Functional Servicing and Stormwater Management Report
4134 16th Avenue Residential Development



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Sign-off Sheet

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1.0 INTRODUCTION

This report has been prepared in support of the Official Plan Amendment for the inclusion of lands owned by Sixteenth Land Holdings Inc. referred herein as the Subject Property into the current Markham Official Plan and in support of two draft plan of subdivision applications. The Subject Property is municipally known as 4134 16th Avenue, in the City of Markham, Region of York and is located in Part lots 16, 17 and 18, Concession 5. The Subject Property is located north of 16th Avenue, East of Warden Avenue, West of Kennedy Road and South of the existing Angus Glen subdivision as shown on ***Figure 1.1***.

1.1 BACKGROUND

To satisfy the requirements of the City of Markham's Official Plan Amendment, a Master Environmental and Servicing Plan (MESP) was prepared for the Subject Property which included a Servicing and Grading Report (SGR) by Stantec Consulting Ltd. dated September 2016, revised in October 2017. Also included in the revised October 2017 MESP was a Natural Environment Report / Environmental Impact Study (NER/EIS) prepared by Beacon Environmental for the Subject Property. The NER/EIS was intended to provide a high level investigation of the Subject Property in coordination with the revised October 2017 MESP to ensure continuity with overall community natural heritage features (environmental), transportation, stormwater management, sanitary servicing, water distribution and supply and area grading.

This Functional Servicing and Stormwater Management Report (FSR) has been prepared to supplement and build on the information outlined within the revised October 2017 MESP and in particular is intended to address the municipal servicing strategies for the Subject Property including general area grading, road works, sanitary drainage and servicing, water supply and distribution, storm water drainage and management and the provision of utilities (electricity, telecommunications, natural gas).

The servicing strategies presented in this report are conceptual. Detailed engineering drawings for the design of site grading, municipal infrastructure (storm drainage, stormwater management, sanitary drainage, water supply and distribution, and road works), and utilities will be submitted as part of the engineering design process for City, Region and Agency review and approval, as the development proceeds through the Plan of Subdivision approval process. All infrastructure works will be designed and constructed to the City of Markham's and Region of York's standards and specifications as required.

The SGR was submitted to the City of Markham in September 2016. Comments were received from City of Markham on March 13, 2017 and May 10, 2017, Toronto and Regional Conservation Authority on May 10, 2017, Region of York on March 1, 2017 and a subsequent email from Region of York on May 10, 2017 and York Region District School Board on February 16, 2017. The report

and drawings have been updated to reflect the revised draft plans and address the agencies' comments.

Site Description

The Subject Property is municipally known as 4134 16th Avenue, in the City of Markham, Region of York and is located in Part lots 16, 17 and 18, Concession 5. Except for an area adjacent to Kennedy Road, the balance of the property is currently used by its former owner York Downs Golf & Country Club for a golf course.

The property is a total of 168.64 hectares, and is located on the north side of 16th. Avenue, on the west side of Kennedy Road, and has a small amount of frontage onto the east side of Warden Avenue as well. There is existing residential development surrounding the property on all sides. The location of the Subject Property is illustrated on ***Figure 1.1***.

Berczy Creek traverses the western portion of the property, and Bruce Creek traverses the property in a roughly north / south direction, bisecting the property into west and east tableland areas.

1.2 PROPOSED PLAN

The proposed residential development is detailed in two draft plans of subdivision, see attached ***Drawings 1.2 & 1.3***. There is one draft plan of subdivision for the east portion of the property herein known as the East Draft Plan lands and one for the west portion of the property herein known as the West Draft Plan Lands. The west draft plan of subdivision also contains the valleylands associated with both the Berczy Creek and the Bruce Creek. References in this report to the two draft plans or to specific lots / blocks and roads will include 'East' or 'West' to denote the appropriate area. The respective draft plans have been included with this report and illustrate the development plan for the Subject Property. The specific phasing of the development is discussed in ***Section 3.0***.

The East Draft Plan of subdivision contains a mix of residential, open space blocks, an elementary school block, parks, and SWM ponds.

The West Draft Plan of subdivision contains a mix of residential, mixed use, open space blocks, parks, and SWM ponds.

Zoning by-law amendment applications are being submitted in support of the draft plan submission. A discussion of the impacts related to stormwater management is included in Section 6.9.

1.3 PREVIOUS STUDIES

The following approved studies/guidelines/documents were reviewed in preparation of this FSR. These studies are relied on to provide the appropriate criteria that apply to this FSR. The studies include:

- City of Markham Official Plan (1987), and City of Markham Official Plan 2014 (as partially approved October 30, 2015);
- City of Markham Stormwater Management Guidelines, October 2016;
- Erosion and Sediment Control Guidelines for Urban Construction, Toronto and Region Conservation Authority et al, December 2006.
- MMM Rouge River Watershed Hydrology Update (2001);
- TRCA Rouge River Watershed Plan (2007);
- TRCA Rouge River State of the Watershed Report (2007);
- TRCA Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines (2009);
- TRCA Low Impact Development Stormwater Management Planning and Design Guide (2010);
- TRCA Stormwater Management Criteria (2012);
- TRCA Living City Policy (2014);
- TRCA Crossing Guideline for Valley and Stream Corridors (2015);
- MOEE Hydrogeological Technical Information Requirements for Land Development Applications (April 1995);
- MOECC Stormwater Management Planning and Design Manual (2003);
- Geotechnical Engineering Design and Submission Requirements (TRCA, November 2007);
- MNR Technical Guide for River & Stream Systems: Erosion Hazard Limit (2002);
- Cosburn Patterson Mather Pond H Stormwater Management Report (1997);
- Stantec Stormwater Management Pond Certification & Assumption, York Downs Pond 'H' (2008);
- Cosburn Patterson Mather Angus Glen Village Stormwater Management Design Brief (1997) and detailed engineering servicing and grading plans (2000);

- Stantec Functional Servicing Report - Angus Glen East Village (Former School Block) (2012);
- Cosburn Patterson Mather Sanitary Trunk Servicing Drawings (May 1996);
- Stantec Functional Servicing Report (2006) and Stormwater Management Report for Deacon Lands (2007);
- Stantec Functional Servicing Report (2015) and Stormwater Management Report for Yorkton Lands (2016); and,
- Stantec et al Master Environmental Servicing Report (2017) for 4134 16th Avenue.

2.0 ENVIRONMENTAL/NATURAL HERITAGE OPPORTUNITIES AND CONSTRAINTS

A detailed review of the existing environmental constraints and natural heritage opportunities and constraints was completed for the Subject Property as part of the revised October 2017 MESP. The revised October 2017 MESP report reviewed the surface water, aquatics, and terrestrial environments and completed a floodplain assessment, stable top of bank assessment, and meander belt assessment all of which were compiled and mapped to develop an overall limit of development. This limit then influenced the development concept and Draft Plans of Subdivision for the Subject Property.

A summary of the significant environmental features as they relate to the functional servicing and stormwater management within the Subject Property is provided below, with the full details provided in the revised October 2017 MESP.

The Subject Property is located within the Bruce Creek and Berczy Creek subcatchments which are both tributaries of the Rouge River. The confluence of these two tributaries occurs just downstream of the Subject Property, south of 16th Avenue. Berczy Creek traverses the western portion of the property, and Bruce Creek traverses the property in a roughly north / south direction, bisecting the property into west and east tableland areas.

A Natural Environment Report / Environmental Impact Study (NER/EIS) was completed by Beacon Environmental for the Subject Property and was included in the revised October 2017 MESP. This report delineated and documented the various natural features and hydrologic features, and determined the appropriate buffers and/or setbacks per the City Official Plan Policies and Region's Policies.

A meander belt width assessment for Bruce Creek and Berczy Creek was completed by Beacon Environmental in the Fluvial Geomorphology Report as part of the revised October 2017 MESP and formed part of the overall limit of development.

The existing Regional Storm flood elevations for Bruce Creek and Berczy Creek were confirmed and mapped as part of the Stantec Consulting Servicing and Grading Report (SGR) included in the revised October 2017 MESP and formed part of the overall limit of development.

3.0 DEVELOPMENT PHASING

It is intended to develop the Subject Property as a phased development consisting of three separate stages. The three stages will encompass multiple phases as shown on the Development Phasing Plan, ***Figure 3.1***. The following sections specify the infrastructure required for the individual phases.

3.1 STAGE A

Phase 1 as discussed throughout this report refers to Phase 1 East (Stage A) as noted on the Development Phasing Plan. Phase 1 will be the first phase of the development as there are existing services (Storm, Sanitary and Water) available and can proceed while the golf course is operational (as the construction has no impact on the golf course operations). Phase 1 consists of single detached and townhouse lots, and is located in the northeast area of the site, bound by existing Kennedy Road to the East**.** Phase 1 will require the removal, extension and connection to existing services on the roads bounding the site as detailed in the respective sections of this report. Phase 1 limits shown in the plan are preliminary. Future reviews or assessments of the servicing and traffic could be provided to support an expansion of Phase 1 limits to the west to include more or all of the non-golf course lands with possible modifications to the existing infrastructure.

The construction of the intersections along Kennedy Road will be coordinated with the Region of York and City of Markham to minimize impacts to traffic.

3.2 STAGE B

The development of Stage B includes Phase 2E and 1W and is located within the East and West Draft Plans. The development of this stage is dependent upon the end of golf course operations and completion of specific infrastructure. The proposed staging as shown on the Development Phasing Plan will require infrastructure phasing for each stage. The following list summarizes all the infrastructure required for the individual phase to proceed to construction on its own schedule.

The construction of one intersection along 16th Avenue will be coordinated with the Region of York and City of Markham to minimize impacts to traffic.

3.2.1 Phase 2E

- Decommissioning of the existing Pond H and the interim SWM Pond adjacent to Street 'B' East;
- Removal of existing storm and sanitary sewers along proposed Streets 'A' & 'K' East;
- Construction of proposed SWM Ponds P1 & P2 and associated storm sewers;

- Construction of sanitary sewers along proposed Streets 'A' & 'K' and Sanitary sewer crossing of Bruce Creek;
- Watermain connections to Yorkton Blvd (Street 'B' East);
- Construction of road intersections along Kennedy Road at Streets 'A' & 'C' East.

3.2.2 Phase 1W

- Construction of proposed SWM Pond P3;
- Construction of interim storm servicing for lots that drain to SWM Pond P4 under the ultimate buildout;
- Sanitary sewer connection to the existing 2100mm diameter trunk along 16th Avenue at Street 'C' West;
- Construction of road intersections along 16th Avenue at Street 'C' (Street 'D' West intersection will remain as the existing golf course entrance in this Stage);
- Watermain connections to 16th Avenue.

3.3 STAGE C

The development of Stage C includes Phases 3E, 2W & 3W and is located within the East and West Draft Plans. The development of this stage is dependent upon the end of golf course operations and completion of specific infrastructure. The proposed staging as shown on the Development Phasing Plan will require infrastructure phasing for each stage. The following list summarizes all the infrastructure required for the individual phase to proceed to construction on its own schedule.

It is anticipated that the existing golf course driveway crossing of Bruce Creek will remain in place until the proposed road crossing (bridge) of Bruce Creek is constructed during Stage C. This existing crossing will also be used during earthworks operations to facilitate fill movement between the east and west lands. Should the existing crossing require any upgrades to accommodate earthworks operations, disturbance to the bed and banks of the watercourse will not be permitted. Proposed SWM ponds will be constructed early on in the earthworks phase and will function as ESC ponds during the earthworks and servicing phases of construction.

The construction of the remaining intersection along 16th Avenue will be coordinated with the Region of York and City of Markham to minimize impacts to traffic.

3.3.1 Phase 2W & 3W

- Construction of SWM Pond P4;

- Decommissioning of interim storm servicing;
- Construction of the Bruce Creek road crossing;
- Watermain crossings of Bruce Creek (at road crossing and separate crossing location);
- Construction of road intersection along 16th Avenue at Street 'D' West.

3.3.2 Phase 3E

- Construction of the Bruce Creek road crossing;
- Watermain crossings of Bruce Creek (at road crossing and separate crossing location);
- Construction of the road intersection at Angus Glen Blvd. and Street 'D' East;
- Watermain connection to Angus Glen Blvd.

4.0 WATERMAIN DISTRIBUTION SYSTEM

4.1 EXISTING EXTERNAL WATERMAIN INFRASTRUCTURE

The Subject Property will be split among two pressure districts, PD5 and PD6RD/RE. A connection between existing PD6RD and PD6RE will be made at the intersection of Bur Oak Avenue and Kennedy Road, which will consolidate these two pressure districts. The water supply for the Subject Property will be provided by connection to existing watermains adjacent to the Subject Property as can be seen in ***Drawings 4.1 & 4.2*** and listed below.

Sixteenth Avenue	450mm diameter
Bur Oak Avenue	300 mm diameter
Angus Glen Boulevard	300 mm diameter
Prospectors Drive	300 mm diameter
Yorkton Boulevard	300 mm diameter
Dancers Drive	150mm diameter
Parkstone Road	150mm diameter

4.2 WATERMAIN DESIGN CRITERIA

The watermains were designed in accordance with the City of Markham's Design Criteria dated June 2013, the MOECC Watermain Design Criteria dated 2008 and the Fire Underwriters Survey. Design parameters are summarized below:

Design Demand

Watermains shall be sized to meet the greater of:
- Maximum day demand plus fire flow
- Maximum hour demand

Fire Flow

Residential	minimum 7,000 L/min
Stacked Townhouse	minimum 10,000 L/min
Residential Mid-Rise, Mixed Use, School	minimum 15,000 L/min

Equivalent Population

Single Family & Semi-Detached	4.0 person/unit
Townhouse	3.8 person/unit
Apartment	3.0 person/unit
School	60 person/hectare of site area
Mixed Use	330 person/hectare of site area

Average Day Consumption Rates

Residential	365 L/cap/day

Peaking Factors

Demand Type	Residential	Non-Residential
Maximum Daily Demand	2.0	1.4
Maximum Hourly Demand (PM)	4.5	0.8
Maximum Daily Demand (AM)	2.0	2.5
Minimum Hourly Demand	0.7	0.7

4.3 PROPOSED WATER DISTRIBUTION SYSTEM

Stantec retained a sub-consultant WSP Canada Inc. (WSP) to analyze the hydraulic requirements of the Subject Property and prepare a Water Distribution Analysis (WDA) report dated July 21, 2016 revised in November 03, 2017 which is provided within ***Appendix A***. The WDA report provides preliminary watermain layout/sizing, PRV requirements and connection points to existing watermains in order to meet the City of Markham and MOECC flow and pressure requirements. The modeling prepared by WSP assumes the development will be phased in two stages those being Phase 1 and full buildout of the East and West Draft plans lands. The report assumes there will be no additional phasing beyond Phase 1, meaning the report does not analyze construction of the East and West Draft plans separately and as such analyzes the demands and pressures for these lands together. The demands and pressures for any additional phasing will be required to be analyzed at the time of detailed design. The analysis was conducted under Minimum Hour, Maximum Day, Maximum Hour, Maximum Day plus Fire Flow as well as an additional scenario for Max Hour with the PD5 Milliken pumps off. The WDA report is summarized in the below sections.

4.3.1 East Draft Plan including Phase 1

Phase 1 will be serviced from PD6RD/RE with connections to PD6RD from the existing 300mm diameter watermain at Prospectors Drive and an existing 150mm diameter watermain at Dancer's Drive. The connection to PD6RE is proposed from the existing 300mm diameter at the intersection of Bur Oak Ave and Kennedy Road. Following these connections the PD6RD and PD6RE pressure districts will be consolidated.

The northern portion of the development will be serviced from PD6RD/RE, with connections to the existing system at Angus Glen Boulevard, Prospectors Drive and Bur Oak Avenue. There will be two east west connections within the development to supply the northwestern portion of the

development. For additional security of supply and/or to supplement fire flows in the event of an upset, a normally closed check valve has been provided from PD5 to PD6RD/RE in the western portion of the development – this would flow northward when open. The southeastern portion of the development will be serviced from PD5 with one connection to Yorkton Boulevard. Security of supply will be provided from a normally closed PRV from the PD6RD/RE zone. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

4.3.1.1 Pipe Sizing

Based on the modeling results for the East Draft Plan lands, the below watermain diameters were determined as shown on ***Drawing 4.1***.

300mm diameter watermain	Streets A, B, D, part of K
200mm diameter watermain	Streets C, AA, BB, E, G, Part of I, M, N, O, P, Part of Q, R, Part of S, T, Part of U, V, X, Y Z
150mm diameter watermain	Streets H, Part of I, J, F, Part of K, L, Part of Q, Part of S, Part of U,

4.3.1.2 Fire Flows

Based on the modeling results, the fire flow demands of the East Draft Plan lands including Phase 1 can be adequately supplied by the proposed watermain layout. The available fire flow is greater than the fire flow demands at the minimum pressure of 140kPa at each distribution system node.

4.3.1.3 Pressures

With the construction of Phase 1, two of the City's existing pressure districts will be consolidated those being PD6RD and PD6RE. The Phase 1 lands will be entirely serviced by the new consolidated PD6RD/RE pressure district. The below ***Table 4.1*** shows that all modeled service pressures for Phase 1 remain within the required operating range under Maximum Day plus Fire Flow and Maximum Hour demands.

With both the East and West Draft plans analyzed together the pressures within the East Draft Plan were modeled under the full development buildout. The East Draft Plan will be serviced by both the new consolidated PD6RD/RE and PD5 pressure districts. As can be seen in the below ***Table 4.1*** all pressures remain within the required operating range under Maximum Day plus Fire Flow and Maximum Hour demands.

Table 4.1 Modeled Service Pressures - East Draft Plan

	Minimum Hour	Maximum Day	Peak Hour	Max Day + Fire Flow
Phase 1	335- 650 kPa	335 - 650 kPa	335 - 650 kPa	201- 2795 L/s available at 140 kPa
Full Buildout	334 - 689 kPa	332 - 688 kPa	293 - 684 kPa	126 – 2699 L/s available at 140 kPa

Within PD6RD/RE service pressures range from 536kPa to 690kPa which as per Ontario Building Code requires individual PRVs for all lots where operating pressures are above 550kPa. As such all lots within Phase 1 and the remaining East Draft Plan lots that are within PD6RD/RE will require individual PRVs as shown on the Watermain Pressure Zones Figure, ***Figure 4.3***. Within PD5 service pressures range from 309kPa to 454kPa which means the lots do not require individual PRVs as under all demand conditions pressures are below 550kPa.

4.3.2 West Draft Plan

The northern portion of the development will be serviced from PD6RD/RE, with connections to the existing system at Angus Glen Boulevard, Prospectors Drive and Bur Oak Avenue. There will be two east west connections within the development to supply the northwestern portion of the development. For additional security of supply and/or to supplement fire flows in the event of an upset, a normally closed check valve has been provided from PD5 to PD6RD/RE in the western portion of the development – this would flow northward when open. The proposed method of crossing the creek will be determined at the detailed design stage but the below three options are currently being considered as shown on ***Figure 7.4***.

1. Pre-insulated watermain pipe that would be strapped to the underside of the bridge.
2. Jack and bore in which a steel casing is augured in the proposed alignment under the creek and then watermain is constructed inside.
3. Directional drilling of the watermain in which a tunnel would be drilled under the creek and then watermain pipe would be pulled back through the finished tunnel.

The south portion of the West Draft Plan lands will be serviced from PD5 with two connections to 16th Avenue. There is an existing 150mm diameter stub across 16th Avenue (in the vicinity of Street 'D' West) which will need to be upgraded to a 300mm diameter watermain to supply the proposed development.

4.3.2.1 Pipe Sizing

Based on the modeling results for the West Draft Plan lands, the below watermain diameters were determined as shown on ***Drawing 4.2***.

300mm diameter watermain	Streets A, Part of B, C, D, U
200mm diameter watermain	Streets Part of B, E, Part of F, G, Part of H, J, K, L, N, O, P, Q, R, S, T, V, W
150mm diameter watermain	Streets Part of F, I, Part of H, M

4.3.2.2 Fire Flows

Based on the modeling results, the fire flow demands within the West Draft Plan lands can be adequately supplied by the proposed watermain layout. The available fire flow is greater than the fire flow demands at the minimum pressure of 140kPa at each distribution system node.

4.3.2.3 Pressures

With both the East and West Draft Plans analyzed together the pressures within the West Draft Plan lands were modeled under the full development buildout. The West Draft Plan will be serviced by the PD6RD/RE and PD5 pressure districts. As can be seen in the below ***Table 4.2*** all pressures remain within the required operating range under Maximum Day plus Fire Flow and Maximum Hour demands.

Table 4.2 Modeled Service Pressures - West Draft Plan

	Minimum Hour	Maximum Day	Peak Hour	Max Day + Fire Flow
Phase 1	335 - 650 kPa	335 - 650 kPa	335 - 650 kPa	201 – 2795 L/s available at 140 kPa
Full Buildout	334 - 689 kPa	332 - 688 kPa	335 - 681 kPa	163 – 1491 L/s available at 140 kPa

The service pressures range between 335kPa to 650kPa for Phase 1 and between 335kPa and 689kPa under full buildout conditions. As per Ontario Building Code individual PRVs are required for all lots where operating pressures are above the 550kPa. As such all lots that are within PD6RD/RE will require individual PRVs as shown on the Watermain Pressure Zones Figure, ***Figure 4.3***. Within PD5 the lots do not require individual PRVs as under all demand conditions pressures are below 550kPa.

5.0 SANITARY DRAINAGE AND SERVICING

5.1 BACKGROUND

The proposed sanitary drainage system will be designed based on gravity flow, striving to minimize infiltration. Pumping stations and/or syphons and forcemains are not required to achieve the necessary sanitary drainage, and are not being considered in this report.

The proposed sanitary sewer design considers the phased development of the Subject Property. Further information will be required to quantify the flows from sources external to the Subject Property, i.e., North Markham Future Urban Area (see ***Section 5.5.2***), as such this report is limited to the property boundaries and known external flows.

Consideration will also be given to the existing sanitary sewers on the property, with the intent to maintain and use as much of this infrastructure as capacity allows in accordance with the design criteria. There is an existing 525mm diameter sewer that runs west along the approximate alignment of the proposed Street 'A' East. The existing 525mm diameter sewer connects into an existing 750mm diameter sewer that runs south from approximately Royal Troon Crescent along the approximate alignment of proposed Street 'K' East and then via Block 1, Woodlot/Wetland ultimately along Yorkton Boulevard to an existing 2100mm diameter trunk sanitary sewer that runs east on 16th Avenue. These existing sewers are depicted within the Sanitary Servicing Plans, ***Drawings 5.1 & 5.2***.

5.2 SANITARY DESIGN CRITERIA

The sanitary sewers will be designed in accordance with the City of Markham Design Criteria (Design Criteria) dated June 2016 and the latest MOECC design guidelines. Design parameters are summarized below.

- Residential Sanitary Generation Rate: 365 litres/capita/day
- Population Density
  - Single Family and Semi Detached: 4.0 Persons/Unit
  - Street Townhouses, Block Townhouses, and Stacked Townhouses: 3.8 Persons/Unit
  - Apartments: 3.0 Persons/Unit
  - Schools: 60 People/hectare of gross floor area (GFA)
  - Commercial (Retail): 100 People/hectare of GFA
  - Parks and Recreation: 60 Persons/hectare
- Harmon's Peaking Factor: Min 1.5, Max 4.0
- Infiltration Rate: 0.26 litres/second/hectare
- Minimum Pipe Size: 200mm
- Minimum Pipe Cover: 2.75m below centerline road elevation
- Full Flow Velocity: Min 0.75m/s, Max 3.65m/s
- Minimum Slope: 1.0% (first leg), 0.5% (second leg and beyond)

As per the latest design criteria sanitary design flow will be estimated using the below formula.

$$Design\ Flow\ (Q) = \frac{M\ x\ q\ x\ P}{86.4} + I\ x\ A$$

- Q = Design Flows (l/s)
- q = Average Daily Flows (365 l/ca/day)
- I = Infiltration Contribution (0.26 l/s)
- A = Gross Drainage Area (ha)
- P = Population/1000
- M = Peaking Factor = $1 + \frac{14}{4+P^{0.5}}$
- p = Population in thousands

5.3 PROPOSED SANITARY FLOW

Sanitary drainage of the Subject Property has been broken down into three drainage divides as shown on the East and West Sanitary Drainage Plans, ***Drawings 5.3 & 5.4*** and explained below:

1) Drainage Area A: This area encompasses all of Phase 1 and a portion of the East Draft Plan (approximately the lots east of proposed Street 'K' East) as shown on ***Drawing 5.3***. Drainage Area A is located in the north-east area of the Subject Property and is adjacent to Kennedy Road. Sanitary flows for this area will be conveyed by local sewers to the existing 525mm & 750mm diameter sewers within the site and ultimately to the existing 2100mm diameter trunk sewer via an existing MH on Yorkton Boulevard.

2) Drainage Area B: This area encompasses the remaining East Draft Plan lands (approximately the lots west of proposed Street 'K' East) that are not within Drainage Area A as shown on ***Drawing 5.3***. Sanitary flows for this area will be conveyed via a network of local sanitary sewers draining to a low point on the north side of Bruce creek on proposed Street 'U' East. A trenchless crossing of Bruce Creek is required to convey these flows to a proposed MH1340 which will combine the flows from the Drainage Areas B & C and convey them to a single connection to the existing 2100mm diameter trunk sewer along 16th Avenue at Street 'C' West.

3) Drainage Area C: This drainage area consists of the entire West Draft Plan lands as shown on ***Drawing 5.4***. Sanitary flows will be conveyed by a network of local sewers ultimately draining to a proposed MH1340 which combines the flows from Drainage Areas B & C and connects to the existing 2100mm diameter trunk on 16th Ave at Street 'C' West.

Further information will be required to quantify the additional flows from the North Markham Future Urban Area including the existing residential lots immediately north, and the ultimate buildout to the North West, and if the City of Markham requires these areas to be conveyed to 16th Avenue through the Subject Property.

Total sanitary design flows for the above three drainage areas have been estimated based on the City's population density and the unit counts noted on the respective Draft Plans. Sanitary Flows within the individual sewers are shown within the design sheets included in ***Appendix B***.

5.4 INTERNAL SANITARY SEWER SYSTEM

Due to timing issues with the existing Golf Course operations and the location of the existing storm and sanitary sewer infrastructure, a specific phasing of the sanitary sewers will be required. The specific phasing and servicing strategies within the respective drainage areas are explained in the following sections. The proposed sanitary sewer layout for the East and West Draft Plans can be seen on ***Drawings 5.1 & 5.2***.

5.4.1 Phase 1

Phase 1 is split into two drainage sub-areas deemed Phase 1 North & Phase 1 South which both lie completely within Drainage Area A. The Phase 1 North area is located in the northeast section of the Subject Property and is bordered by Kennedy Road to the east, the existing Angus Glen development to the north, the proposed Street 'C' East to the South and the existing woodlot (Feature 1) to the west and is approximately 13.52ha in size. The Phase 1 South area is bordered by proposed Street 'C' East to the north, the existing Church land to the east, proposed Street 'D' East to the west, and the extension of Yorkton (Kylemore) development to the south. This area is approximately 3.55ha bringing the total sanitary drainage area of Phase 1 to 16.50ha, as shown on ***Drawing 5.3*** and ***Figure 5.10***. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

5.4.1.1 Phase 1 North

Phase 1 North area will drain via local 200mm diameter sewers conveying flows towards the existing 525 mm diameter sanitary trunk sewer located within Street 'A' East, as shown on ***Drawing 5.1***. Where possible, sewers will generally follow road grades with a general depth of sewers from 2.7m to 4.8m deep (to obvert) and sewer grades ranging from 0.5% to 3.0%.

It should be noted that the existing 525mm diameter concrete sanitary sewer that drains west through Phase 1 along Street 'A' East services an existing 45.6ha (Population: 2,791) development east of Kennedy Road. This existing sanitary sewer is approx. 7 m to 8 m deep (to invert) and although it has capacity for the development of the Subject Property, it is too deep to be considered for local servicing. Therefore a local 200mm diameter sanitary sewer will be required to service the lots fronting onto Street 'A' East.

For the proposed lots fronting onto Parkstone Road, there is an existing sanitary pipe that can be utilized, and for the remaining, a new sanitary pipe will be required. The proposed pipe could drain into the existing pipe to the east, or drain to the west, through the easement block and ultimately into the sanitary sewer network within in Street "I" East.

At the proposed intersection of Streets 'A' & 'B' East a 1500mmø "Dog House" manhole (MH852) is proposed over the existing 525mm diameter sewer. Local 200mm diameter sewers from the north and south on Street 'B' East will convey flows from the Phase 1 North area to the proposed MH852. Due to the depth of the existing sewer two external drop structures as per ***Figure 5.5*** (OPSD 1003.010 detail) will be required with drops of approximately 3.0m expected. Following construction of MH852 and the drop structures, the top portion of the existing 525mm diameter sewer will be removed to allow the Phase 1 North flow to enter the existing 525mm diameter sewer. This method of connection will minimize disruption to the existing live sewer as no by-pass pumping will be required and the existing flow can be maintained during construction. The estimated flows from Phase 1 North to the existing 525mm diameter sewer is 26.50L/s (Population: 1,462, Area: 13.52ha) as shown within the design sheets included in ***Appendix B***.

5.4.1.2 Phase 1 South

Within Phase 1 South, sanitary flows from east to west within Medium Density Block 9 from Street 'B' East to the existing 750mm diameter sanitary sewer within proposed Yorkton Blvd (Street 'B' East) at existing MH10. Within proposed Street 'B' East there is also an existing 1200mm diameter storm sewer which has been avoided in the proposed sanitary sewer layout. Phase 1 South will be serviced locally by 200mm diameter sewers ranging in depth from 3.0m to 5.3m with grades ranging from 0.5% to 5.0% in slope.

The existing sanitary sewer is located on the east side of the right-of-way with an approximate depth of 3.70m (to invert). Based on the design sheets included in ***Appendix B,*** flows for Phase 1 South entering existing MH10 have been estimated at 15.57L/s (Population: 551, Area: 2.98ha).

5.4.2 East Draft Plan

This phase cannot be developed, with the exception of Phase 1 lands until the Golf Course operations end, see ***Drawing 5.1***. The East Draft Plan lands excluding Phase 1 fall within two drainage areas with a portion draining to the existing 750mm diameter sewer on Street 'B' East (Drainage Area A) and the remaining draining to Street 'U' East and crossing the creek (Drainage Area B), as shown on ***Drawing 5.3***.

5.4.2.1 Drainage Area A

The remaining lands within Drainage Area 'A' are bound by proposed Phase 1 to the east, the existing Angus Glen subdivision to the north, proposed Street 'K' to the West and the extension of Yorkton (Kylemore) development to the south and is approximately 7.9ha in size, as shown on ***Drawing 5.3***.

The lands north of Street 'A' East as well as lots south of Street 'A' East will drain via local 200mm diameter sewers to the existing 525mm diameter sewer along Street 'A' East. However due to the alignment of the existing 525mm diameter sewer, the length of the sewer west of existing MH101 will be required to be removed. The existing 525mm diameter sewer will be replaced with

a proposed 525mm and 600mm diameter sewer along Street 'A' East. This proposed sewer will convey flows to a proposed 750mm diameter which will replace a section of the existing 750mm diameter sewer as the existing sewer alignment does not work with the proposed road alignment. The existing 750mm diameter sewer will be required to be removed from the north property boundary at existing MH84 to just south of Street 'V' East near existing MH7. During construction the existing flow within the 750mm diameter sewer will be maintained with the use of by-pass pumping. The proposed 750mm diameter sewer will be required to convey the existing 574.99L/s (Population: 38,965, Area: 713ha) flow from the upstream drainage area as well as the local flows from Drainage Area A. The remaining East Draft Plan lands within Drainage Area A will be conveyed via local 200mm and 250mm diameter sewers to the proposed 750mm diameter sewer within Street 'B' East.

Depths for the sewers range from 2.7m to 7.8m (to Obvert) with sewers grades between 0.4% and 4.0%. Based on the design sheets included in ***Appendix B***, the total estimated flow from Drainage Area A including all external flows to the existing 750mm diameter sewer is 647.50L/s (Population: 45,512, Area: 787.52ha) at existing MH10. The allowable flow from the Subject Property as per the design for the existing 750mm diameter sewer is 46.2ha with a population of 2,167. This was determined as per the York Downs Sanitary Sub-Trunk Sewer, Sanitary Drainage Area Plan, see ***Drawing 5.6***. The total area and population allowed was calculated by adding the three amounts indicated as the York Downs Surplus Lands on ***Drawing 5.6***. The area of the East Draft Plan lands including Phase 1 that is within Drainage Area A is 24.40ha with a population of 3,312 which is slightly above what was assumed in the design of the 750mm diameter trunk sewer. There is no capacity issue with this proposed increase in population density from the Subject Property as can be seen in the design sheets included in ***Appendix B***. The proposed 2100 x 3000 box storm sewer crosses over the realigned 750mm diameter trunk sanitary sewer along Street 'K' east. The sanitary sewer will have an invert of 183.45 approximately 5.6m deep to achieve a 0.3m clearance.

5.4.2.2 Drainage Area B

Drainage Area B is bound by Bruce Creek to the west and south, the existing Angus Glen subdivision to the north and proposed Street 'K' East to the east as shown on ***Drawing 5.3***. Drainage Area B consists of the remaining of the East Draft Plan lands which are proposed to drain to a low point adjacent to SWM Pond 1 on Street 'U' East at MH989, as shown on ***Drawing 5.1***. These lands will be serviced by local 200mm to 300mm diameter sewers ranging in depth from 2.5m to 5.8m with sewer grades ranging from 0.5% to 5.0%. The outlet for these lands is via a connection to the existing 2100 mm diameter sanitary trunk on 16th Avenue which will be achieved by a trenchless crossing of Bruce Creek and combining flow with Drainage Area C at proposed MH1340. This will allow for a single connection to the existing 2100mm diameter trunk sewer for the two drainage areas. The estimated flow for Drainage Area B is 41.30L/s (Population: 2,178, Area: 32.97ha) as shown on the design sheets in ***Appendix B***. Before the sanitary sewer pipe enters the pond block P1, it must pass under the storm and have an invert 177.64m approximately 6.5 m deep to achieve a 0.4m clearance.

An investigation was undertaken to determine if the sanitary discharge from the entire East Draft Plan lands could connect to the existing 750 mm diameter trunk sewer on Street 'B' East but the required invert was approximately 2.4 m lower than the existing sanitary at the point of connection. Therefore, crossing Bruce Creek is the only alternative for the lots noted above. The proposed crossing will be completed by means of trenchless construction and directional drilling from SWM Pond P1 to the mid-rise residential block located at the east end of Street 'E' West located south of Bruce Creek. Details of the crossing are shown in ***Figure 5.7***.

5.4.3 West Draft Plan

Drainage Area C consists of the entire West Draft Plan lands and is bound by an existing development to the north, by Bruce Creek/East Draft Plan to the east, and 16th Avenue to the south. This 49.60ha area drains generally from the north to the south east, with an approximate 16 m elevation change over roughly 1,400 m across the site.

Due to the proposed overall grading of these lands, sanitary servicing will require a dual sanitary sewer in locations where the internal trunk is too deep for local servicing (lots on Block 48 along Street 'B' West). The sanitary sewers are proposed at depths ranging from 2.9 m to 8.98 m with sewer grades ranging from 0.5% to 4.0%. Sanitary flows will be conveyed by a network of local sanitary sewers ranging in size from 200mm to 300mm diameter ultimately draining to a proposed MH 1340 which also accept flows from Drainage Area B. This will allow for a single connection to the existing 2100mm diameter trunk sanitary sewer along 16th Avenue at proposed MH1407. Based on the design sheets provided in ***Appendix B***, the accumulated population and area from Drainage Area C entering MH1407 with the additional flow from Drainage Area B is estimated to be 120.38 L/s (Population: 7,609, Area: 83.27ha). These flows outlet to the 2100 mm diameter sanitary trunk on 16th Avenue. The allowable flows to the 2100 mm diameter sanitary trunk will be subject to City and Region approval.

As noted above, it is intended to make one sanitary connection to the existing 2100 mm diameter sanitary trunk, on north side of 16th Avenue at the intersection of 16th Avenue and proposed Street 'C' West which is opposite Normandale Road, via proposed MH1407. The creek crossing for Drainage Area B results in a sanitary sewer depth of approximately 9m prior to the connection to the existing 2100mm diameter trunk sewer. The existing 2100 mm diameter sanitary trunk sewer is 11 m deep (to invert). The proposed connection is designed to have a manhole (MH1407) adjacent to the existing trunk sanitary sewer with a direct connection into the live sanitary sewer, thus no interruption of existing flow anticipated. This connection has been detailed in ***Figure 5.8***.

5.5 SANITARY TRUNK ALIGNMENT ALTERNATIVES

5.5.1 Alternative Crossing of the Bruce Creek

Different options and locations to cross the Bruce Creek with a sanitary sewer were looked at during the preliminary design process. Crossing Bruce Creek further upstream near the proposed road crossing was analyzed. However, this option would require a deep sanitary sewer from the creek crossing south through the development to the connection at 16th Avenue. The depth range would be from 6 m to 11 m deep due to the proposed grading and the distance travelled within the Subject Property. Therefore, it is considered to be too deep for local servicing, and an upper local sanitary system would have been required for general servicing. This is not an efficient design, and should future maintenance be required for the deep sewer system, the entire road allowance could be impacted.

Therefore, the preferred option was a crossing Bruce Creek from the natural low point on the east side on proposed Street 'U' East to the natural low point on the west side, which is close to the 16th Avenue connection. This would minimize the amount of deep sewers and also minimize the amount of local sanitary sewer systems, in order to provide local service connections.

5.5.2 External Servicing: Markham's Future Urban Area

Markham's new Official Plan (2014) provides for future neighborhoods and employment uses to be developed in an area bordered by Major Mackenzie Drive to the south, the Hydro Corridor and Woodbine Avenue to the west, the northerly City limits and Elgin Mills Road to the north, and Robinson Creek to the east. These lands are known as the Future Urban Area (FUA)

The FUA covers approximately 1,288 hectares (3,180 acres). Refer to ***Figure 5.9*** from XCG Engineering – 2031 Servicing Alternatives.

There are a number of sanitary servicing options being investigated by the City of Markham. One of the alternatives would involve oversizing the proposed sanitary sewer system within the West Bruce Creek area. This option contemplates the elimination of an existing sanitary syphon system located at the Angus Glen Boulevard crossing of Bruce Creek. The existing sanitary sewer flows easterly into the existing 750 mm diameter trunk sanitary sewer within an easement that connects to Yorkton Boulevard and ultimately connects into the 2100 mm diameter YDSS sanitary trunk sewer along 16th Avenue within Yorkton Boulevard (east of the Subject Property). This option requires access to the West Draft Plan area lands via private property. The Landowners have no control over these private lots. Therefore, this option is not being considered at this time.

Additional information will be required to determine the capacity of any sanitary sewers proposed through the West Bruce Creek area to accommodate flows from portions of the FUA.

6.0 STORMWATER MANAGEMENT AND DRAINAGE

6.1 STORMWATER MANAGEMENT CRITERIA

SWM criteria for the Subject Property was established in the revised October 2017 MESP based on several background documents including:

- MMM Rouge River Watershed Hydrology Update (2001);
- MOECC Stormwater Management Planning and Design Manual (SWMPD) (2003);
- TRCA Low Impact Development Stormwater Management Planning and Design Guide (2010);
- TRCA Stormwater Management Criteria (2012); and,
- City of Markham Engineering Design Criteria March 2015.

6.1.1 Quality Control

In accordance with the 2003 MOECC SWMPD Manual and 2012 TRCA Stormwater Management Criteria, Enhanced Level of Protection is required for water quality. This requirement is consistent with City of Markham Design Criteria and Region of York policies.

The SWM facility design will follow the criteria in the Stormwater Management and Design Manual (MOE, 2003) and the Guidance for Development Activities in Redside Dace Protected Habitat (OMNRF, 2016). Thermal mitigation measures will be implemented in accordance with the guidelines, including best efforts to achieve targets including discharge temperatures below 24°C, t a dissolved oxygen concentrations of at least 7 mg/L and total suspended sediment levels less than 25 mg/L above background conditions.

6.1.2 Erosion Control

An erosion analysis that was completed as part of the revised October 2017 MESP addressed the 2012 TRCA Stormwater Management Criteria. The analysis recommends the implementation of extended detention storage of runoff from a 25 mm 4 hour storm over 48 hours for both Bruce Creek and Berczy Creek.

6.1.3 Quantity Control

The revised October 2017 MESP requires quantity control be provided to protect the existing identified downstream Flood Damage Centres, from flooding impacts due to upstream development.

The quantity control requirements are as follows:

- Bruce Creek Upstream of 16th Avenue - Control post-development peak flows to pre-development peak flows for the 2 year through 100 year storm events; and,

- Berczy Creek Downstream of Warden Avenue - No flood control required (only extended detention).

6.1.4 Water Balance

As described in the revised October 2017 MESP, the Subject Property is classed as a Low Groundwater Recharge Area in the 2012 TRCA Stormwater Management Criteria. The water balance requirement for this classification is a "best effort made" approach to the maintenance of groundwater recharge. Additionally, there are natural features within the site that require individual feature based water balance assessments to ensure ecological form and hydrologic function are maintained.

6.1.5 Regional Storm Control

A Regional storm hydrologic assessment was completed in the revised October 2017 MESP to satisfy the 2012 TRCA Stormwater Management Criteria, TRCA's 2014 Living City Policies, and City of Markham's policies. This analysis evaluated the impacts to the Regional storm flows within Bruce Creek and Berczy Creek resulting from the proposed development of the Subject Property. The results indicated downstream areas were not impacted by the Regional storm flows, resulting from development within the Subject Property, therefore further mitigation measures (i.e. Regional quantity storage and/or downstream improvements) were not warranted or recommended. Therefore, no requirements exist for the Regional storm event. For details refer to Section 2.6.3 and 2.6.4 of the SGR in the revised October 2017 MESP.

6.2 BEST MANAGEMENT PRACTICES FOR STORMWATER

As part of the revised October 2017 MESP, a screening and assessment of best management practices for stormwater and LID practices (i.e., lot level, conveyance and end-of-pipe controls) was undertaken. The screening also assessed the feasibility of implementing these strategies within the Subject Property on various land uses.

6.2.1 Recommended SWM & LID Practices

The lot level, conveyance and end-of-pipe controls were evaluated based on the SWM criteria for the Subject Property related to water quality, water quantity, erosion, and water balance. In addition, the following Subject Property characteristics were also considered;

- Soils consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till;
- Depth to groundwater generally ranges from 0.2 m to 6 m;
- Hydraulic conductivity ranges from 8.8 x 10^{-6} to 8.3 x 10^{-4} cm/s;

- Infiltration rates were evaluated to range from 50 mm to 135 mm for Clayey Silt to Clayey Sand Till and 200 mm to 360 mm for Sandy Silt to Silty Sand.

Table 6.1 was taken from the revised October 2017 MESP and summarizes the SWM measures that are recommended for implementation within the Subject Property.

Table 6.1 Recommended SWM and LID Practices

SWM and LID Practice	Lot Level	Conveyance	End-Of-Pipe
Cisterns / Rain Barrels*	X		
Green Roofs*	X		
Downspout Disconnection with Increased Topsoil /Amended Soil	X		
Grassed Swales		X	
Vegetated Filter Strips		X	
Perforated Pipe		X	
Wet ponds			X
Bioretention Facilities / Rain Gardens			X
Infiltration Galleries			X

*Denotes recommended LID practices not currently accounted for in the mitigation strategy

6.2.1.1 LID Practices Proposed for Water Balance Mitigation Strategy

The revised October 2017 MESP examined and assessed the functionality of each LID strategy. The proposed residential development of the Subject Property will increase runoff volumes and reduce infiltration when compared to existing conditions if no mitigation measures are implemented. The existing soils generally consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till and do permit infiltration.

At this stage, LID strategies such as roof downspout disconnection, enhanced grass swales within lots, vegetated filter strips, and increased topsoil depths or amended topsoil appear to be possible for the Subject Property to promote passive infiltration and maintain existing conditions hydrologic characteristics. In addition, infiltration galleries, perforated pipe systems, bioretention facilities, are also proposed. All of the pre-screened LID strategies discussed in the revised October 2017 MESP will be reviewed further at the detailed design stage for site specific feasibility and implementation recommendations.

Based on the revised October 2017 MESP SGR and *Hydrogeological Assessment and Water Balance* report, prepared by R.J. Burnside Associates, the following BMPs are proposed for implementation as part of the assessed water balance mitigation strategy:

- Direction of residential roof downspouts to ground surface;
- Grassed swales in sideyards and backyards;
- Vegetated filter strips within buffer blocks behind residential lots;
- Enclave bioretention facilities;
- Infiltration facility;

- Infiltration galleries; and,
- Perforated roof leader collection (RLC) pipes within the right of way.

Additionally, 300 mm of topsoil or amended soils will be placed on all lots in order to maximize rainwater retention and infiltration, as well as 300 mm within parks and 600 mm within boulevards.

Cisterns/rain barrels are proposed on individual but lots were not accounted for in the water balance mitigation assessment as use of barrels would be at the discretion of the individual homeowners and cannot be guaranteed. Green roofs were also not accounted for in the assessment, and are recommended for further review if other recommended LID strategies are not feasible.

6.3 EXISTING DRAINAGE BOUNDARIES

The Subject Property is located within the Bruce Creek and Berczy Creek subcatchments which are both tributaries of the Rouge River. The approximate drainage boundary between the two subcatchments through the Subject Property is illustrated on **Figure 6.1.** The confluence of these two tributaries occurs just downstream, south of 16th Avenue.

The existing drainage divide for the FSR is consistent with work completed as part of the revised October 2017 MESP, which delineated the boundary based on the topographic survey provided by J.D Barnes. Generally this drainage divide is similar to the subwatershed boundaries determined in the 2001 MMM Hydrology Update, which is also illustrated on **Figure 6.1**. Although there is a difference in drainage divide, the impact to the subcatchment and downstream flow nodes are relatively insignificant. As such, the subwatershed catchment areas within the 2001 MMM watershed model (VO2) are deemed to be acceptable and have remained untouched for any analyses within this report using this model.

Figure 6.1 illustrates the existing drainage divide between the two subcatchments delineated based on the topographic survey, the existing storm drainage boundaries and areas through the Subject Property, the subwatershed drainage areas from the Subject Property, as well as external drainage areas and inputs locations. **Figure 6.2** illustrates in the existing external drainage areas and boundaries.

6.4 PROPOSED DRAINAGE BOUNDARIES

The proposed preliminary grading design of the site has been undertaken to maintain the existing drainage areas to Bruce and Berczy Creek to the extent possible and to minimize drainage diversions. The proposed development and drainage boundaries for the Subject Property are illustrated on **Figure 6.3**. A minor drainage diversion from Bruce Creek to Berczy Creek is proposed which is less than 0.5 ha. This diversion is considered negligible, as it is approximately 0.3% of the Berczy Creek subcatchment area (196.5 ha).

An evaluation of the number and location of end-of-pipe facilities was undertaken in the revised October 2017MESP. Four (4) end-of-pipe wet pond facilities are required in the development providing quality and quantity control, and one (1) end-of-pipe infiltration Facility providing quantity control. The proposed locations of these facilities are shown on **Figure 6.3**.

6.5 PROPOSED STORMWATER MANAGEMENT STRATEGY

Based on the evaluation of SWM and LID in the revised October 2017 MESP, the recommended SWM strategies are described in detail as follows.

6.5.1 Low Impact Development Techniques

6.5.1.1 Extra Topsoil Depth & Amended Soils

An increase in the proposed topsoil depth on lots and other grassed areas, such as parks, and boulevards will be used to promote lot level infiltration (up to 0.3 m depth within lots and parks and 0.6 m within boulevards). The TRCA Sustainable Technologies Evaluation Program's (STEP) recent report titled Preserving and Restoring Healthy Soil: Best Practices for Urban Construction (2012) will be considered to the extent feasible at future design stages.

Amended soils are proposed within backyards of split lot grading with downspout disconnection.

6.5.1.2 Roof Leaders to Grassed Areas

Typically, roof leaders will be discharged to grass areas to promote lot level infiltration, except where roof leaders are directly connected to perforated RLC or infiltration galleries as discussed below.

6.5.1.3 Lot Level Infiltration Facilities

To minimize the development impact on the site water balance, clean storm runoff from roof areas is proposed to be directed to infiltration galleries within parks, medium density blocks, mixed use blocks, or schools, where possible and with appropriate separation from the groundwater table.

The lot infiltration facilities will be sized in accordance with the MOECC Stormwater Management Planning and Design Manual (2003) as well as the TRCA Low-Impact Development Planning and Design Guide, including but not limited to:

- Infiltration galleries will be located a minimum of 4 m from building foundations;
- Overflow pipes will discharge to pervious areas that are a minimum 2 m from building foundations and slope away from building;
- Minimum 1.2 m frost cover will be provided above infiltration galleries;
- Infiltration galleries will be filled with 19 mm diameter clear stone with a 40% void space;
- Infiltration galleries will be wrapped in non-woven filter cloth;
- A perforated over-drain connected to the proposed storm sewer system is to be provided;
- Detention of water will be solely underground to prevent mosquito breeding;

- Bottom of the infiltration trench will be a minimum of 1 m above the seasonally high water table;
- Impervious drainage area to treatment facility ratio between 5:1 and 20:1;
- Maximum trench storage volume will be equivalent to 25 mm of runoff from the contributing roof areas;
- Infiltration galleries will be completed following house construction and installed at the time of sodding; and
- Roof downspouts will be installed with a screened inlet pipe and integrated overflow pipe to splash pads in order to accommodate the City lot grading standards.

Typical detail and cross sections for the infiltration galleries, with overflow to storm sewer are provided on **Figure 6.4.**

The preliminary locations of the proposed infiltration galleries are provided in **Figure 6.5**. Preliminary sizing calculations are provided in **Appendix C**.

6.5.1.4 Perforated Roof Leader Collectors (RLC)

Within some areas of the development, perforated RLC pipes are proposed to collect roof drainage and promote infiltration within the right-of-way below the road surface where appropriate vertical separation from the groundwater table is provided (>1 m). Typical detail and cross sections for the perforated RLC are provided on **Figure 6.4.** The preliminary location of the proposed RLC pipes is provided in **Figure 6.5**. Refer to Section 6.8.3 for information on RLC locations. Preliminary sizing calculations are provided in **Appendix C**.

6.5.1.5 Enclave Bioretention Facilities & Infiltration Facility

Bioretention facilities are proposed within enclave areas as part of the proposed development. These facilities are designed to treat and then infiltrate the drainage from roof, lot, and road areas. The drainage enters the facility at the surface at curb cut locations and is filtered by the landscaping as well as the engineered sand, soil, and organic filter medium prior to infiltrating into the ground. By utilizing the bioretention feature in this way it will provide quality treatment, evapotranspiration and infiltration thereby reducing runoff. These facilities will have an underdrain that is connected to the storm sewer which outlet to the downstream SWM pond. Typical detail and cross section for enclave bioretention facilities are provided on **Figure 6.6.**

Proposed Infiltration Facility 1 will be designed to function the same way as the bioretention facilities with the underdrain connected to the storm sewer which outlets to downstream SWM pond 4. Typical detail and cross section for Infiltration Facility 1 are provided on **Figure 6.7.** Preliminary sizing calculations are provided in **Appendix C**.

6.5.2 Stormwater Management Ponds

The revised October 2017 MESP recommended wet ponds be implemented to provide quality, quantity and erosion control for Bruce Creek and quality and erosion control for Berczy Creek. Details for the wet ponds are provided in Section 6.7.

6.5.2.1 Ponds Releasing to Redside Dace Habitat

Where SWM ponds outlet to Redside Dace habitat designated streams, the MNRF has indicated that temperature reduction of the storm pond outflows be considered. SWM ponds should provide permanent pool depths of 3.0 m to satisfy temperature requirements. Should the 3.0m permanent pool not be feasible, the pond designs should consider the use of Cooling trenches and low flow augmentation systems to mitigate temperature impacts on the receiving steam systems. A conceptual detail and cross section for the cooling trench and low flow augmentation systems is provided in **Appendix C.**

6.5.2.2 Allowable Release Rates for SWM Ponds

The revised October 2017 MESP determined pre development flows to set the allowable release rates for SWM Ponds as the TRCA's hydrology modeling for Rouge River included development and quantity control within the subcatchments of interest. These pre development flows were determined in VO2 by modeling a single subcatchment (210 Bruce) using a rural NASHYD command with the pre-development conditions parameters taken from *Table A.2 in Appendix A* of the *2001 MMM Hydrology Update*. Allowable unitary release rates were calculated for each storm event for this subcatchment. Then the allowable pond release rates were established based on the post development catchment area to each SWM pond. **Table 6.2** is taken from the revised October 2017 MESP and summarizes the allowable release rates for the SWM Ponds within the Subject Property based on the proposed drainage areas. Allowable SWM pond release rates were only calculated for Bruce Creek ponds as these ponds require quantity control whereas Berczy Creek does not.

Table 6.2 Allowable Release Rates for SWM Ponds

Event	Unit Release Rates ($m^3/s/ha$)	Pond 1 (m^3/s)	Pond 2 (m^3/s)	Pond 3 (m^3/s)	Pond 4* (m^3/s)
Watershed		Bruce	Bruce	Bruce	Berczy
Drainage Area (ha)		146.82(minor) 130.72 (major)	11.84	22.80	31.09
2 year	0.006	0.85	0.07	0.13	N/A
5 year	0.010	1.53	0.12	0.24	N/A
25 year	0.022	2.83	0.26	0.49	N/A
100 year	0.037	4.77	0.43	0.83	N/A

*No quantity control requirements - only extended detention control is required for Pond 4

6.6 WATER BALANCE ASSESSMENT

6.6.1 Overall Water Balance Assessment

As part of the revised October 2017 MESP, water balance assessments for the pre-development, post-development and post-development with mitigation were undertaken to determine the magnitude of potential effects on the natural environment. Since the development concept presented in this FSR and the revised October 2017 MESP are the same, the water balance assessments presented in the revised October 2017 MESP are pertinent to this report.

The implementation of LIDs (described in Section 6.5.1) on the Subject Property will improve annual infiltration volumes and evapotranspiration under development conditions, and minimize the surplus in runoff. **Figure 6.8** illustrates the post development water balance mitigation plan. The proposed mitigation plan recommends directing approximately 7.83ha of the total available roof area of the proposed development to surface LID's (increased top soil, amended top soil, sideyard and backyard swales) and 9.13 ha of the total available roof area to subsurface LID's (infiltration galleries and perforated RLC under roads and enclave bioretention).

A summary of the water balance assessments for pre-development, post-development and post-development with mitigation are provided in **Table 6.3** for the West and East Draft Plans.

Table 6.3 Annual Water Balance Summary

Development Condition	Draft Plan	Estimated Annual Infiltration Volume (m^3/yr)	Estimated Annual Runoff Volume (m^3/yr)	Estimated Annual Evapotranspiration Volume (m^3/yr)
Pre Development	West Draft Plan – Berczy Creek	42,500	58,400	222,600
	West Draft Plan – Bruce Creek	59,100	94,700	305,000
	East Draft Plan- Bruce Creek	81,200	137,900	423,700
	Total	**182,800**	**291,000**	**951,300**
Post Development Without Mitigation	West Draft Plan – Berczy Creek	24,900	158,400	117,700
	West Draft Plan – Bruce Creek	49,500	161,150	232,300
	East Draft Plan- Bruce Creek	43,700	346,200	206,500
	Total	**118,100**	**666,100**	**556,500**
Post Development With Mitigation	West Draft Plan – Berczy Creek	55,500	127,900	117,700
	West Draft Plan – Bruce Creek	80,700	130,400	232,200
	East Draft Plan- Bruce Creek	61,900	327,300	207,200
	Total	**198,100**	**585,600**	**557,100**

In summary, the proposed mitigation plan will infiltrate 108% of the pre-development annual infiltration volume for the Subject Property (overall site wide water balance), which is broken down into an increase of 34% for the West Draft Plan and a decrease of 24% for the East Draft Plan. These results indicate that the proposed mitigation plan can satisfy the 'best efforts' approach to matching the targets.

A summary of post development infiltration targets per land use is provided in the *Hydrogeological Assessment and Water Balance Report*. The report establishes a unit target by setting a required depth of rain to be captured from roof tops throughout the year and infiltrated to achieve the site wide water balance. These targets are summarized in **Table 6.4.**

Table 6.4 Summary of Post-Development Infiltration Targets

Land Use	Estimated Post-Development Infiltration Volume (mm/Imp ha/year)	Estimated Post-Development Infiltration Volume (mm/Imp ha/year)	Estimated Post-Development Infiltration per Available LID Roof Area (mm/Imp ha/event)
East Draft Plan			
Residential – Single Detached/Laneway Homes	106	2	8
Residential – Town Homes	110	2	25
Residential – Medium Density	113	2	4
School	110	2	6
West Draft Plan – Berczy Creek			
Residential – Single Detached/Laneway Homes	106	2	3
Residential – Town Homes or Laneway Homes	110	2	3
Mixed Use & Residential – Medium Density	113	2	2
West Draft Plan – Bruce Creek			
Residential – Single Detached/Laneway Homes	106	2	3
Residential – town Homes or Laneway Homes	110	2	9
Mixed Use & Residential – Medium Density	113	2	3

6.6.2 Woodlot/Wetland (Feature 1) Water Balance Assessment

A feature based annual water balance assessment was undertaken for the woodlot/wetland (Feature 1), as a portion of the existing external drainage boundary to the feature is proposed to be developed into lots and roads. A post development water balance assessment was undertaken to ensure that surface runoff to the feature is maintained under the developed condition. A review of the monitoring data gathered in 2017, indicates a small groundwater contribution to this feature. Based on past discussions with TRCA staff, it was agreed that if groundwater contributions to this feature were found that a more detailed feature based water balance assessment may not be necessary as the feature was not solely surface fed. As such, the feature based water balance assessment previously completed as part of the 2016 MESP, is considered suitable and has been updated to reflect the revised draft plan and mitigation plan.

Backyard drainage from lots adjacent to the woodlot/wetland (Feature 1) will sheet flow to the feature. In these select lots, the majority of the roof drainage will be directed to grassed areas within the backyard, which will also sheet flow to the feature. As discussed in Section 6.8.3 one small separate RLC pipe is proposed to collect clean water from the front half of the roofs along Street 'B' East and release to the Woodlot/Wetland (Feature 1) where a flow dispersal mechanism will be installed at the outfall prior to release of the flow into the open space area.

The pre and post development drainage boundaries to this feature are shown on **Figure 6.18**, as well as the proposed mitigation plan. The pre and post development water balance summary to the feature is provided in **Table 6.5**.

Table 6.5 Annual Water Balance Summary with Mitigation to Woodlot/Wetland (Feature 1)

	Pre Development	Post Development with Mitigation
Total Estimated Annual Runoff Volume (m^3/yr)	8,700	9,300
Total Estimated Annual Evapotranspiration Volume (m^3/yr)	40,000	31,900
Total Estimated Annual Infiltration Volume (m^3/yr)	8,000	7,800

6.7 CONCEPTUAL DESIGNS OF PROPOSED SWM FACILITIES

6.7.1 SWM Pond Design Criteria

The preliminary pond designs have been based on the criteria taken from the City of Markham Engineering Design Criteria March 2015, 'Section E' – Storm Drainage and Stormwater Management, as listed below. Additionally, the pond has been designed in accordance with all applicable criteria outlined in the MOECC SWM Manual, March 2003.

6.7.1.1 Safety Criteria

- **Pond depth:** Provide enhanced vegetative barriers and 3.0 m wide flat terraces at approximately mid-depth for ponds with total depths of 6.0 – 9.0 m. Terraces may be integrated with maintenance access roads.

- **Slope grades**: Slopes to be varied between 3:1 to 7:1, however 3:1 slopes shall be avoided in areas expected to have greater exposure to the public, otherwise consideration of enhanced vegetative barriers and / or terracing shall be required.

- **Tableland buffer**: Minimum 2.0 m wide buffer between top of the slope and the edge of the ROW or the edge of the pathway.
- **Water edge treatment**: 7:1 terrace at permanent pool edge, 3.0 m wide either side of permanent pool.
- **Vegetative barriers**: Ponds within residential areas shall be provided with enhanced vegetative barriers.
- **Signage:** All wet ponds must have the information / warning signage shown in the Standard Drawings.
- **Safety equipment**: Provide, in areas with greater exposure to public and, as required by the Director of Engineering.
- **Clay liner**: Provide a minimum of 1.0 m thick compacted clay liner extended to the permanent pool or the seasonal high groundwater lever (whichever is higher) + 0.5 m.
- **Chain link fence**: Provide a 1.5 m high black vinyl chain link perimeter fencing along the property lines of residential, commercial, industrial, or institutional lands where they abut a SWM facility block. Gates along fences shall not be allowed.

6.7.1.2 Maintenance Criteria

- **Maintenance roads:** Roads shall be constructed on a granular base, covered with grass and minimum topsoil, 4.0 m wide within a 5.0 m "no shrub / tree" zone, 2% cross-fall, 10% gradient with maximum 15% gradient.
- **Access to pond inlet/outlet:** Create routes, accessible by personnel and maintenance vehicles, to top and bottom of inlet and outlet structures.
- **Access to sediment forebay**: Grade of ramp shall be 10% with maximum 15% gradient maintenance access above permanent pool.
- **Sediment forebay bottom treatment**: 4.0 m wide ramp of adequate bearing capacity shall continue to the bottom of the permanent pool.
- **Vegetation**: Vegetation shall be native species requiring minimal maintenance and suited to variations in water levels experienced in ponds (see MOE guidelines). For pond depths < 6.0 m, basic slope landscaping shall contain grasses and shrubs of adequate density to discourage public access and geese.

6.7.1.3 SWM Pond Cleanout

It is recommended that the SWM Pond cleanouts (i.e. sediment removal) be completed through dredging operations or similar methodologies. Therefore, the proposed SWM pond grading designs have not included sediment decant areas.

6.7.2 SWM Pond 1

The preliminary grading plan and cross sections for SWM Pond 1 are shown in **Drawing 6.9**. A portion of the grading design for SWM Pond 1 includes filling within the shallow fringe of the Regional Floodplain. The pond grading matches the existing grades along the limit of the propose pond block. Refer to Section 7.2 of the revised October 2017 MESP for the details on the Regional Floodplain cut and fill assessment in support of this grading design.

The toe of the pond berm will be located partially within the Regional floodplain. A review of the expected velocities along the toe of slope are less than 1 m/s which will is acceptable to retain vegetation. The berm should be designed by the geotechnical engineer in accordance with the current dam design guidelines with a clay core centre. Details to be provided at detailed design.

Based on the ground water table data collected to date, the normal water level is below the groundwater therefore a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

6.7.2.1 Outfall Location

SWM Pond 1 is proposed to outlet to Bruce Creek outside of the meander belt and 30m buffer (RSD habitat area) as shown on **Drawing 6.9**. The outlet is set above the 100 Year flood elevation. Erosion protection details will be provided at detailed design.

6.7.2.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 22, 896 m^3 (for the minor system drainage area of 146.82 ha), and the provided permanent pool volume in the pond is 72,347 m^3. Calculations are provided in **Appendix C**.

6.7.2.3 Erosion Control

MESP recommendation for extended detention storage is detention of runoff from a 25 mm storm over 48 hours. For Pond 1 the extended detention volume in the pond is 24,857 m^3. Calculations are provided in **Appendix C**.

6.7.2.4 Quantity Control

The stage-storage-discharge characteristics of Pond 1 are summarized in **Table 6.6**. Calculations are provided in **Appendix C** and supporting modeling is provided in **Appendix D.** Conceptual control structures are listed below:

- 370 mm diameter orifice plate (INV=179.50) on the upstream end of control MH 1
- 2.85 m wide by 0.40 m tall weir (INV=180.20) cutout in control MH P1
- 2.85 m wide weir (INV=181.15) cutout in control MH P1

Table 6.6 SWM Pond 1 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	179.50	72,347	0.0
Ext. Det.	0.216	180.18 (unrouted)	24,857 (unrouted)	0.196 (routed) 0.216(unrouted)
2 Year	0.85	180.28	28,630	0.227
5 Year	1.53	180.61	41,329	1.149
25 Year	2.83	181.06	59,450	2.695
100 Year	4.77	181.51	77,832	4.675

6.7.3 SWM Pond 2

The preliminary grading plan for SWM Pond 2 is shown in **Drawing 6.10**. This pond will form the ultimate location of the SWM pond as noted in Section 2.4.1.2 of the revised October 2017 MESP. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is below the groundwater therefore a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering will be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

6.7.3.1 Outfall Location

SWM Pond 2 is proposed to outlet to Bruce Creek through the existing outlet HW (originally constructed for Pond H) located within the valley as shown in **Drawing 6.10**. No modifications to this existing headwall are proposed.

6.7.3.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 2,149 m^3 (for the 11.84 ha area), and the provided permanent pool volume in the pond is 6,082 m^3. Calculations are provided in **Appendix C**.

6.7.3.3 Erosion Control

The revised October 2017 MESP extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 2 the extended detention volume in the pond is 2,123 m^3. Calculations are provided in **Appendix C**.

6.7.3.4 Quantity Control

The stage-storage-discharge characteristics of Pond 2 are summarized in **Table 6.7**. Calculations are provided in **Appendix C** and supporting modeling is provided in **Appendix D.** Conceptual control structures are listed below:

- 110 mm DIA orifice plate (INV = 181.50) on the upstream end of control MH P2
- A 0.40 m wide weir (INV = 182.20 m) cutout in control MH P2

Table 6.7 SWM Pond 2 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	181.50	6,082	0.0
Ext. Det.	0.018	181.96 (unrouted)	2,123 (unrouted)	0.016(routed) 0.018(unrouted)
2 Year	0.07	181.98	2,225	0.017
5 Year	0.12	182.28	3,830	0.040
25 Year	0.26	182.54	5,246	0.164
100 Year	0.43	182.80	6,776	0.356

6.7.4 SWM Pond 3

The preliminary grading plan for SWM Pond 3 is shown in **Drawing 6.11**. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is above the groundwater table. If the permanent pool depth (minimum of 1.5m) is shallow enough to avoid interception with the groundwater table then a cooling trench and low flow augmentation would be required to satisfy MNR guidelines for release to Redside Dace streams. Otherwise the full 3.0 m permanent pool depth will be provided along with a pond liner and perimeter subdrains (to be connected to the pond outlet headwall). For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

A portion of the drainage area to SWM Pond 3 is unable to flow overland to the pond, therefore 100 year capture is required to collect and convey the major system flow to the pond.

6.7.4.1 Outfall Location

SWM Pond 3 is proposed to outlet to Bruce Creek outside of the meander belt and 30m buffer (RSD habitat area) as shown on **Drawing 6.11**. The outlet is below the 100 Year flood elevation. Erosion protection details will be provided at detailed design.

6.7.4.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 4,097 m^3 (for the 22.8 ha minor system area), and the provided permanent pool volume in the pond is 10,497 m^3. Calculations are provided in **Appendix C**.

6.7.4.3 Erosion Control

The revised October 2017 MESP extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 3 the extended detention volume in the pond is 4,172 m^3. Calculations are provided in **Appendix C**.

6.7.4.4 Quantity Control

The stage-storage-discharge characteristics of Pond 3 are summarized in **Table 6.8**. Calculations are provided in **Appendix C** and supporting modeling is provided in **Appendix D.** Conceptual control structures are listed below:

- 150 mm DIA orifice plate (INV = 177.60) on the upstream end of control MH P3.
- 0.40 m wide weir (INV=177.10) cutout on MH P3

Table 6.8 SWM Pond 3 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	176.5	10,497	0.0
Ext. Det.	0.036	177.09(unrouted)	4,172 (unrouted)	0.033 (routed) 0.036 (unrouted)
2 Year	0.13	177.16	4,773	0.049
5 Year	0.24	177.43	6,888	0.177
25 Year	0.49	177.80	9,974	0.461
100 Year	0.83	178.15	13,002	0.768

6.7.5 SWM Pond 4

The preliminary grading plan for SWM Pond 4 is shown in **Drawing 6.12**. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is below the groundwater; therefore, a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

Due to grading constraints, a small drainage area from "Street D" West will be piped directly into the main cell. The catch basins connected to this localized sewer could be outfitted with CB shields to provide quality treatment before release into the main cell of Pond 4.

6.7.5.1 Outfall Location

SWM Pond 4 is proposed to outlet to Berczy Creek outside of the meander belt and 30m buffer (RSD habitat area) as shown on **Drawing 6.12**. The outlet is located at the toe of existing slope below the Regional water level elevation. Erosion protection details will be provided at detailed design.

6.7.5.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 4,718 m^3 (for the 29.24 ha minor system area), and the provided permanent pool volume in the pond is 5,561 m^3. Calculations are provided in **Appendix C**.

6.7.5.3 Erosion Control

The revised October 2017 MESP extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 4 the extended detention volume in the pond is 4,982 m^3. Calculations are provided in **Appendix C**.

6.7.5.4 Quantity Control

As established in the revised October 2017 MESP, quantity control for Pond 4 is not required other than extended detention (erosion control). The stage-storage-discharge characteristics of Pond 4 are summarized in **Table 6.9**. Calculations are provided in **Appendix C.** Supporting modeling is provided in **Appendix D** has lumped the drainage area to SWM Pond 4 and to Infiltration Facility 1 into one total catchment to calculate the total storage required**.** The extended detention volumes were then separated for each facility based on the appropriate drainage area. Conceptual control structures are listed below:

- 140 mm DIA orifice plate (INV = 178.50) on the upstream end of control MH P4
- 1.0 m wide weir (INV=179.60) cutout on MH P4

Table 6.9 SWM Pond 4 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	178.5	5,561	0.0
Ext. Det.	0.046	179.53	5,298	0.046

6.7.6 Infiltration Facility 1

Proposed Infiltration Facility 1 will be designed to treat the drainage from roof, lot, and road areas (1.85 ha). The drainage enters the facility at the surface at curb cut locations and is filtered (pre-treated) by the landscaping as well as the engineered sand, soil, and organic filter medium prior to infiltration into the ground or release into the underdrain and ultimately the storm sewer. The filter media can be removed and replaced as required. Additional pre-treatment measures could be investigated at detailed design. Typical detail and cross section for Infiltration Facility 1 are provided on **Figure 6.7.**

6.7.6.1 Quality Control

Since the facility is designed to infiltrate flow and filter the water through the bioretention media, it will be providing quality treatment. In accordance with the MOECC SWMPD infiltration facilities are not required to provide permanent pool storage.

6.7.6.2 Erosion Control

The revised October 2017 MESP extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Infiltration Facility 1 the extended detention volume in the facility is 316 m^3. Calculations are provided in **Appendix C**.

6.7.6.3 Quantity Control

As noted above quantity control for Infiltration Facility 1 is not required other than extended detention (erosion control). The stage-storage-discharge characteristics of Infiltration Facility 1 are summarized in **Table 6.10**. Calculations are provided in **Appendix C.** Supporting modeling is provided in **Appendix D** has lumped the drainage area to SWM Pond 4 and to Infiltration Facility 1 into one total catchment to calculate the total storage required**.** The extended detention volumes were then separated for each facility based on the appropriate drainage area.

Table 6.10 Infiltration Facility 1 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
Extended Detention	0.003	N/A	316	0.003

Grassed backyard drainage from lots that are directed to Infiltration Facility 1 will sheet drain to rear yard swales that will outlet to "Block 10 Park" and ultimately to Berczy Creek. Minor grading of "Block 10 Park" will be required.

6.7.7 Proposed Conditions VO2 Modeling

The proposed conditions hydrology modeling provided in the FSR is consistent with the modeling completed in the revised October 2017 MESP. The proposed condition VO2 hydrology modeling was prepared by combining the TRCA's FC Development model with the approved models for the existing Pond H and Interim SWM pond, and incorporating the proposed development of the Subject Property including the proposed land uses, drainage areas and the four proposed SWM Ponds. A detailed description of the model setup is provided within Appendix C of the SGR in the revised October 2017 MESP.

The proposed conditions modeling has not accounted for the detention storage volumes provided by the LID measures proposed within the Subject Property. At detailed design the available detention storage volumes within LID measures could be incorporated into the modeling which may reduce detention storage requirements within the individual SWM Pond blocks.

The proposed conditions drainage boundaries for the Subject Property are illustrated on **Figure 6.2**. **Figure 6.20** illustrates a portion of the Rouge River Hydrology Model catchment boundaries, important downstream flow nodes, and the Subject Property.

Table 6.11 below summarizes the TRCA's FC Development flows and Proposed Development flows for various storm events at the downstream flow nodes. The modeling incorporates the individual pond stage storage discharge characteristics based on the functional outlet designs. VO2 Modeling is provided in **Appendix D1**.

Table 6.11 FC Development and Proposed Development Flows at Downstream Nodes

Node	Node 867		Node 849		Node 868	
Watershed	Bruce		Berczy		Confluence	
Drainage Area (ha)	3551.7		3043.2		6594.9	
Storm Event Flows (12 hr AES)	FC (m^3/s)	PROP (m^3/s)	FC (m^3/s)	PROP (m^3/s)	FC (m^3/s)	PROP (m^3/s)
2 year	13.35	13.21	11.91	11.83	25.02	24.85
5 year	21.00	20.52	19.91	19.80	40.44	39.87
25 year	33.87	33.07	33.51	33.35	66.73	65.83
100 year	46.96	46.10	46.18	46.04	92.71	91.48

As shown in the above table there are no increases to the storm event flows at the downstream flow nodes under the Proposed Development scenario when compared to the FC Development scenarios. Flows are reduced between 0.3% to 2.4% indicating the proposed SWM Ponds are providing adequate quantity control for the proposed development. Therefore, the proposed quantity control measures are appropriate.

6.7.8 Proposed Conditions PCSWMM Modeling

As requested by City of Markham additional modeling using PCSWMM is being undertaken to ensure that the proposed development will not impact the downstream flood damage centres.

The proposed condition hydrology modeling provided in the FSR is consistent with the modeling completed in the revised October 2017 MESP. A detailed description of the model setup is provided within Section 2.6.4 of the SGR in the revised October 2017 MESP. The proposed conditions PCSWMM hydrology modeling presented within this report was completed in an event based mode using the 12 hour AES storm as well as the 3 hour Markham Modified AES design storm distribution (for the purpose of sizing SWM Ponds).

The proposed condition built upon the revised existing condition model by incorporating the proposed development of the Subject Property including the proposed land uses, drainage areas and four SWM Ponds.

Table 6.12 below summarizes the Revised Existing Conditions and Proposed Development flows and water levels at the downstream nodes utilizing PCSWMM for various storm events. PCSWMM Modeling is provided in **Appendix D2**.

Table 6.12 2 to 100 Year Storm PCSWMM Flow Comparison at Downstream Nodes

Node	Node 171		Node 171		Node J5720.94		Node J5720.94	
Watershed	Confluence		Confluence		Confluence		Confluence	
Drainage Area (ha)	6405		6407		13359		13361	
Storm Event Flows (12 hr AES)	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)
2 year	4.03	173.55	4.00	173.55	12.37	169.69	12.54	169.69
5 year	11.18	173.76	11.73	173.77	33.04	170.03	33.65	170.04
25 year	34.69	174.12	35.08	174.12	79.27	170.46	79.73	170.47
100 year	73.73	174.46	74.69	174.47	153.4	171.09	154.45	171.10

As shown in the above table there are minor increases to the storm event flows at the downstream flow nodes under the Proposed Development scenario when compared to the Existing Development scenario. Although flows are increased between 0.7% to 4.7% the corresponding water levels only increase by 0.01m which is negligible. Therefore, the proposed quantity control measures are appropriate.

6.8 STORM SEWER SYSTEM

6.8.1 Storm Sewer Design Criteria

The storm sewers will be designed in accordance with the City of Markham Design Criteria (Design Criteria) dated June 2016 and the latest MOECC design guidelines. Design parameters are summarized below.

- Inlet control devices shall only be used to control flow into the sewer to reduce 100 year HGL;
- Storm sewers are to be designed based on the Rational Method;
- Runoff coefficients will be as per City standards;
- Minimum storm sewer size shall be 300mm diameter;
- Minimum sewer pipe velocity: 0.60 m/s;

- Maximum sewer pipe velocity: 3.70 m/s;
- Minimum sewer grade of: 0.3%, maximum sewer grade of: 3.0%, First leg must be minimum 1.0%;
- Minimum sewer depth of 2.50m from road centreline to sewer obvert;
- Minimum sewer cover 1.2m to provide frost protection;
- Sewers 675mm diameter and larger may be radius pipes;
- Maximum manhole spacing:
    - sewers 600mm diameter or less: 120m
    - sewers 675mm diameter or greater: 170m
- Minimum size of Foundation Drain Collectors: 200mm diameter.

6.8.2 Internal Storm Sewer System

As per City of Markham standards, storm sewers within the Subject Property will be sized to capture and convey runoff for storm events up to and including the 5 year storm event. The storm sewers will then direct this runoff to one of the four proposed SWM ponds. Flows in excess of the 5 year storm event will be routed overland within the right-of-way (ROW) and other designated overland flow routes. There are several locations where a 100 year capture pipe is required to collect and convey major system flows to the appropriate SWM pond. 100 year capture is proposed in some areas of the subject property to preserve existing trees at the property limit or within future park blocks. Refer to ***Figure 6.19***. For details on overland flows refer to ***Section 6.8.5***.

6.8.2.1 Phase 1

Phase 1 lies within the East Draft Plan lands and is split into two drainage divides, Phase 1 North & South based on the proposed grading for the site as shown on the Storm Phasing Plan ***Figure 6.13***. The area north of Street 'C' East is referred to as Phase 1 North and drains to the existing SWM Pond H (on a temporary basis) and ultimately the proposed SWM Pond P1. The area south of Street 'C' East and including Street 'B' East is referred to as Phase 1 South and drains to interim SWM Pond (on a temporary basis) and ultimately proposed SWM Pond P2. The proposed sewer layout for Phase 1 is shown on the East Storm Servicing Plan, ***Drawing 6.14 and 6.15***. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

Phase 1 North conveys flows from the lots and roads via local gravity storm sewers ranging in size from 300mm to 975mm diameter ultimately draining to the proposed SWM Pond P1. Local sewers generally follow road grades with sewer slopes ranging from 0.7% to 3.0% with typical depths of 2.7m to 4.2m. Within Phase 1 North, existing SWM Pond H will be decommissioned following construction of SWM Pond 1 to accommodate the East Draft Plan drainage. Under the interim condition existing SWM Pond H will serve as the outlet for Phase 1 North. There is an external flow of 21,000L/s east of Kennedy Road that drains through the site via an existing 2400mm diameter storm sewer along proposed Street 'A' East that discharges into the existing SWM Pond H. The

local sewers for Phase 1 North will require a proposed "doghouse" MH 160 west of the Street 'A' East & 'B' East intersection to avoid a crossing conflict and will outlet to the existing 2400mm diameter sewer along Street 'A' East under the interim scenario.

Under the ultimate scenario these flows will be conveyed from proposed MH160 to a proposed 2100x3600mm box culvert along Street 'A' East to the proposed SWM Pond P1. The proposed box culvert will be sized to handle the existing 100 year flow from the external area which is captured by the existing 2400mm diameter storm sewer today.

Lots fronting onto Parkstone Road will drain approximately half of the lot drainage towards the existing ROW. An assessment of the available capacity within the storm sewer should be undertaken prior to detailed design to confirm that the pipe and the downstream pond have the available capacity to accept additional drainage. If there is no capacity left, it may be possible to complete a drainage swap such that the front half of the proposed lots would drain to the existing sewer, and any storm sewers along the south boundary be redirected into the Subject Property. For the purposes of this report, the ponds and storm sewers within the proposed development have been sized to accommodate all drainage from these lots.

Phase 1 South will be serviced by local sewers ranging from 300mm to 600mm diameter with depths between 1.5m and 4.20m. The local sewers will convey flows from the lots to the roads and ultimately drain to a proposed 975mm diameter sewer within Street 'B' East via a proposed MH793. The proposed 975mm diameter sewer will ultimately outlet the estimated flows of 1,710L/s to the proposed SWM Pond P2, as shown in the storm sewer design sheets in Appendix E. Until such time as SWM Pond 2 is constructed, an interim proposed storm sewer will drain into the interim SWM Pond located within an easement just north of the future SWM Pond 2. This interim SWM pond will be designed to service 4.29 ha of developed area within the Subject Property as shown on Figure 6.1.

6.8.2.2 East Draft Plan

The East Draft Plan lands outside of Phase 1 are proposed to drain to the proposed SWM Pond P1 with the exception of a small area of 0.93ha (Block 7 & 10) west of proposed Street 'B' East which will drain to the proposed SWM Pond P2. Within the East Draft Plan lands there is an existing storm sewer that serves as the outlet for the existing Pond H that runs approximately along Street 'B' East. As Pond H will be decommissioned once the proposed SWM Pond P1 is constructed this existing sewer will no longer be required and will be removed or decommissioned for the majority of its length. Additionally a portion of the existing 2400mm diameter sewer along Street 'A' East will be removed downstream of proposed MH160 as shown on ***Drawing 6.14***. This sewer will be replaced with a 2100x3600mm box culvert which will be sized to handle drainage from the East Draft Plan and Phase 1 area as well as the existing external drainage. The total minor system drainage area is 118.09 ha (including external area of 82.95 ha), and the major system drainage area of 83.08 ha (including external area of 66.85 ha). This sewer will outlet to the proposed SWM Pond P1 via proposed MH190 on Street 'U' East. The

anticipated flow under the minor storm to this outlet is 14,150L/s and during the 100 year is anticipated to be 25,120L/s.

An area of 18.60ha within the East Draft Plan lands will be conveyed by local sewers ranging in size from 300mm diameter to 1219x1829mm box culvert to outlet on the west side of proposed SWM Pond P1 along Street 'T' East via proposed MH385. Due to ROW capacity limiting overland flow, the proposed sewer will capture and convey the 100 year flow for a 13.91ha area to the pond. The minor flow for this area is anticipated to be 2,670L/s and the 100 year is anticipated to be 5,570L/s as shown within the storm design sheets in ***Appendix E***.

The remaining East Draft Plan area of 2.28ha which is located along the west boundary of the East Draft Plan lands will be conveyed via local sewers to a proposed 825mm diameter sewer that runs along the edge of the valleylands to proposed SWM Pond P1 via MH369. As this area drains to a low point with no outlet for the overland flow, the proposed sewer will be designed to capture and convey the 100 year flow for 1.89 ha area to the pond. The minor flow for this area is anticipated to be 350L/s and the 100 year is anticipated to be 800L/s as shown within the storm design sheets in ***Appendix E***.

6.8.2.3 West Draft Plan

The drainage for the West Draft Plan will be split between two different watersheds that will convey flows to the proposed SWM Ponds P3 & P4, as shown on the Storm Drainage Plan, ***Drawing 6.17***. The catchment adjacent to the Bruce Creek will drain to the proposed SWM Pond P3 and outlet to Bruce Creek. The area which borders the west boundary will drain to the proposed SWM Pond P4 and outlet to Berczy Creek. The proposed storm sewer layout is shown on the included West Storm Servicing Plan, ***Drawing 6.15***.

The drainage to the proposed SWM Pond P3 will be conveyed from the lots to the roads via local sewers ranging in size from 300mm to 1350mm diameter and outlet to the pond via a 1350mm diameter sewer. Sewers within this area range in depth from 1.8m to 4.20m with sewer grades generally following the roads grade with slopes between 0.4% and 2.5%. The total minor system drainage area is 19.22ha. Since the north half of the drainage area is unable to flow overland towards Pond 3, 100 year capture is required. The proposed sewer will capture and convey the 100 year flow from 6.7ha to the pond. The anticipated flow under the minor storm to this outlet is 2,540L/s and during the 100 year is anticipated to be 3,731L/s as shown within the storm design sheets in ***Appendix E***.

The drainage to the proposed SWM Pond P4 will be conveyed from the lots to the roads via local sewers ranging in size from 300mm to 1350mm diameter and outlet to the pond via a 1350mm diameter storm sewer and 375mm diameter storm sewer. Sewers within this area range in depth from 2.6m to 3.8m with sewer grades generally following the roads grade with slopes between 0.5% and 3.5%. The total minor system drainage area to MH604 is 27.42ha. The proposed sewer will capture and convey the 100 year flow from 2 park blocks where grading is minimized for tree saving opportunities, totaling 3.2 ha. The estimated flow for the 5 year storm draining to SWM

Pond P4 is 3,830L/s, and 4,360 during the 100 year storm as shown within the storm design sheets in ***Appendix E***.

6.8.3 Foundation Drain & Roof Leader Collectors

A foundation drain collector (FDC) network is needed in areas where the storm sewer is not sufficiently low enough for basement connections. The proposed FDC will collect cool clean water which can be directly released into the valley system through stone trenches.

Perforated roof leader collector (RLC) pipes are proposed to collect roof drainage and promote infiltration within the right-of-way below the road surface where appropriate separation from the groundwater table is provided (1 m). In one location, a perforated RLC pipe will outlet into an FDC pipe, and is referred to as an FDRLC. This pipe outlets to a wetland stone reservoir within the old golf course irrigation pond, just south of the proposed road crossing of Bruce Creek Valley.

Separate RLC pipes are proposed to collect clean water from 51 roof fronts with an estimated area of 0.351ha as well 1.38ha of roof area from the School Block 8E and roofs within Block 9E and 10E. Drainage will be released to proposed enhancement 'Area E' located west of Street "D" East. A flow dispersal mechanism will be installed at the outfall of the RLC pipe prior to release of the flow into the open space area.

One separate RLC pipe is proposed to collect clean water from the front half of the roofs along Street 'B' East. The total estimated roof area of 0.54ha will be released to the Woodlot/Wetland (Feature 1) located within Block 1 west of Street "B" East. A flow dispersal mechanism will be installed at the outfall of the RLC pipe prior to release of the flow into the open space area.

The below ***Table 6.13*** summarizes the streets where either FDC, RLC or FDRLC are required also illustrated on ***Figure 6.4***.

Table 6.13 FDC, RLC, FDRLC Locations

Drainage System Type	**Street Location (West Draft Plan)**	**Street Location (East Draft Plan)**
Foundation Drain Collector (FDC)	J, K, O	K, U, V, W, X, Y, Z, Block 10E
Foundation Drain and Roof Leader Collector (FDRLC)	U, A	
Perforated Roof Leader Collector (RLC)	A, B, E, F, G, I, J, K, L, M, N, Q, S, U, V, W	AA, B, C, E, F, U, V, W, Y
Roof Leader Collector (RLC) to 'Area E'		K, J, Y, Block 8E, Block 9E
Roof Leader Collector (RLC) to Woodlot/Wetland (Feature 1)		B

6.8.4 Woodlot/Wetland (Feature 1)

An existing woodlot/wetland (Feature 1) exists in the northeast corner of the Subject Property. A description of the feature and its form and function are provided in the Beacon *Natural Environment Report / Environmental Impact Study*. **Figure 6.18** illustrates the staked feature with buffers, the area of the feature, and the existing external drainage area to the feature. Development is proposed within the existing drainage area to this feature. To ensure that this feature continues to receive runoff and maintain its form and function, a feature based water balance assessment has been completed and is described in Section 6.6. The proposed drainage boundaries to the feature are also shown on **Figure 6.18**.

6.8.5 Right-Of-Way Overland Flow Conveyance and Major System Outlets

As noted above, flows in excess of the 5 year storm are typically routed overland within the ROW to SWM ponds or to designated overland flow route outlets. There are several locations where 100 year capture is required to collect major system flows and direct them to the appropriate SWM pond. Some of the proposed 100 year capture locations are proposed to allow for tree preservation along the property line or within future park blocks, reduce overall fill requirements within the site, and ensure the overland flow does not exceed the available ROW capacity.

FlowMaster software was used to evaluate the overland flow capacity for the roads. The calculation was conducted at critical sections with minimum slopes and a maximum flow depth of 0.25m. Detailed calculations are included in ***Appendix F***. The overland flow capacity calculations showed that all the roads have sufficient capacity to accommodate the major system flows.

At detailed design, the inlet capture locations should be designed assuming 50% blockage of capture grates, and the storm sewers be sized to convey the 100 year peak flow without surcharging.

Figure 6.19 illustrates the proposed SWM ponds, proposed drainage boundaries, 100 year capture locations, designated overland flow route outlets, and key locations for overland flow capacity calculations.

6.9 SWM ASSESSMENT OF ZONING EXCEPTIONS

Three exceptions proposed to the zone categories for the single detached lots in both the East and the West Plans of Subdivision are particularly relevant to stormwater management. The first is a reduced rear yard setback from 7.5m to 7.0m for most single detached lots, the second a reduced rear yard setback from 7.5m to 6.0m for the remaining single detached lots, and the third is an exception proposed for approximately 47% of the traditional single detached lots which would permit up to 50% of the rear building face to be located up to 3m from the rear property line. The three exceptions have been reviewed together to assess any impacts to the stormwater management strategy for the Subject Property. The imperviousness of the lots

impacted by the two zoning exceptions were reviewed and compared to the City Standard imperviousness (converted from runoff coefficient from Section E of the City Design Criteria) for singles. The analysis determined that the average imperviousness for all the singles proposed was equal to the City Standard, which was used for SWM Pond sizing, storm pipe sizing and the post development water balance assessment. Therefore, the sizing of the SWM Ponds and pipes are not impacted by the proposed zoning exceptions.

The proposed water balance mitigation plan will be affected by the zoning exceptions as some of the lots will be implementing backyard roofs to amended soils within the backyards. To assess these impacts, the roof and amended soils areas for lots affected by zoning exception have been adjusted to reflect the changes.

The post development water balance mitigation assessment presented in the revised October 2017 MESP has been updated to reflect the zoning exception and the results are summarized in **Appendix I**. In summary, the revised October 2017 MESP post development site wide water balance assessment with mitigation provided a surplus of 8% for infiltration over pre development conditions. The results of the post development site wide water balance assessment with mitigation for both draft plans reflecting the zoning exceptions provides an overall surplus of 9% for infiltration over pre development conditions.

7.0 PRELIMINARY GRADING DESIGN AND ROADWAYS

7.1 CITY OF MARKHAM DESIGN CRITERIA

The Subject Property will be graded in accordance with the City of Markham criteria for Roads Dated July 2016 and Lot Grading dated November 2012 including the following:

Road Grades

- Minimum Centreline 0.7%
- Maximum Centreline 6.0%

Lot Grading Types and Specifications

- Maximum grade between houses shall be 3:1
- Maximum of four (4) rear yards for 0.1 ha may drain to a single swale
- Minimum yard slope 2%
- Maximum yard slope 5%

Park Grading

- Minimum slope 2%
- Maximum slope 5%

The proposed grading design as shown on East and West Grading Plans **Drawings 7.1 & 7.2,** will be designed in a manner which to satisfy the following goals:

- The lands will be graded in compliance with the City's Road and Lot Grading criteria;
- Considering the natural heritage features on the subject property, provisions will be made to minimize grading disturbances in the vicinity of the existing vegetation and natural heritage features identified for retention;
- Road grades were designed to match existing roads and adjacent lot grades along the boundary of the Subject Property;
- Match existing grades to minimize grading and cut/fill quantities and minimize changes to the surface hydrology and hydrogeology, where possible;
- Provide major overland flow routes for flows in excess of storm sewer capacity;
- Accommodate external flows from adjacent properties based on current land use;
- Maintain adequate cover over storm and sanitary sewers and watermains;
- Minimize the need for rear lot catch basins;
- Minimize the need for retaining walls;
- Achieve the SWM objectives for the subject property.

7.2 GRADING AND ROAD ALIGNMENT CONSTRAINTS

The Subject Property is constrained by several existing boundary conditions including existing roads, existing Bruce and Berczy Creek valley features, existing natural features, and existing adjacent developments. The following sections provide more detail on the specific constraints.

7.2.1 Existing Boundary Roads and Adjacent Development

The Subject Property is bound by on all sides by existing local and regional roads, existing residential developments and an existing church property as shown on the Proposed Grading Plans, ***Drawing 7.1 & 7.2***.

Along the North limit, the proposed grading will match the existing rear yard grades for the lots fronting onto Royal County Down Crescent and Royal Troon Crescent. The proposed grading will match the existing edge of ROW grades for Angus Glen Boulevard and Parkstone Road. The proposed grading will match the existing grades at the property line with Angus Glen Boulevard Park.

Along the East limit, the proposed grading will be set a minimum 0.2m above the existing road centerline 1for Kennedy Road, and will match the existing edge of ROW grades along Yorkton Boulevard. The proposed grading will require a retaining wall along the eastern property limit with the Existing Church Site due to a change in grade ranging from 1m to 2.5m. Refer to cross section 1-1 on **Drawing 7.3** for the grading in this area.

Along the South limit, the proposed grading will be set to provide 2% cross fall towards the existing curb and match the existing top of curb along 16th Avenue.

Along the West limit, the proposed grading will match the existing rear yard grades for the lots fronting onto Glenburn Forest Way, Glenridge Drive, and Walnut Glen Place.

7.2.2 Valley Features and Grading in Natural Feature Buffers

The Subject Property is bounded by the Berczy Creek Valley feature to the west and is bisected roughly in the middle by the Bruce Creek Valley feature.

The proposed grading will match the existing grades along the Berczy Creek Valley feature limit with all grading occurring in the proposed lots or within open spaces blocks that will be dedicated as part of the valley system.

The proposed grading will generally match the existing grades along the Bruce Creek Valley feature limit with all grading occurring in the proposed lots or within open spaces blocks that will be dedicated as part of the valley system, with the following exceptions described below.

There are a few locations where the proposed grading adjacent to Bruce Creek Valley requires grading into buffers. The existing woodlot (Feature 2) within the Valley east of SWM Pond 1 will require minor grading that might encroach into the buffer as shown on Section 2-2 on ***Drawing 7.3.***

For window roads adjacent to the valley, the proposed grading will generally match the existing grades along the Bruce Creek Valley feature limit with all grading occurring in or within open spaces blocks that will be dedicated as part of the valley system, as shown on Sections 3-3 and 6-6 on ***Drawing 7.3.***

Limited grading encroachments are required for the proposed road crossing of Bruce Creek and these are discussed in the below ***Section 7.4.4***.

A portion of the proposed SWM pond P1 will encroach into the shallow fringe of the Regional Floodline portion of the Valley feature, and will match the existing grades along the Redside Dace Habitat limit (meander belt limit + 30m) and/or limit of the proposed SWM block.

A floodplain cut grading design will be implemented as shown in Section 4-4 and 5-5 on ***Drawing 7.3.*** The cut grading will occur along the western valley slope south of the existing golf course driveway crossing that will also be removed.

The existing golf course irrigation ponds within the Bruce Creek Valley will be dewatered and filled with top soil to the match the existing waterline levels.

The existing woodlot/wetland (Feature 1) located east of Bruce Creek is surrounded by lots and road. The proposed grading around this feature will tie into existing ground at the buffer limit of the feature where possible. A portion of the road along the east limit of this feature extends into the outer 15m buffer block along with some minor grading, as shown on ***Drawing 7.1***.

The existing Buroak tree and surrounding grades will be retained within the proposed park (Block 6E).

7.3 SITE GRADING DESIGN

In order to achieve natural grade difference across the site while minimizing earthworks various lot types are required. The lot types anticipated are back splits, walkouts, front draining, and front walk-ups, as shown on ***Drawings 7.1 & 7.2.*** The proposed grading of the site will match the existing perimeter grades where possible. Proposed site grading is constrained by existing grades along the perimeter of existing boundary roads, adjacent development, valley systems, and natural heritage features. The overall site grading has been completed to retain these features while minimizing cut and fill operations. Grading practices, to ensure smooth transitions between proposed and existing ground will be observed, and any drainage alteration will not have a negative effect on the neighboring properties. In addition, the grading design has replicated the existing subwatershed drainage boundary divide to the extent possible between Bruce

Creek and Berczy Creek. Due to the grade differential across the subject property, a significant earthworks operation is anticipated.

The Phase 1 lands as shown on ***Drawing 7.1***, are proposed to be graded to tie into the existing boundary grades along the existing Angus Glen subdivision and be set a minimum 0.2m above the existing road centerline for Kennedy Road. Lots within Phase 1 consist of front draining, split and walkout lot types with sideyard grades ranging from 2% to 5% with either 3:1 or 4:1 slopes for the walkouts.

The remainder of the East Draft Plan lands as shown on ***Drawing 7.1***, will be designed concurrently with Phase 1 to ensure the overall grading follows the preferred drainage patterns. These lands will be graded to ties into the existing valley lands and the existing Angus Glen subdivision. Within the East Draft Plan the lot types consist of front draining, split, and walkout lots with slopes ranging from 2% to 5% and with either 3:1 or 4:1 side slopes for the walkouts. In order to preserve existing trees within the proposed park blocks (5E and 6E), existing grades will be maintained to the extent possible with some perimeter grading proposed as shown. The school block (Block 8 East) has proposed grades between 1% and 2.6%.

On the East Draft Plan, a 7.0m grading buffer from the property line in the rear yards of Lots 92 on the north side of Street 'M' East and in lots 130-136 on the north side of Street 'N' East, 153, and 182-191on the north side of Street 'O' East is provided to save the existing trees along the rear lot lines.

The West Draft Plan lands as shown on ***Drawing 7.2,*** are proposed to be graded in order to tie into existing residential development to the west, and a portion of Bruce Creek valley lands to the east. Grading encroachments proposed within the open space Block 1W are shown on ***Drawing 7.2***. Along 16th Avenue, the proposed grades will be set to provide 2% cross fall towards the existing curb and tie into the existing top of curb. Lots within the West Draft Plan lands consist of front draining, split and walkout lot types with sideyard grades ranging from 2% to 5% with either 3:1 or 4:1 side slopes for the walkouts.

Similarly, on West Draft Plan a 10.0m grading buffer from the property line in the rear yards of Lots 340-346 on the west side of Street 'N' West and a 4.0m grading buffer from the property line in the rear yards of Lots 350-360 on the south side of Street 'Q' West is provided to save the existing trees along the rear lot lines. In order to preserve existing trees within the proposed park blocks (7W and 8W), existing grades will be maintained to the extent possible with some perimeter grading proposed as shown.

7.3.1 Preservation of Native Soil

Preservation of Native soil is identified in the MESP Terms of Reference under future study requirements. Based on the proposed grading design and the cut fill calculations, the development is short of fill. Quantities of earth will be imported and this will help in retaining the native soil at site. Export of surplus top soil can be reduced by providing extra depth of topsoil where feasible. Recognizing the existing boundary conditions including the existing boundary roads, adjacent development, valley systems, and natural heritage features the overall site

grading has been completed to retain these features while minimizing cut and fill operations. Additional options should be explored at the detail design stage to minimize the export of Native soil.

7.4 ROADWORKS

7.4.1 Road Access

Road access to Phase 1 will be provided by the construction of two intersections along Kennedy Road at proposed Streets 'A' & 'C' East. There will also be two connections to roads within the existing Angus Glen Subdivisions at Prospectors Avenue and Dancers Drive. These connections will also provide access to the remaining East Draft Plans lands along with the extension of Yorkton Boulevard (Street 'B' East), a connection to Angus Glen Boulevard and the proposed crossing of Bruce Creek to the West Draft Plan Lands.

Access to the West Draft Plan lands will be provided by two proposed intersections along 16th Avenue at proposed Streets 'C' & 'D' West along with the crossing of Bruce Creek to the East Draft Plan lands. These access points are shown on ***Drawings 7.1 & 7.2***.

It is anticipated that the existing golf course driveway crossing of Bruce Creek will remain in place until the proposed road crossing (bridge) of Bruce Creek is constructed. This existing crossing will also be used during earthworks operations to facilitate fill movement between the east and west developments.

7.4.2 Proposed Road Profiles

Preliminary road profiles were established for the Subject Property based on the proposed East and West Draft Plans to satisfy the constraints outlined in ***Section 7.2***. Proposed road grades are designed to meet the City's Design Criteria and range from a minimum of 0.7% to a maximum of 5.0%. The proposed road grades are designed to match existing road and adjacent lot grades at the periphery of the site. The internal portion of the proposed development is largely determined by maintaining adequate cover over the sanitary and storm services while providing for lot grading that is reasonable from the point of view of home construction.

The proposed road profile design will use vertical curves to provide for appropriate transitions in road grades in excess of 1.5% for local roads and 1.0% for minor/major collector roads.

The road grades are also dictated by the depth of cover required over sanitary and storm sewers, the earth cut/fill balance calculations for the site and maintenance of the major storm drainage overland flow routes for the development to the storm water management facilities. The proposed grading design and road profiles for the subdivision maintain the major storm water drainage flows within the subdivision with conveyance over the local road network and

through dedicated overland flow routes to the storm water management facilities located around of the site.

Due to the grade differential of approximately 20 m across the Subject Property, earth cuts and fills of up to 4.0 m in depth are anticipated throughout the site in order to provide positive drainage for local services and to address topographic and environmental constraints. A major earthworks operation is anticipated due to the existing topography. The proposed centreline road elevations are illustrated on the East and West Grading Plans, ***Drawings 7.1 & 7.2.*** Road grades at connections to existing roads are designed to ensure that offsite drainage is generally maintained external to the Subject Property, and to maintain internal site drainage within the Subject Property.

7.4.3 Right of Way Cross Sections

For both the East and West Draft Plans it is proposed that the current City of Markham standard road cross-sections (with the exception of the proposed Enclave Cul-De-Sac and Street F) be used for the development of the subject property including:

- 15.5m RESIDENTIAL LOCAL ROAD
- 17.0m RESIDENTIAL LOCAL ROAD [sidewalk one side – MARKHAM DRAWING MR3]
- 18.5m RESIDENTIAL LOCAL ROAD [sidewalk both sides – MARKHAM DRAWING MR4]
- 23.0m RESIDENTIAL COLLECTOR ROAD [one side parking and shared bike route – MARKHAM DRAWING MR6]
- 23.0 m RESIDENTIAL COLLECTOR ROAD [one side parking and bike lanes – Stantec detail]
- 24.5m RESIDENTIAL COLLETOR ROAD [one side parking and bike lanes MARKHAM DRAWING MR7]32.5m RESIDENTIAL ENCLAVE CUL-DE-SAC [Bioretention Facility, Stantec detail]
- 8.5m and 10.0m RESIDENTIAL LANE [MARKHAM DRAWING MR10]

The typical right-of-way sections noted above are provided in ***Appendix G***.

The design of the roadway geometrics at the following intersections will be undertaken by Poulos & Chung Limited (Transportation Consultants) and will be coordinated with the Region of York:

- Street ‘A’ East and Kennedy Road
- Street ‘C’ East and Kennedy Road
- Street ‘C’ West and 16th Avenue
- Street ‘D’ West and 16th Avenue

7.4.4 Proposed Road Crossing of Bruce Creek

A road crossing of Bruce Creek is required for connectivity and neighborhood structure as well as traffic flow as described in the *Transportation Assessment Internal Roadway Network report* prepared by Poulos & Chung.

A review of the 2015 TRCA Crossings Guideline for Valley and Stream Corridors was undertaken. This TRCA report stated that with respect to new road crossings, many aspects of the natural hazard and natural heritage objectives can be accomplished through proper siting of infrastructure. For example, crossings that are perpendicular to valley and stream corridor and crossing at the narrowest point along the corridor can reduce the impacts and construction costs. Minimize the total number of infrastructure crossings of valleys and wherever possible co-locate infrastructure.

For Natural hazards the objectives pertain to avoidance and mitigation of flood risk, geotechnical risk from slope stability and geomorphic risk from channel migration over time.

- Proposed crossing must not increase flood risk for design storm events up to and including the Regulatory storm event (Regional storm).
- Span the zone of potential future channel migration as defined by the meander belt. Alternative design supported by geomorphic studies may be supportable.

For Natural Heritage function the objectives relate to terrestrial and aquatic habitat and connectivity functions.

- Proposed crossing must avoid siting in locations of woodlots, wetland, seepage areas, and other sensitive habitats, avoid channel realignment, and permitting wildlife movement and fish passage.

Only one road crossing is proposed for the Subject Property which will join the East and West Draft Plans. This crossing location has been selected in area that is relatively narrow and perpendicular to the valley corridor. The proposed road crossing location has avoided woodlots, wetlands, unstable slope areas, and known seepage areas. The proposed road crossing is an open span bridge permitting wildlife movement underneath and fish passage. The proposed road crossing has also avoided channel realignment. In addition, the proposed road crossing is co-located with the watermain crossing as can be seen on ***Figure 7.4***.

Based on the hydraulic analysis for the proposed crossing described below, the crossing has been designed to allow the Regional storm event to be conveyed without overtopping of the road surface.

Due to the wide meander belt width in this reach of the valley corridor it was not possible to span the meander belt width with one open span bridge section. Refer to the Beacon *Fluvial Geomorphology Report* for additional studies to support the proposed design.

A preliminary road crossing design of Bruce Creek has been prepared and included in the revised October 2017 MESP, and this report. The preliminary road crossing design concept consists of a 40 m wide open span bridge section centered over the existing creek with typical road ROW and embankment grading for the approach section leading up to the open span section. ***Figure 7.4*** illustrates the proposed crossing design in plan and cross section.

7.4.4.1 Hydraulic Modelling

As part of the SGR within the MESP, a proposed conditions hydraulic model (HEC RAS 4.1.0) was prepared to analyze the grading and servicing design. The model included the proposed Bruce Creek road crossing, the proposed grading encroachment for Pond 1 into the existing Regional floodline, as well as the compensating cut grading. The modeling presented in this report is the same as within the SGR within the MESP.

The hydraulic modeling assessed the conveyance capacity of the proposed road crossing and open span structure to ensure minimal impacts to the Regional Storm flood elevations upstream of the proposed crossing. ***Drawing 7.5*** illustrates the proposed crossing, cross-section locations, and Regional Storm flood elevations. As shown in ***Table 7.1*** there are some increases to the Regional Storm flood elevations upstream of the proposed crossing, which are contained within the valley. The proposed road and lots will be graded to ensure a minimum 0.3 m of freeboard is provided between the lots and the Regional Storm flood elevation. The proposed conditions modeling output is provided in **Appendix H**.

The proposed conditions modeling assessment includes the SWM pond grading encroachment into the existing Regional Floodline, which is located within the shallow fringe of the floodplain. The pond grading matches the existing grades along the Redside Dace Habitat limit (meander belt limit + 30m) and/or limit of the pond block. The proposed filling also is located within areas of continued disturbance for golf course operations (i.e., works yard, and golfing greens). To satisfy the TRCA Living City Policy (LCP) 8.12.2 an incremental cut and fill assessment has been included as part of the analysis to support the minor SWM Pond grading encroachment into the existing Regional Floodplain. The proposed compensating cut within the valley is necessary within the meander belt and the Redside Dace Habitat limit (meander belt limit + 30m) because the existing Regional Floodplain is off centre from the meander belt width. The majority of the proposed cut grading occurs within golf fairways and access roads (modified areas that will require re-naturalization as part of the overall compensation package for the development).

Table 7.1 Regional Storm Flood Elevation Summary of Bruce Creek

Regional Flow (m^3/s)	Cross Section	Revised Existing Water Surface Elevation (m)	Proposed Water Surface Elevation (m)	Elevation Difference (m)
213.48	8212.01	185.77	185.77	0
213.48	7216.195	185.66	185.66	0

Table 7.1 Regional Storm Flood Elevation Summary of Bruce Creek

Regional Flow (m^3/s)	Cross Section	Revised Existing Water Surface Elevation (m)	Proposed Water Surface Elevation (m)	Elevation Difference (m)
213.48	7216.19	184.78	184.78	0
213.48	7216.186	184.24	184.52	0.28
213.48	7216.183	184.15	184.47	0.32
213.48	7216.18	183.78	184.33	0.55
213.48	7216.175	183.6	184.27	0.67
213.48	7216.172	183.31	184.25	0.94
213.48	7216.171	183.26	184.12	0.86
213.48	7216.168	183.1	182.81	-0.29
213.48	7216.165	183.01	182.77	-0.24
213.48	7216.16	182.94	182.63	-0.31
213.48	7216.145	Bridge (Golf Course)	N/A	N/A
213.48	7216.13	182.07	182.14	0.07
213.48	7216.128	182.09	182.09	0
213.48	7216.125	182.06	182.06	0
213.48	7216.123	181.99	181.99	0
213.48	7216.122	181.56	181.56	0
213.48	7216.121	181.27	181.27	0
213.48	7216.12	180.46	180.44	-0.02
213.48	7216.115	179.91	179.91	0
213.48	7216.11	179.58	179.53	-0.05
213.48	7216.105	179.01	179.03	0.02
213.48	7216.1	178.76	178.76	0
213.48	7216.095	178.58	178.58	0
213.48	7216.09	178.49	178.49	0
213.48	7216.08	177.93	177.93	0
213.48	7216.075	177.92	177.92	0
213.48	7216.07	177.34	177.34	0
213.48	7216.065	177.47	177.47	0
213.48	7216.06	177.39	177.39	0
213.48	7216.045	Bridge (16th Ave)	Bridge (16th Ave)	
213.48	7216.03	176.74	176.74	0

An incremental floodplain cut and fill assessment was undertaken with results presented in **Table 7.2**. These results show that a total and incremental net cut volume can be provided.

Table 7.2 Incremental Floodplain Cut and Fill Assessment

Elevation (m)	Elevation (m)	Cut (m3)	Fill (m^3)	Net (m^3)
177.9	178.2	-5.5	0.27	-5.19
178.2	178.5	-122.2	43.59	-78.62
178.5	178.8	-414.9	371.96	-42.94
178.8	179.1	-621.5	586.69	-34.83
179.1	179.4	-507.9	346.38	-161.54
179.4	179.7	-472.2	194.49	-277.73
179.7	180.0	-612.5	102.32	-510.20
180.0	180.3	-429.7	28.83	-400.87
180.3	180.6	-80.1	7.51	-72.59
180.6	180.9	-1.3	0.21	-1.04
Total Volume =		-3,267.8	1,682.25	-1,585.55

7.5 SLOPE STABILITY CONSIDERATIONS

A slope stability analysis along the west side of Bruce Creek has been completed by Golder Associates and is discussed in the Beacon *Natural Environment Report / Environmental Impact Study*. In addition, a slope stability and natural hazard evaluation along Berczy Creek has been completed by Golder Associates and is discussed in the Beacon *Natural Environment Report / Environmental Impact Study*.

8.0 EROSION AND SEDIMENT CONTROL

Prior to the initiation of any construction within the site, a comprehensive Erosion and Sediment Control program acceptable to the City of Markham, Region of York and the TRCA must be implemented. Appropriate drawings will be prepared at the detailed design stage and submitted to the Agencies for review and approval with supporting report and calculations.

The future ESC plans will include all necessary siltation control facilities and will be designed in accordance with current City guidelines and the requirements of TRCA (Erosion and Sediment Control Design and Submission Requirements, September 2007). Below is a list of recommended erosion and sediment control measures that will be installed and maintained during the construction of the Subject Site:

- Temporary sediment control fences, and tree protection fences (if required) will be placed prior to grading;
- Install temporary swales throughout site along with rock check dams or siltsocks;
- Prior to topsoil stripping phase and bulk earthworks, install temporary sediment traps and/or small temporary sediment control ponds to capture and treat runoff before releasing to open space areas;
- Proposed SWM ponds will be constructed early on in the earthworks phase and will function as ESC ponds during the earthworks and servicing phases of construction;
- Seed temporary topsoil stockpiles to prevent wind erosion;
- All proposed open space areas will be restored with topsoil and vegetation as per the landscape restoration planting plan upon completion of grading;

All temporary erosion and sediment control measures will be routinely inspected and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable.

9.0 UTILITIES

9.1 GAS

Enbridge Gas Distribution Inc. will be the natural gas provider for the proposed development. At this preliminary stage Enbridge has only provided plans for general information on their existing network within the surrounding area. Further discussions and a formal application will be necessary for Enbridge to provide a detailed plan identifying their service to the overall proposed development and each individual lot. Typically Enbridge provides service to lots at an offset of 0.6m from the property line. The existing natural Gas infrastructure is shown in ***Figure 9.1***.

Existing infrastructure surrounding the Subject Property includes:

- A 6" line on the East side of Kennedy Road, running the entire length of the property.
- A 4" line along 16th avenue spanning the East and West thirds of the property.
- A 4" line along Angus Glen Boulevard, running the entire length of the property.
- Various other distribution lines servicing each lot of the subdivisions in the surrounding areas.
- A service is also shown, branching off Warden Avenue, along Old Farm Lane Way. A 2" connection line is shown at the property limit along the West side.

9.2 HYDRO

Hydro power is to be provided by PowerStream Inc. There is existing hydro infrastructure surrounding the entire property, namely Primary overhead lines along, Warden Avenue, Kennedy Road, and 16th Avenue, each having multiple overhead transformers. There is also the existing power service provided to the York Downs Golf Course Club House through an underground service connecting from 16th Avenue; two underground transformers within the property support this service. Further coordination at the time of detailed design will be required with PowerStream Inc. to establish their service alignment of the proposed development. The existing infrastructure can be seen in ***Figure 9.1***. There is also existing underground infrastructure that provides service to each of the lots to the north of the proposed development servicing the subdivision and lots on Angus Glen Boulevard.

9.3 BELL

Bell Canada will be the telephone service provider for the proposed development. Bell has indicated that there is existing buried cable infrastructure along the West side of Kennedy Road. Additionally there are two buried cable lines alone the north side of 16th Avenue. Although Bell

was unable to provide information, it is assumed that there is an existing bell line fed into the property to the existing York Downs Golf Course Clubhouse. Coordination with Bell at the time of detailed design will be required to provide the exact conduit/buried line and pedestal layout that will support the proposed development. ***Figure 9.1*** shows the existing Bell Infrastructure.

9.4 CABLE

Rogers Communications is to be the cable provider within the proposed development. There is existing Rogers infrastructure in the surrounding areas. Both Warden Avenue and 16th Avenue have existing aerial lines, Kennedy Avenue has existing aerial and buried lines. There is also the existing buried line that extends of 16th Avenue, which currently feeds the York Downs Golf Course Club House; these are indicated in ***Figure 9.1.*** Rogers Communications has standard property line offsets of 1.75m on Regional roads and 2.3m on Town roads. Rogers has also indicated that fibre optic cable is present in the area of the proposed development. Exact connection points are to be established at the time of detailed design in coordination with Rogers Communications.

10.0 MONITORING

There are several aspects of the Subject Property that will be monitored during and after construction. A summary of the Erosion and Sediment Control, SWM Facilities, and LID monitoring including the scope of work for the various stages is provided below.

10.1 TEMPORARY EROSION AND SEDIMENT CONTROL FACILITIES MONITORING

Detailed Erosion and Sediment Control Plans will be prepared in support of each draft plan or phases thereof, as well as a report providing calculations and a detailed monitoring/inspection program to be followed until the site is stabilized sufficiently to protect the surrounding natural features.

The following monitoring and record keeping will be required during active construction periods:

- All temporary erosion and sediment controls will be routinely inspected (minimum once a week) and maintained in proper working order;
- All temporary erosion and sediment controls will be inspected after each significant rainfall;
- All necessary repair works will be completed within 48 hours;
- A monthly monitoring report will be completed summarizing site visit outlined above.

During non-construction periods, the inspection of all temporary erosion and sediment control facilities is to be completed following periods of heavy rainfall (>10 mm).

10.2 SWM AND LID MONITORING

The following components of the SWM and LID infrastructure will require monitoring:

- SWM wet ponds
- Infiltration galleries within parks and blocks
- Bioretention enclaves
- Perforated RLC within ROW

10.2.1 Intent of SWM Monitoring Program

The intent of the SWM monitoring program is to ensure the facilities (ponds or LID's) have been constructed in accordance with the approved designs, and that they are operating as

expected. The monitoring program is not intended to evaluate the effectiveness of the design criteria or the accuracy of modeling practices or calculations.

10.2.2 SWM Monitoring Program Stages

The various stages of development require different types of inspection, certification, and monitoring each of which are generally described below. Additional details for each stage of development can be provided at detailed design.

1. Certification Prior to building permits/start of operation

All SWM Ponds, infiltration galleries, bioretention enclaves, and RLC's will require certification by the Engineer to ensure the facilities are constructed in accordance with the design prior to issuance of building permits and/or start of operation of the individual facility.

2. Certification Prior to lot grading completion

Topsoil placement depths will require certification by the Engineer to ensure lot grading is completed in accordance with the approved design prior to lot grading certification, and that the appropriate material (i.e., standard top soil or amended top soil) has been installed per the design.

3. SWM Facility Post Construction Monitoring

In accordance with the City of Markham's 2016 Stormwater Management Guidelines, a monitoring program is required for assumption. The monitoring program to verify SWM facility performance is required for 3 years following construction.

Quantity Control

Dataloggers with pressure transducers (vented) will be located in the SWM facility (inlet and outlet) to capture operating water level readings during storm events. This information will be downloaded and analyzed to show the hydraulic performance and will be used to show the drawdown of rainfall events and a rough estimate of the hydrograph. Available rainfall data should be used to determine approximate return period storm event for correlation to the operating water levels in the facility.

Quality Control

Water quality monitoring is intended to assess and confirm that SWM facilities are providing requisite treatment per the design standards and a comparison to the outflow to that in the receiving watercourse. Temperature monitoring and grab samples (for TSS, TP) should be taken at the inlet, outlet, and within the receiving stream upstream and downstream of the outfall. Three (3) water quality monitoring events per year should be undertaken, once per season

(spring, summer fall). As part of the quality monitoring work seasonal visual inspections will be completed and inspection checklists completed.

In support of the SWM facility maintenance and assumption process required by the City, monitoring reports will be prepared and submitted for water quantity and water quality including seasonal inspections.

10.3 WATERCOURSE MONITORING

Watercourse monitoring is required as a condition of approval for new developments as noted in the City of Markham's 2016 Stormwater Management Guidelines. The watercourse monitoring program is required for 3 years.

10.3.1 Watercourse Monitoring Program

Temperature and flow monitoring as well as grab samples (such as TSS, TP, dissolved oxygen, pH, and salinity) should be taken at the upstream and downstream extents of the property within Bruce creek and Berczy Creek. Multiple wet weather and dry weather samples should be obtained each year with samples collected in each season (spring, summer fall) to characterize seasonal variations or trends. A watercourse monitoring report will be prepared and submitted to the City.

11.0 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

Based on the findings of this report, it is concluded that:

- Phased development of the Subject Property can be achieved with municipal services (water supply and distribution, sanitary drainage, stormwater management and drainage, site grading and earthworks, road works) and utilities using conventional municipal engineering practices and compliance to Municipal Standards. Phase 1 of the Subject Property can be readily serviced from existing municipal infrastructure within and adjacent to the site. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

- The Subject Property can be serviced with domestic and fire water supply and distribution using conventional municipal engineering practices and compliance to City Standards. This can be achieved by extension of and connection to the City's existing water distribution system. Individual PRVs will be required for all lots where service pressures exceed 550kPa as required by the Ontario Building Code.

- The Subject Property can be adequately serviced with sanitary drainage using conventional municipal engineering practices and compliance to Municipal Standards. Sanitary drainage of the Subject Property within Drainage Area A may be readily serviced by connection to the existing sanitary sewer on Streets 'B' & 'K' East. The lands within Drainage Area B require a crossing of Bruce Creek and connection to the existing 2100mm diameter trunk within 16th Avenue. The lands within Drainage Area C will be conveyed to MH1340 which combines the flows from Drainage Area B for a single connection to the existing trunk sewer within 16th Avenue.

- The Subject Property can be adequately serviced with storm drainage using conventional municipal engineering practices and compliance to Municipal Standards. Storm drainage of the Subject Property can be serviced by a conventional gravity storm sewer system with outlet to one of the four proposed SWM Ponds. Phase 1 will outlet to the existing storm sewers and existing Pond H along Street 'A' East until such time that the proposed SWM Pond P1 is built, and to existing Interim Pond along Street 'B' East until such time that the proposed SWM Pond P2 is built.

- The proposed over-all grading design for the site can be achieved using the conventional subdivision design standards and compliance to the proposed stormwater management and overland flow concept.

- Overall site grading will provide for "major" overland flow conveyance where possible to the downstream SWM facilities, provide adequate cover for municipal services and generally tie into existing road grades at intersections (Kennedy Road, 16th Avenue and boundary roads within the existing Angus Glen subdivision) and existing site boundary grades (adjacent properties).

- Streets within the Subject Property will be constructed to the Municipal standards.

- The Subject Property can be adequately serviced through the extension of existing utilities including hydro, gas, cable, and telephone.

11.2 RECOMMENDATIONS

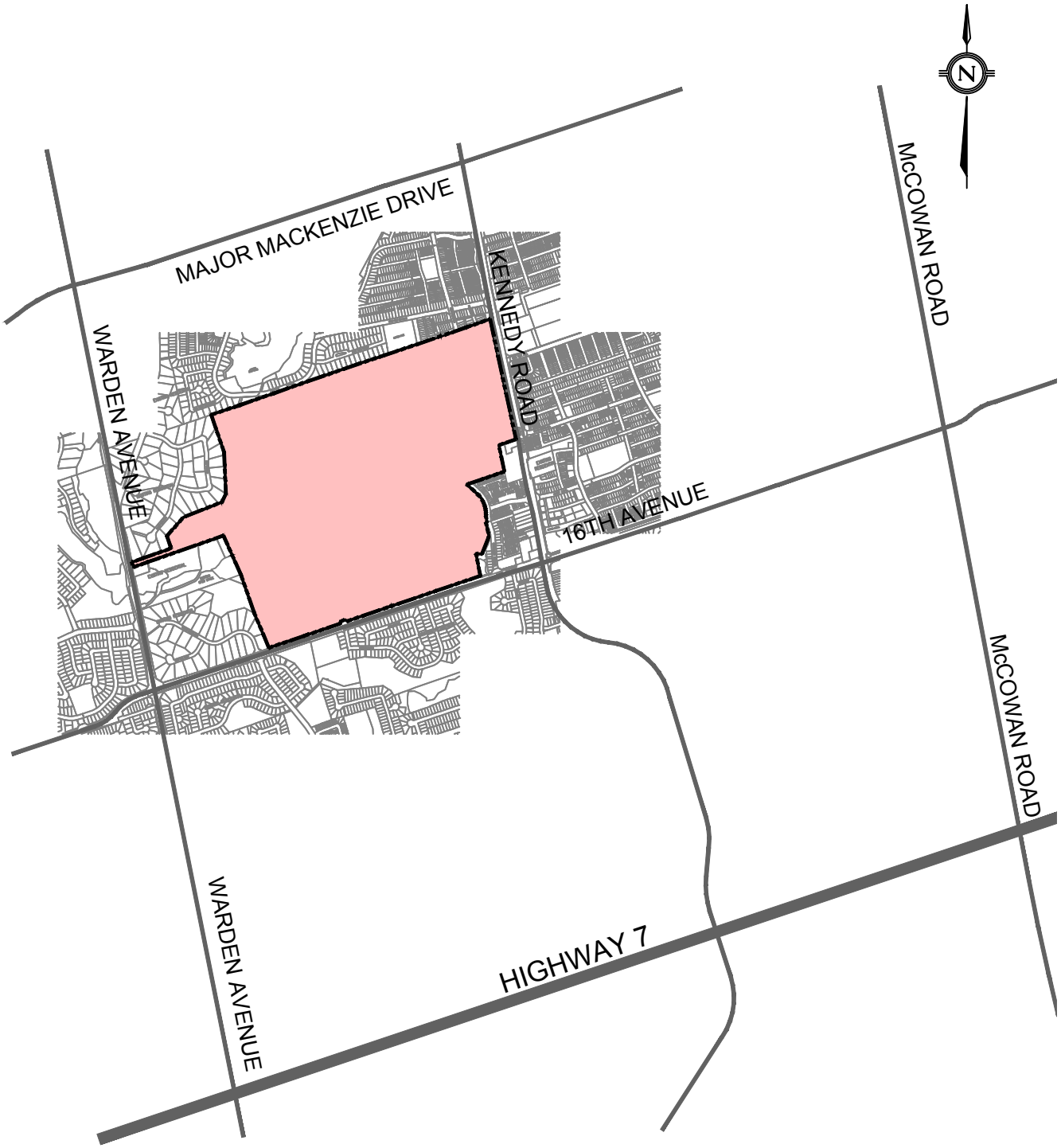
Furthermore, it is recommended that:

- This report is circulated to the applicable review agencies in support of the Official Plan Amendment and Draft Plan of Subdivision Application submitted by Sixteenth Land Holdings Inc., for these lands.

- Detailed grading, erosion and sedimentation control and servicing design drawings be prepared in support of the final detailed design for the development and circulated for review and approval by the City of Markham, York Region, Toronto and Region Conservation Authority and the Ontario Ministry of the Environment and Climate Change.

- A final Stormwater Management Report and Erosion and Sediment Control Plan be completed in support of the final detailed design of the municipal servicing of the development and circulated for review and approval by the City of Markham, York Region, Toronto and Region Conservation Authority and the Ontario Ministry of the Environment and Climate Change.

DRAWINGS & FIGURES



Stantec

NOT TO SCALE

Legend

SUBJECT PROPERTY

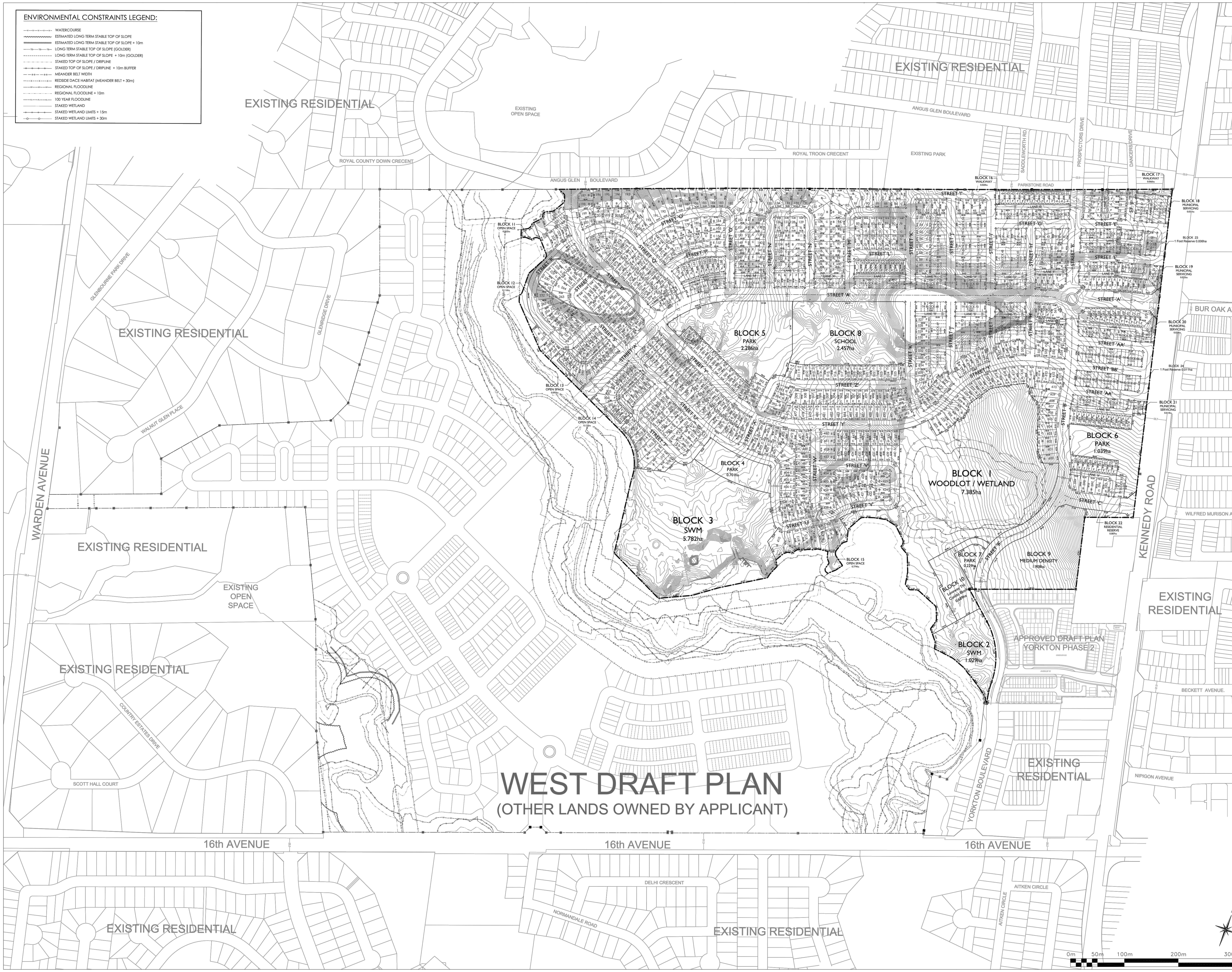
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.1

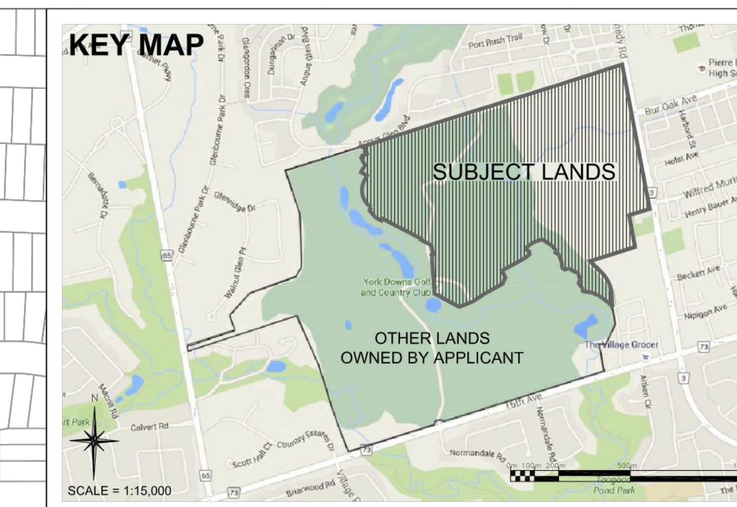
LOCATION PLAN FOR SUBJECT PROPERTY

October 2017

File: v:\01606\Active\160622264\Drawing\sheet_files [FSR]\1.1 – Site Location Plan.dwg – Revised by <Guerriero, Michael> , Fri, Oct 06, 2017 , 1:40 PM



KEY MAP



DRAFT PLAN OF SUBDIVISION

19T-______

PART OF LOT 16, 17 AND 18 CONCESSION 5

CITY OF MARKHAM

REGIONAL MUNICIPALITY OF YORK

OWNER'S CERTIFICATE

I, THE UNDERSIGNED, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS, HEREBY AUTHORIZE GATZIOS PLANNING + DEVELOPMENT CONSULTANTS INC. TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE TOWN OF WHITCHURCH-STOUFFVILLE FOR APPROVAL.

SEPTEMBER 19, 2016 — DATE — Sixteenth Land Holdings Inc.

SEPTEMBER 19th, 2016 — DATE — Sixteenth Land Holdings Inc.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE — J.D. BARNES

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) AS SHOWN
b) AS SHOWN
c) REFER TO KEY PLAN
d) AS SHOWN
e) AS SHOWN
f) AS SHOWN
g) AS SHOWN
h) MUNICIPAL WATER SUPPLY
i) CLAY, LOAM, VARIABLE
j) AS SHOWN
k) MUNICIPAL SERVICES
l) AS SHOWN

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

4134 16th AVENUE RESIDENTIAL DEVELOPMENT - EAST DRAFT PLAN OF SUBDIVISION -- September 15, 2017

Statistics — EAST DRAFT PLAN

LAND USE	LOT / BLOCK NUMBERS:	PLAN CODE	# LOTS / BLOCKS	# UNITS	AREA (ha)
SINGLE DETACHED RESIDENTIAL LOTS					
Access on a Public Road					
15.24m (50') x 28.5m / 35.0m	Lots: 46-47, 50-51, 87-94, 110-112, 124-125, 130-138, 151-154, 173-174, 177-199, 201-204, 213-214, 236-238, 285-286, 315-318, 320-321, 334, 349-351, 365-368, 383-385, 394-395, 410-417, 421-422, 424-425, 451-452, 455-458, 460-461, 472-473, 493-494, 508-509, 543-545, 548, 553, 597-598, 600-602, 615-628	B	135	135	7.727
13.1m (43') x 28.5m	Lots: 20, 53-58, 72-86, 95-98, 105-109, 113, 123, 126-129, 139-142, 147-150, 155-156, 167-171, 176, 200, 205, 210-212, 215-218, 220-221, 223-235, 239, 257-266, 268-278, 282-284, 287-295, 311-314, 323-333, 343-348, 352-355, 362-364, 369-373, 380-382, 386-388, 390-392, 399-408, 418-420, 427-449, 462-469, 471, 474-483, 487-491, 496-499, 503-507, 510-517, 521-525, 531-534, 539-541, 549, 552, 596, 599, 603-605, 609-614,	C	255	255	10.454
11.0m (36') x 28.5m	Lots: 18-19, 45, 48-49, 52, 59-60, 99-100, 103-104, 114, 122, 143, 146, 157, 172, 175, 206, 208-209, 219, 222, 267, 280-281, 296-298, 319, 322, 340-342, 356-361, 374-379, 389, 393, 396-398, 409, 423, 426, 450, 453-454, 459, 470, 484-486, 492, 495, 500-502, 518-520, 526, 528-530, 535-538, 542, 546-547, 550-551, 554-556, 606-608,	E	91	91	3.247
sub-total			481	481	21.428
Access on a Laneway					
9.15m (30') x 28.0m	Lots: 1-17, 21-44, 61-71, 101-102, 115-121, 144-145, 158-166, 207, 240-256, 279, 299-310, 335-339, 527, 557-594, 595,	F	147	147	4.662
Total Single Detached Lots			628	628	26.090
TOWNHOUSE RESIDENTIAL UNITS					
Access on a Public Road					
6.0m (20') x 28.5m	Blocks: 42-48, 50-52, 54-59, 69-72, 74-76, 78-79	J	25	145	2.829
Access on a Laneway					
5.95m (19.5') x 18.0m	Blocks: 25-41, 49, 53, 60-68, 73, 77, 80-83, 90-93	K	38	234	2.987
Total Townhouse Residential Units			63	379	5.816
MEDIUM DENSITY RESIDENTIAL UNITS					
Back to Back Townhouse Blocks	Blocks: 84-89		6	72	0.696
Laneway Townhouse Condo Block	Block: 10		1	31	0.689
Medium Density Blocks	Block: 9		1	145	1.908
Total Medium Density Residential Units			8	248	3.293
TOTAL RESIDENTIAL UNITS			699	1,255	35.199
ELEMENTARY SCHOOL BLOCK	Block: 8		1		2.457
PARKLAND BLOCKS	Blocks: 4-7		4		4.255
WALKWAY BLOCKS	Blocks: 16-17		2		0.087
STORMWATER MANAGEMENT POND BLOCKS	Block: 2-3		2		6.812
ROADS & LANEWAYS:					
Collector Roads 30.0m / 28.5m / 24.5m / 23.0m ROW width	Streets: A-D		2,419.83 lin.m		5.890
Local Roads 17.0m / 18.5m ROW width	Streets: E-Z, AA-BB		6,676.00 lin.m		11.729
Laneways 8.5m / 10.0m ROW width	Laneways: A-X		2,061.93 lin.m		1.768
Total Roads & Laneways					19.387
1 FOOT RESERVE BLOCKS	Blocks: 23-24		2		0.017
MUNICIPAL SERVICING BLOCKS	Blocks: 18-21		4		0.098
RESIDENTIAL RESERVE BLOCK	Block: 22		1		0.087
OPEN SPACE BLOCKS (Woodlot/Wetland)	Block: 1, 11-15		6		7.887
TOTAL PLAN			720	1,255	76.199

Revision #	Description	
1	Revised Post Circulation Comments	September 15, 2017

Title:

4134 16th Avenue East Draft Plan

Scale: 1:2000

NOTE: Elevations Shown hereon relate to Canadian Geodetic Datum

Date: September 15, 2016

Job #: 65MA-1511

Dwg#: 1511-DP2E (36 x 54)

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www.mbtw-wai.com
landscape architecture | urban design | design guidance | architecture | golf design | leisure design

Stantec

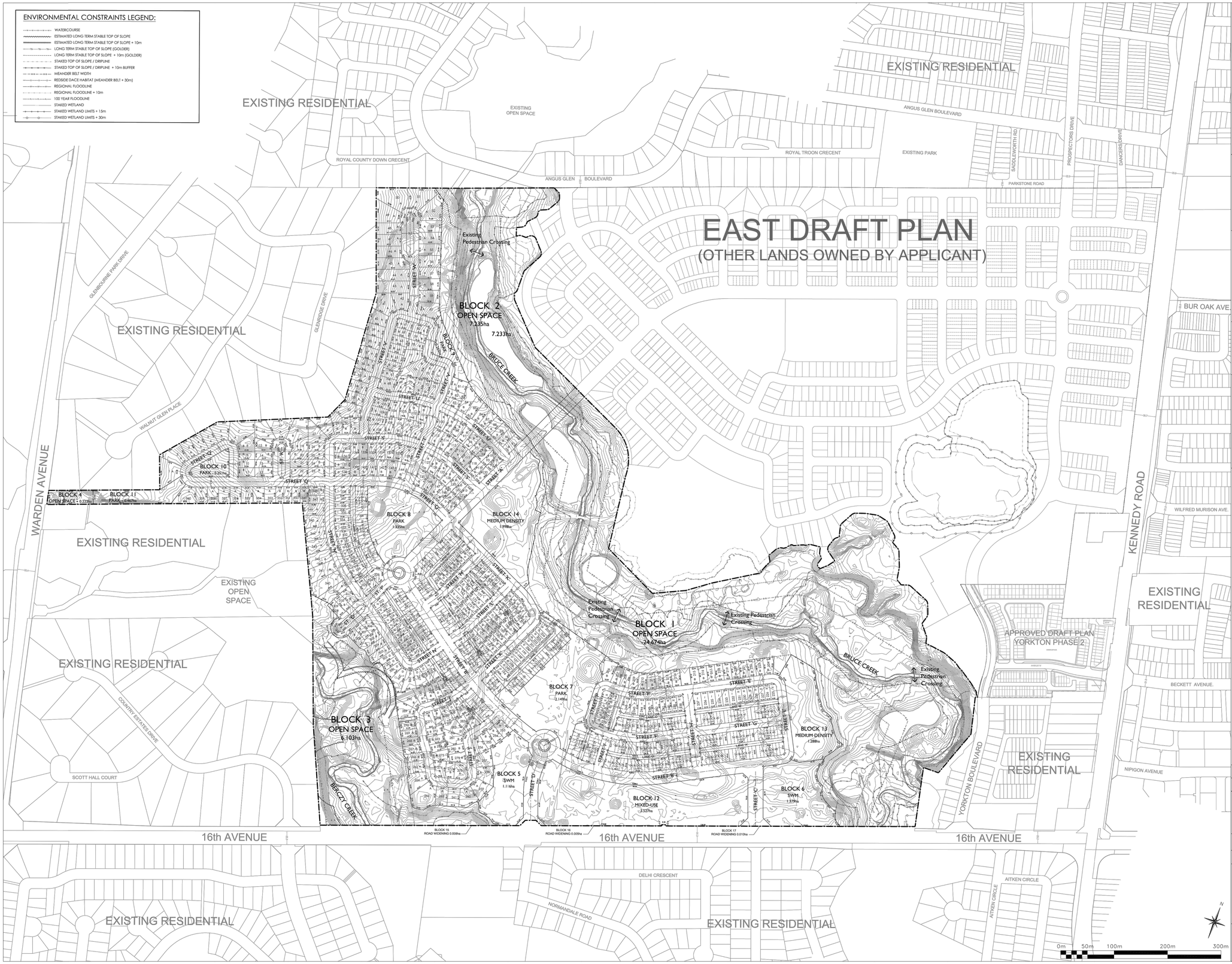
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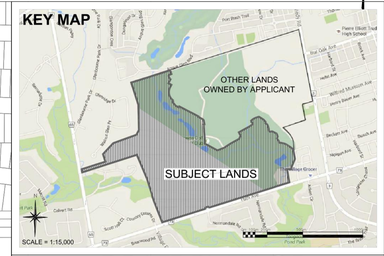
NOTE:
PREPARED BY GATZIOS PLANNING + DEVELOPMENT CONSULTANTS AND MBTW WAI DATED AUGUST 16, 2016

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.2
EAST DRAFT PLAN

October 2017





DRAFT PLAN OF SUBDIVISION

19T-_____

PART OF LOT 16, 17 AND 18 CONCESSION 5

CITY OF MARKHAM

REGIONAL MUNICIPALITY OF YORK

OWNER'S CERTIFICATE

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SEPTEMBER 19, 2016 — DATE — Sixteenth Land Holdings Inc.

SEPTEMBER 19th, 2016 — DATE — Sixteenth Land Holdings Inc.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE — J.D. BARNES

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) AS SHOWN
b) AS SHOWN
c) REFER TO KEY PLAN
d) AS SHOWN
e) AS SHOWN
f) AS SHOWN
g) AS SHOWN
h) MUNICIPAL WATER SUPPLY
i) CLAY, LOAM, VARIABLE
j) AS SHOWN
k) MUNICIPAL SERVICES
l) AS SHOWN

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

LAND USE	LOT / BLOCK NUMBERS:	PLAN CODE	# LOTS / BLOCKS	# UNITS	AREA (ha)
SINGLE DETACHED RESIDENTIAL LOTS					
Access on a Public Road					
21.33m (70') x 31m / 35m	Lots: 1-7, 17, 32-60, 68, 81, 257-265, 278, 340-346, 353-360	A	64	64	6.458
15.24m (50') x 28.5m / 31 / 35m	Lots: 8-16, 18-31, 61-67, 69-71, 74-80, 82, 84-91, 94-118, 123-137, 139-148, 206-224, 255-256, 266-277, 279-281, 287-292, 303-311, 339, 347-352.	B	189	189	9.071
12.2m (40') x 31m	Lots: 72-73, 83, 92-93, 119-122, 138, 149-150, 161-163, 172-174, 17-180, 189-192, 282-283, 286, 293, 296-302.	D	37	37	1.652
sub-total			240	240	17.181
Access on a Laneway					
9.15m (30') x 31m	Lots: 153-159, 164-166, 169-170, 182-185, 201-205, 249-252,	G	25	25	0.770
10.7m (35') x 31m	Lots: 151-152, 160, 167-168, 175-176, 181, 186-188, 193-200, 225-231, 238-241, 247-248, 284-285, 294-295, 312-322, 326-338.	H	53	53	1.970
13.1m (43') x 31m	Lots: 171, 232-237, 242-246, 323-325	I	22	22	0.968
sub-total			100	100	3.708
total Single Detached Lots			340	340	20.889
TOWNHOUSE RESIDENTIAL UNITS					
6.0m (20') x 25.5m	Blocks: 18-57	L	40	281	4.536
MEDIUM DENSITY RESIDENTIAL UNITS					
Mid-Rise Condominium Block (South)	Block: 13		1	190	1.288
Mid-Rise Condominium Block (North)	Block: 14		1	75	1.998
MIXED USE BLOCK (Residential Units)	Block: 12		1	210	3.627
TOTAL RESIDENTIAL UNITS (including MIXED USE BLOCK)			402	926	32.237
PARKLAND BLOCKS	Blocks: 7-11		5		4.468
STORMWATER MANAGEMENT POND BLOCKS	Blocks: 5-6		2		2.496
ROADS & LANEWAYS:					
Collector Roads 28.5m / 27.0m / 24.0m ROW width	Streets: A-D		1,560.54 lin.m		4.182
Local Roads 17.0m/18.5m/ 19.0m ROW width	Streets: E-N, P-Q, S-V		4,787.83 lin.m		8.406
Encloves 10.5m ROW width	Streets: O, R, W		180.00 lin.m		0.773
Laneways 8.5m/7.0m ROW width	Laneways: A-O		1,763.80 lin.m		1.386
Total Roads & Laneways					14.747
ROAD WIDENING BLOCKS	Blocks: 15-17		3		0.022
OPEN SPACE BLOCKS	Blocks: 1-4		4		38.415
TOTAL PLAN			416	926	92.384

Revision #	Description	
1	Revised Post Circulation Comments	September 15, 2017

Title:

4134 16th Avenue West Draft Plan

Scale: 1:2000 — NOTE: Elevations Shown hereon relate to Canadian Geodetic Datum — Date: September 15, 2016

Job #: 65MA-1511 — Dwg#: 1511-DP2W (36 x 54)

Gatzios Planning + Development Consultants Inc.
701 Mount Pleasant Road - 3rd Floor, Toronto, ON. M4S 2N4
T: (647) 748-9466
www.gatziosplanning.com

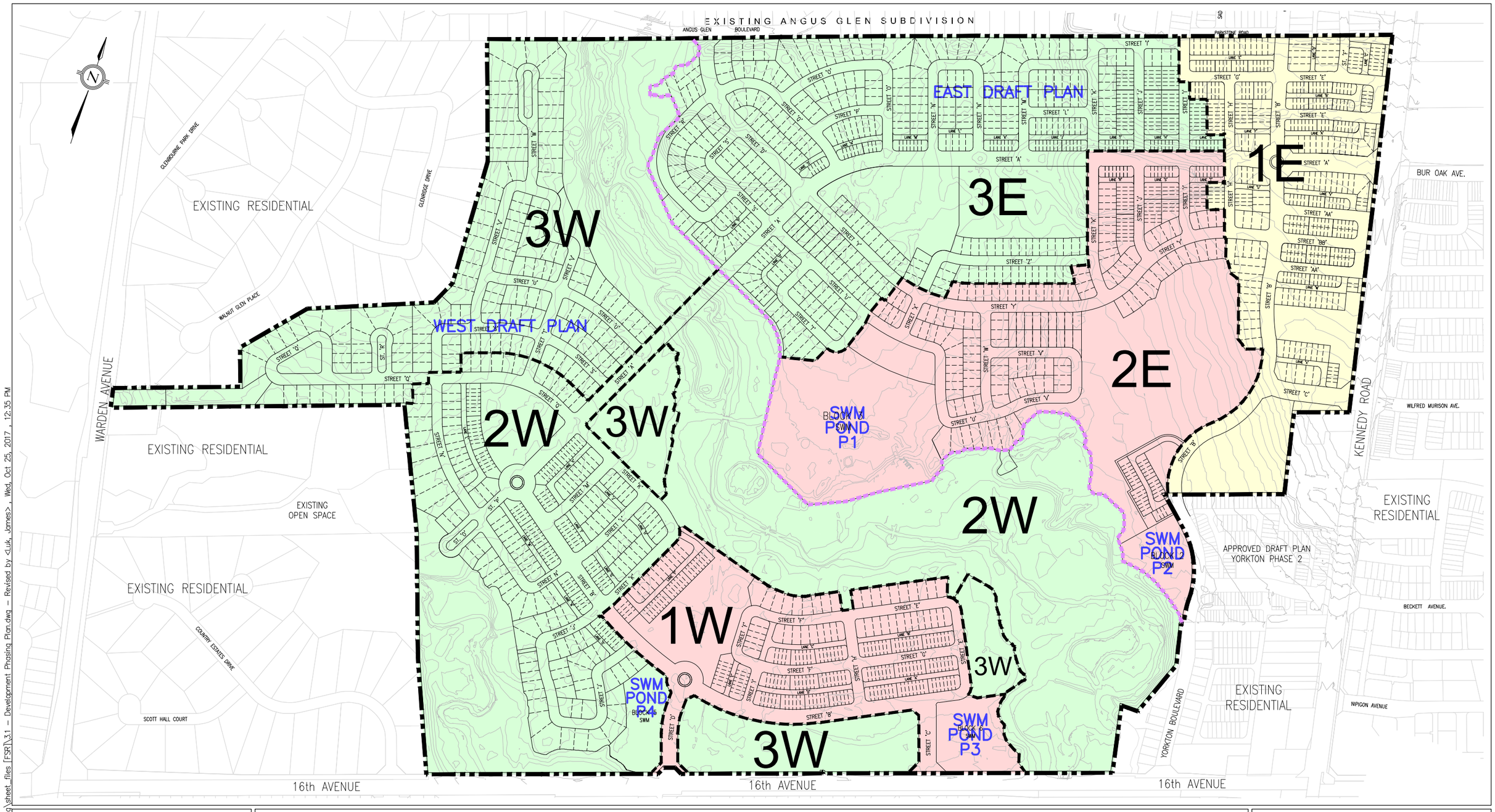
mbtw wai
255 Wicksteed Ave., Unit 1A, Toronto Ontario, Canada M4H 1G8
T: 416.449.7767 | F: 416.449.1803
www.mbtw-wai.com
landscape architecture | urban design | design guidance | architecture | golf design | leisure design

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Legend

NOTE:
PREPARED BY GATZIOS PLANNING + DEVELOPMENT CONSULTANTS AND MBTW WAI DATED AUGUST 16, 2016

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0 60 120 180 240 300

1:6000

Legend

- SUBJECT PROPERTY
- DIVIDE BETWEEN WEST AND EAST DRAFT PLANS
- STAGE A
- STAGE B
- STAGE C

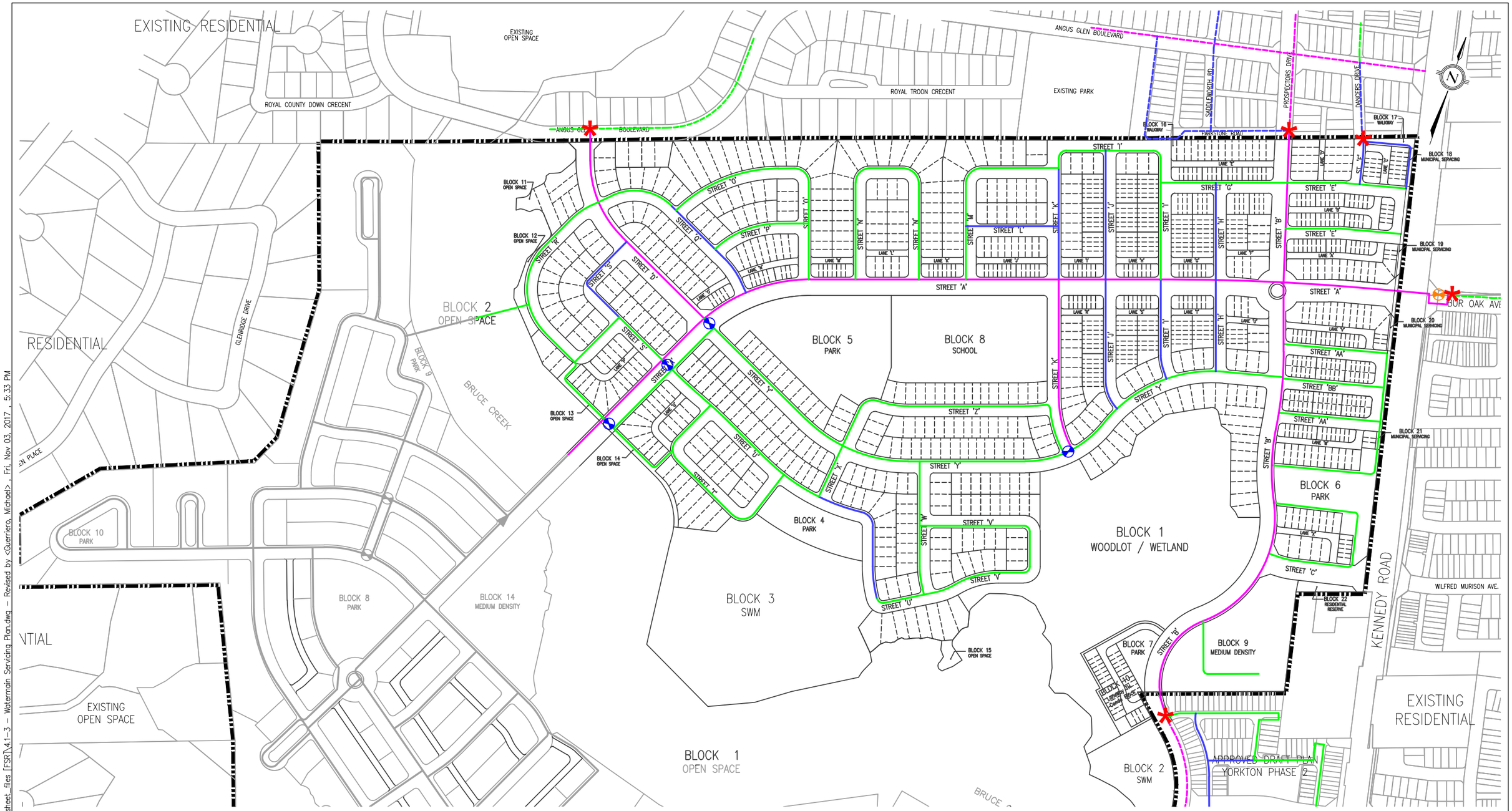
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 3.1

DEVELOPMENT PHASING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\3.1 – Development Phasing Plan.dwg – Revised by <Luk, James> , Wed, Oct 25, 2017 , 12:35 PM



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Legend

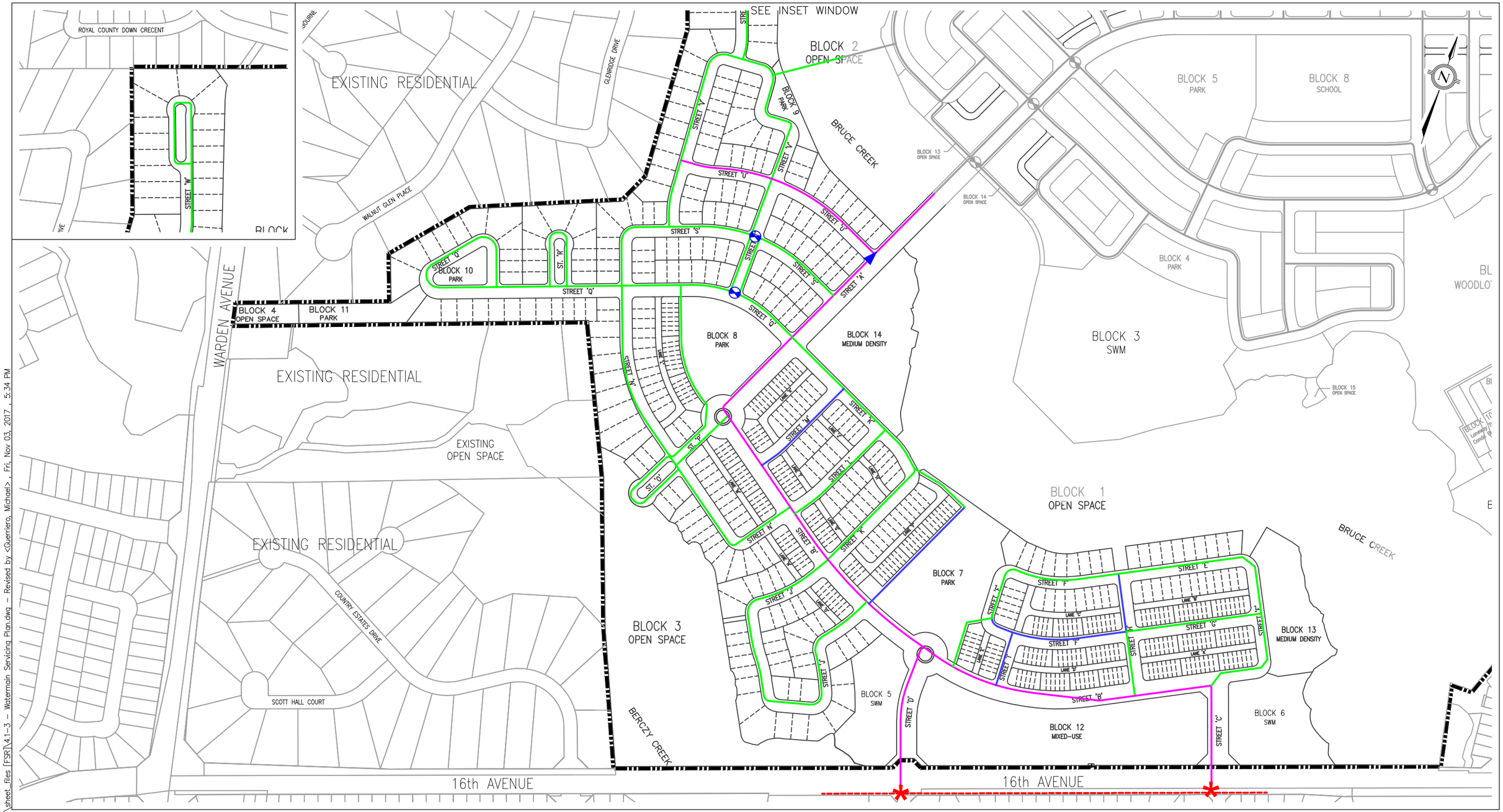
SUBJECT PROPERTY	PROPOSED 50mm WM	EXISTING PRESSURE REDUCING VALVE
EXISTING 150mm WM	PROPOSED 150mm WM	PROPOSED PRESSURE REDUCING VALVE
EXISTING 300mm WM	PROPOSED 200mm WM	PROPOSED CHECK VALVE
EXISTING 450mm WM	PROPOSED 300mm WM	CONNECT TO EXISTING

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 4.1

EAST DRAFT PLAN WATERMAIN DISTRIBUTION SYSTEM

October 2017



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0 50 100 150 200 250

1:5000

Legend

SUBJECT PROPERTY	PROPOSED 50mm WM	EXISTING PRESSURE REDUCING VALVE
EXISTING 150mm WM	PROPOSED 150mm WM	PROPOSED PRESSURE REDUCING VALVE
EXISTING 300mm WM	PROPOSED 200mm WM	PROPOSED CHECK VALVE
EXISTING 450mm WM	PROPOSED 300mm WM	CONNECT TO EXISTING

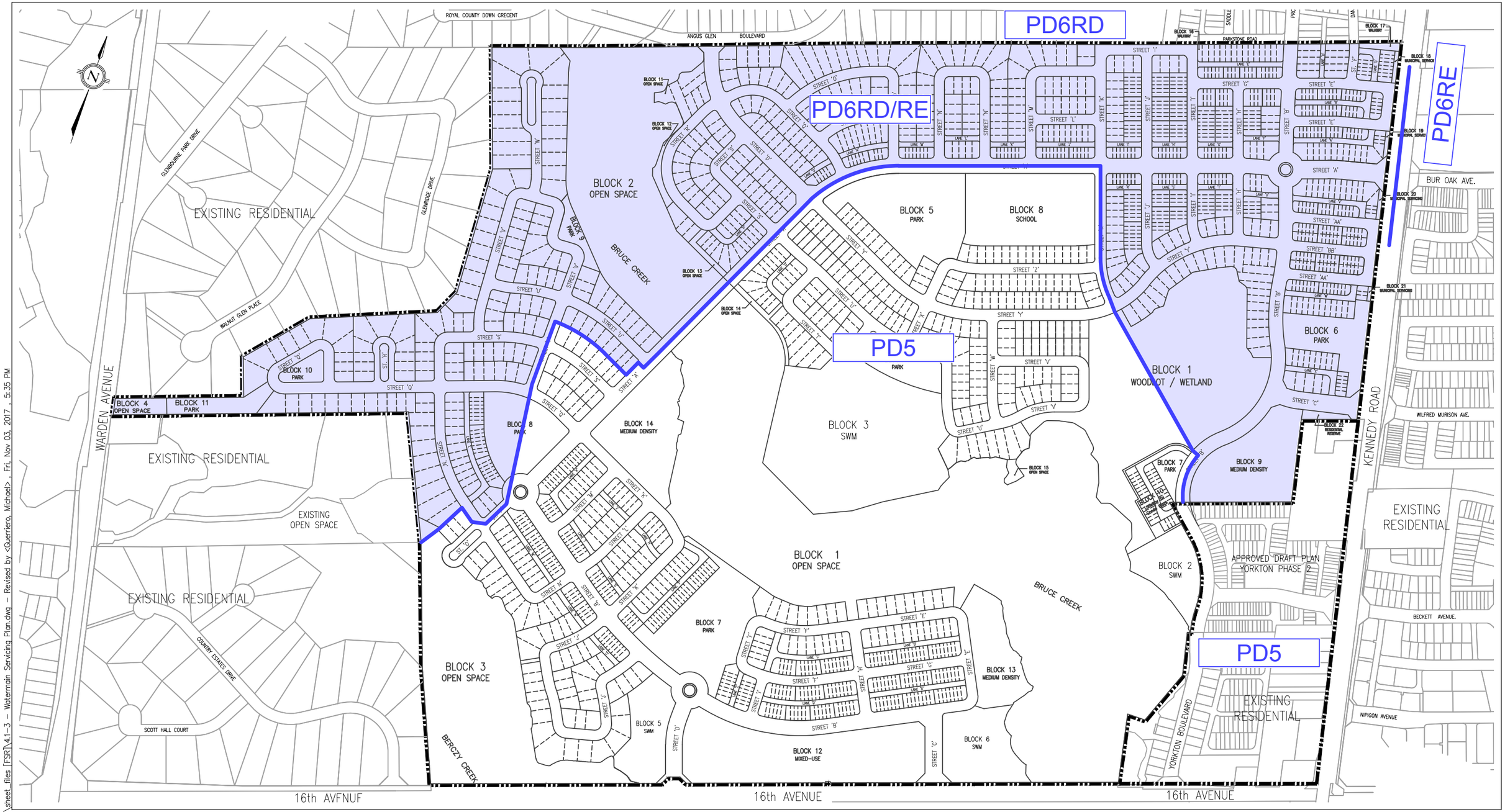
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 4.2

WEST DRAFT PLAN WATERMAIN DISTRIBUTION SYSTEM

October 2017

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Legend

- SUBJECT PROPERTY
- PRESSURE ZONE DIVIDE
- PD6RD PRESSURE ZONE ID
- INDIVIDUAL LOT PRV'S REQUIRED

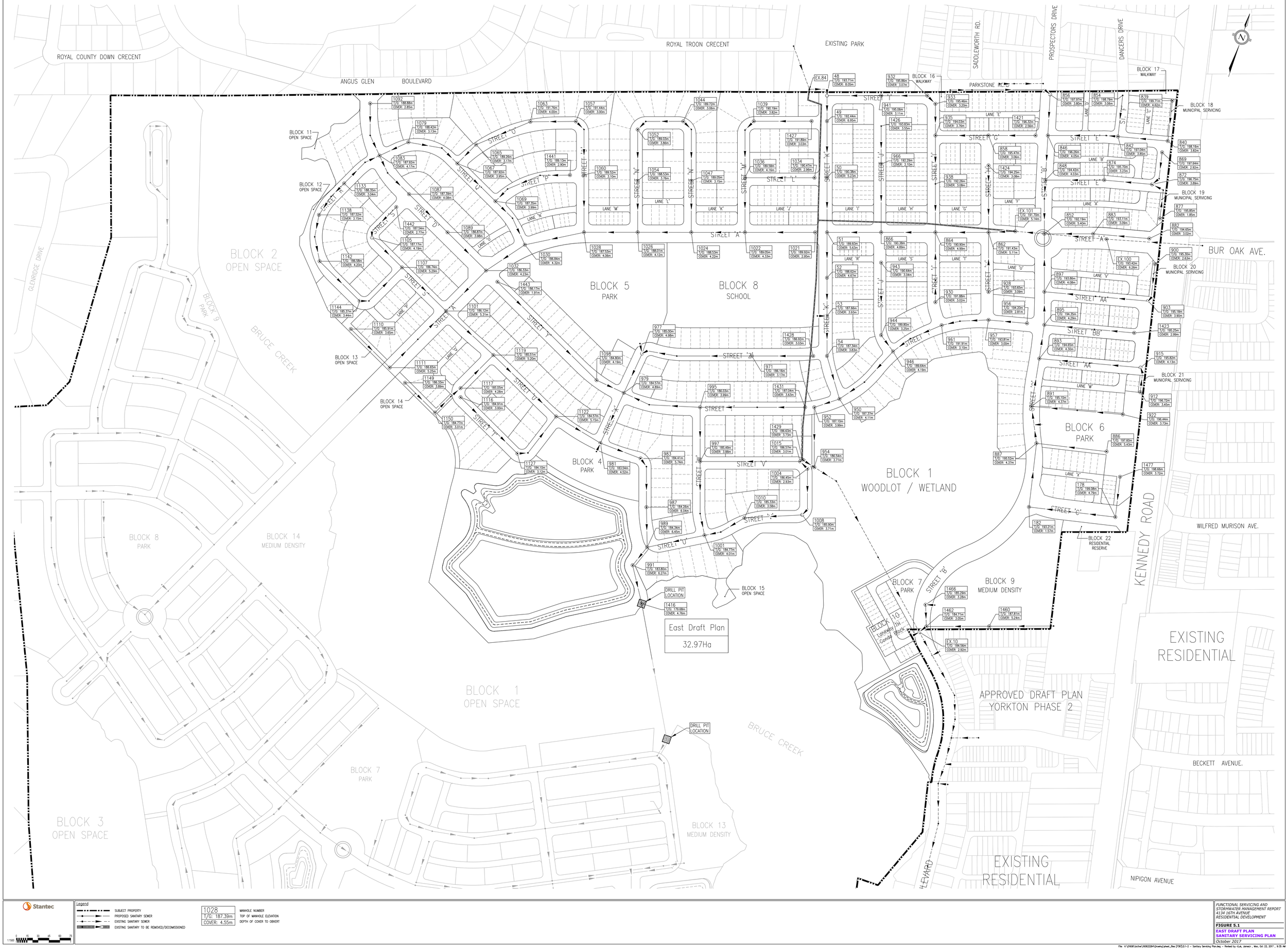
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 4.3

WATERMAIN PRESSURE ZONES

October 2017

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Legend

- SUBJECT PROPERTY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- EXISTING SANITARY TO BE REMOVED/DECOMMISSIONED

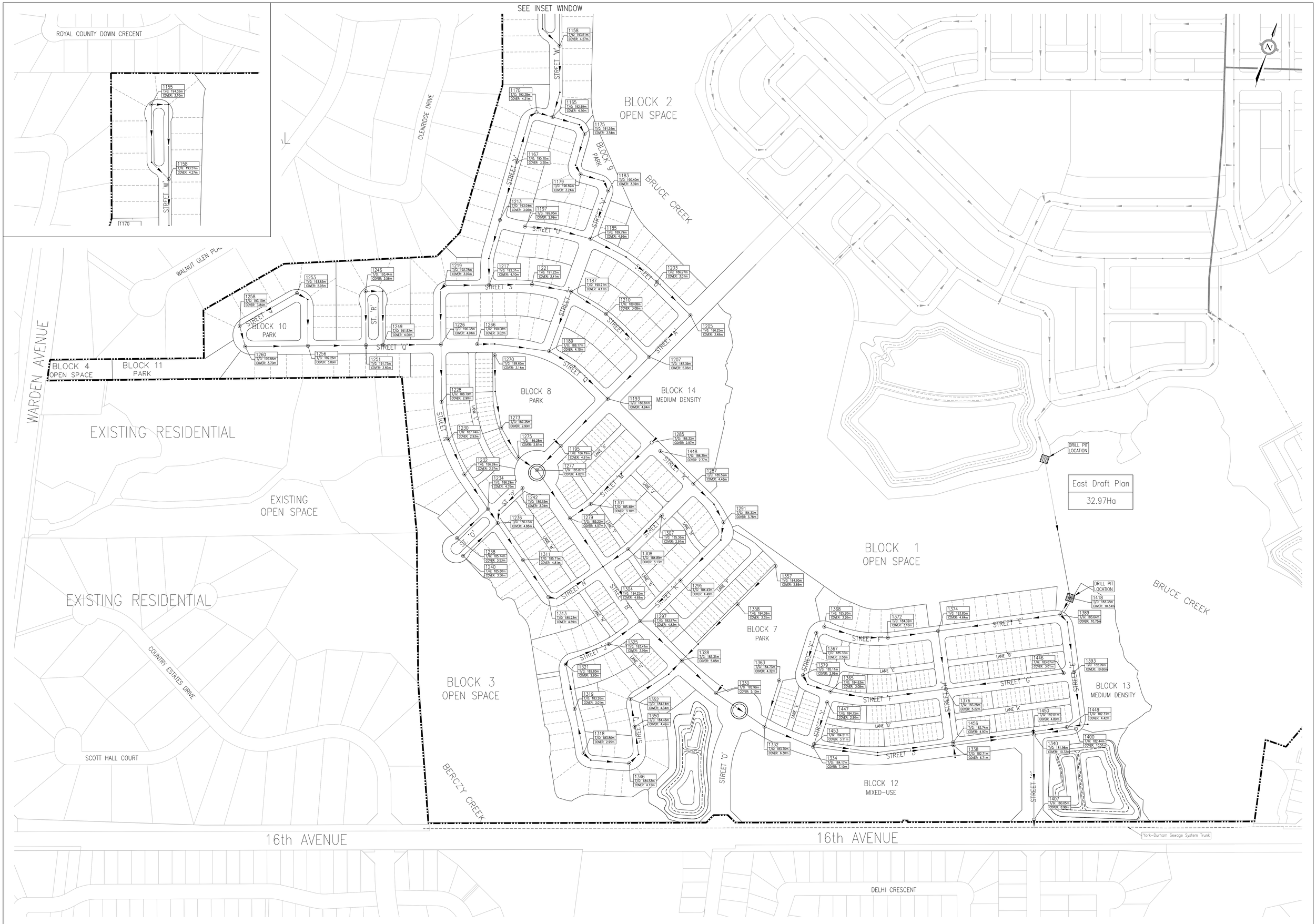
1:1500 0 15 30 45 60 75

1028 — MANHOLE NUMBER
T/G: 187.39m — TOP OF MANHOLE ELEVATION
COVER: 4.55m — DEPTH OF COVER TO OBVERT

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 167H AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.1
EAST DRAFT PLAN
SANITARY SERVICING PLAN
October 2017

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1:1500 (0, 15, 30, 45, 60, 75)

Legend

- SUBJECT PROPERTY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- EXISTING SANITARY TO BE REMOVED/DECOMMISSIONED

1028 — MANHOLE NUMBER
T/C: 187.39m — TOP OF MANHOLE ELEVATION
COVER: 4.55m — DEPTH OF COVER TO OBVERT

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.2

WEST DRAFT PLAN
SANITARY SERVICING PLAN

October 2017

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DRAINAGE AREA 'B'

DRAINAGE AREA 'A'

EXT–2
713Ha

EXT–1
45.6Ha

ROYAL COUNTY DOWN CRECENT

ROYAL TROON CRECENT

EXISTING PARK

ANGUS GLEN BOULEVARD

SADDLEWORTH RD.

PROSPECTORS DRIVE

DANCERS DRIVE

PARKSTONE RD.

GLENRIDGE DRIVE

BLOCK 1
WOODLOT / WETLAND

BLOCK 4
PARK
0.70Ha
60 UNITS | 82 POP

BLOCK 5
PARK
2.29Ha
60 UNITS | 138 POP

BLOCK 6
PARK
1.06Ha
50 UNITS | 64 POP

BLOCK 7
PARK
0.93Ha
30 UNITS | 114 POP

BLOCK 8
SCHOOL
2.46Ha
60 UNITS | 138 POP

BLOCK 9
MEDIUM DENSITY
1.91Ha
145 UNITS | 551 POP

BLOCK 10
TH
Lannerdy Condo Block

BLOCK 11
OPEN SPACE

BLOCK 12
OPEN SPACE

BLOCK 13
OPEN SPACE

BLOCK 14
OPEN SPACE

BLOCK 15
OPEN SPACE

BLOCK 16
WALKWAY

BLOCK 17
WALKWAY

BLOCK 18
MUNICIPAL SERVICING

BLOCK 19
MUNICIPAL SERVICING

BLOCK 20
MUNICIPAL SERVICING

BLOCK 21
MUNICIPAL SERVICING

BLOCK 22
RESIDENTIAL RESERVE
1.64Ha
60 UNITS | 88 POP

BUR OAK AVE.

WILFRED MURISON AVE.

KENNEDY ROAD

BECKETT AVENUE.

NIPIGON AVENUE

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

APPROVED DRAFT PLAN
YORKTON PHASE 2

STREET 'A'
STREET 'B'
STREET 'C'
STREET 'D'
STREET 'E'
STREET 'F'
STREET 'G'
STREET 'H'
STREET 'J'
STREET 'K'
STREET 'L'
STREET 'M'
STREET 'N'
STREET 'P'
STREET 'Q'
STREET 'R'
STREET 'S'
STREET 'T'
STREET 'U'
STREET 'V'
STREET 'W'
STREET 'X'
STREET 'Y'
STREET 'Z'
STREET 'AA'

LANE 'A'
LANE 'B'
LANE 'C'
LANE 'D'
LANE 'E'
LANE 'F'
LANE 'G'
LANE 'H'
LANE 'J'
LANE 'K'
LANE 'L'
LANE 'M'
LANE 'N'
LANE 'P'
LANE 'R'
LANE 'S'
LANE 'T'
LANE 'U'
LANE 'V'
LANE 'W'
LANE 'X'
LANE 'Y'

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1:1500 0 15 30 45 60 75

Legend

SUBJECT PROPERTY
SANITARY DRAINAGE BOUNDARY

0.31Ha
7 UNITS | 22 POP
DRAINAGE AREA
No. OF UNITS | POPULATION

DRAINAGE AREA 'A'
AREA = 29.65Ha
POPULATION = 1688

DRAINAGE AREA 'B'
AREA = 32.99Ha
POPULATION = 2339

EXT–1
45.6Ha
EXTERNAL AREA ID
EXTERNAL DRAINAGE AREA

EXTERNAL FLOW

EXTERNAL AREA 1
AREA = 45.60Ha
POPULATION = 2791

EXTERNAL AREA 2
AREA = 713.00Ha
POPULATION = 38965

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.3

EAST DRAFT PLAN
SANITARY DRAINAGE PLAN

October 2017

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SEE INSET WINDOW

ROYAL COUNTY DOWN CRECENT

DRAINAGE AREA 'C'

BLOCK 2
OPEN SPACE

BLOCK 9
PARK

BLOCK 10
PARK

BLOCK 11
PARK

BLOCK 4
OPEN SPACE

BLOCK 8
PARK

BLOCK 14
MEDIUM DENSITY

BLOCK 7
PARK

BLOCK 1
OPEN SPACE

BLOCK 3
OPEN SPACE

BLOCK 13
MEDIUM DENSITY

BLOCK 12
MIXED-USE

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING
OPEN SPACE

EXISTING RESIDENTIAL

GLENRIDGE DRIVE

BRUCE CREEK

BRUCE CREEK

BERCZY CREEK

WALNUT GLEN PLACE

WARDEN AVENUE

COUNTRY ESTATES DRIVE

SCOTT HALL COURT

16th AVENUE

16th AVENUE

DELHI CRESCENT

York-Durham Sewage System Trunk

STREET 'A'
STREET 'B'
STREET 'C'
STREET 'D'
STREET 'E'
STREET 'F'
STREET 'G'
STREET 'H'
STREET 'J'
STREET 'K'
STREET 'L'
STREET 'M'
STREET 'N'
STREET 'O'
STREET 'P'
STREET 'Q'
LANE 'A'
LANE 'B'
LANE 'C'
LANE 'D'
LANE 'E'
LANE 'F'
LANE 'G'
LANE 'H'
LANE 'J'
LANE 'K'

0.75Ha | 5 UNITS | 20 POP
0.81Ha | 6 UNITS | 24 POP
0.84Ha | 6 UNITS | 24 POP
1.08Ha | 7 UNITS | 28 POP
1.26Ha | 14 UNITS | 56 POP
0.62Ha | 10 UNITS | 40 POP
1.03Ha | 10 UNITS | 40 POP
0.37Ha | 5 UNITS | 20 POP
1.33Ha | 17 UNITS | 68 POP
0.79Ha | 9 UNITS | 36 POP
0.96Ha | 13 UNITS | 52 POP
1.55Ha | 10 UNITS | 40 POP
0.63Ha | 5 UNITS | 20 POP
0.45Ha | 5 UNITS | 20 POP
0.63Ha | 6 UNITS | 24 POP
0.72Ha | 10 UNITS | 40 POP
0.55Ha | 8 UNITS | 24 POP
0.14Ha | 0 UNITS | INF
0.18Ha | 0 UNITS | INF
2.00Ha | 670 m²/GFA | 150 POP
0.47Ha | 8 UNITS | 24 POP
0.25Ha | 0 UNITS | INF
0.41Ha | 4 UNITS | 16 POP
0.13Ha | 0 UNITS | 8 POP
0.23Ha | 0 UNITS | 8 POP
1.34Ha | 60 m²/Ha | 81 POP
0.38Ha | 23 UNITS | 69 POP
2.09Ha | 63 UNITS | 252 POP
0.24Ha | 8 UNITS | 24 POP
1.19Ha | 29 UNITS | 117 POP
1.00Ha | 13 UNITS | 52 POP
0.25Ha | 10 UNITS | 40 POP
0.76Ha | 11 UNITS | 44 POP
0.26Ha | 1 UNITS | 4 POP
0.50Ha | 10 m²/Ha | 13 POP
1.87Ha | 70 m²/Ha | 189 POP
1.50Ha | 22 UNITS | 88 POP
0.53Ha | 15 UNITS | 60 POP
0.41Ha | 16 UNITS | 64 POP
0.36Ha | 23 UNITS | 69 POP
1.73Ha | 26 UNITS | 78 POP
1.91Ha | 0 UNITS | 0 POP
2.15Ha | 60 m²/Ha | 162 POP
1.20Ha | 18 UNITS | 72 POP
1.25Ha | 23 UNITS | 92 POP
1.45Ha | 47 UNITS | 188 POP
0.13Ha | 0 UNITS | INF
1.15Ha | 48 UNITS | 192 POP
1.29Ha | 60 m²/Ha | 78 POP
0.26Ha | 0 UNITS | INF
0.49Ha | 0 UNITS | INF
0.15Ha | 6 UNITS | 31 POP
0.28Ha | 11 UNITS | 44 POP
0.17Ha | 0 UNITS | INF
0.98Ha | 24 UNITS | 96 POP
0.12Ha | 0 UNITS | INF
0.58Ha | 15 UNITS | 61 POP
0.26Ha | 6 UNITS | 24 POP
0.35Ha | 0 UNITS | INF
3.54Ha | 475 UNITS | 1187 POP

East Draft Plan
32.97Ha

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1:1500 | 0 15 30 45 60 75

Legend

SUBJECT PROPERTY
SANITARY DRAINAGE BOUNDARY

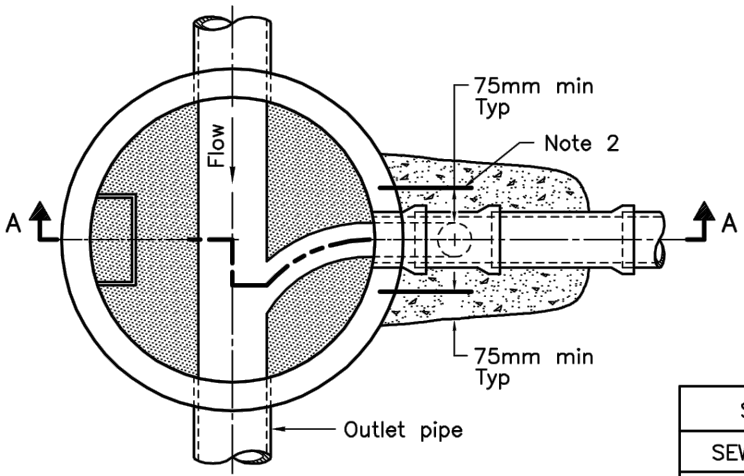
0.31Ha | 7 UNITS | 27 POP
DRAINAGE AREA
No. OF UNITS | POPULATION

DRAINAGE AREA 'C'
AREA = 50.43Ha
POPULATION = 3551

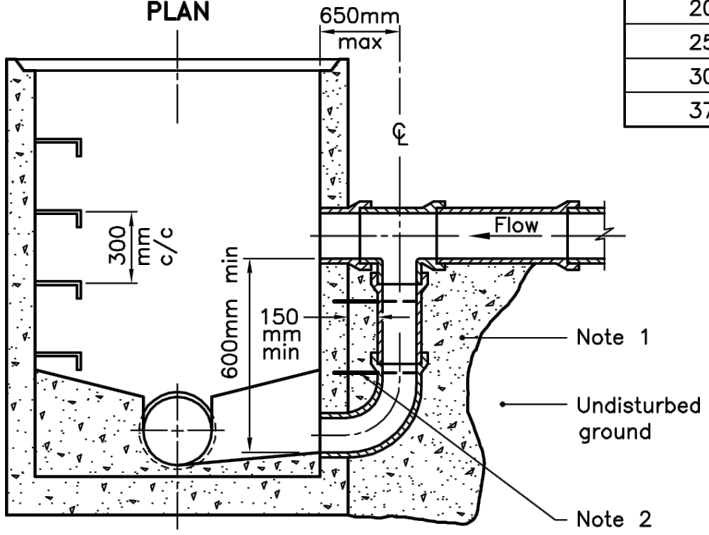
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.4
WEST DRAFT PLAN
SANITARY DRAINAGE PLAN
October 2017

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PLAN



SECTION A–A

SIZE OF DROP PIPE	
SEWER ID	DROP PIPE ID
200	200
250	200
300	250
375	300

NOTES:

1 Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.

2 Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2011	Rev	2
CAST–IN–PLACE MAINTENANCE HOLE DROP STRUCTURE TEE			
	OPSD 1003.010		

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Legend

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.5

CAST-IN-PLACE
MH DROP STRUCTURE

October 2017

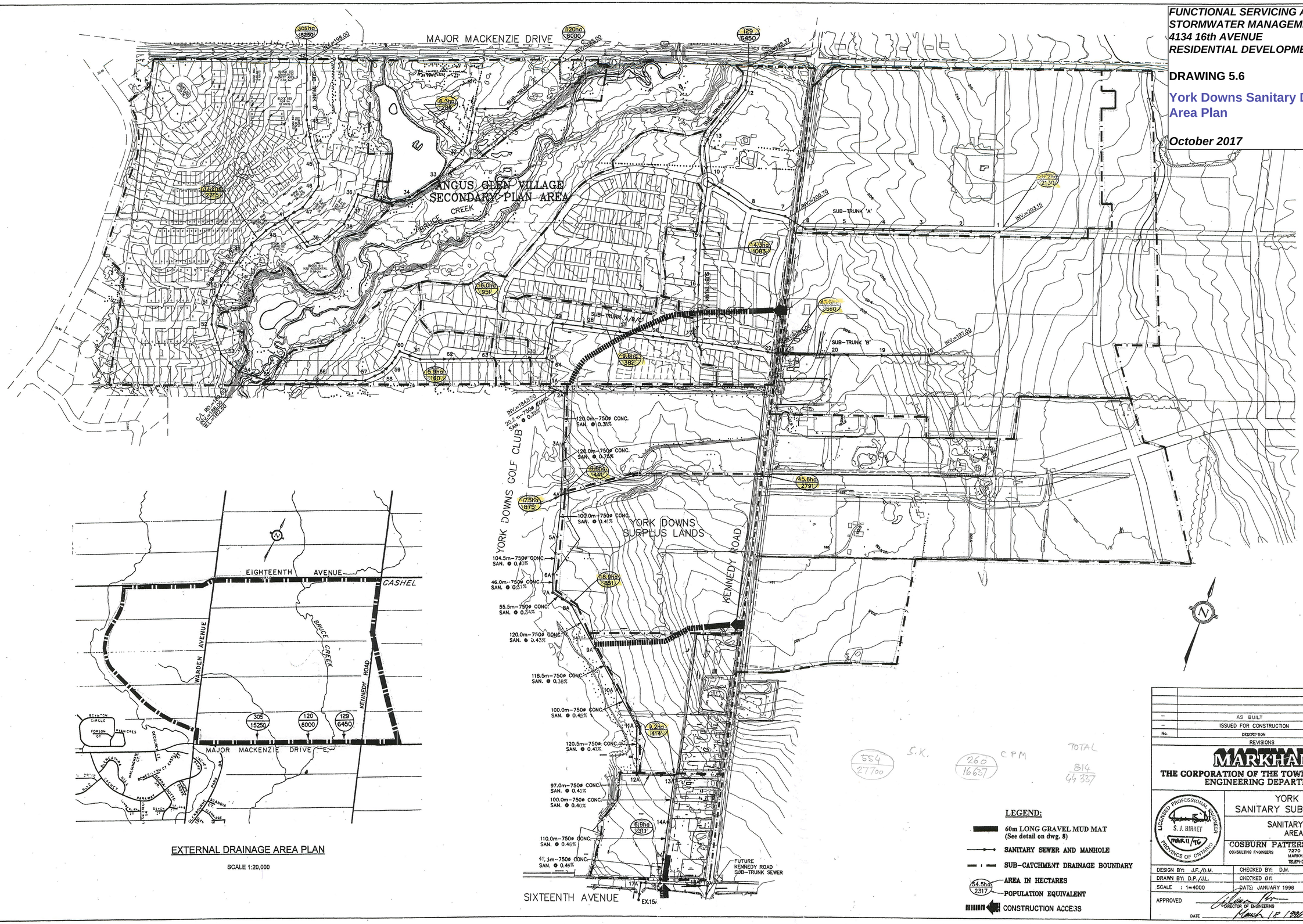
File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\5.5 – MH Drop Structure.dwg – Revised by <Guerriero, Michael>, Tue, Oct 10, 2017, 5:17 PM

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16th AVENUE
RESIDENTIAL DEVELOPMENT

DRAWING 5.6

York Downs Sanitary Drainage Area Plan

October 2017



EXTERNAL DRAINAGE AREA PLAN

SCALE 1:20,000

554 / 27700 S.K. 260 / 16637 CPM TOTAL 814 / 44337

LEGEND:

- 60m LONG GRAVEL MUD MAT (See detail on dwg. 8)
- SANITARY SEWER AND MANHOLE
- SUB-CATCHMENT DRAINAGE BOUNDARY
- AREA IN HECTARES
- POPULATION EQUIVALENT
- CONSTRUCTION ACCESS

No.	DESCRIPTION	DATE	BY
–	AS BUILT	05/15/96	D.L.P.
–	ISSUED FOR CONSTRUCTION	03/19/96	DSM
	REVISIONS		

MARKHAM
THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

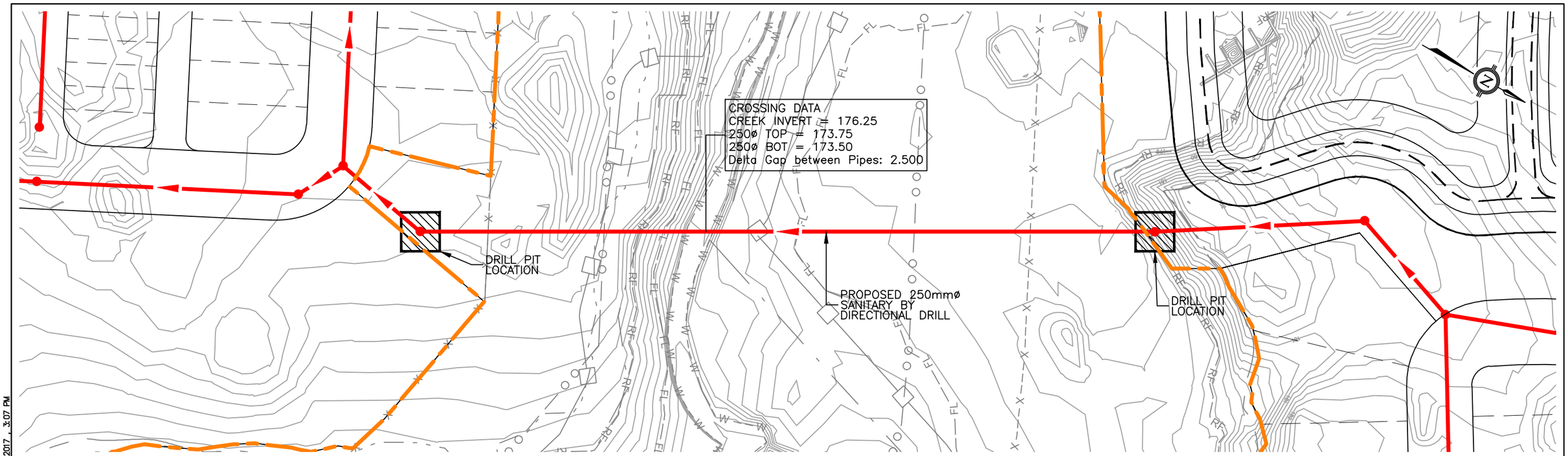
LICENSED PROFESSIONAL ENGINEER — S. J. BIRKET — MAR. 11/96 — PROVINCE OF ONTARIO

YORK DOWNS
SANITARY SUB-TRUNK SEWER

SANITARY DRAINAGE AREA PLAN

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 201
MARKHAM, ONTARIO L3R 4B9
TELEPHONE (905) 474 - 0455

DESIGN BY: J.F./D.M.	CHECKED BY: D.M.	PROJECT No.	
DRAWN BY: D.P./J.L.	CHECKED BY:	92992	
SCALE : 1=4000	DATE: JANUARY 1996		
APPROVED	DIRECTOR OF ENGINEERING	DRAWING No.	
DATE	March 18 1996	A	



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0 10 20 30 40 50
1:1000

Legend

DEVELOPMENT LIMIT (GREATER OF ALL EXISTING CONSTRAINTS)

PROPOSED SANITARY SEWER

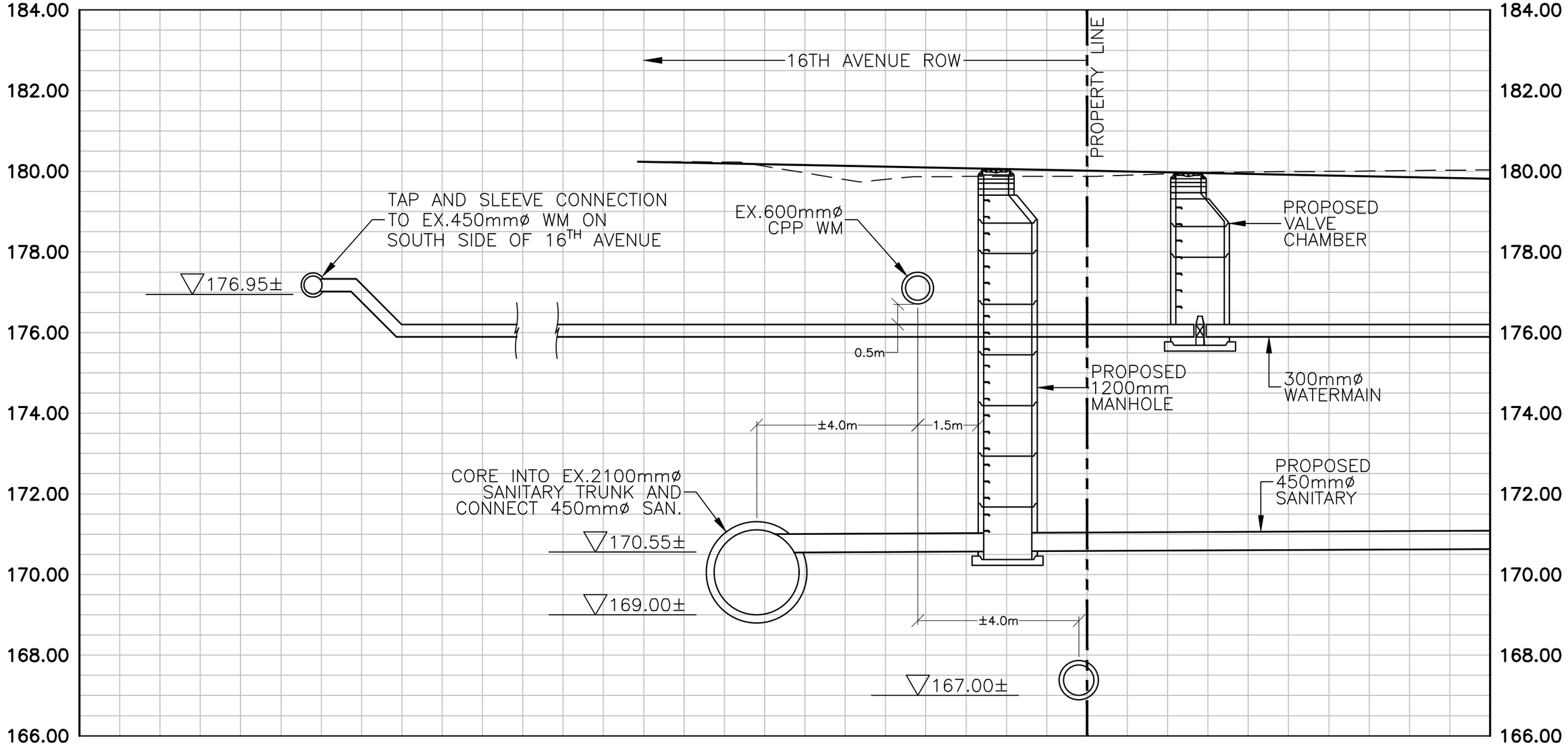
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.7

BRUCE CREEK SANITARY CROSSING PLAN AND PROFILE

October 2017

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File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\5.8 – 16th Avenue Service Connection.dwg – Revised by <Luk, James>, Thu, Oct 12, 2017 , 2:03 PM

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1:100 0 1 2 3 4 5

Legend

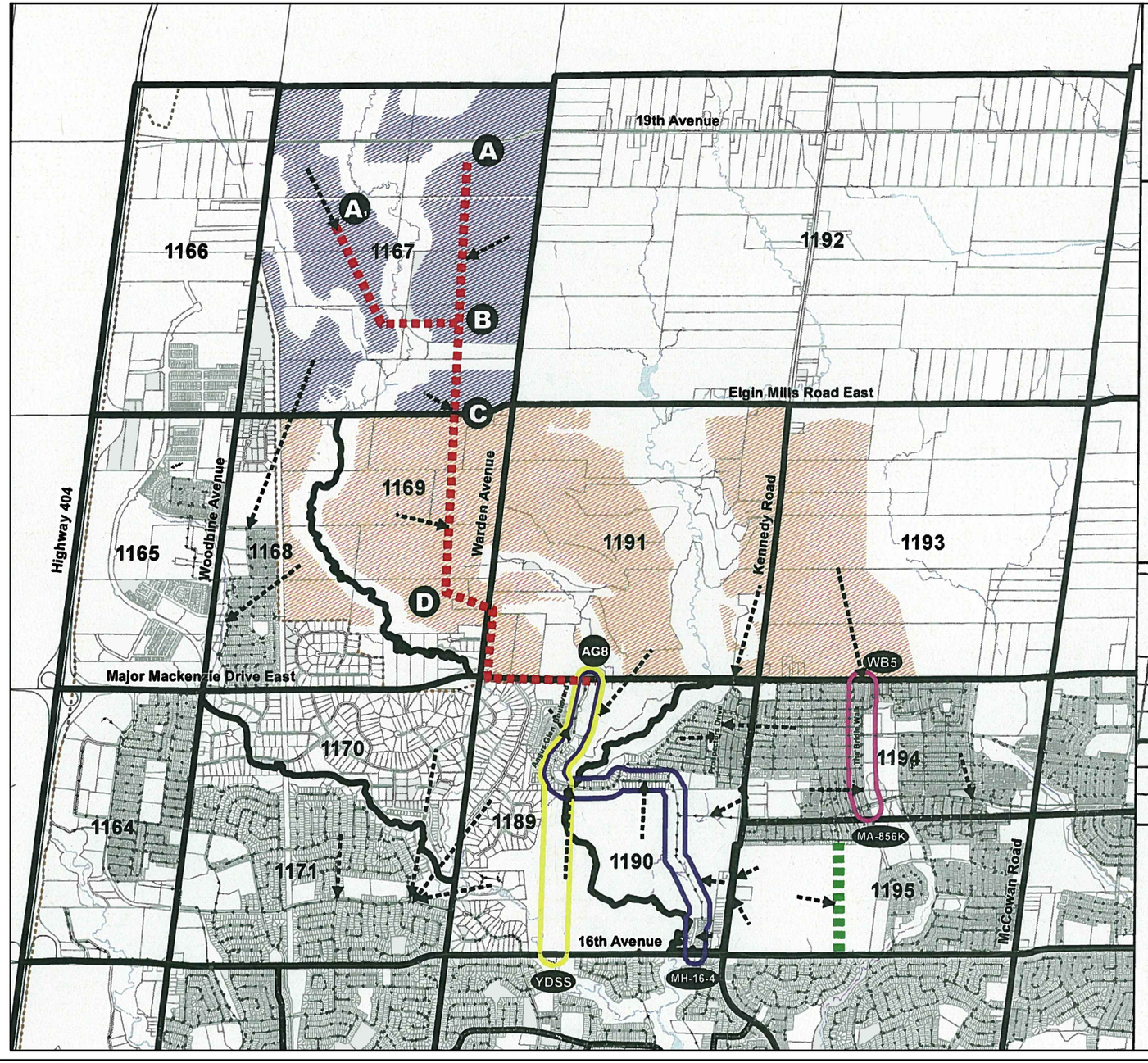
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 5.8

16TH AVENUE SERVICE CONNECTIONS

October 2017

Figure 4
2031 Servicing Alternatives 1, 2 and 3



Loading Points
New Future Service
New Pipe
Alternative 3 - New Pipe
Alternative 1 and 2 - Upgrade/Twin Pipe
All Alternatives - Upgrade Existing Pipe
Sanitary Sewers
Traffic Zones

Property Code

Employment
Residential



Key Map

May 25, 2012

XCG
Environmental Engineers & Scientists

0 250 500 1,000
m

Stantec

Legend

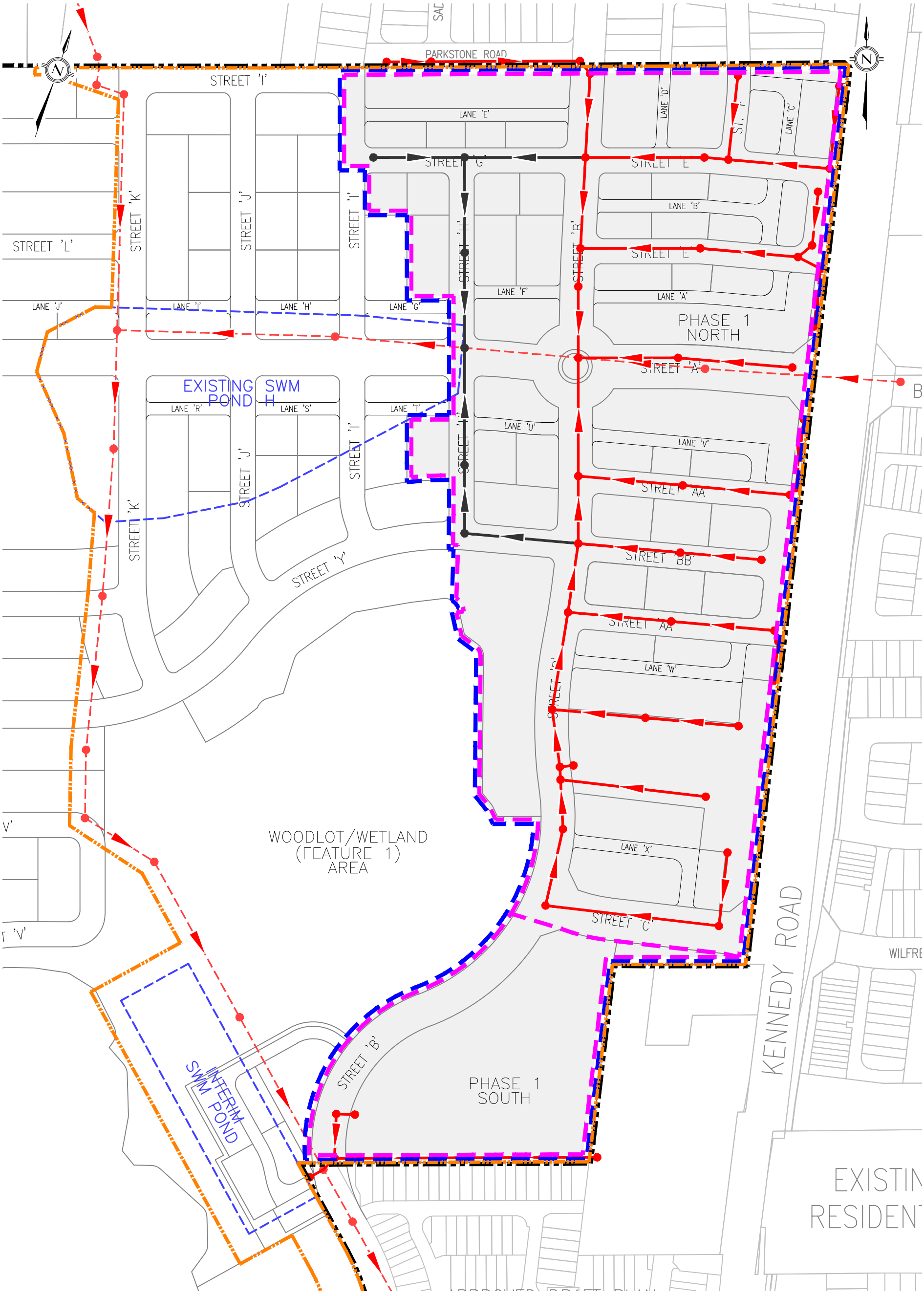
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
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FIGURE 5.9

FUTURE URBAN AREA PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\street_files [FSR]\5.9 – FUA Plan.dwg – Revised by <Guerriero, Michael>, Tue, Oct 10, 2017 - 5:19 PM



Stantec

1:2500 0 25 50 75 100 125

Legend

- SUBJECT PROPERTY
- PROPOSED SANITARY SEWER
- TEMPORARY SANITARY SEWER
- EXISTING SANITARY SEWER
- PHASE 1 LIMIT
- SERVICEABILITY LIMIT
- NON-GOLF COURSE LANDS

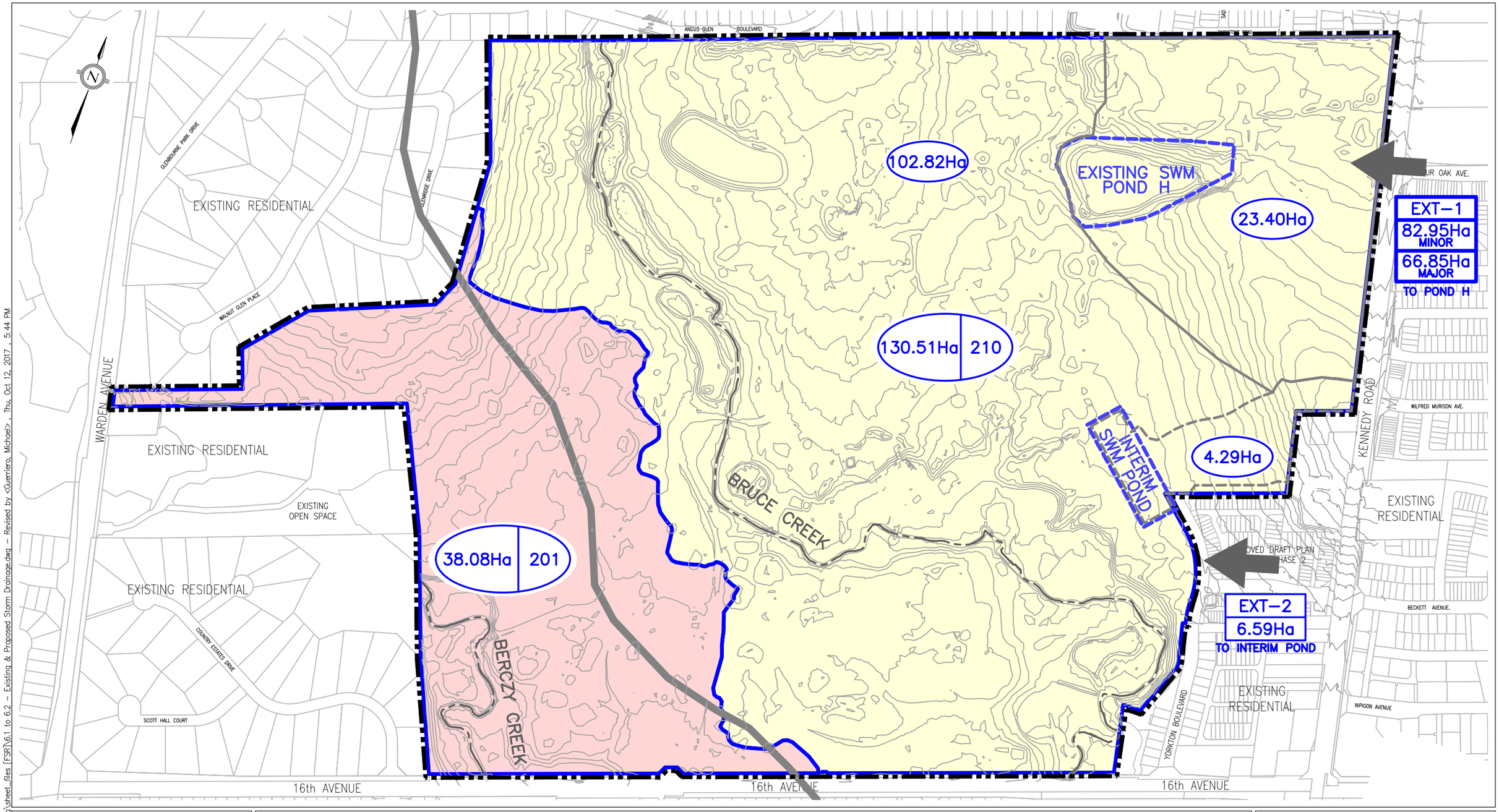
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
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FIGURE 5.10

SANITARY PHASING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\5.10 – Sanitary Phasing Plan.dwg – Revised by <Guerriero, Michael>, Tue, Oct 31, 2017, 10:07 AM



Stantec

0 60 120 180 240 300
1:6000

Legend

- SUBJECT PROPERTY
- EXISTING SUBWATERSHED DRAINAGE BOUNDARY
- EXISTING POND BLOCKS
- EXTERNAL FLOW
- EXT–1 / 82.95Ha / TO POND H — EXTERNAL DRAINAGE AREA
- 130.5Ha | 210 — SUBWATERSHED DRAINAGE AREA FROM SUBJECT PROPERTY; SUBWATERSHED ID
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO EXISTING POND H
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO INTERIM SWM POND
- 2001 MMM SUBWATERSHED DIVIDE
- 29.9Ha — SUBCATCHMENT DRAINAGE AREA

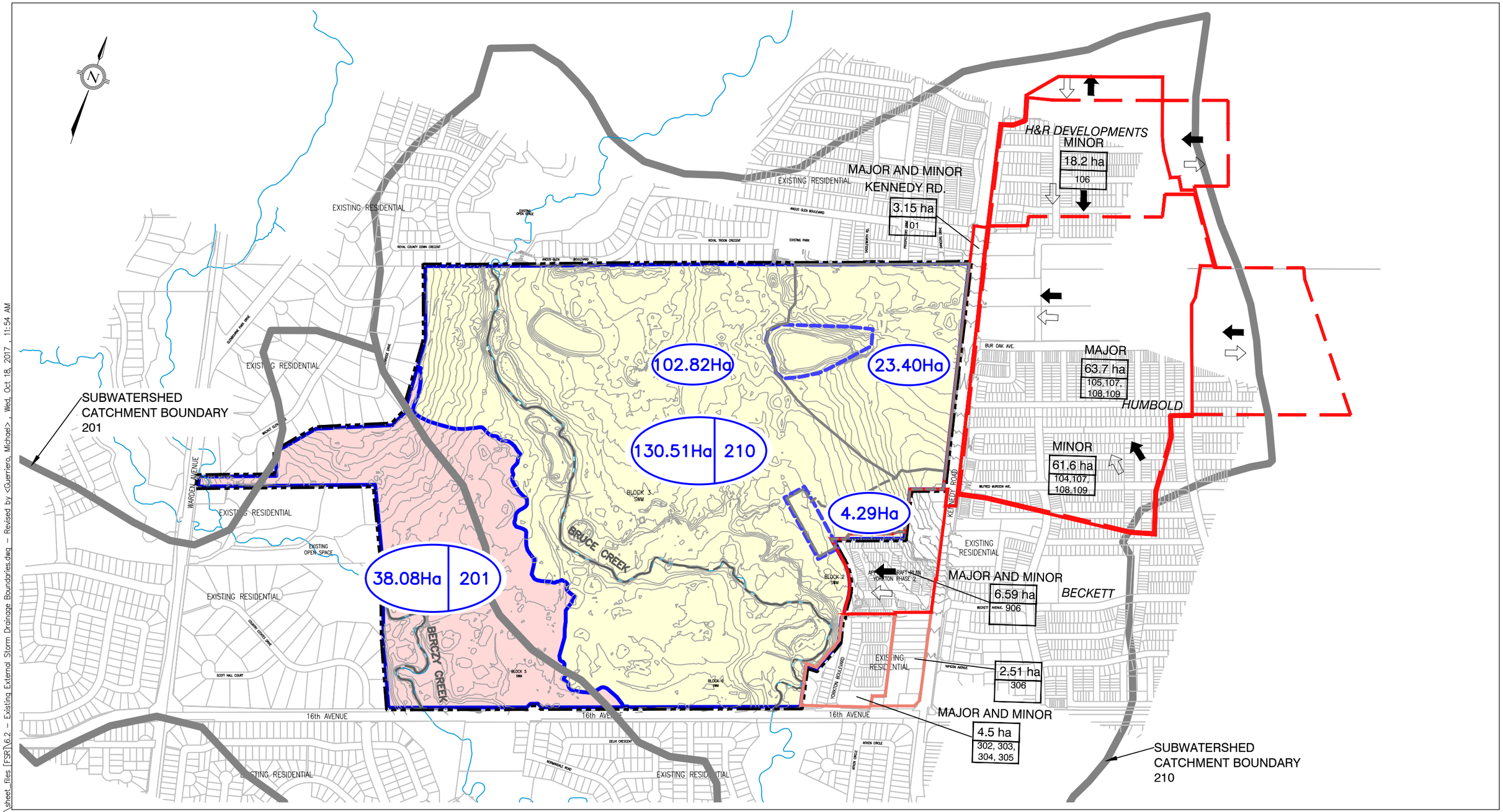
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
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FIGURE 6.1

EXISTING STORM DRAINAGE BOUNDARIES

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.1 to 6.2 – Existing & Proposed Storm Drainage.dwg – Revised by <Guerriero, Michael>, Thu, Oct 12, 2017, 5:44 PM



Stantec

SCALE 1:10000

Legend

- SUBJECT PROPERTY
- EXISTING SUBWATERSHED DRAINAGE BOUNDARY
- EXISTING POND BLOCKS
- MINOR SYSTEM DRAINAGE FLOW ARROW
- MAJOR SYSTEM DRAINAGE FLOW ARROW
- 61.6 ha / 104,107, 108,109 — EXTERNAL DRAINAGE AREA; VO2 CATCHMENT NUMBER
- 130.5Ha | 210 — SUBWATERSHED DRAINAGE AREA FROM SUBJECT PROPERTY; SUBWATERSHED ID
- EXTERNAL DRAINAGE BOUNDARY
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO EXISTING POND H
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO INTERIM SWM POND
- 2001 MMM SUBWATERSHED BOUNDARY
- DEACON & DEACON EXT. LANDS DRAINAGE AREA
- 29.9Ha — SUBCATCHMENT DRAINAGE AREA

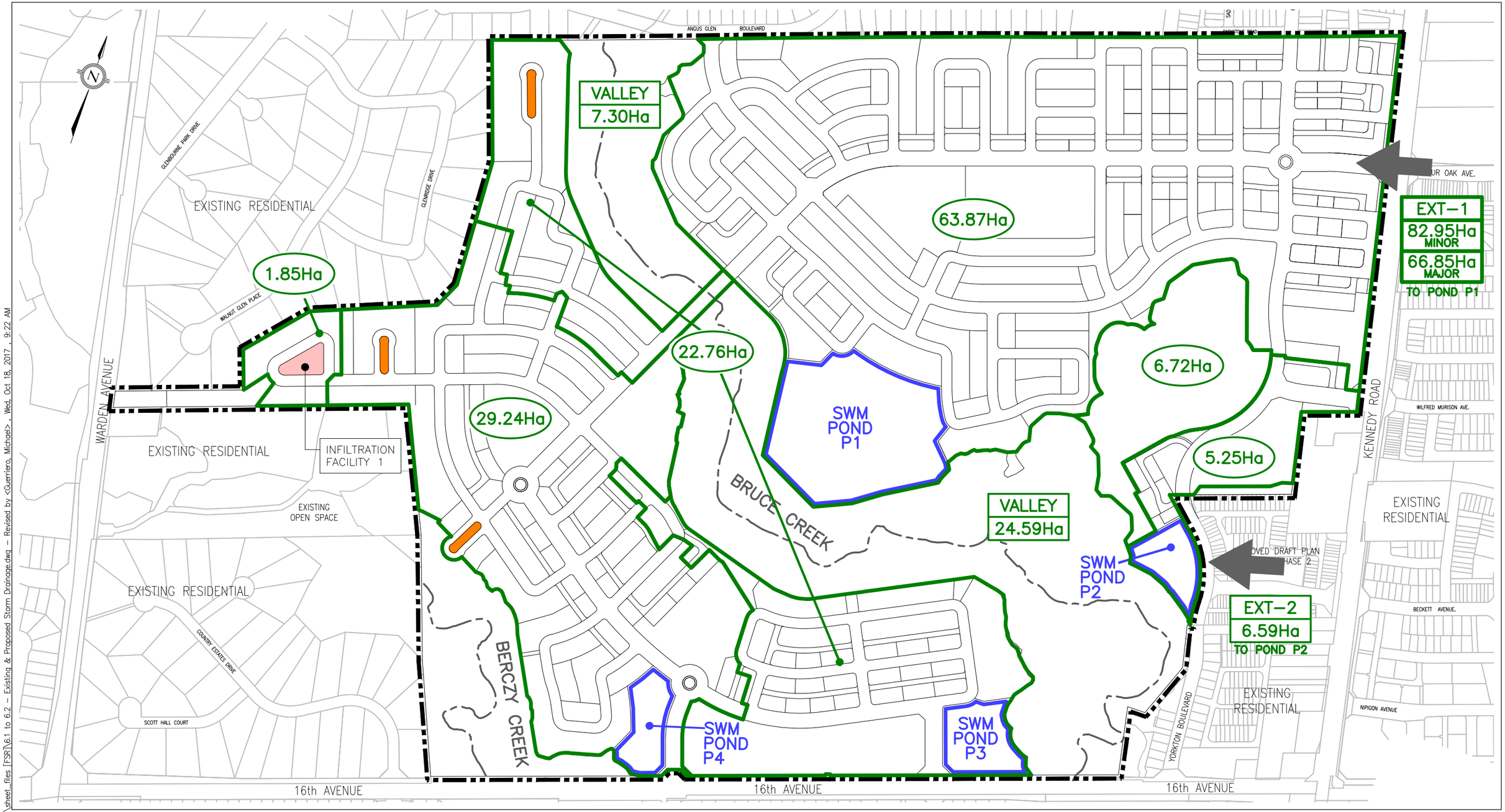
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.2

EXISTING EXTERNAL STORM DRAINAGE BOUNDARIES

October 2017

File: V:\01606\Active\160622264\Drawing sheet_files [FSR]\6.2 – Existing External Storm Drainage Boundaries.dwg – Revised by <Guerriero, Michael> , Wed, Oct 18, 2017 , 11:54 AM



Stantec

1:6000 0 60 120 180 240 300

Legend

- SUBJECT PROPERTY
- PROPOSED STORM DRAINAGE BOUNDARY
- PROPOSED POND BLOCKS
- EXTERNAL FLOW
- INFILTRATION FACILITY 1
- ENCLAVE BIORETENTION
- VALLEY 24.59Ha — VALLEY DRAINAGE AREA
- 29.9Ha — DRAINAGE AREA
- EXT–1 82.95Ha TO POND P1 — EXTERNAL DRAINAGE AREA

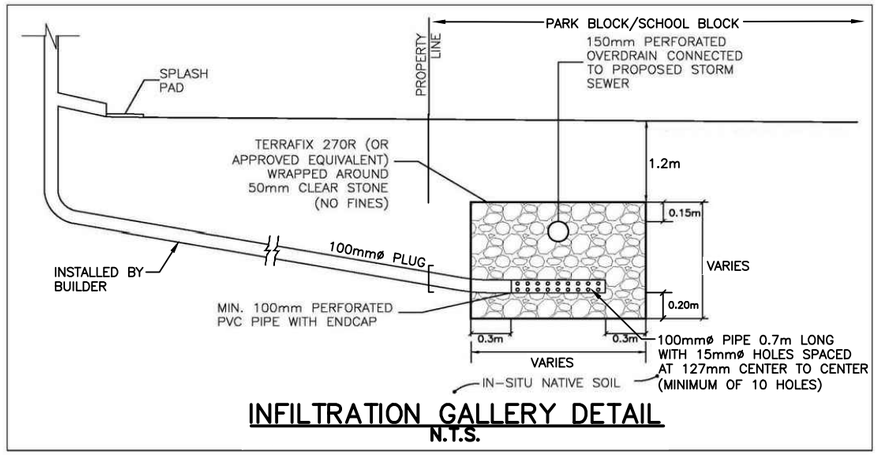
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.3

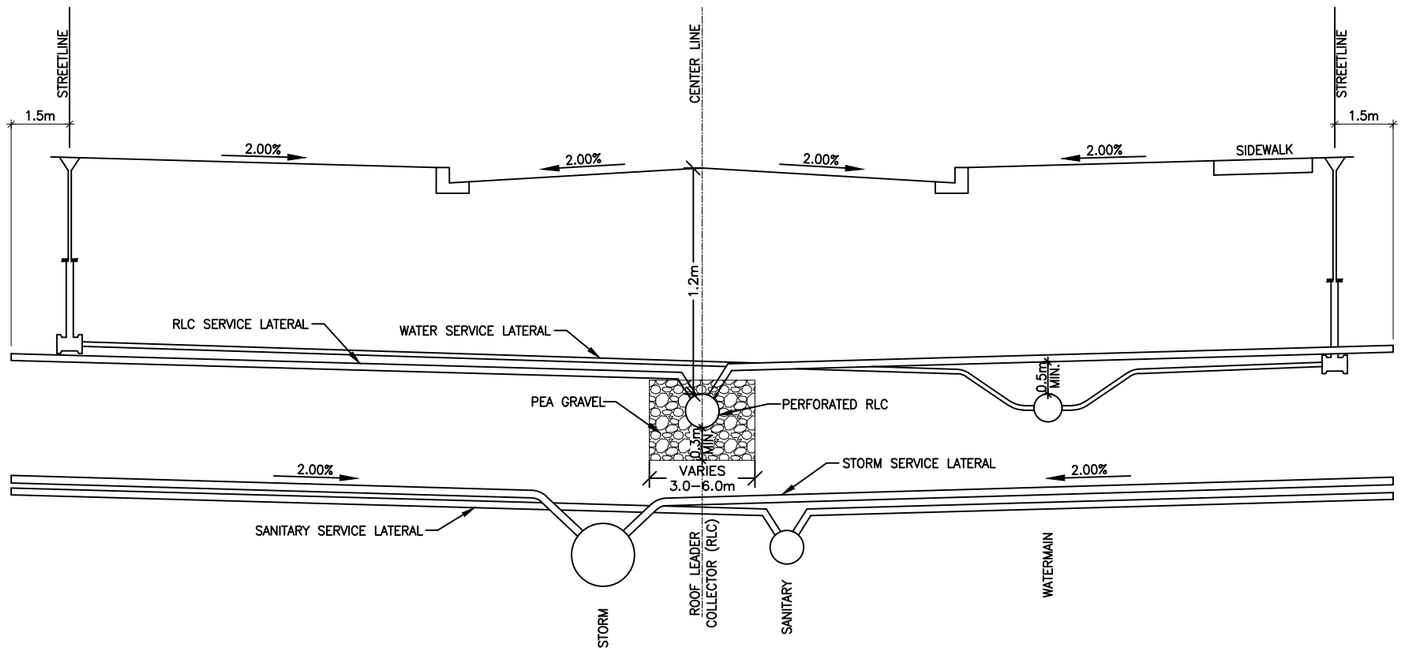
PROPOSED STORM DRAINAGE BOUNDARIES

October 2017

File: v:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.1 to 6.2 – Existing & Proposed Storm Drainage.dwg – Revised by <Guerriero, Michael>, Wed, Oct 18, 2017, 9:22 AM



INFILTRATION GALLERY DETAIL
N.T.S.



PERFORATED RLC & TYPICAL SERVICE LATERALS
N.T.S.

Stantec

Legend

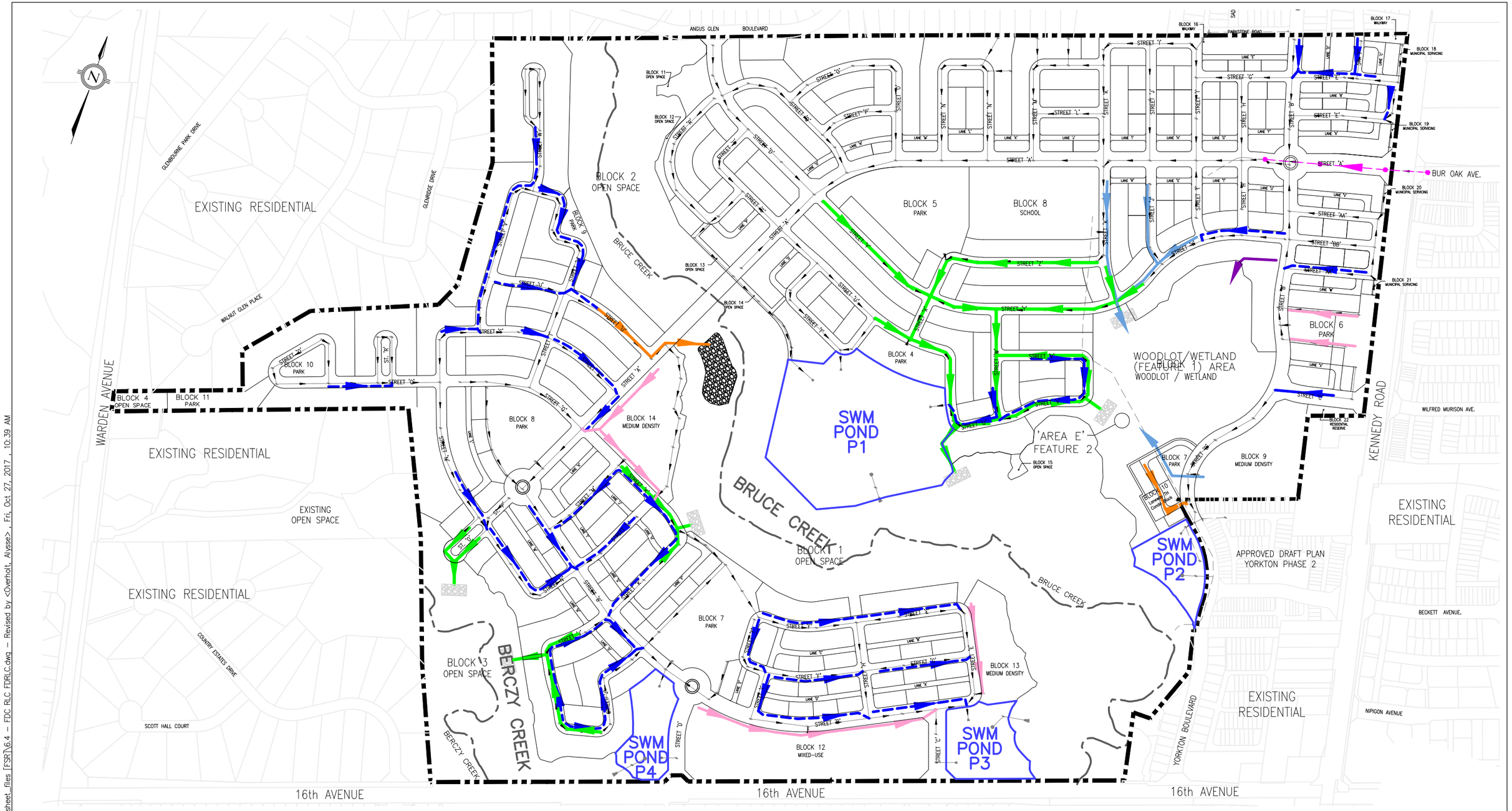
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.4

LOT LEVEL INFILTRATION & ROOF LEADER CONNECTION DETAILS

October 2017

File: V:\01606\Active\160622264\Drawing\street_files [FSR]\6.3 - Lot Level Infiltration and Roof Leader Connection Details.dwg - Revised by <Guerriero, Michael>, Wed, Oct 18, 2017 , 9:26 AM



Stantec

0 60 120 180 240 300

1:6000

Legend

- SUBJECT PROPERTY
- EXISITNG 100 YEAR STORM SEWER
- PROPOSED STORM SEWER
- WETLAND STONE RESERVOIR FOR FDRLC OUTLET
- FDC OUTLET
- PROPOSED RLC TO 'AREA E'
- PROPOSED PERFORATED RLC
- PROPOSED FDC
- PROPOSED FDRLC
- PROPOSED RLC TO WOODLOT/WETLAND FEATURE
- PROPOSED INFILTRATION GALLERY

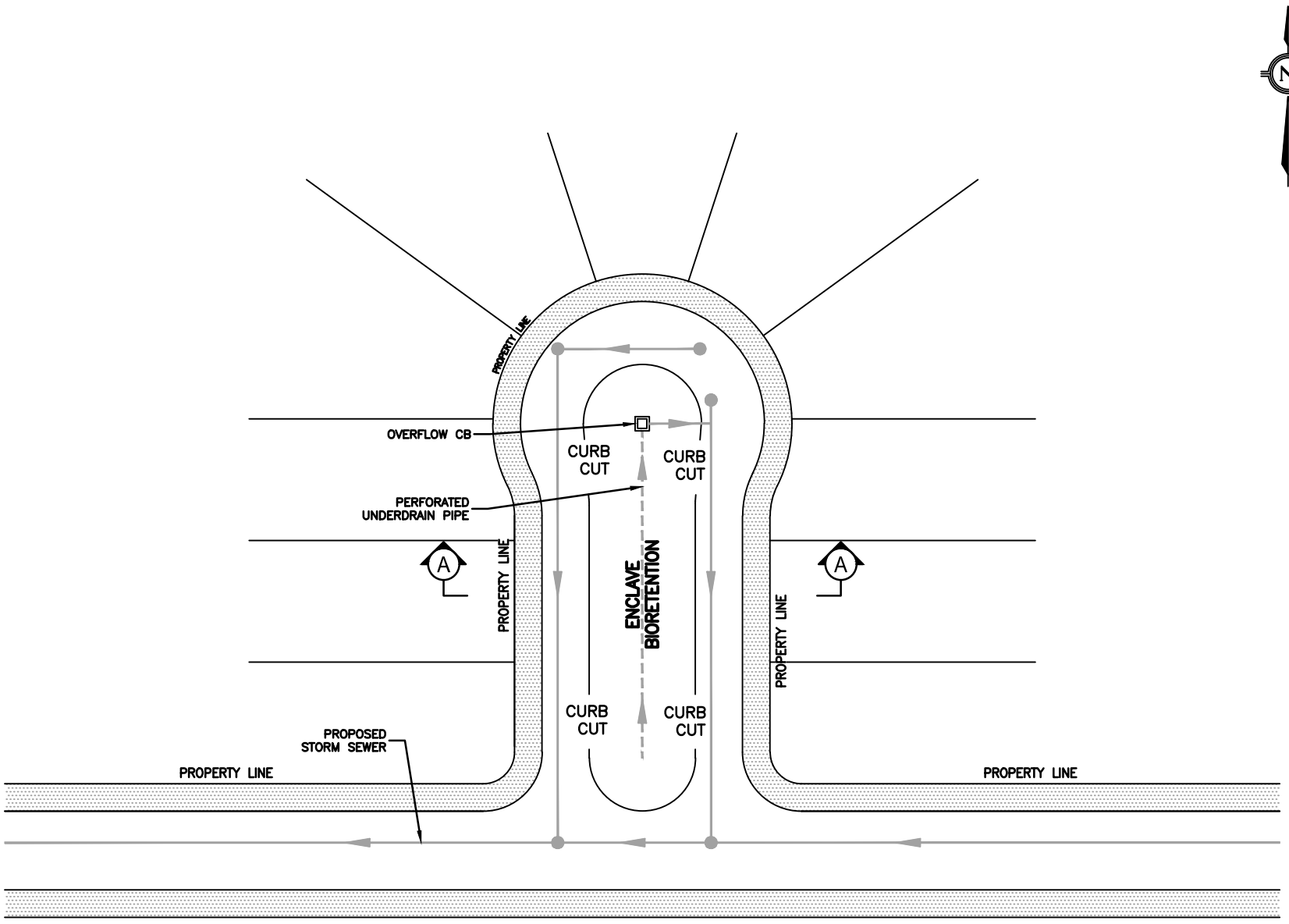
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE ☐.☐

F☐C☐RLC☐F☐RLC☐
INFILTRATION GALLERIES

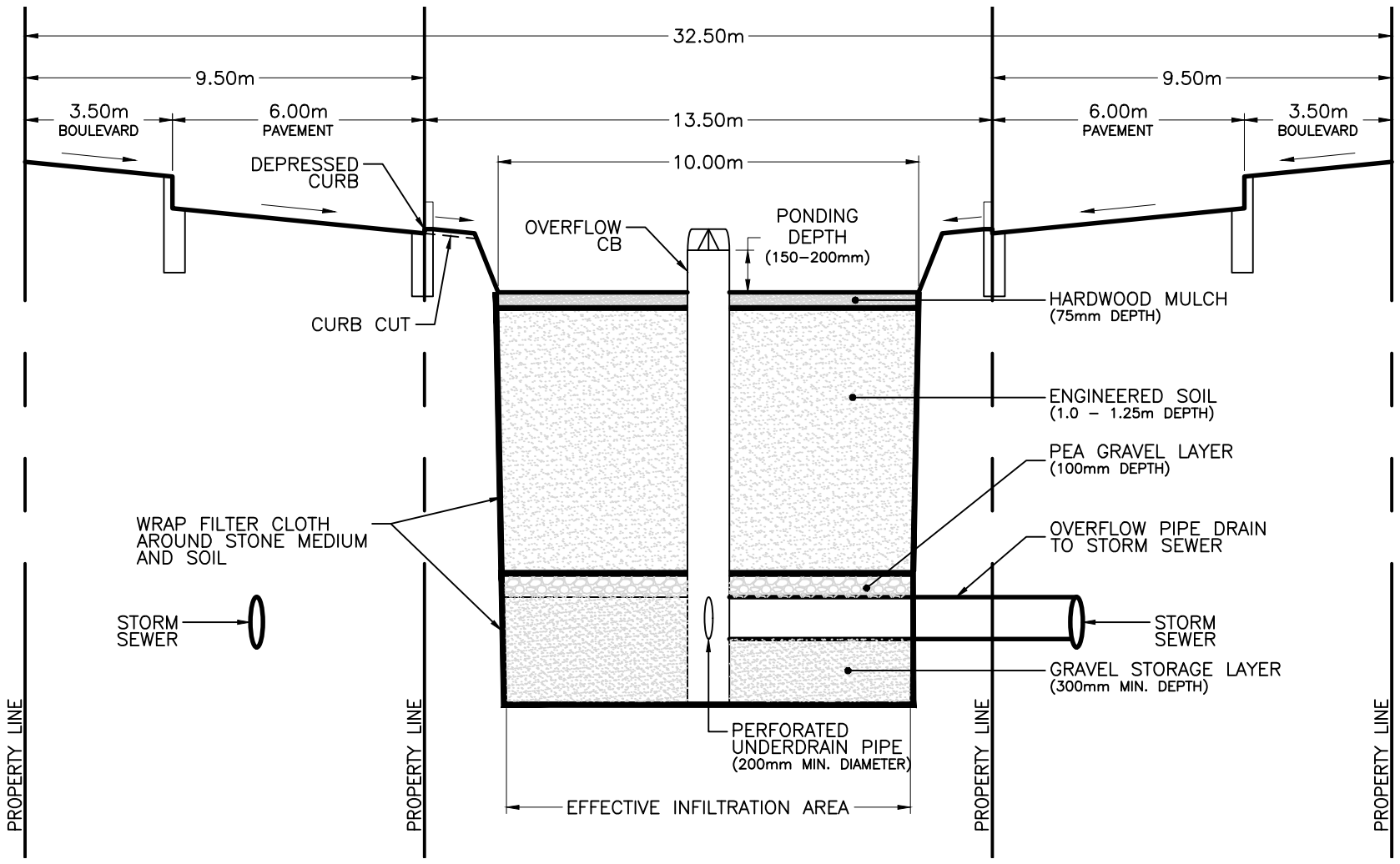
October 2017

File: v:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.4 – FDC RLC FDRLC.dwg – Revised by <Overholt, Alysse>, Fri, Oct 27, 2017 , 10:39 AM



PLAN VIEW

SCALE 1:750



SECTION A-A

SCALE 1:150

Stantec

Legend

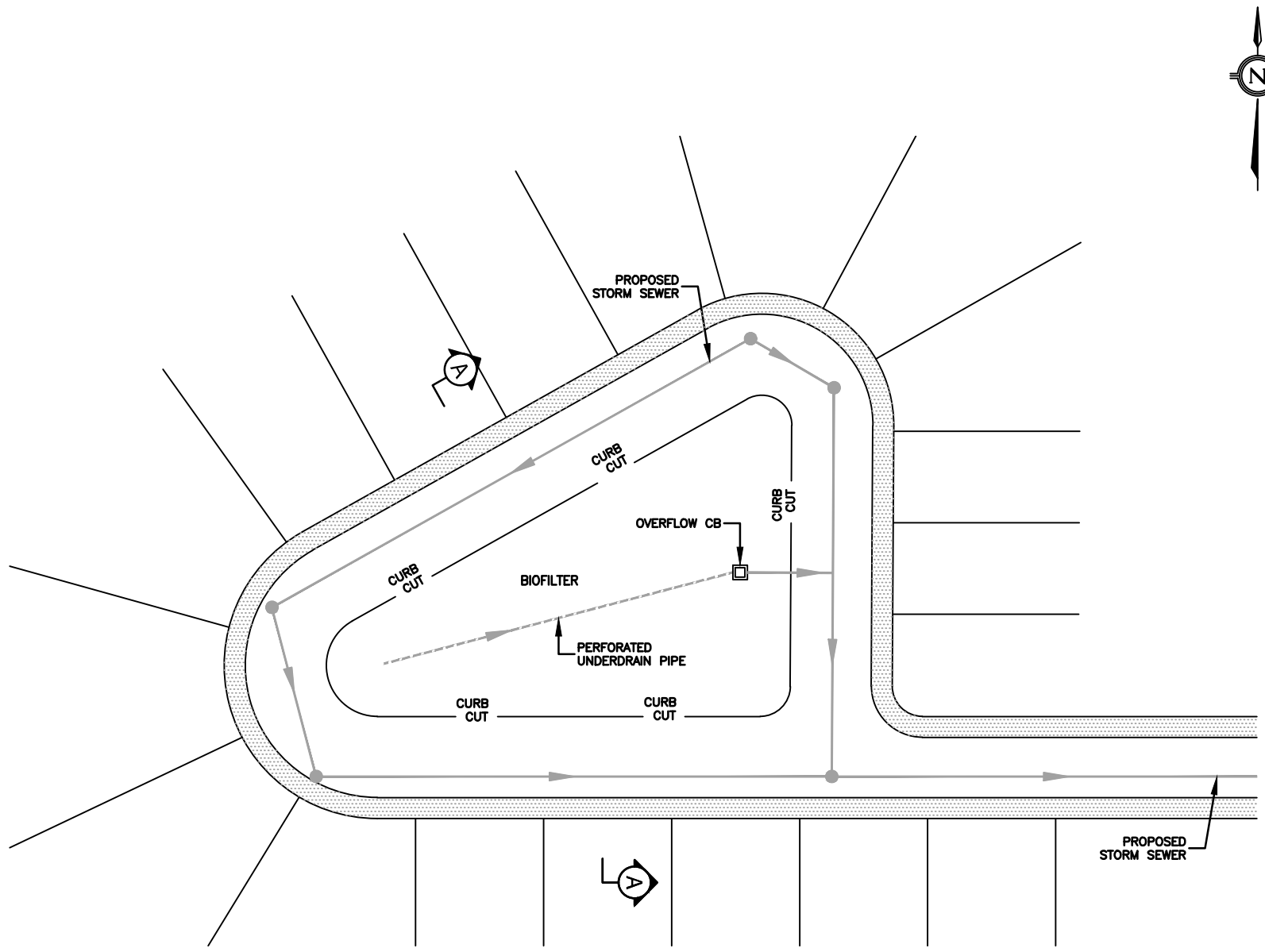
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.6

ENCLAVE BIORETENTION DETAILS

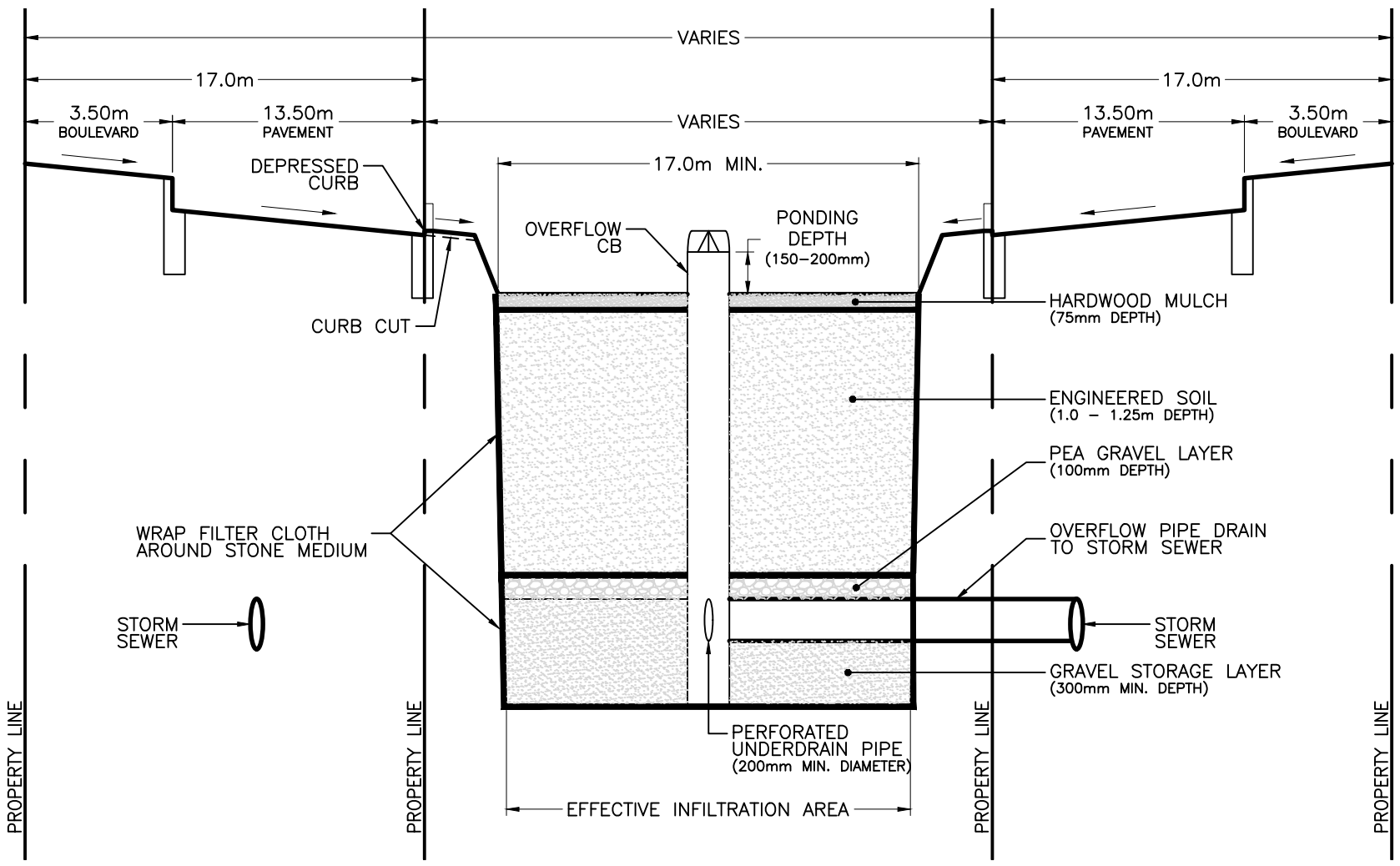
October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.5-6 – Enclave Details.dwg – Revised by <Guerriero, Michael> , Wed, Oct 18, 2017 , 9:37 AM



PLAN VIEW

SCALE 1:1000



SECTION A-A

NOT TO SCALE

Stantec

Legend

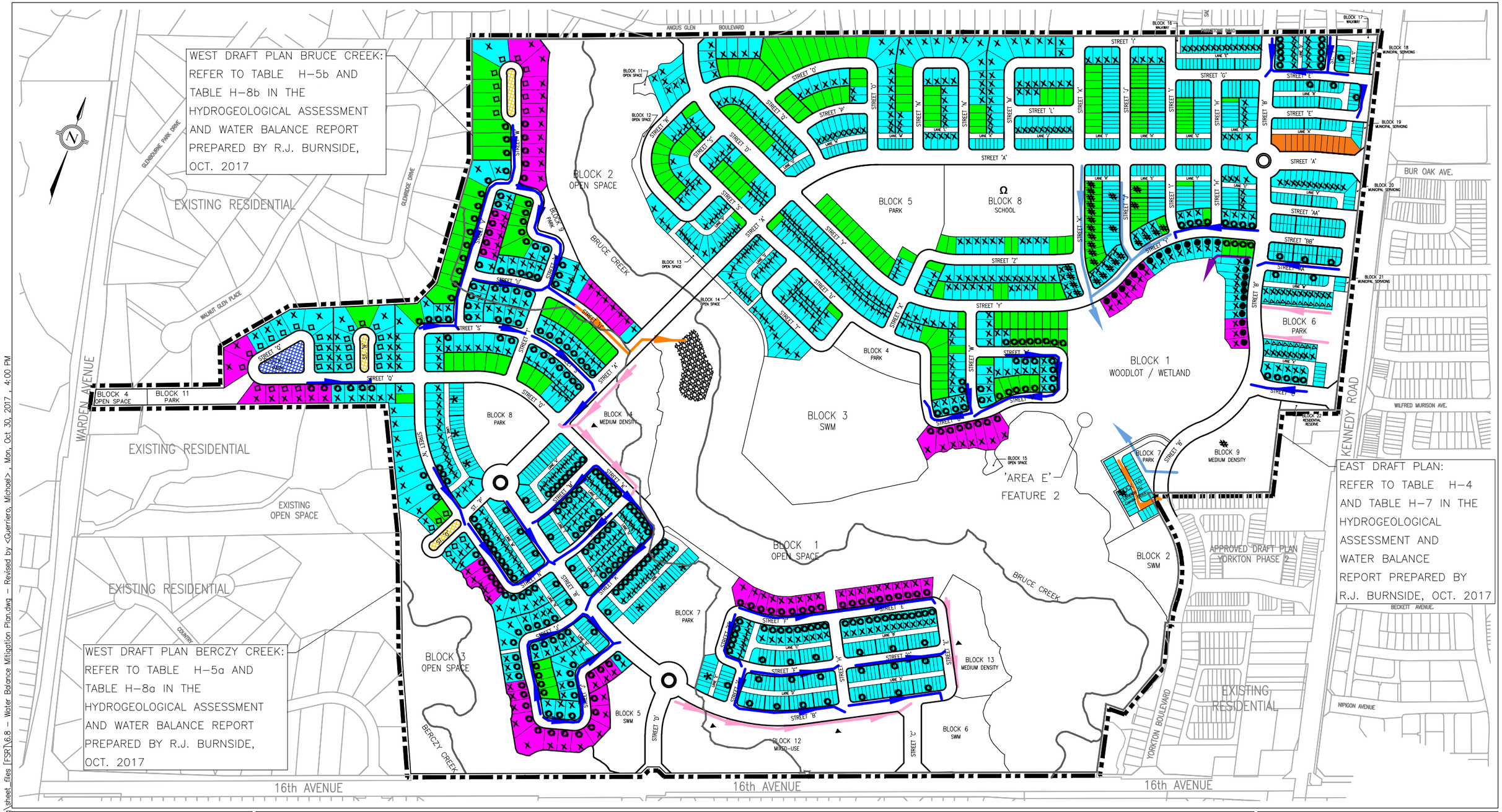
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.7

INFILTRATION FACILITY 1 DETAILS

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.5-6 – Enclave Details.dwg – Revised by <Guerriero, Michael> , Wed, Oct 18, 2017 , 9:38 AM



Stantec

Legend

- SUBJECT PROPERTY
- PROPOSED SOLID RLC
- PROPOSED PERFORATED RLC
- PROPOSED RLC TO WOODLOT/ WETLAND FEATURE
- PROPOSED INFILTRATION GALLERY
- PROPOSED FDRLC
- WETLAND STONE RESERVOIR FOR FDRLC OUTLET
- DRAINAGE DIVIDE BRUCE CREEK AND BERCZY CREEK
- BACK SPLIT
- FRONT DRAIN
- FRONT WALK
- WALKOUT
- ENCLAVE BIORETENTION
- INFILTRATION FACILITY
- * HALF ROOF TO SURFACE
- Ω FULL ROOF TO 'AREA E'
- HALF ROOF TO 'AREA E'
- O HALF ROOF TO PERFORATED RLC
- □ HALF ROOF TO ENCLAVE BIORETENTION
- △ HALF ROOF TO INFILTRATION GALLERY
- ▲ FULL ROOF TO INFILTRATION GALLERY
- X HALF ROOF TO AMENDED SOILS
- ● FULL ROOF TO WOODLOT/WETLAND FEATURE

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.8

POST DEVELOPMENT WATER BALANCE MITIGATION PLAN

October 2017

File: v:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.8 - Water Balance Mitigation Plan.dwg - Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 - 4:00 PM

WEST DRAFT PLAN BRUCE CREEK:
REFER TO TABLE A–5b AND A–8b IN THE MEMO ON SWM ASSESSMENT OF ZONING EXCEPTIONS AND WATER BALANCE PREPARED BY R.J. BURNSIDE

EAST DRAFT PLAN:
REFER TO TABLE A–4 AND A–7 IN THE MEMO ON SWM ASSESSMENT OF ZONING EXCEPTIONS AND WATER BALANCE PREPARED BY R.J. BURNSIDE

WEST DRAFT PLAN BERCZY CREEK:
REFER TO TABLE A–5a AND A–8a IN THE MEMO ON SWM ASSESSMENT OF ZONING EXCEPTIONS AND WATER BALANCE PREPARED BY R.J. BURNSIDE

ANGUS GLEN BOULEVARD
GLENBOURNE PARK DRIVE
GLENRIDGE DRIVE
WALNUT GLEN PLACE
WARDEN AVENUE
KENNEDY ROAD
BUR OAK AVE.
WILFRED MURISON AVE.
BECKETT AVENUE
NIPIGON AVENUE
YORKTON BOULEVARD
BRUCE CREEK
BERCZY CREEK
16th AVENUE

EXISTING RESIDENTIAL
EXISTING OPEN SPACE
APPROVED DRAFT PLAN YORKTON PHASE 2

BLOCK 1 WOODLOT / WETLAND
BLOCK 1 OPEN SPACE
BLOCK 2 OPEN SPACE
BLOCK 2 SWM
BLOCK 3 SWM
BLOCK 3 OPEN SPACE
BLOCK 4 PARK
BLOCK 4 OPEN SPACE
BLOCK 4 MEDIUM DENSITY
BLOCK 5 PARK
BLOCK 5 SWM
BLOCK 6 PARK
BLOCK 6 SWM
BLOCK 7 PARK
BLOCK 7 OPEN SPACE
BLOCK 8 PARK
BLOCK 8 SCHOOL
BLOCK 9 PARK
BLOCK 9 MEDIUM DENSITY
BLOCK 10 RESIDENTIAL RESERVE
BLOCK 11 OPEN SPACE
BLOCK 11 PARK
BLOCK 12 OPEN SPACE
BLOCK 12 MIXED–USE
BLOCK 13 OPEN SPACE
BLOCK 13 MEDIUM DENSITY
BLOCK 14 OPEN SPACE
BLOCK 15 OPEN SPACE
BLOCK 16 WALKWAY
BLOCK 17 WALKWAY
BLOCK 18 MUNICIPAL SERVICING
BLOCK 19 MUNICIPAL SERVICING
BLOCK 20 MUNICIPAL SERVICING
BLOCK 21 MUNICIPAL SERVICING
'AREA E' FEATURE 2

Stantec

1:6000 0 60 120 180 240 300

Legend

- SUBJECT PROPERTY
- PROPOSED SOLID RLC
- PROPOSED PERFORATED RLC
- PROPOSED RLC TO WOODLOT/ WETLAND FEATURE
- PROPOSED INFILTRATION GALLERY
- PROPOSED FDRLC
- WETLAND STONE RESERVOIR FOR FDRLC OUTLET
- DRAINAGE DIVIDE BRUCE CREEK AND BERCZY CREEK
- BACK SPLIT
- FRONT DRAIN
- FRONT WALK
- WALKOUT
- ENCLAVE BIORETENTION
- INFILTRATION FACILITY
- HALF ROOF TO SURFACE
- Ω FULL ROOF TO 'AREA E'
- HALF ROOF TO 'AREA E'
- HALF ROOF TO PERFORATED RLC
- HALF ROOF TO ENCLAVE BIORETENTION
- HALF ROOF TO INFILTRATION GALLERY
- FULL ROOF TO INFILTRATION GALLERY
- HALF ROOF TO AMENDED SOILS
- FULL ROOF TO WOODLOT/WETLAND FEATURE

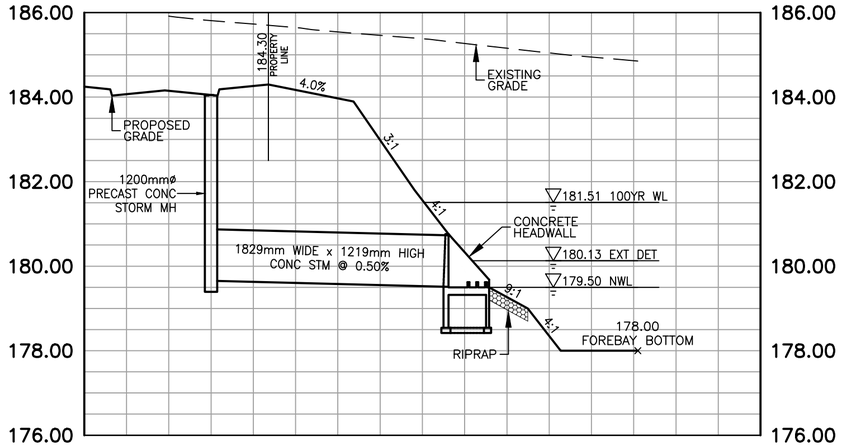
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.8Z

ZONING VARIANCE APPLICABLE LOTS

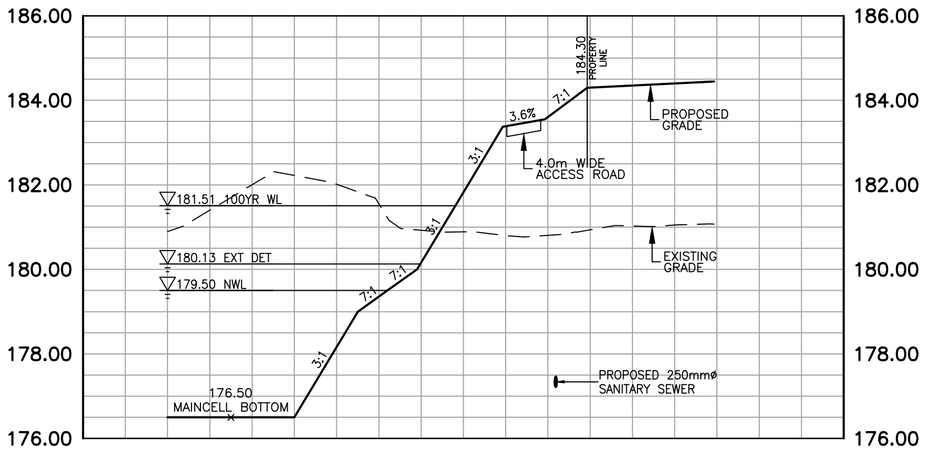
October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.8 – Water Balance Mitigation Plan.dwg – Revised by <Guerriero, Michael>, Tue, Oct 31, 2017 , 11:05 AM



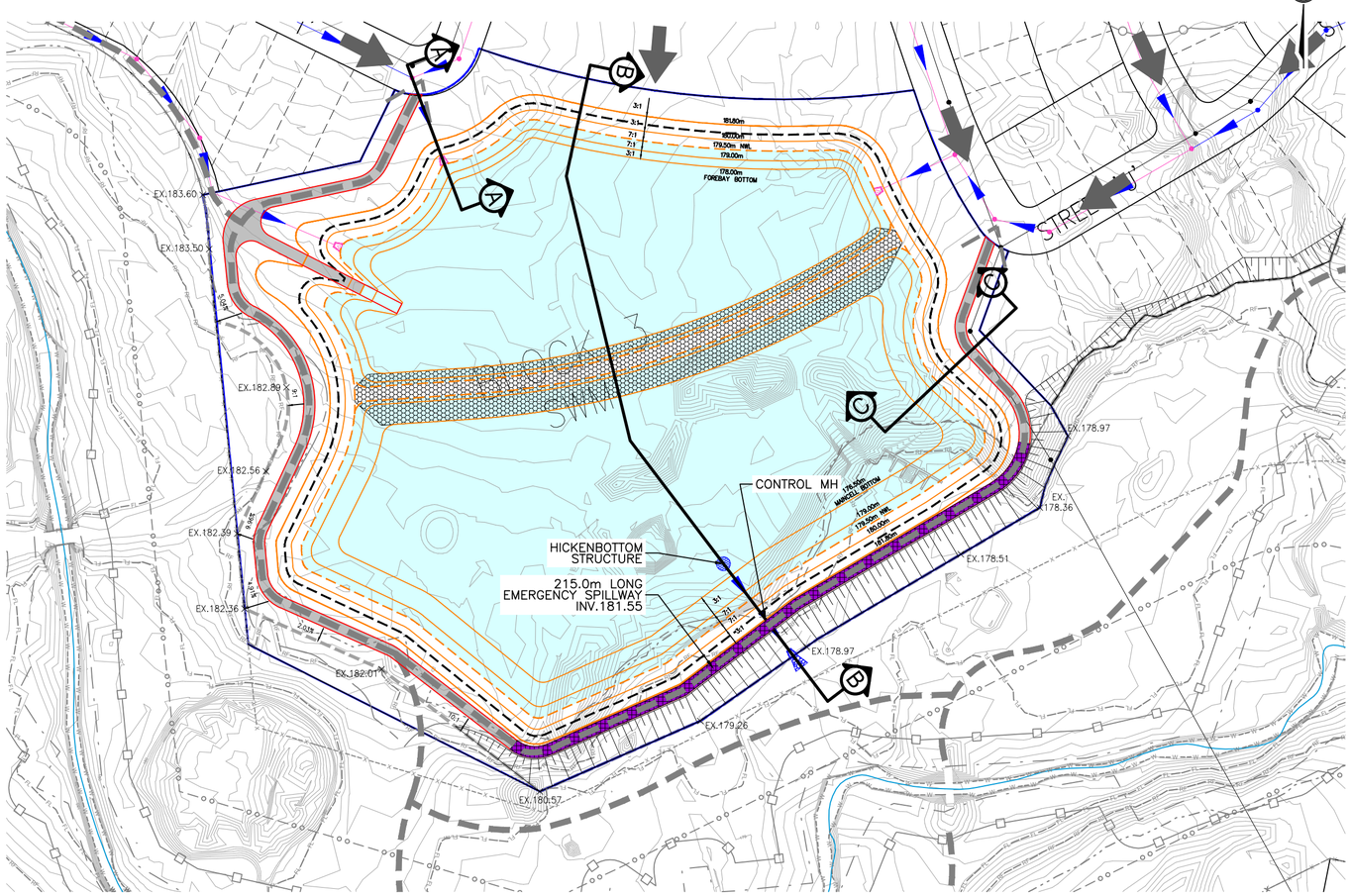
SECTION A

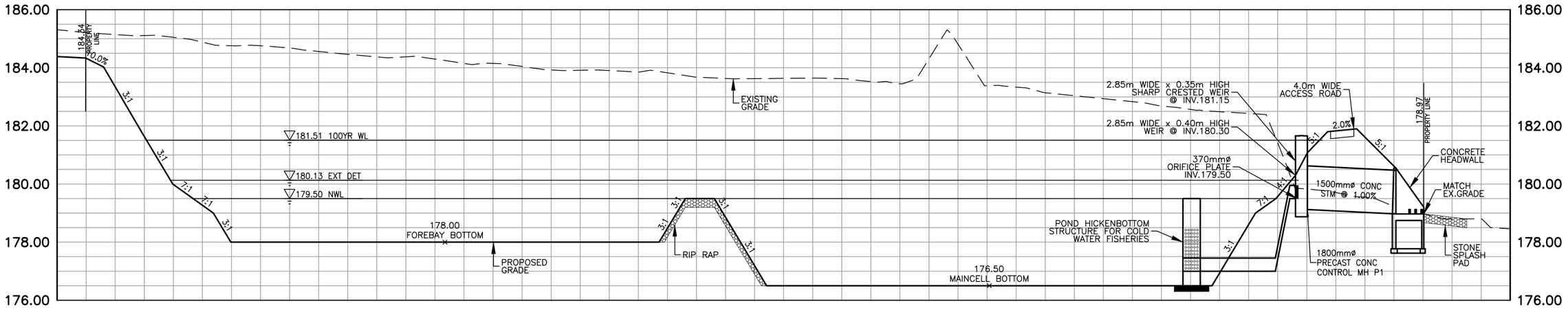
SCALE 1:500–H , 1:100–V



SECTION C

SCALE 1:500–H , 1:100–V





SECTION B

SCALE 1:500–H , 1:100–V

Stantec

1:1500 0 15 30 45 60 75

Legend

- POND BLOCK LIMIT
- SANITARY SEWER
- STORM SEWER
- PROPOSED SUBDRAIN
- EXISTING ELEVATION (EX.182.65)
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- EMERGENCY SPILLWAY
- RIP RAP
- LIMIT OF GRADING (MATCH EX.GRADE)
- CONCEPTUAL TRAIL

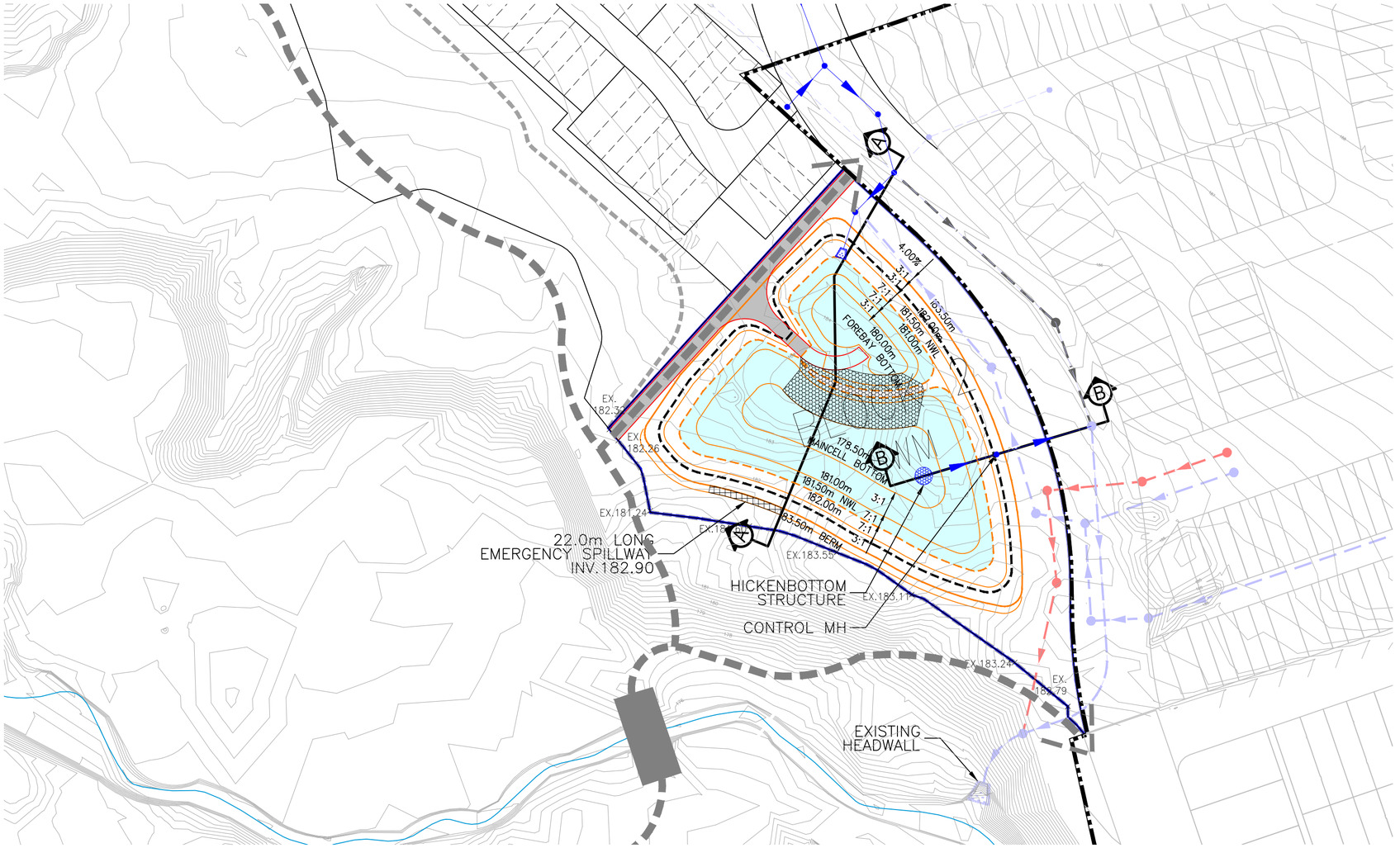
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

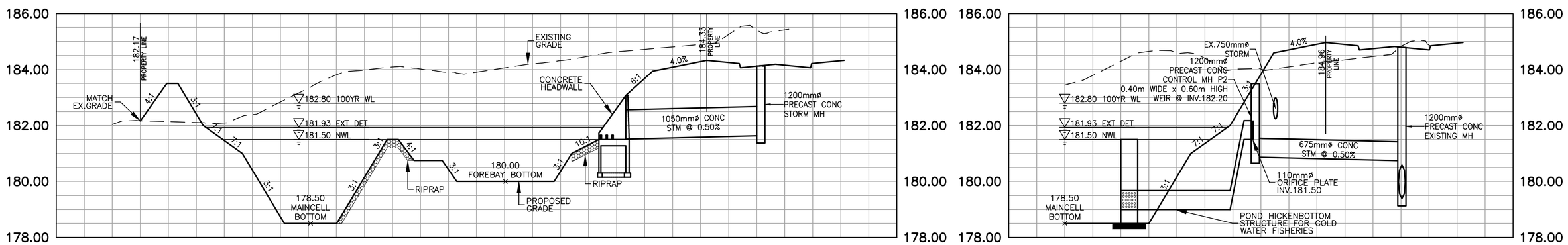
FIGURE 6.9

SWM POND P1
GRADING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.9 – SWM Pond P1 Grading Details.dwg – Revised by <Guerriero, Michael> , Wed, Oct 18, 2017 , 11:41 AM





SECTION A

SCALE 1:500–H , 1:100–V

SECTION B

SCALE 1:500–H , 1:100–V

Stantec

0 10 20 30 40 50
1:1000

Legend

- SUBJECT PROPERTY
- POND BLOCK LIMIT
- STORM SEWER
- EXISTING STORM SEWER (TO REMAIN)
- EXISTING FDC SEWER
- EXISTING ELEVATION (EX.182.65)
- PROPOSED SUBDRAIN
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- EMERGENCY SPILLWAY
- RIP RAP
- LIMIT OF GRADING (MATCH EX.GRADE)
- CONCEPTUAL TRAIL

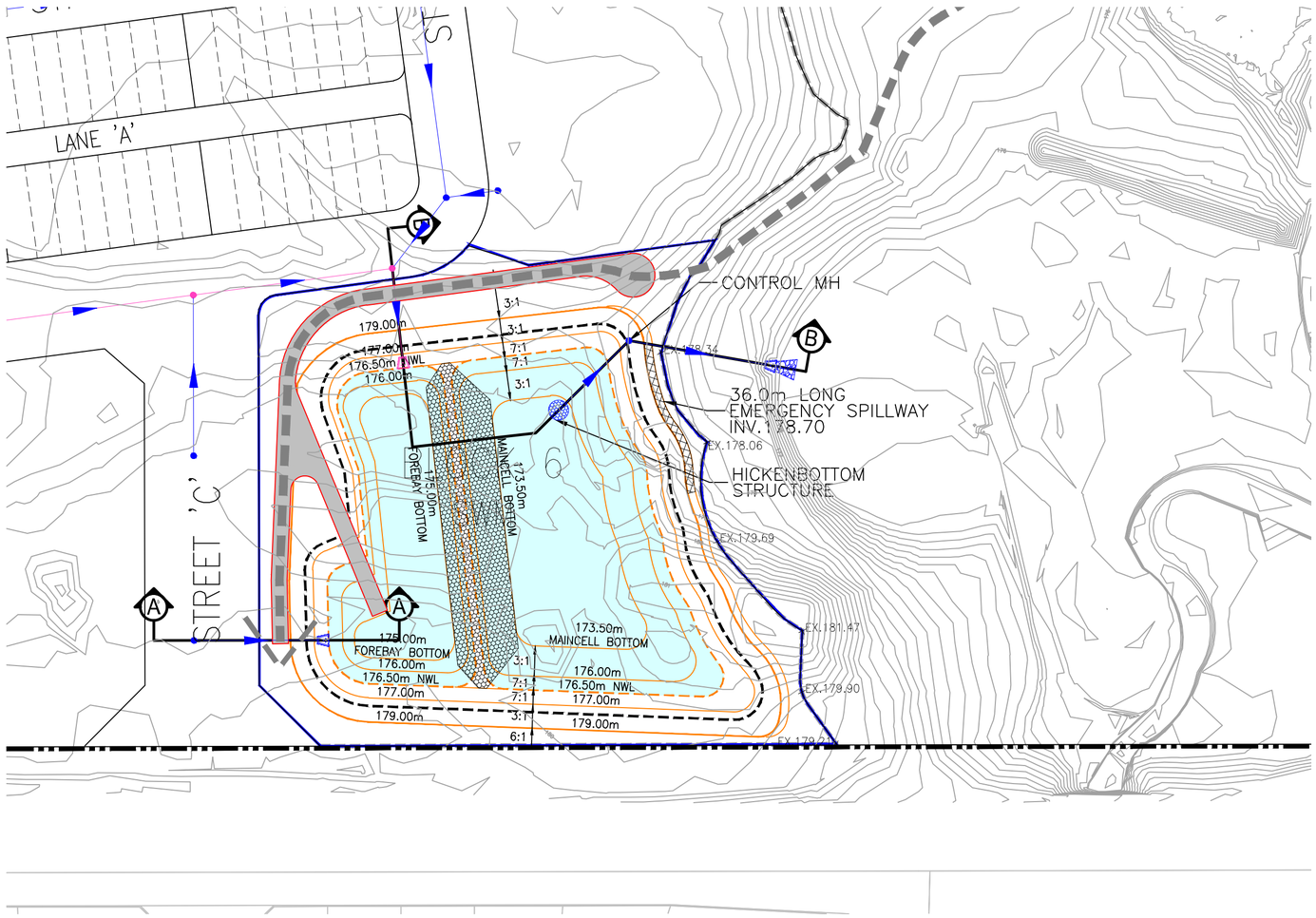
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

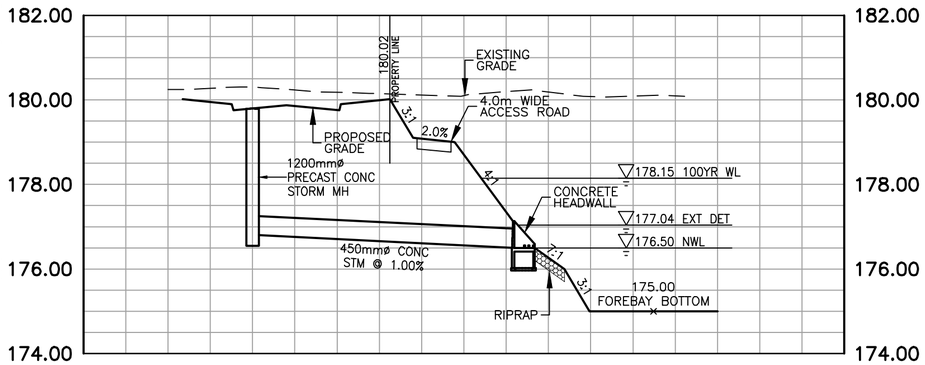
FIGURE 6.10

SWM POND P2
GRADING PLAN

October 2017

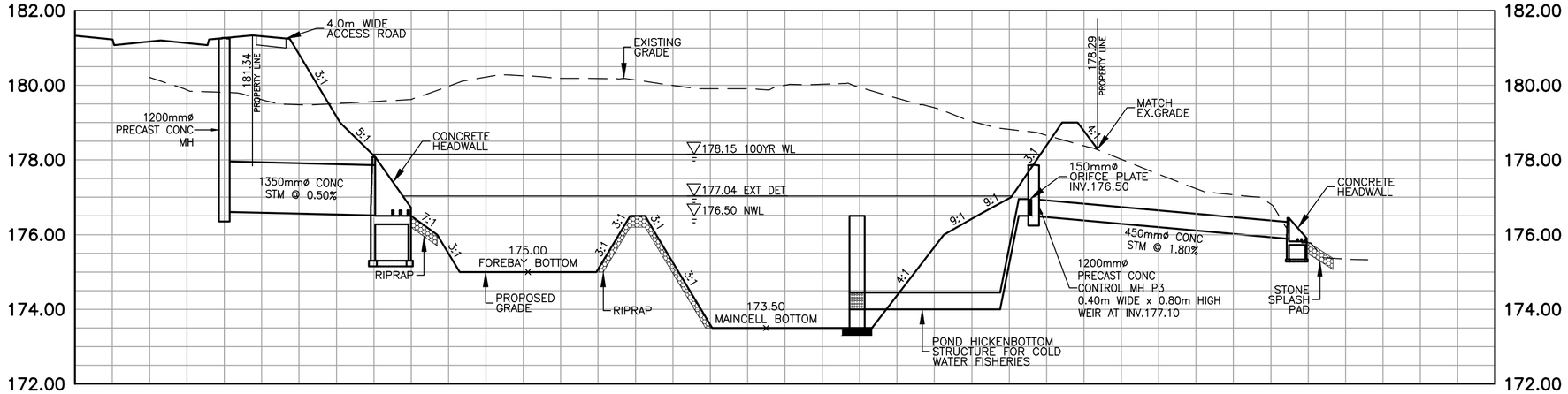
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SECTION A

SCALE 1:500–H , 1:100–V



SECTION B

SCALE 1:500–H , 1:100–V

Stantec

1:1000 0 10 20 30 40 50

Legend

- POND BLOCK LIMIT
- SANITARY SEWER
- STORM SEWER
- PROPOSED SUBDRAIN
- EXISTING ELEVATION (EX.182.65)
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- EMERGENCY SPILLWAY
- RIP RAP
- LIMIT OF GRADING (MATCH EX.GRADE)
- CONCEPTUAL TRAIL

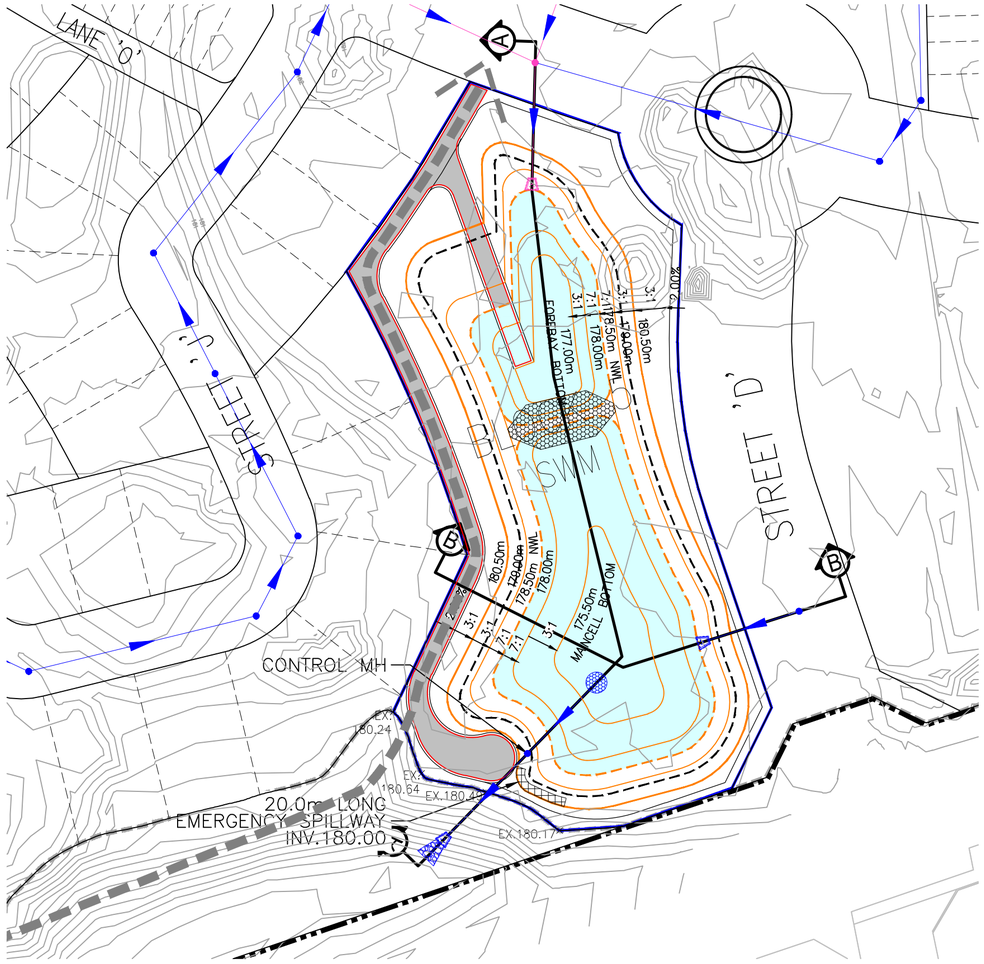
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

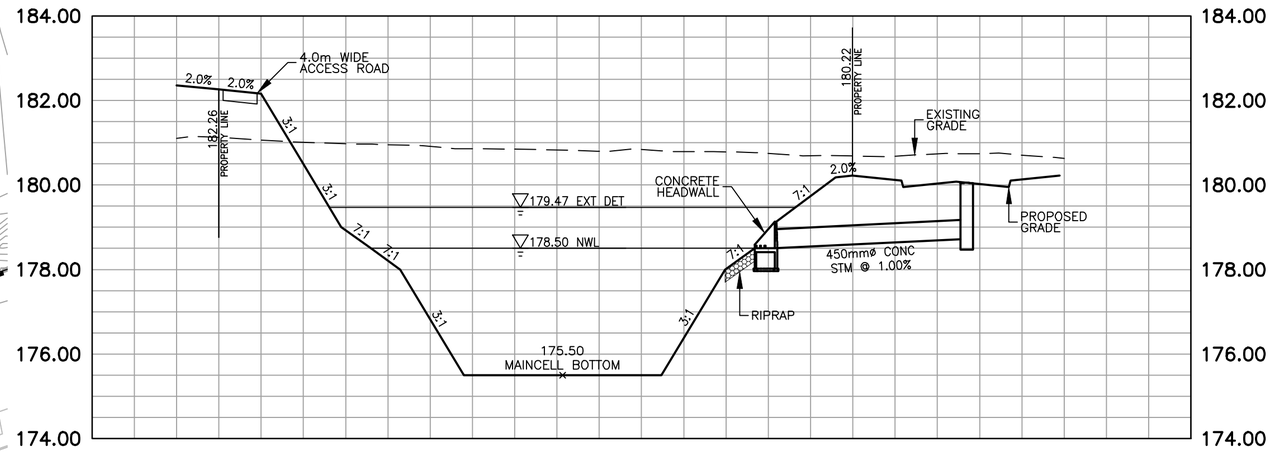
FIGURE 6.11

SWM POND P3
GRADING PLAN

October 2017

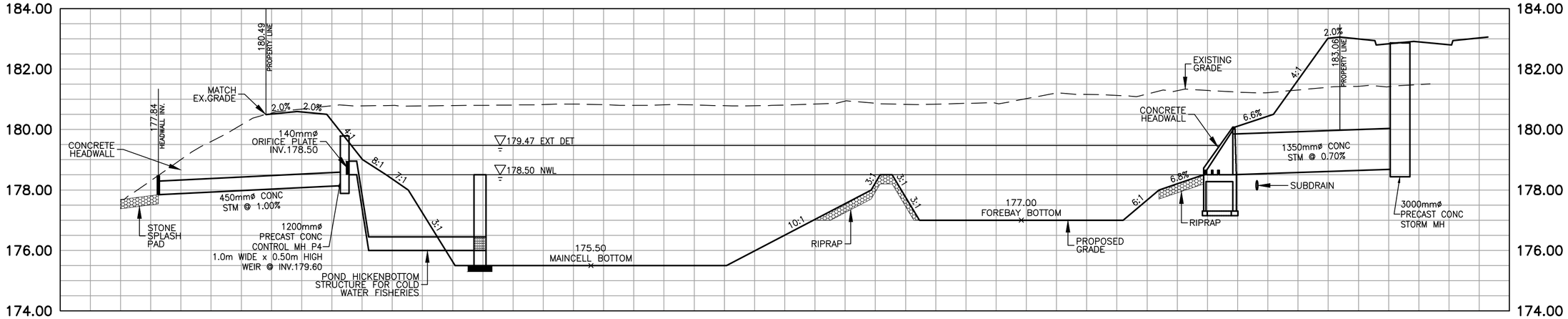
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SECTION B

SCALE 1:500–H , 1:100–V



SECTION A

SCALE 1:500–H , 1:100–V

Stantec

1:1000 0 10 20 30 40 50

Legend

- SUBJECT PROPERTY
- POND BLOCK LIMIT
- STORM SEWER
- PROPOSED SUBDRAIN
- EXISTING ELEVATION (EX.182.65)
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- EMERGENCY SPILLWAY
- RIP RAP
- LIMIT OF GRADING (MATCH EX.GRADE)
- CONCEPTUAL TRAIL

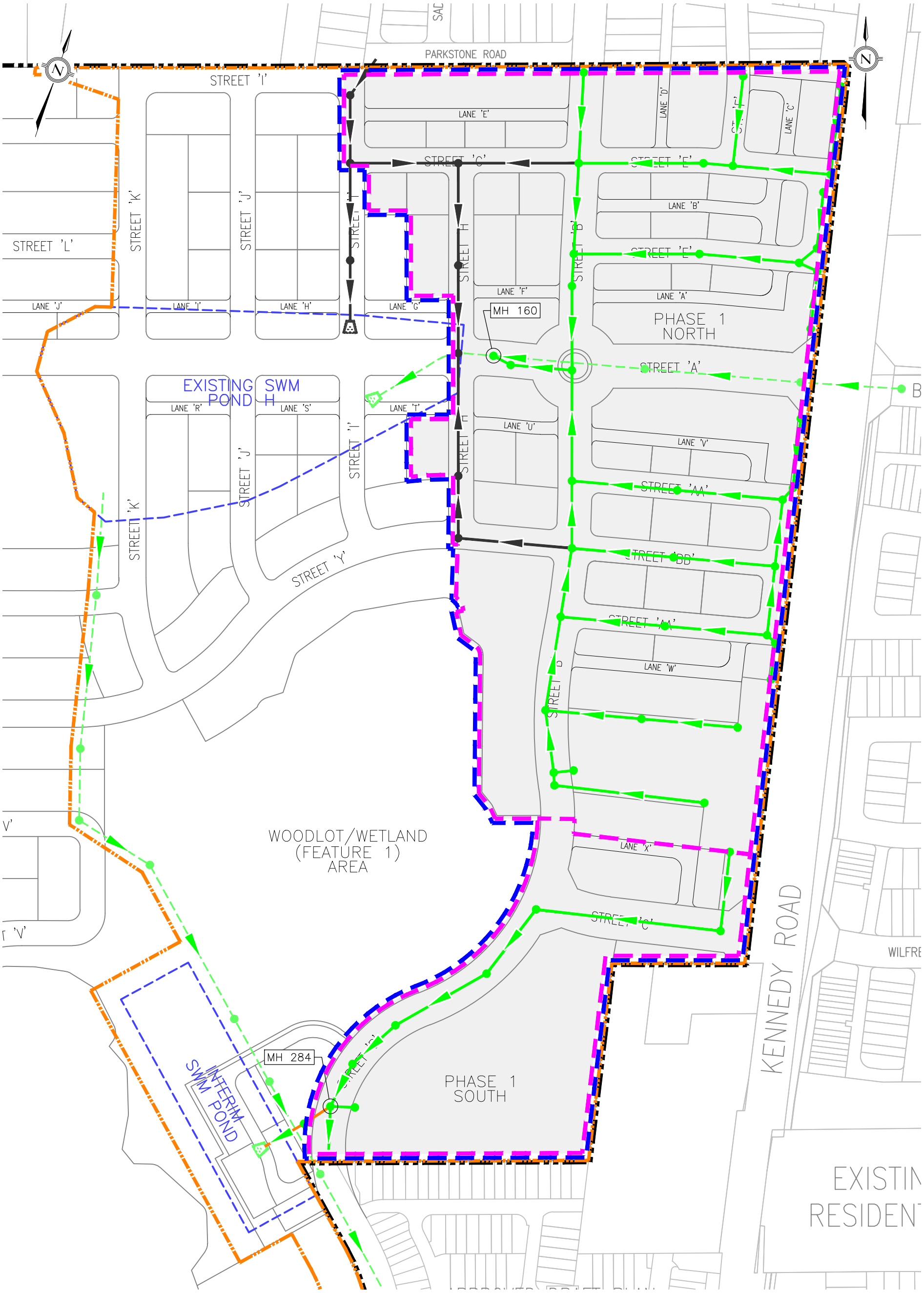
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.12

SWM POND P4 GRADING PLAN

October 2017

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Stantec

0 25 50 75 100 125

1:2500

Legend

- SUBJECT PROPERTY
- PROPOSED STORM SEWER
- TEMPORARY STORM SEWER
- INTERIM STORM SEWER
- EXISTING STORM SEWER
- PHASE 1 LIMIT
- NON-GOLF COURSE LANDS
- SERVICEABILITY LIMIT

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.13

STORM PHASING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.13 - Storm Phasing Plan.dwg - Revised by <Guerriero, Michael>, Mon, Oct 30, 2017, 4:09 PM

ROYAL COUNTY DOWN CRECENT
ROYAL TROON CRECENT
EXISTING PARK
SADDLEWORTH RD.
PROSPECTORS DRIVE
DANCERS DRIVE
ANGUS GLEN BOULEVARD
GLENRIDGE DRIVE
BUR OAK AVE.
KENNEDY ROAD
WILFRED MURISON AVE.
BECKETT AVENUE.
NIPIGON AVENUE
EXISTING RESIDENTIAL
APPROVED DRAFT PLAN YORKTON PHASE 2
BLOCK 1 SWM POND P1
SWM POND P2
BLOCK 4 PARK
BLOCK 5 PARK
BLOCK 6 PARK
BLOCK 7 PARK
BLOCK 8 SCHOOL
BLOCK 9 MEDIUM DENSITY
BLOCK 10 Lotnedry i/n Conseg Block
BLOCK (FEATURE 1) WOODLOT / WETLAND
(FEATURE 2)
BLOCK 11 OPEN SPACE
BLOCK 12 OPEN SPACE
BLOCK 13 OPEN SPACE
BLOCK 14 OPEN SPACE
BLOCK 15 OPEN SPACE
BLOCK 16 WALKWAY
BLOCK 17 WALKWAY
BLOCK 18 MUNICIPAL SERVICING
BLOCK 19 MUNICIPAL SERVICING
BLOCK 20 MUNICIPAL SERVICING
BLOCK 21 MUNICIPAL SERVICING
BLOCK 22 RESIDENTIAL RESERVE
PARKSTONE RD.
STREET 'A' through STREET 'J'
STREET 'K' through STREET 'Z'
STREET 'AA' through STREET 'EE'
LANE 'A' through LANE 'Z'
LANE 'AA' through LANE 'EE'
MH 400 T/C: 188.96m COVER: 2.72m
MH 414 T/C: 188.34m COVER: 2.91m
MH 342 T/C: 188.00m COVER: 3.01m
MH 403 T/C: 187.89m COVER: 2.91m
MH 407 T/C: 187.34m COVER: 2.96m
MH 345 T/C: 187.93m COVER: 3.35m
MH 371 T/C: 187.08m COVER: 3.21m
MH 355 T/C: 186.39m COVER: 3.17m
MH 372 T/C: 186.69m COVER: 3.12m
MH 361 T/C: 185.44m COVER: 3.41m
MH 359 T/C: 185.45m COVER: 3.27m
MH 398 T/C: 186.75m COVER: 2.86m
MH 363 T/C: 186.64m COVER: 3.08m
MH 360 T/C: 184.96m COVER: 3.96m
MH 369 T/C: 183.63m COVER: 2.95m
MH 428 T/C: 191.69m COVER: 3.89m
MH 427 T/C: 191.43m COVER: 3.03m
MH 418 T/C: 187.86m COVER: 3.07m
MH 420 T/C: 187.34m COVER: 2.99m
MH 435 T/C: 189.35m COVER: 2.99m
MH 475 T/C: 189.07m COVER: 3.07m
MH 477 T/C: 188.52m COVER: 3.03m
MH 472 T/C: 189.67m COVER: 3.00m
MH 451 T/C: 190.13m COVER: 2.88m
MH 455 T/C: 189.57m COVER: 2.92m
MH 482 T/C: 188.78m COVER: 3.04m
MH 798 T/C: 190.30m COVER: 3.06m
MH 437 T/C: 187.46m COVER: 3.03m
MH 461 T/C: 188.00m COVER: 2.99m
MH 459 T/C: 188.51m COVER: 3.00m
MH 457 T/C: 189.03m COVER: 3.01m
MH 470 T/C: 189.52m COVER: 2.92m
MH 424 T/C: 186.81m COVER: 2.86m
MH 411 T/C: 186.30m COVER: 2.86m
MH 334 T/C: 186.18m COVER: 1.87m
MH 377 T/C: 186.09m COVER: 3.00m
MH 379 T/C: 185.49m COVER: 2.91m
MH 391 T/C: 185.06m COVER: 2.89m
MH 383 T/C: 184.96m COVER: 3.15m
MH 389 T/C: 184.56m COVER: 3.11m
MH 340 T/C: 184.53m COVER: 2.84m
MH 385 T/C: 184.14m COVER: 3.06m
MH 182 T/C: 185.05m COVER: 1.97m
MH 754 T/C: 186.11m COVER: 2.44m
MH 217 T/C: 185.93m COVER: 2.49m
MH 319 T/C: 184.54m COVER: 1.73m
MH 184 T/C: 183.57m COVER: 1.07m
MH 188 T/C: 184.81m COVER: 2.42m
MH 219 T/C: 185.49m COVER: 2.47m
MH 190 T/C: 184.16m COVER: 2.26m
MH 227 T/C: 184.16m COVER: 2.20m
MH 223 T/C: 184.77m COVER: 2.31m
MH 233 T/C: 185.84m COVER: 2.65m
MH 445 T/C: 193.77m COVER: 3.14m
MH 307 T/C: 194.90m COVER: 3.25m
MH 449 T/C: 192.20m COVER: 2.86m
MH 307 T/C: 193.60m COVER: 2.93m
MH 315 T/C: 190.33m COVER: 2.85m
MH 168 T/C: 189.86m COVER: 2.72m
MH 166 T/C: 190.32m COVER: 2.81m
MH 170 T/C: 189.59m COVER: 3.19m
MH 317 T/C: 190.64m COVER: 3.02m
MH 172 T/C: 187.63m COVER: 3.03m
MH 174 T/C: 187.33m COVER: 2.99m
MH 243 T/C: 187.46m COVER: 2.38m
MH 213 T/C: 186.83m COVER: 2.55m
MH 211 T/C: 187.37m COVER: 2.86m
MH 230 T/C: 186.42m COVER: 2.64m
MH 300 T/C: 193.89m COVER: 3.06m
MH 309 T/C: 192.26m COVER: 3.03m
MH 758 T/C: 191.88m COVER: 3.10m
MH 207 T/C: 189.51m COVER: 3.18m
MH 301 T/C: 195.28m COVER: 3.00m
MH 292 T/C: 195.30m COVER: 3.01m
MH 293 T/C: 193.91m COVER: 3.01m
MH 304 T/C: 192.20m COVER: 3.18m
MH 164 T/C: 190.85m COVER: 3.03m
MH 297 T/C: 192.31m COVER: 3.13m
MH 162 T/C: 191.11m COVER: 3.18m
MH 290 T/C: 193.65m COVER: 3.09m
MH 203 T/C: 191.81m COVER: 3.23m
MH 805 T/C: 194.29m COVER: 3.06m
MH 800 T/C: 195.46m COVER: 3.46m
MH 329 T/C: 196.13m COVER: 3.01m
MH 325 T/C: 197.05m COVER: 2.97m
MH 152 T/C: 194.30m COVER: 3.00m
MH 160 T/C: 191.63m COVER: 3.19m
MH 156 T/C: 192.06m COVER: 2.81m
MH EX 100 T/C: 190.63m COVER: 3.37m
MH 252 T/C: 193.99m COVER: 3.03m
MH 197 T/C: 194.32m COVER: 3.16m
MH 262 T/C: 194.68m COVER: 3.23m
MH 260 T/C: 195.30m COVER: 3.04m
MH 269 T/C: 195.15m COVER: 3.42m
MH 268 T/C: 195.31m COVER: 3.43m
MH 1472 T/C: 199.00m COVER: 4.19m
MH 276 T/C: 193.09m COVER: 2.83m
MH 280 T/C: 187.36m COVER: 2.84m
MH 284 T/C: 185.35m COVER: 2.00m
MH 793 T/C: 184.49m COVER: 1.35m
MH 831 T/C: 199.78m COVER: 4.65m
MH 324 T/C: 198.83m COVER: 3.00m
MH 832 T/C: 198.70m COVER: 3.57m
MH 827 T/C: 197.68m COVER: 2.86m
MH 148 T/C: 196.73m COVER: 4.58m
MH 147 T/C: 195.75m COVER: 3.09m
MH EX 29 T/C: 194.79m COVER: 4.83m
MH 245 T/C: 195.26m COVER: 2.62m
MH 248 T/C: 195.17m COVER: 3.03m
MH 194 T/C: 195.29m COVER: 3.18m
MH 258 T/C: 195.83m COVER: 3.25m
MH 255 T/C: 196.75m COVER: 3.83m
MH 272 T/C: 196.49m COVER: 3.79m
MH 803 T/C: 197.55m COVER: 4.26m
MH 1471 T/C: 198.58m COVER: 3.14m

Stantec

1:500 0 15 30 45 60 75

Legend

- SUBJECT PROPERTY
- PROPOSED STORM SEWER
- PROPOSED 100-YR STORM SEWER
- PROPOSED HEADWALL
- MH 830 — MANHOLE NUMBER
- T/C: 185.73m — TOP OF MANHOLE ELEVATION
- COVER: 1.52m — DEPTH OF COVER TO OBVERT
- EXISTING STORM SEWER
- EXISTING 100-YR STORM SEWER
- EXISTING STORM TO BE REMOVED/DECOMMISSIONED

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.14
EAST DRAFT PLAN
STORM SERVICING PLAN

October 2017

File: 'K:\2160R\Active\160622064\Drawing\sheet_files [TSR]\6.14-15 – Storm Servicing Plan.dwg' – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 4:59 PM

SEE INSET WINDOW

ROYAL COUNTY DOWN CRECENT

MH 558
T/C: 194.31m
COVER: 3.09m

MH 563
T/C: 193.45m
COVER: 3.13m

STREET 'W'

MH 563
T/C: 193.45m
COVER: 3.13m

STREET 'W'

GLENRIDGE DRIVE

BLOCK 2
OPEN SPACE

MH 567
T/C: 192.80m
COVER: 3.15m

MH 571
T/C: 191.48m
COVER: 3.01m

MH 590
T/C: 193.72m
COVER: 3.10m

MH 789
T/C: 191.01m
COVER: 2.98m

BLOCK 9
PARK

MH 575
T/C: 190.38m
COVER: 3.05m

STREET 'V'

MH 589
T/C: 194.97m
COVER: 3.11m

BRUCE CREEK

MH 740
T/C: 192.98m
COVER: 3.02m

STREET 'U'

MH 577
T/C: 189.94m
COVER: 3.32m

MH 708
T/C: 192.89m
COVER: 3.15m

MH 579
T/C: 187.81m
COVER: 3.00m

MH 723
T/C: 192.72m
COVER: 3.12m

MH 710
T/C: 192.66m
COVER: 3.15m

STREET 'T'

STREET 'C'

MH 716
T/C: 190.20m
COVER: 3.42m

STREET 'U'

MH 585
T/C: 183.55m
COVER: 1.60m

WALNUT GLEN PLACE

MH 679
T/C: 193.75m
COVER: 3.00m

MH 703
T/C: 193.35m
COVER: 2.55m

MH 712
T/C: 192.43m
COVER: 3.29m

STREET 'S'

ST. 'R'

MH 684
T/C: 193.13m
COVER: 3.23m

STREET 'A'

BLOCK 10
PARK

MH 680
T/C: 192.85m
COVER: 3.03m

MH 691
T/C: 191.48m
COVER: 3.24m

MH 728
T/C: 190.50m
COVER: 3.21m

STREET 'C'

MH 718
T/C: 188.21m
COVER: 3.16m

STREET 'A'

MH 583
T/C: 186.35m
COVER: 2.27m

MH 762
T/C: 186.05m
COVER: 2.45m

MH 764
T/C: 185.25m
COVER: 1.06m

WARDEN AVENUE

BLOCK 4
OPEN SPACE

BLOCK 11
PARK

MH 686
T/C: 192.95m
COVER: 3.18m

MH 682
T/C: 192.28m
COVER: 3.09m

MH 689
T/C: 191.72m
COVER: 3.14m

MH 693
T/C: 190.25m
COVER: 3.15m

MH 732
T/C: 189.72m
COVER: 3.34m

STREET 'Q'

MH 640
T/C: 187.35m
COVER: 3.12m

BLOCK 8
PARK

BLOCK 14
MEDIUM DENSITY

MH 695
T/C: 188.78m
COVER: 3.22m

MH 642
T/C: 186.76m
COVER: 3.08m

LANE 'J'

STREET 'N'

MH 697
T/C: 187.74m
COVER: 3.28m

MH 735
T/C: 187.38m
COVER: 3.11m

MH 737
T/C: 186.29m
COVER: 3.01m

MH 533
T/C: 186.26m
COVER: 2.97m

MH 739
T/C: 186.31m
COVER: 2.59m

MH 768
T/C: 184.93m
COVER: 1.94m

EXISTING RESIDENTIAL

MH 644
T/C: 186.16m
COVER: 3.09m

LANE 'K'

MH 646
T/C: 185.83m
COVER: 3.18m

MH 657
T/C: 185.87m
COVER: 3.15m

STREET 'K'

STREET 'M'

LANE 'L'

MH 534
T/C: 185.45m
COVER: 2.97m

MH 538
T/C: 184.34m
COVER: 2.22m

EXISTING
OPEN SPACE

MH 677
T/C: 186.27m
COVER: 3.28m

MH 676
T/C: 185.77m
COVER: 2.28m

ST. 'O'

ST. 'P'

MH 682
T/C: 186.14m
COVER: 2.75m

MH 665
T/C: 186.11m
COVER: 3.28m

MH 648
T/C: 185.21m
COVER: 3.17m

LANE 'M'

LANE 'N'

STREET 'L'

MH 653
T/C: 185.20m
COVER: 2.99m

LANE 'N'

MH 636
T/C: 184.63m
COVER: 2.65m

BLOCK 1
OPEN SPACE

MH 544
T/C: 184.78m
COVER: 3.21m

MH 674
T/C: 185.59m
COVER: 2.19m

MH 672
T/C: 185.68m
COVER: 3.36m

MH 650
T/C: 184.56m
COVER: 3.13m

LANE 'O'

STREET 'K'

MH 637
T/C: 184.43m
COVER: 3.15m

LANE 'P'

MH 546
T/C: 182.94m
COVER: 1.62m

BRUCE CREEK

EXISTING RESIDENTIAL

MH 667
T/C: 185.30m
COVER: 3.43m

LANE 'M'

MH 633
T/C: 183.80m
COVER: 2.87m

MH 556
T/C: 184.52m
COVER: 3.15m

MH 548
T/C: 185.26m
COVER: 4.19m

BLOCK 7
PARK

MH 631
T/C: 183.48m
COVER: 2.38m

STREET 'J'

LANE 'Q'

MH 602
T/C: 183.23m
COVER: 2.73m

MH 748
T/C: 184.82m
COVER: 3.33m

MH 524
T/C: 185.16m
COVER: 3.04m

MH 503
T/C: 183.80m
COVER: 3.74m

MH 485
T/C: 184.31m
COVER: 3.00m

MH 486
T/C: 183.55m
COVER: 3.06m

STREET 'E'

STREET 'F'

STREET 'G'

MH 490
T/C: 182.94m
COVER: 3.00m

SWM
POND
P3

BLOCK 13
MEDIUM DENSITY

MH 627
T/C: 182.68m
COVER: 1.21m

MH 604
T/C: 182.91m
COVER: 2.71m

MH 527
T/C: 185.00m
COVER: 3.50m

MH 518
T/C: 184.65m
COVER: 3.28m

LANE 'C'

LANE 'E'

STREET 'I'

STREET 'H'

MH 498
T/C: 183.74m
COVER: 3.00m

LANE 'B'

LANE 'D'

LANE 'A'

MH 505
T/C: 183.25m
COVER: 3.49m

MH 509
T/C: 181.90m
COVER: 3.08m

MH 492
T/C: 182.53m
COVER: 2.99m

MH 625
T/C: 183.31m
COVER: 1.51m

MH 620
T/C: 184.05m
COVER: 3.17m

STREET 'H'

MH 611
T/C: 183.88m
COVER: 2.00m

SWM
POND
P4

STREET 'D'

MH 608
T/C: 183.77m
COVER: 2.91m

MH 494
T/C: 182.38m
COVER: 4.26m

MH 519
T/C: 184.24m
COVER: 3.18m

MH 521
T/C: 183.55m
COVER: 3.07m

MH 507
T/C: 182.75m
COVER: 3.40m

MH 516
T/C: 180.79m
COVER: 1.63m

BLOCK 6
SWM

STREET 'C'

MH 1533
T/C: 179.88m
COVER: 2.76m

COUNTRY ESTATES DRIVE

SCOTT HALL COURT

MH 614
T/C: 184.58m
COVER: 3.18m

BERCZY CREEK

BLOCK 3
OPEN SPACE

BLOCK 12
MIXED-USE

16th AVENUE

16th AVENUE

DELHI CRESCENT

Stantec

Legend

- SUBJECT PROPERTY
- PROPOSED STORM SEWER
- PROPOSED 100-YR STORM SEWER
- PROPOSED HEADWALL
- MH 830 — MANHOLE NUMBER
- T/C: 185.73m — TOP OF MANHOLE ELEVATION
- COVER: 1.52m — DEPTH OF COVER TO OBVERT
- EXISTING STORM SEWER
- EXISTING 100-YR STORM SEWER
- EXISTING STORM TO BE REMOVED/DECOMMISSIONED

1:1500 0 15 30 45 60 75

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.15
WEST DRAFT PLAN
STORM SERVICING PLAN
October 2017

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ROYAL COUNTY DOWN CRECENT

ANGUS GLEN BOULEVARD

ROYAL TROON CRECENT

EXISTING PARK

SADDLEWORTH RD.

PROSPECTORS DRIVE

DANCERS DRIVE

GLENRIDGE DRIVE

BLOCK 16 WALKWAY

PARKSTONE RD.

BLOCK 17 WALKWAY

BLOCK 18 MUNICIPAL SERVICING

BLOCK 19 MUNICIPAL SERVICING

BLOCK 21 MUNICIPAL SERVICING

BLOCK 22 RESIDENTIAL RESERVE

BLOCK 11 OPEN SPACE

BLOCK 12 OPEN SPACE

BLOCK 13 OPEN SPACE

BLOCK 14 OPEN SPACE

BLOCK 15 OPEN SPACE

BLOCK 5 PARK

BLOCK 8 SCHOOL

BLOCK 6 PARK

BLOCK 7 PARK

BLOCK 1 WOODLOT / WETLAND

BLOCK 9 MEDIUM DENSITY

BLOCK 10 Laneway TH Condo Block

STREET 'A'

BUR OAK AVE.

STREET 'G'

STREET 'P'

STREET 'Q'

STREET 'R'

STREET 'O'

STREET 'N'

STREET 'M'

STREET 'L'

STREET 'K'

STREET 'J'

STREET 'I'

STREET 'H'

STREET 'E'

STREET 'F'

STREET 'B'

STREET 'C'

STREET 'D'

STREET 'S'

STREET 'T'

STREET 'U'

STREET 'V'

STREET 'W'

STREET 'X'

STREET 'Y'

STREET 'Z'

STREET 'AA'

STREET 'BB'

LANE 'A' LANE 'B' LANE 'C' LANE 'D' LANE 'E' LANE 'F' LANE 'G' LANE 'H' LANE 'I' LANE 'J' LANE 'K' LANE 'L' LANE 'M' LANE 'N' LANE 'O' LANE 'P' LANE 'R' LANE 'S' LANE 'T' LANE 'U' LANE 'V' LANE 'W' LANE 'X'

SWM POND P1

SWM POND P2

EXT–1
82.95Ha
MINOR
66.85Ha
MAJOR
21.0m³/s
MAJOR FLOW
TO POND P1

EXT–2
6.59Ha
TO POND P2

APPROVED DRAFT PLAN
YORKTON PHASE 2

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

KENNEDY ROAD

WILFRED MURISON AVE.

BECKETT AVENUE.

NIPIGON AVENUE

Stantec

1:1500 0 15 30 45 60 75

Legend

- SUBJECT PROPERTY
- PROPOSED STORM SEWER
- PROPOSED 100-YR STORM SEWER
- PROPOSED HEADWALL
- EXISTING STORM SEWER
- EXISTING 100-YR STORM SEWER

0.69Ha / 0.65 — DRAINAGE AREA / RUNOFF COEFFICIENT

EXT–1 / 82.95Ha / TO POND P1 — DRAINAGE AREA ID / DRAINAGE AREA

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 167H AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.16

EAST DRAFT PLAN
STORM DRAINAGE PLAN

October 2017

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SEE INSET WINDOW

ROYAL COUNTY DOWN CRECENT

1.81Ha 0.65 STREET 'W'

GLENRIDGE DRIVE

BLOCK 2 OPEN SPACE

BRUCE CREEK

BLOCK 9 PARK

WALNUT GLEN PLACE

WARDEN AVENUE

BLOCK 4 OPEN SPACE

BLOCK 11 PARK

BLOCK 10 PARK

EXISTING RESIDENTIAL

EXISTING OPEN SPACE

EXISTING RESIDENTIAL

COUNTRY ESTATES DRIVE

SCOTT HALL COURT

BLOCK 8 PARK

BLOCK 14 MEDIUM DENSITY

BLOCK 1 OPEN SPACE

BLOCK 7 PARK

BLOCK 3 OPEN SPACE

BLOCK 13 MEDIUM DENSITY

BLOCK 12 MI...

SWM POND P4

SWM POND P3

BERCZY CREEK

16th AVENUE

16th AVENUE

DELHI CRESCENT

STREET 'A' STREET 'B' STREET 'C' STREET 'D' STREET 'E' STREET 'F' STREET 'G' STREET 'H' STREET 'I' STREET 'J' STREET 'K' STREET 'L' STREET 'M' STREET 'N' STREET 'O' STREET 'P' STREET 'Q' STREET 'R' STREET 'S' STREET 'T' STREET 'U' STREET 'V' STREET 'W'

LANE 'A' LANE 'B' LANE 'C' LANE 'D' LANE 'E' LANE 'F' LANE 'G' LANE 'H' LANE 'I' LANE 'J' LANE 'K' LANE 'L' LANE 'M' LANE 'N' LANE 'O' LANE 'P' LANE 'Q' LANE 'R' LANE 'S' LANE 'T' LANE 'U' LANE 'V' LANE 'W' LANE 'X' LANE 'Y'

Stantec

1:1500 0 15 30 45 60 75

Legend

- SUBJECT PROPERTY
- PROPOSED STORM SEWER
- PROPOSED 100-YR STORM SEWER
- PROPOSED HEADWALL
- EXISTING STORM SEWER
- EXISTING 100-YR STORM SEWER

0.69Ha 0.65 DRAINAGE AREA / RUNOFF COEFFICIENT

EXT-1 82.95Ha TO POND P1 DRAINAGE AREA ID / DRAINAGE AREA

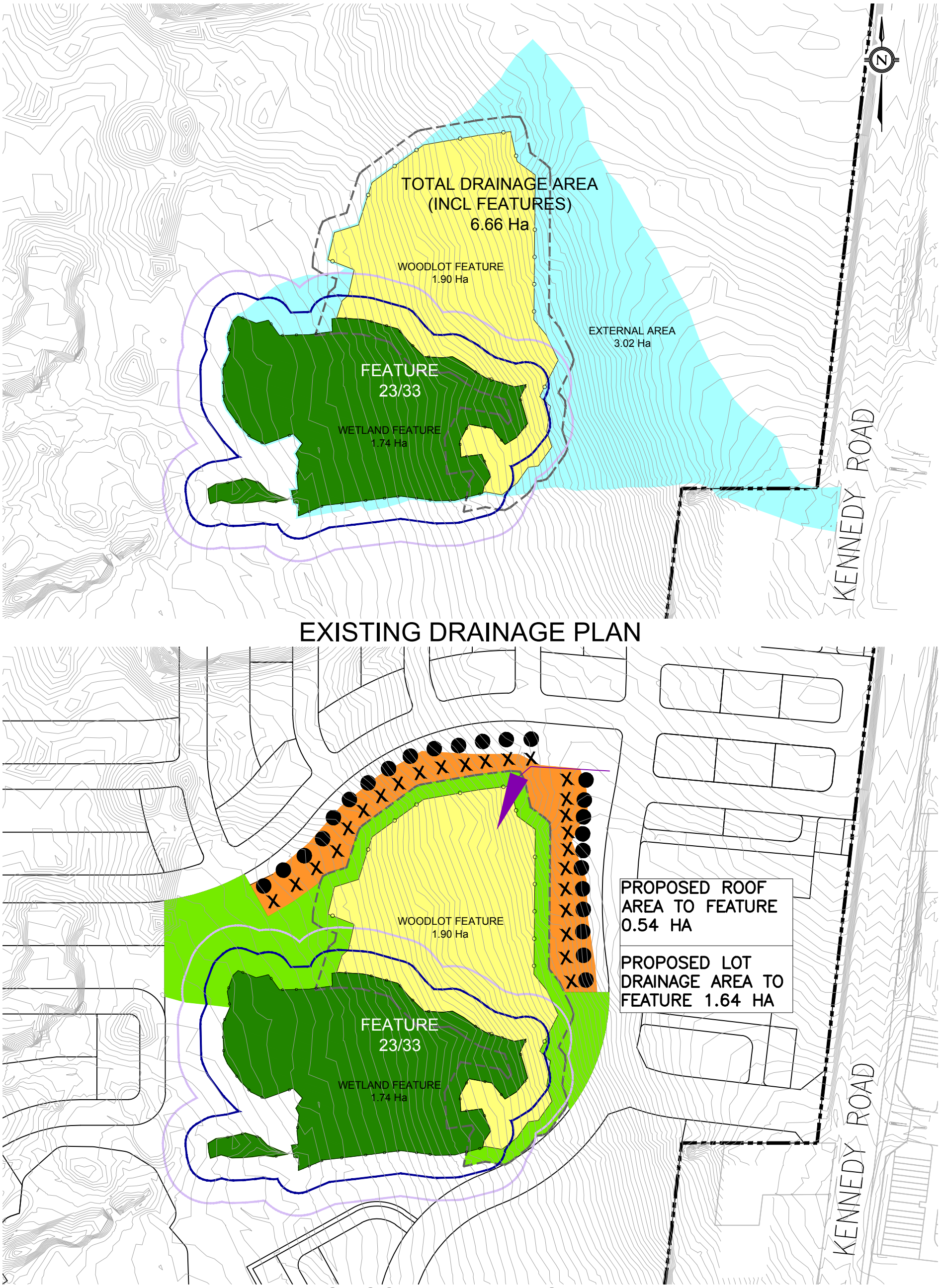
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.17

WEST DRAFT PLAN
STORM DRAINAGE PLAN

October 2017

File: V:\01600\Active\60622264\Drawing\sheet_files [TRP]\6.16-17 – Storm Drainage Plan.dwg – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 4:54 PM



EXISTING DRAINAGE PLAN

PROPOSED DRAINAGE PLAN

Stantec

0 20 40 60 80 100
1:2000

Legend

- SUBJECT PROPERTY
- STAKED DRIPLINE
- STAKED WETLAND
- STAKED DRIPLINE +10.0m
- STAKED WETLAND +15.0m
- STAKED WETLAND +30.0m
- RLC TO WOODLOT/WETLAND FEATURE
- HALF ROOF TO AMENDED SOIL
- WETLAND AREA
- EXISTING DRAINAGE AREA TO FEATURE
- WOODLOT AREA
- PROPOSED REAR LOT AREA TO FEATURE
- PROPOSED OPEN SPACE/ BUFFER TO FEATURE
- FULL ROOF TO WOODLOT/WETLAND FEATURE

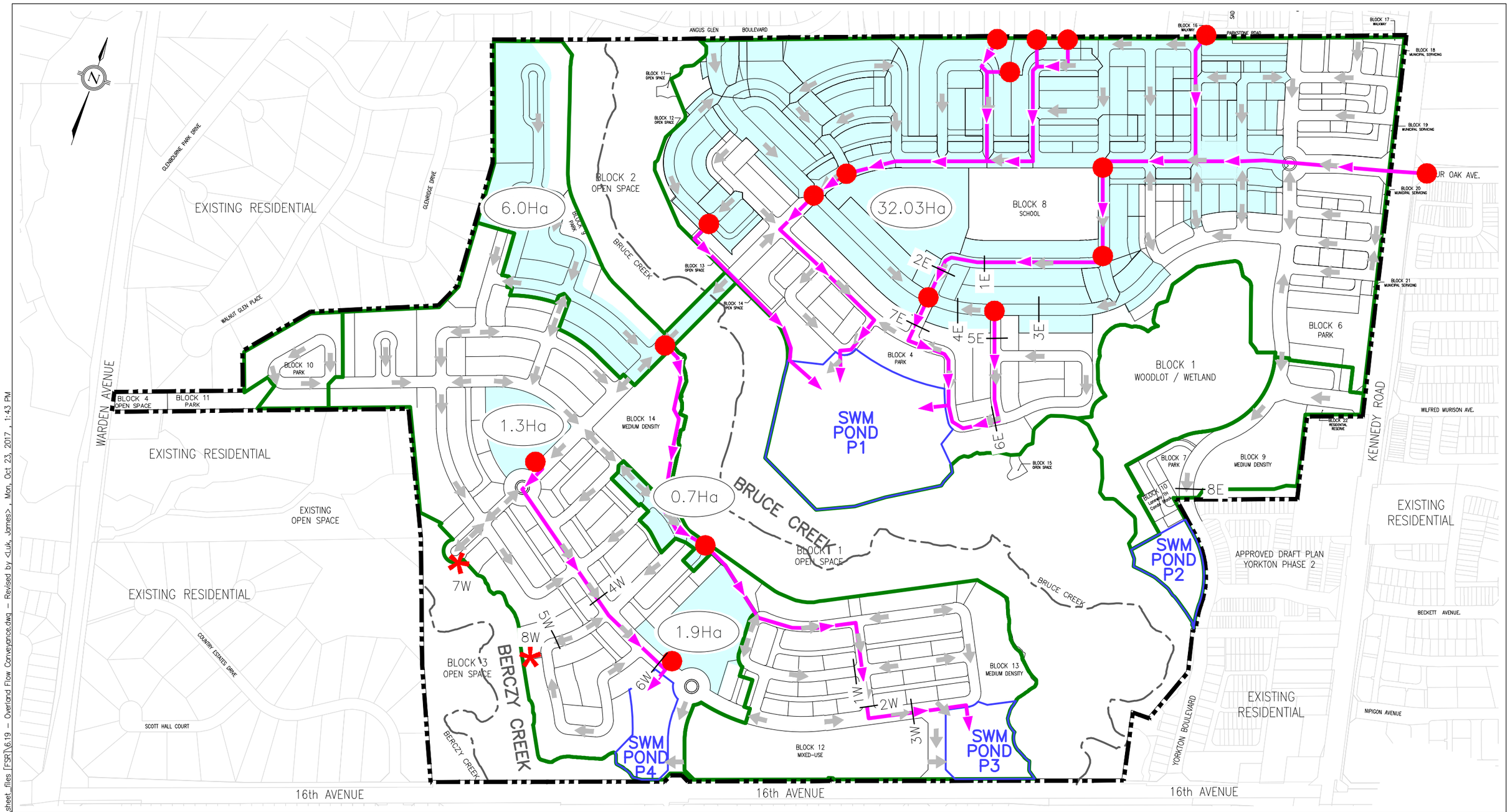
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.18

WOODLOT/WETLAND FEATURE 1 DRAINAGE PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.18 – Woodlot-Wetland Drainage Plan.dwg – Revised by <Guerriero, Michael>, Mon, Oct 30, 2017, 3:57 PM



Stantec

0 60 120 180 240 300
1:6000

Legend

- SUBJECT PROPERTY
- PROPOSED 100 YEAR STORM SEWER
- PROPOSED STORM DRAINAGE BOUNDARY
- MAJOR SYSTEM CAPTURE AREA
- MAJOR OVERLAND FLOW DIRECTION
- MAJOR SYSTEM OVERLAND FLOW ROUTE OUTLET
- 100 YEAR CAPTURE LOCATION
- 29.9Ha — MAJOR SYSTEM DRAINAGE AREA
- 3W — OVERLAND FLOW NODES

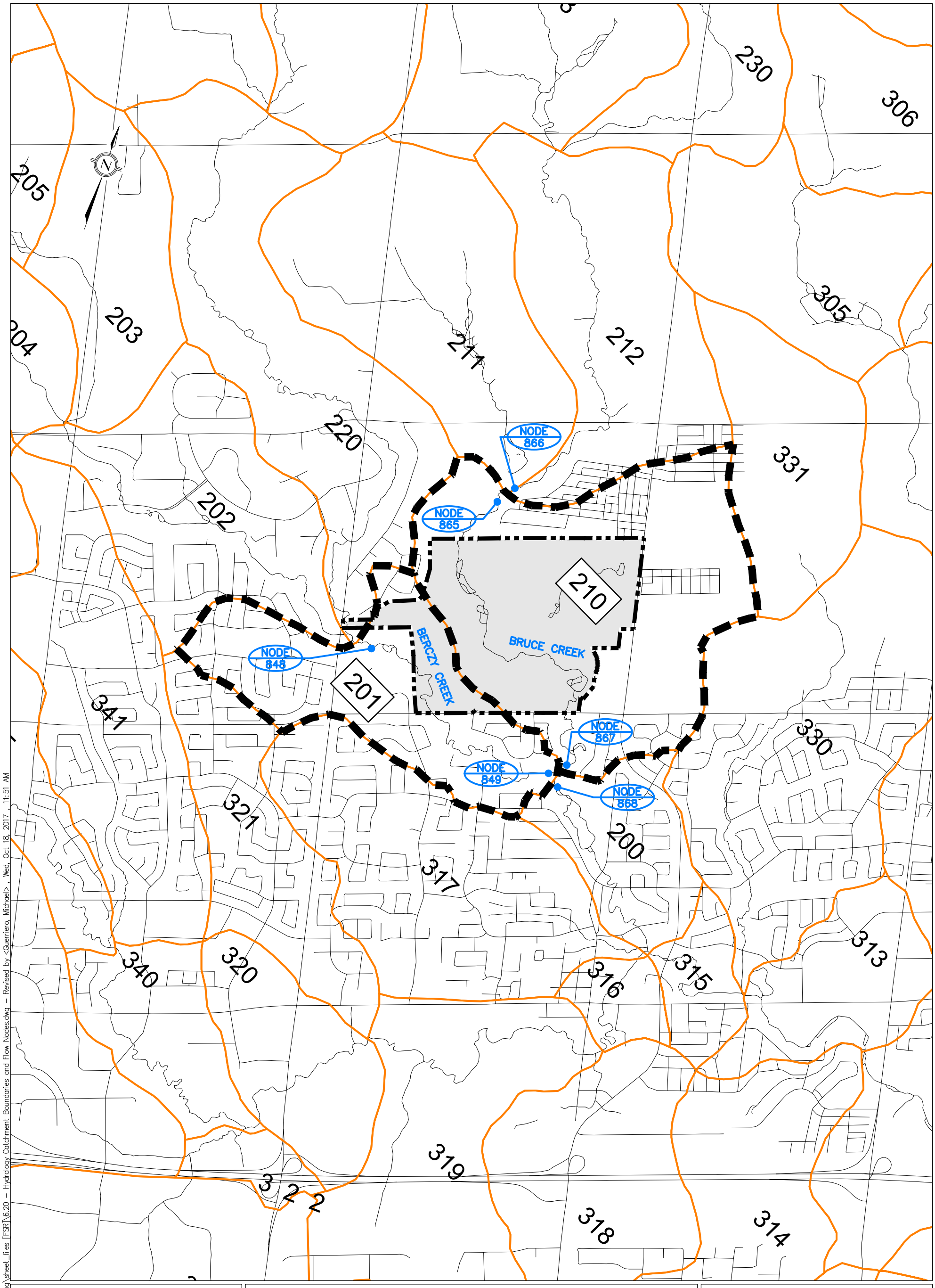
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
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RESIDENTIAL DEVELOPMENT

FIGURE 6.19

OVERLAND FLOW CONVEYANCE AND MAJOR SYSTEM OUTLETS

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.19 – Overland Flow Conveyance.dwg – Revised by <Luk, James> , Mon, Oct 23, 2017 , 1:43 PM



File: V:\01606\Active\160622264\Drawing\sheet_files [FSR]\6.20 – Hydrology Catchment Boundaries and Flow Nodes.dwg – Revised by <Guerriero, Michael> , Wed, Oct 18, 2017 , 11:51 AM

Stantec

0 250 500 750 1000 1250
1:25000

Legend

- SUBJECT PROPERTY
- 320 SUBCATCHMENT NODE ID
- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT BOUNDARY OF INTEREST
- NODE 867 FLOW NODE

MAPPING SOURCE:
SUBWATERSHED BOUNDARY MAPPING PROVIDED BY TRCA IN 2016.

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 6.20

ROUGE RIVER HYDROLOGY MODEL (V02)
CATCHMENT BOUNDARIES & FLOW NODES

October 2017

ROYAL COUNTY DOWN CRECENT
ROYAL TROON CRECENT
EXISTING PARK
ANGUS GLEN BOULEVARD
SADDLEWORTH RD.
PROSPECTORS DRIVE
DANCERS DRIVE
PARKSTONE ROAD
GLENRIDGE DRIVE
BUR OAK AVE.
WILFRED MURISON AVE.
KENNEDY ROAD
BECKETT AVENUE.
NIPIGON AVENUE
BLVD
BLOCK 11 OPEN SPACE
BLOCK 12 OPEN SPACE
BLOCK 13 OPEN SPACE
BLOCK 14 OPEN SPACE
BLOCK 15 OPEN SPACE
BLOCK 16 WALKWAY
BLOCK 17 WALKWAY
BLOCK 18 MUNICIPAL SERVICING
BLOCK 19 MUNICIPAL SERVICING
BLOCK 20 MUNICIPAL SERVICING
BLOCK 21 MUNICIPAL SERVICING
BLOCK 22 RESIDENTIAL RESERVE
K 2 SPACE
BLOCK 5 PARK
BLOCK 8 SCHOOL
BLOCK 4 PARK
BLOCK 6 PARK
BLOCK 7 PARK
BLOCK (FEATURE 1) WOODLOT / WETLAND
AREA 'E' (FEATURE 2)
BLOCK 9 MEDIUM DENSITY
SWM
RETAINING WALL
EXISTING RESIDENTIAL
APPROVED DRAFT PLAN YORKTON PHASE 2
STREET 'A'
STREET 'B'
STREET 'C'
STREET 'D'
STREET 'E'
STREET 'F'
STREET 'G'
STREET 'H'
STREET 'I'
STREET 'J'
STREET 'K'
STREET 'L'
STREET 'M'
STREET 'N'
STREET 'O'
STREET 'P'
STREET 'Q'
STREET 'R'
STREET 'S'
STREET 'T'
STREET 'U'
STREET 'V'
STREET 'W'
STREET 'X'
STREET 'Y'
STREET 'Z'
STREET 'AA'
STREET 'BB'
LANE 'A'
LANE 'B'
LANE 'C'
LANE 'D'
LANE 'E'
LANE 'F'
LANE 'G'
LANE 'H'
LANE 'I'
LANE 'J'
LANE 'K'
LANE 'L'
LANE 'M'
LANE 'N'
LANE 'O'
LANE 'P'
LANE 'Q'
LANE 'R'
LANE 'S'
LANE 'T'
LANE 'U'
LANE 'V'
LANE 'W'

Stantec

1:1500 0 15 30 45 60 75

Legend

- SUBJECT PROPERTY
- PROPOSED CENTRELINE
- 190.76 PROPOSED GRADE
- 27.0% PROPOSED SLOPE
- 190.76 EXISTING GRADE
- PROPOSED 3:1 SLOPE
- CONCEPTUAL TRAIL ROUTE

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 7.1

BRUCE EAST GRADING PLAN

October 2017

File: \\10061\Active\100622064\Drawing\sheet_files [7.1F].7.1-2 – Grading Plan.dwg – Revised by <Lok, James> – Tue, Oct 24, 2017 , 11:43 AM

SEE INSET WINDOW

ROYAL COUNTY DOWN CRECENT

STREET 'W'

GLENRIDGE DRIVE

WITHIN EXISTING GOLF COURSE IRRIGATION PONDS (TO EXISTING WATERLINE)

FILL

BLOCK 2
OPEN SPACE

FILL

BLOCK 9
PARK

BRUCE CREEK

PROPOSED TOPSOIL FILL WITHIN EXISTING GOLF COURSE IRRIGATION PONDS (TO EXISTING WATERLINE)

WALNUT GLEN PLACE

WARDEN AVENUE

BLOCK 4
OPEN SPACE

BLOCK 11
PARK

BLOCK 10
PARK

STREET 'R'

STREET 'C'

STREET 'A'

STREET 'B'

STREET 'D'

STREET 'E'

STREET 'F'

STREET 'G'

STREET 'H'

STREET 'J'

STREET 'K'

STREET 'L'

STREET 'M'

STREET 'N'

STREET 'P'

BLOCK 8
PARK

BLOCK 14
MEDIUM DENSITY

BLOCK 3
SWM

FILL

EXISTING RESIDENTIAL

EXISTING
OPEN SPACE

PROPOSED PEDESTRIAN CROSSING LOCATION OF BRUCE CREEK (AT EXISTING GOLF COURSE CROSSING)

BLOCK 1
OPEN SPACE

BRUCE CREEK

EXISTING RESIDENTIAL

BLOCK 7
PARK

LANE 'A'

LANE 'B'

LANE 'C'

LANE 'D'

LANE 'E'

LANE 'F'

LANE 'G'

LANE 'H'

LANE 'J'

LANE 'K'

LANE 'L'

LANE 'M'

LANE 'N'

LANE 'P'

COUNTRY ESTATES DRIVE

BLOCK 13
MEDIUM DENSITY

BLOCK 5
SWM

BLOCK 6
SWM

BLOCK 3
OPEN SPACE

SCOTT HALL COURT

BERCZY CREEK

BLOCK 12
MIXED-USE

16th AVENUE

16th AVENUE

DELHI CRESCENT

Stantec

1:1500 0 15 30 45 60 75

Legend

- SUBJECT PROPERTY
- PROPOSED CENTRELINE
- 190.76 PROPOSED GRADE
- 27% PROPOSED SLOPE
- 190.76 EXISTING GRADE
- PROPOSED 3:1 SLOPE
- CONCEPTUAL TRAIL ROUTE

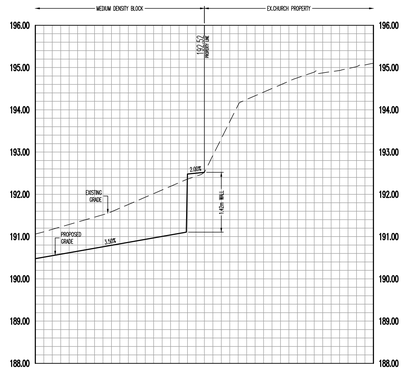
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 7.2

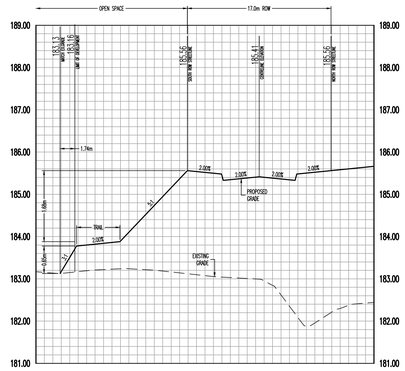
BRUCE WEST GRADING PLAN

October 2017

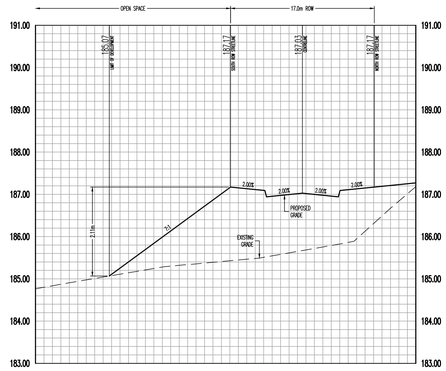
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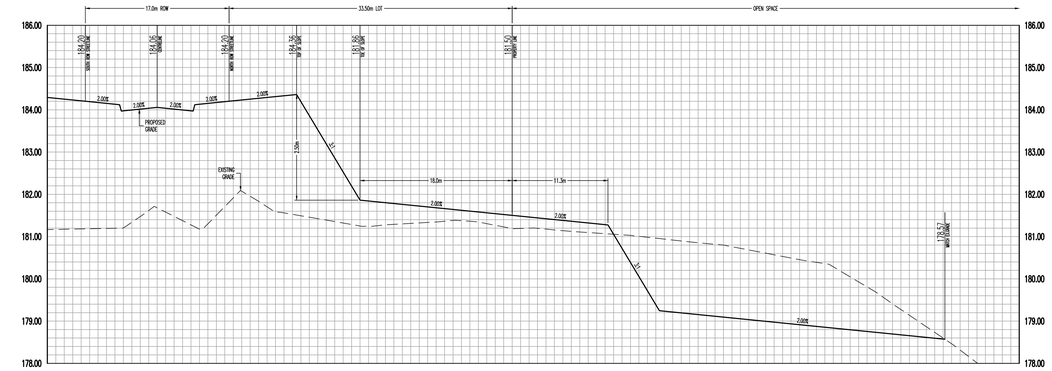
SECTION 1



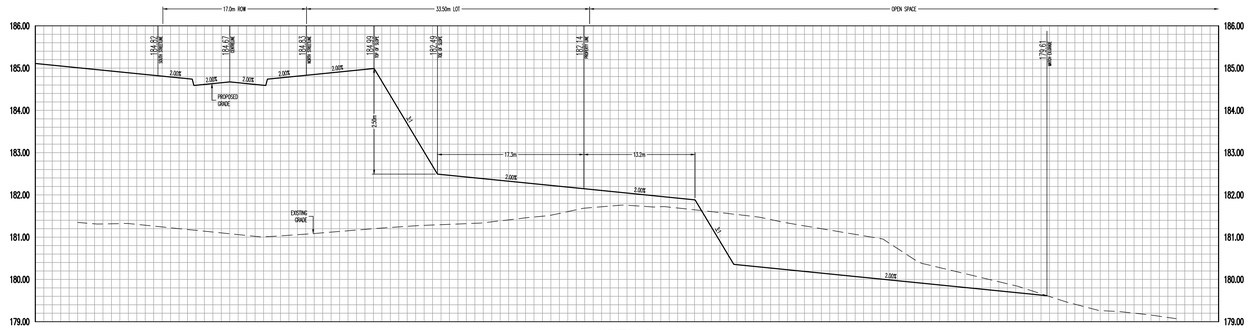
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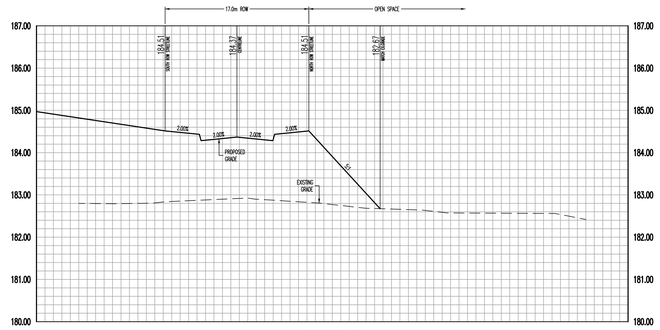
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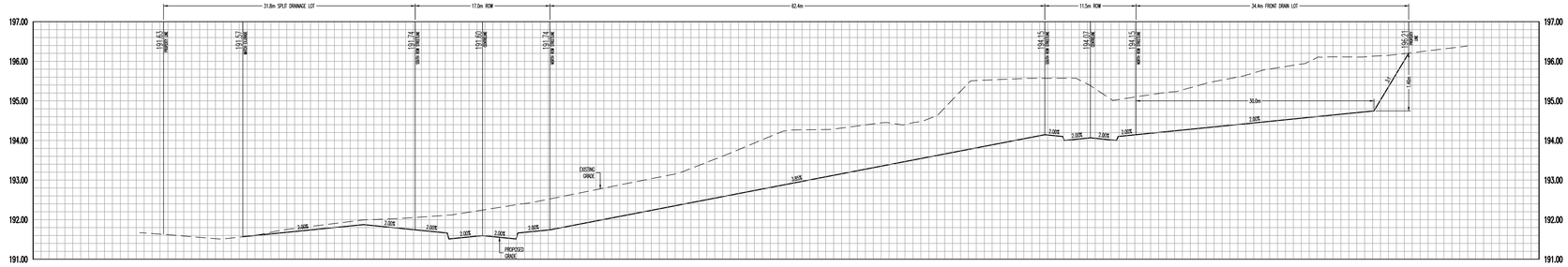
SECTION 4



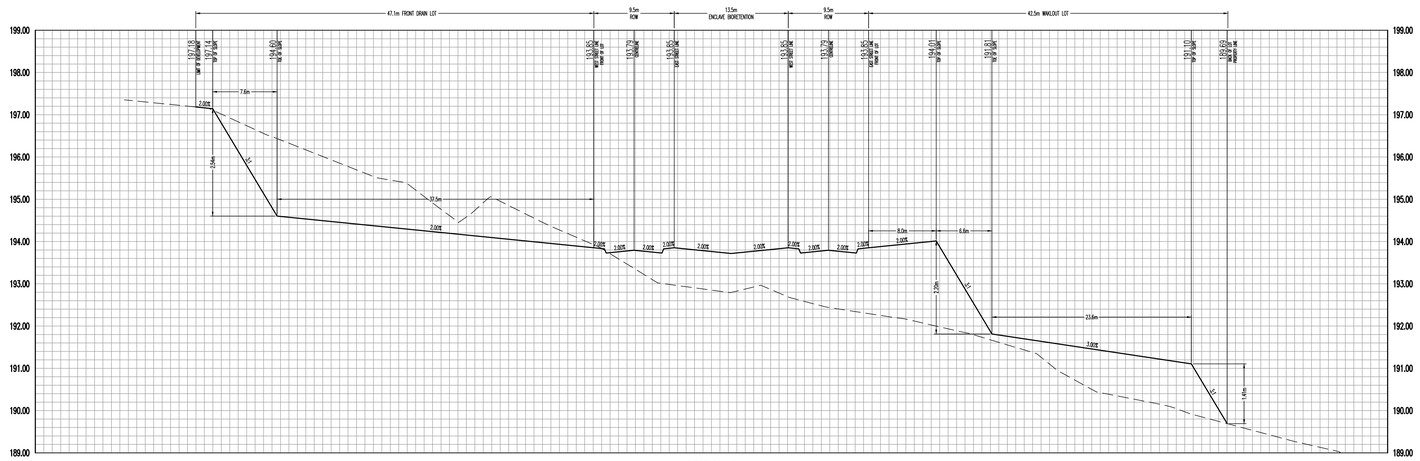
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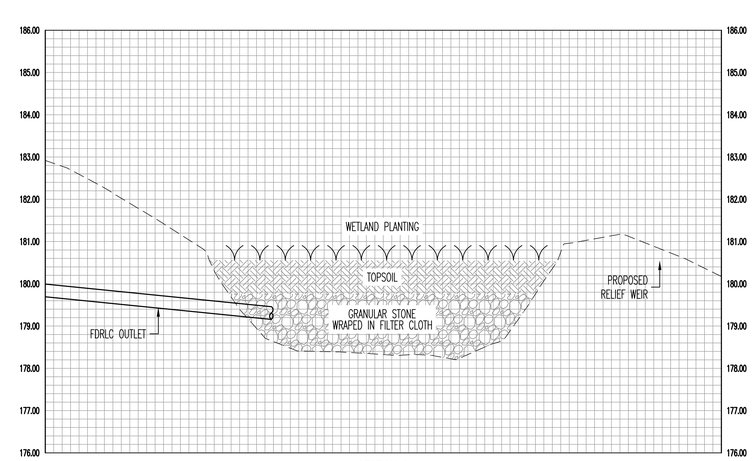
SECTION 6



SECTION 7



SECTION 8



SECTION 9

Stantec

1 : 250 (0, 2.5, 5, 7.5, 10, 12.5)

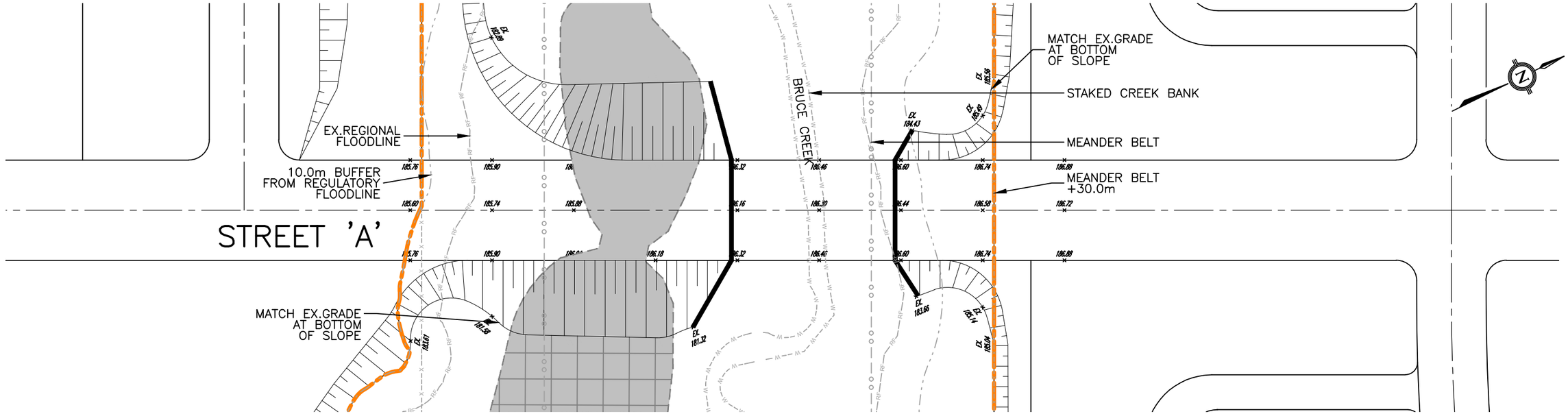
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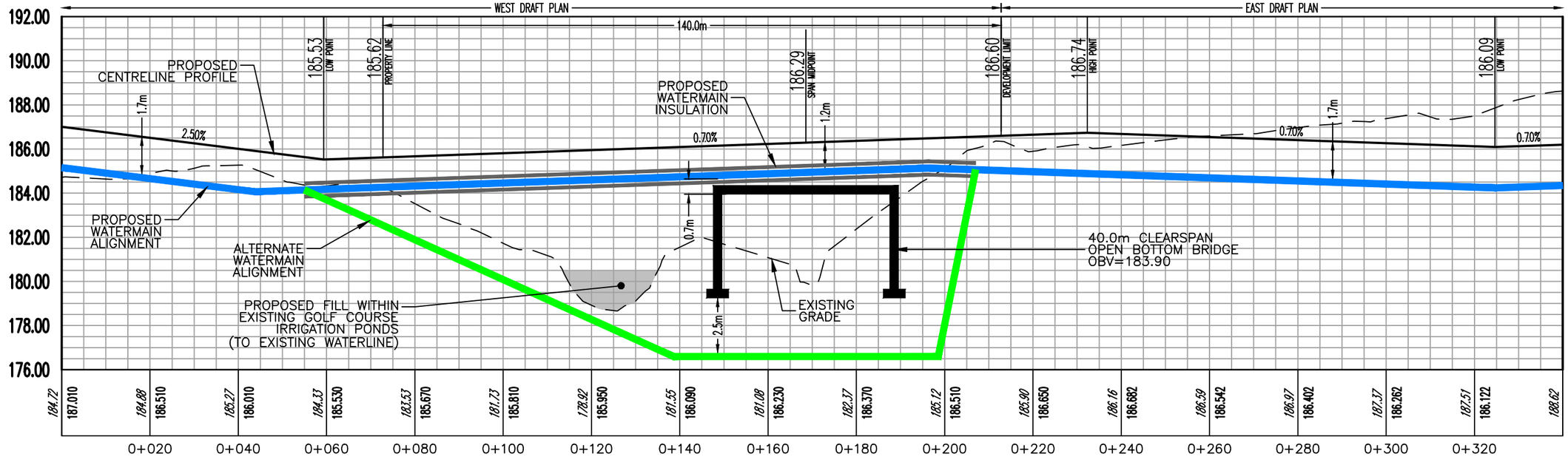
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4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 7.3
GRADING SECTIONS

October 2017

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Stantec

1:1000 0 10 20 30 40 50

Legend

DEVELOPMENT LIMIT (GREATER OF ALL EXISTING CONSTRAINTS)

PROPOSED 3:1 GRADING TO EXISTING GRADE

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
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RESIDENTIAL DEVELOPMENT

FIGURE 7.4

BRUCE CREEK ROAD CROSSING PLAN AND PROFILE

October 2017

File: v:\01606\active\160622264\Drawing\sheet_files [FSR]\7.4 – Bruce Creek Road Crossing Plan and Profile.dwg – Revised by <Guerriero, Michael> , Tue, Oct 31, 2017 , 10:59 AM

EXISTING RESIDENTIAL
EXISTING OPEN SPACE
ROYAL COUNTY DOWN CRECENT
ANGUS GLEN BOULEVARD
ROYAL TROON CRECENT
EXISTING PARK
SADDLEWORTH RD.
PROSPECTORS DRIVE
DANCERS DRIVE
PARKSTONE ROAD
BLOCK 16 WALKWAY
BLOCK 17 WALKWAY
BLOCK 18 MUNICIPAL SERVICING
BLOCK 19 MUNICIPAL SERVICING
BLOCK 20 MUNICIPAL SERVICING
BLOCK 21 MUNICIPAL SERVICING
BLOCK 22 RESIDENTIAL RESERVE
BUR OAK AVE.
WILFRED MURISON AVE.
BECKETT AVENUE.
NIPIGON AVENUE
GLENBOURNE PARK DRIVE
GLENRIDGE DRIVE
WALNUT GLEN PLACE
COUNTRY ESTATES DRIVE
SCOTT HALL COURT
16th AVENUE
DELHI CRESCENT
NORMANDALE ROAD
AITKEN CIRCLE
BLOCK 1 WOODLOT / WETLAND
BLOCK 2 MEDIUM DENSITY
BLOCK 3 SWM
BLOCK 4 PARK
BLOCK 5 PARK
BLOCK 6 PARK
BLOCK 6 SWM
BLOCK 7 OPEN SPACE
BLOCK 8 SCHOOL
BLOCK 8 PARK
BLOCK 9 PARK
BLOCK 10 PARK
BLOCK 11 OPEN SPACE
BLOCK 12 OPEN SPACE
BLOCK 12 MIXED-USE
BLOCK 13 MEDIUM DENSITY
BLOCK 14 MEDIUM DENSITY
BLOCK 15 OPEN SPACE
BLOCK 16 SWM
BLOCK 17 OPEN SPACE
BLOCK PARK
APPROVED DRAFT PLAN OF SUBDIVISION YORKTON PHASE 1
BRUCE CREEK
BEECROFT CREEK
EXISTING CREEK CROSSING TO BE REMOVED UNDER PROPOSED CONDITIONS
STREET 'A' STREET 'B' STREET 'C' STREET 'D' STREET 'E' STREET 'F' STREET 'G' STREET 'H' STREET 'J' STREET 'K' STREET 'L' STREET 'M' STREET 'N' STREET 'O' STREET 'P' STREET 'Q' STREET 'R' STREET 'S' STREET 'T' STREET 'U' STREET 'V' STREET 'W' STREET 'X' STREET 'Y' STREET 'Z' STREET 'AA' STREET 'BB' STREET 'CC'
LANE 'A' LANE 'B' LANE 'C' LANE 'D' LANE 'E' LANE 'F' LANE 'G' LANE 'H' LANE 'J' LANE 'K' LANE 'L' LANE 'M' LANE 'N' LANE 'O' LANE 'P' LANE 'Q' LANE 'R' LANE 'S' LANE 'T' LANE 'U' LANE 'V' LANE 'W' LANE 'X' LANE 'Y'
7216.195 185.66
185.77 7212.01
184.78 7216.19
184.33 7216.18
7216.188 184.52
7216.183 184.47
184.27 7216.175
182.81 7216.168
7216.172 184.25
7216.171 184.12
7216.169 182.77
7216.167 182.63
7216.13 182.14
7216.128 182.09
7216.125 182.06
180.81 7201.13
7216.123 181.99
180.56 7201.125
7216.122 181.56
7216.121 181.27
7216.12 180.44
7216.115 179.91
7216.11 179.53
7216.105 179.03
7216.065 177.47
178.76 7216.1
178.58 7216.095
178.49 7216.09
177.93 7216.08
177.92 7216.075
177.34 7216.07
177.39 7216.06
176.74 7216.03
7201.12 180.37
7201.11 179.79
7201.105 179.22
7201.1 179.29

Stantec

Legend
- REGIONAL FLOODLINE
- REGIONAL FLOODLINE 10m BUFFER
- SUBJECT PROPERTY
- PROPOSED CONTOURS (183.00)

1:2000 0 20 40 60 80 100

REGIONAL FLOOD ELEVATION (m)
CROSS SECTION NUMBER — 7201.12 — 180.37 — CROSS SECTION

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 7.5

PROPOSED REGIONAL STORM FLOODPLAIN MAPPING

October 2017

File: \\1216\Active\160622\04\Drawing\sheet_files [7.5] – RTM_October2017.dwg – Revised by cLa, James – , Thu, Oct 26, 2017 , 1:55 PM

BRUCE CREEK

182.81 7216.168

4.25

71 184.12

7216.165 182.77

7216.16 182.63

7216.13 182.14

EXISTING CREEK CROSSING TO BE REMOVED UNDER PROPOSED CONDITIONS

7216.128 182.09

7216.125 182.06

201.13

7216.123 181.99

125

7216.122

7216.122 181.56

7216.121

7216.12

7216.121 181.27

7216.115

7216.12 180.44

7216.11

7216.115 179.91

7216.105

7216.11 179.53

7216.105 179.03

7216.1

FILL

BLOCK 5 SWM

178.76 7216.1

178.58 7216.095

178.49 7216.09

BLOCK 2 SWM

177.93 7216.08

177.92 7216

177.34

BRUCE CREEK

CONTROL MH

76.0m LONG EMERGENCY SPILLWAY IN @ 178.70

HICKENBOTTOM STRUCTURE

7216.065 177.47

BLOCK 6 SWM

APPROVED YORKTO

EXIS RESID

PARKTON BOULEVARD

Stantec

1:1000 0 10 20 30 40 50

Legend

- PROPOSED REGIONAL FLOODLINE WITH NO CUT
- CROSS SECTION
- EXISTING CONTOURS
- PERMANENT POOL
- FILL IN EXISTING GOLF COURSE POND
- SUBJECT PROPERTY
- LIMIT OF CUT
- LIMIT OF FILL
- DEPTH OF CUT
- DEPTH OF FILL
- LIMIT OF GRADING (MATCH EXISTING GROUND)

PROPOSED REGIONAL FLOOD ELEVATION (m)

CROSS SECTION NUMBER — 7201.12 — 180.37

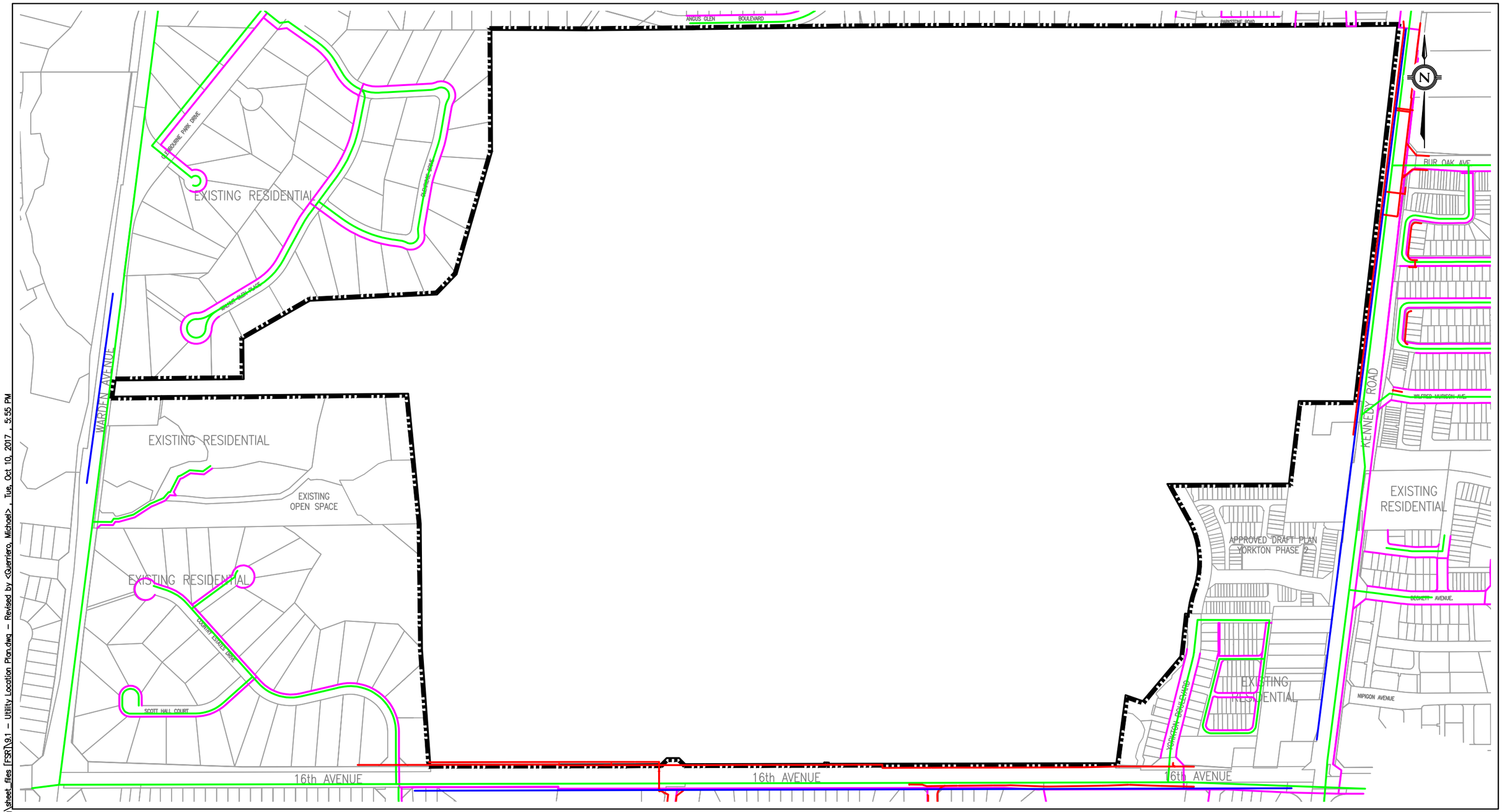
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4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 7.6

PROPOSED FLOODPLAIN CUT AND FILL FOR BRUCE CREEK

October 2017

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File: V:\01606\Active\16062226A\Drawing\sheet_files [FSR]\9.1 – Utility Location Plan.dwg – Revised by <Guerriero, Michael> , Tue, Oct 10, 2017 , 5:55 PM

Stantec

1:6000 0 60 120 180 240 300

Legend

- SUBJECT PROPERTY
- BELL
- ENBRIDGE
- HYDRO (POWERSTREAM)
- ROGERS

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 9.1

EXISTING UTILITY LOCATION PLAN

October 2017

APPENDICIES

Appendix A WATER DISTRIBUTION ANALYSIS

Water Distribution Analysis report prepared by WSP dated November 3, 2017.

November 03, 2017

171-15332-00

Mr. Bob Judges,
STANTEC
300W-675 Cochrane Drive
Markham, Ontario L3R 0B8

Subject: York Downs Development, City of Markham, Region of York

Dear Mr. Judges,

WSP Canada Inc. (WSP) is pleased to present the results of its watermain analysis for the York Down Development, in the City of Markham, Region of York.

The analysis in this report includes hydraulic simulation of the Minimum Hour, Maximum Day, Maximum Day plus Fire and the Peak (Maximum) Hour demands at the proposed development for the present planning horizons. The hydraulic analysis was completed using an InfoWater model of the proposed development's water distribution network, built by WSP and calibrated using City of Markham boundary conditions.

The proposed watermain sizes and network were confirmed using the model to ensure that the system can provide adequate pressures and fire flows to all junctions in the proposed development, subject to constraints.

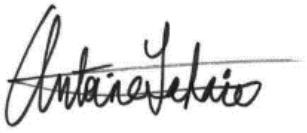
The modeling shows that the development can achieve the hydraulic requirements prescribed by the City of Markham as well as the Ministry of the Environment and Climate Change watermain design criteria.

If you have any questions, do not hesitate to call.

Sincerely,

WSP Canada Inc.





Jean-Luc Daviau, M.A.Sc., P.Eng.
Sr. Hydraulic Specialist
Manager, Hydraulics

Antoine Lahaie, B. Eng
Engineering Intern, Hydraulics

100 Commerce Valley Drive West
Thornhill, ON, Canada L3T 0A1

Tel.: +1 905 882-1100
Fax: +1 905 882-0055
wsp.com

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2.2 Fire Demands 2

2.3 System Pressure Requirements 2

2.4 Watermain Sizing 3

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3.1 Model Setup 3

4 ANALYSIS AND RESULTS 4

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4.2 Fire Flows 4

5 CONCLUSIONS 5

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FIGURES

FIGURE 1 – YORK DOWNS PROPOSED DEVELOPMENT SITE LAYOUT 1

APPENDICES

A SYSTEM LAYOUT AND CALCULATED DEMANDS

B SIMULATED RESULTS

C BOUNDARY CONDITIONS

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Stantec to provide a hydraulic analysis of the proposed York Downs Development in the City of Markham, ON. The proposed development is bounded by Warden Avenue and Kennedy Road to the west and east, and is immediately north of 16th Ave. In this location, the development stagers two (2) pressure districts, PD5 and PD6RD.

Figure 1 shows that the proposed development is primarily residential made up of both single family homes and townhomes blocks, with a mixed use area along 16th Ave. At this time, the development will be constructed in 2 phases. Phase 1 of the development is located along Kennedy Road, and is part of PD6RD with a connection to PD6RE, while the rest of the development was considered as part of Phase 2 and is mostly in PD5. Details on the phasing plan have been included in the Appendix A.

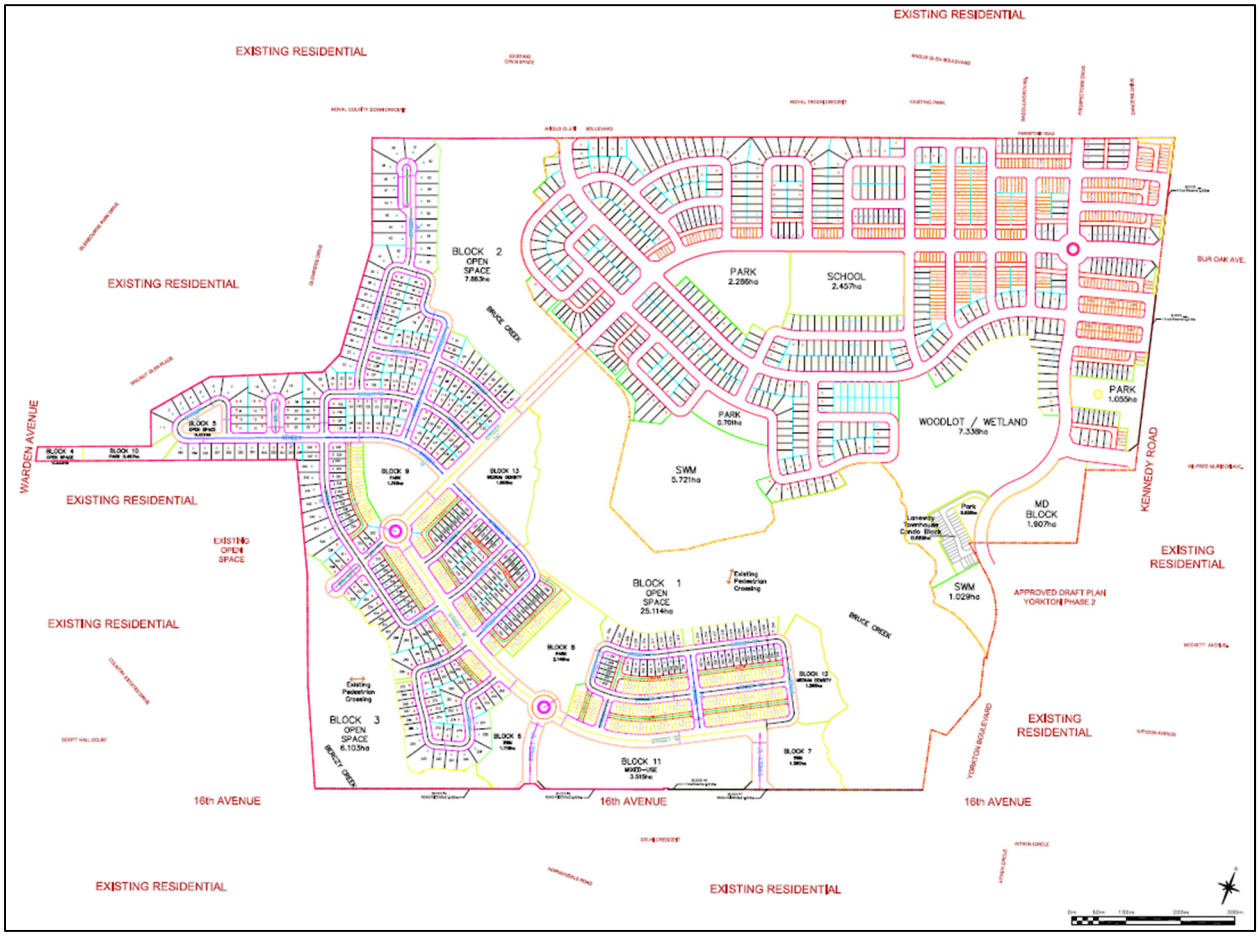


Figure 1 – York Downs Proposed Development Site Layout

2 DESIGN CRITERIA AND DEMANDS

2.1 DEVELOPMENT DEMANDS

The design criteria to determine water demands for this proposed development were based on the City of Markham's Design Criteria (2013). Table 1 summarizes the unit rates and peaking factors used to determine the demands for the York Downs Development.

Table 1 - City of Markham Water Demand Criteria

DEMAND	CRITERA
Average Residential Consumption	365 L/cap/day
Maximum Hour Peaking Factor	4.5
Maximum Day Peaking Factor	2.0
Minimum Hour Peaking Factor	0.7

Source: City of Markham Design Criteria, 2013

Table 2Table 2 presents the total calculated demand rates for the York Down Development while using the rates outlined in the table above. Appendix A provides a detailed calculation of the demands and how they were distributed to each modelled node.

Table 2 - Calculated Demand Rates for the York Downs Development

STUDY AREA	MINIMUM HOUR DEMAND (L/S)	MAXIMUM DAY DEMAND (L/S)	PEAK HOUR DEMAND (L/S)
York Downs Development Demands	20.14	57.47	129.47

2.2 FIRE DEMANDS

The required fire flows were based on the City of Markham's recommended rate of 117 L/s for single family dwellings, 167 L/s for Townhomes (in yellow) and 250 L/s for the mixed use lands and the school block and Block 11 were used in the York Downs Development. These areas are shown in Figure 1.

Details regarding the fire flow demands for each modelled node can be seen in Appendix B.

2.3 SYSTEM PRESSURE REQUIREMENTS

As stipulated by the MOECC, the acceptable pressures under normal conditions are between 275 kPa (40 psi) and 690 kPa (100 psi). That being said the City of Markham required a minimum pressure of 300 kPa (44 psi) and recommends a maximum pressure of 550 kPa (80 psi).

Note that any pressures which are above 690 kPa (100 psi) may require Pressure Reducing Valves (PRVs) to reduce pressure to the acceptable range by the MOECC.

The minimum allowable pressure under maximum day demand plus fire flow is 140 kPa (20 psi) at the location of the fire and everywhere else in the pressure district.

2.4 WATERMAIN SIZING

Watermains are to be sized appropriately to maintain adequate flows without causing excessive energy loss or resulting in excessive water quality decay. Main diameters should therefore be sized to carry the larger of: Maximum Days Demand plus Fire Flow or Peak Hour Demand.

According to the Ministry of the Environment and Climate Change (MOECC), the minimum pipe size in a distribution system providing fire protection should be at least 150 mm in diameter. Additionally, pipes should be looped wherever possible to improve supply security and water quality. Friction factors were assigned according to the pipe diameter as suggested by the MOECC and as shown in Table 3.

Table 3 - Hazen-Williams Roughness Factors

NOMINAL DIAMETER	C-FACTOR
150 mm and smaller	100
200 mm to 250 mm	110
300 mm to 400 mm	120
Over 450 mm	130

3 HYDRAULIC MODEL

3.1 MODEL SETUP

To complete this analysis, a model of the development was created in InfoWater using boundary conditions provided from the City of Markham. A copy of the boundary conditions are included in Appendix C. The proposed zone boundaries were discussed with the City of Markham in March 2016. The closest nodes in the present model were assigned the City's boundary conditions, e.g: flows and pressures.

The proposed development will be split among two pressure districts, PD5 and PD6RD/RE. A connection between PD6RD and PD6RE will be made at Bur Oak Avenue, which will consolidate these two pressure districts. Within the model, the boundary conditions for the Bur Oak connection were assumed to be the same as for the Prospectors Drive connection. With the consolidation of these two pressure districts the City will need to ensure that the settings for the PRVs servicing these two pressure districts are updated accordingly to service both areas as one single pressure district.

Phase 1 will be serviced from PD6RD/RE. Connections to PR6RD will be made at Prospectors Drive and a connection to PD6RE will be made at Bur Oak Avenue. The PD6RD and PD6RE pressure districts will be consolidated during Phase 1 of the development.

The northern portion of the development will be serviced from PD6RD/RE, with connections to the existing system at Angus Glen Boulevard, Prospectors Drive and Bur Oak Avenue. There will be two east west connections within the development to supply the north western portion of the development. For additional security of supply and/or to supplement fire flows in the event of an upset, a normally closed check valve has been provided from PD5 to PD6RD/RE in the western portion of the development – this would flow northward when open.

The south western portion of the development will be serviced from PD5 with two connections to 16th Avenue. There

is an existing 150mm diameter stub across 16th Avenue, this connection will need to be upgraded to supply the proposed development.

The south eastern portion of the development will be serviced from PD5 with one connection to Yorkton Boulevard. Security of supply will be provided from a normally closed PRV from the PD6RD/RE zone.

A layout of the proposed zone boundaries and connections are included in Appendix C.

The analysis was conducted under Minimum Hour, Maximum Day, Maximum Hour and Maximum Day plus Fire demand conditions. The proposed pipe sizes and layout are shown in Appendix A.

4 ANALYSIS AND RESULTS

The proposed watermains within the development were sized to satisfy the greater of either Peak Hour or Maximum Day plus Fire Flow demands. Modeling was carried out for Minimum Hour, Maximum Day, Maximum Day plus Fire Flow and Peak Hour demand conditions under the current planning horizons using an InfoWater model of the development, built and calibrated by WSP as described in previous sections.

4.1 WATERMAIN SIZING AND SYSTEM PRESSURES

Modeled service pressures for the development are summarized in Table 4. All pressures are above the minimum pressures indicated in section 2.3 under Minimum Hour, Maximum Day, Maximum Day plus Fire Flow and Peak Hour demands. The Appendix also includes Average Day results.

The watermains in the development were sized according to the results of the Maximum Hour, Maximum Day plus Fire Flow and Minimum Hour models. Schematics of the development are included in Appendix A.

The modeling indicates that the expected service pressures range between approximately 335 kPa and 650 kPa for the development under Phase 1 conditions and between 335 kPa and 689 kPa (99.9psi) under full buildout conditions.

Based on the simulations, Pressure Reducing Valves (PRV) will not be required at individual service connections. Note that if operating, real-world pressures exceed 690 kPa (100 psi), MOECC would require PRVs at the relevant service connections to reduce pressure to the acceptable range. The City's target is to operate at or below 550 kPa (80 psi) and this may result in lower boundary conditions in the future, with correspondingly lower service pressures. Hydrant flow tests can be performed once the system is operational to validate the computer model predictions.

Table 4 - Summary of Modeled Service Pressures (kPa)

	MINIMUM HOUR	MAXIMUM DAY	PEAK HOUR	MAX DAY + FIRE FLOW
Phase 1 Conditions	335 – 650	335 – 650	335 – 650	201 – 2795 L/s available at 140 kPa
Full Buildout Conditions	335 - 689	335 – 688	335 – 681	163 – 1491 L/s available at 140 kPa

Note: Table includes all boundary condition junctions built into the model and these govern some of the node presures.

4.2 FIRE FLOWS

The minimum allowable pressure under Maximum Day Demand plus Fire Flow is 140 kPa (20 psi) at the location of the fire or anywhere else in the pressure district. The fire flow scenarios were simulated under Maximum Day Demand conditions for the existing planning horizons with the model setup as per section .

The available fire flow from all nodes in the proposed development is greater than the required fire flow for single homes during the 2016 planning horizon. A detailed analysis of fire flow availability at all nodes in the proposed system is included in Appendix C.

5 CONCLUSIONS

The proposed watermain system for the York Downs Development site can achieve hydraulic requirements as prescribed by the Ministry of the Environment & Climate Change and the City of Markham, design criteria as summarized below:

1. The service pressures under existing conditions are expected to range between approximately 335 kPa and 689 kPa which are above the minimum standard pressure established by the MOECC. Based on the simulations, Pressure Reducing Valves (PRV) will not be required at individual service connections.
2. Hydrant flow tests can be performed once the system is operational to validate the computer model predictions. If operating, real-world pressures exceed 690 kPa (100 psi), MOECC would require PRVs at the relevant service connections to reduce pressure to the acceptable range. However, the City's target is to operate at or below 550 kPa (80 psi) and this may result in lower boundary conditions in the future, with correspondingly lower service pressures.
3. All required fire flows can be achieved under Maximum Day Demand conditions for the proposed development under existing conditions;
4. Under Maximum Day plus Fire Flow for existing conditions, the distribution system is able to maintain pressure above 140 kPa at ground level at all modeled nodes in the district;

These conclusions remain valid as long as the water distribution system and the City's network configuration remain as described herein. If significant changes are contemplated to the pipe sizes, water demands or system pressures (boundary conditions), this analysis should be updated.

APPENDIX

A

SYSTEM LAYOUT AND CALCULATED DEMANDS

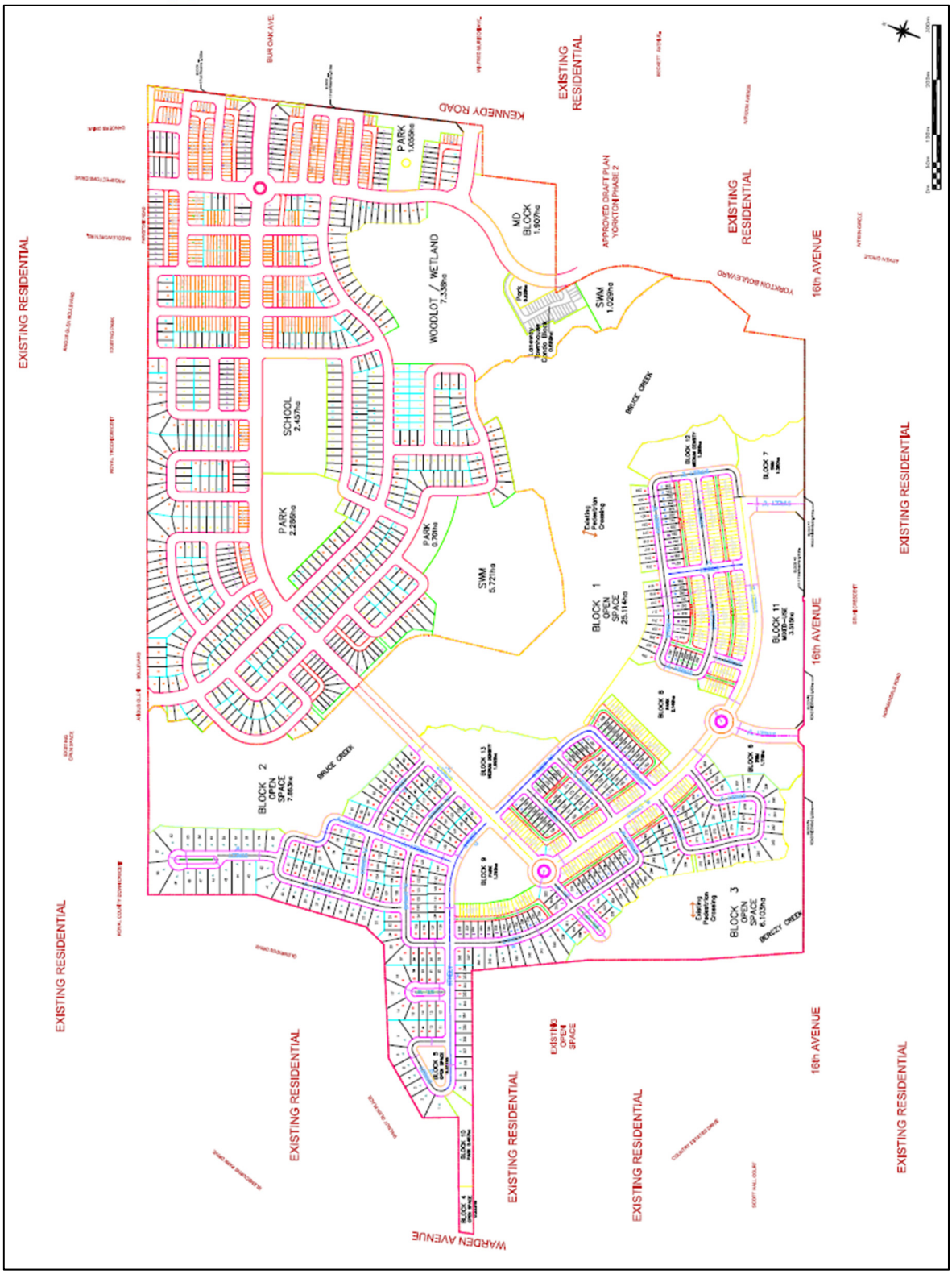


Figure A1 - Proposed System Layout – Showing Street Configuration and Building Types

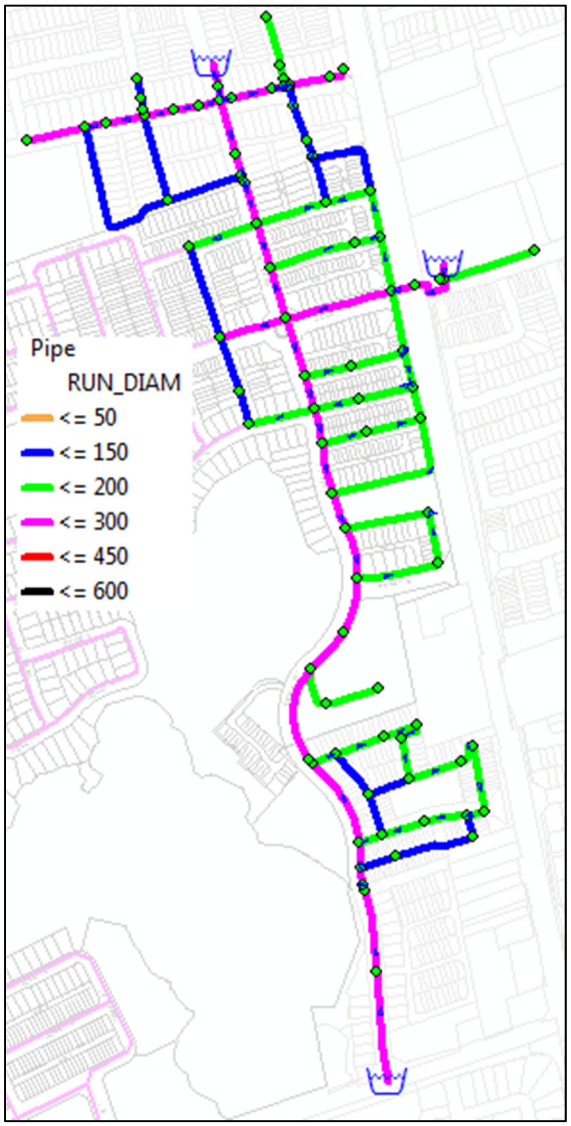


Figure A2 - Proposed System Layout – Showing the Proposed Watermain Layout and Sizes for Phase 1.

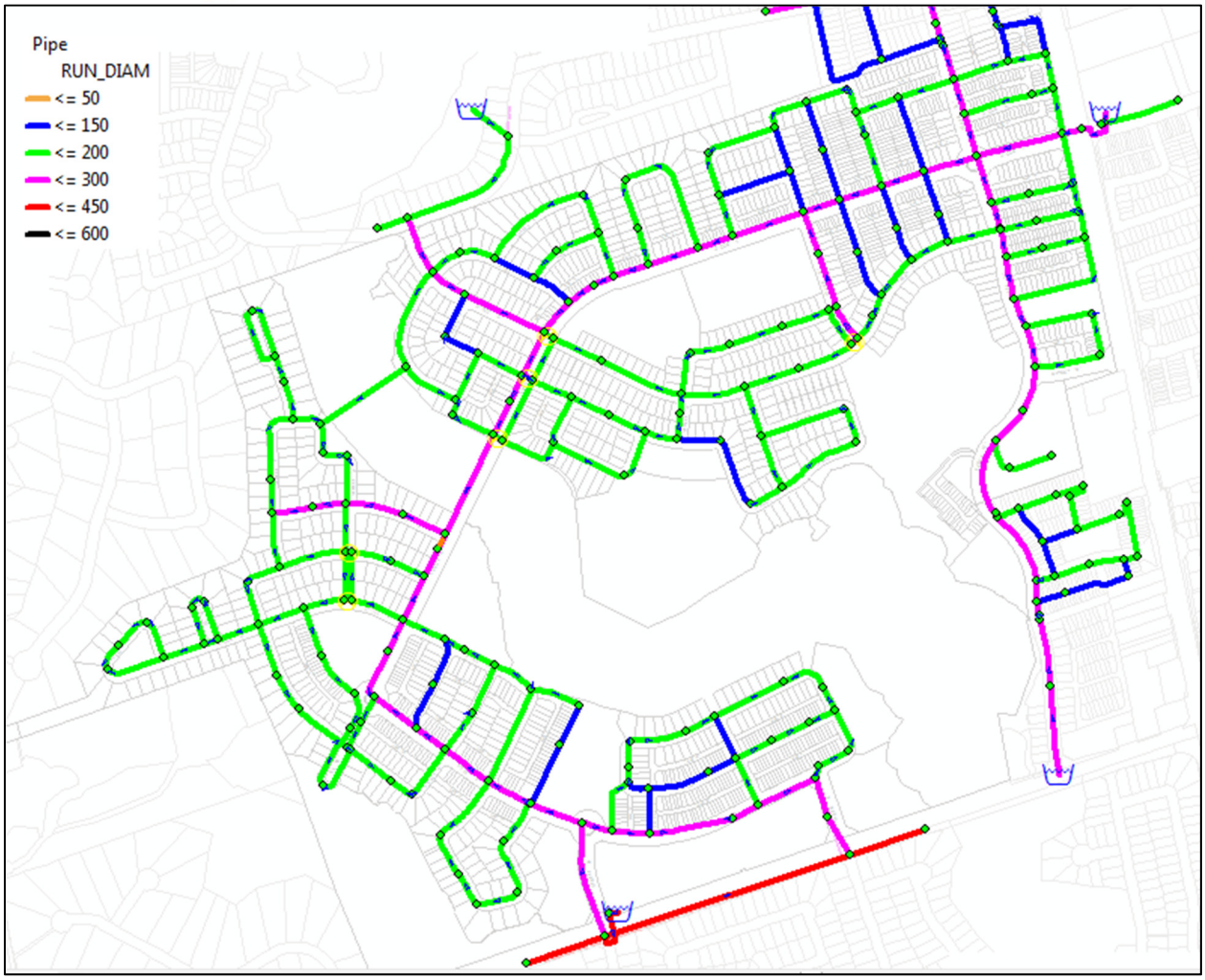


Figure A3 - Proposed System Layout – Showing the Proposed Watermain Layout and Sizes for Full Buildout.

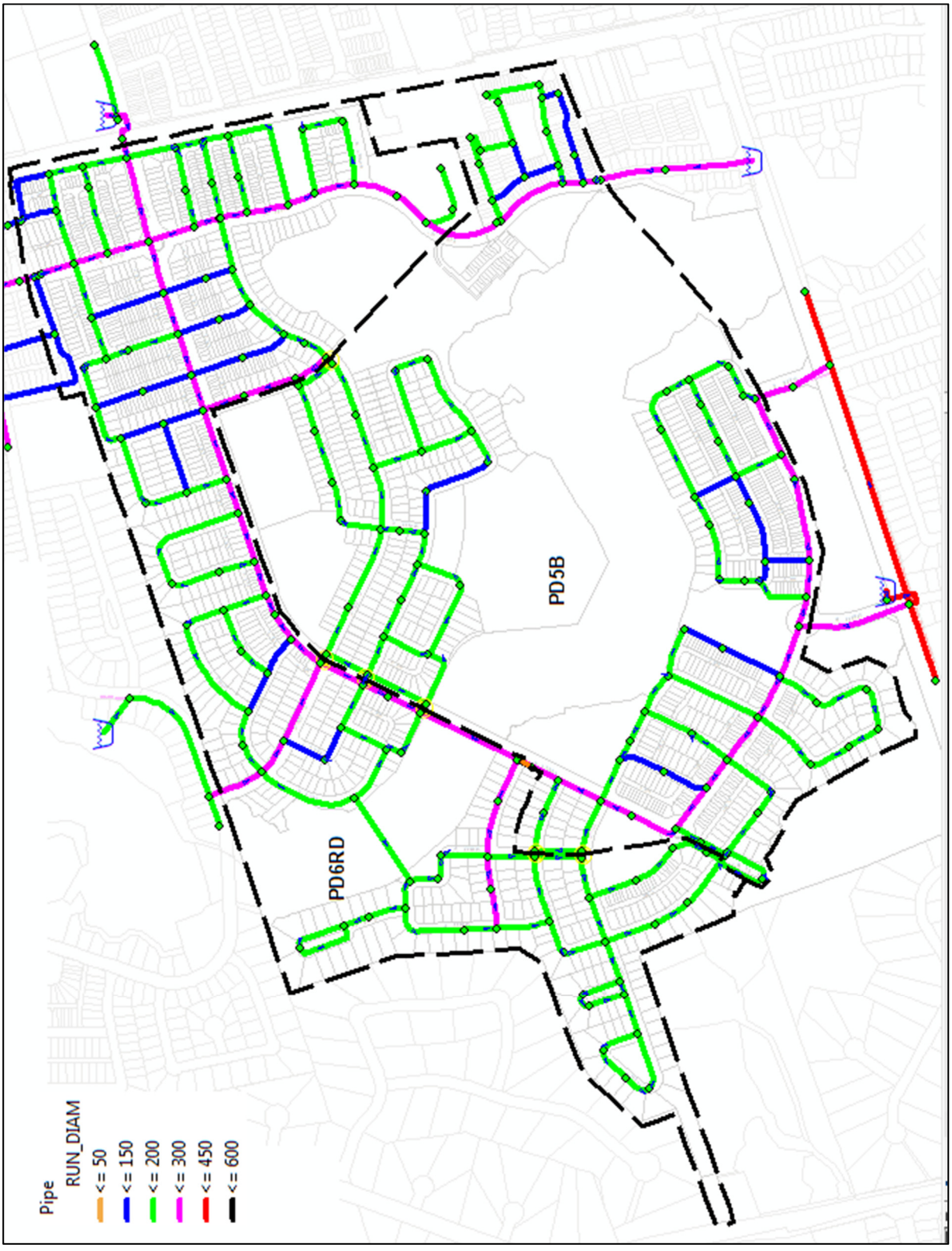


Figure A4 - Proposed System Layout – Showing the Pressure Districts in the Development.

APPENDIX

B

SIMULATED RESULTS

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	0.65	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.58	193.00	254	601
WSP-J722	PD6RD	0.58	193.00	254	601
WSP-J721	PD6RD	0.58	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	592
WSP-J713	PD6RD	0.51	194.00	254	592
WSP-J717	PD6RD	0.07	194.00	254	592
WSP-J725	PD6RD	0.51	194.00	254	592
WSP-J711	PD6RD	0.07	194.50	254	587
WSP-J753	PD6RD	0.14	194.50	254	587
WSP-J754	PD6RD	0.18	194.50	254	587
WSP-J707	PD6RD	0.66	195.00	254	582
WSP-J715	PD6RD	0.58	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.07	195.02	254	582
WSP-J709	PD6RD	0.54	195.50	254	577
WSP-J710	PD6RD	0.25	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.19	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.39	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.33	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-15.79	0.22
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-7.00	0.10
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.02	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.01	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.01	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.01	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.01	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.01	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.01	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.01	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.01	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.01	0.00
P15140	H744	N49213	PD5B	19.65	300	155	16.85	0.24
4919949213B	N49199	H747	PD6RD	3.64	300	155	-12.73	0.18
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-12.73	0.18
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.58	0.15
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.30	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.21	0.07
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.80	0.10
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.29	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.00	0.06
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-0.97	0.01
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.65	0.02
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.63	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.50	0.02
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-0.48	0.02
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.44	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.44	0.01
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.41	0.02
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	-0.33	0.00
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.25	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.22	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.19	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.14	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.14	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.10	0.01
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.09	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.04	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.07	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.14	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	0.16	0.01
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	0.16	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.31	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.52	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.83	0.01
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	0.98	0.03
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	1.02	0.01
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	1.27	0.02
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	1.36	0.02
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.39	0.04
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	1.60	0.02
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.47	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	2.89	0.04
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	4.23	0.06

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	0.45	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.40	193.00	254	601
WSP-J722	PD6RD	0.40	193.00	254	601
WSP-J721	PD6RD	0.40	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	592
WSP-J713	PD6RD	0.36	194.00	254	592
WSP-J717	PD6RD	0.05	194.00	254	592
WSP-J725	PD6RD	0.36	194.00	254	592
WSP-J711	PD6RD	0.05	194.50	254	587
WSP-J753	PD6RD	0.09	194.50	254	587
WSP-J754	PD6RD	0.12	194.50	254	587
WSP-J707	PD6RD	0.46	195.00	254	582
WSP-J715	PD6RD	0.40	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.05	195.02	254	582
WSP-J709	PD6RD	0.38	195.50	254	577
WSP-J710	PD6RD	0.18	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	575
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.13	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.28	197.00	254	562
N49198	PD6RD	8.50	197.04	254	562
WSP-J728	PD6RD	0.23	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-14.55	0.21
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-6.07	0.09
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.01	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
P15140	H744	N49213	PD5B	19.65	300	155	15.73	0.22
4919949213B	N49199	H747	PD6RD	3.64	300	155	-11.69	0.17
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-11.69	0.17
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.63	0.15
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.34	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.02	0.06
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.83	0.10
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.16	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-0.92	0.05
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	-0.88	0.01
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-0.70	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.70	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.51	0.02
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.45	0.01
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.38	0.02
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.30	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.30	0.01
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-0.30	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.15	0.00
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.14	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.13	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.11	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.10	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.10	0.00
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.08	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.04	0.00
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.04	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.01	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.05	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.10	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.21	0.01
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	0.32	0.00
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.36	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.57	0.01
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	0.70	0.02
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.87	0.01
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	0.95	0.01
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	0.96	0.01
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.15	0.04
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.40	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	2.54	0.04
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	3.19	0.05

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	1.30	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	1.16	193.00	254	601
WSP-J722	PD6RD	1.16	193.00	254	601
WSP-J721	PD6RD	1.16	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	1.02	194.00	254	591
WSP-J717	PD6RD	0.14	194.00	254	591
WSP-J725	PD6RD	1.02	194.00	254	591
WSP-J711	PD6RD	0.14	194.50	254	587
WSP-J753	PD6RD	0.27	194.50	254	586
WSP-J754	PD6RD	0.35	194.50	254	587
WSP-J707	PD6RD	1.32	195.00	254	582
WSP-J715	PD6RD	1.16	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.14	195.02	254	581
WSP-J709	PD6RD	1.08	195.50	254	577
WSP-J710	PD6RD	0.51	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.37	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.79	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.67	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-19.30	0.27
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-10.51	0.15
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.02	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.01	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.01	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.01	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.01	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.01	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.01	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.01	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.01	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.01	0.00
P15140	H744	N49213	PD5B	19.65	300	155	20.20	0.29
4919949213B	N49199	H747	PD6RD	3.64	300	155	-15.77	0.22
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-15.77	0.22
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.89	0.09
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.40	0.14
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.13	0.07
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-1.88	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.67	0.09
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.64	0.05
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-1.29	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.24	0.07
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-1.07	0.03
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.94	0.03
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.94	0.03
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.60	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.51	0.03
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.49	0.03
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.46	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.38	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.32	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.29	0.01
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.29	0.01
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.14	0.01
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.13	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.09	0.01
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.14	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.29	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	0.63	0.02
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	0.63	0.02
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.67	0.02
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	1.04	0.01
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	1.20	0.02
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	1.71	0.02
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.84	0.06
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	2.37	0.08
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	2.66	0.04
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.72	0.09
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	2.79	0.04
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	2.97	0.04
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	3.55	0.05
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	4.23	0.06
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	7.27	0.10

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	630
WSP-J731	PD6RD	0.00	190.00	254	630
WSP-J716	PD6RD	2.92	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	2.60	193.00	254	601
WSP-J722	PD6RD	2.60	193.00	254	601
WSP-J721	PD6RD	2.60	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	2.29	194.00	254	591
WSP-J717	PD6RD	0.30	194.00	254	591
WSP-J725	PD6RD	2.29	194.00	254	591
WSP-J711	PD6RD	0.30	194.50	254	586
WSP-J753	PD6RD	0.61	194.50	254	586
WSP-J754	PD6RD	0.79	194.50	254	586
WSP-J707	PD6RD	2.96	195.00	254	581
WSP-J715	PD6RD	2.60	195.00	254	581
WSP-J720	PD6RD	0.00	195.00	254	581
WSP-J724	PD6RD	0.00	195.00	254	581
WSP-J846	PD6RD	0.30	195.02	254	581
WSP-J709	PD6RD	2.43	195.50	254	576
WSP-J710	PD6RD	1.14	195.50	254	576
WSP-J723	PD6RD	0.00	195.50	254	576
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.84	196.00	254	571
WSP-J727	PD6RD	0.00	196.00	254	571
H747	PD6RD	0.00	196.01	254	571
WSP-J701	PD6RD	0.00	196.12	254	570
WSP-J708	PD6RD	0.00	196.50	254	566
WSP-J705	PD6RD	1.77	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	1.50	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-28.14	0.40
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-19.35	0.27
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.04	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.02	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.02	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.02	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.02	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	-0.01	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	-0.01	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	-0.01	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.01	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.01	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.01	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.01	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.01	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.02	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.02	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.02	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.02	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.02	0.00
P15140	H744	N49213	PD5B	19.65	300	155	28.49	0.40
4919949213B	N49199	H747	PD6RD	3.64	300	155	-23.05	0.33
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-23.05	0.33
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-4.41	0.14
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-4.04	0.06
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-2.90	0.09
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-2.64	0.08
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-2.35	0.07
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-2.19	0.07
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-2.19	0.07
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.82	0.10
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-1.80	0.10
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-1.48	0.05
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-1.37	0.04
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.25	0.07
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-1.15	0.07
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.85	0.03
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.74	0.04
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.64	0.02
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.64	0.02
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.36	0.02
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.25	0.01
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.11	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.04	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.30	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	0.61	0.02
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.64	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	1.57	0.05
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	1.67	0.05
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	1.67	0.05
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	2.33	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	3.46	0.11
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	3.91	0.06
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	4.02	0.13
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	4.66	0.07
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	4.96	0.16
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	6.10	0.09
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	6.35	0.09
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	7.31	0.10
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	7.70	0.11
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	8.32	0.12
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	14.55	0.21

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	462
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	433
WSP-J514	PD5B	0.39	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.39	180.50	224	430
WSP-J511	PD5B	0.39	180.50	224	430
WSP-J512	PD5B	0.39	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.39	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.13	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.31	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.34	181.27	224	423
WSP-J519	PD5B	0.30	181.50	224	420
WSP-J520	PD5B	0.35	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.10	181.50	224	420
WSP-J524	PD5B	0.13	181.50	224	420
WSP-J525	PD5B	0.37	181.50	224	420
WSP-J527	PD5B	0.22	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	415
WSP-J531	PD5B	0.19	182.00	224	415
WSP-J532	PD5B	0.00	182.00	224	415
WSP-J567	PD5B	0.19	182.00	224	415
WSP-J785	PD5B	0.17	182.00	228	449
WSP-J529	PD5B	0.41	182.50	224	411
WSP-J530	PD5B	0.31	182.50	224	411
WSP-J533	PD5B	0.00	182.50	224	411
WSP-J788	PD5B	0.15	182.50	228	444
WSP-J534	PD5B	0.29	183.00	224	406
WSP-J536	PD5B	0.00	183.00	224	406
WSP-J537	PD5B	0.00	183.00	224	406
WSP-J538	PD5B	0.55	183.00	224	406
WSP-J539	PD5B	0.00	183.00	224	406
WSP-J540	PD5B	0.08	183.00	224	406
WSP-J541	PD5B	0.29	183.00	224	406
WSP-J787	PD5B	0.20	183.00	228	439
WSP-J789	PD5B	0.24	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	406
WSP-J818	PD5B	0.22	183.00	224	406
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.24	183.50	224	401
WSP-J543	PD5B	0.00	183.50	224	401
WSP-J544	PD5B	0.00	183.50	224	401
WSP-J551	PD5B	0.10	183.50	224	401
WSP-J554	PD5B	0.25	183.50	224	401
WSP-J542	PD5B	0.00	184.00	224	396
WSP-J779	PD5B	0.19	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	396
WSP-J828	PD5B	0.10	184.00	224	396
WSP-J829	PD5B	0.00	184.00	224	396
WSP-J561	PD5B	0.00	184.50	224	391
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.07	185.00	228	419
WSP-J774	PD5B	0.24	185.00	228	419
WSP-J777	PD5B	0.35	185.00	228	419
WSP-J778	PD5B	0.29	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	383
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.29	186.00	228	410
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.14	186.50	228	405
WSP-J772	PD5B	0.14	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	403
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.27	187.00	228	400
WSP-J770	PD5B	0.32	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.29	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	0.51	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-20.44	0.29
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-11.65	0.16
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-3.70	0.05
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-3.25	0.05
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-2.26	0.03
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-1.95	0.03
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-1.94	0.03
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-1.56	0.02
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-1.44	0.05
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-1.29	0.02
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-1.02	0.03
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-0.92	0.03
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-0.76	0.02
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-0.76	0.02
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-0.75	0.02
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-0.69	0.02
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-0.68	0.02
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-0.61	0.02
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-0.61	0.02
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-0.52	0.03
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-0.51	0.02
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.49	0.02
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.40	0.01
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.34	0.02
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.34	0.01
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.30	0.01
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.29	0.01
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.29	0.01
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.18	0.01
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.18	0.01
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.18	0.01
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.15	0.01
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.14	0.00
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.11	0.00
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.09	0.00
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.09	0.01
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.09	0.01
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.05	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.05	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.04	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.04	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.01	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.01	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.03	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.03	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.04	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.04	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.04	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.05	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.05	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.05	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.05	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.06	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.06	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.07	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.07	0.00
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.07	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.11	0.00
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.13	0.00
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.16	0.01
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.16	0.01
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.19	0.01
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.19	0.01
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.20	0.01
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.21	0.00
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.23	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.23	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.28	0.01

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	689
WSP-J826	PD6RD	0.05	184.00	254	689
WSP-J556	PD6RD	0.29	184.50	254	684
WSP-J742	PD6RD	0.00	185.00	254	679
WSP-J546	PD6RD	0.14	185.50	254	674
WSP-J552	PD6RD	0.00	185.50	254	674
WSP-J562	PD6RD	0.19	185.50	254	674
WSP-J748	PD6RD	0.00	185.50	254	675
WSP-J806	PD6RD	0.00	185.50	254	674
WSP-J548	PD6RD	0.37	186.00	254	669
WSP-J550	PD6RD	0.00	186.00	254	669
WSP-J557	PD6RD	0.00	186.00	254	669
WSP-J809	PD6RD	0.00	186.00	254	669
WSP-J816	PD6RD	0.00	186.00	254	669
WSP-J810	PD6RD	0.20	186.50	254	665
WSP-J743	PD6RD	0.19	187.00	254	660
WSP-J762	PD6RD	0.20	187.00	254	660
WSP-J764	PD6RD	0.30	187.00	254	660
WSP-J805	PD6RD	0.20	187.00	254	660
WSP-J812	PD6RD	0.14	187.00	254	660
WSP-J761	PD6RD	0.24	187.50	254	655
WSP-J547	PD6RD	0.22	188.00	254	650
WSP-J564	PD6RD	0.05	188.00	254	650
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.15	188.00	254	650
WSP-J766	PD6RD	0.00	188.00	254	650
WSP-J804	PD6RD	0.17	188.00	254	650
WSP-J807	PD6RD	0.02	188.00	254	650
WSP-J811	PD6RD	0.00	188.50	254	645
WSP-J852	PD6RD	0.17	188.53	254	645
WSP-J563	PD6RD	0.10	189.00	254	640
WSP-J565	PD6RD	0.12	189.00	254	640
WSP-J750	PD6RD	0.43	189.00	254	640
WSP-J763	PD6RD	0.27	189.00	254	640
WSP-J844	PD6RD	0.38	189.15	254	639
WSP-J790	PD6RD	0.00	189.50	254	635
WSP-J560	PD6RD	0.17	190.00	254	630
WSP-J577	PD6RD	0.12	190.00	254	630
WSP-J578	PD6RD	0.00	190.00	254	630
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J744	PD6RD	0.00	190.00	254	630
WSP-J745	PD6RD	0.00	190.00	254	630
WSP-J746	PD6RD	0.51	190.00	254	630
WSP-J765	PD6RD	0.39	190.00	254	630
WSP-J791	PD6RD	0.37	190.00	254	630
WSP-J794	PD6RD	0.35	190.00	254	630
WSP-J799	PD6RD	0.00	190.00	254	630
WSP-J851	PD6RD	0.00	190.16	254	629
WSP-J760	PD6RD	0.15	190.50	254	626
WSP-J847	PD6RD	0.15	190.60	254	624
WSP-J837	PD6RD	0.15	190.86	254	622
WSP-J558	PD6RD	0.14	191.00	254	620
WSP-J747	PD6RD	0.00	191.00	254	621
WSP-J752	PD6RD	0.24	191.00	254	621
WSP-J793	PD6RD	0.00	191.00	254	621
WSP-J798	PD6RD	0.00	191.00	254	621
WSP-J801	PD6RD	0.00	191.00	254	621
WSP-J802	PD6RD	0.39	191.00	254	621
WSP-J759	PD6RD	0.00	191.50	254	616
WSP-J795	PD6RD	0.37	191.50	254	616
WSP-J842	PD6RD	0.00	191.53	254	615
WSP-J566	PD6RD	0.00	192.00	254	611
WSP-J574	PD6RD	0.00	192.00	254	611
WSP-J716	PD6RD	0.65	192.00	254	611
WSP-J751	PD6RD	0.24	192.00	254	611
WSP-J792	PD6RD	0.00	192.00	254	611
WSP-J796	PD6RD	0.39	192.50	254	606
WSP-J559	PD6RD	0.00	193.00	254	601
WSP-J568	PD6RD	0.30	193.00	254	601
WSP-J569	PD6RD	0.00	193.00	254	601
WSP-J571	PD6RD	0.00	193.00	254	601
WSP-J572	PD6RD	0.19	193.00	254	601
WSP-J576	PD6RD	0.14	193.00	254	601
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.58	193.00	254	601
WSP-J722	PD6RD	0.58	193.00	254	601
WSP-J757	PD6RD	0.55	193.00	254	601
WSP-J721	PD6RD	0.58	193.50	254	596
WSP-J573	PD6RD	0.19	194.00	254	591
WSP-J575	PD6RD	0.00	194.00	254	591
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	0.51	194.00	254	591
WSP-J717	PD6RD	0.07	194.00	254	591
WSP-J725	PD6RD	0.51	194.00	254	591
WSP-J711	PD6RD	0.07	194.50	254	586
WSP-J753	PD6RD	0.14	194.50	254	586
WSP-J754	PD6RD	0.18	194.50	254	586
WSP-J758	PD6RD	0.14	194.50	254	586
WSP-J707	PD6RD	0.66	195.00	254	582
WSP-J715	PD6RD	0.58	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.32	0.02
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.32	0.00
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.33	0.01
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.33	0.01
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.34	0.02
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.36	0.01
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.42	0.01
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.44	0.02
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.49	0.02
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	0.55	0.01
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	0.57	0.02
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	0.57	0.02
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	0.66	0.01
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	0.68	0.02
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	0.69	0.02
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	0.71	0.02
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	0.82	0.03
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	0.86	0.03
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	0.87	0.03
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	0.87	0.01
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	0.87	0.03
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	0.92	0.03
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	0.97	0.03
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	1.38	0.04
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	1.38	0.04
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	1.41	0.04
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	2.90	0.04
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	3.84	0.05
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	4.14	0.06
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	7.39	0.10
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
P15140	H744	N49213	PD5B	19.65	300	155	21.58	0.31
4919949213B	N49199	H747	PD6RD	3.64	300	155	-17.10	0.24
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-17.10	0.24
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-6.58	0.09
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-5.42	0.08
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-4.37	0.06
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-3.49	0.05
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-3.25	0.05
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.68	0.09
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-2.42	0.08
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.37	0.13
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.19	0.07
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-2.07	0.03
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-1.91	0.06
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-1.84	0.06
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-1.81	0.06
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-1.80	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.65	0.09
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-1.60	0.02
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.35	0.08
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-1.13	0.04
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-1.13	0.04
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-1.13	0.02
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-0.99	0.03
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-0.91	0.03
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-0.85	0.03
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-0.79	0.03
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-0.75	0.02
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-0.74	0.02
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-0.71	0.02
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.65	0.02
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-0.63	0.04
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.56	0.02
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.56	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.55	0.03
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.54	0.02
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.47	0.01
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-0.44	0.01
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	-0.43	0.01
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.41	0.02
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.40	0.01
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-0.34	0.01
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.28	0.01
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.28	0.01
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.28	0.01
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.25	0.01
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.24	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.23	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.23	0.01
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.23	0.01
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.21	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.21	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.19	0.01
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.18	0.01
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.18	0.01
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.18	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.14	0.00
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.14	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.14	0.00
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.14	0.00
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.12	0.00
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.10	0.00
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.09	0.00
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.07	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.06	0.00
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.05	0.00

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J755	PD6RD	0.42	195.00	254	581
WSP-J846	PD6RD	0.07	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	579
WSP-J709	PD6RD	0.54	195.50	254	577
WSP-J710	PD6RD	0.25	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J756	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.19	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.39	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.33	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			176		335
Maximum			198		689

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	-0.04	0.00
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.02	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	0.00	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	0.00	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	0.01	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.03	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.03	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.04	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.07	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.07	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.07	0.00
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.11	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.12	0.00
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.14	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.14	0.00
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.16	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.18	0.01
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.20	0.01
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.21	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.22	0.01
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.23	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.24	0.01
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.26	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.28	0.01
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.30	0.01
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.30	0.01
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.34	0.01
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.36	0.02
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.38	0.01
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.39	0.01
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.41	0.01
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	0.43	0.01
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.44	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	0.46	0.03
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.47	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.52	0.01
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	0.59	0.02
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	0.59	0.02
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	0.61	0.03
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.64	0.01
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	0.79	0.03
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.85	0.01
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	0.85	0.03
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	0.94	0.03
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	0.94	0.01
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	0.94	0.01
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	0.95	0.01
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	0.95	0.01
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	0.96	0.03
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	1.01	0.03
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	1.06	0.03
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	1.21	0.04
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.40	0.04
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	1.44	0.05
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	1.53	0.05
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	1.53	0.05
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	1.53	0.05
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	1.78	0.03
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	2.06	0.03
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	2.07	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.22	0.07
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	2.26	0.03
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	2.54	0.08
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	2.76	0.04
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	2.92	0.04
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	3.05	0.04
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	3.64	0.05
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	3.70	0.05
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	3.84	0.05
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	4.33	0.06
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	4.57	0.06
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	4.89	0.07
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	5.46	0.08
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	5.55	0.08
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	5.73	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	5.92	0.08
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	8.60	0.12

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	462
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	433
WSP-J514	PD5B	0.27	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.27	180.50	224	430
WSP-J511	PD5B	0.27	180.50	224	430
WSP-J512	PD5B	0.27	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.27	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.09	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.21	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.24	181.27	224	423
WSP-J519	PD5B	0.21	181.50	224	420
WSP-J520	PD5B	0.25	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.07	181.50	224	420
WSP-J524	PD5B	0.09	181.50	224	420
WSP-J525	PD5B	0.26	181.50	224	420
WSP-J527	PD5B	0.16	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	416
WSP-J531	PD5B	0.13	182.00	224	416
WSP-J532	PD5B	0.00	182.00	224	416
WSP-J567	PD5B	0.13	182.00	224	416
WSP-J785	PD5B	0.12	182.00	228	449
WSP-J529	PD5B	0.28	182.50	224	411
WSP-J530	PD5B	0.21	182.50	224	411
WSP-J533	PD5B	0.00	182.50	224	411
WSP-J788	PD5B	0.11	182.50	228	444
WSP-J534	PD5B	0.20	183.00	224	406
WSP-J536	PD5B	0.00	183.00	224	406
WSP-J537	PD5B	0.00	183.00	224	406
WSP-J538	PD5B	0.38	183.00	224	406
WSP-J539	PD5B	0.00	183.00	224	406
WSP-J540	PD5B	0.06	183.00	224	406
WSP-J541	PD5B	0.20	183.00	224	406
WSP-J787	PD5B	0.14	183.00	228	439
WSP-J789	PD5B	0.17	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	406
WSP-J818	PD5B	0.16	183.00	224	406
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.17	183.50	224	401
WSP-J543	PD5B	0.00	183.50	224	401
WSP-J544	PD5B	0.00	183.50	224	401
WSP-J551	PD5B	0.07	183.50	224	401
WSP-J554	PD5B	0.18	183.50	224	401
WSP-J542	PD5B	0.00	184.00	224	396
WSP-J779	PD5B	0.13	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	396
WSP-J828	PD5B	0.07	184.00	224	396
WSP-J829	PD5B	0.00	184.00	224	396
WSP-J561	PD5B	0.00	184.50	224	391
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.05	185.00	228	419
WSP-J774	PD5B	0.17	185.00	228	419
WSP-J777	PD5B	0.25	185.00	228	419
WSP-J778	PD5B	0.20	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	383
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.20	186.00	228	410
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.09	186.50	228	405
WSP-J772	PD5B	0.09	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	403
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.19	187.00	228	400
WSP-J770	PD5B	0.22	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.20	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	0.35	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-17.35	0.25
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-8.88	0.13
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-2.59	0.04
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-2.28	0.03
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-1.58	0.02
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-1.36	0.02
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-1.36	0.02
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-1.09	0.02
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-1.01	0.03
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-0.91	0.01
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-0.72	0.02
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-0.65	0.02
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-0.53	0.02
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-0.53	0.02
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-0.53	0.02
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-0.49	0.02
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-0.48	0.02
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-0.43	0.01
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-0.43	0.01
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-0.37	0.02
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-0.36	0.01
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.34	0.01
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.28	0.01
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.24	0.01
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.24	0.01
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.21	0.01
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.20	0.01
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.20	0.01
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.13	0.00
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.13	0.00
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.12	0.00
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.10	0.01
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.10	0.00
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.08	0.00
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.06	0.00
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.06	0.00
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.06	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.04	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.04	0.00
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.04	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.04	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.01	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.01	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.02	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.02	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.03	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.03	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.03	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.04	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.04	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.04	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.04	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.04	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.04	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.05	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.05	0.00
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.05	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.08	0.00
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.09	0.00
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.11	0.00
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.11	0.00
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.13	0.00
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.14	0.00
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.14	0.00
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.14	0.00
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.16	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.16	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.19	0.01

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	689
WSP-J826	PD6RD	0.04	184.00	254	689
WSP-J556	PD6RD	0.20	184.50	254	684
WSP-J742	PD6RD	0.00	185.00	254	680
WSP-J546	PD6RD	0.09	185.50	254	675
WSP-J552	PD6RD	0.00	185.50	254	675
WSP-J562	PD6RD	0.13	185.50	254	675
WSP-J748	PD6RD	0.00	185.50	254	675
WSP-J806	PD6RD	0.00	185.50	254	675
WSP-J548	PD6RD	0.26	186.00	254	670
WSP-J550	PD6RD	0.00	186.00	254	670
WSP-J557	PD6RD	0.00	186.00	254	670
WSP-J809	PD6RD	0.00	186.00	254	670
WSP-J816	PD6RD	0.00	186.00	254	670
WSP-J810	PD6RD	0.14	186.50	254	665
WSP-J743	PD6RD	0.13	187.00	254	660
WSP-J762	PD6RD	0.14	187.00	254	660
WSP-J764	PD6RD	0.21	187.00	254	660
WSP-J805	PD6RD	0.14	187.00	254	660
WSP-J812	PD6RD	0.09	187.00	254	660
WSP-J761	PD6RD	0.17	187.50	254	655
WSP-J547	PD6RD	0.15	188.00	254	650
WSP-J564	PD6RD	0.04	188.00	254	650
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.11	188.00	254	650
WSP-J766	PD6RD	0.00	188.00	254	650
WSP-J804	PD6RD	0.12	188.00	254	650
WSP-J807	PD6RD	0.01	188.00	254	650
WSP-J811	PD6RD	0.00	188.50	254	645
WSP-J852	PD6RD	0.12	188.53	254	645
WSP-J563	PD6RD	0.07	189.00	254	640
WSP-J565	PD6RD	0.08	189.00	254	640
WSP-J750	PD6RD	0.30	189.00	254	640
WSP-J763	PD6RD	0.19	189.00	254	640
WSP-J844	PD6RD	0.27	189.15	254	639
WSP-J790	PD6RD	0.00	189.50	254	635
WSP-J560	PD6RD	0.12	190.00	254	631
WSP-J577	PD6RD	0.08	190.00	254	631
WSP-J578	PD6RD	0.00	190.00	254	631
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J744	PD6RD	0.00	190.00	254	631
WSP-J745	PD6RD	0.00	190.00	254	631
WSP-J746	PD6RD	0.36	190.00	254	631
WSP-J765	PD6RD	0.28	190.00	254	631
WSP-J791	PD6RD	0.26	190.00	254	631
WSP-J794	PD6RD	0.25	190.00	254	631
WSP-J799	PD6RD	0.00	190.00	254	631
WSP-J851	PD6RD	0.00	190.16	254	629
WSP-J760	PD6RD	0.11	190.50	254	626
WSP-J847	PD6RD	0.11	190.60	254	625
WSP-J837	PD6RD	0.11	190.86	254	622
WSP-J558	PD6RD	0.09	191.00	254	621
WSP-J747	PD6RD	0.00	191.00	254	621
WSP-J752	PD6RD	0.17	191.00	254	621
WSP-J793	PD6RD	0.00	191.00	254	621
WSP-J798	PD6RD	0.00	191.00	254	621
WSP-J801	PD6RD	0.00	191.00	254	621
WSP-J802	PD6RD	0.27	191.00	254	621
WSP-J759	PD6RD	0.00	191.50	254	616
WSP-J795	PD6RD	0.26	191.50	254	616
WSP-J842	PD6RD	0.00	191.53	254	616
WSP-J566	PD6RD	0.00	192.00	254	611
WSP-J574	PD6RD	0.00	192.00	254	611
WSP-J716	PD6RD	0.45	192.00	254	611
WSP-J751	PD6RD	0.17	192.00	254	611
WSP-J792	PD6RD	0.00	192.00	254	611
WSP-J796	PD6RD	0.27	192.50	254	606
WSP-J559	PD6RD	0.00	193.00	254	601
WSP-J568	PD6RD	0.21	193.00	254	601
WSP-J569	PD6RD	0.00	193.00	254	601
WSP-J571	PD6RD	0.00	193.00	254	601
WSP-J572	PD6RD	0.13	193.00	254	601
WSP-J576	PD6RD	0.09	193.00	254	601
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.40	193.00	254	601
WSP-J722	PD6RD	0.40	193.00	254	601
WSP-J757	PD6RD	0.38	193.00	254	601
WSP-J721	PD6RD	0.40	193.50	254	596
WSP-J573	PD6RD	0.13	194.00	254	591
WSP-J575	PD6RD	0.00	194.00	254	591
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	0.36	194.00	254	592
WSP-J717	PD6RD	0.05	194.00	254	591
WSP-J725	PD6RD	0.36	194.00	254	591
WSP-J711	PD6RD	0.05	194.50	254	587
WSP-J753	PD6RD	0.09	194.50	254	587
WSP-J754	PD6RD	0.12	194.50	254	587
WSP-J758	PD6RD	0.09	194.50	254	587
WSP-J707	PD6RD	0.46	195.00	254	582
WSP-J715	PD6RD	0.40	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.22	0.01
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.23	0.00
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.23	0.01
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.23	0.01
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.24	0.01
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.25	0.01
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.30	0.01
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.31	0.02
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.34	0.01
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	0.38	0.01
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	0.40	0.01
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	0.40	0.01
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	0.46	0.01
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	0.48	0.02
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	0.49	0.02
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	0.50	0.02
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	0.57	0.02
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	0.60	0.02
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	0.61	0.02
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	0.61	0.01
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	0.61	0.02
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	0.65	0.02
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	0.68	0.02
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	0.96	0.03
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	0.96	0.03
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	0.99	0.03
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	2.03	0.03
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	2.69	0.04
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	2.90	0.04
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	5.17	0.07
P15140	H744	N49213	PD5B	19.65	300	155	18.65	0.26
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
4919949213B	N49199	H747	PD6RD	3.64	300	155	-14.43	0.20
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-14.43	0.20
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-4.15	0.06
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-3.26	0.05
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-2.52	0.04
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.52	0.14
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.31	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.29	0.07
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-1.92	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.76	0.10
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-1.72	0.02
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-1.45	0.05
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-1.43	0.02
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-1.22	0.02
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-1.21	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.14	0.06
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-1.13	0.04
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-1.09	0.03
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-1.08	0.02
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-0.85	0.03
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-0.71	0.02
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-0.65	0.02
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-0.65	0.02
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-0.65	0.01
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-0.64	0.02
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	-0.61	0.02
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-0.60	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.55	0.02
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-0.55	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.47	0.03
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-0.46	0.03
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.45	0.01
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.44	0.01
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.44	0.01
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-0.41	0.01
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-0.39	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.39	0.01
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.35	0.01
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.29	0.01
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.26	0.01
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.21	0.01
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.20	0.01
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-0.20	0.01
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	-0.20	0.01
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.17	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.17	0.01
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.17	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.15	0.01
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.14	0.01
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.14	0.00
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.14	0.00
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.13	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.13	0.00
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.12	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.10	0.00
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.10	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.10	0.00
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.10	0.00
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.08	0.00
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.07	0.00
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-0.06	0.00
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.06	0.00
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.06	0.00
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.06	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.05	0.00

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J755	PD6RD	0.29	195.00	254	582
WSP-J846	PD6RD	0.05	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	579
WSP-J709	PD6RD	0.38	195.50	254	577
WSP-J710	PD6RD	0.18	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J756	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.13	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.28	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.23	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			176		335
Maximum			198		689

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.05	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.02	0.00
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.01	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	0.00	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	0.00	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.02	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.02	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.05	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.05	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.05	0.00
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.06	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.07	0.00
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.08	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.10	0.00
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.11	0.00
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.11	0.01
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.13	0.00
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	0.14	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.15	0.00
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.15	0.00
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.17	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.20	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.21	0.01
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.21	0.01
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.21	0.01
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.24	0.01
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.24	0.01
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.25	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.25	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	0.26	0.01
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.26	0.01
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.28	0.01
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.31	0.01
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.35	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.36	0.01
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	0.38	0.01
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	0.41	0.01
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	0.42	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.44	0.01
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	0.45	0.03
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	0.49	0.02
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	0.52	0.01
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	0.52	0.01
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	0.55	0.02
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.57	0.01
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	0.58	0.02
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	0.60	0.02
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	0.61	0.02
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	0.66	0.01
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	0.66	0.01
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	0.70	0.02
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	0.74	0.02
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	0.92	0.03
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	0.93	0.03
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	0.93	0.03
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.00	0.03
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	1.08	0.03
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	1.16	0.02
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	1.23	0.02
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	1.39	0.02
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	1.43	0.02
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	1.78	0.03
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.84	0.06
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	1.87	0.03
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	1.99	0.03
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	2.06	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.24	0.07
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	2.31	0.03
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	2.37	0.03
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	2.58	0.04
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	2.69	0.04
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	2.78	0.04
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	2.99	0.04
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	3.50	0.05
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	3.79	0.05
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	4.38	0.06
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	5.93	0.08

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	461
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	432
WSP-J514	PD5B	0.77	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.77	180.50	224	430
WSP-J511	PD5B	0.77	180.50	224	430
WSP-J512	PD5B	0.77	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.78	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.26	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.61	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.68	181.27	224	422
WSP-J519	PD5B	0.61	181.50	224	420
WSP-J520	PD5B	0.71	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.20	181.50	224	420
WSP-J524	PD5B	0.26	181.50	224	420
WSP-J525	PD5B	0.74	181.50	224	420
WSP-J527	PD5B	0.45	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	415
WSP-J531	PD5B	0.37	182.00	224	415
WSP-J532	PD5B	0.00	182.00	224	415
WSP-J567	PD5B	0.37	182.00	224	415
WSP-J785	PD5B	0.34	182.00	228	449
WSP-J529	PD5B	0.81	182.50	224	410
WSP-J530	PD5B	0.61	182.50	224	410
WSP-J533	PD5B	0.00	182.50	224	410
WSP-J788	PD5B	0.30	182.50	228	444
WSP-J534	PD5B	0.57	183.00	224	405
WSP-J536	PD5B	0.00	183.00	224	405
WSP-J537	PD5B	0.00	183.00	224	405
WSP-J538	PD5B	1.09	183.00	224	405
WSP-J539	PD5B	0.00	183.00	224	405
WSP-J540	PD5B	0.17	183.00	224	405
WSP-J541	PD5B	0.57	183.00	224	405
WSP-J787	PD5B	0.41	183.00	228	439
WSP-J789	PD5B	0.47	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	405
WSP-J818	PD5B	0.45	183.00	224	405
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.47	183.50	224	400
WSP-J543	PD5B	0.00	183.50	224	400
WSP-J544	PD5B	0.00	183.50	224	400
WSP-J551	PD5B	0.20	183.50	224	400
WSP-J554	PD5B	0.51	183.50	224	400
WSP-J542	PD5B	0.00	184.00	224	395
WSP-J779	PD5B	0.37	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	395
WSP-J828	PD5B	0.20	184.00	224	395
WSP-J829	PD5B	0.00	184.00	224	395
WSP-J561	PD5B	0.00	184.50	224	390
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.14	185.00	228	419
WSP-J774	PD5B	0.47	185.00	228	419
WSP-J777	PD5B	0.71	185.00	228	419
WSP-J778	PD5B	0.57	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	382
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.57	186.00	228	409
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.27	186.50	228	405
WSP-J772	PD5B	0.27	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	402
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.54	187.00	228	400
WSP-J770	PD5B	0.64	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.57	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	1.01	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-29.82	0.42
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-21.03	0.30
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-7.40	0.10
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-6.50	0.09
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-4.53	0.06
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-3.89	0.06
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-3.89	0.05
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-3.12	0.04
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-2.89	0.09
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-2.59	0.04
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-2.04	0.07
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-1.84	0.06
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-1.52	0.05
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-1.52	0.05
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-1.50	0.05
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-1.39	0.04
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-1.37	0.04
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-1.22	0.04
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-1.22	0.04
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-1.05	0.06
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-1.02	0.03
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.98	0.03
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.79	0.03
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.68	0.04
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.68	0.02
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.61	0.02
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.58	0.02
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.58	0.02
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.36	0.01
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.36	0.01
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.35	0.01
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.30	0.02
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.28	0.01
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.22	0.01
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.18	0.01
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.18	0.01
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.18	0.01
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.10	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.10	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.09	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.09	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.02	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.02	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.06	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.07	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.08	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.09	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.09	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.09	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.10	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.10	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.10	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.11	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.12	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.14	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.14	0.01
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.14	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.22	0.01
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.27	0.01
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.32	0.01
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.32	0.01
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.38	0.01
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.39	0.01
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.40	0.01
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.41	0.01
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.46	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.46	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.56	0.02

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	688
WSP-J826	PD6RD	0.10	184.00	254	687
WSP-J556	PD6RD	0.57	184.50	254	683
WSP-J742	PD6RD	0.00	185.00	254	679
WSP-J546	PD6RD	0.27	185.50	254	673
WSP-J552	PD6RD	0.00	185.50	254	673
WSP-J562	PD6RD	0.37	185.50	254	673
WSP-J748	PD6RD	0.00	185.50	254	674
WSP-J806	PD6RD	0.00	185.50	254	673
WSP-J548	PD6RD	0.74	186.00	254	668
WSP-J550	PD6RD	0.00	186.00	254	668
WSP-J557	PD6RD	0.00	186.00	254	668
WSP-J809	PD6RD	0.00	186.00	254	668
WSP-J816	PD6RD	0.00	186.00	254	668
WSP-J810	PD6RD	0.41	186.50	254	663
WSP-J743	PD6RD	0.37	187.00	254	659
WSP-J762	PD6RD	0.41	187.00	254	659
WSP-J764	PD6RD	0.61	187.00	254	659
WSP-J805	PD6RD	0.41	187.00	254	658
WSP-J812	PD6RD	0.27	187.00	254	658
WSP-J761	PD6RD	0.47	187.50	254	654
WSP-J547	PD6RD	0.44	188.00	254	648
WSP-J564	PD6RD	0.10	188.00	254	648
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.30	188.00	254	649
WSP-J766	PD6RD	0.00	188.00	254	649
WSP-J804	PD6RD	0.34	188.00	254	649
WSP-J807	PD6RD	0.03	188.00	254	649
WSP-J811	PD6RD	0.00	188.50	254	644
WSP-J852	PD6RD	0.34	188.53	254	643
WSP-J563	PD6RD	0.20	189.00	254	638
WSP-J565	PD6RD	0.24	189.00	254	639
WSP-J750	PD6RD	0.87	189.00	254	639
WSP-J763	PD6RD	0.54	189.00	254	639
WSP-J844	PD6RD	0.76	189.15	254	638
WSP-J790	PD6RD	0.00	189.50	254	634
WSP-J560	PD6RD	0.34	190.00	254	629
WSP-J577	PD6RD	0.24	190.00	254	629
WSP-J578	PD6RD	0.00	190.00	254	629
WSP-J730	PD6RD	0.00	190.00	254	630
WSP-J731	PD6RD	0.00	190.00	254	630
WSP-J744	PD6RD	0.00	190.00	254	630
WSP-J745	PD6RD	0.00	190.00	254	630
WSP-J746	PD6RD	1.03	190.00	254	630
WSP-J765	PD6RD	0.79	190.00	254	629
WSP-J791	PD6RD	0.74	190.00	254	629
WSP-J794	PD6RD	0.71	190.00	254	629
WSP-J799	PD6RD	0.00	190.00	254	629
WSP-J851	PD6RD	0.00	190.16	254	627
WSP-J760	PD6RD	0.30	190.50	254	625
WSP-J847	PD6RD	0.30	190.60	254	623
WSP-J837	PD6RD	0.30	190.86	254	620
WSP-J558	PD6RD	0.27	191.00	254	619
WSP-J747	PD6RD	0.00	191.00	254	620
WSP-J752	PD6RD	0.48	191.00	254	620
WSP-J793	PD6RD	0.00	191.00	254	619
WSP-J798	PD6RD	0.00	191.00	254	619
WSP-J801	PD6RD	0.00	191.00	254	619
WSP-J802	PD6RD	0.77	191.00	254	619
WSP-J759	PD6RD	0.00	191.50	254	615
WSP-J795	PD6RD	0.74	191.50	254	614
WSP-J842	PD6RD	0.00	191.53	254	614
WSP-J566	PD6RD	0.00	192.00	254	609
WSP-J574	PD6RD	0.00	192.00	254	609
WSP-J716	PD6RD	1.30	192.00	254	610
WSP-J751	PD6RD	0.47	192.00	254	610
WSP-J792	PD6RD	0.00	192.00	254	609
WSP-J796	PD6RD	0.78	192.50	254	605
WSP-J559	PD6RD	0.00	193.00	254	599
WSP-J568	PD6RD	0.61	193.00	254	599
WSP-J569	PD6RD	0.00	193.00	254	599
WSP-J571	PD6RD	0.00	193.00	254	599
WSP-J572	PD6RD	0.37	193.00	254	599
WSP-J576	PD6RD	0.27	193.00	254	599
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	1.16	193.00	254	601
WSP-J722	PD6RD	1.16	193.00	254	601
WSP-J757	PD6RD	1.09	193.00	254	600
WSP-J721	PD6RD	1.16	193.50	254	596
WSP-J573	PD6RD	0.37	194.00	254	589
WSP-J575	PD6RD	0.00	194.00	254	589
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	1.02	194.00	254	591
WSP-J717	PD6RD	0.14	194.00	254	591
WSP-J725	PD6RD	1.02	194.00	254	591
WSP-J711	PD6RD	0.14	194.50	254	586
WSP-J753	PD6RD	0.27	194.50	254	586
WSP-J754	PD6RD	0.35	194.50	254	586
WSP-J758	PD6RD	0.27	194.50	254	585
WSP-J707	PD6RD	1.32	195.00	254	581
WSP-J715	PD6RD	1.16	195.00	254	581
WSP-J720	PD6RD	0.00	195.00	254	581

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.64	0.04
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.65	0.01
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.67	0.02
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.67	0.02
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.67	0.04
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.73	0.02
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.85	0.03
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.88	0.05
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.98	0.03
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	1.10	0.02
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	1.14	0.04
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	1.14	0.04
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	1.32	0.02
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	1.37	0.04
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	1.39	0.04
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	1.42	0.05
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	1.64	0.05
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	1.72	0.05
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	1.74	0.06
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	1.75	0.02
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	1.75	0.06
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	1.84	0.06
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	1.95	0.06
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	2.75	0.09
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	2.75	0.09
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	2.82	0.09
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	5.81	0.08
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	7.67	0.11
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	8.27	0.12
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	14.77	0.21
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
P15140	H744	N49213	PD5B	19.65	300	155	30.63	0.43
4919949213B	N49199	H747	PD6RD	3.64	300	155	-25.11	0.36
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-25.11	0.36
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-14.36	0.20
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-12.26	0.17
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-10.16	0.14
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-8.14	0.12
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-7.97	0.11
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-5.50	0.17
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-4.17	0.13
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-4.16	0.06
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-4.10	0.13
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-4.07	0.13
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-4.03	0.13
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-3.68	0.05
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-3.28	0.05
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-2.62	0.08
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-2.62	0.08
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-2.62	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.98	0.11
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-1.96	0.06
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-1.83	0.06
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-1.80	0.06
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-1.78	0.06
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-1.76	0.10
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-1.70	0.05
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-1.57	0.05
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-1.52	0.05
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-1.29	0.04
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.22	0.07
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-1.22	0.07
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-1.22	0.04
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-1.17	0.04
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.98	0.03
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.98	0.03
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.91	0.05
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.88	0.03
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.81	0.05
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.79	0.03
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.77	0.02
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.66	0.02
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.64	0.02
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.56	0.02
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.55	0.02
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.52	0.03
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.49	0.02
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	-0.47	0.03
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.45	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.45	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.45	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.38	0.01
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.36	0.02
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.35	0.02
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.32	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.29	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.29	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.29	0.01
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.29	0.01
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.28	0.01
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.24	0.01
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.19	0.01
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.18	0.01
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.17	0.01
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	-0.17	0.01
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.13	0.01
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.04	0.00

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	581
WSP-J755	PD6RD	0.83	195.00	254	581
WSP-J846	PD6RD	0.14	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	578
WSP-J709	PD6RD	1.08	195.50	254	576
WSP-J710	PD6RD	0.51	195.50	254	576
WSP-J723	PD6RD	0.00	195.50	254	576
WSP-J756	PD6RD	0.00	195.50	254	576
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.37	196.00	254	571
WSP-J727	PD6RD	0.00	196.00	254	571
H747	PD6RD	0.00	196.01	254	571
WSP-J701	PD6RD	0.00	196.12	254	570
WSP-J708	PD6RD	0.00	196.50	254	566
WSP-J705	PD6RD	0.79	197.00	254	561
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.67	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552
Minimum			176		335
Maximum			198		688

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	-0.01	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	-0.01	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.06	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.06	0.00
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	0.12	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.14	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.14	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.14	0.00
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	0.17	0.01
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.17	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.17	0.01
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.23	0.01
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.24	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.26	0.01
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.29	0.00
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.30	0.01
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.32	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.35	0.01
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.43	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.45	0.01
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	0.47	0.02
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.48	0.03
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.54	0.03
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.61	0.02
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.61	0.02
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.64	0.02
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.67	0.02
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.74	0.04
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.76	0.02
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.81	0.03
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.84	0.03
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.88	0.03
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.88	0.03
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	1.04	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	1.08	0.06
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	1.17	0.04
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	1.18	0.04
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	1.18	0.07
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	1.30	0.02
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	1.44	0.05
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	1.57	0.05
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	1.70	0.05
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	1.75	0.02
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	1.91	0.03
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	1.91	0.03
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	2.12	0.07
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	2.25	0.03
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	2.25	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.25	0.07
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	2.34	0.07
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	2.41	0.08
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	2.60	0.08
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	2.74	0.09
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	2.75	0.09
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	2.82	0.09
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	3.13	0.04
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	3.43	0.11
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	3.43	0.11
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	3.47	0.11
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	3.58	0.05
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	4.16	0.06
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	4.89	0.16
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	5.06	0.07
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	5.08	0.07
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	5.93	0.08
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	7.67	0.11
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	8.34	0.12
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	8.36	0.12
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	8.74	0.12
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	10.58	0.15
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	11.09	0.16
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	11.28	0.16
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	11.34	0.16
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	11.50	0.16
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	12.78	0.18
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	13.12	0.19
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	16.61	0.24

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	461
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	467
WSP-J515	PD5B	0.00	180.24	224	430
WSP-J514	PD5B	1.73	180.49	224	428
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	428
WSP-J505	PD5B	1.73	180.50	224	428
WSP-J511	PD5B	1.73	180.50	224	428
WSP-J512	PD5B	1.73	180.50	224	428
WSP-J513	PD5B	0.00	180.50	224	428
WSP-J516	PD5B	0.00	180.50	224	428
WSP-J517	PD5B	1.75	180.50	224	428
WSP-J506	PD5B	0.00	181.00	224	423
WSP-J507	PD5B	0.58	181.00	224	423
WSP-J508	PD5B	0.00	181.00	224	423
WSP-J509	PD5B	1.37	181.00	224	423
WSP-J510	PD5B	0.00	181.00	224	423
WSP-J518	PD5B	0.00	181.00	224	423
WSP-J825	PD5B	0.00	181.00	224	423
WSP-J836	PD5B	1.52	181.27	224	420
WSP-J519	PD5B	1.37	181.50	224	418
WSP-J520	PD5B	1.59	181.50	224	418
WSP-J521	PD5B	0.00	181.50	224	418
WSP-J522	PD5B	0.46	181.50	224	418
WSP-J524	PD5B	0.58	181.50	224	418
WSP-J525	PD5B	1.66	181.50	224	418
WSP-J527	PD5B	1.01	181.50	224	418
WSP-J823	PD5B	0.00	181.50	224	418
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	413
WSP-J531	PD5B	0.84	182.00	224	413
WSP-J532	PD5B	0.00	182.00	224	413
WSP-J567	PD5B	0.84	182.00	224	413
WSP-J785	PD5B	0.76	182.00	228	448
WSP-J529	PD5B	1.82	182.50	224	408
WSP-J530	PD5B	1.37	182.50	224	408
WSP-J533	PD5B	0.00	182.50	224	408
WSP-J788	PD5B	0.68	182.50	228	443
WSP-J534	PD5B	1.29	183.00	224	403
WSP-J536	PD5B	0.00	183.00	224	403
WSP-J537	PD5B	0.00	183.00	224	403
WSP-J538	PD5B	2.46	183.00	224	403
WSP-J539	PD5B	0.00	183.00	224	403
WSP-J540	PD5B	0.38	183.00	224	403
WSP-J541	PD5B	1.29	183.00	224	403
WSP-J787	PD5B	0.91	183.00	228	438
WSP-J789	PD5B	1.06	183.00	228	438
WSP-J817	PD5B	0.00	183.00	224	403
WSP-J818	PD5B	1.01	183.00	224	403
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	1.06	183.50	224	398
WSP-J543	PD5B	0.00	183.50	224	398
WSP-J544	PD5B	0.00	183.50	224	398
WSP-J551	PD5B	0.46	183.50	224	398
WSP-J554	PD5B	1.14	183.50	224	398
WSP-J542	PD5B	0.00	184.00	224	393
WSP-J779	PD5B	0.84	184.00	228	428
WSP-J827	PD5B	0.00	184.00	224	393
WSP-J828	PD5B	0.46	184.00	224	393
WSP-J829	PD5B	0.00	184.00	224	393
WSP-J561	PD5B	0.00	184.50	224	388
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.30	185.00	228	418
WSP-J774	PD5B	1.06	185.00	228	418
WSP-J777	PD5B	1.60	185.00	228	418
WSP-J778	PD5B	1.29	185.00	228	418
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	380
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	377
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	1.29	186.00	228	409
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.61	186.50	228	405
WSP-J772	PD5B	0.61	186.50	228	404
WSP-J782	PD5B	0.00	186.50	228	404
WSP-J800	PD5B	0.00	186.50	228	404
WSP-J830	PD5B	0.00	186.72	228	402
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	1.22	187.00	228	399
WSP-J770	PD5B	1.44	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	399
WSP-J832	PD5B	1.29	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-52.38	0.74
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-43.59	0.62
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-16.64	0.24
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-14.63	0.21
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-10.19	0.14
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-8.76	0.12
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-8.74	0.12
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-7.01	0.10
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-6.50	0.21
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-5.82	0.08
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-4.60	0.15
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-4.15	0.13
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-3.42	0.11
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-3.42	0.11
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-3.38	0.11
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-3.12	0.10
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-3.08	0.10
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-2.73	0.09
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-2.73	0.09
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-2.35	0.13
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-2.30	0.07
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-2.20	0.07
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-1.78	0.06
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-1.54	0.09
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-1.52	0.05
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-1.37	0.04
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-1.31	0.04
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-1.31	0.04
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.80	0.03
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.80	0.03
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.79	0.03
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.67	0.04
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.63	0.02
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.50	0.02
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.42	0.01
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.40	0.02
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.40	0.02
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.24	0.01
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.23	0.01
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.21	0.01
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.21	0.01
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.04	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.05	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.14	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.16	0.01
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.17	0.01
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.21	0.01
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.21	0.01
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.21	0.01
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.22	0.01
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.23	0.01
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.23	0.01
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.25	0.01
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.27	0.01
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.31	0.01
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.31	0.02
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.31	0.01
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.50	0.02
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.60	0.02
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.72	0.02
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.72	0.02
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.86	0.03
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.88	0.03
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.89	0.03

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J768	PD5B	2.28	188.00	228	389
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	253	681
WSP-J826	PD6RD	0.23	184.00	253	680
WSP-J556	PD6RD	1.29	184.50	253	676
WSP-J742	PD6RD	0.00	185.00	254	675
WSP-J546	PD6RD	0.61	185.50	253	666
WSP-J552	PD6RD	0.00	185.50	253	666
WSP-J562	PD6RD	0.84	185.50	253	666
WSP-J748	PD6RD	0.00	185.50	254	670
WSP-J806	PD6RD	0.00	185.50	254	666
WSP-J548	PD6RD	1.66	186.00	253	661
WSP-J550	PD6RD	0.00	186.00	253	661
WSP-J557	PD6RD	0.00	186.00	253	661
WSP-J809	PD6RD	0.00	186.00	254	661
WSP-J816	PD6RD	0.00	186.00	253	661
WSP-J810	PD6RD	0.91	186.50	254	657
WSP-J743	PD6RD	0.84	187.00	254	655
WSP-J762	PD6RD	0.91	187.00	254	653
WSP-J764	PD6RD	1.37	187.00	254	653
WSP-J805	PD6RD	0.91	187.00	254	652
WSP-J812	PD6RD	0.61	187.00	254	652
WSP-J761	PD6RD	1.06	187.50	254	649
WSP-J547	PD6RD	0.99	188.00	253	641
WSP-J564	PD6RD	0.23	188.00	253	642
WSP-J732	PD6RD	0.00	188.00	254	647
WSP-J733	PD6RD	0.00	188.00	254	647
WSP-J749	PD6RD	0.68	188.00	254	646
WSP-J766	PD6RD	0.00	188.00	254	643
WSP-J804	PD6RD	0.76	188.00	254	643
WSP-J807	PD6RD	0.08	188.00	254	642
WSP-J811	PD6RD	0.00	188.50	254	637
WSP-J852	PD6RD	0.76	188.53	254	637
WSP-J563	PD6RD	0.46	189.00	253	631
WSP-J565	PD6RD	0.53	189.00	253	632
WSP-J750	PD6RD	1.95	189.00	254	636
WSP-J763	PD6RD	1.22	189.00	254	635
WSP-J844	PD6RD	1.72	189.15	254	633
WSP-J790	PD6RD	0.00	189.50	254	628
WSP-J560	PD6RD	0.76	190.00	253	622
WSP-J577	PD6RD	0.53	190.00	253	621
WSP-J578	PD6RD	0.00	190.00	253	621
WSP-J730	PD6RD	0.00	190.00	254	628
WSP-J731	PD6RD	0.00	190.00	254	628
WSP-J744	PD6RD	0.00	190.00	254	626
WSP-J745	PD6RD	0.00	190.00	254	626
WSP-J746	PD6RD	2.31	190.00	254	626
WSP-J765	PD6RD	1.77	190.00	254	625
WSP-J791	PD6RD	1.67	190.00	254	623
WSP-J794	PD6RD	1.60	190.00	254	623
WSP-J799	PD6RD	0.00	190.00	254	623
WSP-J851	PD6RD	0.00	190.16	253	620
WSP-J760	PD6RD	0.68	190.50	254	620
WSP-J847	PD6RD	0.68	190.60	253	616
WSP-J837	PD6RD	0.68	190.86	253	613
WSP-J558	PD6RD	0.61	191.00	253	612
WSP-J747	PD6RD	0.00	191.00	254	617
WSP-J752	PD6RD	1.08	191.00	254	617
WSP-J793	PD6RD	0.00	191.00	254	613
WSP-J798	PD6RD	0.00	191.00	254	613
WSP-J801	PD6RD	0.00	191.00	254	613
WSP-J802	PD6RD	1.73	191.00	254	613
WSP-J759	PD6RD	0.00	191.50	254	611
WSP-J795	PD6RD	1.67	191.50	254	608
WSP-J842	PD6RD	0.00	191.53	253	607
WSP-J566	PD6RD	0.00	192.00	253	602
WSP-J574	PD6RD	0.00	192.00	253	602
WSP-J716	PD6RD	2.92	192.00	254	607
WSP-J751	PD6RD	1.06	192.00	254	607
WSP-J792	PD6RD	0.00	192.00	254	603
WSP-J796	PD6RD	1.75	192.50	254	598
WSP-J559	PD6RD	0.00	193.00	253	592
WSP-J568	PD6RD	1.37	193.00	253	593
WSP-J569	PD6RD	0.00	193.00	253	593
WSP-J571	PD6RD	0.00	193.00	253	593
WSP-J572	PD6RD	0.84	193.00	253	593
WSP-J576	PD6RD	0.61	193.00	253	592
WSP-J718	PD6RD	0.00	193.00	254	598
WSP-J719	PD6RD	2.60	193.00	254	598
WSP-J722	PD6RD	2.60	193.00	254	598
WSP-J757	PD6RD	2.46	193.00	254	596
WSP-J721	PD6RD	2.60	193.50	254	593
WSP-J573	PD6RD	0.84	194.00	253	582
WSP-J575	PD6RD	0.00	194.00	253	582
WSP-J712	PD6RD	0.00	194.00	254	589
WSP-J713	PD6RD	2.29	194.00	254	589
WSP-J717	PD6RD	0.30	194.00	254	589
WSP-J725	PD6RD	2.29	194.00	254	588
WSP-J711	PD6RD	0.30	194.50	254	584
WSP-J753	PD6RD	0.61	194.50	254	583

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.93	0.01
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	1.04	0.03
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	1.04	0.03
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	1.25	0.04
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	1.44	0.08
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	1.45	0.02
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	1.50	0.05
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	1.50	0.05
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	1.52	0.09
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	1.63	0.05
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	1.90	0.06
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	1.98	0.11
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	2.20	0.07
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	2.47	0.03
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	2.57	0.08
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	2.57	0.08
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	2.96	0.04
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	3.08	0.10
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	3.12	0.10
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	3.19	0.10
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	3.69	0.12
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	3.86	0.12
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	3.92	0.12
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	3.93	0.06
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	3.93	0.13
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	4.15	0.13
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	4.38	0.14
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	6.20	0.20
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	6.20	0.20
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	6.35	0.20
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	13.06	0.18
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	17.26	0.24
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	18.61	0.26
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	33.24	0.47
P15140	H744	N49213	PD5B	19.65	300	155	52.92	0.75
4919949213B	N49199	H747	PD6RD	3.64	300	155	-43.88	0.62
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-43.88	0.62
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-33.12	0.47
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-28.57	0.40
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-23.87	0.34
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-19.22	0.27
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-19.05	0.27
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-12.86	0.41
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-9.62	0.31
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-9.59	0.31
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-9.42	0.30
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-9.37	0.13
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-8.34	0.12
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-7.43	0.11
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-6.71	0.21
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-6.16	0.20
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-6.16	0.20
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-6.16	0.09
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-4.38	0.14
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-4.27	0.14
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-4.21	0.13
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-4.11	0.13
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-3.83	0.12
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-3.54	0.11
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-3.46	0.20
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-3.08	0.10
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-2.90	0.09
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-2.84	0.09
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-2.71	0.15
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-2.11	0.12
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-2.02	0.06
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-2.02	0.06
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-1.94	0.06
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-1.93	0.06
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-1.76	0.06
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-1.60	0.05
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-1.52	0.05
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-1.42	0.08
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	-1.35	0.08
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-1.25	0.04
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-1.23	0.04
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-1.21	0.07
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-1.11	0.04
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-1.07	0.03
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-1.07	0.03
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	-1.01	0.03
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-1.00	0.03
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.85	0.03
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.81	0.05
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.77	0.04
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.71	0.04
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.65	0.02
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.64	0.02
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.64	0.02
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.63	0.02
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.53	0.02
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.42	0.02
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.42	0.01
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.40	0.01
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.27	0.02

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J754	PD6RD	0.79	194.50	254	583
WSP-J758	PD6RD	0.61	194.50	254	582
WSP-J707	PD6RD	2.96	195.00	254	579
WSP-J715	PD6RD	2.60	195.00	254	578
WSP-J720	PD6RD	0.00	195.00	254	579
WSP-J724	PD6RD	0.00	195.00	254	579
WSP-J755	PD6RD	1.88	195.00	254	577
WSP-J846	PD6RD	0.30	195.02	254	578
WSP-J854	PD6RD	0.00	195.25	254	575
WSP-J709	PD6RD	2.43	195.50	254	574
WSP-J710	PD6RD	1.14	195.50	254	574
WSP-J723	PD6RD	0.00	195.50	254	574
WSP-J756	PD6RD	0.00	195.50	254	572
WSP-J845	PD6RD	0.00	195.74	254	571
N49199	PD6RD	8.50	195.96	254	571
WSP-J704	PD6RD	0.00	196.00	254	571
WSP-J726	PD6RD	0.84	196.00	254	569
WSP-J727	PD6RD	0.00	196.00	254	569
H747	PD6RD	0.00	196.01	254	570
WSP-J701	PD6RD	0.00	196.12	254	569
WSP-J708	PD6RD	0.00	196.50	254	565
WSP-J705	PD6RD	1.77	197.00	254	560
N49198	PD6RD	8.50	197.04	254	559
WSP-J728	PD6RD	1.50	198.00	254	549
WSP-J815	PD6RD	0.00	198.00	254	549
Minimum			176		335
Maximum			198		681

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.08	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	-0.02	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	-0.02	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.12	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.12	0.00
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.18	0.01
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	0.27	0.02
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	0.27	0.02
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.28	0.01
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.30	0.01
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.31	0.01
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.31	0.01
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.51	0.02
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.58	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	0.63	0.02
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.64	0.02
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.64	0.01
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.68	0.04
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.71	0.02
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.72	0.02
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	0.90	0.03
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.93	0.03
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.96	0.03
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	1.01	0.03
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	1.13	0.06
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	1.25	0.07
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	1.37	0.04
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	1.37	0.04
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	1.41	0.04
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	1.52	0.05
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	1.52	0.05
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	1.69	0.10
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	1.70	0.05
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	1.82	0.06
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	1.92	0.06
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	1.94	0.06
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	1.97	0.06
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.12	0.07
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	2.21	0.07
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	2.33	0.03
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	2.55	0.14
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	2.62	0.08
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	2.64	0.15
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	2.66	0.08
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	2.97	0.04
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	3.54	0.11
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	3.83	0.12
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	4.04	0.06
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	4.30	0.06
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	4.30	0.06
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	4.77	0.15
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	5.18	0.16
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	5.32	0.08
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	5.32	0.08
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	5.49	0.17
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	5.76	0.18
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	6.07	0.19
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	6.08	0.19
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	6.28	0.09
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	6.28	0.20
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	6.61	0.21
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	7.99	0.25
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	7.99	0.25
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	8.07	0.11
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	8.09	0.26
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	9.37	0.13
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	10.58	0.15
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	10.70	0.34
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	11.94	0.17
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	13.66	0.19
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	17.26	0.24
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	19.25	0.27
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	20.78	0.29
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	21.16	0.30
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	23.90	0.34
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	25.13	0.36
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	25.50	0.36
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	27.06	0.38
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	27.08	0.38
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	29.66	0.42
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	31.06	0.44
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	35.38	0.50

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Fire Flow Table								
ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
KYP2-J17	PD5B	0.00	554.54	243.35	167.00	223.14	201.62	139.96
KYP2-J18	PD5B	0.00	563.52	244.48	167.00	245.59	212.37	139.96
KYP2-J11	PD5B	0.00	530.01	245.29	167.00	280.43	249.02	139.96
KYP2-J10	PD5B	0.00	538.34	245.42	167.00	290.47	254.71	139.96
KYP2-J5	PD5B	0.00	554.50	246.19	167.00	317.66	271.73	139.96
KYP2-J9	PD5B	0.00	551.70	244.89	167.00	317.10	272.62	139.96
KYP2-J4	PD5B	0.00	563.69	246.02	167.00	326.73	275.51	139.96
KYP2-J6	PD5B	0.00	586.34	245.74	167.00	346.62	283.90	139.96
KYP2-J19	PD5B	0.00	559.09	244.78	167.00	333.93	286.58	139.96
KYP2-J20	PD5B	0.00	567.58	246.42	167.00	339.12	288.08	139.96
KYP2-J12	PD5B	0.00	568.89	245.74	167.00	341.93	289.61	139.96
KYP2-J8	PD5B	0.00	573.87	244.75	167.00	353.96	301.44	139.96
KYP2-J7	PD5B	0.00	580.30	244.72	167.00	386.49	350.49	139.96
KYP2-J21	PD5B	0.00	599.48	246.76	167.00	408.47	364.04	139.96
KYP2-J16	PD5B	0.00	568.23	242.85	167.00	397.79	365.72	139.96
N51954	PD5B	4.24	570.14	241.42	167.00	411.39	365.88	139.96
KYP2-J1	PD5B	0.00	578.31	244.52	167.00	397.58	377.26	139.96
KYP2-J2	PD5B	0.00	614.04	247.28	167.00	445.88	444.33	139.96
WSP-J731	PD6RD	0.00	630.59	254.35	167.00	329.57	217.73	139.96
WSP-J721	PD6RD	1.16	596.26	254.35	167.00	420.71	282.94	139.96
WSP-J754	PD6RD	0.35	586.50	254.35	167.00	417.78	284.11	139.96
WSP-J732	PD6RD	0.00	650.19	254.35	167.00	468.27	292.78	139.96
WSP-J704	PD6RD	0.00	571.97	254.37	167.00	423.60	298.06	139.96
WSP-J815	PD6RD	0.00	552.19	254.35	167.00	436.30	334.35	139.96
WSP-J728	PD6RD	0.67	552.19	254.35	167.00	437.30	336.77	139.96
WSP-J753	PD6RD	0.27	586.50	254.35	167.00	484.92	375.47	139.96
WSP-J715	PD6RD	1.16	581.61	254.35	167.00	482.87	380.16	139.96
N49198	PD6RD	8.50	561.37	254.33	167.00	470.06	401.95	139.96
WSP-J733	PD6RD	0.00	650.19	254.35	167.00	562.60	438.50	139.96
WSP-J730	PD6RD	0.00	630.59	254.35	167.00	555.56	468.14	139.96
WSP-J724	PD6RD	0.00	581.59	254.35	167.00	518.09	485.52	139.96
WSP-J727	PD6RD	0.00	571.79	254.35	167.00	511.18	492.63	139.96
WSP-J722	PD6RD	1.16	601.18	254.35	167.00	544.73	535.27	139.96
WSP-J725	PD6RD	1.02	591.38	254.35	167.00	537.21	540.56	139.96
WSP-J726	PD6RD	0.37	571.79	254.35	167.00	521.34	547.35	139.96
WSP-J718	PD6RD	0.00	601.20	254.35	167.00	548.08	548.66	139.96
WSP-J708	PD6RD	0.00	566.85	254.35	167.00	520.29	571.06	139.96
WSP-J705	PD6RD	0.79	561.95	254.35	167.00	516.09	574.23	139.96
WSP-J707	PD6RD	1.32	581.58	254.35	167.00	534.45	575.73	139.96
WSP-J719	PD6RD	1.16	601.20	254.35	167.00	561.98	656.73	139.96
WSP-J709	PD6RD	1.08	576.68	254.35	167.00	543.53	701.41	139.96
WSP-J723	PD6RD	0.00	576.70	254.35	167.00	545.27	723.64	139.96
WSP-J720	PD6RD	0.00	581.60	254.35	167.00	555.53	812.27	139.96
WSP-J716	PD6RD	1.30	611.01	254.35	167.00	585.68	851.61	139.97
WSP-J717	PD6RD	0.14	591.40	254.35	167.00	569.69	916.13	139.97
N49219	PD6RD	0.00	569.36	254.37	167.00	552.75	1003.33	139.97
N49494	PD6RD	0.00	543.87	254.37	167.00	528.74	1037.75	139.97
WSP-J712	PD6RD	0.00	591.42	254.35	167.00	577.56	1202.85	139.97
WSP-J711	PD6RD	0.14	586.52	254.35	167.00	573.21	1221.35	139.97
WSP-J710	PD6RD	0.51	576.73	254.35	167.00	564.91	1298.51	139.97
WSP-J701	PD6RD	0.00	570.68	254.36	167.00	560.48	1393.12	139.97
WSP-J713	PD6RD	1.02	591.45	254.36	167.00	580.84	1409.20	139.97
N49213	PD6RD	0.00	556.72	254.37	167.00	550.67	1842.16	139.97
WSP-J714	PD6RD	0.00	604.25	254.38	167.00	601.17	2795.32	139.99

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Full Buildout Fire Flow Table								
ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J779	PD5B	0.37	429.08	227.79	167.00	132.10	164.41	139.96
KYP2-J17	PD5B	0.00	378.98	225.43	167.00	148.86	170.47	139.96
KYP2-J18	PD5B	0.00	376.92	225.43	167.00	158.17	174.41	139.96
WSP-J520	PD5B	0.71	419.93	224.35	167.00	176.58	181.13	139.96
WSP-J789	PD5B	0.47	438.84	227.78	167.00	175.73	182.24	139.96
WSP-J788	PD5B	0.30	443.74	227.78	167.00	178.10	182.84	139.96
KYP2-J11	PD5B	0.00	335.47	225.43	167.00	181.15	189.94	139.96
WSP-J787	PD5B	0.41	438.85	227.78	167.00	191.50	190.09	139.96
KYP2-J10	PD5B	0.00	342.52	225.43	167.00	189.43	194.48	139.96
WSP-J828	PD5B	0.20	395.40	224.35	167.00	201.60	194.84	139.96
WSP-J833	PD5B	0.00	382.17	224.35	167.00	200.84	196.12	139.96
WSP-J834	PD5B	0.00	378.66	224.35	167.00	205.44	199.58	139.96
KYP2-J5	PD5B	0.00	351.15	225.43	167.00	204.59	203.73	139.96
WSP-J528	PD5B	0.00	415.00	224.35	167.00	226.57	205.93	139.96
KYP2-J4	PD5B	0.00	361.93	225.43	167.00	215.31	209.28	139.96
WSP-J533	PD5B	0.00	410.12	224.35	167.00	231.49	210.04	139.96
WSP-J561	PD5B	0.00	390.50	224.35	167.00	225.44	210.63	139.96
WSP-J567	PD5B	0.37	415.02	224.35	167.00	239.34	214.51	139.96
KYP2-J9	PD5B	0.00	361.04	225.43	167.00	222.98	215.78	139.96
KYP2-J20	PD5B	0.00	361.93	225.43	167.00	224.49	216.79	139.96
WSP-J827	PD5B	0.00	395.40	224.35	167.00	239.26	219.68	139.96
WSP-J542	PD5B	0.00	395.40	224.35	167.00	240.42	220.61	139.96
WSP-J541	PD5B	0.57	405.20	224.35	167.00	244.97	221.68	139.96
KYP2-J6	PD5B	0.00	387.40	225.43	167.00	241.16	222.31	139.96
WSP-J836	PD5B	0.68	422.22	224.35	167.00	253.00	222.48	139.96
KYP2-J12	PD5B	0.00	369.86	225.43	167.00	234.51	222.82	139.96
WSP-J786	PD5B	0.00	468.24	227.78	167.00	253.12	223.19	139.96
WSP-J517	PD5B	0.78	429.72	224.35	167.00	261.49	226.69	139.96
WSP-J531	PD5B	0.37	415.02	224.35	167.00	256.96	227.57	139.96
WSP-J540	PD5B	0.17	405.20	224.35	167.00	254.08	228.66	139.96
KYP2-J19	PD5B	0.00	369.47	225.43	167.00	241.62	229.66	139.96
WSP-J519	PD5B	0.61	419.93	224.35	167.00	267.90	235.11	139.96
WSP-J785	PD5B	0.34	448.65	227.78	167.00	262.60	239.16	139.96
WSP-J829	PD5B	0.00	395.40	224.35	167.00	261.17	239.31	139.96
WSP-J543	PD5B	0.00	400.30	224.35	167.00	263.81	239.54	139.96
WSP-J516	PD5B	0.00	429.72	224.35	167.00	279.27	240.57	139.96
WSP-J524	PD5B	0.26	419.96	224.36	167.00	277.79	243.57	139.96
WSP-J518	PD5B	0.00	424.83	224.35	167.00	280.94	244.28	139.96
KYP2-J8	PD5B	0.00	384.56	225.43	167.00	264.50	246.07	139.96
WSP-J510	PD5B	0.00	424.83	224.35	167.00	282.92	246.25	139.96
WSP-J521	PD5B	0.00	419.95	224.36	167.00	281.34	246.90	139.96
WSP-J511	PD5B	0.77	429.72	224.35	167.00	285.27	246.96	139.96
WSP-J536	PD5B	0.00	405.20	224.35	167.00	277.29	251.11	139.96
WSP-J532	PD5B	0.00	415.04	224.35	167.00	283.45	251.77	139.96
WSP-J535	PD5B	0.47	400.30	224.35	167.00	275.25	252.26	139.96
WSP-J554	PD5B	0.51	400.30	224.35	167.00	275.55	252.68	139.96
WSP-J515	PD5B	0.00	432.24	224.35	167.00	299.03	258.83	139.96
WSP-J529	PD5B	0.81	410.10	224.35	167.00	288.13	261.45	139.96
WSP-J512	PD5B	0.77	429.72	224.35	167.00	299.13	261.47	139.96
WSP-J551	PD5B	0.20	400.30	224.35	167.00	287.07	266.77	139.96
WSP-J534	PD5B	0.57	405.20	224.35	167.00	290.71	268.12	139.96
WSP-J773	PD5B	0.57	409.46	227.79	167.00	263.61	268.91	139.96
WSP-J522	PD5B	0.20	419.96	224.36	167.00	300.80	269.09	139.96
KYP2-J21	PD5B	0.00	390.54	225.43	167.00	289.66	274.29	139.96
WSP-J818	PD5B	0.45	405.20	224.35	167.00	295.95	275.41	139.96
WSP-J774	PD5B	0.47	419.26	227.78	167.00	274.01	275.83	139.96
WSP-J509	PD5B	0.61	424.83	224.35	167.00	312.91	282.47	139.96
WSP-J514	PD5B	0.77	429.85	224.35	167.00	316.20	282.78	139.96
WSP-J544	PD5B	0.00	400.30	224.35	167.00	298.68	283.71	139.96
WSP-J825	PD5B	0.00	424.86	224.36	167.00	321.79	294.81	139.96
WSP-J768	PD5B	1.01	389.95	227.79	167.00	282.00	294.81	139.96
KYP2-J7	PD5B	0.00	391.32	225.43	167.00	303.71	296.91	139.96
WSP-J772	PD5B	0.27	404.58	227.79	167.00	277.99	297.79	139.96
WSP-J538	PD5B	1.09	405.20	224.35	167.00	310.09	298.95	139.96
WSP-J513	PD5B	0.00	429.74	224.36	167.00	331.16	305.87	139.96
WSP-J539	PD5B	0.00	405.21	224.35	167.00	316.80	310.70	139.96
WSP-J803	PD5B	0.00	419.40	227.80	167.00	325.87	313.08	139.96
WSP-J857	PD5B	0.00	398.93	225.43	167.00	318.26	315.84	139.96
KYP2-J2	PD5B	0.00	399.95	225.43	167.00	320.76	319.76	139.96
WSP-J830	PD5B	0.00	402.39	227.78	167.00	283.54	324.13	139.96
WSP-J860	PD5B	0.00	409.44	227.80	167.00	344.44	324.50	139.96
WSP-J775	PD5B	0.00	390.02	227.80	167.00	318.56	325.91	139.96
WSP-J504	PD5B	0.00	429.75	224.36	167.00	343.59	330.63	139.96
WSP-J769	PD5B	0.54	399.80	227.80	167.00	325.42	336.95	139.96
WSP-J778	PD5B	0.57	419.25	227.78	167.00	302.96	340.68	139.96
WSP-J505	PD5B	0.77	429.75	224.36	167.00	347.84	341.13	139.96

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WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J530	PD5B	0.61	410.12	224.35	167.00	333.46	341.48	139.96
WSP-J777	PD5B	0.71	419.26	227.78	167.00	307.46	348.16	139.96
KYP2-J1	PD5B	0.00	391.32	225.43	167.00	327.90	355.03	139.96
WSP-J771	PD5B	0.27	404.73	227.80	167.00	349.05	359.66	139.96
WSP-J800	PD5B	0.00	404.68	227.80	167.00	332.23	373.72	139.96
KYP2-J16	PD5B	0.00	397.60	225.43	167.00	340.29	380.75	139.96
WSP-J527	PD5B	0.45	419.95	224.36	167.00	354.45	381.13	139.96
WSP-J823	PD5B	0.00	419.95	224.36	167.00	355.23	383.33	139.96
WSP-J506	PD5B	0.00	424.88	224.36	167.00	359.42	383.74	139.96
WSP-J782	PD5B	0.00	404.61	227.79	167.00	316.65	388.22	139.96
WSP-J831	PD5B	0.00	419.33	227.79	167.00	333.72	389.04	139.96
WSP-J770	PD5B	0.64	399.83	227.80	167.00	357.55	394.45	139.96
N51954	PD5B	4.24	413.47	225.43	167.00	360.34	414.62	139.96
WSP-J507	PD5B	0.26	424.90	224.36	167.00	368.94	420.68	139.96
WSP-J781	PD5B	0.00	399.70	227.79	167.00	321.77	428.12	139.96
WSP-J738	PD5B	0.00	428.95	225.43	167.00	377.45	430.10	139.96
WSP-J508	PD5B	0.00	424.92	224.36	167.00	379.11	472.60	139.96
WSP-J503	PD5B	0.00	430.02	224.38	167.00	388.56	490.23	139.96
WSP-J832	PD5B	0.57	399.89	227.81	167.00	397.97	550.02	139.96
WSP-J741	PD5B	0.14	419.25	227.78	167.00	349.54	579.46	139.96
WSP-J502	PD5B	0.00	434.92	224.38	167.00	406.68	619.36	139.96
M32130	PD5B	0.00	461.48	224.38	167.00	443.63	861.32	139.97
N04521	PD5B	21.19	453.24	224.38	167.00	438.40	978.49	139.97
M32165	PD5B	0.00	472.96	224.40	167.00	467.00	1576.30	139.97
N52100	PD5B	0.00	453.93	224.40	167.00	451.07	2510.06	139.99
WSP-J576	PD6RD	0.27	599.28	254.16	167.00	51.85	151.77	139.96
WSP-J578	PD6RD	0.00	628.67	254.16	167.00	68.22	154.79	139.96
WSP-J577	PD6RD	0.24	628.67	254.16	167.00	71.95	155.60	139.96
WSP-J837	PD6RD	0.30	620.27	254.16	167.00	121.28	163.80	139.96
WSP-J575	PD6RD	0.00	589.48	254.16	167.00	187.43	177.73	139.96
WSP-J573	PD6RD	0.37	589.48	254.16	167.00	190.10	178.77	139.96
WSP-J568	PD6RD	0.61	599.37	254.17	167.00	207.39	182.99	139.96
WSP-J574	PD6RD	0.00	609.08	254.16	167.00	226.30	187.09	139.96
WSP-J842	PD6RD	0.00	613.72	254.16	167.00	252.21	194.26	139.96
WSP-J569	PD6RD	0.00	599.38	254.17	167.00	252.59	195.28	139.96
WSP-J552	PD6RD	0.00	672.78	254.16	167.00	335.88	215.77	139.96
WSP-J826	PD6RD	0.10	687.48	254.16	167.00	341.55	215.92	139.96
WSP-J846	PD6RD	0.14	580.77	254.29	167.00	306.73	216.74	139.96
WSP-J546	PD6RD	0.27	672.78	254.16	167.00	339.09	217.22	139.96
WSP-J731	PD6RD	0.00	629.96	254.29	167.00	331.12	218.60	139.96
WSP-J547	PD6RD	0.44	648.29	254.16	167.00	339.87	221.42	139.96
WSP-J571	PD6RD	0.00	599.38	254.17	167.00	326.92	223.67	139.96
WSP-J548	PD6RD	0.74	667.89	254.16	167.00	362.22	227.59	139.96
WSP-J560	PD6RD	0.34	628.69	254.16	167.00	387.43	249.12	139.96
WSP-J757	PD6RD	1.09	600.16	254.25	167.00	377.27	250.08	139.96
WSP-J563	PD6RD	0.20	638.50	254.16	167.00	396.27	251.15	139.96
WSP-J559	PD6RD	0.00	599.32	254.16	167.00	379.36	253.26	139.96
WSP-J750	PD6RD	0.87	639.38	254.25	167.00	414.36	259.78	139.96
WSP-J807	PD6RD	0.03	648.51	254.18	167.00	418.55	259.81	139.96
WSP-J550	PD6RD	0.00	667.91	254.16	167.00	440.84	268.79	139.96
WSP-J721	PD6RD	1.16	595.65	254.29	167.00	421.14	284.25	139.96
WSP-J752	PD6RD	0.48	619.90	254.26	167.00	447.05	293.23	139.96
WSP-J847	PD6RD	0.30	622.90	254.16	167.00	444.48	294.42	139.96
WSP-J732	PD6RD	0.00	649.56	254.29	167.00	469.83	295.21	139.96
WSP-J572	PD6RD	0.37	599.37	254.17	167.00	430.81	295.47	139.96
WSP-J566	PD6RD	0.00	609.18	254.17	167.00	439.02	296.83	139.96
WSP-J704	PD6RD	0.00	571.72	254.34	167.00	423.02	297.94	139.96
WSP-J754	PD6RD	0.35	585.71	254.27	167.00	433.91	302.06	139.96
WSP-J565	PD6RD	0.24	638.58	254.17	167.00	476.69	327.22	139.96
WSP-J562	PD6RD	0.37	672.83	254.16	167.00	497.31	329.97	139.96
WSP-J795	PD6RD	0.74	614.31	254.19	167.00	475.84	335.39	139.96
WSP-J564	PD6RD	0.10	648.38	254.17	167.00	485.92	335.90	139.96
WSP-J815	PD6RD	0.00	551.56	254.29	167.00	437.86	339.08	139.96
WSP-J728	PD6RD	0.67	551.56	254.29	167.00	438.86	341.59	139.96
WSP-J792	PD6RD	0.00	609.42	254.19	167.00	480.13	346.12	139.96
WSP-J760	PD6RD	0.30	624.59	254.24	167.00	495.25	347.82	139.96
WSP-J851	PD6RD	0.00	627.26	254.17	167.00	479.69	350.44	139.96
WSP-J793	PD6RD	0.00	619.21	254.19	167.00	490.97	351.80	139.96
WSP-J764	PD6RD	0.61	658.57	254.21	167.00	529.37	364.77	139.96
WSP-J796	PD6RD	0.78	604.50	254.19	167.00	488.14	367.57	139.96
H755	PD6RD	0.00	560.46	254.29	167.00	468.02	390.92	139.96
WSP-J798	PD6RD	0.00	619.20	254.19	167.00	513.14	394.60	139.96
WSP-J558	PD6RD	0.27	618.97	254.17	167.00	482.04	401.08	139.96
N49198	PD6RD	8.50	560.96	254.29	167.00	469.33	402.07	139.96
WSP-J763	PD6RD	0.54	639.23	254.23	167.00	538.03	407.72	139.96
WSP-J791	PD6RD	0.74	629.02	254.19	167.00	527.92	411.42	139.96
WSP-J762	PD6RD	0.41	658.56	254.21	167.00	555.00	415.62	139.96

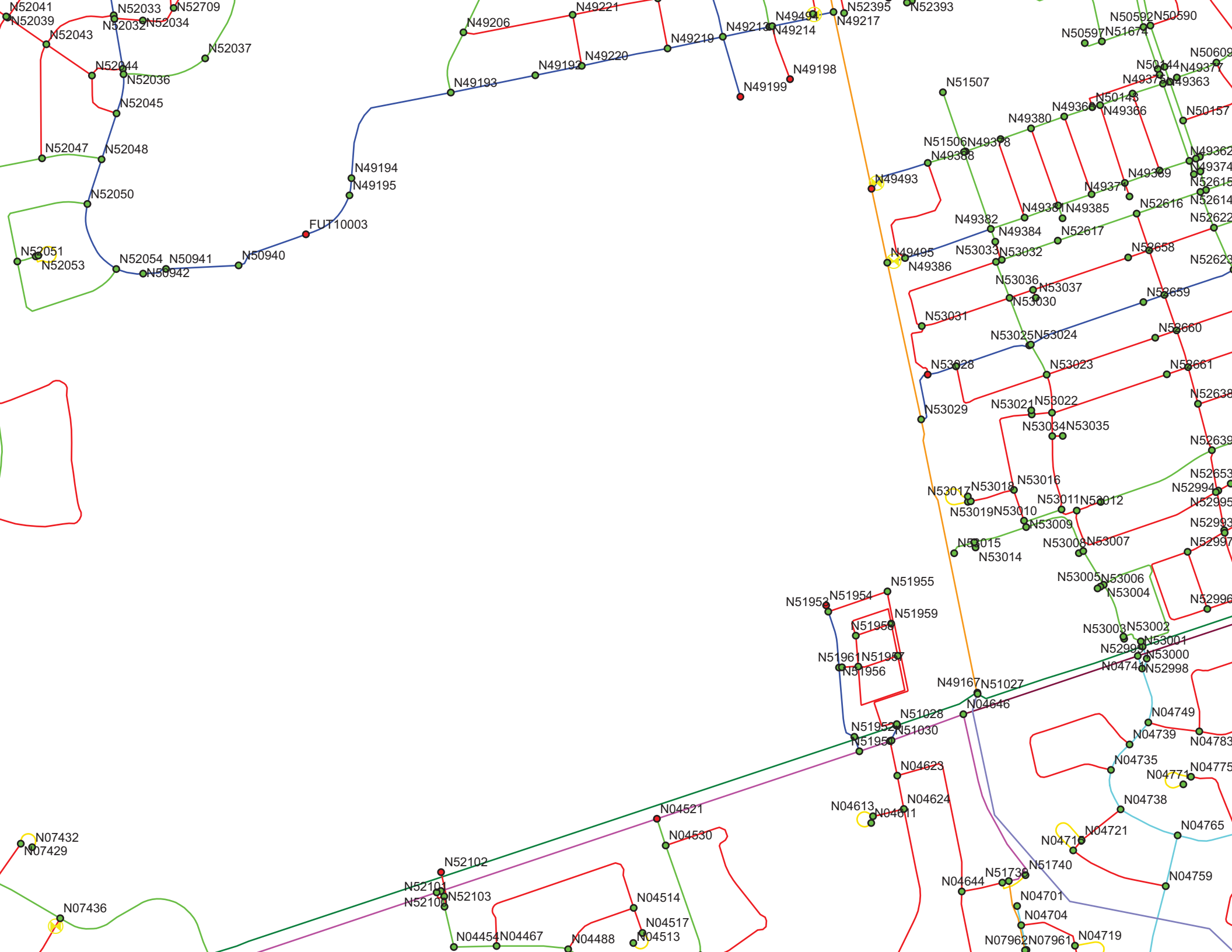
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WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J852	PD6RD	0.34	643.26	254.17	167.00	528.11	426.38	139.96
WSP-J759	PD6RD	0.00	614.80	254.24	167.00	530.78	440.27	139.96
WSP-J811	PD6RD	0.00	643.56	254.17	167.00	533.64	441.75	139.96
WSP-J733	PD6RD	0.00	649.56	254.29	167.00	564.16	447.67	139.96
WSP-J758	PD6RD	0.27	585.47	254.25	167.00	510.92	455.04	139.96
WSP-J557	PD6RD	0.00	667.97	254.17	167.00	535.41	458.67	139.96
WSP-J806	PD6RD	0.00	672.95	254.17	167.00	558.95	464.46	139.96
WSP-J756	PD6RD	0.00	575.76	254.26	167.00	508.37	474.76	139.96
WSP-J730	PD6RD	0.00	629.96	254.29	167.00	557.11	479.91	139.96
WSP-J805	PD6RD	0.41	658.25	254.17	167.00	551.19	482.32	139.96
WSP-J816	PD6RD	0.00	667.97	254.17	167.00	541.10	490.16	139.96
WSP-J761	PD6RD	0.47	653.90	254.23	167.00	578.18	492.39	139.96
WSP-J724	PD6RD	0.00	580.96	254.29	167.00	519.38	499.02	139.96
WSP-J727	PD6RD	0.00	571.16	254.29	167.00	512.74	508.50	139.96
WSP-J755	PD6RD	0.83	580.71	254.26	167.00	522.65	522.66	139.96
WSP-J751	PD6RD	0.47	610.10	254.26	167.00	551.38	536.54	139.96
WSP-J749	PD6RD	0.30	649.20	254.25	167.00	586.65	542.73	139.96
WSP-J722	PD6RD	1.16	600.56	254.29	167.00	545.16	547.03	139.96
WSP-J748	PD6RD	0.00	673.67	254.25	167.00	610.00	551.70	139.96
WSP-J725	PD6RD	1.02	590.76	254.29	167.00	538.09	556.21	139.96
WSP-J753	PD6RD	0.27	585.71	254.27	167.00	534.12	559.26	139.96
WSP-J718	PD6RD	0.00	600.59	254.29	167.00	548.44	561.33	139.96
WSP-J556	PD6RD	0.57	682.69	254.17	167.00	563.19	566.80	139.96
WSP-J726	PD6RD	0.37	571.16	254.29	167.00	522.90	569.52	139.96
WSP-J708	PD6RD	0.00	566.35	254.30	167.00	519.45	573.65	139.96
WSP-J854	PD6RD	0.00	578.25	254.26	167.00	529.39	575.62	139.96
WSP-J705	PD6RD	0.79	561.45	254.30	167.00	515.28	577.08	139.96
WSP-J707	PD6RD	1.32	581.06	254.30	167.00	533.59	579.12	139.96
WSP-J715	PD6RD	1.16	580.83	254.27	167.00	532.99	580.97	139.96
WSP-J794	PD6RD	0.71	628.98	254.19	167.00	554.09	629.88	139.96
WSP-J742	PD6RD	0.00	678.54	254.24	167.00	627.07	634.12	139.96
WSP-J804	PD6RD	0.34	648.60	254.19	167.00	574.78	645.16	139.96
WSP-J845	PD6RD	0.00	573.71	254.29	167.00	535.17	653.58	139.96
WSP-J743	PD6RD	0.37	658.93	254.24	167.00	611.43	654.62	139.96
WSP-J809	PD6RD	0.00	668.04	254.17	167.00	576.13	659.87	139.96
WSP-J810	PD6RD	0.41	663.15	254.17	167.00	576.00	660.54	139.96
WSP-J555	PD6RD	0.00	687.60	254.17	167.00	574.87	663.71	139.96
WSP-J719	PD6RD	1.16	600.60	254.29	167.00	561.96	673.78	139.96
WSP-J801	PD6RD	0.00	619.21	254.19	167.00	551.27	674.93	139.96
WSP-J812	PD6RD	0.27	658.26	254.17	167.00	576.49	679.42	139.96
WSP-J802	PD6RD	0.77	619.25	254.19	167.00	554.31	681.80	139.96
WSP-J799	PD6RD	0.00	628.96	254.19	167.00	557.21	688.03	139.96
WSP-J709	PD6RD	1.08	576.17	254.30	167.00	542.67	707.91	139.96
WSP-J790	PD6RD	0.00	633.97	254.20	167.00	572.22	713.93	139.96
WSP-J744	PD6RD	0.00	629.53	254.24	167.00	589.15	722.24	139.96
WSP-J766	PD6RD	0.00	648.75	254.20	167.00	592.87	746.14	139.96
WSP-J844	PD6RD	0.76	637.59	254.21	167.00	588.43	766.31	139.96
WSP-J723	PD6RD	0.00	576.06	254.29	167.00	546.90	778.74	139.96
WSP-J765	PD6RD	0.79	629.36	254.23	167.00	587.18	805.59	139.96
WSP-J745	PD6RD	0.00	629.52	254.24	167.00	596.52	891.64	139.97
WSP-J720	PD6RD	0.00	580.97	254.29	167.00	557.38	897.47	139.97
WSP-J746	PD6RD	1.03	629.59	254.25	167.00	599.89	929.96	139.97
WSP-J717	PD6RD	0.14	590.78	254.29	167.00	570.43	1001.52	139.97
WSP-J747	PD6RD	0.00	619.90	254.26	167.00	595.04	1004.95	139.97
WSP-J716	PD6RD	1.30	610.22	254.27	167.00	589.64	1088.61	139.97
WSP-J711	PD6RD	0.14	585.96	254.30	167.00	572.34	1288.75	139.97
WSP-J712	PD6RD	0.00	590.81	254.29	167.00	577.23	1376.94	139.97
WSP-J710	PD6RD	0.51	576.21	254.30	167.00	564.29	1379.07	139.97
H747	PD6RD	0.00	571.38	254.32	167.00	560.68	1427.77	139.97
N49199	PD6RD	8.50	571.85	254.32	167.00	561.05	1430.85	139.97
WSP-J701	PD6RD	0.00	570.30	254.32	167.00	559.84	1441.49	139.97
WSP-J713	PD6RD	1.02	590.99	254.31	167.00	580.13	1491.29	139.97

APPENDIX

C

BOUNDARY CONDITIONS


N52041
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N07436

York Downs Boundary Information

Existing scenarios, new model, with PRVs

Min Hour	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Average Day	Demand (L/s	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Max Day	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Peak Hour No PD5 Milliken pumps	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	47.68	178.13	222.13	431.17
16th/Normandale (Street B)	N52102	47.68	180.5	217.76	365.11
Bur Oak	N49493	19.35	192.72	258.47	644.31
Prospectors	N49199	19.04	195.96	254.05	569.26
Dancer's Drive	N49198	19.04	197.04	253.42	552.47
Wilfred Murison Ave	N53028	19.03	199.25	258.49	580.5
Angus Glen (in valley)	FUT10003	18.97	188	253.95	646.24
Yorkton	N51954	9.54	181.66	222.26	397.87

Peak Hour	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Max Day Fire Flow

ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
N52102	21.19	430.42	224.42	250	-675.63	132.82	140
N04521	21.19	463.18	225.4	250	419.95	910.21	140
N49493	8.79	662.33	260.31	250	631.86	1,415.45	140
N49199	8.5	573.97	254.53	250	495.2	753.75	140
N49198	8.5	562	254.39	250	-286.44	173.29	140
N53028	8.48	598.62	260.34	250	543.39	862.21	140
FUT10003	8.43	651.7	254.51	250	519.88	595	140
N51954	4.24	429.04	225.44	117	403.08	496.83	140

Notes: N52102 is the connection point on north side of 16th supplied via a 150 mm pipe. Pipe will need to be replaced or another connection made to the 16th Ave PD5 450 to support York Downs

Appendix B SANITARY SEWER DESIGN SHEETS

Sanitary Sewer Design Sheets prepared by Stantec Consulting Ltd. dated October 2017.

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	839	840	0.19	0.19	8		3.80	30	30	4.00	0.05	0.51	0.56	200	1.00	32.80	1.04	2%
	840	842	0.19	0.38	4		3.80	15	46	4.00	0.10	0.77	0.87	200	1.60	41.49	1.32	2%
	854	842	0.54	0.54	11		3.89	43	43	4.00	0.14	0.72	0.86	200	3.00	56.81	1.81	2%
	842	844	0.06	0.98	2		3.80	8	96	4.00	0.25	1.62	1.88	200	0.50	23.19	0.74	8%
	844	846	0.29	1.27	11		3.80	42	138	4.00	0.33	2.33	2.66	200	0.50	23.19	0.74	11%
	129	130	0.09	0.09	4		4.00	16	16	4.00	0.02	0.27	0.29	200	1.00	32.80	1.04	1%
	130	136	0.30	0.39	10		4.00	40	56	4.00	0.10	0.95	1.05	200	0.50	23.19	0.74	5%
	136	856	0.00	0.39	0		0.00	0	56	4.00	0.10	0.95	1.05	200	0.50	23.19	0.74	5%
	856	846	0.36	0.75	5		4.00	20	76	4.00	0.20	1.28	1.48	200	1.70	42.76	1.36	3%
	846	848	0.20	2.22	2		4.00	8	222	4.00	0.58	3.75	4.32	200	1.40	38.81	1.24	11%
	848	850	0.08	3.40	2		4.00	8	405	4.00	0.88	6.84	7.73	200	0.50	23.19	0.74	33%
	850	852	0.15	3.55	0		0.00	0	405	4.00	0.92	6.84	7.77	200	2.50	51.86	1.65	15%
	877	878	0.10	0.10	4		3.80	15	15	4.00	0.03	0.26	0.28	200	1.00	32.80	1.04	1%
	878	872	0.00	0.10	0		0.00	0	15	4.00	0.03	0.26	0.28	200	1.00	32.80	1.04	1%
	869	870	0.19	0.19	6		4.00	24	24	4.00	0.05	0.41	0.45	200	2.00	46.38	1.48	1%
	870	872	0.06	0.25	0		4.00	0	24	4.00	0.06	0.41	0.47	200	1.00	32.80	1.04	1%
	872	874	0.34	0.69	13		4.00	52	91	4.00	0.18	1.54	1.72	200	0.50	23.19	0.74	7%
	874	848	0.41	1.10	21		4.00	84	175	4.00	0.29	2.96	3.25	200	1.40	38.81	1.24	8%
	882	883	0.74	0.74	14		4.00	56	56	4.00	0.19	0.95	1.14	200	2.00	46.38	1.48	2%
	883	852	0.65	1.39	10		4.00	40	96	4.00	0.36	1.62	1.98	200	1.50	40.17	1.28	5%
	926	889	1.06	1.06	0	60.00		64	64	4.00	0.28	1.07	1.35	200	1.00	32.80	1.04	4%
	1477	178	0.13	0.13	6		3.80	23	23	4.00	0.03	0.39	0.42	200	1.00	32.80	1.04	1%
	178	180	0.14	0.27	2		4.00	8	31	4.00	0.07	0.52	0.59	200	3.50	61.36	1.95	1%
	180	182	0.13	0.40	3		4.00	12	43	4.00	0.10	0.72	0.83	200	0.50	23.19	0.74	4%
	182	887	0.00	0.40	0		0.00	0	43	4.00	0.10	0.72	0.83	200	0.50	23.19	0.74	4%
	886	887	0.24	0.24	9		4.00	36	36	4.00	0.06	0.61	0.67	200	1.00	32.80	1.04	2%
	887	889	0.19	0.83	2		4.00	8	87	4.00	0.22	1.47	1.68	200	0.50	23.19	0.74	7%
	889	891	0.19	2.07	3		4.00	12	162	4.00	0.54	2.74	3.28	200	0.50	23.19	0.74	14%
	891	893	0.49	2.93	5		4.00	20	230	4.00	0.76	3.89	4.66	200	0.50	23.19	0.74	20%
	922	923	0.19	0.19	7		4.00	28	28	4.00	0.05	0.47	0.52	200	1.00	32.80	1.04	2%
	923	891	0.19	0.37	5		4.00	20	48	4.00	0.10	0.81	0.91	200	0.50	23.19	0.74	4%
	912	913	0.07	0.07	3		3.80	11	11	4.00	0.02	0.19	0.21	200	1.00	32.80	1.04	1%
	913	915	0.04	0.11	0		0.00	0	11	4.00	0.03	0.19	0.22	200	1.00	32.80	1.04	1%
	915	917	0.32	0.43	15		3.80	57	68	4.00	0.11	1.16	1.27	200	0.50	23.19	0.74	5%
	917	893	0.32	0.75	19		3.80	72	141	4.00	0.20	2.38	2.57	200	0.50	23.19	0.74	11%
	893	895	0.16	3.84	1		4.00	4	375	4.00	1.00	6.34	7.34	200	0.50	23.19	0.74	32%
	1423	909	0.28	0.28	18		3.80	68	68	4.00	0.07	1.16	1.23	200	1.00	32.80	1.04	4%
	909	895	0.36	0.64	18		3.80	68	137	4.00	0.17	2.31	2.48	200	0.50	23.19	0.74	11%
	900	901	0.11	0.11	4		3.80	15	15	4.00	0.03	0.26	0.29	200	1.00	32.80	1.04	1%
	901	903	0.03	0.14	0		0.00	0	15	4.00	0.04	0.26	0.29	200	1.00	32.80	1.04	1%
	903	905	0.34	0.48	16		3.80	61	76	4.00	0.12	1.28	1.41	200	0.50	23.19	0.74	6%
	905	897	0.33	0.81	18		3.80	68	144	4.00	0.21	2.44	2.65	200	0.50	23.19	0.74	11%
	895	897	0.13	4.61	0		0.00	0	512	3.97	1.20	8.58	9.78	200	0.50	23.19	0.74	42%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	897	852	0.22	5.64	3		4.00	12	668	3.91	1.47	11.03	12.49	200	0.50	23.19	0.74	54%
	Ex.29	Ex.100	45.60	45.60	0	61.21		2791	2791	3.47	11.86	40.90	52.76	525	0.60	333.12	1.54	16%
	Ex.100	852	0.00	45.60	0		0.00	0	2791	3.47	11.86	40.90	52.76	525	0.44	285.27	1.32	18%
	852	Ex.101	0.31	56.49	2		4.00	8	3968	3.34	14.69	55.93	70.62	525	0.44	285.27	1.32	25%
	Ex.101	862	0.28	56.77	6		4.00	24	3992	3.33	14.76	56.23	70.99	525	0.50	304.10	1.40	23%
	1424	860	0.19	0.19	12		3.80	46	46	4.00	0.05	0.77	0.82	200	3.00	56.81	1.81	1%
	860	862	0.31	0.50	4		3.80	15	61	4.00	0.13	1.03	1.16	200	3.00	56.81	1.81	2%
	928	862	0.36	0.36	11		3.80	42	42	4.00	0.09	0.71	0.80	200	2.30	49.74	1.58	2%
	862	864	0.46	58.09	16		3.80	61	4156	3.32	15.10	58.26	73.36	525	0.50	304.10	1.40	24%
	932E	933	0.04	0.04	0		0.00	0	0	4.00	0.01	0.00	0.01	200	3.00	56.81	1.81	0%
	933	935	0.10	0.14	2		3.80	8	8	4.00	0.04	0.13	0.16	200	3.00	56.81	1.81	0%
	1421	858	0.45	0.45	18		3.80	68	68	4.00	0.12	1.16	1.27	200	2.00	46.38	1.48	3%
	858	935	0.50	0.95	18		3.80	68	137	4.00	0.25	2.31	2.56	200	2.00	46.38	1.48	6%
	935	938	0.33	1.42	14		3.80	53	198	4.00	0.37	3.34	3.71	200	1.50	40.17	1.28	9%
	938	864	0.33	1.75	10		3.80	38	236	4.00	0.46	3.98	4.44	200	2.00	46.38	1.48	10%
	930	1425	0.14	0.14	7		3.80	27	27	4.00	0.04	0.45	0.49	200	1.00	32.80	1.04	1%
	1425	864	0.32	0.46	8		3.80	30	57	4.00	0.12	0.96	1.08	200	0.50	23.19	0.74	5%
	864	866	0.46	60.76	16		3.80	61	4509	3.29	15.80	62.60	78.40	525	0.50	304.10	1.40	26%
	1426	966	0.33	0.33	16		3.80	61	61	4.00	0.09	1.03	1.11	200	2.00	46.38	1.48	2%
	966	866	0.60	0.93	18		3.80	68	129	4.00	0.24	2.18	2.43	200	2.00	46.38	1.48	5%
	866	51	0.46	62.15	16		3.80	61	4699	3.27	16.16	64.91	81.07	525	0.50	304.10	1.40	27%
	932W	941	0.26	0.26	4		4.00	16	16	4.00	0.07	0.27	0.34	200	1.50	40.17	1.28	1%
	941	48	0.30	0.56	4		4.00	16	32	4.00	0.15	0.54	0.69	200	1.50	40.17	1.28	2%
	Ex.1	Ex.84	713.00	713.00	0	54.65		38965	38965	2.37	185.38	389.61	574.99	750	0.28	589.09	1.33	98%
	Ex.84	47	0.00	713.00	0		0.00	0	38965	2.37	185.38	389.61	574.99	750	0.30	609.77	1.38	94%
	47	48	0.00	713.00	0		0.00	0	38965	2.37	185.38	389.61	574.99	750	0.40	704.10	1.59	82%
	48	49	0.14	713.70	2		4.00	8	39005	2.37	185.56	389.94	575.50	750	0.40	704.10	1.59	82%
	49	50	0.31	714.02	5		4.00	20	39025	2.37	185.64	390.11	575.75	750	0.40	704.10	1.59	82%
	50	51	0.30	714.32	4		4.00	16	39041	2.37	185.72	390.24	575.96	750	0.40	704.10	1.59	82%
	51	52	0.26	776.73	2		4.00	8	43748	2.32	201.95	428.58	630.53	750	0.35	658.62	1.49	96%
	52	53	0.22	776.95	4		4.00	16	43764	2.32	202.01	428.71	630.72	750	0.35	658.62	1.49	96%
	53	54	0.23	779.64	4		4.00	16	44045	2.32	202.71	430.98	633.69	750	0.35	658.62	1.49	96%
	54	950	0.26	779.90	5		4.00	20	44065	2.32	202.77	431.14	633.91	750	0.35	658.62	1.49	96%
School	1410	53	2.46	2.46	0	107.90		265	265	4.00	0.64	4.49	5.13	200	1.00	32.80	1.04	16%
	956	957	0.42	0.42	8		4.00	32	32	4.00	0.11	0.54	0.65	200	1.00	32.80	1.04	2%
	957	959	0.31	0.74	5		4.00	20	52	4.00	0.19	0.88	1.07	200	2.90	55.85	1.78	2%
	959	961	0.20	0.94	3		4.00	12	64	4.00	0.24	1.08	1.33	200	2.90	55.85	1.78	2%
	961	963	0.37	1.31	6		4.00	24	88	4.00	0.34	1.49	1.83	200	2.90	55.85	1.78	3%
	963	946	0.24	1.55	2		4.00	8	96	4.00	0.40	1.62	2.03	200	2.90	55.85	1.78	4%
	943	944	0.63	0.63	27		4.00	108	108	4.00	0.16	1.83	1.99	200	1.00	32.80	1.04	6%
	944	946	0.18	0.81	0		0.00	0	108	4.00	0.21	1.83	2.04	200	0.50	23.19	0.74	9%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =**	Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =**	Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =**	Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =**	Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =**	Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	946	948	0.41	2.77	7		4.00	28	232	4.00	0.72	3.92	4.64	200	1.00	32.80	1.04	14%
	948	950	0.30	3.07	4		4.00	16	248	4.00	0.80	4.19	4.99	200	2.90	55.85	1.78	9%
	950	952	0.07	783.04	0		0.00	0	44313	2.31	203.59	433.14	636.73	750	0.34	649.15	1.47	98%
	952	954	0.00	783.04	0		0.00	0	44313	2.31	203.59	433.14	636.73	750	0.34	649.15	1.47	98%
	954	Ex.8	0.00	783.04	0		0.00	0	44313	2.31	203.59	433.14	636.73	750	0.34	649.15	1.47	98%
	Ex.8	Ex.9	0.00	783.04	0		0.00	0	44313	2.31	203.59	433.14	636.73	750	0.43	730.02	1.65	87%
	Ex.9	Ex.10	0.00	783.04	0		0.00	0	44313	2.31	203.59	433.14	636.73	750	0.39	695.24	1.57	92%
	1465	1466	1.91	1.91	0	475.00		907	907	3.83	0.50	14.67	15.16	200	1.00	32.80	1.04	46%
	1466	1462	0.00	1.91	0		0.00	0	907	3.83	0.50	14.67	15.16	200	1.00	32.80	1.04	46%
Church	1459	1460	1.64	1.64	0	107.90		177	177	4.00	0.43	2.99	3.42	200	1.00	32.80	1.04	10%
	1460	1462	0.00	1.64	0		0.00	0	177	4.00	0.43	2.99	3.42	200	1.00	32.80	1.04	10%
	1462	Ex.10	0.00	3.55	0		0.00	0	1084	3.78	0.92	17.30	18.22	200	1.00	32.80	1.04	56%
	1469	Ex.10	0.93	0.93	30		3.80	114	114	4.00	0.24	1.93	2.17	200	1.00	32.80	1.04	7%
	Ex.10	Ex.589U	0.00	787.52	0		0.00	0	45512	2.30	204.76	442.75	647.50	750	0.45	746.81	1.69	87%
	Ex.588U	Ex.589U	1.61	1.61	0	89.44		144	144	4.00	0.42	2.43	2.85	200	0.50	23.19	0.74	12%
	Ex.589U	Ex.11	0.13	789.26	0		0.00	0	45656	2.30	205.21	443.90	649.11	750	0.45	746.81	1.69	87%
	Ex.11	Ex.590U	0.12	789.38	0		0.00	0	45656	2.30	205.24	443.90	649.14	750	0.41	712.85	1.61	91%
	Ex.590U	Ex.652U	0.00	789.38	0		0.00	0	45656	2.30	205.24	443.90	649.14	750	0.41	712.85	1.61	91%
	Ex.587U	Ex.652U	2.00	2.00	0	99.00		198	198	4.00	0.52	3.35	3.87	200	2.00	46.38	1.48	8%
	Ex.652U	Ex.654U	0.14	791.52	0		0.00	0	45854	2.30	205.80	445.48	651.28	750	0.41	712.85	1.61	91%
	Ex.653U	Ex.654U	0.76	0.76	0	210.53		160	160	4.00	0.20	2.70	2.90	300	0.98	95.73	1.35	3%
	Ex.654U	Ex.279R	0.00	792.28	0		0.00	0	46014	2.30	205.99	446.76	652.75	750	0.43	730.02	1.65	89%
	Ex.279R	Ex.278R	0.00	792.28	3		3.80	11	46025	2.30	205.99	446.85	652.84	750	1.31	1274.20	2.88	51%
	1427	1039	0.49	0.49	11		4.00	44	44	4.00	0.13	0.74	0.87	200	2.50	51.86	1.65	2%
	1039	1041	0.11	0.59	2		4.00	8	52	4.00	0.15	0.88	1.03	200	0.50	23.19	0.74	4%
	1041	1036	0.40	1.00	4		4.00	16	68	4.00	0.26	1.15	1.41	200	0.50	23.19	0.74	6%
	1036	1022	0.46	2.17	4		4.00	16	152	4.00	0.56	2.57	3.13	200	0.50	23.19	0.74	14%
	1034	1036	0.71	0.71	17		4.00	68	68	4.00	0.18	1.15	1.33	200	1.00	32.80	1.04	4%
	1021	1022	0.51	0.51	14		3.80	53	53	4.00	0.13	0.90	1.03	200	1.00	32.80	1.04	3%
	1022	1024	0.32	3.00	8		3.80	30	236	4.00	0.78	3.98	4.76	200	0.50	23.19	0.74	21%
	1044E	1045	0.09	0.09	2		4.00	8	8	4.00	0.02	0.14	0.16	200	1.00	32.80	1.04	0%
	1045	1047	0.41	0.51	8		4.00	32	40	4.00	0.13	0.68	0.81	200	0.70	27.44	0.87	3%
	1047	1024	0.41	0.92	5		4.00	20	60	4.00	0.24	1.01	1.25	200	0.70	27.44	0.87	5%
	1024	1026	0.38	4.30	5		4.00	20	316	4.00	1.12	5.33	6.45	200	0.50	23.19	0.74	28%
	1044W	1050	0.36	0.36	8		4.00	32	32	4.00	0.09	0.54	0.63	200	1.00	32.80	1.04	2%
	1050	1052	0.11	0.47	2		4.00	8	40	4.00	0.12	0.68	0.80	200	0.50	23.19	0.74	3%
	1052	1054	0.49	0.97	8		4.00	32	72	4.00	0.25	1.22	1.47	200	0.50	23.19	0.74	6%
	1054	1026	0.49	1.46	5		4.00	20	92	4.00	0.38	1.55	1.93	200	0.50	23.19	0.74	8%
	1026	1028	0.32	6.08	8		3.80	30	438	4.00	1.58	7.40	8.98	200	0.50	23.19	0.74	39%
	1057E	1058	0.09	0.09	2		4.00	8	8	4.00	0.02	0.14	0.16	200	2.50	51.86	1.65	0%
	1058	1060	0.38	0.47	8		4.00	32	40	4.00	0.12	0.68	0.80	200	2.50	51.86	1.65	2%
	1060	1028	0.48	0.95	4		4.00	16	56	4.00	0.25	0.95	1.19	200	2.50	51.86	1.65	2%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocity m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1028	1030	0.40	7.43	10		3.80	38	532	3.96	1.93	8.90	10.83	200	0.50	23.19	0.74	47%
	1079E	1080	0.34	0.34	5		4.00	20	20	4.00	0.09	0.34	0.43	200	1.00	32.80	1.04	1%
	1080	1067	0.22	0.56	4		4.00	16	36	4.00	0.15	0.61	0.75	200	0.50	23.19	0.74	3%
	1057W	1063	0.48	0.48	6		4.00	24	24	4.00	0.12	0.41	0.53	200	1.00	32.80	1.04	2%
	1063	1065	0.62	1.10	10		4.00	40	64	4.00	0.29	1.08	1.37	200	2.00	46.38	1.48	3%
	1065	1067	0.28	1.38	0		0.00	0	64	4.00	0.36	1.08	1.44	200	3.50	61.36	1.95	2%
	1067	1069	0.48	2.42	9		4.00	36	136	4.00	0.63	2.30	2.93	200	0.50	23.19	0.74	13%
	1441	1074	0.26	0.26	6		4.00	24	24	4.00	0.07	0.41	0.47	200	2.00	46.38	1.48	1%
	1074	1076	0.31	0.58	7		4.00	28	52	4.00	0.15	0.88	1.03	200	1.80	44.00	1.40	2%
	1076	1069	0.15	0.73	1		4.00	4	56	4.00	0.19	0.95	1.14	200	0.50	23.19	0.74	5%
	1069	1071	0.10	3.25	3		4.00	12	204	4.00	0.84	3.45	4.29	200	0.50	23.19	0.74	19%
	1071	1030	0.12	3.37	0		0.00	0	204	4.00	0.88	3.45	4.32	200	0.50	23.19	0.74	19%
	1030	1032	0.28	11.08	6		3.80	23	759	3.87	2.88	12.42	15.30	200	0.50	23.19	0.74	66%
	1092	1093	0.33	0.33	5		4.00	20	20	4.00	0.09	0.34	0.42	200	2.00	46.38	1.48	1%
	1093	1083	0.23	0.56	1		4.00	4	24	4.00	0.15	0.41	0.55	200	0.80	29.34	0.93	2%
	1133E	1134	0.23	0.23	3		4.00	12	12	4.00	0.06	0.20	0.26	200	1.00	32.80	1.04	1%
	1134	1083	0.12	0.35	1		4.00	4	16	4.00	0.09	0.27	0.36	200	3.20	58.67	1.87	1%
	1079W	1083	0.15	0.15	2		4.00	8	8	4.00	0.04	0.14	0.17	200	1.00	32.80	1.04	1%
	1083	1085	0.14	1.20	1		4.00	4	52	4.00	0.31	0.88	1.19	200	0.50	23.19	0.74	5%
	1085	1087	0.23	1.43	4		4.00	16	68	4.00	0.37	1.15	1.52	200	0.50	23.19	0.74	7%
	1087	1089	0.48	1.91	8		4.00	32	100	4.00	0.50	1.69	2.19	200	0.50	23.19	0.74	9%
	1089	1032	0.48	2.39	8		4.00	32	132	4.00	0.62	2.23	2.85	200	0.50	23.19	0.74	12%
	1032	1101	0.17	13.64	0		0.00	0	891	3.83	3.55	14.42	17.97	200	0.50	23.19	0.74	77%
	1133W	1132	0.12	0.12	2		4.00	8	8	4.00	0.03	0.14	0.17	200	1.50	40.17	1.28	0%
	1132	1138	0.15	0.27	1		4.00	4	12	4.00	0.07	0.20	0.27	200	1.50	40.17	1.28	1%
	1138	1140	0.15	0.42	2		4.00	8	20	4.00	0.11	0.34	0.45	200	1.50	40.17	1.28	1%
	1140	1142	0.17	0.58	1		4.00	4	24	4.00	0.15	0.41	0.56	200	1.50	40.17	1.28	1%
	1142	1144	0.37	0.96	6		4.00	24	48	4.00	0.25	0.81	1.06	200	0.50	23.19	0.74	5%
	1144	1146	0.06	1.02	0		0.00	0	48	4.00	0.26	0.81	1.08	200	0.50	23.19	0.74	5%
	1146	1107	0.31	1.33	9		4.00	36	84	4.00	0.35	1.42	1.77	200	0.50	23.19	0.74	8%
	1442	1103	0.31	0.31	6		4.00	24	24	4.00	0.08	0.41	0.49	200	1.00	32.80	1.04	1%
	1103	1105	0.05	0.36	2		4.00	8	32	4.00	0.09	0.54	0.63	200	1.00	32.80	1.04	2%
	1105	1107	0.38	0.74	4		4.00	16	48	4.00	0.19	0.81	1.00	200	0.50	23.19	0.74	4%
	1107	1101	0.34	2.41	6		4.00	24	156	4.00	0.63	2.64	3.26	200	0.50	23.19	0.74	14%
	1110	1111	0.29	0.29	5		4.00	20	20	4.00	0.08	0.34	0.41	200	1.00	32.80	1.04	1%
	1111	1113	0.37	0.66	4		4.00	16	36	4.00	0.17	0.61	0.78	200	0.50	23.19	0.74	3%
	1113	1101	0.37	1.03	10		4.00	40	76	4.00	0.27	1.28	1.55	200	0.50	23.19	0.74	7%
	1101	1119	0.36	17.44	6		4.00	24	1147	3.76	4.53	18.22	22.75	250	0.50	42.05	0.86	54%
	1119	1444	0.36	18.59	6		4.00	24	1227	3.74	4.83	19.39	24.22	250	0.50	42.05	0.86	58%
	1444	1122	0.36	18.94	7		4.00	28	1255	3.73	4.92	19.80	24.72	250	0.50	42.05	0.86	59%
	1149	1150	0.26	0.26	5		4.00	20	20	4.00	0.07	0.34	0.41	200	1.00	32.80	1.04	1%
	1150	1152	0.00	0.26	0		0.00	0	20	4.00	0.07	0.34	0.41	200	1.00	32.80	1.04	1%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =**	Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =**	Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =**	Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =**	Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =**	Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1152	1117	0.00	0.26	0		0.00	0	20	4.00	0.07	0.34	0.41	200	0.50	23.19	0.74	2%
	1117	1119	0.53	0.79	9		4.00	36	56	4.00	0.21	0.95	1.15	200	0.50	23.19	0.74	5%
	1116	1125	0.32	0.32	7		4.00	28	28	4.00	0.08	0.47	0.56	200	1.00	32.80	1.04	2%
	1125	1127	0.32	0.64	5		4.00	20	48	4.00	0.17	0.81	0.98	200	0.50	23.19	0.74	4%
	1127	1129	0.08	0.72	0		0.00	0	48	4.00	0.19	0.81	1.00	200	0.50	23.19	0.74	4%
	1129	1122	0.37	1.09	4		4.00	16	64	4.00	0.28	1.08	1.36	200	2.00	46.38	1.48	3%
	1122	981	0.26	20.29	4		4.00	16	1335	3.72	5.28	20.95	26.23	250	0.50	42.05	0.86	62%
	1443	1096	0.58	0.58	12		4.00	48	48	4.00	0.15	0.81	0.96	200	1.00	32.80	1.04	3%
	1096	1098	0.73	1.32	15		4.00	60	108	4.00	0.34	1.83	2.17	200	0.50	23.19	0.74	9%
	1098	979	0.28	1.60	3		4.00	12	120	4.00	0.42	2.03	2.44	200	2.00	46.38	1.48	5%
	1428	971	0.58	0.58	12		4.00	48	48	4.00	0.15	0.81	0.96	200	1.00	32.80	1.04	3%
	971	973	0.71	1.28	16		4.00	64	112	4.00	0.33	1.89	2.23	200	0.50	23.19	0.74	10%
	973	975	0.28	1.57	3		4.00	12	124	4.00	0.41	2.10	2.50	200	0.70	27.44	0.87	9%
	975	977	0.05	1.62	0		4.00	0	124	4.00	0.42	2.10	2.52	200	1.00	32.80	1.04	8%
	977	979	0.41	4.32	8		4.00	32	293	4.00	1.12	4.96	6.08	200	0.50	23.19	0.74	26%
	1412	977	2.29	2.29	0	60.00		137	137	4.00	0.60	2.32	2.92	200	1.00	32.80	1.04	9%
	995W	1018	0.41	0.41	8		4.00	32	32	4.00	0.11	0.54	0.65	200	1.00	32.80	1.04	2%
	1018	979	0.23	0.64	3		4.00	12	44	4.00	0.17	0.74	0.91	200	0.50	23.19	0.74	4%
	979	981	0.12	6.68	0		0.00	0	457	3.99	1.74	7.72	9.45	200	0.50	23.19	0.74	41%
	1414	981	0.70	0.70	0	60.00		42	42	4.00	0.18	0.71	0.89	200	1.00	32.80	1.04	3%
	981	983	0.26	27.93	4		4.00	16	1850	3.61	7.26	28.23	35.49	250	0.50	42.05	0.86	84%
	983	985	0.06	27.99	2		4.00	8	1858	3.61	7.28	28.34	35.62	250	0.50	42.05	0.86	85%
	985	987	0.24	28.23	4		4.00	16	1874	3.61	7.34	28.56	35.90	250	0.50	42.05	0.86	85%
	987	989	0.24	28.47	1		4.00	4	1878	3.61	7.40	28.62	36.02	250	0.50	42.05	0.86	86%
	1431	993	0.48	0.48	11		4.00	44	44	4.00	0.13	0.74	0.87	200	1.00	32.80	1.04	3%
	993	995S	0.58	1.06	10		4.00	40	84	4.00	0.28	1.42	1.70	200	0.50	23.19	0.74	7%
	995S	997	0.39	1.45	9		4.00	36	120	4.00	0.38	2.03	2.40	200	0.50	23.19	0.74	10%
	1004W	1015	0.08	0.08	1		4.00	4	4	4.00	0.02	0.07	0.09	200	1.00	32.80	1.04	0%
	1015	997	0.74	0.82	13		4.00	52	56	4.00	0.21	0.95	1.16	200	0.80	29.34	0.93	4%
	997	999	0.41	2.68	9		4.00	36	212	4.00	0.70	3.58	4.28	200	0.50	23.19	0.74	18%
	999	1001	0.17	2.85	1		4.00	4	216	4.00	0.74	3.65	4.39	200	0.50	23.19	0.74	19%
	1004S	1006	0.27	0.27	4		4.00	16	16	4.00	0.07	0.27	0.34	200	1.00	32.80	1.04	1%
	1006	1008	0.05	0.32	0		0.00	0	16	4.00	0.08	0.27	0.35	200	0.50	23.19	0.74	2%
	1008	1010	0.38	0.70	3		4.00	12	28	4.00	0.18	0.47	0.65	200	0.50	23.19	0.74	3%
	1010	1012	0.18	0.88	3		4.00	12	40	4.00	0.23	0.68	0.90	200	0.50	23.19	0.74	4%
	1012	1001	0.11	0.99	2		4.00	8	48	4.00	0.26	0.81	1.07	200	0.50	23.19	0.74	5%
	1001	989	0.66	4.50	9		4.00	36	300	4.00	1.17	5.07	6.24	200	0.50	23.19	0.74	27%
	989	991	0.00	32.97	0		0.00	0	2178	3.56	8.57	32.73	41.30	250	1.00	59.47	1.21	69%
	991	1416	0.00	32.97	0		0.00	0	2178	3.56	8.57	32.73	41.30	250	1.00	59.47	1.21	69%
	1416	1418	0.00	32.97	0		0.00	0	2178	3.56	8.57	32.73	41.30	250	1.00	59.47	1.21	69%
	1418	1389S	0.00	32.97	0		0.00	0	2178	3.56	8.57	32.73	41.30	300	0.50	68.38	0.97	60%
	1155E	1156	0.20	0.20	2		4.00	8	8	4.00	0.05	0.14	0.19	200	1.00	32.80	1.04	1%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**	**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$	**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00		**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**	**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA	**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	Manhole		Area	Accum. Area	Units	Density		Section	Accum.	Peaking Factor	Infil. Flow	Design Flow	Total Flow	Size	Slope	Full Capacity	Full Velocity	Q_A/Q_C
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1156	1158	0.88	1.08	5		4.00	20	28	4.00	0.28	0.47	0.75	200	0.50	23.19	0.74	3%
	1155S	1160	0.53	0.53	4		4.00	16	16	4.00	0.14	0.27	0.41	200	1.00	32.80	1.04	1%
	1160	1158	0.22	0.75	1		4.00	4	20	4.00	0.20	0.34	0.53	200	0.50	23.19	0.74	2%
	1158	1163	0.52	2.35	5		4.00	20	68	4.00	0.61	1.15	1.76	200	0.50	23.19	0.74	8%
	1163	1165	0.29	2.64	1		4.00	4	72	4.00	0.69	1.22	1.90	200	0.50	23.19	0.74	8%
	1167N	1168	0.56	0.56	7		4.00	28	28	4.00	0.14	0.47	0.62	200	4.00	65.60	2.09	1%
	1168	1170	0.09	0.64	1		4.00	4	32	4.00	0.17	0.54	0.71	200	0.50	23.19	0.74	3%
	1170	1165	0.20	0.84	1		4.00	4	36	4.00	0.22	0.61	0.83	200	3.00	56.81	1.81	1%
	1165	1173	0.17	3.65	0		0.00	0	108	4.00	0.95	1.83	2.77	200	0.50	23.19	0.74	12%
	1173	1175	0.06	3.72	0		0.00	0	108	4.00	0.97	1.83	2.79	200	0.50	23.19	0.74	12%
	1175	1177	0.20	3.92	3		4.00	12	120	4.00	1.02	2.03	3.05	200	0.50	23.19	0.74	13%
	1177	1179	0.06	3.98	2		4.00	8	128	4.00	1.04	2.16	3.20	200	0.50	23.19	0.74	14%
	1179	1181	0.15	4.13	2		4.00	8	136	4.00	1.07	2.30	3.37	200	1.00	32.80	1.04	10%
	1181	1183	0.06	4.19	0		0.00	0	136	4.00	1.09	2.30	3.39	200	1.00	32.80	1.04	10%
	1183	1185	0.32	4.51	3		4.00	12	148	4.00	1.17	2.50	3.67	200	1.00	32.80	1.04	11%
	1197	1198	0.28	0.28	4		4.00	16	16	4.00	0.07	0.27	0.34	200	3.50	61.36	1.95	1%
	1198	1185	0.34	0.62	5		4.00	20	36	4.00	0.16	0.61	0.77	200	5.00	73.34	2.33	1%
	1185	1201	0.42	5.55	3		4.00	12	196	4.00	1.44	3.31	4.75	200	0.50	23.19	0.74	20%
	1201	1203	0.42	5.96	7		4.00	28	224	4.00	1.55	3.79	5.34	200	1.50	40.17	1.28	13%
	1203	1205	0.50	6.46	7		4.00	28	252	4.00	1.68	4.26	5.94	200	1.00	32.80	1.04	18%
	1205	1207	0.18	6.64	0		0.00	0	252	4.00	1.73	4.26	5.98	200	0.50	23.19	0.74	26%
	1167S	1213	0.60	0.60	7		4.00	28	28	4.00	0.16	0.47	0.63	200	2.50	51.86	1.65	1%
	1213	1215	0.40	1.00	5		4.00	20	48	4.00	0.26	0.81	1.07	200	0.70	27.44	0.87	4%
	1215	1217	0.26	1.26	2		4.00	8	56	4.00	0.33	0.95	1.27	200	0.70	27.44	0.87	5%
	1219E	1217	0.37	0.37	5		4.00	20	20	4.00	0.10	0.34	0.43	200	2.40	50.81	1.62	1%
	1217	1221	0.41	2.04	4		4.00	16	92	4.00	0.53	1.55	2.09	200	0.50	23.19	0.74	9%
	1221	1187S	0.38	2.42	5		4.00	20	112	4.00	0.63	1.89	2.52	200	3.00	56.81	1.81	4%
	1187E	1210	0.39	0.39	5		4.00	20	20	4.00	0.10	0.34	0.44	200	2.00	46.38	1.48	1%
	1210	1207	0.57	0.96	10		4.00	40	60	4.00	0.25	1.01	1.26	200	2.00	46.38	1.48	3%
	1207	1193	0.25	7.85	0		0.00	0	312	4.00	2.04	5.27	7.31	200	0.50	23.19	0.74	32%
	1187S	1189	0.14	2.56	0		0.00	0	112	4.00	0.67	1.89	2.56	200	0.50	23.19	0.74	11%
	1266	1267	0.13	0.13	2		4.00	8	8	4.00	0.03	0.14	0.17	200	2.00	46.38	1.48	0%
	1267	1189	0.42	0.55	4		4.00	16	24	4.00	0.14	0.41	0.55	200	3.20	58.67	1.87	1%
	1189	1191	0.18	3.29	2		4.00	8	144	4.00	0.86	2.43	3.29	200	0.50	23.19	0.74	14%
	1191	1193	0.29	3.58	4		4.00	16	160	4.00	0.93	2.70	3.63	200	0.50	23.19	0.74	16%
	1193	1195	0.50	11.93	14		3.80	53	525	3.96	3.10	8.79	11.89	200	0.50	23.19	0.74	51%
	1195	1277	0.25	13.52	3		3.80	11	617	3.93	3.52	10.23	13.75	200	0.50	23.19	0.74	59%
	1277	1279	0.44	14.34	12		3.80	46	750	3.88	3.73	12.28	16.01	200	0.50	23.19	0.74	69%
	1282	1195	1.34	1.34	0	60.00		80	80	4.00	0.35	1.36	1.71	200	1.00	32.80	1.04	5%
	1270	1271	0.13	0.13	8		3.80	30	30	4.00	0.03	0.51	0.55	200	2.00	46.38	1.48	1%
	1271	1273	0.13	0.26	8		3.80	30	61	4.00	0.07	1.03	1.09	200	2.00	46.38	1.48	2%
	1273	1275	0.12	0.38	7		3.80	27	87	4.00	0.10	1.48	1.58	200	2.00	46.38	1.48	3%
	1275	1277	0.00	0.38	0		0.00	0	87	4.00	0.10	1.48	1.58	200	2.00	46.38	1.48	3%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1284	1285	2.00	2.00	0	475.00		950	950	3.81	0.52	15.31	15.83	200	1.00	32.80	1.04	48%
	1285	1299	0.39	2.39	6		4.00	24	974	3.81	0.62	15.67	16.29	200	1.00	32.80	1.04	50%
	1299	1301	0.39	2.77	7		4.00	28	1002	3.80	0.72	16.08	16.80	200	0.50	23.19	0.74	72%
	1301	1279	0.23	3.00	0		0.00	0	1002	3.80	0.78	16.08	16.86	200	0.50	23.19	0.74	73%
	1279	1304	0.50	17.84	20		3.80	76	1828	3.62	4.64	27.92	32.56	250	0.50	42.05	0.86	77%
	1307	1308	0.46	0.46	11		4.00	44	44	4.00	0.12	0.74	0.86	200	1.00	32.80	1.04	3%
	1308	1304	0.30	0.76	0		0.00	0	44	4.00	0.20	0.74	0.94	200	0.50	23.19	0.74	4%
	1253E	1254	0.13	0.13	1		4.00	4	4	4.00	0.03	0.07	0.10	200	2.00	46.38	1.48	0%
	1254	1256	0.50	0.63	4		4.00	16	20	4.00	0.16	0.34	0.50	200	2.00	46.38	1.48	1%
	1253W	1258	0.68	0.68	5		4.00	20	20	4.00	0.18	0.34	0.52	200	1.00	32.80	1.04	2%
	1258	1260	0.22	0.90	1		4.00	4	24	4.00	0.23	0.41	0.64	200	0.50	23.19	0.74	3%
	1260	1256	0.65	1.55	4		4.00	16	40	4.00	0.40	0.68	1.08	200	0.80	29.34	0.93	4%
	1256	1251	0.41	2.59	4		4.00	16	76	4.00	0.67	1.28	1.96	200	0.50	23.19	0.74	8%
	1246S	1251	0.45	0.45	5		4.00	20	20	4.00	0.12	0.34	0.45	200	2.00	46.38	1.48	1%
	1246E	1247	0.15	0.15	2		4.00	8	8	4.00	0.04	0.14	0.17	200	1.00	32.80	1.04	1%
	1247	1249	0.48	0.63	4		4.00	16	24	4.00	0.16	0.41	0.57	200	2.70	53.89	1.72	1%
	1251	1249	0.13	3.17	2		4.00	8	104	4.00	0.82	1.76	2.58	200	1.00	32.80	1.04	8%
	1249	1226	0.23	4.03	2		4.00	8	136	4.00	1.05	2.30	3.35	200	1.40	38.81	1.24	9%
	1219W	1224	0.07	0.07	1		4.00	4	4	4.00	0.02	0.07	0.09	200	3.00	56.81	1.81	0%
	1224	1226	0.65	0.72	9		4.00	36	40	4.00	0.19	0.68	0.86	200	1.50	40.17	1.28	2%
	1226	1228	0.68	5.43	9		4.00	36	212	4.00	1.41	3.58	4.99	200	0.50	23.19	0.74	22%
	1228	1230	0.46	5.89	5		4.00	20	232	4.00	1.53	3.92	5.45	200	2.00	46.38	1.48	12%
	1230	1232	0.46	6.34	7		4.00	28	260	4.00	1.65	4.39	6.04	200	2.00	46.38	1.48	13%
	1232	1234	0.50	6.84	2		4.00	8	268	4.00	1.78	4.53	6.31	200	0.70	27.44	0.87	23%
	1238	1234	0.25	0.25	3		4.00	12	12	4.00	0.07	0.20	0.27	200	1.00	32.80	1.04	1%
	1240	1236	0.26	0.26	3		4.00	12	12	4.00	0.07	0.20	0.27	200	1.00	32.80	1.04	1%
	1234	1236	0.00	7.09	0		0.00	0	280	4.00	1.84	4.73	6.57	200	1.00	32.80	1.04	20%
	1242	1243	0.17	0.17	3		4.00	12	12	4.00	0.04	0.20	0.25	200	1.00	32.80	1.04	1%
	1243	1236	0.07	0.24	0		0.00	0	12	4.00	0.06	0.20	0.27	200	1.00	32.80	1.04	1%
	1236	1311	0.44	8.03	7		4.00	28	332	4.00	2.09	5.61	7.70	200	0.50	23.19	0.74	33%
	1311	1313	0.44	8.46	10		4.00	40	372	4.00	2.20	6.29	8.49	200	0.50	23.19	0.74	37%
	1313	1315	0.08	8.54	2		4.00	8	380	4.00	2.22	6.42	8.64	200	0.50	23.19	0.74	37%
	1315	1304	0.55	9.09	3		4.00	12	392	4.00	2.36	6.62	8.99	200	0.70	27.44	0.87	33%
	1304	1297	0.53	28.22	19		3.80	72	2336	3.53	7.34	34.86	42.20	300	0.50	68.38	0.97	62%
	1448	1287	0.38	0.38	6		4.00	24	24	4.00	0.10	0.41	0.50	200	1.80	44.00	1.40	1%
	1287	1289	0.24	0.62	3		4.00	12	36	4.00	0.16	0.61	0.77	200	0.50	23.19	0.74	3%
	1289	1291	0.17	0.79	2		4.00	8	44	4.00	0.20	0.74	0.95	200	0.50	23.19	0.74	4%
	1291	1293	0.15	0.93	1		4.00	4	48	4.00	0.24	0.81	1.05	200	0.50	23.19	0.74	5%
	1293	1295	0.47	1.40	13		4.00	52	100	4.00	0.36	1.69	2.05	200	0.50	23.19	0.74	9%
	1295	1297	0.47	1.87	5		4.00	20	120	4.00	0.49	2.03	2.51	200	0.50	23.19	0.74	11%
	1318N	1319	0.44	0.44	6		4.00	24	24	4.00	0.11	0.41	0.52	200	1.00	32.80	1.04	2%
	1319	1321	0.44	0.88	6		4.00	24	48	4.00	0.23	0.81	1.04	200	0.50	23.19	0.74	4%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocty m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1321	1323	0.05	0.93	1		4.00	4	52	4.00	0.24	0.88	1.12	200	0.50	23.19	0.74	5%
	1323	1325	0.43	1.35	7		4.00	28	80	4.00	0.35	1.35	1.70	200	0.50	23.19	0.74	7%
	1325	1297	0.38	1.73	2		4.00	8	88	4.00	0.45	1.49	1.94	200	0.80	29.34	0.93	7%
	1297	1328	0.41	32.23	14		3.80	53	2597	3.49	8.38	38.35	46.73	300	0.50	68.38	0.97	68%
	1357	1358	0.18	0.18	11		3.80	42	42	4.00	0.05	0.71	0.75	200	1.00	32.80	1.04	2%
	1358	1360	0.18	0.36	12		3.80	46	87	4.00	0.09	1.48	1.57	200	1.00	32.80	1.04	5%
	1360	1328	0.00	0.36	0		0.00	0	87	4.00	0.09	1.48	1.57	200	1.00	32.80	1.04	5%
	1318E	1344	0.10	0.10	1		4.00	4	4	4.00	0.03	0.07	0.09	200	1.00	32.80	1.04	0%
	1344	1346	0.41	0.51	5		4.00	20	24	4.00	0.13	0.41	0.54	200	0.50	23.19	0.74	2%
	1346	1348	0.14	0.64	2		4.00	8	32	4.00	0.17	0.54	0.71	200	0.50	23.19	0.74	3%
	1348	1350	0.29	0.94	2		4.00	8	40	4.00	0.24	0.68	0.92	200	0.50	23.19	0.74	4%
	1350	1352	0.29	1.23	3		4.00	12	52	4.00	0.32	0.88	1.20	200	0.50	23.19	0.74	5%
	1352	1354	0.48	1.71	6		4.00	24	76	4.00	0.44	1.28	1.73	200	0.50	23.19	0.74	7%
	1354	1328	0.20	1.91	1		4.00	4	80	4.00	0.50	1.35	1.85	200	4.00	65.60	2.09	3%
	1328	1330	0.22	34.72	0		0.00	0	2765	3.47	9.03	40.56	49.58	300	0.50	68.38	0.97	73%
	1330	1332	0.27	37.14	0		0.00	0	2894	3.46	9.66	42.25	51.90	300	0.50	68.38	0.97	76%
	1408	1330	2.15	2.15	0	60.00		129	129	4.00	0.56	2.18	2.74	200	1.00	32.80	1.04	8%
	1363	1332	0.15	0.15	8		3.80	30	30	4.00	0.04	0.51	0.55	200	1.00	32.80	1.04	2%
	1332	1334	0.17	37.46	0		0.00	0	2924	3.45	9.74	42.64	52.38	300	0.50	68.38	0.97	77%
	1334	1336	0.00	37.46	0		0.00	0	2924	3.45	9.74	42.64	52.38	300	0.50	68.38	0.97	77%
	1336	1338	0.00	37.46	0		0.00	0	2924	3.45	9.74	42.64	52.38	300	0.50	68.38	0.97	77%
	1405	1338	3.54	3.54	0	475.00		1682	1682	3.64	0.92	25.88	26.80	200	1.00	32.80	1.04	82%
	1338	1340	0.00	41.00	0		0.00	0	4606	3.28	10.66	63.78	74.44	375	0.50	123.98	1.12	60%
	1447	1453	0.28	0.28	8		3.80	30	30	4.00	0.07	0.51	0.59	200	1.00	32.80	1.04	2%
	1453	1454	0.45	0.73	11		3.80	42	72	4.00	0.19	1.22	1.41	200	0.50	23.19	0.74	6%
	1454	1456	0.53	1.26	13		3.80	49	122	4.00	0.33	2.05	2.38	200	2.70	53.89	1.72	4%
	1367	1379	0.33	0.33	6		4.00	24	24	4.00	0.09	0.41	0.49	200	1.00	32.80	1.04	1%
	1379	1381	0.08	0.41	0		0.00	0	24	4.00	0.11	0.41	0.51	200	1.00	32.80	1.04	2%
	1381	1365	0.18	0.58	0		0.00	0	24	4.00	0.15	0.41	0.56	200	1.00	32.80	1.04	2%
	1365	1384	0.32	0.91	14		4.00	56	80	4.00	0.24	1.35	1.59	200	1.00	32.80	1.04	5%
	1384	1376	0.54	1.45	27		4.00	108	188	4.00	0.38	3.18	3.55	200	2.80	54.88	1.75	6%
	1368	1370	0.38	0.38	4		4.00	16	16	4.00	0.10	0.27	0.37	200	1.00	32.80	1.04	1%
	1370	1372	0.29	0.68	5		4.00	20	36	4.00	0.18	0.61	0.78	200	0.50	23.19	0.74	3%
	1372	1374	0.52	1.20	9		4.00	36	72	4.00	0.31	1.22	1.53	200	0.50	23.19	0.74	7%
	1389W	1387	0.50	0.50	10		4.00	40	40	4.00	0.13	0.68	0.81	200	1.00	32.80	1.04	2%
	1387	1374	0.75	1.25	13		4.00	52	92	4.00	0.33	1.55	1.88	200	0.50	23.19	0.74	8%
	1374	1376	0.13	2.58	0		0.00	0	164	4.00	0.67	2.77	3.44	200	0.50	23.19	0.74	15%
	1446	1395	0.43	0.43	20		3.80	76	76	4.00	0.11	1.28	1.40	200	1.00	32.80	1.04	4%
	1395	1376	0.72	1.15	28		3.80	106	182	4.00	0.30	3.08	3.38	200	0.50	23.19	0.74	15%
	1376	1456	0.12	5.30	0		0.00	0	534	3.96	1.38	8.94	10.32	200	0.50	23.19	0.74	44%
	1456	1450	0.58	7.14	16		3.80	61	717	3.89	1.86	11.78	13.63	200	0.50	23.19	0.74	59%
	1389S	1391	0.02	32.99	0		0.00	0	2178	3.56	8.58	32.73	41.31	300	0.50	68.38	0.97	60%

4134 16TH AVENUE
Sanitary Sewer Design Sheet

Project Number:	1606 22264	**Mannings 'n':**	0.013	**Max. Capacity (%):**	85%	**Harmon Peaking Factor:**		**Q =** Design Flow (L/s)
Date:	October 2017	**Min. Velocity (m/s):**	0.75	**Infiltration Flow (L/s):**	0.26	$M = 1+(14/(4+P^{0.5}))$		**q =** Average Domestic Flow (L/c/d)
Consultant:	Stantec Ltd.	**Max. Velocity m/s):**	3.65	**Max. Peaking Factor:**	4.00			**P =** Population/1000
City File Number:	N/A	**Min. Pipe Slope (%):**	0.50%	**Min. Peaking Factor:**	1.50	**Design Flow:**		**I =** Infiltration Flow
Designed By	James Luk	**Avg. Domestic Flow, q (L/c/d):**	365			Q = (MqP/86.4) + IA		**A =** Gross Drainage Area (ha)

Location			Contributing Area					Population		Design Calculations				Capacity Calculations				
Street	**Manhole**		**Area**	**Accum. Area**	**Units**	**Density**		**Section**	**Accum.**	**Peaking Factor**	**Infil. Flow**	**Design Flow**	**Total Flow**	**Size**	**Slope**	**Full Capacity**	**Full Velocity**	**Q_A/Q_C**
	U/S	D/S	(ha)	0.00		(p/ha)	(p/unit)				(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(m/s)	(%)
	1391	1393	0.12	33.11	0		0.00	0	2178	3.56	8.61	32.73	41.34	300	0.50	68.38	0.97	60%
	1393	1398	0.12	33.23	0		0.00	0	2178	3.56	8.64	32.73	41.37	300	0.50	68.38	0.97	60%
	1398	1400	0.00	33.23	0		0.00	0	2178	3.56	8.64	32.73	41.37	300	0.50	68.38	0.97	60%
	1400	1340	0.00	33.23	0		0.00	0	2178	3.56	8.64	32.73	41.37	300	0.50	68.38	0.97	60%
	1403	1449	1.29	1.29	0	60.00		77	77	4.00	0.34	1.31	1.64	200	1.00	32.80	1.04	5%
	1449	1450	0.26	1.55	8		3.80	30	108	4.00	0.40	1.82	2.22	200	0.50	23.19	0.74	10%
	1450	1340	0.00	8.69	0		0.00	0	825	3.85	2.26	13.42	15.68	200	1.00	32.80	1.04	48%
	1340	1407	0.35	83.27	0		0.00	0	7609	3.07	21.65	98.73	120.38	450	0.50	201.60	1.27	60%
	1407	1342	0.00	83.27	0		0.00	0	7609	3.07	21.65	98.73	120.38	450	1.00	285.11	1.79	42%

Appendix C SWM CALCULATIONS

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 26-Oct-17

Summary of Pond 1 - Pond 4 Volumes

Pond #	Site Area (ha)	External Area (ha)	Total Area (ha)	Imperviousness	Required Permanent Pool Size (m^3)	Provided Permanent Pool Size (m^3)	Unrouted Extended Detention Size (m^3)	100 yr storage (m3)	Total Storage Vol
1	63.87	82.95	146.82	59%	22,896	72,347	24,857	77,823	150,170
2	5.25	6.59	11.84	70%	2,149	6,082	2,123	6,790	12,872
3	22.80		22.80	70%	4,097	10,497	4,172	13,052	23,549
4	29.24		29.24	61%	4,718	5,561	4,982	-	5,561
Infiltration Facility 1	1.85		1.85	62%			316		

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 1 Permanent Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	5.8	3.5	
Park Block	0.40	4.0	1.6	
School Block	0.75	2.5	1.8	
Townhouses - Stacked	0.85	5.3	4.5	
Townhouses - Back-to-back	0.75	0.7	0.5	
Medium Density	0.85	0.0	0.0	
Mixed Use	0.85	0.0	0.0	
Singles	0.65	45.6	29.6	
Subtotal Proposed	*0.65*	*63.87*	*41.6*	62%
Existing				
Berczy Village	0.61	52.9	32.3	
Berczy Village	0.61	18.2	11.1	
Berzy Village School	0.58	5.6	3.2	
Berczy Village Commercial	0.84	1.0	0.8	
Berczy Village Commercial	0.84	2.2	1.8	
Kennedy Road	0.65	3.2	2.0	
Subtotal Existing	*0.62*	*82.95*	*51.3*	*57%*
Total	0.63	146.82	92.9	59%

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid
Imperviousness %	59	
MOE, SWMPDM Table 3.2 Volume	196 m³/ha	
	156 m³/ha	Less 40 m³/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release Rate
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	(m^3/s)
Level 1 Wet Pond	22896	5873	24857	0.216

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from V02

RV = 16.93 mm >>>> (For minimum of 48 hr extended detention)

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 1 Storage Calculations

Input

Base of Pond =	176.50	
N.W.L. =	179.50	masl
Increment for Volume =	0.1	m
Required Permanent Pool Volume =	**22896**	m^3
Permanent Pool Volume Provided =	**72347**	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	176.50	0.00	14,928	14,928		0		
	177.00	0.50	15,768	15,768	15,348	7,674	**7,674**	**0**
	177.50	1.00	16,637	16,637	16,202	8,101	**15,775**	**0**
	178.00	1.50	27,422	27,422	22,029	11,015	**26,790**	**0**
	178.50	2.00	29,085	29,085	28,254	14,127	**40,917**	**0**
	179.00	2.50	30,814	30,814	29,950	14,975	**55,891**	**0**
NWL	179.50	3.00	35,008	35,008	32,911	16,455	**72,347**	**0**
	180.00	3.50	37,686	37,686	36,347	18,173	**90,520**	**18,173**
	180.50	4.00	38,895	38,895	38,291	19,145	**109,666**	**37,319**
	181.00	4.50	40,145	40,145	39,520	19,760	**129,425**	**57,079**
	181.50	5.00	41,436	41,436	40,791	20,395	**149,821**	**77,474**
Pond Top	181.80	5.30	42,224	42,224	41,830	12,549	**162,370**	**90,023**

Stantec

Project Description: 4134 16th Avenue - Pond 1 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Pond 1 Control Structure Design Details

Orifice 1 (Round Only)

Invert =	179.50	m
Size =	0.37	m
C=	0.62	
Obvert =	179.87	m



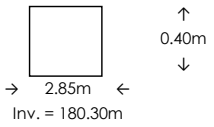
Orifice and Orifice Tube

$$Q = (C)(A)\sqrt{2g\Delta h}$$

Where,
Q = flow rate (m^3/s)
Δh = differential head measured from the centroid of the orifice (m)
g = acceleration due to gravity (m/s^2)
C = coefficient of discharge

Orifice 3 Square

Invert =	180.30	m
Length =	2.85	m
C =	0.62	
Obvert =	180.70	m
Midpoint=	180.50	
Height =	0.40	m
Numbr of Contractions =	2.00	
P=	0.7	m
B=	50	m



*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

Broad Crested Weir 1

Length =	215.00	m
Elevation =	181.60	m
Side Slp =	15.00	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	4.5	m



Refer to Emergency Spillway Calculation

Sharp Crested Weir 3

Length =	2.85	m
Elevation =	181.15	m
Side Slp =	0.00	
Breadth =	0.20	m
Column index no. =	3	(for lookup value of C)
Numbr of Contractions =	2.00	
P=	0.7	m
B=	50	m



Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

To calculate the flow through a contracted sharp crested weir 2 equations are used:

Francis Equation:

For S.I. units: $Q = 1.84(L - 0.2H)H^{3/2}$, where

- **Q** is the water flow rate in m^3/sec,
- **L** is the length of the weir in m, and
- **H** is the head over the weir in m.
- **B** is the width of the channel in m, and
- H_{max} is the maximum expected head over the weir in m.

Kindsvater-Carter Equation:

S.I. units: $Q = C_e(2/3)[(2g)^{1/2}](L + k_b)(H + 0.001)^{3/2}$

Use Francis equation when H/L<= 0.33

Stantec

Project Description: 4134 16th Avenue - Pond 1 Outlet Control Calculations
Job Number: 160622264
Creation Date: 1-Nov-17
Author: TN

Extended Detention - 100 Year Pond Outlet Design

Start Elevation Set to NWL (m) **179.5**
Increment (m) **0.05**

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Control Structure 3 Flow Orifice/Weir Flow (m^3/s)	Weir 1 Outflow (cms)	Weir 3 Outflow (cms)	Total Flow (cms)	Storage (m^3)
179.50	0.000	0.00	0.000	0.000	0.000	0
179.55	0.006	0.00	0.000	0.000	0.006	1757
179.60	0.018	0.00	0.000	0.000	0.018	3527
179.65	0.033	0.00	0.000	0.000	0.033	5310
179.70	0.050	0.00	0.000	0.000	0.050	7107
179.75	0.071	0.00	0.000	0.000	0.071	8917
179.80	0.093	0.00	0.000	0.000	0.093	10741
179.85	0.117	0.00	0.000	0.000	0.117	12578
179.90	0.137	0.00	0.000	0.000	0.137	14428
179.95	0.152	0.00	0.000	0.000	0.152	16293
180.00	0.166	0.00	0.000	0.000	0.166	18167
180.05	0.178	0.00	0.000	0.000	0.178	20047
180.10	0.190	0.00	0.000	0.000	0.190	21933
180.15	0.201	0.00	0.000	0.000	0.201	23825
180.20	0.212	0.00	0.000	0.000	0.212	25723
180.25	0.222	0.00	0.000	0.000	0.222	27627
180.30	0.232	0.00	0.000	0.000	0.232	29538
180.35	0.241	0.06	0.000	0.000	0.299	31454
180.40	0.250	0.16	0.000	0.000	0.414	33376
180.45	0.258	0.30	0.000	0.000	0.560	35305
180.50	0.267	0.46	0.000	0.000	0.729	37239
180.55	0.275	0.64	0.000	0.000	0.919	39180
180.60	0.282	0.84	0.000	0.000	1.126	41127
180.65	0.290	1.06	0.000	0.000	1.349	43080
180.70	0.297	1.29	0.000	0.000	1.587	45040
180.75	0.305	1.57	0.000	0.000	1.870	47006
180.80	0.312	1.71	0.000	0.000	2.027	48978
180.85	0.319	1.85	0.000	0.000	2.171	50956
180.90	0.325	1.98	0.000	0.000	2.306	52941
180.95	0.332	2.10	0.000	0.000	2.432	54931
181.00	0.339	2.21	0.000	0.000	2.552	56929
181.05	0.345	2.32	0.000	0.000	2.667	58932
181.10	0.351	2.43	0.000	0.000	2.776	60942
181.15	0.357	2.52	0.000	0.000	2.881	62959
181.20	0.363	2.62	0.000	0.058	3.041	64982
181.25	0.369	2.71	0.000	0.165	3.245	67011
181.30	0.375	2.80	0.000	0.301	3.477	69047
181.35	0.381	2.89	0.000	0.462	3.730	71089
181.40	0.387	2.97	0.000	0.644	4.001	73138
181.45	0.392	3.05	0.000	0.844	4.287	75194
181.50	0.398	3.13	0.000	1.059	4.588	77255
181.55	0.403	3.21	0.000	1.289	4.901	79324
181.60	0.409	3.28	0.000	1.533	5.225	81399
181.65	0.414	3.36	3.594	1.789	9.154	83481
181.70	0.419	3.43	10.201	2.056	16.106	85569
181.75	0.424	3.50	18.805	2.335	25.065	87664
181.80	0.429	3.57	29.053	2.623	35.675	89765

Stantec

Project Description: 4134 16th Avenue - Pond 1 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Drawdown Calculations

	Outlet
Normal Water Level =	179.50 m
Orifice Size =	0.370 m
Orifice Level (midpoint of orifice) =	179.685 m
Orifice area (ao)=	0.1075 m^2
Orifice Coefficient =	0.62
Orifice Discharge Equation =	$Q = C_2 * Ao * (2 g h)^{1/2}$

Stage (m)	Head Above Orifice Centre Outlet (m)	Surface Area (m2)	Incremental Volume (m3)	Accumulated Volume (m3)	Calculated Surface Area Ap (m2)	Orifice Discharge Q (m3)
179.50	0.000	35,008	0	0	35,838	0.000
179.75	0.065	36,327	8917	8,917	36,784	0.075
180.00	0.315	37,686	9252	18,168	37,730	0.166
180.25	0.565	38,285	9496	27,665	38,676	0.222
180.50	0.815	38,895	9648	37,312	39,622	0.267
180.75	1.065	39,515	9801	47,114	40,568	0.305

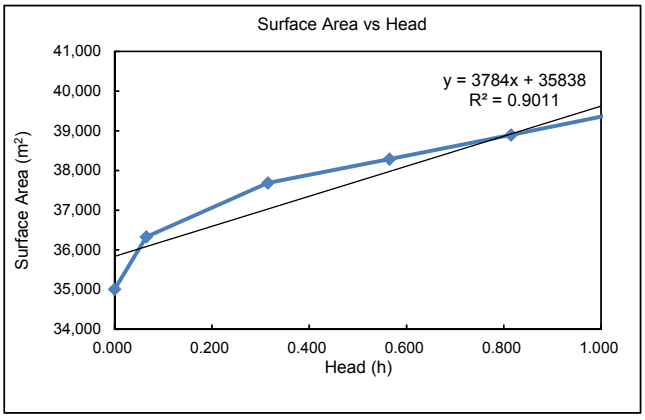
Regression Output:

X Coefficient	3784.00 C_2
Constant	35838.0 C_3
R^2	0.9011

$Ap = C_2*h + C_3$

t = (0.66*c2*h^1.5 + 2*c3*h^0.5)/(2.75 Ao)

Ao =	Main Orifice	0.108 m^2
ED Runoff		17.00 mm
Site Area		148.45 ha
Unrouted Extended Detention Volume :		25,237 m^3
Corresponding Head above Midpoint of Orifice:		0.50 m
Corresponding Surface Area (Ap) =		37,734 m^2
Corresponding Stage =		180.19 mASL
Max Orifice Discharge =		0.209 m^3/s
Drain time (s) =		174,588 s
Drain time (hr) =		48.50 hr > 48 hr



Stantec

Project Description 4134 16th Avenue - Pond 1 Outlet Control Calculations
Job Number 160622264
Date 11/1/2017 15:35
Author TN

Emergency Spillway Calculations (Weir 1)

$Q_{Spillway}$ =	51.981	m^3/s	*100 Year Unattenuated Flow
Weir Invert =	181.55	m	
Weir Length =	215.00	m	
Side Slopes =	15.00	:1	
Max Weir Height =	0.30	m	

Rectangular Broad Crested Weir

$Q=CLH^{1.5}$

assuming:	H =	0.300	m
	L =	215.00	m
	C =	1.45	
	Q =	51.23	m^3/s
	Area =	64.50	m^2

V Notch Weir

$Q=C(\tan \Phi/2)H^{2.5}$

assuming:	H =	0.300	m
	Side Slope =	15	:1
	C =	1.45	
	Q =	1.07	m^3/s
	Area =	1.35	m^2

Total Weir Flow = ***52.298*** ***m^3/s***

Velocity = 0.79 m/s

Note:

L = H x SS =	*4.50*	*m*
$\Phi/2$ = arctan (L/H)=	*86.19*	*deg*
tan ($\Phi/2$) = tan 84.29 =	*15*	*m*

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 2 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	1.03	0.6	
Park Block	0.40	0.23	0.1	
School Block	0.75	0.00	0.0	
Townhouses - Stacked	0.85	0.22	0.2	
Townhouses - Back-to-back	0.75	0.00	0.0	
Medium Density	0.85	1.69	1.4	
Mixed Use	0.85	0.00	0.0	
Singles	0.65	2.07	1.3	
Subtotal Proposed	*0.70*	*5.25*	*3.7*	*70%*
Existing				
Yorkton + Ext	0.71	6.59	4.69	
Subtotal Existing	*0.71*	**6.59**	**4.69**	*71%*
Total	**0.71**	**11.84**	**8.38**	*70%*

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4	
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid	
Imperviousness %	70		
MOE, SWMPDM Table 3.2 Volume	222	m^3/ha	
	182	m^3/ha	Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	**Rate** (m^3/s)
Level 1 Wet Pond	2149	474	2123	0.018

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event fromV02

RV = 17.93 mm >>>> (For minimum of 48 hr extended detention)

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 11/1/2017

SWM Pond 2 Storage Calculations

Input

Base of Pond =	178.50	
N.W.L. =	181.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	2149	m^3
Permanent Pool Volume Provided =	6082	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	178.50	0.00	797	797		0		
	179.00	0.50	1,039	1,039	918	459	**459**	**0**
	179.50	1.00	1,311	1,311	1,175	587	**1,046**	**0**
	180.00	1.50	1,936	1,936	1,624	812	**1,858**	**0**
	180.50	2.00	2,431	2,431	2,183	1,092	**2,950**	**0**
	181.00	2.50	2,978	2,978	2,704	1,352	**4,302**	**0**
NWL	181.50	3.00	4,145	4,145	3,561	1,781	**6,082**	**0**
	182.00	3.50	5,186	5,186	4,665	2,333	**8,415**	**2,333**
	182.50	4.00	5,684	5,684	5,435	2,717	**11,132**	**5,050**
	183.00	4.50	6,205	6,205	5,944	2,972	**14,105**	**8,022**
Pond Top	183.50	5.00	6,760	6,760	6,482	3,241	**17,346**	**11,264**

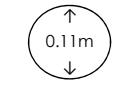
Stantec

Project Description: 4134 16th Avenue - Pond 2 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Control Structure Design Details

Orifice 1 (Round Only)

Invert =	181.50	m
Size =	0.11	m
C=	0.62	
Obvert =	181.61	m



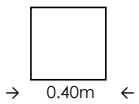
Orifice and Orifice Tube

$$Q = (C)(A)\sqrt{2g\Delta h}$$

Where,
Q = flow rate (m^3/s)
Δh = differential head measured from the centroid of the orifice (m)
g = acceleration due to gravity (m/s^2)
C = coefficient of discharge

Orifice 3 Square

Invert =	182.20	m
Length =	0.40	m
C =	0.62	
Obvert =	182.80	m
Midpoint=	182.50	
Height =	0.60	m
Numbr of Contractions =	2.00	
P=	0.7	m
B=	50	m

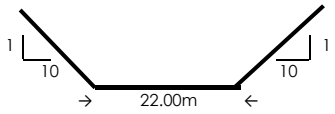


*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

Broad Crested Weir 1

Length =	22.00	m
Elevation =	182.90	m
Side Slp =	10.00	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	4.5	m



Refer to Emergency Spillway Calculation

To calculate the flow through a contracted sharp crested weir 2 equations are used:

Francis Equation:

For S.I. units: $Q = 1.84(L - 0.2H)H^{3/2}$, where

- **Q** is the water flow rate in m^3/sec,
- **L** is the length of the weir in m, and
- **H** is the head over the weir in m.
- **B** is the width of the channel in m, and
- H_{max} is the maximum expected head over the weir in m.

Kindsvater-Carter Equation:

S.I. units: $Q = C_e(2/3)[(2g)^{1/2}](L + k_b)(H + 0.001)^{3/2}$

Use Francis equation when H/L<= 0.33

Stantec

Project Description: 4134 16th Avenue - Pond 2 Outlet Control Calculations
Job Number: 160622264
Creation Date: 1-Nov-17
Author: TN

Extended Detention - 100 Year Pond Outlet Design

Start Elevation Set to NWL (m) **181.5**
Increment (m) **0.05**

Upstream Elevation (m)	Orifice 1 Outflow m^3/s	Orifice 3 Outflow m^3/s	Weir 1 Outflow m^3/s	Weir 2 Outflow m^3/s	Total Flow m^3/s	Storage (m^3)
181.50	0.000	0.00	0.000	0.000	0.000	0
181.55	0.002	0.00	0.000	0.000	0.002	210
181.60	0.005	0.00	0.000	0.000	0.005	425
181.65	0.008	0.00	0.000	0.000	0.008	644
181.70	0.010	0.00	0.000	0.000	0.010	869
181.75	0.012	0.00	0.000	0.000	0.012	1099
181.80	0.013	0.00	0.000	0.000	0.013	1335
181.85	0.014	0.00	0.000	0.000	0.014	1576
181.90	0.015	0.00	0.000	0.000	0.015	1822
181.95	0.016	0.00	0.000	0.000	0.016	2073
182.00	0.017	0.00	0.000	0.000	0.017	2329
182.05	0.018	0.00	0.000	0.000	0.018	2587
182.10	0.019	0.00	0.000	0.000	0.019	2847
182.15	0.020	0.00	0.000	0.000	0.020	3110
182.20	0.021	0.00	0.000	0.000	0.021	3376
182.25	0.022	0.01	0.000	0.000	0.030	3644
182.30	0.023	0.02	0.000	0.000	0.045	3914
182.35	0.023	0.05	0.000	0.000	0.064	4187
182.40	0.024	0.07	0.000	0.000	0.086	4462
182.45	0.025	0.10	0.000	0.000	0.112	4740
182.50	0.025	0.13	0.000	0.000	0.140	5021
182.55	0.026	0.16	0.000	0.000	0.170	5303
182.60	0.027	0.20	0.000	0.000	0.203	5589
182.65	0.027	0.23	0.000	0.000	0.237	5877
182.70	0.028	0.27	0.000	0.000	0.273	6168
182.75	0.029	0.32	0.000	0.000	0.312	6461
182.80	0.029	0.36	0.000	0.000	0.352	6757
182.85	0.030	0.39	0.000	0.000	0.420	7055
182.90	0.030	0.42	0.000	0.000	0.447	7356
182.95	0.031	0.44	0.375	0.000	0.848	7660
183.00	0.031	0.47	1.084	0.000	1.581	7967
183.05	0.032	0.49	2.034	0.000	2.555	8276
183.10	0.032	0.51	3.198	0.000	3.741	8588
183.15	0.033	0.53	4.563	0.000	5.127	8903
183.20	0.033	0.55	5.956	0.000	6.541	9220
183.25	0.034	0.57	7.656	0.000	8.261	9540
183.30	0.034	0.59	9.603	0.000	10.227	9863
183.35	0.035	0.61	11.679	0.000	12.322	10189
183.40	0.035	0.63	13.842	0.000	14.502	10518
183.45	0.036	0.64	16.265	0.000	16.943	10849
183.50	0.036	0.66	18.869	0.000	19.565	11183

Stantec

Project Description: 4134 16th Avenue - Pond 2 Outlet Control Calculations
Job Number: 160622264
Creation Date: 43040.67209
Author: TN

Drawdown Calculations

	Outlet	
Normal Water Level =	181.50	m
Orifice Size =	0.110	m
Orifice Level (midpoint of orifice) =	181.555	m
Orifice area (ao)=	0.0095	m^2
Orifice Coefficient =	0.62	
Orifice Discharge Equation =	$Q = C_2 * Ao * (2 g h)^{1/2}$	

Stage (m)	Head Above Orifice Centre Outlet (m)	Surface Area (m2)	Incremental Volume (m3)	Accumulated Volume (m3)	Calculated Surface Area Ap (m2)	Orifice Discharge Q (m3)
181.50	0.000	4,145	0	0	4,337	0.000
181.75	0.195	4,649	1099	1,099	4,698	0.012
182.00	0.445	5,186	1229	2,329	5,058	0.017
182.25	0.695	5,434	1327	3,656	5,419	0.022
182.50	0.945	5,684	1390	5,046	5,780	0.025
182.75	1.195	5,938	1453	6,499	6,141	0.029

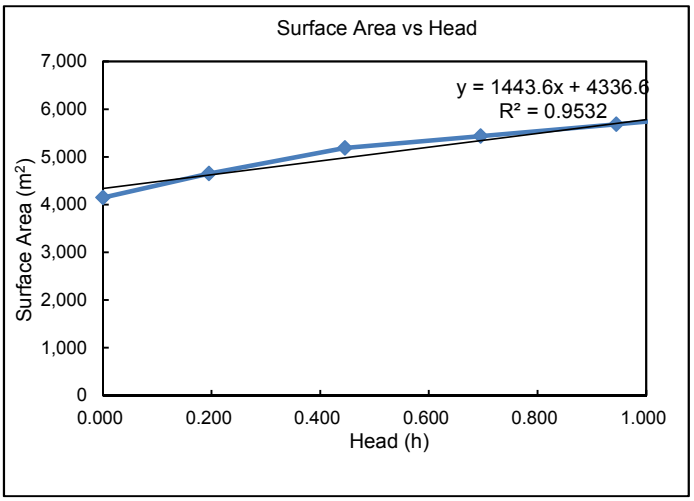
Regression Output:

X Coefficient	1443.60	C_2
Constant	4336.6	C_3
R^2	0.9532	

$Ap = C_2*h + C_3$

t = (0.66*c2*h^1.5 + 2*c3*h^0.5)/(2.75 Ao)

Ao =	Main Orifice	0.010	m^2
ED Runoff		17.61	mm
Site Area		12.44	ha
Unrouted Extended Detention Volume :		2,191	m^3
Corresponding Head above Midpoint of Orifice:		0.42	m
Corresponding Surface Area (Ap) =		4,938	m^2
Corresponding Stage =		181.97	mASL
Max Orifice Discharge =		0.017	m^3/s
Drain time (s) =		224,106	s
Drain time (hr) =		62.25	hr > 48 hr



Stantec

Project Description 4134 16th Avenue - Pond 2 Outlet Control Calculations
Job Number 160622264
Date 11/1/2017 15:33
Author TN

Emergency Spillway Calculations

$Q_{Spillway}$ =	5.675	m^3/s	*100 Year Unattenuated Flow
Weir Invert =	182.90	m	
Weir Length =	22.00	m	
Side Slopes =	10.00	:1	
Max Weir Height =	0.3	m	

Rectangular Broad Crested Weir

$Q=CLH^{1.5}$

assuming:	H =	0.300	m
	L =	22	m
	C =	1.45	
	Q =	5.24	m^3/s
	Area =	6.60	m^2

V Notch Weir

$Q=C(\tan \Phi/2)H^{2.5}$

				Note:		
				L = H x SS =	*3.00*	*m*
assuming:	H =	0.300	m	*Φ/2 = arctan (L/H)=*	*84.29*	*deg*
	Side Slope =	10	:1	*tan (Φ/2) = tan 84.29 =*	*10*	*m*
	C =	1.45				
	Q =	0.71	m^3/s			
	Area =	0.90	m^2			

Total Weir Flow = ***5.956*** ***m^3/s***

Velocity = 0.79 m/s

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 3 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %	
Proposed					
Pond Block	0.60	1.38	0.8		
Park Block	0.40	0.57	0.2		0.57
School Block	0.75	0.00	0.0		
Townhouses - Stacked	0.85	2.16	1.8		
Townhouses - Back-to-back	0.75	0.00	0.0		
Medium Density	0.85	1.29	1.1		
Mixed Use	0.85	3.54	3.0		
Singles	0.65	13.86	9.0		
Total	0.70	22.80	16.0	70%	22.8

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4	
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid	
Imperviousness %	70		
MOE, SWMPDM Table 3.2 Volume	220	m^3/ha	
	180	m^3/ha	Less 40 m^3/ha tor active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release Rate
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	(m^3/s)
Level 1 Wet Pond	4097	912	4172	0.036

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from V02
RV = 18.3 mm >>>> (For minimum of 48 hr extended detention)

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 11/1/2017

SWM Pond 3 Storage Calculations

Input

Base of Pond =	174.60	
N.W.L. =	176.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	**4097**	m^3
Permanent Pool Volume Provided =	**10497**	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	173.50	0.00	1,627	1,627		0		
	174.00	0.50	1,901	1,901	1,764	882	**882**	**0**
	174.50	1.00	2,201	2,201	2,051	1,026	**1,908**	**0**
	175.00	1.50	3,614	3,614	2,907	1,454	**3,361**	**0**
	175.50	2.00	4,263	4,263	3,938	1,969	**5,331**	**0**
	176.00	2.50	4,978	4,978	4,620	2,310	**7,641**	**0**
NWL	176.50	3.00	6,445	6,445	5,712	2,856	**10,497**	**0**
	177.00	3.50	7,645	7,645	7,045	3,523	**14,019**	**3,523**
	177.50	4.00	8,229	8,229	7,937	3,969	**17,988**	**7,491**
	178.00	4.50	8,830	8,830	8,529	4,265	**22,252**	**11,756**
	178.50	5.00	9,459	9,459	7,218	18,046	**25,686**	**15,190**
Pond Top	179.00	5.50	10,218	10,218	9838.3	4919.2	**30,606**	**20,109**

Stantec

Project Description: 4134 16th Avenue - Pond 3 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Control Structure Design Details

Orifice and Orifice Tube

Orifice 1 (Round Only)

Invert =	176.50	m
Size =	0.15	m
C=	0.62	
Obvert =	176.65	m

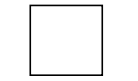


$$Q = (C)(A)\sqrt{2g\Delta h}$$

Where,
Q = flow rate (m^3/s)
Δh = differential head measured from the centroid of the orifice (m)
g = acceleration due to gravity (m/s^2)
C = coefficient of discharge

Orifice 3 Square

Invert =	177.10	m
Length =	0.40	m
C =	0.62	
Obvert =	177.90	m
Midpoint=	177.50	
Height =	0.80	m
Numbr of Contractions =	2.00	
P=	0.7	m
B=	50	m



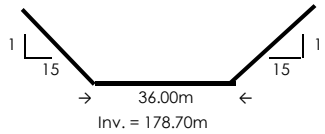
*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

Refer to Emergency Spillway Calculation

Broad Crested Weir 1

Length =	36.00	m
Elevation =	178.70	m
Side Slp =	15.00	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	4.5	m



To calculate the flow through a contracted sharp crested weir 2 equations are used:

Francis Equation:

For S.I. units: $Q = 1.84(L - 0.2H)H^{3/2}$, where

- **Q** is the water flow rate in m^3/sec,
- **L** is the length of the weir in m, and
- **H** is the head over the weir in m.
- **B** is the width of the channel in m, and
- H_{max} is the maximum expected head over the weir in m.

Kindsvater-Carter Equation:

S.I. units: $Q = C_e(2/3)[(2g)^{1/2}](L + k_b)(H + 0.001)^{3/2}$

Use Francis equation when H/L<= 0.33

Stantec

Project Description: 4134 16th Avenue - Pond 3 Outlet Control Calculations
Job Number: 160622264
Creation Date: 1-Nov-17
Author: TN

Extended Detention - 100 Year Pond Outlet Design

Start Elevation Set to NWL (m) **176.5**
Increment (m) **0.05**

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 3 Outflow (cms)	Weir 1 Outflow (cms)	Weir 2 Outflow m^3/s	Total Flow (cms)	Storage (m^3)
176.50	0.000	0.00	0.000	0.000	0.000	0
176.55	0.003	0.00	0.000	0.000	0.003	325
176.60	0.007	0.00	0.000	0.000	0.007	656
176.65	0.013	0.00	0.000	0.000	0.013	993
176.70	0.017	0.00	0.000	0.000	0.017	1335
176.75	0.020	0.00	0.000	0.000	0.020	1684
176.80	0.023	0.00	0.000	0.000	0.023	2038
176.85	0.025	0.00	0.000	0.000	0.025	2399
176.90	0.028	0.00	0.000	0.000	0.028	2766
176.95	0.030	0.00	0.000	0.000	0.030	3140
177.00	0.032	0.00	0.000	0.000	0.032	3518
177.05	0.033	0.00	0.000	0.000	0.033	3899
177.10	0.035	0.00	0.000	0.000	0.035	4282
177.15	0.037	0.01	0.000	0.000	0.045	4669
177.20	0.038	0.02	0.000	0.000	0.060	5059
177.25	0.040	0.05	0.000	0.000	0.081	5451
177.30	0.041	0.07	0.000	0.000	0.104	5846
177.35	0.043	0.10	0.000	0.000	0.130	6245
177.40	0.044	0.13	0.000	0.000	0.159	6646
177.45	0.045	0.16	0.000	0.000	0.189	7050
177.50	0.047	0.20	0.000	0.000	0.223	7458
177.55	0.048	0.23	0.000	0.000	0.258	7868
177.60	0.049	0.27	0.000	0.000	0.295	8281
177.65	0.050	0.32	0.000	0.000	0.333	8697
177.70	0.051	0.36	0.000	0.000	0.374	9116
177.75	0.053	0.41	0.000	0.000	0.416	9538
177.80	0.054	0.45	0.000	0.000	0.460	9963
177.85	0.055	0.50	0.000	0.000	0.505	10391
177.90	0.056	0.56	0.000	0.000	0.552	10822
177.95	0.057	0.59	0.000	0.000	0.646	11257
178.00	0.058	0.62	0.000	0.000	0.679	11694
178.05	0.059	0.65	0.000	0.000	0.711	12134
178.10	0.060	0.68	0.000	0.000	0.741	12578
178.15	0.061	0.71	0.000	0.000	0.769	13024
178.20	0.062	0.74	0.000	0.000	0.797	13474
178.25	0.063	0.76	0.000	0.000	0.824	13927
178.30	0.064	0.79	0.000	0.000	0.850	14383
178.35	0.065	0.81	0.000	0.000	0.875	14842
178.40	0.066	0.83	0.000	0.000	0.899	15304
178.45	0.066	0.86	0.000	0.000	0.923	15770
178.50	0.067	0.88	0.000	0.000	0.946	16239
178.55	0.068	0.90	0.000	0.000	0.969	16711
178.60	0.069	0.92	0.000	0.000	0.991	17187
178.65	0.070	0.94	0.000	0.000	1.012	17667
178.70	0.071	0.96	0.000	0.000	1.033	18150
178.75	0.072	0.98	0.612	0.000	1.666	18636
178.80	0.072	1.00	1.767	0.000	2.841	19127
178.85	0.073	1.02	3.311	0.000	4.405	19622
178.90	0.074	1.04	5.198	0.000	6.311	20121
178.95	0.075	1.06	7.403	0.000	8.536	20624

Stantec

Project Description: 4134 16th Avenue - Pond 3 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017

Author: TN

Drawdown Calculations

	Outlet	
Normal Water Level =	176.50	m
Orifice Size =	0.150	m
Orifice Level (midpoint of orifice) =	176.575	m
Orifice area (ao)=	0.0177	m^2
Orifice Coefficient =	0.62	
Orifice Discharge Equation =	$Q = C_2 * Ao * (2 g h)^{1/2}$	

Stage (m)	Head Above Orifice Centre Outlet (m)	Surface Area (m2)	Incremental Volume (m3)	Accumulated Volume (m3)	Calculated Surface Area Ap (m2)	Orifice Discharge Q (m3)
176.50	0.000	6,445	0	0	6,682	0.000
176.75	0.175	7,022	1683	1,683	7,105	0.020
177.00	0.425	7,645	1833	3,517	7,528	0.032
177.25	0.675	7,936	1948	5,464	7,951	0.040
177.50	0.925	8,229	2021	7,485	8,375	0.047
177.75	1.175	8,526	2094	9,580	8,798	0.053

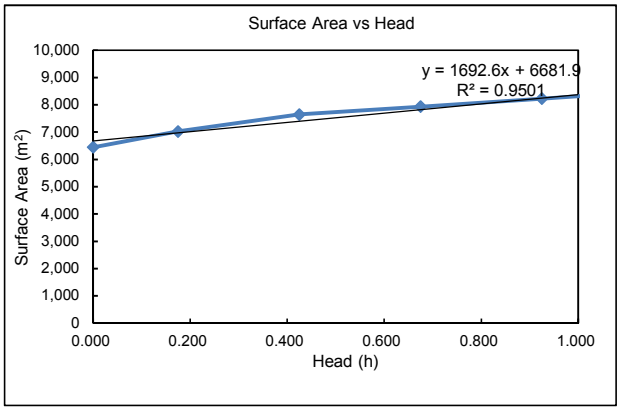
Regression Output:

X Coefficient	1692.60	C_2
Constant	6681.9	C_3
R^2	0.9501	

$Ap = C_2*h + C_3$

$t = (0.66*c2*h^{1.5} + 2*c3*h^{0.5})/(2.75\ Ao)$

Ao =	Main Orifice	0.018	m^2
ED Runoff		17.30	mm
Site Area		21.90	ha
Unrouted Extended Detention Volume :		3,789	m^3
Corresponding Head above Midpoint of Orifice:		0.46	m
Corresponding Surface Area (Ap) =		7,460	m^2
Corresponding Stage =		177.03	mASL
Max Orifice Discharge =		0.033	m^3/s
Drain time (s) =		193,660	s
Drain time (hr) =		53.79	hr > 48 hr



Stantec

Project Description 4134 16th Avenue - Pond 3 Outlet Control Calculations
Job Number 160622264
Date 11/1/2017 15:29
Author TN

Emergency Spillway Calculations

$Q_{Spillway}$ =	9.637	m^3/s	*100 Year Unattenuated Flow
Weir Invert =	178.70	m	
Weir Length =	36.00	m	
Side Slopes =	15.00	:1	
Max Weir Height =	0.3	m	

Rectangular Broad Crested Weir

$Q=CLH^{1.5}$

assuming:	H =	0.300	m
	L =	36	m
	C =	1.45	
	Q =	8.58	m^3/s
	Area =	10.80	m^2

V Notch Weir

$Q=C(\tan \Phi/2)H^{2.5}$

assuming:	H =	0.300	m
	Side Slope =	15	:1
	C =	1.45	
	Q =	1.07	m^3/s
	Area =	1.35	m^2

Total Weir Flow = ***9.650*** ***m^3/s***

Velocity = 0.79 m/s

Note:

L = H x SS =	*4.50*	*m*
$\Phi/2$ = arctan (L/H)=	*86.19*	*deg*
tan ($\Phi/2$) = tan 84.29 =	*15*	*m*

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 26-Oct-17

SWM Pond 4 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	1.12	0.7	
Park Block	0.40	3.47	1.4	
School Block	0.75	0.00	0.0	
Townhouses - Stacked	0.85	2.38	2.0	
Townhouses - Back-to-back	0.75	0.00	0.0	
Medium Density	0.85	2.01	1.7	
Mixed Use	0.85	0.00	0.0	
Singles	0.65	20.26	13.2	
Total	0.65	29.24	19.0	61%

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4	
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid	
Imperviousness %	61		
MOE, SWMPDM Table 3.2 Volume	201	m^3/ha	
	161	m^3/ha	Less 40 m^3/ha tor active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release Rate
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	(m^3/s)
Level 1 Wet Pond	4718	1170	4982	0.043

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from SWMHYMO
RV = 17.04 mm >>>> (For minimum of 48 hr extended detention)

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 10/26/2017

SWM Pond 4 Storage Calculations

Input

Base of Pond =	175.50	
N.W.L. =	178.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	**4718**	m^3
Permanent Pool Volume Provided =	**5561**	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	175.50	0.00	679	679		0		
	176.00	0.50	875	875	777	388	**388**	**0**
	176.50	1.00	1,114	1,114	994	497	**886**	**0**
	177.00	1.50	1,736	1,736	1,425	712	**1,598**	**0**
	177.50	2.00	2,228	2,228	1,982	991	**2,589**	**0**
	178.00	2.50	2,795	2,795	2,511	1,256	**3,845**	**0**
NWL	178.50	3.00	4,069	4,069	3,432	1,716	**5,561**	**0**
	179.00	3.50	5,310	5,310	4,689	2,345	**7,905**	**2,345**
	179.50	4.00	5,933	5,933	5,622	2,811	**10,716**	**5,155**
	180.00	4.50	6,597	6,597	6,265	3,133	**13,849**	**8,288**
Pond Top	180.45	4.95	7,228	7,228	6,912	3,110	**16,959**	**11,398**

Project Description: 4134 16th Avenue - Pond 4 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Control Structure Design Details

Orifice 1 (Round Only)

Invert =	178.50	m
Size =	0.14	m
C=	0.62	
Obvert =	178.64	m



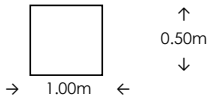
Orifice and Orifice Tube

$$Q = (C)(A)\sqrt{2g\Delta h}$$

Where,
Q = flow rate (m^3/s)
Δh = differential head measured from the centroid of the orifice (m)
g = acceleration due to gravity (m/s^2)
C = coefficient of discharge

Orifice 3 Square

Invert =	179.60	m
Length =	1.00	m
C =	0.62	
Obvert =	180.10	m
Midpoint=	179.85	
Height =	0.50	m
Numbr of Contractions =	2.00	
P=	0.7	m
B=	50	m

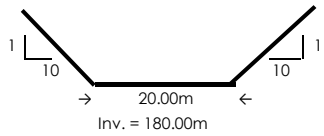


*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

Broad Crested Weir 1

Length =	20.00	m
Elevation =	180.00	m
Side Slp =	10.00	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	4.5	m
Column index no. =	12	(for lookup value of C)



roject Description: 4134 16th Avenue - Pond 4 Outlet Control Calculations
Job Number: 160622264
Creation Date: 1-Nov-17
Author: TN

Extended Detention Pond Outlet Design

on Set to NWL (m) **178.5**
Increment (m) **0.05**

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Control Structure 3 Flow Orifice/Weir Flow (m^3/s)	Weir 1 Outflow (cms)	Total Flow (cms)	Storage (m^3)
178.50	0.000	0.000	0.00	0.000	0.000	0
178.55	0.002	0.000	0.00	0.000	0.002	206
178.60	0.007	0.000	0.00	0.000	0.007	419
178.65	0.012	0.000	0.00	0.000	0.012	637
178.70	0.015	0.000	0.00	0.000	0.015	862
178.75	0.018	0.000	0.00	0.000	0.018	1092
178.80	0.020	0.000	0.00	0.000	0.020	1330
178.85	0.022	0.000	0.00	0.000	0.022	1573
178.90	0.024	0.000	0.00	0.000	0.024	1823
178.95	0.026	0.000	0.00	0.000	0.026	2079
179.00	0.028	0.000	0.00	0.000	0.028	2340
179.05	0.029	0.000	0.00	0.000	0.029	2604
179.10	0.031	0.000	0.00	0.000	0.031	2871
179.15	0.032	0.000	0.00	0.000	0.032	3142
179.20	0.034	0.000	0.00	0.000	0.034	3415
179.25	0.035	0.000	0.00	0.000	0.035	3691
179.30	0.036	0.000	0.00	0.000	0.036	3971
179.35	0.037	0.000	0.00	0.000	0.037	4254
179.40	0.039	0.000	0.00	0.000	0.039	4540
179.45	0.040	0.000	0.00	0.000	0.040	4829
179.50	0.041	0.000	0.00	0.000	0.041	5121
179.55	0.042	0.000	0.00	0.000	0.042	5416
179.60	0.043	0.000	0.00	0.000	0.043	5715
179.65	0.044	0.000	0.02	0.000	0.064	6017
179.70	0.045	0.000	0.06	0.000	0.102	6323
179.75	0.046	0.000	0.10	0.000	0.150	6631
179.80	0.047	0.000	0.16	0.000	0.205	6944
179.85	0.048	0.000	0.22	0.000	0.266	7259
179.90	0.049	0.000	0.28	0.000	0.333	7578
179.95	0.050	0.000	0.36	0.000	0.409	7900
180.00	0.051	0.000	0.44	0.000	0.489	8225
180.05	0.051	0.000	0.52	0.342	0.916	8554
180.10	0.052	0.000	0.61	0.989	1.654	8887
180.15	0.053	0.000	0.75	1.861	2.666	9223
180.20	0.054	0.000	0.81	2.932	3.798	9562
180.25	0.055	0.000	0.87	4.191	5.114	9905
180.30	0.056	0.000	0.92	5.480	6.457	10252
180.35	0.056	0.000	0.97	7.056	8.083	10602
180.40	0.057	0.000	1.02	8.864	9.940	10955
180.45	0.058	0.000	1.06	10.798	11.919	11313

Project Description: 4134 16th Avenue - Pond 4 Outlet Control Calculations
Job Number: 160622264
Creation Date: 11/1/2017
Author: TN

Drawdown Calculations

	Outlet	
Normal Water Level =	178.50	m
Orifice Size =	0.140	m
Orifice Level (midpoint of orifice) =	178.570	m
Orifice area (ao)=	0.0154	m^2
Orifice Coefficient =	0.62	
Orifice Discharge Equation =	$Q = C_2 * Ao * (2 g h)^{1/2}$	

Stage (m)	Head Above Orifice Centre Outlet (m)	Surface Area (m2)	Incremental Volume (m3)	Accumulated Volume (m3)	Calculated Surface Area Ap (m2)	Orifice Discharge Q (m3)
178.50	0.000	4,069	0	0	4,303	0.000
178.75	0.180	4,669	1092	1,092	4,747	0.018
179.00	0.430	5,310	1247	2,340	5,191	0.028
179.25	0.680	5,617	1366	3,705	5,635	0.035
179.50	0.930	5,933	1444	5,149	6,080	0.041
179.75	1.180	6,260	1524	6,673	6,524	0.046

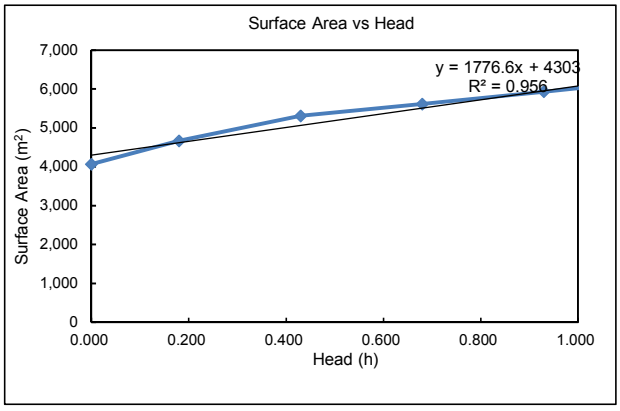
Regression Output:

X Coefficient	1776.60	C_2
Constant	4303.0	C_3
R^2	0.9560	

$Ap = C_2*h + C_3$

$t = (0.66*c2*h^{1.5} + 2*c3*h^{0.5})/(2.75\ Ao)$

Ao =	Main Orifice	0.015	m^2
ED Runoff		17.49	mm
Site Area		29.30	ha
Unrouted Extended Detention Volume :		5,125	m^3
Corresponding Head above Midpoint of Orifice:		0.93	m
Corresponding Surface Area (Ap) =		5,948	m^2
Corresponding Stage =		179.50	mASL
Max Orifice Discharge =		0.041	m^3/s
Drain time (s) =		220,269	s
Drain time (hr) =		61.19	hr > 48 hr



Project Description 4134 16th Avenue - Pond 4 Outlet Control Calculations
Job Number 160622264
Date 11/1/2017 15:32
Author TN

Emergency Spillway Calculations

$Q_{Spillway}$ =	12.35	m^3/s	*100 Year Unattenuated Flow
Weir Invert =	180.00	m	
Weir Length =	20.00	m	
Side Slopes =	10.00	:1	
Max Weir Height =	0.5	m	

Rectangular Broad Crested Weir

$Q=CLH^{1.5}$

assuming:

H =	0.500	m
L =	20	m
C =	1.45	
Q =	10.25	m^3/s
Area =	10.00	m^2

V Notch Weir

$Q=C(\tan \Phi/2)H^{2.5}$

assuming:

H =	0.500	m
Side Slope =	10	:1
C =	1.45	
Q =	2.56	m^3/s
Area =	2.50	m^2

Note:

L = H x SS =	*5.00*	*m*
$\Phi/2$ = arctan (L/H)=	*84.29*	*deg*
tan ($\Phi/2$) = tan 84.29 =	*10*	*m*

Total Weir Flow = ***12.82*** ***m^3/s***

Velocity = 1.03 m/s

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 26-Oct-17

Perforated RLC Trench Sizing Calculation

source: *Low Impact Development Stormwater Management Planning and Design Guide* , p 4-58

$d_{r\,max} = I \times t_s / V_r$

$d_{r\,max}$ =	600	maximum stone reservoir depth (mm)
I =	5	infiltration rate for native soils (mm/hr)
Vr =	0.4	Void space ratio for aggregate used (typically 0.40 for 50 mm clear stone)
t_s =	48	Time to drain (design for 48 hr drain time recommended)

Example Calculation:

Af = WQV / (dr * Vr)

Where:

A_f =	104.84	Footprint surface area (m2)
Average Building Enevelope Area =	0.05	(ha)
Drainage Area =	0.05	Drainage Area (ha)
WQD=	25.00	Water Quality Depth (mm)
WQV =	12.5805	Water quality volume (m^3)
d_r =	0.3	Stone reservoir depth (m)
V_r =	0.4	Void space ratio for aggregate used (typically 0.4 for 50 mm clear stone)
Frontage	21.34	(m)
Width of Stone Required	4.91	(m)

Note the drainage area is estimated to be approximately half of the building envelop area per lot on each side of road - therefore total drainage area is 2 x 1/2 Building Envelope Area = 1 Building Envelope Area

Note:The ratio of impervious drainage area to footprint surface area of the practice should be between 5:1 and 20:1 to limit the rate of accumulation of fine sediments and thereby prevent clogging

Trench ID (Lot ID)	Infiltration Rate i (mm/hr)	Void Ratio Vr	Recommended Drain Time t_s (hr)	Max. Stone Depth $d_{r\,max}$ (mm)	Building Envelope Area (ha)	Drainage Area (ha)	Water Quality Depth WQD (mm)	Water Quality Volume WQV (m^3)	Actual Stone Depth d_r (mm)	Actual Drain Time t_s (hr)	Footprint Area A_f (m^2)	Building Frontage (m)	Infiltration Trench Width w (m)
A	5	0.4	48	600	0.050	0.05	25	12.58	300	24	104.8	21.3	**4.9**
L	5	0.4	48	600	0.017	0.02	25	4.36	300	24	36.3	6.1	**6.0**
B	5	0.4	48	600	0.023	0.02	25	5.87	300	24	49.0	15.2	**3.2**
C	5	0.4	48	600	0.018	0.02	25	4.43	300	24	36.9	13.1	**2.8**

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 27-Oct-17

Infiltration Gallery Sizing Calculation

source: *Low Impact Development Stormwater Management Planning and Design Guide* , p 4-58

$d_{r\,max} = I \times t_s / V_r$

$d_{r\,max}$ =	600	maximum stone reservoir depth (mm)
I =	5	infiltration rate for native soils (mm/hr)
Vr =	0.4	Void space ratio for aggregate used (typically 0.40 for 50 mm clear stone)
t_s =	48	Time to drain (design for 48 hr drain time recommended)

Example Calculation:

Af = WQV / (dr * Vr)

Where:

A_f =	2604.17	Footprint surface area (m2)
Block Area =	2.50	(ha)
Drainage Area =	1.25	Drainage Area (ha)
WQD=	25.00	Water Quality Depth (mm)
WQV =	312.5	Water quality volume (m^3)
d_r =	0.3	Stone reservoir depth (m)
V_r =	0.4	Void space ratio for aggregate used (typically 0.4 for 50 mm clear stone)
Length	130.2	(m)
Width of Stone Required	20.00	(m)

Note the drainage area % of block area varies for each block as follows: Block 12 - 50 %, Block 13 & 14 -30%, Block 6 - Actual Roof Area from Adjacent Lots

note:The ratio of impervious drainage area to footprint surface area of the practice should be between 5:1 and 20:1 to limit the rate of accumulation of fine sediments and thereby prevent clogging.

Infiltration Rate	Void Ratio	Recommended Drain Time	Max. Stone Depth	Block Area	Drainage Area	Water Quality Depth	Water Quality Volume	Actual Stone Depth	Actual Drain Time	Footprint Area	Length of Trench	Infiltration Trench Width
Trench ID (Block ID)	i (mm/hr)	Vr	t_s (hr)	$d_{r\,max}$ (mm)	(ha)	(ha)	WQD (mm)	WQV (m^3)	d_r (mm)	t_s (hr)	A_f (m^2)	L (m)	w (m)
12W	5	0.4	48	600	2.108	1.05	25	263.50	600	48	1097.9	396	**2.8**
13W	5	0.4	48	600	1.290	0.39	25	96.75	600	48	403.1	145	**2.8**
14W	5	0.4	48	600	1.100	0.33	25	82.50	600	48	343.8	285	**1.2**
6E	5	0.4	48	600	0.238	0.12	25	29.75	600	48	124.0	218	**0.6**

Stantec

Project Name: 4134 16th Avenue
Project Number: 160622264

Bioretention Enclave (Typical Size)

source: *Low Impact Development Stormwater Management Planning and Design Guide* , p 4-87

Assumes No Underdrain:

input
output

$d_{c\,max} = i \times (t_s - d_p/i_) / V_r$

$d_{c\,max}$ =	400	maximum stone reservoir depth (mm)
i =	5	infiltration rate for native soils (mm/hr)
Vr =	0.4	Void space ratio for aggregate used (typically 0.40 for 50 mm clear stone)
t_s =	48	Time to drain (design for 48 hr drain time recommended)
d_p =	80	Maximum surface ponding depth (mm)

Note: No Underdrain Volume Calculations assume filtration and infiltration of water quality volume

Af = WQV / (dc * Vr)

Where:

A_f =	703.13	Footprint surface area (m2)	A =	0.45	Drainage Area (ha)
WQV =	112.5	Water quality volume (m3)	WQD =	25	Water Quality Depth (mm)
d_c =	0.400	bioretention cell depth (m)	WQV =	112.5	Water quality volume (m3)
V_r =	0.4	Void space ratio for aggregate used (typically 0.4 for 50 mm clear stone)			

from MOE guidelines section 3.3.1

note:The ratio of impervious drainage area to footprint surface area of the practice should be between 5:1 and 20:1 to limit the rate of accumulation of fine sediments and thereby prevent clogging.

Trench ID	Infiltration Rate i (mm/hr)	Void Ratio Vr	Recommended Drainage Time t_s (hr)	Water Quality Volume WQV (m^3)	Max. Surface Ponding Depth d_p (mm)	Actual Stone Depth $d_{c\,max}$ (mm)	Actual Drain Time t_s (hr)	Footprint Area A_f (m^2)
1	5	0.4	48	112.5	80	400	32	703.13

Avail Surf Area = 730 m2

Stantec

Project Name: 4134 16th Avenue
Project Number: 160622264

Infiltration Facility 1

source: *Low Impact Development Stormwater Management Planning and Design Guide* , p 4-87

Assumes No Underdrain:

input
output

$d_{c\,max} = i \times (t_s - d_p/i_j) / V_r$

$d_{c\,max}$ =	350	maximum stone reservoir depth (mm)
i =	5	infiltration rate for native soils (mm/hr)
Vr =	0.4	Void space ratio for aggregate used (typically 0.40 for 50 mm clear stone)
t_s =	48	Time to drain (design for 48 hr drain time recommended)
d_p =	100	Maximum surface ponding depth (mm)

Note: No Underdrain Volume Calculations assume filtration and infiltration of water quality volume

Af = WQV / (dc * Vr)

Where:

A_f =	2339.29	Footprint surface area (m2)
WQV =	327.5	Water quality volume (m3)
d_c =	0.350	bioretention cell depth (m)
V_r =	0.4	Void space ratio for aggregate used (typically 0.4 for 50 mm clear stone)

A =	1.31	Drainage Area (ha)
WQD =	25	Water Quality Depth (mm)
WQV =	327.5	Water quality volume (m3)

from MOE guidelines section 3.3.1

note:The ratio of impervious drainage area to footprint surface area of the practice should be between 5:1 and 20:1 to limit the rate of accumulation of fine sediments and thereby prevent clogging.

Trench ID	Infiltration Rate i (mm/hr)	Void Ratio Vr	Recommended Drainage Time t_s (hr)	Water Quality Volume WQV (m^3)	Max. Surface Ponding Depth d_p (mm)	Actual Stone Depth $d_{c\,max}$ (mm)	Actual Drain Time t_s (hr)	Footprint Area A_f (m^2)
1	5	0.4	48	327.5	100	350	28	2339.29

Avail Surf Area = 2400 m2

Appendix D PROPOSED CONDITIONS HYDROLOGY MODELING (2-100 YEAR)

D.1 VO2 PROPOSED CONDITIONS HYDROLOGY MODELING (2-100 YEAR)

4134 16th Avenue VO2 Model Setup Summary

The proposed conditions VO2 hydrology modeling was prepared by combining various sources and is described below.

The TRCA's FC Development VO2 model was obtained and reviewed. The TRCA's FC Development VO2 Model was an updated version of the 2001 MMM Hydrology Update. The FC Development scenario included all existing and approved developments incorporated into the Official Plans as of 2000, (referred to as the "FC Development" in this report). This modeling utilized 12 hr AES storms.

In the FC Development model, the Subject Property is located partially within Subcatchment 210 (discharges to Bruce Creek) and 201(discharges to Berczy Creek) of the Rouge River. The Subject Property was modeled as undeveloped open space (0% impervious). Catchment 210 (Bruce) included a single SWM pond for quantity control.

The VO2 model for Subcatchment 210 was updated in 2017 to include an interim SWM Pond that was constructed for the adjacent Yorkton Phase 2 property.

The proposed development of the Subject Property changes the landuse in both Subcatchments 210 and 210 and incorporates 3 ponds discharging to Bruce Creek and 1 to Berczy Creek. As such, the FC Development model required updates to accurately represent the discharge rates at nodes downstream of the Subject Property.

Subcatchment 210 (Bruce Creek) was discretized utilizing the approved Yorkton Phase 2 VO2 modeling prepared for the interim SWM Pond (2017). This model included the Yorkton Phase 2 development with interim SWM Pond and the external drainage and landuses contributing to that pond; the existing Deacon development without controls; and the existing Pond H as-constructed condition including the existing drainage areas and landuses to Pond H. The proposed development within Subject Property was added into the model along with the proposed Bruce Creek Valley. Pond H and the interim SWM pond were removed and replaced by SWM Ponds 1, 2, and 3 discharging to Bruce Creek.

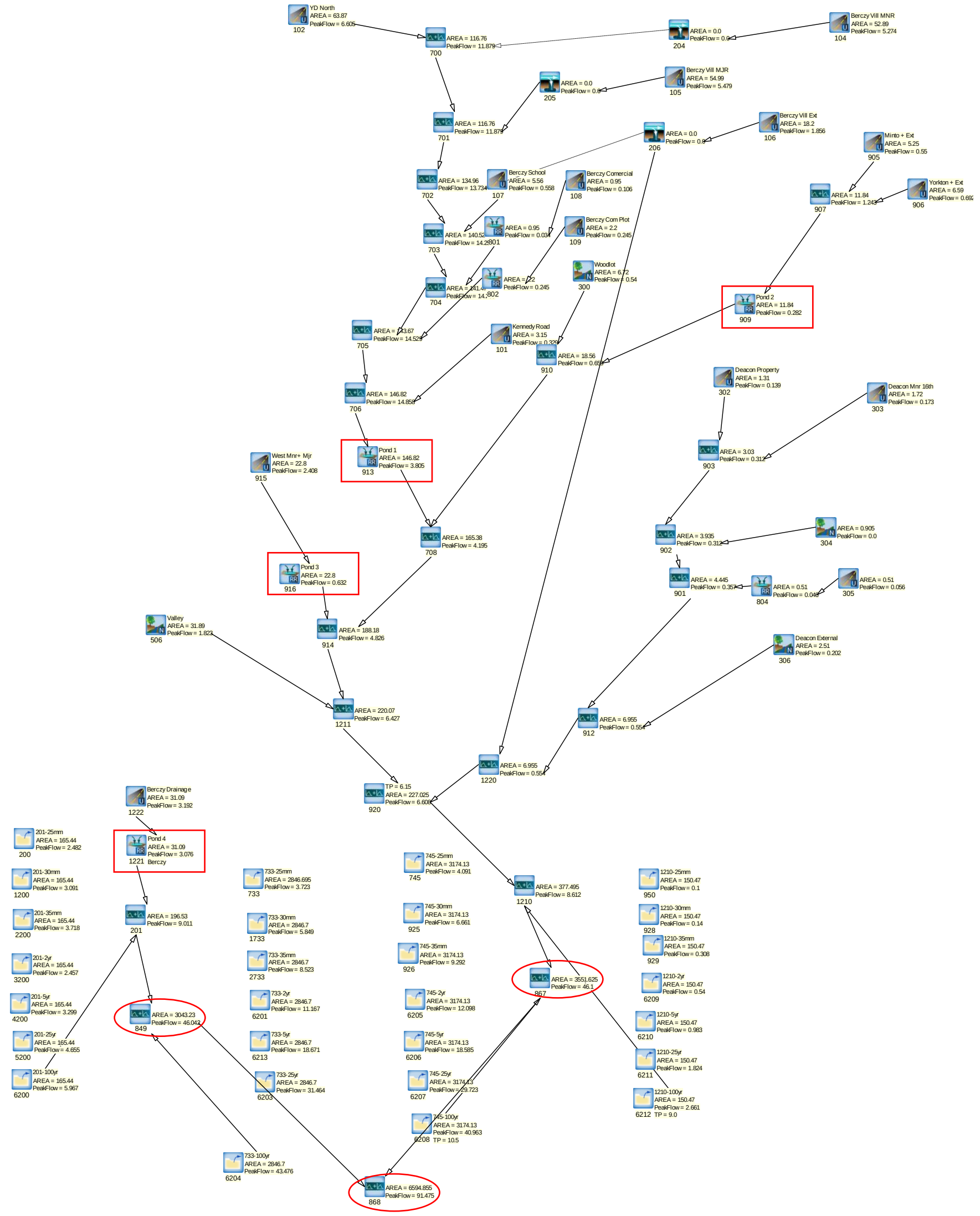
Upstream external flows from Bruce Creek were incorporated into the proposed conditions model by capturing hydrographs from Route Channel ID 745 in the original FC Development model adding them into the proposed conditions model using a readhyd command. The readhyd command was added to the flow node at the downstream end of the Subject Property at addhyd 867.

Since the Subject Property forms part, but not all of Subcatchment 210, flows from those areas of Subcatchment 210 outside of the Subject Property needed to be accounted for in the proposed model. To determine flows from the balance of Subcatchment 210 (approximately 150.47 ha of the original 377.55 ha; 40%), the original FC Development model was run and hydrographs from the node at the downstream end of the Subject Property (Route Reservoir ID 1210) were captured. These hydrographs were then prorated to represent the areas not modelled as part of the Subject Property Subcatchments (i.e., original hydrographs reduced by 60%). The prorated hydrographs were added to the downstream end of the Subject Property using a readhyd command at addhyd 1210.

A similar exercise was completed for Subcatchment 201 (Berczy Creek) with the proposed development being added into the model along with SWM Pond 4. As above, to determine flows from the existing developed areas for the balance of the Berczy Creek subcatchment 201 (approximately 165.44 ha), a prorated readhyd command was used. This readhyd command was developed using the stanhyd ID 201 from the TRCA's FC Development. These flows were then added to the discretized model to determine the updated flows from Subcatchment 201 at addhyd 201. Upstream external flows from Berczy Creek were incorporated using a readhyd command of Route Channel ID 733 taken from TRCA's FC Development model to determine flows at the downstream flow node (addhyd 849).

Flows from node 867 and 849 were added together to determine flows at the downstream node 868.

Post-Development Event Based Model Schematic



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4134 16th Avenue Residential Development
Ponds 1 - 4 Model Summary Tables - V02

Model Inputs Ponds 1 - 4				
Sub-Catchment Location	**Drainage Area (ha)**	**Total Imperviousness**	**Ximp Model Value**	**Ximp Ratio**
Pond 1 (subject property area)	63.87	62%	40%	0.65
Pond 2*	5.25	70%	53%	0.76
Pond 3	22.80	70%	46%	0.65
Pond 4	31.09	61%	40%	0.65
Post-Dev Valley Lands	31.89			

*Lumped Timp/Ximp values shown in table. Values from individual catchments taken from Stantec Yorkton SWM Report, February, 2016

Model Major/Minor Drainage Split Summary and ReadHyd Area Calculation				
Pond	**Area Description**	**Tributary Area (ha) - Minor**	**Major Drainage**	*Difference*
Bruce Creek				
Pond 1	York Downs North	63.87	63.87	
	External Berczy (incl. Kennedy Road)	82.95	66.85	*16.1*
Pond 2	York Downs South	5.25	5.25	
	Yorkton/Ext. Church/Small Res	6.59	6.59	
Pond 3	York Downs West	22.80	22.80	
Uncontrolled Natural Areas within Development	Valley	31.89	31.89	
	Woodlot/Wetland Block	6.72	6.72	
External Area to 16th Avenue	Deacon Lands & External Commercial	7.01	7.01	
	TOTAL =	**227.08**	**210.98**	***16.1***
	Catchment 210 Total Area	377.55		
	Pro-Rated ReadHyd Area	**150.47**		
Berczy Creek				
Pond 4	Berczy Creek	31.09		
	Catchment 201 Total Area	196.53		
	Pro-Rated ReadHyd Area	**165.44**		

**Major System Drainage to Valley = 6.67
Pond 3 Major/Minor Split Area = 16.13

*2.4 ha from NW corner adds to 28.69ha drainage area

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Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

VO2 Modeling Input Parameters

ID	Area (ha)	TIMP	XIMP	CN	Length of Flow Path (m)	Watershed Slope (%)	Watershed Slope (m/m)	[1]Uplands V/($S^{0.5}$)	Uplands TOC (min)	Tp (hr)[2]	Name	Outlet
Subject Site												
102	63.87	62%	40%	88							YD North	Pond 1
905	5.25	70%	53%	85							Mint + Ext	Pond 2
915	22.80	70%	46%	88							West Mnr+Mjr	Pond 3
506	31.89	NASHYD		88	1874	0.48	0.0048	6.1	73.9	0.83	Valley	Bruce Creek
300	6.72	NASHYD		88	330	4.77	0.0477	2.3	10.9	0.12	Woodlot	Bruce Creek
1222	31.09	61%	40%	88							Berczy Drainage	Pond 4
External[3]												
101	3.15	61%	61%	88							Kennedy Road	Pond 1
104[4]	52.89	56%	38%	88							Berczy Vill MNR	Pond 1
105[5]	54.99	56%	38%	88							Berczy Vill MJR	Pond 1
106	18.2	56%	38%	88							Berczy Vill Ext	Pond 1
107	5.56	50%	50%	88							Berczy School	Pond 1
108	0.95	90%	90%	88							Berczy Comercial	Pond 1
109	2.2	90%	90%	88							Berczy Com Plot	Pond 1
906	6.59	71%	53%	85							Yorkton + Ext	Pond 2
302	1.31	64%	54%	88							Deacon Property	Bruce Creek
303	1.72	43%	32%	88							Deacon Mnr 16th	Bruce Creek
304		NASHYD		88						0.006	Deacon Property	Bruce Creek
305	0.51	85%	85%	88							Deacon Property	Bruce Creek
306		NASHYD		88						0.116	Deacon External	Bruce Creek

[1]V/(S0.5) parameter determined based on landuse type per to the *NVCA Stormwater Technical Guide* (2013)

[2]Tp values calculated using the Uplands Method

[3]External catchment parameters are based on previously approved hydrology models for Pond H, the Deacon Property, and Yorkton Phase 2

[4]Catchment 104 represents only minor flows from Berczy Village

[5]Catchment 105 represents only major flows from Berczy Village

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4134 16th Avenue Residential Development
Model Flow Summary - V02

Project No. 160622264

FC Development and Proposed Development Flows at Downstream Nodes									
Node	**Node 867**			**Node 849**			**Node 868**		
Watershed	**Bruce**		**% Flow Difference**	**Berczy**		**% Flow Difference**	**Confluence**		**% Flow Difference**
Drainage Area (ha)	**3551.7**			**3043.2**			**6594.9**		
Storm Event Flows	**FC**	**PROP**		**FC**	**PROP**		**FC**	**PROP**	
	(m^3/s)	**(m^3/s)**		**(m^3/s)**	**(m^3/s)**		**(m^3/s)**	**(m^3/s)**	
2 year	13.35	13.21	-1.0%	11.91	11.83	-0.6%	25.02	24.85	-0.7%
5 year	21.00	20.52	-2.3%	19.91	19.80	-0.5%	40.44	39.87	-1.4%
25 year	33.87	33.07	-2.4%	33.51	33.35	-0.5%	66.73	65.83	-1.4%
100 year	46.96	46.10	-1.8%	46.18	46.04	-0.3%	92.71	91.48	-1.3%

Note: FC = Future Committed Development model flows as taken from the MMM 2001 Rouge River Report
All flows presented in the above table are for the AES 12-hour storm distribution

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

       V    V   I    SSSSS  U   U    A    L
       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
       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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                    *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode


DATE: 10/6/2017                           TIME: 7:43:52 AM

USER:


COMMENTS: _____________________________________________________

----------------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************


--------------------
|    READ STORM    |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |   Comments: 100yr/12hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  3.50   15.05 |  6.75    6.20 | 10.00     .89
                 .50     .89 |  3.75   15.05 |  7.00    6.20 | 10.25     .89
                 .75     .89 |  4.00   15.05 |  7.25    6.20 | 10.50     .89
                1.00     .89 |  4.25   15.05 |  7.50    3.54 | 10.75     .89
                1.25     .89 |  4.50   40.71 |  7.75    3.54 | 11.00     .89
                1.50     .89 |  4.75   40.71 |  8.00    3.54 | 11.25     .89
                1.75     .89 |  5.00   40.71 |  8.25    3.54 | 11.50     .89
                2.00     .89 |  5.25   40.71 |  8.50    1.77 | 11.75     .89
                2.25     .89 |  5.50   11.51 |  8.75    1.77 | 12.00     .89
                2.50    5.31 |  5.75   11.51 |  9.00    1.77 | 12.25     .89
                2.75    5.31 |  6.00   11.51 |  9.25    1.77 |
                3.00    5.31 |  6.25   11.51 |  9.50     .89 |
                3.25    5.31 |  6.50    6.20 |  9.75     .89 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (1222) |   Area    (ha)=  31.09
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  40.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=    18.96         12.13
     Dep. Storage     (mm)=     1.00          1.50
     Average Slope     (%)=     1.00          2.00
     Length            (m)=   455.30         40.00
     Mannings n           =     .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

2-100 Year AES Storms

100-Year Storm

```
                    ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 3.167    5.31 | 6.250   11.51 | 9.333     .89
                .167     .00 | 3.250    5.31 | 6.333    6.20 | 9.417     .89
                .250     .00 | 3.333   15.05 | 6.417    6.20 | 9.500     .89
                .333     .89 | 3.417   15.05 | 6.500    6.20 | 9.583     .89
                .417     .89 | 3.500   15.05 | 6.583    6.20 | 9.667     .89
                .500     .89 | 3.583   15.05 | 6.667    6.20 | 9.750     .89
                .583     .89 | 3.667   15.05 | 6.750    6.20 | 9.833     .89
                .667     .89 | 3.750   15.05 | 6.833    6.20 | 9.917     .89
                .750     .89 | 3.833   15.05 | 6.917    6.20 | 10.000    .89
                .833     .89 | 3.917   15.05 | 7.000    6.20 | 10.083    .89
                .917     .89 | 4.000   15.05 | 7.083    6.20 | 10.167    .89
               1.000     .89 | 4.083   15.05 | 7.167    6.20 | 10.250    .89
               1.083     .89 | 4.167   15.05 | 7.250    6.20 | 10.333    .89
               1.167     .89 | 4.250   15.05 | 7.333    3.54 | 10.417    .89
               1.250     .89 | 4.333   40.71 | 7.417    3.54 | 10.500    .89
               1.333     .89 | 4.417   40.71 | 7.500    3.54 | 10.583    .89
               1.417     .89 | 4.500   40.71 | 7.583    3.54 | 10.667    .89
               1.500     .89 | 4.583   40.71 | 7.667    3.54 | 10.750    .89
               1.583     .89 | 4.667   40.71 | 7.750    3.54 | 10.833    .89
               1.667     .89 | 4.750   40.71 | 7.833    3.54 | 10.917    .89
               1.750     .89 | 4.833   40.71 | 7.917    3.54 | 11.000    .89
               1.833     .89 | 4.917   40.71 | 8.000    3.54 | 11.083    .89
               1.917     .89 | 5.000   40.71 | 8.083    3.54 | 11.167    .89
               2.000     .89 | 5.083   40.71 | 8.167    3.54 | 11.250    .89
               2.083     .89 | 5.167   40.71 | 8.250    3.54 | 11.333    .89
               2.167     .89 | 5.250   40.71 | 8.333    1.77 | 11.417    .89
               2.250     .89 | 5.333   11.51 | 8.417    1.77 | 11.500    .89
               2.333    5.31 | 5.417   11.51 | 8.500    1.77 | 11.583    .89
               2.417    5.31 | 5.500   11.51 | 8.583    1.77 | 11.667    .89
               2.500    5.31 | 5.583   11.51 | 8.667    1.77 | 11.750    .89
               2.583    5.31 | 5.667   11.51 | 8.750    1.77 | 11.833    .89
               2.667    5.31 | 5.750   11.51 | 8.833    1.77 | 11.917    .89
               2.750    5.31 | 5.833   11.51 | 8.917    1.77 | 12.000    .89
               2.833    5.31 | 5.917   11.51 | 9.000    1.77 | 12.083    .89
               2.917    5.31 | 6.000   11.51 | 9.083    1.77 | 12.167    .89
               3.000    5.31 | 6.083   11.51 | 9.167    1.77 | 12.250    .89
               3.083    5.31 | 6.167   11.51 | 9.250    1.77 |

     Max.Eff.Inten.(mm/hr)=      40.71         57.78
               over (min)        10.00         20.00
     Storage Coeff.  (min)=       9.09 (ii)    17.88 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=        .12           .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.40          1.79          3.192 (iii)
     TIME TO PEAK    (hrs)=       5.25          5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54         69.66          76.81
     TOTAL RAINFALL   (mm)=      88.54         88.54          88.54
     RUNOFF COEFFICIENT   =        .99           .79            .87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| NASHYD    (0506) |   Area    (ha)=  31.89   Curve Number    (CN)= 88.0
|ID= 1 DT= 3.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .83

         NOTE:  RAINFALL WAS TRANSFORMED TO   3.0 MIN. TIME STEP.


                    ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .050     .00 | 3.150    5.31 | 6.250   11.51 | 9.350     .89
                .100     .00 | 3.200    5.31 | 6.300    6.20 | 9.400     .89
                .150     .00 | 3.250    5.31 | 6.350    6.20 | 9.450     .89
                .200     .00 | 3.300   15.05 | 6.400    6.20 | 9.500     .89
                .250     .00 | 3.350   15.05 | 6.450    6.20 | 9.550     .89
```

.300	.89	3.400	15.05	6.500	6.20	9.60	.89
.350	.89	3.450	15.05	6.550	6.20	9.65	.89
.400	.89	3.500	15.05	6.600	6.20	9.70	.89
.450	.89	3.550	15.05	6.650	6.20	9.75	.89
.500	.89	3.600	15.05	6.700	6.20	9.80	.89
.550	.89	3.650	15.05	6.750	6.20	9.85	.89
.600	.89	3.700	15.05	6.800	6.20	9.90	.89
.650	.89	3.750	15.05	6.850	6.20	9.95	.89
.700	.89	3.800	15.05	6.900	6.20	10.00	.89
.750	.89	3.850	15.05	6.950	6.20	10.05	.89
.800	.89	3.900	15.05	7.000	6.20	10.10	.89
.850	.89	3.950	15.05	7.050	6.20	10.15	.89
.900	.89	4.000	15.05	7.100	6.20	10.20	.89
.950	.89	4.050	15.05	7.150	6.20	10.25	.89
1.000	.89	4.100	15.05	7.200	6.20	10.30	.89
1.050	.89	4.150	15.05	7.250	6.20	10.35	.89
1.100	.89	4.200	15.05	7.300	3.54	10.40	.89
1.150	.89	4.250	15.05	7.350	3.54	10.45	.89
1.200	.89	4.300	40.71	7.400	3.54	10.50	.89
1.250	.89	4.350	40.71	7.450	3.54	10.55	.89
1.300	.89	4.400	40.71	7.500	3.54	10.60	.89
1.350	.89	4.450	40.71	7.550	3.54	10.65	.89
1.400	.89	4.500	40.71	7.600	3.54	10.70	.89
1.450	.89	4.550	40.71	7.650	3.54	10.75	.89
1.500	.89	4.600	40.71	7.700	3.54	10.80	.89
1.550	.89	4.650	40.71	7.750	3.54	10.85	.89
1.600	.89	4.700	40.71	7.800	3.54	10.90	.89
1.650	.89	4.750	40.71	7.850	3.54	10.95	.89
1.700	.89	4.800	40.71	7.900	3.54	11.00	.89
1.750	.89	4.850	40.71	7.950	3.54	11.05	.89
1.800	.89	4.900	40.71	8.000	3.54	11.10	.89
1.850	.89	4.950	40.71	8.050	3.54	11.15	.89
1.900	.89	5.000	40.71	8.100	3.54	11.20	.89
1.950	.89	5.050	40.71	8.150	3.54	11.25	.89
2.000	.89	5.100	40.71	8.200	3.54	11.30	.89
2.050	.89	5.150	40.71	8.250	3.54	11.35	.89
2.100	.89	5.200	40.71	8.300	1.77	11.40	.89
2.150	.89	5.250	40.71	8.350	1.77	11.45	.89
2.200	.89	5.300	11.51	8.400	1.77	11.50	.89
2.250	.89	5.350	11.51	8.450	1.77	11.55	.89
2.300	5.31	5.400	11.51	8.500	1.77	11.60	.89
2.350	5.31	5.450	11.51	8.550	1.77	11.65	.89
2.400	5.31	5.500	11.51	8.600	1.77	11.70	.89
2.450	5.31	5.550	11.51	8.650	1.77	11.75	.89
2.500	5.31	5.600	11.51	8.700	1.77	11.80	.89
2.550	5.31	5.650	11.51	8.750	1.77	11.85	.89
2.600	5.31	5.700	11.51	8.800	1.77	11.90	.89
2.650	5.31	5.750	11.51	8.850	1.77	11.95	.89
2.700	5.31	5.800	11.51	8.900	1.77	12.00	.89
2.750	5.31	5.850	11.51	8.950	1.77	12.05	.89
2.800	5.31	5.900	11.51	9.000	1.77	12.10	.89
2.850	5.31	5.950	11.51	9.050	1.77	12.15	.89
2.900	5.31	6.000	11.51	9.100	1.77	12.20	.89
2.950	5.31	6.050	11.51	9.150	1.77	12.25	.89
3.000	5.31	6.100	11.51	9.200	1.77		
3.050	5.31	6.150	11.51	9.250	1.77		
3.100	5.31	6.200	11.51	9.300	.89		

Unit Hyd Qpeak (cms)= 1.468

PEAK FLOW (cms)= 1.823 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 59.055
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = .667

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0109) | Area (ha)= 2.20
ID= 1 DT= 1.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.98	.22
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	121.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 1.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.017	.00	3.083	5.31	6.150	11.51	9.22	1.77
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89

1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

Max.Eff.Inten.(mm/hr)=		40.71	54.53	
over (min)		5.00	9.00	
Storage Coeff. (min)=		4.10 (ii)	8.30 (ii)	
Unit Hyd. Tpeak (min)=		5.00	9.00	
Unit Hyd. peak (cms)=		.26	.13	
				TOTALS
PEAK FLOW	(cms)=	.22	.02	.245 (iii)
TIME TO PEAK	(hrs)=	5.23	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	62.25	85.01
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.70	.96

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0107) | Area (ha)= 5.56
ID= 1 DT= 2.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.78	2.78
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	193.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	1.33
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.133	.00	3.200	5.31	6.267	8.86	9.33	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.200	.00	3.267	10.18	6.333	6.20	9.40	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.267	.45	3.333	15.05	6.400	6.20	9.47	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89

.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.133	.89	4.200	15.05	7.267	4.87	10.33	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.200	.89	4.267	27.88	7.333	3.54	10.40	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.133	.89	5.200	40.71	8.267	2.66	11.33	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.200	.89	5.267	26.11	8.333	1.77	11.40	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.267	3.10	5.333	11.51	8.400	1.77	11.47	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.067	5.31	6.133	11.51	9.200	1.77	12.27	.44

Max.Eff.Inten.(mm/hr)=		40.71	34.83	
over (min)		6.00	18.00	
Storage Coeff. (min)=		5.43 (ii)	16.19 (ii)	
Unit Hyd. Tpeak (min)=		6.00	18.00	
Unit Hyd. peak (cms)=		.20	.07	
				TOTALS
PEAK FLOW	(cms)=	.31	.25	.558 (iii)
TIME TO PEAK	(hrs)=	5.23	5.27	5.23
RUNOFF VOLUME	(mm)=	87.54	62.26	74.90
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.70	.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0102)	Area (ha)= 63.87
ID= 1 DT= 3.0 min	Total Imp(%)= 62.00 Dir. Conn.(%)= 40.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	39.60	24.27
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	395.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 3.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.050	.00	3.150	5.31	6.250	11.51	9.35	.89
.100	.00	3.200	5.31	6.300	6.20	9.40	.89
.150	.00	3.250	5.31	6.350	6.20	9.45	.89
.200	.00	3.300	15.05	6.400	6.20	9.50	.89
.250	.00	3.350	15.05	6.450	6.20	9.55	.89
.300	.89	3.400	15.05	6.500	6.20	9.60	.89
.350	.89	3.450	15.05	6.550	6.20	9.65	.89
.400	.89	3.500	15.05	6.600	6.20	9.70	.89
.450	.89	3.550	15.05	6.650	6.20	9.75	.89
.500	.89	3.600	15.05	6.700	6.20	9.80	.89
.550	.89	3.650	15.05	6.750	6.20	9.85	.89
.600	.89	3.700	15.05	6.800	6.20	9.90	.89
.650	.89	3.750	15.05	6.850	6.20	9.95	.89
.700	.89	3.800	15.05	6.900	6.20	10.00	.89
.750	.89	3.850	15.05	6.950	6.20	10.05	.89
.800	.89	3.900	15.05	7.000	6.20	10.10	.89
.850	.89	3.950	15.05	7.050	6.20	10.15	.89
.900	.89	4.000	15.05	7.100	6.20	10.20	.89
.950	.89	4.050	15.05	7.150	6.20	10.25	.89
1.000	.89	4.100	15.05	7.200	6.20	10.30	.89
1.050	.89	4.150	15.05	7.250	6.20	10.35	.89
1.100	.89	4.200	15.05	7.300	3.54	10.40	.89
1.150	.89	4.250	15.05	7.350	3.54	10.45	.89
1.200	.89	4.300	40.71	7.400	3.54	10.50	.89
1.250	.89	4.350	40.71	7.450	3.54	10.55	.89
1.300	.89	4.400	40.71	7.500	3.54	10.60	.89
1.350	.89	4.450	40.71	7.550	3.54	10.65	.89
1.400	.89	4.500	40.71	7.600	3.54	10.70	.89
1.450	.89	4.550	40.71	7.650	3.54	10.75	.89
1.500	.89	4.600	40.71	7.700	3.54	10.80	.89
1.550	.89	4.650	40.71	7.750	3.54	10.85	.89
1.600	.89	4.700	40.71	7.800	3.54	10.90	.89
1.650	.89	4.750	40.71	7.850	3.54	10.95	.89
1.700	.89	4.800	40.71	7.900	3.54	11.00	.89
1.750	.89	4.850	40.71	7.950	3.54	11.05	.89
1.800	.89	4.900	40.71	8.000	3.54	11.10	.89
1.850	.89	4.950	40.71	8.050	3.54	11.15	.89
1.900	.89	5.000	40.71	8.100	3.54	11.20	.89
1.950	.89	5.050	40.71	8.150	3.54	11.25	.89

2.000	.89	5.100	40.71	8.200	3.54	11.30	.89
2.050	.89	5.150	40.71	8.250	3.54	11.35	.89
2.100	.89	5.200	40.71	8.300	1.77	11.40	.89
2.150	.89	5.250	40.71	8.350	1.77	11.45	.89
2.200	.89	5.300	11.51	8.400	1.77	11.50	.89
2.250	.89	5.350	11.51	8.450	1.77	11.55	.89
2.300	5.31	5.400	11.51	8.500	1.77	11.60	.89
2.350	5.31	5.450	11.51	8.550	1.77	11.65	.89
2.400	5.31	5.500	11.51	8.600	1.77	11.70	.89
2.450	5.31	5.550	11.51	8.650	1.77	11.75	.89
2.500	5.31	5.600	11.51	8.700	1.77	11.80	.89
2.550	5.31	5.650	11.51	8.750	1.77	11.85	.89
2.600	5.31	5.700	11.51	8.800	1.77	11.90	.89
2.650	5.31	5.750	11.51	8.850	1.77	11.95	.89
2.700	5.31	5.800	11.51	8.900	1.77	12.00	.89
2.750	5.31	5.850	11.51	8.950	1.77	12.05	.89
2.800	5.31	5.900	11.51	9.000	1.77	12.10	.89
2.850	5.31	5.950	11.51	9.050	1.77	12.15	.89
2.900	5.31	6.000	11.51	9.100	1.77	12.20	.89
2.950	5.31	6.050	11.51	9.150	1.77	12.25	.89
3.000	5.31	6.100	11.51	9.200	1.77		
3.050	5.31	6.150	11.51	9.250	1.77		
3.100	5.31	6.200	11.51	9.300	.89		

Max.Eff.Inten.(mm/hr)=		40.71	59.40	
over (min)		9.00	18.00	
Storage Coeff. (min)=		8.34 (ii)	17.04 (ii)	
Unit Hyd. Tpeak (min)=		9.00	18.00	
Unit Hyd. peak (cms)=		.13	.07	
				TOTALS
PEAK FLOW	(cms)=	2.89	3.72	6.605 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	70.05	77.04
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.79	.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0104)	Area (ha)=	52.89	
ID= 1 DT= 3.0 min	Total Imp(%)=	56.00	Dir. Conn.(%)= 38.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	29.62	23.27
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	594.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		40.71	52.23	
over (min)		12.00	21.00	
Storage Coeff. (min)=		10.66 (ii)	19.81 (ii)	
Unit Hyd. Tpeak (min)=		12.00	21.00	
Unit Hyd. peak (cms)=		.10	.06	
				TOTALS
PEAK FLOW	(cms)=	2.26	3.02	5.274 (iii)
TIME TO PEAK	(hrs)=	5.25	5.30	5.25
RUNOFF VOLUME	(mm)=	87.54	68.29	75.60
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.77	.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0105)	Area (ha)=	54.99	
ID= 1 DT= 3.0 min	Total Imp(%)=	56.00	Dir. Conn.(%)= 38.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	30.79	24.20
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	605.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		40.71	52.23	
over (min)		12.00	21.00	
Storage Coeff. (min)=		10.78 (ii)	19.93 (ii)	
Unit Hyd. Tpeak (min)=		12.00	21.00	
Unit Hyd. peak (cms)=		.10	.06	
				TOTALS
PEAK FLOW	(cms)=	2.35	3.14	5.479 (iii)
TIME TO PEAK	(hrs)=	5.25	5.30	5.25
RUNOFF VOLUME	(mm)=	87.54	68.28	75.60
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.77	.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0106)	Area (ha)=	18.20	
ID= 1 DT= 3.0 min	Total Imp(%)=	56.00	Dir. Conn.(%)= 38.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.19	8.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	348.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		40.71	52.23	
over (min)		9.00	18.00	
Storage Coeff. (min)=		7.73 (ii)	16.89 (ii)	
Unit Hyd. Tpeak (min)=		9.00	18.00	
Unit Hyd. peak (cms)=		.14	.07	
				TOTALS
PEAK FLOW	(cms)=	.78	1.07	1.856 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	68.28	75.60
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.77	.85

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0108)	Area (ha)=	.95	
ID= 1 DT= 1.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.86	.10
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	80.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 1.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.017	.00	3.083	5.31	6.150	11.51	9.22	1.77
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77

.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89

2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	35.00	
over (min)	5.00	8.00	
Storage Coeff. (min)=	3.20 (ii)	7.40 (ii)	
Unit Hyd. Tpeak (min)=	5.00	8.00	
Unit Hyd. peak (cms)=	.30	.15	
			TOTALS
PEAK FLOW (cms)=	.10	.01	.106 (iii)
TIME TO PEAK (hrs)=	5.00	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	62.26	85.01
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	.99	.70	.96

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0101) | Area (ha)= 3.15
ID= 1 DT= 2.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.92	1.23
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	720.00	8.50
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	1.33
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.133	.00	3.200	5.31	6.267	8.86	9.33	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.200	.00	3.267	10.18	6.333	6.20	9.40	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.267	.45	3.333	15.05	6.400	6.20	9.47	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.133	.89	4.200	15.05	7.267	4.87	10.33	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.200	.89	4.267	27.88	7.333	3.54	10.40	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.133	.89	5.200	40.71	8.267	2.66	11.33	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.200	.89	5.267	26.11	8.333	1.77	11.40	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.267	3.10	5.333	11.51	8.400	1.77	11.47	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.067	5.31	6.133	11.51	9.200	1.77	12.27	.44

Max.Eff.Inten.(mm/hr)=	40.71	34.92	
over (min)	10.00	14.00	
Storage Coeff. (min)=	9.72 (ii)	13.06 (ii)	
Unit Hyd. Tpeak (min)=	10.00	14.00	
Unit Hyd. peak (cms)=	.12	.08	
			TOTALS

PEAK FLOW (cms)=	.22	.11	.329 (iii)
TIME TO PEAK (hrs)=	5.23	5.27	5.23
RUNOFF VOLUME (mm)=	87.54	62.26	77.68
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	.99	.70	.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0300)
ID= 1 DT=10.0 min

Area (ha)= 6.72 Curve Number (CN)= 88.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .12

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89
2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

Unit Hyd Qpeak (cms)= 2.213

PEAK FLOW (cms)=	.540 (i)	
TIME TO PEAK (hrs)=	5.167	
RUNOFF VOLUME (mm)=	52.496	
TOTAL RAINFALL (mm)=	88.540	
RUNOFF COEFFICIENT =	.593	

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0905)
ID= 1 DT= 5.0 min

Area (ha)= 5.25
Total Imp(%)= 70.00 Dir. Conn.(%)= 53.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.67	1.58
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	187.10	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	3.167	5.31	6.250	11.51	9.33	.89
.167	.00	3.250	5.31	6.333	6.20	9.42	.89
.250	.00	3.333	15.05	6.417	6.20	9.50	.89
.333	.89	3.417	15.05	6.500	6.20	9.58	.89
.417	.89	3.500	15.05	6.583	6.20	9.67	.89
.500	.89	3.583	15.05	6.667	6.20	9.75	.89
.583	.89	3.667	15.05	6.750	6.20	9.83	.89
.667	.89	3.750	15.05	6.833	6.20	9.92	.89
.750	.89	3.833	15.05	6.917	6.20	10.00	.89
.833	.89	3.917	15.05	7.000	6.20	10.08	.89
.917	.89	4.000	15.05	7.083	6.20	10.17	.89
1.000	.89	4.083	15.05	7.167	6.20	10.25	.89
1.083	.89	4.167	15.05	7.250	6.20	10.33	.89
1.167	.89	4.250	15.05	7.333	3.54	10.42	.89
1.250	.89	4.333	40.71	7.417	3.54	10.50	.89
1.333	.89	4.417	40.71	7.500	3.54	10.58	.89
1.417	.89	4.500	40.71	7.583	3.54	10.67	.89
1.500	.89	4.583	40.71	7.667	3.54	10.75	.89
1.583	.89	4.667	40.71	7.750	3.54	10.83	.89
1.667	.89	4.750	40.71	7.833	3.54	10.92	.89
1.750	.89	4.833	40.71	7.917	3.54	11.00	.89
1.833	.89	4.917	40.71	8.000	3.54	11.08	.89
1.917	.89	5.000	40.71	8.083	3.54	11.17	.89
2.000	.89	5.083	40.71	8.167	3.54	11.25	.89
2.083	.89	5.167	40.71	8.250	3.54	11.33	.89
2.167	.89	5.250	40.71	8.333	1.77	11.42	.89
2.250	.89	5.333	11.51	8.417	1.77	11.50	.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	56.89	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.33 (ii)	14.17 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.21	.08	
			TOTALS
PEAK FLOW (cms)=	.31	.24	.550 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	66.02	77.42
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	.99	.75	.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0906)
ID= 1 DT= 5.0 min

Area (ha)= 6.59
Total Imp(%)= 71.00 Dir. Conn.(%)= 53.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.68	1.91
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	209.60	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	40.71	59.17	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.71 (ii)	14.41 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.20	.08	
			TOTALS
PEAK FLOW (cms)=	.39	.30	.692 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	66.59	77.69
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	.99	.75	.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0915)	Area (ha)=	22.80			
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	46.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	15.96	6.84
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	389.90	40.00
Mannings n	=	.013	.250
Max.Eff.Inten.	(mm/hr)=	40.71	68.79
over	(min)	10.00	20.00
Storage Coeff.	(min)=	8.28 (ii)	16.48 (ii)
Unit Hyd. Tpeak	(min)=	10.00	20.00
Unit Hyd. peak	(cms)=	.13	.06

				TOTALS
PEAK FLOW	(cms)=	1.19	1.22	2.408 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	71.93	79.11
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.81	.89

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0306)	Area (ha)=	2.51	Curve Number (CN)=	88.0	
ID= 1 DT=10.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	.12			

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89
2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

Unit Hyd Qpeak	(cms)=	.826
PEAK FLOW	(cms)=	.202 (i)
TIME TO PEAK	(hrs)=	5.167
RUNOFF VOLUME	(mm)=	52.496
TOTAL RAINFALL	(mm)=	88.540
RUNOFF COEFFICIENT	=	.593

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0305)	Area (ha)=	.51			
ID= 1 DT= 1.0 min	Total Imp(%)=	85.00	Dir. Conn.(%)=	85.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.43	.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.30	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 1.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.017	.00	3.083	5.31	6.150	11.51	9.22	1.77
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89

1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

Max.Eff.Inten.(mm/hr)=		40.71	35.00	
over (min)		5.00	8.00	
Storage Coeff. (min)=		2.65 (ii)	7.70 (ii)	
Unit Hyd. Tpeak (min)=		5.00	8.00	
Unit Hyd. peak (cms)=		.33	.15	
				TOTALS
PEAK FLOW	(cms)=	.05	.01	.056 (iii)
TIME TO PEAK	(hrs)=	4.85	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	62.26	83.74
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.70	.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0302) | Area (ha)= 1.31
ID= 1 DT= 1.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 54.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.84	.47
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	93.50	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	40.71	46.77	
over (min)	5.00	13.00	
Storage Coeff. (min)=	3.52 (ii)	12.11 (ii)	
Unit Hyd. Tpeak (min)=	5.00	13.00	
Unit Hyd. peak (cms)=	.28	.09	

				TOTALS
PEAK FLOW	(cms)=	.08	.06	.139 (iii)
TIME TO PEAK	(hrs)=	5.05	5.27	5.25
RUNOFF VOLUME	(mm)=	87.54	66.67	77.94
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.75	.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0303) | Area (ha)= 1.72
ID= 1 DT= 1.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.74	.98
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	107.10	40.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		40.71	43.18
over (min)		5.00	14.00
Storage Coeff. (min)=		3.81 (ii)	13.69 (ii)
Unit Hyd. Tpeak (min)=		5.00	14.00
Unit Hyd. peak (cms)=		.27	.08

				TOTALS
PEAK FLOW	(cms)=	.06	.11	.173 (iii)
TIME TO PEAK	(hrs)=	5.10	5.27	5.25
RUNOFF VOLUME	(mm)=	87.54	65.49	72.54
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	.99	.74	.82

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0304) | Area (ha)= .90 Curve Number (CN)= 88.0
ID= 1 DT=10.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .01

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89
2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

Unit Hyd Qpeak (cms)= 5.761

PEAK FLOW (cms)= .000 (i)
TIME TO PEAK (hrs)= .000
RUNOFF VOLUME (mm)= .000
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = .000

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ HYD (0745) | AREA (ha)=3174.13
DT=15.0 min | TPEAK (hrs)= 7.00
VOLUME (mm)= 5.01

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.00	2.801	22.00	.531	33.00	.091	44.00	.011
.25	.000	11.25	2.708	22.25	.513	33.25	.088	44.25	.010
.50	.000	11.50	2.616	22.50	.496	33.50	.084	44.50	.010
.75	.000	11.75	2.510	22.75	.479	33.75	.080	44.75	.009
1.00	.000	12.00	2.393	23.00	.462	34.00	.076	45.00	.009
1.25	.000	12.25	2.285	23.25	.446	34.25	.073	45.25	.008
1.50	.011	12.50	2.185	23.50	.430	34.50	.070	45.50	.008
1.75	.054	12.75	2.093	23.75	.415	34.75	.067	45.75	.007
2.00	.141	13.00	2.008	24.00	.400	35.00	.064	46.00	.007
2.25	.270	13.25	1.922	24.25	.385	35.25	.061	46.25	.007
2.50	.420	13.50	1.833	24.50	.371	35.50	.058	46.50	.006
2.75	.572	13.75	1.746	24.75	.358	35.75	.055	46.75	.006
3.00	.765	14.00	1.666	25.00	.345	36.00	.053	47.00	.005
3.25	1.036	14.25	1.594	25.25	.332	36.25	.051	47.25	.005
3.50	1.365	14.50	1.527	25.50	.319	36.50	.048	47.50	.005
3.75	1.729	14.75	1.466	25.75	.307	36.75	.046	47.75	.005
4.00	2.114	15.00	1.409	26.00	.295	37.00	.044	48.00	.004
4.25	2.463	15.25	1.355	26.25	.284	37.25	.042	48.25	.004
4.50	2.751	15.50	1.304	26.50	.273	37.50	.040	48.50	.004
4.75	3.014	15.75	1.256	26.75	.263	37.75	.038	48.75	.003
5.00	3.249	16.00	1.211	27.00	.252	38.00	.036	49.00	.003
5.25	3.455	16.25	1.167	27.25	.242	38.25	.035	49.25	.003
5.50	3.632	16.50	1.126	27.50	.233	38.50	.033	49.50	.003
5.75	3.781	16.75	1.086	27.75	.224	38.75	.031	49.75	.003
6.00	3.902	17.00	1.048	28.00	.215	39.00	.030	50.00	.003
6.25	3.994	17.25	1.011	28.25	.206	39.25	.028	50.25	.002
6.50	4.054	17.50	.978	28.50	.198	39.50	.027	50.50	.002
6.75	4.083	17.75	.947	28.75	.190	39.75	.026	50.75	.002
7.00	4.091	18.00	.917	29.00	.182	40.00	.025	51.00	.002
7.25	4.082	18.25	.887	29.25	.175	40.25	.023	51.25	.002
7.50	4.061	18.50	.858	29.50	.168	40.50	.022	51.50	.002
7.75	4.018	18.75	.830	29.75	.161	40.75	.021	51.75	.002
8.00	3.950	19.00	.803	30.00	.154	41.00	.020	52.00	.002
8.25	3.867	19.25	.776	30.25	.148	41.25	.019	52.25	.001
8.50	3.777	19.50	.750	30.50	.141	41.50	.018	52.50	.001
8.75	3.683	19.75	.724	30.75	.136	41.75	.017	52.75	.001
9.00	3.587	20.00	.699	31.00	.130	42.00	.017	53.00	.001
9.25	3.488	20.25	.676	31.25	.124	42.25	.016	53.25	.001
9.50	3.389	20.50	.653	31.50	.119	42.50	.015	53.50	.001
9.75	3.288	20.75	.630	31.75	.114	42.75	.014	53.75	.001
10.00	3.189	21.00	.608	32.00	.109	43.00	.014	54.00	.000
10.25	3.090	21.25	.588	32.25	.104	43.25	.013		
10.50	2.993	21.50	.568	32.50	.100	43.50	.012		
10.75	2.896	21.75	.550	32.75	.096	43.75	.012		

READ STORM | Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89

1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0925)
DT=15.0 min

AREA (ha)=3174.13
TPEAK (hrs)= 6.75
VOLUME (mm)= 7.36

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.25	3.700	22.50	.591	33.75	.100	45.00	.012
.25	.000	11.50	3.536	22.75	.572	34.00	.096	45.25	.011
.50	.000	11.75	3.383	23.00	.553	34.25	.092	45.50	.011
.75	.000	12.00	3.240	23.25	.534	34.50	.088	45.75	.010
1.00	.000	12.25	3.104	23.50	.516	34.75	.084	46.00	.009
1.25	.000	12.50	2.976	23.75	.498	35.00	.080	46.25	.009
1.50	.018	12.75	2.855	24.00	.481	35.25	.077	46.50	.008
1.75	.090	13.00	2.731	24.25	.464	35.50	.073	46.75	.008
2.00	.242	13.25	2.595	24.50	.448	35.75	.070	47.00	.008
2.25	.448	13.50	2.460	24.75	.432	36.00	.067	47.25	.007
2.50	.683	13.75	2.338	25.00	.416	36.25	.064	47.50	.007
2.75	1.015	14.00	2.227	25.25	.401	36.50	.061	47.75	.006
3.00	1.501	14.25	2.126	25.50	.386	36.75	.058	48.00	.006
3.25	2.093	14.50	2.032	25.75	.372	37.00	.056	48.25	.006
3.50	2.703	14.75	1.942	26.00	.358	37.25	.053	48.50	.005
3.75	3.254	15.00	1.849	26.25	.345	37.50	.051	48.75	.005
4.00	3.807	15.25	1.756	26.50	.332	37.75	.048	49.00	.005
4.25	4.321	15.50	1.671	26.75	.320	38.00	.046	49.25	.004
4.50	4.772	15.75	1.594	27.00	.308	38.25	.044	49.50	.004
4.75	5.171	16.00	1.524	27.25	.296	38.50	.042	49.75	.004
5.00	5.528	16.25	1.459	27.50	.284	38.75	.040	50.00	.004
5.25	5.838	16.50	1.400	27.75	.273	39.00	.038	50.25	.003
5.50	6.099	16.75	1.344	28.00	.263	39.25	.036	50.50	.003
5.75	6.307	17.00	1.292	28.25	.253	39.50	.035	50.75	.003
6.00	6.467	17.25	1.242	28.50	.243	39.75	.033	51.00	.003
6.25	6.577	17.50	1.195	28.75	.233	40.00	.031	51.25	.003
6.50	6.642	17.75	1.151	29.00	.224	40.25	.030	51.50	.002
6.75	6.661	18.00	1.109	29.25	.215	40.50	.029	51.75	.002
7.00	6.610	18.25	1.068	29.50	.206	40.75	.027	52.00	.002
7.25	6.492	18.50	1.030	29.75	.198	41.00	.026	52.25	.002
7.50	6.345	18.75	.995	30.00	.190	41.25	.025	52.50	.002
7.75	6.185	19.00	.962	30.25	.182	41.50	.024	52.75	.002
8.00	6.020	19.25	.931	30.50	.175	41.75	.022	53.00	.002
8.25	5.850	19.50	.900	30.75	.168	42.00	.021	53.25	.002
8.50	5.679	19.75	.870	31.00	.161	42.25	.020	53.50	.001
8.75	5.505	20.00	.841	31.25	.154	42.50	.019	53.75	.001
9.00	5.330	20.25	.812	31.50	.148	42.75	.018	54.00	.001
9.25	5.155	20.50	.784	31.75	.141	43.00	.017	54.25	.001
9.50	4.982	20.75	.757	32.00	.136	43.25	.017	54.50	.001
9.75	4.796	21.00	.731	32.25	.130	43.50	.016	54.75	.001
10.00	4.597	21.25	.706	32.50	.124	43.75	.015	55.00	.001
10.25	4.402	21.50	.682	32.75	.119	44.00	.014	55.25	.001
10.50	4.217	21.75	.658	33.00	.114	44.25	.014	55.50	.000
10.75	4.042	22.00	.635	33.25	.109	44.50	.013		
11.00	3.871	22.25	.612	33.50	.104	44.75	.012		

READ STORM
Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89

1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0926)
DT=15.0 min

AREA (ha)=3174.13
TPEAK (hrs)= 7.00
VOLUME (mm)= 9.99

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.50	4.633	23.00	.635	34.50	.105	46.00	.012
.25	.000	11.75	4.401	23.25	.613	34.75	.100	46.25	.011
.50	.000	12.00	4.188	23.50	.591	35.00	.096	46.50	.011
.75	.000	12.25	3.991	23.75	.572	35.25	.092	46.75	.010
1.00	.000	12.50	3.797	24.00	.552	35.50	.088	47.00	.010
1.25	.000	12.75	3.606	24.25	.534	35.75	.084	47.25	.009
1.50	.028	13.00	3.429	24.50	.516	36.00	.080	47.50	.009
1.75	.139	13.25	3.268	24.75	.498	36.25	.077	47.75	.008
2.00	.368	13.50	3.117	25.00	.481	36.50	.073	48.00	.008
2.25	.669	13.75	2.977	25.25	.464	36.75	.070	48.25	.007
2.50	1.101	14.00	2.836	25.50	.447	37.00	.067	48.50	.007
2.75	1.774	14.25	2.685	25.75	.431	37.25	.064	48.75	.006
3.00	2.597	14.50	2.537	26.00	.416	37.50	.061	49.00	.006
3.25	3.395	14.75	2.404	26.25	.401	37.75	.058	49.25	.006
3.50	4.177	15.00	2.285	26.50	.386	38.00	.056	49.50	.005
3.75	4.920	15.25	2.175	26.75	.372	38.25	.053	49.75	.005
4.00	5.609	15.50	2.075	27.00	.358	38.50	.051	50.00	.005
4.25	6.288	15.75	1.983	27.25	.345	38.75	.048	50.25	.004
4.50	6.917	16.00	1.889	27.50	.332	39.00	.046	50.50	.004
4.75	7.432	16.25	1.792	27.75	.319	39.25	.044	50.75	.004
5.00	7.851	16.50	1.702	28.00	.307	39.50	.042	51.00	.004
5.25	8.221	16.75	1.620	28.25	.295	39.75	.040	51.25	.003
5.50	8.530	17.00	1.546	28.50	.284	40.00	.038	51.50	.003
5.75	8.780	17.25	1.478	28.75	.273	40.25	.037	51.75	.003
6.00	8.977	17.50	1.416	29.00	.263	40.50	.035	52.00	.003
6.25	9.126	17.75	1.358	29.25	.252	40.75	.033	52.25	.003
6.50	9.231	18.00	1.304	29.50	.242	41.00	.032	52.50	.002
6.75	9.288	18.25	1.253	29.75	.233	41.25	.030	52.75	.002
7.00	9.292	18.50	1.204	30.00	.224	41.50	.029	53.00	.002
7.25	9.238	18.75	1.159	30.25	.215	41.75	.027	53.25	.002
7.50	9.131	19.00	1.116	30.50	.206	42.00	.026	53.50	.002
7.75	8.978	19.25	1.074	30.75	.198	42.25	.025	53.75	.002
8.00	8.785	19.50	1.035	31.00	.190	42.50	.024	54.00	.002
8.25	8.561	19.75	1.000	31.25	.182	42.75	.023	54.25	.002
8.50	8.282	20.00	.967	31.50	.175	43.00	.021	54.50	.001
8.75	7.947	20.25	.934	31.75	.168	43.25	.020	54.75	.001
9.00	7.607	20.50	.903	32.00	.161	43.50	.019	55.00	.001
9.25	7.286	20.75	.873	32.25	.154	43.75	.018	55.25	.001
9.50	6.977	21.00	.843	32.50	.148	44.00	.018	55.50	.001
9.75	6.681	21.25	.814	32.75	.141	44.25	.017	55.75	.001
10.00	6.370	21.50	.786	33.00	.136	44.50	.016	56.00	.001
10.25	6.050	21.75	.759	33.25	.130	44.75	.015	56.25	.001
10.50	5.748	22.00	.732	33.50	.124	45.00	.014	56.50	.000
10.75	5.461	22.25	.707	33.75	.119	45.25	.014		
11.00	5.170	22.50	.683	34.00	.114	45.50	.013		
11.25	4.889	22.75	.659	34.25	.109	45.75	.012		

READ STORM
Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89

1.00	.89	4.25	15.05	7.50	3.54	10.75	.89				
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89				
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89				
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89				
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89				
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89				
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89				
2.75	5.31	6.00	11.51	9.25	1.77						
3.00	5.31	6.25	11.51	9.50	.89						
3.25	5.31	6.50	6.20	9.75	.89						

READ HYD (0950)	AREA (ha)= 150.47
DT=15.0 min	TPEAK (hrs)= 13.00
	VOLUME (mm)= 9.79

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	36.00	.055	72.00	.012	108.00	.002	144.00	.000
.25	.000	36.25	.054	72.25	.012	108.25	.002	144.25	.000
.50	.001	36.50	.054	72.50	.012	108.50	.002	144.50	.000
.75	.002	36.75	.053	72.75	.011	108.75	.002	144.75	.000
1.00	.004	37.00	.053	73.00	.011	109.00	.002	145.00	.000
1.25	.006	37.25	.052	73.25	.011	109.25	.002	145.25	.000
1.50	.012	37.50	.051	73.50	.011	109.50	.002	145.50	.000
1.75	.023	37.75	.051	73.75	.011	109.75	.002	145.75	.000
2.00	.035	38.00	.051	74.00	.011	110.00	.002	146.00	.000
2.25	.046	38.25	.050	74.25	.010	110.25	.002	146.25	.000
2.50	.055	38.50	.049	74.50	.010	110.50	.002	146.50	.000
2.75	.061	38.75	.049	74.75	.010	110.75	.002	146.75	.000
3.00	.066	39.00	.049	75.00	.010	111.00	.002	147.00	.000
3.25	.071	39.25	.048	75.25	.010	111.25	.002	147.25	.000
3.50	.074	39.50	.047	75.50	.010	111.50	.002	147.50	.000
3.75	.077	39.75	.047	75.75	.010	111.75	.002	147.75	.000
4.00	.079	40.00	.047	76.00	.010	112.00	.002	148.00	.000
4.25	.081	40.25	.046	76.25	.010	112.25	.002	148.25	.000
4.50	.083	40.50	.046	76.50	.010	112.50	.002	148.50	.000
4.75	.084	40.75	.045	76.75	.010	112.75	.002	148.75	.000
5.00	.084	41.00	.045	77.00	.009	113.00	.002	149.00	.000
5.25	.084	41.25	.044	77.25	.009	113.25	.002	149.25	.000
5.50	.084	41.50	.044	77.50	.009	113.50	.002	149.50	.000
5.75	.085	41.75	.043	77.75	.009	113.75	.002	149.75	.000
6.00	.085	42.00	.043	78.00	.009	114.00	.002	150.00	.000
6.25	.085	42.25	.043	78.25	.009	114.25	.002	150.25	.000
6.50	.085	42.50	.042	78.50	.009	114.50	.002	150.50	.000
6.75	.086	42.75	.041	78.75	.009	114.75	.002	150.75	.000
7.00	.086	43.00	.041	79.00	.008	115.00	.002	151.00	.000
7.25	.086	43.25	.041	79.25	.008	115.25	.002	151.25	.000
7.50	.086	43.50	.040	79.50	.008	115.50	.002	151.50	.000
7.75	.087	43.75	.040	79.75	.008	115.75	.002	151.75	.000
8.00	.088	44.00	.039	80.00	.008	116.00	.002	152.00	.000
8.25	.088	44.25	.039	80.25	.008	116.25	.002	152.25	.000
8.50	.089	44.50	.039	80.50	.008	116.50	.002	152.50	.000
8.75	.090	44.75	.038	80.75	.008	116.75	.002	152.75	.000
9.00	.090	45.00	.038	81.00	.008	117.00	.002	153.00	.000
9.25	.091	45.25	.037	81.25	.008	117.25	.002	153.25	.000
9.50	.092	45.50	.037	81.50	.008	117.50	.002	153.50	.000
9.75	.093	45.75	.037	81.75	.008	117.75	.002	153.75	.000
10.00	.094	46.00	.036	82.00	.008	118.00	.002	154.00	.000
10.25	.094	46.25	.036	82.25	.008	118.25	.002	154.25	.000
10.50	.095	46.50	.035	82.50	.007	118.50	.002	154.50	.000
10.75	.096	46.75	.035	82.75	.007	118.75	.002	154.75	.000
11.00	.096	47.00	.035	83.00	.007	119.00	.002	155.00	.000
11.25	.097	47.25	.034	83.25	.007	119.25	.002	155.25	.000
11.50	.098	47.50	.034	83.50	.007	119.50	.002	155.50	.000
11.75	.098	47.75	.033	83.75	.007	119.75	.001	155.75	.000
12.00	.098	48.00	.033	84.00	.007	120.00	.001	156.00	.000
12.25	.099	48.25	.033	84.25	.007	120.25	.001	156.25	.000
12.50	.099	48.50	.033	84.50	.007	120.50	.001	156.50	.000
12.75	.099	48.75	.032	84.75	.007	120.75	.001	156.75	.000
13.00	.100	49.00	.032	85.00	.006	121.00	.001	157.00	.000
13.25	.100	49.25	.031	85.25	.006	121.25	.001	157.25	.000
13.50	.100	49.50	.031	85.50	.006	121.50	.001	157.50	.000
13.75	.100	49.75	.031	85.75	.006	121.75	.001	157.75	.000
14.00	.100	50.00	.031	86.00	.006	122.00	.001	158.00	.000
14.25	.100	50.25	.030	86.25	.006	122.25	.001	158.25	.000
14.50	.100	50.50	.030	86.50	.006	122.50	.001	158.50	.000
14.75	.100	50.75	.029	86.75	.006	122.75	.001	158.75	.000
15.00	.100	51.00	.029	87.00	.006	123.00	.001	159.00	.000
15.25	.100	51.25	.029	87.25	.006	123.25	.001	159.25	.000
15.50	.100	51.50	.029	87.50	.006	123.50	.001	159.50	.000
15.75	.100	51.75	.028	87.75	.006	123.75	.001	159.75	.000
16.00	.099	52.00	.028	88.00	.006	124.00	.001	160.00	.000
16.25	.099	52.25	.028	88.25	.006	124.25	.001	160.25	.000
16.50	.099	52.50	.027	88.50	.006	124.50	.001	160.50	.000
16.75	.099	52.75	.027	88.75	.006	124.75	.001	160.75	.000
17.00	.098	53.00	.027	89.00	.006	125.00	.001	161.00	.000
17.25	.098	53.25	.027	89.25	.006	125.25	.001	161.25	.000
17.50	.098	53.50	.026	89.50	.005	125.50	.001	161.50	.000
17.75	.097	53.75	.026	89.75	.005	125.75	.001	161.75	.000
18.00	.097	54.00	.026	90.00	.005	126.00	.001	162.00	.000
18.25	.096	54.25	.026	90.25	.005	126.25	.001	162.25	.000
18.50	.096	54.50	.025	90.50	.005	126.50	.001	162.50	.000
18.75	.096	54.75	.025	90.75	.005	126.75	.001	162.75	.000
19.00	.095	55.00	.025	91.00	.005	127.00	.001	163.00	.000
19.25	.095	55.25	.024	91.25	.005	127.25	.001	163.25	.000
19.50	.094	55.50	.024	91.50	.005	127.50	.001	163.50	.000
19.75	.094	55.75	.024	91.75	.005	127.75	.001	163.75	.000
20.00	.093	56.00	.024	92.00	.005	128.00	.001	164.00	.000
20.25	.093	56.25	.023	92.25	.005	128.25	.001	164.25	.000
20.50	.092	56.50	.023	92.50	.005	128.50	.001	164.50	.000
20.75	.092	56.75	.023	92.75	.005	128.75	.001	164.75	.000
21.00	.091	57.00	.023	93.00	.004	129.00	.001	165.00	.000
21.25	.090	57.25	.022	93.25	.004	129.25	.001	165.25	.000
21.50	.090	57.50	.022	93.50	.004	129.50	.001	165.50	.000
21.75	.090	57.75	.022	93.75	.004	129.75	.001	165.75	.000
22.00	.089	58.00	.022	94.00	.004	130.00	.001	166.00	.000
22.25	.088	58.25	.022	94.25	.004	130.25	.001	166.25	.000
22.50	.088	58.50	.021	94.50	.004	130.50	.001	166.50	.000
22.75	.087	58.75	.021	94.75	.004	130.75	.001	166.75	.000
23.00	.086	59.00	.021	95.00	.004	131.00	.001	167.00	.000
23.25	.086	59.25	.020	95.25	.004	131.25	.001	167.25	.000
23.50	.085	59.50	.020	95.50	.004	131.50	.001	167.50	.000
23.75	.085	59.75	.020	95.75	.004	131.75	.001	167.75	.000
24.00	.084	60.00	.020	96.00	.004	132.00	.001	168.00	.000
24.25	.083	60.25	.020	96.25	.004	132.25	.001	168.25	.000
24.50	.083	60.50	.019	96.50	.004	132.50	.001	168.50	.000
24.75	.082	60.75	.019	96.75	.004	132.75	.001	168.75	.000
25.00	.082	61.00	.019	97.00	.004	133.00	.001	169.00	.000
25.25	.081	61.25	.019	97.25	.004	133.25	.001	169.25	.000
25.50	.080	61.50	.018	97.50	.004	133.50	.001	169.50	.000
25.75	.080	61.75	.018	97.75	.004	133.75	.001	169.75	.000
26.00	.079	62.00	.018	98.00	.004	134.00	.001	170.00	.000
26.25	.079	62.25	.018	98.25	.004	134.25	.001	170.25	.000
26.50	.078	62.50	.018	98.50	.004	134.50	.001	170.50	.000
26.75	.077	62.75	.018	98.75	.004	134.75	.001	170.75	.000
27.00	.077	63.00	.017	99.00	.004	135.00	.001	171.00	.000
27.25	.076	63.25	.017	99.25	.004	135.25	.001	171.25	.000
27.50	.075	63.50	.017	99.50	.004	135.50	.001	171.50	.000
27.75	.075	63.75	.017	99.75	.004	135.75	.001	171.75	.000
28.00	.074	64.00	.017	100.00	.003	136.00	.001	172.00	.000
28.25	.073	64.25	.016	100.25	.003	136.25	.001	172.25	.000
28.50	.073	64.50	.016	100.50	.003	136.50	.001	172.50	.000
28.75	.072	64.75	.016	100.75	.003	136.75	.001	172.75	.000
29.00	.071	65.00	.016	101.00	.003	137.00	.001	173.00	.000
29.25	.071	65.25	.016	101.25	.003	137.25	.001	173.25	.000
29.50	.070	65.50	.016	101.50	.003	137.50	.001	173.50	.000
29.75	.069	65.75	.015	101.75	.003	137.75	.001	173.75	.000
30.00	.069	66.00	.015	102.00	.003	138.00	.001	174.00	.000
30.25	.068	66.25	.015	102.25	.003	138.25	.001	174.25	.000
30.50	.068	66.50	.015	102.50	.003	138.50	.001	174.50	.000
30.75	.067	66.75	.015	102.75	.003	138.75	.001	174.75	.000
31.00	.067	67.00	.014	103.00	.003	139.00	.000	175.00	.000
31.25	.066	67.25	.014	103.25	.003	139.25	.000	175.25	.000
31.50	.065	67.50	.014	103.50	.003	139.50	.000	175.50	.000
31.75	.065	67.75	.014	103.75	.003	139.75	.000	175.75	.000
32.00	.064	68.00	.014	104.00	.003	140.00	.000	176.00	.000
32.25	.063	68.25	.014	104.25	.003	140.25	.000	176.25	.000
32.50	.063	68.50	.014	104.50	.003	140.50	.000	176.50	.000
32.75	.062	68.75	.014	104.75	.003	140.75	.000	176.75	.000
33.00	.062	69.00	.013	105.00	.003	141.00	.000	177.00	.000
33.25	.061	69.25	.013	105.25	.003	141.25	.000	177.25	.000
33.50	.061	69.50	.013	105.50	.003	141.50	.000	177.50	.000
33.75	.060	69.75	.013	105.75	.003	141.75	.000	177.75	.000
34.00	.059	70.00	.013	106.00	.002	142.00	.000	178.00	.000

34.25	.059	70.25	.013	106.25	.002	142.25	.000	178.25	.000
34.50	.058	70.50	.012	106.50	.002	142.50	.000	178.50	.000
34.75	.057	70.75	.012	106.75	.002	142.75	.000	178.75	.000
35.00	.057	71.00	.012	107.00	.002	143.00	.000	179.00	.000
35.25	.057	71.25	.012	107.25	.002	143.25	.000		
35.50	.056	71.50	.012	107.50	.002	143.50	.000		
35.75	.055	71.75	.012	107.75	.002	143.75	.000		

READ STORM | Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0928) | AREA (ha)= 150.47

DT=15.0 min | TPEAK (hrs)= 13.75

VOLUME (mm)= 12.98

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	37.00	.069	74.00	.014	111.00	.003	148.00	.000
.25	.000	37.25	.068	74.25	.014	111.25	.002	148.25	.000
.50	.001	37.50	.067	74.50	.013	111.50	.002	148.50	.000
.75	.002	37.75	.067	74.75	.013	111.75	.002	148.75	.000
1.00	.004	38.00	.066	75.00	.013	112.00	.002	149.00	.000
1.25	.008	38.25	.065	75.25	.013	112.25	.002	149.25	.000
1.50	.014	38.50	.065	75.50	.013	112.50	.002	149.50	.000
1.75	.028	38.75	.064	75.75	.013	112.75	.002	149.75	.000
2.00	.044	39.00	.063	76.00	.012	113.00	.002	150.00	.000
2.25	.057	39.25	.063	76.25	.012	113.25	.002	150.25	.000
2.50	.067	39.50	.062	76.50	.012	113.50	.002	150.50	.000
2.75	.075	39.75	.061	76.75	.012	113.75	.002	150.75	.000
3.00	.081	40.00	.061	77.00	.012	114.00	.002	151.00	.000
3.25	.086	40.25	.060	77.25	.012	114.25	.002	151.25	.000
3.50	.090	40.50	.059	77.50	.012	114.50	.002	151.50	.000
3.75	.094	40.75	.059	77.75	.012	114.75	.002	151.75	.000
4.00	.097	41.00	.058	78.00	.012	115.00	.002	152.00	.000
4.25	.100	41.25	.057	78.25	.011	115.25	.002	152.25	.000
4.50	.102	41.50	.057	78.50	.011	115.50	.002	152.50	.000
4.75	.104	41.75	.056	78.75	.011	115.75	.002	152.75	.000
5.00	.105	42.00	.055	79.00	.011	116.00	.002	153.00	.000
5.25	.106	42.25	.055	79.25	.011	116.25	.002	153.25	.000
5.50	.106	42.50	.055	79.50	.011	116.50	.002	153.50	.000
5.75	.107	42.75	.054	79.75	.010	116.75	.002	153.75	.000
6.00	.108	43.00	.053	80.00	.010	117.00	.002	154.00	.000
6.25	.109	43.25	.053	80.25	.010	117.25	.002	154.25	.000
6.50	.110	43.50	.052	80.50	.010	117.50	.002	154.50	.000
6.75	.111	43.75	.051	80.75	.010	117.75	.002	154.75	.000
7.00	.112	44.00	.051	81.00	.010	118.00	.002	155.00	.000
7.25	.113	44.25	.051	81.25	.010	118.25	.002	155.25	.000
7.50	.115	44.50	.050	81.50	.010	118.50	.002	155.50	.000
7.75	.116	44.75	.049	81.75	.010	118.75	.002	155.75	.000
8.00	.118	45.00	.049	82.00	.010	119.00	.002	156.00	.000
8.25	.120	45.25	.048	82.25	.010	119.25	.002	156.25	.000
8.50	.121	45.50	.048	82.50	.009	119.50	.002	156.50	.000
8.75	.123	45.75	.047	82.75	.009	119.75	.002	156.75	.000
9.00	.125	46.00	.047	83.00	.009	120.00	.002	157.00	.000
9.25	.126	46.25	.046	83.25	.009	120.25	.002	157.25	.000
9.50	.128	46.50	.046	83.50	.009	120.50	.002	157.50	.000
9.75	.129	46.75	.045	83.75	.009	120.75	.002	157.75	.000
10.00	.131	47.00	.045	84.00	.009	121.00	.002	158.00	.000
10.25	.132	47.25	.044	84.25	.009	121.25	.002	158.25	.000
10.50	.133	47.50	.044	84.50	.008	121.50	.002	158.50	.000
10.75	.134	47.75	.043	84.75	.008	121.75	.002	158.75	.000
11.00	.135	48.00	.043	85.00	.008	122.00	.002	159.00	.000
11.25	.136	48.25	.042	85.25	.008	122.25	.002	159.25	.000
11.50	.137	48.50	.042	85.50	.008	122.50	.002	159.50	.000
11.75	.137	48.75	.041	85.75	.008	122.75	.002	159.75	.000
12.00	.138	49.00	.041	86.00	.008	123.00	.002	160.00	.000
12.25	.138	49.25	.041	86.25	.008	123.25	.002	160.25	.000
12.50	.139	49.50	.040	86.50	.008	123.50	.002	160.50	.000
12.75	.139	49.75	.040	86.75	.008	123.75	.002	160.75	.000
13.00	.139	50.00	.039	87.00	.008	124.00	.002	161.00	.000
13.25	.139	50.25	.039	87.25	.008	124.25	.002	161.25	.000
13.50	.139	50.50	.038	87.50	.008	124.50	.002	161.50	.000
13.75	.140	50.75	.038	87.75	.007	124.75	.002	161.75	.000
14.00	.140	51.00	.037	88.00	.007	125.00	.002	162.00	.000
14.25	.139	51.25	.037	88.25	.007	125.25	.001	162.25	.000
14.50	.139	51.50	.037	88.50	.007	125.50	.001	162.50	.000
14.75	.139	51.75	.036	88.75	.007	125.75	.001	162.75	.000
15.00	.139	52.00	.036	89.00	.007	126.00	.001	163.00	.000
15.25	.139	52.25	.035	89.25	.007	126.25	.001	163.25	.000
15.50	.139	52.50	.035	89.50	.007	126.50	.001	163.50	.000
15.75	.138	52.75	.035	89.75	.007	126.75	.001	163.75	.000
16.00	.138	53.00	.034	90.00	.007	127.00	.001	164.00	.000
16.25	.137	53.25	.034	90.25	.007	127.25	.001	164.25	.000
16.50	.137	53.50	.033	90.50	.006	127.50	.001	164.50	.000
16.75	.136	53.75	.033	90.75	.006	127.75	.001	164.75	.000
17.00	.136	54.00	.033	91.00	.006	128.00	.001	165.00	.000
17.25	.136	54.25	.033	91.25	.006	128.25	.001	165.25	.000
17.50	.135	54.50	.032	91.50	.006	128.50	.001	165.50	.000
17.75	.134	54.75	.032	91.75	.006	128.75	.001	165.75	.000
18.00	.134	55.00	.031	92.00	.006	129.00	.001	166.00	.000
18.25	.133	55.25	.031	92.25	.006	129.25	.001	166.25	.000
18.50	.132	55.50	.031	92.50	.006	129.50	.001	166.50	.000
18.75	.132	55.75	.030	92.75	.006	129.75	.001	166.75	.000
19.00	.131	56.00	.030	93.00	.006	130.00	.001	167.00	.000
19.25	.130	56.25	.030	93.25	.006	130.25	.001	167.25	.000
19.50	.129	56.50	.029	93.50	.006	130.50	.001	167.50	.000
19.75	.128	56.75	.029	93.75	.006	130.75	.001	167.75	.000
20.00	.128	57.00	.029	94.00	.006	131.00	.001	168.00	.000
20.25	.127	57.25	.029	94.25	.006	131.25	.001	168.25	.000
20.50	.126	57.50	.028	94.50	.006	131.50	.001	168.50	.000
20.75	.125	57.75	.028	94.75	.006	131.75	.001	168.75	.000
21.00	.124	58.00	.027	95.00	.005	132.00	.001	169.00	.000
21.25	.123	58.25	.027	95.25	.005	132.25	.001	169.25	.000
21.50	.122	58.50	.027	95.50	.005	132.50	.001	169.50	.000
21.75	.122	58.75	.027	95.75	.005	132.75	.001	169.75	.000
22.00	.121	59.00	.026	96.00	.005	133.00	.001	170.00	.000
22.25	.120	59.25	.026	96.25	.005	133.25	.001	170.25	.000
22.50	.119	59.50	.026	96.50	.005	133.50	.001	170.50	.000
22.75	.118	59.75	.026	96.75	.005	133.75	.001	170.75	.000
23.00	.117	60.00	.025	97.00	.005	134.00	.001	171.00	.000
23.25	.116	60.25	.025	97.25	.005	134.25	.001	171.25	.000
23.50	.115	60.50	.025	97.50	.005	134.50	.001	171.50	.000
23.75	.114	60.75	.024	97.75	.005	134.75	.001	171.75	.000
24.00	.113	61.00	.024	98.00	.005	135.00	.001	172.00	.000
24.25	.112	61.25	.024	98.25	.005	135.25	.001	172.25	.000
24.50	.112	61.50	.024	98.50	.004	135.50	.001	172.50	.000
24.75	.110	61.75	.024	98.75	.004	135.75	.001	172.75	.000
25.00	.110	62.00	.023	99.00	.004	136.00	.001	173.00	.000
25.25	.109	62.25	.023	99.25	.004	136.25	.001	173.25	.000
25.50	.108	62.50	.023	99.50	.004	136.50	.001	173.50	.000
25.75	.107	62.75	.022	99.75	.004	136.75	.001	173.75	.000
26.00	.106	63.00	.022	100.00	.004	137.00	.001	174.00	.000
26.25	.105	63.25	.022	100.25	.004	137.25	.001	174.25	.000
26.50	.104	63.50	.022	100.50	.004	137.50	.001	174.50	.000
26.75	.103	63.75	.022	100.75	.004	137.75	.001	174.75	.000
27.00	.102	64.00	.021	101.00	.004	138.00	.001	175.00	.000
27.25	.101	64.25	.021	101.25	.004	138.25	.001	175.25	.000
27.50	.100	64.50	.021	101.50	.004	138.50	.001	175.50	.000
27.75	.099	64.75	.020	101.75	.004	138.75	.001	175.75	.000
28.00	.098	65.00	.020	102.00	.004	139.00	.001	176.00	.000
28.25	.098	65.25	.020	102.25	.004	139.25	.001	176.25	.000
28.50	.096	65.50	.020	102.50	.004	139.50	.001	176.50	.000
28.75	.096	65.75	.020	102.75	.004	139.75	.001	176.75	.000
29.00	.095	66.00	.020	103.00	.004	140.00	.001	177.00	.000

29.25	.094	66.25	.019	103.25	.004	140.25	.001	177.25	.000
29.50	.093	66.50	.019	103.50	.004	140.50	.001	177.50	.000
29.75	.092	66.75	.019	103.75	.004	140.75	.001	177.75	.000
30.00	.091	67.00	.018	104.00	.004	141.00	.001	178.00	.000
30.25	.090	67.25	.018	104.25	.004	141.25	.001	178.25	.000
30.50	.090	67.50	.018	104.50	.004	141.50	.001	178.50	.000
30.75	.088	67.75	.018	104.75	.004	141.75	.001	178.75	.000
31.00	.088	68.00	.018	105.00	.004	142.00	.001	179.00	.000
31.25	.087	68.25	.018	105.25	.003	142.25	.001	179.25	.000
31.50	.086	68.50	.017	105.50	.003	142.50	.001	179.50	.000
31.75	.085	68.75	.017	105.75	.003	142.75	.001	179.75	.000
32.00	.084	69.00	.017	106.00	.003	143.00	.001	180.00	.000
32.25	.084	69.25	.017	106.25	.003	143.25	.001	180.25	.000
32.50	.082	69.50	.017	106.50	.003	143.50	.001	180.50	.000
32.75	.082	69.75	.016	106.75	.003	143.75	.001	180.75	.000
33.00	.081	70.00	.016	107.00	.003	144.00	.001	181.00	.000
33.25	.080	70.25	.016	107.25	.003	144.25	.000	181.25	.000
33.50	.079	70.50	.016	107.50	.003	144.50	.000	181.50	.000
33.75	.079	70.75	.016	107.75	.003	144.75	.000	181.75	.000
34.00	.078	71.00	.016	108.00	.003	145.00	.000	182.00	.000
34.25	.077	71.25	.015	108.25	.003	145.25	.000	182.25	.000
34.50	.076	71.50	.015	108.50	.003	145.50	.000	182.50	.000
34.75	.075	71.75	.015	108.75	.003	145.75	.000	182.75	.000
35.00	.075	72.00	.015	109.00	.003	146.00	.000	183.00	.000
35.25	.074	72.25	.015	109.25	.003	146.25	.000	183.25	.000
35.50	.073	72.50	.014	109.50	.003	146.50	.000	183.50	.000
35.75	.073	72.75	.014	109.75	.003	146.75	.000	183.75	.000
36.00	.072	73.00	.014	110.00	.003	147.00	.000	184.00	.000
36.25	.071	73.25	.014	110.25	.003	147.25	.000	184.25	.000
36.50	.070	73.50	.014	110.50	.003	147.50	.000	184.50	.000
36.75	.069	73.75	.014	110.75	.003	147.75	.000		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0929)

DT=15.0 min

AREA (ha)= 150.47

TPEAK (hrs)= 10.25

VOLUME (mm)= 16.43

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	37.75	.077	75.50	.015	113.25	.003	151.00	.000
.25	.000	38.00	.076	75.75	.014	113.50	.003	151.25	.000
.50	.001	38.25	.075	76.00	.014	113.75	.003	151.50	.000
.75	.003	38.50	.075	76.25	.014	114.00	.003	151.75	.000
1.00	.005	38.75	.074	76.50	.014	114.25	.003	152.00	.000
1.25	.009	39.00	.073	76.75	.014	114.50	.002	152.25	.000
1.50	.018	39.25	.072	77.00	.014	114.75	.002	152.50	.000
1.75	.034	39.50	.071	77.25	.014	115.00	.002	152.75	.000
2.00	.053	39.75	.071	77.50	.013	115.25	.002	153.00	.000
2.25	.069	40.00	.070	77.75	.013	115.50	.002	153.25	.000
2.50	.081	40.25	.069	78.00	.013	115.75	.002	153.50	.000
2.75	.090	40.50	.069	78.25	.013	116.00	.002	153.75	.000
3.00	.097	40.75	.068	78.50	.013	116.25	.002	154.00	.000
3.25	.103	41.00	.067	78.75	.013	116.50	.002	154.25	.000
3.50	.108	41.25	.066	79.00	.012	116.75	.002	154.50	.000
3.75	.113	41.50	.065	79.25	.012	117.00	.002	154.75	.000
4.00	.117	41.75	.065	79.50	.012	117.25	.002	155.00	.000
4.25	.120	42.00	.064	79.75	.012	117.50	.002	155.25	.000
4.50	.123	42.25	.063	80.00	.012	117.75	.002	155.50	.000
4.75	.126	42.50	.063	80.25	.012	118.00	.002	155.75	.000
5.00	.128	42.75	.062	80.50	.012	118.25	.002	156.00	.000
5.25	.129	43.00	.061	80.75	.012	118.50	.002	156.25	.000
5.50	.131	43.25	.061	81.00	.012	118.75	.002	156.50	.000
5.75	.133	43.50	.060	81.25	.011	119.00	.002	156.75	.000
6.00	.135	43.75	.059	81.50	.011	119.25	.002	157.00	.000
6.25	.137	44.00	.059	81.75	.011	119.50	.002	157.25	.000
6.50	.139	44.25	.058	82.00	.011	119.75	.002	157.50	.000
6.75	.141	44.50	.057	82.25	.011	120.00	.002	157.75	.000
7.00	.144	44.75	.057	82.50	.011	120.25	.002	158.00	.000
7.25	.147	45.00	.056	82.75	.010	120.50	.002	158.25	.000
7.50	.149	45.25	.056	83.00	.010	120.75	.002	158.50	.000
7.75	.152	45.50	.055	83.25	.010	121.00	.002	158.75	.000
8.00	.155	45.75	.055	83.50	.010	121.25	.002	159.00	.000
8.25	.158	46.00	.054	83.75	.010	121.50	.002	159.25	.000
8.50	.161	46.25	.053	84.00	.010	121.75	.002	159.50	.000
8.75	.163	46.50	.053	84.25	.010	122.00	.002	159.75	.000
9.00	.165	46.75	.052	84.50	.010	122.25	.002	160.00	.000
9.25	.182	47.00	.051	84.75	.010	122.50	.002	160.25	.000
9.50	.247	47.25	.051	85.00	.010	122.75	.002	160.50	.000
9.75	.283	47.50	.050	85.25	.010	123.00	.002	160.75	.000
10.00	.302	47.75	.050	85.50	.009	123.25	.002	161.00	.000
10.25	.308	48.00	.049	85.75	.009	123.50	.002	161.25	.000
10.50	.308	48.25	.049	86.00	.009	123.75	.002	161.50	.000
10.75	.302	48.50	.048	86.25	.009	124.00	.002	161.75	.000
11.00	.295	48.75	.048	86.50	.009	124.25	.002	162.00	.000
11.25	.285	49.00	.047	86.75	.009	124.50	.002	162.25	.000
11.50	.275	49.25	.047	87.00	.009	124.75	.002	162.50	.000
11.75	.265	49.50	.046	87.25	.009	125.00	.002	162.75	.000
12.00	.255	49.75	.046	87.50	.008	125.25	.002	163.00	.000
12.25	.244	50.00	.045	87.75	.008	125.50	.002	163.25	.000
12.50	.234	50.25	.045	88.00	.008	125.75	.002	163.50	.000
12.75	.225	50.50	.044	88.25	.008	126.00	.002	163.75	.000
13.00	.215	50.75	.044	88.50	.008	126.25	.002	164.00	.000
13.25	.206	51.00	.043	88.75	.008	126.50	.002	164.25	.000
13.50	.198	51.25	.043	89.00	.008	126.75	.002	164.50	.000
13.75	.189	51.50	.042	89.25	.008	127.00	.002	164.75	.000
14.00	.181	51.75	.042	89.50	.008	127.25	.002	165.00	.000
14.25	.174	52.00	.041	89.75	.008	127.50	.002	165.25	.000
14.50	.167	52.25	.041	90.00	.008	127.75	.002	165.50	.000
14.75	.167	52.50	.040	90.25	.008	128.00	.002	165.75	.000
15.00	.167	52.75	.040	90.50	.008	128.25	.001	166.00	.000
15.25	.167	53.00	.039	90.75	.008	128.50	.001	166.25	.000
15.50	.166	53.25	.039	91.00	.007	128.75	.001	166.50	.000
15.75	.166	53.50	.039	91.25	.007	129.00	.001	166.75	.000
16.00	.165	53.75	.038	91.50	.007	129.25	.001	167.00	.000
16.25	.165	54.00	.038	91.75	.007	129.50	.001	167.25	.000
16.50	.164	54.25	.037	92.00	.007	129.75	.001	167.50	.000
16.75	.163	54.50	.037	92.25	.007	130.00	.001	167.75	.000
17.00	.163	54.75	.037	92.50	.007	130.25	.001	168.00	.000
17.25	.162	55.00	.036	92.75	.007	130.50	.001	168.25	.000
17.50	.161	55.25	.036	93.00	.007	130.75	.001	168.50	.000
17.75	.160	55.50	.035	93.25	.007	131.00	.001	168.75	.000
18.00	.159	55.75	.035	93.50	.006	131.25	.001	169.00	.000
18.25	.159	56.00	.035	93.75	.006	131.50	.001	169.25	.000
18.50	.157	56.25	.034	94.00	.006	131.75	.001	169.50	.000
18.75	.157	56.50	.034	94.25	.006	132.00	.001	169.75	.000
19.00	.156	56.75	.033	94.50	.006	132.25	.001	170.00	.000
19.25	.155	57.00	.033	94.75	.006	132.50	.001	170.25	.000
19.50	.154	57.25	.033	95.00	.006	132.75	.001	170.50	.000
19.75	.153	57.50	.032	95.25	.006	133.00	.001	170.75	.000
20.00	.152	57.75	.032	95.50	.006	133.25	.001	171.00	.000
20.25	.151	58.00	.031	95.75	.006	133.50	.001	171.25	.000
20.50	.149	58.25	.031	96.00	.006	133.75	.001	171.50	.000
20.75	.149	58.50	.031	96.25	.006	134.00	.001	171.75	.000
21.00	.147	58.75	.031	96.50	.006	134.25	.001	172.00	.000
21.25	.146	59.00	.030	96.75	.006	134.50	.001	172.25	.000
21.50	.145	59.25	.030	97.00	.006	134.75	.001	172.50	.000
21.75	.144	59.50	.029	97.25	.006	135.00	.001	172.75	.000
22.00	.143	59.75	.029	97.50	.006	135.25	.001	173.00	.000
22.25	.142	60.00	.029	97.75	.006	135.50	.001	173.25	.000
22.50	.141	60.25	.029	98.00	.005	135.75	.001	173.50	.000
22.75	.139	60.50	.028	98.25	.005	136.00	.001	173.75	.000
23.00	.138	60.75	.028	98.50	.005	136.25	.001	174.00	.000

23.25	.137	61.00	.028	98.75	.005	136.50	.001	174.25	.000
23.50	.136	61.25	.027	99.00	.005	136.75	.001	174.50	.000
23.75	.135	61.50	.027	99.25	.005	137.00	.001	174.75	.000
24.00	.134	61.75	.027	99.50	.005	137.25	.001	175.00	.000
24.25	.133	62.00	.027	99.75	.005	137.50	.001	175.25	.000
24.50	.132	62.25	.026	100.00	.005	137.75	.001	175.50	.000
24.75	.130	62.50	.026	100.25	.005	138.00	.001	175.75	.000
25.00	.129	62.75	.026	100.50	.005	138.25	.001	176.00	.000
25.25	.128	63.00	.026	100.75	.005	138.50	.001	176.25	.000
25.50	.127	63.25	.025	101.00	.005	138.75	.001	176.50	.000
25.75	.126	63.50	.025	101.25	.005	139.00	.001	176.75	.000
26.00	.124	63.75	.025	101.50	.004	139.25	.001	177.00	.000
26.25	.123	64.00	.024	101.75	.004	139.50	.001	177.25	.000
26.50	.122	64.25	.024	102.00	.004	139.75	.001	177.50	.000
26.75	.121	64.50	.024	102.25	.004	140.00	.001	177.75	.000
27.00	.120	64.75	.024	102.50	.004	140.25	.001	178.00	.000
27.25	.119	65.00	.023	102.75	.004	140.50	.001	178.25	.000
27.50	.118	65.25	.023	103.00	.004	140.75	.001	178.50	.000
27.75	.116	65.50	.023	103.25	.004	141.00	.001	178.75	.000
28.00	.115	65.75	.022	103.50	.004	141.25	.001	179.00	.000
28.25	.114	66.00	.022	103.75	.004	141.50	.001	179.25	.000
28.50	.113	66.25	.022	104.00	.004	141.75	.001	179.50	.000
28.75	.112	66.50	.022	104.25	.004	142.00	.001	179.75	.000
29.00	.111	66.75	.022	104.50	.004	142.25	.001	180.00	.000
29.25	.110	67.00	.021	104.75	.004	142.50	.001	180.25	.000
29.50	.109	67.25	.021	105.00	.004	142.75	.001	180.50	.000
29.75	.108	67.50	.021	105.25	.004	143.00	.001	180.75	.000
30.00	.106	67.75	.021	105.50	.004	143.25	.001	181.00	.000
30.25	.106	68.00	.020	105.75	.004	143.50	.001	181.25	.000
30.50	.104	68.25	.020	106.00	.004	143.75	.001	181.50	.000
30.75	.103	68.50	.020	106.25	.004	144.00	.001	181.75	.000
31.00	.102	68.75	.020	106.50	.004	144.25	.001	182.00	.000
31.25	.101	69.00	.020	106.75	.004	144.50	.001	182.25	.000
31.50	.100	69.25	.019	107.00	.004	144.75	.001	182.50	.000
31.75	.099	69.50	.019	107.25	.004	145.00	.001	182.75	.000
32.00	.098	69.75	.019	107.50	.004	145.25	.001	183.00	.000
32.25	.097	70.00	.019	107.75	.004	145.50	.001	183.25	.000
32.50	.096	70.25	.018	108.00	.004	145.75	.001	183.50	.000
32.75	.095	70.50	.018	108.25	.004	146.00	.001	183.75	.000
33.00	.094	70.75	.018	108.50	.003	146.25	.001	184.00	.000
33.25	.093	71.00	.018	108.75	.003	146.50	.001	184.25	.000
33.50	.092	71.25	.018	109.00	.003	146.75	.001	184.50	.000
33.75	.091	71.50	.018	109.25	.003	147.00	.001	184.75	.000
34.00	.090	71.75	.017	109.50	.003	147.25	.001	185.00	.000
34.25	.089	72.00	.017	109.75	.003	147.50	.000	185.25	.000
34.50	.088	72.25	.017	110.00	.003	147.75	.000	185.50	.000
34.75	.088	72.50	.017	110.25	.003	148.00	.000	185.75	.000
35.00	.086	72.75	.016	110.50	.003	148.25	.000	186.00	.000
35.25	.086	73.00	.016	110.75	.003	148.50	.000	186.25	.000
35.50	.085	73.25	.016	111.00	.003	148.75	.000	186.50	.000
35.75	.084	73.50	.016	111.25	.003	149.00	.000	186.75	.000
36.00	.083	73.75	.016	111.50	.003	149.25	.000	187.00	.000
36.25	.082	74.00	.016	111.75	.003	149.50	.000	187.25	.000
36.50	.081	74.25	.016	112.00	.003	149.75	.000	187.50	.000
36.75	.081	74.50	.015	112.25	.003	150.00	.000		
37.00	.080	74.75	.015	112.50	.003	150.25	.000		
37.25	.079	75.00	.015	112.75	.003	150.50	.000		
37.50	.078	75.25	.015	113.00	.003	150.75	.000		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0200)

DT=15.0 min

AREA (ha)= 165.44

TPEAK (hrs)= 1.75

VOLUME (mm)= 11.03

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	12.00	.095	24.00	.016	36.00	.003	48.00	.001
.25	.044	12.25	.092	24.25	.015	36.25	.003	48.25	.000
.50	.148	12.50	.088	24.50	.014	36.50	.003	48.50	.000
.75	.249	12.75	.085	24.75	.014	36.75	.003	48.75	.000
1.00	.350	13.00	.082	25.00	.013	37.00	.003	49.00	.000
1.25	.526	13.25	.079	25.25	.013	37.25	.003	49.25	.000
1.50	1.498	13.50	.076	25.50	.013	37.50	.002	49.50	.000
1.75	2.482	13.75	.073	25.75	.012	37.75	.002	49.75	.000
2.00	2.017	14.00	.071	26.00	.012	38.00	.002	50.00	.000
2.25	1.533	14.25	.068	26.25	.011	38.25	.002	50.25	.000
2.50	1.165	14.50	.066	26.50	.011	38.50	.002	50.50	.000
2.75	.910	14.75	.063	26.75	.010	38.75	.002	50.75	.000
3.00	.734	15.00	.061	27.00	.010	39.00	.002	51.00	.000
3.25	.614	15.25	.059	27.25	.010	39.25	.002	51.25	.000
3.50	.529	15.50	.056	27.50	.009	39.50	.002	51.50	.000
3.75	.471	15.75	.055	27.75	.009	39.75	.002	51.75	.000
4.00	.428	16.00	.052	28.00	.008	40.00	.002	52.00	.000
4.25	.346	16.25	.051	28.25	.008	40.25	.002	52.25	.000
4.50	.225	16.50	.049	28.50	.008	40.50	.002	52.50	.000
4.75	.157	16.75	.047	28.75	.008	40.75	.002	52.75	.000
5.00	.121	17.00	.045	29.00	.008	41.00	.001	53.00	.000
5.25	.103	17.25	.044	29.25	.008	41.25	.001	53.25	.000
5.50	.095	17.50	.042	29.50	.007	41.50	.001	53.50	.000
5.75	.093	17.75	.040	29.75	.007	41.75	.001	53.75	.000
6.00	.093	18.00	.039	30.00	.007	42.00	.001	54.00	.000
6.25	.097	18.25	.037	30.25	.006	42.25	.001	54.25	.000
6.50	.101	18.50	.036	30.50	.006	42.50	.001	54.50	.000
6.75	.106	18.75	.035	30.75	.006	42.75	.001	54.75	.000
7.00	.111	19.00	.034	31.00	.006	43.00	.001	55.00	.000
7.25	.116	19.25	.032	31.25	.005	43.25	.001	55.25	.000
7.50	.122	19.50	.031	31.50	.005	43.50	.001	55.50	.000
7.75	.127	19.75	.029	31.75	.005	43.75	.001	55.75	.000
8.00	.133	20.00	.029	32.00	.005	44.00	.001	56.00	.000
8.25	.136	20.25	.028	32.25	.004	44.25	.001	56.25	.000
8.50	.137	20.50	.027	32.50	.004	44.50	.001	56.50	.000
8.75	.137	20.75	.025	32.75	.004	44.75	.001	56.75	.000
9.00	.136	21.00	.024	33.00	.004	45.00	.001	57.00	.000
9.25	.135	21.25	.024	33.25	.004	45.25	.001	57.25	.000
9.50	.133	21.50	.023	33.50	.004	45.50	.001	57.50	.000
9.75	.130	21.75	.022	33.75	.003	45.75	.001	57.75	.000
10.00	.127	22.00	.021	34.00	.003	46.00	.001	58.00	.000
10.25	.124	22.25	.020	34.25	.003	46.25	.001	58.25	.000
10.50	.120	22.50	.019	34.50	.003	46.50	.001	58.50	.000
10.75	.115	22.75	.019	34.75	.003	46.75	.001	58.75	.000
11.00	.111	23.00	.019	35.00	.003	47.00	.001	59.00	.000
11.25	.107	23.25	.018	35.25	.003	47.25	.001		
11.50	.103	23.50	.017	35.50	.003	47.50	.001		
11.75	.099	23.75	.016	35.75	.003	47.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89

2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0733)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 6.75
	VOLUME (mm)= 6.37

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	40.75	.119	81.50	.015	122.25	.004	163.00	.001
.25	.000	41.00	.116	81.75	.015	122.50	.003	163.25	.001
.50	.000	41.25	.114	82.00	.014	122.75	.003	163.50	.001
.75	.001	41.50	.111	82.25	.014	123.00	.003	163.75	.001
1.00	.003	41.75	.109	82.50	.014	123.25	.003	164.00	.001
1.25	.006	42.00	.107	82.75	.014	123.50	.003	164.25	.001
1.50	.018	42.25	.105	83.00	.014	123.75	.003	164.50	.001
1.75	.054	42.50	.103	83.25	.014	124.00	.003	164.75	.001
2.00	.129	42.75	.101	83.50	.014	124.25	.003	165.00	.001
2.25	.252	43.00	.099	83.75	.014	124.50	.003	165.25	.001
2.50	.420	43.25	.097	84.00	.013	124.75	.003	165.50	.001
2.75	.620	43.50	.095	84.25	.013	125.00	.003	165.75	.001
3.00	.841	43.75	.093	84.50	.013	125.25	.003	166.00	.001
3.25	1.131	44.00	.091	84.75	.013	125.50	.003	166.25	.001
3.50	1.474	44.25	.090	85.00	.013	125.75	.003	166.50	.001
3.75	1.829	44.50	.088	85.25	.013	126.00	.003	166.75	.001
4.00	2.193	44.75	.087	85.50	.013	126.25	.003	167.00	.001
4.25	2.499	45.00	.085	85.75	.013	126.50	.003	167.25	.001
4.50	2.736	45.25	.083	86.00	.012	126.75	.003	167.50	.001
4.75	2.953	45.50	.082	86.25	.012	127.00	.003	167.75	.001
5.00	3.157	45.75	.081	86.50	.012	127.25	.003	168.00	.001
5.25	3.333	46.00	.079	86.75	.012	127.50	.003	168.25	.001
5.50	3.475	46.25	.078	87.00	.012	127.75	.003	168.50	.001
5.75	3.582	46.50	.076	87.25	.012	128.00	.003	168.75	.001
6.00	3.655	46.75	.075	87.50	.012	128.25	.003	169.00	.001
6.25	3.701	47.00	.074	87.75	.012	128.50	.003	169.25	.001
6.50	3.722	47.25	.073	88.00	.012	128.75	.003	169.50	.001
6.75	3.723	47.50	.071	88.25	.011	129.00	.003	169.75	.001
7.00	3.704	47.75	.070	88.50	.011	129.25	.003	170.00	.001
7.25	3.679	48.00	.069	88.75	.011	129.50	.003	170.25	.001
7.50	3.639	48.25	.068	89.00	.011	129.75	.003	170.50	.001
7.75	3.581	48.50	.067	89.25	.011	130.00	.003	170.75	.001
8.00	3.517	48.75	.066	89.50	.011	130.25	.003	171.00	.001
8.25	3.448	49.00	.065	89.75	.011	130.50	.003	171.25	.001
8.50	3.377	49.25	.064	90.00	.011	130.75	.003	171.50	.001
8.75	3.304	49.50	.063	90.25	.011	131.00	.003	171.75	.001
9.00	3.230	49.75	.062	90.50	.011	131.25	.003	172.00	.001
9.25	3.155	50.00	.061	90.75	.010	131.50	.003	172.25	.001
9.50	3.079	50.25	.060	91.00	.010	131.75	.003	172.50	.001
9.75	3.005	50.50	.059	91.25	.010	132.00	.003	172.75	.001
10.00	2.932	50.75	.058	91.50	.010	132.25	.003	173.00	.001
10.25	2.861	51.00	.057	91.75	.010	132.50	.003	173.25	.001
10.50	2.792	51.25	.057	92.00	.010	132.75	.002	173.50	.001
10.75	2.723	51.50	.056	92.25	.010	133.00	.002	173.75	.001
11.00	2.656	51.75	.055	92.50	.010	133.25	.002	174.00	.001
11.25	2.591	52.00	.054	92.75	.010	133.50	.002	174.25	.001
11.50	2.526	52.25	.053	93.00	.010	133.75	.002	174.50	.001
11.75	2.463	52.50	.052	93.25	.010	134.00	.002	174.75	.001
12.00	2.401	52.75	.052	93.50	.009	134.25	.002	175.00	.001
12.25	2.336	53.00	.051	93.75	.009	134.50	.002	175.25	.001
12.50	2.264	53.25	.050	94.00	.009	134.75	.002	175.50	.001
12.75	2.193	53.50	.049	94.25	.009	135.00	.002	175.75	.001
13.00	2.127	53.75	.049	94.50	.009	135.25	.002	176.00	.001
13.25	2.064	54.00	.048	94.75	.009	135.50	.002	176.25	.001
13.50	2.005	54.25	.047	95.00	.009	135.75	.002	176.50	.001
13.75	1.942	54.50	.047	95.25	.009	136.00	.002	176.75	.001
14.00	1.877	54.75	.046	95.50	.009	136.25	.002	177.00	.001
14.25	1.817	55.00	.046	95.75	.009	136.50	.002	177.25	.001
14.50	1.761	55.25	.045	96.00	.009	136.75	.002	177.50	.001
14.75	1.709	55.50	.044	96.25	.009	137.00	.002	177.75	.001
15.00	1.661	55.75	.044	96.50	.009	137.25	.002	178.00	.001
15.25	1.616	56.00	.043	96.75	.008	137.50	.002	178.25	.001
15.50	1.572	56.25	.043	97.00	.008	137.75	.002	178.50	.001
15.75	1.531	56.50	.042	97.25	.008	138.00	.002	178.75	.001
16.00	1.492	56.75	.042	97.50	.008	138.25	.002	179.00	.001
16.25	1.454	57.00	.041	97.75	.008	138.50	.002	179.25	.001
16.50	1.417	57.25	.041	98.00	.008	138.75	.002	179.50	.001
16.75	1.381	57.50	.040	98.25	.008	139.00	.002	179.75	.001
17.00	1.347	57.75	.040	98.50	.008	139.25	.002	180.00	.001
17.25	1.313	58.00	.039	98.75	.008	139.50	.002	180.25	.001
17.50	1.280	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.249	58.50	.038	99.25	.008	140.00	.002	180.75	.001
18.00	1.218	58.75	.038	99.50	.008	140.25	.002	181.00	.001
18.25	1.188	59.00	.037	99.75	.008	140.50	.002	181.25	.001
18.50	1.158	59.25	.037	100.00	.008	140.75	.002	181.50	.001
18.75	1.130	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.102	59.75	.036	100.50	.007	141.25	.002	182.00	.001
19.25	1.075	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.048	60.25	.035	101.00	.007	141.75	.002	182.50	.001
19.75	1.022	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	.996	60.75	.034	101.50	.007	142.25	.002	183.00	.001
20.25	.971	61.00	.034	101.75	.007	142.50	.002	183.25	.001
20.50	.947	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	.923	61.50	.033	102.25	.007	143.00	.002	183.75	.001
21.00	.900	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	.877	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	.855	62.25	.032	103.00	.007	143.75	.002	184.50	.001
21.75	.833	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	.812	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	.791	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	.771	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.751	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.732	63.75	.030	104.50	.006	145.25	.002	186.00	.001
23.25	.714	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.697	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.680	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.663	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.646	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.630	65.25	.028	106.00	.006	146.75	.002	187.50	.001
24.75	.613	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.598	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.582	66.00	.027	106.75	.006	147.50	.002	188.25	.000
25.50	.567	66.25	.027	107.00	.006	147.75	.002	188.50	.000
25.75	.553	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.539	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.525	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.512	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.499	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.486	67.75	.025	108.50	.006	149.25	.002	190.00	.000
27.25	.473	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.461	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.449	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.437	68.75	.024	109.50	.005	150.25	.001	191.00	.000
28.25	.425	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.414	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.402	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.391	69.75	.023	110.50	.005	151.25	.001	192.00	.000
29.25	.381	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.370	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.360	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.351	70.75	.022	111.50	.005	152.25	.001	193.00	.000
30.25	.341	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.332	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.323	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.314	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.305	72.00	.021	112.75	.005	153.50	.001	194.25	.000
31.50	.297	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.289	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.281	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.274	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.266	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.259	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.252	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.246	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.239	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.233	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.227	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.221	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.215	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.210	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.204	75.75	.018	116.50	.004	157.25	.001	198.00	.000
35.25	.199	76.00	.018	116.75	.004	157.50	.001	198.25	.000

35.50	.194	76.25	.018	117.00	.004	157.75	.001	198.50	.000
35.75	.189	76.50	.018	117.25	.004	158.00	.001	198.75	.000
36.00	.184	76.75	.018	117.50	.004	158.25	.001	199.00	.000
36.25	.180	77.00	.018	117.75	.004	158.50	.001	199.25	.000
36.50	.175	77.25	.017	118.00	.004	158.75	.001	199.50	.000
36.75	.171	77.50	.017	118.25	.004	159.00	.001	199.75	.000
37.00	.167	77.75	.017	118.50	.004	159.25	.001	200.00	.000
37.25	.163	78.00	.017	118.75	.004	159.50	.001	200.25	.000
37.50	.159	78.25	.017	119.00	.004	159.75	.001	200.50	.000
37.75	.155	78.50	.017	119.25	.004	160.00	.001	200.75	.000
38.00	.152	78.75	.016	119.50	.004	160.25	.001	201.00	.000
38.25	.148	79.00	.016	119.75	.004	160.50	.001	201.25	.000
38.50	.145	79.25	.016	120.00	.004	160.75	.001	201.50	.000
38.75	.142	79.50	.016	120.25	.004	161.00	.001	201.75	.000
39.00	.138	79.75	.016	120.50	.004	161.25	.001	202.00	.000
39.25	.135	80.00	.016	120.75	.004	161.50	.001	202.25	.000
39.50	.132	80.25	.015	121.00	.004	161.75	.001		
39.75	.129	80.50	.015	121.25	.004	162.00	.001		
40.00	.127	80.75	.015	121.50	.004	162.25	.001		
40.25	.124	81.00	.015	121.75	.004	162.50	.001		
40.50	.121	81.25	.015	122.00	.004	162.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (1200)

DT=15.0 min

AREA (ha)= 165.44

TPEAK (hrs)= 1.75

VOLUME (mm)= 14.15

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.00	.152	22.00	.022	33.00	.003	44.00	.001
.25	.057	11.25	.145	22.25	.021	33.25	.003	44.25	.001
.50	.190	11.50	.138	22.50	.020	33.50	.003	44.50	.000
.75	.312	11.75	.132	22.75	.019	33.75	.003	44.75	.000
1.00	.434	12.00	.127	23.00	.019	34.00	.003	45.00	.000
1.25	.650	12.25	.121	23.25	.018	34.25	.003	45.25	.000
1.50	1.864	12.50	.116	23.50	.017	34.50	.003	45.50	.000
1.75	3.091	12.75	.111	23.75	.016	34.75	.003	45.75	.000
2.00	2.456	13.00	.106	24.00	.015	35.00	.003	46.00	.000
2.25	1.833	13.25	.102	24.25	.014	35.25	.002	46.25	.000
2.50	1.378	13.50	.098	24.50	.014	35.50	.002	46.50	.000
2.75	1.074	13.75	.093	24.75	.013	35.75	.002	46.75	.000
3.00	.869	14.00	.089	25.00	.013	36.00	.002	47.00	.000
3.25	.735	14.25	.085	25.25	.013	36.25	.002	47.25	.000
3.50	.644	14.50	.082	25.50	.012	36.50	.002	47.50	.000
3.75	.583	14.75	.078	25.75	.011	36.75	.002	47.75	.000
4.00	.540	15.00	.075	26.00	.011	37.00	.002	48.00	.000
4.25	.447	15.25	.072	26.25	.010	37.25	.002	48.25	.000
4.50	.301	15.50	.068	26.50	.010	37.50	.002	48.50	.000
4.75	.227	15.75	.066	26.75	.009	37.75	.002	48.75	.000
5.00	.192	16.00	.062	27.00	.009	38.00	.002	49.00	.000
5.25	.178	16.25	.060	27.25	.008	38.25	.001	49.25	.000
5.50	.175	16.50	.057	27.50	.008	38.50	.001	49.50	.000
5.75	.178	16.75	.055	27.75	.008	38.75	.001	49.75	.000
6.00	.186	17.00	.052	28.00	.008	39.00	.001	50.00	.000
6.25	.195	17.25	.051	28.25	.008	39.25	.001	50.25	.000
6.50	.205	17.50	.048	28.50	.007	39.50	.001	50.50	.000
6.75	.215	17.75	.046	28.75	.007	39.75	.001	50.75	.000
7.00	.227	18.00	.044	29.00	.007	40.00	.001	51.00	.000
7.25	.232	18.25	.042	29.25	.006	40.25	.001	51.25	.000
7.50	.234	18.50	.040	29.50	.006	40.50	.001	51.50	.000
7.75	.234	18.75	.039	29.75	.006	40.75	.001	51.75	.000
8.00	.231	19.00	.037	30.00	.005	41.00	.001	52.00	.000
8.25	.228	19.25	.035	30.25	.005	41.25	.001	52.25	.000
8.50	.224	19.50	.034	30.50	.005	41.50	.001	52.50	.000
8.75	.218	19.75	.032	30.75	.005	41.75	.001	52.75	.000
9.00	.212	20.00	.031	31.00	.004	42.00	.001	53.00	.000
9.25	.205	20.25	.029	31.25	.004	42.25	.001	53.25	.000
9.50	.197	20.50	.029	31.50	.004	42.50	.001	53.50	.000
9.75	.189	20.75	.027	31.75	.004	42.75	.001		
10.00	.180	21.00	.026	32.00	.003	43.00	.001		
10.25	.173	21.25	.024	32.25	.003	43.25	.001		
10.50	.165	21.50	.024	32.50	.003	43.50	.001		
10.75	.158	21.75	.023	32.75	.003	43.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (1733)

DT=15.0 min

AREA (ha)=2846.70

TPEAK (hrs)= 6.50

VOLUME (mm)= 8.91

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	40.75	.129	81.50	.015	122.25	.004	163.00	.001
.25	.000	41.00	.126	81.75	.015	122.50	.004	163.25	.001
.50	.001	41.25	.123	82.00	.015	122.75	.003	163.50	.001
.75	.002	41.50	.120	82.25	.014	123.00	.003	163.75	.001
1.00	.004	41.75	.118	82.50	.014	123.25	.003	164.00	.001
1.25	.008	42.00	.115	82.75	.014	123.50	.003	164.25	.001
1.50	.025	42.25	.113	83.00	.014	123.75	.003	164.50	.001
1.75	.080	42.50	.110	83.25	.014	124.00	.003	164.75	.001
2.00	.198	42.75	.108	83.50	.014	124.25	.003	165.00	.001
2.25	.401	43.00	.106	83.75	.014	124.50	.003	165.25	.001
2.50	.779	43.25	.103	84.00	.013	124.75	.003	165.50	.001
2.75	1.227	43.50	.101	84.25	.013	125.00	.003	165.75	.001
3.00	1.679	43.75	.099	84.50	.013	125.25	.003	166.00	.001
3.25	2.240	44.00	.097	84.75	.013	125.50	.003	166.25	.001
3.50	2.738	44.25	.095	85.00	.013	125.75	.003	166.50	.001
3.75	3.207	44.50	.093	85.25	.013	126.00	.003	166.75	.001
4.00	3.693	44.75	.092	85.50	.013	126.25	.003	167.00	.001
4.25	4.173	45.00	.090	85.75	.013	126.50	.003	167.25	.001
4.50	4.582	45.25	.088	86.00	.013	126.75	.003	167.50	.001
4.75	4.917	45.50	.087	86.25	.012	127.00	.003	167.75	.001
5.00	5.192	45.75	.085	86.50	.012	127.25	.003	168.00	.001
5.25	5.416	46.00	.083	86.75	.012	127.50	.003	168.25	.001
5.50	5.590	46.25	.082	87.00	.012	127.75	.003	168.50	.001

5.75	5.715	46.50	.080	87.25	.012	128.00	.003	168.75	.001
6.00	5.797	46.75	.079	87.50	.012	128.25	.003	169.00	.001
6.25	5.840	47.00	.077	87.75	.012	128.50	.003	169.25	.001
6.50	5.849	47.25	.076	88.00	.012	128.75	.003	169.50	.001
6.75	5.831	47.50	.075	88.25	.012	129.00	.003	169.75	.001
7.00	5.789	47.75	.073	88.50	.011	129.25	.003	170.00	.001
7.25	5.726	48.00	.072	88.75	.011	129.50	.003	170.25	.001
7.50	5.643	48.25	.071	89.00	.011	129.75	.003	170.50	.001
7.75	5.548	48.50	.070	89.25	.011	130.00	.003	170.75	.001
8.00	5.442	48.75	.069	89.50	.011	130.25	.003	171.00	.001
8.25	5.328	49.00	.067	89.75	.011	130.50	.003	171.25	.001
8.50	5.203	49.25	.066	90.00	.011	130.75	.003	171.50	.001
8.75	5.067	49.50	.065	90.25	.011	131.00	.003	171.75	.001
9.00	4.917	49.75	.064	90.50	.011	131.25	.003	172.00	.001
9.25	4.755	50.00	.063	90.75	.011	131.50	.003	172.25	.001
9.50	4.591	50.25	.062	91.00	.010	131.75	.003	172.50	.001
9.75	4.435	50.50	.061	91.25	.010	132.00	.003	172.75	.001
10.00	4.281	50.75	.060	91.50	.010	132.25	.003	173.00	.001
10.25	4.125	51.00	.059	91.75	.010	132.50	.003	173.25	.001
10.50	3.970	51.25	.058	92.00	.010	132.75	.002	173.50	.001
10.75	3.822	51.50	.057	92.25	.010	133.00	.002	173.75	.001
11.00	3.681	51.75	.057	92.50	.010	133.25	.002	174.00	.001
11.25	3.551	52.00	.056	92.75	.010	133.50	.002	174.25	.001
11.50	3.429	52.25	.055	93.00	.010	133.75	.002	174.50	.001
11.75	3.315	52.50	.054	93.25	.010	134.00	.002	174.75	.001
12.00	3.207	52.75	.053	93.50	.010	134.25	.002	175.00	.001
12.25	3.104	53.00	.052	93.75	.009	134.50	.002	175.25	.001
12.50	3.006	53.25	.052	94.00	.009	134.75	.002	175.50	.001
12.75	2.913	53.50	.051	94.25	.009	135.00	.002	175.75	.001
13.00	2.823	53.75	.050	94.50	.009	135.25	.002	176.00	.001
13.25	2.737	54.00	.049	94.75	.009	135.50	.002	176.25	.001
13.50	2.654	54.25	.049	95.00	.009	135.75	.002	176.50	.001
13.75	2.575	54.50	.048	95.25	.009	136.00	.002	176.75	.001
14.00	2.498	54.75	.047	95.50	.009	136.25	.002	177.00	.001
14.25	2.420	55.00	.047	95.75	.009	136.50	.002	177.25	.001
14.50	2.336	55.25	.046	96.00	.009	136.75	.002	177.50	.001
14.75	2.251	55.50	.045	96.25	.009	137.00	.002	177.75	.001
15.00	2.173	55.75	.045	96.50	.009	137.25	.002	178.00	.001
15.25	2.100	56.00	.044	96.75	.008	137.50	.002	178.25	.001
15.50	2.033	56.25	.043	97.00	.008	137.75	.002	178.50	.001
15.75	1.966	56.50	.043	97.25	.008	138.00	.002	178.75	.001
16.00	1.896	56.75	.042	97.50	.008	138.25	.002	179.00	.001
16.25	1.828	57.00	.042	97.75	.008	138.50	.002	179.25	.001
16.50	1.765	57.25	.041	98.00	.008	138.75	.002	179.50	.001
16.75	1.707	57.50	.041	98.25	.008	139.00	.002	179.75	.001
17.00	1.654	57.75	.040	98.50	.008	139.25	.002	180.00	.001
17.25	1.604	58.00	.040	98.75	.008	139.50	.002	180.25	.001
17.50	1.557	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.513	58.50	.039	99.25	.008	140.00	.002	180.75	.001
18.00	1.470	58.75	.038	99.50	.008	140.25	.002	181.00	.001
18.25	1.430	59.00	.038	99.75	.008	140.50	.002	181.25	.001
18.50	1.391	59.25	.037	100.00	.008	140.75	.002	181.50	.001
18.75	1.353	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.317	59.75	.036	100.50	.007	141.25	.002	182.00	.001
19.25	1.282	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.248	60.25	.036	101.00	.007	141.75	.002	182.50	.001
19.75	1.215	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	1.183	60.75	.035	101.50	.007	142.25	.002	183.00	.001
20.25	1.152	61.00	.034	101.75	.007	142.50	.002	183.25	.001
20.50	1.122	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	1.093	61.50	.034	102.25	.007	143.00	.002	183.75	.001
21.00	1.064	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	1.037	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	1.009	62.25	.033	103.00	.007	143.75	.002	184.50	.001
21.75	.983	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	.957	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	.932	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	.908	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.884	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.860	63.75	.030	104.50	.007	145.25	.002	186.00	.001
23.25	.838	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.815	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.794	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.772	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.752	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.733	65.25	.029	106.00	.006	146.75	.002	187.50	.001
24.75	.714	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.696	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.679	66.00	.028	106.75	.006	147.50	.002	188.25	.000
25.50	.661	66.25	.027	107.00	.006	147.75	.002	188.50	.000
25.75	.644	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.627	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.610	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.594	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.578	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.562	67.75	.026	108.50	.006	149.25	.002	190.00	.000
27.25	.548	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.534	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.520	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.506	68.75	.025	109.50	.006	150.25	.001	191.00	.000
28.25	.493	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.480	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.467	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.454	69.75	.024	110.50	.005	151.25	.001	192.00	.000
29.25	.442	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.429	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.418	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.406	70.75	.023	111.50	.005	152.25	.001	193.00	.000
30.25	.395	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.384	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.373	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.362	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.352	72.00	.022	112.75	.005	153.50	.001	194.25	.000
31.50	.342	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.333	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.323	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.314	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.306	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.297	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.289	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.281	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.273	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.265	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.258	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.251	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.244	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.237	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.231	75.75	.019	116.50	.004	157.25	.001	198.00	.000
35.25	.225	76.00	.018	116.75	.004	157.50	.001	198.25	.000
35.50	.219	76.25	.018	117.00	.004	157.75	.001	198.50	.000
35.75	.213	76.50	.018	117.25	.004	158.00	.001	198.75	.000
36.00	.207	76.75	.018	117.50	.004	158.25	.001	199.00	.000
36.25	.202	77.00	.018	117.75	.004	158.50	.001	199.25	.000
36.50	.196	77.25	.017	118.00	.004	158.75	.001	199.50	.000
36.75	.191	77.50	.017	118.25	.004	159.00	.001	199.75	.000
37.00	.186	77.75	.017	118.50	.004	159.25	.001	200.00	.000
37.25	.182	78.00	.017	118.75	.004	159.50	.001	200.25	.000
37.50	.177	78.25	.017	119.00	.004	159.75	.001	200.50	.000
37.75	.172	78.50	.017	119.25	.004	160.00	.001	200.75	.000
38.00	.168	78.75	.016	119.50	.004	160.25	.001	201.00	.000
38.25	.164	79.00	.016	119.75	.004	160.50	.001	201.25	.000
38.50	.160	79.25	.016	120.00	.004	160.75	.001	201.50	.000
38.75	.156	79.50	.016	120.25	.004	161.00	.001	201.75	.000
39.00	.152	79.75	.016	120.50	.004	161.25	.001	202.00	.000
39.25	.149	80.00	.016	120.75	.004	161.50	.001	202.25	.000
39.50	.145	80.25	.016	121.00	.004	161.75	.001		
39.75	.142	80.50	.015	121.25	.004	162.00	.001		
40.00	.138	80.75	.015	121.50	.004	162.25	.001		
40.25	.135	81.00	.015	121.75	.004	162.50	.001		
40.50	.132	81.25	.015	122.00	.004	162.75	.001		

READ STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89

2.75	5.31	6.00	11.51	9.25	1.77
3.00	5.31	6.25	11.51	9.50	.89
3.25	5.31	6.50	6.20	9.75	.89

READ HYD (2200)	AREA (ha)=	165.44
DT=15.0 min	TPEAK (hrs)=	1.75
	VOLUME (mm)=	17.48

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	10.00	.228	20.00	.031	30.00	.004	40.00	.001
.25	.071	10.25	.217	20.25	.029	30.25	.004	40.25	.001
.50	.234	10.50	.206	20.50	.028	30.50	.003	40.50	.001
.75	.376	10.75	.196	20.75	.026	30.75	.003	40.75	.001
1.00	.519	11.00	.187	21.00	.025	31.00	.003	41.00	.001
1.25	.774	11.25	.178	21.25	.024	31.25	.003	41.25	.001
1.50	2.241	11.50	.169	21.50	.023	31.50	.003	41.50	.000
1.75	3.718	11.75	.161	21.75	.022	31.75	.003	41.75	.000
2.00	2.899	12.00	.153	22.00	.021	32.00	.003	42.00	.000
2.25	2.133	12.25	.146	22.25	.019	32.25	.003	42.25	.000
2.50	1.593	12.50	.138	22.50	.019	32.50	.003	42.50	.000
2.75	1.243	12.75	.131	22.75	.018	32.75	.003	42.75	.000
3.00	1.016	13.00	.125	23.00	.017	33.00	.003	43.00	.000
3.25	.872	13.25	.119	23.25	.016	33.25	.003	43.25	.000
3.50	.777	13.50	.113	23.50	.015	33.50	.002	43.50	.000
3.75	.716	13.75	.108	23.75	.014	33.75	.002	43.75	.000
4.00	.678	14.00	.103	24.00	.013	34.00	.002	44.00	.000
4.25	.576	14.25	.098	24.25	.013	34.25	.002	44.25	.000
4.50	.411	14.50	.093	24.50	.013	34.50	.002	44.50	.000
4.75	.333	14.75	.088	24.75	.012	34.75	.002	44.75	.000
5.00	.301	15.00	.084	25.00	.011	35.00	.002	45.00	.000
5.25	.295	15.25	.080	25.25	.011	35.25	.002	45.25	.000
5.50	.301	15.50	.076	25.50	.010	35.50	.002	45.50	.000
5.75	.313	15.75	.072	25.75	.010	35.75	.002	45.75	.000
6.00	.330	16.00	.068	26.00	.009	36.00	.001	46.00	.000
6.25	.348	16.25	.066	26.25	.008	36.25	.001	46.25	.000
6.50	.356	16.50	.062	26.50	.008	36.50	.001	46.50	.000
6.75	.358	16.75	.059	26.75	.008	36.75	.001	46.75	.000
7.00	.357	17.00	.056	27.00	.008	37.00	.001	47.00	.000
7.25	.353	17.25	.053	27.25	.008	37.25	.001	47.25	.000
7.50	.347	17.50	.051	27.50	.007	37.50	.001	47.50	.000
7.75	.339	17.75	.048	27.75	.007	37.75	.001	47.75	.000
8.00	.329	18.00	.046	28.00	.006	38.00	.001	48.00	.000
8.25	.318	18.25	.044	28.25	.006	38.25	.001	48.25	.000
8.50	.306	18.50	.041	28.50	.006	38.50	.001	48.50	.000
8.75	.293	18.75	.040	28.75	.005	38.75	.001	48.75	.000
9.00	.279	19.00	.038	29.00	.005	39.00	.001	49.00	.000
9.25	.265	19.25	.036	29.25	.005	39.25	.001	49.25	.000
9.50	.252	19.50	.034	29.50	.004	39.50	.001	49.50	.000
9.75	.240	19.75	.032	29.75	.004	39.75	.001		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (2733)	AREA (ha)=	2846.70
DT=15.0 min	TPEAK (hrs)=	6.25
	VOLUME (mm)=	11.71

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	40.75	.138	81.50	.015	122.25	.004	163.00	.001
.25	.000	41.00	.134	81.75	.015	122.50	.003	163.25	.001
.50	.001	41.25	.131	82.00	.015	122.75	.003	163.50	.001
.75	.002	41.50	.128	82.25	.014	123.00	.003	163.75	.001
1.00	.005	41.75	.125	82.50	.014	123.25	.003	164.00	.001
1.25	.010	42.00	.122	82.75	.014	123.50	.003	164.25	.001
1.50	.033	42.25	.119	83.00	.014	123.75	.003	164.50	.001
1.75	.111	42.50	.117	83.25	.014	124.00	.003	164.75	.001
2.00	.328	42.75	.114	83.50	.014	124.25	.003	165.00	.001
2.25	.841	43.00	.112	83.75	.014	124.50	.003	165.25	.001
2.50	1.416	43.25	.109	84.00	.013	124.75	.003	165.50	.001
2.75	2.043	43.50	.107	84.25	.013	125.00	.003	165.75	.001
3.00	2.793	43.75	.104	84.50	.013	125.25	.003	166.00	.001
3.25	3.424	44.00	.102	84.75	.013	125.50	.003	166.25	.001
3.50	4.164	44.25	.100	85.00	.013	125.75	.003	166.50	.001
3.75	4.880	44.50	.098	85.25	.013	126.00	.003	166.75	.001
4.00	5.549	44.75	.096	85.50	.013	126.25	.003	167.00	.001
4.25	6.134	45.00	.094	85.75	.013	126.50	.003	167.25	.001
4.50	6.657	45.25	.092	86.00	.012	126.75	.003	167.50	.001
4.75	7.128	45.50	.090	86.25	.012	127.00	.003	167.75	.001
5.00	7.550	45.75	.088	86.50	.012	127.25	.003	168.00	.001
5.25	7.902	46.00	.087	86.75	.012	127.50	.003	168.25	.001
5.50	8.167	46.25	.085	87.00	.012	127.75	.003	168.50	.001
5.75	8.349	46.50	.083	87.25	.012	128.00	.003	168.75	.001
6.00	8.467	46.75	.082	87.50	.012	128.25	.003	169.00	.001
6.25	8.523	47.00	.080	87.75	.012	128.50	.003	169.25	.001
6.50	8.520	47.25	.079	88.00	.012	128.75	.003	169.50	.001
6.75	8.465	47.50	.077	88.25	.012	129.00	.003	169.75	.001
7.00	8.364	47.75	.076	88.50	.011	129.25	.003	170.00	.001
7.25	8.208	48.00	.075	88.75	.011	129.50	.003	170.25	.001
7.50	8.004	48.25	.073	89.00	.011	129.75	.003	170.50	.001
7.75	7.783	48.50	.072	89.25	.011	130.00	.003	170.75	.001
8.00	7.545	48.75	.071	89.50	.011	130.25	.003	171.00	.001
8.25	7.295	49.00	.069	89.75	.011	130.50	.003	171.25	.001
8.50	7.049	49.25	.068	90.00	.011	130.75	.003	171.50	.001
8.75	6.810	49.50	.067	90.25	.011	131.00	.003	171.75	.001
9.00	6.580	49.75	.066	90.50	.011	131.25	.003	172.00	.001
9.25	6.358	50.00	.065	90.75	.011	131.50	.003	172.25	.001
9.50	6.143	50.25	.064	91.00	.010	131.75	.003	172.50	.001
9.75	5.930	50.50	.063	91.25	.010	132.00	.003	172.75	.001
10.00	5.716	50.75	.062	91.50	.010	132.25	.003	173.00	.001
10.25	5.505	51.00	.061	91.75	.010	132.50	.002	173.25	.001
10.50	5.300	51.25	.060	92.00	.010	132.75	.002	173.50	.001
10.75	5.086	51.50	.059	92.25	.010	133.00	.002	173.75	.001
11.00	4.868	51.75	.058	92.50	.010	133.25	.002	174.00	.001
11.25	4.668	52.00	.057	92.75	.010	133.50	.002	174.25	.001
11.50	4.480	52.25	.056	93.00	.010	133.75	.002	174.50	.001
11.75	4.300	52.50	.055	93.25	.010	134.00	.002	174.75	.001
12.00	4.122	52.75	.054	93.50	.010	134.25	.002	175.00	.001
12.25	3.948	53.00	.053	93.75	.009	134.50	.002	175.25	.001
12.50	3.787	53.25	.053	94.00	.009	134.75	.002	175.50	.001
12.75	3.638	53.50	.052	94.25	.009	135.00	.002	175.75	.001
13.00	3.500	53.75	.051	94.50	.009	135.25	.002	176.00	.001
13.25	3.373	54.00	.050	94.75	.009	135.50	.002	176.25	.001
13.50	3.252	54.25	.050	95.00	.009	135.75	.002	176.50	.001
13.75	3.138	54.50	.049	95.25	.009	136.00	.002	176.75	.001
14.00	3.031	54.75	.048	95.50	.009	136.25	.002	177.00	.001
14.25	2.929	55.00	.047	95.75	.009	136.50	.002	177.25	.001
14.50	2.831	55.25	.047	96.00	.009	136.75	.002	177.50	.001
14.75	2.739	55.50	.046	96.25	.009	137.00	.002	177.75	.001
15.00	2.650	55.75	.045	96.50	.009	137.25	.002	178.00	.001
15.25	2.565	56.00	.045	96.75	.008	137.50	.002	178.25	.001
15.50	2.483	56.25	.044	97.00	.008	137.75	.002	178.50	.001
15.75	2.394	56.50	.043	97.25	.008	138.00	.002	178.75	.001
16.00	2.301	56.75	.043	97.50	.008	138.25	.002	179.00	.001
16.25	2.215	57.00	.042	97.75	.008	138.50	.002	179.25	.001
16.50	2.136	57.25	.042	98.00	.008	138.75	.002	179.50	.001
16.75	2.063	57.50	.041	98.25	.008	139.00	.002	179.75	.001

17.00	1.995	57.75	.041	98.50	.008	139.25	.002	180.00	.001
17.25	1.922	58.00	.040	98.75	.008	139.50	.002	180.25	.001
17.50	1.849	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.782	58.50	.039	99.25	.008	140.00	.002	180.75	.001
18.00	1.720	58.75	.039	99.50	.008	140.25	.002	181.00	.001
18.25	1.663	59.00	.038	99.75	.008	140.50	.002	181.25	.001
18.50	1.610	59.25	.038	100.00	.008	140.75	.002	181.50	.001
18.75	1.560	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.514	59.75	.037	100.50	.007	141.25	.002	182.00	.001
19.25	1.470	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.427	60.25	.036	101.00	.007	141.75	.002	182.50	.001
19.75	1.387	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	1.348	60.75	.035	101.50	.007	142.25	.002	183.00	.001
20.25	1.311	61.00	.035	101.75	.007	142.50	.002	183.25	.001
20.50	1.274	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	1.239	61.50	.034	102.25	.007	143.00	.002	183.75	.001
21.00	1.206	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	1.173	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	1.141	62.25	.033	103.00	.007	143.75	.002	184.50	.001
21.75	1.111	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	1.081	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	1.052	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	1.024	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.996	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.970	63.75	.030	104.50	.007	145.25	.002	186.00	.001
23.25	.944	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.918	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.894	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.869	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.846	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.823	65.25	.029	106.00	.006	146.75	.002	187.50	.001
24.75	.801	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.779	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.758	66.00	.028	106.75	.006	147.50	.002	188.25	.000
25.50	.738	66.25	.027	107.00	.006	147.75	.002	188.50	.000
25.75	.719	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.700	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.683	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.665	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.647	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.629	67.75	.026	108.50	.006	149.25	.002	190.00	.000
27.25	.612	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.595	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.579	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.563	68.75	.025	109.50	.006	150.25	.001	191.00	.000
28.25	.548	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.534	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.520	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.506	69.75	.024	110.50	.005	151.25	.001	192.00	.000
29.25	.492	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.479	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.466	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.453	70.75	.023	111.50	.005	152.25	.001	193.00	.000
30.25	.440	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.428	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.416	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.404	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.393	72.00	.021	112.75	.005	153.50	.001	194.25	.000
31.50	.381	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.371	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.360	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.350	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.340	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.330	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.320	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.311	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.302	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.294	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.285	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.277	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.269	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.262	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.254	75.75	.018	116.50	.004	157.25	.001	198.00	.000
35.25	.247	76.00	.018	116.75	.004	157.50	.001	198.25	.000
35.50	.240	76.25	.018	117.00	.004	157.75	.001	198.50	.000
35.75	.234	76.50	.018	117.25	.004	158.00	.001	198.75	.000
36.00	.227	76.75	.018	117.50	.004	158.25	.001	199.00	.000
36.25	.221	77.00	.018	117.75	.004	158.50	.001	199.25	.000
36.50	.215	77.25	.017	118.00	.004	158.75	.001	199.50	.000
36.75	.209	77.50	.017	118.25	.004	159.00	.001	199.75	.000
37.00	.203	77.75	.017	118.50	.004	159.25	.001	200.00	.000
37.25	.198	78.00	.017	118.75	.004	159.50	.001	200.25	.000
37.50	.193	78.25	.017	119.00	.004	159.75	.001	200.50	.000
37.75	.187	78.50	.017	119.25	.004	160.00	.001	200.75	.000
38.00	.182	78.75	.016	119.50	.004	160.25	.001	201.00	.000
38.25	.178	79.00	.016	119.75	.004	160.50	.001	201.25	.000
38.50	.173	79.25	.016	120.00	.004	160.75	.001	201.50	.000
38.75	.169	79.50	.016	120.25	.004	161.00	.001	201.75	.000
39.00	.164	79.75	.016	120.50	.004	161.25	.001	202.00	.000
39.25	.160	80.00	.016	120.75	.004	161.50	.001	202.25	.000
39.50	.156	80.25	.016	121.00	.004	161.75	.001		
39.75	.152	80.50	.015	121.25	.004	162.00	.001		
40.00	.148	80.75	.015	121.50	.004	162.25	.001		
40.25	.145	81.00	.015	121.75	.004	162.50	.001		
40.50	.141	81.25	.015	122.00	.004	162.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (3200)
DT=15.0 min

AREA (ha)= 165.44
TPEAK (hrs)= 5.25
VOLUME (mm)= 22.41

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.25	.494	22.50	.058	33.75	.006	45.00	.001
.25	.000	11.50	.484	22.75	.056	34.00	.006	45.25	.001
.50	.001	11.75	.473	23.00	.052	34.25	.005	45.50	.001
.75	.011	12.00	.461	23.25	.050	34.50	.005	45.75	.001
1.00	.030	12.25	.449	23.50	.047	34.75	.005	46.00	.001
1.25	.042	12.50	.427	23.75	.045	35.00	.004	46.25	.001
1.50	.049	12.75	.394	24.00	.043	35.25	.004	46.50	.001
1.75	.054	13.00	.370	24.25	.040	35.50	.004	46.75	.001
2.00	.056	13.25	.349	24.50	.039	35.75	.004	47.00	.000
2.25	.057	13.50	.332	24.75	.037	36.00	.003	47.25	.000
2.50	.109	13.75	.317	25.00	.035	36.25	.003	47.50	.000
2.75	.209	14.00	.303	25.25	.034	36.50	.003	47.75	.000
3.00	.269	14.25	.290	25.50	.032	36.75	.003	48.00	.000
3.25	.305	14.50	.278	25.75	.030	37.00	.003	48.25	.000
3.50	.436	14.75	.266	26.00	.029	37.25	.003	48.50	.000
3.75	.668	15.00	.254	26.25	.027	37.50	.003	48.75	.000
4.00	.807	15.25	.244	26.50	.026	37.75	.003	49.00	.000
4.25	.891	15.50	.233	26.75	.024	38.00	.003	49.25	.000
4.50	1.234	15.75	.223	27.00	.024	38.25	.003	49.50	.000
4.75	1.848	16.00	.214	27.25	.022	38.50	.003	49.75	.000
5.00	2.222	16.25	.204	27.50	.021	38.75	.003	50.00	.000
5.25	2.457	16.50	.194	27.75	.020	39.00	.002	50.25	.000
5.50	2.276	16.75	.185	28.00	.019	39.25	.002	50.50	.000
5.75	1.717	17.00	.177	28.25	.019	39.50	.002	50.75	.000
6.00	1.389	17.25	.168	28.50	.017	39.75	.002	51.00	.000
6.25	1.201	17.50	.160	28.75	.016	40.00	.002	51.25	.000
6.50	1.038	17.75	.152	29.00	.016	40.25	.002	51.50	.000
6.75	.866	18.00	.144	29.25	.015	40.50	.002	51.75	.000
7.00	.773	18.25	.137	29.50	.014	40.75	.002	52.00	.000

7.25	.726	18.50	.130	29.75	.013	41.00	.002	52.25	.000
7.50	.680	18.75	.124	30.00	.013	41.25	.002	52.50	.000
7.75	.620	19.00	.118	30.25	.012	41.50	.001	52.75	.000
8.00	.595	19.25	.112	30.50	.012	41.75	.001	53.00	.000
8.25	.591	19.50	.107	30.75	.011	42.00	.001	53.25	.000
8.50	.579	19.75	.101	31.00	.010	42.25	.001	53.50	.000
8.75	.556	20.00	.096	31.25	.010	42.50	.001	53.75	.000
9.00	.551	20.25	.092	31.50	.009	42.75	.001	54.00	.000
9.25	.558	20.50	.087	31.75	.009	43.00	.001	54.25	.000
9.50	.559	20.75	.082	32.00	.008	43.25	.001	54.50	.000
9.75	.548	21.00	.078	32.25	.008	43.50	.001	54.75	.000
10.00	.540	21.25	.075	32.50	.008	43.75	.001	55.00	.000
10.25	.530	21.50	.071	32.75	.008	44.00	.001		
10.50	.522	21.75	.067	33.00	.007	44.25	.001		
10.75	.513	22.00	.064	33.25	.007	44.50	.001		
11.00	.504	22.25	.061	33.50	.006	44.75	.001		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (4200)	AREA (ha)= 165.44
DT=15.0 min	TPEAK (hrs)= 5.25
	VOLUME (mm)= 31.76

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	10.00	.912	20.00	.105	30.00	.009	40.00	.001
.25	.000	10.25	.883	20.25	.098	30.25	.008	40.25	.001
.50	.003	10.50	.855	20.50	.093	30.50	.008	40.50	.001
.75	.021	10.75	.829	20.75	.088	30.75	.008	40.75	.001
1.00	.045	11.00	.803	21.00	.082	31.00	.008	41.00	.001
1.25	.059	11.25	.776	21.25	.077	31.25	.007	41.25	.001
1.50	.067	11.50	.749	21.50	.073	31.50	.007	41.50	.001
1.75	.071	11.75	.722	21.75	.069	31.75	.006	41.75	.001
2.00	.073	12.00	.696	22.00	.065	32.00	.006	42.00	.001
2.25	.075	12.25	.670	22.25	.061	32.25	.005	42.25	.001
2.50	.145	12.50	.631	22.50	.057	32.50	.005	42.50	.001
2.75	.283	12.75	.577	22.75	.054	32.75	.005	42.75	.000
3.00	.361	13.00	.537	23.00	.051	33.00	.004	43.00	.000
3.25	.406	13.25	.504	23.25	.048	33.25	.004	43.25	.000
3.50	.583	13.50	.475	23.50	.045	33.50	.004	43.50	.000
3.75	.900	13.75	.450	23.75	.042	33.75	.003	43.75	.000
4.00	1.082	14.00	.426	24.00	.040	34.00	.003	44.00	.000
4.25	1.188	14.25	.405	24.25	.037	34.25	.003	44.25	.000
4.50	1.653	14.50	.384	24.50	.035	34.50	.003	44.50	.000
4.75	2.499	14.75	.364	24.75	.033	34.75	.003	44.75	.000
5.00	2.996	15.00	.346	25.00	.031	35.00	.003	45.00	.000
5.25	3.299	15.25	.328	25.25	.029	35.25	.003	45.25	.000
5.50	3.035	15.50	.311	25.50	.028	35.50	.003	45.50	.000
5.75	2.255	15.75	.294	25.75	.026	35.75	.003	45.75	.000
6.00	1.833	16.00	.278	26.00	.024	36.00	.003	46.00	.000
6.25	1.616	16.25	.262	26.25	.023	36.25	.002	46.25	.000
6.50	1.433	16.50	.246	26.50	.022	36.50	.002	46.50	.000
6.75	1.233	16.75	.231	26.75	.020	36.75	.002	46.75	.000
7.00	1.144	17.00	.218	27.00	.019	37.00	.002	47.00	.000
7.25	1.118	17.25	.205	27.25	.018	37.25	.002	47.25	.000
7.50	1.087	17.50	.193	27.50	.017	37.50	.002	47.50	.000
7.75	1.035	17.75	.182	27.75	.016	37.75	.002	47.75	.000
8.00	1.030	18.00	.171	28.00	.015	38.00	.002	48.00	.000
8.25	1.051	18.25	.161	28.25	.014	38.25	.001	48.25	.000
8.50	1.058	18.50	.152	28.50	.013	38.50	.001	48.50	.000
8.75	1.035	18.75	.142	28.75	.013	38.75	.001	48.75	.000
9.00	1.028	19.00	.134	29.00	.012	39.00	.001	49.00	.000
9.25	1.019	19.25	.126	29.25	.011	39.25	.001	49.25	.000
9.50	.988	19.50	.119	29.50	.010	39.50	.001	49.50	.000
9.75	.944	19.75	.112	29.75	.010	39.75	.001		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (5200)	AREA (ha)= 165.44
DT=15.0 min	TPEAK (hrs)= 5.25
	VOLUME (mm)= 46.99

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	9.00	1.801	18.00	.183	27.00	.013	36.00	.001
.25	.000	9.25	1.741	18.25	.170	27.25	.012	36.25	.001
.50	.009	9.50	1.664	18.50	.157	27.50	.011	36.50	.001
.75	.038	9.75	1.566	18.75	.146	27.75	.010	36.75	.001
1.00	.069	10.00	1.487	19.00	.136	28.00	.009	37.00	.001
1.25	.085	10.25	1.419	19.25	.126	28.25	.009	37.25	.001
1.50	.094	10.50	1.355	19.50	.117	28.50	.008	37.50	.001
1.75	.098	10.75	1.293	19.75	.109	28.75	.008	37.75	.001
2.00	.101	11.00	1.233	20.00	.101	29.00	.007	38.00	.001
2.25	.103	11.25	1.175	20.25	.094	29.25	.007	38.25	.001
2.50	.203	11.50	1.119	20.50	.088	29.50	.006	38.50	.001
2.75	.402	11.75	1.063	20.75	.081	29.75	.006	38.75	.000
3.00	.507	12.00	1.011	21.00	.076	30.00	.005	39.00	.000
3.25	.563	12.25	.960	21.25	.070	30.25	.005	39.25	.000
3.50	.810	12.50	.893	21.50	.065	30.50	.004	39.50	.000
3.75	1.266	12.75	.807	21.75	.061	30.75	.004	39.75	.000
4.00	1.511	13.00	.742	22.00	.056	31.00	.004	40.00	.000
4.25	1.648	13.25	.690	22.25	.052	31.25	.003	40.25	.000
4.50	2.314	13.50	.646	22.50	.049	31.50	.003	40.50	.000
4.75	3.542	13.75	.605	22.75	.045	31.75	.003	40.75	.000
5.00	4.235	14.00	.568	23.00	.042	32.00	.003	41.00	.000
5.25	4.655	14.25	.534	23.25	.039	32.25	.003	41.25	.000
5.50	4.271	14.50	.501	23.50	.036	32.50	.003	41.50	.000
5.75	3.158	14.75	.470	23.75	.034	32.75	.003	41.75	.000
6.00	2.624	15.00	.439	24.00	.031	33.00	.003	42.00	.000
6.25	2.400	15.25	.411	24.25	.029	33.25	.002	42.25	.000
6.50	2.222	15.50	.382	24.50	.027	33.50	.002	42.50	.000
6.75	2.015	15.75	.355	24.75	.025	33.75	.002	42.75	.000
7.00	1.966	16.00	.330	25.00	.023	34.00	.002	43.00	.000
7.25	2.001	16.25	.306	25.25	.022	34.25	.002	43.25	.000
7.50	2.016	16.50	.285	25.50	.020	34.50	.002	43.50	.000
7.75	1.990	16.75	.264	25.75	.019	34.75	.002	43.75	.000

8.00	2.006	17.00	.246	26.00	.017	35.00	.001	44.00	.000
8.25	2.026	17.25	.228	26.25	.016	35.25	.001	44.25	.000
8.50	1.987	17.50	.212	26.50	.015	35.50	.001		
8.75	1.877	17.75	.197	26.75	.013	35.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6201)

DT=15.0 min

AREA (ha)=2846.70

TPEAK (hrs)= 10.00

VOLUME (mm)= 16.00

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.218	83.50	.017	125.25	.004	167.00	.001
.25	.000	42.00	.212	83.75	.017	125.50	.004	167.25	.001
.50	.000	42.25	.207	84.00	.017	125.75	.004	167.50	.001
.75	.000	42.50	.201	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.196	84.50	.016	126.25	.004	168.00	.001
1.25	.000	43.00	.190	84.75	.016	126.50	.004	168.25	.001
1.50	.000	43.25	.185	85.00	.016	126.75	.004	168.50	.001
1.75	.001	43.50	.180	85.25	.016	127.00	.004	168.75	.001
2.00	.002	43.75	.176	85.50	.016	127.25	.004	169.00	.001
2.25	.002	44.00	.171	85.75	.015	127.50	.004	169.25	.001
2.50	.003	44.25	.167	86.00	.015	127.75	.004	169.50	.001
2.75	.005	44.50	.162	86.25	.015	128.00	.003	169.75	.001
3.00	.007	44.75	.158	86.50	.015	128.25	.003	170.00	.001
3.25	.010	45.00	.154	86.75	.015	128.50	.003	170.25	.001
3.50	.014	45.25	.150	87.00	.015	128.75	.003	170.50	.001
3.75	.020	45.50	.147	87.25	.015	129.00	.003	170.75	.001
4.00	.029	45.75	.143	87.50	.014	129.25	.003	171.00	.001
4.25	.045	46.00	.140	87.75	.014	129.50	.003	171.25	.001
4.50	.075	46.25	.136	88.00	.014	129.75	.003	171.50	.001
4.75	.137	46.50	.133	88.25	.014	130.00	.003	171.75	.001
5.00	.264	46.75	.130	88.50	.014	130.25	.003	172.00	.001
5.25	.493	47.00	.127	88.75	.014	130.50	.003	172.25	.001
5.50	1.034	47.25	.124	89.00	.014	130.75	.003	172.50	.001
5.75	1.909	47.50	.121	89.25	.014	131.00	.003	172.75	.001
6.00	2.842	47.75	.118	89.50	.013	131.25	.003	173.00	.001
6.25	3.755	48.00	.116	89.75	.013	131.50	.003	173.25	.001
6.50	4.639	48.25	.113	90.00	.013	131.75	.003	173.50	.001
6.75	5.507	48.50	.111	90.25	.013	132.00	.003	173.75	.001
7.00	6.273	48.75	.108	90.50	.013	132.25	.003	174.00	.001
7.25	7.047	49.00	.106	90.75	.013	132.50	.003	174.25	.001
7.50	7.802	49.25	.104	91.00	.013	132.75	.003	174.50	.001
7.75	8.480	49.50	.101	91.25	.013	133.00	.003	174.75	.001
8.00	9.043	49.75	.099	91.50	.012	133.25	.003	175.00	.001
8.25	9.544	50.00	.097	91.75	.012	133.50	.003	175.25	.001
8.50	9.983	50.25	.095	92.00	.012	133.75	.003	175.50	.001
8.75	10.351	50.50	.093	92.25	.012	134.00	.003	175.75	.001
9.00	10.646	50.75	.091	92.50	.012	134.25	.003	176.00	.001
9.25	10.873	51.00	.090	92.75	.012	134.50	.003	176.25	.001
9.50	11.034	51.25	.088	93.00	.012	134.75	.003	176.50	.001
9.75	11.129	51.50	.086	93.25	.012	135.00	.003	176.75	.001
10.00	11.167	51.75	.084	93.50	.012	135.25	.003	177.00	.001
10.25	11.153	52.00	.083	93.75	.011	135.50	.003	177.25	.001
10.50	11.093	52.25	.081	94.00	.011	135.75	.003	177.50	.001
10.75	10.991	52.50	.080	94.25	.011	136.00	.003	177.75	.001
11.00	10.853	52.75	.078	94.50	.011	136.25	.003	178.00	.001
11.25	10.685	53.00	.077	94.75	.011	136.50	.003	178.25	.001
11.50	10.486	53.25	.075	95.00	.011	136.75	.003	178.50	.001
11.75	10.265	53.50	.074	95.25	.011	137.00	.003	178.75	.001
12.00	10.028	53.75	.073	95.50	.011	137.25	.003	179.00	.001
12.25	9.780	54.00	.071	95.75	.011	137.50	.003	179.25	.001
12.50	9.521	54.25	.070	96.00	.011	137.75	.003	179.50	.001
12.75	9.249	54.50	.069	96.25	.010	138.00	.002	179.75	.001
13.00	8.951	54.75	.068	96.50	.010	138.25	.002	180.00	.001
13.25	8.620	55.00	.067	96.75	.010	138.50	.002	180.25	.001
13.50	8.280	55.25	.066	97.00	.010	138.75	.002	180.50	.001
13.75	7.953	55.50	.064	97.25	.010	139.00	.002	180.75	.001
14.00	7.633	55.75	.063	97.50	.010	139.25	.002	181.00	.001
14.25	7.312	56.00	.062	97.75	.010	139.50	.002	181.25	.001
14.50	7.000	56.25	.061	98.00	.010	139.75	.002	181.50	.001
14.75	6.708	56.50	.060	98.25	.010	140.00	.002	181.75	.001
15.00	6.434	56.75	.059	98.50	.010	140.25	.002	182.00	.001
15.25	6.171	57.00	.058	98.75	.010	140.50	.002	182.25	.001
15.50	5.917	57.25	.057	99.00	.009	140.75	.002	182.50	.001
15.75	5.670	57.50	.057	99.25	.009	141.00	.002	182.75	.001
16.00	5.436	57.75	.056	99.50	.009	141.25	.002	183.00	.001
16.25	5.198	58.00	.055	99.75	.009	141.50	.002	183.25	.001
16.50	4.961	58.25	.054	100.00	.009	141.75	.002	183.50	.001
16.75	4.741	58.50	.053	100.25	.009	142.00	.002	183.75	.001
17.00	4.539	58.75	.052	100.50	.009	142.25	.002	184.00	.001
17.25	4.350	59.00	.052	100.75	.009	142.50	.002	184.25	.001
17.50	4.163	59.25	.051	101.00	.009	142.75	.002	184.50	.001
17.75	3.979	59.50	.050	101.25	.009	143.00	.002	184.75	.001
18.00	3.809	59.75	.049	101.50	.009	143.25	.002	185.00	.001
18.25	3.653	60.00	.049	101.75	.009	143.50	.002	185.25	.001
18.50	3.509	60.25	.048	102.00	.009	143.75	.002	185.50	.001
18.75	3.376	60.50	.047	102.25	.008	144.00	.002	185.75	.001
19.00	3.251	60.75	.046	102.50	.008	144.25	.002	186.00	.001
19.25	3.134	61.00	.046	102.75	.008	144.50	.002	186.25	.001
19.50	3.024	61.25	.045	103.00	.008	144.75	.002	186.50	.001
19.75	2.919	61.50	.044	103.25	.008	145.00	.002	186.75	.001
20.00	2.820	61.75	.044	103.50	.008	145.25	.002	187.00	.001
20.25	2.726	62.00	.043	103.75	.008	145.50	.002	187.25	.001
20.50	2.636	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	2.550	62.50	.042	104.25	.008	146.00	.002	187.75	.001
21.00	2.463	62.75	.041	104.50	.008	146.25	.002	188.00	.001
21.25	2.370	63.00	.041	104.75	.008	146.50	.002	188.25	.001
21.50	2.278	63.25	.040	105.00	.008	146.75	.002	188.50	.001
21.75	2.193	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	2.115	63.75	.039	105.50	.008	147.25	.002	189.00	.001
22.25	2.044	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	1.973	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	1.899	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	1.827	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	1.760	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	1.700	65.25	.037	107.00	.007	148.75	.002	190.50	.001
23.75	1.644	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	1.592	65.75	.036	107.50	.007	149.25	.002	191.00	.001
24.25	1.543	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	1.497	66.25	.035	108.00	.007	149.75	.002	191.50	.001
24.75	1.453	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	1.411	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	1.371	67.00	.034	108.75	.007	150.50	.002	192.25	.001
25.50	1.333	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.296	67.50	.033	109.25	.007	151.00	.002	192.75	.001
26.00	1.260	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.225	68.00	.032	109.75	.007	151.50	.002	193.25	.000
26.50	1.192	68.25	.032	110.00	.006	151.75	.002	193.50	.000
26.75	1.159	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.128	68.75	.031	110.50	.006	152.25	.002	194.00	.000
27.25	1.098	69.00	.031	110.75	.006	152.50	.002	194.25	.000
27.50	1.068	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.039	69.50	.030	111.25	.006	153.00	.002	194.75	.000
28.00	1.012	69.75	.030	111.50	.006	153.25	.002	195.00	.000
28.25	.984	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	.958	70.25	.029	112.00	.006	153.75	.002	195.50	.000
28.75	.932	70.50	.029	112.25	.006	154.00	.002	195.75	.000
29.00	.907	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	.882	71.00	.028	112.75	.006	154.50	.002	196.25	.000
29.50	.859	71.25	.028	113.00	.006	154.75	.002	196.50	.000
29.75	.835	71.50	.028	113.25	.006	155.00	.002	196.75	.000

30.00	.813	71.75	.027	113.50	.006	155.25	.002	197.00	.000
30.25	.790	72.00	.027	113.75	.006	155.50	.001	197.25	.000
30.50	.769	72.25	.027	114.00	.006	155.75	.001	197.50	.000
30.75	.748	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.729	72.75	.026	114.50	.006	156.25	.001	198.00	.000
31.25	.710	73.00	.026	114.75	.006	156.50	.001	198.25	.000
31.50	.692	73.25	.026	115.00	.005	156.75	.001	198.50	.000
31.75	.674	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.656	73.75	.025	115.50	.005	157.25	.001	199.00	.000
32.25	.639	74.00	.025	115.75	.005	157.50	.001	199.25	.000
32.50	.621	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.604	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.588	74.75	.024	116.50	.005	158.25	.001	200.00	.000
33.25	.571	75.00	.024	116.75	.005	158.50	.001	200.25	.000
33.50	.556	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.542	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.527	75.75	.023	117.50	.005	159.25	.001	201.00	.000
34.25	.513	76.00	.023	117.75	.005	159.50	.001	201.25	.000
34.50	.499	76.25	.023	118.00	.005	159.75	.001	201.50	.000
34.75	.486	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.473	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.460	77.00	.022	118.75	.005	160.50	.001	202.25	.000
35.50	.447	77.25	.022	119.00	.005	160.75	.001	202.50	.000
35.75	.434	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.422	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.410	78.00	.021	119.75	.005	161.50	.001	203.25	.000
36.50	.399	78.25	.021	120.00	.005	161.75	.001	203.50	.000
36.75	.387	78.50	.021	120.25	.005	162.00	.001	203.75	.000
37.00	.376	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.366	79.00	.020	120.75	.005	162.50	.001	204.25	.000
37.50	.355	79.25	.020	121.00	.004	162.75	.001	204.50	.000
37.75	.345	79.50	.020	121.25	.004	163.00	.001	204.75	.000
38.00	.335	79.75	.020	121.50	.004	163.25	.001	205.00	.000
38.25	.326	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.316	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.307	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.298	80.75	.019	122.50	.004	164.25	.001	206.00	.000
39.25	.290	81.00	.019	122.75	.004	164.50	.001	206.25	.000
39.50	.282	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.274	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.266	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.258	82.00	.018	123.75	.004	165.50	.001	207.25	.000
40.50	.251	82.25	.018	124.00	.004	165.75	.001	207.50	.000
40.75	.244	82.50	.018	124.25	.004	166.00	.001		
41.00	.237	82.75	.017	124.50	.004	166.25	.001		
41.25	.231	83.00	.017	124.75	.004	166.50	.001		
41.50	.224	83.25	.017	125.00	.004	166.75	.001		

READ STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6203)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 9.50
	VOLUME (mm)= 38.51

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.286	83.50	.016	125.25	.004	167.00	.001
.25	.000	42.00	.277	83.75	.016	125.50	.004	167.25	.001
.50	.000	42.25	.269	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.261	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.253	84.50	.016	126.25	.004	168.00	.001
1.25	.001	43.00	.246	84.75	.016	126.50	.004	168.25	.001
1.50	.001	43.25	.238	85.00	.016	126.75	.004	168.50	.001
1.75	.002	43.50	.231	85.25	.015	127.00	.004	168.75	.001
2.00	.004	43.75	.224	85.50	.015	127.25	.004	169.00	.001
2.25	.005	44.00	.218	85.75	.015	127.50	.003	169.25	.001
2.50	.008	44.25	.212	86.00	.015	127.75	.003	169.50	.001
2.75	.011	44.50	.205	86.25	.015	128.00	.003	169.75	.001
3.00	.015	44.75	.199	86.50	.015	128.25	.003	170.00	.001
3.25	.021	45.00	.194	86.75	.015	128.50	.003	170.25	.001
3.50	.030	45.25	.188	87.00	.014	128.75	.003	170.50	.001
3.75	.048	45.50	.183	87.25	.014	129.00	.003	170.75	.001
4.00	.084	45.75	.178	87.50	.014	129.25	.003	171.00	.001
4.25	.149	46.00	.173	87.75	.014	129.50	.003	171.25	.001
4.50	.278	46.25	.168	88.00	.014	129.75	.003	171.50	.001
4.75	.829	46.50	.163	88.25	.014	130.00	.003	171.75	.001
5.00	2.121	46.75	.159	88.50	.014	130.25	.003	172.00	.001
5.25	4.022	47.00	.154	88.75	.014	130.50	.003	172.25	.001
5.50	6.106	47.25	.150	89.00	.013	130.75	.003	172.50	.001
5.75	8.212	47.50	.146	89.25	.013	131.00	.003	172.75	.001
6.00	10.393	47.75	.142	89.50	.013	131.25	.003	173.00	.001
6.25	12.636	48.00	.138	89.75	.013	131.50	.003	173.25	.001
6.50	15.001	48.25	.135	90.00	.013	131.75	.003	173.50	.001
6.75	17.305	48.50	.131	90.25	.013	132.00	.003	173.75	.001
7.00	19.507	48.75	.128	90.50	.013	132.25	.003	174.00	.001
7.25	21.638	49.00	.125	90.75	.013	132.50	.003	174.25	.001
7.50	23.625	49.25	.121	91.00	.012	132.75	.003	174.50	.001
7.75	25.424	49.50	.118	91.25	.012	133.00	.003	174.75	.001
8.00	27.019	49.75	.115	91.50	.012	133.25	.003	175.00	.001
8.25	28.384	50.00	.113	91.75	.012	133.50	.003	175.25	.001
8.50	29.494	50.25	.110	92.00	.012	133.75	.003	175.50	.001
8.75	30.344	50.50	.107	92.25	.012	134.00	.003	175.75	.001
9.00	30.945	50.75	.105	92.50	.012	134.25	.003	176.00	.001
9.25	31.312	51.00	.102	92.75	.012	134.50	.003	176.25	.001
9.50	31.464	51.25	.100	93.00	.012	134.75	.003	176.50	.001
9.75	31.416	51.50	.097	93.25	.011	135.00	.003	176.75	.001
10.00	31.193	51.75	.095	93.50	.011	135.25	.003	177.00	.001
10.25	30.827	52.00	.093	93.75	.011	135.50	.003	177.25	.001
10.50	30.340	52.25	.091	94.00	.011	135.75	.003	177.50	.001
10.75	29.746	52.50	.089	94.25	.011	136.00	.003	177.75	.001
11.00	29.070	52.75	.087	94.50	.011	136.25	.003	178.00	.001
11.25	28.325	53.00	.085	94.75	.011	136.50	.003	178.25	.001
11.50	27.510	53.25	.083	95.00	.011	136.75	.003	178.50	.001
11.75	26.642	53.50	.081	95.25	.011	137.00	.003	178.75	.001
12.00	25.750	53.75	.080	95.50	.011	137.25	.003	179.00	.001
12.25	24.837	54.00	.078	95.75	.010	137.50	.003	179.25	.001
12.50	23.935	54.25	.076	96.00	.010	137.75	.002	179.50	.001
12.75	23.016	54.50	.075	96.25	.010	138.00	.002	179.75	.001
13.00	22.106	54.75	.073	96.50	.010	138.25	.002	180.00	.001
13.25	21.184	55.00	.072	96.75	.010	138.50	.002	180.25	.001
13.50	20.268	55.25	.070	97.00	.010	138.75	.002	180.50	.001
13.75	19.363	55.50	.069	97.25	.010	139.00	.002	180.75	.001
14.00	18.451	55.75	.068	97.50	.010	139.25	.002	181.00	.001
14.25	17.530	56.00	.066	97.75	.010	139.50	.002	181.25	.001
14.50	16.635	56.25	.065	98.00	.010	139.75	.002	181.50	.001
14.75	15.781	56.50	.064	98.25	.010	140.00	.002	181.75	.001
15.00	14.959	56.75	.063	98.50	.009	140.25	.002	182.00	.001
15.25	14.151	57.00	.062	98.75	.009	140.50	.002	182.25	.001
15.50	13.363	57.25	.061	99.00	.009	140.75	.002	182.50	.001
15.75	12.624	57.50	.059	99.25	.009	141.00	.002	182.75	.001
16.00	11.938	57.75	.058	99.50	.009	141.25	.002	183.00	.001
16.25	11.303	58.00	.057	99.75	.009	141.50	.002	183.25	.001
16.50	10.711	58.25	.056	100.00	.009	141.75	.002	183.50	.001
16.75	10.148	58.50	.055	100.25	.009	142.00	.002	183.75	.001
17.00	9.578	58.75	.054	100.50	.009	142.25	.002	184.00	.001
17.25	9.024	59.00	.053	100.75	.009	142.50	.002	184.25	.001
17.50	8.522	59.25	.053	101.00	.009	142.75	.002	184.50	.001
17.75	8.065	59.50	.052	101.25	.009	143.00	.002	184.75	.001
18.00	7.643	59.75	.051	101.50	.009	143.25	.002	185.00	.001
18.25	7.236	60.00	.050	101.75	.008	143.50	.002	185.25	.001
18.50	6.844	60.25	.049	102.00	.008	143.75	.002	185.50	.001
18.75	6.483	60.50	.048	102.25	.008	144.00	.002	185.75	.001
19.00	6.152	60.75	.048	102.50	.008	144.25	.002	186.00	.001

19.25	5.849	61.00	.047	102.75	.008	144.50	.002	186.25	.001
19.50	5.566	61.25	.046	103.00	.008	144.75	.002	186.50	.001
19.75	5.288	61.50	.045	103.25	.008	145.00	.002	186.75	.001
20.00	5.022	61.75	.045	103.50	.008	145.25	.002	187.00	.001
20.25	4.782	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	4.564	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	4.363	62.50	.043	104.25	.008	146.00	.002	187.75	.001
21.00	4.164	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	3.967	63.00	.042	104.75	.008	146.50	.002	188.25	.001
21.50	3.785	63.25	.041	105.00	.008	146.75	.002	188.50	.001
21.75	3.618	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	3.465	63.75	.040	105.50	.007	147.25	.002	189.00	.001
22.25	3.325	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	3.193	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	3.070	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	2.954	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	2.844	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	2.741	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	2.643	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.549	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	2.448	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	2.344	66.25	.034	108.00	.007	149.75	.002	191.50	.001
24.75	2.248	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	2.160	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	2.080	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	2.006	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.929	67.50	.032	109.25	.007	151.00	.002	192.75	.001
26.00	1.851	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.777	68.00	.031	109.75	.006	151.50	.002	193.25	.000
26.50	1.711	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.650	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.594	68.75	.030	110.50	.006	152.25	.002	194.00	.000
27.25	1.542	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.493	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.447	69.50	.029	111.25	.006	153.00	.002	194.75	.000
28.00	1.403	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.361	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	1.321	70.25	.028	112.00	.006	153.75	.002	195.50	.000
28.75	1.282	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.245	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	1.209	71.00	.027	112.75	.006	154.50	.002	196.25	.000
29.50	1.174	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	1.141	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	1.109	71.75	.027	113.50	.006	155.25	.001	197.00	.000
30.25	1.077	72.00	.026	113.75	.006	155.50	.001	197.25	.000
30.50	1.047	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	1.018	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.989	72.75	.025	114.50	.006	156.25	.001	198.00	.000
31.25	.962	73.00	.025	114.75	.005	156.50	.001	198.25	.000
31.50	.935	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.909	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.883	73.75	.024	115.50	.005	157.25	.001	199.00	.000
32.25	.859	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.834	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.811	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.788	74.75	.023	116.50	.005	158.25	.001	200.00	.000
33.25	.766	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.745	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.725	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.706	75.75	.022	117.50	.005	159.25	.001	201.00	.000
34.25	.687	76.00	.022	117.75	.005	159.50	.001	201.25	.000
34.50	.669	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.650	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.632	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.614	77.00	.021	118.75	.005	160.50	.001	202.25	.000
35.50	.597	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.580	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.563	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.548	78.00	.020	119.75	.005	161.50	.001	203.25	.000
36.50	.533	78.25	.020	120.00	.005	161.75	.001	203.50	.000
36.75	.518	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.504	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.490	79.00	.020	120.75	.004	162.50	.001	204.25	.000
37.50	.476	79.25	.019	121.00	.004	162.75	.001	204.50	.000
37.75	.462	79.50	.019	121.25	.004	163.00	.001	204.75	.000
38.00	.449	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.436	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.423	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.411	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.399	80.75	.018	122.50	.004	164.25	.001	206.00	.000

39.25	.387	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.376	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.365	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.354	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.343	82.00	.017	123.75	.004	165.50	.001	207.25	.000
40.50	.333	82.25	.017	124.00	.004	165.75	.001	207.50	.000
40.75	.323	82.50	.017	124.25	.004	166.00	.001		
41.00	.313	82.75	.017	124.50	.004	166.25	.001		
41.25	.304	83.00	.017	124.75	.004	166.50	.001		
41.50	.295	83.25	.017	125.00	.004	166.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6205)

DT=15.0 min

AREA (ha)=3174.13

TPEAK (hrs)= 11.00

VOLUME (mm)= 14.09

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	12.50	11.134	25.00	1.009	37.50	.157	50.00	.016
.25	.000	12.75	10.839	25.25	.976	37.75	.151	50.25	.015
.50	.000	13.00	10.511	25.50	.943	38.00	.144	50.50	.014
.75	.000	13.25	10.158	25.75	.912	38.25	.138	50.75	.014
1.00	.000	13.50	9.787	26.00	.881	38.50	.133	51.00	.013
1.25	.000	13.75	9.376	26.25	.851	38.75	.127	51.25	.012
1.50	.000	14.00	8.910	26.50	.822	39.00	.122	51.50	.012
1.75	.000	14.25	8.440	26.75	.794	39.25	.117	51.75	.011
2.00	.000	14.50	8.003	27.00	.767	39.50	.112	52.00	.010
2.25	.000	14.75	7.595	27.25	.740	39.75	.107	52.25	.010
2.50	.000	15.00	7.216	27.50	.714	40.00	.102	52.50	.009
2.75	.000	15.25	6.860	27.75	.689	40.25	.098	52.75	.009
3.00	.000	15.50	6.511	28.00	.666	40.50	.094	53.00	.008
3.25	.000	15.75	6.156	28.25	.643	40.75	.090	53.25	.008
3.50	.000	16.00	5.802	28.50	.620	41.00	.086	53.50	.008
3.75	.001	16.25	5.454	28.75	.598	41.25	.082	53.75	.007
4.00	.004	16.50	5.129	29.00	.578	41.50	.079	54.00	.007
4.25	.013	16.75	4.837	29.25	.559	41.75	.075	54.25	.006
4.50	.040	17.00	4.576	29.50	.540	42.00	.072	54.50	.006
4.75	.110	17.25	4.339	29.75	.522	42.25	.069	54.75	.005
5.00	.267	17.50	4.122	30.00	.504	42.50	.066	55.00	.005
5.25	.541	17.75	3.919	30.25	.487	42.75	.063	55.25	.005
5.50	.973	18.00	3.719	30.50	.470	43.00	.060	55.50	.005
5.75	1.669	18.25	3.527	30.75	.453	43.25	.057	55.75	.004
6.00	2.613	18.50	3.352	31.00	.437	43.50	.055	56.00	.004
6.25	3.611	18.75	3.190	31.25	.421	43.75	.052	56.25	.004
6.50	4.580	19.00	3.040	31.50	.406	44.00	.050	56.50	.004
6.75	5.488	19.25	2.894	31.75	.392	44.25	.048	56.75	.003
7.00	6.347	19.50	2.738	32.00	.377	44.50	.045	57.00	.003
7.25	7.142	19.75	2.583	32.25	.363	44.75	.043	57.25	.003
7.50	7.811	20.00	2.445	32.50	.350	45.00	.041	57.50	.003
7.75	8.410	20.25	2.321	32.75	.337	45.25	.039	57.75	.003
8.00	8.976	20.50	2.208	33.00	.324	45.50	.038	58.00	.002
8.25	9.497	20.75	2.105	33.25	.312	45.75	.036	58.25	.002

8.50	9.971	21.00	2.010	33.50	.300	46.00	.034	58.50	.002
8.75	10.397	21.25	1.916	33.75	.289	46.25	.033	58.75	.002
9.00	10.775	21.50	1.820	34.00	.278	46.50	.031	59.00	.002
9.25	11.105	21.75	1.727	34.25	.267	46.75	.030	59.25	.002
9.50	11.388	22.00	1.643	34.50	.257	47.00	.028	59.50	.002
9.75	11.623	22.25	1.566	34.75	.247	47.25	.027	59.75	.002
10.00	11.812	22.50	1.497	35.00	.237	47.50	.026	60.00	.001
10.25	11.950	22.75	1.433	35.25	.228	47.75	.024	60.25	.001
10.50	12.047	23.00	1.373	35.50	.219	48.00	.023	60.50	.001
10.75	12.095	23.25	1.318	35.75	.210	48.25	.022	60.75	.001
11.00	12.098	23.50	1.266	36.00	.202	48.50	.021	61.00	.001
11.25	12.053	23.75	1.217	36.25	.193	48.75	.020	61.25	.001
11.50	11.957	24.00	1.171	36.50	.186	49.00	.019	61.50	.001
11.75	11.818	24.25	1.127	36.75	.178	49.25	.018	61.75	.001
12.00	11.627	24.50	1.086	37.00	.171	49.50	.017	62.00	.000
12.25	11.398	24.75	1.046	37.25	.164	49.75	.016		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6206)	AREA (ha)=3174.13
DT=15.0 min	TPEAK (hrs)= 11.25
	VOLUME (mm)= 22.21

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.00	17.276	26.00	1.082	39.00	.156	52.00	.014
.25	.000	13.25	16.910	26.25	1.042	39.25	.149	52.25	.014
.50	.000	13.50	16.492	26.50	1.006	39.50	.143	52.50	.013
.75	.000	13.75	15.977	26.75	.972	39.75	.137	52.75	.012
1.00	.000	14.00	15.387	27.00	.939	40.00	.131	53.00	.012
1.25	.000	14.25	14.781	27.25	.907	40.25	.126	53.25	.011
1.50	.000	14.50	14.165	27.50	.876	40.50	.121	53.50	.011
1.75	.000	14.75	13.538	27.75	.846	40.75	.116	53.75	.010
2.00	.000	15.00	12.904	28.00	.816	41.00	.111	54.00	.010
2.25	.000	15.25	12.267	28.25	.788	41.25	.106	54.25	.009
2.50	.000	15.50	11.586	28.50	.760	41.50	.102	54.50	.009
2.75	.000	15.75	10.836	28.75	.734	41.75	.097	54.75	.008
3.00	.000	16.00	10.108	29.00	.708	42.00	.093	55.00	.008
3.25	.000	16.25	9.450	29.25	.683	42.25	.089	55.25	.007
3.50	.000	16.50	8.850	29.50	.660	42.50	.085	55.50	.007
3.75	.004	16.75	8.299	29.75	.636	42.75	.082	55.75	.006
4.00	.015	17.00	7.792	30.00	.613	43.00	.078	56.00	.006
4.25	.040	17.25	7.325	30.25	.592	43.25	.075	56.25	.006
4.50	.100	17.50	6.880	30.50	.572	43.50	.071	56.50	.005
4.75	.252	17.75	6.419	30.75	.553	43.75	.068	56.75	.005
5.00	.555	18.00	5.952	31.00	.535	44.00	.065	57.00	.005
5.25	1.117	18.25	5.524	31.25	.516	44.25	.062	57.25	.004
5.50	2.165	18.50	5.151	31.50	.499	44.50	.060	57.50	.004
5.75	3.630	18.75	4.825	31.75	.481	44.75	.057	57.75	.004
6.00	5.115	19.00	4.535	32.00	.464	45.00	.054	58.00	.004
6.25	6.588	19.25	4.274	32.25	.448	45.25	.052	58.25	.003
6.50	7.916	19.50	4.037	32.50	.432	45.50	.050	58.50	.003
6.75	9.053	19.75	3.810	32.75	.417	45.75	.047	58.75	.003

7.00	10.138	20.00	3.591	33.00	.402	46.00	.045	59.00	.003
7.25	11.155	20.25	3.391	33.25	.387	46.25	.043	59.25	.003
7.50	12.095	20.50	3.208	33.50	.373	46.50	.041	59.50	.002
7.75	12.960	20.75	3.023	33.75	.359	46.75	.039	59.75	.002
8.00	13.759	21.00	2.834	34.00	.346	47.00	.038	60.00	.002
8.25	14.501	21.25	2.663	34.25	.333	47.25	.036	60.25	.002
8.50	15.185	21.50	2.512	34.50	.321	47.50	.034	60.50	.002
8.75	15.807	21.75	2.377	34.75	.309	47.75	.033	60.75	.002
9.00	16.365	22.00	2.255	35.00	.297	48.00	.031	61.00	.002
9.25	16.858	22.25	2.144	35.25	.286	48.25	.030	61.25	.002
9.50	17.286	22.50	2.043	35.50	.275	48.50	.028	61.50	.002
9.75	17.649	22.75	1.947	35.75	.264	48.75	.027	61.75	.001
10.00	17.947	23.00	1.848	36.00	.254	49.00	.026	62.00	.001
10.25	18.178	23.25	1.750	36.25	.244	49.25	.025	62.25	.001
10.50	18.372	23.50	1.660	36.50	.234	49.50	.023	62.50	.001
10.75	18.497	23.75	1.579	36.75	.225	49.75	.022	62.75	.001
11.00	18.558	24.00	1.506	37.00	.216	50.00	.021	63.00	.001
11.25	18.585	24.25	1.439	37.25	.208	50.25	.020	63.25	.001
11.50	18.543	24.50	1.378	37.50	.199	50.50	.019	63.50	.000
11.75	18.439	24.75	1.321	37.75	.191	50.75	.018		
12.00	18.299	25.00	1.267	38.00	.184	51.00	.017		
12.25	18.101	25.25	1.217	38.25	.176	51.25	.017		
12.50	17.867	25.50	1.170	38.50	.169	51.50	.016		
12.75	17.605	25.75	1.125	38.75	.162	51.75	.015		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6207)	AREA (ha)=3174.13
DT=15.0 min	TPEAK (hrs)= 11.00
	VOLUME (mm)= 36.01

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.25	26.719	26.50	1.285	39.75	.178	53.00	.016
.25	.000	13.50	26.099	26.75	1.232	40.00	.171	53.25	.016
.50	.000	13.75	25.473	27.00	1.183	40.25	.164	53.50	.015
.75	.000	14.00	24.801	27.25	1.137	40.50	.157	53.75	.014
1.00	.000	14.25	24.078	27.50	1.093	40.75	.151	54.00	.014
1.25	.000	14.50	23.314	27.75	1.052	41.00	.145	54.25	.013
1.50	.000	14.75	22.515	28.00	1.015	41.25	.139	54.50	.012
1.75	.000	15.00	21.676	28.25	.980	41.50	.133	54.75	.012
2.00	.000	15.25	20.781	28.50	.946	41.75	.128	55.00	.011
2.25	.000	15.50	19.802	28.75	.913	42.00	.122	55.25	.011
2.50	.000	15.75	18.832	29.00	.882	42.25	.117	55.50	.010
2.75	.000	16.00	17.913	29.25	.851	42.50	.112	55.75	.010
3.00	.000	16.25	16.994	29.50	.821	42.75	.108	56.00	.009
3.25	.000	16.50	16.087	29.75	.792	43.00	.103	56.25	.009
3.50	.003	16.75	15.192	30.00	.764	43.25	.099	56.50	.008
3.75	.015	17.00	14.313	30.25	.737	43.50	.095	56.75	.008
4.00	.047	17.25	13.352	30.50	.711	43.75	.091	57.00	.007
4.25	.113	17.50	12.371	30.75	.686	44.00	.087	57.25	.007
4.50	.262	17.75	11.480	31.00	.662	44.25	.083	57.50	.006
4.75	.583	18.00	10.650	31.25	.639	44.50	.079	57.75	.006

5.00	1.255	18.25	9.888	31.50	.616	44.75	.076	58.00	.006
5.25	2.612	18.50	9.194	31.75	.594	45.00	.073	58.25	.005
5.50	4.641	18.75	8.561	32.00	.574	45.25	.070	58.50	.005
5.75	6.933	19.00	7.966	32.25	.555	45.50	.067	58.75	.005
6.00	9.158	19.25	7.390	32.50	.536	45.75	.064	59.00	.004
6.25	11.133	19.50	6.854	32.75	.518	46.00	.061	59.25	.004
6.50	12.992	19.75	6.350	33.00	.500	46.25	.058	59.50	.004
6.75	14.685	20.00	5.866	33.25	.483	46.50	.056	59.75	.004
7.00	16.258	20.25	5.429	33.50	.466	46.75	.053	60.00	.003
7.25	17.739	20.50	5.046	33.75	.450	47.00	.051	60.25	.003
7.50	19.161	20.75	4.710	34.00	.434	47.25	.049	60.50	.003
7.75	20.564	21.00	4.411	34.25	.418	47.50	.046	60.75	.003
8.00	21.950	21.25	4.142	34.50	.403	47.75	.044	61.00	.003
8.25	23.269	21.50	3.893	34.75	.389	48.00	.042	61.25	.002
8.50	24.471	21.75	3.655	35.00	.375	48.25	.040	61.50	.002
8.75	25.545	22.00	3.432	35.25	.361	48.50	.039	61.75	.002
9.00	26.492	22.25	3.205	35.50	.348	48.75	.037	62.00	.002
9.25	27.306	22.50	2.982	35.75	.335	49.00	.035	62.25	.002
9.50	27.987	22.75	2.788	36.00	.322	49.25	.034	62.50	.002
9.75	28.532	23.00	2.619	36.25	.310	49.50	.032	62.75	.002
10.00	28.954	23.25	2.469	36.50	.299	49.75	.031	63.00	.002
10.25	29.263	23.50	2.335	36.75	.287	50.00	.029	63.25	.001
10.50	29.511	23.75	2.214	37.00	.276	50.25	.028	63.50	.001
10.75	29.671	24.00	2.103	37.25	.266	50.50	.027	63.75	.001
11.00	29.723	24.25	2.003	37.50	.256	50.75	.025	64.00	.001
11.25	29.700	24.50	1.903	37.75	.246	51.00	.024	64.25	.001
11.50	29.576	24.75	1.800	38.00	.236	51.25	.023	64.50	.001
11.75	29.382	25.00	1.704	38.25	.227	51.50	.022	64.75	.001
12.00	29.100	25.25	1.616	38.50	.218	51.75	.021	65.00	.001
12.25	28.756	25.50	1.538	38.75	.210	52.00	.020	65.25	.000
12.50	28.358	25.75	1.466	39.00	.201	52.25	.019		
12.75	27.873	26.00	1.401	39.25	.193	52.50	.018		
13.00	27.326	26.25	1.341	39.50	.186	52.75	.017		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6209)	AREA (ha)= 150.47
DT=15.0 min	TPEAK (hrs)= 12.00
	VOLUME (mm)= 21.57

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.75	.094	77.50	.017	116.25	.003	155.00	.000
.25	.000	39.00	.094	77.75	.017	116.50	.003	155.25	.000
.50	.000	39.25	.092	78.00	.017	116.75	.003	155.50	.000
.75	.000	39.50	.092	78.25	.017	117.00	.003	155.75	.000
1.00	.000	39.75	.090	78.50	.016	117.25	.003	156.00	.000
1.25	.000	40.00	.090	78.75	.016	117.50	.003	156.25	.000
1.50	.001	40.25	.089	79.00	.016	117.75	.003	156.50	.000
1.75	.001	40.50	.088	79.25	.016	118.00	.003	156.75	.000
2.00	.001	40.75	.087	79.50	.016	118.25	.003	157.00	.000
2.25	.002	41.00	.086	79.75	.016	118.50	.003	157.25	.000
2.50	.002	41.25	.085	80.00	.016	118.75	.003	157.50	.000
2.75	.003	41.50	.084	80.25	.015	119.00	.003	157.75	.000
3.00	.004	41.75	.083	80.50	.015	119.25	.003	158.00	.000
3.25	.006	42.00	.082	80.75	.015	119.50	.003	158.25	.000
3.50	.008	42.25	.082	81.00	.015	119.75	.003	158.50	.000
3.75	.011	42.50	.081	81.25	.015	120.00	.003	158.75	.000
4.00	.015	42.75	.080	81.50	.014	120.25	.002	159.00	.000
4.25	.020	43.00	.079	81.75	.014	120.50	.002	159.25	.000
4.50	.026	43.25	.078	82.00	.014	120.75	.002	159.50	.000
4.75	.035	43.50	.077	82.25	.014	121.00	.002	159.75	.000
5.00	.047	43.75	.077	82.50	.014	121.25	.002	160.00	.000
5.25	.060	44.00	.076	82.75	.014	121.50	.002	160.25	.000
5.50	.074	44.25	.075	83.00	.014	121.75	.002	160.50	.000
5.75	.086	44.50	.074	83.25	.013	122.00	.002	160.75	.000
6.00	.096	44.75	.073	83.50	.013	122.25	.002	161.00	.000
6.25	.104	45.00	.073	83.75	.013	122.50	.002	161.25	.000
6.50	.111	45.25	.072	84.00	.013	122.75	.002	161.50	.000
6.75	.117	45.50	.071	84.25	.013	123.00	.002	161.75	.000
7.00	.122	45.75	.070	84.50	.013	123.25	.002	162.00	.000
7.25	.127	46.00	.069	84.75	.012	123.50	.002	162.25	.000
7.50	.131	46.25	.069	85.00	.012	123.75	.002	162.50	.000
7.75	.135	46.50	.068	85.25	.012	124.00	.002	162.75	.000
8.00	.139	46.75	.067	85.50	.012	124.25	.002	163.00	.000
8.25	.142	47.00	.067	85.75	.012	124.50	.002	163.25	.000
8.50	.146	47.25	.066	86.00	.012	124.75	.002	163.50	.000
8.75	.149	47.50	.065	86.25	.012	125.00	.002	163.75	.000
9.00	.153	47.75	.064	86.50	.012	125.25	.002	164.00	.000
9.25	.157	48.00	.064	86.75	.012	125.50	.002	164.25	.000
9.50	.160	48.25	.063	87.00	.011	125.75	.002	164.50	.000
9.75	.164	48.50	.062	87.25	.011	126.00	.002	164.75	.000
10.00	.174	48.75	.061	87.50	.011	126.25	.002	165.00	.000
10.25	.301	49.00	.061	87.75	.011	126.50	.002	165.25	.000
10.50	.387	49.25	.060	88.00	.011	126.75	.002	165.50	.000
10.75	.446	49.50	.059	88.25	.011	127.00	.002	165.75	.000
11.00	.487	49.75	.059	88.50	.011	127.25	.002	166.00	.000
11.25	.514	50.00	.058	88.75	.010	127.50	.002	166.25	.000
11.50	.529	50.25	.058	89.00	.010	127.75	.002	166.50	.000
11.75	.537	50.50	.057	89.25	.010	128.00	.002	166.75	.000
12.00	.540	50.75	.056	89.50	.010	128.25	.002	167.00	.000
12.25	.538	51.00	.056	89.75	.010	128.50	.002	167.25	.000
12.50	.533	51.25	.055	90.00	.010	128.75	.002	167.50	.000
12.75	.523	51.50	.055	90.25	.010	129.00	.002	167.75	.000
13.00	.510	51.75	.054	90.50	.010	129.25	.002	168.00	.000
13.25	.495	52.00	.053	90.75	.010	129.50	.002	168.25	.000
13.50	.479	52.25	.053	91.00	.010	129.75	.002	168.50	.000
13.75	.464	52.50	.052	91.25	.009	130.00	.002	168.75	.000
14.00	.448	52.75	.052	91.50	.009	130.25	.002	169.00	.000
14.25	.433	53.00	.051	91.75	.009	130.50	.002	169.25	.000
14.50	.419	53.25	.051	92.00	.009	130.75	.002	169.50	.000
14.75	.405	53.50	.050	92.25	.009	131.00	.002	169.75	.000
15.00	.390	53.75	.049	92.50	.009	131.25	.002	170.00	.000
15.25	.377	54.00	.049	92.75	.009	131.50	.002	170.25	.000
15.50	.363	54.25	.048	93.00	.009	131.75	.002	170.50	.000
15.75	.350	54.50	.048	93.25	.008	132.00	.002	170.75	.000
16.00	.338	54.75	.047	93.50	.008	132.25	.002	171.00	.000
16.25	.326	55.00	.047	93.75	.008	132.50	.002	171.25	.000
16.50	.314	55.25	.046	94.00	.008	132.75	.002	171.50	.000
16.75	.302	55.50	.046	94.25	.008	133.00	.002	171.75	.000
17.00	.291	55.75	.045	94.50	.008	133.25	.002	172.00	.000
17.25	.280	56.00	.045	94.75	.008	133.50	.002	172.25	.000
17.50	.269	56.25	.044	95.00	.008	133.75	.002	172.50	.000
17.75	.258	56.50	.044	95.25	.008	134.00	.002	172.75	.000
18.00	.248	56.75	.043	95.50	.008	134.25	.001	173.00	.000
18.25	.238	57.00	.043	95.75	.008	134.50	.001	173.25	.000
18.50	.228	57.25	.042	96.00	.008	134.75	.001	173.50	.000
18.75	.219	57.50	.042	96.25	.008	135.00	.001	173.75	.000
19.00	.210	57.75	.041	96.50	.008	135.25	.001	174.00	.000
19.25	.201	58.00	.041	96.75	.007	135.50	.001	174.25	.000
19.50	.192	58.25	.041	97.00	.007	135.75	.001	174.50	.000
19.75	.184	58.50	.040	97.25	.007	136.00	.001	174.75	.000
20.00	.177	58.75	.039	97.50	.007	136.25	.001	175.00	.000
20.25	.169	59.00	.039	97.75	.007	136.50	.001	175.25	.000
20.50	.167	59.25	.039	98.00	.007	136.75	.001	175.50	.000
20.75	.167	59.50	.038	98.25	.007	137.00	.001	175.75	.000
21.00	.167	59.75	.038	98.50	.007	137.25	.001	176.00	.000
21.25	.166	60.00	.037	98.75	.007	137.50	.001	176.25	.000
21.50	.166	60.25	.037	99.00	.007	137.75	.001	176.50	.000
21.75	.165	60.50	.037	99.25	.006	138.00	.001	176.75	.000
22.00	.165	60.75	.036	99.50	.006	138.25	.001	177.00	.000
22.25	.164	61.00	.036	99.75	.006	138.50	.001	177.25	.000
22.50	.163	61.25	.035	100.00	.006	138.75	.001	177.50	.000

22.75	.163	61.50	.035	100.25	.006	139.00	.001	177.75	.000		
23.00	.162	61.75	.035	100.50	.006	139.25	.001	178.00	.000		
23.25	.161	62.00	.034	100.75	.006	139.50	.001	178.25	.000		
23.50	.161	62.25	.034	101.00	.006	139.75	.001	178.50	.000		
23.75	.160	62.50	.033	101.25	.006	140.00	.001	178.75	.000		
24.00	.159	62.75	.033	101.50	.006	140.25	.001	179.00	.000		
24.25	.158	63.00	.033	101.75	.006	140.50	.001	179.25	.000		
24.50	.157	63.25	.032	102.00	.006	140.75	.001	179.50	.000		
24.75	.156	63.50	.032	102.25	.006	141.00	.001	179.75	.000		
25.00	.155	63.75	.032	102.50	.006	141.25	.001	180.00	.000		
25.25	.154	64.00	.031	102.75	.006	141.50	.001	180.25	.000		
25.50	.153	64.25	.031	103.00	.006	141.75	.001	180.50	.000		
25.75	.152	64.50	.031	103.25	.006	142.00	.001	180.75	.000		
26.00	.151	64.75	.030	103.50	.006	142.25	.001	181.00	.000		
26.25	.150	65.00	.030	103.75	.005	142.50	.001	181.25	.000		
26.50	.149	65.25	.030	104.00	.005	142.75	.001	181.50	.000		
26.75	.148	65.50	.029	104.25	.005	143.00	.001	181.75	.000		
27.00	.147	65.75	.029	104.50	.005	143.25	.001	182.00	.000		
27.25	.145	66.00	.029	104.75	.005	143.50	.001	182.25	.000		
27.50	.144	66.25	.028	105.00	.005	143.75	.001	182.50	.000		
27.75	.143	66.50	.028	105.25	.005	144.00	.001	182.75	.000		
28.00	.142	66.75	.028	105.50	.005	144.25	.001	183.00	.000		
28.25	.141	67.00	.027	105.75	.005	144.50	.001	183.25	.000		
28.50	.140	67.25	.027	106.00	.005	144.75	.001	183.50	.000		
28.75	.139	67.50	.027	106.25	.005	145.00	.001	183.75	.000		
29.00	.137	67.75	.027	106.50	.005	145.25	.001	184.00	.000		
29.25	.136	68.00	.026	106.75	.005	145.50	.001	184.25	.000		
29.50	.135	68.25	.026	107.00	.005	145.75	.001	184.50	.000		
29.75	.134	68.50	.026	107.25	.005	146.00	.001	184.75	.000		
30.00	.133	68.75	.026	107.50	.004	146.25	.001	185.00	.000		
30.25	.132	69.00	.025	107.75	.004	146.50	.001	185.25	.000		
30.50	.131	69.25	.025	108.00	.004	146.75	.001	185.50	.000		
30.75	.130	69.50	.025	108.25	.004	147.00	.001	185.75	.000		
31.00	.128	69.75	.024	108.50	.004	147.25	.001	186.00	.000		
31.25	.127	70.00	.024	108.75	.004	147.50	.001	186.25	.000		
31.50	.126	70.25	.024	109.00	.004	147.75	.001	186.50	.000		
31.75	.125	70.50	.024	109.25	.004	148.00	.001	186.75	.000		
32.00	.124	70.75	.023	109.50	.004	148.25	.001	187.00	.000		
32.25	.122	71.00	.023	109.75	.004	148.50	.001	187.25	.000		
32.50	.121	71.25	.023	110.00	.004	148.75	.001	187.50	.000		
32.75	.120	71.50	.022	110.25	.004	149.00	.001	187.75	.000		
33.00	.119	71.75	.022	110.50	.004	149.25	.001	188.00	.000		
33.25	.118	72.00	.022	110.75	.004	149.50	.001	188.25	.000		
33.50	.117	72.25	.022	111.00	.004	149.75	.001	188.50	.000		
33.75	.116	72.50	.022	111.25	.004	150.00	.001	188.75	.000		
34.00	.114	72.75	.021	111.50	.004	150.25	.001	189.00	.000		
34.25	.113	73.00	.021	111.75	.004	150.50	.001	189.25	.000		
34.50	.112	73.25	.021	112.00	.004	150.75	.001	189.50	.000		
34.75	.111	73.50	.021	112.25	.004	151.00	.001	189.75	.000		
35.00	.110	73.75	.020	112.50	.004	151.25	.001	190.00	.000		
35.25	.109	74.00	.020	112.75	.004	151.50	.001	190.25	.000		
35.50	.108	74.25	.020	113.00	.004	151.75	.001	190.50	.000		
35.75	.107	74.50	.020	113.25	.004	152.00	.001	190.75	.000		
36.00	.106	74.75	.020	113.50	.004	152.25	.001	191.00	.000		
36.25	.105	75.00	.019	113.75	.004	152.50	.001	191.25	.000		
36.50	.104	75.25	.019	114.00	.004	152.75	.001	191.50	.000		
36.75	.102	75.50	.019	114.25	.003	153.00	.001	191.75	.000		
37.00	.102	75.75	.019	114.50	.003	153.25	.000	192.00	.000		
37.25	.100	76.00	.018	114.75	.003	153.50	.000	192.25	.000		
37.50	.100	76.25	.018	115.00	.003	153.75	.000	192.50	.000		
37.75	.098	76.50	.018	115.25	.003	154.00	.000	192.75	.000		
38.00	.098	76.75	.018	115.50	.003	154.25	.000	193.00	.000		
38.25	.096	77.00	.018	115.75	.003	154.50	.000	193.25	.000		
38.50	.096	77.25	.018	116.00	.003	154.75	.000				

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6210)	AREA (ha)= 150.47
DT=15.0 min	TPEAK (hrs)= 10.25
	VOLUME (mm)= 31.33

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.75	.093	77.50	.017	116.25	.003	155.00	.000
.25	.000	39.00	.092	77.75	.017	116.50	.003	155.25	.000
.50	.000	39.25	.091	78.00	.016	116.75	.003	155.50	.000
.75	.000	39.50	.090	78.25	.016	117.00	.003	155.75	.000
1.00	.000	39.75	.090	78.50	.016	117.25	.003	156.00	.000
1.25	.000	40.00	.088	78.75	.016	117.50	.003	156.25	.000
1.50	.001	40.25	.088	79.00	.016	117.75	.003	156.50	.000
1.75	.001	40.50	.086	79.25	.016	118.00	.003	156.75	.000
2.00	.002	40.75	.086	79.50	.016	118.25	.003	157.00	.000
2.25	.002	41.00	.085	79.75	.015	118.50	.003	157.25	.000
2.50	.003	41.25	.084	80.00	.015	118.75	.003	157.50	.000
2.75	.004	41.50	.083	80.25	.015	119.00	.003	157.75	.000
3.00	.006	41.75	.082	80.50	.015	119.25	.003	158.00	.000
3.25	.008	42.00	.081	80.75	.015	119.50	.003	158.25	.000
3.50	.011	42.25	.081	81.00	.014	119.75	.002	158.50	.000
3.75	.015	42.50	.079	81.25	.014	120.00	.002	158.75	.000
4.00	.021	42.75	.079	81.50	.014	120.25	.002	159.00	.000
4.25	.027	43.00	.078	81.75	.014	120.50	.002	159.25	.000
4.50	.035	43.25	.077	82.00	.014	120.75	.002	159.50	.000
4.75	.047	43.50	.076	82.25	.014	121.00	.002	159.75	.000
5.00	.063	43.75	.075	82.50	.014	121.25	.002	160.00	.000
5.25	.082	44.00	.075	82.75	.013	121.50	.002	160.25	.000
5.50	.100	44.25	.074	83.00	.013	121.75	.002	160.50	.000
5.75	.117	44.50	.073	83.25	.013	122.00	.002	160.75	.000
6.00	.130	44.75	.072	83.50	.013	122.25	.002	161.00	.000
6.25	.141	45.00	.071	83.75	.013	122.50	.002	161.25	.000
6.50	.151	45.25	.071	84.00	.013	122.75	.002	161.50	.000
6.75	.160	45.50	.070	84.25	.012	123.00	.002	161.75	.000
7.00	.198	45.75	.069	84.50	.012	123.25	.002	162.00	.000
7.25	.438	46.00	.068	84.75	.012	123.50	.002	162.25	.000
7.50	.588	46.25	.067	85.00	.012	123.75	.002	162.50	.000
7.75	.680	46.50	.067	85.25	.012	124.00	.002	162.75	.000
8.00	.738	46.75	.066	85.50	.012	124.25	.002	163.00	.000
8.25	.782	47.00	.065	85.75	.012	124.50	.002	163.25	.000
8.50	.820	47.25	.065	86.00	.012	124.75	.002	163.50	.000
8.75	.851	47.50	.064	86.25	.012	125.00	.002	163.75	.000
9.00	.879	47.75	.063	86.50	.011	125.25	.002	164.00	.000
9.25	.908	48.00	.063	86.75	.011	125.50	.002	164.25	.000
9.50	.936	48.25	.062	87.00	.011	125.75	.002	164.50	.000
9.75	.960	48.50	.061	87.25	.011	126.00	.002	164.75	.000
10.00	.976	48.75	.061	87.50	.011	126.25	.002	165.00	.000
10.25	.983	49.00	.060	87.75	.011	126.50	.002	165.25	.000
10.50	.983	49.25	.059	88.00	.011	126.75	.002	165.50	.000
10.75	.976	49.50	.059	88.25	.010	127.00	.002	165.75	.000
11.00	.965	49.75	.058	88.50	.010	127.25	.002	166.00	.000
11.25	.951	50.00	.057	88.75	.010	127.50	.002	166.25	.000
11.50	.933	50.25	.057	89.00	.010	127.75	.002	166.50	.000
11.75	.913	50.50	.056	89.25	.010	128.00	.002	166.75	.000
12.00	.892	50.75	.055	89.50	.010	128.25	.002	167.00	.000
12.25	.869	51.00	.055	89.75	.010	128.50	.002	167.25	.000
12.50	.843	51.25	.054	90.00	.010	128.75	.002	167.50	.000
12.75	.813	51.50	.053	90.25	.010	129.00	.002	167.75	.000
13.00	.781	51.75	.053	90.50	.010	129.25	.002	168.00	.000
13.25	.747	52.00	.052	90.75	.009	129.50	.002	168.25	.000
13.50	.715	52.25	.052	91.00	.009	129.75	.002	168.50	.000
13.75	.684	52.50	.051	91.25	.009	130.00	.002	168.75	.000
14.00	.655	52.75	.051	91.50	.009	130.25	.002	169.00	.000
14.25	.627	53.00	.050	91.75	.009	130.50	.002	169.25	.000
14.50	.599	53.25	.049	92.00	.009	130.75	.002	169.50	.000
14.75	.573	53.50	.049	92.25	.009	131.00	.002	169.75	.000

15.00	.548	53.75	.049	92.50	.009	131.25	.002	170.00	.000
15.25	.524	54.00	.048	92.75	.008	131.50	.002	170.25	.000
15.50	.501	54.25	.047	93.00	.008	131.75	.002	170.50	.000
15.75	.479	54.50	.047	93.25	.008	132.00	.002	170.75	.000
16.00	.458	54.75	.046	93.50	.008	132.25	.002	171.00	.000
16.25	.438	55.00	.046	93.75	.008	132.50	.002	171.25	.000
16.50	.418	55.25	.045	94.00	.008	132.75	.002	171.50	.000
16.75	.399	55.50	.045	94.25	.008	133.00	.002	171.75	.000
17.00	.380	55.75	.044	94.50	.008	133.25	.002	172.00	.000
17.25	.362	56.00	.044	94.75	.008	133.50	.002	172.25	.000
17.50	.344	56.25	.043	95.00	.008	133.75	.001	172.50	.000
17.75	.327	56.50	.043	95.25	.008	134.00	.001	172.75	.000
18.00	.311	56.75	.042	95.50	.008	134.25	.001	173.00	.000
18.25	.296	57.00	.042	95.75	.008	134.50	.001	173.25	.000
18.50	.281	57.25	.041	96.00	.008	134.75	.001	173.50	.000
18.75	.267	57.50	.041	96.25	.007	135.00	.001	173.75	.000
19.00	.253	57.75	.041	96.50	.007	135.25	.001	174.00	.000
19.25	.241	58.00	.040	96.75	.007	135.50	.001	174.25	.000
19.50	.228	58.25	.040	97.00	.007	135.75	.001	174.50	.000
19.75	.217	58.50	.039	97.25	.007	136.00	.001	174.75	.000
20.00	.206	58.75	.039	97.50	.007	136.25	.001	175.00	.000
20.25	.196	59.00	.038	97.75	.007	136.50	.001	175.25	.000
20.50	.186	59.25	.038	98.00	.007	136.75	.001	175.50	.000
20.75	.177	59.50	.037	98.25	.007	137.00	.001	175.75	.000
21.00	.167	59.75	.037	98.50	.007	137.25	.001	176.00	.000
21.25	.167	60.00	.037	98.75	.006	137.50	.001	176.25	.000
21.50	.167	60.25	.036	99.00	.006	137.75	.001	176.50	.000
21.75	.167	60.50	.036	99.25	.006	138.00	.001	176.75	.000
22.00	.166	60.75	.035	99.50	.006	138.25	.001	177.00	.000
22.25	.165	61.00	.035	99.75	.006	138.50	.001	177.25	.000
22.50	.165	61.25	.035	100.00	.006	138.75	.001	177.50	.000
22.75	.164	61.50	.034	100.25	.006	139.00	.001	177.75	.000
23.00	.163	61.75	.034	100.50	.006	139.25	.001	178.00	.000
23.25	.163	62.00	.033	100.75	.006	139.50	.001	178.25	.000
23.50	.162	62.25	.033	101.00	.006	139.75	.001	178.50	.000
23.75	.161	62.50	.033	101.25	.006	140.00	.001	178.75	.000
24.00	.160	62.75	.033	101.50	.006	140.25	.001	179.00	.000
24.25	.159	63.00	.032	101.75	.006	140.50	.001	179.25	.000
24.50	.158	63.25	.032	102.00	.006	140.75	.001	179.50	.000
24.75	.157	63.50	.031	102.25	.006	141.00	.001	179.75	.000
25.00	.156	63.75	.031	102.50	.006	141.25	.001	180.00	.000
25.25	.155	64.00	.031	102.75	.006	141.50	.001	180.25	.000
25.50	.154	64.25	.030	103.00	.006	141.75	.001	180.50	.000
25.75	.153	64.50	.030	103.25	.005	142.00	.001	180.75	.000
26.00	.152	64.75	.030	103.50	.005	142.25	.001	181.00	.000
26.25	.151	65.00	.029	103.75	.005	142.50	.001	181.25	.000
26.50	.150	65.25	.029	104.00	.005	142.75	.001	181.50	.000
26.75	.149	65.50	.029	104.25	.005	143.00	.001	181.75	.000
27.00	.147	65.75	.028	104.50	.005	143.25	.001	182.00	.000
27.25	.146	66.00	.028	104.75	.005	143.50	.001	182.25	.000
27.50	.145	66.25	.028	105.00	.005	143.75	.001	182.50	.000
27.75	.144	66.50	.027	105.25	.005	144.00	.001	182.75	.000
28.00	.143	66.75	.027	105.50	.005	144.25	.001	183.00	.000
28.25	.141	67.00	.027	105.75	.005	144.50	.001	183.25	.000
28.50	.140	67.25	.027	106.00	.005	144.75	.001	183.50	.000
28.75	.139	67.50	.026	106.25	.005	145.00	.001	183.75	.000
29.00	.138	67.75	.026	106.50	.005	145.25	.001	184.00	.000
29.25	.137	68.00	.026	106.75	.005	145.50	.001	184.25	.000
29.50	.136	68.25	.026	107.00	.004	145.75	.001	184.50	.000
29.75	.134	68.50	.025	107.25	.004	146.00	.001	184.75	.000
30.00	.133	68.75	.025	107.50	.004	146.25	.001	185.00	.000
30.25	.132	69.00	.025	107.75	.004	146.50	.001	185.25	.000
30.50	.131	69.25	.024	108.00	.004	146.75	.001	185.50	.000
30.75	.130	69.50	.024	108.25	.004	147.00	.001	185.75	.000
31.00	.128	69.75	.024	108.50	.004	147.25	.001	186.00	.000
31.25	.127	70.00	.024	108.75	.004	147.50	.001	186.25	.000
31.50	.126	70.25	.023	109.00	.004	147.75	.001	186.50	.000
31.75	.125	70.50	.023	109.25	.004	148.00	.001	186.75	.000
32.00	.123	70.75	.023	109.50	.004	148.25	.001	187.00	.000
32.25	.122	71.00	.022	109.75	.004	148.50	.001	187.25	.000
32.50	.121	71.25	.022	110.00	.004	148.75	.001	187.50	.000
32.75	.120	71.50	.022	110.25	.004	149.00	.001	187.75	.000
33.00	.119	71.75	.022	110.50	.004	149.25	.001	188.00	.000
33.25	.118	72.00	.022	110.75	.004	149.50	.001	188.25	.000
33.50	.116	72.25	.021	111.00	.004	149.75	.001	188.50	.000
33.75	.115	72.50	.021	111.25	.004	150.00	.001	188.75	.000
34.00	.114	72.75	.021	111.50	.004	150.25	.001	189.00	.000
34.25	.113	73.00	.021	111.75	.004	150.50	.001	189.25	.000
34.50	.112	73.25	.020	112.00	.004	150.75	.001	189.50	.000
34.75	.110	73.50	.020	112.25	.004	151.00	.001	189.75	.000
35.00	.109	73.75	.020	112.50	.004	151.25	.001	190.00	.000
35.25	.108	74.00	.020	112.75	.004	151.50	.001	190.25	.000
35.50	.107	74.25	.020	113.00	.004	151.75	.001	190.50	.000
35.75	.106	74.50	.019	113.25	.004	152.00	.001	190.75	.000
36.00	.105	74.75	.019	113.50	.004	152.25	.001	191.00	.000
36.25	.104	75.00	.019	113.75	.003	152.50	.001	191.25	.000
36.50	.103	75.25	.019	114.00	.003	152.75	.000	191.50	.000
36.75	.102	75.50	.018	114.25	.003	153.00	.000	191.75	.000
37.00	.100	75.75	.018	114.50	.003	153.25	.000	192.00	.000
37.25	.100	76.00	.018	114.75	.003	153.50	.000	192.25	.000
37.50	.098	76.25	.018	115.00	.003	153.75	.000	192.50	.000
37.75	.098	76.50	.018	115.25	.003	154.00	.000	192.75	.000
38.00	.096	76.75	.018	115.50	.003	154.25	.000		
38.25	.095	77.00	.017	115.75	.003	154.50	.000		
38.50	.094	77.25	.017	116.00	.003	154.75	.000		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6211)	AREA (ha)= 150.47
DT=15.0 min	TPEAK (hrs)= 9.50
	VOLUME (mm)= 47.16

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.50	.092	77.00	.017	115.50	.003	154.00	.000
.25	.000	38.75	.091	77.25	.016	115.75	.003	154.25	.000
.50	.000	39.00	.090	77.50	.016	116.00	.003	154.50	.000
.75	.000	39.25	.089	77.75	.016	116.25	.003	154.75	.000
1.00	.000	39.50	.088	78.00	.016	116.50	.003	155.00	.000
1.25	.001	39.75	.087	78.25	.016	116.75	.003	155.25	.000
1.50	.002	40.00	.086	78.50	.016	117.00	.003	155.50	.000
1.75	.002	40.25	.085	78.75	.016	117.25	.003	155.75	.000
2.00	.002	40.50	.084	79.00	.015	117.50	.003	156.00	.000
2.25	.003	40.75	.083	79.25	.015	117.75	.003	156.25	.000
2.50	.004	41.00	.082	79.50	.015	118.00	.003	156.50	.000
2.75	.006	41.25	.081	79.75	.015	118.25	.003	156.75	.000
3.00	.008	41.50	.081	80.00	.015	118.50	.003	157.00	.000
3.25	.012	41.75	.080	80.25	.014	118.75	.003	157.25	.000
3.50	.016	42.00	.079	80.50	.014	119.00	.002	157.50	.000
3.75	.021	42.25	.078	80.75	.014	119.25	.002	157.75	.000
4.00	.029	42.50	.077	81.00	.014	119.50	.002	158.00	.000
4.25	.039	42.75	.076	81.25	.014	119.75	.002	158.25	.000
4.50	.050	43.00	.075	81.50	.014	120.00	.002	158.50	.000
4.75	.067	43.25	.075	81.75	.014	120.25	.002	158.75	.000
5.00	.090	43.50	.074	82.00	.013	120.50	.002	159.00	.000
5.25	.116	43.75	.073	82.25	.013	120.75	.002	159.25	.000
5.50	.143	44.00	.072	82.50	.013	121.00	.002	159.50	.000
5.75	.167	44.25	.071	82.75	.013	121.25	.002	159.75	.000
6.00	.792	44.50	.071	83.00	.013	121.50	.002	160.00	.000
6.25	1.133	44.75	.070	83.25	.013	121.75	.002	160.25	.000
6.50	1.315	45.00	.069	83.50	.012	122.00	.002	160.50	.000
6.75	1.401	45.25	.068	83.75	.012	122.25	.002	160.75	.000
7.00	1.438	45.50	.067	84.00	.012	122.50	.002	161.00	.000

7.25	1.468	45.75	.067	84.25	.012	122.75	.002	161.25	.000
7.50	1.503	46.00	.066	84.50	.012	123.00	.002	161.50	.000
7.75	1.539	46.25	.065	84.75	.012	123.25	.002	161.75	.000
8.00	1.578	46.50	.065	85.00	.012	123.50	.002	162.00	.000
8.25	1.629	46.75	.064	85.25	.012	123.75	.002	162.25	.000
8.50	1.687	47.00	.063	85.50	.012	124.00	.002	162.50	.000
8.75	1.741	47.25	.063	85.75	.011	124.25	.002	162.75	.000
9.00	1.784	47.50	.062	86.00	.011	124.50	.002	163.00	.000
9.25	1.814	47.75	.061	86.25	.011	124.75	.002	163.25	.000
9.50	1.824	48.00	.061	86.50	.011	125.00	.002	163.50	.000
9.75	1.814	48.25	.060	86.75	.011	125.25	.002	163.75	.000
10.00	1.788	48.50	.059	87.00	.011	125.50	.002	164.00	.000
10.25	1.752	48.75	.059	87.25	.011	125.75	.002	164.25	.000
10.50	1.710	49.00	.058	87.50	.010	126.00	.002	164.50	.000
10.75	1.663	49.25	.057	87.75	.010	126.25	.002	164.75	.000
11.00	1.613	49.50	.057	88.00	.010	126.50	.002	165.00	.000
11.25	1.561	49.75	.056	88.25	.010	126.75	.002	165.25	.000
11.50	1.507	50.00	.055	88.50	.010	127.00	.002	165.50	.000
11.75	1.452	50.25	.055	88.75	.010	127.25	.002	165.75	.000
12.00	1.397	50.50	.054	89.00	.010	127.50	.002	166.00	.000
12.25	1.342	50.75	.053	89.25	.010	127.75	.002	166.25	.000
12.50	1.286	51.00	.053	89.50	.010	128.00	.002	166.50	.000
12.75	1.225	51.25	.052	89.75	.010	128.25	.002	166.75	.000
13.00	1.162	51.50	.052	90.00	.009	128.50	.002	167.00	.000
13.25	1.100	51.75	.051	90.25	.009	128.75	.002	167.25	.000
13.50	1.041	52.00	.051	90.50	.009	129.00	.002	167.50	.000
13.75	.985	52.25	.050	90.75	.009	129.25	.002	167.75	.000
14.00	.933	52.50	.049	91.00	.009	129.50	.002	168.00	.000
14.25	.883	52.75	.049	91.25	.009	129.75	.002	168.25	.000
14.50	.837	53.00	.049	91.50	.009	130.00	.002	168.50	.000
14.75	.793	53.25	.048	91.75	.009	130.25	.002	168.75	.000
15.00	.751	53.50	.047	92.00	.008	130.50	.002	169.00	.000
15.25	.712	53.75	.047	92.25	.008	130.75	.002	169.25	.000
15.50	.675	54.00	.046	92.50	.008	131.00	.002	169.50	.000
15.75	.639	54.25	.046	92.75	.008	131.25	.002	169.75	.000
16.00	.604	54.50	.045	93.00	.008	131.50	.002	170.00	.000
16.25	.571	54.75	.045	93.25	.008	131.75	.002	170.25	.000
16.50	.538	55.00	.044	93.50	.008	132.00	.002	170.50	.000
16.75	.507	55.25	.044	93.75	.008	132.25	.002	170.75	.000
17.00	.477	55.50	.043	94.00	.008	132.50	.002	171.00	.000
17.25	.450	55.75	.043	94.25	.008	132.75	.002	171.25	.000
17.50	.423	56.00	.042	94.50	.008	133.00	.001	171.50	.000
17.75	.397	56.25	.042	94.75	.008	133.25	.001	171.75	.000
18.00	.374	56.50	.041	95.00	.008	133.50	.001	172.00	.000
18.25	.352	56.75	.041	95.25	.008	133.75	.001	172.25	.000
18.50	.330	57.00	.041	95.50	.007	134.00	.001	172.50	.000
18.75	.310	57.25	.040	95.75	.007	134.25	.001	172.75	.000
19.00	.292	57.50	.039	96.00	.007	134.50	.001	173.00	.000
19.25	.274	57.75	.039	96.25	.007	134.75	.001	173.25	.000
19.50	.258	58.00	.039	96.50	.007	135.00	.001	173.50	.000
19.75	.242	58.25	.038	96.75	.007	135.25	.001	173.75	.000
20.00	.228	58.50	.038	97.00	.007	135.50	.001	174.00	.000
20.25	.214	58.75	.037	97.25	.007	135.75	.001	174.25	.000
20.50	.201	59.00	.037	97.50	.007	136.00	.001	174.50	.000
20.75	.189	59.25	.037	97.75	.007	136.25	.001	174.75	.000
21.00	.178	59.50	.036	98.00	.006	136.50	.001	175.00	.000
21.25	.167	59.75	.036	98.25	.006	136.75	.001	175.25	.000
21.50	.167	60.00	.035	98.50	.006	137.00	.001	175.50	.000
21.75	.167	60.25	.035	98.75	.006	137.25	.001	175.75	.000
22.00	.166	60.50	.035	99.00	.006	137.50	.001	176.00	.000
22.25	.166	60.75	.034	99.25	.006	137.75	.001	176.25	.000
22.50	.165	61.00	.034	99.50	.006	138.00	.001	176.50	.000
22.75	.164	61.25	.033	99.75	.006	138.25	.001	176.75	.000
23.00	.163	61.50	.033	100.00	.006	138.50	.001	177.00	.000
23.25	.163	61.75	.033	100.25	.006	138.75	.001	177.25	.000
23.50	.162	62.00	.032	100.50	.006	139.00	.001	177.50	.000
23.75	.161	62.25	.032	100.75	.006	139.25	.001	177.75	.000
24.00	.160	62.50	.032	101.00	.006	139.50	.001	178.00	.000
24.25	.159	62.75	.031	101.25	.006	139.75	.001	178.25	.000
24.50	.158	63.00	.031	101.50	.006	140.00	.001	178.50	.000
24.75	.157	63.25	.031	101.75	.006	140.25	.001	178.75	.000
25.00	.156	63.50	.030	102.00	.006	140.50	.001	179.00	.000
25.25	.155	63.75	.030	102.25	.006	140.75	.001	179.25	.000
25.50	.153	64.00	.030	102.50	.005	141.00	.001	179.50	.000
25.75	.153	64.25	.029	102.75	.005	141.25	.001	179.75	.000
26.00	.151	64.50	.029	103.00	.005	141.50	.001	180.00	.000
26.25	.150	64.75	.029	103.25	.005	141.75	.001	180.25	.000
26.50	.149	65.00	.028	103.50	.005	142.00	.001	180.50	.000
26.75	.147	65.25	.028	103.75	.005	142.25	.001	180.75	.000
27.00	.146	65.50	.028	104.00	.005	142.50	.001	181.00	.000
27.25	.145	65.75	.027	104.25	.005	142.75	.001	181.25	.000
27.50	.144	66.00	.027	104.50	.005	143.00	.001	181.50	.000
27.75	.143	66.25	.027	104.75	.005	143.25	.001	181.75	.000
28.00	.141	66.50	.027	105.00	.005	143.50	.001	182.00	.000
28.25	.140	66.75	.026	105.25	.005	143.75	.001	182.25	.000
28.50	.139	67.00	.026	105.50	.005	144.00	.001	182.50	.000
28.75	.137	67.25	.026	105.75	.005	144.25	.001	182.75	.000
29.00	.136	67.50	.026	106.00	.005	144.50	.001	183.00	.000
29.25	.135	67.75	.025	106.25	.004	144.75	.001	183.25	.000
29.50	.134	68.00	.025	106.50	.004	145.00	.001	183.50	.000
29.75	.132	68.25	.025	106.75	.004	145.25	.001	183.75	.000
30.00	.131	68.50	.024	107.00	.004	145.50	.001	184.00	.000
30.25	.130	68.75	.024	107.25	.004	145.75	.001	184.25	.000
30.50	.129	69.00	.024	107.50	.004	146.00	.001	184.50	.000
30.75	.127	69.25	.024	107.75	.004	146.25	.001	184.75	.000
31.00	.126	69.50	.023	108.00	.004	146.50	.001	185.00	.000
31.25	.125	69.75	.023	108.25	.004	146.75	.001	185.25	.000
31.50	.124	70.00	.023	108.50	.004	147.00	.001	185.50	.000
31.75	.122	70.25	.022	108.75	.004	147.25	.001	185.75	.000
32.00	.121	70.50	.022	109.00	.004	147.50	.001	186.00	.000
32.25	.120	70.75	.022	109.25	.004	147.75	.001	186.25	.000
32.50	.119	71.00	.022	109.50	.004	148.00	.001	186.50	.000
32.75	.118	71.25	.022	109.75	.004	148.25	.001	186.75	.000
33.00	.116	71.50	.021	110.00	.004	148.50	.001	187.00	.000
33.25	.115	71.75	.021	110.25	.004	148.75	.001	187.25	.000
33.50	.114	72.00	.021	110.50	.004	149.00	.001	187.50	.000
33.75	.113	72.25	.021	110.75	.004	149.25	.001	187.75	.000
34.00	.112	72.50	.020	111.00	.004	149.50	.001	188.00	.000
34.25	.110	72.75	.020	111.25	.004	149.75	.001	188.25	.000
34.50	.109	73.00	.020	111.50	.004	150.00	.001	188.50	.000
34.75	.108	73.25	.020	111.75	.004	150.25	.001	188.75	.000
35.00	.107	73.50	.020	112.00	.004	150.50	.001	189.00	.000
35.25	.106	73.75	.019	112.25	.004	150.75	.001	189.25	.000
35.50	.104	74.00	.019	112.50	.004	151.00	.001	189.50	.000
35.75	.104	74.25	.019	112.75	.004	151.25	.001	189.75	.000
36.00	.102	74.50	.019	113.00	.003	151.50	.001	190.00	.000
36.25	.101	74.75	.018	113.25	.003	151.75	.001	190.25	.000
36.50	.100	75.00	.018	113.50	.003	152.00	.000	190.50	.000
36.75	.099	75.25	.018	113.75	.003	152.25	.000	190.75	.000
37.00	.098	75.50	.018	114.00	.003	152.50	.000	191.00	.000
37.25	.097	75.75	.018	114.25	.003	152.75	.000	191.25	.000
37.50	.096	76.00	.018	114.50	.003	153.00	.000	191.50	.000
37.75	.095	76.25	.017	114.75	.003	153.25	.000	191.75	.000
38.00	.094	76.50	.017	115.00	.003	153.50	.000	192.00	.000
38.25	.093	76.75	.017	115.25	.003	153.75	.000		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6204)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 9.50
	VOLUME (mm)= 51.01

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW

hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
.00	.000	41.75	.312	83.50	.016	125.25	.004	167.00	.001
.25	.000	42.00	.303	83.75	.016	125.50	.004	167.25	.001
.50	.000	42.25	.293	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.285	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.276	84.50	.016	126.25	.004	168.00	.001
1.25	.001	43.00	.268	84.75	.016	126.50	.004	168.25	.001
1.50	.002	43.25	.259	85.00	.015	126.75	.004	168.50	.001
1.75	.003	43.50	.252	85.25	.015	127.00	.004	168.75	.001
2.00	.005	43.75	.244	85.50	.015	127.25	.003	169.00	.001
2.25	.007	44.00	.237	85.75	.015	127.50	.003	169.25	.001
2.50	.010	44.25	.230	86.00	.015	127.75	.003	169.50	.001
2.75	.014	44.50	.223	86.25	.015	128.00	.003	169.75	.001
3.00	.019	44.75	.216	86.50	.015	128.25	.003	170.00	.001
3.25	.027	45.00	.210	86.75	.014	128.50	.003	170.25	.001
3.50	.040	45.25	.204	87.00	.014	128.75	.003	170.50	.001
3.75	.068	45.50	.198	87.25	.014	129.00	.003	170.75	.001
4.00	.125	45.75	.192	87.50	.014	129.25	.003	171.00	.001
4.25	.233	46.00	.186	87.75	.014	129.50	.003	171.25	.001
4.50	.561	46.25	.181	88.00	.014	129.75	.003	171.50	.001
4.75	1.618	46.50	.176	88.25	.014	130.00	.003	171.75	.001
5.00	3.645	46.75	.171	88.50	.014	130.25	.003	172.00	.001
5.25	6.226	47.00	.166	88.75	.013	130.50	.003	172.25	.001
5.50	9.013	47.25	.161	89.00	.013	130.75	.003	172.50	.001
5.75	11.783	47.50	.156	89.25	.013	131.00	.003	172.75	.001
6.00	14.764	47.75	.152	89.50	.013	131.25	.003	173.00	.001
6.25	17.954	48.00	.148	89.75	.013	131.50	.003	173.25	.001
6.50	21.172	48.25	.144	90.00	.013	131.75	.003	173.50	.001
6.75	24.399	48.50	.140	90.25	.013	132.00	.003	173.75	.001
7.00	27.575	48.75	.136	90.50	.013	132.25	.003	174.00	.001
7.25	30.634	49.00	.132	90.75	.012	132.50	.003	174.25	.001
7.50	33.455	49.25	.129	91.00	.012	132.75	.003	174.50	.001
7.75	35.957	49.50	.125	91.25	.012	133.00	.003	174.75	.001
8.00	38.116	49.75	.122	91.50	.012	133.25	.003	175.00	.001
8.25	39.926	50.00	.119	91.75	.012	133.50	.003	175.25	.001
8.50	41.359	50.25	.116	92.00	.012	133.75	.003	175.50	.001
8.75	42.397	50.50	.113	92.25	.012	134.00	.003	175.75	.001
9.00	43.074	50.75	.110	92.50	.012	134.25	.003	176.00	.001
9.25	43.427	51.00	.107	92.75	.012	134.50	.003	176.25	.001
9.50	43.476	51.25	.105	93.00	.011	134.75	.003	176.50	.001
9.75	43.245	51.50	.102	93.25	.011	135.00	.003	176.75	.001
10.00	42.774	51.75	.100	93.50	.011	135.25	.003	177.00	.001
10.25	42.103	52.00	.097	93.75	.011	135.50	.003	177.25	.001
10.50	41.265	52.25	.095	94.00	.011	135.75	.003	177.50	.001
10.75	40.283	52.50	.093	94.25	.011	136.00	.003	177.75	.001
11.00	39.191	52.75	.091	94.50	.011	136.25	.003	178.00	.001
11.25	38.019	53.00	.088	94.75	.011	136.50	.003	178.25	.001
11.50	36.796	53.25	.086	95.00	.011	136.75	.003	178.50	.001
11.75	35.547	53.50	.085	95.25	.011	137.00	.003	178.75	.001
12.00	34.278	53.75	.083	95.50	.010	137.25	.003	179.00	.001
12.25	33.005	54.00	.081	95.75	.010	137.50	.003	179.25	.001
12.50	31.723	54.25	.079	96.00	.010	137.75	.002	179.50	.001
12.75	30.425	54.50	.077	96.25	.010	138.00	.002	179.75	.001
13.00	29.110	54.75	.076	96.50	.010	138.25	.002	180.00	.001
13.25	27.805	55.00	.074	96.75	.010	138.50	.002	180.25	.001
13.50	26.517	55.25	.073	97.00	.010	138.75	.002	180.50	.001
13.75	25.258	55.50	.071	97.25	.010	139.00	.002	180.75	.001
14.00	24.032	55.75	.070	97.50	.010	139.25	.002	181.00	.001
14.25	22.841	56.00	.068	97.75	.010	139.50	.002	181.25	.001
14.50	21.680	56.25	.067	98.00	.010	139.75	.002	181.50	.001
14.75	20.554	56.50	.066	98.25	.009	140.00	.002	181.75	.001
15.00	19.442	56.75	.064	98.50	.009	140.25	.002	182.00	.001
15.25	18.332	57.00	.063	98.75	.009	140.50	.002	182.25	.001
15.50	17.264	57.25	.062	99.00	.009	140.75	.002	182.50	.001
15.75	16.262	57.50	.061	99.25	.009	141.00	.002	182.75	.001
16.00	15.317	57.75	.060	99.50	.009	141.25	.002	183.00	.001
16.25	14.420	58.00	.058	99.75	.009	141.50	.002	183.25	.001
16.50	13.559	58.25	.057	100.00	.009	141.75	.002	183.50	.001
16.75	12.751	58.50	.056	100.25	.009	142.00	.002	183.75	.001
17.00	12.011	58.75	.055	100.50	.009	142.25	.002	184.00	.001
17.25	11.333	59.00	.054	100.75	.009	142.50	.002	184.25	.001
17.50	10.708	59.25	.053	101.00	.009	142.75	.002	184.50	.001
17.75	10.105	59.50	.052	101.25	.009	143.00	.002	184.75	.001
18.00	9.510	59.75	.051	101.50	.008	143.25	.002	185.00	.001
18.25	8.955	60.00	.051	101.75	.008	143.50	.002	185.25	.001
18.50	8.455	60.25	.050	102.00	.008	143.75	.002	185.50	.001
18.75	8.001	60.50	.049	102.25	.008	144.00	.002	185.75	.001
19.00	7.577	60.75	.048	102.50	.008	144.25	.002	186.00	.001
19.25	7.165	61.00	.047	102.75	.008	144.50	.002	186.25	.001
19.50	6.771	61.25	.047	103.00	.008	144.75	.002	186.50	.001
19.75	6.410	61.50	.046	103.25	.008	145.00	.002	186.75	.001
20.00	6.080	61.75	.045	103.50	.008	145.25	.002	187.00	.001
20.25	5.778	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	5.489	62.25	.044	104.00	.008	145.75	.002	187.50	.001
20.75	5.207	62.50	.043	104.25	.008	146.00	.002	187.75	.001
21.00	4.945	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	4.709	63.00	.042	104.75	.008	146.50	.002	188.25	.001
21.50	4.494	63.25	.041	105.00	.008	146.75	.002	188.50	.001
21.75	4.291	63.50	.040	105.25	.007	147.00	.002	188.75	.001
22.00	4.090	63.75	.040	105.50	.007	147.25	.002	189.00	.001
22.25	3.897	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	3.718	64.25	.039	106.00	.007	147.75	.002	189.50	.001
22.75	3.554	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	3.405	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	3.265	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	3.135	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	3.014	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.899	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	2.791	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	2.689	66.25	.034	108.00	.007	149.75	.002	191.50	.001
24.75	2.592	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	2.492	66.75	.033	108.50	.007	150.25	.002	192.00	.001
25.25	2.386	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	2.286	67.25	.032	109.00	.007	150.75	.002	192.50	.001
25.75	2.194	67.50	.032	109.25	.007	151.00	.002	192.75	.001
26.00	2.110	67.75	.032	109.50	.006	151.25	.002	193.00	.000
26.25	2.034	68.00	.031	109.75	.006	151.50	.002	193.25	.000
26.50	1.957	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.877	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.802	68.75	.030	110.50	.006	152.25	.002	194.00	.000
27.25	1.732	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.669	69.25	.029	111.00	.006	152.75	.002	194.50	.000
27.75	1.611	69.50	.029	111.25	.006	153.00	.002	194.75	.000
28.00	1.557	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.507	70.00	.028	111.75	.006	153.50	.002	195.25	.000
28.50	1.460	70.25	.028	112.00	.006	153.75	.002	195.50	.000
28.75	1.415	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.372	70.75	.027	112.50	.006	154.25	.002	196.00	.000
29.25	1.331	71.00	.027	112.75	.006	154.50	.002	196.25	.000
29.50	1.292	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	1.254	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	1.217	71.75	.026	113.50	.006	155.25	.001	197.00	.000
30.25	1.182	72.00	.026	113.75	.006	155.50	.001	197.25	.000
30.50	1.148	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	1.115	72.50	.025	114.25	.006	156.00	.001	197.75	.000
31.00	1.084	72.75	.025	114.50	.005	156.25	.001	198.00	.000
31.25	1.053	73.00	.025	114.75	.005	156.50	.001	198.25	.000
31.50	1.024	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.995	73.50	.024	115.25	.005	157.00	.001	198.75	.000
32.00	.967	73.75	.024	115.50	.005	157.25	.001	199.00	.000
32.25	.940	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.913	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.888	74.50	.023	116.25	.005	158.00	.001	199.75	.000
33.00	.863	74.75	.023	116.50	.005	158.25	.001	200.00	.000
33.25	.838	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.814	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.791	75.50	.022	117.25	.005	159.00	.001	200.75	.000
34.00	.769	75.75	.022	117.50	.005	159.25	.001	201.00	.000
34.25	.748	76.00	.022	117.75	.005	159.50	.001	201.25	.000
34.50	.728	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.708	76.50	.021	118.25	.005	160.00	.001	201.75	.000
35.00	.689	76.75	.021	118.50	.005	160.25	.001	202.00	.000
35.25	.671	77.00	.021	118.75	.005	160.50	.001	202.25	.000
35.50	.652	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.634	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.616	77.75	.020	119.50	.005	161.25	.001	203.00	.000
36.25	.598	78.00	.020	119.75	.005	161.50	.001	203.25	.000
36.50	.581	78.25	.020	120.00	.005	161.75	.001	203.50	.000
36.75	.565	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.549	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.534	79.00	.019	120.75	.004	162.50	.001	204.25	.000
37.50	.519	79.25	.019	121.00	.004	162.75	.001	204.50	.000
37.75	.505	79.50	.019	121.25	.004	163.00	.001	204.75	.000
38.00	.490	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.476	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.463	80.25	.018	122.00	.004	163.75	.001	205.50	.000
38.75	.449	80.50	.018	122.25	.004	164.00	.001	205.75	.000
39.00	.436	80.75	.018	122.50	.004	164.25	.001	206.00	.000
39.25	.423	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.411	81.25	.018	123.00	.004	164.75	.001	206.50	.000

39.75 .399	81.50 .018	123.25 .004	165.00 .001	206.75 .000
40.00 .387	81.75 .017	123.50 .004	165.25 .001	207.00 .000
40.25 .375	82.00 .017	123.75 .004	165.50 .001	207.25 .000
40.50 .364	82.25 .017	124.00 .004	165.75 .001	207.50 .000
40.75 .353	82.50 .017	124.25 .004	166.00 .001	
41.00 .342	82.75 .017	124.50 .004	166.25 .001	
41.25 .332	83.00 .017	124.75 .004	166.50 .001	
41.50 .322	83.25 .016	125.00 .004	166.75 .001	

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6200)	AREA (ha)= 165.44
DT=15.0 min	TPEAK (hrs)= 5.25
	VOLUME (mm)= 60.21

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	8.50	2.667	17.00	.259	25.50	.015	34.00	.001
.25	.000	8.75	2.544	17.25	.239	25.75	.014	34.25	.001
.50	.035	9.00	2.445	17.50	.220	26.00	.013	34.50	.001
.75	.081	9.25	2.352	17.75	.202	26.25	.012	34.75	.001
1.00	.104	9.50	2.195	18.00	.186	26.50	.011	35.00	.001
1.25	.115	9.75	2.071	18.25	.172	26.75	.010	35.25	.001
1.50	.121	10.00	1.965	18.50	.157	27.00	.009	35.50	.001
1.75	.124	10.25	1.864	18.75	.145	27.25	.008	35.75	.001
2.00	.125	10.50	1.767	19.00	.134	27.50	.008	36.00	.001
2.25	.126	10.75	1.673	19.25	.123	27.75	.008	36.25	.001
2.50	.439	11.00	1.585	19.50	.113	28.00	.007	36.50	.000
2.75	.597	11.25	1.498	19.75	.104	28.25	.006	36.75	.000
3.00	.676	11.50	1.414	20.00	.096	28.50	.006	37.00	.000
3.25	.715	11.75	1.334	20.25	.088	28.75	.005	37.25	.000
3.50	1.428	12.00	1.260	20.50	.082	29.00	.005	37.50	.000
3.75	1.791	12.25	1.189	20.75	.075	29.25	.004	37.75	.000
4.00	1.983	12.50	1.060	21.00	.069	29.50	.004	38.00	.000
4.25	2.092	12.75	.965	21.25	.063	29.75	.003	38.25	.000
4.50	3.996	13.00	.890	21.50	.058	30.00	.003	38.50	.000
4.75	5.005	13.25	.826	21.75	.054	30.25	.003	38.75	.000
5.00	5.584	13.50	.769	22.00	.050	30.50	.003	39.00	.000
5.25	5.967	13.75	.718	22.25	.045	30.75	.003	39.25	.000
5.50	4.177	14.00	.671	22.50	.042	31.00	.003	39.50	.000
5.75	3.366	14.25	.625	22.75	.039	31.25	.003	39.75	.000
6.00	3.052	14.50	.583	23.00	.035	31.50	.003	40.00	.000
6.25	2.995	14.75	.541	23.25	.033	31.75	.002	40.25	.000
6.50	2.691	15.00	.502	23.50	.030	32.00	.002	40.50	.000
6.75	2.637	15.25	.464	23.75	.028	32.25	.002	40.75	.000
7.00	2.707	15.50	.427	24.00	.025	32.50	.002	41.00	.000
7.25	2.835	15.75	.393	24.25	.024	32.75	.002	41.25	.000
7.50	2.798	16.00	.361	24.50	.022	33.00	.002		
7.75	2.826	16.25	.333	24.75	.020	33.25	.001		
8.00	2.854	16.50	.306	25.00	.019	33.50	.001		
8.25	2.850	16.75	.282	25.25	.017	33.75	.001		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6208)	AREA (ha)=3174.13
DT=15.0 min	TPEAK (hrs)= 10.50
	VOLUME (mm)= 48.33

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.50	33.456	27.00	1.384	40.50	.185	54.00	.017
.25	.000	13.75	32.478	27.25	1.324	40.75	.177	54.25	.016
.50	.000	14.00	31.519	27.50	1.269	41.00	.170	54.50	.015
.75	.000	14.25	30.583	27.75	1.217	41.25	.163	54.75	.014
1.00	.000	14.50	29.647	28.00	1.169	41.50	.157	55.00	.014
1.25	.000	14.75	28.732	28.25	1.123	41.75	.150	55.25	.013
1.50	.000	15.00	27.797	28.50	1.079	42.00	.144	55.50	.012
1.75	.000	15.25	26.822	28.75	1.040	42.25	.138	55.75	.012
2.00	.000	15.50	25.819	29.00	1.004	42.50	.133	56.00	.011
2.25	.000	15.75	24.782	29.25	.969	42.75	.127	56.25	.011
2.50	.000	16.00	23.705	29.50	.936	43.00	.122	56.50	.010
2.75	.000	16.25	22.553	29.75	.903	43.25	.117	56.75	.010
3.00	.000	16.50	21.333	30.00	.871	43.50	.112	57.00	.009
3.25	.001	16.75	20.117	30.25	.841	43.75	.107	57.25	.009
3.50	.007	17.00	19.007	30.50	.811	44.00	.103	57.50	.008
3.75	.031	17.25	17.978	30.75	.783	44.25	.099	57.75	.008
4.00	.090	17.50	16.959	31.00	.755	44.50	.094	58.00	.007
4.25	.213	17.75	15.960	31.25	.728	44.75	.090	58.25	.007
4.50	.461	18.00	14.928	31.50	.703	45.00	.087	58.50	.007
4.75	.993	18.25	13.844	31.75	.679	45.25	.083	58.75	.006
5.00	2.180	18.50	12.810	32.00	.655	45.50	.079	59.00	.006
5.25	4.282	18.75	11.874	32.25	.631	45.75	.076	59.25	.005
5.50	6.983	19.00	11.000	32.50	.609	46.00	.073	59.50	.005
5.75	9.898	19.25	10.188	32.75	.588	46.25	.070	59.75	.005
6.00	12.631	19.50	9.449	33.00	.568	46.50	.067	60.00	.004
6.25	15.243	19.75	8.776	33.25	.549	46.75	.064	60.25	.004
6.50	17.642	20.00	8.123	33.50	.531	47.00	.061	60.50	.004
6.75	19.869	20.25	7.503	33.75	.513	47.25	.058	60.75	.004
7.00	22.090	20.50	6.950	34.00	.495	47.50	.056	61.00	.003
7.25	24.379	20.75	6.438	34.25	.478	47.75	.053	61.25	.003
7.50	26.607	21.00	5.944	34.50	.462	48.00	.051	61.50	.003
7.75	28.732	21.25	5.489	34.75	.445	48.25	.049	61.75	.003
8.00	30.732	21.50	5.092	35.00	.430	48.50	.047	62.00	.003
8.25	32.608	21.75	4.743	35.25	.414	48.75	.044	62.25	.003
8.50	34.433	22.00	4.433	35.50	.400	49.00	.043	62.50	.002
8.75	36.136	22.25	4.156	35.75	.385	49.25	.041	62.75	.002
9.00	37.579	22.50	3.900	36.00	.371	49.50	.039	63.00	.002
9.25	38.753	22.75	3.656	36.25	.358	49.75	.037	63.25	.002
9.50	39.668	23.00	3.411	36.50	.345	50.00	.035	63.50	.002
9.75	40.329	23.25	3.167	36.75	.332	50.25	.034	63.75	.002
10.00	40.753	23.50	2.948	37.00	.320	50.50	.032	64.00	.002
10.25	40.957	23.75	2.758	37.25	.308	50.75	.031	64.25	.002
10.50	40.963	24.00	2.592	37.50	.296	51.00	.029	64.50	.001
10.75	40.794	24.25	2.444	37.75	.285	51.25	.028	64.75	.001
11.00	40.477	24.50	2.311	38.00	.274	51.50	.027	65.00	.001
11.25	40.046	24.75	2.191	38.25	.264	51.75	.026	65.25	.001

11.50	39.521	25.00	2.081	38.50	.254	52.00	.024	65.50	.001
11.75	38.908	25.25	1.982	38.75	.244	52.25	.023	65.75	.001
12.00	38.213	25.50	1.880	39.00	.235	52.50	.022	66.00	.001
12.25	37.509	25.75	1.777	39.25	.225	52.75	.021	66.25	.000
12.50	36.815	26.00	1.682	39.50	.217	53.00	.020		
12.75	36.072	26.25	1.596	39.75	.208	53.25	.019		
13.00	35.259	26.50	1.518	40.00	.200	53.50	.018		
13.25	34.386	26.75	1.448	40.25	.192	53.75	.017		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6212)

DT=15.0 min

AREA (ha)= 150.47

TPEAK (hrs)= 9.00

VOLUME (mm)= 60.86

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.50	.089	77.00	.016	115.50	.003	154.00	.000
.25	.000	38.75	.088	77.25	.016	115.75	.003	154.25	.000
.50	.000	39.00	.088	77.50	.016	116.00	.003	154.50	.000
.75	.000	39.25	.086	77.75	.016	116.25	.003	154.75	.000
1.00	.001	39.50	.086	78.00	.016	116.50	.003	155.00	.000
1.25	.001	39.75	.084	78.25	.015	116.75	.003	155.25	.000
1.50	.002	40.00	.084	78.50	.015	117.00	.003	155.50	.000
1.75	.002	40.25	.083	78.75	.015	117.25	.003	155.75	.000
2.00	.003	40.50	.082	79.00	.015	117.50	.003	156.00	.000
2.25	.004	40.75	.081	79.25	.015	117.75	.003	156.25	.000
2.50	.005	41.00	.080	79.50	.014	118.00	.003	156.50	.000
2.75	.007	41.25	.079	79.75	.014	118.25	.002	156.75	.000
3.00	.010	41.50	.079	80.00	.014	118.50	.002	157.00	.000
3.25	.014	41.75	.078	80.25	.014	118.75	.002	157.25	.000
3.50	.019	42.00	.077	80.50	.014	119.00	.002	157.50	.000
3.75	.027	42.25	.076	80.75	.014	119.25	.002	157.75	.000
4.00	.037	42.50	.075	81.00	.014	119.50	.002	158.00	.000
4.25	.048	42.75	.074	81.25	.014	119.75	.002	158.25	.000
4.50	.063	43.00	.073	81.50	.013	120.00	.002	158.50	.000
4.75	.084	43.25	.073	81.75	.013	120.25	.002	158.75	.000
5.00	.113	43.50	.072	82.00	.013	120.50	.002	159.00	.000
5.25	.147	43.75	.071	82.25	.013	120.75	.002	159.25	.000
5.50	.649	44.00	.070	82.50	.013	121.00	.002	159.50	.000
5.75	1.481	44.25	.069	82.75	.012	121.25	.002	159.75	.000
6.00	1.856	44.50	.069	83.00	.012	121.50	.002	160.00	.000
6.25	2.031	44.75	.068	83.25	.012	121.75	.002	160.25	.000
6.50	2.120	45.00	.067	83.50	.012	122.00	.002	160.50	.000
6.75	2.159	45.25	.067	83.75	.012	122.25	.002	160.75	.000
7.00	2.184	45.50	.066	84.00	.012	122.50	.002	161.00	.000
7.25	2.228	45.75	.065	84.25	.012	122.75	.002	161.25	.000
7.50	2.294	46.00	.064	84.50	.012	123.00	.002	161.50	.000
7.75	2.367	46.25	.063	84.75	.012	123.25	.002	161.75	.000
8.00	2.446	46.50	.063	85.00	.011	123.50	.002	162.00	.000
8.25	2.532	46.75	.062	85.25	.011	123.75	.002	162.25	.000
8.50	2.608	47.00	.061	85.50	.011	124.00	.002	162.50	.000
8.75	2.653	47.25	.061	85.75	.011	124.25	.002	162.75	.000
9.00	2.661	47.50	.060	86.00	.011	124.50	.002	163.00	.000
9.25	2.639	47.75	.059	86.25	.011	124.75	.002	163.25	.000
9.50	2.597	48.00	.059	86.50	.011	125.00	.002	163.50	.000
9.75	2.537	48.25	.058	86.75	.010	125.25	.002	163.75	.000
10.00	2.461	48.50	.057	87.00	.010	125.50	.002	164.00	.000
10.25	2.378	48.75	.057	87.25	.010	125.75	.002	164.25	.000
10.50	2.292	49.00	.056	87.50	.010	126.00	.002	164.50	.000
10.75	2.203	49.25	.056	87.75	.010	126.25	.002	164.75	.000
11.00	2.114	49.50	.055	88.00	.010	126.50	.002	165.00	.000
11.25	2.026	49.75	.054	88.25	.010	126.75	.002	165.25	.000
11.50	1.937	50.00	.054	88.50	.010	127.00	.002	165.50	.000
11.75	1.849	50.25	.053	88.75	.010	127.25	.002	165.75	.000
12.00	1.764	50.50	.053	89.00	.010	127.50	.002	166.00	.000
12.25	1.680	50.75	.052	89.25	.010	127.75	.002	166.25	.000
12.50	1.596	51.00	.051	89.50	.009	128.00	.002	166.50	.000
12.75	1.509	51.25	.051	89.75	.009	128.25	.002	166.75	.000
13.00	1.420	51.50	.050	90.00	.009	128.50	.002	167.00	.000
13.25	1.335	51.75	.050	90.25	.009	128.75	.002	167.25	.000
13.50	1.254	52.00	.049	90.50	.009	129.00	.002	167.50	.000
13.75	1.179	52.25	.049	90.75	.009	129.25	.002	167.75	.000
14.00	1.110	52.50	.048	91.00	.009	129.50	.002	168.00	.000
14.25	1.045	52.75	.047	91.25	.009	129.75	.002	168.25	.000
14.50	.983	53.00	.047	91.50	.008	130.00	.002	168.50	.000
14.75	.926	53.25	.047	91.75	.008	130.25	.002	168.75	.000
15.00	.872	53.50	.046	92.00	.008	130.50	.002	169.00	.000
15.25	.820	53.75	.045	92.25	.008	130.75	.002	169.25	.000
15.50	.771	54.00	.045	92.50	.008	131.00	.002	169.50	.000
15.75	.724	54.25	.045	92.75	.008	131.25	.002	169.75	.000
16.00	.679	54.50	.044	93.00	.008	131.50	.002	170.00	.000
16.25	.636	54.75	.043	93.25	.008	131.75	.002	170.25	.000
16.50	.595	55.00	.043	93.50	.008	132.00	.002	170.50	.000
16.75	.556	55.25	.043	93.75	.008	132.25	.001	170.75	.000
17.00	.519	55.50	.042	94.00	.008	132.50	.001	171.00	.000
17.25	.485	55.75	.041	94.25	.008	132.75	.001	171.25	.000
17.50	.452	56.00	.041	94.50	.008	133.00	.001	171.50	.000
17.75	.422	56.25	.041	94.75	.007	133.25	.001	171.75	.000
18.00	.394	56.50	.040	95.00	.007	133.50	.001	172.00	.000
18.25	.368	56.75	.040	95.25	.007	133.75	.001	172.25	.000
18.50	.344	57.00	.039	95.50	.007	134.00	.001	172.50	.000
18.75	.320	57.25	.039	95.75	.007	134.25	.001	172.75	.000
19.00	.299	57.50	.039	96.00	.007	134.50	.001	173.00	.000
19.25	.279	57.75	.038	96.25	.007	134.75	.001	173.25	.000
19.50	.260	58.00	.038	96.50	.007	135.00	.001	173.50	.000
19.75	.243	58.25	.037	96.75	.007	135.25	.001	173.75	.000
20.00	.227	58.50	.037	97.00	.007	135.50	.001	174.00	.000
20.25	.212	58.75	.036	97.25	.007	135.75	.001	174.25	.000
20.50	.198	59.00	.036	97.50	.006	136.00	.001	174.50	.000
20.75	.184	59.25	.035	97.75	.006	136.25	.001	174.75	.000
21.00	.172	59.50	.035	98.00	.006	136.50	.001	175.00	.000
21.25	.167	59.75	.035	98.25	.006	136.75	.001	175.25	.000
21.50	.167	60.00	.034	98.50	.006	137.00	.001	175.50	.000
21.75	.166	60.25	.034	98.75	.006	137.25	.001	175.75	.000
22.00	.166	60.50	.034	99.00	.006	137.50	.001	176.00	.000
22.25	.165	60.75	.033	99.25	.006	137.75	.001	176.25	.000
22.50	.164	61.00	.033	99.50	.006	138.00	.001	176.50	.000
22.75	.163	61.25	.033	99.75	.006	138.25	.001	176.75	.000
23.00	.163	61.50	.032	100.00	.006	138.50	.001	177.00	.000
23.25	.162	61.75	.032	100.25	.006	138.75	.001	177.25	.000
23.50	.161	62.00	.031	100.50	.006	139.00	.001	177.50	.000
23.75	.160	62.25	.031	100.75	.006	139.25	.001	177.75	.000
24.00	.159	62.50	.031	101.00	.006	139.50	.001	178.00	.000
24.25	.158	62.75	.031	101.25	.006	139.75	.001	178.25	.000
24.50	.157	63.00	.030	101.50	.006	140.00	.001	178.50	.000
24.75	.155	63.25	.030	101.75	.006	140.25	.001	178.75	.000
25.00	.154	63.50	.029	102.00	.005	140.50	.001	179.00	.000
25.25	.153	63.75	.029	102.25	.005	140.75	.001	179.25	.000
25.50	.152	64.00	.029	102.50	.005	141.00	.001	179.50	.000
25.75	.151	64.25	.029	102.75	.005	141.25	.001	179.75	.000
26.00	.149	64.50	.028	103.00	.005	141.50	.001	180.00	.000
26.25	.148	64.75	.028	103.25	.005	141.75	.001	180.25	.000
26.50	.147	65.00	.027	103.50	.005	142.00	.001	180.50	.000
26.75	.145	65.25	.027	103.75	.005	142.25	.001	180.75	.000
27.00	.144	65.50	.027	104.00	.005	142.50	.001	181.00	.000
27.25	.143	65.75	.027	104.25	.005	142.75	.001	181.25	.000
27.50	.141	66.00	.026	104.50	.005	143.00	.001	181.50	.000
27.75	.140	66.25	.026	104.75	.005	143.25	.001	181.75	.000
28.00	.139	66.50	.026	105.00	.005	143.50	.001	182.00	.000
28.25	.138	66.75	.026	105.25	.005	143.75	.001	182.25	.000
28.50	.136	67.00	.025	105.50	.004	144.00	.001	182.50	.000
28.75	.135	67.25	.025	105.75	.004	144.25	.001	182.75	.000

29.00	.134	67.50	.025	106.00	.004	144.50	.001	183.00	.000		
29.25	.132	67.75	.024	106.25	.004	144.75	.001	183.25	.000		
29.50	.131	68.00	.024	106.50	.004	145.00	.001	183.50	.000		
29.75	.130	68.25	.024	106.75	.004	145.25	.001	183.75	.000		
30.00	.129	68.50	.024	107.00	.004	145.50	.001	184.00	.000		
30.25	.127	68.75	.024	107.25	.004	145.75	.001	184.25	.000		
30.50	.126	69.00	.023	107.50	.004	146.00	.001	184.50	.000		
30.75	.125	69.25	.023	107.75	.004	146.25	.001	184.75	.000		
31.00	.124	69.50	.023	108.00	.004	146.50	.001	185.00	.000		
31.25	.122	69.75	.022	108.25	.004	146.75	.001	185.25	.000		
31.50	.121	70.00	.022	108.50	.004	147.00	.001	185.50	.000		
31.75	.120	70.25	.022	108.75	.004	147.25	.001	185.75	.000		
32.00	.118	70.50	.022	109.00	.004	147.50	.001	186.00	.000		
32.25	.117	70.75	.022	109.25	.004	147.75	.001	186.25	.000		
32.50	.116	71.00	.021	109.50	.004	148.00	.001	186.50	.000		
32.75	.115	71.25	.021	109.75	.004	148.25	.001	186.75	.000		
33.00	.114	71.50	.021	110.00	.004	148.50	.001	187.00	.000		
33.25	.112	71.75	.020	110.25	.004	148.75	.001	187.25	.000		
33.50	.111	72.00	.020	110.50	.004	149.00	.001	187.50	.000		
33.75	.110	72.25	.020	110.75	.004	149.25	.001	187.75	.000		
34.00	.109	72.50	.020	111.00	.004	149.50	.001	188.00	.000		
34.25	.108	72.75	.020	111.25	.004	149.75	.001	188.25	.000		
34.50	.106	73.00	.020	111.50	.004	150.00	.001	188.50	.000		
34.75	.105	73.25	.019	111.75	.004	150.25	.001	188.75	.000		
35.00	.104	73.50	.019	112.00	.004	150.50	.001	189.00	.000		
35.25	.103	73.75	.019	112.25	.003	150.75	.001	189.25	.000		
35.50	.102	74.00	.018	112.50	.003	151.00	.001	189.50	.000		
35.75	.101	74.25	.018	112.75	.003	151.25	.000	189.75	.000		
36.00	.100	74.50	.018	113.00	.003	151.50	.000	190.00	.000		
36.25	.099	74.75	.018	113.25	.003	151.75	.000	190.25	.000		
36.50	.098	75.00	.018	113.50	.003	152.00	.000	190.50	.000		
36.75	.096	75.25	.018	113.75	.003	152.25	.000	190.75	.000		
37.00	.096	75.50	.017	114.00	.003	152.50	.000	191.00	.000		
37.25	.094	75.75	.017	114.25	.003	152.75	.000	191.25	.000		
37.50	.094	76.00	.017	114.50	.003	153.00	.000	191.50	.000		
37.75	.092	76.25	.017	114.75	.003	153.25	.000				
38.00	.091	76.50	.017	115.00	.003	153.50	.000				
38.25	.090	76.75	.016	115.25	.003	153.75	.000				

READ STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6213)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 9.75
	VOLUME (mm)= 24.40

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.247	83.50	.017	125.25	.004	167.00	.001
.25	.000	42.00	.240	83.75	.017	125.50	.004	167.25	.001
.50	.000	42.25	.233	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.227	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.220	84.50	.016	126.25	.004	168.00	.001
1.25	.000	43.00	.214	84.75	.016	126.50	.004	168.25	.001
1.50	.001	43.25	.208	85.00	.016	126.75	.004	168.50	.001
1.75	.002	43.50	.202	85.25	.016	127.00	.004	168.75	.001
2.00	.002	43.75	.196	85.50	.015	127.25	.004	169.00	.001
2.25	.004	44.00	.191	85.75	.015	127.50	.004	169.25	.001
2.50	.005	44.25	.186	86.00	.015	127.75	.003	169.50	.001
2.75	.007	44.50	.181	86.25	.015	128.00	.003	169.75	.001
3.00	.010	44.75	.176	86.50	.015	128.25	.003	170.00	.001
3.25	.015	45.00	.171	86.75	.015	128.50	.003	170.25	.001
3.50	.021	45.25	.166	87.00	.015	128.75	.003	170.50	.001
3.75	.030	45.50	.162	87.25	.014	129.00	.003	170.75	.001
4.00	.048	45.75	.158	87.50	.014	129.25	.003	171.00	.001
4.25	.079	46.00	.154	87.75	.014	129.50	.003	171.25	.001
4.50	.137	46.25	.150	88.00	.014	129.75	.003	171.50	.001
4.75	.263	46.50	.146	88.25	.014	130.00	.003	171.75	.001
5.00	.671	46.75	.142	88.50	.014	130.25	.003	172.00	.001
5.25	1.651	47.00	.138	88.75	.014	130.50	.003	172.25	.001
5.50	2.936	47.25	.135	89.00	.014	130.75	.003	172.50	.001
5.75	4.248	47.50	.131	89.25	.013	131.00	.003	172.75	.001
6.00	5.588	47.75	.128	89.50	.013	131.25	.003	173.00	.001
6.25	6.989	48.00	.125	89.75	.013	131.50	.003	173.25	.001
6.50	8.470	48.25	.122	90.00	.013	131.75	.003	173.50	.001
6.75	9.815	48.50	.119	90.25	.013	132.00	.003	173.75	.001
7.00	11.105	48.75	.116	90.50	.013	132.25	.003	174.00	.001
7.25	12.321	49.00	.114	90.75	.013	132.50	.003	174.25	.001
7.50	13.491	49.25	.111	91.00	.013	132.75	.003	174.50	.001
7.75	14.581	49.50	.108	91.25	.012	133.00	.003	174.75	.001
8.00	15.555	49.75	.106	91.50	.012	133.25	.003	175.00	.001
8.25	16.389	50.00	.104	91.75	.012	133.50	.003	175.25	.001
8.50	17.101	50.25	.101	92.00	.012	133.75	.003	175.50	.001
8.75	17.680	50.50	.099	92.25	.012	134.00	.003	175.75	.001
9.00	18.128	50.75	.097	92.50	.012	134.25	.003	176.00	.001
9.25	18.442	51.00	.095	92.75	.012	134.50	.003	176.25	.001
9.50	18.628	51.25	.093	93.00	.012	134.75	.003	176.50	.001
9.75	18.671	51.50	.091	93.25	.012	135.00	.003	176.75	.001
10.00	18.606	51.75	.089	93.50	.011	135.25	.003	177.00	.001
10.25	18.436	52.00	.087	93.75	.011	135.50	.003	177.25	.001
10.50	18.202	52.25	.085	94.00	.011	135.75	.003	177.50	.001
10.75	17.891	52.50	.083	94.25	.011	136.00	.003	177.75	.001
11.00	17.544	52.75	.082	94.50	.011	136.25	.003	178.00	.001
11.25	17.147	53.00	.080	94.75	.011	136.50	.003	178.25	.001
11.50	16.727	53.25	.079	95.00	.011	136.75	.003	178.50	.001
11.75	16.257	53.50	.077	95.25	.011	137.00	.003	178.75	.001
12.00	15.760	53.75	.076	95.50	.011	137.25	.003	179.00	.001
12.25	15.268	54.00	.074	95.75	.011	137.50	.003	179.25	.001
12.50	14.778	54.25	.073	96.00	.010	137.75	.003	179.50	.001
12.75	14.270	54.50	.071	96.25	.010	138.00	.002	179.75	.001
13.00	13.747	54.75	.070	96.50	.010	138.25	.002	180.00	.001
13.25	13.227	55.00	.069	96.75	.010	138.50	.002	180.25	.001
13.50	12.708	55.25	.068	97.00	.010	138.75	.002	180.50	.001
13.75	12.188	55.50	.066	97.25	.010	139.00	.002	180.75	.001
14.00	11.674	55.75	.065	97.50	.010	139.25	.002	181.00	.001
14.25	11.175	56.00	.064	97.75	.010	139.50	.002	181.25	.001
14.50	10.690	56.25	.063	98.00	.010	139.75	.002	181.50	.001
14.75	10.223	56.50	.062	98.25	.010	140.00	.002	181.75	.001
15.00	9.765	56.75	.061	98.50	.010	140.25	.002	182.00	.001
15.25	9.285	57.00	.060	98.75	.009	140.50	.002	182.25	.001
15.50	8.803	57.25	.059	99.00	.009	140.75	.002	182.50	.001
15.75	8.359	57.50	.058	99.25	.009	141.00	.002	182.75	.001
16.00	7.950	57.75	.057	99.50	.009	141.25	.002	183.00	.001
16.25	7.558	58.00	.056	99.75	.009	141.50	.002	183.25	.001
16.50	7.177	58.25	.055	100.00	.009	141.75	.002	183.50	.001
16.75	6.814	58.50	.054	100.25	.009	142.00	.002	183.75	.001
17.00	6.474	58.75	.053	100.50	.009	142.25	.002	184.00	.001
17.25	6.156	59.00	.052	100.75	.009	142.50	.002	184.25	.001
17.50	5.862	59.25	.051	101.00	.009	142.75	.002	184.50	.001
17.75	5.590	59.50	.051	101.25	.009	143.00	.002	184.75	.001
18.00	5.322	59.75	.050	101.50	.009	143.25	.002	185.00	.001
18.25	5.061	60.00	.049	101.75	.009	143.50	.002	185.25	.001
18.50	4.824	60.25	.048	102.00	.008	143.75	.002	185.50	.001
18.75	4.609	60.50	.048	102.25	.008	144.00	.002	185.75	.001
19.00	4.412	60.75	.047	102.50	.008	144.25	.002	186.00	.001
19.25	4.219	61.00	.046	102.75	.008	144.50	.002	186.25	.001
19.50	4.027	61.25	.046	103.00	.008	144.75	.002	186.50	.001
19.75	3.846	61.50	.045	103.25	.008	145.00	.002	186.75	.001
20.00	3.680	61.75	.044	103.50	.008	145.25	.002	187.00	.001
20.25	3.527	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	3.386	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	3.255	62.50	.042	104.25	.008	146.00	.002	187.75	.001
21.00	3.132	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	3.016	63.00	.041	104.75	.008	146.50	.002	188.25	.001

21.50	2.907	63.25	.040	105.00	.008	146.75	.002	188.50	.001
21.75	2.804	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	2.706	63.75	.039	105.50	.008	147.25	.002	189.00	.001
22.25	2.613	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	2.523	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	2.426	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	2.325	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	2.233	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	2.149	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	2.072	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.000	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	1.925	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	1.848	66.25	.035	108.00	.007	149.75	.002	191.50	.001
24.75	1.777	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	1.712	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	1.653	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	1.598	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.547	67.50	.033	109.25	.007	151.00	.002	192.75	.001
26.00	1.499	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.453	68.00	.032	109.75	.006	151.50	.002	193.25	.000
26.50	1.410	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.369	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.329	68.75	.031	110.50	.006	152.25	.002	194.00	.000
27.25	1.291	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.254	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.218	69.50	.030	111.25	.006	153.00	.002	194.75	.000
28.00	1.184	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.151	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	1.119	70.25	.029	112.00	.006	153.75	.002	195.50	.000
28.75	1.088	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.058	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	1.029	71.00	.028	112.75	.006	154.50	.002	196.25	.000
29.50	1.001	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	.973	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	.946	71.75	.027	113.50	.006	155.25	.002	197.00	.000
30.25	.920	72.00	.027	113.75	.006	155.50	.001	197.25	.000
30.50	.895	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	.870	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.846	72.75	.026	114.50	.006	156.25	.001	198.00	.000
31.25	.822	73.00	.026	114.75	.005	156.50	.001	198.25	.000
31.50	.800	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.777	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.756	73.75	.025	115.50	.005	157.25	.001	199.00	.000
32.25	.736	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.717	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.697	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.680	74.75	.024	116.50	.005	158.25	.001	200.00	.000
33.25	.661	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.643	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.625	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.608	75.75	.023	117.50	.005	159.25	.001	201.00	.000
34.25	.591	76.00	.023	117.75	.005	159.50	.001	201.25	.000
34.50	.574	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.558	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.543	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.529	77.00	.022	118.75	.005	160.50	.001	202.25	.000
35.50	.514	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.500	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.486	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.473	78.00	.021	119.75	.005	161.50	.001	203.25	.000
36.50	.460	78.25	.021	120.00	.005	161.75	.001	203.50	.000
36.75	.447	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.434	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.421	79.00	.020	120.75	.005	162.50	.001	204.25	.000
37.50	.409	79.25	.020	121.00	.004	162.75	.001	204.50	.000
37.75	.397	79.50	.020	121.25	.004	163.00	.001	204.75	.000
38.00	.386	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.375	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.364	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.353	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.343	80.75	.019	122.50	.004	164.25	.001	206.00	.000
39.25	.333	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.323	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.313	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.304	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.295	82.00	.018	123.75	.004	165.50	.001	207.25	.000
40.50	.287	82.25	.018	124.00	.004	165.75	.001	207.50	.000
40.75	.278	82.50	.017	124.25	.004	166.00	.001		
41.00	.270	82.75	.017	124.50	.004	166.25	.001		
41.25	.262	83.00	.017	124.75	.004	166.50	.001		
41.50	.255	83.25	.017	125.00	.004	166.75	.001		

READ STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

RESERVOIR (1221)
IN= 2---> OUT= 1
DT= 5.0 min

Pond 4

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0430	.5715
.0120	.0637	.1500	.6631
.0150	.0862	.3330	.7578
.0260	.2079	1.6540	.8887
.0290	.2604	5.1140	.9905
.0320	.3142	6.4570	1.0252
.0370	.4254	9.9400	1.0955
.0410	.5121	11.9190	1.1313
.0420	.5416	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	3.192	5.25	76.81
OUTFLOW: ID= 1 (1221)	31.090	3.076	5.33	76.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 96.38
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .9318

RESERVOIR (0802)
IN= 2---> OUT= 1
DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.4000	.0620
.3500	.0005	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0109)	2.200	.245	5.25	85.01
OUTFLOW: ID= 1 (0802)	2.200	.245	5.25	85.01

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.99
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0003

DUHYD (0204)
Inlet Cap.=7.653
#of Inlets= 1
Total(cms)= 7.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	52.89	5.27	5.25	75.60
MAJOR SYS.(ID= 2):	.00	.00	.00	.00
MINOR SYS.(ID= 3):	52.89	5.27	5.25	75.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (0205)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
Inlet Cap.=7.938				
#of Inlets= 1				
Total(cms)= 7.9				
TOTAL HYD.(ID= 1):	54.99	5.48	5.25	75.60
MAJOR SYS.(ID= 2):	.00	.00	.00	.00
MINOR SYS.(ID= 3):	54.99	5.48	5.25	75.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (0206)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
Inlet Cap.=3.047				
#of Inlets= 1				
Total(cms)= 3.0				
TOTAL HYD.(ID= 1):	18.20	1.86	5.25	75.60
MAJOR SYS.(ID= 2):	.00	.00	.00	.00
MINOR SYS.(ID= 3):	18.20	1.86	5.25	75.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0801)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1				
DT= 1.0 min	.0000	.0000	.0400	.0670
	.0300	.0005	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0108)	.950	.106	5.25	85.01
OUTFLOW: ID= 1 (0801)	.950	.034	5.47	85.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 32.38
TIME SHIFT OF PEAK FLOW (min)= 13.00
MAXIMUM STORAGE USED (ha.m.)= .0287

ADD HYD (0907)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0905):	5.25	.550	5.25	77.42
+ ID2= 2 (0906):	6.59	.692	5.25	77.69
ID = 3 (0907):	11.84	1.243	5.25	77.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0916)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1				
DT= 5.0 min	.0000	.0000	.0450	.4669
	.0130	.0993	.1300	.6245
	.0170	.1335	.2950	.8281
	.0300	.3140	.7410	1.2578
	.0320	.3518	.9230	1.5770
	.0330	.3899	3.6480	1.9622
	.0350	.4282	6.8140	2.0624

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0915)	22.800	2.408	5.25	79.11
OUTFLOW: ID= 1 (0916)	22.800	.632	6.42	79.02

Pond 3

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.23
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 1.1526

RESERVOIR (0804)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1				
DT= 1.0 min	.0000	.0000	.0920	.0220

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0305)	.510	.056	5.25	83.74
OUTFLOW: ID= 1 (0804)	.510	.046	5.30	83.62

PEAK FLOW REDUCTION [Qout/Qin](%)= 81.85
TIME SHIFT OF PEAK FLOW (min)= 3.00
MAXIMUM STORAGE USED (ha.m.)= .0110

ADD HYD (0903)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0302):	1.31	.139	5.25	77.94
+ ID2= 2 (0303):	1.72	.173	5.25	72.54
ID = 3 (0903):	3.03	.312	5.25	74.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0902)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0903):	3.03	.312	5.25	74.88
+ ID2= 2 (0304):	.90	.000	.00	.00
ID = 3 (0902):	3.93	.312	5.25	57.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0201)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (6200):	165.44	5.967	5.25	60.21
+ ID2= 2 (1221):	31.09	3.076	5.33	76.77
ID = 3 (0201):	196.53	9.011	5.25	62.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0700)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0102):	63.87	6.605	5.25	77.04
+ ID2= 2 (0204):	52.89	5.274	5.25	75.60
ID = 3 (0700):	116.76	11.879	5.25	76.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0701)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				

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*** W A R N I N G :  HYDROGRAPH 0205 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
          ID1= 1 (0700):   116.76  11.879     5.25    76.39
        + ID2= 2 (0205):      .00    .000      .00      .00
          ================================================
          ID = 3 (0701):   116.76  11.879     5.25    76.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0702) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0701):   116.76  11.879     5.25    76.39
        + ID2= 2 (0206):    18.20   1.856     5.25    75.60
          ================================================
          ID = 3 (0702):   134.96  13.734     5.25    76.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR (0909) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |   OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |    (cms)     (ha.m.)
                          .0000      .0000    |     .0640      .4187
                          .0020      .0210    |     .1120      .4740
                          .0100      .0869    |     .1400      .5021
                          .0140      .1576    |     .2730      .6168
                          .0150      .1822    |     .3120      .6461
                          .0160      .2073    |     .3520      .6757
                          .0170      .2329    |     .4970      .7967
                          .0180      .2587    |     .5850      .9220
                          .0200      .3110    |    6.6520     1.1183
                          .0210      .3376    |     .0000      .0000

                               AREA      QPEAK      TPEAK       R.V.
                               (ha)      (cms)      (hrs)       (mm)
     INFLOW : ID= 2 (0907)    11.840     1.243       5.25      77.57
     OUTFLOW: ID= 1 (0909)    11.840      .282       6.42      77.35

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.69
                    TIME SHIFT OF PEAK FLOW         (min)= 70.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=   .6236

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0901) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0804):      .51     .046     5.30    83.62
        + ID2= 2 (0902):     3.93     .312     5.25    57.66
          ================================================
          ID = 3 (0901):     4.45     .357     5.25    60.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0849) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (6204):  2846.70  43.476     9.50    51.01
        + ID2= 2 (0201):   196.53   9.011     5.25    62.83
          ================================================
          ID = 3 (0849):  3043.23  46.042     9.25    51.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0703) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
```

Pond 2

Node 849

```
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0107):     5.56     .558     5.23    74.90
        + ID2= 2 (0702):   134.96  13.734     5.25    76.28
          ================================================
          ID = 3 (0703):   140.52  14.251     5.23    76.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0910) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0300):     6.72     .540     5.17    52.50
        + ID2= 2 (0909):    11.84     .282     6.42    77.35
          ================================================
          ID = 3 (0910):    18.56     .659     5.17    68.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0912) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0306):     2.51     .202     5.17    52.50
        + ID2= 2 (0901):     4.45     .357     5.25    60.64
          ================================================
          ID = 3 (0912):     6.96     .554     5.17    57.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0704) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0703):   140.52  14.251     5.23    76.23
        + ID2= 2 (0801):      .95     .034     5.47    85.00
          ================================================
          ID = 3 (0704):   141.47  14.285     5.23    76.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (1220) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH 0206 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
          ID1= 1 (0912):     6.96     .554     5.17    57.70
        + ID2= 2 (0206):      .00     .000      .00      .00
          ================================================
          ID = 3 (1220):     6.96     .554     5.17    57.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0705) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0802):     2.20     .245     5.25    85.01
        + ID2= 2 (0704):   141.47  14.285     5.23    76.29
          ================================================
          ID = 3 (0705):   143.67  14.529     5.23    76.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0706) |
```

```
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (0705):    143.67   14.529      5.23     76.42
       + ID2= 2 (0101):      3.15     .329      5.23     77.68
         ================================================
         ID = 3 (0706):    146.82   14.858      5.23     76.45

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

Pond 1

```
-------------------
| RESERVOIR (0913) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |      OUTFLOW    STORAGE    |   OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)     |    (cms)     (ha.m.)
                           .0000      .0000     |     .9190      3.9180
                           .0930     1.0741     |    1.3490      4.3080
                           .1900     2.1933     |    2.3060      5.2941
                           .2010     2.3825     |    2.6670      5.8932
                           .2120     2.5723     |    2.8810      6.2959
                           .2220     2.7627     |    3.7300      7.1089
                           .2320     2.9538     |    4.5880      7.7255
                           .2990     3.1454     |    5.2250      8.1399
                           .4140     3.3376     |   26.3630      8.7664
                           .5600     3.5305     |   37.6740      8.9765

                                AREA      QPEAK       TPEAK       R.V.
                                (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0706)    146.820    14.858        5.23       76.45
    OUTFLOW: ID= 1 (0913)    146.820     3.805        6.48       63.32

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.61
                TIME SHIFT OF PEAK FLOW         (min)= 75.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  7.1630
```

```
-------------------
| ADD HYD   (0708) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (0913):    146.82    3.805      6.48     63.32
       + ID2= 2 (0910):     18.56     .659      5.17     68.35
         ================================================
         ID = 3 (0708):    165.38    4.195      6.40     62.46

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
-------------------
| ADD HYD   (0914) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (0708):    165.38    4.195      6.40     62.46
       + ID2= 2 (0916):     22.80     .632      6.42     79.02
         ================================================
         ID = 3 (0914):    188.18    4.826      6.42     62.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
-------------------
| ADD HYD   (1211) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (0506):     31.89    1.823      5.75     59.05
       + ID2= 2 (0914):    188.18    4.826      6.42     62.91
         ================================================
         ID = 3 (1211):    220.07    6.427      6.17     62.35

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
-------------------
| ADD HYD   (0920) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (1211):    220.07    6.427      6.17     62.35
       + ID2= 2 (1220):      6.96     .554      5.17     57.70
         ================================================
         ID = 3 (0920):    227.02    6.608      6.15     62.21

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
-------------------
| ADD HYD   (1210) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (6212):    150.47    2.661      9.00     60.86
       + ID2= 2 (0920):    227.02    6.608      6.15     62.21
         ================================================
         ID = 3 (1210):    377.50    8.612      6.27     59.26

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

Node 867

```
-------------------
| ADD HYD   (0867) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (6208):   3174.13   40.963     10.50     48.33
       + ID2= 2 (1210):    377.50    8.612      6.27     59.26
         ================================================
         ID = 3 (0867):   3551.63   46.100     10.00     49.14

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

Node 868

```
-------------------
| ADD HYD   (0868) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
-------------------          (ha)      (cms)     (hrs)      (mm)
         ID1= 1 (0849):   3043.23   46.042      9.25     51.77
       + ID2= 2 (0867):   3551.63   46.100     10.00     49.14
         ================================================
         ID = 3 (0868):   6594.85   91.475      9.75     49.87

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 FINISH
```

```
      V    V   I    SSSSS  U   U    A    L
      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
      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
```

2-Year Storm

```
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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 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
```

```
DATE: 10/6/2017                          TIME: 7:50:24 AM

USER:


COMMENTS: _____________________________________________________


  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

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

      START @   .00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
  **  CALIB NASHYD       0506  1  3.0   31.89     .57  5.85  19.11  .46    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD     0109  1  1.0    2.20     .11  5.25  39.08  .93    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0107  1  2.0    5.56     .22  5.23  31.41  .75    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD     0102  1  3.0   63.87    2.68  5.25  32.45  .77    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD     0104  1  3.0   52.89    2.05  5.30  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0105  1  3.0   54.99    2.13  5.30  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0106  1  3.0   18.20     .74  5.25  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0108  1  1.0     .95     .05  5.25  39.08  .93    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0101  1  2.0    3.15     .14  5.27  33.52  .80    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD       0300  1 10.0    6.72     .20  5.17  18.41  .44    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0905  1  5.0    5.25     .23  5.25  33.09  .79    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0906  1  5.0    6.59     .29  5.25  33.26  .79    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0915  1  5.0   22.80    1.01  5.25  34.01  .81    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD       0306  1 10.0    2.51     .07  5.17  18.41  .44    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0305  1  1.0     .51     .03  5.25  38.12  .91    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD     0302  1  1.0    1.31     .06  5.25  33.42  .80    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD     0303  1  1.0    1.72     .07  5.25  29.29  .70    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD       0304  1 10.0     .90     .00   .00    .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
*
  **  CALIB STANDHYD     1222  1  5.0   31.09    1.29  5.25  32.29  .77    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD           0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
```

```
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

```
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .11  5.25  39.08  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD              0204  1  3.0   52.89    2.05  5.30  31.44  n/a    .000
         MAJOR SYSTEM:   0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0204  3  3.0   52.89    2.05  5.30  31.44  n/a    .000
*
      DUHYD              0205  1  3.0   54.99    2.13  5.30  31.44  n/a    .000
         MAJOR SYSTEM:   0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0205  3  3.0   54.99    2.13  5.30  31.44  n/a    .000
*
      DUHYD              0206  1  3.0   18.20     .74  5.25  31.44  n/a    .000
         MAJOR SYSTEM:   0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0206  3  3.0   18.20     .74  5.25  31.44  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.35  39.08  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84     .52  5.25  33.19  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .12  7.83  33.92  n/a    .000
      {ST=   .60 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .02  5.32  38.00  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .13  5.25  31.07  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .13  5.25  23.93  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09     .26  7.17  32.25  n/a    .000
      {ST=   .72 ha.m }
*
      ADD [3200 + 1221]  0201  3  5.0  196.53    2.49  5.25  23.97  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    4.71  5.25  31.99  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    4.71  5.25  31.99  n/a    .000
*
      ADD [0701 + 0206]  0702  3  3.0  134.96    5.45  5.25  31.92  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .02  9.33  32.96  n/a    .000
      {ST=   .34 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .15  5.25  25.54  n/a    .000
*
      ADD [6201 + 0201]  0849  3  5.0 3043.23   11.83 10.00  16.51  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52    5.67  5.27  31.90  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .21  5.17  27.69  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .22  5.17  22.97  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47    5.70  5.27  31.95  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .22  5.17  22.97  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67    5.81  5.27  32.05  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82    5.95  5.27  32.09  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82     .74  7.97  20.31  n/a    .000
      {ST=  3.72 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38     .78  7.97  19.96  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18     .90  7.97  20.31  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    1.18  7.17  20.14  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    1.23  7.17  20.22  n/a    .000
*
      ADD [6209 + 0920]  1210  3  1.0  377.49    1.35  7.17  18.16  n/a    .000
*
      ADD [6205 + 1210]  0867  3  1.0 3551.62   13.21 11.00  14.34  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   24.85 10.50  14.96  n/a    .000
*
 FINISH
```

==========

==========

```
       V    V   I    SSSSS  U   U    A    L
```

```
 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
 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
```

5-Year Storm

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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 2.3.3\voin.dat
Output filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\Event Based Discretized Mode
Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\Event Based Discretized Mode

DATE: 10/6/2017 TIME: 7:48:35 AM

USER:

COMMENTS: _____

****
** SIMULATION NUMBER: 7 **
****

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

    START @   .00 hrs
    --------------------
    READ STORM                15.0
    [ Ptot= 54.38 mm ]
    fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
    remark: 5yr/12hr
*
  **  CALIB NASHYD       0506  1  3.0   31.89     .88  5.85  29.02  .53    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD     0109  1  1.0    2.20     .15  5.25  51.23  .94    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0107  1  2.0    5.56     .31  5.23  42.66  .78    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD     0102  1  3.0   63.87    3.69  5.25  44.08  .81    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD     0104  1  3.0   52.89    2.88  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0105  1  3.0   54.99    2.99  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0106  1  3.0   18.20    1.03  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0108  1  1.0     .95     .06  5.25  51.23  .94    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0101  1  2.0    3.15     .19  5.23  45.02  .83    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD       0300  1 10.0    6.72     .29  5.17  26.94  .50    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0905  1  5.0    5.25     .31  5.25  44.64  .82    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0906  1  5.0    6.59     .40  5.25  44.85  .82    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0915  1  5.0   22.80    1.37  5.25  45.83  .84    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD       0306  1 10.0    2.51     .11  5.17  26.94  .50    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0305  1  1.0     .51     .03  5.25  50.16  .92    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD     0302  1  1.0    1.31     .08  5.25  45.03  .83    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD     0303  1  1.0    1.72     .09  5.25  40.43  .74    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD       0304  1 10.0     .90     .00   .00   .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
*
  **  CALIB STANDHYD     1222  1  5.0   31.09    1.78  5.25  43.89  .81    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD           0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
```

```
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
```

```
*
      READ HYD           3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
```

```
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

```
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .15  5.25  51.23  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD              0204  1  3.0   52.89    2.88  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0204  3  3.0   52.89    2.88  5.25  42.91  n/a    .000
*
      DUHYD              0205  1  3.0   54.99    2.99  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0205  3  3.0   54.99    2.99  5.25  42.91  n/a    .000
*
      DUHYD              0206  1  3.0   18.20    1.03  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0206  3  3.0   18.20    1.03  5.25  42.91  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.38  51.23  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84     .71  5.25  44.76  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .23  7.33  45.74  n/a    .000
      {ST=   .75 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .03  5.32  50.04  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .17  5.25  42.42  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .17  5.25  32.66  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09     .77  5.92  43.85  n/a    .000
      {ST=   .80 ha.m }
*
      ADD [4200 + 1221]  0201  3  5.0  196.53    3.40  5.25  33.68  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    6.56  5.25  43.55  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    6.56  5.25  43.55  n/a    .000
*
      ADD [0701 + 0206]  0702  3  3.0  134.96    7.59  5.25  43.46  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .07  7.92  44.53  n/a    .000
      {ST=   .43 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .20  5.25  34.66  n/a    .000
*
      ADD [6213 + 0201]  0849  3  5.0 3043.23   19.80  9.50  25.00  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52    7.87  5.27  43.43  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .31  5.17  38.16  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .30  5.17  31.87  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47    7.90  5.27  43.48  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .30  5.17  31.87  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67    8.05  5.27  43.60  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82    8.24  5.27  43.63  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82    1.59  7.23  31.34  n/a    .000
```

```
      {ST=  4.55 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38    1.70  7.17  30.78  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18    1.94  7.17  31.15  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    2.58  6.45  30.84  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    2.66  6.37  30.87  n/a    .000
*
      ADD [6210 + 0920]  1210  3  1.0  377.50    2.96  7.50  28.50  n/a    .000
*
      ADD [6206 + 1210]  0867  3  1.0 3551.63   20.52 10.75  22.65  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   39.87 10.00  23.32  n/a    .000
*
 FINISH

================================================================================================================

================================================================================================================


       V    V   I    SSSSS  U   U    A    L
       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
      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 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode


DATE: 10/6/2017                           TIME: 7:47:21 AM

USER:


COMMENTS: _____________________________________________________


  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************

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

      START @   .00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
  **  CALIB NASHYD      0506  1  3.0   31.89    1.39  5.80  45.14  .62    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD    0109  1  1.0    2.20     .20  5.25  69.71  .95    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD    0107  1  2.0    5.56     .45  5.23  60.18  .82    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD    0102  1  3.0   63.87    5.28  5.25  62.04  .85    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD    0104  1  3.0   52.89    4.18  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD    0105  1  3.0   54.99    4.34  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD    0106  1  3.0   18.20    1.48  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD    0108  1  1.0     .95     .09  5.25  69.71  .95    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD    0101  1  2.0    3.15     .27  5.23  62.80  .86    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD      0300  1 10.0    6.72     .42  5.17  40.69  .56    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD    0905  1  5.0    5.25     .44  5.25  62.49  .85    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD    0906  1  5.0    6.59     .56  5.25  62.74  .86    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD    0915  1  5.0   22.80    1.95  5.25  63.98  .88    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD      0306  1 10.0    2.51     .16  5.17  40.69  .56    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD    0305  1  1.0     .51     .05  5.25  68.52  .94    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD    0302  1  1.0    1.31     .11  5.25  62.96  .86    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD    0303  1  1.0    1.72     .14  5.25  57.86  .79    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD      0304  1 10.0     .90     .00   .00    .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
*
  **  CALIB STANDHYD    1222  1  5.0   31.09    2.56  5.25  61.82  .85    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD          0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD          0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD          0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

25-Year Storm

```
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
```

```
      READ HYD           6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .20  5.25  69.71  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD              0204  1  3.0   52.89    4.18  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0204  3  3.0   52.89    4.18  5.25  60.70  n/a    .000
*
      DUHYD              0205  1  3.0   54.99    4.34  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0205  3  3.0   54.99    4.34  5.25  60.70  n/a    .000
*
      DUHYD              0206  1  3.0   18.20    1.48  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0206  3  3.0   18.20    1.48  5.25  60.70  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.42  69.71  n/a    .000
      {ST=   .02 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84    1.00  5.25  62.63  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .45  6.50  63.90  n/a    .000
      {ST=   .97 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .04  5.30  68.40  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .25  5.25  60.06  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .25  5.25  46.25  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09    2.08  5.42  61.78  n/a    .000
      {ST=   .90 ha.m }
*
      ADD [5200 + 1221]  0201  3  5.0  196.53    6.48  5.42  49.33  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    9.45  5.25  61.43  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    9.45  5.25  61.43  n/a    .000
*
```

```
      ADD [0701 + 0206]  0702  3  3.0  134.96   10.93  5.25  61.33  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .18  6.75  62.40  n/a    .000
      {ST=   .53 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .29  5.25  48.79  n/a    .000
*
      ADD [6203 + 0201]  0849  3  5.0 3043.23   33.35  9.50  39.21  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52   11.34  5.23  61.29  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .47  5.17  54.54  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .44  5.17  45.87  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47   11.37  5.23  61.34  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .44  5.17  45.87  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67   11.57  5.23  61.47  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82   11.84  5.23  61.50  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82    2.70  6.67  48.70  n/a    .000
      {ST=  5.96 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38    2.95  6.60  47.96  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18    3.40  6.58  48.37  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    4.63  6.17  47.91  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    4.77  6.17  47.84  n/a    .000
*
      ADD [6211 + 0920]  1210  3  1.0  377.50    5.93  6.50  45.10  n/a    .000
*
      ADD [6207 + 1210]  0867  3  1.0 3551.63   33.07 10.50  36.68  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   65.83  9.75  37.39  n/a    .000
*
 FINISH
```

==========

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

       V    V   I    SSSSS  U   U    A    L
       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
       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
```

25mm Chicago Storm & 2-100 Year 4-hour Markham Storms

```
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                  *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: C:\Users\spentelow\Desktop\1-100Year_EventModel\Event Based Discretized Model.out
  Summary filename: C:\Users\spentelow\Desktop\1-100Year_EventModel\Event Based Discretized Model.sum

DATE: 11/1/2017                          TIME: 9:04:54 AM

USER:


COMMENTS: _____________________________________________________

----------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


-------------------
|    READ STORM    |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 25.00 mm |   Comments: Twenty five mm Four Hour Chicago Storm
-------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                 .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                 .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                 .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                 .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

------------------------------------------------------------------------------
-------------------
| RESERVOIR (0913) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .9190      3.9180
                          .0930     1.0741    |   1.3490      4.3080
                          .1900     2.1933    |   2.3060      5.2941
                          .2010     2.3825    |   2.6670      5.8932
                          .2120     2.5723    |   2.8810      6.2959
                          .2220     2.7627    |   3.7300      7.1089
                          .2320     2.9538    |   4.5880      7.7255
                          .2990     3.1454    |   5.2250      8.1399
                          .4140     3.3376    |  26.3630      8.7664
                          .5600     3.5305    |  37.6740      8.9765

                               AREA      QPEAK       TPEAK       R.V.
                               (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0706)    146.820    6.539        1.57       16.93
     OUTFLOW: ID= 1 (0913)    146.820     .196        4.48       10.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.99
                  TIME SHIFT OF PEAK FLOW         (min)=175.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  2.2938

------------------------------------------------------------------------------
-------------------
| RESERVOIR (0909) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .0640      .4187
                          .0020      .0210    |    .1120      .4740
                          .0100      .0869    |    .1400      .5021
                          .0140      .1576    |    .2730      .6168
                          .0150      .1822    |    .3120      .6461
                          .0160      .2073    |    .3520      .6757
                          .0170      .2329    |   1.6240      .7967
                          .0180      .2587    |   6.5870      .9220
                          .0200      .3110    |  19.6150     1.1183
                          .0210      .3376    |    .0000      .0000

                               AREA      QPEAK       TPEAK       R.V.
                               (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0907)    11.840     .835        1.50       17.93
     OUTFLOW: ID= 1 (0909)    11.840     .016        4.33       17.71

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.86
                  TIME SHIFT OF PEAK FLOW         (min)=170.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .1963

------------------------------------------------------------------------------
-------------------
| RESERVOIR (0916) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .0450      .4669
                          .0130      .0993    |    .1300      .6245
                          .0170      .1335    |    .2950      .8281
                          .0300      .3140    |    .7410     1.2578
                          .0320      .3518    |    .9230     1.5770
                          .0330      .3899    |   3.6480     1.9622
                          .0350      .4282    |   6.8140     2.0624

                               AREA      QPEAK       TPEAK       R.V.
                               (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0915)    22.800    1.259        1.58       18.30
     OUTFLOW: ID= 1 (0916)    22.800     .033        4.42       18.22

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.61
                  TIME SHIFT OF PEAK FLOW         (min)=170.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .3837

------------------------------------------------------------------------------
-------------------
| RESERVOIR (1221) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .0430      .5715
                          .0120      .0637    |    .1500      .6631
                          .0150      .0862    |    .3330      .7578
                          .0260      .2079    |   1.6540      .8887
                          .0290      .2604    |   5.1140      .9905
                          .0320      .3142    |   6.4570     1.0252
                          .0370      .4254    |   9.9400     1.0955
                          .0410      .5121    |  11.9190     1.1313
                          .0420      .5416    |    .0000      .0000

                               AREA      QPEAK       TPEAK       R.V.
                               (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (1222)    31.090    1.475        1.58       17.04
     OUTFLOW: ID= 1 (1221)    31.090     .040        4.50       17.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.70
                  TIME SHIFT OF PEAK FLOW         (min)=175.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .4869

------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************
```

MASS STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 29.16 mm	Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES

Duration of storm = 3.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	1.57	.83	3.88	1.58	13.33	2.33	2.34
.17	1.78	.92	4.76	1.67	8.15	2.42	2.24
.25	1.85	1.00	6.05	1.75	5.67	2.50	2.13
.33	1.96	1.08	9.34	1.83	4.37	2.58	2.03
.42	2.13	1.17	21.80	1.92	3.64	2.67	1.96
.50	2.41	1.25	41.22	2.00	3.11	2.75	1.85
.58	2.62	1.33	100.08	2.08	2.73	2.83	1.89
.67	2.97	1.42	53.15	2.17	2.59	2.92	1.75
.75	3.36	1.50	25.05	2.25	2.41	3.00	1.68

RESERVOIR (0913) IN= 2---> OUT= 1 DT= 1.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.9190	3.9180
	.0930	1.0741	1.3490	4.3080
	.1900	2.1933	2.3060	5.2941
	.2010	2.3825	2.6670	5.8932
	.2120	2.5723	2.8810	6.2959
	.2220	2.7627	3.7300	7.1089
	.2320	2.9538	4.5880	7.7255
	.2990	3.1454	5.2250	8.1399
	.4140	3.3376	26.3630	8.7664
	.5600	3.5305	37.6740	8.9765

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0706)	146.820	13.248	1.43	20.53
OUTFLOW: ID= 1 (0913)	146.820	.227	3.30	12.76

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.71
TIME SHIFT OF PEAK FLOW (min)=112.00
MAXIMUM STORAGE USED (ha.m.)= 2.8566

RESERVOIR (0909) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0640	.4187
	.0020	.0210	.1120	.4740
	.0100	.0869	.1400	.5021
	.0140	.1576	.2730	.6168
	.0150	.1822	.3120	.6461
	.0160	.2073	.3520	.6757
	.0170	.2329	1.6240	.7967
	.0180	.2587	6.5870	.9220
	.0200	.3110	19.6150	1.1183
	.0210	.3376	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0907)	11.840	1.559	1.33	21.57
OUTFLOW: ID= 1 (0909)	11.840	.017	3.17	21.35

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.12
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= .2432

RESERVOIR (0916) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0450	.4669
	.0130	.0993	.1300	.6245
	.0170	.1335	.2950	.8281
	.0300	.3140	.7410	1.2578
	.0320	.3518	.9230	1.5770
	.0330	.3899	3.6480	1.9622
	.0350	.4282	6.8140	2.0624

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0915)	22.800	2.412	1.42	22.06
OUTFLOW: ID= 1 (0916)	22.800	.049	3.17	21.98

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.02
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= .4738

RESERVOIR (1221) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0430	.5715
	.0120	.0637	.1500	.6631
	.0150	.0862	.3330	.7578
	.0260	.2079	1.6540	.8887
	.0290	.2604	5.1140	.9905
	.0320	.3142	6.4570	1.0252
	.0370	.4254	9.9400	1.0955
	.0410	.5121	11.9190	1.1313
	.0420	.5416	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	2.915	1.42	20.67
OUTFLOW: ID= 1 (1221)	31.090	.079	3.17	20.62

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.71
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= .6024

****
** SIMULATION NUMBER: 3 **
****

MASS STORM	Filename: V:\01606\Active\160622264 \Analysis\SWM\Hydrology\ VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 42.00 mm	Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES

Duration of storm = 3.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	2.27	.83	5.59	1.58	19.20	2.33	3.38
.17	2.57	.92	6.85	1.67	11.74	2.42	3.23
.25	2.67	1.00	8.72	1.75	8.16	2.50	3.07
.33	2.82	1.08	13.46	1.83	6.30	2.58	2.92
.42	3.07	1.17	31.40	1.92	5.24	2.67	2.82
.50	3.48	1.25	59.37	2.00	4.49	2.75	2.67
.58	3.78	1.33	144.14	2.08	3.93	2.83	2.72
.67	4.28	1.42	76.56	2.17	3.73	2.92	2.52
.75	4.84	1.50	36.09	2.25	3.48	3.00	2.42

RESERVOIR (0913) IN= 2---> OUT= 1 DT= 1.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.9190	3.9180
	.0930	1.0741	1.3490	4.3080
	.1900	2.1933	2.3060	5.2941
	.2010	2.3825	2.6670	5.8932
	.2120	2.5723	2.8810	6.2959
	.2220	2.7627	3.7300	7.1089
	.2320	2.9538	4.5880	7.7255

.2990	3.1454	5.2250	8.1399
.4140	3.3376	26.3630	8.7664
.5600	3.5305	37.6740	8.9765

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0706)	146.820	22.598	1.43	32.08
OUTFLOW: ID= 1 (0913)	146.820	1.149	2.82	22.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.08
TIME SHIFT OF PEAK FLOW (min)= 83.00
MAXIMUM STORAGE USED (ha.m.)= 4.1265

RESERVOIR (0909)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0640	.4187
.0020	.0210	.1120	.4740
.0100	.0869	.1400	.5021
.0140	.1576	.2730	.6168
.0150	.1822	.3120	.6461
.0160	.2073	.3520	.6757
.0170	.2329	1.6240	.7967
.0180	.2587	6.5870	.9220
.0200	.3110	19.6150	1.1183
.0210	.3376	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0907)	11.840	2.600	1.33	33.19
OUTFLOW: ID= 1 (0909)	11.840	.040	3.08	32.97

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.52
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= .3727

RESERVOIR (0916)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0450	.4669
.0130	.0993	.1300	.6245
.0170	.1335	.2950	.8281
.0300	.3140	.7410	1.2578
.0320	.3518	.9230	1.5770
.0330	.3899	3.6480	1.9622
.0350	.4282	6.8140	2.0624

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0915)	22.800	3.830	1.33	34.01
OUTFLOW: ID= 1 (0916)	22.800	.177	2.75	33.92

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.62
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= .6824

RESERVOIR (1221)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0430	.5715
.0120	.0637	.1500	.6631
.0150	.0862	.3330	.7578
.0260	.2079	1.6540	.8887
.0290	.2604	5.1140	.9905
.0320	.3142	6.4570	1.0252
.0370	.4254	9.9400	1.0955
.0410	.5121	11.9190	1.1313
.0420	.5416	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	4.686	1.42	32.29
OUTFLOW: ID= 1 (1221)	31.090	.711	2.08	32.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.18
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= .7965

****
** SIMULATION NUMBER: 4 **
****

MASS STORM
Ptotal= 61.00 mm

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES

Duration of storm = 3.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	3.29	.83	8.13	1.58	27.89	2.33	4.90
.17	3.73	.92	9.96	1.67	17.06	2.42	4.68
.25	3.88	1.00	12.66	1.75	11.86	2.50	4.47
.33	4.10	1.08	19.54	1.83	9.15	2.58	4.25
.42	4.47	1.17	45.60	1.92	7.61	2.67	4.10
.50	5.05	1.25	86.23	2.00	6.51	2.75	3.88
.58	5.49	1.33	209.35	2.08	5.71	2.83	3.95
.67	6.22	1.42	111.19	2.17	5.42	2.92	3.66
.75	7.03	1.50	52.41	2.25	5.05	3.00	3.51

RESERVOIR (0913)
IN= 2---> OUT= 1
DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.9190	3.9180
.0930	1.0741	1.3490	4.3080
.1900	2.1933	2.3060	5.2941
.2010	2.3825	2.6670	5.8932
.2120	2.5723	2.8810	6.2959
.2220	2.7627	3.7300	7.1089
.2320	2.9538	4.5880	7.7255
.2990	3.1454	5.2250	8.1399
.4140	3.3376	26.3630	8.7664
.5600	3.5305	37.6740	8.9765

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0706)	144.860	36.096	1.43	49.91
OUTFLOW: ID= 1 (0913)	144.860	2.695	2.27	39.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.47
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 5.9466

RESERVOIR (0909)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0640	.4187
.0020	.0210	.1120	.4740
.0100	.0869	.1400	.5021
.0140	.1576	.2730	.6168
.0150	.1822	.3120	.6461
.0160	.2073	.3520	.6757
.0170	.2329	1.6240	.7967
.0180	.2587	6.5870	.9220
.0200	.3110	19.6150	1.1183
.0210	.3376	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0907)	11.840	4.099	1.33	51.04
OUTFLOW: ID= 1 (0909)	11.840	.164	2.33	50.81

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.01
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= .5232

RESERVOIR (0916)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0450	.4669
.0130	.0993	.1300	.6245
.0170	.1335	.2950	.8281
.0300	.3140	.7410	1.2578
.0320	.3518	.9230	1.5770
.0330	.3899	3.6480	1.9622
.0350	.4282	6.8140	2.0624

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0915)	22.800	6.963	1.42	52.22
OUTFLOW: ID= 1 (0916)	22.800	.461	2.08	52.13

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.63
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= .9890

RESERVOIR (1221)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0430	.5715
.0120	.0637	.1500	.6631
.0150	.0862	.3330	.7578
.0260	.2079	1.6540	.8887
.0290	.2604	5.1140	.9905
.0320	.3142	6.4570	1.0252
.0370	.4254	9.9400	1.0955
.0410	.5121	11.9190	1.1313
.0420	.5416	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	7.530	1.42	50.19
OUTFLOW: ID= 1 (1221)	31.090	3.867	1.67	50.15

PEAK FLOW REDUCTION [Qout/Qin](%)= 51.35
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .9544

****
** SIMULATION NUMBER: 5 **
****

MASS STORM
Ptotal= 80.00 mm

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES

Duration of storm = 3.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	4.32	.83	10.66	1.58	36.58	2.33	6.43
.17	4.90	.92	13.06	1.67	22.37	2.42	6.14
.25	5.09	1.00	16.61	1.75	15.55	2.50	5.86
.33	5.38	1.08	25.63	1.83	12.00	2.58	5.57
.42	5.86	1.17	59.81	1.92	9.98	2.67	5.38
.50	6.62	1.25	113.09	2.00	8.54	2.75	5.09
.58	7.20	1.33	274.56	2.08	7.49	2.83	5.18
.67	8.16	1.42	145.82	2.17	7.10	2.92	4.80
.75	9.22	1.50	68.74	2.25	6.62	3.00	4.61

RESERVOIR (0913)
IN= 2---> OUT= 1
DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.9190	3.9180
.0930	1.0741	1.3490	4.3080
.1900	2.1933	2.3060	5.2941
.2010	2.3825	2.6670	5.8932
.2120	2.5723	2.8810	6.2959
.2220	2.7627	3.7300	7.1089
.2320	2.9538	4.5880	7.7255
.2990	3.1454	5.2250	8.1399
.4140	3.3376	26.3630	8.7664
.5600	3.5305	37.6740	8.9765

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0706)	142.637	51.981	1.40	68.18
OUTFLOW: ID= 1 (0913)	142.637	4.675	2.12	56.81

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.99
TIME SHIFT OF PEAK FLOW (min)= 43.00
MAXIMUM STORAGE USED (ha.m.)= 7.7823

RESERVOIR (0909)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0640	.4187
.0020	.0210	.1120	.4740
.0100	.0869	.1400	.5021
.0140	.1576	.2730	.6168
.0150	.1822	.3120	.6461
.0160	.2073	.3520	.6757
.0170	.2329	1.6240	.7967
.0180	.2587	6.5870	.9220
.0200	.3110	19.6150	1.1183
.0210	.3376	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0907)	11.840	5.675	1.33	69.29
OUTFLOW: ID= 1 (0909)	11.840	.375	2.00	69.06

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.61
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= .6785

RESERVOIR (0916)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0450	.4669
.0130	.0993	.1300	.6245
.0170	.1335	.2950	.8281
.0300	.3140	.7410	1.2578
.0320	.3518	.9230	1.5770
.0330	.3899	3.6480	1.9622
.0350	.4282	6.8140	2.0624

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0915)	22.800	9.637	1.42	70.73
OUTFLOW: ID= 1 (0916)	22.800	.768	2.00	70.65

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.97
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 1.3052

RESERVOIR (1221)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

.0000	.0000	|	.0430	.5715
.0120	.0637	|	.1500	.6631
.0150	.0862	|	.3330	.7578
.0260	.2079	|	1.6540	.8887
.0290	.2604	|	5.1140	.9905
.0320	.3142	|	6.4570	1.0252
.0370	.4254	|	9.9400	1.0955
.0410	.5121	|	11.9190	1.1313
.0420	.5416	|	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	12.353	1.42	68.50
OUTFLOW: ID= 1 (1221)	31.090	7.939	1.58	68.46

PEAK FLOW REDUCTION [Qout/Qin](%)= 64.27
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 1.0762

D.2 PCSWMM PROPOSED CONDITIONS HYDROLOGY MODELING (2-100 YEAR)

Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

PCSWMM Modeling Output Summary Tables **2 to 100 Year Event**

Description	Existing Conditions with Updated Pond H		YDD Proposed		Existing Conditions with Updated Pond H		YDD Proposed	
Node	**Node 171**				**Node J5720.94**			
Drainage Area (ha)	**6405**		**6407**		**13359**		**13361**	
Storm Event Flows	**Existing Flow**	**Existing Water Level**	**Proposed Flow**	**Proposed Water Level**	**Existing Flow**	**Existing Water Level**	**Proposed Flow**	**Proposed Water Level**
(12 hr AES)	**(m^3/s)**	**(m)**	**(m^3/s)**	**(m)**	**(m^3/s)**	**(m)**	**(m^3/s)**	**(m)**
2 year	5.19	173.59	5.02	173.59	21.51	169.86	21.56	169.87
5 year	13.69	173.81	14.19	173.82	43.17	170.11	43.62	170.11
25 year	38.84	174.17	39.32	174.17	87.59	170.52	88.22	170.52
100 year	62.02	174.38	62.94	174.38	135.31	170.97	136.25	170.97

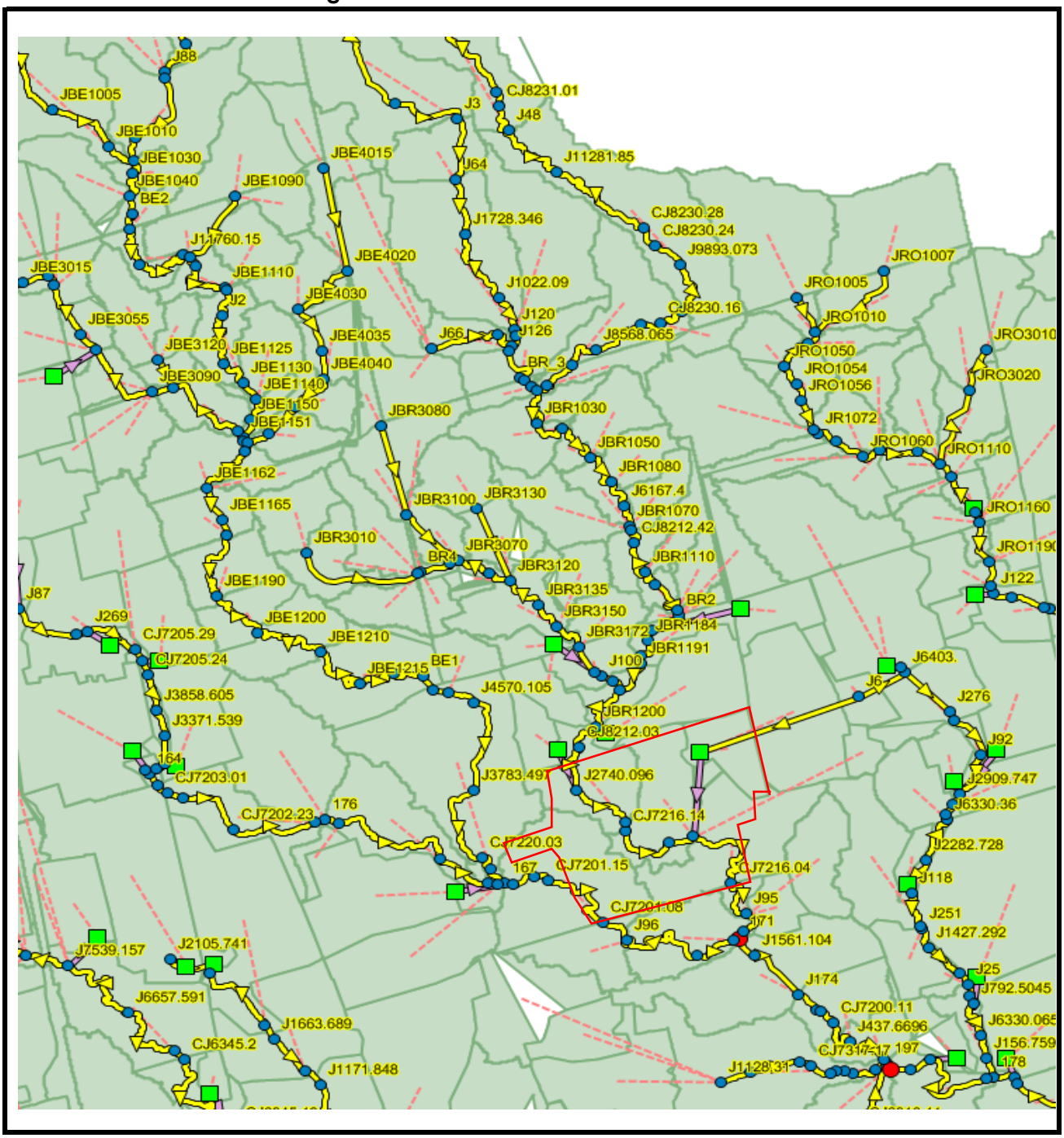
Project Description: 4134 16th Avenue MESP/FSR

Job Number: 160622264

Date: Oct-17

PCSWMM Modeling Schematic

Existing Conditions **2 to 100 Year Storm**



Stantec

Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

PCSWMM Modeling Input Parameters **Existing Conditions**

2 to 100 Year Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDDEX	S124	48.73	8	270	1802	160.493	4.009	0.176
YDDEX	S138	61.84	14	521	1188	152.773	3.456	0.175
YDDEX	S2	23.50	64	170	1383	131.437	3.343	0.15
YDDEX	S268_1	74.13	10	526	1410	168.686	2.976	0.191
YDDEX	S290_2	39.49	10	380	1039	106.869	8.303	0.123
External EX1	S129_4	16.11	43	656	245	62.23	2.31	0.104
External EX1	S131	63.67	57	2005	318	70.067	4.175	0.097

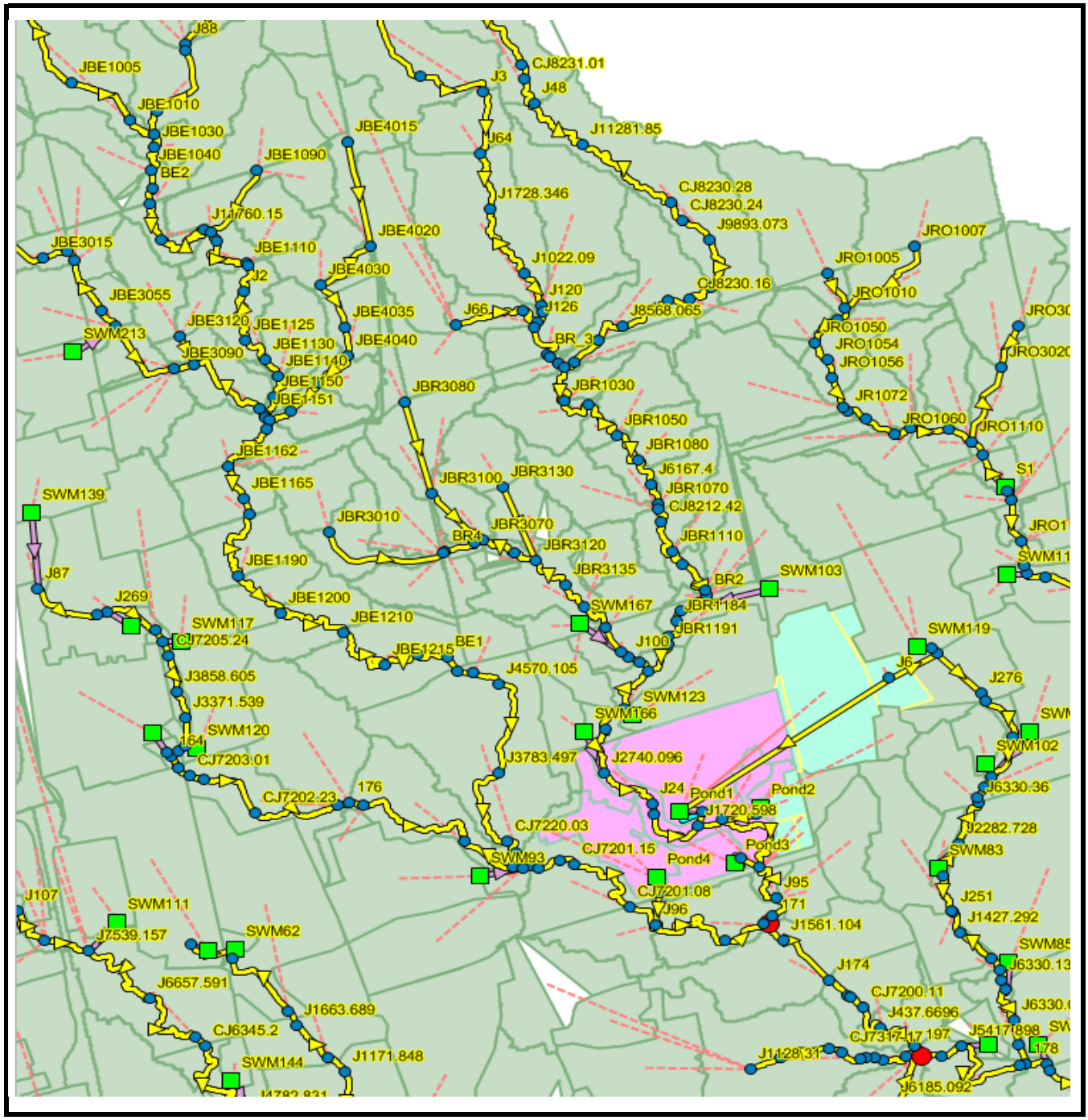
Project Description: 4134 16th Avenue MESP/FSR

Job Number: 160622264

Date: Oct-17

PCSWMM Modeling Schematic

Proposed Conditions **2 to 100 Year Storm**



Stantec

Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

PCSWMM Modeling Input Parameters **Post Development Conditions**

2 to 100 Year Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDD_to Pond 1	TP1	63.89	62	125	5111	160.493	4.009	0.176
YDD_to Pond 2	TP2	5.25	70	120	437	152.773	3.456	0.175
YDD_to Pond 3	TP3	22.77	70	440	517	134.411	5.395	0.154
YDD_to Pond 4	TP4	29.25	61	295	992	168.686	2.976	0.191
YDD_to Pond 4	TP41	1.85	61	100	185	168.686	2.976	0.191
YDD_uncontrolled	Nat	6.72	5	220	306	152.773	3.456	0.175
External EX1	S129_4	16.11	43	656	245	62.23	2.31	0.104
External EX1	S131	63.67	57	2005	318	70.067	4.175	0.097
External EX1	TP21	6.60	71	100	660	152.773	3.456	0.175
External EX1	S12	4.45	46	100	445	152.773	3.456	0.175
External EX1	S13	2.52	5	100	252	152.773	3.456	0.175
External EX1	S28	3.14	61	1200	26	70.067	4.175	0.097
Bruce River	S67	24.59	5	100	2459	156.633	3.732	0.176
Bruce River	S68	7.30	5	100	730	106.869	8.303	0.123

Appendix E STORM SEWER DESIGN SHEETS

Storm Sewer Design Sheets prepared by Stantec Consulting Ltd. dated October 2017.

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	EX.28	EX.29	82.95	0.57	0.00	47.28	47.28	87.35	11.47	68.5	2400	1.09	15.00	25.85	5.71	44%	0.20	15.20
	EX.29	EX.100	0.69	0.65	0.00	0.45	47.73	86.62	11.48	106.0	2400	0.65		19.96	4.41	58%	0.40	15.60
Ext. Berczy	EX.100	160	0.57	0.65	0.00	0.37	48.10	85.22	11.39	88.7	2400	0.62		19.49	4.31	58%	0.34	15.94
	831	832	0.16	0.75	0.00	0.12	0.12	111.06	0.04	60.1	300	1.00		0.10	1.37	38%	0.73	10.73
	832	325	0.23	0.75	0.00	0.17	0.29	106.72	0.09	66.5	375	0.80		0.16	1.42	55%	0.78	11.51
	325	327	0.07	0.75	0.00	0.05	0.69	102.49	0.20	20.0	450	0.80		0.26	1.60	77%	0.21	11.72
	327	329S	0.29	0.75	0.00	0.22	0.91	101.43	0.26	84.5	525	0.80		0.38	1.78	66%	0.79	12.51
	324	325	0.49	0.70	0.00	0.34	0.34	111.06	0.11	61.1	300	3.00		0.17	2.37	63%	0.43	10.43
	331	329S	0.34	0.65	0.00	0.22	0.22	111.06	0.07	61.6	300	3.00		0.17	2.37	41%	0.43	10.43
	329S	152	0.25	0.65	0.00	0.16	1.29	97.58	0.35	61.6	525	3.00		0.74	3.44	47%	0.30	12.81
	147	825	0.09	0.75	0.00	0.07	0.07	111.06	0.02	39.4	300	1.00		0.10	1.37	22%	0.48	10.48
	825	148	0.00	0.90	0.00	0.00	0.07	108.17	0.02	13.6	300	1.00		0.10	1.37	21%	0.17	10.65
	827	828	0.16	0.75	0.00	0.12	0.12	111.06	0.04	38.2	300	2.00		0.14	1.93	28%	0.33	10.33
	828	148	0.07	0.75	0.00	0.05	0.17	109.06	0.05	15.7	300	1.00		0.10	1.37	54%	0.19	10.52
	148	150	0.29	0.75	0.00	0.22	0.46	107.22	0.14	67.7	450	0.50		0.20	1.27	68%	0.89	11.54
	150	152	0.37	0.75	0.00	0.28	0.74	102.37	0.21	85.2	525	0.50		0.30	1.40	69%	1.01	12.55
	152	154	0.09	0.70	0.00	0.06	2.09	96.21	0.56	21.8	525	3.00		0.74	3.44	75%	0.11	12.92
	154	156	0.24	0.70	0.00	0.17	2.26	95.74	0.60	57.1	750	0.50		0.79	1.78	76%	0.53	13.45
	803	800	0.24	0.65	0.00	0.16	0.16	111.06	0.05	101.5	300	1.00		0.10	1.37	50%	1.24	11.24
	800	268	0.12	0.65	0.00	0.08	0.23	103.94	0.07	22.5	375	0.50		0.12	1.12	54%	0.33	11.57
	268	269	0.15	0.65	0.00	0.10	0.75	102.19	0.21	28.8	525	0.50		0.30	1.40	70%	0.34	11.91
	801	268	1.04	0.40	0.00	0.42	0.42	111.06	0.13	14.1	375	1.00		0.18	1.59	73%	0.15	10.15
	272	273	0.14	0.75	0.00	0.10	0.10	111.06	0.03	65.4	300	1.00		0.10	1.37	32%	0.80	10.80
	273	269	0.14	0.75	0.00	0.10	0.20	106.36	0.06	65.4	375	0.50		0.12	1.12	48%	0.97	11.77
	269	262	0.43	0.65	0.00	0.28	1.23	100.46	0.34	64.2	600	0.50		0.43	1.54	79%	0.70	12.61
	255	256	0.09	0.75	0.00	0.07	0.07	111.06	0.02	25.2	300	1.00		0.10	1.37	22%	0.31	10.31
	256	258N	0.03	0.75	0.00	0.02	0.09	109.19	0.03	7.4	300	0.50		0.07	0.97	39%	0.13	10.44
	258W	260	0.25	0.75	0.00	0.19	0.19	111.06	0.06	69.5	300	0.90		0.09	1.30	63%	0.89	10.89
	260	262	0.25	0.75	0.00	0.19	0.38	105.82	0.11	70.9	375	0.90		0.17	1.51	67%	0.78	11.68
	262	197	0.12	0.65	0.00	0.08	1.68	97.13	0.45	47.1	675	0.50		0.59	1.66	76%	0.47	13.08
	258N	194N	0.16	0.75	0.00	0.12	0.21	108.43	0.06	47.0	375	0.50		0.12	1.12	51%	0.70	11.13
	194W	195	0.24	0.75	0.00	0.18	0.18	111.06	0.06	69.1	300	1.00		0.10	1.37	57%	0.84	10.84
	195	197	0.24	0.75	0.00	0.18	0.36	106.11	0.11	69.1	450	0.50		0.20	1.27	52%	0.91	11.75
	197	252	0.09	0.65	0.00	0.06	2.10	95.01	0.55	45.6	675	2.50		1.33	3.71	42%	0.20	13.29
	194N	248	0.14	0.65	0.00	0.09	0.30	104.50	0.09	45.5	375	0.50		0.12	1.12	70%	0.67	11.81
	245	246	0.14	0.65	0.00	0.09	0.09	111.06	0.03	47.3	300	1.00		0.10	1.37	30%	0.58	10.58
	246	248	0.03	0.65	0.00	0.02	0.11	107.61	0.03	10.5	300	0.50		0.07	0.97	50%	0.18	10.76
	248	250	0.22	0.65	0.00	0.14	0.56	100.99	0.16	71.7	450	1.00		0.29	1.79	55%	0.67	12.47
	250	252	0.22	0.65	0.00	0.14	0.70	97.76	0.19	71.6	525	0.50		0.30	1.40	62%	0.85	13.32
	252	156	0.41	0.65	0.00	0.27	3.07	93.96	0.80	75.0	750	1.10		1.17	2.64	69%	0.47	13.80
	156	158	0.00	0.90	0.00	0.00	5.32	91.99	1.36	34.0	1050	0.50		1.93	2.23	70%	0.25	14.05
	158	160	0.00	0.90	0.00	0.00	5.32	90.96	1.34	7.4	1050	0.50		1.93	2.23	70%	0.06	14.11
	160	162	0.50	0.65	0.00	0.33	53.75	84.05	12.55	38.0	2134 x 3048 Box	0.50		25.93	3.99	48%	0.16	16.10

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	329E	292S	0.38	0.75	0.00	0.29	0.29	111.06	0.09	81.6	375	1.00		0.18	1.59	51%	0.86	10.86
	292S	297	0.33	0.75	0.00	0.24	0.53	106.02	0.16	69.2	375	3.00		0.30	2.75	51%	0.42	11.28
	297	162	0.30	0.75	0.00	0.23	0.76	103.73	0.22	64.3	375	3.00		0.30	2.75	72%	0.39	11.67
	290	162	0.42	0.75	0.00	0.32	0.32	111.06	0.10	78.3	300	2.80		0.16	2.29	60%	0.57	10.57
	162	164	0.36	0.75	0.00	0.27	55.09	83.52	12.78	73.3	2134 x 3048 Box	0.50		25.93	3.99	49%	0.31	16.41
	300E	301	0.13	0.65	0.00	0.09	0.09	111.06	0.03	12.5	300	3.00		0.17	2.37	16%	0.09	10.09
	1540	301	0.46	0.55	0.00	0.25	0.25	111.06	0.08	30.0	375	1.50		0.21	1.94	36%	0.26	10.26
	301	293	0.49	0.65	0.00	0.32	0.66	109.49	0.20	46.0	375	3.00		0.30	2.75	66%	0.28	10.54
	292W	293	0.39	0.75	0.00	0.29	0.29	111.06	0.09	73.3	300	2.00		0.14	1.93	66%	0.63	10.63
	293	304	0.38	0.75	0.00	0.29	1.24	107.30	0.37	65.9	450	3.00		0.49	3.10	75%	0.35	10.98
	304	164	0.40	0.75	0.00	0.30	1.53	105.31	0.45	67.7	600	1.40		0.73	2.57	62%	0.44	11.42
	758	759	0.26	0.75	0.00	0.20	0.20	111.06	0.06	47.1	300	1.00		0.10	1.37	62%	0.57	10.57
	759	164	0.25	0.75	0.00	0.19	0.38	107.62	0.11	45.3	375	1.00		0.18	1.59	65%	0.48	11.05
	164	166	0.37	0.75	0.00	0.28	57.28	82.53	13.13	74.8	2134 x 3048 Box	0.45		24.60	3.78	53%	0.33	16.74
	300W	307S	0.27	0.70	0.00	0.19	0.19	111.06	0.06	65.9	300	1.50		0.12	1.68	49%	0.66	10.66
	307S	309	0.37	0.70	0.00	0.26	0.45	107.16	0.13	91.4	300	3.00		0.17	2.37	79%	0.64	11.30
	309	166	0.39	0.70	0.00	0.28	0.72	103.62	0.21	97.2	375	2.00		0.25	2.25	84%	0.72	12.02
	166	168	0.47	0.75	0.00	0.35	58.36	81.48	13.21	64.8	2134 x 3048 Box	0.45		24.60	3.78	54%	0.29	17.02
	168	170	0.00	0.90	0.00	0.00	58.36	80.60	13.07	14.1	2134 x 3048 Box	0.45		24.60	3.78	53%	0.06	17.09
	798	170	0.37	0.70	0.00	0.26	0.26	111.06	0.08	80.3	300	1.00		0.10	1.37	83%	0.98	10.98
	170	785	0.30	0.70	0.00	0.21	58.82	80.41	13.14	51.8	2134 x 3048 Box	1.90		50.56	7.77	26%	0.11	17.20
	785	172	0.31	0.70	0.00	0.22	59.04	80.08	13.13	53.6	2134 x 3048 Box	1.50		44.92	6.91	29%	0.13	17.33
	787	172	2.46	0.75	0.00	1.85	1.85	111.06	0.57	9.3	675	1.00		0.84	2.35	68%	0.07	10.07
	172	174	0.24	0.70	0.00	0.16	61.05	79.69	13.51	37.3	2134 x 3048 Box	0.50		25.93	3.99	52%	0.16	17.48
	174	176	0.09	0.70	0.00	0.06	61.11	79.23	13.45	14.1	2134 x 3048 Box	2.00		51.87	7.97	26%	0.03	17.51
	176	754	0.61	0.70	0.00	0.43	61.54	79.14	13.53	96.4	2134 x 3600 Box	0.35		26.77	3.48	51%	0.46	17.97
	754	178	0.61	0.70	0.00	0.43	61.97	77.81	13.39	96.4	2134 x 3600 Box	0.35		26.77	3.48	50%	0.46	18.43
	178	180	0.27	0.70	0.00	0.19	62.15	76.54	13.21	42.3	2134 x 3600 Box	0.35		26.77	3.48	49%	0.20	18.64
	180	182	0.07	0.70	0.00	0.05	62.20	75.99	13.13	10.7	2134 x 3600 Box	0.35		26.77	3.48	49%	0.05	18.69
	182	319	0.41	0.70	0.00	0.29	63.41	75.85	13.36	65.2	2134 x 3600 Box	0.35		26.77	3.48	50%	0.31	19.00
	783	182	2.29	0.40	0.00	0.92	0.92	111.06	0.28	9.6	525	1.00		0.43	1.99	66%	0.08	10.08
	334	335	0.64	0.65	0.00	0.42	0.42	111.06	0.13	93.3	375	1.00		0.18	1.59	73%	0.98	10.98
	335	337	0.69	0.65	0.00	0.45	0.86	105.34	0.25	100.0	525	0.50		0.30	1.40	83%	1.19	12.17
	337	319	0.26	0.65	0.00	0.17	1.03	99.22	0.28	38.2	600	0.50		0.43	1.54	66%	0.41	12.58
	217W	321	0.39	0.65	0.00	0.25	0.25	111.06	0.08	66.8	300	1.00		0.10	1.37	80%	0.81	10.81
	321	319	0.25	0.65	0.00	0.17	0.42	106.26	0.12	43.9	450	0.50		0.20	1.27	61%	0.58	11.39
	319	184	0.12	0.65	0.00	0.08	64.93	75.03	13.53	76.7	2134 x 3600 Box	0.35		26.77	3.48	51%	0.37	19.37
	340E	184	0.26	0.65	0.00	0.17	0.17	111.06	0.05	64.3	300	1.00		0.10	1.37	54%	0.78	10.78
	814	184	0.71	0.40	0.00	0.28	0.28	111.06	0.09	8.5	375	1.00		0.18	1.59	50%	0.09	10.09
	184	186	0.32	0.65	0.00	0.21	65.59	74.09	13.50	62.5	2134 x 3600 Box	0.35		26.77	3.48	50%	0.30	19.67
	186	188	0.06	0.65	0.00	0.04	65.63	73.34	13.37	11.3	2134 x 3600 Box	0.35		26.77	3.48	50%	0.05	19.72
	188	190	0.37	0.65	0.00	0.24	65.87	73.20	13.39	73.2	2134 x 3600 Box	0.35		26.77	3.48	50%	0.35	20.07
	805	199	0.40	0.65	0.00	0.26	0.26	111.06	0.08	70.2	300	1.00		0.10	1.37	82%	0.85	10.85
	199	201	0.18	0.65	0.00	0.12	0.38	106.03	0.11	32.0	300	2.90		0.16	2.33	67%	0.23	11.08

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	201	203	0.18	0.65	0.00	0.12	0.49	104.77	0.14	32.0	375	2.90		0.30	2.70	48%	0.20	11.28
	203	205	0.20	0.65	0.00	0.13	0.63	103.71	0.18	35.6	375	2.90		0.30	2.70	60%	0.22	11.50
	205	207	0.23	0.65	0.00	0.15	0.77	102.55	0.22	40.3	375	2.90		0.30	2.70	74%	0.25	11.75
	317	756	0.50	0.75	0.00	0.37	0.37	111.06	0.11	101.9	375	1.00		0.18	1.59	66%	1.07	11.07
	756	207	0.16	0.75	0.00	0.12	0.50	104.84	0.14	33.5	450	0.50		0.20	1.27	72%	0.44	11.51
	207	209	0.23	0.65	0.00	0.15	1.42	101.28	0.40	45.5	450	2.90		0.49	3.05	82%	0.25	12.00
	209	211	0.27	0.65	0.00	0.17	1.59	100.05	0.44	53.0	600	1.00		0.61	2.17	72%	0.41	12.40
	243	211	0.35	0.65	0.00	0.23	0.23	111.06	0.07	59.9	300	1.00		0.10	1.37	73%	0.73	10.73
	211	213	0.21	0.65	0.00	0.14	1.96	98.09	0.53	36.8	750	0.50		0.79	1.78	68%	0.34	12.75
	213	215	0.46	0.65	0.00	0.30	2.26	96.50	0.61	79.8	750	0.50		0.79	1.78	77%	0.75	13.49
	215	217S	0.46	0.65	0.00	0.30	2.56	93.24	0.66	79.8	750	0.50		0.79	1.78	84%	0.75	14.24
	217S	219	0.39	0.65	0.00	0.25	2.81	90.21	0.70	74.8	900	0.50		1.28	2.01	55%	0.62	14.86
	230W	240	0.05	0.65	0.00	0.03	0.03	111.06	0.01	10.8	300	1.00		0.10	1.37	10%	0.13	10.13
	240	219	0.64	0.65	0.00	0.42	0.45	110.25	0.14	140.3	450	0.50		0.20	1.27	68%	1.85	11.98
	219	221	0.38	0.65	0.00	0.25	3.51	87.86	0.86	68.3	900	0.50		1.28	2.01	67%	0.57	15.43
	221	223	0.20	0.65	0.00	0.13	3.63	85.82	0.87	35.1	900	0.50		1.28	2.01	68%	0.29	15.72
	230S	231	0.24	0.65	0.00	0.15	0.15	111.06	0.05	52.8	300	1.00		0.10	1.37	49%	0.64	10.64
	231	233	0.08	0.65	0.00	0.05	0.21	107.23	0.06	18.7	375	0.50		0.12	1.12	50%	0.28	10.92
	233	235	0.31	0.65	0.00	0.20	0.41	105.66	0.12	68.8	450	0.50		0.20	1.27	59%	0.90	11.83
	235	237	0.17	0.65	0.00	0.11	0.52	100.89	0.15	37.7	450	0.50		0.20	1.27	72%	0.50	12.32
	237	223	0.12	0.65	0.00	0.08	0.60	98.47	0.16	27.5	450	0.50		0.20	1.27	81%	0.36	12.68
	223	225	0.24	0.65	0.00	0.16	4.39	84.82	1.03	59.0	975	0.50		1.58	2.12	65%	0.46	16.18
	225	227	0.08	0.65	0.00	0.05	4.45	83.27	1.03	20.2	975	0.50		1.58	2.12	65%	0.16	16.34
	227	190	0.11	0.65	0.00	0.07	4.52	82.75	1.04	27.2	975	0.50		1.58	2.12	66%	0.21	16.55
P1 EAST	190	P1E	0.00	0.90	0.00	0.00	70.39	72.35	14.15	29.2	2134 x 3600 Box	0.35		26.77	3.48	53%	0.14	20.21
	307W	445	0.36	0.65	0.00	0.23	0.23	111.06	0.07	64.8	300	1.50		0.12	1.68	60%	0.64	10.64
	445	447	0.08	0.65	0.00	0.05	0.28	107.22	0.08	14.1	300	3.00		0.17	2.37	50%	0.10	10.74
	447	449S	0.14	0.65	0.00	0.09	0.37	106.66	0.11	25.3	300	3.00		0.17	2.37	66%	0.18	10.92
	449S	315	0.43	0.65	0.00	0.28	0.65	105.66	0.19	78.1	375	2.60		0.28	2.56	67%	0.51	11.43
	315	466	0.31	0.65	0.00	0.20	0.85	102.92	0.24	56.6	525	0.70		0.36	1.66	68%	0.57	12.00
	466	455	0.31	0.65	0.00	0.20	1.05	100.05	0.29	56.6	525	0.70		0.36	1.66	81%	0.57	12.56
	449W	468	0.27	0.65	0.00	0.17	0.17	111.06	0.05	56.7	300	2.50		0.15	2.16	35%	0.44	10.44
	468	451	0.23	0.65	0.00	0.15	0.36	107.90	0.11	49.9	375	1.40		0.21	1.88	53%	0.44	10.97
	451	453	0.04	0.65	0.00	0.03	0.44	105.40	0.13	9.2	450	0.70		0.24	1.50	54%	0.10	11.07
	453	455	0.33	0.65	0.00	0.22	0.66	104.83	0.19	71.4	450	0.70		0.24	1.50	81%	0.79	11.87
	455	457	0.35	0.65	0.00	0.23	1.94	97.34	0.53	75.3	675	0.70		0.70	1.97	75%	0.64	13.20
	RLCB 1	468	0.06	0.65	0.00	0.04	0.04	111.06	0.01	43.2	300	1.00		0.10	1.37	12%	0.53	10.53
	RLCB 2	451	0.08	0.65	0.00	0.05	0.05	111.06	0.02	43.5	300	1.00		0.10	1.37	17%	0.53	10.53
	470	457	0.41	0.75	0.00	0.31	0.31	111.06	0.09	100.8	375	1.00		0.18	1.59	54%	1.06	11.06
	457	459	0.27	0.75	0.00	0.20	2.45	94.49	0.64	74.0	675	0.70		0.70	1.97	92%	0.63	13.83
	472E	480	0.07	0.65	0.00	0.04	0.14	107.35	0.04	12.5	300	1.00		0.10	1.37	42%	0.15	10.77
	480	482	0.40	0.65	0.00	0.26	0.54	106.49	0.16	72.1	525	0.70		0.36	1.66	44%	0.72	11.50
	482	459	0.40	0.65	0.00	0.26	0.79	102.58	0.23	72.1	525	0.70		0.36	1.66	63%	0.72	12.22
	RLCB 3	480	0.22	0.65	0.00	0.14	0.14	111.06	0.04	37.0	375	1.00		0.18	1.59	25%	0.39	10.39
	RLCB 4	472E	0.14	0.65	0.00	0.09	0.09	111.06	0.03	51.0	300	1.00		0.10	1.37	29%	0.62	10.62

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	459	461	0.27	0.75	0.00	0.20	3.45	91.85	0.88	74.0	825	0.70		1.20	2.25	73%	0.55	14.38
	472W	473	0.51	0.65	0.00	0.33	0.33	111.06	0.10	59.7	375	1.00		0.18	1.59	59%	0.63	10.63
	473	475	0.07	0.65	0.00	0.04	0.38	107.32	0.11	7.8	375	1.00		0.18	1.59	64%	0.08	10.71
	475	477	0.63	0.65	0.00	0.41	0.79	106.86	0.23	73.7	525	0.70		0.36	1.66	65%	0.74	11.45
	477	461	0.63	0.65	0.00	0.41	1.20	102.83	0.34	73.7	600	0.70		0.51	1.82	67%	0.68	12.12
	461	437	0.27	0.75	0.00	0.20	4.85	89.68	1.21	74.0	900	0.70		1.51	2.38	80%	0.52	14.90
	427E	433	0.05	0.65	0.00	0.03	0.03	111.06	0.01	12.4	300	2.50		0.15	2.16	6%	0.10	10.10
	433	435S	0.25	0.65	0.00	0.16	0.20	110.47	0.06	65.2	300	2.50		0.15	2.16	39%	0.50	10.60
	435S	437	0.21	0.65	0.00	0.14	0.33	107.49	0.10	79.0	300	2.50		0.15	2.16	65%	0.61	11.21
	437	424	0.33	0.75	0.00	0.25	5.43	87.72	1.32	81.3	900	0.70		1.51	2.38	87%	0.57	15.47
	427W	428	0.42	0.65	0.00	0.27	0.27	111.06	0.08	60.3	375	1.00		0.18	1.59	48%	0.63	10.63
	428	430	0.55	0.65	0.00	0.36	0.63	107.28	0.19	79.7	375	2.00		0.25	2.25	76%	0.59	11.23
	430	418	0.28	0.65	0.00	0.18	0.81	104.00	0.23	39.8	375	3.50		0.33	2.97	72%	0.22	11.45
	414E	416	0.40	0.65	0.00	0.26	0.26	111.06	0.08	44.3	300	1.00		0.10	1.37	82%	0.54	10.54
	416	418	0.29	0.65	0.00	0.19	0.45	107.82	0.13	32.9	450	0.50		0.20	1.27	67%	0.43	10.97
	418	420	0.37	0.65	0.00	0.24	1.50	102.82	0.43	74.0	675	0.50		0.59	1.66	72%	0.74	12.19
	435W	440	0.33	0.65	0.00	0.22	0.22	111.06	0.07	55.7	300	2.00		0.14	1.93	49%	0.48	10.48
	440	442	0.28	0.65	0.00	0.18	0.40	108.17	0.12	47.2	375	1.80		0.24	2.13	51%	0.37	10.85
	442	420	0.16	0.65	0.00	0.11	0.51	106.06	0.15	27.0	450	0.50		0.20	1.27	74%	0.35	11.20
	420	422	0.17	0.65	0.00	0.11	2.12	99.10	0.58	28.5	675	0.70		0.70	1.97	83%	0.24	12.43
	422	424	0.27	0.65	0.00	0.18	2.29	97.95	0.62	45.3	750	0.70		0.93	2.11	67%	0.36	12.79
	424	411	0.23	0.75	0.00	0.17	7.90	85.68	1.88	63.4	900 x 1800 Box	0.80		4.99	3.08	38%	0.34	15.81
	400	401	0.25	0.65	0.00	0.16	0.16	111.06	0.05	48.9	300	2.00		0.14	1.93	36%	0.42	10.42
	401	403	0.18	0.65	0.00	0.12	0.28	108.52	0.08	35.6	375	0.80		0.16	1.42	54%	0.42	10.84
	414W	403	0.19	0.65	0.00	0.12	0.12	111.06	0.04	46.6	300	1.00		0.10	1.37	39%	0.57	10.57
	403	405	0.16	0.65	0.00	0.10	0.51	106.12	0.15	25.2	450	0.80		0.26	1.60	59%	0.26	11.10
	405	407E	0.28	0.65	0.00	0.18	0.69	104.67	0.20	44.4	450	0.80		0.26	1.60	79%	0.46	11.56
	407E	409	0.48	0.65	0.00	0.31	1.00	102.24	0.28	75.0	525	0.70		0.36	1.66	79%	0.75	12.31
	409	411	0.48	0.65	0.00	0.31	1.31	98.52	0.36	74.6	600	0.70		0.51	1.82	70%	0.68	13.00
	411	377	0.16	0.90	0.00	0.14	9.36	84.51	2.20	77.8	1219 x 1829 Box	0.40		5.55	2.49	40%	0.52	16.33
	407S	353	0.30	0.65	0.00	0.20	0.20	111.06	0.06	66.3	300	1.00		0.10	1.37	63%	0.81	10.81
	353	371	0.07	0.75	0.00	0.06	0.25	106.29	0.07	16.2	375	0.50		0.12	1.12	60%	0.24	11.05
	371	372E	0.24	0.65	0.00	0.16	0.41	104.96	0.12	52.9	450	0.50		0.20	1.27	59%	0.70	11.74
	372E	377	0.46	0.65	0.00	0.30	0.71	101.31	0.20	85.3	450	0.70		0.24	1.50	84%	0.95	12.69
	398	377	0.74	0.65	0.00	0.48	0.48	111.06	0.15	89.2	375	1.00		0.18	1.59	85%	0.94	10.94
	377	379E	0.36	0.65	0.00	0.23	10.78	82.78	2.48	81.3	1219 x 1829 Box	0.50		6.20	2.78	40%	0.49	16.82
	379E	391	0.29	0.65	0.00	0.19	10.97	81.24	2.47	64.8	1219 x 1829 Box	0.70		7.34	3.29	34%	0.33	17.14
	391	340S	0.29	0.65	0.00	0.19	11.15	80.23	2.49	64.8	1219 x 1829 Box	0.70		7.34	3.29	34%	0.33	17.47
	340S	394	0.27	0.65	0.00	0.17	11.33	79.25	2.49	60.8	1219 x 1829 Box	0.70		7.34	3.29	34%	0.31	17.78
	394	385	0.08	0.65	0.00	0.05	11.38	78.36	2.48	18.2	1219 x 1829 Box	0.70		7.34	3.29	34%	0.09	17.87
	379S	381	0.46	0.65	0.00	0.30	0.30	111.06	0.09	61.6	375	1.00		0.18	1.59	53%	0.65	10.65
	381	383	0.12	0.65	0.00	0.08	0.38	107.21	0.11	15.9	375	0.70		0.15	1.33	77%	0.20	10.85
	383	389	0.39	0.65	0.00	0.25	0.63	106.08	0.19	52.0	450	0.70		0.24	1.50	78%	0.58	11.42
	389	385	0.47	0.65	0.00	0.30	0.94	102.96	0.27	62.0	525	0.70		0.36	1.66	74%	0.62	12.04
P1 NORTH	385	P1N	0.00	0.90	0.00	0.00	12.32	78.10	2.67	30.5	1219 x 1829 Box	0.50		6.20	2.78	43%	0.18	18.06

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	342	343	0.35	0.65	0.00	0.23	0.23	111.06	0.07	69.2	300	1.00		0.10	1.37	73%	0.84	10.84
	343	345	0.15	0.65	0.00	0.10	0.33	106.09	0.10	29.3	375	0.50		0.12	1.12	78%	0.43	11.28
	345	351	0.15	0.65	0.00	0.10	0.42	103.72	0.12	29.3	450	0.50		0.20	1.27	60%	0.38	11.66
	351	355	0.24	0.65	0.00	0.15	0.58	101.72	0.16	46.7	450	1.50		0.35	2.20	47%	0.35	12.02
	355	359	0.38	0.65	0.00	0.25	0.83	99.95	0.23	74.9	450	1.50		0.35	2.20	66%	0.57	12.59
	372S	374	0.47	0.65	0.00	0.30	0.30	111.06	0.09	56.0	300	1.50		0.12	1.68	79%	0.56	10.56
	374	359	0.15	0.65	0.00	0.10	0.40	107.72	0.12	18.2	300	3.00		0.17	2.37	72%	0.13	10.68
	359	361	0.00	0.90	0.00	0.00	1.23	97.24	0.33	33.6	750	0.50		0.79	1.78	42%	0.31	12.90
	361	363	0.13	0.65	0.00	0.09	1.31	95.82	0.35	87.9	825	0.40		0.91	1.70	39%	0.86	13.76
	363	838	0.09	0.65	0.00	0.06	1.37	92.13	0.35	57.3	825	0.40		0.91	1.70	39%	0.56	14.32
	838	365	0.09	0.65	0.00	0.06	1.43	89.88	0.36	57.3	825	0.40		0.91	1.70	39%	0.56	14.89
	365	367	0.05	0.65	0.00	0.04	1.46	87.76	0.36	36.2	825	0.40		0.91	1.70	39%	0.35	15.24
	367	369	0.03	0.65	0.00	0.02	1.48	86.47	0.36	20.2	825	0.40		0.91	1.70	39%	0.20	15.44
P1 WEST	369	P1W	0.00	0.90	0.00	0.00	1.48	85.77	0.35	47.7	825	0.50		1.02	1.90	35%	0.42	15.86
	1471	1472	0.07	0.75	0.00	0.05	0.05	111.06	0.02	52.0	300	1.00		0.10	1.37	17%	0.63	10.63
	1472	1474	0.41	0.65	0.00	0.27	0.32	107.29	0.10	62.3	300	3.50		0.18	2.56	53%	0.41	11.04
	1474	276	0.41	0.65	0.00	0.27	0.59	105.01	0.17	62.3	375	3.50		0.33	2.97	52%	0.35	11.39
	276	278	0.28	0.90	0.00	0.25	0.83	103.14	0.24	57.2	375	4.50		0.37	3.37	64%	0.28	11.67
	278	280	0.34	0.90	0.00	0.31	1.14	101.67	0.32	71.0	450	4.50		0.60	3.80	53%	0.31	11.98
	280	282	0.19	0.90	0.00	0.17	1.31	100.12	0.36	39.1	450	2.60		0.46	2.89	79%	0.23	12.21
	282	284	0.16	0.90	0.00	0.14	1.45	99.02	0.40	32.5	675	0.50		0.59	1.66	67%	0.33	12.53
	284	793	0.21	0.90	0.00	0.19	3.36	97.48	0.91	42.9	900	0.50		1.28	2.01	71%	0.36	12.89
	808	284	1.91	0.90	0.00	1.72	1.72	111.06	0.53	16.6	675	1.00		0.84	2.35	63%	0.12	10.12
	795	793	0.93	0.75	0.00	0.70	0.70	111.06	0.22	15.9	450	1.00		0.29	1.79	75%	0.15	10.15
	793	1557	0.10	0.90	0.00	0.09	4.15	95.86	1.10	20.7	975	0.50		1.58	2.12	70%	0.16	13.05
	1557	286	0.00	0.65	0.00	0.00	4.15	95.14	1.10	17.3	975	0.50		1.58	2.12	69%	0.14	13.19
Ex.Yorkton	W278	286	3.07	0.74	0.10	2.28	2.28	91.10	0.68	14.2	825	0.30	14.01	0.79	1.47	86%	0.16	14.18
	286	W279	0.00	0.90	0.00	0.00	6.42	90.46	1.72	15.9	1050	0.50		1.93	2.23	89%	0.12	14.29
	W277	W279	2.36	0.66	0.00	1.56	1.56	91.57	0.40	59.2	750	0.30	13.90	0.61	1.38	71%	0.71	14.61
POND P2	W279	P2	0.00	0.90	0.00	0.00	7.98	88.78	2.07	11.4	1050	0.90		2.59	2.99	81%	0.06	14.68
	558E	559	0.13	0.65	0.00	0.08	0.08	111.06	0.03	23.0	300	1.00		0.10	1.37	26%	0.28	10.28
	559	561	0.27	0.65	0.00	0.18	0.26	109.35	0.08	49.6	375	0.50		0.12	1.12	63%	0.74	11.02
	561	563	0.27	0.65	0.00	0.18	0.44	105.14	0.13	49.6	450	0.50		0.20	1.27	63%	0.65	11.67
	558S	595	0.42	0.65	0.00	0.27	0.27	111.06	0.08	76.2	375	1.00		0.18	1.59	48%	0.80	10.80
	595	563	0.18	0.65	0.00	0.12	0.39	106.34	0.11	32.5	450	0.50		0.20	1.27	57%	0.43	11.23
	563	565	0.31	0.65	0.00	0.20	1.03	101.69	0.29	57.4	600	0.50		0.43	1.54	67%	0.62	12.29
	565	567	0.23	0.65	0.00	0.15	1.18	98.62	0.32	41.8	600	0.50		0.43	1.54	74%	0.45	12.75
	589N	590	0.44	0.65	0.00	0.29	0.29	111.06	0.09	59.9	300	2.50		0.15	2.16	58%	0.46	10.46
	590	592	0.13	0.65	0.00	0.09	0.37	108.28	0.11	18.1	300	2.50		0.15	2.16	73%	0.14	10.60
	592	567	0.13	0.65	0.00	0.08	0.46	107.47	0.14	17.1	375	2.50		0.28	2.51	49%	0.11	10.71
	567	569	0.21	0.65	0.00	0.13	1.77	96.51	0.47	39.9	600	2.50		0.97	3.43	49%	0.19	12.94
	569	571	0.06	0.65	0.00	0.04	1.80	95.64	0.48	10.8	600	1.00		0.61	2.17	78%	0.08	13.02
	571	789	0.23	0.65	0.00	0.15	1.95	95.28	0.52	44.0	600	1.00		0.61	2.17	84%	0.34	13.36

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	789	790	0.09	0.65	0.00	0.06	2.01	93.81	0.52	17.5	675	1.00		0.84	2.35	62%	0.12	13.48
	790	573	0.17	0.65	0.00	0.11	2.12	93.28	0.55	32.4	675	1.00		0.84	2.35	65%	0.23	13.71
	573	575	0.06	0.65	0.00	0.04	2.16	92.33	0.55	10.7	675	1.00		0.84	2.35	66%	0.08	13.79
	575	577E	0.37	0.65	0.00	0.24	2.40	92.02	0.61	72.0	750	0.70		0.93	2.11	66%	0.57	14.36
	740	741	0.26	0.65	0.00	0.17	0.17	111.06	0.05	40.0	300	3.50		0.18	2.56	29%	0.26	10.26
	741	577E	0.29	0.65	0.00	0.19	0.36	109.47	0.11	45.3	300	3.50		0.18	2.56	60%	0.30	10.56
	577E	579	0.39	0.65	0.00	0.25	3.01	89.75	0.75	60.5	750	3.00		1.93	4.36	39%	0.23	14.59
	579	581	0.32	0.65	0.00	0.21	3.22	88.87	0.79	49.2	825	0.50		1.02	1.90	78%	0.43	15.02
	581	583	0.44	0.65	0.00	0.28	3.50	87.27	0.85	67.8	825	0.50		1.02	1.90	84%	0.59	15.62
	583	585	0.21	0.65	0.00	0.13	3.63	85.16	0.86	32.0	825	0.50		1.02	1.90	85%	0.28	15.90
	585	587	0.36	0.90	0.00	0.32	3.96	84.21	0.93	28.5	1200	0.40		2.47	2.18	38%	0.22	16.12
	587	762	0.00	0.65	0.00	0.00	3.96	83.48	0.92	34.8	1200	0.40		2.47	2.18	37%	0.27	16.38
	762	764	0.00	0.65	0.00	0.00	3.96	82.61	0.91	50.1	1200	0.40		2.47	2.18	37%	0.38	16.76
	764	766	0.00	0.65	0.00	0.00	3.96	81.40	0.89	17.0	1200	0.40		2.47	2.18	36%	0.13	16.89
	766	768	0.00	0.65	0.00	0.00	3.96	81.00	0.89	47.7	1200	0.40		2.47	2.18	36%	0.36	17.26
	768	770	0.00	0.65	0.00	0.00	3.96	79.89	0.88	64.2	1200	0.40		2.47	2.18	36%	0.49	17.75
	770	534	0.00	0.65	0.00	0.00	3.96	78.45	0.86	30.4	1200	0.40		2.47	2.18	35%	0.23	17.98
	799	534	0.40	0.65	0.00	0.26	0.26	111.06	0.08	74.0	300	1.80		0.13	1.84	62%	0.67	10.67
	534	536	0.19	0.65	0.00	0.12	4.34	77.79	0.94	34.7	1200	0.40		2.47	2.18	38%	0.26	18.25
	536	538	0.14	0.65	0.00	0.09	4.43	77.05	0.95	26.6	1200	0.40		2.47	2.18	38%	0.20	18.45
	538	540	0.00	0.65	0.00	0.00	4.43	76.49	0.94	20.4	1200	0.40		2.47	2.18	38%	0.16	18.61
	540	542	0.00	0.65	0.00	0.00	4.43	76.07	0.94	32.7	1200	0.40		2.47	2.18	38%	0.25	18.86
	542	544	0.00	0.65	0.00	0.00	4.43	75.40	0.93	45.3	1200	0.40		2.47	2.18	38%	0.35	19.20
	556N	544	0.18	0.75	0.00	0.14	0.14	111.06	0.04	77.0	300	1.00		0.10	1.37	43%	0.94	10.94
	544	546	0.00	0.65	0.00	0.00	4.57	74.50	0.95	50.1	1200	0.40		2.47	2.18	38%	0.38	19.59
	546	548	0.30	0.40	0.00	0.12	4.69	73.53	0.96	50.1	1200	0.40		2.47	2.18	39%	0.38	19.97
	548	550	0.22	0.65	0.00	0.14	4.83	72.59	0.97	57.1	1200	0.50		2.76	2.44	35%	0.39	20.36
	550	552	0.15	0.65	0.00	0.10	4.93	71.66	0.98	38.8	1200	0.50		2.76	2.44	36%	0.27	20.62
	552	503	0.25	0.65	0.00	0.16	5.09	71.04	1.00	64.6	1200	0.50		2.76	2.44	36%	0.44	21.07
	485W	503	0.36	0.65	0.00	0.23	0.23	111.06	0.07	69.0	300	1.00		0.10	1.37	75%	0.84	10.84
	503	505	0.51	0.65	0.00	0.33	5.66	70.04	1.10	79.0	1200	0.40		2.47	2.18	45%	0.60	21.67
	524	525	0.15	0.65	0.00	0.10	0.10	111.06	0.03	63.3	300	1.00		0.10	1.37	32%	0.77	10.77
	525	527	0.04	0.65	0.00	0.03	0.13	106.50	0.04	17.5	300	0.50		0.07	0.97	56%	0.30	11.07
	527	518E	0.07	0.65	0.00	0.05	0.18	104.83	0.05	29.7	300	0.50		0.07	0.97	75%	0.51	11.58
	518E	530	0.43	0.75	0.00	0.32	0.50	102.13	0.14	65.8	450	0.50		0.20	1.27	70%	0.87	12.45
	530	505	0.60	0.75	0.00	0.45	0.95	97.88	0.26	93.2	525	0.70		0.36	1.66	72%	0.93	13.38
	498W	505	0.30	0.65	0.00	0.20	0.20	111.06	0.06	67.1	300	1.00		0.10	1.37	62%	0.82	10.82
	505	507	0.44	0.75	0.00	0.33	7.13	68.71	1.36	76.8	1350	0.40		3.38	2.36	40%	0.54	22.21
	518S	519	0.28	0.65	0.00	0.19	0.19	111.06	0.06	78.9	300	1.00		0.10	1.37	59%	0.96	10.96
	519	521	0.34	0.65	0.00	0.22	0.40	105.44	0.12	93.0	375	0.80		0.16	1.42	75%	1.09	12.05
	521	507	0.36	0.65	0.00	0.23	3.82	99.77	1.06	99.8	900	0.70		1.51	2.38	70%	0.70	12.75
	781	521	3.54	0.90	0.00	3.19	3.19	111.06	0.98	10.7	825	1.00		1.44	2.69	68%	0.07	10.07
	507	514	0.25	0.75	0.00	0.18	11.14	67.57	2.09	54.4	1350	0.40		3.38	2.36	62%	0.38	22.60
	514	509	0.25	0.75	0.00	0.18	11.32	66.79	2.10	54.4	1350	0.40		3.38	2.36	62%	0.38	22.98
	516	509	0.33	0.65	0.00	0.21	0.21	111.06	0.07	40.0	300	1.00		0.10	1.37	68%	0.49	10.49

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	509	494	0.20	0.75	0.00	0.15	11.68	66.02	2.14	50.0	1350	0.40		3.38	2.36	63%	0.35	23.33
	485E	496	0.20	0.65	0.00	0.13	0.13	111.06	0.04	45.4	300	1.00		0.10	1.37	42%	0.55	10.55
	496	486	0.24	0.65	0.00	0.16	0.29	107.74	0.09	54.0	375	0.70		0.15	1.33	59%	0.68	11.23
	486	488	0.05	0.65	0.00	0.03	0.32	103.97	0.09	10.4	375	0.70		0.15	1.33	63%	0.13	11.36
	488	490	0.32	0.65	0.00	0.21	0.53	103.28	0.15	70.5	450	0.70		0.24	1.50	63%	0.78	12.14
	498E	499	0.16	0.65	0.00	0.11	0.11	111.06	0.03	33.2	300	1.00		0.10	1.37	34%	0.40	10.40
	499	490	0.37	0.65	0.00	0.24	0.34	108.61	0.10	74.1	375	0.70		0.15	1.33	71%	0.93	11.34
	490	492	0.26	0.75	0.00	0.20	1.07	99.33	0.29	61.1	525	0.70		0.36	1.66	82%	0.61	12.76
	492	494	0.10	0.75	0.00	0.07	2.30	96.46	0.62	22.1	675	1.00		0.84	2.35	73%	0.16	12.91
	777	492	1.29	0.90	0.00	1.16	1.16	111.06	0.36	13.0	525	1.00		0.43	1.99	83%	0.11	10.11
POND P3	494	P3	0.00	0.65	0.00	0.00	13.99	65.33	2.54	22.6	1350	0.50		3.77	2.64	67%	0.14	23.48
	589S	708	0.52	0.65	0.00	0.34	0.34	111.06	0.10	80.6	300	2.50		0.15	2.16	68%	0.62	10.62
	708	710	0.33	0.65	0.00	0.21	0.55	107.35	0.16	50.8	450	0.70		0.24	1.50	68%	0.56	11.19
	710	712	0.26	0.65	0.00	0.17	0.72	104.22	0.21	40.2	525	0.70		0.36	1.66	58%	0.40	11.59
	723E	712	0.20	0.65	0.00	0.13	0.13	111.06	0.04	54.5	300	1.00		0.10	1.37	41%	0.66	10.66
	712	714	0.36	0.65	0.00	0.23	1.08	102.10	0.31	61.6	525	2.00		0.61	2.81	50%	0.37	11.95
	714	716S	0.28	0.65	0.00	0.18	1.26	100.26	0.35	48.5	525	2.00		0.61	2.81	58%	0.29	12.24
	577S	716S	0.13	0.65	0.00	0.08	0.08	111.06	0.03	76.2	300	1.00		0.10	1.37	27%	0.93	10.93
	716S	718	0.14	0.65	0.00	0.09	1.44	98.86	0.39	86.3	525	2.00		0.61	2.81	65%	0.51	12.75
	728	729	0.32	0.65	0.00	0.21	0.21	111.06	0.06	43.0	300	2.00		0.14	1.93	47%	0.37	10.37
	729	718	0.53	0.65	0.00	0.34	0.55	108.82	0.17	70.1	375	2.00		0.25	2.25	67%	0.52	10.89
	718	720	0.32	0.65	0.00	0.21	2.20	96.47	0.59	49.4	600	1.60		0.78	2.75	76%	0.30	13.05
	720	642	0.39	0.65	0.00	0.25	2.45	95.13	0.65	58.9	675	1.00		0.84	2.35	77%	0.42	13.47
	716E	745	0.21	0.65	0.00	0.14	0.14	111.06	0.04	65.8	300	2.00		0.14	1.93	31%	0.57	10.57
	745	640	0.26	0.65	0.00	0.17	0.31	107.67	0.09	78.3	300	2.00		0.14	1.93	67%	0.67	11.24
	640	642	0.26	0.65	0.00	0.17	0.47	103.92	0.14	79.8	450	0.70		0.24	1.50	57%	0.89	12.13
	642	644	0.51	0.75	0.00	0.38	3.31	93.33	0.86	90.0	825	0.70		1.20	2.25	71%	0.67	14.14
	644	646	0.26	0.75	0.00	0.20	4.03	90.61	1.01	46.5	900	0.70		1.51	2.38	67%	0.33	14.46
	646	648	0.44	0.75	0.00	0.33	4.67	89.34	1.16	78.0	900	0.80		1.62	2.55	72%	0.51	14.98
	775	644	1.32	0.40	0.00	0.53	0.53	111.06	0.16	16.3	525	1.00		0.43	1.99	38%	0.14	10.14
	732	733	0.14	0.75	0.00	0.11	0.11	111.06	0.03	50.8	300	2.00		0.14	1.93	24%	0.44	10.44
	733	735	0.14	0.75	0.00	0.10	0.21	108.42	0.06	49.9	300	2.00		0.14	1.93	46%	0.43	10.87
	735	737	0.13	0.75	0.00	0.10	0.31	105.96	0.09	47.6	300	2.00		0.14	1.93	66%	0.41	11.28
	737	646	0.00	0.65	0.00	0.00	0.31	103.72	0.09	33.5	300	2.00		0.14	1.93	65%	0.29	11.57
	773	533	2.01	0.90	0.00	1.81	1.81	111.06	0.56	13.3	675	1.00		0.84	2.35	66%	0.09	10.09
	533	657	0.31	0.65	0.00	0.20	2.01	110.48	0.62	56.7	675	1.00		0.84	2.35	73%	0.40	10.50
	657	659	0.31	0.65	0.00	0.20	2.21	108.08	0.66	56.7	750	0.70		0.93	2.11	71%	0.45	10.94
	659	648	0.21	0.65	0.00	0.14	2.35	105.53	0.69	38.4	750	0.70		0.93	2.11	74%	0.30	11.25
	648	650	0.49	0.75	0.00	0.37	7.38	87.43	1.79	79.0	1050	0.80		2.44	2.82	73%	0.47	15.44
	679W	684	0.38	0.65	0.00	0.25	0.25	111.06	0.08	92.0	300	1.00		0.10	1.37	78%	1.12	11.12
	684	686	0.11	0.65	0.00	0.07	0.32	104.57	0.09	26.5	375	0.50		0.12	1.12	74%	0.39	11.51
	686	682	0.34	0.65	0.00	0.22	0.54	102.49	0.15	83.8	450	0.70		0.24	1.50	64%	0.93	12.45
	679E	680	0.08	0.65	0.00	0.05	0.05	111.06	0.02	12.4	300	2.00		0.14	1.93	11%	0.11	10.11
	680	682	0.40	0.65	0.00	0.26	0.31	110.40	0.10	64.4	300	2.00		0.14	1.93	70%	0.55	10.66

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	682	689	0.22	0.65	0.00	0.14	0.99	97.90	0.27	79.3	525	0.70		0.36	1.66	75%	0.79	13.24
	703S	689	0.45	0.65	0.00	0.29	0.29	111.06	0.09	74.0	300	2.70		0.16	2.25	57%	0.55	10.55
	703E	705	0.14	0.65	0.00	0.09	0.09	111.06	0.03	23.0	300	1.00		0.10	1.37	29%	0.28	10.28
	705	691	0.45	0.65	0.00	0.29	0.38	109.35	0.12	73.9	300	2.70		0.16	2.25	73%	0.55	10.83
	689	691	0.07	0.65	0.00	0.05	1.33	94.32	0.35	23.0	525	1.50		0.53	2.43	66%	0.16	13.40
	691	693	0.18	0.65	0.00	0.12	1.83	93.65	0.48	77.3	600	1.50		0.75	2.66	63%	0.48	13.88
	723S	725	0.19	0.65	0.00	0.12	0.12	111.06	0.04	16.0	300	3.00		0.17	2.37	23%	0.11	10.11
	725	693	0.81	0.65	0.00	0.53	0.65	110.36	0.20	68.4	375	3.00		0.30	2.75	66%	0.41	10.53
	693	695	0.69	0.65	0.00	0.45	2.93	91.64	0.75	73.8	675	2.00		1.19	3.32	63%	0.37	14.25
	695	697	0.49	0.65	0.00	0.32	3.25	90.17	0.81	52.6	675	2.00		1.19	3.32	68%	0.26	14.52
	697	699	0.49	0.65	0.00	0.32	3.57	89.15	0.88	52.6	675	2.00		1.19	3.32	74%	0.26	14.78
	699	677	0.51	0.65	0.00	0.33	3.90	88.16	0.96	54.2	825	0.70		1.20	2.25	80%	0.40	15.18
	676	677	0.21	0.65	0.00	0.14	0.14	111.06	0.04	54.1	300	1.00		0.10	1.37	44%	0.66	10.66
	674	665	0.24	0.65	0.00	0.15	0.15	111.06	0.05	60.8	300	1.00		0.10	1.37	49%	0.74	10.74
	677	665	0.04	0.65	0.00	0.03	4.06	86.69	0.98	23.3	825	0.70		1.20	2.25	81%	0.17	15.35
	662	663	0.15	0.65	0.00	0.10	0.10	111.06	0.03	46.1	300	1.00		0.10	1.37	31%	0.56	10.56
	663	665	0.00	0.65	0.00	0.00	0.10	107.69	0.03	18.9	300	0.50		0.07	0.97	43%	0.33	10.89
	665	672	0.33	0.65	0.00	0.21	4.53	86.08	1.08	67.7	900	0.70		1.51	2.38	72%	0.47	15.83
	672	667	0.28	0.65	0.00	0.18	4.71	84.44	1.11	57.5	900	0.70		1.51	2.38	73%	0.40	16.23
	667	669	0.07	0.65	0.00	0.04	4.76	83.10	1.10	14.1	900	0.70		1.51	2.38	73%	0.10	16.33
	669	650	0.36	0.65	0.00	0.23	4.99	82.78	1.15	74.0	975	0.50		1.58	2.12	72%	0.58	16.91
	653	654	0.55	0.65	0.00	0.36	0.36	111.06	0.11	82.7	375	1.00		0.18	1.59	63%	0.87	10.87
	654	650	0.30	0.65	0.00	0.20	0.55	105.96	0.16	45.9	450	0.70		0.24	1.50	68%	0.51	11.38
	650	633	0.53	0.75	0.00	0.40	13.33	80.95	3.00	90.0	1350	0.50		3.77	2.64	79%	0.57	17.48
	636	637	0.62	0.65	0.00	0.40	0.40	111.06	0.12	80.2	375	1.00		0.18	1.59	71%	0.84	10.84
	637	633	0.62	0.65	0.00	0.40	0.81	106.10	0.24	80.2	525	0.50		0.30	1.40	78%	0.95	11.79
	611N	625	0.38	0.65	0.00	0.25	0.25	111.06	0.08	56.4	300	1.00		0.10	1.37	79%	0.69	10.69
	625	627	0.38	0.65	0.00	0.25	0.49	106.98	0.15	56.4	450	0.50		0.20	1.27	73%	0.74	11.43
	627	629	0.11	0.65	0.00	0.07	0.56	102.93	0.16	15.8	450	0.50		0.20	1.27	80%	0.21	11.64
	629	631	0.41	0.65	0.00	0.27	0.83	101.86	0.24	61.2	525	0.50		0.30	1.40	77%	0.73	12.36
	631	633	0.31	0.65	0.00	0.20	1.03	98.29	0.28	46.2	600	0.50		0.43	1.54	65%	0.50	12.86
	633	602	0.42	0.75	0.00	0.32	15.48	79.23	3.41	76.3	1350	0.50		3.77	2.64	90%	0.48	17.96
	556S	600	0.18	0.75	0.00	0.14	0.14	111.06	0.04	75.7	300	1.00		0.10	1.37	43%	0.92	10.92
	600	602	0.00	0.65	0.00	0.00	0.14	105.66	0.04	36.3	300	0.50		0.07	0.97	58%	0.62	11.55
	611E	612	0.07	0.65	0.00	0.05	0.05	111.06	0.01	16.0	300	1.00		0.10	1.37	15%	0.19	10.19
	612	614	0.26	0.65	0.00	0.17	0.21	109.87	0.07	55.4	375	0.50		0.12	1.12	53%	0.82	11.02
	614	616	0.10	0.65	0.00	0.06	0.28	105.13	0.08	21.3	375	0.50		0.12	1.12	66%	0.32	11.33
	616	618	0.20	0.65	0.00	0.13	0.41	103.43	0.12	43.2	450	0.50		0.20	1.27	58%	0.57	11.90
	618	620	0.15	0.65	0.00	0.10	0.51	100.52	0.14	32.0	450	0.50		0.20	1.27	70%	0.42	12.32
	620	622	0.25	0.65	0.00	0.16	0.67	98.48	0.18	54.7	525	0.50		0.30	1.40	60%	0.65	12.97
	622	602	0.12	0.65	0.00	0.08	0.75	95.50	0.20	25.7	525	0.50		0.30	1.40	65%	0.30	13.28
	602	604	0.12	0.65	0.00	0.08	16.44	77.84	3.56	50.1	1350	0.60		4.13	2.89	86%	0.29	18.25
	748	749	0.13	0.75	0.00	0.10	0.10	111.06	0.03	52.4	300	1.00		0.10	1.37	31%	0.64	10.64
	749	608	0.00	0.65	0.00	0.00	0.10	107.26	0.03	17.4	300	0.50		0.07	0.97	42%	0.30	10.94

4134 16TH AVENUE
Storm Sewer Design Sheet (5-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 5 Yrs, n = 0.013 — A = 1045.41
Rainfall Intensity = $A/(T+B)^C$ — B = 4.90
Starting 'T' = 10 min — C = 0.83

Street	Manhole		Runoff					Rainfall Intensity	Cumm. Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Q_{ACT}/Q_{CAP}	Time	
	From	To	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R			Length	Diameter	Slope					Section	Accum.
			(ha)	"R"	(m^3/s)			(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(%)	(min)	(min)
	608	604	0.62	0.80	0.00	0.50	0.59	105.57	0.17	84.7	450	0.80		0.26	1.60	68%	0.88	11.82
	779	604	2.14	0.40	0.00	0.86	0.86	111.06	0.26	17.5	600	1.00		0.61	2.17	43%	0.13	10.13
POND P4	604	P4	0.00	0.65	0.00	0.00	17.89	77.04	3.83	27.7	1350	0.70		4.47	3.12	86%	0.15	18.40

Stantec

4134 16TH AVENUE

Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	EX.28	EX.29	66.85	0.71	0.00	47.63	47.63	Y	20.89	157.87	20.89	68.5	2400	1.09	15.00	25.85	5.71	0.20	15.20	81%	190.47	189.84	0.00	189.05	-1.42	Existing Pipe
	EX.29	EX.100	0.69	0.81	0.00	0.56	48.19	N	20.90	156.59	20.96	106.0	2400	0.65		19.96	4.41	0.40	15.60	105%	189.84	189.04	0.11	192.84	3.00	Okay!
Ext. Berczy	EX.100	160	0.57	0.81	0.00	0.47	48.65	N	20.80	154.10	20.83	88.7	2400	0.62		19.49	4.31	0.34	15.94	107%	189.03	188.48	0.00	190.68	1.65	Okay!
	831	832	0.16	0.94	0.00	0.15	0.15	N	0.04	199.39	0.08	60.1	300	1.00		0.10	1.37	0.73	10.73	38%	195.13	194.52	0.00	197.83	2.71	Okay!
	832	325	0.23	0.94	0.00	0.21	0.36	N	0.09	191.88	0.19	66.5	375	0.80		0.16	1.42	0.78	11.51	55%	194.52	193.99	0.00	196.15	1.63	Okay!
	325	327	0.07	0.94	0.00	0.06	0.86	N	0.20	184.52	0.44	20.0	450	0.80		0.26	1.60	0.21	11.72	77%	193.99	193.83	0.00	195.10	1.11	Okay!
	327	329S	0.29	0.94	0.00	0.27	1.13	N	0.26	182.65	0.57	84.5	525	0.80		0.38	1.78	0.79	12.51	66%	193.83	193.16	0.00	194.93	1.10	Okay!
	324	325	0.49	0.88	0.00	0.43	0.43	N	0.11	199.39	0.24	61.1	300	3.00		0.17	2.37	0.43	10.43	63%	195.82	193.99	0.00	196.88	1.06	Okay!
	331	329S	0.34	0.81	0.00	0.28	0.28	N	0.07	199.39	0.15	61.6	300	3.00		0.17	2.37	0.43	10.43	41%	195.03	193.18	0.00	196.04	1.01	Okay!
	329S	152	0.25	0.81	0.00	0.20	1.61	N	0.35	175.92	0.79	61.6	525	3.00		0.74	3.44	0.30	12.81	47%	193.06	191.21	0.00	194.18	1.12	Okay!
	147	825	0.09	0.94	0.00	0.08	0.08	N	0.02	199.39	0.05	39.4	300	1.00		0.10	1.37	0.48	10.48	22%	192.65	192.26	0.00	193.80	1.15	Okay!
	825	148	0.00	1.00	0.00	0.00	0.08	N	0.02	194.40	0.05	13.6	300	1.00		0.10	1.37	0.17	10.65	21%	192.21	192.07	0.00	194.70	2.49	Okay!
	827	828	0.16	0.94	0.00	0.15	0.15	N	0.04	199.39	0.09	38.2	300	2.00		0.14	1.93	0.33	10.33	28%	194.76	193.99	0.00	195.73	0.97	Okay!
	828	148	0.07	0.94	0.00	0.06	0.22	N	0.05	195.94	0.12	15.7	300	1.00		0.10	1.37	0.19	10.52	54%	193.94	193.79	0.00	194.97	1.03	Okay!
	148	150	0.29	0.94	0.00	0.27	0.57	N	0.14	192.74	0.31	67.7	450	0.50		0.20	1.27	0.89	11.54	68%	192.07	191.74	0.00	194.78	2.71	Okay!
	150	152	0.37	0.94	0.00	0.34	0.92	N	0.21	184.30	0.47	85.2	525	0.50		0.30	1.40	1.01	12.55	69%	191.74	191.31	0.00	193.75	2.01	Okay!
	152	154	0.09	0.88	0.00	0.08	2.61	N	0.56	173.52	1.26	21.8	525	3.00		0.74	3.44	0.11	12.92	75%	191.21	190.56	0.00	192.35	1.14	Okay!
	154	156	0.24	0.88	0.00	0.21	2.82	N	0.60	172.69	1.35	57.1	750	0.50		0.79	1.78	0.53	13.45	76%	190.56	190.27	0.00	191.70	1.14	Okay!
	803	800	0.24	0.81	0.00	0.20	0.20	N	0.05	199.39	0.11	101.5	300	1.00		0.10	1.37	1.24	11.24	50%	193.29	192.27	0.00	195.60	2.31	Okay!
	800	268	0.12	0.81	0.00	0.10	0.29	N	0.07	187.05	0.15	22.5	375	0.50		0.12	1.12	0.33	11.57	54%	191.97	191.86	0.00	193.51	1.54	Okay!
	268	269	0.15	0.81	0.00	0.12	0.93	N	0.21	183.98	0.48	28.8	525	0.50		0.30	1.40	0.34	11.91	70%	191.79	191.65	0.00	193.36	1.57	Okay!
	801	268	1.04	0.50	0.00	0.52	0.52	N	0.13	199.39	0.29	14.1	375	1.00		0.18	1.59	0.15	10.15	73%	192.15	192.01	0.00	193.53	1.38	Okay!
	272	273	0.14	0.94	0.00	0.13	0.13	N	0.03	199.39	0.07	65.4	300	1.00		0.10	1.37	0.80	10.80	32%	192.70	192.05	0.00	194.54	1.84	Okay!
	273	269	0.14	0.94	0.00	0.13	0.25	N	0.06	191.25	0.13	65.4	375	0.50		0.12	1.12	0.97	11.77	48%	192.05	191.72	0.00	193.99	1.94	Okay!
	269	262	0.43	0.81	0.00	0.35	1.54	N	0.34	180.96	0.77	64.2	600	0.50		0.43	1.54	0.70	12.61	79%	191.65	191.35	0.00	193.21	1.57	Okay!
	255	256	0.09	0.94	0.00	0.08	0.08	N	0.02	199.39	0.05	25.2	300	1.00		0.10	1.37	0.31	10.31	22%	192.91	192.66	0.00	194.80	1.89	Okay!
	256	258N	0.03	0.94	0.00	0.02	0.11	N	0.03	196.16	0.06	7.4	300	0.50		0.07	0.97	0.13	10.44	39%	192.61	192.57	0.00	194.08	1.47	Okay!
	258W	260	0.25	0.94	0.00	0.23	0.23	N	0.06	199.39	0.13	69.5	300	0.90		0.09	1.30	0.89	10.89	63%	192.95	192.32	0.00	193.88	0.93	Okay!
	260	262	0.25	0.94	0.00	0.24	0.47	N	0.11	190.31	0.25	70.9	375	0.90		0.17	1.51	0.78	11.68	67%	192.25	191.61	0.00	193.35	1.10	Okay!
	262	197	0.12	0.81	0.00	0.10	2.11	N	0.45	175.13	1.02	47.1	675	0.50		0.59	1.66	0.47	13.08	76%	191.35	191.11	0.00	192.73	1.38	Okay!
	258N	194N	0.16	0.94	0.00	0.15	0.26	N	0.06	194.85	0.14	47.0	375	0.50		0.12	1.12	0.70	11.13	51%	192.57	192.33	0.00	193.88	1.31	Okay!
	194W	195	0.24	0.94	0.00	0.22	0.22	N	0.06	199.39	0.12	69.1	300	1.00		0.10	1.37	0.84	10.84	57%	192.10	191.41	0.00	193.34	1.24	Okay!
	195	197	0.24	0.94	0.00	0.22	0.45	N	0.11	190.81	0.24	69.1	450	0.50		0.20	1.27	0.91	11.75	52%	191.41	191.06	0.00	192.88	1.47	Okay!
	197	252	0.09	0.81	0.00	0.07	2.63	N	0.55	171.40	1.25	45.6	675	2.50		1.33	3.71	0.20	13.29	42%	191.06	189.92	0.00	192.37	1.31	Okay!
	194N	248	0.14	0.81	0.00	0.11	0.37	N	0.09	188.02	0.20	45.5	375	0.50		0.12	1.12	0.67	11.81	70%	192.28	192.06	0.00	193.34	1.06	Okay!
	245	246	0.14	0.81	0.00	0.12	0.12	N	0.03	199.39	0.06	47.3	300	1.00		0.10	1.37	0.58	10.58	30%	192.63	192.16	0.00	193.31	0.68	Okay!
	246	248	0.03	0.81	0.00	0.03	0.14	N	0.03	193.42	0.08	10.5	300	0.50		0.07	0.97	0.18	10.76	50%	192.11	192.06	0.00	193.24	1.13	Okay!
	248	250	0.22	0.81	0.00	0.18	0.69	N	0.16	181.89	0.35	71.7	450	1.00		0.29	1.79	0.67	12.47	55%	192.06	191.37	0.00	193.22	1.16	Okay!
	250	252	0.22	0.81	0.00	0.18	0.87	N	0.19	176.24	0.43	71.6	525	0.50		0.30	1.40	0.85	13.32	62%	191.37	191.01	0.00	192.60	1.24	Okay!
	252	156	0.41	0.81	0.00	0.33	3.83	N	0.80	169.56	1.80	75.0	750	1.10		1.17	2.64	0.47	13.80	69%	189.92	189.10	0.00	192.01	2.09	Okay!
	156	158	0.00	1.00	0.00	0.00	6.65	N	1.36	166.08	3.07	34.0	1050	0.50		1.93	2.23	0.25	14.05	70%	189.10	188.93	0.00	190.10	1.00	Okay!
	158	160	0.00	1.00	0.00	0.00	6.65	N	1.34	164.27	3.03	7.4	1050	0.50		1.93	2.23	0.06	14.11	70%	188.88	188.84	0.00	189.74	0.86	Okay!
	160	162	0.50	0.81	0.00	0.41	55.71	Y	21.81	152.03	23.53	38.0	2134 x 3048 Box	0.50		25.93	3.99	0.16	16.10	85%	187.73	187.54	0.00	189.68	1.95	Okay!
	329E	292S	0.38	0.94	0.00	0.36	0.36	Y	0.20	199.39	0.20	81.6	375	1.00		0.18	1.59	0.86	10.86	51%	193.13	192.31	0.00	194.18	1.05	Okay!
	292S	297	0.33	0.94	0.00	0.30	0.66	Y	0.35	190.66	0.35	69.2	375	3.00		0.30	2.75	0.42	11.28	51%	192.21	190.14	0.00	193.35	1.14	Okay!
	297	162	0.30	0.94	0.00	0.28	0.95	Y	0.49	186.68	0.49	64.3	375	3.00		0.30	2.75	0.39	11.67	72%	190.09	188.16	0.00	191.33	1.24	Okay!
	290	162	0.42	0.94	0.00	0.39	0.39	Y	0.22	199.39	0.22	78.3	300	2.80		0.16	2.29	0.57	10.57	60%	190.55	188.36	0.00	191.70	1.15	Okay!
	162	164	0.36	0.94	0.00	0.34	57.39	Y	22.37	151.09	24.09	73.3	2134 x 3048 Box	0.50		25.93	3.99	0.31	16.41	86%	187.51	187.14	0.00	189.45	1.94	Okay!
	300E	301	0.13	0.81	0.00	0.11	0.11	Y	0.06	199.39	0.06	12.5	300	3.00		0.17	2.37	0.09	10.09	16%	192.62	192.27	0.00	193.74	1.12	Okay!
	1540	301	0.46	0.69	0.00	0.32	0.32	Y	0.18	199.39	0.18	30.0	375	1.50		0.21	1.94	0.26	10.26	82%	194.08	193.63	0.00	192.39	-1.68	Ex.DCB
	301	293	0.49	0.81	0.00	0.40	0.82	Y	0.45	196.68	0.45	46.0	375	3.00		0.30	2.75	0.28	10.54	98%	192.27	190.89	0.00	193.33	1.06	Okay!
	292W	293	0.39	0.94	0.00	0.37	0.37	Y	0.20	199.39	0.20	73.3	300	2.00		0.14	1.93	0.63	10.63	66%	192.28	190.82	0.00	193.35	1.07	Okay!
	293	304	0.38	0.94	0.00	0.36	1.55	Y	0.83	192.88	0.83	65.9	450	3.00		0.49	3.10	0.35	10.98	94%	190.82	188.92	0.00	191.96	1.14	Okay!
	304	164	0.40	0.94	0.00	0.37	1.92	Y	1.01	189.43	1.01	67.7	600	1.40		0.73	2.57	0.44	11.42	75%	188.92	187.97	0.00	190.25	1.33	Okay!
	758	759	0.26	0.94	0.00	0.24	0.24	Y	0.14	199.39	0.14	47.1	300	1.00		0.10	1.37	0.57	10.57	62%	188.71	188.24	0.00	189.93	1.22	Okay!
	759	164	0.25	0.94	0.00	0.23	0.48	Y	0.26	193.44	0.26	45.3	375	1.00		0.18	1.59	0.48	11.05	65%	188.24	187.78	0.00	189.43	1.19	Okay!
	164	166	0.37	0.94	0.00	0.35	60.13	Y	23.22	149.31	24.94	74.8	2134 x 3048 Box	0.45		24.60	3.78	0.33	16.74	92%	187.11	186.77	0.00	188.90	1.79	Okay!
	300W	307S	0.27	0.88	0.00	0.23	0.23	Y	0.13	199.39	0.13	65.9	300	1.50		0.12	1.68	0.66	10.66	49%	192.99	192.00	0.00	193.74	0.75	Okay!
	307S	309	0.37	0.88	0.00	0.32	0.56	Y	0.30	192.63	0.30	91.4	300	3.00		0.17	2.37	0.64	11.30	79%	191.90	189.16	0.00	192.95	1.05	Okay!

4134 16TH AVENUE

Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	309	166	0.39	0.88	0.00	0.34	0.90	Y	0.47	186.47	0.47	97.2	375	2.00		0.25	2.25	0.72	12.02	84%	189.16	187.21	0.00	190.31	1.15	Okay!
	166	168	0.47	0.94	0.00	0.44	61.47	Y	23.46	147.45	25.18	64.8	2134 x 3048 Box	0.45		24.60	3.78	0.29	17.02	92%	186.74	186.45	0.00	188.37	1.63	Okay!
	168	170	0.00	1.00	0.00	0.00	61.47	Y	23.20	145.88	24.91	14.1	2134 x 3048 Box	0.45		24.60	3.78	0.06	17.09	92%	186.42	186.36	0.00	187.91	1.49	Okay!
	798	170	0.37	0.88	0.00	0.32	0.32	Y	0.18	199.39	0.18	80.3	300	1.00		0.10	1.37	0.98	10.98	83%	186.98	186.18	0.00	188.35	1.37	Okay!
	170	785	0.30	0.88	0.00	0.26	62.06	Y	23.37	145.54	25.09	51.8	2134 x 3048 Box	1.90		50.56	7.77	0.11	17.20	46%	185.73	184.75	0.00	187.64	1.91	Okay!
	785	172	0.31	0.88	0.00	0.27	62.33	Y	23.38	144.94	25.10	53.6	2134 x 3048 Box	1.50		44.92	6.91	0.13	17.33	52%	184.72	183.91	0.00	186.61	1.90	Okay!
	787	172	2.46	0.94	0.00	2.31	2.31	N	0.57	199.39	1.28	9.3	675	1.00		0.84	2.35	0.07	10.07	68%	184.43	184.34	0.00	185.78	1.35	Okay!
	172	174	0.24	0.88	0.00	0.21	64.84	Y	23.56	144.25	25.98	37.3	2134 x 3048 Box	0.50		25.93	3.99	0.16	17.48	92%	183.88	183.69	0.00	185.68	1.80	Okay!
	174	176	0.09	0.88	0.00	0.08	64.92	Y	23.44	143.43	25.87	14.1	2134 x 3048 Box	2.00		51.87	7.97	0.03	17.51	45%	183.66	183.38	0.00	185.38	1.72	Okay!
	176	754	0.61	0.88	0.00	0.53	65.45	Y	23.63	143.28	26.05	96.4	2134 x 3600 Box	0.35		26.77	3.48	0.46	17.97	88%	183.13	182.79	0.00	185.02	1.89	FDC
	754	178	0.61	0.88	0.00	0.53	65.99	Y	23.40	140.91	25.83	96.4	2134 x 3600 Box	0.35		26.77	3.48	0.46	18.43	87%	182.76	182.42	0.00	184.16	1.40	FDC
	178	180	0.27	0.88	0.00	0.23	66.22	Y	23.08	138.62	25.50	42.3	2134 x 3600 Box	0.35		26.77	3.48	0.20	18.64	87%	182.39	182.25	0.00	183.48	1.09	FDC
	180	182	0.07	0.88	0.00	0.06	66.28	Y	22.92	137.64	25.34	10.7	2134 x 3600 Box	0.35		26.77	3.48	0.05	18.69	86%	182.22	182.18	0.00	183.16	0.95	FDC
	182	319	0.41	0.88	0.00	0.36	67.79	Y	23.45	137.39	25.87	65.2	2134 x 3600 Box	0.35		26.77	3.48	0.31	19.00	87%	182.15	181.92	0.00	183.08	0.93	FDC
	783	182	2.29	0.50	0.00	1.15	1.15	Y	0.63	199.39	0.63	9.6	525	1.00		0.43	1.99	0.08	10.08	66%	182.96	182.87	0.00	183.88	0.92	Okay!
	334	335	0.64	0.81	0.00	0.52	0.52	Y	0.29	199.39	0.29	93.3	375	1.00		0.18	1.59	0.98	10.98	73%	184.24	183.31	0.00	184.23	-0.01	FDC
	335	337	0.69	0.81	0.00	0.56	1.08	Y	0.57	189.47	0.57	100.0	525	0.50		0.30	1.40	1.19	12.17	83%	183.31	182.81	0.00	183.58	0.27	FDC
	337	319	0.26	0.81	0.00	0.21	1.29	Y	0.64	178.80	0.64	38.2	600	0.50		0.43	1.54	0.41	12.58	66%	182.81	182.62	0.00	182.92	0.11	FDC
	217W	321	0.39	0.81	0.00	0.31	0.31	Y	0.17	199.39	0.17	66.8	300	1.00		0.10	1.37	0.81	10.81	80%	183.51	182.84	0.00	183.98	0.47	FDC
	321	319	0.25	0.81	0.00	0.21	0.52	Y	0.28	191.08	0.28	43.9	450	0.50		0.20	1.27	0.58	11.39	61%	182.84	182.62	0.00	182.98	0.14	FDC
	319	184	0.12	0.81	0.00	0.10	69.69	N	24.13	135.92	26.31	76.7	2134 x 3600 Box	0.35		26.77	3.48	0.37	19.37	90%	181.89	181.62	0.00	182.59	0.70	FDC
	340E	184	0.26	0.81	0.00	0.21	0.21	N	0.05	199.39	0.12	64.3	300	1.00		0.10	1.37	0.78	10.78	54%	182.95	182.31	0.00	182.58	-0.37	FDC
	814	184	0.71	0.50	0.00	0.36	0.36	N	0.09	199.39	0.20	8.5	375	1.00		0.18	1.59	0.09	10.09	50%	182.40	182.32	0.00	181.70	-0.70	FDC
	184	186	0.32	0.81	0.00	0.26	70.52	N	24.10	134.23	26.29	62.5	2134 x 3600 Box	0.35		26.77	3.48	0.30	19.67	90%	181.59	181.37	0.00	181.62	0.03	FDC
	186	188	0.06	0.81	0.00	0.05	70.57	N	23.97	132.88	26.05	11.3	2134 x 3600 Box	0.35		26.77	3.48	0.05	19.72	90%	181.34	181.30	0.00	182.49	1.15	FDC
	188	190	0.37	0.81	0.00	0.30	70.87	N	23.99	132.65	26.11	73.2	2134 x 3600 Box	0.35		26.77	3.48	0.35	20.07	90%	181.27	181.02	0.00	182.66	1.39	FDC
	805	199	0.40	0.81	0.00	0.32	0.32	N	0.08	199.39	0.18	70.2	300	1.00		0.10	1.37	0.85	10.85	82%	191.16	190.46	0.00	192.34	1.18	Okay!
	199	201	0.18	0.81	0.00	0.15	0.47	N	0.11	190.68	0.25	32.0	300	2.90		0.16	2.33	0.23	11.08	67%	190.41	189.48	0.00	191.81	1.40	Okay!
	201	203	0.18	0.81	0.00	0.15	0.62	N	0.14	188.48	0.32	32.0	375	2.90		0.30	2.70	0.20	11.28	48%	189.48	188.56	0.00	190.83	1.35	Okay!
	203	205	0.20	0.81	0.00	0.16	0.78	N	0.18	186.63	0.41	35.6	375	2.90		0.30	2.70	0.22	11.50	60%	188.51	187.47	0.00	189.86	1.36	Okay!
	205	207	0.23	0.81	0.00	0.19	0.97	N	0.22	184.62	0.50	40.3	375	2.90		0.30	2.70	0.25	11.75	74%	187.42	186.26	0.00	188.78	1.36	Okay!
	317	756	0.50	0.94	0.00	0.47	0.47	N	0.11	199.39	0.26	101.9	375	1.00		0.18	1.59	1.07	11.07	66%	187.54	186.52	0.00	188.69	1.15	Okay!
	756	207	0.16	0.94	0.00	0.15	0.62	N	0.14	188.61	0.32	33.5	450	0.50		0.20	1.27	0.44	11.51	72%	186.52	186.36	0.00	187.93	1.41	Okay!
	207	209	0.23	0.81	0.00	0.19	1.77	Y	0.44	182.40	0.90	45.5	450	2.90		0.49	3.05	0.25	12.00	82%	186.26	184.94	0.00	187.56	1.31	Okay!
	209	211	0.27	0.81	0.00	0.22	1.99	Y	0.54	180.24	1.00	53.0	600	1.00		0.61	2.17	0.41	12.40	72%	184.94	184.41	0.00	186.41	1.48	Okay!
	243	211	0.35	0.81	0.00	0.28	0.28	Y	0.16	199.39	0.16	59.9	300	1.00		0.10	1.37	0.73	10.73	73%	185.00	184.41	0.00	185.51	0.51	FDC
	211	213	0.21	0.81	0.00	0.17	2.45	Y	0.75	176.81	1.20	36.8	750	0.50		0.79	1.78	0.34	12.75	68%	184.41	184.22	0.00	185.42	1.02	FDC
	213	215	0.46	0.81	0.00	0.37	2.82	Y	0.91	174.02	1.36	79.8	750	0.50		0.79	1.78	0.75	13.49	77%	184.17	183.77	0.00	184.88	0.71	FDC
	215	217S	0.46	0.81	0.00	0.37	3.19	Y	1.04	168.28	1.49	79.8	750	0.50		0.79	1.78	0.75	14.24	84%	183.72	183.32	0.00	184.62	0.90	FDC
	217S	219	0.39	0.81	0.00	0.32	3.51	N	1.08	162.94	1.59	74.8	900	0.50		1.28	2.01	0.62	14.86	84%	183.32	182.95	0.00	183.98	0.66	FDC
	230W	240	0.05	0.81	0.00	0.04	0.04	N	0.01	199.39	0.02	10.8	300	1.00		0.10	1.37	0.13	10.13	10%	183.71	183.60	0.00	184.47	0.76	FDC
	240	219	0.64	0.81	0.00	0.52	0.56	N	0.14	197.99	0.31	140.3	450	0.50		0.20	1.27	1.85	11.98	68%	183.60	182.90	0.00	184.59	0.99	FDC
	219	221	0.38	0.81	0.00	0.31	4.38	N	1.23	158.78	1.93	68.3	900	0.50		1.28	2.01	0.57	15.43	96%	182.90	182.56	0.00	183.54	0.64	FDC
	221	223	0.20	0.81	0.00	0.16	4.54	N	1.24	155.18	1.96	35.1	900	0.50		1.28	2.01	0.29	15.72	97%	182.51	182.33	0.00	183.07	0.56	FDC
	230S	231	0.24	0.81	0.00	0.19	0.19	N	0.05	199.39	0.11	52.8	300	1.00		0.10	1.37	0.64	10.64	49%	183.73	183.20	0.00	184.47	0.74	FDC
	231	233	0.08	0.81	0.00	0.07	0.26	N	0.06	192.75	0.14	18.7	375	0.50		0.12	1.12	0.28	10.92	50%	183.20	183.10	0.00	184.08	0.88	FDC
	233	235	0.31	0.81	0.00	0.25	0.51	N	0.12	190.03	0.27	68.8	450	0.50		0.20	1.27	0.90	11.83	59%	183.10	182.76	0.00	183.89	0.79	FDC
	235	237	0.17	0.81	0.00	0.14	0.65	N	0.15	181.72	0.33	37.7	450	0.50		0.20	1.27	0.50	12.32	72%	182.71	182.52	0.00	183.30	0.59	FDC
	237	223	0.12	0.81	0.00	0.10	0.75	N	0.16	177.49	0.37	27.5	450	0.50		0.20	1.27	0.36	12.68	81%	182.47	182.33	0.00	183.06	0.59	FDC
	223	225	0.24	0.81	0.00	0.20	5.49	N	1.41	153.39	2.34	59.0	975	0.50		1.58	2.12	0.46	16.18	89%	182.33	182.04	0.00	182.82	0.49	FDC
	225	227	0.08	0.81	0.00	0.07	5.56	N	1.40	150.63	2.33	20.2	975	0.50		1.58	2.12	0.16	16.34	89%	181.99	181.89	0.00	182.40	0.41	FDC
	227	190	0.11	0.81	0.00	0.09	5.65	N	1.41	149.72	2.35	27.2	975	0.50		1.58	2.12	0.21	16.55	89%	181.84	181.70	0.00	182.21	0.37	FDC
P1 EAST	190	P1E	0.00	1.00	0.00	0.00	76.52	N	25.12	131.11	27.87	29.2	2134 x 3600 Box	0.35		26.77	3.48	0.14	20.21	94%	180.99	180.88	0.00	182.21	1.22	Okay!
	307W	445	0.36	0.81	0.00	0.29	0.29	Y	0.16	199.39	0.16	64.8	300	1.50		0.12	1.68	0.64	10.64	60%	191.58	190.61	0.00	192.95	1.37	Okay!
	445	447	0.08	0.81	0.00	0.06	0.35	Y	0.19	192.75	0.19	14.1	300	3.00		0.17	2.37	0.10	10.74	50%	190.56	190.13	0.00	191.82	1.26	Okay!
	447	449S	0.14	0.81	0.00	0.11	0.46	Y	0.25	191.76	0.25	25.3	300	3.00		0.17	2.37	0.18	10.92	66%	190.08	189.42	0.00	191.29	1.21	Okay!
	449S	315	0.43	0.81	0.00	0.35	0.81	Y	0.43	190.03	0.43	78.1	375	2.60		0.28	2.56	0.51	11.43	67%	189.42	187.39	0.00	190.25	0.83	Okay!
	315	466	0.31	0.81	0.00	0.25	1.06	Y	0.55	185.26	0.55	56.6	525	0.70		0.36	1.66	0.57	12.00	68%	187.39	186.99	0.00	188.38	0.99	Okay!
	466	455	0.31	0.81	0.00	0.25	1.32	Y	0.66	180.24	0.66	56.6	525	0.70		0.36	1.66	0.57	12.56	81%	186.94	186.54	0.00	188.18	1.24	Okay!

4134 16TH AVENUE

Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	449W	468	0.27	0.81	0.00	0.22	0.22	Y	0.12	199.39	0.12	56.7	300	2.50		0.15	2.16	0.44	10.44	35%	189.27	187.86	0.00	190.25	0.98	Okay!
	468	451	0.23	0.81	0.00	0.19	0.45	Y	0.24	193.93	0.24	49.9	375	1.40		0.21	1.88	0.44	10.97	60%	187.86	187.16	0.00	188.95	1.09	Okay!
	451	453	0.04	0.81	0.00	0.04	0.55	Y	0.29	189.57	0.29	9.2	450	0.70		0.24	1.50	0.10	11.07	69%	187.16	187.09	0.00	188.17	1.01	Okay!
	453	455	0.33	0.81	0.00	0.27	0.83	Y	0.43	188.59	0.43	71.4	450	0.70		0.24	1.50	0.79	11.87	95%	187.04	186.54	0.00	188.14	1.10	Okay!
	455	457	0.35	0.81	0.00	0.29	2.43	Y	1.18	175.50	1.18	75.3	675	0.70		0.70	1.97	0.64	13.20	80%	186.54	186.02	0.00	187.62	1.08	Okay!
	RLCB 1	468	0.06	0.81	0.00	0.05	0.05	Y	0.03	199.39	0.03	43.2	300	1.00		0.10	1.37	0.53	10.53	28%	188.29	187.86	0.00	189.07	0.78	RLCB
	RLCB 2	451	0.08	0.81	0.00	0.07	0.07	Y	0.04	199.39	0.04	43.5	300	1.00		0.10	1.37	0.53	10.53	37%	187.59	187.16	0.00	187.59	0.00	RLCB
	470	457	0.41	0.94	0.00	0.38	0.38	Y	0.21	199.39	0.21	100.8	375	1.00		0.18	1.59	1.06	11.06	54%	186.93	185.92	0.00	187.98	1.05	Okay!
	457	459	0.27	0.94	0.00	0.25	3.07	Y	1.45	170.48	1.45	74.0	675	0.70		0.70	1.97	0.63	13.83	97%	185.92	185.40	0.00	187.08	1.16	Okay!
	472E	480	0.07	0.81	0.00	0.06	0.17	Y	0.09	192.98	0.09	12.5	300	1.00		0.10	1.37	0.15	10.77	78%	186.58	186.46	0.00	187.72	1.14	Okay!
	480	482	0.40	0.81	0.00	0.32	0.67	Y	0.36	191.47	0.36	72.1	525	0.70		0.36	1.66	0.72	11.50	69%	186.46	185.95	0.00	187.59	1.13	Okay!
	482	459	0.40	0.81	0.00	0.32	0.99	Y	0.51	184.66	0.51	72.1	525	0.70		0.36	1.66	0.72	12.22	88%	185.90	185.40	0.00	187.08	1.18	Okay!
	RLCB 3	480	0.22	0.81	0.00	0.18	0.18	Y	0.10	199.39	0.10	37.0	375	1.00		0.18	1.59	0.39	10.39	56%	186.83	186.46	0.00	187.86	1.03	RLCB
	RLCB 4	472E	0.14	0.81	0.00	0.11	0.11	Y	0.06	199.39	0.06	51.0	300	1.00		0.10	1.37	0.62	10.62	65%	187.14	186.63	0.00	186.56	-0.58	RLCB
	459	461	0.27	0.94	0.00	0.25	4.31	Y	1.99	165.84	1.99	74.0	825	0.70		1.20	2.25	0.55	14.38	84%	185.40	184.88	0.00	186.56	1.16	Okay!
	472W	473	0.51	0.81	0.00	0.42	0.42	Y	0.23	199.39	0.23	59.7	375	1.00		0.18	1.59	0.63	10.63	59%	186.64	186.04	0.00	187.72	1.08	Okay!
	473	475	0.07	0.81	0.00	0.05	0.47	Y	0.25	192.92	0.25	7.8	375	1.00		0.18	1.59	0.08	10.71	64%	185.99	185.91	0.00	187.16	1.17	Okay!
	475	477	0.63	0.81	0.00	0.52	0.99	Y	0.53	192.11	0.53	73.7	525	0.70		0.36	1.66	0.74	11.45	65%	185.91	185.40	0.00	187.12	1.21	Okay!
	477	461	0.63	0.81	0.00	0.52	1.50	Y	0.77	185.10	0.77	73.7	600	0.70		0.51	1.82	0.68	12.12	67%	185.40	184.88	0.00	186.57	1.17	Okay!
	461	437	0.27	0.94	0.00	0.25	6.07	Y	2.73	162.00	2.73	74.0	900	0.70		1.51	2.38	0.52	14.90	88%	184.88	184.36	0.00	186.05	1.17	Okay!
	427E	433	0.05	0.81	0.00	0.04	0.04	Y	0.02	199.39	0.02	12.4	300	2.50		0.15	2.16	0.10	10.10	6%	188.33	188.02	0.00	189.48	1.15	Okay!
	433	435S	0.25	0.81	0.00	0.20	0.24	Y	0.13	198.37	0.13	65.2	300	2.50		0.15	2.16	0.50	10.60	39%	187.97	186.34	0.00	189.11	1.14	Okay!
	435S	437	0.21	0.81	0.00	0.17	0.41	Y	0.22	193.21	0.22	79.0	300	2.50		0.15	2.16	0.61	11.21	65%	186.29	184.31	0.00	187.40	1.11	Okay!
	437	424	0.33	0.94	0.00	0.31	6.79	Y	2.99	158.54	2.99	81.3	900	0.70		1.51	2.38	0.57	15.47	96%	184.31	183.74	0.00	185.51	1.20	Okay!
	427W	428	0.42	0.81	0.00	0.34	0.34	Y	0.19	199.39	0.19	60.3	375	1.00		0.18	1.59	0.63	10.63	48%	188.37	187.77	0.00	189.48	1.11	Okay!
	428	430	0.55	0.81	0.00	0.45	0.79	Y	0.42	192.85	0.42	79.7	375	2.00		0.25	2.25	0.59	11.23	76%	187.72	186.12	0.00	189.74	2.02	Okay!
	430	418	0.28	0.81	0.00	0.22	1.02	Y	0.53	187.15	0.53	39.8	375	3.50		0.33	2.97	0.22	11.45	72%	186.07	184.68	0.00	187.23	1.16	Okay!
	414E	416	0.40	0.81	0.00	0.32	0.32	Y	0.18	199.39	0.18	44.3	300	1.00		0.10	1.37	0.54	10.54	82%	185.29	184.84	0.00	186.39	1.10	Okay!
	416	418	0.29	0.81	0.00	0.24	0.56	Y	0.30	193.79	0.30	32.9	450	0.50		0.20	1.27	0.43	10.97	67%	184.84	184.68	0.00	186.11	1.27	Okay!
	418	420	0.37	0.81	0.00	0.30	1.88	Y	0.96	185.09	0.96	74.0	675	0.50		0.59	1.66	0.74	12.19	72%	184.68	184.31	0.00	185.91	1.23	Okay!
	435W	440	0.33	0.81	0.00	0.27	0.27	Y	0.15	199.39	0.15	55.7	300	2.00		0.14	1.93	0.48	10.48	49%	186.36	185.24	0.00	187.40	1.04	Okay!
	440	442	0.28	0.81	0.00	0.23	0.50	Y	0.27	194.39	0.27	47.2	375	1.80		0.24	2.13	0.37	10.85	51%	185.24	184.39	0.00	186.34	1.10	Okay!
	442	420	0.16	0.81	0.00	0.13	0.63	Y	0.34	190.73	0.34	27.0	450	0.50		0.20	1.27	0.35	11.20	74%	184.39	184.26	0.00	185.62	1.23	Okay!
	420	422	0.17	0.81	0.00	0.14	2.65	Y	1.31	178.58	1.31	28.5	675	0.70		0.70	1.97	0.24	12.43	83%	184.26	184.06	0.00	185.39	1.13	Okay!
	422	424	0.27	0.81	0.00	0.22	2.87	Y	1.41	176.57	1.41	45.3	750	0.70		0.93	2.11	0.36	12.79	67%	184.06	183.74	0.00	185.16	1.10	Okay!
	424	411	0.23	0.94	0.00	0.22	9.88	N	4.33	154.92	4.25	63.4	900 x 1800 Box	0.80		4.99	3.08	0.34	15.81	87%	183.32	182.92	0.03	184.86	1.54	Okay!
	400	401	0.25	0.81	0.00	0.20	0.20	Y	0.11	199.39	0.11	48.9	300	2.00		0.14	1.93	0.42	10.42	36%	186.17	185.19	0.00	187.01	0.84	Okay!
	401	403	0.18	0.81	0.00	0.15	0.35	Y	0.19	194.99	0.19	35.6	375	0.80		0.16	1.42	0.42	10.84	54%	185.19	184.90	0.00	186.27	1.08	Okay!
	414W	403	0.19	0.81	0.00	0.15	0.15	Y	0.09	199.39	0.09	46.6	300	1.00		0.10	1.37	0.57	10.57	39%	185.36	184.90	0.00	186.39	1.03	Okay!
	403	405	0.16	0.81	0.00	0.13	0.63	Y	0.34	190.83	0.34	25.2	450	0.80		0.26	1.60	0.26	11.10	59%	184.90	184.70	0.00	185.94	1.04	Okay!
	405	407E	0.28	0.81	0.00	0.23	0.86	Y	0.45	188.32	0.45	44.4	450	0.80		0.26	1.60	0.46	11.56	79%	184.65	184.29	0.00	185.77	1.12	Okay!
	407E	409	0.48	0.81	0.00	0.39	1.25	Y	0.64	184.06	0.64	75.0	525	0.70		0.36	1.66	0.75	12.31	79%	184.29	183.77	0.00	185.39	1.10	Okay!
	409	411	0.48	0.81	0.00	0.39	1.64	Y	0.81	177.56	0.81	74.6	600	0.70		0.51	1.82	0.68	13.00	70%	183.77	183.24	0.00	184.87	1.10	Okay!
	411	377	0.16	1.00	0.00	0.16	11.68	N	5.10	152.83	4.96	77.8	1219 x 1829 Box	0.40		5.55	2.49	0.52	16.33	92%	182.92	182.61	0.00	184.35	1.43	Okay!
	407S	353	0.30	0.81	0.00	0.25	0.25	N	0.06	199.39	0.14	66.3	300	1.00		0.10	1.37	0.81	10.81	63%	184.61	183.95	0.00	185.39	0.78	Okay!
	353	371	0.07	0.94	0.00	0.07	0.32	N	0.07	191.13	0.17	16.2	375	0.50		0.12	1.12	0.24	11.05	60%	183.95	183.87	0.00	185.28	1.33	Okay!
	371	372E	0.24	0.81	0.00	0.20	0.51	N	0.12	188.82	0.27	52.9	450	0.50		0.20	1.27	0.70	11.74	59%	183.79	183.53	0.00	185.13	1.34	Okay!
	372E	377	0.46	0.81	0.00	0.37	0.89	N	0.20	182.45	0.45	85.3	450	0.70		0.24	1.50	0.95	12.69	84%	183.49	182.89	0.00	184.74	1.25	Okay!
	398	377	0.74	0.81	0.00	0.60	0.60	N	0.15	199.39	0.33	89.2	375	1.00		0.18	1.59	0.94	10.94	85%	183.82	182.93	0.00	184.80	0.98	Okay!
	377	379E	0.36	0.81	0.00	0.29	13.46	N	5.38	149.77	5.60	81.3	1219 x 1829 Box	0.50		6.20	2.78	0.49	16.82	87%	182.58	182.18	0.00	184.14	1.56	Okay!
	379E	391	0.29	0.81	0.00	0.23	13.69	N	5.37	147.02	5.59	64.8	1219 x 1829 Box	0.70		7.34	3.29	0.33	17.14	73%	182.15	181.69	0.00	183.54	1.39	Okay!
	391	340S	0.29	0.81	0.00	0.23	13.92	N	5.39	145.22	5.62	64.8	1219 x 1829 Box	0.70		7.34	3.29	0.33	17.47	73%	181.66	181.21	0.00	183.11	1.45	Okay!
	340S	394	0.27	0.81	0.00	0.22	14.14	N	5.39	143.48	5.64	60.8	1219 x 1829 Box	0.70		7.34	3.29	0.31	17.78	73%	181.18	180.75	0.00	182.58	1.40	Okay!
	394	385	0.08	0.81	0.00	0.07	14.20	N	5.38	141.88	5.60	18.2	1219 x 1829 Box	0.70		7.34	3.29	0.09	17.87	73%	180.72	180.60	0.00	182.19	1.47	Okay!
	379S	381	0.46	0.81	0.00	0.38	0.38	N	0.09	199.39	0.21	61.6	375	1.00		0.18	1.59	0.65	10.65	53%	182.50	181.88	0.00	183.54	1.04	Okay!
	381	383	0.12	0.81	0.00	0.10	0.47	N	0.11	192.72	0.25	15.9	375	0.70		0.15	1.33	0.20	10.85	77%	181.83	181.72	0.00	183.14	1.31	Okay!
	383	389	0.39	0.81	0.00	0.32	0.79	N	0.19	190.76	0.42	52.0	450	0.70		0.24	1.50	0.58	11.42	78%	181.72	181.36	0.00	183.01	1.29	Okay!
	389	385	0.47	0.81	0.00	0.38	1.17	N	0.27	185.32	0.60	62.0	525	0.70		0.36	1.66	0.62	12.04	74%	181.36	180.93	0.00	182.61	1.25	Okay!
P1 NORTH	385	P1N	0.00	1.00	0.00	0.00	15.37	N	5.57	141.41	6.04	30.5	1219 x 1829 Box	0.50		6.20	2.78	0.18	18.06	90%	180.57	180.41	0.00	182.19	1.62	Okay!
	342	343	0.35	0.81	0.00	0.29	0.29	Y	0.16	199.39	0.16	69.2	300	1.00		0.10	1.37	0.84	10.84	73%	184.93	184.23	0.00	186.05	1.12	Okay!

4134 16TH AVENUE
Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	343	345	0.15	0.81	0.00	0.12	0.41	Y	0.22	190.79	0.22	29.3	375	0.50		0.12	1.12	0.43	11.28	78%	184.23	184.09	0.00	186.02	1.79	Okay!
	345	351	0.15	0.81	0.00	0.12	0.53	Y	0.27	186.66	0.27	29.3	450	0.50		0.20	1.27	0.38	11.66	60%	184.09	183.94	0.00	185.57	1.48	Okay!
	351	355	0.24	0.81	0.00	0.19	0.72	Y	0.37	183.17	0.37	46.7	450	1.50		0.35	2.20	0.35	12.02	47%	183.89	183.19	0.00	185.11	1.22	Okay!
	355	359	0.38	0.81	0.00	0.31	1.03	Y	0.52	180.06	0.52	74.9	450	1.50		0.35	2.20	0.57	12.59	66%	183.14	182.02	0.00	184.44	1.30	Okay!
	372S	374	0.47	0.81	0.00	0.38	0.38	Y	0.21	199.39	0.21	56.0	300	1.50		0.12	1.68	0.56	10.56	79%	183.45	182.61	0.00	184.74	1.29	Okay!
	374	359	0.15	0.81	0.00	0.12	0.50	Y	0.27	193.62	0.27	18.2	300	3.00		0.17	2.37	0.13	10.68	72%	182.56	182.02	0.00	183.71	1.15	Okay!
	359	361	0.00	1.00	0.00	0.00	1.54	N	0.77	175.33	0.75	33.6	750	0.50		0.79	1.78	0.31	12.90	98%	182.02	181.85	0.00	183.45	1.43	Okay!
	361	363	0.13	0.81	0.00	0.11	1.64	N	0.79	172.82	0.79	87.9	825	0.40		0.91	1.70	0.86	13.76	87%	181.85	181.50	0.00	183.49	1.64	Okay!
	363	838	0.09	0.81	0.00	0.07	1.71	N	0.79	166.33	0.79	57.3	825	0.40		0.91	1.70	0.56	14.32	87%	181.45	181.22	0.00	184.69	3.24	Okay!
	838	365	0.09	0.81	0.00	0.07	1.78	N	0.79	162.36	0.80	57.3	825	0.40		0.91	1.70	0.56	14.89	87%	181.17	180.94	0.00	183.34	2.17	Okay!
	365	367	0.05	0.81	0.00	0.04	1.83	N	0.79	158.60	0.81	36.2	825	0.40		0.91	1.70	0.35	15.24	87%	180.89	180.74	0.00	183.01	2.12	Okay!
	367	369	0.03	0.81	0.00	0.02	1.85	N	0.79	156.32	0.80	20.2	825	0.40		0.91	1.70	0.20	15.44	87%	180.69	180.61	0.00	182.41	1.72	Okay!
P1 WEST	369	P1W	0.00	1.00	0.00	0.00	1.85	N	0.79	155.08	0.80	47.7	825	0.50		1.02	1.90	0.42	15.86	78%	180.56	180.33	0.00	181.68	1.12	Okay!
	1471	1472	0.07	0.94	0.00	0.07	0.07	N	0.02	199.39	0.04	52.0	300	1.00		0.10	1.37	0.63	10.63	17%	195.43	194.91	0.00	196.63	1.20	Okay!
	1472	1474	0.41	0.81	0.00	0.33	0.40	N	0.10	192.86	0.21	62.3	300	3.50		0.18	2.56	0.41	11.04	53%	194.81	192.63	0.00	197.05	2.24	Okay!
	1474	276	0.41	0.81	0.00	0.33	0.73	N	0.17	188.91	0.38	62.3	375	3.50		0.33	2.97	0.35	11.39	52%	192.49	190.31	0.00	193.94	1.45	Okay!
	276	278	0.28	1.00	0.00	0.28	1.01	N	0.24	185.64	0.52	57.2	375	4.50		0.37	3.37	0.28	11.67	64%	190.26	187.68	0.00	191.15	0.89	Okay!
	278	280	0.34	1.00	0.00	0.34	1.35	N	0.32	183.08	0.69	71.0	450	4.50		0.60	3.80	0.31	11.98	53%	187.68	184.49	0.00	188.61	0.93	Okay!
	280	282	0.19	1.00	0.00	0.19	1.54	N	0.36	180.36	0.77	39.1	450	2.60		0.46	2.89	0.23	12.21	79%	184.44	183.42	0.00	185.41	0.97	Okay!
	282	284	0.16	1.00	0.00	0.16	1.70	N	0.40	178.44	0.84	32.5	675	0.50		0.59	1.66	0.33	12.53	67%	183.42	183.26	0.00	184.02	0.60	Okay!
	284	793	0.21	1.00	0.00	0.21	3.81	N	0.91	175.74	1.86	42.9	900	0.50		1.28	2.01	0.36	12.89	71%	183.23	183.02	0.00	183.40	0.17	No Lots
	808	284	1.91	1.00	0.00	1.91	1.91	N	0.53	199.39	1.06	16.6	675	1.00		0.84	2.35	0.12	10.12	63%	183.42	183.26	0.00	183.68	0.26	Block Connection
	795	793	0.93	0.94	0.00	0.87	0.87	N	0.22	199.39	0.48	15.9	450	1.00		0.29	1.79	0.15	10.15	75%	183.18	183.02	0.00	182.69	-0.49	Block Connection
	793	1557	0.10	1.00	0.00	0.10	4.78	N	1.10	172.90	2.30	20.7	975	0.50		1.58	2.12	0.16	13.05	70%	183.02	182.91	0.00	182.54	-0.48	No Lots
	1557	286	0.00	0.81	0.00	0.00	4.78	N	1.10	171.63	2.28	17.3	975	0.50		1.58	2.12	0.14	13.19	69%	182.86	182.78	0.00	182.45	-0.41	No Lots
Ex.Yorkton	W278	286	3.07	0.93	0.10	2.85	2.85	N	0.87	164.52	1.40	14.2	825	0.30	14.01	0.79	1.47	0.16	14.18	111%	182.84	182.78	0.02	181.38	-1.46	No Lots
	286	W279	0.00	1.00	0.00	0.00	7.63	N	1.91	163.39	3.57	15.9	1050	0.50		1.93	2.23	0.12	14.29	99%	182.78	182.70	0.00	181.36	-1.42	No Lots
	W277	W279	2.36	0.83	0.00	1.95	1.95	N	0.57	165.35	0.90	59.2	750	0.30	13.90	0.61	1.38	0.71	14.61	93%	182.88	182.70	0.00	182.57	-0.31	No Lots
POND P2	W279	P2	0.00	1.00	0.00	0.00	9.58	N	2.44	160.42	4.37	11.4	1050	0.90		2.59	2.99	0.06	14.68	94%	182.65	182.55	0.00	182.10	-0.55	No Lots
	558E	559	0.13	0.81	0.00	0.10	0.10	Y	0.06	199.39	0.06	23.0	300	1.00		0.10	1.37	0.28	10.28	26%	191.15	190.92	0.00	192.36	1.21	Okay!
	559	561	0.27	0.81	0.00	0.22	0.32	Y	0.18	196.44	0.18	49.6	375	0.50		0.12	1.12	0.74	11.02	63%	190.92	190.67	0.00	192.31	1.39	Okay!
	561	563	0.27	0.81	0.00	0.22	0.54	Y	0.29	189.12	0.29	49.6	450	0.50		0.20	1.27	0.65	11.67	63%	190.67	190.43	0.00	191.84	1.17	Okay!
	558S	595	0.42	0.81	0.00	0.34	0.34	Y	0.19	199.39	0.19	76.2	375	1.00		0.18	1.59	0.80	10.80	48%	191.15	190.38	0.00	192.36	1.21	Okay!
	595	563	0.18	0.81	0.00	0.14	0.48	Y	0.26	191.21	0.26	32.5	450	0.50		0.20	1.27	0.43	11.23	57%	190.38	190.22	0.00	191.76	1.38	Okay!
	563	565	0.31	0.81	0.00	0.26	1.28	Y	0.65	183.11	0.65	57.4	600	0.50		0.43	1.54	0.62	12.29	67%	190.22	189.93	0.00	191.50	1.28	Okay!
	565	567	0.23	0.81	0.00	0.19	1.47	Y	0.73	177.74	0.73	41.8	600	0.50		0.43	1.54	0.45	12.75	74%	189.88	189.68	0.00	191.10	1.22	Okay!
	589N	590	0.44	0.81	0.00	0.36	0.36	Y	0.20	199.39	0.20	59.9	300	2.50		0.15	2.16	0.46	10.46	58%	192.10	190.60	0.00	193.02	0.92	Okay!
	590	592	0.13	0.81	0.00	0.11	0.47	Y	0.25	194.58	0.25	18.1	300	2.50		0.15	2.16	0.14	10.60	73%	190.55	190.10	0.00	191.77	1.22	Okay!
	592	567	0.13	0.81	0.00	0.10	0.57	Y	0.31	193.18	0.31	17.1	375	2.50		0.28	2.51	0.11	10.71	49%	190.10	189.67	0.00	191.29	1.19	Okay!
	567	569	0.21	0.81	0.00	0.17	2.21	Y	1.07	174.05	1.07	39.9	600	2.50		0.97	3.43	0.19	12.94	49%	189.58	188.58	0.00	190.87	1.29	Okay!
	569	571	0.06	0.81	0.00	0.05	2.25	Y	1.08	172.52	1.08	10.8	600	1.00		0.61	2.17	0.08	13.02	78%	188.53	188.42	0.00	189.84	1.31	Okay!
	571	789	0.23	0.81	0.00	0.19	2.44	Y	1.16	171.87	1.16	44.0	600	1.00		0.61	2.17	0.34	13.36	84%	188.37	187.93	0.00	189.53	1.16	Okay!
	789	790	0.09	0.81	0.00	0.07	2.51	Y	1.18	169.29	1.18	17.5	675	1.00		0.84	2.35	0.12	13.48	62%	187.93	187.76	0.00	189.06	1.13	Okay!
	790	573	0.17	0.81	0.00	0.14	2.65	Y	1.24	168.37	1.24	32.4	675	1.00		0.84	2.35	0.23	13.71	65%	187.71	187.38	0.00	188.91	1.21	Okay!
	573	575	0.06	0.81	0.00	0.04	2.69	Y	1.25	166.68	1.25	10.7	675	1.00		0.84	2.35	0.08	13.79	66%	187.33	187.22	0.00	188.55	1.22	Okay!
	575	577E	0.37	0.81	0.00	0.30	3.00	Y	1.38	166.13	1.38	72.0	750	0.70		0.93	2.11	0.57	14.36	66%	187.22	186.72	0.00	188.43	1.21	Okay!
	740	741	0.26	0.81	0.00	0.21	0.21	Y	0.12	199.39	0.12	40.0	300	3.50		0.18	2.56	0.26	10.26	29%	189.89	188.49	0.00	191.03	1.14	Okay!
	741	577E	0.29	0.81	0.00	0.24	0.45	Y	0.24	196.64	0.24	45.3	300	3.50		0.18	2.56	0.30	10.56	60%	188.44	186.85	0.00	189.61	1.18	Okay!
	577E	579	0.39	0.81	0.00	0.32	3.76	Y	1.69	162.13	1.69	60.5	750	3.00		1.93	4.36	0.23	14.59	39%	186.51	184.70	0.00	187.99	1.48	Okay!
	579	581	0.32	0.81	0.00	0.26	4.02	Y	1.79	160.57	1.79	49.2	825	0.50		1.02	1.90	0.43	15.02	78%	184.70	184.45	0.00	185.86	1.16	Okay!
	581	583	0.44	0.81	0.00	0.35	4.37	Y	1.92	157.74	1.92	67.8	825	0.50		1.02	1.90	0.59	15.62	84%	184.40	184.06	0.00	185.02	0.62	Okay!
	583	585	0.21	0.81	0.00	0.17	4.54	Y	1.94	154.00	1.94	32.0	825	0.50		1.02	1.90	0.28	15.90	85%	183.96	183.80	0.00	184.40	0.44	No Lots
	585	587	0.36	1.00	0.00	0.36	4.90	N	2.01	152.30	2.07	28.5	1200	0.40		2.47	2.18	0.22	16.12	81%	183.80	183.69	0.00	183.60	-0.20	No Lots
	587	762	0.00	0.81	0.00	0.00	4.90	N	2.00	151.01	2.06	34.8	1200	0.40		2.47	2.18	0.27	16.38	81%	183.64	183.50	0.00	183.68	0.04	No Lots
	762	764	0.00	0.81	0.00	0.00	4.90	N	1.99	149.47	2.04	50.1	1200	0.40		2.47	2.18	0.38	16.76	81%	183.45	183.25	0.00	184.10	0.65	No Lots
	764	766	0.00	0.81	0.00	0.00	4.90	N	1.98	147.30	2.01	17.0	1200	0.40		2.47	2.18	0.13	16.89	80%	183.20	183.13	0.00	183.30	0.10	No Lots
	766	768	0.00	0.81	0.00	0.00	4.90	N	1.97	146.59	2.00	47.7	1200	0.40		2.47	2.18	0.36	17.26	80%	183.08	182.89	0.00	182.71	-0.37	No Lots
	768	770	0.00	0.81	0.00	0.00	4.90	N	1.96	144.61	1.97	64.2	1200	0.40		2.47	2.18	0.49	17.75	80%	182.84	182.59	0.00	182.98	0.14	No Lots
	770	534	0.00	0.81	0.00	0.00	4.90	N	1.95	142.04	1.93	30.4	1200	0.40		2.47	2.18	0.23	17.98	79%	182.54	182.41	0.00	183.42	0.89	No Lots
	799	534	0.40	0.81	0.00	0.32	0.32	Y	0.18	199.39	0.18	74.0	300	1.80		0.13	1.84	0.67	10.67	62%	183.65	182.31	0.00	184.36	0.72	Okay!

4134 16TH AVENUE

Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	534	536	0.19	0.81	0.00	0.15	5.38	Y	2.12	140.85	2.10	34.7	1200	0.40		2.47	2.18	0.26	18.25	82%	182.31	182.17	0.00	183.48	1.17	Okay!
	536	538	0.14	0.81	0.00	0.12	5.50	Y	2.14	139.53	2.13	26.6	1200	0.40		2.47	2.18	0.20	18.45	82%	182.12	182.02	0.00	182.85	0.73	Okay!
	538	540	0.00	0.81	0.00	0.00	5.50	N	2.13	138.54	2.11	20.4	1200	0.40		2.47	2.18	0.16	18.61	87%	181.97	181.89	0.00	182.39	0.42	No Lots
	540	542	0.00	0.81	0.00	0.00	5.50	N	2.13	137.78	2.10	32.7	1200	0.40		2.47	2.18	0.25	18.86	86%	181.84	181.71	0.00	182.50	0.66	No Lots
	542	544	0.00	0.81	0.00	0.00	5.50	N	2.12	136.59	2.08	45.3	1200	0.40		2.47	2.18	0.35	19.20	86%	181.66	181.47	0.00	182.49	0.83	No Lots
	556N	544	0.18	0.94	0.00	0.17	0.17	N	0.04	199.39	0.09	77.0	300	1.00		0.10	1.37	0.94	10.94	43%	182.19	181.42	0.00	182.57	0.38	No Lots
	544	546	0.00	0.81	0.00	0.00	5.66	N	2.14	134.98	2.12	50.1	1200	0.40		2.47	2.18	0.38	19.59	87%	181.42	181.22	0.00	182.83	1.41	No Lots
	546	548	0.30	0.50	0.00	0.15	5.81	N	2.15	133.24	2.15	50.1	1200	0.40		2.47	2.18	0.38	19.97	87%	181.17	180.97	0.00	180.99	-0.18	No Lots
	548	550	0.22	0.81	0.00	0.18	5.99	N	2.17	131.55	2.19	57.1	1200	0.50		2.76	2.44	0.39	20.36	79%	180.92	180.64	0.00	183.31	2.39	Okay!
	550	552	0.15	0.81	0.00	0.12	6.11	N	2.17	129.88	2.21	38.8	1200	0.50		2.76	2.44	0.27	20.62	79%	180.59	180.39	0.00	182.79	2.20	Okay!
	552	503	0.25	0.81	0.00	0.20	6.32	N	2.20	128.76	2.26	64.6	1200	0.50		2.76	2.44	0.44	21.07	80%	180.34	180.02	0.00	182.39	2.05	Okay!
	485W	503	0.36	0.81	0.00	0.29	0.29	N	0.07	199.39	0.16	69.0	300	1.00		0.10	1.37	0.84	10.84	75%	181.24	180.55	0.00	182.36	1.12	Okay!
	503	505	0.51	0.81	0.00	0.41	7.02	N	2.29	126.95	2.48	79.0	1200	0.40		2.47	2.18	0.60	21.67	93%	179.92	179.61	0.00	181.85	1.93	Okay!
	524	525	0.15	0.81	0.00	0.13	0.13	N	0.03	199.39	0.07	63.3	300	1.00		0.10	1.37	0.77	10.77	32%	182.26	181.62	0.00	183.41	1.16	Okay!
	525	527	0.04	0.81	0.00	0.03	0.16	N	0.04	191.49	0.09	17.5	300	0.50		0.07	0.97	0.30	11.07	56%	181.57	181.49	0.00	183.17	1.60	Okay!
	527	518E	0.07	0.81	0.00	0.06	0.22	N	0.05	188.59	0.11	29.7	300	0.50		0.07	0.97	0.51	11.58	75%	181.44	181.29	0.00	183.05	1.62	Okay!
	518E	530	0.43	0.94	0.00	0.40	0.62	N	0.14	183.88	0.32	65.8	450	0.50		0.20	1.27	0.87	12.45	70%	181.29	180.96	0.00	182.70	1.41	Okay!
	530	505	0.60	0.94	0.00	0.57	1.19	N	0.26	176.45	0.58	93.2	525	0.70		0.36	1.66	0.93	13.38	72%	180.96	180.31	0.00	182.09	1.13	Okay!
	498W	505	0.30	0.81	0.00	0.24	0.24	N	0.06	199.39	0.14	67.1	300	1.00		0.10	1.37	0.82	10.82	62%	180.68	180.01	0.00	181.79	1.11	Okay!
	505	507	0.44	0.94	0.00	0.41	8.87	N	2.55	124.57	3.07	76.8	1350	0.40		3.38	2.36	0.54	22.21	76%	179.61	179.30	0.00	181.30	1.70	Okay!
	518S	519	0.28	0.81	0.00	0.23	0.23	N	0.06	199.39	0.13	78.9	300	1.00		0.10	1.37	0.96	10.96	59%	181.84	181.05	0.00	182.70	0.86	Okay!
	519	521	0.34	0.81	0.00	0.27	0.50	N	0.12	189.64	0.27	93.0	375	0.80		0.16	1.42	1.09	12.05	75%	181.05	180.31	0.00	182.29	1.24	Okay!
	521	507	0.36	0.81	0.00	0.29	4.34	N	1.06	179.76	2.17	99.8	900	0.70		1.51	2.38	0.70	12.75	70%	180.31	179.61	0.00	181.55	1.24	Okay!
	781	521	3.54	1.00	0.00	3.54	3.54	N	0.98	199.39	1.96	10.7	825	1.00		1.44	2.69	0.07	10.07	68%	180.42	180.31	0.00	181.61	1.20	Okay!
	507	514	0.25	0.94	0.00	0.23	13.43	N	3.28	122.51	4.57	54.4	1350	0.40		3.38	2.36	0.38	22.60	97%	179.20	178.98	0.00	180.80	1.60	Okay!
	514	509	0.25	0.94	0.00	0.23	13.66	N	3.29	121.09	4.60	54.4	1350	0.40		3.38	2.36	0.38	22.98	98%	178.93	178.71	0.00	180.42	1.49	Okay!
	516	509	0.33	0.81	0.00	0.27	0.27	N	0.07	199.39	0.15	40.0	300	1.00		0.10	1.37	0.49	10.49	68%	179.06	178.66	0.00	178.75	-0.31	No Lots
	509	494	0.20	0.94	0.00	0.19	14.12	N	3.34	119.71	4.69	50.0	1350	0.40		3.38	2.36	0.35	23.33	99%	178.66	178.46	0.00	179.95	1.29	Okay!
	485E	496	0.20	0.81	0.00	0.17	0.17	N	0.04	199.39	0.09	45.4	300	1.00		0.10	1.37	0.55	10.55	42%	181.30	180.84	0.00	182.36	1.06	Okay!
	496	486	0.24	0.81	0.00	0.20	0.36	N	0.09	193.65	0.20	54.0	375	0.70		0.15	1.33	0.68	11.23	59%	180.84	180.47	0.00	182.05	1.21	Okay!
	486	488	0.05	0.81	0.00	0.04	0.40	N	0.09	187.10	0.21	10.4	375	0.70		0.15	1.33	0.13	11.36	63%	180.42	180.34	0.00	181.60	1.19	Okay!
	488	490	0.32	0.81	0.00	0.26	0.66	N	0.15	185.89	0.34	70.5	450	0.70		0.24	1.50	0.78	12.14	63%	180.34	179.85	0.00	181.51	1.17	Okay!
	498E	499	0.16	0.81	0.00	0.13	0.13	N	0.03	199.39	0.07	33.2	300	1.00		0.10	1.37	0.40	10.40	34%	180.70	180.37	0.00	181.79	1.09	Okay!
	499	490	0.37	0.81	0.00	0.30	0.43	N	0.10	195.16	0.23	74.1	375	0.70		0.15	1.33	0.93	11.34	71%	180.37	179.85	0.00	181.56	1.19	Okay!
	490	492	0.26	0.94	0.00	0.25	1.34	N	0.29	178.98	0.66	61.1	525	0.70		0.36	1.66	0.61	12.76	82%	179.85	179.42	0.00	180.99	1.14	Okay!
	492	494	0.10	0.94	0.00	0.09	2.72	N	0.62	173.95	1.31	22.1	675	1.00		0.84	2.35	0.16	12.91	73%	179.42	179.20	0.00	180.57	1.15	Okay!
	777	492	1.29	1.00	0.00	1.29	1.29	N	0.36	199.39	0.71	13.0	525	1.00		0.43	1.99	0.11	10.11	83%	179.55	179.42	0.00	180.80	1.25	Okay!
POND P3	494	P3	0.00	0.81	0.00	0.00	16.83	N	3.73	118.47	5.54	22.6	1350	0.50		3.77	2.64	0.14	23.48	99%	177.96	177.85	0.00	180.44	2.48	Okay!
	589S	708	0.52	0.81	0.00	0.42	0.42	N	0.10	199.39	0.23	80.6	300	2.50		0.15	2.16	0.62	10.62	68%	191.79	189.78	0.00	193.02	1.23	Okay!
	708	710	0.33	0.81	0.00	0.26	0.68	N	0.16	192.98	0.37	50.8	450	0.70		0.24	1.50	0.56	11.19	68%	189.78	189.42	0.00	191.04	1.26	Okay!
	710	712	0.26	0.81	0.00	0.21	0.89	N	0.21	187.52	0.47	40.2	525	0.70		0.36	1.66	0.40	11.59	58%	189.42	189.14	0.00	190.71	1.29	Okay!
	723E	712	0.20	0.81	0.00	0.16	0.16	N	0.04	199.39	0.09	54.5	300	1.00		0.10	1.37	0.66	10.66	41%	189.59	189.04	0.00	190.77	1.19	Okay!
	712	714	0.36	0.81	0.00	0.29	1.35	N	0.31	183.83	0.69	61.6	525	2.00		0.61	2.81	0.37	11.95	50%	189.04	187.81	0.00	190.47	1.43	Okay!
	714	716S	0.28	0.81	0.00	0.23	1.58	N	0.35	180.61	0.79	48.5	525	2.00		0.61	2.81	0.29	12.24	58%	187.76	186.79	0.00	189.20	1.44	Okay!
	577S	716S	0.13	0.81	0.00	0.11	0.11	N	0.03	199.39	0.06	76.2	300	1.00		0.10	1.37	0.93	10.93	27%	187.45	186.69	0.00	187.99	0.54	Okay!
	716S	718	0.14	0.81	0.00	0.11	1.80	N	0.39	178.16	0.89	86.3	525	2.00		0.61	2.81	0.51	12.75	65%	186.69	184.96	0.00	188.25	1.56	Okay!
	728	729	0.32	0.81	0.00	0.26	0.26	N	0.06	199.39	0.15	43.0	300	2.00		0.14	1.93	0.37	10.37	47%	187.23	186.37	0.00	188.55	1.32	Okay!
	729	718	0.53	0.81	0.00	0.43	0.69	N	0.17	195.51	0.38	70.1	375	2.00		0.25	2.25	0.52	10.89	67%	186.37	184.96	0.00	187.69	1.32	Okay!
	718	720	0.32	0.81	0.00	0.26	2.75	N	0.59	173.98	1.33	49.4	600	1.60		0.78	2.75	0.30	13.05	76%	184.96	184.17	0.00	186.26	1.30	Okay!
	720	642	0.39	0.81	0.00	0.31	3.06	N	0.65	171.62	1.46	58.9	675	1.00		0.84	2.35	0.42	13.47	77%	184.17	183.58	0.00	185.42	1.25	Okay!
	716E	745	0.21	0.81	0.00	0.17	0.17	N	0.04	199.39	0.10	65.8	300	2.00		0.14	1.93	0.57	10.57	31%	187.07	185.76	0.00	188.25	1.18	Okay!
	745	640	0.26	0.81	0.00	0.21	0.38	N	0.09	193.52	0.21	78.3	300	2.00		0.14	1.93	0.67	11.24	67%	185.71	184.14	0.00	186.93	1.22	Okay!
	640	642	0.26	0.81	0.00	0.21	0.59	N	0.14	187.00	0.31	79.8	450	0.70		0.24	1.50	0.89	12.13	57%	184.14	183.58	0.00	185.40	1.26	Okay!
	642	644	0.51	0.94	0.00	0.48	4.13	N	0.86	168.45	1.93	90.0	825	0.70		1.20	2.25	0.67	14.14	71%	183.58	182.95	0.00	184.83	1.25	Okay!
	644	646	0.26	0.94	0.00	0.25	5.04	N	1.22	163.65	2.29	46.5	900	0.70		1.51	2.38	0.33	14.46	80%	182.95	182.63	0.00	184.21	1.26	Okay!
	646	648	0.44	0.94	0.00	0.41	5.84	N	1.36	161.41	2.62	78.0	900	0.80		1.62	2.55	0.51	14.98	84%	182.53	181.90	0.00	183.88	1.35	Okay!
	775	644	1.32	0.50	0.00	0.66	0.66	Y	0.37	199.39	0.37	16.3	525	1.00		0.43	1.99	0.14	10.14	85%	183.12	182.95	0.00	183.80	0.69	Okay!
	732	733	0.14	0.94	0.00	0.13	0.13	N	0.03	199.39	0.07	50.8	300	2.00		0.14	1.93	0.44	10.44	24%	186.31	185.30	0.00	187.77	1.46	Okay!
	733	735	0.14	0.94	0.00	0.13	0.26	N	0.06	194.83	0.14	49.9	300	2.00		0.14	1.93	0.43	10.87	46%	185.25	184.25	0.00	186.60	1.35	Okay!
	735	737	0.13	0.94	0.00	0.12	0.38	N	0.09	190.55	0.20	47.6	300	2.00		0.14	1.93	0.41	11.28	66%	184.20	183.25	0.00	185.43	1.23	Okay!

Stantec

4134 16TH AVENUE

Storm Sewer Design Sheet (100-Year)

Job No.:	160622264	**Consultant:**	Stantec Ltd.
Date:	October 2017	**Prepared by:**	James Luk
Amanda Number:	N/A		

Design Return Period = 100 Yrs, n = 0.013 — A = 2167.43
Rainfall Intensity = $A/(T+B)^C$ — B = 6.03
Starting 'T' = min — C = 0.86

Street	Manhole		Runoff					Include 100-Year Flow?	Accum. Capture (Pipe Flow)	Rainfall Intensity	100-Year Flow	Pipe Data			Override Tc	Full Capacity	Full Velocity	Time		Q_{ACT}/Q_{CAP}	Hydraulic Grade Line Analysis					
	U/S	D/S	Area	Runoff Coeff.	External Flow	A x R	Accum. A x R					Length	Diameter	Slope				Section	Accum.		U/S HGL	D/S HGL	Surcharging Above U/S Obv.	Basement Elevation	U/S HGL Less Basement Elevation	Verification
			(ha)	"R"	(m^3/s)			(Y/N)	(m^3/s)	(mm/hr)	(m^3/s)	(m)	(mm)	(%)	(min)	(m^3/s)	(m/s)	(min)	(min)	(%)	(m)	(m)	(m)	(m)	(m)	
	737	646	0.00	0.81	0.00	0.00	0.38	N	0.09	186.66	0.20	33.5	300	2.00		0.14	1.93	0.29	11.57	65%	183.20	182.53	0.00	184.33	1.13	Okay!
	773	533	2.01	1.00	0.00	2.01	2.01	N	0.56	199.39	1.11	13.3	675	1.00		0.84	2.35	0.09	10.09	66%	183.37	183.24	0.00	184.48	1.11	Okay!
	533	657	0.31	0.81	0.00	0.25	2.26	N	0.62	198.39	1.25	56.7	675	1.00		0.84	2.35	0.40	10.50	73%	183.19	182.62	0.00	184.31	1.12	Okay!
	657	659	0.31	0.81	0.00	0.25	2.51	N	0.66	194.23	1.36	56.7	750	0.70		0.93	2.11	0.45	10.94	71%	182.62	182.22	0.00	183.92	1.30	Okay!
	659	648	0.21	0.81	0.00	0.17	2.68	N	0.69	189.81	1.42	38.4	750	0.70		0.93	2.11	0.30	11.25	74%	182.17	181.90	0.00	183.55	1.38	Okay!
	648	650	0.49	0.94	0.00	0.46	8.98	N	2.00	158.03	3.94	79.0	1050	0.80		2.44	2.82	0.47	15.44	82%	181.90	181.27	0.00	183.26	1.36	Okay!
	679W	684	0.38	0.81	0.00	0.31	0.31	N	0.08	199.39	0.17	92.0	300	1.00		0.10	1.37	1.12	11.12	78%	190.74	189.82	0.00	191.80	1.06	Okay!
	684	686	0.11	0.81	0.00	0.09	0.39	N	0.09	188.13	0.21	26.5	375	0.50		0.12	1.12	0.39	11.51	74%	189.82	189.68	0.00	191.18	1.36	Okay!
	686	682	0.34	0.81	0.00	0.28	0.67	N	0.15	184.50	0.35	83.8	450	0.70		0.24	1.50	0.93	12.45	64%	189.68	189.10	0.00	191.00	1.32	Okay!
	679E	680	0.08	0.81	0.00	0.06	0.06	N	0.02	199.39	0.03	12.4	300	2.00		0.14	1.93	0.11	10.11	11%	190.68	190.43	0.00	191.80	1.12	Okay!
	680	682	0.40	0.81	0.00	0.33	0.39	N	0.10	198.26	0.21	64.4	300	2.00		0.14	1.93	0.55	10.66	70%	190.38	189.10	0.00	191.54	1.16	Okay!
	682	689	0.22	0.81	0.00	0.18	1.24	N	0.27	176.47	0.61	79.3	525	0.70		0.36	1.66	0.79	13.24	75%	189.10	188.54	0.00	190.33	1.23	Okay!
	703S	689	0.45	0.81	0.00	0.37	0.37	N	0.09	199.39	0.20	74.0	300	2.70		0.16	2.25	0.55	10.55	57%	190.75	188.75	0.00	191.40	0.65	Okay!
	703E	705	0.14	0.81	0.00	0.11	0.11	N	0.03	199.39	0.06	23.0	300	1.00		0.10	1.37	0.28	10.28	29%	190.73	190.50	0.00	191.40	0.67	Okay!
	705	691	0.45	0.81	0.00	0.37	0.48	N	0.12	196.44	0.26	73.9	300	2.70		0.16	2.25	0.55	10.83	73%	190.40	188.40	0.00	191.44	1.04	Okay!
	689	691	0.07	0.81	0.00	0.06	1.67	N	0.35	170.20	0.79	23.0	525	1.50		0.53	2.43	0.16	13.40	66%	188.49	188.15	0.00	189.77	1.28	Okay!
	691	693	0.18	0.81	0.00	0.15	2.29	N	0.48	169.01	1.08	77.3	600	1.50		0.75	2.66	0.48	13.88	63%	188.15	186.99	0.00	189.53	1.38	Okay!
	723S	725	0.19	0.81	0.00	0.15	0.15	N	0.04	199.39	0.09	16.0	300	3.00		0.17	2.37	0.11	10.11	23%	189.52	189.04	0.00	190.77	1.25	Okay!
	725	693	0.81	0.81	0.00	0.66	0.81	N	0.20	198.19	0.45	68.4	375	3.00		0.30	2.75	0.41	10.53	66%	189.04	186.99	0.00	190.34	1.30	Okay!
	693	695	0.69	0.81	0.00	0.56	3.66	N	0.75	165.47	1.68	73.8	675	2.00		1.19	3.32	0.37	14.25	63%	186.99	185.51	0.00	188.30	1.31	Okay!
	695	697	0.49	0.81	0.00	0.40	4.06	N	0.81	162.87	1.84	52.6	675	2.00		1.19	3.32	0.26	14.52	68%	185.46	184.41	0.00	186.83	1.37	Okay!
	697	699	0.49	0.81	0.00	0.40	4.46	N	0.88	161.07	2.00	52.6	675	2.00		1.19	3.32	0.26	14.78	74%	184.36	183.31	0.00	185.79	1.43	Okay!
	699	677	0.51	0.81	0.00	0.41	4.88	N	0.96	159.31	2.16	54.2	825	0.70		1.20	2.25	0.40	15.18	80%	183.31	182.93	0.00	184.74	1.43	Okay!
	676	677	0.21	0.81	0.00	0.17	0.17	N	0.04	199.39	0.10	54.1	300	1.00		0.10	1.37	0.66	10.66	44%	183.42	182.88	0.00	183.82	0.40	FDC
	674	665	0.24	0.81	0.00	0.19	0.19	N	0.05	199.39	0.11	60.8	300	1.00		0.10	1.37	0.74	10.74	49%	183.33	182.72	0.00	183.64	0.31	FDC
	677	665	0.04	0.81	0.00	0.03	5.08	N	0.98	156.71	2.21	23.3	825	0.70		1.20	2.25	0.17	15.35	81%	182.88	182.72	0.00	184.32	1.44	Okay!
	662	663	0.15	0.81	0.00	0.12	0.12	N	0.03	199.39	0.07	46.1	300	1.00		0.10	1.37	0.56	10.56	31%	183.32	182.86	0.00	184.19	0.87	Okay!
	663	665	0.00	0.81	0.00	0.00	0.12	N	0.03	193.57	0.07	18.9	300	0.50		0.07	0.97	0.33	10.89	43%	182.81	182.72	0.00	184.38	1.57	Okay!
	665	672	0.33	0.81	0.00	0.27	5.66	N	1.08	155.62	2.45	67.7	900	0.70		1.51	2.38	0.47	15.83	72%	182.72	182.24	0.00	184.16	1.44	Okay!
	672	667	0.28	0.81	0.00	0.23	5.89	N	1.11	152.72	2.50	57.5	900	0.70		1.51	2.38	0.40	16.23	73%	182.19	181.79	0.00	183.73	1.54	Okay!
	667	669	0.07	0.81	0.00	0.06	5.95	N	1.10	150.34	2.48	14.1	900	0.70		1.51	2.38	0.10	16.33	73%	181.74	181.64	0.00	183.35	1.61	Okay!
	669	650	0.36	0.81	0.00	0.29	6.24	N	1.15	149.76	2.60	74.0	975	0.50		1.58	2.12	0.58	16.91	72%	181.64	181.27	0.00	183.23	1.59	Okay!
	653	654	0.55	0.81	0.00	0.44	0.44	N	0.11	199.39	0.25	82.7	375	1.00		0.18	1.59	0.87	10.87	63%	182.42	181.59	0.00	183.54	1.12	Okay!
	654	650	0.30	0.81	0.00	0.25	0.69	N	0.16	190.55	0.37	45.9	450	0.70		0.24	1.50	0.51	11.38	68%	181.59	181.27	0.00	182.98	1.39	Okay!
	650	633	0.53	0.94	0.00	0.50	16.41	N	3.20	146.50	6.68	90.0	1350	0.50		3.77	2.64	0.57	17.48	85%	181.27	180.82	0.00	182.61	1.34	Okay!
	636	637	0.62	0.81	0.00	0.50	0.50	N	0.12	199.39	0.28	80.2	375	1.00		0.18	1.59	0.84	10.84	71%	181.98	181.17	0.00	182.68	0.71	Okay!
	637	633	0.62	0.81	0.00	0.50	1.01	N	0.24	190.80	0.53	80.2	525	0.50		0.30	1.40	0.95	11.79	78%	181.17	180.77	0.00	182.47	1.30	Okay!
	611N	625	0.38	0.81	0.00	0.31	0.31	N	0.08	199.39	0.17	56.4	300	1.00		0.10	1.37	0.69	10.69	79%	182.28	181.72	0.00	181.93	-0.35	FDC
	625	627	0.38	0.81	0.00	0.31	0.62	N	0.15	192.33	0.33	56.4	450	0.50		0.20	1.27	0.74	11.43	73%	181.72	181.44	0.00	181.36	-0.36	FDC
	627	629	0.11	0.81	0.00	0.09	0.70	N	0.16	185.28	0.36	15.8	450	0.50		0.20	1.27	0.21	11.64	80%	181.39	181.31	0.00	180.73	-0.66	FDC
	629	631	0.41	0.81	0.00	0.33	1.04	N	0.24	183.41	0.53	61.2	525	0.50		0.30	1.40	0.73	12.36	77%	181.31	181.00	0.00	180.94	-0.37	FDC
	631	633	0.31	0.81	0.00	0.25	1.29	N	0.28	177.17	0.64	46.2	600	0.50		0.43	1.54	0.50	12.86	65%	181.00	180.77	0.00	181.53	0.53	Okay!
	633	602	0.42	0.94	0.00	0.39	19.10	N	3.61	143.44	7.61	76.3	1350	0.50		3.77	2.64	0.48	17.96	96%	180.77	180.39	0.00	181.85	1.08	Okay!
	556S	600	0.18	0.94	0.00	0.17	0.17	N	0.04	199.39	0.09	75.7	300	1.00		0.10	1.37	0.92	10.92	43%	181.33	180.57	0.00	182.57	1.24	Okay!
	600	602	0.00	0.81	0.00	0.00	0.17	N	0.04	190.03	0.09	36.3	300	0.50		0.07	0.97	0.62	11.55	58%	180.52	180.34	0.00	182.25	1.73	Okay!
	611E	612	0.07	0.81	0.00	0.06	0.06	N	0.01	199.39	0.03	16.0	300	1.00		0.10	1.37	0.19	10.19	15%	181.81	181.65	0.00	181.93	0.12	FDC
	612	614	0.26	0.81	0.00	0.21	0.27	N	0.07	197.33	0.15	55.4	375	0.50		0.12	1.12	0.82	11.02	53%	181.65	181.38	0.00	182.07	0.42	FDC
	614	616	0.10	0.81	0.00	0.08	0.35	N	0.08	189.12	0.18	21.3	375	0.50		0.12	1.12	0.32	11.33	66%	181.33	181.22	0.00	182.63	1.31	Okay!
	616	618	0.20	0.81	0.00	0.16	0.51	N	0.12	186.15	0.26	43.2	450	0.50		0.20	1.27	0.57	11.90	58%	181.22	181.00	0.00	182.83	1.61	Okay!
	618	620	0.15	0.81	0.00	0.12	0.63	N	0.14	181.07	0.32	32.0	450	0.50		0.20	1.27	0.42	12.32	70%	180.95	180.79	0.00	182.43	1.48	Okay!
	620	622	0.25	0.81	0.00	0.21	0.84	N	0.18	177.49	0.41	54.7	525	0.50		0.30	1.40	0.65	12.97	60%	180.79	180.52	0.00	182.10	1.31	Okay!
	622	602	0.12	0.81	0.00	0.10	0.93	N	0.20	172.27	0.45	25.7	525	0.50		0.30	1.40	0.30	13.28	65%	180.47	180.34	0.00	181.61	1.14	Okay!
	602	604	0.12	0.81	0.00	0.10	20.30	N	3.76	140.96	7.95	50.1	1350	0.60		4.13	2.89	0.29	18.25	91%	180.34	180.04	0.00	181.28	0.94	Okay!
	748	749	0.13	0.94	0.00	0.12	0.12	N	0.03	199.39	0.07	52.4	300	1.00		0.10	1.37	0.64	10.64	31%	181.38	180.86	0.00	182.87	1.49	Okay!
	749	608	0.00	0.81	0.00	0.00	0.12	N	0.03	192.81	0.07	17.4	300	0.50		0.07	0.97	0.30	10.94	42%	180.81	180.72	0.00	181.99	1.18	Okay!
	608	604	0.62	1.00	0.00	0.62	0.74	N	0.17	189.87	0.39	84.7	450	0.80		0.26	1.60	0.88	11.82	68%	180.72	180.04	0.00	181.77	1.05	Okay!
	779	604	2.14	0.50	0.00	1.07	1.07	Y	0.59	199.39	0.59	17.5	600	1.00		0.61	2.17	0.13	10.13	97%	180.22	180.04	0.00	180.27	0.05	Park
POND P4	604	P4	0.00	0.81	0.00	0.00	22.11	N	4.36	139.52	8.57	27.7	1350	0.70		4.47	3.12	0.15	18.40	98%	180.04	179.85	0.00	180.96	0.92	Okay!

V:\01606\Active\160622264\Analysis\Pipe Design\Storm\160622264 (James) Design Sheet Storm 2017.10.03 DP2.xlsx

Appendix F OVERLAND FLOW AND ROW CAPACITY CALCULATIONS

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date 10/26/2017

Overland Flow Capacity Calculations

West Draft Plan								
Pond #	**Node #**	**Road**	**Section Description**	**Slope %**	**Flow Capacity (m^3/s)**	**Capacity Flow Depth (m)**	**Drainage Area (ha)**	**Overland Flow (m^3/s)**
3	1W	Street F East	17m ROW	0.7	1.49	0.21	1.3	0.32
3	2W	Street F South	18.5m ROW	0.7	1.49	0.21	3.55	0.89
3	3W	Street B	24.5m ROW	0.7	3.53	0.23	5.02	1.25
4	4W	Street B North of Street K	24.5 m ROW	0.8	3.77	0.25	11.72	2.90
4	5W	Street J	17 m ROW	0.9	1.69	0.21	5.20	1.28
4	6W	Street B Downstream of Street K	24.5 m ROW	0.8	3.77	0.25	9.47	2.34

Discharge Location	**Node #**	**Road**	**Section Description**	**Slope %**	**Flow Capacity (m^3/s)**	**100 Year Flow Depth (m)**	**Drainage Area (ha)**	**Overland Flow (m^3/s)**
To Berczy	7W	St O	Overland Flow Route 4 m bottom width with 3:1 side slopes	5	4.66	0.11	4.78	1.18
To Berczy	8W	Street J	Overland Flow Route 4 m bottom width with 3:1 side slopes	1.8	2.33	0.21	6.93	1.73

Stantec

Project Description:	**4134 16th Avenue**
Job Number:	**160622264**
Creation Date	**10/26/2017**

Overland Flow Capacity Calculations

East Draft Plan

Pond #	Node #	Road	Section Description	Slope %	Flow Capacity (m^3/s)	Capacity Flow Depth (m)	Drainage Area (ha)	Overland Flow (m^3/s)
1	1E	St Z	17.0m ROW	0.7	1.49	0.21	5.53	1.38
1	2E	St X	18.5 m ROW	0.7	2.1	0.24	7.99	2.00
1	3E	St Y	18.5 m ROW	0.7	2.1	0.24	5.42	1.36
1	4E	St Y	18.5 m ROW	2	3.61	0.24	4.01	1.00
1	5E	St W	17.0m ROW	0.7	1.49	0.21	1.41	0.35
1	6E	St U	17.0m ROW	0.8	1.59	0.21	4.42	1.11
1	7E	St X	18.5 m ROW	1.4	3.02	0.24	12.00	3.01
2	8E	Street B	23 m ROW	0.8	3.52	0.25	4.59	1.15

Typical 17 m ROW Flow Capacity 0.7% Slope

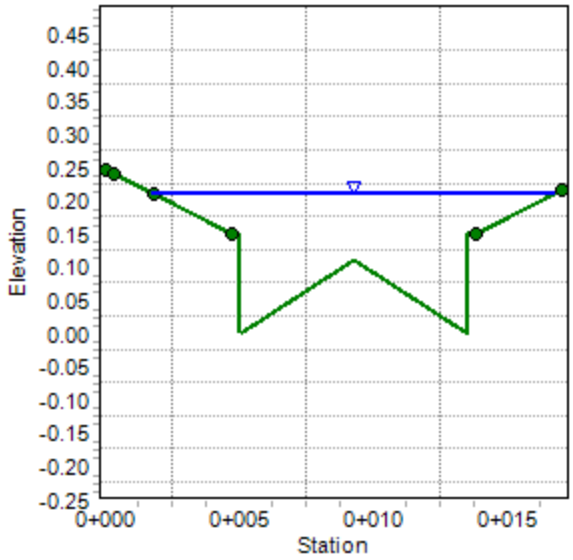
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.21	m
Discharge	1.49	m³/s

Cross Section Image



Typical 17 m ROW Flow Capacity 0.7% Slope

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.21	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.2440
0+000.30	0.2380
0+001.80	0.2080
0+004.70	0.1500
0+005.00	0.1500
0+005.00	0.0000
0+009.25	0.1100
0+013.50	0.0000
0+013.50	0.1500
0+013.80	0.1500
0+017.00	0.2140

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.2440)	(0+000.30, 0.2380)	0.025
(0+000.30, 0.2380)	(0+001.80, 0.2080)	0.013
(0+001.80, 0.2080)	(0+004.70, 0.1500)	0.025
(0+004.70, 0.1500)	(0+013.80, 0.1500)	0.013
(0+013.80, 0.1500)	(0+017.00, 0.2140)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Typical 17 m ROW Flow Capacity 0.7% Slope

Results

Discharge		1.49	m³/s
Elevation Range	0.000 to 0.244 m		
Flow Area		1.53	m²
Wetted Perimeter		15.404	m
Hydraulic Radius		0.10	m
Top Width		15.100	m
Normal Depth		0.21	m
Critical Depth		0.21	m
Critical Slope		0.00744	m/m
Velocity		0.97	m/s
Velocity Head		0.05	m
Specific Energy		0.26	m
Froude Number		0.97	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.21	m
Critical Depth	0.21	m
Channel Slope	0.70000	%
Critical Slope	0.00744	m/m

Messages

Notes

total 100 year minus pipe capacity x 40%

Cross Section for 17 m ROW 2% Boulevards 0.8% Slope Capacity

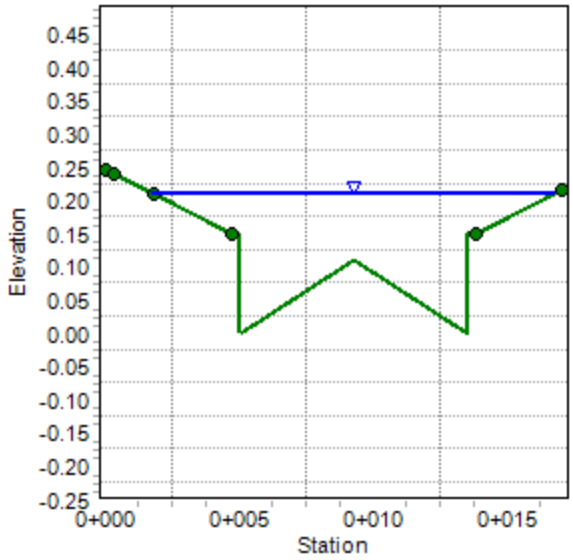
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.21	m
Discharge	1.59	m³/s

Cross Section Image



Worksheet for 17 m ROW 2% Boulevards 0.8% Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.21	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.244
0+000.30	0.238
0+001.80	0.208
0+004.70	0.150
0+005.00	0.150
0+005.00	0.000
0+009.25	0.110
0+013.50	0.000
0+013.50	0.150
0+013.80	0.150
0+017.00	0.214

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.244)	(0+000.30, 0.238)	0.025
(0+000.30, 0.238)	(0+001.80, 0.208)	0.013
(0+001.80, 0.208)	(0+004.70, 0.150)	0.025
(0+004.70, 0.150)	(0+013.80, 0.150)	0.013
(0+013.80, 0.150)	(0+017.00, 0.214)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for 17 m ROW 2% Boulevards 0.8% Slope Capacity

Results

Discharge		1.59	m³/s
Elevation Range	0.000 to 0.244 m		
Flow Area		1.53	m²
Wetted Perimeter		15.404	m
Hydraulic Radius		0.10	m
Top Width		15.100	m
Normal Depth		0.21	m
Critical Depth		0.21	m
Critical Slope		0.00739	m/m
Velocity		1.04	m/s
Velocity Head		0.05	m
Specific Energy		0.26	m
Froude Number		1.04	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.21	m
Critical Depth	0.21	m
Channel Slope	0.80000	%
Critical Slope	0.00739	m/m

Messages

Notes

total 100 year minus pipe capacity x 40%

Cross Section for 17 m ROW 2% Boulevards 0.9% Slope Capacity

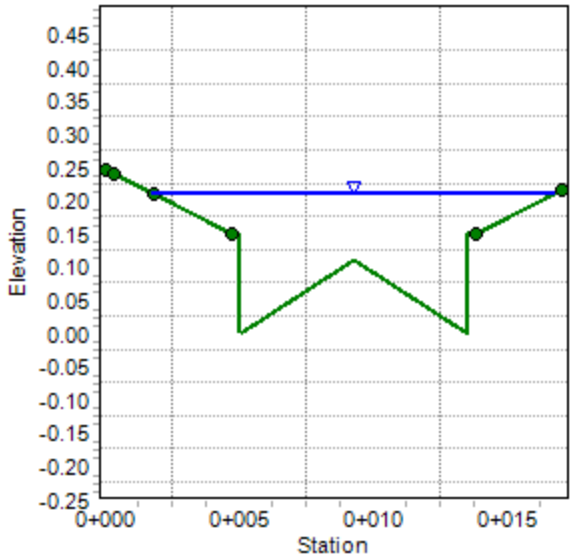
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.90000	%
Normal Depth	0.21	m
Discharge	1.69	m³/s

Cross Section Image



Worksheet for 17 m ROW 2% Boulevards 0.9% Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.90000	%
Normal Depth	0.21	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.244
0+000.30	0.238
0+001.80	0.208
0+004.70	0.150
0+005.00	0.150
0+005.00	0.000
0+009.25	0.110
0+013.50	0.000
0+013.50	0.150
0+013.80	0.150
0+017.00	0.214

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.244)	(0+000.30, 0.238)	0.025
(0+000.30, 0.238)	(0+001.80, 0.208)	0.013
(0+001.80, 0.208)	(0+004.70, 0.150)	0.025
(0+004.70, 0.150)	(0+013.80, 0.150)	0.013
(0+013.80, 0.150)	(0+017.00, 0.214)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for 17 m ROW 2% Boulevards 0.9% Slope Capacity

Results

Discharge		1.69	m³/s
Elevation Range	0.000 to 0.244 m		
Flow Area		1.53	m²
Wetted Perimeter		15.404	m
Hydraulic Radius		0.10	m
Top Width		15.100	m
Normal Depth		0.21	m
Critical Depth		0.22	m
Critical Slope		0.00732	m/m
Velocity		1.10	m/s
Velocity Head		0.06	m
Specific Energy		0.27	m
Froude Number		1.10	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.21	m
Critical Depth	0.22	m
Channel Slope	0.90000	%
Critical Slope	0.00732	m/m

Messages

Notes

total 100 year minus pipe capacity x 40%

18.5 m ROW 2 % Boulevards 0.7% Slope Capacity

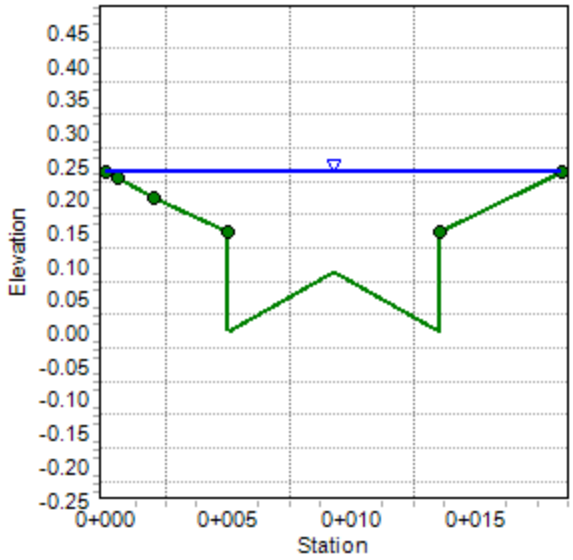
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.24	m
Discharge	2.13	m³/s

Cross Section Image



18.5 m ROW 2 % Boulevards 0.7% Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.24	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.240
0+000.50	0.230
0+002.00	0.200
0+005.00	0.150
0+005.00	0.000
0+009.25	0.090
0+013.50	0.000
0+013.50	0.150
0+018.50	0.240

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.240)	(0+000.50, 0.230)	0.025
(0+000.50, 0.230)	(0+002.00, 0.200)	0.013
(0+002.00, 0.200)	(0+005.00, 0.150)	0.025
(0+005.00, 0.150)	(0+013.50, 0.150)	0.013
(0+013.50, 0.150)	(0+018.50, 0.240)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

18.5 m ROW 2 % Boulevards 0.7% Slope Capacity

Results

Discharge		2.13	m³/s
Elevation Range	0.000 to 0.240 m		
Flow Area		2.12	m²
Wetted Perimeter		18.793	m
Hydraulic Radius		0.11	m
Top Width		18.489	m
Normal Depth		0.24	m
Critical Depth		0.24	m
Critical Slope		0.00778	m/m
Velocity		1.01	m/s
Velocity Head		0.05	m
Specific Energy		0.29	m
Froude Number		0.95	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.24	m
Critical Depth	0.24	m
Channel Slope	0.70000	%
Critical Slope	0.00778	m/m

18.5 m ROW 2 % Boulevards 1.4% Slope Capacity

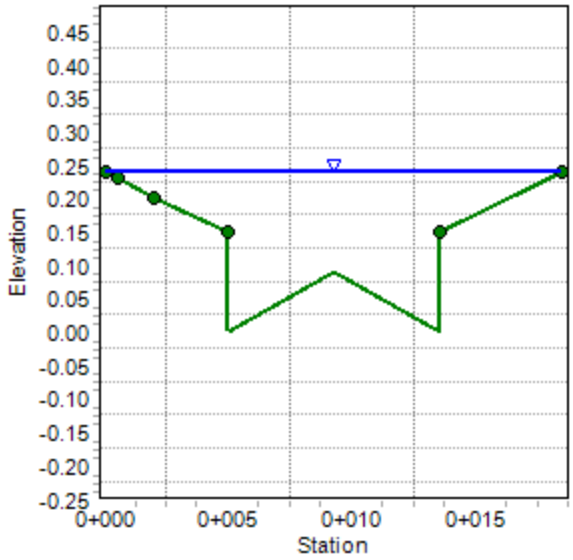
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	1.40000	%
Normal Depth	0.24	m
Discharge	3.01	m³/s

Cross Section Image



18.5 m ROW 2 % Boulevards 1.4% Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	1.40000	%
Normal Depth	0.24	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.240
0+000.50	0.230
0+002.00	0.200
0+005.00	0.150
0+005.00	0.000
0+009.25	0.090
0+013.50	0.000
0+013.50	0.150
0+018.50	0.240

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.240)	(0+000.50, 0.230)	0.025
(0+000.50, 0.230)	(0+002.00, 0.200)	0.013
(0+002.00, 0.200)	(0+005.00, 0.150)	0.025
(0+005.00, 0.150)	(0+013.50, 0.150)	0.013
(0+013.50, 0.150)	(0+018.50, 0.240)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

18.5 m ROW 2 % Boulevards 1.4% Slope Capacity

Results

Discharge		3.01	m³/s
Elevation Range	0.000 to 0.240 m		
Flow Area		2.12	m²
Wetted Perimeter		18.793	m
Hydraulic Radius		0.11	m
Top Width		18.489	m
Normal Depth		0.24	m
Critical Depth		0.26	m
Critical Slope		0.00727	m/m
Velocity		1.42	m/s
Velocity Head		0.10	m
Specific Energy		0.34	m
Froude Number		1.34	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.24	m
Critical Depth	0.26	m
Channel Slope	1.40000	%
Critical Slope	0.00727	m/m

18.5 m ROW 2 % Boulevards 2% Slope Capacity

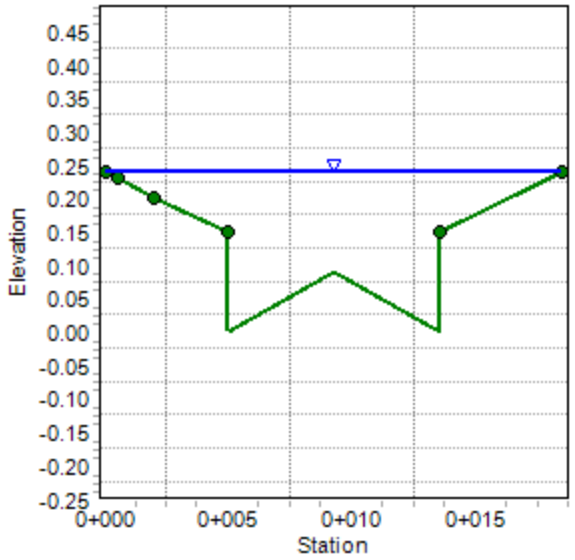
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	2.00000	%
Normal Depth	0.24	m
Discharge	3.60	m³/s

Cross Section Image



18.5 m ROW 2 % Boulevards 2% Slope Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	2.00000	%
Normal Depth	0.24	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.240
0+000.50	0.230
0+002.00	0.200
0+005.00	0.150
0+005.00	0.000
0+009.25	0.090
0+013.50	0.000
0+013.50	0.150
0+018.50	0.240

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.240)	(0+000.50, 0.230)	0.025
(0+000.50, 0.230)	(0+002.00, 0.200)	0.013
(0+002.00, 0.200)	(0+005.00, 0.150)	0.025
(0+005.00, 0.150)	(0+013.50, 0.150)	0.013
(0+013.50, 0.150)	(0+018.50, 0.240)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

18.5 m ROW 2 % Boulevards 2% Slope Capacity

Results

Discharge		3.60	m³/s
Elevation Range	0.000 to 0.240 m		
Flow Area		2.12	m²
Wetted Perimeter		18.793	m
Hydraulic Radius		0.11	m
Top Width		18.489	m
Normal Depth		0.24	m
Critical Depth		0.28	m
Critical Slope		0.00701	m/m
Velocity		1.70	m/s
Velocity Head		0.15	m
Specific Energy		0.39	m
Froude Number		1.61	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.24	m
Critical Depth	0.28	m
Channel Slope	2.00000	%
Critical Slope	0.00701	m/m

Typical 23m ROW Flow Capacity at 0.8% Slope

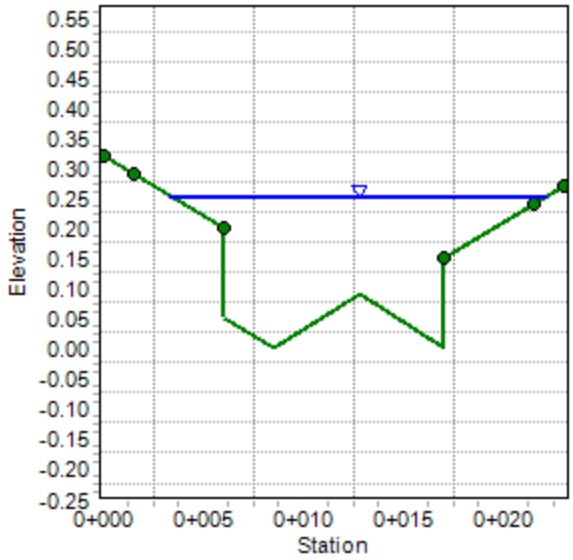
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.25	m
Discharge	3.52	m³/s

Cross Section Image



Typical 23 m ROW at Flow Capacity at 0.8% Slope

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.25	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.32
0+001.50	0.29
0+006.00	0.20
0+006.00	0.05
0+008.50	0.00
0+012.75	0.09
0+017.00	0.00
0+017.00	0.15
0+021.50	0.24
0+023.00	0.27

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.32)	(0+001.50, 0.29)	0.013
(0+001.50, 0.29)	(0+006.00, 0.20)	0.025
(0+006.00, 0.20)	(0+017.00, 0.15)	0.013
(0+017.00, 0.15)	(0+021.50, 0.24)	0.025
(0+021.50, 0.24)	(0+023.00, 0.27)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Typical 23 m ROW at Flow Capacity at 0.8% Slope

Results

Discharge		3.52	m³/s
Elevation Range	0.000 to 0.320 m		
Flow Area		2.69	m²
Wetted Perimeter		19.204	m
Hydraulic Radius		0.14	m
Top Width		18.900	m
Normal Depth		0.25	m
Critical Depth		0.27	m
Critical Slope		0.00646	m/m
Velocity		1.31	m/s
Velocity Head		0.09	m
Specific Energy		0.34	m
Froude Number		1.11	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.25	m
Critical Depth	0.27	m
Channel Slope	0.80000	%
Critical Slope	0.00646	m/m

Messages

Notes

100 year - 5 year

Typical 24.5 m ROW Flow Capacity 0.7% Slope

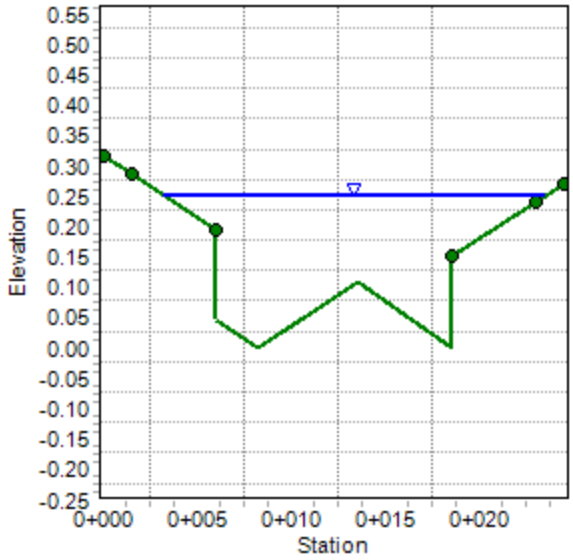
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.25	m
Discharge	3.53	m³/s

Cross Section Image



Typical 24.5 m ROW Flow Capacity 0.7% Slope

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.70000	%
Normal Depth	0.25	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.3140
0+001.50	0.2840
0+006.00	0.1940
0+006.00	0.0440
0+008.20	0.0000
0+013.50	0.1060
0+018.50	0.0000
0+018.50	0.1500
0+023.00	0.2400
0+024.50	0.2700

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.3140)	(0+001.50, 0.2840)	0.013
(0+001.50, 0.2840)	(0+006.00, 0.1940)	0.025
(0+006.00, 0.1940)	(0+018.50, 0.1500)	0.013
(0+018.50, 0.1500)	(0+023.00, 0.2400)	0.025
(0+023.00, 0.2400)	(0+024.50, 0.2700)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Typical 24.5 m ROW Flow Capacity 0.7% Slope

Results

Discharge		3.53	m³/s
Elevation Range	0.00 to 0.31 m		
Flow Area		2.86	m²
Wetted Perimeter		20.604	m
Hydraulic Radius		0.14	m
Top Width		20.300	m
Normal Depth		0.25	m
Critical Depth		0.26	m
Critical Slope		0.00632	m/m
Velocity		1.23	m/s
Velocity Head		0.08	m
Specific Energy		0.33	m
Froude Number		1.05	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.25	m
Critical Depth	0.26	m
Channel Slope	0.70000	%
Critical Slope	0.00632	m/m

Messages

Notes

100 year - 5 year

Typical 24.5 m ROW Overland Flow Capacity at 0.8% Slope

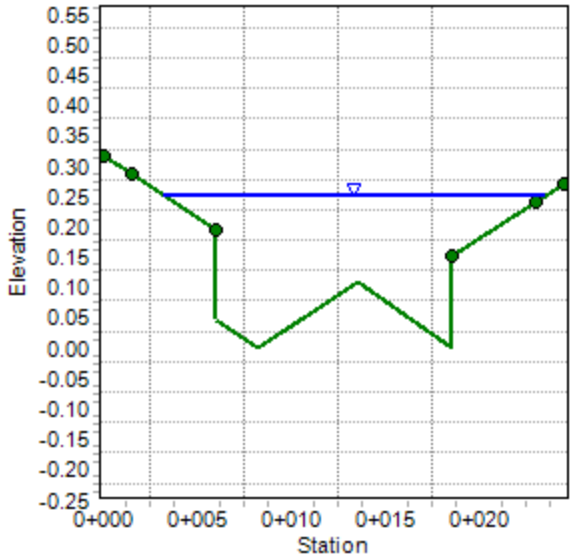
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.25	m
Discharge	3.77	m³/s

Cross Section Image



24.5 Typical ROW Flow Capacity at 0.8 % Slope

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.80000	%
Normal Depth	0.25	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.31
0+001.50	0.28
0+006.00	0.19
0+006.00	0.04
0+008.20	0.00
0+013.50	0.11
0+018.50	0.00
0+018.50	0.15
0+023.00	0.24
0+024.50	0.27

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.31)	(0+001.50, 0.28)	0.013
(0+001.50, 0.28)	(0+006.00, 0.19)	0.025
(0+006.00, 0.19)	(0+018.50, 0.15)	0.013
(0+018.50, 0.15)	(0+023.00, 0.24)	0.025
(0+023.00, 0.24)	(0+024.50, 0.27)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

24.5 Typical ROW Flow Capacity at 0.8 % Slope

Results

Discharge		3.77	m³/s
Elevation Range	0.000 to 0.314 m		
Flow Area		2.86	m²
Wetted Perimeter		20.604	m
Hydraulic Radius		0.14	m
Top Width		20.300	m
Normal Depth		0.25	m
Critical Depth		0.26	m
Critical Slope		0.00628	m/m
Velocity		1.32	m/s
Velocity Head		0.09	m
Specific Energy		0.34	m
Froude Number		1.12	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.25	m
Critical Depth	0.26	m
Channel Slope	0.80000	%
Critical Slope	0.00628	m/m

Messages

Notes

100 year - 5 year

Node 7W overland flow capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	5.00000	%
Normal Depth	0.25	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.250
0+000.75	0.000
0+005.75	0.000
0+006.50	0.250

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.250)	(0+006.50, 0.250)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	4.66	m³/s
Elevation Range	0.000 to 0.250 m	
Flow Area	1.44	m²
Wetted Perimeter	6.581	m
Hydraulic Radius	0.22	m
Top Width	6.500	m
Normal Depth	0.25	m
Critical Depth	0.40	m
Critical Slope	0.00919	m/m

Node 7W overland flow capacity

Results

Velocity		3.24	m/s
Velocity Head		0.54	m
Specific Energy		0.79	m
Froude Number		2.20	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.25	m
Critical Depth	0.40	m
Channel Slope	5.00000	%
Critical Slope	0.00919	m/m

Node 7W Overland Flow

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	5.00000	%
Normal Depth	0.12	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.250
0+000.75	0.000
0+005.75	0.000
0+006.50	0.250

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.250)	(0+006.50, 0.250)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	1.24	m³/s
Elevation Range	0.000 to 0.250 m	
Flow Area	0.61	m²
Wetted Perimeter	5.727	m
Hydraulic Radius	0.11	m
Top Width	5.690	m
Normal Depth	0.12	m
Critical Depth	0.18	m
Critical Slope	0.01138	m/m

Node 7W Overland Flow

Results

Velocity		2.02	m/s
Velocity Head		0.21	m
Specific Energy		0.32	m
Froude Number		1.96	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.12	m
Critical Depth	0.18	m
Channel Slope	5.00000	%
Critical Slope	0.01138	m/m

Node 8W Overland Flow Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	1.79000	%
Normal Depth	0.25	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.250
0+001.00	0.000
0+005.00	0.000
0+006.00	0.250

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.250)	(0+001.00, 0.000)	0.025
(0+001.00, 0.000)	(0+005.00, 0.000)	0.025
(0+005.00, 0.000)	(0+006.00, 0.250)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	2.33	m³/s
Elevation Range	0.000 to 0.250 m	
Flow Area	1.25	m²
Wetted Perimeter	6.062	m
Hydraulic Radius	0.21	m
Top Width	6.000	m
Normal Depth	0.25	m

Node 8W Overland Flow Capacity

Results

Critical Depth		0.29	m
Critical Slope		0.01005	m/m
Velocity		1.87	m/s
Velocity Head		0.18	m
Specific Energy		0.43	m
Froude Number		1.31	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.25	m
Critical Depth	0.29	m
Channel Slope	1.79000	%
Critical Slope	0.01005	m/m

Node 8W Overland Flow

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	1.79000	%
Normal Depth	0.21	m

Section Definitions

Station (m)	Elevation (m)
0+000.00	0.250
0+001.00	0.000
0+005.00	0.000
0+006.00	0.250

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+000.00, 0.250)	(0+001.00, 0.000)	0.025
(0+001.00, 0.000)	(0+005.00, 0.000)	0.025
(0+005.00, 0.000)	(0+006.00, 0.250)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	1.72	m³/s
Elevation Range	0.000 to 0.250 m	
Flow Area	1.02	m²
Wetted Perimeter	5.732	m
Hydraulic Radius	0.18	m
Top Width	5.680	m
Normal Depth	0.21	m

Node 8W Overland Flow

Results

Critical Depth		0.24	m
Critical Slope		0.01055	m/m
Velocity		1.69	m/s
Velocity Head		0.15	m
Specific Energy		0.36	m
Froude Number		1.28	
Flow Type	Supercritical		

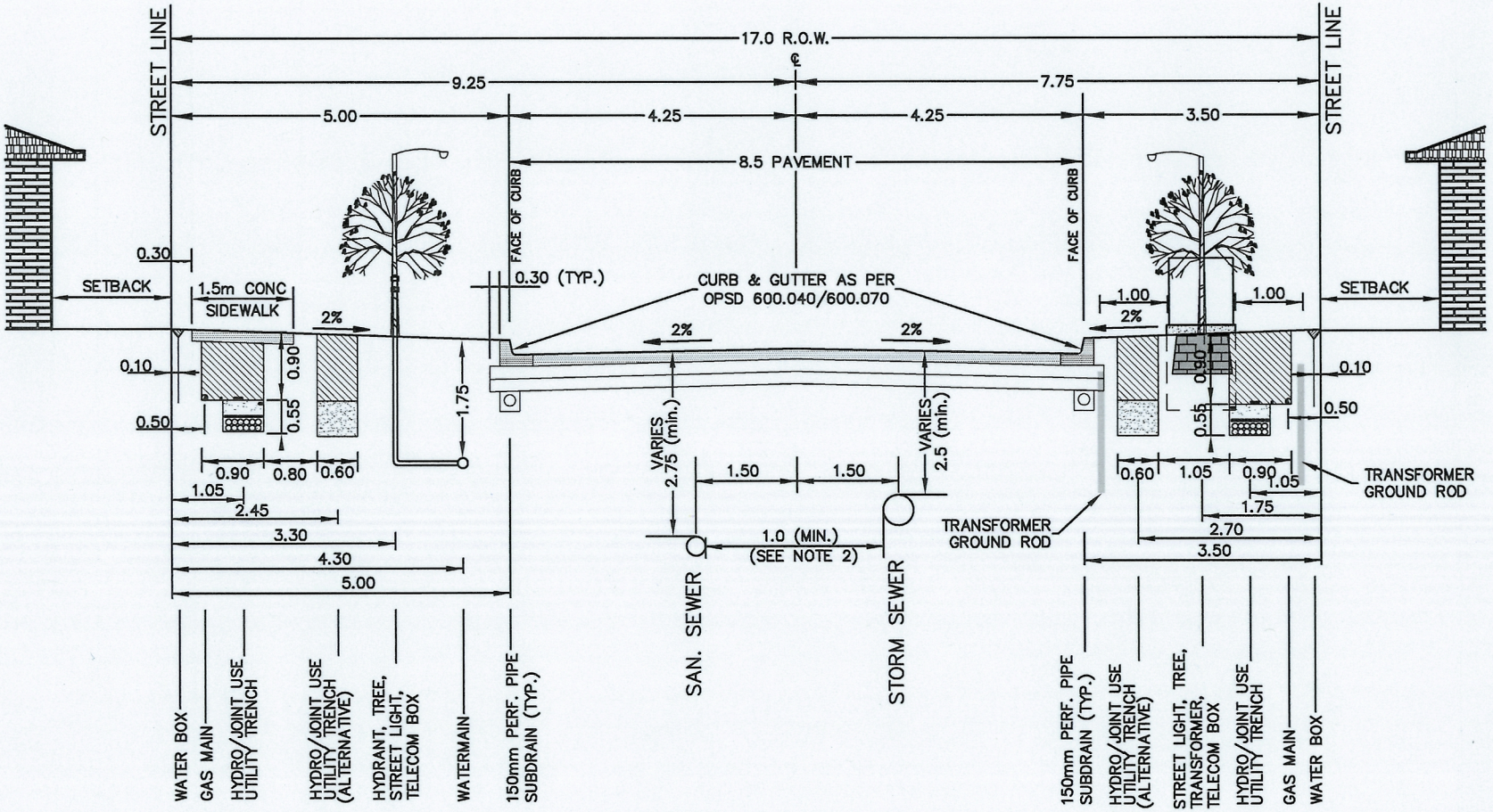
GVF Input Data

Downstream Depth	0.00	m
Length	0.000	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.21	m
Critical Depth	0.24	m
Channel Slope	1.79000	%
Critical Slope	0.01055	m/m

Appendix G TYPICAL ROW SECTIONS



NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN PIPES SHALL BE 1.0m.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM

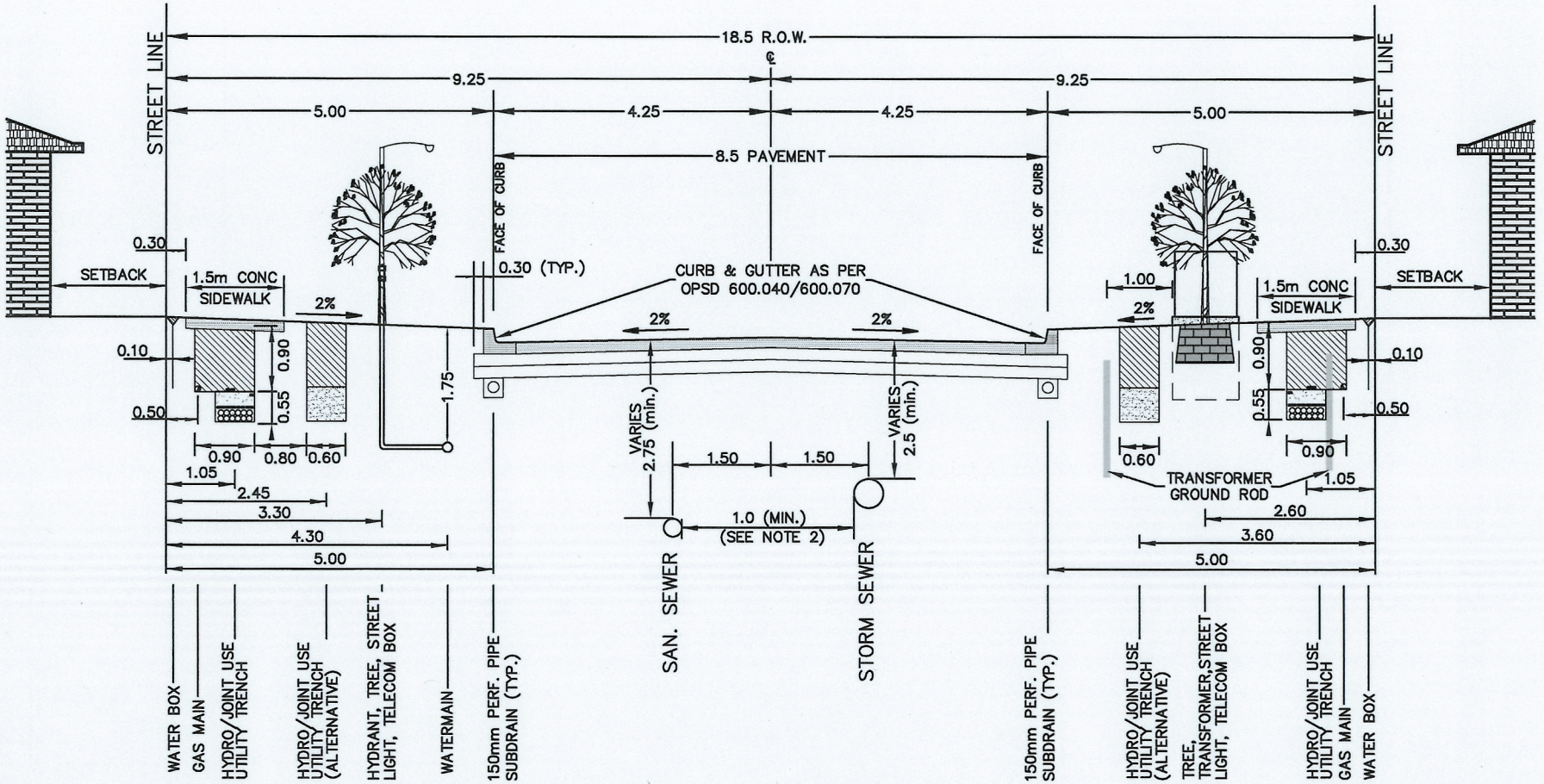
ENGINEERING DEPARTMENT

DRAWING NAME:

17.0m RESIDENTIAL LOCAL ROAD (SIDEWALK ON ONE SIDE)

NOTE: THIS STANDARD TO BE USED ONLY IF APPROVED BY THE D.O.E.

SCALE: NTS	APPROVED BY: DIRECTOR OF ENGINEERING
REV: 0	
DATE: SEPTEMBER 2010	DWG. NO. MR3



NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. THIS STANDARD TO BE USED FOR LOCAL ROADS SURROUNDING SCHOOLS, PARKS, ICI, MEDIUM OR HIGH DENSITY RESIDENTIAL AREAS, AND IN AREAS WHERE SIDEWALKS ARE REQUIRED ON BOTH SIDES.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

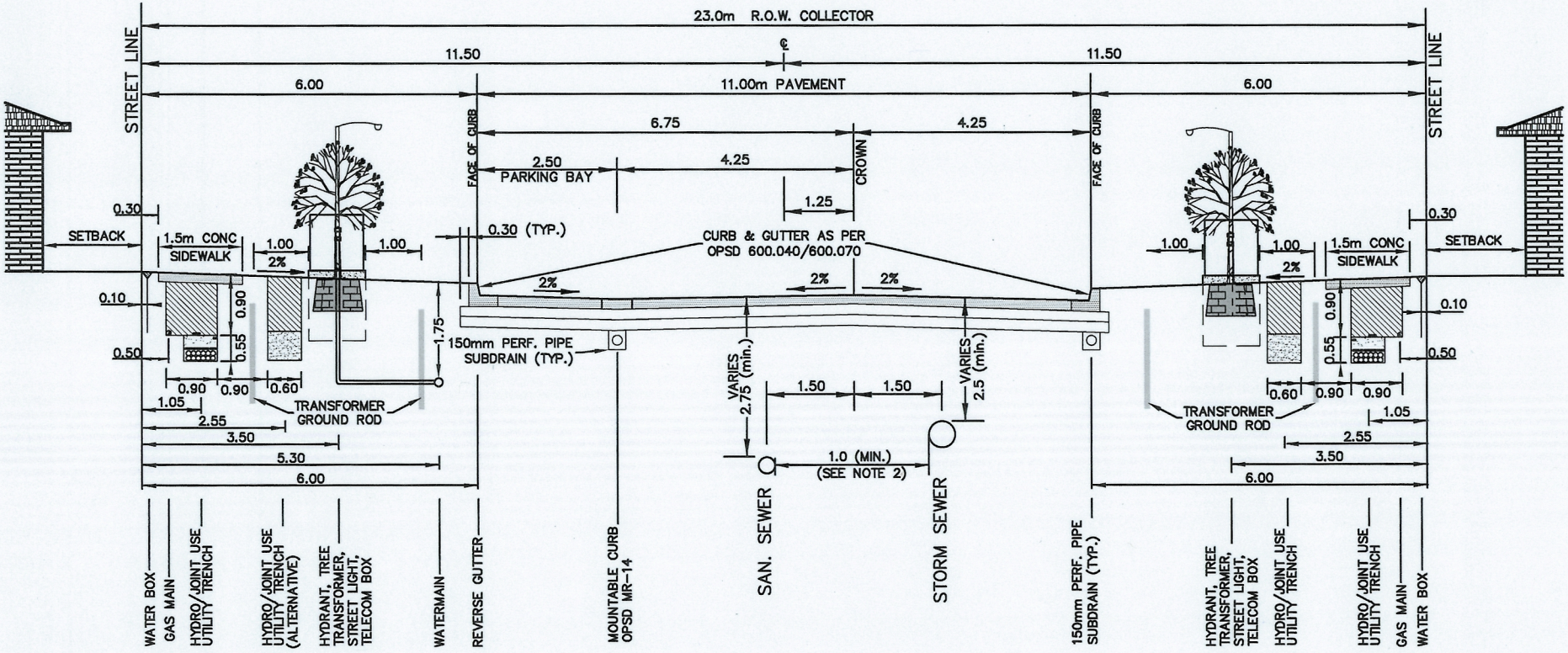
MARKHAM

ENGINEERING DEPARTMENT

DRAWING NAME:

18.5m RESIDENTIAL LOCAL ROAD (SIDEWALKS ON BOTH SIDES)

SCALE: NTS	APPROVED BY: DIRECTOR OF ENGINEERING
REV: 0	
DATE: SEPTEMBER 2010	DWG. NO. MR4



NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. FOR CURB TRANSITION ON PARKING BAY, SEE MR18.

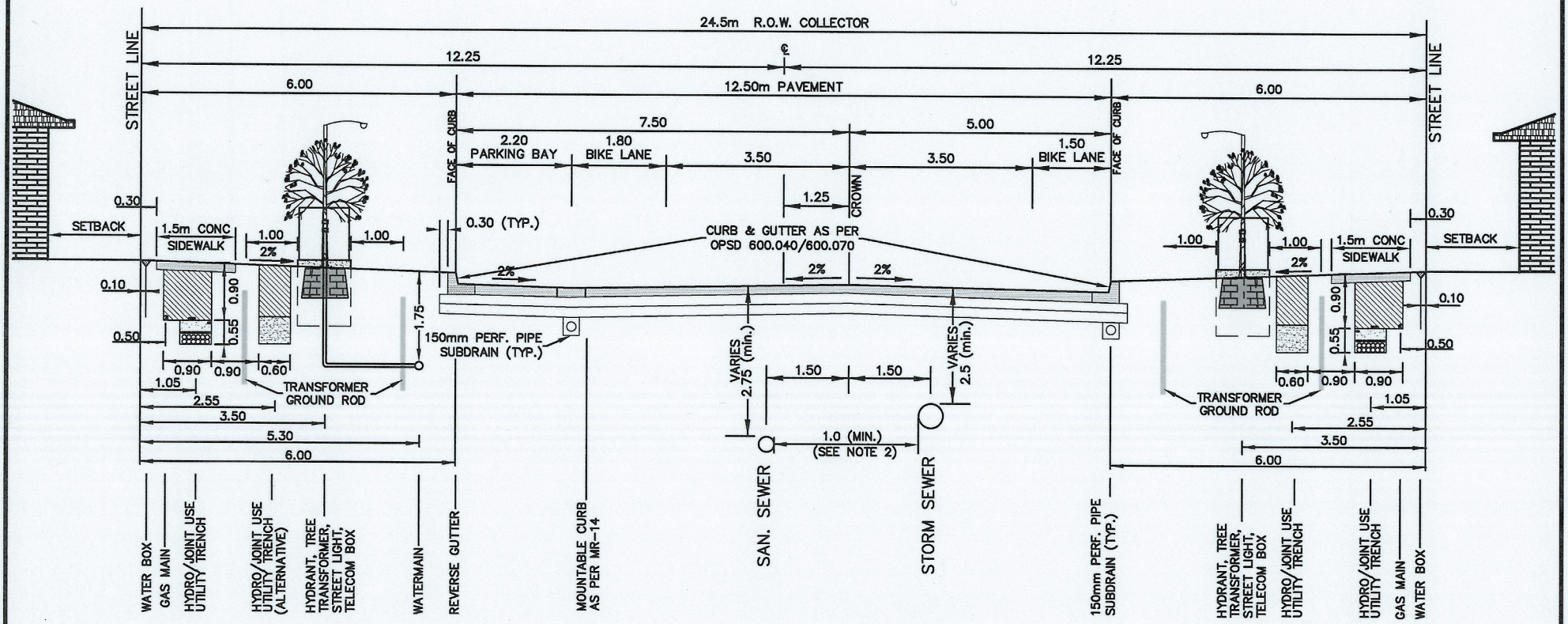
ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM
ENGINEERING DEPARTMENT

DRAWING NAME:

23.0m RESIDENTIAL COLLECTOR ROAD (ONE SIDE PARKING & SHARED BIKE ROUTE)

SCALE: NTS	APPROVED BY: DIRECTOR OF ENGINEERING
REV: 0	
DATE: SEPTEMBER 2010	DWG. NO. MR6



NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. FOR CURB TRANSITION ON PARKING BAY, SEE MR18.

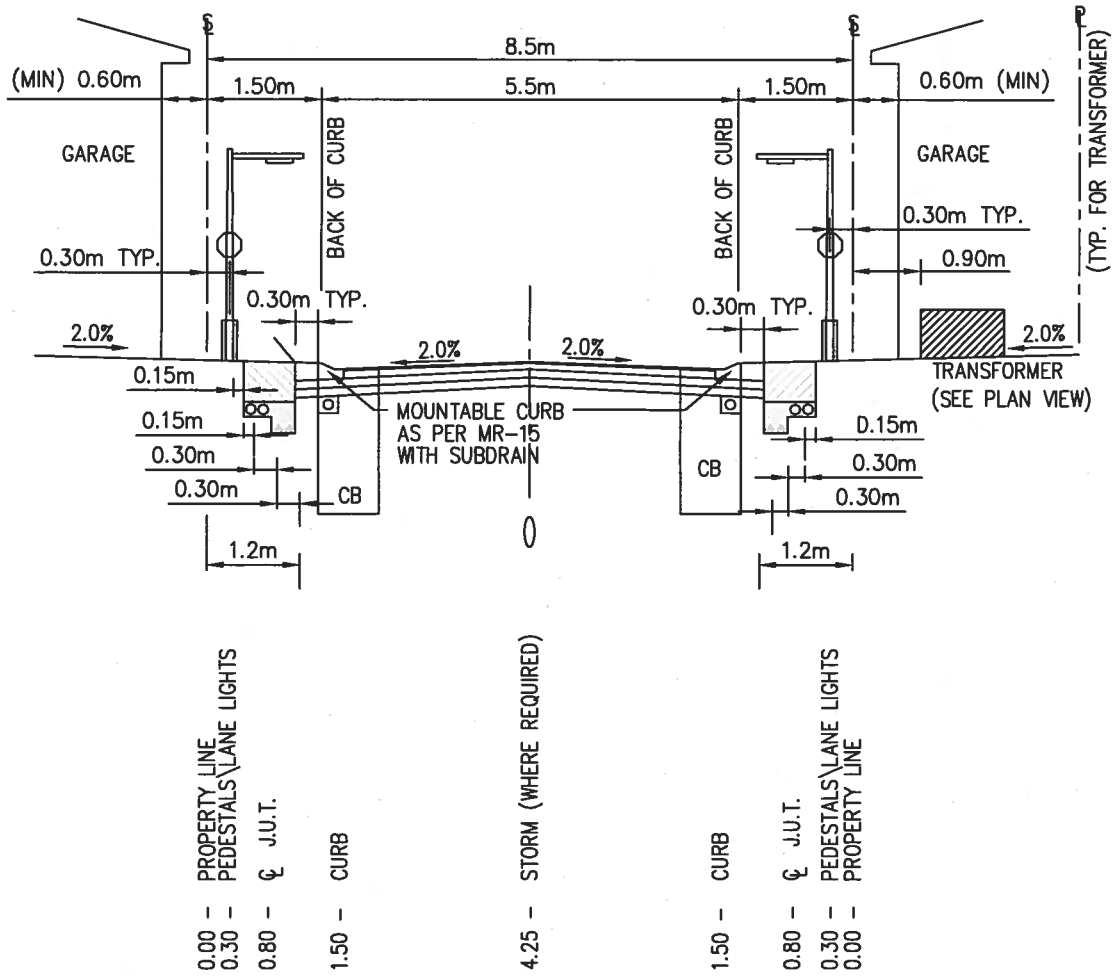
ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM
ENGINEERING DEPARTMENT

DRAWING NAME:

24.5m RESIDENTIAL COLLECTOR ROAD (ONE SIDE PARKING BAY & BIKE LANES)

SCALE: NTS	APPROVED BY: DIRECTOR OF ENGINEERING
REV: 0	
DATE: SEPTEMBER 2010	DWG. NO. MR7



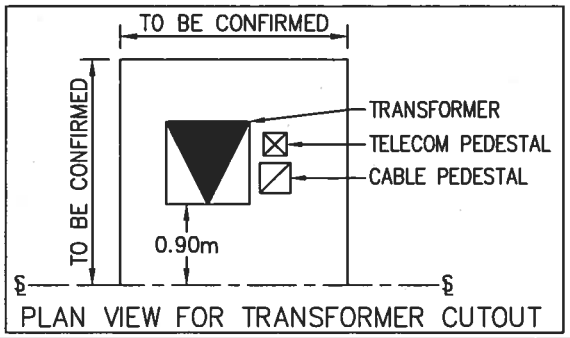
ALL DIMENSIONS ARE IN METRES
UNLESS OTHERWISE SHOWN.

CRITERIA FOR LANE WAYS

1. MAXIMUM LENGTH OF LANE SHALL BE 120m FOR SINGLES AND 90m FOR TOWNS.
2. LANES SHALL NOT INTERSECT LANES, EXCEPT APPROVED BY THE DIRECTOR OF ENGINEERING.
3. LANES SHALL START AND END ON ROADS.
4. LANES SHALL PREFERABLY BE STRAIGHT OR WITH SLIGHT CURVATURE. MINIMUM CENTRE LINE RADIUS SHALL BE 12m.
5. ROADS SHALL NOT START OR END AT A LANE.
6. MINIMUM DRIVEWAY APRON SHALL BE 4% AND MAXIMUM 8%.

NOTES

1. LANE R.O.W. TO BE WIDENED PERIODICALLY TO ACCOMMODATE TRANSFORMERS, SWITCH GEARS, UTILITY PEDESTALS, AND HYDRANTS, WHERE NECESSARY.
2. WHERE PRACTICAL, BELL AND CABLE TV PEDESTALS TO BE INSTALLED WITHIN TRANSFORMER NOTCHES.
3. GARAGES TO BE SET BACK MIN. 0.60m FROM STREETLINE. EAVES MAY EXTEND INTO SET BACK, BUT EAVES OR GARAGE FOUNDATION SHALL NOT ENCROACH ONTO R.O.W..
4. PUBLIC LANE LIGHTING TO BE PROVIDED.
5. PROVIDE FULL DEPTH GRANULAR PAVEMENT STRUCTURE FOR A MINIMUM WIDTH OF 300mm BEHIND EACH CURB.
6. TYP. MINIMUM DEPTH FOR UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUB-DRAINS).



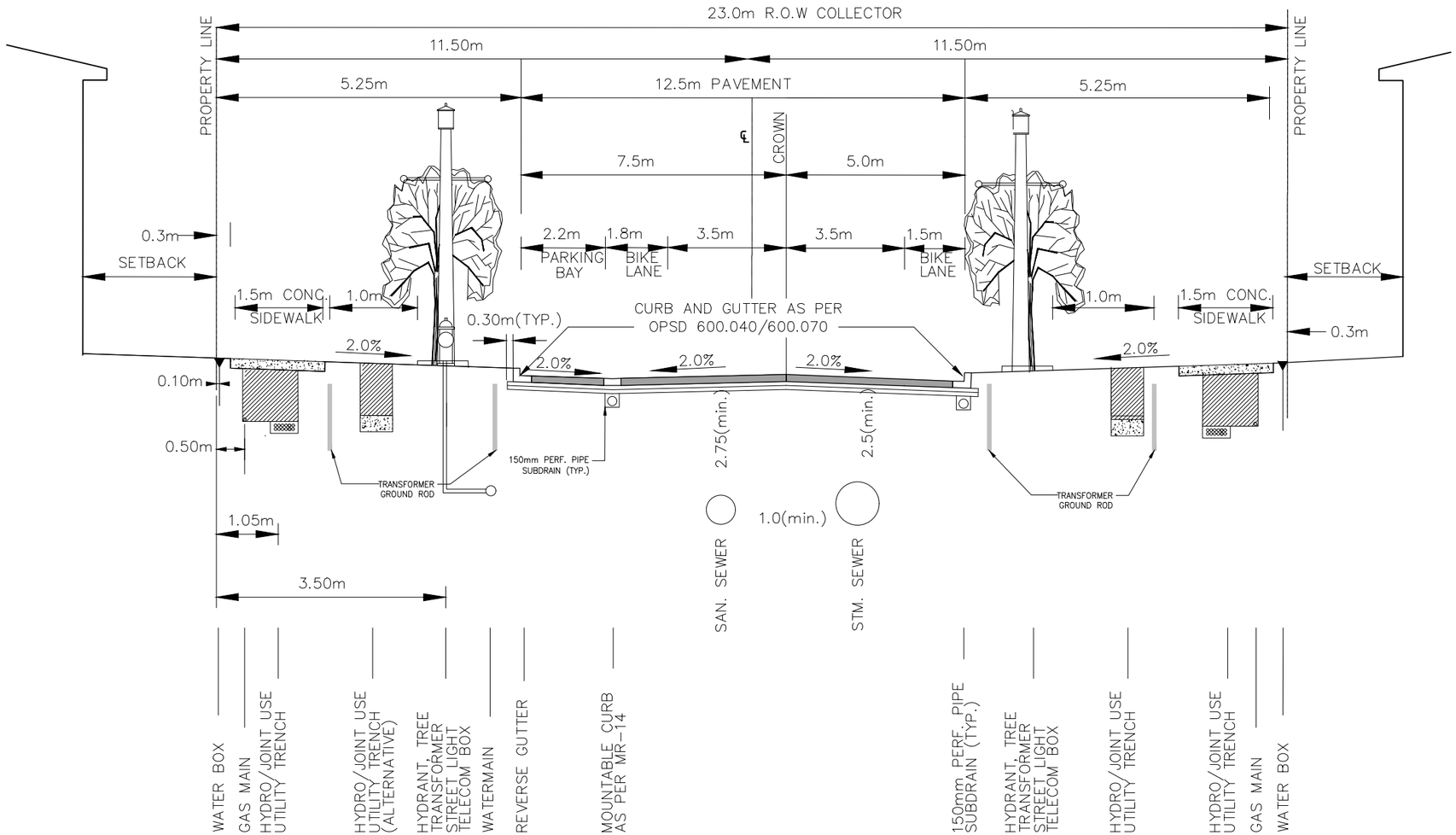
PLAN VIEW FOR TRANSFORMER CUTOUT

MARKHAM
ENGINEERING DEPARTMENT

DRAWING NAME:

8.5m RESIDENTIAL LANE (WITH UTILITIES)

SCALE: NTS	APPROVED BY: DIRECTOR OF ENGINEERING
REV: 1	
DATE: AUGUST 2012	DWG. NO. MR10



22.5m STREET

PARKING PERMITTED BOTH SIDES IN OFF PEAK PERIODS
N.T.S.

NOTES:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0M (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0M.
3. FOR THE CURB TRANSITION ON PARKING BAY, SEE MR18.
4. THIS STANDARD IS A MODIFIED VERSION OF TOWN STANDARD MR7.

Stantec

1:500 0 5 10 15 20 25

Legend

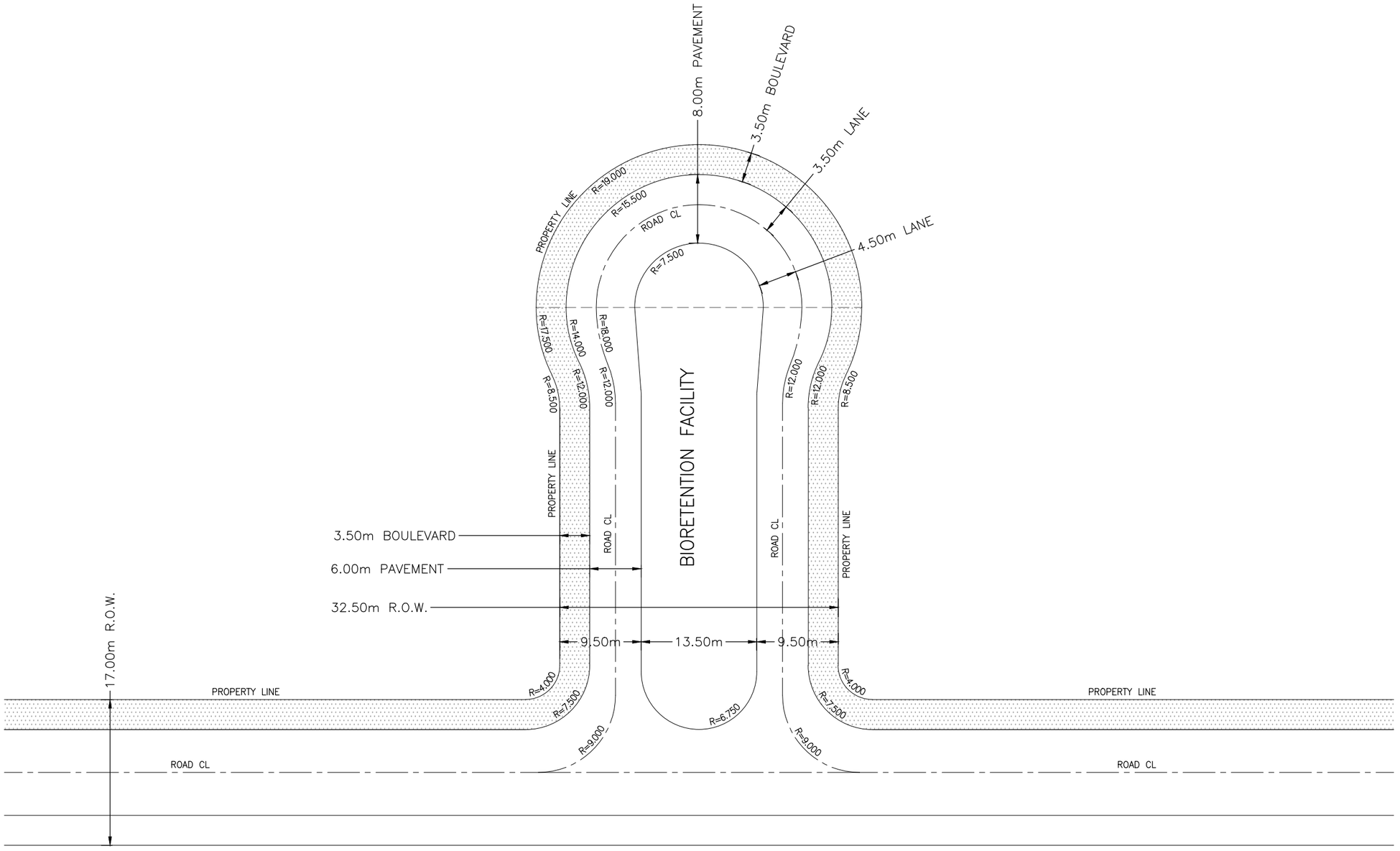
FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE G-1

23.0m MODIFIED ROW

October 2017

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Stantec

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Legend

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE G-2

RESIDENTIAL ENCLAVE CUL-DE-SAC (TYPICAL MODIFIED)

October 2017

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Appendix H PROPOSED CONDITIONS HYDRAULICS BRUCE CREEK

Stantec

Bruce Creek Hydraulics Modelling Analysis (Proposed Cut & Fill) for

2 - 100 Year and Regional Storm Events

October 2017

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2

Reach	River Sta	Profile	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)	
Reach 2	8212.01	Regional	213.48	182.30	185.77		185.81	0.000260	1.06	286.55	133.05	0.18
Reach 2	8212.01	100 YR	50.23	182.30	184.07		184.09	0.000215	0.61	99.95	87.33	0.15
Reach 2	8212.01	50 YR	42.61	182.30	183.93		183.95	0.000213	0.58	88.05	82.55	0.14
Reach 2	8212.01	25 YR	35.47	182.30	183.79		183.80	0.000209	0.54	76.54	76.42	0.14
Reach 2	8212.01	10 YR	27.35	182.30	183.59		183.60	0.000211	0.49	62.20	68.01	0.14
Reach 2	8212.01	5 YR	21.47	182.30	183.42		183.43	0.000215	0.45	51.37	60.90	0.14
Reach 2	8212.01	2 YR	13.60	182.30	183.14		183.15	0.000237	0.39	35.79	48.88	0.14
Reach 2	7216.195	Regional	213.48	181.68	185.66		185.77	0.000892	1.95	177.65	77.24	0.32
Reach 2	7216.195	100 YR	50.23	181.68	184.01		184.05	0.000674	1.15	68.88	59.04	0.25
Reach 2	7216.195	50 YR	42.61	181.68	183.87		183.91	0.000687	1.11	60.68	58.17	0.25
Reach 2	7216.195	25 YR	35.47	181.68	183.73		183.77	0.000709	1.07	52.25	57.26	0.25
Reach 2	7216.195	10 YR	27.35	181.68	183.52		183.56	0.000797	1.05	40.63	55.99	0.26
Reach 2	7216.195	5 YR	21.47	181.68	183.34		183.39	0.000928	1.04	30.78	54.89	0.28
Reach 2	7216.195	2 YR	13.60	181.68	183.04		183.09	0.001200	1.01	15.06	38.54	0.31
Reach 2	7216.19	Regional	213.48	181.52	184.78	184.78	185.52	0.007671	4.95	75.66	53.55	0.91
Reach 2	7216.19	100 YR	50.23	181.52	183.42	183.42	183.87	0.007602	3.29	21.50	27.12	0.82
Reach 2	7216.19	50 YR	42.61	181.52	183.29	183.29	183.73	0.007723	3.15	18.35	25.14	0.82
Reach 2	7216.19	25 YR	35.47	181.52	183.14	183.14	183.57	0.008397	3.06	14.79	22.03	0.84
Reach 2	7216.19	10 YR	27.35	181.52	182.91	182.91	183.34	0.010507	3.02	10.48	14.73	0.91
Reach 2	7216.19	5 YR	21.47	181.52	182.75	182.75	183.15	0.011378	2.84	8.32	12.49	0.92
Reach 2	7216.19	2 YR	13.60	181.52	182.52	182.48	182.82	0.011887	2.44	5.78	9.33	0.90
Reach 2	7216.186	Regional	213.48	181.34	184.52		184.70	0.002535	2.85	126.47	66.08	0.52
Reach 2	7216.186	100 YR	50.23	181.34	183.09		183.17	0.002459	1.84	46.40	49.53	0.46
Reach 2	7216.186	50 YR	42.61	181.34	183.00		183.08	0.002348	1.73	42.13	48.64	0.45
Reach 2	7216.186	25 YR	35.47	181.34	182.91		182.98	0.002245	1.63	37.75	47.97	0.43
Reach 2	7216.186	10 YR	27.35	181.34	182.83		182.88	0.001816	1.41	33.95	47.39	0.39
Reach 2	7216.186	5 YR	21.47	181.34	182.69		182.75	0.002031	1.39	27.54	46.39	0.40
Reach 2	7216.186	2 YR	13.60	181.34	182.56		182.60	0.001612	1.15	21.45	45.13	0.35
Reach 2	7216.183	Regional	213.48	181.04	184.47		184.60	0.001977	2.51	149.10	81.60	0.46
Reach 2	7216.183	100 YR	50.23	181.04	183.00		183.08	0.002376	1.76	50.63	59.12	0.45
Reach 2	7216.183	50 YR	42.61	181.04	182.92		182.98	0.002350	1.69	45.50	58.44	0.45
Reach 2	7216.183	25 YR	35.47	181.04	182.82		182.89	0.002350	1.61	40.17	57.73	0.44
Reach 2	7216.183	10 YR	27.35	181.04	182.76	182.49	182.81	0.001828	1.38	36.63	57.25	0.39
Reach 2	7216.183	5 YR	21.47	181.04	182.59	182.44	182.65	0.002702	1.53	26.86	55.88	0.46
Reach 2	7216.183	2 YR	13.60	181.04	182.33	182.33	182.47	0.006328	1.96	12.82	51.14	0.67
Reach 2	7216.18	Regional	213.48	180.83	184.33	183.45	184.50	0.001880	2.56	140.05	74.32	0.46
Reach 2	7216.18	100 YR	50.23	180.83	182.58	182.58	182.86	0.005913	2.68	30.24	51.80	0.71
Reach 2	7216.18	50 YR	42.61	180.83	182.51	182.51	182.77	0.005699	2.54	26.49	50.85	0.69
Reach 2	7216.18	25 YR	35.47	180.83	182.43	182.43	182.68	0.005464	2.39	22.61	49.85	0.67
Reach 2	7216.18	10 YR	27.35	180.83	182.16	182.09	182.57	0.010280	2.81	9.86	12.22	0.88
Reach 2	7216.18	5 YR	21.47	180.83	182.14	181.93	182.40	0.006832	2.26	9.59	11.60	0.72
Reach 2	7216.18	2 YR	13.60	180.83	182.03	181.66	182.16	0.004077	1.62	8.41	9.52	0.55
Reach 2	7216.175	Regional	213.48	180.45	184.27	182.71	184.34	0.000846	1.84	204.53	99.81	0.32
Reach 2	7216.175	100 YR	50.23	180.45	182.48	181.95	182.53	0.001176	1.34	63.00	63.38	0.33
Reach 2	7216.175	50 YR	42.61	180.45	182.35	181.89	182.39	0.001275	1.32	54.61	61.50	0.34
Reach 2	7216.175	25 YR	35.47	180.45	182.20	181.84	182.25	0.001469	1.32	45.66	59.42	0.36
Reach 2	7216.175	10 YR	27.35	180.45	182.00	181.76	182.06	0.001912	1.37	34.47	56.73	0.40
Reach 2	7216.175	5 YR	21.47	180.45	181.84	181.70	181.91	0.002619	1.45	25.55	54.48	0.45
Reach 2	7216.175	2 YR	13.60	180.45	181.65	181.45	181.74	0.003432	1.45	15.50	51.83	0.50
Reach 2	7216.172	Regional	213.48	180.39	184.25		184.30	0.000625	1.66	239.40	121.22	0.28
Reach 2	7216.172	100 YR	50.23	180.39	182.44		182.48	0.000821	1.21	71.66	64.92	0.28
Reach 2	7216.172	50 YR	42.61	180.39	182.31		182.34	0.000857	1.17	62.97	62.54	0.29
Reach 2	7216.172	25 YR	35.47	180.39	182.15		182.19	0.000946	1.16	53.61	60.13	0.30
Reach 2	7216.172	10 YR	27.35	180.39	181.95		181.99	0.001160	1.16	41.69	56.92	0.32
Reach 2	7216.172	5 YR	21.47	180.39	181.77		181.81	0.001566	1.23	31.62	54.64	0.36
Reach 2	7216.172	2 YR	13.60	180.39	181.48		181.57	0.003610	1.55	16.01	53.81	0.53
Reach 2	7216.171	Regional	213.48	180.05	184.12	182.66	184.24	0.001005	2.15	157.35	108.16	0.35
Reach 2	7216.171	100 YR	50.23	180.05	182.36	181.66	182.42	0.000984	1.42	57.05	82.10	0.31
Reach 2	7216.171	50 YR	42.61	180.05	182.23	181.57	182.28	0.000984	1.35	50.92	79.84	0.31
Reach 2	7216.171	25 YR	35.47	180.05	182.07	181.48	182.13	0.001034	1.31	43.98	77.25	0.31
Reach 2	7216.171	10 YR	27.35	180.05	181.86	181.36	181.91	0.001192	1.30	34.58	73.66	0.33
Reach 2	7216.171	5 YR	21.47	180.05	181.66	181.25	181.72	0.001437	1.30	26.30	68.16	0.35
Reach 2	7216.171	2 YR	13.60	180.05	181.33	180.95	181.41	0.002111	1.32	14.84	56.91	0.41
Reach 2	7216.169		Bridge									
Reach 2	7216.168	Regional	213.48	179.70	182.81	182.42	183.22	0.004472	3.73	89.12	107.01	0.71
Reach 2	7216.168	100 YR	50.23	179.70	181.72	181.44	181.86	0.002520	2.02	39.16	93.10	0.49
Reach 2	7216.168	50 YR	42.61	179.70	181.61	181.35	181.75	0.002516	1.94	34.58	91.78	0.49
Reach 2	7216.168	25 YR	35.47	179.70	181.50	181.25	181.63	0.002520	1.85	29.93	90.42	0.48

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	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)	
Reach 2	7216.168	10 YR	27.35	179.70	181.38	180.99	181.49	0.002315	1.68	25.00	88.82	0.45
Reach 2	7216.168	5 YR	21.47	179.70	181.23	180.84	181.34	0.002521	1.62	19.19	83.80	0.47
Reach 2	7216.168	2 YR	13.60	179.70	180.92	180.60	181.04	0.003410	1.56	9.69	15.14	0.52
Reach 2	7216.165	Regional	213.48	179.27	182.77	181.99	182.88	0.001443	2.09	175.78	122.20	0.40
Reach 2	7216.165	100 YR	50.23	179.27	181.61	181.25	181.67	0.001283	1.39	61.27	84.05	0.34
Reach 2	7216.165	50 YR	42.61	179.27	181.47	180.94	181.55	0.001471	1.41	50.49	80.69	0.36
Reach 2	7216.165	25 YR	35.47	179.27	181.32	180.79	181.41	0.001884	1.49	38.26	77.59	0.40
Reach 2	7216.165	10 YR	27.35	179.27	181.09	180.59	181.23	0.003052	1.68	20.97	74.34	0.50
Reach 2	7216.165	5 YR	21.47	179.27	180.91	180.41	181.05	0.003520	1.63	13.21	13.31	0.52
Reach 2	7216.165	2 YR	13.60	179.27	180.59	180.15	180.69	0.003373	1.46	9.29	10.57	0.50
Reach 2	7216.16	Regional	213.48	179.12	182.63		182.78	0.001740	2.44	173.86	141.37	0.44
Reach 2	7216.16	100 YR	50.23	179.12	181.35	180.85	181.54	0.002552	2.08	38.63	74.39	0.49
Reach 2	7216.16	50 YR	42.61	179.12	181.14	180.68	181.38	0.003518	2.25	24.40	53.94	0.56
Reach 2	7216.16	25 YR	35.47	179.12	180.99		181.22	0.003530	2.12	18.35	19.70	0.55
Reach 2	7216.16	10 YR	27.35	179.12	180.82		181.00	0.003318	1.89	15.21	16.30	0.53
Reach 2	7216.16	5 YR	21.47	179.12	180.66		180.81	0.003195	1.70	12.81	14.08	0.51
Reach 2	7216.16	2 YR	13.60	179.12	180.36		180.46	0.003060	1.45	9.40	10.09	0.48
Reach 2	7216.13	Regional	213.48	178.92	182.14	182.14	182.66	0.006091	4.08	99.09	101.44	0.81
Reach 2	7216.13	100 YR	50.23	178.92	180.86	180.82	181.39	0.009406	3.24	16.57	20.99	0.90
Reach 2	7216.13	50 YR	42.61	178.92	180.83	180.66	181.24	0.007359	2.82	15.94	20.32	0.79
Reach 2	7216.13	25 YR	35.47	178.92	180.80		181.10	0.005579	2.42	15.30	18.92	0.68
Reach 2	7216.13	10 YR	27.35	178.92	180.66		180.89	0.004904	2.10	13.11	13.19	0.63
Reach 2	7216.13	5 YR	21.47	178.92	180.52		180.70	0.004697	1.89	11.38	11.40	0.60
Reach 2	7216.13	2 YR	13.60	178.92	180.23		180.37	0.004464	1.64	8.27	9.80	0.57
Reach 2	7216.128	Regional	213.48	178.63	182.09		182.20	0.001677	2.44	180.82	122.76	0.43
Reach 2	7216.128	100 YR	50.23	178.63	180.91		181.04	0.002154	2.05	53.49	89.37	0.45
Reach 2	7216.128	50 YR	42.61	178.63	180.69	180.61	180.89	0.003338	2.37	35.85	69.76	0.55
Reach 2	7216.128	25 YR	35.47	178.63	180.50	180.33	180.78	0.004718	2.62	23.50	58.18	0.65
Reach 2	7216.128	10 YR	27.35	178.63	180.40	180.15	180.62	0.003832	2.27	18.64	41.72	0.58
Reach 2	7216.128	5 YR	21.47	178.63	180.21		180.42	0.004259	2.19	13.05	21.88	0.60
Reach 2	7216.128	2 YR	13.60	178.63	179.91		180.09	0.004471	1.91	8.08	12.84	0.59
Reach 2	7216.125	Regional	213.48	178.49	182.06		182.13	0.000945	1.82	218.25	147.42	0.32
Reach 2	7216.125	100 YR	50.23	178.49	180.92		180.95	0.000628	1.12	90.00	103.09	0.24
Reach 2	7216.125	50 YR	42.61	178.49	180.70		180.75	0.000984	1.31	67.26	101.44	0.30
Reach 2	7216.125	25 YR	35.47	178.49	180.46		180.56	0.001854	1.65	43.53	99.55	0.40
Reach 2	7216.125	10 YR	27.35	178.49	180.13	179.79	180.36	0.004487	2.22	14.39	16.79	0.60
Reach 2	7216.125	5 YR	21.47	178.49	179.92	179.61	180.14	0.004895	2.12	11.21	13.85	0.62
Reach 2	7216.125	2 YR	13.60	178.49	179.60		179.78	0.005250	1.87	7.47	9.92	0.62
Reach 2	7216.123	Regional	213.48	177.97	181.99		182.08	0.001183	2.27	209.80	141.01	0.37
Reach 2	7216.123	100 YR	50.23	177.97	180.85		180.92	0.000863	1.52	72.14	95.26	0.30
Reach 2	7216.123	50 YR	42.61	177.97	180.56		180.68	0.001566	1.89	45.36	86.97	0.40
Reach 2	7216.123	25 YR	35.47	177.97	180.29		180.45	0.002162	2.05	28.31	38.08	0.46
Reach 2	7216.123	10 YR	27.35	177.97	179.93	179.49	180.17	0.003398	2.26	16.26	31.05	0.55
Reach 2	7216.123	5 YR	21.47	177.97	179.73		179.93	0.003319	2.05	12.34	12.41	0.54
Reach 2	7216.123	2 YR	13.60	177.97	179.41		179.56	0.003263	1.73	8.70	10.44	0.51
Reach 2	7216.122	Regional	213.48	178.05	181.56	181.56	182.00	0.004859	4.29	115.32	108.42	0.74
Reach 2	7216.122	100 YR	50.23	178.05	180.59	180.01	180.86	0.002800	2.60	33.78	52.52	0.53
Reach 2	7216.122	50 YR	42.61	178.05	180.35	179.91	180.62	0.003029	2.53	25.08	26.40	0.54
Reach 2	7216.122	25 YR	35.47	178.05	180.11	179.70	180.38	0.003457	2.50	19.43	19.97	0.57
Reach 2	7216.122	10 YR	27.35	178.05	179.79	179.46	180.07	0.004185	2.44	13.99	15.64	0.61
Reach 2	7216.122	5 YR	21.47	178.05	179.59		179.83	0.004365	2.28	11.07	12.17	0.61
Reach 2	7216.122	2 YR	13.60	178.05	179.29		179.47	0.004113	1.90	7.89	9.70	0.57
Reach 2	7216.121	Regional	213.48	178.02	181.27	181.27	181.70	0.005345	4.15	108.66	104.64	0.76
Reach 2	7216.121	100 YR	50.23	178.02	179.93	179.93	180.71	0.010414	3.94	13.57	9.72	0.96
Reach 2	7216.121	50 YR	42.61	178.02	179.75	179.75	180.47	0.010998	3.77	11.87	9.25	0.97
Reach 2	7216.121	25 YR	35.47	178.02	179.58	179.58	180.22	0.011589	3.56	10.29	8.79	0.98
Reach 2	7216.121	10 YR	27.35	178.02	179.44	179.36	179.92	0.009831	3.06	9.14	8.44	0.88
Reach 2	7216.121	5 YR	21.47	178.02	179.37		179.70	0.007594	2.57	8.48	8.24	0.77
Reach 2	7216.121	2 YR	13.60	178.02	179.15		179.36	0.006099	2.01	6.79	7.68	0.67
Reach 2	7216.12	Regional	213.48	177.76	180.44	180.39	180.82	0.006706	4.14	111.37	117.76	0.84
Reach 2	7216.12	100 YR	50.23	177.76	179.69	179.68	179.92	0.004197	2.57	38.78	80.43	0.63
Reach 2	7216.12	50 YR	42.61	177.76	179.62	179.45	179.84	0.003981	2.44	33.43	77.07	0.61
Reach 2	7216.12	25 YR	35.47	177.76	179.59	179.29	179.76	0.003225	2.16	30.52	75.02	0.54
Reach 2	7216.12	10 YR	27.35	177.76	179.48	179.11	179.63	0.002667	1.88	23.44	61.73	0.49
Reach 2	7216.12	5 YR	21.47	177.76	179.33		179.46	0.002659	1.75	17.02	25.50	0.48
Reach 2	7216.12	2 YR	13.60	177.76	179.06		179.17	0.002725	1.52	11.01	18.50	0.47
Reach 2	7216.115	Regional	213.48	177.31	179.91	179.91	180.24	0.007507	4.28	116.32	130.87	0.87
Reach 2	7216.115	100 YR	50.23	177.31	179.31	179.31	179.53	0.004379	2.71	44.33	105.42	0.64

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	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)	
Reach 2	7216.115	50 YR	42.61	177.31	179.24	179.24	179.46	0.004306	2.62	37.05	97.82	0.63
Reach 2	7216.115	25 YR	35.47	177.31	179.05	179.05	179.35	0.005775	2.82	22.19	59.69	0.71
Reach 2	7216.115	10 YR	27.35	177.31	178.79	178.79	179.18	0.008560	3.04	12.71	21.01	0.84
Reach 2	7216.115	5 YR	21.47	177.31	178.64	178.64	179.00	0.008891	2.86	9.88	16.77	0.84
Reach 2	7216.115	2 YR	13.60	177.31	178.39	178.36	178.69	0.009320	2.51	6.46	11.82	0.83
Reach 2	7216.11	Regional	213.48	176.96	179.53		179.67	0.003622	2.85	151.26	132.33	0.59
Reach 2	7216.11	100 YR	50.23	176.96	178.89		178.95	0.002025	1.73	68.35	122.50	0.42
Reach 2	7216.11	50 YR	42.61	176.96	178.77		178.85	0.002511	1.83	54.47	110.57	0.46
Reach 2	7216.11	25 YR	35.47	176.96	178.65		178.76	0.003570	2.07	40.68	106.15	0.54
Reach 2	7216.11	10 YR	27.35	176.96	178.55	178.30	178.69	0.003995	2.09	30.65	103.37	0.57
Reach 2	7216.11	5 YR	21.47	176.96	178.39		178.51	0.003976	1.92	19.05	40.18	0.55
Reach 2	7216.11	2 YR	13.60	176.96	178.16		178.27	0.004406	1.76	11.73	26.11	0.56
Reach 2	7216.105	Regional	213.48	176.20	179.03		179.25	0.004757	3.58	137.40	140.40	0.71
Reach 2	7216.105	100 YR	50.23	176.20	178.07	178.07	178.54	0.009146	3.63	23.75	51.99	0.92
Reach 2	7216.105	50 YR	42.61	176.20	178.02	178.02	178.41	0.007617	3.25	21.67	32.79	0.83
Reach 2	7216.105	25 YR	35.47	176.20	177.97	177.97	178.28	0.006283	2.88	19.93	30.40	0.75
Reach 2	7216.105	10 YR	27.35	176.20	177.69	177.69	178.08	0.009553	3.08	12.69	20.57	0.89
Reach 2	7216.105	5 YR	21.47	176.20	177.53	177.53	177.89	0.010288	2.91	9.82	15.94	0.91
Reach 2	7216.105	2 YR	13.60	176.20	177.30	177.30	177.60	0.010699	2.53	6.63	12.91	0.89
Reach 2	7216.1	Regional	213.48	175.72	178.76		178.93	0.002318	2.67	178.02	115.82	0.51
Reach 2	7216.1	100 YR	50.23	175.72	177.60		177.72	0.002161	1.81	54.32	91.99	0.45
Reach 2	7216.1	50 YR	42.61	175.72	177.50		177.60	0.002045	1.69	45.70	75.74	0.43
Reach 2	7216.1	25 YR	35.47	175.72	177.39		177.48	0.001825	1.52	38.93	50.09	0.40
Reach 2	7216.1	10 YR	27.35	175.72	177.25		177.33	0.001680	1.36	32.34	46.42	0.38
Reach 2	7216.1	5 YR	21.47	175.72	177.14		177.20	0.001572	1.24	27.03	43.40	0.36
Reach 2	7216.1	2 YR	13.60	175.72	176.91		176.96	0.001614	1.09	17.74	37.52	0.35
Reach 2	7216.095	Regional	213.48	175.25	178.58		178.74	0.002672	3.11	170.30	94.29	0.56
Reach 2	7216.095	100 YR	50.23	175.25	177.53		177.59	0.001292	1.66	74.99	86.68	0.36
Reach 2	7216.095	50 YR	42.61	175.25	177.42		177.48	0.001236	1.57	66.26	85.67	0.35
Reach 2	7216.095	25 YR	35.47	175.25	177.31		177.37	0.001199	1.49	56.85	84.16	0.34
Reach 2	7216.095	10 YR	27.35	175.25	177.18		177.23	0.001094	1.36	45.90	81.32	0.32
Reach 2	7216.095	5 YR	21.47	175.25	177.07		177.11	0.000988	1.23	36.98	76.80	0.30
Reach 2	7216.095	2 YR	13.60	175.25	176.85		176.88	0.000824	1.03	22.34	40.51	0.27
Reach 2	7216.09	Regional	213.48	175.29	178.49		178.56	0.001616	2.14	267.35	201.79	0.40
Reach 2	7216.09	100 YR	50.23	175.29	177.44	177.04	177.48	0.001211	1.38	102.08	126.08	0.32
Reach 2	7216.09	50 YR	42.61	175.29	177.34	176.89	177.38	0.001266	1.35	88.97	123.83	0.33
Reach 2	7216.09	25 YR	35.47	175.29	177.22	176.86	177.26	0.001408	1.36	74.28	121.12	0.34
Reach 2	7216.09	10 YR	27.35	175.29	177.07	176.78	177.13	0.001618	1.37	56.88	117.82	0.36
Reach 2	7216.09	5 YR	21.47	175.29	176.95	176.63	177.01	0.001799	1.36	42.33	111.22	0.37
Reach 2	7216.09	2 YR	13.60	175.29	176.69	176.26	176.77	0.002550	1.41	19.60	68.01	0.43
Reach 2	7216.08	Regional	213.48	175.13	177.93	177.93	178.28	0.005715	3.96	124.88	160.48	0.77
Reach 2	7216.08	100 YR	50.23	175.13	176.84	176.84	177.21	0.007073	3.12	25.40	35.60	0.79
Reach 2	7216.08	50 YR	42.61	175.13	176.70	176.70	177.09	0.007969	3.11	20.62	31.40	0.82
Reach 2	7216.08	25 YR	35.47	175.13	176.60	176.60	176.96	0.007744	2.92	17.60	28.59	0.80
Reach 2	7216.08	10 YR	27.35	175.13	176.44	176.44	176.78	0.008154	2.75	13.38	24.33	0.81
Reach 2	7216.08	5 YR	21.47	175.13	176.29	176.29	176.62	0.009045	2.65	9.98	20.08	0.83
Reach 2	7216.08	2 YR	13.60	175.13	176.17		176.36	0.005807	1.96	7.92	15.36	0.65
Reach 2	7216.075	Regional	213.48	174.84	177.92		177.94	0.000336	1.04	394.17	236.55	0.19
Reach 2	7216.075	100 YR	50.23	174.84	176.76		176.77	0.000270	0.67	150.90	169.58	0.16
Reach 2	7216.075	50 YR	42.61	174.84	176.56		176.57	0.000418	0.77	116.90	165.74	0.19
Reach 2	7216.075	25 YR	35.47	174.84	176.37		176.39	0.000700	0.91	86.71	164.22	0.25
Reach 2	7216.075	10 YR	27.35	174.84	176.19		176.22	0.001313	1.14	56.85	162.83	0.33
Reach 2	7216.075	5 YR	21.47	174.84	176.09	176.02	176.14	0.001727	1.24	41.27	162.12	0.37
Reach 2	7216.075	2 YR	13.60	174.84	175.99	175.58	176.05	0.001740	1.16	24.90	161.36	0.37
Reach 2	7216.07	Regional	213.48	174.56	177.34		177.74	0.004660	3.57	98.26	75.25	0.72
Reach 2	7216.07	100 YR	50.23	174.56	176.62		176.70	0.001157	1.42	52.00	53.64	0.34
Reach 2	7216.07	50 YR	42.61	174.56	176.38		176.47	0.001529	1.48	39.99	46.32	0.38
Reach 2	7216.07	25 YR	35.47	174.56	176.15		176.24	0.002042	1.54	30.15	34.50	0.43
Reach 2	7216.07	10 YR	27.35	174.56	175.86		175.97	0.003185	1.62	21.59	28.15	0.51
Reach 2	7216.07	5 YR	21.47	174.56	175.65		175.77	0.004788	1.71	15.86	26.88	0.60
Reach 2	7216.07	2 YR	13.60	174.56	175.38	175.36	175.54	0.009877	1.87	8.73	25.22	0.81
Reach 2	7216.065	Regional	213.48	173.99	177.47		177.51	0.000517	1.38	381.58	182.82	0.25
Reach 2	7216.065	100 YR	50.23	173.99	176.65		176.65	0.000111	0.52	238.19	165.38	0.11
Reach 2	7216.065	50 YR	42.61	173.99	176.41		176.41	0.000135	0.54	199.07	163.28	0.12
Reach 2	7216.065	25 YR	35.47	173.99	176.17		176.18	0.000171	0.56	161.23	161.33	0.13
Reach 2	7216.065	10 YR	27.35	173.99	175.88		175.89	0.000259	0.61	114.31	157.78	0.16
Reach 2	7216.065	5 YR	21.47	173.99	175.66		175.68	0.000382	0.67	80.43	156.25	0.19
Reach 2	7216.065	2 YR	13.60	173.99	175.37		175.40	0.000630	0.74	36.61	129.45	0.23

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	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)	
Reach 2	7216.06	Regional	213.48	173.78	177.39	176.39	177.43	0.000841	1.82	339.18	188.13	0.32
Reach 2	7216.06	100 YR	50.23	173.78	176.63	175.40	176.64	0.000158	0.66	203.43	151.03	0.13
Reach 2	7216.06	50 YR	42.61	173.78	176.32	175.30	176.37	0.000665	1.25	63.85	140.53	0.26
Reach 2	7216.06	25 YR	35.47	173.78	176.09	175.21	176.13	0.000727	1.22	54.60	132.24	0.27
Reach 2	7216.06	10 YR	27.35	173.78	175.78	175.07	175.83	0.000864	1.19	42.64	122.02	0.29
Reach 2	7216.06	5 YR	21.47	173.78	175.55	174.96	175.60	0.000995	1.17	33.64	113.71	0.30
Reach 2	7216.06	2 YR	13.60	173.78	175.25	174.67	175.29	0.001052	1.04	22.39	102.22	0.30
Reach 2	7216.045		Bridge									
Reach 2	7216.03	Regional	213.48	173.75	176.74	176.39	176.77	0.000929	1.61	346.14	205.14	0.31
Reach 2	7216.03	100 YR	50.23	173.75	175.43	175.43	175.82	0.009289	3.34	27.99	183.33	0.87
Reach 2	7216.03	50 YR	42.61	173.75	175.34	175.34	175.69	0.008996	3.15	24.98	180.88	0.85
Reach 2	7216.03	25 YR	35.47	173.75	175.24	175.24	175.57	0.008597	2.94	21.99	178.43	0.82
Reach 2	7216.03	10 YR	27.35	173.75	175.12	175.12	175.41	0.008214	2.69	17.98	175.17	0.79
Reach 2	7216.03	5 YR	21.47	173.75	175.02	175.02	175.28	0.007774	2.47	14.71	172.50	0.76
Reach 2	7216.03	2 YR	13.60	173.75	174.79	174.79	175.05	0.009339	2.31	7.58	67.73	0.80

Appendix I WATER BALANCE MITIGATION ASSESSMENT OF ZONING EXCEPTIONS