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Drainage Improvements for Various Roads, 2020

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY REPORT

Town of Innisfil

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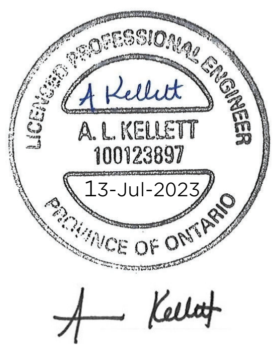	
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Issue	Date	Description
1	October 7, 2020	30% Design Submission
2	August 11, 2021	60% Design Submission
3	February 4, 2022	100% Environmental Assessment Report
4	June 16, 2022	Final Environmental Assessment Report
5	December 9, 2022	Final Environmental Assessment Report with 2022 Updates
6	July 13, 2023	Final Environmental Assessment Report with 2023 Cultural Heritage Updates

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by the Town of Innisfil (Town) to develop remedial drainage improvement alternatives for various road areas in the Town. This report addresses the study area comprised of the following locations identified by the Town:

- Buchanan Street from 9th Line to Hartley Road/Crystal Beach Road;
- Tall Tree Lane from 9th Line to Crystal Beach Road;
- Crystal Beach Road from Roberts Road to Goodfellow Avenue;
- Goodfellow Avenue from 9th Line to dead end of Goodfellow Avenue;
- Reid Street; and
- Bonsecour Crescent.

The study area is traversed by Leonard's Creek which has a large upstream drainage area including the Alcona North, Pratt D'Amico, Alonzi, Crossroads, and Skivereen subdivisions. The study area is fully within the Lake Simcoe Region Conservation Authority (LSRCA) Regulated Area.

Drainage issues have been observed on Buchanan Street with seasonal flooding occurring at the watercourse crossing and the south end of Buchanan Street at the intersection with Crystal Beach Road. The Town has also identified the need for repairs to the storm outlet at the end of Tall Tree Lane (2347 Crystal Beach Road) and replacement of the three culverts at the end of Roberts Road.

1.1 MUNICIPAL CLASS EA PROCESS

This document has been prepared to satisfy the Municipal Class EA requirements for Schedule 'B' projects, allowing this project to proceed directly to Phase 5 of the EA process and detailed design by way of a Notice of Study completion.

This Municipal Class EA Study Report documents, Phases 1 and 2 of the Class EA process (provided overleaf) as follows:

Phase 1: Identify the problem.

Phase 2: Identify and assess at a strategic level, alternative solutions to the identified problem, then recommend the preferred alternatives that can be implemented.

The Municipal Class EA Study Report will be finalized upon the conclusion of Phases 1 and 2 of the Class EA process and made available for public comment prior to being approved and adopted by the Town.

1.2 OBJECTIVES

The purpose of this report is to identify potential drainage improvements that can be implemented in the study area to alleviate frequent flooding issues.

1.3 DESIGN CRITERIA AND BACKGROUND INFORMATION

This report has been prepared recognizing the pertinent Municipal and Provincial guidelines on municipal design, water resources, and the environment, as well as other relevant background reports including the following:

- C.C. Tatham & Associates Ltd., Alcona North Secondary Plan Draft Master Drainage Plan, 2011.
- C.C. Tatham & Associates Ltd., Innisfil Comprehensive Stormwater Management Master Plan (CSWMMP), 2016.
- Credit Valley Conservation (CVC) and Toronto & Region Conservation Authority (TRCA), Low Impact Development Stormwater Management Planning and Design Guide, 2010;
- LSRCA, Technical Guidelines for Stormwater Management Submissions, September 1, 2016;
- The Lathem Group Inc., Stormwater Management Report Taylorwood Subdivision, July 1995;
- Ministry of Environment [now Ministry of the Environment, Conservation and Parks (MECP)] Stormwater Management Practices Planning and Design Manual, 2003;
- Ministry of the Environment and Climate Change [now MECP], Lake Simcoe Protection Plan (LSPP), 2009;
- Town of Innisfil, Engineering Design Standards and Specification Manual, 2021.

A topographic survey of the study area was completed in June 2020 to confirm existing drainage patterns and details with respect to drainage infrastructure. Detailed contour mapping from South Central Ontario Orthophotography (SCOOP) GIS data was used to supplement the collected topographic survey data to confirm existing drainage patterns.

2 Existing Conditions

The study area is crossed by Leonard's Creek which conveys drainage from the Leonard's Beach Wetland and the Alcona North, Pratt D'Amico, Alonzi, Crossroads, and Skivereen subdivisions to Lake Simcoe. The above-mentioned subdivisions drain to the south tributary of Leonard's Creek. A Study Area Drainage Plan (Drawing SDP-1) illustrating the existing drainage conditions in the study area has been prepared and is included in Appendix A for reference.

Leonard's Creek transects the study area on private property from west to east, crossing under Buchanan Street and Tall Tree Lane until it is straightened into a roadside channel along Goodfellow Avenue and flows southwest under Crystal Beach Road and into Lake Simcoe. The portion of Leonard's Creek through the study area is considered a cold-water creek.

This area is a flood damage centre, with a significant number of properties located within the Regional floodplain. This condition is the result of historic development of residential properties within the floodplain.

2.1 HYDROLOGY REVIEW

This drainage system was previously modelled by R.J. Burnside and Associates (RJBA) using the single event SWMHYMO Hydrologic Model Version 3.1/10.1.97 as part of the Alcona North Secondary Plan Draft Master Drainage Plan project in 2011. The model was updated using Visual OTTHYMO (VO) to reflect the current drainage conditions. Per the Town of Innisfil Engineering Design Standards and Specifications Manual, the 4-hour Chicago (CHI), 12-hr SCS Type II, (SCS12) and 24-hour SCS Type II (SCS24) storm distributions and Regional storm (Hurricane Hazel) under AMCIII conditions were modelled. Results for the 12-hr SCS storm are not presented as the resultant peak flows are less than those produced by the 24-hr SCS storm.

The study area is generally contained within the area defined as Catchment 18 in the Alcona North Secondary Draft Master Drainage plan. Through further examination of the study area, we have refined the Catchment 18 drainage area and delineated drainage areas to three major outlets as shown on Drawing SDP-1, as follows:

- Catchment 1800 (19.49 ha), which drains to Leonard's Creek watercourse (Outlet #1);
- Catchment 1801 (6.46 ha) that drains north to the 9th Line ditch, where flow travels east until meeting the Goodfellow Avenue ditch, where it travels south to the Leonard's Creek crossing under Goodfellow Avenue (Outlet #1);
- Catchment 1802 (0.89 ha), which consists of additional drainage area to Catchment 18 that drains to Leonard's Creek (Outlet #1);

- Catchment 1803 (0.64 ha) which consists of additional drainage area to Catchment 18 including properties on Taylorwoods Boulevard that drain to Leonard's Creek (Outlet #1);
- Catchment 5004 (2.91 ha), consisting of Freemont Court and Chappell Court drainage area which drains to Leonard's Creek (Outlet #1);
- Catchment 1901 (1.06 ha), consisting of the Tall Tree Lane and Crystal Beach Road drainage area that is conveyed to the Tall Tree Lane outlet (Outlet #2);
- Catchment 1902 (1.30 ha), consisting of Buchanan Street and Hartley Road drainage area that drains to the 600 mm dia. culvert under the Buchanan Street and Crystal Beach Road intersection to the ditch on the west side of Crystal Beach Road (Outlet #3);
- Catchment 5002 (2.85 ha), consisting of the area that drains to the west Crystal Beach Road ditch, where flow is conveyed southward to the culverts at the south end of Crystal Beach Road (Outlet #3);
- Catchment 5003 (14.99 ha), consisting of the area that drains to the Taylorwood SWM pond, and is conveyed to culverts at the south end of Crystal Beach Road (Outlet #3);
- Catchment 5001 (2.94 ha), consisting of the area that drains to the north ditch on Roberts Road, where flow is conveyed east to the culverts at the south end of Crystal Beach Road (Outlet #3); and
- Catchments upstream of the study area (approximately 516 ha) consist of developed lands north of Innisfil Beach Road, undeveloped lands north of Innisfil Beach Road, and undeveloped lands north of 9th Line all of which drain to Leonard's Creek (Outlet #1).

As noted above, there are three major outlets for the study area. Outlet #1 is located at the Leonard's Creek outlet to Lake Simcoe. Outlet #2 is located at the intersection between Tall Tree Lane and Crystal Beach Road, which discharges to Lake Simcoe via storm sewer through the Town-owned parcel from Crystal Beach Road to Lake Simcoe. Outlet #3 is located at the south end of Crystal Beach Road, where culverts discharge through Innisfil Beach Park to Lake Simcoe.

The 4-hour CHI and 24-hour SCS peak flows through the study area are summarized in Table 1 below and detailed VO output is included in Appendix A.

Table 1: Existing Condition Study Area Peak Flows

DESIGN STORM FREQUENCY	PEAK FLOW (m^3/s)					
	OUTLET #1		OUTLET #2		OUTLET #3	
	4HR CHI	24HR SCS	4HR CHI	24HR SCS	4HR CHI	24HR SCS
2-year	2.34	3.94	0.01	0.03	0.27	0.33
5-year	4.58	7.79	0.03	0.06	0.39	0.85
10-year	6.44	10.79	0.04	0.09	0.59	1.41
25-year	8.96	14.84	0.06	0.12	0.93	2.59
50-year	10.89	18.19	0.07	0.15	1.20	3.18
100-year	13.04	20.99	0.09	0.17	1.85	3.69
Hurricane Hazel (Regional)	46.05		0.14		2.68	

2.2 HYDRAULIC REVIEW

The R.J. Burnside HEC-RAS model developed for the Alcona North Draft Secondary Master Plan was used as a starting point for the hydraulic review of the study area. The base HEC-RAS model consists of the Leonard's Creek river reach.

It was determined through desktop review and comparison to the topographic survey obtained in July 2020 the R.J. Burnside HEC-RAS models river alignment required updates. The creek geometry was therefore adjusted based on the detailed topographic survey data obtained to better reflect the existing creek geometry. The cross-section locations that have been used in the revised Tatham model are generally in similar locations to the R.J. Burnside HEC-RAS model, however the numbering has been updated with the change in river alignment and therefore is not consistent with the R.J. Burnside model. A HEC-RAS Cross Section Location Plan (Drawing XS-1) illustrating the location of the cross sections used in the Tatham model is included in Appendix B for reference.

The following peak flows summarized in Table 2 have been defined based on the updated hydrology modelling discussed above.

Table 2: Peak Flow Summary

RETURN PERIOD	SECTION 2855 (m^3/s)	SECTION 2158 25TH SDRD (m^3/s)	SECTION 1529 BUCHANAN ST (m^3/s)	SECTION 1078 GOODFELLOW AVE (m^3/s)
2-year	2.65	3.81	3.90	3.93
5-year	5.20	7.54	7.71	7.78
10-year	7.26	10.43	10.67	10.77
25-year	10.05	14.33	14.66	14.83
50-year	12.41	17.56	17.97	18.18
100-year	14.50	20.25	20.73	20.97
Regional	29.24	43.86	45.37	45.96

The 2-year to 100-year flow profiles use the seasonal high-water surface elevation of Lake Simcoe, 219.15 m, as the downstream boundary condition. The historical high-water surface elevation of Lake Simcoe, 219.50 m is used for the Regional flow profile.

At the Town's request, the hydraulic model was updated to define spill flows from Leonard's Creek. The cross sections in the hydraulic model were established between 9th Line, Hartley Road, Crystal Beach Road and Goodfellow Avenue. Lateral weirs were incorporated into the hydraulic modelling along the centreline of 9th Line, Hartley Road/Crystal Beach Road and Goodfellow Avenue to estimate the flow leaving Leonard's Creek across these road locations under each design storm condition. Spill flows are summarized in the table below.

Table 3: Summary of Spill Flow Leaving Leonard's Creek

RETURN PERIOD	LATERAL WEIR 1529.2 HARTLEY RD /CRYSTAL BEACH RD (m^3/s)	LATERAL WEIR 1429 9TH LINE (m^3/s)	LATERAL WEIR 1176 GOODFELLOW AVE (m^3/s)
2-year	N/A	0.14	N/A
5-year	0.89	0.72	N/A
10-year	1.49	1.35	N/A
25-year	2.23	2.68	N/A

RETURN PERIOD	LATERAL WEIR 1529.2 HARTLEY RD /CRYSTAL BEACH RD (m^3/s)	LATERAL WEIR 1429 9TH LINE (m^3/s)	LATERAL WEIR 1176 GOODFELLOW AVE (m^3/s)
50-year	3.64	3.84	N/A
100-year	4.94	4.92	N/A
Regional	13.73	14.28	13.27

The results of the spill flow analysis indicate that peak flows cannot be contained within the watercourse banks under each design storm condition, with the exception of the spill to Goodfellow Ave, which only occurs under the Regional storm event.

The updated HEC-RAS model has been used to evaluate the capacity of each watercourse crossing through the study area. A summary of the results is provided in Table 4 below, while detailed modelling is provided in Appendix B.

Table 4: Summary of Culvert Crossing Capacity

CROSSING	5-YEAR		25-YEAR		REGIONAL	
	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)
Buchanan Street	0.26	0.37	0.16	0.43	0.18	0.68
Tall Tree Lane	1.65	0.25	0.23	0.29	0.18	0.47
Goodfellow Ave/ Crystal Beach Road	0.17	0.22	0.18	0.29	0.14	0.18

The Town of Innisfil Engineering and Design Standards (2021) note that for storm return frequencies of 5-year, 25-year and Regional storms, the maximum allowable flooding depths are 0 m, 0.05 m and 0.15 m for local roads. As shown, the capacities of the existing crossings do not meet these criteria.

We note the model results are generally governed by the boundary condition at the downstream end, as shown under the 25-year and Regional conditions for the Buchanan Street and Tall Tree Lane crossings, and the Regional condition for the Goodfellow Avenue/Crystal Beach Road crossing, where culvert capacity is not increasing with increasing head and peak flow rates.

2.3 EXISTING DRAINAGE AREAS REQUIRING POTENTIAL IMPROVEMENTS

Based on our initial review of the background information, the existing conditions hydrologic and hydraulic analysis, and discussions with the Town, the following drainage areas requiring potential improvement have been identified.

2.3.1 Crystal Beach Road Culvert Crossing

The Town has identified the need to replace the three existing culverts located under Crystal Beach Road just north of the intersection with Roberts Road, which convey drainage from the Crystal Beach Road ditch to Lake Simcoe (Outlet #3). The existing culverts are in a deteriorated condition and have insufficient capacity based on hydraulic analysis conducted using HY-8 software. Under existing conditions and with a tailwater elevation of 219.15 m representing the Lake Simcoe seasonal high-water level, the culverts can convey a flow of 0.92 m^3/s before the road is overtopped, which is sufficient to convey the 5-year design storm peak flow. Under the 100-year design storm, flow overtops Crystal Beach Road and Roberts Road at a depth of 0.13 m and spills southeast towards the Innisfil Beach Park and Lake Simcoe. The water surface elevation upstream of the existing culverts under the 100-year design storm is 219.79 m. Detailed HY-8 output is provided in Appendix C for reference. We note the lowest surveyed property line elevation in the area of the culvert crossing is 219.35 m, indicating water will spill onto private property well before overtopping the road. However, the proposed culvert replacement with a larger opening area is anticipated to decrease headwater elevations upstream of the culvert and hence reduce the flood levels and extents on the adjacent private property compared to existing conditions.

The Outlet #3 culverts were also analyzed with a tailwater elevation of 218.85 m representing the Lake Simcoe average March water level. This analysis shows the expected performance of the outlet during a major runoff event early in the spring season. Under these conditions the culverts can convey a flow of 1.14 m^3/s before the road is overtopped, which is sufficient to convey the 5-year design storm peak flow. Under the 100-year design storm, flow overtops the road at a depth of 0.13 m, similar to what occurs under the Lake Simcoe seasonal high-water level tailwater condition. Detailed HY-8 output is provided in Appendix C for reference.

2.3.2 Tall Tree Lane Drainage Outlet

The Town has identified the drainage outlet at the end of Tall Tree Lane (2347 Crystal Beach Road) is in need of repair and additional erosion protection at the lake. The outlet consists of the following:

- Two 300 mm diameter smooth HDPE pipes which convey flows from the roadside ditches along Tall Tree Lane to a ditch inlet catch basin located along the east side of Crystal Beach Road directly in front of 2347 Crystal Beach Road;
- A 600 mm x 1200 mm ditch inlet catch basin with two – 300 mm diameter pipes which convey flow to a ditch inlet catch basin to the east; and

- A 600 mm x 1200 mm ditch inlet catch basin with two – 300 mm diameter pipes which convey flow to the outlet at Lake Simcoe.

A topographic survey and field investigation of the Tall Tree Lane drainage outlet was conducted, and the resulting information analysed to assess the performance of the outlet. Analysis of the outlet was conducted using PCSWMM. It was determined the outlet, in its existing condition with a tailwater elevation of 219.15 representing the Lake Simcoe seasonal high-water level, can convey flows up to and including the 50-year 24-hr SCS design storm flow of 0.15 m^3/s without surcharging the ditch inlet catch basins. Under the 100-year 24-hr SCS design storm flow of 0.17 m^3/s, water will surcharge the system and discharge from the ditch inlet catch basin at a rate of 0.001 m^3/s. Detailed PCSWMM output is provided in Appendix C for reference.

2.3.3 Flooding of Buchanan Street

The Town has stated it is necessary to close Buchanan Street periodically each year as the overland flow from rainfall and/or spring melt events overtops the road. The Town has indicated that 2370 and 2364 Buchanan Street as well as 2374, 2370, and 2366 Tall Tree Lane and two vacant lots fronting on Tall Tree Lane, all of which are in close proximity to Leonard's Creek, are regularly affected by flooding. Leonard's Creek has a large upstream drainage area (524.50 ha), resulting in high peak flows that typically extend beyond the creek channel banks through the study area. The noted increase in flooding at Buchanan Street may be a result of increased development upstream, resulting in high peak flows for longer durations. Increased flooding could also be attributed to sediment accumulation in Leonard's Creek. This sediment accumulation may be the result of watercourse erosion caused by geomorphic changes resulting from upstream urbanization or a lack of sediment and erosion controls during the construction of upstream developments.

The Town has also stated that in 2017, a second area of flooding concern was identified. This area affects 2344 and 2338 Buchanan Street, 678 Hartley Road, 2334 and 2340 Crystal Beach Road, and 2348 Tall Tree Lane. Based on the topographic survey information and field investigation conducted by Tatham, the flooding of this area appears to be caused by blockage of the 600 mm diameter CSP culvert crossing Hartley Road at Crystal Beach Road.

Tatham notes the study area is low-lying, relative to Lake Simcoe, and also flat, which contributes to the flooding events observed in recent years.

2.3.4 Study Area Ditch Condition Summary

The Town has also noted ditch capacity issues through the study area. The following table provides a summary of the condition and capacity of the existing roadside ditches for the roads within the study area. HY-8 culvert calculations for limiting driveway culverts and Manning's calculations for the ditches at the limiting location for each section described in the table are provided in Appendix C for reference.

Table 5: Study Area Ditch Condition Summary

ROADSIDE DITCH	STATIONS	CONDITION SUMMARY
Crystal Beach Road West Roadside Ditch	1+040 to 1+420	Ditch has well defined trapezoidal cross section, drains to south. Ditch inverts below Lake Simcoe seasonal high-water level (219.15 m). No effective conveyance capacity, as ditch section is at reverse grade and subject to backwater effects from Lake Simcoe.
	1+440 to 1+500	Ditch has well defined triangular cross section, drains to south. Ditch capacity of 0.04 m^3/s. Culvert capacity of 0.06 m^3/s
	1+500 to 1+560	Ditch has well defined triangular cross section, drains north to Outlet #2. Ditch capacity of 0.17 m^3/s. Driveway culvert capacity of 0.20 m^3/s.
	1+580 to 1+670	Ditch not well defined, drains to southwest. No effective conveyance capacity.
	1+670 to 1+810	Ditch has defined triangular cross section, drains to east. Reverse grade sections and blocked culverts results in no effective conveyance capacity.
Buchanan Street West Roadside Ditch	2+020 to 2+085	Ditch has defined triangular cross section, drains to the south. Ditch capacity of 0.02 m^3/s. Driveway culvert capacity of 0.08 m^3/s
	2+085 to 2+190	Ditch has defined triangular cross section, drains to south and across Buchanan via 450 mm diameter culvert. Sections with reverse grade results in no effective conveyance capacity.
	2+190 to 2+250	Ditch has poorly defined triangular cross section, drains to the north. Ditch capacity of 0.02 m^3/s. Driveway culvert capacity of 0.03 m^3/s.
	2+260 to 2+340	Ditch has shallow triangular cross section, drains to north. Capacity of 0.01 m^3/s. Driveway culvert capacity of 0.03 m^3/s.
Buchanan Street East Roadside Ditch	2+020 to 2+160	Ditch has shallow triangular cross section, drains to south. Ditch capacity of 0.02 m^3/s. Driveway culvert capacity of 0.06 m^3/s.
	2+160 to 2+250	Ditch is poorly defined, drains to north. No effective conveyance capacity.
	2+250 to 2+285	Ditch is poorly defined, drains to south. No effective conveyance capacity.
	2+285 to 2+340	Ditch is poorly defined, drains to north. No effective conveyance capacity.
Tall Tree Lane West Roadside Ditch	3+020 to 3+105	Ditch has well defined trapezoidal cross section, drains south to Outlet #2. Ditch capacity of 0.07 m^3/s. Driveway culvert capacity of 0.04 m^3/s.
	3+105 to 3+180	Ditch is poorly defined, drains to north. No effective conveyance capacity.

ROADSIDE DITCH	STATIONS	CONDITION SUMMARY
	3+180 to 3+220	Ditch is poorly defined, drains to south. No effective conveyance capacity.
	3+220 to 3+250	Ditch is poorly defined, drains to north. No effective conveyance capacity.
Tall Tree Lane East Roadside Ditch	3+040 to 3+150	Ditch has well defined triangular cross section from 3+085 to 3+040, drains south to Outlet #2. No capacity upstream of 3+085. Capacity of 0.04 m^3/s downstream of 3+085.
	3+150 to 3+180	Ditch has defined triangular cross section, drains to north. Ditch capacity of 0.30 m^3/s. Driveway culvert capacity of 0.07 m^3/s.
	3+180 to 3+235	Ditch has defined triangular cross section, drains to south. Ditch capacity of 0.08 m^3/s. Driveway culvert capacity of 0.00 m^3/s due to reverse grades.
	3+235 to 3+250	Ditch has shallow triangular cross section, drains to north. No effective conveyance capacity due to culvert blockage.
Goodfellow Avenue	4+020 to 4+150	Ditch has well defined trapezoidal cross section (conveys Leonard's Creek), drains to southeast. Ditch inverts below Lake Simcoe seasonal high-water level (219.15 m). Capacity limited by lack of slope and backwater conditions at the culvert crossing under Crystal Beach Road.
Bonsecour Crescent		There are no existing roadside ditches along Bonsecour Crescent.

The overall flat topography of the area and inconsistent grading to the outlets severely limits the capacity of most of the ditches. Due to their close vicinity to Leonard's Creek, most ditches in the study area are inundated with water spilling from Leonard's Creek during peak flow events, further limiting their capacity to convey flows. Overall, the ditches do not have capacity to provide a significant reduction to peak flows in Leonard's Creek under existing conditions.

To analyze the ditch capacity requirements for local drainage in the study area, a Rational Method calculation was performed for each section of ditch described in Table 5 and the resultant peak flows compared to the existing ditch and limiting culvert capacities. This analysis assumes there is no spill from Leonard's Creek and the full ditch capacity is available. The results of this analysis are summarized in Table 6 and detailed Rational Method calculations are included in Appendix C. Drawing DDP-1 illustrating the existing ditch drainage areas is enclosed for reference.

Table 6: Study Area Existing Ditch Capacity Summary

ROADSIDE DITCH	STATIONS	DITCH CATCHMENT ID	LIMITING DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	EXCEEDANCE FREQUENCY (years)
Crystal Beach Road West Roadside Ditch	1+040 to 1+420	5002+1902	0.00	-	<2
	1+440 to 1+500	102	0.04	0.06	> 100
	1+500 to 1+560	103	0.17	0.20	> 100
	1+580 to 1+670	104	0.00	-	< 2
	1+670 to 1+810	105	0.00	-	< 2
Buchanan Street West Roadside Ditch	2+020 to 2+085	201	0.02	0.08	10
	2+085 to 2+190	204	0.00	-	< 2
	2+190 to 2+250	202	0.02	-	< 2
	2+260 to 2+340	203	0.01	0.03	< 2
Buchanan Street East Roadside Ditch	2+020 to 2+160	204	0.02	0.06	< 2
	2+160 to 2+250	205	0.00	-	< 2
	2+250 to 2+285	206	0.00	-	< 2
	2+285 to 2+340	207	0.00	-	< 2
Tall Tree Lane West Roadside Ditch	3+020 to 3+105	301	0.07	0.04	25
	3+105 to 3+180	302	0.00	-	< 2
	3+180 to 3+220	303	0.00	-	< 2

ROADSIDE DITCH	STATIONS	DITCH CATCHMENT ID	LIMITING DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	EXCEEDANCE FREQUENCY (years)
	3+220 to 3+250	304	0.00	-	< 2
Tall Tree Lane East Roadside Ditch	3+040 to 3+150	305	0.00	-	< 2
	3+150 to 3+180	306	0.30	0.07	> 100
	3+180 to 3+235	307	0.08	0.00	< 2
	3+235 to 3+250	308	0.00	-	< 2

A detailed analysis of the existing Crystal Beach Road roadside ditch from STA. 1+040 to STA. 1+420 was also conducted using HY-8 culvert analysis software. The existing conditions are described in detail as part of the development of Alternatives #2 and #4 in Section 3 of this report. Detailed HY-8 output is included in Appendix C for reference. This section of ditch has a large drainage area and is influenced by the performance of the culverts crossing Crystal Beach Road which outlet to Lake Simcoe at Outlet #3. The Goodfellow Avenue ditch was not included in the Rational Method analysis as it conveys Leonard's Creek.

2.3.5 Icing of Ditches and Culverts

The Town has identified icing of ditches and culverts as a major contributor to flooding in the study area. Flooding is regularly observed during mid-winter melt events and the spring thaw while ice is still present in Leonard's Creek and the study area ditches. Heavy rainfall conditions have also contributed to flooding events observed during mid-winter melt events and the spring thaw.

2.3.6 Resident Survey Responses

At the initiation of the study, the Town advertised an online survey for residents in the study area via local newspaper and mailed letters. Some additional responses from residents were received via email and have also been considered. The responses from property owners are summarized in Table 7, while full responses are provided in Appendix C.

Table 7: Summary of Resident Survey Responses

PROPERTY ADDRESS	PROPERTY OWNER COMMENTS ON FREQUENCY OF FLOODING INCIDENTS
2338 Buchanan Street	The road floods several times a year, depending on the weather, typically in the spring and during the winter thaw (January) and whenever there is adverse weather with thunderstorms, etc.
2344 Buchanan Street	Winter and spring every year since 1999 and occasionally other rainy times.
2319 Crystal Beach Road	Through all seasons, including winter melt, we have our driveway flooded and it can take up to 24 hours for the 2-3 inches of water to dissipate. Number of incidents - well, every time it rains (regular through heavy) or winter melt. Fall 2019, winter, spring, summer 2020.
2369 Goodfellow Avenue	Any time of year after heavy rains or winter/spring snow melts
2234 Crystal Beach Road	Every year there is water on the property in early spring and summer. The property is usually quite wet every year especially by the ditch. Cannot remember the years that it was exceptionally high, but it does happen.
2362 Bonsecour Crescent	Too numerous to count.
Plan 768, Lot 35	None.
2365 Goodfellow Avenue	Annually - winter and spring, a couple of major summer storms never had flooding until 8 to 10 years ago some flooding caused by - neighbouring resident regrading and adding fill - soil erosion and the raising of Goodfellow Avenue past my property (6 - 7 inches).
2338 Goodfellow Avenue	None.
2235 Crystal Beach Road	Every spring our driveway is flooded.
2362 Bonsecour Crescent	Every early spring and after a heavy rainfall. Most recently in the last 3-4 years.
2383 Goodfellow Avenue	Many over the years but the spring is the worst, particularly if there has been a lot of snow.
2371 Crystal Beach Road	Only twice. Summer 1967 and summer 1980?
2370 Crystal Beach Road	Once. 11-March-2021. Water covered the entire property. 8" in garage; luckily no basement, but water in crawl space.
2395 Crystal Beach Road	Many years ago the ditch ran straight down 9th Line and into the lake where the new parkette is now. A very small diversion was built there

PROPERTY ADDRESS	PROPERTY OWNER COMMENTS ON FREQUENCY OF FLOODING INCIDENTS
	when the parkette was created, but nothing for the main amount of water which still overflows the "new" culvert under the road beside my house each spring. This culvert is too small to handle all that water and proceeds to take away much of my garden each year, mostly on the lake side of my house.
688 Reid Street	They are experiencing more flooding since the Town paved their street with no attention to swales. The water now runs onto several lots which recently caused a birch tree on her lot to lose root support and it started to topple. InnPower had to come in and cut it down.
2340 Crystal Beach Road	Winter Jan/Feb 2017, Winter Jan/Feb 2018, Winter Jan/Feb 2019. Water flows from Buchanan St culverts flowing South and then across our yard from the back of yard on Buchanan to Crystal Beach Rd. In 2018, the water flowed in the pattern above and then also traveling from Crystal Beach Rd and Hartley towards Tall tree lane northwardly.

Tatham has reviewed and considered each survey response with respect to the observed flooding in the study area.

2.4 CULTURAL HERITAGE RESOURCES

A Stage 1 background study of the Study Area was conducted to provide information about the Study Area's geography, history, previous archaeological field work and current land condition to evaluate and document in detail the Study Area's archaeological potential and to recommend appropriate strategies for Stage 2 survey. A Stage 2 property assessment was conducted to document all archaeological resources in the Study Area, to determine whether the Study Area contains archaeological resources requiring further assessment, and to recommend next steps. The characteristics of the Study Area dictated that the Stage 2 survey be conducted by a test pit survey strategy.

The Study Area is located on the ancestral territory of the Wendat (Huron) First Nations, originally known as "Wendake". However, by the mid-17th century, the Wendat were pushed out by the Haudenosaunee, who were later dispersed and displaced by colonial settlement. When the Township of Innisfil was surveyed in 1820, the Study Area became part of Lots 26 and 27, Concession 8, in the former Township of Innisfil, County of Simcoe. The first settlers came by water through the Holland River and Lake Simcoe, settling in the Big Bay Point area. Although a route between York (Toronto) and Barrie was established by 1825, the development of the Township was gradual in the 1830s and 1840s. It was not until the 1850s, when the Ontario, Simcoe and Huron Railway (later the Northern Railway) started a rail service between Toronto and Collingwood the Township experienced more significant growth.

Many hamlets were established along the railway line in the second half of the 19th century. In proximity to the Study Area were Craigvale, Bramley, Lefroy and Belle Ewart. Located a few concessions south of the Study Area on the shoreline of Lake Simcoe, Belle Ewart was laid out in 1850 and became one of the busiest distribution ports in the north, centred on Lake Simcoe.

The Study Area remained undeveloped until the 1920s, when William and Susan (Warnica) Goodfellow purchased the lake front property extending from present-day Innisfil Beach Park to the 9th Line. The 1920s Cummins Rural Directory of Innisfil shows Susan Goodfellow as the owner of Lot 27, Concession 8 in the location of present-day Bon Secours Beach. William and Susan Goodfellow's purchase of the lakefront stemmed from a belief that the Radial Railway, which ran from Newmarket to Jacksons Point would come up the west side of Lake Simcoe, thereby bringing those wishing to construct summer cottages. Following their purchase, the Goodfellows began to clear the shoreline and construct nearby roads (e.g., Innisfil Beach Road).

An interview with Ward Goodfellow reveals in the early 1920s, the lakeshore was characterized by wild rice, swamp, aspen and willows. To clear the shoreline and develop the beach, they had to plow the cedar stumps out with a horse drawn plow. Other secondary sources describe how wagonloads of sand and other fill were brought across the shallow bay from the 9th Line (an overgrown trail at the time) to build up the shoreline. In 1928, the Goodfellows hired Barrie surveyor, Mr. Ardagh, to survey the property into lots, the first of which was sold in 1928.

The Radial Railway was never constructed but the Goodfellow family's purchase of the shoreline and their development of the beaches and nearby roads led to the area's establishment and success as a summer cottage destination. William and Susan constructed their summer home, "Sandy Nook" here as well as many others (Figure3). The Goodfellows also constructed the canal (still visible) adjacent to Crystal Beach Road in the 1930s to divert Leonard's Creek southward (Figure 4), in the process using the fill to build up the new Crystal Beach roadbed.

Ultimately the completion of the Toronto to Barrie Highway (later Highway400) from York to Barrie in 1952 led to the transformation of the cottage community to a full-time residential community.

Today, the area continues to be characterized by its early to mid-20th century cottage landscape, including narrow road widths with little to no verge and roadside drainage ditches, resulting in a semi-rural character and intimate scale. Many of the original cottages have been replaced with modern post-1980s two-storey homes, and the remaining original cottages (1930s to 1950s single-storey frame buildings) have been heavily modified to accommodate full-season occupation.

3 Problem/Opportunity Statement

The study area experiences flooding during the spring and after heavy rainfalls. While historical flooding due to development of the Leonard's Creek floodplain has been documented in the study area, Town staff have noted seasonal flooding problems have worsened in recent years.

The study area requires solutions to improve drainage conditions, to address resident concerns, road closures due to flooding and high maintenance demands on the Town.

4 Drainage Improvement Alternatives

The most direct way to restore floodplain capacity would be for the Town to acquire property along the creek corridor or create a diversion with an alternate outlet to Lake Simcoe, which would require property acquisition or the conversion of the 9th Line Park to a drainage outlet. Through discussion with the Town, it was determined both options are beyond the Town's financial means due to increasing property values of shoreline property within the municipality. As these options are not feasible in the short term, the alternatives presented in this study focus on other opportunities to reduce flood risk, while allowing the Town to look for opportunities to acquire property in the creek corridor or to facilitate a diversion in the future.

The following drainage improvement alternatives have been considered and are shown conceptually on the attached Drainage Improvement Plans (DI-1 to DI-7). Unless noted otherwise, the analysis of all drainage features which outlet to Lake Simcoe assume a tailwater elevation of 219.15 m to represent the seasonal high-water level in the lake.

4.1 ALTERNATIVE #1 – DO NOTHING

The "Do Nothing" option allows for the consideration of not implementing any changes to the existing drainage system infrastructure within the study area. This option is considered to provide a benchmark to gauge the implications of each proposed drainage improvement.

4.2 ALTERNATIVE #2 – REPLACEMENT OF CULVERTS AT SOUTH END OF CRYSTAL BEACH ROAD

Alternative #2 would involve the detailed design, removal, and replacement of the existing 400 mm diameter culvert and two existing 600 mm diameter culverts which cross Crystal Beach Road near Roberts Road and outlet to Lake Simcoe (Outlet #3) as well as regrading and lowering approximately 50 m of Crystal Beach Road to create a defined sag for flows overtopping the road. The existing culverts are in a deteriorated condition and have been identified by the Town as in need of replacement.

The existing culvert crossing was analyzed using HY-8 software to determine the existing hydraulic capacity. It was determined the three existing culverts crossing Crystal Beach Road can convey a total flow of 0.92 m^3/s before overtopping the road, which is sufficient to convey the 5-year 24-hour SCS design storm, assuming no blockages to the culverts. Under the 100-year design storm, flow overtops Crystal Beach Road and Roberts Road at a depth of 0.13 m and spills southeast towards the Roberts Road ditch and Lake Simcoe. The water surface elevation upstream of the existing culverts under the 100-year design storm is 219.79 m.

To improve the performance of the culvert crossing, it is recommended the existing culverts be replaced with a culvert configuration with greater conveyance capacity. For evaluation purposes, two 1390 mm x 970 mm pipe arch culverts embedded 0.30 m with natural substrate. The improved pipe arch culvert configuration will convey 1.25 m^3/s before overtopping the road, which is sufficient to convey the 5-year 24-hour SCS design storm peak flow. The culverts were modelled as 1390 mm diameter circular culverts embedded 720 mm to provide an equivalent flow area. Detailed HY-8 output is included in Appendix D. The proposed road sag has been designed to convey the 100-year 24-hour SCS design storm peak flow at a maximum depth of 0.15 m per Town standards and will limit the water surface elevation to 219.50 m upstream of the proposed culverts. However, the proposed crossing will overtop the road at a depth of 0.10 m under the 25-year 24-hour SCS design storm which does not meet the Town standard of a maximum depth of flow of 0.05 m. Although this standard is not met, the safe access requirements for maximum flow depth, velocity and depth velocity product are all achieved under the 100-year 24-hour SCS design storm peak flow.

Per comments from the Town Operations Staff, replacing the existing culverts with a concrete box culvert was also investigated. It was determined a 3000 mm x 900 mm box culvert would achieve the Town standards by providing 0.05 m and 0.11 m of flow depth over the road under the peak flows from the 25-year and 100-year 24-hour SCS design storms respectively. Detailed HY-8 output is included in Appendix D for reference. The additional cost of installing the concrete box culvert and the required distribution slab instead of the proposed pipe arch culverts is estimated to be approximately $150,000.00. Although the concrete box culvert will provide improved performance compared to the proposed pipe arches, the additional cost is significant. Since the proposed pipe arch culverts will meet the Town standards for depth of flow and safe access under the 100-year 24-hour SCS design storm peak flow, it is not recommended to install a concrete box culvert.

Additional analysis of the proposed culvert crossing was conducted with a tailwater elevation of 218.85, representing the Lake Simcoe average March water level. Under this tailwater condition, the proposed 1390 mm x 970 mm pipe arch culverts will convey flows up to 1.85 m^3/s before the road is overtopped, which is sufficient to convey the 10-year 24-hour SCS design storm peak flow. The 25-year and 100-year 24-hour SCS design storm peak flows will overtop the road at depths of 0.07 m and 0.12 m respectively. The 3000 mm x 900 mm box culvert was also analyzed under this tailwater condition, and it will convey flows up to 2.45 m^3/s before the road is overtopped, which is sufficient to convey the 10-year 24-hour SCS design storm peak flow. The 25-year and 100-year 24-hour SCS design storm peak flows will overtop the road at depths of 0.02 m and 0.09 m respectively.

In addition to the culvert replacement and road alterations, it is also recommended to construct an in-water sediment barrier to protect the culverts' outlet at Lake Simcoe. The intent of the sediment barrier would be to prevent sediment accumulation from the wave action of Lake Simcoe, to maximize the conveyance of the proposed culverts and reduce maintenance cleanout requirements over time. The installation of a sediment barrier structure and culvert replacement would require permits from LSRCA, the Ministry of Norther Development, Mining, Natural Resources and Forestry (MNDMNRF) and the Department of Fisheries and Oceans (DFO). No tree removals will be required to implement this alternative. The Municipal Class Environmental Assessment (EA) document indicates a Schedule B Class EA will be required as part of the design works if Alternative #2 includes the construction of a sediment barrier for outlet protection. If the sediment barrier is not constructed, this alternative would be considered a Schedule A+ Class EA activity.

4.3 ALTERNATIVE #3 – IMPROVEMENTS TO TALL TREE LANE OUTLET

Alternative #3 would involve the detailed design and construction of improvements to the outlet to Lake Simcoe at the south end of Tall Tree Lane (Outlet #2) and additional erosion protection at the outfall. This outlet is located on the Town-owned property 2347 Crystal Beach Road, which consists of a grass-covered lane over two 300 mm diameter pipes that convey flow from a ditch inlet catch basin on Crystal Beach Road to Lake Simcoe. Numerous residents in the area have deeded access to Lake Simcoe through this property.

Under low-flow conditions Outlet #2 drains Catchment 1901 having an area of approximately 1.06 ha, but during the 2-year design storm and any higher intensity storm events, Outlet #2 receives overflow from Leonard's Creek. Outlet #2's capacity is limited compared to the peak flows defined in the hydrologic and hydraulic analyses completed for Leonard's Creek. There is minimal opportunity to improve the capacity of this outlet due to the constrained nature of the property, as it has limited width and there is a lack of cover over the existing 300 mm diameter outlet pipes.

Outlet #2 was analyzed using PCSWMM to determine its existing performance levels. Analysis of the outlet concluded it can convey the Catchment 1901 5-year peak flow of 0.06 m^3/s without overtopping the roadway or surcharging the DICBs, meeting the Town requirements for minor storm system conveyance.

To improve the performance of this outlet, armour stone walls were considered along the north and south property lines of the outlet to contain any flow that may surcharge from the system during less frequent design storms. The proposed walls were calculated to add 0.24 m^3/s of overland flow capacity through the outlet which is sufficient to convey the flow that surcharges the ditch inlet catch basin at a rate of 0.001 m^3/s under the 100-year 24-hr SCS design storm flow from Catchment 1901. A detailed Manning's equation flow calculation is included in Appendix E for reference.

An in-water sediment barrier has also been proposed to provide outlet protection for the existing 300 mm diameter pipe outlets into Lake Simcoe. The purpose of a sediment barrier at this location is to prevent sediment accumulation from the wave action of Lake Simcoe at the pipe outlets. This alternative would require permits from LSRCA, The Ministry of Northern Development, Mining, Natural Resources and Forestry (MNDMNRF) and the Department of Fisheries and Oceans (DFO). No tree removals will be required to implement this alternative. The Municipal Class EA document indicates a Schedule B Class EA will be required as part of the design process if Alternative #3 includes the construction of a sediment barrier for outlet protection. The work would be considered a Schedule B activity as "construction of spillway facilities at existing outfalls for erosion or sedimentation control".

4.4 ALTERNATIVE #4 – DITCH IMPROVEMENTS

4.4.1 Crystal Beach Road

Improvements to the culvert crossing located at the south end of Crystal Beach Road (Alternative #2) will have a positive effect on the performance of the Crystal Beach Road roadside ditch. Under existing conditions, the limited capacity of the outlet and driveway culvert crossings causes a backwater effect. The tailwater resulting from each culvert crossing reduces the capacity of next upstream driveway culvert along Crystal Beach Road. The resulting water surface elevation upstream of the 2314 Crystal Beach Road driveway is 219.94 m under the 5-year design storm when considering the tailwater impacts. All driveways from 2314 Crystal Beach Road to the outlet are overtopped during the 5-year design storm. Detailed HY-8 output for the existing conditions analysis is included in Appendix C. Drawing DDP-3 shows the Crystal Beach Road roadside ditch from Roberts Road to Buchanan Street and the prorated flows used for the analysis of the ditch.

Replacing the Crystal Beach Road crossing culverts with 2 – 1390 mm x 970 mm pipe arch culverts (Alternative #2) would reduce water levels in the Crystal Beach Road roadside ditch for approximately 75 m to the north of the crossing, however the water surface elevation upstream of the 2314 Crystal Beach Road driveway will remain at 219.94 under the 5-year 24-hour SCS design storm and most driveways are still overtopped.

The effect of installing a second 600 mm diameter culvert at each driveway crossing was assessed to determine if significant improvement would be observed. The analysis was conducted assuming Alternative #2 had been implemented. Results from the analysis indicate improvement in the overall conveyance along the entire length of the ditch from Roberts Road to Buchanan Street. Water levels at the upstream end of the ditch (2314 Crystal Beach Road) are lowered from 219.94 under existing conditions to 219.77 under the 5-year 24-hour SCS design storm. The proposed driveway culvert twinning would also improve the performance of the 600 mm diameter culvert crossing from Buchanan Street at Crystal Beach Road, thereby improving the flooding condition observed at the south end of Buchanan Street. Detailed HY-8 output for the proposed conditions analysis is included in Appendix F.

The proposed improvements were also analyzed with a tailwater elevation of 218.85 m representing the Lake Simcoe average March water level. Under this tailwater condition, implementation of Alternative #2 alone would reduce water levels in the Crystal Beach Road roadside ditch for approximately 140 m to the north of the crossing. However, the water surface elevation upstream of the 2314 Crystal Beach Road driveway will remain at 219.94 m under the 5-year design storm and most driveways are still overtopped. Implementation of Alternative #2 along with installing a second 600 mm diameter culvert at each driveway crossing will reduce water levels for the entire length of the ditch from Roberts Road to Buchanan Street. Water levels at the upstream end of the ditch (2314 Crystal Beach Road) are lowered from 219.94 m under existing conditions to 219.61 m under the 5-year 24-hour SCS design storm.

The creation of a ditch on the east side of Crystal Beach Road from Innisfil Beach Park to 2297 Crystal Beach Road (approximately 270 m) was also investigated. Due to the low elevation of the properties east of Crystal Beach Road relative to the Lake Simcoe seasonal high-water level (219.15 m), it is not possible to create a ditch which satisfies Town standards for driveway culverts without setting ditch inverts below the Lake Simcoe seasonal high-water level. At the downstream end of this ditch, there will only be 0.11 m of depth from the ditch top of bank at property line to the high-water level. Therefore, the ditch will only have a capacity of 0.07 m^3/s above the high-water level before spilling onto private property. The cost of creating this ditch and installing the many driveway culverts required has been estimated at approximately $405,000.00. As there would be little benefit and a large associated cost, it is not recommended to construct a ditch on the east side of Crystal Beach Road.

It is also recommended the Town create a maintenance program for regular cleanout of the roadside ditch on Crystal Beach Road from Roberts Road to Buchanan Street. As this section of ditch is ponded for much of the year, sediment accumulation will occur relatively quickly resulting in the need for frequent ditch cleanouts to maintain sufficient capacity.

Minor regrading is suggested for the west roadside ditch along Crystal Beach Road from STA. 1+670 to Tall Tree Lane. These works would create a defined ditch and eliminate the obstruction of the driveway culvert at 2366 Crystal Beach Road.

The Town requested Tatham investigate a resident complaint of ponding at the driveway of 2385 Crystal Beach Road and suggest a possible solution. To alleviate this ponding the potential for constructing a roadside ditch from 2385 Crystal Beach Road to Leonard's Creek was explored. To construct this ditch driveway culverts would need to be installed at 2385 Crystal Beach Road and the two residences downstream. It is noted ponding water is expected in the ditch when the Lake Simcoe water level is at its seasonal high.

4.4.2 Buchanan Street

The potential for improving the capacity of the existing roadside ditches on Buchanan Street was explored. We note the Buchanan Street ROW is constrained by its narrow road allowance for the roadside ditches on each side, as well as the proximity to existing fences along the east roadside ditch. We have proposed cleanout and ditch grading improvements to maximize the available ditch conveyance.

4.4.3 Tall Tree Lane

Based on the existing conditions, there is an opportunity to regrade sections of the roadside ditch along Tall Tree Lane. The sections identified for regrading are the west roadside ditch from STA. 3+140 to Leonard's Creek, and from STA. 3+215 to Leonard's Creek, and the east roadside ditch from STA 3+070 to STA. 3+145, from Leonard's Creek to STA 3+195, and from STA 3+230 to STA 3+250. Regrading these sections of the ditch will provide a more defined ditch cross section with better conveyance capacity.

4.4.4 Goodfellow Avenue & Bonsecour Crescent

No improvements are recommended to the existing Goodfellow Avenue roadside ditch west of Crystal Beach Road, due to the space constraints in the right of way and the significant tailwater effect from the Lake. It is recommended the ditch be cleaned of sediment and included as part of the recommended maintenance program for the roadside ditch along Crystal Beach Road.

To improve drainage conditions along Goodfellow Avenue east of Crystal Beach Road, it is recommended to create minor roadside swales and install small driveway culverts from STA. 4+170 to STA. 4+330 and to install a twin 100 mm diameter culvert crossing. It is also recommended to acquire a drainage easement to provide an outlet for the proposed roadside swales. 2333 Goodfellow Avenue is being considered as a potential option for this drainage easement, as there are no existing structures on the property. However, the final drainage easement location and width will be determined at the detailed design stage.

To improve drainage conditions at Bonsecour Crescent it is recommended to regrade and realign a portion of the road, to create a minor roadside swale along the north side of Bonsecour Crescent and to install two twin 100 mm diameter culvert crossings to provide an outlet to Lake Simcoe.

Due to the low elevations in the area of Goodfellow Avenue and Bonsecour Crescent, a robust drainage solution, with proper conveyance of minor and major storm flows in the right of way, is not possible for this area. The recommended improvements are a "best efforts" approach to reduce nuisance ponding in the area and alleviate the issues noted in the resident survey responses. As such, small diameter culverts are specified in an attempt to maintain minimum cover requirements while also keeping proposed ditch inverts above the Lake Simcoe seasonal high-water level of 219.15 m. As the recommended improvements primarily consist of shallow swales and small diameter culverts, regular maintenance of these features will be important to prevent sediment buildup and clogging.

4.4.5 Ditch Improvements Summary

The effects of the proposed ditch improvements on the capacity of the roadside ditches in the study area are summarized in Table 8 below and detailed capacity calculations are included in Appendix F. The Rational Method calculations completed for the existing ditch drainage areas were updated where proposed drainage areas differ. The calculated capacities and exceedance frequencies are based on these Rational Method calculations and do not account for flow spilling from Leonard's Creek. Drawing DDP-2 illustrates the proposed ditch drainage areas and is enclosed for reference.

Table 8: Study Area Ditch Improvements Capacity Summary

ROADSIDE DITCH	STATIONS	DITCH CATCHMENT ID	EXISTING DITCH CAPACITY (m^3/s)	PROPOSED DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	PROPOSED EXCEEDANCE FREQUENCY (years)
Crystal Beach Road West Roadside Ditch	1+440 to 1+500	102	0.04	0.04	0.06	> 100
	1+500 to 1+560	103	0.17	0.17	0.20	> 100
	1+580 to 1+670	104	0.00	0.06	0.01	< 2
	1+670 to 1+810	105	0.00	0.17	0.04	< 2
Buchanan Street West Roadside Ditch	2+020 to 2+085	201	0.02	0.03	0.08	50
	2+085 to 2+120	2042P	0.00	0.04	0.11	> 100
	2+120 to 2+250	202P	0.00	0.08	0.06	50
	2+250 to 2+310	2031P	0.01	0.06	0.04	> 100
	2+310 to 2+340	2032P	0.01	0.02	0.04	50
Buchanan Street East Roadside Ditch	2+020 to 2+160	204	0.02	0.08	0.06	25
	2+160 to 2+250	205	0.00	0.07	0.04	25
	2+250 to 2+285	206	0.00	0.10	N/A	> 100
	2+285 to 2+340	207	0.00	0.01	N/A	2
Tall Tree Lane	3+020 to 3+105	301	0.07	0.07	0.04	25

ROADSIDE DITCH	STATIONS	DITCH CATCHMENT ID	EXISTING DITCH CAPACITY (m^3/s)	PROPOSED DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	PROPOSED EXCEEDANCE FREQUENCY (years)
West Roadside Ditch	3+105 to 3+180	302	0.00	0.02	0.02	5
	3+180 to 3+220	303	0.00	0.28	0.11	> 100
	3+220 to 3+250	304	0.00	0.00	N/A	< 2
Tall Tree Lane East Roadside Ditch	3+040 to 3+120	305	0.00	0.05	0.09	50
	3+120 to 3+180	306	0.30	0.09	0.07	> 100
	3+180 to 3+235	307	0.08	0.09	0.05	> 100
	3+235 to 3+250	308	0.00	0.28	0.15	> 100

All of the recommended ditch improvements under Alternative #4 will require a permit from the LSRCA, as they are located within LSRCA's Regulated area. Some vegetation clearing and tree removals will be required to implement this alternative. The works involved in this alternative would be categorized as a Schedule A+ Class EA activity and do not require additional study. Understanding the broad scope presented in Alternative #4, it is recommended the proposed works be implemented in part, or on a staged basis to lessen the financial impact of the alternative.

4.5 ALTERNATIVE #5 – REPLACEMENT OF CULVERT CROSSING HARTLEY ROAD AT CRYSTAL BEACH ROAD

The Town has identified an area of flooding at the south end of Buchanan Street near the intersection with Hartley Road and Crystal Beach Road. Based on the topographic survey and available SCOOP GIS data, there is an area of approximately 1.30 ha that drains to the south end of Buchanan Street and contributes to the flooding. Topographic survey and field investigation of the study area determined the 600 mm diameter CSP culvert crossing Buchanan Street at Crystal Beach Road to be in deteriorated condition. It is recommended the culvert be replaced and the ditch immediately upstream and downstream of the culvert be regraded to improve drainage.

This alternative would require a permit from the LSRCA. No tree removals will be required to implement this alternative. The works involved in this alternative would not require a Class EA.

It is recommended Alternative #5 be implemented in conjunction with full implementation of Alternatives #2 and #4 (i.e. replacement of culvert crossing Crystal Beach Road and twinning of driveway culverts along Crystal Beach Road). The downstream conditions in the Crystal Beach Road roadside ditch south of Buchanan Street and Hartley Road are a limiting factor of the culvert crossing Hartley Road. High tailwater in this section of the ditch results in water upstream of the 600 mm CSP culvert crossing Hartley Road ponding above the crown of the road at the south end of Buchanan Street. To alleviate this ponding, the conveyance of the Crystal Beach Road roadside ditch south of Buchanan Street must be improved. Due to the downstream constraints, there is little benefit to upsizing the culvert crossing at Hartley Road without first implementing improvements downstream. Detailed HY-8 output is included in Appendix G analyzing the culvert crossing under existing conditions, implementation of Alternative #5 only (no implementation of Alternatives #2 and #4) and implementation of Alternative #5 in conjunction with Alternatives #2 and #4.

4.6 ALTERNATIVE #6 – UPGRADE LEONARD'S CREEK CULVERT CROSSINGS

To alleviate the frequent flooding of Buchanan Street, Tatham has explored upgrading the culvert crossings at Goodfellow Avenue/Crystal Beach Road, Tall Tree Lane and Buchanan Street. A HEC-RAS analysis was performed to determine the expected improvements and implications of upgrading these culverts. Detailed HEC-RAS output is included in Appendix H for reference.

A twinned culvert configuration was considered for each of the Leonard's Creek crossings in the study area, apart from the Buchanan Street crossing where a third culvert was evaluated. To reduce the backwater effects observed in the existing condition, each proposed culvert upgrade was reviewed as part of its own scenario from downstream to upstream, starting with the upgrade at Goodfellow Avenue crossing.

We note due to the low, flat topography of the study area and high peak flows estimated at each crossing, there are some inconsistencies between the proposed scenarios, and warning errors were observed at the crossings under some of the design storms. A summary of the observed HEC-RAS errors is provided in Appendix H. Although the developed model is producing warnings at some locations, it provides a general estimate of the flood conditions in the study area. We note significant additional modelling effort is required in order to produce results with more certainty.

4.6.1 Scenario #1

The HEC-RAS results for Scenario #1, involving twinning the 2100 mm diameter culvert crossing Goodfellow Avenue alone are summarized in the following table.

Table 9: Culvert Capacities with Goodfellow Ave / Crystal Beach Rd Crossing Upgrade (Scenario #1)

CROSSING	5-YEAR STORM		25-YEAR STORM		REGIONAL STORM	
	CAPACITY (M^3/S)	PONDING DEPTH (M)	CAPACITY (M^3/S)	PONDING DEPTH (M)	CAPACITY (M^3/S)	PONDING DEPTH (M)
Buchanan St	0.14	0.37	0.12	0.43	0.18	0.68
Tall Tree Lane	1.69	0.25	0.14	0.28	0.18	0.47
Goodfellow Ave/ Crystal Beach Rd	0.33	0.22	0.46	0.29	0.27	0.18

As shown, twinning the culvert crossing at Goodfellow Avenue in Scenario #1 marginally helps to reduce backwater effects at the upstream crossings during minor storm events. While results indicate that the culvert capacity of the Goodfellow Avenue crossing is improved under Scenario #1, the flooding depths at Goodfellow Avenue are unchanged and do not satisfy the Town's Engineering and Design Standards (2020).

4.6.2 Scenario #2

The HEC-RAS results for Scenario #2, where twinning both the 1100 mm x 1800 mm corrugated pipe arch culvert under Tall Tree Lane and the 2100 mm diameter culvert under Goodfellow Avenue/Crystal Beach Road have been proposed, are summarized in the following table.

Table 10: Culvert Capacities with Tall Tree Lane & Goodfellow Ave Crossing Upgrades (Scenario #2)

CROSSING	5-YEAR STORM		25-YEAR STORM		REGIONAL STORM	
	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)
Buchanan St	0.24	0.36	0.30	0.44	0.18	0.68
Tall Tree Lane	2.93	0.24	0.50	0.29	0.47	0.46
Goodfellow Ave/ Crystal Beach Rd	0.46	0.23	0.58	0.29	0.33	0.18

As shown, twinning the Tall Tree Lane crossing, in combination with twinning the Goodfellow Avenue crossing in Scenario #2 improves the culvert capacity at the Tall Tree Lane crossing by 1.30 m^3/s under the 5-year storm condition. We note backwater conditions, while improved, still exist at Tall Tree Lane under the 25-year and Regional storm conditions. There is no observable benefit to installing an additional 1100 mm x 1800 mm corrugated steel pipe arch culvert under Tall

Tree Lane, as flow depths over the road are not decreased more than 1 cm from the existing condition.

4.6.3 Scenario #3

The HEC-RAS results for Scenario #3, which consists of all culvert crossings being upgraded through the study area, including twinning the 2100 mm diameter Goodfellow Avenue/Crystal Beach Road and 1100 mm x 1800 mm corrugated steel pipe arch Tall Tree Lane crossings, as well as adding a third 900 mm diameter culvert to the crossing on Buchanan Street, are summarized in the following table.

Table 11: Culvert Capacities with All Proposed Crossing Upgrades (Scenario #3)

CROSSING	5-YEAR STORM		25-YEAR STORM		REGIONAL STORM	
	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)	CAPACITY (m^3/s)	PONDING DEPTH (m)
Buchanan St	0.28	0.36	0.32	0.44	0.26	0.68
Tall Tree Lane	2.94	0.24	0.46	0.29	0.61	0.46
Goodfellow Ave/ Crystal Beach Rd	0.46	0.23	8.51	0.30	0.46	0.18

Per the results shown, there are minimal capacity improvements resulting from the additional culvert proposed at Buchanan Street in Scenario #3. This is due to the particularly low elevation of Buchanan Street, with a minimum road deck elevation of 219.83 m to the north of the crossing, which minimizes the hydraulic head on the crossing to 0.03 m. Backwater effects also continue to be observed at the Buchanan Street crossing in the Regional Storm condition under Scenario #3.

4.6.4 Comparison of Culvert Upgrade Scenarios

The water surface elevations through the study area have been reviewed to ensure any proposed culvert crossing upgrades on Leonard's Creek will not negatively impact water surface elevations on private property. We note the approach of reviewing culvert upgrades from downstream to upstream has been undertaken to ensure new ponding areas are not developed as a result of increased flow to undersized downstream infrastructure. A summary of the water surface elevation results under existing conditions and each of the proposed improvement scenarios is provided in Table 12.

As shown in Table 12, there are anticipated decreases in water surface elevations across the study area under each of the culvert upgrade scenarios. To quantify the difference in water surface elevations between each of the proposed culvert upgrade scenarios and the existing condition,

Table 13 compares the percent differences between existing and proposed conditions flood depths, based on the results from the HEC-RAS model. This quantifies the relative flooding impacts of each scenario through the study area. This comparison demonstrates that water depths are not reduced more than 2% (2 cm) as a result of any of the proposed scenarios, and there are anticipated water depth increases at Cross Section 1065 during the 5-year and 25-year storms.

As the study area and particularly the private properties between Goodfellow Avenue/Crystal Beach Road and the Lake Simcoe Shoreline are already subject to frequent flood conditions, we do not recommend implementing culvert upgrades on Leonard's Creek. The anticipated capital cost of constructing this project is high, and it results in minimal benefit (less than 2% decrease in anticipated water depths) for the surrounding study area. While conveyance may improve for minor storms, the Town's Engineering and Design Standards (2020) criteria for overland flow depths at each crossing can not satisfied by any of the culvert upgrade scenarios.

If any of the culvert upgrade scenarios described in Alternative #5 were to be implemented, permitting from LSRCA, MNDMNRF and DFO would be required. All of the culvert upgrade scenarios under Alternative #5 fall under the Schedule A/A+ Class EA process. While no trees would require removal, dewatering at the Goodfellow Avenue crossing will be challenging, as the existing culvert essentially outlets to Lake Simcoe at this location. Also, the Town does not own the easement channel downstream of the Goodfellow Avenue crossing and this property would need to be purchased or an easement obtained from the property owner at 2366 Goodfellow Avenue.

Table 12: Water Surface Elevation Summary

CROSS SECTION	5-YEAR WATER SURFACE ELEVATION (m)				25-YEAR WATER SURFACE ELEVATION (m)				REGIONAL WATER SURFACE ELEVATION (m)			
	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3
1428	220.19	220.19	220.18	220.18	220.24	220.24	220.25	220.24	220.49	220.49	220.49	220.49
1418	220.20	220.20	220.19	220.19	220.26	220.26	220.27	220.27	220.51	220.51	220.51	220.51
1410 Buchanan Street Crossing												
1407	220.19	220.20	220.18	220.18	220.26	220.26	220.26	220.26	220.51	220.51	220.51	220.51
1404	220.19	220.19	220.18	220.18	220.25	220.25	220.25	220.25	220.47	220.47	220.47	220.47
1386	220.18	220.18	220.16	220.16	220.21	220.21	220.21	220.21	220.38	220.38	220.38	220.38
1377	220.17	220.18	220.16	220.16	220.21	220.21	220.21	220.21	220.39	220.39	220.38	220.38
1369	220.17	220.18	220.16	220.16	220.21	220.20	220.21	220.21	220.39	220.39	220.38	220.38
1359	220.17	220.18	220.16	220.16	220.20	220.20	220.20	220.20	220.38	220.38	220.38	220.38
1347	220.17	220.17	220.16	220.16	220.21	220.20	220.21	220.21	220.39	220.39	220.38	220.38
1335 Tall Tree Lane Crossing												
1329	220.03	220.03	220.05	220.05	220.20	220.20	220.20	220.20	220.39	220.39	220.38	220.38
1321	220.01	220.01	220.03	220.03	220.18	220.18	220.18	220.18	220.34	220.34	220.34	220.34
1308	219.95	219.95	219.96	219.96	220.06	220.06	220.06	220.06	220.35	220.35	220.34	220.34
1290	219.91	219.90	219.92	219.92	220.00	220.00	220.00	220.00	220.11	220.11	220.11	220.11

CROSS SECTION	5-YEAR WATER SURFACE ELEVATION (m)				25-YEAR WATER SURFACE ELEVATION (m)				REGIONAL WATER SURFACE ELEVATION (m)			
	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3	EX. SCENARIO	SCENARIO #1	SCENARIO #2	SCENARIO #3
1255	219.88	219.88	219.89	219.89	219.97	219.97	219.97	219.98	220.06	220.06	220.07	220.06
1225	219.87	219.87	219.88	219.88	219.96	219.96	219.96	219.96	220.04	220.04	220.04	220.04
1204	219.86	219.86	219.87	219.87	219.95	219.95	219.95	219.95	220.01	220.01	220.02	220.01
1162	219.85	219.85	219.86	219.86	219.92	219.93	219.92	219.93	219.86	219.86	219.87	219.86
1144	219.83	219.83	219.84	219.84	219.91	219.91	219.91	219.92	219.80	219.80	219.82	219.80
1105	219.82	219.82	219.83	219.83	219.89	219.89	219.89	219.90	219.78	219.78	219.78	219.78
1080	219.82	219.82	219.83	219.83	219.89	219.89	219.89	219.90	219.78	219.78	219.78	219.78
1070 Goodfellow Avenue/Crystal Beach Road Crossing												
1067	219.75	219.75	219.76	219.76	219.89	219.89	219.89	219.89	219.72	219.72	219.78	219.78
1062	219.70	219.69	219.72	219.72	219.88	219.88	219.88	219.88	219.62	219.62	219.64	219.63
1034	219.58	219.58	219.60	219.60	219.80	219.80	219.79	219.80	219.55	219.55	219.56	219.56
1013	219.30	219.30	219.33	219.33	219.50	219.50	219.50	219.50	219.50	219.50	219.50	219.50

Table 13: Percent Difference in Channel Depth from Existing Condition

CROSS SECTION	5-YEAR			25-YEAR			REGIONAL		
	SCENARIO #1	SCENARIO #2	SCENARIO #3	SCENARIO #1	SCENARIO #2	SCENARIO #3	SCENARIO #1	SCENARIO #2	SCENARIO #3
1428	0.00%	1.52%	1.52%	0.00%	-1.41%	0.00%	0.00%	0.00%	0.00%
1418	0.00%	0.92%	0.92%	0.00%	-0.87%	-0.87%	0.00%	0.00%	0.00%
1410 Buchanan Street Crossing									
1407	-1.14%	1.14%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1404	0.00%	1.27%	1.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1386	0.00%	1.96%	1.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1377	-1.05%	1.05%	1.05%	0.00%	0.00%	0.00%	0.00%	0.85%	0.85%
1369	-0.96%	0.96%	0.96%	0.93%	0.00%	0.00%	0.00%	0.79%	0.79%
1359	-0.96%	0.96%	0.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1347	0.00%	0.76%	0.76%	0.74%	0.00%	0.00%	0.00%	0.65%	0.65%
1335 Tall Tree Lane Crossing									
1329	0.00%	-1.90%	-1.90%	0.00%	0.00%	0.00%	0.00%	0.71%	0.71%
1321	0.00%	-2.06%	-2.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1308	0.00%	-1.04%	-1.04%	0.00%	0.00%	0.00%	0.00%	0.74%	0.74%
1290	1.10%	-1.10%	-1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1255	0.00%	-1.37%	-1.37%	0.00%	0.00%	-1.22%	0.00%	-1.10%	0.00%

CROSS SECTION	5-YEAR			25-YEAR			REGIONAL		
	SCENARIO #1	SCENARIO #2	SCENARIO #3	SCENARIO #1	SCENARIO #2	SCENARIO #3	SCENARIO #1	SCENARIO #2	SCENARIO #3
1225	0.00%	-0.88%	-0.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1204	0.00%	-0.98%	-0.98%	0.00%	0.00%	0.00%	0.00%	-0.85%	0.00%
1162	0.00%	-0.84%	-0.84%	-0.79%	0.00%	-0.79%	0.00%	-0.83%	0.00%
1144	0.00%	-0.88%	-0.88%	0.00%	0.00%	-0.82%	0.00%	-1.80%	0.00%
1105	0.00%	-0.76%	-0.76%	0.00%	0.00%	-0.72%	0.00%	0.00%	0.00%
1080	0.00%	-0.70%	-0.70%	0.00%	0.00%	-0.67%	0.00%	0.00%	0.00%
1070 Goodfellow Avenue/Crystal Beach Road Crossing									
1067	0.00%	-0.78%	-0.78%	0.00%	0.00%	0.00%	0.00%	-4.80%	-4.80%
1062	0.83%	-1.65%	-1.65%	0.00%	0.00%	0.00%	0.00%	-1.77%	-0.88%
1034	0.00%	-1.83%	-1.83%	0.00%	0.76%	0.00%	0.00%	-0.94%	-0.94%
1013	0.00%	-3.70%	-3.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

4.7 ALTERNATIVE #7 – UPSTREAM WETLAND CREATION SCREENING

We have completed a screening of known Town-owned parcels where wetland creation could be completed to reduce peak flows observed downstream. As part of this screening exercise, the following Town parks and Town-owned properties have been reviewed:

- Huron Court Park, 1260 Huron Court;
- Andrade Park, 1095 Lebanon Drive;
- Warrington Park, 2300 Warrington Way;
- 2384 Goodfellow Avenue;
- 2298 Crystal Beach Road; and
- 2324 Jack Crescent.

The park properties are located upstream of the study area. Both 2384 Goodfellow Avenue and 2298 Crystal Beach Road are Town-owned properties located within the study area. The Town identified the 2324 Jack Crescent property as additional upstream Town-owned property to review. A key plan of each property is provided in Appendix I for reference.

Our screening process is intended as a 'first look' to determine whether wetland expansion would be appropriate on each property parcel. Table 14 summarizes the screening criteria that was used to screen each property parcel.

Table 14: Wetland Reconstruction Screening Criteria

CRITERION	DESCRIPTION	CRITERION RESPONSE	SCORE
Available Area	Property area where wetland expansion is feasible (generally avoiding existing infrastructure including playgrounds, trails and SWM facilities)	<0.2 ha >=0.2 ha	-1 1
Impact to Existing Property Amenities	If yes, proposed available area would impact existing sports field If no, available area not anticipated to impact existing infrastructure	Yes No	0 1
Environmentally Sensitive Area (ESA) Present	If yes, MNDMNRF unevaluated or evaluated wetland, or Leonard's Creek present on property If no, no ESA are within property area	Yes No	0 1
Tree Removal Required	If yes, tree removals required If no, tree removal not required	Yes No	0 1

CRITERION	DESCRIPTION	CRITERION RESPONSE	SCORE
Diversion Possible	If yes, the available area can feasibly receive drainage diversion from Leonard's Creek to facilitate wetland expansion If no, there is no connection between available area and Leonard's Creek	Yes No	1 0

We note for LSRCA to support the implementation of a wetland facility, their current guidelines do not allow for online improvements. Therefore, a diversion would be required for Leonard's Creek flows to be directed to an offline wetland facility. While it isn't impossible, it may be a challenging grading exercise on some of the identified properties requiring field confirmation following the receipt of input from the Town.

Table 15 overleaf summarizes the screening scores for each of the identified properties and provides additional notes on feasibility of wetland reconstruction.

As shown in Table 15, Andrade Park, 2384 Goodfellow Avenue, and 2324 Jack Crescent were scored with three points during the screening evaluation. Further evaluation of these wetland creation options is presented in the following sections.

4.7.1 Required Storage Volumes for Meaningful Reduction in Peak Flows at Outlet #1

As an effort to determine the scale of storage volumes and land allocation that would be required to provide a small, but meaningful reduction in peak flow, an additional VO model scenario was created to determine the storage volume required to provide a 10% peak flow reduction at Outlet #1. The storage required was modelled using a simplified approach with a RouteReservoir node downstream of Outlet #1. Detailed modelling output is included in Appendix I for reference.

To reduce the 100-year 24-hour SCS design storm peak flow by 10% (from 20.99 m^3/s to 18.98 m^3/s), an active storage volume of approximately 38,000 m^3 is required. In a wetland facility with a typical active storage depth of 2.5 m, an approximate wetland surface area of 1.52 ha would be required, which in turn would require a dedicated block area of approximately 2.28 ha to facilitate grading and meet Town Standards with respect to maintenance access paths, etc.

At the present time, no Town-owned areas where a SWM facility of this size could be accommodated have been identified.

4.7.2 Andrade Park

The property at 1095 Lebanon Drive has an area of approximately 0.85 ha with 0.40 ha of baseball diamond that could be repurposed for use as a wetland/LID facility. Constructing a wetland/LID facility on this property would require a diversion from the Leonard's Creek tributary that transects

2226 Adullam Avenue. The diversion would be approximately 75 metres in length and would be difficult to construct without impacting adjacent properties. Andrade Park is located in the headwater area of the watershed, and therefore any proposed wetland facility in this area would provide additional storage or flow control for an upstream area of approximately 140 ha of the total 540 ha in the watershed. The available area of 0.40 ha is insufficient to provide a wetland facility large enough to significantly reduce peak flows in the study area. Construction of a wetland/LID facility at this location is not recommended at this time.

4.7.3 2384 Goodfellow Avenue

The property at 2384 Goodfellow Avenue has an area of approximately 0.25 ha, all of which is heavily vegetated but could be adapted for use as a wetland/LID facility. Leonard's Creek passes directly through this property which appears to be low-lying, and a portion of the property may currently be acting as a wetland. This property is located at the downstream end of Leonard's Creek and the study area, and therefore any wetland or LID facility constructed here would have no benefit to the large portion of the study area upstream of the property. Additionally, the property is too small to accommodate a facility that could significantly reduce peak flow rates. Construction of a wetland/LID facility at this location is not recommended at this time.

4.7.4 2324 Jack Crescent

The property at 2324 Jack Crescent has an area of approximately 9.45 ha of which 0.30 ha is located outside of the mapped wetland in an active SWM block that could be used as a creation for wetland/LID facility creation. The construction of a wetland facility on this property would require a diversion from Leonard's Creek through Leonard's Beach Swamp, which is an MNDMNRF evaluated wetland. Permitting of this diversion through an environmentally sensitive area is anticipated to be challenging. The available space of 0.30 ha would not allow for a sufficiently large wetland facility to be constructed that could meaningfully reduce peak flows in the study area. Construction of a wetland/LID facility at this location is not recommended at this time.

Table 15: Wetland Reconstruction Screening Scores

PROPERTY LOCATION	PROPERTY AREA	AVAILABLE AREA	IMPACT TO EXISTING PROPERTY AMENITIES	ESA PRESENT	TREE REMOVAL REQUIRED	DIVERSION POSSIBLE	SCREENING SCORE	NOTES
Huron Court Park 1260 Huron Court	0.95 ha	0.15 ha	No	No	No	No	2	A diversion from Leonard's Creek to the available space in Huron Court Park is not feasible. However, the available area identified consists of green space and could be converted to a LID facility consisting of an underground chamber storage system that would receive minor flow from the existing storm sewers on Huron Court and or Benson Street.
Andrade Park 1095 Lebanon Drive	0.85 ha	0.40 ha	Yes	No	Yes	Yes	3	A traditional wetland facility could be introduced if a diversion from the Leonard's Creek tributary that transects 2226 Adullam Avenue is confirmed to be feasible. Removal of the existing ball diamond in the park would be required to facilitate the wetland facility construction. Alternatively, a LID facility, such as an underground chamber storage system could be implemented to reduce minor flows and maintain the existing park infrastructure.
Warrington Park 2300 Warrington Way	0.95 ha	0.45 ha	Yes	Yes	Yes	Yes	2	A traditional wetland facility could be introduced if a diversion from the Leonard's Creek tributary that transects 2324 Jack Crescent is confirmed to be feasible. This diversion would be through Leonard's Swamp, which is an MNDMNRF evaluated wetland. Removal of the existing ball diamond in the park would be required to facilitate the wetland facility construction. Alternatively, a LID facility, such as an underground chamber storage system could be implemented to reduce minor flows and maintain the existing park infrastructure. Permitting of a diversion through an environmentally sensitive area such as Leonard's Swamp could be challenging.
2384 Goodfellow Avenue	0.25 ha	0.25 ha	No	Yes	Yes	Yes	3	The property area is not large enough to allow for a traditional wetland facility that would significantly improve the peak flows at this location. However, an approach involving offline wetland storage cells could be accommodated to improve conditions under minor storms. Significant tree removal would be required to facilitate this approach.
2298 Crystal Beach Road	0.12 ha	0.12 ha	No	No	Yes	No	1	The property area is not large enough or close enough to Leonard's Creek to facilitate a traditional wetland facility. A diversion from the ditch on Crystal Beach Road to a ponding area could be implemented but may not be well received by neighbouring residents.
2324 Jack Crescent	9.45 ha	0.30 ha	No	Yes	Yes	Yes	3	0.30 ha is available between the residential lots fronting onto Jack Crescent, the SWM pond block, and the Leonard's Swamp. This area may be suitable for the implementation of a traditional wetland facility if a diversion from Leonard's Creek is confirmed to be feasible. This diversion would be through Leonard's Swamp, which is an MNDMNRF evaluated wetland. Permitting of a diversion through an environmentally sensitive area such as Leonard's Swamp could be challenging.

4.8 ALTERNATIVE #8 – IMPLEMENT RECOMMENDATIONS FROM ALCONA NORTH SECONDARY PLAN

Alternative #8 involves the implementation of the Preferred Drainage/SWM plan established in the Alcona North Secondary Plan Draft Master Drainage Plan (MDP) prepared by Tatham in 2011. We note although the Secondary Plan was not ultimately adopted by the Town at the time, the recommendations result in a 25% peak flow reduction at the downstream end of system, where the study area is located.

As part of the Alcona North Secondary Plan Draft Master Drainage Plan, options aimed to reduce the flooding issues in the study area were presented and evaluated. The options were established based on SWM control types including surface storage, infiltration, vegetative, soft measures, special purpose and conservation and restoration. The MDP Options are summarized as follows:

- Option 1: Local Drainage Area SWM Facilities (No Over-Control)
  - Local SWM facilities will be provided for each development area across the Secondary Plan lands. These SWM facilities will achieve the minimum water quantity control requirements, resulting in little to no reduction to peak flows in the study area.
- Option 2: Over-Control of Storm Flows in Alcona North Development Areas
  - Similar to Option 1, local SWM facilities will be provided across the Secondary Plan Area. However, the SWM facilities in Option 2 would over-control post-development flows by 10% (Option 2a), 30% (Option 2b), 50% (Option 2c) and 80% (Option 2d) of pre-development levels.
- Option 3: Control of Storm Flows in Alcona North Development Area and Over-Control of External Catchment #1
  - Option 3 has the same characteristic as Option 2; however, it will also provide peak flow control of Catchment 1 (139.80 ha) located immediately north of the Secondary Plan Area. An external SWM facility would be constructed to reduce external Catchment 1 peak flows by 15% (Option 3a), 25% (Option 3b) and 50% (Option 3c) of existing levels.

In addition to the options summarized above, it was recommended infiltration measures be applied wherever soil conditions permit. These measures include at-source measures such as soak away pits and road infiltration trenches and end of pipe SWMF infiltration measures.

It was determined from the hydraulic model created as part of the MDP development, a peak flow reduction of approximately 25% is the optimal target to improve flooding in the study area. The Preferred Drainage/SWM Plan was established with the goal of meeting this 25% reduction.

Recognizing this objective, several combinations of Options 2 and 3 were evaluated in the MDP. It was determined as a minimum, 50% over control of SWM facilities within the Secondary Plan Area along with greater than 15% over control of the external Catchment 1 area is required to meet this goal. Alternatively, 80% over control SWM facilities within the Secondary Plan Area combined with little external area control can also achieve this objective.

We recommend the Town strictly apply the recommendations of this report as criteria for development within the Alcona North Secondary Plan area.

4.9 ALTERNATIVE #9 - DRAINAGE IMPROVEMENTS AT REID STREET

Alternative #9 would involve the detailed design and construction of minor swales, complete with perforated subdrains in stone infiltration trenches in the ROW on both sides of Reid Street.

The resident at 688 Reid Street has identified drainage deficiencies since the recent paving of Reid Street and Hazel's Gate. It is understood the road paving works resulted in removal of a minor roadside ditch, which caused water to pond at the front of the resident's property, leading to the loss of a birch tree due to water damage.

The proposed works presented in Alternative #9 will eliminate nuisance ponding from the front of lots along Reid Street. Alternative #9 also provides an opportunity to implement an LID facility in the form of infiltration trenches. According to the Soil Survey of Simcoe County, the soils in the area of Reid Street are Alliston sand loam, which is classified in the "AB" hydrologic soil group and would be suitable for the introduction of infiltration based SWM practices.

Peto MacCallum Ltd. (PML) completed a hydrogeological investigation in August 2021 to confirm the general soil types, groundwater table elevations and infiltration rates of native soils in the study area. PML completed their field investigation in April 2021. The observed high groundwater elevations prohibit the required separation (1.0 m) between infiltration facilities and the groundwater table. Therefore, Alternative #9 is not recommended.

This proposed work in Alternative #9 would require a permit from LSRCA. No tree removals would be required to implement this alternative. The works involved in this alternative would be classified as a Schedule A Class EA and not require additional study.

4.10 ALTERNATIVE #10 – STORM SEWER DIVERSION FROM CHAPPELL COURT/SANDY TRAIL

Alternative #10 would involve the construction of storm sewer on Sandy Trail from Chappell Court to Happy Vale Drive to redirect drainage from Chappell Court and Freemont Court away from Leonard's Creek. Developments at Chappell Court and Freemont Court comprise an area of approximately 3.1 ha. Storm sewers in Chappell Court and Freemont Court collect drainage for an area of approximately 2.9 ha (Catchment 5004) and discharge to a stormwater management facility north of Chappell Court and ultimately to Leonard's Creek. Redirecting flow from this storm sewer could divert approximately 2.9 ha of drainage area away from Leonard's Creek to the Happy Vale Drive storm sewer.

This alternative would require the construction of approximately 395 m of storm sewer along Chappell Court and Sandy Trail to connect to the existing storm sewer at Happy Vale Drive. The existing Chappell Court storm sewer would need to be removed to accommodate the construction of the proposed storm sewer. Approximately 210 m of storm sewer along Sandy Trail would be decommissioned and the existing catch basin maintenance holes would be connected to the proposed storm sewer.

Analysis of the existing Happy Vale Drive storm sewers determined that the sewers are undersized for the current drainage area, with some sewers providing capacity for less than half of the 1:5-year design flow. Therefore, the existing storm sewer does not have capacity to accept additional flow from Chappell Court and Freemont Court. A detailed storm sewer design sheet is provided in Appendix J for reference.

An additional VO model was created to model the proposed scenario with the Chappell Court/Sandy Trail Subdivision storm sewer redirected to Happy Vale Drive. The peak flows under the 2-year through 10-year design storms at Outlets #1 and #3 for the existing and proposed sewer diversion scenarios are compared in Table 16 below. The proposed sewer diversion scenario VO output is included in Appendix J for reference.

Table 16: Outlets #1 & #3 Peak Flows Comparison – Sewer Diversion Alternative

DESIGN STORM		OUTLET #1		OUTLET #3	
		Existing Scenario (m^3/s)	Diversion Scenario (m^3/s)	Existing Scenario (m^3/s)	Diversion Scenario (m^3/s)
2-year	4hr CHI	2.34	2.33	0.27	0.27
	24hr SCS	3.94	3.92	0.33	0.44
5-year	4hr CHI	4.58	4.56	0.39	0.54
	24hr SCS	7.80	7.77	0.85	1.15
10-year	4hr CHI	6.44	6.41	0.59	0.83
	24hr SCS	10.79	10.76	1.41	2.28

The results from the proposed sewer diversion scenario show that only minor reductions in peak flow rates at Outlet #1 are achieved under the 2-year through 10-year design storms. The average peak flow reduction is 0.3% for the 2-year through 10-year design storms. Meanwhile at Outlet #3, the diversion causes an average peak flow increase of 36% for the 2-year through 10-year design storms.

Due to the peak flow timing in the watershed, the proposed Chappell Court/Sandy Trail storm sewer diversion results in minimal reduction to peak flows at Outlet #1 while significantly increasing peak flows at Outlet #3. Analysis of the Happy Vale Drive storm sewer determined it is under-sized for its current drainage area. Also, the anticipated capital cost of implementing this alternative is approximately $620,000, without considering the upgrades to the Happy Vale Drive storm sewer and Taylorwoods SWM pond would be required. In terms of relative benefits, the average 0.3% peak flow reduction at Outlet #1 does not warrant the high capital cost and resulting peak flow increase to Outlet #3. For these reasons we do not recommend implementing Alternative #9.

If Alternative #9 was implemented, an ECA amendment would be required along with permit approval from LSRCA. No tree removals would be required to implement this alternative. As the proposed works involve a diversion from a watercourse to Town infrastructure, a Schedule C Class EA may be required.

4.11 ALTERNATIVE #11 – RAIN BARREL PROGRAM IN THE STUDY AREA WATERSHED

Alternative #11 would involve the implementation of a targeted rain barrel program for properties in the study area watershed. Residents would be encouraged to install rain barrels to collect rainwater from roof downspouts, thereby reducing runoff at the lot level.

There are three major outlets within the study area as described in Section 2.2 of the Conceptual Drainage Improvements Design Report. Outlet #1 has a total catchment area of approximately 537.38 ha, 149.95 ha of which encompasses approximately 1580 lots. Outlet #2 has a catchment area of approximately 0.95 ha and encompasses seven lots. Outlet #3 has a catchment area of approximately 24.23 ha and encompasses 242 lots.

An additional VO model scenario was created to assess the benefit of implementing rain barrels at properties within the catchments of the study area's three major outlets. The storage provided by the rain barrels was modelled by increasing the initial abstraction and depression storage parameters for the catchments. Detailed calculations showing the equivalent additional surface storage provided by the rain barrels are included in Appendix K for reference. It was determined if 50 percent of lots installed a standard 220L rain barrel, the equivalent additional surface storage for each catchment is approximately 0.08 to 0.12 mm. This amount of additional storage is not expected to significantly reduce peak flows at any of the three major outlets, however it can have an effect on lot level runoff and more frequent, nuisance drainage concerns. To verify this assumption, the peak flows for the 2 through 10-year design storms for the proposed rain barrel scenario and the existing conditions scenario are summarized in Table 17 overleaf and detailed VO output is included in Appendix K for reference.

As expected, the rain barrel scenario peak flows show a minimal decrease from the existing conditions scenario at Outlets #1 and #3. While this Alternative does not result in a significant difference to existing peak flows that are exacerbating the study area, it does produce an incremental benefit in reducing runoff from the drainage area and presents an opportunity for increasing public awareness on stormwater management issues. We recommend the Town continue to promote the existing rain barrel program facilitated by Operations staff.

Table 17: Rain Barrel Scenario Peak Flow Comparison

DESIGN STORM		OUTLET #1		OUTLET #3	
		Existing Scenario (m^3/s)	Rain Barrel Scenario (m^3/s)	Existing Scenario (m^3/s)	Rain Barrel Scenario (m^3/s)
2-year	4hr CHI	2.34	2.32	0.27	0.26
	24hr SCS	3.94	3.92	0.33	0.33
5-year	4hr CHI	4.58	4.56	0.39	0.39
	24hr SCS	7.80	7.77	0.85	0.85
10-year	4hr CHI	6.44	6.42	0.59	0.58
	24hr SCS	10.79	10.77	1.41	1.40

4.12 ALTERNATIVE #12 – DIVERSION THROUGH 9TH LINE PARK

Recent drainage improvements have been made at the 9th Line Park, located at the termination of 9th Line at Lake Simcoe to divert flows from the Leonard Street west roadside ditch to outlet at Lake Simcoe. These improvements included installing twin 525 mm diameter HDPE culverts across the 9th Line, twin 450 mm diameter HDPE culverts crossing Leonard Street and twin 525 mm diameter HDPE culverts crossing the 9th Line extension east of Leonard Street as well as construction of ditches to convey flows to Lake Simcoe.

Alternative #12 would involve the installation of twin 450 mm diameter HDPE culverts crossing Goodfellow Avenue at 9th Line, grading of a ditch from Goodfellow Avenue to Lake Simcoe and upsizing two 200 mm diameter culvert crossings to twin 450 mm diameter HDPE culvert crossings at the pedestrian walkway and hydrant access south of 9th Line. This culvert crossing would divert some flow from Leonard's Creek away from Outlet #1 and the 2100 mm diameter culvert crossing at Goodfellow Avenue/Crystal Beach Road.

Analysis of the proposed twin 450 mm diameter HDPE culverts conducted using HY-8 software determined the proposed culverts will provide approximately 0.40 m^3/s of additional flow capacity before water overtops the road at Goodfellow Avenue. Additional analysis of the proposed culvert crossing was conducted with a tailwater elevation of 218.85 representing the Lake Simcoe average March water level. With this tailwater elevation the proposed culverts will provide approximately 0.45 m^3/s of additional flow capacity before water overtops the road at Goodfellow Avenue.

Detailed HY-8 output and Manning's calculations to size the proposed ditch are included in Appendix L for reference. The HY-8 analysis determined installing these additional culverts will not significantly improve the performance of Outlet #1 and the 2100 mm diameter culvert crossing at Goodfellow Avenue/Crystal Beach Road.

This alternative would require a permit from the LSRCA. No tree removals will be required to implement this alternative. The works involved in this alternative would be categorized as a Schedule A+ Class EA and would not require additional study.

5 Public Consultation

Public consultation was completed in accordance with the Municipal Class EA process outlined in the MEA *Municipal Class Environmental Assessment Document* (October 2000, as amended in 2007, 2011 and 2015). The public consultation undertaken leading up to and including the Virtual Public Engagement for this study is outlined in the following sections.

5.1 NOTICE OF STUDY COMMENCEMENT & VIRTUAL PUBLIC ENGAGEMENT

Due to COVID-19 related restrictions at the time of the study, public consultation was facilitated via Virtual Public Engagement material posted on the Town's website. The Virtual Public Engagement material consisted of a recorded presentation in video format and presentation slides in PDF format presenting prepared maps and drawings displaying drainage deficiencies and preliminary drainage improvements. The Virtual Public Engagement material was available to the public on the Town website from May 26th to June 30th, 2021. All attendees were encouraged to provide input and feedback regarding the study. Comment sheets were provided and attendees were encouraged to identify their preferences regarding the alternative design solutions. The Public Engagement presentation slides are provided in Appendix M for reference.

Prior to the Virtual Public Engagement session, a notification letter was distributed on April 21, 2021, to local residents and stakeholders to notify them about the Virtual Public Engagement session. Notification of the Virtual Public Engagement session was also advertised in the local newspaper and on the Town website.

5.2 RESULTS OF PUBLIC CONSULTATION

The Virtual Public Engagement content was viewed 84 times by members of the public. Fourteen of the viewers downloaded a document, visited multiple pages and or contributed to the survey tool set up on the Drainage Improvements section of the Town's website. During the 36-day period the material was published online, 11 comments were submitted by residents. The comments received have been provided in Appendix M for reference.

5.3 PUBLIC PREFERENCE

We have reviewed the received comments and concerns to provide the following summary of main themes of the comments received.

5.3.1 Upstream Development, Infrastructure Improvements & New Builds

The rate of development of upstream lands was mentioned by several residents. Most understand, with new construction of buildings, paved roads, etc., the impermeability of the land increases, causing more water to flow to the downstream properties. One resident asks the recommendations for stormwater management as a result of development in Alcona North Secondary Plan be approved by Council and implemented, as approving development without implementing proper SWM controls, severely impacts downstream properties and is irresponsible. Many Residents are upset with road improvements that include asphalt lifts as the new roads are impermeable and now create runoff that flood or pool at their driveways. Many reported the roads in front of their houses were higher than their driveways which can cause safety risks in winter months with ice forming. Regarding new construction in the subject area, one resident requested more standards and concern for neighbours when developing in these low-lying areas, as changing the grade of the lot to build a large home with a vast driveway affects drainage for many properties.

5.3.2 Lake Access

For many residents, maintaining safe and easy access to the lake is important for recreational activities like swimming and boating in the summertime and skating in the wintertime. Reconfiguring lake access points to accommodate SWM infrastructure or controls is not ideal if they result in loss of safe and easy access. Furthermore, one comment indicated there is a perception allowing drainage to enter the lake near beach access points affects the quality of the water and leads to water advisories.

5.3.3 9th Line Park

Two comments indicated drainage issues have been observed more frequently following the re-alignment of Leonard's Creek along Goodfellow Avenue and under Crystal Beach Road. Historical mapping was provided, which indicates Leonard's Creek outlet was historically located in the Bonsecour Beach area at the 9th Line Park. Historical mapping and photographs provided have been included in Appendix B.

5.3.4 Natural Heritage

An issue a few residents included in their comments was their concern for wildlife and vegetation. Modifications to the beach access points to accommodate the stormwater drainage could be detrimental to the various species living in those areas. Additionally, the excessive flooding of properties has seen several residents having topsoil wash away and erosion of ground around trees leaving their roots exposed and thus more vulnerable to harmful conditions.

5.3.5 Desire for Permanent Solutions

Residents acknowledged while several options were provided as potential drainage improvements, they are eager to have solutions are long lasting and not temporary fixes as they have been dealing with flooding and drainage issues for several years now. The rain barrel option was described as "almost obsolete" indicating the residents understand major improvements need to be made to mitigate the drainage issues in the neighbourhood.

5.3.6 Other

Two comments received relate to locations outside of the study area, requesting Town review of the Cookstown and Rose Lane areas in Innisfil.

6 Recommended Drainage Improvement Alternatives

Each of the proposed drainage improvement options has been evaluated with respect to feasibility, magnitude of improvement and cost. The following options have been recommended for implementation to improve drainage conditions in the various roads study area:

- Alternative #2 – Replacement of Culverts at South End of Crystal Beach Road;
- Alternative #3 – Improvement to Tall Tree Lane Outlet;
- Alternative #4 – Ditch Improvements (partial or staged implementation as budgets permit);
- Alternative #5 – Replacement of Culvert Crossing at Hartley Road/Crystal Beach Road;
- Alternative #11 – Implementation of a Rain Barrel Program in the Study Area Watershed; and
- Alternative #12 – Diversion Through 9th Line Park.

Alternative #8 involves implementing the recommendations from the 2011 Alcona North Secondary Master Drainage Plan. We recommend that the Town continue to use the recommendations of this report as criteria for development within the Alcona North Secondary Plan area or begin to use the recommendations if they are not being used at this time.

6.1 UPDATES TO ALTERNATIVE #3 FOLLOWING RECEIPT OF PUBLIC COMMENTS

Multiple comments have been received from the public throughout the project noting concerns with respect to maintaining the Lake access at the Tall Trees Lane Outlet. In response to these comments, the proposed design has been scaled back as follows:

- Armour stone walls removed to prevent root damage to mature trees on adjacent properties and ensure existing access width is maintained;
- Sediment barrier removed to maintain watercraft access; and
- Install headwall to repair erosion at storm pipe ends and prevent future erosion from occurring.

The revised design meets the concerns of the public with respect to maintaining access and impacts to mature trees on adjacent property. The revised design is not anticipated to impact wildlife, which will be confirmed through the Environmental Investigation to be completed by Beacon Environmental as part of the detailed design process.

6.2 ENVIRONMENTAL SCREENING

Beacon Environmental has completed a Natural Heritage Desktop Screening in January 2022. The desktop screening provides a review of the study area's terrestrial resources, aquatic resources and species at risk with recommendations to complete future field surveys in spring/summer 2022, constraints analysis and recommended mitigation and avoidance measures, as well as permitting and regulatory considerations.

The Natural Heritage Desktop Screening has been provided in Appendix G for reference.

6.3 HYDROGEOLOGICAL INVESTIGATION

Peto MacCallum Ltd. (PML) completed a hydrogeological investigation in August 2021 to confirm the general soil types, groundwater table elevations and infiltration rates of native soils in the study area. PML completed their field investigation in April 2021.

The borehole drilling and monitoring well installation program included eight boreholes, five of which were fitted with monitoring wells. Soil conditions generally consisted of topsoil, fill and sand/silty sand deposits in the majority of the boreholes. Ground water levels were found to be between 0.3 m and 0.9 m below ground surface. The hydrogeological investigation is provided in Appendix H for reference.

The observed high groundwater elevations prohibit the required separation (1.0 m) between infiltration facilities and the groundwater table. Therefore, Alternative #9 was removed from the recommended alternatives.

6.4 CULTURAL HERITAGE RESOURCES

6.4.1 Archeological Resources

AS&G Archaeological Consultants have completed their investigations to support Stage 1 and Stage 2 archaeological assessments for Alternatives #2 and #3. The Stage 1 background study found that the Study Area exhibited potential for the recovery of archaeological resources of cultural heritage value and concluded that the Study Area requires a Stage 2 assessment. The Stage 2 property assessment, which consisted of a systematic and judgmental test pit survey, did not result in the identification of archaeological resources. Based on the results of their land-based and aquatic assessments, no further archaeological assessment is required for the Study Area.

6.4.2 Built Heritage and Cultural Heritage Landscapes

The results of the MCM checklist exercise demonstrated there are no known or recognized cultural heritage resources or landscapes in the Study Area, but that there is the potential for cultural heritage value as identified through the presence of buildings that are over 40 years old (i.e., single-storey frame cottages dating from the 1930s to 1950s). Additionally, through historical research and a site visit, Heritage Studio identified the Study Area has associative value for its connection to the Goodfellow family, who settled early in the Township's history and were responsible for the development of the area as a summer cottage and recreation destination in the late 1920s.

Heritage Studio did not identify the Study Area as a cultural heritage landscape, however, the area has a strong sense of place that stems from its location on the shoreline of Lake Simcoe and the pattern of development associated with its origins as a cottaging community. Despite the residential transformation of the area from the 1950s onwards and increasingly, the construction of large modern houses in the Study Area, the semi-rural cottage landscape continues to provide a distinctive identity to the area. Future plans or modifications to the public realm (i.e., road widening, sidewalk installation) should be carefully considered to protect, foster and enhance this identity and sense of place, particularly at the northern end of Crystal Beach Road, Tall Tree Lane, Buchanan Street and Goodfellow Avenue and Bonsecour Crescent.

As proposed, the recommended drainage alternatives will complement the existing character of the public realm and Heritage Studio has not identified any negative impacts to the potential cultural heritage resources, identified through the MCM checklist exercise. Accordingly, no further cultural heritage studies are recommended at this time.

6.5 COASTAL ENGINEERING REVIEW

We understand sediment deposition at the piped outlet from Crystal Beach Road to Lake Simcoe is contributing to flow capacity restrictions. The Tall Tree Lane outlet to Lake Simcoe has experienced erosion, which we understand is primarily due to wave action, and possibly also from ice effects.

The sediment accumulation at the Crystal Beach outfall can likely be attributed to both wave driven accumulation of lake sediment, as well as sediment transported from the contributing upstream drainage area by the watercourse. The dynamics of these systems are complex, and it is challenging to determine if one of the sediment sources is more impactful to sediment accumulation at the outfall without extensive study.

A coastal engineering review of the two outfall locations was completed and has been included in Appendix J for reference. The coastal review considered available information on currents and winds applicable to the subject shoreline area and determined a sediment barrier could be implemented at the Crystal Beach Road outlet to offer localized mitigation of the accumulation of lake sediment at the outfall, while minimizing disruption to overall coastal processes and to sediment deposition from the riverine system. For the Tall Tree Lane outlet, it was determined a concrete headwall would provide the necessary mitigation against erosion of the bank.

6.6 PERMITTING AND APPROVAL REQUIREMENTS

LSRCA permits would be required for all alternatives except Alternatives #8, and #11.

Any in-water work as proposed in Alternative #2 and Alternative #3 would require review under the Fisheries Act. It may be necessary to submit a Request for Review to the DFO. We note a Request for Review to DFO can take from three to six months to obtain an approval.

A works permit from the MNDMNRF will also be required for Alternative #2 and Alternative #3 as they involve work in the lakebed. The time to obtain a works permit is approximately three to four months, including a mandatory 45-day First Nation consultation period. An MNDMNRF permit to collect fish will likely be required prior to construction.

The in-water works timing window only permits construction between July 15th and September 30th. This construction window allows time to obtain all necessary permits after completion of the detailed design in late 2021, before construction can commence approximately eight months later.

6.7 CONSTRUCTION COST ESTIMATE AND PROJECT SCHEDULE

Preliminary construction cost estimates and schedules have been prepared to allow the Town to consider these factors in determining a preferred alternative or alternatives. As Alternative #6 consists of a location screening only at the 30% submission stage, estimated costs have not been provided. We note implementing Alternative #8 will incur no capital costs to the Town. A summary is provided below, and an itemized breakdown is provided in Appendix F.

Table 18: Summary of Preliminary Construction Costs and Duration

DESIGN ALTERNATIVE	CONSTRUCTION COST	CONSTRUCTION DURATION
Alternative #2	$180,800	2 weeks
Alternative #3	$18,000	1 week
Alternative #4	$2,400,000	1-8 weeks
Alternative #5	$39,700	1 week
Alternative #6	$267,400	4-8 weeks
Alternative #7	$89,500	2 weeks
Alternative #10	$694,900	12 weeks
Alternative #11	$71,500	N/A
Alternative #12	$44,100	1 week

We note Alternative #11 accounts for the capital cost of 916 rain barrels and does not include any cost-sharing with residents.

7 2022 Updated Recommendations

The timing on the issuance of the notice of completion for this MCEA document was delayed from the originally anticipated timeline due to a number of factors including a multitude of received public comments, turnover in Town staff and further comments received from the Town of Innisfil Operations staff and comments received from LSRCA. Given this passage of time, and the evolution of the detailed design in the intervening months, we have included this Section to document revisions to the following Alternatives:

- Alternative #2 – Replacement of Culverts at South End of Crystal Beach Road;
- Alternative #3 – Improvement to Tall Tree Lane Outlet;
- Alternative #4 – Ditch Improvements (partial or staged implementation as budgets permit);
- Alternative #5 – Replacement of Culvert Crossing at Hartley Road/Crystal Beach Road;
- Alternative #8 – Implementation of recommendations from other Town of Innisfil studies; and
- Alternative #11 – Implementation of a Rain Barrel Program in the Study Area Watershed.

7.1 SUMMARY OF RECOMMENDED ALTERNATIVES

The changes to the recommended alternatives are summarized in the following sections.

7.1.1 Alternative #2 – Replacement of Culverts at South End of Crystal Beach Road

The existing two – 600 mm diameter and one – 400 mm diameter CSP culverts crossing Crystal Beach Road at STA. 1+046 will be removed and replaced with a 2400 mm x 1200 mm concrete box culvert embedded with 450 mm of natural substrate as shown on Drawing DI-1. The concrete box culvert configuration is recommended for installation because of its extended service life when compared to the previously recommended pipe arch culverts.

Per comments received from the Town's Operations staff, Crystal Beach Road centerline grades will be maintained through the culvert replacement area. Due to the limited cover over the culvert, a distribution slab will be constructed over the culvert beneath the road platform. Installing the proposed concrete box culvert will improve the capacity of Outlet 3 from 1.15 m^3/s to 3.96 m^3/s which is sufficient to convey the 100-year design storm peak flow. This culvert replacement will improve the capacity of Outlet #3 and hence improve the capacity of the driveway culverts along Crystal Beach Road upstream of Outlet #3 by lowering the water elevation in the Crystal Beach Road ditch. HY-8 culvert analysis program output is included in Appendix L for reference.

LSRCA has indicated they cannot support the installation of a stone sediment barrier in Lake Simcoe immediately beyond the culvert outlet, per section 6.8 of the LSRCA Ontario Regulation

179/06 Implementation Guidelines, 2021. Therefore, the previously proposed sediment barrier is no longer recommended and will not be implemented.

7.1.2 Alternative #3 – Improvements to Tall Tree Lane Outlet

A concrete headwall will be constructed at the Tall Tree Lane outlet (Outlet #2) to protect the ends of the two – 300 mm diameter HDPE storm sewer pipes as shown on Drawing DI-2.

7.1.3 Alternative #4 – Ditch Improvements

Crystal Beach Road

The existing 600 mm diameter CSP driveway culverts along Crystal Beach Road from STA. 1+010 to STA 1+420 (Twenty (20) culverts total) will be replaced with 750 mm diameter HDPE culverts, or twin 450 mm diameter HDPE culverts based on the available driveway cover. Existing driveway grading will generally be maintained. Along with the culvert replacements, the roadside ditch will be cleaned out and regraded from STA. 1+010 to STA. 1+420, at a backslope of 3:1 and fore slope of 2:1 to maximize the ditch conveyance towards Outlet #3. The culvert replacements and ditch regrading are shown on Drawings DI-1 and DI-2. The proposed Crystal Beach Road driveway culvert upgrades, ditch improvements and replacement of the culvert at Outlet #3 will increase the capacity of the roadside ditch to alleviate flooding conditions observed at Buchanan Street.

The roadside ditch will be regraded from STA. 1+440 to STA. 1+535 and the three existing 400 mm diameter CSP driveway culverts will be replaced with 400 mm diameter HDPE culverts as shown on Drawing DI-2. This regrading of the ditch will allow the area surrounding the intersection of Buchanan Street and Crystal Beach Road to drain towards Outlet #2 under flooding conditions.

The northwest roadside ditch will be regraded from STA. 1+572 to STA. 1+650 and from STA. 1+710 to STA. 1+808 as shown on Drawing DI-3. Four existing driveway culverts will be removed and replaced with HDPE culverts along this section of the roadside ditch. This will create a more defined roadside ditch to collect local drainage and convey it to adjacent Outlets #1 and #2.

A proposed roadside ditch will be graded along the southeast side of the road from STA. 1+722 to STA. 1+809 as shown on Drawing DI-3. Three 400 mm diameter HDPE driveway culverts will be installed at the three existing driveways along the proposed roadside ditch. This roadside ditch will collect local drainage and convey it to Outlet #1.

Table 19: Updated Proposed Crystal Beach Road Ditch Improvements Capacity Summary

STATIONS	DITCH CATCHMENT ID	EXISTING DITCH CAPACITY (m^3/s)	PROPOSED DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	PROPOSED EXCEEDANCE FREQUENCY (years)
1+040 to 1+420 (W)	5002+1902	0.00	1.36	0.75	50

STATIONS	DITCH CATCHMENT ID	EXISTING DITCH CAPACITY (m^3/s)	PROPOSED DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	PROPOSED EXCEEDANCE FREQUENCY (years)
1+440 to 1+500 (W)	102	0.04	0.12	0.26	> 100
1+500 to 1+560 (W)	103	0.17	0.24	0.14	> 100
1+580 to 1+670 (W)	104	0.00	0.20	0.08	25
1+670 to 1+810 (W)	105	0.00	0.31	0.27	> 100

As shown in Table 19, the proposed ditch capacities are generally improved through the proposed ditch grading, and able to convey at minimum the 1:25 year return period peak flows from their local catchment areas. We note in major storms where spill flows are experienced from Leonard's Creek, the proposed ditch geometry is not anticipated to contain the additional spill flows. It is expected the recommended ditch improvements will assist in reducing nuisance ponding conditions under minor storm conditions. In sections where the ditch capacity could not be improved due to backwater constraints and or spatial constraints, additional ponding area has been provided to allow for additional storage of flood volumes observed under the 1:2 year to Regional storms from Leonard's Creek.

As discussed above, ditch grading and culvert upgrades are proposed in the west roadside ditch on Crystal Beach Road from Station 1+000 to 1+420. Due to the assumed backwater condition of 218.85 m, the Crystal Beach Road ditch will be subject to backwater effects during spring conditions. The driveway culvert and ditch grading upgrades proposed will provide increased flood volume storage to alleviate flooding conditions on Buchanan Street.

Tall Tree Lane

The west roadside ditch will be regraded from STA. 3+140 to Leonard's Creek, and from STA. 3+215 to Leonard's Creek. The east roadside ditch will be regraded from STA 3+070 to STA. 3+145, from Leonard's Creek to STA 3+195, and from STA 3+230 to STA 3+250. The ditch regrading described above is shown on Drawing DI-4. Regrading these sections of the ditch will provide a more defined ditch cross section with improved conveyance capacity. Proposed ditch capacities on Tall Tree Lane are summarized in Table 20.

Table 20: Updated Proposed Tall Tree Lane Ditch Improvements Capacity Summary

STATIONS	DITCH CATCHMENT ID	EXISTING DITCH CAPACITY (m^3/s)	PROPOSED DITCH CAPACITY (m^3/s)	LIMITING CULVERT CAPACITY (m^3/s)	PROPOSED EXCEEDANCE FREQUENCY (years)
3+020 to 3+105 (W)	301	0.07	1.38	0.40	> 100
3+105 to 3+180 (W)	302	0.00	0.16	0.28	> 100
3+180 to 3+220 (W)	303	0.00	0.13	0.12	> 100
3+040 to 3+120 (E)	305	0.00	0.28	0.09	> 100
3+120 to 3+180 (E)	306	0.30	0.05	0.28	> 100
3+180 to 3+235 (E)	307	0.08	1.01	0.27	> 100
3+235 to 3+250 (E)	308	0.00	0.67	0.23	> 100

As shown in Table 20, the proposed ditch capacities are generally improved through the proposed ditch grading, and in most cases able to convey more than the1:100-year return period peak flows from their local catchment areas. We note in major storms where spill flows are experienced from Leonard's Creek, the proposed ditch geometry will not contain flooding. It is expected the ditch improvements will assist in reducing nuisance ponding conditions under minor storm conditions. In sections where the ditch capacity could not be improved due to backwater constraints and or spatial constraints, additional ponding area has been provided to allow for additional storage of flood volumes observed under the 1:2 year to Regional storms from Leonard's Creek.

Buchanan Street

Through discussion with the Town, it was determined to provide meaningful improvements to the flooding conditions observed annually on Buchanan Street, easements on the west side of Buchanan Street will be required to provide adequate space for ditching beyond the limits of the existing ROW. It is recommended an easement be acquired on the east boundary of the following properties abutting Buchanan Street:

- 678 Hartley Road;
- 2338 Buchanan Street;

- 2334 Buchanan Street;
- 2350 Buchanan Street;
- 2358 Buchanan Street;
- 2364 Buchanan Street;
- 2370 Buchanan Street;
- 2384 Buchanan Street; and
- 667 9th Line.

Due to delays in obtaining permission to enter for these properties, the detailed design for the ditch improvements is ongoing.

Goodfellow Avenue & Bonsecour Crescent

The detailed design for Goodfellow Avenue and Bonsecour Crescent will be completed at the same time as the proposed road rehabilitation design for this area. Efforts to maximize drainage conveyance in proposed swales will be confirmed based on the proposed road centerline grading associated with the road rehabilitation efforts, recognizing that the ROW extent and opportunity for positive drainage is constrained in this area.

A drainage outlet easement is to be located on the east boundary of 2346 Goodfellow Avenue. It is anticipated this easement will accommodate a 0.2 m deep triangular swale with side slopes of 3:1. All details with respect to 2346 Goodfellow Avenue will be finalized at the detailed design stage, following the finalization of the easement agreement with the landowner of 2346 Goodfellow Avenue.

The previously noted easement location on the eastern property line of 2333 Goodfellow Avenue will not be considered in the detailed design stage moving forward.

7.1.4 Alternative #5 – Replacement of Culvert Crossing at Hartley Road/Crystal Beach Road

Per comments from Town Operations staff, an additional 600 mm diameter CSP culvert from the west side of Buchanan Street will also be implemented under Hartley Road to convey drainage to the ditch on the west side of Crystal Beach Road. The existing 600 mm diameter HDPE culvert crossing Buchanan Street at STA. 2+010 will also be removed and replaced with a 600 mm diameter HDPE culvert in approximately the same location. The proposed culvert installations will direct drainage towards the Crystal Beach Road roadside ditch (which will also be improved) and will help alleviate flooding at the intersection of Buchanan Street and Crystal Beach Road. Details with respect to the proposed culverts will be finalized based on the Buchanan Street ditching design.

HY-8 culvert analysis program output is included in Appendix L for reference.

7.1.5 Alternative #8 – Implementation of Recommendations from Other Town of Innisfil Studies

The Town of Innisfil is currently completing a Stormwater Management Master Plan Update and Innisfil Flooding Strategy project. The 2022 Stormwater Management Master Plan Update will assess the relevant findings of the previous Master Plan, incorporate future growth and demands on the network, identify areas where information gaps exist, and update the plan accordingly. The goals and policies identified in this update will include strategies to improve and minimize the negative impacts of flooding and stormwater movement, improve safety, preserve local character, and protect the natural environment.

Flooding within the Town has become a significant concern for the municipality and its residents. The purpose of the Flooding Strategy is to look more holistically at this concern and proactively identify areas of concern and potential strategies, while exploring innovative, cost-effective, and environmentally sustainable solutions and create a prioritized action plan for the Town's short, medium, and long-term capital budget planning.

Alternative #8 involves implementing the recommendations from the 2011 Alcona North Secondary Master Drainage Plan. We recommend the Town continue to use the recommendations of this report as criteria for development within the Alcona North Secondary Plan area or begin to use the recommendations if they are not being applied at this time, until the Stormwater Management Master Plan Update and Innisfil Flooding Strategy are complete, at which point, the recommendations in these documents should serve as criteria for future development in and upstream of the study area.

7.1.6 Alternative #11 – Implementation of a Rain Barrel Program in the Study Area Watershed

Alternative #11 would involve the implementation of a targeted rain barrel program for properties in the study area watershed, as described in Section 4.11.

7.1.7 Alternative #12 – Diversion Through 9th Line Park

Alternative #12 was removed from the list of recommended improvements at the Town's direction because the peak flow that could be diverted via storm sewer through the 9th Line Park was limited due to utility and cover constraints.

8 Summary

The following options have been recommended for implementation to improve drainage conditions in the various roads study area:

- Alternative #2 – Replacement of Culverts at South End of Crystal Beach Road;
- Alternative #3 – Improvement to Tall Tree Lane Outlet;
- Alternative #4 – Ditch Improvements (partial or staged implementation as budgets permit);
- Alternative #5 – Replacement of Culvert Crossing at Hartley Road/Crystal Beach Road;
- Alternative #8 – Implementation of Recommendations from Other Town of Innisfil Studies; and
- Alternative #11 – Implementation of a Rain Barrel Program in the Study Area Watershed.

Each of the proposed drainage improvement options has been evaluated with respect to feasibility, magnitude of improvement, environmental impacts, hydrogeological feasibility and cost. These options are generally supported by the Town and the public based on the comments received.

9 Mitigation Measures

The identification and use of appropriate mitigation measures can reduce potential impacts resulting from the implementation of the recommended Alternatives.

9.1 ENVIRONMENTAL MITIGATION

Appropriate erosion and sediment control measures, consistent with LSRCA and Town of Innisfil standards, should be identified on the detailed design drawings and carefully implemented by the Contractor.

Mitigation measures related to in-water works, consistent with LSRCA standards should be specified on the detailed design drawings and diligently implemented by the Contractor. In-water works timing windows must be respected.

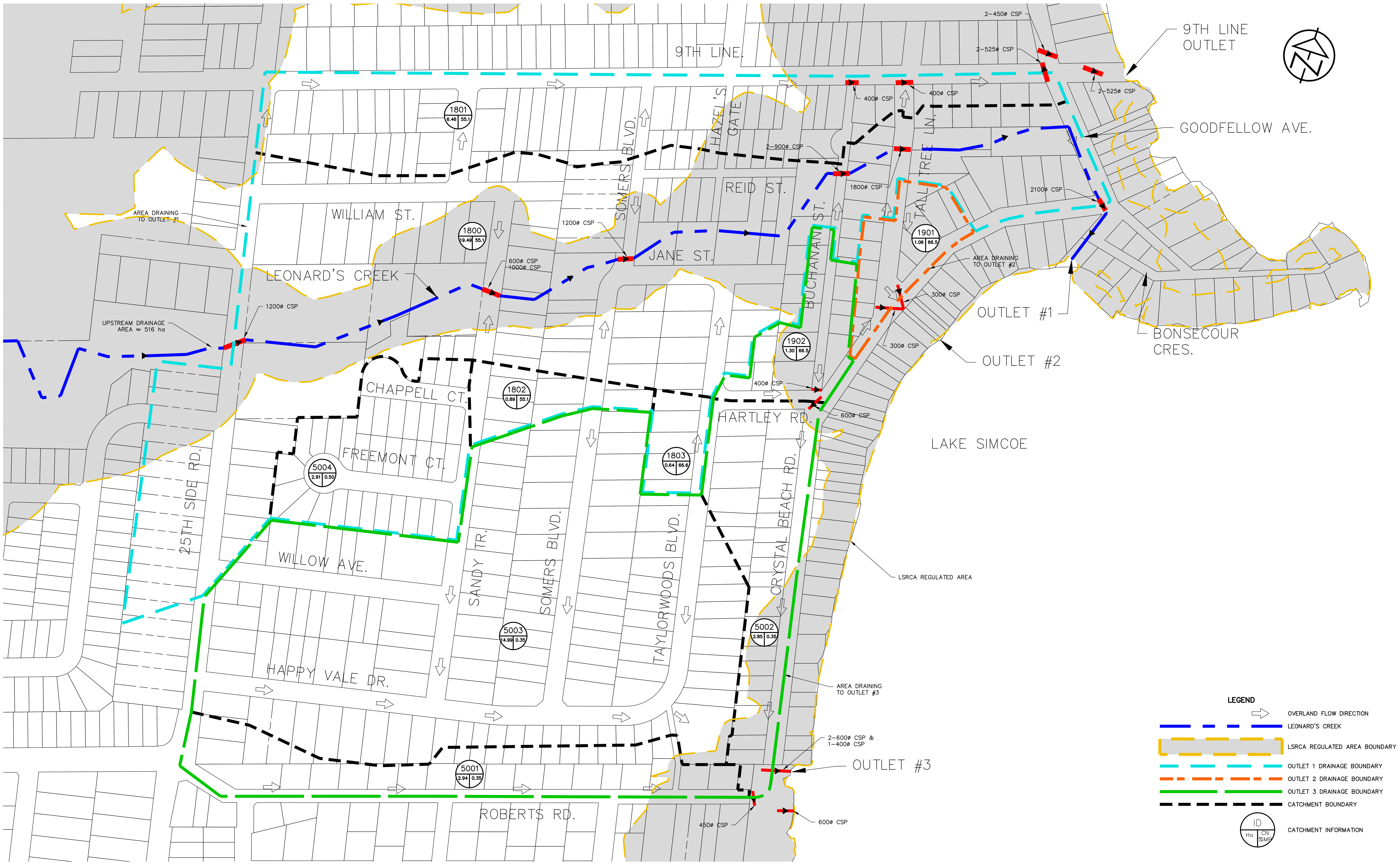
Tree preservation details, consistent with Town of Innisfil standards, should be included on the detailed design drawings and implemented by the Contractor.

Conditions of the LSRCA permit and any approvals from DFO and MNDMNRF must be understood and followed by the Contractor.

9.2 CULTURAL HERITAGE MITIGATION

The implementation of the recommended alternatives must comply with the recommendations of the Stage 1 and 2 archaeological assessment, completed by AS&G Archaeological Consultants

Should previously undocumented archaeological resources be discovered during subsequent field work or construction, they may represent a new archaeological site and would therefore be subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the Ontario Heritage Act.



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BENCHMARKS

TBM1 – ELEVATION 219.60
DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH–EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR 60% DESIGN	MAY 19/21

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

STUDY AREA DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG: SDP-1
DRAWN: SD	DATE: SEPT 2020	
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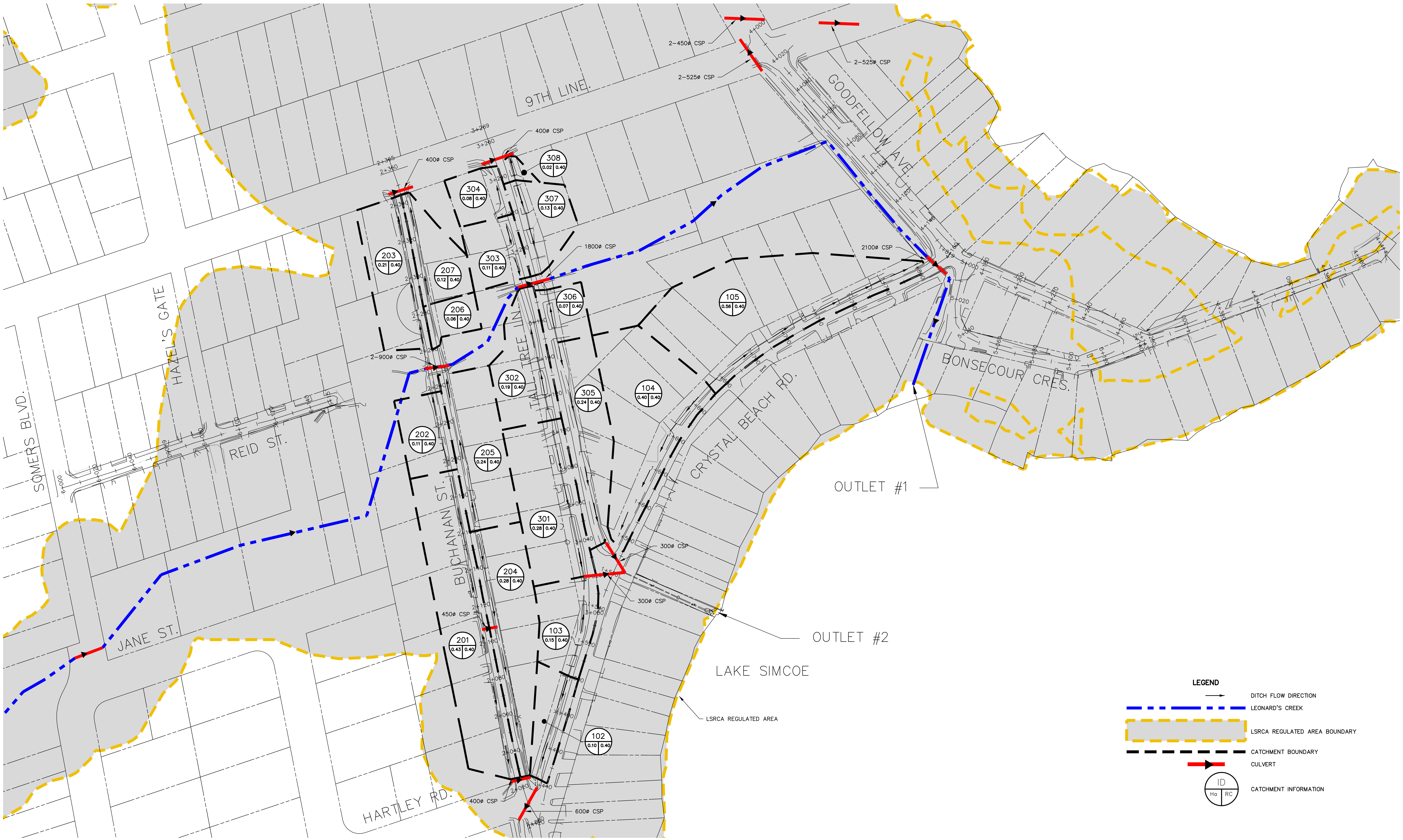
Drawing Name: 420395–DP1.dwg, Plotted: May 11, 2021



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TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR 60% DESIGN	MAY 19/21

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS

INNISFIL, ON

STUDY AREA DITCHES DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG: DDP-1
DRAWN: SD	DATE: SEPT 2020	
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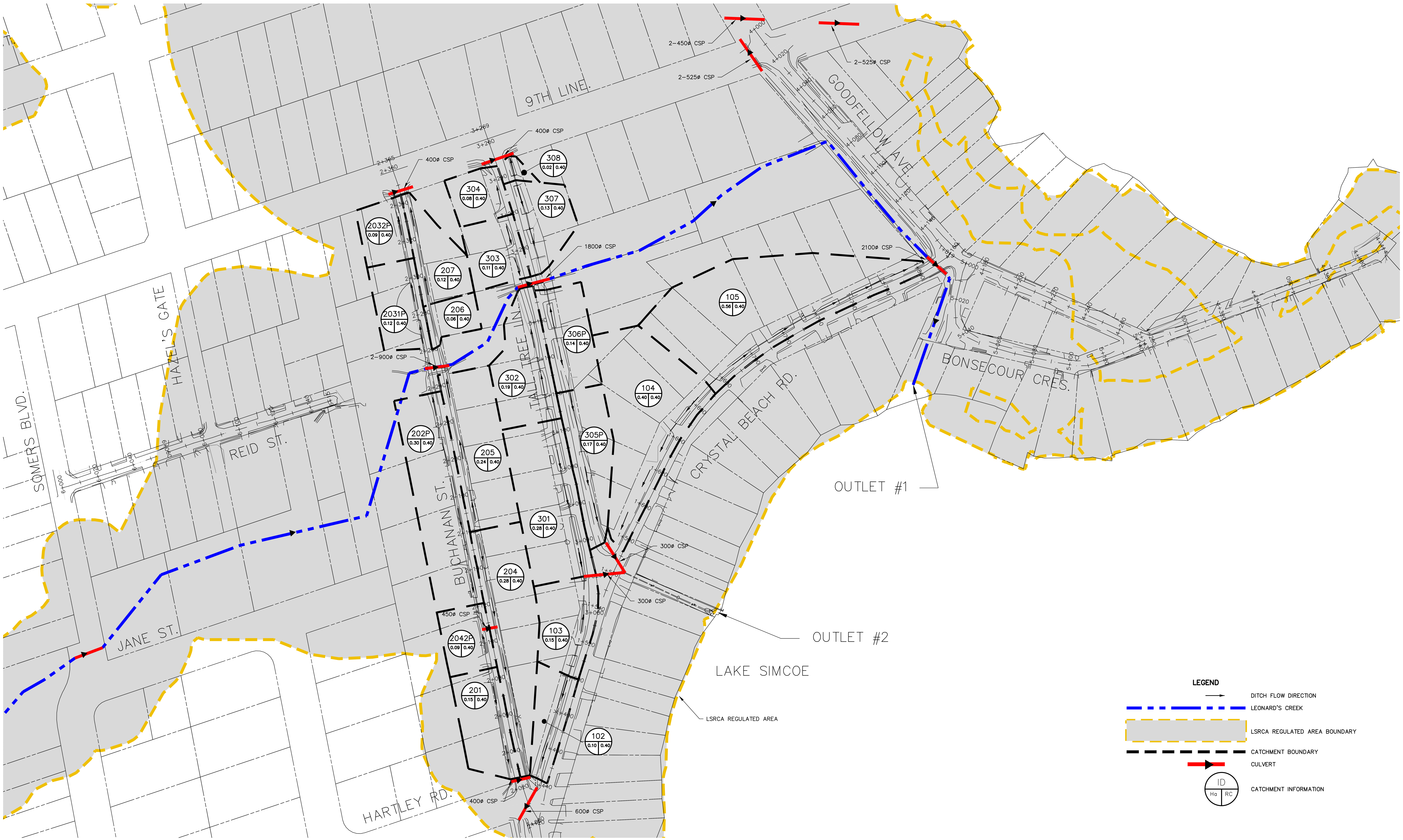

DISCLAIMER AND COPYRIGHT	BENCHMARKS	NOTES
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No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR 60% DESIGN	MAY 19/21

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS

INNISFIL, ON

PROPOSED STUDY AREA DITCHES DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG:
DRAWN: SD	DATE: SEPT 2020	**DDP-2**
CHECK: ALK	SCALE: 1:1000	

Drawing Name: 420395–DP2.dwg, Plotted: May 12, 2021

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No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR 60% DESIGN	MAY 19/21

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

CRYSTAL BEACH ROAD DITCH DRAINAGE PLAN

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG: DDP-3
DRAWN: SD	DATE: SEPT 2020	
CHECK: ALK	SCALE: 1:1000	

Drawing Name: 420395-DP2.dwg, Plotted: May 11, 2021

Appendix A:
Existing Conditions Hydrologic Analysis

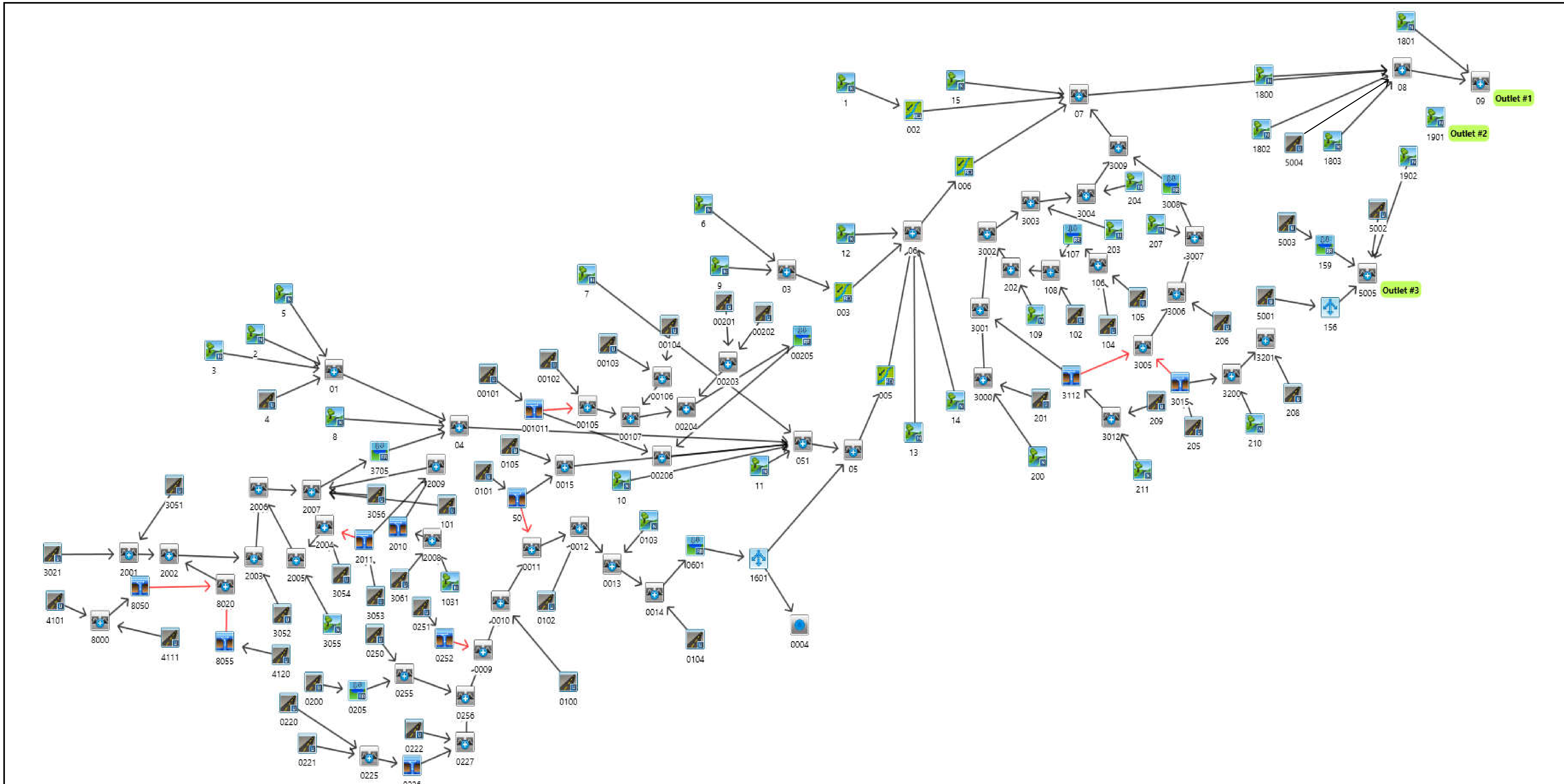
The Visual OTTHYMO (VO) model for the Town of Innisfil (TOI) Drainage Improvements for Various Roads project (2020) was created based on the SWMHYMO model previously created by R.J. Burnside as part of the Alcona North Secondary Plan Draft Master Drainage Plan project in 2011. The following notes help to summarize the different components of the model and explain updates and additions that were made as part of the Drainage Improvements study.

- Primary reference for model construction was Technical Memorandum prepared by R.J. Burnside titled Alcona North OPA-1 Area 1 & 2 SWM Gap Analysis Update for Land Use Concept Plan. Memorandum is included as Appendix A to the Alcona North Secondary Plan Draft Master Drainage Plan.
- Hydrographs 1031 to 4111 comprise the Alcona North, Alonzi and Pratt D'amico developments. For further detail regarding these areas refer to the Crisdawn Pratt D'Amico SWM Report (2008) prepared by TSH and drawing Pratt D'Amico STM-2.
- Hydrographs 4, 3021, and 4101 have been developed since the creation of the R.J. Burnside model. The parameters of these areas have been adjusted in accordance with the TOI Comprehensive Stormwater Management Master Plan, OP Land Use table.
- Hydrographs 0100 to 0250 comprise Phase 1 and 2 of the Crossroads development. For further detail regarding these areas refer to the Crisdawn Pratt D'Amico SWM Report (2008) prepared by TSH and the post development Visual OTTHYMO Schematic.
- Hydrographs 00101 to 00206 comprise Phase 3 of the Crossroads development. For further detail regarding these areas refer to the SWM Report for Crossroads Development Phase 3 (1995) prepared by Falby Burnside and Associates.
- Hydrographs 200 to 211 comprise the Skivereen Estates development. For further detail regarding these areas refer to the Skivereen Estates SWM Report (1999) prepared by CCTA and drawing PST-1
- Additional catchment delineation was undertaken in catchment 18 of the original R.J. Burnside model. These areas were delineated to define drainage directed to the Tall Tree Lane outlet, and the Crystal Beach Road roadside ditch. Additional area was determined to drain to Leonard's Creek and these catchments added.
- To define flows directed to the Crystal Beach Road culvert crossing, catchments 5001 to 5003 were delineated with reference to the Taylorwoods Subdivision SWM Report (1995) prepared by The Lathem Group Inc. The catchment parameters were updated in accordance with the TOI Comprehensive Stormwater Management Master Plan OP, Land Use table.

T:\2020 PROJECTS\420395 - Various Roads Drainage Improvement Program - TOI\Documents\Reports\Appendices\A - Existing Conditions\VO Output\420395 - VO Model Notes.docx

TATHAM ENGINEERING

PROJECT	Various Roads Drainage Improvement Program - TOI	FILE	420395
		DATE	2021-04-29
SUBJECT	VO Schematic	NAME	MMR
		PAGE	1 OF 1



NASHYD | STANDHYD | ROUTE PIPE | ROUTE CHANNEL | ADDHYD | ROUTE RESERVOIR | DUHYD | DIVERT HYD

```
=====================================================================================
===========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


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DATE: 04-29-2021                          TIME: 02:32:28

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 01 - 2yr 4hr 10min Chicag **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB NASHYD          0103  1  2.0     2.10    0.03  1.57   5.35 0.14    0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB STANDHYD        0100  1  2.0     2.50    0.18  1.33  16.36 0.44    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB STANDHYD        0200  1  2.0     2.68    0.18  1.33  19.95 0.54    0.000
    [I%=24.0:S%= 2.00]
```

```
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68     0.18  1.37  19.95  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0250  1  2.0     1.51     0.15  1.33  23.71 0.64    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19     0.33  1.33  21.31  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0221  1  2.0     0.62     0.08  1.33  25.85 0.70    0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0220  1  2.0     2.11     0.13  1.33  18.81 0.51    0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0     2.73     0.21  1.33  20.40  n/a    0.000
*
    DUHYD                0226  1  2.0     2.73     0.21  1.33  20.40  n/a    0.000
       MAJOR SYSTEM:     0226  2  2.0     0.08     0.05  1.33  20.40  n/a    0.000
       MINOR SYSTEM:     0226  3  2.0     2.65     0.16  1.27  20.40  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0222  1  2.0     1.12     0.15  1.33  25.85 0.70    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0     1.20     0.20  1.33  25.47  n/a    0.000
*
    ADD [  0227+  0255]  0256  3  2.0     5.39     0.53  1.33  22.24  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0251  1  2.0     0.48     0.04  1.33  22.27 0.60    0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0     0.48     0.04  1.33  22.27  n/a    0.000
       MAJOR SYSTEM:     0252  2  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0252  3  2.0     0.48     0.04  1.33  22.27  n/a    0.000
*
    ADD [  0252+  0256]  0009  3  2.0     5.87     0.58  1.33  22.24  n/a    0.000
*
    ADD [  0009+  0100]  0010  3  2.0     8.37     0.76  1.33  20.48  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0     1.90     0.15  1.33  17.14 0.46    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0     1.90     0.15  1.33  17.14  n/a    0.000
       MAJOR SYSTEM:     0050  2  2.0     0.00     0.00  1.33  17.14  n/a    0.000
       MINOR SYSTEM:     0050  3  2.0     1.90     0.15  1.33  17.14  n/a    0.000
*
```

```
   ADD [  0010+  0050]  0011  3  2.0   10.27    0.91  1.33  19.87  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0102  1  2.0   10.00    0.77  1.33  17.60 0.48    0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]  0012  3  2.0   20.27    1.68  1.33  18.75  n/a    0.000
*
   ADD [  0012+  0103]  0013  3  2.0   22.37    1.69  1.33  17.49  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0104  1  2.0    2.50    0.19  1.33  16.20 0.44    0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]  0014  3  2.0   24.87    1.88  1.33  17.36  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             0601  1  2.0   24.87    0.07  4.10  17.33  n/a    0.000
*
   DIVERT HYD           1601  1  2.0   24.87    0.07  4.10  17.33  n/a    0.000
      Outflow           0002  2  2.0    0.06    0.00  4.10  17.33  n/a    0.000
      Outflow           0002  3  2.0   24.81    0.07  4.10  17.33  n/a    0.000
      Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 ** CALIB NASHYD        0210  1  5.0    2.36    0.03  1.50   4.76 0.13    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0205  1  5.0    0.75    0.05  1.33  17.83 0.48    0.000
   [I%=30.0:S%= 0.50]
*
   DUHYD                3015  1  5.0    0.75    0.05  1.33  17.83  n/a    0.000
      MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     3015  3  5.0    0.75    0.05  1.33  17.83  n/a    0.000
*
   ADD [  0210+  3015]  3200  3  5.0    2.36    0.03  1.50   4.76  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0208  1  5.0    0.86    0.06  1.33  17.84 0.48    0.000
   [I%=30.0:S%= 0.50]
*
   ADD [  0208+  3200]  3201  3  5.0    3.22    0.08  1.33   8.25  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.01  1.60   5.18 0.14    0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.21]
*
```

```
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.02  1.53   5.18 0.14    0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.16]
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.13  1.33  10.38 0.28    0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.13  1.33  10.38  n/a    0.000
      Outflow           0001  2  2.0    2.32    0.10  1.33  10.38  n/a    0.000
      Outflow           0001  3  2.0    0.62    0.03  1.33  10.38  n/a    0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.13  1.33  12.24 0.33    0.000
   [I%=20.0:S%= 1.00]
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       5003  1  2.0   14.99    0.57  1.37  10.41 0.28    0.000
   [I%=20.0:S%= 1.00]
*
 ** Reservoir
   OUTFLOW:             0159  1  1.0   14.99    0.09  2.58   9.50  n/a    0.000
*
   ADD [  0156+  0159]  5005  3  1.0   17.31    0.13  1.33   9.61  n/a    0.000
*
   ADD [  5005+  1902]  5005  1  1.0   18.61    0.14  1.37   9.30  n/a    0.000
*
   ADD [  5005+  5002]  5005  3  1.0   21.46    0.27  1.33   9.69  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0001  1  2.0  139.80    0.76  3.10   7.48 0.20    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 1.05]
*
   CHANNEL[ 2:  0001]   0002  1  1.0  139.80    0.65  4.13   7.48  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0002  1  1.0   18.97    0.09  3.13   6.71 0.18    0.000
   [CN=71.0         ]
   [ N = 2.0:Tp 1.06]
*
   CHIC STORM                  10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0003  1  1.0   13.15    0.09  2.38   6.71 0.18    0.000
   [CN=71.0         ]
   [ N = 2.0:Tp 0.62]
*
```

```
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.24  2.42   7.44 0.20    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.31  1.35   9.66 0.26    0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.18  2.68   6.71  n/a    0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.32  1.35   7.33  n/a    0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    0.47  2.38   7.38  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.05  2.37   3.64 0.10    0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.03  1.42   9.26 0.25    0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.04  1.33  20.56 0.56    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.07  1.33  12.81  n/a    0.000
*
    DUHYD                2010  1  5.0    1.53    0.07  1.33  12.81  n/a    0.000
       MAJOR SYSTEM:     2010  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     2010  3  5.0    1.53    0.07  1.33  12.81  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.03  1.33  20.55 0.56    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.03  1.33  20.55  n/a    0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.03  1.33  20.55  n/a    0.000
*
    ADD [  2010+  2011]  2009  3  0.0    0.00    0.00  0.00  20.55  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.03  1.50   8.54 0.23    0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
```

```
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.03  1.33  20.55 0.56    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.05  1.33  20.55  n/a    0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.07  1.33  12.45  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.50  1.33  22.69 0.61    0.000
    [I%=37.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    0.88  1.33  20.58 0.56    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.09  1.33  13.33 0.36    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    0.97  1.33  19.81  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.20  1.33  21.30 0.58    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.03  1.33  15.69 0.42    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.24  1.33  20.51  n/a    0.000
*
    DUHYD                8050  1  5.0    2.82    0.24  1.33  20.51  n/a    0.000
       MAJOR SYSTEM:     8050  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     8050  3  5.0    2.82    0.24  1.33  20.51  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.01  1.33  27.43 0.74    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.01  1.33  27.43  n/a    0.000
       MAJOR SYSTEM:     8055  2  5.0    0.00    0.00  1.33  27.43  n/a    0.000
       MINOR SYSTEM:     8055  3  5.0    0.08    0.01  1.25  27.43  n/a    0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.90    0.25  1.33  20.69  n/a    0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.20    1.22  1.33  19.97  n/a    0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.56    1.72  1.33  20.65  n/a    0.000
*
```

```
   ADD [  2003+  2005]  2006  3  5.0   23.40    1.79  1.33  20.00  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.02  1.33  18.99 0.51    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.15  1.33  22.42 0.61    0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.70    1.81  1.33  19.99  n/a    0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.70    1.81  1.33  19.99  n/a    0.000
*
   ADD [  2007+  3056]  2007  3  5.0   25.07    1.96  1.33  20.12  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             3705  1  5.0   25.07    0.18  2.92  20.08  n/a    0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.33    0.64  2.52  10.39  n/a    0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.75    0.69  2.50   9.52  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.17  2.15   8.53 0.23    0.000
   [CN=78.0          ]
   [ N = 2.0:Tp 0.49]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.02  2.77   2.40 0.06    0.000
   [CN=47.0          ]
   [ N = 2.0:Tp 0.77]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0011  1  2.0    8.42    0.01  2.97   2.18 0.06    0.000
   [CN=45.0          ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0105  1  2.0    2.90    0.15  1.33  12.12 0.33    0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050]  0015  3  2.0    2.90    0.15  1.33  12.13  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0101  1  2.0    1.57    0.10  1.33  19.29 0.52    0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                1011  1  2.0    1.57    0.10  1.33  19.29  n/a    0.000
      MAJOR SYSTEM:     1011  2  2.0    0.00    0.00  0.00   0.00  n/a    0.000
```

```
      MINOR SYSTEM:     1011  3  2.0    1.57    0.10  1.33  19.29  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0102  1  2.0    2.63    0.21  1.33  20.95 0.57    0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    4.20    0.31  1.33  20.33  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0103  1  2.0    0.61    0.11  1.33  30.29 0.82    0.000
   [I%=75.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0104  1  2.0    1.57    0.14  1.33  22.07 0.60    0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104]  0106  3  2.0    2.18    0.25  1.33  24.37  n/a    0.000
*
   ADD [  0105+  0106]  0107  3  2.0    6.38    0.56  1.33  21.71  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0201  1  2.0   10.34    0.76  1.33  20.73 0.56    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0202  1  2.0    2.00    0.14  1.33  20.11 0.54    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0201+  0202]  0203  3  2.0   12.34    0.90  1.33  20.63  n/a    0.000
*
   ADD [  0107+  0203]  0204  3  2.0   18.72    1.47  1.33  21.00  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             0205  1  2.0   18.72    0.13  3.03  20.98  n/a    0.000
*
   ADD [  1011+  0205]  0206  3  2.0   18.72    0.13  3.03  20.98  n/a    0.000
*
   ADD [  0015+  0206]  0051  3  2.0   21.62    0.21  1.33  19.79  n/a    0.000
*
   ADD [  0051+  0004]  0051  1  1.0  134.37    0.85  2.50  11.18  n/a    0.000
*
   ADD [  0051+  0010]  0051  3  1.0  142.13    0.86  2.50  10.70  n/a    0.000
*
   ADD [  0051+  0011]  0051  1  1.0  150.55    0.87  2.52  10.22  n/a    0.000
*
   ADD [  0051+  0007]  0051  3  1.0  167.23    1.04  2.42  10.05  n/a    0.000
*
   ADD [  0051+  1601]  0005  3  1.0  167.29    1.04  2.42  10.06  n/a    0.000
*
   CHANNEL[ 2:  0005]   0005  1  1.0  167.29    0.94  3.05  10.03  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
```

```
 *  CALIB NASHYD         0006  1  1.0   64.36    0.40  2.85   7.65 0.21    0.000
    [CN=75.0        ]
    [ N = 2.0:Tp 0.89]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.15  2.53   7.53 0.20    0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    0.55  2.75   7.62  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.51  3.23   7.62  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.04  3.00   2.40 0.07    0.000
    [CN=48.0        ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.04  2.70   2.19 0.06    0.000
    [CN=44.0        ]
    [ N = 2.0:Tp 0.73]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.01  3.33   1.94 0.05    0.000
    [CN=40.0        ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.96    1.45  3.12   9.22  n/a    0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.34    1.49  3.12   8.66  n/a    0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.37    1.53  3.10   8.18  n/a    0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.68    1.54  3.10   7.99  n/a    0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.68    1.48  3.52   7.98  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.06  3.43   2.37 0.06    0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 1.12]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.03  1.67   4.91 0.13    0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.18]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.04  1.33  28.42 0.77    0.000
```

```
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.06  1.33   6.98  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.01  1.50   4.83 0.13    0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.13]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.06  1.33  28.44 0.77    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.07  1.33  11.08  n/a    0.000
*
    DUHYD                3112  1  5.0    1.36    0.07  1.33  11.08  n/a    0.000
       MAJOR SYSTEM:     3112  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     3112  3  5.0    1.36    0.07  1.33  11.08  n/a    0.000
*
    ADD [  3000+  3112]  3001  3  5.0    2.95    0.06  1.33   6.98  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.01  2.00   6.27 0.17    0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.40]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.11  1.33  31.07 0.84    0.000
    [I%=87.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.05  1.33  33.46 0.91    0.000
    [I%=95.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.03  1.33  34.35 0.93    0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.08  1.33  33.81  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.01  1.58  33.47  n/a    0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.12  1.33  32.07  n/a    0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.12  1.33  17.89  n/a    0.000
*
    ADD [  0202+  3001]  3002  3  5.0    4.97    0.18  1.33  11.41  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
```

```
 *  CALIB NASHYD         0203  1  5.0     1.17    0.01  1.83   3.21 0.09    0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0     6.14    0.18  1.33   9.85  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0204  1  5.0     3.82    0.02  1.67   3.18 0.09    0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0     9.96    0.19  1.33   7.29  n/a    0.000
*
    ADD [  3015+  3112]  3005  3  5.0     2.11    0.12  1.33  13.48  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0206  1  5.0     7.28    0.48  1.33  17.85 0.48    0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0     9.39    0.60  1.33  16.87  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0207  1  5.0     0.72    0.00  1.58   2.55 0.07    0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    10.11    0.60  1.33  15.85  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    10.11    0.12  2.25  15.87  n/a    0.000
*
    ADD [  3004+  3008]  3009  3  5.0    20.07    0.21  1.33  11.61  n/a    0.000
*
    ADD [  0002+  0006]  0007  3  1.0   446.48    2.10  3.70   7.82  n/a    0.000
*
    ADD [  0007+  0015]  0007  1  1.0   481.74    2.16  3.70   7.42  n/a    0.000
*
    ADD [  0007+  3009]  0007  3  1.0   501.81    2.27  3.63   7.59  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1800  1  2.0    19.49    0.04  3.77   3.44 0.09    0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1802  1  5.0     0.89    0.01  1.58   2.93 0.08    0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1803  1  5.0     0.64    0.01  1.50   6.39 0.17    0.000
    [CN=66.6         ]
```

```
    [ N = 3.0:Tp 0.19]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       5004  1  2.0     2.91    0.22  1.33  15.53 0.42    0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0   521.30    2.31  3.65   7.44  n/a    0.000
*
    ADD [  0008+  1802]  0008  1  1.0   522.19    2.31  3.65   7.43  n/a    0.000
*
    ADD [  0008+  1803]  0008  3  1.0   522.83    2.31  3.63   7.43  n/a    0.000
*
    ADD [  0008+  5004]  0008  1  1.0   525.74    2.32  3.63   7.47  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1801  1  5.0     6.46    0.02  2.75   3.41 0.09    0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0   532.20    2.34  3.58   7.42  n/a    0.000
*
=================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L               (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```

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```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\94444c61-a955-4cb7-8a07-c9c79463e119\s
  Summary    filename:     C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\94444c61-a955-4cb7-8a07-c9c79463e119\s

DATE: 04-29-2021                          TIME: 02:32:26

USER:

COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : Run 02 - 5yr 4hr 10min Chicag **
```

```
 *************************************************

 W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.     Qbase
                                   min     ha   '  cms   hrs      mm            cms

     START @  0.00 hrs
     --------------------
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 ** CALIB NASHYD          0103  1  2.0     2.10     0.05  1.57   9.67 0.19     0.000
   [CN=56.0        ]
   [ N = 3.0:Tp 0.22]
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 ** CALIB STANDHYD        0100  1  2.0     2.50     0.24  1.33  24.33 0.48     0.000
   [I%=33.0:S%= 2.00]
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 ** CALIB STANDHYD        0200  1  2.0     2.68     0.28  1.33  30.48 0.60     0.000
   [I%=24.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:               0205  1  2.0     2.68     0.24  1.43  30.48  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0250  1  2.0     1.51     0.23  1.33  35.14 0.70     0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]    0255  3  2.0     4.19     0.47  1.33  32.16  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0221  1  2.0     0.62     0.12  1.33  37.51 0.74     0.000
   [I%=51.0:S%= 2.00]
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0220  1  2.0     2.11     0.20  1.37  29.06 0.58     0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]    0225  3  2.0     2.73     0.32  1.33  30.98  n/a     0.000
*
   DUHYD                  0226  1  2.0     2.73     0.32  1.33  30.98  n/a     0.000
      MAJOR SYSTEM:       0226  2  2.0     0.38     0.16  1.33  30.98  n/a     0.000
      MINOR SYSTEM:       0226  3  2.0     2.35     0.16  1.23  30.98  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0222  1  2.0     1.12     0.21  1.33  37.51 0.74     0.000
   [I%=51.0:S%= 2.00]
*
   ADD [  0222+  0226]    0227  3  2.0     1.50     0.37  1.33  35.87  n/a     0.000
*
   ADD [  0227+  0255]    0256  3  2.0     5.69     0.83  1.33  33.13  n/a     0.000
```

```
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0251  1  2.0     0.48     0.07  1.33  33.36 0.66     0.000
   [I%=32.0:S%= 2.00]
*
   DUHYD                  0252  1  2.0     0.48     0.07  1.33  33.36  n/a     0.000
      MAJOR SYSTEM:       0252  2  2.0     0.01     0.01  1.33  33.36  n/a     0.000
      MINOR SYSTEM:       0252  3  2.0     0.47     0.05  1.30  33.36  n/a     0.000
*
   ADD [  0252+  0256]    0009  3  2.0     6.16     0.89  1.33  33.15  n/a     0.000
*
   ADD [  0009+  0100]    0010  3  2.0     8.66     1.13  1.33  30.60  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0101  1  2.0     1.90     0.20  1.33  25.35 0.50     0.000
   [I%=35.0:S%= 2.00]
*
   DUHYD                  0050  1  2.0     1.90     0.20  1.33  25.35  n/a     0.000
      MAJOR SYSTEM:       0050  2  2.0     0.08     0.05  1.33  25.35  n/a     0.000
      MINOR SYSTEM:       0050  3  2.0     1.82     0.15  1.23  25.35  n/a     0.000
*
   ADD [  0010+  0050]    0011  3  2.0    10.48     1.28  1.33  29.69  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0102  1  2.0    10.00     1.04  1.33  26.06 0.52     0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]    0012  3  2.0    20.48     2.32  1.33  27.92  n/a     0.000
*
   ADD [  0012+  0103]    0013  3  2.0    22.58     2.35  1.33  26.22  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD        0104  1  2.0     2.50     0.25  1.33  24.17 0.48     0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]    0014  3  2.0    25.08     2.60  1.33  26.01  n/a     0.000
*
 ** Reservoir
   OUTFLOW:               0601  1  2.0    25.08     0.09  4.17  25.98  n/a     0.000
*
   DIVERT HYD             1601  1  2.0    25.08     0.09  4.17  25.98  n/a     0.000
      Outflow             0002  2  2.0     0.05     0.00  4.17  25.98  n/a     0.000
      Outflow             0002  3  2.0    25.03     0.09  4.17  25.98  n/a     0.000
      Outflow             0002  4  2.0     0.00     0.00  0.00   0.00  n/a     0.000
      Outflow             0002  5  2.0     0.00     0.00  0.00   0.00  n/a     0.000
      Outflow             0002  6  2.0     0.00     0.00  0.00   0.00  n/a     0.000
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
*
 ** CALIB NASHYD          0210  1  5.0     2.36     0.06  1.50   9.82 0.19     0.000
   [CN=68.0        ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                  10.0
   [ Ptot= 50.52 mm ]
```

```
*
 *  CALIB STANDHYD       0205  1  5.0     0.75    0.07  1.33  27.55 0.55    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0     0.75    0.07  1.33  27.55  n/a    0.000
       MAJOR SYSTEM:     3015  2  5.0     0.02    0.01  1.33  27.55  n/a    0.000
       MINOR SYSTEM:     3015  3  5.0     0.73    0.06  1.25  27.55  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0     2.38    0.07  1.33   9.97  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0208  1  5.0     0.86    0.09  1.33  27.56 0.55    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0     3.24    0.15  1.33  14.64  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1901  1  2.0     1.06    0.03  1.57  10.39 0.21    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1902  1  2.0     1.30    0.04  1.50  10.39 0.21    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5001  1  2.0     2.94    0.18  1.33  16.14 0.32    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0     2.94    0.18  1.33  16.14  n/a    0.000
       Outflow           0001  2  2.0     2.32    0.14  1.33  16.14  n/a    0.000
       Outflow           0001  3  2.0     0.62    0.04  1.33  16.14  n/a    0.000
       Outflow           0001  4  2.0     0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  5  2.0     0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  6  2.0     0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5002  1  2.0     2.85    0.18  1.33  19.38 0.38    0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5003  1  2.0    14.99    0.82  1.33  16.18 0.32    0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0    14.99    0.25  1.98  15.27  n/a    0.000
*
    ADD [  0156+  0159]  5005  3  1.0    17.31    0.28  1.95  15.38  n/a    0.000
*
    ADD [  5005+  1902]  5005  1  1.0    18.61    0.30  1.92  15.03  n/a    0.000
*
```

```
    ADD [  5005+  5002]  5005  3  1.0    21.46    0.39  1.33  15.61  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0001  1  2.0   139.80    1.45  3.03  14.21 0.28    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0   139.80    1.28  3.97  14.20  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0002  1  1.0    18.97    0.18  3.08  12.86 0.25    0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0003  1  1.0    13.15    0.17  2.33  12.86 0.25    0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0005  1  1.0    32.68    0.47  2.38  14.16 0.28    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0004  1  1.0     8.46    0.43  1.35  15.10 0.30    0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0    32.12    0.34  2.63  12.86  n/a    0.000
*
    ADD [  0001+  0004]  0001  1  1.0    40.58    0.47  1.37  13.33  n/a    0.000
*
    ADD [  0001+  0005]  0001  3  1.0    73.26    0.88  2.35  13.70  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0008  1  2.0    14.42    0.12  2.33   7.58 0.15    0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1031  1  5.0     1.05    0.05  1.42  16.03 0.32    0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       3061  1  5.0     0.48    0.06  1.33  31.04 0.61    0.000
    [I%=30.0:S%= 2.00]
*
```

```
   ADD [  1031+  3061]  2008  3  5.0    1.53    0.11  1.33  20.74  n/a    0.000
*
   DUHYD                2010  1  5.0    1.53    0.11  1.33  20.74  n/a    0.000
      MAJOR SYSTEM:     2010  2  5.0    0.01    0.01  1.33  20.74  n/a    0.000
      MINOR SYSTEM:     2010  3  5.0    1.52    0.10  1.33  20.74  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3053  1  5.0    0.30    0.04  1.33  31.03 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   DUHYD                2011  1  5.0    0.30    0.04  1.33  31.03  n/a    0.000
      MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     2011  3  5.0    0.30    0.04  1.33  31.03  n/a    0.000
*
   ADD [  2010+  2011]  2009  3  5.0    0.01    0.01  1.33  20.74  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         3055  1  5.0    1.24    0.05  1.50  14.92 0.30    0.000
   [CN=70.0          ]
   [ N = 2.0:Tp 0.17]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3054  1  5.0    0.30    0.04  1.33  31.03 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  2011+  3054]  2004  3  5.0    0.60    0.08  1.33  31.03  n/a    0.000
*
   ADD [  2004+  3055]  2005  3  5.0    1.84    0.11  1.33  20.17  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3052  1  5.0    5.36    0.71  1.33  33.71 0.67    0.000
   [I%=37.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3051  1  5.0   11.90    1.33  1.33  31.05 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3021  1  5.0    1.40    0.12  1.33  20.22 0.40    0.000
   [I%=28.0:S%= 2.00]
*
   ADD [  3021+  3051]  2001  3  5.0   13.30    1.46  1.33  29.91  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       4111  1  5.0    2.42    0.29  1.33  32.09 0.64    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
```

```
 * CALIB STANDHYD       4101  1  5.0    0.40    0.05  1.33  23.42 0.46    0.000
   [I%=35.0:S%= 2.00]
*
   ADD [  4101+  4111]  8000  3  5.0    2.82    0.34  1.33  30.86  n/a    0.000
*
   DUHYD                8050  1  5.0    2.82    0.34  1.33  30.86  n/a    0.000
      MAJOR SYSTEM:     8050  2  5.0    0.13    0.10  1.33  30.86  n/a    0.000
      MINOR SYSTEM:     8050  3  5.0    2.69    0.24  1.25  30.86  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       4120  1  5.0    0.08    0.02  1.33  39.44 0.78    0.000
   [I%=58.0:S%= 2.00]
*
   DUHYD                8055  1  5.0    0.08    0.02  1.33  39.44  n/a    0.000
      MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  1.33  39.44  n/a    0.000
      MINOR SYSTEM:     8055  3  5.0    0.07    0.01  1.25  39.44  n/a    0.000
*
   ADD [  8050+  8055]  8020  3  5.0    2.76    0.25  1.25  31.08  n/a    0.000
*
   ADD [  2001+  8020]  2002  3  5.0   16.06    1.71  1.33  30.11  n/a    0.000
*
   ADD [  2002+  3052]  2003  3  5.0   21.42    2.42  1.33  31.01  n/a    0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.26    2.53  1.33  30.15  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.03  1.33  28.73 0.57    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.20  1.33  32.46 0.64    0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.56    2.56  1.33  30.13  n/a    0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.58    2.57  1.33  30.13  n/a    0.000
*
   ADD [  2007+  3056]  2007  3  5.0   24.95    2.77  1.33  30.26  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             3705  1  5.0   24.95    0.39  2.42  30.22  n/a    0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.21    1.27  2.38  17.64  n/a    0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.63    1.38  2.37  16.35  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.33  2.10  16.08 0.32    0.000
   [CN=78.0          ]
   [ N = 2.0:Tp 0.49]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.03  2.70   5.14 0.10    0.000
   [CN=47.0          ]
```

```
   [ N = 2.0:Tp 0.77]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0011  1  2.0    8.42    0.03  2.90   4.72 0.09    0.000
   [CN=45.0         ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0105  1  2.0    2.90    0.20  1.33  18.47 0.37    0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050] 0015  3  2.0    2.98    0.26  1.33  18.65  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0101  1  2.0    1.57    0.16  1.33  29.59 0.59    0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD               1011  1  2.0    1.57    0.16  1.33  29.59  n/a    0.000
      MAJOR SYSTEM:    1011  2  2.0    0.03    0.03  1.33  29.59  n/a    0.000
      MINOR SYSTEM:    1011  3  2.0    1.54    0.13  1.30  29.59  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0102  1  2.0    2.63    0.31  1.33  31.63 0.63    0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102] 0105  3  2.0    4.17    0.44  1.33  30.88  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0103  1  2.0    0.61    0.15  1.33  42.62 0.84    0.000
   [I%=75.0:S%= 2.00]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0104  1  2.0    1.57    0.21  1.33  32.92 0.65    0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104] 0106  3  2.0    2.18    0.36  1.33  35.64  n/a    0.000
*
   ADD [  0105+  0106] 0107  3  2.0    6.35    0.80  1.33  32.51  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0201  1  2.0   10.34    1.12  1.33  31.28 0.62    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD      0202  1  2.0    2.00    0.22  1.33  30.65 0.61    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0201+  0202] 0203  3  2.0   12.34    1.33  1.33  31.18  n/a    0.000
```

```
*
   ADD [  0107+  0203] 0204  3  2.0   18.69    2.13  1.33  31.63  n/a    0.000
*
 ** Reservoir
   OUTFLOW:            0205  1  2.0   18.69    0.20  3.03  31.62  n/a    0.000
*
   ADD [  1011+  0205] 0206  3  2.0   18.72    0.20  3.03  31.61  n/a    0.000
*
   ADD [  0015+  0206] 0051  3  2.0   21.70    0.37  1.33  29.83  n/a    0.000
*
   ADD [  0051+  0004] 0051  1  1.0  134.32    1.61  2.37  18.53  n/a    0.000
*
   ADD [  0051+  0010] 0051  3  1.0  142.08    1.65  2.38  17.80  n/a    0.000
*
   ADD [  0051+  0011] 0051  1  1.0  150.50    1.68  2.38  17.07  n/a    0.000
*
   ADD [  0051+  0007] 0051  3  1.0  167.18    1.99  2.33  16.97  n/a    0.000
*
   ADD [  0051+  1601] 0005  3  1.0  167.24    1.99  2.33  16.97  n/a    0.000
*
   CHANNEL[ 2:  0005]  0005  1  1.0  167.24    1.82  2.85  16.95  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0006  1  1.0   64.36    0.76  2.78  14.55 0.29    0.000
   [CN=75.0         ]
   [ N = 2.0:Tp 0.89]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0009  1  2.0   21.31    0.29  2.50  14.26 0.28    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.72]
*
   ADD [  0006+  0009] 0003  3  1.0   85.67    1.04  2.70  14.48  n/a    0.000
*
   CHANNEL[ 2:  0003]  0003  1  1.0   85.67    1.00  3.12  14.48  n/a    0.000
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0012  1  2.0   22.38    0.09  2.90   5.20 0.10    0.000
   [CN=48.0         ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0013  1  2.0   22.03    0.09  2.63   4.68 0.09    0.000
   [CN=44.0         ]
   [ N = 2.0:Tp 0.73]
*
   CHIC STORM              10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD        0014  1  2.0    9.31    0.03  3.27   4.12 0.08    0.000
   [CN=40.0         ]
   [ N = 2.0:Tp 1.08]
*
   ADD [  0003+  0005] 0006  3  1.0  252.91    2.80  2.95  16.11  n/a    0.000
*
   ADD [  0006+  0012] 0006  1  1.0  275.29    2.89  2.95  15.22  n/a    0.000
```

```
*
   ADD [  0006+  0013]  0006  3  1.0  297.32    2.98  2.93  14.44  n/a    0.000
*
   ADD [  0006+  0014]  0006  1  1.0  306.63    3.01  2.93  14.13  n/a    0.000
*
   CHANNEL[ 2:  0006]   0006  1  1.0  306.63    2.91  3.30  14.12  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0015  1  2.0   35.26    0.12  3.37   5.09 0.10    0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 1.12]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0200  1  5.0    2.69    0.06  1.58  10.12 0.20    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.18]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0201  1  5.0    0.26    0.06  1.33  40.47 0.80    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0200+  0201]  3000  3  5.0    2.95    0.09  1.33  12.80  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0211  1  5.0    1.00    0.03  1.50   9.96 0.20    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.13]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0209  1  5.0    0.36    0.08  1.33  40.47 0.80    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211]  3012  3  5.0    1.36    0.10  1.33  18.03  n/a    0.000
*
   DUHYD                3112  1  5.0    1.36    0.10  1.33  18.03  n/a    0.000
      MAJOR SYSTEM:     3112  2  5.0    0.02    0.01  1.33  18.03  n/a    0.000
      MINOR SYSTEM:     3112  3  5.0    1.34    0.09  1.33  18.03  n/a    0.000
*
   ADD [  3000+  3112]  3001  3  5.0    2.97    0.10  1.33  12.82  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0109  1  5.0    1.11    0.02  2.00  12.66 0.25    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.40]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0102  1  5.0    0.53    0.14  1.33  43.46 0.86    0.000
   [I%=87.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0104  1  5.0    0.23    0.07  1.33  46.57 0.92    0.000
   [I%=95.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0105  1  5.0    0.15    0.04  1.33  47.74 0.94    0.000
   [I%=98.0:S%= 2.00]
*
   ADD [  0104+  0105]  0106  3  5.0    0.38    0.11  1.33  47.03  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             0107  1  5.0    0.38    0.02  1.67  46.70  n/a    0.000
*
   ADD [  0102+  0107]  0108  3  5.0    0.91    0.16  1.33  44.81  n/a    0.000
*
   ADD [  0108+  0109]  0202  3  5.0    2.02    0.16  1.33  27.14  n/a    0.000
*
   ADD [  0202+  3001]  3002  3  5.0    4.99    0.26  1.33  18.63  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0203  1  5.0    1.17    0.01  1.83   6.82 0.14    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.30]
*
   ADD [  0203+  3002]  3003  3  5.0    6.16    0.27  1.33  16.38  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0204  1  5.0    3.82    0.05  1.67   6.77 0.13    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.20]
*
   ADD [  0204+  3003]  3004  3  5.0    9.98    0.29  1.33  12.70  n/a    0.000
*
   ADD [  3015+  3112]  3005  3  5.0    2.07    0.15  1.33  21.39  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0206  1  5.0    7.28    0.68  1.33  27.57 0.55    0.000
   [I%=30.0:S%= 1.00]
*
   ADD [  0206+  3005]  3006  3  5.0    9.35    0.83  1.33  26.20  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0207  1  5.0    0.72    0.01  1.58   5.47 0.11    0.000
   [CN=50.0         ]
   [ N = 2.0:Tp 0.16]
*
   ADD [  0207+  3006]  3007  3  5.0   10.07    0.84  1.33  24.72  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             3008  1  5.0   10.07    0.22  2.08  24.73  n/a    0.000
*
   ADD [  3004+  3008]  3009  3  5.0   20.05    0.37  1.83  18.75  n/a    0.000
*
```

```
    ADD [  0002+  0006]  0007  3  1.0  446.43    4.11  3.48  14.14  n/a    0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.69    4.23  3.48  13.48  n/a    0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.74    4.43  3.43  13.69  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.09  3.70   7.09 0.14    0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM                   10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.01  1.58   6.10 0.12    0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                   10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.02  1.50  11.96 0.24    0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    CHIC STORM                   10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.30  1.33  22.88 0.45    0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.23    4.51  3.43  13.44  n/a    0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.12    4.52  3.43  13.43  n/a    0.000
*
    ADD [  0008+  1803]  0008  3  1.0  522.76    4.52  3.43  13.43  n/a    0.000
*
    ADD [  0008+  5004]  0008  1  1.0  525.67    4.54  3.43  13.48  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.04  2.75   7.04 0.14    0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.13    4.58  3.43  13.40  n/a    0.000
*
==================================================================================
==========================


       V     V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V     V   I    SS     U   U   A A   L
        V   V    I     SS    U   U  AAAAA  L
        V   V    I      SS   U   U  A   A  L
         VV      I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO      TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```


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```
                    *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\095d4ff4-84e5-42d4-a5d1-344deb89fad5\s
  Summary     filename:     C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\095d4ff4-84e5-42d4-a5d1-344deb89fad5\s


DATE: 04-29-2021                           TIME: 02:32:16

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 03 -10yr 4hr 10min Chicag **
  **************************************************

  W/E COMMAND              HYD  ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                     min     ha   '  cms   hrs     mm            cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                   10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.07  1.57  13.14 0.22    0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                   10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.29  1.33  30.12 0.50    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.35  1.37  38.02 0.64    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.24  1.57  38.02  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.28  1.33  43.19 0.72    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.52  1.33  39.88  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 59.69 mm ]
```

```
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.14  1.33  45.67 0.77    0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.27  1.37  36.45 0.61    0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.41  1.33  38.54  n/a    0.000
*
    DUHYD                0226  1  2.0    2.73    0.41  1.33  38.54  n/a    0.000
       MAJOR SYSTEM:     0226  2  2.0    0.57    0.25  1.33  38.54  n/a    0.000
       MINOR SYSTEM:     0226  3  2.0    2.16    0.16  1.23  38.54  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.26  1.33  45.67 0.77    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.69    0.51  1.33  43.27  n/a    0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.88    1.03  1.33  40.86  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.08  1.33  41.22 0.69    0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.08  1.33  41.22  n/a    0.000
       MAJOR SYSTEM:     0252  2  2.0    0.03    0.03  1.33  41.22  n/a    0.000
       MINOR SYSTEM:     0252  3  2.0    0.45    0.05  1.23  41.22  n/a    0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.34    1.08  1.33  40.88  n/a    0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.84    1.37  1.33  37.84  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.24  1.33  31.30 0.52    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.24  1.33  31.30  n/a    0.000
       MAJOR SYSTEM:     0050  2  2.0    0.13    0.09  1.33  31.30  n/a    0.000
       MINOR SYSTEM:     0050  3  2.0    1.77    0.15  1.23  31.30  n/a    0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.61    1.52  1.33  36.74  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.23  1.33  32.16 0.54    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.61    2.75  1.33  34.52  n/a    0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.71    2.79  1.33  32.54  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
```

```
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.30  1.33  29.96 0.50    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.21    3.08  1.33  32.29  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.21    0.17  4.03  32.24  n/a    0.000
*
    DIVERT HYD           1601  1  2.0   25.21    0.17  4.03  32.24  n/a    0.000
       Outflow           0002  2  2.0    0.05    0.00  4.03  32.24  n/a    0.000
       Outflow           0002  3  2.0   25.16    0.17  4.03  32.24  n/a    0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.09  1.50  13.96 0.23    0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.09  1.33  34.60 0.58    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.09  1.33  34.60  n/a    0.000
       MAJOR SYSTEM:     3015  2  5.0    0.04    0.03  1.33  34.60  n/a    0.000
       MINOR SYSTEM:     3015  3  5.0    0.71    0.06  1.25  34.60  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.40    0.11  1.33  14.30  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.10  1.33  34.61 0.58    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.26    0.21  1.33  19.66  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.04  1.57  14.63 0.25    0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.06  1.50  14.63 0.25    0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.21  1.33  20.46 0.34    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.21  1.33  20.46  n/a    0.000
```

```
     Outflow             0001  2  2.0    2.32     0.17  1.33  20.46  n/a    0.000
     Outflow             0001  3  2.0    0.62     0.04  1.33  20.46  n/a    0.000
     Outflow             0001  4  2.0    0.00     0.00  0.00   0.00  n/a    0.000
     Outflow             0001  5  2.0    0.00     0.00  0.00   0.00  n/a    0.000
     Outflow             0001  6  2.0    0.00     0.00  0.00   0.00  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        5002  1  2.0    2.85     0.22  1.33  24.73 0.41    0.000
  [I%=20.0:S%= 1.00]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        5003  1  2.0   14.99     0.99  1.33  20.52 0.34    0.000
  [I%=20.0:S%= 1.00]
*
 ** Reservoir
  OUTFLOW:               0159  1  1.0   14.99     0.38  1.83  19.60  n/a    0.000
*
  ADD [  0156+  0159]    5005  3  1.0   17.31     0.44  1.82  19.72  n/a    0.000
*
  ADD [  5005+  1902]    5005  1  1.0   18.61     0.48  1.77  19.36  n/a    0.000
*
  ADD [  5005+  5002]    5005  3  1.0   21.46     0.59  1.70  20.08  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          0001  1  2.0  139.80     2.00  3.00  19.50 0.33    0.000
  [CN=74.0          ]
  [ N = 2.0:Tp 1.05]
*
  CHANNEL[ 2:  0001]     0002  1  1.0  139.80     1.77  3.85  19.49  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          0002  1  1.0   18.97     0.24  3.05  17.75 0.30    0.000
  [CN=71.0          ]
  [ N = 2.0:Tp 1.06]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          0003  1  1.0   13.15     0.24  2.32  17.75 0.30    0.000
  [CN=71.0          ]
  [ N = 2.0:Tp 0.62]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          0005  1  1.0   32.68     0.64  2.35  19.44 0.33    0.000
  [CN=74.0          ]
  [ N = 2.0:Tp 0.65]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        0004  1  1.0    8.46     0.52  1.35  19.23 0.32    0.000
  [I%=18.0:S%= 2.00]
*
  ADD [  0002+  0003]    0001  3  1.0   32.12     0.47  2.60  17.75  n/a    0.000
```

```
*
  ADD [  0001+  0004]    0001  1  1.0   40.58     0.59  1.37  18.06  n/a    0.000
*
  ADD [  0001+  0005]    0001  3  1.0   73.26     1.21  2.33  18.67  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          0008  1  2.0   14.42     0.17  2.30  10.87 0.18    0.000
  [CN=58.0          ]
  [ N = 2.0:Tp 0.57]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          1031  1  5.0    1.05     0.07  1.42  21.22 0.36    0.000
  [CN=73.0          ]
  [ N = 2.0:Tp 0.11]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        3061  1  5.0    0.48     0.08  1.33  38.53 0.65    0.000
  [I%=30.0:S%= 2.00]
*
  ADD [  1031+  3061]    2008  3  5.0    1.53     0.15  1.33  26.65  n/a    0.000
*
  DUHYD                  2010  1  5.0    1.53     0.15  1.33  26.65  n/a    0.000
     MAJOR SYSTEM:       2010  2  5.0    0.10     0.05  1.33  26.65  n/a    0.000
     MINOR SYSTEM:       2010  3  5.0    1.43     0.10  1.33  26.65  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        3053  1  5.0    0.30     0.05  1.33  38.53 0.65    0.000
  [I%=30.0:S%= 2.00]
*
  DUHYD                  2011  1  5.0    0.30     0.05  1.33  38.53  n/a    0.000
     MAJOR SYSTEM:       2011  2  5.0    0.00     0.00  0.00   0.00  n/a    0.000
     MINOR SYSTEM:       2011  3  5.0    0.30     0.05  1.33  38.53  n/a    0.000
*
  ADD [  2010+  2011]    2009  3  5.0    0.10     0.05  1.33  26.65  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          3055  1  5.0    1.24     0.06  1.50  19.87 0.33    0.000
  [CN=70.0          ]
  [ N = 2.0:Tp 0.17]
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        3054  1  5.0    0.30     0.05  1.33  38.52 0.65    0.000
  [I%=30.0:S%= 2.00]
*
  ADD [  2011+  3054]    2004  3  5.0    0.60     0.10  1.33  38.52  n/a    0.000
*
  ADD [  2004+  3055]    2005  3  5.0    1.84     0.15  1.33  25.95  n/a    0.000
*
  CHIC STORM                   10.0
  [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD        3052  1  5.0    5.36     0.86  1.33  41.51 0.70    0.000
```

```
   [I%=37.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       3051  1  5.0   11.90    1.63  1.33  38.55 0.65    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       3021  1  5.0    1.40    0.15  1.33  25.29 0.42    0.000
   [I%=28.0:S%= 2.00]
*
   ADD [  3021+  3051]  2001  3  5.0   13.30    1.78  1.33  37.15  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       4111  1  5.0    2.42    0.41  1.33  39.78 0.67    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       4101  1  5.0    0.40    0.05  1.33  29.03 0.49    0.000
   [I%=35.0:S%= 2.00]
*
   ADD [  4101+  4111]  8000  3  5.0    2.82    0.46  1.33  38.25  n/a    0.000
*
   DUHYD                8050  1  5.0    2.82    0.46  1.33  38.25  n/a    0.000
      MAJOR SYSTEM:     8050  2  5.0    0.35    0.22  1.33  38.25  n/a    0.000
      MINOR SYSTEM:     8050  3  5.0    2.47    0.24  1.25  38.25  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       4120  1  5.0    0.08    0.02  1.33  47.77 0.80    0.000
   [I%=58.0:S%= 2.00]
*
   DUHYD                8055  1  5.0    0.08    0.02  1.33  47.77  n/a    0.000
      MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  1.33  47.77  n/a    0.000
      MINOR SYSTEM:     8055  3  5.0    0.07    0.01  1.25  47.77  n/a    0.000
*
   ADD [  8050+  8055]  8020  3  5.0    2.54    0.25  1.25  38.51  n/a    0.000
*
   ADD [  2001+  8020]  2002  3  5.0   15.84    2.03  1.33  37.37  n/a    0.000
*
   ADD [  2002+  3052]  2003  3  5.0   21.20    2.89  1.33  38.42  n/a    0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.04    3.04  1.33  37.42  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.05  1.33  35.77 0.60    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.24  1.33  39.57 0.66    0.000
   [I%=50.0:S%= 0.25]
*
```

```
   ADD [  0101+  2006]  2007  3  5.0   23.34    3.09  1.33  37.40  n/a    0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.44    3.14  1.33  37.35  n/a    0.000
*
   ADD [  2007+  3056]  2007  3  5.0   24.81    3.37  1.33  37.48  n/a    0.000
*
** Reservoir
   OUTFLOW:             3705  1  5.0   24.81    0.55  2.33  37.44  n/a    0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.07    1.76  2.33  23.16  n/a    0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.49    1.93  2.33  21.58  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.45  2.08  21.93 0.37    0.000
   [CN=78.0          ]
   [ N = 2.0:Tp 0.49]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.05  2.67   7.48 0.13    0.000
   [CN=47.0          ]
   [ N = 2.0:Tp 0.77]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0011  1  2.0    8.42    0.05  2.87   6.91 0.12    0.000
   [CN=45.0          ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0105  1  2.0    2.90    0.24  1.33  23.18 0.39    0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050]  0015  3  2.0    3.03    0.33  1.33  23.52  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0101  1  2.0    1.57    0.21  1.33  37.01 0.62    0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                1011  1  2.0    1.57    0.21  1.33  37.01  n/a    0.000
      MAJOR SYSTEM:     1011  2  2.0    0.14    0.08  1.33  37.01  n/a    0.000
      MINOR SYSTEM:     1011  3  2.0    1.43    0.13  1.23  37.01  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0102  1  2.0    2.63    0.38  1.33  39.27 0.66    0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    4.06    0.51  1.33  38.47  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0103  1  2.0    0.61    0.18  1.33  51.12 0.86    0.000
```

```
    [I%=75.0:S%= 2.00]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD       0104  1  2.0    1.57    0.27  1.33  40.63 0.68    0.000
    [I%=36.0:S%= 2.00]
 *
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.45  1.33  43.57  n/a    0.000
 *
    ADD [  0105+  0106]  0107  3  2.0    6.24    0.95  1.33  40.25  n/a    0.000
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD       0201  1  2.0   10.34    1.43  1.37  38.83 0.65    0.000
    [I%=30.0:S%= 2.00]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD       0202  1  2.0    2.00    0.29  1.33  38.20 0.64    0.000
    [I%=25.0:S%= 2.00]
 *
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.71  1.37  38.73  n/a    0.000
 *
    ADD [  0107+  0203]  0204  3  2.0   18.58    2.66  1.33  39.24  n/a    0.000
 *
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.58    0.27  2.90  39.22  n/a    0.000
 *
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.27  2.90  39.21  n/a    0.000
 *
    ADD [  0015+  0206]  0051  3  2.0   21.75    0.51  1.33  37.02  n/a    0.000
 *
    ADD [  0051+  0004]  0051  1  1.0  134.24    2.24  2.33  24.08  n/a    0.000
 *
    ADD [  0051+  0010]  0051  3  1.0  142.00    2.29  2.33  23.18  n/a    0.000
 *
    ADD [  0051+  0011]  0051  1  1.0  150.42    2.33  2.33  22.27  n/a    0.000
 *
    ADD [  0051+  0007]  0051  3  1.0  167.10    2.76  2.27  22.23  n/a    0.000
 *
    ADD [  0051+  1601]  0005  3  1.0  167.14    2.76  2.27  22.23  n/a    0.000
 *
    CHANNEL[ 2:  0005]   0005  1  1.0  167.14    2.55  2.77  22.21  n/a    0.000
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0006  1  1.0   64.36    1.05  2.75  19.97 0.33    0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0009  1  2.0   21.31    0.39  2.47  19.56 0.33    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
 *
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.44  2.67  19.87  n/a    0.000
 *
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.38  3.03  19.87  n/a    0.000
```

```
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0012  1  2.0   22.38    0.14  2.87   7.60 0.13    0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0013  1  2.0   22.03    0.14  2.60   6.82 0.11    0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0014  1  2.0    9.31    0.04  3.23   6.00 0.10    0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
 *
    ADD [  0003+  0005]  0006  3  1.0  252.81    3.91  2.88  21.41  n/a    0.000
 *
    ADD [  0006+  0012]  0006  1  1.0  275.19    4.05  2.87  20.29  n/a    0.000
 *
    ADD [  0006+  0013]  0006  3  1.0  297.22    4.18  2.87  19.29  n/a    0.000
 *
    ADD [  0006+  0014]  0006  1  1.0  306.53    4.22  2.87  18.89  n/a    0.000
 *
    CHANNEL[ 2:  0006]   0006  1  1.0  306.53    4.08  3.20  18.88  n/a    0.000
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0015  1  2.0   35.26    0.18  3.33   7.43 0.12    0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0200  1  5.0    2.69    0.08  1.58  14.38 0.24    0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD       0201  1  5.0    0.26    0.07  1.33  48.77 0.82    0.000
    [I%=75.0:S%= 0.50]
 *
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.12  1.33  17.41  n/a    0.000
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD         0211  1  5.0    1.00    0.04  1.50  14.15 0.24    0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
 *
    CHIC STORM                10.0
    [ Ptot= 59.69 mm ]
 *
```

```
 *  CALIB STANDHYD        0209  1  5.0     0.36     0.10  1.33  48.78 0.82    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]   3012  3  5.0     1.36     0.12  1.33  23.32  n/a    0.000
*
    DUHYD                 3112  1  5.0     1.36     0.12  1.33  23.32  n/a    0.000
       MAJOR SYSTEM:      3112  2  5.0     0.05     0.03  1.33  23.32  n/a    0.000
       MINOR SYSTEM:      3112  3  5.0     1.31     0.09  1.25  23.32  n/a    0.000
*
    ADD [  3000+  3112]   3001  3  5.0     3.00     0.15  1.33  17.51  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0109  1  5.0     1.11     0.03  1.92  17.77 0.30    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0102  1  5.0     0.53     0.17  1.33  51.93 0.87    0.000
    [I%=87.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0104  1  5.0     0.23     0.08  1.33  55.47 0.93    0.000
    [I%=95.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0105  1  5.0     0.15     0.05  1.33  56.80 0.95    0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]   0106  3  5.0     0.38     0.13  1.33  56.00  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              0107  1  5.0     0.38     0.02  1.67  55.66  n/a    0.000
*
    ADD [  0102+  0107]   0108  3  5.0     0.91     0.18  1.33  53.48  n/a    0.000
*
    ADD [  0108+  0109]   0202  3  5.0     2.02     0.19  1.33  33.86  n/a    0.000
*
    ADD [  0202+  3001]   3002  3  5.0     5.02     0.34  1.33  24.09  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0203  1  5.0     1.17     0.02  1.83   9.88 0.17    0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]   3003  3  5.0     6.19     0.35  1.33  21.40  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0204  1  5.0     3.82     0.07  1.58   9.80 0.16    0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]   3004  3  5.0    10.01     0.39  1.33  16.98  n/a    0.000
```

```
*
    ADD [  3015+  3112]   3005  3  5.0     2.02     0.15  1.25  27.29  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0206  1  5.0     7.28     0.83  1.33  34.62 0.58    0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]   3006  3  5.0     9.30     0.98  1.33  33.02  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0207  1  5.0     0.72     0.01  1.50   7.98 0.13    0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]   3007  3  5.0    10.02     0.99  1.33  31.22  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              3008  1  5.0    10.02     0.22  2.33  31.24  n/a    0.000
*
    ADD [  3004+  3008]   3009  3  5.0    20.03     0.48  1.67  24.11  n/a    0.000
*
    ADD [  0002+  0006]   0007  3  1.0   446.33     5.75  3.37  19.07  n/a    0.000
*
    ADD [  0007+  0015]   0007  1  1.0   481.59     5.93  3.37  18.22  n/a    0.000
*
    ADD [  0007+  3009]   0007  3  1.0   501.62     6.23  3.37  18.45  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          1800  1  2.0    19.49     0.12  3.63  10.15 0.17    0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          1802  1  5.0     0.89     0.02  1.58   8.78 0.15    0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          1803  1  5.0     0.64     0.03  1.50  16.39 0.27    0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        5004  1  2.0     2.91     0.36  1.33  28.21 0.47    0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]   0008  3  1.0   521.11     6.35  3.37  18.14  n/a    0.000
*
    ADD [  0008+  1802]   0008  1  1.0   522.00     6.35  3.37  18.13  n/a    0.000
*
    ADD [  0008+  1803]   0008  3  1.0   522.64     6.36  3.37  18.12  n/a    0.000
*
```

```
   ADD [  0008+  5004]  0008  1  1.0  525.55    6.38  3.37  18.18  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD          1801  1  5.0    6.46    0.06  2.67  10.09 0.17   0.000
   [CN=54.9          ]
   [ N = 3.0:Tp 0.99]
*
   ADD [  0008+  1801]  0009  3  1.0  532.01    6.44  3.37  18.08  n/a   0.000
*
=================================================================================
=========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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```
                  *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\15d3a69e-4863-466b-9766-75414b5c5044\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\15d3a69e-4863-466b-9766-75414b5c5044\s


DATE: 04-29-2021                          TIME: 02:32:17

USER:

COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 04 -25yr 4hr 10min Chicag **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm           cms

     START @  0.00 hrs
     --------------------
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.10  1.57  18.06 0.25   0.000
   [CN=56.0          ]
   [ N = 3.0:Tp 0.22]
*
```

```
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.35  1.33  37.80 0.53   0.000
   [I%=33.0:S%= 2.00]
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.48  1.37  47.87 0.67   0.000
   [I%=24.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:             0205  1  2.0    2.68    0.26  1.63  47.87  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0250  1  2.0    1.51    0.34  1.33  53.57 0.75   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]  0255  3  2.0    4.19    0.58  1.33  49.93  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0221  1  2.0    0.62    0.17  1.33  56.16 0.79   0.000
   [I%=51.0:S%= 2.00]
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0220  1  2.0    2.11    0.35  1.37  46.13 0.65   0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0    2.73    0.52  1.33  48.41  n/a   0.000
*
   DUHYD                0226  1  2.0    2.73    0.52  1.33  48.41  n/a   0.000
      MAJOR SYSTEM:     0226  2  2.0    0.75    0.36  1.33  48.41  n/a   0.000
      MINOR SYSTEM:     0226  3  2.0    1.98    0.16  1.20  48.41  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0222  1  2.0    1.12    0.31  1.33  56.16 0.79   0.000
   [I%=51.0:S%= 2.00]
*
   ADD [  0222+  0226]  0227  3  2.0    1.87    0.67  1.33  53.05  n/a   0.000
*
   ADD [  0227+  0255]  0256  3  2.0    6.06    1.26  1.33  50.89  n/a   0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0251  1  2.0    0.48    0.10  1.33  51.41 0.72   0.000
   [I%=32.0:S%= 2.00]
*
   DUHYD                0252  1  2.0    0.48    0.10  1.33  51.41  n/a   0.000
      MAJOR SYSTEM:     0252  2  2.0    0.05    0.05  1.33  51.41  n/a   0.000
      MINOR SYSTEM:     0252  3  2.0    0.43    0.05  1.23  51.41  n/a   0.000
*
   ADD [  0252+  0256]  0009  3  2.0    6.48    1.31  1.33  50.93  n/a   0.000
*
   ADD [  0009+  0100]  0010  3  2.0    8.98    1.66  1.33  47.27  n/a   0.000
```

```
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.29  1.33  39.16 0.55    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.29  1.33  39.16  n/a    0.000
       MAJOR SYSTEM:     0050  2  2.0    0.17    0.14  1.33  39.16  n/a    0.000
       MINOR SYSTEM:     0050  3  2.0    1.73    0.15  1.23  39.16  n/a    0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.71    1.81  1.33  45.96  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.47  1.33  40.21 0.56    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.71    3.28  1.33  43.19  n/a    0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.81    3.33  1.33  40.87  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.35  1.33  37.63 0.53    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.31    3.68  1.33  40.55  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.31    0.36  3.20  40.50  n/a    0.000
*
    DIVERT HYD           1601  1  2.0   25.31    0.36  3.20  40.50  n/a    0.000
       Outflow           0002  2  2.0    0.83    0.06  3.20  40.50  n/a    0.000
       Outflow           0002  3  2.0   24.48    0.30  3.20  40.50  n/a    0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.13  1.42  19.83 0.28    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.11  1.33  43.88 0.62    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.11  1.33  43.88  n/a    0.000
       MAJOR SYSTEM:     3015  2  5.0    0.07    0.05  1.33  43.88  n/a    0.000
       MINOR SYSTEM:     3015  3  5.0    0.68    0.06  1.25  43.88  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.43    0.17  1.33  20.49  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.12  1.33  43.88 0.62    0.000
```

```
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.29    0.29  1.33  26.61  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.06  1.57  20.64 0.29    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.08  1.50  20.64 0.29    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.26  1.33  26.34 0.37    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.26  1.33  26.34  n/a    0.000
       Outflow           0001  2  2.0    2.32    0.20  1.33  26.34  n/a    0.000
       Outflow           0001  3  2.0    0.62    0.06  1.33  26.34  n/a    0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.28  1.33  31.97 0.45    0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.21  1.33  26.42 0.37    0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    0.61  1.70  25.50  n/a    0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    0.70  1.68  25.61  n/a    0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    0.76  1.67  25.26  n/a    0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    0.93  1.65  26.15  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD         0001  1  2.0  139.80    2.76  2.97  26.82 0.38    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    2.48  3.75  26.81  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 71.24 mm ]
*
```

```
 *  CALIB NASHYD        0002  1  1.0   18.97    0.34  3.02  24.56 0.34    0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 1.06]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD        0003  1  1.0   13.15    0.34  2.30  24.56 0.34    0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 0.62]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD        0005  1  1.0   32.68    0.89  2.33  26.75 0.38    0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.65]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      0004  1  1.0    8.46    0.65  1.35  24.87 0.35    0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003] 0001  3  1.0   32.12    0.65  2.57  24.56  n/a    0.000
*
    ADD [  0001+  0004] 0001  1  1.0   40.58    0.79  2.22  24.63  n/a    0.000
*
    ADD [  0001+  0005] 0001  3  1.0   73.26    1.68  2.33  25.57  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD        0008  1  2.0   14.42    0.24  2.27  15.64 0.22    0.000
    [CN=58.0        ]
    [ N = 2.0:Tp 0.57]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD        1031  1  5.0    1.05    0.10  1.42  28.33 0.40    0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3061  1  5.0    0.48    0.10  1.33  48.31 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061] 2008  3  5.0    1.53    0.19  1.33  34.60  n/a    0.000
*
    DUHYD               2010  1  5.0    1.53    0.19  1.33  34.60  n/a    0.000
       MAJOR SYSTEM:    2010  2  5.0    0.21    0.09  1.33  34.60  n/a    0.000
       MINOR SYSTEM:    2010  3  5.0    1.32    0.10  1.25  34.60  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3053  1  5.0    0.30    0.06  1.33  48.30 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD               2011  1  5.0    0.30    0.06  1.33  48.30  n/a    0.000
       MAJOR SYSTEM:    2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:    2011  3  5.0    0.30    0.06  1.33  48.30  n/a    0.000
*
    ADD [  2010+  2011] 2009  3  5.0    0.21    0.09  1.33  34.60  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB NASHYD        3055  1  5.0    1.24    0.08  1.50  26.69 0.37    0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3054  1  5.0    0.30    0.06  1.33  48.30 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054] 2004  3  5.0    0.60    0.13  1.33  48.30  n/a    0.000
*
    ADD [  2004+  3055] 2005  3  5.0    1.84    0.19  1.33  33.74  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3052  1  5.0    5.36    1.19  1.33  51.62 0.72    0.000
    [I%=37.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3051  1  5.0   11.90    2.02  1.33  48.32 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      3021  1  5.0    1.40    0.18  1.33  32.09 0.45    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051] 2001  3  5.0   13.30    2.20  1.33  46.61  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      4111  1  5.0    2.42    0.51  1.33  49.77 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      4101  1  5.0    0.40    0.06  1.33  36.47 0.51    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111] 8000  3  5.0    2.82    0.58  1.33  47.88  n/a    0.000
*
    DUHYD               8050  1  5.0    2.82    0.58  1.33  47.88  n/a    0.000
       MAJOR SYSTEM:    8050  2  5.0    0.51    0.34  1.33  47.88  n/a    0.000
       MINOR SYSTEM:    8050  3  5.0    2.31    0.24  1.25  47.88  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 71.24 mm ]
*
 *  CALIB STANDHYD      4120  1  5.0    0.08    0.02  1.33  58.48 0.82    0.000
    [I%=58.0:S%= 2.00]
```

```
*
   DUHYD                     8055  1  5.0     0.08     0.02  1.33  58.48  n/a    0.000
      MAJOR SYSTEM:          8055  2  5.0     0.01     0.01  1.33  58.48  n/a    0.000
      MINOR SYSTEM:          8055  3  5.0     0.07     0.01  1.25  58.48  n/a    0.000
*
   ADD [  8050+  8055]       8020  3  5.0     2.37     0.25  1.25  48.17  n/a    0.000
*
   ADD [  2001+  8020]       2002  3  5.0    15.67     2.45  1.33  46.85  n/a    0.000
*
   ADD [  2002+  3052]       2003  3  5.0    21.03     3.64  1.33  48.07  n/a    0.000
*
   ADD [  2003+  2005]       2006  3  5.0    22.87     3.83  1.33  46.91  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0101  1  5.0     0.30     0.06  1.33  44.99 0.63    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            3056  1  5.0     1.37     0.28  1.33  48.82 0.69    0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]       2007  3  5.0    23.17     3.89  1.33  46.89  n/a    0.000
*
   ADD [  2007+  2009]       2007  1  5.0    23.38     3.99  1.33  46.78  n/a    0.000
*
   ADD [  2007+  3056]       2007  3  5.0    24.75     4.27  1.33  46.89  n/a    0.000
*
 ** Reservoir
   OUTFLOW:                  3705  1  5.0    24.75     0.71  2.25  46.85  n/a    0.000
*
   ADD [  0001+  3705]       0004  3  1.0    98.01     2.39  2.32  30.67  n/a    0.000
*
   ADD [  0004+  0008]       0004  1  1.0   112.43     2.63  2.30  28.75  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0007  1  1.0    16.68     0.62  2.07  29.93 0.42    0.000
   [CN=78.0          ]
   [ N = 2.0:Tp 0.49]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0010  1  2.0     7.76     0.07  2.63  10.94 0.15    0.000
   [CN=47.0          ]
   [ N = 2.0:Tp 0.77]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0011  1  2.0     8.42     0.07  2.83  10.15 0.14    0.000
   [CN=45.0          ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0105  1  2.0     2.90     0.29  1.33  29.53 0.41    0.000
   [I%=23.0:S%= 2.00]
```

```
*
   ADD [  0105+  0050]       0015  3  2.0     3.07     0.42  1.33  30.06  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0101  1  2.0     1.57     0.27  1.37  46.70 0.66    0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                     1011  1  2.0     1.57     0.27  1.37  46.70  n/a    0.000
      MAJOR SYSTEM:          1011  2  2.0     0.26     0.14  1.37  46.70  n/a    0.000
      MINOR SYSTEM:          1011  3  2.0     1.31     0.13  1.23  46.70  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0102  1  2.0     2.63     0.46  1.33  49.20 0.69    0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]       0105  3  2.0     3.94     0.59  1.33  48.37  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0103  1  2.0     0.61     0.21  1.33  61.95 0.87    0.000
   [I%=75.0:S%= 2.00]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0104  1  2.0     1.57     0.33  1.33  50.64 0.71    0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104]       0106  3  2.0     2.18     0.54  1.33  53.81  n/a    0.000
*
   ADD [  0105+  0106]       0107  3  2.0     6.12     1.13  1.33  50.30  n/a    0.000
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0201  1  2.0    10.34     1.76  1.37  48.67 0.68    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                      10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0202  1  2.0     2.00     0.36  1.37  48.05 0.67    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0201+  0202]       0203  3  2.0    12.34     2.12  1.37  48.57  n/a    0.000
*
   ADD [  0107+  0203]       0204  3  2.0    18.46     3.25  1.33  49.14  n/a    0.000
*
 ** Reservoir
   OUTFLOW:                  0205  1  2.0    18.46     0.35  2.80  49.12  n/a    0.000
*
   ADD [  1011+  0205]       0206  3  2.0    18.72     0.35  2.80  49.09  n/a    0.000
*
   ADD [  0015+  0206]       0051  3  2.0    21.79     0.67  1.33  46.41  n/a    0.000
*
   ADD [  0051+  0004]       0051  1  1.0   134.23     3.04  2.30  31.61  n/a    0.000
*
   ADD [  0051+  0010]       0051  3  1.0   141.99     3.11  2.33  30.48  n/a    0.000
*
```

```
   ADD [  0051+  0011]  0051  1  1.0  150.41    3.18  2.33  29.34  n/a    0.000
*
   ADD [  0051+  0007]  0051  3  1.0  167.09    3.78  2.23  29.40  n/a    0.000
*
   ADD [  0051+  1601]  0005  3  1.0  167.92    3.78  2.23  29.46  n/a    0.000
*
   CHANNEL[ 2:  0005]   0005  1  1.0  167.92    3.54  2.72  29.43  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0006  1  1.0   64.36    1.46  2.72  27.44 0.39    0.000
   [CN=75.0         ]
   [ N = 2.0:Tp 0.89]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0009  1  2.0   21.31    0.55  2.43  26.88 0.38    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.72]
*
   ADD [  0006+  0009]  0003  3  1.0   85.67    1.99  2.63  27.30  n/a    0.000
*
   CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.92  2.98  27.30  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0012  1  2.0   22.38    0.20  2.83  11.15 0.16    0.000
   [CN=48.0         ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0013  1  2.0   22.03    0.20  2.57   9.99 0.14    0.000
   [CN=44.0         ]
   [ N = 2.0:Tp 0.73]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0014  1  2.0    9.31    0.06  3.20   8.79 0.12    0.000
   [CN=40.0         ]
   [ N = 2.0:Tp 1.08]
*
   ADD [  0003+  0005]  0006  3  1.0  253.59    5.43  2.82  28.71  n/a    0.000
*
   ADD [  0006+  0012]  0006  1  1.0  275.97    5.64  2.82  27.29  n/a    0.000
*
   ADD [  0006+  0013]  0006  3  1.0  298.00    5.83  2.82  26.01  n/a    0.000
*
   ADD [  0006+  0014]  0006  1  1.0  307.31    5.89  2.82  25.49  n/a    0.000
*
   CHANNEL[ 2:  0006]   0006  1  1.0  307.31    5.73  3.12  25.47  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0015  1  2.0   35.26    0.26  3.27  10.88 0.15    0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 1.12]
*
```

```
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0200  1  5.0    2.69    0.12  1.58  20.43 0.29    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.18]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD       0201  1  5.0    0.26    0.08  1.33  59.37 0.83    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0200+  0201]  3000  3  5.0    2.95    0.16  1.33  23.86  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0211  1  5.0    1.00    0.05  1.50  20.10 0.28    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.13]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD       0209  1  5.0    0.36    0.11  1.33  59.39 0.83    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211]  3012  3  5.0    1.36    0.16  1.33  30.50  n/a    0.000
*
   DUHYD                3112  1  5.0    1.36    0.16  1.33  30.50  n/a    0.000
      MAJOR SYSTEM:     3112  2  5.0    0.11    0.07  1.33  30.50  n/a    0.000
      MINOR SYSTEM:     3112  3  5.0    1.25    0.09  1.25  30.50  n/a    0.000
*
   ADD [  3000+  3112]  3001  3  5.0    3.06    0.23  1.33  24.10  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD         0109  1  5.0    1.11    0.04  1.92  24.89 0.35    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.40]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD       0102  1  5.0    0.53    0.20  1.33  62.65 0.88    0.000
   [I%=87.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD       0104  1  5.0    0.23    0.09  1.33  66.70 0.94    0.000
   [I%=95.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD       0105  1  5.0    0.15    0.06  1.33  68.22 0.96    0.000
   [I%=98.0:S%= 2.00]
*
   ADD [  0104+  0105]  0106  3  5.0    0.38    0.15  1.33  67.30  n/a    0.000
*
** Reservoir
```

```
   OUTFLOW:                  0107  1  5.0    0.38    0.02  1.75  66.96  n/a    0.000
*
   ADD [  0102+  0107]  0108  3  5.0    0.91    0.22  1.33  64.45  n/a    0.000
*
   ADD [  0108+  0109]  0202  3  5.0    2.02    0.23  1.33  42.71  n/a    0.000
*
   ADD [  0202+  3001]  3002  3  5.0    5.08    0.45  1.33  31.50  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0203  1  5.0    1.17    0.03  1.75  14.33 0.20    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.30]
*
   ADD [  0203+  3002]  3003  3  5.0    6.25    0.46  1.33  28.29  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0204  1  5.0    3.82    0.11  1.58  14.21 0.20    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.20]
*
   ADD [  0204+  3003]  3004  3  5.0   10.07    0.53  1.33  22.95  n/a    0.000
*
   ADD [  3015+  3112]  3005  3  5.0    1.94    0.15  1.25  35.23  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            0206  1  5.0    7.28    1.09  1.33  43.89 0.62    0.000
   [I%=30.0:S%= 1.00]
*
   ADD [  0206+  3005]  3006  3  5.0    9.22    1.24  1.33  42.07  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              0207  1  5.0    0.72    0.02  1.50  11.66 0.16    0.000
   [CN=50.0         ]
   [ N = 2.0:Tp 0.16]
*
   ADD [  0207+  3006]  3007  3  5.0    9.94    1.25  1.33  39.87  n/a    0.000
*
 ** Reservoir
   OUTFLOW:                  3008  1  5.0    9.94    0.23  2.42  39.89  n/a    0.000
*
   ADD [  3004+  3008]  3009  3  5.0   20.00    0.63  1.33  31.36  n/a    0.000
*
   ADD [  0002+  0006]  0007  3  1.0  447.11    8.06  3.30  25.89  n/a    0.000
*
   ADD [  0007+  0015]  0007  1  1.0  482.37    8.32  3.30  24.79  n/a    0.000
*
   ADD [  0007+  3009]  0007  3  1.0  502.37    8.66  3.28  25.05  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              1800  1  2.0   19.49    0.18  3.60  14.59 0.20    0.000
   [CN=55.1         ]
   [ N = 2.0:Tp 1.34]
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              1802  1  5.0    0.89    0.03  1.58  12.69 0.18    0.000
   [CN=50.7         ]
   [ N = 3.0:Tp 0.21]
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              1803  1  5.0    0.64    0.04  1.50  22.61 0.32    0.000
   [CN=66.6         ]
   [ N = 3.0:Tp 0.19]
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB STANDHYD            5004  1  2.0    2.91    0.43  1.33  35.29 0.50    0.000
   [I%=35.0:S%= 1.00]
*
   ADD [  0007+  1800]  0008  3  1.0  521.86    8.83  3.30  24.66  n/a    0.000
*
   ADD [  0008+  1802]  0008  1  1.0  522.75    8.84  3.30  24.64  n/a    0.000
*
   ADD [  0008+  1803]  0008  3  1.0  523.39    8.84  3.28  24.64  n/a    0.000
*
   ADD [  0008+  5004]  0008  1  1.0  526.30    8.87  3.28  24.70  n/a    0.000
*
   CHIC STORM                  10.0
   [ Ptot= 71.24 mm ]
*
 * CALIB NASHYD              1801  1  5.0    6.46    0.09  2.67  14.50 0.20    0.000
   [CN=54.9         ]
   [ N = 3.0:Tp 0.99]
*
   ADD [  0008+  1801]  0009  3  1.0  532.76    8.96  3.25  24.58  n/a    0.000
*
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7b8aff3c-8990-4c87-86a9-3e7989704cf4\s
  Summary    filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7b8aff3c-8990-4c87-86a9-3e7989704cf4\s
```

```
DATE: 04-29-2021                        TIME: 02:32:23

USER:


COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : Run 05 - 50yr 4hr 10min Chica **
  ************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.     Qbase
                                   min      ha   '  cms   hrs      mm            cms

      START @  0.00 hrs
      -------------------
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 ** CALIB NASHYD           0103  1  2.0     2.10    0.12  1.57   21.90 0.28    0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 ** CALIB STANDHYD         0100  1  2.0     2.50    0.40  1.33   43.50 0.55    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 ** CALIB STANDHYD         0200  1  2.0     2.68    0.56  1.37   55.07 0.69    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:               0205  1  2.0     2.68    0.28  1.63   55.07  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0250  1  2.0     1.51    0.41  1.33   61.10 0.77    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]    0255  3  2.0     4.19    0.66  1.33   57.25  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0221  1  2.0     0.62    0.20  1.33   63.74 0.80    0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0220  1  2.0     2.11    0.41  1.37   53.22 0.67    0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]    0225  3  2.0     2.73    0.60  1.33   55.61  n/a    0.000
*
    DUHYD                  0226  1  2.0     2.73    0.60  1.33   55.61  n/a    0.000
       MAJOR SYSTEM:       0226  2  2.0     0.85    0.44  1.33   55.61  n/a    0.000
```

```
       MINOR SYSTEM:       0226  3  2.0     1.88    0.16  1.20   55.61  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0222  1  2.0     1.12    0.35  1.33   63.75 0.80    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]    0227  3  2.0     1.97    0.79  1.33   60.23  n/a    0.000
*
    ADD [  0227+  0255]    0256  3  2.0     6.16    1.45  1.33   58.20  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0251  1  2.0     0.48    0.12  1.33   58.82 0.74    0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                  0252  1  2.0     0.48    0.12  1.33   58.82  n/a    0.000
       MAJOR SYSTEM:       0252  2  2.0     0.07    0.06  1.33   58.82  n/a    0.000
       MINOR SYSTEM:       0252  3  2.0     0.41    0.05  1.23   58.82  n/a    0.000
*
    ADD [  0252+  0256]    0009  3  2.0     6.57    1.51  1.33   58.24  n/a    0.000
*
    ADD [  0009+  0100]    0010  3  2.0     9.07    1.90  1.33   54.18  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0101  1  2.0     1.90    0.32  1.33   44.98 0.57    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                  0050  1  2.0     1.90    0.32  1.33   44.98  n/a    0.000
       MAJOR SYSTEM:       0050  2  2.0     0.21    0.17  1.33   44.98  n/a    0.000
       MINOR SYSTEM:       0050  3  2.0     1.69    0.15  1.23   44.98  n/a    0.000
*
    ADD [  0010+  0050]    0011  3  2.0    10.76    2.05  1.33   52.73  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0102  1  2.0    10.00    1.65  1.33   46.17 0.58    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]    0012  3  2.0    20.76    3.71  1.33   49.57  n/a    0.000
*
    ADD [  0012+  0103]    0013  3  2.0    22.86    3.76  1.33   47.03  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0104  1  2.0     2.50    0.40  1.33   43.33 0.55    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]    0014  3  2.0    25.36    4.17  1.33   46.66  n/a    0.000
*
 ** Reservoir
    OUTFLOW:               0601  1  2.0    25.36    0.47  2.93   46.61  n/a    0.000
*
    DIVERT HYD             1601  1  2.0    25.36    0.47  2.93   46.61  n/a    0.000
       Outflow             0002  2  2.0     1.24    0.06  2.93   46.61  n/a    0.000
       Outflow             0002  3  2.0    24.12    0.41  2.93   46.61  n/a    0.000
       Outflow             0002  4  2.0     0.00    0.00  0.00    0.00  n/a    0.000
       Outflow             0002  5  2.0     0.00    0.00  0.00    0.00  n/a    0.000
```

```
      Outflow               0002  6  2.0     0.00     0.00  0.00   0.00  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
 ** CALIB NASHYD            0210  1  5.0     2.36     0.17  1.42  24.40 0.31    0.000
   [CN=68.0          ]
   [ N = 2.0:Tp 0.11]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB STANDHYD          0205  1  5.0     0.75     0.13  1.33  50.71 0.64    0.000
   [I%=30.0:S%= 0.50]
 *
   DUHYD                    3015  1  5.0     0.75     0.13  1.33  50.71  n/a    0.000
      MAJOR SYSTEM:         3015  2  5.0     0.12     0.07  1.33  50.71  n/a    0.000
      MINOR SYSTEM:         3015  3  5.0     0.63     0.06  1.25  50.71  n/a    0.000
 *
   ADD [  0210+  3015]      3200  3  5.0     2.48     0.23  1.33  25.64  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB STANDHYD          0208  1  5.0     0.86     0.15  1.33  50.71 0.64    0.000
   [I%=30.0:S%= 0.50]
 *
   ADD [  0208+  3200]      3201  3  5.0     3.34     0.38  1.33  32.10  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            1901  1  2.0     1.06     0.07  1.57  25.31 0.32    0.000
   [CN=66.5          ]
   [ N = 3.0:Tp 0.21]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            1902  1  2.0     1.30     0.10  1.50  25.31 0.32    0.000
   [CN=66.5          ]
   [ N = 3.0:Tp 0.16]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB STANDHYD          5001  1  2.0     2.94     0.30  1.33  30.79 0.39    0.000
   [I%=20.0:S%= 1.00]
 *
   DIVERT HYD               0156  1  2.0     2.94     0.30  1.33  30.79  n/a    0.000
      Outflow               0001  2  2.0     2.32     0.24  1.33  30.79  n/a    0.000
      Outflow               0001  3  2.0     0.62     0.06  1.33  30.79  n/a    0.000
      Outflow               0001  4  2.0     0.00     0.00  0.00   0.00  n/a    0.000
      Outflow               0001  5  2.0     0.00     0.00  0.00   0.00  n/a    0.000
      Outflow               0001  6  2.0     0.00     0.00  0.00   0.00  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB STANDHYD          5002  1  2.0     2.85     0.33  1.33  37.42 0.47    0.000
   [I%=20.0:S%= 1.00]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
```

```
 *
  * CALIB STANDHYD          5003  1  2.0    14.99     1.40  1.33  30.88 0.39    0.000
   [I%=20.0:S%= 1.00]
 *
 ** Reservoir
   OUTFLOW:                 0159  1  1.0    14.99     0.78  1.65  29.97  n/a    0.000
 *
   ADD [  0156+  0159]      5005  3  1.0    17.31     0.90  1.63  30.08  n/a    0.000
 *
   ADD [  5005+  1902]      5005  1  1.0    18.61     0.99  1.62  29.74  n/a    0.000
 *
   ADD [  5005+  5002]      5005  3  1.0    21.46     1.20  1.55  30.76  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            0001  1  2.0   139.80     3.33  2.97  32.39 0.41    0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 1.05]
 *
   CHANNEL[ 2:  0001]       0002  1  1.0   139.80     3.02  3.72  32.39  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            0002  1  1.0    18.97     0.41  3.00  29.79 0.37    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 1.06]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            0003  1  1.0    13.15     0.41  2.28  29.79 0.37    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 0.62]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            0005  1  1.0    32.68     1.08  2.32  32.32 0.41    0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 0.65]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB STANDHYD          0004  1  1.0     8.46     0.76  1.37  29.16 0.37    0.000
   [I%=18.0:S%= 2.00]
 *
   ADD [  0002+  0003]      0001  3  1.0    32.12     0.79  2.57  29.79  n/a    0.000
 *
   ADD [  0001+  0004]      0001  1  1.0    40.58     0.95  2.22  29.66  n/a    0.000
 *
   ADD [  0001+  0005]      0001  3  1.0    73.26     2.03  2.32  30.85  n/a    0.000
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
 *
  * CALIB NASHYD            0008  1  2.0    14.42     0.30  2.27  19.41 0.24    0.000
   [CN=58.0          ]
   [ N = 2.0:Tp 0.57]
 *
   CHIC STORM                         10.0
   [ Ptot= 79.45 mm ]
```

```
*
 *  CALIB NASHYD        1031  1  5.0    1.05    0.11  1.42  33.71 0.42    0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3061  1  5.0    0.48    0.12  1.33  55.46 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061] 2008  3  5.0    1.53    0.23  1.33  40.53  n/a    0.000
*
    DUHYD               2010  1  5.0    1.53    0.23  1.33  40.53  n/a    0.000
       MAJOR SYSTEM:    2010  2  5.0    0.29    0.13  1.33  40.53  n/a    0.000
       MINOR SYSTEM:    2010  3  5.0    1.24    0.10  1.25  40.53  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3053  1  5.0    0.30    0.07  1.33  55.45 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD               2011  1  5.0    0.30    0.07  1.33  55.45  n/a    0.000
       MAJOR SYSTEM:    2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:    2011  3  5.0    0.30    0.07  1.33  55.45  n/a    0.000
*
    ADD [  2010+  2011] 2009  3  5.0    0.29    0.13  1.33  40.53  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD        3055  1  5.0    1.24    0.10  1.50  31.88 0.40    0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3054  1  5.0    0.30    0.07  1.33  55.45 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054] 2004  3  5.0    0.60    0.15  1.33  55.45  n/a    0.000
*
    ADD [  2004+  3055] 2005  3  5.0    1.84    0.22  1.33  39.57  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3052  1  5.0    5.36    1.37  1.33  58.98 0.74    0.000
    [I%=37.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3051  1  5.0   11.90    2.70  1.33  55.47 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3021  1  5.0    1.40    0.21  1.33  37.18 0.47    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051] 2001  3  5.0   13.30    2.91  1.33  53.54  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      4111  1  5.0    2.42    0.59  1.33  57.06 0.72    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      4101  1  5.0    0.40    0.07  1.33  42.00 0.53    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111] 8000  3  5.0    2.82    0.67  1.33  54.92  n/a    0.000
*
    DUHYD               8050  1  5.0    2.82    0.67  1.33  54.92  n/a    0.000
       MAJOR SYSTEM:    8050  2  5.0    0.62    0.43  1.33  54.92  n/a    0.000
       MINOR SYSTEM:    8050  3  5.0    2.20    0.24  1.25  54.92  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      4120  1  5.0    0.08    0.03  1.33  66.18 0.83    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD               8055  1  5.0    0.08    0.03  1.33  66.18  n/a    0.000
       MAJOR SYSTEM:    8055  2  5.0    0.02    0.02  1.33  66.18  n/a    0.000
       MINOR SYSTEM:    8055  3  5.0    0.06    0.01  1.25  66.18  n/a    0.000
*
    ADD [  8050+  8055] 8020  3  5.0    2.27    0.25  1.25  55.23  n/a    0.000
*
    ADD [  2001+  8020] 2002  3  5.0   15.57    3.16  1.33  53.79  n/a    0.000
*
    ADD [  2002+  3052] 2003  3  5.0   20.93    4.53  1.33  55.12  n/a    0.000
*
    ADD [  2003+  2005] 2006  3  5.0   22.77    4.75  1.33  53.86  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      0101  1  5.0    0.30    0.07  1.33  51.77 0.65    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      3056  1  5.0    1.37    0.32  1.33  55.58 0.70    0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006] 2007  3  5.0   23.07    4.82  1.33  53.83  n/a    0.000
*
    ADD [  2007+  2009] 2007  1  5.0   23.35    4.94  1.33  53.67  n/a    0.000
*
    ADD [  2007+  3056] 2007  3  5.0   24.72    5.26  1.33  53.78  n/a    0.000
*
 ** Reservoir
    OUTFLOW:            3705  1  5.0   24.72    0.92  2.17  53.74  n/a    0.000
*
    ADD [  0001+  3705] 0004  3  1.0   97.98    2.94  2.23  36.34  n/a    0.000
*
    ADD [  0004+  0008] 0004  1  1.0  112.40    3.24  2.23  34.17  n/a    0.000
*
    CHIC STORM                10.0
```

```
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0007  1  1.0   16.68    0.75  2.05  35.98 0.45    0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0010  1  2.0    7.76    0.09  2.63  13.73 0.17    0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0011  1  2.0    8.42    0.09  2.83  12.76 0.16    0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0105  1  2.0    2.90    0.32  1.33  34.30 0.43    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]    0015  3  2.0    3.11    0.50  1.33  35.00  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0101  1  2.0    1.57    0.32  1.37  53.80 0.68    0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                  1011  1  2.0    1.57    0.32  1.37  53.80  n/a    0.000
       MAJOR SYSTEM:       1011  2  2.0    0.32    0.19  1.37  53.80  n/a    0.000
       MINOR SYSTEM:       1011  3  2.0    1.25    0.13  1.23  53.80  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0102  1  2.0    2.63    0.57  1.33  56.45 0.71    0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]    0105  3  2.0    3.88    0.70  1.33  55.60  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0103  1  2.0    0.61    0.24  1.33  69.72 0.88    0.000
    [I%=75.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0104  1  2.0    1.57    0.38  1.33  57.93 0.73    0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]    0106  3  2.0    2.18    0.61  1.33  61.23  n/a    0.000
*
    ADD [  0105+  0106]    0107  3  2.0    6.06    1.31  1.33  57.63  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
```

```
*
 *  CALIB STANDHYD         0201  1  2.0   10.34    2.03  1.37  55.85 0.70    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD         0202  1  2.0    2.00    0.42  1.37  55.25 0.70    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]    0203  3  2.0   12.34    2.45  1.37  55.75  n/a    0.000
*
    ADD [  0107+  0203]    0204  3  2.0   18.40    3.74  1.33  56.37  n/a    0.000
*
 ** Reservoir
    OUTFLOW:               0205  1  2.0   18.40    0.42  2.73  56.35  n/a    0.000
*
    ADD [  1011+  0205]    0206  3  2.0   18.72    0.42  2.73  56.31  n/a    0.000
*
    ADD [  0015+  0206]    0051  3  2.0   21.83    0.80  1.33  53.28  n/a    0.000
*
    ADD [  0051+  0004]    0051  1  1.0  134.23    3.73  2.22  37.28  n/a    0.000
*
    ADD [  0051+  0010]    0051  3  1.0  141.99    3.82  2.23  35.99  n/a    0.000
*
    ADD [  0051+  0011]    0051  1  1.0  150.41    3.89  2.25  34.69  n/a    0.000
*
    ADD [  0051+  0007]    0051  3  1.0  167.09    4.63  2.20  34.82  n/a    0.000
*
    ADD [  0051+  1601]    0005  3  1.0  168.33    4.69  2.20  34.90  n/a    0.000
*
    CHANNEL[ 2:  0005]     0005  1  1.0  168.33    4.35  2.65  34.87  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0006  1  1.0   64.36    1.76  2.72  33.13 0.42    0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0009  1  2.0   21.31    0.66  2.43  32.46 0.41    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]    0003  3  1.0   85.67    2.41  2.62  32.96  n/a    0.000
*
    CHANNEL[ 2:  0003]     0003  1  1.0   85.67    2.33  2.97  32.96  n/a    0.000
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0012  1  2.0   22.38    0.25  2.83  14.00 0.18    0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                   10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD           0013  1  2.0   22.03    0.25  2.57  12.54 0.16    0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
```

```
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0014  1  2.0    9.31    0.07  3.20  11.05 0.14    0.000
   [CN=40.0         ]
   [ N = 2.0:Tp 1.08]
*
   ADD [  0003+  0005]   0006  3  1.0  254.00    6.63  2.77  34.23  n/a    0.000
*
   ADD [  0006+  0012]   0006  1  1.0  276.38    6.88  2.77  32.59  n/a    0.000
*
   ADD [  0006+  0013]   0006  3  1.0  298.41    7.13  2.77  31.11  n/a    0.000
*
   ADD [  0006+  0014]   0006  1  1.0  307.72    7.20  2.77  30.50  n/a    0.000
*
   CHANNEL[ 2:  0006]    0006  1  1.0  307.72    7.00  3.03  30.49  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0015  1  2.0   35.26    0.33  3.27  13.66 0.17    0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 1.12]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0200  1  5.0    2.69    0.15  1.50  25.13 0.32    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.18]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0201  1  5.0    0.26    0.09  1.33  67.01 0.84    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0200+  0201]   3000  3  5.0    2.95    0.19  1.33  28.82  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0211  1  5.0    1.00    0.07  1.50  24.73 0.31    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.13]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0209  1  5.0    0.36    0.13  1.33  67.03 0.84    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211]   3012  3  5.0    1.36    0.18  1.33  35.92  n/a    0.000
*
   DUHYD                 3112  1  5.0    1.36    0.18  1.33  35.92  n/a    0.000
      MAJOR SYSTEM:      3112  2  5.0    0.16    0.09  1.33  35.92  n/a    0.000
      MINOR SYSTEM:      3112  3  5.0    1.20    0.09  1.25  35.92  n/a    0.000
*
   ADD [  3000+  3112]   3001  3  5.0    3.11    0.28  1.33  29.19  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
```

```
 * CALIB NASHYD          0109  1  5.0    1.11    0.05  1.92  30.35 0.38    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.40]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0102  1  5.0    0.53    0.22  1.33  70.34 0.89    0.000
   [I%=87.0:S%= 2.00]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0104  1  5.0    0.23    0.10  1.33  74.71 0.94    0.000
   [I%=95.0:S%= 2.00]
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0105  1  5.0    0.15    0.07  1.33  76.36 0.96    0.000
   [I%=98.0:S%= 2.00]
*
   ADD [  0104+  0105]   0106  3  5.0    0.38    0.17  1.33  75.36  n/a    0.000
*
** Reservoir
   OUTFLOW:              0107  1  5.0    0.38    0.02  1.75  75.02  n/a    0.000
*
   ADD [  0102+  0107]   0108  3  5.0    0.91    0.24  1.33  72.29  n/a    0.000
*
   ADD [  0108+  0109]   0202  3  5.0    2.02    0.25  1.33  49.25  n/a    0.000
*
   ADD [  0202+  3001]   3002  3  5.0    5.13    0.54  1.33  37.09  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0203  1  5.0    1.17    0.03  1.75  17.86 0.22    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.30]
*
   ADD [  0203+  3002]   3003  3  5.0    6.30    0.55  1.33  33.52  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB NASHYD          0204  1  5.0    3.82    0.14  1.58  17.72 0.22    0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.20]
*
   ADD [  0204+  3003]   3004  3  5.0   10.12    0.63  1.33  27.55  n/a    0.000
*
   ADD [  3015+  3112]   3005  3  5.0    1.83    0.15  1.25  41.03  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
 * CALIB STANDHYD        0206  1  5.0    7.28    1.25  1.33  50.72 0.64    0.000
   [I%=30.0:S%= 1.00]
*
   ADD [  0206+  3005]   3006  3  5.0    9.11    1.40  1.33  48.77  n/a    0.000
*
   CHIC STORM               10.0
   [ Ptot= 79.45 mm ]
*
```

```
 *  CALIB NASHYD        0207  1  5.0    0.72    0.02  1.50  14.62 0.18    0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006] 3007  3  5.0    9.83    1.42  1.33  46.27  n/a    0.000
*
 ** Reservoir
    OUTFLOW:            3008  1  5.0    9.83    0.28  2.42  46.29  n/a    0.000
*
    ADD [  3004+  3008] 3009  3  5.0   19.95    0.77  1.33  36.79  n/a    0.000
*
    ADD [  0002+  0006] 0007  3  1.0  447.52    9.82  3.20  31.08  n/a    0.000
*
    ADD [  0007+  0015] 0007  1  1.0  482.78   10.15  3.20  29.81  n/a    0.000
*
    ADD [  0007+  3009] 0007  3  1.0  502.73   10.52  3.20  30.09  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD        1800  1  2.0   19.49    0.22  3.60  18.11 0.23    0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD        1802  1  5.0    0.89    0.04  1.50  15.81 0.20    0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD        1803  1  5.0    0.64    0.05  1.50  27.40 0.34    0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB STANDHYD      5004  1  2.0    2.91    0.49  1.33  40.54 0.51    0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800] 0008  3  1.0  522.22   10.73  3.20  29.64  n/a    0.000
*
    ADD [  0008+  1802] 0008  1  1.0  523.11   10.74  3.20  29.62  n/a    0.000
*
    ADD [  0008+  1803] 0008  3  1.0  523.75   10.75  3.20  29.61  n/a    0.000
*
    ADD [  0008+  5004] 0008  1  1.0  526.66   10.78  3.20  29.67  n/a    0.000
*
    CHIC STORM                10.0
    [ Ptot= 79.45 mm ]
*
 *  CALIB NASHYD        1801  1  5.0    6.46    0.12  2.67  18.00 0.23    0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801] 0009  3  1.0  533.12   10.89  3.20  29.53  n/a    0.000
*
=================================================================================
==========================
```

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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```


```
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```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\89a91e06-3551-45f2-a380-d92308a6837e\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\89a91e06-3551-45f2-a380-d92308a6837e\s


DATE: 04-29-2021                           TIME: 02:32:24

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 06 - 100yr 4hr 10min Chic **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 87.58 mm ]
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.15  1.57  25.94 0.30    0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                10.0
    [ Ptot= 87.58 mm ]
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.44  1.33  49.30 0.56    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD      0200  1  2.0    2.68    0.64  1.37  62.31 0.71    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0205  1  2.0    2.68    0.49  1.53  62.31  n/a    0.000
```

```
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0250  1  2.0    1.51    0.47  1.33  68.63 0.78    0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]  0255  3  2.0    4.19    0.74  1.53  64.59  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0221  1  2.0    0.62    0.22  1.33  71.32 0.81    0.000
   [I%=51.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0220  1  2.0    2.11    0.48  1.37  60.37 0.69    0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0    2.73    0.68  1.33  62.86  n/a    0.000
*
   DUHYD                0226  1  2.0    2.73    0.68  1.33  62.86  n/a    0.000
      MAJOR SYSTEM:     0226  2  2.0    0.95    0.52  1.33  62.86  n/a    0.000
      MINOR SYSTEM:     0226  3  2.0    1.78    0.16  1.20  62.86  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0222  1  2.0    1.12    0.40  1.33  71.32 0.81    0.000
   [I%=51.0:S%= 2.00]
*
   ADD [  0222+  0226]  0227  3  2.0    2.07    0.92  1.33  67.43  n/a    0.000
*
   ADD [  0227+  0255]  0256  3  2.0    6.26    1.63  1.33  65.53  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0251  1  2.0    0.48    0.14  1.33  66.25 0.76    0.000
   [I%=32.0:S%= 2.00]
*
   DUHYD                0252  1  2.0    0.48    0.14  1.33  66.25  n/a    0.000
      MAJOR SYSTEM:     0252  2  2.0    0.09    0.08  1.33  66.25  n/a    0.000
      MINOR SYSTEM:     0252  3  2.0    0.39    0.05  1.23  66.25  n/a    0.000
*
   ADD [  0252+  0256]  0009  3  2.0    6.65    1.69  1.33  65.57  n/a    0.000
*
   ADD [  0009+  0100]  0010  3  2.0    9.15    2.13  1.33  61.13  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0101  1  2.0    1.90    0.36  1.33  50.91 0.58    0.000
   [I%=35.0:S%= 2.00]
*
   DUHYD                0050  1  2.0    1.90    0.36  1.33  50.91  n/a    0.000
      MAJOR SYSTEM:     0050  2  2.0    0.27    0.21  1.33  50.91  n/a    0.000
      MINOR SYSTEM:     0050  3  2.0    1.63    0.15  1.20  50.91  n/a    0.000
*
   ADD [  0010+  0050]  0011  3  2.0   10.79    2.28  1.33  59.58  n/a    0.000
*
   CHIC STORM                 10.0
```

```
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0102  1  2.0   10.00    1.84  1.33  52.21 0.60    0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]  0012  3  2.0   20.79    4.12  1.33  56.03  n/a    0.000
*
   ADD [  0012+  0103]  0013  3  2.0   22.89    4.20  1.33  53.27  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0104  1  2.0    2.50    0.45  1.33  49.14 0.56    0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]  0014  3  2.0   25.39    4.65  1.33  52.86  n/a    0.000
*
** Reservoir
   OUTFLOW:             0601  1  2.0   25.39    0.55  2.83  52.81  n/a    0.000
*
   DIVERT HYD           1601  1  2.0   25.39    0.55  2.83  52.81  n/a    0.000
      Outflow           0002  2  2.0    1.39    0.06  2.83  52.81  n/a    0.000
      Outflow           0002  3  2.0   23.99    0.49  2.83  52.81  n/a    0.000
      Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
** CALIB NASHYD         0210  1  5.0    2.36    0.21  1.42  29.17 0.33    0.000
   [CN=68.0          ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0205  1  5.0    0.75    0.15  1.33  57.60 0.66    0.000
   [I%=30.0:S%= 0.50]
*
   DUHYD                3015  1  5.0    0.75    0.15  1.33  57.60  n/a    0.000
      MAJOR SYSTEM:     3015  2  5.0    0.15    0.09  1.33  57.60  n/a    0.000
      MINOR SYSTEM:     3015  3  5.0    0.60    0.06  1.25  57.60  n/a    0.000
*
   ADD [  0210+  3015]  3200  3  5.0    2.51    0.28  1.33  30.87  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0208  1  5.0    0.86    0.17  1.33  57.61 0.66    0.000
   [I%=30.0:S%= 0.50]
*
   ADD [  0208+  3200]  3201  3  5.0    3.37    0.45  1.33  37.69  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.09  1.57  30.20 0.34    0.000
   [CN=66.5          ]
   [ N = 3.0:Tp 0.21]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
```

```
 *  CALIB NASHYD          1902  1  2.0     1.30     0.12  1.50   30.20 0.34     0.000
    [CN=66.5        ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        5001  1  2.0     2.94     0.34  1.33   35.39 0.40     0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD            0156  1  2.0     2.94     0.34  1.33   35.39  n/a     0.000
       Outflow            0001  2  2.0     2.32     0.26  1.33   35.39  n/a     0.000
       Outflow            0001  3  2.0     0.62     0.07  1.33   35.39  n/a     0.000
       Outflow            0001  4  2.0     0.00     0.00  0.00    0.00  n/a     0.000
       Outflow            0001  5  2.0     0.00     0.00  0.00    0.00  n/a     0.000
       Outflow            0001  6  2.0     0.00     0.00  0.00    0.00  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        5002  1  2.0     2.85     0.37  1.33   43.01 0.49     0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        5003  1  2.0    14.99     1.58  1.33   35.50 0.41     0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:              0159  1  1.0    14.99     1.26  1.52   34.58  n/a     0.000
*
    ADD [  0156+  0159]   5005  3  1.0    17.31     1.43  1.52   34.69  n/a     0.000
*
    ADD [  5005+  1902]   5005  1  1.0    18.61     1.55  1.52   34.38  n/a     0.000
*
    ADD [  5005+  5002]   5005  3  1.0    21.46     1.85  1.52   35.52  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          0001  1  2.0   139.80     3.95  2.93   38.16 0.44     0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]    0002  1  1.0   139.80     3.60  3.65   38.15  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          0002  1  1.0    18.97     0.49  2.97   35.22 0.40     0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 1.06]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          0003  1  1.0    13.15     0.49  2.27   35.22 0.40     0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 0.62]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
```

```
 *  CALIB NASHYD          0005  1  1.0    32.68     1.29  2.30   38.09 0.43     0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.65]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        0004  1  1.0     8.46     0.88  1.37   33.61 0.38     0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]   0001  3  1.0    32.12     0.95  2.53   35.22  n/a     0.000
*
    ADD [  0001+  0004]   0001  1  1.0    40.58     1.12  2.20   34.89  n/a     0.000
*
    ADD [  0001+  0005]   0001  3  1.0    73.26     2.41  2.28   36.32  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          0008  1  2.0    14.42     0.37  2.23   23.41 0.27     0.000
    [CN=58.0        ]
    [ N = 2.0:Tp 0.57]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          1031  1  5.0     1.05     0.13  1.42   39.25 0.45     0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        3061  1  5.0     0.48     0.13  1.33   62.65 0.72     0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]   2008  3  5.0     1.53     0.26  1.33   46.59  n/a     0.000
*
    DUHYD                 2010  1  5.0     1.53     0.26  1.33   46.59  n/a     0.000
       MAJOR SYSTEM:      2010  2  5.0     0.36     0.16  1.33   46.59  n/a     0.000
       MINOR SYSTEM:      2010  3  5.0     1.17     0.10  1.25   46.59  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD        3053  1  5.0     0.30     0.08  1.33   62.64 0.72     0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                 2011  1  5.0     0.30     0.08  1.33   62.64  n/a     0.000
       MAJOR SYSTEM:      2011  2  5.0     0.00     0.00  0.00    0.00  n/a     0.000
       MINOR SYSTEM:      2011  3  5.0     0.30     0.08  1.33   62.64  n/a     0.000
*
    ADD [  2010+  2011]   2009  3  5.0     0.36     0.16  1.33   46.59  n/a     0.000
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD          3055  1  5.0     1.24     0.12  1.50   37.26 0.43     0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    CHIC STORM                  10.0
    [ Ptot= 87.58 mm ]
*
```

```
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.08  1.33  62.64 0.72    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.17  1.33  62.64  n/a    0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.26  1.33  45.53  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    1.55  1.33  66.35 0.76    0.000
    [I%=37.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    3.08  1.33  62.66 0.72    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.23  1.33  42.40 0.48    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    3.31  1.33  60.52  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.68  1.33  64.37 0.74    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.09  1.33  47.63 0.54    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.76  1.33  62.00  n/a    0.000
*
    DUHYD                8050  1  5.0    2.82    0.76  1.33  62.00  n/a    0.000
       MAJOR SYSTEM:     8050  2  5.0    0.73    0.52  1.33  62.00  n/a    0.000
       MINOR SYSTEM:     8050  3  5.0    2.09    0.24  1.25  62.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.03  1.33  73.86 0.84    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.03  1.33  73.86  n/a    0.000
       MAJOR SYSTEM:     8055  2  5.0    0.02    0.02  1.33  73.86  n/a    0.000
       MINOR SYSTEM:     8055  3  5.0    0.06    0.01  1.25  73.86  n/a    0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.15    0.25  1.25  62.33  n/a    0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.45    3.56  1.33  60.78  n/a    0.000
*
    ADD [  2002+  3052]  2003  3  5.0   20.81    5.11  1.33  62.21  n/a    0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.65    5.37  1.33  60.86  n/a    0.000
*
    CHIC STORM                 10.0
```

```
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.08  1.33  58.63 0.67    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.35  1.33  62.39 0.71    0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   22.95    5.45  1.33  60.83  n/a    0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.31    5.61  1.33  60.61  n/a    0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.68    5.96  1.33  60.71  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.68    1.22  2.00  60.67  n/a    0.000
*
    ADD [  0001+  3705]  0004  3  1.0   97.94    3.59  2.17  42.17  n/a    0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.36    3.96  2.17  39.76  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.90  2.03  42.18 0.48    0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.11  2.60  16.72 0.19    0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.11  2.80  15.58 0.18    0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.36  1.33  39.21 0.45    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.17    0.58  1.33  40.19  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.36  1.37  60.96 0.70    0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.36  1.37  60.96  n/a    0.000
       MAJOR SYSTEM:     1011  2  2.0    0.39    0.23  1.37  60.96  n/a    0.000
       MINOR SYSTEM:     1011  3  2.0    1.18    0.13  1.23  60.96  n/a    0.000
*
    CHIC STORM                 10.0
```

```
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0102  1  2.0    2.63    0.64  1.33  63.73 0.73    0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    3.81    0.77  1.33  62.87  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0103  1  2.0    0.61    0.26  1.33  77.46 0.88    0.000
   [I%=75.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0104  1  2.0    1.57    0.42  1.33  65.25 0.75    0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104]  0106  3  2.0    2.18    0.69  1.33  68.67  n/a    0.000
*
   ADD [  0105+  0106]  0107  3  2.0    5.99    1.46  1.33  64.98  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0201  1  2.0   10.34    2.30  1.37  63.08 0.72    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0202  1  2.0    2.00    0.46  1.37  62.49 0.71    0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0201+  0202]  0203  3  2.0   12.34    2.76  1.37  62.98  n/a    0.000
*
   ADD [  0107+  0203]  0204  3  2.0   18.33    4.19  1.33  63.63  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             0205  1  2.0   18.33    0.49  2.67  63.61  n/a    0.000
*
   ADD [  1011+  0205]  0206  3  2.0   18.72    0.49  2.67  63.56  n/a    0.000
*
   ADD [  0015+  0206]  0051  3  2.0   21.89    0.93  1.33  60.18  n/a    0.000
*
   ADD [  0051+  0004]  0051  1  1.0  134.25    4.53  2.17  43.09  n/a    0.000
*
   ADD [  0051+  0010]  0051  3  1.0  142.01    4.64  2.17  41.65  n/a    0.000
*
   ADD [  0051+  0011]  0051  1  1.0  150.43    4.73  2.17  40.19  n/a    0.000
*
   ADD [  0051+  0007]  0051  3  1.0  167.11    5.62  2.17  40.39  n/a    0.000
*
   ADD [  0051+  1601]  0005  3  1.0  168.50    5.68  2.17  40.49  n/a    0.000
*
   CHANNEL[ 2:  0005]   0005  1  1.0  168.50    5.24  2.55  40.46  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0006  1  1.0   64.36    2.09  2.68  39.00 0.45    0.000
   [CN=75.0         ]
   [ N = 2.0:Tp 0.89]
```

```
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0009  1  2.0   21.31    0.79  2.40  38.23 0.44    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.72]
*
   ADD [  0006+  0009]  0003  3  1.0   85.67    2.87  2.60  38.81  n/a    0.000
*
   CHANNEL[ 2:  0003]   0003  1  1.0   85.67    2.77  2.90  38.81  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0012  1  2.0   22.38    0.31  2.80  17.06 0.19    0.000
   [CN=48.0         ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0013  1  2.0   22.03    0.31  2.53  15.29 0.17    0.000
   [CN=44.0         ]
   [ N = 2.0:Tp 0.73]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0014  1  2.0    9.31    0.09  3.17  13.50 0.15    0.000
   [CN=40.0         ]
   [ N = 2.0:Tp 1.08]
*
   ADD [  0003+  0005]  0006  3  1.0  254.17    7.94  2.68  39.90  n/a    0.000
*
   ADD [  0006+  0012]  0006  1  1.0  276.55    8.25  2.68  38.05  n/a    0.000
*
   ADD [  0006+  0013]  0006  3  1.0  298.58    8.55  2.68  36.37  n/a    0.000
*
   ADD [  0006+  0014]  0006  1  1.0  307.89    8.64  2.68  35.68  n/a    0.000
*
   CHANNEL[ 2:  0006]   0006  1  1.0  307.89    8.41  2.97  35.67  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0015  1  2.0   35.26    0.41  3.20  16.65 0.19    0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 1.12]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD         0200  1  5.0    2.69    0.19  1.50  30.06 0.34    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.18]
*
   CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD       0201  1  5.0    0.26    0.10  1.33  74.63 0.85    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0200+  0201]  3000  3  5.0    2.95    0.23  1.33  33.98  n/a    0.000
```

```
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        0211  1  5.0    1.00    0.08  1.50  29.57 0.34    0.000
   [CN=68.0        ]
   [ N = 2.0:Tp 0.13]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD      0209  1  5.0    0.36    0.14  1.33  74.63 0.85    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211] 3012  3  5.0    1.36    0.21  1.33  41.50  n/a    0.000
*
   DUHYD               3112  1  5.0    1.36    0.21  1.33  41.50  n/a    0.000
      MAJOR SYSTEM:    3112  2  5.0    0.22    0.12  1.33  41.50  n/a    0.000
      MINOR SYSTEM:    3112  3  5.0    1.14    0.09  1.25  41.50  n/a    0.000
*
   ADD [  3000+  3112] 3001  3  5.0    3.17    0.34  1.33  34.51  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        0109  1  5.0    1.11    0.06  1.92  36.02 0.41    0.000
   [CN=74.0        ]
   [ N = 2.0:Tp 0.40]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD      0102  1  5.0    0.53    0.24  1.33  77.97 0.89    0.000
   [I%=87.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD      0104  1  5.0    0.23    0.11  1.33  82.65 0.94    0.000
   [I%=95.0:S%= 2.00]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD      0105  1  5.0    0.15    0.07  1.33  84.41 0.96    0.000
   [I%=98.0:S%= 2.00]
*
   ADD [  0104+  0105] 0106  3  5.0    0.38    0.19  1.33  83.34  n/a    0.000
*
** Reservoir
   OUTFLOW:            0107  1  5.0    0.38    0.02  1.75  83.01  n/a    0.000
*
   ADD [  0102+  0107] 0108  3  5.0    0.91    0.26  1.33  80.07  n/a    0.000
*
   ADD [  0108+  0109] 0202  3  5.0    2.02    0.28  1.33  55.86  n/a    0.000
*
   ADD [  0202+  3001] 3002  3  5.0    5.19    0.63  1.33  42.82  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        0203  1  5.0    1.17    0.04  1.75  21.62 0.25    0.000
   [CN=56.0        ]
   [ N = 2.0:Tp 0.30]
```

```
*
   ADD [  0203+  3002] 3003  3  5.0    6.36    0.64  1.33  38.92  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        0204  1  5.0    3.82    0.17  1.58  21.45 0.24    0.000
   [CN=56.0        ]
   [ N = 2.0:Tp 0.20]
*
   ADD [  0204+  3003] 3004  3  5.0   10.18    0.75  1.33  32.37  n/a    0.000
*
   ADD [  3015+  3112] 3005  3  5.0    1.74    0.15  1.25  47.07  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB STANDHYD      0206  1  5.0    7.28    1.42  1.33  57.61 0.66    0.000
   [I%=30.0:S%= 1.00]
*
   ADD [  0206+  3005] 3006  3  5.0    9.02    1.57  1.33  55.58  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        0207  1  5.0    0.72    0.03  1.50  17.79 0.20    0.000
   [CN=50.0        ]
   [ N = 2.0:Tp 0.16]
*
   ADD [  0207+  3006] 3007  3  5.0    9.74    1.59  1.33  52.79  n/a    0.000
*
** Reservoir
   OUTFLOW:            3008  1  5.0    9.74    0.36  2.25  52.79  n/a    0.000
*
   ADD [  3004+  3008] 3009  3  5.0   19.92    0.91  1.33  42.35  n/a    0.000
*
   ADD [  0002+  0006] 0007  3  1.0  447.69   11.74  3.15  36.44  n/a    0.000
*
   ADD [  0007+  0015] 0007  1  1.0  482.95   12.14  3.15  35.00  n/a    0.000
*
   ADD [  0007+  3009] 0007  3  1.0  502.87   12.59  3.10  35.29  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        1800  1  2.0   19.49    0.26  3.53  21.86 0.25    0.000
   [CN=55.1        ]
   [ N = 2.0:Tp 1.34]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        1802  1  5.0    0.89    0.04  1.50  19.15 0.22    0.000
   [CN=50.7        ]
   [ N = 3.0:Tp 0.21]
*
   CHIC STORM                10.0
   [ Ptot= 87.58 mm ]
*
 * CALIB NASHYD        1803  1  5.0    0.64    0.06  1.50  32.40 0.37    0.000
   [CN=66.6        ]
   [ N = 3.0:Tp 0.19]
*
   CHIC STORM                10.0
```

```
   [ Ptot= 87.58 mm ]
*
 *  CALIB STANDHYD       5004  1  2.0     2.91     0.57  1.33  45.91 0.52    0.000
   [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0   522.36    12.85  3.10  34.79  n/a    0.000
*
    ADD [  0008+  1802]  0008  1  1.0   523.25    12.86  3.10  34.76  n/a    0.000
*
    ADD [  0008+  1803]  0008  3  1.0   523.89    12.87  3.10  34.76  n/a    0.000
*
    ADD [  0008+  5004]  0008  1  1.0   526.80    12.91  3.10  34.82  n/a    0.000
*
    CHIC STORM                 10.0
   [ Ptot= 87.58 mm ]
*
 *  CALIB NASHYD         1801  1  5.0     6.46     0.14  2.67  21.73 0.25    0.000
   [CN=54.9         ]
   [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0   533.26    13.04  3.10  34.66  n/a    0.000
*
=================================================================================
==========================
```

```
       V    V   I    SSSSS  U    U    A    L              (v 6.2.2005)
       V    V   I    SS     U    U   A A   L
        V  V    I     SS    U    U  AAAAA  L
        V  V    I      SS   U    U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H    H  Y   Y  M   M   OOO      TM
       O   O     T      T    H    H   Y Y   MM MM  O   O
       O   O     T      T    H    H    Y    M   M  O   O
        OOO      T      T    H    H    Y    M   M   OOO
```

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***** S U M M A R Y   O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\314bc91e-0bcc-47bd-a124-9953c9ddd92a\s
  Summary    filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\314bc91e-0bcc-47bd-a124-9953c9ddd92a\s


DATE: 04-29-2021                          TIME: 02:32:18

USER:


COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : Run 07 - 2yr 12hr 15min SCS    **
  **************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

       START @  0.00 hrs
       --------------------
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0     2.10     0.05  6.37   8.62 0.18    0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0     2.50     0.15  6.23  22.49 0.47    0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0     2.68     0.21  6.27  28.06 0.59    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68     0.21  6.27  28.06  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0     1.51     0.15  6.23  32.54 0.68    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19     0.36  6.27  29.67  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0     0.62     0.07  6.23  34.86 0.73    0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0     2.11     0.15  6.27  26.69 0.56    0.000
    [I%=20.0:S%= 2.00]
*
```

```
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.22  6.23  28.55  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.22  6.23  28.55  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.12    0.06  6.23  28.55  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.61    0.16  6.10  28.55  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.13  6.23  34.87 0.73   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.24    0.20  6.23  34.28  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.43    0.55  6.27  30.72  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.05  6.23  30.83 0.65   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.05  6.23  30.83  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.48    0.05  6.23  30.83  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    5.91    0.59  6.23  30.73  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.41    0.74  6.23  28.28  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.12  6.23  23.45 0.49   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.12  6.23  23.45  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.90    0.12  6.23  23.45  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.31    0.87  6.23  27.39  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.63  6.23  24.11 0.51   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.31    1.50  6.23  25.78  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.41    1.53  6.23  24.17  n/a   0.000
*
```

```
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.15  6.23  22.33 0.47   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   24.91    1.69  6.23  23.98  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   24.91    0.08  9.77  23.93  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   24.91    0.08  9.77  23.93  n/a   0.000
       Outflow           0002  2  2.0    0.06    0.00  9.77  23.93  n/a   0.000
       Outflow           0002  3  2.0   24.85    0.08  9.77  23.93  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.07  6.25   8.58 0.18   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.05  6.25  25.31 0.53   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.05  6.25  25.31  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.75    0.05  6.25  25.31  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.36    0.07  6.25   8.58  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.06  6.25  25.31 0.53   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.22    0.12  6.25  13.05  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.03  6.37   9.11 0.19   0.000
```

```
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.04  6.33   9.11 0.19   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.11  6.23  14.79 0.31   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.11  6.23  14.79  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.09  6.23  14.79  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.02  6.23  14.79  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.12  6.23  17.70 0.37   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    0.53  6.27  14.83 0.31   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    0.16  6.90  13.91  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    0.18  6.88  14.03  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    0.19  6.85  13.68  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    0.30  6.27  14.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    1.11  7.53  12.59 0.27   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    0.93  8.55  12.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.13  7.57  11.31 0.24   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.14  6.95  11.37 0.24   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.37  6.98  12.53 0.26   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.29  6.27  13.82 0.29   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.26  7.18  11.37  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.39  6.28  11.88  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    0.71  6.90  12.17  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.09  6.93   6.60 0.14   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.05  6.25  14.42 0.30   0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.04  6.25  28.63 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.09  6.25  18.88  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.09  6.25  18.88  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.53    0.09  6.25  18.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.03  6.25  28.63 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.03  6.25  28.63  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.03  6.25  28.63  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  0.0    0.00    0.00  0.00  28.63  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.04  6.33  13.39 0.28   0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.03  6.25  28.62 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.05  6.25  28.63  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.09  6.25  18.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.51  6.25  31.19 0.66   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.00  6.25  28.65 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.08  6.25  18.62 0.39   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.08  6.25  27.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.22  6.25  29.62 0.62   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.03  6.25  21.63 0.46   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.25  6.25  28.49  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.25  6.25  28.49  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.01    0.01  6.25  28.49  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.81    0.24  6.25  28.49  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.01  6.25  36.71 0.77   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.01  6.25  36.71  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.00    0.00  6.25  36.71  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.08    0.01  6.25  36.71  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.89    0.25  6.25  28.71  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.19    1.33  6.25  27.79  n/a   0.000
*
```

```
   ADD [  2002+  3052]  2003  3  5.0   21.55    1.84  6.25  28.64  n/a   0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.39    1.93  6.25  27.83  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.02  6.25  26.49 0.56   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.12  6.25  30.17 0.64   0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.69    1.95  6.25  27.81  n/a   0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.69    1.95  6.25  27.81  n/a   0.000
*
   ADD [  2007+  3056]  2007  3  5.0   25.06    2.08  6.25  27.94  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             3705  1  5.0   25.06    0.28  7.08  27.90  n/a   0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.32    0.98  6.98  15.74  n/a   0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.74    1.07  6.97  14.57  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.27  6.80  14.27 0.30   0.000
   [CN=78.0         ]
   [ N = 2.0:Tp 0.49]
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.03  7.23   4.45 0.09   0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 0.77]
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0011  1  2.0    8.42    0.02  7.37   4.08 0.09   0.000
   [CN=45.0         ]
   [ N = 2.0:Tp 0.87]
```

```
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0105  1  2.0    2.90    0.12  6.23  16.99 0.36   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050]  0015  3  2.0    2.90    0.12  6.23  16.99  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0101  1  2.0    1.57    0.12  6.27  27.22 0.57   0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                1011  1  2.0    1.57    0.12  6.27  27.22  n/a   0.000
      MAJOR SYSTEM:     1011  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     1011  3  2.0    1.57    0.12  6.27  27.22  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0102  1  2.0    2.63    0.22  6.27  29.18 0.61   0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    4.20    0.34  6.27  28.45  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0103  1  2.0    0.61    0.09  6.23  39.85 0.84   0.000
   [I%=75.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0104  1  2.0    1.57    0.14  6.23  30.44 0.64   0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104]  0106  3  2.0    2.18    0.23  6.23  33.07  n/a   0.000
*
   ADD [  0105+  0106]  0107  3  2.0    6.38    0.57  6.23  30.03  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 47.50 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0201  1  2.0   10.34    0.80  6.27  28.86 0.61   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.16  6.27  28.23 0.59   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    0.96  6.27  28.76  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.72    1.52  6.27  29.19  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.72    0.16  7.37  29.18  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.16  7.37  29.18  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.62    0.22  6.23  27.54  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.36    1.26  6.98  16.66  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.12    1.28  6.98  15.99  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.54    1.31  7.00  15.32  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.22    1.57  6.92  15.22  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.28    1.57  6.92  15.22  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.28    1.38  7.47  15.18  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    0.59  7.33  12.86 0.27   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.23  7.07  12.64 0.27   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    0.82  7.25  12.83  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.76  7.70  12.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.07  7.37   4.50 0.09   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.07  7.17   4.06 0.09   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.02  7.70   3.57 0.08   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.95    2.13  7.57  14.38  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.33    2.20  7.57  13.58  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.36    2.26  7.57  12.87  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.67    2.28  7.57  12.59  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.67    2.17  7.92  12.57  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.09  7.77   4.41 0.09   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.05  6.33   8.84 0.19   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.03  6.25  37.74 0.79   0.000
    [I%=75.0:S%= 0.50]
*
```

```
   ADD [  0200+  0201]  3000  3  5.0    2.95    0.09  6.25  11.39  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0211  1  5.0    1.00    0.03  6.25   8.70 0.18   0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.13]
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0209  1  5.0    0.36    0.05  6.25  37.76 0.79   0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211]  3012  3  5.0    1.36    0.07  6.25  16.39  n/a   0.000
*
   DUHYD                3112  1  5.0    1.36    0.07  6.25  16.39  n/a   0.000
      MAJOR SYSTEM:     3112  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     3112  3  5.0    1.36    0.07  6.25  16.39  n/a   0.000
*
   ADD [  3000+  3112]  3001  3  5.0    2.95    0.09  6.25  11.39  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0109  1  5.0    1.11    0.02  6.67  11.10 0.23   0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.40]
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0102  1  5.0    0.53    0.08  6.25  40.69 0.86   0.000
   [I%=87.0:S%= 2.00]
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0104  1  5.0    0.23    0.04  6.25  43.65 0.92   0.000
   [I%=95.0:S%= 2.00]
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0105  1  5.0    0.15    0.03  6.25  44.76 0.94   0.000
```

```
   [I%=98.0:S%= 2.00]
*
   ADD [  0104+  0105]  0106  3  5.0    0.38    0.06  6.25  44.09  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0107  1  5.0    0.38    0.02  6.33  43.76  n/a   0.000
*
   ADD [  0102+  0107]  0108  3  5.0    0.91    0.10  6.25  41.97  n/a   0.000
*
   ADD [  0108+  0109]  0202  3  5.0    2.02    0.11  6.25  25.01  n/a   0.000
*
   ADD [  0202+  3001]  3002  3  5.0    4.97    0.19  6.25  16.92  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0203  1  5.0    1.17    0.01  6.50   5.92 0.12   0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.30]
*
   ADD [  0203+  3002]  3003  3  5.0    6.14    0.20  6.25  14.83  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0204  1  5.0    3.82    0.05  6.33   5.88 0.12   0.000
   [CN=56.0         ]
   [ N = 2.0:Tp 0.20]
*
   ADD [  0204+  3003]  3004  3  5.0    9.96    0.24  6.25  11.39  n/a   0.000
*
   ADD [  3015+  3112]  3005  3  5.0    2.11    0.12  6.25  19.56  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB STANDHYD       0206  1  5.0    7.28    0.49  6.25  25.32 0.53   0.000
   [I%=30.0:S%= 1.00]
*
   ADD [  0206+  3005]  3006  3  5.0    9.39    0.61  6.25  24.03  n/a   0.000
*
   READ STORM               15.0
   [ Ptot= 47.50 mm ]
   fname             :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
   remark: 2yr 12hr 15min SCS
*
 * CALIB NASHYD         0207  1  5.0    0.72    0.01  6.33   4.74 0.10   0.000
   [CN=50.0         ]
   [ N = 2.0:Tp 0.16]
*
   ADD [  0207+  3006]  3007  3  5.0   10.11    0.62  6.25  22.65  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             3008  1  5.0   10.11    0.16  6.83  22.66  n/a   0.000
```

```
*
    ADD [  3004+  3008]  3009  3  5.0   20.07    0.30  6.25  17.07  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.47    3.05  8.08  12.57  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.73    3.14  8.08  11.97  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.80    3.28  8.03  12.18  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 47.50 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD        1800  1  2.0   19.49    0.06  8.13   6.18 0.13   0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM               15.0
    [ Ptot= 47.50 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD        1802  1  5.0    0.89    0.01  6.33   5.31 0.11   0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM               15.0
    [ Ptot= 47.50 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD        1803  1  5.0    0.64    0.02  6.33  10.61 0.22   0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM               15.0
    [ Ptot= 47.50 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD      5004  1  2.0    2.91    0.18  6.23  21.19 0.45   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.29    3.34  8.03  11.95  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.18    3.34  8.03  11.94  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  522.82    3.34  8.03  11.94  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  525.73    3.36  8.03  11.99  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 47.50 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD        1801  1  5.0    6.46    0.03  7.33   6.14 0.13   0.000
    [CN=54.9          ]
```

```
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.19    3.38  8.03  11.92  n/a   0.000
*
=====================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
       OOO      T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.
```


```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\494aac47-ba5d-4d85-bd4a-ee8203f99509\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\494aac47-ba5d-4d85-bd4a-ee8203f99509\s


DATE: 04-29-2021                          TIME: 02:32:20

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 08 -5yr 12hr 15min SCS    **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha    '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM               15.0
    [ Ptot= 66.00 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.09  6.37  15.75 0.24   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM               15.0
    [ Ptot= 66.00 mm ]
    fname           :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
```

```
    remark: 5yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.23  6.23  34.27 0.52   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.35  6.27  43.36 0.66   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.24  6.40  43.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.24  6.23  48.83 0.74   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.48  6.23  45.33  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.11  6.23  51.37 0.78   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.26  6.27  41.69 0.63   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.37  6.27  43.89  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.37  6.27  43.89  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.42    0.21  6.27  43.89  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.31    0.16  6.07  43.89  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.20  6.23  51.38 0.78   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.54    0.41  6.23  49.33  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.73    0.89  6.23  46.41  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.07  6.23  46.75 0.71   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.07  6.23  46.75  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.02    0.02  6.23  46.75  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.46    0.05  6.13  46.75  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.19    0.94  6.23  46.43  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.69    1.17  6.23  42.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.18  6.23  35.54 0.54   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.18  6.23  35.54  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.04    0.03  6.23  35.54  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.86    0.15  6.10  35.54  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.55    1.32  6.23  41.63  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.92  6.23  36.51 0.55   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.55    2.24  6.23  39.14  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.65    2.31  6.23  36.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.23  6.23  34.10 0.52   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.15    2.54  6.23  36.69  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.15    0.16  8.47  36.59  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.15    0.16  8.47  36.59  n/a   0.000
       Outflow           0002  2  2.0    0.05    0.00  8.47  36.59  n/a   0.000
       Outflow           0002  3  2.0   25.10    0.16  8.47  36.59  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
```

```
      Outflow            0002  5  2.0     0.00     0.00  0.00    0.00  n/a    0.000
      Outflow            0002  6  2.0     0.00     0.00  0.00    0.00  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0     2.36     0.14  6.25   17.09 0.26    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0     0.75     0.08  6.25   39.62 0.60    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0     0.75     0.08  6.25   39.62  n/a    0.000
      MAJOR SYSTEM:      3015  2  5.0     0.02     0.02  6.25   39.62  n/a    0.000
      MINOR SYSTEM:      3015  3  5.0     0.73     0.06  6.17   39.62  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0     2.38     0.16  6.25   17.30  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0     0.86     0.09  6.25   39.62 0.60    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0     3.24     0.25  6.25   23.22  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0     1.06     0.05  6.37   17.83 0.27    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0     1.30     0.08  6.30   17.83 0.27    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       5001  1  2.0     2.94     0.18  6.23   23.61 0.36    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0     2.94     0.18  6.23   23.61  n/a    0.000
      Outflow            0001  2  2.0     2.32     0.14  6.23   23.61  n/a    0.000
      Outflow            0001  3  2.0     0.62     0.04  6.23   23.61  n/a    0.000
      Outflow            0001  4  2.0     0.00     0.00  0.00    0.00  n/a    0.000
      Outflow            0001  5  2.0     0.00     0.00  0.00    0.00  n/a    0.000
      Outflow            0001  6  2.0     0.00     0.00  0.00    0.00  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0     2.85     0.20  6.27   28.63 0.43    0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0    14.99     0.85  6.27   23.68 0.36    0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0    14.99     0.46  6.53   22.77  n/a    0.000
*
    ADD [  0156+  0159]  5005  3  1.0    17.31     0.53  6.52   22.88  n/a    0.000
*
    ADD [  5005+  1902]  5005  1  1.0    18.61     0.57  6.48   22.53  n/a    0.000
*
    ADD [  5005+  5002]  5005  3  1.0    21.46     0.70  6.47   23.34  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0   139.80     2.12  7.47   23.42 0.35    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0   139.80     1.84  8.33   23.41  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0    18.97     0.26  7.50   21.29 0.32    0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
```

```
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.27  6.92  21.38 0.32   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.72  6.95  23.35 0.35   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.48  6.27  22.25 0.34   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.51  7.13  21.39  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.70  6.28  21.57  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    1.35  6.82  22.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.19  6.90  13.40 0.20   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.09  6.25  25.04 0.38   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.07  6.25  43.84 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.16  6.25  30.93  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.16  6.25  30.93  n/a   0.000
      MAJOR SYSTEM:      2010  2  5.0    0.11    0.06  6.25  30.93  n/a   0.000
```

```
      MINOR SYSTEM:      2010  3  5.0    1.42    0.10  6.17  30.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.05  6.25  43.83 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.05  6.25  43.83  n/a   0.000
      MAJOR SYSTEM:      2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:      2011  3  5.0    0.30    0.05  6.25  43.83  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.11    0.06  6.25  30.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.07  6.25  23.52 0.36   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.05  6.25  43.83 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.09  6.25  43.83  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.16  6.25  30.14  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.79  6.25  47.00 0.71   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.57  6.25  43.85 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.13  6.25  28.95 0.44    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.70  6.25  42.28  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.34  6.25  45.20 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.04  6.25  33.04 0.50    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.39  6.25  43.47  n/a    0.000
*
    DUHYD                8050  1  5.0    2.82    0.39  6.25  43.47  n/a    0.000
       MAJOR SYSTEM:     8050  2  5.0    0.18    0.15  6.25  43.47  n/a    0.000
       MINOR SYSTEM:     8050  3  5.0    2.64    0.24  6.08  43.47  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.02  6.25  53.57 0.81    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.02  6.25  53.57  n/a    0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  6.25  53.57  n/a    0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01  6.08  53.57  n/a    0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.71    0.25  6.08  43.74  n/a    0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.01    1.95  6.25  42.53  n/a    0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.37    2.74  6.25  43.65  n/a    0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.21    2.90  6.25  42.58  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.04  6.25  40.75 0.62    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.18  6.25  44.59 0.68    0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.51    2.94  6.25  42.55  n/a    0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.61    3.00  6.25  42.50  n/a    0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.98    3.18  6.25  42.62  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.98    0.59  6.92  42.58  n/a    0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.24    1.93  6.83  27.03  n/a    0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.66    2.13  6.83  25.28  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.52  6.77  26.22 0.40    0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.06  7.17   9.31 0.14    0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.05  7.33   8.61 0.13    0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.18  6.23  26.59 0.40    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    2.94    0.22  6.23  26.72  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.20  6.27  42.26 0.64    0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.20  6.27  42.26  n/a    0.000
       MAJOR SYSTEM:     1011  2  2.0    0.10    0.07  6.27  42.26  n/a    0.000
       MINOR SYSTEM:     1011  3  2.0    1.47    0.13  6.10  42.26  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.36  6.27  44.65 0.68    0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.10    0.49  6.27  43.79  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.13  6.23  57.02 0.86    0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.23  6.23  46.06 0.70    0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.35  6.23  49.13  n/a    0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.28    0.84  6.23  45.65  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.31  6.27  44.16 0.67    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.26  6.27  43.54 0.66    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.58  6.27  44.06  n/a    0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.62    2.41  6.27  44.60  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.62    0.27  7.23  44.58  n/a    0.000
```

```
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.27  7.23  44.57  n/a    0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.66    0.41  6.23  42.14  n/a    0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.33    2.44  6.82  27.99  n/a    0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.09    2.50  6.82  26.97  n/a    0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.51    2.54  6.88  25.94  n/a    0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.19    3.05  6.82  25.97  n/a    0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.23    3.05  6.82  25.97  n/a    0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.23    2.74  7.33  25.92  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.14  7.28  23.93 0.36    0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.44  7.03  23.48 0.36    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.57  7.20  23.85  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.48  7.58  23.85  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.15  7.33   9.47 0.14    0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.15  7.10   8.49 0.13    0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0014  1  2.0    9.31    0.04  7.63   7.47 0.11   0.000
    [CN=40.0        ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.90    4.19  7.42  25.22  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.28    4.34  7.42  23.94  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.31    4.49  7.40  22.79  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.62    4.53  7.40  22.33  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.62    4.34  7.72  22.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0015  1  2.0   35.26    0.19  7.70   9.25 0.14   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0200  1  5.0    2.69    0.11  6.33  17.60 0.27   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0201  1  5.0    0.26    0.05  6.25  54.54 0.83   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.16  6.25  20.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0211  1  5.0    1.00    0.05  6.25  17.32 0.26   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0209  1  5.0    0.36    0.07  6.25  54.55 0.83   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.12  6.25  27.17  n/a   0.000
*
    DUHYD               3112  1  5.0    1.36    0.12  6.25  27.17  n/a   0.000
       MAJOR SYSTEM:    3112  2  5.0    0.05    0.03  6.25  27.17  n/a   0.000
       MINOR SYSTEM:    3112  3  5.0    1.31    0.09  6.17  27.17  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.00    0.19  6.25  20.96  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0109  1  5.0    1.11    0.03  6.58  21.57 0.33   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0102  1  5.0    0.53    0.12  6.25  57.78 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0104  1  5.0    0.23    0.05  6.25  61.60 0.93   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0105  1  5.0    0.15    0.04  6.25  63.04 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.09  6.25  62.17  n/a   0.000
*
 ** Reservoir
    OUTFLOW:            0107  1  5.0    0.38    0.02  6.33  61.85  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.14  6.25  59.48  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.16  6.25  38.65  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.02    0.35  6.25  28.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD        0203  1  5.0    1.17    0.02  6.50  12.23 0.19   0.000
    [CN=56.0        ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.19    0.36  6.25  25.08  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0204  1  5.0    3.82    0.10  6.33  12.13 0.18   0.000
    [CN=56.0        ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.01    0.46  6.25  20.14  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.04    0.15  6.17  31.61  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0206  1  5.0    7.28    0.76  6.25  39.63 0.60   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.32    0.91  6.25  37.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        0207  1  5.0    0.72    0.02  6.33   9.92 0.15   0.000
    [CN=50.0        ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.04    0.93  6.25  35.87  n/a   0.000
*
 ** Reservoir
    OUTFLOW:            3008  1  5.0   10.04    0.22  6.92  35.88  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.05    0.61  6.25  28.02  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.42    6.06  7.87  22.65  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.68    6.25  7.87  21.67  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.73    6.54  7.83  21.92  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        1800  1  2.0   19.49    0.13  8.03  12.50 0.19   0.000
    [CN=55.1        ]
    [ N = 2.0:Tp 1.34]
```

```
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        1802  1  5.0    0.89    0.03  6.33  10.84 0.16   0.000
    [CN=50.7        ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        1803  1  5.0    0.64    0.04  6.33  19.71 0.30   0.000
    [CN=66.6        ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      5004  1  2.0    2.91    0.27  6.23  32.03 0.49   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.22    6.66  7.87  21.57  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.11    6.66  7.87  21.55  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  522.75    6.67  7.87  21.55  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  525.66    6.69  7.83  21.61  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 66.00 mm ]
    fname              :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD        1801  1  5.0    6.46    0.07  7.25  12.42 0.19   0.000
    [CN=54.9        ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.12    6.75  7.83  21.50  n/a   0.000
*
=================================================================================
==========================


       V    V   I   SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I   SS     U   U   A A   L
        V  V    I    SS    U   U  AAAAA  L
        V  V    I     SS   U   U  A   A  L
         VV     I   SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```

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```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\47e4ae75-2862-4d61-acc8-4eb77b65a373\s
  Summary     filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\47e4ae75-2862-4d61-acc8-4eb77b65a373\s


DATE: 04-29-2021                          TIME: 02:32:19

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 09 - 10yr 12hr 15min SCS  **
  ************************************************

  W/E COMMAND             HYD  ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.12  6.37  21.44 0.27   0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.28  6.23  42.83 0.55   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.46  6.27  54.23 0.69   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.26  6.43  54.23  n/a   0.000
*
    READ STORM                  15.0
```

```
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.30  6.23  60.22 0.77   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.54  6.23  56.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.14  6.23  62.86 0.80   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.35  6.27  52.39 0.67   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.49  6.23  54.77  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.49  6.23  54.77  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.58    0.33  6.23  54.77  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.15    0.16  6.03  54.77  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.25  6.23  62.86 0.80   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.70    0.57  6.23  60.10  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.89    1.12  6.23  57.46  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.09  6.23  57.96 0.74   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.09  6.23  57.96  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.04    0.04  6.23  57.96  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.44    0.05  6.07  57.96  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.33    1.17  6.23  57.50  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.83    1.45  6.23  53.34  n/a   0.000
*
```

```
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       0101  1  2.0    1.90    0.23  6.23  44.30 0.56   0.000
   [I%=35.0:S%= 2.00]
*
   DUHYD                0050  1  2.0    1.90    0.23  6.23  44.30  n/a   0.000
      MAJOR SYSTEM:     0050  2  2.0    0.11    0.08  6.23  44.30  n/a   0.000
      MINOR SYSTEM:     0050  3  2.0    1.79    0.15  6.07  44.30  n/a   0.000
*
   ADD [  0010+  0050]  0011  3  2.0   10.62    1.60  6.23  51.82  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       0102  1  2.0   10.00    1.13  6.23  45.47 0.58   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]  0012  3  2.0   20.62    2.74  6.23  48.74  n/a   0.000
*
   ADD [  0012+  0103]  0013  3  2.0   22.72    2.82  6.23  46.21  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       0104  1  2.0    2.50    0.29  6.23  42.66 0.54   0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]  0014  3  2.0   25.22    3.11  6.23  45.86  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0601  1  2.0   25.22    0.35  7.47  45.75  n/a   0.000
*
   DIVERT HYD           1601  1  2.0   25.22    0.35  7.47  45.75  n/a   0.000
      Outflow           0002  2  2.0    0.61    0.05  7.47  45.75  n/a   0.000
      Outflow           0002  3  2.0   24.61    0.29  7.47  45.75  n/a   0.000
      Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 ** CALIB NASHYD        0210  1  5.0    2.36    0.19  6.25  23.85 0.30   0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
```

```
*
 * CALIB STANDHYD       0205  1  5.0    0.75    0.11  6.25  49.90 0.64   0.000
   [I%=30.0:S%= 0.50]
*
   DUHYD                3015  1  5.0    0.75    0.11  6.25  49.90  n/a   0.000
      MAJOR SYSTEM:     3015  2  5.0    0.07    0.05  6.25  49.90  n/a   0.000
      MINOR SYSTEM:     3015  3  5.0    0.68    0.06  6.08  49.90  n/a   0.000
*
   ADD [  0210+  3015]  3200  3  5.0    2.43    0.24  6.25  24.59  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       0208  1  5.0    0.86    0.13  6.25  49.91 0.64   0.000
   [I%=30.0:S%= 0.50]
*
   ADD [  0208+  3200]  3201  3  5.0    3.29    0.37  6.25  31.21  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.07  6.37  24.75 0.32   0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.21]
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.11  6.30  24.75 0.32   0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.16]
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.23  6.23  30.26 0.39   0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.23  6.23  30.26  n/a   0.000
      Outflow           0001  2  2.0    2.32    0.18  6.23  30.26  n/a   0.000
      Outflow           0001  3  2.0    0.62    0.05  6.23  30.26  n/a   0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 78.50 mm ]
   fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.27  6.27  36.78 0.47   0.000
```

```
    [I%=20.0:S%= 1.00]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        5003  1  2.0   14.99    1.11  6.27  30.35 0.39   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:              0159  1  1.0   14.99    0.73  6.43  29.44  n/a   0.000
*
    ADD [  0156+  0159]   5005  3  1.0   17.31    0.84  6.42  29.55  n/a   0.000
*
    ADD [  5005+  1902]   5005  1  1.0   18.61    0.93  6.40  29.21  n/a   0.000
*
    ADD [  5005+  5002]   5005  3  1.0   21.46    1.12  6.38  30.22  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0001  1  2.0  139.80    2.91  7.47  31.73 0.40   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]    0002  1  1.0  139.80    2.55  8.25  31.73  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0002  1  1.0   18.97    0.36  7.48  29.04 0.37   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0003  1  1.0   13.15    0.38  6.90  29.16 0.37   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0005  1  1.0   32.68    0.99  6.93  31.66 0.40   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
```

```
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0004  1  1.0    8.46    0.64  6.27  28.65 0.36   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]   0001  3  1.0   32.12    0.71  7.12  29.17  n/a   0.000
*
    ADD [  0001+  0004]   0001  1  1.0   40.58    0.96  6.30  29.06  n/a   0.000
*
    ADD [  0001+  0005]   0001  3  1.0   73.26    1.84  6.82  30.22  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0008  1  2.0   14.42    0.28  6.87  18.96 0.24   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          1031  1  5.0    1.05    0.12  6.25  33.07 0.42   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        3061  1  5.0    0.48    0.09  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]   2008  3  5.0    1.53    0.21  6.25  39.83  n/a   0.000
*
    DUHYD                 2010  1  5.0    1.53    0.21  6.25  39.83  n/a   0.000
       MAJOR SYSTEM:      2010  2  5.0    0.20    0.11  6.25  39.83  n/a   0.000
       MINOR SYSTEM:      2010  3  5.0    1.33    0.10  6.08  39.83  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        3053  1  5.0    0.30    0.06  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                 2011  1  5.0    0.30    0.06  6.25  54.62  n/a   0.000
       MAJOR SYSTEM:      2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      2011  3  5.0    0.30    0.06  6.25  54.62  n/a   0.000
*
    ADD [  2010+  2011]   2009  3  5.0    0.20    0.11  6.25  39.83  n/a   0.000
*
    READ STORM                  15.0
```

```
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.10  6.25  31.27 0.40   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.06  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.12  6.25  54.62  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.21  6.25  38.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.99  6.25  58.12 0.74   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.99  6.25  54.63 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.16  6.25  36.58 0.47   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    2.15  6.25  52.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.47  6.25  56.20 0.72   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
```

```
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.05  6.25  41.35 0.53   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.53  6.25  54.10  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.53  6.25  54.10  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.39    0.29  6.25  54.10  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.43    0.24  6.08  54.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.02  6.25  65.27 0.83   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.02  6.25  65.27  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  6.25  65.27  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01  6.08  65.27  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.50    0.25  6.08  54.41  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.80    2.40  6.25  53.00  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.16    3.39  6.25  54.29  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.00    3.60  6.25  53.06  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.05  6.25  50.98 0.65   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname            :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.22  6.25  54.79 0.70   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.30    3.65  6.25  53.03  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.50    3.76  6.25  52.92  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.87    3.98  6.25  53.03  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.87    0.82  6.83  52.99  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.13    2.66  6.83  35.50  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.55    2.94  6.83  33.38  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD        0007  1  1.0   16.68    0.70  6.75  35.26 0.45   0.000
    [CN=78.0        ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD        0010  1  2.0    7.76    0.08  7.17  13.39 0.17   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD        0011  1  2.0    8.42    0.08  7.30  12.45 0.16   0.000
    [CN=45.0        ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0105  1  2.0    2.90    0.23  6.23  33.73 0.43   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.01    0.31  6.23  34.13  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0101  1  2.0    1.57    0.27  6.27  52.97 0.67   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD               1011  1  2.0    1.57    0.27  6.27  52.97  n/a   0.000
       MAJOR SYSTEM:    1011  2  2.0    0.20    0.14  6.27  52.97  n/a   0.000
       MINOR SYSTEM:    1011  3  2.0    1.37    0.13  6.07  52.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0102  1  2.0    2.63    0.47  6.27  55.60 0.71   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.00    0.60  6.27  54.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0103  1  2.0    0.61    0.15  6.23  68.82 0.88   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0104  1  2.0    1.57    0.28  6.23  57.08 0.73   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.44  6.23  60.36  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.18    1.04  6.23  56.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0201  1  2.0   10.34    1.73  6.27  55.01 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0202  1  2.0    2.00    0.35  6.27  54.41 0.69   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    2.08  6.27  54.91  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.52    3.10  6.27  55.51  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.52    0.36  7.10  55.49  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.36  7.10  55.46  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.73    0.61  6.23  52.51  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.28    3.37  6.82  36.46  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.04    3.45  6.82  35.20  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.46    3.51  6.83  33.93  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.14    4.21  6.82  34.06  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.75    4.21  6.82  34.10  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.75    3.80  7.27  34.05  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.56  7.25  32.40 0.41   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.60  7.03  31.80 0.41   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    2.15  7.18  32.29  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    2.04  7.52  32.29  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.22  7.30  13.65 0.17   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.22  7.10  12.23 0.16   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.06  7.60  10.78 0.14   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  253.42    5.81  7.35  33.45  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.80    6.03  7.35  31.85  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.83    6.25  7.35  30.39  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.14    6.31  7.35  29.80  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.14    6.07  7.63  29.77  n/a   0.000
*
    READ STORM                15.0
```

```
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.28  7.67  13.32 0.17   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.16  6.33  24.57 0.31   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.06  6.25  66.13 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.21  6.25  28.23  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.07  6.25  24.17 0.31   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.08  6.25  66.14 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.16  6.25  35.28  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.16  6.25  35.28  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.11    0.07  6.25  35.28  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.25    0.09  6.08  35.28  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.06    0.28  6.25  28.49  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.04  6.58  29.70 0.38   0.000
```

```
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.14  6.25  69.44 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.06  6.25  73.78 0.94   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.04  6.25  75.41 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.11  6.25  74.43  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02  6.33  74.10  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.16  6.25  71.39  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.19  6.25  48.48  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.08    0.47  6.25  36.44  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.03  6.50  17.43 0.22   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.25    0.50  6.25  32.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.14  6.33  17.30 0.22   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.07    0.63  6.25  26.97  n/a   0.000
```

```
*
    ADD [  3015+  3112]  3005  3  5.0    1.93    0.15  6.08  40.44  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.07  6.25  49.92 0.64   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.21    1.22  6.25  47.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.03  6.33  14.26 0.18   0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.93    1.24  6.25  45.49  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.93    0.23  7.00  45.50  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.00    0.85  6.25  36.17  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.94    8.45  7.78  30.38  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.20    8.72  7.78  29.14  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.20    9.04  7.78  29.42  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.18  7.97  17.69 0.23   0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.04  6.33  15.43 0.20   0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.05  6.33  26.83 0.34   0.000
```

```
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.35  6.23  39.92 0.51   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.69    9.22  7.78  28.98  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.58    9.23  7.78  28.95  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  523.22    9.23  7.78  28.95  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  526.13    9.26  7.78  29.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.10  7.25  17.58 0.22   0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.59    9.35  7.78  28.87  n/a   0.000
*
===============================================================================
=========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```
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All rights reserved.
```

```

                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\9d1202a4-25cf-4481-89f1-c6a70deef85f\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\9d1202a4-25cf-4481-89f1-c6a70deef85f\s


DATE: 04-29-2021                          TIME: 02:32:27

USER:
```

```
COMMENTS: ____________________________________________________________

  **********************************************
  ** SIMULATION : Run 10 -25yr 12hr 15min SCS   **
  **********************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min      ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.16  6.37  29.30 0.31   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.36  6.23  54.01 0.57   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.60  6.27  68.12 0.72   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.29  6.43  68.12  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.38  6.23  74.65 0.79   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.63  6.23  70.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.17  6.23  77.37 0.82   0.000
    [I%=51.0:S%= 2.00]
```

```
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0     2.11     0.46  6.27  66.11 0.70   0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0     2.73     0.62  6.23  68.67  n/a   0.000
*
   DUHYD                0226  1  2.0     2.73     0.62  6.23  68.67  n/a   0.000
      MAJOR SYSTEM:     0226  2  2.0     0.73     0.46  6.23  68.67  n/a   0.000
      MINOR SYSTEM:     0226  3  2.0     2.00     0.16  5.90  68.67  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0     1.12     0.31  6.23  77.37 0.82   0.000
   [I%=51.0:S%= 2.00]
*
   ADD [  0222+  0226]  0227  3  2.0     1.85     0.77  6.23  73.94  n/a   0.000
*
   ADD [  0227+  0255]  0256  3  2.0     6.04     1.40  6.23  71.54  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0     0.48     0.11  6.23  72.19 0.77   0.000
   [I%=32.0:S%= 2.00]
*
   DUHYD                0252  1  2.0     0.48     0.11  6.23  72.19  n/a   0.000
      MAJOR SYSTEM:     0252  2  2.0     0.06     0.06  6.23  72.19  n/a   0.000
      MINOR SYSTEM:     0252  3  2.0     0.42     0.05  6.07  72.19  n/a   0.000
*
   ADD [  0252+  0256]  0009  3  2.0     6.46     1.46  6.23  71.58  n/a   0.000
*
   ADD [  0009+  0100]  0010  3  2.0     8.96     1.82  6.23  66.67  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0     1.90     0.29  6.23  55.70 0.59   0.000
   [I%=35.0:S%= 2.00]
*
   DUHYD                0050  1  2.0     1.90     0.29  6.23  55.70  n/a   0.000
      MAJOR SYSTEM:     0050  2  2.0     0.19     0.14  6.23  55.70  n/a   0.000
      MINOR SYSTEM:     0050  3  2.0     1.71     0.15  6.07  55.70  n/a   0.000
*
   ADD [  0010+  0050]  0011  3  2.0    10.67     1.97  6.23  64.91  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    10.00     1.42  6.23  57.10 0.61   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]  0012  3  2.0    20.67     3.39  6.23  61.13  n/a   0.000
*
   ADD [  0012+  0103]  0013  3  2.0    22.77     3.52  6.23  58.20  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0     2.50     0.37  6.23  53.84 0.57   0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]  0014  3  2.0    25.27     3.88  6.23  57.77  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0601  1  2.0    25.27     0.54  7.27  57.65  n/a   0.000
*
   DIVERT HYD           1601  1  2.0    25.27     0.54  7.27  57.65  n/a   0.000
      Outflow           0002  2  2.0     1.31     0.06  7.27  57.65  n/a   0.000
      Outflow           0002  3  2.0    23.96     0.47  7.27  57.65  n/a   0.000
      Outflow           0002  4  2.0     0.00     0.00  0.00   0.00  n/a   0.000
      Outflow           0002  5  2.0     0.00     0.00  0.00   0.00  n/a   0.000
      Outflow           0002  6  2.0     0.00     0.00  0.00   0.00  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0     2.36     0.27  6.25  33.13 0.35   0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0     0.75     0.14  6.25  63.16 0.67   0.000
   [I%=30.0:S%= 0.50]
*
   DUHYD                3015  1  5.0     0.75     0.14  6.25  63.16  n/a   0.000
      MAJOR SYSTEM:     3015  2  5.0     0.11     0.08  6.25  63.16  n/a   0.000
      MINOR SYSTEM:     3015  3  5.0     0.64     0.06  6.08  63.16  n/a   0.000
*
   ADD [  0210+  3015]  3200  3  5.0     2.47     0.35  6.25  34.51  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0     0.86     0.16  6.25  63.16 0.67   0.000
   [I%=30.0:S%= 0.50]
```

```
*
   ADD [  0208+  3200]  3201  3  5.0    3.33    0.52  6.25  41.90  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.10  6.37  34.26 0.36   0.000
   [CN=66.5          ]
   [ N = 3.0:Tp 0.21]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.15  6.30  34.26 0.36   0.000
   [CN=66.5          ]
   [ N = 3.0:Tp 0.16]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.30  6.27  39.17 0.42   0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.30  6.27  39.17  n/a   0.000
      Outflow           0001  2  2.0    2.32    0.24  6.27  39.17  n/a   0.000
      Outflow           0001  3  2.0    0.62    0.06  6.27  39.17  n/a   0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.37  6.27  47.58 0.51   0.000
   [I%=20.0:S%= 1.00]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB STANDHYD       5003  1  2.0   14.99    1.46  6.27  39.29 0.42   0.000
   [I%=20.0:S%= 1.00]
*
 ** Reservoir
   OUTFLOW:             0159  1  1.0   14.99    1.82  6.27  38.37  n/a   0.000
*
   ADD [  0156+  0159]  5005  3  1.0   17.31    2.06  6.27  38.48  n/a   0.000
*
   ADD [  5005+  1902]  5005  1  1.0   18.61    2.20  6.27  38.18  n/a   0.000
*
```

```
   ADD [  5005+  5002]  5005  3  1.0   21.46    2.57  6.27  39.43  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         0001  1  2.0  139.80    3.96  7.43  42.88 0.46   0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 1.05]
*
   CHANNEL[ 2:  0001]   0002  1  1.0  139.80    3.53  8.17  42.88  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         0002  1  1.0   18.97    0.49  7.45  39.52 0.42   0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 1.06]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         0003  1  1.0   13.15    0.52  6.90  39.69 0.42   0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 0.62]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB NASHYD         0005  1  1.0   32.68    1.35  6.93  42.80 0.46   0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 0.65]
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
*
 * CALIB STANDHYD       0004  1  1.0    8.46    0.87  6.27  37.27 0.40   0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]  0001  3  1.0   32.12    0.97  7.10  39.69  n/a   0.000
*
   ADD [  0001+  0004]  0001  1  1.0   40.58    1.33  6.30  39.19  n/a   0.000
*
   ADD [  0001+  0005]  0001  3  1.0   73.26    2.51  6.82  40.80  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 94.02 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
   remark: 25yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD        0008  1  2.0   14.42    0.40  6.87  26.76 0.28   0.000
    [CN=58.0        ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD        1031  1  5.0    1.05    0.16  6.25  43.77 0.47   0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3061  1  5.0    0.48    0.12  6.25  68.41 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.27  6.25  51.50  n/a   0.000
*
    DUHYD               2010  1  5.0    1.53    0.27  6.25  51.50  n/a   0.000
       MAJOR SYSTEM:    2010  2  5.0    0.29    0.17  6.25  51.50  n/a   0.000
       MINOR SYSTEM:    2010  3  5.0    1.24    0.10  6.08  51.50  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3053  1  5.0    0.30    0.07  6.25  68.41 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD               2011  1  5.0    0.30    0.07  6.25  68.41  n/a   0.000
       MAJOR SYSTEM:    2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:    2011  3  5.0    0.30    0.07  6.25  68.41  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.29    0.17  6.25  51.50  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD        3055  1  5.0    1.24    0.13  6.25  41.67 0.44   0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3054  1  5.0    0.30    0.07  6.25  68.41 0.73   0.000
    [I%=30.0:S%= 2.00]
*
```

```
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.15  6.25  68.41  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.28  6.25  50.39  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3052  1  5.0    5.36    1.34  6.25  72.26 0.77   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3051  1  5.0   11.90    2.54  6.25  68.42 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3021  1  5.0    1.40    0.21  6.25  46.66 0.50   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    2.75  6.25  66.13  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4111  1  5.0    2.42    0.60  6.25  70.24 0.75   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4101  1  5.0    0.40    0.07  6.25  52.20 0.56   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.67  6.25  67.68  n/a   0.000
*
    DUHYD               8050  1  5.0    2.82    0.67  6.25  67.68  n/a   0.000
       MAJOR SYSTEM:    8050  2  5.0    0.53    0.43  6.25  67.68  n/a   0.000
       MINOR SYSTEM:    8050  3  5.0    2.29    0.24  6.08  67.68  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4120  1  5.0    0.08    0.02  6.25  79.96 0.85   0.000
```

```
    [I%=58.0:S%= 2.00]
*
    DUHYD                  8055  1  5.0    0.08    0.02  6.25  79.96  n/a   0.000
       MAJOR SYSTEM:       8055  2  5.0    0.01    0.01  6.25  79.96  n/a   0.000
       MINOR SYSTEM:       8055  3  5.0    0.07    0.01  6.08  79.96  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.36    0.25  6.08  68.03  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.66    3.00  6.25  66.42  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.02    4.34  6.25  67.91  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.86    4.61  6.25  66.50  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0101  1  5.0    0.30    0.07  6.25  64.16 0.68   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         3056  1  5.0    1.37    0.27  6.25  67.85 0.72   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.16    4.68  6.25  66.47  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.45    4.85  6.25  66.28  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.82    5.12  6.25  66.37  n/a   0.000
*
 ** Reservoir
    OUTFLOW:               3705  1  5.0   24.82    1.34  6.67  66.33  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.08    3.83  6.77  46.75  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.50    4.22  6.78  44.19  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD           0007  1  1.0   16.68    0.95  6.75  47.24 0.50   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD           0010  1  2.0    7.76    0.12  7.13  19.25 0.20   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
```

```
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD           0011  1  2.0    8.42    0.11  7.27  17.97 0.19   0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0105  1  2.0    2.90    0.30  6.23  43.22 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.09    0.44  6.23  43.98  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0101  1  2.0    1.57    0.34  6.27  66.70 0.71   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                  1011  1  2.0    1.57    0.34  6.27  66.70  n/a   0.000
       MAJOR SYSTEM:       1011  2  2.0    0.29    0.21  6.27  66.70  n/a   0.000
       MINOR SYSTEM:       1011  3  2.0    1.28    0.13  6.03  66.70  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0102  1  2.0    2.63    0.60  6.23  69.57 0.74   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    3.91    0.73  6.23  68.63  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0103  1  2.0    0.61    0.19  6.23  83.63 0.89   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 94.02 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0104  1  2.0    1.57    0.36  6.23  71.11 0.76   0.000
    [I%=36.0:S%= 2.00]
*
```

```
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.55  6.23  74.61  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.09    1.28  6.23  70.77  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    2.20  6.27  68.87 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.45  6.27  68.29 0.73   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    2.65  6.27  68.78  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.43    3.91  6.27  69.44  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.43    0.48  7.00  69.42  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.48  7.00  69.38  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.81    0.88  6.27  65.78  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.30    4.81  6.77  47.68  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.06    4.92  6.77  46.12  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.48    5.01  6.77  44.55  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.16    5.96  6.77  44.82  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  168.47    6.02  6.77  44.91  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  168.47    5.39  7.13  44.86  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    2.13  7.23  43.73 0.47   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.81  7.00  42.95 0.46   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
```

```
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    2.93  7.17  43.59  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    2.80  7.47  43.59  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.32  7.27  19.65 0.21   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.32  7.07  17.63 0.19   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.09  7.57  15.58 0.17   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  254.14    8.10  7.27  44.43  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.52    8.42  7.27  42.43  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.55    8.73  7.27  40.60  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.86    8.82  7.27  39.84  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.86    8.50  7.52  39.81  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.40  7.63  19.18 0.20   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.22  6.33  34.13 0.36   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
```

```
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.07  6.25  80.68 0.86   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.29  6.25  38.24  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.10  6.25  33.58 0.36   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.10  6.25  80.70 0.86   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.21  6.25  46.05  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.21  6.25  46.05  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.19    0.12  6.25  46.05  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.17    0.09  6.08  46.05  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.14    0.41  6.25  38.71  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.06  6.58  40.67 0.43   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.17  6.25  84.04 0.89   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.08  6.25  88.95 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.05  6.25  90.79 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.13  6.25  89.68  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02  6.33  89.35  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.19  6.25  86.26  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.24  6.25  61.21  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.16    0.64  6.25  47.52  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.05  6.42  24.78 0.26   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.33    0.68  6.25  43.32  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.21  6.33  24.59 0.26   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.15    0.88  6.25  36.27  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.80    0.15  6.08  52.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.38  6.25  63.17 0.67   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.08    1.53  6.25  60.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 94.02 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
```

```
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.04  6.25  20.46 0.22   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.80    1.56  6.25  57.99  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.80    0.35  6.92  58.00  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.96    1.10  6.25  46.95  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  447.66   11.75  7.67  40.77  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.92   12.15  7.67  39.19  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.88   12.55  7.65  39.50  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.26  7.93  25.00 0.27   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.05  6.33  21.96 0.23   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.07  6.33  36.53 0.39   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.45  6.23  50.26 0.53   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  522.37   12.80  7.65  38.96  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  523.26   12.81  7.65  38.93  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  523.90   12.82  7.65  38.93  n/a   0.000
*
```

```
    ADD [  0008+  5004]  0008  1  1.0  526.81   12.85  7.65  38.99  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 94.02 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\0158815b-a087-45e0-82c2-
    remark: 25yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.15  7.25  24.86 0.26   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  533.27   12.99  7.63  38.82  n/a   0.000
*
================================================================================
==========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output     filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\2a86787c-7c9e-4861-a55e-7f8de18745d7\s
  Summary    filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\2a86787c-7c9e-4861-a55e-7f8de18745d7\s

DATE: 04-29-2021                          TIME: 02:32:17

USER:

COMMENTS: ____________________________________________________________

  **************************************************
  ** SIMULATION : Run 11 - 50yr 12hr 15min SCS  **
  **************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
```

```
    remark: 50yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.20  6.37  35.63 0.34   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.42  6.23  62.62 0.59   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.70  6.27  78.61 0.75   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.84  6.33  78.61  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0250  1  2.0    1.51    0.43  6.23  85.49 0.81   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    1.13  6.33  81.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0221  1  2.0    0.62    0.20  6.23  88.24 0.84   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0220  1  2.0    2.11    0.54  6.27  76.50 0.73   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.72  6.23  79.17  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.72  6.23  79.17  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.82    0.56  6.23  79.17  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    1.91    0.16  5.87  79.17  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
```

```
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0222  1  2.0    1.12    0.36  6.23  88.25 0.84   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.94    0.92  6.23  84.40  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    6.13    1.69  6.33  82.14  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0251  1  2.0    0.48    0.13  6.23  82.90 0.79   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.13  6.23  82.90  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.08    0.08  6.23  82.90  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.40    0.05  6.03  82.90  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.54    1.74  6.33  82.19  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    9.04    2.09  6.23  76.77  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0101  1  2.0    1.90    0.34  6.23  64.47 0.61   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.34  6.23  64.47  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.25    0.19  6.23  64.47  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.65    0.15  6.03  64.47  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.68    2.24  6.23  74.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0102  1  2.0   10.00    1.65  6.23  66.02 0.63   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.68    3.89  6.23  70.60  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.78    4.04  6.23  67.37  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
  * CALIB STANDHYD       0104  1  2.0    2.50    0.44  6.23  62.46 0.59   0.000
    [I%=33.0:S%= 2.00]
```

```
*
    ADD [  0013+  0104]  0014  3  2.0   25.28    4.47  6.23  66.89  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.28    0.65  7.17  66.77  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.28    0.65  7.17  66.77  n/a   0.000
       Outflow           0002  2  2.0    1.51    0.07  7.17  66.77  n/a   0.000
       Outflow           0002  3  2.0   23.78    0.58  7.17  66.77  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.33  6.25  40.51 0.38   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.17  6.25  73.24 0.69   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.17  6.25  73.24  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.14    0.11  6.25  73.24  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.61    0.06  6.08  73.24  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.50    0.44  6.25  42.37  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.19  6.25  73.24 0.69   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.36    0.63  6.25  50.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.13  6.37  41.83 0.40   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.18  6.30  41.83 0.40   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.37  6.27  46.17 0.44   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.37  6.27  46.17  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.29  6.27  46.17  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.08  6.27  46.17  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.47  6.27  55.98 0.53   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.79  6.27  46.31 0.44   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    1.87  6.25  45.40  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    2.17  6.25  45.50  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    2.33  6.25  45.24  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    2.79  6.25  46.67  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    4.80  7.40  51.60 0.49   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    4.29  8.08  51.60  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                    C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
```

```
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         0002  1  1.0   18.97    0.60  7.45  47.78 0.45   0.000
   [CN=71.0        ]
   [ N = 2.0:Tp 1.06]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         0003  1  1.0   13.15    0.63  6.88  47.97 0.45   0.000
   [CN=71.0        ]
   [ N = 2.0:Tp 0.62]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         0005  1  1.0   32.68    1.63  6.92  51.52 0.49   0.000
   [CN=74.0        ]
   [ N = 2.0:Tp 0.65]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB STANDHYD       0004  1  1.0    8.46    1.06  6.27  44.08 0.42   0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]  0001  3  1.0   32.12    1.18  7.08  47.98  n/a   0.000
*
   ADD [  0001+  0004]  0001  1  1.0   40.58    1.64  6.30  47.17  n/a   0.000
*
   ADD [  0001+  0005]  0001  3  1.0   73.26    3.04  6.82  49.11  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         0008  1  2.0   14.42    0.49  6.87  33.09 0.31   0.000
   [CN=58.0        ]
   [ N = 2.0:Tp 0.57]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         1031  1  5.0    1.05    0.19  6.25  52.11 0.49   0.000
   [CN=73.0        ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB STANDHYD       3061  1  5.0    0.48    0.14  6.25  78.84 0.75   0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]  2008  3  5.0    1.53    0.32  6.25  60.49  n/a   0.000
*
   DUHYD                2010  1  5.0    1.53    0.32  6.25  60.49  n/a   0.000
      MAJOR SYSTEM:     2010  2  5.0    0.35    0.22  6.25  60.49  n/a   0.000
      MINOR SYSTEM:     2010  3  5.0    1.18    0.10  6.08  60.49  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB STANDHYD       3053  1  5.0    0.30    0.09  6.25  78.84 0.75   0.000
   [I%=30.0:S%= 2.00]
*
   DUHYD                2011  1  5.0    0.30    0.09  6.25  78.84  n/a   0.000
      MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     2011  3  5.0    0.30    0.09  6.25  78.84  n/a   0.000
*
   ADD [  2010+  2011]  2009  3  5.0    0.35    0.22  6.25  60.49  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB NASHYD         3055  1  5.0    1.24    0.15  6.25  49.81 0.47   0.000
   [CN=70.0        ]
   [ N = 2.0:Tp 0.17]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB STANDHYD       3054  1  5.0    0.30    0.09  6.25  78.84 0.75   0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  2011+  3054]  2004  3  5.0    0.60    0.17  6.25  78.84  n/a   0.000
*
   ADD [  2004+  3055]  2005  3  5.0    1.84    0.33  6.25  59.28  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
*
 * CALIB STANDHYD       3052  1  5.0    5.36    1.55  6.25  82.90 0.79   0.000
   [I%=37.0:S%= 2.00]
*
   READ STORM                 15.0
   [ Ptot=105.51 mm ]
   fname               :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
   remark: 50yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    3.22  6.25  78.85 0.75   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.24  6.25  54.49 0.52   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    3.47  6.25  76.29  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.69  6.25  80.82 0.77   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.09  6.25  60.57 0.57   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.78  6.25  77.95  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.78  6.25  77.95  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.61    0.54  6.25  77.95  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.21    0.24  6.00  77.95  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.03  6.25  90.96 0.86   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.03  6.25  90.96  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.02    0.02  6.25  90.96  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.06    0.01  6.08  90.96  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.27    0.25  6.08  78.32  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.57    3.72  6.25  76.58  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   20.93    5.27  6.25  78.20  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.77    5.59  6.25  76.67  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
```

```
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.08  6.25  74.17 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.32  6.25  77.76 0.74   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.07    5.67  6.25  76.64  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.42    5.89  6.25  76.40  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.79    6.21  6.25  76.48  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.79    1.89  6.58  76.44  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.05    4.79  6.70  55.50  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.47    5.27  6.75  52.63  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    1.14  6.73  56.53 0.54   0.000
    [CN=78.0           ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.15  7.13  24.10 0.23   0.000
    [CN=47.0           ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.14  7.27  22.55 0.21   0.000
    [CN=45.0           ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.35  6.23  50.63 0.48   0.000
```

```
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.15    0.55  6.23  51.74  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.40  6.27  77.09 0.73   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.40  6.27  77.09  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.35    0.27  6.27  77.09  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.22    0.13  6.03  77.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.70  6.23  80.11 0.76   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    3.85    0.83  6.23  79.15  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.22  6.23  94.67 0.90   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.42  6.23  81.69 0.77   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.64  6.23  85.32  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.03    1.47  6.23  81.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    2.65  6.27  79.34 0.75   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.52  6.27  78.79 0.75   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    3.17  6.27  79.25  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.37    4.62  6.23  79.95  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.37    0.57  6.97  79.93  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.59  6.30  79.88  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.87    1.11  6.27  75.82  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.34    5.97  6.73  56.38  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.10    6.11  6.75  54.62  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.52    6.23  6.75  52.82  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.20    7.37  6.75  53.19  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  168.71    7.43  6.75  53.31  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  168.71    6.66  7.05  53.25  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    2.57  7.22  52.58 0.50   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.99  7.00  51.68 0.49   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    3.54  7.15  52.42  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    3.40  7.45  52.42  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.40  7.27  24.61 0.23   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.41  7.07  22.10 0.21   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.11  7.57  19.58 0.19   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  254.38    9.89  7.22  52.97  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.76   10.30  7.22  50.68  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.79   10.70  7.18  48.57  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  308.10   10.81  7.22  47.70  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  308.10   10.44  7.45  47.66  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.51  7.60  24.01 0.23   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.27  6.33  41.74 0.40   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.08  6.25  91.58 0.87   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.35  6.25  46.13  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
```

```
 *  CALIB NASHYD         0211  1  5.0    1.00    0.13  6.25  41.06 0.39   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.12  6.25  91.59 0.87   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.24  6.25  54.44  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.24  6.25  54.44  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.24    0.15  6.25  54.44  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.12    0.09  6.08  54.44  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.19    0.51  6.25  46.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.08  6.58  49.27 0.47   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.19  6.25  94.92 0.90   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.09  6.25 100.20 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=105.51 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.06  6.25 102.19 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.14  6.25 100.99  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.03  6.33 100.66  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.21  6.25  97.31  n/a   0.000
```

```
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.27  6.25  70.91  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.21    0.78  6.25  56.12  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.06  6.42  30.77 0.29   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.38    0.82  6.25  51.47  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.26  6.33  30.52 0.29   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.20    1.07  6.25  43.63  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.73    0.15  6.08  61.07  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.61  6.25  73.25 0.69   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.01    1.76  6.25  70.92  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.05  6.25  25.56 0.24   0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.73    1.81  6.25  67.56  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.73    1.04  6.58  67.58  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.93    1.62  6.58  55.32  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  447.90   14.35  7.60  48.89  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  483.16   14.86  7.60  47.08  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  503.09   15.32  7.58  47.40  n/a   0.000
```

```
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.32  7.90  30.96 0.29   0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.07  6.33  27.31 0.26   0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.08  6.33  44.23 0.42   0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.52  6.23  58.25 0.55   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  522.58   15.63  7.58  46.79  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  523.47   15.64  7.58  46.76  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  524.11   15.65  7.58  46.75  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  527.02   15.68  7.58  46.82  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=105.51 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c7fbfd2b-39b2-4d9b-8f3f-
    remark: 50yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.18  7.25  30.79 0.29   0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  533.48   15.86  7.57  46.62  n/a   0.000
*
================================================================================
==========================
```

```
      V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```

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```
                 *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\6fb1521b-b13a-4b93-be82-0b671b3a01c5\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\6fb1521b-b13a-4b93-be82-0b671b3a01c5\s


DATE: 04-29-2021                          TIME: 02:32:23

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 12 - 100yr 12hr 15min SCS **
  ************************************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min    ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.23  6.37  41.40 0.36   0.000
    [CN=56.0        ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.48  6.23  70.26 0.61   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.78  6.27  87.79 0.76   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0205  1  2.0    2.68    0.96  6.30  87.79  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0250  1  2.0    1.51    0.48  6.23  94.92 0.82   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250] 0255  3  2.0    4.19    1.36  6.30  90.36  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0221  1  2.0    0.62    0.22  6.23  97.70 0.85   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0220  1  2.0    2.11    0.62  6.27  85.59 0.74   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221] 0225  3  2.0    2.73    0.84  6.23  88.34  n/a   0.000
*
    DUHYD               0226  1  2.0    2.73    0.84  6.23  88.34  n/a   0.000
       MAJOR SYSTEM:    0226  2  2.0    0.90    0.68  6.23  88.34  n/a   0.000
       MINOR SYSTEM:    0226  3  2.0    1.83    0.16  5.83  88.34  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0222  1  2.0    1.12    0.39  6.23  97.70 0.85   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226] 0227  3  2.0    2.02    1.07  6.23  93.53  n/a   0.000
*
    ADD [  0227+  0255] 0256  3  2.0    6.21    2.20  6.30  91.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0251  1  2.0    0.48    0.15  6.23  92.23 0.80   0.000
```

```
    [I%=32.0:S%= 2.00]
*
    DUHYD                  0252  1  2.0    0.48     0.15  6.23  92.23  n/a   0.000
       MAJOR SYSTEM:       0252  2  2.0    0.09     0.09  6.23  92.23  n/a   0.000
       MINOR SYSTEM:       0252  3  2.0    0.39     0.05  6.03  92.23  n/a   0.000
*
    ADD [  0252+  0256]    0009  3  2.0    6.60     2.25  6.30  91.44  n/a   0.000
*
    ADD [  0009+  0100]    0010  3  2.0    9.10     2.66  6.30  85.62  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0101  1  2.0    1.90     0.39  6.23  72.23 0.63   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                  0050  1  2.0    1.90     0.39  6.23  72.23  n/a   0.000
       MAJOR SYSTEM:       0050  2  2.0    0.30     0.24  6.23  72.23  n/a   0.000
       MINOR SYSTEM:       0050  3  2.0    1.60     0.15  6.03  72.23  n/a   0.000
*
    ADD [  0010+  0050]    0011  3  2.0   10.70     2.81  6.30  83.62  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0102  1  2.0   10.00     1.86  6.23  73.91 0.64   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]    0012  3  2.0   20.70     4.51  6.27  78.93  n/a   0.000
*
    ADD [  0012+  0103]    0013  3  2.0   22.80     4.71  6.27  75.47  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0104  1  2.0    2.50     0.49  6.23  70.09 0.61   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]    0014  3  2.0   25.30     5.18  6.27  74.94  n/a   0.000
*
 ** Reservoir
    OUTFLOW:               0601  1  2.0   25.30     0.96  7.10  74.82  n/a   0.000
*
    DIVERT HYD             1601  1  2.0   25.30     0.96  7.10  74.82  n/a   0.000
       Outflow             0002  2  2.0    2.04     0.22  7.10  74.82  n/a   0.000
       Outflow             0002  3  2.0   23.26     0.74  7.10  74.82  n/a   0.000
       Outflow             0002  4  2.0    0.00     0.00  0.00   0.00  n/a   0.000
       Outflow             0002  5  2.0    0.00     0.00  0.00   0.00  n/a   0.000
       Outflow             0002  6  2.0    0.00     0.00  0.00   0.00  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
```

```
*
 ** CALIB NASHYD           0210  1  5.0    2.36     0.39  6.25  47.18 0.41   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0205  1  5.0    0.75     0.19  6.25  82.09 0.71   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                  3015  1  5.0    0.75     0.19  6.25  82.09  n/a   0.000
       MAJOR SYSTEM:       3015  2  5.0    0.16     0.13  6.25  82.09  n/a   0.000
       MINOR SYSTEM:       3015  3  5.0    0.59     0.06  6.08  82.09  n/a   0.000
*
    ADD [  0210+  3015]    3200  3  5.0    2.52     0.52  6.25  49.44  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0208  1  5.0    0.86     0.22  6.25  82.09 0.71   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]    3201  3  5.0    3.38     0.73  6.25  57.74  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           1901  1  2.0    1.06     0.15  6.37  48.68 0.42   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           1902  1  2.0    1.30     0.21  6.30  48.67 0.42   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                   15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         5001  1  2.0    2.94     0.43  6.27  52.47 0.45   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD             0156  1  2.0    2.94     0.43  6.27  52.47  n/a   0.000
       Outflow             0001  2  2.0    2.32     0.34  6.27  52.47  n/a   0.000
       Outflow             0001  3  2.0    0.62     0.09  6.27  52.47  n/a   0.000
       Outflow             0001  4  2.0    0.00     0.00  0.00   0.00  n/a   0.000
```

```
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         5002  1  2.0    2.85    0.53  6.27  63.46 0.55    0.000
   [I%=20.0:S%= 1.00]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         5003  1  2.0   14.99    2.05  6.27  52.63 0.46    0.000
   [I%=20.0:S%= 1.00]
*
 ** Reservoir
   OUTFLOW:                0159  1  1.0   14.99    2.04  6.27  51.71  n/a    0.000
*
   ADD [  0156+  0159]     5005  3  1.0   17.31    2.38  6.27  51.81  n/a    0.000
*
   ADD [  5005+  1902]     5005  1  1.0   18.61    2.58  6.27  51.59  n/a    0.000
*
   ADD [  5005+  5002]     5005  3  1.0   21.46    3.11  6.27  53.17  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           0001  1  2.0  139.80    5.54  7.40  59.39 0.51    0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 1.05]
*
   CHANNEL[ 2:  0001]      0002  1  1.0  139.80    4.98  8.07  59.39  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           0002  1  1.0   18.97    0.69  7.43  55.18 0.48    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 1.06]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           0003  1  1.0   13.15    0.73  6.88  55.40 0.48    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 0.62]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           0005  1  1.0   32.68    1.89  6.92  59.30 0.51    0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 0.65]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         0004  1  1.0    8.46    1.25  6.27  50.22 0.44    0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]     0001  3  1.0   32.12    1.37  7.07  55.41  n/a    0.000
*
   ADD [  0001+  0004]     0001  1  1.0   40.58    1.93  6.30  54.33  n/a    0.000
*
   ADD [  0001+  0005]     0001  3  1.0   73.26    3.51  6.82  56.55  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           0008  1  2.0   14.42    0.58  6.83  38.88 0.34    0.000
   [CN=58.0          ]
   [ N = 2.0:Tp 0.57]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD           1031  1  5.0    1.05    0.21  6.25  59.54 0.52    0.000
   [CN=73.0          ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD         3061  1  5.0    0.48    0.15  6.25  87.96 0.76    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]     2008  3  5.0    1.53    0.37  6.25  68.45  n/a    0.000
*
   DUHYD                   2010  1  5.0    1.53    0.37  6.25  68.45  n/a    0.000
      MAJOR SYSTEM:        2010  2  5.0    0.39    0.27  6.25  68.45  n/a    0.000
      MINOR SYSTEM:        2010  3  5.0    1.14    0.10  6.00  68.45  n/a    0.000
*
   READ STORM                  15.0
   [ Ptot=115.43 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
   remark: 100yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.10  6.25  87.96 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.10  6.25  87.96  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.10  6.25  87.96  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.39    0.27  6.25  68.45  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.18  6.25  57.11 0.49   0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.10  6.25  87.96 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.19  6.25  87.96  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.37  6.25  67.17  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    1.74  6.25  92.19 0.80   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    3.62  6.25  87.97 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.30  6.25  61.47 0.53   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    3.92  6.25  85.18  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.78  6.25  90.05 0.78   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.10  6.25  68.00 0.59   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.88  6.25  86.93  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.88  6.25  86.93  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.68    0.64  6.25  86.93  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.14    0.24  5.92  86.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.03  6.25 100.50 0.87   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.03  6.25 100.50  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.02    0.02  6.25 100.50  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.06    0.01  6.00 100.50  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.20    0.25  6.00  87.32  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.50    4.17  6.25  85.48  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   20.86    5.91  6.25  87.20  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.70    6.28  6.25  85.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.09  6.25  82.96 0.72   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.35  6.25  86.44 0.75   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.00    6.37  6.25  85.55  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.39    6.64  6.25  85.26  n/a   0.000
*
```

```
    ADD [  2007+  3056]  2007  3  5.0   24.76    6.99  6.25  85.33  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.76    2.60  6.50  85.29  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.02    5.83  6.50  63.28  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.44    6.33  6.50  60.15  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    1.31  6.73  64.78 0.56   0.000
    [CN=78.0        ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.18  7.10  28.59 0.25   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.17  7.27  26.81 0.23   0.000
    [CN=45.0        ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.41  6.23  57.26 0.50   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.20    0.65  6.23  58.69  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.47  6.23  86.18 0.75   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.47  6.23  86.18  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.39    0.34  6.23  86.18  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.18    0.13  5.93  86.18  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.75  6.23  89.31 0.77   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    3.81    0.88  6.23  88.35  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.24  6.23 104.26 0.90   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.47  6.23  90.92 0.79   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.71  6.23  94.65  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    5.99    1.59  6.23  90.64  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    2.78  6.27  88.49 0.77   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.61  6.23  87.96 0.76   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    3.38  6.27  88.40  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.33    4.94  6.27  89.14  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.33    2.01  6.60  89.12  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    2.01  6.60  89.05  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.92    2.20  6.60  84.62  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.36    8.46  6.60  64.12  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.12    8.61  6.60  62.18  n/a   0.000
```

```
*
    ADD [  0051+  0011]  0051  1  1.0  150.54    8.73  6.60  60.20  n/a    0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.22   10.02  6.60  60.66  n/a    0.000
*
    ADD [  0051+  1601]  0005  3  1.0  169.26   10.08  6.60  60.83  n/a    0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  169.26    8.13  6.95  60.77  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    2.97  7.22  60.47 0.52   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    1.14  7.00  59.47 0.52   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    4.09  7.13  60.29  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    3.94  7.42  60.29  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.48  7.27  29.20 0.25   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.49  7.07  26.27 0.23   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.13  7.53  23.32 0.20   0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  254.93   11.72  7.10  60.61  n/a    0.000
```

```
*
    ADD [  0006+  0012]  0006  1  1.0  277.31   12.19  7.10  58.07  n/a    0.000
*
    ADD [  0006+  0013]  0006  3  1.0  299.34   12.68  7.10  55.73  n/a    0.000
*
    ADD [  0006+  0014]  0006  1  1.0  308.65   12.80  7.10  54.75  n/a    0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  308.65   12.35  7.37  54.72  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.61  7.60  28.50 0.25   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.32  6.33  48.61 0.42   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.09  6.25 101.04 0.88   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.41  6.25  53.23  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.15  6.25  47.82 0.41   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                15.0
    [ Ptot=115.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.13  6.25 101.04 0.88   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.28  6.25  61.91  n/a    0.000
*
    DUHYD                3112  1  5.0    1.36    0.28  6.25  61.91  n/a    0.000
       MAJOR SYSTEM:     3112  2  5.0    0.28    0.19  6.25  61.91  n/a    0.000
       MINOR SYSTEM:     3112  3  5.0    1.08    0.09  6.08  61.91  n/a    0.000
```

```
*
    ADD [  3000+  3112]  3001  3  5.0    3.23    0.60  6.25  53.99  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.09  6.58  56.97 0.49   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.21  6.25 104.35 0.90   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.09  6.25 109.94 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.06  6.25 112.03 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.16  6.25 110.76  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.03  6.33 110.43  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.23  6.25 106.89  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.30  6.25  79.46  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.25    0.89  6.25  63.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.07  6.42  36.27 0.31   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.42    0.95  6.25  58.77  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.31  6.33  35.98 0.31   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.24    1.24  6.25  50.27  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.66    0.15  6.08  69.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.83  6.25  82.10 0.71   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    8.94    1.98  6.25  79.66  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.06  6.25  30.28 0.26   0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.66    2.03  6.25  75.98  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.66    1.33  6.42  76.00  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.91    2.20  6.42  62.76  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  448.45   16.83  7.53  56.18  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  483.71   17.44  7.53  54.16  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  503.62   17.95  7.52  54.50  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.38  7.90  36.42 0.32   0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname             :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.08  6.33  32.26 0.28   0.000
```

```
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD          1803  1  5.0    0.64    0.10  6.33  51.16 0.44   0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB STANDHYD        5004  1  2.0    2.91    0.58  6.23  65.35 0.57   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  523.11   18.32  7.52  53.83  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  524.00   18.33  7.52  53.79  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  524.64   18.34  7.52  53.79  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  527.55   18.38  7.52  53.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=115.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\dbe0d1a3-f6f6-43df-9f9f-
    remark: 100yr 12hr 15min SCS
*
 *  CALIB NASHYD          1801  1  5.0    6.46    0.22  7.25  36.23 0.31   0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  534.01   18.59  7.50  53.64  n/a   0.000
*
==================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

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```
                   *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\5b2c7582-c87d-4fff-95be-79eef6b334ba\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\5b2c7582-c87d-4fff-95be-79eef6b334ba\s


DATE: 04-29-2021                           TIME: 02:32:20

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 13 - 2yr 24hr 15min SCS     **
  **************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD          0103  1  2.0    2.10    0.05 12.37  11.47 0.21   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB STANDHYD        0100  1  2.0    2.50    0.16 12.23  27.39 0.49   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB STANDHYD        0200  1  2.0    2.68    0.23 12.27  34.48 0.62   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0205  1  2.0    2.68    0.23 12.27  34.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0250  1  2.0    1.51    0.17 12.23  39.42 0.71   0.000
    [I%=37.0:S%= 2.00]
*
```

```
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.39 12.27  36.26  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.08 12.23  41.85 0.76   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.17 12.27  32.97 0.59   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.25 12.27  34.99  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.25 12.27  34.99  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.14    0.09 12.27  34.99  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.59    0.16 12.10  34.99  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.15 12.23  41.85 0.76   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.26    0.23 12.23  41.08  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.45    0.62 12.27  37.38  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.05 12.23  37.54 0.68   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.05 12.23  37.54  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.48    0.05 12.23  37.54  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    5.93    0.67 12.27  37.39  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.43    0.83 12.23  34.42  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.13 12.23  28.49 0.51   0.000
    [I%=35.0:S%= 2.00]
```

```
*
    DUHYD                0050  1  2.0    1.90    0.13 12.23  28.49  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.90    0.13 12.23  28.49  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.33    0.96 12.23  33.33  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.69 12.23  29.29 0.53   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.33    1.65 12.23  31.34  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.43    1.69 12.23  29.48  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.17 12.23  27.23 0.49   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   24.93    1.86 12.23  29.26  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   24.93    0.08 15.60  29.11  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   24.93    0.08 15.60  29.11  n/a   0.000
       Outflow           0002  2  2.0    0.06    0.00 15.60  29.11  n/a   0.000
       Outflow           0002  3  2.0   24.88    0.08 15.60  29.11  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.08 12.25  11.98 0.22   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.05 12.25  31.29 0.56   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.05 12.25  31.29  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.75    0.05 12.25  31.29  n/a   0.000
*
```

```
   ADD [  0210+  3015]  3200  3  5.0    2.36    0.08 12.25  11.98  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0208  1  5.0    0.86    0.06 12.25  31.29 0.56   0.000
   [I%=30.0:S%= 0.50]
*
   ADD [  0208+  3200]  3201  3  5.0    3.22    0.14 12.25  17.13  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.03 12.37  12.59 0.23   0.000
   [CN=66.5        ]
   [ N = 3.0:Tp 0.21]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.05 12.33  12.59 0.23   0.000
   [CN=66.5        ]
   [ N = 3.0:Tp 0.16]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.12 12.23  18.41 0.33   0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.12 12.23  18.41  n/a   0.000
     Outflow            0001  2  2.0    2.32    0.10 12.23  18.41  n/a   0.000
     Outflow            0001  3  2.0    0.62    0.03 12.23  18.41  n/a   0.000
     Outflow            0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
     Outflow            0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
     Outflow            0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.14 12.23  22.20 0.40   0.000
   [I%=20.0:S%= 1.00]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
```

```
 * CALIB STANDHYD       5003  1  2.0   14.99    0.58 12.27  18.46 0.33   0.000
   [I%=20.0:S%= 1.00]
*
 ** Reservoir
   OUTFLOW:             0159  1  1.0   14.99    0.19 12.83  17.55  n/a   0.000
*
   ADD [  0156+  0159]  5005  3  1.0   17.31    0.22 12.78  17.66  n/a   0.000
*
   ADD [  5005+  1902]  5005  1  1.0   18.61    0.23 12.78  17.31  n/a   0.000
*
   ADD [  5005+  5002]  5005  3  1.0   21.46    0.33 12.27  17.96  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0001  1  2.0  139.80    1.29 13.50  16.98 0.31   0.000
   [CN=74.0        ]
   [ N = 2.0:Tp 1.05]
*
   CHANNEL[ 2:  0001]   0002  1  1.0  139.80    1.08 14.40  16.93  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0002  1  1.0   18.97    0.16 13.53   9.95 0.18   0.000
   [CN=71.0        ]
   [ N = 2.0:Tp 1.06]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0003  1  1.0   13.15    0.16 12.92  11.24 0.20   0.000
   [CN=71.0        ]
   [ N = 2.0:Tp 0.62]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0005  1  1.0   32.68    0.43 12.97  12.32 0.22   0.000
   [CN=74.0        ]
   [ N = 2.0:Tp 0.65]
*
   READ STORM                 15.0
   [ Ptot= 55.43 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0004  1  1.0    8.46    0.32 12.27  17.27 0.31   0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]  0001  3  1.0   32.12    0.31 13.15  15.41  n/a   0.000
```

```
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.45 12.28  15.80  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    0.82 12.82  16.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.11 12.90   9.28 0.17   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.06 12.25  18.75 0.34   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.05 12.25  35.01 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.11 12.25  23.85  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.11 12.25  23.85  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.01    0.01 12.25  23.85  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.52    0.10 12.25  23.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.03 12.25  35.00 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.03 12.25  35.00  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.03 12.25  35.00  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.01    0.01 12.25  23.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.05 12.33  17.51 0.32   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
```

```
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.03 12.25  35.00 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.06 12.25  35.00  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.10 12.25  23.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.56 12.25  37.85 0.68   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.09 12.25  35.03 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.09 12.25  22.89 0.41   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.18 12.25  33.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.24 12.25  36.17 0.65   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.03 12.25  26.39 0.48   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.27 12.25  34.78  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.27 12.25  34.78  n/a   0.000
```

```
      MAJOR SYSTEM:     8050  2  5.0    0.03    0.03 12.25  34.78  n/a   0.000
      MINOR SYSTEM:     8050  3  5.0    2.79    0.24 12.25  34.78  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       4120  1  5.0    0.08    0.01 12.25  43.90 0.79   0.000
   [I%=58.0:S%= 2.00]
*
   DUHYD                8055  1  5.0    0.08    0.01 12.25  43.90  n/a   0.000
      MAJOR SYSTEM:     8055  2  5.0    0.00    0.00 12.25  43.90  n/a   0.000
      MINOR SYSTEM:     8055  3  5.0    0.08    0.01 12.17  43.90  n/a   0.000
*
   ADD [  8050+  8055]  8020  3  5.0    2.87    0.25 12.25  35.03  n/a   0.000
*
   ADD [  2001+  8020]  2002  3  5.0   16.17    1.43 12.25  33.98  n/a   0.000
*
   ADD [  2002+  3052]  2003  3  5.0   21.53    1.99 12.25  34.94  n/a   0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.37    2.09 12.25  34.02  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.03 12.25  32.45 0.59   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.13 12.25  36.23 0.65   0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.67    2.12 12.25  34.00  n/a   0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.68    2.13 12.25  34.00  n/a   0.000
*
   ADD [  2007+  3056]  2007  3  5.0   25.05    2.26 12.25  34.12  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             3705  1  5.0   25.05    0.32 13.00  34.08  n/a   0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.31    1.13 12.92  19.72  n/a   0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.73    1.24 12.92  18.38  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.31 12.77  14.43 0.26   0.000
   [CN=78.0         ]
   [ N = 2.0:Tp 0.49]
```

```
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.03 13.20   6.35 0.11   0.000
   [CN=47.0         ]
   [ N = 2.0:Tp 0.77]
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB NASHYD         0011  1  2.0    8.42    0.03 13.33   5.85 0.11   0.000
   [CN=45.0         ]
   [ N = 2.0:Tp 0.87]
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0105  1  2.0    2.90    0.13 12.23  20.95 0.38   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050]  0015  3  2.0    2.90    0.13 12.23  20.95  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0101  1  2.0    1.57    0.13 12.27  33.52 0.60   0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                1011  1  2.0    1.57    0.13 12.27  33.52  n/a   0.000
      MAJOR SYSTEM:     1011  2  2.0    0.00    0.00 12.27  33.52  n/a   0.000
      MINOR SYSTEM:     1011  3  2.0    1.57    0.13 12.27  33.52  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0102  1  2.0    2.63    0.24 12.27  35.68 0.64   0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    4.20    0.37 12.27  34.88  n/a   0.000
*
   READ STORM                  15.0
   [ Ptot= 55.43 mm ]
   fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
   remark: 2yr 24hr 15min SCS
*
 * CALIB STANDHYD       0103  1  2.0    0.61    0.10 12.23  47.16 0.85   0.000
   [I%=75.0:S%= 2.00]
```

```
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.15 12.23  37.02 0.67   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.25 12.23  39.85  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.38    0.62 12.23  36.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    0.88 12.27  35.29 0.64   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.18 12.27  34.65 0.63   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.06 12.27  35.19  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.72    1.67 12.27  35.66  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.72    0.17 13.37  35.64  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.17 13.37  35.64  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.62    0.23 12.23  33.67  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.35    1.44 12.92  20.78  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.11    1.47 12.92  19.99  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.53    1.49 12.92  19.20  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.21    1.80 12.85  19.19  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.26    1.80 12.85  19.19  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.26    1.59 13.42  19.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    0.69 13.30  11.92 0.22   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
```

```
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.26 13.03  17.03 0.31   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    0.95 13.22  17.30  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.89 13.63  17.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.08 13.33   6.44 0.12   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.08 13.13   5.78 0.10   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.02 13.63   5.08 0.09   0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.93    2.46 13.52  18.47  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.31    2.55 13.52  17.49  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.34    2.63 13.48  16.62  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.65    2.65 13.48  16.27  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.65    2.53 13.85  16.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.11 13.73   6.29 0.11   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
```

```
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.07 12.33  12.34 0.22   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.04 12.25  44.89 0.81   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.10 12.25  15.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.03 12.25  12.14 0.22   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.05 12.25  44.90 0.81   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.08 12.25  20.81  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.08 12.25  20.81  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.36    0.08 12.25  20.81  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    2.95    0.10 12.25  15.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.02 12.58  15.32 0.28   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.09 12.25  47.99 0.87   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.04 12.25  51.34 0.93   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.03 12.25  52.59 0.95   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.07 12.25  51.83  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02 12.33  51.50  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.10 12.25  49.45  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.12 12.25  30.70  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    4.97    0.22 12.25  21.50  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.01 12.50   8.40 0.15   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.14    0.23 12.25  19.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.06 12.33   8.34 0.15   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0    9.96    0.28 12.25  14.91  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.11    0.14 12.25  24.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    0.53 12.25  31.30 0.56   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.39    0.67 12.25  29.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.01 12.33   6.77 0.12   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.11    0.68 12.25  28.14  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0   10.11    0.18 12.83  28.15  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.07    0.34 12.25  21.58  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.45    3.56 13.98  16.44  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.71    3.66 13.98  15.70  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.78    3.81 13.93  15.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.07 14.00   8.67 0.16   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.02 12.33   7.48 0.13   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.02 12.33  14.27 0.26   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.20 12.23  25.70 0.46   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.27    3.89 13.93  15.66  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.16    3.89 13.93  15.65  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  522.80    3.89 13.93  15.64  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  525.71    3.90 13.93  15.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.04 13.33   8.62 0.16   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.17    3.94 13.93  15.61  n/a   0.000
*
===============================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
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```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\5d388af9-7968-40ca-b8bc-2dbc1a25730d\s
  Summary    filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\5d388af9-7968-40ca-b8bc-2dbc1a25730d\s


DATE: 04-29-2021                          TIME: 02:32:21

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 14 - 5yr 24hr 15min SCS   **
  ************************************************
```

```
  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.     Qbase
                                    min     ha   '  cms   hrs      mm            cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0     2.10     0.10 12.37   21.11 0.27    0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0     2.50     0.25 12.23   42.35 0.54    0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0     2.68     0.39 12.27   53.63 0.69    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68     0.25 12.40   53.63  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0     1.51     0.27 12.23   59.60 0.77    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19     0.51 12.23   55.78  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0     0.62     0.12 12.23   62.23 0.80    0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0     2.11     0.30 12.27   51.80 0.67    0.000
```

```
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0     2.73     0.41 12.27   54.17  n/a    0.000
*
    DUHYD                0226  1  2.0     2.73     0.41 12.27   54.17  n/a    0.000
       MAJOR SYSTEM:     0226  2  2.0     0.42     0.25 12.27   54.17  n/a    0.000
       MINOR SYSTEM:     0226  3  2.0     2.31     0.16 12.07   54.17  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0     1.12     0.22 12.23   62.23 0.80    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0     1.54     0.47 12.23   60.04  n/a    0.000
*
    ADD [  0227+  0255]  0256  3  2.0     5.73     0.97 12.23   56.92  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0     0.48     0.08 12.23   57.34 0.74    0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0     0.48     0.08 12.23   57.34  n/a    0.000
       MAJOR SYSTEM:     0252  2  2.0     0.02     0.03 12.23   57.34  n/a    0.000
       MINOR SYSTEM:     0252  3  2.0     0.46     0.05 12.10   57.34  n/a    0.000
*
    ADD [  0252+  0256]  0009  3  2.0     6.18     1.03 12.23   56.95  n/a    0.000
*
    ADD [  0009+  0100]  0010  3  2.0     8.68     1.28 12.23   52.75  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0     1.90     0.20 12.23   43.81 0.56    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0     1.90     0.20 12.23   43.81  n/a    0.000
       MAJOR SYSTEM:     0050  2  2.0     0.06     0.05 12.23   43.81  n/a    0.000
       MINOR SYSTEM:     0050  3  2.0     1.84     0.15 12.10   43.81  n/a    0.000
*
    ADD [  0010+  0050]  0011  3  2.0    10.52     1.43 12.23   51.19  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    10.00     1.02 12.23   44.97 0.58    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0    20.52     2.44 12.23   48.16  n/a    0.000
*
```

```
    ADD [  0012+  0103]  0013  3  2.0   22.62    2.52 12.23  45.65  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.25 12.23  42.19 0.54   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.12    2.77 12.23  45.30  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.12    0.20 14.10  44.99  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.12    0.20 14.10  44.99  n/a   0.000
       Outflow           0002  2  2.0    0.04    0.00 14.10  44.99  n/a   0.000
       Outflow           0002  3  2.0   25.08    0.20 14.10  44.99  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.17 12.25  23.47 0.30   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.09 12.25  49.34 0.63   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.09 12.25  49.34  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.03    0.03 12.25  49.34  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.72    0.06 12.08  49.34  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.39    0.19 12.25  23.79  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.10 12.25  49.34 0.63   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.25    0.30 12.25  30.55  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.06 12.37  24.36 0.31   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.09 12.30  24.35 0.31   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.20 12.23  29.89 0.38   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.20 12.23  29.89  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.16 12.23  29.89  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.04 12.23  29.89  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.24 12.27  36.32 0.47   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    0.96 12.27  29.98 0.39   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    0.56 12.50  29.06  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    0.64 12.48  29.17  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    0.70 12.45  28.83  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    0.85 12.43  29.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
```

```
 *  CALIB NASHYD        0001  1  2.0  139.80    2.44 13.43  31.26 0.40   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]  0002  1  1.0  139.80    2.13 14.23  31.19  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        0002  1  1.0   18.97    0.30 13.47  19.20 0.25   0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        0003  1  1.0   13.15    0.31 12.90  21.56 0.28   0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        0005  1  1.0   32.68    0.82 12.93  23.40 0.30   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0004  1  1.0    8.46    0.56 12.27  28.29 0.36   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003] 0001  3  1.0   32.12    0.59 13.10  28.73  n/a   0.000
*
    ADD [  0001+  0004] 0001  1  1.0   40.58    0.83 12.30  28.64  n/a   0.000
*
    ADD [  0001+  0005] 0001  3  1.0   73.26    1.54 12.82  29.78  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        0008  1  2.0   14.42    0.23 12.87  18.64 0.24   0.000
    [CN=58.0        ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        1031  1  5.0    1.05    0.10 12.25  32.62 0.42   0.000
    [CN=73.0        ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3061  1  5.0    0.48    0.08 12.25  54.03 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061] 2008  3  5.0    1.53    0.18 12.25  39.34  n/a   0.000
*
    DUHYD               2010  1  5.0    1.53    0.18 12.25  39.34  n/a   0.000
       MAJOR SYSTEM:    2010  2  5.0    0.12    0.08 12.25  39.34  n/a   0.000
       MINOR SYSTEM:    2010  3  5.0    1.41    0.10 12.17  39.34  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3053  1  5.0    0.30    0.05 12.25  54.02 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD               2011  1  5.0    0.30    0.05 12.25  54.02  n/a   0.000
       MAJOR SYSTEM:    2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:    2011  3  5.0    0.30    0.05 12.25  54.02  n/a   0.000
*
    ADD [  2010+  2011] 2009  3  5.0    0.12    0.08 12.25  39.34  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        3055  1  5.0    1.24    0.08 12.33  30.83 0.40   0.000
    [CN=70.0        ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3054  1  5.0    0.30    0.05 12.25  54.02 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054] 2004  3  5.0    0.60    0.10 12.25  54.02  n/a   0.000
*
    ADD [  2004+  3055] 2005  3  5.0    1.84    0.18 12.25  38.39  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
```

```
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       3052  1  5.0    5.36    0.87 12.25  57.51 0.74   0.000
   [I%=37.0:S%= 2.00]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       3051  1  5.0   11.90    1.74 12.25  54.04 0.69   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       3021  1  5.0    1.40    0.14 12.25  36.15 0.46   0.000
   [I%=28.0:S%= 2.00]
*
   ADD [  3021+  3051]  2001  3  5.0   13.30    1.89 12.25  52.15  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       4111  1  5.0    2.42    0.42 12.25  55.60 0.71   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       4101  1  5.0    0.40    0.05 12.25  40.89 0.53   0.000
   [I%=35.0:S%= 2.00]
*
   ADD [  4101+  4111]  8000  3  5.0    2.82    0.47 12.25  53.51  n/a   0.000
*
   DUHYD                8050  1  5.0    2.82    0.47 12.25  53.51  n/a   0.000
      MAJOR SYSTEM:     8050  2  5.0    0.27    0.23 12.25  53.51  n/a   0.000
      MINOR SYSTEM:     8050  3  5.0    2.55    0.24 12.08  53.51  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       4120  1  5.0    0.08    0.02 12.25  64.62 0.83   0.000
   [I%=58.0:S%= 2.00]
*
   DUHYD                8055  1  5.0    0.08    0.02 12.25  64.62  n/a   0.000
      MAJOR SYSTEM:     8055  2  5.0    0.01    0.01 12.25  64.62  n/a   0.000
      MINOR SYSTEM:     8055  3  5.0    0.07    0.01 12.08  64.62  n/a   0.000
*
   ADD [  8050+  8055]  8020  3  5.0    2.62    0.25 12.08  53.82  n/a   0.000
*
   ADD [  2001+  8020]  2002  3  5.0   15.92    2.14 12.25  52.43  n/a   0.000
*
   ADD [  2002+  3052]  2003  3  5.0   21.28    3.01 12.25  53.71  n/a   0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.12    3.19 12.25  52.49  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.05 12.25  50.42 0.65   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.19 12.25  54.23 0.70   0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.42    3.24 12.25  52.46  n/a   0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.54    3.32 12.25  52.39  n/a   0.000
*
   ADD [  2007+  3056]  2007  3  5.0   24.91    3.52 12.25  52.49  n/a   0.000
*
** Reservoir
   OUTFLOW:             3705  1  5.0   24.91    0.65 12.83  52.45  n/a   0.000
*
   ADD [  0001+  3705]  0004  3  1.0   98.17    2.19 12.83  34.28  n/a   0.000
*
   ADD [  0004+  0008]  0004  1  1.0  112.59    2.42 12.83  32.28  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB NASHYD         0007  1  1.0   16.68    0.59 12.75  26.96 0.35   0.000
   [CN=78.0          ]
   [ N = 2.0:Tp 0.49]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB NASHYD         0010  1  2.0    7.76    0.07 13.13  13.16 0.17   0.000
   [CN=47.0          ]
   [ N = 2.0:Tp 0.77]
*
   READ STORM                 15.0
   [ Ptot= 77.82 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
   remark: 5yr 24hr 15min SCS
*
 * CALIB NASHYD         0011  1  2.0    8.42    0.06 13.30  12.22 0.16   0.000
```

```
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.20 12.23  33.33 0.43   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    2.96    0.26 12.23  33.56  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.22 12.27  52.38 0.67   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.22 12.27  52.38  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.12    0.09 12.27  52.38  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.45    0.13 12.10  52.38  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.40 12.27  55.00 0.71   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.08    0.53 12.27  54.07  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.14 12.23  68.17 0.88   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.25 12.23  56.47 0.73   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.39 12.23  59.75  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.26    0.92 12.23  56.04  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
```

```
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.51 12.27  54.41 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.31 12.27  53.81 0.69   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.82 12.27  54.31  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.60    2.73 12.27  54.90  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.60    0.29 13.20  54.88  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.29 13.20  54.86  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.68    0.48 12.23  51.95  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.28    2.77 12.82  35.33  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.04    2.83 12.82  34.12  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.46    2.89 12.82  32.89  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.14    3.47 12.80  33.08  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.18    3.47 12.80  33.08  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.18    3.12 13.28  32.93  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.31 13.25  22.69 0.29   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.50 13.00  31.33 0.40   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.80 13.17  31.81  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.71 13.53  31.81  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0012  1  2.0   22.38    0.18 13.30  13.41 0.17   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0013  1  2.0   22.03    0.18 13.07  12.01 0.15   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0014  1  2.0    9.31    0.05 13.57  10.58 0.14   0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.85    4.79 13.37  32.55  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.23    4.97 13.37  30.99  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.26    5.15 13.37  29.59  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.57    5.20 13.37  29.01  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.57    5.00 13.67  28.94  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0015  1  2.0   35.26    0.23 13.63  13.09 0.17   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0200  1  5.0    2.69    0.13 12.33  24.17 0.31   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  5.0    0.26    0.05 12.25  65.49 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.18 12.25  27.82  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0211  1  5.0    1.00    0.06 12.25  23.78 0.31   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0209  1  5.0    0.36    0.08 12.25  65.50 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.14 12.25  34.83  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.14 12.25  34.83  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.06    0.05 12.25  34.83  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.30    0.09 12.17  34.83  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.01    0.23 12.25  27.97  n/a   0.000
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0109  1  5.0    1.11    0.04 12.58  29.25 0.38   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  5.0    0.53    0.13 12.25  68.81 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  5.0    0.23    0.06 12.25  73.12 0.94   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM               15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.04 12.25  74.74 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.10 12.25  73.76  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02 12.33  73.43  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.15 12.25  70.74  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.17 12.25  47.94  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.03    0.41 12.25  35.98  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.03 12.42  17.13 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.20    0.43 12.25  32.43  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.12 12.33  17.00 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.02    0.54 12.25  26.55  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.02    0.15 12.17  40.01  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    0.84 12.25  49.35 0.63   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.30    0.99 12.25  47.32  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.02 12.33  14.01 0.18   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.02    1.02 12.25  44.93  n/a   0.000
*
```

```
 ** Reservoir
    OUTFLOW:             3008  1  5.0   10.02    0.22 12.92  44.93  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.04    0.71 12.25  35.73  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.37    7.01 13.80  29.65  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.63    7.24 13.80  28.43  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.67    7.54 13.78  28.73  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.15 13.90  17.38 0.22   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.03 12.33  15.17 0.19   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.04 12.33  26.43 0.34   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.31 12.23  39.48 0.51   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.16    7.69 13.78  28.30  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.05    7.69 13.78  28.28  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  522.69    7.70 13.78  28.28  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  525.60    7.72 13.78  28.34  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
```

```
 *  CALIB NASHYD        1801  1  5.0    6.46    0.09 13.25  17.29 0.22   0.000
    [CN=54.9        ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.06    7.79 13.78  28.20  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```


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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\681ea6c3-cb7e-4d6c-86d2-876445aa2818\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\681ea6c3-cb7e-4d6c-86d2-876445aa2818\s


DATE: 04-29-2021                          TIME: 02:32:22

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 15 - 10yr 24hr 15min SCS  **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.   Qbase
                                  min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.14 12.37  28.72 0.31   0.000
    [CN=56.0        ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
```

```
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.32 12.23  53.21 0.57   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.52 12.27  67.13 0.72   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0205  1  2.0    2.68    0.26 12.43  67.13  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0250  1  2.0    1.51    0.33 12.23  73.63 0.79   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.58 12.23  69.48  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0221  1  2.0    0.62    0.15 12.23  76.34 0.82   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0220  1  2.0    2.11    0.40 12.27  65.14 0.70   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.55 12.23  67.68  n/a   0.000
*
    DUHYD               0226  1  2.0    2.73    0.55 12.23  67.68  n/a   0.000
       MAJOR SYSTEM:    0226  2  2.0    0.55    0.39 12.23  67.68  n/a   0.000
       MINOR SYSTEM:    0226  3  2.0    2.18    0.16 12.03  67.68  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 92.93 mm ]
    fname               :               C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0222  1  2.0    1.12    0.28 12.23  76.34 0.82   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.67    0.66 12.23  73.49  n/a   0.000
```

```
*
    ADD [  0227+  0255]  0256  3  2.0    5.86    1.24 12.23  70.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.10 12.23  71.18 0.77   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.10 12.23  71.18  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.05    0.05 12.23  71.18  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.43    0.05 12.07  71.18  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.29    1.30 12.23  70.66  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.79    1.61 12.23  65.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.25 12.23  54.89 0.59   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.25 12.23  54.89  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.13    0.10 12.23  54.89  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.77    0.15 12.07  54.89  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.57    1.76 12.23  63.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.25 12.23  56.27 0.61   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.57    3.01 12.23  60.18  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.67    3.12 12.23  57.27  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.32 12.23  53.04 0.57   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.17    3.44 12.23  56.85  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.17    0.42 13.37  56.50  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.17    0.42 13.37  56.50  n/a   0.000
       Outflow           0002  2  2.0    0.83    0.06 13.37  56.50  n/a   0.000
```

```
       Outflow           0002  3  2.0   24.34    0.36 13.37  56.50  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.23 12.25  32.45 0.35   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.12 12.25  62.21 0.67   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.12 12.25  62.21  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.08    0.06 12.25  62.21  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.67    0.06 12.08  62.21  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.44    0.30 12.25  33.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.14 12.25  62.21 0.67   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.30    0.44 12.25  40.91  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.09 12.37  33.56 0.36   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.13 12.30  33.56 0.36   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.26 12.27  38.52 0.41   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.26 12.27  38.52  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.21 12.27  38.52  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.06 12.27  38.52  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.32 12.27  46.79 0.50   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.26 12.27  38.64 0.42   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    0.92 12.37  37.72  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    1.05 12.37  37.83  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    1.17 12.37  37.53  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    1.41 12.37  38.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    3.33 13.43  42.07 0.45   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    2.94 14.15  41.99  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.41 13.45  26.44 0.28   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
```

```
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.43 12.88  29.59 0.32   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    1.12 12.92  31.93 0.34   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.74 12.27  36.65 0.39   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.81 13.08  38.93  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    1.13 12.30  38.45  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    2.10 12.82  40.04  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.33 12.83  26.18 0.28   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.14 12.25  43.00 0.46   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.10 12.25  67.44 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.24 12.25  50.66  n/a   0.000
*
```

```
    DUHYD                    2010  1  5.0     1.53     0.24 12.25  50.66  n/a    0.000
       MAJOR SYSTEM:         2010  2  5.0     0.21     0.14 12.25  50.66  n/a    0.000
       MINOR SYSTEM:         2010  3  5.0     1.32     0.10 12.08  50.66  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           3053  1  5.0     0.30     0.07 12.25  67.43 0.73    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                    2011  1  5.0     0.30     0.07 12.25  67.43  n/a    0.000
       MAJOR SYSTEM:         2011  2  5.0     0.00     0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:         2011  3  5.0     0.30     0.07 12.25  67.43  n/a    0.000
*
    ADD [  2010+  2011]      2009  3  5.0     0.21     0.14 12.25  50.66  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD             3055  1  5.0     1.24     0.11 12.25  40.91 0.44    0.000
    [CN=70.0           ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           3054  1  5.0     0.30     0.06 12.25  67.43 0.73    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]      2004  3  5.0     0.60     0.13 12.25  67.43  n/a    0.000
*
    ADD [  2004+  3055]      2005  3  5.0     1.84     0.24 12.25  49.56  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           3052  1  5.0     5.36     1.09 12.25  71.25 0.77    0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           3051  1  5.0    11.90     2.22 12.25  67.44 0.73    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           3021  1  5.0     1.40     0.18 12.25  45.93 0.49    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]      2001  3  5.0    13.30     2.40 12.25  65.18  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           4111  1  5.0     2.42     0.53 12.25  69.24 0.75    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           4101  1  5.0     0.40     0.06 12.25  51.42 0.55    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]      8000  3  5.0     2.82     0.59 12.25  66.71  n/a    0.000
*
    DUHYD                    8050  1  5.0     2.82     0.59 12.25  66.71  n/a    0.000
       MAJOR SYSTEM:         8050  2  5.0     0.39     0.35 12.25  66.71  n/a    0.000
       MINOR SYSTEM:         8050  3  5.0     2.43     0.24 12.08  66.71  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           4120  1  5.0     0.08     0.02 12.25  78.91 0.85    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                    8055  1  5.0     0.08     0.02 12.25  78.91  n/a    0.000
       MAJOR SYSTEM:         8055  2  5.0     0.01     0.01 12.25  78.91  n/a    0.000
       MINOR SYSTEM:         8055  3  5.0     0.07     0.01 12.08  78.91  n/a    0.000
*
    ADD [  8050+  8055]      8020  3  5.0     2.50     0.25 12.08  67.05  n/a    0.000
*
    ADD [  2001+  8020]      2002  3  5.0    15.80     2.65 12.25  65.47  n/a    0.000
*
    ADD [  2002+  3052]      2003  3  5.0    21.16     3.75 12.25  66.94  n/a    0.000
*
    ADD [  2003+  2005]      2006  3  5.0    23.00     3.99 12.25  65.55  n/a    0.000
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD           0101  1  5.0     0.30     0.06 12.25  63.21 0.68    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                     15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.24 12.25  66.92 0.72   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.30    4.05 12.25  65.52  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.51    4.19 12.25  65.39  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.88    4.43 12.25  65.47  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.88    0.98 12.75  65.43  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.14    3.07 12.80  45.17  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.56    3.40 12.80  42.73  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.79 12.73  36.44 0.39   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.10 13.13  18.82 0.20   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.09 13.27  17.56 0.19   0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.26 12.23  42.53 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.03    0.36 12.23  43.05  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
```

```
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.30 12.27  65.72 0.71   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.30 12.27  65.72  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.21    0.17 12.27  65.72  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.36    0.13 12.07  65.72  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.53 12.27  68.58 0.74   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    3.99    0.66 12.27  67.60  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.17 12.23  82.58 0.89   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.31 12.23  70.11 0.75   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.48 12.23  73.60  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.17    1.14 12.23  69.72  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.93 12.27  67.89 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.39 12.27  67.31 0.72   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    2.32 12.27  67.79  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.51    3.44 12.27  68.44  n/a   0.000
*
```

```
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.51    0.39 13.07  68.42  n/a    0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.39 13.07  68.39  n/a    0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.75    0.70 12.23  64.86  n/a    0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.30    3.87 12.78  46.15  n/a    0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.06    3.96 12.78  44.65  n/a    0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.48    4.04 12.80  43.14  n/a    0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.16    4.83 12.78  43.46  n/a    0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.99    4.88 12.80  43.52  n/a    0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.99    4.39 13.20  43.36  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.78 13.23  30.98 0.33    0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.68 13.00  42.14 0.45    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    2.45 13.15  42.77  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    2.34 13.48  42.77  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.26 13.27  19.20 0.21    0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.26 13.07  17.22 0.19    0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.07 13.57  15.21 0.16    0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  253.66    6.67 13.32  43.16  n/a    0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.04    6.93 13.32  41.22  n/a    0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.07    7.19 13.30  39.44  n/a    0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.38    7.26 13.30  38.71  n/a    0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.38    7.00 13.57  38.64  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.33 13.60  18.74 0.20    0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.19 12.33  33.43 0.36    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.07 12.25  79.66 0.86    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.25 12.25  37.51  n/a    0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.09 12.25  32.89 0.35    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
```

```
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.09 12.25  79.67 0.86   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.18 12.25  45.27  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.18 12.25  45.27  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.13    0.09 12.25  45.27  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.23    0.09 12.08  45.27  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.08    0.34 12.25  37.83  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.05 12.58  39.87 0.43   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.15 12.25  83.01 0.89   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.07 12.25  87.88 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.05 12.25  89.71 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.12 12.25  88.61  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02 12.33  88.27  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.18 12.25  85.21  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.21 12.25  60.30  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.10    0.55 12.25  46.73  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
```

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\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.04 12.42  24.24 0.26   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.27    0.58 12.25  42.53  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.17 12.33  24.04 0.26   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.09    0.75 12.25  35.53  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.91    0.15 12.08  51.26  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.20 12.25  62.22 0.67   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.19    1.35 12.25  59.95  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.03 12.25  20.00 0.22   0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.91    1.38 12.25  57.05  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.91    0.24 13.00  57.07  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.99    0.97 12.25  46.20  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  447.18    9.76 13.70  39.69  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.44   10.09 13.70  38.15  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.43   10.43 13.70  38.47  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.21 13.90  24.45 0.26   0.000
```

```
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.05 12.33  21.47 0.23   0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.06 12.33  35.83 0.39   0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.39 12.23  49.52 0.53   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  521.92   10.64 13.70  37.95  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  522.81   10.64 13.70  37.92  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  523.45   10.65 13.70  37.92  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  526.36   10.68 13.70  37.98  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.12 13.25  24.32 0.26   0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  532.82   10.79 13.70  37.82  n/a   0.000
*
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
```

```
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


```
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.
```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\e11d26ec-de8b-40eb-907e-ee0627146e7d\s
  Summary    filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\e11d26ec-de8b-40eb-907e-ee0627146e7d\s


DATE: 04-29-2021                          TIME: 02:32:29

USER:


COMMENTS: ____________________________________________________________


  **********************************************
  ** SIMULATION : Run 16 - 25yr 24hr 15min SCS  **
  **********************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.19 12.37  39.12 0.35   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.40 12.23  67.26 0.60   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.67 12.27  84.20 0.75   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.65 12.37  84.20  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.42 12.23  91.23 0.82   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.89 12.37  86.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.19 12.23  94.00 0.84   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.51 12.27  82.03 0.74   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.70 12.23  84.75  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.70 12.23  84.75  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.66    0.54 12.23  84.75  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.07    0.16 12.00  84.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.34 12.23  94.01 0.84   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.78    0.88 12.23  90.58  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.97    1.55 12.23  87.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.13 12.23  88.58 0.79   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.13 12.23  88.58  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.06    0.07 12.23  88.58  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.42    0.05 12.07  88.58  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.38    1.61 12.23  87.92  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.88    2.01 12.23  82.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.33 12.23  69.19 0.62   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.33 12.23  69.19  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.20    0.18 12.23  69.19  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.70    0.15 12.07  69.19  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.58    2.16 12.23  80.04  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.58 12.23  70.82 0.63   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.58    3.75 12.23  75.56  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.68    3.89 12.23  72.18  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.42 12.23  67.09 0.60   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.18    4.30 12.23  71.68  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.18    0.60 13.20  71.29  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.18    0.60 13.20  71.29  n/a   0.000
       Outflow           0002  2  2.0    1.24    0.06 13.20  71.29  n/a   0.000
       Outflow           0002  3  2.0   23.94    0.54 13.20  71.29  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.32 12.25  44.55 0.40   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.16 12.25  78.62 0.70   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.16 12.25  78.62  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.11    0.10 12.25  78.62  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.64    0.06 12.08  78.62  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.47    0.42 12.25  46.13  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.18 12.25  78.62 0.70   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.33    0.60 12.25  54.51  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.12 12.37  45.97 0.41   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.17 12.30  45.97 0.41   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.36 12.27  49.98 0.45   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.36 12.27  49.98  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.28 12.27  49.98  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.08 12.27  49.98  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.43 12.27  60.52 0.54   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.71 12.27  50.14 0.45   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    1.73 12.25  49.22  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    2.01 12.25  49.32  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    2.17 12.25  49.09  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    2.59 12.25  50.61  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    4.50 13.40  56.33 0.50   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    4.02 14.07  56.23  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.56 13.43  36.19 0.32   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.59 12.88  40.38 0.36   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname            :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    1.52 12.90  43.31 0.39   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.65]
*
```

```
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0004  1  1.0     8.46     1.02 12.27  47.80 0.43   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]   0001  3  1.0    32.12     1.11 13.07  52.48  n/a   0.000
*
    ADD [  0001+  0004]   0001  1  1.0    40.58     1.58 12.30  51.50  n/a   0.000
*
    ADD [  0001+  0005]   0001  3  1.0    73.26     2.83 12.82  53.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0008  1  2.0    14.42     0.46 12.83  36.59 0.33   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          1031  1  5.0     1.05     0.18 12.25  56.62 0.51   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3061  1  5.0     0.48     0.13 12.25  84.39 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]   2008  3  5.0     1.53     0.31 12.25  65.33  n/a   0.000
*
    DUHYD                 2010  1  5.0     1.53     0.31 12.25  65.33  n/a   0.000
       MAJOR SYSTEM:      2010  2  5.0     0.29     0.21 12.25  65.33  n/a   0.000
       MINOR SYSTEM:      2010  3  5.0     1.24     0.10 12.08  65.33  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3053  1  5.0     0.30     0.08 12.25  84.39 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                 2011  1  5.0     0.30     0.08 12.25  84.39  n/a   0.000
       MAJOR SYSTEM:      2011  2  5.0     0.00     0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      2011  3  5.0     0.30     0.08 12.25  84.39  n/a   0.000
*
    ADD [  2010+  2011]   2009  3  5.0     0.29     0.21 12.25  65.33  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          3055  1  5.0     1.24     0.15 12.25  54.24 0.49   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3054  1  5.0     0.30     0.08 12.25  84.38 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]   2004  3  5.0     0.60     0.17 12.25  84.38  n/a   0.000
*
    ADD [  2004+  3055]   2005  3  5.0     1.84     0.31 12.25  64.07  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3052  1  5.0     5.36     1.50 12.25  88.55 0.79   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3051  1  5.0    11.90     3.11 12.25  84.40 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        3021  1  5.0     1.40     0.24 12.25  58.73 0.53   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]   2001  3  5.0    13.30     3.34 12.25  81.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        4111  1  5.0     2.42     0.67 12.25  86.44 0.77   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
```

```
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.08 12.25  65.08 0.58   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.76 12.25  83.41  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.76 12.25  83.41  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.52    0.52 12.25  83.41  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.30    0.24 12.08  83.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.03 12.25  96.75 0.87   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.03 12.25  96.75  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.02 12.25  96.75  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01 12.08  96.75  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.37    0.25 12.08  83.79  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.67    3.59 12.25  82.01  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.03    5.09 12.25  83.68  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.87    5.40 12.25  82.10  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.08 12.25  79.51 0.71   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.31 12.25  83.04 0.74   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.17    5.48 12.25  82.07  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.46    5.69 12.25  81.86  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.83    6.00 12.25  81.93  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.83    1.69 12.58  81.89  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.09    4.41 12.67  59.41  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.51    4.85 12.70  56.49  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    1.06 12.72  48.91 0.44   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.14 13.10  26.81 0.24   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.13 13.27  25.12 0.23   0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.34 12.23  54.65 0.49   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.10    0.52 12.23  55.60  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.39 12.27  82.62 0.74   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.39 12.27  82.62  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.28    0.26 12.27  82.62  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.29    0.13 12.07  82.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.67 12.27  85.71 0.77   0.000
    [I%=29.0:S%= 2.00]
*
```

```
    ADD [  1011+  0102]  0105  3  2.0    3.92    0.80 12.27  84.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.21 12.23 100.51 0.90   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.40 12.23  87.31 0.78   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.62 12.23  91.00  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.10    1.42 12.23  86.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    2.55 12.27  84.91 0.76   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.50 12.27  84.37 0.76   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    3.05 12.27  84.82  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.44    4.44 12.27  85.53  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.44    0.52 12.97  85.51  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.54 12.27  85.46  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.82    1.04 12.27  81.22  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.33    5.49 12.67  60.28  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.09    5.62 12.70  58.46  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.51    5.73 12.73  56.59  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.19    6.79 12.73  57.08  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  168.43    6.85 12.73  57.18  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  168.43    6.15 13.08  57.01  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    2.41 13.22  42.01 0.38   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.92 12.97  56.40 0.51   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    3.31 13.13  57.19  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    3.18 13.45  57.19  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.38 13.27  27.38 0.25   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.38 13.07  24.61 0.22   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.11 13.53  21.82 0.20   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  254.10    9.19 13.22  57.07  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.48    9.57 13.22  54.67  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.51    9.95 13.22  52.45  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.82   10.05 13.22  51.52  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.82    9.70 13.45  51.44  n/a   0.000
```

```
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0015  1  2.0    35.26     0.48 13.60   26.72 0.24    0.000
    [CN=47.0           ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0200  1  5.0     2.69     0.26 12.33   45.90 0.41    0.000
    [CN=68.0           ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  5.0     0.26     0.08 12.25   97.34 0.87    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]   3000  3  5.0     2.95     0.34 12.25   50.43  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0211  1  5.0     1.00     0.12 12.25   45.16 0.40    0.000
    [CN=68.0           ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0209  1  5.0     0.36     0.11 12.25   97.35 0.87    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]   3012  3  5.0     1.36     0.24 12.25   58.97  n/a    0.000
*
    DUHYD                 3112  1  5.0     1.36     0.24 12.25   58.97  n/a    0.000
       MAJOR SYSTEM:      3112  2  5.0     0.20     0.15 12.25   58.97  n/a    0.000
       MINOR SYSTEM:      3112  3  5.0     1.16     0.09 12.08   58.97  n/a    0.000
*
    ADD [  3000+  3112]   3001  3  5.0     3.15     0.48 12.25   50.97  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0109  1  5.0     1.11     0.07 12.58   53.94 0.48    0.000
    [CN=74.0           ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  5.0     0.53     0.19 12.25 100.67 0.90    0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  5.0     0.23     0.08 12.25 106.14 0.95    0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  5.0     0.15     0.06 12.25 108.19 0.97    0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]   0106  3  5.0     0.38     0.14 12.25 106.95  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              0107  1  5.0     0.38     0.02 12.33 106.61  n/a    0.000
*
    ADD [  0102+  0107]   0108  3  5.0     0.91     0.21 12.25 103.15  n/a    0.000
*
    ADD [  0108+  0109]   0202  3  5.0     2.02     0.26 12.25   76.11  n/a    0.000
*
    ADD [  0202+  3001]   3002  3  5.0     5.17     0.75 12.25   60.79  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0203  1  5.0     1.17     0.06 12.42   34.09 0.31    0.000
    [CN=56.0           ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]   3003  3  5.0     6.34     0.79 12.25   55.87  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=111.56 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD          0204  1  5.0     3.82     0.25 12.33   33.82 0.30    0.000
    [CN=56.0           ]
    [ N = 2.0:Tp 0.20]
```

```
*
    ADD [  0204+  3003]  3004  3  5.0   10.16    1.02 12.25  47.57  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.80    0.15 12.08  65.92  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.54 12.25  78.63 0.70   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.08    1.69 12.25  76.12  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.04 12.25  28.41 0.25   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.80    1.74 12.25  72.61  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.80    0.82 12.67  72.61  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.96    1.31 12.67  59.86  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  447.62   13.41 13.60  52.94  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.88   13.89 13.60  51.02  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.83   14.33 13.57  51.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.30 13.87  34.25 0.31   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.06 12.33  30.29 0.27   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.08 12.33  48.42 0.43   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.50 12.23  62.56 0.56   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  522.32   14.63 13.58  50.74  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  523.21   14.63 13.58  50.70  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  523.85   14.64 13.57  50.70  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  526.76   14.68 13.57  50.76  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=111.56 mm ]
    fname               :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\d0419850-3d65-4df3-a1a6-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.17 13.25  34.07 0.31   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  533.22   14.84 13.57  50.56  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\8f786bbf-c208-453e-afa9-b7ab4ab7125e\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\8f786bbf-c208-453e-afa9-b7ab4ab7125e\s


DATE: 04-29-2021                           TIME: 02:32:25
```

```
USER:

COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 17 - 50yr 24hr 15min SCS  **
  **************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.23 12.37  47.64 0.38   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.48 12.23  78.32 0.62   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.78 12.27  97.36 0.77   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0205  1  2.0    2.68    0.98 12.30  97.36  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0250  1  2.0    1.51    0.48 12.23 104.73 0.83   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250] 0255  3  2.0    4.19    1.38 12.30 100.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD      0221  1  2.0    0.62    0.22 12.23 107.54 0.86   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0220  1  2.0    2.11    0.62 12.27  95.09 0.76   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221] 0225  3  2.0    2.73    0.84 12.23  97.92  n/a   0.000
*
    DUHYD               0226  1  2.0    2.73    0.84 12.23  97.92  n/a   0.000
       MAJOR SYSTEM:    0226  2  2.0    0.73    0.68 12.23  97.92  n/a   0.000
       MINOR SYSTEM:    0226  3  2.0    2.00    0.16 11.90  97.92  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0222  1  2.0    1.12    0.40 12.23 107.54 0.86   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226] 0227  3  2.0    1.85    1.08 12.23 103.74  n/a   0.000
*
    ADD [  0227+  0255] 0256  3  2.0    6.04    2.22 12.30 101.16  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0251  1  2.0    0.48    0.15 12.23 101.96 0.81   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD               0252  1  2.0    0.48    0.15 12.23 101.96  n/a   0.000
       MAJOR SYSTEM:    0252  2  2.0    0.08    0.09 12.23 101.96  n/a   0.000
       MINOR SYSTEM:    0252  3  2.0    0.40    0.05 12.07 101.96  n/a   0.000
*
    ADD [  0252+  0256] 0009  3  2.0    6.44    2.27 12.30 101.21  n/a   0.000
*
    ADD [  0009+  0100] 0010  3  2.0    8.94    2.67 12.30  94.81  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0101  1  2.0    1.90    0.38 12.23  80.42 0.64   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD               0050  1  2.0    1.90    0.38 12.23  80.42  n/a   0.000
       MAJOR SYSTEM:    0050  2  2.0    0.26    0.23 12.23  80.42  n/a   0.000
       MINOR SYSTEM:    0050  3  2.0    1.64    0.15 12.07  80.42  n/a   0.000
*
    ADD [  0010+  0050] 0011  3  2.0   10.59    2.82 12.30  92.58  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.84 12.23  82.23 0.65   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.59    4.35 12.23  87.55  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.69    4.53 12.23  83.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.49 12.23  78.16 0.62   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.19    5.01 12.23  83.29  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.19    0.88 13.13  82.89  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.19    0.88 13.13  82.89  n/a   0.000
       Outflow           0002  2  2.0    1.64    0.18 13.13  82.89  n/a   0.000
       Outflow           0002  3  2.0   23.55    0.70 13.13  82.89  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.39 12.25  54.33 0.43   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.19 12.25  91.36 0.73   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.19 12.25  91.36  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.14    0.13 12.25  91.36  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.61    0.06 12.08  91.36  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.50    0.52 12.25  56.39  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.22 12.25  91.36 0.73   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.36    0.74 12.25  65.34  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.15 12.37  56.02 0.45   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.21 12.30  56.01 0.45   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.43 12.27  59.20 0.47   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.43 12.27  59.20  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.34 12.27  59.20  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.09 12.27  59.20  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.54 12.27  71.41 0.57   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    2.05 12.27  59.38 0.47   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    2.10 12.27  58.46  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    2.44 12.27  58.56  n/a   0.000
*
```

```
    ADD [  5005+  1902]  5005  1  1.0   18.61    2.64 12.27  58.38  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    3.18 12.27  60.11  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    5.43 13.40  67.66 0.54   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    4.89 14.03  67.56  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.68 13.42  44.07 0.35   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.71 12.87  49.09 0.39   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    1.83 12.90  52.43 0.42   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    1.26 12.27  56.79 0.45   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    1.34 13.07  63.33  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    1.94 12.30  61.97  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    3.41 12.82  64.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.57 12.83  45.16 0.36   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.21 12.25  67.42 0.54   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.15 12.25  97.48 0.78   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.37 12.25  76.85  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.37 12.25  76.85  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.33    0.27 12.25  76.85  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.20    0.10 12.08  76.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.10 12.25  97.48 0.78   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.10 12.25  97.48  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.10 12.25  97.48  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.33    0.27 12.25  76.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.18 12.25  64.87 0.52   0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.10 12.25  97.47 0.78   0.000
```

```
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.19 12.25  97.47  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.37 12.25  75.50  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3052  1  5.0    5.36    1.74 12.25 101.86 0.81   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3051  1  5.0   11.90    3.63 12.25  97.49 0.78   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3021  1  5.0    1.40    0.30 12.25  68.89 0.55   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    3.94 12.25  94.48  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      4111  1  5.0    2.42    0.78 12.25  99.69 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      4101  1  5.0    0.40    0.10 12.25  75.85 0.60   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.88 12.25  96.31  n/a   0.000
*
    DUHYD               8050  1  5.0    2.82    0.88 12.25  96.31  n/a   0.000
       MAJOR SYSTEM:    8050  2  5.0    0.58    0.64 12.25  96.31  n/a   0.000
       MINOR SYSTEM:    8050  3  5.0    2.24    0.24 12.08  96.31  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD      4120  1  5.0    0.08    0.03 12.25 110.43 0.88   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD               8055  1  5.0    0.08    0.03 12.25 110.43  n/a   0.000
       MAJOR SYSTEM:    8055  2  5.0    0.01    0.02 12.25 110.43  n/a   0.000
       MINOR SYSTEM:    8055  3  5.0    0.07    0.01 12.08 110.43  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.30    0.25 12.08  96.71  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.60    4.19 12.25  94.81  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   20.96    5.93 12.25  96.61  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.80    6.29 12.25  94.91  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0101  1  5.0    0.30    0.09 12.25  92.17 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD      3056  1  5.0    1.37    0.35 12.25  95.53 0.76   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.10    6.39 12.25  94.87  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.43    6.65 12.25  94.62  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.80    7.01 12.25  94.67  n/a   0.000
*
 ** Reservoir
    OUTFLOW:            3705  1  5.0   24.80    2.50 12.50  94.63  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.06    5.68 12.50  70.70  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.48    6.18 12.50  67.43  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD        0007  1  1.0   16.68    1.27 12.72  58.82 0.47   0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :              C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD        0010  1  2.0    7.76    0.18 13.10  33.53 0.27   0.000
```

```
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0011  1  2.0    8.42    0.16 13.23  31.50 0.25   0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  2.0    2.90    0.41 12.23  64.33 0.51   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]   0015  3  2.0    3.16    0.64 12.23  65.64  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0101  1  2.0    1.57    0.47 12.23  95.68 0.76   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                 1011  1  2.0    1.57    0.47 12.23  95.68  n/a   0.000
       MAJOR SYSTEM:      1011  2  2.0    0.33    0.34 12.23  95.68  n/a   0.000
       MINOR SYSTEM:      1011  3  2.0    1.24    0.13 12.03  95.68  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  2.0    2.63    0.75 12.27  98.92 0.79   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]   0105  3  2.0    3.87    0.88 12.27  97.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0103  1  2.0    0.61    0.24 12.23 114.21 0.91   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  2.0    1.57    0.47 12.23 100.55 0.80   0.000
```

```
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]   0106  3  2.0    2.18    0.71 12.23 104.37  n/a   0.000
*
    ADD [  0105+  0106]   0107  3  2.0    6.05    1.58 12.23 100.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  2.0   10.34    2.76 12.27  98.04 0.78   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0202  1  2.0    2.00    0.61 12.23  97.53 0.78   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]   0203  3  2.0   12.34    3.36 12.27  97.96  n/a   0.000
*
    ADD [  0107+  0203]   0204  3  2.0   18.39    4.92 12.27  98.70  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0205  1  2.0   18.39    1.22 12.70  98.68  n/a   0.000
*
    ADD [  1011+  0205]   0206  3  2.0   18.72    1.22 12.70  98.63  n/a   0.000
*
    ADD [  0015+  0206]   0051  3  2.0   21.88    1.38 12.70  93.87  n/a   0.000
*
    ADD [  0051+  0004]   0051  1  1.0  134.36    7.35 12.70  71.47  n/a   0.000
*
    ADD [  0051+  0010]   0051  3  1.0  142.12    7.51 12.70  69.40  n/a   0.000
*
    ADD [  0051+  0011]   0051  1  1.0  150.54    7.65 12.70  67.28  n/a   0.000
*
    ADD [  0051+  0007]   0051  3  1.0  167.22    8.92 12.70  67.90  n/a   0.000
*
    ADD [  0051+  1601]   0005  3  1.0  168.86    8.99 12.70  68.04  n/a   0.000
*
    CHANNEL[ 2:  0005]    0005  1  1.0  168.86    7.74 12.97  67.86  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0006  1  1.0   64.36    2.90 13.20  50.84 0.40   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot=125.69 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0009  1  2.0   21.31    1.11 12.97  67.74 0.54   0.000
```

```
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    3.99 13.13  68.64  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    3.84 13.40  68.64  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0012  1  2.0   22.38    0.48 13.23  34.24 0.27    0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0013  1  2.0   22.03    0.48 13.03  30.85 0.25    0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0014  1  2.0    9.31    0.13 13.53  27.44 0.22    0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  254.53   11.33 13.13  68.12  n/a    0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.91   11.80 13.13  65.38  n/a    0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.94   12.28 13.13  62.84  n/a    0.000
*
    ADD [  0006+  0014]  0006  1  1.0  308.25   12.41 13.13  61.77  n/a    0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  308.25   11.99 13.38  61.69  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0015  1  2.0   35.26    0.61 13.57  33.43 0.27    0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0200  1  5.0    2.69    0.32 12.33  55.97 0.45    0.000
```

```
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  5.0    0.26    0.09 12.25 110.87 0.88    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.41 12.25  60.81  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0211  1  5.0    1.00    0.15 12.25  55.06 0.44    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0209  1  5.0    0.36    0.13 12.25 110.87 0.88    0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.28 12.25  69.84  n/a    0.000
*
    DUHYD                 3112  1  5.0    1.36    0.28 12.25  69.84  n/a    0.000
       MAJOR SYSTEM:      3112  2  5.0    0.24    0.19 12.25  69.84  n/a    0.000
       MINOR SYSTEM:      3112  3  5.0    1.12    0.09 12.08  69.84  n/a    0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.19    0.60 12.25  61.50  n/a    0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD          0109  1  5.0    1.11    0.09 12.58  65.15 0.52    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  5.0    0.53    0.21 12.25 114.14 0.91    0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
```

```
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.10 12.25 120.02 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.06 12.25 122.22 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.16 12.25 120.89  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.03 12.33 120.56  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.24 12.25 116.82  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.30 12.25  88.43  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.21    0.90 12.25  71.93  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.07 12.42  42.24 0.34   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.38    0.95 12.25  66.49  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.31 12.33  41.90 0.33   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.20    1.24 12.25  57.29  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.73    0.15 12.08  77.45  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.81 12.25  91.36 0.73   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.01    1.96 12.25  88.70  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.06 12.25  35.45 0.28   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.73    2.02 12.25  84.75  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.73    1.77 12.50  84.78  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.93    2.52 12.50  70.70  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  448.05   16.45 13.53  63.52  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  483.31   17.06 13.53  61.32  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  503.24   17.56 13.50  61.70  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.38 13.83  42.35 0.34   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.08 12.33  37.65 0.30   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.10 12.33  58.58 0.47   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot=125.69 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
    remark: 50yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.60 12.23  72.87 0.58   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  522.73   17.92 13.52  60.97  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  523.62   17.93 13.52  60.93  n/a   0.000
*
```

```
   ADD [  0008+  1803]  0008  3  1.0  524.26   17.94 13.52  60.93  n/a   0.000
*
   ADD [  0008+  5004]  0008  1  1.0  527.17   17.98 13.52  61.00  n/a   0.000
*
   READ STORM                15.0
   [ Ptot=125.69 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\f12cf131-f450-45d5-b112-
   remark: 50yr 24hr 15min SCS
*
 * CALIB NASHYD         1801  1  5.0    6.46    0.21 13.25  42.15 0.34   0.000
   [CN=54.9        ]
   [ N = 3.0:Tp 0.99]
*
   ADD [  0008+  1801]  0009  3  1.0  533.63   18.19 13.50  60.77  n/a   0.000
*
=================================================================================
==========================


      V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\ac56579d-5eec-4d87-acd6-a3977e529d7e\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\ac56579d-5eec-4d87-acd6-a3977e529d7e\s


DATE: 04-29-2021                          TIME: 02:32:27

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 18 - 100yr 24hr 15min SCS **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                  min      ha   '  cms   hrs      mm           cms

     START @  0.00 hrs
     --------------------
   READ STORM                15.0
   [ Ptot=136.79 mm ]
```

```
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.27 12.37  54.66 0.40   0.000
   [CN=56.0        ]
   [ N = 3.0:Tp 0.22]
*
   READ STORM                15.0
   [ Ptot=136.79 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.54 12.23  87.22 0.64   0.000
   [I%=33.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot=136.79 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.90 12.23 107.81 0.79   0.000
   [I%=24.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:              0205  1  2.0    2.68    1.44 12.27 107.81  n/a   0.000
*
   READ STORM                15.0
   [ Ptot=136.79 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.55 12.23 115.40 0.84   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]  0255  3  2.0    4.19    1.98 12.27 110.54  n/a   0.000
*
   READ STORM                15.0
   [ Ptot=136.79 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.24 12.23 118.23 0.86   0.000
   [I%=51.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot=136.79 mm ]
   fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
   remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.70 12.27 105.46 0.77   0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0    2.73    0.94 12.23 108.36  n/a   0.000
*
   DUHYD                 0226  1  2.0    2.73    0.94 12.23 108.36  n/a   0.000
      MAJOR SYSTEM:      0226  2  2.0    0.78    0.78 12.23 108.36  n/a   0.000
      MINOR SYSTEM:      0226  3  2.0    1.95    0.16 11.87 108.36  n/a   0.000
*
```

```
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.44 12.23 118.24 0.86   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.90    1.22 12.23 114.19  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    6.09    3.16 12.27 111.68  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.16 12.23 112.55 0.82   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.16 12.23 112.55  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.08    0.11 12.23 112.55  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.40    0.05 12.03 112.55  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.48    3.21 12.27 111.73  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.98    3.74 12.27 104.91  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.44 12.23  89.45 0.65   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.44 12.23  89.45  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.31    0.29 12.23  89.45  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.59    0.15 12.03  89.45  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.57    3.89 12.27 102.59  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    2.06 12.23  91.38 0.67   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.57    5.89 12.27  97.14  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.67    6.12 12.27  93.21  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.56 12.23  87.06 0.64   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.17    6.67 12.27  92.60  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.17    1.31 12.87  92.18  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.17    1.31 12.87  92.18  n/a   0.000
       Outflow           0002  2  2.0    2.30    0.40 12.87  92.18  n/a   0.000
       Outflow           0002  3  2.0   22.87    0.91 12.87  92.18  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.45 12.25  62.30 0.46   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.21 12.25 101.50 0.74   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.21 12.25 101.50  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.15    0.15 12.25 101.50  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.60    0.06 12.08 101.50  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.51    0.60 12.25  64.72  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.24 12.25 101.50 0.74   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.37    0.84 12.25  74.09  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.17 12.37  64.22 0.47   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                  15.0
    [ Ptot=136.79 mm ]
    fname                   :                   C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.24 12.30  64.22 0.47   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.51 12.27  66.71 0.49   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.51 12.27  66.71  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.40 12.27  66.71  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.11 12.27  66.71  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.61 12.27  80.20 0.59   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    2.43 12.27  66.91 0.49   0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   14.99    2.45 12.27  65.99  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   17.31    2.85 12.27  66.09  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   18.61    3.08 12.27  65.96  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   21.46    3.69 12.27  67.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    6.18 13.37  76.81 0.56   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    5.61 14.00  76.71  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
```

```
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.78 13.42  50.51 0.37   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.81 12.87  56.20 0.41   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    2.09 12.90  59.83 0.44   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    1.43 12.28  64.14 0.47   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    1.54 13.05  72.13  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    2.23 12.30  70.46  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    3.89 12.80  73.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.67 12.83  52.24 0.38   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.24 12.25  76.13 0.56   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
```

```
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.17 12.25 107.87 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.41 12.25  86.09  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.41 12.25  86.09  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.36    0.31 12.25  86.09  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.17    0.10 12.08  86.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.11 12.25 107.87 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.11 12.25 107.87  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.11 12.25 107.87  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.36    0.31 12.25  86.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.20 12.25  73.48 0.54   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.11 12.25 107.86 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.22 12.25 107.87  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.42 12.25  84.70  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    1.93 12.25 112.41 0.82   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    4.05 12.25 107.88 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.34 12.25  77.13 0.56   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    4.39 12.25 104.64  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.87 12.25 110.19 0.81   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.11 12.25  84.53 0.62   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.98 12.25 106.55  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.98 12.25 106.55  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.63    0.74 12.25 106.55  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.19    0.24 12.08 106.55  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.03 12.25 121.21 0.89   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.03 12.25 121.21  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.02    0.02 12.25 121.21  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.06    0.01 12.08 121.21  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.26    0.25 12.08 106.97  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.56    4.64 12.25 104.98  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   20.92    6.58 12.25 106.88  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   22.76    6.99 12.25 105.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
```

```
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.10 12.25 102.25 0.75   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.39 12.25 105.47 0.77   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.06    7.09 12.25 105.05  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.42    7.41 12.25 104.76  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.79    7.80 12.25 104.80  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.79    3.52 12.42 104.76  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.05    7.12 12.42  79.80  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.47    7.65 12.42  76.27  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    1.44 12.70  66.81 0.49   0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.21 13.10  39.16 0.29   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.19 13.23  36.86 0.27   0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.45 12.23  72.19 0.53   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.21    0.75 12.23  73.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.52 12.23 106.05 0.78   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.52 12.23 106.05  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.36    0.39 12.23 106.05  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.21    0.13 12.03 106.05  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.83 12.27 109.39 0.80   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    3.84    0.96 12.27 108.34  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.26 12.23 125.01 0.91   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.52 12.23 111.04 0.81   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.79 12.23 114.95  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.02    1.74 12.23 110.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    3.07 12.27 108.47 0.79   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.68 12.23 107.97 0.79   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    3.75 12.27 108.39  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.36    5.46 12.27 109.16  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.36    2.96 12.50 109.14  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    2.99 12.50 109.08  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.93    3.28 12.50 103.92  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.40   10.71 12.50  80.50  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.16   10.87 12.50  78.24  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.58   11.00 12.50  75.93  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.26   12.36 12.50  76.64  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  169.56   12.47 12.50  76.85  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  169.56    9.36 12.85  76.66  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    3.30 13.20  58.02 0.42   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    1.26 12.97  76.89 0.56   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    4.54 13.12  77.88  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    4.38 13.40  77.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.56 13.23  39.99 0.29   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.57 13.03  36.10 0.26   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.16 13.50  32.18 0.24   0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  255.23   13.24 12.98  77.07  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  277.61   13.79 13.03  74.08  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  299.64   14.35 13.03  71.29  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  308.95   14.50 13.03  70.11  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  308.95   13.99 13.30  70.03  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.71 13.57  39.05 0.29   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.37 12.33  64.19 0.47   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.10 12.25 121.55 0.89   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.47 12.25  69.24  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
```

```
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.17 12.25  63.15 0.46   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.14 12.25 121.56 0.89   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.32 12.25  78.61  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.32 12.25  78.61  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.28    0.23 12.25  78.61  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.08    0.09 12.08  78.61  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.23    0.69 12.25  70.04  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.10 12.58  74.23 0.54   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.23 12.25 124.76 0.91   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.10 12.25 130.93 0.96   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.07 12.25 133.25 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.17 12.25 131.85  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.03 12.33 131.51  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.26 12.25 127.58  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.33 12.25  98.26  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.25    1.02 12.25  80.91  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.08 12.42  49.00 0.36   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.42    1.09 12.25  75.09  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.36 12.33  48.61 0.36   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.24    1.42 12.25  65.21  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.68    0.15 12.08  86.72  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    2.03 12.25 101.50 0.74   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    8.96    2.18 12.25  98.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=136.79 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.07 12.25  41.33 0.30   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.68    2.25 12.25  94.46  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.68    2.61 12.42  94.48  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.92    3.61 12.42  79.44  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  448.75   18.98 13.47  72.11  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  484.01   19.69 13.47  69.70  n/a   0.000
```

```
*
    ADD [  0007+  3009]  0007  3  1.0  503.92   20.25 13.45  70.09  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.44 13.83  49.07 0.36   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.09 12.33  43.79 0.32   0.000
    [CN=50.7        ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.11 12.33  66.86 0.49   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.67 12.23  81.19 0.59   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  523.41   20.68 13.45  69.30  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  524.30   20.69 13.45  69.26  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  524.94   20.70 13.45  69.26  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  527.85   20.75 13.45  69.32  n/a   0.000
*
    READ STORM                15.0
    [ Ptot=136.79 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\4e404e1c-6229-4e42-98bd-1a9dc732bfa9\c3d44fdb-56e8-42e5-ae75-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.25 13.25  48.84 0.36   0.000
    [CN=54.9        ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  534.31   20.99 13.43  69.07  n/a   0.000
*
```

```
===============================================================================
=========================

       V    V   I    SSSSS  U   U    A    L            (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\e7b596db-d8c1-43cb-840b-4617e5f81ad2\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\e7b596db-d8c1-43cb-840b-4617e5f81ad2\s

DATE: 04-29-2021                           TIME: 02:43:03

USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : HAZEL                          **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                  min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 ** CALIB NASHYD         0103  1  2.0     2.10    0.27 10.03 150.11 0.71    0.000
    [CN=75.0         ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 ** CALIB STANDHYD       0100  1  2.0     2.50    0.33 10.00 177.00 0.83    0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 ** CALIB STANDHYD       0200  1  2.0     2.68    0.39 10.00 196.23 0.93    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68    0.45 10.03 196.23  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0250  1  2.0     1.51    0.22 10.00 200.61 0.95    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19    0.67 10.03 197.81  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0221  1  2.0     0.62    0.09 10.00 201.82 0.95    0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0220  1  2.0     2.11    0.30 10.00 194.86 0.92    0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0     2.73    0.40 10.00 196.44  n/a    0.000
*
    DUHYD                0226  1  2.0     2.73    0.40 10.00 196.44  n/a    0.000
       MAJOR SYSTEM:     0226  2  2.0     0.62    0.24 10.00 196.44  n/a    0.000
       MINOR SYSTEM:     0226  3  2.0     2.11    0.16  6.53 196.44  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0222  1  2.0     1.12    0.16 10.00 201.83 0.95    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0     1.74    0.40 10.00 199.91  n/a    0.000
*
    ADD [  0227+  0255]  0256  3  2.0     5.93    1.05 10.03 198.42  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname                  :                C:\Users\jmacdonald\AppData\Local\Temp
```

```
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.07 10.00 198.98 0.94   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.07 10.00 198.98  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.02    0.01 10.00 198.98  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.46    0.05  9.27 198.98  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.39    1.11 10.03 198.46  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.89    1.43 10.03 192.43  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.25 10.00 178.89 0.84   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.25 10.00 178.89  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.24    0.10 10.00 178.89  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.66    0.15  9.20 178.89  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.56    1.58 10.03 190.30  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.25 10.00 180.47 0.85   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.56    2.83 10.03 185.52  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.66    3.10 10.03 182.24  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.33 10.00 176.84 0.83   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.16    3.42 10.03 181.70  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.16    3.44 10.03 181.53  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.16    3.44 10.03 181.53  n/a   0.000
       Outflow           0002  2  2.0    6.37    1.49 10.03 181.53  n/a   0.000
       Outflow           0002  3  2.0   18.79    1.94 10.03 181.53  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                  12.0
```

```
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0210  1  5.0    2.36    0.31 10.00 153.25 0.72   0.000
    [CN=83.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.11 10.00 190.21 0.90   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.11 10.00 190.21  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.10    0.05 10.00 190.21  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.65    0.06  9.25 190.21  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.46    0.35 10.00 154.76  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.12 10.00 190.21 0.90   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.32    0.47 10.00 163.94  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.14 10.00 159.73 0.75   0.000
    [CN=82.0         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.18 10.00 159.71 0.75   0.000
    [CN=82.0         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.37 10.00 155.39 0.73   0.000
    [I%=20.0:S%= 1.00]
*
```

```
    DIVERT HYD            0156  1  2.0     2.94     0.37 10.00 155.39  n/a    0.000
      Outflow             0001  2  2.0     2.32     0.29 10.00 155.39  n/a    0.000
      Outflow             0001  3  2.0     0.62     0.08 10.00 155.39  n/a    0.000
      Outflow             0001  4  2.0     0.00     0.00  0.00   0.00  n/a    0.000
      Outflow             0001  5  2.0     0.00     0.00  0.00   0.00  n/a    0.000
      Outflow             0001  6  2.0     0.00     0.00  0.00   0.00  n/a    0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD        5002  1  2.0     2.85     0.38 10.00 171.96 0.81    0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD        5003  1  2.0    14.99     1.83 10.00 155.39 0.73    0.000
    [I%=20.0:S%= 1.00]
*
 ** Reservoir
    OUTFLOW:              0159  1  1.0    14.99     1.83 10.02 154.47  n/a    0.000
*
    ADD [  0156+  0159]   5005  3  1.0    17.31     2.12 10.00 154.59  n/a    0.000
*
    ADD [  5005+  1902]   5005  1  1.0    18.61     2.30 10.00 154.95  n/a    0.000
*
    ADD [  5005+  5002]   5005  3  1.0    21.46     2.68 10.00 157.21  n/a    0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          0001  1  2.0   139.80    12.14 11.23 172.86 0.82    0.000
    [CN=87.0         ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]    0002  1  1.0   139.80    11.64 11.62 172.86  n/a    0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          0002  1  1.0    18.97     1.61 11.27 166.31 0.78    0.000
    [CN=85.0         ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          0003  1  1.0    13.15     1.35 11.02 168.15 0.79    0.000
    [CN=85.0         ]
```

```
    [ N = 2.0:Tp 0.62]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          0005  1  1.0    32.68     3.36 11.02 172.68 0.81    0.000
    [CN=87.0         ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD        0004  1  1.0     8.46     1.05 10.02 153.19 0.72    0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]   0001  3  1.0    32.12     2.94 11.08 168.21  n/a    0.000
*
    ADD [  0001+  0004]   0001  1  1.0    40.58     3.74 11.02 165.08  n/a    0.000
*
    ADD [  0001+  0005]   0001  3  1.0    73.26     7.10 11.02 168.51  n/a    0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          0008  1  2.0    14.42     1.39 11.00 145.28 0.69    0.000
    [CN=76.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD          1031  1  5.0     1.05     0.14 10.00 167.76 0.79    0.000
    [CN=86.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD        3061  1  5.0     0.48     0.07 10.00 195.47 0.92    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]   2008  3  5.0     1.53     0.21 10.00 176.45  n/a    0.000
*
    DUHYD                 2010  1  5.0     1.53     0.21 10.00 176.45  n/a    0.000
      MAJOR SYSTEM:       2010  2  5.0     0.30     0.11 10.00 176.45  n/a    0.000
      MINOR SYSTEM:       2010  3  5.0     1.23     0.10  9.17 176.45  n/a    0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
```

```
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.04 10.00 195.46 0.92    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.04 10.00 195.46  n/a    0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.04 10.00 195.46  n/a    0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.30    0.11 10.00 176.45  n/a    0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.17 10.00 167.77 0.79    0.000
    [CN=84.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.04 10.00 195.46 0.92    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.09 10.00 195.46  n/a    0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.25 10.00 176.80  n/a    0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.77 10.00 198.26 0.94    0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.71 10.00 195.48 0.92    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.19 10.00 166.51 0.79    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.89 10.00 192.43  n/a    0.000
```

```
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.35 10.00 196.89 0.93    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.05 10.00 173.05 0.82    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.40 10.00 193.51  n/a    0.000
*
    DUHYD                8050  1  5.0    2.82    0.40 10.00 193.51  n/a    0.000
       MAJOR SYSTEM:     8050  2  5.0    0.35    0.16 10.00 193.51  n/a    0.000
       MINOR SYSTEM:     8050  3  5.0    2.47    0.24  9.17 193.51  n/a    0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.01 10.00 203.05 0.96    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.01 10.00 203.05  n/a    0.000
       MAJOR SYSTEM:     8055  2  5.0    0.00    0.00 10.00 203.05  n/a    0.000
       MINOR SYSTEM:     8055  3  5.0    0.08    0.01  9.25 203.05  n/a    0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.55    0.25  9.25 193.80  n/a    0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.85    2.14 10.00 192.65  n/a    0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.21    2.92 10.00 194.07  n/a    0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.05    3.17 10.00 192.69  n/a    0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.04 10.00 191.21 0.90    0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.19 10.00 191.17 0.90    0.000
    [I%=50.0:S%= 0.25]
*
```

```
    ADD [  0101+  2006]  2007  3  5.0    23.35     3.21 10.00 192.67  n/a    0.000
*
    ADD [  2007+  2009]  2007  1  5.0    23.65     3.32 10.00 192.46  n/a    0.000
*
    ADD [  2007+  3056]  2007  3  5.0    25.02     3.51 10.00 192.39  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0    25.02     3.43 10.00 192.35  n/a    0.000
*
    ADD [  0001+  3705]  0004  3  1.0    98.28     9.73 11.00 173.93  n/a    0.000
*
    ADD [  0004+  0008]  0004  1  1.0   112.70    11.12 11.00 170.27  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0007  1  1.0    16.68     1.85 10.57 177.16 0.84   0.000
    [CN=89.0         ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0010  1  2.0     7.76     0.61 11.10 125.15 0.59   0.000
    [CN=67.0         ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0011  1  2.0     8.42     0.62 11.17 120.60 0.57   0.000
    [CN=65.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0105  1  2.0     2.90     0.36 10.00 162.24 0.77   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0     3.14     0.46 10.00 163.49  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0101  1  2.0     1.57     0.23 10.00 194.35 0.92   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0     1.57     0.23 10.00 194.35  n/a    0.000
```

```
      MAJOR SYSTEM:      1011  2  2.0     0.21     0.10 10.00 194.35  n/a    0.000
      MINOR SYSTEM:      1011  3  2.0     1.36     0.13  9.17 194.35  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0102  1  2.0     2.63     0.38 10.00 196.38 0.93   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0     3.99     0.51 10.00 195.69  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0103  1  2.0     0.61     0.09 10.00 204.79 0.97   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0104  1  2.0     1.57     0.23 10.00 197.13 0.93   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0     2.18     0.32 10.00 199.28  n/a    0.000
*
    ADD [  0105+  0106]  0107  3  2.0     6.17     0.83 10.00 196.96  n/a    0.000
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0201  1  2.0    10.34     1.48 10.00 195.67 0.92   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0202  1  2.0     2.00     0.29 10.00 195.60 0.92   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0    12.34     1.77 10.00 195.66  n/a    0.000
*
    ADD [  0107+  0203]  0204  3  2.0    18.51     2.60 10.00 196.09  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    18.51     2.60 10.00 196.07  n/a    0.000
*
    ADD [  1011+  0205]  0206  3  2.0    18.72     2.70 10.00 196.05  n/a    0.000
*
    ADD [  0015+  0206]  0051  3  2.0    21.86     3.16 10.00 191.38  n/a    0.000
```

```
*
    ADD [  0051+  0004]  0051  1  1.0  134.55   13.76 10.03 173.65  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.31   14.21 10.03 171.00  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.73   14.65 10.08 168.19  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.41   16.45 11.00 169.08  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  173.79   17.82 10.03 169.53  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  173.79   17.46 11.00 169.46  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0006  1  1.0   64.36    5.98 11.13 171.83 0.81   0.000
    [CN=87.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0009  1  2.0   21.31    2.13 11.03 172.94 0.82   0.000
    [CN=87.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    8.10 11.10 172.67  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    7.99 11.27 172.67  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0012  1  2.0   22.38    1.71 11.17 126.89 0.60   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0013  1  2.0   22.03    1.70 11.10 118.96 0.56   0.000
    [CN=64.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.58 11.37 112.93 0.53   0.000
```

```
    [CN=61.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  259.46   25.28 11.03 170.52  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  281.84   26.98 11.03 167.05  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  303.87   28.68 11.03 163.57  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  313.18   29.24 11.03 162.06  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  313.18   28.79 11.18 162.02  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 ** CALIB NASHYD         0015  1  2.0   35.26    2.37 11.37 124.99 0.59   0.000
    [CN=67.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 ** CALIB NASHYD         0200  1  5.0    2.69    0.35 10.00 157.89 0.74   0.000
    [CN=83.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.04 10.00 201.79 0.95   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.39 10.00 161.76  n/a   0.000
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.13 10.00 155.33 0.73   0.000
    [CN=83.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                  12.0
    [ Ptot=212.00 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.05 10.00 201.81 0.95   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.18 10.00 167.64  n/a   0.000
```

```
*
    DUHYD                3112  1  5.0    1.36    0.18 10.00 167.64  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.26    0.09 10.00 167.64  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.10    0.09  9.17 167.64  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.21    0.48 10.00 162.24  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.13 10.25 169.53 0.80   0.000
    [CN=87.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.08 10.00 202.68 0.96   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.03 10.00 207.18 0.98   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.02 10.00 208.87 0.99   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.06 10.00 207.85  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.03 11.00 207.51  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.10 10.00 204.70  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.23 10.00 185.37  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.23    0.71 10.00 171.17  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.13 10.08 141.52 0.67   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.30]
```

```
*
    ADD [  0203+  3002]  3003  3  5.0    6.40    0.84 10.00 165.75  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.46 10.00 140.39 0.66   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.22    1.29 10.00 156.27  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.75    0.15  9.25 176.03  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.02 10.00 190.22 0.90   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.03    1.17 10.00 187.47  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.08 10.00 128.42 0.61   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.75    1.25 10.00 183.11  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.75    1.30 10.00 183.12  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.97    2.60 10.00 169.38  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  452.98   40.03 11.25 165.36  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  488.24   42.39 11.25 162.45  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  508.21   43.86 11.17 162.72  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         1800  1  2.0   19.49    1.32 11.53 141.45 0.67   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
```

```
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.11 10.00 132.37 0.62   0.000
    [CN=70.0         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.09 10.00 162.70 0.77   0.000
    [CN=82.0         ]
    [ N = 3.0:Tp 0.19]
*
    READ STORM                 12.0
    [ Ptot=212.00 mm ]
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\613bfe53-98c0-4feb-8682-7ca272ebd907\7e87272e-225c-4cbd-8ba8-
    remark: HAZEL
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.38 10.00 167.69 0.79   0.000
    [I%=35.0:S%= 1.00]
*
    ADD [  0007+  1800]  0008  3  1.0  527.70   45.14 11.18 161.94  n/a   0.000
*
    ADD [  0008+  1802]  0008  1  1.0  528.59   45.21 11.17 161.89  n/a   0.000
*
    ADD [  0008+  1803]  0008  3  1.0  529.23   45.25 11.17 161.89  n/a   0.000
*
    ADD [  0008+  5004]  0008  1  1.0  532.14   45.46 11.17 161.92  n/a   0.000
*
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    [ Ptot=212.00 mm ]
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*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.59 11.17 141.46 0.67   0.000
    [CN=74.0         ]
    [ N = 3.0:Tp 0.99]
*
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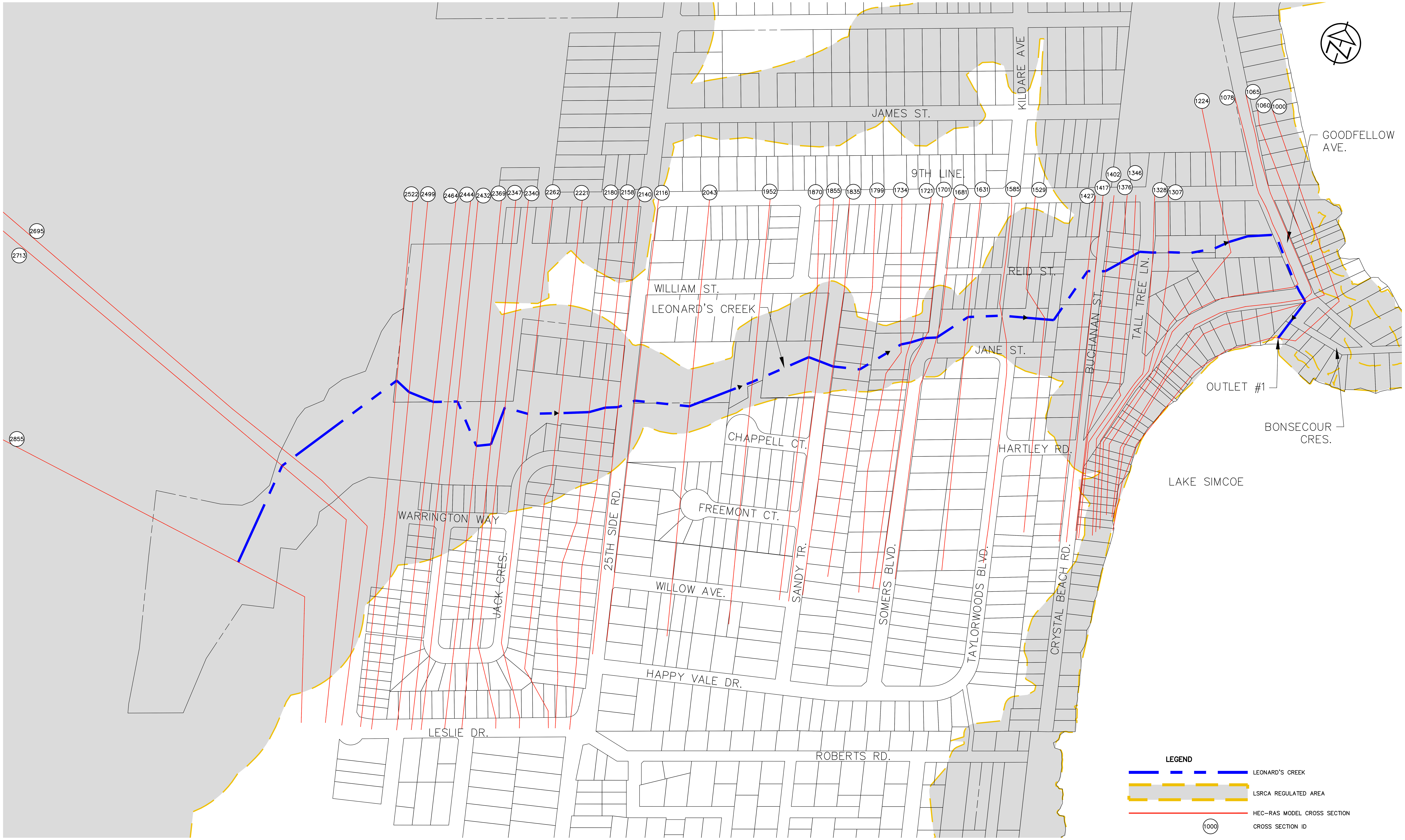
*
 FINISH

=================================================================================
==========================
```

Appendix B:
Existing Conditions Hydraulic Analysis



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BENCHMARKS

TBM1 – ELEVATION 219.60
DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH–EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR 60% DESIGN	MAY 12/21

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

HEC–RAS CROSS SECTION LOCATION PLAN

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG: **XS-1**
DRAWN: SD	DATE: MAR 2021	
CHECK: ALK	SCALE: 1:2500	

Drawing Name: 420395–XS1.dwg, Plotted: May 05, 2021

HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1428	Hazel	Tatham Ex. (Regional)	45.18	219.53	220.49	220.40	220.54	0.003179	1.50	66.84	203.69	0.50
Leonard's Creek	1	1428	2 year	Tatham Ex. (1:2 Year)	3.89	219.53	220.12	219.82	220.12	0.000735	0.50	11.80	43.83	0.22
Leonard's Creek	1	1428	5 year	Tatham Existing Condition (1:5-100 year)	7.71	219.53	220.19	219.89	220.21	0.001531	0.79	15.29	48.82	0.33
Leonard's Creek	1	1428	10 year	Tatham Existing Condition (1:5-100 year)	10.67	219.53	220.22	220.01	220.25	0.002368	1.01	16.67	51.49	0.41
Leonard's Creek	1	1428	25 year	Tatham Existing Condition (1:5-100 year)	14.66	219.53	220.24	220.11	220.30	0.003847	1.32	17.79	61.85	0.53
Leonard's Creek	1	1428	50 year	Tatham Existing Condition (1:5-100 year)	17.97	219.53	220.27	220.15	220.34	0.004600	1.49	19.95	75.53	0.58
Leonard's Creek	1	1428	100 year	Tatham Existing Condition (1:5-100 year)	20.73	219.53	220.29	220.19	220.38	0.005117	1.60	21.95	86.00	0.61
Leonard's Creek	1	1418	Hazel	Tatham Ex. (Regional)	42.48	219.11	220.51	220.06	220.51	0.000147	0.38	225.28	341.41	0.11
Leonard's Creek	1	1418	2 year	Tatham Ex. (1:2 Year)	3.89	219.11	220.12	219.72	220.12	0.000039	0.15	64.44	220.30	0.05
Leonard's Creek	1	1418	5 year	Tatham Existing Condition (1:5-100 year)	7.69	219.11	220.20	219.96	220.20	0.000072	0.21	82.56	224.87	0.07
Leonard's Creek	1	1418	10 year	Tatham Existing Condition (1:5-100 year)	10.60	219.11	220.23	220.02	220.23	0.000104	0.26	90.04	226.26	0.09
Leonard's Creek	1	1418	25 year	Tatham Existing Condition (1:5-100 year)	14.51	219.11	220.26	220.02	220.26	0.000157	0.33	96.88	229.61	0.11
Leonard's Creek	1	1418	50 year	Tatham Existing Condition (1:5-100 year)	17.64	219.11	220.30	220.02	220.30	0.000181	0.36	105.39	234.29	0.12
Leonard's Creek	1	1418	100 year	Tatham Existing Condition (1:5-100 year)	20.23	219.11	220.33	220.02	220.33	0.000094	0.27	164.18	341.41	0.09
Leonard's Creek	1	1410			Culvert									
Leonard's Creek	1	1407	Hazel	Tatham Ex. (Regional)	42.48	219.31	220.51	219.90	220.51	0.000113	0.32	245.26	342.76	0.10
Leonard's Creek	1	1407	2 year	Tatham Ex. (1:2 Year)	3.89	219.31	220.12	219.82	220.12	0.000022	0.10	73.27	188.35	0.04
Leonard's Creek	1	1407	5 year	Tatham Existing Condition (1:5-100 year)	7.69	219.31	220.19	219.82	220.19	0.000024	0.12	137.33	339.53	0.04
Leonard's Creek	1	1407	10 year	Tatham Existing Condition (1:5-100 year)	10.60	219.31	220.23	219.82	220.23	0.000036	0.15	147.79	340.93	0.05
Leonard's Creek	1	1407	25 year	Tatham Existing Condition (1:5-100 year)	14.51	219.31	220.26	219.82	220.26	0.000052	0.18	160.47	342.76	0.06
Leonard's Creek	1	1407	50 year	Tatham Existing Condition (1:5-100 year)	17.64	219.31	220.30	219.82	220.30	0.000060	0.20	173.64	342.76	0.07
Leonard's Creek	1	1407	100 year	Tatham Existing Condition (1:5-100 year)	20.23	219.31	220.33	219.82	220.33	0.000066	0.21	183.92	342.76	0.07
Leonard's Creek	1	1404	Hazel	Tatham Ex. (Regional)	41.81	219.40	220.47	220.14	220.50	0.001754	1.19	71.75	141.65	0.38
Leonard's Creek	1	1404	2 year	Tatham Ex. (1:2 Year)	3.89	219.40	220.12	219.69	220.12	0.000162	0.27	27.83	99.40	0.11
Leonard's Creek	1	1404	5 year	Tatham Existing Condition (1:5-100 year)	7.69	219.40	220.19	219.79	220.19	0.000361	0.43	35.60	112.36	0.16
Leonard's Creek	1	1404	10 year	Tatham Existing Condition (1:5-100 year)	10.58	219.40	220.22	219.83	220.22	0.000570	0.56	38.70	116.60	0.21
Leonard's Creek	1	1404	25 year	Tatham Existing Condition (1:5-100 year)	14.46	219.40	220.25	219.88	220.26	0.000844	0.70	42.49	120.28	0.25
Leonard's Creek	1	1404	50 year	Tatham Existing Condition (1:5-100 year)	17.53	219.40	220.28	219.92	220.29	0.000957	0.76	46.85	123.36	0.27
Leonard's Creek	1	1404	100 year	Tatham Existing Condition (1:5-100 year)	20.06	219.40	220.31	219.94	220.32	0.001035	0.81	50.34	125.84	0.28
Leonard's Creek	1	1386	Hazel	Tatham Ex. (Regional)	37.91	219.16	220.38	220.22	220.45	0.002943	1.65	46.51	100.02	0.50
Leonard's Creek	1	1386	2 year	Tatham Ex. (1:2 Year)	3.89	219.16	220.11	219.56	220.11	0.000164	0.32	21.99	76.83	0.11
Leonard's Creek	1	1386	5 year	Tatham Existing Condition (1:5-100 year)	7.60	219.16	220.18	219.67	220.18	0.000406	0.53	27.48	85.39	0.18
Leonard's Creek	1	1386	10 year	Tatham Existing Condition (1:5-100 year)	10.36	219.16	220.20	219.75	220.21	0.000664	0.69	29.13	86.87	0.23
Leonard's Creek	1	1386	25 year	Tatham Existing Condition (1:5-100 year)	14.01	219.16	220.21	219.83	220.24	0.001072	0.89	30.82	88.36	0.29
Leonard's Creek	1	1386	50 year	Tatham Existing Condition (1:5-100 year)	16.65	219.16	220.25	219.87	220.27	0.001246	0.98	33.56	90.56	0.32
Leonard's Creek	1	1386	100 year	Tatham Existing Condition (1:5-100 year)	18.81	219.16	220.27	219.90	220.30	0.001369	1.05	35.78	92.33	0.34
Leonard's Creek	1	1377	Hazel	Tatham Ex. (Regional)	33.88	219.22	220.39	220.15	220.42	0.001426	1.11	60.34	146.14	0.34
Leonard's Creek	1	1377	2 year	Tatham Ex. (1:2 Year)	3.89	219.22	220.11	219.53	220.11	0.000131	0.27	22.71	74.29	0.10
Leonard's Creek	1	1377	5 year	Tatham Existing Condition (1:5-100 year)	7.21	219.22	220.17	219.65	220.18	0.000292	0.43	27.69	78.50	0.15
Leonard's Creek	1	1377	10 year	Tatham Existing Condition (1:5-100 year)	9.76	219.22	220.19	219.72	220.20	0.000478	0.56	29.10	79.67	0.19
Leonard's Creek	1	1377	25 year	Tatham Existing Condition (1:5-100 year)	13.19	219.22	220.21	219.82	220.23	0.000788	0.73	30.46	80.76	0.25
Leonard's Creek	1	1377	50 year	Tatham Existing Condition (1:5-100 year)	15.36	219.22	220.24	219.87	220.26	0.000890	0.79	32.92	82.67	0.27
Leonard's Creek	1	1377	100 year	Tatham Existing Condition (1:5-100 year)	17.12	219.22	220.26	219.91	220.29	0.000963	0.84	34.93	84.23	0.28
Leonard's Creek	1	1369	Hazel	Tatham Ex. (Regional)	30.76	219.13	220.39	220.14	220.40	0.001089	0.96	68.66	151.39	0.29
Leonard's Creek	1	1369	2 year	Tatham Ex. (1:2 Year)	3.89	219.13	220.11	219.57	220.11	0.000165	0.31	25.68	90.21	0.11
Leonard's Creek	1	1369	5 year	Tatham Existing Condition (1:5-100 year)	6.92	219.13	220.17	219.80	220.18	0.000312	0.45	31.67	95.00	0.15
Leonard's Creek	1	1369	10 year	Tatham Existing Condition (1:5-100 year)	9.31	219.13	220.19	219.91	220.20	0.000496	0.57	33.31	96.27	0.19
Leonard's Creek	1	1369	25 year	Tatham Existing Condition (1:5-100 year)	12.60	219.13	220.21	219.97	220.22	0.000813	0.74	34.82	97.42	0.24
Leonard's Creek	1	1369	50 year	Tatham Existing Condition (1:5-100 year)	14.41	219.13	220.24	220.00	220.25	0.000857	0.78	37.85	98.88	0.25
Leonard's Creek	1	1369	100 year	Tatham Existing Condition (1:5-100 year)	15.89	219.13	220.26	220.02	220.28	0.000881	0.80	40.29	99.63	0.26
Leonard's Creek	1	1359	Hazel	Tatham Ex. (Regional)	28.03	219.13	220.38	220.03	220.39	0.000410	0.65	104.06	267.59	0.19
Leonard's Creek	1	1359	2 year	Tatham Ex. (1:2 Year)	3.86	219.13	220.11	219.38	220.11	0.000062	0.21	33.04	102.72	0.07
Leonard's Creek	1	1359	5 year	Tatham Existing Condition (1:5-100 year)	6.63	219.13	220.17	219.47	220.18	0.000121	0.31	39.85	109.14	0.10
Leonard's Creek	1	1359	10 year	Tatham Existing Condition (1:5-100 year)	8.88	219.13	220.19	219.54	220.19	0.000196	0.40	41.69	110.75	0.13
Leonard's Creek	1	1359	25 year	Tatham Existing Condition (1:5-100 year)	12.06	219.13	220.20	219.61	220.21	0.000330	0.52	43.34	112.11	0.17
Leonard's Creek	1	1359	50 year	Tatham Existing Condition (1:5-100 year)	13.56	219.13	220.23	219.65	220.24	0.000347	0.55	46.83	114.86	0.17
Leonard's Creek	1	1359	100 year	Tatham Existing Condition (1:5-100 year)	14.78	219.13	220.26	219.68	220.27	0.000358	0.57	49.69	117.70	0.17
Leonard's Creek	1	1347	Hazel	Tatham Ex. (Regional)	25.16	218.85	220.39	220.10	220.39	0.000150	0.40	145.69	266.55	0.11
Leonard's Creek	1	1347	2 year	Tatham Ex. (1:2 Year)	3.76	218.85	220.11	219.49	220.11	0.000084	0.25	30.23	93.95	0.08
Leonard's Creek	1	1347	5 year	Tatham Existing Condition (1:5-100 year)	6.23	218.85	220.17	219.64	220.17	0.000149	0.35	36.23	94.04	0.11
Leonard's Creek	1	1347	10 year	Tatham Existing Condition (1:5-100 year)	8.35	218.85	220.19	219.77	220.19	0.000241	0.45	37.71	94.07	0.14
Leonard's Creek	1	1347	25 year	Tatham Existing Condition (1:5-100 year)	11.39	218.85	220.21	219.93	220.21	0.000108	0.30	97.64	266.55	0.09
Leonard's Creek	1	1347	50 year	Tatham Existing Condition (1:5-100 year)	12.57	218.85	220.24	219.98	220.24	0.000102	0.30	105.93	266.55	0.09
Leonard's Creek	1	1347	100 year	Tatham Existing Condition (1:5-100 year)	13.53	218.85	220.26	220.02	220.26	0.000098	0.30	112.55	266.55	0.09
Leonard's Creek	1	1335			Culvert									
Leonard's Creek	1	1329	Hazel	Tatham Ex. (Regional)	25.16	218.98	220.39	219.97	220.39	0.000068	0.24	179.16	246.27	0.08
Leonard's Creek	1	1329	2 year	Tatham Ex. (1:2 Year)	3.76	218.98	219.90	219.55	219.91	0.000411	0.39	13.93	56.72	0.17
Leonard's Creek	1	1329	5 year	Tatham Existing Condition (1:5-100 year)	6.23	218.98	220.03	219.62	220.04	0.000033	0.13	93.02	243.32	0.05
Leonard's Creek	1	1329	10 year	Tatham Existing Condition (1:5-100 year)	8.35	218.98	220.11	219.70	220.11	0.000034	0.14	111.26	245.11	0.05
Leonard's Creek	1	1329	25 year	Tatham Existing Condition (1:5-100 year)	11.39	218.98	220.20	219.81	220.20	0.000035	0.15	134.14	246.27	0.05
Leonard's Creek	1	1329	50 year	Tatham Existing Condition (1:5-100 year)	12.57	218.98	220.24	219.85	220.24	0.000036	0.16	142.19	246.27	0.05
Leonard's Creek	1	1329	100 year	Tatham Existing Condition (1:5-100 year)	13.53	218.98	220.26	219.88	220.26	0.000036	0.16	148.12	246.27	0.05
Leonard's Creek	1	1321	Hazel	Tatham Ex. (Regional)	23.18	219.04	220.34	220.05	220.37	0.001301	0.93	42.13	99.37	0.32
Leonard's Creek	1	1321	2 year	Tatham Ex. (1:2 Year)	3.76	219.04	219.89	219.55	219.90	0.001076	0.52	8.46	34.29	0.26
Leonard's Creek	1	1321	5 year	Tatham Existing Condition (1:5-100 year)	6.14	219.04	220.01	219.67	220.03	0.000977	0.59	13.71	54.20	0.26
Leonard's Creek	1	1321	10 year	Tatham Existing Condition (1:5-100 year)	8.00	219.04	220.08	219.75	220.10	0.000962	0.63	17.86	61.66	0.26
Leonard's Creek	1	1321	25 year	Tatham Existing Condition (1:5-100 year)	10.56	219.04	220.18	219.83	220.19	0.000832	0.65	26.37	94.38	0.25
Leonard's Creek	1	1321	50 year	Tatham Existing Condition (1:5-100 year)	11.56	219.04	220.21	219.87	220.23	0.000768	0.64	29.61	95.10	0.24
Leonard's Creek	1	1321	100 year	Tatham Existing Condition (1:5-100 year)	12.33	219.04	220.24	219.88	220.25	0.000730	0.64	31.98	95.66	0.23
Leonard's Creek	1	1308	Hazel	Tatham Ex. (Regional)	21.09	218.99	220.35	220.07	220.35	0.000244	0.46	91.64	184.22	0.14
Leonard's Creek	1	1308	2 year	Tatham Ex. (1:2 Year)	3.76	218.99	219.86	219.47	219.88	0.001241	0.69	5.47	9.60	0.29
Leonard's Creek	1	1308	5 year	Tatham Existing Condition (1:5-100 year)	6.12	218.99	219.95	219.60	220.00	0.002021	0.96	6.39	9.95	0.38
Leonard's Creek	1	1308	10 year	Tatham Existing Condition (1:5-100 year)	7.82	218.99	220.00	219.67	220.06	0.002630	1.15	6.86	10.13	0.43
Leonard's Creek	1	1308	25 year	Tatham Existing Condition (1:5-100 year)	10.02	218.99	220.06	219.75	220.15	0.003311	1.36	7.46	10.35	0.49
Leonard's Creek	1	1308	50 year	Tatham Existing Condition (1:5-100 year)	10.89	218.99	220.07	219.79	220.18	0.003618	1.44	7.65	10.62	0.52
Leonard's Creek	1	1308	100 year	Tatham Existing Condition (1:5-100 year)	11.54	218.99	220.09	219.81	220.20	0.003865	1.51	7.78	11.44	0.54
Leonard's Creek	1	1290	Hazel	Tatham Ex. (Regional)	19.40	219.00	220.11	220.08	220.32	0.007634	2.14	11.80	27.65	0.75
Leonard's Creek	1	1290	2 year	Tatham Ex. (1:2 Year)	3.76	219.00	219.83	219.51	219.86	0.001455	0.72	5.24	9.64	0.31
Leonard's Creek	1	1290	5 year	Tatham Existing Condition (1:5-100 year)	6.12	219.00	219.91	219.62	219.96	0.002469	1.01	6.60	23.15	0.41

HEC-RAS Locations: User Defined (Continued)

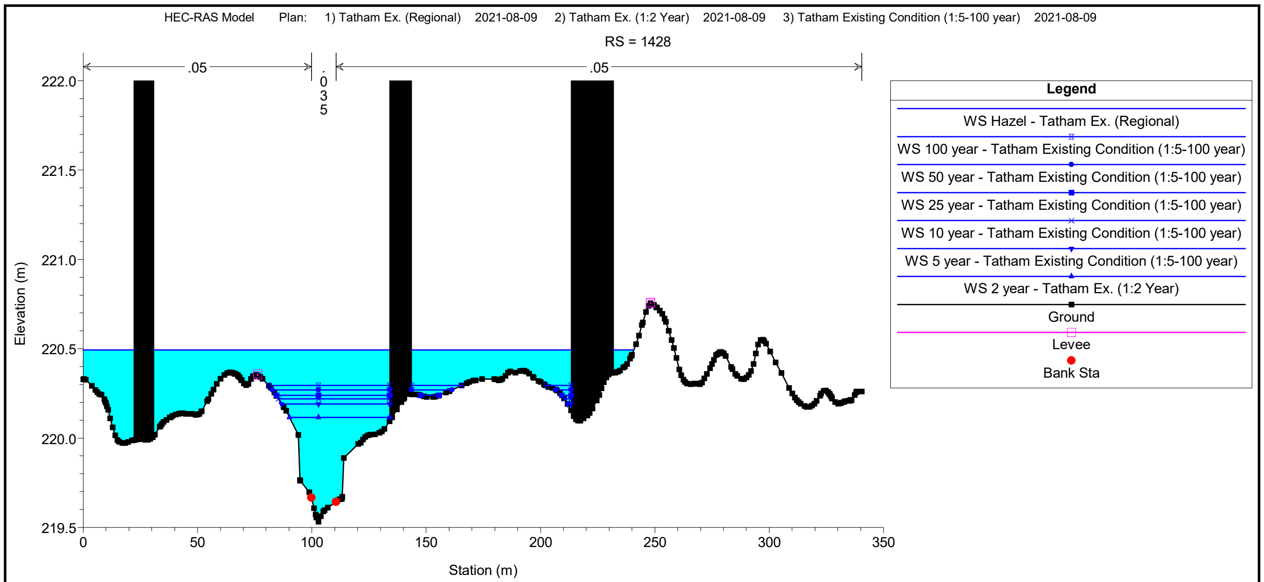
River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1290	10 year	Tatham Existing Condition (1:5-100 year)	7.81	219.00	219.94	219.68	220.01	0.003272	1.20	7.41	23.97	0.47
Leonard's Creek	1	1290	25 year	Tatham Existing Condition (1:5-100 year)	9.83	219.00	220.00	219.75	220.09	0.003629	1.34	8.89	25.33	0.51
Leonard's Creek	1	1290	50 year	Tatham Existing Condition (1:5-100 year)	10.62	219.00	220.02	219.78	220.11	0.003834	1.40	9.32	25.71	0.52
Leonard's Creek	1	1290	100 year	Tatham Existing Condition (1:5-100 year)	11.21	219.00	220.03	219.80	220.13	0.003998	1.45	9.61	25.96	0.54
Leonard's Creek	1	1255	Hazel	Tatham Ex. (Regional)	18.38	219.15	220.06	219.86	220.13	0.002558	1.28	20.93	56.86	0.44
Leonard's Creek	1	1255	2 year	Tatham Ex. (1:2 Year)	3.76	219.15	219.81	219.41	219.82	0.000514	0.46	10.21	34.75	0.19
Leonard's Creek	1	1255	5 year	Tatham Existing Condition (1:5-100 year)	6.12	219.15	219.88	219.49	219.90	0.000843	0.63	12.71	36.79	0.24
Leonard's Creek	1	1255	10 year	Tatham Existing Condition (1:5-100 year)	7.81	219.15	219.91	219.54	219.94	0.001154	0.75	13.72	38.93	0.29
Leonard's Creek	1	1255	25 year	Tatham Existing Condition (1:5-100 year)	9.76	219.15	219.97	219.60	220.00	0.001227	0.82	16.35	45.41	0.30
Leonard's Creek	1	1255	50 year	Tatham Existing Condition (1:5-100 year)	10.46	219.15	219.99	219.62	220.02	0.001270	0.85	17.16	47.48	0.31
Leonard's Creek	1	1255	100 year	Tatham Existing Condition (1:5-100 year)	10.98	219.15	220.00	219.64	220.03	0.001304	0.87	17.73	48.55	0.31
Leonard's Creek	1	1225	Hazel	Tatham Ex. (Regional)	17.85	218.73	220.04	219.60	220.07	0.001115	0.94	33.29	102.63	0.30
Leonard's Creek	1	1225	2 year	Tatham Ex. (1:2 Year)	3.76	218.73	219.81	219.19	219.81	0.000216	0.35	14.26	62.30	0.13
Leonard's Creek	1	1225	5 year	Tatham Existing Condition (1:5-100 year)	6.12	218.73	219.87	219.28	219.88	0.000385	0.49	18.77	76.93	0.17
Leonard's Creek	1	1225	10 year	Tatham Existing Condition (1:5-100 year)	7.81	218.73	219.89	219.34	219.91	0.000538	0.59	20.52	78.68	0.20
Leonard's Creek	1	1225	25 year	Tatham Existing Condition (1:5-100 year)	9.76	218.73	219.96	219.39	219.97	0.000553	0.62	25.68	83.59	0.21
Leonard's Creek	1	1225	50 year	Tatham Existing Condition (1:5-100 year)	10.43	218.73	219.98	219.41	219.99	0.000565	0.64	27.17	88.37	0.21
Leonard's Creek	1	1225	100 year	Tatham Existing Condition (1:5-100 year)	10.90	218.73	219.99	219.43	220.00	0.000573	0.65	28.25	93.17	0.21
Leonard's Creek	1	1204	Hazel	Tatham Ex. (Regional)	17.59	218.84	220.01	219.73	220.04	0.001342	1.09	35.23	109.83	0.34
Leonard's Creek	1	1204	2 year	Tatham Ex. (1:2 Year)	3.76	218.84	219.80	219.25	219.81	0.000265	0.42	17.19	59.08	0.14
Leonard's Creek	1	1204	5 year	Tatham Existing Condition (1:5-100 year)	6.12	218.84	219.86	219.35	219.87	0.000461	0.58	21.06	66.62	0.19
Leonard's Creek	1	1204	10 year	Tatham Existing Condition (1:5-100 year)	7.81	218.84	219.88	219.41	219.90	0.000660	0.70	22.37	76.90	0.23
Leonard's Creek	1	1204	25 year	Tatham Existing Condition (1:5-100 year)	9.76	218.84	219.95	219.47	219.96	0.000675	0.74	28.02	98.63	0.24
Leonard's Creek	1	1204	50 year	Tatham Existing Condition (1:5-100 year)	10.43	218.84	219.96	219.49	219.98	0.000678	0.75	29.81	102.58	0.24
Leonard's Creek	1	1204	100 year	Tatham Existing Condition (1:5-100 year)	10.89	218.84	219.98	219.50	219.99	0.000677	0.75	31.05	104.35	0.24
Leonard's Creek	1	1162	Hazel	Tatham Ex. (Regional)	14.39	218.66	219.86	219.53	219.96	0.003393	1.64	19.64	115.99	0.52
Leonard's Creek	1	1162	2 year	Tatham Ex. (1:2 Year)	3.76	218.66	219.80	219.21	219.80	0.000146	0.33	21.11	74.54	0.11
Leonard's Creek	1	1162	5 year	Tatham Existing Condition (1:5-100 year)	6.12	218.66	219.85	219.31	219.86	0.000360	0.53	26.28	133.34	0.17
Leonard's Creek	1	1162	10 year	Tatham Existing Condition (1:5-100 year)	7.81	218.66	219.86	219.37	219.87	0.000531	0.65	27.80	135.10	0.21
Leonard's Creek	1	1162	25 year	Tatham Existing Condition (1:5-100 year)	9.76	218.66	219.92	219.42	219.94	0.000475	0.64	37.10	146.60	0.20
Leonard's Creek	1	1162	50 year	Tatham Existing Condition (1:5-100 year)	10.43	218.66	219.94	219.46	219.95	0.000468	0.64	39.77	148.55	0.20
Leonard's Creek	1	1162	100 year	Tatham Existing Condition (1:5-100 year)	10.89	218.66	219.96	219.47	219.97	0.000461	0.64	41.62	149.33	0.20
Leonard's Creek	1	1144	Hazel	Tatham Ex. (Regional)	10.65	218.69	219.80	219.80	219.88	0.004210	1.64	16.24	103.41	0.55
Leonard's Creek	1	1144	2 year	Tatham Ex. (1:2 Year)	3.80	218.69	219.79		219.79	0.000475	0.54	17.91	113.16	0.18
Leonard's Creek	1	1144	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.69	219.83		219.85	0.000754	0.71	23.75	126.79	0.23
Leonard's Creek	1	1144	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.69	219.84		219.86	0.001197	0.89	24.07	127.32	0.30
Leonard's Creek	1	1144	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.69	219.91		219.92	0.000867	0.80	34.07	140.75	0.26
Leonard's Creek	1	1144	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.69	219.93		219.94	0.000831	0.79	36.77	144.19	0.25
Leonard's Creek	1	1144	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.69	219.94		219.95	0.000806	0.79	38.64	146.29	0.25
Leonard's Creek	1	1105	Hazel	Tatham Ex. (Regional)	6.36	218.50	219.78	219.14	219.79	0.000388	0.50	19.15	52.49	0.17
Leonard's Creek	1	1105	2 year	Tatham Ex. (1:2 Year)	3.80	218.50	219.78	218.99	219.78	0.000120	0.28	22.62	70.36	0.10
Leonard's Creek	1	1105	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.50	219.82	219.14	219.83	0.000244	0.41	25.58	71.99	0.14
Leonard's Creek	1	1105	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.50	219.82	219.23	219.83	0.000412	0.53	25.18	71.76	0.18
Leonard's Creek	1	1105	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.50	219.89	219.34	219.90	0.000416	0.57	30.46	73.93	0.18
Leonard's Creek	1	1105	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.50	219.91	219.36	219.92	0.000431	0.58	31.81	74.35	0.19
Leonard's Creek	1	1105	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.50	219.92	219.37	219.93	0.000440	0.59	32.71	74.67	0.19
Leonard's Creek	1	1080	Hazel	Tatham Ex. (Regional)	4.54	218.40	219.78	219.10	219.78	0.000037	0.16	70.30	232.21	0.05
Leonard's Creek	1	1080	2 year	Tatham Ex. (1:2 Year)	3.80	218.40	219.78	219.05	219.78	0.000025	0.13	72.70	242.25	0.04
Leonard's Creek	1	1080	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.40	219.82	219.20	219.82	0.000045	0.18	82.89	242.29	0.06
Leonard's Creek	1	1080	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.40	219.82	219.28	219.82	0.000077	0.24	81.66	242.28	0.08
Leonard's Creek	1	1080	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.40	219.89	219.38	219.89	0.000068	0.24	99.47	248.18	0.07
Leonard's Creek	1	1080	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.40	219.91	219.41	219.91	0.000068	0.24	104.02	249.44	0.07
Leonard's Creek	1	1080	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.40	219.92	219.42	219.92	0.000068	0.24	107.08	250.16	0.07
Leonard's Creek	1	1070			Culvert									
Leonard's Creek	1	1067	Hazel	Tatham Ex. (Regional)	4.54	218.47	219.72	219.72	219.78	0.007532	1.29	6.47	44.04	0.60
Leonard's Creek	1	1067	2 year	Tatham Ex. (1:2 Year)	3.80	218.47	219.70	219.70	219.78	0.009241	1.39	4.38	32.23	0.66
Leonard's Creek	1	1067	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.47	219.75	219.75	219.82	0.009097	1.48	7.98	49.51	0.66
Leonard's Creek	1	1067	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.47	219.82	219.78	219.82	0.000265	0.27	58.69	246.04	0.12
Leonard's Creek	1	1067	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.47	219.89	219.78	219.89	0.000190	0.25	76.69	248.64	0.10
Leonard's Creek	1	1067	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.47	219.91	219.78	219.91	0.000185	0.25	80.61	249.14	0.10
Leonard's Creek	1	1067	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.47	219.92	219.78	219.92	0.000180	0.25	83.73	249.52	0.10
Leonard's Creek	1	1062	Hazel	Tatham Ex. (Regional)	4.54	218.49	219.62	219.08	219.64	0.000646	0.57	11.79	84.11	0.22
Leonard's Creek	1	1062	2 year	Tatham Ex. (1:2 Year)	3.80	218.49	219.48	219.04	219.51	0.001091	0.65	5.86	10.25	0.27
Leonard's Creek	1	1062	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.49	219.70	219.18	219.72	0.000607	0.60	19.51	112.66	0.21
Leonard's Creek	1	1062	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.49	219.80		219.81	0.000406	0.53	31.98	134.66	0.18
Leonard's Creek	1	1062	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.49	219.88		219.89	0.000381	0.54	43.18	168.13	0.17
Leonard's Creek	1	1062	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.49	219.89		219.90	0.000384	0.55	45.87	170.76	0.18
Leonard's Creek	1	1062	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.49	219.91		219.91	0.000377	0.55	48.08	172.00	0.17
Leonard's Creek	1	1034	Hazel	Tatham Ex. (Regional)	4.54	218.49	219.55		219.60	0.001766	0.98	5.02	13.19	0.35
Leonard's Creek	1	1034	2 year	Tatham Ex. (1:2 Year)	3.80	218.49	219.40		219.45	0.002701	1.05	3.70	6.87	0.42
Leonard's Creek	1	1034	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.49	219.58		219.67	0.002850	1.28	5.61	23.99	0.45
Leonard's Creek	1	1034	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.49	219.69	219.35	219.77	0.002624	1.33	8.82	42.96	0.44
Leonard's Creek	1	1034	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.49	219.80	219.45	219.85	0.001857	1.21	20.47	151.51	0.38
Leonard's Creek	1	1034	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.49	219.83	219.49	219.87	0.001457	1.09	26.23	171.45	0.34
Leonard's Creek	1	1034	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.49	219.86	219.51	219.89	0.001254	1.03	30.53	201.84	0.32
Leonard's Creek	1	1013	Hazel	Tatham Ex. (Regional)	4.54	218.49	219.50	219.19	219.55	0.003165	1.01	4.65	10.73	0.44
Leonard's Creek	1	1013	2 year	Tatham Ex. (1:2 Year)	3.80	218.49	219.15	219.13	219.32	0.016301	1.84	2.06	5.23	0.94
Leonard's Creek	1	1013	5 year	Tatham Existing Condition (1:5-100 year)	6.19	218.49	219.30	219.30	219.53	0.017798	2.10	2.95	6.63	1.00
Leonard's Creek	1	1013	10 year	Tatham Existing Condition (1:5-100 year)	7.91	218.49	219.41	219.41	219.64	0.016217	2.13	3.77	8.79	0.98
Leonard's Creek	1	1013	25 year	Tatham Existing Condition (1:5-100 year)	9.92	218.49	219.50	219.50	219.75	0.015079	2.21	4.65	10.74	0.96
Leonard's Creek	1	1013	50 year	Tatham Existing Condition (1:5-100 year)	10.64	218.49	219.53	219.53	219.78	0.014397	2.24	4.98	11.44	0.95
Leonard's Creek	1	1013	100 year	Tatham Existing Condition (1:5-100 year)	11.13	218.49	219.55	219.55	219.80	0.013984	2.26	5.21	11.91	0.94

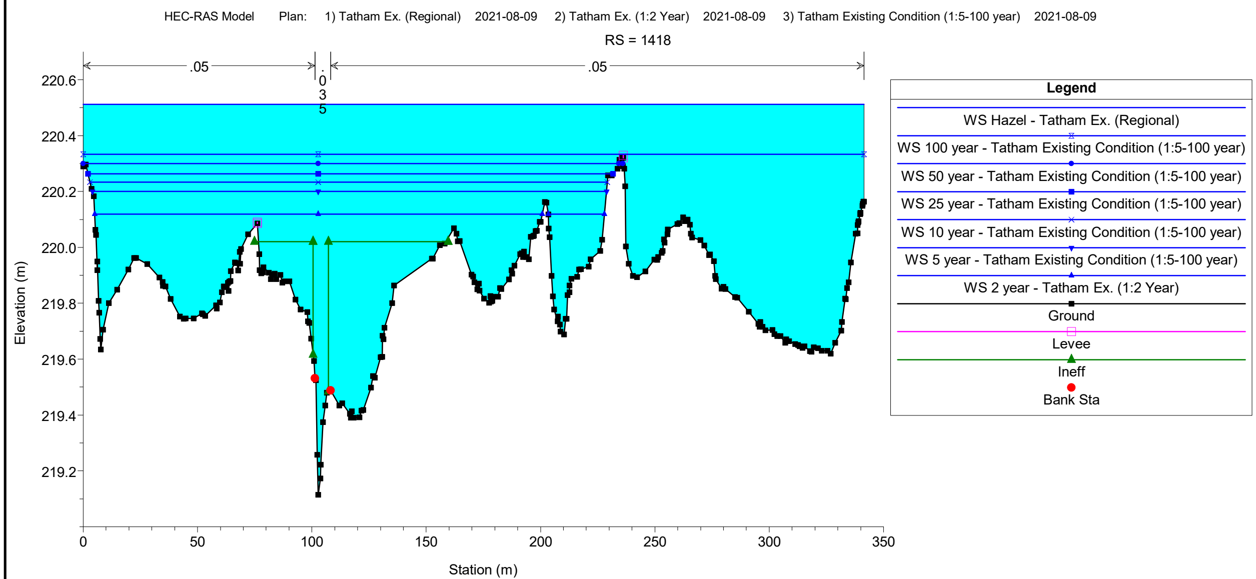
HEC-RAS Locations: User Defined

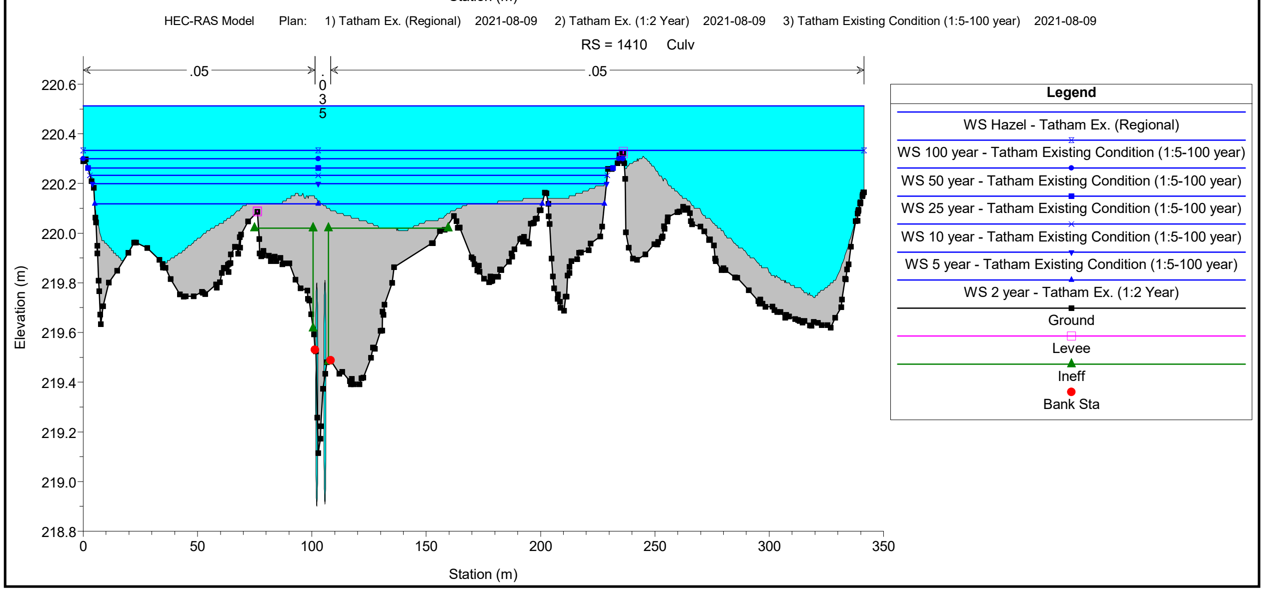
River	Reach	River Sta	Profile	Plan	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
					(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Leonard's Creek	1	1410 Culvert #1	Hazel	Tatham Ex. (Regional)	220.51	220.51	219.13	220.51	220.02	0.09	38.24	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #2	Hazel	Tatham Ex. (Regional)	220.51	220.51	219.14	220.51	220.02	0.09	38.24	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #1	2 year	Tatham Ex. (1:2 Year)	220.12	220.12	219.09	220.12	220.02	0.06	3.77	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #2	2 year	Tatham Ex. (1:2 Year)	220.12	220.12	219.10	220.12	220.02	0.06	3.77	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #1	5 year	Tatham Existing Condition (1:5-100 year)	220.20	220.20	219.19	220.20	220.02	0.13	7.43	0.01	0.21	0.21
Leonard's Creek	1	1410 Culvert #2	5 year	Tatham Existing Condition (1:5-100 year)	220.20	220.20	219.19	220.20	220.02	0.13	7.43	0.01	0.21	0.21
Leonard's Creek	1	1410 Culvert #1	10 year	Tatham Existing Condition (1:5-100 year)	220.23	220.23	219.22	220.23	220.02	0.16	10.27	0.01	0.25	0.25
Leonard's Creek	1	1410 Culvert #2	10 year	Tatham Existing Condition (1:5-100 year)	220.23	220.23	219.23	220.23	220.02	0.16	10.27	0.01	0.25	0.25
Leonard's Creek	1	1410 Culvert #1	25 year	Tatham Existing Condition (1:5-100 year)	220.26	220.26	219.12	220.26	220.02	0.08	14.35	0.00	0.13	0.13
Leonard's Creek	1	1410 Culvert #2	25 year	Tatham Existing Condition (1:5-100 year)	220.26	220.26	219.13	220.26	220.02	0.08	14.35	0.00	0.13	0.13
Leonard's Creek	1	1410 Culvert #1	50 year	Tatham Existing Condition (1:5-100 year)	220.30	220.30	218.99	220.30	220.02	0.02	17.61	0.00	0.03	0.03
Leonard's Creek	1	1410 Culvert #2	50 year	Tatham Existing Condition (1:5-100 year)	220.30	220.30	219.00	220.30	220.02	0.02	17.61	0.00	0.03	0.03
Leonard's Creek	1	1410 Culvert #1	100 year	Tatham Existing Condition (1:5-100 year)	220.33	220.33	219.11	220.33	220.02	0.08	21.77	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #2	100 year	Tatham Existing Condition (1:5-100 year)	220.33	220.33	219.12	220.33	220.02	0.08	21.77	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	Hazel	Tatham Ex. (Regional)	220.39	220.39	219.01	220.39	220.10	0.18	15.66	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	2 year	Tatham Ex. (1:2 Year)	220.11	220.11	220.10	220.11	220.10	2.01	1.75	0.21	1.27	1.27
Leonard's Creek	1	1335 Culvert #1	5 year	Tatham Existing Condition (1:5-100 year)	220.17	220.17	220.14	220.17	220.11	1.65	4.59	0.14	1.04	1.04
Leonard's Creek	1	1335 Culvert #1	10 year	Tatham Existing Condition (1:5-100 year)	220.19	220.19	220.19	220.19	220.11	1.26	23.22	0.08	0.79	0.79
Leonard's Creek	1	1335 Culvert #1	25 year	Tatham Existing Condition (1:5-100 year)	220.21	220.21	220.20	220.21	220.11	0.23	11.16	0.00	0.14	0.14
Leonard's Creek	1	1335 Culvert #1	50 year	Tatham Existing Condition (1:5-100 year)	220.24	220.24	220.24	220.24	220.11	0.16	12.42	0.00	0.10	0.10
Leonard's Creek	1	1335 Culvert #1	100 year	Tatham Existing Condition (1:5-100 year)	220.26	220.26	220.26	220.26	220.11	0.21	13.33	0.00	0.13	0.13
Leonard's Creek	1	1070 Culvert #1	Hazel	Tatham Ex. (Regional)	219.78	219.78	219.78	219.78	219.67	0.14	4.40	0.06	0.08	0.08
Leonard's Creek	1	1070 Culvert #1	2 year	Tatham Ex. (1:2 Year)	219.78	219.78	219.09	219.78	219.67	0.29	3.51	0.08	0.08	0.08
Leonard's Creek	1	1070 Culvert #1	5 year	Tatham Existing Condition (1:5-100 year)	219.82	219.82	219.82	219.82	219.67	0.17	6.03	0.07	0.09	0.09
Leonard's Creek	1	1070 Culvert #1	10 year	Tatham Existing Condition (1:5-100 year)	219.82	219.82	219.82	219.82	219.67	0.16	7.75	0.00	0.09	0.09
Leonard's Creek	1	1070 Culvert #1	25 year	Tatham Existing Condition (1:5-100 year)	219.89	219.89	219.89	219.89	219.67	0.18	9.74	0.00	0.10	0.10
Leonard's Creek	1	1070 Culvert #1	50 year	Tatham Existing Condition (1:5-100 year)	219.91	219.91	219.91	219.91	219.67	0.34	10.29	0.00	0.19	0.19
Leonard's Creek	1	1070 Culvert #1	100 year	Tatham Existing Condition (1:5-100 year)	219.92	219.92	219.92	219.92	219.67	0.33	10.80	0.00	0.18	0.18

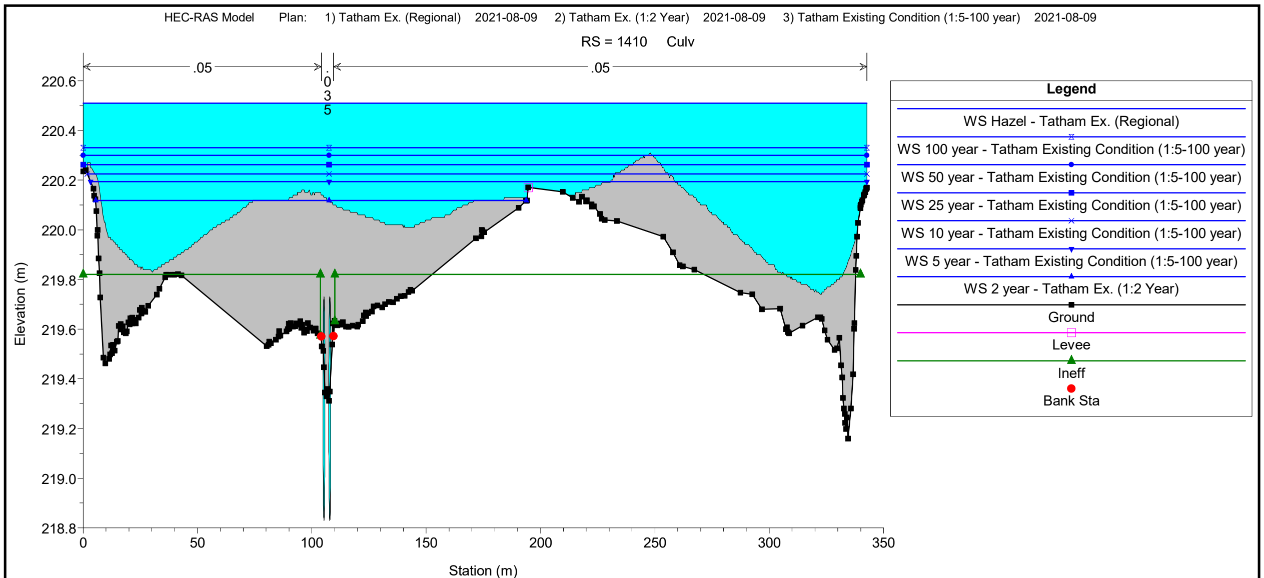
HEC-RAS River: Leonard's Creek Reach: 1

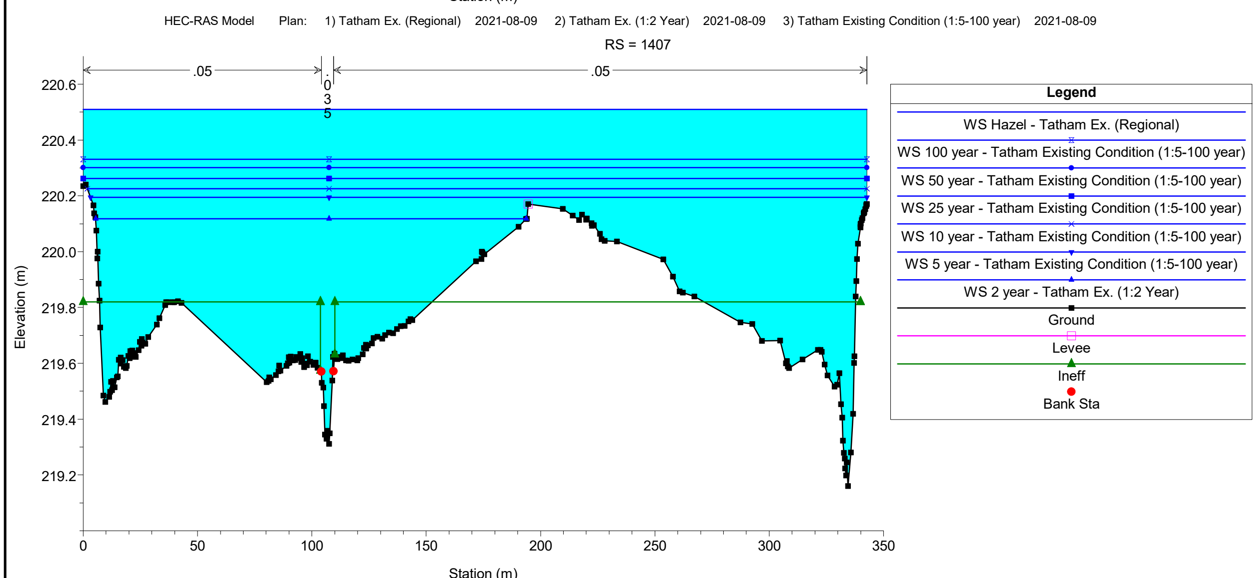
Reach	River Sta	Profile	Plan	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
				(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1	1529.2	Hazel	Tatham Ex. (Regional)	43.86	13.73	25.16	13.73		161.69	0.44	0.28	219.95	220.92	220.88	220.39	220.39
1	1529.2	5 year	Tatham Existing Condition (1:5-100 year)	7.54	0.89	6.23	0.89		144.01	0.09	0.04	219.95	220.54	220.53	220.04	220.03
1	1529.2	10 year	Tatham Existing Condition (1:5-100 year)	10.43	1.49	8.35	1.49		154.39	0.16	0.07	219.95	220.61	220.59	220.11	220.11
1	1529.2	25 year	Tatham Existing Condition (1:5-100 year)	14.33	2.23	11.39	2.23		154.81	0.25	0.10	219.95	220.65	220.63	220.20	220.20
1	1529.2	50 year	Tatham Existing Condition (1:5-100 year)	17.56	3.64	12.57	3.64		155.42	0.29	0.13	219.95	220.71	220.68	220.24	220.24
1	1529.2	100 year	Tatham Existing Condition (1:5-100 year)	20.25	4.94	13.53	4.94		155.89	0.31	0.16	219.95	220.74	220.71	220.26	220.26
1	1429	Hazel	Tatham Ex. (Regional)	45.37	14.28	17.59	14.28		186.63	0.40	0.22	219.97	220.54	220.50	220.04	220.01
1	1429	2 year	Tatham Ex. (1:2 Year)	3.89	0.14	3.76	0.14		23.82	0.08	0.04	219.97	220.13	220.12	219.81	219.80
1	1429	5 year	Tatham Existing Condition (1:5-100 year)	7.71	0.72	6.12	0.72		62.36	0.14	0.07	219.97	220.22	220.19	219.87	219.86
1	1429	10 year	Tatham Existing Condition (1:5-100 year)	10.67	1.35	7.81	1.35		71.11	0.16	0.10	219.97	220.26	220.22	219.90	219.88
1	1429	25 year	Tatham Existing Condition (1:5-100 year)	14.66	2.68	9.76	2.68		125.73	0.22	0.09	219.97	220.31	220.24	219.96	219.95
1	1429	50 year	Tatham Existing Condition (1:5-100 year)	17.97	3.84	10.43	3.84		164.78	0.26	0.10	219.97	220.35	220.27	219.98	219.96
1	1429	100 year	Tatham Existing Condition (1:5-100 year)	20.73	4.92	10.89	4.92		186.63	0.28	0.10	219.97	220.39	220.30	219.99	219.98
1	1176	Hazel	Tatham Ex. (Regional)	17.59	13.27	4.54	13.27		113.04	0.34	0.25	219.51	219.98	219.91	219.78	219.75

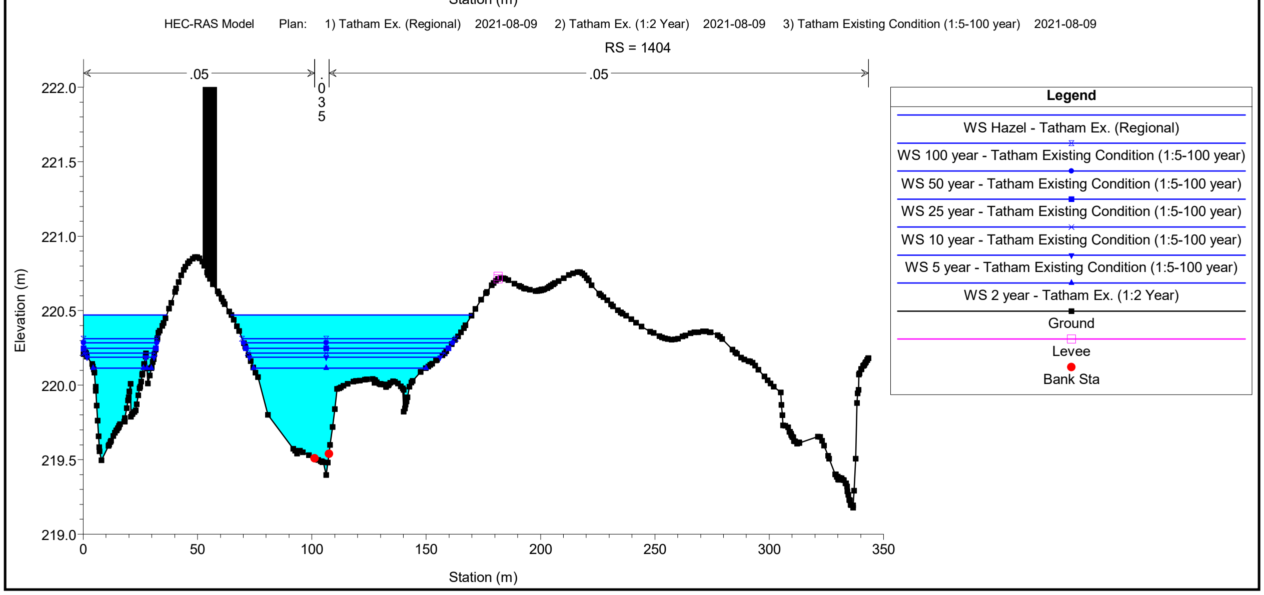

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1428
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

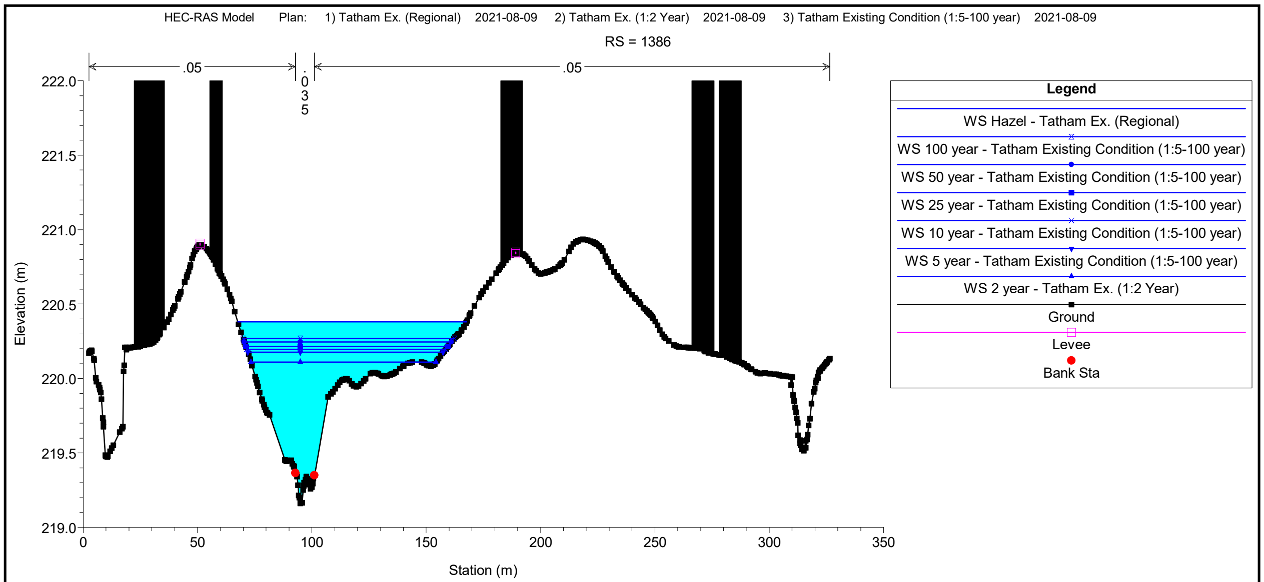

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1418
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta

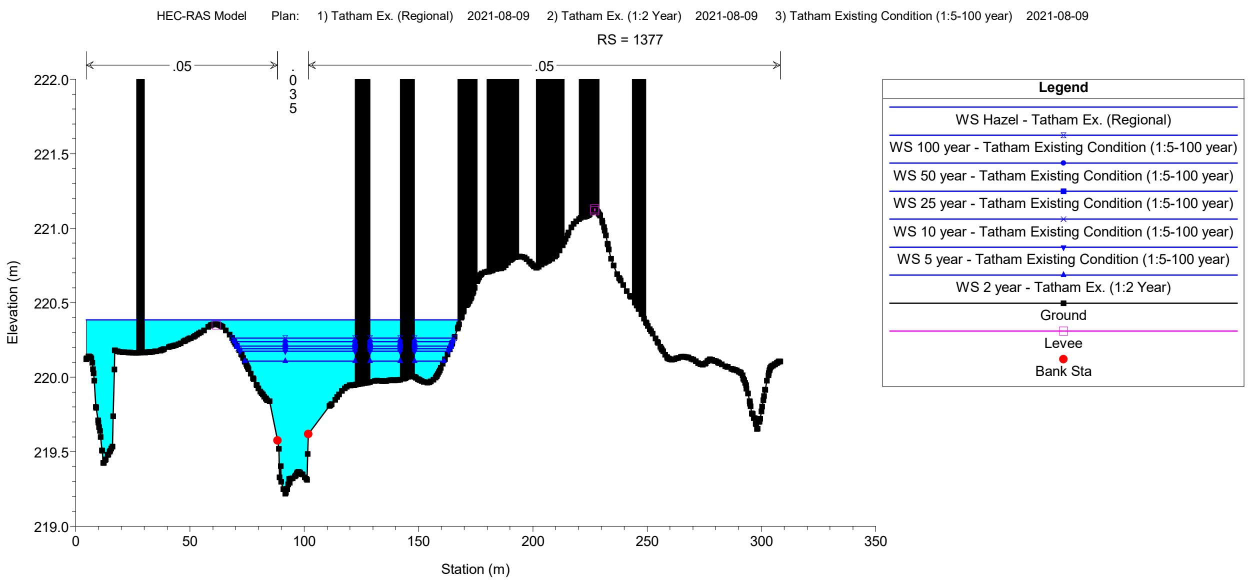

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta

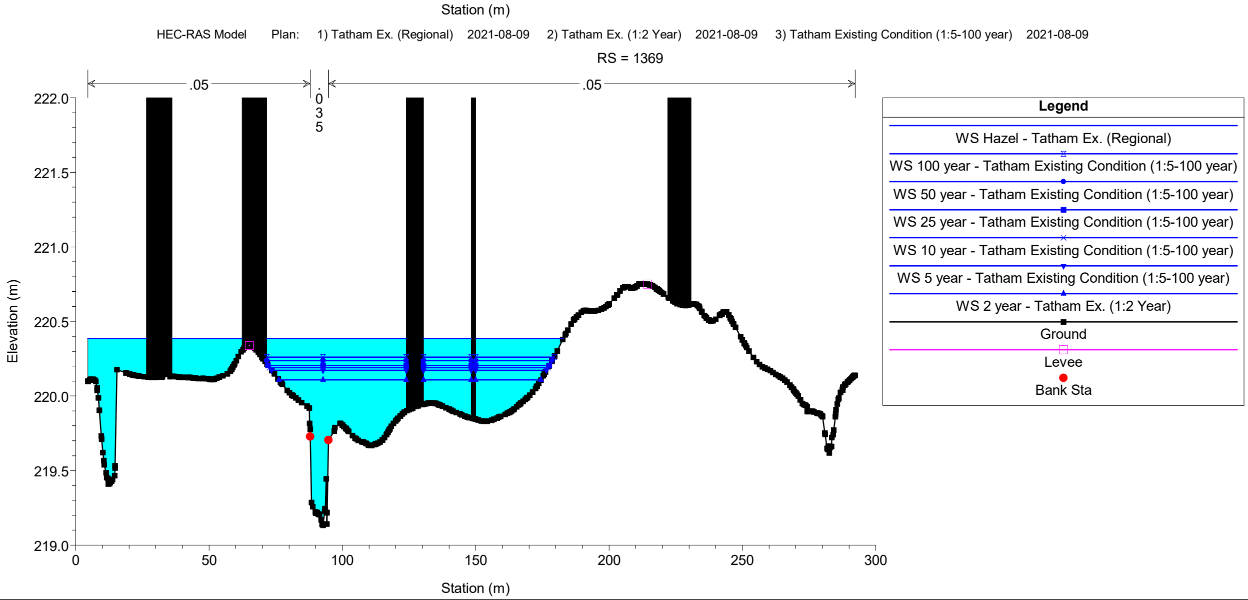

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta

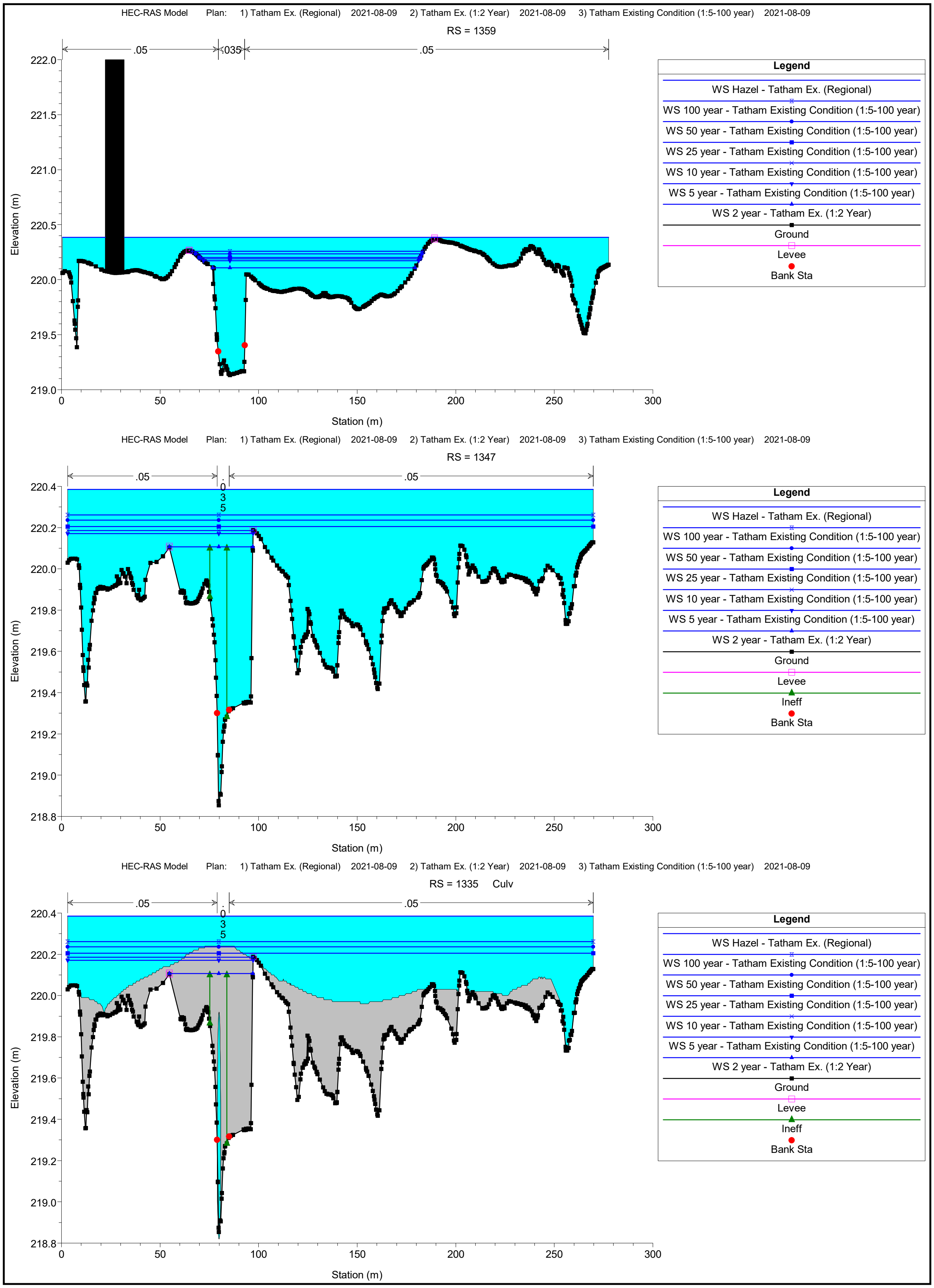

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1407
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1404
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

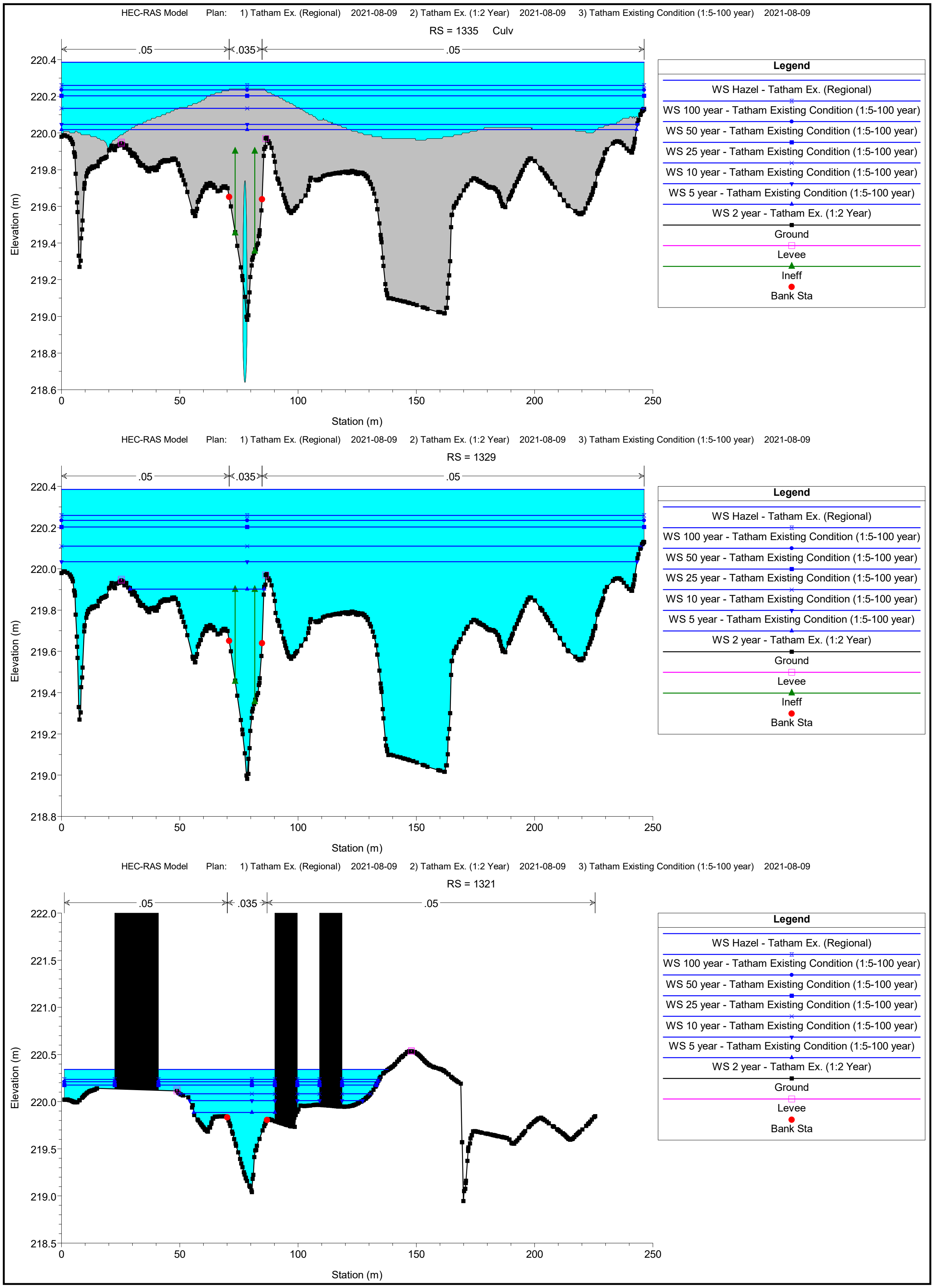

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1386
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

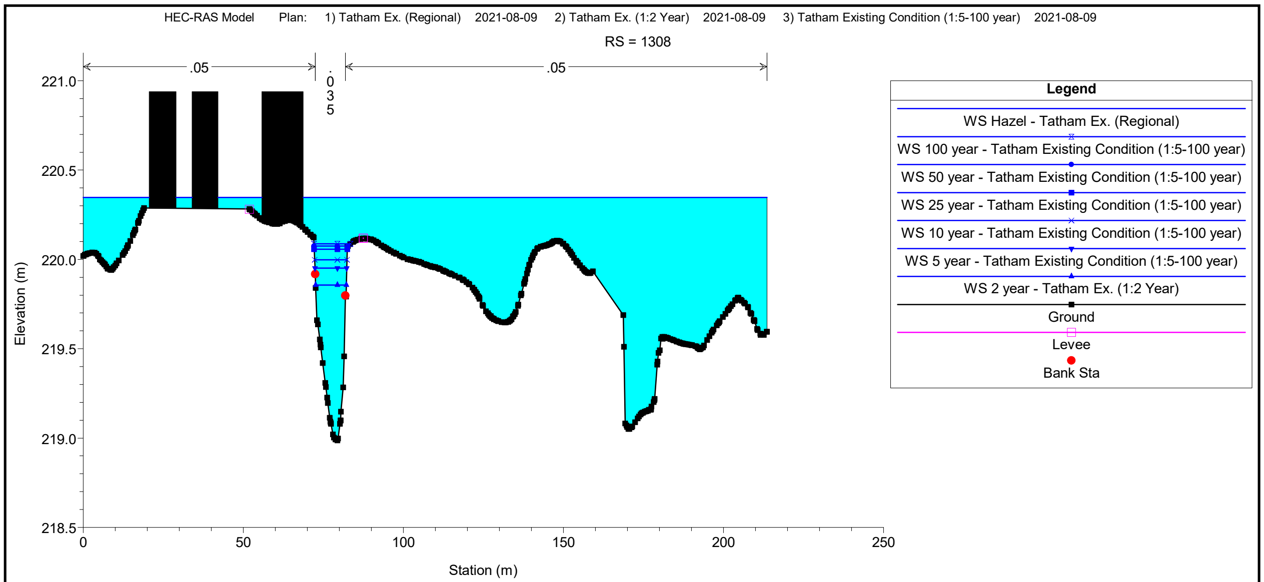

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1377
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1369
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta



HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1359
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1347
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1329
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1321
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta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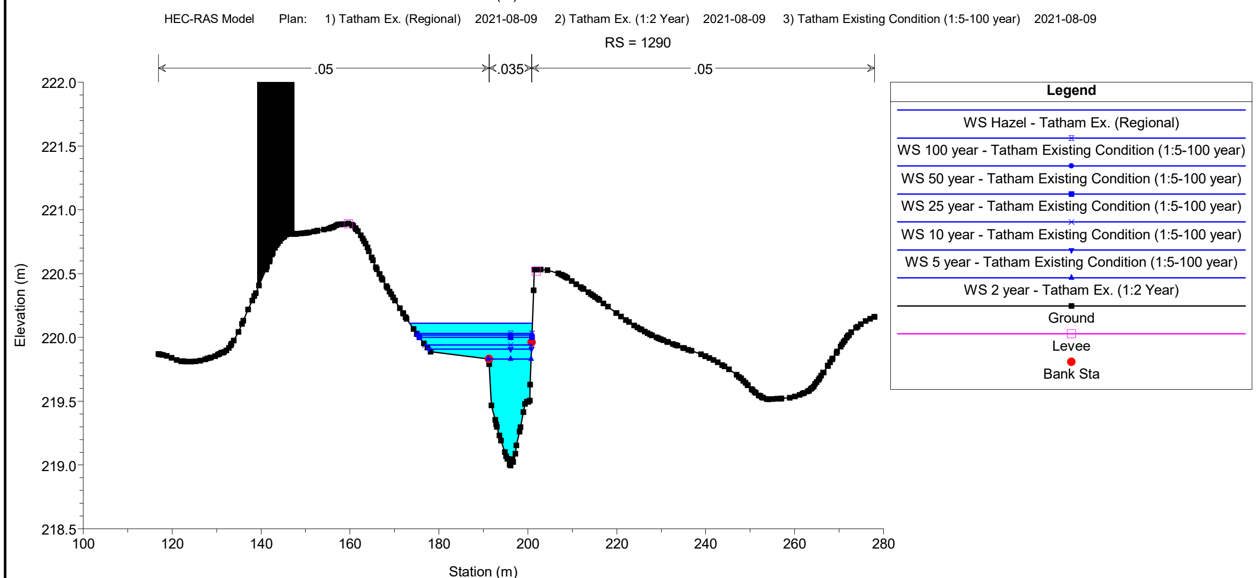
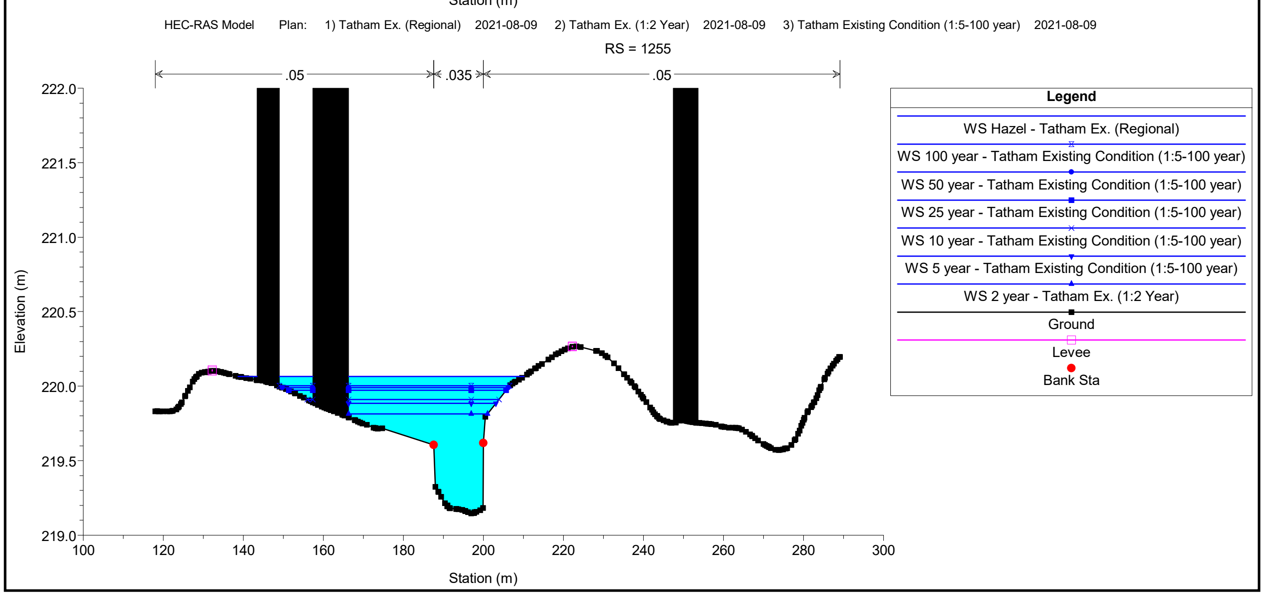
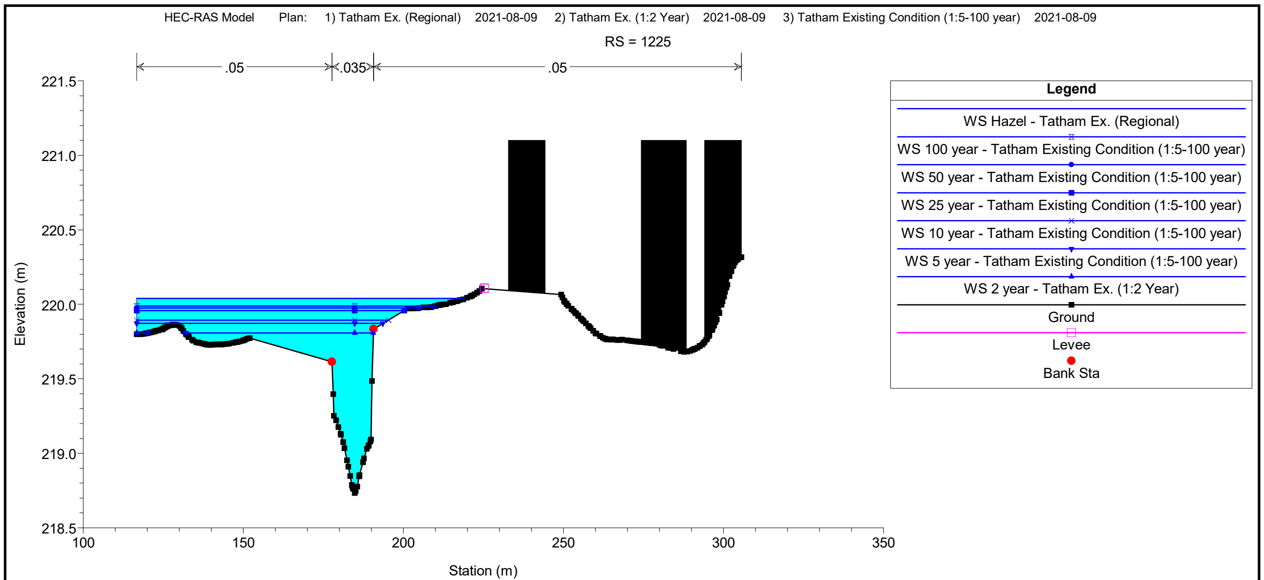
RS = 1308
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1290
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1255
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta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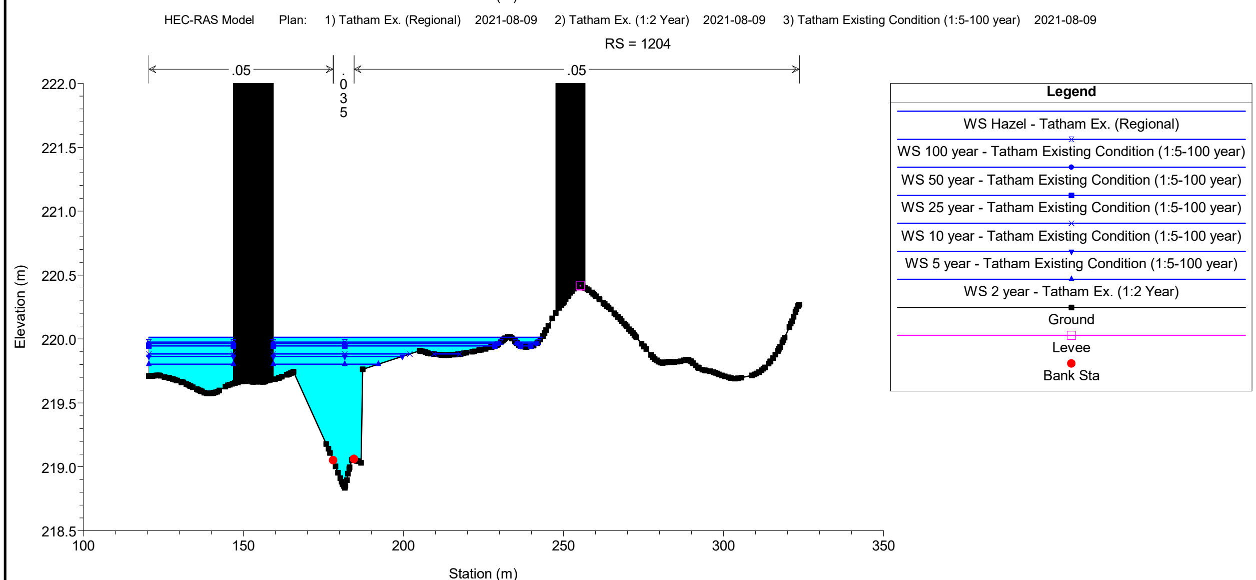
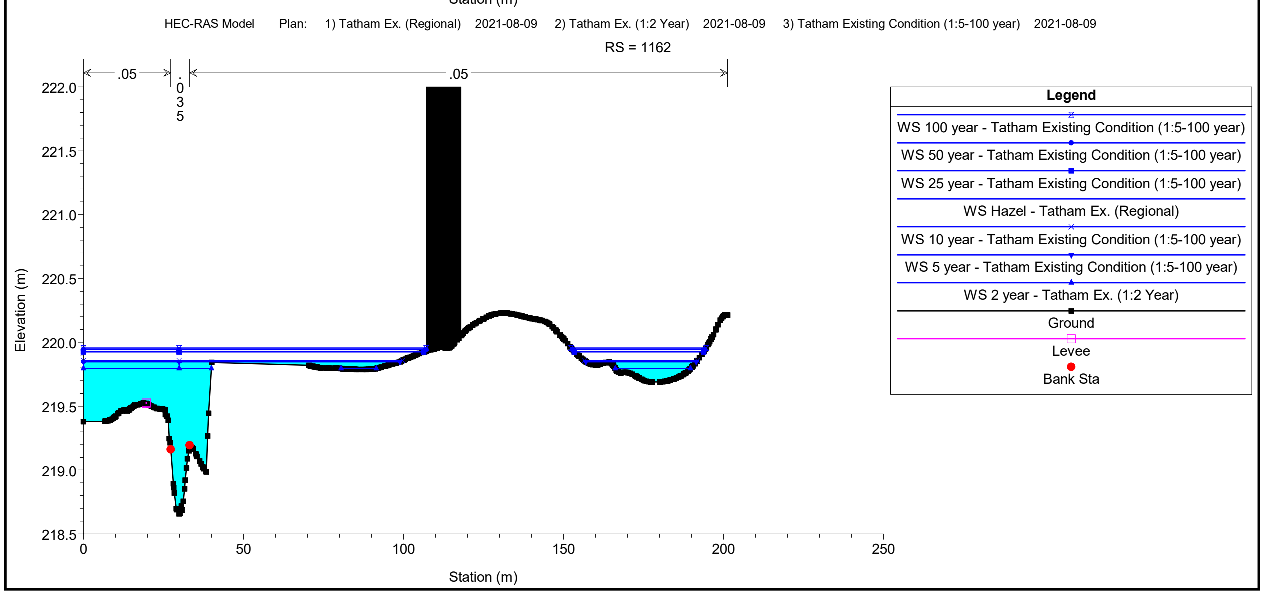
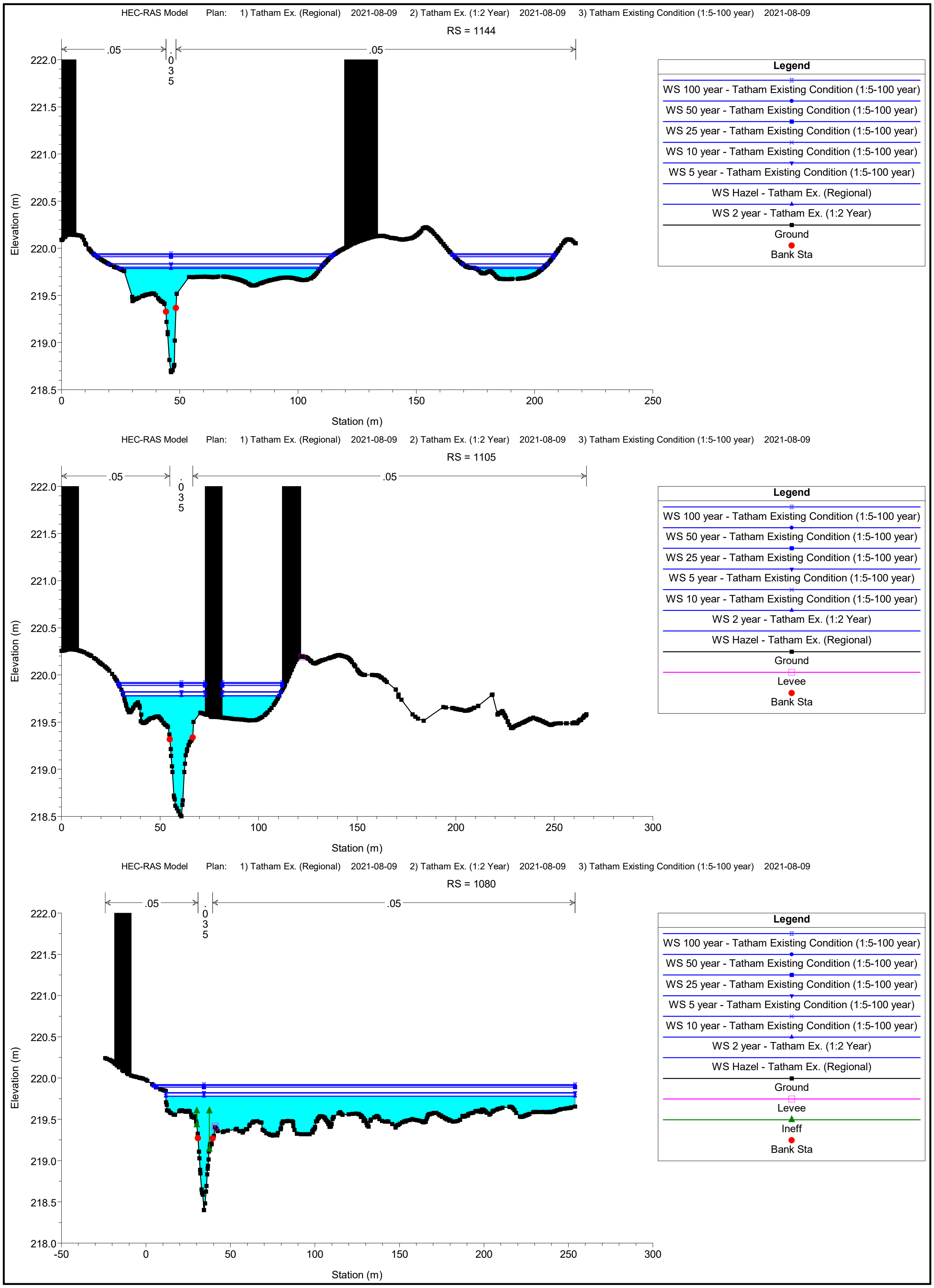
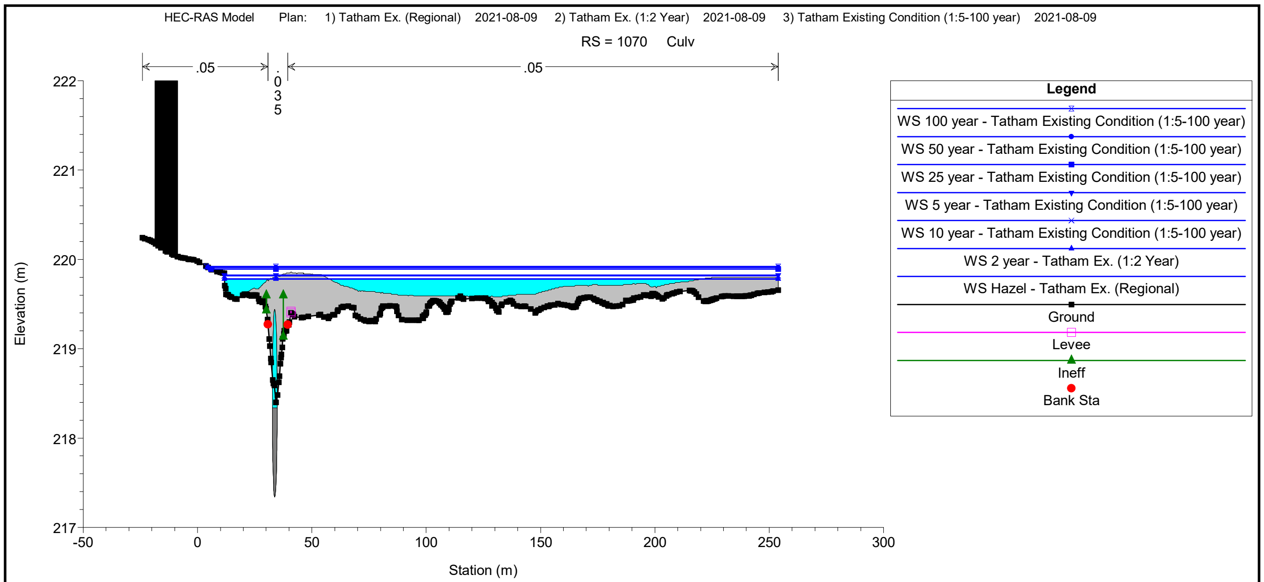
RS = 1225
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

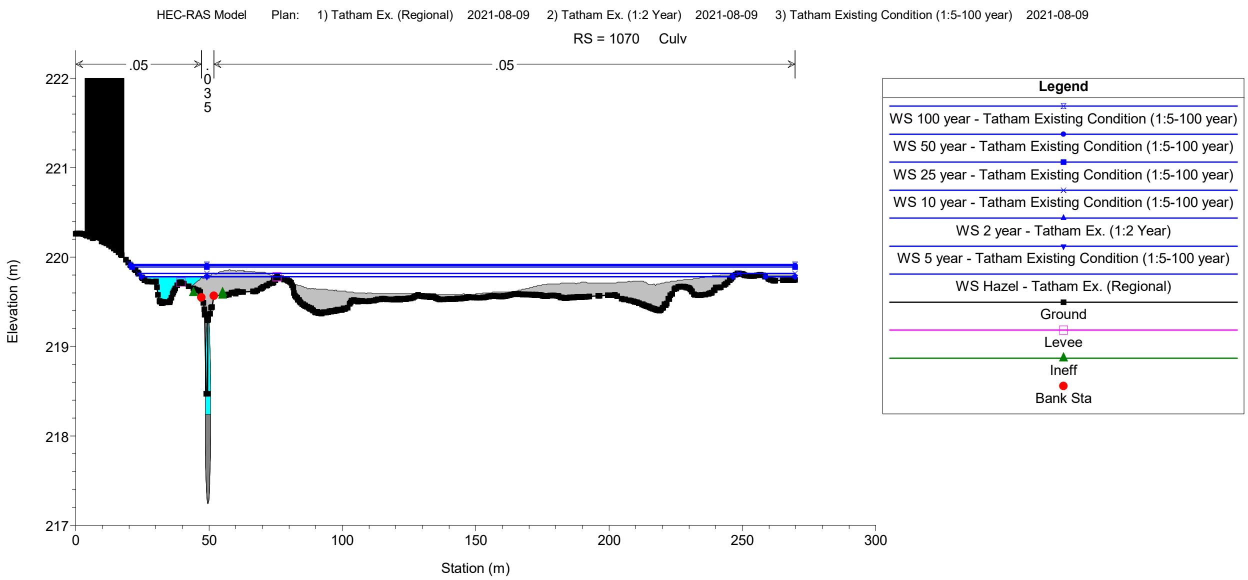

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1204
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Tatham Ex. (Regional)
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

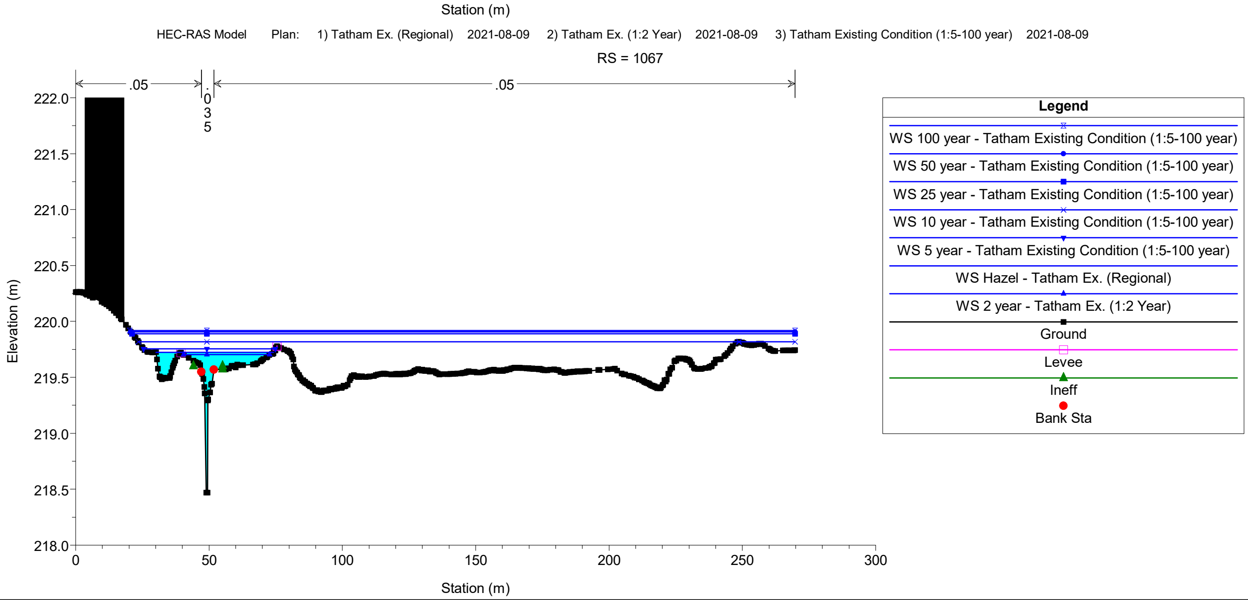

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1162
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta

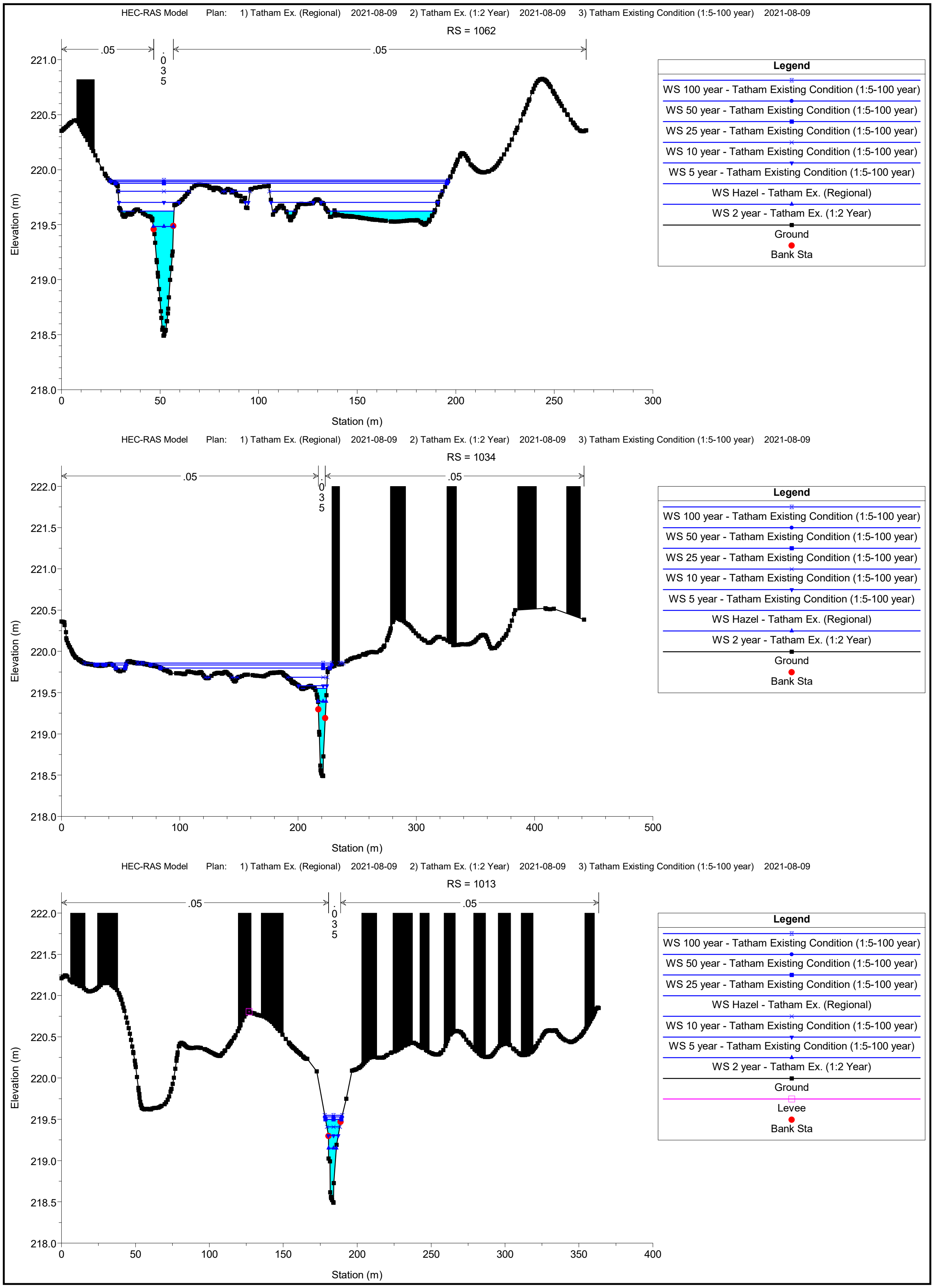


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1144
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1105
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
WS Hazel - Tatham Ex. (Regional)
Ground
Levee
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1080
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
WS Hazel - Tatham Ex. (Regional)
Ground
Levee
Ineff
Bank Sta

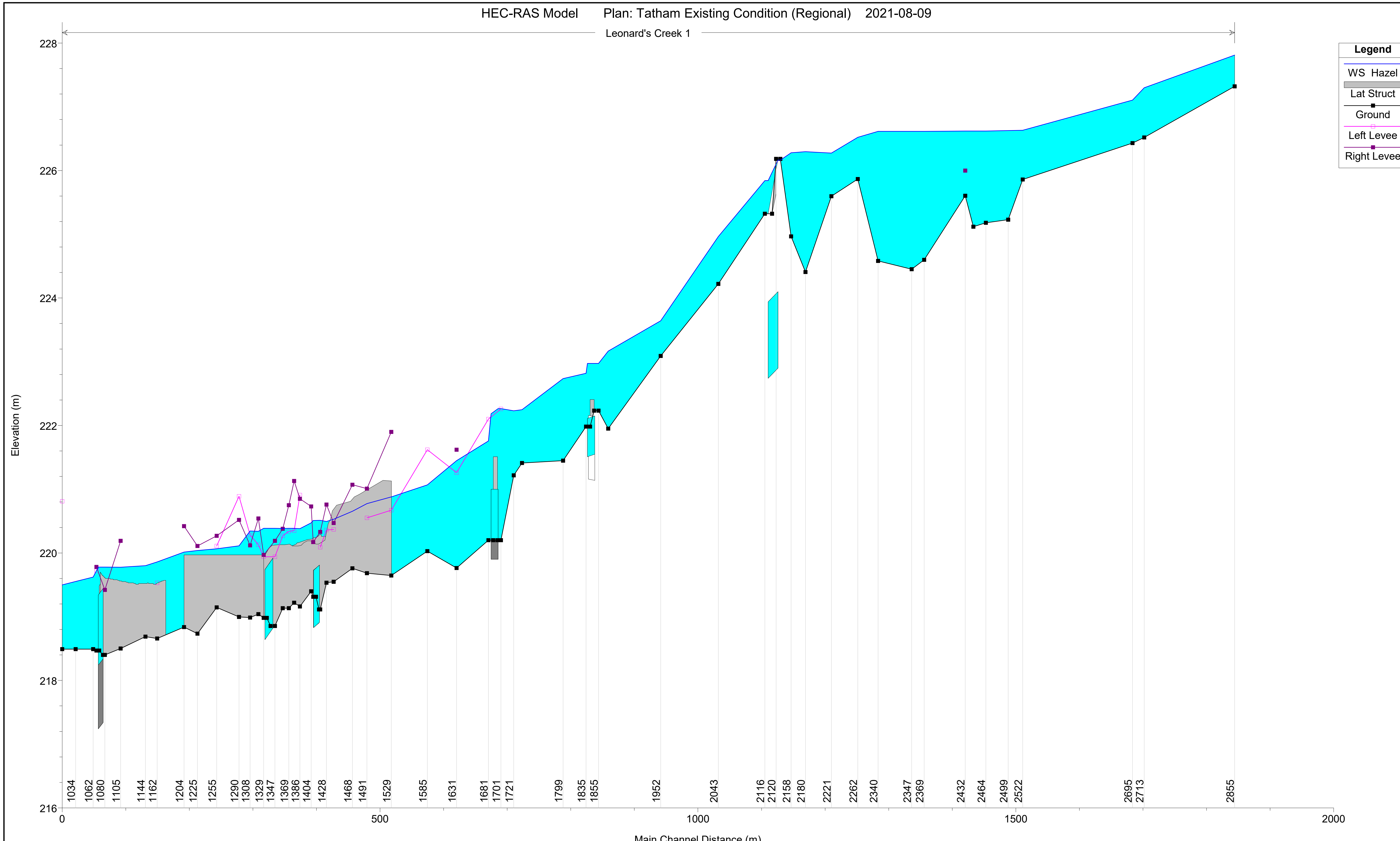

HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
WS Hazel - Tatham Ex. (Regional)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1067
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Ineff
Bank Sta



HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1062
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1034
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Bank Sta
HEC-RAS Model Plan: 1) Tatham Ex. (Regional) 2021-08-09 2) Tatham Ex. (1:2 Year) 2021-08-09 3) Tatham Existing Condition (1:5-100 year) 2021-08-09
RS = 1013
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Tatham Existing Condition (1:5-100 year)
WS 50 year - Tatham Existing Condition (1:5-100 year)
WS 25 year - Tatham Existing Condition (1:5-100 year)
WS Hazel - Tatham Ex. (Regional)
WS 10 year - Tatham Existing Condition (1:5-100 year)
WS 5 year - Tatham Existing Condition (1:5-100 year)
WS 2 year - Tatham Ex. (1:2 Year)
Ground
Levee
Bank Sta



HEC-RAS Model Plan: Tatham Existing Condition (Regional) 2021-08-09
Leonard's Creek 1
Legend
WS Hazel
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
228
226
224
222
220
218
216
0
500
1000
1500
2000
1034 1062 1080 1105 1144 1162 1204 1225 1255 1290 1308 1329 1347 1369 1386 1404 1428 1468 1491 1529 1585 1631 1681 1701 1721 1799 1835 1855 1952 2043 2116 2120 2158 2180 2221 2262 2340 2347 2369 2432 2464 2499 2522 2695 2713 2855

SUMMARY OF HECRAS WARNINGS – EXISTING CONDITION

We note that due to the low, flat topography of the study area and high peak flows estimated at each crossing, there are some inconsistencies between the proposed scenarios, and warning errors were observed at the crossings under some of the design storms. A summary of the observed HEC-RAS errors is provided below. Although the developed model is producing warnings at some locations, it provides a general estimate of the flood conditions in the study area. We note that significant additional modelling effort is required in order to produce results with more certainty.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
2-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
5-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
10-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
50-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
100-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1335	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1410	The weir over culvert is submerged.	Not anticipated to affect results.

T:\2020 PROJECTS\420395 - Various Roads Drainage Improvement Program - TOI\Design\HEC-RAS\GEOHECRAS\HECRAS Files - 60% Submission\Existing Condition - HECRAS Error Summary.docx

Appendix C: Existing Areas of Potential Improvement & Resident Survey Responses

Outlet #3

HY-8 Culvert Analysis Report

Crossing Notes: EX Crystal Beach Road Lake Simcoe Seasonal HWL

Existing culverts crossing Crystal Beach Road modeled per survey collected by Tatham, June 2020. 2 - 600mm CSP and 1 - 400mm CSP.

Culvert Data Summary - N 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Culvert Data Summary - 400

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Culvert Data Summary - S 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - EX Crystal Beach Road

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: EX Crystal Beach Road

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	63.00	219.75
3	68.00	219.77
4	79.00	219.77
5	90.00	219.72
6	112.00	219.72
7	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Table 1 - Culvert Summary Table: N 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.14	219.22	0.360	0.637	4-FFf	0.272	0.238	0.600	0.860	0.494	0.000
5-yr 24hr SCS	0.85	0.36	219.58	0.673	1.003	4-FFf	0.600	0.390	0.600	0.860	1.262	0.000
10-yr 24hr SCS	1.41	0.41	219.73	0.767	1.152	4-FFf	0.600	0.420	0.600	0.860	1.462	0.000
25-yr 24hr SCS	2.59	0.43	219.77	0.789	1.188	4-FFf	0.600	0.427	0.600	0.860	1.507	0.000
50-yr 24hr SCS	3.18	0.43	219.78	0.797	1.200	4-FFf	0.600	0.429	0.600	0.860	1.521	0.000
100-yr 24hr SCS	3.69	0.43	219.79	0.802	1.208	4-FFf	0.600	0.430	0.600	0.860	1.532	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.58 m,   Outlet Elevation (invert): 218.36 m

Culvert Length: 24.40 m,   Culvert Slope: 0.0090

****

Table 2 - Culvert Summary Table: 400

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.05	219.22	0.243	0.596	4-FFf	0.223	0.160	0.400	0.860	0.409	0.000
5-yr 24hr SCS	0.85	0.13	219.58	0.454	0.963	4-FFf	0.400	0.261	0.400	0.860	1.044	0.000
10-yr 24hr SCS	1.41	0.15	219.73	0.518	1.111	4-FFf	0.400	0.282	0.400	0.860	1.209	0.000
25-yr 24hr SCS	2.59	0.16	219.77	0.534	1.148	4-FFf	0.400	0.286	0.400	0.860	1.246	0.000
50-yr 24hr SCS	3.18	0.16	219.78	0.539	1.159	4-FFf	0.400	0.287	0.400	0.860	1.258	0.000
100-yr 24hr SCS	3.69	0.16	219.79	0.542	1.168	4-FFf	0.400	0.288	0.400	0.860	1.267	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.62 m,   Outlet Elevation (invert): 218.49 m

Culvert Length: 24.40 m,   Culvert Slope: 0.0053

****

Table 3 - Culvert Summary Table: S 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.14	219.22	0.359	0.627	4-FFf	0.249	0.238	0.600	0.860	0.494	0.000
5-yr 24hr SCS	0.85	0.36	219.58	0.672	0.993	4-FFf	0.462	0.390	0.600	0.860	1.262	0.000
10-yr 24hr SCS	1.41	0.41	219.73	0.766	1.142	4-FFf	0.600	0.420	0.600	0.860	1.462	0.000
25-yr 24hr SCS	2.59	0.43	219.77	0.788	1.178	4-FFf	0.600	0.427	0.600	0.860	1.507	0.000
50-yr 24hr SCS	3.18	0.43	219.78	0.796	1.190	4-FFf	0.600	0.429	0.600	0.860	1.521	0.000
100-yr 24hr SCS	3.69	0.43	219.79	0.801	1.198	4-FFf	0.600	0.430	0.600	0.860	1.532	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.59 m, Outlet Elevation (invert): 218.29 m

Culvert Length: 24.40 m, Culvert Slope: 0.0123

****

Table 5 - Summary of Culvert Flows at Crossing: EX Crystal Beach Road

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	N 600 Discharge (cms)	400 Discharge (cms)	S 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.22	2-yr 24hr SCS	0.33	0.14	0.05	0.14	0.00	10
219.58	5-yr 24hr SCS	0.85	0.36	0.13	0.36	0.00	42
219.73	10-yr 24hr SCS	1.41	0.41	0.15	0.41	0.42	12
219.77	25-yr 24hr SCS	2.59	0.43	0.16	0.43	1.57	5
219.78	50-yr 24hr SCS	3.18	0.43	0.16	0.43	2.15	3
219.79	100-yr 24hr SCS	3.69	0.43	0.16	0.43	2.66	3
219.66	Overtopping	0.92	0.39	0.14	0.39	0.00	Overtopping

Outlet #3

HY-8 Culvert Analysis Report

Crossing Notes: EX Crystal Beach Road

Lake Simcoe Average March Water Level

Existing culverts crossing Crystal Beach Road modeled per survey collected by Tatham, June 2020. 2 - 600mm CSP and 1 - 400mm CSP. Analyzed for Lake Simcoe Water Level = 218.85 (Average March Level)

Culvert Data Summary - N 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Culvert Data Summary - 400

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Culvert Data Summary - S 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - EX Crystal Beach Road

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: EX Crystal Beach Road

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	63.00	219.75
3	68.00	219.77
4	79.00	219.77
5	90.00	219.72
6	112.00	219.72
7	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Culvert Summary Table: N 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.13	218.97	0.349	0.391	3-M1t	0.264	0.231	0.490	0.560	0.535	0.000
5-yr 24hr SCS	0.85	0.36	219.29	0.671	0.712	3-M2t	0.600	0.389	0.490	0.560	1.439	0.000
10-yr 24hr SCS	1.41	0.49	219.72	0.922	1.137	7-M2t	0.600	0.460	0.490	0.560	2.000	0.000
25-yr 24hr SCS	2.59	0.51	219.76	0.949	1.183	7-M2t	0.600	0.465	0.490	0.560	2.050	0.000
50-yr 24hr SCS	3.18	0.51	219.78	0.956	1.196	7-M2t	0.600	0.467	0.490	0.560	2.064	0.000
100-yr 24hr SCS	3.69	0.51	219.79	0.961	1.205	7-M2t	0.600	0.468	0.490	0.560	2.074	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.58 m, Outlet Elevation (invert): 218.36 m

Culvert Length: 24.40 m, Culvert Slope: 0.0090

****

Culvert Summary Table: 400

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.07	218.97	0.285	0.351	3-M1t	0.268	0.185	0.360	0.560	0.565	0.000
5-yr 24hr SCS	0.85	0.13	219.29	0.458	0.672	7-M2t	0.400	0.262	0.360	0.560	1.112	0.000
10-yr 24hr SCS	1.41	0.18	219.72	0.636	1.097	7-M2t	0.400	0.310	0.360	0.560	1.550	0.000
25-yr 24hr SCS	2.59	0.19	219.76	0.655	1.143	7-M2t	0.400	0.314	0.360	0.560	1.589	0.000
50-yr 24hr SCS	3.18	0.19	219.78	0.661	1.156	7-M2t	0.400	0.315	0.360	0.560	1.601	0.000
100-yr 24hr SCS	3.69	0.19	219.79	0.664	1.165	7-M2t	0.400	0.316	0.360	0.560	1.608	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.62 m, Outlet Elevation (invert): 218.49 m

Culvert Length: 24.40 m, Culvert Slope: 0.0053

****

Culvert Summary Table: S 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.13	218.97	0.346	0.381	3-M1t	0.240	0.230	0.560	0.560	0.476	0.000
5-yr 24hr SCS	0.85	0.36	219.29	0.680	0.702	7-M1t	0.469	0.393	0.560	0.560	1.319	0.000
10-yr 24hr SCS	1.41	0.50	219.72	0.943	1.127	7-M2t	0.600	0.464	0.560	0.560	1.837	0.000
25-yr 24hr SCS	2.59	0.52	219.76	0.971	1.173	7-M2t	0.600	0.470	0.560	0.560	1.883	0.000
50-yr 24hr SCS	3.18	0.52	219.78	0.978	1.186	7-M2t	0.600	0.472	0.560	0.560	1.896	0.000
100-yr 24hr SCS	3.69	0.52	219.79	0.984	1.195	7-M2t	0.600	0.473	0.560	0.560	1.906	0.000

****

Straight Culvert

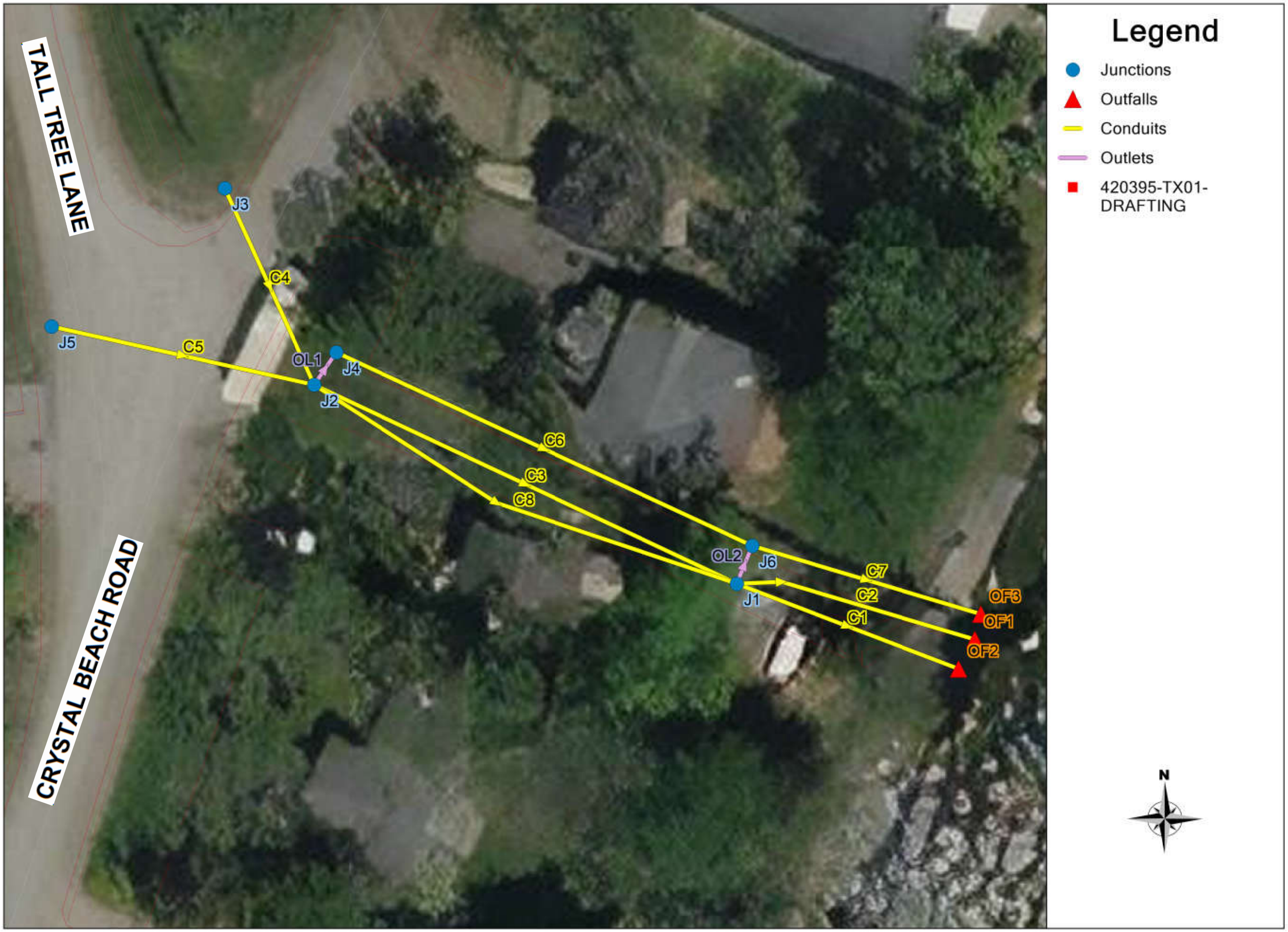
Inlet Elevation (invert): 218.59 m, Outlet Elevation (invert): 218.29 m

Culvert Length: 24.40 m, Culvert Slope: 0.0123

****

Summary of Culvert Flows at Crossing: EX Crystal Beach Road

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	N 600 Discharge (cms)	400 Discharge (cms)	S 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
218.97	2-yr 24hr SCS	0.33	0.13	0.07	0.13	0.00	8
219.29	5-yr 24hr SCS	0.85	0.36	0.13	0.36	0.00	4
219.72	10-yr 24hr SCS	1.41	0.49	0.18	0.50	0.22	17
219.76	25-yr 24hr SCS	2.59	0.51	0.19	0.52	1.36	5
219.78	50-yr 24hr SCS	3.18	0.51	0.19	0.52	1.95	4
219.79	100-yr 24hr SCS	3.69	0.51	0.19	0.52	2.46	3
219.66	Overtopping	1.14	0.48	0.18	0.49	0.00	Overtopping


TALL TREE LANE
CRYSTAL BEACH ROAD
J1
J2
J3
J4
J5
J6
C1
C2
C3
C4
C5
C6
C7
C8
OL1
OL2
OF1
OF2
OF3
Legend
Junctions
Outfalls
Conduits
Outlets
420395-TX01-DRAFTING
N

5-YR 24H SCS DESIGN STORM LAKE SIMCOE SEASONAL HWL

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

WARNING 04: minimum elevation drop used for Conduit C2

****
Element Count
****

Number of rain gages 0
Number of subcatchments ... 0
Number of nodes 9
Number of links 10
Number of pollutants 0
Number of land uses 0

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	218.75	1.06	0.0	
J2	JUNCTION	218.75	1.20	0.0	
J3	JUNCTION	219.04	1.06	0.0	Yes
J4	JUNCTION	219.75	0.50	0.0	
J5	JUNCTION	219.10	1.00	0.0	Yes
J6	JUNCTION	219.61	0.50	0.0	
OF1	OUTFALL	218.65	0.72	0.0	
OF2	OUTFALL	218.65	0.64	0.0	
OF3	OUTFALL	218.65	0.65	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF2	CONDUIT	18.7	0.3209	0.0130
C2	J1	OF1	CONDUIT	18.7	0.0016	0.0130
C3	J2	J1	CONDUIT	31.8	-0.1572	0.0130
C4	J3	J2	CONDUIT	18.5	-0.0541	0.0130
C5	J5	J2	CONDUIT	21.7	0.2304	0.0130
C6	J4	J6	CONDUIT	36.4	0.3842	0.0400
C7	J6	OF3	CONDUIT	19.1	4.2344	0.0400
C8	J2	J1	CONDUIT	31.8	-0.0629	0.0130
OL1	J2	J4	OUTLET			
OL2	J1	J6	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C2	CIRCULAR	0.30	0.07	0.07	0.30	1	0.00
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.04
C4	CIRCULAR	0.30	0.07	0.07	0.30	1	0.02
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C6	RECT_OPEN	0.50	1.25	0.36	2.50	1	0.98
C7	RECT_OPEN	0.50	1.25	0.36	2.50	1	3.24

```
C8               CIRCULAR             0.30     0.07     0.07     0.30        1     0.02


  *********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  *********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ NO
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 09/22/2020 00:00:00
  Ending Date .............. 09/23/2020 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001524 m


  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m       10^6 ltr
  **************************     ---------      ---------
  Dry Weather Inflow .......         0.000          0.000
  Wet Weather Inflow .......         0.000          0.000
  Groundwater Inflow .......         0.000          0.000
  RDII Inflow ..............         0.000          0.000
  External Inflow ..........         0.518          5.184
  External Outflow .........         0.518          5.176
  Flooding Loss ............         0.000          0.000
  Evaporation Loss .........         0.000          0.000
  Exfiltration Loss ........         0.000          0.000
  Initial Stored Volume ....         0.001          0.009
  Final Stored Volume ......         0.002          0.016
  Continuity Error (%) .....         0.025


  ***************************
  Time-Step Critical Elements
  ***************************
  Link C4 (99.63%)


  ********************************
  Highest Flow Instability Indexes
  ********************************
  All links are stable.
```

****
Routing Time Step Summary
****

Minimum Time Step	:	2.15 sec
Average Time Step	:	4.99 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.51	0.51	219.26	0 19:58	0.51
J2	JUNCTION	0.56	0.56	219.31	0 00:19	0.56
J3	JUNCTION	0.31	0.31	219.35	0 00:18	0.31
J4	JUNCTION	0.00	0.00	219.75	0 00:00	0.00
J5	JUNCTION	0.22	0.22	219.32	0 00:11	0.22
J6	JUNCTION	0.00	0.00	219.61	0 00:00	0.00
OF1	OUTFALL	0.53	0.53	219.18	0 23:54	0.53
OF2	OUTFALL	0.50	0.50	219.15	0 00:00	0.50
OF3	OUTFALL	0.50	0.50	219.15	0 00:00	0.50

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J1	JUNCTION	0.000	0.060	0 00:18	0	5.18	0.0
J2	JUNCTION	0.000	0.060	0 00:03	0	5.18	0.0
J3	JUNCTION	0.040	0.040	0 00:00	3.46	3.46	0.0
J4	JUNCTION	0.000	0.000	0 00:00	0	0	0.0
J5	JUNCTION	0.020	0.020	0 00:00	1.73	1.73	0.0
J6	JUNCTION	0.000	0.000	0 00:00	0	0	0.0
OF1	OUTFALL	0.000	0.021	0 23:54	0	1.83	0.0
OF2	OUTFALL	0.000	0.039	0 14:19	0	3.34	0.0
OF3	OUTFALL	0.000	0.000	0 00:00	0	0	0.0

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J3	JUNCTION	23.96	0.011	0.749

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	100.00	0.021	0.021	1.832
OF2	100.00	0.039	0.039	3.344
OF3	0.00	0.000	0.000	0.000
System	66.67	0.060	0.000	5.177

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.039	0 14:19	0.84	0.71	0.62
C2	CONDUIT	0.021	0 23:54	0.60	5.44	0.50
C3	CONDUIT	0.028	0 00:19	0.52	0.72	0.71
C4	CONDUIT	0.040	0 00:01	0.76	1.79	0.94
C5	CONDUIT	0.021	0 00:02	0.67	0.45	0.81
C6	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C7	CONDUIT	0.000	0 00:00	0.00	0.00	0.35
C8	CONDUIT	0.032	0 00:18	0.58	1.34	0.76
OL1	DUMMY	0.000	0 00:00			
OL2	DUMMY	0.000	0 00:00			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	---------- Fraction of Time in Flow Class ---------- Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C2	0.01	0.01	0.01	23.98	0.01
C4	0.01	0.01	23.96	23.99	0.01
C8	0.01	0.01	0.01	23.97	0.01

Analysis begun on: Mon May 10 21:30:08 2021
Analysis ended on: Mon May 10 21:30:08 2021
Total elapsed time: < 1 sec

50-YR 24H SCS DESIGN STORM - LAKE SIMCOE SEASONAL HWL

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

WARNING 04: minimum elevation drop used for Conduit C2

****
Element Count
****
Number of rain gages 0
Number of subcatchments ... 0
Number of nodes 9
Number of links 10
Number of pollutants 0
Number of land uses 0

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	218.75	1.06	0.0	
J2	JUNCTION	218.75	1.20	0.0	
J3	JUNCTION	219.04	1.06	0.0	Yes
J4	JUNCTION	219.75	0.50	0.0	
J5	JUNCTION	219.10	1.00	0.0	Yes
J6	JUNCTION	219.61	0.50	0.0	
OF1	OUTFALL	218.65	0.72	0.0	
OF2	OUTFALL	218.65	0.64	0.0	
OF3	OUTFALL	218.65	0.65	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF2	CONDUIT	18.7	0.3209	0.0130
C2	J1	OF1	CONDUIT	18.7	0.0016	0.0130
C3	J2	J1	CONDUIT	31.8	-0.1572	0.0130
C4	J3	J2	CONDUIT	18.5	-0.0541	0.0130
C5	J5	J2	CONDUIT	21.7	0.2304	0.0130
C6	J4	J6	CONDUIT	36.4	0.3842	0.0400
C7	J6	OF3	CONDUIT	19.1	4.2344	0.0400
C8	J2	J1	CONDUIT	31.8	-0.0629	0.0130
OL1	J2	J4	OUTLET			
OL2	J1	J6	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C2	CIRCULAR	0.30	0.07	0.07	0.30	1	0.00
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.04
C4	CIRCULAR	0.30	0.07	0.07	0.30	1	0.02
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C6	RECT_OPEN	0.50	1.25	0.36	2.50	1	0.98
C7	RECT_OPEN	0.50	1.25	0.36	2.50	1	3.24

```
C8               CIRCULAR             0.30     0.07     0.07     0.30        1     0.02


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 09/22/2020 00:00:00
Ending Date .............. 09/23/2020 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001524 m


**************************        Volume         Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.000         0.000
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         1.296        12.959
External Outflow .........         1.295        12.946
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.001         0.009
Final Stored Volume ......         0.002         0.018
Continuity Error (%) .....         0.033


***************************
Time-Step Critical Elements
***************************
Link C1 (99.88%)


********************************
Highest Flow Instability Indexes
********************************
All links are stable.
```

****
Routing Time Step Summary
****

Minimum Time Step	:	3.06 sec
Average Time Step	:	4.45 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.01
Percent Not Converging	:	0.03

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.71	0.71	219.46	0 02:23	0.71
J2	JUNCTION	0.90	0.90	219.65	0 07:29	0.90
J3	JUNCTION	0.81	0.81	219.85	0 20:37	0.81
J4	JUNCTION	0.00	0.00	219.75	0 00:00	0.00
J5	JUNCTION	0.65	0.65	219.75	1 00:00	0.65
J6	JUNCTION	0.00	0.00	219.61	0 00:00	0.00
OF1	OUTFALL	0.62	0.62	219.27	0 14:09	0.62
OF2	OUTFALL	0.56	0.56	219.21	0 00:23	0.56
OF3	OUTFALL	0.50	0.50	219.15	0 00:00	0.50

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J1	JUNCTION	0.000	0.150	0 16:55	0	12.9	0.0
J2	JUNCTION	0.000	0.151	0 00:00	0	13	0.0
J3	JUNCTION	0.090	0.090	0 00:00	7.78	7.78	0.0
J4	JUNCTION	0.000	0.000	0 00:00	0	0	0.0
J5	JUNCTION	0.060	0.060	0 00:00	5.18	5.18	0.0
J6	JUNCTION	0.000	0.000	0 00:00	0	0	0.0
OF1	OUTFALL	0.000	0.067	0 17:41	0	5.8	0.0
OF2	OUTFALL	0.000	0.083	0 00:23	0	7.14	0.0
OF3	OUTFALL	0.000	0.000	0 00:00	0	0	0.0

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J3	JUNCTION	24.00	0.511	0.249
J5	JUNCTION	23.98	0.353	0.347

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	100.00	0.067	0.067	5.803
OF2	100.00	0.083	0.083	7.143
OF3	0.00	0.000	0.000	0.000
System	66.67	0.150	0.000	12.946

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.083	0 00:23	1.26	1.51	0.87
C2	CONDUIT	0.067	0 17:41	1.06	17.22	0.84
C3	CONDUIT	0.074	0 00:42	1.05	1.93	1.00
C4	CONDUIT	0.093	0 00:00	1.38	4.13	1.00
C5	CONDUIT	0.061	0 00:00	0.97	1.30	1.00
C6	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
C7	CONDUIT	0.000	0 00:00	0.00	0.00	0.35
C8	CONDUIT	0.076	0 16:55	1.07	3.13	1.00
OL1	DUMMY	0.000	0 00:00			
OL2	DUMMY	0.000	0 00:00			

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	0.01	23.98	0.01	23.98	0.01
C2	0.01	23.97	0.01	23.99	0.01
C3	23.97	23.97	23.98	23.98	0.01
C4	23.98	23.98	24.00	24.00	0.01
C5	23.98	23.98	23.98	23.99	23.98
C8	23.97	23.97	23.98	23.99	0.01

Analysis begun on: Mon May 10 21:29:25 2021
Analysis ended on: Mon May 10 21:29:25 2021
Total elapsed time: < 1 sec

100-YR 24H SCS DESIGN STORM - LAKE SIMCOE SEASONAL HWL

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.014)

WARNING 04: minimum elevation drop used for Conduit C2

****
Element Count
****

Number of rain gages 0
Number of subcatchments ... 0
Number of nodes 9
Number of links 10
Number of pollutants 0
Number of land uses 0

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	218.75	1.06	0.0	
J2	JUNCTION	218.75	1.20	0.0	
J3	JUNCTION	219.04	1.06	0.0	Yes
J4	JUNCTION	219.75	0.50	0.0	
J5	JUNCTION	219.10	1.00	0.0	Yes
J6	JUNCTION	219.61	0.50	0.0	
OF1	OUTFALL	218.65	0.72	0.0	
OF2	OUTFALL	218.65	0.64	0.0	
OF3	OUTFALL	218.65	0.65	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF2	CONDUIT	18.7	0.3209	0.0130
C2	J1	OF1	CONDUIT	18.7	0.0016	0.0130
C3	J2	J1	CONDUIT	31.8	-0.1572	0.0130
C4	J3	J2	CONDUIT	18.5	-0.0541	0.0130
C5	J5	J2	CONDUIT	21.7	0.2304	0.0130
C6	J4	J6	CONDUIT	36.4	0.3842	0.0400
C7	J6	OF3	CONDUIT	19.1	4.2344	0.0400
C8	J2	J1	CONDUIT	31.8	-0.0629	0.0130
OL1	J2	J4	OUTLET			
OL2	J1	J6	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C2	CIRCULAR	0.30	0.07	0.07	0.30	1	0.00
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.04
C4	CIRCULAR	0.30	0.07	0.07	0.30	1	0.02
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C6	RECT_OPEN	0.50	1.25	0.36	2.50	1	0.98
C7	RECT_OPEN	0.50	1.25	0.36	2.50	1	3.24

```
C8               CIRCULAR             0.30     0.07     0.07     0.30        1     0.02


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 09/22/2020 00:00:00
Ending Date .............. 09/23/2020 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001524 m


**************************        Volume         Volume
Flow Routing Continuity         hectare-m      10^6 ltr
**************************       ---------      ---------
Dry Weather Inflow .......          0.000          0.000
Wet Weather Inflow .......          0.000          0.000
Groundwater Inflow .......          0.000          0.000
RDII Inflow ..............          0.000          0.000
External Inflow ..........          1.469         14.687
External Outflow .........          1.464         14.640
Flooding Loss ............          0.000          0.000
Evaporation Loss .........          0.000          0.000
Exfiltration Loss ........          0.000          0.000
Initial Stored Volume ....          0.001          0.009
Final Stored Volume ......          0.002          0.019
Continuity Error (%) .....          0.250


*************************
Highest Continuity Errors
*************************
Node J4 (-3.75%)


***************************
Time-Step Critical Elements
***************************
Link C1 (99.89%)
```

****
Highest Flow Instability Indexes
****
Link C4 (150)
Link OL1 (150)
Link C5 (150)
Link C6 (149)
Link C3 (149)

****
Routing Time Step Summary
****

Minimum Time Step	:	2.84 sec
Average Time Step	:	4.21 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	4.97
Percent Not Converging	:	0.02

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.76	0.76	219.51	0 14:19	0.76
J2	JUNCTION	1.01	1.01	219.76	0 06:53	1.01
J3	JUNCTION	0.96	0.97	220.01	0 14:44	0.97
J4	JUNCTION	0.01	0.01	219.76	0 03:11	0.01
J5	JUNCTION	0.79	0.80	219.90	0 00:19	0.80
J6	JUNCTION	0.00	0.00	219.61	1 00:00	0.00
OF1	OUTFALL	0.64	0.64	219.29	0 02:18	0.64
OF2	OUTFALL	0.58	0.58	219.23	0 02:32	0.58
OF3	OUTFALL	0.50	0.50	219.15	0 00:00	0.50

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J1	JUNCTION	0.000	0.170	0 08:46	0	14.6	0.0
J2	JUNCTION	0.000	0.171	0 00:00	0	14.7	0.2
J3	JUNCTION	0.100	0.100	0 00:00	8.64	8.64	0.0
J4	JUNCTION	0.000	0.002	0 00:03	0	0.0635	-3.6
J5	JUNCTION	0.070	0.070	0 00:00	6.05	6.05	-0.0
J6	JUNCTION	0.000	0.001	0 03:34	0	0.0659	0.1
OF1	OUTFALL	0.000	0.078	0 11:50	0	6.7	0.0
OF2	OUTFALL	0.000	0.092	0 08:26	0	7.94	0.0
OF3	OUTFALL	0.000	0.000	1 00:00	0	0.00604	0.0

****
Node Surcharge Summary

****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J2	JUNCTION	23.95	0.015	0.185
J3	JUNCTION	24.00	0.668	0.092
J5	JUNCTION	23.99	0.496	0.204

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	100.00	0.078	0.078	6.697
OF2	100.00	0.092	0.092	7.937
OF3	99.22	0.000	0.000	0.006
System	99.74	0.169	0.000	14.641

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.092	0 08:26	1.38	1.68	0.89
C2	CONDUIT	0.078	0 11:50	1.20	19.88	0.86
C3	CONDUIT	0.084	0 08:46	1.18	2.18	1.00
C4	CONDUIT	0.101	0 00:00	1.49	4.51	1.00
C5	CONDUIT	0.071	0 00:00	1.06	1.52	1.00
C6	CONDUIT	0.001	0 03:34	0.05	0.00	0.01
C7	CONDUIT	0.000	1 00:00	0.00	0.00	0.35
C8	CONDUIT	0.085	0 08:46	1.21	3.52	1.00
OL1	DUMMY	0.002	0 00:03			
OL2	DUMMY	0.001	0 02:01			

****
Flow Classification Summary
****

	Adjusted /Actual	---------- Fraction of Time in Flow Class ---------- Up	Down	Sub	Sup	Up	Down	Norm	Inlet

Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours	Hours
Conduit	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	0.01	23.98	0.01	23.98	0.01
C2	0.01	23.98	0.01	23.99	0.01
C3	23.98	23.98	23.99	23.99	0.01
C4	23.99	23.99	24.00	24.00	0.01
C5	23.99	23.99	23.99	23.99	23.99
C8	23.98	23.98	23.99	23.99	0.01

Analysis begun on: Mon May 10 21:23:19 2021
Analysis ended on: Mon May 10 21:23:19 2021
Total elapsed time: < 1 sec

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
Roadside Ditch - Crystal Beach Road STA. 1+465 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.005	m/m
BOTTOM WIDTH	0.0	
RIGHT SIDE SLOPE	3.5	:1 H:V
LEFT SIDE SLOPE	5.0	:1 H:V
DEPTH	0.16	m
AREA	0.109	m^2
WETTED PERIMETER	1.398	m
HYDRAULIC RADIUS	0.078	m
FLOW CAPACITY	0.035	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Existing
Roadside Ditch - Crystal Beach Road STA. 1+530 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.008	m/m
BOTTOM WIDTH	0.0	
RIGHT SIDE SLOPE	3.0	:1 H:V
LEFT SIDE SLOPE	7.0	:1 H:V
DEPTH	0.25	m
AREA	0.313	m^2
WETTED PERIMETER	2.558	m
HYDRAULIC RADIUS	0.122	m
FLOW CAPACITY	0.172	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
W Roadside Ditch - Buchanan Street STA. 2+050 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	6.0	:1 H:V	
LEFT SIDE SLOPE	3.6	:1 H:V	
DEPTH	0.13	m	
AREA	0.081	m^2	
WETTED PERIMETER	1.276	m	
HYDRAULIC RADIUS	0.064	m	
FLOW CAPACITY	0.023	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
W Roadside Ditch - Buchanan Street STA. 2+205 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.009	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	12.5	:1 H:V	
LEFT SIDE SLOPE	12.5	:1 H:V	
DEPTH	0.07	m	
AREA	0.061	m^2	
WETTED PERIMETER	1.756	m	
HYDRAULIC RADIUS	0.035	m	
FLOW CAPACITY	0.016	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
W Roadside Ditch - Buchanan Street STA. 2+310 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.001	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	2.4	:1 H:V	
LEFT SIDE SLOPE	8.7	:1 H:V	
DEPTH	0.11	m	
AREA	0.067	m^2	
WETTED PERIMETER	1.249	m	
HYDRAULIC RADIUS	0.054	m	
FLOW CAPACITY	0.008	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
E Roadside Ditch - Buchanan Street STA. 2+080 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.01	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	4.0	:1 H:V	
LEFT SIDE SLOPE	9.0	:1 H:V	
DEPTH	0.10	m	
AREA	0.065	m^2	
WETTED PERIMETER	1.318	m	
HYDRAULIC RADIUS	0.049	m	
FLOW CAPACITY	0.022	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
W Roadside Ditch - Tall Tree Lane STA. 3+080 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.002	m/m
BOTTOM WIDTH	0.00	
RIGHT SIDE SLOPE	3.0	:1 H:V
LEFT SIDE SLOPE	2.5	:1 H:V
DEPTH	0.29	m

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

AREA	0.231	m^2
WETTED PERIMETER	1.698	m
HYDRAULIC RADIUS	0.136	m
FLOW CAPACITY	0.068	m^3/s

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
E Roadside Ditch - Tall Tree Lane STA. 3+050 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.002	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	4.0	:1 H:V	
LEFT SIDE SLOPE	5.0	:1 H:V	
DEPTH	0.19	m	
AREA	0.162	m^2	
WETTED PERIMETER	1.752	m	
HYDRAULIC RADIUS	0.093	m	
FLOW CAPACITY	0.037	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing
E Roadside Ditch - Tall Tree Lane STA. 3+160

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.009	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	4.3	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.34	m	
AREA	0.422	m^2	
WETTED PERIMETER	2.576	m	
HYDRAULIC RADIUS	0.164	m	
FLOW CAPACITY	0.300	m^3/s	

Existing
E Roadside Ditch - Tall Tree Lane STA. 3+205

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.008	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	2.5	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.24	m	
AREA	0.158	m^2	
WETTED PERIMETER	1.405	m	
HYDRAULIC RADIUS	0.113	m	
FLOW CAPACITY	0.083	m^3/s	

HY-8 Culvert Analysis Report – Existing Ditches Limiting Culvert Capacity Calculations

Note: Most calculations set roadway crest as highest upstream ditch top of bank elevation such that capacity at overtopping represents full ditch headwater condition. Calculations neglect tailwater effects from features other than Lake Simcoe.

Crossing Notes: 2360 CBR (1+500 to 1+560)

Reference - Limiting culvert capacity for Crystal Beach Road West Roadside Ditch STA 1+500 to STA 1+560

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2360 CBR (1+500 to 1+560)

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.50 m

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0030

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.39 m

Roadway Data for Crossing: 2360 CBR (1+500 to 1+560)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.06
1	2.50	219.88
2	7.00	219.90

Roadway Surface: Gravel

Roadway Top Width: 6.50 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.39	0.000	0.200	0-NF	0.000	0.000	0.080	0.000	0.000	0.000
0.05	0.05	219.60	0.244	0.406	7-A2t	-0.305	0.158	0.244	0.164	0.622	0.307
0.10	0.10	219.65	0.374	0.461	7-A2t	-0.305	0.227	0.309	0.229	0.960	0.368
0.10	0.10	219.65	0.374	0.461	7-A2t	-0.305	0.227	0.309	0.229	0.960	0.368
0.20	0.20	219.89	0.699	0.642	7-A2t	-0.305	0.321	0.395	0.315	1.562	0.440
0.25	0.21	219.92	0.734	1.026	4-FFf	-0.305	0.327	0.400	0.348	1.644	0.466
0.30	0.21	219.95	0.740	1.061	4-FFf	-0.305	0.328	0.400	0.377	1.654	0.488
0.35	0.21	219.96	0.740	1.087	4-FFf	-0.305	0.328	0.400	0.403	1.654	0.508
0.40	0.21	219.98	0.740	1.111	4-FFf	-0.305	0.328	0.400	0.427	1.654	0.526
0.45	0.21	219.99	0.740	1.134	4-FFf	-0.305	0.328	0.400	0.450	1.654	0.541
0.50	0.21	220.00	0.740	1.155	4-FFf	-0.305	0.328	0.400	0.470	1.654	0.556

****

Straight Culvert

Inlet Elevation (invert): 219.19 m, Outlet Elevation (invert): 219.31 m

Culvert Length: 6.50 m, Culvert Slope: -0.0185

****

Summary of Culvert Flows at Crossing: 2360 CBR (1+500 to 1+560)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.39	0.00	0.00	0.00	1
219.60	0.05	0.05	0.00	1
219.65	0.10	0.10	0.00	1
219.65	0.10	0.10	0.00	1
219.89	0.20	0.20	0.00	21
219.92	0.25	0.21	0.04	7
219.95	0.30	0.21	0.09	5
219.96	0.35	0.21	0.14	4
219.98	0.40	0.21	0.19	4
219.99	0.45	0.21	0.24	4
220.00	0.50	0.21	0.29	3
219.88	0.20	0.20	0.00	Overtopping

Crossing Notes: Buchanan @ CBR (2+020 to 2+085)

Reference - Limiting culvert capacity for Buchanan Street West Roadside Ditch STA 2+020 to STA 2+085

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Buchanan @ CBR (2+020 to 2+085)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.23 m

Roadway Data for Crossing: Buchanan @ CBR (2+020 to 2+085)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.53 m

Roadway Surface: Paved

Roadway Top Width: 6.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.23	0.000	0.060	0-NF	0.000	0.000	0.130	0.000	0.000	0.000
0.05	0.05	219.46	0.238	0.290	3-M1t	0.181	0.158	0.314	0.184	0.472	0.492
0.10	0.08	219.55	0.326	0.385	3-M1t	0.250	0.207	0.369	0.239	0.692	0.585
0.10	0.08	219.55	0.326	0.385	3-M1t	0.250	0.207	0.369	0.239	0.692	0.585
0.20	0.10	219.58	0.364	0.482	4-FFf	0.282	0.225	0.400	0.310	0.785	0.696
0.25	0.10	219.60	0.379	0.523	4-FFf	0.295	0.231	0.400	0.337	0.830	0.736
0.30	0.11	219.61	0.391	0.558	4-FFf	0.307	0.237	0.400	0.360	0.866	0.770
0.35	0.11	219.63	0.403	0.591	4-FFf	0.320	0.242	0.400	0.382	0.902	0.800
0.40	0.12	219.64	0.416	0.623	4-FFf	0.400	0.247	0.400	0.401	0.940	0.827
0.45	0.12	219.66	0.432	0.657	4-FFf	0.400	0.253	0.400	0.420	0.985	0.852
0.50	0.13	219.67	0.442	0.684	4-FFf	0.400	0.257	0.400	0.436	1.012	0.875

****

Straight Culvert

Inlet Elevation (invert): 219.17 m, Outlet Elevation (invert): 219.10 m

Culvert Length: 7.00 m, Culvert Slope: 0.0100

****

Summary of Culvert Flows at Crossing: Buchanan @ CBR (2+020 to 2+085)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.23	0.00	0.00	0.00	1
219.46	0.05	0.05	0.00	1
219.55	0.10	0.08	0.02	13
219.55	0.10	0.08	0.02	2
219.58	0.20	0.10	0.10	5
219.60	0.25	0.10	0.15	4
219.61	0.30	0.11	0.19	3
219.63	0.35	0.11	0.24	4
219.64	0.40	0.12	0.28	6
219.66	0.45	0.12	0.33	7
219.67	0.50	0.13	0.38	11
219.53	0.08	0.08	0.00	Overtopping

Crossing Notes: 2370 Buchanan W(2+190 to 2+250)

Reference - Limiting culvert capacity for Buchanan Street West Roadside Ditch STA 2+190 to 2+250.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2370 Buchanan W(2+190 to 2+250)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.60 m

Roadway Data for Crossing: 2370 Buchanan W(2+190 to 2+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.83 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.62	0.000	0.000	0-NF	0.000	0.000	0.150	0.000	0.000	0.000
0.03	0.03	219.83	0.193	0.213	1-S1f	0.114	0.129	0.300	0.173	0.404	0.334
0.06	0.03	219.85	0.214	0.257	1-S1f	0.125	0.141	0.300	0.224	0.476	0.397
0.09	0.04	219.87	0.229	0.300	1-S1f	0.133	0.149	0.300	0.261	0.529	0.439
0.10	0.04	219.88	0.236	0.316	1-S1f	0.137	0.153	0.300	0.272	0.556	0.451
0.15	0.05	219.92	0.276	0.397	4-FFf	0.156	0.171	0.300	0.316	0.699	0.499
0.18	0.05	219.94	0.295	0.439	4-FFf	0.165	0.179	0.300	0.339	0.766	0.523
0.21	0.06	219.96	0.311	0.477	4-FFf	0.173	0.186	0.300	0.359	0.821	0.543
0.24	0.06	219.98	0.326	0.512	4-FFf	0.179	0.192	0.300	0.377	0.867	0.562
0.27	0.06	220.00	0.337	0.542	4-FFf	0.184	0.195	0.300	0.394	0.903	0.578
0.30	0.07	220.01	0.348	0.571	4-FFf	0.189	0.199	0.300	0.410	0.939	0.594

****

Straight Culvert

Inlet Elevation (invert): 219.62 m, Outlet Elevation (invert): 219.45 m

Culvert Length: 6.00 m, Culvert Slope: 0.0283

****

Summary of Culvert Flows at Crossing: 2370 Buchanan W(2+190 to 2+250)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.62	0.00	0.00	0.00	1
219.83	0.03	0.03	0.00	32
219.85	0.06	0.03	0.03	9
219.87	0.09	0.04	0.05	8
219.88	0.10	0.04	0.06	9
219.92	0.15	0.05	0.10	10
219.94	0.18	0.05	0.13	5
219.96	0.21	0.06	0.15	6
219.98	0.24	0.06	0.18	7
220.00	0.27	0.06	0.21	7
220.01	0.30	0.07	0.23	4
219.83	0.03	0.03	0.00	Overtopping

Crossing Notes: 2384 Buchanan W(2+260 to 2+340)

Reference - Limiting culvert capacity for Buchanan Street West Roadside Ditch STA 2+260 to 2+340.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2384 Buchanan W(2+260 to 2+340)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.57 m

Roadway Data for Crossing: 2384 Buchanan W(2+260 to 2+340)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.68 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.57	0.000	0.120	0-NF	0.000	0.000	0.080	0.000	0.000	0.000
0.03	0.03	219.68	0.178	0.233	7-A2c	-0.305	0.117	0.117	0.000	0.933	0.000
0.06	0.03	219.70	0.196	0.254	7-A2c	-0.305	0.129	0.129	0.000	0.976	0.000
0.09	0.04	219.72	0.208	0.268	7-A2c	-0.305	0.137	0.137	0.000	1.006	0.000
0.10	0.04	219.72	0.212	0.271	7-A2c	-0.305	0.140	0.140	0.000	1.014	0.000
0.15	0.05	219.74	0.229	0.290	7-A2c	-0.305	0.150	0.150	0.000	1.061	0.000
0.18	0.05	219.75	0.237	0.299	7-A2c	-0.305	0.155	0.155	0.000	1.078	0.000
0.21	0.05	219.76	0.246	0.308	7-A2c	-0.305	0.161	0.161	0.000	1.095	0.000
0.24	0.05	219.77	0.254	0.317	7-A2c	-0.305	0.165	0.165	0.000	1.112	0.000
0.27	0.06	219.77	0.261	0.325	7-A2c	-0.305	0.170	0.170	0.000	1.127	0.000
0.30	0.06	219.78	0.268	0.333	7-A2c	-0.305	0.174	0.174	0.000	1.142	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.45 m,   Outlet Elevation (invert): 219.49 m

Culvert Length: 6.00 m,   Culvert Slope: -0.0067

****

Summary of Culvert Flows at Crossing: 2384 Buchanan W(2+260 to 2+340)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.57	0.00	0.00	0.00	1
219.68	0.03	0.03	0.00	30
219.70	0.06	0.03	0.03	6
219.72	0.09	0.04	0.05	5
219.72	0.10	0.04	0.06	3
219.74	0.15	0.05	0.10	4
219.75	0.18	0.05	0.13	3
219.76	0.21	0.05	0.16	3
219.77	0.24	0.05	0.19	3
219.77	0.27	0.06	0.21	3
219.78	0.30	0.06	0.24	3
219.68	0.03	0.03	0.00	Overtopping

Crossing Notes: 2362 TTL (3+020 to 3+105)

Reference - Limiting culvert capacity for Tall Tree Lane West Roadside Ditch STA 3+020 to STA 3+105.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2362 TTL (3+020 to 3+105)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.36 m

Roadway Data for Crossing: 2362 TTL (3+020 to 3+105)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.60 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.36	0.000	0.150	0-NF	0.000	0.000	0.100	0.000	0.000	0.000
0.05	0.04	219.61	0.215	0.410	7-A2t	-0.305	0.142	0.349	0.249	0.350	0.269
0.10	0.08	219.68	0.326	0.562	4-FFf	-0.305	0.206	0.400	0.323	0.655	0.320
0.10	0.08	219.68	0.326	0.562	4-FFf	-0.305	0.206	0.400	0.323	0.655	0.320
0.20	0.09	219.78	0.348	0.677	4-FFf	-0.305	0.216	0.400	0.419	0.724	0.381
0.25	0.10	219.82	0.376	0.742	4-FFf	-0.305	0.229	0.400	0.455	0.811	0.402
0.30	0.11	219.85	0.395	0.794	4-FFf	-0.305	0.238	0.400	0.487	0.868	0.421
0.35	0.12	219.88	0.414	0.844	4-FFf	-0.305	0.245	0.400	0.516	0.925	0.438
0.40	0.12	219.91	0.432	0.890	4-FFf	-0.305	0.252	0.400	0.543	0.975	0.453
0.45	0.13	219.93	0.448	0.934	4-FFf	-0.305	0.258	0.400	0.567	1.021	0.466
0.50	0.13	219.95	0.463	0.975	4-FFf	-0.305	0.263	0.400	0.590	1.062	0.478

****

Straight Culvert

Inlet Elevation (invert): 219.21 m, Outlet Elevation (invert): 219.26 m

Culvert Length: 9.00 m, Culvert Slope: -0.0056

****

Summary of Culvert Flows at Crossing: 2362 TTL (3+020 to 3+105)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.36	0.00	0.00	0.00	1
219.61	0.05	0.04	0.01	12
219.68	0.10	0.08	0.02	21
219.68	0.10	0.08	0.02	2
219.78	0.20	0.09	0.11	11
219.82	0.25	0.10	0.15	8
219.85	0.30	0.11	0.19	7
219.88	0.35	0.12	0.23	6
219.91	0.40	0.12	0.28	6
219.93	0.45	0.13	0.32	7
219.95	0.50	0.13	0.37	4
219.60	0.04	0.04	0.00	Overtopping

Crossing Notes: 2383 TTL (3+150 to 3+180)

Reference - Limiting culvert capacity for Tall Tree Lane East Roadside Ditch STA 3+150 to 3+180.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2383 TTL (3+150 to 3+180)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: 2383 TTL (3+150 to 3+180)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.66 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.35	0.000	0.080	0-NF	0.000	0.000	0.000	-0.200	0.000	0.000
0.05	0.05	219.61	0.242	0.343	7-A2c	-0.305	0.158	0.158	-0.200	1.086	0.000
0.10	0.07	219.68	0.305	0.414	7-A2c	-0.305	0.194	0.194	-0.200	1.218	0.000
0.10	0.07	219.68	0.305	0.414	7-A2c	-0.305	0.194	0.194	-0.200	1.218	0.000
0.20	0.09	219.72	0.349	0.451	7-A2c	-0.305	0.217	0.217	-0.200	1.314	0.000
0.25	0.10	219.73	0.378	0.464	7-A2c	-0.305	0.229	0.229	-0.200	1.375	0.000
0.30	0.11	219.75	0.404	0.477	7-A2c	-0.305	0.241	0.241	-0.200	1.418	0.000
0.35	0.12	219.76	0.427	0.489	7-A2c	-0.305	0.250	0.250	-0.200	1.460	0.000
0.40	0.13	219.77	0.448	0.501	7-A2c	-0.305	0.258	0.258	-0.200	1.498	0.000
0.45	0.14	219.78	0.469	0.512	7-A2c	-0.305	0.266	0.266	-0.200	1.525	0.000
0.50	0.14	219.79	0.488	0.523	7-A2c	-0.305	0.272	0.272	-0.200	1.555	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.27 m, Outlet Elevation (invert): 219.35 m

Culvert Length: 8.50 m, Culvert Slope: -0.0094

****

Summary of Culvert Flows at Crossing: 2383 TTL (3+150 to 3+180)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.35	0.00	0.00	0.00	1
219.61	0.05	0.05	0.00	1
219.68	0.10	0.07	0.03	12
219.68	0.10	0.07	0.03	2
219.72	0.20	0.09	0.11	5
219.73	0.25	0.10	0.15	4
219.75	0.30	0.11	0.19	4
219.76	0.35	0.12	0.23	4
219.77	0.40	0.13	0.27	4
219.78	0.45	0.14	0.31	4
219.79	0.50	0.14	0.36	4
219.66	0.07	0.07	0.00	Overtopping

Crossing Notes: 2387 TTL (3+180 to 3+235)

Reference - Limiting culvert capacity for Tall Tree Lane East Roadside Ditch STA 3+180 to 3+235.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2387 TTL (3+180 to 3+235)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0001

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.41 m

Roadway Data for Crossing: 2387 TTL (3+180 to 3+235)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.47 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.41	0.000	0.260	0-NF	0.000	0.000	0.200	0.000	0.000	0.000
0.05	0.04	219.85	0.221	0.721	4-FFf	-0.305	0.145	0.400	0.436	0.342	0.087
0.10	0.07	219.98	0.298	0.894	4-FFf	-0.305	0.191	0.400	0.566	0.568	0.104
0.10	0.07	219.98	0.298	0.894	4-FFf	-0.305	0.191	0.400	0.566	0.568	0.104
0.20	0.11	220.14	0.391	1.148	4-FFf	-0.305	0.235	0.400	0.734	0.856	0.124
0.25	0.12	220.21	0.425	1.251	4-FFf	-0.305	0.250	0.400	0.798	0.957	0.131
0.30	0.13	220.27	0.457	1.344	4-FFf	-0.305	0.261	0.400	0.855	1.044	0.137
0.35	0.14	220.32	0.485	1.429	4-FFf	-0.305	0.271	0.400	0.905	1.120	0.142
0.40	0.15	220.36	0.511	1.508	4-FFf	-0.305	0.279	0.400	0.952	1.187	0.147
0.45	0.16	220.41	0.536	1.582	4-FFf	-0.305	0.286	0.400	0.995	1.247	0.152
0.50	0.16	220.45	0.560	1.651	4-FFf	-0.305	0.292	0.400	1.035	1.302	0.156

****

Straight Culvert

Inlet Elevation (invert): 219.15 m, Outlet Elevation (invert): 219.21 m

Culvert Length: 9.20 m, Culvert Slope: -0.0065

****

Summary of Culvert Flows at Crossing: 2387 TTL (3+180 to 3+235)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.41	0.00	0.00	0.00	1
219.85	0.05	0.04	0.01	3
219.98	0.10	0.07	0.03	70
219.98	0.10	0.07	0.03	4
220.14	0.20	0.11	0.09	49
220.21	0.25	0.12	0.13	18
220.27	0.30	0.13	0.17	16
220.32	0.35	0.14	0.21	16
220.36	0.40	0.15	0.25	15
220.41	0.45	0.16	0.29	16
220.45	0.50	0.16	0.34	6
219.47	0.00	0.00	0.00	Overtopping

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Crystal Beach Road - W Ditch STA 1+440 to 1+500

Catchment ID:	102	
Catchment Area (ha):	0.10	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.02	0.02	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.009	m^3/s
5YR	0.012	m^3/s
10YR	0.014	m^3/s
25YR	0.018	m^3/s
50YR	0.022	m^3/s
100YR	0.025	m^3/s

Rational Method Calculation

TATHAM ENGINEERING

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Crystal Beach Road - W Ditch STA 1+500 to 1+560

Catchment ID:	103	
Catchment Area (ha):	0.15	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.02	0.02	0.03	0.03	0.04

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.014	m^3/s
5YR	0.018	m^3/s
10YR	0.021	m^3/s
25YR	0.027	m^3/s
50YR	0.033	m^3/s
100YR	0.038	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Crystal Beach Road - W Ditch STA 1+580 to 1+670

Catchment ID:	104	
Catchment Area (ha):	0.40	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.04	0.05	0.06	0.07	0.09	0.10

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.037	m^3/s
5YR	0.048	m^3/s
10YR	0.056	m^3/s
25YR	0.072	m^3/s
50YR	0.088	m^3/s
100YR	0.100	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Crystal Beach Road - W Ditch STA 1+670 to 1+810

Catchment ID:	105	
Catchment Area (ha):	0.56	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.05	0.07	0.08	0.10	0.12	0.14

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.052	m^3/s
5YR	0.068	m^3/s
10YR	0.079	m^3/s
25YR	0.101	m^3/s
50YR	0.123	m^3/s
100YR	0.140	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+020 to 2+190

Catchment ID:	201	
Catchment Area (ha):	0.43	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.04	0.05	0.06	0.08	0.09	0.11

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.040	m^3/s
5YR	0.052	m^3/s
10YR	0.060	m^3/s
25YR	0.078	m^3/s
50YR	0.094	m^3/s
100YR	0.108	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+190 to 2+250

Catchment ID:	202	
Catchment Area (ha):	0.11	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.02	0.02	0.02	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.010	m^3/s
5YR	0.013	m^3/s
10YR	0.015	m^3/s
25YR	0.020	m^3/s
50YR	0.024	m^3/s
100YR	0.028	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+260 to 2+340

Catchment ID:	203	
Catchment Area (ha):	0.21	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.02	0.03	0.03	0.04	0.05	0.05

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.019	m^3/s
5YR	0.025	m^3/s
10YR	0.030	m^3/s
25YR	0.038	m^3/s
50YR	0.046	m^3/s
100YR	0.053	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - E Ditch STA 2+020 to 2+160

Catchment ID:	204	
Catchment Area (ha):	0.28	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.03	0.03	0.04	0.05	0.06	0.07

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.026	m^3/s
5YR	0.034	m^3/s
10YR	0.039	m^3/s
25YR	0.051	m^3/s
50YR	0.061	m^3/s
100YR	0.070	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - E Ditch STA 2+160 to 2+250

Catchment ID:	205	
Catchment Area (ha):	0.24	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.02	0.03	0.03	0.04	0.05	0.06

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.022	m^3/s
5YR	0.029	m^3/s
10YR	0.034	m^3/s
25YR	0.043	m^3/s
50YR	0.053	m^3/s
100YR	0.060	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - E Ditch STA 2+250 to 2+285

Catchment ID:	206	
Catchment Area (ha):	0.06	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.01	0.01	0.02

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.006	m^3/s
5YR	0.007	m^3/s
10YR	0.008	m^3/s
25YR	0.011	m^3/s
50YR	0.013	m^3/s
100YR	0.015	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - E Ditch STA 2+285 to 2+340

Catchment ID:	207	
Catchment Area (ha):	0.12	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.02	0.02	0.03	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.011	m^3/s
5YR	0.015	m^3/s
10YR	0.017	m^3/s
25YR	0.022	m^3/s
50YR	0.026	m^3/s
100YR	0.030	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - W Ditch STA 3+020 to 3+105

Catchment ID:	301	
Catchment Area (ha):	0.28	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.03	0.03	0.04	0.05	0.06	0.07

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.026	m^3/s
5YR	0.034	m^3/s
10YR	0.039	m^3/s
25YR	0.051	m^3/s
50YR	0.061	m^3/s
100YR	0.070	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - W Ditch STA 3+105 to 3+180

Catchment ID:	202	
Catchment Area (ha):	0.19	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.02	0.02	0.03	0.03	0.04	0.05

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.018	m^3/s
5YR	0.023	m^3/s
10YR	0.027	m^3/s
25YR	0.034	m^3/s
50YR	0.042	m^3/s
100YR	0.048	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - W Ditch STA 3+180 to 3+220

Catchment ID:	303	
Catchment Area (ha):	0.11	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.02	0.02	0.02	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.010	m^3/s
5YR	0.013	m^3/s
10YR	0.015	m^3/s
25YR	0.020	m^3/s
50YR	0.024	m^3/s
100YR	0.028	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - W Ditch STA 3+220 to 3+250

Catchment ID:	304	
Catchment Area (ha):	0.08	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.01	0.02	0.02

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.007	m^3/s
5YR	0.010	m^3/s
10YR	0.011	m^3/s
25YR	0.014	m^3/s
50YR	0.018	m^3/s
100YR	0.020	m^3/s

Rational Method Calculation

TATHAM ENGINEERING

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+040 to 3+150

Catchment ID:	305	
Catchment Area (ha):	0.24	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.02	0.03	0.03	0.04	0.05	0.06

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.022	m^3/s
5YR	0.029	m^3/s
10YR	0.034	m^3/s
25YR	0.043	m^3/s
50YR	0.053	m^3/s
100YR	0.060	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+150 to 3+180

Catchment ID:	306	
Catchment Area (ha):	0.07	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.01	0.02	0.02

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.006	m^3/s
5YR	0.008	m^3/s
10YR	0.010	m^3/s
25YR	0.013	m^3/s
50YR	0.015	m^3/s
100YR	0.018	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+180 to 3+235

Catchment ID:	307	
Catchment Area (ha):	0.13	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.02	0.02	0.02	0.03	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.012	m^3/s
5YR	0.016	m^3/s
10YR	0.018	m^3/s
25YR	0.024	m^3/s
50YR	0.028	m^3/s
100YR	0.033	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+235 to 3+250

Catchment ID:	308
Catchment Area (ha):	0.02
Runoff Coefficient:	0.40 Low-density residential
Time of Concentration (min):	10.00

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.00	0.00	0.00	0.00	0.00	0.01

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.002	m^3/s
5YR	0.002	m^3/s
10YR	0.003	m^3/s
25YR	0.004	m^3/s
50YR	0.004	m^3/s
100YR	0.005	m^3/s

CRYSTAL BEACH ROAD ROADSIDE DITCH STA 1+040 TO STA 1+420

HY-8 Culvert Analysis Report

Existing conditions - Tailwater = 219.15 - Lake Simcoe seasonal HWL

Culvert Data Summary - 2232 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.58 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.09	219.59	0.276	0.993	4-FFf	-0.305	0.185	0.600	0.980	0.302	0.000
1:100-year 24hr SCS	0.86	0.21	219.66	0.459	1.057	4-FFf	-0.305	0.294	0.600	0.980	0.730	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.60 m, Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.59	1:5-year 24hr SCS	0.33	0.09	0.25	10
219.66	1:100-year 24hr SCS	0.86	0.21	0.65	3
219.51	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2234 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.59 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.04	219.59	0.183	0.953	4-FFf	-0.305	0.123	0.600	0.950	0.138	0.000
1:100-year 24hr SCS	0.86	0.08	219.60	0.263	0.961	4-FFf	-0.305	0.176	0.600	0.950	0.275	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.64 m,   Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.59	1:5-year 24hr SCS	0.33	0.04	0.29	5
219.60	1:100-year 24hr SCS	0.86	0.08	0.79	4
219.26	Overtopping	-56897.22	-56897.22	0.00	Overtopping

Culvert Data Summary - 2240 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.59 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.21	219.67	0.459	1.245	4-FFf	-0.305	0.294	0.600	1.170	0.732	0.000
1:100-year 24hr SCS	0.86	0.31	219.76	0.609	1.342	4-FFf	-0.305	0.364	0.600	1.170	1.109	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.42 m,   Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.67	1:5-year 24hr SCS	0.33	0.21	0.12	7
219.76	1:100-year 24hr SCS	0.86	0.31	0.55	4
219.60	Overtopping	0.07	0.07	0.00	Overtopping

Culvert Data Summary - 2246 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.67 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.19	219.73	0.426	1.193	4-FFf	0.286	0.278	0.600	1.220	0.659	0.000
1:100-year 24hr SCS	0.86	0.29	219.82	0.571	1.282	4-FFf	0.378	0.350	0.600	1.220	1.026	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.54 m, Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m, Culvert Slope: 0.0134

****

Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.73	1:5-year 24hr SCS	0.33	0.19	0.14	6
219.82	1:100-year 24hr SCS	0.86	0.29	0.57	4
219.62	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2250 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.73 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.07	219.74	0.252	1.269	4-FFf	-0.305	0.169	0.600	1.280	0.254	0.000
1:100-year 24hr SCS	0.76	0.20	219.80	0.444	1.328	4-FFf	-0.305	0.286	0.600	1.280	0.693	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.74	1:5-year 24hr SCS	0.29	0.07	0.22	11
219.80	1:100-year 24hr SCS	0.76	0.20	0.56	3
219.60	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2254 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2254 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.74 m

Roadway Data for Crossing: 2254 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.79
1	3.40	219.54
2	5.80	219.42
3	11.50	219.82

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2254 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.03	219.74	0.169	1.272	4-FFf	-0.305	0.114	0.600	1.290	0.119	0.000
1:100-year 24hr SCS	0.76	0.07	219.75	0.239	1.278	4-FFf	-0.305	0.160	0.600	1.290	0.231	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2254 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2254 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.74	1:5-year 24hr SCS	0.29	0.03	0.26	5
219.75	1:100-year 24hr SCS	0.76	0.07	0.70	4
219.42	Overtopping	-630607.44	-630607.44	0.00	Overtopping

Culvert Data Summary - 2258 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2258 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.74 m

Roadway Data for Crossing: 2258 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.88
1	2.40	219.82
2	6.00	219.72
3	11.40	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2258 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.19	219.81	0.428	1.057	4-FFf	0.344	0.278	0.600	1.050	0.658	0.000
1:100-year 24hr SCS	0.71	0.27	219.88	0.548	1.134	4-FFf	0.457	0.338	0.600	1.050	0.963	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.75 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 8.20 m, Culvert Slope: 0.0073

****

Summary of Culvert Flows at Crossing: 2258 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2258 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.81	1:5-year 24hr SCS	0.27	0.19	0.08	8
219.88	1:100-year 24hr SCS	0.71	0.27	0.44	4
219.72	Overtopping	0.01	0.01	0.00	Overtopping

Culvert Data Summary - 2262 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2262 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.81 m

Roadway Data for Crossing: 2262 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	1.90	219.59
2	5.80	219.68
3	10.20	219.88

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2262 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.04	219.81	0.172	1.052	4-FFf	0.108	0.118	0.600	1.180	0.127	0.000
1:100-year 24hr SCS	0.71	0.07	219.82	0.248	1.059	4-FFf	0.153	0.170	0.600	1.180	0.257	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.76 m, Outlet Elevation (invert): 218.63 m

Culvert Length: 6.20 m, Culvert Slope: 0.0210

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Summary of Culvert Flows at Crossing: 2262 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2262 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.81	1:5-year 24hr SCS	0.27	0.04	0.24	5
219.82	1:100-year 24hr SCS	0.71	0.07	0.64	4
219.59	Overtopping	-6014.82	-6014.82	0.00	Overtopping

Culvert Data Summary - 2270 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.81 m

Roadway Data for Crossing: 2270 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.87
1	3.20	219.83
2	6.80	219.77
3	12.00	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2270 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.16	219.85	0.387	1.021	4-FFf	-0.305	0.253	0.600	0.980	0.551	0.000
1:100-year 24hr SCS	0.71	0.24	219.91	0.508	1.080	4-FFf	-0.305	0.319	0.600	0.980	0.857	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m,   Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2270 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.27	0.16	0.11	6
219.91	1:100-year 24hr SCS	0.71	0.24	0.46	3
219.77	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2270 CBR (2) 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2270 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	2.90	219.80
2	6.60	219.75
3	11.70	219.86

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2270 CBR (2) 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.05	219.85	0.199	1.024	4-FFf	-0.305	0.134	0.600	1.020	0.161	0.000
1:100-year 24hr SCS	0.57	0.14	219.88	0.361	1.053	4-FFf	-0.305	0.237	0.600	1.020	0.489	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m,   Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2270 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR (2) 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.05	0.18	11
219.88	1:100-year 24hr SCS	0.57	0.14	0.43	4
219.75	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2274 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2274 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2274 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.96
1	3.40	219.76
2	7.20	219.70
3	13.50	219.90

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2274 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.04	219.85	0.172	1.142	4-FFf	0.125	0.117	0.600	1.020	0.125	0.000
1:100-year 24hr SCS	0.57	0.10	219.87	0.296	1.157	4-FFf	0.211	0.198	0.600	1.020	0.348	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.71 m,   Outlet Elevation (invert): 218.64 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0113

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Summary of Culvert Flows at Crossing: 2274 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2274 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.04	0.19	8
219.87	1:100-year 24hr SCS	0.57	0.10	0.48	5
219.70	Overtopping	-0.87	-0.87	0.00	Overtopping

Culvert Data Summary - 2276 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2276 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2276 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.78
1	3.10	219.64
2	6.90	219.72
3	13.50	219.98

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2276 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.03	219.85	0.162	1.112	4-FFf	-0.305	0.109	0.600	1.020	0.110	0.000
1:100-year 24hr SCS	0.57	0.06	219.86	0.232	1.117	4-FFf	-0.305	0.155	0.600	1.020	0.217	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.74 m, Outlet Elevation (invert): 218.74 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2276 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2276 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.03	0.19	5
219.86	1:100-year 24hr SCS	0.57	0.06	0.51	4
219.64	Overtopping	-31034.66	-31034.66	0.00	Overtopping

Culvert Data Summary - 2282 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2282 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2282 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.00
1	2.30	219.90
2	6.70	219.84
3	13.50	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2282 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.16	219.89	0.380	0.902	4-FFf	0.238	0.252	0.600	0.970	0.548	0.000
1:100-year 24hr SCS	0.50	0.25	219.96	0.509	0.967	4-FFf	0.311	0.322	0.600	0.970	0.871	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.99 m, Outlet Elevation (invert): 218.88 m

Culvert Length: 6.20 m, Culvert Slope: 0.0177

****

Summary of Culvert Flows at Crossing: 2282 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2282 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.89	1:5-year 24hr SCS	0.19	0.16	0.03	6
219.96	1:100-year 24hr SCS	0.50	0.25	0.25	4
219.84	Overtopping	0.02	0.02	0.00	Overtopping

Culvert Data Summary - 2286 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2286 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.89 m

Roadway Data for Crossing: 2286 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.06
1	3.00	219.97
2	7.50	219.84
3	14.50	220.06

Roadway Surface: Gravel

Roadway Top Width: 10.00 m

Culvert Summary Table: 2286 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.12	219.92	0.334	0.974	4-FFf	-0.305	0.221	0.600	0.940	0.427	0.000
1:100-year 24hr SCS	0.50	0.21	219.99	0.457	1.038	4-FFf	-0.305	0.293	0.600	0.940	0.727	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.95 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 12.30 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2286 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2286 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.12	0.07	3
219.99	1:100-year 24hr SCS	0.50	0.21	0.29	4
219.84	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2290 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2290 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2290 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.14
1	3.00	219.94
2	7.90	219.71
3	15.00	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2290 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.03	219.92	0.161	1.072	4-FFf	0.138	0.109	0.600	1.110	0.109	0.000
1:100-year 24hr SCS	0.50	0.08	219.93	0.258	1.081	4-FFf	0.220	0.174	0.600	1.110	0.269	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.85 m,   Outlet Elevation (invert): 218.81 m

Culvert Length: 7.00 m,   Culvert Slope: 0.0057

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Summary of Culvert Flows at Crossing: 2290 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2290 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.03	0.16	6
219.93	1:100-year 24hr SCS	0.50	0.08	0.43	5
219.71	Overtopping	-803632.16	-803632.16	0.00	Overtopping

Culvert Data Summary - 2294 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2294 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2294 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.97
1	2.40	219.88
2	6.00	219.80
3	13.40	220.06

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2294 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.04	219.92	0.196	1.144	4-FFf	-0.305	0.132	0.600	1.110	0.157	0.000
1:100-year 24hr SCS	0.50	0.14	219.95	0.360	1.175	4-FFf	-0.305	0.236	0.600	1.110	0.486	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.78 m, Outlet Elevation (invert): 218.78 m

Culvert Length: 7.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2294 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2294 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.04	0.15	10
219.95	1:100-year 24hr SCS	0.50	0.14	0.36	4
219.80	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2298 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2298 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2298 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	4.00	219.81
2	7.90	219.81
3	16.00	220.11

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2298 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.03	219.92	0.148	1.191	4-FFf	0.126	0.099	0.600	1.230	0.091	0.000
1:100-year 24hr SCS	0.41	0.05	219.93	0.218	1.196	4-FFf	0.185	0.146	0.600	1.230	0.194	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.73 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2298 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2298 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.15	0.03	0.13	5
219.93	1:100-year 24hr SCS	0.41	0.05	0.36	5
219.81	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2306 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2306 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.92
1	2.00	218.82
2	5.00	218.84
3	13.80	220.14

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.01	219.92	0.110	1.110	4-FFf	0.078	0.074	0.600	1.230	0.051	0.000
1:100-year 24hr SCS	0.41	0.02	219.92	0.142	1.111	4-FFf	0.100	0.096	0.600	1.230	0.086	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.81 m, Outlet Elevation (invert): 218.72 m

Culvert Length: 7.00 m, Culvert Slope: 0.0129

****

Summary of Culvert Flows at Crossing: 2306 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.15	0.01	0.14	3
219.92	1:100-year 24hr SCS	0.41	0.02	0.39	2
218.82	Overtopping	-349830629933558330000000000000000.00	-349830629933558330000000000000000.00	0.00	Overtopping

Culvert Data Summary - 2306 (2) CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2306 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.99
1	2.00	219.86
2	5.00	219.88
3	13.80	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 (2) CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.07	219.93	0.253	1.099	4-FFf	-0.305	0.170	0.600	1.230	0.257	0.000
1:100-year 24hr SCS	0.41	0.18	219.98	0.419	1.146	4-FFf	-0.305	0.272	0.600	1.230	0.630	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2306 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 (2) CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.93	1:5-year 24hr SCS	0.15	0.07	0.08	10
219.98	1:100-year 24hr SCS	0.41	0.18	0.23	3
219.86	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2314 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2314 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.93 m

Roadway Data for Crossing: 2314 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.53
1	2.60	220.31
2	6.00	220.13
3	9.00	219.82
4	14.50	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2314 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.11	0.06	219.94	0.225	1.097	4-FFf	0.171	0.151	0.600	1.130	0.208	0.000
1:100-year 24hr SCS	0.31	0.17	219.98	0.403	1.145	4-FFf	0.304	0.264	0.600	1.130	0.598	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.84 m,   Outlet Elevation (invert): 218.77 m

Culvert Length: 7.80 m,   Culvert Slope: 0.0090

****

Summary of Culvert Flows at Crossing: 2314 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2314 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.94	1:5-year 24hr SCS	0.11	0.06	0.05	10
219.98	1:100-year 24hr SCS	0.31	0.17	0.14	3
219.82	Overtopping	0.00	0.00	0.00	Overtopping

HY-8 Culvert Analysis Report

Existing Conditions - Tailwater = 218.85 - Lake Simcoe March average water level

Culvert Data Summary - 2232 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.29 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.49	0.634	0.885	4-FFf	-0.305	0.374	0.600	0.690	1.167	0.000
1:100-year 24hr SCS	0.86	0.43	219.62	0.802	1.024	4-FFf	-0.305	0.429	0.600	0.690	1.525	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.60 m, Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.49	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.62	1:100-year 24hr SCS	0.86	0.43	0.43	5
219.51	Overtopping	0.35	0.35	0.00	Overtopping

Culvert Data Summary - 2234 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.49 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.05	219.50	0.212	0.855	4-FFf	-0.305	0.143	0.600	0.850	0.183	0.000
1:100-year 24hr SCS	0.86	0.16	219.54	0.391	0.895	4-FFf	-0.305	0.256	0.600	0.850	0.562	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.64 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.50	1:5-year 24hr SCS	0.33	0.05	0.28	10
219.54	1:100-year 24hr SCS	0.86	0.16	0.70	5
219.26	Overtopping	-2533.76	-2533.76	0.00	Overtopping

Culvert Data Summary - 2240 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.50 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.28	219.64	0.559	1.216	4-FFf	-0.305	0.343	0.600	1.080	0.985	0.000
1:100-year 24hr SCS	0.86	0.38	219.75	0.710	1.330	4-FFf	-0.305	0.402	0.600	1.080	1.337	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.42 m,   Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.64	1:5-year 24hr SCS	0.33	0.28	0.05	10
219.75	1:100-year 24hr SCS	0.86	0.38	0.48	4
219.60	Overtopping	0.24	0.24	0.00	Overtopping

Culvert Data Summary - 2246 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.64 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.21	219.72	0.466	1.183	4-FFf	0.311	0.300	0.600	1.190	0.758	0.000
1:100-year 24hr SCS	0.86	0.31	219.82	0.606	1.279	4-FFf	0.400	0.364	0.600	1.190	1.111	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.54 m, Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m, Culvert Slope: 0.0134

****

Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.72	1:5-year 24hr SCS	0.33	0.21	0.11	8
219.82	1:100-year 24hr SCS	0.86	0.31	0.54	4
219.62	Overtopping	0.02	0.02	0.00	Overtopping

Culvert Data Summary - 2250 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.72 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.08	219.73	0.272	1.262	4-FFf	-0.305	0.182	0.600	1.270	0.293	0.000
1:100-year 24hr SCS	0.76	0.21	219.80	0.459	1.326	4-FFf	-0.305	0.294	0.600	1.270	0.733	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.73	1:5-year 24hr SCS	0.29	0.08	0.21	10
219.80	1:100-year 24hr SCS	0.76	0.21	0.55	3
219.60	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2254 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2254 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.73 m

Roadway Data for Crossing: 2254 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.79
1	3.40	219.54
2	5.80	219.42
3	11.50	219.82

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2254 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.03	219.73	0.172	1.262	4-FFf	-0.305	0.115	0.600	1.280	0.122	0.000
1:100-year 24hr SCS	0.76	0.07	219.74	0.248	1.269	4-FFf	-0.305	0.166	0.600	1.280	0.247	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2254 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2254 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.73	1:5-year 24hr SCS	0.29	0.03	0.26	5
219.74	1:100-year 24hr SCS	0.76	0.07	0.70	4
219.42	Overtopping	-433759.81	-433759.81	0.00	Overtopping

Culvert Data Summary - 2258 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2258 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.74 m

Roadway Data for Crossing: 2258 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.88
1	2.40	219.82
2	6.00	219.72
3	11.40	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2258 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.19	219.81	0.428	1.057	4-FFf	0.344	0.278	0.600	1.050	0.658	0.000
1:100-year 24hr SCS	0.71	0.27	219.88	0.548	1.134	4-FFf	0.457	0.338	0.600	1.050	0.963	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.75 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 8.20 m, Culvert Slope: 0.0073

****

Summary of Culvert Flows at Crossing: 2258 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2258 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.81	1:5-year 24hr SCS	0.27	0.19	0.08	8
219.88	1:100-year 24hr SCS	0.71	0.27	0.44	4
219.72	Overtopping	0.01	0.01	0.00	Overtopping

Culvert Data Summary - 2262 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2262 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.81 m

Roadway Data for Crossing: 2262 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	1.90	219.59
2	5.80	219.68
3	10.20	219.88

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2262 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.04	219.81	0.172	1.052	4-FFf	0.108	0.118	0.600	1.180	0.127	0.000
1:100-year 24hr SCS	0.71	0.07	219.82	0.248	1.059	4-FFf	0.153	0.170	0.600	1.180	0.257	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.76 m, Outlet Elevation (invert): 218.63 m

Culvert Length: 6.20 m, Culvert Slope: 0.0210

****

Summary of Culvert Flows at Crossing: 2262 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2262 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.81	1:5-year 24hr SCS	0.27	0.04	0.24	5
219.82	1:100-year 24hr SCS	0.71	0.07	0.64	4
219.59	Overtopping	-6014.82	-6014.82	0.00	Overtopping

Culvert Data Summary - 2270 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.81 m

Roadway Data for Crossing: 2270 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.87
1	3.20	219.83
2	6.80	219.77
3	12.00	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2270 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.16	219.85	0.387	1.021	4-FFf	-0.305	0.253	0.600	0.980	0.551	0.000
1:100-year 24hr SCS	0.71	0.24	219.91	0.508	1.080	4-FFf	-0.305	0.319	0.600	0.980	0.857	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2270 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.27	0.16	0.11	6
219.91	1:100-year 24hr SCS	0.71	0.24	0.46	3
219.77	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2270 CBR (2) 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2270 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	2.90	219.80
2	6.60	219.75
3	11.70	219.86

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2270 CBR (2) 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.05	219.85	0.199	1.024	4-FFf	-0.305	0.134	0.600	1.020	0.161	0.000
1:100-year 24hr SCS	0.57	0.14	219.88	0.361	1.053	4-FFf	-0.305	0.237	0.600	1.020	0.489	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2270 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR (2) 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.05	0.18	11
219.88	1:100-year 24hr SCS	0.57	0.14	0.43	4
219.75	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2274 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2274 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2274 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.96
1	3.40	219.76
2	7.20	219.70
3	13.50	219.90

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2274 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.04	219.85	0.172	1.142	4-FFf	0.125	0.117	0.600	1.020	0.125	0.000
1:100-year 24hr SCS	0.57	0.10	219.87	0.296	1.157	4-FFf	0.211	0.198	0.600	1.020	0.348	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.71 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.20 m, Culvert Slope: 0.0113

****

Summary of Culvert Flows at Crossing: 2274 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2274 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.04	0.19	8
219.87	1:100-year 24hr SCS	0.57	0.10	0.48	5
219.70	Overtopping	-0.87	-0.87	0.00	Overtopping

Culvert Data Summary - 2276 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2276 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2276 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.78
1	3.10	219.64
2	6.90	219.72
3	13.50	219.98

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2276 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.03	219.85	0.162	1.112	4-FFf	-0.305	0.109	0.600	1.020	0.110	0.000
1:100-year 24hr SCS	0.57	0.06	219.86	0.232	1.117	4-FFf	-0.305	0.155	0.600	1.020	0.217	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.74 m, Outlet Elevation (invert): 218.74 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2276 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2276 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.85	1:5-year 24hr SCS	0.22	0.03	0.19	5
219.86	1:100-year 24hr SCS	0.57	0.06	0.51	4
219.64	Overtopping	-31034.66	-31034.66	0.00	Overtopping

Culvert Data Summary - 2282 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2282 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.85 m

Roadway Data for Crossing: 2282 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.00
1	2.30	219.90
2	6.70	219.84
3	13.50	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2282 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.16	219.89	0.380	0.902	4-FFf	0.238	0.252	0.600	0.970	0.548	0.000
1:100-year 24hr SCS	0.50	0.25	219.96	0.509	0.967	4-FFf	0.311	0.322	0.600	0.970	0.871	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.99 m, Outlet Elevation (invert): 218.88 m

Culvert Length: 6.20 m, Culvert Slope: 0.0177

****

Summary of Culvert Flows at Crossing: 2282 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2282 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.89	1:5-year 24hr SCS	0.19	0.16	0.03	6
219.96	1:100-year 24hr SCS	0.50	0.25	0.25	4
219.84	Overtopping	0.02	0.02	0.00	Overtopping

Culvert Data Summary - 2286 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2286 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.89 m

Roadway Data for Crossing: 2286 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.06
1	3.00	219.97
2	7.50	219.84
3	14.50	220.06

Roadway Surface: Gravel

Roadway Top Width: 10.00 m

Culvert Summary Table: 2286 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.12	219.92	0.334	0.974	4-FFf	-0.305	0.221	0.600	0.940	0.427	0.000
1:100-year 24hr SCS	0.50	0.21	219.99	0.457	1.038	4-FFf	-0.305	0.293	0.600	0.940	0.727	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.95 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 12.30 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2286 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2286 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.12	0.07	3
219.99	1:100-year 24hr SCS	0.50	0.21	0.29	4
219.84	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2290 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2290 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2290 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.14
1	3.00	219.94
2	7.90	219.71
3	15.00	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2290 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.03	219.92	0.161	1.072	4-FFf	0.138	0.109	0.600	1.110	0.109	0.000
1:100-year 24hr SCS	0.50	0.08	219.93	0.258	1.081	4-FFf	0.220	0.174	0.600	1.110	0.269	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.85 m, Outlet Elevation (invert): 218.81 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2290 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2290 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.03	0.16	6
219.93	1:100-year 24hr SCS	0.50	0.08	0.43	5
219.71	Overtopping	-803632.16	-803632.16	0.00	Overtopping

Culvert Data Summary - 2294 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2294 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2294 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.97
1	2.40	219.88
2	6.00	219.80
3	13.40	220.06

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2294 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.04	219.92	0.196	1.144	4-FFf	-0.305	0.132	0.600	1.110	0.157	0.000
1:100-year 24hr SCS	0.50	0.14	219.95	0.360	1.175	4-FFf	-0.305	0.236	0.600	1.110	0.486	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.78 m,   Outlet Elevation (invert): 218.78 m

Culvert Length: 7.00 m,   Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2294 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2294 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.19	0.04	0.15	10
219.95	1:100-year 24hr SCS	0.50	0.14	0.36	4
219.80	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2298 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2298 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2298 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	4.00	219.81
2	7.90	219.81
3	16.00	220.11

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2298 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.03	219.92	0.148	1.191	4-FFf	0.126	0.099	0.600	1.230	0.091	0.000
1:100-year 24hr SCS	0.41	0.05	219.93	0.218	1.196	4-FFf	0.185	0.146	0.600	1.230	0.194	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.73 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

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Summary of Culvert Flows at Crossing: 2298 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2298 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.15	0.03	0.13	5
219.93	1:100-year 24hr SCS	0.41	0.05	0.36	5
219.81	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2306 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2306 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.92
1	2.00	218.82
2	5.00	218.84
3	13.80	220.14

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.01	219.92	0.110	1.110	4-FFf	0.078	0.074	0.600	1.230	0.051	0.000
1:100-year 24hr SCS	0.41	0.02	219.92	0.142	1.111	4-FFf	0.100	0.096	0.600	1.230	0.086	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.81 m,   Outlet Elevation (invert): 218.72 m

Culvert Length: 7.00 m,   Culvert Slope: 0.0129

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Summary of Culvert Flows at Crossing: 2306 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.92	1:5-year 24hr SCS	0.15	0.01	0.14	3
219.92	1:100-year 24hr SCS	0.41	0.02	0.39	2
218.82	Overtopping	-349830629933558330000000000000000.00	-349830629933558330000000000000000.00	0.00	Overtopping

Culvert Data Summary - 2306 (2) CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.92 m

Roadway Data for Crossing: 2306 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.99
1	2.00	219.86
2	5.00	219.88
3	13.80	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 (2) CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.07	219.93	0.253	1.099	4-FFf	-0.305	0.170	0.600	1.230	0.257	0.000
1:100-year 24hr SCS	0.41	0.18	219.98	0.419	1.146	4-FFf	-0.305	0.272	0.600	1.230	0.630	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2306 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 (2) CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.93	1:5-year 24hr SCS	0.15	0.07	0.08	10
219.98	1:100-year 24hr SCS	0.41	0.18	0.23	3
219.86	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2314 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2314 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.93 m

Roadway Data for Crossing: 2314 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.53
1	2.60	220.31
2	6.00	220.13
3	9.00	219.82
4	14.50	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2314 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.11	0.06	219.94	0.225	1.097	4-FFf	0.171	0.151	0.600	1.130	0.208	0.000
1:100-year 24hr SCS	0.31	0.17	219.98	0.403	1.145	4-FFf	0.304	0.264	0.600	1.130	0.598	0.000

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Straight Culvert

Inlet Elevation (invert): 218.84 m,   Outlet Elevation (invert): 218.77 m

Culvert Length: 7.80 m,   Culvert Slope: 0.0090

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Summary of Culvert Flows at Crossing: 2314 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2314 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.94	1:5-year 24hr SCS	0.11	0.06	0.05	10
219.98	1:100-year 24hr SCS	0.31	0.17	0.14	3
219.82	Overtopping	0.00	0.00	0.00	Overtopping

STUDY AREA EXISTING CONDITIONS PHOTO LOG

Photograph 1: Buchanan Street Looking North (Google Street View, 2015)

Photograph 2: Buchanan Street Looking North

Photograph 3: Buchanan Street Twin 900mm Dia. Culvert Crossing Inlet

Photograph 4: Buchanan Street Twin 900mm Dia. Culvert Crossing Outlet

Photograph 5: Tall Tree Lane Looking North (Google Street View, 2015)

Photograph 6: Tall Tree Lane (Outlet #2) Easement to Lake Simcoe (Google Street View, 2015)

Photograph 7: Tall Tree Lane (Outlet #2) Ditch Inlet Catch Basin Structure inlets

Photograph 8: Tall Tree Lane (Outlet #2) Ditch Inlet Catch Basin Structure inlets

Photograph 9: Tall Tree Lane 1800 mm Dia. Culvert Crossing Inlet

Photograph 10: Tall Tree Lane 1800 mm Dia. Culvert Crossing Outlet

Photograph 11: Crystal Beach Road Looking Northeast toward Goodfellow Ave Intersection (Google Street View, 2015)

Photograph 12: Goodfellow Avenue 2100 mm Dia. Culvert Crossing Inlet

Photograph 13: Goodfellow Avenue 2100 mm Dia. Culvert Crossing Outlet

Photograph 14: Leonard's Creek Outlet to Lake Simcoe

Photograph 15: Crystal Beach Road Looking South at Hartley Road & Buchanan Street Intersection (Google Street View, 2015)

Photograph 16: Obstructed inlet of 600 mm Dia. Buchanan Street/Crystal Beach Road Culvert

Photograph 17: Outlet of 600 mm Dia. Buchanan Street/Crystal Beach Road Culvert

Summary of Resident Survey Responses

Do you live on one (or more) of the following roads: Buchanan St., Tall Tree Ln., Crystal Beach Rd., Goodfellow Ave., Bonsecour Cres., Reid St.?	Are you a seasonal resident?	How long have you lived at this address?	Is your property in close proximity to (Leonard's Creek)	How many flooding incidents have you experienced and approximately when did they occur (e.g. dates, time, seasons)?	How did the flooding impact your yard or structures in your yard?	Please type any additional comments related to the flooding that you have experienced.	Would you allow Town Staff and the Town's Consulting Engineer access to your property in order to complete investigations required for the design of the drainage improvements in the area?	Please provide your address.
Yes	No	i have owed the property since 2007. It was my primary residence foe approximately 5 years. It is currently rented to the same family since I left.	N/A	The road floods several times a year, depending on the weather. typically in the spring and during the winter thaw (January). When every there is adverse weather with thunderstorms etc.	The water has not come to the house but makes the driveway very difficult to enter, also the lower part of the driveway has flooded as well	I remember years when I could not enter my street because of the flooding. In the winter it would flood and then freeze	Yes	2338 Buchanan St
Yes	No	22 Years	N/A	Winter and spring every year since 1999 and occasionally other rainy times	End of driveway flooding and corner of property lines consistent my. But since development back yard floods thoroughly	The new developments in the area surrounding us seems to have increased their grade above ours when they all use to be lower and where the the water sat when flooding was occurring. We could also use culverts and proper ditches this might help allow water to flow out properly.	Yes	2344 Buchanan Street
Yes	No	09-Oct-19	N/A	Through all seasons, including winter melt, we have our driveway flooded and it can take up to 24 hours for the 2-3 inches of water to dissipate. Number of incidents - well, every time it rains (regular thru heavy) or winter melt. Fall 2019, winter, spring, summer 2020.	Driveway flooding and pooling caused by regular and heavy rainfall. Always holding my breath whether it will flood into the garage! The side yard and the non-driveway side of the garage - yard gets pooled with water.	We live across the street from the intersection of Buchanan, Hartley and Crystal Beach and when the drainage ditch rises and overflows, it usually goes west onto Buchanan. Our concern is that major rain/melt, would send the overflow in both directions, and on top of the lake in our driveway, I can only image the worst. Not a flooding comment but with the exception of this summer's drought phase (2020), our sump pump runs several times an hour - not true for our neighbor to the north. This is another reason why overflow at this intersection concerns me.	Please provide your contact information so we can discuss further (email, phone number) - 705 436 5234	2319 Crystal Beach Rd
Yes	No	13 Years	N/A	Any time of year after heavy rains or winter/spring snow melts	Major problem in the spring, summer and fall is the lower end of my driveway becoming a swimming pool. My driveway is receiving ongoing damage including cracking and heaving. In the winter, after a melting incident followed by freezing, I have a large skating rink...VERY dangerous for walking, especially when covered again by snow. After a heavy rain I have to dodge my driveway and weave a path around my property to walk out to the street.	I am very concerned about visitors to my home, delivery people or workers slipping and falling on my "skating rink" in the winter, and then having cause to sue me.	Yes	2369 Goodfellow Avenue, L9S 3X2
Yes	Yes	1993	Subdivision run off pond behind property. Ditch & culvert front of property, run off water from lake and pond (Crystal Beach Rd and Roberts Rd)	Every year there is water on the property early spring/summer. The property is usually quite wet every year especially by the ditch. Cannot remember the years that it was exceptionally high but it does happen.	Water in the garage. Some items damaged. Yard becomes to wet to use for a while, especially the front yard.	The road was built higher than out property, properties beside us. Small ditch on north side is does not drain because it is almost gone. The run off pond for the subdivision behind us was put in higher than our property. Please note: 2235 Crystal Beach Rd there has a puddle in middle of driveway when there is accessive water and when it rains. Property is also lower than the road.	Yes the Town Staff and the Town's Engineer has access to the property to complete investigations in relation to the design of this project. If they require more information they can certainly send an email or phone. If possible could we be notified as to when they will be accessing our property. Thank you for taking the time to look into this matter.	2234 Crystal Beach Road, Alcona
Yes	Yes	The property on Bonsecour Cres. is seasonal since 1933. We are permanent residents on Cove Ave.	N/A	too numerous to count	damaged outbuildings and contents, undermined fences	The town put in a drainage ditch along Bonsecour running to the canal but over the years everyone but us has filled it in	Yes	2362 Bonsecour Cres.
Yes	Yes	I own a lot on Crystal Beach Road	N/A	none	did not	N/A	No	Plan 768 LOT 35
Yes	No	owned since 1957, permanent since 1994	N/A	annually - winter and spring, a couple of major summer storms never had flooding until 8 to 10 years ago some flooding caused by - neighbouring resident regrading and adding fill - soil erosion and the raising of Goodfellow Av past my property (6 - 7 inches)	soil erosion, damage to car garage, other land sinking caused by infilling and regrading of neighbouring residential properties and for the last 4-5 years work on Goodfellow Av - raised at least 6-7 inches past my driveway. Possible damage to my cottage foundation	Please contact me Brian Dyce 416-726-2546 I have a number of photos over the years to illustrate my concerns Would need a couple of weeks to create suitable prints if needed or can email images	Yes	2365 Goodfellow Av
Yes	Yes	1930	N/A	none	it didn't	N/A	No	2338 Goodfellow Ave.
Yes	Yes	6 Years	N/A	every spring our drive way is flooded	water at about 3" deep over most of the driveway. danger of water entering the house		Yes	2235 Crystal Beach Road

Summary of Resident Survey Responses

Do you live on one (or more) of the following roads: Buchanan St., Tall Tree Ln., Crystal Beach Rd., Goodfellow Ave., Bonsecour Cres., Reid St.?	Are you a seasonal resident?	How long have you lived at this address?	Is your property in close proximity to (Leonard's Creek)	How many flooding incidents have you experienced and approximately when did they occur (e.g. dates, time, seasons)?	How did the flooding impact your yard or structures in your yard?	Please type any additional comments related to the flooding that you have experienced.	Would you allow Town Staff and the Town's Consulting Engineer access to your property in order to complete investigations required for the design of the drainage improvements in the area?	Please provide your address.
Yes	Yes	This is a family cottage built in 1934	N/A	every early spring and after a heavy rainfall . most recently in the last 3-4 years	water fills ditch to overflowing, running into yard on either side of driveway pooling in and around wooden fence, trees, fire hydrant and town water shut off pipe	Our property is the only one left on Bonsecours that has a drainage ditch that flows directly into the creek area, one property away. All water from the roadway is directed into this area and cannot keep up with the flow. Last summer the ditch area was re-dug as far as the creek , with silt cloth at the waters edge, however when water sits in this area it only becomes a breeding ground for the mosquitos. After the work was completed, the lot next door was left with a deep ditch accross where he had previously filled in for driveway access. This leaves us concerned that he may fill in his portion again this spring, blocking off the flow to the creek, backing up water into our property. We would like to see the drainage redirected to pipping underground and fill in the swail all the way to creek.	Yes	2362 Bonsecoures Cres(cottage) 3286 Cove Ave (home)
Yes	Yes	We have owned the property since 1968	N/A	Many over the years but the spring is the worst, particularly if there has been alot of snow	The bottom of the driveway often gets flooded out & have to cross over to the neighbours to get out by foot		Yes	2383 Goodfellow ave
Yes	Yes	67 years		Only Twice Summer 1967 and summer 1980?	Covered half of lawn from road to cottage, no damage. Receded quickly after major rainfall.	No Answer	Yes	2371 Crystal Beach Road
Yes	No	Purchase home December 2020		One. 11-March-2021.	Water covered the entire property. 8" in garage; luckily no basement, but water in crawl space. Mallard pair currently enjoying the 4-property pond from the peninsula at Crystal Beach/Tall Tree - north.	Saturated overland flow from the west towards the lake is trapped in this depression. No mechanism to handle displacement along the WRE of Crystal Beach Road.	Yes	2370 Crystal Beach Road
						Many years ago the ditch ran straight down 9th Line and into the lake where the new parkette is now. A very small diversion was built there when the parkette was created, but nothing for the main amount of water which still overflows the "new" culvert under the road beside my house each spring. As I tried to tell people at the time, this culvert is too small to handle all that water, and proceeds to take away much of my garden each year, mostly on the lake side of my house. Why can't the water be diverted straight out to the lake from 9th Line, with a minimal amount coming further along as far as Crystal Beach Rd area like it used to? This area seems to me to have been studied, studied some more, and still more … when the parkette was built was the perfect time to remediate the problem. But it was not done. Why?		2395 Crystal Beach Road
						They are experiencing more flooding since the Town paved their street with no attention to swales. The water now runs onto several lots which recently caused a birch tree on her lot to loose root support and it started to topple. InnPower had to come in and cut it down. I did ask customer service to inquire with engineering to look into putting some swales to help alleviate the flooding on their property but I have heard nothing back.		688 Reid Street
								759 Happy Vale Drive
Yes	No	Spring 2011		1. Winter Jan/Feb 2017 2. Winter Jan/Feb 2018 3. winter Jan/Feb 2019	-Driveway underwater - 1 foot away from entering garage. - Water on 70-90% yard -2018 - worst year. Water flowing along foundation of house. Water up to 1 ft deep at end of driveway G36	Water flows from Buchanan rd culverts flowing South and then across our yard from the back of yard on Buchanan to Crystal beach rd. In 2018 - the water flowed in the pattern above and then also traveling from Crystal Beach Rd and Hartley towards Tall tree lane northwardly. I watched toys and items floating in this direction	No	2340 Crystal Beach Road

Appendix D:
Alternative Analysis

Alternative #2

HY-8 Culvert Analysis Report

Crossing Notes: PROP Crystal Beach Road 2-1390x970 (REGRADE)

Crossing model to represent equivalent of twin 1390x970 pipe arch culverts with 300mm embedment. Modeled as 1390 diameter culvert with 720mm embedment to acheive equivalent flow area. Proposed regrading of road profile to lower flood elevations. Spill to TOI max allowable flooding depth (0.15m above crown). Design Goal HWE: 219.50

Culvert Data Summary - 1390x970- 300 embed

Barrel Shape: Circular

Barrel Diameter: 1390.00 mm

Barrel Material: Corrugated Steel

Embedment: 720.00 mm

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - PROP Crystal Beach Road 2-1390x970 (REGRADE)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: PROP Crystal Beach Road 2-1390x970 (REGRADE)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	44.00	219.67
3	59.80	219.35
4	78.00	219.35
5	83.00	219.55
6	91.00	219.72
7	112.00	219.72
8	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Table 1 - Culvert Summary Table: 1390x970- 300 Embed

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.33	219.16	0.168	0.584	3-M1f	0.159	0.112	0.670	0.790	0.229	0.000
5-yr 24hr SCS	0.85	0.85	219.24	0.333	0.662	3-M1f	0.302	0.216	0.670	0.790	0.591	0.000
10-yr 24hr SCS	1.41	1.31	219.37	0.448	0.791	4-FFf	0.425	0.287	0.670	0.790	0.913	0.000
25-yr 24hr SCS	2.59	1.53	219.45	0.497	0.868	4-FFf	0.491	0.317	0.670	0.790	1.061	0.000
50-yr 24hr SCS	3.18	1.59	219.48	0.512	0.895	4-FFf	0.516	0.325	0.670	0.790	1.108	0.000
100-yr 24hr SCS	3.69	1.64	219.50	0.523	0.915	4-FFf	0.537	0.331	0.670	0.790	1.142	0.000

****

Straight Culvert

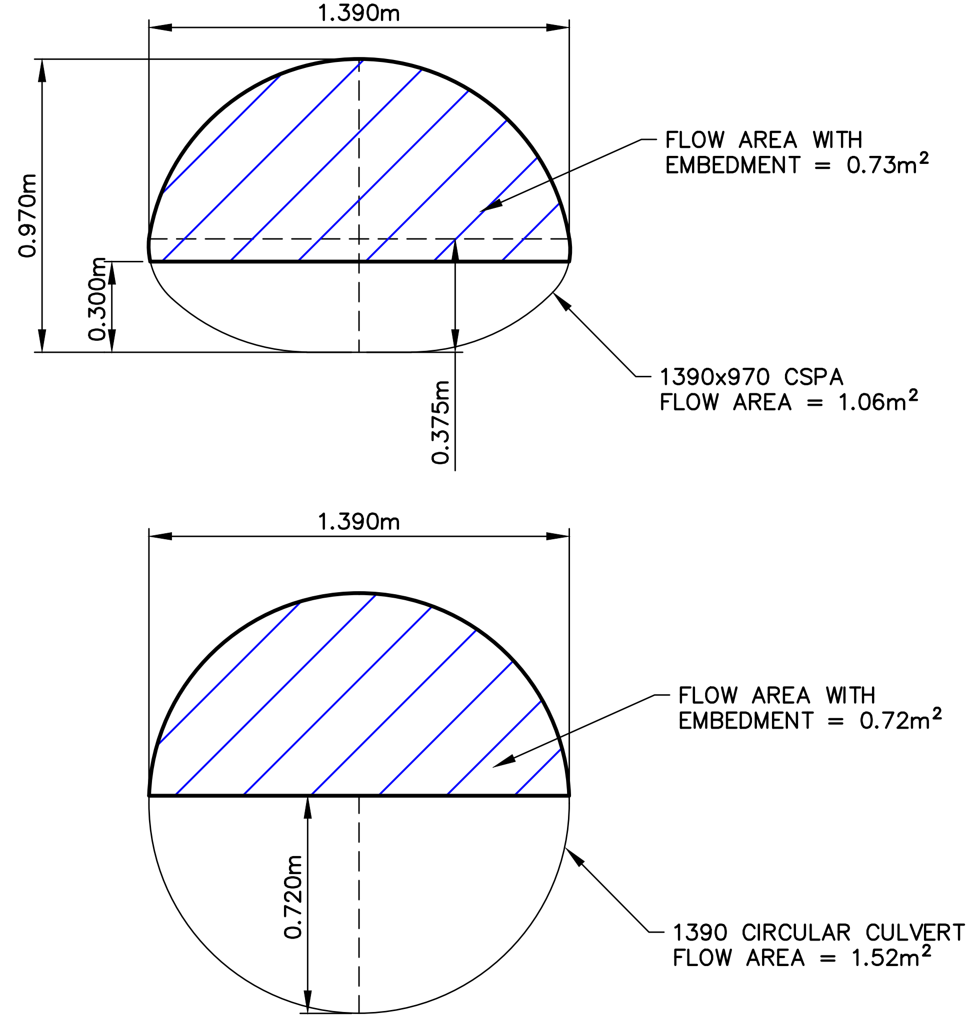
Inlet Elevation (invert): 218.58 m,   Outlet Elevation (invert): 218.36 m

Culvert Length: 24.40 m,   Culvert Slope: 0.0090

****

Table 3 - Summary of Culvert Flows at Crossing: PROP Crystal Beach Road 2-1390x970 (REGRADE)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	1390x970- 300 embed Discharge (cms)	Roadway Discharge (cms)	Iterations
219.16	2-yr 24hr SCS	0.33	0.33	0.00	1
219.24	5-yr 24hr SCS	0.85	0.85	0.00	1
219.37	10-yr 24hr SCS	1.41	1.31	0.09	13
219.45	25-yr 24hr SCS	2.59	1.53	1.06	5
219.48	50-yr 24hr SCS	3.18	1.59	1.58	4
219.50	100-yr 24hr SCS	3.69	1.64	2.04	3
219.35	Overtopping	1.25	1.25	0.00	Overtopping



DETAIL: EMBEDDED PIPE ARCH AND CIRCULAR PIPE EQUIVALENT FLOW AREA

HY-8 Culvert Analysis Report

Crossing Notes: PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Crossing model to represent 3000 span x 900 rise box culvert with 300mm embedment. Proposed regrading of road profile to lower flood elevations. Spill to TOI max allowable flooding depth (0.15m above crown).

Culvert Data Summary - 3000x900 BOX

Barrel Shape: Concrete Box

Barrel Span: 3000.00 mm

Barrel Rise: 900.00 mm

Barrel Material: Concrete

Embedment: 300.00 mm

Barrel Manning's n: 0.0130 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	44.00	219.67
3	59.80	219.35
4	78.00	219.35
5	83.00	219.55
6	91.00	219.72
7	112.00	219.72
8	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Table 1 - Culvert Summary Table: 3000x900 BOX

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.33	219.16	0.162	0.596	3-M1f	0.124	0.106	0.600	0.950	0.183	0.000
5-yr 24hr SCS	0.85	0.85	219.19	0.304	0.626	4-FFf	0.219	0.204	0.600	0.950	0.472	0.000
10-yr 24hr SCS	1.41	1.41	219.25	0.448	0.690	4-FFf	0.297	0.284	0.600	0.950	0.783	0.000
25-yr 24hr SCS	2.59	2.23	219.40	0.642	0.840	4-FFf	0.391	0.381	0.600	0.950	1.237	0.000
50-yr 24hr SCS	3.18	2.37	219.43	0.676	0.873	4-FFf	0.406	0.397	0.600	0.950	1.317	0.000
100-yr 24hr SCS	3.69	2.47	219.46	0.699	0.897	4-FFf	0.416	0.407	0.600	0.950	1.370	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.56 m, Outlet Elevation (invert): 218.17 m

Culvert Length: 24.40 m, Culvert Slope: 0.0160

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Table 3 - Summary of Culvert Flows at Crossing: PROP Crystal Beach Road 3000x900 BOX (REGRADE)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	3000x900 BOX Discharge (cms)	Roadway Discharge (cms)	Iterations
219.16	2-yr 24hr SCS	0.33	0.33	0.00	1
219.19	5-yr 24hr SCS	0.85	0.85	0.00	1
219.25	10-yr 24hr SCS	1.41	1.41	0.00	1
219.40	25-yr 24hr SCS	2.59	2.23	0.36	8
219.43	50-yr 24hr SCS	3.18	2.37	0.81	5
219.46	100-yr 24hr SCS	3.69	2.47	1.22	4
219.35	Overtopping	1.99	1.99	0.00	Overtopping

HY-8 Culvert Analysis Report

Crossing Notes: PROP Crystal Beach Road 2-1390x970 (REGRADE2)

Crossing model to represent equivalent of twin 1390x970 pipe arch culverts with 300mm embedment. Modeled as 1390 diameter culvert with 720mm embedment to achieve equivalent flow area. Proposed regrading of road profile to lower flood elevations. Spill to TOI max allowable flooding depth (0.15m above crown). Design Goal max HWE: 219.50. Analyzed for Lake Simcoe Water Level = 218.85 (Average March Level)

Culvert Data Summary - 1390x970- 300 Embed

Barrel Shape: Circular

Barrel Diameter: 1390.00 mm

Barrel Material: Corrugated Steel

Embedment: 720.00 mm

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - PROP Crystal Beach Road 2-1390x970 (REGRADE)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: PROP Crystal Beach Road 2-1390x970 (REGRADE)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	44.00	219.67
3	59.80	219.35
4	78.00	219.35
5	83.00	219.55
6	91.00	219.72
7	112.00	219.72
8	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Culvert Summary Table: 1390x970- 300 Embed

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	1390x970- 300 embed Discharge (cms)	Roadway Discharge (cms)	Iterations
218.88	2-yr 24hr SCS	0.33	0.33	0.00	1
219.02	5-yr 24hr SCS	0.85	0.85	0.00	1
219.20	10-yr 24hr SCS	1.41	1.41	0.00	1
219.42	25-yr 24hr SCS	2.59	2.02	0.57	7
219.45	50-yr 24hr SCS	3.18	2.09	1.09	5
219.47	100-yr 24hr SCS	3.69	2.13	1.55	4
219.35	Overtopping	1.85	1.85	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 218.58 m, Outlet Elevation (invert): 218.36 m

Culvert Length: 24.40 m, Culvert Slope: 0.0090

****

Summary of Culvert Flows at Crossing: PROP Crystal Beach Road 2-1390x970 (REGRADE)

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.33	218.88	0.168	0.305	3-M1t	0.159	0.112	0.490	0.490	0.272	0.000
5-yr 24hr SCS	0.85	0.85	219.02	0.333	0.443	3-M1t	0.302	0.216	0.490	0.490	0.701	0.000
10-yr 24hr SCS	1.41	1.41	219.20	0.471	0.619	3-M1t	0.454	0.300	0.490	0.490	1.164	0.000
25-yr 24hr SCS	2.59	2.02	219.42	0.609	0.837	3-M2t	0.670	0.374	0.490	0.490	1.665	0.000
50-yr 24hr SCS	3.18	2.09	219.45	0.627	0.870	3-M2t	0.670	0.384	0.490	0.490	1.724	0.000
100-yr 24hr SCS	3.69	2.13	219.47	0.637	0.894	3-M2t	0.670	0.389	0.490	0.490	1.761	0.000

HY-8 Culvert Analysis Report

Crossing Notes: PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Crossing model to represent 3000 span x 900 rise box culvert with 300mm embedment. Proposed regrading of road profile to lower flood elevations. Spill to TOI max allowable flooding depth (0.15m above crown). Analyzed for Lake Simcoe Water Level = 218.85 (Average March Level)

Culvert Data Summary - 3000x900 BOX

Barrel Shape: Concrete Box

Barrel Span: 3000.00 mm

Barrel Rise: 900.00 mm

Barrel Material: Concrete

Embedment: 300.00 mm

Barrel Manning's n: 0.0130 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: PROP Crystal Beach Road 3000x900 BOX (REGRADE2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	44.00	219.67
3	59.80	219.35
4	78.00	219.35
5	83.00	219.55
6	91.00	219.72
7	112.00	219.72
8	129.00	219.86

Roadway Surface: Paved

Roadway Top Width: 7.50 m

Culvert Summary Table: 3000x900 BOX

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	3000x900 BOX Discharge (cms)	Roadway Discharge (cms)	Iterations
218.87	2-yr 24hr SCS	0.33	0.33	0.00	1
218.95	5-yr 24hr SCS	0.85	0.85	0.00	1
219.09	10-yr 24hr SCS	1.41	1.41	0.00	1
219.37	25-yr 24hr SCS	2.59	2.52	0.07	6
219.41	50-yr 24hr SCS	3.18	2.74	0.44	7
219.44	100-yr 24hr SCS	3.69	2.84	0.85	5
219.35	Overtopping	2.45	2.45	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 218.56 m, Outlet Elevation (invert): 218.17 m

Culvert Length: 24.40 m, Culvert Slope: 0.0160

****

Summary of Culvert Flows at Crossing: PROP Crystal Beach Road 3000x900 BOX (REGRADE)

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2-yr 24hr SCS	0.33	0.33	218.87	0.162	0.305	3-M1f	0.124	0.106	0.600	0.650	0.183	0.000
5-yr 24hr SCS	0.85	0.85	218.95	0.304	0.387	3-M1f	0.219	0.204	0.600	0.650	0.472	0.000
10-yr 24hr SCS	1.41	1.41	219.09	0.448	0.527	3-M1f	0.297	0.284	0.600	0.650	0.783	0.000
25-yr 24hr SCS	2.59	2.52	219.37	0.713	0.807	3-M1f	0.422	0.415	0.600	0.650	1.402	0.000
50-yr 24hr SCS	3.18	2.74	219.41	0.765	0.854	3-M1f	0.443	0.437	0.600	0.650	1.520	0.000
100-yr 24hr SCS	3.69	2.84	219.44	0.789	0.876	3-M1f	0.452	0.448	0.600	0.650	1.577	0.000

Alternative #3

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Tall Tree Lane - Overland Spillway w Armour Stone Walls

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.004	m/m
BOTTOM WIDTH	2.50	
DEPTH	0.20	m
AREA	0.500	m^2
WETTED PERIMETER	2.900	m
HYDRAULIC RADIUS	0.172	m
FLOW CAPACITY	0.245	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Alternative #4

ALTERNATIVE #2 ONLY - CRYSTAL BEACH ROADSIDE DITCH DRIVEWAY CULVERTS STA. 1+050 - STA. 1+400

HY-8 Culvert Analysis Report

Culvert Data Summary - 2232 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.24 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.44	0.634	0.835	4-FFf	-0.305	0.374	0.600	0.640	1.167	0.000
1:100-year 24hr SCS	0.86	0.46	219.62	0.855	1.019	4-FFf	-0.305	0.444	0.600	0.640	1.625	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.60 m, Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.44	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.62	1:100-year 24hr SCS	0.86	0.46	0.40	5
219.51	Overtopping	0.39	0.39	0.00	Overtopping

Culvert Data Summary - 2234 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.44 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.08	219.45	0.266	0.811	4-FFf	-0.305	0.178	0.600	0.800	0.281	0.000
1:100-year 24hr SCS	0.86	0.22	219.52	0.474	0.885	4-FFf	-0.305	0.302	0.600	0.800	0.768	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.64 m,   Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.45	1:5-year 24hr SCS	0.33	0.08	0.25	11
219.52	1:100-year 24hr SCS	0.86	0.22	0.64	3
219.26	Overtopping	-261.76	-261.76	0.00	Overtopping

Culvert Data Summary - 2240 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.45 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.31	219.62	0.603	1.197	4-FFf	-0.305	0.362	0.600	1.030	1.093	0.000
1:100-year 24hr SCS	0.86	0.41	219.74	0.764	1.325	4-FFf	-0.305	0.419	0.600	1.030	1.451	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.42 m, Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.62	1:5-year 24hr SCS	0.33	0.31	0.02	10
219.74	1:100-year 24hr SCS	0.86	0.41	0.45	5
219.60	Overtopping	0.29	0.29	0.00	Overtopping

Culvert Data Summary - 2246 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.62 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.23	219.72	0.489	1.177	4-FFf	0.326	0.311	0.600	1.170	0.817	0.000
1:100-year 24hr SCS	0.86	0.33	219.82	0.629	1.276	4-FFf	0.415	0.373	0.600	1.170	1.164	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.54 m, Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m, Culvert Slope: 0.0134

****

Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.72	1:5-year 24hr SCS	0.33	0.23	0.10	8
219.82	1:100-year 24hr SCS	0.86	0.33	0.53	4
219.62	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2250 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.72 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.08	219.73	0.272	1.262	4-FFf	-0.305	0.182	0.600	1.270	0.293	0.000
1:100-year 24hr SCS	0.76	0.21	219.80	0.459	1.326	4-FFf	-0.305	0.294	0.600	1.270	0.733	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m,   Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.73	1:5-year 24hr SCS	0.29	0.08	0.21	10
219.80	1:100-year 24hr SCS	0.76	0.21	0.55	3
219.60	Overtopping	0.00	0.00	0.00	Overtopping

IMPROVEMENTS TO DITCH WATER LEVELS END AT 2250 CRYSTAL BEACH ROAD

HY-8 Culvert Analysis Report

Culvert Data Summary - 2232 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.24 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.29	0.400	0.689	4-FFf	-0.305	0.261	0.600	0.640	0.584	0.000
1:100-year 24hr SCS	0.86	0.81	219.54	0.759	0.938	4-FFf	-0.305	0.417	0.600	0.640	1.440	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.60 m,   Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.29	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.54	1:100-year 24hr SCS	0.86	0.81	0.04	6
219.51	Overtopping	0.78	0.78	0.00	Overtopping

Culvert Data Summary - 2234 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.29 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.31	219.33	0.383	0.692	4-FFf	-0.305	0.251	0.600	0.650	0.542	0.000
1:100-year 24hr SCS	0.86	0.59	219.45	0.581	0.805	4-FFf	-0.305	0.353	0.600	0.650	1.040	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.64 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.33	1:5-year 24hr SCS	0.33	0.31	0.02	7
219.45	1:100-year 24hr SCS	0.86	0.59	0.27	5
219.26	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2240 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.33 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.38	0.400	0.958	4-FFf	-0.305	0.261	0.600	0.910	0.584	0.000
1:100-year 24hr SCS	0.86	0.82	219.63	0.767	1.207	4-FFf	-0.305	0.420	0.600	0.910	1.458	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.42 m,   Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.38	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.63	1:100-year 24hr SCS	0.86	0.82	0.04	6
219.60	Overtopping	0.79	0.79	0.00	Overtopping

Culvert Data Summary - 2246 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.38 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.43	0.396	0.889	4-FFf	0.267	0.261	0.600	0.930	0.584	0.000
1:100-year 24hr SCS	0.86	0.82	219.69	0.761	1.146	4-FFf	0.600	0.419	0.600	0.930	1.454	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.54 m, Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m, Culvert Slope: 0.0134

****

Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.43	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.69	1:100-year 24hr SCS	0.86	0.82	0.04	5
219.62	Overtopping	0.73	0.73	0.00	Overtopping

Culvert Data Summary - 2250 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.43 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.29	219.47	0.371	0.997	4-FFf	-0.305	0.243	0.600	0.980	0.513	0.000
1:100-year 24hr SCS	0.76	0.72	219.66	0.684	1.192	4-FFf	-0.305	0.393	0.600	0.980	1.281	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m,   Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.47	1:5-year 24hr SCS	0.29	0.29	0.00	1
219.66	1:100-year 24hr SCS	0.76	0.72	0.03	7
219.60	Overtopping	0.62	0.62	0.00	Overtopping

Culvert Data Summary - 2254 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2254 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.47 m

Roadway Data for Crossing: 2254 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.79
1	3.40	219.54
2	5.80	219.42
3	11.50	219.82

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2254 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.26	219.50	0.348	1.030	4-FFf	-0.305	0.229	0.600	1.020	0.460	0.000
1:100-year 24hr SCS	0.76	0.53	219.59	0.539	1.123	4-FFf	-0.305	0.333	0.600	1.020	0.934	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2254 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2254 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.50	1:5-year 24hr SCS	0.29	0.26	0.03	8
219.59	1:100-year 24hr SCS	0.76	0.53	0.23	5
219.42	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2258 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2258 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.50 m

Roadway Data for Crossing: 2258 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.88
1	2.40	219.82
2	6.00	219.72
3	11.40	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2258 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.54	0.354	0.785	4-FFf	0.283	0.234	0.600	0.810	0.477	0.000
1:100-year 24hr SCS	0.71	0.71	219.74	0.668	0.993	4-FFf	0.600	0.388	0.600	0.810	1.250	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.75 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 8.20 m, Culvert Slope: 0.0073

****

Summary of Culvert Flows at Crossing: 2258 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2258 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.54	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.74	1:100-year 24hr SCS	0.71	0.71	0.00	8
219.72	Overtopping	0.67	0.67	0.00	Overtopping

Culvert Data Summary - 2262 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2262 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.54 m

Roadway Data for Crossing: 2262 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	1.90	219.59
2	5.80	219.68
3	10.20	219.88

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2262 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.57	0.349	0.812	4-FFf	0.211	0.234	0.600	0.910	0.477	0.000
1:100-year 24hr SCS	0.71	0.55	219.67	0.545	0.912	4-FFf	0.315	0.339	0.600	0.910	0.967	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.76 m, Outlet Elevation (invert): 218.63 m

Culvert Length: 6.20 m, Culvert Slope: 0.0210

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Summary of Culvert Flows at Crossing: 2262 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2262 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.57	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.67	1:100-year 24hr SCS	0.71	0.55	0.16	5
219.59	Overtopping	0.34	0.34	0.00	Overtopping

Culvert Data Summary - 2270 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.57 m

Roadway Data for Crossing: 2270 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.87
1	3.20	219.83
2	6.80	219.77
3	12.00	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2270 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.60	0.356	0.771	4-FFf	-0.305	0.234	0.600	0.740	0.477	0.000
1:100-year 24hr SCS	0.71	0.71	219.78	0.671	0.953	4-FFf	-0.305	0.388	0.600	0.740	1.251	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m,   Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2270 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.60	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.78	1:100-year 24hr SCS	0.71	0.71	0.00	11
219.77	Overtopping	0.68	0.68	0.00	Overtopping

Culvert Data Summary - 2270 CBR (2) 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.60 m

Roadway Data for Crossing: 2270 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	2.90	219.80
2	6.60	219.75
3	11.70	219.86

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Table 28 - Culvert Summary Table: 2270 CBR (2) 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.62	0.317	0.791	4-FFf	-0.305	0.210	0.600	0.770	0.389	0.000
1:100-year 24hr SCS	0.57	0.57	219.74	0.568	0.909	4-FFf	-0.305	0.347	0.600	0.770	1.008	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m, Culvert Slope: 0.0000

****

Table 30 - Summary of Culvert Flows at Crossing: 2270 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR (2) 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.62	1:5-year 24hr SCS	0.22	0.22	0.00	1
219.74	1:100-year 24hr SCS	0.57	0.57	0.00	1
219.75	Overtopping	0.59	0.59	0.00	Overtopping

Culvert Data Summary - 2274 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2274 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.62 m

Roadway Data for Crossing: 2274 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.96
1	3.40	219.76
2	7.20	219.70
3	13.50	219.90

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2274 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.64	0.314	0.931	4-FFf	0.224	0.210	0.600	0.790	0.389	0.000
1:100-year 24hr SCS	0.57	0.54	219.75	0.545	1.040	4-FFf	0.383	0.337	0.600	0.790	0.959	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.71 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.20 m, Culvert Slope: 0.0113

****

Summary of Culvert Flows at Crossing: 2274 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2274 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.64	1:5-year 24hr SCS	0.22	0.22	0.00	1
219.75	1:100-year 24hr SCS	0.57	0.54	0.03	8
219.70	Overtopping	0.43	0.43	0.00	Overtopping

Culvert Data Summary - 2276 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2276 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.64 m

Roadway Data for Crossing: 2276 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.78
1	3.10	219.64
2	6.90	219.72
3	13.50	219.98

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2276 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.66	0.317	0.921	4-FFf	-0.305	0.210	0.600	0.810	0.388	0.000
1:100-year 24hr SCS	0.57	0.47	219.74	0.495	0.996	4-FFf	-0.305	0.312	0.600	0.810	0.823	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.74 m, Outlet Elevation (invert): 218.74 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2276 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2276 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.66	1:5-year 24hr SCS	0.22	0.22	0.00	8
219.74	1:100-year 24hr SCS	0.57	0.47	0.10	5
219.64	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2282 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2282 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.66 m

Roadway Data for Crossing: 2282 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.00
1	2.30	219.90
2	6.70	219.84
3	13.50	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2282 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.68	0.288	0.686	4-FFf	0.184	0.194	0.600	0.780	0.336	0.000
1:100-year 24hr SCS	0.50	0.50	219.77	0.514	0.780	4-FFf	0.314	0.324	0.600	0.780	0.884	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.99 m,   Outlet Elevation (invert): 218.88 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0177

****

Summary of Culvert Flows at Crossing: 2282 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2282 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.68	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.77	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.84	Overtopping	0.64	0.64	0.00	Overtopping

Culvert Data Summary - 2286 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2286 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.68 m

Roadway Data for Crossing: 2286 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.06
1	3.00	219.97
2	7.50	219.84
3	14.50	220.06

Roadway Surface: Gravel

Roadway Top Width: 10.00 m

Culvert Summary Table: 2286 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.70	0.293	0.751	4-FFf	-0.305	0.194	0.600	0.730	0.336	0.000
1:100-year 24hr SCS	0.50	0.50	219.82	0.519	0.875	4-FFf	-0.305	0.324	0.600	0.730	0.884	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.95 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 12.30 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2286 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2286 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.70	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.82	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.84	Overtopping	0.53	0.53	0.00	Overtopping

Culvert Data Summary - 2290 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2290 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.70 m

Roadway Data for Crossing: 2290 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.14
1	3.00	219.94
2	7.90	219.71
3	15.00	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2290 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.72	0.293	0.867	4-FFf	0.250	0.195	0.600	0.890	0.339	0.000
1:100-year 24hr SCS	0.50	0.45	219.79	0.486	0.945	4-FFf	0.434	0.309	0.600	0.890	0.803	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.85 m, Outlet Elevation (invert): 218.81 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2290 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2290 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.72	1:5-year 24hr SCS	0.19	0.19	0.00	8
219.79	1:100-year 24hr SCS	0.50	0.45	0.04	5
219.71	Overtopping	0.15	0.15	0.00	Overtopping

Culvert Data Summary - 2294 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2294 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.72 m

Roadway Data for Crossing: 2294 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.97
1	2.40	219.88
2	6.00	219.80
3	13.40	220.06

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2294 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.74	0.293	0.957	4-FFf	-0.305	0.194	0.600	0.910	0.336	0.000
1:100-year 24hr SCS	0.50	0.49	219.83	0.514	1.051	4-FFf	-0.305	0.321	0.600	0.910	0.870	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.78 m, Outlet Elevation (invert): 218.78 m

Culvert Length: 7.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2294 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2294 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.74	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.83	1:100-year 24hr SCS	0.50	0.49	0.01	7
219.80	Overtopping	0.42	0.42	0.00	Overtopping

Culvert Data Summary - 2298 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2298 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.74 m

Roadway Data for Crossing: 2298 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	4.00	219.81
2	7.90	219.81
3	16.00	220.11

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2298 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.15	219.75	0.256	1.020	4-FFf	0.219	0.173	0.600	1.050	0.265	0.000
1:100-year 24hr SCS	0.41	0.41	219.82	0.452	1.086	4-FFf	0.398	0.291	0.600	1.050	0.718	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.73 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2298 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2298 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.75	1:5-year 24hr SCS	0.15	0.15	0.00	1
219.82	1:100-year 24hr SCS	0.41	0.41	0.00	7
219.81	Overtopping	0.39	0.39	0.00	Overtopping

Culvert Data Summary - 2306 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.75 m

Roadway Data for Crossing: 2306 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.92
1	2.00	218.82
2	5.00	218.84
3	13.80	220.14

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.03	219.75	0.114	0.940	4-FFf	0.080	0.076	0.600	1.060	0.054	0.000
1:100-year 24hr SCS	0.41	0.05	219.75	0.148	0.941	4-FFf	0.105	0.100	0.600	1.060	0.094	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.81 m, Outlet Elevation (invert): 218.72 m

Culvert Length: 7.00 m, Culvert Slope: 0.0129

****

Summary of Culvert Flows at Crossing: 2306 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.75	1:5-year 24hr SCS	0.15	0.03	0.12	4
219.75	1:100-year 24hr SCS	0.41	0.05	0.36	2
218.82	Overtopping	-2272806066040926800000000000000000000000000000000000000000000.00	-2272806066040926800000000000000000000000000000000000000000000.00	0.00	Overtopping

Culvert Data Summary - 2306 (2) CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.75 m

Roadway Data for Crossing: 2306 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.99
1	2.00	219.86
2	5.00	219.88
3	13.80	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 (2) CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.15	219.76	0.258	0.930	4-FFf	-0.305	0.173	0.600	1.060	0.265	0.000
1:100-year 24hr SCS	0.41	0.41	219.82	0.456	0.994	4-FFf	-0.305	0.293	0.600	1.060	0.725	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2306 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 (2) CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.76	1:5-year 24hr SCS	0.15	0.15	0.00	1
219.82	1:100-year 24hr SCS	0.41	0.41	0.00	1
219.86	Overtopping	0.50	0.50	0.00	Overtopping

Culvert Data Summary - 2314 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2314 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.76 m

Roadway Data for Crossing: 2314 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.53
1	2.60	220.31
2	6.00	220.13
3	9.00	219.82
4	14.50	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2314 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.11	0.11	219.77	0.217	0.926	4-FFf	0.165	0.146	0.600	0.960	0.195	0.000
1:100-year 24hr SCS	0.31	0.31	219.81	0.383	0.966	4-FFf	0.289	0.252	0.600	0.960	0.548	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.84 m, Outlet Elevation (invert): 218.77 m

Culvert Length: 7.80 m, Culvert Slope: 0.0090

****

Summary of Culvert Flows at Crossing: 2314 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2314 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.77	1:5-year 24hr SCS	0.11	0.11	0.00	1
219.81	1:100-year 24hr SCS	0.31	0.31	0.00	1
219.82	Overtopping	0.35	0.35	0.00	Overtopping

ALTERNATIVE #2 - CRYSTAL BEACH ROADSIDE DITCH
TWINNED DRIVEWAY CULVERTS STA. 1+050 - STA. 1+400

HY-8 Culvert Analysis Report

Analysis for tailwater = 218.85 - Lake Simcoe average March water level

Culvert Data Summary - 2232 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.02 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.28	0.634	0.682	7-H2t	-0.305	0.374	0.420	0.420	1.561	0.000
1:100-year 24hr SCS	0.86	0.53	219.61	1.007	0.943	7-JH2c	-0.305	0.476	0.476	0.420	2.154	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.60 m,   Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.28	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.61	1:100-year 24hr SCS	0.86	0.53	0.33	5
219.51	Overtopping	0.49	0.49	0.00	Overtopping

Culvert Data Summary - 2234 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.28 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.24	219.38	0.502	0.741	4-FFf	-0.305	0.316	0.600	0.640	0.840	0.000
1:100-year 24hr SCS	0.86	0.35	219.50	0.666	0.861	4-FFf	-0.305	0.387	0.600	0.640	1.241	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.64 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.38	1:5-year 24hr SCS	0.33	0.24	0.09	8
219.50	1:100-year 24hr SCS	0.86	0.35	0.51	4
219.26	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2240 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.38 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.57	0.634	1.151	4-FFf	-0.305	0.374	0.600	0.960	1.167	0.000
1:100-year 24hr SCS	0.86	0.45	219.74	0.839	1.317	4-FFf	-0.305	0.439	0.600	0.960	1.596	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.42 m, Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.57	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.74	1:100-year 24hr SCS	0.86	0.45	0.41	5
219.60	Overtopping	0.35	0.35	0.00	Overtopping

Culvert Data Summary - 2246 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.57 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.27	219.70	0.540	1.160	4-FFf	0.358	0.335	0.600	1.120	0.947	0.000
1:100-year 24hr SCS	0.86	0.36	219.81	0.684	1.271	4-FFf	0.452	0.394	0.600	1.120	1.289	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.54 m, Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m, Culvert Slope: 0.0134

****

Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.70	1:5-year 24hr SCS	0.33	0.27	0.06	10
219.81	1:100-year 24hr SCS	0.86	0.36	0.49	5
219.62	Overtopping	0.17	0.17	0.00	Overtopping

Culvert Data Summary - 2250 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.70 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.11	219.72	0.315	1.251	4-FFf	-0.305	0.209	0.600	1.250	0.385	0.000
1:100-year 24hr SCS	0.76	0.23	219.79	0.490	1.323	4-FFf	-0.305	0.310	0.600	1.250	0.810	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.72	1:5-year 24hr SCS	0.29	0.11	0.18	9
219.79	1:100-year 24hr SCS	0.76	0.23	0.53	4
219.60	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2254 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2254 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.72 m

Roadway Data for Crossing: 2254 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.79
1	3.40	219.54
2	5.80	219.42
3	11.50	219.82

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2254 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.04	219.72	0.174	1.252	4-FFf	-0.305	0.117	0.600	1.270	0.125	0.000
1:100-year 24hr SCS	0.76	0.07	219.73	0.257	1.260	4-FFf	-0.305	0.172	0.600	1.270	0.264	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2254 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2254 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.72	1:5-year 24hr SCS	0.29	0.04	0.26	5
219.73	1:100-year 24hr SCS	0.76	0.07	0.69	4
219.42	Overtopping	-229965.14	-229965.14	0.00	Overtopping

Culvert Data Summary - 2258 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2258 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.72 m

Roadway Data for Crossing: 2258 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.88
1	2.40	219.82
2	6.00	219.72
3	11.40	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2258 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.20	219.80	0.451	1.050	4-FFf	0.364	0.291	0.600	1.030	0.718	0.000
1:100-year 24hr SCS	0.71	0.29	219.88	0.571	1.132	4-FFf	0.600	0.349	0.600	1.030	1.020	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.75 m,   Outlet Elevation (invert): 218.69 m

Culvert Length: 8.20 m,   Culvert Slope: 0.0073

****

Summary of Culvert Flows at Crossing: 2258 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2258 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.80	1:5-year 24hr SCS	0.27	0.20	0.07	9
219.88	1:100-year 24hr SCS	0.71	0.29	0.42	4
219.72	Overtopping	0.00	0.00	0.00	Overtopping

Culvert Data Summary - 2262 CBR 600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2262 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.80 m

Roadway Data for Crossing: 2262 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	1.90	219.59
2	5.80	219.68
3	10.20	219.88

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2262 CBR 600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.04	219.80	0.175	1.042	4-FFf	0.109	0.120	0.600	1.170	0.131	0.000
1:100-year 24hr SCS	0.71	0.08	219.81	0.258	1.051	4-FFf	0.159	0.176	0.600	1.170	0.275	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.76 m,   Outlet Elevation (invert): 218.63 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0210

****

Summary of Culvert Flows at Crossing: 2262 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2262 CBR 600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.80	1:5-year 24hr SCS	0.27	0.04	0.24	5
219.81	1:100-year 24hr SCS	0.71	0.08	0.64	4
219.59	Overtopping	-2719.27	-2719.27	0.00	Overtopping

IMPROVEMENTS TO DITCH WATER LEVELS END AT 2262 CRYSTAL BEACH ROAD

ALTERNATIVE #2 & #4 - CRYSTAL BEACH ROADSIDE DITCH
TWINNED DRIVEWAY CULVERTS STA. 1+050 - STA. 1+400

HY-8 Culvert Analysis Report

Analysis for tailwater = 218.85 - Lake Simcoe average March water level

Culvert Data Summary - 2232 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2232 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.02 m

Roadway Data for Crossing: 2232 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	6.70	219.51
2	11.40	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2232 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.10	0.400	0.497	7-H2t	-0.305	0.261	0.420	0.420	0.781	0.000
1:100-year 24hr SCS	0.86	0.86	219.42	0.799	0.824	7-H2c	-0.305	0.428	0.428	0.420	1.990	0.000

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Straight Culvert

Inlet Elevation (invert): 218.60 m, Outlet Elevation (invert): 218.60 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2232 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2232 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.10	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.42	1:100-year 24hr SCS	0.86	0.86	0.00	1
219.51	Overtopping	0.97	0.97	0.00	Overtopping

Culvert Data Summary - 2234 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2234 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.10 m

Roadway Data for Crossing: 2234 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.38
1	2.10	219.26
2	6.10	219.49
3	10.50	219.72

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2234 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.16	0.400	0.524	7-H2t	-0.305	0.261	0.460	0.460	0.709	0.000
1:100-year 24hr SCS	0.86	0.75	219.39	0.703	0.751	7-H2t	-0.305	0.400	0.460	0.460	1.608	0.000

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Straight Culvert

Inlet Elevation (invert): 218.64 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.50 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2234 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2234 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.16	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.39	1:100-year 24hr SCS	0.86	0.75	0.11	6
219.26	Overtopping	0.54	0.54	0.00	Overtopping

Culvert Data Summary - 2240 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2240 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.16 m

Roadway Data for Crossing: 2240 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.59
1	4.10	219.60
2	10.00	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2240 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.21	0.400	0.788	4-FFf	-0.305	0.261	0.600	0.740	0.584	0.000
1:100-year 24hr SCS	0.86	0.86	219.48	0.799	1.064	4-FFf	-0.305	0.428	0.600	0.740	1.521	0.000

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Straight Culvert

Inlet Elevation (invert): 218.42 m, Outlet Elevation (invert): 218.42 m

Culvert Length: 6.00 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2240 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2240 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.21	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.48	1:100-year 24hr SCS	0.86	0.86	0.00	1
219.60	Overtopping	1.00	1.00	0.00	Overtopping

Culvert Data Summary - 2246 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2246 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.21 m

Roadway Data for Crossing: 2246 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	3.60	219.68
2	6.00	219.62
3	11.50	219.85

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2246 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.33	0.33	219.26	0.396	0.719	4-FFf	0.267	0.261	0.600	0.760	0.584	0.000
1:100-year 24hr SCS	0.86	0.86	219.55	0.795	1.005	4-FFf	0.600	0.428	0.600	0.760	1.521	0.000

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Straight Culvert

Inlet Elevation (invert): 218.54 m,   Outlet Elevation (invert): 218.45 m

Culvert Length: 6.70 m,   Culvert Slope: 0.0134

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Summary of Culvert Flows at Crossing: 2246 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2246 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.26	1:5-year 24hr SCS	0.33	0.33	0.00	1
219.55	1:100-year 24hr SCS	0.86	0.86	0.00	1
219.62	Overtopping	0.95	0.95	0.00	Overtopping

Culvert Data Summary - 2250 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2250 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.26 m

Roadway Data for Crossing: 2250 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.90
1	4.00	219.66
2	7.00	219.60
3	12.20	219.84

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2250 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.29	219.30	0.371	0.827	4-FFf	-0.305	0.243	0.600	0.810	0.513	0.000
1:100-year 24hr SCS	0.76	0.76	219.52	0.713	1.045	4-FFf	-0.305	0.403	0.600	0.810	1.344	0.000

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Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2250 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2250 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.30	1:5-year 24hr SCS	0.29	0.29	0.00	1
219.52	1:100-year 24hr SCS	0.76	0.76	0.00	1
219.60	Overtopping	0.88	0.88	0.00	Overtopping

Culvert Data Summary - 2254 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2254 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.30 m

Roadway Data for Crossing: 2254 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.79
1	3.40	219.54
2	5.80	219.42
3	11.50	219.82

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2254 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.29	0.29	219.34	0.371	0.867	4-FFf	-0.305	0.243	0.600	0.850	0.513	0.000
1:100-year 24hr SCS	0.76	0.71	219.52	0.669	1.050	4-FFf	-0.305	0.388	0.600	0.850	1.247	0.000

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Straight Culvert

Inlet Elevation (invert): 218.47 m, Outlet Elevation (invert): 218.47 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2254 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2254 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.34	1:5-year 24hr SCS	0.29	0.29	0.00	1
219.52	1:100-year 24hr SCS	0.76	0.71	0.05	7
219.42	Overtopping	0.52	0.52	0.00	Overtopping

Culvert Data Summary - 2258 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2258 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.34 m

Roadway Data for Crossing: 2258 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.88
1	2.40	219.82
2	6.00	219.72
3	11.40	219.87

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2258 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.38	0.354	0.625	4-FFf	0.283	0.234	0.600	0.650	0.477	0.000
1:100-year 24hr SCS	0.71	0.71	219.59	0.670	0.835	4-FFf	0.600	0.389	0.600	0.650	1.256	0.000

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Straight Culvert

Inlet Elevation (invert): 218.75 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 8.20 m, Culvert Slope: 0.0073

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Summary of Culvert Flows at Crossing: 2258 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2258 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.38	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.59	1:100-year 24hr SCS	0.71	0.71	0.00	1
219.72	Overtopping	0.88	0.88	0.00	Overtopping

Culvert Data Summary - 2262 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2262 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.38 m

Roadway Data for Crossing: 2262 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.51
1	1.90	219.59
2	5.80	219.68
3	10.20	219.88

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2262 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.41	0.349	0.652	4-FFf	0.211	0.234	0.600	0.750	0.477	0.000
1:100-year 24hr SCS	0.71	0.69	219.59	0.649	0.829	4-FFf	0.365	0.383	0.600	0.750	1.217	0.000

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Straight Culvert

Inlet Elevation (invert): 218.76 m,   Outlet Elevation (invert): 218.63 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0210

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Summary of Culvert Flows at Crossing: 2262 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2262 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.41	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.59	1:100-year 24hr SCS	0.71	0.69	0.02	7
219.59	Overtopping	0.69	0.69	0.00	Overtopping

Culvert Data Summary - 2270 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.41 m

Roadway Data for Crossing: 2270 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.87
1	3.20	219.83
2	6.80	219.77
3	12.00	219.87

Roadway Surface: Gravel

Roadway Top Width: 5.00 m

Culvert Summary Table: 2270 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.27	0.27	219.44	0.356	0.610	7-H2t	-0.305	0.234	0.580	0.580	0.482	0.000
1:100-year 24hr SCS	0.71	0.71	219.58	0.673	0.753	7-H2t	-0.305	0.389	0.580	0.580	1.269	0.000

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Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2270 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.44	1:5-year 24hr SCS	0.27	0.27	0.00	1
219.58	1:100-year 24hr SCS	0.71	0.71	0.00	1
219.77	Overtopping	1.00	1.00	0.00	Overtopping

Culvert Data Summary - 2270 CBR (2) 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2270 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.44 m

Roadway Data for Crossing: 2270 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	2.90	219.80
2	6.60	219.75
3	11.70	219.86

Roadway Surface: Gravel

Roadway Top Width: 5.00 m

Culvert Summary Table: 2270 CBR (2) 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.46	0.317	0.631	4-FFf	-0.305	0.210	0.600	0.610	0.389	0.000
1:100-year 24hr SCS	0.57	0.57	219.58	0.568	0.749	4-FFf	-0.305	0.347	0.600	0.610	1.008	0.000

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Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 5.50 m, Culvert Slope: 0.0000

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Summary of Culvert Flows at Crossing: 2270 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2270 CBR (2) 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.46	1:5-year 24hr SCS	0.22	0.22	0.00	1
219.58	1:100-year 24hr SCS	0.57	0.57	0.00	1
219.75	Overtopping	0.85	0.85	0.00	Overtopping

Culvert Data Summary - 2274 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2274 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.46 m

Roadway Data for Crossing: 2274 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.96
1	3.40	219.76
2	7.20	219.70
3	13.50	219.90

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2274 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.48	0.314	0.771	4-FFf	0.224	0.210	0.600	0.630	0.389	0.000
1:100-year 24hr SCS	0.57	0.57	219.60	0.565	0.894	4-FFf	0.397	0.347	0.600	0.630	1.008	0.000

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Straight Culvert

Inlet Elevation (invert): 218.71 m, Outlet Elevation (invert): 218.64 m

Culvert Length: 6.20 m, Culvert Slope: 0.0113

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Summary of Culvert Flows at Crossing: 2274 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2274 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.48	1:5-year 24hr SCS	0.22	0.22	0.00	1
219.60	1:100-year 24hr SCS	0.57	0.57	0.00	1
219.70	Overtopping	0.74	0.74	0.00	Overtopping

Culvert Data Summary - 2276 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2276 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.48 m

Roadway Data for Crossing: 2276 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.78
1	3.10	219.64
2	6.90	219.72
3	13.50	219.98

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2276 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.22	0.22	219.50	0.317	0.761	4-FFf	-0.305	0.210	0.600	0.650	0.389	0.000
1:100-year 24hr SCS	0.57	0.57	219.62	0.568	0.884	4-FFf	-0.305	0.347	0.600	0.650	1.008	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.74 m,   Outlet Elevation (invert): 218.74 m

Culvert Length: 6.20 m,   Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2276 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2276 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.50	1:5-year 24hr SCS	0.22	0.22	0.00	1
219.62	1:100-year 24hr SCS	0.57	0.57	0.00	1
219.64	Overtopping	0.60	0.60	0.00	Overtopping

Culvert Data Summary - 2282 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2282 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.50 m

Roadway Data for Crossing: 2282 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.00
1	2.30	219.90
2	6.70	219.84
3	13.50	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.00 m

Culvert Summary Table: 2282 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.52	0.288	0.527	1-S1f	0.184	0.194	0.600	0.620	0.336	0.000
1:100-year 24hr SCS	0.50	0.50	219.61	0.514	0.622	1-S1f	0.314	0.324	0.600	0.620	0.884	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.99 m, Outlet Elevation (invert): 218.88 m

Culvert Length: 6.20 m, Culvert Slope: 0.0177

****

Summary of Culvert Flows at Crossing: 2282 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2282 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.52	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.61	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.84	Overtopping	0.88	0.88	0.00	Overtopping

Culvert Data Summary - 2286 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2286 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.52 m

Roadway Data for Crossing: 2286 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.06
1	3.00	219.97
2	7.50	219.84
3	14.50	220.06

Roadway Surface: Gravel

Roadway Top Width: 10.00 m

Culvert Summary Table: 2286 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.54	0.293	0.590	7-H2t	-0.305	0.194	0.570	0.570	0.342	0.000
1:100-year 24hr SCS	0.50	0.50	219.63	0.519	0.676	7-H2t	-0.305	0.324	0.570	0.570	0.901	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.95 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 12.30 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2286 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2286 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.54	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.63	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.84	Overtopping	0.95	0.95	0.00	Overtopping

Culvert Data Summary - 2290 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2290 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.54 m

Roadway Data for Crossing: 2290 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.14
1	3.00	219.94
2	7.90	219.71
3	15.00	220.05

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2290 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.56	0.291	0.707	4-FFf	0.249	0.194	0.600	0.730	0.336	0.000
1:100-year 24hr SCS	0.50	0.50	219.65	0.517	0.805	4-FFf	0.475	0.324	0.600	0.730	0.884	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.85 m,   Outlet Elevation (invert): 218.81 m

Culvert Length: 7.00 m,   Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2290 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2290 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.56	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.65	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.71	Overtopping	0.61	0.61	0.00	Overtopping

Culvert Data Summary - 2294 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2294 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.56 m

Roadway Data for Crossing: 2294 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.97
1	2.40	219.88
2	6.00	219.80
3	13.40	220.06

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2294 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.19	0.19	219.58	0.293	0.797	4-FFf	-0.305	0.194	0.600	0.750	0.336	0.000
1:100-year 24hr SCS	0.50	0.50	219.67	0.519	0.895	4-FFf	-0.305	0.324	0.600	0.750	0.884	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.78 m, Outlet Elevation (invert): 218.78 m

Culvert Length: 7.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2294 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2294 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.58	1:5-year 24hr SCS	0.19	0.19	0.00	1
219.67	1:100-year 24hr SCS	0.50	0.50	0.00	1
219.80	Overtopping	0.72	0.72	0.00	Overtopping

Culvert Data Summary - 2298 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2298 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.58 m

Roadway Data for Crossing: 2298 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.82
1	4.00	219.81
2	7.90	219.81
3	16.00	220.11

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2298 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.15	219.59	0.256	0.860	4-FFf	0.219	0.173	0.600	0.890	0.265	0.000
1:100-year 24hr SCS	0.41	0.41	219.66	0.455	0.927	4-FFf	0.401	0.293	0.600	0.890	0.725	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.73 m, Outlet Elevation (invert): 218.69 m

Culvert Length: 7.00 m, Culvert Slope: 0.0057

****

Summary of Culvert Flows at Crossing: 2298 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2298 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.59	1:5-year 24hr SCS	0.15	0.15	0.00	1
219.66	1:100-year 24hr SCS	0.41	0.41	0.00	1
219.81	Overtopping	0.71	0.71	0.00	Overtopping

Culvert Data Summary - 2306 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.59 m

Roadway Data for Crossing: 2306 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.92
1	2.00	218.82
2	5.00	218.84
3	13.80	220.14

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2306 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.03	219.59	0.118	0.781	4-FFf	0.084	0.080	0.600	0.900	0.060	0.000
1:100-year 24hr SCS	0.41	0.06	219.59	0.157	0.782	4-FFf	0.110	0.106	0.600	0.900	0.104	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.81 m, Outlet Elevation (invert): 218.72 m

Culvert Length: 7.00 m, Culvert Slope: 0.0129

****

Summary of Culvert Flows at Crossing: 2306 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.59	1:5-year 24hr SCS	0.15	0.03	0.12	4
219.59	1:100-year 24hr SCS	0.41	0.06	0.35	2
218.82	Overtopping	-398621851107529610000000000000000000000000000000000000.00	-398621851107529610000000000000000000000000000000000000.00	0.00	Overtopping

Culvert Data Summary - 2306 (2) CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2306 CBR (2)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.59 m

Roadway Data for Crossing: 2306 CBR (2)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.99
1	2.00	219.86
2	5.00	219.88
3	13.80	220.18

Roadway Surface: Gravel

Roadway Top Width: 4.00 m

Culvert Summary Table: 2306 (2) CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.15	0.15	219.60	0.258	0.770	4-FFf	-0.305	0.173	0.600	0.900	0.265	0.000
1:100-year 24hr SCS	0.41	0.41	219.66	0.456	0.834	4-FFf	-0.305	0.293	0.600	0.900	0.725	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.83 m, Outlet Elevation (invert): 218.83 m

Culvert Length: 6.20 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2306 CBR (2)

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2306 (2) CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.60	1:5-year 24hr SCS	0.15	0.15	0.00	1
219.66	1:100-year 24hr SCS	0.41	0.41	0.00	1
219.86	Overtopping	0.78	0.78	0.00	Overtopping

Culvert Data Summary - 2314 CBR 2-600

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2314 CBR

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.60 m

Roadway Data for Crossing: 2314 CBR

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.53
1	2.60	220.31
2	6.00	220.13
3	9.00	219.82
4	14.50	220.18

Roadway Surface: Gravel

Roadway Top Width: 6.70 m

Culvert Summary Table: 2314 CBR 2-600

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1:5-year 24hr SCS	0.11	0.11	219.61	0.217	0.766	4-FFf	0.165	0.146	0.600	0.800	0.195	0.000
1:100-year 24hr SCS	0.31	0.31	219.65	0.383	0.806	4-FFf	0.289	0.252	0.600	0.800	0.548	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.84 m, Outlet Elevation (invert): 218.77 m

Culvert Length: 7.80 m, Culvert Slope: 0.0090

****

Summary of Culvert Flows at Crossing: 2314 CBR

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2314 CBR 2-600 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.61	1:5-year 24hr SCS	0.11	0.11	0.00	1
219.65	1:100-year 24hr SCS	0.31	0.31	0.00	1
219.82	Overtopping	0.68	0.68	0.00	Overtopping

Channel capacity calculations using Manning's Equation

Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Crystal Beach Road STA. 1+610 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.004	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	10.0	:1 H:V	
LEFT SIDE SLOPE	10.0	:1 H:V	
DEPTH	0.15	m	
AREA	0.225	m^2	
WETTED PERIMETER	3.015	m	
HYDRAULIC RADIUS	0.075	m	
FLOW CAPACITY	0.063	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Crystal Beach Road STA. 1+740 (Shallowest D/S Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.33	m	
AREA	0.327	m^2	
WETTED PERIMETER	2.087	m	
HYDRAULIC RADIUS	0.157	m	
FLOW CAPACITY	0.168	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
W Roadside Ditch - Buchanan Street STA. 2+050 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.009	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	6.0	:1 H:V	
LEFT SIDE SLOPE	3.6	:1 H:V	
DEPTH	0.13	m	
AREA	0.081	m^2	
WETTED PERIMETER	1.276	m	
HYDRAULIC RADIUS	0.064	m	
FLOW CAPACITY	0.031	m^3/s	

Proposed
W Roadside Ditch - Buchanan Street STA. 2+115 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.012	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	10.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.12	m	
AREA	0.094	m^2	
WETTED PERIMETER	1.585	m	
HYDRAULIC RADIUS	0.059	m	
FLOW CAPACITY	0.039	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
W Roadside Ditch - Buchanan Street STA. 2+160 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	2.0	:1 H:V	
LEFT SIDE SLOPE	2.0	:1 H:V	
DEPTH	0.30	m	
AREA	0.180	m^2	
WETTED PERIMETER	1.342	m	
HYDRAULIC RADIUS	0.134	m	
FLOW CAPACITY	0.083	m^3/s	

Channel capacity calculations using Manning's Equation

Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
W Roadside Ditch - Buchanan Street STA. 2+300 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.007	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	4.5	:1 H:V	
LEFT SIDE SLOPE	2.0	:1 H:V	
DEPTH	0.20	m	
AREA	0.130	m^2	
WETTED PERIMETER	1.369	m	
HYDRAULIC RADIUS	0.095	m	
FLOW CAPACITY	0.057	m^3/s	

Proposed
W Roadside Ditch - Buchanan Street STA. 2+325 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.004	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.16	m	
AREA	0.077	m^2	
WETTED PERIMETER	1.012	m	
HYDRAULIC RADIUS	0.076	m	
FLOW CAPACITY	0.022	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Buchanan Street STA. 2+095 (Shallowest D/S Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.006	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	2.2	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.32	m	
AREA	0.266	m^2	
WETTED PERIMETER	1.785	m	
HYDRAULIC RADIUS	0.149	m	
FLOW CAPACITY	0.145	m^3/s	

Proposed
E Roadside Ditch - Buchanan Street STA. 2+140 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.004	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.26	m	
AREA	0.203	m^2	
WETTED PERIMETER	1.644	m	
HYDRAULIC RADIUS	0.123	m	
FLOW CAPACITY	0.079	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Buchanan Street STA. 2+195 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.006	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	4.0	:1 H:V	
DEPTH	0.21	m	
AREA	0.154	m^2	
WETTED PERIMETER	1.530	m	
HYDRAULIC RADIUS	0.101	m	
FLOW CAPACITY	0.065	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Buchanan Street STA. 2+275 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.008	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	5.0	:1 H:V	
DEPTH	0.22	m	
AREA	0.194	m^2	
WETTED PERIMETER	1.817	m	
HYDRAULIC RADIUS	0.107	m	
FLOW CAPACITY	0.097	m^3/s	

Proposed
E Roadside Ditch - Buchanan Street STA. 2+325 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.008	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	5.0	:1 H:V	
LEFT SIDE SLOPE	2.5	:1 H:V	
DEPTH	0.1	m	
AREA	0.038	m^2	
WETTED PERIMETER	0.779	m	
HYDRAULIC RADIUS	0.048	m	
FLOW CAPACITY	0.011	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
W Roadside Ditch - Tall Tree Lane STA. 3+140 (Shallowest D/S Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	4.0	:1 H:V	
DEPTH	0.15	m	

AREA	0.079	m^2
WETTED PERIMETER	1.093	m
HYDRAULIC RADIUS	0.072	m
FLOW CAPACITY	0.024	m^3/s

Channel capacity calculations using Manning's Equation

Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
W Roadside Ditch - Tall Tree Lane STA. 3+200 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.009	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.36	m	
AREA	0.389	m^2	
WETTED PERIMETER	2.277	m	
HYDRAULIC RADIUS	0.171	m	
FLOW CAPACITY	0.284	m^3/s	

TATHAM ENGINEERING

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Tall Tree Lane STA. 3+100 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.004	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	4.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.2	m	

AREA	0.140	m^2
WETTED PERIMETER	1.457	m
HYDRAULIC RADIUS	0.096	m

FLOW CAPACITY	0.046	m^3/s

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Tall Tree Lane STA. 3+130 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.002	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	11.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.22	m	
AREA	0.339	m^2	
WETTED PERIMETER	3.126	m	
HYDRAULIC RADIUS	0.108	m	
FLOW CAPACITY	0.086	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
E Roadside Ditch - Tall Tree Lane STA. 3+200 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.008	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.24	m	
AREA	0.173	m^2	
WETTED PERIMETER	1.518	m	
HYDRAULIC RADIUS	0.114	m	
FLOW CAPACITY	0.091	m^3/s	

Proposed
E Roadside Ditch - Tall Tree Lane STA. 3+240 (Shallowest Section)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.001	m/m	
BOTTOM WIDTH	0.00		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.54	m	
AREA	0.875	m^2	
WETTED PERIMETER	3.415	m	
HYDRAULIC RADIUS	0.256	m	
FLOW CAPACITY	0.279	m^3/s	

HY-8 Culvert Analysis Report – Proposed Ditches Limiting Culvert Capacity Calculations

Note: Most calculations set roadway crest as highest upstream ditch top of bank elevation such that capacity at overtopping represents full ditch headwater condition. Calculations neglect tailwater effects from features other than Lake Simcoe.

Crossing Notes: 600 Hartley (CBR 1+440 to 1+500)

Reference - Limiting culvert capacity for Crystal Beach Road roadside ditch STA 1+440 to STA 1+500 & Buchanan Street east roadside ditch STA 2+020 to STA 2+160.

Culvert Data Summary - 600 CSP

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 600 Hartley (CBR 1+440 to 1+500)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 218.95 m

Roadway Data for Crossing: 600 Hartley (CBR 1+440 to 1+500)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.30 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 600 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.05	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.05	0.05	219.28	0.207	0.231	3-M1t	0.183	0.140	0.210	0.210	0.568	0.379
0.10	0.07	219.33	0.248	0.279	3-M1t	0.218	0.166	0.272	0.272	0.562	0.451
0.10	0.07	219.33	0.248	0.279	3-M1t	0.218	0.166	0.272	0.272	0.562	0.451
0.20	0.09	219.36	0.279	0.332	3-M1t	0.247	0.188	0.352	0.352	0.510	0.537
0.25	0.10	219.38	0.293	0.356	3-M1t	0.259	0.195	0.383	0.383	0.501	0.567
0.30	0.10	219.39	0.307	0.381	3-M1t	0.273	0.205	0.410	0.410	0.507	0.594
0.35	0.11	219.40	0.319	0.404	3-M1t	0.284	0.213	0.435	0.435	0.511	0.617
0.40	0.12	219.42	0.335	0.428	3-M1t	0.299	0.223	0.457	0.457	0.529	0.638
0.45	0.13	219.44	0.351	0.452	3-M1t	0.314	0.232	0.478	0.478	0.550	0.657
0.50	0.14	219.46	0.365	0.474	3-M1t	0.327	0.241	0.497	0.497	0.567	0.675

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Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 20.00 m, Culvert Slope: 0.0050

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Summary of Culvert Flows at Crossing: 600 Hartley (CBR 1+440 to 1+500)

Headwater Elevation (m)	Total Discharge (cms)	600 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.05	0.00	0.00	0.00	1
219.28	0.05	0.05	0.00	1
219.33	0.10	0.07	0.03	9
219.33	0.10	0.07	0.03	2
219.36	0.20	0.09	0.11	6
219.38	0.25	0.10	0.15	4
219.39	0.30	0.10	0.19	4
219.40	0.35	0.11	0.24	3
219.42	0.40	0.12	0.28	5
219.44	0.45	0.13	0.32	8
219.46	0.50	0.14	0.36	8
219.30	0.06	0.06	0.00	Overtopping

Crossing Notes: 2366 CBR (1+580 to 1+670)

Reference - Limiting capacity for Crystal Beach Road roadside ditch STA 1+580 to STA 1+670.

Culvert Data Summary - 200 CSP

Barrel Shape: Circular

Barrel Diameter: 200.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2366 CBR (1+580 to 1+670)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.37 m

Roadway Data for Crossing: 2366 CBR (1+580 to 1+670)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.62 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 200 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.45	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.05	0.02	219.65	0.186	0.201	7-M1t	0.137	0.115	0.187	0.187	0.591	0.357
0.10	0.02	219.67	0.210	0.284	4-FFf	0.157	0.124	0.200	0.243	0.673	0.425
0.10	0.02	219.67	0.210	0.284	4-FFf	0.157	0.124	0.200	0.243	0.673	0.425
0.20	0.03	219.70	0.243	0.407	4-FFf	0.200	0.136	0.200	0.315	0.802	0.505
0.25	0.03	219.73	0.257	0.456	4-FFf	0.200	0.140	0.200	0.342	0.851	0.534
0.30	0.03	219.75	0.268	0.497	4-FFf	0.200	0.143	0.200	0.366	0.888	0.559
0.35	0.03	219.77	0.279	0.537	4-FFf	0.200	0.146	0.200	0.388	0.925	0.581
0.40	0.03	219.79	0.289	0.573	4-FFf	0.200	0.149	0.200	0.408	0.957	0.600
0.45	0.03	219.80	0.300	0.608	4-FFf	0.200	0.151	0.200	0.427	0.988	0.618
0.50	0.03	219.82	0.310	0.641	4-FFf	0.200	0.154	0.200	0.444	1.018	0.635

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Straight Culvert

Inlet Elevation (invert): 219.45 m, Outlet Elevation (invert): 219.37 m

Culvert Length: 5.50 m, Culvert Slope: 0.0145

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Summary of Culvert Flows at Crossing: 2366 CBR (1+580 to 1+670)

Headwater Elevation (m)	Total Discharge (cms)	200 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.45	0.00	0.00	0.00	1
219.65	0.05	0.02	0.03	14
219.67	0.10	0.02	0.08	6
219.67	0.10	0.02	0.08	2
219.70	0.20	0.03	0.17	4
219.73	0.25	0.03	0.22	8
219.75	0.30	0.03	0.27	10
219.77	0.35	0.03	0.32	7
219.79	0.40	0.03	0.37	7
219.80	0.45	0.03	0.42	6
219.82	0.50	0.03	0.47	5
219.62	0.01	0.01	0.00	Overtopping

Crossing Notes: 2396 CBR (1+670 to 1+810)

Reference - Limiting culvert capacity for Crystal Beach roadside ditch STA 1+670 to STA 1+810.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2396 CBR (1+670 to 1+810)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: 2396 CBR (1+670 to 1+810)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.40 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.15	0.000	0.160	0-NF	0.000	0.000	0.190	0.200	0.000	0.000
0.02	0.02	219.19	0.160	0.196	3-M1t	0.149	0.106	0.190	0.200	0.424	0.000
0.04	0.04	219.26	0.242	0.269	3-M2t	0.300	0.154	0.190	0.200	0.847	0.000
0.05	0.05	219.30	0.282	0.309	3-M2t	0.300	0.172	0.190	0.200	1.059	0.000
0.08	0.07	219.41	0.378	0.420	7-M2c	0.300	0.208	0.208	0.200	1.372	0.000
0.10	0.07	219.42	0.387	0.433	7-M2c	0.300	0.211	0.211	0.200	1.388	0.000
0.12	0.08	219.43	0.395	0.444	7-M2c	0.300	0.213	0.213	0.200	1.401	0.000
0.14	0.08	219.44	0.402	0.453	7-M2c	0.300	0.215	0.215	0.200	1.412	0.000
0.16	0.08	219.45	0.408	0.461	7-M2c	0.300	0.217	0.217	0.200	1.422	0.000
0.18	0.08	219.46	0.413	0.468	7-M2c	0.300	0.218	0.218	0.200	1.431	0.000
0.20	0.08	219.47	0.418	0.475	7-M2c	0.300	0.219	0.219	0.200	1.439	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.99 m, Outlet Elevation (invert): 218.96 m

Culvert Length: 5.50 m, Culvert Slope: 0.0055

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Summary of Culvert Flows at Crossing: 2396 CBR (1+670 to 1+810)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.15	0.00	0.00	0.00	1
219.19	0.02	0.02	0.00	1
219.26	0.04	0.04	0.00	1
219.30	0.05	0.05	0.00	1
219.41	0.08	0.07	0.01	15
219.42	0.10	0.07	0.03	5
219.43	0.12	0.08	0.04	4
219.44	0.14	0.08	0.06	4
219.45	0.16	0.08	0.08	3
219.46	0.18	0.08	0.10	3
219.47	0.20	0.08	0.12	3
219.40	0.07	0.07	0.00	Overtopping

Crossing Notes: 2390 CBR (1+670 to 1+810)

Reference - Limiting culvert capacity for Crystal Beach roadside ditch STA 1+670 to STA 1+810.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2390 CBR (1+670 to 1+810)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.30 m

Roadway Data for Crossing: 2390 CBR (1+670 to 1+810)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.42 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.30	0.000	0.210	0-NF	0.000	0.000	0.250	0.250	0.000	0.000
0.02	0.02	219.32	0.160	0.234	3-M1t	0.153	0.106	0.250	0.250	0.318	0.000
0.04	0.04	219.38	0.242	0.293	3-M2t	0.300	0.154	0.250	0.250	0.636	0.000
0.05	0.05	219.42	0.280	0.330	3-M2t	0.300	0.171	0.250	0.250	0.787	0.000
0.08	0.05	219.44	0.301	0.353	3-M2t	0.300	0.180	0.250	0.250	0.867	0.000
0.10	0.06	219.45	0.308	0.363	7-M2t	0.300	0.184	0.250	0.250	0.895	0.000
0.12	0.06	219.46	0.314	0.372	7-M2t	0.300	0.186	0.250	0.250	0.919	0.000
0.14	0.06	219.47	0.319	0.380	7-M2t	0.300	0.188	0.250	0.250	0.939	0.000
0.16	0.06	219.48	0.325	0.388	7-M2t	0.300	0.190	0.250	0.250	0.957	0.000
0.18	0.06	219.48	0.329	0.395	7-M2t	0.300	0.192	0.250	0.250	0.975	0.000
0.20	0.06	219.49	0.334	0.401	7-M2t	0.300	0.193	0.250	0.250	0.991	0.000

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Straight Culvert

Inlet Elevation (invert): 219.09 m,   Outlet Elevation (invert): 219.05 m

Culvert Length: 8.00 m,   Culvert Slope: 0.0050

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Summary of Culvert Flows at Crossing: 2390 CBR (1+670 to 1+810)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.30	0.00	0.00	0.00	1
219.32	0.02	0.02	0.00	1
219.38	0.04	0.04	0.00	1
219.42	0.05	0.05	0.00	26
219.44	0.08	0.05	0.03	6
219.45	0.10	0.06	0.04	4
219.46	0.12	0.06	0.06	4
219.47	0.14	0.06	0.08	3
219.48	0.16	0.06	0.10	3
219.48	0.18	0.06	0.12	3
219.49	0.20	0.06	0.14	3
219.42	0.05	0.05	0.00	Overtopping

Crossing Notes: 2382/2386 CBR (1+670 to 1+810)

Reference - Limiting culvert capacity for Crystal Beach roadside ditch STA 1+670 to STA 1+810.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2382/2386 CBR (1+670 to 1+810)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.40 m

Roadway Data for Crossing: 2382/2386 CBR (1+670 to 1+810)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.52 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.40	0.000	0.200	0-NF	0.000	0.000	0.250	0.250	0.000	0.000
0.02	0.02	219.43	0.160	0.233	3-M1t	0.168	0.106	0.250	0.250	0.318	0.000
0.04	0.04	219.51	0.242	0.308	3-M2t	0.300	0.154	0.250	0.250	0.636	0.000
0.05	0.04	219.53	0.259	0.329	3-M2t	0.300	0.162	0.250	0.250	0.701	0.000
0.08	0.05	219.55	0.271	0.348	7-M2t	0.300	0.167	0.250	0.250	0.749	0.000
0.10	0.05	219.56	0.276	0.357	7-M2t	0.300	0.170	0.250	0.250	0.770	0.000
0.12	0.05	219.57	0.280	0.366	7-M2t	0.300	0.172	0.250	0.250	0.788	0.000
0.14	0.05	219.57	0.285	0.373	7-M2t	0.300	0.173	0.250	0.250	0.805	0.000
0.16	0.05	219.58	0.289	0.381	7-M2t	0.300	0.175	0.250	0.250	0.820	0.000
0.18	0.05	219.59	0.292	0.388	7-M2t	0.300	0.176	0.250	0.250	0.834	0.000
0.20	0.05	219.59	0.296	0.394	7-M2t	0.300	0.178	0.250	0.250	0.848	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.20 m, Outlet Elevation (invert): 219.15 m

Culvert Length: 13.50 m, Culvert Slope: 0.0037

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Summary of Culvert Flows at Crossing: 2382/2386 CBR (1+670 to 1+810)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.40	0.00	0.00	0.00	1
219.43	0.02	0.02	0.00	1
219.51	0.04	0.04	0.00	1
219.53	0.05	0.04	0.01	10
219.55	0.08	0.05	0.03	5
219.56	0.10	0.05	0.05	4
219.57	0.12	0.05	0.07	3
219.57	0.14	0.05	0.09	3
219.58	0.16	0.05	0.11	3
219.59	0.18	0.05	0.13	3
219.59	0.20	0.05	0.15	3
219.52	0.04	0.04	0.00	Overtopping

Crossing Notes: 450 Crossing Buchanan STA 2+105

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+085 to STA 2+120.

Culvert Data Summary - 450 CSP

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 450 Crossing Buchanan STA 2+105

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0060

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.57 m

Roadway Data for Crossing: 450 Crossing Buchanan STA 2+105

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.00 m

Crest Elevation: 220.06 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 450 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.67	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.05	0.05	219.93	0.226	0.258	3-M1t	0.154	0.152	0.203	0.203	0.720	0.406
0.10	0.10	220.04	0.339	0.372	3-M1t	0.228	0.220	0.263	0.263	1.037	0.483
0.10	0.10	220.04	0.339	0.372	3-M1t	0.228	0.220	0.263	0.263	1.037	0.483
0.20	0.16	220.16	0.463	0.483	7-M1t	0.307	0.277	0.341	0.341	1.215	0.575
0.25	0.18	220.19	0.512	0.524	7-M1t	0.340	0.296	0.370	0.370	1.267	0.607
0.30	0.19	220.22	0.549	0.591	7-M2t	0.450	0.308	0.397	0.397	1.295	0.636
0.35	0.21	220.26	0.586	0.595	3-M2t	0.450	0.319	0.420	0.420	1.333	0.661
0.40	0.22	220.29	0.618	0.654	7-M2t	0.450	0.327	0.442	0.442	1.371	0.683
0.45	0.23	220.32	0.648	0.706	4-FFf	0.450	0.335	0.450	0.462	1.430	0.704
0.50	0.24	220.35	0.678	0.754	4-FFf	0.450	0.341	0.450	0.480	1.489	0.722

****

Straight Culvert

Inlet Elevation (invert): 219.67 m, Outlet Elevation (invert): 219.57 m

Culvert Length: 6.80 m, Culvert Slope: 0.0147

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Summary of Culvert Flows at Crossing: 450 Crossing Buchanan STA 2+105

Headwater Elevation (m)	Total Discharge (cms)	450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.67	0.00	0.00	0.00	1
219.93	0.05	0.05	0.00	1
220.04	0.10	0.10	0.00	1
220.04	0.10	0.10	0.00	1
220.16	0.20	0.16	0.04	6
220.19	0.25	0.18	0.07	4
220.22	0.30	0.19	0.11	2
220.26	0.35	0.21	0.14	4
220.29	0.40	0.22	0.18	4
220.32	0.45	0.23	0.22	3
220.35	0.50	0.24	0.26	3
220.06	0.11	0.11	0.00	Overtopping

Crossing Notes: 2370 Buchanan W(2+120 to 2+250)

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+120 to STA 2+250.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2370 Buchanan W(2+120 to 2+250)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.29 m

Roadway Data for Crossing: 2370 Buchanan W(2+120 to 2+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.83 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.33	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.56	0.202	0.226	3-M2t	0.185	0.132	0.173	0.173	0.710	0.334
0.06	0.06	219.69	0.323	0.357	3-M2t	0.300	0.189	0.224	0.224	1.058	0.397
0.09	0.08	219.84	0.429	0.515	7-M2t	0.300	0.222	0.261	0.261	1.250	0.439
0.10	0.08	219.85	0.433	0.528	7-M2t	0.300	0.223	0.272	0.272	1.225	0.451
0.15	0.09	219.87	0.449	0.589	4-FFf	0.300	0.227	0.300	0.316	1.207	0.499
0.18	0.09	219.88	0.457	0.621	4-FFf	0.300	0.228	0.300	0.339	1.225	0.523
0.21	0.09	219.89	0.464	0.650	4-FFf	0.300	0.230	0.300	0.359	1.242	0.543
0.24	0.09	219.90	0.471	0.677	4-FFf	0.300	0.231	0.300	0.377	1.258	0.562
0.27	0.09	219.91	0.476	0.700	4-FFf	0.300	0.232	0.300	0.394	1.270	0.578
0.30	0.09	219.92	0.484	0.727	4-FFf	0.300	0.234	0.300	0.410	1.289	0.594

****

Straight Culvert

Inlet Elevation (invert): 219.33 m, Outlet Elevation (invert): 219.29 m

Culvert Length: 6.50 m, Culvert Slope: 0.0062

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Summary of Culvert Flows at Crossing: 2370 Buchanan W(2+120 to 2+250)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.33	0.00	0.00	0.00	1
219.56	0.03	0.03	0.00	1
219.69	0.06	0.06	0.00	1
219.84	0.09	0.08	0.01	23
219.85	0.10	0.08	0.02	5
219.87	0.15	0.09	0.06	5
219.88	0.18	0.09	0.09	4
219.89	0.21	0.09	0.12	3
219.90	0.24	0.09	0.15	3
219.91	0.27	0.09	0.18	3
219.92	0.30	0.09	0.21	3
219.83	0.08	0.08	0.00	Overtopping

Crossing Notes: 2364 Buchanan W(2+120 to 2+250)

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+120 to STA 2+250.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2364 Buchanan W(2+120 to 2+250)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.69 m

Roadway Data for Crossing: 2364 Buchanan W(2+120 to 2+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.82 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.69	0.000	0.250	0-NF	0.000	0.000	0.290	0.290	0.000	0.000
0.03	0.03	219.73	0.202	0.287	3-M1t	0.185	0.132	0.290	0.290	0.429	0.000
0.06	0.06	219.83	0.308	0.385	7-M2t	0.300	0.184	0.290	0.290	0.806	0.000
0.09	0.06	219.84	0.323	0.404	7-M2t	0.300	0.190	0.290	0.290	0.858	0.000
0.10	0.06	219.85	0.327	0.408	7-M2t	0.300	0.191	0.290	0.290	0.870	0.000
0.15	0.06	219.87	0.343	0.428	7-M2t	0.300	0.196	0.290	0.290	0.921	0.000
0.18	0.07	219.88	0.351	0.437	7-M2t	0.300	0.199	0.290	0.290	0.946	0.000
0.21	0.07	219.89	0.358	0.447	7-M2t	0.300	0.201	0.290	0.290	0.969	0.000
0.24	0.07	219.90	0.365	0.455	7-M2t	0.300	0.203	0.290	0.290	0.990	0.000
0.27	0.07	219.90	0.372	0.464	7-M2t	0.300	0.205	0.290	0.290	1.009	0.000
0.30	0.07	219.91	0.378	0.471	7-M2t	0.300	0.208	0.290	0.290	1.027	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.44 m, Outlet Elevation (invert): 219.40 m

Culvert Length: 6.50 m, Culvert Slope: 0.0062

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Summary of Culvert Flows at Crossing: 2364 Buchanan W(2+120 to 2+250)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.69	0.00	0.00	0.00	1
219.73	0.03	0.03	0.00	1
219.83	0.06	0.06	0.00	24
219.84	0.09	0.06	0.03	6
219.85	0.10	0.06	0.04	4
219.87	0.15	0.06	0.08	4
219.88	0.18	0.07	0.11	3
219.89	0.21	0.07	0.14	3
219.90	0.24	0.07	0.17	3
219.90	0.27	0.07	0.20	3
219.91	0.30	0.07	0.23	3
219.82	0.06	0.06	0.00	Overtopping

Crossing Notes: 2358 Buchanan W(2+120 to 2+250)

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+120 to STA 2+250.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2358 Buchanan W(2+120 to 2+250)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.82 m

Roadway Data for Crossing: 2358 Buchanan W(2+120 to 2+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 220.04 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.82	0.000	0.160	0-NF	0.000	0.000	0.190	0.190	0.000	0.000
0.03	0.03	219.89	0.203	0.234	3-M2t	0.205	0.132	0.190	0.190	0.636	0.000
0.06	0.06	220.02	0.323	0.360	3-M2t	0.300	0.189	0.190	0.190	1.271	0.000
0.09	0.07	220.06	0.351	0.401	7-M2c	0.300	0.199	0.199	0.190	1.329	0.000
0.10	0.07	220.07	0.355	0.405	7-M2c	0.300	0.200	0.200	0.190	1.337	0.000
0.15	0.07	220.09	0.369	0.426	7-M2c	0.300	0.205	0.205	0.190	1.363	0.000
0.18	0.07	220.10	0.374	0.436	7-M2c	0.300	0.206	0.206	0.190	1.374	0.000
0.21	0.07	220.11	0.381	0.446	7-M2c	0.300	0.209	0.209	0.190	1.377	0.000
0.24	0.07	220.11	0.388	0.454	7-M2c	0.300	0.211	0.211	0.190	1.389	0.000
0.27	0.07	220.12	0.394	0.462	7-M2c	0.300	0.213	0.213	0.190	1.399	0.000
0.30	0.08	220.13	0.398	0.470	7-M2c	0.300	0.214	0.214	0.190	1.405	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.66 m,   Outlet Elevation (invert): 219.63 m

Culvert Length: 6.50 m,   Culvert Slope: 0.0046

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Summary of Culvert Flows at Crossing: 2358 Buchanan W(2+120 to 2+250)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.82	0.00	0.00	0.00	1
219.89	0.03	0.03	0.00	1
220.02	0.06	0.06	0.00	1
220.06	0.09	0.07	0.02	8
220.07	0.10	0.07	0.03	4
220.09	0.15	0.07	0.08	4
220.10	0.18	0.07	0.11	3
220.11	0.21	0.07	0.14	3
220.11	0.24	0.07	0.17	3
220.12	0.27	0.07	0.19	3
220.13	0.30	0.08	0.22	3
220.04	0.06	0.06	0.00	Overtopping

Crossing Notes: 2384 Buchanan Street (2+250 to 2+310)

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+250 to STA 2+310.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2384 Buchanan Street (2+250 to 2+310)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0007

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.34 m

Roadway Data for Crossing: 2384 Buchanan Street (2+250 to 2+310)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.00 m

Crest Elevation: 219.69 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.38	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.05	0.05	219.71	0.227	0.342	3-M1t	0.189	0.150	0.358	0.358	0.386	0.195
0.10	0.07	219.81	0.299	0.480	4-FFf	0.253	0.193	0.400	0.464	0.579	0.232
0.10	0.07	219.81	0.299	0.480	4-FFf	0.253	0.193	0.400	0.464	0.579	0.232
0.20	0.11	219.95	0.395	0.688	4-FFf	0.400	0.239	0.400	0.602	0.876	0.276
0.25	0.12	220.00	0.432	0.774	4-FFf	0.400	0.253	0.400	0.655	0.983	0.292
0.30	0.13	220.05	0.465	0.851	4-FFf	0.400	0.266	0.400	0.701	1.074	0.305
0.35	0.14	220.09	0.495	0.922	4-FFf	0.400	0.275	0.400	0.743	1.153	0.317
0.40	0.15	220.13	0.524	0.987	4-FFf	0.400	0.284	0.400	0.781	1.224	0.328
0.45	0.16	220.17	0.551	1.049	4-FFf	0.400	0.291	0.400	0.816	1.287	0.338
0.50	0.17	220.20	0.577	1.107	4-FFf	0.400	0.297	0.400	0.849	1.346	0.347

****

Straight Culvert

Inlet Elevation (invert): 219.38 m, Outlet Elevation (invert): 219.34 m

Culvert Length: 5.50 m, Culvert Slope: 0.0073

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Summary of Culvert Flows at Crossing: 2384 Buchanan Street (2+250 to 2+310)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.38	0.00	0.00	0.00	1
219.71	0.05	0.05	0.00	3
219.81	0.10	0.07	0.03	9
219.81	0.10	0.07	0.03	2
219.95	0.20	0.11	0.09	8
220.00	0.25	0.12	0.12	7
220.05	0.30	0.13	0.17	7
220.09	0.35	0.14	0.21	7
220.13	0.40	0.15	0.25	6
220.17	0.45	0.16	0.29	5
220.20	0.50	0.17	0.33	5
219.69	0.04	0.04	0.00	Overtopping

Crossing Notes: 400 @ 9th Line Buchanan W(2+310 to 2+340)

Reference - Limiting culvert capacity for Buchanan Street west roadside ditch STA 2+310 to STA 2+340.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 400 @ 9th Line Buchanan W(2+310 to 2+340)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0030

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.39 m

Roadway Data for Crossing: 400 @ 9th Line Buchanan W(2+310 to 2+340)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.69 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.46	0.000	0.000	0-NF	0.000	0.000	0.020	0.000	0.000	0.000
0.05	0.04	219.70	0.218	0.240	3-M1t	0.158	0.145	0.251	0.231	0.519	0.313
0.10	0.05	219.72	0.242	0.283	3-M1t	0.175	0.160	0.319	0.299	0.479	0.373
0.10	0.05	219.72	0.242	0.283	3-M1t	0.175	0.160	0.319	0.299	0.479	0.373
0.20	0.07	219.78	0.296	0.380	3-M1f	0.213	0.192	0.400	0.388	0.572	0.443
0.25	0.08	219.81	0.329	0.438	3-M1f	0.237	0.209	0.400	0.422	0.676	0.468
0.30	0.10	219.84	0.359	0.494	4-FFf	0.259	0.223	0.400	0.452	0.770	0.490
0.35	0.11	219.87	0.387	0.547	4-FFf	0.281	0.235	0.400	0.479	0.855	0.510
0.40	0.12	219.89	0.413	0.597	4-FFf	0.302	0.246	0.400	0.503	0.931	0.527
0.45	0.12	219.92	0.432	0.640	4-FFf	0.320	0.254	0.400	0.526	0.988	0.543
0.50	0.13	219.94	0.458	0.689	4-FFf	0.400	0.263	0.400	0.547	1.059	0.557

****

Straight Culvert

Inlet Elevation (invert): 219.46 m, Outlet Elevation (invert): 219.37 m

Culvert Length: 7.50 m, Culvert Slope: 0.0120

****

Summary of Culvert Flows at Crossing: 400 @ 9th Line Buchanan W(2+310 to 2+340)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.46	0.00	0.00	0.00	1
219.70	0.05	0.04	0.01	17
219.72	0.10	0.05	0.05	8
219.72	0.10	0.05	0.05	2
219.78	0.20	0.07	0.13	12
219.81	0.25	0.08	0.16	10
219.84	0.30	0.10	0.20	7
219.87	0.35	0.11	0.24	7
219.89	0.40	0.12	0.28	8
219.92	0.45	0.12	0.33	7
219.94	0.50	0.13	0.37	5
219.69	0.04	0.04	0.00	Overtopping

Crossing Notes: 2362 TTL Buchanan E(2+160 to 2+250)

Reference - Limiting culvert capacity for Buchanan Street east roadside ditch STA 2+160 to STA 2+250.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2362 TTL Buchanan E(2+160 to 2+250)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0060

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.55 m

Roadway Data for Crossing: 2362 TTL Buchanan E(2+160 to 2+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.87 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.60	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.82	0.202	0.220	3-M2t	0.168	0.132	0.167	0.167	0.741	0.358
0.06	0.05	219.88	0.263	0.287	3-M2t	0.227	0.164	0.217	0.217	0.830	0.425
0.09	0.05	219.90	0.278	0.311	3-M2t	0.300	0.171	0.252	0.252	0.773	0.471
0.10	0.05	219.90	0.282	0.321	3-M2t	0.300	0.172	0.263	0.263	0.763	0.483
0.15	0.05	219.92	0.299	0.378	4-FFf	0.300	0.179	0.300	0.306	0.770	0.535
0.18	0.06	219.93	0.309	0.410	4-FFf	0.300	0.184	0.300	0.327	0.802	0.560
0.21	0.06	219.94	0.318	0.439	4-FFf	0.300	0.188	0.300	0.347	0.832	0.582
0.24	0.06	219.95	0.328	0.468	4-FFf	0.300	0.191	0.300	0.365	0.864	0.601
0.27	0.06	219.96	0.334	0.492	4-FFf	0.300	0.193	0.300	0.381	0.883	0.619
0.30	0.06	219.96	0.341	0.515	4-FFf	0.300	0.196	0.300	0.397	0.906	0.636

****

Straight Culvert

Inlet Elevation (invert): 219.60 m, Outlet Elevation (invert): 219.55 m

Culvert Length: 6.00 m, Culvert Slope: 0.0083

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Summary of Culvert Flows at Crossing: 2362 TTL Buchanan E(2+160 to 2+250)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.60	0.00	0.00	0.00	1
219.82	0.03	0.03	0.00	1
219.88	0.06	0.05	0.01	12
219.90	0.09	0.05	0.04	5
219.90	0.10	0.05	0.05	4
219.92	0.15	0.05	0.10	4
219.93	0.18	0.06	0.12	3
219.94	0.21	0.06	0.15	3
219.95	0.24	0.06	0.18	3
219.96	0.27	0.06	0.21	3
219.96	0.30	0.06	0.24	3
219.87	0.04	0.04	0.00	Overtopping

Crossing Notes: 2374 TTL W(3+105 to 3+180)

Reference - Limiting culvert capacity for Tall Tree Lane west roadside ditch STA 3+105 to STA 3+180.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2374 TTL W(3+105 to 3+180)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0090

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.33 m

Roadway Data for Crossing: 2374 TTL W(3+105 to 3+180)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.54 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.33	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.02	219.55	0.176	0.222	7-H2t	-0.305	0.116	0.155	0.155	0.637	0.416
0.06	0.03	219.57	0.191	0.253	7-H2t	-0.305	0.125	0.201	0.201	0.536	0.495
0.09	0.03	219.58	0.202	0.282	7-H2t	-0.305	0.132	0.234	0.234	0.501	0.548
0.10	0.03	219.58	0.206	0.292	7-H2t	-0.305	0.134	0.243	0.243	0.501	0.562
0.15	0.04	219.62	0.235	0.328	7-H2t	-0.305	0.150	0.283	0.283	0.549	0.622
0.18	0.04	219.64	0.252	0.390	4-FFf	-0.305	0.158	0.300	0.303	0.597	0.651
0.21	0.05	219.65	0.266	0.424	4-FFf	-0.305	0.165	0.300	0.322	0.650	0.677
0.24	0.05	219.67	0.279	0.455	4-FFf	-0.305	0.171	0.300	0.338	0.695	0.700
0.27	0.05	219.68	0.296	0.491	4-FFf	-0.305	0.178	0.300	0.353	0.755	0.721
0.30	0.06	219.70	0.324	0.541	4-FFf	-0.305	0.189	0.300	0.368	0.847	0.740

****

Straight Culvert

Inlet Elevation (invert): 219.33 m, Outlet Elevation (invert): 219.33 m

Culvert Length: 8.00 m, Culvert Slope: 0.0000

****

Summary of Culvert Flows at Crossing: 2374 TTL W(3+105 to 3+180)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.33	0.00	0.00	0.00	1
219.55	0.03	0.02	0.01	25
219.57	0.06	0.03	0.03	7
219.58	0.09	0.03	0.06	5
219.58	0.10	0.03	0.07	4
219.62	0.15	0.04	0.11	5
219.64	0.18	0.04	0.14	12
219.65	0.21	0.05	0.17	11
219.67	0.24	0.05	0.19	11
219.68	0.27	0.05	0.22	9
219.70	0.30	0.06	0.24	6
219.54	0.02	0.02	0.00	Overtopping

Crossing Notes: 2374 TTL W(3+180 to 3+220)

Reference - Limiting cuvlert capacity for Tall Tree Lane west roadside ditch STA 3+180 to STA 3+220.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2374 TTL W(3+180 to 3+220)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0090

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.45 m

Roadway Data for Crossing: 2374 TTL W(3+180 to 3+220)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.86 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.45	0.000	0.000	0-NF	0.000	0.000	0.070	0.000	0.000	0.000
0.03	0.03	219.65	0.179	0.201	3-M1t	0.129	0.120	0.225	0.155	0.412	0.416
0.06	0.06	219.74	0.264	0.290	3-M1t	0.188	0.174	0.271	0.201	0.662	0.495
0.09	0.09	219.82	0.342	0.366	3-M1t	0.242	0.215	0.304	0.234	0.878	0.548
0.10	0.10	219.84	0.367	0.391	3-M1t	0.260	0.227	0.313	0.243	0.947	0.562
0.15	0.12	219.88	0.415	0.441	7-M1t	0.296	0.247	0.353	0.283	1.003	0.622
0.18	0.12	219.90	0.428	0.461	7-M1t	0.307	0.252	0.373	0.303	1.005	0.651
0.21	0.13	219.91	0.439	0.483	7-M1t	0.317	0.256	0.392	0.322	1.013	0.677
0.24	0.13	219.92	0.449	0.514	4-FFf	0.400	0.260	0.400	0.338	1.035	0.700
0.27	0.13	219.92	0.460	0.540	4-FFf	0.400	0.263	0.400	0.353	1.064	0.721
0.30	0.14	219.93	0.470	0.563	4-FFf	0.400	0.267	0.400	0.368	1.089	0.740

****

Straight Culvert

Inlet Elevation (invert): 219.45 m, Outlet Elevation (invert): 219.38 m

Culvert Length: 5.50 m, Culvert Slope: 0.0127

****

Summary of Culvert Flows at Crossing: 2374 TTL W(3+180 to 3+220)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.45	0.00	0.00	0.00	1
219.65	0.03	0.03	0.00	1
219.74	0.06	0.06	0.00	1
219.82	0.09	0.09	0.00	1
219.84	0.10	0.10	0.00	1
219.88	0.15	0.12	0.03	7
219.90	0.18	0.12	0.06	4
219.91	0.21	0.13	0.08	4
219.92	0.24	0.13	0.11	3
219.92	0.27	0.13	0.14	3
219.93	0.30	0.14	0.16	3
219.86	0.11	0.11	0.00	Overtopping

Crossing Notes: Oulet 2 TTL E(3+040 to 3+120)

Reference - Approximate limiting capacity of Outlet #2 simplified as long 300 CSP culvert for Tall Tree Lane east roadside ditch STA 3+040 to STA 3+120.

Culvert Data Summary - 300 CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Oulet 2 TTL E(3+040 to 3+120)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: Oulet 2 TTL E(3+040 to 3+120)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.52 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 300 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.15	0.000	0.100	0-NF	0.000	0.000	0.080	0.150	0.000	0.000
0.03	0.03	219.37	0.203	0.317	7-A2c	-0.305	0.132	0.132	0.150	0.997	0.000
0.06	0.06	219.42	0.324	0.370	7-A2c	-0.305	0.189	0.189	0.150	1.275	0.000
0.09	0.09	219.52	0.471	0.453	7-JA2c	-0.305	0.231	0.231	0.150	1.480	0.000
0.10	0.09	219.53	0.480	0.458	7-JA2c	-0.305	0.233	0.233	0.150	1.492	0.000
0.15	0.09	219.56	0.506	0.473	7-JA2c	-0.305	0.238	0.238	0.150	1.527	0.000
0.18	0.10	219.57	0.517	0.479	7-JA2c	-0.305	0.240	0.240	0.150	1.545	0.000
0.21	0.10	219.58	0.527	0.485	7-JA2c	-0.305	0.242	0.242	0.150	1.558	0.000
0.24	0.10	219.59	0.536	0.490	7-JA2c	-0.305	0.243	0.243	0.150	1.570	0.000
0.27	0.10	219.60	0.545	0.495	7-JA2c	-0.305	0.245	0.245	0.150	1.581	0.000
0.30	0.10	219.60	0.553	0.499	7-JA2c	-0.305	0.246	0.246	0.150	1.592	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 219.07 m

Culvert Length: 70.00 m, Culvert Slope: -0.0003

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Summary of Culvert Flows at Crossing: Oulet 2 TTL E(3+040 to 3+120)

Headwater Elevation (m)	Total Discharge (cms)	300 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.15	0.00	0.00	0.00	1
219.37	0.03	0.03	0.00	1
219.42	0.06	0.06	0.00	1
219.52	0.09	0.09	0.00	37
219.53	0.10	0.09	0.01	6
219.56	0.15	0.09	0.06	5
219.57	0.18	0.10	0.08	4
219.58	0.21	0.10	0.11	3
219.59	0.24	0.10	0.14	3
219.60	0.27	0.10	0.17	3
219.60	0.30	0.10	0.20	3
219.52	0.09	0.09	0.00	Overtopping

Crossing Notes: 2387 TTL E(3+180 to 3+235)

Reference - Limiting culvert capacity for Tall Tree Lane east roadside ditch STA 3+180 to STA 3+235.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2387 TTL E(3+180 to 3+235)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.15 m

Roadway Data for Crossing: 2387 TTL E(3+180 to 3+235)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.47 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.20	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.40	0.180	0.202	3-M1t	0.161	0.120	0.173	0.173	0.576	0.334
0.06	0.05	219.48	0.249	0.278	3-M2t	0.226	0.164	0.224	0.224	0.740	0.397
0.09	0.06	219.49	0.264	0.302	3-M1t	0.241	0.173	0.261	0.261	0.681	0.439
0.10	0.06	219.50	0.268	0.309	3-M1t	0.245	0.175	0.272	0.272	0.668	0.451
0.15	0.07	219.52	0.285	0.343	3-M1t	0.263	0.185	0.316	0.316	0.631	0.499
0.18	0.07	219.53	0.294	0.363	3-M1t	0.273	0.190	0.339	0.339	0.622	0.523
0.21	0.07	219.53	0.302	0.383	3-M1t	0.283	0.194	0.359	0.359	0.622	0.543
0.24	0.08	219.54	0.310	0.403	7-M1t	0.293	0.199	0.377	0.377	0.626	0.562
0.27	0.08	219.55	0.320	0.427	7-M1t	0.307	0.204	0.394	0.394	0.647	0.578
0.30	0.09	219.57	0.333	0.458	4-FFf	0.400	0.210	0.400	0.410	0.684	0.594

****

Straight Culvert

Inlet Elevation (invert): 219.20 m, Outlet Elevation (invert): 219.15 m

Culvert Length: 9.00 m, Culvert Slope: 0.0056

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Summary of Culvert Flows at Crossing: 2387 TTL E(3+180 to 3+235)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.20	0.00	0.00	0.00	1
219.40	0.03	0.03	0.00	1
219.48	0.06	0.05	0.01	17
219.49	0.09	0.06	0.03	5
219.50	0.10	0.06	0.04	4
219.52	0.15	0.07	0.08	4
219.53	0.18	0.07	0.11	3
219.53	0.21	0.07	0.14	3
219.54	0.24	0.08	0.16	3
219.55	0.27	0.08	0.19	4
219.57	0.30	0.09	0.22	10
219.47	0.05	0.05	0.00	Overtopping

Crossing Notes: 2395 TTL E(3+235 to 3+250)

Reference - Limiting cuvlert capacity for Tall Tree Lane west roadside ditch STA 3+235 to STA 3+250.

Culvert Data Summary - 400 CSP

Barrel Shape: Circular

Barrel Diameter: 400.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2395 TTL E(3+235 to 3+250)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0030

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.20 m

Roadway Data for Crossing: 2395 TTL E(3+235 to 3+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.79 m

Roadway Surface: Paved

Roadway Top Width: 1.00 m

Culvert Summary Table: 400 CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.25	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.45	0.180	0.200	3-M1t	0.144	0.120	0.190	0.190	0.508	0.276
0.06	0.06	219.54	0.265	0.293	3-M1t	0.213	0.174	0.247	0.247	0.737	0.328
0.09	0.09	219.62	0.342	0.369	3-M1t	0.282	0.215	0.288	0.288	0.931	0.363
0.10	0.10	219.65	0.368	0.397	3-M2t	0.309	0.227	0.299	0.299	0.992	0.373
0.15	0.15	219.79	0.509	0.542	7-M2t	0.400	0.279	0.348	0.348	1.285	0.412
0.18	0.15	219.81	0.525	0.580	7-M2t	0.400	0.284	0.373	0.373	1.264	0.431
0.21	0.16	219.82	0.535	0.613	7-M2t	0.400	0.287	0.395	0.395	1.254	0.448
0.24	0.16	219.84	0.544	0.642	4-FFf	0.400	0.289	0.400	0.415	1.272	0.464
0.27	0.16	219.85	0.552	0.668	4-FFf	0.400	0.291	0.400	0.434	1.290	0.478
0.30	0.16	219.85	0.559	0.693	4-FFf	0.400	0.293	0.400	0.452	1.307	0.490

****

Straight Culvert

Inlet Elevation (invert): 219.25 m, Outlet Elevation (invert): 219.20 m

Culvert Length: 6.00 m, Culvert Slope: 0.0083

****

Summary of Culvert Flows at Crossing: 2395 TTL E(3+235 to 3+250)

Headwater Elevation (m)	Total Discharge (cms)	400 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.25	0.00	0.00	0.00	1
219.45	0.03	0.03	0.00	1
219.54	0.06	0.06	0.00	1
219.62	0.09	0.09	0.00	1
219.65	0.10	0.10	0.00	1
219.79	0.15	0.15	0.00	34
219.81	0.18	0.15	0.03	6
219.82	0.21	0.16	0.05	4
219.84	0.24	0.16	0.08	4
219.85	0.27	0.16	0.11	3
219.85	0.30	0.16	0.14	3
219.79	0.15	0.15	0.00	Overtopping

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+085 to 2+0120

Catchment ID:	2042P	
Catchment Area (ha):	0.09	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.02	0.02	0.02

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.008	m^3/s
5YR	0.011	m^3/s
10YR	0.013	m^3/s
25YR	0.016	m^3/s
50YR	0.020	m^3/s
100YR	0.023	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+120 to 2+250

Catchment ID:	202P	
Catchment Area (ha):	0.30	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.03	0.04	0.04	0.05	0.07	0.08

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.028	m^3/s
5YR	0.036	m^3/s
10YR	0.042	m^3/s
25YR	0.054	m^3/s
50YR	0.066	m^3/s
100YR	0.075	m^3/s

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+250 to 2+310

Catchment ID:	2031P	
Catchment Area (ha):	0.12	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.02	0.02	0.03	0.03

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.011	m^3/s
5YR	0.015	m^3/s
10YR	0.017	m^3/s
25YR	0.022	m^3/s
50YR	0.026	m^3/s
100YR	0.030	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - W Ditch STA 2+310 to 2+340

Catchment ID:	2032P	
Catchment Area (ha):	0.09	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.01	0.01	0.02	0.02	0.02

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.008	m^3/s
5YR	0.011	m^3/s
10YR	0.013	m^3/s
25YR	0.016	m^3/s
50YR	0.020	m^3/s
100YR	0.023	m^3/s

Rational Method Calculation

TATHAM ENGINEERING

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Buchanan Street - E Ditch STA 2+020 to 2+160

Catchment ID:	204+2042P	
Catchment Area (ha):	0.37	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.03	0.04	0.05	0.07	0.08	0.09

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.034	m^3/s
5YR	0.045	m^3/s
10YR	0.052	m^3/s
25YR	0.067	m^3/s
50YR	0.081	m^3/s
100YR	0.093	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+040 to 3+120

Catchment ID:	305P	
Catchment Area (ha):	0.17	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.02	0.02	0.02	0.03	0.04	0.04

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.016	m^3/s
5YR	0.021	m^3/s
10YR	0.024	m^3/s
25YR	0.031	m^3/s
50YR	0.037	m^3/s
100YR	0.043	m^3/s

TATHAM ENGINEERING

Rational Method Calculation

Project Details

Various Roads Drainage Improvements	420395

Prepared By

J. Macdonald	April 5, 2021

Municipality

Town of Innisfil

Tall Tree Lane - E Ditch STA 3+120 to 3+180

Catchment ID:	306P	
Catchment Area (ha):	0.14	
Runoff Coefficient:	0.40	Low-density residential
Time of Concentration (min):	10.00	

Design Storm	2YR	5YR	10YR	25YR	50YR	100YR
A	678	854	976	1146	1236	1426
B	4.70	4.70	4.70	4.92	4.70	5.27
C	0.78	0.77	0.76	0.76	0.75	0.76
i (mm/hr)	83	109	127	148	164	180
Runoff C	0.40	0.40	0.40	0.44	0.48	0.50
Q (m^3/s)	0.01	0.02	0.02	0.03	0.03	0.04

Peak Runoff Rate (m^3/s) - Rational Method (Q=CiA/360)

Storm	$Q_{EXISTING}$	
2YR	0.013	m^3/s
5YR	0.017	m^3/s
10YR	0.020	m^3/s
25YR	0.025	m^3/s
50YR	0.031	m^3/s
100YR	0.035	m^3/s

Alternative #5

HY-8 Culvert Analysis Report

Crossing Notes: Ex 600 Crossing Hartley

Crossing modeled in existing deteriorated condition. Appears to be obstructed by 270mm at inlet.

Culvert Data Summary – 600 CSP

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 270.00 mm

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Ex 600 Crossing Hartley

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.94 m

Roadway Data for Crossing: Ex 600 Crossing Hartley

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.24
1	11.90	220.16
2	20.90	220.21

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: 600 CSP

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.99	2yr 24hr SCS	0.05	0.05	0.00	1
220.09	5yr 24hr SCS	0.09	0.09	0.00	1
220.18	10yr 24hr SCS	0.13	0.11	0.01	17
220.20	25yr 24hr SCS	0.17	0.12	0.05	6
220.21	50yr 24hr SCS	0.21	0.12	0.09	4
220.21	100yr 24hr SCS	0.25	0.12	0.13	3
220.16	Overtopping	0.11	0.11	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 218.99 m,   Outlet Elevation (invert): 219.31 m

Culvert Length: 20.50 m,   Culvert Slope: -0.0156

****

Summary of Culvert Flows at Crossing: Ex 600 Crossing Hartley

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.99	0.138	0.997	4-FFf	-0.305	0.091	0.330	0.710	0.315	0.000
5yr 24hr SCS	0.09	0.09	220.09	0.206	1.101	4-FFf	-0.305	0.134	0.330	0.710	0.568	0.000
10yr 24hr SCS	0.13	0.11	220.18	0.244	1.193	4-FFf	-0.305	0.155	0.330	0.710	0.721	0.000
25yr 24hr SCS	0.17	0.12	220.20	0.249	1.208	4-FFf	-0.305	0.158	0.330	0.710	0.742	0.000
50yr 24hr SCS	0.21	0.12	220.21	0.252	1.217	4-FFf	-0.305	0.159	0.330	0.710	0.755	0.000
100yr 24hr SCS	0.25	0.12	220.21	0.255	1.224	4-FFf	-0.305	0.160	0.330	0.710	0.765	0.000

HY-8 Culvert Analysis Report

Crossing Notes: Prop 600 CSP Crossing Hartley (Alternative #5)

Model assumes no downstream improvements. Existing Crystal Beach Road roadside ditch 5-yr 24H SCS design storm tailwater condition is applied.

Culvert Data Summary – 600 CSP

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Prop 600 Crossing Hartley (Alternative #4)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.94 m

Roadway Data for Crossing: Prop 600 Crossing Hartley (Alternative #4)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.24
1	11.90	220.16
2	20.90	220.21

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: 600 CSP

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
219.95	2yr 24hr SCS	0.05	0.05	0.00	1
219.96	5yr 24hr SCS	0.09	0.09	0.00	1
219.99	10yr 24hr SCS	0.13	0.13	0.00	1
220.03	25yr 24hr SCS	0.17	0.17	0.00	1
220.07	50yr 24hr SCS	0.21	0.21	0.00	1
220.13	100yr 24hr SCS	0.25	0.25	0.00	1
220.16	Overtopping	0.27	0.27	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 20.50 m, Culvert Slope: 0.0049

****

Summary of Culvert Flows at Crossing: Prop 600 Crossing Hartley (Alternative #4)

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.95	0.207	0.898	4-FFf	0.184	0.140	0.600	0.990	0.177	0.000
5yr 24hr SCS	0.09	0.09	219.96	0.283	0.915	4-FFf	0.252	0.190	0.600	0.990	0.318	0.000
10yr 24hr SCS	0.13	0.13	219.99	0.347	0.942	4-FFf	0.312	0.229	0.600	0.990	0.460	0.000
25yr 24hr SCS	0.17	0.17	220.03	0.406	0.978	4-FFf	0.371	0.265	0.600	0.990	0.601	0.000
50yr 24hr SCS	0.21	0.21	220.07	0.462	1.025	4-FFf	0.435	0.296	0.600	0.990	0.743	0.000
100yr 24hr SCS	0.25	0.25	220.13	0.518	1.081	4-FFf	0.600	0.324	0.600	0.990	0.884	0.000

HY-8 Culvert Analysis Report

Crossing Notes: Prop 600 Crossing Hartley (Alternative #5, #4 & #2)

Crossing model assumes downstream improvements to Crystal Beach Road culvert crossing (Alternative #1) and twinned driveway culverts (Alternative #3). Assumed tailwater elevation of 219.77 based on proposed Crystal Beach Road roadside ditch modeling for 5-yr 24h SCS design storm.

Culvert Data Summary - 600 CSP

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.77 m

Roadway Data for Crossing: Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.24
1	11.90	220.16
2	20.90	220.21

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: 600 CSP

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	600 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.78	2yr 24hr SCS	0.05	0.05	0.00	1
219.79	5yr 24hr SCS	0.09	0.09	0.00	1
219.82	10yr 24hr SCS	0.13	0.13	0.00	1
219.86	25yr 24hr SCS	0.17	0.17	0.00	1
219.90	50yr 24hr SCS	0.21	0.21	0.00	1
219.96	100yr 24hr SCS	0.25	0.25	0.00	1
220.16	Overtopping	0.36	0.36	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 20.50 m, Culvert Slope: 0.0049

****

Summary of Culvert Flows at Crossing: Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.78	0.207	0.728	4-FFf	0.184	0.140	0.600	0.770	0.177	0.000
5yr 24hr SCS	0.09	0.09	219.79	0.283	0.745	4-FFf	0.252	0.190	0.600	0.770	0.318	0.000
10yr 24hr SCS	0.13	0.13	219.82	0.347	0.772	4-FFf	0.312	0.229	0.600	0.770	0.460	0.000
25yr 24hr SCS	0.17	0.17	219.86	0.406	0.808	4-FFf	0.371	0.265	0.600	0.770	0.601	0.000
50yr 24hr SCS	0.21	0.21	219.90	0.462	0.855	4-FFf	0.435	0.296	0.600	0.770	0.743	0.000
100yr 24hr SCS	0.25	0.25	219.96	0.518	0.911	4-FFf	0.600	0.324	0.600	0.770	0.884	0.000

HY-8 Culvert Analysis Report

Crossing Notes: Prop 600 Crossing Hartley (Alternative #5, #4 & #2)

Crossing model assumes downstream improvements to Crystal Beach Road culvert crossing (Alternative #1) and twinned driveway culverts (Alternative #3). Assumed tailwater elevation of 219.61 based on proposed Crystal Beach Road roadside ditch modeling for 5-yr 24h SCS design storm. for Lake Simcoe average March water level condition.

Culvert Data Summary - 600 CSP

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.61 m

Roadway Data for Crossing: Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.24
1	11.90	220.16
2	20.90	220.21

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: 600 CSP

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	600 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.62	2yr 24hr SCS	0.05	0.05	0.00	1
219.63	5yr 24hr SCS	0.09	0.09	0.00	1
219.66	10yr 24hr SCS	0.13	0.13	0.00	1
219.70	25yr 24hr SCS	0.17	0.17	0.00	1
219.74	50yr 24hr SCS	0.21	0.21	0.00	1
219.80	100yr 24hr SCS	0.25	0.25	0.00	1
220.16	Overtopping	0.42	0.42	0.00	Overtopping

****

Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 20.50 m, Culvert Slope: 0.0049

****

Summary of Culvert Flows at Crossing: Prop 600 Crossing Hartley (Alternative #4, #3 & #1)

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.62	0.207	0.568	3-M1f	0.184	0.140	0.600	0.610	0.177	0.000
5yr 24hr SCS	0.09	0.09	219.63	0.283	0.585	3-M1f	0.252	0.190	0.600	0.610	0.318	0.000
10yr 24hr SCS	0.13	0.13	219.66	0.347	0.612	3-M1f	0.312	0.229	0.600	0.610	0.460	0.000
25yr 24hr SCS	0.17	0.17	219.70	0.406	0.648	4-FFf	0.371	0.265	0.600	0.610	0.601	0.000
50yr 24hr SCS	0.21	0.21	219.74	0.462	0.695	4-FFf	0.435	0.296	0.600	0.610	0.743	0.000
100yr 24hr SCS	0.25	0.25	219.80	0.518	0.751	4-FFf	0.600	0.324	0.600	0.610	0.884	0.000

Alternative #6

Alternative #6

Scenario #1 - Twinning Goodfellow Ave / Crystal Beach Road Crossing

HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1428	Hazel	Proposed Scenario #1 (Regional)	45.18	219.53	220.49	220.40	220.54	0.003180	1.50	66.83	203.69	0.51
Leonard's Creek	1	1428	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.53	220.12	219.81	220.13	0.000718	0.49	11.92	43.93	0.22
Leonard's Creek	1	1428	5 year	Proposed Scenario #1 (1:5-100 year)	7.71	219.53	220.19	219.89	220.21	0.001553	0.79	15.20	48.65	0.33
Leonard's Creek	1	1428	10 year	Proposed Scenario #1 (1:5-100 year)	10.67	219.53	220.21	220.01	220.25	0.002470	1.03	16.38	50.95	0.42
Leonard's Creek	1	1428	25 year	Proposed Scenario #1 (1:5-100 year)	14.66	219.53	220.24	220.11	220.30	0.003898	1.32	17.68	60.88	0.53
Leonard's Creek	1	1428	50 year	Proposed Scenario #1 (1:5-100 year)	17.97	219.53	220.29	220.15	220.36	0.003934	1.40	21.69	84.83	0.54
Leonard's Creek	1	1428	100 year	Proposed Scenario #1 (1:5-100 year)	20.73	219.53	220.30	220.19	220.38	0.005074	1.60	22.05	86.43	0.61
Leonard's Creek	1	1418	Hazel	Proposed Scenario #1 (Regional)	42.48	219.11	220.51	220.06	220.51	0.000147	0.38	225.27	341.41	0.11
Leonard's Creek	1	1418	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.11	220.12	219.70	220.12	0.000038	0.14	64.99	220.46	0.05
Leonard's Creek	1	1418	5 year	Proposed Scenario #1 (1:5-100 year)	7.69	219.11	220.20	219.96	220.20	0.000072	0.21	82.16	224.78	0.07
Leonard's Creek	1	1418	10 year	Proposed Scenario #1 (1:5-100 year)	10.58	219.11	220.23	220.02	220.23	0.000108	0.27	88.89	226.06	0.09
Leonard's Creek	1	1418	25 year	Proposed Scenario #1 (1:5-100 year)	14.51	219.11	220.26	220.02	220.26	0.000159	0.33	96.52	229.40	0.11
Leonard's Creek	1	1418	50 year	Proposed Scenario #1 (1:5-100 year)	17.65	219.11	220.32	220.02	220.32	0.000161	0.35	109.57	235.67	0.11
Leonard's Creek	1	1418	100 year	Proposed Scenario #1 (1:5-100 year)	20.22	219.11	220.33	220.02	220.33	0.000093	0.27	164.48	341.41	0.09
Leonard's Creek	1	1410			Culvert									
Leonard's Creek	1	1407	Hazel	Proposed Scenario #1 (Regional)	42.48	219.31	220.51	219.90	220.51	0.000113	0.32	245.24	342.76	0.10
Leonard's Creek	1	1407	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.31	220.12	219.80	220.12	0.000022	0.10	73.38	188.60	0.04
Leonard's Creek	1	1407	5 year	Proposed Scenario #1 (1:5-100 year)	7.69	219.31	220.20	219.82	220.20	0.000023	0.11	138.11	339.64	0.04
Leonard's Creek	1	1407	10 year	Proposed Scenario #1 (1:5-100 year)	10.58	219.31	220.23	219.82	220.23	0.000036	0.15	147.82	340.94	0.05
Leonard's Creek	1	1407	25 year	Proposed Scenario #1 (1:5-100 year)	14.51	219.31	220.26	219.82	220.26	0.000053	0.18	160.28	342.76	0.06
Leonard's Creek	1	1407	50 year	Proposed Scenario #1 (1:5-100 year)	17.65	219.31	220.30	219.82	220.30	0.000060	0.20	174.07	342.76	0.07
Leonard's Creek	1	1407	100 year	Proposed Scenario #1 (1:5-100 year)	20.22	219.31	220.33	219.82	220.33	0.000065	0.21	184.22	342.76	0.07
Leonard's Creek	1	1404	Hazel	Proposed Scenario #1 (Regional)	41.81	219.40	220.47	220.14	220.50	0.001754	1.19	71.74	141.64	0.38
Leonard's Creek	1	1404	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.40	220.12	219.70	220.12	0.000161	0.27	27.89	99.52	0.11
Leonard's Creek	1	1404	5 year	Proposed Scenario #1 (1:5-100 year)	7.68	219.40	220.19	219.78	220.19	0.000354	0.43	35.88	112.77	0.16
Leonard's Creek	1	1404	10 year	Proposed Scenario #1 (1:5-100 year)	10.57	219.40	220.22	219.83	220.22	0.000568	0.55	38.71	116.63	0.21
Leonard's Creek	1	1404	25 year	Proposed Scenario #1 (1:5-100 year)	14.46	219.40	220.25	219.88	220.26	0.000848	0.70	42.42	120.23	0.25
Leonard's Creek	1	1404	50 year	Proposed Scenario #1 (1:5-100 year)	17.53	219.40	220.28	219.92	220.30	0.000948	0.76	47.02	123.48	0.27
Leonard's Creek	1	1404	100 year	Proposed Scenario #1 (1:5-100 year)	20.05	219.40	220.31	219.95	220.32	0.001027	0.81	50.47	125.94	0.28
Leonard's Creek	1	1386	Hazel	Proposed Scenario #1 (Regional)	37.91	219.16	220.38	220.22	220.45	0.002945	1.65	46.50	100.02	0.50
Leonard's Creek	1	1386	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.16	220.11	219.56	220.11	0.000169	0.33	22.02	80.95	0.11
Leonard's Creek	1	1386	5 year	Proposed Scenario #1 (1:5-100 year)	7.58	219.16	220.18	219.68	220.19	0.000397	0.53	27.71	85.64	0.18
Leonard's Creek	1	1386	10 year	Proposed Scenario #1 (1:5-100 year)	10.35	219.16	220.20	219.74	220.21	0.000662	0.69	29.15	86.88	0.23
Leonard's Creek	1	1386	25 year	Proposed Scenario #1 (1:5-100 year)	14.05	219.16	220.21	219.83	220.24	0.001085	0.90	30.73	88.27	0.30
Leonard's Creek	1	1386	50 year	Proposed Scenario #1 (1:5-100 year)	16.64	219.16	220.25	219.87	220.27	0.001230	0.98	33.73	90.70	0.32
Leonard's Creek	1	1386	100 year	Proposed Scenario #1 (1:5-100 year)	18.79	219.16	220.27	219.90	220.30	0.001355	1.04	35.92	92.42	0.33
Leonard's Creek	1	1377	Hazel	Proposed Scenario #1 (Regional)	33.87	219.22	220.39	220.15	220.42	0.001427	1.11	60.33	146.14	0.34
Leonard's Creek	1	1377	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.22	220.11	219.54	220.11	0.000131	0.27	22.74	74.32	0.10
Leonard's Creek	1	1377	5 year	Proposed Scenario #1 (1:5-100 year)	7.16	219.22	220.18	219.64	220.18	0.000284	0.43	27.90	78.68	0.15
Leonard's Creek	1	1377	10 year	Proposed Scenario #1 (1:5-100 year)	9.76	219.22	220.19	219.72	220.20	0.000478	0.56	29.12	79.68	0.19
Leonard's Creek	1	1377	25 year	Proposed Scenario #1 (1:5-100 year)	13.23	219.22	220.21	219.82	220.23	0.000798	0.73	30.37	80.69	0.25
Leonard's Creek	1	1377	50 year	Proposed Scenario #1 (1:5-100 year)	15.34	219.22	220.24	219.87	220.26	0.000878	0.79	33.09	82.81	0.26
Leonard's Creek	1	1377	100 year	Proposed Scenario #1 (1:5-100 year)	17.10	219.22	220.26	219.91	220.29	0.000952	0.83	35.06	84.34	0.28
Leonard's Creek	1	1369	Hazel	Proposed Scenario #1 (Regional)	30.76	219.13	220.39	220.14	220.40	0.001090	0.96	68.65	151.39	0.29
Leonard's Creek	1	1369	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.13	220.11	219.58	220.11	0.000164	0.31	25.72	90.25	0.11
Leonard's Creek	1	1369	5 year	Proposed Scenario #1 (1:5-100 year)	6.85	219.13	220.18	219.79	220.18	0.000299	0.44	31.94	95.21	0.15
Leonard's Creek	1	1369	10 year	Proposed Scenario #1 (1:5-100 year)	9.31	219.13	220.19	219.91	220.20	0.000496	0.57	33.33	96.29	0.19
Leonard's Creek	1	1369	25 year	Proposed Scenario #1 (1:5-100 year)	12.65	219.13	220.20	219.97	220.22	0.000826	0.75	34.70	97.33	0.24
Leonard's Creek	1	1369	50 year	Proposed Scenario #1 (1:5-100 year)	14.38	219.13	220.24	220.00	220.25	0.000841	0.77	38.05	98.94	0.25
Leonard's Creek	1	1369	100 year	Proposed Scenario #1 (1:5-100 year)	15.86	219.13	220.26	220.01	220.28	0.000869	0.80	40.45	99.68	0.25
Leonard's Creek	1	1359	Hazel	Proposed Scenario #1 (Regional)	28.03	219.13	220.38	220.03	220.39	0.000410	0.65	104.04	267.59	0.19
Leonard's Creek	1	1359	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.13	220.11	219.39	220.11	0.000062	0.21	33.08	102.73	0.07
Leonard's Creek	1	1359	5 year	Proposed Scenario #1 (1:5-100 year)	6.54	219.13	220.18	219.47	220.18	0.000116	0.31	40.17	109.41	0.10
Leonard's Creek	1	1359	10 year	Proposed Scenario #1 (1:5-100 year)	8.89	219.13	220.19	219.54	220.19	0.000196	0.40	41.71	110.77	0.13
Leonard's Creek	1	1359	25 year	Proposed Scenario #1 (1:5-100 year)	12.10	219.13	220.20	219.62	220.21	0.000334	0.53	43.20	111.96	0.17
Leonard's Creek	1	1359	50 year	Proposed Scenario #1 (1:5-100 year)	13.53	219.13	220.24	219.65	220.25	0.000341	0.55	47.07	115.03	0.17
Leonard's Creek	1	1359	100 year	Proposed Scenario #1 (1:5-100 year)	14.76	219.13	220.26	219.67	220.27	0.000354	0.56	49.88	117.98	0.17
Leonard's Creek	1	1347	Hazel	Proposed Scenario #1 (Regional)	25.16	218.85	220.39	220.10	220.39	0.000150	0.40	145.67	266.55	0.11
Leonard's Creek	1	1347	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.85	220.11	219.50	220.11	0.000090	0.26	30.26	93.95	0.08
Leonard's Creek	1	1347	5 year	Proposed Scenario #1 (1:5-100 year)	6.12	218.85	220.17	219.64	220.18	0.000141	0.34	36.51	94.05	0.11
Leonard's Creek	1	1347	10 year	Proposed Scenario #1 (1:5-100 year)	8.35	218.85	220.19	219.77	220.19	0.000241	0.45	37.73	94.07	0.14
Leonard's Creek	1	1347	25 year	Proposed Scenario #1 (1:5-100 year)	11.42	218.85	220.20	219.93	220.21	0.000109	0.31	97.32	266.55	0.09
Leonard's Creek	1	1347	50 year	Proposed Scenario #1 (1:5-100 year)	12.55	218.85	220.24	219.97	220.24	0.000100	0.30	106.48	266.55	0.09
Leonard's Creek	1	1347	100 year	Proposed Scenario #1 (1:5-100 year)	13.52	218.85	220.26	220.01	220.26	0.000096	0.30	112.98	266.55	0.09
Leonard's Creek	1	1335			Culvert									
Leonard's Creek	1	1329	Hazel	Proposed Scenario #1 (Regional)	25.16	218.98	220.39	219.97	220.39	0.000068	0.24	179.13	246.27	0.08
Leonard's Creek	1	1329	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.98	219.91	219.51	219.92	0.000408	0.40	14.44	57.52	0.17
Leonard's Creek	1	1329	5 year	Proposed Scenario #1 (1:5-100 year)	6.12	218.98	220.03	219.61	220.03	0.000033	0.13	91.86	243.25	0.05
Leonard's Creek	1	1329	10 year	Proposed Scenario #1 (1:5-100 year)	8.35	218.98	220.11	219.70	220.11	0.000034	0.14	111.30	245.12	0.05
Leonard's Creek	1	1329	25 year	Proposed Scenario #1 (1:5-100 year)	11.42	218.98	220.20	219.81	220.20	0.000035	0.15	134.23	246.27	0.05
Leonard's Creek	1	1329	50 year	Proposed Scenario #1 (1:5-100 year)	12.55	218.98	220.23	219.85	220.23	0.000036	0.16	141.75	246.27	0.05
Leonard's Creek	1	1329	100 year	Proposed Scenario #1 (1:5-100 year)	13.52	218.98	220.26	219.87	220.26	0.000036	0.16	148.46	246.27	0.05
Leonard's Creek	1	1321	Hazel	Proposed Scenario #1 (Regional)	23.17	219.04	220.34	220.05	220.37	0.001302	0.93	42.12	99.37	0.32
Leonard's Creek	1	1321	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.04	219.90	219.56	219.91	0.001063	0.52	8.75	34.35	0.26
Leonard's Creek	1	1321	5 year	Proposed Scenario #1 (1:5-100 year)	6.04	219.04	220.01	219.67	220.02	0.000982	0.58	13.46	53.81	0.26
Leonard's Creek	1	1321	10 year	Proposed Scenario #1 (1:5-100 year)	7.99	219.04	220.08	219.74	220.10	0.000960	0.63	17.87	61.68	0.26
Leonard's Creek	1	1321	25 year	Proposed Scenario #1 (1:5-100 year)	10.55	219.04	220.18	219.83	220.19	0.000828	0.65	26.42	94.39	0.25
Leonard's Creek	1	1321	50 year	Proposed Scenario #1 (1:5-100 year)	11.54	219.04	220.21	219.87	220.22	0.000778	0.64	29.41	95.07	0.24
Leonard's Creek	1	1321	100 year	Proposed Scenario #1 (1:5-100 year)	12.36	219.04	220.24	219.89	220.25	0.000726	0.64	32.12	95.69	0.23
Leonard's Creek	1	1308	Hazel	Proposed Scenario #1 (Regional)	21.08	218.99	220.35	220.07	220.35	0.000244	0.46	91.63	184.22	0.14
Leonard's Creek	1	1308	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.99	219.86	219.47	219.89	0.001281	0.71	5.54	9.63	0.29
Leonard's Creek	1	1308	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	218.99	219.95	219.59	219.99	0.001992	0.95	6.36	9.94	0.37
Leonard's Creek	1	1308	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	218.99	220.00	219.67	220.07	0.002621	1.15	6.86	10.13	0.43
Leonard's Creek	1	1308	25 year	Proposed Scenario #1 (1:5-100 year)	10.01	218.99	220.06	219.75	220.15	0.003284	1.36	7.48	10.36	0.49
Leonard's Creek	1	1308	50 year	Proposed Scenario #1 (1:5-100 year)	10.87	218.99	220.07	219.79	220.18	0.003633	1.44	7.63	10.46	0.52
Leonard's Creek	1	1308	100 year	Proposed Scenario #1 (1:5-100 year)	11.59	218.99	220.09	219.81	220.20	0.003903	1.51	7.78	11.44	0.54
Leonard's Creek	1	1290	Hazel	Proposed Scenario #1 (Regional)	19.39	219.00	220.11	220.08	220.32	0.007632	2.14	11.80	27.65	0.75

Alternative #6

Scenario #1 - Twinning Goodfellow Ave / Crystal Beach Road Crossing

HEC-RAS Locations: User Defined (Continued)

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1290	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.00	219.84	219.51	219.86	0.001503	0.74	5.31	11.13	0.31
Leonard's Creek	1	1290	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	219.00	219.90	219.61	219.95	0.002434	1.00	6.53	23.07	0.41
Leonard's Creek	1	1290	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	219.00	219.94	219.68	220.01	0.003272	1.20	7.42	23.98	0.47
Leonard's Creek	1	1290	25 year	Proposed Scenario #1 (1:5-100 year)	9.84	219.00	220.00	219.76	220.09	0.003600	1.34	8.93	25.37	0.50
Leonard's Creek	1	1290	50 year	Proposed Scenario #1 (1:5-100 year)	10.59	219.00	220.02	219.78	220.11	0.003877	1.40	9.24	25.64	0.53
Leonard's Creek	1	1290	100 year	Proposed Scenario #1 (1:5-100 year)	11.26	219.00	220.03	219.80	220.13	0.004056	1.45	9.59	25.94	0.54
Leonard's Creek	1	1255	Hazel	Proposed Scenario #1 (Regional)	18.38	219.15	220.06	219.86	220.13	0.002560	1.28	20.92	56.82	0.44
Leonard's Creek	1	1255	2 year	Proposed Scenario #1 (1:2 year)	3.89	219.15	219.82	219.41	219.83	0.000527	0.47	10.44	34.94	0.19
Leonard's Creek	1	1255	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	219.15	219.88	219.49	219.90	0.000832	0.62	12.61	36.71	0.24
Leonard's Creek	1	1255	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	219.15	219.91	219.54	219.94	0.001154	0.75	13.73	38.96	0.29
Leonard's Creek	1	1255	25 year	Proposed Scenario #1 (1:5-100 year)	9.82	219.15	219.97	219.60	220.00	0.001231	0.83	16.42	45.55	0.30
Leonard's Creek	1	1255	50 year	Proposed Scenario #1 (1:5-100 year)	10.40	219.15	219.99	219.62	220.02	0.001281	0.85	17.00	47.00	0.31
Leonard's Creek	1	1255	100 year	Proposed Scenario #1 (1:5-100 year)	10.99	219.15	220.00	219.64	220.03	0.001319	0.87	17.66	48.51	0.31
Leonard's Creek	1	1225	Hazel	Proposed Scenario #1 (Regional)	17.85	218.73	220.04	219.60	220.07	0.001117	0.94	33.27	102.60	0.30
Leonard's Creek	1	1225	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.73	219.81	219.19	219.82	0.000223	0.36	14.65	63.70	0.13
Leonard's Creek	1	1225	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	218.73	219.87	219.28	219.88	0.000380	0.48	18.57	76.73	0.17
Leonard's Creek	1	1225	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	218.73	219.90	219.34	219.91	0.000538	0.59	20.55	78.70	0.20
Leonard's Creek	1	1225	25 year	Proposed Scenario #1 (1:5-100 year)	9.82	218.73	219.96	219.39	219.98	0.000554	0.63	25.79	83.69	0.21
Leonard's Creek	1	1225	50 year	Proposed Scenario #1 (1:5-100 year)	10.35	218.73	219.97	219.41	219.99	0.000568	0.64	26.86	84.68	0.21
Leonard's Creek	1	1225	100 year	Proposed Scenario #1 (1:5-100 year)	10.90	218.73	219.99	219.42	220.00	0.000578	0.65	28.12	92.90	0.21
Leonard's Creek	1	1204	Hazel	Proposed Scenario #1 (Regional)	17.60	218.84	220.01	219.73	220.04	0.001346	1.09	35.19	109.68	0.34
Leonard's Creek	1	1204	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.84	219.81	219.26	219.81	0.000274	0.42	17.56	59.83	0.15
Leonard's Creek	1	1204	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	218.84	219.86	219.35	219.87	0.000455	0.57	20.90	66.32	0.19
Leonard's Creek	1	1204	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	218.84	219.88	219.41	219.90	0.000659	0.70	22.40	77.10	0.23
Leonard's Creek	1	1204	25 year	Proposed Scenario #1 (1:5-100 year)	9.82	218.84	219.95	219.47	219.96	0.000676	0.74	28.16	99.16	0.24
Leonard's Creek	1	1204	50 year	Proposed Scenario #1 (1:5-100 year)	10.35	218.84	219.96	219.49	219.98	0.000686	0.75	29.43	101.99	0.24
Leonard's Creek	1	1204	100 year	Proposed Scenario #1 (1:5-100 year)	10.87	218.84	219.97	219.50	219.99	0.000682	0.75	30.89	104.16	0.24
Leonard's Creek	1	1162	Hazel	Proposed Scenario #1 (Regional)	14.40	218.66	219.86	219.53	219.96	0.003352	1.63	19.81	116.26	0.52
Leonard's Creek	1	1162	2 year	Proposed Scenario #1 (1:2 year)	3.89	218.66	219.80	219.21	219.80	0.000151	0.33	21.58	82.35	0.11
Leonard's Creek	1	1162	5 year	Proposed Scenario #1 (1:5-100 year)	6.02	218.66	219.85	219.30	219.85	0.000356	0.53	25.98	132.88	0.17
Leonard's Creek	1	1162	10 year	Proposed Scenario #1 (1:5-100 year)	7.81	218.66	219.86	219.37	219.87	0.000530	0.65	27.85	135.16	0.21
Leonard's Creek	1	1162	25 year	Proposed Scenario #1 (1:5-100 year)	9.82	218.66	219.93	219.42	219.94	0.000475	0.64	37.31	146.86	0.20
Leonard's Creek	1	1162	50 year	Proposed Scenario #1 (1:5-100 year)	10.35	218.66	219.94	219.45	219.95	0.000476	0.65	39.17	148.30	0.20
Leonard's Creek	1	1162	100 year	Proposed Scenario #1 (1:5-100 year)	10.87	218.66	219.95	219.47	219.96	0.000466	0.65	41.35	149.22	0.20
Leonard's Creek	1	1144	Hazel	Proposed Scenario #1 (Regional)	10.67	218.69	219.80	219.80	219.89	0.004423	1.67	15.82	102.59	0.57
Leonard's Creek	1	1144	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.69	219.79		219.80	0.000478	0.55	18.59	114.65	0.19
Leonard's Creek	1	1144	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.69	219.83		219.84	0.000749	0.71	23.46	126.34	0.23
Leonard's Creek	1	1144	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.69	219.84		219.86	0.001193	0.89	24.13	127.42	0.30
Leonard's Creek	1	1144	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.69	219.91		219.92	0.000864	0.80	34.28	141.00	0.25
Leonard's Creek	1	1144	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.69	219.92		219.94	0.000854	0.80	36.11	143.26	0.25
Leonard's Creek	1	1144	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.69	219.94		219.95	0.000819	0.79	38.36	145.97	0.25
Leonard's Creek	1	1105	Hazel	Proposed Scenario #1 (Regional)	6.38	218.50	219.78	219.15	219.79	0.000389	0.50	19.19	52.51	0.17
Leonard's Creek	1	1105	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.50	219.79	219.00	219.79	0.000124	0.29	23.02	70.58	0.10
Leonard's Creek	1	1105	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.50	219.82	219.13	219.83	0.000240	0.41	25.43	71.89	0.14
Leonard's Creek	1	1105	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.50	219.82	219.23	219.83	0.000412	0.53	25.22	71.78	0.18
Leonard's Creek	1	1105	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.50	219.89	219.34	219.90	0.000418	0.57	30.57	73.97	0.18
Leonard's Creek	1	1105	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.50	219.90	219.36	219.91	0.000436	0.58	31.45	74.24	0.19
Leonard's Creek	1	1105	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.50	219.92	219.37	219.93	0.000444	0.60	32.55	74.61	0.19
Leonard's Creek	1	1080	Hazel	Proposed Scenario #1 (Regional)	4.57	218.40	219.78	219.10	219.78	0.000038	0.16	70.49	232.21	0.05
Leonard's Creek	1	1080	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.40	219.79	219.06	219.79	0.000025	0.13	74.09	242.25	0.04
Leonard's Creek	1	1080	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.40	219.82	219.22	219.82	0.000044	0.18	82.39	242.29	0.06
Leonard's Creek	1	1080	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.40	219.82	219.30	219.82	0.000077	0.24	81.77	242.28	0.08
Leonard's Creek	1	1080	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.40	219.89	219.38	219.89	0.000068	0.24	99.83	248.28	0.07
Leonard's Creek	1	1080	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.40	219.90	219.40	219.91	0.000069	0.24	102.81	249.11	0.08
Leonard's Creek	1	1080	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.40	219.92	219.42	219.92	0.000069	0.24	106.56	250.04	0.08
Leonard's Creek	1	1070			Culvert									
Leonard's Creek	1	1067	Hazel	Proposed Scenario #1 (Regional)	4.57	218.47	219.72	219.72	219.78	0.007646	1.30	6.47	44.04	0.60
Leonard's Creek	1	1067	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.47	219.70	219.70	219.79	0.009906	1.44	4.38	32.24	0.68
Leonard's Creek	1	1067	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.47	219.75	219.75	219.82	0.008819	1.46	7.98	49.51	0.65
Leonard's Creek	1	1067	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.47	219.82	219.78	219.82	0.000264	0.27	58.74	246.11	0.12
Leonard's Creek	1	1067	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.47	219.89	219.78	219.89	0.000190	0.25	76.96	248.67	0.10
Leonard's Creek	1	1067	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.47	219.90	219.78	219.90	0.000187	0.25	80.04	249.06	0.10
Leonard's Creek	1	1067	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.47	219.92	219.78	219.92	0.000180	0.25	83.63	249.51	0.10
Leonard's Creek	1	1062	Hazel	Proposed Scenario #1 (Regional)	4.57	218.49	219.62	219.09	219.64	0.000647	0.58	11.93	84.70	0.22
Leonard's Creek	1	1062	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.49	219.50	219.05	219.52	0.001073	0.65	6.02	10.62	0.27
Leonard's Creek	1	1062	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.49	219.69	219.17	219.71	0.000627	0.60	18.67	110.44	0.22
Leonard's Creek	1	1062	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.49	219.80		219.81	0.000406	0.53	32.02	134.74	0.18
Leonard's Creek	1	1062	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.49	219.88		219.89	0.000382	0.54	43.37	168.22	0.17
Leonard's Creek	1	1062	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.49	219.89		219.90	0.000386	0.55	45.46	170.53	0.18
Leonard's Creek	1	1062	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.49	219.91		219.91	0.000377	0.55	48.02	171.96	0.17
Leonard's Creek	1	1034	Hazel	Proposed Scenario #1 (Regional)	4.57	218.49	219.55		219.60	0.001786	0.99	5.03	13.45	0.36
Leonard's Creek	1	1034	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.49	219.41		219.47	0.002669	1.06	3.81	7.06	0.42
Leonard's Creek	1	1034	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.49	219.58		219.66	0.002840	1.27	5.47	21.99	0.45
Leonard's Creek	1	1034	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.49	219.69	219.35	219.77	0.002627	1.33	8.82	43.00	0.44
Leonard's Creek	1	1034	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.49	219.80	219.45	219.85	0.001820	1.20	20.92	152.32	0.38
Leonard's Creek	1	1034	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.49	219.83	219.48	219.87	0.001493	1.10	25.53	167.07	0.34
Leonard's Creek	1	1034	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.49	219.86	219.51	219.89	0.001257	1.03	30.43	201.36	0.32
Leonard's Creek	1	1013	Hazel	Proposed Scenario #1 (Regional)	4.57	218.49	219.50	219.19	219.55	0.003213	1.02	4.65	10.73	0.44
Leonard's Creek	1	1013	2 year	Proposed Scenario #1 (1:2 year)	3.93	218.49	219.15	219.14	219.34	0.017479	1.91	2.06	5.23	0.97
Leonard's Creek	1	1013	5 year	Proposed Scenario #1 (1:5-100 year)	6.10	218.49	219.30	219.30	219.52	0.017789	2.10	2.91	6.53	1.00
Leonard's Creek	1	1013	10 year	Proposed Scenario #1 (1:5-100 year)	7.92	218.49	219.41	219.41	219.64	0.016121	2.13	3.78	8.82	0.98
Leonard's Creek	1	1013	25 year	Proposed Scenario #1 (1:5-100 year)	9.98	218.49	219.50	219.50	219.75	0.014984	2.21	4.68	10.81	0.96
Leonard's Creek	1	1013	50 year	Proposed Scenario #1 (1:5-100 year)	10.56	218.49	219.53	219.53	219.78	0.014359	2.23	4.96	11.39	0.95
Leonard's Creek	1	1013	100 year	Proposed Scenario #1 (1:5-100 year)	11.11	218.49	219.55	219.55	219.80	0.014148	2.26	5.18	11.85	0.95

Alternative #6

Scenario #1 - Twinning Goodfellow Ave / Crystal Beach Road Crossing

HEC-RAS Locations: User Defined

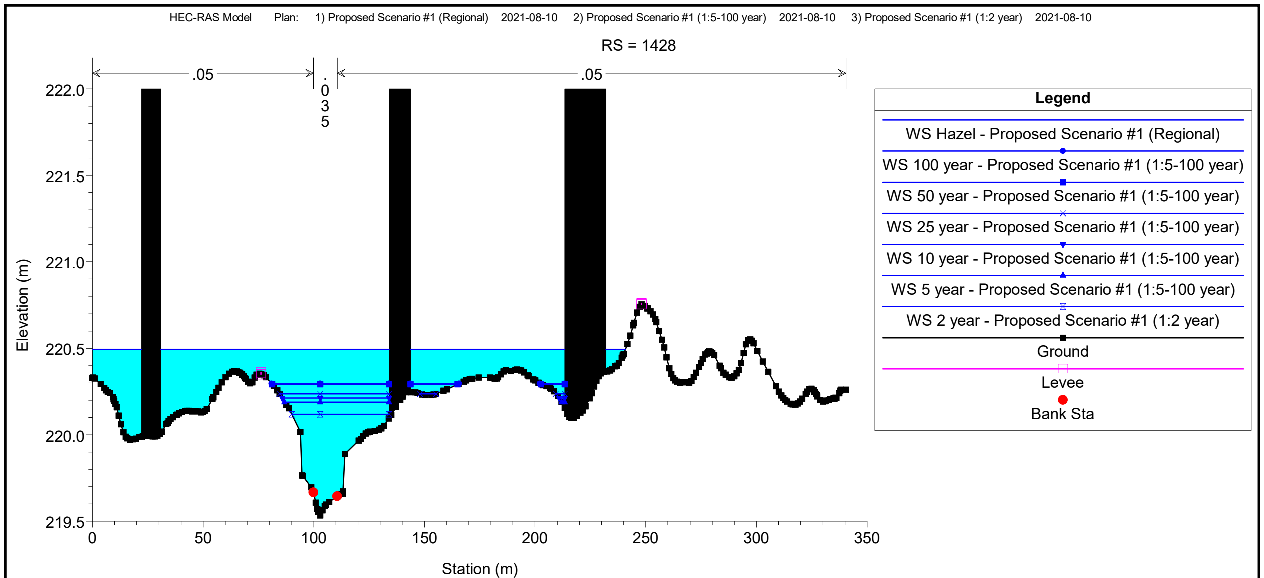
River	Reach	River Sta	Profile	Plan	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
					(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Leonard's Creek	1	1410 Culvert #1	Hazel	Proposed Scenario #1 (Regional)	220.51	220.51	219.13	220.51	220.02	0.09	38.65	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #2	Hazel	Proposed Scenario #1 (Regional)	220.51	220.51	219.14	220.51	220.02	0.09	38.65	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #1	2 year	Proposed Scenario #1 (1:2 year)	220.12	220.12	219.14	220.12	220.02	0.10	3.70	0.00	0.15	0.15
Leonard's Creek	1	1410 Culvert #2	2 year	Proposed Scenario #1 (1:2 year)	220.12	220.12	219.15	220.12	220.02	0.10	3.70	0.00	0.15	0.15
Leonard's Creek	1	1410 Culvert #1	5 year	Proposed Scenario #1 (1:5-100 year)	220.20	220.20	219.11	220.20	220.02	0.07	7.54	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #2	5 year	Proposed Scenario #1 (1:5-100 year)	220.20	220.20	219.12	220.20	220.02	0.07	7.54	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #1	10 year	Proposed Scenario #1 (1:5-100 year)	220.23	220.23	219.15	220.23	220.02	0.10	10.38	0.00	0.16	0.16
Leonard's Creek	1	1410 Culvert #2	10 year	Proposed Scenario #1 (1:5-100 year)	220.23	220.23	219.16	220.23	220.02	0.10	10.38	0.00	0.16	0.16
Leonard's Creek	1	1410 Culvert #1	25 year	Proposed Scenario #1 (1:5-100 year)	220.26	220.26	219.09	220.26	220.02	0.06	14.38	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #2	25 year	Proposed Scenario #1 (1:5-100 year)	220.26	220.26	219.10	220.26	220.02	0.06	14.38	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #1	50 year	Proposed Scenario #1 (1:5-100 year)	220.32	220.32	219.29	220.32	220.02	0.23	17.19	0.02	0.36	0.36
Leonard's Creek	1	1410 Culvert #2	50 year	Proposed Scenario #1 (1:5-100 year)	220.32	220.32	219.29	220.32	220.02	0.23	17.19	0.02	0.36	0.36
Leonard's Creek	1	1410 Culvert #1	100 year	Proposed Scenario #1 (1:5-100 year)	220.33	220.33	219.11	220.33	220.02	0.08	22.05	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #2	100 year	Proposed Scenario #1 (1:5-100 year)	220.33	220.33	219.12	220.33	220.02	0.08	22.05	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	Hazel	Proposed Scenario #1 (Regional)	220.39	220.39	219.01	220.39	220.10	0.18	15.66	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	2 year	Proposed Scenario #1 (1:2 year)	220.11	220.11	220.10	220.11	220.10	1.97	1.93	0.20	1.24	1.24
Leonard's Creek	1	1335 Culvert #1	5 year	Proposed Scenario #1 (1:5-100 year)	220.18	220.17	220.15	220.18	220.11	1.69	4.43	0.14	1.07	1.07
Leonard's Creek	1	1335 Culvert #1	10 year	Proposed Scenario #1 (1:5-100 year)	220.19	220.19	220.19	220.19	220.11	1.26	23.25	0.08	0.79	0.79
Leonard's Creek	1	1335 Culvert #1	25 year	Proposed Scenario #1 (1:5-100 year)	220.20	220.20	220.20	220.20	220.11	0.14	11.27	0.00	0.09	0.09
Leonard's Creek	1	1335 Culvert #1	50 year	Proposed Scenario #1 (1:5-100 year)	220.24	220.24	220.23	220.24	220.11	0.31	12.24	0.00	0.20	0.20
Leonard's Creek	1	1335 Culvert #1	100 year	Proposed Scenario #1 (1:5-100 year)	220.26	220.26	220.26	220.26	220.11	0.22	13.30	0.00	0.14	0.14
Leonard's Creek	1	1070 Culvert #1	Hazel	Proposed Scenario #1 (Regional)	219.78	219.78	219.21	219.78	219.67	0.27	4.30	0.06	0.07	0.07
Leonard's Creek	1	1070 Culvert #1	2 year	Proposed Scenario #1 (1:2 year)	219.79	219.79	219.11	219.79	219.67	0.30	3.63	0.08	0.08	0.08
Leonard's Creek	1	1070 Culvert #1	5 year	Proposed Scenario #1 (1:5-100 year)	219.82	219.82	219.44	219.82	219.67	0.33	5.76	0.07	0.09	0.09
Leonard's Creek	1	1070 Culvert #1	10 year	Proposed Scenario #1 (1:5-100 year)	219.82	219.82	219.74	219.82	219.67	0.38	7.54	0.00	0.10	0.10
Leonard's Creek	1	1070 Culvert #1	25 year	Proposed Scenario #1 (1:5-100 year)	219.89	219.89	219.89	219.89	219.67	0.46	9.52	0.00	0.12	0.12
Leonard's Creek	1	1070 Culvert #1	50 year	Proposed Scenario #1 (1:5-100 year)	219.91	219.90	219.89	219.91	219.67	0.36	10.20	0.00	0.10	0.10
Leonard's Creek	1	1070 Culvert #1	100 year	Proposed Scenario #1 (1:5-100 year)	219.92	219.92	219.90	219.92	219.67	0.50	10.61	0.00	0.14	0.14

Alternative #6

Scenario #1 - Twinning Goodfellow Ave / Crystal Beach Road Crossing

HEC-RAS River: Leonard's Creek Reach: 1

Reach	River Sta	Profile	Plan	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
				(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1	1529.2	Hazel	Proposed Scenario #1 (Regional)	43.86	13.72	25.16	13.72		161.69	0.44	0.28	219.95	220.92	220.88	220.39	220.39
1	1529.2	5 year	Proposed Scenario #1 (1:5-100 year)	7.54	0.96	6.12	0.96		145.50	0.09	0.05	219.95	220.54	220.53	220.03	220.03
1	1529.2	10 year	Proposed Scenario #1 (1:5-100 year)	10.43	1.48	8.35	1.48		154.28	0.16	0.07	219.95	220.61	220.59	220.11	220.11
1	1529.2	25 year	Proposed Scenario #1 (1:5-100 year)	14.33	2.18	11.42	2.18		154.78	0.25	0.10	219.95	220.65	220.63	220.20	220.20
1	1529.2	50 year	Proposed Scenario #1 (1:5-100 year)	17.56	3.81	12.55	3.81		155.82	0.28	0.13	219.95	220.71	220.68	220.23	220.23
1	1529.2	100 year	Proposed Scenario #1 (1:5-100 year)	20.25	5.01	13.52	5.01		155.91	0.31	0.16	219.95	220.73	220.70	220.26	220.26
1	1429	Hazel	Proposed Scenario #1 (Regional)	45.37	14.27	17.60	14.27		186.63	0.40	0.22	219.97	220.54	220.50	220.04	220.01
1	1429	2 year	Proposed Scenario #1 (1:2 year)	3.89	0.14	3.89	0.14		24.83	0.08	0.04	219.97	220.13	220.12	219.81	219.81
1	1429	5 year	Proposed Scenario #1 (1:5-100 year)	7.71	0.74	6.02	0.74		62.22	0.14	0.07	219.97	220.21	220.19	219.87	219.86
1	1429	10 year	Proposed Scenario #1 (1:5-100 year)	10.67	1.36	7.81	1.36		78.14	0.16	0.09	219.97	220.25	220.21	219.90	219.88
1	1429	25 year	Proposed Scenario #1 (1:5-100 year)	14.66	2.68	9.82	2.68		125.64	0.23	0.09	219.97	220.30	220.24	219.96	219.95
1	1429	50 year	Proposed Scenario #1 (1:5-100 year)	17.97	3.85	10.35	3.85		164.78	0.26	0.10	219.97	220.36	220.29	219.98	219.96
1	1429	100 year	Proposed Scenario #1 (1:5-100 year)	20.73	4.95	10.87	4.95		186.63	0.28	0.10	219.97	220.38	220.30	219.99	219.97
1	1176	Hazel	Proposed Scenario #1 (Regional)	17.60	13.23	4.57	13.23		113.04	0.34	0.25	219.51	219.98	219.91	219.78	219.75



HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
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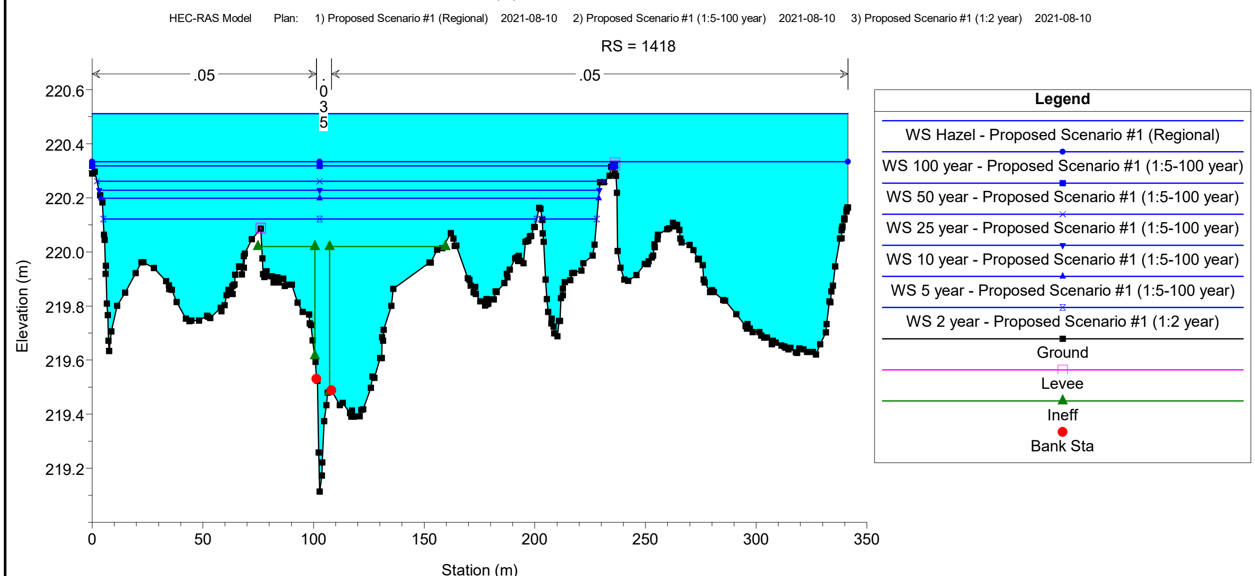
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta



HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
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.035
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Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
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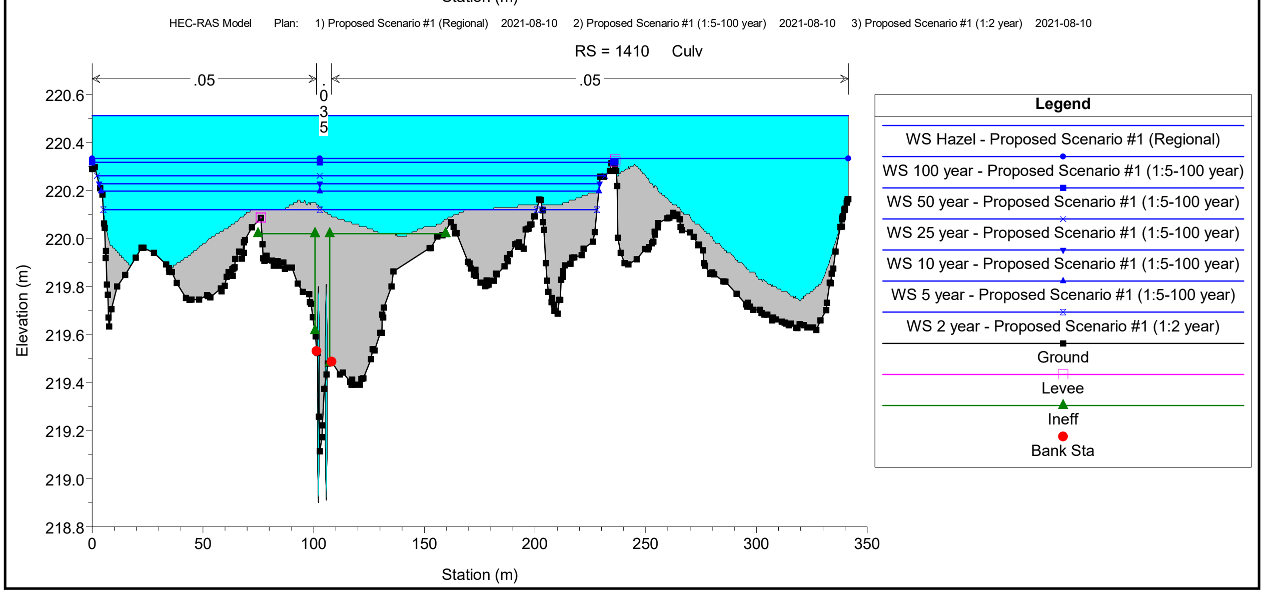
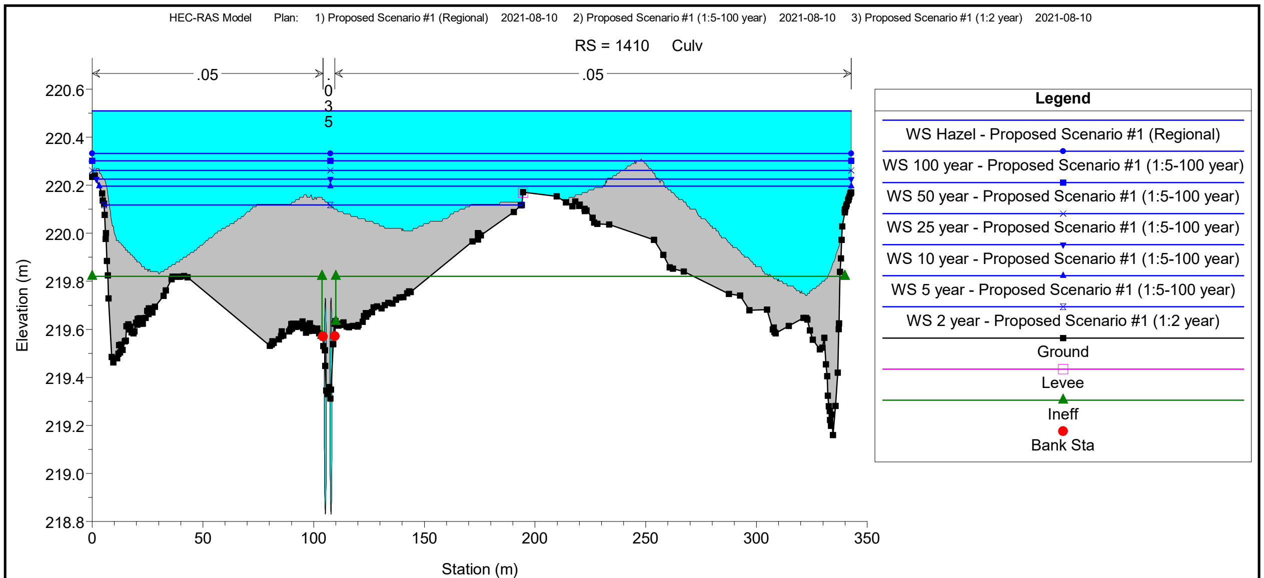
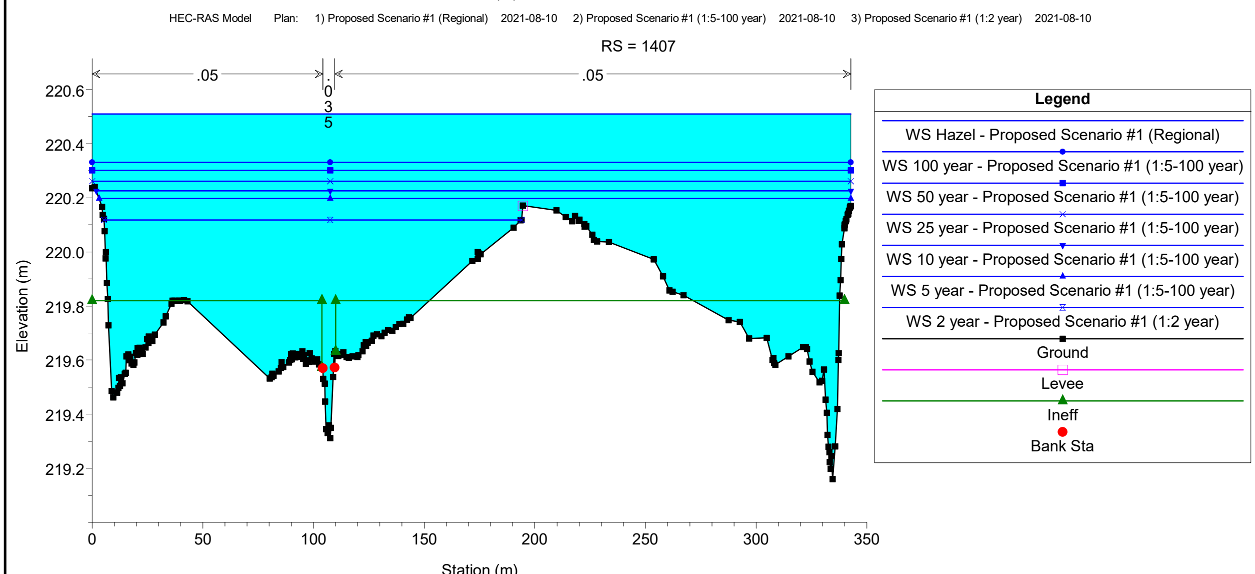
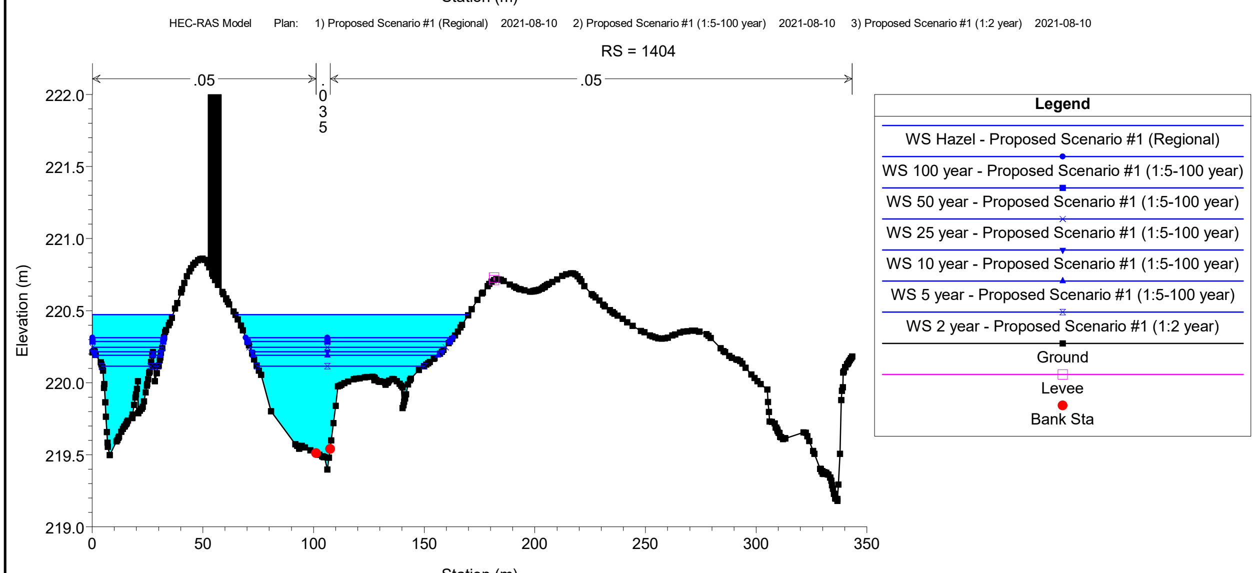
Bank Sta

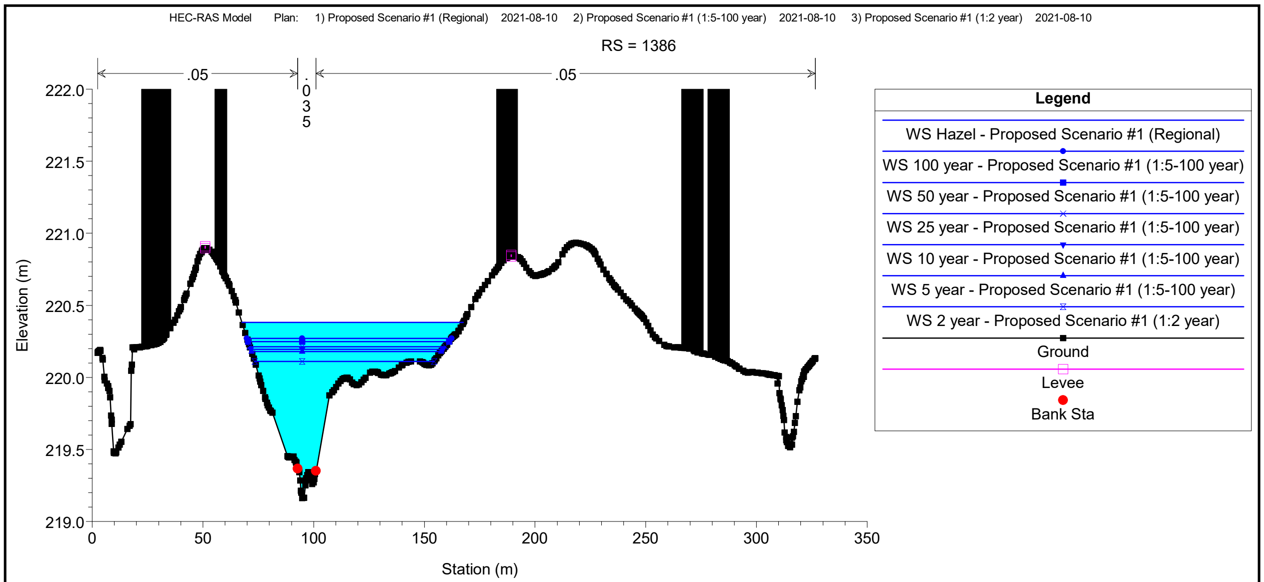


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

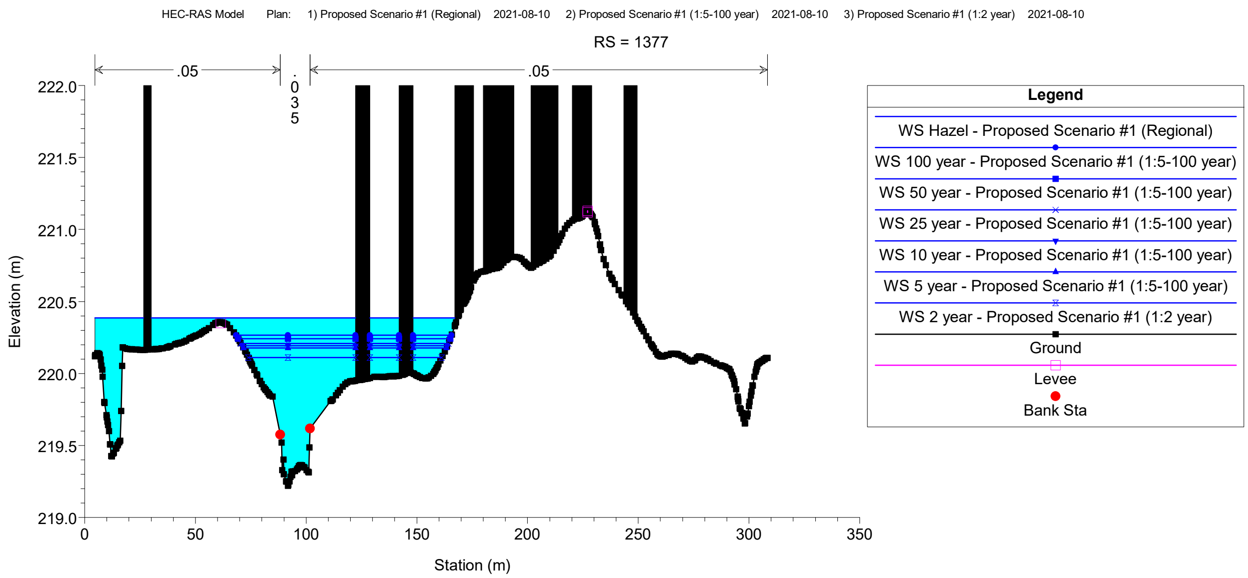

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1407
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

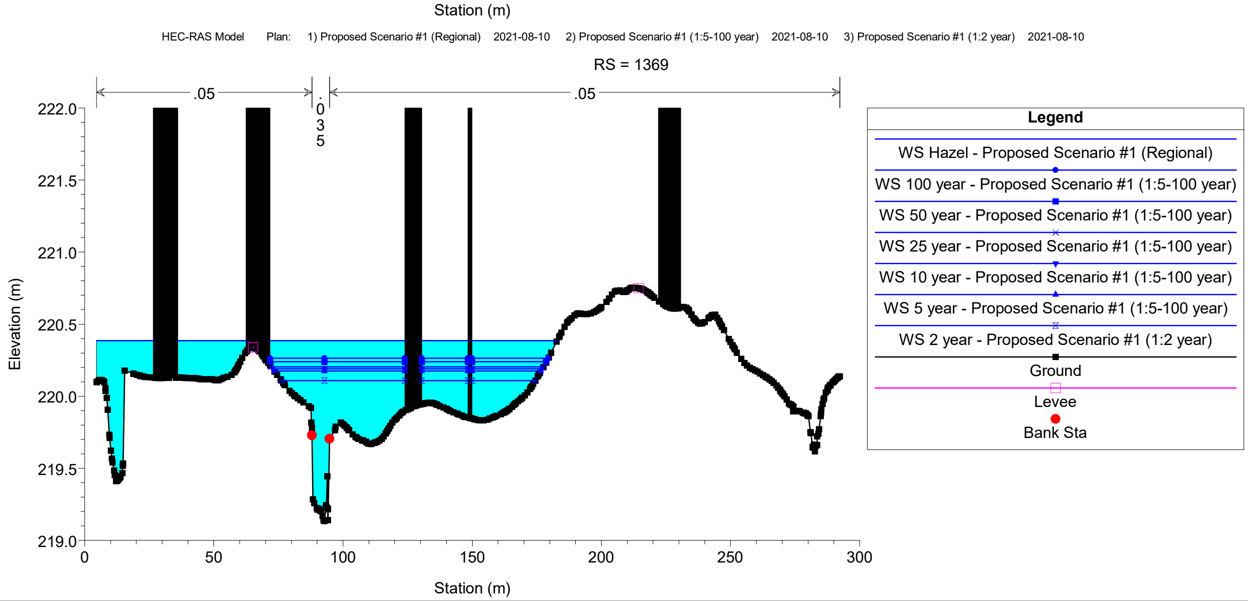

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1404
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta



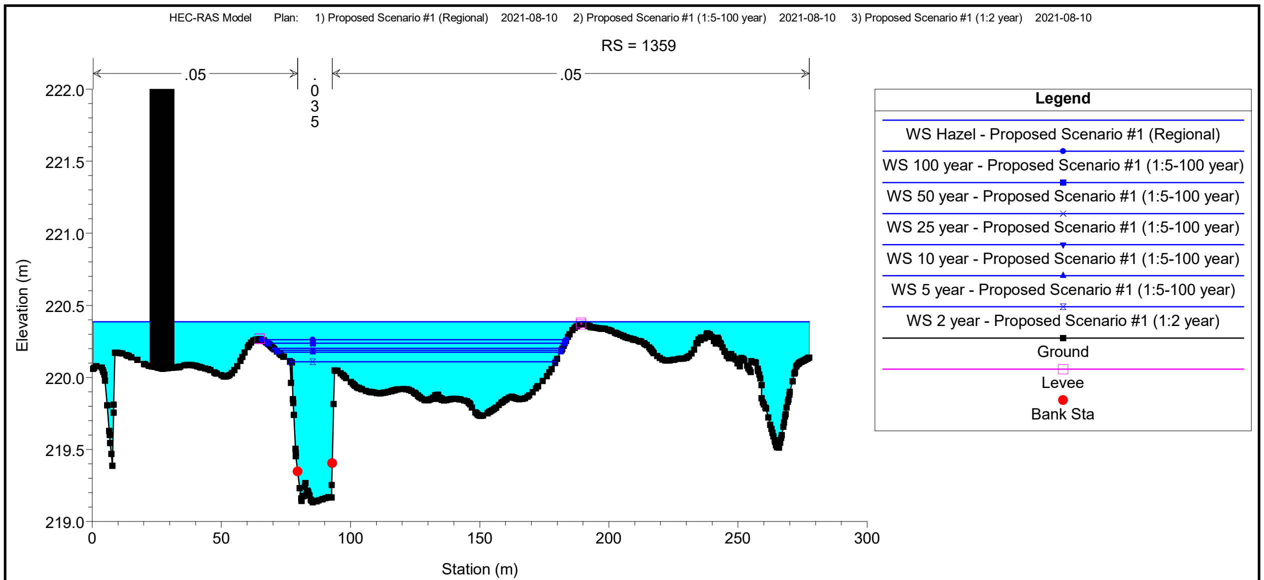
HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1386
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

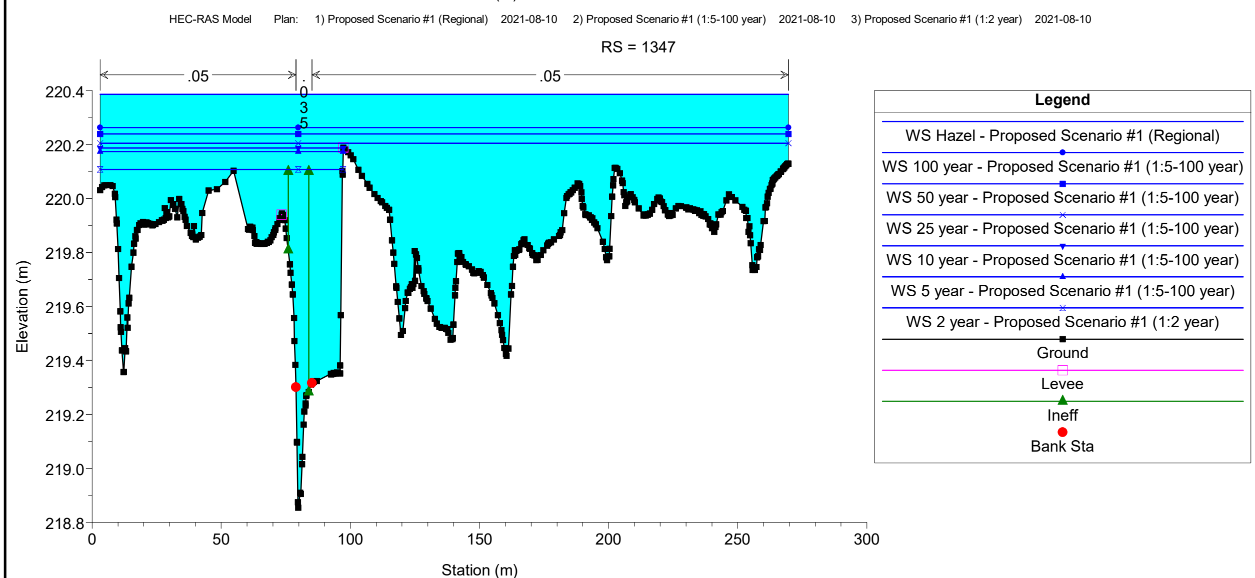


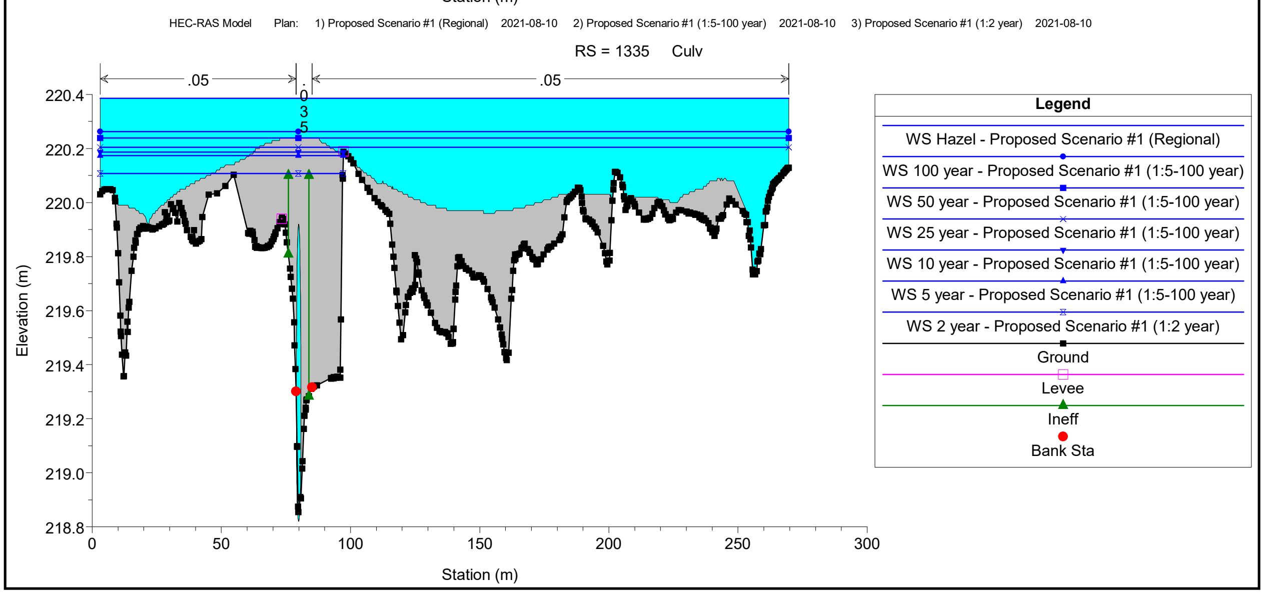
HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1377
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

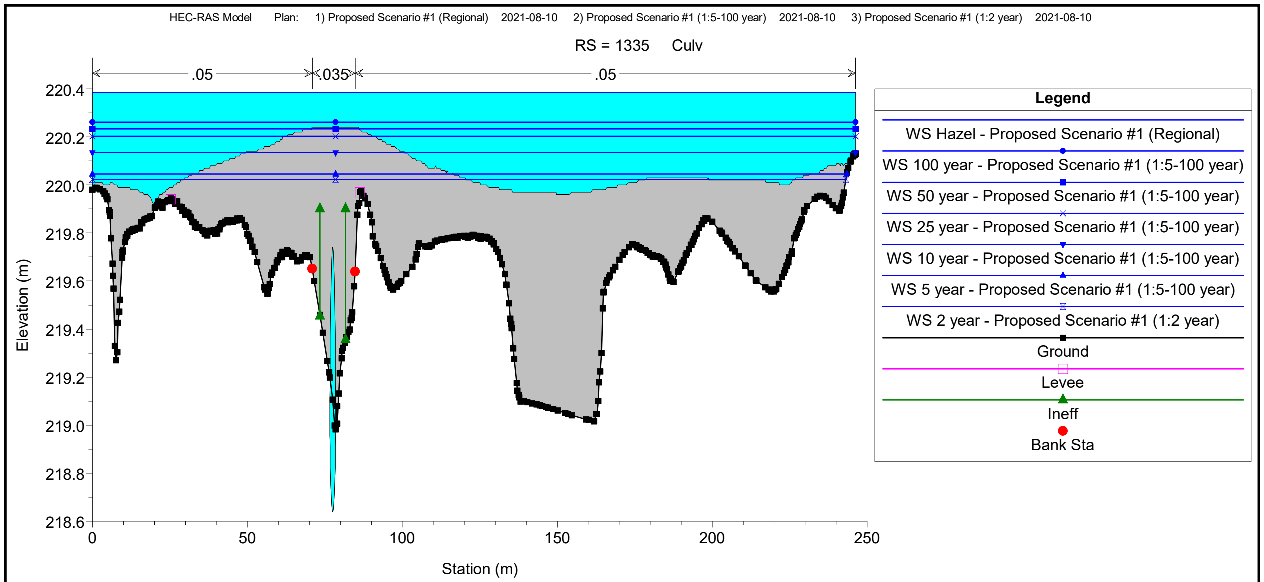


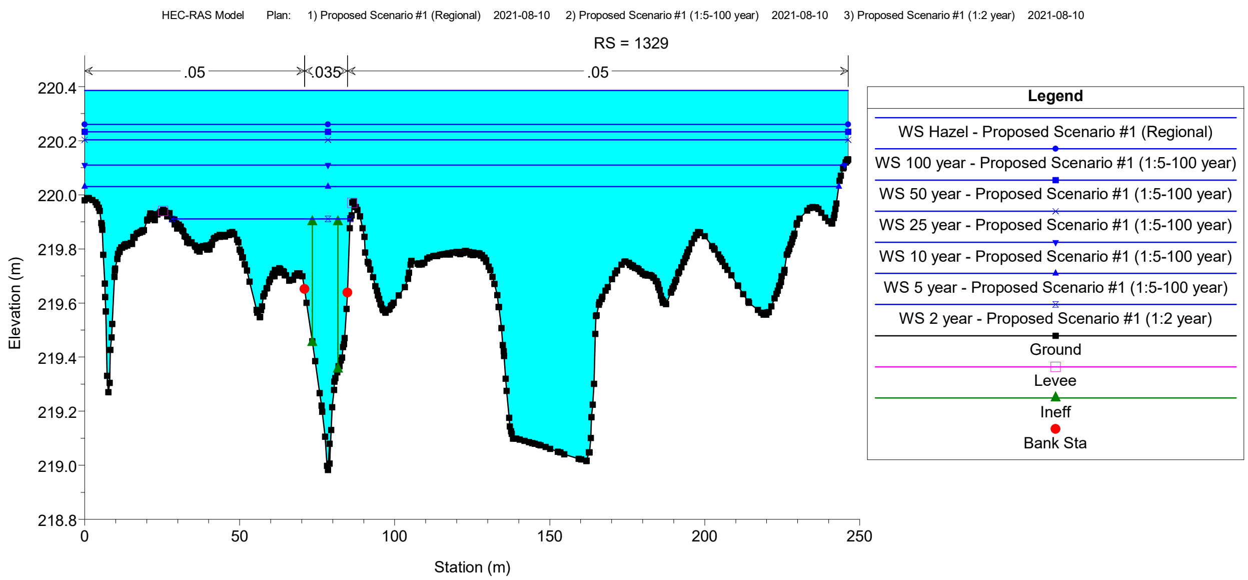
HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1369
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

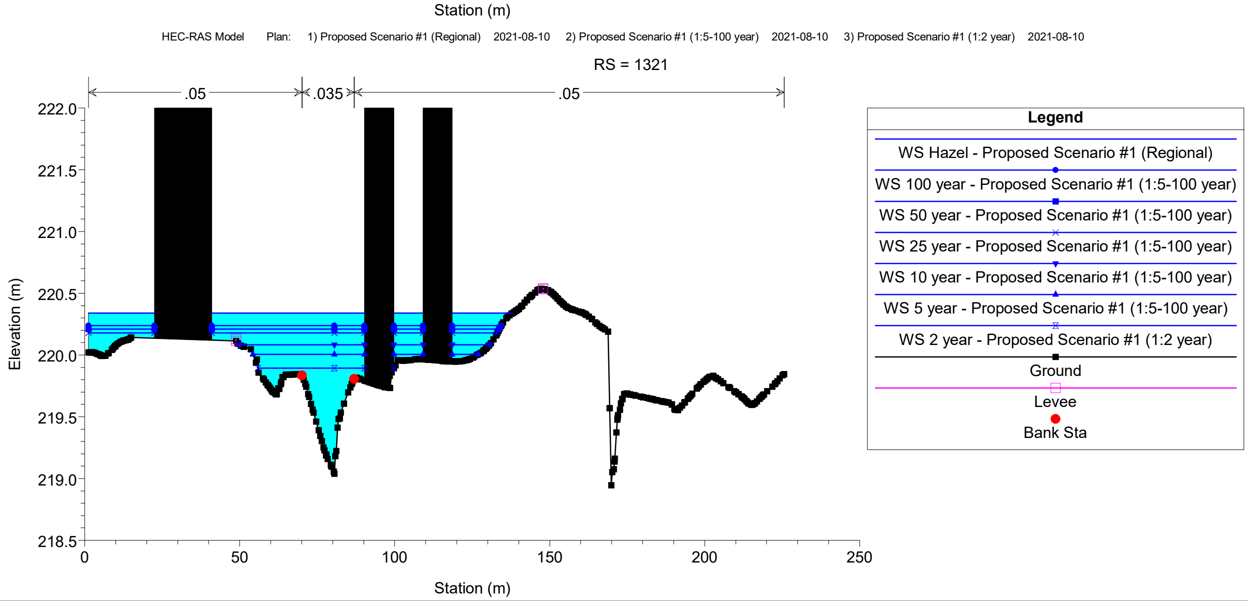

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1359
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

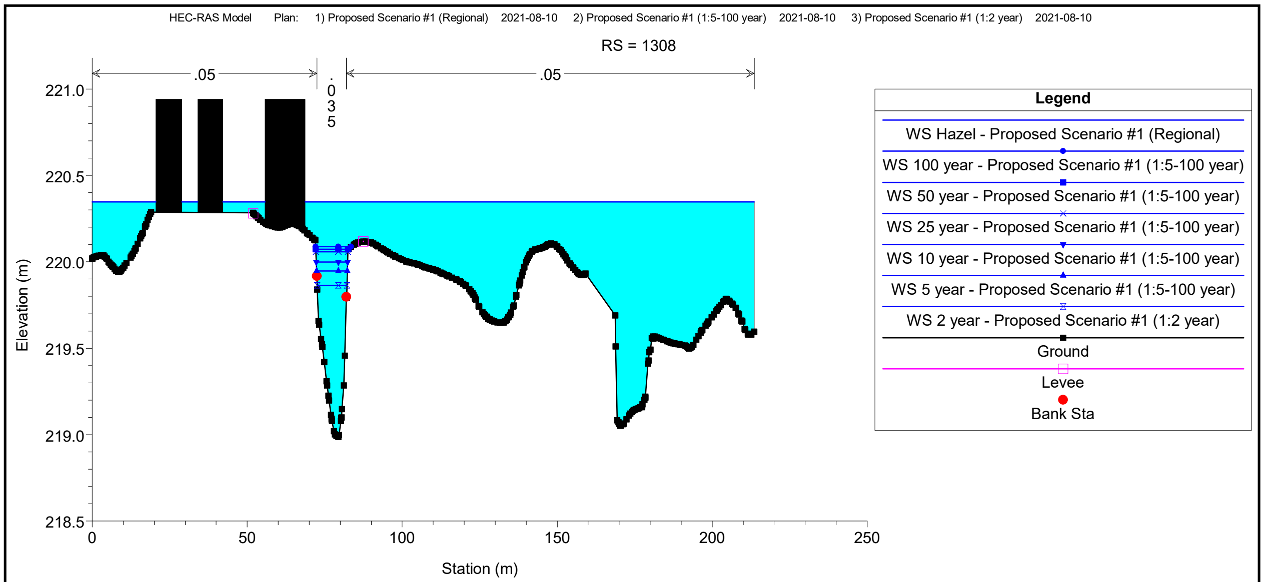

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1347
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

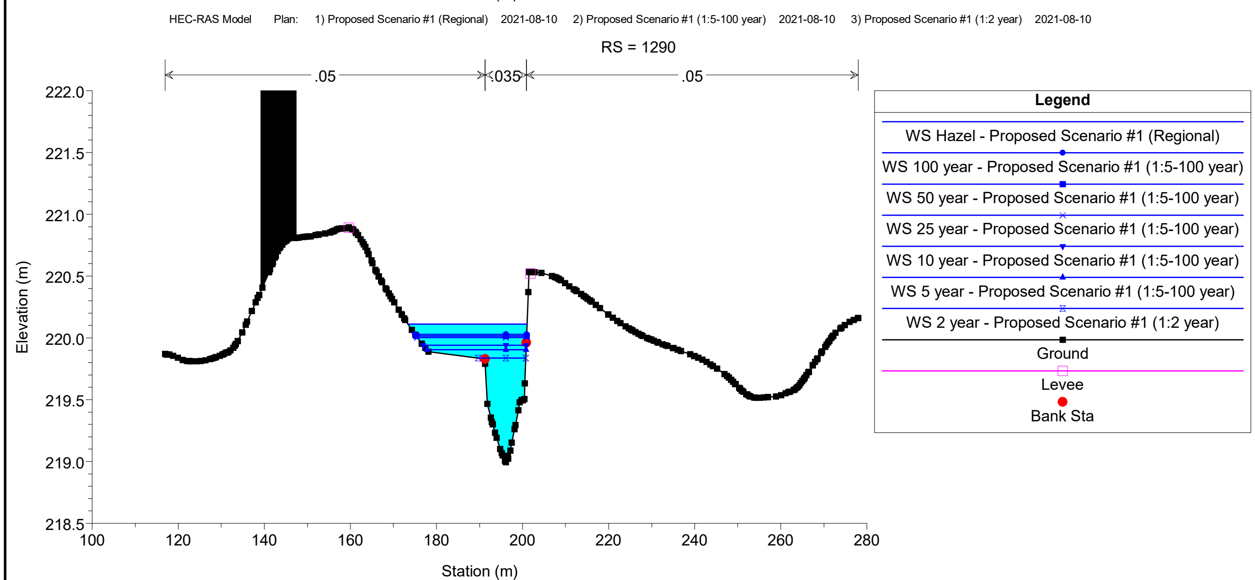

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

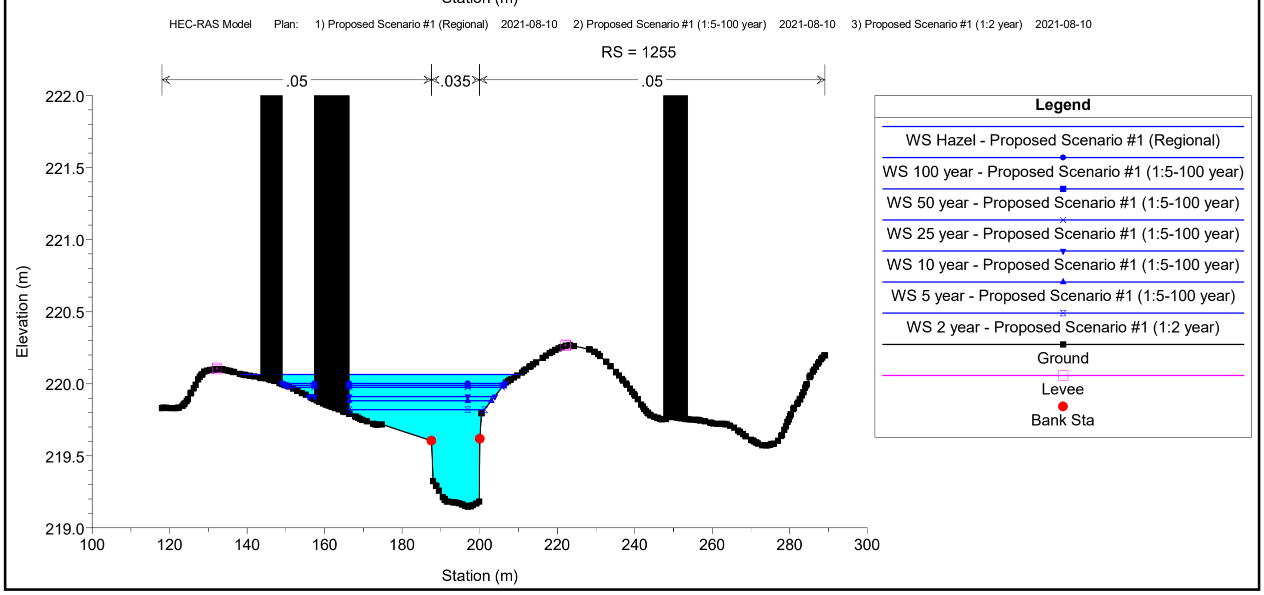

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

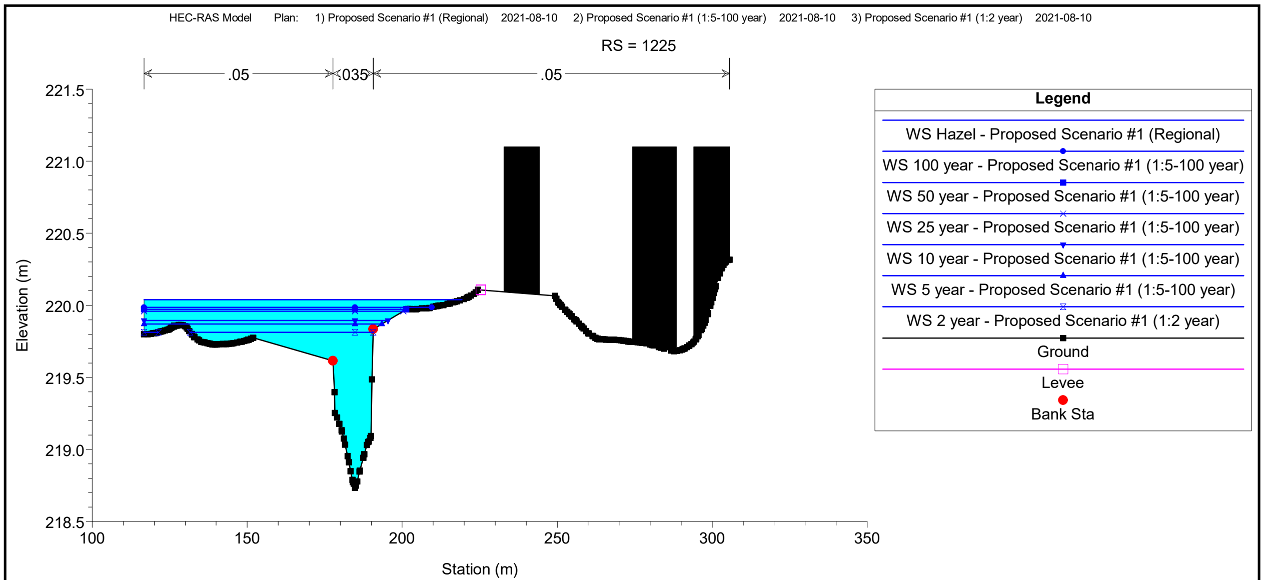

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1329
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta

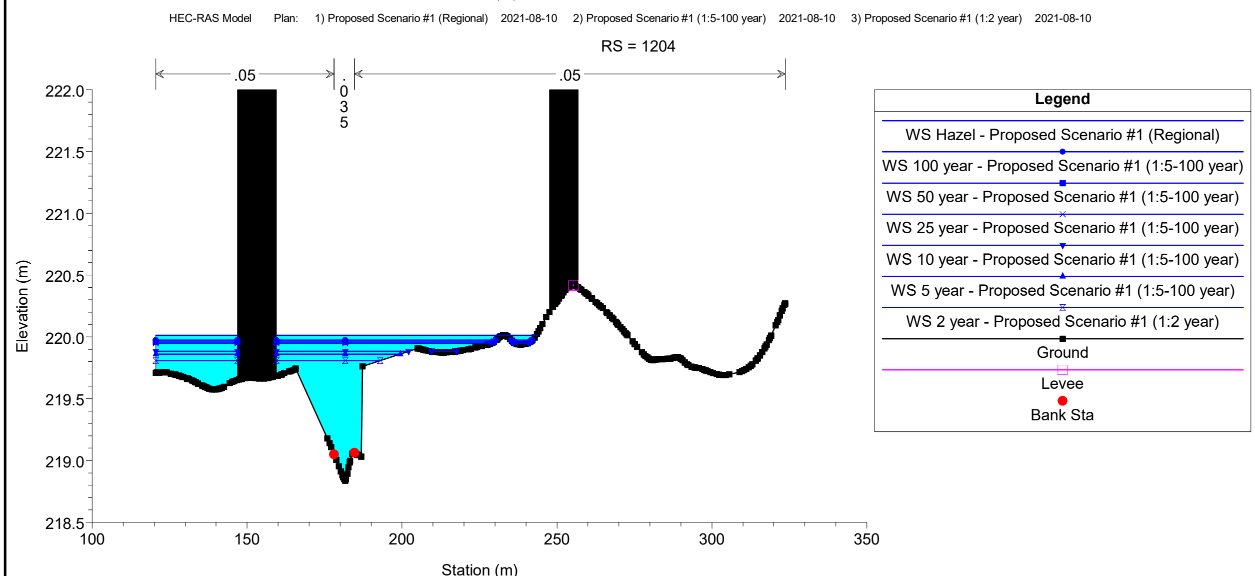

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1321
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

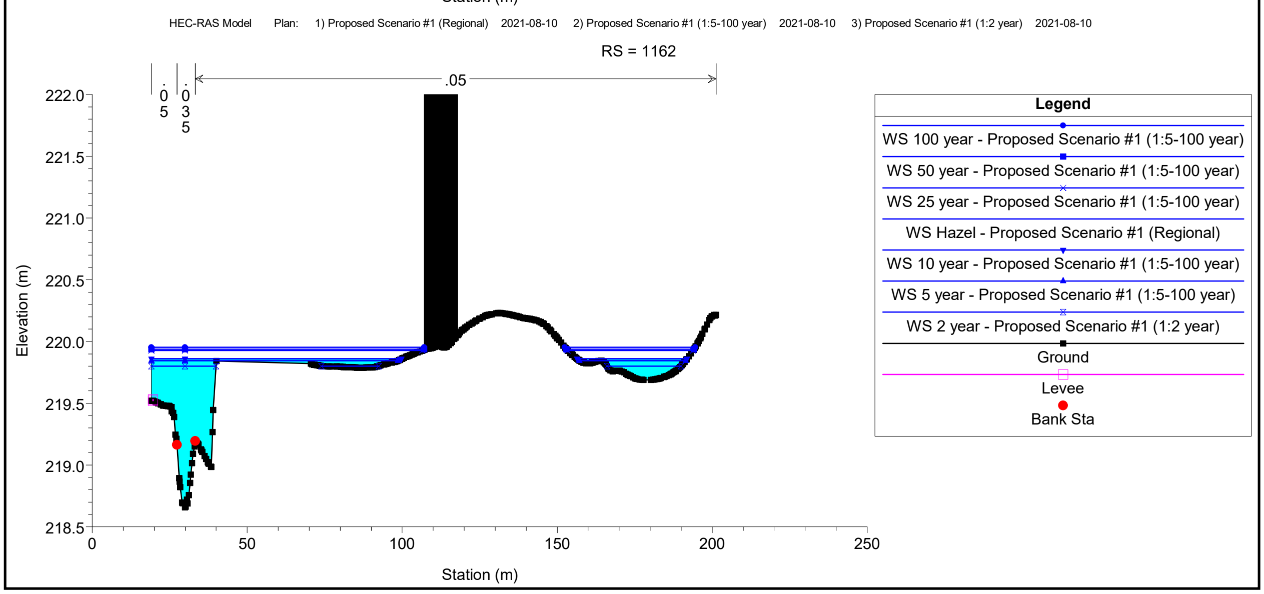

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1308
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

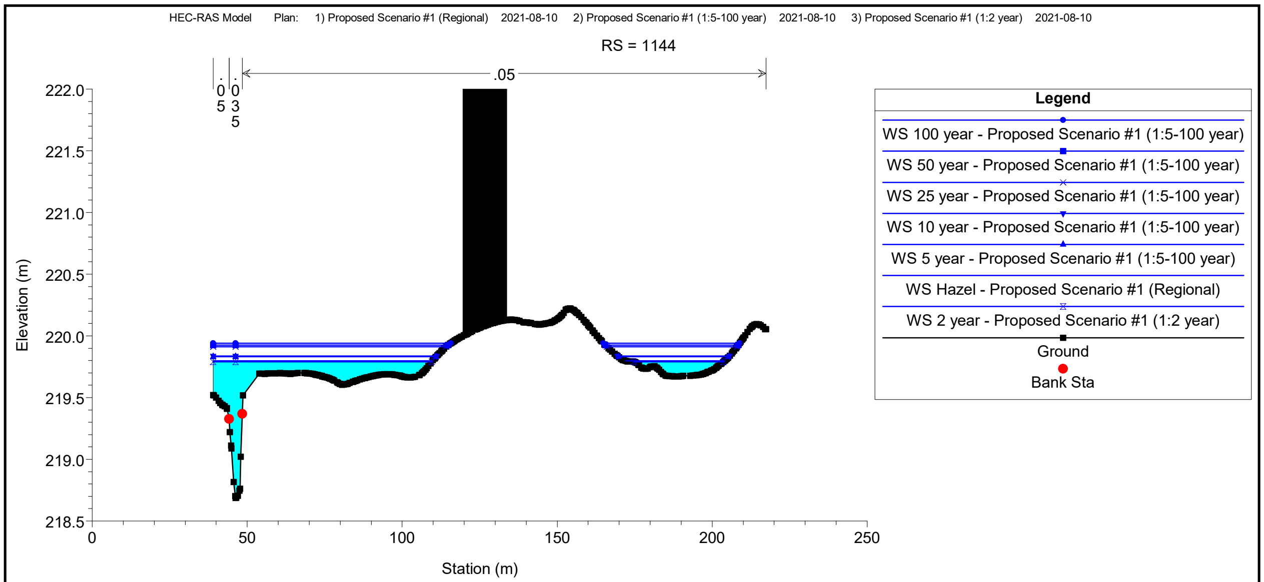

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1290
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

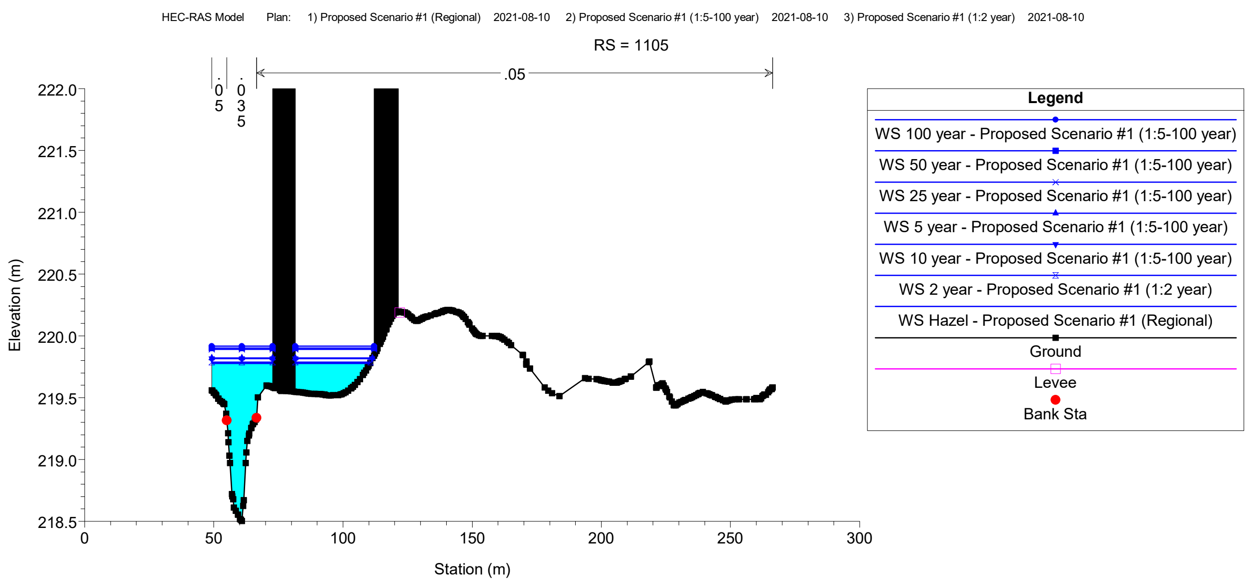

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1255
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

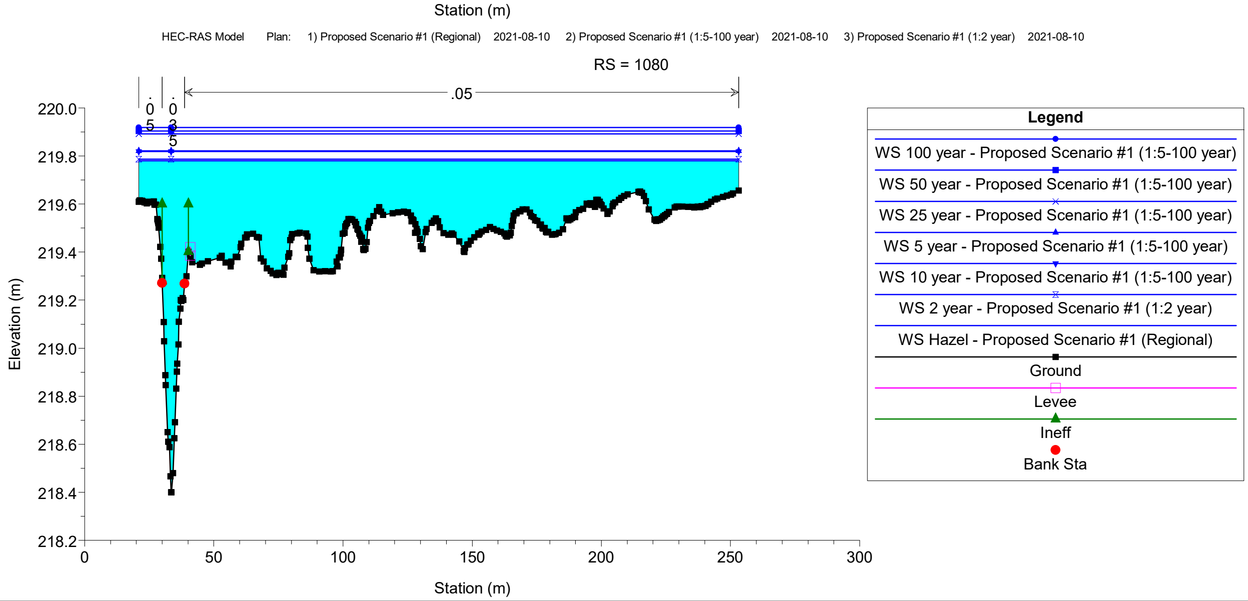

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1225
.05
.035
.05
Elevation (m)
221.5
221.0
220.5
220.0
219.5
219.0
218.5
100
150
200
250
300
350
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

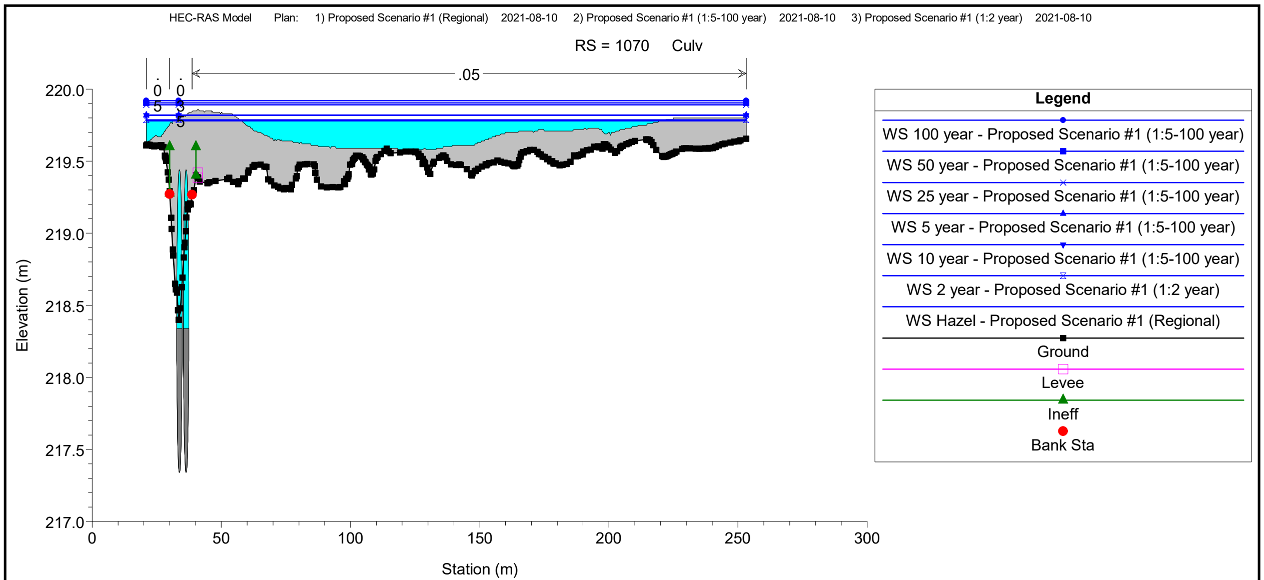

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1204
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
100
150
200
250
300
350
Station (m)
Legend
WS Hazel - Proposed Scenario #1 (Regional)
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta

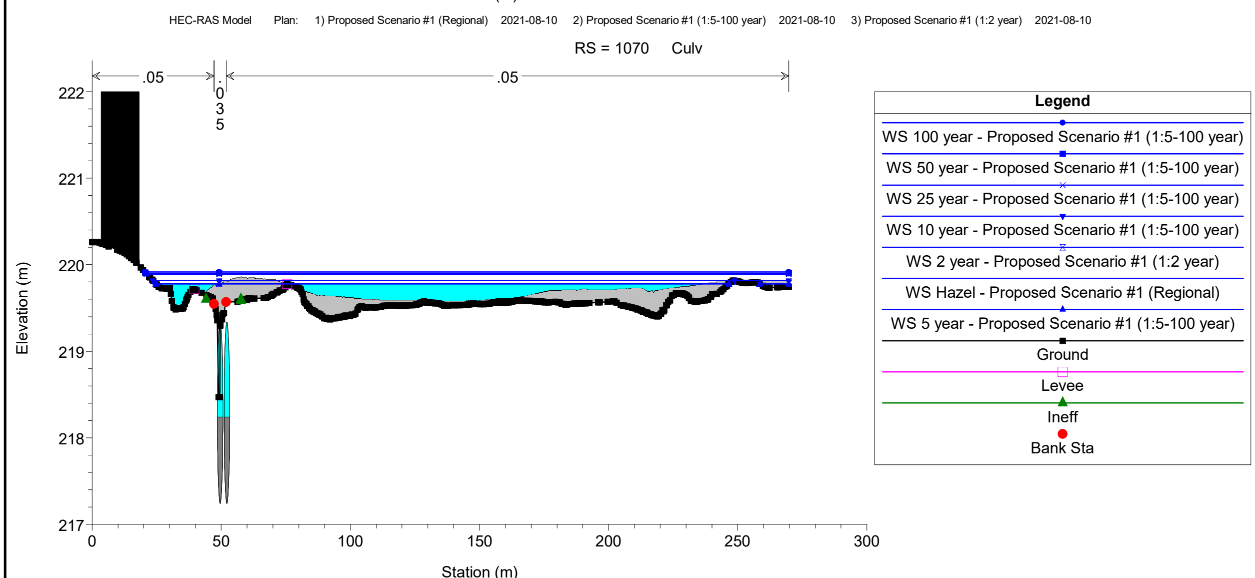

HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1162
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1144
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1105
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
WS Hazel - Proposed Scenario #1 (Regional)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1080
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
WS Hazel - Proposed Scenario #1 (Regional)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1070 Culv
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
WS Hazel - Proposed Scenario #1 (Regional)
Ground
Levee
Ineff
Bank Sta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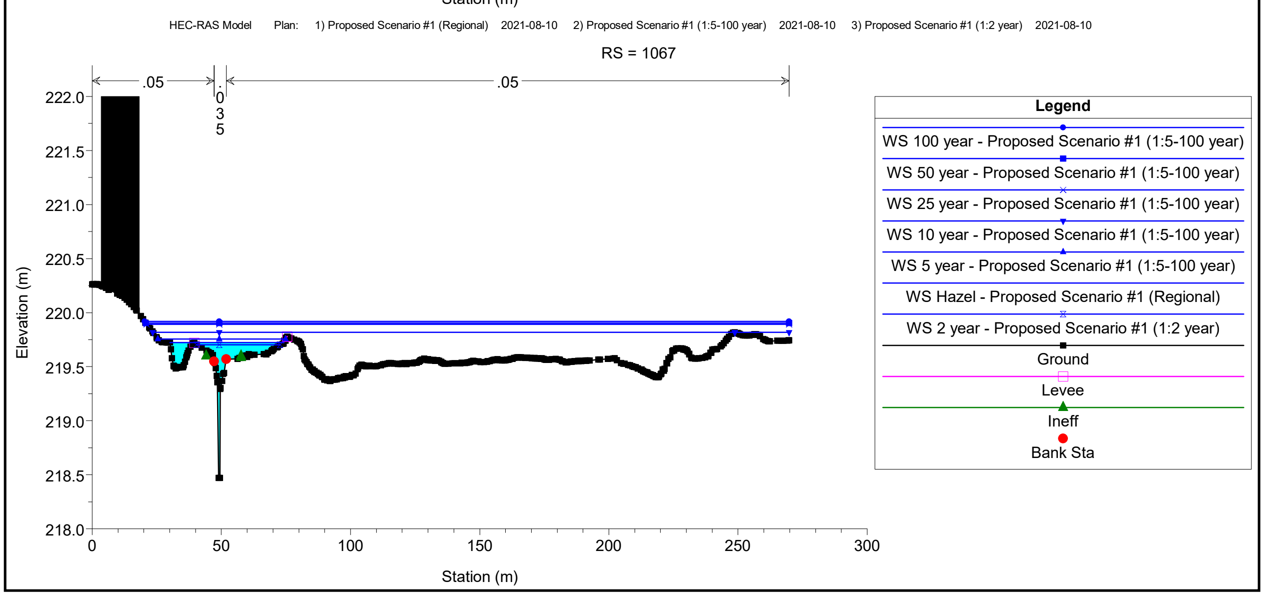
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
Ground
Levee
Ineff
Bank Sta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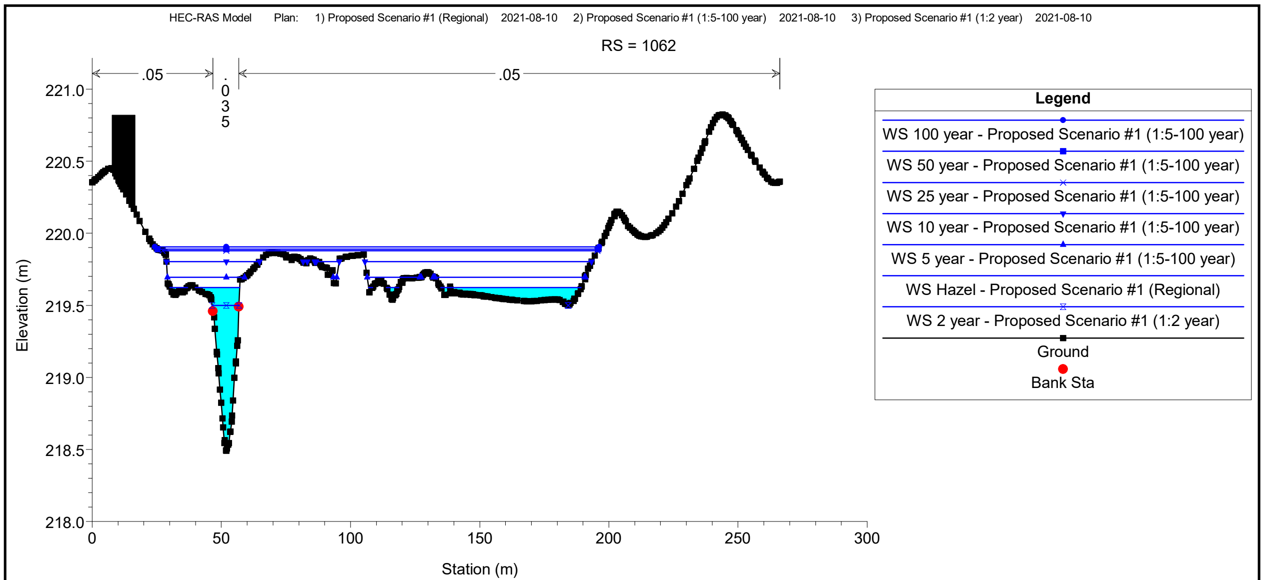
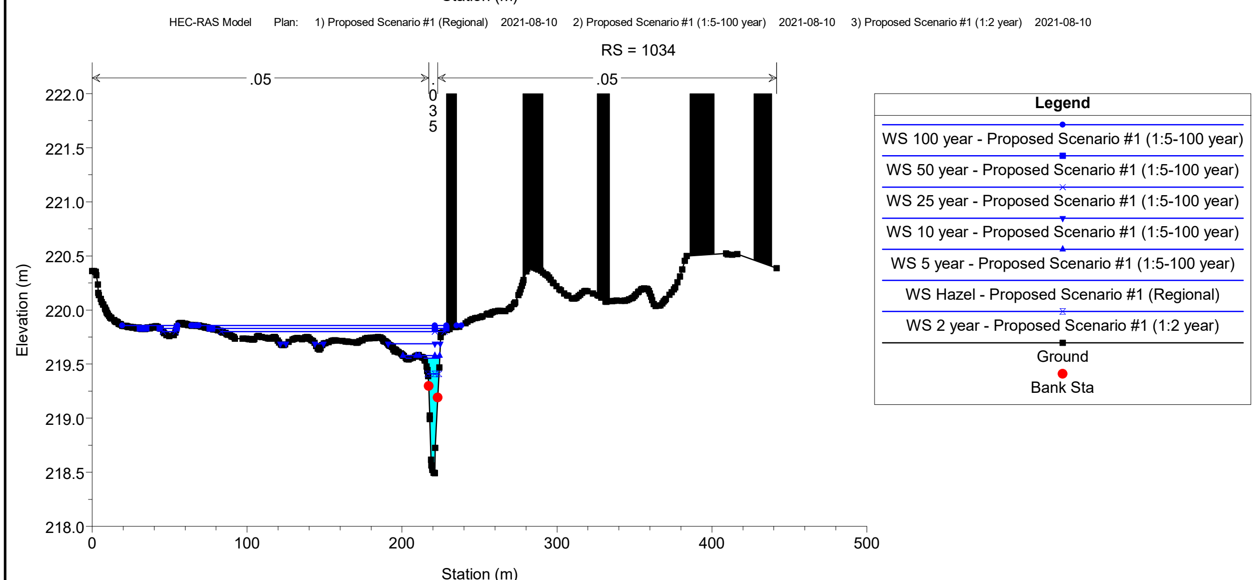
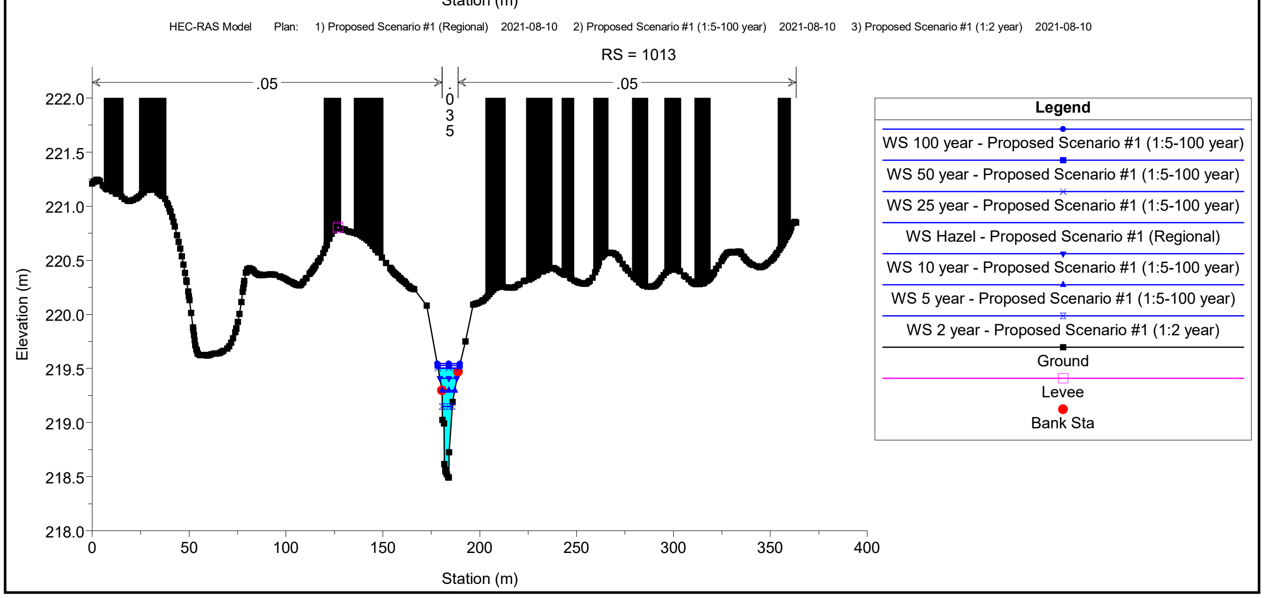
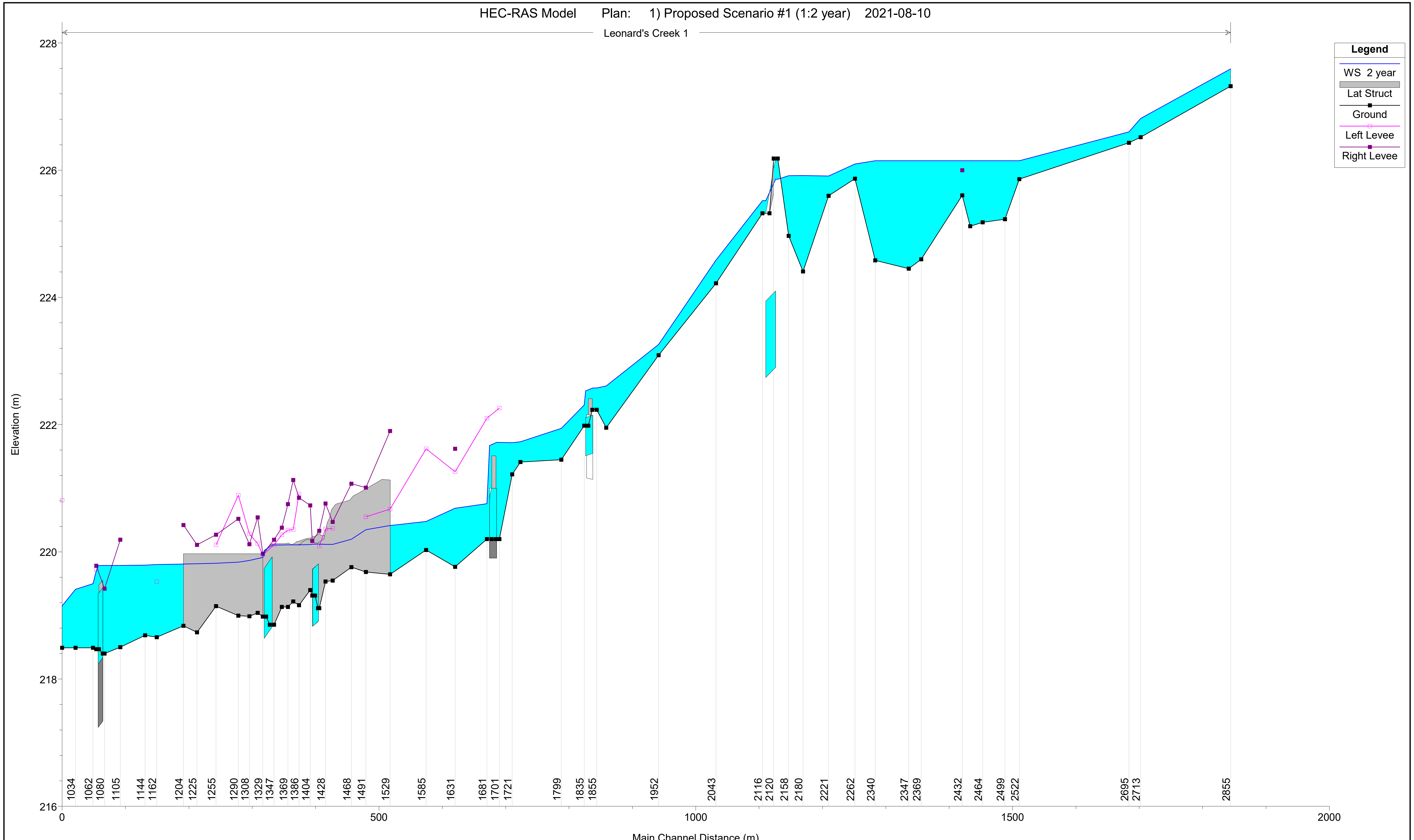
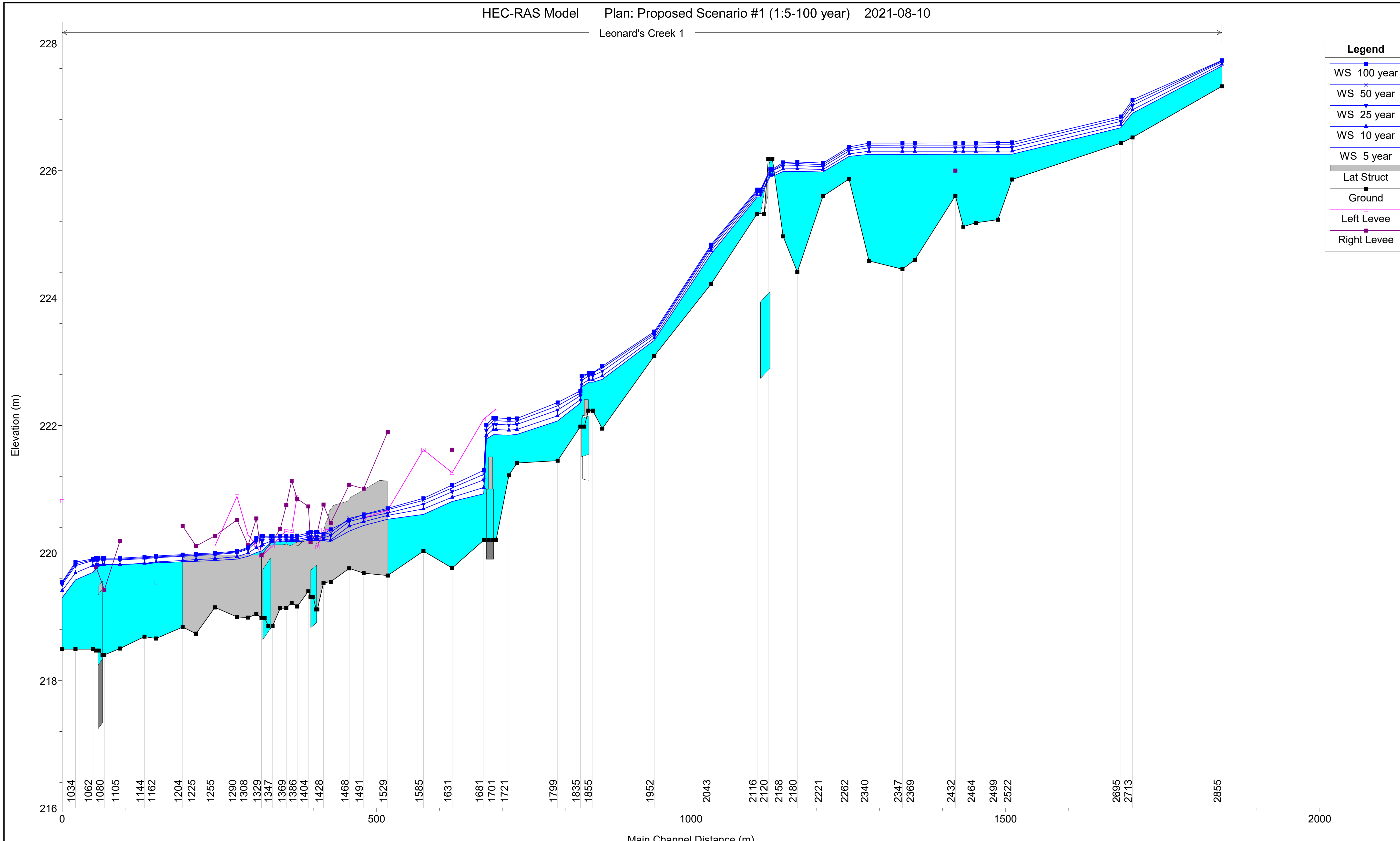
RS = 1067
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1062
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1034
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (Regional) 2021-08-10 2) Proposed Scenario #1 (1:5-100 year) 2021-08-10 3) Proposed Scenario #1 (1:2 year) 2021-08-10
RS = 1013
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #1 (1:5-100 year)
WS 50 year - Proposed Scenario #1 (1:5-100 year)
WS 25 year - Proposed Scenario #1 (1:5-100 year)
WS Hazel - Proposed Scenario #1 (Regional)
WS 10 year - Proposed Scenario #1 (1:5-100 year)
WS 5 year - Proposed Scenario #1 (1:5-100 year)
WS 2 year - Proposed Scenario #1 (1:2 year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #1 (1:2 year) 2021-08-10
Leonard's Creek 1
Legend
WS 2 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
216
218
220
222
224
226
228
Main Channel Distance (m)
0
500
1000
1500
2000
1034 1062 1080 1105 1144 1162 1204 1225 1255 1290 1308 1329 1347 1369 1386 1404 1428 1468 1491 1529 1585 1631 1681 1701 1721 1799 1835 1855 1952 2043 2116 2120 2158 2180 2221 2262 2340 2347 2369 2432 2464 2499 2522 2695 2713 2855



HEC-RAS Model Plan: Proposed Scenario #1 (1:5-100 year) 2021-08-10
Leonard's Creek 1
Legend
WS 100 year
WS 50 year
WS 25 year
WS 10 year
WS 5 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
216
218
220
222
224
226
228
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
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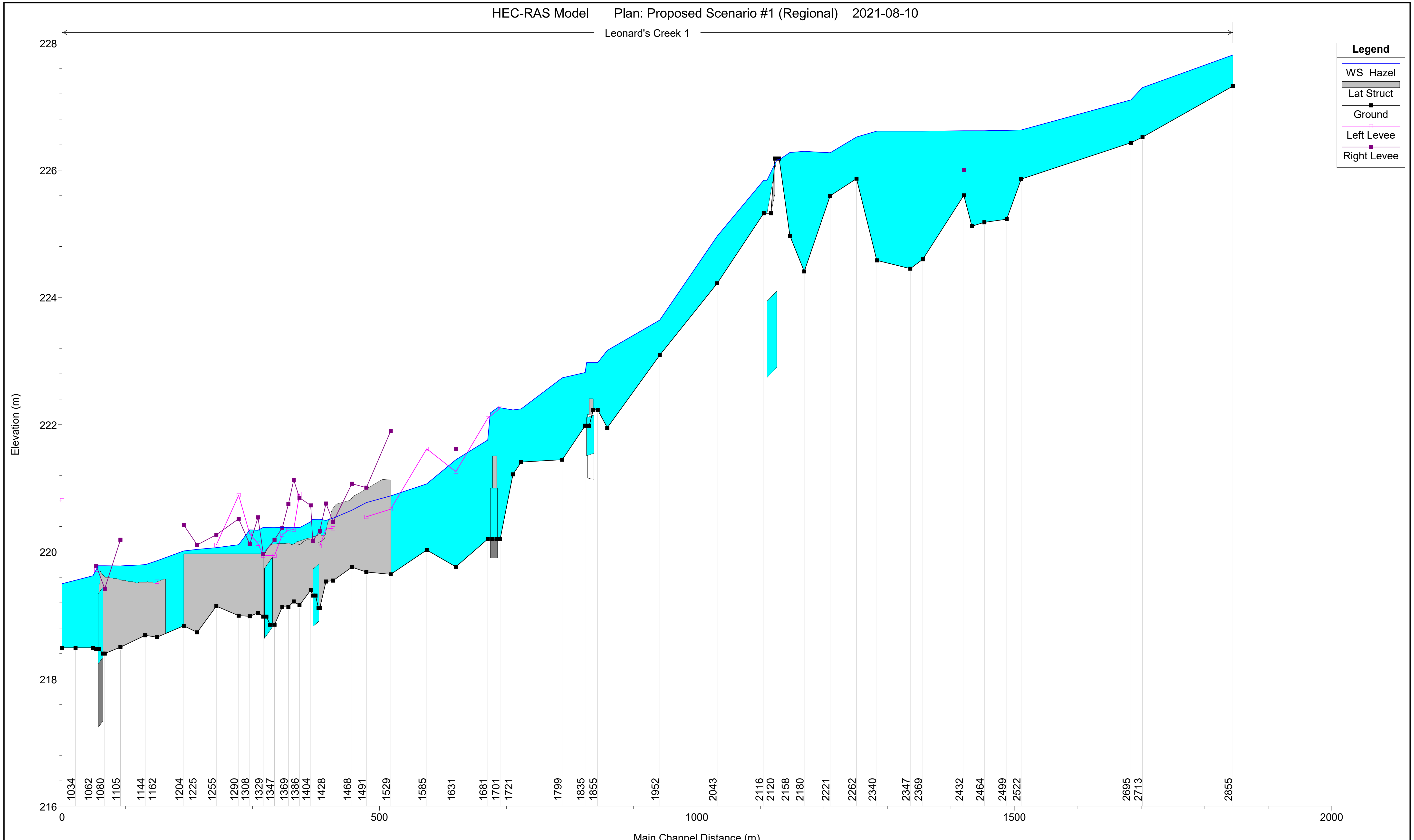
2522
2695
2713
2855


HEC-RAS Model Plan: Proposed Scenario #1 (Regional) 2021-08-10
Leonard's Creek 1
Legend
WS Hazel
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
1034 1062 1080 1105 1144 1162 1204 1225 1255 1290 1308 1329 1347 1369 1386 1404 1428 1468 1491 1529 1585 1631 1681 1701 1721 1799 1835 1855 1952 2043 2116 2120 2158 2180 2221 2262 2340 2347 2369 2432 2464 2499 2522 2695 2713 2855

SUMMARY OF HECRAS WARNINGS – SCENARIO #1

We note that due to the low, flat topography of the study area and high peak flows estimated at each crossing, there are some inconsistencies between the proposed scenarios, and warning errors were observed at the crossings under some of the design storms. A summary of the observed HEC-RAS errors is provided below. Although the developed model is producing warnings at some locations, it provides a general estimate of the flood conditions in the study area. We note that significant additional modelling effort is required in order to produce results with more certainty.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
2-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
5-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
5-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
10-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
Regional	1335	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1410	The weir over culvert is submerged.	Not anticipated to affect results.

T:\2020 PROJECTS\420395 - Various Roads Drainage Improvement Program - TOI\Design\HEC-RAS\GEOHECRAS\HECRAS Files - 60% Submission\Scenario #1 - HECRAS Error Summary.docx

Alternative #6

Scenario #2 - Twinning Goodfellow Ave / Crystal Beach Road & Tall Tree Lane Crossings

HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1428	Hazel	Proposed Scenario #2 (Regional)	45.17	219.53	220.49	220.40	220.54	0.003210	1.50	66.60	203.65	0.51
Leonard's Creek	1	1428	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.53	220.11	219.81	220.12	0.000747	0.50	11.72	43.76	0.22
Leonard's Creek	1	1428	5 year	Proposed Scenario #2 (1:5-100 year)	7.71	219.53	220.18	219.89	220.20	0.001675	0.81	14.74	47.81	0.34
Leonard's Creek	1	1428	10 year	Proposed Scenario #2 (1:5-100 year)	10.67	219.53	220.21	220.01	220.25	0.002535	1.04	16.21	50.62	0.42
Leonard's Creek	1	1428	25 year	Proposed Scenario #2 (1:5-100 year)	14.66	219.53	220.25	220.11	220.30	0.003669	1.29	18.20	67.60	0.51
Leonard's Creek	1	1428	50 year	Proposed Scenario #2 (1:5-100 year)	17.97	219.53	220.27	220.15	220.34	0.004547	1.48	20.07	76.09	0.58
Leonard's Creek	1	1428	100 year	Proposed Scenario #2 (1:5-100 year)	20.73	219.53	220.30	220.19	220.38	0.005091	1.60	22.01	86.25	0.61
Leonard's Creek	1	1418	Hazel	Proposed Scenario #2 (Regional)	42.46	219.11	220.51	220.07	220.51	0.000148	0.38	224.94	341.41	0.11
Leonard's Creek	1	1418	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.11	220.12	219.70	220.12	0.000039	0.15	64.04	220.21	0.05
Leonard's Creek	1	1418	5 year	Proposed Scenario #2 (1:5-100 year)	7.70	219.11	220.19	219.96	220.19	0.000079	0.22	80.14	224.34	0.08
Leonard's Creek	1	1418	10 year	Proposed Scenario #2 (1:5-100 year)	10.60	219.11	220.22	220.02	220.23	0.000111	0.27	88.19	225.93	0.09
Leonard's Creek	1	1418	25 year	Proposed Scenario #2 (1:5-100 year)	14.51	219.11	220.27	220.02	220.27	0.000151	0.33	98.14	230.34	0.11
Leonard's Creek	1	1418	50 year	Proposed Scenario #2 (1:5-100 year)	17.63	219.11	220.30	220.02	220.30	0.000180	0.36	105.69	234.35	0.12
Leonard's Creek	1	1418	100 year	Proposed Scenario #2 (1:5-100 year)	20.22	219.11	220.33	220.02	220.33	0.000093	0.27	164.36	341.41	0.09
Leonard's Creek	1	1410			Culvert									
Leonard's Creek	1	1407	Hazel	Proposed Scenario #2 (Regional)	42.46	219.31	220.51	219.90	220.51	0.000113	0.32	244.95	342.76	0.10
Leonard's Creek	1	1407	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.31	220.11	219.80	220.11	0.000022	0.10	72.63	187.80	0.04
Leonard's Creek	1	1407	5 year	Proposed Scenario #2 (1:5-100 year)	7.70	219.31	220.18	219.82	220.18	0.000026	0.12	133.96	339.08	0.04
Leonard's Creek	1	1407	10 year	Proposed Scenario #2 (1:5-100 year)	10.60	219.31	220.23	219.82	220.23	0.000036	0.15	147.78	340.93	0.05
Leonard's Creek	1	1407	25 year	Proposed Scenario #2 (1:5-100 year)	14.51	219.31	220.26	219.82	220.26	0.000052	0.18	160.52	342.76	0.06
Leonard's Creek	1	1407	50 year	Proposed Scenario #2 (1:5-100 year)	17.63	219.31	220.30	219.82	220.30	0.000060	0.20	173.92	342.76	0.07
Leonard's Creek	1	1407	100 year	Proposed Scenario #2 (1:5-100 year)	20.22	219.31	220.33	219.82	220.33	0.000065	0.21	184.09	342.76	0.07
Leonard's Creek	1	1404	Hazel	Proposed Scenario #2 (Regional)	41.79	219.40	220.47	220.14	220.50	0.001761	1.19	71.60	141.54	0.38
Leonard's Creek	1	1404	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.40	220.11	219.70	220.11	0.000167	0.27	27.49	98.80	0.11
Leonard's Creek	1	1404	5 year	Proposed Scenario #2 (1:5-100 year)	7.70	219.40	220.18	219.78	220.18	0.000391	0.44	34.45	110.56	0.17
Leonard's Creek	1	1404	10 year	Proposed Scenario #2 (1:5-100 year)	10.59	219.40	220.22	219.83	220.22	0.000570	0.56	38.69	116.59	0.21
Leonard's Creek	1	1404	25 year	Proposed Scenario #2 (1:5-100 year)	14.46	219.40	220.25	219.88	220.26	0.000843	0.70	42.51	120.29	0.25
Leonard's Creek	1	1404	50 year	Proposed Scenario #2 (1:5-100 year)	17.52	219.40	220.28	219.92	220.30	0.000950	0.76	46.97	123.44	0.27
Leonard's Creek	1	1404	100 year	Proposed Scenario #2 (1:5-100 year)	20.04	219.40	220.31	219.95	220.32	0.001029	0.81	50.42	125.90	0.28
Leonard's Creek	1	1386	Hazel	Proposed Scenario #2 (Regional)	37.85	219.16	220.38	220.22	220.45	0.002959	1.65	46.36	99.95	0.50
Leonard's Creek	1	1386	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.16	220.11	219.56	220.11	0.000167	0.32	21.72	74.78	0.11
Leonard's Creek	1	1386	5 year	Proposed Scenario #2 (1:5-100 year)	7.64	219.16	220.16	219.68	220.17	0.000444	0.55	26.50	84.58	0.19
Leonard's Creek	1	1386	10 year	Proposed Scenario #2 (1:5-100 year)	10.37	219.16	220.20	219.75	220.21	0.000666	0.69	29.12	86.86	0.23
Leonard's Creek	1	1386	25 year	Proposed Scenario #2 (1:5-100 year)	14.01	219.16	220.21	219.83	220.24	0.001070	0.89	30.84	88.38	0.29
Leonard's Creek	1	1386	50 year	Proposed Scenario #2 (1:5-100 year)	16.65	219.16	220.25	219.87	220.27	0.001235	0.98	33.67	90.65	0.32
Leonard's Creek	1	1386	100 year	Proposed Scenario #2 (1:5-100 year)	18.78	219.16	220.27	219.90	220.30	0.001357	1.04	35.87	92.39	0.33
Leonard's Creek	1	1377	Hazel	Proposed Scenario #2 (Regional)	33.78	219.22	220.38	220.15	220.42	0.001431	1.11	60.13	146.14	0.35
Leonard's Creek	1	1377	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.22	220.11	219.54	220.11	0.000135	0.28	22.44	74.08	0.10
Leonard's Creek	1	1377	5 year	Proposed Scenario #2 (1:5-100 year)	7.36	219.22	220.16	219.65	220.17	0.000329	0.45	26.75	77.74	0.16
Leonard's Creek	1	1377	10 year	Proposed Scenario #2 (1:5-100 year)	9.78	219.22	220.19	219.73	220.20	0.000481	0.56	29.09	79.66	0.19
Leonard's Creek	1	1377	25 year	Proposed Scenario #2 (1:5-100 year)	13.18	219.22	220.21	219.81	220.23	0.000785	0.73	30.48	80.78	0.25
Leonard's Creek	1	1377	50 year	Proposed Scenario #2 (1:5-100 year)	15.36	219.22	220.24	219.87	220.26	0.000884	0.79	33.03	82.76	0.26
Leonard's Creek	1	1377	100 year	Proposed Scenario #2 (1:5-100 year)	17.08	219.22	220.26	219.91	220.29	0.000952	0.83	35.02	84.30	0.28
Leonard's Creek	1	1369	Hazel	Proposed Scenario #2 (Regional)	30.63	219.13	220.38	220.14	220.40	0.001089	0.96	68.45	151.35	0.29
Leonard's Creek	1	1369	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.13	220.10	219.58	220.11	0.000170	0.31	25.35	89.92	0.11
Leonard's Creek	1	1369	5 year	Proposed Scenario #2 (1:5-100 year)	7.16	219.13	220.16	219.80	220.17	0.000367	0.48	30.50	94.06	0.16
Leonard's Creek	1	1369	10 year	Proposed Scenario #2 (1:5-100 year)	9.35	219.13	220.19	219.91	220.20	0.000501	0.58	33.29	96.26	0.19
Leonard's Creek	1	1369	25 year	Proposed Scenario #2 (1:5-100 year)	12.59	219.13	220.21	219.97	220.22	0.000810	0.74	34.84	97.44	0.24
Leonard's Creek	1	1369	50 year	Proposed Scenario #2 (1:5-100 year)	14.42	219.13	220.24	220.00	220.25	0.000849	0.77	37.98	98.92	0.25
Leonard's Creek	1	1369	100 year	Proposed Scenario #2 (1:5-100 year)	15.83	219.13	220.26	220.01	220.28	0.000869	0.80	40.40	99.67	0.25
Leonard's Creek	1	1359	Hazel	Proposed Scenario #2 (Regional)	27.87	219.13	220.38	220.03	220.39	0.000409	0.65	103.68	267.59	0.19
Leonard's Creek	1	1359	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.13	220.10	219.39	220.11	0.000064	0.22	32.65	102.60	0.07
Leonard's Creek	1	1359	5 year	Proposed Scenario #2 (1:5-100 year)	6.95	219.13	220.16	219.48	220.16	0.000144	0.34	38.49	107.90	0.11
Leonard's Creek	1	1359	10 year	Proposed Scenario #2 (1:5-100 year)	8.93	219.13	220.19	219.54	220.19	0.000198	0.40	41.67	110.74	0.13
Leonard's Creek	1	1359	25 year	Proposed Scenario #2 (1:5-100 year)	12.05	219.13	220.20	219.61	220.21	0.000328	0.52	43.37	112.14	0.17
Leonard's Creek	1	1359	50 year	Proposed Scenario #2 (1:5-100 year)	13.57	219.13	220.24	219.65	220.25	0.000345	0.55	46.98	114.97	0.17
Leonard's Creek	1	1359	100 year	Proposed Scenario #2 (1:5-100 year)	14.73	219.13	220.26	219.68	220.27	0.000353	0.56	49.83	117.92	0.17
Leonard's Creek	1	1347	Hazel	Proposed Scenario #2 (Regional)	24.96	218.85	220.38	220.10	220.39	0.000149	0.40	145.32	266.55	0.11
Leonard's Creek	1	1347	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.85	220.10	219.50	220.10	0.000092	0.26	29.86	93.92	0.09
Leonard's Creek	1	1347	5 year	Proposed Scenario #2 (1:5-100 year)	6.63	218.85	220.16	219.67	220.16	0.000183	0.39	35.01	94.02	0.12
Leonard's Creek	1	1347	10 year	Proposed Scenario #2 (1:5-100 year)	8.40	218.85	220.19	219.77	220.19	0.000244	0.45	37.70	94.07	0.14
Leonard's Creek	1	1347	25 year	Proposed Scenario #2 (1:5-100 year)	11.38	218.85	220.21	219.94	220.21	0.000107	0.30	97.71	266.55	0.09
Leonard's Creek	1	1347	50 year	Proposed Scenario #2 (1:5-100 year)	12.60	218.85	220.24	220.01	220.24	0.000101	0.30	106.29	266.55	0.09
Leonard's Creek	1	1347	100 year	Proposed Scenario #2 (1:5-100 year)	13.49	218.85	220.26	220.04	220.26	0.000096	0.30	112.85	266.55	0.09
Leonard's Creek	1	1335			Culvert									
Leonard's Creek	1	1329	Hazel	Proposed Scenario #2 (Regional)	24.96	218.98	220.38	219.97	220.38	0.000067	0.24	178.65	246.27	0.08
Leonard's Creek	1	1329	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.98	219.91	219.51	219.92	0.000408	0.40	14.44	57.52	0.17
Leonard's Creek	1	1329	5 year	Proposed Scenario #2 (1:5-100 year)	6.63	218.98	220.05	219.64	220.05	0.000033	0.13	96.91	243.53	0.05
Leonard's Creek	1	1329	10 year	Proposed Scenario #2 (1:5-100 year)	8.40	218.98	220.11	219.70	220.11	0.000034	0.14	111.63	245.16	0.05
Leonard's Creek	1	1329	25 year	Proposed Scenario #2 (1:5-100 year)	11.38	218.98	220.20	219.79	220.20	0.000035	0.15	134.07	246.27	0.05
Leonard's Creek	1	1329	50 year	Proposed Scenario #2 (1:5-100 year)	12.60	218.98	220.24	219.82	220.24	0.000036	0.16	142.18	246.27	0.05
Leonard's Creek	1	1329	100 year	Proposed Scenario #2 (1:5-100 year)	13.49	218.98	220.26	219.85	220.26	0.000036	0.16	148.14	246.27	0.05
Leonard's Creek	1	1321	Hazel	Proposed Scenario #2 (Regional)	23.01	219.04	220.34	220.05	220.37	0.001296	0.93	41.95	99.26	0.32
Leonard's Creek	1	1321	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.04	219.90	219.56	219.91	0.001063	0.52	8.75	34.35	0.26
Leonard's Creek	1	1321	5 year	Proposed Scenario #2 (1:5-100 year)	6.49	219.04	220.03	219.69	220.04	0.000959	0.59	14.58	55.41	0.25
Leonard's Creek	1	1321	10 year	Proposed Scenario #2 (1:5-100 year)	8.03	219.04	220.08	219.75	220.10	0.000960	0.63	17.95	61.79	0.26
Leonard's Creek	1	1321	25 year	Proposed Scenario #2 (1:5-100 year)	10.56	219.04	220.18	219.83	220.19	0.000835	0.65	26.34	94.38	0.25
Leonard's Creek	1	1321	50 year	Proposed Scenario #2 (1:5-100 year)	11.58	219.04	220.21	219.87	220.23	0.000772	0.64	29.59	95.10	0.24
Leonard's Creek	1	1321	100 year	Proposed Scenario #2 (1:5-100 year)	12.32	219.04	220.24	219.88	220.25	0.000728	0.64	31.99	95.66	0.23
Leonard's Creek	1	1308	Hazel	Proposed Scenario #2 (Regional)	20.96	218.99	220.34	220.07	220.35	0.000244	0.46	91.30	184.22	0.14
Leonard's Creek	1	1308	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.99	219.86	219.47	219.89	0.001281	0.71	5.54	9.63	0.29
Leonard's Creek	1	1308	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	218.99	219.96	219.61	220.01	0.002116	1.00	6.50	10.00	0.39
Leonard's Creek	1	1308	10 year	Proposed Scenario #2 (1:5-100 year)	7.85	218.99	220.00	219.67	220.07	0.002636	1.15	6.87	10.13	0.43
Leonard's Creek	1	1308	25 year	Proposed Scenario #2 (1:5-100 year)	10.02	218.99	220.06	219.75	220.15	0.003319	1.36	7.46	10.35	0.49
Leonard's Creek	1	1308	50 year	Proposed Scenario #2 (1:5-100 year)	10.90	218.99	220.07	219.79	220.18	0.003641	1.45	7.64	10.55	0.52
Leonard's Creek	1	1308	100 year	Proposed Scenario #2 (1:5-100 year)	11.54	218.99	220.09	219.81	220.20	0.003865	1.51	7.79	11.45	0.54
Leonard's Creek	1	1290	Hazel	Proposed Scenario #2 (Regional)	19.31	219.00	220.11	220.08	220.32	0.007509	2.13	11.84	27.68	0.75

Alternative #6

Scenario #2 - Twinning Goodfellow Ave / Crystal Beach Road & Tall Tree Lane Crossings

HEC-RAS Locations: User Defined (Continued)

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1290	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.00	219.84	219.51	219.86	0.001503	0.74	5.31	11.13	0.31
Leonard's Creek	1	1290	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	219.00	219.92	219.63	219.97	0.002579	1.04	6.83	23.40	0.42
Leonard's Creek	1	1290	10 year	Proposed Scenario #2 (1:5-100 year)	7.84	219.00	219.94	219.68	220.01	0.003274	1.21	7.44	24.00	0.47
Leonard's Creek	1	1290	25 year	Proposed Scenario #2 (1:5-100 year)	9.82	219.00	220.00	219.75	220.09	0.003634	1.34	8.87	25.32	0.51
Leonard's Creek	1	1290	50 year	Proposed Scenario #2 (1:5-100 year)	10.63	219.00	220.02	219.78	220.11	0.003872	1.41	9.28	25.67	0.53
Leonard's Creek	1	1290	100 year	Proposed Scenario #2 (1:5-100 year)	11.19	219.00	220.03	219.80	220.13	0.003964	1.44	9.64	25.98	0.53
Leonard's Creek	1	1255	Hazel	Proposed Scenario #2 (Regional)	18.35	219.15	220.07	219.86	220.13	0.002514	1.27	21.08	57.41	0.44
Leonard's Creek	1	1255	2 year	Proposed Scenario #2 (1:2 year)	3.89	219.15	219.82	219.41	219.83	0.000527	0.47	10.44	34.94	0.19
Leonard's Creek	1	1255	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	219.15	219.89	219.50	219.91	0.000879	0.65	13.06	37.16	0.25
Leonard's Creek	1	1255	10 year	Proposed Scenario #2 (1:5-100 year)	7.84	219.15	219.91	219.54	219.94	0.001154	0.76	13.77	39.06	0.29
Leonard's Creek	1	1255	25 year	Proposed Scenario #2 (1:5-100 year)	9.73	219.15	219.97	219.60	220.00	0.001220	0.82	16.34	45.38	0.30
Leonard's Creek	1	1255	50 year	Proposed Scenario #2 (1:5-100 year)	10.44	219.15	219.99	219.62	220.02	0.001279	0.85	17.08	47.17	0.31
Leonard's Creek	1	1255	100 year	Proposed Scenario #2 (1:5-100 year)	10.90	219.15	220.00	219.64	220.04	0.001269	0.86	17.84	48.62	0.31
Leonard's Creek	1	1225	Hazel	Proposed Scenario #2 (Regional)	17.89	218.73	220.04	219.60	220.07	0.001097	0.93	33.62	103.03	0.30
Leonard's Creek	1	1225	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.73	219.81	219.19	219.82	0.000223	0.36	14.65	63.70	0.13
Leonard's Creek	1	1225	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	218.73	219.88	219.29	219.89	0.000402	0.50	19.47	77.63	0.17
Leonard's Creek	1	1225	10 year	Proposed Scenario #2 (1:5-100 year)	7.84	218.73	219.90	219.34	219.91	0.000537	0.59	20.63	78.78	0.20
Leonard's Creek	1	1225	25 year	Proposed Scenario #2 (1:5-100 year)	9.72	218.73	219.96	219.39	219.97	0.000549	0.62	25.66	83.57	0.21
Leonard's Creek	1	1225	50 year	Proposed Scenario #2 (1:5-100 year)	10.40	218.73	219.97	219.41	219.99	0.000569	0.64	27.00	87.93	0.21
Leonard's Creek	1	1225	100 year	Proposed Scenario #2 (1:5-100 year)	10.78	218.73	219.99	219.41	220.01	0.000550	0.64	28.54	93.69	0.21
Leonard's Creek	1	1204	Hazel	Proposed Scenario #2 (Regional)	17.67	218.84	220.02	219.73	220.05	0.001347	1.09	35.54	110.29	0.34
Leonard's Creek	1	1204	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.84	219.81	219.26	219.81	0.000274	0.42	17.56	59.83	0.15
Leonard's Creek	1	1204	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	218.84	219.87	219.36	219.88	0.000482	0.59	21.64	67.68	0.20
Leonard's Creek	1	1204	10 year	Proposed Scenario #2 (1:5-100 year)	7.84	218.84	219.88	219.41	219.90	0.000659	0.70	22.47	77.69	0.23
Leonard's Creek	1	1204	25 year	Proposed Scenario #2 (1:5-100 year)	9.72	218.84	219.95	219.47	219.96	0.000670	0.73	28.01	98.60	0.24
Leonard's Creek	1	1204	50 year	Proposed Scenario #2 (1:5-100 year)	10.40	218.84	219.96	219.49	219.98	0.000684	0.75	29.60	102.27	0.24
Leonard's Creek	1	1204	100 year	Proposed Scenario #2 (1:5-100 year)	10.74	218.84	219.98	219.50	219.99	0.000642	0.73	31.45	104.83	0.23
Leonard's Creek	1	1162	Hazel	Proposed Scenario #2 (Regional)	14.66	218.66	219.87	219.53	219.96	0.003302	1.63	20.48	117.17	0.52
Leonard's Creek	1	1162	2 year	Proposed Scenario #2 (1:2 year)	3.89	218.66	219.80	219.21	219.80	0.000151	0.33	21.58	82.35	0.11
Leonard's Creek	1	1162	5 year	Proposed Scenario #2 (1:5-100 year)	6.44	218.66	219.86	219.32	219.86	0.000372	0.54	27.38	134.67	0.17
Leonard's Creek	1	1162	10 year	Proposed Scenario #2 (1:5-100 year)	7.84	218.66	219.86	219.37	219.87	0.000528	0.65	28.00	135.38	0.21
Leonard's Creek	1	1162	25 year	Proposed Scenario #2 (1:5-100 year)	9.72	218.66	219.92	219.42	219.94	0.000471	0.64	37.11	146.61	0.20
Leonard's Creek	1	1162	50 year	Proposed Scenario #2 (1:5-100 year)	10.40	218.66	219.94	219.46	219.95	0.000474	0.65	39.44	148.41	0.20
Leonard's Creek	1	1162	100 year	Proposed Scenario #2 (1:5-100 year)	10.74	218.66	219.96	219.47	219.97	0.000430	0.62	42.38	149.65	0.19
Leonard's Creek	1	1144	Hazel	Proposed Scenario #2 (Regional)	11.07	218.69	219.82	219.82	219.89	0.003848	1.58	17.76	105.57	0.53
Leonard's Creek	1	1144	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.69	219.79		219.80	0.000478	0.55	18.59	114.65	0.19
Leonard's Creek	1	1144	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.69	219.84		219.85	0.000764	0.72	24.80	128.53	0.24
Leonard's Creek	1	1144	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.69	219.84		219.86	0.001183	0.89	24.31	127.73	0.29
Leonard's Creek	1	1144	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.69	219.91		219.92	0.000858	0.80	34.10	140.79	0.25
Leonard's Creek	1	1144	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.69	219.93		219.94	0.000846	0.80	36.39	143.68	0.25
Leonard's Creek	1	1144	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.69	219.95		219.96	0.000742	0.76	39.56	147.36	0.24
Leonard's Creek	1	1105	Hazel	Proposed Scenario #2 (Regional)	6.73	218.50	219.78	219.16	219.79	0.000433	0.53	19.20	52.51	0.18
Leonard's Creek	1	1105	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.50	219.79	219.00	219.79	0.000124	0.29	23.02	70.58	0.10
Leonard's Creek	1	1105	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.50	219.83	219.15	219.84	0.000258	0.43	26.10	72.34	0.14
Leonard's Creek	1	1105	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.50	219.82	219.23	219.83	0.000411	0.53	25.32	71.83	0.18
Leonard's Creek	1	1105	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.50	219.89	219.34	219.90	0.000412	0.56	30.49	73.94	0.18
Leonard's Creek	1	1105	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.50	219.90	219.36	219.92	0.000435	0.58	31.59	74.29	0.19
Leonard's Creek	1	1105	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.50	219.93	219.37	219.94	0.000411	0.58	33.28	74.87	0.18
Leonard's Creek	1	1080	Hazel	Proposed Scenario #2 (Regional)	4.88	218.40	219.78	219.12	219.78	0.000043	0.17	70.55	232.21	0.06
Leonard's Creek	1	1080	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.40	219.79	219.06	219.79	0.000025	0.13	74.09	242.25	0.04
Leonard's Creek	1	1080	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.40	219.83	219.24	219.83	0.000047	0.19	84.68	242.30	0.06
Leonard's Creek	1	1080	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.40	219.82	219.30	219.82	0.000076	0.24	82.11	242.28	0.08
Leonard's Creek	1	1080	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.40	219.89	219.38	219.89	0.000067	0.23	99.57	248.21	0.07
Leonard's Creek	1	1080	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.40	219.91	219.40	219.91	0.000069	0.24	103.31	249.25	0.07
Leonard's Creek	1	1080	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.40	219.93	219.42	219.93	0.000063	0.23	108.98	250.63	0.07
Leonard's Creek	1	1070			Culvert									
Leonard's Creek	1	1067	Hazel	Proposed Scenario #2 (Regional)	4.88	218.47	219.78	219.78	219.78	0.000164	0.21	49.78	233.14	0.09
Leonard's Creek	1	1067	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.47	219.70	219.70	219.79	0.009906	1.44	4.38	32.24	0.68
Leonard's Creek	1	1067	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.47	219.76	219.76	219.83	0.009270	1.51	8.26	49.73	0.67
Leonard's Creek	1	1067	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.47	219.82	219.78	219.82	0.000281	0.28	59.03	246.35	0.12
Leonard's Creek	1	1067	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.47	219.89	219.78	219.89	0.000190	0.25	76.46	248.61	0.10
Leonard's Creek	1	1067	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.47	219.90	219.78	219.91	0.000186	0.25	80.39	249.11	0.10
Leonard's Creek	1	1067	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.47	219.91	219.78	219.92	0.000181	0.25	82.84	249.41	0.10
Leonard's Creek	1	1062	Hazel	Proposed Scenario #2 (Regional)	4.88	218.49	219.64	219.11	219.66	0.000647	0.58	13.29	90.90	0.22
Leonard's Creek	1	1062	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.49	219.50	219.05	219.52	0.001073	0.65	6.02	10.62	0.27
Leonard's Creek	1	1062	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.49	219.72	219.19	219.74	0.000551	0.58	22.04	118.59	0.20
Leonard's Creek	1	1062	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.49	219.80		219.81	0.000404	0.53	32.19	135.12	0.18
Leonard's Creek	1	1062	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.49	219.88		219.88	0.000381	0.54	43.03	168.05	0.17
Leonard's Creek	1	1062	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.49	219.89		219.90	0.000385	0.55	45.72	170.68	0.18
Leonard's Creek	1	1062	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.49	219.90		219.91	0.000379	0.55	47.45	171.64	0.17
Leonard's Creek	1	1034	Hazel	Proposed Scenario #2 (Regional)	4.88	218.49	219.56		219.62	0.001961	1.04	5.14	16.11	0.37
Leonard's Creek	1	1034	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.49	219.41		219.47	0.002669	1.06	3.81	7.06	0.42
Leonard's Creek	1	1034	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.49	219.60		219.69	0.002840	1.30	6.11	26.08	0.45
Leonard's Creek	1	1034	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.49	219.69	219.35	219.77	0.002611	1.33	8.90	43.59	0.44
Leonard's Creek	1	1034	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.49	219.79	219.45	219.85	0.001893	1.22	20.05	150.25	0.38
Leonard's Creek	1	1034	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.49	219.83	219.49	219.87	0.001470	1.10	25.97	169.38	0.34
Leonard's Creek	1	1034	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.49	219.85		219.88	0.001306	1.05	29.31	194.10	0.32
Leonard's Creek	1	1013	Hazel	Proposed Scenario #2 (Regional)	4.88	218.49	219.50	219.21	219.56	0.003650	1.09	4.65	10.73	0.47
Leonard's Creek	1	1013	2 year	Proposed Scenario #2 (1:2 year)	3.93	218.49	219.15	219.14	219.34	0.017479	1.91	2.06	5.23	0.97
Leonard's Creek	1	1013	5 year	Proposed Scenario #2 (1:5-100 year)	6.52	218.49	219.33	219.33	219.55	0.017337	2.10	3.10	7.10	1.00
Leonard's Creek	1	1013	10 year	Proposed Scenario #2 (1:5-100 year)	7.94	218.49	219.41	219.41	219.64	0.016314	2.14	3.77	8.79	0.98
Leonard's Creek	1	1013	25 year	Proposed Scenario #2 (1:5-100 year)	9.88	218.49	219.50	219.50	219.74	0.014929	2.20	4.66	10.75	0.96
Leonard's Creek	1	1013	50 year	Proposed Scenario #2 (1:5-100 year)	10.60	218.49	219.53	219.53	219.78	0.014468	2.24	4.96	11.40	0.95
Leonard's Creek	1	1013	100 year	Proposed Scenario #2 (1:5-100 year)	10.99	218.49	219.54	219.54	219.80	0.014229	2.26	5.12	11.74	0.95

Alternative #6

Scenario #2 - Twinning Goodfellow Ave / Crystal Beach Road & Tall Tree Lane Crossings

HEC-RAS Locations: User Defined

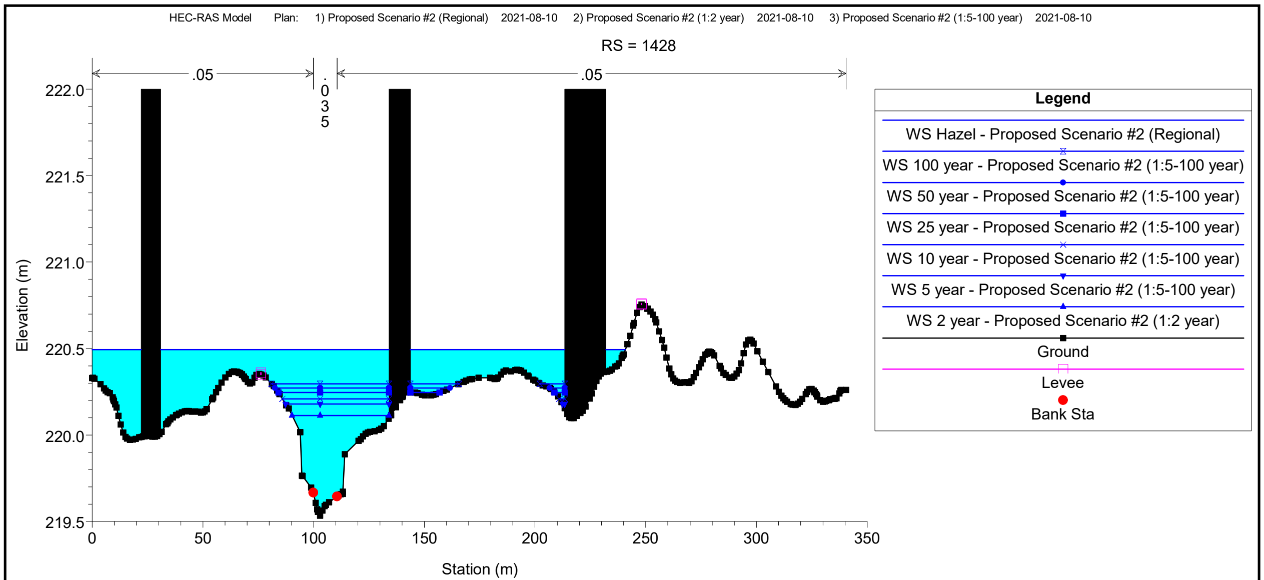
River	Reach	River Sta	Profile	Plan	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
					(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Leonard's Creek	1	1410 Culvert #1	Hazel	Proposed Scenario #2 (Regional)	220.51	220.51	219.13	220.51	220.02	0.09	38.20	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #2	Hazel	Proposed Scenario #2 (Regional)	220.51	220.51	219.14	220.51	220.02	0.09	38.20	0.00	0.14	0.14
Leonard's Creek	1	1410 Culvert #1	2 year	Proposed Scenario #2 (1:2 year)	220.12	220.12	219.14	220.12	220.02	0.09	3.71	0.00	0.15	0.15
Leonard's Creek	1	1410 Culvert #2	2 year	Proposed Scenario #2 (1:2 year)	220.12	220.12	219.14	220.12	220.02	0.09	3.71	0.00	0.15	0.15
Leonard's Creek	1	1410 Culvert #1	5 year	Proposed Scenario #2 (1:5-100 year)	220.19	220.19	219.17	220.19	220.02	0.12	7.45	0.00	0.19	0.19
Leonard's Creek	1	1410 Culvert #2	5 year	Proposed Scenario #2 (1:5-100 year)	220.19	220.19	219.18	220.19	220.02	0.12	7.45	0.00	0.19	0.19
Leonard's Creek	1	1410 Culvert #1	10 year	Proposed Scenario #2 (1:5-100 year)	220.23	220.22	219.04	220.23	220.02	0.03	10.53	0.00	0.05	0.05
Leonard's Creek	1	1410 Culvert #2	10 year	Proposed Scenario #2 (1:5-100 year)	220.23	220.22	219.04	220.23	220.02	0.03	10.53	0.00	0.05	0.05
Leonard's Creek	1	1410 Culvert #1	25 year	Proposed Scenario #2 (1:5-100 year)	220.27	220.27	219.21	220.27	220.02	0.15	14.21	0.01	0.24	0.24
Leonard's Creek	1	1410 Culvert #2	25 year	Proposed Scenario #2 (1:5-100 year)	220.27	220.27	219.21	220.27	220.02	0.15	14.21	0.01	0.24	0.24
Leonard's Creek	1	1410 Culvert #1	50 year	Proposed Scenario #2 (1:5-100 year)	220.30	220.30	219.07	220.30	220.02	0.05	17.53	0.00	0.08	0.08
Leonard's Creek	1	1410 Culvert #2	50 year	Proposed Scenario #2 (1:5-100 year)	220.30	220.30	219.08	220.30	220.02	0.05	17.53	0.00	0.08	0.08
Leonard's Creek	1	1410 Culvert #1	100 year	Proposed Scenario #2 (1:5-100 year)	220.33	220.33	219.11	220.33	220.02	0.08	22.03	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #2	100 year	Proposed Scenario #2 (1:5-100 year)	220.33	220.33	219.12	220.33	220.02	0.08	22.03	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	Hazel	Proposed Scenario #2 (Regional)	220.39	220.38	220.39	220.39	220.10	0.47	24.49	0.00	0.15	0.15
Leonard's Creek	1	1335 Culvert #1	2 year	Proposed Scenario #2 (1:2 year)	220.10	220.10	219.63	220.10	220.10	3.89	1.74	0.19	1.23	1.23
Leonard's Creek	1	1335 Culvert #1	5 year	Proposed Scenario #2 (1:5-100 year)	220.16	220.16	220.07	220.16	220.11	2.93	3.70	0.11	0.93	0.93
Leonard's Creek	1	1335 Culvert #1	10 year	Proposed Scenario #2 (1:5-100 year)	220.19	220.19	220.10	220.19	220.11	2.48	4.84	0.07	0.79	0.79
Leonard's Creek	1	1335 Culvert #1	25 year	Proposed Scenario #2 (1:5-100 year)	220.21	220.21	220.20	220.21	220.11	0.50	10.88	0.00	0.16	0.16
Leonard's Creek	1	1335 Culvert #1	50 year	Proposed Scenario #2 (1:5-100 year)	220.24	220.24	220.24	220.24	220.11	0.46	12.14	0.00	0.14	0.14
Leonard's Creek	1	1335 Culvert #1	100 year	Proposed Scenario #2 (1:5-100 year)	220.26	220.26	220.26	220.26	220.11	0.50	12.98	0.00	0.16	0.16
Leonard's Creek	1	1070 Culvert #1	Hazel	Proposed Scenario #2 (Regional)	219.78	219.78	219.25	219.78	219.67	0.33	4.54	0.00	0.09	0.09
Leonard's Creek	1	1070 Culvert #1	2 year	Proposed Scenario #2 (1:2 year)	219.79	219.79	219.11	219.79	219.67	0.30	3.63	0.08	0.08	0.08
Leonard's Creek	1	1070 Culvert #1	5 year	Proposed Scenario #2 (1:5-100 year)	219.83	219.83	219.51	219.83	219.67	0.46	6.06	0.07	0.12	0.12
Leonard's Creek	1	1070 Culvert #1	10 year	Proposed Scenario #2 (1:5-100 year)	219.82	219.82	219.75	219.82	219.67	0.43	7.51	0.00	0.12	0.12
Leonard's Creek	1	1070 Culvert #1	25 year	Proposed Scenario #2 (1:5-100 year)	219.89	219.89	219.89	219.89	219.67	0.58	9.30	0.00	0.16	0.16
Leonard's Creek	1	1070 Culvert #1	50 year	Proposed Scenario #2 (1:5-100 year)	219.91	219.91	219.91	219.91	219.67	0.49	10.11	0.00	0.13	0.13
Leonard's Creek	1	1070 Culvert #1	100 year	Proposed Scenario #2 (1:5-100 year)	219.93	219.93	219.93	219.92	219.67	8.64	2.35	0.01	2.35	2.35

Alternative #6

Scenario #2 - Twinning Goodfellow Ave / Crystal Beach Road & Tall Tree Lane Crossings

HEC-RAS River: Leonard's Creek Reach: 1

Reach	River Sta	Profile	Plan	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
				(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1	1529.2	Hazel	Proposed Scenario #2 (Regional)	43.86	13.63	24.96	13.63		161.63	0.43	0.28	219.95	220.92	220.88	220.38	220.38
1	1529.2	5 year	Proposed Scenario #2 (1:5-100 year)	7.54	0.59	6.63	0.59		137.73	0.10	0.04	219.95	220.54	220.53	220.05	220.05
1	1529.2	10 year	Proposed Scenario #2 (1:5-100 year)	10.43	1.46	8.40	1.46		154.22	0.16	0.07	219.95	220.61	220.59	220.11	220.11
1	1529.2	25 year	Proposed Scenario #2 (1:5-100 year)	14.33	2.26	11.38	2.26		154.93	0.25	0.10	219.95	220.65	220.63	220.20	220.20
1	1529.2	50 year	Proposed Scenario #2 (1:5-100 year)	17.56	3.70	12.60	3.70		155.45	0.29	0.13	219.95	220.71	220.68	220.24	220.24
1	1529.2	100 year	Proposed Scenario #2 (1:5-100 year)	20.25	4.99	13.49	4.99		155.90	0.31	0.16	219.95	220.74	220.71	220.26	220.26
1	1429	Hazel	Proposed Scenario #2 (Regional)	45.37	14.28	17.67	14.28		186.63	0.40	0.22	219.97	220.54	220.50	220.05	220.02
1	1429	2 year	Proposed Scenario #2 (1:2 year)	3.89	0.12	3.89	0.12		24.05	0.07	0.04	219.97	220.12	220.11	219.81	219.81
1	1429	5 year	Proposed Scenario #2 (1:5-100 year)	7.71	0.67	6.44	0.67		62.48	0.13	0.07	219.97	220.21	220.18	219.88	219.87
1	1429	10 year	Proposed Scenario #2 (1:5-100 year)	10.67	1.37	7.84	1.37		77.99	0.16	0.09	219.97	220.25	220.21	219.90	219.88
1	1429	25 year	Proposed Scenario #2 (1:5-100 year)	14.66	2.68	9.72	2.68		127.66	0.22	0.09	219.97	220.31	220.25	219.96	219.95
1	1429	50 year	Proposed Scenario #2 (1:5-100 year)	17.97	3.83	10.40	3.83		164.78	0.26	0.10	219.97	220.35	220.27	219.98	219.96
1	1429	100 year	Proposed Scenario #2 (1:5-100 year)	20.73	4.99	10.74	4.99		186.63	0.28	0.10	219.97	220.39	220.30	219.99	219.98
1	1176	Hazel	Proposed Scenario #2 (Regional)	17.67	13.78	4.88	13.78		113.04	0.35	0.26	219.51	219.99	219.91	219.78	219.78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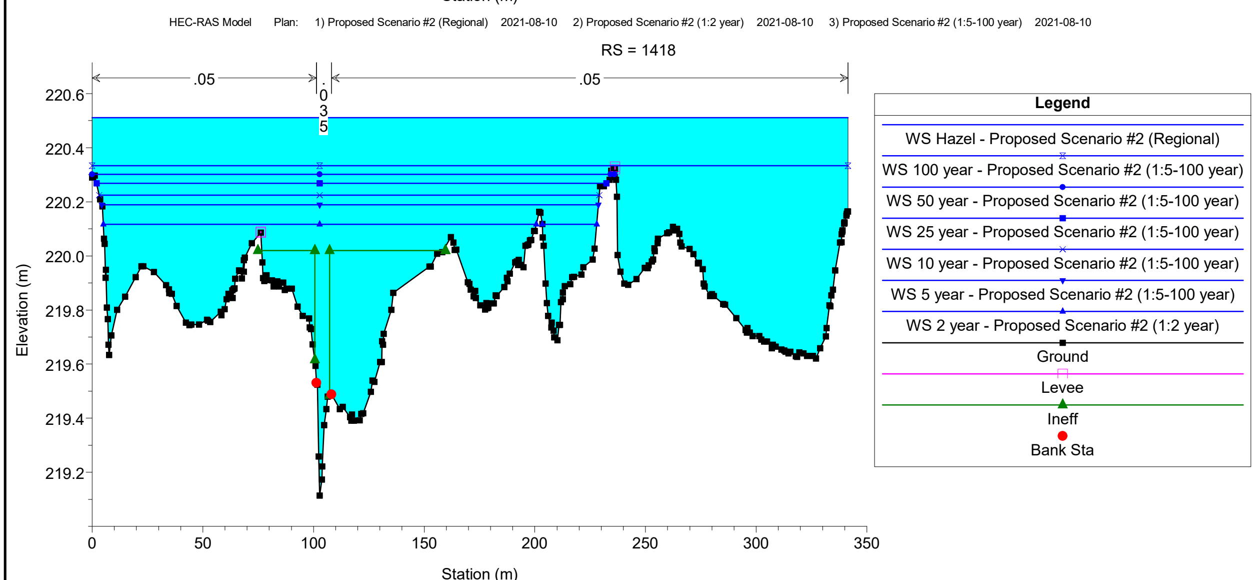
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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Station (m)
Legend
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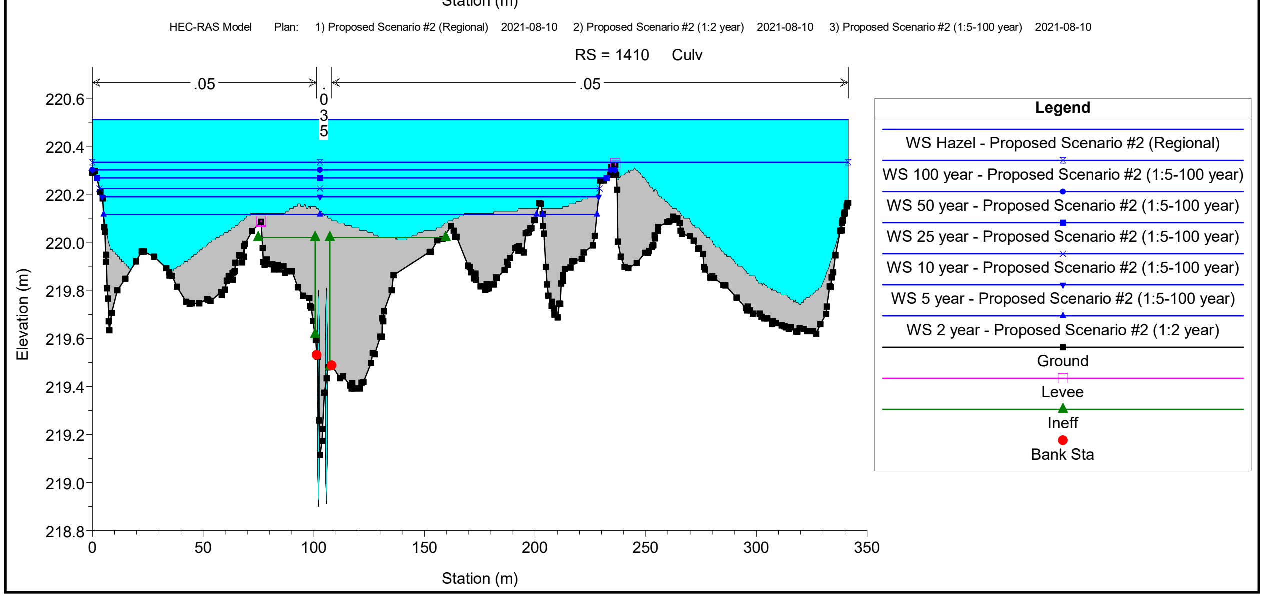
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta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Elevation (m)
Station (m)
Legend
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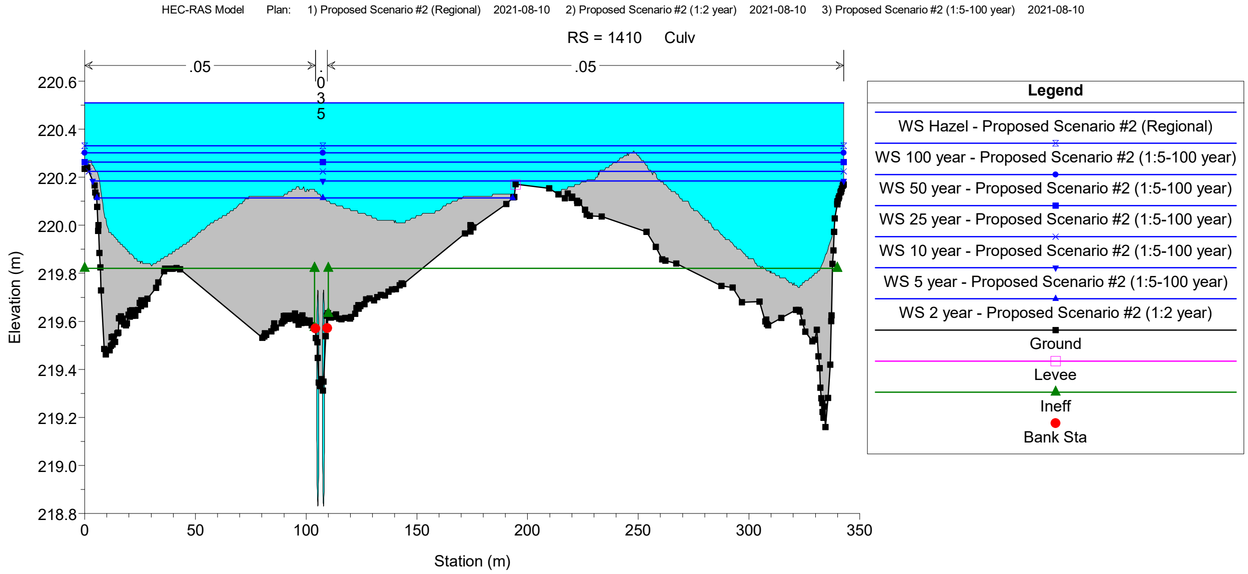
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta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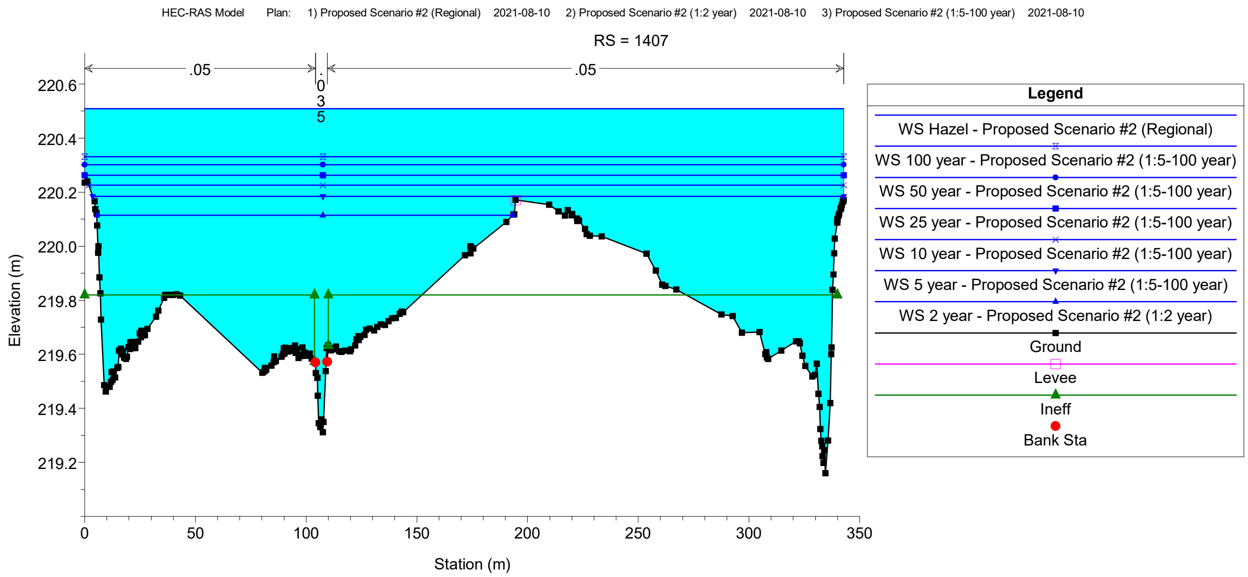
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta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Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
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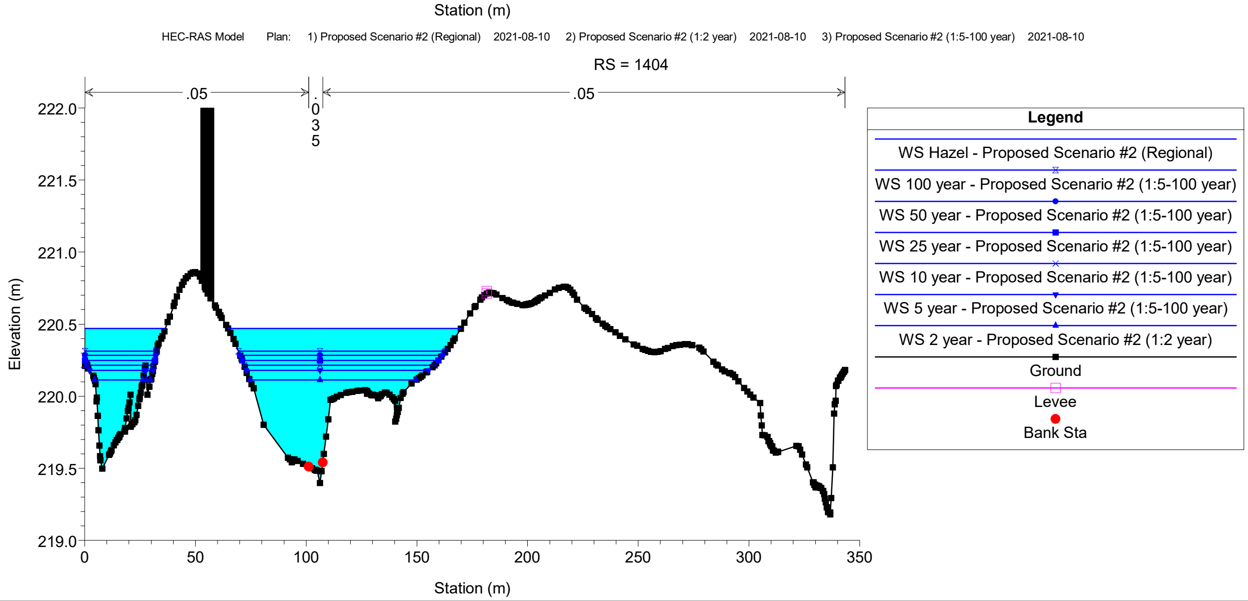
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta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Station (m)
Legend
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WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
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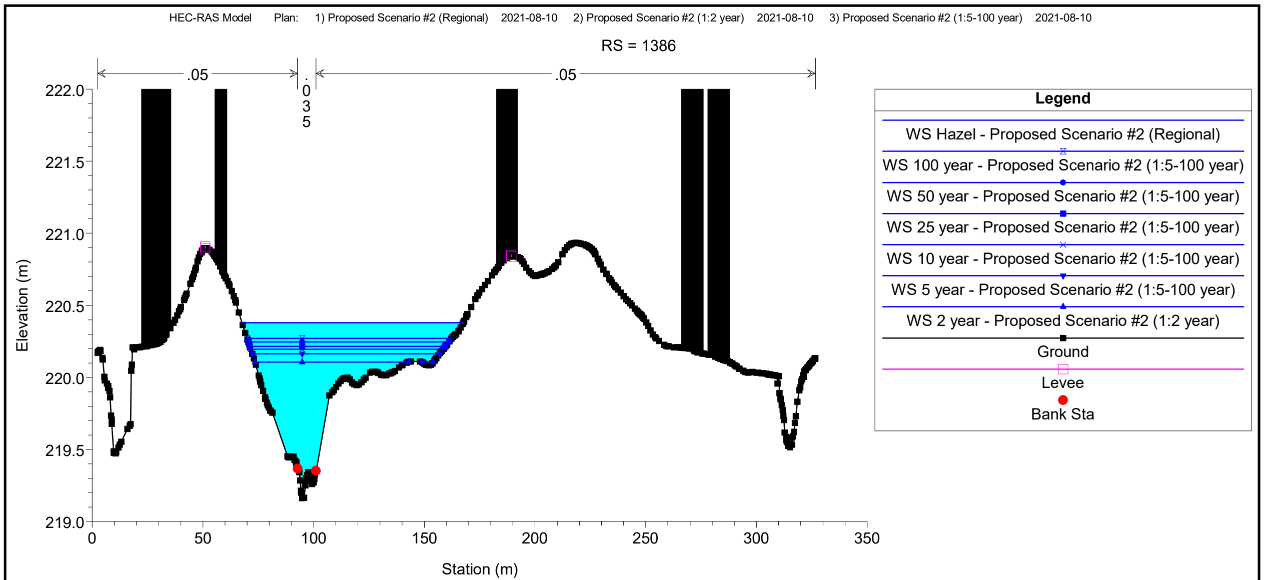
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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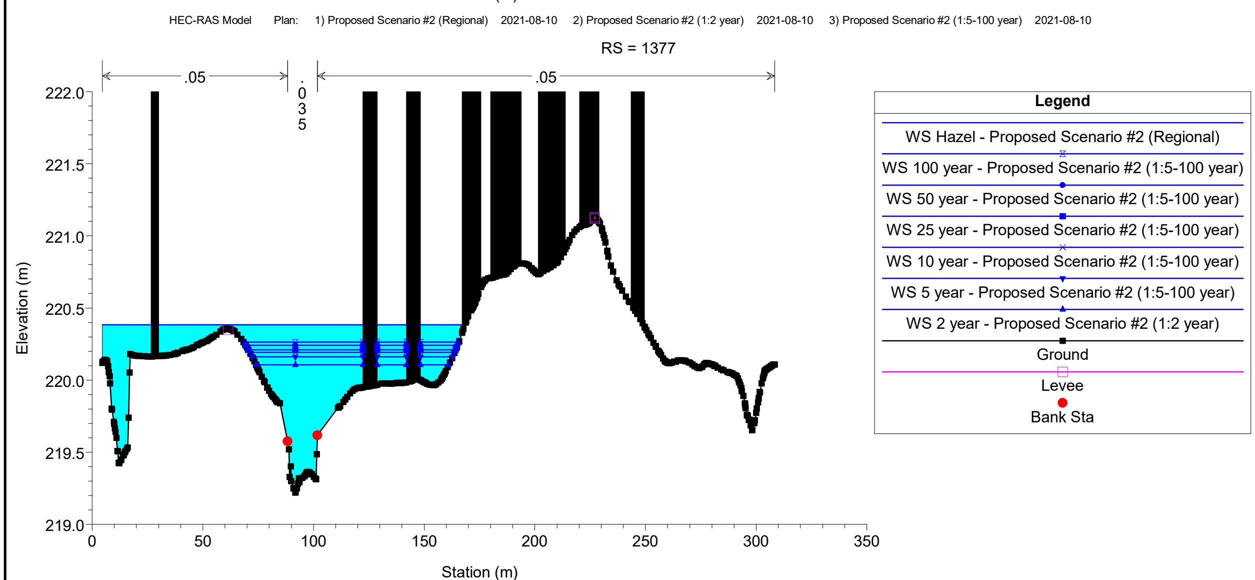
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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Station (m)
Legend
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WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
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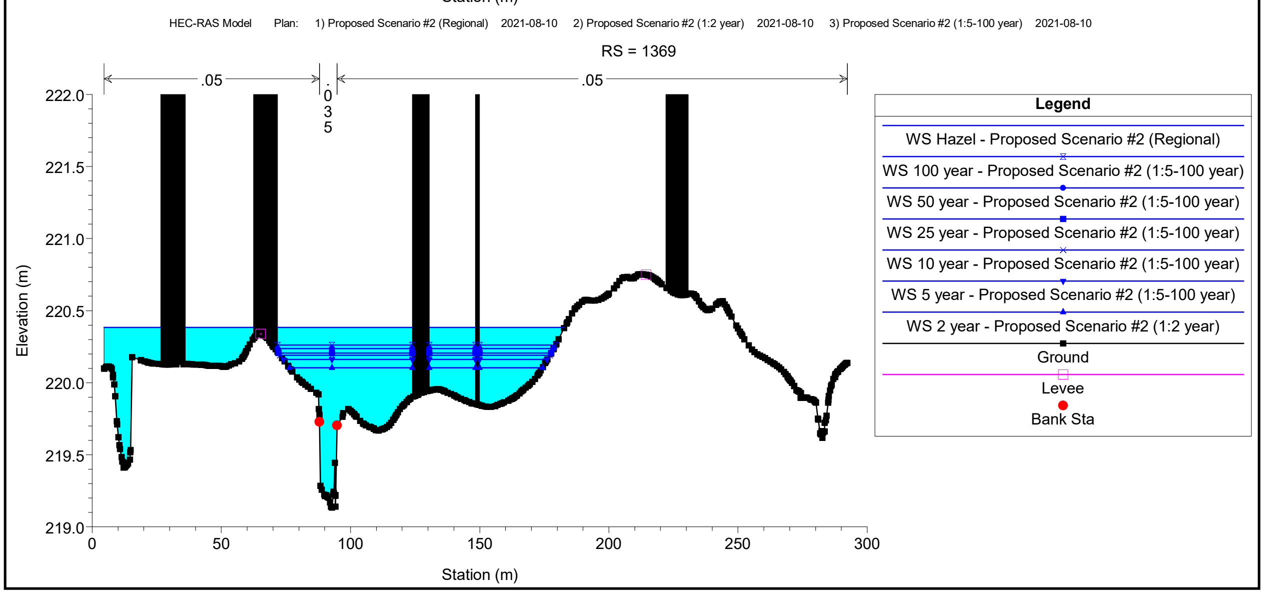
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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Station (m)
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WS 50 year - Proposed Scenario #2 (1:5-100 year)
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WS 10 year - Proposed Scenario #2 (1:5-100 year)
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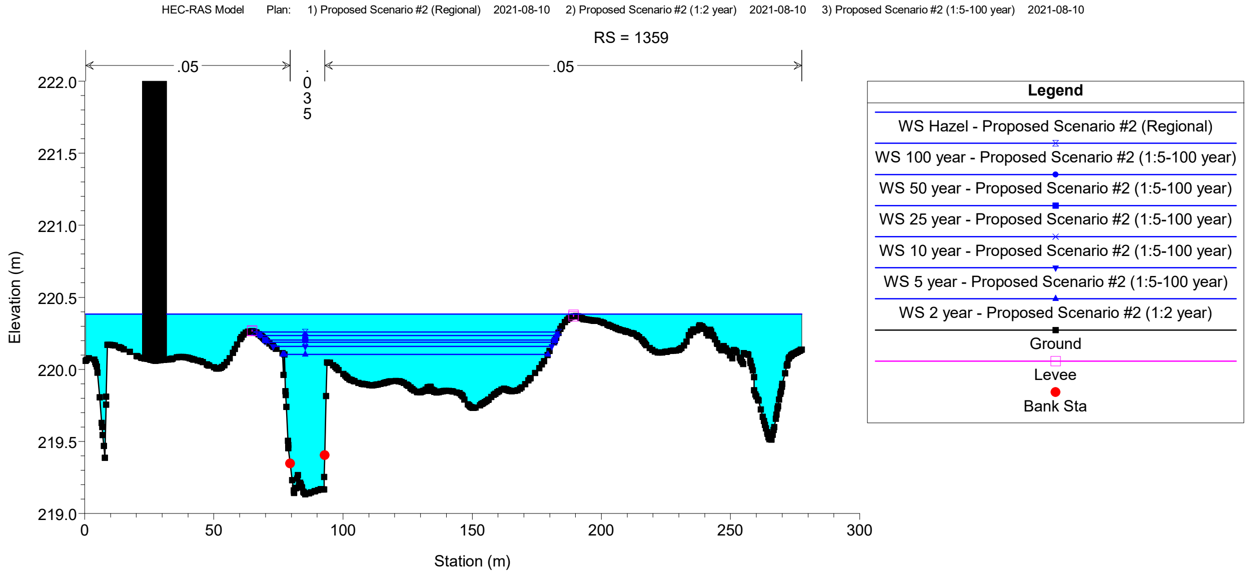
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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Station (m)
Legend
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WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
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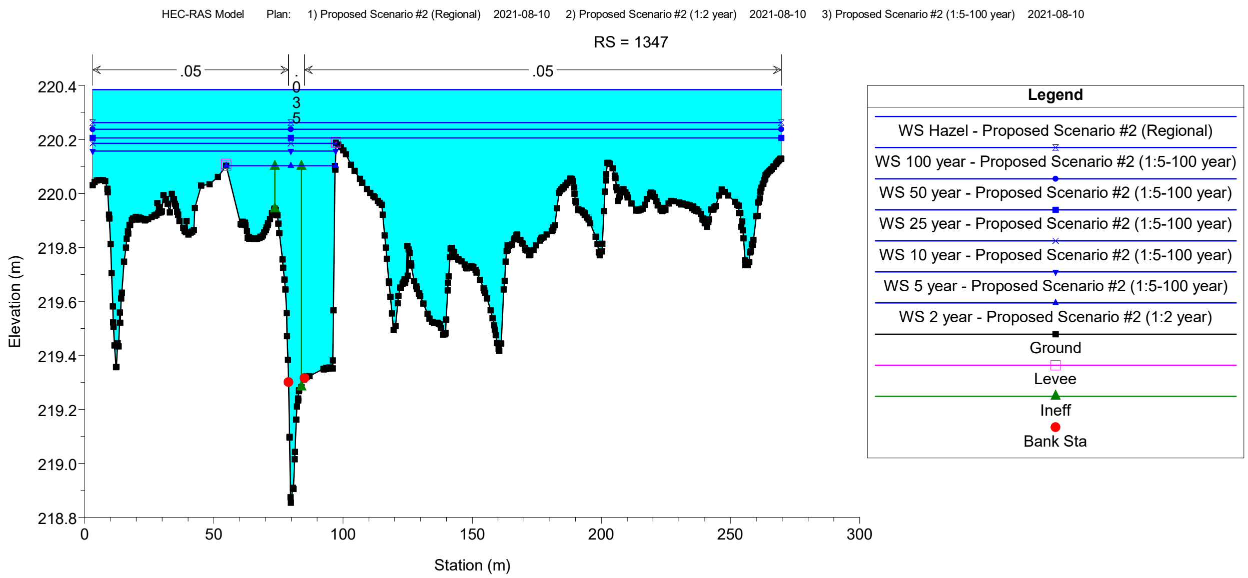
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta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Elevation (m)
Station (m)
Legend
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WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
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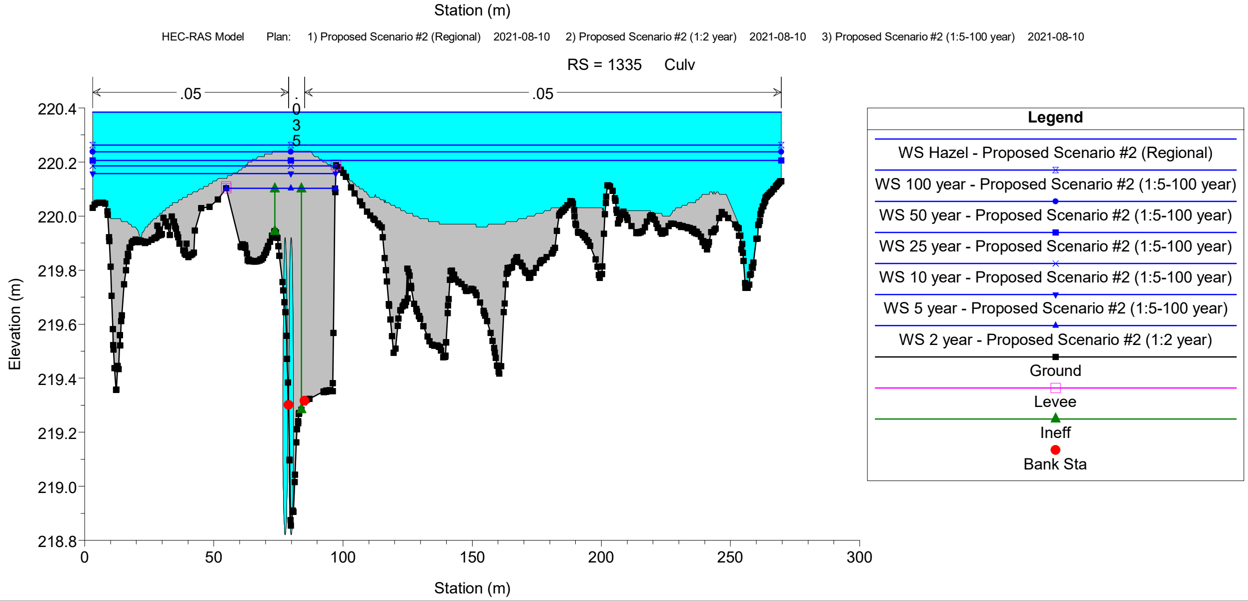
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta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Elevation (m)
Station (m)
Legend
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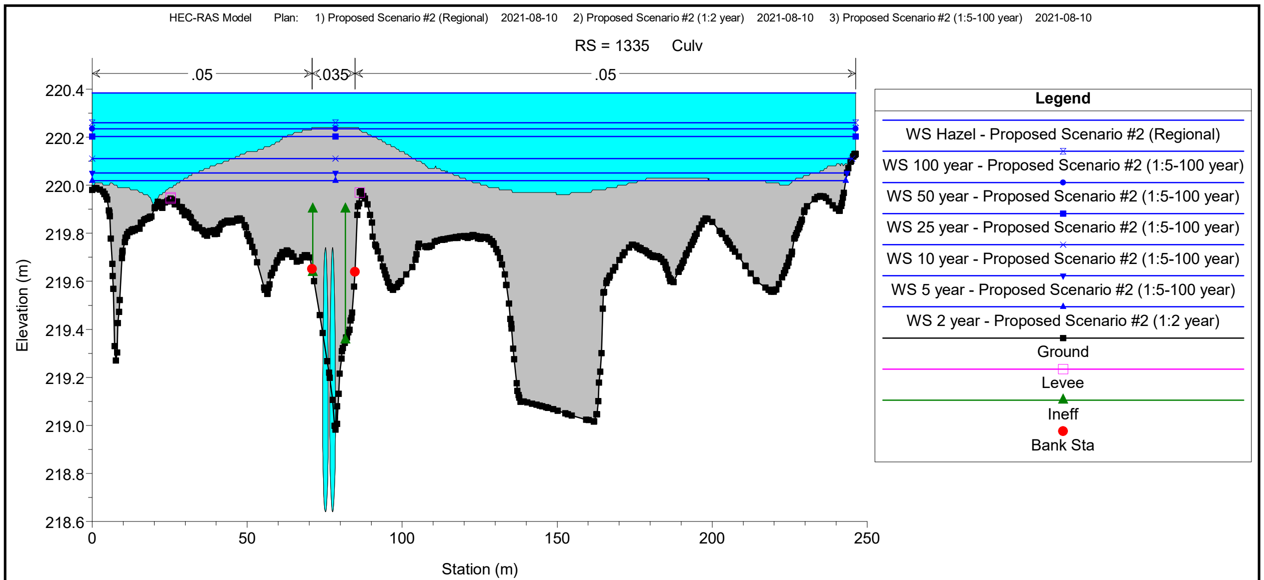
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta



HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
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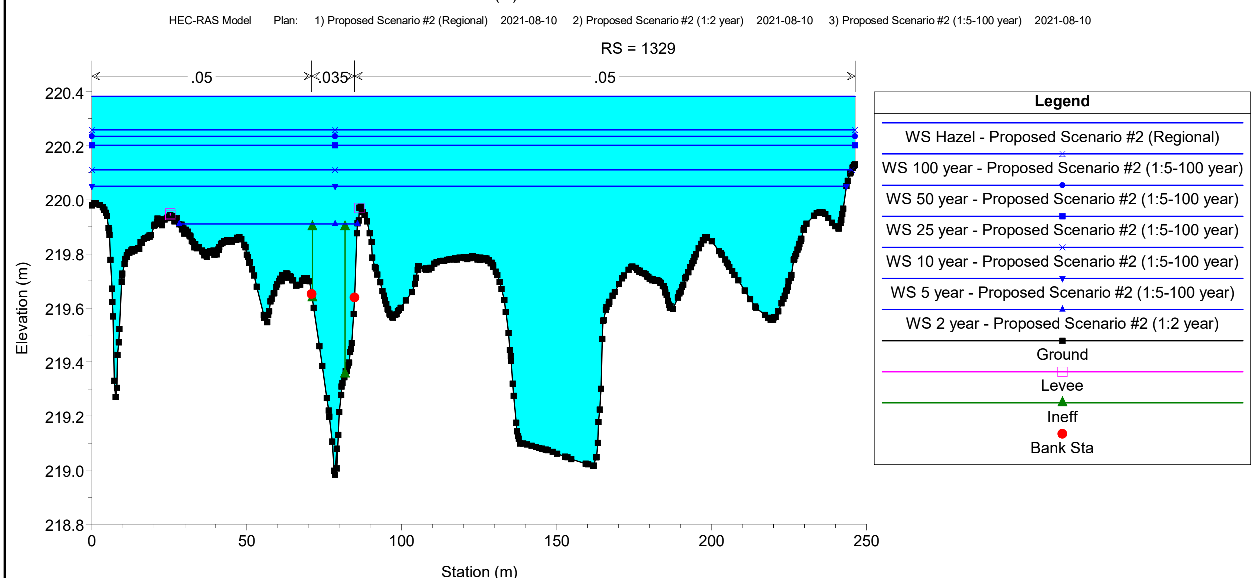
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta



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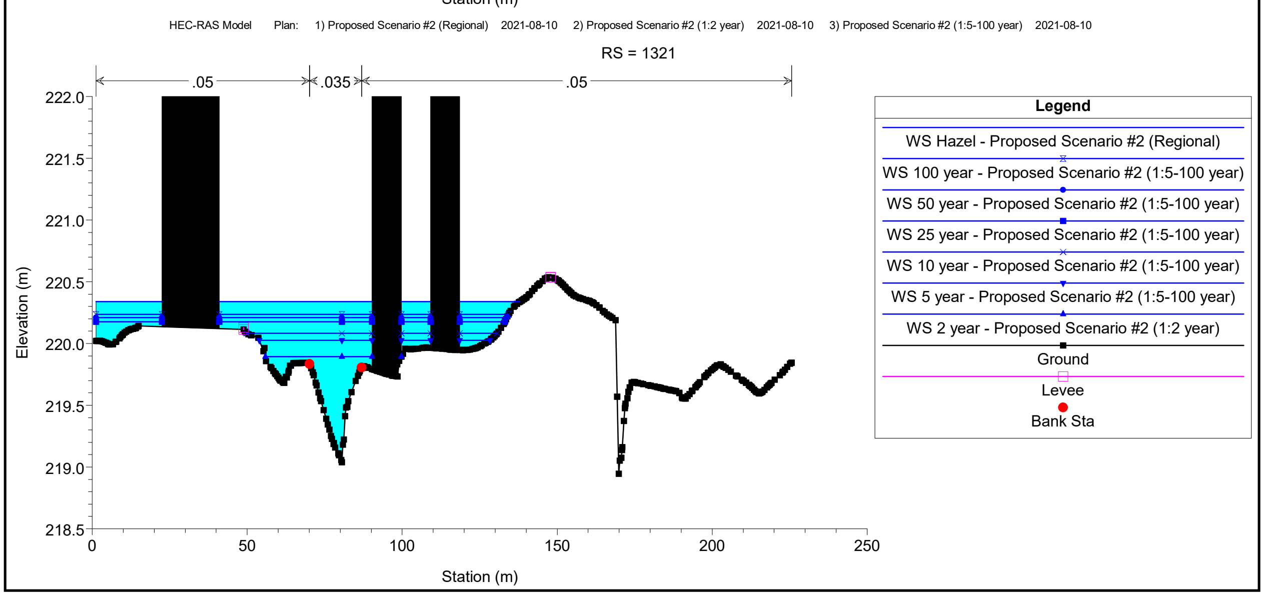
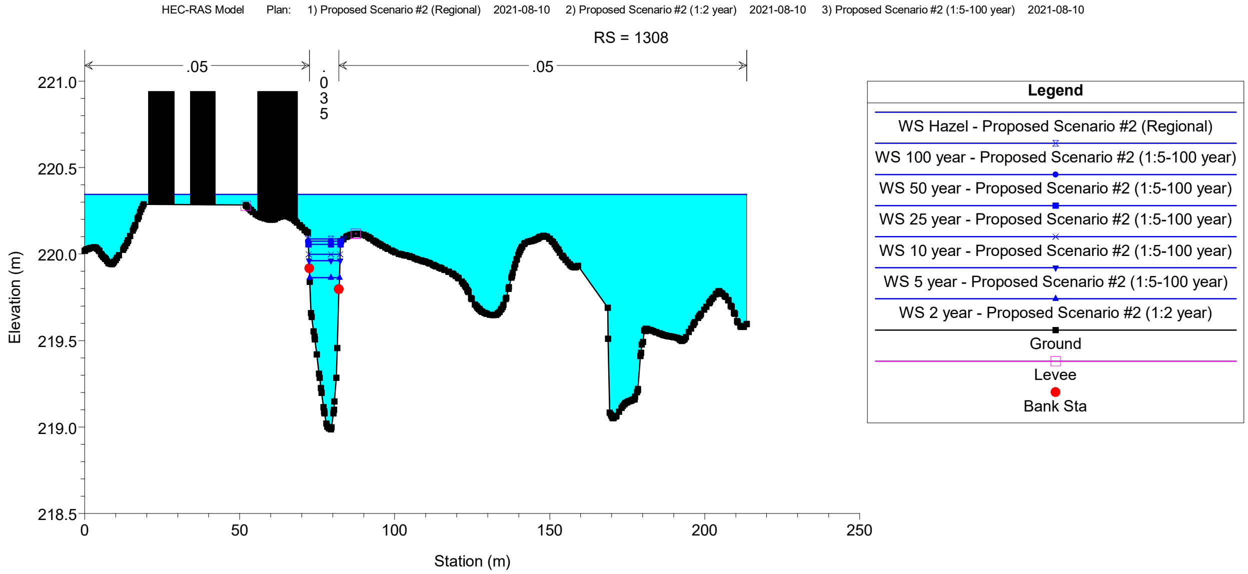
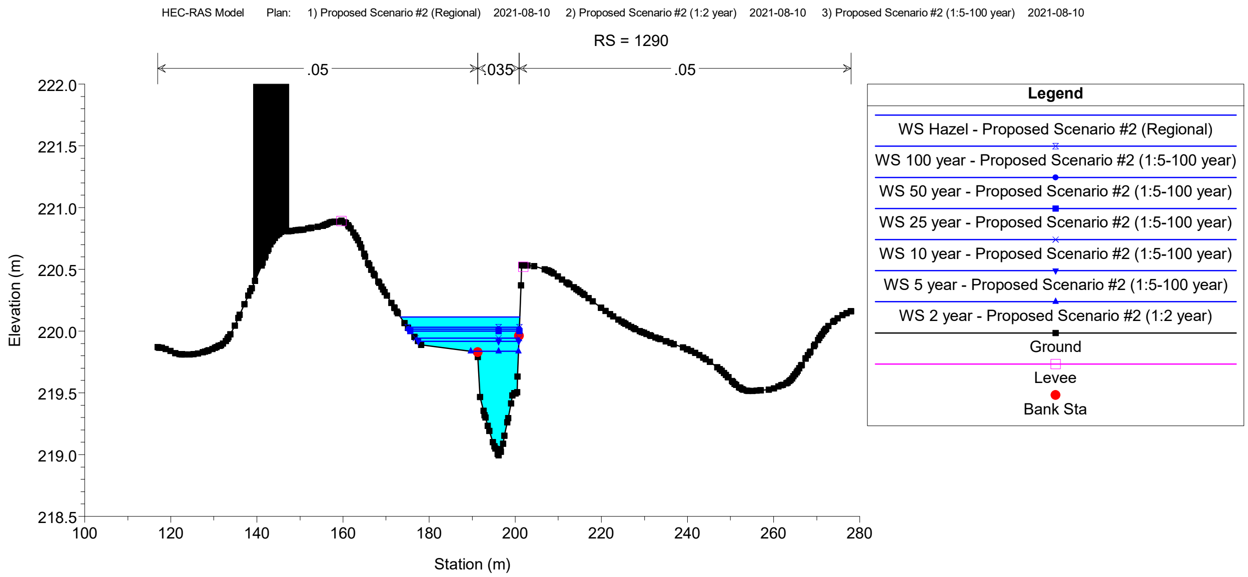
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta



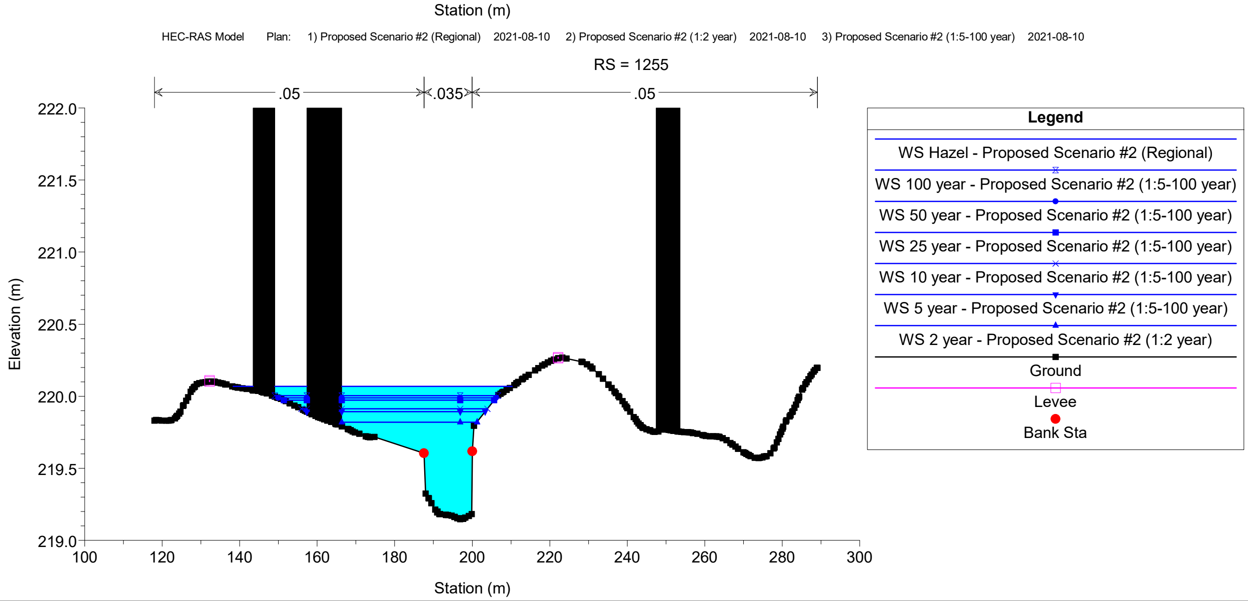
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1321
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta



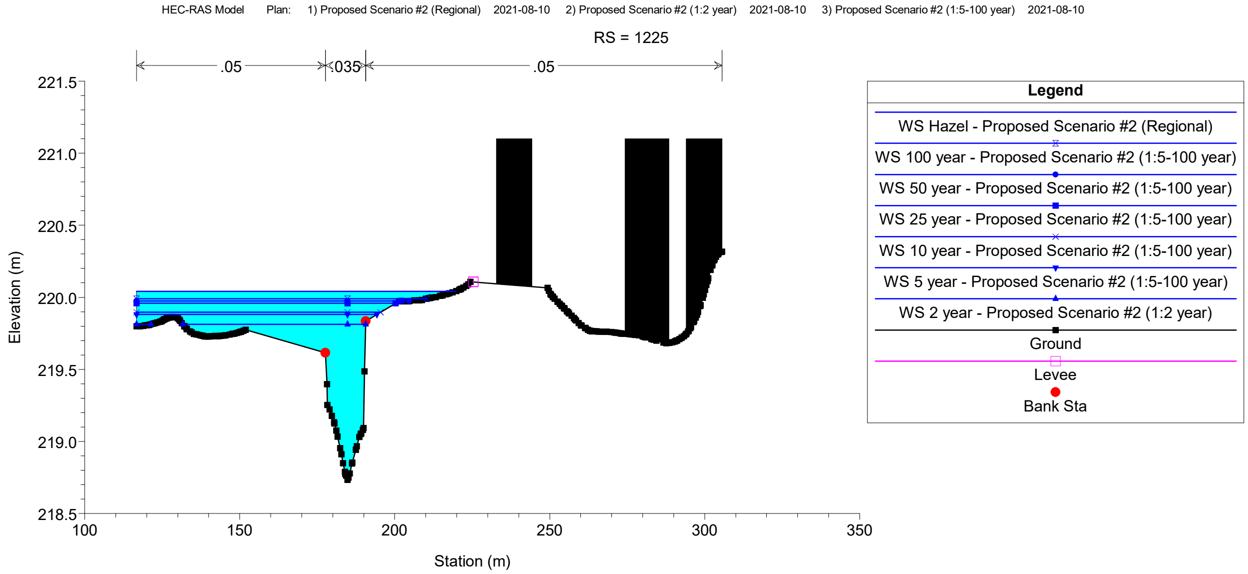
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1308
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta



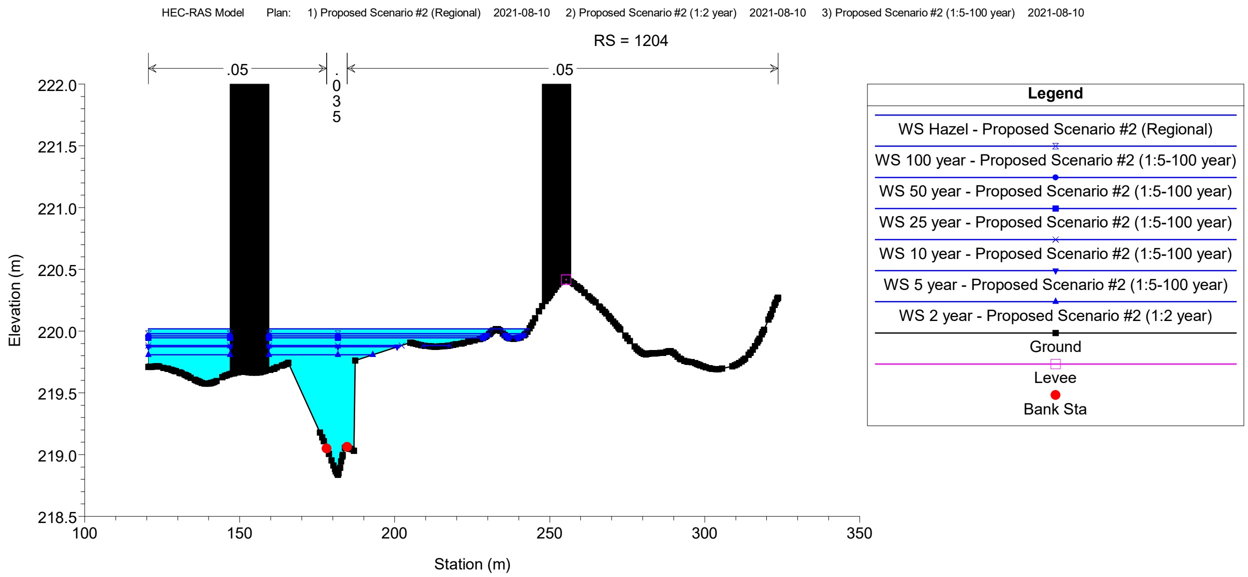
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1290
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta



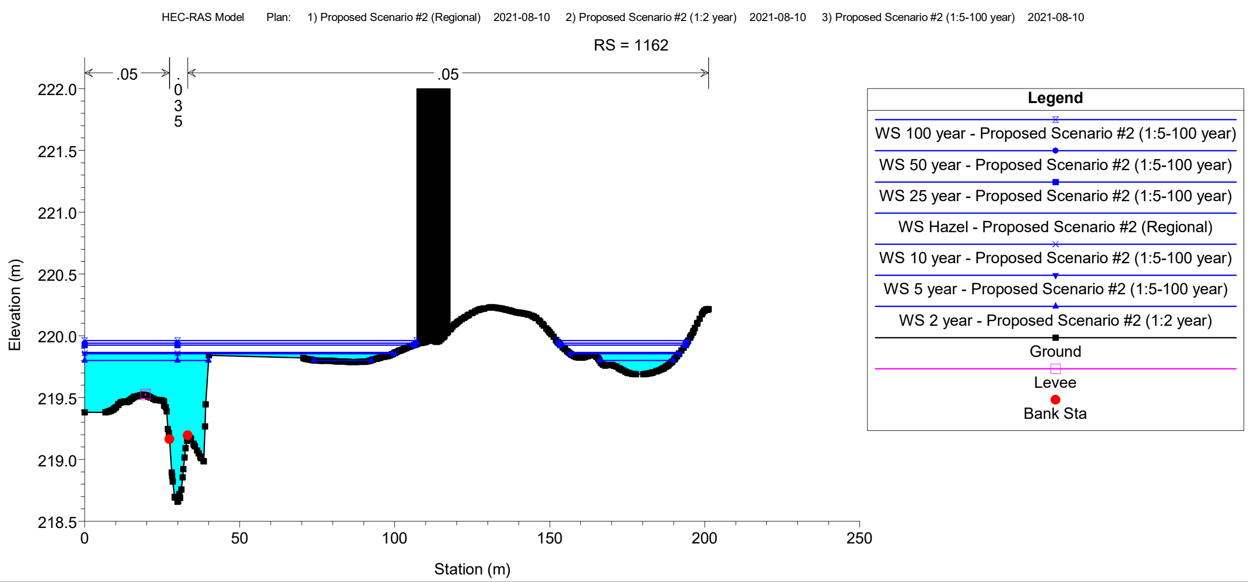
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1255
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta



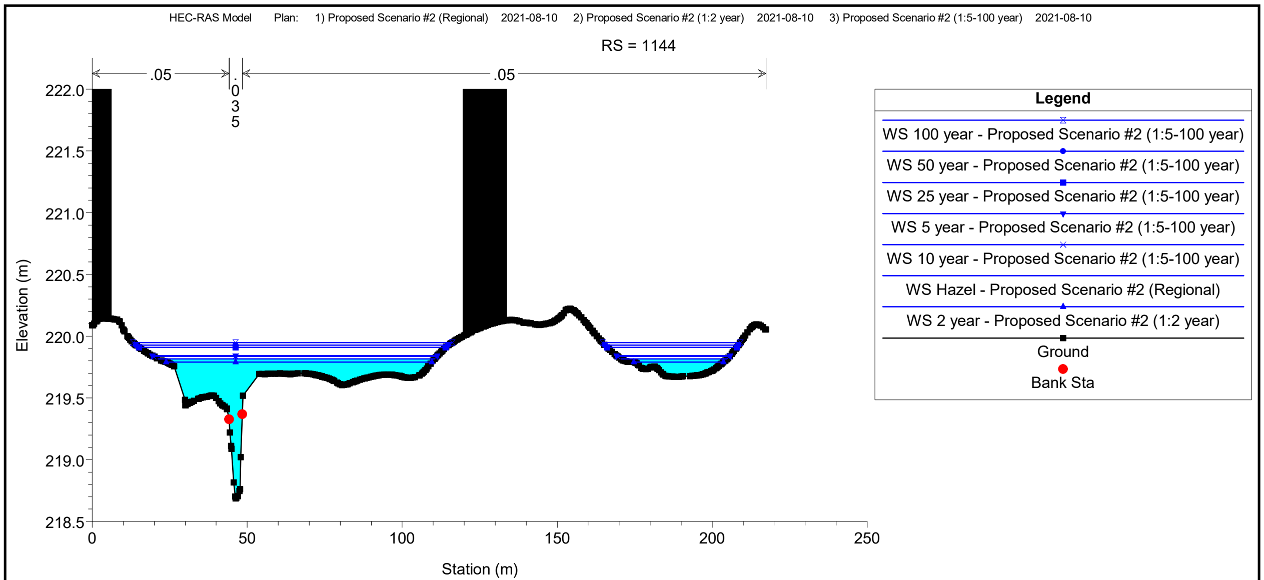
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1225
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta

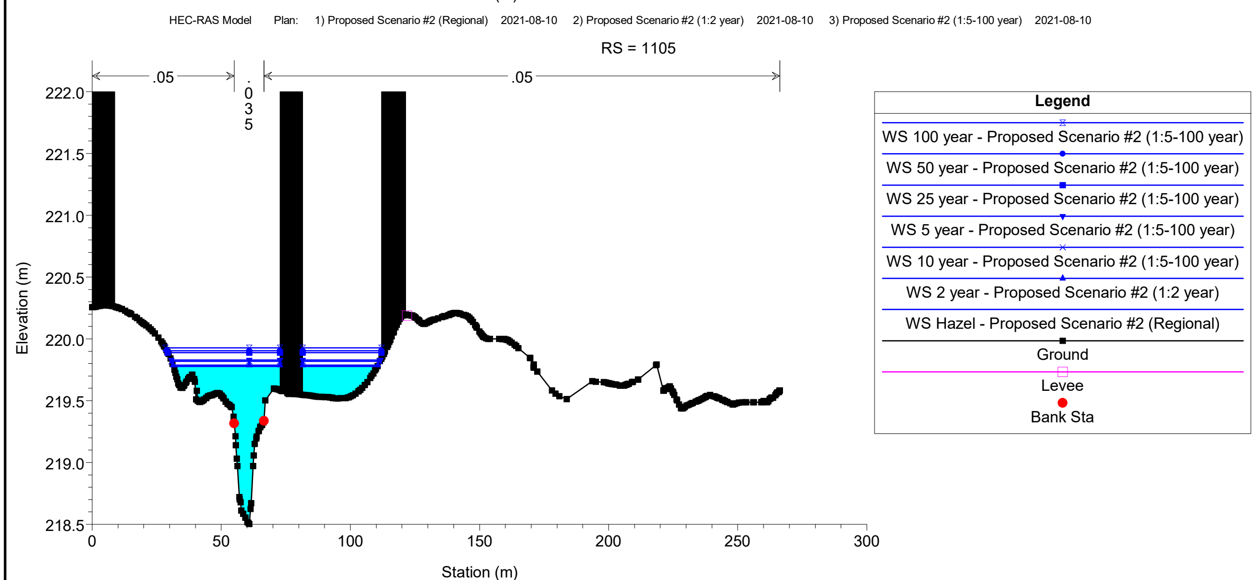


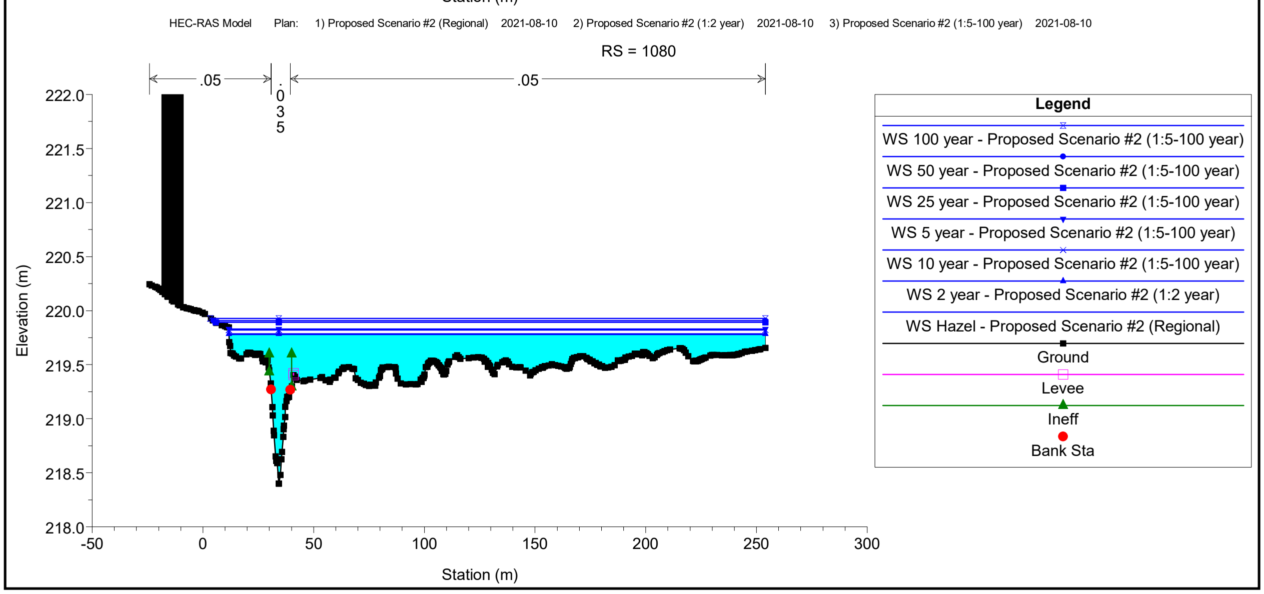
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1204
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #2 (Regional)
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta

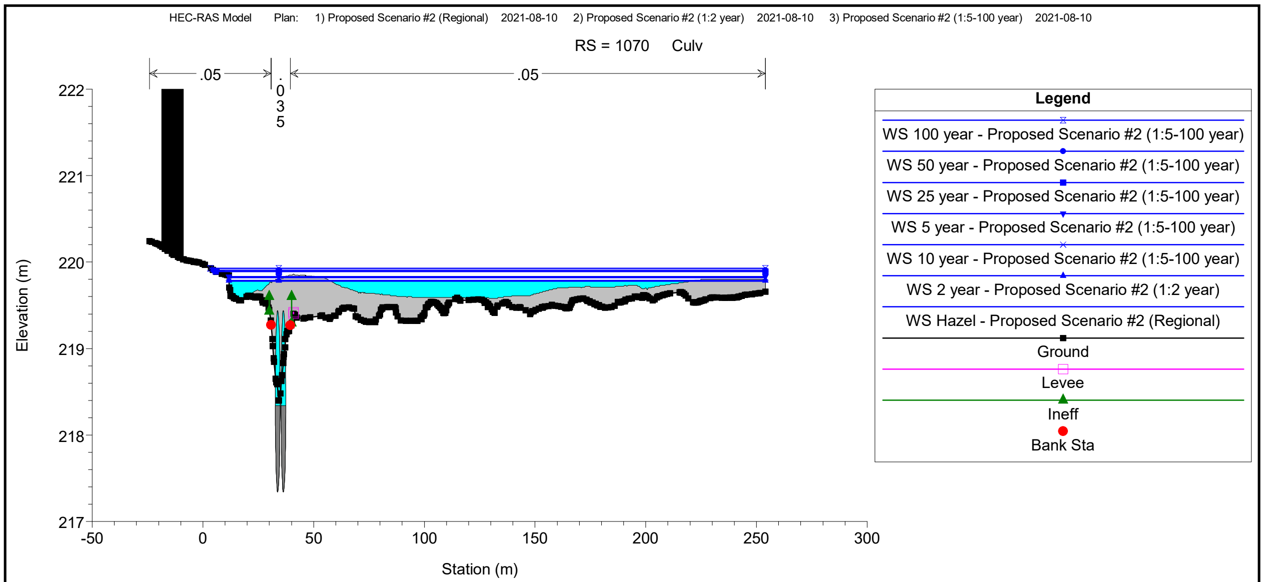


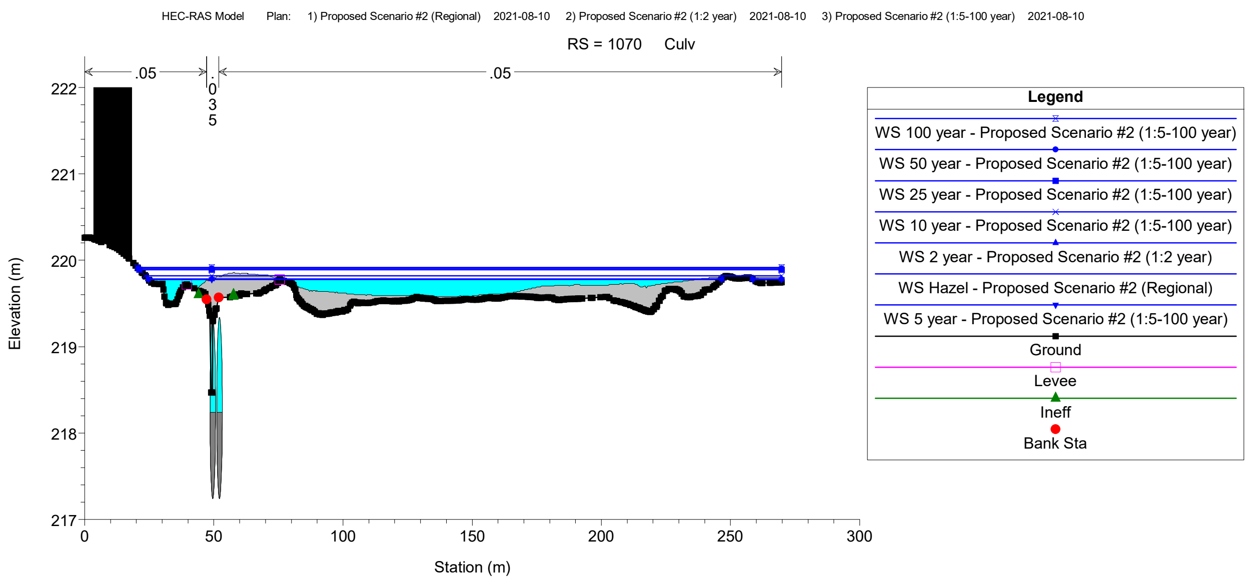
HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1162
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta

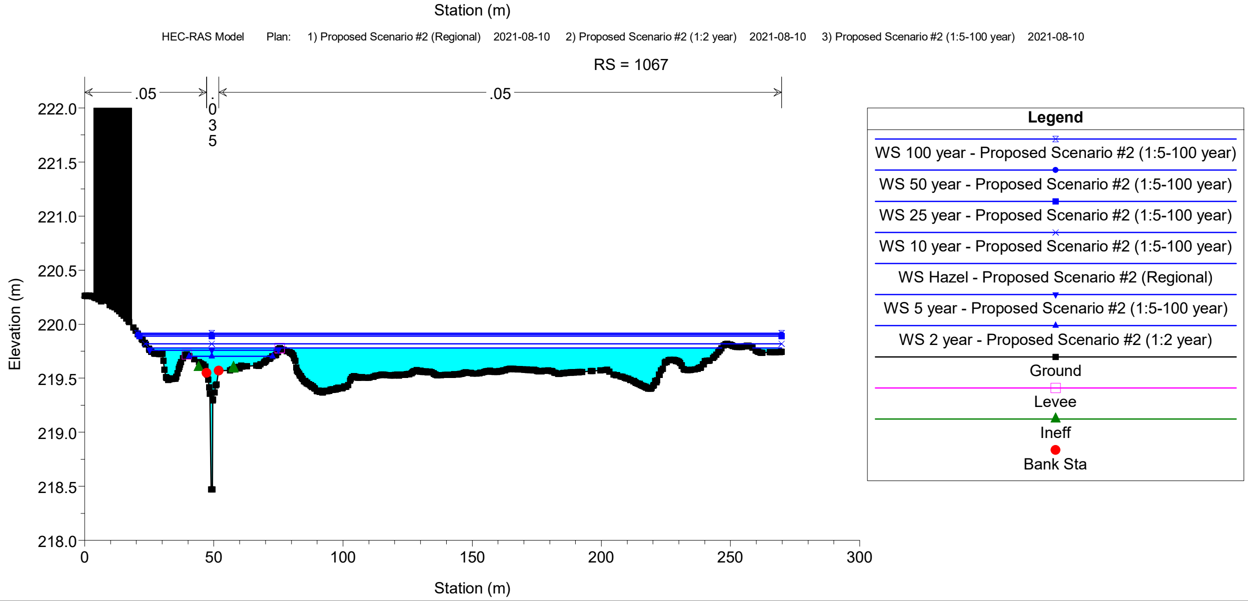

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1144
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Bank Sta

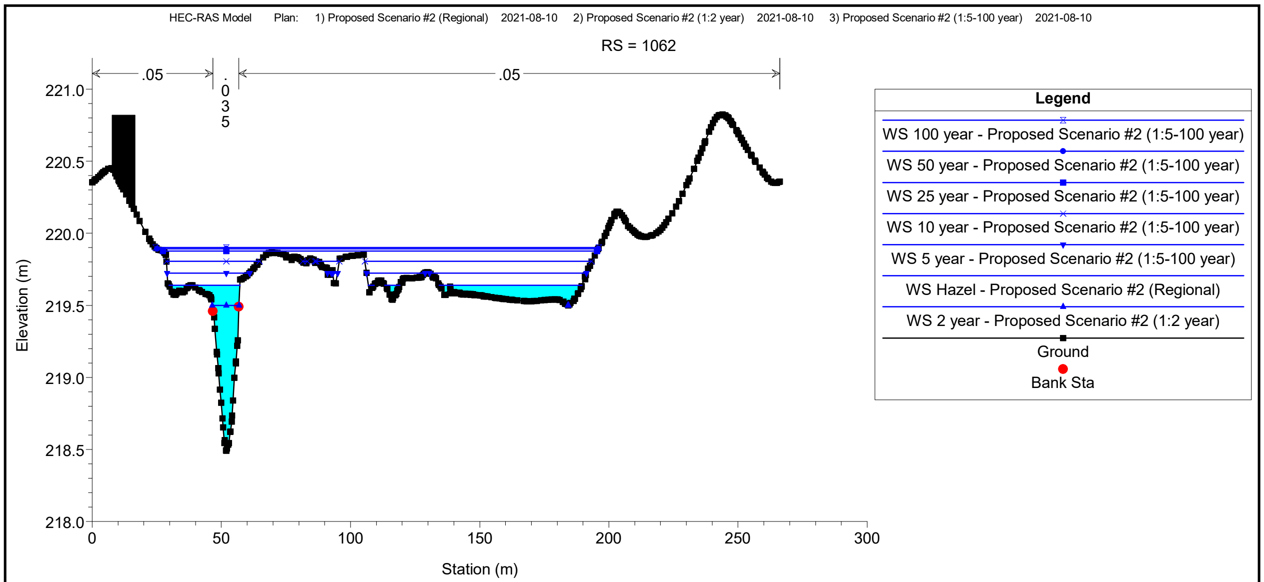

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1105
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
300
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
WS Hazel - Proposed Scenario #2 (Regional)
Ground
Levee
Bank Sta

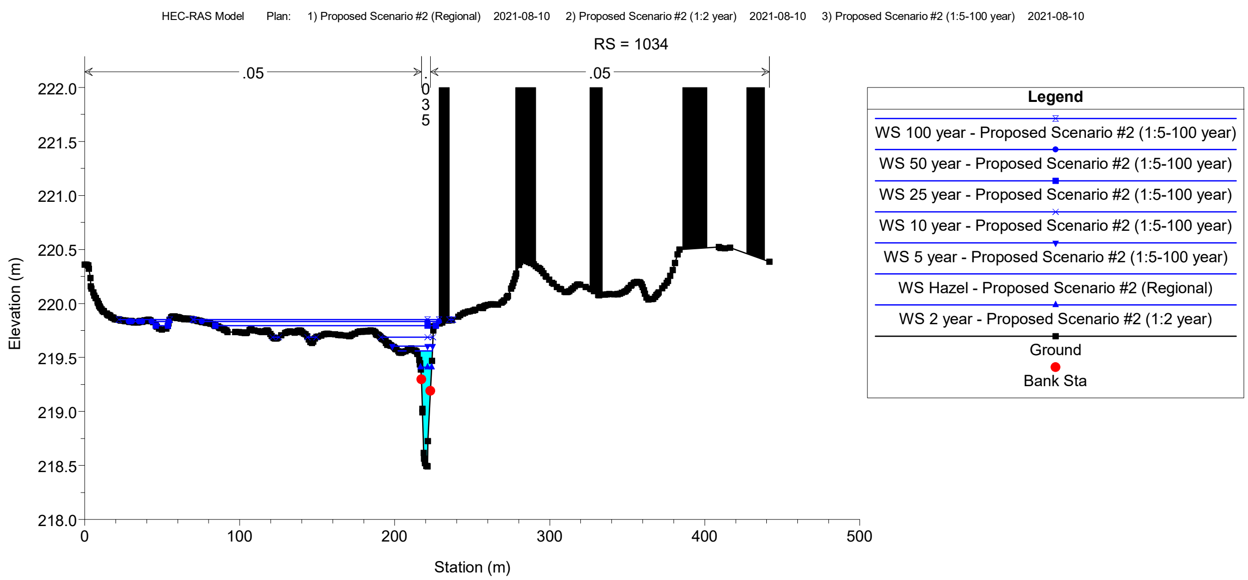

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1080
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
218.0
-50
0
50
100
150
200
250
300
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
WS Hazel - Proposed Scenario #2 (Regional)
Ground
Levee
Ineff
Bank Sta

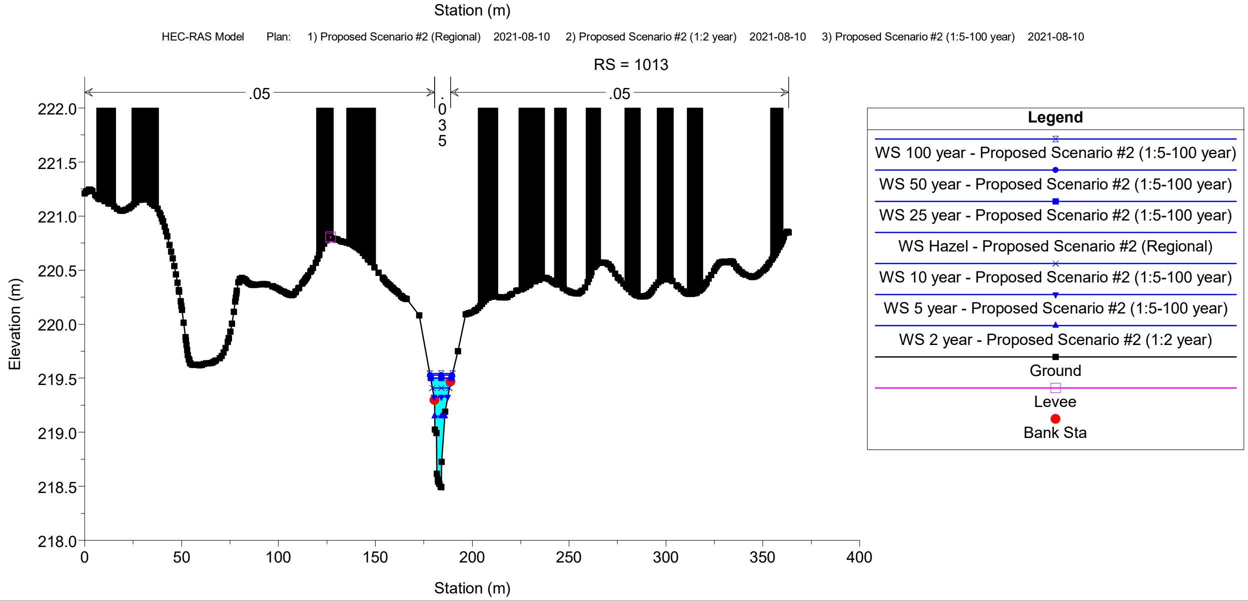

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
WS Hazel - Proposed Scenario #2 (Regional)
Ground
Levee
Ineff
Bank Sta

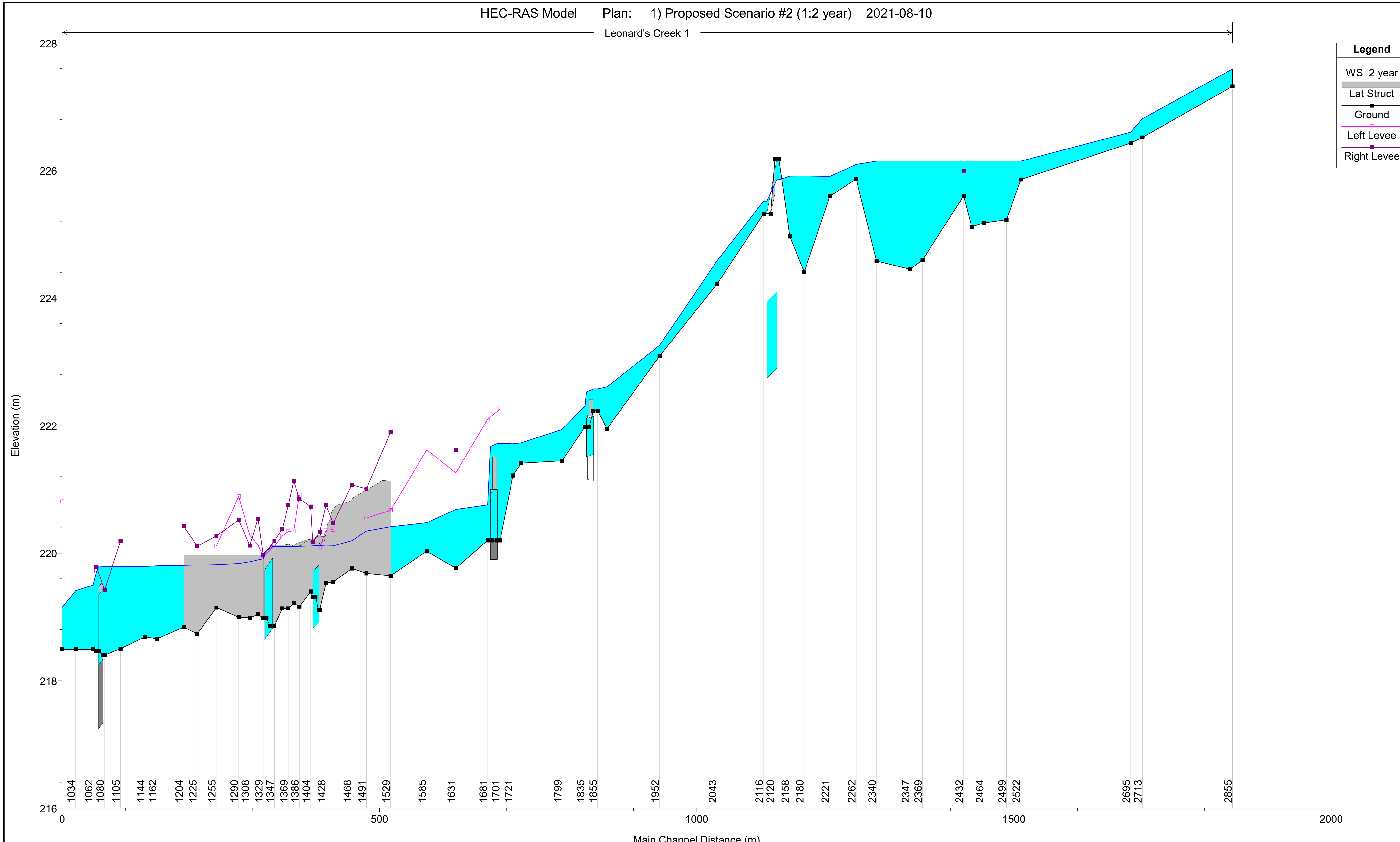

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1067
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Ineff
Bank Sta

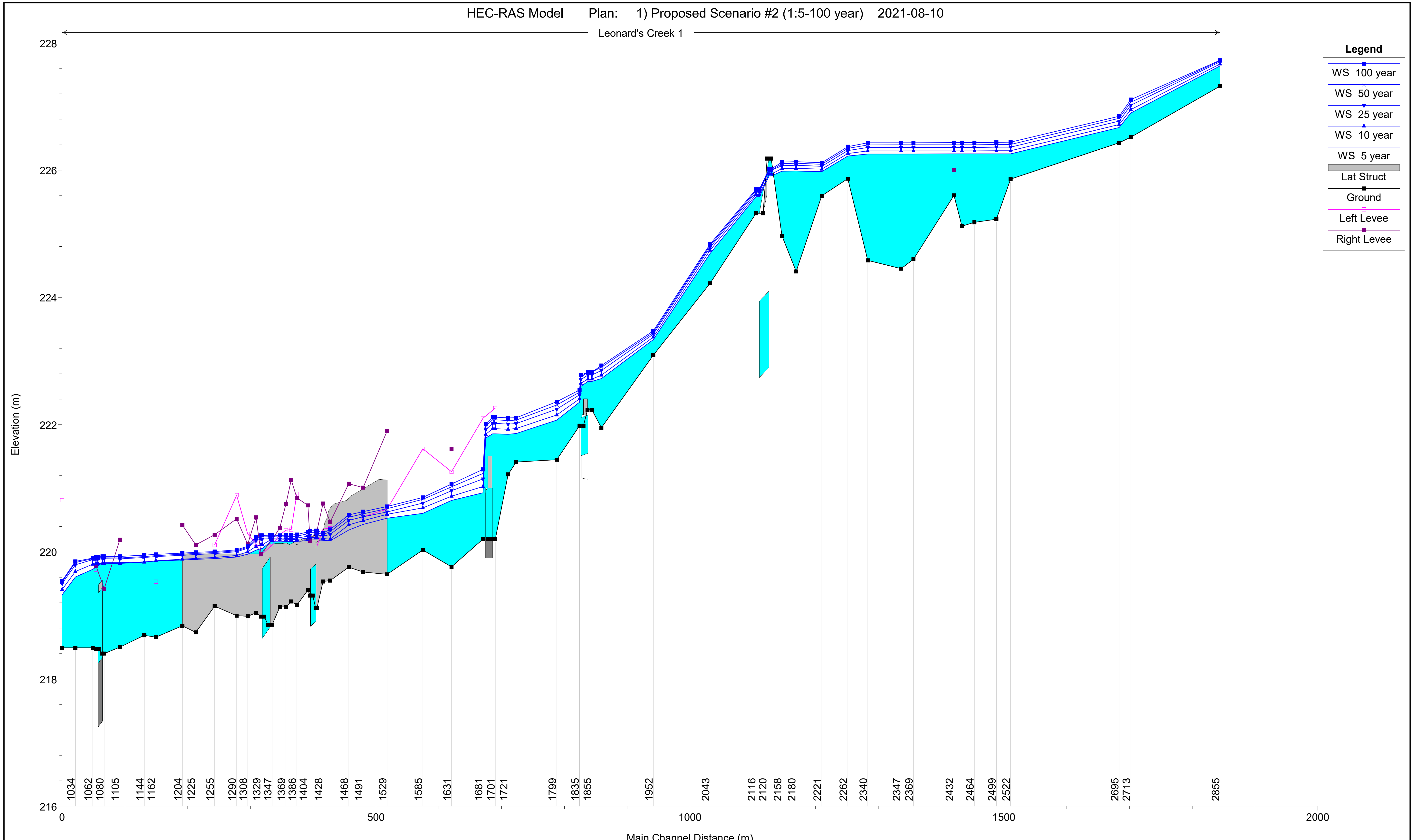

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1062
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1034
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Bank Sta

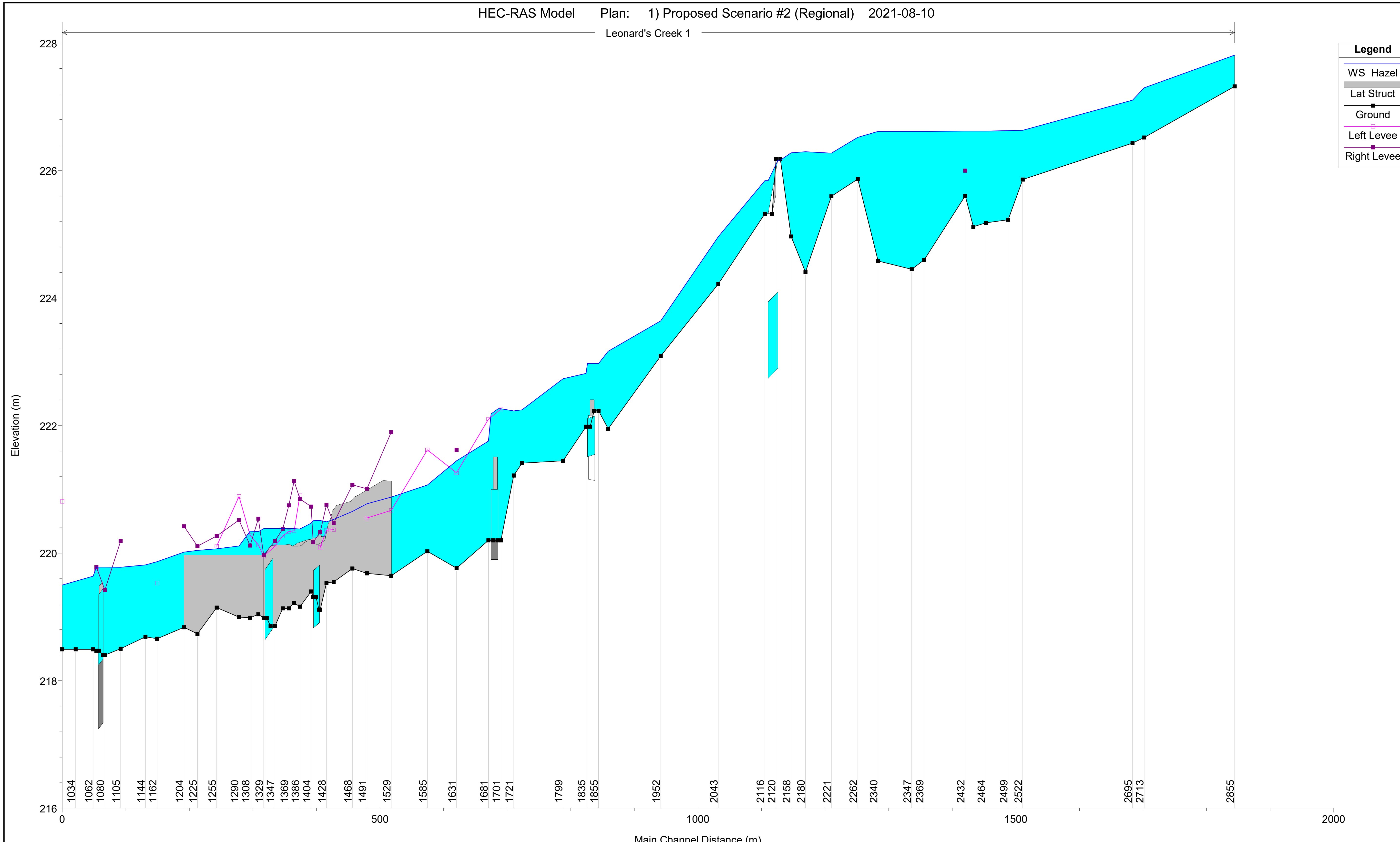

HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10 2) Proposed Scenario #2 (1:2 year) 2021-08-10 3) Proposed Scenario #2 (1:5-100 year) 2021-08-10
RS = 1013
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #2 (1:5-100 year)
WS 50 year - Proposed Scenario #2 (1:5-100 year)
WS 25 year - Proposed Scenario #2 (1:5-100 year)
WS Hazel - Proposed Scenario #2 (Regional)
WS 10 year - Proposed Scenario #2 (1:5-100 year)
WS 5 year - Proposed Scenario #2 (1:5-100 year)
WS 2 year - Proposed Scenario #2 (1:2 year)
Ground
Levee
Bank Sta



HEC-RAS Model Plan: 1) Proposed Scenario #2 (1:2 year) 2021-08-10
Leonard's Creek 1
Legend
WS 2 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
228
226
224
222
220
218
216
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855



HEC-RAS Model Plan: 1) Proposed Scenario #2 (1:5-100 year) 2021-08-10
Leonard's Creek 1
Legend
WS 100 year
WS 50 year
WS 25 year
WS 10 year
WS 5 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855
216
218
220
222
224
226
228
0
500
1000
1500
2000


HEC-RAS Model Plan: 1) Proposed Scenario #2 (Regional) 2021-08-10
Leonard's Creek 1
Legend
WS Hazel
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
216
218
220
222
224
226
228
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855

SUMMARY OF HECRAS WARNINGS – SCENARIO #2

We note that due to the low, flat topography of the study area and high peak flows estimated at each crossing, there are some inconsistencies between the proposed scenarios, and warning errors were observed at the crossings under some of the design storms. A summary of the observed HEC-RAS errors is provided below. Although the developed model is producing warnings at some locations, it provides a general estimate of the flood conditions in the study area. We note that significant additional modelling effort is required in order to produce results with more certainty.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
2-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 2-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 2-year flow profile results.
2-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 2-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 2-year flow profile results.
2-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
5-year	1070	During the culvert inlet control computations, the program could not	The downstream culvert end is 90% submerged under the downstream boundary condition water surface

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
		balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
5-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
5-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
10-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
50-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1070	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
Regional	1335	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
Regional	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	When compared with Existing and Scenario #1 results (where this error doesn't occur) there is minimal change in water surface elevation upstream and downstream of the culvert, indicating that the outlet energy grade is reasonable.
Regional	1410	The weir over culvert is submerged.	Not anticipated to affect results.

Alternative #6

Scenario #3 - Upgrade of All Crossings

HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1428	Hazel	Proposed Scenario #3 (Regional)	45.17	219.53	220.49	220.40	220.54	0.003181	1.50	66.83	203.69	0.51
Leonard's Creek	1	1428	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.53	220.11	219.81	220.12	0.000745	0.50	11.74	43.77	0.22
Leonard's Creek	1	1428	5 year	Proposed Scenario #3 (1:5-100 year)	7.71	219.53	220.18	219.89	220.20	0.001684	0.82	14.71	47.75	0.34
Leonard's Creek	1	1428	10 year	Proposed Scenario #3 (1:5-100 year)	10.67	219.53	220.21	220.01	220.25	0.002538	1.04	16.21	50.61	0.42
Leonard's Creek	1	1428	25 year	Proposed Scenario #3 (1:5-100 year)	14.66	219.53	220.24	220.11	220.30	0.003761	1.31	17.98	63.49	0.52
Leonard's Creek	1	1428	50 year	Proposed Scenario #3 (1:5-100 year)	17.97	219.53	220.27	220.15	220.35	0.004460	1.47	20.27	77.15	0.57
Leonard's Creek	1	1428	100 year	Proposed Scenario #3 (1:5-100 year)	20.73	219.53	220.30	220.19	220.38	0.005097	1.60	22.00	86.19	0.61
Leonard's Creek	1	1418	Hazel	Proposed Scenario #3 (Regional)	42.47	219.11	220.51	220.07	220.51	0.000147	0.38	225.25	341.41	0.11
Leonard's Creek	1	1418	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.11	220.12	219.72	220.12	0.000039	0.15	64.11	220.22	0.05
Leonard's Creek	1	1418	5 year	Proposed Scenario #3 (1:5-100 year)	7.70	219.11	220.19	219.95	220.19	0.000079	0.22	80.00	224.31	0.08
Leonard's Creek	1	1418	10 year	Proposed Scenario #3 (1:5-100 year)	10.60	219.11	220.22	220.02	220.23	0.000111	0.27	88.17	225.93	0.09
Leonard's Creek	1	1418	25 year	Proposed Scenario #3 (1:5-100 year)	14.49	219.11	220.27	220.02	220.27	0.000154	0.33	97.47	229.96	0.11
Leonard's Creek	1	1418	50 year	Proposed Scenario #3 (1:5-100 year)	17.62	219.11	220.30	220.02	220.31	0.000177	0.36	106.20	234.45	0.12
Leonard's Creek	1	1418	100 year	Proposed Scenario #3 (1:5-100 year)	20.24	219.11	220.33	220.02	220.33	0.000094	0.27	164.32	341.41	0.09
Leonard's Creek	1	1410			Culvert									
Leonard's Creek	1	1407	Hazel	Proposed Scenario #3 (Regional)	42.47	219.31	220.51	219.90	220.51	0.000113	0.32	244.95	342.76	0.10
Leonard's Creek	1	1407	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.31	220.11	219.80	220.11	0.000022	0.10	72.63	187.80	0.04
Leonard's Creek	1	1407	5 year	Proposed Scenario #3 (1:5-100 year)	7.70	219.31	220.18	219.82	220.19	0.000026	0.12	134.03	339.09	0.04
Leonard's Creek	1	1407	10 year	Proposed Scenario #3 (1:5-100 year)	10.60	219.31	220.23	219.82	220.23	0.000036	0.15	147.75	340.93	0.05
Leonard's Creek	1	1407	25 year	Proposed Scenario #3 (1:5-100 year)	14.49	219.31	220.26	219.82	220.26	0.000052	0.18	160.37	342.76	0.06
Leonard's Creek	1	1407	50 year	Proposed Scenario #3 (1:5-100 year)	17.62	219.31	220.30	219.82	220.30	0.000060	0.20	173.79	342.76	0.07
Leonard's Creek	1	1407	100 year	Proposed Scenario #3 (1:5-100 year)	20.24	219.31	220.33	219.82	220.33	0.000065	0.21	184.23	342.76	0.07
Leonard's Creek	1	1404	Hazel	Proposed Scenario #3 (Regional)	41.80	219.40	220.47	220.14	220.50	0.001763	1.19	71.60	141.54	0.38
Leonard's Creek	1	1404	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.40	220.11	219.70	220.11	0.000167	0.27	27.49	98.80	0.11
Leonard's Creek	1	1404	5 year	Proposed Scenario #3 (1:5-100 year)	7.70	219.40	220.18	219.79	220.18	0.000390	0.44	34.47	110.60	0.17
Leonard's Creek	1	1404	10 year	Proposed Scenario #3 (1:5-100 year)	10.59	219.40	220.22	219.83	220.22	0.000571	0.56	38.68	116.57	0.21
Leonard's Creek	1	1404	25 year	Proposed Scenario #3 (1:5-100 year)	14.44	219.40	220.25	219.88	220.26	0.000843	0.69	42.46	120.26	0.25
Leonard's Creek	1	1404	50 year	Proposed Scenario #3 (1:5-100 year)	17.51	219.40	220.28	219.92	220.29	0.000952	0.76	46.92	123.41	0.27
Leonard's Creek	1	1404	100 year	Proposed Scenario #3 (1:5-100 year)	20.06	219.40	220.31	219.94	220.32	0.001028	0.81	50.47	125.94	0.28
Leonard's Creek	1	1386	Hazel	Proposed Scenario #3 (Regional)	37.87	219.16	220.38	220.22	220.45	0.002967	1.65	46.33	99.94	0.50
Leonard's Creek	1	1386	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.16	220.11	219.56	220.11	0.000167	0.32	21.72	74.78	0.11
Leonard's Creek	1	1386	5 year	Proposed Scenario #3 (1:5-100 year)	7.64	219.16	220.16	219.68	220.17	0.000443	0.55	26.52	84.60	0.19
Leonard's Creek	1	1386	10 year	Proposed Scenario #3 (1:5-100 year)	10.37	219.16	220.20	219.75	220.21	0.000666	0.69	29.11	86.86	0.23
Leonard's Creek	1	1386	25 year	Proposed Scenario #3 (1:5-100 year)	13.99	219.16	220.21	219.83	220.24	0.001069	0.89	30.81	88.34	0.29
Leonard's Creek	1	1386	50 year	Proposed Scenario #3 (1:5-100 year)	16.64	219.16	220.25	219.87	220.27	0.001238	0.98	33.63	90.62	0.32
Leonard's Creek	1	1386	100 year	Proposed Scenario #3 (1:5-100 year)	18.82	219.16	220.27	219.90	220.30	0.001360	1.04	35.90	92.41	0.33
Leonard's Creek	1	1377	Hazel	Proposed Scenario #3 (Regional)	33.79	219.22	220.38	220.15	220.42	0.001434	1.11	60.09	146.14	0.35
Leonard's Creek	1	1377	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.22	220.11	219.54	220.11	0.000135	0.28	22.44	74.08	0.10
Leonard's Creek	1	1377	5 year	Proposed Scenario #3 (1:5-100 year)	7.36	219.22	220.16	219.65	220.17	0.000329	0.45	26.77	77.76	0.16
Leonard's Creek	1	1377	10 year	Proposed Scenario #3 (1:5-100 year)	9.78	219.22	220.19	219.73	220.20	0.000481	0.56	29.08	79.66	0.19
Leonard's Creek	1	1377	25 year	Proposed Scenario #3 (1:5-100 year)	13.17	219.22	220.21	219.81	220.23	0.000785	0.73	30.45	80.76	0.25
Leonard's Creek	1	1377	50 year	Proposed Scenario #3 (1:5-100 year)	15.34	219.22	220.24	219.87	220.26	0.000885	0.79	32.99	82.73	0.26
Leonard's Creek	1	1377	100 year	Proposed Scenario #3 (1:5-100 year)	17.14	219.22	220.26	219.91	220.29	0.000958	0.84	35.04	84.32	0.28
Leonard's Creek	1	1369	Hazel	Proposed Scenario #3 (Regional)	30.63	219.13	220.38	220.13	220.40	0.001092	0.96	68.41	151.34	0.29
Leonard's Creek	1	1369	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.13	220.10	219.58	220.11	0.000170	0.31	25.35	89.92	0.11
Leonard's Creek	1	1369	5 year	Proposed Scenario #3 (1:5-100 year)	7.16	219.13	220.16	219.80	220.17	0.000366	0.48	30.52	94.08	0.16
Leonard's Creek	1	1369	10 year	Proposed Scenario #3 (1:5-100 year)	9.35	219.13	220.19	219.91	220.20	0.000501	0.58	33.28	96.25	0.19
Leonard's Creek	1	1369	25 year	Proposed Scenario #3 (1:5-100 year)	12.57	219.13	220.21	219.97	220.22	0.000810	0.74	34.80	97.41	0.24
Leonard's Creek	1	1369	50 year	Proposed Scenario #3 (1:5-100 year)	14.40	219.13	220.24	220.00	220.25	0.000851	0.78	37.92	98.90	0.25
Leonard's Creek	1	1369	100 year	Proposed Scenario #3 (1:5-100 year)	15.91	219.13	220.26	220.01	220.28	0.000876	0.80	40.42	99.67	0.25
Leonard's Creek	1	1359	Hazel	Proposed Scenario #3 (Regional)	27.88	219.13	220.38	220.03	220.39	0.000410	0.65	103.62	267.59	0.19
Leonard's Creek	1	1359	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.13	220.10	219.39	220.11	0.000064	0.22	32.65	102.60	0.07
Leonard's Creek	1	1359	5 year	Proposed Scenario #3 (1:5-100 year)	6.94	219.13	220.16	219.48	220.16	0.000143	0.34	38.52	107.92	0.11
Leonard's Creek	1	1359	10 year	Proposed Scenario #3 (1:5-100 year)	8.92	219.13	220.19	219.54	220.19	0.000198	0.40	41.66	110.72	0.13
Leonard's Creek	1	1359	25 year	Proposed Scenario #3 (1:5-100 year)	12.02	219.13	220.20	219.61	220.21	0.000328	0.52	43.33	112.09	0.17
Leonard's Creek	1	1359	50 year	Proposed Scenario #3 (1:5-100 year)	13.55	219.13	220.24	219.65	220.24	0.000345	0.55	46.93	114.93	0.17
Leonard's Creek	1	1359	100 year	Proposed Scenario #3 (1:5-100 year)	14.82	219.13	220.26	219.68	220.27	0.000357	0.57	49.84	117.94	0.17
Leonard's Creek	1	1347	Hazel	Proposed Scenario #3 (Regional)	24.97	218.85	220.38	220.10	220.39	0.000149	0.40	145.26	266.55	0.11
Leonard's Creek	1	1347	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.85	220.10	219.50	220.10	0.000092	0.26	29.86	93.92	0.09
Leonard's Creek	1	1347	5 year	Proposed Scenario #3 (1:5-100 year)	6.62	218.85	220.16	219.66	220.16	0.000183	0.38	35.04	94.02	0.12
Leonard's Creek	1	1347	10 year	Proposed Scenario #3 (1:5-100 year)	8.39	218.85	220.19	219.77	220.19	0.000244	0.45	37.68	94.07	0.14
Leonard's Creek	1	1347	25 year	Proposed Scenario #3 (1:5-100 year)	11.35	218.85	220.21	219.89	220.21	0.000107	0.30	97.61	266.55	0.09
Leonard's Creek	1	1347	50 year	Proposed Scenario #3 (1:5-100 year)	12.56	218.85	220.24	220.01	220.24	0.000101	0.30	106.15	266.55	0.09
Leonard's Creek	1	1347	100 year	Proposed Scenario #3 (1:5-100 year)	13.57	218.85	220.26	220.04	220.26	0.000098	0.30	112.90	266.55	0.09
Leonard's Creek	1	1335			Culvert									
Leonard's Creek	1	1329	Hazel	Proposed Scenario #3 (Regional)	24.97	218.98	220.38	219.97	220.38	0.000068	0.24	178.15	246.27	0.08
Leonard's Creek	1	1329	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.98	219.91	219.51	219.92	0.000408	0.40	14.44	57.52	0.17
Leonard's Creek	1	1329	5 year	Proposed Scenario #3 (1:5-100 year)	6.62	218.98	220.05	219.64	220.05	0.000033	0.13	96.83	243.52	0.05
Leonard's Creek	1	1329	10 year	Proposed Scenario #3 (1:5-100 year)	8.39	218.98	220.11	219.70	220.11	0.000034	0.14	111.58	245.16	0.05
Leonard's Creek	1	1329	25 year	Proposed Scenario #3 (1:5-100 year)	11.35	218.98	220.20	219.79	220.20	0.000035	0.15	134.11	246.27	0.05
Leonard's Creek	1	1329	50 year	Proposed Scenario #3 (1:5-100 year)	12.56	218.98	220.23	219.82	220.24	0.000036	0.16	141.99	246.27	0.05
Leonard's Creek	1	1329	100 year	Proposed Scenario #3 (1:5-100 year)	13.57	218.98	220.26	219.85	220.26	0.000036	0.16	148.56	246.27	0.05
Leonard's Creek	1	1321	Hazel	Proposed Scenario #3 (Regional)	22.99	219.04	220.34	220.05	220.36	0.001315	0.93	41.69	99.08	0.32
Leonard's Creek	1	1321	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.04	219.90	219.56	219.91	0.001063	0.52	8.75	34.35	0.26
Leonard's Creek	1	1321	5 year	Proposed Scenario #3 (1:5-100 year)	6.48	219.04	220.03	219.68	220.04	0.000960	0.59	14.56	55.38	0.25
Leonard's Creek	1	1321	10 year	Proposed Scenario #3 (1:5-100 year)	8.03	219.04	220.08	219.75	220.10	0.000961	0.63	17.94	61.77	0.26
Leonard's Creek	1	1321	25 year	Proposed Scenario #3 (1:5-100 year)	10.52	219.04	220.18	219.83	220.19	0.000827	0.65	26.37	94.38	0.25
Leonard's Creek	1	1321	50 year	Proposed Scenario #3 (1:5-100 year)	11.54	219.04	220.21	219.87	220.23	0.000772	0.64	29.52	95.09	0.24
Leonard's Creek	1	1321	100 year	Proposed Scenario #3 (1:5-100 year)	12.38	219.04	220.24	219.89	220.25	0.000726	0.64	32.16	95.70	0.23
Leonard's Creek	1	1308	Hazel	Proposed Scenario #3 (Regional)	20.91	218.99	220.34	220.07	220.35	0.000246	0.46	90.85	184.22	0.14
Leonard's Creek	1	1308	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.99	219.86	219.47	219.89	0.001281	0.71	5.54	9.63	0.29
Leonard's Creek	1	1308	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	218.99	219.96	219.61	220.01	0.002114	1.00	6.50	10.00	0.39
Leonard's Creek	1	1308	10 year	Proposed Scenario #3 (1:5-100 year)	7.84	218.99	220.00	219.67	220.07	0.002635	1.15	6.87	10.13	0.43
Leonard's Creek	1	1308	25 year	Proposed Scenario #3 (1:5-100 year)	10.00	218.99	220.06	219.75	220.15	0.003276	1.35	7.47	10.36	0.49
Leonard's Creek	1	1308	50 year	Proposed Scenario #3 (1:5-100 year)	10.87	218.99	220.07	219.79	220.18	0.003616	1.44	7.64	10.57	0.52
Leonard's Creek	1	1308	100 year	Proposed Scenario #3 (1:5-100 year)	11.59	218.99	220.09	219.81	220.20	0.003887	1.51	7.79	11.50	0.54
Leonard's Creek	1	1290	Hazel	Proposed Scenario #3 (Regional)	19.21	219.00	220.11	220.08	220.31	0.007578	2.13	11.74	27.60	0.75

Alternative #6

Scenario #3 - Upgrade of All Crossings

HEC-RAS Locations: User Defined (Continued)

River	Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Leonard's Creek	1	1290	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.00	219.84	219.51	219.86	0.001503	0.74	5.31	11.13	0.31
Leonard's Creek	1	1290	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	219.00	219.92	219.62	219.97	0.002576	1.04	6.83	23.39	0.42
Leonard's Creek	1	1290	10 year	Proposed Scenario #3 (1:5-100 year)	7.83	219.00	219.94	219.68	220.01	0.003273	1.20	7.43	24.00	0.47
Leonard's Creek	1	1290	25 year	Proposed Scenario #3 (1:5-100 year)	9.80	219.00	220.00	219.75	220.09	0.003555	1.33	8.95	25.38	0.50
Leonard's Creek	1	1290	50 year	Proposed Scenario #3 (1:5-100 year)	10.60	219.00	220.02	219.78	220.11	0.003843	1.40	9.30	25.69	0.52
Leonard's Creek	1	1290	100 year	Proposed Scenario #3 (1:5-100 year)	11.26	219.00	220.03	219.80	220.13	0.004023	1.45	9.63	25.97	0.54
Leonard's Creek	1	1255	Hazel	Proposed Scenario #3 (Regional)	18.20	219.15	220.06	219.86	220.13	0.002536	1.27	20.82	56.33	0.44
Leonard's Creek	1	1255	2 year	Proposed Scenario #3 (1:2 year)	3.89	219.15	219.82	219.41	219.83	0.000527	0.47	10.44	34.94	0.19
Leonard's Creek	1	1255	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	219.15	219.89	219.50	219.91	0.000878	0.65	13.05	37.14	0.25
Leonard's Creek	1	1255	10 year	Proposed Scenario #3 (1:5-100 year)	7.83	219.15	219.91	219.54	219.94	0.001153	0.75	13.77	39.05	0.29
Leonard's Creek	1	1255	25 year	Proposed Scenario #3 (1:5-100 year)	9.73	219.15	219.98	219.60	220.00	0.001194	0.81	16.52	45.78	0.30
Leonard's Creek	1	1255	50 year	Proposed Scenario #3 (1:5-100 year)	10.45	219.15	219.99	219.62	220.02	0.001275	0.85	17.11	47.25	0.31
Leonard's Creek	1	1255	100 year	Proposed Scenario #3 (1:5-100 year)	11.02	219.15	220.00	219.64	220.03	0.001313	0.87	17.74	48.56	0.31
Leonard's Creek	1	1225	Hazel	Proposed Scenario #3 (Regional)	17.68	218.73	220.04	219.60	220.07	0.001106	0.93	33.11	102.40	0.30
Leonard's Creek	1	1225	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.73	219.81	219.19	219.82	0.000223	0.36	14.65	63.70	0.13
Leonard's Creek	1	1225	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	218.73	219.88	219.29	219.89	0.000401	0.50	19.45	77.62	0.17
Leonard's Creek	1	1225	10 year	Proposed Scenario #3 (1:5-100 year)	7.83	218.73	219.90	219.34	219.91	0.000537	0.59	20.62	78.77	0.20
Leonard's Creek	1	1225	25 year	Proposed Scenario #3 (1:5-100 year)	9.73	218.73	219.96	219.39	219.98	0.000535	0.62	26.02	83.91	0.20
Leonard's Creek	1	1225	50 year	Proposed Scenario #3 (1:5-100 year)	10.42	218.73	219.97	219.41	219.99	0.000568	0.64	27.05	88.04	0.21
Leonard's Creek	1	1225	100 year	Proposed Scenario #3 (1:5-100 year)	10.94	218.73	219.99	219.42	220.00	0.000577	0.65	28.27	93.21	0.21
Leonard's Creek	1	1204	Hazel	Proposed Scenario #3 (Regional)	17.43	218.84	220.01	219.71	220.04	0.001333	1.08	35.05	109.11	0.34
Leonard's Creek	1	1204	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.84	219.81	219.26	219.81	0.000274	0.42	17.56	59.83	0.15
Leonard's Creek	1	1204	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	218.84	219.87	219.36	219.88	0.000481	0.59	21.63	67.66	0.20
Leonard's Creek	1	1204	10 year	Proposed Scenario #3 (1:5-100 year)	7.83	218.84	219.88	219.41	219.90	0.000658	0.70	22.47	77.65	0.23
Leonard's Creek	1	1204	25 year	Proposed Scenario #3 (1:5-100 year)	9.73	218.84	219.95	219.47	219.97	0.000649	0.72	28.49	100.31	0.23
Leonard's Creek	1	1204	50 year	Proposed Scenario #3 (1:5-100 year)	10.42	218.84	219.96	219.49	219.98	0.000683	0.75	29.67	102.36	0.24
Leonard's Creek	1	1204	100 year	Proposed Scenario #3 (1:5-100 year)	10.93	218.84	219.98	219.50	219.99	0.000682	0.76	31.07	104.37	0.24
Leonard's Creek	1	1162	Hazel	Proposed Scenario #3 (Regional)	14.31	218.66	219.86	219.53	219.95	0.003347	1.63	19.68	116.04	0.52
Leonard's Creek	1	1162	2 year	Proposed Scenario #3 (1:2 year)	3.89	218.66	219.80	219.21	219.80	0.000151	0.33	21.58	82.35	0.11
Leonard's Creek	1	1162	5 year	Proposed Scenario #3 (1:5-100 year)	6.44	218.66	219.86	219.32	219.86	0.000372	0.54	27.35	134.64	0.17
Leonard's Creek	1	1162	10 year	Proposed Scenario #3 (1:5-100 year)	7.83	218.66	219.86	219.37	219.87	0.000528	0.65	27.99	135.37	0.21
Leonard's Creek	1	1162	25 year	Proposed Scenario #3 (1:5-100 year)	9.73	218.66	219.93	219.42	219.94	0.000451	0.63	37.95	147.65	0.19
Leonard's Creek	1	1162	50 year	Proposed Scenario #3 (1:5-100 year)	10.42	218.66	219.94	219.46	219.95	0.000473	0.65	39.53	148.45	0.20
Leonard's Creek	1	1162	100 year	Proposed Scenario #3 (1:5-100 year)	10.93	218.66	219.96	219.47	219.97	0.000464	0.65	41.62	149.33	0.20
Leonard's Creek	1	1144	Hazel	Proposed Scenario #3 (Regional)	10.65	218.69	219.80	219.80	219.88	0.004128	1.62	16.42	103.80	0.55
Leonard's Creek	1	1144	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.69	219.79		219.80	0.000478	0.55	18.59	114.65	0.19
Leonard's Creek	1	1144	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.69	219.84		219.85	0.000764	0.72	24.78	128.50	0.24
Leonard's Creek	1	1144	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.69	219.84		219.86	0.001182	0.89	24.30	127.72	0.29
Leonard's Creek	1	1144	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.69	219.92		219.93	0.000806	0.78	35.04	141.92	0.25
Leonard's Creek	1	1144	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.69	219.93		219.94	0.000845	0.80	36.49	143.82	0.25
Leonard's Creek	1	1144	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.69	219.94		219.95	0.000813	0.79	38.63	146.28	0.25
Leonard's Creek	1	1105	Hazel	Proposed Scenario #3 (Regional)	6.41	218.50	219.78	219.14	219.79	0.000391	0.51	19.25	52.54	0.17
Leonard's Creek	1	1105	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.50	219.79	219.00	219.79	0.000124	0.29	23.02	70.58	0.10
Leonard's Creek	1	1105	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.50	219.83	219.15	219.84	0.000258	0.43	26.09	72.34	0.14
Leonard's Creek	1	1105	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.50	219.82	219.23	219.83	0.000410	0.53	25.31	71.83	0.18
Leonard's Creek	1	1105	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.50	219.90	219.34	219.91	0.000396	0.55	31.05	74.12	0.18
Leonard's Creek	1	1105	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.50	219.91	219.35	219.92	0.000435	0.58	31.64	74.30	0.19
Leonard's Creek	1	1105	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.50	219.92	219.37	219.93	0.000444	0.60	32.69	74.66	0.19
Leonard's Creek	1	1080	Hazel	Proposed Scenario #3 (Regional)	4.65	218.40	219.78	219.11	219.78	0.000039	0.16	70.73	232.21	0.05
Leonard's Creek	1	1080	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.40	219.79	219.06	219.79	0.000025	0.13	74.09	242.25	0.04
Leonard's Creek	1	1080	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.40	219.83	219.24	219.83	0.000047	0.19	84.64	242.30	0.06
Leonard's Creek	1	1080	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.40	219.82	219.30	219.82	0.000076	0.24	82.10	242.28	0.08
Leonard's Creek	1	1080	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.40	219.90	219.38	219.90	0.000063	0.23	101.42	248.72	0.07
Leonard's Creek	1	1080	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.40	219.91	219.41	219.91	0.000069	0.24	103.47	249.29	0.07
Leonard's Creek	1	1080	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.40	219.92	219.42	219.92	0.000069	0.24	107.01	250.15	0.08
Leonard's Creek	1	1070			Culvert									
Leonard's Creek	1	1067	Hazel	Proposed Scenario #3 (Regional)	4.65	218.47	219.78	219.78	219.78	0.000149	0.20	49.78	233.14	0.09
Leonard's Creek	1	1067	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.47	219.70	219.70	219.79	0.009906	1.44	4.38	32.24	0.68
Leonard's Creek	1	1067	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.47	219.76	219.76	219.83	0.009249	1.51	8.26	49.73	0.67
Leonard's Creek	1	1067	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.47	219.82	219.78	219.82	0.000282	0.28	58.97	246.35	0.12
Leonard's Creek	1	1067	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.47	219.89	219.78	219.89	0.000190	0.25	76.52	248.62	0.10
Leonard's Creek	1	1067	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.47	219.91	219.78	219.91	0.000186	0.25	80.51	249.12	0.10
Leonard's Creek	1	1067	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.47	219.92	219.78	219.92	0.000179	0.25	84.09	249.56	0.10
Leonard's Creek	1	1062	Hazel	Proposed Scenario #3 (Regional)	4.65	218.49	219.63	219.09	219.64	0.000647	0.58	12.27	86.05	0.22
Leonard's Creek	1	1062	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.49	219.50		219.52	0.001073	0.65	6.02	10.62	0.27
Leonard's Creek	1	1062	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.49	219.72	219.19	219.74	0.000552	0.58	21.98	118.48	0.20
Leonard's Creek	1	1062	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.49	219.80		219.81	0.000404	0.53	32.16	135.05	0.18
Leonard's Creek	1	1062	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.49	219.88		219.88	0.000381	0.54	43.07	168.07	0.17
Leonard's Creek	1	1062	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.49	219.89		219.90	0.000385	0.55	45.79	170.72	0.18
Leonard's Creek	1	1062	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.49	219.91		219.92	0.000375	0.55	48.35	172.15	0.17
Leonard's Creek	1	1034	Hazel	Proposed Scenario #3 (Regional)	4.65	218.49	219.56		219.61	0.001829	1.00	5.06	14.09	0.36
Leonard's Creek	1	1034	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.49	219.41		219.47	0.002669	1.06	3.81	7.06	0.42
Leonard's Creek	1	1034	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.49	219.60		219.69	0.002841	1.30	6.10	26.00	0.45
Leonard's Creek	1	1034	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.49	219.69	219.35	219.77	0.002613	1.33	8.89	43.49	0.44
Leonard's Creek	1	1034	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.49	219.80	219.45	219.85	0.001879	1.21	20.20	150.46	0.38
Leonard's Creek	1	1034	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.49	219.83	219.49	219.87	0.001461	1.10	26.13	170.37	0.34
Leonard's Creek	1	1034	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.49	219.86	219.51	219.89	0.001239	1.02	30.99	204.10	0.31
Leonard's Creek	1	1013	Hazel	Proposed Scenario #3 (Regional)	4.65	218.49	219.50	219.20	219.55	0.003321	1.04	4.65	10.73	0.45
Leonard's Creek	1	1013	2 year	Proposed Scenario #3 (1:2 year)	3.93	218.49	219.15	219.14	219.34	0.017479	1.91	2.06	5.23	0.97
Leonard's Creek	1	1013	5 year	Proposed Scenario #3 (1:5-100 year)	6.51	218.49	219.33	219.33	219.55	0.017342	2.10	3.10	7.09	1.00
Leonard's Creek	1	1013	10 year	Proposed Scenario #3 (1:5-100 year)	7.94	218.49	219.41	219.41	219.64	0.016292	2.14	3.77	8.79	0.98
Leonard's Creek	1	1013	25 year	Proposed Scenario #3 (1:5-100 year)	9.90	218.49	219.50	219.50	219.75	0.014973	2.20	4.66	10.75	0.96
Leonard's Creek	1	1013	50 year	Proposed Scenario #3 (1:5-100 year)	10.62	218.49	219.53	219.53	219.78	0.014414	2.24	4.97	11.43	0.95
Leonard's Creek	1	1013	100 year	Proposed Scenario #3 (1:5-100 year)	11.17	218.49	219.55	219.55	219.81	0.014167	2.27	5.20	11.88	0.95

Alternative #6

Scenario #3 - Upgrade of All Crossings

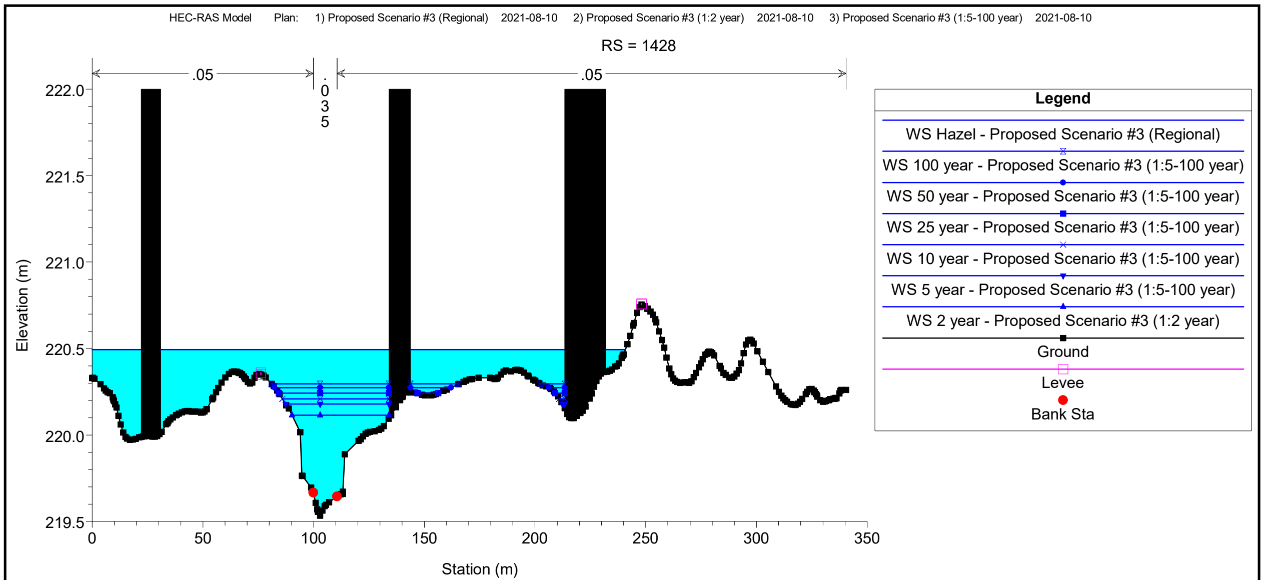
HEC-RAS Locations: User Defined

River	Reach	River Sta	Profile	Plan	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
					(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
Leonard's Creek	1	1410 Culvert #1	Hazel	Proposed Scenario #3 (Regional)	220.51	220.51	219.09	220.51	220.02	0.13	52.43	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #2	Hazel	Proposed Scenario #3 (Regional)	220.51	220.51	219.19	220.51	220.02	0.13	52.43	0.00	0.20	0.20
Leonard's Creek	1	1410 Culvert #1	2 year	Proposed Scenario #3 (1:2 year)	220.12	220.12	219.09	220.12	220.02	0.13	3.64	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #2	2 year	Proposed Scenario #3 (1:2 year)	220.12	220.12	219.18	220.12	220.02	0.12	3.64	0.00	0.20	0.20
Leonard's Creek	1	1410 Culvert #1	5 year	Proposed Scenario #3 (1:5-100 year)	220.19	220.19	219.10	220.19	220.02	0.14	7.41	0.00	0.11	0.11
Leonard's Creek	1	1410 Culvert #2	5 year	Proposed Scenario #3 (1:5-100 year)	220.19	220.19	219.21	220.19	220.02	0.14	7.41	0.00	0.22	0.22
Leonard's Creek	1	1410 Culvert #1	10 year	Proposed Scenario #3 (1:5-100 year)	220.23	220.22	219.00	220.23	220.02	0.04	10.53	0.00	0.03	0.03
Leonard's Creek	1	1410 Culvert #2	10 year	Proposed Scenario #3 (1:5-100 year)	220.23	220.22	219.05	220.23	220.02	0.04	10.53	0.00	0.06	0.06
Leonard's Creek	1	1410 Culvert #1	25 year	Proposed Scenario #3 (1:5-100 year)	220.27	220.27	219.11	220.26	220.02	0.16	14.17	0.00	0.12	0.12
Leonard's Creek	1	1410 Culvert #2	25 year	Proposed Scenario #3 (1:5-100 year)	220.27	220.27	219.22	220.27	220.02	0.16	14.17	0.00	0.25	0.25
Leonard's Creek	1	1410 Culvert #1	50 year	Proposed Scenario #3 (1:5-100 year)	220.30	220.30	219.09	220.30	220.02	0.13	17.36	0.00	0.10	0.10
Leonard's Creek	1	1410 Culvert #2	50 year	Proposed Scenario #3 (1:5-100 year)	220.30	220.30	219.19	220.31	220.02	0.13	17.36	0.00	0.21	0.21
Leonard's Creek	1	1410 Culvert #1	100 year	Proposed Scenario #3 (1:5-100 year)	220.33	220.33	219.05	220.33	220.02	0.08	14.03	0.00	0.06	0.06
Leonard's Creek	1	1410 Culvert #2	100 year	Proposed Scenario #3 (1:5-100 year)	220.33	220.33	219.12	220.33	220.02	0.08	14.03	0.00	0.12	0.12
Leonard's Creek	1	1335 Culvert #1	Hazel	Proposed Scenario #3 (Regional)	220.39	220.38	220.38	220.39	220.10	0.61	24.37	0.00	0.19	0.19
Leonard's Creek	1	1335 Culvert #1	2 year	Proposed Scenario #3 (1:2 year)	220.10	220.10	219.63	220.10	220.10	3.89	1.74	0.19	1.23	1.23
Leonard's Creek	1	1335 Culvert #1	5 year	Proposed Scenario #3 (1:5-100 year)	220.16	220.16	220.07	220.16	220.11	2.94	3.68	0.11	0.93	0.93
Leonard's Creek	1	1335 Culvert #1	10 year	Proposed Scenario #3 (1:5-100 year)	220.19	220.19	220.12	220.19	220.11	2.49	4.83	0.07	0.79	0.79
Leonard's Creek	1	1335 Culvert #1	25 year	Proposed Scenario #3 (1:5-100 year)	220.21	220.21	220.20	220.21	220.11	0.46	10.89	0.00	0.14	0.14
Leonard's Creek	1	1335 Culvert #1	50 year	Proposed Scenario #3 (1:5-100 year)	220.24	220.24	220.24	220.24	220.11	0.48	12.09	0.00	0.15	0.15
Leonard's Creek	1	1335 Culvert #1	100 year	Proposed Scenario #3 (1:5-100 year)	220.26	220.26	220.26	220.26	220.11	0.37	13.21	0.00	0.12	0.12
Leonard's Creek	1	1070 Culvert #1	Hazel	Proposed Scenario #3 (Regional)	219.78	219.78	219.22	219.78	219.67	0.46	4.19	0.00	0.13	0.13
Leonard's Creek	1	1070 Culvert #1	2 year	Proposed Scenario #3 (1:2 year)	219.79	219.79	219.11	219.79	219.67	0.30	3.63	0.08	0.08	0.08
Leonard's Creek	1	1070 Culvert #1	5 year	Proposed Scenario #3 (1:5-100 year)	219.83	219.83	219.50	219.83	219.67	0.46	6.05	0.07	0.12	0.12
Leonard's Creek	1	1070 Culvert #1	10 year	Proposed Scenario #3 (1:5-100 year)	219.82	219.82	219.75	219.82	219.67	0.47	7.47	0.00	0.13	0.13
Leonard's Creek	1	1070 Culvert #1	25 year	Proposed Scenario #3 (1:5-100 year)	219.90	219.90	219.90	219.89	219.67	8.51	1.39	0.01	2.32	2.32
Leonard's Creek	1	1070 Culvert #1	50 year	Proposed Scenario #3 (1:5-100 year)	219.91	219.91	219.91	219.91	219.67	8.54	2.08	0.00	2.33	2.33
Leonard's Creek	1	1070 Culvert #1	100 year	Proposed Scenario #3 (1:5-100 year)	219.92	219.92	219.92	219.92	219.67	0.49	10.68	0.00	0.13	0.13

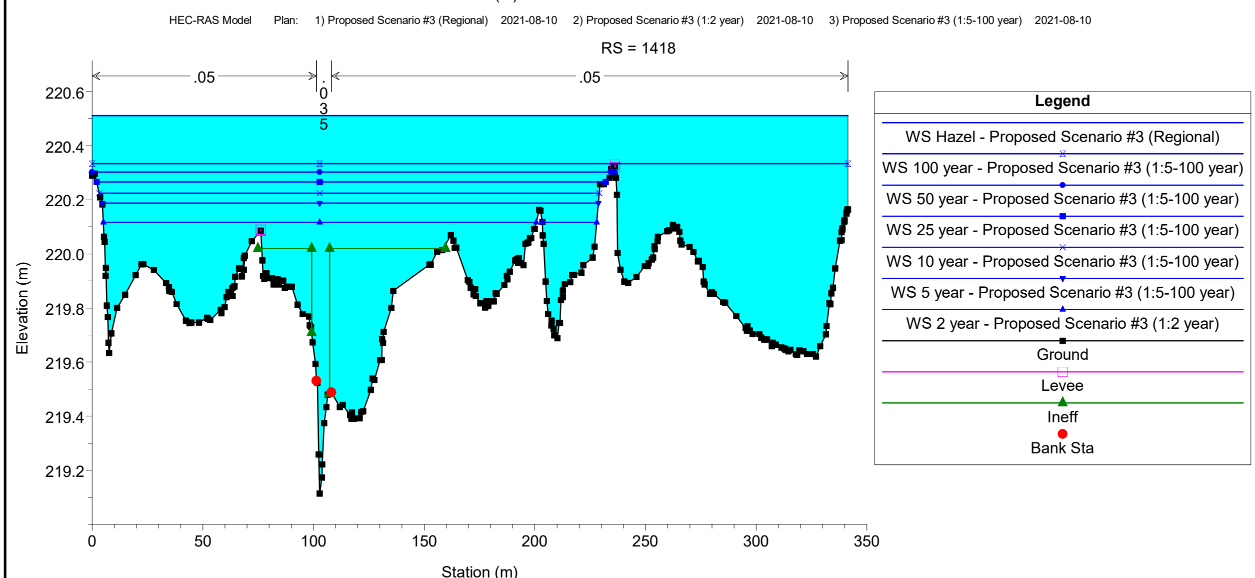
Alternative #6
Scenario #3 - Upgrade of All Crossings

HEC-RAS   River: Leonard's Creek   Reach: 1

Reach	River Sta	Profile	Plan	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
				(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
1	1529.2	Hazel	Proposed Scenario #3 (Regional)	43.86	13.62	24.97	13.62		161.69	0.43	0.28	219.95	220.92	220.88	220.38	220.38
1	1529.2	5 year	Proposed Scenario #3 (1:5-100 year)	7.54	0.59	6.62	0.59		137.72	0.10	0.04	219.95	220.54	220.53	220.05	220.05
1	1529.2	10 year	Proposed Scenario #3 (1:5-100 year)	10.43	1.46	8.39	1.46		154.22	0.16	0.07	219.95	220.61	220.59	220.11	220.11
1	1529.2	25 year	Proposed Scenario #3 (1:5-100 year)	14.33	2.23	11.35	2.23		154.87	0.25	0.10	219.95	220.65	220.63	220.20	220.20
1	1529.2	50 year	Proposed Scenario #3 (1:5-100 year)	17.56	3.69	12.56	3.69		155.49	0.28	0.13	219.95	220.71	220.68	220.24	220.23
1	1529.2	100 year	Proposed Scenario #3 (1:5-100 year)	20.25	5.00	13.57	5.00		155.90	0.31	0.16	219.95	220.74	220.71	220.26	220.26
1	1429	Hazel	Proposed Scenario #3 (Regional)	45.37	14.07	17.43	14.07		186.63	0.40	0.21	219.97	220.54	220.50	220.04	220.01
1	1429	2 year	Proposed Scenario #3 (1:2 year)	3.89	0.12	3.89	0.12		24.05	0.07	0.04	219.97	220.12	220.11	219.81	219.81
1	1429	5 year	Proposed Scenario #3 (1:5-100 year)	7.71	0.67	6.44	0.67		62.48	0.13	0.07	219.97	220.21	220.18	219.88	219.87
1	1429	10 year	Proposed Scenario #3 (1:5-100 year)	10.67	1.36	7.83	1.36		77.77	0.16	0.09	219.97	220.25	220.21	219.90	219.88
1	1429	25 year	Proposed Scenario #3 (1:5-100 year)	14.66	2.70	9.73	2.70		126.14	0.22	0.09	219.97	220.31	220.24	219.97	219.95
1	1429	50 year	Proposed Scenario #3 (1:5-100 year)	17.97	3.83	10.42	3.83		164.78	0.26	0.10	219.97	220.35	220.28	219.98	219.96
1	1429	100 year	Proposed Scenario #3 (1:5-100 year)	20.73	4.98	10.93	4.98		186.63	0.28	0.10	219.97	220.39	220.30	219.99	219.98
1	1176	Hazel	Proposed Scenario #3 (Regional)	17.43	13.36	4.65	13.36		113.04	0.34	0.25	219.51	219.98	219.91	219.78	219.78



HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1428
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta



HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1418
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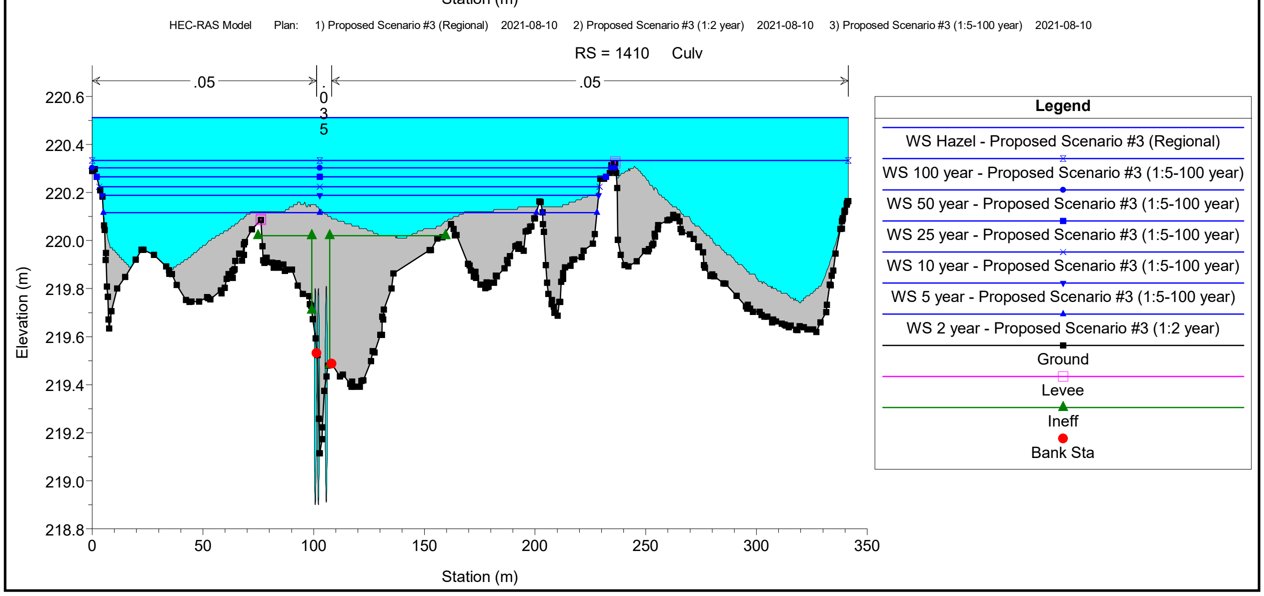
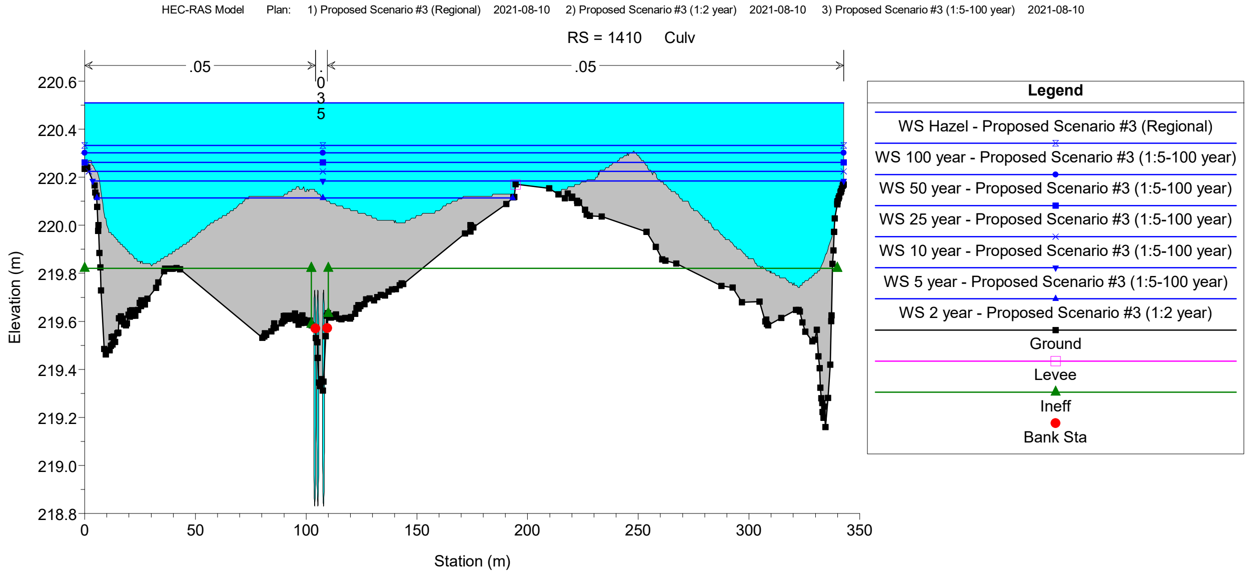
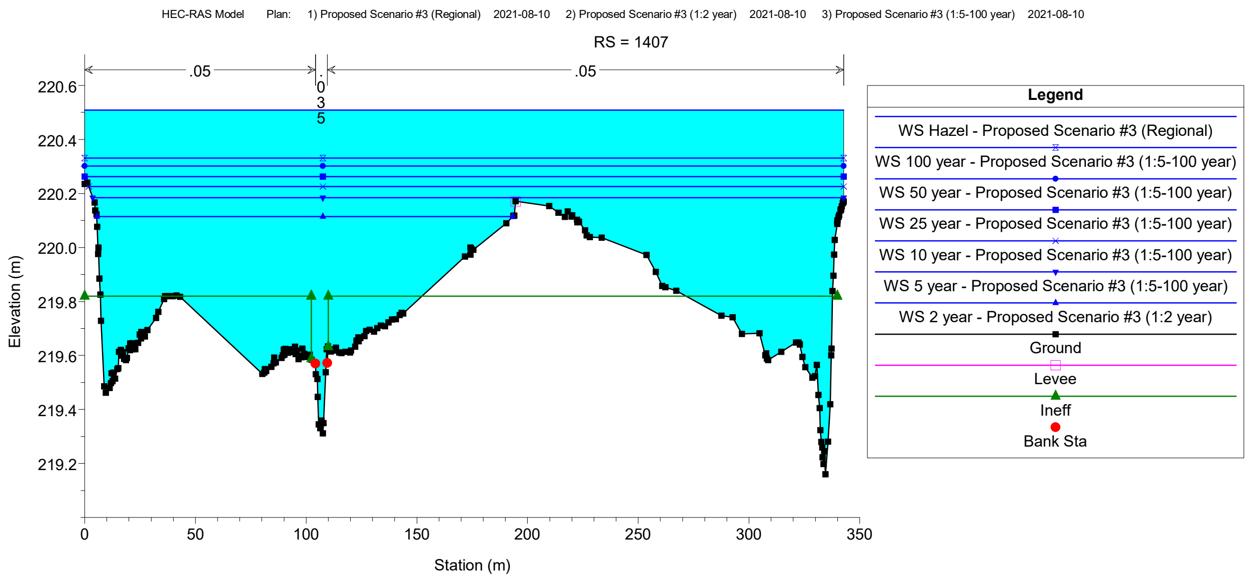
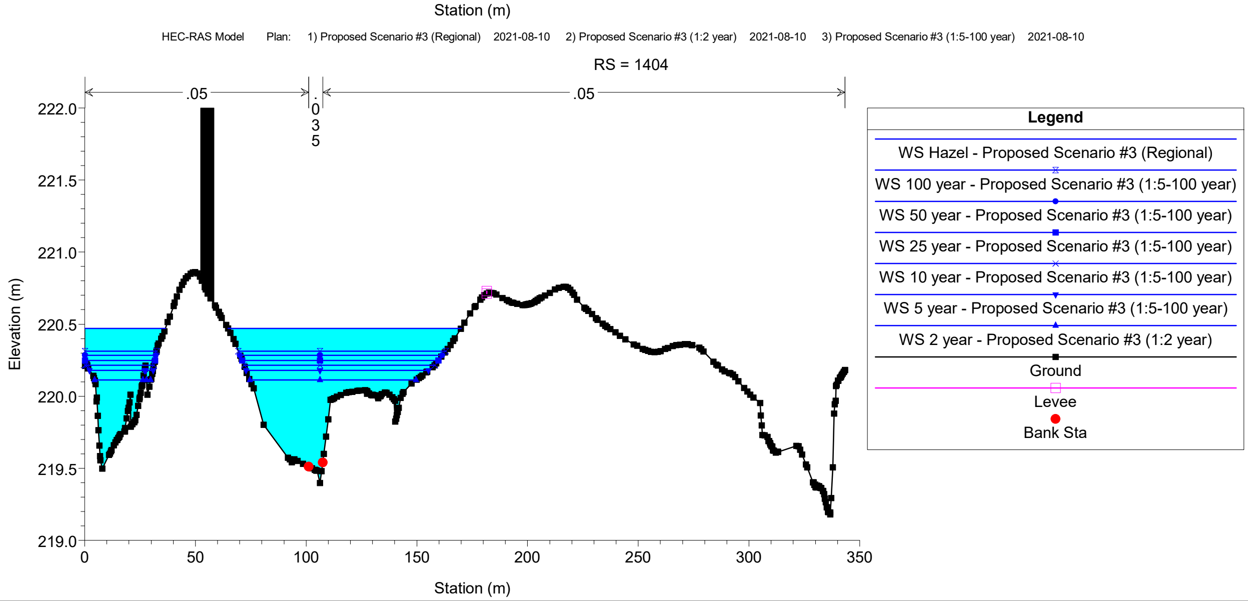
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

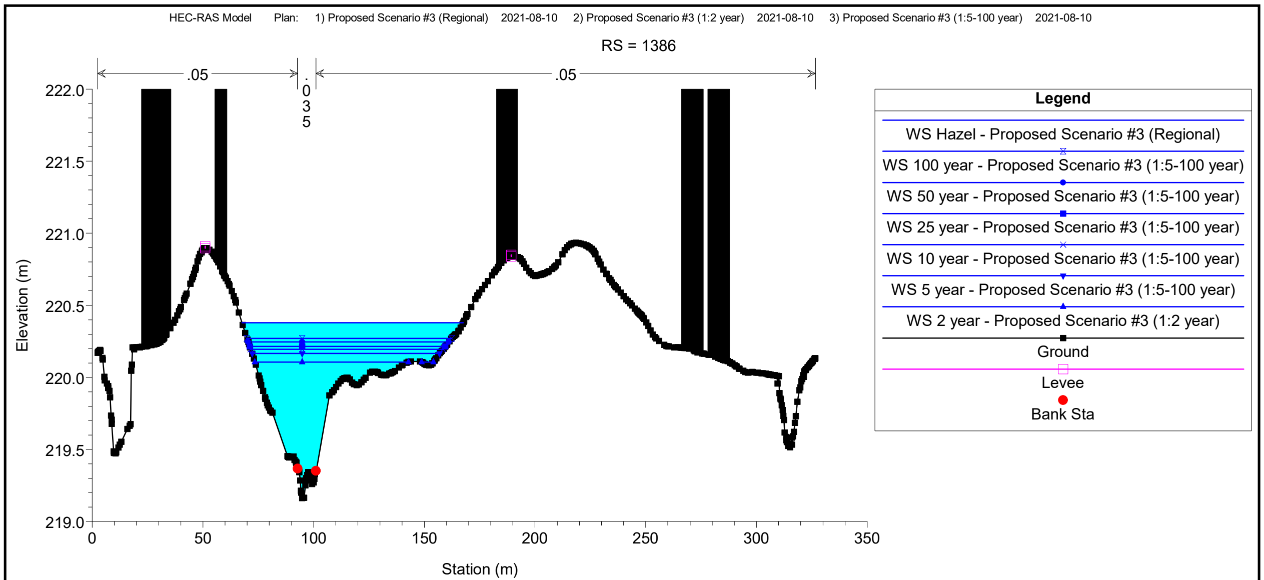


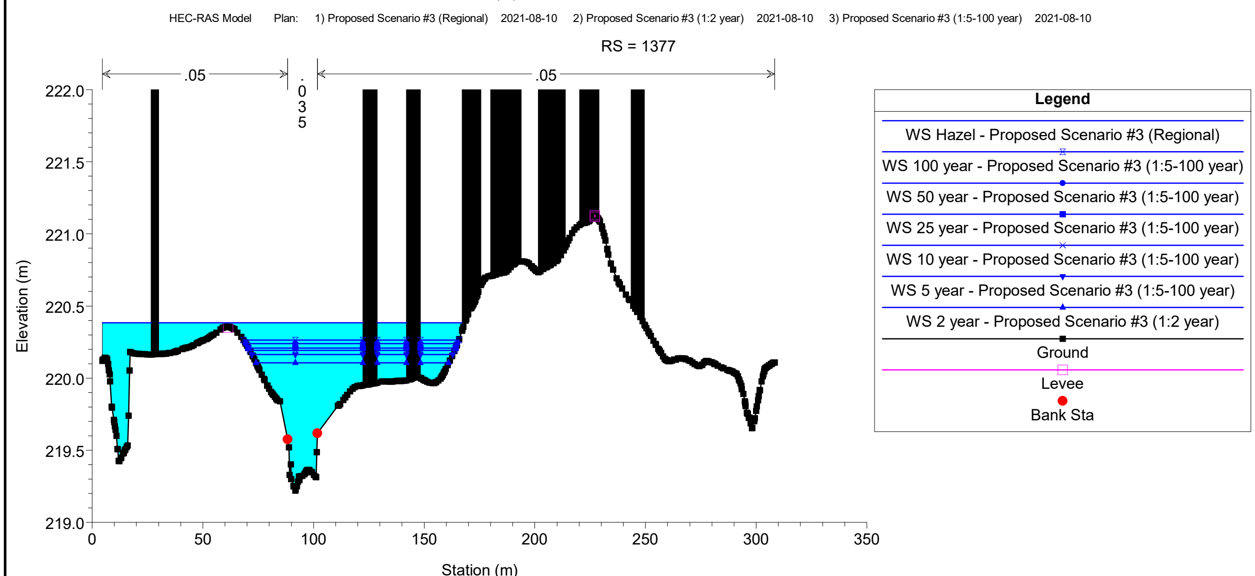
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

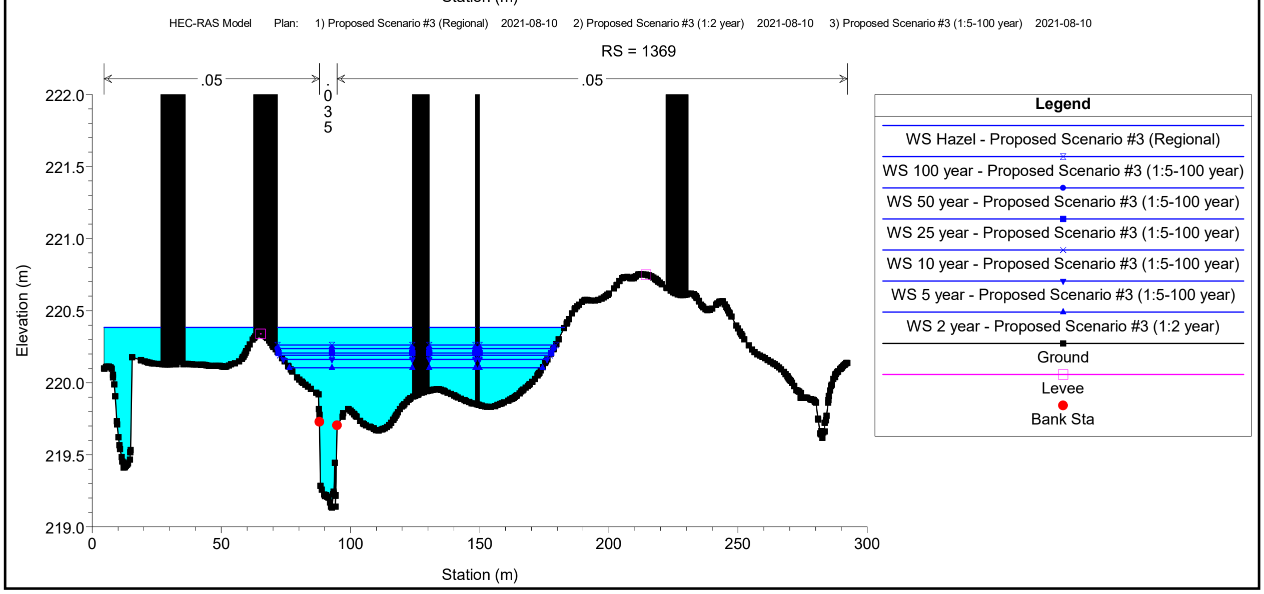

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1410 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

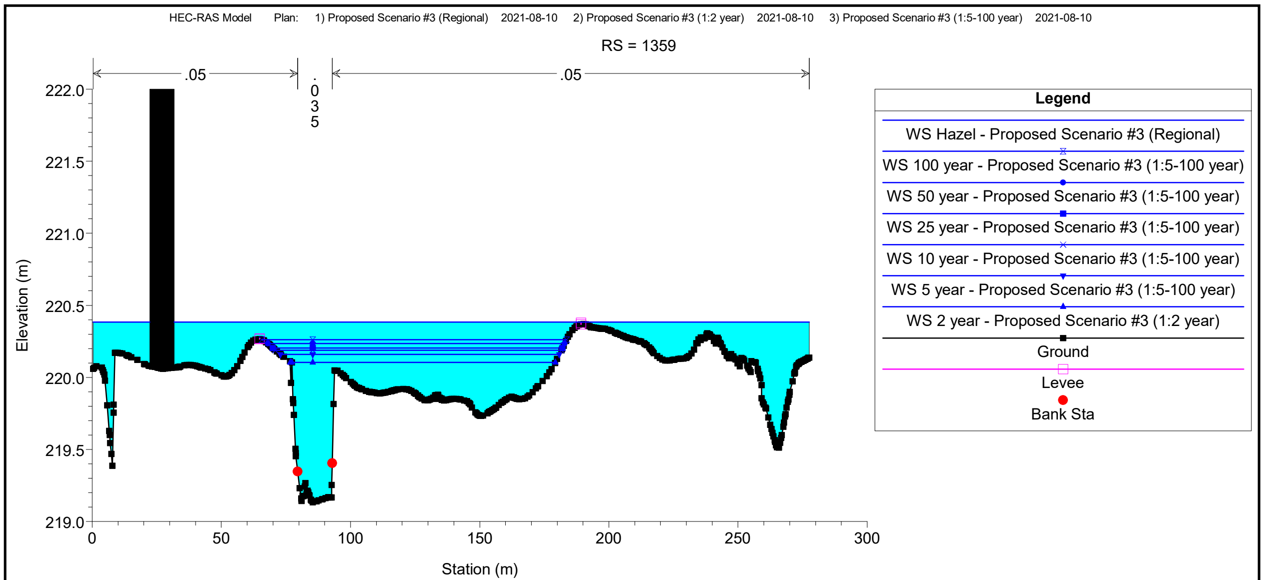

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1407
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1404
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

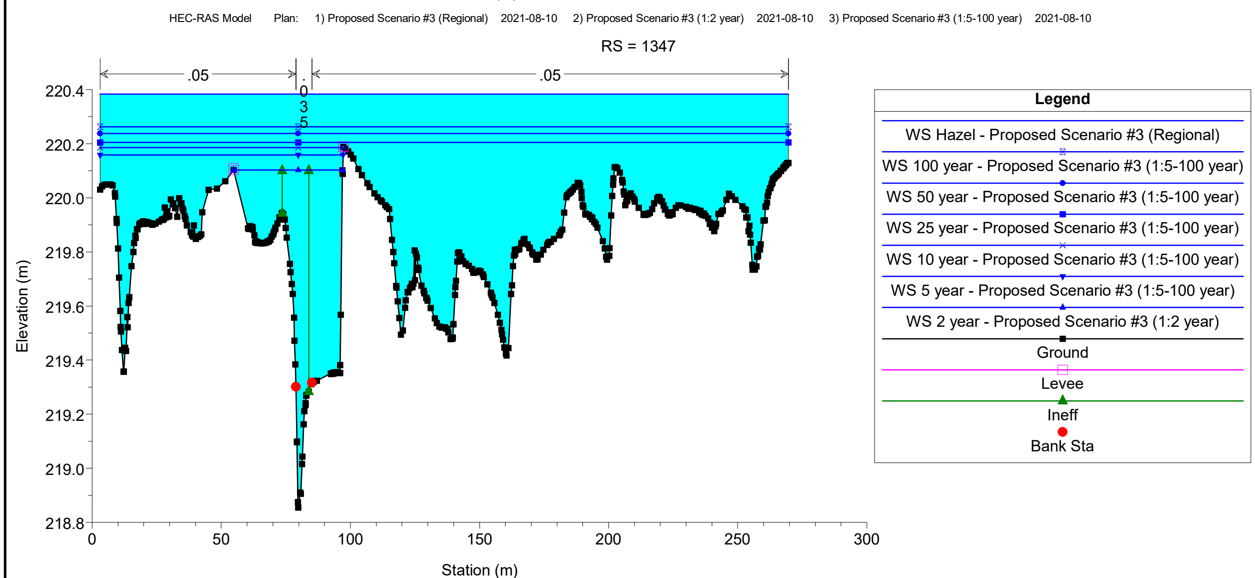

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1386
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1377
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

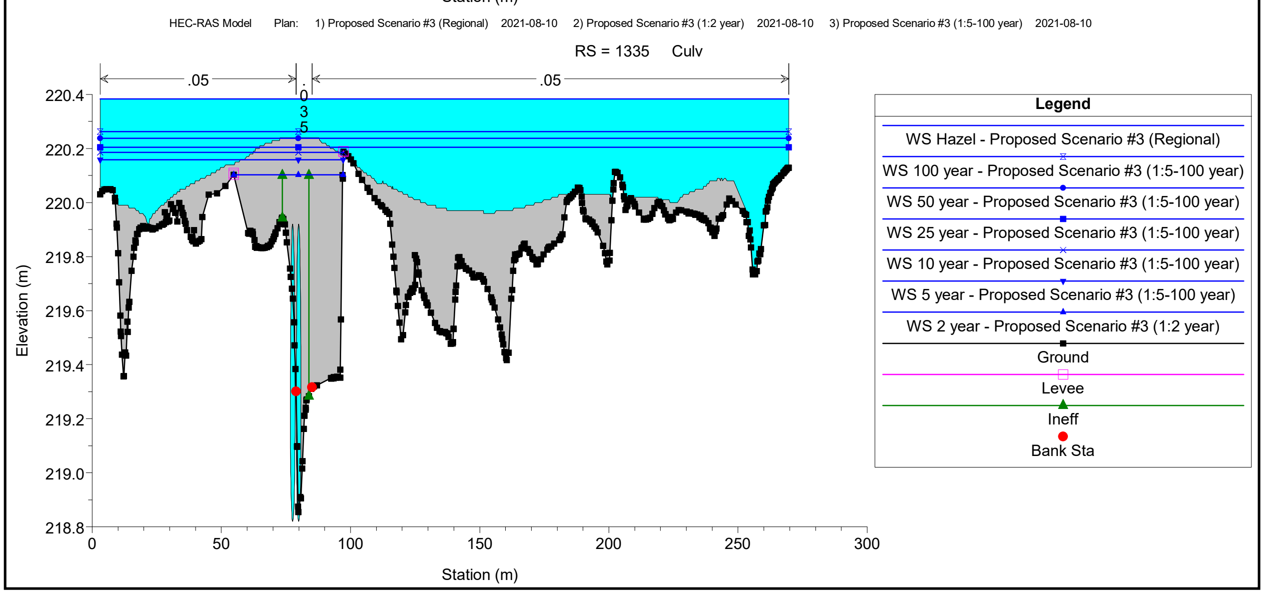

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1369
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta



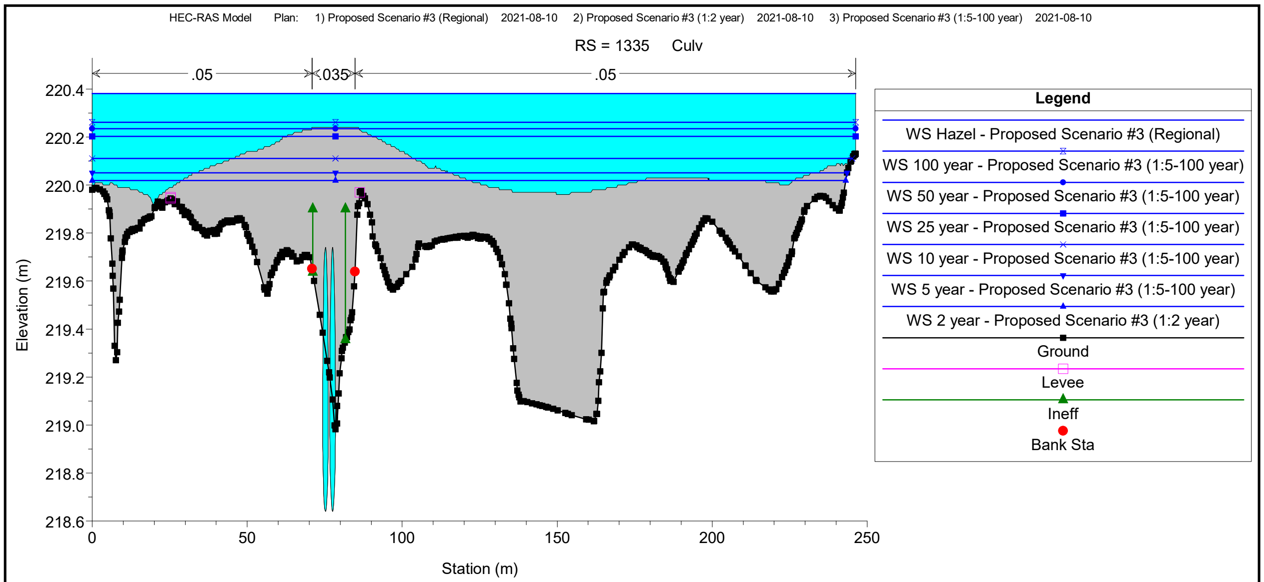
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1359
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

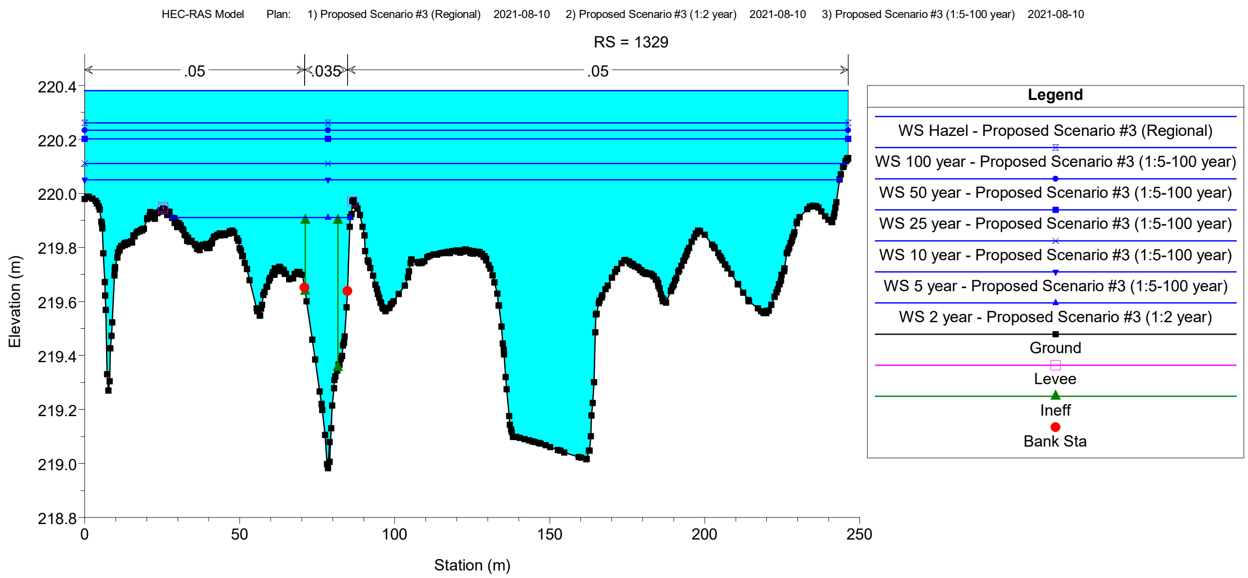


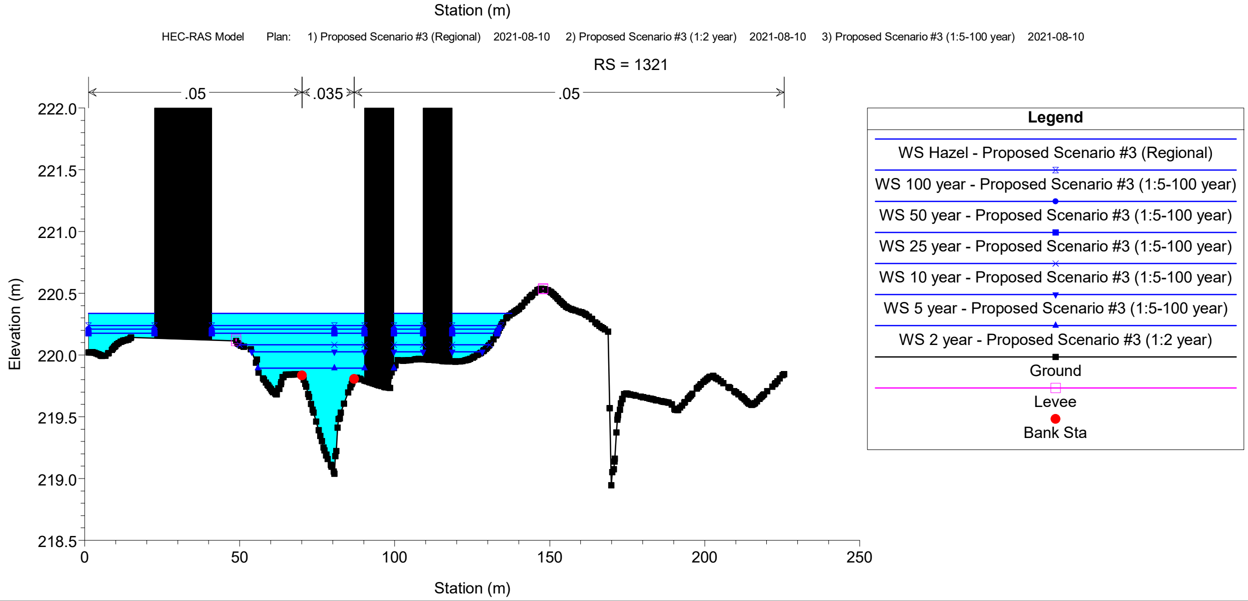
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1347
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

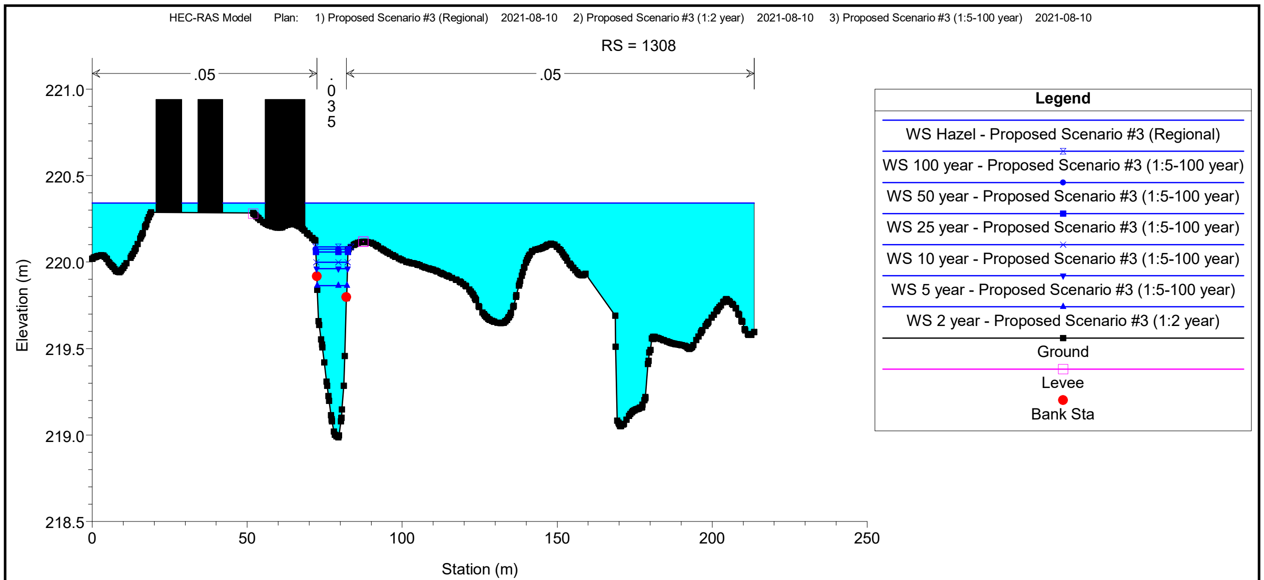


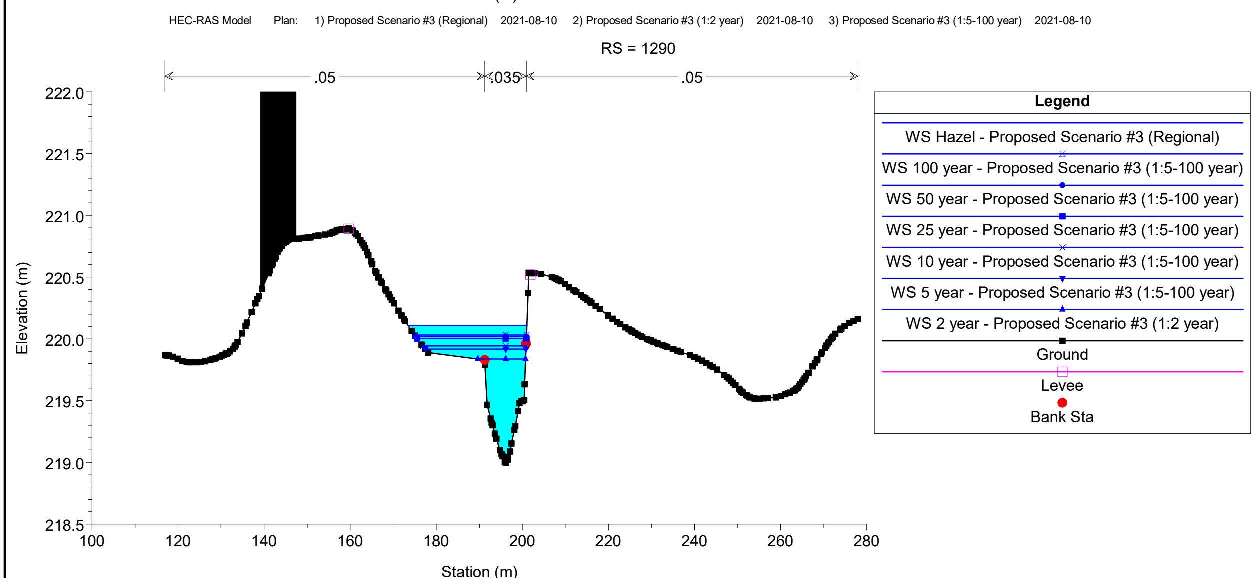
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

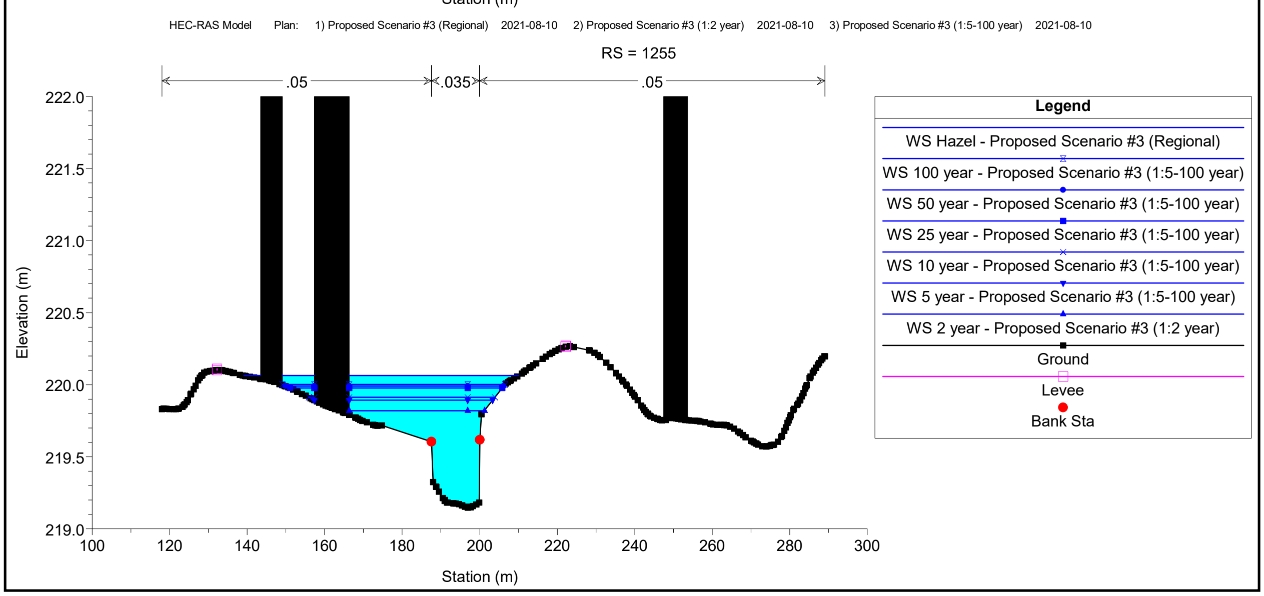

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1335 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

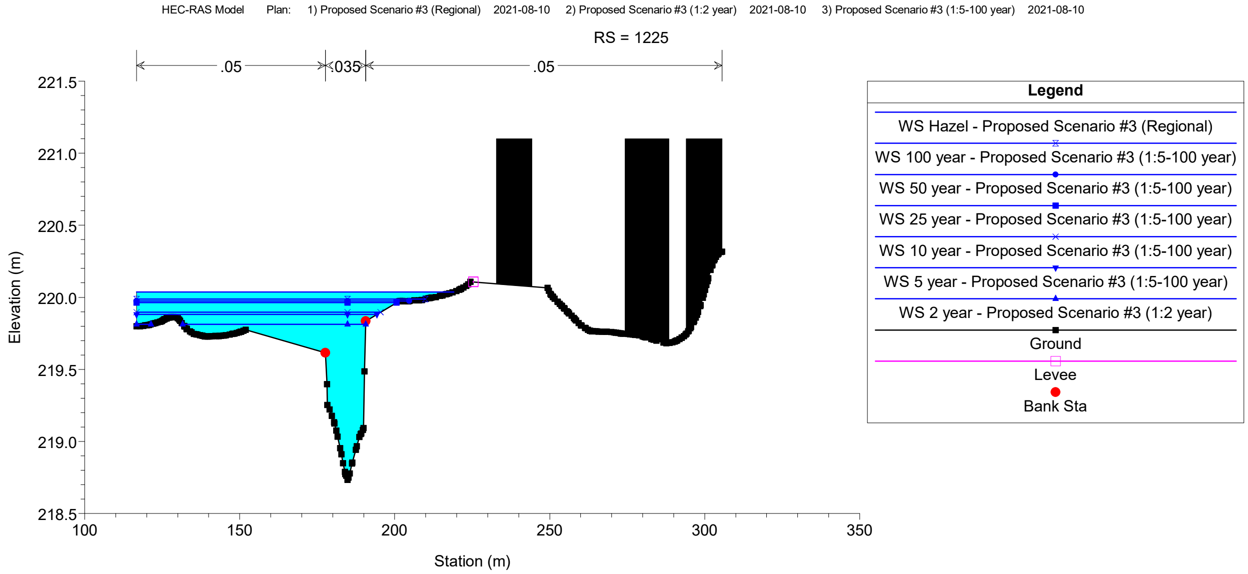

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1329
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta

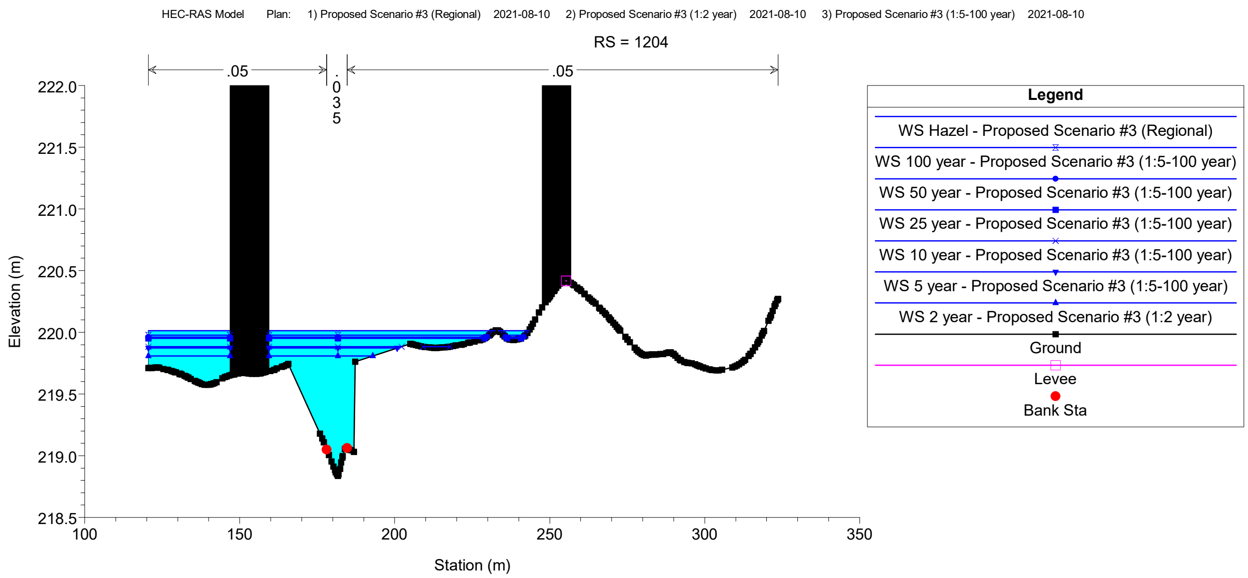

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1321
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

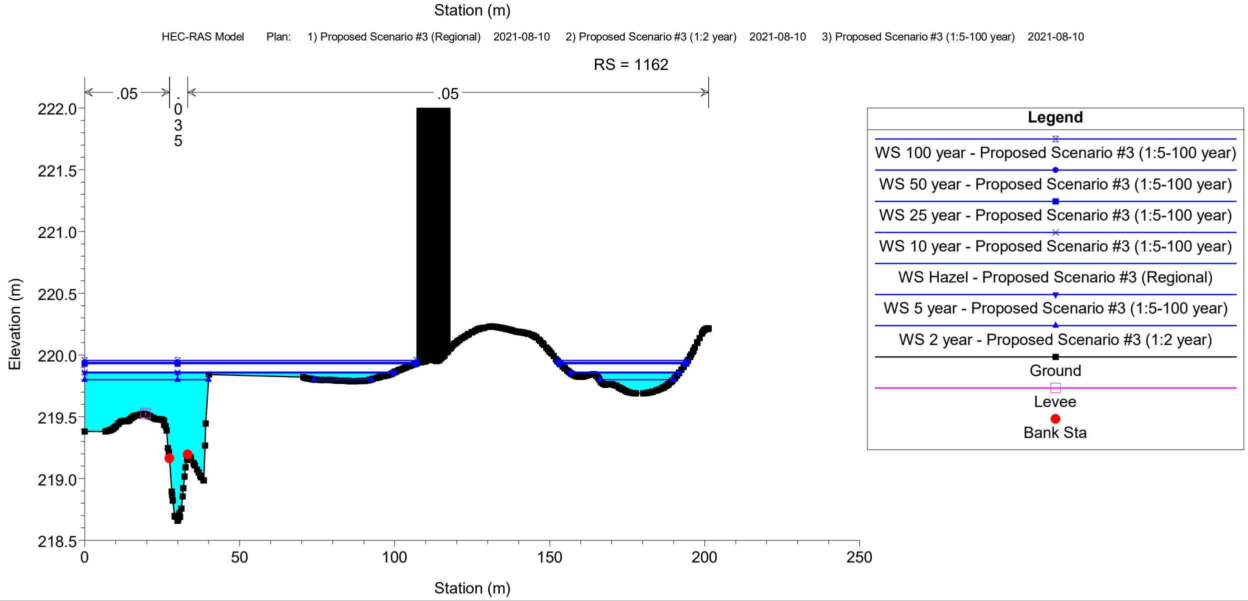

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1308
.05
.035
.05
221.0
220.5
220.0
219.5
219.0
218.5
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

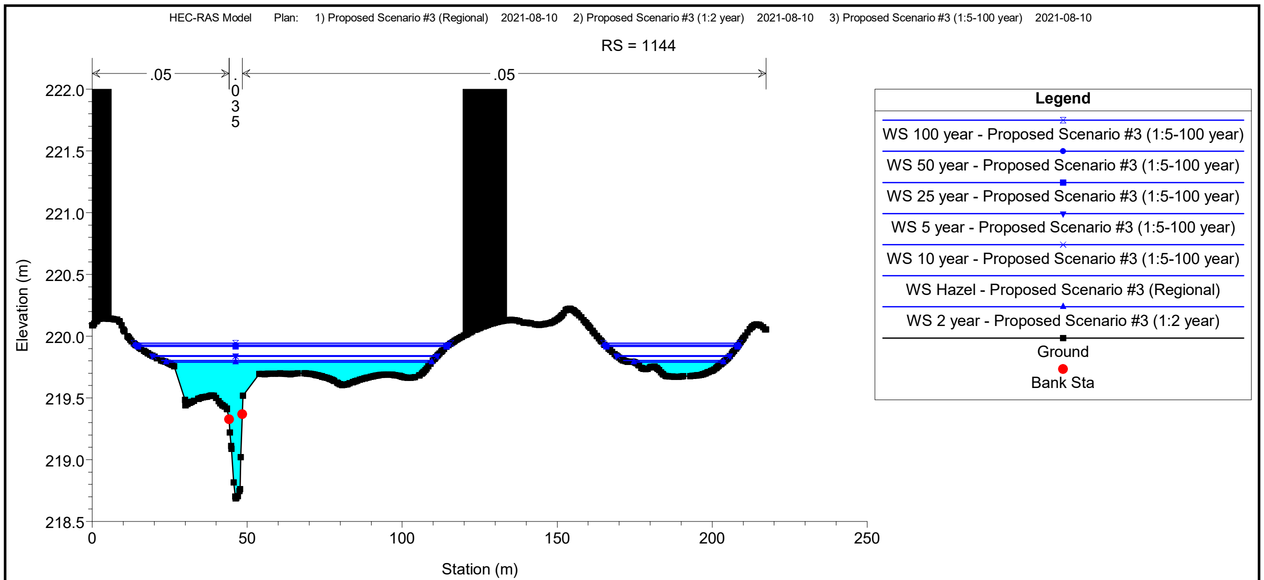

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1290
.05
.035
.05
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
Elevation (m)
100
120
140
160
180
200
220
240
260
280
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

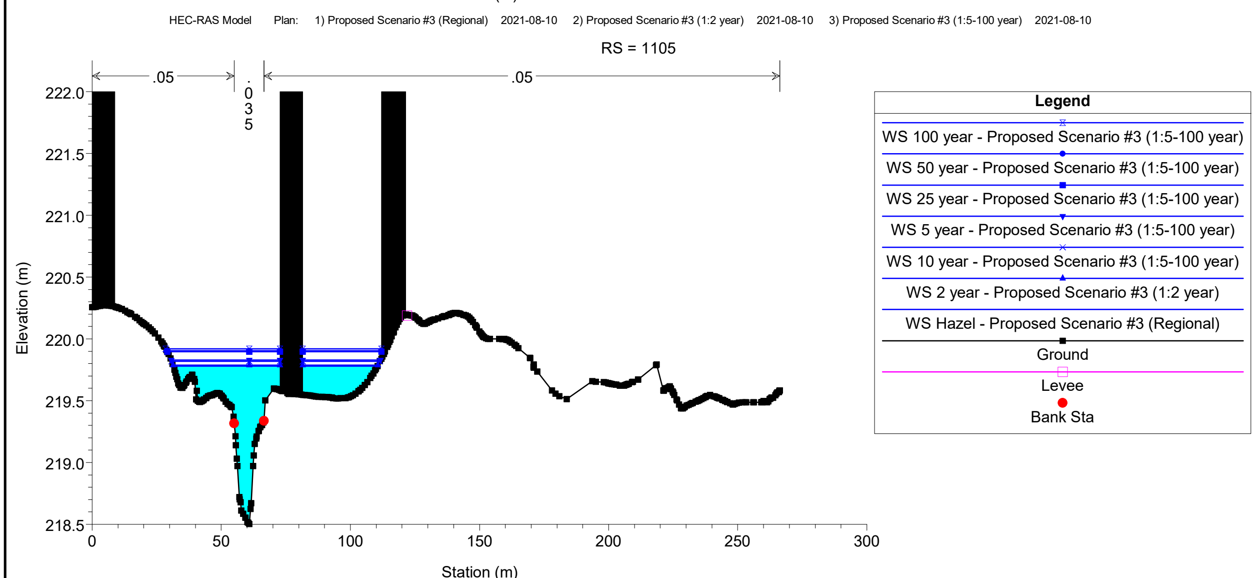

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1255
.05
.035
.05
222.0
221.5
221.0
220.5
220.0
219.5
219.0
Elevation (m)
100
120
140
160
180
200
220
240
260
280
300
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

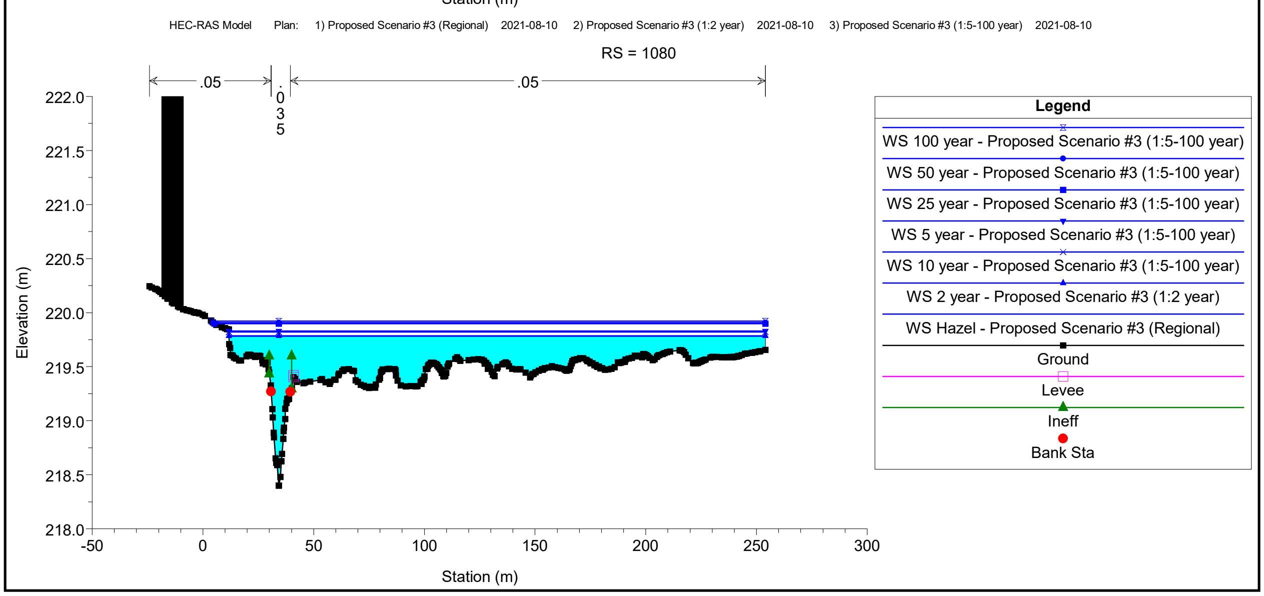

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1225
.05
.035
.05
Elevation (m)
221.5
221.0
220.5
220.0
219.5
219.0
218.5
100
150
200
250
300
350
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

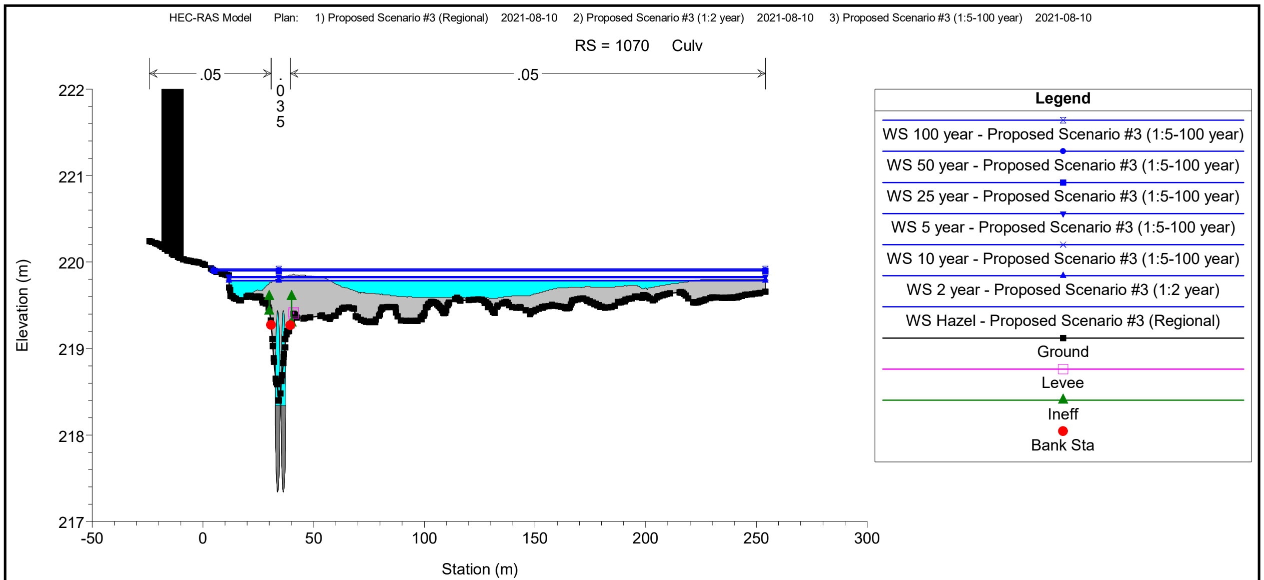

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1204
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
100
150
200
250
300
350
Station (m)
Legend
WS Hazel - Proposed Scenario #3 (Regional)
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1162
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta

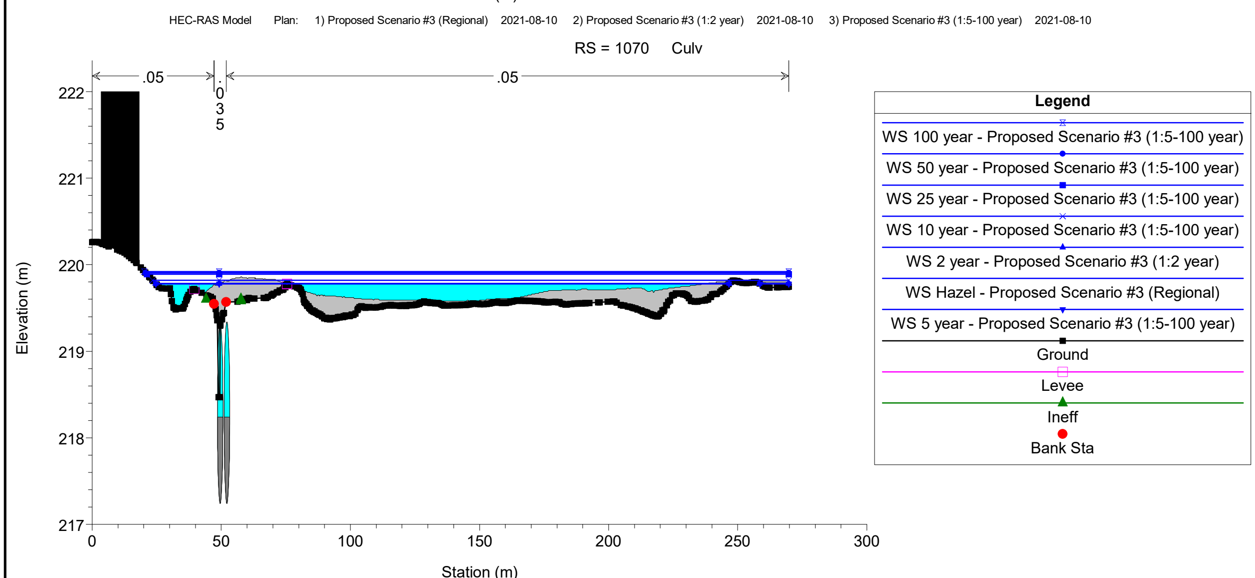

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1144
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1105
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
0
50
100
150
200
250
300
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
WS Hazel - Proposed Scenario #3 (Regional)
Ground
Levee
Bank Sta

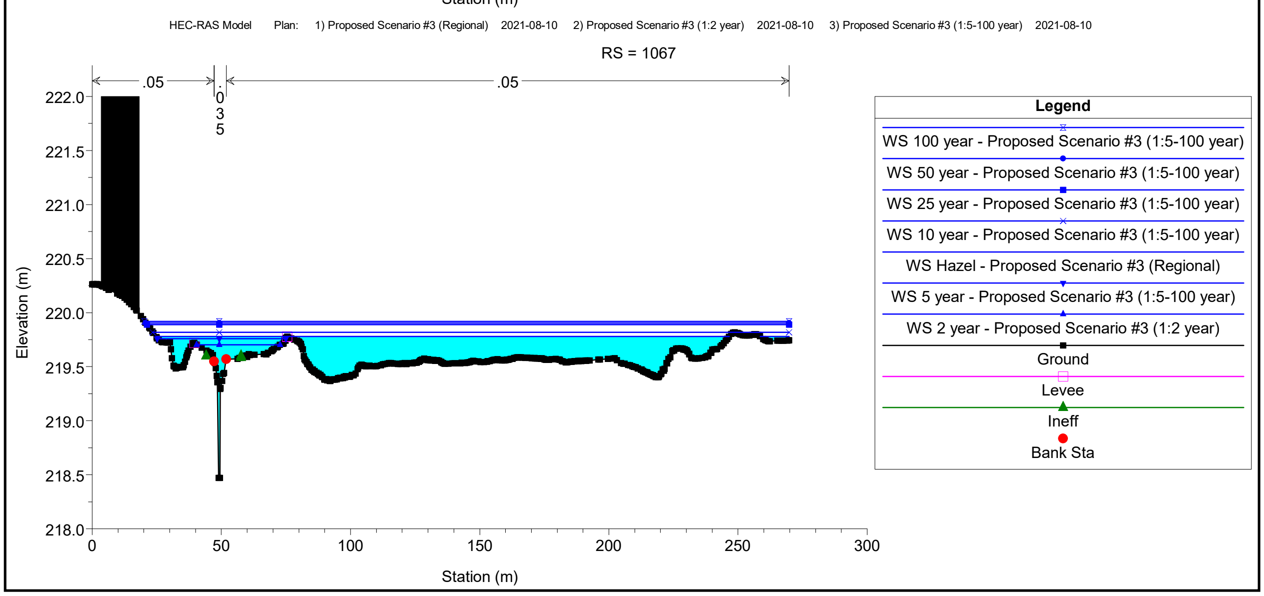

HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1080
.05
.035
.05
Elevation (m)
222.0
221.5
221.0
220.5
220.0
219.5
219.0
218.5
218.0
-50
0
50
100
150
200
250
300
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
WS Hazel - Proposed Scenario #3 (Regional)
Ground
Levee
Ineff
Bank Sta



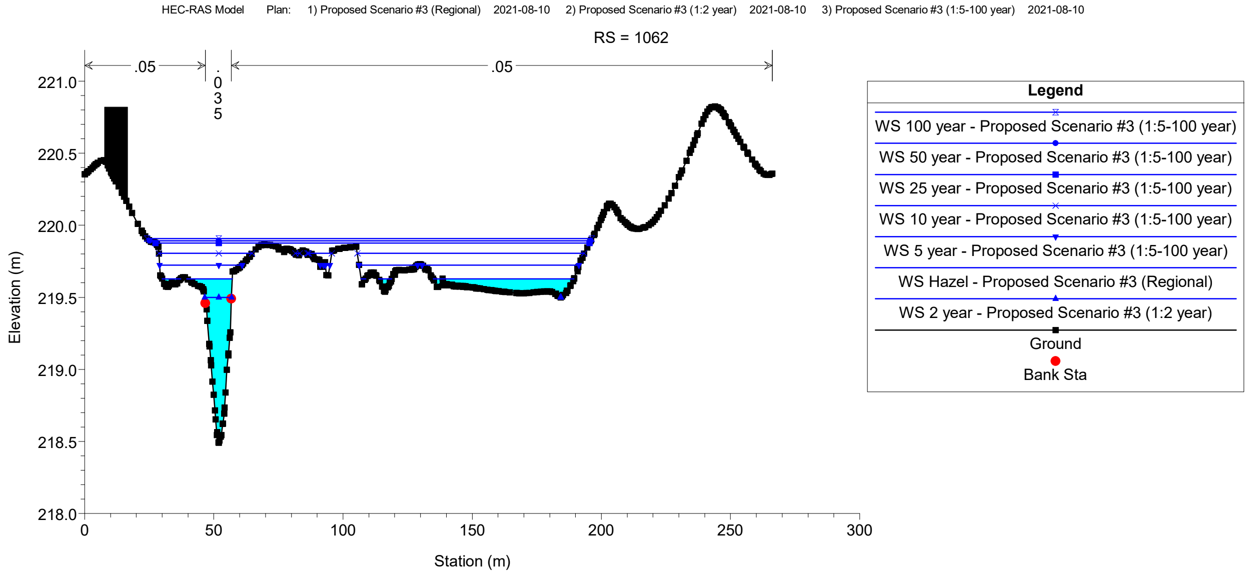
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
WS Hazel - Proposed Scenario #3 (Regional)
Ground
Levee
Ineff
Bank Sta



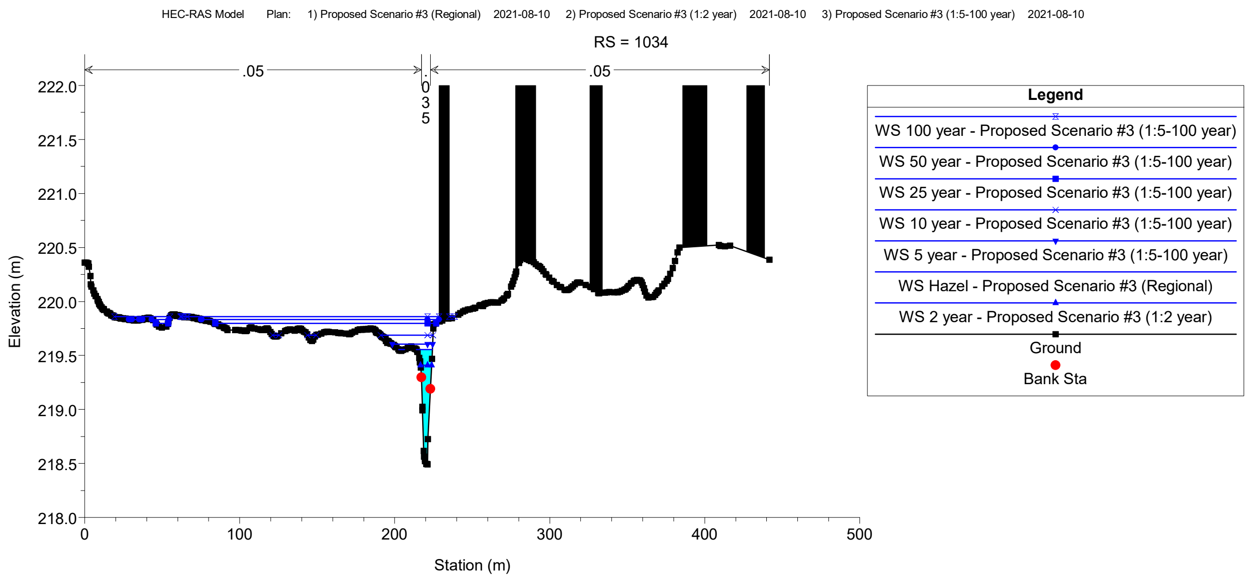
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1070 Culv
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
Ground
Levee
Ineff
Bank Sta



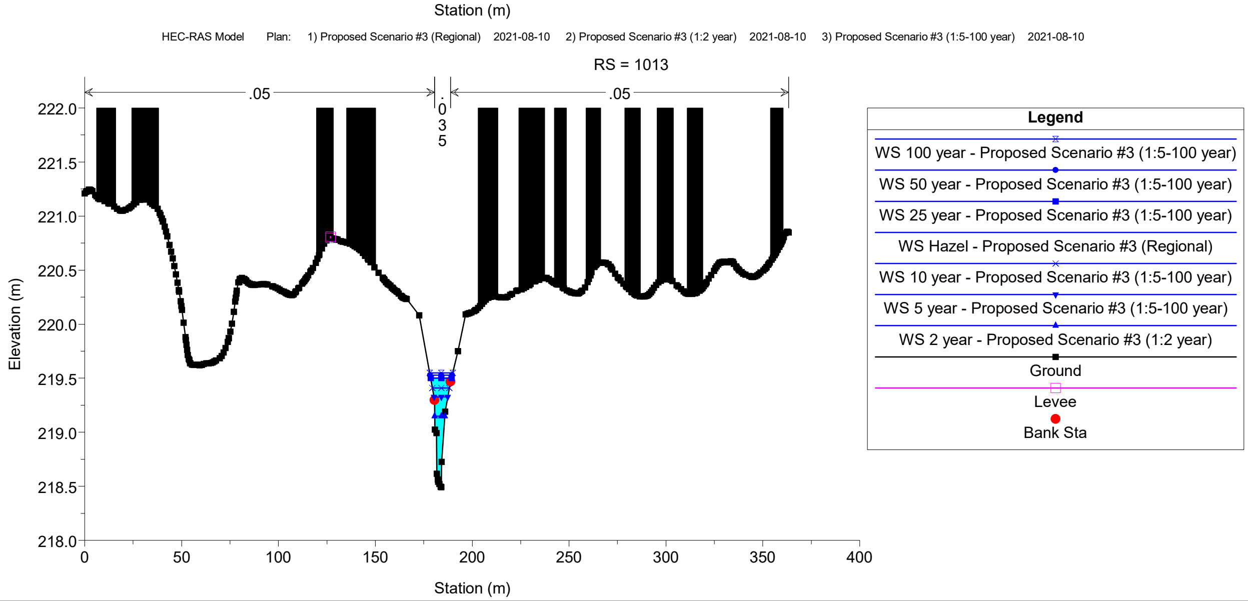
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1067
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Ineff
Bank Sta



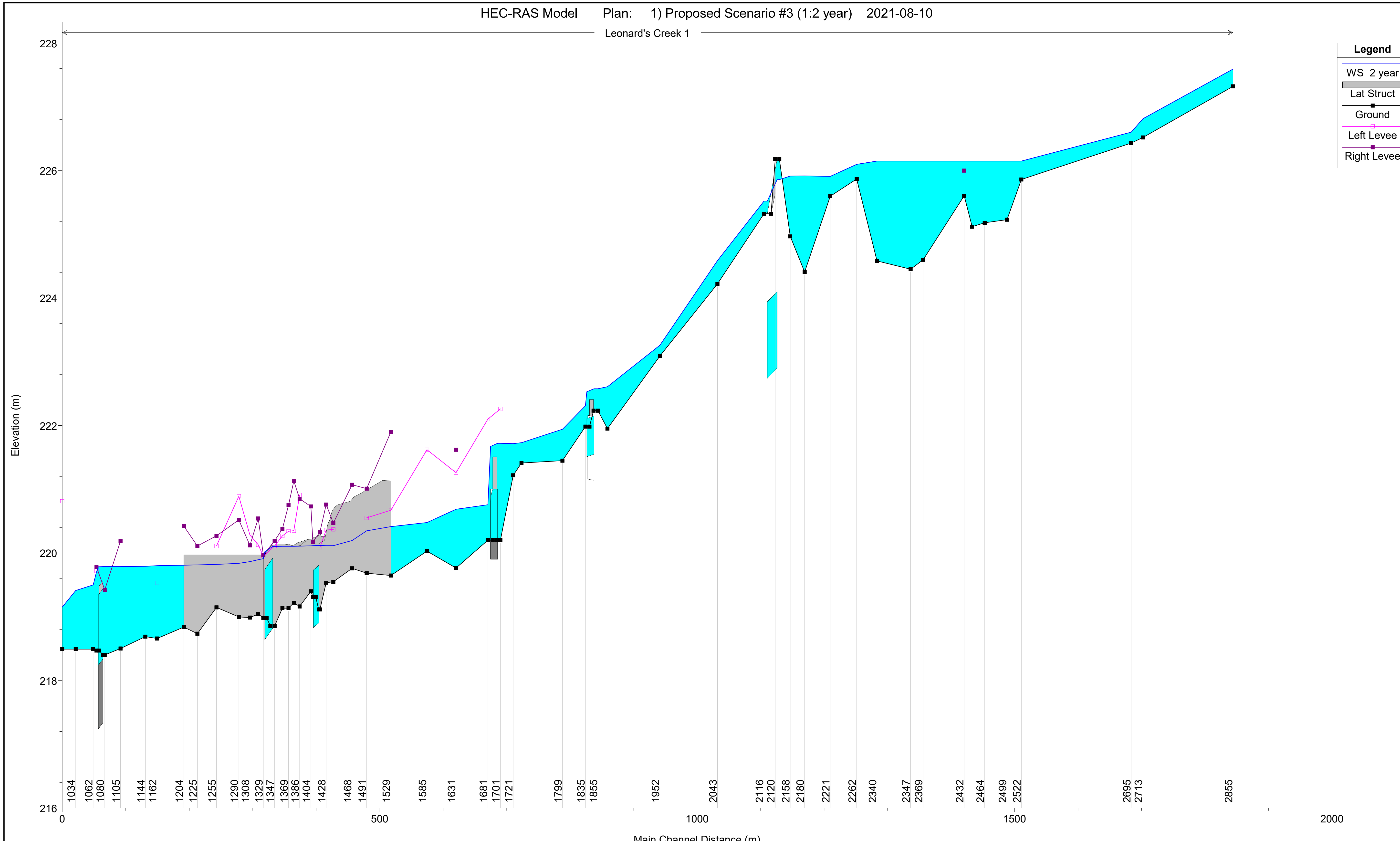
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1062
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Bank Sta

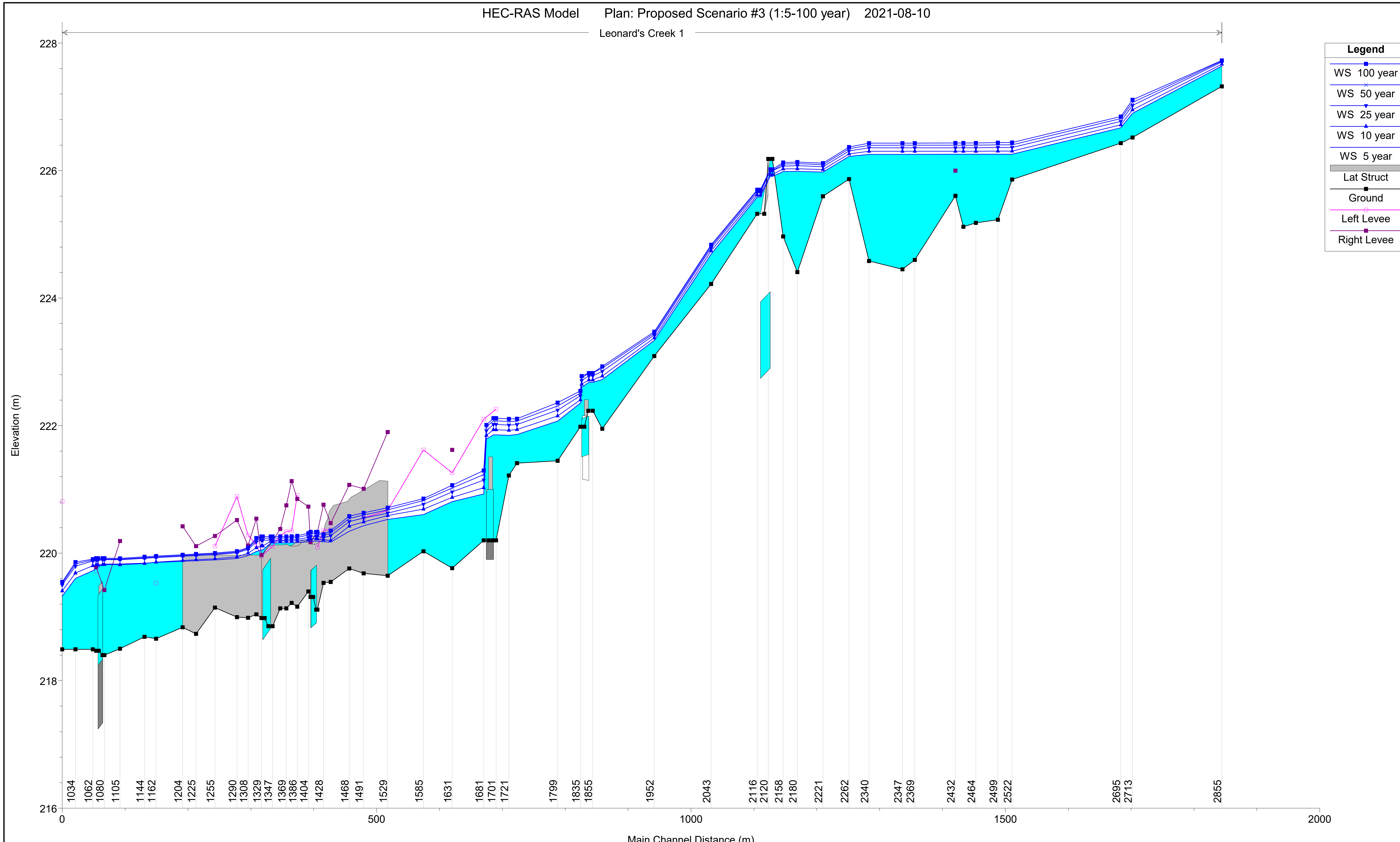


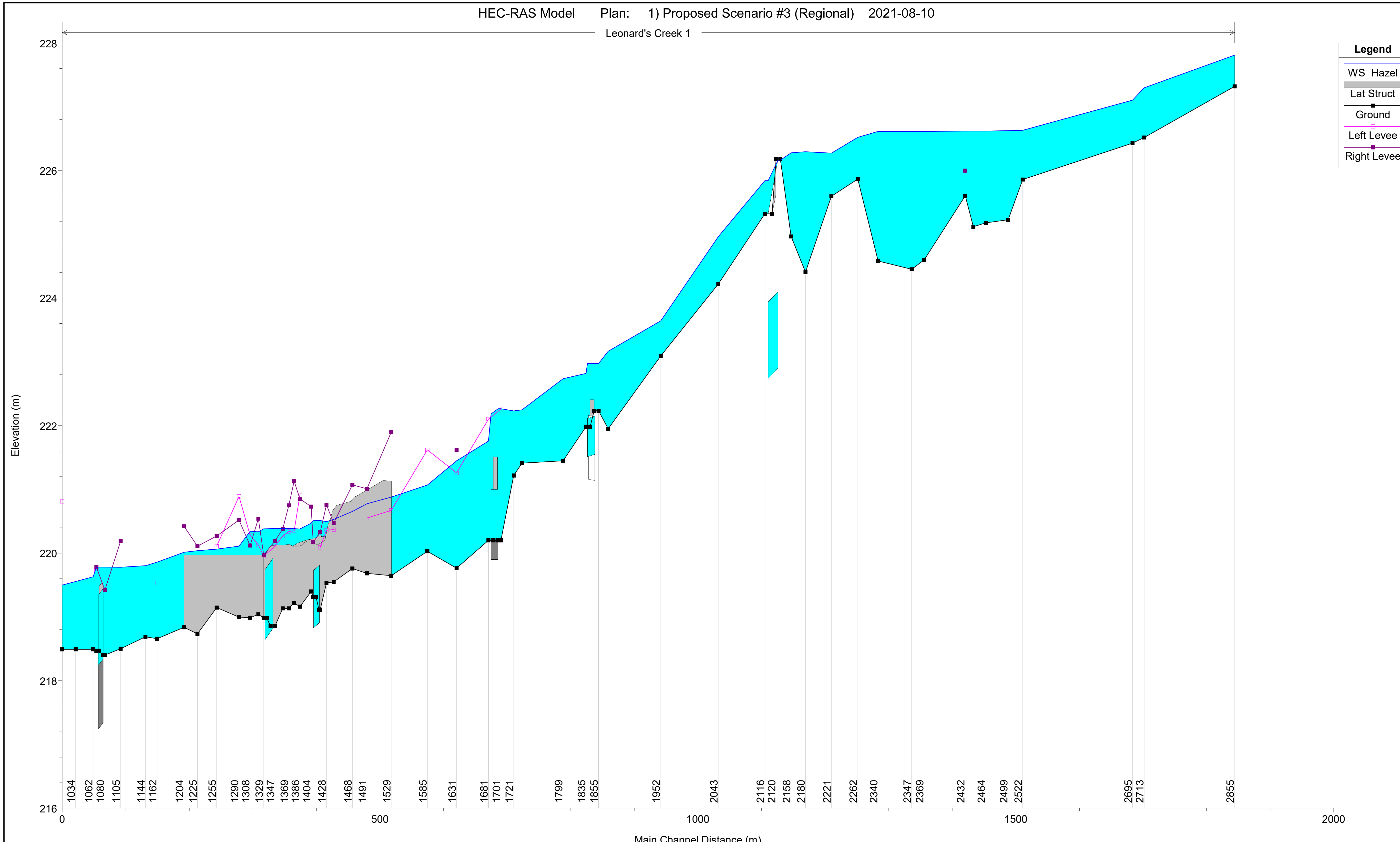
HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1034
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Bank Sta



HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10 2) Proposed Scenario #3 (1:2 year) 2021-08-10 3) Proposed Scenario #3 (1:5-100 year) 2021-08-10
RS = 1013
.05
.035
.05
Elevation (m)
Station (m)
Legend
WS 100 year - Proposed Scenario #3 (1:5-100 year)
WS 50 year - Proposed Scenario #3 (1:5-100 year)
WS 25 year - Proposed Scenario #3 (1:5-100 year)
WS Hazel - Proposed Scenario #3 (Regional)
WS 10 year - Proposed Scenario #3 (1:5-100 year)
WS 5 year - Proposed Scenario #3 (1:5-100 year)
WS 2 year - Proposed Scenario #3 (1:2 year)
Ground
Levee
Bank Sta


HEC-RAS Model Plan: 1) Proposed Scenario #3 (1:2 year) 2021-08-10
Leonard's Creek 1
Legend
WS 2 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
216
218
220
222
224
226
228
Main Channel Distance (m)
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855


HEC-RAS Model Plan: Proposed Scenario #3 (1:5-100 year) 2021-08-10
Leonard's Creek 1
Legend
WS 100 year
WS 50 year
WS 25 year
WS 10 year
WS 5 year
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
228
226
224
222
220
218
216
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855


HEC-RAS Model Plan: 1) Proposed Scenario #3 (Regional) 2021-08-10
Leonard's Creek 1
Legend
WS Hazel
Lat Struct
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
216
218
220
222
224
226
228
0
500
1000
1500
2000
1034
1062
1080
1105
1144
1162
1204
1225
1255
1290
1308
1329
1347
1369
1386
1404
1428
1468
1491
1529
1585
1631
1681
1701
1721
1799
1835
1855
1952
2043
2116
2120
2158
2180
2221
2262
2340
2347
2369
2432
2464
2499
2522
2695
2713
2855

SUMMARY OF HECRAS WARNINGS – SCENARIO #3

We note that due to the low, flat topography of the study area and high peak flows estimated at each crossing, there are some inconsistencies between the proposed scenarios, and warning errors were observed at the crossings under some of the design storms. A summary of the observed HEC-RAS errors is provided below. Although the developed model is producing warnings at some locations, it provides a general estimate of the flood conditions in the study area. We note that significant additional modelling effort is required in order to produce results with more certainty.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
2-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 2-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 2-year flow profile results.
2-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
2-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 2-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 2-year flow profile results.
2-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
5-year	1070	During the culvert inlet control computations, the program could not	The downstream culvert end is 90% submerged under the downstream boundary condition water surface

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
		balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
5-year	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
5-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
10-year	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
10-year	1335	During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	The 10-year flow profile in the profile plot that has been selected by HEC-RAS as the solution with the minimum appears to be reasonable. We note that no engineering decisions have been made based on the 10-year flow profile results.
10-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
25-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.

FLOW PROFILE	CROSS SECTION ID	WARNING DESCRIPTION	TATHAM NOTES
50-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
50-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1070	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1335	The weir over culvert is submerged.	Not anticipated to affect results.
100-year	1410	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1070	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1070	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 90% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
Regional	1335	The weir over culvert is submerged.	Not anticipated to affect results.
Regional	1335	During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.	The downstream culvert end is 50% submerged under the downstream boundary condition water surface elevation of 219.15 m. The culvert is under outlet control, and therefore the inlet control calculations are not relevant.
Regional	1335	During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.	When compared with Existing and Scenario #1 results (where this error doesn't occur) there is minimal differences in water surface elevations upstream and downstream of the culvert, indicating that the outlet energy grade is reasonable.
Regional	1410	The weir over culvert is submerged.	Not anticipated to affect results.

Alternative #7

```
*********************************************
** SIMULATION:Run 18 - 100yr 24hr 15min SCS **
*********************************************
--------------------
| RESERVOIR(  0163)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  18.8990      3.7800
                          3.5500     0.7800   |   0.0000      0.0000

                                       AREA     QPEAK     TPEAK       R.V.
                                       (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0009)    534.314     20.991     13.43      69.07
   OUTFLOW: ID= 1 (  0163)    534.314     18.983     14.08      69.03

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 90.43
                   TIME SHIFT OF PEAK FLOW        (min)= 39.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  3.7965

     **** WARNING : SELECTED ROUTING TIME STEP DENIED.
-------------------------------------------------------------------------------
```

LEGEND

Property Line
Stream
MNR Unevaluated Wetland

TATHAM ENGINEERING

Various Roads Drainage Improvement Program
Huron Court Park, 1260 Huron Court, Innisfil

LEGEND

Property Line
Stream

TATHAM ENGINEERING

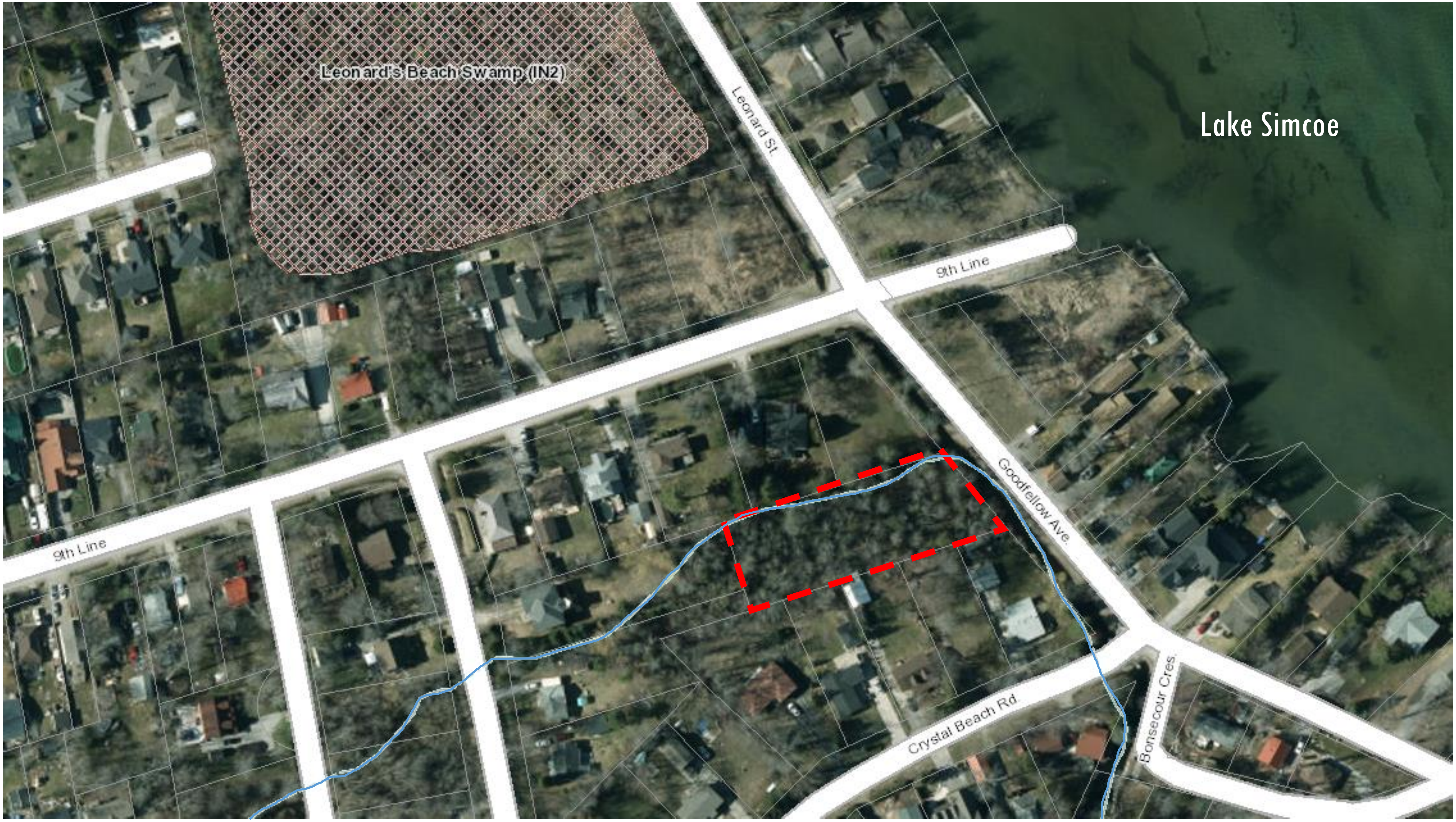
Various Roads Drainage Improvement Program
Andrade Park, 1095 Lebanon Drive, Innisfil

LEGEND

Property Line
Stream
MNR Evaluated Wetland

TATHAM ENGINEERING

Various Roads Drainage Improvement Program
Warrington Park, 2300 Warrington Way, Innisfil

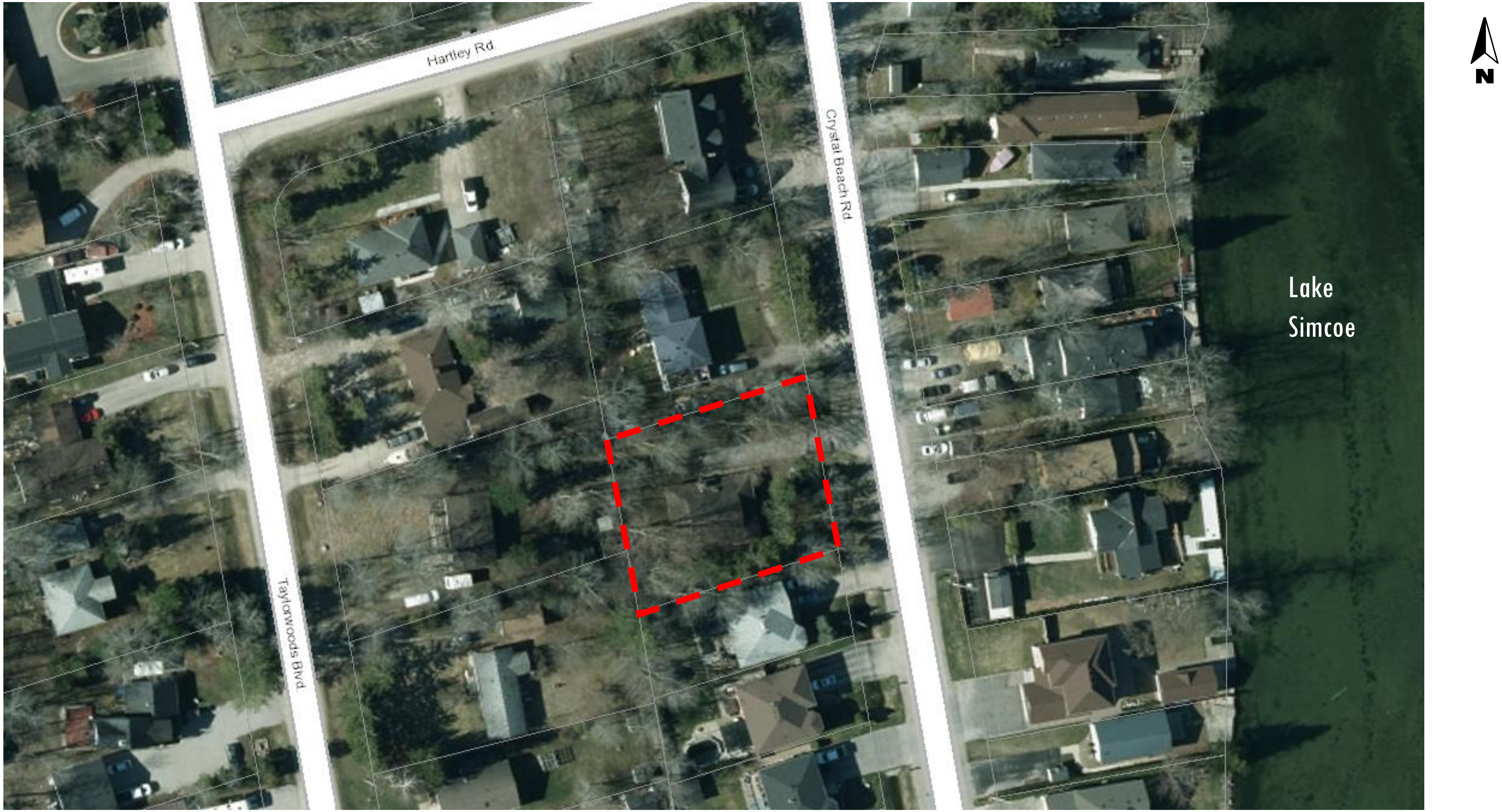


LEGEND

Property Line
Stream
MNR Evaluated Wetland

TATHAM ENGINEERING

Various Roads Drainage Improvement Program
2384 Goodfellow Avenue, Innisfil

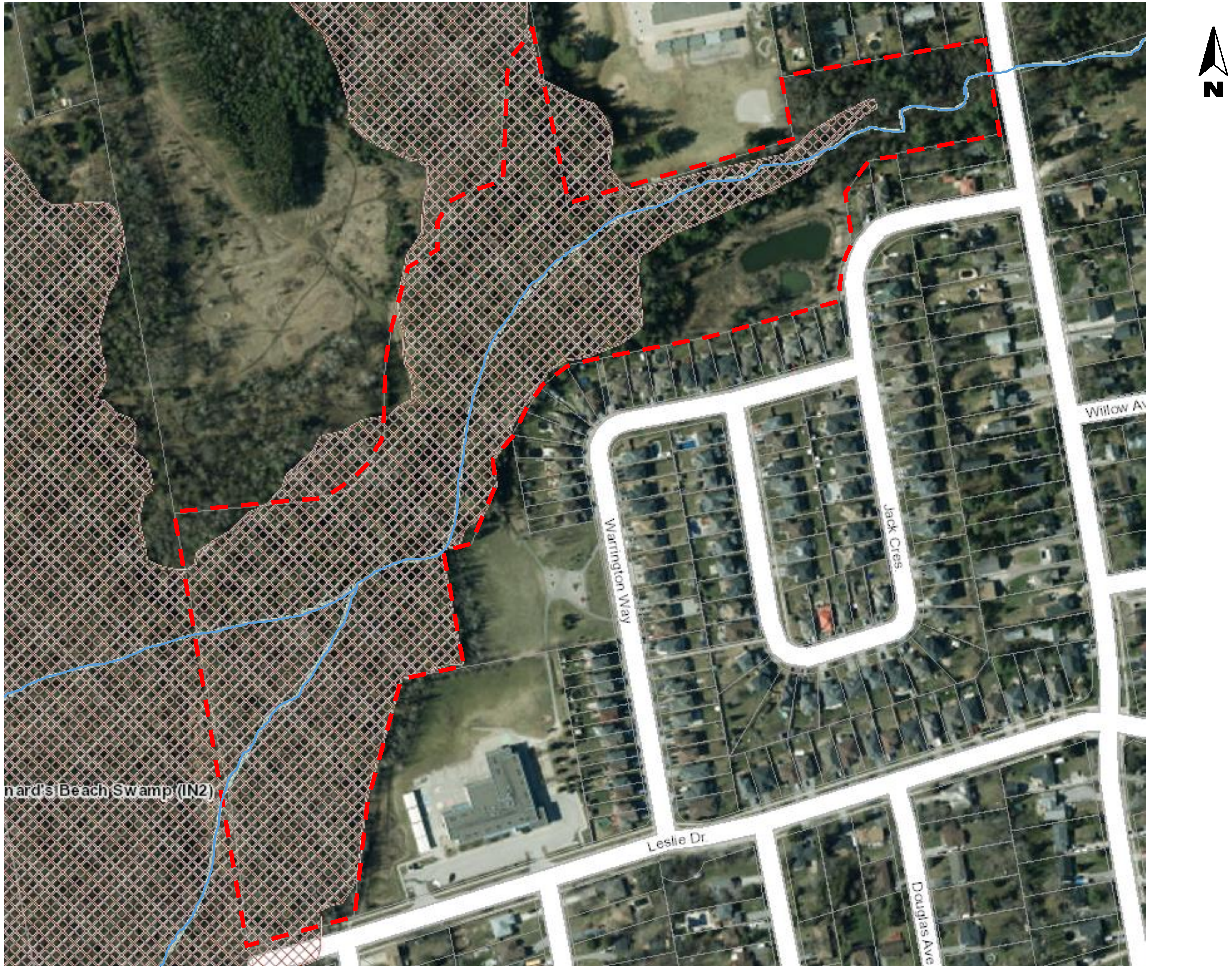


LEGEND

Property Line

TATHAM ENGINEERING

Various Roads Drainage Improvement Program
2298 Crystal Beach Road, Innisfil



LEGEND

Property Line

Stream

MNR Evaluated Wetland

TATHAM ENGINEERING

Various Roads Drainage Improvement Program
2324 Jack Crescent, Innisfil

Alternative #10

TATHAM ENGINEERING

Storm Sewer Design Sheet

Version Number: 1 **Version Date:** January 14, 2021

Project Information

Town of Innisfil Various Roads - Option #10 Existing Condition	420395

Drawing Reference

TAYLORWOODS SUBDIVISION STORM DRAINAGE BASINS (SD-2)	December 01-98

Prepared By

J. Macdonald	January 14-21

Reviewed By

A. Kellet	January 20-21

Municipality

Town of Innisfil

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	678.09	4.70	0.78
5	853.61	4.70	0.77
10	975.87	4.70	0.76
25	1146.28	4.92	0.76
50	1236.15	4.70	0.75
100	1426.41	5.27	0.76

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
HAPPY VALE DR		STMMH1	STMMH2	6.91	0.30	5	0.30	2.07	6.91	2.07	10.00	108.92	0.627	0.013	41.2	0.87%	450	1.67	0.266	1.67	0.41	621	235.9%	10.41
HAPPY VALE DR		STMMH2	STMMH3	2.03	0.40	5	0.40	0.81	8.94	2.89	10.41	106.65	0.855	0.013	62.6	0.46%	525	1.35	0.292	1.35	0.77	785	293.0%	11.18
SOMERS BLVD		STMMH10	STMMH9	0.92	0.40	5	0.40	0.37	0.92	0.37	10.00	108.92	0.111	0.013	87.8	0.48%	375	1.10	0.121	1.10	1.33	363	91.7%	11.33
SOMERS BLVD		STMMH9	STMMH3	0.54	0.40	5	0.40	0.22	1.46	0.58	11.33	101.93	0.165	0.013	79.1	0.49%	375	1.11	0.123	1.11	1.19	419	134.7%	12.52
HAPPY VALE DR		STMMH3	STMMH4	0.66	0.40	5	0.40	0.27	11.06	3.73	11.18	102.64	1.065	0.013	85.8	0.34%	675	1.37	0.490	1.37	1.04	903	217.2%	12.23
HAPPY VALE DR		STMMH4	STMMH5	2.08	0.40	5	0.40	0.83	13.14	4.57	12.23	97.76	1.240	0.013	40.7	0.30%	675	1.29	0.460	1.29	0.53	978	269.3%	12.76
TAYLORWOODS BLVD		STMMH7	STMMH6	0.40	0.40	5	0.40	0.16	0.40	0.16	10.00	108.92	0.048	0.013	59.9	0.18%	375	0.67	0.074	0.67	1.49	319	64.9%	11.49
TAYLORWOODS BLVD		STMMH6	STMMH5	0.53	0.40	5	0.40	0.21	0.92	0.37	11.49	101.16	0.104	0.013	32.0	0.20%	375	0.71	0.078	0.71	0.75	417	132.5%	12.24
HAPPY VALE DR		STMMH5	POND	0.92	0.40	5	0.40	0.37	14.99	5.31	12.76	95.49	1.407	0.013	16.0	0.56%	675	1.76	0.629	1.76	0.15	913	223.7%	12.91

1. Existing storm sewer information obtained from Taylorwoods Subdivision Storm Drainage Basins Plan as-constructed drawing (SD-2) dated December 1998.

TATHAM ENGINEERING

Storm Sewer Design Sheet

Version Number: 1 **Version Date:** January 14, 2021

Project Information

Town of Innisfil Various Roads - Option #10 Proposed Diversion	420395

Drawing Reference

TAYLORWOODS SUBDIVISION STORM DRAINAGE BASINS (SD-2)	December 01-98

Prepared By

J. Macdonald	January 14-21

Reviewed By

A.Kellet	January 20-21

Municipality

Town of Innisfil

Runoff Coefficient Adjustment

Year	A	B
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Manning's Coefficient

Pipe	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	678.09	4.70	0.78
5	853.61	4.70	0.77
10	975.87	4.70	0.76
25	1146.28	4.92	0.76
50	1236.15	4.70	0.75
100	1426.41	5.27	0.76

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient	Design Storm (Year)	Adjusted Runoff Coefficient	Area × Runoff Coefficient	Cumulative Area (ha)	Cumulative Area × Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
SANDY TRAIL/CHAPPELL CRT		MH6	STMMH1	2.91	0.60	5	0.60	1.75	2.91	1.75	10.00	108.92	0.528	0.013	395.0	0.45%	675	1.58	0.564	1.58	4.18	658	93.7%	14.18
HAPPY VALE DR		STMMH1	STMMH2	6.91	0.30	5	0.30	2.07	9.82	3.82	14.18	89.93	0.954	0.013	41.2	0.87%	**450**	1.67	0.266	1.67	0.41	726	358.7%	14.59
HAPPY VALE DR		STMMH2	STMMH3	2.03	0.40	5	0.40	0.81	11.85	4.63	14.59	88.46	1.138	0.013	62.6	0.46%	**525**	1.35	0.292	1.35	0.77	874	390.1%	15.36
SOMERS BLVD		STMMH10	STMMH9	0.92	0.40	5	0.40	0.37	0.92	0.37	10.00	108.92	0.111	0.013	87.8	0.48%	**375**	1.10	0.121	1.10	1.33	363	91.7%	11.33
SOMERS BLVD		STMMH9	STMMH3	0.54	0.40	5	0.40	0.22	1.46	0.58	11.33	101.93	0.165	0.013	79.1	0.49%	**375**	1.11	0.123	1.11	1.19	419	134.7%	12.52
HAPPY VALE DR		STMMH3	STMMH4	0.66	0.40	5	0.40	0.27	13.97	5.48	15.36	85.83	1.307	0.013	85.8	0.34%	**675**	1.37	0.490	1.37	1.04	975	266.6%	16.41
HAPPY VALE DR		STMMH4	STMMH5	2.08	0.40	5	0.40	0.83	16.05	6.31	16.41	82.56	1.448	0.013	40.7	0.30%	**675**	1.29	0.460	1.29	0.53	1037	314.4%	16.93
TAYLORWOODS BLVD		STMMH7	STMMH6	0.40	0.40	5	0.40	0.16	0.40	0.16	10.00	108.92	0.048	0.013	59.9	0.18%	**375**	0.67	0.074	0.67	1.49	319	64.9%	11.49
TAYLORWOODS BLVD		STMMH6	STMMH5	0.53	0.40	5	0.40	0.21	0.92	0.37	11.49	101.16	0.104	0.013	32.0	0.20%	**375**	0.71	0.078	0.71	0.75	417	132.5%	12.24
HAPPY VALE DR		STMMH5	POND	0.92	0.40	5	0.40	0.37	17.90	7.05	16.93	81.01	1.587	0.013	16.0	0.56%	**675**	1.76	0.629	1.76	0.15	955	252.3%	17.09

1. Existing storm sewer information obtained from Taylorwoods Subdivision Storm Drainage Basins Plan as-constructed drawing (SD-2) dated December 1998.
2. Proposed sewer slope based on existing Chappell Court and Happy Vale Drive storm sewer information obtained from Summer Lane Detailed Design as-constructed drawing (C-403) dated January 2014 and Taylorwoods Subdivision Storm Drainage Basins Plan as-constructed drawing (SD-2) dated December 1998.

```
===================================================================================
==========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T     H   H   Y Y   MM MM  O   O
       O   O    T      T     H   H    Y    M   M  O   O
        OOO     T      T     H   H    Y    M   M   OOO
```

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***** S U M M A R Y   O U T P U T *****

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\772db9fd-7abf-466e-ae5c-aec7788c3593\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\772db9fd-7abf-466e-ae5c-aec7788c3593\s


DATE: 04-29-2021                          TIME: 02:49:39

USER:


COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : Run 01 - 2yr 4hr 10min Chicag **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                   min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB NASHYD          0103  1  2.0    2.10    0.03  1.57   5.35 0.14    0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB STANDHYD        0100  1  2.0    2.50    0.18  1.33  16.36 0.44    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB STANDHYD        0200  1  2.0    2.68    0.18  1.33  19.95 0.54    0.000
    [I%=24.0:S%= 2.00]
```

```
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.18  1.37  19.95  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.15  1.33  23.71 0.64   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.33  1.33  21.31  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.08  1.33  25.85 0.70   0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.13  1.33  18.81 0.51   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.21  1.33  20.40  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.21  1.33  20.40  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.08    0.05  1.33  20.40  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.65    0.16  1.27  20.40  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.15  1.33  25.85 0.70   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.20    0.20  1.33  25.47  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.39    0.53  1.33  22.24  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.04  1.33  22.27 0.60   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.04  1.33  22.27  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.48    0.04  1.33  22.27  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    5.87    0.58  1.33  22.24  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.37    0.76  1.33  20.48  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.15  1.33  17.14 0.46   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.15  1.33  17.14  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.00    0.00  1.33  17.14  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.90    0.15  1.33  17.14  n/a   0.000
*
```

```
    ADD [  0010+  0050]  0011  3  2.0   10.27    0.91  1.33  19.87  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.77  1.33  17.60 0.48    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.27    1.68  1.33  18.75  n/a    0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.37    1.69  1.33  17.49  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.19  1.33  16.20 0.44    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   24.87    1.88  1.33  17.36  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   24.87    0.07  4.10  17.33  n/a    0.000
*
    DIVERT HYD           1601  1  2.0   24.87    0.07  4.10  17.33  n/a    0.000
       Outflow           0002  2  2.0    0.06    0.00  4.10  17.33  n/a    0.000
       Outflow           0002  3  2.0   24.81    0.07  4.10  17.33  n/a    0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.03  1.50   4.76 0.13    0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.05  1.33  17.83 0.48    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.05  1.33  17.83  n/a    0.000
       MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     3015  3  5.0    0.75    0.05  1.33  17.83  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.36    0.03  1.50   4.76  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.06  1.33  17.84 0.48    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.22    0.08  1.33   8.25  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.01  1.60   5.18 0.14    0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
```

```
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.02  1.53   5.18 0.14    0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.13  1.33  10.38 0.28    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.13  1.33  10.38  n/a    0.000
       Outflow           0001  2  2.0    2.32    0.10  1.33  10.38  n/a    0.000
       Outflow           0001  3  2.0    0.62    0.03  1.33  10.38  n/a    0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.13  1.33  12.24 0.33    0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    0.57  1.37  10.41 0.28    0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.22  1.33  15.53 0.42    0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0    2.91    0.22  1.33  15.53  n/a    0.000
       MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0165  3  2.0    2.91    0.22  1.33  15.53  n/a    0.000
*
    PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.17  1.37  15.51  n/a    0.000
*
    ADD [  0164+  5003]  0166  3  2.0   17.90    0.73  1.37  11.24  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   17.90    0.15  2.20  10.47  n/a    0.000
*
    ADD [  0156+  0159]  5005  3  1.0   20.22    0.17  2.17  10.46  n/a    0.000
*
    ADD [  5005+  1902]  5005  1  1.0   21.52    0.18  2.17  10.14  n/a    0.000
*
    ADD [  5005+  5002]  5005  3  1.0   24.37    0.27  1.33  10.39  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0001  1  2.0  139.80    0.76  3.10   7.48 0.20    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    0.65  4.13   7.48  n/a    0.000
*
```

```
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            0002  1  1.0   18.97    0.09  3.13    6.71 0.18    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 1.06]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            0003  1  1.0   13.15    0.09  2.38    6.71 0.18    0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 0.62]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            0005  1  1.0   32.68    0.24  2.42    7.44 0.20    0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 0.65]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          0004  1  1.0    8.46    0.31  1.35    9.66 0.26    0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]     0001  3  1.0   32.12    0.18  2.68    6.71  n/a    0.000
*
   ADD [  0001+  0004]     0001  1  1.0   40.58    0.32  1.35    7.33  n/a    0.000
*
   ADD [  0001+  0005]     0001  3  1.0   73.26    0.47  2.38    7.38  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            0008  1  2.0   14.42    0.05  2.37    3.64 0.10    0.000
   [CN=58.0          ]
   [ N = 2.0:Tp 0.57]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            1031  1  5.0    1.05    0.03  1.42    9.26 0.25    0.000
   [CN=73.0          ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3061  1  5.0    0.48    0.04  1.33   20.56 0.56    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]     2008  3  5.0    1.53    0.07  1.33   12.81  n/a    0.000
*
   DUHYD                   2010  1  5.0    1.53    0.07  1.33   12.81  n/a    0.000
      MAJOR SYSTEM:        2010  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
      MINOR SYSTEM:        2010  3  5.0    1.53    0.07  1.33   12.81  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3053  1  5.0    0.30    0.03  1.33   20.55 0.56    0.000
   [I%=30.0:S%= 2.00]
```

```
*
   DUHYD                   2011  1  5.0    0.30    0.03  1.33   20.55  n/a    0.000
      MAJOR SYSTEM:        2011  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
      MINOR SYSTEM:        2011  3  5.0    0.30    0.03  1.33   20.55  n/a    0.000
*
   ADD [  2010+  2011]     2009  3  0.0    0.00    0.00  0.00   20.55  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD            3055  1  5.0    1.24    0.03  1.50    8.54 0.23    0.000
   [CN=70.0          ]
   [ N = 2.0:Tp 0.17]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3054  1  5.0    0.30    0.03  1.33   20.55 0.56    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  2011+  3054]     2004  3  5.0    0.60    0.05  1.33   20.55  n/a    0.000
*
   ADD [  2004+  3055]     2005  3  5.0    1.84    0.07  1.33   12.45  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3052  1  5.0    5.36    0.50  1.33   22.69 0.61    0.000
   [I%=37.0:S%= 2.00]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3051  1  5.0   11.90    0.88  1.33   20.58 0.56    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          3021  1  5.0    1.40    0.09  1.33   13.33 0.36    0.000
   [I%=28.0:S%= 2.00]
*
   ADD [  3021+  3051]     2001  3  5.0   13.30    0.97  1.33   19.81  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          4111  1  5.0    2.42    0.20  1.33   21.30 0.58    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD          4101  1  5.0    0.40    0.03  1.33   15.69 0.42    0.000
   [I%=35.0:S%= 2.00]
*
   ADD [  4101+  4111]     8000  3  5.0    2.82    0.24  1.33   20.51  n/a    0.000
*
   DUHYD                   8050  1  5.0    2.82    0.24  1.33   20.51  n/a    0.000
      MAJOR SYSTEM:        8050  2  5.0    0.00    0.00  0.00    0.00  n/a    0.000
      MINOR SYSTEM:        8050  3  5.0    2.82    0.24  1.33   20.51  n/a    0.000
*
   CHIC STORM                    10.0
   [ Ptot= 36.96 mm ]
```

```
*
 *  CALIB STANDHYD       4120  1  5.0     0.08     0.01  1.33  27.43 0.74    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0     0.08     0.01  1.33  27.43  n/a    0.000
       MAJOR SYSTEM:     8055  2  5.0     0.00     0.00  1.33  27.43  n/a    0.000
       MINOR SYSTEM:     8055  3  5.0     0.08     0.01  1.25  27.43  n/a    0.000
*
    ADD [  8050+  8055]  8020  3  5.0     2.90     0.25  1.33  20.69  n/a    0.000
*
    ADD [  2001+  8020]  2002  3  5.0    16.20     1.22  1.33  19.97  n/a    0.000
*
    ADD [  2002+  3052]  2003  3  5.0    21.56     1.72  1.33  20.65  n/a    0.000
*
    ADD [  2003+  2005]  2006  3  5.0    23.40     1.79  1.33  20.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0101  1  5.0     0.30     0.02  1.33  18.99 0.51    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       3056  1  5.0     1.37     0.15  1.33  22.42 0.61    0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0    23.70     1.81  1.33  19.99  n/a    0.000
*
    ADD [  2007+  2009]  2007  1  5.0    23.70     1.81  1.33  19.99  n/a    0.000
*
    ADD [  2007+  3056]  2007  3  5.0    25.07     1.96  1.33  20.12  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0    25.07     0.18  2.92  20.08  n/a    0.000
*
    ADD [  0001+  3705]  0004  3  1.0    98.33     0.64  2.52  10.39  n/a    0.000
*
    ADD [  0004+  0008]  0004  1  1.0   112.75     0.69  2.50   9.52  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0007  1  1.0    16.68     0.17  2.15   8.53 0.23    0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0010  1  2.0     7.76     0.02  2.77   2.40 0.06    0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB NASHYD         0011  1  2.0     8.42     0.01  2.97   2.18 0.06    0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
```

```
*
 *  CALIB STANDHYD       0105  1  2.0     2.90     0.15  1.33  12.12 0.33    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0     2.90     0.15  1.33  12.13  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0     1.57     0.10  1.33  19.29 0.52    0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0     1.57     0.10  1.33  19.29  n/a    0.000
       MAJOR SYSTEM:     1011  2  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     1011  3  2.0     1.57     0.10  1.33  19.29  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0     2.63     0.21  1.33  20.95 0.57    0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0     4.20     0.31  1.33  20.33  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0103  1  2.0     0.61     0.11  1.33  30.29 0.82    0.000
    [I%=75.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0104  1  2.0     1.57     0.14  1.33  22.07 0.60    0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0     2.18     0.25  1.33  24.37  n/a    0.000
*
    ADD [  0105+  0106]  0107  3  2.0     6.38     0.56  1.33  21.71  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0201  1  2.0    10.34     0.76  1.33  20.73 0.56    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
*
 *  CALIB STANDHYD       0202  1  2.0     2.00     0.14  1.33  20.11 0.54    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0    12.34     0.90  1.33  20.63  n/a    0.000
*
    ADD [  0107+  0203]  0204  3  2.0    18.72     1.47  1.33  21.00  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    18.72     0.13  3.03  20.98  n/a    0.000
*
    ADD [  1011+  0205]  0206  3  2.0    18.72     0.13  3.03  20.98  n/a    0.000
*
    ADD [  0015+  0206]  0051  3  2.0    21.62     0.21  1.33  19.79  n/a    0.000
*
    ADD [  0051+  0004]  0051  1  1.0   134.37     0.85  2.50  11.18  n/a    0.000
```

```
*
   ADD [  0051+  0010]  0051  3  1.0  142.13    0.86  2.50  10.70  n/a    0.000
*
   ADD [  0051+  0011]  0051  1  1.0  150.55    0.87  2.52  10.22  n/a    0.000
*
   ADD [  0051+  0007]  0051  3  1.0  167.23    1.04  2.42  10.05  n/a    0.000
*
   ADD [  0051+  1601]  0005  3  1.0  167.29    1.04  2.42  10.06  n/a    0.000
*
   CHANNEL[ 2:  0005]   0005  1  1.0  167.29    0.94  3.05  10.03  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0006  1  1.0   64.36    0.40  2.85   7.65 0.21    0.000
   [CN=75.0         ]
   [ N = 2.0:Tp 0.89]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0009  1  2.0   21.31    0.15  2.53   7.53 0.20    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.72]
*
   ADD [  0006+  0009]  0003  3  1.0   85.67    0.55  2.75   7.62  n/a    0.000
*
   CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.51  3.23   7.62  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0012  1  2.0   22.38    0.04  3.00   2.40 0.07    0.000
   [CN=48.0         ]
   [ N = 2.0:Tp 0.87]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0013  1  2.0   22.03    0.04  2.70   2.19 0.06    0.000
   [CN=44.0         ]
   [ N = 2.0:Tp 0.73]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0014  1  2.0    9.31    0.01  3.33   1.94 0.05    0.000
   [CN=40.0         ]
   [ N = 2.0:Tp 1.08]
*
   ADD [  0003+  0005]  0006  3  1.0  252.96    1.45  3.12   9.22  n/a    0.000
*
   ADD [  0006+  0012]  0006  1  1.0  275.34    1.49  3.12   8.66  n/a    0.000
*
   ADD [  0006+  0013]  0006  3  1.0  297.37    1.53  3.10   8.18  n/a    0.000
*
   ADD [  0006+  0014]  0006  1  1.0  306.68    1.54  3.10   7.99  n/a    0.000
*
   CHANNEL[ 2:  0006]   0006  1  1.0  306.68    1.48  3.52   7.98  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0015  1  2.0   35.26    0.06  3.43   2.37 0.06    0.000
```

```
   [CN=47.0         ]
   [ N = 2.0:Tp 1.12]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0200  1  5.0    2.69    0.03  1.67   4.91 0.13    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.18]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0201  1  5.0    0.26    0.04  1.33  28.42 0.77    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0200+  0201]  3000  3  5.0    2.95    0.06  1.33   6.98  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0211  1  5.0    1.00    0.01  1.50   4.83 0.13    0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.13]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0209  1  5.0    0.36    0.06  1.33  28.44 0.77    0.000
   [I%=75.0:S%= 0.50]
*
   ADD [  0209+  0211]  3012  3  5.0    1.36    0.07  1.33  11.08  n/a    0.000
*
   DUHYD                3112  1  5.0    1.36    0.07  1.33  11.08  n/a    0.000
      MAJOR SYSTEM:     3112  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     3112  3  5.0    1.36    0.07  1.33  11.08  n/a    0.000
*
   ADD [  3000+  3112]  3001  3  5.0    2.95    0.06  1.33   6.98  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB NASHYD         0109  1  5.0    1.11    0.01  2.00   6.27 0.17    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.40]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0102  1  5.0    0.53    0.11  1.33  31.07 0.84    0.000
   [I%=87.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0104  1  5.0    0.23    0.05  1.33  33.46 0.91    0.000
   [I%=95.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 36.96 mm ]
*
 * CALIB STANDHYD       0105  1  5.0    0.15    0.03  1.33  34.35 0.93    0.000
   [I%=98.0:S%= 2.00]
*
```

```
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.08  1.33  33.81  n/a   0.000
 *
  ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.01  1.58  33.47  n/a   0.000
 *
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.12  1.33  32.07  n/a   0.000
 *
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.12  1.33  17.89  n/a   0.000
 *
    ADD [  0202+  3001]  3002  3  5.0    4.97    0.18  1.33  11.41  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         0203  1  5.0    1.17    0.01  1.83   3.21 0.09   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
 *
    ADD [  0203+  3002]  3003  3  5.0    6.14    0.18  1.33   9.85  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         0204  1  5.0    3.82    0.02  1.67   3.18 0.09   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
 *
    ADD [  0204+  3003]  3004  3  5.0    9.96    0.19  1.33   7.29  n/a   0.000
 *
    ADD [  3015+  3112]  3005  3  5.0    2.11    0.12  1.33  13.48  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB STANDHYD       0206  1  5.0    7.28    0.48  1.33  17.85 0.48   0.000
    [I%=30.0:S%= 1.00]
 *
    ADD [  0206+  3005]  3006  3  5.0    9.39    0.60  1.33  16.87  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         0207  1  5.0    0.72    0.00  1.58   2.55 0.07   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
 *
    ADD [  0207+  3006]  3007  3  5.0   10.11    0.60  1.33  15.85  n/a   0.000
 *
  ** Reservoir
    OUTFLOW:             3008  1  5.0   10.11    0.12  2.25  15.87  n/a   0.000
 *
    ADD [  3004+  3008]  3009  3  5.0   20.07    0.21  1.33  11.61  n/a   0.000
 *
    ADD [  0002+  0006]  0007  3  1.0  446.48    2.10  3.70   7.82  n/a   0.000
 *
    ADD [  0007+  0015]  0007  1  1.0  481.74    2.16  3.70   7.42  n/a   0.000
 *
    ADD [  0007+  3009]  0007  3  1.0  501.81    2.27  3.63   7.59  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         1800  1  2.0   19.49    0.04  3.77   3.44 0.09   0.000
    [CN=55.1         ]
```

```
    [ N = 2.0:Tp 1.34]
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         1802  1  5.0    0.89    0.01  1.58   2.93 0.08   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         1803  1  5.0    0.64    0.01  1.50   6.39 0.17   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
 *
    ADD [  0007+  0165]  0008  3  1.0  501.81    2.27  3.63   7.59  n/a   0.000
 *
    ADD [  0008+  1800]  0008  1  1.0  521.30    2.31  3.65   7.44  n/a   0.000
 *
    ADD [  0008+  1802]  0008  3  1.0  522.19    2.31  3.65   7.43  n/a   0.000
 *
    ADD [  0008+  1803]  0008  1  1.0  522.83    2.31  3.63   7.43  n/a   0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 36.96 mm ]
 *
  * CALIB NASHYD         1801  1  5.0    6.46    0.02  2.75   3.41 0.09   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
 *
    ADD [  0008+  1801]  0009  3  1.0  529.29    2.33  3.63   7.38  n/a   0.000
 *
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```


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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7a5c726b-371c-4001-873f-b3dfdb241aee\s
  Summary    filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7a5c726b-371c-4001-873f-b3dfdb241aee\s


DATE: 04-29-2021                          TIME: 02:49:39
```

```
USER:

COMMENTS: ____________________________________________________________

  ************************************************
  ** SIMULATION : Run 02 - 5yr 4hr 10min Chicag **
  ************************************************

  W/E COMMAND            HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 ** CALIB NASHYD         0103  1  2.0     2.10     0.05  1.57   9.67 0.19   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 ** CALIB STANDHYD       0100  1  2.0     2.50     0.24  1.33  24.33 0.48   0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 ** CALIB STANDHYD       0200  1  2.0     2.68     0.28  1.33  30.48 0.60   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68     0.24  1.43  30.48  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0250  1  2.0     1.51     0.23  1.33  35.14 0.70   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19     0.47  1.33  32.16  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0221  1  2.0     0.62     0.12  1.33  37.51 0.74   0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0220  1  2.0     2.11     0.20  1.37  29.06 0.58   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0     2.73     0.32  1.33  30.98  n/a   0.000
*
    DUHYD                0226  1  2.0     2.73     0.32  1.33  30.98  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0     0.38     0.16  1.33  30.98  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0     2.35     0.16  1.23  30.98  n/a   0.000
*
    CHIC STORM                  10.0
```

```
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0222  1  2.0     1.12     0.21  1.33  37.51 0.74   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0     1.50     0.37  1.33  35.87  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0     5.69     0.83  1.33  33.13  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0251  1  2.0     0.48     0.07  1.33  33.36 0.66   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0     0.48     0.07  1.33  33.36  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0     0.01     0.01  1.33  33.36  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0     0.47     0.05  1.30  33.36  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0     6.16     0.89  1.33  33.15  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0     8.66     1.13  1.33  30.60  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0     1.90     0.20  1.33  25.35 0.50   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0     1.90     0.20  1.33  25.35  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0     0.08     0.05  1.33  25.35  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0     1.82     0.15  1.23  25.35  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0    10.48     1.28  1.33  29.69  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0    10.00     1.04  1.33  26.06 0.52   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0    20.48     2.32  1.33  27.92  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0    22.58     2.35  1.33  26.22  n/a   0.000
*
    CHIC STORM                  10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0104  1  2.0     2.50     0.25  1.33  24.17 0.48   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0    25.08     2.60  1.33  26.01  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0    25.08     0.09  4.17  25.98  n/a   0.000
*
    DIVERT HYD           1601  1  2.0    25.08     0.09  4.17  25.98  n/a   0.000
       Outflow           0002  2  2.0     0.05     0.00  4.17  25.98  n/a   0.000
       Outflow           0002  3  2.0    25.03     0.09  4.17  25.98  n/a   0.000
       Outflow           0002  4  2.0     0.00     0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0     0.00     0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0     0.00     0.00  0.00   0.00  n/a   0.000
*
    CHIC STORM                  10.0
```

```
    [ Ptot= 50.52 mm ]
*
 ** CALIB NASHYD         0210  1  5.0     2.36     0.06  1.50   9.82 0.19    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0205  1  5.0     0.75     0.07  1.33  27.55 0.55    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0     0.75     0.07  1.33  27.55  n/a    0.000
       MAJOR SYSTEM:     3015  2  5.0     0.02     0.01  1.33  27.55  n/a    0.000
       MINOR SYSTEM:     3015  3  5.0     0.73     0.06  1.25  27.55  n/a    0.000
*
    ADD [  0210+  3015]  3200  3  5.0     2.38     0.07  1.33   9.97  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0208  1  5.0     0.86     0.09  1.33  27.56 0.55    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0     3.24     0.15  1.33  14.64  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1901  1  2.0     1.06     0.03  1.57  10.39 0.21    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         1902  1  2.0     1.30     0.04  1.50  10.39 0.21    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5001  1  2.0     2.94     0.18  1.33  16.14 0.32    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0     2.94     0.18  1.33  16.14  n/a    0.000
       Outflow           0001  2  2.0     2.32     0.14  1.33  16.14  n/a    0.000
       Outflow           0001  3  2.0     0.62     0.04  1.33  16.14  n/a    0.000
       Outflow           0001  4  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       Outflow           0001  5  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       Outflow           0001  6  2.0     0.00     0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5002  1  2.0     2.85     0.18  1.33  19.38 0.38    0.000
    [I%=20.0:S%= 1.00]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5003  1  2.0    14.99     0.82  1.33  16.18 0.32    0.000
    [I%=20.0:S%= 1.00]
```

```
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       5004  1  2.0     2.91     0.30  1.33  22.88 0.45    0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0     2.91     0.30  1.33  22.88  n/a    0.000
       MAJOR SYSTEM:     0165  2  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:     0165  3  2.0     2.91     0.30  1.33  22.88  n/a    0.000
*
    PIPE   [ 2:  0165]   0164  1  2.0     2.91     0.23  1.37  22.84  n/a    0.000
*
    ADD [  0164+  5003]  0166  3  2.0    17.90     1.03  1.33  17.27  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0    17.90     0.38  1.80  16.50  n/a    0.000
*
    ADD [  0156+  0159]  5005  3  1.0    20.22     0.43  1.78  16.46  n/a    0.000
*
    ADD [  5005+  1902]  5005  1  1.0    21.52     0.45  1.75  16.09  n/a    0.000
*
    ADD [  5005+  5002]  5005  3  1.0    24.37     0.54  1.70  16.47  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0001  1  2.0   139.80     1.45  3.03  14.21 0.28    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0   139.80     1.28  3.97  14.20  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0002  1  1.0    18.97     0.18  3.08  12.86 0.25    0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0003  1  1.0    13.15     0.17  2.33  12.86 0.25    0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0005  1  1.0    32.68     0.47  2.38  14.16 0.28    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0004  1  1.0     8.46     0.43  1.35  15.10 0.30    0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0    32.12     0.34  2.63  12.86  n/a    0.000
*
    ADD [  0001+  0004]  0001  1  1.0    40.58     0.47  1.37  13.33  n/a    0.000
*
```

```
   ADD [  0001+  0005]  0001  3  1.0   73.26    0.88  2.35  13.70  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         0008  1  2.0   14.42    0.12  2.33   7.58 0.15    0.000
   [CN=58.0         ]
   [ N = 2.0:Tp 0.57]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         1031  1  5.0    1.05    0.05  1.42  16.03 0.32    0.000
   [CN=73.0         ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3061  1  5.0    0.48    0.06  1.33  31.04 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]  2008  3  5.0    1.53    0.11  1.33  20.74  n/a    0.000
*
   DUHYD                2010  1  5.0    1.53    0.11  1.33  20.74  n/a    0.000
      MAJOR SYSTEM:     2010  2  5.0    0.01    0.01  1.33  20.74  n/a    0.000
      MINOR SYSTEM:     2010  3  5.0    1.52    0.10  1.33  20.74  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3053  1  5.0    0.30    0.04  1.33  31.03 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   DUHYD                2011  1  5.0    0.30    0.04  1.33  31.03  n/a    0.000
      MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     2011  3  5.0    0.30    0.04  1.33  31.03  n/a    0.000
*
   ADD [  2010+  2011]  2009  3  5.0    0.01    0.01  1.33  20.74  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB NASHYD         3055  1  5.0    1.24    0.05  1.50  14.92 0.30    0.000
   [CN=70.0         ]
   [ N = 2.0:Tp 0.17]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3054  1  5.0    0.30    0.04  1.33  31.03 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  2011+  3054]  2004  3  5.0    0.60    0.08  1.33  31.03  n/a    0.000
*
   ADD [  2004+  3055]  2005  3  5.0    1.84    0.11  1.33  20.17  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3052  1  5.0    5.36    0.71  1.33  33.71 0.67    0.000
   [I%=37.0:S%= 2.00]
*
   CHIC STORM                 10.0
```

```
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3051  1  5.0   11.90    1.33  1.33  31.05 0.61    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3021  1  5.0    1.40    0.12  1.33  20.22 0.40    0.000
   [I%=28.0:S%= 2.00]
*
   ADD [  3021+  3051]  2001  3  5.0   13.30    1.46  1.33  29.91  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       4111  1  5.0    2.42    0.29  1.33  32.09 0.64    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       4101  1  5.0    0.40    0.05  1.33  23.42 0.46    0.000
   [I%=35.0:S%= 2.00]
*
   ADD [  4101+  4111]  8000  3  5.0    2.82    0.34  1.33  30.86  n/a    0.000
*
   DUHYD                8050  1  5.0    2.82    0.34  1.33  30.86  n/a    0.000
      MAJOR SYSTEM:     8050  2  5.0    0.13    0.10  1.33  30.86  n/a    0.000
      MINOR SYSTEM:     8050  3  5.0    2.69    0.24  1.25  30.86  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       4120  1  5.0    0.08    0.02  1.33  39.44 0.78    0.000
   [I%=58.0:S%= 2.00]
*
   DUHYD                8055  1  5.0    0.08    0.02  1.33  39.44  n/a    0.000
      MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  1.33  39.44  n/a    0.000
      MINOR SYSTEM:     8055  3  5.0    0.07    0.01  1.25  39.44  n/a    0.000
*
   ADD [  8050+  8055]  8020  3  5.0    2.76    0.25  1.25  31.08  n/a    0.000
*
   ADD [  2001+  8020]  2002  3  5.0   16.06    1.71  1.33  30.11  n/a    0.000
*
   ADD [  2002+  3052]  2003  3  5.0   21.42    2.42  1.33  31.01  n/a    0.000
*
   ADD [  2003+  2005]  2006  3  5.0   23.26    2.53  1.33  30.15  n/a    0.000
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       0101  1  5.0    0.30    0.03  1.33  28.73 0.57    0.000
   [I%=30.0:S%= 2.00]
*
   CHIC STORM                 10.0
   [ Ptot= 50.52 mm ]
*
 * CALIB STANDHYD       3056  1  5.0    1.37    0.20  1.33  32.46 0.64    0.000
   [I%=50.0:S%= 0.25]
*
   ADD [  0101+  2006]  2007  3  5.0   23.56    2.56  1.33  30.13  n/a    0.000
*
   ADD [  2007+  2009]  2007  1  5.0   23.58    2.57  1.33  30.13  n/a    0.000
```

```
*
    ADD [  2007+  3056]  2007  3  5.0   24.95    2.77  1.33  30.26  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.95    0.39  2.42  30.22  n/a    0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.21    1.27  2.38  17.64  n/a    0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.63    1.38  2.37  16.35  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.33  2.10  16.08 0.32    0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.03  2.70   5.14 0.10    0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.03  2.90   4.72 0.09    0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.20  1.33  18.47 0.37    0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    2.98    0.26  1.33  18.65  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.16  1.33  29.59 0.59    0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.16  1.33  29.59  n/a   0.000
      MAJOR SYSTEM:      1011  2  2.0    0.03    0.03  1.33  29.59  n/a   0.000
      MINOR SYSTEM:      1011  3  2.0    1.54    0.13  1.30  29.59  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.31  1.33  31.63 0.63    0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.17    0.44  1.33  30.88  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.15  1.33  42.62 0.84    0.000
    [I%=75.0:S%= 2.00]
*
    CHIC STORM                 10.0
```

```
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.21  1.33  32.92 0.65    0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.36  1.33  35.64  n/a    0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.35    0.80  1.33  32.51  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.12  1.33  31.28 0.62    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.22  1.33  30.65 0.61    0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.33  1.33  31.18  n/a    0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.69    2.13  1.33  31.63  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.69    0.20  3.03  31.62  n/a    0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.20  3.03  31.61  n/a    0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.70    0.37  1.33  29.83  n/a    0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.32    1.61  2.37  18.53  n/a    0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.08    1.65  2.38  17.80  n/a    0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.50    1.68  2.38  17.07  n/a    0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.18    1.99  2.33  16.97  n/a    0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.24    1.99  2.33  16.97  n/a    0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.24    1.82  2.85  16.95  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0006  1  1.0   64.36    0.76  2.78  14.55 0.29    0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.29  2.50  14.26 0.28    0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.04  2.70  14.48  n/a    0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.00  3.12  14.48  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 50.52 mm ]
```

```
 *
  *  CALIB NASHYD          0012  1  2.0   22.38    0.09  2.90   5.20 0.10    0.000
     [CN=48.0          ]
     [ N = 2.0:Tp 0.87]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0013  1  2.0   22.03    0.09  2.63   4.68 0.09    0.000
     [CN=44.0          ]
     [ N = 2.0:Tp 0.73]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0014  1  2.0    9.31    0.03  3.27   4.12 0.08    0.000
     [CN=40.0          ]
     [ N = 2.0:Tp 1.08]
 *
     ADD [  0003+  0005]  0006  3  1.0  252.91    2.80  2.95  16.11  n/a    0.000
 *
     ADD [  0006+  0012]  0006  1  1.0  275.29    2.89  2.95  15.22  n/a    0.000
 *
     ADD [  0006+  0013]  0006  3  1.0  297.32    2.98  2.93  14.44  n/a    0.000
 *
     ADD [  0006+  0014]  0006  1  1.0  306.63    3.01  2.93  14.13  n/a    0.000
 *
     CHANNEL[ 2:  0006]   0006  1  1.0  306.63    2.91  3.30  14.12  n/a    0.000
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0015  1  2.0   35.26    0.12  3.37   5.09 0.10    0.000
     [CN=47.0          ]
     [ N = 2.0:Tp 1.12]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0200  1  5.0    2.69    0.06  1.58  10.12 0.20    0.000
     [CN=68.0          ]
     [ N = 2.0:Tp 0.18]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB STANDHYD        0201  1  5.0    0.26    0.06  1.33  40.47 0.80    0.000
     [I%=75.0:S%= 0.50]
 *
     ADD [  0200+  0201]  3000  3  5.0    2.95    0.09  1.33  12.80  n/a    0.000
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0211  1  5.0    1.00    0.03  1.50   9.96 0.20    0.000
     [CN=68.0          ]
     [ N = 2.0:Tp 0.13]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB STANDHYD        0209  1  5.0    0.36    0.08  1.33  40.47 0.80    0.000
     [I%=75.0:S%= 0.50]
 *
```

```
     ADD [  0209+  0211]  3012  3  5.0    1.36    0.10  1.33  18.03  n/a    0.000
 *
     DUHYD                3112  1  5.0    1.36    0.10  1.33  18.03  n/a    0.000
        MAJOR SYSTEM:     3112  2  5.0    0.02    0.01  1.33  18.03  n/a    0.000
        MINOR SYSTEM:     3112  3  5.0    1.34    0.09  1.33  18.03  n/a    0.000
 *
     ADD [  3000+  3112]  3001  3  5.0    2.97    0.10  1.33  12.82  n/a    0.000
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0109  1  5.0    1.11    0.02  2.00  12.66 0.25    0.000
     [CN=74.0          ]
     [ N = 2.0:Tp 0.40]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB STANDHYD        0102  1  5.0    0.53    0.14  1.33  43.46 0.86    0.000
     [I%=87.0:S%= 2.00]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB STANDHYD        0104  1  5.0    0.23    0.07  1.33  46.57 0.92    0.000
     [I%=95.0:S%= 2.00]
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB STANDHYD        0105  1  5.0    0.15    0.04  1.33  47.74 0.94    0.000
     [I%=98.0:S%= 2.00]
 *
     ADD [  0104+  0105]  0106  3  5.0    0.38    0.11  1.33  47.03  n/a    0.000
 *
 **  Reservoir
     OUTFLOW:             0107  1  5.0    0.38    0.02  1.67  46.70  n/a    0.000
 *
     ADD [  0102+  0107]  0108  3  5.0    0.91    0.16  1.33  44.81  n/a    0.000
 *
     ADD [  0108+  0109]  0202  3  5.0    2.02    0.16  1.33  27.14  n/a    0.000
 *
     ADD [  0202+  3001]  3002  3  5.0    4.99    0.26  1.33  18.63  n/a    0.000
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0203  1  5.0    1.17    0.01  1.83   6.82 0.14    0.000
     [CN=56.0          ]
     [ N = 2.0:Tp 0.30]
 *
     ADD [  0203+  3002]  3003  3  5.0    6.16    0.27  1.33  16.38  n/a    0.000
 *
     CHIC STORM                 10.0
     [ Ptot= 50.52 mm ]
 *
  *  CALIB NASHYD          0204  1  5.0    3.82    0.05  1.67   6.77 0.13    0.000
     [CN=56.0          ]
     [ N = 2.0:Tp 0.20]
 *
     ADD [  0204+  3003]  3004  3  5.0    9.98    0.29  1.33  12.70  n/a    0.000
 *
     ADD [  3015+  3112]  3005  3  5.0    2.07    0.15  1.33  21.39  n/a    0.000
 *
```

```
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB STANDHYD      0206  1  5.0     7.28    0.68  1.33  27.57 0.55    0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0     9.35    0.83  1.33  26.20  n/a    0.000
*
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD        0207  1  5.0     0.72    0.01  1.58   5.47 0.11    0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    10.07    0.84  1.33  24.72  n/a    0.000
*
 ** Reservoir
    OUTFLOW:            3008  1  5.0    10.07    0.22  2.08  24.73  n/a    0.000
*
    ADD [  3004+  3008]  3009  3  5.0    20.05    0.37  1.83  18.75  n/a    0.000
*
    ADD [  0002+  0006]  0007  3  1.0   446.43    4.11  3.48  14.14  n/a    0.000
*
    ADD [  0007+  0015]  0007  1  1.0   481.69    4.23  3.48  13.48  n/a    0.000
*
    ADD [  0007+  3009]  0007  3  1.0   501.74    4.43  3.43  13.69  n/a    0.000
*
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD        1800  1  2.0    19.49    0.09  3.70   7.09 0.14    0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD        1802  1  5.0     0.89    0.01  1.58   6.10 0.12    0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD        1803  1  5.0     0.64    0.02  1.50  11.96 0.24    0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0   501.74    4.43  3.43  13.69  n/a    0.000
*
    ADD [  0008+  1800]  0008  1  1.0   521.23    4.51  3.43  13.44  n/a    0.000
*
    ADD [  0008+  1802]  0008  3  1.0   522.12    4.52  3.43  13.43  n/a    0.000
*
    ADD [  0008+  1803]  0008  1  1.0   522.76    4.52  3.43  13.43  n/a    0.000
*
    CHIC STORM               10.0
    [ Ptot= 50.52 mm ]
*
 *  CALIB NASHYD        1801  1  5.0     6.46    0.04  2.75   7.04 0.14    0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
```

```
    ADD [  0008+  1801]  0009  3  1.0  529.22    4.56  3.43  13.35  n/a   0.000
*
=================================================================================
========================


      V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


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```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\fa4326bd-0df8-440a-aad9-9d36d373c3b6\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\fa4326bd-0df8-440a-aad9-9d36d373c3b6\s


DATE: 04-29-2021                          TIME: 02:49:47

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 03 -10yr 4hr 10min Chicag **
  **************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    CHIC STORM               10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB NASHYD        0103  1  2.0     2.10    0.07  1.57  13.14 0.22    0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    CHIC STORM               10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB STANDHYD      0100  1  2.0     2.50    0.29  1.33  30.12 0.50    0.000
    [I%=33.0:S%= 2.00]
*
    CHIC STORM               10.0
    [ Ptot= 59.69 mm ]
*
```

```
 ** CALIB STANDHYD        0200  1  2.0     2.68     0.35  1.37  38.02 0.64    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:              0205  1  2.0     2.68     0.24  1.57  38.02  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0250  1  2.0     1.51     0.28  1.33  43.19 0.72    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]   0255  3  2.0     4.19     0.52  1.33  39.88  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0221  1  2.0     0.62     0.14  1.33  45.67 0.77    0.000
    [I%=51.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0220  1  2.0     2.11     0.27  1.37  36.45 0.61    0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]   0225  3  2.0     2.73     0.41  1.33  38.54  n/a    0.000
*
    DUHYD                 0226  1  2.0     2.73     0.41  1.33  38.54  n/a    0.000
       MAJOR SYSTEM:      0226  2  2.0     0.57     0.25  1.33  38.54  n/a    0.000
       MINOR SYSTEM:      0226  3  2.0     2.16     0.16  1.23  38.54  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0222  1  2.0     1.12     0.26  1.33  45.67 0.77    0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]   0227  3  2.0     1.69     0.51  1.33  43.27  n/a    0.000
*
    ADD [  0227+  0255]   0256  3  2.0     5.88     1.03  1.33  40.86  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0251  1  2.0     0.48     0.08  1.33  41.22 0.69    0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                 0252  1  2.0     0.48     0.08  1.33  41.22  n/a    0.000
       MAJOR SYSTEM:      0252  2  2.0     0.03     0.03  1.33  41.22  n/a    0.000
       MINOR SYSTEM:      0252  3  2.0     0.45     0.05  1.23  41.22  n/a    0.000
*
    ADD [  0252+  0256]   0009  3  2.0     6.34     1.08  1.33  40.88  n/a    0.000
*
    ADD [  0009+  0100]   0010  3  2.0     8.84     1.37  1.33  37.84  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0101  1  2.0     1.90     0.24  1.33  31.30 0.52    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                 0050  1  2.0     1.90     0.24  1.33  31.30  n/a    0.000
       MAJOR SYSTEM:      0050  2  2.0     0.13     0.09  1.33  31.30  n/a    0.000
```

```
       MINOR SYSTEM:      0050  3  2.0     1.77     0.15  1.23  31.30  n/a    0.000
*
    ADD [  0010+  0050]   0011  3  2.0    10.61     1.52  1.33  36.74  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0102  1  2.0    10.00     1.23  1.33  32.16 0.54    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]   0012  3  2.0    20.61     2.75  1.33  34.52  n/a    0.000
*
    ADD [  0012+  0103]   0013  3  2.0    22.71     2.79  1.33  32.54  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0104  1  2.0     2.50     0.30  1.33  29.96 0.50    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]   0014  3  2.0    25.21     3.08  1.33  32.29  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              0601  1  2.0    25.21     0.17  4.03  32.24  n/a    0.000
*
    DIVERT HYD            1601  1  2.0    25.21     0.17  4.03  32.24  n/a    0.000
       Outflow            0002  2  2.0     0.05     0.00  4.03  32.24  n/a    0.000
       Outflow            0002  3  2.0    25.16     0.17  4.03  32.24  n/a    0.000
       Outflow            0002  4  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       Outflow            0002  5  2.0     0.00     0.00  0.00   0.00  n/a    0.000
       Outflow            0002  6  2.0     0.00     0.00  0.00   0.00  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 ** CALIB NASHYD          0210  1  5.0     2.36     0.09  1.50  13.96 0.23    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0205  1  5.0     0.75     0.09  1.33  34.60 0.58    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                 3015  1  5.0     0.75     0.09  1.33  34.60  n/a    0.000
       MAJOR SYSTEM:      3015  2  5.0     0.04     0.03  1.33  34.60  n/a    0.000
       MINOR SYSTEM:      3015  3  5.0     0.71     0.06  1.25  34.60  n/a    0.000
*
    ADD [  0210+  3015]   3200  3  5.0     2.40     0.11  1.33  14.30  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0208  1  5.0     0.86     0.10  1.33  34.61 0.58    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]   3201  3  5.0     3.26     0.21  1.33  19.66  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          1901  1  2.0     1.06     0.04  1.57  14.63 0.25    0.000
    [CN=66.5          ]
```

```
   [ N = 3.0:Tp 0.21]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.06  1.50  14.63 0.25    0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.16]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.21  1.33  20.46 0.34    0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.21  1.33  20.46  n/a    0.000
      Outflow           0001  2  2.0    2.32    0.17  1.33  20.46  n/a    0.000
      Outflow           0001  3  2.0    0.62    0.04  1.33  20.46  n/a    0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.22  1.33  24.73 0.41    0.000
   [I%=20.0:S%= 1.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       5003  1  2.0   14.99    0.99  1.33  20.52 0.34    0.000
   [I%=20.0:S%= 1.00]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       5004  1  2.0    2.91    0.36  1.33  28.21 0.47    0.000
   [I%=35.0:S%= 1.00]
*
   DUHYD                0165  1  2.0    2.91    0.36  1.33  28.21  n/a    0.000
      MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a    0.000
      MINOR SYSTEM:     0165  3  2.0    2.91    0.36  1.33  28.21  n/a    0.000
*
   PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.28  1.37  28.17  n/a    0.000
*
   ADD [  0164+  5003]  0166  3  2.0   17.90    1.24  1.33  21.76  n/a    0.000
*
 ** Reservoir
   OUTFLOW:             0159  1  1.0   17.90    0.59  1.68  21.00  n/a    0.000
*
   ADD [  0156+  0159]  5005  3  1.0   20.22    0.66  1.67  20.93  n/a    0.000
*
   ADD [  5005+  1902]  5005  1  1.0   21.52    0.71  1.67  20.55  n/a    0.000
*
   ADD [  5005+  5002]  5005  3  1.0   24.37    0.83  1.65  21.04  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0001  1  2.0  139.80    2.00  3.00  19.50 0.33    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 1.05]
*
```

```
   CHANNEL[ 2:  0001]   0002  1  1.0  139.80    1.77  3.85  19.49  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0002  1  1.0   18.97    0.24  3.05  17.75 0.30    0.000
   [CN=71.0         ]
   [ N = 2.0:Tp 1.06]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0003  1  1.0   13.15    0.24  2.32  17.75 0.30    0.000
   [CN=71.0         ]
   [ N = 2.0:Tp 0.62]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0005  1  1.0   32.68    0.64  2.35  19.44 0.33    0.000
   [CN=74.0         ]
   [ N = 2.0:Tp 0.65]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       0004  1  1.0    8.46    0.52  1.35  19.23 0.32    0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]  0001  3  1.0   32.12    0.47  2.60  17.75  n/a    0.000
*
   ADD [  0001+  0004]  0001  1  1.0   40.58    0.59  1.37  18.06  n/a    0.000
*
   ADD [  0001+  0005]  0001  3  1.0   73.26    1.21  2.33  18.67  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         0008  1  2.0   14.42    0.17  2.30  10.87 0.18    0.000
   [CN=58.0         ]
   [ N = 2.0:Tp 0.57]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB NASHYD         1031  1  5.0    1.05    0.07  1.42  21.22 0.36    0.000
   [CN=73.0         ]
   [ N = 2.0:Tp 0.11]
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
 * CALIB STANDHYD       3061  1  5.0    0.48    0.08  1.33  38.53 0.65    0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]  2008  3  5.0    1.53    0.15  1.33  26.65  n/a    0.000
*
   DUHYD                2010  1  5.0    1.53    0.15  1.33  26.65  n/a    0.000
      MAJOR SYSTEM:     2010  2  5.0    0.10    0.05  1.33  26.65  n/a    0.000
      MINOR SYSTEM:     2010  3  5.0    1.43    0.10  1.33  26.65  n/a    0.000
*
   CHIC STORM                10.0
   [ Ptot= 59.69 mm ]
*
```

```
 *  CALIB STANDHYD        3053  1  5.0    0.30    0.05  1.33  38.53 0.65    0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                 2011  1  5.0    0.30    0.05  1.33  38.53  n/a    0.000
       MAJOR SYSTEM:      2011  2  5.0    0.00    0.00  0.00   0.00  n/a    0.000
       MINOR SYSTEM:      2011  3  5.0    0.30    0.05  1.33  38.53  n/a    0.000
*
    ADD [  2010+  2011]   2009  3  5.0    0.10    0.05  1.33  26.65  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          3055  1  5.0    1.24    0.06  1.50  19.87 0.33    0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        3054  1  5.0    0.30    0.05  1.33  38.52 0.65    0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]   2004  3  5.0    0.60    0.10  1.33  38.52  n/a    0.000
*
    ADD [  2004+  3055]   2005  3  5.0    1.84    0.15  1.33  25.95  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        3052  1  5.0    5.36    0.86  1.33  41.51 0.70    0.000
    [I%=37.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        3051  1  5.0   11.90    1.63  1.33  38.55 0.65    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        3021  1  5.0    1.40    0.15  1.33  25.29 0.42    0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]   2001  3  5.0   13.30    1.78  1.33  37.15  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        4111  1  5.0    2.42    0.41  1.33  39.78 0.67    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        4101  1  5.0    0.40    0.05  1.33  29.03 0.49    0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]   8000  3  5.0    2.82    0.46  1.33  38.25  n/a    0.000
*
    DUHYD                 8050  1  5.0    2.82    0.46  1.33  38.25  n/a    0.000
       MAJOR SYSTEM:      8050  2  5.0    0.35    0.22  1.33  38.25  n/a    0.000
       MINOR SYSTEM:      8050  3  5.0    2.47    0.24  1.25  38.25  n/a    0.000
*
```

```
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        4120  1  5.0    0.08    0.02  1.33  47.77 0.80    0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                 8055  1  5.0    0.08    0.02  1.33  47.77  n/a    0.000
       MAJOR SYSTEM:      8055  2  5.0    0.01    0.01  1.33  47.77  n/a    0.000
       MINOR SYSTEM:      8055  3  5.0    0.07    0.01  1.25  47.77  n/a    0.000
*
    ADD [  8050+  8055]   8020  3  5.0    2.54    0.25  1.25  38.51  n/a    0.000
*
    ADD [  2001+  8020]   2002  3  5.0   15.84    2.03  1.33  37.37  n/a    0.000
*
    ADD [  2002+  3052]   2003  3  5.0   21.20    2.89  1.33  38.42  n/a    0.000
*
    ADD [  2003+  2005]   2006  3  5.0   23.04    3.04  1.33  37.42  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        0101  1  5.0    0.30    0.05  1.33  35.77 0.60    0.000
    [I%=30.0:S%= 2.00]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD        3056  1  5.0    1.37    0.24  1.33  39.57 0.66    0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]   2007  3  5.0   23.34    3.09  1.33  37.40  n/a    0.000
*
    ADD [  2007+  2009]   2007  1  5.0   23.44    3.14  1.33  37.35  n/a    0.000
*
    ADD [  2007+  3056]   2007  3  5.0   24.81    3.37  1.33  37.48  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              3705  1  5.0   24.81    0.55  2.33  37.44  n/a    0.000
*
    ADD [  0001+  3705]   0004  3  1.0   98.07    1.76  2.33  23.16  n/a    0.000
*
    ADD [  0004+  0008]   0004  1  1.0  112.49    1.93  2.33  21.58  n/a    0.000
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0007  1  1.0   16.68    0.45  2.08  21.93 0.37    0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0010  1  2.0    7.76    0.05  2.67   7.48 0.13    0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    CHIC STORM                  10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD          0011  1  2.0    8.42    0.05  2.87   6.91 0.12    0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
```

```
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0105  1  2.0     2.90     0.24  1.33   23.18 0.39     0.000
    [I%=23.0:S%= 2.00]
 *
    ADD [  0105+  0050]   0015  3  2.0     3.03     0.33  1.33   23.52  n/a     0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0101  1  2.0     1.57     0.21  1.33   37.01 0.62     0.000
    [I%=23.0:S%= 2.00]
 *
    DUHYD                 1011  1  2.0     1.57     0.21  1.33   37.01  n/a     0.000
       MAJOR SYSTEM:      1011  2  2.0     0.14     0.08  1.33   37.01  n/a     0.000
       MINOR SYSTEM:      1011  3  2.0     1.43     0.13  1.23   37.01  n/a     0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0102  1  2.0     2.63     0.38  1.33   39.27 0.66     0.000
    [I%=29.0:S%= 2.00]
 *
    ADD [  1011+  0102]   0105  3  2.0     4.06     0.51  1.33   38.47  n/a     0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0103  1  2.0     0.61     0.18  1.33   51.12 0.86     0.000
    [I%=75.0:S%= 2.00]
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0104  1  2.0     1.57     0.27  1.33   40.63 0.68     0.000
    [I%=36.0:S%= 2.00]
 *
    ADD [  0103+  0104]   0106  3  2.0     2.18     0.45  1.33   43.57  n/a     0.000
 *
    ADD [  0105+  0106]   0107  3  2.0     6.24     0.95  1.33   40.25  n/a     0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0201  1  2.0    10.34     1.43  1.37   38.83 0.65     0.000
    [I%=30.0:S%= 2.00]
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB STANDHYD        0202  1  2.0     2.00     0.29  1.33   38.20 0.64     0.000
    [I%=25.0:S%= 2.00]
 *
    ADD [  0201+  0202]   0203  3  2.0    12.34     1.71  1.37   38.73  n/a     0.000
 *
    ADD [  0107+  0203]   0204  3  2.0    18.58     2.66  1.33   39.24  n/a     0.000
 *
 ** Reservoir
    OUTFLOW:              0205  1  2.0    18.58     0.27  2.90   39.22  n/a     0.000
 *
    ADD [  1011+  0205]   0206  3  2.0    18.72     0.27  2.90   39.21  n/a     0.000
 *
    ADD [  0015+  0206]   0051  3  2.0    21.75     0.51  1.33   37.02  n/a     0.000
```

```
 *
    ADD [  0051+  0004]   0051  1  1.0  134.24    2.24  2.33  24.08  n/a    0.000
 *
    ADD [  0051+  0010]   0051  3  1.0  142.00    2.29  2.33  23.18  n/a    0.000
 *
    ADD [  0051+  0011]   0051  1  1.0  150.42    2.33  2.33  22.27  n/a    0.000
 *
    ADD [  0051+  0007]   0051  3  1.0  167.10    2.76  2.27  22.23  n/a    0.000
 *
    ADD [  0051+  1601]   0005  3  1.0  167.14    2.76  2.27  22.23  n/a    0.000
 *
    CHANNEL[ 2:  0005]    0005  1  1.0  167.14    2.55  2.77  22.21  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD          0006  1  1.0   64.36    1.05  2.75  19.97 0.33    0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD          0009  1  2.0   21.31    0.39  2.47  19.56 0.33    0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
 *
    ADD [  0006+  0009]   0003  3  1.0   85.67    1.44  2.67  19.87  n/a    0.000
 *
    CHANNEL[ 2:  0003]    0003  1  1.0   85.67    1.38  3.03  19.87  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD          0012  1  2.0   22.38    0.14  2.87   7.60 0.13    0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD          0013  1  2.0   22.03    0.14  2.60   6.82 0.11    0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
 *
  * CALIB NASHYD          0014  1  2.0    9.31    0.04  3.23   6.00 0.10    0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
 *
    ADD [  0003+  0005]   0006  3  1.0  252.81    3.91  2.88  21.41  n/a    0.000
 *
    ADD [  0006+  0012]   0006  1  1.0  275.19    4.05  2.87  20.29  n/a    0.000
 *
    ADD [  0006+  0013]   0006  3  1.0  297.22    4.18  2.87  19.29  n/a    0.000
 *
    ADD [  0006+  0014]   0006  1  1.0  306.53    4.22  2.87  18.89  n/a    0.000
 *
    CHANNEL[ 2:  0006]    0006  1  1.0  306.53    4.08  3.20  18.88  n/a    0.000
 *
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
```

```
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.18  3.33   7.43 0.12   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 1.12]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.08  1.58  14.38 0.24   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.18]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.07  1.33  48.77 0.82   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.12  1.33  17.41  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.04  1.50  14.15 0.24   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.13]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.10  1.33  48.78 0.82   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.12  1.33  23.32  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.12  1.33  23.32  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.05    0.03  1.33  23.32  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.31    0.09  1.25  23.32  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.00    0.15  1.33  17.51  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.03  1.92  17.77 0.30   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.40]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.17  1.33  51.93 0.87   0.000
    [I%=87.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.08  1.33  55.47 0.93   0.000
    [I%=95.0:S%= 2.00]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.05  1.33  56.80 0.95   0.000
```

```
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.13  1.33  56.00  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02  1.67  55.66  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.18  1.33  53.48  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.19  1.33  33.86  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.02    0.34  1.33  24.09  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.02  1.83   9.88 0.17   0.000
    [CN=56.0        ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.19    0.35  1.33  21.40  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.07  1.58   9.80 0.16   0.000
    [CN=56.0        ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.01    0.39  1.33  16.98  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.02    0.15  1.25  27.29  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    0.83  1.33  34.62 0.58   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.30    0.98  1.33  33.02  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.01  1.50   7.98 0.13   0.000
    [CN=50.0        ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.02    0.99  1.33  31.22  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0   10.02    0.22  2.33  31.24  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.03    0.48  1.67  24.11  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.33    5.75  3.37  19.07  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.59    5.93  3.37  18.22  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.62    6.23  3.37  18.45  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
```

```
 *  CALIB NASHYD         1800  1  2.0   19.49    0.12  3.63  10.15 0.17    0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.02  1.58   8.78 0.15    0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.03  1.50  16.39 0.27    0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  501.62    6.23  3.37  18.45  n/a    0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.11    6.35  3.37  18.14  n/a    0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.00    6.35  3.37  18.13  n/a    0.000
*
    ADD [  0008+  1803]  0008  1  1.0  522.64    6.36  3.37  18.12  n/a    0.000
*
    CHIC STORM                 10.0
    [ Ptot= 59.69 mm ]
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.06  2.67  10.09 0.17    0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  529.10    6.41  3.37  18.03  n/a    0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

```
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```


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\dea3b145-37df-4bf4-9467-f25a9fc823df\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\dea3b145-37df-4bf4-9467-f25a9fc823df\s
```

```
DATE: 04-29-2021                           TIME: 02:49:45

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 07 - 2yr 12hr 15min SCS    **
  **************************************************

  W/E COMMAND              HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                   min      ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.05  6.37   8.62 0.18    0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.15  6.23  22.49 0.47    0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.21  6.27  28.06 0.59    0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.21  6.27  28.06  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.15  6.23  32.54 0.68    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.36  6.27  29.67  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.07  6.23  34.86 0.73   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.15  6.27  26.69 0.56   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.22  6.23  28.55  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.22  6.23  28.55  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.12    0.06  6.23  28.55  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.61    0.16  6.10  28.55  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.13  6.23  34.87 0.73   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.24    0.20  6.23  34.28  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.43    0.55  6.27  30.72  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.05  6.23  30.83 0.65   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.05  6.23  30.83  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.48    0.05  6.23  30.83  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    5.91    0.59  6.23  30.73  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.41    0.74  6.23  28.28  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.12  6.23  23.45 0.49   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.12  6.23  23.45  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.90    0.12  6.23  23.45  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.31    0.87  6.23  27.39  n/a   0.000
*
```

```
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.63  6.23  24.11 0.51   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.31    1.50  6.23  25.78  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.41    1.53  6.23  24.17  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.15  6.23  22.33 0.47   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   24.91    1.69  6.23  23.98  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   24.91    0.08  9.77  23.93  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   24.91    0.08  9.77  23.93  n/a   0.000
       Outflow           0002  2  2.0    0.06    0.00  9.77  23.93  n/a   0.000
       Outflow           0002  3  2.0   24.85    0.08  9.77  23.93  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.07  6.25   8.58 0.18   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.05  6.25  25.31 0.53   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.05  6.25  25.31  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.75    0.05  6.25  25.31  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.36    0.07  6.25   8.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.06  6.25  25.31 0.53   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.22    0.12  6.25  13.05  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.03  6.37   9.11 0.19   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.04  6.33   9.11 0.19   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.11  6.23  14.79 0.31   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.11  6.23  14.79  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.09  6.23  14.79  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.02  6.23  14.79  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.12  6.23  17.70 0.37   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    0.53  6.27  14.83 0.31   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
```

```
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.18  6.23  21.19 0.45   0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0    2.91    0.18  6.23  21.19  n/a   0.000
       MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0165  3  2.0    2.91    0.18  6.23  21.19  n/a   0.000
*
    PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.16  6.27  21.16  n/a   0.000
*
    ADD [  0164+  5003]  0166  3  2.0   17.90    0.68  6.27  15.86  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   17.90    0.28  6.68  15.09  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   20.22    0.31  6.67  15.06  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   21.52    0.32  6.63  14.70  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   24.37    0.38  6.57  15.05  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    1.11  7.53  12.59 0.27   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    0.93  8.55  12.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.13  7.57  11.31 0.24   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.14  6.95  11.37 0.24   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.37  6.98  12.53 0.26   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.65]
*
```

```
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.29  6.27  13.82 0.29   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.26  7.18  11.37  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.39  6.28  11.88  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    0.71  6.90  12.17  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.09  6.93   6.60 0.14   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.05  6.25  14.42 0.30   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.04  6.25  28.63 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.09  6.25  18.88  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.09  6.25  18.88  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.53    0.09  6.25  18.88  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.03  6.25  28.63 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.03  6.25  28.63  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.03  6.25  28.63  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  0.0    0.00    0.00  0.00  28.63  n/a   0.000
```

```
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.04  6.33  13.39 0.28   0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.03  6.25  28.62 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.05  6.25  28.63  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.09  6.25  18.36  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.51  6.25  31.19 0.66   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.00  6.25  28.65 0.60   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.08  6.25  18.62 0.39   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.08  6.25  27.59  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.22  6.25  29.62 0.62   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
```

```
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.03  6.25  21.63 0.46   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.25  6.25  28.49  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.25  6.25  28.49  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.01    0.01  6.25  28.49  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.81    0.24  6.25  28.49  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.01  6.25  36.71 0.77   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.01  6.25  36.71  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.00    0.00  6.25  36.71  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.08    0.01  6.25  36.71  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.89    0.25  6.25  28.71  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.19    1.33  6.25  27.79  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.55    1.84  6.25  28.64  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.39    1.93  6.25  27.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.02  6.25  26.49 0.56   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.12  6.25  30.17 0.64   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.69    1.95  6.25  27.81  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.69    1.95  6.25  27.81  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   25.06    2.08  6.25  27.94  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   25.06    0.28  7.08  27.90  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.32    0.98  6.98  15.74  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.74    1.07  6.97  14.57  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.27  6.80  14.27 0.30   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.03  7.23   4.45 0.09   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.02  7.37   4.08 0.09   0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.12  6.23  16.99 0.36   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    2.90    0.12  6.23  16.99  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.12  6.27  27.22 0.57   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.12  6.27  27.22  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.57    0.12  6.27  27.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname                  :                    C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.22  6.27  29.18 0.61   0.000
    [I%=29.0:S%= 2.00]
*
```

```
    ADD [  1011+  0102]  0105  3  2.0    4.20    0.34  6.27  28.45  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0103  1  2.0    0.61    0.09  6.23  39.85 0.84   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  2.0    1.57    0.14  6.23  30.44 0.64   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.23  6.23  33.07  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.38    0.57  6.23  30.03  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  2.0   10.34    0.80  6.27  28.86 0.61   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0202  1  2.0    2.00    0.16  6.27  28.23 0.59   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    0.96  6.27  28.76  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.72    1.52  6.27  29.19  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0205  1  2.0   18.72    0.16  7.37  29.18  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.16  7.37  29.18  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.62    0.22  6.23  27.54  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.36    1.26  6.98  16.66  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.12    1.28  6.98  15.99  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.54    1.31  7.00  15.32  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.22    1.57  6.92  15.22  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.28    1.57  6.92  15.22  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.28    1.38  7.47  15.18  n/a   0.000
```

```
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0006  1  1.0   64.36    0.59  7.33  12.86 0.27   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0009  1  2.0   21.31    0.23  7.07  12.64 0.27   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    0.82  7.25  12.83  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.76  7.70  12.83  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0012  1  2.0   22.38    0.07  7.37   4.50 0.09   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0013  1  2.0   22.03    0.07  7.17   4.06 0.09   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 47.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0014  1  2.0    9.31    0.02  7.70   3.57 0.08   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.95    2.13  7.57  14.38  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.33    2.20  7.57  13.58  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.36    2.26  7.57  12.87  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.67    2.28  7.57  12.59  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.67    2.17  7.92  12.57  n/a   0.000
```

```
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0015  1  2.0   35.26    0.09  7.77   4.41 0.09   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0200  1  5.0    2.69    0.05  6.33   8.84 0.19   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0201  1  5.0    0.26    0.03  6.25  37.74 0.79   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]   3000  3  5.0    2.95    0.09  6.25  11.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0211  1  5.0    1.00    0.03  6.25   8.70 0.18   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0209  1  5.0    0.36    0.05  6.25  37.76 0.79   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]   3012  3  5.0    1.36    0.07  6.25  16.39  n/a   0.000
*
    DUHYD                 3112  1  5.0    1.36    0.07  6.25  16.39  n/a   0.000
       MAJOR SYSTEM:      3112  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:      3112  3  5.0    1.36    0.07  6.25  16.39  n/a   0.000
*
    ADD [  3000+  3112]   3001  3  5.0    2.95    0.09  6.25  11.39  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD          0109  1  5.0    1.11    0.02  6.67  11.10 0.23   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  5.0    0.53    0.08  6.25  40.69 0.86   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  5.0    0.23    0.04  6.25  43.65 0.92   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  5.0    0.15    0.03  6.25  44.76 0.94   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]   0106  3  5.0    0.38    0.06  6.25  44.09  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0107  1  5.0    0.38    0.02  6.33  43.76  n/a   0.000
*
    ADD [  0102+  0107]   0108  3  5.0    0.91    0.10  6.25  41.97  n/a   0.000
*
    ADD [  0108+  0109]   0202  3  5.0    2.02    0.11  6.25  25.01  n/a   0.000
*
    ADD [  0202+  3001]   3002  3  5.0    4.97    0.19  6.25  16.92  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0203  1  5.0    1.17    0.01  6.50   5.92 0.12   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]   3003  3  5.0    6.14    0.20  6.25  14.83  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 47.50 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD          0204  1  5.0    3.82    0.05  6.33   5.88 0.12   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
```

```
*
    ADD [  0204+  3003]  3004  3  5.0    9.96    0.24  6.25  11.39  n/a    0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.11    0.12  6.25  19.56  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    0.49  6.25  25.32 0.53   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.39    0.61  6.25  24.03  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.01  6.33   4.74 0.10   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.11    0.62  6.25  22.65  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0   10.11    0.16  6.83  22.66  n/a    0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.07    0.30  6.25  17.07  n/a    0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.47    3.05  8.08  12.57  n/a    0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.73    3.14  8.08  11.97  n/a    0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.80    3.28  8.03  12.18  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.06  8.13   6.18 0.13   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.01  6.33   5.31 0.11   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.02  6.33  10.61 0.22   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  501.80    3.28  8.03  12.18  n/a    0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.29    3.34  8.03  11.95  n/a    0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.18    3.34  8.03  11.94  n/a    0.000
*
    ADD [  0008+  1803]  0008  1  1.0  522.82    3.34  8.03  11.94  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 47.50 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\b80aaf0e-d6d3-4348-b896-
    remark: 2yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.03  7.33   6.14 0.13   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  529.28    3.37  8.03  11.87  n/a    0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7410f0bd-01c9-47e2-b4bc-7d22af10ef7d\s
  Summary    filename:     C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\7410f0bd-01c9-47e2-b4bc-7d22af10ef7d\s


DATE: 04-29-2021                          TIME: 02:49:38

USER:


COMMENTS: ____________________________________________________________


  **************************************************
  ** SIMULATION : Run 08 -5yr 12hr 15min SCS    **
```

```
 ************************************************

 W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min    ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.09  6.37  15.75 0.24   0.000
   [CN=56.0         ]
   [ N = 3.0:Tp 0.22]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.23  6.23  34.27 0.52   0.000
   [I%=33.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.35  6.27  43.36 0.66   0.000
   [I%=24.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:             0205  1  2.0    2.68    0.24  6.40  43.36  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0250  1  2.0    1.51    0.24  6.23  48.83 0.74   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]  0255  3  2.0    4.19    0.48  6.23  45.33  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0221  1  2.0    0.62    0.11  6.23  51.37 0.78   0.000
   [I%=51.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0220  1  2.0    2.11    0.26  6.27  41.69 0.63   0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0    2.73    0.37  6.27  43.89  n/a   0.000
*
   DUHYD                0226  1  2.0    2.73    0.37  6.27  43.89  n/a   0.000
      MAJOR SYSTEM:     0226  2  2.0    0.42    0.21  6.27  43.89  n/a   0.000
      MINOR SYSTEM:     0226  3  2.0    2.31    0.16  6.07  43.89  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0222  1  2.0    1.12    0.20  6.23  51.38 0.78   0.000
   [I%=51.0:S%= 2.00]
*
   ADD [  0222+  0226]  0227  3  2.0    1.54    0.41  6.23  49.33  n/a   0.000
*
   ADD [  0227+  0255]  0256  3  2.0    5.73    0.89  6.23  46.41  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0251  1  2.0    0.48    0.07  6.23  46.75 0.71   0.000
   [I%=32.0:S%= 2.00]
*
   DUHYD                0252  1  2.0    0.48    0.07  6.23  46.75  n/a   0.000
      MAJOR SYSTEM:     0252  2  2.0    0.02    0.02  6.23  46.75  n/a   0.000
      MINOR SYSTEM:     0252  3  2.0    0.46    0.05  6.13  46.75  n/a   0.000
*
   ADD [  0252+  0256]  0009  3  2.0    6.19    0.94  6.23  46.43  n/a   0.000
*
   ADD [  0009+  0100]  0010  3  2.0    8.69    1.17  6.23  42.93  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0101  1  2.0    1.90    0.18  6.23  35.54 0.54   0.000
   [I%=35.0:S%= 2.00]
*
   DUHYD                0050  1  2.0    1.90    0.18  6.23  35.54  n/a   0.000
      MAJOR SYSTEM:     0050  2  2.0    0.04    0.03  6.23  35.54  n/a   0.000
      MINOR SYSTEM:     0050  3  2.0    1.86    0.15  6.10  35.54  n/a   0.000
*
   ADD [  0010+  0050]  0011  3  2.0   10.55    1.32  6.23  41.63  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD      0102  1  2.0   10.00    0.92  6.23  36.51 0.55   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0011+  0102]  0012  3  2.0   20.55    2.24  6.23  39.14  n/a   0.000
```

```
*
   ADD [  0012+  0103]  0013  3  2.0   22.65    2.31  6.23  36.97  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       0104  1  2.0    2.50    0.23  6.23  34.10 0.52   0.000
   [I%=33.0:S%= 2.00]
*
   ADD [  0013+  0104]  0014  3  2.0   25.15    2.54  6.23  36.69  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0601  1  2.0   25.15    0.16  8.47  36.59  n/a   0.000
*
   DIVERT HYD           1601  1  2.0   25.15    0.16  8.47  36.59  n/a   0.000
      Outflow           0002  2  2.0    0.05    0.00  8.47  36.59  n/a   0.000
      Outflow           0002  3  2.0   25.10    0.16  8.47  36.59  n/a   0.000
      Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 ** CALIB NASHYD        0210  1  5.0    2.36    0.14  6.25  17.09 0.26   0.000
   [CN=68.0         ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       0205  1  5.0    0.75    0.08  6.25  39.62 0.60   0.000
   [I%=30.0:S%= 0.50]
*
   DUHYD                3015  1  5.0    0.75    0.08  6.25  39.62  n/a   0.000
      MAJOR SYSTEM:     3015  2  5.0    0.02    0.02  6.25  39.62  n/a   0.000
      MINOR SYSTEM:     3015  3  5.0    0.73    0.06  6.17  39.62  n/a   0.000
*
   ADD [  0210+  3015]  3200  3  5.0    2.38    0.16  6.25  17.30  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       0208  1  5.0    0.86    0.09  6.25  39.62 0.60   0.000
   [I%=30.0:S%= 0.50]
*
   ADD [  0208+  3200]  3201  3  5.0    3.24    0.25  6.25  23.22  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
```

```
   remark: 5yr 12hr 15min SCS
*
 * CALIB NASHYD         1901  1  2.0    1.06    0.05  6.37  17.83 0.27   0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.21]
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB NASHYD         1902  1  2.0    1.30    0.08  6.30  17.83 0.27   0.000
   [CN=66.5         ]
   [ N = 3.0:Tp 0.16]
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       5001  1  2.0    2.94    0.18  6.23  23.61 0.36   0.000
   [I%=20.0:S%= 1.00]
*
   DIVERT HYD           0156  1  2.0    2.94    0.18  6.23  23.61  n/a   0.000
      Outflow           0001  2  2.0    2.32    0.14  6.23  23.61  n/a   0.000
      Outflow           0001  3  2.0    0.62    0.04  6.23  23.61  n/a   0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       5002  1  2.0    2.85    0.20  6.27  28.63 0.43   0.000
   [I%=20.0:S%= 1.00]
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       5003  1  2.0   14.99    0.85  6.27  23.68 0.36   0.000
   [I%=20.0:S%= 1.00]
*
   READ STORM                 15.0
   [ Ptot= 66.00 mm ]
   fname                :                   C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 * CALIB STANDHYD       5004  1  2.0    2.91    0.27  6.23  32.03 0.49   0.000
   [I%=35.0:S%= 1.00]
*
   DUHYD                0165  1  2.0    2.91    0.27  6.23  32.03  n/a   0.000
      MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     0165  3  2.0    2.91    0.27  6.23  32.03  n/a   0.000
*
   PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.24  6.27  31.99  n/a   0.000
```

```
*
   ADD [  0164+  5003]  0166  3  2.0   17.90    1.09  6.27  25.03  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0159  1  1.0   17.90    0.71  6.42  24.27  n/a   0.000
*
   ADD [  0156+  0159]  5005  3  1.0   20.22    0.78  6.42  24.19  n/a   0.000
*
   ADD [  5005+  1902]  5005  1  1.0   21.52    0.85  6.40  23.81  n/a   0.000
*
   ADD [  5005+  5002]  5005  3  1.0   24.37    0.99  6.38  24.37  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    2.12  7.47  23.42 0.35   0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 1.05]
*
   CHANNEL[ 2:  0001]   0002  1  1.0  139.80    1.84  8.33  23.41  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.26  7.50  21.29 0.32   0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 1.06]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.27  6.92  21.38 0.32   0.000
   [CN=71.0          ]
   [ N = 2.0:Tp 0.62]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.72  6.95  23.35 0.35   0.000
   [CN=74.0          ]
   [ N = 2.0:Tp 0.65]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.48  6.27  22.25 0.34   0.000
   [I%=18.0:S%= 2.00]
*
   ADD [  0002+  0003]  0001  3  1.0   32.12    0.51  7.13  21.39  n/a   0.000
```

```
*
   ADD [  0001+  0004]  0001  1  1.0   40.58    0.70  6.28  21.57  n/a   0.000
*
   ADD [  0001+  0005]  0001  3  1.0   73.26    1.35  6.82  22.36  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.19  6.90  13.40 0.20   0.000
   [CN=58.0          ]
   [ N = 2.0:Tp 0.57]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.09  6.25  25.04 0.38   0.000
   [CN=73.0          ]
   [ N = 2.0:Tp 0.11]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.07  6.25  43.84 0.66   0.000
   [I%=30.0:S%= 2.00]
*
   ADD [  1031+  3061]  2008  3  5.0    1.53    0.16  6.25  30.93  n/a   0.000
*
   DUHYD                2010  1  5.0    1.53    0.16  6.25  30.93  n/a   0.000
      MAJOR SYSTEM:     2010  2  5.0    0.11    0.06  6.25  30.93  n/a   0.000
      MINOR SYSTEM:     2010  3  5.0    1.42    0.10  6.17  30.93  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.05  6.25  43.83 0.66   0.000
   [I%=30.0:S%= 2.00]
*
   DUHYD                2011  1  5.0    0.30    0.05  6.25  43.83  n/a   0.000
      MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     2011  3  5.0    0.30    0.05  6.25  43.83  n/a   0.000
*
   ADD [  2010+  2011]  2009  3  5.0    0.11    0.06  6.25  30.93  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.07  6.25  23.52 0.36   0.000
   [CN=70.0          ]
   [ N = 2.0:Tp 0.17]
```

```
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.05  6.25  43.83 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.09  6.25  43.83  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.16  6.25  30.14  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.79  6.25  47.00 0.71   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.57  6.25  43.85 0.66   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.13  6.25  28.95 0.44   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.70  6.25  42.28  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.34  6.25  45.20 0.68   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.04  6.25  33.04 0.50   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.39  6.25  43.47  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.39  6.25  43.47  n/a   0.000
```

```
       MAJOR SYSTEM:     8050  2  5.0    0.18    0.15  6.25  43.47  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.64    0.24  6.08  43.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.02  6.25  53.57 0.81   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.02  6.25  53.57  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.01  6.25  53.57  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01  6.08  53.57  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.71    0.25  6.08  43.74  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.01    1.95  6.25  42.53  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.37    2.74  6.25  43.65  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.21    2.90  6.25  42.58  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.04  6.25  40.75 0.62   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.18  6.25  44.59 0.68   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.51    2.94  6.25  42.55  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.61    3.00  6.25  42.50  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.98    3.18  6.25  42.62  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.98    0.59  6.92  42.58  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.24    1.93  6.83  27.03  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.66    2.13  6.83  25.28  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.52  6.77  26.22 0.40   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
```

```
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.06  7.17   9.31 0.14   0.000
   [CN=47.0        ]
   [ N = 2.0:Tp 0.77]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.05  7.33   8.61 0.13   0.000
   [CN=45.0        ]
   [ N = 2.0:Tp 0.87]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.18  6.23  26.59 0.40   0.000
   [I%=23.0:S%= 2.00]
*
   ADD [  0105+  0050]  0015  3  2.0    2.94    0.22  6.23  26.72  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.20  6.27  42.26 0.64   0.000
   [I%=23.0:S%= 2.00]
*
   DUHYD                1011  1  2.0    1.57    0.20  6.27  42.26  n/a   0.000
      MAJOR SYSTEM:     1011  2  2.0    0.10    0.07  6.27  42.26  n/a   0.000
      MINOR SYSTEM:     1011  3  2.0    1.47    0.13  6.10  42.26  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.36  6.27  44.65 0.68   0.000
   [I%=29.0:S%= 2.00]
*
   ADD [  1011+  0102]  0105  3  2.0    4.10    0.49  6.27  43.79  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.13  6.23  57.02 0.86   0.000
   [I%=75.0:S%= 2.00]
```

```
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.23  6.23  46.06 0.70   0.000
   [I%=36.0:S%= 2.00]
*
   ADD [  0103+  0104]  0106  3  2.0    2.18    0.35  6.23  49.13  n/a   0.000
*
   ADD [  0105+  0106]  0107  3  2.0    6.28    0.84  6.23  45.65  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.31  6.27  44.16 0.67   0.000
   [I%=30.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.26  6.27  43.54 0.66   0.000
   [I%=25.0:S%= 2.00]
*
   ADD [  0201+  0202]  0203  3  2.0   12.34    1.58  6.27  44.06  n/a   0.000
*
   ADD [  0107+  0203]  0204  3  2.0   18.62    2.41  6.27  44.60  n/a   0.000
*
 ** Reservoir
   OUTFLOW:             0205  1  2.0   18.62    0.27  7.23  44.58  n/a   0.000
*
   ADD [  1011+  0205]  0206  3  2.0   18.72    0.27  7.23  44.57  n/a   0.000
*
   ADD [  0015+  0206]  0051  3  2.0   21.66    0.41  6.23  42.14  n/a   0.000
*
   ADD [  0051+  0004]  0051  1  1.0  134.33    2.44  6.82  27.99  n/a   0.000
*
   ADD [  0051+  0010]  0051  3  1.0  142.09    2.50  6.82  26.97  n/a   0.000
*
   ADD [  0051+  0011]  0051  1  1.0  150.51    2.54  6.88  25.94  n/a   0.000
*
   ADD [  0051+  0007]  0051  3  1.0  167.19    3.05  6.82  25.97  n/a   0.000
*
   ADD [  0051+  1601]  0005  3  1.0  167.23    3.05  6.82  25.97  n/a   0.000
*
   CHANNEL[ 2:  0005]   0005  1  1.0  167.23    2.74  7.33  25.92  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.14  7.28  23.93 0.36   0.000
   [CN=75.0        ]
   [ N = 2.0:Tp 0.89]
```

```
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.44  7.03  23.48 0.36   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.57  7.20  23.85  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.48  7.58  23.85  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.15  7.33   9.47 0.14   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.15  7.10   8.49 0.13   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.04  7.63   7.47 0.11   0.000
    [CN=40.0          ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.90    4.19  7.42  25.22  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.28    4.34  7.42  23.94  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.31    4.49  7.40  22.79  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.62    4.53  7.40  22.33  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.62    4.34  7.72  22.30  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.19  7.70   9.25 0.14   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 1.12]
```

```
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.11  6.33  17.60 0.27   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.05  6.25  54.54 0.83   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.16  6.25  20.86  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.05  6.25  17.32 0.26   0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.07  6.25  54.55 0.83   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.12  6.25  27.17  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.12  6.25  27.17  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.05    0.03  6.25  27.17  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.31    0.09  6.17  27.17  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.00    0.19  6.25  20.96  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.03  6.58  21.57 0.33   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                  15.0
    [ Ptot= 66.00 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.12  6.25  57.78 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.05  6.25  61.60 0.93   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.04  6.25  63.04 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.09  6.25  62.17  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02  6.33  61.85  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.14  6.25  59.48  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.16  6.25  38.65  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.02    0.35  6.25  28.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.02  6.50  12.23 0.19   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.19    0.36  6.25  25.08  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.10  6.33  12.13 0.18   0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.01    0.46  6.25  20.14  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    2.04    0.15  6.17  31.61  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
```

```
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    0.76  6.25  39.63 0.60   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.32    0.91  6.25  37.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.02  6.33   9.92 0.15   0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0   10.04    0.93  6.25  35.87  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0   10.04    0.22  6.92  35.88  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.05    0.61  6.25  28.02  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.42    6.06  7.87  22.65  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  481.68    6.25  7.87  21.67  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  501.73    6.54  7.83  21.92  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.13  8.03  12.50 0.19   0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.03  6.33  10.84 0.16   0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 66.00 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
    remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.04  6.33  19.71 0.30   0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  501.73    6.54  7.83  21.92  n/a   0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.22    6.66  7.87  21.57  n/a   0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.11    6.66  7.87  21.55  n/a   0.000
```

```
*
   ADD [  0008+  1803]  0008  1  1.0  522.75    6.67  7.87  21.55  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 66.00 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\dcd42c8f-b04a-4575-bdf3-
   remark: 5yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.07  7.25  12.42 0.19   0.000
   [CN=54.9         ]
   [ N = 3.0:Tp 0.99]
*
   ADD [  0008+  1801]  0009  3  1.0  529.21    6.73  7.83  21.44  n/a   0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\ecb7a510-b42d-4b9b-a2d7-3385adb3f702\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\ecb7a510-b42d-4b9b-a2d7-3385adb3f702\s


DATE: 04-29-2021                           TIME: 02:49:46

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 09 - 10yr 12hr 15min SCS  **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak    R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs      mm          cms

     START @  0.00 hrs
     --------------------
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
```

```
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.12  6.37  21.44 0.27   0.000
   [CN=56.0         ]
   [ N = 3.0:Tp 0.22]
*
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.28  6.23  42.83 0.55   0.000
   [I%=33.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.46  6.27  54.23 0.69   0.000
   [I%=24.0:S%= 2.00]
*
 ** Reservoir
   OUTFLOW:              0205  1  2.0    2.68    0.26  6.43  54.23  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.30  6.23  60.22 0.77   0.000
   [I%=37.0:S%= 2.00]
*
   ADD [  0205+  0250]  0255  3  2.0    4.19    0.54  6.23  56.39  n/a   0.000
*
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.14  6.23  62.86 0.80   0.000
   [I%=51.0:S%= 2.00]
*
   READ STORM                15.0
   [ Ptot= 78.50 mm ]
   fname                 :                  C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
   remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.35  6.27  52.39 0.67   0.000
   [I%=20.0:S%= 2.00]
*
   ADD [  0220+  0221]  0225  3  2.0    2.73    0.49  6.23  54.77  n/a   0.000
*
   DUHYD                 0226  1  2.0    2.73    0.49  6.23  54.77  n/a   0.000
      MAJOR SYSTEM:      0226  2  2.0    0.58    0.33  6.23  54.77  n/a   0.000
      MINOR SYSTEM:      0226  3  2.0    2.15    0.16  6.03  54.77  n/a   0.000
*
   READ STORM                15.0
```

```
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.25  6.23  62.86 0.80   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.70    0.57  6.23  60.10  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.89    1.12  6.23  57.46  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.09  6.23  57.96 0.74   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.09  6.23  57.96  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.04    0.04  6.23  57.96  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.44    0.05  6.07  57.96  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.33    1.17  6.23  57.50  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.83    1.45  6.23  53.34  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.23  6.23  44.30 0.56   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.23  6.23  44.30  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.11    0.08  6.23  44.30  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.79    0.15  6.07  44.30  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.62    1.60  6.23  51.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.13  6.23  45.47 0.58   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.62    2.74  6.23  48.74  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.72    2.82  6.23  46.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.29  6.23  42.66 0.54   0.000
```

```
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.22    3.11  6.23  45.86  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.22    0.35  7.47  45.75  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.22    0.35  7.47  45.75  n/a   0.000
       Outflow           0002  2  2.0    0.61    0.05  7.47  45.75  n/a   0.000
       Outflow           0002  3  2.0   24.61    0.29  7.47  45.75  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.19  6.25  23.85 0.30   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.11  6.25  49.90 0.64   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.11  6.25  49.90  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.07    0.05  6.25  49.90  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.68    0.06  6.08  49.90  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.43    0.24  6.25  24.59  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.13  6.25  49.91 0.64   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.29    0.37  6.25  31.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.07  6.37  24.75 0.32   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
```

```
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.11  6.30  24.75 0.32   0.000
    [CN=66.5        ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.23  6.23  30.26 0.39   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.23  6.23  30.26  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.18  6.23  30.26  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.05  6.23  30.26  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.27  6.27  36.78 0.47   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.11  6.27  30.35 0.39   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.35  6.23  39.92 0.51   0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0    2.91    0.35  6.23  39.92  n/a   0.000
       MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0165  3  2.0    2.91    0.35  6.23  39.92  n/a   0.000
*
    PIPE    [ 2:  0165]  0164  1  2.0    2.91    0.31  6.27  39.87  n/a   0.000
*
    ADD [  0164+  5003]  0166  3  2.0   17.90    1.41  6.27  31.90  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   17.90    1.38  6.30  31.13  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   20.22    1.55  6.28  31.03  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   21.52    1.65  6.28  30.65  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   24.37    1.91  6.28  31.37  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    2.91  7.47  31.73 0.40   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    2.55  8.25  31.73  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.36  7.48  29.04 0.37   0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.38  6.90  29.16 0.37   0.000
    [CN=71.0        ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.99  6.93  31.66 0.40   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.64  6.27  28.65 0.36   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.71  7.12  29.17  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.96  6.30  29.06  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    1.84  6.82  30.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
```

```
*
 *  CALIB NASHYD        0008  1  2.0   14.42    0.28  6.87  18.96 0.24   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD        1031  1  5.0    1.05    0.12  6.25  33.07 0.42   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3061  1  5.0    0.48    0.09  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061] 2008  3  5.0    1.53    0.21  6.25  39.83  n/a   0.000
*
    DUHYD               2010  1  5.0    1.53    0.21  6.25  39.83  n/a   0.000
       MAJOR SYSTEM:    2010  2  5.0    0.20    0.11  6.25  39.83  n/a   0.000
       MINOR SYSTEM:    2010  3  5.0    1.33    0.10  6.08  39.83  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3053  1  5.0    0.30    0.06  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD               2011  1  5.0    0.30    0.06  6.25  54.62  n/a   0.000
       MAJOR SYSTEM:    2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:    2011  3  5.0    0.30    0.06  6.25  54.62  n/a   0.000
*
    ADD [  2010+  2011] 2009  3  5.0    0.20    0.11  6.25  39.83  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD        3055  1  5.0    1.24    0.10  6.25  31.27 0.40   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3054  1  5.0    0.30    0.06  6.25  54.62 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054] 2004  3  5.0    0.60    0.12  6.25  54.62  n/a   0.000
*
    ADD [  2004+  3055] 2005  3  5.0    1.84    0.21  6.25  38.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3052  1  5.0    5.36    0.99  6.25  58.12 0.74   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3051  1  5.0   11.90    1.99  6.25  54.63 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      3021  1  5.0    1.40    0.16  6.25  36.58 0.47   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051] 2001  3  5.0   13.30    2.15  6.25  52.73  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4111  1  5.0    2.42    0.47  6.25  56.20 0.72   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4101  1  5.0    0.40    0.05  6.25  41.35 0.53   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111] 8000  3  5.0    2.82    0.53  6.25  54.10  n/a   0.000
*
    DUHYD               8050  1  5.0    2.82    0.53  6.25  54.10  n/a   0.000
       MAJOR SYSTEM:    8050  2  5.0    0.39    0.29  6.25  54.10  n/a   0.000
       MINOR SYSTEM:    8050  3  5.0    2.43    0.24  6.08  54.10  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD      4120  1  5.0    0.08    0.02  6.25  65.27 0.83   0.000
```

```
    [I%=58.0:S%= 2.00]
*
    DUHYD                  8055  1  5.0    0.08    0.02  6.25  65.27  n/a   0.000
       MAJOR SYSTEM:       8055  2  5.0    0.01    0.01  6.25  65.27  n/a   0.000
       MINOR SYSTEM:       8055  3  5.0    0.07    0.01  6.08  65.27  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.50    0.25  6.08  54.41  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.80    2.40  6.25  53.00  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.16    3.39  6.25  54.29  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.00    3.60  6.25  53.06  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0101  1  5.0    0.30    0.05  6.25  50.98 0.65   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        3056  1  5.0    1.37    0.22  6.25  54.79 0.70   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.30    3.65  6.25  53.03  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.50    3.76  6.25  52.92  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.87    3.98  6.25  53.03  n/a   0.000
*
 ** Reservoir
    OUTFLOW:               3705  1  5.0   24.87    0.82  6.83  52.99  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.13    2.66  6.83  35.50  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.55    2.94  6.83  33.38  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0007  1  1.0   16.68    0.70  6.75  35.26 0.45   0.000
    [CN=78.0        ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0010  1  2.0    7.76    0.08  7.17  13.39 0.17   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 0.77]
```

```
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD          0011  1  2.0    8.42    0.08  7.30  12.45 0.16   0.000
    [CN=45.0        ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  2.0    2.90    0.23  6.23  33.73 0.43   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.01    0.31  6.23  34.13  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0101  1  2.0    1.57    0.27  6.27  52.97 0.67   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                  1011  1  2.0    1.57    0.27  6.27  52.97  n/a   0.000
       MAJOR SYSTEM:       1011  2  2.0    0.20    0.14  6.27  52.97  n/a   0.000
       MINOR SYSTEM:       1011  3  2.0    1.37    0.13  6.07  52.97  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  2.0    2.63    0.47  6.27  55.60 0.71   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.00    0.60  6.27  54.70  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0103  1  2.0    0.61    0.15  6.23  68.82 0.88   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  2.0    1.57    0.28  6.23  57.08 0.73   0.000
    [I%=36.0:S%= 2.00]
*
```

```
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.44  6.23  60.36  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.18    1.04  6.23  56.70  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.73  6.27  55.01 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.35  6.27  54.41 0.69   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    2.08  6.27  54.91  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.52    3.10  6.27  55.51  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.52    0.36  7.10  55.49  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.36  7.10  55.46  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.73    0.61  6.23  52.51  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.28    3.37  6.82  36.46  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.04    3.45  6.82  35.20  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.46    3.51  6.83  33.93  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.14    4.21  6.82  34.06  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.75    4.21  6.82  34.10  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.75    3.80  7.27  34.05  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.56  7.25  32.40 0.41   0.000
    [CN=75.0         ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.60  7.03  31.80 0.41   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.72]
```

```
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    2.15  7.18  32.29  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    2.04  7.52  32.29  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.22  7.30  13.65 0.17   0.000
    [CN=48.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.22  7.10  12.23 0.16   0.000
    [CN=44.0         ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.06  7.60  10.78 0.14   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  253.42    5.81  7.35  33.45  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.80    6.03  7.35  31.85  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.83    6.25  7.35  30.39  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.14    6.31  7.35  29.80  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.14    6.07  7.63  29.77  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.28  7.67  13.32 0.17   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname            :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.16  6.33  24.57 0.31   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
```

```
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.06  6.25  66.13 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.21  6.25  28.23  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.07  6.25  24.17 0.31   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.08  6.25  66.14 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.16  6.25  35.28  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.16  6.25  35.28  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.11    0.07  6.25  35.28  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.25    0.09  6.08  35.28  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.06    0.28  6.25  28.49  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.04  6.58  29.70 0.38   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.14  6.25  69.44 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.06  6.25  73.78 0.94   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.04  6.25  75.41 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.11  6.25  74.43  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02  6.33  74.10  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.16  6.25  71.39  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.19  6.25  48.48  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.08    0.47  6.25  36.44  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0    1.17    0.03  6.50  17.43 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.25    0.50  6.25  32.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.14  6.33  17.30 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.07    0.63  6.25  26.97  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.93    0.15  6.08  40.44  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.07  6.25  49.92 0.64   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.21    1.22  6.25  47.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 78.50 mm ]
    fname                 :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
```

```
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.03  6.33  14.26 0.18   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.93    1.24  6.25  45.49  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.93    0.23  7.00  45.50  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   20.00    0.85  6.25  36.17  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  446.94    8.45  7.78  30.38  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.20    8.72  7.78  29.14  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.20    9.04  7.78  29.42  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.18  7.97  17.69 0.23   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.04  6.33  15.43 0.20   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.05  6.33  26.83 0.34   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  502.20    9.04  7.78  29.42  n/a   0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.69    9.22  7.78  28.98  n/a   0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.58    9.23  7.78  28.95  n/a   0.000
*
    ADD [  0008+  1803]  0008  1  1.0  523.22    9.23  7.78  28.95  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 78.50 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\086ef498-07f8-49aa-aeca-
    remark: 10yr 12hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.10  7.25  17.58 0.22   0.000
```

```
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  529.68    9.32  7.78  28.81  n/a   0.000
*
==================================================================================
==========================

     V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
     V    V   I    SS     U   U   A A   L
      V  V    I     SS    U   U  AAAAA  L
      V  V    I      SS   U   U  A   A  L
       VV     I    SSSSS  UUUUU  A   A  LLLLL

      OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
     O   O    T      T    H   H   Y Y   MM MM  O   O
     O   O    T      T    H   H    Y    M   M  O   O
      OOO     T      T    H   H    Y    M   M   OOO
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```


```
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```


```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\90b5aca4-30a4-48ca-942b-9e73d01e5c1e\s
  Summary    filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\90b5aca4-30a4-48ca-942b-9e73d01e5c1e\s


DATE: 04-29-2021                          TIME: 02:49:40

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 13 - 2yr 24hr 15min SCS   **
  ************************************************

  W/E COMMAND           HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                 min    ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      -------------------
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0    2.10    0.05 12.37  11.47 0.21   0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
```

```
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0    2.50    0.16 12.23  27.39 0.49   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0    2.68    0.23 12.27  34.48 0.62   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0    2.68    0.23 12.27  34.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.17 12.23  39.42 0.71   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.39 12.27  36.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.08 12.23  41.85 0.76   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.17 12.27  32.97 0.59   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.25 12.27  34.99  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.25 12.27  34.99  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.14    0.09 12.27  34.99  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.59    0.16 12.10  34.99  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.15 12.23  41.85 0.76   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.26    0.23 12.23  41.08  n/a   0.000
*
```

```
    ADD [  0227+  0255]  0256  3  2.0    5.45    0.62 12.27  37.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.05 12.23  37.54 0.68   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.05 12.23  37.54  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.48    0.05 12.23  37.54  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    5.93    0.67 12.27  37.39  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.43    0.83 12.23  34.42  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.13 12.23  28.49 0.51   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.13 12.23  28.49  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.90    0.13 12.23  28.49  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.33    0.96 12.23  33.33  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    0.69 12.23  29.29 0.53   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.33    1.65 12.23  31.34  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.43    1.69 12.23  29.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.17 12.23  27.23 0.49   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   24.93    1.86 12.23  29.26  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   24.93    0.08 15.60  29.11  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   24.93    0.08 15.60  29.11  n/a   0.000
       Outflow           0002  2  2.0    0.06    0.00 15.60  29.11  n/a   0.000
       Outflow           0002  3  2.0   24.88    0.08 15.60  29.11  n/a   0.000
```

```
      Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD        0210  1  5.0    2.36    0.08 12.25  11.98 0.22   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0205  1  5.0    0.75    0.05 12.25  31.29 0.56   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD               3015  1  5.0    0.75    0.05 12.25  31.29  n/a   0.000
      MAJOR SYSTEM:     3015  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     3015  3  5.0    0.75    0.05 12.25  31.29  n/a   0.000
*
    ADD [  0210+  3015] 3200  3  5.0    2.36    0.08 12.25  11.98  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0208  1  5.0    0.86    0.06 12.25  31.29 0.56   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200] 3201  3  5.0    3.22    0.14 12.25  17.13  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD        1901  1  2.0    1.06    0.03 12.37  12.59 0.23   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD        1902  1  2.0    1.30    0.05 12.33  12.59 0.23   0.000
    [CN=66.5         ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
```

```
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      5001  1  2.0    2.94    0.12 12.23  18.41 0.33   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD          0156  1  2.0    2.94    0.12 12.23  18.41  n/a   0.000
      Outflow           0001  2  2.0    2.32    0.10 12.23  18.41  n/a   0.000
      Outflow           0001  3  2.0    0.62    0.03 12.23  18.41  n/a   0.000
      Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      5002  1  2.0    2.85    0.14 12.23  22.20 0.40   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      5003  1  2.0   14.99    0.58 12.27  18.46 0.33   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD      5004  1  2.0    2.91    0.20 12.23  25.70 0.46   0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD               0165  1  2.0    2.91    0.20 12.23  25.70  n/a   0.000
      MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
      MINOR SYSTEM:     0165  3  2.0    2.91    0.20 12.23  25.70  n/a   0.000
*
    PIPE   [ 2:  0165]  0164  1  2.0    2.91    0.17 12.27  25.67  n/a   0.000
*
    ADD [  0164+  5003] 0166  3  2.0   17.90    0.75 12.27  19.63  n/a   0.000
*
 ** Reservoir
    OUTFLOW:            0159  1  1.0   17.90    0.31 12.63  18.87  n/a   0.000
*
    ADD [  0156+  0159] 5005  3  1.0   20.22    0.35 12.63  18.81  n/a   0.000
*
    ADD [  5005+  1902] 5005  1  1.0   21.52    0.37 12.58  18.44  n/a   0.000
*
    ADD [  5005+  5002] 5005  3  1.0   24.37    0.44 12.53  18.88  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD        0001  1  2.0  139.80    1.29 13.50  16.98 0.31   0.000
    [CN=74.0         ]
```

```
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    1.08 14.40  16.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.16 13.53   9.95 0.18   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.16 12.92  11.24 0.20   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.43 12.97  12.32 0.22   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.32 12.27  17.27 0.31   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.31 13.15  15.41  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.45 12.28  15.80  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    0.82 12.82  16.30  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.11 12.90   9.28 0.17   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.06 12.25  18.75 0.34   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.05 12.25  35.01 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.11 12.25  23.85  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.11 12.25  23.85  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.01    0.01 12.25  23.85  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.52    0.10 12.25  23.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.03 12.25  35.00 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.03 12.25  35.00  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.03 12.25  35.00  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.01    0.01 12.25  23.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.05 12.33  17.51 0.32   0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.03 12.25  35.00 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.06 12.25  35.00  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.10 12.25  23.22  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.56 12.25  37.85 0.68   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.09 12.25  35.03 0.63   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.09 12.25  22.89 0.41   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.18 12.25  33.75  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.24 12.25  36.17 0.65   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.03 12.25  26.39 0.48   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.27 12.25  34.78  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.27 12.25  34.78  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.03    0.03 12.25  34.78  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.79    0.24 12.25  34.78  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.01 12.25  43.90 0.79   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.01 12.25  43.90  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.00    0.00 12.25  43.90  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.08    0.01 12.17  43.90  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.87    0.25 12.25  35.03  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   16.17    1.43 12.25  33.98  n/a   0.000
*
```

```
    ADD [  2002+  3052]  2003  3  5.0   21.53    1.99 12.25  34.94  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.37    2.09 12.25  34.02  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.03 12.25  32.45 0.59   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.13 12.25  36.23 0.65   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.67    2.12 12.25  34.00  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.68    2.13 12.25  34.00  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   25.05    2.26 12.25  34.12  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   25.05    0.32 13.00  34.08  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.31    1.13 12.92  19.72  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.73    1.24 12.92  18.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.31 12.77  14.43 0.26   0.000
    [CN=78.0        ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.03 13.20   6.35 0.11   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.03 13.33   5.85 0.11   0.000
    [CN=45.0        ]
    [ N = 2.0:Tp 0.87]
```

```
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  2.0    2.90    0.13 12.23  20.95 0.38   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    2.90    0.13 12.23  20.95  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0101  1  2.0    1.57    0.13 12.27  33.52 0.60   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                 1011  1  2.0    1.57    0.13 12.27  33.52  n/a   0.000
       MAJOR SYSTEM:      1011  2  2.0    0.00    0.00 12.27  33.52  n/a   0.000
       MINOR SYSTEM:      1011  3  2.0    1.57    0.13 12.27  33.52  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  2.0    2.63    0.24 12.27  35.68 0.64   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.20    0.37 12.27  34.88  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0103  1  2.0    0.61    0.10 12.23  47.16 0.85   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  2.0    1.57    0.15 12.23  37.02 0.67   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.25 12.23  39.85  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.38    0.62 12.23  36.58  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD        0201  1  2.0   10.34    0.88 12.27  35.29 0.64   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0202  1  2.0    2.00    0.18 12.27  34.65 0.63   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.06 12.27  35.19  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.72    1.67 12.27  35.66  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0205  1  2.0   18.72    0.17 13.37  35.64  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.17 13.37  35.64  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.62    0.23 12.23  33.67  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.35    1.44 12.92  20.78  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.11    1.47 12.92  19.99  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.53    1.49 12.92  19.20  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.21    1.80 12.85  19.19  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.26    1.80 12.85  19.19  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.26    1.59 13.42  19.07  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD          0006  1  1.0   64.36    0.69 13.30  11.92 0.22   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD          0009  1  2.0   21.31    0.26 13.03  17.03 0.31   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    0.95 13.22  17.30  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    0.89 13.63  17.30  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 55.43 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.08 13.33   6.44 0.12   0.000
    [CN=48.0        ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.08 13.13   5.78 0.10   0.000
    [CN=44.0        ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.02 13.63   5.08 0.09   0.000
    [CN=40.0        ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.93    2.46 13.52  18.47  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.31    2.55 13.52  17.49  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.34    2.63 13.48  16.62  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.65    2.65 13.48  16.27  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.65    2.53 13.85  16.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.11 13.73   6.29 0.11   0.000
    [CN=47.0        ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.07 12.33  12.34 0.22   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.04 12.25  44.89 0.81   0.000
    [I%=75.0:S%= 0.50]
*
```

```
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.10 12.25  15.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.03 12.25  12.14 0.22   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0209  1  5.0    0.36    0.05 12.25  44.90 0.81   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.08 12.25  20.81  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.08 12.25  20.81  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.36    0.08 12.25  20.81  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    2.95    0.10 12.25  15.21  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0109  1  5.0    1.11    0.02 12.58  15.32 0.28   0.000
    [CN=74.0        ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  5.0    0.53    0.09 12.25  47.99 0.87   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  5.0    0.23    0.04 12.25  51.34 0.93   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 55.43 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  5.0    0.15    0.03 12.25  52.59 0.95   0.000
```

```
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0     0.38     0.07 12.25   51.83  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0     0.38     0.02 12.33   51.50  n/a    0.000
*
    ADD [  0102+  0107]  0108  3  5.0     0.91     0.10 12.25   49.45  n/a    0.000
*
    ADD [  0108+  0109]  0202  3  5.0     2.02     0.12 12.25   30.70  n/a    0.000
*
    ADD [  0202+  3001]  3002  3  5.0     4.97     0.22 12.25   21.50  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0203  1  5.0     1.17     0.01 12.50    8.40 0.15    0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0     6.14     0.23 12.25   19.01  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0     3.82     0.06 12.33    8.34 0.15    0.000
    [CN=56.0          ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0     9.96     0.28 12.25   14.91  n/a    0.000
*
    ADD [  3015+  3112]  3005  3  5.0     2.11     0.14 12.25   24.53  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0     7.28     0.53 12.25   31.30 0.56    0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0     9.39     0.67 12.25   29.78  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0     0.72     0.01 12.33    6.77 0.12    0.000
    [CN=50.0          ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    10.11     0.68 12.25   28.14  n/a    0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    10.11     0.18 12.83   28.15  n/a    0.000
*
    ADD [  3004+  3008]  3009  3  5.0    20.07     0.34 12.25   21.58  n/a    0.000
*
    ADD [  0002+  0006]  0007  3  1.0   446.45     3.56 13.98   16.44  n/a    0.000
*
    ADD [  0007+  0015]  0007  1  1.0   481.71     3.66 13.98   15.70  n/a    0.000
*
    ADD [  0007+  3009]  0007  3  1.0   501.78     3.81 13.93   15.93  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0    19.49     0.07 14.00    8.67 0.16    0.000
    [CN=55.1          ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0     0.89     0.02 12.33    7.48 0.13    0.000
    [CN=50.7          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0     0.64     0.02 12.33   14.27 0.26    0.000
    [CN=66.6          ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0   501.78     3.81 13.93   15.93  n/a    0.000
*
    ADD [  0008+  1800]  0008  1  1.0   521.27     3.89 13.93   15.66  n/a    0.000
*
    ADD [  0008+  1802]  0008  3  1.0   522.16     3.89 13.93   15.65  n/a    0.000
*
    ADD [  0008+  1803]  0008  1  1.0   522.80     3.89 13.93   15.64  n/a    0.000
*
    READ STORM                15.0
    [ Ptot= 55.43 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\a60f4c09-e736-4ec3-906c-
    remark: 2yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0     6.46     0.04 13.33    8.62 0.16    0.000
    [CN=54.9          ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0   529.26     3.92 13.93   15.56  n/a    0.000
*
=================================================================================
==========================


       V    V   I    SSSSS  U    U    A    L             (v 6.2.2005)
```

```
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output       filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\6cd5f030-776f-4436-b2a9-fa4b62f1de73\s
  Summary     filename:    C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\6cd5f030-776f-4436-b2a9-fa4b62f1de73\s


DATE: 04-29-2021                          TIME: 02:49:37

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 14 - 5yr 24hr 15min SCS   **
  ************************************************

  W/E COMMAND             HYD ID    DT     AREA  ' Qpeak Tpeak    R.V. R.C.    Qbase
                                    min     ha   '  cms   hrs      mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0103  1  2.0     2.10    0.10 12.37  21.11 0.27   0.000
    [CN=56.0          ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0100  1  2.0     2.50    0.25 12.23  42.35 0.54   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
```

```
    remark: 5yr 24hr 15min SCS
*
 ** CALIB STANDHYD       0200  1  2.0     2.68    0.39 12.27  53.63 0.69   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0     2.68    0.25 12.40  53.63  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0     1.51    0.27 12.23  59.60 0.77   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0     4.19    0.51 12.23  55.78  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0     0.62    0.12 12.23  62.23 0.80   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0     2.11    0.30 12.27  51.80 0.67   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0     2.73    0.41 12.27  54.17  n/a   0.000
*
    DUHYD                0226  1  2.0     2.73    0.41 12.27  54.17  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0     0.42    0.25 12.27  54.17  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0     2.31    0.16 12.07  54.17  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0     1.12    0.22 12.23  62.23 0.80   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0     1.54    0.47 12.23  60.04  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0     5.73    0.97 12.23  56.92  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0     0.48    0.08 12.23  57.34 0.74   0.000
    [I%=32.0:S%= 2.00]
```

```
*
    DUHYD                 0252  1  2.0    0.48     0.08 12.23  57.34  n/a    0.000
       MAJOR SYSTEM:      0252  2  2.0    0.02     0.03 12.23  57.34  n/a    0.000
       MINOR SYSTEM:      0252  3  2.0    0.46     0.05 12.10  57.34  n/a    0.000
*
    ADD [  0252+  0256]   0009  3  2.0    6.18     1.03 12.23  56.95  n/a    0.000
*
    ADD [  0009+  0100]   0010  3  2.0    8.68     1.28 12.23  52.75  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0101  1  2.0    1.90     0.20 12.23  43.81 0.56    0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                 0050  1  2.0    1.90     0.20 12.23  43.81  n/a    0.000
       MAJOR SYSTEM:      0050  2  2.0    0.06     0.05 12.23  43.81  n/a    0.000
       MINOR SYSTEM:      0050  3  2.0    1.84     0.15 12.10  43.81  n/a    0.000
*
    ADD [  0010+  0050]   0011  3  2.0   10.52     1.43 12.23  51.19  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  2.0   10.00     1.02 12.23  44.97 0.58    0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]   0012  3  2.0   20.52     2.44 12.23  48.16  n/a    0.000
*
    ADD [  0012+  0103]   0013  3  2.0   22.62     2.52 12.23  45.65  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  2.0    2.50     0.25 12.23  42.19 0.54    0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]   0014  3  2.0   25.12     2.77 12.23  45.30  n/a    0.000
*
 ** Reservoir
    OUTFLOW:              0601  1  2.0   25.12     0.20 14.10  44.99  n/a    0.000
*
    DIVERT HYD            1601  1  2.0   25.12     0.20 14.10  44.99  n/a    0.000
       Outflow            0002  2  2.0    0.04     0.00 14.10  44.99  n/a    0.000
       Outflow            0002  3  2.0   25.08     0.20 14.10  44.99  n/a    0.000
       Outflow            0002  4  2.0    0.00     0.00  0.00   0.00  n/a    0.000
       Outflow            0002  5  2.0    0.00     0.00  0.00   0.00  n/a    0.000
       Outflow            0002  6  2.0    0.00     0.00  0.00   0.00  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
```

```
 ** CALIB NASHYD          0210  1  5.0    2.36     0.17 12.25  23.47 0.30    0.000
    [CN=68.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0205  1  5.0    0.75     0.09 12.25  49.34 0.63    0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                 3015  1  5.0    0.75     0.09 12.25  49.34  n/a    0.000
       MAJOR SYSTEM:      3015  2  5.0    0.03     0.03 12.25  49.34  n/a    0.000
       MINOR SYSTEM:      3015  3  5.0    0.72     0.06 12.08  49.34  n/a    0.000
*
    ADD [  0210+  3015]   3200  3  5.0    2.39     0.19 12.25  23.79  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0208  1  5.0    0.86     0.10 12.25  49.34 0.63    0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]   3201  3  5.0    3.25     0.30 12.25  30.55  n/a    0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          1901  1  2.0    1.06     0.06 12.37  24.36 0.31    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          1902  1  2.0    1.30     0.09 12.30  24.35 0.31    0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        5001  1  2.0    2.94     0.20 12.23  29.89 0.38    0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD            0156  1  2.0    2.94     0.20 12.23  29.89  n/a    0.000
       Outflow            0001  2  2.0    2.32     0.16 12.23  29.89  n/a    0.000
       Outflow            0001  3  2.0    0.62     0.04 12.23  29.89  n/a    0.000
       Outflow            0001  4  2.0    0.00     0.00  0.00   0.00  n/a    0.000
       Outflow            0001  5  2.0    0.00     0.00  0.00   0.00  n/a    0.000
```

```
      Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.24 12.27  36.32 0.47   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    0.96 12.27  29.98 0.39   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.31 12.23  39.48 0.51   0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0    2.91    0.31 12.23  39.48  n/a   0.000
       MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0165  3  2.0    2.91    0.31 12.23  39.48  n/a   0.000
*
    PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.26 12.27  39.44  n/a   0.000
*
    ADD [  0164+  5003]  0166  3  2.0   17.90    1.23 12.27  31.52  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   17.90    0.82 12.42  30.75  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   20.22    0.90 12.42  30.65  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   21.52    0.98 12.40  30.27  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   24.37    1.15 12.38  30.98  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    2.44 13.43  31.26 0.40   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    2.13 14.23  31.19  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.30 13.47  19.20 0.25   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0003  1  1.0   13.15    0.31 12.90  21.56 0.28   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    0.82 12.93  23.40 0.30   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.56 12.27  28.29 0.36   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.59 13.10  28.73  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    0.83 12.30  28.64  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    1.54 12.82  29.78  n/a   0.000
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.23 12.87  18.64 0.24   0.000
    [CN=58.0          ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.10 12.25  32.62 0.42   0.000
    [CN=73.0          ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                  15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
```

```
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.08 12.25  54.03 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.18 12.25  39.34  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.18 12.25  39.34  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.12    0.08 12.25  39.34  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.41    0.10 12.17  39.34  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.05 12.25  54.02 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.05 12.25  54.02  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.05 12.25  54.02  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.12    0.08 12.25  39.34  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.08 12.33  30.83 0.40   0.000
    [CN=70.0          ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.05 12.25  54.02 0.69   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.10 12.25  54.02  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.18 12.25  38.39  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    0.87 12.25  57.51 0.74   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    1.74 12.25  54.04 0.69   0.000
```

```
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.14 12.25  36.15 0.46   0.000
    [I%=28.0:S%= 2.00]
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    1.89 12.25  52.15  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.42 12.25  55.60 0.71   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.05 12.25  40.89 0.53   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.47 12.25  53.51  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.47 12.25  53.51  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.27    0.23 12.25  53.51  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.55    0.24 12.08  53.51  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.02 12.25  64.62 0.83   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.02 12.25  64.62  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.01 12.25  64.62  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01 12.08  64.62  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.62    0.25 12.08  53.82  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.92    2.14 12.25  52.43  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.28    3.01 12.25  53.71  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.12    3.19 12.25  52.49  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.05 12.25  50.42 0.65   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.19 12.25  54.23 0.70   0.000
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.42    3.24 12.25  52.46  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.54    3.32 12.25  52.39  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.91    3.52 12.25  52.49  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.91    0.65 12.83  52.45  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.17    2.19 12.83  34.28  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.59    2.42 12.83  32.28  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.59 12.75  26.96 0.35   0.000
    [CN=78.0         ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.07 13.13  13.16 0.17   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.06 13.30  12.22 0.16   0.000
    [CN=45.0         ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.20 12.23  33.33 0.43   0.000
    [I%=23.0:S%= 2.00]
*
```

```
    ADD [  0105+  0050]  0015  3  2.0    2.96    0.26 12.23  33.56  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.22 12.27  52.38 0.67   0.000
    [I%=23.0:S%= 2.00]
*
    DUHYD                1011  1  2.0    1.57    0.22 12.27  52.38  n/a   0.000
       MAJOR SYSTEM:     1011  2  2.0    0.12    0.09 12.27  52.38  n/a   0.000
       MINOR SYSTEM:     1011  3  2.0    1.45    0.13 12.10  52.38  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0    2.63    0.40 12.27  55.00 0.71   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]  0105  3  2.0    4.08    0.53 12.27  54.07  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0103  1  2.0    0.61    0.14 12.23  68.17 0.88   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    1.57    0.25 12.23  56.47 0.73   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]  0106  3  2.0    2.18    0.39 12.23  59.75  n/a   0.000
*
    ADD [  0105+  0106]  0107  3  2.0    6.26    0.92 12.23  56.04  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  2.0   10.34    1.51 12.27  54.41 0.70   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0202  1  2.0    2.00    0.31 12.27  53.81 0.69   0.000
```

```
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]  0203  3  2.0   12.34    1.82 12.27  54.31  n/a   0.000
*
    ADD [  0107+  0203]  0204  3  2.0   18.60    2.73 12.27  54.90  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0205  1  2.0   18.60    0.29 13.20  54.88  n/a   0.000
*
    ADD [  1011+  0205]  0206  3  2.0   18.72    0.29 13.20  54.86  n/a   0.000
*
    ADD [  0015+  0206]  0051  3  2.0   21.68    0.48 12.23  51.95  n/a   0.000
*
    ADD [  0051+  0004]  0051  1  1.0  134.28    2.77 12.82  35.33  n/a   0.000
*
    ADD [  0051+  0010]  0051  3  1.0  142.04    2.83 12.82  34.12  n/a   0.000
*
    ADD [  0051+  0011]  0051  1  1.0  150.46    2.89 12.82  32.89  n/a   0.000
*
    ADD [  0051+  0007]  0051  3  1.0  167.14    3.47 12.80  33.08  n/a   0.000
*
    ADD [  0051+  1601]  0005  3  1.0  167.18    3.47 12.80  33.08  n/a   0.000
*
    CHANNEL[ 2:  0005]   0005  1  1.0  167.18    3.12 13.28  32.93  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0006  1  1.0   64.36    1.31 13.25  22.69 0.29   0.000
    [CN=75.0           ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0009  1  2.0   21.31    0.50 13.00  31.33 0.40   0.000
    [CN=74.0           ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]  0003  3  1.0   85.67    1.80 13.17  31.81  n/a   0.000
*
    CHANNEL[ 2:  0003]   0003  1  1.0   85.67    1.71 13.53  31.81  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0012  1  2.0   22.38    0.18 13.30  13.41 0.17   0.000
    [CN=48.0           ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD         0013  1  2.0   22.03    0.18 13.07  12.01 0.15   0.000
    [CN=44.0           ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0014  1  2.0    9.31    0.05 13.57  10.58 0.14   0.000
    [CN=40.0           ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  252.85    4.79 13.37  32.55  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  275.23    4.97 13.37  30.99  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  297.26    5.15 13.37  29.59  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  306.57    5.20 13.37  29.01  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  306.57    5.00 13.67  28.94  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0015  1  2.0   35.26    0.23 13.63  13.09 0.17   0.000
    [CN=47.0           ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0200  1  5.0    2.69    0.13 12.33  24.17 0.31   0.000
    [CN=68.0           ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0    0.26    0.05 12.25  65.49 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.18 12.25  27.82  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD         0211  1  5.0    1.00    0.06 12.25  23.78 0.31   0.000
    [CN=68.0           ]
```

```
    [ N = 2.0:Tp 0.13]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0209  1  5.0    0.36    0.08 12.25  65.50 0.84   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0209+  0211]   3012  3  5.0    1.36    0.14 12.25  34.83  n/a   0.000
*
    DUHYD                 3112  1  5.0    1.36    0.14 12.25  34.83  n/a   0.000
       MAJOR SYSTEM:      3112  2  5.0    0.06    0.05 12.25  34.83  n/a   0.000
       MINOR SYSTEM:      3112  3  5.0    1.30    0.09 12.17  34.83  n/a   0.000
*
    ADD [  3000+  3112]   3001  3  5.0    3.01    0.23 12.25  27.97  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0109  1  5.0    1.11    0.04 12.58  29.25 0.38   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0102  1  5.0    0.53    0.13 12.25  68.81 0.88   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0104  1  5.0    0.23    0.06 12.25  73.12 0.94   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0105  1  5.0    0.15    0.04 12.25  74.74 0.96   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]   0106  3  5.0    0.38    0.10 12.25  73.76  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0107  1  5.0    0.38    0.02 12.33  73.43  n/a   0.000
*
    ADD [  0102+  0107]   0108  3  5.0    0.91    0.15 12.25  70.74  n/a   0.000
*
    ADD [  0108+  0109]   0202  3  5.0    2.02    0.17 12.25  47.94  n/a   0.000
```

```
*
    ADD [  0202+  3001]   3002  3  5.0    5.03    0.41 12.25  35.98  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0203  1  5.0    1.17    0.03 12.42  17.13 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]   3003  3  5.0    6.20    0.43 12.25  32.43  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0204  1  5.0    3.82    0.12 12.33  17.00 0.22   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]   3004  3  5.0   10.02    0.54 12.25  26.55  n/a   0.000
*
    ADD [  3015+  3112]   3005  3  5.0    2.02    0.15 12.17  40.01  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB STANDHYD        0206  1  5.0    7.28    0.84 12.25  49.35 0.63   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]   3006  3  5.0    9.30    0.99 12.25  47.32  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 77.82 mm ]
    fname                :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD          0207  1  5.0    0.72    0.02 12.33  14.01 0.18   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]   3007  3  5.0   10.02    1.02 12.25  44.93  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              3008  1  5.0   10.02    0.22 12.92  44.93  n/a   0.000
*
    ADD [  3004+  3008]   3009  3  5.0   20.04    0.71 12.25  35.73  n/a   0.000
*
    ADD [  0002+  0006]   0007  3  1.0  446.37    7.01 13.80  29.65  n/a   0.000
*
    ADD [  0007+  0015]   0007  1  1.0  481.63    7.24 13.80  28.43  n/a   0.000
*
    ADD [  0007+  3009]   0007  3  1.0  501.67    7.54 13.78  28.73  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        1800  1  2.0   19.49    0.15 13.90  17.38 0.22   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        1802  1  5.0    0.89    0.03 12.33  15.17 0.19   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        1803  1  5.0    0.64    0.04 12.33  26.43 0.34   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  501.67    7.54 13.78  28.73  n/a   0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.16    7.69 13.78  28.30  n/a   0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.05    7.69 13.78  28.28  n/a   0.000
*
    ADD [  0008+  1803]  0008  1  1.0  522.69    7.70 13.78  28.28  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 77.82 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\aa1ca00a-d181-46bb-a6fc-
    remark: 5yr 24hr 15min SCS
*
 *  CALIB NASHYD        1801  1  5.0    6.46    0.09 13.25  17.29 0.22   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  529.15    7.77 13.78  28.14  n/a   0.000
*
=================================================================================
==========================


       V    V   I   SSSSS  U   U    A    L             (v 6.2.2005)
       V    V   I   SS     U   U   A A   L
        V  V    I    SS    U   U  AAAAA  L
        V  V    I     SS   U   U  A   A  L
         VV     I   SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```

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```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output      filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\655a6b1e-d450-43a3-bf0f-d3c5f9ecdef9\s
  Summary    filename:   C:\Users\jmacdonald\AppData\Local\Civica\VH5\799b751b-
aa12-4c81-8055-bcf6f8f60679\655a6b1e-d450-43a3-bf0f-d3c5f9ecdef9\s


DATE: 04-29-2021                          TIME: 02:49:36

USER:


COMMENTS: ____________________________________________________________


  ************************************************
  ** SIMULATION : Run 15 - 10yr 24hr 15min SCS  **
  ************************************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.    Qbase
                                  min      ha   '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD        0103  1  2.0    2.10    0.14 12.37  28.72 0.31   0.000
    [CN=56.0         ]
    [ N = 3.0:Tp 0.22]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0100  1  2.0    2.50    0.32 12.23  53.21 0.57   0.000
    [I%=33.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB STANDHYD      0200  1  2.0    2.68    0.52 12.27  67.13 0.72   0.000
    [I%=24.0:S%= 2.00]
*
 ** Reservoir
    OUTFLOW:            0205  1  2.0    2.68    0.26 12.43  67.13  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
```

```
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0250  1  2.0    1.51    0.33 12.23  73.63 0.79   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0205+  0250]  0255  3  2.0    4.19    0.58 12.23  69.48  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0221  1  2.0    0.62    0.15 12.23  76.34 0.82   0.000
    [I%=51.0:S%= 2.00]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0220  1  2.0    2.11    0.40 12.27  65.14 0.70   0.000
    [I%=20.0:S%= 2.00]
*
    ADD [  0220+  0221]  0225  3  2.0    2.73    0.55 12.23  67.68  n/a   0.000
*
    DUHYD                0226  1  2.0    2.73    0.55 12.23  67.68  n/a   0.000
       MAJOR SYSTEM:     0226  2  2.0    0.55    0.39 12.23  67.68  n/a   0.000
       MINOR SYSTEM:     0226  3  2.0    2.18    0.16 12.03  67.68  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0222  1  2.0    1.12    0.28 12.23  76.34 0.82   0.000
    [I%=51.0:S%= 2.00]
*
    ADD [  0222+  0226]  0227  3  2.0    1.67    0.66 12.23  73.49  n/a   0.000
*
    ADD [  0227+  0255]  0256  3  2.0    5.86    1.24 12.23  70.62  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0251  1  2.0    0.48    0.10 12.23  71.18 0.77   0.000
    [I%=32.0:S%= 2.00]
*
    DUHYD                0252  1  2.0    0.48    0.10 12.23  71.18  n/a   0.000
       MAJOR SYSTEM:     0252  2  2.0    0.05    0.05 12.23  71.18  n/a   0.000
       MINOR SYSTEM:     0252  3  2.0    0.43    0.05 12.07  71.18  n/a   0.000
*
    ADD [  0252+  0256]  0009  3  2.0    6.29    1.30 12.23  70.66  n/a   0.000
*
    ADD [  0009+  0100]  0010  3  2.0    8.79    1.61 12.23  65.70  n/a   0.000
*
    READ STORM                 15.0
```

```
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.90    0.25 12.23  54.89 0.59   0.000
    [I%=35.0:S%= 2.00]
*
    DUHYD                0050  1  2.0    1.90    0.25 12.23  54.89  n/a   0.000
       MAJOR SYSTEM:     0050  2  2.0    0.13    0.10 12.23  54.89  n/a   0.000
       MINOR SYSTEM:     0050  3  2.0    1.77    0.15 12.07  54.89  n/a   0.000
*
    ADD [  0010+  0050]  0011  3  2.0   10.57    1.76 12.23  63.88  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0102  1  2.0   10.00    1.25 12.23  56.27 0.61   0.000
    [I%=37.0:S%= 2.00]
*
    ADD [  0011+  0102]  0012  3  2.0   20.57    3.01 12.23  60.18  n/a   0.000
*
    ADD [  0012+  0103]  0013  3  2.0   22.67    3.12 12.23  57.27  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0104  1  2.0    2.50    0.32 12.23  53.04 0.57   0.000
    [I%=33.0:S%= 2.00]
*
    ADD [  0013+  0104]  0014  3  2.0   25.17    3.44 12.23  56.85  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0601  1  2.0   25.17    0.42 13.37  56.50  n/a   0.000
*
    DIVERT HYD           1601  1  2.0   25.17    0.42 13.37  56.50  n/a   0.000
       Outflow           0002  2  2.0    0.83    0.06 13.37  56.50  n/a   0.000
       Outflow           0002  3  2.0   24.34    0.36 13.37  56.50  n/a   0.000
       Outflow           0002  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0002  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0210  1  5.0    2.36    0.23 12.25  32.45 0.35   0.000
    [CN=68.0        ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
```

```
 *  CALIB STANDHYD       0205  1  5.0    0.75    0.12 12.25  62.21 0.67   0.000
    [I%=30.0:S%= 0.50]
*
    DUHYD                3015  1  5.0    0.75    0.12 12.25  62.21  n/a   0.000
       MAJOR SYSTEM:     3015  2  5.0    0.08    0.06 12.25  62.21  n/a   0.000
       MINOR SYSTEM:     3015  3  5.0    0.67    0.06 12.08  62.21  n/a   0.000
*
    ADD [  0210+  3015]  3200  3  5.0    2.44    0.30 12.25  33.38  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0208  1  5.0    0.86    0.14 12.25  62.21 0.67   0.000
    [I%=30.0:S%= 0.50]
*
    ADD [  0208+  3200]  3201  3  5.0    3.30    0.44 12.25  40.91  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1901  1  2.0    1.06    0.09 12.37  33.56 0.36   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1902  1  2.0    1.30    0.13 12.30  33.56 0.36   0.000
    [CN=66.5          ]
    [ N = 3.0:Tp 0.16]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5001  1  2.0    2.94    0.26 12.27  38.52 0.41   0.000
    [I%=20.0:S%= 1.00]
*
    DIVERT HYD           0156  1  2.0    2.94    0.26 12.27  38.52  n/a   0.000
       Outflow           0001  2  2.0    2.32    0.21 12.27  38.52  n/a   0.000
       Outflow           0001  3  2.0    0.62    0.06 12.27  38.52  n/a   0.000
       Outflow           0001  4  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  5  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       Outflow           0001  6  2.0    0.00    0.00  0.00   0.00  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5002  1  2.0    2.85    0.32 12.27  46.79 0.50   0.000
    [I%=20.0:S%= 1.00]
```

```
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5003  1  2.0   14.99    1.26 12.27  38.64 0.42   0.000
    [I%=20.0:S%= 1.00]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       5004  1  2.0    2.91    0.39 12.23  49.52 0.53   0.000
    [I%=35.0:S%= 1.00]
*
    DUHYD                0165  1  2.0    2.91    0.39 12.23  49.52  n/a   0.000
       MAJOR SYSTEM:     0165  2  2.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     0165  3  2.0    2.91    0.39 12.23  49.52  n/a   0.000
*
    PIPE   [ 2:  0165]   0164  1  2.0    2.91    0.34 12.27  49.47  n/a   0.000
*
    ADD [  0164+  5003]  0166  3  2.0   17.90    1.60 12.27  40.40  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0159  1  1.0   17.90    1.64 12.27  39.63  n/a   0.000
*
    ADD [  0156+  0159]  5005  3  1.0   20.22    1.84 12.27  39.50  n/a   0.000
*
    ADD [  5005+  1902]  5005  1  1.0   21.52    1.96 12.27  39.15  n/a   0.000
*
    ADD [  5005+  5002]  5005  3  1.0   24.37    2.28 12.27  40.04  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0001  1  2.0  139.80    3.33 13.43  42.07 0.45   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 1.05]
*
    CHANNEL[ 2:  0001]   0002  1  1.0  139.80    2.94 14.15  41.99  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0002  1  1.0   18.97    0.41 13.45  26.44 0.28   0.000
    [CN=71.0          ]
    [ N = 2.0:Tp 1.06]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname               :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
```

```
 *  CALIB NASHYD         0003  1  1.0   13.15    0.43 12.88  29.59 0.32   0.000
    [CN=71.0         ]
    [ N = 2.0:Tp 0.62]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0005  1  1.0   32.68    1.12 12.92  31.93 0.34   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.65]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0004  1  1.0    8.46    0.74 12.27  36.65 0.39   0.000
    [I%=18.0:S%= 2.00]
*
    ADD [  0002+  0003]  0001  3  1.0   32.12    0.81 13.08  38.93  n/a   0.000
*
    ADD [  0001+  0004]  0001  1  1.0   40.58    1.13 12.30  38.45  n/a   0.000
*
    ADD [  0001+  0005]  0001  3  1.0   73.26    2.10 12.82  40.04  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0008  1  2.0   14.42    0.33 12.83  26.18 0.28   0.000
    [CN=58.0         ]
    [ N = 2.0:Tp 0.57]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1031  1  5.0    1.05    0.14 12.25  43.00 0.46   0.000
    [CN=73.0         ]
    [ N = 2.0:Tp 0.11]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3061  1  5.0    0.48    0.10 12.25  67.44 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  1031+  3061]  2008  3  5.0    1.53    0.24 12.25  50.66  n/a   0.000
*
    DUHYD                2010  1  5.0    1.53    0.24 12.25  50.66  n/a   0.000
       MAJOR SYSTEM:     2010  2  5.0    0.21    0.14 12.25  50.66  n/a   0.000
       MINOR SYSTEM:     2010  3  5.0    1.32    0.10 12.08  50.66  n/a   0.000
*
```

```
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3053  1  5.0    0.30    0.07 12.25  67.43 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    DUHYD                2011  1  5.0    0.30    0.07 12.25  67.43  n/a   0.000
       MAJOR SYSTEM:     2011  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
       MINOR SYSTEM:     2011  3  5.0    0.30    0.07 12.25  67.43  n/a   0.000
*
    ADD [  2010+  2011]  2009  3  5.0    0.21    0.14 12.25  50.66  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         3055  1  5.0    1.24    0.11 12.25  40.91 0.44   0.000
    [CN=70.0         ]
    [ N = 2.0:Tp 0.17]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3054  1  5.0    0.30    0.06 12.25  67.43 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    ADD [  2011+  3054]  2004  3  5.0    0.60    0.13 12.25  67.43  n/a   0.000
*
    ADD [  2004+  3055]  2005  3  5.0    1.84    0.24 12.25  49.56  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3052  1  5.0    5.36    1.09 12.25  71.25 0.77   0.000
    [I%=37.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3051  1  5.0   11.90    2.22 12.25  67.44 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname               :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3021  1  5.0    1.40    0.18 12.25  45.93 0.49   0.000
    [I%=28.0:S%= 2.00]
```

```
*
    ADD [  3021+  3051]  2001  3  5.0   13.30    2.40 12.25  65.18  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4111  1  5.0    2.42    0.53 12.25  69.24 0.75   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4101  1  5.0    0.40    0.06 12.25  51.42 0.55   0.000
    [I%=35.0:S%= 2.00]
*
    ADD [  4101+  4111]  8000  3  5.0    2.82    0.59 12.25  66.71  n/a   0.000
*
    DUHYD                8050  1  5.0    2.82    0.59 12.25  66.71  n/a   0.000
       MAJOR SYSTEM:     8050  2  5.0    0.39    0.35 12.25  66.71  n/a   0.000
       MINOR SYSTEM:     8050  3  5.0    2.43    0.24 12.08  66.71  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       4120  1  5.0    0.08    0.02 12.25  78.91 0.85   0.000
    [I%=58.0:S%= 2.00]
*
    DUHYD                8055  1  5.0    0.08    0.02 12.25  78.91  n/a   0.000
       MAJOR SYSTEM:     8055  2  5.0    0.01    0.01 12.25  78.91  n/a   0.000
       MINOR SYSTEM:     8055  3  5.0    0.07    0.01 12.08  78.91  n/a   0.000
*
    ADD [  8050+  8055]  8020  3  5.0    2.50    0.25 12.08  67.05  n/a   0.000
*
    ADD [  2001+  8020]  2002  3  5.0   15.80    2.65 12.25  65.47  n/a   0.000
*
    ADD [  2002+  3052]  2003  3  5.0   21.16    3.75 12.25  66.94  n/a   0.000
*
    ADD [  2003+  2005]  2006  3  5.0   23.00    3.99 12.25  65.55  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  5.0    0.30    0.06 12.25  63.21 0.68   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       3056  1  5.0    1.37    0.24 12.25  66.92 0.72   0.000
```

```
    [I%=50.0:S%= 0.25]
*
    ADD [  0101+  2006]  2007  3  5.0   23.30    4.05 12.25  65.52  n/a   0.000
*
    ADD [  2007+  2009]  2007  1  5.0   23.51    4.19 12.25  65.39  n/a   0.000
*
    ADD [  2007+  3056]  2007  3  5.0   24.88    4.43 12.25  65.47  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3705  1  5.0   24.88    0.98 12.75  65.43  n/a   0.000
*
    ADD [  0001+  3705]  0004  3  1.0   98.14    3.07 12.80  45.17  n/a   0.000
*
    ADD [  0004+  0008]  0004  1  1.0  112.56    3.40 12.80  42.73  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0007  1  1.0   16.68    0.79 12.73  36.44 0.39   0.000
    [CN=78.0          ]
    [ N = 2.0:Tp 0.49]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0010  1  2.0    7.76    0.10 13.13  18.82 0.20   0.000
    [CN=47.0          ]
    [ N = 2.0:Tp 0.77]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0011  1  2.0    8.42    0.09 13.27  17.56 0.19   0.000
    [CN=45.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0105  1  2.0    2.90    0.26 12.23  42.53 0.46   0.000
    [I%=23.0:S%= 2.00]
*
    ADD [  0105+  0050]  0015  3  2.0    3.03    0.36 12.23  43.05  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname                :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0101  1  2.0    1.57    0.30 12.27  65.72 0.71   0.000
    [I%=23.0:S%= 2.00]
```

```
*
    DUHYD                  1011  1  2.0    1.57    0.30 12.27  65.72  n/a   0.000
       MAJOR SYSTEM:       1011  2  2.0    0.21    0.17 12.27  65.72  n/a   0.000
       MINOR SYSTEM:       1011  3  2.0    1.36    0.13 12.07  65.72  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD         0102  1  2.0    2.63    0.53 12.27  68.58 0.74   0.000
    [I%=29.0:S%= 2.00]
*
    ADD [  1011+  0102]    0105  3  2.0    3.99    0.66 12.27  67.60  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD         0103  1  2.0    0.61    0.17 12.23  82.58 0.89   0.000
    [I%=75.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD         0104  1  2.0    1.57    0.31 12.23  70.11 0.75   0.000
    [I%=36.0:S%= 2.00]
*
    ADD [  0103+  0104]    0106  3  2.0    2.18    0.48 12.23  73.60  n/a   0.000
*
    ADD [  0105+  0106]    0107  3  2.0    6.17    1.14 12.23  69.72  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD         0201  1  2.0   10.34    1.93 12.27  67.89 0.73   0.000
    [I%=30.0:S%= 2.00]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD         0202  1  2.0    2.00    0.39 12.27  67.31 0.72   0.000
    [I%=25.0:S%= 2.00]
*
    ADD [  0201+  0202]    0203  3  2.0   12.34    2.32 12.27  67.79  n/a   0.000
*
    ADD [  0107+  0203]    0204  3  2.0   18.51    3.44 12.27  68.44  n/a   0.000
*
 ** Reservoir
    OUTFLOW:               0205  1  2.0   18.51    0.39 13.07  68.42  n/a   0.000
*
    ADD [  1011+  0205]    0206  3  2.0   18.72    0.39 13.07  68.39  n/a   0.000
```

```
*
    ADD [  0015+  0206]   0051  3  2.0   21.75    0.70 12.23  64.86  n/a   0.000
*
    ADD [  0051+  0004]   0051  1  1.0  134.30    3.87 12.78  46.15  n/a   0.000
*
    ADD [  0051+  0010]   0051  3  1.0  142.06    3.96 12.78  44.65  n/a   0.000
*
    ADD [  0051+  0011]   0051  1  1.0  150.48    4.04 12.80  43.14  n/a   0.000
*
    ADD [  0051+  0007]   0051  3  1.0  167.16    4.83 12.78  43.46  n/a   0.000
*
    ADD [  0051+  1601]   0005  3  1.0  167.99    4.88 12.80  43.52  n/a   0.000
*
    CHANNEL[ 2:  0005]    0005  1  1.0  167.99    4.39 13.20  43.36  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD          0006  1  1.0   64.36    1.78 13.23  30.98 0.33   0.000
    [CN=75.0          ]
    [ N = 2.0:Tp 0.89]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD          0009  1  2.0   21.31    0.68 13.00  42.14 0.45   0.000
    [CN=74.0          ]
    [ N = 2.0:Tp 0.72]
*
    ADD [  0006+  0009]   0003  3  1.0   85.67    2.45 13.15  42.77  n/a   0.000
*
    CHANNEL[ 2:  0003]    0003  1  1.0   85.67    2.34 13.48  42.77  n/a   0.000
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD          0012  1  2.0   22.38    0.26 13.27  19.20 0.21   0.000
    [CN=48.0          ]
    [ N = 2.0:Tp 0.87]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD          0013  1  2.0   22.03    0.26 13.07  17.22 0.19   0.000
    [CN=44.0          ]
    [ N = 2.0:Tp 0.73]
*
    READ STORM                   15.0
    [ Ptot= 92.93 mm ]
    fname                 :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
```

```
*
 *  CALIB NASHYD        0014  1  2.0    9.31    0.07 13.57  15.21 0.16   0.000
    [CN=40.0         ]
    [ N = 2.0:Tp 1.08]
*
    ADD [  0003+  0005]  0006  3  1.0  253.66    6.67 13.32  43.16  n/a   0.000
*
    ADD [  0006+  0012]  0006  1  1.0  276.04    6.93 13.32  41.22  n/a   0.000
*
    ADD [  0006+  0013]  0006  3  1.0  298.07    7.19 13.30  39.44  n/a   0.000
*
    ADD [  0006+  0014]  0006  1  1.0  307.38    7.26 13.30  38.71  n/a   0.000
*
    CHANNEL[ 2:  0006]   0006  1  1.0  307.38    7.00 13.57  38.64  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD        0015  1  2.0   35.26    0.33 13.60  18.74 0.20   0.000
    [CN=47.0         ]
    [ N = 2.0:Tp 1.12]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD        0200  1  5.0    2.69    0.19 12.33  33.43 0.36   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.18]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0201  1  5.0    0.26    0.07 12.25  79.66 0.86   0.000
    [I%=75.0:S%= 0.50]
*
    ADD [  0200+  0201]  3000  3  5.0    2.95    0.25 12.25  37.51  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD        0211  1  5.0    1.00    0.09 12.25  32.89 0.35   0.000
    [CN=68.0         ]
    [ N = 2.0:Tp 0.13]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0209  1  5.0    0.36    0.09 12.25  79.67 0.86   0.000
    [I%=75.0:S%= 0.50]
```

```
*
    ADD [  0209+  0211]  3012  3  5.0    1.36    0.18 12.25  45.27  n/a   0.000
*
    DUHYD                3112  1  5.0    1.36    0.18 12.25  45.27  n/a   0.000
       MAJOR SYSTEM:     3112  2  5.0    0.13    0.09 12.25  45.27  n/a   0.000
       MINOR SYSTEM:     3112  3  5.0    1.23    0.09 12.08  45.27  n/a   0.000
*
    ADD [  3000+  3112]  3001  3  5.0    3.08    0.34 12.25  37.83  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD        0109  1  5.0    1.11    0.05 12.58  39.87 0.43   0.000
    [CN=74.0         ]
    [ N = 2.0:Tp 0.40]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0102  1  5.0    0.53    0.15 12.25  83.01 0.89   0.000
    [I%=87.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0104  1  5.0    0.23    0.07 12.25  87.88 0.95   0.000
    [I%=95.0:S%= 2.00]
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD      0105  1  5.0    0.15    0.05 12.25  89.71 0.97   0.000
    [I%=98.0:S%= 2.00]
*
    ADD [  0104+  0105]  0106  3  5.0    0.38    0.12 12.25  88.61  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0107  1  5.0    0.38    0.02 12.33  88.27  n/a   0.000
*
    ADD [  0102+  0107]  0108  3  5.0    0.91    0.18 12.25  85.21  n/a   0.000
*
    ADD [  0108+  0109]  0202  3  5.0    2.02    0.21 12.25  60.30  n/a   0.000
*
    ADD [  0202+  3001]  3002  3  5.0    5.10    0.55 12.25  46.73  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 92.93 mm ]
    fname              :                C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD        0203  1  5.0    1.17    0.04 12.42  24.24 0.26   0.000
```

```
    [CN=56.0         ]
    [ N = 2.0:Tp 0.30]
*
    ADD [  0203+  3002]  3003  3  5.0    6.27    0.58 12.25  42.53  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0204  1  5.0    3.82    0.17 12.33  24.04 0.26   0.000
    [CN=56.0         ]
    [ N = 2.0:Tp 0.20]
*
    ADD [  0204+  3003]  3004  3  5.0   10.09    0.75 12.25  35.53  n/a   0.000
*
    ADD [  3015+  3112]  3005  3  5.0    1.91    0.15 12.08  51.26  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0206  1  5.0    7.28    1.20 12.25  62.22 0.67   0.000
    [I%=30.0:S%= 1.00]
*
    ADD [  0206+  3005]  3006  3  5.0    9.19    1.35 12.25  59.95  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0207  1  5.0    0.72    0.03 12.25  20.00 0.22   0.000
    [CN=50.0         ]
    [ N = 2.0:Tp 0.16]
*
    ADD [  0207+  3006]  3007  3  5.0    9.91    1.38 12.25  57.05  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             3008  1  5.0    9.91    0.24 13.00  57.07  n/a   0.000
*
    ADD [  3004+  3008]  3009  3  5.0   19.99    0.97 12.25  46.20  n/a   0.000
*
    ADD [  0002+  0006]  0007  3  1.0  447.18    9.76 13.70  39.69  n/a   0.000
*
    ADD [  0007+  0015]  0007  1  1.0  482.44   10.09 13.70  38.15  n/a   0.000
*
    ADD [  0007+  3009]  0007  3  1.0  502.43   10.43 13.70  38.47  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1800  1  2.0   19.49    0.21 13.90  24.45 0.26   0.000
    [CN=55.1         ]
    [ N = 2.0:Tp 1.34]
*
    READ STORM                 15.0
```

```
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1802  1  5.0    0.89    0.05 12.33  21.47 0.23   0.000
    [CN=50.7         ]
    [ N = 3.0:Tp 0.21]
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1803  1  5.0    0.64    0.06 12.33  35.83 0.39   0.000
    [CN=66.6         ]
    [ N = 3.0:Tp 0.19]
*
    ADD [  0007+  0165]  0008  3  1.0  502.43   10.43 13.70  38.47  n/a   0.000
*
    ADD [  0008+  1800]  0008  1  1.0  521.92   10.64 13.70  37.95  n/a   0.000
*
    ADD [  0008+  1802]  0008  3  1.0  522.81   10.64 13.70  37.92  n/a   0.000
*
    ADD [  0008+  1803]  0008  1  1.0  523.45   10.65 13.70  37.92  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 92.93 mm ]
    fname              :                 C:\Users\jmacdonald\AppData\Local\Temp
\3a736f1e-1ed2-419b-874f-8d2991179952\e0d3751f-4d05-4e1f-8d76-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         1801  1  5.0    6.46    0.12 13.25  24.32 0.26   0.000
    [CN=54.9         ]
    [ N = 3.0:Tp 0.99]
*
    ADD [  0008+  1801]  0009  3  1.0  529.91   10.76 13.70  37.75  n/a   0.000
*
```

Alternative #11

PROJECT	Town of Innisfil - Various Roads Drainage Improvements	FILE	420395
		DATE	January 27, 2021
SUBJECT	Alternative #11 - Rain Barrel Volume Calculations	NAME	J. Macdonald
		PAGE	1 OF 1

Calculate total volume of rain barrels in each catchment then convert to depth of surface storage to use in Visual OTTHYMO model as Initial Abstraction/

standard rain barrel size 0.22 m^3

Outlet #1

Number of Lots	1582	
Area	149.95 ha	
Percent of Lots With Rain Barrel	50%	
Additional Surface Storage	0.12 mm	Applied to Initial Abstraction & Depression Storage parameters

Outlet #2

Number of Lots	7	
Area	0.95 ha	
Percent of Lots With Rain Barrel	50%	
Additional Surface Storage	0.08 mm	Applied to Initial Abstraction & Depression Storage parameters

Outlet #3

Number of Lots	242	
Area	24.23 ha	
Percent of Lots With Rain Barrel	50%	
Additional Surface Storage	0.11 mm	Applied to Initial Abstraction & Depression Storage parameters

```
**********************************************
** SIMULATION:Run 01 - 2yr 4hr 10min Chicago **
**********************************************
```

Outlet #3

```
--------------------
| ADD HYD   (  5005)|
|   1 +  2 =  3     |           AREA     QPEAK     TPEAK      R.V.
--------------------            (ha)     (cms)     (hrs)      (mm)
        ID1= 1 (  0156):        2.32    0.102      1.33     10.34
      + ID2= 2 (  0159):       14.99    0.089      2.60      9.45
        ===================================================
        ID = 3 (  5005):       17.31    0.129      1.33      9.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD   (  5005)|
|   3 +  2 =  1     |           AREA     QPEAK     TPEAK      R.V.
--------------------            (ha)     (cms)     (hrs)      (mm)
        ID1= 3 (  5005):       17.31    0.129      1.33      9.57
      + ID2= 2 (  1902):        1.30    0.019      1.53      5.13
        ===================================================
        ID = 1 (  5005):       18.61    0.137      1.37      9.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD   (  5005)|
|   1 +  2 =  3     |           AREA     QPEAK     TPEAK      R.V.
--------------------            (ha)     (cms)     (hrs)      (mm)
        ID1= 1 (  5005):       18.61    0.137      1.37      9.26
      + ID2= 2 (  5002):        2.85    0.128      1.33     12.19
        ===================================================
        ID = 3 (  5005):       21.46    0.264      1.33      9.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
**********************************************
** SIMULATION:Run 02 - 5yr 4hr 10min Chicago **
**********************************************

--------------------
| ADD HYD   (  5005)|
|   1 +  2 =  3     |           AREA     QPEAK     TPEAK      R.V.
--------------------            (ha)     (cms)     (hrs)      (mm)
        ID1= 1 (  0156):        2.32    0.139      1.33     16.09
      + ID2= 2 (  0159):       14.99    0.244      2.00     15.22
        ===================================================
        ID = 3 (  5005):       17.31    0.282      1.97     15.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD   (  5005)|
|   3 +  2 =  1     |           AREA     QPEAK     TPEAK      R.V.
--------------------            (ha)     (cms)     (hrs)      (mm)
        ID1= 3 (  5005):       17.31    0.282      1.97     15.34
      + ID2= 2 (  1902):        1.30    0.039      1.50     10.32
        ===================================================
        ID = 1 (  5005):       18.61    0.299      1.93     14.99
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.299     1.93    14.99
      + ID2= 2 (  5002):     2.85   0.180     1.33    19.33
        ===================================================
        ID = 3 (  5005):    21.46   0.387     1.33    15.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
***********************************************
** SIMULATION:Run 03 -10yr 4hr 10min Chicago **
***********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):     2.32   0.166     1.33    20.41
      + ID2= 2 (  0159):    14.99   0.382     1.83    19.56
        ===================================================
        ID = 3 (  5005):    17.31   0.441     1.82    19.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):    17.31   0.441     1.82    19.67
      + ID2= 2 (  1902):     1.30   0.057     1.50    14.55
        ===================================================
        ID = 1 (  5005):    18.61   0.474     1.78    19.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.474     1.78    19.31
      + ID2= 2 (  5002):     2.85   0.220     1.33    24.68
        ===================================================
        ID = 3 (  5005):    21.46   0.584     1.70    20.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 07 - 2yr 12hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):     2.32   0.087     6.23    14.74
      + ID2= 2 (  0159):    14.99   0.156     6.92    13.87
        ===================================================
```

```
        ID = 3 (  5005):    17.31   0.179     6.88    13.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):    17.31   0.179     6.88    13.98
      + ID2= 2 (  1902):     1.30   0.037     6.33     9.05
        ==========================================================
        ID = 1 (  5005):    18.61   0.188     6.87    13.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.188     6.87    13.64
      + ID2= 2 (  5002):     2.85   0.121     6.23    17.65
        ==========================================================
        ID = 3 (  5005):    21.46   0.298     6.27    14.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
*******************************************
** SIMULATION:Run 08 -5yr 12hr 15min SCS **
*******************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):     2.32   0.139     6.23    23.56
      + ID2= 2 (  0159):    14.99   0.460     6.53    22.72
        ==========================================================
        ID = 3 (  5005):    17.31   0.528     6.52    22.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):    17.31   0.528     6.52    22.83
      + ID2= 2 (  1902):     1.30   0.075     6.30    17.75
        ==========================================================
        ID = 1 (  5005):    18.61   0.572     6.48    22.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.572     6.48    22.48
      + ID2= 2 (  5002):     2.85   0.200     6.27    28.57
        ==========================================================
        ID = 3 (  5005):    21.46   0.698     6.47    23.29
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
*********************************************
** SIMULATION:Run 09 - 10yr 12hr 15min SCS **
*********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):      2.32   0.179      6.23    30.21
      + ID2= 2 (  0159):     14.99   0.733      6.43    29.39
        ===============================================================
        ID = 3 (  5005):     17.31   0.837      6.42    29.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):     17.31   0.837      6.42    29.50
      + ID2= 2 (  1902):      1.30   0.105      6.30    24.66
        ===============================================================
        ID = 1 (  5005):     18.61   0.924      6.40    29.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):     18.61   0.924      6.40    29.16
      + ID2= 2 (  5002):      2.85   0.271      6.27    36.72
        ===============================================================
        ID = 3 (  5005):     21.46   1.116      6.38    30.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 13 - 2yr 24hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):      2.32   0.096     12.23    18.36
      + ID2= 2 (  0159):     14.99   0.193     12.83    17.50
        ===============================================================
        ID = 3 (  5005):     17.31   0.222     12.80    17.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):     17.31   0.222     12.80    17.61
      + ID2= 2 (  1902):      1.30   0.045     12.33    12.52
```

```
        ====================================================
        ID = 1 (  5005):    18.61   0.234    12.78    17.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.234    12.78    17.26
      + ID2= 2 (  5002):     2.85   0.135    12.23    22.14
        ====================================================
        ID = 3 (  5005):    21.46   0.331    12.27    17.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 14 - 5yr 24hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0156):     2.32   0.158    12.23    29.83
      + ID2= 2 (  0159):    14.99   0.556    12.50    29.01
        ====================================================
        ID = 3 (  5005):    17.31   0.636    12.48    29.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):    17.31   0.636    12.48    29.12
      + ID2= 2 (  1902):     1.30   0.090    12.30    24.27
        ====================================================
        ID = 1 (  5005):    18.61   0.696    12.45    28.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   0.696    12.45    28.78
      + ID2= 2 (  5002):     2.85   0.236    12.27    36.26
        ====================================================
        ID = 3 (  5005):    21.46   0.847    12.43    29.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
*********************************************
** SIMULATION:Run 15 - 10yr 24hr 15min SCS **
*********************************************

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
```

```
        ID1= 1 (  0156):     2.32   0.207    12.27    38.47
      + ID2= 2 (  0159):    14.99   0.910    12.38    37.67
        =======================================================
        ID = 3 (  5005):    17.31   1.043    12.37    37.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  5005):    17.31   1.043    12.37    37.78
      + ID2= 2 (  1902):     1.30   0.126    12.30    33.46
        =======================================================
        ID = 1 (  5005):    18.61   1.160    12.37    37.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  5005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  5005):    18.61   1.160    12.37    37.47
      + ID2= 2 (  5002):     2.85   0.322    12.27    46.74
        =======================================================
        ID = 3 (  5005):    21.46   1.396    12.37    38.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

Outlet #1

```
*****************************************************
** SIMULATION:Run 01 - 2yr 4hr 10min Chicago **
*****************************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA    QPEAK     TPEAK      R.V.
--------------------          (ha)    (cms)     (hrs)      (mm)
        ID1= 1 (  0008):    525.74   2.304      3.65      7.43
      + ID2= 2 (  1801):      6.46   0.021      2.75      3.39
        ===========================================================
        ID = 3 (  0009):    532.20   2.322      3.63      7.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
*****************************************************
** SIMULATION:Run 02 - 5yr 4hr 10min Chicago **
*****************************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA    QPEAK     TPEAK      R.V.
--------------------          (ha)    (cms)     (hrs)      (mm)
        ID1= 1 (  0008):    525.67   4.517      3.43     13.43
      + ID2= 2 (  1801):      6.46   0.045      2.75      7.01
        ===========================================================
        ID = 3 (  0009):    532.13   4.555      3.43     13.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
*****************************************************
** SIMULATION:Run 03 -10yr 4hr 10min Chicago **
*****************************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA    QPEAK     TPEAK      R.V.
--------------------          (ha)    (cms)     (hrs)      (mm)
        ID1= 1 (  0008):    525.55   6.360      3.37     18.12
      + ID2= 2 (  1801):      6.46   0.064      2.67     10.04
        ===========================================================
        ID = 3 (  0009):    532.01   6.416      3.37     18.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 07 - 2yr 12hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA    QPEAK     TPEAK      R.V.
--------------------          (ha)    (cms)     (hrs)      (mm)
        ID1= 1 (  0008):    525.73   3.337      8.03     11.94
      + ID2= 2 (  1801):      6.46   0.034      7.33      6.11
        ===========================================================
        ID = 3 (  0009):    532.19   3.366      8.03     11.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
*******************************************
** SIMULATION:Run 08 -5yr 12hr 15min SCS **
*******************************************
```

```
--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0008):   525.66   6.665     7.87    21.55
      + ID2= 2 (  1801):     6.46   0.072     7.25    12.38
        ===================================================
        ID = 3 (  0009):   532.12   6.727     7.83    21.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
*********************************************
** SIMULATION:Run 09 - 10yr 12hr 15min SCS **
*********************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0008):   526.13   9.231     7.78    28.95
      + ID2= 2 (  1801):     6.46   0.103     7.25    17.53
        ===================================================
        ID = 3 (  0009):   532.59   9.322     7.78    28.81

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 13 - 2yr 24hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0008):   525.71   3.885    13.93    15.64
      + ID2= 2 (  1801):     6.46   0.041    13.33     8.58
        ===================================================
        ID = 3 (  0009):   532.17   3.919    13.93    15.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
********************************************
** SIMULATION:Run 14 - 5yr 24hr 15min SCS **
********************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0008):   525.60   7.699    13.78    28.27
      + ID2= 2 (  1801):     6.46   0.085    13.25    17.23
        ===================================================
        ID = 3 (  0009):   532.06   7.774    13.78    28.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
*********************************************
** SIMULATION:Run 15 - 10yr 24hr 15min SCS **
*********************************************

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
       ID1= 1 (  0008):   526.36  10.655    13.70    37.91
     + ID2= 2 (  1801):     6.46   0.121    13.25    24.26
       ===================================================
       ID = 3 (  0009):   532.82  10.765    13.70    37.75

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

Alternative #12

HY-8 Culvert Analysis Report

Alternative #12 – Diversion Through 9th Line Park

Culvert Data Summary - 2-450 HDPE (Goodfellow Ave)

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Goodfellow Ave)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.35 m

Roadway Data for Crossing: 9th Line Culvert (Goodfellow Ave)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.65
1	13.50	219.55
2	26.50	219.52
3	46.00	219.59
4	65.00	219.52
5	101.00	219.52
6	119.00	219.56
7	136.50	219.60
8	160.00	219.72
9	175.50	219.87

Roadway Surface: Paved

Roadway Top Width: 7.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.40 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.35	0.000	0.630	0-NF	0.000	0.000	0.450	0.680	0.000	0.000
0.20	0.20	219.39	0.322	0.673	4-FFf	0.219	0.220	0.450	0.680	0.629	0.000
0.40	0.40	219.52	0.506	0.798	4-FFf	0.356	0.312	0.450	0.680	1.245	0.000
0.40	0.40	219.52	0.506	0.798	4-FFf	0.356	0.312	0.450	0.680	1.245	0.000
0.80	0.43	219.55	0.541	0.827	4-FFf	0.450	0.325	0.450	0.680	1.351	0.000
1.00	0.44	219.55	0.549	0.834	4-FFf	0.450	0.328	0.450	0.680	1.375	0.000
1.20	0.44	219.56	0.556	0.840	4-FFf	0.450	0.331	0.450	0.680	1.395	0.000
1.40	0.45	219.57	0.562	0.845	4-FFf	0.450	0.333	0.450	0.680	1.412	0.000
1.60	0.45	219.57	0.568	0.850	4-FFf	0.450	0.334	0.450	0.680	1.428	0.000
1.80	0.46	219.57	0.573	0.855	4-FFf	0.450	0.336	0.450	0.680	1.442	0.000
2.00	0.46	219.58	0.577	0.858	4-FFf	0.450	0.337	0.450	0.680	1.454	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.72 m, Outlet Elevation (invert): 218.67 m

Culvert Length: 12.00 m, Culvert Slope: 0.0042

****

Summary of Culvert Flows at Crossing: 9th Line Culvert (Goodfellow Ave)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.35	0.00	0.00	0.00	1
219.39	0.20	0.20	0.00	1
219.52	0.40	0.40	0.00	66
219.52	0.40	0.40	0.00	2
219.55	0.80	0.43	0.36	7
219.55	1.00	0.44	0.56	4
219.56	1.20	0.44	0.75	4
219.57	1.40	0.45	0.94	3
219.57	1.60	0.45	1.14	3
219.57	1.80	0.46	1.34	3
219.58	2.00	0.46	1.52	2
219.52	0.40	0.40	0.00	Overtopping

Culvert Data Summary - 2-450 HDPE (Walkway)

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Walkway)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.29 m

Roadway Data for Crossing: 9th Line Culvert (Walkway)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.40
1	6.00	219.30
2	10.00	219.30
3	15.00	219.40

Roadway Surface: Paved

Roadway Top Width: 3.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.40 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE (Walkway)

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.29	0.000	0.670	0-NF	0.000	0.000	0.450	0.670	0.000	0.000
0.20	0.18	219.32	0.301	0.698	4-FFf	0.181	0.208	0.450	0.670	0.565	0.000
0.40	0.27	219.35	0.388	0.734	4-FFf	0.228	0.256	0.450	0.670	0.851	0.000
0.40	0.27	219.35	0.388	0.734	4-FFf	0.228	0.256	0.450	0.670	0.851	0.000
0.80	0.36	219.40	0.469	0.783	4-FFf	0.273	0.298	0.450	0.670	1.131	0.000
1.00	0.39	219.42	0.495	0.800	4-FFf	0.287	0.309	0.450	0.670	1.214	0.000
1.20	0.41	219.44	0.518	0.815	4-FFf	0.299	0.317	0.450	0.670	1.284	0.000
1.40	0.43	219.45	0.539	0.830	4-FFf	0.310	0.325	0.450	0.670	1.347	0.000
1.60	0.45	219.46	0.559	0.844	4-FFf	0.320	0.332	0.450	0.670	1.405	0.000
1.80	0.46	219.48	0.578	0.857	4-FFf	0.331	0.338	0.450	0.670	1.457	0.000
2.00	0.48	219.49	0.596	0.870	4-FFf	0.340	0.343	0.450	0.670	1.506	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.62 m, Outlet Elevation (invert): 218.59 m

Culvert Length: 4.50 m, Culvert Slope: 0.0067

****

Summary of Culvert Flows at Crossing: 9th Line Culvert (Walkway)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.29	0.00	0.00	0.00	1
219.32	0.20	0.18	0.02	8
219.35	0.40	0.27	0.13	7
219.35	0.40	0.27	0.13	2
219.40	0.80	0.36	0.44	5
219.42	1.00	0.39	0.61	4
219.44	1.20	0.41	0.79	3
219.45	1.40	0.43	0.97	3
219.46	1.60	0.45	1.15	3
219.48	1.80	0.46	1.34	3
219.49	2.00	0.48	1.52	3
219.30	0.11	0.11	0.00	Overtopping

Culvert Data Summary - 2-450 HDPE (Hydrant Access)

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Hydrant Access)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.15 m

Roadway Data for Crossing: 9th Line Culvert (Hydrant Access)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.40
1	6.00	219.30
2	10.00	219.30
3	15.00	219.40

Roadway Surface: Gravel

Roadway Top Width: 3.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.40 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE (Hydrant Access)

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.15	0.000	0.630	0-NF	0.000	0.000	0.450	0.870	0.000	0.000
0.20	0.20	219.18	0.322	0.665	4-FFf	0.215	0.220	0.450	0.870	0.629	0.000
0.40	0.40	219.29	0.510	0.770	4-FFf	0.348	0.314	0.450	0.870	1.258	0.000
0.40	0.40	219.29	0.510	0.770	4-FFf	0.348	0.314	0.450	0.870	1.258	0.000
0.80	0.52	219.39	0.650	0.867	4-FFf	0.450	0.358	0.450	0.870	1.639	0.000
1.00	0.55	219.41	0.683	0.891	4-FFf	0.450	0.366	0.450	0.870	1.718	0.000
1.20	0.57	219.43	0.710	0.909	4-FFf	0.450	0.372	0.450	0.870	1.779	0.000
1.40	0.58	219.45	0.735	0.927	4-FFf	0.450	0.377	0.450	0.870	1.833	0.000
1.60	0.60	219.46	0.758	0.942	4-FFf	0.450	0.381	0.450	0.870	1.881	0.000
1.80	0.61	219.48	0.780	0.957	4-FFf	0.450	0.384	0.450	0.870	1.926	0.000
2.00	0.63	219.49	0.801	0.972	4-FFf	0.450	0.388	0.450	0.870	1.967	0.000

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Straight Culvert

Inlet Elevation (invert): 218.52 m, Outlet Elevation (invert): 218.50 m

Culvert Length: 4.50 m, Culvert Slope: 0.0044

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Summary of Culvert Flows at Crossing: 9th Line Culvert (Hydrant Access)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.15	0.00	0.00	0.00	1
219.18	0.20	0.20	0.00	1
219.29	0.40	0.40	0.00	1
219.29	0.40	0.40	0.00	1
219.39	0.80	0.52	0.28	8
219.41	1.00	0.55	0.45	5
219.43	1.20	0.57	0.63	4
219.45	1.40	0.58	0.82	4
219.46	1.60	0.60	1.00	3
219.48	1.80	0.61	1.19	3
219.49	2.00	0.63	1.37	3
219.30	0.41	0.41	0.00	Overtopping

HY-8 Culvert Analysis Report

Analysis for tailwater = 218.85 - Lake Simcoe average March water level

Culvert Data Summary - 2-450 HDPE

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Goodfellow Ave)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.27 m

Roadway Data for Crossing: 9th Line Culvert (Goodfellow Ave)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.65
1	13.50	219.55
2	26.50	219.52
3	46.00	219.59
4	65.00	219.52
5	101.00	219.52
6	119.00	219.56
7	136.50	219.60
8	160.00	219.72
9	175.50	219.87

Roadway Surface: Paved

Roadway Top Width: 7.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.45 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.27	0.000	0.550	0-NF	0.000	0.000	0.450	0.600	0.000	0.000
0.20	0.20	219.31	0.322	0.593	4-FFf	0.219	0.220	0.450	0.600	0.629	0.000
0.40	0.40	219.44	0.510	0.721	4-FFf	0.360	0.314	0.450	0.600	1.258	0.000
0.45	0.45	219.49	0.563	0.766	4-FFf	0.450	0.333	0.450	0.600	1.415	0.000
0.80	0.51	219.54	0.630	0.824	4-FFf	0.450	0.353	0.450	0.600	1.592	0.000
1.00	0.51	219.55	0.640	0.832	4-FFf	0.450	0.356	0.450	0.600	1.615	0.000
1.20	0.52	219.56	0.647	0.838	4-FFf	0.450	0.358	0.450	0.600	1.633	0.000
1.40	0.52	219.56	0.653	0.843	4-FFf	0.450	0.359	0.450	0.600	1.648	0.000
1.60	0.53	219.57	0.659	0.848	4-FFf	0.450	0.360	0.450	0.600	1.662	0.000
1.80	0.53	219.57	0.664	0.853	4-FFf	0.450	0.362	0.450	0.600	1.674	0.000
2.00	0.54	219.58	0.669	0.857	4-FFf	0.450	0.363	0.450	0.600	1.686	0.000

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Straight Culvert

Inlet Elevation (invert): 218.72 m, Outlet Elevation (invert): 218.67 m

Culvert Length: 12.00 m, Culvert Slope: 0.0042

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Summary of Culvert Flows at Crossing: 9th Line Culvert (Goodfellow Ave)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.27	0.00	0.00	0.00	1
219.31	0.20	0.20	0.00	1
219.44	0.40	0.40	0.00	1
219.49	0.45	0.45	0.00	1
219.54	0.80	0.51	0.29	10
219.55	1.00	0.51	0.48	5
219.56	1.20	0.52	0.68	4
219.56	1.40	0.52	0.87	3
219.57	1.60	0.53	1.07	3
219.57	1.80	0.53	1.26	3
219.58	2.00	0.54	1.46	3
219.52	0.48	0.48	0.00	Overtopping

Culvert Data Summary - 2-450 HDPE

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Walkway)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.09 m

Roadway Data for Crossing: 9th Line Culvert (Walkway)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.40
1	6.00	219.30
2	10.00	219.30
3	15.00	219.40

Roadway Surface: Paved

Roadway Top Width: 3.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.45 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.09	0.000	0.470	0-NF	0.000	0.000	0.450	0.470	0.000	0.000
0.20	0.20	219.12	0.321	0.505	4-FFf	0.192	0.220	0.450	0.470	0.629	0.000
0.40	0.40	219.23	0.509	0.610	4-FFf	0.294	0.314	0.450	0.470	1.258	0.000
0.45	0.45	219.27	0.563	0.647	4-FFf	0.322	0.333	0.450	0.470	1.415	0.000
0.80	0.57	219.37	0.716	0.754	4-FFf	0.450	0.373	0.450	0.470	1.793	0.000
1.00	0.59	219.40	0.753	0.779	4-FFf	0.450	0.380	0.450	0.470	1.870	0.000
1.20	0.61	219.42	0.780	0.798	4-FFf	0.450	0.384	0.450	0.470	1.926	0.000
1.40	0.63	219.43	0.804	0.814	4-FFf	0.450	0.388	0.450	0.470	1.974	0.000
1.60	0.64	219.45	0.826	0.829	4-FFf	0.450	0.392	0.450	0.470	2.017	0.000
1.80	0.65	219.46	0.844	0.841	4-FFf	0.450	0.394	0.450	0.470	2.050	0.000
2.00	0.66	219.48	0.858	0.851	4-FFf	0.450	0.396	0.450	0.470	2.076	0.000

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Straight Culvert

Inlet Elevation (invert): 218.62 m, Outlet Elevation (invert): 218.59 m

Culvert Length: 4.50 m, Culvert Slope: 0.0067

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Summary of Culvert Flows at Crossing: 9th Line Culvert (Walkway)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.09	0.00	0.00	0.00	1
219.12	0.20	0.20	0.00	1
219.23	0.40	0.40	0.00	1
219.27	0.45	0.45	0.00	1
219.37	0.80	0.57	0.23	9
219.40	1.00	0.59	0.40	5
219.42	1.20	0.61	0.59	4
219.43	1.40	0.63	0.77	4
219.45	1.60	0.64	0.96	3
219.46	1.80	0.65	1.15	3
219.48	2.00	0.66	1.34	3
219.30	0.49	0.49	0.00	Overtopping

Culvert Data Summary - 2-450 HDPE

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 9th Line Culvert (Hydrant)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: 9th Line Culvert (Hydrant)

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.40
1	6.00	219.30
2	10.00	219.30
3	15.00	219.40

Roadway Surface: Gravel

Roadway Top Width: 3.00 m

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cms

Design Flow: 0.45 cms

Maximum Flow: 2.00 cms

Culvert Summary Table: 2-450 HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	218.85	0.000	0.330	0-NF	0.000	0.000	0.350	0.570	0.000	0.000
0.20	0.20	218.90	0.322	0.381	1-S1t	0.215	0.220	0.350	0.570	0.734	0.000
0.40	0.40	219.04	0.510	0.524	7-M1t	0.348	0.314	0.350	0.570	1.507	0.000
0.45	0.45	219.09	0.563	0.568	3-M2t	0.450	0.333	0.350	0.570	1.695	0.000
0.80	0.65	219.36	0.843	0.774	7-M2c	0.450	0.394	0.394	0.570	2.208	0.000
1.00	0.67	219.40	0.875	0.798	7-M2c	0.450	0.398	0.398	0.570	2.254	0.000
1.20	0.68	219.42	0.898	0.815	7-M2c	0.450	0.400	0.400	0.570	2.285	0.000
1.40	0.69	219.44	0.916	0.829	7-M2c	0.450	0.403	0.403	0.570	2.310	0.000
1.60	0.70	219.45	0.934	0.842	7-M2c	0.450	0.404	0.404	0.570	2.334	0.000
1.80	0.71	219.47	0.949	0.854	7-M2c	0.450	0.406	0.406	0.570	2.356	0.000
2.00	0.72	219.48	0.964	0.865	7-M2c	0.450	0.408	0.408	0.570	2.376	0.000

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Straight Culvert

Inlet Elevation (invert): 218.52 m, Outlet Elevation (invert): 218.50 m

Culvert Length: 4.50 m, Culvert Slope: 0.0044

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Summary of Culvert Flows at Crossing: 9th Line Culvert (Hydrant)

Headwater Elevation (m)	Total Discharge (cms)	2-450 CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
218.85	0.00	0.00	0.00	1
218.90	0.20	0.20	0.00	1
219.04	0.40	0.40	0.00	1
219.09	0.45	0.45	0.00	1
219.36	0.80	0.65	0.15	6
219.40	1.00	0.67	0.33	6
219.42	1.20	0.68	0.52	5
219.44	1.40	0.69	0.70	4
219.45	1.60	0.70	0.90	4
219.47	1.80	0.71	1.09	3
219.48	2.00	0.72	1.28	3
219.30	0.61	0.61	0.00	Overtopping

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed 9th Line Outlet (U/S of Twin 525 Culverts)

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.003	m/m	
BOTTOM WIDTH	0.5		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.45	m	
AREA	0.833	m^2	
WETTED PERIMETER	3.346	m	
HYDRAULIC RADIUS	0.249	m	
FLOW CAPACITY	0.451	m^3/s	

PROJECT	TOI Various Roads	FILE	420395
		DATE	March 2021
SUBJECT	Manning's Equation Flow Calculations	NAME	J. Macdonald
		PAGE	OF

TATHAM ENGINEERING

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Existing 9th Line Outlet - Estimate

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.003	m/m	
BOTTOM WIDTH	0.5		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.90	m	
AREA	2.880	m^2	
WETTED PERIMETER	6.192	m	
HYDRAULIC RADIUS	0.465	m	
FLOW CAPACITY	2.367	m^3/s	

Existing 9th Line Outlet - Proposed Widening

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.003	m/m	
BOTTOM WIDTH	1.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.90	m	
AREA	3.330	m^2	
WETTED PERIMETER	6.692	m	
HYDRAULIC RADIUS	0.498	m	
FLOW CAPACITY	2.863	m^3/s	
ADDITIONAL CAPACITY	0.496	m^3/s	
REQUIRED ADD. CAPACITY	0.450	m^3/s	Max discharge from proposed 2-450mm HDPE culverts before flow overtops Goodfellow Ave.

Appendix E:
Public Consultation

Type	Company	Address1	Address2	City	PostalCode	FirstName	LastName	Title	JobTitle	WorkPhone	Email
Agency	Ministry of the Environment, Conservation & Parks	Barrie District Office	54 Cedar Pointe Dr. Unit 1201	Barrie, Ontario	L4N 5R7	Cindy	Hood	Ms.	Manager	705-309-5874	cindy.hood@ontario.ca
Agency	Ministry of the Environment, Conservation & Parks	Central Region Office	Place Nouveau 5775 Yonge Street, 9th Floor	Toronto, Ontario	M2M 4J1	Chunmei	Liu	Ms.	EA Coordinator	416-326-4886	chunmei.lui@ontario.ca
Agency	Ministry of the Environment, Conservation & Parks	Environmental Assessment Services	135 St. Clair Ave. W. 1st Floor	Toronto, Ontario	M4V 1P5	Annamaria	Cross	Ms.	Manager	416-314-7967	Annamaria.cross@ontario.ca
Agency	Ministry of Tourism, Culture & Sport	Midhurst District Office	2284 Nursery Road	Midhurst, Ontario	L0L 1X0	Chantale	Gagnon	Ms.	Regional Advisor	705-241-2386	chantale.gagnon@ontario.ca
Agency	Ministry of Tourism, Culture & Sport	Heritage Planning Unit	401 Bay Street Suite 1701	Toronto, Ontario	M7A 0A7	Dan	Minkin	Mr.	Heritage Planner	416-314-7147	dan.minkin@ontario.ca
Agency	Ministry of Tourism, Culture & Sport	Archaeology Program Unit	401 Bay Street Suite 1700	Toronto, Ontario	M7A 0A7	Katherine	Cappella	Ms.	Manager	416-314-7132	katherine.cappella@ontario.ca
Agency	Ministry of Natural Resources & Forestry	Midhurst District	2284 Nursery Road	Midhurst, Ontario	L0L 1X0	Shawn	Carey	Mr.	District Manager	705-725-7561	shawn.carey@ontario.ca
Agency	Ministry of Municipal Affairs and Housing	Central Municipal Services Office	777 Bay Street 13th Floor	Toronto, Ontario	M5G 2E5	Aly	N. Alibhai	Mr.	Regional Director	416-585-7264	aly.alibhai@ontario.ca
Agency	Ministry of Agriculture, Food & Rural Affairs	Economic Development Division, Rural Programs Branch	1 Stone Rd W. 4th Floor	Guelph, Ontario	N1G 4Y2	Carolyn	Hamilton	Ms.	Director	519-826-3419	carolyn.hamilton@ontario.ca
Agency	Ministry of Agriculture, Food & Rural Affairs	Policy Division, Food Safety & Environmental Policy Branch	1 Stone Rd W. 2nd Floor	Guelph, Ontario	N1G 4Y2	Sharon	Bailey	Ms.	Director	519-826-6800	sharon.bailey@ontario.ca
Agency	Ministry of Transportation	Central Region, Corridor Management	159 Sir William Hearst Avenue, Bldg. "D", 7th Floor	Toronto, Ontario	M3M 0B7	Peter	Dorton	Mr.	Sr. Project Manager	416-235-4280	peter.dorton@ontario.ca
Agency	Ministry of Transportation	Central Region, Planning & Design	159 Sir William Hearst Avenue, Bldg. "D", 7th Floor	Toronto, Ontario	M3M 0B7	John	Mackinnon	Mr.	Area Manager	416-235-5533	john.mackinnon@ontario.ca
Agency	Ministry of Indigenous Affairs	Indigenous Relations Branch	160 Bloor Street E. Suite 400	Toronto, Ontario	M7A 2E6	Francois	Lachance	Mr.	Senior Advisor	416-326-4754	francois.lachance@ontario.ca

Type	Company	Address1	Address2	City	PostalCode	FirstName	LastName	Title	JobTitle	WorkPhone	Email
Agency	Nottawasaga Valley Conservation Authority	John Hix Conservation Administration Centre	8195 8th Line	Utopia, Ontario	L0M 1T0	Doug	Hevenor	Mr.	Chief Administrative Officer	705-424-1479 ext. 225	dhevenor@nvca.on.ca
Agency	Lake Simcoe Region Conservation Authority		120 Bayview Parkway	Newmarket, Ontario	L3Y 3W3	Ben	Longstaff	Mr.	General Manager, Integrated Watershed Management	905-895-1281 ext. 305	b.longstaff@lsrca.on.ca
Agency	Simcoe Muskoka District Health Unit	15 Sperling Drive		Barrie, Ontario	L4M 6K9					705-721-7520	
Agency	Infrastructure Ontario	Realty Operations & Asset Management	1 Dundas Street West Suite 2000	Toronto, Ontario	M5G 1Z3	Sean	Wiley	Mr.	Executive Vice-President, Asset Management	416-327-3937	sean.wiley@infrastructureontario.ca
Agency (Federal)	Crown-Indigenous Relations & Northern Affairs Canada	Lands & Economic Development - Environment	655 Bay Street, Suite 700 8th Floor	Toronto, Ontario	M5G 2K4	Sunil	Bajaj	Mr.	Manager	416-973-4614	sunil.bajaj@canada.ca
Agency (Federal)	Department of Fisheries and Oceans	Fish & Fish Habitat Protection Program	867 Lakeshore Road	Burlington, Ontario	L7S 1A1	Tom	Hoggarth	Mr.	Regional Director, Ecosystems Management	905-336-4764	
Municipal	South Simcoe Police	North Division	2137 Innisfil Beach Road	Innisfil, Ontario	L9S 1A2	Andrew	Fletcher	Chief	Chief of Police	705-436-2141	inquiries@southsimcoepolice.ca
Municipal	City of Barrie	P.O. Box 400	70 Collier Street	Barrie, Ontario	L4M 4T5	Andrea	Miller	Ms.	General Manager, Infrastructure & Growth Management	705-739-4220 ext. 4485	andrea.miller@barrie.ca
Municipal	The County of Simcoe	Administration Centre	1110 Highway 26	Midhurst, Ontario	L9X 1N6	Mark	Aitkin	Mr.	Chief Administrative Officer	705-726-9300 ext.1260	cao@simcoe.ca
School Board	Simcoe County District School Board		1170 Highway 26	Midhurst, Ontario	L9X 1N6	Andrew	Keuken	Mr.	Manager of Planning, Enrolment & Community Use	705-734-6363 ext. 11513	akeuken@scdsb.on.ca
School Board	Simcoe Muskoka Catholic District School Board	46 Alliance Blvd.		Barrie, Ontario	L4M 5K3	Jennifer	Sharpe	Ms.	Manager of Planning & Properties	705-722-3555 ext. 351	jsharpe@smcdsb.on.ca
School Board	Simcoe County Student Transportation Consortium	64 Cedar Pointe Drive Suite 1403		Barrie, Ontario	L4N 5R7	Bonnie	Branch	Ms.	Transportation Coordinator	705-733-8965	bbranch@scstc.ca
Utility	Bell Canada	136 Bayfield Street	Floor 2	Barrie, Ontario	L4M 3B1	Andrew	Fournier	Mr.	Manager, Access Network	705-722-2677	andrew.fournier@bell.ca

Type	Company	Address1	Address2	City	PostalCode	FirstName	LastName	Title	JobTitle	WorkPhone	Email
Utility	Rogers Cable Systems	1 Sperling Drive	P.O. Box 8500	Barrie, Ontario	L4M 6B8	Tony	Dominguez	Mr.	Systems Planner	705-737-4660	tony.dominguez@rci.rogers.com
Utility	Hydro One	Subdivision Group	420 Welham Road	Barrie, Ontario	L4N 8Z2	Heather	McTeer	Ms.			
Utility	Hydro One Network	45 Sarjeant Drive	P.O. Box 6700	Barrie, Ontario	L4M 5N5	Business Customer Centre					
Utility	Ontario Power Generation	700 University Avenue		Toronto, Ontario	M5G 1X6	Christopher F.	Ginther	Ms.	Chief Administrative Officer	416-592-2555	
Utility	InnPower	7251 Yonge Street		Innisfil, Ontario	L9S 0J3	Wally	Malcolm		Chief Executive Officer	705-431-4321	
Utility	Enbridge Gas Distribution Inc.	10 Churchill Dr.		Barrie, Ontario	L4N 8Z5	David	Smith	Mr.	Sales Development Representative	705-739-5254	
First Nations Community	Chippewas of Georgina Island	R. R. #2	P.O. Box N-13	Sutton West, ON	LOE 1RO	Donna	Big Canoe	Ms.	Chief	705 437-1337	
First Nations Community	Chippewas of Rama First Nation	5884 Rama Road	Suite 200	Rama, Ontario	L3V 6H6	Rodney	Noganosh		Chief	705-325-3611	
First Nations Community	Wahta Mohawk	P.O. Box 260	2664 Muskoka Road 38	Bala, Ontario	P0C 1A0	Philip	Franks		Chief	705-762-2354	
First Nations Community	Moose Dear Point	3719 Twelve Mile Bay Road	P.O. Box 119	Mac Tier, Ontario	P0C 1H0	Barron	King		Chief	705-375-5209	
First Nations Community	Wasauksing First Nation	P.O. Box 250	1508 Geewadin Road	Parry Sound, Ontario	P2A 2X4	Warren	Tabobondung		Chief	705-746-2531	
First Nations Community	Coordinator for Williams Treaties First Nation	8 Creswick Court		Barrie, Ontario	L4M 2J7	Karry	Sandy-McKenzie	Ms.	Barrister & Solicitor		inquiries@williamstreatiesfirstnations.ca
First Nations Community	Beausoleil First Nation (Christian Island)	11 O'Gemaa Miikaan		Christian Island, Ontario	L9M 0A9	Guy	Monague		Chief	705-247-2051	
First Nations Community	Georgian Bay Métis Council	355 Cranston Crescent	PO Box 4	Midland, Ontario	L4R 4K6	Greg	Garratt	Mr.	President	705-526-6335	greggarratt@gmail.com
First Nations Community	Moon River Métis Council		385a Bethune Drive North	Gravenhurst, Ontario	P1P 1B8	Tony	Muscat	Mr.	President		
First Nations Community	Métis Nation of Ontario - Head Office	66 Slater Street	Suite 1100	Ottawa, Ontario	K1P 5H1						

Type	Company	Address1	Address2	City	PostalCode	FirstName	LastName	Title	JobTitle	WorkPhone	Email
First Nations Community	La Nation Huronne-Wendat (Huron-Wendat First Nation)	Centre Administratif	255 Place Chef Michel Laveau	Wendake, Quebec	G0A 4V0	Konrad H.	Sioui		Grand Chief	418-843-3767	

From:	Hannah Abel
To:	Nicole Foris; Amanda Kellett
Cc:	aleal@innisfil.ca; rdasilva@innisfil.ca
Bcc:	chantale.gagnon@ontario.ca; cindy.hood@ontario.ca; Annamaria.cross@ontario.ca; chunmei.liu@ontario.ca; dan.minkin@ontario.ca; katherine.cappella@ontario.ca; shawn.carey@ontario.ca; aly.alibhai@ontario.ca; carolyn.hamilton@ontario.ca; sharon.bailey@ontario.ca; b.longstaff@lsrca.on.ca; sean.wiley@infrastructureontario.ca; sunil.bajaj@canada.ca; inquiries@southsimcoepolice.ca; andrea.miller@barrie.ca; cao@simcoe.ca; akeuken@scdsb.on.ca; bbranch@scstc.ca; peter.dorton@ontario.ca; john.mackinnon@ontario.ca; francois.lachance@ontario.ca; dhevenor@nvca.on.ca; jsharpe@smcdsb.on.ca; andrew.fournier@bell.ca; tony.dominguez@rci.rogers.com; inquiries@williamstreatiesfirstnations.ca; greggarratt@gmail.com
Subject:	Various Roads Drainage Improvement Program - Town of Innisfil - Notice of Study Commencement
Date:	Thursday, April 1, 2021 1:37:00 PM
Attachments:	L - TOI Notice of Study Commencement.pdf

The Town of Innisfil has initiated a Municipal Class Environmental Assessment (EA) for drainage improvements in the Bonsecours Beach and Goodfellow Beach area in the community of Alcona. The existing environmental and drainage conditions in the study area will be reviewed. Alternative solutions will be established and evaluated based on their impact on the environment and the opportunities and constraints of the project.

This study is being executed in accordance with the planning and design process for Schedule "B" projects as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 and 2011). A copy of the Notice of Study Commencement is attached.

If you have any questions, initial comments or input regarding the study, please do not hesitate to contact Amanda Kellett.

Amanda Kellett, B.Sc.Eng, P.Eng.

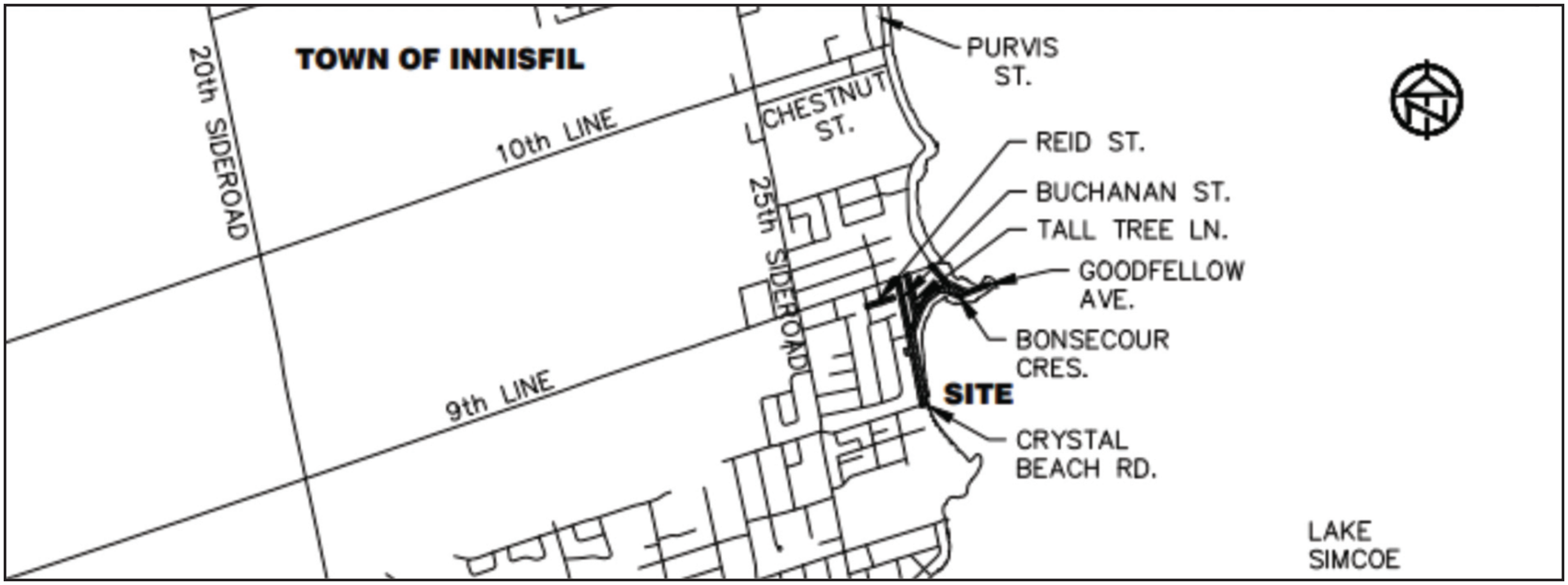
Senior Engineer, Group Leader

Tatham Engineering Limited

41 King Street, Unit 4 | Barrie | Ontario | L9Y 5A6

T 705-733-9037 x2042 | **C** 705-220-7278 **E** akellett@tathameng.com

TOWN OF INNISFIL
VARIOUS ROADS DRAINAGE IMPROVEMENTS PROGRAM
NOTICE OF STUDY COMMENCEMENT



The Town of Innisfil has initiated a Class Environmental Assessment (EA) for drainage improvements in the Bonsecours Beach and Goodfellow Beach area in the community of Alcona. This study is being executed in accordance with the planning and design process for Schedule “B” projects as outlined in the Municipal Engineers Association *Municipal Class Environmental Assessment* document (October 2000, as amended in 2007 and 2011).

The existing environmental and drainage conditions in the study area will be reviewed. Alternative solutions, including a sediment barrier to protect the storm sewer outlet across from the south end of Tall Tree Lane and the culverts under the south end of Crystal Beach Road from sediment accumulation, will be established and evaluated based on their impact on the environment and the opportunities and constraints of the project.

A public consultation program is being established to obtain timely input into the study. A virtual Public Information Center (PIC) will be scheduled in the spring to provide an opportunity for the public and stakeholders to review the alternatives and recommended strategy under consideration, and to provide input and comments. A Notice providing time and location of the PIC will be published in local newspapers.

As they become available, further details on the project and the Municipal Class Environmental Assessment will be available on the Town’s website https://www.getinvolvedinnisfil.ca/drainage and from the consultants’ office. Written comments and input are welcome. Comments and requests for information should be submitted to:

Amber Leal, C.E.T.
Town of Innisfil
Tel: 705-436-3740, ext. 3246
e-mail: aleal@innisfil.ca

or

Amanda Kellett, P.Eng.
Tatham Engineering Limited
Tel: 705-733-9037, ext 2042
e-mail: akellett@tathameng.com

This Notice issued March 4th, 2021

Nicole Foris

From: Dorton, Peter (MTO) <Peter.Dorton@ontario.ca>
Sent: April 1, 2021 2:09 PM
To: Hannah Abel; Nicole Foris; Amanda Kellett
Cc: aleal@innisfil.ca; rdasilva@innisfil.ca; Van Voorst, John (MTO); Grobel, Lukasz (MTO); Blaney, Cameron (MTO); Hajjar, Alexander (MTO)
Subject: RE: Various Roads Drainage Improvement Program - Town of Innisfil - Notice of Study Commencement
Attachments: L - TOI Notice of Study Commencement.pdf

Hi Amanda:

These proposed drainage improvements are beyond MTO's permit control area.

MTO review and approvals are not required.

Peter Dorton
Senior Project Manager
Ministry of Transportation
Central Operations, Highway Corridor Management Section
159 Sir William Hearst Avenue, 7th Floor
Toronto, ON M3M 0B7
Cell: (437) 833 - 9396
E-Mail: peter.dorton@ontario.ca
Web: www.mto.gov.on.ca/english/engineering/management/corridor

---

From: Hannah Abel <habel@tathameng.com>
Sent: April 1, 2021 1:37 PM
To: Nicole Foris <nforis@tathameng.com>; Amanda Kellett <akellett@tathameng.com>
Cc: aleal@innisfil.ca; rdasilva@innisfil.ca
Subject: Various Roads Drainage Improvement Program - Town of Innisfil - Notice of Study Commencement

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

The Town of Innisfil has initiated a Municipal Class Environmental Assessment (EA) for drainage improvements in the Bonsecours Beach and Goodfellow Beach area in the community of Alcona. The existing environmental and drainage conditions in the study area will be reviewed. Alternative solutions will be established and evaluated based on their impact on the environment and the opportunities and constraints of the project.

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If you have any questions, initial comments or input regarding the study, please do not hesitate to contact Amanda Kellett.

Amanda Kellett, B.Sc.Eng, P.Eng.

Senior Engineer, Group Leader

Tatham Engineering Limited

41 King Street, Unit 4 | Barrie | Ontario | L9Y 5A6

T 705-733-9037 x2042 | **C** 705-220-7278 **E** akellett@tathameng.com

Nicole Foris

From:	EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Sent:	May 6, 2021 4:56 PM
To:	Nicole Foris; Amanda Kellett; aleal@innisfil.ca; Roberto DaSilva
Cc:	Potter, Katy (MECP); Hood, Cindy (MECP)
Subject:	RE: Innisfil, Municipal Class EA, Various Roads Drainage Improvements Program
Attachments:	06 May 2021 MECP Comments_NoC_VariousRdDrainage.pdf

Please find the attached letter as the ministry's general comments for the above noted project. If you have any questions, please feel free to contact me directly.

Best regards,

Chunmei Liu | Regional EA and Planning Coordinator
Environmental Assessment Branch, **Ontario Ministry of the Environment, Conservation and Parks**
Chunmei.Liu@ontario.ca | Website: http://www.ene.gov.on.ca/

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

Nous attendons vos commentaires. Qu'avez-vous pensé de mon service? Vous pouvez nous faire part de vos commentaires au 1-888-745-8888 ou à ontario.ca/retroactioninspection

---

From: Nicole Foris <nforis@tathameng.com>
Sent: April-05-21 10:32 AM
To: EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Cc: Amanda Kellett <akellett@tathameng.com>; aleal@innisfil.ca; Roberto DaSilva <rdasilva@innisfil.ca>
Subject: Innisfil, Municipal Class EA, Various Roads Drainage Improvements Program

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

The Town of Innisfil has initiated a Municipal Class Environmental Assessment (EA) for drainage improvements in the Bonsecours Beach and Goodfellow Beach area in the community of Alcona. The existing environmental and drainage conditions in the study area will be reviewed. Alternative solutions will be established and evaluated based on their impact on the environment and the opportunities and constraints of the project.

This study is being executed in accordance with the planning and design process for Schedule "B" projects as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 and 2011). A copy of the Notice of Study Commencement is attached.

If you have any questions, initial comments or input regarding the study, please do not hesitate to contact Amber Leal or Amanda Kellett.

Amber Leal, C.E.T. PMP
Capital Project Manager
705-436-3740 Ext. 3246 | 1-888-436-3710 (toll free)

Amanda Kellett, B.Sc.Eng, P.Eng.
Senior Engineer, Group Leader
Tatham Engineering Limited
41 King Street, Unit 4 | Barrie | Ontario | L9Y 5A6
T 705-733-9037 x2042 | **C** 705-220-7278 **E** akellett@tathameng.com

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2. It is agreed that only those hard copy documents bearing the professional seal and signature of the Tatham Engineering Limited project engineer will govern the work of the project. In the event of any dispute concerning an electronic document, the appropriately dated hard copy will be the document used by Tatham Engineering Limited to govern and resolve the dispute.

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

Ontario

May 6, 2021

File No.: EA 01-06-04

Amber Leal, C.E.T
Capital Project Manager,
Town of Innisfil
2101 Innisfil Beach Road.
Innisfil, ON. L9S 1A1
705-436-3740 Ext. 3246
aleal@innisfil.ca

Re: **Various Road Drainage Improvements Program**
Town of Innisfil
Municipal Class EA
Response to Notice of Study Commencement

Dear Amber Leal,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Town of Innisfil (proponent) has indicated that the study is following the approved environmental planning process for a Schedule B project under the Municipal Class Environmental Assessment (Class EA).

The **updated (February 2021)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- The following Williams Treaties Communities with copy to the Williams Treaties coordinator Karry Sandy McKenzie:
    - Chippewas of Georgina Island
    - Chippewas of Rama First Nation (Mnjikaning)
    - Beausoleil First Nation

- Huron-Wendat Nation, if there is potential for the project to impact archeological resources

- Métis Nation of Ontario- Lands and Resources Dept with a copy to Region 7 Councillor David Dusome

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right
- Consultation with Indigenous communities or other stakeholders has reached an impasse
- A Part II Order request is expected on the basis of impacts to Aboriginal or treaty rights

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also ensure a copy of the final notice is sent to the ministry's Central Region EA notification email account (eanotification.cregion@ontario.ca) after the draft report is reviewed and finalized.

Should you or any members of your project team have any questions regarding the material above, please contact me at chunmei.liu@ontario.ca.

Yours truly,

Chunmei Liu
Regional Environmental Assessment Coordinator – Central Region

cc Katy Potter, Supervisor, Environmental Assessment Services, MECP
Cindy Hood, Manager, Barrie District Office, MECP
Amanda Kellett, P.Eng., Tatham Engineering Limited

Attach: Areas of Interest
A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. February 2021)

It is suggested that you check off each section after you have considered / addressed it.

☐ **Planning and Policy**

- Projects located in MECP Central Region are subject to **A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020).** Parts of the study area may also be subject to the Oak Ridges Moraine Conservation Plan (2017), Niagara Escarpment Plan (2017), Greenbelt Plan (2017) or Lake Simcoe Protection Plan (2014). Applicable plans and the applicable policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.

- Additionally, if the project is located within the boundaries of the Lake Simcoe Protection Plan, we also strongly recommend that the project team review the information and resources available on the province's website related to protecting Lake Simcoe found here: https://www.ontario.ca/page/protecting-lake-simcoe, including the Lake Simcoe phosphorus reduction strategy.

- The **Provincial Policy Statement (2020)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

☐ **Source Water Protection**

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

    - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

    - If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: http://www.applications.ene.gov.on.ca/swp/en/index.php. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the "Map Legend" bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information
For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

- **Climate Change**

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

    1. Consider during the assessment of alternative solutions and alternative designs, the following:
        a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
        b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
    2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

□ **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

- **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
  - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
  - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
  - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, you may consider the provisions of the Rouge Park Management Plan if applicable.

- **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

- **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

  - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
  - Watershed information, drainage conditions, and other relevant background information
  - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
  - Information on maintenance and monitoring commitments.

- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

☐ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements

Contaminated Sites

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP's D-4 guideline for land use considerations near landfills and dumps.
  - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

Servicing, Utilities and Facilities

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

Mitigation and Monitoring

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

☐ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

☐ **Class EA Process**

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**

- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020

Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address (for projects in MECP Central Region, the email is eanotification.cregion@ontario.ca).

The public has the ability to request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Part II Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests on those matters should be addressed in writing to:

Minister Jeff Yurek
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;

- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Nicole Foris

From: Nicole Foris
Sent: May 6, 2021 8:48 AM
To: Lori-Jeanne Bolduc
Cc: Amanda Kellett; aleal@innisfil.ca; Roberto DaSilva
Subject: RE: Various Road Drainage Improvement Program (Tatham No. 420395)

Hi Lori-Jeanne,

We can share the report with Huron-Wendat Nation when it's ready for review. At this point, we are not anticipating that a Stage 3 archaeological assessment will be required, but if the Stage 1 and 2 assessments indicate that it will be required, we will involve Huron-Wendat Nation in any discussions and on-site investigation.

We will check with the Town on their funding availability and get back to you.

Thanks,

Nicole

Nicole Foris, B.A.Sc., P.Eng.
Intermediate Engineer

Tatham Engineering Limited
41 King Street, Unit 4 | Barrie | Ontario | L4N 6B5
T 705-733-9037 x2028 | nforis@tathameng.com | tathameng.com

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From: Lori-Jeanne Bolduc <Lori-Jeanne.Bolduc@wendake.ca>
Sent: May 5, 2021 1:45 PM
To: Nicole Foris <nforis@tathameng.com>
Cc: Amanda Kellett <akellett@tathameng.com>; aleal@innisfil.ca; Roberto DaSilva <rdasilva@innisfil.ca>
Subject: RE: Various Road Drainage Improvement Program (Tatham No. 420395)

Hi Nicole,

Thank you for following up. I understand that archaeological fieldwork is currently being carried out. The Huron-Wendat Nation is interested in receiving copies of the draft reports for review and comments. If a stage 3 archaeological assessment is required, it is important that we send a monitor on site. Is there funding available for the Huron-Wendat Nation to be involved?

Thank you,

Lori-Jeanne

ATTENTION: Please note that Maxime Picard has a new position at the Huron-Wendat Nation Council and is no longer in charge of Ontario consultations. Any new consultation from Ontario must be sent to Mario Gros-Louis (mario.groslouis@wendake.ca) and Lori-Jeanne Bolduc (lori-jeanne.bolduc@wendake.ca).

For inquiries relating specifically to archaeology (fieldwork planning, monitoring, reports review, etc.), please contact Valérie Janssen, archaeologist (valerie.janssen@wendake.ca), Jean-François Richard (jean-francois.richard@wendake.ca) and Isabelle Lechasseur (isabelle.lechasseur@wendake.ca).

NATION HURONNE-WENDAT
Bureau du Nionwentsïo

Lori-Jeanne Bolduc, M. ATDR
Conseillère en aménagement du territoire

255, Place Chef Michel-Laveau
Wendake (Qc) G0A 4V0
Téléphone : 418-843-3767 # 2211
Courriel : lori-jeanne.bolduc@cnhw.qc.ca

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De : Nicole Foris <nforis@tathameng.com>
Envoyé : 3 mai 2021 15:43
À : Lori-Jeanne Bolduc <Lori-Jeanne.Bolduc@wendake.ca>
Cc : Amanda Kellett <akellett@tathameng.com>; aleal@innisfil.ca; Roberto DaSilva <rdasilva@innisfil.ca>
Objet : RE: Various Road Drainage Improvement Program (Tatham No. 420395)

Hi Lori-Jeanne,

Thank-you for your inquiry. A Stage 1 and Stage 2 archaeological assessment is currently being carried out at the two locations where sediment barriers in Lake Simcoe are being considered to prevent sediment accumulation at existing culvert outlets. This assessment includes terrestrial and aquatic field investigation. The completed archaeological assessment will be included in our final Environmental Assessment report.

Please visit https://www.getinvolvedinnisfil.ca/drainage to stay up to date on the status of the Environmental Assessment as it proceeds.

Virtual public engagement is being offered to allow interested members of the public and stakeholders an opportunity to review and provide comments on the alternative design concepts, the recommendations and the next steps in the study process. A recorded presentation and display boards detailing the sediment barrier designs discussed above, and describing the overall study will be available for viewing on the Town's website www.getinvolvedinnisfil.ca/drainage for a 2-week period from May 26th, 2021 to June 9th, 2021. Members of the public and stakeholders are encouraged to submit comments via the comment sheet available on the Town website.

Please let us know if you have any further questions.

Kind regards,

Nicole

Nicole Foris, B.A.Sc., P.Eng.
Intermediate Engineer

Tatham Engineering Limited
41 King Street, Unit 4 | Barrie | Ontario | L4N 6B5
T 705-733-9037 x2028 | nforis@tathameng.com | tathameng.com

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From: Amanda Kellett <akellett@tathameng.com>
Sent: May 3, 2021 12:40 PM
To: Nicole Foris <nforis@tathameng.com>
Subject: Fwd: Various Road Drainage Improvement Program

Can you please respond to this inquiry?

Get Outlook for iOS

From: lori-jeanne bolduc <lori-jeanne.bolduc@cnhw.qc.ca>
Sent: Thursday, April 22, 2021 4:47 PM
To: Amanda Kellett
Cc: mario gros-louis
Subject: Various Road Drainage Improvement Program

Hi Amanda,

I'm writing in response to the letter you sent to the Huron-Wendat Nation on April 1st. Please note that the Grand Chief of the Huron-Wendat Nation is now Rémy Vincent. All further correspondence should be addressed to him.

Regarding the Various Road Drainage Improvement Program, could you please let us know if any archaeological studies or fieldwork will be necessary as part of this project?

Thank you,

NATION HURONNE-WENDAT
Bureau du Nionwentsïo

Lori-Jeanne Bolduc, M. ATDR
Conseillère en aménagement du territoire
255, Place Chef Michel-Laveau
Wendake (Qc) G0A 4V0
Téléphone : 418-843-3767 # 2211
Courriel : lori-jeanne.bolduc@cnhw.qc.ca

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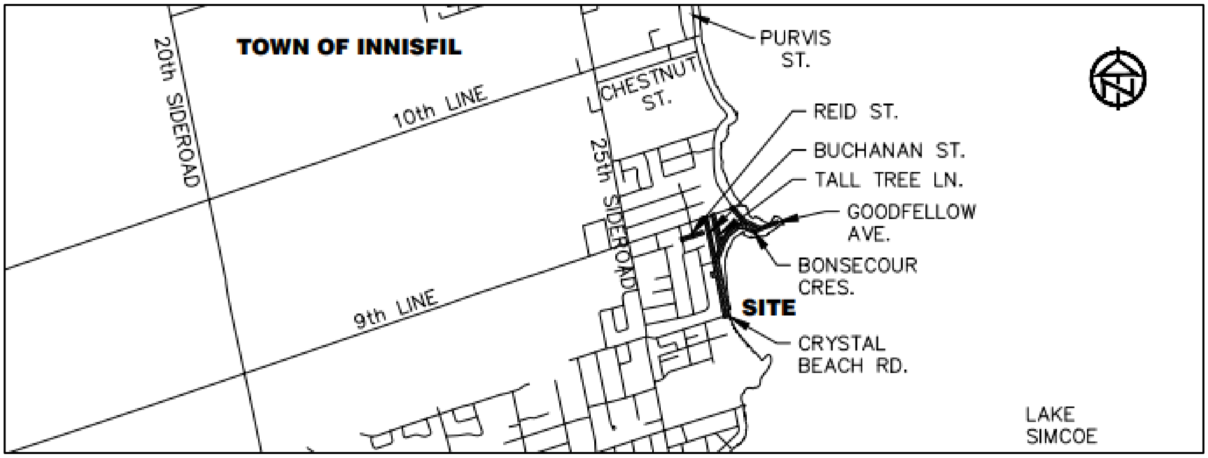
TOWN OF INNISFIL
VARIOUS ROADS DRAINAGE IMPROVEMENTS PROGRAM

NOTICE OF VIRTUAL PUBLIC ENGAGEMENT



The Town of Innisfil has initiated a Class Environmental Assessment (EA) for drainage improvements in the Bonsecours Beach and Goodfellow Beach area in the community of Alcona. This study is being executed in accordance with the planning and design process for Schedule "B" projects as outlined in the Municipal Engineers Association *Municipal Class Environmental Assessment* document (October 2000, as amended in 2007 and 2011).

Virtual public engagement is being offered to allow interested members of the public an opportunity to review and provide comments on the alternative design concepts, the recommendations and the next steps in the study process. A recorded presentation and display boards detailing the above, and describing the overall study will be available for viewing on the Town's website www.getinvolvedinnisfil.ca/drainage for a 2-week period from May 26th, 2021 to June 9th, 2021. Members of the public are encouraged to submit comments by June 30th, 2021 (a comment sheet is also available on the Town's website).

Upon receipt of agency and public comments, the final preferred solutions will be confirmed and supporting environmental investigations will be completed for Town review and council endorsement. Following this, the report will be available for public review and comment. A separate notice pertaining to this will be issued at that time.

Project Contacts:

Amber Leal, C.E.T.
Town of Innisfil
Tel: 705-436-3740, ext. 3246
e-mail: aleal@innisfil.ca

or

Amanda Kellett, P.Eng.
Tatham Engineering Limited
Tel: 705-733-9037, ext 2042
e-mail: akellett@tathameng.com

This Notice issued April 22, 2021.

TATHAM ENGINEERING

2020 Various Roads Drainage Improvements Program

Town of Innisfil

May 26, 2021

Innisfil

1

Presentation Agenda

1. Project Understanding
2. Class EA Process
3. Problem or Opportunity (Class EA Phase 1)
4. Alternative Solutions & Recommendations (Class EA Phase 2)
5. Next Steps

Innisfil

2

1
PROJECT UNDERSTANDING

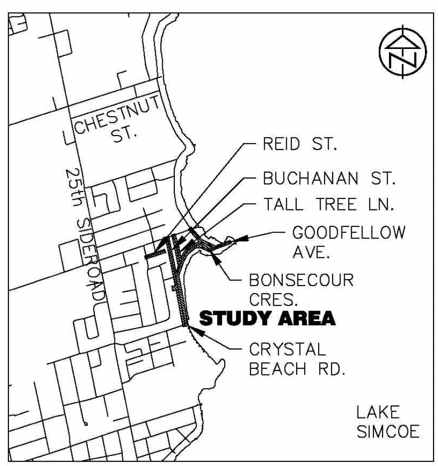
3

What is the Town Trying to Achieve?

To develop possible solutions to known drainage problems for specific road areas in the Town.

These areas include:

- Buchanan St from 9th Line to Hartley Rd/Crystal Beach Rd;
- Tall Tree Ln from 9th Line to Crystal Beach Rd;
- Crystal Beach Rd from Roberts Rd to Goodfellow Ave;
- Goodfellow Ave from 9th Line to dead end of Goodfellow Ave;
- Reid St; and
- Bonsecour Cres.



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Study Background

- Drainage issues have been observed along Leonard's Creek, from Reid St to the Lake Simcoe outlet at Goodfellow Ave.
- Buchanan St typically sees seasonal flooding at the crossing of Leonard's Creek, severe enough to cause road closures in the spring and after heavy rainfalls.

Buchanan St Culvert Crossing, Looking Upstream

Buchanan St Culvert Crossing, Looking Downstream

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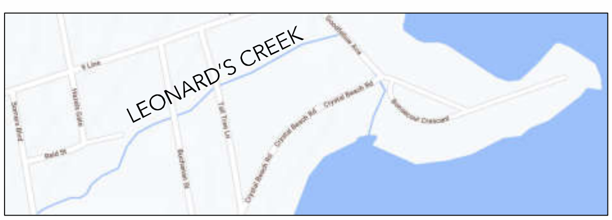
Study Background

- The following issues have been identified as contributing factors to the drainage problems occurring in the study area:
  - Climate change;
  - Low ground elevation and proximity to Lake Simcoe;
  - Development in floodplain; and
  - Upstream development resulting in increases to streamflow and water volumes travelling down Leonard's Creek.



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How Can Identified Drainage Issues be Addressed?

The most direct way to restore floodplain capacity would be for the Town to acquire property along the creek corridor or acquire property to create a diversion with an alternate outlet to the Lake, however, both options are very expensive and not feasible in the short term.

This study will focus on other options to reduce flood risk, while allowing for the Town to look for opportunities to acquire property in the creek corridor in the future.

Leonard's Creek, Looking Upstream from Crystal Beach Rd

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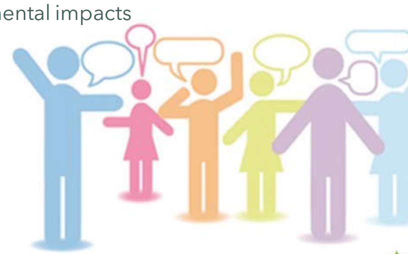
What is the Purpose of this Study?

- Develop potential drainage improvements within the study area to provide improvements to flooding
- Assess the potential drainage improvements given potential environmental impacts
- Identify the preferred solutions
- Establish measures to reduce environmental impacts
- Satisfy the Class EA requirements
- Gather feedback from the Public



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What is the Purpose of this Information Session?

- Provide opportunity for public engagement
- Describe the study area, study purpose and objective
- Present the need and justification for the study and issues to be resolved
- Identify alternative solutions and potential environmental impacts
- Get feedback and comments to help us select preferred solutions

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Where is the Study Area?

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What are the Existing Conditions Along Reid St?

- Recently paved
- Limited right of way (ROW) width
- Minor drainage issues relating to increased runoff from paving

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What are the Existing Conditions Along Buchanan St?

- Limited ROW width
- Subject to severe springtime flooding
- Limited space for roadside ditches

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What are the Existing Conditions Along Tall Tree Ln?

- Limited ROW width
- Ponding issues reported in roadside ditches

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What are the Existing Conditions Along Goodfellow Ave?

- Paved road transitions to gravel
- Limited ROW width
- Ponding issues reported for multiple driveways

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What are the Existing Conditions along Bonsecour Cres?

- Gravel surface
- No guide rail protection
- Limited ROW width
- Ponding issues reported for multiple driveways

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What are the Existing Conditions Along Crystal Beach Rd?

- Ponding issues reported for multiple driveways
- Ditch in west boulevard only

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2
CLASS EA PROCESS

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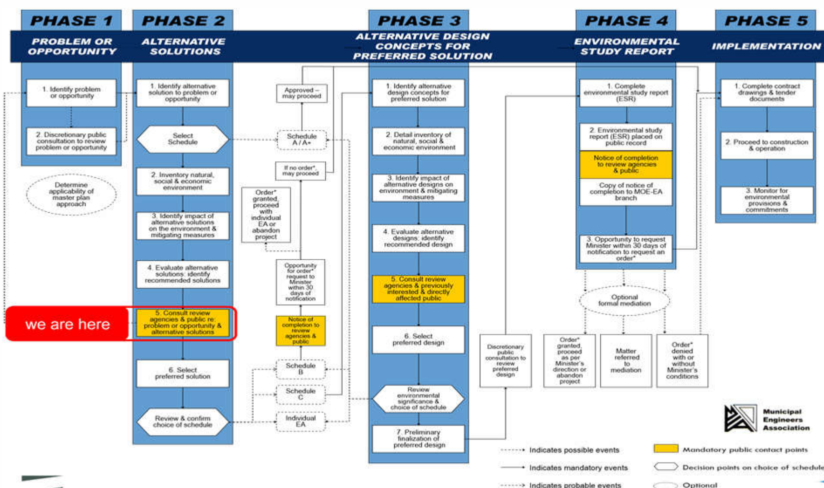
What is a Class Environmental Assessment?

It is a standardized planning procedure for common Municipal projects



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In More Simple Terms

WE ARE HERE			
Notice of Commencement	Virtual Public Engagement	Notice of Completion	
Phase 1	**Phase 2**		**Phase 5**
Identify & describe the problem or opportunity	Identify & assess alternative solutions to solve the problem. Establish the Preferred Solution.	Issue Notice of Completion to Review Agencies and Public	Design & Construction

Schedule B →

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3 PROBLEM / OPPORTUNITY STATEMENT

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Problem/Opportunity Statement

The study area experiences flooding during the spring and after heavy rainfalls. While historical flooding due to development of the Leonard's Creek floodplain has been documented in the study area, Town staff have noted that seasonal flooding problems have worsened in recent years.

The study area requires solutions to improve drainage conditions, as a result of resident requests, road closures due to flooding and high maintenance demands on the Town.

Leonard's Creek Looking Upstream from Buchanan Street

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4
ALTERNATIVE SOLUTIONS & RECOMMENDATIONS

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Alternative #1 – Do Nothing

- Study Area to remain in existing condition (i.e. no proposed drainage improvements)
- Alternative provides no solutions to drainage issues

Existing Outlet #1 Channel

Existing Outlet #2

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Alternative #2 – Replacement of Crystal Beach Rd Culverts

- Existing culverts to be removed and replaced with two larger corrugated pipe arch culverts
- Create a defined low point in Crystal Beach Rd to better convey flow that overtops the road toward Lake Simcoe
- Create sediment barrier to protect culvert outlets from being blocked by lake sediment

Existing Culverts at South end of Crystal Beach Rd (Upstream End)

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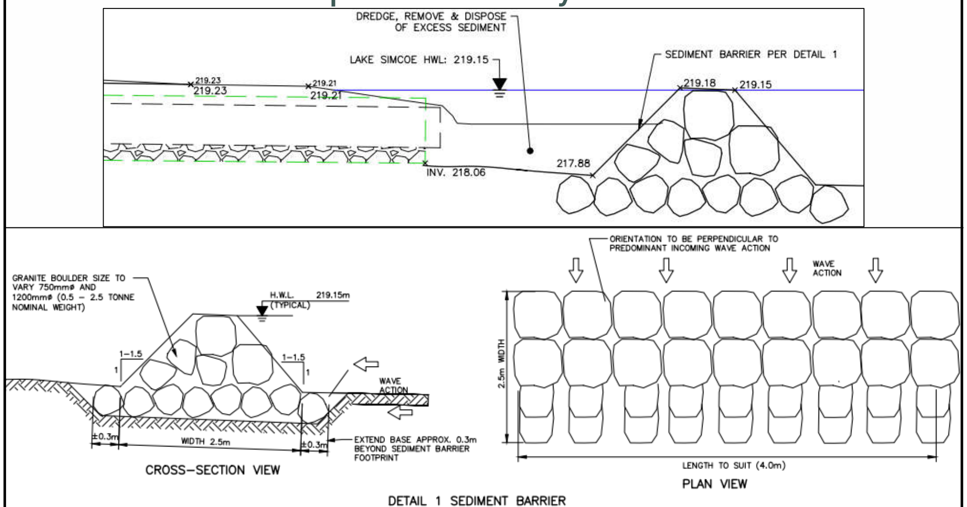
Alternative #2 – Replacement of Crystal Beach Rd Culverts



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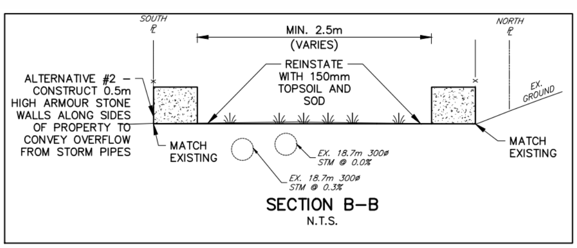
Alternative #3 – Improvements to Tall Tree Ln Outlet

- Construct armour stone wall along north and south property lines to better contain overtopping flows
- Install a sediment barrier to protect pipe outlets from sediment accumulation
- May impact roots of trees on adjacent private properties



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Alternative #4 – Ditch Improvements

- Minor regrading of ditches where possible
- Upgrading driveway culverts to provide additional capacity
- Construct a roadside ditch from 2385 Crystal Beach Rd to Leonard's Creek
- Installation of a minor swale along Goodfellow Ave east of Crystal Beach Rd
- Regrade and resurface Bonsecour Cres, installation of minor swales in boulevard

Existing Crystal Beach Rd Ditch Looking North from South End

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Alternative #5 – Replacement of Culvert Crossing Hartley Rd at Crystal Beach Rd

- Existing culvert is deteriorated (inlet is blocked/caved in) and requires replacement to prevent upstream ponding
- To be replaced with new culvert of the same size

Existing Hartley Rd Culvert Inlet

Existing Hartley Rd Culvert Outlet (Looking South on Crystal Bea

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Alternative #6 – Upgrade Leonard's Creek Culvert Crossings

- Add culverts to allow for more flow to be conveyed through culverts at Crystal Beach Rd, Tall Tree Ln and Buchanan St
- The existing culverts are lower than the Lake Simcoe high water level, which limits the flow that can travel through the culverts


Existing Leonard's Creek Culvert Crossing Locations


Existing Buchanan St Culverts


Existing Tall Tree Ln Culvert


Existing Crystal Beach Rd Culvert

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Alternative #7 – Upstream Wetland Reconstruction Screening

- Upstream Town-owned properties were reviewed for possible wetland creation opportunities
- Constructed wetland would provide water storage to reduce the rate of flow in the creek through the study area, and reduce flooding impacts
- However, the sites available were not large enough to provide meaningful improvements to flood conditions in the study area, and therefore wetland creation is not recommended

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Alternative #8 – Implement Recommendations from Alcona North Secondary Plan

- Implement Policy Controls for Upstream Development, including:
  - Stricter stormwater management controls to be provided for new developments, to reduce flows released to Leonard's Creek
  - Improvements and maintenance for existing upstream stormwater management ponds to reduce flows released to Leonard's Creek
  - Require infiltration measures for new development and improvements to existing stormwater facilities to reduce stormwater runoff volumes released to Leonard's Creek
- Changes implemented through these policy controls can reduce peak flow rates (meaning the maximum rate that water travels through the creek after a storm event) in the study area by up to 25%

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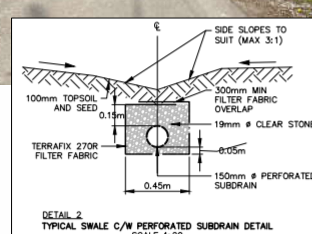
Alternative #9 – Drainage Improvements at Reid St

- Reinstate minor drainage ditch on both sides of Reid St, include perforated subdrains in stone infiltration trenches
- Would lessen drainage issues as a result of Reid St and Hazel's Gate paving works

Existing Reid St ROW



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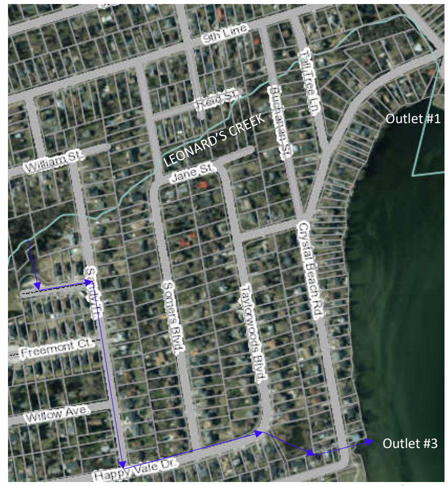
Alternative #10 – Storm Sewer Diversion from Chappell Court/Sandy Trail

- Diversion of flow from Leonard's Creek via storm sewers on Chappell Court and Sandy Trail to Happy Vale Drive to Outlet #3
- Happy Vale Drive storm sewer system does not have enough capacity for the area it currently serves
- Would result in minor improvements at Leonard's Creek outlet, but not recommended due to very high capital cost and possible negative impacts on Outlet #3



Leonard Creek Diversion via storm sewer to Outlet #3

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Alternative #11 – Rain Barrel Program

- Encourage residents to install rain barrels to collect rainwater from roof downspouts
- Will not significantly reduce flood flows in the study area, but will reduce runoff from lots under light rainfall conditions
- Provides minor local improvement, increased public education and engagement

Rain Barrel

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Alternative #12 – Diversion Through 9th Line Park

- Grade a ditch from Goodfellow Ave to Lake Simcoe, upsize culverts at pedestrian crossing
- Install culverts under Goodfellow Ave at 9th Line
- Reduce flows in Leonard's Creek and divert flows from Outlet #1

9th Line Park

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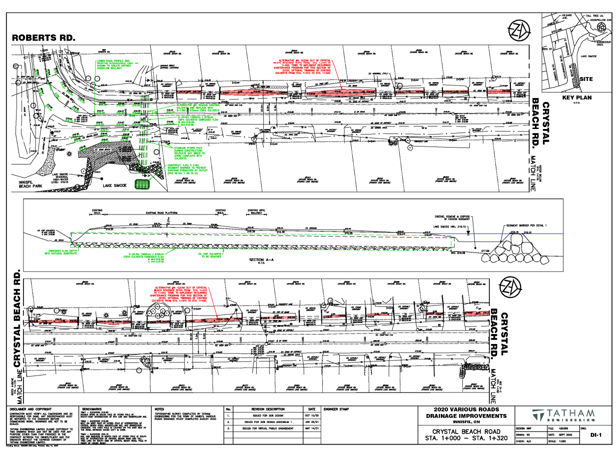
Location Map: Drawing DI-1



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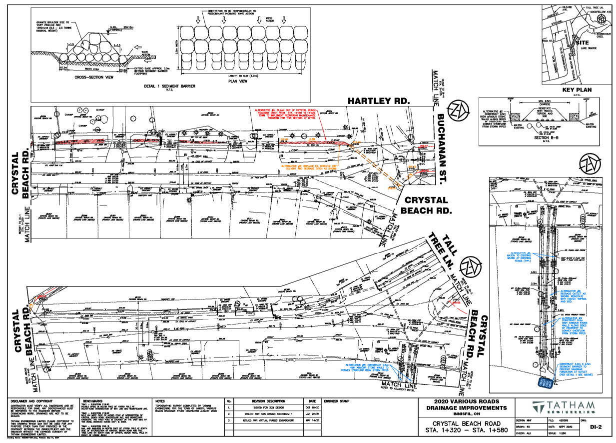
Location Map: Drawing DI-2



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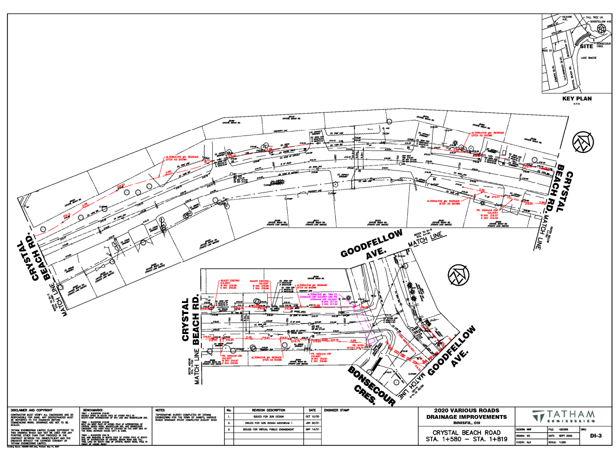
Location Map: Drawing DI-3



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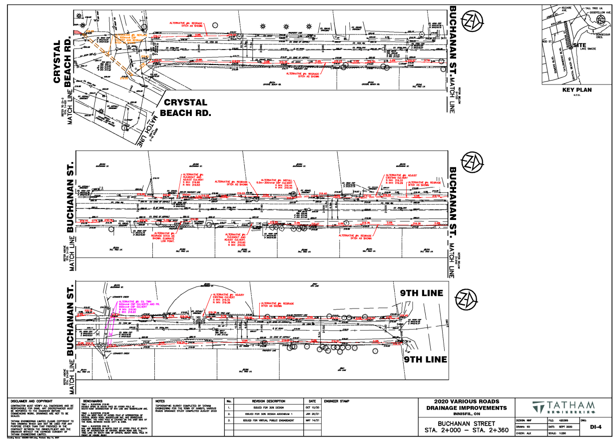
Location Map: Drawing DI-4



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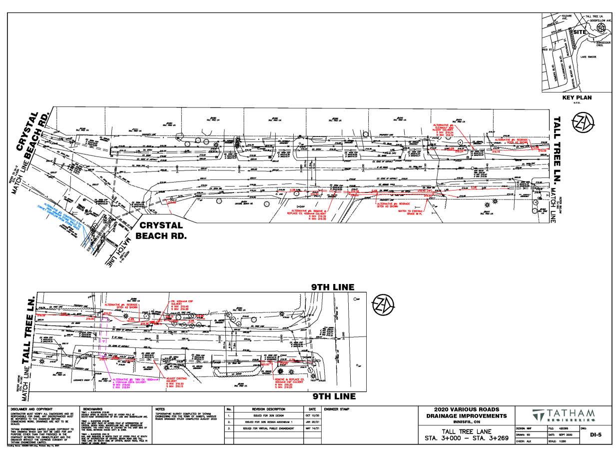
Location Map: Drawing DI-5



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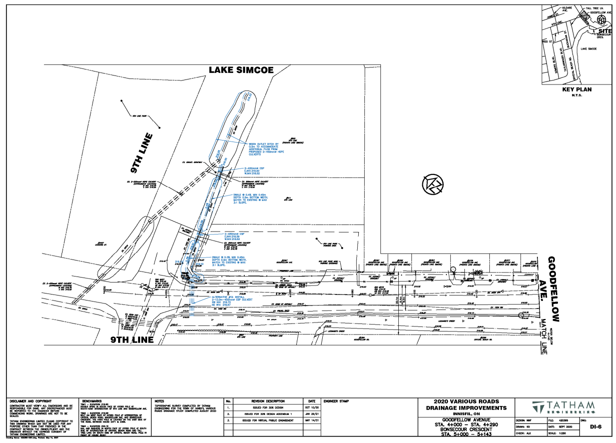
Location Map: Drawing DI-6



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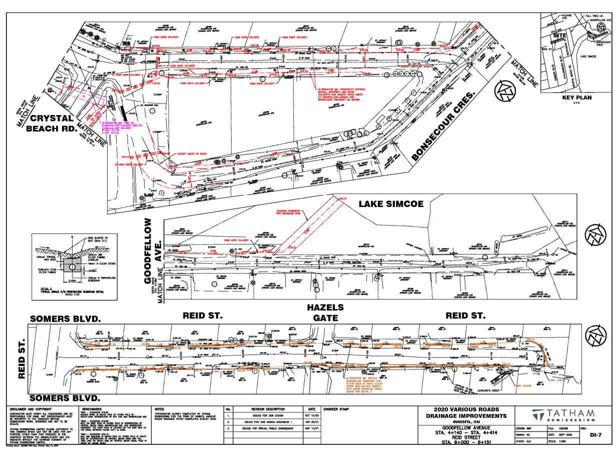
Location Map: Drawing DI-7



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5
NEXT STEPS

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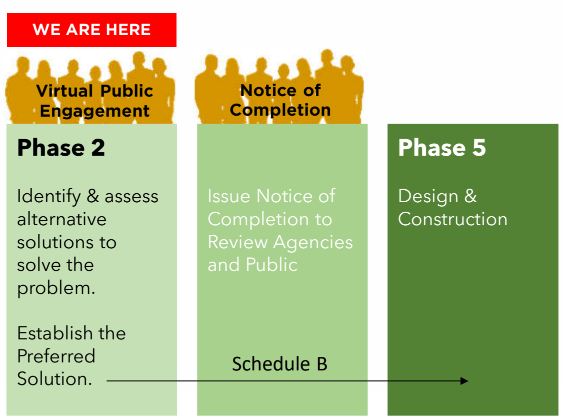
What are the Next Steps?

Receive public comments and input for consideration in identification of the Preferred Solutions, to be carried forward to Detailed Design and Construction



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What are the Next Steps?

Remainder of Study to:

- Review/address public, agency and stakeholder comments
- Conduct assessment of alternative design concepts
- Identify preferred alternative(s)
- Complete required environmental investigations
- Issue Notice of Study Completion
- Prepare final report for Council review/endorsement
- Place final report on public record for 30-day review

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Provide Comments

Complete the Resident Survey

- Provide contact information so we can forward study updates and findings

Submit a comment sheet

- Comment sheets are available at: https://app.smartsheet.com/b/form/4cbcd127f88348eda21d0379284976fa
- All comments will be considered
- All comments become part of the public record

All Comment sheets are to be submitted by Wednesday June 30, 2021

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Thank you for Your Interest in this Project

Please feel free to contact the Town and/or Tatham Engineering any time should you have further questions or concerns.

For Additional Information:

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Innisfil, ON L9S 1A1
t: (705) 436-3740 ext. 3246
e: aleal@innisfil.ca

Amanda Kellett, B.Sc.Eng., P.Eng.
Tatham Engineering Limited
41 King St, Unit 4
Barrie, ON L4N 6B5
t: (705) 733-9037 ext. 2042
e: akellett@tathameng.com

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Town of Innisfil - Various Roads Drainage Improvement Program

Public Open House Comments

	Comments
1	Everything is given to Alcona, nothing to Cookstown, we now know where we stand on the food chain for improvements. I live in Cookstown Royal Oak Estates, and a drainage issue we had and someone here had been working with Innisfil on for a year, was just thrown under the bus and we as a senior community, pay taxes, but I guess our taxes are for Alcona improvements only. We all will remember this when the voting must take place for real advocates of our community.
2	I am encouraged to see continued investment in infrastructure. I am wondering how I would go about having Rose Lane considered for improvements in both drainage and its overall condition. In addition to lacking sidewalks, the road itself is in terrible shape.
3	I live on Reid Street. I am very interested to see how the town is going to proceed with fixing the drainage issues in my area. I have lived here for over 6 years. When I first moved here there was some flooding because of how low the ground is with the swamp in my back yard and no clear path for it to drain to the lake. With the new building the town has allowed in this area the flooding is outrageous. It floods right up past my steps and washes away the soil and sand and is uprooting the trees. Now my road is paved and it floods the driveway. This is not progress, it's destructive to the natural environment. I am interested in hearing how the town will fix the problems it has created and who they think should pay for it.
4	Severe concerns about water being rerouted through 9th line beach into the lake. 2020 was the first year of water testing and I believe that there was only one water test that didn't lead to an advisory. Hire a professional engineer who has a specialty in drainage. Stop allowing people to add fill and change drainage of their property. Stop allowing paving of driveways - too much of the lots are being taken up by home and hardscaping & there is no place for the water to be absorbed. Stop allowing properties to be filled in to build a house - it changes drainage for everyone.
5	I have lived on Reid St. for 6 years. The flooding has been getting worse every year. The new buildings on Buchanan have contributed as it has changed the water flow. The last 3 years the back creek or run off channel has not been able to had the spring melt or heavy rainfall. All the top soil washes away and many days I can not walk on the grass as it's under water and in the spring the last 2 years I can't even get to my back door to get in and out of the house. Since the road has been paved and raised my driveway it is now lower than the road and it is under water when its wet and freezes at night in the winter and early spring. Many trees are dying on the property as the soil is washing away and the roots are left bare. I hope you address these serious issues by fixing the water run offs ASAP.
6	i tried to follow what the various options are but i found it very confusing. so many options just made it more confusing. the diagrams were too small, when i tried to enlarge them so i could see them clearly, i could not. it was very difficult to understand what the options were as a result. i found it to not be very user friendly.
7	Hi I have Waterfront Property on Goodfellow. It has been in the family since the late 50's. Over the past 5-6 years the town has been raising the level of Goodfellow past my property causing ponding on my driveway and along my roadside fence. Also in the past 5 to 10 years new neighbours along the road have raised the level of their properties and built large homes - leaving the boundary between 2365 and 2361 as just about the lowest point on the stretch of Goodfellow south of the bridge to Crystal Beach road. Finally I believe the drainage issues in my area started with redirecting Leonards creek from flowing directly into the lake near the south line of the 9th line park. It was redirected to flow south and west into the bay south of Goodfellow Ave. I have a Topographic Map from the 1920's that shows how Leonards creek used to drain straight into the lake. The redirect is much like what they did many decades ago to the Don River in Toronto - there are currently plans to restore the path of the Don to minimize risks of flooding - In my opinion the same should be considered with Leonards creek using the 9th line park. I also have pictures of a flood about 15 years ago because the culvert under crystal beach road couldn't handle the flow. Can't find a way to attach to this. I'd be happy to provide copies of map, historic pictures of Leonard's creek along Goodfellow and a couple of floods if you have an email address. Thanks for Reading.
8	Tonight we had a heavy rainfall. My entire backyard is flooded. (I have photos) 22 years ago, I had a stone patio installed. The stones alone cost $5000. The labour was extra. I would never have considered going to such expense had I forseen the constant flooding we have today. Over the last ten years, Hazels Gate, the lane that runs the length of my property has been raised 2 feet!!! I have protested to the Town many times regarding this issue. Perhaps attention to drainage might have alleviated my problem. The storms and rainfall were just as heavy 20 years ago as they are now. I have lived in Innisfil over 30 years, and seen little change in the amount of precipitation, but a great change in the manner in which it affects my property. Hazels Gate ends at Reid st. Many of my neighbors on Reid st. Are also suffering this new flooding problem.

Town of Innisfil - Various Roads Drainage Improvement Program

Public Open House Comments

	Comments
9	The recommended plan for the drainage at Tall Tree Lane is deeded property for a number of homes along Crystal Beach Road and Tall Tree Road residence. This should not be changed. The last time the town put in culverts, the landscape was destroyed making it difficult to navigate into the water as the culverts became exposed and slippery. We use the access regularly throughout the seasons. In the winter we use it for ice skating and push a children's Chariot wagon through the access and in the summer we load kayaks and paddle boards. We also access for swimming. A head wall, sediment barrier, river rocks, ledger stone, etc, will make it hard to enter the water. We do not want to haul our water crafts along rocks. Furthermore, we have spotted snapping turtles exiting this water access point this year. We spotted a larger one that exited the water from this point and traveled across the road to our property and we spotted a smaller one shortly after in May of this year. We have also spotted turtle eggs in this area. Given the fact that there are few spots for turtles to exit the lake because of break walls, the landscape for Tall Tree access needs to remain natural. I have documentation of one of the turtles, and documentation of the eggs we have spotted in the same access. Alt #11 for residence to use rain barrels is almost obsolete. The issues of flooding in the past 10 years has occurred in the winter when the snow melts, its raining and the ground cannot absorb water when it is still frozen. Keeping in mind the town has proposed plans for each area, you must listen to the residence and simply not go through the process of giving us an opportunity to express our concerns. We noticed that sand was dumped in the Tall Tree access point to the lake shortly after these proposals were available for the residence. The sand completely covered the exposed culverts and plugged the culverts. The sand was also placed much higher than where the water levels are found. This sand was fresh and we are curious if this was an attempt to block the voices of the residence in effort to move along with the proposed plan. These culverts were completely open and functioning this spring prior the the sand suddenly appearing and covering the culverts. I have emailed previously to this email and have expressed concern for the proposed plan for Tall Tree Lane Access.
10	thanks for the chance to comment. We have experienced road and driveway flooding for many years and brought this to the attention of Town staff several times a few years ago. Shannon from the consultant team for the road project did follow up but in the end Town staff said no problem and closed the file. As noted in this drainage study there is a problem and it needs to be addressed. The presentation identifies the causes for the flooding issues and I agree; low groundwater elevations, development upstream without sufficient stormwater controls in place, and insufficiently sized and maintained stormwater infrastructure to address the flows (especially increasing flows due to climate change and development activity). As noted, the property acquisition option is not realistic. The do nothing option is also not realistic. The majority of the other alternative are realistic; in fact most of them need to be part of the action plan even if implementation is phased. First and foremost, the recommendations for stormwater management as a result of development in Alcona North Secondary Plan must be approved by Council and implemented. Approving development to proceed, knowing there will be a 25% increase in SWM impact downstream, without requiring the necessary SWM implementation is irresponsible. Seeing the physical changes/flooding in the downstream area illustrates the recommendations that accompanied the Secondary Plan process are valid and needed. As more land is scheduled to come on line in the next few years, Alternative #8 must be actioned immediately. Without this action, any culvert work and ditch work will simply be fighting a loosing battle. Development can be a good thing provided appropriate mitigation is in place at source and down stream. Implement the recommendations. All of the ditch and culvert alternatives are valid and needed. I am personally most interested in Alternative #5 at Hartley and Crystal Beach Road because this is right outside my house and I hope it will improve the significant flooding of my driveway. That said, selecting only one or two of the culvert and ditch alternatives will not address the area wide issue. al of the culvert are either too small, clogged or set below ground/lake water level. Until they are all fixed, the area will have flooding problems. My request is that a phased implementation plan be approved to get this storm infrastructure up to standard (within the next few years and to coincide with more upstream development coming online). Cost is an issue, hence then need to phase. Picking and choosing locations and leaving others wont solve the problem and does not reflect a responsible approach to managing these issues. The significant upgrades, including sediment barriers at OL3 and OL2 are critical. Standing water in the ditches along Crystal Beach and Roberts Road is observed everyday. I appreciate the intent of Alternative #11 for rain barrels and not opposed but that is not the focused solution needed to the tangible issue we have right now. As a follow up I would like to review and discuss in detail the Dwg D-1-2 for Crystal Beach/Buchanan and Tall Tree as this effects me and it was really hard to review the design on the package/online. In addition I would like to know next steps and when recommendations will be going to Council and how I can make my voice heard at the Council table on this matter; specifically implementation of the Alcona North Secondary Plan recommendations. thanks in advance
11	Im very concerned about the proposed changes for the Tall Tree Rd. access point. My wife and I moved here 10 years ago to be near the lake and this access point was a determining factor in us buying here in Innisfil. We live almost directly across the street and use this access daily for playing, swimming, launching kayaks and paddle boards. In the winter months we access the lake here to skate, ski, and walk on the ice. We treat this land as a loved extension of our property and we keep it clean of garbage and maintain as best we can. Please don't take this access away from us, its the reason we're here. We need it to remain as our point of entry to Simcoe.

Appendix F: Preliminary Opinion of Probable Cost

TOWN OF INNISFIL
DRAINAGE IMPROVEMENTS FOR VARIOUS ROADS
PROJECT 420395

PRELIMINARY CONSTRUCTION COST ESTIMATE

December 5, 2022

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
1.0	**Alternative #2 - Replacement of Culverts at South End of Crystal Beach Road with CSPA Culverts**				
1.01	Dewatering	L.S.			$5,000.00
1.02	Remove and Dispose of Asphalt	m^2	330	$6.00	$1,980.00
1.03	Remove and Dispose of Existing Culvert	Ea.	3	$2,000.00	$6,000.00
1.04	Excavation for New Culverts	m^3	50	$50.00	$2,500.00
1.05	Install 1390mm x 970mm CSPA Culvert	m	50	$900.00	$45,000.00
1.06	Excavate and Regrade Road	m^2	330	$30.00	$9,900.00
1.07	Road Restoration Including Granulars	m^2	330	$75.00	$24,750.00
1.08	Granite Boulders (2 - 4 tonne nominal weight)	t	60	$200.00	$12,000.00
1.09	Armour Stone (0.5 - 3 tonne nominal weight)	t	40	$200.00	$8,000.00
1.10	Turbidity Curtain	m	25	$25.00	$625.00
	SUBTOTAL				**$115,130.00**
	Internal Staff Charges (Engineering, Purchasing, Legal (10%))				$11,513.00
	Design/Engineering Design (10%)				$11,513.00
	Design/Engineering Construction (7%)				$8,059.10
	Contingency (30%)				$34,539.00
	TOTAL ALTERNATIVE #2				**$180,754.10**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
1.0	**Alternative #2A - Replacement of Culverts at South End of Crystal Beach Road with Concrete Box Culvert**				
1.01	Dewatering	L.S.			$5,000.00
1.02	Remove and Dispose of Asphalt	m^2	330	$6.00	$1,980.00
1.03	Remove and Dispose of Existing Culvert	Ea.	3	$2,000.00	$6,000.00
1.04	Excavation for New Culverts	m^3	50	$50.00	$2,500.00
1.05	Install 3000mm x 900mm Concrete Box Culvert	m	25	$5,175.00	$129,375.00
1.06	Excavate and Regrade Road	m^2	330	$30.00	$9,900.00
1.07	150mm Concrete Distribution Slab	m^3	4	$2,500.00	$10,000.00
1.08	Road Restoration Including Granulars	m^2	330	$75.00	$24,750.00
1.09	Granite Boulders (2 - 4 tonne nominal weight)	t	60	$200.00	$12,000.00
1.10	Armour Stone (0.5 - 3 tonne nominal weight)	t	40	$200.00	$8,000.00
1.11	Turbidity Curtain	m	25	$25.00	$625.00
	SUBTOTAL				**$209,505.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$20,950.50
				Design/Engineering Design (10%)	$20,950.50
				Design/Engineering Construction (7%)	$14,665.35
				Contingency (30%)	$62,851.50
	TOTAL ALTERNATIVE #2A				**$328,922.85**
2.0	**Alternative #3 - Improvements to Tall Tree Lane Drainage Outlet**				
2.01	Construct Envirolok Headwall	m^2	5	$600.00	$3,000.00
2.02	Granular 'B' Backfill	m^3	10	$100.00	$1,000.00
2.03	Topsoil and Sod disturbed area	m^2	150	$15.00	$2,250.00
2.04	Turbidity Curtain	m	25	$200.00	$5,000.00
	SUBTOTAL				**$11,250.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$1,125.00
				Design/Engineering Design (10%)	$1,125.00
				Design/Engineering Construction (7%)	$787.50
				Contingency (30%)	$3,375.00
	TOTAL ALTERNATIVE #3				**$17,662.50**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
3.0	**Alternative #4 - Ditch Improvements**				
	Crystal Beach Road Improvements				
3.01	Dewatering	L.S.			$5,000.00
3.02	Install 600mm CSP Culvert at Driveway	Ea.	20	$5,000.00	$100,000.00
3.03	Adjust Existing Culvert	Ea.	20	$500.00	$10,000.00
3.04	Replace Driveway Headwalls	Ea.	40	$8,000.00	$320,000.00
3.05	Resurface Driveway	m^2	920	$50.00	$46,000.00
3.06	Ditch Cleanout	m	230	$50.00	$11,500.00
3.07	Regrade Ditch	m	25	$30.00	$750.00
3.08	Construct Ditch (2385 Crystal Beach Road)	m	90	$30.00	$2,700.00
3.09	Install 300mm CSP Culvert at Driveway	Ea.	3	$1,800.00	$5,400.00
	Tall Tree Lane Improvements				
3.10	Dewatering	L.S.			$2,500.00
3.11	Regrade Ditch	m	100	$30.00	$3,000.00
	Buchanan Street Improvements				
3.12	Dewatering	L.S.			$2,500.00
3.13	Construct Ditch	m	325	$30.00	$9,750.00
3.14	Acquire Drainage Easement (Width & Location TBD at Detailed	L.S.			$780,000.00
	Goodfellow Avenue (West of Crystal Beach Road) Improvements				
3.15	Dewatering	L.S.			$2,500.00
3.16	Ditch Cleanout	m	135	$50.00	$6,750.00
	Goodfellow Avenue & Bonsecour Crescent				
3.17	Dewatering, mobilization/demobilization	LS		$10,000.00	$10,000.00
3.18	Grade ditch	m	230	$30.00	$6,900.00
3.19	100mm HDPE culvert	m	105	$30.00	$3,150.00
3.20	Remove and dispose of granular road material	m^2	115	$50.00	$5,750.00
3.21	Regrade granular road	m^2	400	$20.00	$8,000.00
3.22	Resurface driveway	m^2	150	$50.00	$7,500.00
3.23	Acquire Drainage Easement (Width & Location TBD at Detailed	LS			$180,000.00
	SUBTOTAL				**$1,529,650.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$152,965.00
				Design/Engineering Design (10%)	$152,965.00
				Design/Engineering Construction (7%)	$107,075.50
				Contingency (30%)	$458,895.00
	TOTAL ALTERNATIVE #4				**$2,401,550.50**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
3.2	**Alternative #4A - Crystal Beach Road - East Ditch Construction**				
3.21	Install 400mm CSP Culvert at Driveway	Ea.	11	$4,000.00	$44,000.00
3.22	Install Driveway Headwalls	Ea.	22	$8,000.00	$176,000.00
3.23	Construct Ditch	m	160	$30.00	$4,800.00
3.24	Resurface Driveway	m^2	450	$50.00	$22,500.00
	SUBTOTAL				**$247,300.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$24,730.00
				Design/Engineering Design (10%)	$24,730.00
				Design/Engineering Construction (7%)	$17,311.00
				Contingency (30%)	$74,190.00
	TOTAL ALTERNATIVE #4A				**$388,261.00**
4.0	**Alternative #5 - Replace Culvert Crossing Buchanan Street at Crystal Beach Road**				
4.01	Dewatering	L.S.			$5,000.00
4.02	Remove and Dispose of Asphalt	m^2	50	$6.00	$300.00
4.03	Remove and Dispose of Existing Culvert	Ea.	1	$2,000.00	$2,000.00
4.04	Install 600mm CSP Culvert	m	19	$750.00	$14,250.00
4.05	Road Restoration	m^2	50.0	$75.00	$3,750.00
	SUBTOTAL				**$25,300.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$2,530.00
				Design/Engineering Design (10%)	$2,530.00
				Design/Engineering Construction (7%)	$1,771.00
				Contingency (30%)	$7,590.00
	TOTAL ALTERNATIVE #5				**$39,721.00**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
5.0	**Alternative #6 - Upgrade Leonard's Creek Culverts (Twin Existing Culverts)**				
5.01	Dewatering	L.S.			$20,000.00
5.02	Remove and Dispose of Asphalt	m^2	495	$6.00	$2,970.00
5.03	Excavation for New Culverts	m^3	580	$50.00	$29,000.00
5.04	Install 900 mm Dia. CSP Culvert	m	9	$550.00	$4,950.00
5.05	Install 1800 mm Dia. CSP Culvert	m	13	$900.00	$11,250.00
5.06	Install 2100 mm Dia. CSP Culvert	m	14	$1,050.00	$14,700.00
5.07	Concrete Headwalls	Ea.	6	$8,000.00	$48,000.00
5.08	Road Restoration	m^2	495	$75.00	$37,125.00
5.09	Turbidity Curtain	m	10	$25.00	$250.00
5.10	Stone Silt Trap	Ea.	2	$450.00	$900.00
5.11	Silt Fence	m	60	$20.00	$1,200.00
	SUBTOTAL				**$170,345.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$17,034.50
				Design/Engineering Design (10%)	$17,034.50
				Design/Engineering Construction (7%)	$11,924.15
				Contingency (30%)	$51,103.50
	TOTAL ALTERNATIVE #6				**$267,441.65**
8.0	**Alternative #9 - Drainage Improvements at Reid Street**				
8.01	Dewatering, mobilization/demobilization	LS		$5,000.00	$5,000.00
8.02	Infiltration trench c/w 150mm subdrain in filter sock	m	290	$135.00	$39,150.00
8.03	Grade minor swale c/w 100mm topsoil and sod	m	175	$25.00	$4,375.00
8.04	Resurface driveway	m^2	170	$50.00	$8,500.00
	SUBTOTAL				**$57,025.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$5,702.50
				Design/Engineering Design (10%)	$5,702.50
				Design/Engineering Construction (7%)	$3,991.75
				Contingency (30%)	$17,107.50
	TOTAL ALTERNATIVE #9				**$89,529.25**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
9.0	**Alternative #10 – Storm Sewer Diversion from Chappell Court/Sandy Trail Development**				
9.01	Dewatering, mobilization/demobilization	LS		$30,000.00	$30,000.00
9.02	Remove and dispose of asphalt	m^2	1,200	$20.00	$24,000.00
9.03	Remove existing storm sewer	m	75	$70.00	$5,250.00
9.04	Remove existing maintenance hole	Ea.	2	$1,500.00	$3,000.00
9.05	Remove existing ditch inlet	Ea.	1	$800.00	$800.00
9.06	Install 450mm storm sewer	m	395	$450.00	$177,750.00
9.07	Install 525mm storm sewer	m	10	$500.00	$5,000.00
9.08	Install 300mm storm sewer (catch basin lead)	m	45	$350.00	$15,750.00
9.09	Connect existing storm lateral to proposed sewer	Ea.	7	$250.00	$1,750.00
9.10	Connect to existing maintenance hole/catch basin	Ea.	6	$2,300.00	$13,800.00
9.11	Install 1200mm maintenance hole	Ea.	5	$6,500.00	$32,500.00
9.12	Install 1500mm maintenance hole	Ea.	1	$8,500.00	$8,500.00
9.13	Install 1200mm ditch inlet maintenance hole	Ea.	1	$7,500.00	$7,500.00
9.14	Reinstate road pavement	m^2	1,200	$75.00	$90,000.00
9.15	Dispose of excess material	m^3	900	$30.00	$27,000.00
	SUBTOTAL				**$442,600.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$44,260.00
				Design/Engineering Design (10%)	$44,260.00
				Design/Engineering Construction (7%)	$30,982.00
				Contingency (30%)	$132,780.00
	TOTAL ALTERNATIVE #10				**$694,882.00**
10.0	**Alternative #11 - Rain Barrel Program in the Study Area Watershed**				
10.01	Rain barrel	Ea.	916	$60.00	$54,960.00
	SUBTOTAL				**$54,960.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$5,496.00
				Contingency (20%)	$10,992.00
	TOTAL ALTERNATIVE #11				**$71,448.00**

ITEM NO.	DESCRIPTION	UNIT	QTY	ESTIMATED UNIT PRICE	ESTIMATED AMOUNT
11.0	**Alternative #12 - Diversion Through 9th Line Park**				
11.01	Dewatering	L.S.			$5,000.00
11.02	Remove and Dispose of Asphalt	m^2	30	$6.00	$180.00
11.03	Remove and Dispose of Existing Culvert	Ea.	2	$1,000.00	$2,000.00
11.04	Install 2-450mm HDPE Culvert	m	22	$660.00	$14,520.00
11.05	Road Restoration	m^2	30	$75.00	$2,250.00
11.06	Ditching	m	35	$35.00	$1,225.00
11.07	Widen Existen Ditch & Place 300mm River Stone	m	23	$100.00	$2,300.00
11.08	Restore Pedestrian Walkway	m^2	20	$30.00	$600.00
	SUBTOTAL				**$28,075.00**
				Internal Staff Charges (Engineering, Purchasing, Legal (10%))	$2,807.50
				Design/Engineering Design (10%)	$2,807.50
				Design/Engineering Construction (7%)	$1,965.25
				Contingency (30%)	$8,422.50
	TOTAL ALTERNATIVE #12				**$44,077.75**

Appendix G: Environmental Screening Report

Memorandum

To: Nicole Foris, Tatham Engineering Limited

cc: Amanda Kellett, Tatham Engineering Limited

From: Devon Fowler and Geri Poisson, Beacon Environmental Limited

Date: January 13, 2022

Ref.: 220161

Re: **Natural Heritage Desktop Screening for Municipal Class Environmental Assessment Report – Town of Innisfil Various Roads Drainage Study**

Beacon Environmental Limited (Beacon) has been retained by Tatham Engineering to complete a natural heritage desktop review regarding the proposed drainage improvements for various roads within the Town of Innisfil. This memo addresses the study area comprised of the following locations identified by the Town:

- Buchanan Street from 9th Line to Hartley Road/ Crystal Beach Road;
- Tall Tree Lane from 9th Line to Crystal Beach Road;
- Crystal Beach Road from Robert Road to Goodfellow Avenue;
- Goodfellow Avenue from 9th Line to dead end of Goodfellow Avenue;
- Reid Street; and
- Bonsecour Crescent.

The proposed works will address the drainage issues that have been identified along Buchanan Street with seasonal flooding occurring at the watercourse crossing and the south end of Buchanan Street at the intersection with Crystal Beach Road. The Town has also identified the need for repairs to the storm outlet at the end of Tall Tree Lane (2347 Crystal Beach Road) and replacement of the three culverts at the end of Roberts Road. Proposed works may also include ditch improvements where needed along the roads listed above, and the replacement of the culvert at Hartley Road and Crystal Beach Road.

1. Policy Context

1.1 Federal Fisheries Act

Fish and fish habitat are protected under the federal *Fisheries Act* (1985) which was last amended on August 28, 2019 and is administered by Fisheries and Oceans Canada (DFO). The protection provisions of the *Fisheries Act* apply to all fish and fish habitat throughout Canada and the Act sets out authorities for the regulation of works, undertakings or activities that risk harming fish and fish habitat. Specifically, the protection provisions include two core prohibitions. One is against persons carrying on works, undertakings or activities that result in the "death of fish by means other than fishing" (subsection 34.4[1]), and the other is "harmful alteration, disruption or destruction of fish habitat" (subsection 35[1]; also referred to as "HADD"). The protection provisions are applied in conjunction with other applicable federal laws and regulations related to aquatic ecosystems, including the federal SARA.

Fish habitat is defined in subsection 2(1) of the *Fisheries Act* to include all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include, but are not limited to, spawning grounds and nursery, rearing, food supply and migration areas.

Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts, specifically the death of fish and HADD. Where proponents believe that their work, undertaking or activity will result in harmful impacts to fish and fish habitat, DFO will work with proponents to assess the risk of their proposed work, undertaking or activity resulting in the death of fish or HADD of fish habitat and provide advice and guidance on how to comply with the *Fisheries Act*.

1.2 Migratory Birds Convention Act (1994)

The federal MBCA (1994) protects the nests, eggs and young of most bird species from harassment, harm or destruction. On the site, this legislation would apply in relation to any proposed vegetation clearing as part of the implementation of the proposed site development plan, once approved. Although there are no permitting requirements, proponents must comply with the legislation and may be fined if found to be in contravention of the MBCA.

Environment Canada currently considers the "high risk" period for encountering nesting birds in southern Ontario to be from mid-March to late August. Regardless of the date, any nest and the habitat to support the nesting birds is protected under the MBCA, and therefore even for proposed vegetation clearing outside of the "high risk" window, surveys should be conducted by a qualified environmental inspector to screen for active nests prior to works being undertaken.

1.3 Provincial Policy Statement (2020)

Policy 2.1 of the Provincial Policy Statement (PPS) provides direction to regional and local municipalities regarding planning policies specifically for the protection and management of defined natural heritage features and resources. The Natural Heritage Reference Manual (OMNR 2010) is a technical document used to help assess the natural environment to identify natural heritage or significant features and areas, as defined by the PPS. The PPS provides planning policies for the following features or defined areas:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Fish habitat; and
- Habitat of endangered or threatened species.

Each one of these features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. Identification of these features is made in a variety of ways.

Significant wetlands and significant coastal wetlands are identified by protocols provided by the Ministry of Natural Resources and Forestry (MNRF) as are criteria for significant woodlands (although they have not been developed).

Fish habitat is governed by the federal Fisheries Act and variously applied by Fisheries and Oceans Canada (DFO). The identification of the remainder of these PPS features is the responsibility of the municipality (or other planning authority).

Habitat of endangered or threatened species is generally regulated through the Endangered Species Act, 2007 and associated regulations and administered by the Ministry of the Environment, Conservation and Parks (MECP).

Several of these natural heritage features may occur within or adjacent to the study area.

The subject property is outside of the Greenbelt Plan, Oak Ridges Moraine Conservation Plan, and Niagara Escarpment Plan.

1.4 Endangered Species Act (2007)

The provincial *Endangered Species Act*, (2007, ESA) came into effect on June 30, 2008 and replaced the former 1971 Act. The Committee on the Status of Species at Risk in Ontario (COSSARO) is responsible for assessing the status of species throughout Ontario whereby over 200 species in Ontario are currently designated as extirpated, endangered, threatened, or of special concern. MECP administers regulations under the ESA.

See Section 3.3 of this report for a list of regulated species with potential to occur on the subject property.

1.5 Lake Simcoe Protection Plan (2009)

The Lake Simcoe Protection Act, which was passed in December 2008, provides a legislative framework for protecting the Lake Simcoe Watershed. Among other items, the Act includes the requirement for a Protection Plan with legally binding polices.

The main objectives of the LSPP are to:

- Protect, improve or restore the elements that contribute to the ecological health of the Lake Simcoe watershed;
- Reduce loadings of phosphorus and other nutrients to Lake Simcoe and its tributaries; and
- Prohibit and remove any direct discharge of pollutants to Lake Simcoe and its tributaries.

The following Designated Policies (DP) may be relevant to the proposed works within the study area:

6.9-DP The alteration of the shore of Lake Simcoe, other lakes or any permanent or intermittent stream for the purpose of establishing or altering drainage works such as those works under the Drainage Act, infrastructure or for stabilization, erosion control or protection purposes shall only be permitted if it is demonstrated that natural shoreline treatments (e.g. planting of natural vegetation, bioengineering) that maintain the natural contour of the shoreline will be used where practical, and a vegetative riparian area will be established to the extent feasible.

6.23-DP Development or site alteration is not permitted within a key natural heritage feature, a key hydrologic feature and within a related vegetation protection zone referred to in policy 6.24, except in relation to the following:

a) Forest, fish, and wildlife management;
b) Stewardship, conservation, restoration and remediation undertakings;
c) Existing uses as specified in policy 6.45;
d) Flood or erosion control projects but only if the projects have been demonstrated to be necessary in the public interest after all alternatives have been considered;
e) ***Retrofits of existing stormwater management works (i.e., improving the provision of stormwater services to existing development in the watershed where no feasible alternative exists) but not new stormwater management works;***
f) New mineral aggregate operations and wayside pits and quarries pursuant to policies 6.41 – 6.44;
g) Infrastructure, but only if the need for the project has been demonstrated through an Environmental Assessment of other similar environmental approval and there is no reasonable alternative; and

h) *Low-intensity recreational uses that require very little terrain or vegetation modification and few, if any, buildings or structures, including but not limited to the following:*
   i. *non-motorized trail use;*
   ii. *natural heritage appreciation;*
   iii. *unserviced camping on public and institutional land; and*
   iv. *accessory uses to existing buildings or structures.*

1.6 County of Simcoe Official Plan (2016)

The following maps and schedules were consulted to determine the appropriate policy framework for this exercise:

- Schedule 5.1 (Land Use Designations) depicts a settlement area within the study area; and
- Schedule 5.2.2 (Streams and Evaluated Wetlands) depicts a stream corridor within the study area and a PSW adjacent to the study area.

General land development policies are found under Section 3.3 of the County OP.

As per *Section 3.3.15* of the County of Simcoe Official Plan (OP), development and site alteration shall not be permitted:

i. *In significant wetlands and significant coastal wetlands.*
ii. *In the following unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions: Significant woodlands, significant valleylands, significant wildlife habitat, significant areas of natural and scientific interest (ANSIs), and coastal wetlands (not covered by 3.3.15 i) above).*
iii. *In the following regional and local features, where a local official plan has identified such features, unless is has been demonstrated that there will be no negative impacts on the natural heritage features or their ecological functions: wetlands 2.0 hectares or larger in area determined to be locally significant by an approved EIS, including but not limited to evaluated wetlands, and Regional areas of natural and scientific interest (ANSIs).*
iv. *In fish habitat except in accordance with provincial and federal requirements.*
v. *In habitat of Endangered species and Threatened species, except in accordance with provincial and federal requirements.*

1.7 Town of Innisfil Official Plan (2018)

The Town of Innisfil approved the Towns “Our Place” Official Plan on October 9, 2018 and took effect November 13, 2018.

The following maps and schedules were consulted to determine the appropriate policy framework for this exercise:

- Schedule A (Municipal Strategy) – identifies that the study area is within the Primary Settlement and a Future Strategic Settlement Employment Area;
- Schedule B1 (Land Use: Alcona) – Identifies that the study area is within the Residential Low Density Area 1 and the corridor associated with Leonard's Creek is identified as a Key Hydrologic Feature; and
- Appendix 6 (Areas of Groundwater Discharge), Appendix 9 (Natural Areas – ESA and Wetlands) and Appendix 10 (Woodlands) – depicts a stream corridor transecting the study area and a Provincially Significant Wetland (PSW) within 100 m of the northern section of the study area.

Regarding Key Natural Heritage Features & Key Hydrologic Feature, Section 17 (Natural Heritage System) of the Official Plan provides a definition in the following:

> *17.1.4 The Key Natural Heritage Features and Key Hydrologic Features designation includes the following key natural heritage features:*
>
> i. *Habitat of Endangered species and Threatened species;*
> ii. *Provincially significant wetlands;*
> iii. *All other wetlands 2.0 ha or larger in area, including but not limited to evaluated wetlands;*
> iv. *Wetlands within Lake Simcoe Watershed;*
> v. *Significant woodlands;*
> vi. *Significant valleylands;*
> vii. *Significant wildlife habitat;*
> viii. *Significant life science Areas of Natural and Scientific Interest;*
> ix. *Fish habitat;*
> x. *Savannahs and tall grass prairies; and*
> xi. *Natural areas abutting to Lake Simcoe.*
>
> *17.1.5 The Key Natural Heritage Features and Key Hydrologic Features designation includes the following key hydrologic features:*
>
> i. *Permanent stream and intermittent streams;*
> ii. *Lakes including the lake bed of Lake Simcoe;*
> iii. *Seepage areas and springs;*
> iv. *Provincially significant wetlands;*
> v. *All other wetlands 2.0 ha or larger in area, including but not limited to evaluated wetlands; and,*
> vi. *Wetlands within Lake Simcoe Watershed.*

The Innisfil OP identifies the requirement for a Natural Heritage Evaluation to investigate potential development on lands adjacent to Key Natural Heritage and Key Hydrologic Features. Specifically, Policy 17.1.15 states:

> *Development and site alteration shall not be permitted on adjacent lands to Key Natural Heritage Features and Key Hydrologic Features unless the ecological function of the adjacent lands have been evaluated through a Natural Heritage Evaluation, and it is demonstrated that there will be no negative impacts on the Key Natural Heritage Features and Key Hydrologic Features or their ecological functions and identifies a vegetation protection zone. Within the Natural Heritage system overlay, the vegetation*

protection zone shall be no less than 30 metres from the outside boundary of key hydrologic features, fish habitat and significant woodlands.

Finally, refinement to the boundary of Key Natural Heritage Features and Key Hydrologic Features is permitted as outlined in Policy 17.1.25:

Refinements to the boundaries of lands designated Key Natural Heritage Feature and Key Hydrologic Feature, through an approved Natural Heritage Evaluation, shall not require an amendment to this Plan. The adjoining land use designation(s) shall be deemed to apply to the lands removed from a Key Natural Heritage Feature and Key Hydrologic Feature designation.

The study area contains a stream corridor, potential habitat for endangered or threatened species and is adjacent (within 100 m) to a PSW.

1.8 Lake Simcoe Region Conservation Authority Act (Ontario Regulation 179/06)

The LSRCA regulates hazard lands, including creeks, valleylands, shorelines, and wetlands along with their applicable setback areas. The subject area contains several areas of valleyland, watercourse and wetland that are regulated by this authority. A screening of the potentially regulated areas indicates that most of the subject area may be regulated.

Any site alteration or development within regulated areas may require a permit from the LSRCA.

2. Methods

2.1 Background Information Review

Background documents and supporting technical documents containing information relevant to the biophysical features of the subject property were gathered and reviewed. Due to the seasonal requirements of many of the required surveys, field investigations have not been completed at the time of this memo. Please refer to the sections below for next steps and recommended surveys to be completed in the upcoming field season.

In preparation for site investigations, and using the resources listed below, Beacon conducted a desktop SAR assessment. The SAR assessment determines the likelihood that SAR or other significant natural heritage features and functions may be present in an area of interest. This system allows Beacon to combine the most current information provided by MNRF and MECP through the Land Information Ontario (LIO) portal with GIS layers from provincial floral and faunal atlases (listed below). All relevant layers can then be overlaid on the most recent high resolution orthoimagery. The screening process helps identify areas that can then be targeted (e.g., potential habitat) during a field assessment to maximize the efficiency and effectiveness of on-site investigations. The following information sources were reviewed as part of the desktop screening:

- MNRF Land Information Ontario (LIO, 2021) Base Mapping Data for:
    - Fish community records (including any SAR records), fish habitat data and watercourse thermal regime information;
    - Designated natural areas (e.g., ANSI, wooded areas, Provincially Significant Wetlands (PSW) / Locally Significant Wetlands (LSW) / unevaluated wetlands, provincial parks);
    - Wildlife habitats;
    - Natural Heritage Information Centre (NHIC) provincially tracked species;
- Wildlife Atlases:
    - Ontario Butterfly Atlas (OBA);
    - Ontario Breeding Bird Atlas (OBBA);
    - Ontario Reptile and Amphibian Atlas (ORAA);
    - iNaturalist Herps of Ontario Project;
    - Atlas of the Mammals of Ontario;
    - Bat Conservation International (BCI) Species Profiles;
    - SAR range maps https://www.ontario.ca/environment-and-energy/species-risk-ontario-list;
    - Fisheries and Oceans Canada Species at Risk Online Mapping Tool;
- Planning Documents and Guidelines:
    - In-water Work Timing Window Guidelines (MNRF, 2013);
    - Significant Wildlife Habitat Technical Guide (MNRF, 2000);
    - Significant Wildlife Habitat Criteria Schedule for Ecoregion 6E (MNRF, 2015);
    - Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement – Second Edition (MNRF, 2010);
    - The Town of Innisfil Official Plan and schedules (2018);
    - LSRCA regulation and watershed mapping (2022); and
    - Innisfil Creeks Subwatershed Plan (LSCRA, 2012).

3. Existing Natural Heritage Conditions

The following subsection provide the results of the existing conditions review of the study area using existing information and the results of the desktop review.

3.1 Terrestrial Resources

The subject property lies within Lake Simcoe-Rideau Ecoregion 6E. More specifically, the subject property lies within the Barrie Ecodistrict 6E-6, which covers some 560,878 ha, including portions of Simcoe County, York Region, and Durham Region. Ecodistrict 6E-6 extends from clay and limestone plains in the north (just south of the Canadian Shield) to the Simcoe County Lowlands and Schomberg

Clay Plains in the south. Vegetation resources of the ecoregion are characterized primarily by deciduous forests and wetlands, the majority of which are swamp (Henson & Brodribb 2005).

The most common forest types in this subwatershed are deciduous and mixed forests, which are typically found on well drained sandy or loamy sites. Deciduous forests are widespread in this subwatershed and can be found in a variety of topographic positions. Mixed forests are typically found on the edges of deciduous forests, in swamps, or in areas with a slight topographic slope. The landscape surrounding the study area is dominated by single, detached residences.

There are four wetlands designated as “Provincially Significant” in this subwatershed. Adjacent to the study area is one of the four PSW’s within the subwatershed: Leonard’s Beach Swamp (a complex of mixed and deciduous swamp near Leonard’s Beach east of Leonard Street).

There exist numerous trees, both publicly-owned (Town of Innisfil road right of way) and privately owned, within the study area and proposed works. The Town’s Engineering Design Standards and Specifications (2021) requires a tree inventory and preservation plan be prepared for construction projects to protect existing trees and the planting of new trees.

3.2 Aquatic Resources

The study area is within the Innisfil Creek subwatershed and located on the western side of the Lake Simcoe watershed. The Innisfil Creeks subwatershed is 107 km^2 in size, and accounts for 4% of Lake Simcoe’s total watershed area (LSRCA, 2012). All the subwatershed streams have headwaters in agricultural areas, and then flow east to west downstream, some through urban areas, before entering the lake (LSRCA, 2012). Fish communities in the subwatershed range from cold headwater communities featuring such species as Brook Trout (*Salvelinus fontinalis*) and Mottled Sculpin (*Cottus bairdii*) to diverse warm water systems containing such species as Creek Chub (*Semotilus atromaculatus*) and Brown Bullhead (*Ameiurus nebulosus*).

Within the subwatershed, groundwater flows generally toward Cook’s Bay and the lakeshore just to the north of it, and into Kempenfelt Bay. The LSRCA (2012) indicates that there are groundwater contributions to some of the subwatersheds tributaries, as indicated by the presence of the sensitive fish species Brook Trout; however, groundwater discharge was not identified as a significant contributor to the flow of the creeks in this subwatershed.

3.2.1 Leonard’s Creek

Leonard’s Creek transects the study area west to east crossing under Buchanan Street and Tall Tree Lane where it is straightened into a roadside channel along Leonard Street. Leonard’s Creek then flows southeast, under Crystal Beach Road, into Lake Simcoe south of Bon Secours Beach. Within the study area, Leonard’s Creek conveys drainage from the Leonard Beach Swamp (PSW north of 9th Line) and many of the surrounding roadside drainage features throughout the residential surroundings.

Leonard’s Creek, within the study area, is considered a cold-water creek based on both temperature and fish community assemblage (LIO, 2021). This correlates with the LSRCA data; however, the subwatershed report (LSRCA, 2012) further explains that cold water fish species are only present close to its confluence with Lake Simcoe. The main southern branches go through mainly urban land use and small patches of natural heritage cover. The northern branches go through similar land uses near the mouth but have headwaters in primarily rural and agricultural lands. The LSRCA note that there is no historical or current record of Brook Trout occupying this creek, but current data show Mottled Sculpin to be present at the site closest to the mouth, which may indicate that the habitat is appropriate for Brook Trout.

The LSRCA (2012) recognizes that the aquatic communities in Leonard's Creek may be showing signs of stress as there is low abundance and diversity of fish in the headwaters and benthic data indicates significant organic pollution (except for the headwaters) through the system. However, the reaches closest to the mouth of Lake Simcoe are known to provide the most ideal habitat for cold water species (LSRCA, 2012).

Land Information Ontario (MNRF, 2021) provides a general fish community assemblage for Leonard's Creek (MH-0276-GOO):

- Blacknose Dace (*Rhinichthys atratulus*);
- Blacknose Shiner (*Notropis heterolepis*);
- Bluntnose Minnow (*Pimephales notatus*);
- Brook Stickleback (*Culaea inconstans*);
- Central Mudminnow (*Umbra limi*);
- Common Shiner (*Luxilus cornutus*);
- Creek Chub (*Semotilus atromaculatus*);
- Emerald Shiner (*Notropis atherinoides*);
- Fathead Minnow (*Pimephales promelas*);
- Finescale Dace (Phoxinus neogaeus);
- Johnny Darter (*Etheostoma nigrum*);
- Largemouth Bass (*Micropterus salmoides*);
- Mottled Sculpin (*Cottus bairdii*);
- Mimic Shiner (*Notropis volucellus*);
- Northern Pearl Dace (*Margariscus nachtriebi*);
- Northern Redbelly Dace (*Phoxinus eos*);
- Pumpkinseed (*Lepomis gibbosus*);
- Rock Bass (*Ambloplites rupestris*);
- Smallmouth Bass (*Micropterus dolomieu*);
- Spotfin Shiner (*Cyprinella spiloptera*);
- White Sucker (*Catostomus commersoni*); and
- Yellow Perch (*Perca flavescens*).

The Innisfil Subwatershed report (LSRCA, 2012) has identified a cold-water timing window of June 1 to September 30 for the main branch of Leonard's Creek. No records for aquatic SAR have been identified for any of watercourses within the study area.

3.3 Species at Risk

An assessment was completed to determine whether there were potentially any occurrences or if any suitable habitat was present for any of the endangered or threatened species known to occur in the vicinity (<5 km) of the study area. This assessment identified a total of 14 species as having the potential to occur on or adjacent to the study area:

Table 1. Study Area

Common Name	Scientific Name	ESA[1] Status	SARA[2] Status	COSEWIC[3] Status	Habitat Present in Subject Area?
Bank Swallow	*Riparia riparia*	THR	THR	THR	**No**, not likely.
Barn Swallow	*Hirundo rustica*	THR	THR	THR	**Yes**, but proposed work is not likely to affect species' habitat (i.e., removal of structures)
Blanding's Turtle	*Emydoidea blandingii*	THR	THR	END	**Yes**, but not likely to be occupied.
Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	**No** (meadows, grasslands)
Butternut	*Juglans cinerea*	END	END	END	**Yes**, field investigations needed
Cerulean Warbler	*Setophaga cerulea*	THR	END	END	**No**, not likely
Eastern Meadowlark	*Sturnella magna*	THR	THR	THR	**No** (meadows, grasslands)
Eastern Small-footed Myotis	*Myotis leibii*	END	-	-	**Yes**, field investigations needed
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	THR	**No**, not likely
Henslow Sparrow	*Ammodramus henslowii*	END	END	END	**No**, not likely
Least Bittern	*Ixobrychus exilis*	THR	THR	THR	**Yes**, but not likely to be occupied.
Little Brown Myotis	*Myotis lucifugus*	END	END	END	**Yes**, field investigations needed
Northern Myotis	*Myotis septentrionalis*	END	END	END	**Yes**, field investigations needed
Tri-colored Bat	*Perimyotis subflavus*	END	END	END	**Yes**, field investigations needed

The proposed work is assumed to be restricted to the roadside ROW; however, any minor encroachment into treed habitat or wetland habitat should be assessed for SAR habitat. Beacon reviewed aerial imagery to assess the potential that habitat for regulated species may occur within the study area. Based on the desktop review, there is potential for endangered bats and Butternut in the treed communities, specifically along the Leonard's Creek corridor. There is also suitable habitat for Blanding's Turtle in the aquatic habitats, including the creek corridor and adjacent PSW. Additionally, the wide drainage channels, adjacent PSW and proximity to open water may provide habitat for Least Bittern. Barn Swallows nest almost exclusively on human-made structures such as open barns, under bridges and in large culverts. The species is attracted to open structures that include ledges where they can build their nests; the culverts slated for replacement are unlikely to provide habitat for this species.

Due to the presence of suitable habitat for endangered or threatened species, seasonal surveys would be required to address these species. If regulated species are found to be using the available habitat, there are permits and exemptions available under the *Endangered Species Act*.

4. Recommended Future Surveys (Spring / Summer 2022)

Several surveys are required in order to more accurately present an impact assessment for the natural heritage features identified within the study area and to recommend mitigation measures for the proposed works:

- Tree Inventory Assessment;
- Scoped Aquatic Assessment; and
- SAR Habitat Screening and specialised species surveys (if required).

5. Constraints Analysis and Recommend Mitigation and Avoidance Measures

The findings of this report are preliminary and represent a high-level review of the study area. Beacon has reviewed the existing natural heritage policies and assessed the possible presence of natural features within study area through desktop analysis.

The study area contains a portion of the Leonard's Creek corridor, small transects of treed communities and is in close proximity to a PSW and the Lake Simcoe shoreline. As the analysis was completed entirely through desktop review surveys, seasonal surveys will be required to assess and identify any constraints resulting from identified natural heritage features within the study area.

Due to the presence of suitable habitat for Butternut and endangered bats, additional surveys would be required to confirm habitat / species presence within the study area.

5.1 Erosion and Sediment Control

Prior to construction, detailed Erosion and Sediment Control Plan should be developed using the *Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guidelines for Urban Construction* (2019).

5.2 Tree Removal and Preservation

An Arborist Report should be prepared by an I.S.A. Certified Arborist. Methodology and reporting shall be in accordance with Section 8.0 of the Town's Engineering Standards. All trees having a diameter-at-breast-height (DBH) ≥10 cm shall be included in the inventory and relevant information such as species, DBH, canopy diameter, health and condition should be collected. The methods and results of the tree inventory should be detailed in a complete Arborist Report. Prior to the undertaking of tree removals, a Tree Removal Strategy / Tree Preservation Plan may be developed during detailed design to document tree protection and mitigation measures.

5.3 Timing Windows

Any in water work shall adhere to the timing window identified for Leonard's Creek (June 1 to September 30).

To ensure compliance with the federal Migratory Birds Convention Act (1994), any vegetation clearing between April 1 and August 30 should only occur after an ecologist with appropriate avian knowledge has surveyed the area to confirm no breeding birds are present.

If applicable, any disturbance to bat roosting habitat should be avoided during the bat roosting period, with emphasis on avoiding potential effect during the maternity period and in accordance with MECP requirements.

5.4 Fish and Wildlife Rescue

Fish and wildlife collection permits, under the *Fish and Wildlife Conservation Act* will be necessary to relocate fish or amphibians or reptiles. Relocations shall be conducted during the appropriate timing windows and the with the required permitting in place.

6. Permitting and Regulatory Considerations

Leonard's Creek and all surrounding drainage features are regulated by LSRCA. In this regard, a permit will be required from LSRCA for any proposed development and sit alterations prior to construction.

It is expected that many of the proposed work activities will involve work below the highwater mark of Leonard's Creek and several of the drainage features within the study area. An assessment of potential impacts on fish and fish habitat should be completed and submitted to DFO for project review. Compliance with the fish habitat protection provisions of the *Fisheries Act* will require the application of measures to avoid causing the death of fish and/or the HADD of fish habitat. Upon consultation with DFO, if death of a fish and/ or HADD of fish habitat cannot be avoided after the application of the appropriate protection and mitigation measures, a letter of approval or an authorization from DFO may need to be obtained.

Upon completion of the recommended field investigations, if regulated species are found to be using the available habitat, there are permits and exemptions available under the *Endangered Species Act* that will need to be obtained prior to construction.

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Appendix H: Geotechnical and Hydrogeological Report

Peto MacCallum Ltd.
CONSULTING ENGINEERS

August 27, 2021

PML Ref.: 21BX005
Report: 1

Ms. Nicole Foris, P.Eng.
Tatham Engineering Limited
41 King Street, Unit 4
Barrie, Ontario
L4N 6B5

Dear Ms. Foris

Hydrogeological Investigation
Various Roads
Innisfil, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the hydrogeological investigation recently completed for the above noted project site. Authorization for this work was provided by Ms. N. Foris, in an email dated February 10, 2021, with authorization for additional studies provided on April 10, 2021.

It is understood that as a result of historical drainage issues along several roads in the Town of Innisfil, a hydrogeological investigation was requested. The roads that are a part of this study are noted below:

- Crystal Beach Road – Roberts Road to Goodfellow Avenue
- Ried Street – Simcoe Boulevard to Buchanan Street
- Goodfellow Avenue – 9th Line to end
- Bonsecour Crescent – entire road
- Buchanan Street – Crystal Beach Road to 9th Line
- Tall Tree Lane – Crystal Beach Road to 9th Line

The roads are shown on Drawings 1 and 2, attached.

The purpose of this investigation was to carry out a borehole drilling and monitoring well installation program to establish existing ground water conditions, as well as to conduct Guelph Permeameter (GP) testing in order to determine site-specific infiltration parameters.

In addition, geotechnical engineering recommendations were requested to provide pavement design for Bonsecour Crescent and Goodfellow Avenue.

Field Investigation

Borehole Drilling and Monitoring Well Installation

A borehole drilling and monitoring well installation program was carried out on April 27, 2021. Borehole/Monitoring Well 1, 3, and 5 to 7 were advanced to 3.6 m below existing grade and Boreholes 2, 4, and 8 to 10 were advanced to 1.5 m below existing grade. Further, It is noted that two geotechnical test pits (Test Pits 11 and 12) were completed concurrently to confirm road granular thickness and subgrade conditions (0.3 to 0.4 m depth). Borehole and test pit locations are shown on Drawings 1 and 2, appended.

PML laid out the boreholes and test pits in the field for the recent investigation. The ground surface elevation at the borehole and test pit locations was obtained with a Sokkia SHC5000 Global Navigation Satellite System (GNSS). Vertical and horizontal accuracy of this unit are 0.1 and 0.5 m, respectively. All elevations in this report are geodetic and expressed in metres.

Co-ordination for clearances of underground utilities was provided by PML. The boreholes were drilled cognizant of the underground utilities.

The boreholes were advanced using continuous flight solid stem augers, powered by a track mounted Geoprobe 7822 DT drill rig, equipped with an automatic hammer, supplied, and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals for identification purposes using a conventional 51 mm OD split spoon sampler. The sample excluded particles larger than 38 mm. Standard penetration tests were carried out simultaneously with the sampling operations to assess the strength characteristics of the subsoil. The ground water conditions in the boreholes were assessed during drilling by visual examination of the soil samples, the sampler, and drill rods as the samples were retrieved, and measurement of the water level in the open boreholes, if any.

Test pits were carried out with hand equipment.

All recovered samples were returned to our laboratory for detailed examination and moisture content determinations. Grain size analyses were carried out on five samples of the major soil units from the boreholes. Four samples of the existing granular materials and two samples of the subgrade soil were submitted for grain size analysis from the test pits. The laboratory test results are provided on Figures 1 to 4, appended.

A monitoring well, comprised of 50 mm diameter PVC pipe with a 1.5 m long screen at the bottom, filter sand, bentonite seal and stick-up protective casing, was installed in five boreholes to permit ground water level monitoring. The details of the monitoring well installation are shown on the applicable Log of Borehole sheets. It should be noted that the well becomes the property of the Owner and will have to be decommissioned by the Owner in accordance with O.Reg. 903. Boreholes without wells were backfilled in accordance with O.Reg. 903.

Guelph Permeameter Testing

As part of the borehole drilling program, PML carried out GP testing in select boreholes. GP testing was carried out at depths of 0.3 to 0.8 m below grade in Boreholes 3, 4, and 8 to 10.

Site Setting

The site is located east of 25th Sideroad between Innisfil Beach Road and 10th Line in Alcona, Innisfil, and the area generally comprises residential properties and minor residential roadways.

Physiography and Topography

The site is located within the physiographic region known as the Simcoe Lowlands comprising sand plains (Chapman and Putnam, 1984).

The borehole elevations indicate about 2.2 m of relief across the site, with elevations ranging from 219.40 to 221.60, gently sloping down towards Lake Simcoe to the east.

Drainage and Surface Water Flow

Leonard's Creek crosses through the site from west to east towards Goodfellow Avenue and ultimately discharging to Lake Simcoe. Lake Simcoe is immediately adjacent to the eastern limits of the site. Surface drainage on the site is expected to follow the topography towards Leonard Creek and/or Lake Simcoe.

Geology and Subsurface Conditions

Geology

Bedrock below the overburden is mapped as Verulam limestone, dolostone, shale, arkose, and sandstone of the Simcoe Group from the Middle Ordovician period of the Paleozoic era of the Phanerzoic eon. Bedrock is anticipated at depths of approximately 50 m based on the Ontario Division of Mines preliminary Map P.980 Drift Thickness Series for the Barrie Area.

Subsurface Conditions

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions, including soil classifications, inferred stratigraphy and thicknesses, Standard Penetration test N Values (N Values, blows per 300 mm penetration of the split spoon sampler), well installation details, ground water level observations and the results of laboratory moisture content determinations.

Due to the soil sampling procedures and the limited size of samples, the depth/elevation demarcations on the borehole logs must be viewed as "transitional" zones, and cannot be construed as exact geologic boundaries between layers. PML should be retained to assist in defining the geological boundaries in the field during construction, if required.

Reference is also made to the appended Log of Test Pit sheets for details of the road granular thicknesses and subgrade soil types.

Topsoil was present at the surface of Boreholes 1, 4, 6, 9 and 10, ranging in total thickness from 50 to 250 mm.

Road and/or shoulder granulars were present at the surface of Boreholes 2, 3, 5, 7 and 8 and Test Pits 11 and 12, ranging from 200 to 400 mm in total thickness. Grain size analyses on four samples of the granular material are presented on Figures 1 and 2, appended.

Fill was encountered below the topsoil and/or road granulars in Boreholes 1, 3, 4, 6, 7 and 9 and Test Pits 11 and 12 to a depth of 0.7 to 2.7 m (elevation 217.10 to 220.70), the 1.5 m depth of exploration in Borehole 8, and the 0.3 to 0.4 m depth of exploration in Test Pits 11 and 12. The material comprised sand and gravel, to sand. Six representative samples were submitted for gradation and the results are presented on Figure 3, attached. The material had N Values ranging from 3 to 10, indicating variable compaction. The layer was moist to wet with moisture contents of 6 to 15%.

A local sandy silt till unit was encountered in Borehole 3 below to fill unit extending to the 3.6 m depth of exploration. The unit comprised sandy silt with variable clay and gravel. Cobbles and boulders were noted during drilling. The material had N Values of 13 to 83 indicating compact to very dense density. The layer was moist to wet with moisture contents of 6 to 11%.

A peat unit was encountered below the granular/topsoil and fill in Boreholes 1, 5 and 7 extending to a depth of 1.6 to 2.1 m (elevation 217.3 to 217.9), and the 1.5 m depth of exploration in Borehole 4. The material had N Values of 1 to 6 indicating very loose to loose condition. The layer was wet with moisture contents of 10 to 407%.

A sand/silty sand deposit was revealed in Boreholes 1, 2, 5 to 7, 9 and 10. The material was 0.5 to 1.5 m in thickness and was below the peat and/or fill to the 1.5 to 3.6 m depth of exploration, locally 3.2 m and 2.1 m depth in Boreholes 6 and 7, respectively. A sample of the material was submitted for a gradation analysis and the results are provided on Figure 4, attached. N Values in the soil were 1 to 15, indicating very loose to compact density. The deposit was typically wet with moisture contents of 10 to 25%.

A clay unit was encountered below the sand/silty sand unit extending to the 3.6 m depth of exploration in Boreholes 6 and 7. The material had N Values of 3 to 8 indicating soft to firm consistency. The layer had moisture contents of 17 to 20%.

The first water strike (ground water first encountered during drilling), the ground water/wet cave levels measured in the boreholes upon completion of augering, and ground water level measured in the wells following completion are summarized in the table below, on a borehole by borehole basis.

BH	FIRST STRIKE DURING DRILLING DEPTH (m) / ELEVATION	UPON COMPLETION OF AUGERING DEPTH (m) / ELEVATION	WATER LEVEL IN WELL DEPTH (m) / ELEVATION	
			2021-05-17	2021-07-21
1	0.5 / 218.9	0.6 / 218.8	0.5 / 218.9	0.3 / 219.1
2	No Water	No Water	--	--
3	3.0 / 217.1	2.7 / 217.4	0.8 / 219.3	0.9 / 219.2
4	No Water	1.5 / 217.9	--	--
5	1.6 / 218.4	1.8 / 218.2	0.7 / 219.3	0.7 / 219.3
6	1.5 / 218.3	1.5 / 218.3	0.9 / 218.9	0.7 / 219.1
7	1.3 / 218.1	1.3 / 218.1	0.5 / 218.9	0.5 / 218.9
8	No Water	No Water	--	--
9	0.7 / 220.9	0.9 / 220.7	--	--
10	0.8 / 219.0	0.6 / 219.2	--	--

The regional ground water table is believed to be below the depth of exploration. Near surface ground water stabilized at approximately 0.5 to 0.9 m below the existing ground surface (elevation 218.9 to 219.3). It is noted that the surface water elevation of Lake Simcoe is approximately 219.0.

The test pits did not encounter ground water.

Ground water levels will fluctuate seasonally, and in response to variations in precipitation.

Hydrogeological Recommendations

Infiltration Assessment

Guelph Permeameter Testing

A GP test was completed at five borehole locations (Boreholes 3, 4, 8, 9 and 10) in order to determine the field saturated hydraulic conductivity. The GP test was carried out at a depth of 0.3 to 0.8 m depth. The GP test depths were determined such that unsaturated near surface soils were assessed. For each GP test, the water level drop in the GP chamber was visually monitored and recorded until a steady infiltration rate was reached.

The field saturated hydraulic conductivity, K_{fs}, was determined utilizing the Zhang et al. (1998) method as follows:

Single Head Method

$$K_{fs} = \frac{C_1 x Q_1}{2\pi {H_1}^2 + \pi a^2 C_1 + 2\pi \left(\frac{H_1}{a^*}\right)}$$

Where:

C = shape factor
Q = the steady-state rate of fall of water in reservoir (cm/s)
H = hydraulic head (cm)
α = borehole radius (cm)

An approximate relationship between K_{fs} and the infiltration rate was established in the Toronto Regional Conservation Authority / Credit Valley Conservation (TRCA/CVC) LID Stormwater Management Planning and Design Guide and was utilized to determine approximate infiltration rates:

$$Infiltrate\ Rate = \sqrt[3.7363]{\frac{K_{fs}}{6\ x\ 10^{-11}}}$$

The test locations and results are summarized below:

LOCATION	TEST DEPTH (m) / ELEVATION	MATERIAL TYPE	K_{fs} (cm/sec)	INFILTRATION RATE (mm/hr)	FACTORED INFILTRATION RATE (mm/hr)
Borehole 3 (offset)	0.8 / 219.3	Sand (Fill) / Till	2.5 $x10^{-5}$	32	13
Borehole 4	0.4 / 219.0	Sand (Fill)	2.6 $x10^{-3}$	111	44
Borehole8	0.5 / 219.0	Sand (Fill)	3.2 $x10^{-4}$	63	25
Borehole 9 (offset)	0.7 / 220.9	Sand and Gravel (Fill)	3.8 $x10^{-5}$	36	14
Borehole 10 (offset)	0.3 / 219.5	Topsoil / Sand	3.8 $x10^{-5}$	36	14

Note: Some locations were offset from the original borehole.

Particle Size Distribution

Five soil samples were submitted for grain size analysis and the Hydraulic Conductivities (K) were estimated based on the particle size distribution. The results of the laboratory testing are included in Figures 1 to 2 and the estimate of Hydraulic Conductivities are summarized in the table below.

SAMPLE	DEPTH (m)	SOIL TYPE	ESTIMATED K (cm/sec)
Borehole 3 GP1	0.6 to 0.8	Sand and Gravel (Fill)	10^{-3} to 10^{-4}
Borehole 4 GP1	0.2 to 0.4	Sand (Fill)	10^{-2} to 10^{-3}
Borehole 5 SS4	2.1 to 2.7	Sand	10^{-2} to 10^{-3}
Borehole 8 GP1	0.3 to 0.5	Sand (Fill)	10^{-2} to 10^{-3}
Borehole 9 GP1	0.5 to 0.7	Sand and Gravel (Fill)	10^{-3} to 10^{-4}

The Vukovic & Soro method was used to assess K.

The K value derived from the particle size distribution curve does not take into consideration site specific details such as compaction, soil structure, organic content and/or the degree of saturation.

General

Based on the above findings the following observations are noted:

- Peat was encountered at approximate depths of 1.5 to 2.0 m in the vicinity of Boreholes 1, 4, 5 and 7 along Crystal Beach Road, Reid Street and Bonsecour Crescent. The peat appears to be lower permeability that the overlying and underlying silty sand/sand units encountered on-site. As such, the peat layer appears to be acting as an impermeable layer potentially inhibiting recharge.

- Clay was encountered at about 2.0 to 3.0 m at Boreholes 1 and 7 on Reid Street and Bousecour Crescent which is similarly anticipated to potentially act as an impermeable layer inhibiting recharge.

Pavement Design

It is understood that the Town is considering paving Bonsecour Crescent and Good Fellow Avenue, both of which are currently gravel roads.

Both roads are considered as local roads based on the Town Standard. The Town Standard pavement design specification for local roads is as follows:

MATERIAL	THICKNESS (mm)
Asphalt Surface Course	40
Asphalt Binder Course	60
Granular Base	150
Granular Subbase	400
Total	650

Based on Boreholes 7 and 8 and Test Pits 11 and 12, the existing granular comprises 100 to 150 mm of granular base over 50 to 250 mm of granular subbase for a total thickness of 200 to 400 mm. The underlying subgrade comprised a sand to sand and gravel fill.

The analyses on the granular materials from Test Pits 11 and 12 show the materials to be outside of the OPSS Granular A and Granular B Type I specifications.

The existing granular thickness is substandard and the quality is also substandard.

The first option is to reconstruct the pavements and implement the local road design specification noted above.

The second option, provided a reduced pavement life and increased maintenance are acceptable, would be to utilize the existing granular as the subbase and add 200 mm of new granular base, and the asphalt noted in the local road design specification provided above.

For new construction, rough grading will involve stripping of the existing pavement and cutting down to the design subgrade level. It is not intended to remove all of the existing fill from under the road structure. However, in order to minimize potential settlement issues, it is recommended that following rough grading to the proposed subgrade level, the exposed subgrade soil should be compacted to minimum 95% Standard Proctor maximum dry density (SPmdd), under geotechnical review by PML. Any unstable zones identified during this process should be sub-excavated and replaced with select site material placed in 200 mm thick lifts and compacted to a minimum 95% SPmdd.

If existing granular material is left in place, compact to minimum 100% SPmdd.

The above options consider the construction will be carried out during the dry time of the year. If wet or unstable subgrade is encountered, additional excavation, additional granular subbase, the use of Granular B Type II and/or geotextile may be required, subject to geotechnical review during construction.

The new pavement shall transition into the existing pavement with a 10H:1V frost taper at the limits of the project.

Imported material for the granular base and subbase should conform to OPSS gradation specifications for Granular A and Granular B Type I, respectively, and should be compacted to 100% SPmdd.

For the pavement to function properly, it is essential that provisions be made for water to drain out of and not collect in the base material. For rural cross-sections, the granular material should daylight in the ditches in accordance with OPSD 200.010.

Closure

We trust this report is complete within our Terms of Reference. Please do not hesitate to call if you have any questions.

Sincerely

Peto MacCallum Ltd.

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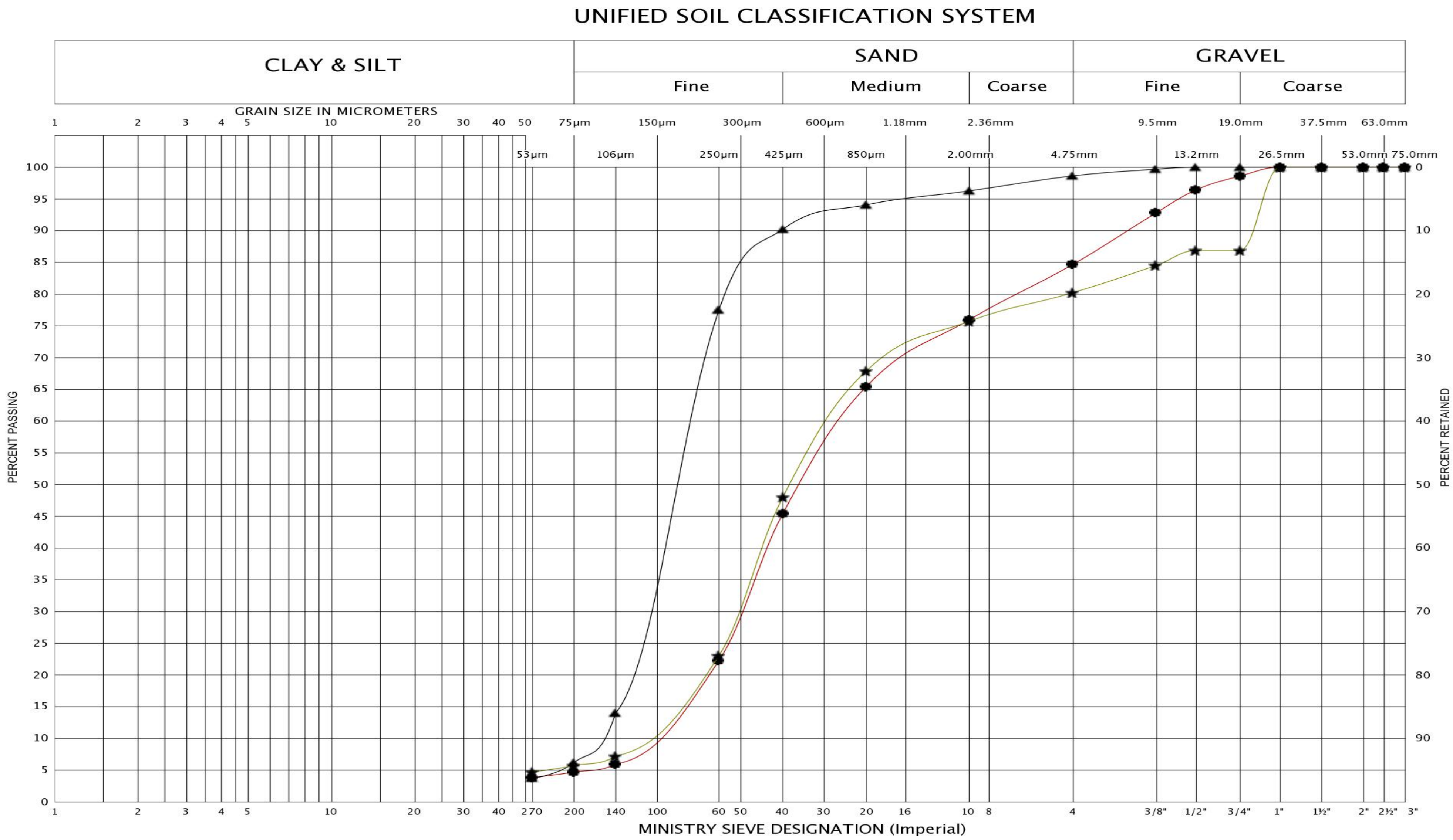
Enclosure(s):
Figures 1 to 4 – Grain Size Distribution Charts
List of Abbreviations
Log of Boreholes Nos 1 to 10
Lot of Test Pits Nos 11 and 12
Borehole/Test Pit Location Plan - Drawings 1 and 2

Distribution:
1 cc: Tatham Engineering Limited (email only)
1 cc: PML Barrie



LEGEND	BH	BH4	BH8	BH 5
	SAMPLE	GP1	GP1	4
	SYMBOL	★	⬣	▲

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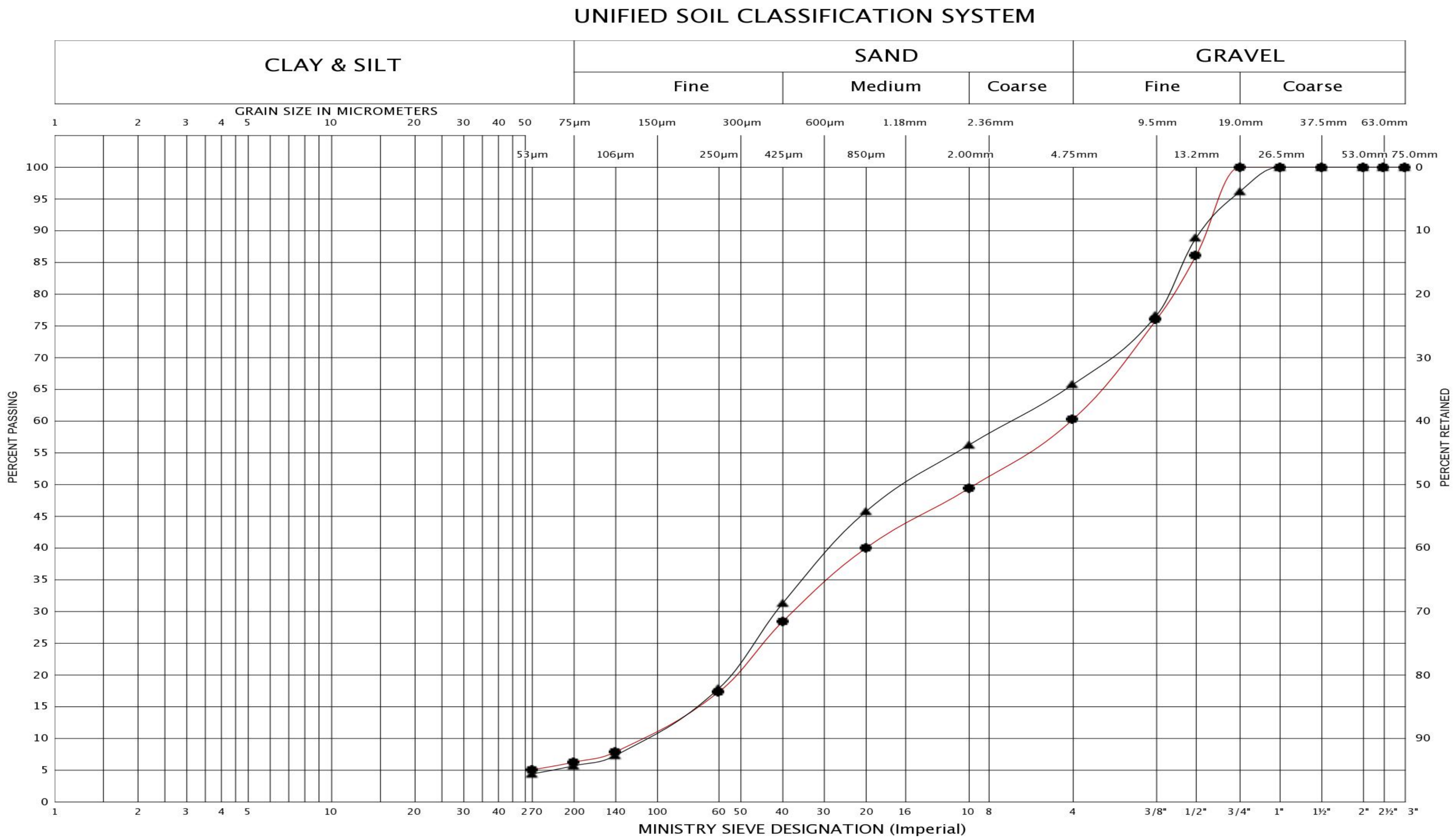
GRAIN SIZE DISTRIBUTION

SAND, Trace to Some Gravel, Trace Silt

FIG No.: 1

Project No.: 21BX005



LEGEND	BH	BH3	BH9
	SAMPLE	GP1	GP1
	SYMBOL	●	▲

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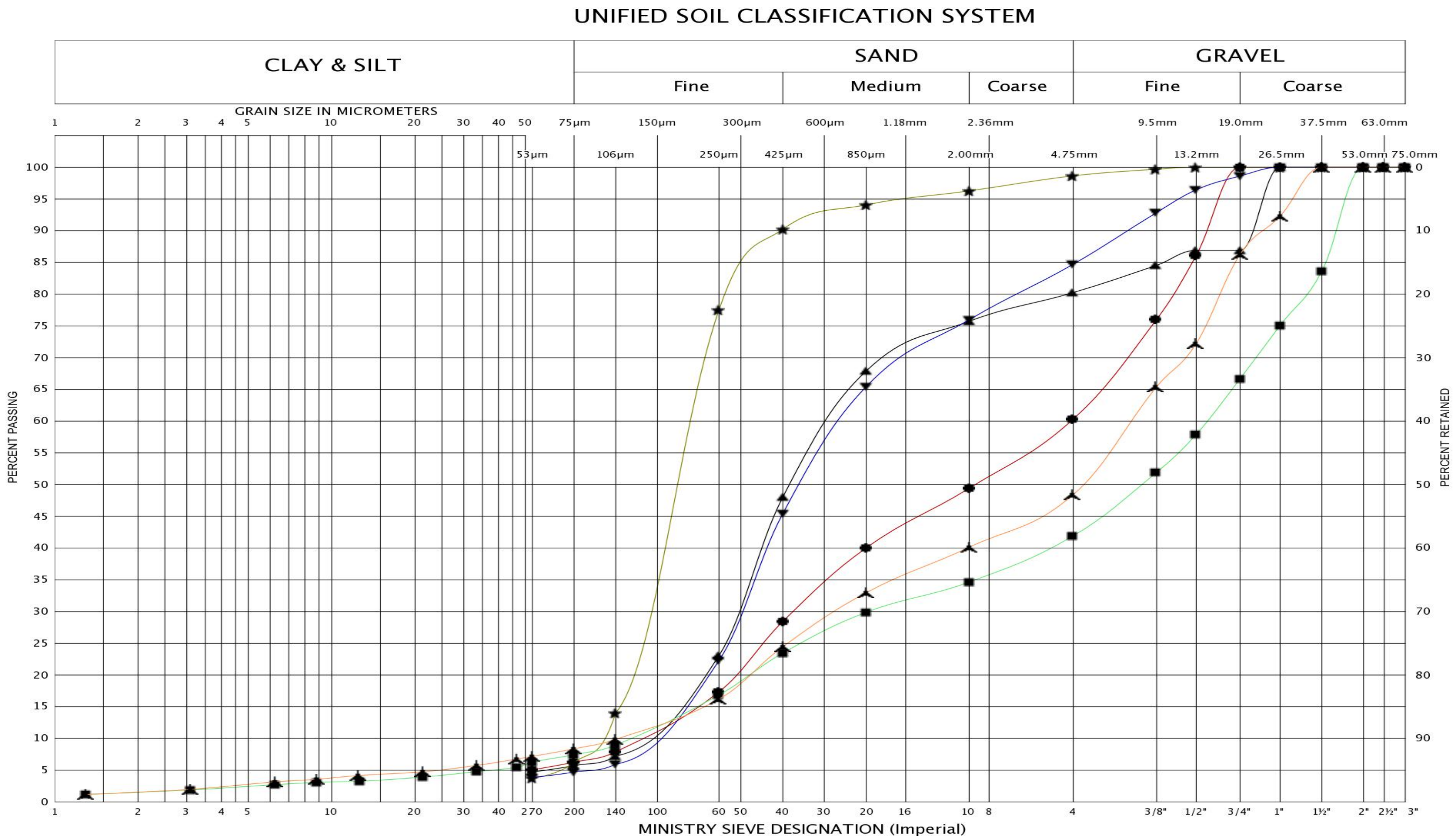
GRAIN SIZE DISTRIBUTION

SAND AND GRAVEL, Trace Silt

FIG No.: 2

Project No.: 21BX005



LEGEND	BH	TP11	TP12	BH 3	BH 4	BH 8	BH 5
	SAMPLE	GS2	GS2	1	1	1	3
	SYMBOL	■	⅄	⬢	▲	▼	★

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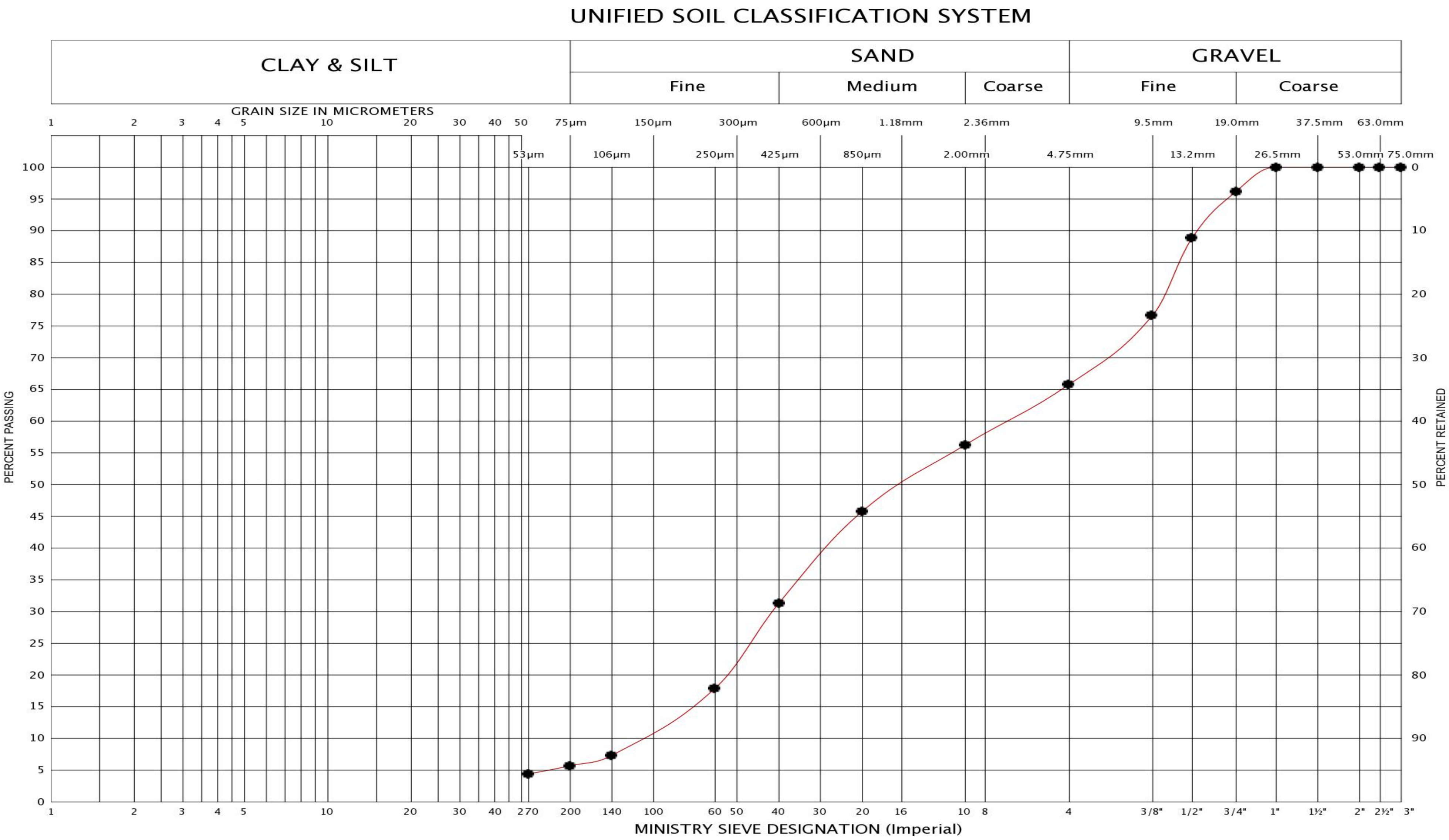
GRAIN SIZE DISTRIBUTION

FILL: Sand, Trace to Some Gravel, Trace Silt to Sand and Gravel, Trace Silt

FIG No.: 3

Project No.: 21BX005



LEGEND	BH	BH 9
	SAMPLE	1
	SYMBOL	⬢

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GRAIN SIZE DISTRIBUTION

SAND AND GRAVEL, Trace Silt

FIG No.: 4

Project No.: 21BX005

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTLL	Wetter Than Liquid Limit
WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	ST	Slotted Tube Sample
WS	Washed Sample	TW	Thinwall Open
SB	Scraper Bucket Sample	TP	Thinwall Piston
AS	Auger Sample	OS	Oesterberg Sample
CS	Chunk Sample	FS	Foil Sample
GS	Grab Sample	RC	Rock Core

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

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LOG OF BOREHOLE/MONITORING WELL NO. 1

17T 616902E 4908979N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN NG

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 219.40				
0.10 / 219.30	TOPSOIL: Dark brown, sandy silt, trace organics, moist				Stick-up casing
1.2 / 218.2	FILL: Brown to grey, silty sand, some gravel, moist to wet	1	SS	6	First water strike 0.5 m; Bentonite seal
		2	SS	3	Filter Sand
2.1 / 217.3	PEAT: Very loose, black, amorphous peat, wood pieces, wet	3	SS	2	
3.6 / 215.8	SILTY SAND: Loose, brown, silty sand, trace gravel, wet	4	SS	8	50 mm slotted pipe
		5	SS	5	
	BOREHOLE TERMINATED AT 3.6 m				Upon completion of augering Water at 0.6 m; Cave at 2.4 m

Water content: Sample 1 ≈ 10%; Sample 2: 407 (unit weight column area)

Water Level Readings:

Date	Depth	Elev.
2021-05-17	0.5	218.9
2021-07-21	0.3	219.1

Chart legend: SHEAR STRENGTH (kPa): + FIELD VANE, △ TORVANE, ○ Qu, ▲ POCKET PENETROMETER, O Q (50, 100, 150, 200); DYNAMIC CONE PENETRATION ×, STANDARD PENETRATION TEST ● (20, 40, 60, 80); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40); UNIT WEIGHT kN/m³; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL; ELEVATION SCALE 219, 218, 217, 216; Depth scale 0.0–5.0

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LOG OF BOREHOLE NO. 2

17T 616846E 4909178N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN NG

DEPTH / ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION × / STANDARD PENETRATION TEST ●	WATER CONTENT (%)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 219.75									
0.0	ROAD GRANULARS: 150 mm granular base, 200 mm granular subbase, moist		1A / 1B	GS	--					
0.35 / 219.40	SILTY SAND: Loose, brown to grey, silty sand, some gravel, moist to very moist		2	SS	8	219	●	○		
1.5 / 218.3	BOREHOLE TERMINATED AT 1.5 m									Upon completion of augering No water No cave

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LOG OF BOREHOLE/MONITORING WELL NO. 3

17T 616816E 4909337N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu; ▲ POCKET PENETROMETER O Q (50, 100, 150, 200)
DYNAMIC CONE PENETRATION ×; STANDARD PENETRATION TEST ● (20, 40, 60, 80)
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40)
UNIT WEIGHT kN/m³
GROUND WATER OBSERVATIONS AND REMARKS; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
0.0	SURFACE ELEVATION 220.05				220	
	ROAD GRANULARS: 150 mm granular base, 250 mm granular subbase, moist	1A / 1B	GS	--		Stick-up casing
0.40 / 219.65	FILL: Brown, sand and gravel, trace silt, moist					Bentonite seal
0.90 / 219.15	SANDY SILT TILL: Compact to very dense, grey, sandy silt, trace to some clay, some gravel, cobbles and boulders, moist to wet					GP Test Completed
1.0		2	SS	13	219	Filter sand
		3	SS	19		
2.0					218	50 mm slotted pipe
		4	SS	58		
3.0					217	First water strike 3.0 m
		5	SS	83		
3.6 / 216.5	BOREHOLE TERMINATED AT 3.6 m					Upon completion of augering Water at 2.7 m Cave at 2.9 m
4.0						
5.0						

Water Level Readings:

Date	Depth	Elev.
2021-05-17	0.8	219.3
2021-07-21	0.9	219.2

NOTES

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LOG OF BOREHOLE NO. 4

17T 616988E 4909630N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

SURFACE ELEVATION 219.40

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	WATER CONTENT (%)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS
0.07 / 219.33	TOPSOIL: Black, silty sand, trace gravel, moist							
	FILL: Brown, sand, some gravel, trace silt, moist to wet	1	SS	4	219			GP Test Completed
0.70 / 218.70	PEAT: Very loose, black, amorphic peat, wood pieces, very moist	2	SS	2	218	292		
1.5 / 217.9	BOREHOLE TERMINATED AT 1.5 m							Upon completion of augering Water at 1.5 m No cave

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q — 50 100 150 200
DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ● — 20 40 60 80
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30 40
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

NOTES

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LOG OF BOREHOLE/MONITORING WELL NO. 5

17T 616766E 4909597N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	WATER CONTENT (%)	GROUND WATER OBSERVATIONS AND REMARKS
0.0	SURFACE ELEVATION 219.95					
	SHOULDER GRANULAR: 400 m granular, moist	1	SS	3	~10	Stick-up casing
0.40 / 219.55	PEAT: Very loose, black, amorphic peat, wood pieces, very moist to wet	2	SS	3	92	Bentonite seal; Filter sand
		3	SS	1	~17	First water strike 1.6 m
2.1 / 217.9	SAND: Compact, brown to grey, sand, some gravel, trace to some silt, very moist to wet	4	SS	17	~24	50 mm slotted pipe
2.9 / 217.1	SILTY SAND: Loose, grey, silty sand, wet	5	SS	5	~24	
3.6 / 216.4	BOREHOLE TERMINATED AT 3.6 m					Upon completion of augering Water at 1.8 m No cave

Water Level Readings:

Date	Depth	Elev.
2021-05-17	0.7	219.3
2021-07-21	0.7	219.3

Chart legend: SHEAR STRENGTH (kPa): + FIELD VANE, △ TORVANE, ○ Qu, ▲ POCKET PENETROMETER, ● Q (50, 100, 150, 200); DYNAMIC CONE PENETRATION ×, STANDARD PENETRATION TEST ● (20, 40, 60, 80); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40); UNIT WEIGHT kN/m³; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL. Elevation scale: 219, 218, 217.

NOTES

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LOG OF BOREHOLE/MONITORING WELL NO. 6

17T 616813E 4909625N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

SURFACE ELEVATION 219.75

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	WATER CONTENT (%)	GROUND WATER OBSERVATIONS AND REMARKS
0.10 / 219.65	TOPSOIL: Black, silty sand, trace gravel, moist					Stick-up casing
	FILL: Loose, black, silty sand, trace gravel, moist to wet	1	SS	5	~5	Bentonite seal
		2	SS	10	~11	Filter sand
		3	SS	5	~20	First water strike at 1.5 m
		4	SS	9	~22	50 mm slotted pipe
2.7 / 217.1	SILTY SAND: Loose, brown, silty sand, wet					
3.2 / 216.6	CLAY: Firm, grey, clay, trace sand, trace silt, trace gravel, APL to WTPL	5	SS	6	~26	
3.6 / 216.2	BOREHOLE TERMINATED AT 3.6 m					Upon completion of augering Water at 1.5 m Cave at 0.9 m

Water Level Readings:

Date	Depth	Elev.
2021-05-17	0.9	218.9
2021-07-21	0.7	219.1

Chart legend: SHEAR STRENGTH (kPa): + FIELD VANE, △ TORVANE, ○ Qu, ▲ POCKET PENETROMETER, O Q (50, 100, 150, 200); DYNAMIC CONE PENETRATION ×, STANDARD PENETRATION TEST ● (20, 40, 60, 80); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40); UNIT WEIGHT kN/m³; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL. Elevation scale: 219, 218, 217. Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0.

NOTES

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LOG OF BOREHOLE/MONITORING WELL NO. 7

17T 617046E 4909623N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

SURFACE ELEVATION 219.40

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	NATURAL MOISTURE CONTENT	GROUND WATER OBSERVATIONS AND REMARKS
0.0	ROAD GRANULARS: 100 mm granular base, 150 mm granular subbase, moist	1A[1]	GS			Stick-up casing
0.25 / 219.15	FILL: Brown, sand, trace to some gravel, moist to wet	1B[1]	GS			Bentonite seal
		2	SS	6		Filter sand
1.2 / 218.2	PEAT: Very loose to loose, black, amorphic peat, wood pieces, very moist to wet					First water strike at 1.3 m
1.6 / 217.8	SILTY SAND: Very loose, grey, silty sand, trace gravel, wet	3	SS	2	~24	
2.1 / 217.3	CLAY: Soft to firm, grey, clay, trace silt, trace sand, APL to WTPL	4	SS	8	~21	50 mm slotted pipe
		5	SS	3	~16	
3.6 / 215.8	BOREHOLE TERMINATED AT 3.6 m					Upon completion of augering Water at 1.3 m Cave at 0.6 m

Water Level Readings:

Date	Depth	Elev.
2021-05-17	0.5	218.9
2021-07-21	0.5	218.9

Column headings: SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ● Q (50, 100, 150, 200); DYNAMIC CONE PENETRATION ×; STANDARD PENETRATION TEST ● (20, 40, 60, 80); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40); UNIT WEIGHT kN/m³; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL; ELEVATION SCALE 219, 218, 217, 216; STRAT PLOT.

NOTES

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LOG OF BOREHOLE NO. 8

17T 617120E 4909611N

PROJECT Hydrogeological Investigation - Various Roads
LOCATION Town of Innisfil, ON
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE April 27, 2021
PML REF. 21BX005
ENGINEER AK
TECHNICIAN NG

SHEAR STRENGTH (kPa): + FIELD VANE, △ TORVANE, ○ Qu, ▲ POCKET PENETROMETER, **O** Q (50, 100, 150, 200)
DYNAMIC CONE PENETRATION ×, STANDARD PENETRATION TEST ● (20, 40, 60, 80)
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30, 40)

DEPTH / ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	SPT / Water content	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 219.45								
0.0	ROAD GRANULARS: 150 mm granular base, 250 mm granular subbase, moist		1A	GS					
			1B	GS					
0.40 / 219.05	FILL: Loose, brown, sand, trace to some gravel, trace silt, moist					219			GP Test Completed
			2	SS	8				
1.5 / 218.0	BOREHOLE TERMINATED AT 1.5 m					218			Upon completion of augering No water No cave

NOTES

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LOG OF BOREHOLE NO. 9

17T 616576E 4909530N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN NG

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	NATURAL MOISTURE CONTENT (%)	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 221.60					
0.05 / 221.55	TOPSOIL: Black, silty sand, trace gravel, moist					
	FILL: Brown, sand and gravel, trace silt, very moist	1	GS	7	~10	First strike water at 0.7 m GP Test Completed
0.90 / 220.70	SAND AND GRAVEL: Compact, brown, sand and gravel, trace silt, wet	2	SS	12	~20	
1.5 / 220.1	BOREHOLE TERMINATED AT 1.5 m					Upon completion of augering Water at 0.9 m No cave

Column headings: SOIL PROFILE; STRAT PLOT; SAMPLES; ELEVATION SCALE (221); SHEAR STRENGTH (kPa): +FIELD VANE △TORVANE ○Qu ▲POCKET PENETROMETER ●Q, 50 100 150 200; DYNAMIC CONE PENETRATION ×, STANDARD PENETRATION TEST ●, 20 40 60 80; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30 40; UNIT WEIGHT kN/m³; GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

NOTES

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LOG OF BOREHOLE NO. 10

17T 616712E 4909582N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN NG

SHEAR STRENGTH (kPa): + FIELD VANE, △ TORVANE, ○ Qu, ▲ POCKET PENETROMETER, ● Q (scale 50, 100, 150, 200)
DYNAMIC CONE PENETRATION ×; STANDARD PENETRATION TEST ● (scale 20, 40, 60, 80)
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (scale 10, 20, 30, 40)

DEPTH / ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.0	SURFACE ELEVATION 219.75							
	TOPSOIL/PEAT: Very loose, black, peat/topsoil, trace gravel, wood pieces, very moist							
0.25 / 219.50	SAND: Very loose to compact, grey, sand, some silt, wet		1	SS	1		156	GP Test Completed
						219		First strike water at 0.8 m
1.0			2	SS	15			
1.5 / 218.3	BOREHOLE TERMINATED AT 1.5 m							Upon completion of augering Water at 0.6 m No cave

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

NOTES

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LOG OF TEST PIT NO. 11

17T 617082E 4909593N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
EXCAVATION METHOD Hand Dug
TECHNICIAN NG

DEPTH / ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	SHEAR STRENGTH (kPa) / DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT — WATER CONTENT (%)	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 219.65									
	ROAD GRANULAR: 150 mm of granular base, 150 mm of granular subbase, moist		1A	GS	--					
0.30			1B							
219.25	FILL: Brown, sand and gravel, trace silt, moist		2	GS	--					
	HAND DUG TEST PIT COMPLETED TO 0.4 m									Upon completion of hand digging No water No cave

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

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LOG OF TEST PIT NO. 12

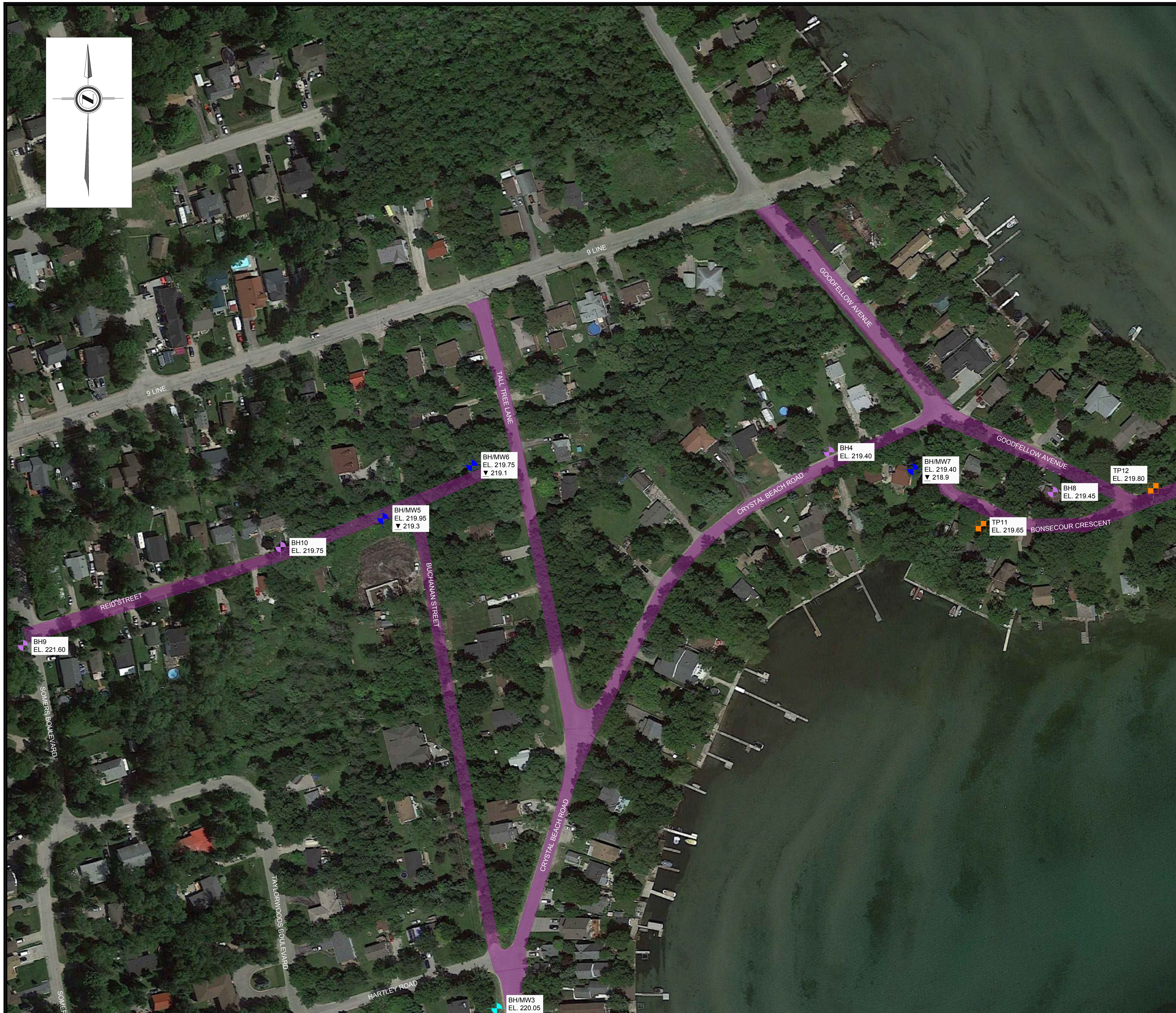
17T 617173E 4909613N

PROJECT Hydrogeological Investigation - Various Roads
PML REF. 21BX005
LOCATION Town of Innisfil, ON
BORING DATE April 27, 2021
ENGINEER AK
EXCAVATION METHOD Hand Dug
TECHNICIAN NG

SOIL PROFILE			SAMPLES			ELEVATION SCALE	SHEAR STRENGTH (kPa) +FIELD VANE △TORVANE ○ Qu ▲POCKET PENETROMETER ● Q 50 100 150 200 / DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ● 20 40 60 80	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L / WATER CONTENT (%) 10 20 30 40	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
DEPTH / ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES					
	SURFACE ELEVATION 219.80									
	ROAD GRANULAR: 150 mm of granular base, 50 mm of granular subbase, moist		1A	GS	--					
0.20			1B							
	FILL: Brown, sand and gravel, trace silt		2	GS	--					
219.50	HAND DUG TEST PIT COMPLETED TO 0.3 m									Upon completion of hand digging No water No cave

Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

NOTES



KEY PLAN
INNISFIL, ONTARIO

LEGEND:

BH/MW7 EL. 219.40 ▼ 218.9	BOREHOLE/MONITORING WELL LOCATION SURFACE ELEVATION GROUND WATER ELEVATION (2021-07-21)
BH/MW3 EL. 220.05 ▼ 219.2	BOREHOLE/MONITORING WELL LOCATION (GP TESTING) SURFACE ELEVATION GROUND WATER ELEVATION (2021-07-21)
BH2 EL. 219.45	BOREHOLE LOCATION SURFACE ELEVATION
BH8 EL. 219.45	BOREHOLE LOCATION (GP TESTING) SURFACE ELEVATION
TP11 EL. 219.65	TEST PIT SURFACE ELEVATION

0m 25 50 75 100 150

SCALE
(1:2000)

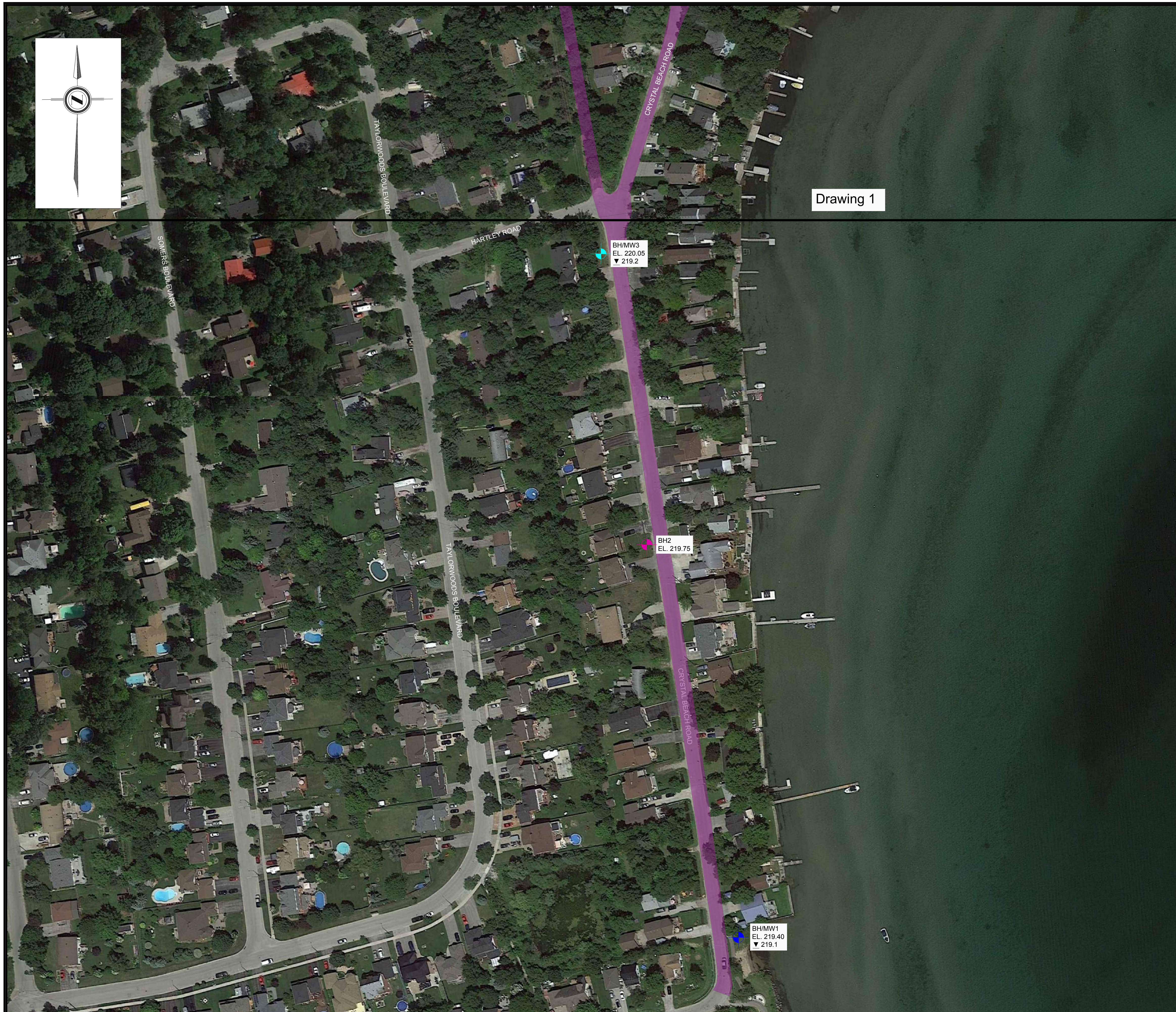
BOREHOLE/TEST PIT LOCATION PLAN (NORTH)

HYDROGEOLOGICAL INVESTIGATION
VARIOUS LOCATIONS
TOWN OF INNISFIL, ONTARIO

TOWN OF INNISFIL

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	FH	DATE	SCALE	PML REF.	DRAWING NO.
CHECKED	AK	AUG 2021	AS SHOWN	21BX005	1
APPROVED	AK				



KEY PLAN
INNISFIL, ONTARIO

LEGEND:

BH/MW7 EL. 219.40 ▼ 218.9	BOREHOLE/MONITORING WELL LOCATION SURFACE ELEVATION GROUND WATER ELEVATION (2021-07-21)
BH/MW3 EL. 220.05 ▼ 219.2	BOREHOLE/MONITORING WELL LOCATION (GP TESTING) SURFACE ELEVATION GROUND WATER ELEVATION (2021-07-21)
BH2 EL. 219.45	BOREHOLE LOCATION SURFACE ELEVATION
BH8 EL. 219.45	BOREHOLE LOCATION (GP TESTING) SURFACE ELEVATION
TP11 EL. 219.65	TEST PIT SURFACE ELEVATION

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SCALE
(1:2000)

BOREHOLE/TEST PIT LOCATION PLAN (SOUTH)

HYDROGEOLOGICAL INVESTIGATION
VARIOUS LOCATIONS
TOWN OF INNISFIL, ONTARIO

TOWN OF INNISFIL

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	FH	DATE	SCALE	PML REF.	DRAWING NO.
CHECKED	AK	AUG 2021	AS SHOWN	21BX005	2
APPROVED	AK				

Appendix I: Archaeological Assessment Report

Stage 1 and 2 Archaeological Assessment for Various Roads Drainage Improvement Program, Part of Lot 27, Concession 8, Former Township of Innisfil, County of Simcoe, Now in the Town of Innisfil, Ontario

Prepared by

S & G

Archaeological Consulting

Licensee: Dr. Helen R. Haines
Archaeological Consulting Licence P124
Project Information Number P124-0070-2021

ORIGINAL Report
Dated: August 19, 2021

EXECUTIVE SUMMARY

AS&G Archaeological Consulting was contracted to conduct a Stage 1 and 2 Archaeological Assessment for Various Roads Drainage Improvement Program, Part of Lot 27, Concession 8, Former Township of Innisfil, County of Simcoe, Now in the Town of Innisfil, Ontario. The development project was triggered by the Environmental Assessment Act. The archaeological assessment was done in advance of a proposed development within the property.

A Stage 1 background study of the subject property was conducted to provide information about the property's geography, history, previous archaeological fieldwork and current land condition in order to evaluate and document in detail the property's archaeological potential and to recommend appropriate strategies for Stage 2 survey. A Stage 2 property assessment was conducted to document all archaeological resources on the property, to determine whether the property contains archaeological resources requiring further assessment, and to recommend next steps. The characteristics of the property dictated that the Stage 2 survey be conducted by a test pit survey strategy.

The Stage 1 background study found that the subject property exhibits potential for the recovery of archaeological resources of cultural heritage value and concluded that the property requires a Stage 2 assessment. The Stage 2 property assessment, which consisted of a systematic and judgmental test pit survey, did not result in the identification of archaeological resources.

The Stage 1 background study concluded that the property exhibits archaeological potential. The Stage 2 property assessment did not identify any archaeological resources within the subject property. **The report recommends that no further archaeological assessment of the property is required**.

TABLE OF CONTENTS

PROJECT PERSONNEL

Project Manager:	Dr. Helen R. Haines (P124)
Project Director:	Mr. Norbert Stanchly (R149)
Field Director:	Mr. Norbert Stanchly
Field Archaeologists:	Ms. Jacqueline McCowan
Report Preparation:	Mr. Norbert Stanchly
Graphics:	Mr. Norbert Stanchly

INTRODUCTION

The *Ontario Heritage Act*, R.S.O. 1990 c. O.18, requires anyone wishing to carry out archaeological fieldwork in Ontario to have a license from the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI). All licensees are to file a report with the MHSTCI containing details of the fieldwork that has been done for each project. Following standards and guidelines set out by the MHSTCI is a condition of a licence to conduct archaeological fieldwork in Ontario. **AS&G Archaeological Consulting** confirms that this report meets ministry report requirements as set out in the *2011 Standards and Guidelines for Consultant Archaeologists* and is filed in fulfillment of the terms and conditions an archaeological license.

1.0 PROJECT CONTEXT (Section 7.5.5)

This section of the report will provide the context for the archaeological fieldwork, including the development context, the historical context, and the archaeological context.

1.1 Development Context (Section 7.5.6, Standards 1-3)

AS&G Archaeological Consulting was contracted to conduct a Stage 1 and 2 Archaeological Assessment for Various Roads Drainage Improvement Program, Part of Lot 27, Concession 8, Former Township of Innisfil, County of Simcoe, Now in the Town of Innisfil, Ontario. The development project was triggered by the Environmental Assessment Act. The archaeological assessment was done in advance of a proposed development within the property.

The development project was triggered by the Environmental Assessment Act. The archaeological assessment was done as part of a Class EA in advance of proposed development within the subject property. This Class EA Study is being conducted in accordance with Schedule ‘B’ of the Municipal Class Environmental Assessment document. The Town of Innisfil proposes to replace the culvert and install a sediment barrier at the Roberts Road Outlet, located where Roberts Road merges into Crystal Beach Road. This report deals only with the archaeological assessment of the area of the proposed culvert replacement which measures approximately 25 metres east west and approximately 2 metres in width.

Permission to access the study area to conduct all required archaeological fieldwork activities, including the recovery of artifacts was given by the landowner and their representative.

1.2 Historical Context (Section 7.5.7, Standards 1-2)

In advance of the Stage 2 assessment, a Stage 1 background study of the subject property was conducted in order to document the property's archaeological and land use history and present condition. Several sources were referenced to determine if features or characteristics indicating archaeological potential for pre-contact and post-contact resources exist.

Characteristics indicating archaeological potential include the near-by presence of previously identified archaeological sites, primary and secondary water sources, features indicating past water sources, accessible or inaccessible shoreline, pockets of well-drained sandy soil, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases, resource areas, (including food or medicinal plants, scarce raw materials, early Euro-Canadian industry), areas of early Euro-Canadian settlement, early historical transportation routes, property listed on a municipal register or designated under the *Ontario Heritage Act* or that is a federal, provincial or municipal historic landmark or site, and property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations.

Archaeological potential can be determined not to be present for either the entire property or a part of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This is commonly referred to as 'disturbed' or 'disturbance', and may include: quarrying, major landscaping involving grading below topsoil, building footprints, and sewage and infrastructure development. Archaeological potential is not removed where there is documented potential for deeply buried intact archaeological resources beneath land alterations, or where it cannot be clearly demonstrated through background research and property inspection that there has been complete and intensive disturbance of an area. Where complete disturbance cannot be demonstrated in Stage 1, it will be necessary to undertake Stage 2 assessment.

The background study determined that the following features or characteristics indicate archaeological potential for the subject property:

- The subject property is located adjacent to a primary water source, i.e. Lake Simcoe.
- The study area is located within the "Lake Simcoe Basin" of the Simcoe Lowlands physiographic regions of Southern Ontario. On the northern and western shores of Lake Simcoe, the lowland consists of a narrow bouldery terrace for the most part confirmed by a low bluff cut by the highest stage of Lake Algonquin Basin. Extensive areas of bogs and wet sand permeate the basin, thus making the area attractive for settlement.

Pre-contact Period

The Precontact period began with the arrival of nomadic peoples with the gradual retreat of the glaciers approximately 12,000 years ago (Karrow and Warner 1990). Between 12,000 and 10,000 years before present, the Palaeoindian period was characterized by people that lived in small family groups, subsisting on large game and other fauna associated with the cooler environments of the period (Ellis and Deller 1990).

Archaic Period (10,000 - 2800 BP) - As the climate in southern Ontario warmed, Aboriginal populations adapted to these new environments. New technologies and subsistence strategies were introduced and developed. Woodworking implements such as groundstone axes, adzes and gouges began to appear, as did net-sinkers (for fishing), numerous types of spear points and items made from native copper, which was mined from the Lake Superior region. The presence of native copper on archaeological sites in southern Ontario and adjacent areas suggests that Archaic groups were involved in long range exchange and interaction. The trade networks established at this time were to persist between Aboriginal groups until European contact. Archaic peoples became seasonal hunters and gatherers to exploit seasonably available resources in differing geographic areas. As the seasons changed, these bands split into smaller groups and moved inland to exploit other resources that were available during the fall and winter such as deer, rabbit, squirrel and bear, which thrived in the forested margins of these areas (Ellis et al. 1990).

The Woodland Period (2800 BP to AD 750) saw the gradual establishment of technological and social changes, especially the appearance of clay pots (Spence et al. 1990). Population increases also led to the establishment of larger camps and villages with more permanent structures. Elaborate burial rituals and the interment of numerous exotic grave goods with the deceased began to take place. Increased trade and interaction between southern Ontario populations and groups as far away as the Atlantic coast and the Ohio Valley was also taking place. The Late Woodland period is marked by the introduction of maize to Southern Ontario, ca. AD 700. With the development of horticulture as the predominant subsistence base, the Late Woodland Period gave rise to a tremendous population increase and the establishment of permanent villages. Social changes were also taking place and distinct clustering of both longhouses within villages (clan development) and villages within a region (tribal development). The Late Woodland groups that inhabited the Toronto area eventually moved their villages northward toward Georgian Bay. It was these and other groups in southwest Ontario that eventually evolved into the Aboriginal nations who interacted with and were described by French missionaries and explorers during the early seventeenth century (Williamson 2013).

Post-contact History of Simcoe County and Township of Innisfil

Historically, the study area is located in part of Lot 27, Concession 8 in the former Township of Innisfil, County of Simcoe. The 1881 Illustrated Atlas of Simcoe County, Townhip of Innisfil, does not depict any structures within Lot 27, Concession 8.

In the seventeenth century Simcoe County was home to the Huron. With the arrival of French priests and Jesuits, missions were established near Georgian Bay. After the destruction of the missions by the Iroquois and the British, Algonquin speaking peoples occupied the area. After the war of 1812, the government began to invest in the military defences of Upper Canada, through the extension of Simcoe's Yonge Street from Lake Simcoe to Penetanguishene on Georgian Bay (Garbutt 2010).

The Township of Innisfil was surveyed in 1820 and contained 68,653 acres of rolling terrain and mostly clay loam soils (Belden, 1881, p. 14). Immediately after the survey, the Hewson family arrived in the Township of Innisfil on the point of land at the entrance to Kempenfeldt Bay, then called Hewson's Point (Belden, 1881, p.14). Before 1830, few dwellings had taken up farms, but the few that had, ventured out to the Township of Innisfil and, took up land around what is now called Hewson's Point (Belden, 1881, p.14; Hunter, 1909b, p.53). By 1850, 1,887 individuals resided within the Township of Innisfil and the township had one grist, five sawmills and cultivated acreage that exceeded fifty percent (Smith, 1851, pp.53-54; Belden, 1881, p.14). Agriculture is the main industry within the Township of Innisfil with a "considerable amount of lumbering done within its borders" (Belden, 1881, p.14).

The background research demonstrates that the study area has been occupied by Aboriginal peoples for thousands of years and is located on the territory of the (ancestral) Huron-Wendat. The background research and historic mapping also demonstrates that the study area is located in the Former Township of Innisfil, County of Simcoe. Nineteenth century mapping indicates that the study area includes historical transportation routes.

In summary, the Stage 1 background study indicates that there is potential for the recovery of pre-contact and post-contact Euro-Canadian archaeological resources within the subject property. As it cannot be clearly demonstrated through the background study that there has been complete and intensive disturbance of the area, archaeological potential is not removed.

1.3 Archaeological Context (Section 7.5.8, Standards 1-7)

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (O.A.S.D.), an inventory of the documented archaeological record in Ontario.

Summary information on the known archaeological sites in the vicinity of the study area was obtained from the MHSTCI site database. There are no known archaeological sites located within the study area limits, nor are there any known archaeological sites within a one-kilometre radius of the subject property.

The subject property consists of an existing culvert, roadway, gravel and grassed areas adjacent to the roadway, as well as cobble beach adjacent to Lake Simcoe. The study area is approximately 50 square metres in size.

The study area is located within the "Lake Simcoe Basin" of the Simcoe Lowlands physiographic regions of Southern Ontario. On the northern and western shores of Lake Simcoe, the lowland consists of a narrow bouldery terrace for the most part confirmed by a low bluff cut by the highest stage of Lake Algonquin. On the south and east shores of Lake Simcoe are broader plains. Overall, the Lake Simcoe basin is a poorer farm district than the Nottawasaga Basin (located on the west side of Lake Simcoe). Extensive areas of bogs and wet sand permeate the basin, but these soils may become useful as population grows, since both can be drained and developed for vegetables, like the Holland Marsh (Chapman & Putnam, 1984, pp.181-182).

The archaeological fieldwork of the subject property was undertaken on July 10, 2021, under partly cloudy skies and warm temperatures.

AS&G Archaeological Consulting is not aware of any other previous archaeological fieldwork carried out immediately adjacent to the study area.

We are unaware of any previous findings and recommendations relevant to the current stage of work with the exception of those discussed above.

There are no unusual physical features that may have affected fieldwork strategy decisions or the identification of artifacts or cultural features.

There is no additional archaeological information that may be relevant to understanding the choice of fieldwork techniques or the recommendations of this report.

2.0 FIELD METHODS (Section 7.8.1, Standards 1-3)

This section of the report addresses Section 7.8.1 of the 2011 Standards and Guidelines for Consultant Archaeologists. It does not address Section 7.7.2 because no property inspection was done as a separate Stage 1.

The entire project area was surveyed with the exception of areas identified as visibly disturbed.

As relevant, we provide detailed and explicit descriptions addressing Standards 2a and b.

The general standards for property survey under Section 2.1 of the 2011 Standards and Guidelines for Consultant Archaeologists were addressed as follows:

- Section 2.1, S1 – All of the subject property was surveyed including lands immediately adjacent to built structures within the property, as applicable.
- Section 2.1, S2a (land of no or low potential due to physical features such as permanently wet areas, exposed bedrock, and steep slopes) – n/a
- Section 2.1, S2b (no or low potential due to extensive and deep land alterations) – There are areas of clear extensive and deep disturbance including the existing roadway and previous culvert construction leading into Lake Simcoe.
- Section 2.1, S2c (lands recommended not to require Stage 2 assessment by a previous Stage 1 report where the ministry has accepted that Stage 1 into the register) - n/a
- Section 2.1, S2d (lands designated for forest management activity w/o potential for impacts to archaeological sites, as determined through Stage 1 forest management plans process) - n/a
- Section 2.1, S2e (lands formally prohibited from alterations) - n/a
- Section 2.1, S2f (lands confirmed to be transferred to a public land holding body, etc.) - n/a
- Section 2.1, S3 - The Stage 2 survey was conducted when weather and lighting conditions permitted excellent visibility of features.
- Section 2.1, S4 - No GPS recordings were taken as no artifacts were found during the Stage 2 assessment.
- Section 2.1, S5 - All field activities were mapped in reference to either fixed landmarks, survey stakes and development markers as appropriate. See report section *9.0 Maps*.
- Section 2.1, S6 - See report section *8.0 Images* for photo documentation of examples of field conditions encountered.

The subject property was subject to a judgmental test pit survey appropriate to the characteristics of the property. Disturbance was noted in each test pit excavated. Disturbance consisted of gravel fill and is associated with the original construction of the culvert. Test pits could not be excavated to subsoil due to the disturbance.

The test pit survey of the property followed the standards within Section 2.1.2 of the *2011 Standards and Guidelines for Consultant Archaeologists*. Test pit survey was only conducted where ploughing was not possible or viable, as per Standard 1. Test pits were judgmentally spaced at maximum intervals of 10 metres throughout the subject property identified as having archaeological potential. All test pits were at least 30 cm in diameter. Each test pit was excavated by hand and examined for stratigraphy, cultural features, or evidence of fill. No stratigraphy or cultural features were noted. Soils were screened through 6mm mesh. No artifacts were encountered. All test pits were backfilled.

All areas of the subject property were judgmentally surveyed with the exception of those exemptions listed above.

Approximately 40% of the property was surveyed by judgmental test pit survey. Approximately 50% of the property was visibly disturbed and consisted of the roadway and ditching/culvert. The remaining 10% consists of the cobble beach fronting onto Lake Simcoe which was assessment as wet and low with no potential.

3.0 RECORD OF FINDS (Section 7.8.2, Standards 1-3)

This section documents all finds discovered as a result of the Stage 1 and 2 archaeological assessment of the subject property.

No archaeological resources or sites were identified in the Stage 2.

An inventory of the documentary record generated in the field is provided in Table 1.

Table 1: Inventory of Documentary Record

Document Type	Description
Field Notes	• This report constitutes the field notes for this project
Photographs	• 9 digital photographs
Maps	• The report figures represent all of the maps generated in the field.

Information detailing exact site locations on the property is not submitted because no sites or archaeological resources were identified in the Stage 2 assessment.

4.0 ANALYSIS AND CONCLUSIONS (Section 7.8.3, Standards 1-2)

No archaeological sites were identified. Standard 2 is not addressed because no sites were identified.

5.0 RECOMMENDATIONS (Section 7.8.4, Standards 1-3)

The report makes recommendations only regarding archaeological matters.

The Stage 2 archaeological assessment did not identify any archaeological sites requiring further assessment or mitigation of impacts and **it is recommended that no further archaeological assessment of the property be required.**

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION (Section 7.5.9, Standards 1-2)

Section 7.5.9, Standard 1a
This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

Section 7.5.9, Standard 1b
It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Section 7.5.9, Standard 1c
Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

Section 7.5.9, Standard 1d
The *Cemeteries Act*, R.S.O, 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Section 7.5.9, Standard 2
Not applicable

7.0 BIBLIOGRAPHY AND SOURCES (Section 7.5.10, Standards 1)

Belden, H. & Co.
1881 Simcoe Supplement in Illustrated Atlas of the Dominion of Canada. Toronto.

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Ellis, C.J., Kenyon, I.T., and Spence, M.W.
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1871 Hogg's Map of the County of Simcoe. Collingwood, Ontario.

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1990 The Geological and Biological Environment for Human Occupation in Southern Ontario. In C.J. Ellis, and N. Ferris (Eds.). The Archaeology of Southern Ontario to A.D. 1650. London, Ontario: Occasional Publication of the London Chapter, OAS, pp. 5-35.

Ministry of Tourism and Culture
2011 Standards and Guidelines for Consultant Archaeologists.

Spence, M.W., Pihl, R.H., and Murphy, C.R.
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Williamson, R.F.
2013 The Woodland Period, 900 BCE to 1700 CE. In Munson, M.K. and Jamieson, S.M (Eds.) Before Archaeology: The Archaeology of a Province. Montreal & Kingston, Ontario: McGill Queen's University Press.

8.0 IMAGES (Sections 7.5.11, 7.7.5, 7.8.6)

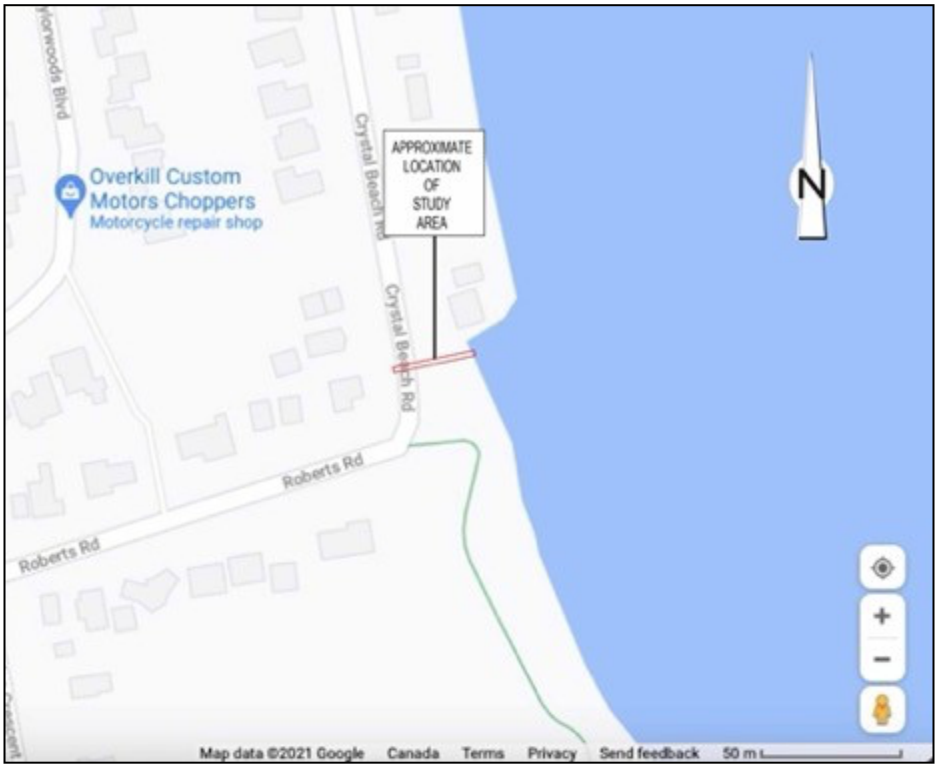
Image 1: Shows disturbed areas at Roberts Road Outlet.

Image 2: Shows disturbed areas at Roberts Road Outlet.

Image 3: Shows close up of area subject to test pit survey and found to be disturbed at Roberts Road Outlet.

Image 4: Close up showing disturbed soils at Tall Tree Lane Outlet.

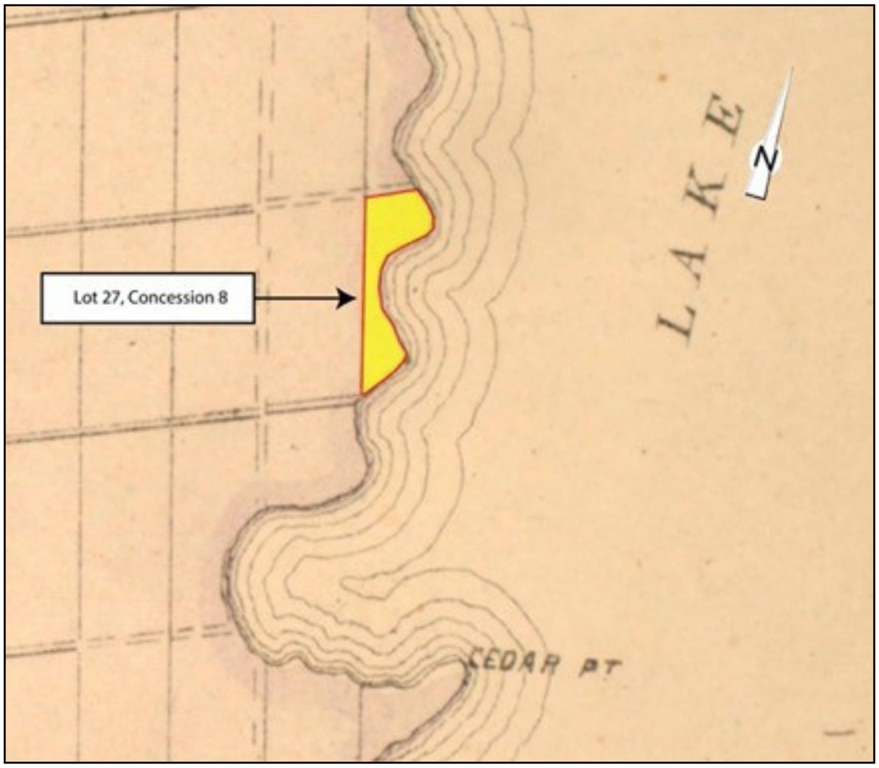
9.0 MAPS (Section 7.5.12, 7.7.6, 7.8.7)



Map 1: Shows general location property.

Map 2: Location of the Property overlaid on recent aerial imagery (after Google Earth).

Map 3: Lot 27, Concession 8 (outlined in red) as depicted on the 1871 Hogg's Map of the County of Simcoe.



Map 4: Shows lot 27, Concession 8 Township of Innisfil as depicted in the 1881 Illustrated Historical Atlas of Simcoe County. Note that no structures are depicted within the lot. Not to scale.

Map 5: Development mapping provided by proponent.

Map 6: Results of the Stage 2 land based archaeological assessment of the Roberts Road Outlet.

IRVIN HERITAGE INC.

Marine Archaeological Assessment
Various Roads Drainage Improvement Program
Town of Innisfil
Roberts Road Outlet

Town of Innisfil
County of Simcoe
Historic Township of Innisfil
Historic County of Simcoe

November 17, 2021
Prepared for: The Proponent
Prepared by: Irvin Heritage Inc.
Archaeological Licensee: Thomas Irvin, P379
Marine Archaeological Permit: 2021-03
Version: Original

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EXECUTIVE SUMMARY

Irvin Heritage Inc. was retained by AS&G Archaeological consulting to conducted a Marine Archaeological Survey in support of their clients the installation of a sediment barrier related to the replacement of existing stormwater culverts which drain into Lake Simcoe.

The areas of the proposed sediment barrier, plus an additional buffer area, was subject to a 1 m transect visual/snorkel survey. No archaeological resources were identified.

Given the results and conclusions of the completed survey, the following recommendations are made:

- It is the professional opinion of the archaeological licensee, Thomas Irvin (P379) that the balance of the Study Area has been sufficiently assessed and is free of further archaeological concern.

- Notwithstanding the above recommendations, the provided Advice On Compliance With Legislation shall take precedent over any recommendations of this report should deeply buried archaeological resources or human remains be found during any future earthworks within the Study Area.

Project Personnel

Professional Licensee & Project Manager: Thomas Irvin, MA (P379)

Field Director(s): Thomas Irvin, MA (P379)

In-Water Safety Monitor: Diego Iminez

Report Author(s): Thomas Irvin, MA (P379)
Michelle Pandith, BA

GIS & Graphics: Michelle Pandith, BA

1. ASSESSMENT CONTEXT

1.1. Development Context

Irvin Heritage Inc. was retained by AS&G Archaeological consulting to conducted a Marine Archaeological Survey in support of their clients installation of sediment barriers related to the replacement of existing stormwater culverts which drain into Lake Simcoe (Map 1). The requirement for such an assessment was triggered by the related Class EA under the Environmental Assessment Act.

1.2. Environmental Setting

The Marine Archaeological Survey Area is roughly rectangular, approximately 128 square meters in size (given the small size of the Study Area, providing the site area in Ha would have been impractical) (Map 2).

2. HISTORICAL CONTEXT

2.1. General History

The Marine Archaeological Survey Area is directly adjacent or within the boundary of Treaty 18, known as the Nottawasaga Purchase. This treaty was signed on October 17, 1818 by representatives of the Crown and certain Anishinaabe peoples (MIA 2021). The treaty is additionally known as the Lake Simcoe- Nottawasaga Treaty and was the first of three treaties signed between October and November of 1818 (MIA 2021).

The Study Area is north of the Euro-Canadian settlement of Belle Ewart. The settlement was named after James Bell Ewart who, while a resident of the town of Dundas, owned land in the area and laid out village lots in 1853 (Rayburn 1997). The settlement quickly became an important port related to the transfer of lumber to Toronto via the Northern Railway (Mika 1977). However, a devastating fire which destroyed the sawmills, this compounded with a lack of lumber, resulted in the port closing. At the height of production the town boasted two churches, two hotels and three general stores (Mika 1977).

2.2. Study Area History

A review of historical resources resulted in the following data relevant to the Study Area:

Map 4: 1871 Map of the County of Simcoe (Hogg 1871)

The Marine Archaeological Survey area is situated adjacent to Lot 27, Concession 8 which has no listed ownership. There are no structures noted within or directly adjacent to the Study Area.

Map 5: 1881 Map of the County of Simcoe (Belden 1881)

The Marine Archaeological Survey area is situated adjacent to Lot 27, Concession 8 which has no listed ownership. There are no structures noted within or directly adjacent to the Study Area.

The following should be noted in regard to the review of historic maps:

- Study Area placement within historic maps is only approximate
- Many historic maps were subscriber based, meaning only individuals who paid a fee would have their property details mapped

3. ARCHAEOLOGICAL CONTEXT

The Study Area is situated within an overall historic landscape that would have been appropriate for both resource procurement and transit by both Indigenous and Euro-Canadian peoples.

3.1. Registered Archaeological Sites

A search of the Ontario Sites Database conducted on July 8, 2021, using a Study Area centroid of 17T E 4908984 N 616913 indicated that there are no registered archaeological sites within a 1 km radius of the Study Area.

3.2. Related and/or Adjacent Archaeological Assessments

No previous archaeological assessment either within or directly adjacent to the Study Area were found.

4. MARINE ARCHAEOLOGICAL SURVEY AREA

The Survey Area was found to be directly adjacent to a public beach, used for both leisure and small launching small watercraft (Image 1). Existing modifications to the shoreline consisted of gabion retaining walls and associated measures used to prevent shoreline erosion (Image 2). The northern limit of the survey consisting of a steel piling wall, abutting existing development.

The Survey Area was found to be relatively shallow, at a roughly maximum depth of .81 m and exhibited exception visibility (Image 4).

The marine assessment consisted of the licensee conducting a visual 1 m transect survey of the Marine Archaeological Survey Area, starting from the shoreline outwards into Lake Simcoe, with a return pass. At times the licensee employed snorkelling to aid in the visual review of the lake bed.

No archaeological resources or cultural features were noted during the assessment.

5. RECOMMENDATIONS

Given the analysis and conclusion of the completed survey, the following recommendations are made:

- It is the professional opinion of the archaeological licensee, Thomas Irvin (P379) that the Study Area has been sufficiently assessed and is free of further archaeological concern.

- Notwithstanding the above recommendations, the provided Advice On Compliance With Legislation shall take precedent over any recommendations of this report should deeply buried archaeological resources or human remains be found during any future earthworks within the Study Area.

6. ADVICE ON COMPLIANCE WITH LEGISLATION

The Standards and Guidelines for Consultant Archaeologists requires that the following standard statements be provided within all archaeological reports for the benefit of the proponent and approval authority in the land use planning and development process (MTC 2011:126):

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the MTCS, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the Ontario Heritage Act.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Service.

7. IMAGES

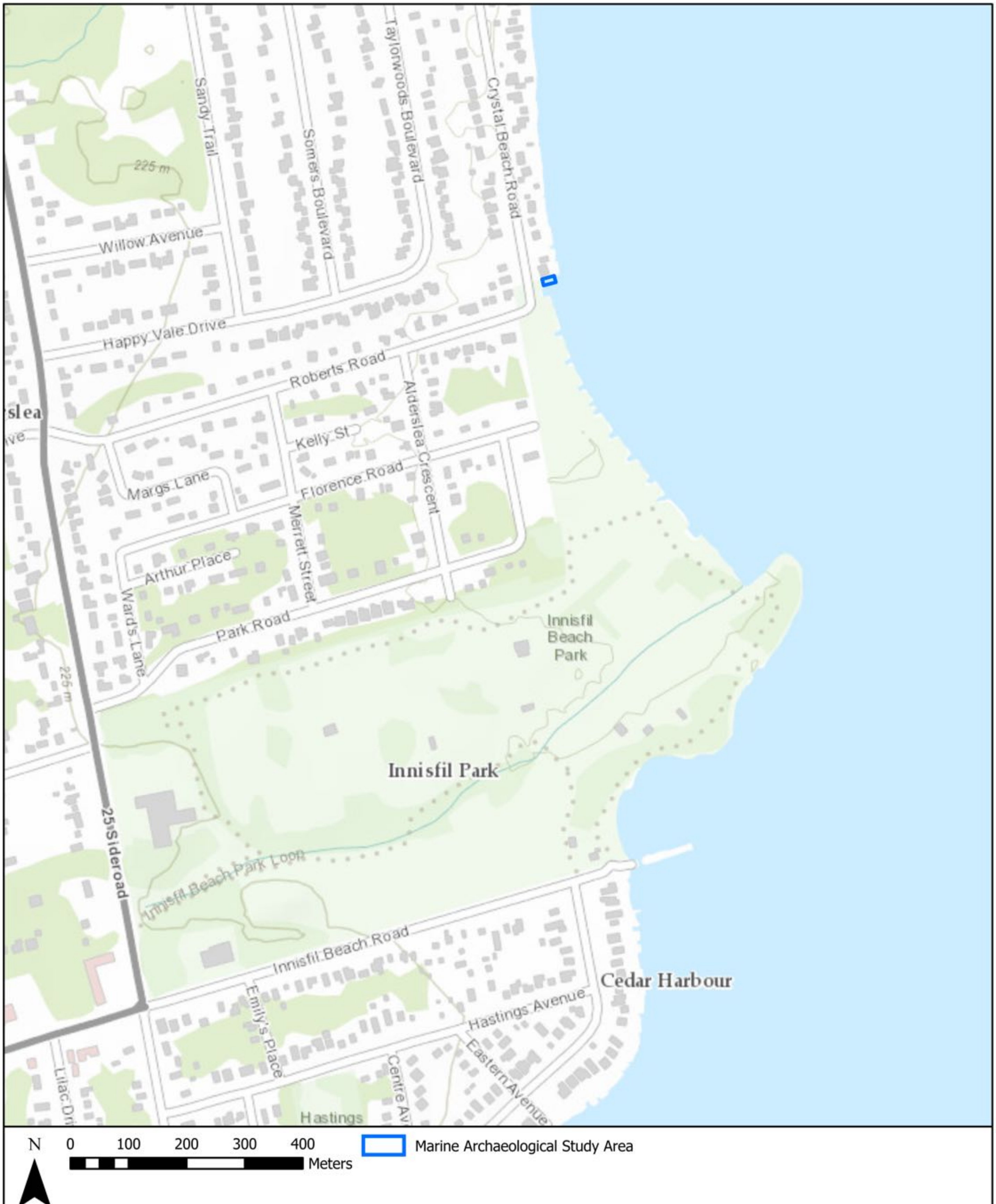
Image 1: View of Marine Survey Area.

Image 2: Existing impacts and gabion wall.

Image 3: Steel piling wall forming the northern limit of the Study Area.

Image 4: Visibility of the water column within the survey area.

8. MAPS

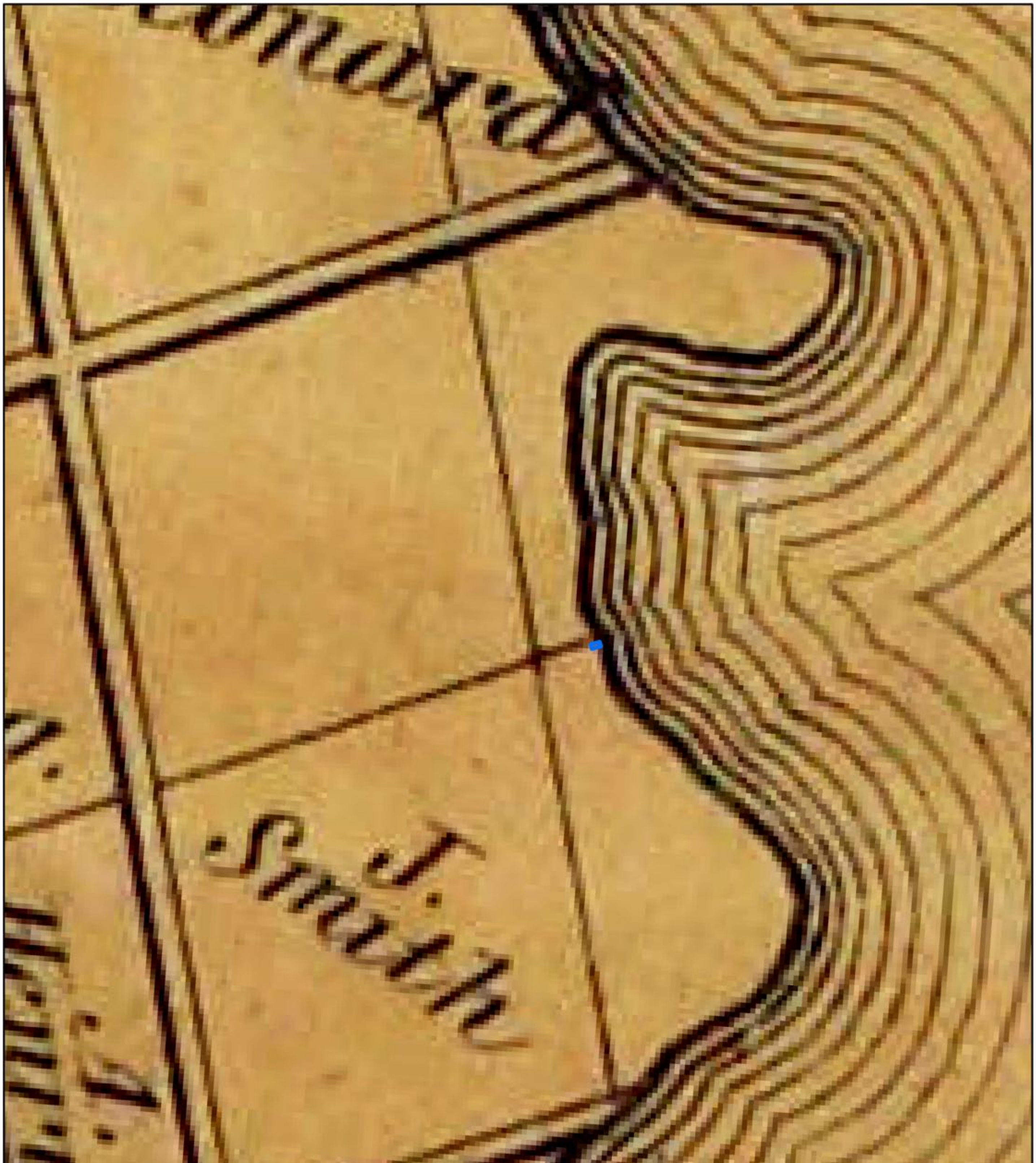


Source: City of Brampton, City of Toronto, County of Simcoe, York Region, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA, AAFC, NRCan

Map 1: Marine Archaeological Survey Location

Source: Simcoe Region GIS WMS

Map 2: Marine Archaeological Survey Area Environmental Detail



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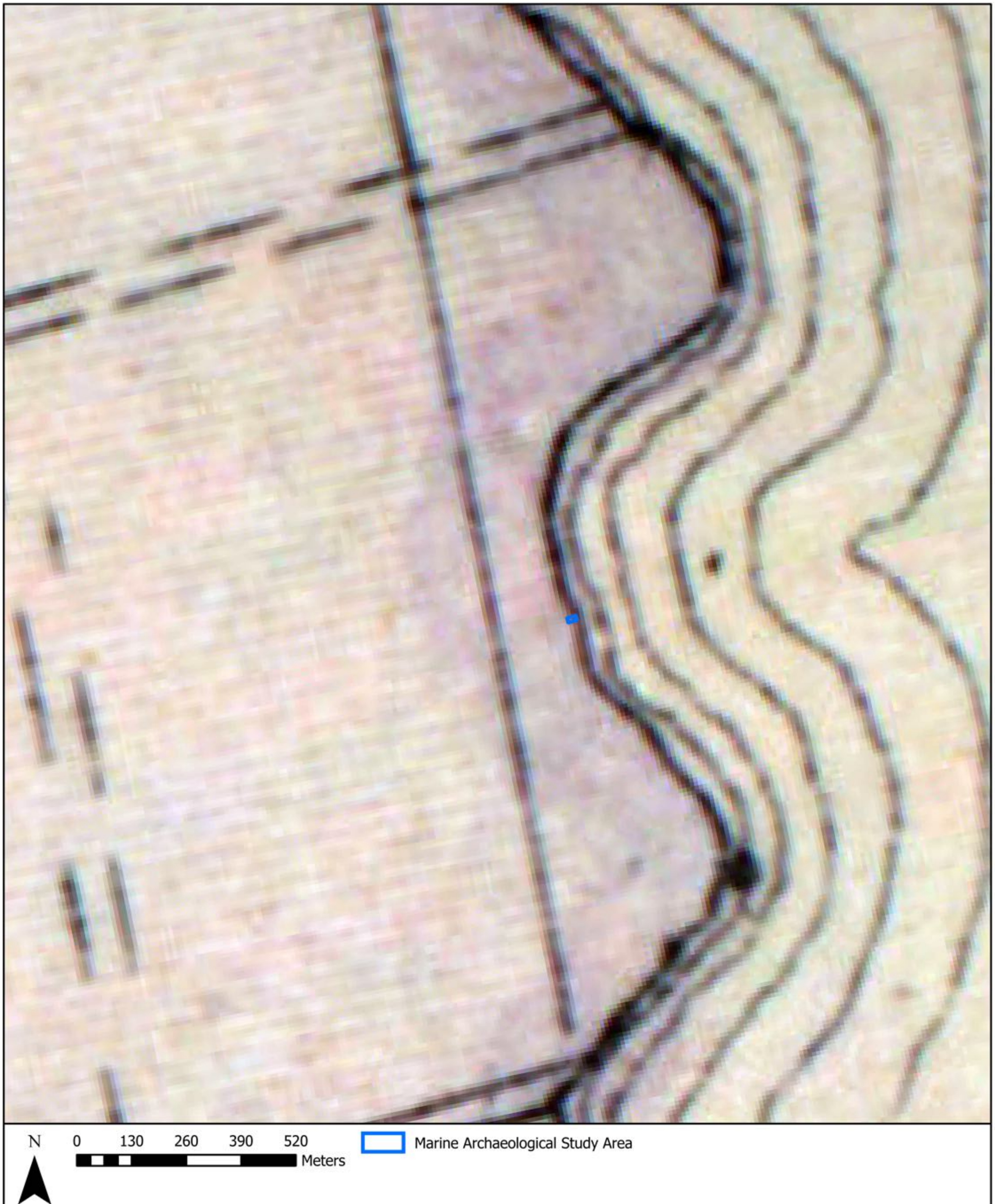
0 130 260 390 520
Meters

Marine Archaeological Study Area

Source: 1871 Hogg

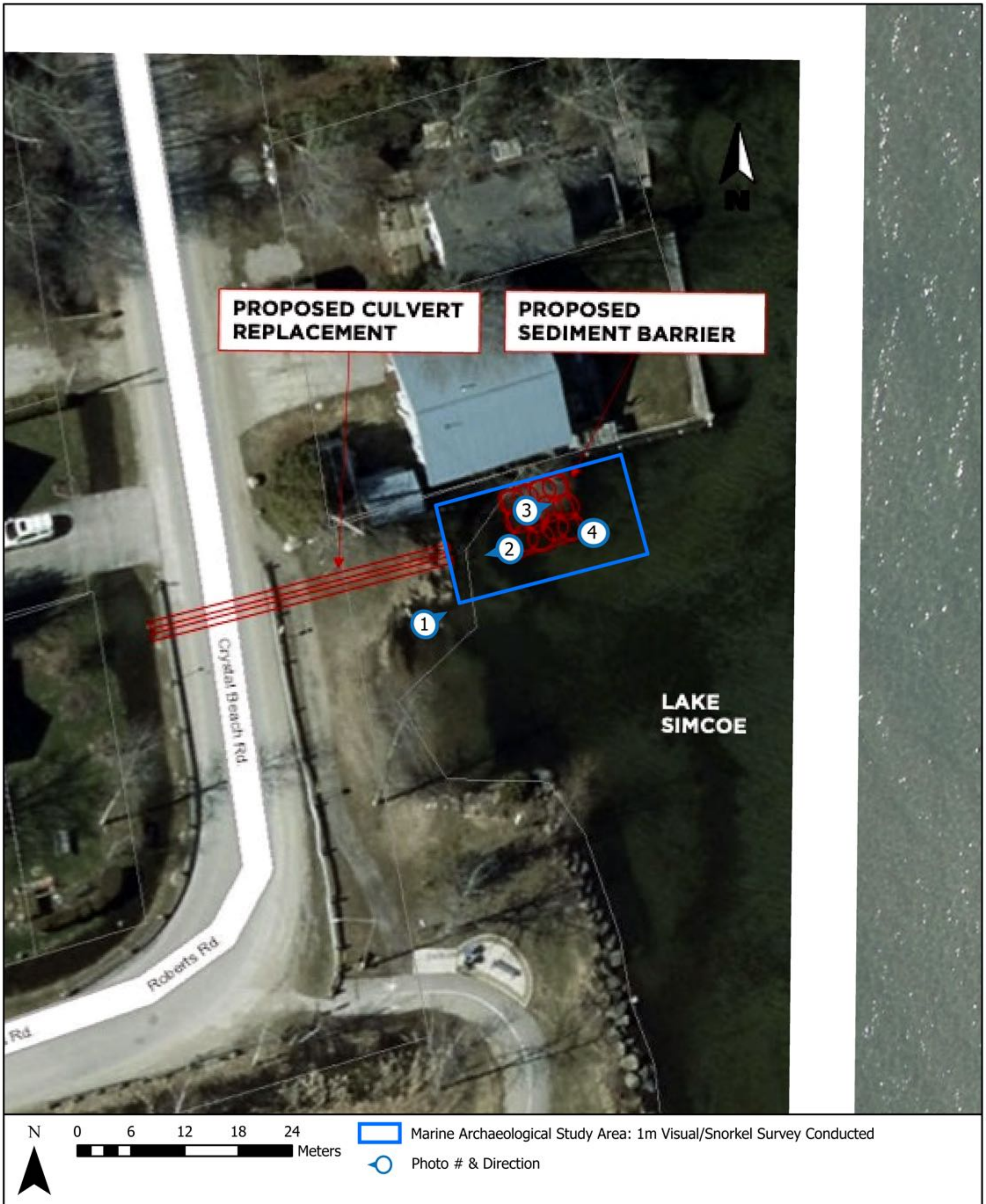
Map 3: Marine Archaeological Survey Area atop 1871 Historic Map



Source: 1881 Belden

Map 4: Marine Archaeological Survey Area atop 1881 Historic Map

Map 5: Marine Archaeological Survey Results of Assessment



Source: Simcoe Region GIS WMS

Map 6: Marine Archaeological Survey Results of Assessment with Proposed Sediment Barrier

9. REFERENCES

Belden, H.
1881 Illustrated Historical Atlas of the County of Simcoe. Toronto. H Belden & Co.
Ontario Ministry of Indigenous Affairs (MIA)

Hogg, J.
1871 Illustrated Historical Atlas of the County of Simcoe. Collingwood. Union Publishing Company. Ont.

Mika, N. & H.
1977 Places in Ontario Vol 1 A-E. Mika Publishing Company. Belleville, Ontario.

Ontario Ministry of Indigenous Affairs (MIA)
2021 Map of Ontario treaties and reserves. Accessed online at https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Rayburn, Alan
1997 Place Names of Ontario, University of Toronto Press Incorporated: Toronto.

Irvin Heritage Inc.

Marine Archaeological Assessment
Various Roads Drainage Improvement Program
Town of Innisfil
Tall Tree Lane Outlet

Town of Innisfil
County of Simcoe
Historic Township of Innisfil
Historic County of Simcoe

November 17, 2021
Prepared for: The Proponent
Prepared by: Irvin Heritage Inc.
Archaeological Licensee: Thomas Irvin, P379
Marine Archaeological Permit: 2021-04
Version: Original

contact@irvinheritage.com
Office: 647-799-4418 Cell: 647-656-4810
515 Mulock Drive, Suite 1, Newmarket ON L3Y 1A1
www.irvinheritage.com

EXECUTIVE SUMMARY

Irvin Heritage Inc. was retained by AS&G Archaeological consulting to conducted a Marine Archaeological Survey in support of their clients the installation of a sediment barrier related to the replacement of existing stormwater culverts which drain into Lake Simcoe.

The areas of the proposed sediment barrier, plus an additional buffer area, was subject to a 1 m transect visual/snorkel survey. No archaeological resources were identified.

Given the results and conclusions of the completed survey, the following recommendations are made:

- It is the professional opinion of the archaeological licensee, Thomas Irvin (P379) that the balance of the Study Area has been sufficiently assessed and is free of further archaeological concern.

- Notwithstanding the above recommendations, the provided Advice On Compliance With Legislation shall take precedent over any recommendations of this report should deeply buried archaeological resources or human remains be found during any future earthworks within the Study Area.

Project Personnel

Professional Licensee & Project Manager: Thomas Irvin, MA (P379)

Field Director(s): Thomas Irvin, MA (P379)

In-Water Safety Monitor: Diego Iminez

Report Author(s): Thomas Irvin, MA (P379)
Michelle Pandith, BA

GIS & Graphics: Michelle Pandith, BA

1. ASSESSMENT CONTEXT

1.1. Development Context

Irvin Heritage Inc. was retained by AS&G Archaeological consulting to conducted a Marine Archaeological Survey in support of their clients installation of sediment barriers related to the replacement of existing stormwater culverts which drain into Lake Simcoe (Map 1). The requirement for such an assessment was triggered by the related Class EA under the Environmental Assessment Act.

1.2. Environmental Setting

The Marine Archaeological Survey Area is roughly square approximately 71 square meters in size (given the small size of the Study Area, providing the site area in Ha would have been impractical) (Map 2).

2. HISTORICAL CONTEXT

2.1. General History

The Marine Archaeological Survey Area is directly adjacent or within the boundary of Treaty 18, known as the Nottawasaga Purchase. This treaty was signed on October 17, 1818 by representatives of the Crown and certain Anishinaabe peoples (MIA 2021). The treaty is additionally known as the Lake Simcoe- Nottawasaga Treaty and was the first of three treaties signed between October and November of 1818 (MIA 2021).

The Study Area is north of the Euro-Canadian settlement of Belle Ewart. The settlement was named after James Bell Ewart who, while a resident of the town of Dundas, owned land in the area and laid out village lots in 1853 (Rayburn 1997). The settlement quickly became an important port related to the transfer of lumber to Toronto via the Northern Railway (Mika 1977). However, a devastating fire which destroyed the sawmills, this compounded with a lack of lumber, resulted in the port closing. At the height of production the town boasted two churches, two hotels and three general stores (Mika 1977).

2.2. Study Area History

A review of historical resources resulted in the following data relevant to the Study Area:

Map 4: 1871 Map of the County of Simcoe (Hogg 1871)

The Marine Archaeological Survey area is situated adjacent to Lot 27, Concession 8 which has no listed ownership. There are no structures noted within or directly adjacent to the Study Area.

Map 5: 1881 Map of the County of Simcoe (Belden 1881)

The Marine Archaeological Survey area is situated adjacent to Lot 27, Concession 8 which has no listed ownership. There are no structures noted within or directly adjacent to the Study Area.

The following should be noted in regard to the review of historic maps:

- Study Area placement within historic maps is only approximate
- Many historic maps were subscriber based, meaning only individuals who paid a fee would have their property details mapped

3. ARCHAEOLOGICAL CONTEXT

The Study Area is situated within an overall historic landscape that would have been appropriate for both resource procurement and transit by both Indigenous and Euro-Canadian peoples.

3.1. Registered Archaeological Sites

A search of the Ontario Sites Database conducted on July 8, 2021, using a Study Area centroid of 17T E 4908984 N 616913 indicated that there are no registered archaeological sites within a 1 km radius of the Study Area.

3.2. Related and/or Adjacent Archaeological Assessments

A Stage 1 and 2 Archaeological Assessment was undertaken by AS&G Archaeological Consulting in support of the replacement of the existing culvert (AS&G 2021). The assessment consisted of a test pit survey which determined the area to be of low archaeological potential having been previously subject to disturbance related to the culvert installation.

4. MARINE ARCHAEOLOGICAL SURVEY AREA

The Survey Area was found to be at the end of a grassed stormwater right-of-way with a sandy beach area (Images 1 & 2). Existing modifications to the shoreline adjacent were noted with steel piling and associated cribwork present (Image 3). The Survey Area was found to be relatively shallow, at a roughly maximum depth of .55 m and exhibited exceptional visibility (Image 4).

The marine assessment consisted of the licensee conducting a visual 1 m transect survey of the Marine Archaeological Survey Area, starting from the shoreline outwards into Lake Simcoe, with a return pass. At times the licensee employed snorkelling to aid in the visual review of the lake bed.

No archaeological resources or cultural features were noted during the assessment.

5. RECOMMENDATIONS

Given the analysis and conclusion of the completed survey, the following recommendations are made:

- It is the professional opinion of the archaeological licensee, Thomas Irvin (P379) that the Study Area has been sufficiently assessed and is free of further archaeological concern.

- Notwithstanding the above recommendations, the provided Advice On Compliance With Legislation shall take precedent over any recommendations of this report should deeply buried archaeological resources or human remains be found during any future earthworks within the Study Area.

6. ADVICE ON COMPLIANCE WITH LEGISLATION

The Standards and Guidelines for Consultant Archaeologists requires that the following standard statements be provided within all archaeological reports for the benefit of the proponent and approval authority in the land use planning and development process (MTC 2011:126):

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7. IMAGES

Image 1: View existing stemware infrastructure leading to the marine survey area.

Image 2: View of the marine survey area.

Image 3: Steel piling and associated cribwork adjacent to the marine study area.

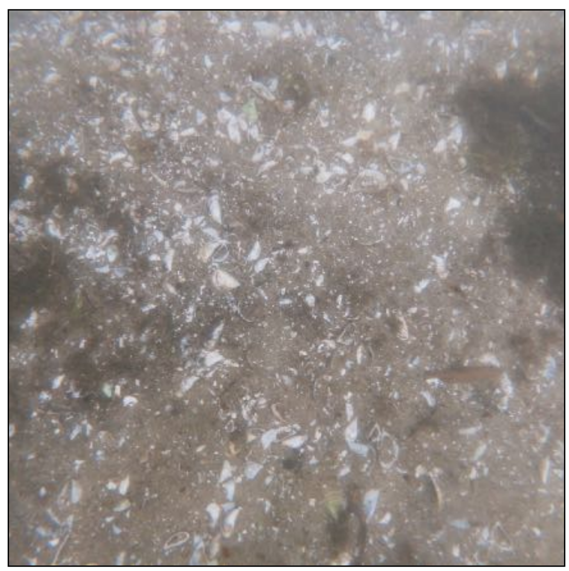
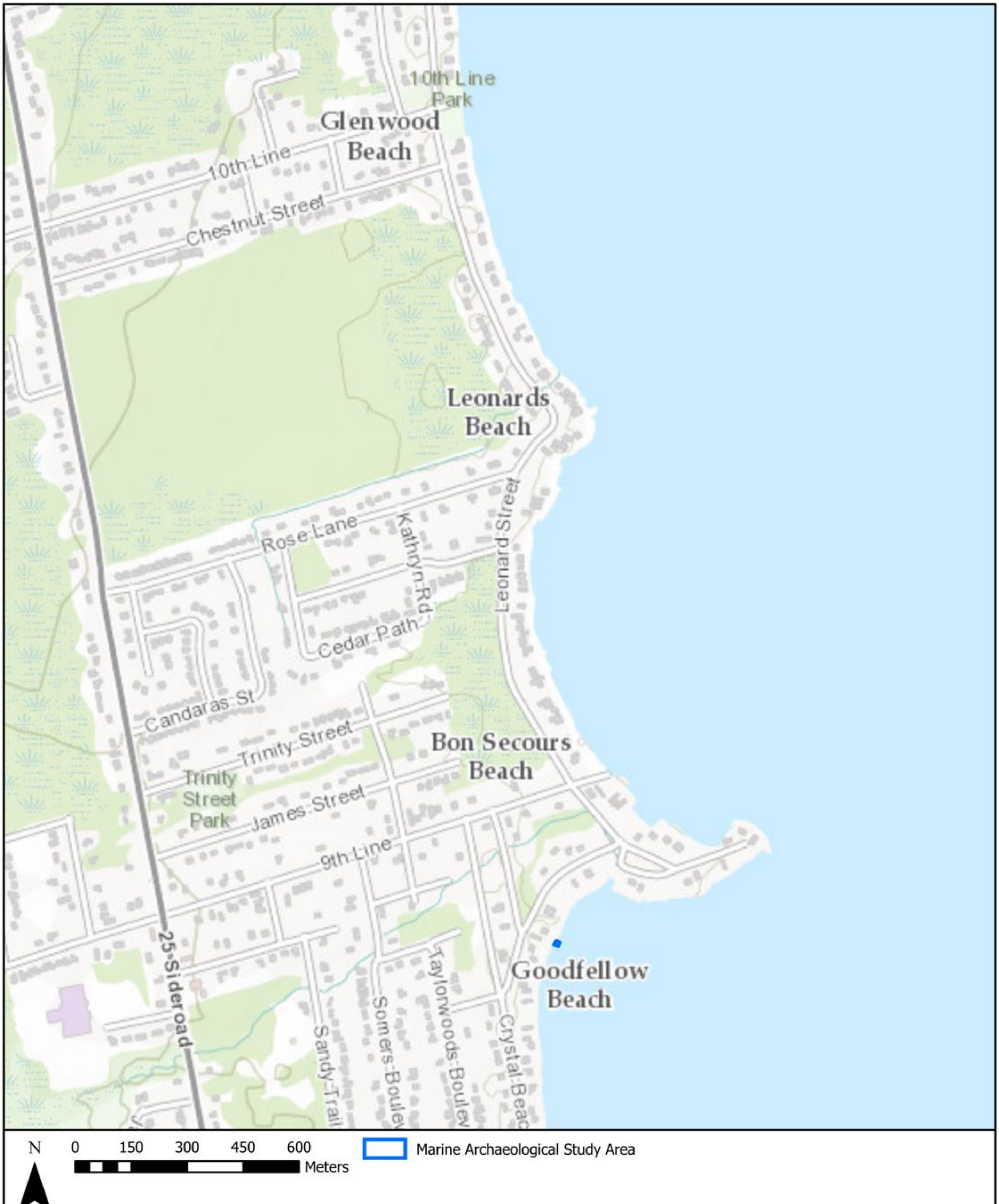


Image 4: Visibility of the water column within the survey area.

8. MAPS

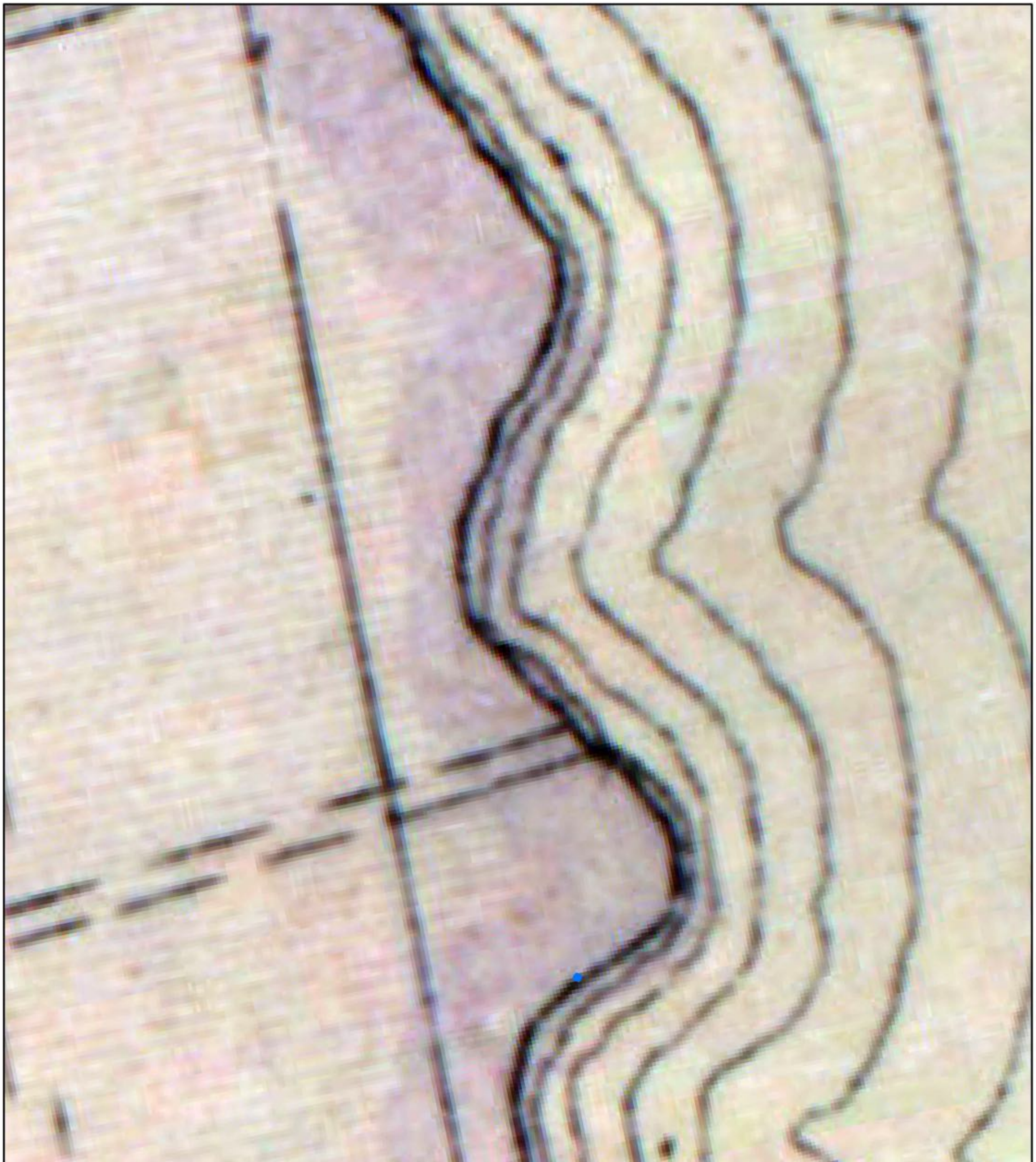


Source: City of Brampton, City of Toronto, County of Simcoe, York Region, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, AAFC, NRCan

Map 1: Marine Archaeological Survey Location

Map 2: Marine Archaeological Survey Area Environmental Detail

Map 3: Marine Archaeological Survey Area atop 1871 Historic Map



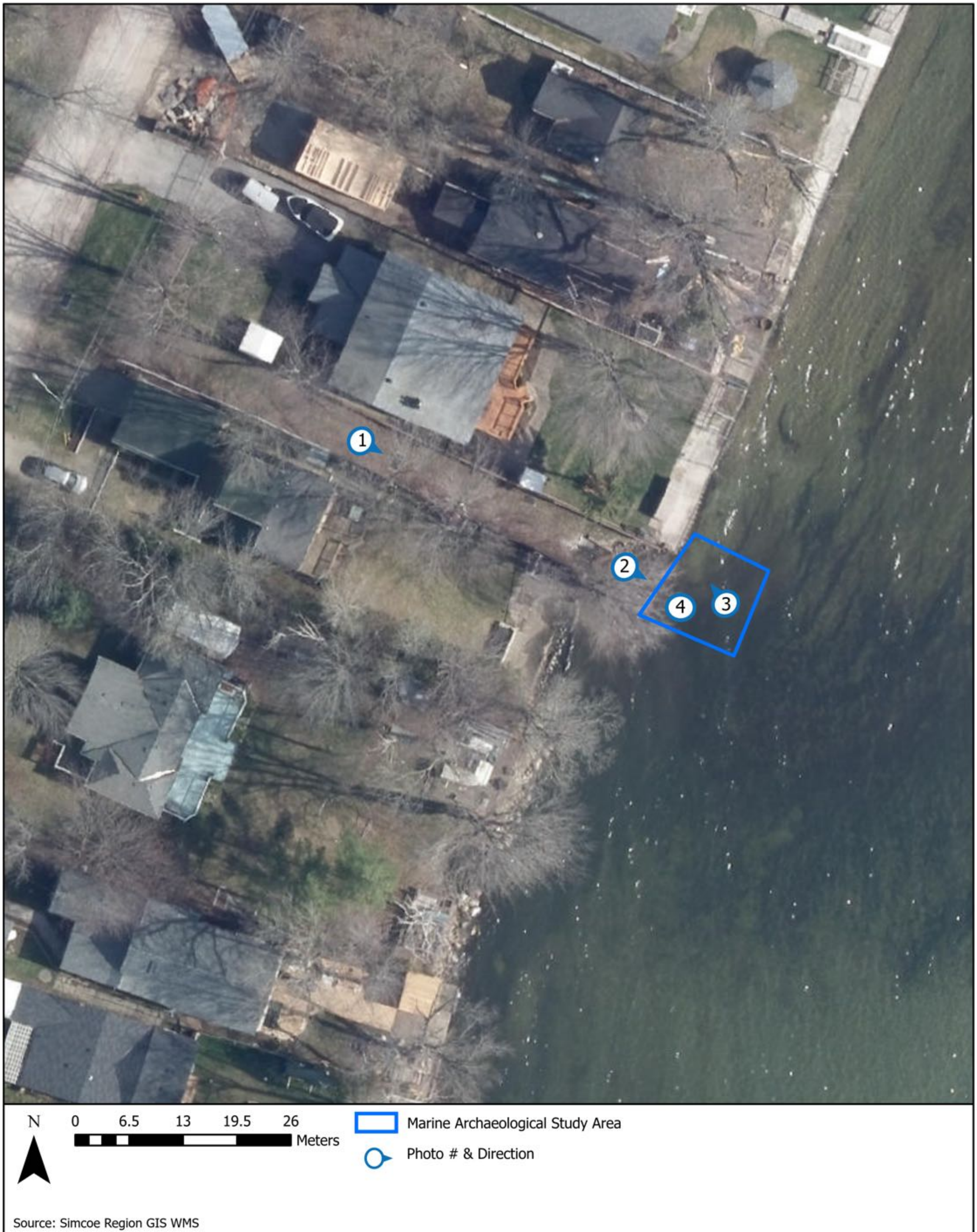
N

0 150 300 450 600 Meters

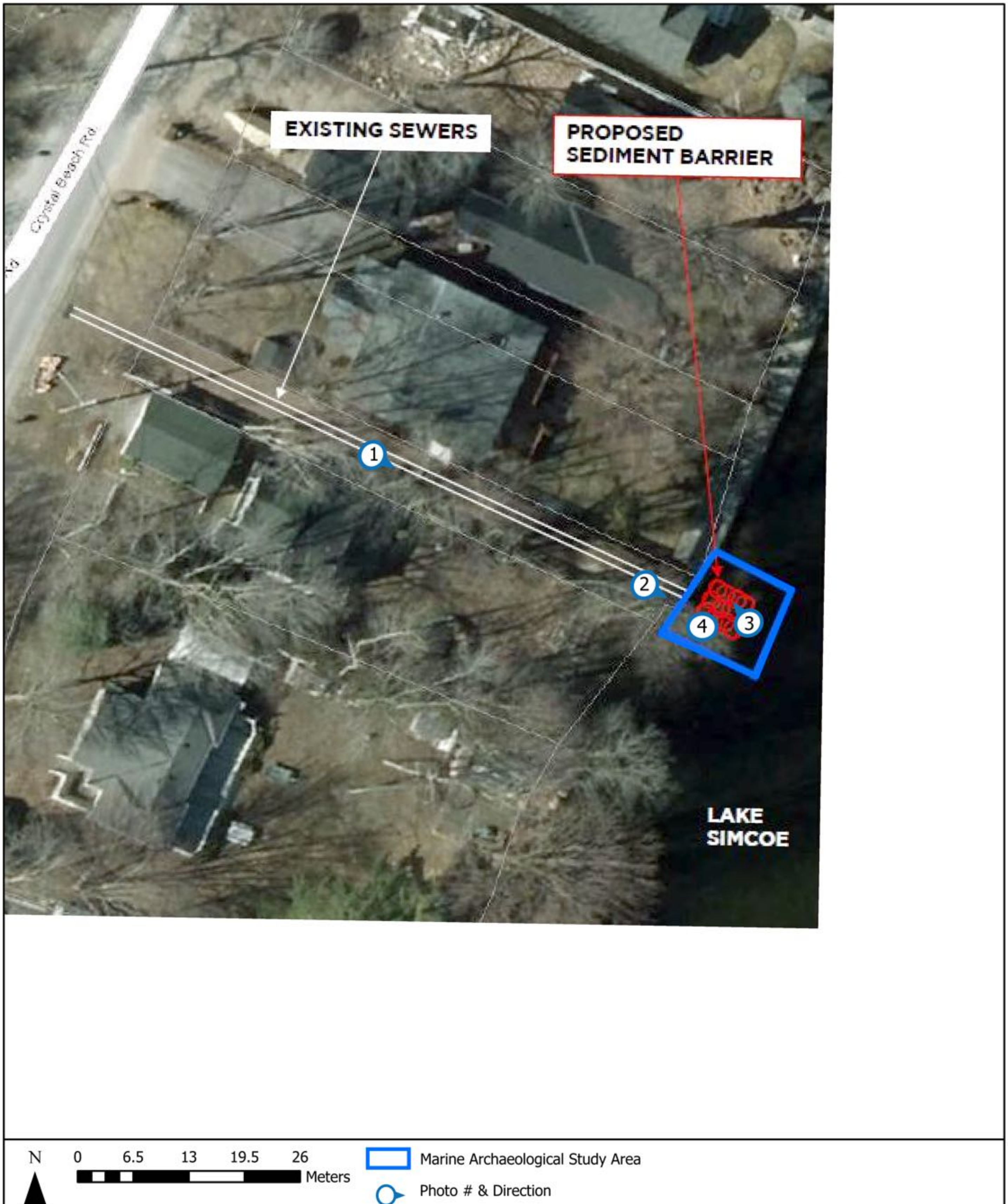
Marine Archaeological Study Area

Source: 1881 Belden

Map 4: Marine Archaeological Survey Area atop 1881 Historic Map



Map 5: Marine Archaeological Survey Results of Assessment



Source: Simcoe Region GIS WMS

Map 6: Marine Archaeological Survey Results of Assessment with Proposed Sediment Barrier

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2021 Map of Ontario treaties and reserves. Accessed online at https://www.ontario.ca/page/map-ontario-treaties-and-reserves

Rayburn, Alan
1997 Place Names of Ontario, University of Toronto Press Incorporated: Toronto.

Appendix J:
Coastal Engineering Assessment

TATHAM ENGINEERING

41 King Street, Unit 4
Barrie, Ontario L4N 6B5

T 705-733-9037
E info@tathameng.com

tathameng.com

Memo

File	Recipient	Company
420395	**Amber Leal, C.E.T.**	**Town of Innisfil**

Date	Purpose
February 4, 2022	**Crystal Beach Road Class EA, Town of Innisfil** **Option 2 & 3: Sediment Barrier - Coastal Review**

Message

Introduction

As part of the Class EA process, we have prepared this memo as a review of shoreline conditions to screen for potential impacts that might result from the proposed design alternatives of Option #2 and Option #3. Both options would involve the detailed design and construction of localized outfall improvements to provide a barrier to deter sandbars from forming at the outlet of the drainage channel. Both options would effectively improve an exacerbating cause of the drainage issues at Crystal Beach Road by reducing the occurrence of obstruction due to sandbars forming at the Crystal Beach Road drainage channel outlets.

These alternatives propose the construction of a boulder sediment barrier to protect each of the outlets from sediment accumulation. The installation of this structure would require permits or approvals from Lake Simcoe Region Conservation Authority (LSRCA), the Ministry of Natural Resources and Forestry (MNRF) and the Department of Fisheries and Oceans (DFO).

Existing Site Conditions

The shoreline in the immediate vicinity of both sites consists of a large number of docks of variable construction extending from residential properties out towards the lake. A significant number of the shoreline properties have hardened walls (concrete, armour stone or boulder) along the beach to define their maintained property limit. The area is known as Goodfellow Beach and is a pocket beach just north of Cook's Bay in Lake Simcoe.

The sites are exposed to waves generated from the northeast-east-southeast directions. A sandy beach is present along the length of the properties' shorelines. Figure 1 shows the existing shoreline conditions for Option #2 in the vicinity of the site, located at the Tall Tree Lane and Crystal Beach Road intersection. Whereas Figure 2 shows the existing conditions for Option #3 in the vicinity of the site, located at the southern end of Crystal Beach Road.

Photos taken by Azimuth Environmental Consulting Inc. of the shoreline areas have been provided in Appendix A.

Available data on lake currents and winds was taken from a 2010 study prepared for LSRCA entitled, "Surface Water Vulnerability Analysis for LSRCA Town of Innisfil – Alcona Water Treatment Plant" dated April 2010 by W.F Baird and Associates.

The study collected data on currents in several locations within the Lake, including Cook's Bay. Their findings suggest that currents in both locations vary with depth. At the surface and near lakebed, they tend to move to the northeast, while at a mid-depth they move to the southwest.

The study also assessed wind data from the Lagoon City meteorological buoy. A statistical analysis was undertaken to determine that winds from the north are most frequent and the highest wind speeds are from directions northwest through southwest.

Based on the above, the presumed direction of longshore drift for both subject shorelines is to the south. This is consistent with observed site conditions.

Proposed Boulder Sediment Barrier

As noted above, a small sediment barrier is proposed to be constructed to alleviate the ongoing issues with sediment accumulation at the mouth of both channels. The footprint of the proposed structure for both Options #2 & #3 is approximately 10 sq. m. Design information for the proposed structures are provided in Drawings DR-1, DR-2, DE-1 and DE-2 respectively.

The effects of the sediment barriers will be very localized, given the limited footprint of the structures and their close placement to the shoreline. These are features of the design which have been specified to allow external sediment transport to carry on as usual. For this reason, overall littoral transport rates and long-term erosion rates should be largely unaffected by the proposed works. The localized effects are intended to be limited to a minor relocation of accumulated sediment from the mouth of the channel to the lake side of the barrier.

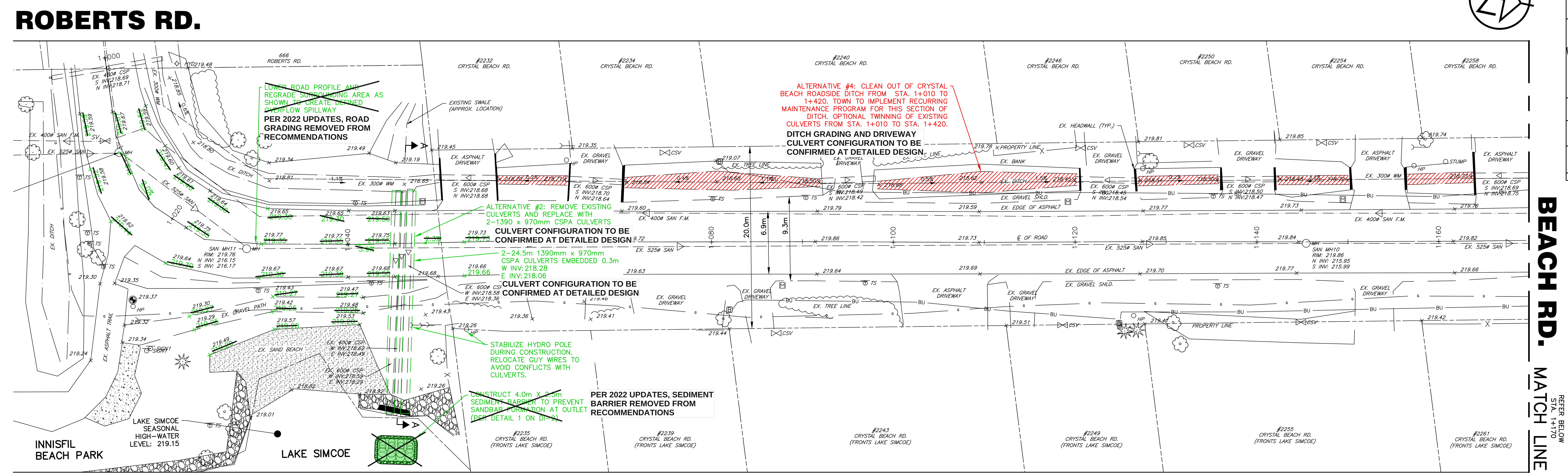
Conclusion

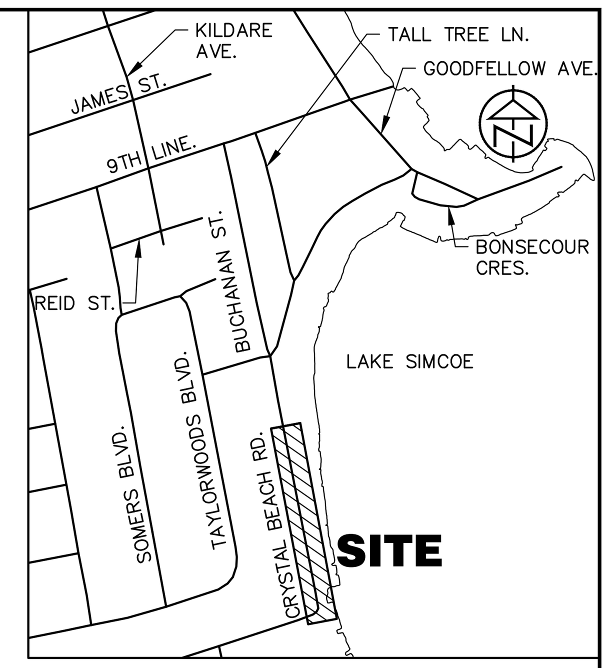
We believe the proposed sediment barriers will improve the function of the drainage channels and reduce the maintenance requirements for the Town in frequent dredging of the outlets, while representing very little risk to coastal processes locally or on a larger scale.

From

Amanda Kellett, P.Eng.

Appendix K:
Drawings Including 2022 Design Updates





KEY PLAN
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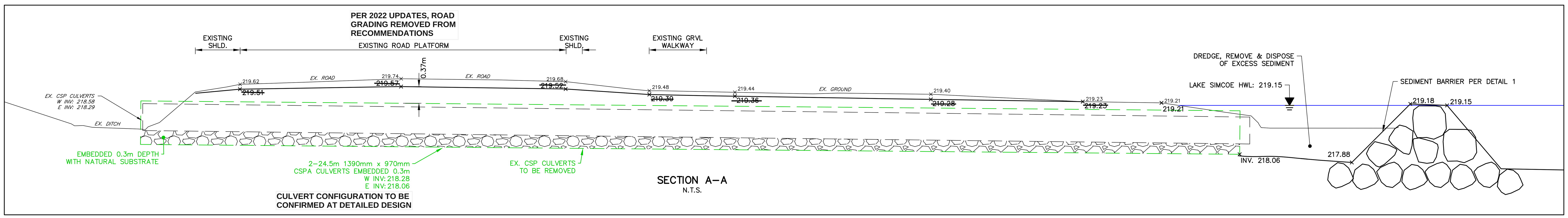
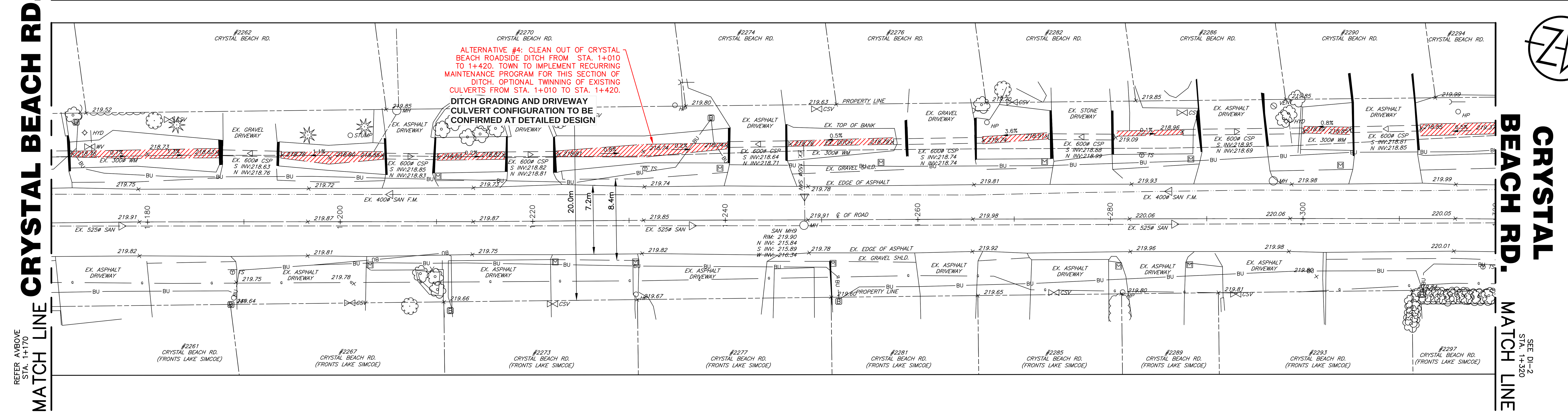


SECTION A-A
N.T.S.



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TBM1 – ELEVATION 219.60
DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH-EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDRO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR VIRTUAL PUBLIC ENGAGEMENT	MAY 14/21
4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	ISSUED FOR FINAL EA	DEC 01/22

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2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

CRYSTAL BEACH ROAD STA. 1+000 – STA. 1+320

TATHAM ENGINEERING

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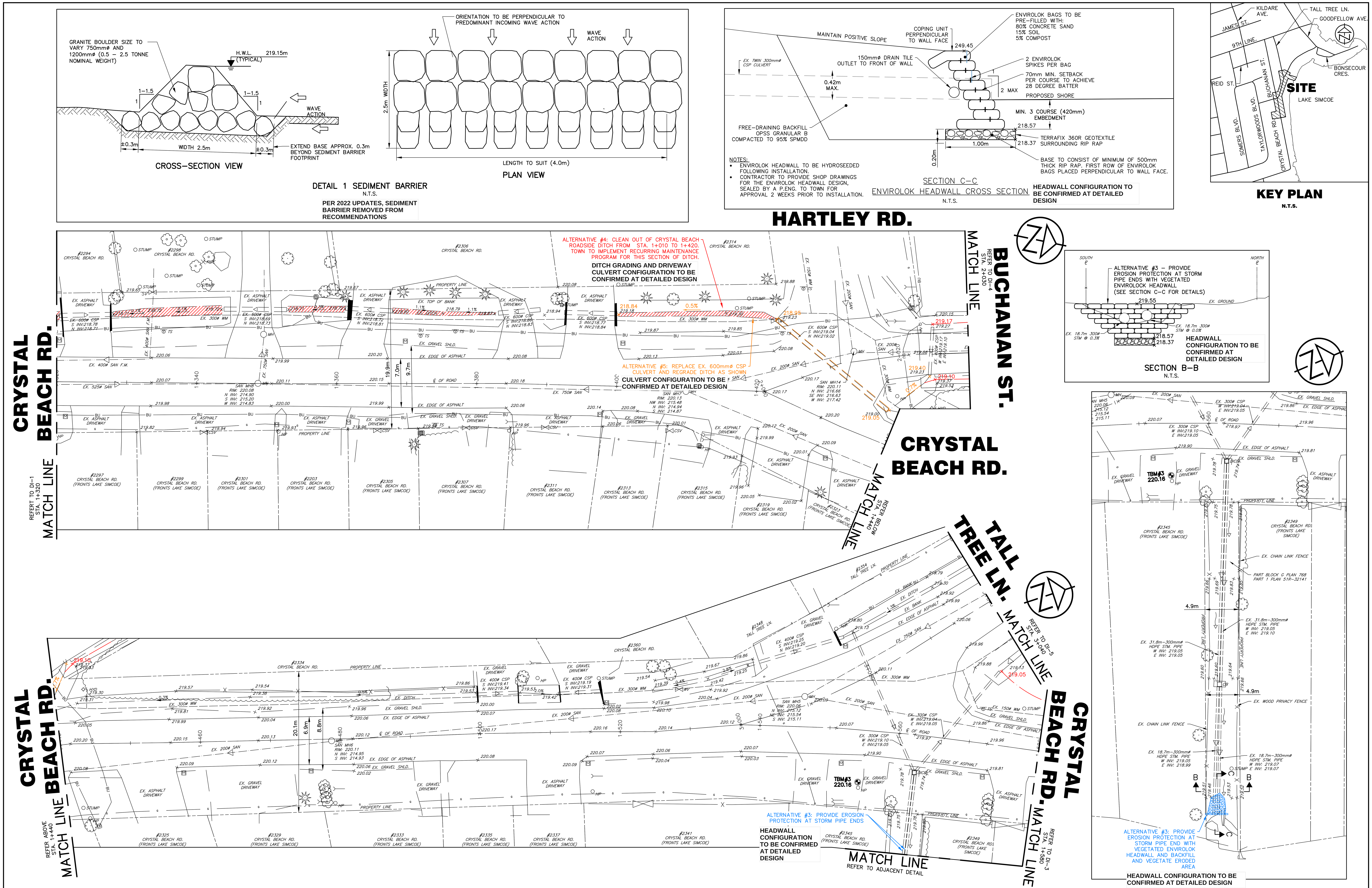

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No.	REVISION DESCRIPTION	DATE
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2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
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4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	ISSUED FOR FINAL EA	DEC 01/22

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2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

CRYSTAL BEACH ROAD
STA. 1+320 – STA. 1+580

TATHAM ENGINEERING

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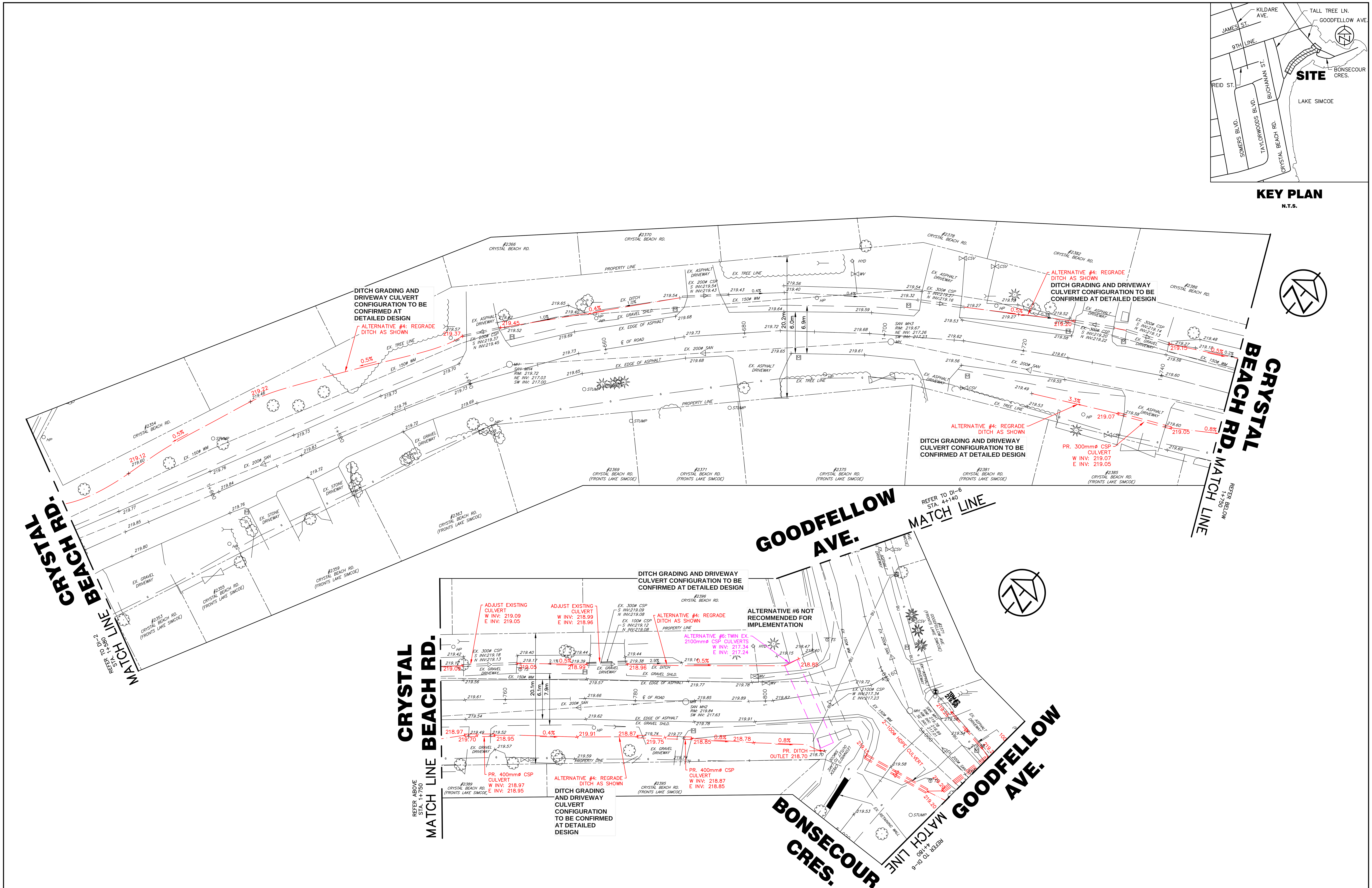

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2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

CRYSTAL BEACH ROAD
STA. 1+580 – STA. 1+819

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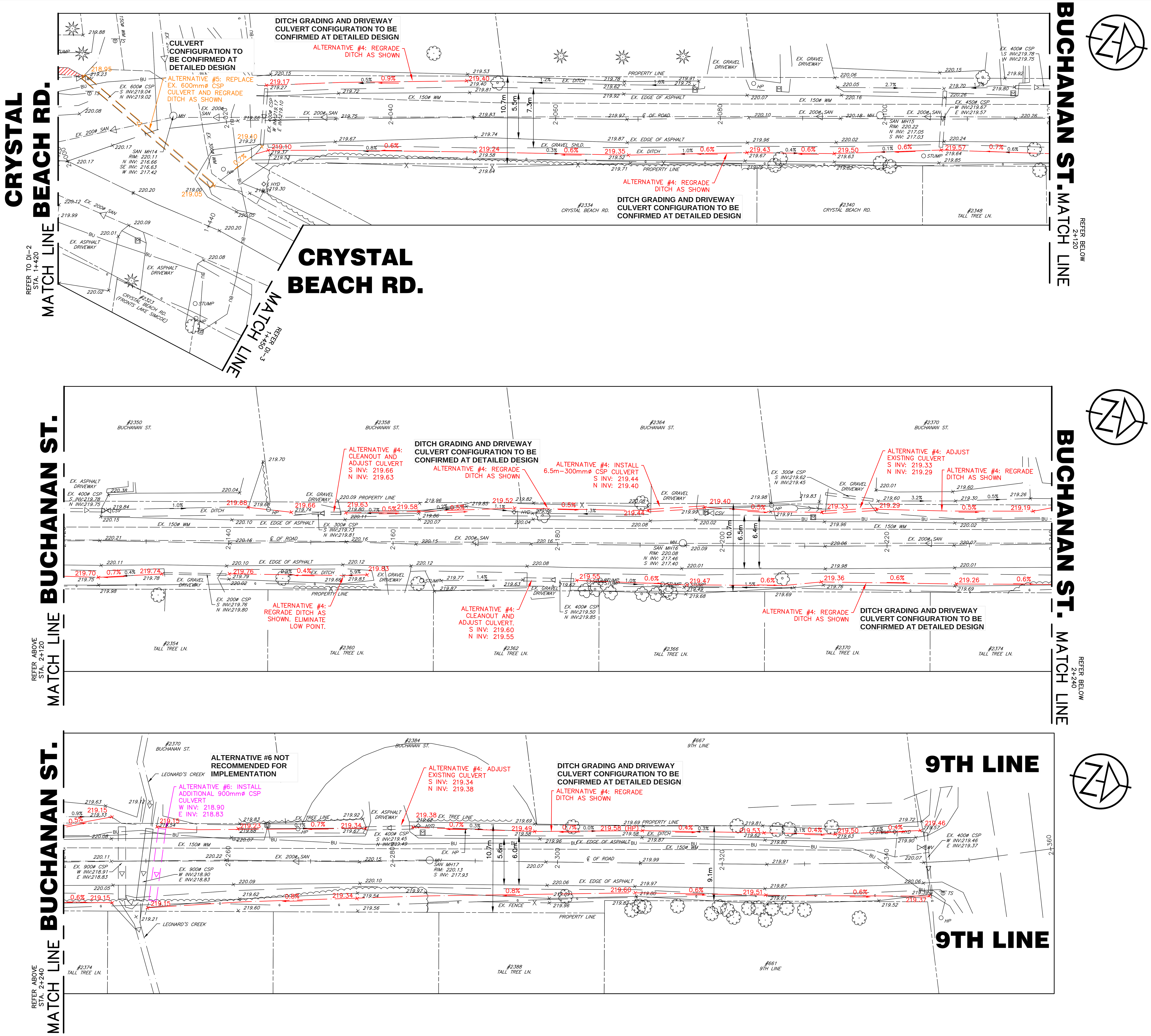

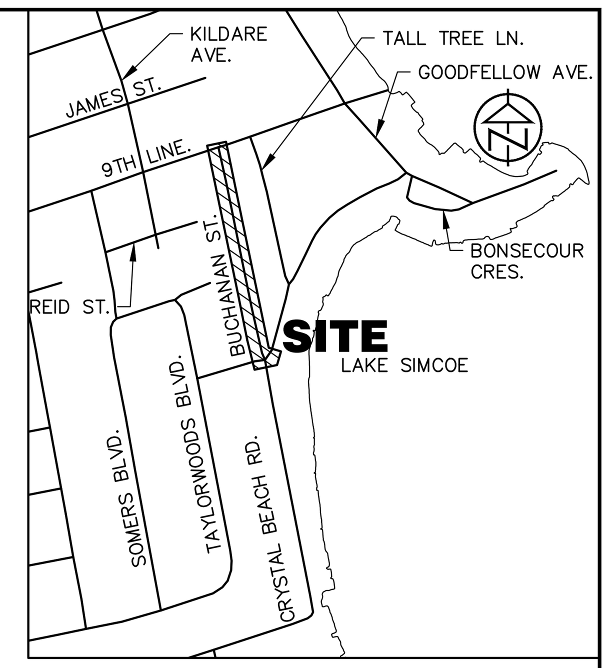

KEY PLAN

N.T.S.

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BENCHMARKS

TBM1 – ELEVATION 219.60
DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH–EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR VIRTUAL PUBLIC ENGAGEMENT	MAY 14/21
4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	**ISSUED FOR FINAL EA**	**DEC 01/22**

ENGINEER STAMP

NOT FOR CONSTRUCTION

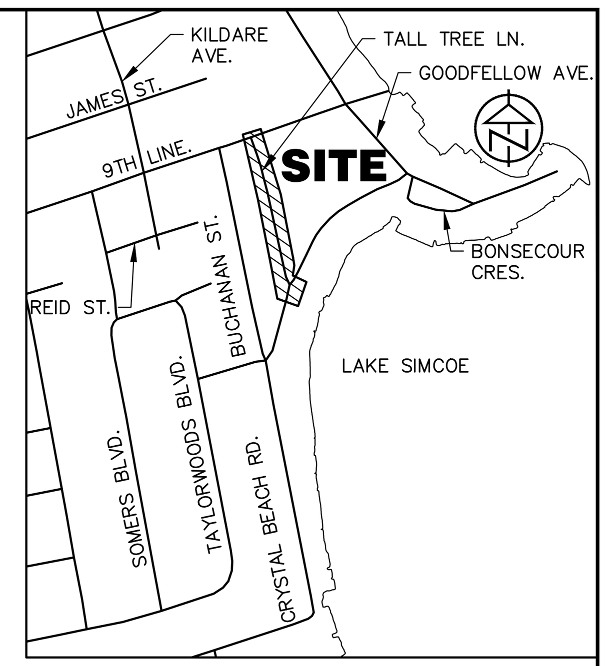
2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

BUCHANAN STREET
STA. 2+000 – STA. 2+360

TATHAM ENGINEERING

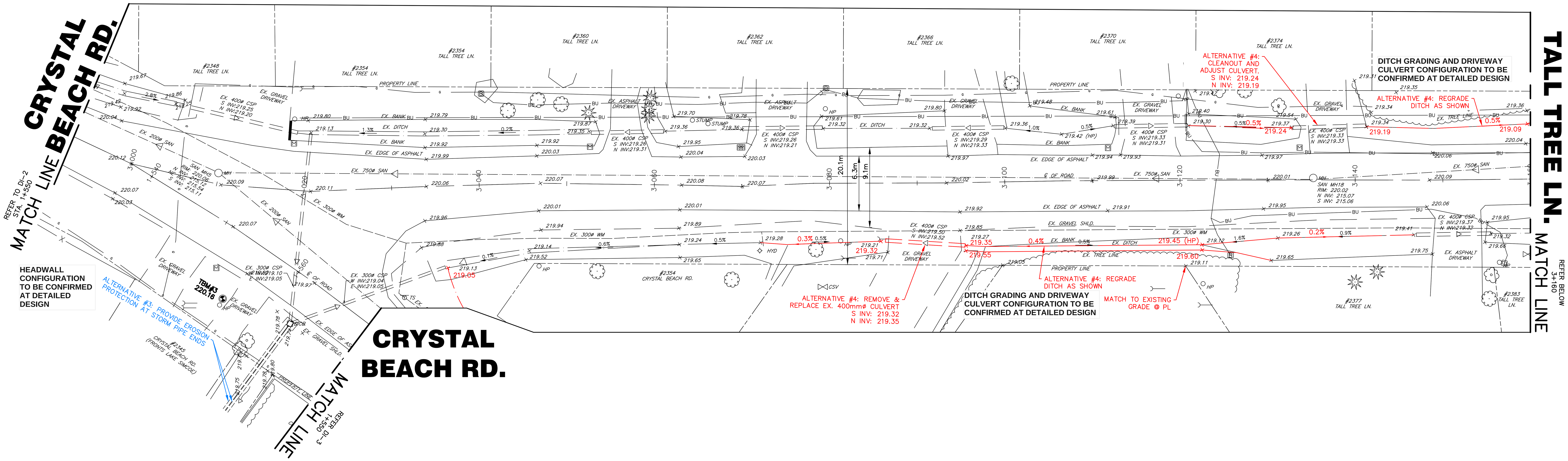
DESIGN: NHF	FILE: 420395	DWG: **DI-4**
DRAWN: SD	DATE: SEPT 2020	
CHECK: ALK	SCALE: 1:250	

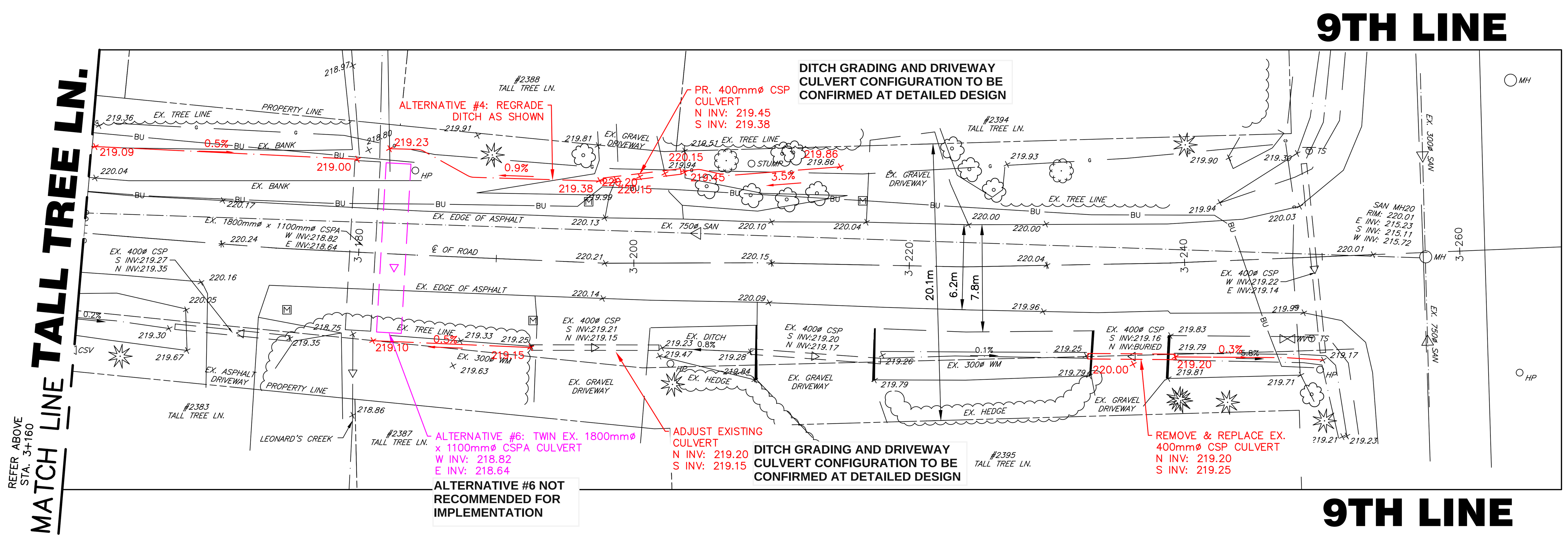
Drawing Name: 420395–DI01.dwg, Plotted: Aug 12, 2021



KEY PLAN

N.T.S.





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DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH–EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

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1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR VIRTUAL PUBLIC ENGAGEMENT	MAY 14/21
4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	**ISSUED FOR FINAL EA**	**DEC 01/22**

ENGINEER STAMP

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2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS

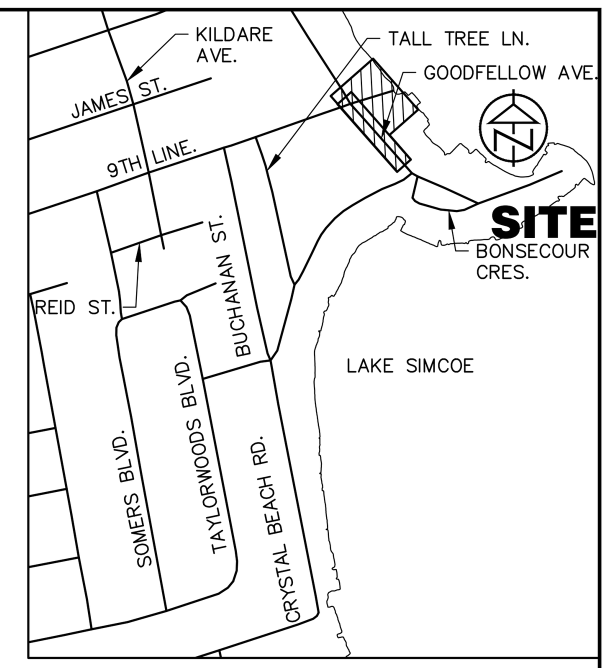
INNISFIL, ON

TALL TREE LANE
STA. 3+000 – STA. 3+269

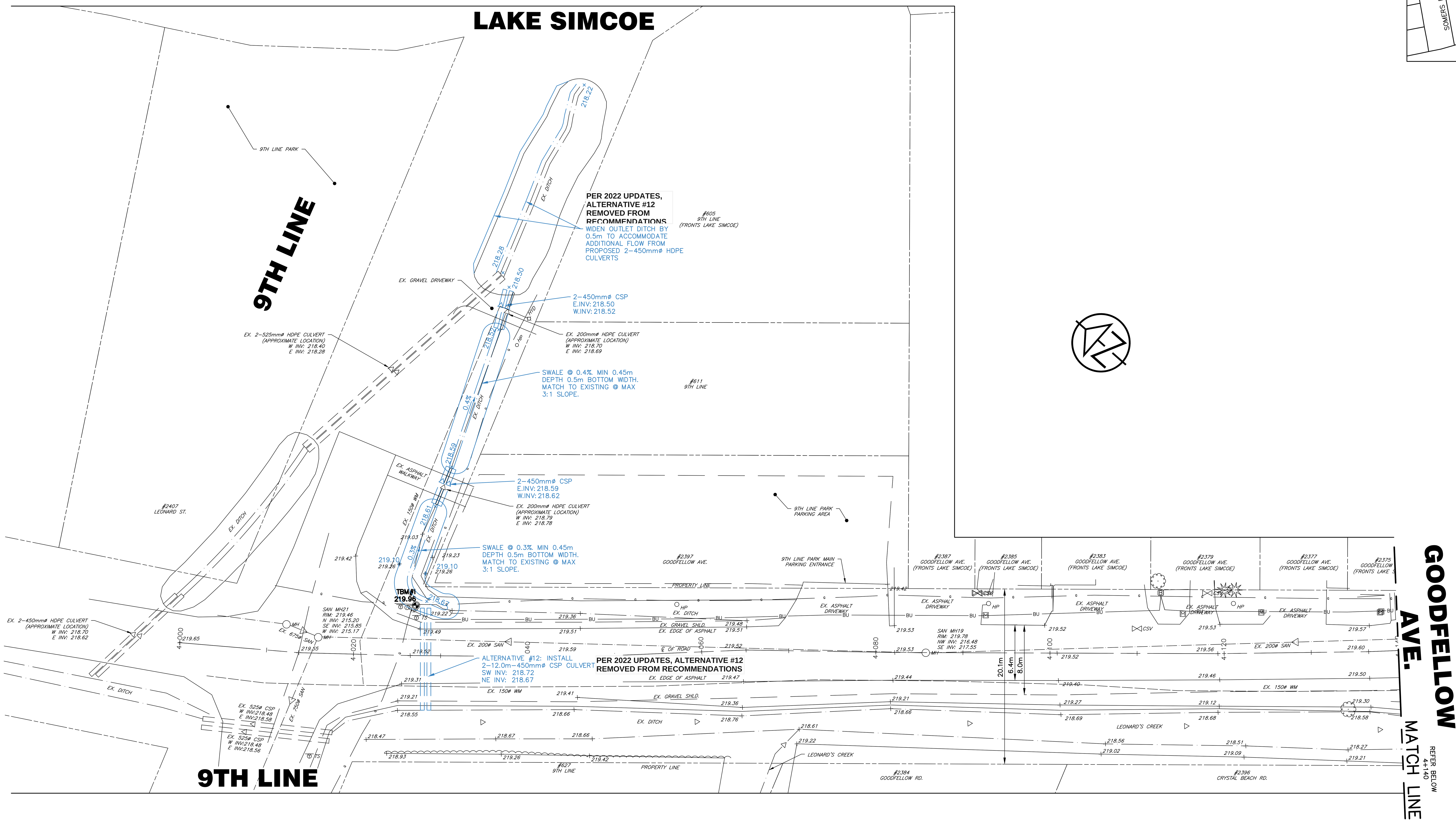
TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG:
DRAWN: SD	DATE: SEPT 2020	**DI-5**
CHECK: ALK	SCALE: 1:250	

Drawing Name: 420395–DI01.dwg, Plotted: Aug 12, 2021



KEY PLAN
N.T.S.



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No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR VIRTUAL PUBLIC ENGAGEMENT	MAY 14/21
4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	ISSUED FOR FINAL EA	DEC 01/22

ENGINEER STAMP

NOT FOR CONSTRUCTION

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS

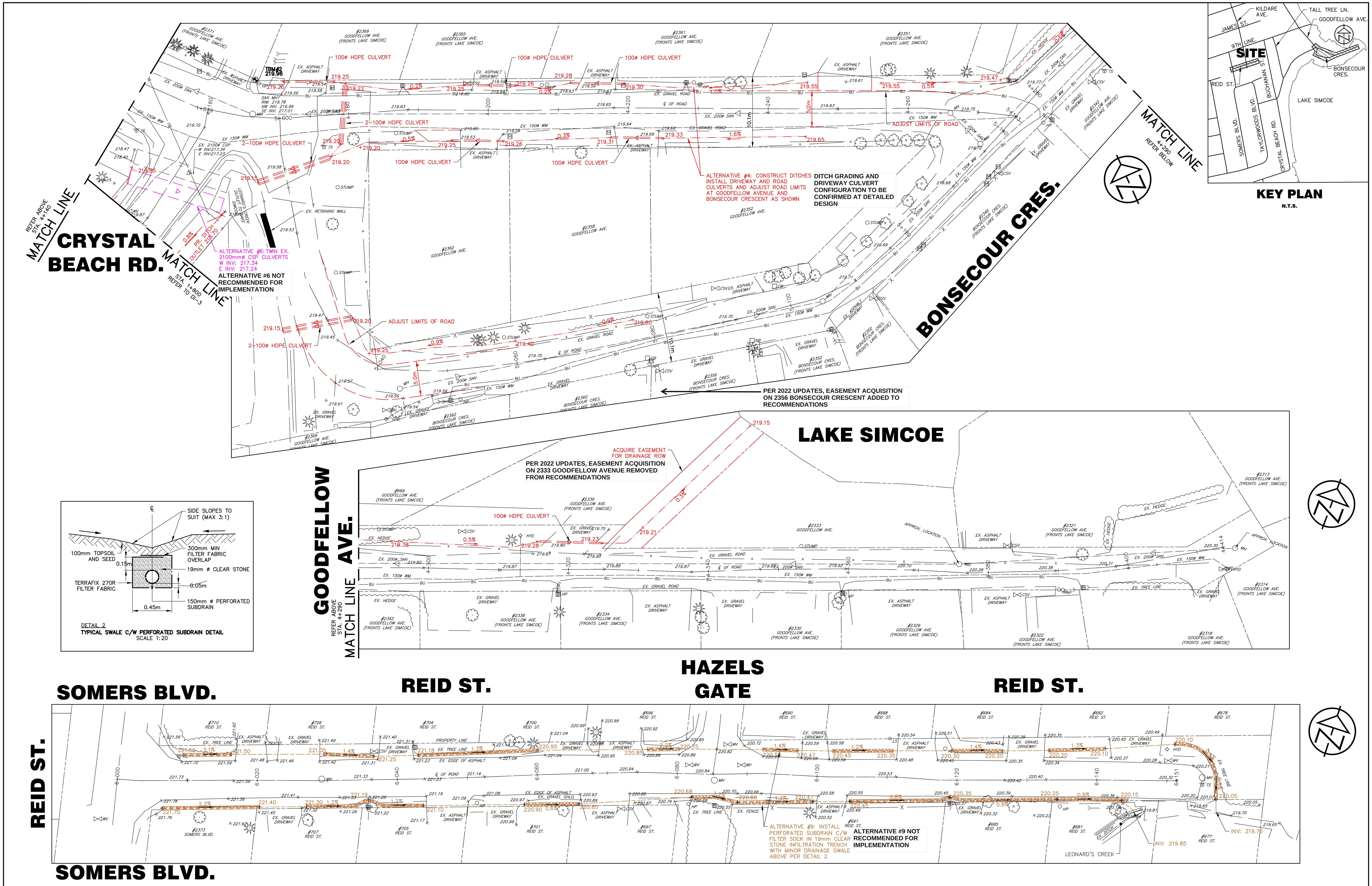
INNISFIL, ON

GOODFELLOW AVENUE
STA. 4+000 – STA. 4+290
BONSECOUR CRESCENT
STA. 5+000 – 5+143

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG:
DRAWN: SD	DATE: SEPT 2020	DI-6
CHECK: ALK	SCALE: 1:250	

Drawing Name: 420395-DI01.dwg, Plotted: Aug 12, 2021



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No.	REVISION DESCRIPTION	DATE
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5.	ISSUED FOR FINAL EA	DEC 01/22

ENGINEER STAMP

NOT FOR CONSTRUCTION

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS
INNISFIL, ON

GOODFELLOW AVENUE
STA. 4+140 – STA. 4+414
REID STREET
STA. 6+000 – 6+151

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG: DI-7
DRAWN: SD	DATE: SEPT 2020	
CHECK: ALK	SCALE: 1:250	

Drawing Name: 420395–DI01.dwg, Plotted: Aug 12, 2021

Appendix L:
Calculations to Support 2022 Design Updates

Updated Alternative #2

HY-8 Culvert Analysis Report: PROP Crystal Beach Road 2400x1200 BOX

Crossing Notes:
Crossing modeled assuming Lake Simcoe tailwater = 218.85 (Average March water level).

Site Data – PROP Crystal Beach Road 2400x1200 BOX

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 217.82 m

Outlet Station: 24.40 m

Outlet Elevation: 217.76 m

Number of Barrels: 1

Culvert Data Summary - PROP Crystal Beach Road 2400x1200 BOX

Barrel Shape: Concrete Box

Barrel Span: 2400.00 mm

Barrel Rise: 1200.00 mm

Barrel Material: Concrete

Embedment: 450.00 mm

Barrel Manning's n: 0.0130 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - PROP Crystal Beach Road 2400x1200 BOX

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: PROP Crystal Beach Road 2400x1200 BOX

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.85
1	38.00	219.66
2	68.00	219.77
3	84.00	219.75
4	91.00	219.72
5	112.00	219.72
6	129.00	219.86

Roadway Surface: Paved   Roadway Top Width: 7.50 m

Culvert Summary Table: PROP Crystal Beach Road 2400x1200 BOX

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5-yr 24hr SCS	0.83	0.83	218.90	0.351	0.631	3-M1t	0.438	0.232	0.640	0.850	0.540	0.000
25-yr 24hr SCS	2.36	2.36	219.17	0.774	0.903	3-M2t	0.750	0.460	0.640	0.850	1.536	0.000
100-yr 24hr SCS	3.36	3.36	219.44	1.042	1.174	7-M2t	0.750	0.583	0.640	0.850	2.188	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.27 m, Outlet Elevation (invert): 218.21 m

Culvert Length: 24.40 m, Culvert Slope: 0.0025

****

Summary of Culvert Flows at Crossing: PROP Crystal Beach Road 2400x1200 BOX

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2400x1200 BOX Discharge (cms)	Roadway Discharge (cms)	Iterations
218.90	5-yr 24hr SCS	0.83	0.83	0.00	1
219.17	25-yr 24hr SCS	2.36	2.36	0.00	1
219.44	100-yr 24hr SCS	3.36	3.36	0.00	1
219.66	Overtopping	3.96	3.96	0.00	Overtopping

Updated
Alternative #4

CRYSTAL BEACH ROAD

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Crystal Beach Road (W) STA. 1+060

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.002	m/m
BOTTOM WIDTH	1.2	
RIGHT SIDE SLOPE	2.6	:1 H:V
LEFT SIDE SLOPE	2.2	:1 H:V
DEPTH	1	m
TAILWATER DEPTH	0.48	m
AREA	3.597	m^2
WETTED PERIMETER	6.397	m
HYDRAULIC RADIUS	0.562	m
FULL FLOW CAPACITY	2.740	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

UNDER TAILWATER CONDITIONS (TAILWATER ELEV = 218.85):

BOTTOM WIDTH	3.5	m
DEPTH	0.52	m
AREA	2.469	m^2
WETTED PERIMETER	6.204	m
HYDRAULIC RADIUS	0.398	m
UNDER TAILWATER	1.494	m^3/s

Proposed
Roadside Ditch - Crystal Beach Road (W) STA. 1+450

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.005	m/m
BOTTOM WIDTH	0.0	
RIGHT SIDE SLOPE	3.0	:1 H:V
LEFT SIDE SLOPE	2.7	:1 H:V
DEPTH	0.3	m
AREA	0.257	m^2
WETTED PERIMETER	1.815	m
HYDRAULIC RADIUS	0.142	m
FLOW CAPACITY	0.123	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Crystal Beach Road (W) STA. 1+530

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	7.9	:1 H:V	
DEPTH	0.3	m	
AREA	0.489	m^2	
WETTED PERIMETER	3.330	m	
HYDRAULIC RADIUS	0.147	m	
FLOW CAPACITY	0.241	m^3/s	

Proposed
Roadside Ditch - Crystal Beach Road (W) STA. 1+580

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.001	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	2.3	:1 H:V	
DEPTH	0.5	m	
AREA	0.668	m^2	
WETTED PERIMETER	2.855	m	
HYDRAULIC RADIUS	0.234	m	
FLOW CAPACITY	0.200	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Crystal Beach Road (W) STA. 1+770

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.5	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.4	m	
AREA	0.521	m^2	
WETTED PERIMETER	2.724	m	
HYDRAULIC RADIUS	0.191	m	
FLOW CAPACITY	0.305	m^3/s	

HY-8 Culvert Analysis Report: 2232 Crystal Beach Road Driveway Culvert

Site Data - 750 mm Dia. CBR Driveway Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 218.36 m

Outlet Station: 6.70 m

Outlet Elevation: 218.35 m

Number of Barrels: 1

Culvert Data Summary - 750 mm Dia. CBR Driveway Culvert

Barrel Shape: Circular

Barrel Diameter: 750.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2232 CBR (Station 1+053.7)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: 2232 CBR (Station 1+053.7)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 219.54 m

Roadway Surface: Paved

Roadway Top Width: 5.00 m

Table 1 - Culvert Summary Table: 750 mm Dia. CBR Driveway Culvert

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	218.85	0.000	0.490	0-NF	0.000	0.000	0.500	0.000	0.000	0.000
0.10	0.10	218.86	0.259	0.499	3-M1t	0.230	0.188	0.500	0.000	0.320	0.000
0.20	0.20	218.88	0.373	0.525	3-M1t	0.334	0.269	0.500	0.000	0.639	0.000
0.30	0.30	218.93	0.482	0.568	3-M1t	0.426	0.333	0.500	0.000	0.959	0.000
0.33	0.33	218.94	0.511	0.584	3-M1t	0.453	0.351	0.500	0.000	1.055	0.000
0.50	0.50	219.06	0.660	0.698	3-M2t	0.750	0.435	0.500	0.000	1.598	0.000
0.60	0.60	219.14	0.745	0.778	3-M2t	0.750	0.478	0.500	0.000	1.918	0.000
0.70	0.70	219.22	0.834	0.860	7-M2c	0.750	0.517	0.517	0.000	2.155	0.000
0.80	0.80	219.30	0.932	0.943	7-M2c	0.750	0.554	0.554	0.000	2.287	0.000
0.90	0.90	219.40	1.042	1.029	7-M2c	0.750	0.586	0.586	0.000	2.429	0.000
1.00	1.00	219.53	1.166	1.120	7-M2c	0.750	0.616	0.616	0.000	2.577	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.36 m, Outlet Elevation (invert): 218.35 m

Culvert Length: 6.70 m, Culvert Slope: 0.0015

****

Table 12 - Summary of Culvert Flows at Crossing: 2232 CBR (Station 1+053.7)

Headwater Elevation (m)	Total Discharge (cms)	750 mm Dia. CBR Driveway Culvert Discharge (cms)	Roadway Discharge (cms)	Iterations
218.85	0.00	0.00	0.00	1
218.86	0.10	0.10	0.00	1
218.88	0.20	0.20	0.00	1
218.93	0.30	0.30	0.00	1
218.94	0.33	0.33	0.00	1
219.06	0.50	0.50	0.00	1
219.14	0.60	0.60	0.00	1
219.22	0.70	0.70	0.00	1
219.30	0.80	0.80	0.00	1
219.40	0.90	0.90	0.00	1
219.53	1.00	1.00	0.00	1
219.54	1.01	1.01	0.00	Overtopping

HY-8 Culvert Analysis Report: 2234 Crystal Beach Road Driveway Culvert

Site Data - Twin 450 mm Dia. CBR Driveway Culverts

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 218.39 m

Outlet Station: 6.10 m

Outlet Elevation: 218.38 m

Number of Barrels: 2

Culvert Data Summary - Twin 450 mm Dia. CBR Driveway Culverts

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2234 CBR (Station 1+067.6)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: 2234 CBR (Station 1+067.6)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 219.42 m

Roadway Surface: Paved

Roadway Top Width: 5.00 m

Table 1 - Culvert Summary Table: Twin 450 mm Dia. CBR Driveway Culverts

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	218.85	0.000	0.460	0-NF	0.000	0.000	0.450	0.000	0.000	0.000
0.10	0.10	218.86	0.211	0.469	4-FFf	0.193	0.152	0.450	0.000	0.314	0.000
0.20	0.20	218.89	0.323	0.497	4-FFf	0.296	0.220	0.450	0.000	0.629	0.000
0.30	0.30	218.93	0.415	0.542	4-FFf	0.450	0.271	0.450	0.000	0.943	0.000
0.33	0.33	218.95	0.443	0.560	4-FFf	0.450	0.284	0.450	0.000	1.037	0.000
0.50	0.50	219.08	0.623	0.689	4-FFf	0.450	0.350	0.450	0.000	1.572	0.000
0.60	0.60	219.18	0.761	0.789	4-FFf	0.450	0.381	0.450	0.000	1.886	0.000
0.70	0.70	219.32	0.929	0.908	4-FFf	0.450	0.404	0.450	0.000	2.201	0.000
0.80	0.77	219.45	1.063	1.002	4-FFf	0.450	0.415	0.450	0.000	2.422	0.000
0.90	0.79	219.50	1.108	1.034	4-FFf	0.450	0.418	0.450	0.000	2.491	0.000
1.00	0.81	219.53	1.143	1.059	4-FFf	0.450	0.421	0.450	0.000	2.545	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.39 m, Outlet Elevation (invert): 218.38 m

Culvert Length: 6.10 m, Culvert Slope: 0.0016

****

Table 2 - Summary of Culvert Flows at Crossing: 2234 CBR (Station 1+067.6)

Headwater Elevation (m)	Total Discharge (cms)	Twin 450 mm Dia. CBR Driveway Culverts Discharge (cms)	Roadway Discharge (cms)	Iterations
218.85	0.00	0.00	0.00	1
218.86	0.10	0.10	0.00	1
218.89	0.20	0.20	0.00	1
218.93	0.30	0.30	0.00	1
218.95	0.33	0.33	0.00	1
219.08	0.50	0.50	0.00	1
219.18	0.60	0.60	0.00	1
219.32	0.70	0.70	0.00	1
219.45	0.80	0.77	0.03	9
219.50	0.90	0.79	0.11	6
219.53	1.00	0.81	0.19	5
219.42	0.75	0.75	0.00	Overtopping

HY-8 Culvert Analysis Report: 2348 Crystal Beach Road Driveway Culvert

Site Data - 300mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.15 m

Outlet Station: 14.10 m

Outlet Elevation: 219.10 m

Number of Barrels: 1

Culvert Data Summary - 300mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2348 CBR (1+500 to 1+560)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 5.40 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.10 m

Roadway Data for Crossing: 2348 CBR (1+500 to 1+560)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 m

Crest Elevation: 220.00 m

Roadway Surface: Gravel

Roadway Top Width: 4.50 m

Table 1 - Culvert Summary Table: 300mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.15	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.02	0.02	219.33	0.160	0.177	3-M1t	0.114	0.106	0.118	0.118	0.773	0.265
0.04	0.04	219.41	0.242	0.261	2-M2c	0.170	0.154	0.154	0.153	1.095	0.315
0.05	0.05	219.45	0.282	0.297	2-M2c	0.198	0.172	0.172	0.167	1.191	0.333
0.08	0.08	219.57	0.420	0.413	7-M2c	0.300	0.220	0.220	0.199	1.442	0.375
0.10	0.10	219.69	0.543	0.544	7-M2c	0.300	0.244	0.244	0.216	1.622	0.397
0.12	0.12	219.85	0.698	0.697	7-M2c	0.300	0.264	0.264	0.231	1.823	0.415
0.14	0.14	220.01	0.860	0.844	7-M2c	0.300	0.276	0.276	0.245	2.017	0.431
0.16	0.14	220.04	0.887	0.869	7-M2c	0.300	0.277	0.277	0.258	2.049	0.446
0.18	0.14	220.06	0.906	0.886	7-M2c	0.300	0.278	0.278	0.269	2.072	0.459
0.20	0.14	220.07	0.923	0.900	7-M2t	0.300	0.278	0.280	0.280	2.083	0.472

****

Straight Culvert

Inlet Elevation (invert): 219.15 m, Outlet Elevation (invert): 219.10 m

Culvert Length: 14.10 m, Culvert Slope: 0.0035

****

Table 2 - Summary of Culvert Flows at Crossing: 2348 CBR (1+500 to 1+560)

Headwater Elevation (m)	Total Discharge (cms)	300mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.15	0.00	0.00	0.00	1
219.33	0.02	0.02	0.00	1
219.41	0.04	0.04	0.00	1
219.45	0.05	0.05	0.00	1
219.57	0.08	0.08	0.00	1
219.69	0.10	0.10	0.00	1
219.85	0.12	0.12	0.00	1
220.01	0.14	0.14	0.00	22
220.04	0.16	0.14	0.02	6
220.06	0.18	0.14	0.04	5
220.07	0.20	0.14	0.06	4
220.00	0.14	0.14	0.00	Overtopping

HY-8 Culvert Analysis Report: 2366 Crystal Beach Road Driveway Culvert

Site Data - 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.13 m

Outlet Station: 8.90 m

Outlet Elevation: 219.12 m

Number of Barrels: 1

Culvert Data Summary - 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2366 CBR (1+580 to 1+670)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 2.70 (_:1)

Channel Slope: 0.0010

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.12 m

Roadway Data for Crossing: 2366 CBR (1+580 to 1+670)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 219.62 m

Roadway Surface: Paved

Roadway Top Width: 5.00 m

Table 1 - Culvert Summary Table: 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.13	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.05	0.05	219.47	0.262	0.344	7-M2t	0.300	0.172	0.296	0.296	0.709	0.212
0.10	0.08	219.64	0.384	0.537	4-FFf	0.300	0.225	0.300	0.383	1.183	0.252
0.10	0.08	219.64	0.384	0.537	4-FFf	0.300	0.225	0.300	0.383	1.183	0.252
0.20	0.09	219.70	0.427	0.691	4-FFf	0.300	0.237	0.300	0.497	1.320	0.300
0.25	0.10	219.72	0.445	0.750	4-FFf	0.300	0.241	0.300	0.541	1.371	0.317
0.30	0.10	219.74	0.465	0.807	4-FFf	0.300	0.245	0.300	0.579	1.429	0.331
0.35	0.10	219.76	0.477	0.852	4-FFf	0.300	0.248	0.300	0.613	1.459	0.344
0.40	0.11	219.78	0.497	0.902	4-FFf	0.300	0.252	0.300	0.645	1.514	0.356
0.45	0.11	219.81	0.520	0.952	4-FFf	0.300	0.256	0.300	0.674	1.571	0.367
0.50	0.11	219.83	0.542	0.999	4-FFf	0.300	0.259	0.300	0.701	1.625	0.377

****

Straight Culvert

Inlet Elevation (invert): 219.13 m, Outlet Elevation (invert): 219.12 m

Culvert Length: 8.90 m, Culvert Slope: 0.0011

****

Table 2 - Summary of Culvert Flows at Crossing: 2366 CBR (1+580 to 1+670)

Headwater Elevation (m)	Total Discharge (cms)	300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.13	0.00	0.00	0.00	1
219.47	0.05	0.05	0.00	1
219.64	0.10	0.08	0.02	13
219.64	0.10	0.08	0.02	2
219.70	0.20	0.09	0.11	5
219.72	0.25	0.10	0.15	4
219.74	0.30	0.10	0.20	4
219.76	0.35	0.10	0.25	4
219.78	0.40	0.11	0.30	6
219.81	0.45	0.11	0.34	11
219.83	0.50	0.11	0.39	9
219.62	0.08	0.08	0.00	Overtopping

HY-8 Culvert Analysis Report: 2396 Crystal Beach Road Driveway Culvert

Site Data - Twin 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 218.87 m

Outlet Station: 6.50 m

Outlet Elevation: 218.84 m

Number of Barrels: 2

Culvert Data Summary - Twin 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2396 CBR (1+670 to 1+810)

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 218.85 m

Roadway Data for Crossing: 2396 CBR (1+670 to 1+810)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 5.00 m

Crest Elevation: 219.53 m

Roadway Surface: Gravel

Roadway Top Width: 1.00 m

Table 1 - Culvert Summary Table: Twin 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	218.87	0.000	0.000	0-NF	0.000	0.000	0.010	0.000	0.000	0.000
0.02	0.02	218.97	0.103	0.046	1-S2n	0.074	0.074	0.074	0.000	0.722	0.000
0.04	0.04	219.02	0.148	0.084	1-S2n	0.106	0.106	0.106	0.000	0.870	0.000
0.06	0.06	219.06	0.191	0.122	1-S2n	0.132	0.132	0.132	0.000	0.966	0.000
0.07	0.07	219.10	0.210	0.227	2-M2c	0.145	0.144	0.144	0.000	1.046	0.000
0.10	0.10	219.15	0.262	0.277	2-M2c	0.180	0.172	0.172	0.000	1.191	0.000
0.12	0.12	219.18	0.295	0.309	7-M2c	0.205	0.189	0.189	0.000	1.275	0.000
0.14	0.14	219.21	0.330	0.341	7-M2c	0.235	0.205	0.205	0.000	1.364	0.000
0.16	0.16	219.24	0.369	0.374	7-M2c	0.300	0.220	0.220	0.000	1.442	0.000
0.18	0.18	219.28	0.412	0.410	7-M2c	0.300	0.233	0.233	0.000	1.530	0.000
0.20	0.20	219.33	0.460	0.453	7-M2c	0.300	0.244	0.244	0.000	1.622	0.000

****

Straight Culvert

Inlet Elevation (invert): 218.87 m, Outlet Elevation (invert): 218.84 m

Culvert Length: 6.50 m, Culvert Slope: 0.0046

****

Table 2 - Summary of Culvert Flows at Crossing: 2396 CBR (1+670 to 1+810)

Headwater Elevation (m)	Total Discharge (cms)	Twin 300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
218.87	0.00	0.00	0.00	1
218.97	0.02	0.02	0.00	1
219.02	0.04	0.04	0.00	1
219.06	0.06	0.06	0.00	1
219.10	0.07	0.07	0.00	1
219.15	0.10	0.10	0.00	1
219.18	0.12	0.12	0.00	1
219.21	0.14	0.14	0.00	1
219.24	0.16	0.16	0.00	1
219.28	0.18	0.18	0.00	1
219.33	0.20	0.20	0.00	1
219.53	0.27	0.27	0.00	Overtopping

TALL TREE LANE

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Tall Tree Lane (W) STA. 3+040

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.002	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.3	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.9	m	
AREA	2.261	m^2	
WETTED PERIMETER	5.584	m	
HYDRAULIC RADIUS	0.405	m	
FULL FLOW CAPACITY	1.383	m^3/s	

Proposed
Roadside Ditch - Tall Tree Lane (W) STA. 3+170

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.3	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.3	m	
AREA	0.283	m^2	
WETTED PERIMETER	1.980	m	
HYDRAULIC RADIUS	0.143	m	
FLOW CAPACITY	0.137	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Tall Tree Lane (W) STA. 3+190

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.004	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.1	:1 H:V	
DEPTH	0.6	m	
AREA	1.103	m^2	
WETTED PERIMETER	3.868	m	
HYDRAULIC RADIUS	0.285	m	
FLOW CAPACITY	0.756	m^3/s	

Proposed
Roadside Ditch - Tall Tree Lane (E) STA. 3+040

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.002	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.8	:1 H:V	
DEPTH	0.45	m	
AREA	0.684	m^2	
WETTED PERIMETER	3.174	m	
HYDRAULIC RADIUS	0.216	m	
FLOW CAPACITY	0.275	m^3/s	

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Tall Tree Lane (E) STA. 3+160

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.002	m/m
BOTTOM WIDTH	0.0	
RIGHT SIDE SLOPE	3.0	:1 H:V
LEFT SIDE SLOPE	3.0	:1 H:V
DEPTH	0.25	m
AREA	0.188	m^2
WETTED PERIMETER	1.585	m
HYDRAULIC RADIUS	0.119	m
FLOW CAPACITY	0.051	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Proposed
Roadside Ditch - Tall Tree Lane (E) STA. 3+190

CHANNEL PROPERTIES

MANNING'S COEFF	0.040	
SLOPE	0.005	m/m
BOTTOM WIDTH	0.0	
RIGHT SIDE SLOPE	3.0	:1 H:V
LEFT SIDE SLOPE	2.9	:1 H:V
DEPTH	0.65	m
AREA	1.248	m^2
WETTED PERIMETER	4.054	m
HYDRAULIC RADIUS	0.308	m
FLOW CAPACITY	1.006	m^3/s

Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)

Manning's Equation

Channel capacity calculations using Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Roadside Ditch - Tall Tree Lane (E) STA. 3+240

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.003	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.6	:1 H:V	
DEPTH	0.6	m	
AREA	1.181	m^2	
WETTED PERIMETER	4.115	m	
HYDRAULIC RADIUS	0.287	m	
FLOW CAPACITY	0.667	m^3/s	

HY-8 Culvert Analysis Report: 2360 Tall Tree Lane Driveway Culvert

Site Data - Twin 375 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.20 m

Outlet Station: 8.80 m

Outlet Elevation: 219.17 m

Number of Barrels: 2

Culvert Data Summary - Twin 375 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 375.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2360 TTL W(3+020 to 3+105)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.10 (_:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.17 m

Roadway Data for Crossing: 2360 TTL W(3+020 to 3+105)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.06 m

Roadway Surface: Paved

Roadway Top Width: 4.00 m

Table 1 - Culvert Summary Table: Twin 375 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.20	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.38	0.119	0.180	3-M1t	0.091	0.086	0.203	0.203	0.246	0.235
0.03	0.03	219.39	0.127	0.191	3-M1t	0.097	0.091	0.213	0.213	0.263	0.243
0.09	0.09	219.50	0.217	0.299	3-M1t	0.162	0.152	0.306	0.306	0.466	0.310
0.12	0.12	219.54	0.260	0.345	3-M1t	0.191	0.178	0.341	0.341	0.569	0.333
0.15	0.15	219.59	0.298	0.389	7-M1t	0.220	0.200	0.371	0.371	0.680	0.352
0.18	0.18	219.64	0.333	0.438	4-FFf	0.249	0.218	0.375	0.397	0.815	0.368
0.21	0.21	219.69	0.369	0.487	4-FFf	0.283	0.237	0.375	0.421	0.951	0.383
0.24	0.24	219.74	0.407	0.537	4-FFf	0.375	0.255	0.375	0.442	1.086	0.396
0.27	0.27	219.79	0.447	0.591	4-FFf	0.375	0.270	0.375	0.462	1.222	0.407
0.30	0.30	219.85	0.492	0.646	4-FFf	0.375	0.284	0.375	0.481	1.358	0.418

****

Straight Culvert

Inlet Elevation (invert): 219.20 m, Outlet Elevation (invert): 219.17 m

Culvert Length: 8.80 m, Culvert Slope: 0.0034

****

Table 2 - Summary of Culvert Flows at Crossing: 2360 TTL W(3+020 to 3+105)

Headwater Elevation (m)	Total Discharge (cms)	Twin 375 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.20	0.00	0.00	0.00	1
219.38	0.03	0.03	0.00	1
219.39	0.03	0.03	0.00	1
219.50	0.09	0.09	0.00	1
219.54	0.12	0.12	0.00	1
219.59	0.15	0.15	0.00	1
219.64	0.18	0.18	0.00	1
219.69	0.21	0.21	0.00	1
219.74	0.24	0.24	0.00	1
219.79	0.27	0.27	0.00	1
219.85	0.30	0.30	0.00	1
220.06	0.40	0.40	0.00	Overtopping

HY-8 Culvert Analysis Report: 2374 Tall Tree Lane Driveway Culvert

Site Data - Twin 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.24 m

Outlet Station: 9.50 m

Outlet Elevation: 219.18 m

Number of Barrels: 2

Culvert Data Summary - Twin 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Channel Data - 2374 TTL W(3+105 to 3+180)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.10 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.18 m

Roadway Data for Crossing: 2374 TTL W(3+105 to 3+180)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.05 m

Roadway Surface: Paved

Roadway Top Width: 4.50 m

Table 1 - Culvert Summary Table: Twin 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.24	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.38	0.127	0.141	1-S1t	0.084	0.091	0.171	0.171	0.350	0.332
0.06	0.06	219.45	0.191	0.207	1-S1t	0.121	0.132	0.222	0.222	0.521	0.394
0.09	0.09	219.50	0.245	0.263	1-S1t	0.153	0.163	0.258	0.258	0.679	0.437
0.10	0.10	219.52	0.261	0.281	1-S1t	0.163	0.172	0.268	0.268	0.732	0.448
0.15	0.15	219.63	0.349	0.387	4-FFf	0.217	0.213	0.300	0.312	1.061	0.496
0.18	0.18	219.71	0.411	0.468	4-FFf	0.300	0.233	0.300	0.334	1.273	0.519
0.21	0.21	219.80	0.486	0.558	4-FFf	0.300	0.250	0.300	0.354	1.485	0.540
0.24	0.24	219.90	0.573	0.657	4-FFf	0.300	0.264	0.300	0.373	1.698	0.558
0.27	0.27	220.00	0.673	0.765	4-FFf	0.300	0.274	0.300	0.389	1.910	0.575
0.30	0.29	220.07	0.735	0.836	4-FFf	0.300	0.279	0.300	0.405	2.028	0.590

****

Straight Culvert

Inlet Elevation (invert): 219.24 m, Outlet Elevation (invert): 219.18 m

Culvert Length: 9.50 m, Culvert Slope: 0.0063

****

Table 2 - Summary of Culvert Flows at Crossing: 2374 TTL W(3+105 to 3+180)

Headwater Elevation (m)	Total Discharge (cms)	Twin 300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.24	0.00	0.00	0.00	1
219.38	0.03	0.03	0.00	1
219.45	0.06	0.06	0.00	1
219.50	0.09	0.09	0.00	1
219.52	0.10	0.10	0.00	1
219.63	0.15	0.15	0.00	1
219.71	0.18	0.18	0.00	1
219.80	0.21	0.21	0.00	1
219.90	0.24	0.24	0.00	1
220.00	0.27	0.27	0.00	1
220.07	0.30	0.29	0.01	10
220.05	0.28	0.28	0.00	Overtopping

HY-8 Culvert Analysis Report: 2388 Tall Tree Lane Driveway Culvert

Site Data - 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.34 m

Outlet Station: 7.70 m

Outlet Elevation: 219.30 m

Number of Barrels: 1

Culvert Data Summary - 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2388 TTL W(3+180 to 3+220)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.10 (_:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.30 m

Roadway Data for Crossing: 2388 TTL W(3+180 to 3+220)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.05 m

Roadway Surface: Paved

Roadway Top Width: 4.10 m

Table 1 - Culvert Summary Table: 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.34	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.54	0.203	0.155	1-S2n	0.128	0.132	0.128	0.171	1.011	0.332
0.06	0.06	219.68	0.323	0.336	7-M1t	0.197	0.189	0.222	0.222	1.072	0.394
0.09	0.09	219.82	0.477	0.446	3-M2t	0.300	0.233	0.258	0.258	1.392	0.437
0.10	0.10	219.88	0.543	0.498	7-M2t	0.300	0.244	0.268	0.268	1.499	0.448
0.15	0.12	220.08	0.740	0.682	4-FFf	0.300	0.268	0.300	0.312	1.764	0.496
0.18	0.13	220.10	0.759	0.718	4-FFf	0.300	0.269	0.300	0.334	1.793	0.519
0.21	0.13	220.11	0.775	0.749	4-FFf	0.300	0.270	0.300	0.354	1.817	0.540
0.24	0.13	220.13	0.789	0.778	4-FFf	0.300	0.271	0.300	0.373	1.839	0.558
0.27	0.13	220.14	0.802	0.804	4-FFf	0.300	0.272	0.300	0.389	1.857	0.575
0.30	0.13	220.15	0.814	0.828	4-FFf	0.300	0.273	0.300	0.405	1.875	0.590

****

Straight Culvert

Inlet Elevation (invert): 219.34 m, Outlet Elevation (invert): 219.30 m

Culvert Length: 7.70 m, Culvert Slope: 0.0052

****

Table 2 - Summary of Culvert Flows at Crossing: 2388 TTL W(3+180 to 3+220)

Headwater Elevation (m)	Total Discharge (cms)	300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.34	0.00	0.00	0.00	1
219.54	0.03	0.03	0.00	1
219.68	0.06	0.06	0.00	1
219.82	0.09	0.09	0.00	1
219.88	0.10	0.10	0.00	1
220.08	0.15	0.12	0.03	12
220.10	0.18	0.13	0.05	5
220.11	0.21	0.13	0.08	4
220.13	0.24	0.13	0.11	4
220.14	0.27	0.13	0.14	3
220.15	0.30	0.13	0.17	3
220.05	0.12	0.12	0.00	Overtopping

HY-8 Culvert Analysis Report: 2366 Tall Tree Lane Driveway Culvert

Site Data - Ex. 300 mm CSP

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.25 m

Outlet Station: 15.90 m

Outlet Elevation: 219.25 m

Number of Barrels: 1

Culvert Data Summary - Ex. 300 mm CSP

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Corrugated Steel

Embedment: 0.00 mm

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2366 TTL E (3+040 to 3+120)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.40 (_:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.25 m

Roadway Data for Crossing: 2366 TTL E (3+040 to 3+120)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 219.85 m

Roadway Surface: Gravel

Roadway Top Width: 7.50 m

Table 1 - Culvert Summary Table: Ex. 300 mm CSP

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.25	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.53	0.203	0.284	7-H2t	-0.305	0.132	0.196	0.196	0.615	0.231
0.06	0.06	219.62	0.324	0.370	7-H2t	-0.305	0.189	0.254	0.254	0.942	0.274
0.09	0.09	219.73	0.478	0.457	7-H2t	-0.305	0.233	0.295	0.295	1.260	0.304
0.10	0.09	219.86	0.503	0.987	4-FFf	-0.305	0.237	0.300	0.307	1.329	0.312
0.15	0.09	219.91	0.503	1.037	4-FFf	-0.305	0.237	0.300	0.358	1.329	0.345
0.18	0.09	219.92	0.503	1.062	4-FFf	-0.305	0.237	0.300	0.383	1.329	0.361
0.21	0.09	219.94	0.503	1.085	4-FFf	-0.305	0.237	0.300	0.406	1.329	0.375
0.24	0.09	219.95	0.503	1.106	4-FFf	-0.305	0.237	0.300	0.426	1.329	0.388
0.27	0.09	219.97	0.503	1.125	4-FFf	-0.305	0.237	0.300	0.446	1.329	0.400
0.30	0.09	219.98	0.503	1.143	4-FFf	-0.305	0.237	0.300	0.464	1.329	0.410

****

Straight Culvert

Inlet Elevation (invert): 219.25 m, Outlet Elevation (invert): 219.25 m

Culvert Length: 15.90 m, Culvert Slope: 0.0000

****

Table 2 - Summary of Culvert Flows at Crossing: 2366 TTL E (3+040 to 3+120)

Headwater Elevation (m)	Total Discharge (cms)	Ex. 300 mm CSP Discharge (cms)	Roadway Discharge (cms)	Iterations
219.25	0.00	0.00	0.00	1
219.53	0.03	0.03	0.00	1
219.62	0.06	0.06	0.00	1
219.73	0.09	0.09	0.00	1
219.86	0.10	0.09	0.01	34
219.91	0.15	0.09	0.06	6
219.92	0.18	0.09	0.09	4
219.94	0.21	0.09	0.12	4
219.95	0.24	0.09	0.15	3
219.97	0.27	0.09	0.18	3
219.98	0.30	0.09	0.21	3
219.85	0.09	0.09	0.00	Overtopping

HY-8 Culvert Analysis Report: 2383 Tall Tree Lane Driveway Culvert

Site Data - 450 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.20 m

Outlet Station: 8.30 m

Outlet Elevation: 219.14 m

Number of Barrels: 1

Culvert Data Summary - 450 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 450.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2383 TTL E(3+120 to 3+180)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0020

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.25 m

Roadway Data for Crossing: 2383 TTL E(3+120 to 3+180)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.08 m

Roadway Surface: Paved

Roadway Top Width: 4.00 m

Table 1 - Culvert Summary Table: 450 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.25	0.000	0.050	0-NF	0.000	0.000	0.110	0.000	0.000	0.000
0.03	0.03	219.47	0.173	0.265	1-S1t	0.100	0.117	0.315	0.205	0.245	0.237
0.06	0.06	219.54	0.252	0.341	1-S1t	0.142	0.167	0.376	0.266	0.413	0.282
0.09	0.09	219.60	0.319	0.404	1-S1t	0.177	0.208	0.420	0.310	0.573	0.312
0.10	0.10	219.62	0.341	0.424	1-S1t	0.187	0.220	0.433	0.323	0.629	0.320
0.15	0.15	219.73	0.449	0.532	1-S1f	0.237	0.271	0.450	0.376	0.943	0.354
0.18	0.18	219.80	0.520	0.604	4-FFf	0.266	0.298	0.450	0.402	1.132	0.371
0.21	0.21	219.88	0.599	0.683	4-FFf	0.296	0.322	0.450	0.426	1.320	0.385
0.24	0.24	219.97	0.689	0.768	4-FFf	0.329	0.343	0.450	0.448	1.509	0.398
0.27	0.27	220.06	0.793	0.860	4-FFf	0.450	0.364	0.450	0.468	1.698	0.410
0.30	0.28	220.10	0.842	0.913	4-FFf	0.450	0.372	0.450	0.487	1.780	0.421

****

Straight Culvert

Inlet Elevation (invert): 219.20 m,   Outlet Elevation (invert): 219.14 m

Culvert Length: 8.30 m,   Culvert Slope: 0.0072

****

Table 2 - Summary of Culvert Flows at Crossing: 2383 TTL E(3+120 to 3+180)

Headwater Elevation (m)	Total Discharge (cms)	450 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.25	0.00	0.00	0.00	1
219.47	0.03	0.03	0.00	1
219.54	0.06	0.06	0.00	1
219.60	0.09	0.09	0.00	1
219.62	0.10	0.10	0.00	1
219.73	0.15	0.15	0.00	1
219.80	0.18	0.18	0.00	1
219.88	0.21	0.21	0.00	1
219.97	0.24	0.24	0.00	1
220.06	0.27	0.27	0.00	1
220.10	0.30	0.28	0.02	8
220.08	0.28	0.28	0.00	Overtopping

HY-8 Culvert Analysis Report: 2387 Tall Tree Lane Driveway Culvert

Site Data - Twin 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.21 m

Outlet Station: 9.20 m

Outlet Elevation: 219.15 m

Number of Barrels: 2

Culvert Data Summary - Twin 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2387 TTL E (3+180 to 3+235)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0040

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.15 m

Roadway Data for Crossing: 2387 TTL E (3+180 to 3+235)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.07 m

Roadway Surface: Paved

Roadway Top Width: 8.00 m

Table 1 - Culvert Summary Table: Twin 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.21	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
0.03	0.03	219.36	0.138	0.151	1-S1t	0.083	0.091	0.180	0.180	0.327	0.307
0.06	0.06	219.43	0.202	0.222	1-S1t	0.120	0.132	0.234	0.234	0.493	0.365
0.09	0.09	219.49	0.262	0.283	1-S1t	0.151	0.163	0.272	0.272	0.653	0.404
0.10	0.10	219.51	0.282	0.303	1-S1t	0.161	0.172	0.283	0.283	0.708	0.415
0.15	0.15	219.64	0.393	0.426	4-FFf	0.214	0.213	0.300	0.330	1.061	0.459
0.18	0.18	219.73	0.477	0.518	4-FFf	0.300	0.233	0.300	0.353	1.273	0.481
0.21	0.21	219.83	0.578	0.620	4-FFf	0.300	0.250	0.300	0.374	1.485	0.500
0.24	0.24	219.94	0.698	0.733	4-FFf	0.300	0.264	0.300	0.394	1.698	0.516
0.27	0.27	220.07	0.838	0.856	4-FFf	0.300	0.274	0.300	0.411	1.910	0.532
0.30	0.28	220.10	0.875	0.900	4-FFf	0.300	0.276	0.300	0.428	1.961	0.546

****

Straight Culvert

Inlet Elevation (invert): 219.21 m, Outlet Elevation (invert): 219.15 m

Culvert Length: 9.20 m, Culvert Slope: 0.0065

****

Table 2 - Summary of Culvert Flows at Crossing: 2387 TTL E (3+180 to 3+235)

Headwater Elevation (m)	Total Discharge (cms)	Twin 300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.21	0.00	0.00	0.00	1
219.36	0.03	0.03	0.00	1
219.43	0.06	0.06	0.00	1
219.49	0.09	0.09	0.00	1
219.51	0.10	0.10	0.00	1
219.64	0.15	0.15	0.00	1
219.73	0.18	0.18	0.00	1
219.83	0.21	0.21	0.00	1
219.94	0.24	0.24	0.00	1
220.07	0.27	0.27	0.00	1
220.10	0.30	0.28	0.02	7
220.07	0.27	0.27	0.00	Overtopping

HY-8 Culvert Analysis Report: 2395 Tall Tree Lane Driveway Culvert

Site Data - Twin 300 mm Dia. HDPE

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.25 m

Outlet Station: 7.80 m

Outlet Elevation: 219.22 m

Number of Barrels: 2

Culvert Data Summary - Twin 300 mm Dia. HDPE

Barrel Shape: Circular

Barrel Diameter: 300.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - 2395 TTL E(3+235 to 3+250)

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.30 (_:1)

Channel Slope: 0.0030

Channel Manning's n: 0.0400

Channel Invert Elevation: 219.24 m

Roadway Data for Crossing: 2395 TTL E(3+235 to 3+250)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 m

Crest Elevation: 220.00 m

Roadway Surface: Paved

Roadway Top Width: 5.50 m

Table 1 - Culvert Summary Table: Twin 300 mm Dia. HDPE

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.00	0.00	219.25	0.000	0.000	0-NF	0.000	0.000	0.020	0.000	0.000	0.000
0.03	0.03	219.44	0.138	0.187	3-M1t	0.095	0.091	0.203	0.183	0.294	0.270
0.06	0.06	219.51	0.203	0.257	3-M1t	0.139	0.132	0.258	0.238	0.464	0.322
0.09	0.09	219.57	0.262	0.320	7-M1t	0.179	0.163	0.297	0.277	0.638	0.356
0.10	0.10	219.59	0.282	0.344	3-M1f	0.192	0.172	0.300	0.288	0.707	0.365
0.15	0.15	219.72	0.394	0.474	4-FFf	0.300	0.213	0.300	0.335	1.061	0.404
0.18	0.18	219.81	0.478	0.563	4-FFf	0.300	0.233	0.300	0.359	1.273	0.423
0.21	0.21	219.91	0.578	0.662	4-FFf	0.300	0.250	0.300	0.380	1.485	0.440
0.24	0.24	220.01	0.683	0.759	4-FFf	0.300	0.262	0.300	0.400	1.672	0.455
0.27	0.24	220.03	0.714	0.800	4-FFf	0.300	0.265	0.300	0.418	1.723	0.468
0.30	0.25	220.05	0.731	0.829	4-FFf	0.300	0.267	0.300	0.435	1.750	0.481

****

Straight Culvert

Inlet Elevation (invert): 219.25 m, Outlet Elevation (invert): 219.22 m

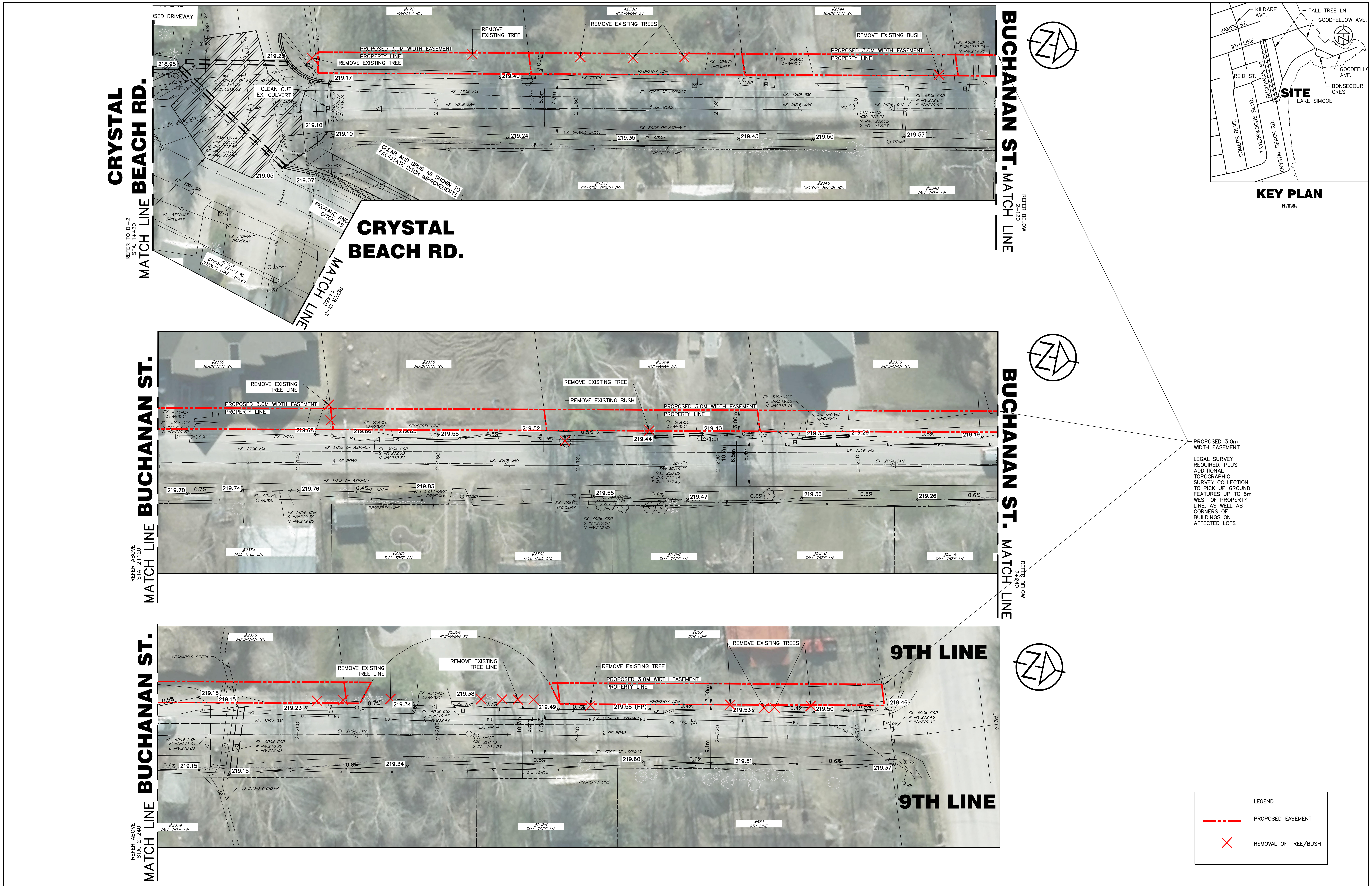
Culvert Length: 7.80 m, Culvert Slope: 0.0038

****

Table 2 - Summary of Culvert Flows at Crossing: 2395 TTL E(3+235 to 3+250)

Headwater Elevation (m)	Total Discharge (cms)	Twin 300 mm Dia. HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.25	0.00	0.00	0.00	1
219.44	0.03	0.03	0.00	1
219.51	0.06	0.06	0.00	1
219.57	0.09	0.09	0.00	1
219.59	0.10	0.10	0.00	1
219.72	0.15	0.15	0.00	1
219.81	0.18	0.18	0.00	1
219.91	0.21	0.21	0.00	1
220.01	0.24	0.24	0.00	17
220.03	0.27	0.24	0.03	6
220.05	0.30	0.25	0.05	5
220.00	0.23	0.23	0.00	Overtopping

BUCHANAN STREET



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BENCHMARKS

TBM1 – ELEVATION 219.60
DOUBLE SPIKE IN SOUTH FACE OF HYDRO POLE AT SOUTH–EAST INTERSECTION OF 9TH LINE AND GOODFELLOW AVE.

TBM2 – ELEVATION 219.96
BOLT ON WEST FACE OF HYDRO POLE AT INTERSECTION OF CRYSTAL BEACH ROAD, GOODFELLOW AVE, AND BONSECOUR CRESCENT. THE HYDO POLE IS LOCATED ON THE EAST SIDE OF THE ROAD, BETWEEN HOUSE 2371 & 2369.

TBM3 – ELEVATION 220.16
NAIL AND WASHERS IN NORTH FACE OF HYDRO POLE AT SOUTH SIDE OF INTERSECTION OF CRYSTAL BEACH ROAD AND TALL TREE LANE ON SOUTH SIDE OF CRYSTAL BEACH ROAD, POLE IN FRONT OF HOUSE #2351

NOTES

TOPOGRAPHIC SURVEY COMPLETED BY TATHAM ENGINEERING FOR THE TOWN OF INNISFIL VARIOUS ROADS DRAINAGE STUDY COMPLETED AUGUST 2020

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR 30% DESIGN	OCT 10/20
2.	ISSUED FOR 30% DESIGN ADDENDUM 1	JAN 29/21
3.	ISSUED FOR VIRTUAL PUBLIC ENGAGEMENT	MAY 14/21
4.	ISSUED FOR 60% DESIGN	AUG 08/21
5.	ISSUED FOR 100% DESIGN	FEB 04/22

ENGINEER STAMP

2020 VARIOUS ROADS DRAINAGE IMPROVEMENTS

INNISFIL, ON

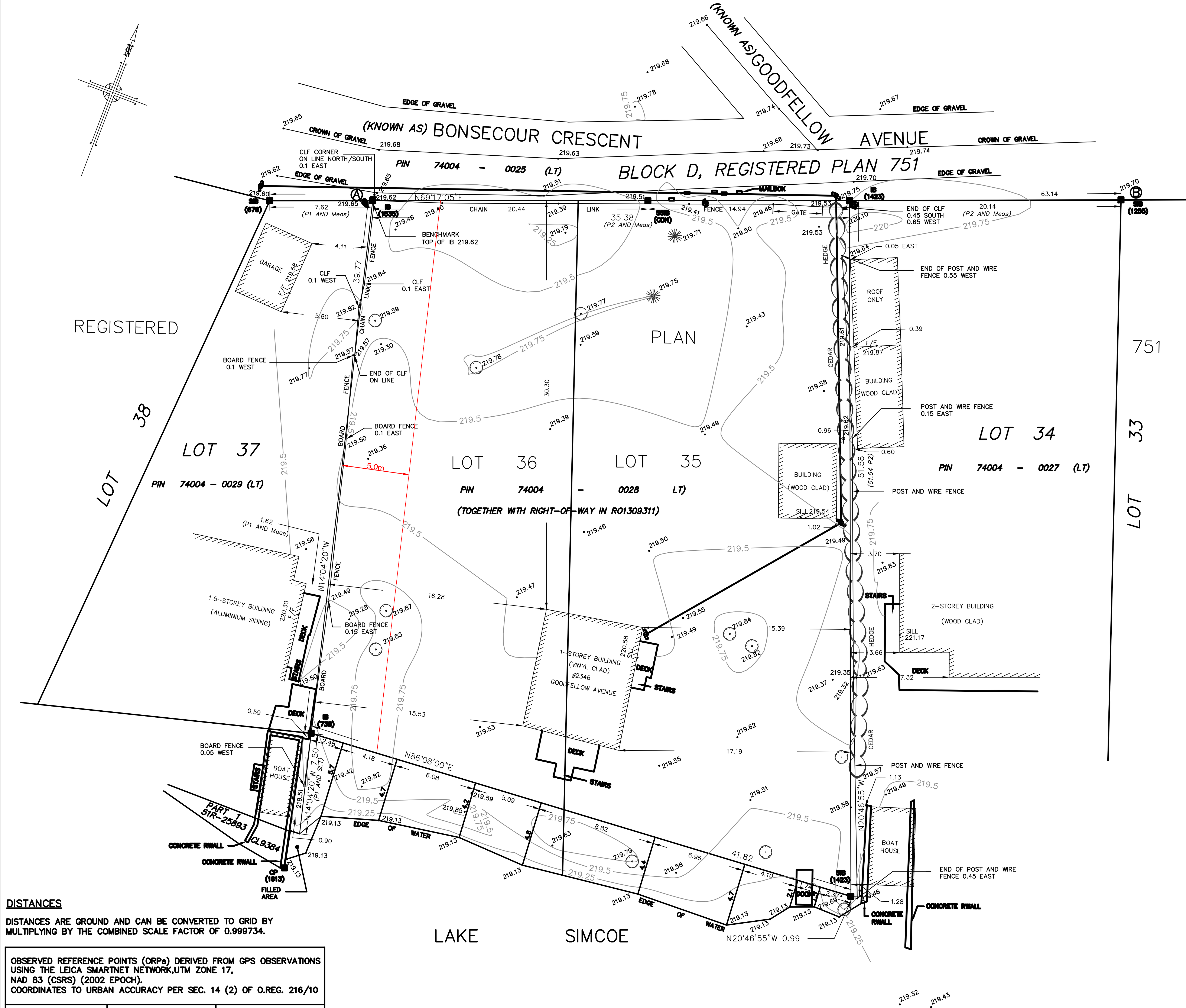
BUCHANAN STREET
STA. 2+000 – STA. 2+360

TATHAM ENGINEERING

DESIGN: NHF	FILE: 420395	DWG:	DI-PROP
DRAWN: SD	DATE: OCT 2020		
CHECK: ALK	SCALE: 1:250		

Drawing Name: 420395–DI01.dwg, Plotted: Jul 19, 2022

GOODFELLOW AVENUE & BONSECOUR CRESCENT



TOPOGRAPHIC SURVEY OF

ALL OF LOT 35 AND 36
REGISTERED PLAN 751

GEOGRAPHIC TOWNSHIP OF INNISFIL
TOWN OF INNISFIL
COUNTY OF SIMCOE

SCALE 1 : 200

2 0 10 20 metres

RUDY MAK SURVEYING LTD.

ELEVATION NOTE:

ELEVATION ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM OBSERVED REFERENCE POINTS (ORP) USING THE LEICA SMARTNET NETWORK (2010 EPOCH) AND ARE REFERRED TO THE CGVD-1928:1978 DATUM.

BENCHMARK

SITE BENCHMARK IS THE TOP OF THE SIB AT THE NORTHWEST CORNER OF LOT 36, REGISTERED PLAN 751, HAVING AN ELEVATION OF 219.62.

NOTES:

THIS TOPOGRAPHIC SURVEY PLAN DELINEATES THE FEATURES AS SHOWN AND VISIBLE, GIVEN THE SITE CONDITIONS. CONSTRUCTION ACTIVITY, FROZEN GROUND, SNOW COVER, ETC. MAY HAVE HIDDEN FEATURES OTHERWISE VISIBLE. THE LOCATION OF UNDERGROUND SERVICES, IF SHOWN, WAS DERIVED FROM PLANS OBTAINED FROM OTHER AGENCIES. RUDY MAK SURVEYING CANNOT BE HELD RESPONSIBLE FOR THE LOCATION AND ACCURACY OF UNDERGROUND SERVICES. THE LOCATION OF ALL SERVICES MUST BE VERIFIED ON SITE. ONLY A SIGNED AND SEALED PAPER COPY OF THIS SURVEY IS AN ORIGINAL COPY. NO DIGITAL VERSION OF THIS PLAN IS TO BE CONSIDERED "ORIGINAL" AND MAY HAVE BEEN ALTERED BY OTHERS.

LEGEND

	DENOTES	FOUND SURVEY MONUMENT
SIB	DENOTES	STANDARD IRON BAR
IB	DENOTES	IRON BAR
RWALL	DENOTES	RETAINING WALL
F/F	DENOTES	FINISHED FLOOR
CLF	DENOTES	CHAIN LINK FENCE
	DENOTES	FENCING
(676)	DENOTES	A.F. ALLMAN, O.L.S.
(738)	DENOTES	R.C. KIRKPATRICK, O.L.S.
(1255)	DENOTES	R.C. RAIKES, O.L.S.
(1423)	DENOTES	R.R. KRUPOWICZ
(1535)	DENOTES	P. MANSFIELD, O.L.S.
(CDN)	DENOTES	CDN LAND SURVEYORS INC.
(P1)	DENOTES	SURVEYORS REAL PROPERTY REPORT BY EPLETT AND WOROBEC SURVEYING LTD, OLS DATED APRIL 26, 1996
(P2)	DENOTES	SURVEYORS REAL PROPERTY REPORT BY RICHARD ROBERT KRUPOWICZ SURVEYING LTD, OLS DATED 1997
	DENOTES	WATER VALVE
	DENOTES	BELL BOX
	DENOTES	UTILITY POLE
	DENOTES	OVERHEAD WIRES
	DENOTES	DECIDUOUS TREE
	DENOTES	CONIFEROUS TREE

REVISION	BY	DATE
FIRST ISSUE	YHZ	JUNE 8, 2018

T:\BLOCK-CAD\BORDER-RUDYMAK\Rudy Mak 45132 web logo.jpg

89 BIG BAY POINT ROAD
BARRIE, ONTARIO L4N 8M5 (705) 722-3845
E-MAIL MAIL@MAKSURVEYING.COM

DRAWN BY: YHZ	CHECK BY: BJS	FILE No. 13132TOPO

DISTANCES

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999734.

OBSERVED REFERENCE POINTS (ORPs) DERIVED FROM GPS OBSERVATIONS USING THE LEICA SMARTNET NETWORK,UTM ZONE 17, NAD 83 (CSRS) (2002 EPOCH).
COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
ORP A	4909586.74	617117.44
ORP B	4909606.37	617169.35

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THE PLAN.

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BEARING NOTE

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A TO B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010 EPOCH).

FOR BEARING COMPARISONS, A ROTATION OF 01°22'55" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN 51R-25893.

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

TATHAM ENGINEERING

PROJECT	TOI Various Roads	FILE	420395
		DATE	October 2022
SUBJECT	2346 Goodfellow Ave - Manning's Equation Flow Calculations	NAME	NHF
		PAGE	1 OF 1

Channel capacity calculations using Manning's Equation

Manning's Equation

$$Q = \frac{1}{n} A R^{2/3} s^{1/2}$$

Proposed
Easement Ditch - 2346 Goodfellow Avenue

CHANNEL PROPERTIES

MANNING'S COEFF	0.040		Grassed Channels and Swales - Kentucky bluegrass length 0.10 - 0.15m, greater than 0.20m flow depth (MTO Drainage Management Manual Design Chart 2.01)
SLOPE	0.005	m/m	
BOTTOM WIDTH	0.0		
RIGHT SIDE SLOPE	3.0	:1 H:V	
LEFT SIDE SLOPE	3.0	:1 H:V	
DEPTH	0.2	m	
AREA	0.120	m^2	
WETTED PERIMETER	1.265	m	
HYDRAULIC RADIUS	0.095	m	
FULL FLOW CAPACITY	0.044	m^3/s	

Updated
Alternative #5

HY-8 Culvert Analysis Report: PROP. 600 HDPE Crossing Buchanan

Crossing Notes:
Replacement of existing 600 CSP with Prop. 600 HDPE culvert. Modelled with tailwater in Crystal Beach Roadside ditch at approximate 5-year level.

Site Data - 600 HDPE Crossing Buchanan

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.05 m

Outlet Station: 20.50 m

Outlet Elevation: 218.95 m

Number of Barrels: 1

Culvert Data Summary - 600 HDPE Crossing Buchanan

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Prop 600 HDPE Crossing Buchanan

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.53 m

Roadway Data for Crossing: Prop 600 HDPE Crossing Buchanan

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	220.24
1	11.90	220.16
2	20.90	220.21

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: Prop 600 HDPE Crossing Buchanan

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.53	0.207	0.485	1-S1t	0.129	0.140	0.580	0.580	0.177	0.000
5yr 24hr SCS	0.09	0.09	219.54	0.283	0.495	1-S1t	0.174	0.190	0.580	0.580	0.318	0.000
10yr 24hr SCS	0.13	0.13	219.56	0.347	0.511	1-S1t	0.211	0.229	0.580	0.580	0.459	0.000
25yr 24hr SCS	0.17	0.17	219.58	0.406	0.533	1-S1t	0.244	0.265	0.580	0.580	0.600	0.000
50yr 24hr SCS	0.21	0.21	219.61	0.462	0.560	1-S1t	0.275	0.296	0.580	0.580	0.741	0.000
100yr 24hr SCS	0.25	0.25	219.64	0.518	0.593	1-S1t	0.305	0.324	0.580	0.580	0.883	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.05 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 20.50 m, Culvert Slope: 0.0049

****

Summary of Culvert Flows at Crossing: Prop 600 HDPE Crossing Buchanan

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	600 HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.53	2yr 24hr SCS	0.05	0.05	0.00	1
219.54	5yr 24hr SCS	0.09	0.09	0.00	1
219.56	10yr 24hr SCS	0.13	0.13	0.00	1
219.58	25yr 24hr SCS	0.17	0.17	0.00	1
219.61	50yr 24hr SCS	0.21	0.21	0.00	1
219.64	100yr 24hr SCS	0.25	0.25	0.00	1
220.16	Overtopping	0.58	0.58	0.00	Overtopping

HY-8 Culvert Analysis Report: Prop 600 HDPE Crossing Hartley

Crossing Notes:
New 600 HDPE culvert. Modelled with tailwater in Crystal Beach Roadside ditch at approximate 5-year level.

Site Data - Prop 600 HDPE Crossing Hartley

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 m

Inlet Elevation: 219.20 m

Outlet Station: 14.50 m

Outlet Elevation: 218.95 m

Number of Barrels: 1

Culvert Data Summary - Prop 600 HDPE Crossing Hartley

Barrel Shape: Circular

Barrel Diameter: 600.00 mm

Barrel Material: Smooth HDPE

Embedment: 0.00 mm

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Channel Data - Prop 600 HDPE Crossing Hartley

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 219.53 m

Roadway Data for Crossing: Prop 600 HDPE Crossing Hartley

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (m)	Elevation (m)
0	0.00	219.97
1	18.50	219.83
2	35.24	219.75
3	43.74	219.80
4	51.80	220.01

Roadway Surface: Paved

Roadway Top Width: 15.00 m

Culvert Summary Table: Prop 600 HDPE Crossing Hartley

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2yr 24hr SCS	0.05	0.05	219.54	0.205	0.337	1-S1t	0.095	0.140	0.580	0.580	0.177	0.000
5yr 24hr SCS	0.09	0.09	219.55	0.279	0.355	1-S1t	0.126	0.190	0.580	0.580	0.318	0.000
10yr 24hr SCS	0.13	0.13	219.59	0.343	0.385	1-S1t	0.152	0.229	0.580	0.580	0.459	0.000
25yr 24hr SCS	0.17	0.17	219.60	0.402	0.374	1-JS1t	0.175	0.265	0.580	0.580	0.600	0.000
50yr 24hr SCS	0.21	0.21	219.66	0.458	0.398	1-JS1t	0.195	0.296	0.580	0.580	0.741	0.000
100yr 24hr SCS	0.25	0.25	219.71	0.514	0.426	1-JS1t	0.214	0.324	0.580	0.580	0.883	0.000

****

Straight Culvert

Inlet Elevation (invert): 219.20 m, Outlet Elevation (invert): 218.95 m

Culvert Length: 14.50 m, Culvert Slope: 0.0172

****

Summary of Culvert Flows at Crossing: Prop 600 HDPE Crossing Hartley

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	600 HDPE Discharge (cms)	Roadway Discharge (cms)	Iterations
219.54	2yr 24hr SCS	0.05	0.05	0.00	1
219.55	5yr 24hr SCS	0.09	0.09	0.00	1
219.59	10yr 24hr SCS	0.13	0.13	0.00	1
219.60	25yr 24hr SCS	0.17	0.17	0.00	1
219.66	50yr 24hr SCS	0.21	0.21	0.00	1
219.71	100yr 24hr SCS	0.25	0.25	0.00	1
219.75	Overtopping	0.28	0.28	0.00	Overtopping

Appendix M:
Cultural Heritage Memo

HERITAGE | **Studio**
149 Ordnance St.
Kingston, ON, K7K 1G9
alex@heritagestudio.ca

June 14, 2023.

Nicole Foris, Intermediate Engineer, Project Manager
Tatham Engineering
41 King Street, Unit 4
Barrie, ON, L4N 6B5
705-733-9037 x2028
nforis@tathameng.com

Cultural Heritage Memo

To:	Nicole Foris, Intermediate Engineer & Project Manager, Tatham Engineering
From:	Alex Rowse-Thompson, Principal, Heritage Studio
Project:	Drainage Improvements to Various Roads, Town of Innisfil, Municipal Class Environmental Assessment
Re:	MCM Screening Checklist for Built Heritage Resources and Cultural Heritage Landscapes

1.0 Introduction & Background

Heritage Studio was retained by Tatham Engineering to undertake a Cultural Heritage Memo in support of the Municipal Class Environmental Assessment (MCEA) for "Drainage Improvements to Various Roads, 2020" for the Town of Innisfil. The Study Area is located in the Bon Secours and Goodfellow Beach areas in the community of Alcona in the Town of Innisfil, on the shoreline of Lake Simcoe (Figure 1). Prior to Heritage Studio's involvement, the Project File Report was completed, including Phase 1 and 2 archaeological assessments, and submitted in December 2022. The Ministry of Citizenship and Multiculturalism (MCM) provided comments on the Project File Report in February 2023, noting that to fulfill the requirements of Schedule B of the MCEA, the report needs to identify the presence of known or potential built heritage resources and/or cultural heritage landscapes. Through subsequent communications between Heritage Studio and Dan Minkin, Heritage Planner at MCM, it was agreed that given the nature and location of the proposed interventions, a Cultural Heritage Memo, including the completion of the Province's *Criteria for Evaluating Potential Built*

Heritage Resources and Cultural Heritage Landscapes checklist exercise, would be an appropriate response.

In addition to the MCM checklist, Heritage Studio reviewed the Project File Report, communicated with Nicole Foris (Intermediate Engineer and Project Manager at Tatham Engineering), and visited the Study Area to ensure a comprehensive understanding of the proposed interventions and to accurately identify any potential impact(s) to cultural heritage resources and/or landscapes. This memo is informed by the following documents and guidelines which form the cultural heritage policy framework in Ontario:

- Parks Canada's Standards and Guidelines for the Conservation of Historic Places in Canada
- Ministry of Tourism, Culture and Sport's Heritage Tool Kit
- Ontario Heritage Act
- 2020 Provincial Policy Statement
- And other charters and guidelines that exemplify best practice in the field of cultural heritage

The following sections provide an historical overview of the Study Area, the results of the MCM checklist exercise, a description of the proposed interventions, and an assessment of the potential for impact(s) to cultural heritage resources and/or landscapes.

Figure 1: Study Area (Tatham Engineering, 2022)

2.0 Historical Overview of the Study Area

The Study Area is located on the ancestral territory of the Wendat (Huron) First Nations, originally known as "Wendake". However, by the mid-17th century, the Wendat were pushed out by the Haudenosaunee, who were later dispersed and displaced by colonial settlement. When the Township of Innisfil was surveyed in 1820, the Study Area became part of Lots 26 and 27, Concession 8, in the former Township of Innisfil, County of Simcoe. The first settlers came by water through the Holland River and Lake Simcoe, settling in the Big Bay Point area. Although a route between York (Toronto) and Barrie was established by 1825, the development of the township was gradual in the 1830s and 1840s. It was not until the 1850s, when the Ontario, Simcoe and Huron Railway (later the Northern Railway) started service a rail service between Toronto and Collingwood that the township experienced more significant growth.

Figure 2: 1881 Illustrated Historical County Atlas of the County of Simcoe, H. Belden & Co., approximate location of Study Area annotated with dashed red line. (The Canadian County Atlas Digital Project, McGill Library, annotated by Heritage Studio)

Many hamlets were established along the railway line in the second half of the 19th century. In proximity to the Study area were Craigvale, Bramley, Lefroy and Belle Ewart. Located a few concessions south of the Study Area on the shoreline of Lake Simcoe, Belle Ewart was laid out in 1850 and became one of the busiest distribution ports in the north, centred on Lake Simcoe.

Andrew Hunter's "A History of Simcoe County," published in 1909 references a small village, located a few miles north of Belle Ewart, beyond Cedar Point, named "Lakeland", which had a sawmill and two or three dozen houses. The geographic description places this village close to the Study Area, but neither the 1871 Hogg's map of the County of Simcoe or Belden's 1881 1881 Illustrated Historical Atlas of the County of Simcoe show any form of settlement or development in or near the Study Area. Secondary sources describe the Study Area as thick brush with a marshy shoreline that was only penetrable by foot into the early 20th century.

The Study Area remained undeveloped until the 1920s, when William and Susan (Warnica) Goodfellow[1] purchased the lake front property extending from present-day Innisfil Beach Park to the 9th Line. The 1920s Cummins Rural Directory of Innisfil shows Susan Goodfellow as the owner of Lot 27, Concession 8 in the location of present-day Bon Secours Beach. William and Susan Goodfellow's purchase of the lakefront stemmed from a belief that the Radial Railway, which ran from Newmarket to Jacksons Point would come up the west side of Lake Simcoe, thereby bringing those wishing to construct summer cottages. Following their purchase, the Goodfellows began to clear the shoreline and construct nearby roads (e.g., Innisfil Beach Road).

An interview with Ward Goodfellow reveals that in the early 1920s, the lakeshore was characterized by wild rice, swamp, aspen and willows. To clear the shoreline and develop the beach, they had to plow the cedar stumps out with a horse drawn plow. Other secondary sources describe how wagonloads of sand and other fill were brought across the shallow bay from the 9th Line (an overgrown trail at the time) to build up the shoreline. In 1928, the Goodfellows hired Barrie surveyor, Mr. Ardaugh, to survey the property into lots, the first of which was sold in 1928.

Figures 3 & 4: Susan (Warnica) Goodfellow and her three children, Isabel, Roy, and Ward at their summer cottage location "Sandy Nook" on Bon Secours Beach, date unknown (OurStoriesInnisfil.ca) and the canal constructed by the Goodfellow family in the 1930s to divert Leonard's Creek south. (Heritage Studio, May 2023)

[1] The Goodfellows were a pioneering Innisfil family, with John Goodfellow arriving from Scotland and settling on the south half of Lot 18, Concession 7 in the Township of Innisfil in 1843.

The Radial Railway was never constructed but the Goodfellow family's purchase of the shoreline and their development of the beaches and nearby roads led to the area's establishment and success as a summer cottage destination. William and Susan constructed their summer home, "Sandy Nook" here as well as many others (Figure 3). The Goodfellows also constructed the canal (still visible) adjacent to Crystal Beach Road in the 1930s to divert Leonard's Creek southward (Figure 4), in the process using the fill to build up the new Crystal Beach roadbed. According to oral histories from Our Stories Innisfil, the name for Bon Secours Beach comes from a visit to Montreal by William Goodfellow, who realized that Bon Secours translates to "good fellow".

Ultimately the completion of the Toronto to Barrie Highway (later Highway 400) from York to Barrie in 1952 led to the transformation of the cottage community to a full-time residential community. The 1951 Innisfil Historical Review describes the shoreline being lined with summer homes, which are "fast being adapted to long season and all year homes, as the speedway when in use will allow these people to live along the beautiful shore of Innisfil and be at their place of business in the city in less time than some of those who live on the outskirts can get there by public conveyances."

Today, the area continues to be characterized by its early to mid-20th century cottage landscape, including narrow road widths with little to no verge and roadside drainage ditches, resulting in a semi-rural character and intimate scale. Many of the original cottages have been replaced with modern post-1980s two-storey homes, and the remaining original cottages (1930s to 1950s single-storey frame buildings) have been heavily modified to accommodate full-season occupation.

Figures 5 & 6: Existing verge and ditch along the west side of Tall Tree Lane and intersection of Tall Tree Lane and Crystal Beach Road.

Figures 7 & 8: Early to mid-20th boathouse/outbuilding on Goodfellow Avenue and early to mid-20th century frame cottage with garage on the east side of Crystal Beach Road. (Heritage Studio, May 2023)


Figures 9 & 10: Juxtaposition of single-storey early to mid-20th century frame cottages and modern residential construction on Bonsecours Crescent. (Heritage Studio, May 2023)

3.0 MCM Checklist Results

The MCM's *Criteria for Evaluating for Potential Built Heritage Resources and Cultural Heritage Landscapes* is a high-level checklist that was developed for the identification of known (recognized or protected) cultural heritage resources or buildings/landscapes with potential cultural heritage value within a property or project area. The checklist (included as Appendix A) was completed using the instructions on pages 4-8 as well as the following methods:

- Desktop data collection
  - Town of Innisfil Municipal Heritage Register
  - Simcoe County GIS
  - Historic mapping & arial imagery
  - Directory of Designated Railway Stations in Ontario (Parks Canada)
  - Directory of Federal Heritage Designations (Government of Canada)
  - Designated Lighthouses (Parks Canada)
  - World Heritage List (UNESCO)
- Communication with municipal, agency and local groups via email
  - Town of Innisfil (contact – Kevin Jacob, Assistant Clerk)
  - Conservation easements or Ontario Heritage Trust-owned properties (Ontario Heritage Trust)
  - Innisfil Historical Society (contact - Donna Wice)
- Historic research
  - Online resources
  - Innisfil Public Library
- Site Visit (May 31, 2023)

The checklist results confirm that there are <u>no known or recognized</u> cultural heritage resources or landscapes within the Study Area; however, the presence of properties containing buildings over 40 years old (i.e., constructed before 1983) was confirmed through Part B of the checklist, which screens for <u>potential</u> cultural heritage value. Heritage Studio's site visit confirmed that there are no pre 20th century buildings in the Study Area, but that a number of 1930s to 1950s single-storey frame cottages remain from the original subdivision and development of the area for cottaging. The remaining frame cottages have largely retained their form and massing, but have been heavily modified to accommodate full-time occupation, including replacement of cladding, windows, and doors. A few original 1930s – 1950s frame garages also remain from the early to mid-20th century development.

Part C of the checklist, "Other Considerations" addresses local and Aboriginal knowledge of the project area. Heritage Studio contacted the Innisfil Historical Society, who in turn canvassed their members with the result being no noted heritage structures or landscapes or concerns with the proposal.

Through the MCEA process, Tatham Engineering contacted the following First Nations communities.

- Chippewas of Georgina Island
- Chippewas of Rama First Nation
- Wahta Mohawk
- Moose Dear Point
- Wasauking First Nation
- Coordinator for Williams Treaties First Nation
- Beausoleil First Nation
- Moose River Metis Council
- Metis Nation of Ontario
- La Nation Huronne-Wendat (Huron Wendat First Nation)

Tatham Engineering received one response from the Huron Wendat First Nation, noting a request to be present should the archaeological investigations progress to Stage 3. Finally, through the MCEA public consultation, neither Tatham Engineering nor Town staff received comments regarding the potential for cultural heritage resources or landscapes in the area.

Although not explicitly raised by the Innisfil Historical Society, through Heritage Studio's historical research, including examination of the Innisfil Historical Reviews (1951 and 1984), a site visit, and utilizing *Ontario Regulation 9/06* (the Criteria for Determining Cultural Heritage Value or Interest), it is evident that the Study Area has cultural heritage value for its association with the Goodfellow family. The Goodfellow family settled early in the township's history and were responsible for the establishment and development of the Study Area as a summer cottage and recreation destination in the late 1920s.

4.0 Proposed Interventions & Impact Assessment

The objective of the Project File Report was to identify potential drainage improvements that can be implemented to alleviate frequent flooding issues in the Study Area. Following the evaluation of a number of drainage improvement alternatives, Section 7 of the Project File Report provides a list of updated 2022 recommendations. Four of the recommended alternatives will have a physical impact on the Study Area, and include:

Alternative #2

- Replacement of the three existing smaller culverts at the south of Crystal Beach Road with one larger concrete box culvert.

Alternative #3

- The construction of a concrete headwall to protect the ends of the two storm sewer pipes (i.e., Tall Tree Lane outlet) as they enter Lake Simcoe.

Alternative #4

- Replacement of driveway culverts with larger diameters and clearing and re-grading ditches along the west side of Crystal Beach Road.
- Regrading of the ditch along the west and east sides of Tall Tree Lane
- Digging a new ditch along the west side of Buchanan Street
- Digging new ditches and swales along Goodfellow Avenue and Bonsecour Crescent

Alternative #5

- Replacement of the existing culvert with a new culvert in approximately the same location at the intersection of Hartley and Crystal Beach Roads.
- Installation of an additional culvert from the west side of Buchanan Street under Hartley Road to move water to the ditch on the west side of Crystal Beach Road.

The recommended drainage improvement alternatives are located within the public right of way or within adjacent easements, and largely relate to existing infrastructure or areas that have been previously disturbed through grading, ditches, road construction, etc. Through conversations with Nicole Foris, Intermediate Engineer and Project Manager at Tatham Engineering, it was confirmed that the grading of existing and new ditches will follow existing profiles and in the case of new ditches, depths will not exceed 2 feet. Accordingly, the proposed drainage improvements will have a minimal visual impact on the Study Area, complement the existing public realm character and have no impact on the original 1930s to 1950s cottages, which have been identified as having potential cultural heritage value.

One exception is the proposed ditches and swales along Goodfellow Avenue and Bonsecour Crescent, where currently the right-of-way is level with adjacent properties and there are no existing ditches on either side of the roads. Heritage Studio understands that there is future proposed road rehabilitation of Goodfellow Avenue and Bon Secours Crescent. Given the limited width of the right-of-way and the location of older garages/outbuildings (some dating from the 1930s to 1950s) on or close to property lines, careful consideration should be given to preserving the semi-rural character of the public realm and roadway as well as the protection of adjacent original garage/outbuildings, which contribute to the character of the area.

5.0 Conclusion & Recommendations

The results of the MCM checklist exercise demonstrated that there are no known or recognized cultural heritage resources or landscapes in the Study Area, but that there is the potential for cultural heritage value as identified through the presence of buildings that are over 40 years old (i.e., single storey frame cottages dating from the 1930s to 1950s). Additionally, through historical research and a site visit, Heritage Studio identified that the Study Area has associative value for its connection to the Goodfellow family, who settled early in the township's history and were responsible for the development of the area as a summer cottage and recreation destination in the late 1920s.

Heritage Studio did not identify the Study Area as a cultural heritage landscape[2], however, the area has a strong sense of place that stems from its location on the shoreline of Lake Simcoe and the pattern of development associated with its origins as a cottaging community. Despite the residential transformation of the area from the 1950s onwards and increasingly, the construction of large modern houses in the Study Area, the semi-rural cottage landscape continues to provide a distinctive identity to the area. Future plans or modifications to the public realm (i.e., road widening, sidewalk installation) should be carefully considered to protect, foster and enhance this identity and sense of place, particularly at the northern end of Crystal Beach Road, Tall Tree Lane, Buchanan Street and Goodfellow Avenue and Bonsecours Crescent.

The Study Area's flat low-lying topography and the presence of Leonard's Creek combined with 20th century development of the area has led to regular flooding issues, and inevitably residents are seeking infrastructure improvements to alleviate flooding and related property damage. As proposed, the recommended drainage alternatives will complement the existing character of the public realm and Heritage Studio has not identified any negative impacts to the potential cultural heritage resources, identified through the MCM checklist exercise. Accordingly, no further cultural heritage studies are recommended at this time.

I trust that the comments provided are to your satisfaction. Please contact me should you require any further details or wish to discuss the contents of this letter.

Sincerely,

Alex Rowse-Thompson MCIP RPP CAHP
Principal, Heritage Studio

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[2] A cultural heritage landscape is a property or defined geographical area of cultural heritage significance that has been modified by human activities and is valued by a community. These activities or uses may be key to the cultural heritage vale, significance and meaning of this landscape.

6.0 Sources

A history of Simcoe County by Andrew F. Hunter, Volume II, Published by the County Council, 1909

County of Simcoe Interactive GIS map: https://opengis.simcoe.ca. Last accessed June 3, 2023.

County of Simcoe Archaeological Management Plan: Thematic History of Simcoe County and Colonial Period Archaeological Potential. ASI. No date.

Historical Review: A Record of 100 Years of Progress. June 1951. Innisfil Township Centennial.

Historical Review: Supplemental Edition to 1967. Township of Innisfil

Historical Review: Ontario Bicentennial edition 1994. Township of Innisfil.

Our Stories Innisfil: www.ourstoriesinnisfil.ca. Last accessed May 29, 2023.
Town of Innisfil Municipal Heritage Register: https/innisful.ca/en/building-and-development/resources/TOI-Municipal-Heritage-Register-Public-Version.pdf

The Visible Past: A Pictorial History of Simcoe County by Adelaide Leitch. 1992. The County of Simcoe.

1871 Hogg's Map of the County of Simcoe

1881 Illustrated Historical Atlas of the County of Simcoe, H. Belden & Co.

1923 Map of Innisfil. Cummins Rural Directory.

Appendix A: MCM Checklist Results

Project or Property Name
Various Roads Drainage Improvements Program

Project or Property Location (upper and lower or single tier municipality)
Bonsecours & Goodfellow Beach areas, Alcona, Town of Innisfil, Simcoe County

Proponent Name
Town of Innisfil

Proponent Contact Information
Nicole Foris, Tatham Engineering Limited, 41 King St., Unit 4, Barrie, ON, L4N 6B5, nforis@tathameng.com

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?		✓

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?		✓

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?		✓
b. a National Historic Site (or part of)?		✓
c. designated under the *Heritage Railway Stations Protection Act*?		✓
d. designated under the *Heritage Lighthouse Protection Act*?		✓
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?		✓
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?		✓

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?		✓
b. has or is adjacent to a known burial site and/or cemetery?		✓
c. is in a Canadian Heritage River watershed?		✓
d. contains buildings or structures that are 40 or more years old?	✓	

Part C: Other Considerations	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?		✓
b. has a special association with a community, person or historical event?	✓	
c. contains or is part of a cultural heritage landscape?		✓

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority