



November 24, 2017

Via: Email – jinwood@innisfil.ca

Jason Inwood
Manager of Operations
Town of Innisfil
2101 Innisfil Beach Road
Innisfil ON L9S 1A1

Dear Jason:

**Re: South Innisfil Creek Drain and Branches Improvements
Status Report
Project No.: 300038790.0000**

The following correspondence provides a summary of the works completed since our project status report dated April 20th, 2017, for the South Innisfil Creek Drain and Branches Improvements. It is understood that this correspondence may be made available to the public for information purposes and will form the basis for an upcoming Public Liaison Committee meeting.

As noted in our April 20th, 2017 correspondence, a supplementary field survey was planned to augment previous survey information completed by Dillon Consulting, and in particular, supply additional topographic information at the downstream end of the drainage system. This survey would allow a more accurate hydrologic and hydraulic model to be completed for the downstream end of the drain to the 15th Line. We note that this survey was completed in May and has facilitated the additional modelling required to determine hydrologic and hydraulic conditions at the downstream end of the proposed drainage works.

Also, as previously noted, a meeting was held with representatives of the MTO on March 27, 2017 at which we had undertaken to forward some background information relative to this project. This included the Ontario Drainage Referee's Orders relative to the drainage improvements to the South Innisfil Creek Drain and Branches as well as various reports and drawings. Those documents have been submitted to the MTO.

Following the submission of the April Status Report, Burnside in conjunction with Town staff coordinated the Public Liaison Committee meeting held on April 27, 2017, which included the appointed members from the public, Council Representatives, as well as Town staff and representatives from Nottawasaga Valley Conservation Authority and Ontario Ministry of Agriculture Food & Rural Affairs. A presentation was prepared for that PLC meeting to facilitate an understanding of the background information and works completed to date. Also in preparation for the PLC meeting, a Technical Memorandum regarding the variance in hydrology flows was finalized and circulated for review.

With the availability of the additional topographic survey, Burnside proceeded to create base plan drawings from the original Dillon survey and the supplementary Burnside survey, and have prepared the required Plan & Profile template drawings for the drainage system.

As previously noted, Aecom Engineering was the consultant retained by the MTO to complete the Environmental Assessment for the Highway 400 Improvements from Highway 89 to Highway 11. There has been review and comments provided relative to emails and documentation from Aecom regarding the overall project and in particular the stormwater management pond required for the Highway 89 interchange. Burnside has continued to follow up with respect to the anticipated replacement of the Highway 400/South Innisfil Creek Drain crossing as addressed in an earlier draft Drainage report as prepared by Aecom on behalf of the MTO. We assisted the Town to respond to Aecom with respect to the stormwater management facility required for the Highway 89 interchange and provided comments with respect to maintenance work required to the Municipal Drains in the area to facilitate the pond construction.

Burnside has had a number of communications with Morrison & Hershfield who have been retained by the Ministry of Transportation (MTO) to prepare the final design of the "Interim Interchange" of Highway 400 and Highway 89. Burnside has also attended a meeting with Town staff and Morrison & Hershfield relative to the design of the Highway 400/Highway 89 interchange on June 23, 2017.

It is noted that the limit of construction for the Highway 400/Highway 89 interchange is approximately 30 metres south of the Highway 400/South Innisfil Creek Drain crossings. Although the MTO had indicated in a draft hydrology and hydraulic report that the South Innisfil Creek crossing would be replaced, there had been no assurances when (within the overall Highway 11 improvement project which extends from Highway 89 through to Highway 11) the crossing replacement would actually occur. Further correspondence and discussions have occurred with Morrison & Hershfield relative to potential cost savings to the overall Highway 400 Improvements if the South Innisfil Creek/Highway 400 Crossing was included in the Highway 89 interchange work as it may eliminate the need for a significant sized crossing within the current interchange project on the Hnydczak Relief Drain. This would mean moving the construction limits for the Highway 89 intersection project approximately 50 metres further north.

In cooperation with the Ministry of Transportation and their design consultants Morrison & Hershfield for the Highway 400/Highway 89 interchange, Burnside did provide to Morrison & Hershfield the hydrologic model to facilitate their design efforts for the new interchange. The model was provided without responsibility attached to Burnside or the Town of Innisfil in this regard. Efforts have been made to follow up with Morrison & Hershfield to determine the results of their hydrologic and hydraulic analysis of the water crossings within the Highway 89 interchange project in conjunction with the South Innisfil Creek/Highway 400 crossing. Efforts to contact Morrison & Hershfield in this regard have not been successful.

Formal correspondence has been submitted to the MTO dated June 23, 2017 which provided a summary of the meetings and discussions held regarding the drainage requirements for South Innisfil Creek Drain and indicating that the Final Engineer's Report will require the Highway 400 crossing to be replaced with a larger structure at a lower elevation. It is accepted that any crossing placed by the MTO will have far greater hydraulic capacity than required by the design criteria for the Municipal Drain; however, we indicated that our design grade for the municipal drain will be lower through the Highway 400 crossing than currently exists.

As previously noted, the Dillon report provided the additional capacity required in the South Innisfil Creek Drain by widening the channel in conjunction with the building of dykes. Burnside has raised concerns with respect to the provision of dykes along the channel and in particular the determination of liability should the capacity of the channel and dykes be exceeded by more intense storm events. It has been determined that once the Highway 400/South Innisfil Creek Drain crossing is replaced, the channel could actually be deepened physically in conjunction with the replacement of the Highway 400 crossing culverts by more than 0.5 metres. This would allow the provision of increased capacity in the upstream channel by deepening rather than the construction of dykes.

Further correspondence was submitted to the MTO on July 27, 2017 in which we reported further discussions held with their consultants and confirmed the invert elevation that will be required for the South Innisfil Creek drain crossing at Highway 400.

In preparation of the Plan & Profile drawings some apparent field survey information inconsistency issues surfaced relative to the "as built" information for the road crossings including Highway 400, 5th Sideroad, Highway 89 and 15th Line. Additional field survey beyond the supplementary survey noted above has been completed to confirm the "as built" condition of the above-noted structures and to resolve the inconsistency in information.

Work has continued on the Plan & Profile drawings to incorporate all of the survey data, as well as surrounding digital (GIS Topo information) to facilitate the design of the drainage improvements.

We have had communications with a number of the property owners within the Market Garden area, as well as with the owner of the golf course property situated immediately upstream of Highway 400.

There was a need by one of the property owners on the 3rd Line to construct a new crossing to their property from the 3rd Line in conjunction with some site development on that property. Burnside has reviewed the proposed crossing relative to the hydrologic and hydraulic analysis carried out to date and have provided a recommendation to the Town in this regard.

The South Innisfil Creek drain Watershed has proven to be relatively sensitive to the model parameters and methodology used to determine a design flow. There are no functional stream gauges in the immediate vicinity of the drain and official rainfall data in the local area is limited. Considerable effort has been spent in the refinement and analysis of the hydrologic flows including the "Watershed classification" and "Flood Frequency Analysis" and a comparison to actual flood events. Hydraulic analysis has been undertaken on the existing channel, as well as on the proposed channel. Information was obtained through the Town, as well as other sources to try to assist in the calibration of the hydrologic and hydraulic analyses relative to historic flood events in this area.

As we advanced the hydrologic and hydraulic analysis a meeting was held with the Town staff including Glenn Switzer, Development Engineer (former senior Engineer with Nottawasaga Valley Conservation Authority). This meeting was held in an effort to provide some level of comfort with respect to the hydrologic and hydraulic analysis that have been completed to date. This did generate a need to undertake some further hydrologic analysis which has been completed over the last couple of weeks in an effort to determine a design criteria flow for the channel improvements. Continued work to refine hydrology and hydraulic calculations for the drain design includes; comparison with flood frequency analysis and hydrometric data, flood

storage characteristics and watershed attenuation, determination of existing channel capacity and new channel dimensions and calibration of the model using photographs taken by Town staff of storm events and limited rainfall data. It is intended that the hydrologic and hydraulic analysis for the drain will be completed and formalized in a technical report and submitted to the Town for review in the near future.

We have initiated review of environmental and aquatic constraints and design considerations for conveyance improvements. This in preparation for a submission to DFO.

Although it has been concluded that the Reive Blvd./Highway 400/South Innisfil Creek Drain crossings will be replaced at a lower elevation which will allow a deepening of the upstream channel, an investigation has been completed at the 2nd Line Bridge to determine any constraints to deepening the channel at that location relative to the structural integrity of the 2nd Line Bridge.

Burnside has prepared follow up letter dated October 18, 2017 to MTO regarding the Highway 400/South Innisfil Creek Drain crossing and has had follow up discussions with NVCA regarding additional resources/information regarding flow calibration.

We have procured from the Town of Innisfil the property ownership based on the assessment roll mapping and assessment rolls for the properties within the South Innisfil Creek Drain Watershed in an effort to prepare the base spreadsheet for the future distribution of assessments.

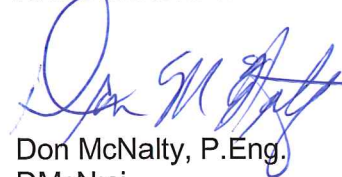
We have recently had the opportunity to review the Notice of Transportation Environmental Study Report Addendum Submission for the Highway 400 Improvement project and have found the Design Study Reports on the web site. The final report confirms that the Highway 400/South Innisfil Creek Drain crossing as well as the Highway 400/Hyndczak Relief Drain crossing will be replaced as part of the Highway 400 Improvement project. We have not been able to get a response from the MTO regarding the inclusion of the South Innisfil Creek Drain crossing in the Highway 400/Highway 89 interchange project and therefore the timing for the crossing replacement is still uncertain.

The next PLC committee meeting will be held on November 29, 2017. The intent of this committee meeting is to provide further additional detail on the work completed to date and to outline the next steps in this process.

We trust the above provides sufficient details relative to the works completed over the last five or six months. If you have any questions, please do not hesitate to contact us.

Yours truly,

R.J. Burnside & Associates Limited



Don McNalty, P.Eng.
DMcN:sj

Enclosure(s) None

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