



April 20, 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 purpose of the following correspondence is to provide a summary of the works completed to date since our appointment by the Town of Innisfil (Innisfil) for the South Innisfil Creek Drain and Branches Improvements with the intent that it would be made available to the public for information. It will also address the current status of ongoing investigations and outline the anticipated next steps.

Shortly after our appointment and the project start up meeting we contacted Dillon Engineering (Dillon) requesting specific background information including the raw field survey data, the engineering drawings in digital format, the Excel files for the Assessment Schedule spreadsheet and any correspondence that related to agency review and approval of the proposed work as set out in the August, 2013 Engineer's Report. We carried out an extensive review of all of the background documentation which supported the Final Engineer's Report as authored by Dillon to determine its value towards moving this project to completion. To date it appears that the raw field survey data will be extremely valuable and it is not anticipated that a complete updated survey will be required although some supplemental field survey will be required in specific areas. Although the engineering drawings will provide a valuable resource of background information, the technical advances in drawing creation which allows more efficient drawing production as well as quantity calculation will likely dictate the creation of new drawing files directly from the raw survey data file. We received very little background information from Dillon relative to the agency review and approval process related to the proposed work. However, there have been significant regulatory changes over the last few years and the local Conservation Authorities no longer have agreements with DFO to address fishery issues. Consequently, the agency approvals will need to be addressed again.

We initiated preliminary discussions with the Nottawasaga Valley Conservation Authority (NVCA), Ministry of Transportation of Ontario (MTO) and the Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA) relative to the project. In particular those initial

discussions addressed the Town's desire to reconsider the replacement of the Hwy 400 Crossing for the South Innisfil Creek Drain. Based on those discussions, we found that the NVCA was receptive from an engineering perspective to changes to the capacity and depth of that crossing relative to the drainage improvements. Our initial discussions with the MTO led us to believe that replacement of the Hwy 400 crossing would require extensive support documentation that such an undertaking was necessary and that there were no immediate plans to replace the crossing. We also initiated discussions with the NVCA regarding the ecological/environmental constraints which may exist relative to future work on this Municipal Drain. The NVCA also provided some additional documents which they had on file relative to the review and approval process for the proposed work as set out in the 2013 report.

We had noted in our review of the Dillon engineering drawings as well as the original profile drawings prepared by DH Weir in 1956 that there would be opportunities with the replacement of the Hwy 400 crossing to actually lower the grade of the Municipal Drain upstream of Hwy 400. Approximately 0.5 metres of deepening could be achieved by lowering a relatively short section of the Drain which is at a steeper gradient as it crosses the Hwy 400 right of way and potentially further deepening by lowering the grade to the 15th Line. The additional deepening of the channel will be subject to the structure elevations at the relatively new structures on Hwy 89 and 5 Sideroad.

Achieving additional capacity to accommodate the design storm by deepening the existing channel, if possible, is very significant. It is noted that the design as presented in the 2013 report was to accommodate a 2 year storm event which is a typical design criteria for municipal drains in the province of Ontario. The area has experienced in the past, and it certainly should be anticipated in the future, storm events that exceed the 2 year storm event and those storm events will not be contained within the drain channel as proposed. The creation of continuous dykes to build the required capacity creates a situation that if the capacity is exceeded and the dykes overtop to flood the adjoining land, provision must be made for that floodwater to be removed after the storm event flows have subsided. We note that the responsibility for the removal of flood water needs to be very clear (i.e., property owner or the Municipal Drain). Creating capacity by deepening the channel will in part at least resolve this issue in that the spoil banks may not be continuous leaving outlet paths for the larger storm event flood water.

On the basis that we would need to provide extensive support documentation to justify the deepening of the drain and the replacement of the Hwy 400 crossing, Burnside commenced work to create a Hydrologic/Hydraulic model relative to the floodlines upstream of Highway 400 under major storm events. Although the Drain itself will be designed for a relatively small return frequency storm it was felt that the only way to justify the replacement of the structures to the MTO was to address the more significant storm events and the consequences of the flooding impacts upstream. This evolved into an extensive review of the Dillon model, as well as past NVCA reports and regulated flood lines pertaining to the hydrology and associated culvert hydraulics in the vicinity of the Innisfil Creek Drain. It was determined that extensive additional mapping and surveying may be required to build a sufficient technical case for the crossing replacement. Burnside determined the scope and completed the coordination of this additional work but the actual survey and mapping did not commence.

We were aware that the MTO was undertaking an overall review of the Highway 400 corridor from Highway 89 to Highway 11 north of Barrie. In late November, 2016 the Town of Innisfil was able to obtain a draft report prepared by Aecom Engineering entitled Highway 400

Stormwater Management Report. This report actually identified that the South Innisfil Creek Crossing of Hwy 400, which is identified as Culvert No. 44 in the report, would be replaced as part of the Hwy 400 Improvements. This replacement was driven by hydraulic capacity issues relative to that crossing. Although acknowledging that the report is in draft format, we have been able to confirm that the MTO does acknowledge the need to replace that crossing as part of the Hwy 400 road improvement projects. As a result the issue is no longer the need to provide a technical argument to support the replacement of the crossing under Hwy 400 but rather to determine the timing that such a replacement would occur. A meeting was held with MTO staff and their consultants on March 27, 2017, at which time it was confirmed that the South Innisfil Creek Drain Crossing of Hwy 400 would be replaced as part of the overall Hwy 400 Improvements. The timing of the replacement relative to the Hwy 400 Improvement Phases is unknown but may be influenced by the Municipal Drain requirements.

Through the anticipated need to prepare a technical argument for the culvert crossing replacement, as well as for the actual detailed design of the Drain itself, extensive hydrologic and hydraulic mapping and modelling has been prepared. We provide in the attachment a point form summary of some of the hydrology and hydraulic analysis that have been completed to date. We have prepared a memorandum in draft form relative to the hydrologic and hydraulic findings which has been forwarded to the NVCA for their review and comments are expected in the near future.

It has been determined that some additional field survey will be required and we have been in the field to re-establish the survey control points used to complete the Dillon field survey so that the supplementary survey can be undertaken and tied to the previous survey information. We have anticipated that the related topographic survey will be completed in the near future subject to water levels in the Drain. This survey will allow us to create a more accurate model for the downstream end of the Drain to the 15th Line. It is noted that in the hydrologic model prepared by Dillon it did not really address the existing channel downstream of Hwy 89 to the 15th Line and it is further noted that the bridge on Hwy 89 has been replaced since the 2013 report was prepared and submitted.

In preparing the catchment area mapping it was determined that there appeared to be some inconsistencies between the catchment area mapping and the assessment area shown within the Dillon report. We have gone through the assessment schedule from the 2013 report to compare it to the catchment area mapping being used for the hydrologic and hydraulic analysis.

It was determined early in the process that there would be a potential benefit to establishing a Public Liaison Committee made up of representatives of the agencies, the Town, Burnside and the public affected by this Municipal Drain. That committee has been formed over the last couple of months and the initial PLC meeting will be held on April 27, 2017. The intent of this committee meeting is to provide some additional detail on the work completed to date but more importantly to obtain some feedback and input from the agencies and property owners in an effort to move this project to a satisfactory solution. We intended to complete property owner visits in the relatively near future, and there would be some additional reporting to the public over the next couple of months.

Yours truly,

R.J. Burnside & Associates Limited

A handwritten signature in black ink, appearing to read "Don McNalty". The signature is written in a cursive style and is positioned above a horizontal line that extends across the page.

Don McNalty, P.Eng.
DMcN:sj

Enclosure(s) Summary of Hydrology/Hydraulic Analysis (March, 2017)

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Town Of Innisfil
South Innisfil Creek Drain & Branches Improvements
Summary of Hydrology/Hydraulic Analysis
March, 2017

General

- Burnside has reviewed the Dillon, AECOMM, URS, NVCA reports pertaining to the hydrology and associated culvert hydraulics in the vicinity of the Innisfil Creek Drain
- Completed a peak summary table comparisons of each report
- Completed a reference document summarizing the findings of the various comparisons
- Determine additional survey, mapping and base plan requirements for hydraulic modelling
- Liaison with NVCA regarding flood studies and modelling

Hydrology/Hydraulics

- Compiled topographic information from various sources
- Compiled an ArchHYDRO GIS model to discretize the overall Innisfil Creek watershed boundary and sub-watershed boundaries
- Summarized watershed land use and soils characteristics
- Calculated land use runoff characteristics including SCS curve numbers, initial abstractions, time to peak.
- Set Flow Node locations within the watershed to be used as Hydrologic Reference points within the hydrologic model
- Calculated hydrograph shifting to account for flow travel time between sub-watershed boundaries
- Compiled a SWMHYMO Hydrological Model
- Summarized peak flow at flow node locations within the watershed
- Completed a draft Hydrologic Report for NVCA review and comment
- Completed a detailed review of the Aecom Hwy 400 Storm Water Management Report
- Completed a detailed review of the South Innisfil Creek HEC-RAS hydraulic model completed by Dillon in 2011
- Summarized Roadway and field crossing existing information