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Kizell Lands – Fernbank 5618 Hazeldean Road

Concept Servicing Report Assessment of Adequacy of Public Services and Stormwater Site Management

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**CONCEPT SERVICING REPORT
ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
AND STORMWATER SITE MANAGEMENT**

**KIZELL LANDS - FERNBANK
5618 HAZELDEAN ROAD**

Prepared By:

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February 23, 2018

Novatech File: 108195
Ref: R-2016-159

February 23, 2018

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, ON K1P 1J1

Attention: Ms. Kathy Rygus

Dear Ms. Rygus:

**Reference: Concept Servicing Report
Kizell Lands - Fernbank
Our File No.: 108195**

Enclosed are four (4) copies of the Concept Servicing Report for the Kizell Lands within the Fernbank Community. The report addresses development servicing for the subject property.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH



Mark Bissett, P.Eng.
Senior Project Manager

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Appendix A: Sewer Design Sheets and Water Modelling

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1.0 INTRODUCTION

1.1 Background

The Kizell Lands are located within the Fernbank Community between the Abbott Street extension and Hazeldean Road, east of Iber Road. **Figure 1-1** shows the location of the Fernbank Community and the Kizell Lands. The lands will be developed with a mix of residential products (low, medium and high-density), accompanied by commercial, institutional and recreational land uses.

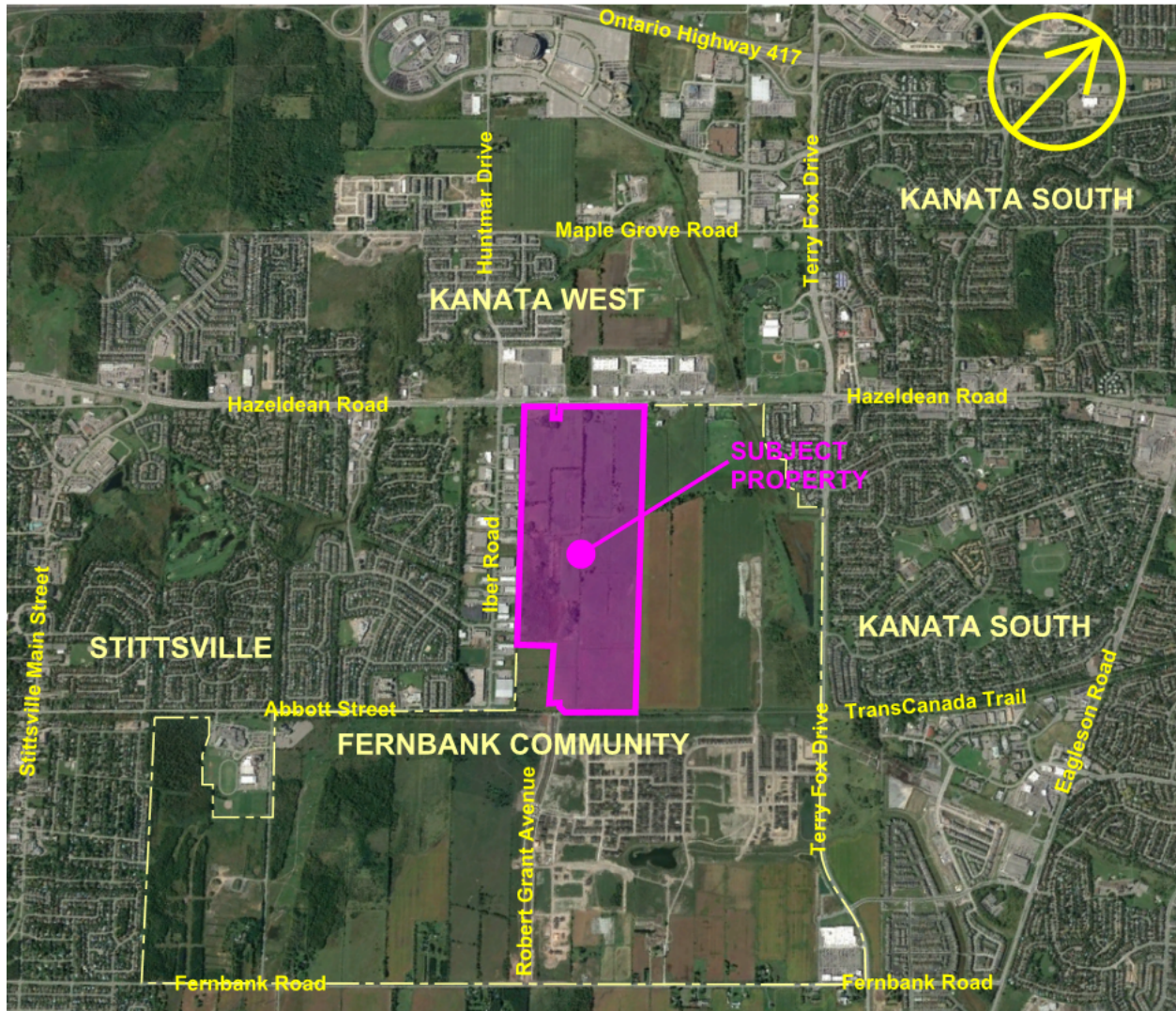


Figure 1-1: Key Plan

The proposed subdivision is approximately 88.67ha and will be bordered by existing industrial lands to the west (Iber Road), the Trans-Canada Trail to the south, future residential lands to the east (Richcraft), and commercial lands to the north (Hazeldean Road).

The subdivision will be comprised of low, medium, and high-density residential dwellings with a planned total of 333 singles, 274 townhouses, and 225 stacked townhouses. Approximately 646 units are proposed within the medium-density blocks (9.92ha), that will be located adjacent the

proposed extension to Robert Grant Avenue. An additional 378 apartment units (680 population) within the high-density block (5.33ha) will be located in proximity to the proposed Robert Grant Avenue. Mixed-Use blocks (9.94ha) are proposed along the existing Hazeldean Road and proposed Robert Grant Avenue, with a Commercial block (0.55ha) located west of the proposed Robert Grant Avenue. A school (3.0ha) will front onto the proposed minor collector along the east boundary of the site. A Park n' Ride facility (1.83ha) is proposed at the corner of the proposed Robert Grant Avenue and Hazeldean Road. The remainder of the site is comprised of Parkland (4.81ha), Open Space (1.67ha), Hydro Corridor (2.70ha), and a SWM Facility (4.32ha). The proposed Land Use Plan is shown in **Figure 2**.

This Concept Servicing Report provides information on the considerations and approach by which Novatech has analyzed the existing site information for the Kizell Lands, and details how the development lands can be adequately serviced while meeting the City requirements and all other pertinent regulations. This study builds upon works completed for the Fernbank Community Design Plan **[1]** prepared by Walker, Nott, Dragicevic Associates Limited, the Fernbank Master Servicing Study **[2]** prepared by Novatech, and the Fernbank Environmental Management Plan also prepared by Novatech **[3]**.

There is ongoing coordination with the landowners to the east who are seeking Draft Plan approval (Richcraft and Metric), and finalizing detail design (Mattamy). Kizell will cost share local infrastructure with Richcraft and Mattamy as part of a private agreement; this may include sewer oversizing, stormwater ponds, roadways, etc.

Major landowners within the Fernbank Community have executed a cost sharing agreement that deals with construction of Robert Grant Avenue, Abbott Street extension, the Fernbank Trunk, and Parkland development; and Kizell is a party to this agreement.



Figure 1-2: Land Use Plan

2.0 TOPOGRAPHY AND GRADING

2.1 Existing Conditions

Based on the topographical survey shown below in **Figure 2-1**, the site generally slopes to the northeast at approximately 0.6%. Steeper grades of up to 15% are locally found near the high-point along the west property boundary. The maximum grade of approximately 107.0 metres on the west property boundary, and a minimum elevation of approximately 99.0 metres in the northeast corner give a total elevation differential of approximately 8.0 metres across the entire site.

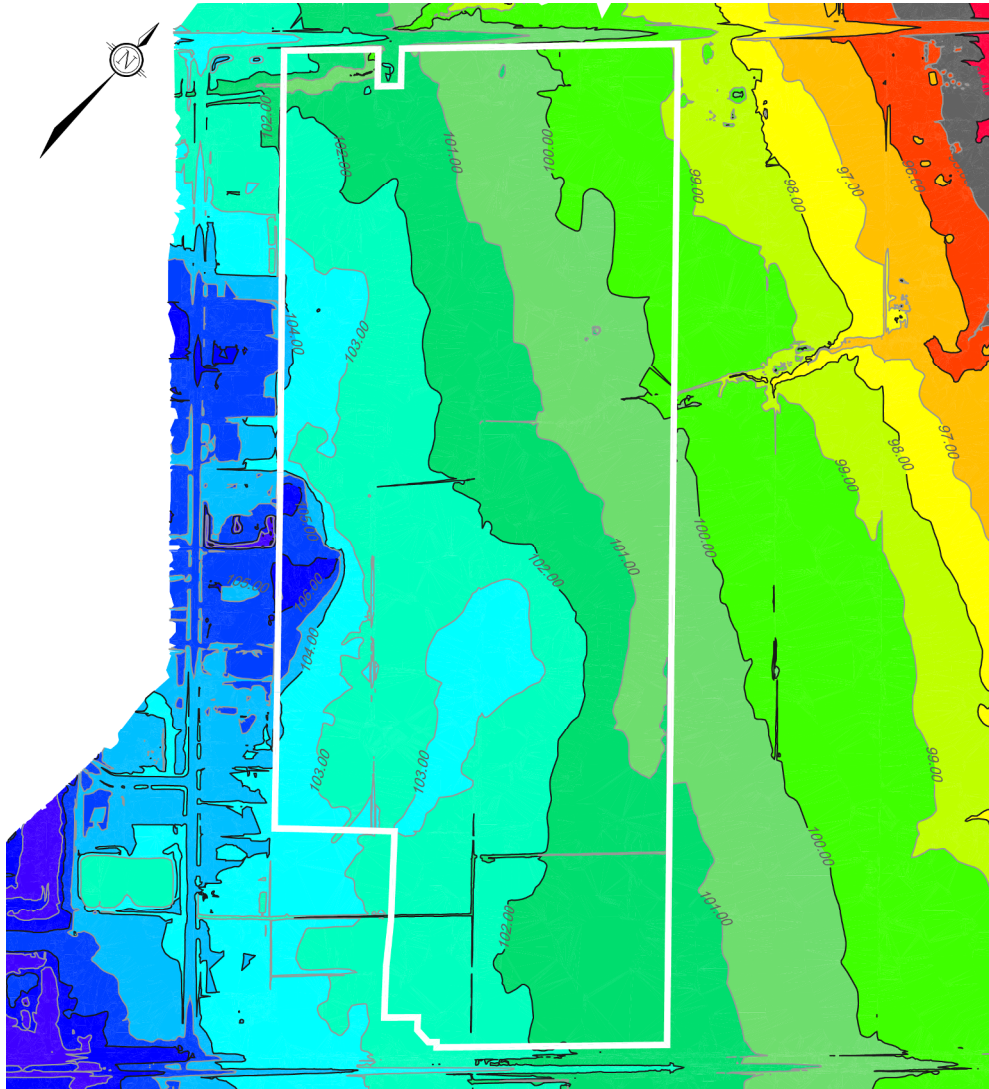


Figure 2-1: Existing Topography

Geotechnical investigations were carried out by Houle Chevrier Engineering [4], and bedrock was encountered in a localized area along the west part of the site, characterized by exposed bedrock and/or bedrock at shallow depth.

Existing elevations will be met along Hazeldean Road, the west property boundary (Iber Road), and the Trans Canada Trail. Grading will be coordinated with the proposed development to the east (Richcraft). A high-level grading plan is shown in **Appendix B**.

2.3 Offsite Requirements

Grading will be coordinated with adjacent land owners (Richcraft) to ensure compliance with grade raise restrictions and proper functioning of the major system flow paths.

2.4 Changes from Fernbank Community Design Plan

No significant changes are anticipated to the Grading Plan, as outlined in the approved Fernbank Master Servicing Study.

3.0 ROADWAYS

3.1 Existing Conditions

Currently there is roadway access to the Kizell Lands via Robert Grant Avenue and Hazeldean Road. The 2013 City of Ottawa Transportation Master Plan **[6]** classifies Robert Grant Avenue as a 2-lane Arterial Road, while Terry Fox Drive is classified therein as a 4-lane Arterial Road.

3.2 Proposed Conditions

The Fernbank Transportation Master Plan **[6]** prepared by Delcan, specifies that a North-South Arterial Road is required to serve the Fernbank Community. The existing Arterial Road (Robert Grant Avenue) is to be extended through the development from Abbott Street to Hazeldean Road.

Robert Grant Avenue has been constructed as a 2-lane arterial road between Fernbank Road and Abbott Street, and will continue with the same configuration to Hazeldean Road. It is planned that Robert Grant Avenue will be upgraded to include two vehicle-lanes in both directions with transit lanes in the centre median.

Two east-west major collectors (26m ROW) are planned that will connect to Robert Grant Avenue; these include the Abbott Street Extension and Street 2. The major collectors generally follow the approved alignment from the Fernbank Transportation Master Plan.

There are two minor collectors (22m ROW) planned. The first connects the two major collectors along a north-south axis near the east property line, while the second connects Robert Grant Avenue and Hazeldean Road through the Richcraft property.

All other roads to be constructed are either local roads (18m ROW) or private. Typical cross-sections are contained within the Fernbank Community Design Plan **[1]** and the City of Ottawa Standard Detail Drawings.

Refer to the Transportation Study **[7]**, prepared by Novatech for more detailed analysis of the proposed road network.

3.3 Offsite Requirements

Offsite roadwork may be required at the intersection of Robert Grant and Hazeldean Road.

3.4 Changes from Fernbank Community Design Plan

The roadway network generally follows the Fernbank Transportation Master Plan [6], except for a portion of the north-south minor collector that was omitted east of Pond 1.

4.0 SANITARY SEWERS

4.1 Existing Conditions

Currently, there is no sanitary infrastructure within the Kizell Lands.

The Stittsville Trunk runs parallel to the Trans Canada Trail south of the Kizell Lands, and is a 750mm diameter trunk sewer that flows easterly to the Hazeldean Pump Station.

The Fernbank Trunk is located south of the Kizell Lands within the Hydro One easement corridor, and flows easterly to the Hazeldean Pump Station.

The City of Ottawa recently completed an upgrade to the Hazeldean Pump Station to improve system capacity, reliability, and emergency overflow conditions. The Fernbank Trunk is now connected to the Hazeldean Pump Station.

4.2 Proposed Conditions

Unit and population densities are taken from the Fernbank Community Design Plan [1]. All other design parameters are specified in the City of Ottawa Sewer Design Guidelines [8]. The peak design flow parameters in **Table 4.1** have been used in the sewer capacity analysis.

Most the sanitary flow from the Kizell Lands will connect into the proposed Stittsville Diversion Trunk, located within Robert Grant Avenue, and will ultimately outlet to the Kanata West Pump Station. The remainder of the sanitary flow is proposed to connect into downstream sewer systems at five different nodes through the adjacent Richcraft Lands. Flow from these five nodes is routed to the Hazeldean Pump Station via the existing Fernbank Trunk. The trunk sewer layout is shown on the Sanitary Drainage Area Plan located in **Appendix B**.

The Stittsville Diversion Trunk is expected to convey approximately 570.7L/s at node SA114 near Hazeldean Road. This is comprised of 493.4L/s diverted from the Stittsville Trunk, and 77.3L/s generated from within the Kizell Lands (approx. 65.3ha).

Five localized areas will drain easterly through the Richcraft Lands to the Hazeldean Pump Station. These are identified as Outlets 2-6 on the Sanitary Drainage Area Plan and have peak design flows of 16.9L/s, 1.8L/s, 1.0L/s, 1.4L/s and 8.3L/s respectively. The sanitary sewer design is being coordinated with the adjacent landowners.

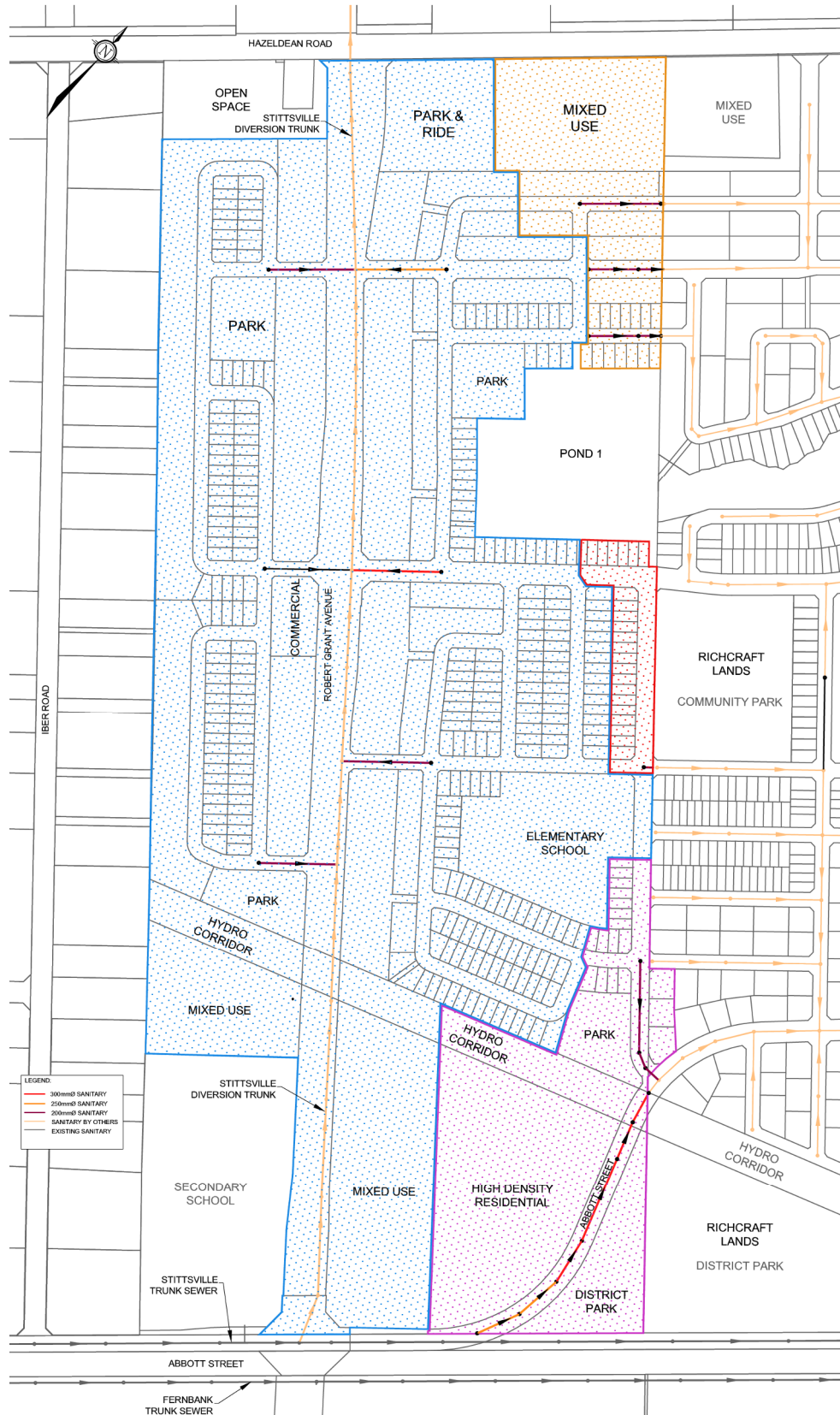


Figure 4-1: Sanitary Sewer Network

Table 4.1: Sanitary Sewer Design Parameters

| Parameter | Design Parameter |
|---|------------------------------------|
| Single Unit Population | 3.4 people/unit |
| Townhome/Stacked Townhome Unit Population | 2.7 people/unit |
| Stacked Townhome Unit Density | 49 Units/net ha |
| Medium Density/High Density/Mixed Use Unit Population | 1.8 people/unit |
| Medium Density Residential Unit Density | 65 Units/net ha |
| High Density Residential/Mixed Use Unit Density | 85 Units/net ha |
| Residential Flow Rate, Average Daily | 350 L/cap/day |
| Residential Peaking Factor | Harmon Equation (min=2.0, max=4.0) |
| Commercial & Institutional Flow Rate | 50,000 L/day/ha |
| ICI Peaking Factor | 1.5 |
| Infiltration Rate | 0.28 L/s/ha |
| Minimum Pipe Size | 250 mm (ICI), 200mm (Res) |
| Minimum Velocity | 0.6 m/s |
| Maximum Velocity | 3.0 m/s |

4.3 Offsite Requirements

The Stittsville Diversion Trunk is a city-initiated wastewater project that will route flow from the Stittsville Trunk to the Kanata West Pump Station. The planned sewer alignment runs through the Kizell Lands within the Robert Grant Avenue ROW to Hazeldean Road, then continues through the Kanata West Lands to the Kanata West Pump Station. The Stittsville Diversion Trunk and KWPS must be operational before tributary lands owned by Kizell can be developed.

4.4 Changes from Fernbank Community Design Plan

The Stittsville Diversion Trunk is new infrastructure that was not contemplated at the time of the Fernbank CDP.

5.0 WATER DISTRIBUTION

5.1 Existing Conditions

Figure 5.1 from the Fernbank Environmental Management Plan [3] identifies potential well locations within the Fernbank Community. All water wells shall be properly abandoned in accordance with the Ontario Water Resources Act, R.R.O. 1990, Regulation 903, as amended.

A 400mm watermain is located south of the Kizell Lands in an unopened road allowance. To the north, 600mm and 900mm watermains are located in Hazeldean Road, that connect to the Glen Cairn Water Reservoir and Pump Station. A 300mm watermain is located in Iber Road, and connects the above infrastructure. The existing plant is shown on the Water Distribution Plan included in **Appendix B**.

5.2 Proposed Conditions

A planning-level assessment of the water distribution system was completed in Section 8 of the Fernbank Master Servicing Study [2].

The Kizell Lands will be connected to the existing watermain network by way of separate feed points. Two connections are proposed to the existing 400mm diameter main south of the site; one within the intersection of Robert Grant Avenue and Abbott Street, and the other approximately 230m east within the planned extension of Abbott Street. A third watermain connection is proposed to the 900mm diameter watermain within Hazeldean Road at the Robert Grant Avenue intersection. Additional connections will be made through the neighboring lands to the east (Richcraft) that in turn connect to the existing 900mm main in Hazeldean Road, the existing 400mm main in Terry Fox Drive and the existing 400mm main adjacent the Trans Canada Trail. These watermain connections are being coordinated with the adjacent landowners.

In accordance with the Fernbank Master Servicing Study [2], a 300mm watermain is proposed to link the existing off-site distribution system from Hazeldean Road to Abbott Street, and connect with the planned development infrastructure to the east. These larger 300mm pipes serve as the primary conduit to supply the subdivision, and ensure adequate conveyance of domestic water and fire protection. A layout for the 300mm piping system is presented on the Water Distribution Plan, and is attached in **Appendix C**.

We have not shown the network of smaller 150mm and 200mm watermain that is required to supply individual lots and/or blocks. This system of local water infrastructure will be established at detail design of the subdivision, and serves to reinforce the overall supply (network looping).

The watermain boundary conditions below were obtained from the City of Ottawa and has been included in **Appendix A**:

Boundary Condition Hazeldean Connection (900mm feedermain):

Max Day + FF of 167 L/s = 155.6m
Max Day + FF of 217 L/s = 155.6m
Minimum Pressure during Peak Hour = 155.5m
Max Pressure Check = 162.4m

Boundary Condition Abbott Connection (400mm watermain):

Max Day + FF of 167 L/s = 154.5m
Max Day + FF of 217 L/s = 153.6m
Minimum Pressure during Peak Hour = 154.5m
Max Pressure Check = 162.1m

City of Ottawa watermain design criteria and Fernbank Community Design Parameters are outlined in **Table 5.1**.

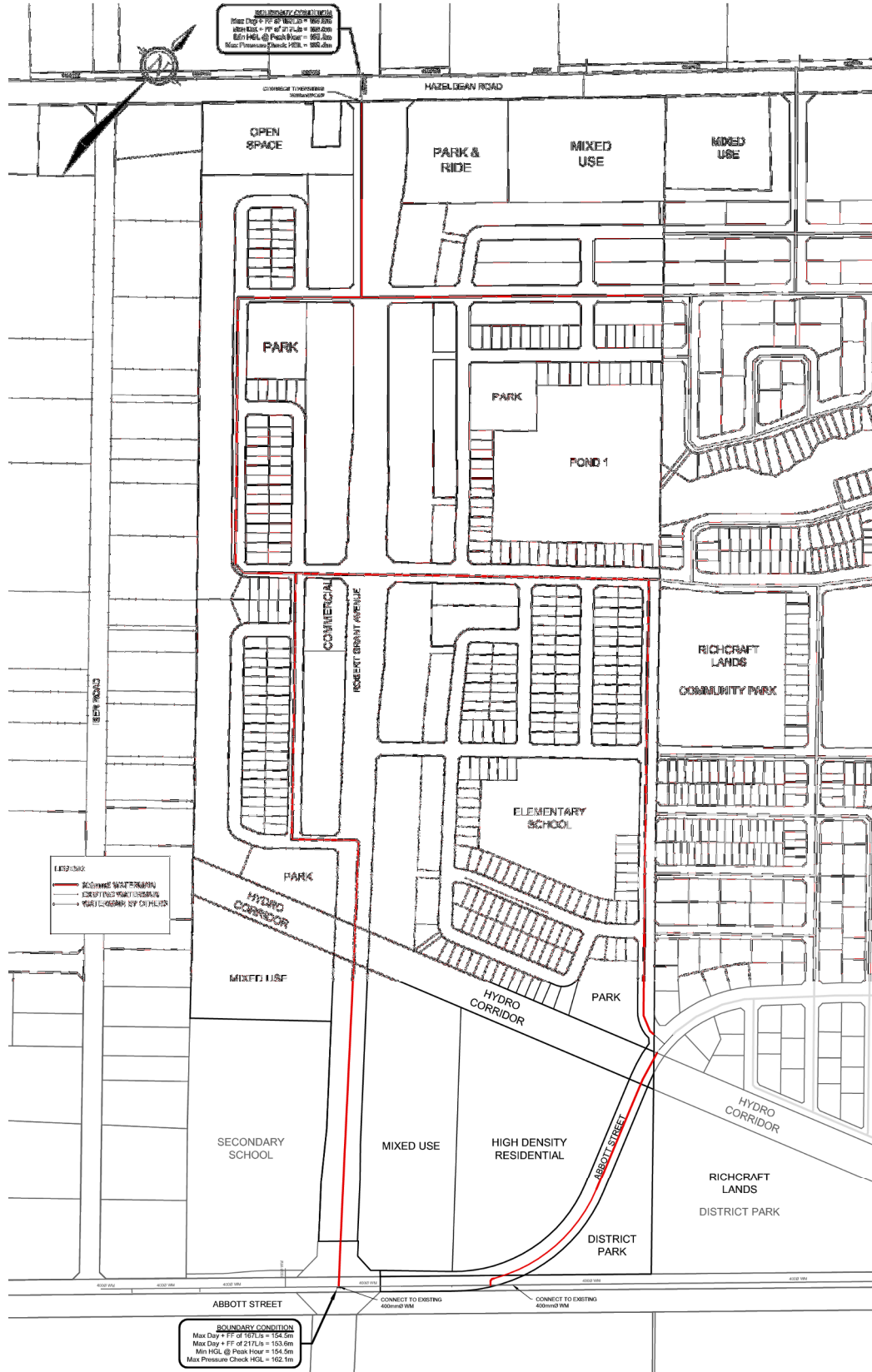


Figure 5-1: Watermain Layout

Table 5.1: Watermain Design Criteria

| Design Parameter | Design Criteria |
|--|---|
| Single Family Home Population | 3.4 people/unit |
| Townhouse/Stacked Townhouse Population | 2.7 people/unit |
| Medium Density/High Density/Mixed Use Population | 1.8 people/unit |
| Stacked Townhouse Density | 49 units/ha |
| Medium Residential Density | 65 units/ha |
| High Residential Density/Mixed Use Density | 85 units/ha |
| Residential Demand | 350 L/c/d |
| Institutional/Commercial Demand | 28,000 L/gross ha/day |
| Maximum Day Demand | 2.5 x Average Day |
| Peak Hour Demand | 2.2 x Maximum Day |
| Institutional/Commercial Max Day | 1.5 x Average Day |
| Institutional/Commercial Peak Hour | 1.8 x Maximum Day |
| Fire Demand (Residential Areas) | 167 L/s |
| Fire Demand (Institutional and Commercial Areas) | 217 L/s |
| Maximum Pressure | 690 kPa (100psi) unoccupied areas |
| Maximum Pressure | 552 kPa (80psi) occupied areas outside of ROW |
| Minimum Pressure | 275 kPa (40 psi) except during fire flow |
| Minimum Pressure (Fire) | 140 kPa (20 psi) |

In accordance with the City of Ottawa’s Technical Bulletin, a fire flow of 167L/s was used for all residential dwelling types, while a fire flow of 217L/s was used for the industrial, commercial, and institutional areas as referenced in the Fernbank Master Servicing Study [2].

The proposed watermain was modeled using EPANET 2. The EPANET model layout is shown in drawing 108195-WTR.

A summary of the model results is shown below in **Table 5.2**, **Table 5.3** and **Table 5.4**. Full model results are included in **Appendix A**.

Table 5.2: Summary of Hydraulic Model Results - Maximum Day + Fire Flow

| Operating Condition | Minimum Pressure |
|---------------------|------------------|
| 223.95 L/s at N6 | 360.52 kPa (N6) |

Table 5.3: Summary of Hydraulic Model Results - Peak Hour Demand

| Operating Condition | Maximum Pressure | Minimum Pressure |
|---------------------------|------------------|------------------|
| 127.87 L/s through system | 577.02 (N9) | 488.44 kPa (N1) |

Table 5.4: Summary of Hydraulic Model Results – Maximum Pressure Check

| Operating Condition | Maximum Pressure | Minimum Pressure |
|--------------------------|------------------|------------------|
| 25.68 L/s through system | 644.71 kPa (N9) | 564.86 kPa (MU1) |

Water modelling shows the planned network will meet minimum system pressure requirements during both the fire flow and peak hour design conditions. The maximum pressure check shows modelled system pressures are above 552 kPa (80 psi) throughout the subdivision, therefore pressure reducing valves will be required on all dwellings.

5.3 Offsite Requirements

As specified in the Fernbank Master Servicing Study [2], additional firm pumping capacity at the Glen Cairn Pumping Station and one of the Zone 2W pumping stations might be required to meet additional demands associated with the Fernbank Community. The timing of these upgrades is related to the overall rate of growth in the entire Zone 3W (Kanata and Stittsville area). Growth within the Abbott-Fernbank Lands plays only a small part in determining when these upgrades are required; the City of Ottawa will determine when these water supply upgrades occur. No direct costs associated with the offsite upgrades are attributable to the developer.

To provide watermain looping to the site, it will be necessary for the adjacent Richcraft Lands to the east to be constructed ahead of the Kizell development. The Richcraft development is proceeding in advance of the Kizell Lands and will provide valve closures on the watermains at the property line for future connection and extension of the distribution system.

5.4 Changes from Fernbank Community Design Plan

Changes in the proposed water system are defined as *minor* on page 83 of the Fernbank Master Servicing Study [1] and do not require an amendment to the Environmental Assessment since the results do not appreciably change the expected net impacts associated with the project. These changes include:

- Two connections to the existing 400mm diameter watermain running east/west on the south side of the Kizell Lands will be made at the intersection of Robert Grant Avenue and Abbott Street and the other connection 230 metres east. The water distribution links are required for reasons of supply and redundancy; however, there is flexibility in the precise location of the link.
- The 300mm diameter trunk system has been slightly realigned to follow the proposed road network.

6.0 STORMWATER MANAGEMENT

6.1 Existing Drainage Conditions

The Kizell Lands are located at the headwaters of the Carp River West Tributary (part of the Carp River Watershed). There is currently no storm sewer infrastructure servicing the Kizell Lands. Site drainage primarily occurs via overland flow to agricultural ditches. **Figure 6-1** shows the location of the Kizell Lands and the existing watershed boundaries.

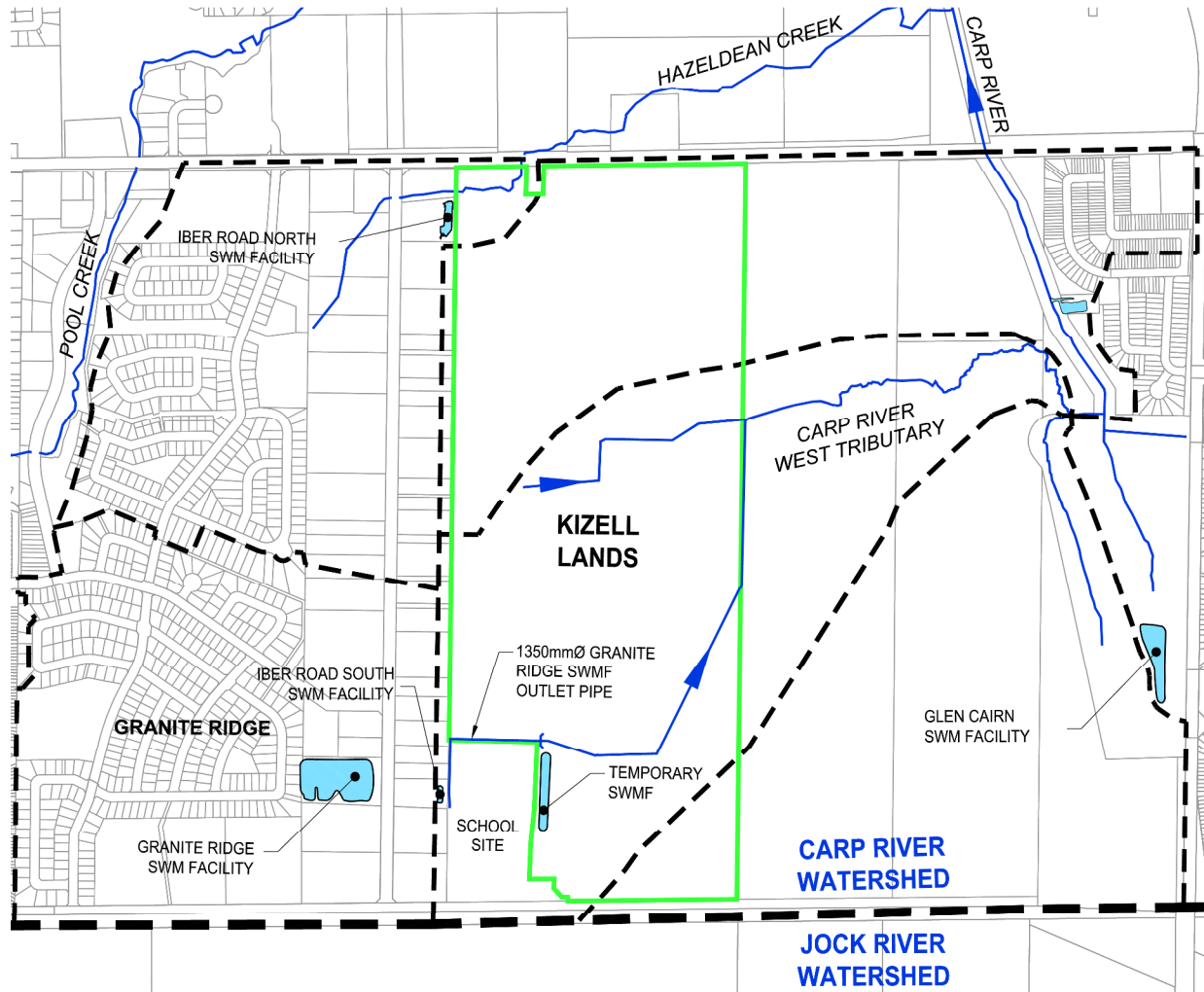


Figure 6-1: Existing Watershed Boundaries

6.1.1 Kizell Lands

Under existing conditions, storm runoff from the southern portion of the Kizell Lands is conveyed by overland flow and open channels to the Carp River West Tributary, which flows east to a confluence with the Carp River just north of the Glen Cairn SWM Facility. As specified in the Fernbank Environmental Management Plan, the Carp River West Tributary has been classified as a tolerant warm water fish community that provides permanent fish habitat.

The Kizell Lands north of the Carp River West Tributary generally slope to the east, towards the Carp River with no defined watercourse.

The Northwest corner of the site is tributary to Hazeldean Creek, which flows east to a confluence with the Carp River approximately 250m north of Hazeldean Road.

Additional information on the existing conditions can be found in the Fernbank Environmental Management Plan [3].

6.1.2 Granite Ridge SWM Facility

The Granite Ridge SWM Facility is located on the west side of Iber Road in Stittsville. This facility provides water quality and quantity control for the Granite Ridge Subdivision, which is south west of the proposed Kizell Lands development.

Under existing conditions, outflows from the Granite Ridge SWM facility are directed through a culvert under Iber Road into an open channel, and into a 1350mm storm sewer running along the north side of the high school site on Abbott Street. This storm sewer discharges into a temporary outlet ditch at the northeast corner of the high school site, which flows northeast to a confluence with the Carp River West Tributary at the eastern limit of the Kizell Lands.

6.1.3 Iber Road

Properties within the Iber Road Business Park are expected to provide on-site water quantity control, matching peak flows to pre-development levels (Simmering & Associates, February 2000). A summary of the required quantity controls outlined in the MOECC Environmental Compliance Approvals for several of the properties on Iber Road have been provided as a part of the Technical Memo included in **Appendix B**. Runoff from the Iber Road Business park is directed to a drainage ditch along the northern boundary of the Business Park and connects to the Granite Ridge SWM facility outlet ditch just east of Iber Road.

6.1.4 High School Site

Drainage works were recently completed in support of a new high school development that involved redirecting outflow from the Granite Ridge SWM Facility around the school site. A temporary SWM facility was constructed to provide water quality and quantity control. Once the Kizell Lands are developed, the temporary pond will be decommissioned and storm runoff from the high school site will be directed to the proposed storm sewers servicing the Kizell lands, with water quality treatment provided by the proposed SWM Facility (Fernbank Pond 1). Quantity control is to be provided on-site for peak flows greater than the 1:5-year post-development peak flows.

6.2 Stormwater Management Criteria

The Kizell Lands are located within the Carp River Subwatershed, and are tributary to the Carp River, which falls under the jurisdiction of the Mississippi Valley Conservation Authority (MVCA). The following stormwater management criteria have been developed based on the criteria in the Fernbank EMP, and requirements of the MVCA and the City of Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016).

6.2.1 *Minor System (Storm Sewers)*

- Storm sewers are to be designed using the Rational Method as follows:
 - 1:2 year return period for local streets;
 - 1:5 year return period for collector roads;
 - 1:10 year return period for arterial roads;
- Inlet control devices (ICDs) are to be installed in road and rearyard catchbasins to control inflows to the storm sewers;
- Ensure that the 100-year hydraulic grade line in the storm sewer is at least 0.3 m below the underside of footing (USF) elevations for the proposed development.

6.2.2 *Major System (Overland Flow)*

- Overland flows are to be confined within the right-of-way and/or defined drainage easements for all storms up to and including the 1:100 year event;
- Maximum depth of flow (static + dynamic) on local and collector streets shall not exceed 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- Maximum depth of flow on arterial roads shall not overtop the barrier curb and shall leave one lane free of water in each direction.
- Runoff that exceeds the available storage in the right-of-way will be conveyed overland along defined major system flow routes towards the proposed major system outlet to the SWM Facility. There must be at least 15cm of vertical clearance between the spill elevation on the street and the ground elevation at the building envelope that is in the proximity of the flow route or ponding area;
- Although rear yard storage cannot be accounted for in computer modelling, the effect of flow attenuation can be accounted for by assuming a constant slope ditch/swale draining to the street with the following geometry:
 - A minimum slope of 1.5%;
 - A depth ranging between 150mm (min) and 600mm (max); and
 - Maximum side slopes of 3H:1V.
- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60;

6.2.3 *Water Quality & Quantity Control*

- Provide a *Normal* (70% TSS removal) level of quality control;
- Implement lot level and conveyance Best Management Practices to promote infiltration and treatment of storm runoff;
- Post-development peak flows are not to exceed pre-development peak flows for all storms up to and including the 100-year event.

6.3 Storm Servicing Design

Storm servicing for the subject development will be provided using a dual drainage system: Runoff from frequent events will be conveyed by storm sewers (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system).

The minor system servicing the Kizell lands is divided into two main trunks with a north and a south inlet to the stormwater management facility. The proposed SWM facility (Pond 1) will serve as the outlet for both the major and minor systems.

6.3.1 Minor System Design

The storm sewers comprising the minor system have been designed in accordance with Technical Bulletin PIEDTB-2016-01 (September 2016). The criteria used to design the storm sewers are summarized in

Design Sheets are in **Appendix A**. The Storm Drainage Area Plan is in **Appendix C**.

Table 6.1 and **Table 6.2**.

Design Sheets are in **Appendix A**. The Storm Drainage Area Plan is in **Appendix C**.

Table 6.1: Storm Sewer Design Parameters

| Parameter | Design Criteria |
|---|--------------------------------|
| Local Roads | 2 Year Return Period |
| Collector Roads | 5 Year Return Period |
| Arterial Road | 10 Year Return Period |
| Storm Sewer Design | Rational Method / PCSWMM |
| IDF Rainfall Data | Ottawa Sewer Design Guidelines |
| Initial Time of Concentration (T_c) | 15 min |
| Minimum Velocity | 0.8 m/s |
| Maximum Velocity | 3.0 m/s |
| Minimum Diameter | 300 mm |

Table 6.2: Runoff Coefficients

| Land Use | Runoff Coefficient |
|---|--------------------|
| Mixed Use | 0.80 |
| Park N' Ride | 0.80 |
| Arterial Roads | 0.90 |
| Schools | 0.60 |
| Medium Density / High Density Residential | 0.80 |
| Low Density Residential | 0.65 |
| Parks | 0.40 |
| Hydro Corridor | 0.20 |

Initial Time of Concentration

For conceptual design purposes, the subcatchment areas have been discretized as semi-lumped areas and do not represent each individual sewer section. A 15 minute initial time of concentration has been used to represent the additional travel time through the sewers in the uppermost reaches of the catchments.

At the detailed design stage, the catchment areas will be refined to reflect the areas tributary to each inlet of the sewer system, and the storm sewer design sheets will use an initial time of concentration of 10 minutes.

Inlet Control Devices

Inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system capacity (1:2yr local / 1:5yr collector / 1:10yr arterial). ICDs sizes and catchbasin locations will be determined during the detailed design stage.

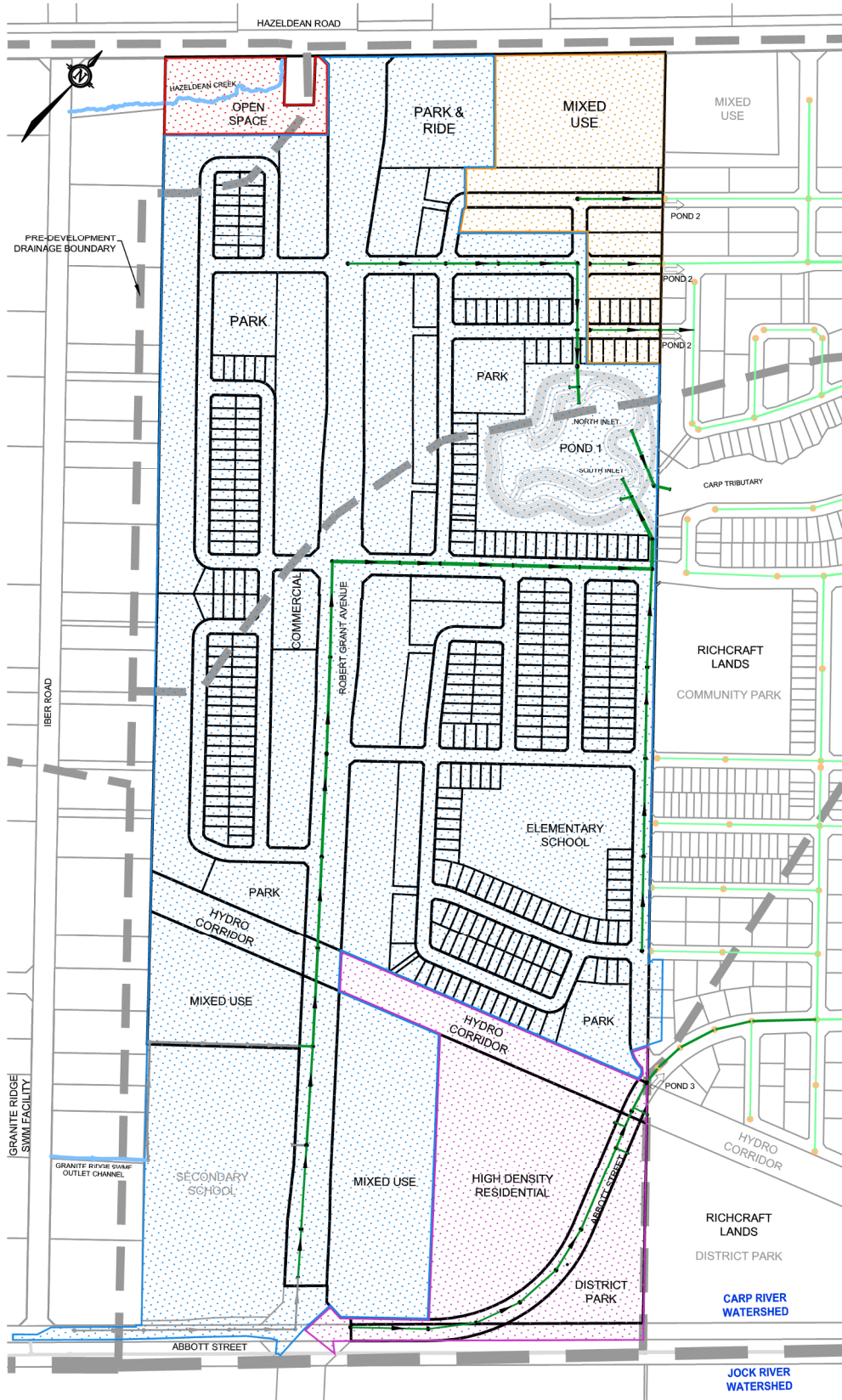


Figure 6-2: Storm Sewer Network

6.3.2 Major System Design

The major system design will conform to the design standards outlined in the Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016). During detailed design, the right-of-way will be graded to provide sufficient storage to contain the major system runoff from storm events exceeding the minor system capacity for all storms up to and including the 100-year design event. The site will be graded to provide an engineered overland flow route for large, infrequent storms, or in the event that the storm sewer system becomes obstructed, with the majority of major system flows routed to Pond 1. There are three drainage areas in the north-eastern corner of the site (P2-21, P2-22, P2-23) where major and minor system flows are tributary to the storm sewers within the adjacent development, which outlet to Pond 2.

Cross-Street Flow

No cross-street flow is permitted for the minor (2-year) storm event, and there is to be only minimal ponding within the roadways. Major system flow from local streets can be conveyed to other local or collector roads, or to a Stormwater Management Facility or watercourse.

Major System Flow Depths

For events exceeding the minor system design storm and up to the 100-year design storm, flow depths in the right of way are to be limited to the maximum water depths outlined in **Table 6.3**.

Table 6.3: Major System Flow Depths

| Road Classification | Maximum Water Depth |
|---------------------|---|
| Local | 350mm at edge of pavement |
| Collector | 350mm at edge of pavement |
| Arterial | No barrier curb overtopping/Flow spread must leave at least one lane free of water in each direction. |

6.3.3 Groundwater Infiltration and Water Balance

As discussed in the Fernbank Environmental Management Plan [3], the hydrogeologic conditions of the Kizell Lands will be altered by the increase in hard surfaces and the increased efficiency of stormwater conveyance. The net result will be a reduction in groundwater infiltration, which can potentially result in a reduction in the groundwater table, reduction of baseflow in watercourses, reduced well capacities and consolidation of the overburden, among other impacts.

The recommended infiltration target is to match pre-development infiltration rates. The water balance analysis in the Fernbank Environmental Management Plan [3] indicates that maintaining annual pre-development infiltration should be achievable using infiltration best management practices; the types, locations, and suitability of infiltration BMPs will be dependent on site specific details and land use.

Infiltration Best Management Practices

Infiltration of surface runoff will be accomplished using lot level and conveyance controls. The most suitable practices for groundwater infiltration include:

- Infiltration of runoff captured by rear yard catchbasins;
- Direct roof leaders to rear yard areas;
- Infiltration trenches underlying drainage swales in park areas;
- The use of fine sandy loam topsoil in parks and on residential lawns.

By implementing infiltration Best Management Practices as part of the storm drainage design for the Kizell lands, the impacts of development on the hydrologic cycle can be considerably reduced. Infiltration of clean runoff will also have additional benefits for stormwater management; by reducing the volume of “clean” water conveyed to Pond 1, the performance of Pond 1 will be increased.

6.3.4 SWM Facility – Pond 1

Water quantity control and water quality treatment will be provided by an end-of pipe stormwater management pond, ‘Pond 1’. Pond 1 has been sized to control and treat runoff from the Kizell Lands development, including flows from the Granite Ridge SWM facility, and a portion of Iber Road.

6.4 Hydrologic & Hydraulic Modeling

The *City of Ottawa Sewer Design Guidelines* (October 2012) require hydrologic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the Kizell Lands was evaluated using the PCSWMM hydrologic/hydraulic model.

A semi-lumped model of the proposed subdivision storm sewers and Pond 1 was developed using PCSWMM, and has been imported into the Carp River PCSWMM model to evaluate the impact of the proposed development on water levels in the Carp River.

The PCSWMM model is a semi-lumped model that represents both the minor and major system flows from the development. The results of the analysis were used to:

- Simulate major and minor system runoff from the site;
- Determine the storm sewer hydraulic grade line for the 100-year storm event;
- Ensure the stormwater management facility is sufficiently sized to control runoff from the proposed development and the upstream drainage areas.

Additional details on the Carp River PCSWMM model are provided in **Section 6.4.5**. Modeling files are provided on the enclosed CD.

6.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms and historical storms. The IDF parameters used to generate the Chicago design storms were taken from the *Ottawa Design Guidelines - Sewer* (November 2004). The 12-Hour SCS MTO design storms were copied from the provided Carp River PCSWMM model, to ensure consistent results.

3 Hour Chicago Distribution:

- 25mm Event (Water Quality)
- 2-year Event
- 5-year Event
- 10-year Event
- 100-year Event

12 Hour MTO SCS Distribution:

- 2-year Event
- 5-year Event
- 10-year Event
- 100-year Event

The 3-hour Chicago distribution generated the highest peak flows on a per-subcatchment basis, however the 12-hour SCS storm (MTO distribution) generated higher HGL elevations. Thus, both storm distributions were used for the design and analysis of the storm drainage system.

6.4.2 Storm Drainage Areas

The site has been divided into subcatchments based on the proposed land use and roadway design. The catchment areas shown on the Storm Drainage Area Plan **108195-STM** (**Appendix C**) correspond to the areas used in the Storm Sewer Design Sheet (**Appendix A**).

6.4.3 Model Parameters

The hydrologic parameters for each subcatchment were developed based on the Land Use Plan (**Figure 2**) and the Storm Drainage Area Plan (**108195-STM**). An overview of the modeling parameters is provided in **Table 6.4**.

Table 6.4: PCSWMM Model Parameters

| Area ID | Area (ha) | Runoff Coeff. (C) | Percent Impervious (%) | No Depression (%) | Curve Number (CN) | Equivalent Width (m) | Average Slope (%) |
|----------------------------------|--------------|-------------------------|------------------------------|-------------------------|-------------------------|----------------------------|-------------------------|
| DEL Lands Catchment Areas | | | | | | | |
| P1-01 | 1.25 | 0.82 | 89% | 0% | 80.5 | 400 | 0.35 |
| P1-02 | 0.47 | 0.90 | 100% | 0% | 80.5 | 95 | 0.35 |
| P1-03a | 6.01 | 0.68 | 69% | 50% | 80.5 | 330 | 0.50 |
| P1-03b | 2.63 | 0.68 | 69% | 50% | 80.5 | 590* | 0.50 |
| P1-04a | 2.38 | 0.81 | 87% | 50% | 80.5 | 535* | 0.50 |
| P1-04b | 2.07 | 0.81 | 87% | 50% | 80.5 | 465* | 0.50 |
| P1-04c | 0.96 | 0.90 | 100% | 0% | 80.5 | 208 | 0.33 |
| P1-05 | 1.61 | 0.50 | 43% | 0% | 80.5 | 250 | 0.30 |
| P1-06 | 3.49 | 0.62 | 60% | 50% | 80.5 | 600 | 0.45 |
| P1-07 | 1.65 | 0.90 | 100% | 0% | 80.5 | 340 | 0.40 |
| P1-08 | 9.55 | 0.69 | 70% | 50% | 80.5 | 1800 | 0.45 |
| P1-09 | 1.66 | 0.84 | 91% | 0% | 80.5 | 250 | 0.32 |

| Area ID | Area (ha) | Runoff Coeff. (C) | Percent Impervious (%) | No Depression (%) | Curve Number (CN) | Equivalent Width (m) | Average Slope (%) |
|---------------------------------|--------------|-------------------|------------------------|-------------------|-------------------|----------------------|-------------------|
| P1-10 | 1.89 | 0.70 | 71% | 50% | 80.5 | 350 | 0.20 |
| P1-11 | 4.70 | 0.70 | 71% | 50% | 80.5 | 750 | 0.35 |
| P1-12 | 2.28 | 0.65 | 64% | 50% | 80.5 | 580 | 0.25 |
| P1-13 | 8.08 | 0.65 | 64% | 50% | 80.5 | 1400 | 0.35 |
| P1-14 | 3.28 | 0.60 | 57% | 50% | 80.5 | 250 | 0.25 |
| P1-15 | 2.44 | 0.65 | 64% | 10% | 80.5 | 550 | 0.13 |
| P1-16 | 5.76 | 0.66 | 66% | 50% | 80.5 | 1000 | 0.20 |
| P1-17 | 2.42 | 0.88 | 97% | 0% | 80.5 | 370 | 0.50 |
| P1-18 | 3.04 | 0.78 | 83% | 10% | 80.5 | 680* | 0.25 |
| P1-19 | 1.49 | 0.65 | 64% | 50% | 80.5 | 230 | 0.13 |
| P1-20 | 4.70 | 0.65 | 64% | 50% | 80.5 | 700 | 0.22 |
| P1-25_POND1 | 4.29 | 0.76 | 80% | 0% | 80.5 | 250 | 0.10 |
| TOTAL: | 78.10 | | | | | | |
| Off-Site Catchment Areas | | | | | | | |
| CS254_1 | 47.20 | 0.51 | 44% | 25% | 85.0 | 500 | 0.70 |
| CS254_2 | 18.12 | 0.45 | 36% | 25% | 87.0 | 500 | 0.50 |
| CS252 | 10.45 | 0.59 | 56% | 25% | 87.0 | 210 | 0.50 |

*Where detailed street information is not available, a width value of 225m per ha has been used.

Major System Storage

Since the major system has not yet been designed, the subcatchment areas are not based on a detailed grading plan. Major system storage is represented in the PCSWMM model using storage nodes. The required storage volumes are based on containing the runoff from the 100-year event within road sags (max depth of 0.35m) with no cascading overland flow. The release rates from the storage nodes have been established as follows:

- Local Roads, up to the 2-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;
- Collector Roads, up to the 5-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;
- Arterial Roads, up to the 10-year peak flow from the subcatchment flow uncontrolled to the storm sewers, storage is provided for larger storm events;

As the project is only at the Draft Plan stage, detailed lot-level grading information is not yet available. The PCSWMM model is set up with the main trunk sewers, as outlined in the storm sewer design sheet.

The required major system storage volumes are provided in **Section 6.4.4 “Model Results”** - refer to **Table 6.7**.

Runoff Coefficient/ Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the Runoff Coefficients (see **Table 6.2**) noted on the Storm Drainage Area Plan (**108195-STM**) using the equation:

$$\%IMP = \frac{(C - 0.2)}{0.7}$$

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Residential rooftops are assumed to provide no depression storage and all rainfall is converted to runoff. The percentage of rooftop area to total impervious area is represented by the 'no depression storage' column in **Table 6.4**.

Curve Number

The Carp River Watershed PCSWMM model uses an SCS Curve Number of 80.5. Thus, all subcatchments within the Kizell Lands have been given a curve number value of 80.5, to remain consistent with the Carp River Watershed model.

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter is calculated as described in the *Sewer Design Guidelines, October 2012, Section 5.4.5.6*. For areas where detailed roadway information is available, the total length of the street segment, multiplied by 2 (in areas where there is to be development on both sides of the street) has been used. In areas where detailed roadway information is not available, such as in the mixed-use development blocks, a value of 225m per ha has been used. These areas have been indicated in the model parameter table with an asterisk (*).

Upstream Areas

The proposed Kizell Lands development must maintain a storm outlet for the Granite Ridge SWM facility. The existing 1350mm storm sewer north of the high school site at Abbott Street will connect to the proposed storm sewer system, and will serve as the outlet for the Granite Ridge SWM facility and a portion of the industrial area on the east side of Iber Road.

The outflows from the upstream SWM facilities will have already been treated, but will be routed through the Kizell storm sewers to Pond 1. For SWM facilities in series, the MOE recommends that the downstream pond (Pond 1) be designed to provide 80 m³/ha extended detention storage, double the standard 40 m³/ha required for a single facility.

Fernbank Pond 1

Refer to **Section 7.0** for additional details on the design of Fernbank Pond 1, including the stage-storage-discharge curves used in the PCSWMM model.

Modeling Files / Schematic

The PCSWMM model schematics are provided in **Appendix B**. Digital copies of the modeling files and model output for all storm events are provided on the enclosed CD.

6.4.4 Model Results

The results of the PCSWMM model are summarized in the following sections.

Peak Flows

The proposed SWM facility has been designed to control post-development peak flows in the Carp River West Tributary to pre-development levels. The pre-development peak flows for the 12-hour SCS distribution are taken from Table 8-2 of the Fernbank EMP. A comparison of pre- vs. post-development peak flows is provided in **Table 6.5**.

Table 6.5: Pre vs. Post-Development Peak Flows to Carp River West Tributary (m³/s)

| Storm Distribution-> | 12hr SCS Distribution | | | |
|-------------------------|-----------------------|------|------|-------|
| Return Period-> | 2yr | 5yr | 10yr | 100yr |
| Pre-Development | 1.71 | 2.67 | 3.32 | 5.43 |
| Post-Development | 1.19 | 2.01 | 2.61 | 4.70 |

Hydraulic Grade Line

The PCSWMM model was used to evaluate the 100-year hydraulic grade line (HGL) elevations within the proposed storm sewers. As the design is only at the draft plan stage, underside of footing (USF) elevations have not yet been determined. The HGL analysis will need to be revised at the detailed design stage to reflect the controlled inflows at each inlet to the storm sewers.

The model indicates that there will be some surcharging of the sewers during the 100-year event. While the 3-hour Chicago distribution generates higher peak flows, the 12-hour SCS MTO distribution generates larger runoff volumes. Consequently, the 12-hour SCS MTO distribution also generates the highest HGL elevations due to backwater from the 100-year water level in the proposed SWM facility.

The storm sewer sizes and elevations have been adjusted where possible to maintain a 100-year HGL within approximately 0.30 m above the pipe obvert.

Table 6.6: 100-year HGL Elevations

| Manhole ID | MH Invert Elevation (m) | T/G Elevation (m) | Outlet Pipe Obvert (m) | HGL Elevation (MTO SCS) (m) | WL Above Obvert (MTO SCS) (m) | HGL Elevation (Chicago) (m) | WL Above Obvert (Chicago) (m) |
|--------------|-------------------------|-------------------|------------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|
| P1-101 (STM) | 97.65 | 100.80 | 99.45 | 99.48 | 0.00 | 99.35 | -0.13 |
| P1-103 (STM) | 97.70 | 100.83 | 99.54 | 99.80 | 0.23 | 99.72 | 0.15 |
| P1-105 (STM) | 97.78 | 101.51 | 99.80 | 99.96 | 0.36 | 99.89 | 0.29 |
| P1-107 (STM) | 98.35 | 101.67 | 99.70 | 100.06 | 0.34 | 100.01 | 0.29 |
| P1-109 (STM) | 98.46 | 101.84 | 99.81 | 100.12 | 0.29 | 100.09 | 0.26 |
| P1-111 (STM) | 98.79 | 102.06 | 99.99 | 100.33 | 0.33 | 100.33 | 0.33 |

| Manhole ID | MH Invert Elevation (m) | T/G Elevation (m) | Outlet Pipe Obvert (m) | HGL Elevation (MTO SCS) (m) | WL Above Obvert (MTO SCS) (m) | HGL Elevation (Chicago) (m) | WL Above Obvert (Chicago) (m) |
|------------------|----------------------------|----------------------|---------------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|
| P1-113 (STM) | 99.17 | 102.30 | 100.22 | 100.58 | 0.34 | 100.59 | 0.35 |
| P1-147 (STM) | 97.98 | 101.82 | 99.89 | 100.21 | 0.32 | 100.16 | 0.27 |
| P1-153 (STM) | 98.10 | 102.12 | 99.97 | 100.34 | 0.37 | 100.26 | 0.29 |
| P1-165 (STM) | 98.23 | 102.43 | 100.06 | 100.45 | 0.39 | 100.35 | 0.29 |
| P1-169 (STM) | 98.31 | 102.61 | 100.11 | 100.52 | 0.41 | 100.41 | 0.30 |
| P1-171 (STM) | 98.44 | 102.51 | 100.25 | 100.61 | 0.36 | 100.50 | 0.25 |
| P1-173 (STM) | 99.43 | 103.07 | 100.47 | 100.66 | 0.17 | 100.57 | 0.08 |
| P1-203 (STM) | 98.67 | 103.15 | 100.47 | 100.94 | 0.44 | 100.82 | 0.32 |
| P1-205 (STM) | 98.91 | 103.66 | 100.71 | 101.09 | 0.35 | 100.99 | 0.25 |
| P1-207 (STM) | 99.16 | 103.17 | 100.96 | 101.29 | 0.30 | 101.16 | 0.17 |
| P1-209 (STM) | 100.43 | 103.50 | 101.18 | 101.53 | 0.34 | 101.40 | 0.21 |
| P1-215 (STM) | 99.59 | 102.78 | 101.27 | 101.51 | 0.24 | 101.32 | 0.05 |
| P1-215a(STM) | 101.06 | 103.39 | 101.52 | 101.91 | 0.39 | 101.64 | 0.12 |
| P1-217 (STM) | 99.89 | 103.31 | 101.82 | 101.77 | 0.20 | 101.52 | -0.05 |
| P1-219 (STM) | 100.64 | 103.45 | 101.84 | 101.91 | 0.06 | 101.71 | -0.14 |
| P1-221 (STM) | 100.69 | 102.42 | 101.44 | 101.71 | 0.26 | 101.51 | 0.06 |
| P1-221a(STM) | 99.72 | 102.75 | 101.37 | 101.64 | 0.24 | 101.42 | 0.02 |
| P1-301 (STM) | 97.70 | 101.25 | 99.04 | 99.39 | 0.35 | 99.19 | 0.15 |
| P1-303 (STM) | 97.73 | 101.29 | 99.07 | 99.39 | 0.32 | 99.19 | 0.12 |
| P1-305 (STM) | 97.79 | 101.36 | 99.13 | 99.40 | 0.27 | 99.25 | 0.12 |
| P1-307 (STM) | 98.48 | 101.56 | 99.32 | 99.65 | 0.33 | 99.56 | 0.24 |
| P1-317 (STM) | 97.91 | 101.44 | 99.26 | 99.42 | 0.14 | 99.36 | 0.08 |
| P1-319 (STM) | 98.12 | 101.57 | 99.47 | 99.83 | 0.34 | 99.83 | 0.34 |
| P1-321 (STM) | 98.22 | 101.65 | 99.57 | 100.02 | 0.43 | 100.02 | 0.43 |
| P1-323 (STM) | 98.89 | 101.72 | 99.72 | 100.27 | 0.54 | 100.30 | 0.57 |
| P1-327 (STM) | 98.82 | 102.05 | 99.87 | 100.16 | 0.27 | 100.18 | 0.29 |
| P1-337 (STM) | 99.34 | 102.84 | 100.17 | 100.54 | 0.36 | 100.57 | 0.39 |
| P1-349 (STM) | 101.62 | 103.80 | 102.22 | 102.25 | 0.02 | 102.28 | 0.05 |
| P1-351 (STM) | 101.35 | 103.76 | 102.12 | 101.95 | -0.16 | 101.98 | -0.13 |
| P1-EX. 501 (STM) | 101.18 | 104.04 | 102.53 | 102.69 | 0.14 | 102.44 | -0.11 |
| P1-EX. 502 (STM) | 101.12 | 103.98 | 102.47 | 102.58 | 0.09 | 102.36 | -0.13 |
| P1-EX. 503 (STM) | 100.87 | 103.75 | 102.22 | 102.18 | -0.06 | 102.00 | -0.24 |
| P1-EX. 504 (STM) | 100.63 | 103.49 | 101.98 | 101.95 | -0.05 | 101.80 | -0.20 |

Note that there are some manhole locations where the 100-year HGL elevation exceeds 0.30m above the pipe obvert. During the detailed design stage, pipe sizes and building elevations will be adjusted accordingly to ensure the 100-year HGL will be at least 0.30m below the design USF elevations.

Major System Storage

The storage required in the right-of-way has been evaluated on a per-hectare basis for each subcatchment. Refer to **Table 6.7**.

Table 6.7: Major System Storage

| Drainage Area ID | Area (ha) | Storage Required | | |
|------------------|-----------|------------------------|--------------------------------|---|
| | | Area (m ²) | Total Volume (m ³) | Per Hectare Volume (m ³ /ha) |
| P1-01 | 1.25 | 315 | 56 | 45 |
| P1-01 | 0.47 | 140 | 25 | 53 |
| P1-03a | 6.01 | 3325 | 501 | 83 |
| P1-03b | 2.63 | 1850 | 324 | 123 |
| P1-04a | 2.38 | 2050 | 359 | 151 |
| P1-04b | 2.07 | 1550 | 272 | 131 |
| P1-04c | 0.96 | 250 | 44 | 46 |
| P1-05 | 1.61 | 215 | 38 | 24 |
| P1-06 | 3.49 | 1750 | 307 | 88 |
| P1-07 | 1.65 | 425 | 75 | 45 |
| P1-08 | 9.55 | 5400 | 946 | 99 |
| P1-09 | 1.66 | 385 | 68 | 41 |
| P1-10 | 1.89 | 1100 | 193 | 102 |
| P1-11 | 4.7 | 2750 | 482 | 103 |
| P1-12 | 2.28 | 1250 | 219 | 96 |
| P1-13 | 8.08 | 4200 | 736 | 91 |
| P1-14 | 3.28 | 1575 | 276 | 84 |
| P1-15 | 2.44 | 1310 | 230 | 94 |
| P1-16 | 5.76 | 3300 | 578 | 100 |
| P1-17 | 2.42 | 750 | 132 | 54 |
| P1-18 | 3.04 | 1400 | 246 | 81 |
| P1-19 | 1.49 | 450 | 79 | 53 |
| P1-20 | 4.7 | 2550 | 447 | 95 |

There is a relatively wide range of major system storage requirements. Some areas, primarily those designated for mixed use development, may require up to 150m³/ha in order to fully contain the 100-year event.

The required major system storage volumes are generally larger than the values documented in the Fernbank MSS. However, Technical Bulletin PIEDTB-2016-01 (September 2016) has

increased the allowable ponding depths in the right-of-way from 0.30m to 0.35m, which represents a significant increase in the maximum storage volumes that can be provided.

The major system storage volumes will be reassessed at the detailed design stage to ensure the appropriate major system storage is provided.

6.4.5 Carp River Watershed PCSWMM Model

The City has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

To determine what effect the proposed Kizell Lands development will have on the downstream Carp River, the Kizell Lands PCSWMM model was integrated into the Carp River Watershed PCSWMM model provided by the City, following the protocol outlined in the *City of Ottawa Carp River PCSWMM Model Documentation*.

After discussions with City staff, there have been some revisions made to some of the subcatchment area parameters upstream and downstream of the Kizell subdivision. Please refer to the technical memorandum included in **Appendix B**, which outlines these changes.

The results of the analysis indicate that the proposed development will not have an adverse effect on the downstream watercourses, as the outflows from Pond 1 are to be controlled to match existing flows into the Carp River West Tributary.

6.4.6 Runoff Volumes and Downstream Impacts

When the Fernbank EMP was written, it was assumed that the Kizell Lands would have an average imperviousness of 56%. The current plans for the proposed residential development have an average imperviousness of 70%. The Fernbank EMP states the following: *“The recommended areas for SWM blocks have been oversized to allow for flexibility in the configuration of the SWM facilities, as well as to allow provide flexibility for expansion of the SWM facilities to account for any intensification of development from the current land use plan.”* (Page 88 Section 9.0, Fernbank EMP, Novatech, June 2009).

Pond 1

The conceptual design for the Pond 1 SWM facility (refer to drawing **108195-SWM**) accounts for the increase in runoff resulting from the increased impervious area, and will control flows to the allowable release rates as outlined in the Fernbank EMP. The pond forebay sizing has also been adjusted from the original concept to account for the increase in imperviousness, to ensure that the 70% TSS water quality requirement is being met.

Runoff Volumes

In terms of the runoff volume, the Fernbank EMP outlines the following criteria: *“Increases in runoff volumes resulting from development are not to exceed an additional 40,000m³ above existing conditions for the 100-year event.”*

To determine the magnitude and impact of additional runoff volume directed to the Carp River West Tributary due to the increased impervious area of the Kizell lands, the SWMHYMO model submitted as a part of the Fernbank EMP was updated with a % impervious (TIMP) value of 0.70, up from the original 0.56. Results are as follows:

Table 6.8: 100-year Runoff Volume Comparison

| Development Condition | 100yr Runoff Volume (m3) | | | | |
|---------------------------------------|--------------------------|--------|--------|---------|----------|
| | Pond 1 | Pond 2 | Pond 3 | Total | Increase |
| Pre-Development | 112,700 | 17,900 | 51,300 | 181,900 | - |
| Post-Development (no BMPs, 56% IMP) | 122,100 | 20,000 | 68,400 | 210,500 | 28,600 |
| Post-Development (with BMPs, 56% IMP) | 120,200 | 19,500 | 68,500 | 208,200 | 26,300 |
| Post-Development (no BMPs, 70% IMP) | 126,800 | 20,000 | 68,400 | 215,200 | 33,300 |
| Post-Development (with BMPs, 70% IMP) | 124,100 | 19,500 | 68,500 | 212,100 | 30,200 |

The Fernbank EMP states that “Increases in runoff volume resulting from development are not to exceed an additional 40,000m³ above existing conditions for the 100-year event.” As shown in the above table, the increase in impervious area does result in an increase to the runoff volume directed to the Carp River. However, the increase is well within the allowable overall increase for the Fernbank Community.

Continuous Modeling (Erosion Assessment)

To determine if there would be a negative impact to the downstream channel morphology, the continuous SWMHYMO model submitted as a part of the Fernbank EMP was updated with a % impervious (TIMP) value of 0.70, up from the original 0.56. Results are as follows:

Table 6.9: Erosion Threshold Exceedance Comparison

| # of Hours Exceeding Critical Flow Threshold for Erosion % of Total Annual Flow above Erosion Threshold | | | | | | |
|--|-------------|----------------|-----------------|----------------|-----------------|-------------|
| Location | Year | | | | | |
| | 1974 | 1979 | 1981 | 1986 | 1995 | 1997 |
| Critical Flow = 1.70 m3/s (C12) | | | | | | |
| Carp River West Tributary @ Monitoring Location C12 (Downstream of SWMF P1) | | | | | | |
| Pre-Development | 0 hrs 0% | 7 hrs 0.10% | 12 hrs 0.20% | 6 hrs 0.10% | 16 hrs 0.30% | 0 hrs 0% |
| Post-Development (no BMPs, 56% IMP) | 0 hrs 0% | 6 hrs 0.10% | 10 hrs 0.20% | 4 hrs 0.10% | 15 hrs 0.30% | 0 hrs 0% |
| Post-Development (no BMPs, 70% IMP) | 0 hrs 0% | 6 hrs 0.10% | 11 hrs 0.20% | 5 hrs 0.10% | 16 hrs 0.30% | 0 hrs 0% |

As shown in the above table, there should be little to no increase in impact to the downstream channel morphology due to the increased impervious area.

7.0 STORMWATER MANAGEMENT FACILITY

The proposed SWM facility has been sized to provide water quality and quantity control for a total tributary drainage area of 77.9 ha from the Kizell Lands, plus an additional 75.8 ha from the upstream Granite Ridge SWM Facility and Iber Road. The design of the SWM facility is shown on Drawing **108195-SWM**.

7.1 Design Criteria

The proposed SWM facility has been designed to meet the following criteria:

- Provide a *Normal* level of water quality control (70% long-term TSS removal);
- Provide quantity control storage to limit post-development flows into the Carp River West Tributary to 4.75 m³/s for all storms up to and including the 100-year event;
- The SWM facility will have side slopes of 3:1 (H:V) or shallower;
- The forebays have been sized to provide sufficient storage for 10-years of sediment accumulation;
- A sediment storage area for each forebay (two in total) have been provided within the SWM block to allow for storage and drying of material removed during maintenance/cleanout;
- Guardrails conforming to City standards are to be installed at the inlet and outlet structures of the SWM facility;
- Infiltration tests are to be performed on the native material to determine whether a liner will be required.

7.2 Pathways/ SWM Facility Access

Access to the inlet and outlet structures and the sediment storage area will be provided by the proposed service road / pathway that runs around the perimeter of the pond. Two accesses to the pond block will be provided as shown on Drawing **108195-SWM**.

7.3 Geotechnical (Pond Liner)

It is recommended that the base and the sidewalls of the SWM facility be inspected by a geotechnical consultant to confirm the requirement for a geotechnical liner. The thickness of the pond liner (if required) would be designed to be outside the limits of the design grades of the SWM facility and would have no impact on the storage volume of the pond.

7.4 Inlet Structures

The north and south inlets to the SWM facility have been designed with flow splitters consisting of a low-flow pipe to direct runoff from smaller storm events into the forebays, and a high flow pipe to direct peak flows from larger storm events directly into the main cell of the pond. The low-flow and high-flow pipes are to be separated by a weir structure within the connecting manhole.

The SWM Facility inlet structures will consist of the following:

- North Inlet:
 - 1350 mm pipe outletting to the north forebay, sized for the flows from the 25mm water quality event;
 - 1340 x 2100 mm pipe outletting to the main cell of the pond.
 - Flow splitter weir (crest elevation = 98.55 m)
- South Inlet:
 - 1800 mm pipe outletting to the north forebay, sized for the flows from the 25mm water quality event;
 - 1800 mm pipe outletting to the main cell of the pond.
 - Flow splitter weir (crest elevation = 98.86 m)

A plunge pool will be placed at each inlet to prevent scour and erosion. The plunge pool and the banks of the forebay near the inlet will be lined with riprap as per City of Ottawa standards.

7.5 Sediment Forebays/ Permanent Pool

The sediment forebays and permanent pool have been designed in accordance with the *MOE SWM Planning and Design Manual* (March 2003). Supporting calculations are provided in **Appendix B**.

Forebays

The north forebay will have a length of approximately 75 m, and the south forebay will have a length of approximately 85 m. Submerged riprap berms set 0.10 m below the normal water level will separate the forebays from the main cell of the pond.

Annual sediment loading to the SWM facility from the upstream drainage area has been estimate at approximately 145.2 m³/year (see design calculations in **Appendix B**). Each forebay has been designed to allow for a minimum of 10 years of sediment accumulation:

- The north forebay will have an estimated sediment loading rate of approximately 34 m³/year. This corresponds to a sediment volume of 340 m³ over a period of 10 years. The north forebay provides a sediment storage volume of approximately 1,160 m³ at the top of the submerged berm separating the forebay and the main cell.
- The south forebay will have an estimated sediment loading rate of approximately 111 m³/year. This corresponds to a sediment volume of 1,110 m³ over a period of 10 years. The south forebay provides a sediment storage volume of approximately 3,500 m³ at the top of the submerged berm separating the forebay and the main cell.

Permanent Pool

The upstream drainage area from the Kizell Lands to the SWM facility (approximately 77.93 ha) has an average imperviousness of 71%. For a *Normal* level of protection (70% long-term TSS removal), the required permanent pool volume is approximately 6,700 m³.

The conceptual design of the SWM pond is governed primarily by the active storage component. The permanent pool volume provided by the conceptual design (21,800 m³) is based on the pond footprint at the normal water level, and grading down to a permanent pool depth of 1.5m. At the detailed design stage, the pond configuration will be revised to ensure the permanent pool is not significantly over-sized.

7.6 SWM Facility Outlet Structure

Outflows from the SWM facility will be routed through an outlet control structure before discharging to a 1950 mm storm sewer which will outlet to the Carp River West Tributary. Refer to **Appendix B** for the supporting outlet sizing calculations and to Drawing **108195-SWM**.

7.6.1 Extended Detention

Extended detention will be provided for the first 6,290m³ (6,234m³ required) of active storage to allow for settling of suspended sediment in the pond. Extended detention outflows will be conveyed to the outlet structure via a 450mm reverse slope pipe with an invert of 96.25m at the bottom of the SWM facility and an invert of 97.75m (normal water level) at the connection to the outlet structure. The extended detention volume will be released over a period of approximately 40 hours through a 220mm slide-in orifice plate installed in the weir within the outlet structure.

7.6.2 Quantity Control

Flows that exceed the extended detention storage volume will outlet through a multi-stage weir within the outlet structure.

7.6.3 Overflow Spillway

The proposed SWM facility has been sized to provide sufficient storage for storms up to and including the 100-year event. An overflow spillway has been provided in case the outlet storm sewer is obstructed or an extreme event (greater than the 100-year event) generates runoff exceeding the maximum available storage in the SWM facility. The overflow spillway will have a crest elevation of 99.80m and will direct overflows into the Carp River West Tributary.

7.7 Stage-Storage-Discharge Table

Based on the proposed SWM facility design, the calculated stage-storage-discharge table is as follows:

Table 7.1: Pond 1 Stage-Storage-Discharge Table

| Service Level | Elevation (m) | Stage (m) | Total Volume (m ³) | Active Volume (m ³) | Discharge (L/s) |
|-----------------|---------------|-----------|--------------------------------|---------------------------------|-----------------|
| Bottom | 96.15 | - | 0 | | |
| NWL | 97.65 | 0.00 | 22298 | 0 | 0 |
| | 97.75 | 0.10 | 23254 | 956 | 0 |
| | 97.85 | 0.20 | 25037 | 2739 | 31 |
| | 97.95 | 0.30 | 26863 | 4565 | 45 |
| Ex. Det. | 98.10 | 0.45 | 27794 | 5496 | 92 |

| Service Level | Elevation (m) | Stage (m) | Total Volume (m ³) | Active Volume (m ³) | Discharge (L/s) |
|-----------------|---------------|-----------|--------------------------------|---------------------------------|-----------------|
| | 98.05 | 0.40 | 28736 | 6438 | 55 |
| | 98.15 | 0.50 | 30663 | 8365 | 153 |
| | 98.25 | 0.60 | 32637 | 10339 | 320 |
| | 98.35 | 0.70 | 34658 | 12360 | 529 |
| | 98.45 | 0.80 | 36736 | 14438 | 770 |
| 2-year | 98.57 | 0.92 | 38863 | 16565 | 1090 |
| | 98.65 | 1.00 | 41057 | 18759 | 1320 |
| | 98.75 | 1.10 | 43332 | 21034 | 1622 |
| 5-year | 98.80 | 1.15 | 45619 | 23321 | 1778 |
| | 98.90 | 1.25 | 47933 | 25635 | 2100 |
| | 99.00 | 1.35 | 50287 | 27989 | 2431 |
| | 99.10 | 1.45 | 52672 | 30374 | 2772 |
| | 99.20 | 1.55 | 55070 | 32772 | 3154 |
| | 99.30 | 1.65 | 57507 | 35209 | 3654 |
| 100-year | 99.40 | 1.75 | 58737 | 36439 | 4217 |
| Overflow | 99.70 | 2.05 | 66025 | 43727 | 8564 |

Note that the discharge rate has been calculated based on the orifice and weir calculations, and is less than the peak flow measured from the outlet in the PCSWMM model.

7.8 Carp River West Tributary

The SWM facility will outlet to the existing Carp River West Tributary at the northern end of the site. As per the Fernbank EMP, the upper reach of the tributary is not considered a “naturalized” channel, and will be re-graded to accommodate the proposed SWM facility outlet. There is an existing perched culvert downstream of the planned Pond 1 outlet that was identified in the EMP for removal to facilitate the movement of aquatic species. The Carp River West Tributary is classified as a tolerant warm-water fish community (Type 3 Community), based on the *Carp River Watershed/Subwatershed Study*. Temperature mitigation is required within Pond 1 and along the Tributary, with the goal of ensuring that the temperature of discharged stormwater does not exceed 25°C (22°C preferred). Temperature mitigation is commonly achieved through tree plantings (shade), pond layout and orientation, and bottom-draw techniques. The re-graded section of the Carp River West Tributary will be reinstated with plantings and may incorporate other natural channel features (specifics to be determined at the detailed design stage). Sections of open channel upstream of Pond 1 will be abandoned in conjunction with urbanization, all in accordance with recommendations from the EMP.

7.9 Decommissioning/Abandonment of Existing Facilities

The temporary SWM facility for the high school site is located within the Robert Grant Avenue right-of-way. Decommissioning of the facility will occur in conjunction with construction of Robert Grant Avenue northerly to Hazeldean Road. The storage and treatment function of the temporary facility will be replaced by Pond 1, with conveyance by new storm sewers.

The upper reach of the Carp River West Tributary provides agricultural drainage, and an outlet for the Granite Ridge SWM Facility and High School upstream of Pond 1. Construction sequencing of decommissioning commences with the construction of Pond 1 to operational conditions (vegetated) including the outlet to Carp Tributary. The trunk storm sewer system within Robert Grant Avenue must be installed connecting the Granite Ridge Diversion Pipe to Pond 1. The trunk storm sewer system must then be extended, with connections to outlet from both Abbott Street and the High School Site storm sewers (including by-pass pumping). Decommissioning of the temporary SWM Facility and reinstatement of ground surface to be completed once connections are made. The open channels will be progressively abandoned in conjunction with development of the lands, and in accordance with the Fernbank Environmental Management Plan (see **Figure 7** for construction sequencing details). The MVCA's regulatory jurisdiction extends into the planned development and any alterations of the tributary and entombment requires written authorization from MVCA pursuant to Ontario Regulation 153/06 ("Development, Interference with Wetlands and Alterations to Shorelines and Watercourses").

Compensation planting and environmental work for the planned channel entombment will be completed in accordance with the EMP, and coordinated with the MVCA.

7.10 Changes from Fernbank Community Design Plan

To prevent major system drainage from crossing Robert Grant Avenue, the Fernbank CDP proposed two dry ponds on the Kizell Lands. The intent was for major system flow to be conveyed overland to the dry ponds during heavy rainfall events, for temporary storage. Policy changes outlined in Technical Bulletin PIEDTB-2016-01 (September 2016) with respect to stormwater design have increased the permitted ponding depths within ROW's leading to an increase in available surface storage. The consequence of this design change is that the dry ponds are no longer required, as the major and minor system is now locally contained.

The overall percent impervious for the subdivision has increased from the 56% outlined in the EMP to 70%. Refer to **Section 6.4.6** for details of the impact this change will have on the downstream watercourses.

8.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). Detailed plans will be provided at the detailed design stage.

Typical erosion and sediment control measures recommended include, but are not limited to, the use of silt fences around perimeter of site (OPSD 219.110), filter fabric or inserts under catch basin/maintenance hole lids, heavy duty silt fence barrier (OPSD 219.130), straw bale check dams (OPSD 219.180), rock check dams (219.210 or OPSD 219.211), turbidity curtain (OPSD 219.260), dewatering trap (OPSD 219.240), temporary water passage system (OPSD 221.030), riprap (OPSS 511), mud mats, silt bags for dewatering operations, topsoil and sod to disturbed areas and natural grassed waterways. Dewatering and sediment control techniques will be developed for the individual situations based on the above guidelines and utilizing typical measures to ensure erosion and sediment control is controlled in an acceptable manner and there is no negative impact to adjacent lands, water bodies or water treatment/conveyance facilities.

It will be the responsibility of the Contractor to submit a detailed construction schedule and appropriate staging, dewatering and erosion and sediment control plans to the Contract Administrator for review and approval prior to the commencement of work.

All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.

- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accord with the design drawings and that mitigation measures are being implemented as specified.
 - A light duty silt fence barrier is to be installed in the locations shown on the Erosion and Sediment Control Plan.
 - Straw bale barriers are to be installed in drainage ditches
 - Inserts are to be placed under the grates of all proposed and existing catchbasins and structures.
 - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.
- The contractor shall ensure that proper dust control is provided with the application of water (and if required, calcium chloride) during dry periods.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.
- The contractor acknowledges that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

A list of Best Management Practices, recommended by the Mississippi Valley Conservation Authority, for the development are provided below:

- Natural areas to be retained are to be isolated by sturdy construction fencing or similar barrier at least 1.0m in height during construction in order to ensure their retention.
- Construction equipment will remain within the areas of active construction and will not cross the sediment control measures.
- Following construction, bare soils will be re-seeded to reduce surface erosion.
- Erosion and sediment control measures will be in place for the duration of construction and until the site is re-vegetated. Erosion and sediment control measures should be maintained in good condition for the duration of construction. These measures should be removed at the completion of construction once the site has stabilized.
- Disturbed areas should be replanted with locally grown native species.
- No woody vegetation should be removed between April 15th and August 15th unless a breeding bird survey is conducted.
- Should any species at risk be discovered and/or should any species at risk or their habitat be potentially impacted by on site activities, the Ministry of Natural Resources and Forestry (MNRF) should be contacted immediately and activities should be modified to avoid impacts until further direction is provided by MNRF.

9.0 NOISE

The City of Ottawa is concerned with noise from aircraft, roads, railways and Transitways as expressed in Section 4.8.8 of the Official Plan. These policies are supported by the Environmental Noise Control Guidelines [10] which is a technical document that outlines the specific sound level criteria.

The proposed Arterial Road, Hazeldean Road, Abbott Street and the Major/Minor Collectors are all classified as potential noise sources that must be analyzed at the detailed design stage. The Plan of Subdivision has been configured to mitigate noise levels to the extent practical using planning-based strategies. Dwellings adjacent the Arterial Road will likely have an architectural and acoustic façade facing the high-traffic roadway, and an outdoor amenity area shielded behind the super-structure of each apartment block.

Despite the preceding land use measures, a detailed noise study will be undertaken in conjunction with the Plan of Subdivision and Site Plan applications. Specific noise mitigation measures will be analyzed and submitted at that time, including such measures as noise attenuation barriers, acoustic residential glazing, etc.

10.0 UTILITIES

The development will be serviced by Hydro Ottawa, Bell Canada, Enbridge Gas and Rogers Cablevision (as required); services will be constructed as per the City and Utility standards.

Discussions with the various utility companies have confirmed that there is adequate infrastructure in the vicinity to supply the Fernbank Community as it grows. Ongoing coordination during the development approvals process will be required to ensure that utilities are in place when development proceeds.

As stated in the Fernbank Master Servicing Study, the utility firms have requested they are kept apprised throughout the development process, but no additional investigation or analysis is warranted until detail design is initiated.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding, the report conclusions are summarized below:

- 1) The servicing design generally conforms to the conclusions and recommendations outlined in the Fernbank Master Servicing Study and the Fernbank Environmental Management Plan both of which were approved by Council on June 24, 2009.
- 2) There is adequate capacity in the existing and planned infrastructure (sanitary, storm and water) to accommodate servicing from the Kizell Lands.
- 3) The proposed grading design generally follows the existing topographic contours. Grading will be coordinated with neighbouring land owners.
- 4) The Stittsville Diversion Trunk and Kanata West Pump Station (sanitary) must be operational for servicing of the Kizell Lands.
- 5) The Glen Cairn Pumping Station will be upgraded by the City of Ottawa as-and-when required based on overall growth rates within in the entire Zone 3W Area.
- 6) Pond 1 is required to provide quality and quantity control of stormwater runoff. Ponds 2 & 3 will be constructed by others, and will service a portion of the Kizell Lands.
- 7) A Noise Study is required in conjunction with the detail design of the development.
- 8) Hydro, Gas, Bell and Cablevision have infrastructure nearby to service the proposed development.

This report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

Prepared By:

NOVATECH



Michael Petepiece, P.Eng.
Project Manager

Prepared By:



Mark Bissett, P.Eng.
Project Manager

References

- 1 “Fernbank Community Design Plan, Walker, Nott, Dragicevic Associates Ltd. [June 24, 2009]
- 2 “Fernbank Master Servicing Study”, Novatech Engineering Consultants Ltd. [June 24, 2009]
- 3 “Fernbank Environmental Management Plan”, Novatech Engineering Consultants Ltd. [June 24, 2009]
- 4 “Preliminary Geotechnical Assessment Kizell Lands, 5618 Hazeldean Road, Ottawa, Ontario”, Houle Chevrier Engineering [August 25, 2016]
- 5 “Transportation Master Plan”, City of Ottawa [November 2013]
- 6 “Fernbank Transportation Master Plan”, Delcan [June 24, 2009]
- 7 “Kizell Lands - Community Transportation Study / Transportation Impact Study”, Novatech [Report No. 2016-161, November 2016]
- 8 “Sewer Design Guidelines”, Department of Public Works and Services, City of Ottawa [October 2012]
- 9 “Standard Tender Documents, Material Specifications and Standard Detail Drawings” City of Ottawa, Department of Infrastructure Services and Community Sustainability [March, 2014]
- 10 “City of Ottawa Environmental Noise Control Guidelines, Planning and Growth Management Department” City of Ottawa [January, 2016]
- 11 “Granite Ridge Subdivision Stormwater Site Management Plan and Summary of Calculations” Simmering & Associates Ltd. [February, 2000]

Appendix A: Sewer Design Sheets and Water Modelling

Storm Sewer Design Sheet (Rational Method)

Sanitary Sewer Design Sheets

Watermain Boundary Conditions

Watermain Modelling

Fernbank Community - Kizell Lands: Storm Sewer Design Sheet (Rational Method)

| LOCATION | | | AREA | | | | | | | | | | FLOW | | | | | | Total Peak Flow (Q) (L/s) | PROPOSED SEWER | | | | | | | | | | |
|---------------------------|-----------|---------|--------------|-------------------|-------------------|-----------|-----------------------------|-------------|---------|------|----------------|-----------------|-----------------------------|----------------|---------------|-----------------------|------------------------|-----|---------------------------|-----------------|-----------|----------------|-----------|------------|----------------|--------------------------|---------------------|-------------|------|--|
| Location | From Node | To Node | Park N' Ride | Arterial Road ROW | Abbott Street ROW | Mixed Use | High Density / Medium Block | Low Density | Schools | Park | Hydro Corridor | Total Area (ha) | Weighted Runoff Coefficient | Indivi 2.78 AR | Accum 2.78 AR | Time of Concentration | Rain Intensity (mm/hr) | | | Peak Flow (L/s) | Pipe Type | Pipe Size (mm) | Grade (%) | Length (m) | Capacity (l/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q/Qfull (%) | | |
| | | | | | | | | | | | | | | | | | 2yr | 5yr | | | | | | | | | | | 10yr | |
| POND 1 North Inlet | | | 0.80 | 0.90 | 0.76 | 0.80 | 0.80 | 0.65 | 0.60 | 0.40 | 0.20 | | | | | | | | | | | | | | | | | | | |
| P1-16 | 337 | 327 | | | | | 1.66 | 3.30 | | | 0.80 | 5.76 | 0.66 | 10.54 | 10.54 | 15.00 | 61.77 | | | 651.3 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | 651.3 | CONC | 825 | 0.30 | 97.0 | 820.2 | 1.49 | 1.09 | 79.4% | | |
| P1-17 | 327 | 321 | | | | | | 0.20 | | | | 0.00 | 0.65 | 0.00 | 10.54 | 16.09 | 59.31 | | | 625.4 | | | | | | | | | | |
| | | | | 2.22 | | | | | | | | 0.20 | 0.65 | 0.36 | 0.36 | 16.09 | | | 29.0 | 1176.0 | CONC | 1350 | 0.25 | 120.0 | 2784.1 | 1.88 | 1.06 | 42.2% | | |
| P1-18 | 323 | 321 | 1.84 | | | | 0.70 | 0.50 | | | | 3.04 | 0.78 | 6.55 | 6.55 | 15.00 | 61.77 | | | 404.7 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | 404.7 | CONC | 900 | 0.20 | 71.2 | 844.6 | 1.29 | 0.92 | 47.9% | | |
| P1-19 | 321 | 317 | | | | | | | | | | 0.00 | | 0.00 | 17.10 | 17.15 | 57.12 | | | 976.6 | | | | | | | | | | |
| | | | | | | | | 1.49 | | | | 1.49 | 0.65 | 2.69 | 3.05 | 17.15 | | | 235.8 | 1714.3 | CONC | 1350 | 0.15 | 161.8 | 2156.5 | 1.46 | 1.85 | 79.5% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 5.55 | 17.15 | | | 502.0 | | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 17.10 | 19.00 | 53.70 | | | 918.2 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 3.05 | 19.00 | | | 221.5 | 1611.2 | CONC | 1650 | 0.15 | 81.5 | 3682.6 | 1.67 | 0.81 | 43.8% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 5.55 | 19.00 | | | 471.5 | | | | | | | | | | | |
| P1-20 | 307 | 305 | | | | | 1.48 | 2.41 | | | 0.81 | 4.70 | 0.65 | 8.55 | 8.55 | 15.00 | 61.77 | | | 527.9 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | 527.9 | CONC | 825 | 0.20 | 81.7 | 669.7 | 1.21 | 1.12 | 78.8% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 25.64 | 19.81 | 52.34 | | | 1342.2 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 3.05 | 19.81 | | | 215.8 | 2017.3 | CONC | 1650 | 0.10 | 76.4 | 3006.9 | 1.36 | 0.93 | 67.1% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 5.55 | 19.81 | | | 459.4 | | | | | | | | | | | |
| TOTAL | | | 1.84 | 2.22 | 0.00 | 0.00 | 3.84 | 7.90 | 0.00 | 1.61 | 0.00 | 17.41 | 0.71 | | 34.25 | 20.75 | | | | 115.9 | L/s/ha | | | | | | | | | |

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
 A = AREA IN HECTARES (ha)
 I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)
 R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3) So^(1/2) WHERE :
 Q = CAPACITY (L/s)
 n = MANNING COEFFICIENT OF ROUGHNESS (0.013)
 A = FLOW AREA (m²)

Project: Kizell Lands (108195)
 Designed: LRW
 Checked: MAB
 Date: February 23 2018



Fernbank Community - Kizell Lands: Storm Sewer Design Sheet (Rational Method)

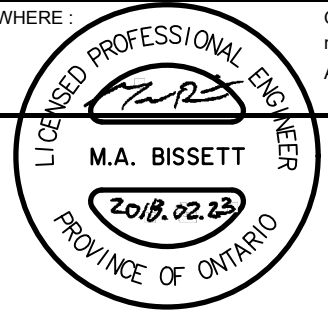
| LOCATION | | | AREA | | | | | | | | | | FLOW | | | | | | Total Peak Flow (Q) (L/s) | PROPOSED SEWER | | | | | | | | | | | |
|--------------------------------------|-----------|---------|--------------|-------------------|-------------------|-----------|-----------------------------|-------------|---------|------|----------------|------------|-----------------------------|----------------|---------------|-----------------------|------------------------|-------|---------------------------|-----------------|-----------|-----------|-----------|------------|----------------|--------------------------|---------------------|-------------|------|-------|-------|
| Location | From Node | To Node | Park N' Ride | Arterial Road ROW | Abbott Street ROW | Mixed Use | High Density / Medium Block | Low Density | Schools | Park | Hydro Corridor | Total Area | Weighted Runoff Coefficient | Indivi 2.78 AR | Accum 2.78 AR | Time of Concentration | Rain Intensity (mm/hr) | | | Peak Flow (L/s) | Pipe Type | Size (mm) | Grade (%) | Length (m) | Capacity (l/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q/Qfull (%) | | | |
| | | | | | | | | | | | | | | | | | 2yr | 5yr | | | | | | | | | | | 10yr | | |
| POND 1 South Outlet | | | 0.80 | 0.90 | 0.76 | 0.80 | 0.80 | 0.65 | 0.60 | 0.40 | 0.20 | (ha) | | | | | | | | | | | | | | | | | | | |
| P1-1 | Abbott | 351 | | | 0.70 | | | | | | | 0.00 | 0.70 | 0.76 | 0.00 | 0.00 | 15.00 | | | | 0.0 | 258.2 | CONC | 600 | 0.20 | 121.9 | 286.5 | 0.98 | 2.07 | 90.1% | |
| | | | | 0.55 | | | | | | | | 0.55 | 0.90 | | 1.38 | 1.38 | 15.00 | | | 97.85 | 134.7 | | | | | | | | | | |
| P1-2 | 351 | 219 | | | | | | | | | | 0.00 | 0.00 | | 0.00 | 0.00 | 17.07 | | | | 0.0 | 345.8 | CONC | 750 | 0.25 | 104.1 | 580.7 | 1.27 | 1.36 | 59.5% | |
| | | | | 0.47 | | | | | | | | 0.47 | 0.90 | | 1.18 | 2.55 | 17.07 | | | 90.63 | 231.3 | | | | | | | | | | |
| P1-3 | 219 | 217 | | | | 2.63 | | | 6.01 | | | 8.64 | 0.66 | | 15.87 | 15.87 | 18.43 | 54.70 | | | | 868.3 | 1325.9 | CONC | 1200 | 0.25 | 120.0 | 2033.7 | 1.74 | 1.15 | 65.2% |
| | | | | 0.59 | | | | | | | | 0.59 | 0.90 | | 1.48 | 4.03 | 18.43 | | | 86.49 | 348.4 | | | | | | | | | | |
| Granite Ridge/Industrial Park | | | | | | | | | | | | | | | | | | | | | | 2483.0 | | | | | | | | | |
| P1-4 | 217 | 215 | | | | 4.45 | | | | | | 4.45 | 0.80 | | 9.90 | 25.77 | 19.58 | 52.72 | | | | 1358.5 | 4359.5 | CONC | 1650 | 0.25 | 120.0 | 4754.3 | 2.15 | 0.93 | 91.7% |
| | | | | 0.37 | | | | | | | | 0.37 | 0.90 | | 0.93 | 4.95 | 19.58 | | | 83.3 | 412.7 | | | | | | | | | | |
| P1-5 | 215 | 207 | | | | | | | | 0.93 | | 0.93 | 0.20 | | 0.52 | 26.29 | 20.51 | 51.23 | | | | 1346.6 | 4470.4 | CONC | 1650 | 0.25 | 112.9 | 4754.3 | 2.15 | 0.87 | 94.0% |
| | | | | 0.68 | | | | | | | | 0.68 | 0.90 | | 1.70 | 6.66 | 20.51 | | | 80.92 | 538.6 | | | | | | | | | | |
| P1-6 | 209 | 207 | | | | | 0.57 | 2.11 | | 0.81 | | 3.49 | 0.62 | | 5.98 | 5.98 | 15.00 | 61.77 | | | | 369.4 | 369.4 | CONC | 750 | 0.30 | 74.1 | 636.1 | 1.39 | 0.89 | 58.1% |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 0.00 | 15.00 | | | | 0.0 | | | | | | | | | | |
| P1-7 | 207 | 171 | | | | | | | | | | 0.00 | | | 0.00 | 32.27 | 21.38 | 49.91 | | | | 1610.5 | 5042.9 | CONC | 1800 | 0.20 | 246.7 | 5362.9 | 2.04 | 2.01 | 94.0% |
| | | | | 1.65 | | | | | | | | 0.00 | | | 0.00 | 1.48 | 21.38 | | | 67.4 | 99.6 | | | | | | | | | | |
| | | | | | | | | | | | | 1.65 | 0.90 | | 4.13 | 10.78 | 21.38 | | | 78.81 | 849.8 | | | | | | | | | | |
| P1-8 | 173 | 171 | | | | 0.55 | 2.07 | 6.93 | | | | 9.55 | 0.69 | | 18.35 | 18.35 | 15.00 | 61.77 | | | | 1133.4 | 1133.4 | CONC | 1050 | 0.30 | 79.8 | 1560.3 | 1.75 | 0.76 | 72.6% |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 0.00 | 15.00 | | | | 0.0 | | | | | | | | | | |
| P1-9 | 171 | 165 | | | | | | 0.37 | | | | 0.00 | 0.00 | | 0.00 | 50.62 | 23.40 | 47.14 | | | | 2386.1 | 6047.7 | CONC | 2400 | 0.10 | 132.9 | 8166.8 | 1.75 | 1.27 | 74.1% |
| | | | | 1.29 | | | | | | | | 0.37 | 0.65 | | 0.67 | 2.15 | 23.40 | | | 63.6 | 136.5 | | | | | | | | | | |
| | | | | | | | | | | | | 1.29 | 0.90 | | 3.23 | 14.01 | 23.40 | | | 74.4 | 1042.1 | | | | | | | | | | |
| P1-10 | 165 | 153 | | | | | 0.64 | 0.66 | | | | 1.30 | 0.72 | | 2.62 | 53.23 | 24.66 | 45.57 | | | | 2425.7 | 6113.0 | CONC | 2400 | 0.10 | 88.8 | 8166.8 | 1.75 | 0.85 | 74.9% |
| | | | | | | | | | | | | 0.59 | 0.65 | | 1.07 | 3.21 | 24.66 | | | 61.4 | 197.4 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 14.01 | 24.66 | | | 71.86 | 1006.9 | | | | | | | | | | |
| P1-11 | 153 | 147 | | | | | 1.30 | 2.94 | | | | 4.24 | 0.70 | | 8.20 | 61.44 | 25.51 | 44.58 | | | | 2738.8 | 6449.6 | CONC | 2400 | 0.10 | 82.0 | 8166.8 | 1.75 | 0.78 | 79.0% |
| | | | | | | | | | | | | 0.46 | 0.65 | | 0.83 | 4.04 | 25.51 | | | 60.1 | 243.1 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 14.01 | 25.51 | | | 70.28 | 984.8 | | | | | | | | | | |
| P1-12 | 147 | 105 | | | | | | 1.73 | | | | 1.73 | 0.65 | | 3.13 | 64.56 | 26.29 | 43.71 | | | | 2822.0 | 6567.1 | CONC | 2400 | 0.10 | 87.1 | 8166.8 | 1.75 | 0.83 | 80.4% |
| | | | | | | | | | | | | 0.55 | 0.65 | | 0.99 | 5.04 | 26.29 | | | 58.9 | 296.8 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 14.01 | 26.29 | | | 68.89 | 965.3 | | | | | | | | | | |
| P1-13 | 113 | 111 | | | | | 1.51 | 4.82 | | 0.80 | | 7.13 | 0.65 | | 12.96 | 12.96 | 15.00 | 61.77 | | | | 800.4 | 943.8 | CONC | 1050 | 0.20 | 116.7 | 1274.0 | 1.43 | 1.36 | 74.1% |
| | | | | | | | | | | | | 0.95 | 0.65 | | 1.72 | 1.72 | 15.00 | | | 83.56 | 143.4 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 0.00 | 15.00 | | | | 0.0 | | | | | | | | | | |
| P1-14 | 111 | 109 | | | | | | | 3.04 | | | 3.04 | 0.60 | | 5.07 | 18.03 | 16.36 | 58.72 | | | | 1058.7 | 1229.4 | CONC | 1200 | 0.15 | 120.1 | 1575.3 | 1.35 | 1.48 | 78.0% |
| | | | | | | | | | | | | 0.24 | 0.65 | | 0.43 | 2.15 | 16.36 | | | 79.39 | 170.7 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 0.00 | 16.36 | | | | 0.0 | | | | | | | | | | |
| P1-15 | 109 | 105 | | | | | | 1.26 | | | | 1.26 | 0.65 | | 2.28 | 20.31 | 17.85 | 55.77 | | | | 1132.5 | 1455.2 | CONC | 1500 | 0.10 | 233.3 | 2332.0 | 1.28 | 3.04 | 62.4% |
| | | | | | | | | | | | | 1.18 | 0.65 | | 2.13 | 4.28 | 17.85 | | | 75.36 | 322.7 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 0.00 | 17.85 | | | | 0.0 | | | | | | | | | | |
| Pond 1 | 105 | 101 | | | | | | | | | | 0.00 | | | 0.00 | 84.87 | 27.12 | 42.82 | | | | 3634.4 | 7600.8 | CONC | 1800x3000 | 0.10 | 80.8 | 9301.6 | 1.81 | 0.75 | 81.7% |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 9.32 | 27.12 | | | 57.7 | 537.9 | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | | 0.00 | 14.01 | 27.12 | | | 67.5 | 945.5 | | | | | | | | | | |
| TOTAL | | | 0.00 | 5.60 | 0.70 | 7.63 | 6.09 | 24.79 | 9.05 | 1.61 | 0.93 | 56.40 | 0.69 | | 108.20 | 27.87 | | | | | | 134.8 | L/s/ha | | | | | | | | |

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s) A = AREA IN HECTARES (ha) I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr) R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3) So^(1/2) WHERE :

Q = CAPACITY (L/s) n = MANNING COEFFICIENT OF ROUGHNESS (0.013) A = FLOW AREA (m²)

Project: Kizell Lands (108195) Designed: LRW Checked: MAB Date: February 23 2018



Fernbank Community - Kizell Lands: Storm Sewer Design Sheet (Rational Method)

| LOCATION | | | AREA | | | | | | | | | | | FLOW | | | | | | Total Peak Flow (Q) (L/s) | PROPOSED SEWER | | | | | | | | | |
|---------------|-----------|---------|--------------|-------------------|-------------------|-----------|-----------------------------|-------------|---------|------|----------------|-----------------|-----------------------------|----------------|---------------|-----------------------|------------------------|-------|-------|---------------------------|-----------------|-----------|----------------|-----------|------------|----------------|--------------------------|---------------------|-------------|--|
| Location | From Node | To Node | Park N' Ride | Arterial Road ROW | Abbott Street ROW | Mixed Use | High Density / Medium Block | Low Density | Schools | Park | Hydro Corridor | Total Area (ha) | Weighted Runoff Coefficient | Indivi 2.78 AR | Accum 2.78 AR | Time of Concentration | Rain Intensity (mm/hr) | | | | Peak Flow (L/s) | Pipe Type | Pipe Size (mm) | Grade (%) | Length (m) | Capacity (l/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q/Qfull (%) | |
| | | | | | | | | | | | | | | | | | 2yr | 5yr | 10yr | | | | | | | | | | | |
| POND 2 | | | 0.80 | 0.90 | 0.70 | 0.80 | 0.80 | 0.65 | 0.60 | 0.40 | 0.20 | | | | | | | | | | | | | | | | | | | |
| P2-21 | 401 | R219 | | | | 2.90 | | 1.93 | | | | 4.83 | 0.74 | 9.94 | 9.94 | 15.00 | 61.77 | | | 613.8 | CONC | 825 | 0.40 | 107.1 | 947.1 | 1.72 | 1.04 | 64.8% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | | | | | | | | | | | |
| P2-22 | 503 | 501 | | | | | | 0.76 | | | | 0.76 | 0.65 | 1.37 | 1.37 | 15.00 | | 83.56 | 114.8 | 114.8 | PVC | 375 | 1.00 | 88.2 | 182.9 | 1.60 | 0.92 | 62.7% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | | | | | | | | | | | |
| P2-23 | 603 | 601 | | | | | | 0.71 | | | | 0.71 | 0.65 | 1.28 | 1.28 | 15.00 | 61.77 | | | 79.2 | PVC | 375 | 1.00 | 86.7 | 182.9 | 1.60 | 0.90 | 43.3% | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | | | | | | | | | | | |
| POND 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P3-24 | 409 | 425 | | | | | 5.30 | | | 1.63 | 1.76 | 8.69 | 0.60 | 14.58 | 14.58 | 15.00 | 61.77 | | | 900.5 | CONC | 1050 | 0.50 | 39.3 | 2014.4 | 2.25 | 0.29 | 57.6% | | |
| | | | | | | | | | | | | 1.60 | 0.70 | 3.11 | 3.11 | 15.00 | | 83.6 | 259.7 | | | | | | | | | | | |
| | | | | | | | | | | | | 0.00 | | 0.00 | 0.00 | 15.00 | | | 0.0 | | | | | | | | | | | |

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
 A = AREA IN HECTARES (ha)
 I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)
 R = WEIGHTED RUNOFF COEFFICIENT

$Q = (1/n) A R^{(2/3)} S_o^{(1/2)}$ WHERE :
 Q = CAPACITY (L/s)
 n = MANNING COEFFICIENT OF ROUGHNESS (0.013)
 A = FLOW AREA (m²)

Project: Kizell Lands (108195)
 Designed: LRW
 Checked: MAB
 Date: February 23 2018



**FERNBANK COMMUNITY - KIZELL LANDS
SANITARY SEWER DESIGN SHEET**

| AREA | | | RESIDENTIAL | | | | | | | | | | | | | ICI | | | | INFILTRATION | | | Total Flow (l/s) | PIPE | | | | | | | | | | |
|------------------------------------|--------|--------|-------------|-------|-------|-------|---------------|-------|----------------|-------|--------------|--|-----------|------|-------|---------|-------|----------------------|-------------------------|------------------|-----------------|-----------------|------------------|------------------|-------------------|-----------|-----------|------------|----------------|----------------------|-------------------------|--------|-------|-------|
| ID | From | To | SINGLES | | TOWNS | | STACKED TOWNS | | MEDIUM DENSITY | | HIGH DENSITY | | MIXED USE | | TOTAL | | | Commercial Area (ha) | Institutional Area (ha) | Accum. Area (ha) | Peak Flow (l/s) | Total Area (ha) | | Accum. Area (ha) | Infil. Flow (l/s) | Size (mm) | Slope (%) | Length (m) | Capacity (l/s) | Full Flow Vel. (m/s) | Q/Q _{full} (%) | | | |
| Outlet 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stittsville Diversion Trunk | | | | | | | | | | | | | | | | | | | | | | | | 493.4 | | | | | | | | | | |
| | SA100 | SA101 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 0 | 4.0 | 0.0 | | | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.00 | 0.0 | 493.4 | 900 | 0.38 | 62 | 1164.2 | 1.77 | 42.4% |
| A1-1 | SA101 | SA102 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 0.0 | 4.0 | 0.0 | | | 0.00 | 0.0 | 0.00 | 0.3 | 0.94 | 0.94 | 0.3 | 493.7 | 975 | 0.16 | 120 | 935.2 | 1.21 | 52.8% |
| A1-2 | SA102 | SA104 | | 0.0 | | 0.0 | | | | | | | | 2.60 | 219.0 | 219.0 | 219.0 | 4.0 | 3.5 | | 1.17 | | 1.17 | 1.0 | 3.71 | 4.65 | 1.3 | 499.3 | 975 | 0.16 | 240 | 935.2 | 1.21 | 53.4% |
| A1-3 | SA104 | SA106a | | 0.0 | | 0.0 | | | | | | | | 4.47 | 376.0 | 376.0 | 595.0 | 3.9 | 9.5 | | 2.01 | | 3.18 | 2.8 | 6.76 | 11.41 | 3.2 | 508.8 | 975 | 0.16 | 167 | 935.2 | 1.21 | 54.4% |
| A1-4 | 222 | SA106a | 19 | 64.6 | | 0.0 | 0.88 | 116.4 | 0.64 | 74.9 | | | | 0.0 | 255.9 | 255.9 | 4.0 | 4.1 | | | 0.80 | 0.80 | 0.7 | 3.74 | 3.74 | 1.0 | 5.9 | 200 | 0.35 | 96 | 20.2 | 0.62 | 29.1% | |
| A1-5 | SA106a | SA107a | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 850.9 | 3.8 | 13.3 | | | | 3.98 | 3.5 | 0.56 | 15.71 | 4.4 | 514.5 | 975 | 0.16 | 126 | 935.2 | 1.21 | 55.0% | |
| A1-6 | 212 | SA107a | 76 | 258.4 | 36 | 97.2 | | | 1.51 | 176.7 | | | | 0.0 | 532.3 | 532.3 | 4.0 | 8.5 | | | 0.81 | 0.81 | 0.7 | 7.08 | 7.08 | 2.0 | 11.2 | 200 | 0.35 | 109 | 20.2 | 0.62 | 55.4% | |
| A1-7 | SA107a | SA108 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 1383.2 | 3.7 | 20.8 | | | | 4.79 | 4.2 | 1.17 | 23.96 | 6.7 | 525.0 | 975 | 0.16 | 234 | 935.2 | 1.21 | 56.1% | |
| A1-8 | 148 | SA108 | 68 | 231.2 | | 0.0 | 2.26 | 299.0 | 2.11 | 246.9 | | | | 0.0 | 478.1 | 478.1 | 4.0 | 7.7 | | 0.55 | | 0.55 | 0.5 | 9.63 | 9.63 | 2.7 | 10.9 | 250 | 0.35 | 106 | 36.7 | 0.72 | 29.7% | |
| A1-9 | 190 | SA108 | 74 | 251.6 | 44 | 118.8 | | | 1.30 | 152.1 | | | | 0.0 | 522.5 | 522.5 | 4.0 | 8.4 | | | 3.04 | 3.04 | 2.6 | 10.65 | 10.65 | 3.0 | 14.0 | 300 | 0.20 | 109 | 45.1 | 0.62 | 31.1% | |
| A1-10 | SA108 | SA112 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 2383.7 | 3.5 | 34.0 | | | | 8.38 | 7.3 | 1.78 | 46.02 | 12.9 | 547.6 | 975 | 0.16 | 367 | 935.2 | 1.21 | 58.6% | |
| A1-11 | 112 | SA112 | 16 | 54.4 | | 0.0 | 1.50 | 198.5 | 1.55 | 181.4 | | | | 0.0 | 434.2 | 434.2 | 4.0 | 7.0 | | | 0.80 | 0.80 | 0.7 | 5.51 | 5.51 | 1.5 | 9.3 | 200 | 0.80 | 106 | 30.6 | 0.94 | 30.3% | |
| A1-12 | 120 | SA112 | 28 | 95.2 | 127 | 342.9 | | | 2.81 | 328.8 | | | | 0.0 | 766.9 | 766.9 | 3.9 | 12.0 | | | 0.81 | 0.81 | 0.7 | 9.36 | 9.36 | 2.6 | 15.4 | 250 | 0.25 | 111 | 31.0 | 0.61 | 49.5% | |
| A1-13 | SA112 | SA114 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 3584.8 | 3.4 | 49.0 | | | | 9.99 | 8.7 | 1.66 | 62.55 | 17.5 | 568.6 | 975 | 0.16 | 241 | 935.2 | 1.21 | 60.8% | |
| A1-14 | SA114 | SA115 | | 0.0 | | 0.0 | | | | | | | | 0.0 | 0.0 | 3584.81 | 3.4 | 49.0 | | | 1.83 | 11.82 | 10.3 | 1.83 | 64.38 | 18.0 | 570.7 | 975 | 0.24 | 92 | 1145.4 | 1.49 | 49.8% | |
| Outlet 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A2-1, A2-2 | R20 | R19 | 15 | 51.0 | 15 | 40.5 | | | | | 680 | | | 0.0 | 772 | 772 | 3.9 | 12.1 | | | 1.64 | 1.64 | 1.4 | 11.93 | 11.93 | 3.3 | 16.9 | 300 | 0.50 | 43 | 71.3 | 0.98 | 23.6% | |
| Outlet 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A3-1 | 404 | R30 | 23 | 78.2 | | 0.0 | | | | | | | | 0.0 | 78.2 | 78.2 | 4.0 | 1.3 | | | | 0.00 | 0.0 | 1.74 | 1.74 | 0.5 | 1.8 | 200 | 0.35 | 11 | 20.2 | 0.62 | 8.7% | |
| Outlet 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A4-1 | 502 | 504 | 14 | 47.6 | | 0.0 | | | | | | | | 0.0 | 47.6 | 47.6 | 4.0 | 0.8 | | | | 0.00 | 0.0 | 0.73 | 0.73 | 0.2 | 1.0 | 200 | 0.65 | 27 | 27.6 | 0.85 | 3.5% | |
| Outlet 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A5-1 | 602 | RCAP1 | | 0.0 | 26 | 70.2 | | | | | | | | 0.0 | 70.2 | 70.2 | 4.0 | 1.1 | | | | 0.00 | 0.0 | 0.76 | 0.76 | 0.2 | 1.4 | 200 | 0.75 | 29 | 29.6 | 0.91 | 4.6% | |
| Outlet 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A6-1 | 700 | 702 | | 0.0 | 48 | 129.6 | | | | | | | | 0.0 | 129.6 | 129.6 | 4.0 | 2.1 | | | | 0.00 | 0.0 | 1.39 | 1.39 | 0.4 | 2.5 | 200 | 0.35 | 99 | 20.2 | 0.62 | 12.3% | |
| A6-1 | 702 | R41 | | 0.0 | | 0.0 | | | | | | | | 2.86 | 241.0 | 241.0 | 370.6 | 4.0 | 6.0 | | 1.29 | | 1.29 | 1.1 | 2.86 | 4.25 | 1.2 | 8.3 | 250 | 0.35 | 3 | 36.7 | 0.72 | 22.6% |

Design Parameters:
 Avg Flow/Person = 350 l/day
 Comm./Inst. Flow = 50000 l/ha/day
 Infiltration = 0.28 l/s/ha
 Pipe Friction n = 0.013
 Residential Peaking Factor = Harmon Equation (max 4, min 2)
 Peaking Factor Comm./Inst. = 1.5

Population Density:
 ppl/unit
 Mixed Use/HDR 1.80
 Singles 3.40
 Towns 2.70
 Stacked Towns 2.70
 Medium Density 1.80

Project: Kizell Lands (108195)
 Designed: LRW
 Checked: MAB
 Date: February 23, 2018



Lucas Wilson

From: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Sent: September-29-16 8:30 AM
To: Lucas Wilson
Subject: FW: Fernbank Community - Kizell Lands: WM Boundary Conditions

Lucas,

Here are the requested boundary conditions:

Hazeldean Connection (900mm feedermain):

PKHR = 155.5m
MAX HGL = 162.4m
MXDY+Fire (167 L/s) = 155.6m
MXDY+Fire (217 L/s) = 155.6m

Abbott Street Connection (400mm watermain):

PKHR = 154.5m
MAX HGL = 162.1m
MXDY+Fire (167 L/s) = 154.5m
MXDY+Fire (217 L/s) = 153.6m

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

From: Lucas Wilson [<mailto:l.wilson@novatech-eng.com>]
Sent: September 26, 2016 1:44 PM
To: Surprenant, Eric
Subject: Fernbank Community - Kizell Lands: WM Boundary Conditions

Eric,

Not sure who will be assigned to this project but I thought I'd start with you. I'm looking for boundary conditions to complete a hydraulic analysis in support of Draft Plan Submission. The site is located north of Fernbank Crossing, between Abbott Street and Hazeldean. I've included a drawing which highlights the connections at Hazeldean and Abbott Street within the extended Robert Grant ROW. I've also attached the projected water demand for the Concept Site. Please let me know if you require additional information.

Thanks,
Lucas Wilson | P.Eng.
Project Engineer

NOVATECH

Engineers, Planners & Landscape Architects | 200-240 Michael Cowpland Drive, Ottawa, ON K2M 1P6

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**Kizell Lands
Water Demand**

| | Area (ha) | Units | Population | Average Day Demand (L/s) | Maximum Day Demand (L/s) | Peak Hour Demand (L/s) |
|-----------------------------------|--------------|-------------|-------------|--------------------------------|--------------------------------|------------------------------|
| Singles | N/A | 333 | 1132 | 4.586 | 11.466 | 25.226 |
| Towns | N/A | 274 | 740 | 2.997 | 7.492 | 16.483 |
| Stacked Towns | 4.60 | 225 | 609 | 2.465 | 6.163 | 13.559 |
| Medium Density Residential | 9.94 | 646 | 1163 | 4.711 | 11.778 | 25.911 |
| High Density Residential | N/A | 378 | 680 | 2.756 | 6.891 | 15.159 |
| Mixed Use Residential | 5.47 | 465 | 837 | 3.390 | 8.476 | 18.646 |
| Mixed Use Commercial | 4.48 | N.A | N/A | 1.452 | 2.178 | 3.920 |
| Commercial | 0.55 | N.A | N/A | 0.178 | 0.267 | 0.481 |
| Schools | 3.03 | N/A | N/A | 0.982 | 1.473 | 2.651 |
| Park | 4.82 | N/A | N/A | 1.562 | 2.343 | 4.218 |
| Park N' Ride | 1.83 | N/A | N/A | 0.593 | 0.890 | 1.601 |
| Total | 34.72 | 2321 | 5161 | 25.673 | 59.416 | 127.856 |

Water Demand Parameters

| | | | | |
|------------------------------------|-------|----------------|----|--------------|
| Singles | 3.4 | ppl/unit | | |
| Towns | 2.7 | ppl/unit | | |
| Stacked Towns | 2.7 | ppl/unit | 49 | units/net ha |
| Medium Density Residential | 1.8 | ppl/unit | 65 | units/net ha |
| Mixed Use Residential | 1.8 | ppl/unit | 85 | units/net ha |
| Residential Demand | 350 | L/c/day | | |
| Institutional/Commercial Demand | 28000 | L/gross ha/day | | |
| Residential Max Day | 2.5 | x Avg Day | | |
| Residential Peak Hour | 2.2 | x Max Day | | |
| Institutional/Commercial Max Day | 1.5 | x Avg Day | | |
| Institutional/Commercial Peak Hour | 1.8 | x Max Day | | |
| Residential Fire Flow | 167 | L/s | | |
| Institutional/Commercial Fire Flow | 217 | L/s | | |

Fernbank Community - Kizell Lands: Watermain Demand

| Node | Singles | Towns | Stacked Towns (ha) | Medium Density Area (ha) | High Density | Mixed Use Area (ha) | Institutional/Commercial Area (ha) | Total Population | Total IC Area (ha) | Average Day Residential Demand (L/s) | Average Day IC Demand (L/s) | Total Average Day Demand (L/s) | Maximum Day Residential Demand (L/s) | Maximum Day IC Demand (L/s) | Total Maximum Day Demand (L/s) | Peak Hour Residential Demand (L/s) | Peak Hour IC Demand (L/s) | Total Peak Hour Demand (L/s) | Fire Flow (L/s) |
|--------------|------------|------------|--------------------|--------------------------|--------------|---------------------|------------------------------------|------------------|--------------------|--------------------------------------|-----------------------------|--------------------------------|--------------------------------------|-----------------------------|--------------------------------|------------------------------------|---------------------------|------------------------------|-----------------|
| HD1 | | | | | 378 | | 1.64 | 680 | 1.64 | 2.755 | 0.531 | 3.286 | 6.887 | 0.797 | 7.684 | 15.151 | 1.435 | 16.586 | 217 |
| MU1 | | | | | | 4.70 | | 396 | 2.12 | 1.602 | 0.685 | 2.288 | 4.005 | 1.028 | 5.034 | 8.812 | 1.851 | 10.663 | 217 |
| MU2 | | | | | | 2.38 | | 200 | 1.07 | 0.811 | 0.347 | 1.158 | 2.028 | 0.521 | 2.549 | 4.462 | 0.937 | 5.399 | 217 |
| N1 | 46 | | 1.75 | 1.31 | | | 1.36 | 541 | 1.36 | 2.192 | 0.441 | 2.633 | 5.481 | 0.661 | 6.142 | 12.058 | 1.190 | 13.248 | 167 |
| N2 | 16 | | 1.27 | 1.56 | | | 0.80 | 405 | 0.80 | 1.640 | 0.259 | 1.900 | 4.101 | 0.389 | 4.490 | 9.022 | 0.700 | 9.722 | 167 |
| N3 | 29 | 172 | | 1.74 | | 2.86 | 0.81 | 1007 | 2.10 | 4.080 | 0.680 | 4.760 | 10.201 | 1.019 | 11.220 | 22.442 | 1.835 | 24.276 | 217 |
| N4 | 121 | 82 | | 2.37 | | | | 910 | 0.00 | 3.687 | 0.000 | 3.687 | 9.217 | 0.000 | 9.217 | 20.277 | 0.000 | 20.277 | 167 |
| N5 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | N/A |
| N6 | 80 | 20 | | 1.51 | | | 3.83 | 503 | 3.83 | 2.036 | 1.241 | 3.277 | 5.091 | 1.862 | 6.953 | 11.200 | 3.351 | 14.551 | 217 |
| N7 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 167 |
| N8 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 167 |
| N9 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | N/A |
| N10 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | N/A |
| PR1 | | | | | | | 1.83 | 0 | 1.83 | 0.000 | 0.593 | 0.593 | 0.000 | 0.890 | 0.890 | 0.000 | 1.601 | 1.601 | 167 |
| T1 | | | | | | | | 0 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | N/A |
| T2 | 41 | | 1.58 | 1.45 | | | | 518 | 0.00 | 2.099 | 0.000 | 2.099 | 5.247 | 0.000 | 5.247 | 11.543 | 0.000 | 11.543 | 167 |
| Total | 333 | 274 | 4.6 | 9.94 | 378 | 9.94 | 10.27 | 5160 | 14.74 | 20.903 | 4.778 | 25.681 | 52.257 | 7.167 | 59.424 | 114.966 | 12.900 | 127.867 | |

Water Demand Parameters

| | | | | | |
|---------------------------------|-------|----------------|------------------------------------|-----|-----------|
| Singles | 3.4 | ppl/unit | Residential Max Day | 2.5 | x Avg Day |
| Towns | 2.7 | ppl/unit | Residential Peak Hour | 2.2 | x Max Day |
| Stacked Towns | 132.3 | ppl/net ha | | | |
| Medium Density Area | 117 | ppl/net ha | Institutional/Commercial Max Day | 1.5 | x Avg Day |
| Mixed Use Residential | 153 | ppl/net ha | Institutional/Commercial Peak Hour | 1.8 | x Max Day |
| High Density Residential | 1.8 | ppl/unit | | | |
| Residential Demand | 350 | L/c/day | Residential Fire Flow | 167 | L/s |
| Institutional/Commercial Demand | 28000 | L/gross ha/day | Institutional/Commercial Fire Flow | 217 | L/s |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Peak Hour)

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 16.59 | 154.34 | 51.14 | 501.68 | 72.76 |
| Junc MU1 | 104.52 | 10.66 | 154.39 | 49.87 | 489.22 | 70.96 |
| Junc MU2 | 104.15 | 5.4 | 154.33 | 50.18 | 492.27 | 71.40 |
| Junc N1 | 104.5 | 13.25 | 154.29 | 49.79 | 488.44 | 70.84 |
| Junc N2 | 103.44 | 9.72 | 154.76 | 51.32 | 503.45 | 73.02 |
| Junc N3 | 101.79 | 24.28 | 155.03 | 53.24 | 522.28 | 75.75 |
| Junc N4 | 102.48 | 20.28 | 154.22 | 51.74 | 507.57 | 73.62 |
| Junc N5 | 101.94 | 0 | 154.26 | 52.32 | 513.26 | 74.44 |
| Junc N6 | 102.39 | 14.55 | 154.22 | 51.83 | 508.45 | 73.74 |
| Junc N7 | 101.47 | 0 | 154.22 | 52.75 | 517.48 | 75.05 |
| Junc N8 | 100.7 | 0 | 155.2 | 54.5 | 534.65 | 77.54 |
| Junc N9 | 96.68 | 0 | 155.5 | 58.82 | 577.02 | 83.69 |
| Junc N10 | 102.7 | 0 | 154.46 | 51.76 | 507.77 | 73.65 |
| Junc PR1 | 102 | 1.6 | 155.41 | 53.41 | 523.95 | 75.99 |
| Junc T1 | 102.94 | 0 | 155.03 | 52.09 | 511.00 | 74.11 |
| Junc T2 | 103.73 | 11.54 | 154.29 | 50.56 | 495.99 | 71.94 |
| Resvr 1 | 155.5 | -69.4 | 155.5 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -58.47 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links - (Peak Hour)

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 25.68 | 0.37 | 0.63 | 0.027 |
| Pipe 2 | 240 | 297 | 120 | 15.02 | 0.22 | 0.23 | 0.029 |
| Pipe 3 | 399 | 297 | 120 | 9.62 | 0.14 | 0.10 | 0.031 |
| Pipe 4 | 216 | 297 | 120 | 3.63 | 0.05 | 0.02 | 0.036 |
| Pipe 5 | 443 | 297 | 120 | 33.80 | 0.49 | 1.05 | 0.026 |
| Pipe 6 | 164 | 297 | 120 | 43.52 | 0.63 | 1.68 | 0.025 |
| Pipe 7 | 242 | 297 | 120 | -42.04 | 0.61 | 1.57 | 0.025 |
| Pipe 8 | 52 | 297 | 120 | -43.64 | 0.63 | 1.69 | 0.025 |
| Pipe 9 | 576 | 900 | 120 | -25.76 | 0.04 | 0.00 | 0.031 |
| Pipe 10 | 260 | 297 | 120 | -25.76 | 0.37 | 0.63 | 0.027 |
| Pipe 11 | 139 | 297 | 120 | -1.48 | 0.02 | 0.00 | 0.041 |
| Pipe 12 | 216 | 297 | 120 | 18.63 | 0.27 | 0.35 | 0.028 |
| Pipe 13 | 246 | 297 | 120 | -1.65 | 0.02 | 0.00 | 0.040 |
| Pipe 14 | 469 | 297 | 120 | -1.65 | 0.02 | 0.00 | 0.040 |
| Pipe 15 | 283 | 297 | 120 | 16.20 | 0.23 | 0.27 | 0.029 |
| Pipe 16 | 123 | 297 | 120 | 32.79 | 0.47 | 0.99 | 0.026 |
| Pipe 17 | 173 | 400 | 120 | -32.79 | 0.26 | 0.23 | 0.027 |
| Pipe 18 | 472 | 297 | 120 | -25.76 | 0.37 | 0.63 | 0.027 |
| Pipe 19 | 147 | 297 | 120 | -16.20 | 0.23 | 0.27 | 0.029 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Max Pressure Check)

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 3.29 | 162.1 | 58.9 | 577.81 | 83.80 |
| Junc MU1 | 104.52 | 2.29 | 162.1 | 57.58 | 564.86 | 81.93 |
| Junc MU2 | 104.15 | 1.16 | 162.1 | 57.95 | 568.49 | 82.45 |
| Junc N1 | 104.5 | 2.63 | 162.12 | 57.62 | 565.25 | 81.98 |
| Junc N2 | 103.44 | 1.9 | 162.27 | 58.83 | 577.12 | 83.70 |
| Junc N3 | 101.79 | 4.76 | 162.33 | 60.54 | 593.90 | 86.14 |
| Junc N4 | 102.48 | 3.69 | 162.12 | 59.64 | 585.07 | 84.86 |
| Junc N5 | 101.94 | 0 | 162.1 | 60.16 | 590.17 | 85.60 |
| Junc N6 | 102.39 | 3.28 | 162.1 | 59.71 | 585.76 | 84.96 |
| Junc N7 | 101.47 | 0 | 162.11 | 60.64 | 594.88 | 86.28 |
| Junc N8 | 100.7 | 0 | 162.36 | 61.66 | 604.88 | 87.73 |
| Junc N9 | 96.68 | 0 | 162.4 | 65.72 | 644.71 | 93.51 |
| Junc N10 | 102.7 | 0 | 162.1 | 59.4 | 582.71 | 84.52 |
| Junc PR1 | 102 | 0.59 | 162.39 | 60.39 | 592.43 | 85.92 |
| Junc T1 | 102.94 | 0 | 162.33 | 59.39 | 582.62 | 84.50 |
| Junc T2 | 103.73 | 2.1 | 162.13 | 58.4 | 572.90 | 83.09 |
| Resvr 1 | 162.4 | -24.77 | 162.4 | 0 | 0.00 | 0.00 |
| Resvr 2 | 162.1 | -0.91 | 162.1 | 0 | 0.00 | 0.00 |

Network Table - Links - (Max Pressure Check)

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | -1.45 | 0.02 | 0.00 | 0.041 |
| Pipe 2 | 240 | 297 | 120 | -3.74 | 0.05 | 0.02 | 0.036 |
| Pipe 3 | 399 | 297 | 120 | -4.89 | 0.07 | 0.03 | 0.034 |
| Pipe 4 | 216 | 297 | 120 | 7.53 | 0.11 | 0.07 | 0.032 |
| Pipe 5 | 443 | 297 | 120 | 17.52 | 0.25 | 0.31 | 0.028 |
| Pipe 6 | 164 | 297 | 120 | 19.42 | 0.28 | 0.38 | 0.028 |
| Pipe 7 | 242 | 297 | 120 | -15.13 | 0.22 | 0.24 | 0.029 |
| Pipe 8 | 52 | 297 | 120 | -15.72 | 0.23 | 0.25 | 0.029 |
| Pipe 9 | 576 | 900 | 120 | -9.05 | 0.01 | 0.00 | 0.037 |
| Pipe 10 | 260 | 297 | 120 | -9.05 | 0.13 | 0.09 | 0.031 |
| Pipe 11 | 139 | 297 | 120 | -4.29 | 0.06 | 0.02 | 0.035 |
| Pipe 12 | 216 | 297 | 120 | 7.89 | 0.11 | 0.07 | 0.032 |
| Pipe 13 | 246 | 297 | 120 | 4.21 | 0.06 | 0.02 | 0.035 |
| Pipe 14 | 469 | 297 | 120 | 4.21 | 0.06 | 0.02 | 0.035 |
| Pipe 15 | 283 | 297 | 120 | -0.93 | 0.01 | 0.00 | 0.042 |
| Pipe 16 | 123 | 297 | 120 | 2.36 | 0.03 | 0.01 | 0.038 |
| Pipe 17 | 173 | 400 | 120 | -2.36 | 0.02 | 0.00 | 0.038 |
| Pipe 18 | 472 | 297 | 120 | -9.05 | 0.13 | 0.09 | 0.031 |
| Pipe 19 | 147 | 297 | 120 | 0.93 | 0.01 | 0.00 | 0.045 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Fire Flow Summary)

| Fire Flow | | Minimum Pressure | | |
|-----------|------------|------------------|----------------|--------|
| Node | Flow (L/s) | Pressure (kPa) | Pressure (PSI) | Node |
| HD1 | 217 | 458.13 | 66.45 | HD1 |
| MU1 | 217 | 447.53 | 64.91 | MU1 |
| MU2 | 217 | 429.68 | 62.32 | MU2 |
| N1 | 167 | 451.06 | 65.42 | N1 |
| N2 | 167 | 476.86 | 69.16 | N2 |
| N3 | 217 | 475.49 | 68.96 | N1 |
| N4 | 167 | 464.31 | 67.34 | N4 |
| N6 | 217 | 423.69 | 61.45 | N6 |
| N7 | 167 | 467.15 | 67.75 | N7 |
| N8 | 167 | 487.26 | 70.67 | N1 |
| PR1 | 167 | 490.01 | 71.07 | N1/MU1 |
| T2 | 167 | 464.50 | 67.37 | N1 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'HD1')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 224.68 | 149.9 | 46.7 | 458.13 | 66.45 |
| Junc MU1 | 104.52 | 5.03 | 153.5 | 48.98 | 480.49 | 69.69 |
| Junc MU2 | 104.15 | 2.55 | 153.41 | 49.26 | 483.24 | 70.09 |
| Junc N1 | 104.5 | 6.14 | 153.29 | 48.79 | 478.63 | 69.42 |
| Junc N2 | 103.44 | 4.49 | 154.51 | 51.07 | 501.00 | 72.66 |
| Junc N3 | 101.79 | 11.22 | 155.08 | 53.29 | 522.77 | 75.82 |
| Junc N4 | 102.48 | 9.22 | 152.54 | 50.06 | 491.09 | 71.23 |
| Junc N5 | 101.94 | 0 | 150.45 | 48.51 | 475.88 | 69.02 |
| Junc N6 | 102.39 | 6.95 | 150.74 | 48.35 | 474.31 | 68.79 |
| Junc N7 | 101.47 | 0 | 151.92 | 50.45 | 494.91 | 71.78 |
| Junc N8 | 100.7 | 0 | 155.27 | 54.57 | 535.33 | 77.64 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 152.68 | 49.98 | 490.30 | 71.11 |
| Junc PR1 | 102 | 0.89 | 155.5 | 53.5 | 524.84 | 76.12 |
| Junc T1 | 102.94 | 0 | 155.05 | 52.11 | 511.20 | 74.14 |
| Junc T2 | 103.73 | 5.25 | 153.26 | 49.53 | 485.89 | 70.47 |
| Resvr 1 | 155.6 | -74.36 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 153.6 | -202.07 | 153.6 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'HD1')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 24.55 | 0.35 | 0.58 | 0.027 |
| Pipe 2 | 240 | 297 | 120 | 19.51 | 0.28 | 0.38 | 0.028 |
| Pipe 3 | 399 | 297 | 120 | 16.96 | 0.24 | 0.29 | 0.028 |
| Pipe 4 | 216 | 297 | 120 | -10.82 | 0.16 | 0.13 | 0.030 |
| Pipe 5 | 443 | 297 | 120 | 57.76 | 0.83 | 2.83 | 0.024 |
| Pipe 6 | 164 | 297 | 120 | 62.25 | 0.90 | 3.25 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -46.24 | 0.67 | 1.88 | 0.025 |
| Pipe 8 | 52 | 297 | 120 | -47.13 | 0.68 | 1.94 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -27.23 | 0.04 | 0.00 | 0.031 |
| Pipe 10 | 260 | 297 | 120 | -27.23 | 0.39 | 0.70 | 0.027 |
| Pipe 11 | 139 | 297 | 120 | -16.01 | 0.23 | 0.26 | 0.029 |
| Pipe 12 | 216 | 297 | 120 | 63.33 | 0.91 | 3.36 | 0.023 |
| Pipe 13 | 246 | 297 | 120 | 54.11 | 0.78 | 2.51 | 0.024 |
| Pipe 14 | 469 | 297 | 120 | 54.11 | 0.78 | 2.51 | 0.024 |
| Pipe 15 | 283 | 297 | 120 | -47.16 | 0.68 | 1.95 | 0.024 |
| Pipe 16 | 123 | 297 | 120 | 177.52 | 2.56 | 22.66 | 0.020 |
| Pipe 17 | 173 | 400 | 120 | -177.52 | 1.41 | 5.31 | 0.021 |
| Pipe 18 | 472 | 297 | 120 | -27.23 | 0.39 | 0.70 | 0.027 |
| Pipe 19 | 147 | 297 | 120 | 47.16 | 0.68 | 1.95 | 0.024 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'MU1')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.43 | 50.23 | 492.76 | 71.47 |
| Junc MU1 | 104.52 | 222.03 | 150.14 | 45.62 | 447.53 | 64.91 |
| Junc MU2 | 104.15 | 2.55 | 150.83 | 46.68 | 457.93 | 66.42 |
| Junc N1 | 104.5 | 6.14 | 152.08 | 47.58 | 466.76 | 67.70 |
| Junc N2 | 103.44 | 4.49 | 154.36 | 50.92 | 499.53 | 72.45 |
| Junc N3 | 101.79 | 11.22 | 155.02 | 53.23 | 522.19 | 75.74 |
| Junc N4 | 102.48 | 9.22 | 152.91 | 50.43 | 494.72 | 71.75 |
| Junc N5 | 101.94 | 0 | 153.25 | 51.31 | 503.35 | 73.00 |
| Junc N6 | 102.39 | 6.95 | 153.16 | 50.77 | 498.05 | 72.24 |
| Junc N7 | 101.47 | 0 | 153 | 51.53 | 505.51 | 73.32 |
| Junc N8 | 100.7 | 0 | 155.22 | 54.52 | 534.84 | 77.57 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 153.56 | 50.86 | 498.94 | 72.36 |
| Junc PR1 | 102 | 0.89 | 155.49 | 53.49 | 524.74 | 76.11 |
| Junc T1 | 102.94 | 0 | 154.97 | 52.03 | 510.41 | 74.03 |
| Junc T2 | 103.73 | 5.25 | 152.89 | 49.16 | 482.26 | 69.95 |
| Resvr 1 | 155.6 | -79.47 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 153.6 | -196.95 | 153.6 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'MU1')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 163.63 | 2.36 | 19.48 | 0.020 |
| Pipe 2 | 240 | 297 | 120 | -58.40 | 0.84 | 2.89 | 0.024 |
| Pipe 3 | 399 | 297 | 120 | -60.95 | 0.88 | 3.13 | 0.024 |
| Pipe 4 | 216 | 297 | 120 | 67.09 | 0.97 | 3.74 | 0.023 |
| Pipe 5 | 443 | 297 | 120 | 62.87 | 0.91 | 3.31 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 67.36 | 0.97 | 3.77 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -49.52 | 0.71 | 2.13 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -50.41 | 0.73 | 2.20 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -29.07 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -29.07 | 0.42 | 0.79 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -17.85 | 0.26 | 0.32 | 0.028 |
| Pipe 12 | 216 | 297 | 120 | -9.47 | 0.14 | 0.10 | 0.031 |
| Pipe 13 | 246 | 297 | 120 | -18.68 | 0.27 | 0.35 | 0.028 |
| Pipe 14 | 469 | 297 | 120 | -18.68 | 0.27 | 0.35 | 0.028 |
| Pipe 15 | 283 | 297 | 120 | 25.64 | 0.37 | 0.63 | 0.027 |
| Pipe 16 | 123 | 297 | 120 | 33.32 | 0.48 | 1.02 | 0.026 |
| Pipe 17 | 173 | 400 | 120 | -33.32 | 0.27 | 0.24 | 0.027 |
| Pipe 18 | 472 | 297 | 120 | -29.07 | 0.42 | 0.79 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -25.64 | 0.37 | 0.63 | 0.027 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'MU2')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.28 | 50.08 | 491.28 | 71.25 |
| Junc MU1 | 104.52 | 5.03 | 151.1 | 46.58 | 456.95 | 66.27 |
| Junc MU2 | 104.15 | 219.55 | 147.95 | 43.8 | 429.68 | 62.32 |
| Junc N1 | 104.5 | 6.14 | 150.38 | 45.88 | 450.08 | 65.28 |
| Junc N2 | 103.44 | 4.49 | 153.93 | 50.49 | 495.31 | 71.84 |
| Junc N3 | 101.79 | 11.22 | 154.84 | 53.05 | 520.42 | 75.48 |
| Junc N4 | 102.48 | 9.22 | 151.99 | 49.51 | 485.69 | 70.44 |
| Junc N5 | 101.94 | 0 | 152.89 | 50.95 | 499.82 | 72.49 |
| Junc N6 | 102.39 | 6.95 | 152.68 | 50.29 | 493.34 | 71.55 |
| Junc N7 | 101.47 | 0 | 152.23 | 50.76 | 497.96 | 72.22 |
| Junc N8 | 100.7 | 0 | 155.11 | 54.41 | 533.76 | 77.42 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 153.52 | 50.82 | 498.54 | 72.31 |
| Junc PR1 | 102 | 0.89 | 155.45 | 53.45 | 524.34 | 76.05 |
| Junc T1 | 102.94 | 0 | 154.77 | 51.83 | 508.45 | 73.74 |
| Junc T2 | 103.73 | 5.25 | 151.87 | 48.14 | 472.25 | 68.49 |
| Resvr 1 | 155.6 | -92.02 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 153.6 | -184.41 | 153.6 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'MU2')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 137.31 | 1.98 | 14.08 | 0.021 |
| Pipe 2 | 240 | 297 | 120 | 132.28 | 1.91 | 13.14 | 0.021 |
| Pipe 3 | 399 | 297 | 120 | -87.27 | 1.26 | 6.08 | 0.022 |
| Pipe 4 | 216 | 297 | 120 | 93.41 | 1.35 | 6.90 | 0.022 |
| Pipe 5 | 443 | 297 | 120 | 75.42 | 1.09 | 4.64 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 79.91 | 1.15 | 5.17 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -57.56 | 0.83 | 2.81 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -58.45 | 0.84 | 2.90 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -33.57 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -33.57 | 0.48 | 1.04 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -22.35 | 0.32 | 0.49 | 0.027 |
| Pipe 12 | 216 | 297 | 120 | -23.24 | 0.34 | 0.52 | 0.027 |
| Pipe 13 | 246 | 297 | 120 | -32.46 | 0.47 | 0.97 | 0.026 |
| Pipe 14 | 469 | 297 | 120 | -32.46 | 0.47 | 0.97 | 0.026 |
| Pipe 15 | 283 | 297 | 120 | 39.41 | 0.57 | 1.40 | 0.025 |
| Pipe 16 | 123 | 297 | 120 | 47.10 | 0.68 | 1.94 | 0.024 |
| Pipe 17 | 173 | 400 | 120 | -47.10 | 0.37 | 0.46 | 0.025 |
| Pipe 18 | 472 | 297 | 120 | -33.57 | 0.48 | 1.04 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -39.41 | 0.57 | 1.40 | 0.025 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N1')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 154.09 | 50.89 | 499.23 | 72.41 |
| Junc MU1 | 104.52 | 5.03 | 153.52 | 49 | 480.69 | 69.72 |
| Junc MU2 | 104.15 | 2.55 | 152.33 | 48.18 | 472.65 | 68.55 |
| Junc N1 | 104.5 | 173.14 | 150.48 | 45.98 | 451.06 | 65.42 |
| Junc N2 | 103.44 | 4.49 | 154.02 | 50.58 | 496.19 | 71.97 |
| Junc N3 | 101.79 | 11.22 | 154.88 | 53.09 | 520.81 | 75.54 |
| Junc N4 | 102.48 | 9.22 | 152.28 | 49.8 | 488.54 | 70.86 |
| Junc N5 | 101.94 | 0 | 153.56 | 51.62 | 506.39 | 73.45 |
| Junc N6 | 102.39 | 6.95 | 153.28 | 50.89 | 499.23 | 72.41 |
| Junc N7 | 101.47 | 0 | 152.63 | 51.16 | 501.88 | 72.79 |
| Junc N8 | 100.7 | 0 | 155.13 | 54.43 | 533.96 | 77.44 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 154.4 | 51.7 | 507.18 | 73.56 |
| Junc PR1 | 102 | 0.89 | 155.46 | 53.46 | 524.44 | 76.06 |
| Junc T1 | 102.94 | 0 | 154.82 | 51.88 | 508.94 | 73.82 |
| Junc T2 | 103.73 | 5.25 | 152.1 | 48.37 | 474.51 | 68.82 |
| Resvr 1 | 155.6 | -89.38 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -137.05 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N1')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 83.02 | 1.20 | 5.54 | 0.023 |
| Pipe 2 | 240 | 297 | 120 | 77.98 | 1.13 | 4.94 | 0.023 |
| Pipe 3 | 399 | 297 | 120 | 75.43 | 1.09 | 4.64 | 0.023 |
| Pipe 4 | 216 | 297 | 120 | 97.71 | 1.41 | 7.50 | 0.022 |
| Pipe 5 | 443 | 297 | 120 | 72.78 | 1.05 | 4.35 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 77.27 | 1.12 | 4.85 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -55.87 | 0.81 | 2.66 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -56.76 | 0.82 | 2.74 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -32.62 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -32.62 | 0.47 | 0.98 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -21.40 | 0.31 | 0.45 | 0.028 |
| Pipe 12 | 216 | 297 | 120 | -30.18 | 0.44 | 0.85 | 0.026 |
| Pipe 13 | 246 | 297 | 120 | -39.40 | 0.57 | 1.39 | 0.025 |
| Pipe 14 | 469 | 297 | 120 | -39.40 | 0.57 | 1.39 | 0.025 |
| Pipe 15 | 283 | 297 | 120 | 46.35 | 0.67 | 1.88 | 0.025 |
| Pipe 16 | 123 | 297 | 120 | 54.03 | 0.78 | 2.50 | 0.024 |
| Pipe 17 | 173 | 400 | 120 | -54.03 | 0.43 | 0.59 | 0.025 |
| Pipe 18 | 472 | 297 | 120 | -32.62 | 0.47 | 0.98 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -46.35 | 0.67 | 1.88 | 0.025 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N2')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 154.21 | 51.01 | 500.41 | 72.58 |
| Junc MU1 | 104.52 | 5.03 | 154.15 | 49.63 | 486.87 | 70.61 |
| Junc MU2 | 104.15 | 2.55 | 153.77 | 49.62 | 486.77 | 70.60 |
| Junc N1 | 104.5 | 6.14 | 153.2 | 48.7 | 477.75 | 69.29 |
| Junc N2 | 103.44 | 171.49 | 152.05 | 48.61 | 476.86 | 69.16 |
| Junc N3 | 101.79 | 11.22 | 154.08 | 52.29 | 512.96 | 74.40 |
| Junc N4 | 102.48 | 9.22 | 153.07 | 50.59 | 496.29 | 71.98 |
| Junc N5 | 101.94 | 0 | 153.86 | 51.92 | 509.34 | 73.87 |
| Junc N6 | 102.39 | 6.95 | 153.68 | 51.29 | 503.15 | 72.98 |
| Junc N7 | 101.47 | 0 | 153.28 | 51.81 | 508.26 | 73.72 |
| Junc N8 | 100.7 | 0 | 154.62 | 53.92 | 528.96 | 76.72 |
| Junc N9 | 96.68 | 0 | 155.59 | 58.91 | 577.91 | 83.82 |
| Junc N10 | 102.7 | 0 | 154.43 | 51.73 | 507.47 | 73.60 |
| Junc PR1 | 102 | 0.89 | 155.3 | 53.3 | 522.87 | 75.84 |
| Junc T1 | 102.94 | 0 | 153.91 | 50.97 | 500.02 | 72.52 |
| Junc T2 | 103.73 | 5.25 | 152.98 | 49.25 | 483.14 | 70.07 |
| Resvr 1 | 155.6 | -134.38 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -92.05 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N2')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 47.35 | 0.68 | 1.96 | 0.024 |
| Pipe 2 | 240 | 297 | 120 | 42.31 | 0.61 | 1.59 | 0.025 |
| Pipe 3 | 399 | 297 | 120 | 39.76 | 0.57 | 1.42 | 0.025 |
| Pipe 4 | 216 | 297 | 120 | -33.62 | 0.49 | 1.04 | 0.026 |
| Pipe 5 | 443 | 297 | 120 | -49.22 | 0.71 | 2.11 | 0.024 |
| Pipe 6 | 164 | 297 | 120 | 122.27 | 1.76 | 11.36 | 0.021 |
| Pipe 7 | 242 | 297 | 120 | -84.76 | 1.22 | 5.76 | 0.022 |
| Pipe 8 | 52 | 297 | 120 | -85.65 | 1.24 | 5.88 | 0.022 |
| Pipe 9 | 576 | 900 | 120 | -48.73 | 0.08 | 0.01 | 0.028 |
| Pipe 10 | 260 | 297 | 120 | -48.73 | 0.70 | 2.07 | 0.024 |
| Pipe 11 | 139 | 297 | 120 | -37.51 | 0.54 | 1.27 | 0.025 |
| Pipe 12 | 216 | 297 | 120 | -20.85 | 0.30 | 0.43 | 0.028 |
| Pipe 13 | 246 | 297 | 120 | -30.07 | 0.43 | 0.85 | 0.026 |
| Pipe 14 | 469 | 297 | 120 | -30.07 | 0.43 | 0.85 | 0.026 |
| Pipe 15 | 283 | 297 | 120 | 37.02 | 0.53 | 1.24 | 0.025 |
| Pipe 16 | 123 | 297 | 120 | 44.70 | 0.65 | 1.76 | 0.025 |
| Pipe 17 | 173 | 400 | 120 | -44.70 | 0.36 | 0.41 | 0.026 |
| Pipe 18 | 472 | 297 | 120 | -48.73 | 0.70 | 2.07 | 0.024 |
| Pipe 19 | 147 | 297 | 120 | -37.02 | 0.53 | 1.24 | 0.025 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N3')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.43 | 50.23 | 492.76 | 71.47 |
| Junc MU1 | 104.52 | 5.03 | 153.41 | 48.89 | 479.61 | 69.56 |
| Junc MU2 | 104.15 | 2.55 | 153.23 | 49.08 | 481.47 | 69.83 |
| Junc N1 | 104.5 | 6.14 | 152.97 | 48.47 | 475.49 | 68.96 |
| Junc N2 | 103.44 | 4.49 | 152.63 | 49.19 | 482.55 | 69.99 |
| Junc N3 | 101.79 | 228.22 | 150.65 | 48.86 | 479.32 | 69.52 |
| Junc N4 | 102.48 | 9.22 | 152.9 | 50.42 | 494.62 | 71.74 |
| Junc N5 | 101.94 | 0 | 153.25 | 51.31 | 503.35 | 73.00 |
| Junc N6 | 102.39 | 6.95 | 153.16 | 50.77 | 498.05 | 72.24 |
| Junc N7 | 101.47 | 0 | 152.99 | 51.52 | 505.41 | 73.30 |
| Junc N8 | 100.7 | 0 | 152.4 | 51.7 | 507.18 | 73.56 |
| Junc N9 | 96.68 | 0 | 155.58 | 58.9 | 577.81 | 83.80 |
| Junc N10 | 102.7 | 0 | 153.56 | 50.86 | 498.94 | 72.36 |
| Junc PR1 | 102 | 0.89 | 155.06 | 53.06 | 520.52 | 75.49 |
| Junc T1 | 102.94 | 0 | 152.57 | 49.63 | 486.87 | 70.61 |
| Junc T2 | 103.73 | 5.25 | 152.88 | 49.15 | 482.16 | 69.93 |
| Resvr 1 | 155.6 | -209.26 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 153.6 | -67.16 | 153.6 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N3')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 33.72 | 0.49 | 1.05 | 0.026 |
| Pipe 2 | 240 | 297 | 120 | 28.68 | 0.41 | 0.77 | 0.026 |
| Pipe 3 | 399 | 297 | 120 | 26.13 | 0.38 | 0.65 | 0.027 |
| Pipe 4 | 216 | 297 | 120 | -19.99 | 0.29 | 0.40 | 0.028 |
| Pipe 5 | 443 | 297 | 120 | -24.34 | 0.35 | 0.57 | 0.027 |
| Pipe 6 | 164 | 297 | 120 | -19.85 | 0.29 | 0.39 | 0.028 |
| Pipe 7 | 242 | 297 | 120 | -116.13 | 1.68 | 10.33 | 0.021 |
| Pipe 8 | 52 | 297 | 120 | -117.02 | 1.69 | 10.47 | 0.021 |
| Pipe 9 | 576 | 900 | 120 | -92.24 | 0.14 | 0.03 | 0.026 |
| Pipe 10 | 260 | 297 | 120 | -92.24 | 1.33 | 6.74 | 0.022 |
| Pipe 11 | 139 | 297 | 120 | 135.98 | 1.96 | 13.83 | 0.021 |
| Pipe 12 | 216 | 297 | 120 | -9.59 | 0.14 | 0.10 | 0.031 |
| Pipe 13 | 246 | 297 | 120 | -18.81 | 0.27 | 0.35 | 0.028 |
| Pipe 14 | 469 | 297 | 120 | -18.81 | 0.27 | 0.35 | 0.028 |
| Pipe 15 | 283 | 297 | 120 | 25.76 | 0.37 | 0.63 | 0.027 |
| Pipe 16 | 123 | 297 | 120 | 33.45 | 0.48 | 1.03 | 0.026 |
| Pipe 17 | 173 | 400 | 120 | -33.45 | 0.27 | 0.24 | 0.027 |
| Pipe 18 | 472 | 297 | 120 | -92.24 | 1.33 | 6.74 | 0.022 |
| Pipe 19 | 147 | 297 | 120 | -25.76 | 0.37 | 0.63 | 0.027 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N4')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.73 | 50.53 | 495.70 | 71.90 |
| Junc MU1 | 104.52 | 5.03 | 153.96 | 49.44 | 485.01 | 70.34 |
| Junc MU2 | 104.15 | 2.55 | 153.34 | 49.19 | 482.55 | 69.99 |
| Junc N1 | 104.5 | 6.14 | 152.4 | 47.9 | 469.90 | 68.15 |
| Junc N2 | 103.44 | 4.49 | 153.98 | 50.54 | 495.80 | 71.91 |
| Junc N3 | 101.79 | 11.22 | 154.86 | 53.07 | 520.62 | 75.51 |
| Junc N4 | 102.48 | 176.22 | 149.81 | 47.33 | 464.31 | 67.34 |
| Junc N5 | 101.94 | 0 | 152.64 | 50.7 | 497.37 | 72.14 |
| Junc N6 | 102.39 | 6.95 | 152.07 | 49.68 | 487.36 | 70.69 |
| Junc N7 | 101.47 | 0 | 150.59 | 49.12 | 481.87 | 69.89 |
| Junc N8 | 100.7 | 0 | 155.12 | 54.42 | 533.86 | 77.43 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 154.31 | 51.61 | 506.29 | 73.43 |
| Junc PR1 | 102 | 0.89 | 155.46 | 53.46 | 524.44 | 76.06 |
| Junc T1 | 102.94 | 0 | 154.8 | 51.86 | 508.75 | 73.79 |
| Junc T2 | 103.73 | 5.25 | 152 | 48.27 | 473.53 | 68.68 |
| Resvr 1 | 155.6 | -90.56 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -135.87 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N4')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 59.92 | 0.86 | 3.03 | 0.024 |
| Pipe 2 | 240 | 297 | 120 | 54.89 | 0.79 | 2.58 | 0.024 |
| Pipe 3 | 399 | 297 | 120 | 52.34 | 0.76 | 2.36 | 0.024 |
| Pipe 4 | 216 | 297 | 120 | -46.19 | 0.67 | 1.87 | 0.025 |
| Pipe 5 | 443 | 297 | 120 | 73.96 | 1.07 | 4.48 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 78.45 | 1.13 | 4.99 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -56.62 | 0.82 | 2.73 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -57.51 | 0.83 | 2.81 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -33.04 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -33.04 | 0.48 | 1.01 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -21.82 | 0.31 | 0.47 | 0.027 |
| Pipe 12 | 216 | 297 | 120 | 114.91 | 1.66 | 10.12 | 0.021 |
| Pipe 13 | 246 | 297 | 120 | -61.31 | 0.88 | 3.16 | 0.024 |
| Pipe 14 | 469 | 297 | 120 | -61.31 | 0.88 | 3.16 | 0.024 |
| Pipe 15 | 283 | 297 | 120 | 68.26 | 0.99 | 3.86 | 0.023 |
| Pipe 16 | 123 | 297 | 120 | 75.95 | 1.10 | 4.70 | 0.023 |
| Pipe 17 | 173 | 400 | 120 | -75.95 | 0.60 | 1.10 | 0.024 |
| Pipe 18 | 472 | 297 | 120 | -33.04 | 0.48 | 1.01 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -68.26 | 0.99 | 3.86 | 0.023 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N6')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 151.23 | 48.03 | 471.17 | 68.34 |
| Junc MU1 | 104.52 | 5.03 | 153.25 | 48.73 | 478.04 | 69.33 |
| Junc MU2 | 104.15 | 2.55 | 152.88 | 48.73 | 478.04 | 69.33 |
| Junc N1 | 104.5 | 6.14 | 152.31 | 47.81 | 469.02 | 68.03 |
| Junc N2 | 103.44 | 4.49 | 154.02 | 50.58 | 496.19 | 71.97 |
| Junc N3 | 101.79 | 11.22 | 154.88 | 53.09 | 520.81 | 75.54 |
| Junc N4 | 102.48 | 9.22 | 150.36 | 47.88 | 469.70 | 68.12 |
| Junc N5 | 101.94 | 0 | 147.51 | 45.57 | 447.04 | 64.84 |
| Junc N6 | 102.39 | 223.95 | 145.58 | 43.19 | 423.69 | 61.45 |
| Junc N7 | 101.47 | 0 | 148.72 | 47.25 | 463.52 | 67.23 |
| Junc N8 | 100.7 | 0 | 155.13 | 54.43 | 533.96 | 77.44 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 153.01 | 50.31 | 493.54 | 71.58 |
| Junc PR1 | 102 | 0.89 | 155.46 | 53.46 | 524.44 | 76.06 |
| Junc T1 | 102.94 | 0 | 154.81 | 51.87 | 508.84 | 73.80 |
| Junc T2 | 103.73 | 5.25 | 152.09 | 48.36 | 474.41 | 68.81 |
| Resvr 1 | 155.6 | -89.47 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 153.6 | -186.96 | 153.6 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N6')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 47.18 | 0.68 | 1.95 | 0.024 |
| Pipe 2 | 240 | 297 | 120 | 42.15 | 0.61 | 1.58 | 0.025 |
| Pipe 3 | 399 | 297 | 120 | 39.60 | 0.57 | 1.41 | 0.025 |
| Pipe 4 | 216 | 297 | 120 | -33.46 | 0.48 | 1.03 | 0.026 |
| Pipe 5 | 443 | 297 | 120 | 72.87 | 1.05 | 4.36 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 77.36 | 1.12 | 4.87 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -55.93 | 0.81 | 2.67 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -56.82 | 0.82 | 2.75 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -32.65 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -32.65 | 0.47 | 0.98 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -21.43 | 0.31 | 0.45 | 0.028 |
| Pipe 12 | 216 | 297 | 120 | 101.08 | 1.46 | 7.98 | 0.022 |
| Pipe 13 | 246 | 297 | 120 | 91.86 | 1.33 | 6.69 | 0.022 |
| Pipe 14 | 469 | 297 | 120 | 91.86 | 1.33 | 6.69 | 0.022 |
| Pipe 15 | 283 | 297 | 120 | 132.09 | 1.91 | 13.11 | 0.021 |
| Pipe 16 | 123 | 297 | 120 | 139.78 | 2.02 | 14.55 | 0.021 |
| Pipe 17 | 173 | 400 | 120 | -139.78 | 1.11 | 3.41 | 0.022 |
| Pipe 18 | 472 | 297 | 120 | -32.65 | 0.47 | 0.98 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -132.09 | 1.91 | 13.11 | 0.021 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N7')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.48 | 50.28 | 493.25 | 71.54 |
| Junc MU1 | 104.52 | 5.03 | 154.06 | 49.54 | 485.99 | 70.49 |
| Junc MU2 | 104.15 | 2.55 | 153.57 | 49.42 | 484.81 | 70.32 |
| Junc N1 | 104.5 | 6.14 | 152.83 | 48.33 | 474.12 | 68.76 |
| Junc N2 | 103.44 | 4.49 | 154.2 | 50.76 | 497.96 | 72.22 |
| Junc N3 | 101.79 | 11.22 | 154.95 | 53.16 | 521.50 | 75.64 |
| Junc N4 | 102.48 | 9.22 | 150.77 | 48.29 | 473.72 | 68.71 |
| Junc N5 | 101.94 | 0 | 151.97 | 50.03 | 490.79 | 71.18 |
| Junc N6 | 102.39 | 6.95 | 151.19 | 48.8 | 478.73 | 69.43 |
| Junc N7 | 101.47 | 167 | 149.09 | 47.62 | 467.15 | 67.75 |
| Junc N8 | 100.7 | 0 | 155.18 | 54.48 | 534.45 | 77.52 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 154.25 | 51.55 | 505.71 | 73.35 |
| Junc PR1 | 102 | 0.89 | 155.47 | 53.47 | 524.54 | 76.08 |
| Junc T1 | 102.94 | 0 | 154.9 | 51.96 | 509.73 | 73.93 |
| Junc T2 | 103.73 | 5.25 | 152.53 | 48.8 | 478.73 | 69.43 |
| Resvr 1 | 155.6 | -84.18 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -142.25 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N7')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 53.53 | 0.77 | 2.46 | 0.024 |
| Pipe 2 | 240 | 297 | 120 | 48.49 | 0.70 | 2.05 | 0.024 |
| Pipe 3 | 399 | 297 | 120 | 45.94 | 0.66 | 1.85 | 0.025 |
| Pipe 4 | 216 | 297 | 120 | -39.80 | 0.57 | 1.42 | 0.025 |
| Pipe 5 | 443 | 297 | 120 | 67.58 | 0.98 | 3.79 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 72.07 | 1.04 | 4.27 | 0.023 |
| Pipe 7 | 242 | 297 | 120 | -52.53 | 0.76 | 2.38 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -53.42 | 0.77 | 2.45 | 0.024 |
| Pipe 9 | 576 | 900 | 120 | -30.76 | 0.05 | 0.00 | 0.030 |
| Pipe 10 | 260 | 297 | 120 | -30.76 | 0.44 | 0.88 | 0.026 |
| Pipe 11 | 139 | 297 | 120 | -19.54 | 0.28 | 0.38 | 0.028 |
| Pipe 12 | 216 | 297 | 120 | 102.14 | 1.47 | 8.14 | 0.022 |
| Pipe 13 | 246 | 297 | 120 | 92.92 | 1.34 | 6.83 | 0.022 |
| Pipe 14 | 469 | 297 | 120 | -74.08 | 1.07 | 4.49 | 0.023 |
| Pipe 16 | 123 | 297 | 120 | 88.72 | 1.28 | 6.27 | 0.022 |
| Pipe 17 | 173 | 400 | 120 | -88.72 | 0.71 | 1.47 | 0.023 |
| Pipe 18 | 472 | 297 | 120 | -30.76 | 0.44 | 0.88 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -81.03 | 1.17 | 5.30 | 0.023 |
| Pipe 15 | 283 | 297 | 120 | 81.03 | 1.17 | 5.30 | 0.023 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N8')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 154.39 | 51.19 | 502.17 | 72.83 |
| Junc MU1 | 104.52 | 5.03 | 154.39 | 49.87 | 489.22 | 70.96 |
| Junc MU2 | 104.15 | 2.55 | 154.3 | 50.15 | 491.97 | 71.35 |
| Junc N1 | 104.5 | 6.14 | 154.17 | 49.67 | 487.26 | 70.67 |
| Junc N2 | 103.44 | 4.49 | 154.11 | 50.67 | 497.07 | 72.09 |
| Junc N3 | 101.79 | 11.22 | 153.33 | 51.54 | 505.61 | 73.33 |
| Junc N4 | 102.48 | 9.22 | 154.14 | 51.66 | 506.78 | 73.50 |
| Junc N5 | 101.94 | 0 | 154.3 | 52.36 | 513.65 | 74.50 |
| Junc N6 | 102.39 | 6.95 | 154.25 | 51.86 | 508.75 | 73.79 |
| Junc N7 | 101.47 | 0 | 154.18 | 52.71 | 517.09 | 75.00 |
| Junc N8 | 100.7 | 167 | 152.22 | 51.52 | 505.41 | 73.30 |
| Junc N9 | 96.68 | 0 | 155.58 | 58.9 | 577.81 | 83.80 |
| Junc N10 | 102.7 | 0 | 154.47 | 51.77 | 507.86 | 73.66 |
| Junc PR1 | 102 | 0.89 | 155.33 | 53.33 | 523.17 | 75.88 |
| Junc T1 | 102.94 | 0 | 154.1 | 51.16 | 501.88 | 72.79 |
| Junc T2 | 103.73 | 5.25 | 154.14 | 50.41 | 494.52 | 71.72 |
| Resvr 1 | 155.6 | -175.14 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -51.29 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'N8')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 25.12 | 0.36 | 0.61 | 0.027 |
| Pipe 2 | 240 | 297 | 120 | 20.09 | 0.29 | 0.40 | 0.028 |
| Pipe 3 | 399 | 297 | 120 | 17.54 | 0.25 | 0.31 | 0.028 |
| Pipe 4 | 216 | 297 | 120 | -11.40 | 0.16 | 0.14 | 0.030 |
| Pipe 5 | 443 | 297 | 120 | -8.46 | 0.12 | 0.08 | 0.032 |
| Pipe 6 | 164 | 297 | 120 | -3.97 | 0.06 | 0.02 | 0.035 |
| Pipe 7 | 242 | 297 | 120 | -79.26 | 1.14 | 5.09 | 0.023 |
| Pipe 8 | 52 | 297 | 120 | -80.15 | 1.16 | 5.20 | 0.023 |
| Pipe 9 | 576 | 900 | 120 | -94.99 | 0.15 | 0.03 | 0.025 |
| Pipe 10 | 260 | 297 | 120 | 72.01 | 1.04 | 4.26 | 0.023 |
| Pipe 11 | 139 | 297 | 120 | 83.23 | 1.20 | 5.57 | 0.023 |
| Pipe 12 | 216 | 297 | 120 | -2.31 | 0.03 | 0.01 | 0.038 |
| Pipe 13 | 246 | 297 | 120 | -11.52 | 0.17 | 0.14 | 0.030 |
| Pipe 14 | 469 | 297 | 120 | -11.52 | 0.17 | 0.14 | 0.030 |
| Pipe 15 | 283 | 297 | 120 | 18.48 | 0.27 | 0.34 | 0.028 |
| Pipe 16 | 123 | 297 | 120 | 26.16 | 0.38 | 0.65 | 0.027 |
| Pipe 17 | 173 | 400 | 120 | -26.16 | 0.21 | 0.15 | 0.028 |
| Pipe 18 | 472 | 297 | 120 | -94.99 | 1.37 | 7.12 | 0.022 |
| Pipe 19 | 147 | 297 | 120 | -18.48 | 0.27 | 0.34 | 0.028 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'PR1')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 154.46 | 51.26 | 502.86 | 72.93 |
| Junc MU1 | 104.52 | 5.03 | 154.47 | 49.95 | 490.01 | 71.07 |
| Junc MU2 | 104.15 | 2.55 | 154.46 | 50.31 | 493.54 | 71.58 |
| Junc N1 | 104.5 | 6.14 | 154.45 | 49.95 | 490.01 | 71.07 |
| Junc N2 | 103.44 | 4.49 | 154.56 | 51.12 | 501.49 | 72.73 |
| Junc N3 | 101.79 | 11.22 | 154.7 | 52.91 | 519.05 | 75.28 |
| Junc N4 | 102.48 | 9.22 | 154.43 | 51.95 | 509.63 | 73.92 |
| Junc N5 | 101.94 | 0 | 154.44 | 52.5 | 515.03 | 74.70 |
| Junc N6 | 102.39 | 6.95 | 154.43 | 52.04 | 510.51 | 74.04 |
| Junc N7 | 101.47 | 0 | 154.43 | 52.96 | 519.54 | 75.35 |
| Junc N8 | 100.7 | 0 | 155.02 | 54.32 | 532.88 | 77.29 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 154.49 | 51.79 | 508.06 | 73.69 |
| Junc PR1 | 102 | 167.89 | 154.61 | 52.61 | 516.10 | 74.85 |
| Junc T1 | 102.94 | 0 | 154.62 | 51.68 | 506.98 | 73.53 |
| Junc T2 | 103.73 | 5.25 | 154.45 | 50.72 | 497.56 | 72.17 |
| Resvr 1 | 155.6 | -198.91 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -27.52 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'PR1')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 12.16 | 0.18 | 0.16 | 0.030 |
| Pipe 2 | 240 | 297 | 120 | 7.13 | 0.10 | 0.06 | 0.032 |
| Pipe 3 | 399 | 297 | 120 | 4.58 | 0.07 | 0.03 | 0.035 |
| Pipe 4 | 216 | 297 | 120 | 1.56 | 0.02 | 0.00 | 0.041 |
| Pipe 5 | 443 | 297 | 120 | 15.31 | 0.22 | 0.24 | 0.029 |
| Pipe 6 | 164 | 297 | 120 | 19.80 | 0.29 | 0.39 | 0.028 |
| Pipe 7 | 242 | 297 | 120 | 5.61 | 0.08 | 0.04 | 0.034 |
| Pipe 8 | 52 | 297 | 120 | -162.28 | 2.34 | 19.19 | 0.020 |
| Pipe 9 | 576 | 900 | 120 | -36.63 | 0.06 | 0.01 | 0.029 |
| Pipe 10 | 260 | 297 | 120 | -36.63 | 0.53 | 1.22 | 0.025 |
| Pipe 11 | 139 | 297 | 120 | -25.41 | 0.37 | 0.62 | 0.027 |
| Pipe 12 | 216 | 297 | 120 | 8.50 | 0.12 | 0.08 | 0.032 |
| Pipe 13 | 246 | 297 | 120 | -0.72 | 0.01 | 0.00 | 0.045 |
| Pipe 14 | 469 | 297 | 120 | -0.72 | 0.01 | 0.00 | 0.046 |
| Pipe 15 | 283 | 297 | 120 | 7.67 | 0.11 | 0.07 | 0.032 |
| Pipe 16 | 123 | 297 | 120 | 15.36 | 0.22 | 0.24 | 0.029 |
| Pipe 17 | 173 | 400 | 120 | -15.36 | 0.12 | 0.06 | 0.030 |
| Pipe 18 | 472 | 297 | 120 | -36.63 | 0.53 | 1.22 | 0.025 |
| Pipe 19 | 147 | 297 | 120 | -7.67 | 0.11 | 0.07 | 0.032 |

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'T2')

| Node ID | Elevation m | Demand LPS | Head m | Pressure m | Pressure kPa | Pressure psi |
|----------|----------------|---------------|-----------|---------------|-----------------|-----------------|
| Junc HD1 | 103.2 | 7.68 | 153.99 | 50.79 | 498.25 | 72.27 |
| Junc MU1 | 104.52 | 5.03 | 153.83 | 49.31 | 483.73 | 70.16 |
| Junc MU2 | 104.15 | 2.55 | 153.05 | 48.9 | 479.71 | 69.58 |
| Junc N1 | 104.5 | 6.14 | 151.85 | 47.35 | 464.50 | 67.37 |
| Junc N2 | 103.44 | 4.49 | 153.69 | 50.25 | 492.95 | 71.50 |
| Junc N3 | 101.79 | 11.22 | 154.74 | 52.95 | 519.44 | 75.34 |
| Junc N4 | 102.48 | 9.22 | 151.59 | 49.11 | 481.77 | 69.87 |
| Junc N5 | 101.94 | 0 | 153.3 | 51.36 | 503.84 | 73.08 |
| Junc N6 | 102.39 | 6.95 | 152.94 | 50.55 | 495.90 | 71.92 |
| Junc N7 | 101.47 | 0 | 152.05 | 50.58 | 496.19 | 71.97 |
| Junc N8 | 100.7 | 0 | 155.05 | 54.35 | 533.17 | 77.33 |
| Junc N9 | 96.68 | 0 | 155.6 | 58.92 | 578.01 | 83.83 |
| Junc N10 | 102.7 | 0 | 154.37 | 51.67 | 506.88 | 73.52 |
| Junc PR1 | 102 | 0.89 | 155.43 | 53.43 | 524.15 | 76.02 |
| Junc T1 | 102.94 | 0 | 154.66 | 51.72 | 507.37 | 73.59 |
| Junc T2 | 103.73 | 172.25 | 151.32 | 47.59 | 466.86 | 67.71 |
| Resvr 1 | 155.6 | -98.16 | 155.6 | 0 | 0.00 | 0.00 |
| Resvr 2 | 154.5 | -128.27 | 154.5 | 0 | 0.00 | 0.00 |

Network Table - Links (Max Day + FF 'T2')

| Link ID | Length m | Diameter mm | Roughness | Flow LPS | Velocity m/s | Headloss m/km | Friction Factor |
|---------|-------------|----------------|-----------|-------------|-----------------|------------------|--------------------|
| Pipe 1 | 178 | 297 | 120 | 67.28 | 0.97 | 3.76 | 0.023 |
| Pipe 2 | 240 | 297 | 120 | 62.25 | 0.90 | 3.25 | 0.023 |
| Pipe 3 | 399 | 297 | 120 | 59.70 | 0.86 | 3.01 | 0.024 |
| Pipe 4 | 216 | 297 | 120 | -53.56 | 0.77 | 2.46 | 0.024 |
| Pipe 5 | 443 | 297 | 120 | 81.56 | 1.18 | 5.37 | 0.023 |
| Pipe 6 | 164 | 297 | 120 | 86.05 | 1.24 | 5.93 | 0.022 |
| Pipe 7 | 242 | 297 | 120 | -61.50 | 0.89 | 3.18 | 0.024 |
| Pipe 8 | 52 | 297 | 120 | -62.39 | 0.90 | 3.27 | 0.023 |
| Pipe 9 | 576 | 900 | 120 | -35.77 | 0.06 | 0.01 | 0.029 |
| Pipe 10 | 260 | 297 | 120 | -35.77 | 0.52 | 1.17 | 0.025 |
| Pipe 11 | 139 | 297 | 120 | -24.55 | 0.35 | 0.58 | 0.027 |
| Pipe 12 | 216 | 297 | 120 | -37.13 | 0.54 | 1.25 | 0.025 |
| Pipe 13 | 246 | 297 | 120 | -46.35 | 0.67 | 1.88 | 0.025 |
| Pipe 14 | 469 | 297 | 120 | -46.35 | 0.67 | 1.88 | 0.025 |
| Pipe 15 | 283 | 297 | 120 | 53.30 | 0.77 | 2.44 | 0.024 |
| Pipe 16 | 123 | 297 | 120 | 60.99 | 0.88 | 3.13 | 0.024 |
| Pipe 17 | 173 | 400 | 120 | -60.99 | 0.49 | 0.73 | 0.024 |
| Pipe 18 | 472 | 297 | 120 | -35.77 | 0.52 | 1.17 | 0.026 |
| Pipe 19 | 147 | 297 | 120 | -53.30 | 0.77 | 2.44 | 0.024 |

Appendix B: Stormwater Documentation

Technical Memorandum – Carp River PCSWMM Model
PCSWMM Model Schematic
Pond 1 Design Sheet
Chicago Design Storms
SCS Design Storms
100-year Model Output – Kizell Lands only
100-year Model Output – Carp River model – future conditions
100-year Model Output – Carp River model – interim conditions

MEMORANDUM

DATE: FEBRUARY 27, 2018
TO: LAURENT JOLLIET
FROM: KALLIE AULD, P.ENG.
RE: KIZELL LANDS AND FERNBANK POND 1:
INTEGRATION WITH CARP RIVER PCSWMM MODEL (REV. 2)
CC: MIKE PETEPIECE, P.ENG., MARK BISSETT, P.ENG.

1.0 BACKGROUND

The City has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

This technical memorandum provides an overview of how the PCSWMM model for the Kizell Lands and Fernbank Pond 1 has been integrated into the City of Ottawa Carp River PCSWMM model (March, 2017) and changes that have been made to the Carp River model.

2.0 UPSTREAM DRAINAGE AREAS

Existing Conditions

Storm runoff from the Granite Ridge subdivision (47.21 ha) and a portion of the Iber Road industrial area (18.11 ha + 10.45 ha) is tributary to an existing 1350 mm storm sewer. This sewer runs across the existing high school site south of the Kizell Lands, then outlets to an open ditch that conveys flows north across the Kizell Lands to the Carp River West Tributary and ultimately the Carp River.

The design flows used to size the 1350 mm storm sewer were taken from the *Granite Ridge Subdivision Stormwater Site Management Plan and Summary of Calculations* (Simmering & Associates, February 2000). The sewer was sized to accommodate the controlled 100-year peak flow from the upstream drainage area.

Proposed Conditions

As part of the proposed development, the existing storm sewer crossing the High school property will be extended through the Kizell Lands to a new SWM facility (Fernbank Pond 1) that will provide stormwater quality and quantity control for the proposed subdivision. This sewer will also collect storm runoff from a portion of the proposed development.

2.1 Model Revisions to Upstream Areas

Several changes have been made to the Carp River PCSWMM models (Existing, Interim, and Future) to better represent the flows from the upstream drainage areas:

Granite Ridge Subdivision:

- Slight changes have been made to area CS254_1 in all PCSWMM models;
- The percent impervious has been updated from 47.2% to 44.2%, based on the impervious surface layer provided by the City;
- No changes have been made to the Subarea Routing method or Percent Routed.

Iber Road:

- Slight changes have been made to areas CS254_2 (Iber West) and CS252 (Iber East) in all PCSWMM models;
- The percent impervious for each area has been updated based on the impervious surface layer provided by the City;
 - The % impervious for area CS254-2 has changed from 40% to 36.1%
 - The % impervious for area CS252 has changed from 66% to 56.4%
- Storage nodes have been added to both areas to represent the average amount of on-site storage outlined in the attached MOECC Environmental Compliance Approvals (**Attachment 1**). Refer to the following tables for details:

Table 1: Iber Road East Storage Volumes (m³/ha) & Release Rates (L/s)

| Area (ha) | Storage Volume (m ³) | Release Rate (L/s) | Storage Volume (m ³ /ha) | Release Rate (L/s/ha) |
|-----------|----------------------------------|--------------------|-------------------------------------|-----------------------|
| 0.27 | 69 | 10 | 257 | 37 |
| 0.43 | 116 | 29 | 270 | 67 |
| 0.59 | 180 | 30 | 305 | 51 |
| 0.52 | 252 | 14 | 484 | 26 |
| 0.69 | 75 | 22 | 109 | 32 |
| 0.38 | 70 | 16 | 184 | 42 |
| 0.97 | 150 | 62 | 155 | 64 |
| 1.13 | 154 | N/A | 136 | N/A |

Table 2: Iber Road West Storage Volumes (m³/ha) & Release Rates (L/s)

| Area (ha) | Storage Volume (m ³) | Release Rate (L/s) | Storage Volume (m ³ /ha) | Release Rate (L/s/ha) |
|-----------|----------------------------------|--------------------|-------------------------------------|-----------------------|
| 0.51 | 67 | 16 | 131 | 31 |
| 1.17 | 380 | 37 | 325 | 32 |
| 0.56 | 90 | 62 | 161 | 110 |
| 1.74 | 447 | 125 | 257 | 72 |
| 0.84 | 304 | 79 | 362 | 94 |

Based on the values outlined in **Tables 1** and **2**, overall storage volumes and release rates were determined:

Table 3: Overall Iber Road On-Site Storage Volumes

| Iber Road Area | Total Area (ha) | On-Site Storage | | | |
|----------------|-----------------|------------------------------|------------------------------|------------------------------|-----------------------------------|
| | | Minimum (m ³ /ha) | Maximum (m ³ /ha) | Average (m ³ /ha) | Average Overall (m ³) |
| Iber Road East | 10.45 | 109 | 484 | 237 | 2482 |
| Iber Road West | 18.12 | 131 | 362 | 247 | 4477 |

Table 4: Overall Iber Road Release Rates

| Iber Road Area | Total Area (ha) | Release Rate | | | |
|----------------|-----------------|------------------|------------------|------------------|-----------------------|
| | | Minimum (L/s/ha) | Maximum (L/s/ha) | Average (L/s/ha) | Average Overall (L/s) |
| Iber Road East | 10.45 | 26 | 67 | 46 | 477 |
| Iber Road West | 18.12 | 31 | 110 | 68 | 1227 |

For area CS254_2 (Iber Road West), the storage node was altered slightly, providing less storage than the average overall volume listed in **Table 3**. This was done to ensure the release rate during the 100-year storm event matched the average overall calculated in **Table 4**. For area CS252 (Iber Road East), the storage provided matches that listed in **Table 3**, and the release rate was adjusted using an orifice to ensure the release rate during the 100-year storm event matched the average overall calculated in **Table 4**.

The revisions to areas CS254_1, CS254_2, and CS252 have reduced the peak flows directed to the existing 1350mm storm sewer, such that they are more representative of existing conditions. Each of the Existing, Interim, Future, and stand-alone Pond 1 model have been updated to reflect these revisions. Model results outlined in the Conceptual Site Servicing and Stormwater Management report, and later in this memo, reflect these changes.

3.0 MODEL DEVELOPMENT & INTEGRATION

A PCSWMM model of the Kizell Lands was developed by Novatech based on the conceptual storm drainage area plan and storm sewer layout. This model was used to evaluate the storage requirements in the proposed SWM facility (Fernbank Pond 1) and the level of service provided by the conceptual major and minor system networks.

The nodes, links, and storage curves used to represent the major and minor drainage system network for the Kizell Lands development have been designed in accordance with City of Ottawa Technical Bulletin PIEDTB-2016-01 (September 2016).

Fernbank Pond 1 will provide stormwater quality and quantity control for the Kizell Lands (77.93 ha), and has been sized to accommodate the controlled outflows from the upstream Granite Ridge SWM Facility and a portion of the Iber Road industrial area – refer to **Drawing 108195-STM**. Additional details on the design of the subdivision are available in the Concept Servicing Report.

3.1 Model Integration

The standalone PCSWMM model of the Kizell Lands has been integrated into the Carp River PCSWMM models (interim and future conditions) in accordance with the protocol outlined the *City of Ottawa Carp River PCSWMM Model Documentation*. The updated Carp River models are provided on the attached CD as a part of the *Kizell Lands – Fernbank Concept Servicing Report*.

Carp River - Interim Conditions

The Interim Conditions PCSWMM model has been updated to reflect the proposed design for the Kizell Lands and Fernbank Pond 1. Drainage area 'CS251' was adjusted to be consistent with the storm catchment areas from the standalone PCSWMM model of the Kizell Lands.

Carp River - Future (Ultimate) Conditions

The Future Conditions PCSWMM model has been updated to reflect ultimate development of the Fernbank Lands tributary to the Carp River including Fernbank Ponds 1, 2, and 3. The Future Conditions Carp River PCSWMM model (March 2017) includes the stand alone PCSWMM model for Pond 1 and the latest development plans within the Pond 1 drainage area.

3.2 Model Results

Table 5 (Interim Conditions) and **Table 6** (Future Conditions) provide a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original, unedited, models provided by the City in March 2017.

Table 5: 100-year Flows and Water Levels in Carp River (Interim Conditions)

| Location on Carp River | PCSWMM Node | Original (March 2017) | | Kizell Lands (Feb 2018) | |
|---------------------------------|-------------|--------------------------|-----------------|--------------------------|-----------------|
| | | Flow (m ³ /s) | Water Level (m) | Flow (m ³ /s) | Water Level (m) |
| West Tributary at Mattamy Lands | CJ251 | 5.78 | 95.84 | 5.61 | 95.84 |
| Existing West Tributary | CJ201 | 12.47 | 94.52 | 12.94 | 94.58 |
| Near Pond 2/3 Outfall | CJ200 | 12.52 | 94.50 | 12.48 | 94.55 |
| Hazeldean Road | CJ199 | 11.39 | 94.50 | 12.64 | 94.55 |
| Maple Grove Road | CJ172 | 11.25 | 94.45 | 14.81 | 94.49 |
| Palladium Drive | CJ150 | 28.55 | 94.33 | 30.41 | 94.37 |
| Highway 417 | CJ120 | 29.24 | 94.24 | 31.15 | 94.28 |
| Feedmill Creek | CJ106 | 29.88 | 94.00 | 31.83 | 94.02 |

Table 6: 100-year Flows and Water Levels in Carp River (Future Conditions)

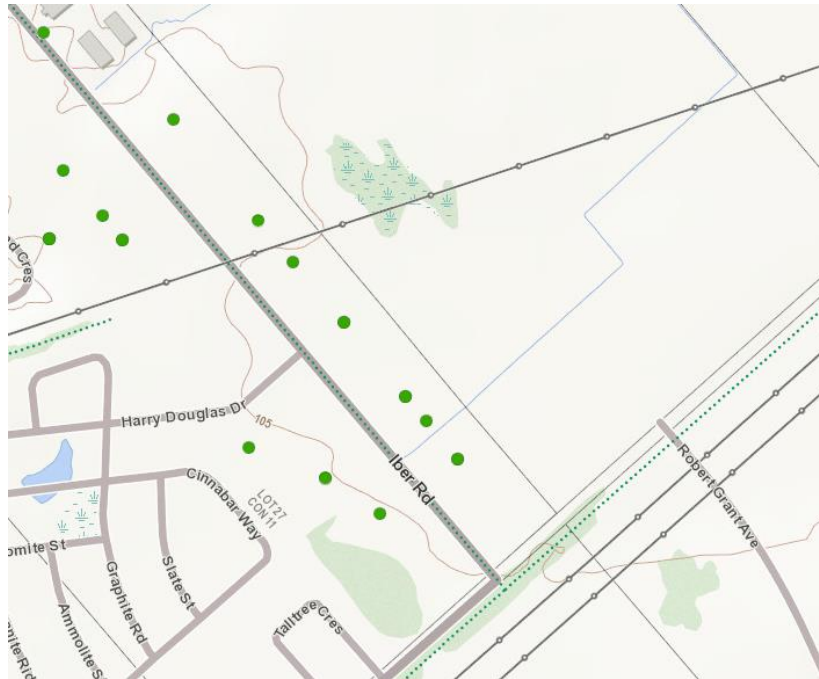
| Location on Carp River | PCSWMM Node | Original (March 2017) | | Kizell Lands (Feb 2018) | |
|---------------------------------|-------------|--------------------------|-----------------|--------------------------|-----------------|
| | | Flow (m ³ /s) | Water Level (m) | Flow (m ³ /s) | Water Level (m) |
| West Tributary at Mattamy Lands | CJ251 | 4.94 | 94.40 | 5.14 | 94.41 |
| Existing West Tributary | CJ201 | 8.52 | 94.33 | 8.50 | 94.37 |
| Near Pond 2/3 Outfall | CJ200 | 14.98 | 94.31 | 15.09 | 94.35 |
| Hazeldean Road | CJ199 | 13.99 | 94.30 | 13.89 | 94.34 |

| Location on Carp River | PCSWMM Node | Original (March 2017) | | Kizell Lands (Feb 2018) | |
|---------------------------------|-------------|--------------------------|-----------------|--------------------------|-----------------|
| | | Flow (m ³ /s) | Water Level (m) | Flow (m ³ /s) | Water Level (m) |
| West Tributary at Mattamy Lands | CJ251 | 4.94 | 94.40 | 5.14 | 94.41 |
| Maple Grove Road | CJ172 | 16.63 | 94.19 | 16.67 | 94.21 |
| Palladium Drive | CJ150 | 52.51 | 94.15 | 58.88 | 94.17 |
| Highway 417 | CJ120 | 32.49 | 93.97 | 33.42 | 94.00 |
| Feedmill Creek | CJ106 | 44.17 | 93.68 | 45.75 | 93.71 |

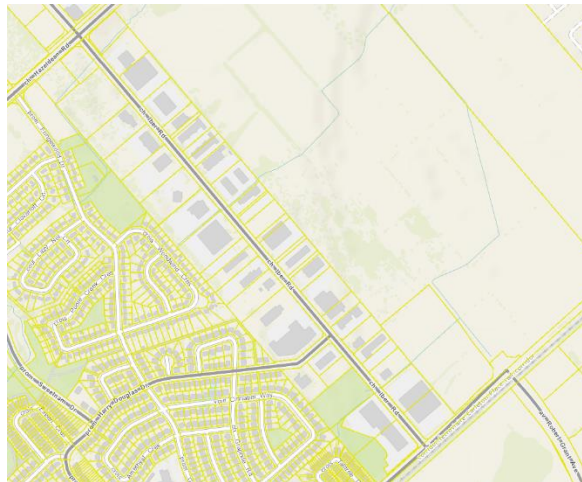
The model results indicate a slight increase in peak flow in the Carp River, as the 100-year release rates for Pond 1 have increased from the March 2017 model. The release rates are generally consistent with the release rates from the SWMHYMO model prepared as part of the Fernbank EMP.

The model results indicate that there will be no substantial change to the modeled 100-year water levels in the Carp River under interim or future development conditions. The PCSWMM model output has been reviewed and any increases in water level are generally less than 0.05m, with one location having an increase of 0.07m under interim conditions. Under ultimate conditions the maximum observed increase is 0.04m.

ATTACHMENT 1
Iber Road Industrial (East)
MOE ECA's (SWM)



Access Environment



GeoOttawa

ATTACHMENT 1
Iber Road Industrial (East)
MOE ECA's (SWM)

Summary of MOE ECA's for Iber Road Industrial (from Access Environment Website)

| Site Location | MOE ECA # | SWM Strategy | Drainage Area | SWM Storage | Release Rate |
|---|-------------|--|---------------|--|--|
| East Side of Iber Road | | | | | |
| Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658 | 9724-6B9NSK | SWM Pond | 0.27 ha | 69.3 m ³ | 10.1 L/s* (Post - 5yr Pre) |
| | | SWM Pond | 0.43 ha | 116 m ³ | 28.6 L/s* (Post - 5yr Pre) |
| 149 Iber Rd | 0305-78HL9L | SWM Pond | 0.59 ha | 180 m ³ | 30.1 L/s |
| 109 Iber Road | 8975-A4VL6P | SWM Pond | 0.52 ha | 235 m ³ (+ 16.9 m ³ of infil) | 13.7 L/s (Post - 5yr Pre) |
| 185 Iber Road | 8466-5SDK27 | SWM pond | 0.69 ha | 75 m ³ | 22.3 L/s |
| Lots 9 and 10, Registered Plan 4M-658 | 3222-56PSBR | SWM Pond | 0.38 ha | 70 m ³ | 16 L/s |
| | | SWM Pond | 0.97 ha | 150 m ³ | 62 L/s |
| 139 Iber Road, Lot 5, Part 4/5, Plan 4M-658 | 1916-5XEMBL | 3x SWM Ponds | - | 154 m ³ | Post - Pre |
| West Side of Iber Road | | | | | |
| 150 Iber Road, Part of Lot 14, Registered Plan 4M-658 | 1015-6CANY3 | Rooftop / Surface Ponding | - | 39 m ³ (roof top) + 28 m ³ (surface) | 4.6 L/s + 5.0 L/s + 3.9 L/s + 2.3 L/s |
| 164 Iber Road | 4789-6KJJT3 | Inlet to GR SWM Pond | - | - | - |
| 110 Iber Road | 9230-95LSBM | Surface / Underground Storage & SWM Pond | 1.17 ha | 156 m ³ (surface) + 167 m ³ (underground) + 57 m ³ (pond) | 37 L/s (pond) |
| 86 Harry Douglas Drive (intersection with Iber Road) | 0940-5G9JK3 | SWM Pond | 0.56 ha | 90 m ³ | 61.7 L/s |
| 200 Iber Road | 7685-7C8NXM | Rooftop / SWM Pond | - | 446.5 m ³ | 20.48 L/s (rooftop) + 40.5 L/s + 63.8 L/s. |
| 118 Iber Road | 9025-6EWRL8 | Rooftop / SWM Pond | - | 84 m ³ (rooftop) + 220 m ³ (pond) | 8 L/s + 8 L/s + 63 L/s |

Please refer to the attached ECA documents.



Ministry
of the
Environment

Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 9724-6B9NSK

Campbell Bros. Movers Limited
55 Midpark Crescent
London, Ontario
N6N 1A9

Site Location: Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658
City of Ottawa

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a stormwater management system to serve a 0.81 ha site being used for the existing office and warehouse building (moving and storage of furniture) and proposed addition at the above listed location, consisting of the following:

- stormwater management pond (known as North Pond), located in the north-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.27 ha, having a total storage volume of 69.3 m³ complete with overflow outlet and outlet structure consisting of a 150 mm diameter outflow pipe allowing a maximum discharge of 10.1 L/s (5-year storm event) to the existing drainage swale and eventually to Carp River;
- stormwater management pond (known as South Pond), located in the south-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.43 ha, having a total storage volume of 116 m³ complete with outlet structure consisting of a 200 mm diameter outflow pipe allowing a maximum discharge of 28.6 L/s (5-year storm event) to the existing drainage swale and eventually to Carp River;
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the applications dated January 9, 2002 and February 24, 2005, including reports entitled "Report for Review by the City of Ottawa and the Mississippi Valley Conservation Authority, Proposed Warehouse and Office Building Campbell Moving Limited, Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658, Iber Road, Stittsville, Goulbourn, now City of Ottawa" dated February-March, 2001, revised 5/6 April, 2002 and 23 March, 2001 and "Amended Report for Review by the City of Ottawa and the Mississippi Valley Conservation Authority, Phase - II Proposed Addition to Existing Warehouse and Office Building Campbell Moving Limited, Block 12, Plan 4M-454 and Part of Blocks 7 & 8, Plan 4M-658, Iber Road, Stittsville, Goulbourn, now City of Ottawa" dated January 2005, final plans and specifications prepared by H. C. Morash, P.Eng.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

1. "Certificate" means this entire Certificate of Approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;
2. "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Ontario Water Resources Act;
3. "Ministry" means the Ontario Ministry of the Environment;
4. "District Manager" means the District Manager of the Ottawa District Office of the Ministry;
5. "Owner" means City of Ottawa and includes its successors and assignees; and
6. "Works" means the sewage works described in the Owner's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

1.1 The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater management works do not constitute a safety or health hazard to the general public.

1.2 Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Certificate, the application for approval of the Works and the submitted supporting documents and plans and specifications as submitted.

1.3 Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail:

1.4 The approval granted by this Certificate is based upon a review of the proposed works in the context of its effect on the environment, its process performance and principles of established engineering theory.

1.5 The review did not include a consideration of the architectural, mechanical or structural components of the Works except to the extent necessary to review the works as set out in the above paragraph.

1.6 The Owner shall ensure that, at all times, the Works and related equipment and appurtenances which are installed or used to achieve compliance with this Certificate are properly operated and maintained and meet with the operation and maintenance requirements of the Municipality.

2. EXPIRY OF APPROVAL

2.1 The approval issued by this Certificate will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Certificate.

3. CHANGE OF OWNER

3.1 The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the District Manager;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the District Manager;

3.2 In the event of any change in ownership of the Works, other than a change to a successor Municipality, the Owner shall notify in writing the succeeding owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the District Manager and the Director.

4. CLEANING AND MAINTENANCE

4.1 The Owner shall ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management ponds at least once a year to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid any reduction of capacity of the ponds. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.

5. RECORD KEEPING AND REPORTING

5.1 The Owner shall prepare operational manual which should include, but not limited to, frequency and method of clean-out of stormwater management works within six (6) months from the date of issuance of this Certificate of Approval or the commissioning of the Works. The Owner shall keep the operations manual up to date with such revisions as may be required. Upon request, the Owner shall make the manual available for inspection by Ministry personnel and furnish a copy to the Ministry.

5.2 The Owner shall maintain a logbook to record the results of all inspections and any cleaning and maintenance operations undertaken and shall make the logbook available for inspection by the Ministry upon request.

5.3 The Owner shall retain all records related to the monitoring activities required by this Certificate, for a period of three (3) years from the date of their creation, unless otherwise directed in writing by the District Manager.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed because it is not in the public interest for the Director to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this Ministry.
2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the Works are made aware of the Certificate and continue to operate the Works in compliance with it.
4. Condition 4 is included as regular removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment and/or decaying vegetation on the downstream receiving watercourse. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design.
5. Condition 5 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Certificate, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

This Certificate of Approval revokes and replaces Certificate(s) of Approval Municipal and Private Sewage Works Number 8662-576Q6F issued on February 14, 2002.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;

CONTENT COPY OF ORIGINAL

8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 13th day of April, 2005

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

KC/
c: District Manager, MOE Ottawa District Office
Henry Morash, P.Eng.
R. L. Phillips, C.E.T., Program Manager, City of Ottawa



Ministry
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Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 0940-5G9JK3

4063767 Canada Inc.
PO Box 11336 Stn H
Nepean, Ontario
K2H 7V1

Site Location: Microzone Complex
86 Harry Douglas Drive
City of Ottawa

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

stormwater management facility to serve a light manufacturing operation at the above location on a site area of approximately 0.8 hectare with discharge of the stormwater to an existing municipal wet pond located south of the site, consisting of the following:

- one (1) catchbasin at the loading ramp for collection of stormwater with discharge via a 150 millimeter diameter pipe to an outlet structure located at a dry pond;
- one (1) rectangular shaped dry pond at the south-east corner of the site having a volumetric capacity of approximately 90 cubic metres at an elevation of 104.25 metre for collection of runoff from approximately 0.56 hectare of the site with a maximum release rate of 61.7 litres/second from the pond achieved during a 100-year storm due to flow restriction from the pond by installation of a 173 millimetre diameter orifice at the outlet structure; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the Application for Approval of Industrial Sewage Works dated October 24, 2002 submitted by the Principal, Dynar Architect and Associates Inc., and the Stormwater Management Report for Microzone Complex, Ottawa dated October 12, 2002, prepared by Simmering and Associates Ltd, Ottawa.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means 4063767 Canada Inc., and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications.

2. OPERATION AND MAINTENANCE

(1) The Owner shall undertake an inspection of the condition of the stormwater management pond, at least six (6) times a year, and undertake any necessary cleaning and maintenance to prevent the excessive buildup of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted.
2. Condition 2 is included to ensure that any buildup of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

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DATED AT TORONTO this 11th day of December, 2002

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

AC/
c: District Manager, MOE Ottawa
Douglas Kerr, Simmering & Associates Ltd.



Ministry
of the
Environment

Ministère
de
l'Environnement

AMENDED CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 0305-78HL9L
Issue Date: November 28, 2007

Ontario

The Duncan Group Limited
149 Iber Rd
Ottawa, Ontario
K2S 1E7

Site Location: Sani-Sol
149 Iber Rd
City of Ottawa
K2S 1E7

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

stormwater management facility to serve a new sales and service centre for cleaning products and equipment on a site area covering approximately 0.59 hectares at the above location, consisting of the following:

- one (1) in-line storage pond at the eastern part of the site with a storage capacity of approximately 180 m³ with 100-millimetre diameter outlet control device installed in a 300-millimetre diameter CSP pipe with a controlled maximum flow rate of 30.1 litres per second for the 100-year return storm; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the following documents:

1. Application for Approval of Industrial Sewage Works dated July 29, 2002 and the associated documents submitted by the Owner, The Duncan Group Limited, Stittsville, Ontario.
2. Application for Approval of Industrial Sewage Works submitted by David Duncan of the The Duncan Group Limited, received on September 6, 2007 and all supporting information.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means The Duncan Group Limited, and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(2) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(3) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. CHANGE OF OWNER

The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within thirty (30) days of the change occurring:

- (a) change of *Owner*;
- (b) change of address of the *Owner*;
- (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*; and
- (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*.

4. OPERATION AND MAINTENANCE

(1) The *Owner* shall inspect the *Works* at least once a year and, if necessary, clean and maintain the *Works* to prevent the excessive build-up of sediments, oil/grit, and/or vegetation

(2) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at 149 Iber Rd, Ottawa, for inspection by the *Ministry*. The logbook shall include the following:

- (a) the name of the *Works*;
- (b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed; and

(c) the date of each spill within the catchment area, including follow-up actions / remedial measures undertaken.

5. **RECORD KEEPING**

The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this *Certificate*.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that the *Works* are constructed in a timely manner so that standards applicable at the time of Approval of the *Works* are still applicable at the time of construction, to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.
4. Condition 4 is included to require that the *Works* be properly operated and maintained such that the environment is protected.
5. Condition 5 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works*.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3010-5G8HQR issued on November 27, 2002.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

CONTENT COPY OF ORIGINAL

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 28th day of November, 2007

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

KD/
c: District Manager, MOE Ottawa.
Todd Perry, McIntosh Perry Consulting Engineers Ltd.

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Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement
climatique

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 8975-A4VL6P

Issue Date: December 11, 2015

8769028 Canada Inc.
Post Office Box, No. 78013
Ottawa, Ontario
K2E 1B1

Site Location: 109 Iber Road
City of Ottawa

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

establishment of stormwater management works for the industrial warehouse development (approximately 0.61 hectares in area), located at 109 Iber Road within the Carp River watershed in the City of Ottawa. The proposed works will drain to the existing Iber Road ditch which discharges into the Carp River. The works are to provide normal level water quality control and water quantity control attenuating the post-development peak flow from 5-year and 100-year design storms to the 5-year peak flow pre-development rates for 0.52 hectares of the site. The remaining 0.09 hectares, which consists mostly of landscaped areas, will be uncontrolled (drain via sheet flow off of the site). The works consist of the following:

storm sewers collecting stormwater runoff from the proposed warehouse building, parking areas, and landscaped areas and conveying it to a stormwater detention area located at the front of the site;

stormwater management facility (catchment area 0.52 hectares, 85% impervious): - one (1) dry pond located at the front of the property (between the proposed warehouse building and Iber Road) providing 111 m³ of storage and a maximum release rate of 9.7 L/s under the 5-year storm and 235 m³ of storage and a maximum release rate of 13.7 L/s under the 100-year storm. The pond is to discharge through an inlet control device to the existing ditch on Iber Road;

stormwater management facility (catchment area 0.52 hectares, 85% impervious): - one (1) clear stone infiltration trench underlying the proposed dry pond providing 16.9 m³ of storage volume;

including erosion/sedimentation control measures during construction and all other controls and appurtenances essential for the proper operation of the aforementioned Works;

all in accordance with the submitted supporting documents listed in Schedule "A" forming part of this Approval.

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire document including the application and any supporting documents listed

"Director" means a person appointed by the Minister pursuant to section 5 of the Environmental Protection Act for the purposes of Part II.1 of the Environmental Protection Act;

"District Manager" means the District Manager of the Ottawa office of the Ministry;

"Equivalent" means a substituted product that meets the required quality and performance standards of a named product;

"Ministry" means the ministry of the government of Ontario responsible for the Environmental Protection Act and the Ontario Water Resources Act and includes all officials, employees or other persons acting on its behalf;

"Owner" means 8769028 Canada Inc. and includes their successors and assignees;

"Water Supervisor" means the Water Supervisor of the Ottawa office of the Ministry;

"Works" means the sewage works described in the Owner's application(s) and this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the Conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

(3) Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The Conditions of this Approval are severable. If any Condition of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such Condition to other circumstances and the remainder of this Approval shall not be affected thereby.

(6) The issuance of, and compliance with the Conditions of this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval

(b) limit in any way the authority of the Ministry to require certain steps be taken to require the Owner to furnish any further information related to compliance with this Approval.

2. EXPIRY OF APPROVAL

(1) This Approval will cease to apply to those parts of the Works which have not been constructed within **five (5) years** of the date of this Approval.

3. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within **thirty (30) days** of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act , R.S.O. 1990, c. B17 shall be included in the notification to the District Manager;

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

4. OPERATION AND MAINTENANCE

(1) The Owner shall inspect the Works at least **once a year** and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

(2) The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the Owner's office for inspection by the Ministry. The logbook shall include the following:

(a) the name of the Works; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

5. MONITORING AND REPORTING

(1) The Owner shall carry out a monitoring program for the inspection and maintenance of the Works as outlined in this Approval, and shall copy the Water Supervisor on any and all reports related to the operation and maintenance of the Works.

6. SPILL CONTINGENCY AND POLLUTION PREVENTION PLAN

(1) Upon commencement of operation of the Works, the Owner shall implement a Spill Contingency and Pollution Prevention Plan that outlines procedures as to how to mitigate the impacts of a spill within the area serviced by the Works and/or prevent pollution incidents. The said plan shall include as a minimum, but not limited to:

- (a) the name, job title and location (address) of the Owner, person in charge, management or control of the 109 Iber Road site;
- (b) the name, job title and 24-hour telephone number of the person(s) responsible for activating the Spill Contingency and Pollution Prevention Plan;
- (c) a site plan drawn to scale showing the facility, nearby buildings, streets, catchbasins & manholes, drainage patterns (including direction(s) of flow in storm sewers) and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);
- (d) steps to be taken to report, contain, clean up and dispose of contaminants following a spill;
- (e) a listing of telephone numbers for: local clean-up companies who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and MOE Spills Action Centre 1-800-268-6060;
- (f) Materials Safety Data Sheets (MSDS) for each and every hazardous material which may be transported or stored within the area serviced by the Works;
- (g) the means (internal corporate procedures) by which the Spill Contingency and Pollution Prevention Plan is activated;
- (h) a description of the spill response and pollution prevention training provided to employees assigned to work in the area serviced by the Works, the date(s) on which the training was provided and to whom;
- (i) an inventory of response and clean-up equipment available to implement the Spill Contingency and Pollution Prevention Plan, location and date of maintenance/replacement if warranted, including testing and calibration of the equipment; and
- (j) the date on which the Spill Contingency and Pollution Prevention Plan was prepared and subsequently, amended.

(2) The Spill Contingency and Pollution Prevention Plan shall be kept in a conspicuous place near the reception area on site.

(3) The Spill Contingency and Pollution Prevention Plan will be amended from time to time as needed by changes in the operation of the facility or to reflect updates in the Municipal By-Laws, or improved Best Management Practices by the Owner.

7. TEMPORARY EROSION AND SEDIMENT CONTROL

(1) The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every **two (2) weeks** and after each significant storm event (a significant storm event is defined as a minimum of 25 mm of rain in any 24 hour period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly .

(2) The Owner shall maintain records of inspections and maintenance which shall be made available

inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

8. RECORD KEEPING

The Owner shall retain for a minimum of **five (5) years** from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

Schedule "A"

1. Application for Environmental Compliance Approval , dated August 4, 2015 and received on August 17, 2015, submitted by 8769028 Canada Inc.;
2. Storm Water Management Report , dated August 6, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.;
3. Servicing Brief , dated August 6, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.; and
4. Engineering Drawings - 14014-C1 – C14 , dated May 23, 2014, prepared by D. B. Gray Engineering Inc. for 8769028 Canada Inc.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which approval was granted. This Condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that any subsequent Owner of the Works is made aware of the Approval and continue to operate the Works in compliance with it.
4. Condition 4 is included to require that the Works be properly operated and maintained such that the environment is protected.
5. Condition 5 is included to enable the Owner to evaluate and demonstrate the performance of the Works on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works do not cause any impairment of the receiving watercourse.
6. Condition 6 is included to ensure that the Ministry is immediately informed of the occurrence of an emergency or otherwise abnormal situation so that appropriate steps are taken to address the immediate concerns regarding the protection of public health and minimizing environmental damage and to be able to devise an overall abatement strategy to prevent long term degradation and the re-occurrence of the situation.
7. Condition 7 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving

8. Condition 8 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the
purposes of Part II.1 of the
Environmental Protection Act
Ministry of the Environment and
Climate Change
135 St. Clair Avenue West, 1st
Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 11th day of December,
2015

Gregory Zimmer, P.Eng.
Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

JW/

c: District Manager, MOECC, Ottawa District Office



Ministry
of the
Environment

Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 1015-6CANY3

Torbram Electric Supply Corporation
25 Van Kirk Drive
Brampton, Ontario
L7A 1A6

Site Location: Torbram Electric
150 Iber Road, Part of Lot 14, Registered Plan 4M-658
Ottawa City, Ontario
K2S 1E7

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a **stormwater management facility** to be constructed to service Torbram Electric warehouse/office development, at 150 Iber Road, Part of Lot 14, Registered Plan 4M-658, in the City of Ottawa, comprising the following:

Storage Component (for the 100 year storm event)

- storage provided on roof top of 39 cubic metres;
- storage provided on surface ponding of 28 cubic metres;

Flow Control (for the 100 year storm event)

- three (3) roof drains, releasing the flow at 4.6 L/s for a water depth of 123 mm;
 - one (1) flow control device in catchbasin "CB No.1", rated at 5.0 L/s for a head of 0.65 m;
 - one (1) flow control device in catchbasin "CB No.2", rated at 3.9 L/s for a head of 0.66 m; and
 - one (1) flow control device in catchbasin "CB No.3", rated at 2.3 L/s for a head of 0.75 m;
- discharging to the existing roadside ditches on Iber Road and Harry Douglas Drive;

all in accordance with the application dated March 14, 2005 and received on March 17, 2005, including a Stormwater Management Report, final plans, specifications and other supporting documentation prepared by Simmering & Associates Ltd.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*Owner*" means Torbram Electric Supply Corporation, and includes its successors and assignees; and
- (3) "*Works*" means the sewage works described in the Owner's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

CONTENT COPY OF ORIGINAL

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. OPERATION AND MAINTENANCE

3.1 The *Owner* shall carry out and maintain an annual inspection and maintenance program on the operation of the stormwater management works in accordance with the manufacturer's recommendation.

3.2 After a two (2) year period, the District Manager of the MOE Ottawa District Office may alter the frequency of inspection of the stormwater management works if he/she is requested to do so by the *Owner* and considers it acceptable upon review of information submitted in support of the request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is imposed to ensure that the stormwater management works are operated and maintained without any adverse impact on the environment.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;

CONTENT COPY OF ORIGINAL

4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 16th day of May, 2005

Aziz Ahmed, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

NH/
c: District Manager, MOE Ottawa District Office
Scott Taylor, Simmering & Associates Ltd.

Content Copy Of Original



Ministry of the Environment
Ministère de l'Environnement

ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 9230-95LSBM
Issue Date: March 22, 2013

City of Ottawa
100 Constellation Crescent
Ottawa, Ontario
K2G 6J8

Site Location: City of Ottawa Works Garage and Offices Project
110 Iber Road
City of Ottawa
K2S 1E9

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the establishment of stormwater management Works to serve the 110 Iber Road site as part of the City of Ottawa Works Garage and Offices Project, in the City of Ottawa, for the collection and disposal of stormwater runoff from a total catchment area of 1.17 ha, to attenuate post-development peak flows to allowable release levels, discharging to the existing roadside ditch located along Iber Road and ultimately to Pool Creek River, for all storm events up to and including the 100-year return storm, consisting of the following:

surface storage provided in the southwest portion of the site, on the 1,200 m² parking lot area, having an available storage volume of approx. 156 m³ and a maximum ponding depth of 0.3 m, discharging to a stormwater storage channel;

underground storage provided in a stormwater storage channel (clear stone storage area), located under the south ramp, having a total available storage volume of 167 m³, consisting of a 43 m long, 14.7 m wide and 0.58 m deep layer of 75 mm diameter clear stone surrounded by a geotextile fabric, complete with a 43 m long 150 mm diameter perforated subdrain located at the bottom of the storage area, discharging via a 150 mm diameter perforated outlet pipe to a stormwater management dry pond;

a stormwater management dry pond located in the landscaped area in the southeast portion of the site, adjacent to Iber Road, designed to accommodate up to and including the 100-year return storm runoff from a catchment area of 1.17 ha, having a total active storage volume of 57 m³ and a maximum ponding depth of 0.5 m, complete with a 150 mm diameter perforated inlet sudrain, a 200 mm diameter inlet pipe, a berm along the east side of the pond and a 150 mm deep layer of 75 mm diameter clear stone on the bottom of the pond, discharging via a 150 mm diameter outlet pipe allowing a maximum discharge of 37 L/s (100-year return storm) to the existing roadside ditch located along Iber Road and ultimately to Pool Creek River;

the design report entitled "Report 110 Iber Road -Stormwater Management Report, Ottawa, Ontario" dated August 10, 2012, final plans and specifications prepared by Morrison Hershfield Limited.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation.
2. "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Part II.1 of the Environmental Protection Act;
3. "District Manager" means the District Manager of the Ottawa District Office of the Ministry;
4. "Ministry" means the Ontario Ministry of the Environment;
5. "Owner" means City of Ottawa, and includes its successors and assignees; and
6. "Works" means the sewage works described in the Owner's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1.1 The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, the application for approval of the Works and the submitted supporting documents and plans and specifications as listed in this Approval.

1.3 Where there is a conflict between a provision of any submitted document referred to in this Approval and the Conditions of this Approval, the Conditions in this Approval shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.

2. EXPIRY OF APPROVAL

been constructed within five (5) years of the date of this Approval.

3. CHANGE OF OWNER

The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of Owner;

(b) change of address of the Owner;

(c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act , R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; and

(d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

4. SPILL CONTINGENCY PLAN

4.1 Within six (6) months from the issuance of this Approval, the Owner shall implement a spill contingency plan - that is a set of procedures describing how to mitigate the impacts of a spill within the area serviced by the Works. This plan shall include as a minimum:

(i) the name, job title and location (address) of the Owner, person in charge, management or person(s) in control of the facility;

(ii) the name, job title and 24-hour telephone number of the person(s) responsible for activating the spill contingency plan;

(iii) a site plan drawn to scale showing the facility, nearby buildings, streets, catchbasins & manholes, drainage patterns (including direction(s) of flow in storm sewers), any receiving body(ies) of water that could potentially be significantly impacted by a spill and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);

(iv) steps to be taken to report, contain, clean up and dispose of contaminants following a spill;

(v) a listing of telephone numbers for: local clean-up company(ies) who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and MOE Spills Action Centre 1-800-268-6060;

(vi) Materials Safety Data Sheets (MSDS) for each hazardous material which may be transported or stored within the area serviced by the Works;

(vii) the means (internal corporate procedures) by which the spill contingency plan is activated;

(viii) a description of the spill response training provided to employees assigned to work in the area serviced by the Works, the date(s) on which the training was provided and by whom;

(ix) an inventory of response and clean-up equipment available to implement the spill contingency plan, location and date of maintenance/replacement if warranted; and

(x) the date on which the contingency plan was prepared and subsequently, amended.

4.2 The spill contingency plan shall be kept in a conspicuous, readily accessible location on-site.

4.3 The spill contingency plan shall be amended from time to time as required by changes in the operation of the facility.

5. OPERATION AND MAINTENANCE

5.1 The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater management Works do not constitute a safety or health hazard to the general public.

5.2 The Owner shall ensure that the design storage volumes are maintained at all times.

5.3 The Owner shall undertake an inspection of the condition of the stormwater management Works, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management Works to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid reduction of capacity of the Works. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.

5.4 The Owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the Owner's corporate office for inspection by the Ministry. The logbook shall include the following:

(a) the name of the Works; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed and method of clean-out of the stormwater management Works.

6. RECORD KEEPING

The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this Approval.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the Works are built and operated in the manner in which they were described for review and upon which Approval was granted. This Condition is also included to emphasize the precedence of Conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The Condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this Approval of the existence of this Approval.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included to ensure that the Owner will implement the Spill Contingency Plan, such that the environment is protected and deterioration, loss, injury or damage to any person(s) or property is prevented.

5. Condition 5 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from this approved stormwater management Works are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the Works. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design. Furthermore, Condition 5 is included to ensure that the stormwater management Works are operated and maintained to function as designed.

6. Condition 6 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the
purposes of Part II.1 of the
Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor
12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 22nd day of March, 2013

Sherif Hegazy, P.Eng.

Director

appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

KC/

c: District Manager, MOE Ottawa District Office

Meghan MacSween, P.Eng., Morrison Hershfield Limited



Ministry
of the
Environment

Ministère
de
l'Environnement

CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 8466-5SDK27

Almicnic Holdings Inc.
40 Kenins Crescent
Kanata, Ontario
K2K 3E5

Site Location: 185 Iber Road
Ottawa City,

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a stormwater management facility to serve an office and warehouse on a site area of approximately 0.69 hectare at the above location, as follows:

- one (1) stormwater management pond at the south-east corner of the site with a total volumetric capacity of over 75 cubic metres for collection of runoff from the site with discharge to an adjacent ditch via a 600 mm high by 600 mm wide V-notched outlet control structure at a maximum rate of 22.3 litres/second; and
- all other appurtenances essential for proper operation of the aforementioned sewage works;

all in accordance with the Application for Approval of Industrial Sewage Works dated July 23, 2003, and the associated documents submitted by the President, Almicnic Holdings Inc., Kanata, Ontario.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"District Manager" means the District Manager of the Ottawa District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means Almicnic Holdings Inc. and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications.

2. OPERATION AND MAINTENANCE

(1) The Owner shall undertake an inspection of the condition of the stormwater management facility, at least four (4) times a year, and undertake any necessary cleaning and maintenance to prevent the excessive build-up of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted.

2. Condition 2 is included to ensure that any build-up of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 21st day of October, 2003

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

AC/

c: District Manager, MOE Ottawa

Todd Perry, McIntosh Perry Consulting Engineers Ltd.


CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
 NUMBER 7685-7C8NXM
 Issue Date: March 27, 2008

GML Industrial Fund GP Ltd.
 200 Tremblay Rd
 Ottawa, Ontario
 K1G 3H5

Site Location: 200 Iber Road
 200 Iber Rd
 Ottawa City

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a **stormwater management facility** to be constructed at 200 Iber Road, in the City of Ottawa, comprising the following:

Storage Component (for the 5 year storm event)

- storage on roof top of approximately 50.5 cubic metres;
- storage in the ditch ponding of approximately 183.1 cubic metres;

Storage Component (for the 100 year storm event)

- storage on roof top of approximately 103.8 cubic metres;
- storage in the ditch ponding of approximately 446.5 cubic metres;

Flow Control

- eleven(11) roof drains, releasing the flow at 20.48 L/s for a maximum depth of 143 mm;
- one (1) 164 mm diameter orifice rated at 40.5 L/s for a head of 0.52 m, discharging to ditch along Iber Road;
- one (1) 215 mm diameter orifice rated at 63.8 L/s for a head of 0.43 m, discharging to ditch along the north property limit;

all in accordance with the application dated August 14, 2007 and received on August 24, 2007, and all supporting documentation and information associated with the application including stormwater management report, final plans and specifications prepared by David McManus Engineering Ltd.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*Owner*" means **GML Industrial Fund GP Ltd.**, and includes **its** successors and assignees; and
- (3) "*Works*" means the sewage works described in the *Owner's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

2. EXPIRY OF APPROVAL

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. OPERATION AND MAINTENANCE

3.1 The *Owner* shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater works do not constitute a safety or health hazard to the general public.

3.2 The *Owner* shall undertake an inspection of the condition of the stormwater management system, at least once a year, and undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the above noted stormwater management system to prevent the excessive build-up of sediment, debris and/or decaying vegetation to avoid reduction of capacity of the pond. The *Owner* shall also regularly inspect and clean out the inlet to and outlet from the works to ensure that these are not obstructed.

3.3 The *Owner* shall prepare operational manual which should include, but not limited to, frequency and method of clean-out of stormwater management works within six (6) months from the date of issuance of this *Certificate* or the commissioning of the works. The *Owner* shall keep the operations manual up to date with such revisions as may be required. Upon request, the *Owner* shall make the manual available for inspection by *Ministry* personnel and furnish a copy to the *Ministry*.

3.4 The *Owner* shall maintain a logbook to record the results of all inspections and any cleaning and maintenance operations undertaken and shall make the logbook available for inspection by the *Ministry* upon request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the *Owner* his/her responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

CONTENT COPY OF ORIGINAL

3. Condition 3.1 is imposed because it is not in the public interest for the *Director* to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this *Ministry*.

4. Condition 3.2 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the works. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design, and to prevent stormwater impounded in the works from becoming stagnant.

5. Conditions 3.3 and 3.4 are included to ensure that the stormwater management facility is operated and maintained to function as designed.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 27th day of March, 2008

Zafar Bhatti, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

AM/
c: District Manager, MOE Ottawa
Mike Keating, David McManus Engineering Ltd.



Ministry
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AMENDED CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 9025-6EWRL8

Ontario

BVS Holdings Ltd.
118 Iber Road
Ottawa, Ontario
K2S 1E9

Site Location: Excelcon Business Centre
118 Iber Road
Ottawa City, Ontario

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

stormwater management facilities and appurtenances to service Excelcon Business Centre at 118 Iber Road, in the City of Ottawa, comprising the following:

Storage Component (for the 100 year storm event)

- storage in rooftops of approximately 84 cubic metres;
- storage in a swale and on surface ponding of approximately 220 cubic metres;

Flow Control

- roofdrains on the roof top (0.13 ha) of the existing buildings, restricting the release rate at 8 L/s at a maximum depth of 100 mm;
- roofdrains on the rooftop (0.13 ha) of the new buildings, restricting the release rate at 8 L/s at a maximum depth of 100 mm; and
- an 182 mm diameter orifice plate, rated at 63 L/s for a head of 0.83 m, discharging to the existing roadside ditch on Iber Road;

all in accordance with the application dated May 30, 2005 and received on June 14, 2005, and all supporting documentation and information including a design brief revised June 1, 2005, a design brief dated Stage I/1997, final plans and specifications prepared by Capital Engineering Group Ltd.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (1) "*Certificate*" means this entire Certificate of Approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;
- (2) "*Owner*" means BVS Holdings Ltd., and includes its successors and assignees; and
- (3) "*Works*" means the sewage works described in the *Owner's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

1.1 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

CONTENT COPY OF ORIGINAL

1.2 Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

1.3 Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

1.4 Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

1.5 The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

2.1 The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. OPERATION AND MAINTENANCE

3.1 The *Owner* shall carry out and maintain an annual inspection and maintenance program on the operation of the stormwater management works in accordance with the manufacturer's recommendation.

3.2 After a two (2) year period, the District Manager of the MOE District Office may alter the frequency of inspection of the stormwater management works if he/she is requested to do so by the *Owner* and considers it acceptable upon review of information submitted in support of the request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is imposed to ensure that the stormwater management works are operated and maintained without any adverse impact on the environment.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3-1002-97-006 issued on August 26, 1997

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

CONTENT COPY OF ORIGINAL

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 5th day of August, 2005

Aziz Ahmed, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

NH/
c: District Manager, MOE Ottawa District Office
Andy Naoum, P.Eng., Capital Engineering Group Ltd.



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CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 3222-56PSBR

Gary's Radiator & Welding Ltd.
323 Coventry Road
Ottawa, Ontario
K1K 3X6

Site Location: Kingdom Auto Parts Warehouse
Lots 9 and 10, Registered Plan 4M-658
City of Ottawa

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

stormwater management system to serve the Kingdom Auto Parts Warehouse, in the City of Ottawa, consisting of the following:

POND A

stormwater management pond (known as Pond A) located adjacent to Iber Road, collecting up to 100-year storm event runoff from an area of 0.38 ha, having a total storage volume of 70 m³, complete with overflow channel and outlet structure consisting of a 300 mm diameter CSP complete with a 104 mm diameter orifice plate allowing a maximum discharge of 16 L/s (100-year storm event) to the existing ditch along Iber Road and ultimately to Carp River and all other items necessary to have a complete and operable stormwater management system;

POND B

stormwater management pond (known as Pond B) located in the north-east corner of the site, collecting up to 100-year storm event runoff from an area of 0.97 ha, having a total storage volume of 150 m³, complete with overflow channel and outlet structure consisting of a 300 mm diameter CSP complete with a 200 mm diameter orifice plate allowing a maximum discharge of 62 L/s (100-year storm event) to the existing ditch along the north side of the site and ultimately to Carp River and all other items necessary to have a complete and operable stormwater management system;

STORM SEWER

150 mm diameter storm sewer to serve the loading area, discharging to the existing ditch along the north side of the site and ultimately to Carp River;

all in accordance with the application dated December 13, 2001, including report entitled "Stormwater Management Report, Kingdom Auto Parts Proposed Warehouse, Iber Road, Ottawa, Ontario" dated February 1, 2001, Revised June 21, 2001, prepared by Simmering & Associates Ltd., Consulting Engineers.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Owner" means Gary's Radiator & Welding Ltd.;

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the stormwater works do not constitute a safety or health hazard to the general public.
2. The Owner shall ensure that sediment and excessive decaying vegetation are removed from the above noted stormwater

CONTENT COPY OF ORIGINAL

management system at such a frequency as to prevent the excessive buildup and potential overflow of sediment and/or decaying vegetation into the receiving watercourse.

3. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

4. Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed because it is not in the public interest for the Director to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this Ministry.

2. Condition 2 is included as regular removal of sediment and excessive decaying vegetation from this approved stormwater management system are required to mitigate the impact of sediment and/or decaying vegetation on the downstream receiving watercourse. It is also required to ensure that adequate storage is maintained in the stormwater management facilities at all times as required by the design.

3. Conditions 3 and 4 are imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. These conditions are also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the

CONTENT COPY OF ORIGINAL

Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 31st day of January, 2002

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

KC/

c: District Manager, MOE Ottawa District Office
Douglas Kerr, E.I.T., Simmering & Associates Ltd.
R. L. Phillips, C.E.T., Program Manager-Ottawa West, City of Ottawa



**AMENDMENT TO CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS**

NUMBER 4789-6KJJT3

Notice No. 1

Issue Date: March 12, 2008

154 Iber Road Corp.
204-880 Lady Ellen Pl NOTICE -2
Ottawa, Ontario
K1Z 5L9

Site Location: 164 Iber Road,
The City of Ottawa.

You are hereby notified that I have amended Certificate of Approval No. 4789-6KJJT3 issued on January 27, 2006 for the City of Ottawa, as follows:

- a new 200mm diameter storm sewer inlet to the existing Granite Park Stormwater Management Facility from Pond "B", to be constructed in the City of Ottawa;

all in accordance with the application from Iber Road Corp., dated September 7, 2007, including final plan sketch #1 dated February 12, 2008 and specifications prepared by Scott MacKichan, P.Eng., of Novatech Engineering Consultants Ltd.

This Notice shall constitute part of the approval issued under Certificate of Approval No. 4789-6KJJT3 dated January 27, 2006

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

CONTENT COPY OF ORIGINAL

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 12th day of March, 2008

Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

MN/
c: District Manager, MOE Ottawa
Clerk, the City of Ottawa.
Scott Makichan, P.Eng, Novatech Engineering Consultants Ltd.



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CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 1916-5XEMBL

3843173 Canada Inc.
93 Hines Road, No. 1
Kanata, Ontario
K2K 2M5

Site Location: L-D Tool and Die
139 Iber Road, Lot 5, Part 4/5, Plan 4M-658
Ottawa City,

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

the establishment of sewage works for the collection, transmission and disposal of stormwater runoff and to attenuate post-development peak flows to pre-development levels, for all storm events up to and including the 100-year return storm, consisting of the following:

- three (3) stormwater ponds with total ponding volume requirement of approximately 86 cubic metres for the 5-year return storm event and 154 cubic metres for the 100-year return storm event, two of the ponds being equipped with 200 millimetre diameter control discharge pipe and a 250 millimetre diameter control discharge pipe for the third pond;

all in accordance with the Application for Approval of Industrial Sewage Works dated January 7, 2004 and signed by David Tait, President of 3843173 Canada Inc. and all supporting information.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act*;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means 3843173 Canada Inc. and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

(2) Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between

the listed submitted documents, the document bearing the most recent date shall prevail.

2. OPERATION AND MAINTENANCE

(1) The Owner shall undertake an inspection of the condition of the stormwater management ponds, at least once a year, and undertake any necessary cleaning and maintenance to prevent the excessive buildup of sediment and/or decaying vegetation.

(2) The owner shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site for inspection by the Ministry.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. This condition is included to ensure that any buildup of sediment and/or decaying vegetation does not impair the performance of the stormwater management facility.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

CONTENT COPY OF ORIGINAL

DATED AT TORONTO this 14th day of April, 2004

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

KD/
c: District Manager, MOE Ottawa
Neil S. Caldwell, Jp2g Consultants Inc.

Pond 1

Pond Inflow Summary

Drainage Areas

| | | | |
|--------------------------------|-------|----|--|
| Drainage Area to North Forebay | 17.41 | ha | |
| Drainage Area Imperviousness | 73 | % | |
| Drainage Area to South Forebay | 56.4 | ha | |
| Drainage Area Imperviousness | 70 | % | |
| | | | |
| Total Pond Drainage Area | 78.10 | ha | <i>Refer to Drawing 108195-STM for drainage area delineation</i> |
| Total Area Imperviousness | 71.50 | % | |

Minor System Inflows

| Table 1: Minor System Inflow Summary | |
|---|---------------------------------|
| Design Storm | Inflow (m³/s) |
| 15mm | - |
| 25mm | 6.372 |
| 2-year | 7.688 |
| 5-year | 10.292 |
| 10-year | 11.163 |
| 100-year | 13.732 |

Flows determined from the PCSWMM model

Pond 1

North Forebay Design

| Design Storm | Inflow (m ³ /s) |
|--------------|----------------------------|
| 15mm | |
| 25mm | 1.686 |
| 2-year | 2.206 |
| 5-year | 2.814 |
| 10-year | 3.120 |
| 100-year | 3.491 |

Flows determined from the PCSWMM model

Settling Calculation: $Dist = \sqrt{\frac{rQ_p}{V_s}}$

Equation 4.5 of the SWM Planning and Design Manual (MOE, 2003)

Length to width ratio (r): 3.5 :1

Settling Velocity (V_s): 0.000593 m/s

Per Table 5

Peak Water Quality Flow (Q_p): 1.686 m³/s

Per Section 3.5 of the SWMP Planning and Design Manual (MOE 1994)

Dist (Forebay Length): 100 m

Dispersion/Resuspension Calculation: $Dist = \frac{8Q}{dV_f}$

Equation 4.6 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Velocity, V: 0.5 m/s

Per Section 4.6.2 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Depth, D: 1.5 m

Effective Depth, d: 1.04 m

Forebay Depth - Sediment Accumulation

Inlet Flow Rate, Q: 1.686 m³/s

(Water Quality event)

Dist (Forebay Length): 17.9872 m

Forebay Length based on d: 26 m

| Characteristic | Minimum | Provided |
|-------------------------------------|---------|----------|
| Length (m) | 100 | 75 |
| Bottom Width (m) | 2.2 | 6.0 |
| Top Width (m) | 29 | 15 |
| L:W Ratio (H:1V) | 2 | 5.0 |
| Minimum Depth (m) | 1.5 | 1.5 |
| Approx. Flow Area (m ²) | - | 16 |
| Average Velocity (m/s) | - | 0.11 |
| Approx. Volume (m ³) | - | 1181 |

Trapezoidal cross-section assumed

Must be less than 0.15m/s

Pond 1

South Forebay Design

| Design Storm | Inflow (m ³ /s) |
|--------------|----------------------------|
| 15mm | |
| 25mm | 3.987 |
| 2-year | 5.239 |
| 5-year | 7.461 |
| 10-year | 8.052 |
| 100-year | 9.500 |

Flows determined from the PCSWMM model

Settling Calculation: $Dist = \sqrt{\frac{rQ_p}{V_s}}$

Equation 4.5 of the SWM Planning and Design Manual (MOE, 2003)

Length to width ratio (r): 4.5 :1

Settling Velocity (V_s): 0.000593 m/s

Per Table 5

Peak Water Quality Flow (Q_p): 3.987 m³/s

Per Section 3.5 of the SWMP Planning and Design Manual (MOE 1994)

Dist (Forebay Length): 174 m

Dispersion/Resuspension Calculation: $Dist = \frac{8Q}{dV_f}$

Equation 4.6 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Velocity, V: 0.5 m/s

Per Section 4.6.2 of the SWM Planning and Design Manual (MOE, 2003)

Forebay Depth, D: 1.5 m

Effective Depth, d: 1.06 m

Forebay Depth - Sediment Accumulation

Inlet Flow Rate, Q: 3.987 m³/s

(Water Quality event)

Dist (Forebay Length): 42.53067 m

Effective d Forebay Length: 60 m

| Characteristic | Minimum | Provided |
|-------------------------------------|---------|----------|
| Length (m) | 174 | 135 |
| Bottom Width (m) | 5.3 | 14.0 |
| Top Width (m) | 39 | 23 |
| L:W Ratio (H:1V) | 2 | 5.9 |
| Minimum Depth (m) | 1.5 | 1.5 |
| Approx. Flow Area (m ²) | - | 28 |
| Average Velocity (m/s) | - | 0.14 |
| Approx. Volume (m ³) | - | 3746 |

Trapezoidal cross-section assumed

Must be less than 0.15m/s

Pond 1

Outlet Design

Extended Detention

Drawdown Time:
$$t = \frac{2A_p}{CA_o(2g)^{0.5}} (h_1^{0.5} - h_2^{0.5})$$
 Equation 4.10 of the SWM Planning and Design Manual (MOE, 2003)

Pond Surface Area (A_p): 12553 m²

Orifice Diameter: 220 mm

Orifice Flow Area (A_o): 0.0380 m²

Orifice Coefficient (C): 0.61

Per Section 8.3.8.1 of the OSDG.

Extended Detention Depth (h): 0.35 m

Drawdown Time (t): 40.2 hours

Pond 1

Quantity Control

Table 8: Quantity Control Summary

| Service Level | Elevation (m) | Stage (m) | Outflow (L/s) | | | | | |
|---------------|---------------|-----------|---------------|-----------|-----------|-----------|-------|--------|
| | | | ED | Struct. 1 | Struct. 2 | Struct. 3 | Total | Target |
| NWL | 97.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ex. Det | 98.00 | 0.35 | 50 | 0 | 0 | 0 | 50 | 50 |
| 2-year | 98.57 | 0.92 | 92 | 998 | 0 | 0 | 1090 | 1710 |
| 5-year | 98.80 | 1.15 | 105 | 1673 | 0 | 0 | 1778 | 2670 |
| 100-year | 99.40 | 1.75 | 132 | 3694 | 391 | 0 | 4217 | 4750 |
| Overflow | 99.70 | | 143 | 4758 | 1231 | 2432 | 8564 | |

Extended Detention Orifice

C 0.61
 Diameter 220 mm
 Area 0.0380 m²
 Invert 97.65 m
 C/L 97.76 m
 $Q_{\text{orifice}} = C \times A \times (2 \times g \times H)^{0.5}$

Structure 1 (Rectangular Weir)

Weir Coefficient (C) 1.84
 Bottom Width 1.55 m
 Bottom of Weir Elevation 98.05 m
 $Q \text{ (m}^3\text{/s)} = C \times (L - 0.2H) \times H^{(3/2)}$

Structure 2 (Rectangular Weir)

Weir Coefficient (C) 1.84
 Bottom Width 1.75 m
 Bottom of Weir Elevation 99.15 m
 $Q \text{ (m}^3\text{/s)} = C \times (L - 0.2H) \times H^{(3/2)}$

Structure 3 (Broad-Crested Weir)

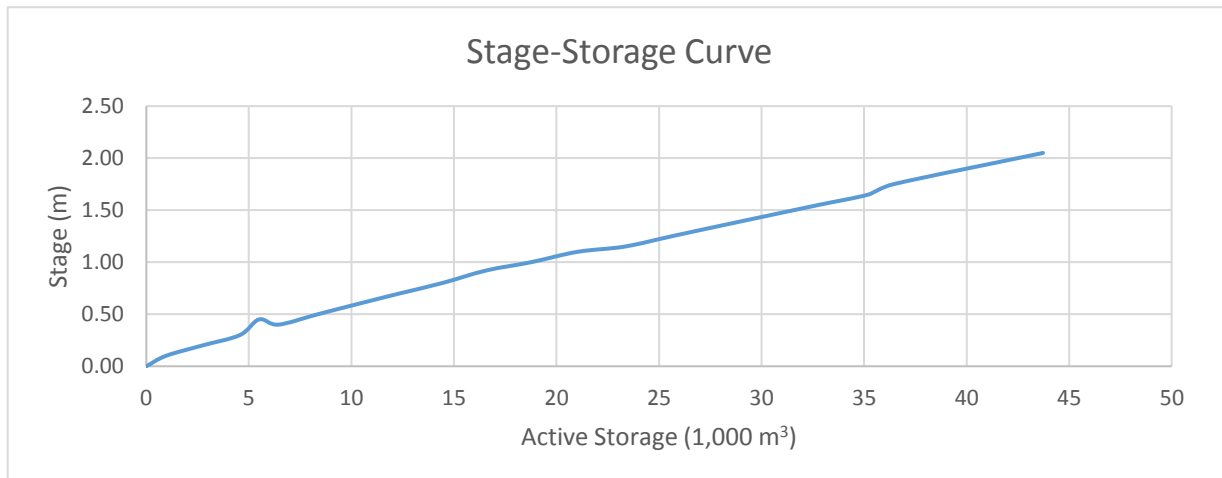
Weir Coefficient (C) 1.48
 Bottom Width 10.0 m
 Bottom of Weir Elevation 99.40 m
 $Q \text{ (m}^3\text{/s)} = C \times L \times H^{(3/2)}$

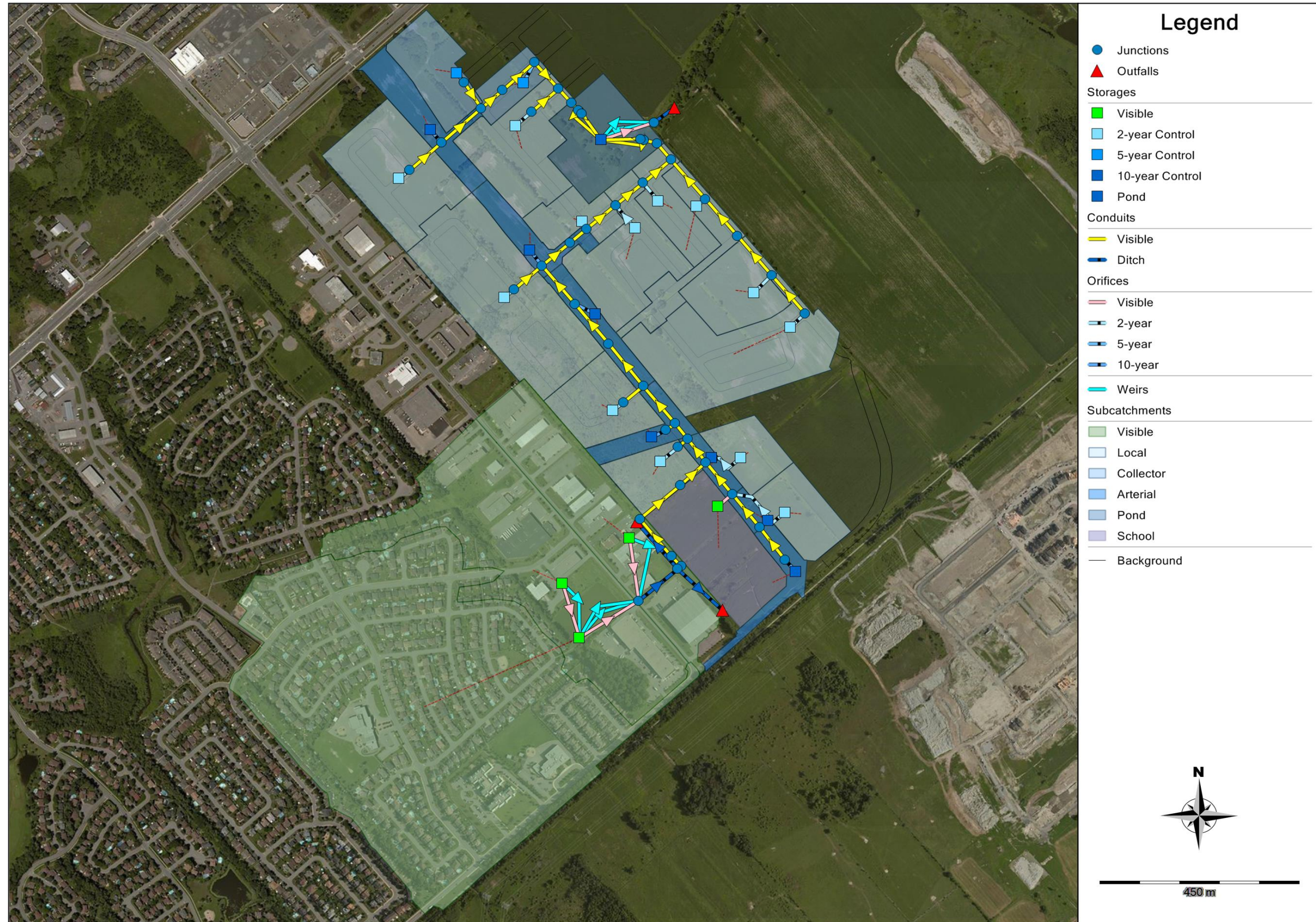
Pond 1

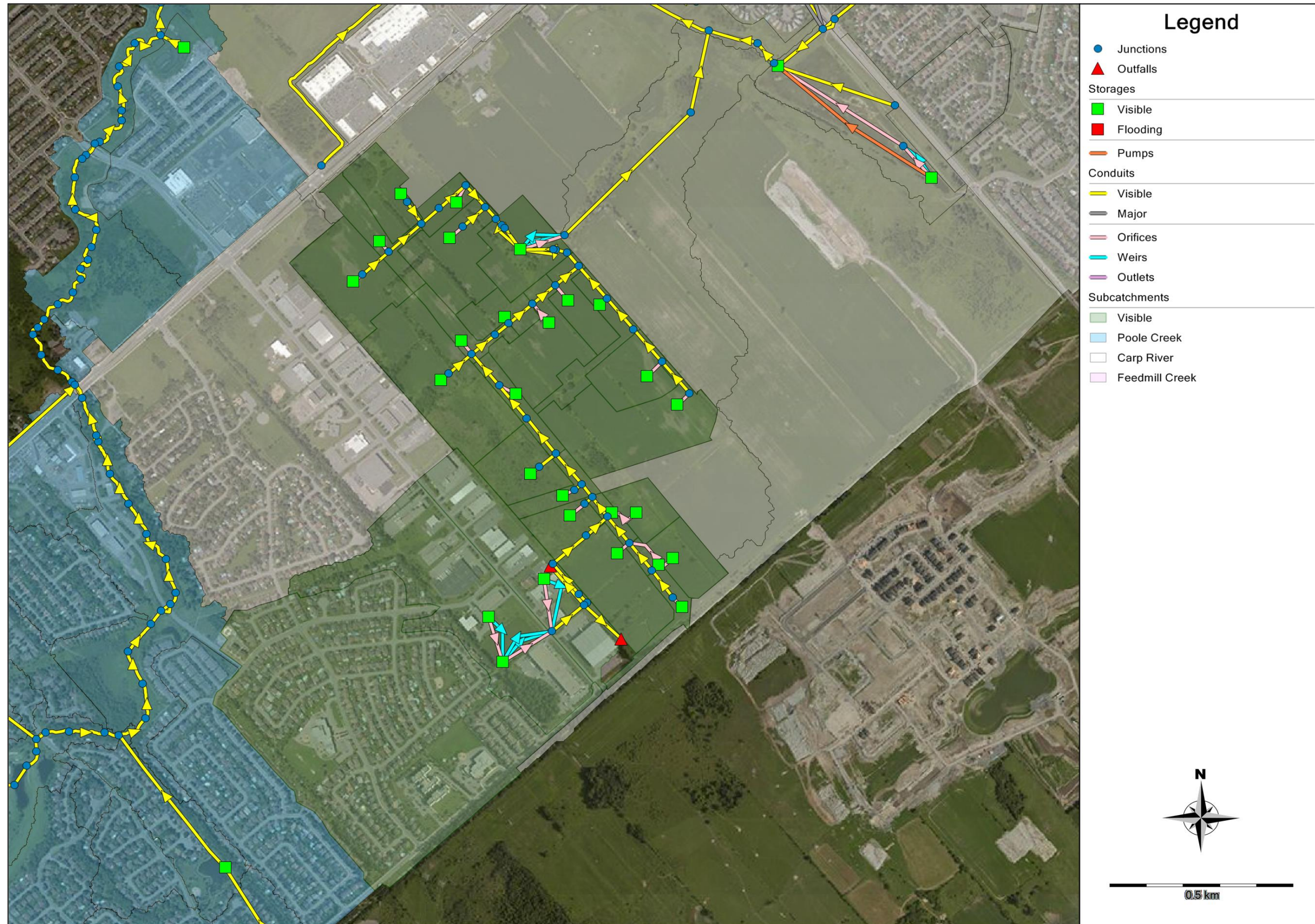
Pond Design Summary

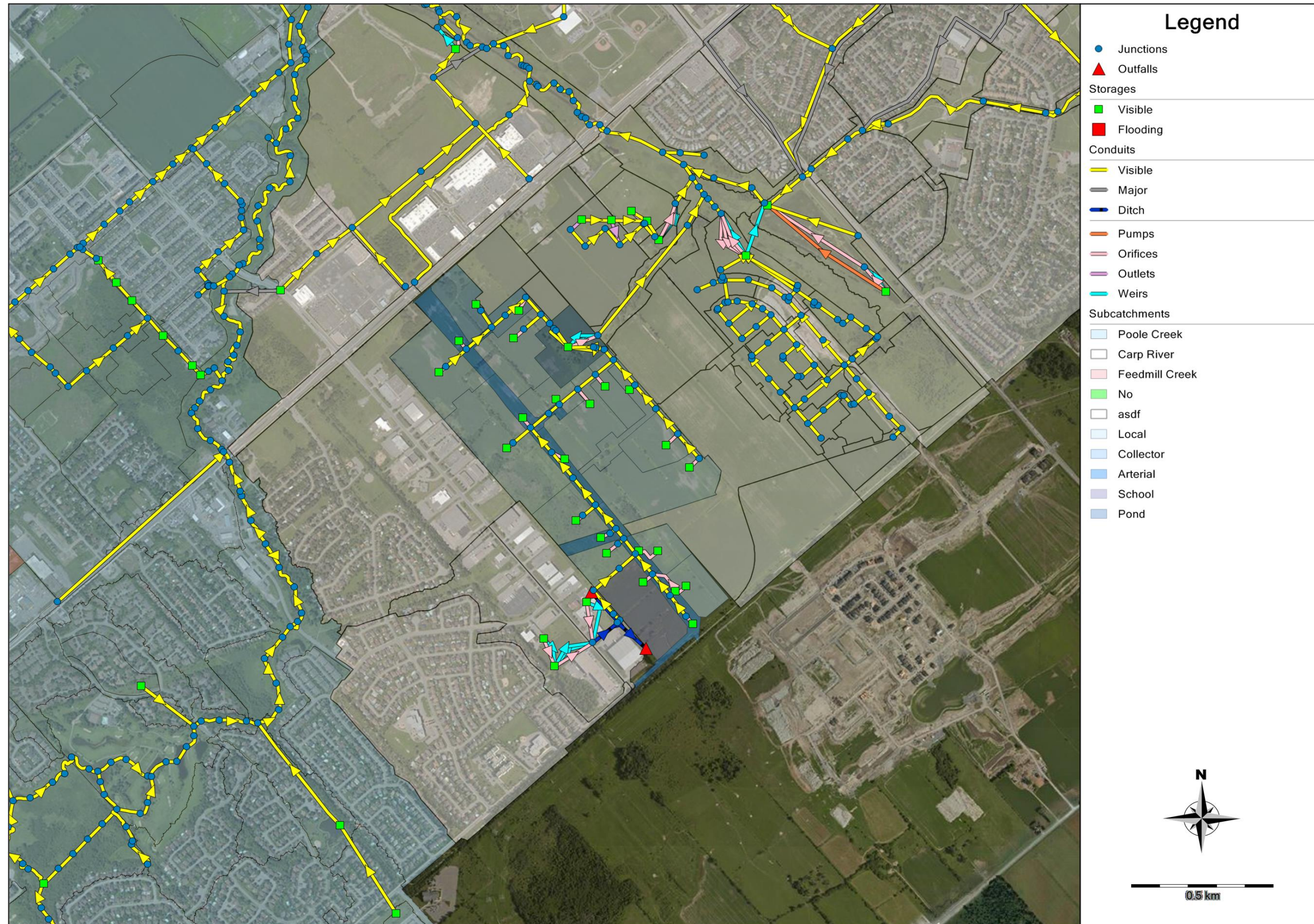
Stage-Storage-Discharge Table

| Table 9: Stage-Storage-Discharge | | | | | |
|----------------------------------|---------------|-----------|--------------------------------|---------------------------------|-------------------------------|
| Service Level | Elevation (m) | Stage (m) | Total Volume (m ³) | Active Volume (m ³) | Discharge (m ³ /s) |
| Bottom | 96.15 | - | 0 | | |
| NWL | 97.65 | 0.00 | 22298 | 0 | 0 |
| | 97.75 | 0.10 | 23254 | 956 | 0 |
| | 97.85 | 0.20 | 25037 | 2739 | 31 |
| | 97.95 | 0.30 | 26863 | 4565 | 45 |
| Ex. Det. | 98.10 | 0.45 | 27794 | 5496 | 92 |
| | 98.05 | 0.40 | 28736 | 6438 | 55 |
| | 98.15 | 0.50 | 30663 | 8365 | 153 |
| | 98.25 | 0.60 | 32637 | 10339 | 320 |
| | 98.35 | 0.70 | 34658 | 12360 | 529 |
| | 98.45 | 0.80 | 36736 | 14438 | 770 |
| 2-year | 98.57 | 0.92 | 38863 | 16565 | 1090 |
| | 98.65 | 1.00 | 41057 | 18759 | 1320 |
| | 98.75 | 1.10 | 43332 | 21034 | 1622 |
| 5-year | 98.80 | 1.15 | 45619 | 23321 | 1778 |
| | 98.90 | 1.25 | 47933 | 25635 | 2100 |
| | 99.00 | 1.35 | 50287 | 27989 | 2431 |
| | 99.10 | 1.45 | 52672 | 30374 | 2772 |
| | 99.20 | 1.55 | 55070 | 32772 | 3154 |
| | 99.30 | 1.65 | 57507 | 35209 | 3654 |
| 100-year | 99.40 | 1.75 | 58737 | 36439 | 4217 |
| Overflow | 99.70 | 2.05 | 66025 | 43727 | 8564 |









Fernbank Community - Kizell Lands

HGL Elevations



Engineers, Planners & Landscape Architects

| Manhole ID | MH Invert Elevation (m) | T/G Elevation (m) | Outlet pipe invert (m) | Outlet Pipe Diameter (m) | Outlet Pipe Obvert (m) | HGL Elevation (MTO SCS) (m) | WL Above Obvert (MTO SCS) (m) | HGL Elevation (Chicago) (m) | WL Above Obvert (Chicago) (m) |
|---------------|-------------------------|-------------------|------------------------|--------------------------|------------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|
| P1-101 (STM) | 97.65 | 100.80 | 97.65 | 1829.00 | 99.48 | 99.48 | 0.00 | 99.35 | -0.13 |
| P1-103 (STM) | 97.70 | 100.83 | 97.74 | 1829.00 | 99.57 | 99.80 | 0.23 | 99.72 | 0.15 |
| P1-105 (STM) | 97.78 | 101.51 | 98.08 | 1524.00 | 99.60 | 99.96 | 0.36 | 99.89 | 0.29 |
| P1-107 (STM) | 98.35 | 101.67 | 98.20 | 1524.00 | 99.72 | 100.06 | 0.34 | 100.01 | 0.29 |
| P1-109 (STM) | 98.46 | 101.84 | 98.31 | 1524.00 | 99.83 | 100.12 | 0.29 | 100.09 | 0.26 |
| P1-111 (STM) | 98.79 | 102.06 | 98.79 | 1210.00 | 100.00 | 100.33 | 0.33 | 100.33 | 0.33 |
| P1-113 (STM) | 99.17 | 102.30 | 99.17 | 1067.00 | 100.24 | 100.58 | 0.34 | 100.59 | 0.35 |
| P1-147 (STM) | 97.98 | 101.82 | 97.93 | 1956.00 | 99.89 | 100.21 | 0.32 | 100.16 | 0.27 |
| P1-153 (STM) | 98.10 | 102.12 | 98.01 | 1956.00 | 99.97 | 100.34 | 0.37 | 100.26 | 0.29 |
| P1-165 (STM) | 98.23 | 102.43 | 98.10 | 1956.00 | 100.06 | 100.45 | 0.39 | 100.35 | 0.29 |
| P1-169 (STM) | 98.31 | 102.61 | 98.15 | 1956.00 | 100.11 | 100.52 | 0.41 | 100.41 | 0.30 |
| P1-171 (STM) | 98.44 | 102.51 | 98.29 | 1956.00 | 100.25 | 100.61 | 0.36 | 100.50 | 0.25 |
| P1-173 (STM) | 99.43 | 103.07 | 98.97 | 1524.00 | 100.49 | 100.66 | 0.17 | 100.57 | 0.08 |
| P1-203 (STM) | 98.67 | 103.15 | 98.67 | 1829.00 | 100.50 | 100.94 | 0.44 | 100.82 | 0.32 |
| P1-205 (STM) | 98.91 | 103.66 | 98.91 | 1829.00 | 100.74 | 101.09 | 0.35 | 100.99 | 0.25 |
| P1-207 (STM) | 99.16 | 103.17 | 99.16 | 1829.00 | 100.99 | 101.29 | 0.30 | 101.16 | 0.17 |
| P1-209 (STM) | 100.43 | 103.50 | 100.43 | 762.00 | 101.19 | 101.53 | 0.34 | 101.40 | 0.21 |
| P1-215 (STM) | 99.59 | 102.78 | 99.59 | 1676.00 | 101.27 | 101.51 | 0.24 | 101.32 | 0.05 |
| P1-215a (STM) | 101.06 | 103.39 | 101.06 | 457.00 | 101.52 | 101.91 | 0.39 | 101.64 | 0.12 |
| P1-217 (STM) | 99.89 | 103.31 | 99.89 | 1676.00 | 101.57 | 101.77 | 0.20 | 101.52 | -0.05 |
| P1-219 (STM) | 100.64 | 103.45 | 100.64 | 1210.00 | 101.85 | 101.91 | 0.06 | 101.71 | -0.14 |
| P1-221 (STM) | 100.69 | 102.42 | 100.69 | 762.00 | 101.45 | 101.71 | 0.26 | 101.51 | 0.06 |
| P1-221a(STM) | 99.72 | 102.75 | 99.72 | 1676.00 | 101.40 | 101.64 | 0.24 | 101.42 | 0.02 |
| P1-301 (STM) | 97.70 | 101.25 | 97.70 | 1340.00 | 99.04 | 99.39 | 0.35 | 99.19 | 0.15 |
| P1-303 (STM) | 97.73 | 101.29 | 97.73 | 1340.00 | 99.07 | 99.39 | 0.32 | 99.19 | 0.12 |
| P1-305 (STM) | 97.79 | 101.36 | 97.79 | 1340.00 | 99.13 | 99.40 | 0.27 | 99.25 | 0.12 |
| P1-307 (STM) | 98.48 | 101.56 | 98.48 | 838.00 | 99.32 | 99.65 | 0.33 | 99.56 | 0.24 |
| P1-317 (STM) | 97.91 | 101.44 | 97.91 | 1372.00 | 99.28 | 99.42 | 0.14 | 99.36 | 0.08 |
| P1-319 (STM) | 98.12 | 101.57 | 98.12 | 1372.00 | 99.49 | 99.83 | 0.34 | 99.83 | 0.34 |
| P1-321 (STM) | 98.22 | 101.65 | 98.22 | 1372.00 | 99.59 | 100.02 | 0.43 | 100.02 | 0.43 |
| P1-323 (STM) | 98.89 | 101.72 | 98.89 | 838.00 | 99.73 | 100.27 | 0.54 | 100.30 | 0.57 |

Fernbank Community - Kizell Lands

HGL Elevations



Engineers, Planners & Landscape Architects

| Manhole ID | MH Invert Elevation (m) | T/G Elevation (m) | Outlet pipe invert (m) | Outlet Pipe Diameter (m) | Outlet Pipe Obvert (m) | HGL Elevation (MTO SCS) (m) | WL Above Obvert (MTO SCS) (m) | HGL Elevation (Chicago) (m) | WL Above Obvert (Chicago) (m) |
|------------------|-------------------------|-------------------|------------------------|--------------------------|------------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|
| P1-327 (STM) | 98.82 | 102.05 | 98.82 | 1067.00 | 99.89 | 100.16 | 0.27 | 100.18 | 0.29 |
| P1-337 (STM) | 99.34 | 102.84 | 99.34 | 838.00 | 100.18 | 100.54 | 0.36 | 100.57 | 0.39 |
| P1-349 (STM) | 101.62 | 103.80 | 101.62 | 610.00 | 102.23 | 102.25 | 0.02 | 102.28 | 0.05 |
| P1-351 (STM) | 101.35 | 103.76 | 101.35 | 762.00 | 102.11 | 101.95 | -0.16 | 101.98 | -0.13 |
| P1-EX. 501 (STM) | 101.18 | 104.04 | 101.18 | 1372.00 | 102.55 | 102.69 | 0.14 | 102.44 | -0.11 |
| P1-EX. 502 (STM) | 101.12 | 103.98 | 101.12 | 1372.00 | 102.49 | 102.58 | 0.09 | 102.36 | -0.13 |
| P1-EX. 503 (STM) | 100.87 | 103.75 | 100.87 | 1372.00 | 102.24 | 102.18 | -0.06 | 102.00 | -0.24 |
| P1-EX. 504 (STM) | 100.63 | 103.49 | 100.63 | 1372.00 | 102.00 | 101.95 | -0.05 | 101.80 | -0.20 |

```

00001> 2
00002> *#####
00003> *#####
00004> *##### INPUT FILE FOR CARP RIVER, CITY OF KANATA #####
00005> *##### FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009 #####
00006> *##### EVENT BASED MODELING (5 MINUTE TIMESTEP) #####
00007> *
00008> *
00009> * REFERENCE DRAINAGE AREA PLANS:
00010> *
00011> * FIGURE 8.1
00012> *
00013> *#####
00014> * EVENT BASED SIMULATION
00015> *#####
00016> START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[1]
00017> C25m=3.stm
00018> *
00019> READ STORM STORM_FILENAME=["storm.001"]
00020> *#####
00021> DEFAULT VALUES ICASEDef=[1], read and print values
00022> DEFVAL_FILENAME=["ottawa.def"]
00023> *
00024> COMPUTE API API=[20], APIK=[0.9]/day
00025> *#####
00026> * LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
00027> *
00028> READ HYD ID=[9], NHYD=["101-3"],
00029> HYD_FILENAME=["H-101-3"]
00030> *#####
00031> * FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
00032> * (GLEN CAIRN SWMP OUTLET CHANNEL)
00033> *
00034> * HEADWATER P1
00035> *#####
00036> CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
00037> XIMP=[0.45], TIMP=[0.70], DWF=[0](cms), LOSS=[2],
00038> SCS curve number CN=[80.5],
00039> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00040> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00041> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00042> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00043> Continuous simulation parameters:
00044> IARCPER=[4](hrs), IARCLIMP=[2](hrs),
00045> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00046> InterEventTime=[12](hrs), END=-1
00047> *
00048> COMPUTE DUALHYD IDin=[1], CINLET=[7.71](cms), NINLET=[1],
00049> MAJID=[2], MAJNHYD=["P1ma"],
00050> MINID=[3], MinNHYD=["P1min"],
00051> TMJSTO=[3857](cu-m)
00052> *
00053> CONTINUOUS NASHYD ID=[4], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
00054> DWF= 0 CN= 90 IA= 9.8 N=2 TP=0.25
00055> Continuous simulation parameters:
00056> IARCPER=[4](hrs),
00057> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00058> InterEventTime=[12](hrs)
00059> Baseflow simulation parameters:
00060> BaseFlowOption=[1],
00061> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00062> VHydCond=[10](mm/hr), END=-1
00063> *
00064> ADD HYD IDsum=[1], NHYD=["P1in"], IDs to add=[2,3,4,9]
00065> *
00066> ROUTE RESERVOIR IDout=[2], NHYD=["P1out"], IDin=[1],
00067> RDT=[5](min),
00068> TABLE of ( OUTFLOW-STORAGE ) values
00069> (cms) - (ha-m)
00070> [ 0.000 , 0.000 ]
00071> [ 0.050 , 0.499 ]
00072> [ 1.500 , 2.030 ]
00073> [ 2.500 , 2.810 ]
00074> [ 4.500 , 2.920 ]
00075> [ 4.800 , 3.500 ]
00076> [ 5.000 , 3.930 ]
00077> [ 5.300 , 4.500 ]
00078> [ -1 , -1 ] (max twenty pts)
00079> *
00080> CONTINUOUS NASHYD ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
00081> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.25
00082> Continuous simulation parameters:
00083> IARCPER=[4](hrs),
00084> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00085> InterEventTime=[12](hrs)
00086> Baseflow simulation parameters:
00087> BaseFlowOption=[1],
00088> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00089> VHydCond=[10](mm/hr), END=-1
00090> *
00091> * CARP RIVER TRIBUTARY AT CARP RIVER
00092> *
00093> ADD HYD IDsum=[9], NHYD=["1012NC"], IDs to add=[1,3]
00094> *
00095> ADD HYD IDsum=[9], NHYD=["101-2"], IDs to add=[2,3]
00096> *
00097> SAVE HYD ID=[9], # OF PCYCLES=[1], ICASEsh=[1]
00098> HYD_COMMENT=["Carp Tributary @ Carp River - XP2054*"]
00099> *#####
00100> * FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
00101> * (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
00102> *
00103> * SOUTH POND P3
00104> * 10yr control
00105> *#####
00106> CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
00107> XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
00108> SCS curve number CN=[80.5],
00109> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00110> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00111> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00112> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00113> Continuous simulation parameters:
00114> IARCPER=[4](hrs), IARCLIMP=[2](hrs),
00115> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00116> InterEventTime=[12](hrs), END=-1
00117> *
00118> COMPUTE DUALHYD IDin=[1], CINLET=[9.17](cms), NINLET=[1],
00119> MAJID=[2], MAJNHYD=["P3ma"],
00120> MINID=[3], MinNHYD=["P3min"],
00121> TMJSTO=[4584](cu-m)
00122> *
00123> CONTINUOUS NASHYD ID=[4], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
00124> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.25
00125> Continuous simulation parameters:
00126> IARCPER=[4](hrs),
00127> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00128> InterEventTime=[12](hrs)
00129> Baseflow simulation parameters:
00130> BaseFlowOption=[1],
00131> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00132> VHydCond=[10](mm/hr), END=-1
00133> *
00134> ADD HYD IDsum=[1], NHYD=["P3in"], IDs to add=[2,3,4]
00135> *

```

```

00136> ROUTE RESERVOIR IDout=[2], NHYD=["P3out"], IDin=[1],
00137> RDT=[5](min),
00138> TABLE of ( OUTFLOW-STORAGE ) values
00139> (cms) - (ha-m)
00140> [ 0.000 , 0.000 ]
00141> [ 0.050 , 0.427 ]
00142> [ 0.300 , 1.568 ]
00143> [ 0.800 , 2.120 ]
00144> [ 1.750 , 2.905 ]
00145> [ -1 , -1 ] (max twenty pts)
00146> IDovf=[3], NHYDovf=["P3OVF"]
00147> *
00148> * SOUTH POND (P3) AT CARP RIVER
00149> *
00150> ADD HYD IDsum=[8], NHYD=["500*"], IDs to add=[2,3]
00151> *
00152> SAVE HYD ID=[8], # OF PCYCLES=[1], ICASEsh=[1]
00153> HYD_COMMENT=["South Pond @ Carp River"]
00154> *#####
00155> * HEC-RAS inflow hydrograph @ 44751
00156> * NODE 2054
00157> *
00158> *#####
00159> ADD HYD IDsum=[10], NHYD=["2054*"], IDs to add=[8,9]
00160> *
00161> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00162> HYD_COMMENT=["HEC-RAS Inflow Node 2054 / Station 44751*"]
00163> *#####
00164> * LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
00165> * (28/35/36)
00166> *
00167> * NORTH POND P2
00168> * 10yr control
00169> *#####
00170> CONTINUOUS STANDHYD ID=[1], NHYD=["P2"], DT=[5](min), AREA=[23.14](ha),
00171> XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
00172> SCS curve number CN=[80.5],
00173> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00174> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00175> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.5](%),
00176> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00177> Continuous simulation parameters:
00178> IARCPER=[4](hrs), IARCLIMP=[2](hrs),
00179> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00180> InterEventTime=[12](hrs), END=-1
00181> *
00182> COMPUTE DUALHYD IDin=[1], CINLET=[2.31](cms), NINLET=[1],
00183> MAJID=[2], MAJNHYD=["P2ma"],
00184> MINID=[3], MinNHYD=["P2min"],
00185> TMJSTO=[1157](cu-m)
00186> *
00187> CONTINUOUS NASHYD ID=[4], NHYD=["SWM2"] DT=[5]min, AREA=[0.99](ha),
00188> DWF= 0 CN= 90 IA= 9.8 N=2 TP=0.25
00189> Continuous simulation parameters:
00190> IARCPER=[4](hrs),
00191> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00192> InterEventTime=[12](hrs)
00193> Baseflow simulation parameters:
00194> BaseFlowOption=[1],
00195> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00196> VHydCond=[10](mm/hr), END=-1
00197> *
00198> ADD HYD IDsum=[1], NHYD=["P2in"], IDs to add=[2,3,4]
00199> *#####
00200> ROUTE RESERVOIR IDout=[2], NHYD=["P2out"], IDin=[1],
00201> RDT=[5](min),
00202> TABLE of ( OUTFLOW-STORAGE ) values
00203> (cms) - (ha-m)
00204> [ 0.000 , 0.000 ]
00205> [ 0.030 , 0.130 ]
00206> [ 0.150 , 0.277 ]
00207> [ 0.350 , 0.441 ]
00208> [ 0.700 , 0.675 ]
00209> [ -1 , -1 ] (max twenty pts)
00210> IDovf=[3], NHYDovf=["P2OVF"]
00211> *
00212> ADD HYD IDsum=[6], NHYD=["PND2"], IDs to add=[2,3]
00213> *
00214> * NORTH POND (P2) AT CARP RIVER
00215> *
00216> SAVE HYD ID=[6], # OF PCYCLES=[1], ICASEsh=[1]
00217> HYD_COMMENT=["PND2-outflow/overflow"]
00218> *
00219> *
00220> CONTINUOUS NASHYD ID=[4], NHYD=["CRFP"] DT=[5]min, AREA=[24.18](ha),
00221> DWF= 0 CN= 82 IA= 9.8 N=2 TP=0.50
00222> Continuous simulation parameters:
00223> IARCPER=[4](hrs),
00224> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00225> InterEventTime=[12](hrs)
00226> Baseflow simulation parameters:
00227> BaseFlowOption=[1],
00228> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00229> VHydCond=[10](mm/hr), END=-1
00230> *
00231> CONTINUOUS STANDHYD ID=[5], NHYD=["28"], DT=[5](min), AREA=[12.5](ha),
00232> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00233> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00234> DCAY=[4](/hr), F=[0](mm),
00235> Pervious surfaces: IAPER=[4.67](mm), SLP=[1.0](%),
00236> LGP=[205](m), MNP=[0.10], SCP=[0](min),
00237> Impervious surfaces: IAIMP=[1.57](mm), SLP=[1.0](%),
00238> LGI=[700](m), MNI=[0.013], SCI=[0](min),
00239> Continuous simulation parameters:
00240> IARCPER=[4](hrs), IARCLIMP=[2](hrs),
00241> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00242> InterEventTime=[12](hrs), END=-1
00243> *
00244> *
00245> *
00246> * HEC-RAS inflow hydrograph @ 44548
00247> * NODE 2065
00248> * (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
00249> * (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
00250> *#####
00251> ADD HYD IDsum=[7], NHYD=["2065*"], IDs to add=[4,5,6]
00252> *
00253> SAVE HYD ID=[7], # OF PCYCLES=[1], ICASEsh=[1]
00254> HYD_COMMENT=["HEC-RAS Inflow Node 2065 / Station 44548*"]
00255> *#####
00256> * LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
00257> * (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)
00258> *
00259> CONTINUOUS STANDHYD ID=[5], NHYD=["100-1"], DT=[5](min), AREA=[61.17](ha),
00260> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00261> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00262> DCAY=[4](/hr), F=[0](mm),
00263> Pervious surfaces: IAPER=[4.67](mm), SLP=[0.8](%),
00264> LGP=[1200](m), MNP=[0.10], SCP=[0](min),
00265> Impervious surfaces: IAIMP=[1.57](mm), SLP=[0.8](%),
00266> LGI=[1700](m), MNI=[0.013], SCI=[0](min)
00267> Continuous simulation parameters:
00268> IARCPER=[4](hrs), IARCLIMP=[2](hrs),
00269> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1](mm),
00270> InterEventTime=[12](hrs), END=-1

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00271> *%-----|-----|
00272> *% LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
00273> *% (USED IN MODEL CALIBRATION)
00274> *% -----|-----|
00275> CONTINUOUS NASHYD ID=[6], NHYD=["102-1"], DT=[5]min, AREA=[39.8](ha),
00276> DWF=[0](cms), CN/C=[78], IA=[9.8](mm),
00277> N=[2], TP=[1.10]hrs
00278> Continuous simulation parameters:
00279> IaRSCper=[4](hrs),
00280> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00281> InterEventTime=[12](hrs)
00282> Baseflow simulation parameters:
00283> BaseFlowOption=[1],
00284> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00285> VHydCond=[10](mm/hr), END=-1
00286> *%-----|-----|
00287> *% HEC-RAS inflow hydrograph @ 43966
00288> *% (Hazeldean Creek @ Carp River)
00289> *% -----|-----|
00290> ADD HYD IDsum=[10], NHYD=["3894"], IDs to add=[5,6]
00291> *
00292> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00293> HD_COMMENT=["HEC-RAS Inflow Node 3894 / Station 43966*"]
00294> *%-----|-----|
00295> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[2]
00296> * S2-24.stm
00297> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[3]
00298> * S5-24.stm
00299> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[4]
00300> * S10-24.stm
00301> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[5]
00302> * S25-24.stm
00303> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[6]
00304> * S50-24.stm
00305> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[7]
00306> * S100-24.stm
00307> *%-----|-----|
00308> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[8]
00309> * S2-12.stm
00310> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[9]
00311> * S5-12.stm
00312> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[10]
00313> * S10-12.stm
00314> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[11]
00315> * S25-12.stm
00316> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[12]
00317> * S50-12.stm
00318> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[13]
00319> * S100-12.stm
00320> *%-----|-----|
00321> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[14]
00322> * C2-3.stm
00323> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[15]
00324> * C5-3.stm
00325> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[16]
00326> * C10-3.stm
00327> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00328> * C25-3.stm
00329> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00330> * C50-3.stm
00331> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00332> * C100-3.stm
00333> *%-----|-----|
00334> *START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00335> * C25mm-3.stm
00336> *%-----|-----|
00337> FINISH
00338>
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00001> =====
00002>
00003> SSSSS W W M M H H Y Y M M O O 999 999
00004> S W W W M M M H H Y Y M M M O O 9 9 9 9
00005> SSSSS W W M M M H H H Y Y M M M O # 9 9 9 9 Ver 4.05
00006> S W W M M H H Y Y M M O O 9999 9999 Sept 2011
00007> SSSSS W W M M H H Y Y M M O O 9 9 9 9
00008> StormWater Management Hydrologic Model 999 999
00009>
00010>
00011> *****
00012> ***** SWMHYMO Ver/4.05 *****
00013> ***** A single event and continuous hydrologic simulation model *****
00014> ***** based on the principles of HYMO and its successors *****
00015> ***** OTTHYMO-83 and OTTHYMO-89. *****
00016> *****
00017> ***** Distributed by: J.F. Sabourin and Associates Inc. *****
00018> ***** Ottawa, Ontario: (613) 836-3884 *****
00019> ***** Gatineau, Quebec: (819) 243-6858 *****
00020> ***** E-Mail: swmhyo@jfaa.com *****
00021> *****
00022>
00023> ***** Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD *****
00024> ***** Nepean SERIAL#5320763 *****
00025> *****
00026> *****
00027> *****
00028> ***** PROGRAM ARRAY DIMENSIONS *****
00029> ***** Maximum value for ID numbers : 10 *****
00030> ***** Max. number of rainfall points: 105408 *****
00031> ***** Max. number of flow points : 105408 *****
00032> *****
00033> *****
00034> *****
00035> ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
00036> *****
00037> ***** ID: Hydrograph Identification numbers, (1-10). *****
00038> ***** NHTD: Hydrograph reference numbers, (6 digits or characters). *****
00039> ***** AREA: Drainage area associated with hydrograph, (ac.) or (ha.). *****
00040> ***** PEAK: Peak flow of simulated hydrograph, (ft3/s) or (m3/s). *****
00041> ***** TpeakDate_hh:mm is the date and time of the peak flow. *****
00042> ***** R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). *****
00043> ***** R.C.: Runoff Coefficient of simulated hydrograph, (ratio). *****
00044> ***** *: see WARNING or NOTE message printed at end of run. *****
00045> ***** **: see ERROR message printed at end of run. *****
00046> *****
00047> *****
00048> *****
00049> *****
00050> *****
00051> *****
00052> *****
00053> ***** SUMMARY OUTPUT *****
00054> *****
00055> * DATE: 2017-07-14 TIME: 10:13:41 RUN COUNTER: 000742 *
00056> *****
00057> * Input filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.dat *
00058> * Output filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.out *
00059> * Summary filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-Dce.sum *
00060> * User comments:
00061> * 1:
00062> * 2:
00063> * 3:
00064> *****
00065> *****
00066> *****
00067> RUN:COMMAND#
00068> 001-0001-START
00069> [TZERO = .00 hrs on 0]
00070> [METOUT= 2 (1=imperial, 2=metric output)]
00071> [NSTORM= 1]
00072> [ENRUL = 1]
00073> *****
00074> 001-0002-CONTINUOUS NASHYD 04:SWM1
00075> READ STORM
00076> Filename = storm.001
00077> Comment =
00078> [INT=10.0;SDUR= 3.00;PTOT= 25.00]
00079> 001-0003-CONTINUOUS NASHYD 04:CRFP
00080> DEFAULT VALUES
00081> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00082> ICASDR = 1 (read and print data)
00083> FileTitle =
00084> ***** PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 *****
00085> Horton's infiltration equation parameters:
00086> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00087> Parameters for Pervious surfaces in STANDHYD:
00088> [IAimp= 4.67 mm] [LGP=40.00 mm] [MNP= 250]
00089> Parameters for IMPERVIOUS surfaces in STANDHYD:
00090> [IAimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00091> Parameters used in NASHYD:
00092> [Ia= 4.67 mm] [N= 2.00]
00093> 001-0004-COMPUTE API
00094> [APIini= 20.00; APIkdy= 9000; APIkdt= .9993]
00095> [APIax= 44.55; APIavg= 33.46; APImin= 20.35]
00096> *****
00097> 001-0005-CONTINUOUS NASHYD 04:CRFP
00098> READ HYD
00099> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.001
00100> Comment = GRANITE RIDGE AREA 101-3
00101> 001-0006-CONTINUOUS NASHYD 04:SWM1
00102> CONTINUOUS STANDHYD01:P1 77.13 3.058 No_date 1:30 18.08
00103> [XIMP= 45;TIMP= 70]
00104> [LOSS= 2 ;CN= 80.5]
00105> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00106> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00107> [IARClmp= 2.00; IARCPper= 4.00]
00108> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00109> 001-0007-CONTINUOUS NASHYD 04:SWM2
00110> COMPUTE DUALHYD 01:P1 77.13 3.058 No_date 1:30 18.08
00111> Major System / 02:P3maj .00 .000 No_date 0:00 .00
00112> Minor System \ 03:P3min 77.13 3.058 No_date 1:30 18.08
00113> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00114> 001-0008-CONTINUOUS NASHYD 04:SWM3
00115> CONTINUOUS NASHYD 04:SWM1 4.50 .079 No_date 1:35 8.24
00116> [CN= 90.0; N= 2.00]
00117> [Tp= 25;DT= 5.00]
00118> [IARCE= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00119> [InterEventTime= 12.00]
00120> 001-0009-CONTINUOUS NASHYD 04:CRFP
00121> ADD HYD
00122> + 03:P3min 77.13 3.058 No_date 1:30 18.08
00123> + 09:101-3 69.53 605 No_date 2:30 14.08
00124> + 09:101-3 69.53 605 No_date 2:30 14.08
00125> [DT= 5.00] SUM= 01:P1in 151.16 3.541 No_date 1:35 16.22
00126> 001-0010-CONTINUOUS NASHYD 04:SWM1
00127> ROUTE RESERVOIR -> 01:P1in 151.16 3.541 No_date 1:35 16.22
00128> [RDT= 5.00] out<- 02:P3out 151.16 .869 No_date 3:30 16.22
00129> [MxStoUsed=.1364E+01]
00130> 001-0011-CONTINUOUS NASHYD 03:CRTRIB
00131> CONTINUOUS NASHYD 03:CRTRIB 3.69 .045 No_date 1:35 5.93
00132> [CN= 82.0; N= 2.00]
00133> [Tp= 25;DT= 5.00]
00134> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00135> [InterEventTime= 12.00]

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00136> 001-0012-CONTINUOUS NASHYD 04:SWM2
00137> ADD HYD
00138> + 03:CRTRIB 151.16 3.541 No_date 1:35 16.22
00139> + 045 No_date 1:35 5.93
00140> [IARClmp= 2.00; IARCPper= 4.00]
00141> 001-0013-CONTINUOUS NASHYD 04:SWM2
00142> ADD HYD
00143> + 03:CRTRIB 151.16 .869 No_date 3:30 16.22
00144> + 075 No_date 3:25 15.98
00145> [IARClmp= 2.00; IARCPper= 4.00]
00146> 001-0014-CONTINUOUS NASHYD 04:SWM3
00147> SAVE HYD
00148> 09:101-2 154.85 .875 No_date 3:25 15.98
00149> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.001
00150> remark:Carp Tributary @ Carp River - XP2054
00151> 001-0015-CONTINUOUS STANDHYD01:P3
00152> CONTINUOUS STANDHYD01:P3 91.68 2.593 No_date 1:30 14.61
00153> [XIMP=.34;TIMP=.43]
00154> [LOSS= 2 ;CN= 80.5]
00155> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00156> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00157> [IARClmp= 2.00; IARCPper= 4.00]
00158> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00159> 001-0016-CONTINUOUS NASHYD 04:SWM2
00160> COMPUTE DUALHYD 01:P3 91.68 2.593 No_date 1:30 14.61
00161> Major System / 02:P3maj .00 .000 No_date 0:00 .00
00162> Minor System \ 03:P3min 91.68 2.593 No_date 1:30 14.61
00163> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00164> 001-0017-CONTINUOUS NASHYD 04:SWM3
00165> CONTINUOUS NASHYD 04:SWM3 2.60 .031 No_date 1:35 5.93
00166> [CN= 82.0; N= 2.00]
00167> [Tp= 25;DT= 5.00]
00168> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00169> [InterEventTime= 12.00]
00170> 001-0018-CONTINUOUS NASHYD 04:SWM2
00171> ADD HYD
00172> + 03:P3min 91.68 2.593 No_date 1:30 14.61
00173> + 04:SWM3 2.60 .031 No_date 1:35 5.93
00174> [DT= 5.00] SUM= 01:P3in 94.28 2.623 No_date 1:30 14.37
00175> 001-0019-CONTINUOUS NASHYD 04:SWM3
00176> ROUTE RESERVOIR -> 02:P3out 94.28 2.623 No_date 1:30 14.37
00177> [RDT= 5.00] out<- 02:P3out 94.28 .222 No_date 3:55 14.37
00178> overflow <= 03:P3OVf .00 .000 No_date 0:00 .00
00179> [MxStoUsed=.1168E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00180> 001-0020-CONTINUOUS NASHYD 04:SWM2
00181> ADD HYD
00182> + 03:P3OVf 94.28 .222 No_date 3:55 14.37
00183> + 03:P3OVf .00 .000 No_date 0:00 .00
00184> [DT= 5.00] SUM= 08:500 94.28 .212 No_date 3:55 14.37
00185> 001-0021-CONTINUOUS NASHYD 04:SWM2
00186> SAVE HYD
00187> 08:500 94.28 .212 No_date 3:55 14.37
00188> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.001
00189> remark:South Pond @ Carp River
00190> 001-0022-CONTINUOUS NASHYD 04:SWM2
00191> ADD HYD
00192> + 09:101-2 154.85 .875 No_date 3:25 15.98
00193> + 249.13 1.084 No_date 3:30 15.37
00194> [DT= 5.00] SUM= 09:101-2 154.85 .875 No_date 3:25 15.98
00195> 001-0023-CONTINUOUS NASHYD 04:SWM2
00196> SAVE HYD
00197> 10:2054 249.13 1.084 No_date 3:30 15.37
00198> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.001
00199> remark:HEC-RAS Inflow Node 2054 / Station 44751
00200> 001-0024-CONTINUOUS NASHYD 04:CRFP
00201> CONTINUOUS STANDHYD01:P2 23.14 .834 No_date 1:30 16.82
00202> [XIMP=.47;TIMP=.59]
00203> [LOSS= 2 ;CN= 80.5]
00204> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 40.;MNP= 200;SCP= .0]
00205> [Impervious area: IAimp= 1.57;SLPI= .50;LGI=1400.;MNI=.013;SCI= .0]
00206> [IARClmp= 2.00; IARCPper= 4.00]
00207> [SMIN= 26.32; SMAX=175.50; SK=1.000]
00208> 001-0025-CONTINUOUS NASHYD 04:SWM2
00209> COMPUTE DUALHYD 01:P2 23.14 .834 No_date 1:30 16.82
00210> Major System / 02:P2maj .00 .000 No_date 0:00 .00
00211> Minor System \ 03:P2min 23.14 .834 No_date 1:30 16.82
00212> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00213> 001-0026-CONTINUOUS NASHYD 04:SWM2
00214> CONTINUOUS NASHYD 04:SWM2 .99 .017 No_date 1:35 8.24
00215> [CN= 90.0; N= 2.00]
00216> [Tp= 25;DT= 5.00]
00217> [IARCE= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00218> [InterEventTime= 12.00]
00219> 001-0027-CONTINUOUS NASHYD 04:CRFP
00220> ADD HYD
00221> + 03:P2min 23.14 .834 No_date 1:30 16.82
00222> + 04:SWM2 .99 .017 No_date 1:35 8.24
00223> [DT= 5.00] SUM= 01:P2in 24.13 .851 No_date 1:30 16.47
00224> 001-0028-CONTINUOUS NASHYD 04:SWM2
00225> ROUTE RESERVOIR -> 02:P2out 24.13 .851 No_date 1:30 16.47
00226> [RDT= 5.00] out<- 02:P2out 24.13 .164 No_date 3:10 16.47
00227> overflow <= 03:P2OVf .00 .000 No_date 0:00 .00
00228> [MxStoUsed=.2888E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00229> 001-0029-CONTINUOUS NASHYD 04:SWM2
00230> ADD HYD
00231> + 03:P2OVf 24.13 .164 No_date 3:10 16.47
00232> + 03:P2OVf .00 .000 No_date 0:00 .00
00233> [DT= 5.00] SUM= 06:PND2 24.13 .164 No_date 3:10 16.47
00234> 001-0030-CONTINUOUS NASHYD 04:SWM2
00235> SAVE HYD
00236> 06:PND2 24.13 .164 No_date 3:10 16.47
00237> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.001
00238> remark:PND2-outflow/overflow
00239> 001-0031-CONTINUOUS NASHYD 04:CRFP
00240> CONTINUOUS NASHYD 04:CRFP 24.18 .196 No_date 2:00 5.93
00241> [CN= 82.0; N= 2.00]
00242> [Tp= 50;DT= 3.00]
00243> [IARCE= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00244> [InterEventTime= 12.00]
00245> 001-0032-CONTINUOUS NASHYD 04:CRFP
00246> CONTINUOUS STANDHYD05:28 12.50 .519 No_date 1:15 10.12
00247> [XIMP=.38;TIMP=.45]
00248> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00249> [Pervious area: IAper= 4.67;SLPP=1.00;LGP= 205.;MNP= 100;SCP= .0]
00250> [Impervious area: IAimp= 1.57;SLPI=1.00;LGI= 700.;MNI=.013;SCI= .0]
00251> [IARClmp= 2.00; IARCPper= 4.00]
00252> 001-0033-CONTINUOUS NASHYD 04:CRFP
00253> ADD HYD
00254> + 05:28 12.50 .519 No_date 1:15 10.12
00255> + 06:PND2 24.13 .164 No_date 3:10 16.47
00256> [DT= 5.00] SUM= 07:2065 60.81 .564 No_date 1:15 10.97
00257> 001-0034-CONTINUOUS NASHYD 04:SWM1
00258> SAVE HYD
00259> 07:2065 60.81 .564 No_date 1:15 10.97
00260> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.001
00261> remark:HEC-RAS Inflow Node 2065 / Station 44548
00262> 001-0035-CONTINUOUS NASHYD 04:CRFP
00263> CONTINUOUS STANDHYD05:100-1 61.17 1.610 No_date 1:25 10.12
00264> [XIMP=.38;TIMP=.45]
00265> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00266> [Pervious area: IAper= 4.67;SLPP= 80.;LGP=1200.;MNP= 100;SCP= .0]
00267> [Impervious area: IAimp= 1.57;SLPI= .80;LGI=1700.;MNI=.013;SCI= .0]
00268> [IARClmp= 2.00; IARCPper= 4.00]
00269> 001-0036-CONTINUOUS NASHYD 06:102-1
00270> CONTINUOUS NASHYD 06:102-1 39.80 .165 No_date 3:00 5.00
00271> [CN= 78.0; N= 2.00]
00272> [Tp= 1.10;DT= 5.00]
00273> [IARCE= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00274> [InterEventTime= 12.00]
00275> 001-0037-CONTINUOUS NASHYD 04:CRFP
00276> ADD HYD
00277> + 05:100-1 61.17 1.610 No_date 1:25 10.12
00278> + 06:102-1 39.80 .165 No_date 3:00 5.00
00279> [DT= 5.00] SUM= 01:3894 61.17 1.610 No_date 1:25 8.10
00280> 001-0038-CONTINUOUS NASHYD 04:CRFP
00281> SAVE HYD
00282> 01:3894 61.17 1.610 No_date 1:25 8.10

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00271>      fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.001
00272>      remark:HEC-RAS Inflow Node 3894 / Station 43966
00273> ** END OF RUN : 7
00274>
00275> *****
00276>
00277>
00278>
00279>
00280>
00281> RUN:COMMAND#
00282> 008:0001-----
00283> START
00284> [TZERO = .00 hrs on 0]
00285> [METOUT= 2 (1=imperial, 2=metric output)]
00286> [NSTORM= 1 ]
00287> [NRUN = 8 ]
00288>
00289> READ STORM
00290> Filename = storm.001
00291> Comment =
00292> [SDT=30.00:SDUR= 12.00:PTOT= 42.34]
00293>
00294> DEFAULT VALUES
00295> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00296> ICASEdv = 1 (read and print data)
00297> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00298> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00299> Horton's infiltration equation parameters:
00300> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00301> Parameters for PERVIOUS surfaces in STANDHYD:
00302> [IAPER= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00303> Parameters for IMPERVIOUS surfaces in STANDHYD:
00304> [IARCI= 1.57 mm] [CLI= 1.50] [MNI= .013]
00305> Parameters used in NASHYD:
00306> [Ia= 4.67 mm] [N= 2.00]
00307>
00308> *****
00309> [APIIn= 20.00: APIKdy= .9000: APIKdt= .9978]
00310> [APImax= 60.24: APIavg= 39.87: APImin= 20.59]
00311> 008:0005-----
00312> READ HYD 09:101-3 69.53 1.068 No_date 7:05 29.55
00313> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.008
00314> Comment = GRANITE RIDGE AREA 101-3
00315> 008:0006-----
00316> CONTINUOUS STANDHYD01:P1 77.13 3.984 No_date 6:15 34.42
00317> [XIMP= 45:TIMP=.70]
00318> [LOSS= 2 :CN= 80.5]
00319> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00320> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00321> [IARCI= 2.00: IAREC= 4.00]
00322> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00323> 008:0007-----
00324> COMPUTE DUALHYD 01:P1 77.13 3.984 No_date 6:15 34.42
00325> Major System / 02:P1maj .00 .000 No_date 0:00 .00
00326> Minor System / 03:P1min 77.13 3.984 No_date 6:15 34.42
00327> [MJSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00328> [Ia= 4.67 mm] [N= 2.00]
00329> CONTINUOUS NASHYD 04:SWM1 4.50 .186 No_date 6:10 23.33
00330> [CN= 90.0: N= 2.00]
00331> [Tp= .25:DT= 5.00]
00332> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00333> [InterEventTime= 12.00]
00334> 008:0009-----
00335> ADD HYD 02:P1maj .00 .000 No_date 0:00 .00
00336> + 03:P1min 77.13 3.984 No_date 6:15 34.42
00337> + 04:SWM1 4.50 .186 No_date 6:10 23.33
00338> + 09:101-3 69.53 1.068 No_date 7:05 29.55
00339> [DT= 5.00] SUM= 01:P1in 151.16 4.951 No_date 6:15 31.85
00340> 008:0010-----
00341> ROUTE RESERVOIR -> 01:P1in 151.16 4.951 No_date 6:15 31.85
00342> [RDT= 5.00] out<- 02:P1out 151.16 1.601 No_date 8:10 31.85
00343> [MxStoUsed=.2109E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00344> 008:0011-----
00345> CONTINUOUS NASHYD 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00346> [CN= 82.0: N= 2.00]
00347> [Tp= .25:DT= 5.00]
00348> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00349> [InterEventTime= 12.00]
00350> 008:0012-----
00351> ADD HYD 01:P1in 151.16 4.951 No_date 6:15 31.85
00352> + 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00353> + 09:101-3 69.53 1.068 No_date 7:05 29.55
00354> 008:0013-----
00355> ADD HYD 02:P1out 151.16 1.601 No_date 8:10 31.85
00356> + 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00357> [DT= 5.00] SUM= 09:101-2 154.85 1.621 No_date 8:05 31.54
00358> 008:0014-----
00359> SAVE HYD 09:101-2 154.85 1.621 No_date 8:05 31.54
00360> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.008
00361> remark:Carp Tributary at Carp River - XP2054
00362> 008:0015-----
00363> CONTINUOUS STANDHYD01:P3 91.68 3.874 No_date 6:15 29.72
00364> [XIMP= 34:TIMP=.43]
00365> [LOSS= 2 :CN= 80.5]
00366> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00367> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00368> [IARCI= 2.00: IAREC= 4.00]
00369> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00370> 008:0016-----
00371> COMPUTE DUALHYD 01:P3 91.68 3.874 No_date 6:15 29.72
00372> Major System / 02:P2maj .00 .000 No_date 0:00 .00
00373> Minor System / 03:P3min 91.68 3.874 No_date 6:15 29.72
00374> [MJSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00375> 008:0017-----
00376> CONTINUOUS NASHYD 04:SWM3 2.60 .081 No_date 6:10 18.79
00377> [CN= 82.0: N= 2.00]
00378> [Tp= .25:DT= 5.00]
00379> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00380> [InterEventTime= 12.00]
00381> 008:0018-----
00382> ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
00383> + 03:P3min 91.68 3.874 No_date 6:15 29.72
00384> + 04:SWM3 2.60 .081 No_date 6:10 18.79
00385> [DT= 5.00] SUM= 01:P3in 94.28 3.953 No_date 6:15 29.42
00386> 008:0019-----
00387> ROUTE RESERVOIR -> 01:P3in 94.28 3.953 No_date 6:15 29.42
00388> [RDT= 5.00] out<- 02:P3out 94.28 .601 No_date 8:35 29.42
00389> overflow <= 03:P3OVF .00 .000 No_date 0:00 .00
00390> [MxStoUsed=.1900E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00391> 008:0020-----
00392> ADD HYD 02:P3out 94.28 .601 No_date 8:35 29.42
00393> + 04:SWM3 2.60 .081 No_date 6:10 18.79
00394> [DT= 5.00] SUM= 08:500 94.28 .601 No_date 8:35 29.42
00395> 008:0021-----
00396> SAVE HYD 08:500 94.28 .601 No_date 8:35 29.42
00397> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.008
00398> remark:South Pond at Carp River
00399> 008:0022-----
00400> ADD HYD 08:500 94.28 .601 No_date 8:35 29.42
00401> + 09:101-2 154.85 1.621 No_date 8:05 31.54
00402> [DT= 5.00] SUM= 10:2054 249.13 2.213 No_date 8:15 30.74
00403> 008:0023-----
00404> SAVE HYD 10:2054 249.13 2.213 No_date 8:15 30.74
00405> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.008

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00406> remark:HEC-RAS Inflow Node 2054 / Station 44751
00407>
00408> 008:0024-----
00409> CONTINUOUS STANDHYD01:P2 23.14 1.118 No_date 6:15 32.61
00410> [XIMP= 47:TIMP=.59]
00411> [LOSS= 2 :CN= 80.5]
00412> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00413> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00414> [IARCI= 2.00: IAREC= 4.00]
00415> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00416> 008:0025-----
00417> COMPUTE DUALHYD 01:P2 23.14 1.118 No_date 6:15 32.61
00418> Major System / 02:P2maj .00 .000 No_date 0:00 .00
00419> Minor System / 03:P2min 23.14 1.118 No_date 6:15 32.61
00420> [MJSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00421> 008:0026-----
00422> CONTINUOUS NASHYD 04:SWM2 .99 .041 No_date 6:10 23.33
00423> [CN= 90.0: N= 2.00]
00424> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00425> [InterEventTime= 12.00]
00426> 008:0027-----
00427> ADD HYD 02:P2maj .00 .000 No_date 0:00 .00
00428> + 03:P2min 23.14 1.118 No_date 6:15 32.61
00429> + 04:SWM2 .99 .041 No_date 6:10 23.33
00430> [DT= 5.00] SUM= 01:P2in 24.13 1.158 No_date 6:15 32.23
00431> 008:0028-----
00432> ROUTE RESERVOIR -> 01:P2in 24.13 1.158 No_date 6:15 32.23
00433> [RDT= 5.00] out<- 02:P2out 24.13 1.118 No_date 7:30 32.61
00434> overflow <= 03:P2OVF .00 .000 No_date 0:00 .00
00435> [MxStoUsed=.4269E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00436> 008:0029-----
00437> ADD HYD 02:P2out 24.13 .333 No_date 7:30 32.23
00438> + 03:P2OVF .00 .000 No_date 0:00 .00
00439> [DT= 5.00] SUM= 06:PND2 24.13 .333 No_date 7:30 32.23
00440> 008:0030-----
00441> SAVE HYD 06:PND2 24.13 .333 No_date 7:30 32.23
00442> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.008
00443> remark:PND2-outflow
00444> 008:0031-----
00445> CONTINUOUS NASHYD 04:CRFP 24.18 .494 No_date 6:35 18.79
00446> [CN= 82.0: N= 2.00]
00447> [Tp= .50:DT= 5.00]
00448> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00449> [InterEventTime= 12.00]
00450> 008:0032-----
00451> CONTINUOUS STANDHYD05:28 12.50 .445 No_date 6:00 18.26
00452> [XIMP= 38:TIMP=.45]
00453> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00454> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00455> [Impervious area: IAIMP= 1.57:SLPI=1.00:LGI= 700. ....]
00456> [IARCI= 2.00: IAREC= 4.00]
00457> 008:0033-----
00458> ADD HYD 01:P1in 151.16 4.951 No_date 6:15 31.85
00459> + 05:28 12.50 .445 No_date 6:00 18.26
00460> + 06:PND2 24.13 .333 No_date 7:30 32.23
00461> [DT= 5.00] SUM= 07:2065 60.81 .912 No_date 6:35 24.01
00462> 008:0034-----
00463> SAVE HYD 07:2065 60.81 .912 No_date 6:35 24.01
00464> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.008
00465> remark:HEC-RAS Inflow Node 2065 / Station 44548
00466> 008:0035-----
00467> CONTINUOUS STANDHYD05:100-1 61.17 1.647 No_date 6:10 18.26
00468> [XIMP= 38:TIMP=.45]
00469> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00470> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00471> [Impervious area: IAIMP= 1.57:SLPI=1.00:LGI= 700. ....]
00472> [IARCI= 2.00: IAREC= 4.00]
00473> 008:0036-----
00474> CONTINUOUS NASHYD 06:102-1 39.80 .404 No_date 7:25 16.64
00475> [CN= 78.0: N= 2.00]
00476> [Tp= 1.10:DT= 5.00]
00477> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00478> [InterEventTime= 12.00]
00479> 008:0037-----
00480> ADD HYD 05:100-1 61.17 1.647 No_date 6:10 18.26
00481> + 06:102-1 39.80 .404 No_date 7:25 16.64
00482> [DT= 5.00] SUM= 10:3894 100.97 1.794 No_date 6:10 17.62
00483> 008:0038-----
00484> SAVE HYD 10:3894 100.97 1.794 No_date 6:10 17.62
00485> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.008
00486> remark:HEC-RAS Inflow Node 3894 / Station 43966
00487> *** END OF RUN : 8
00488> *****
00489> *****
00490>
00491>
00492>
00493>
00494>
00495> RUN:COMMAND#
00496> 009:0001-----
00497> START
00498> [TZERO = .00 hrs on 0]
00499> [METOUT= 2 (1=imperial, 2=metric output)]
00500> [NSTORM= 1 ]
00501> [NRUN = 9 ]
00502> 009:0002-----
00503> READ STORM
00504> Filename = storm.001
00505> Comment =
00506> [SDT=30.00:SDUR= 12.00:PTOT= 56.18]
00507>
00508> DEFAULT VALUES
00509> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00510> ICASEdv = 1 (read and print data)
00511> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00512> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00513> Horton's infiltration equation parameters:
00514> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00515> Parameters for PERVIOUS surfaces in STANDHYD:
00516> [IAPER= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00517> Parameters for IMPERVIOUS surfaces in STANDHYD:
00518> [IAIMP= 1.57 mm] [CLI= 1.50] [MNI= .013]
00519> Parameters used in NASHYD:
00520> [Ia= 4.67 mm] [N= 2.00]
00521> 009:0004-----
00522> COMPUTE API
00523> [APIIn= 20.00: APIKdy= .9000: APIKdt= .9978]
00524> [APImax= 73.73: APIavg= 46.81: APImin= 20.80]
00525> 009:0005-----
00526> READ HYD 09:101-3 69.53 1.597 No_date 6:55 42.20
00527> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.009
00528> Comment = GRANITE RIDGE AREA 101-3
00529> 009:0006-----
00530> CONTINUOUS STANDHYD01:P1 77.13 5.939 No_date 6:10 47.84
00531> [XIMP= 45:TIMP=.70]
00532> [LOSS= 2 :CN= 80.5]
00533> [Pervious area: IAPER= 4.67:SLPP=1.00:LGP= 40.:MNP=.200:SCP=.0]
00534> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400.:MNI=.013:SCI=.0]
00535> [IARCI= 2.00: IAREC= 4.00]
00536> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00537> 009:0007-----
00538> COMPUTE API
00539> Major System / 02:P1maj .00 .000 No_date 0:00 .00
00540> Minor System / 03:P1min 77.13 5.939 No_date 6:10 47.84

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00541> [MjSysSto=0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00542> 009:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM1 4.50 .308 No_date 6:05 36.39
00544> [CN= 90.0: N= 2.00]
00545> [Tp=.25:DT= 5.00]
00546> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00547> [InterEventTime= 12.00]
00548> 009:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
00550> + 03:P3min 77.13 5.939 No_date 6:10 47.84
00551> + 04:SWM1 4.50 .308 No_date 6:05 36.39
00552> + 09:101-3 69.53 1.597 No_date 6:55 42.20
00553> [DT= 5.00] SUM= 01:P3in 151.16 7.448 No_date 6:10 44.91
00554> 009:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P3in 151.16 7.448 No_date 6:10 44.91
00555> [RDT= 5.00] out<- 02:Plout 151.16 2.758 No_date 7:35 44.91
00556> [MxStoUsed=.2824E+01]
00557> 009:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS NASHYD 03:CRTRIB 3.69 .202 No_date 6:05 30.76
00560> [CN= 82.0: N= 2.00]
00561> [Tp=.25:DT= 5.00]
00562> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00563> [InterEventTime= 12.00]
00564> 009:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 01:P3in 151.16 7.448 No_date 6:10 44.91
00565> + 03:CRTRIB 3.69 .202 No_date 6:05 30.76
00566> [DT= 5.00] SUM= 09:1012NC 154.85 7.649 No_date 6:10 44.57
00567> 009:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 02:Plout 151.16 2.758 No_date 7:35 44.91
00568> + 03:CRTRIB 3.69 .202 No_date 6:05 30.76
00569> [DT= 5.00] SUM= 09:101-2 154.85 2.799 No_date 7:35 44.57
00570> 009:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 01:P1-2 154.85 2.799 No_date 7:35 44.57
00571> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00572> [InterEventTime= 12.00]
00573> 009:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
** END OF RUN : 9
00574> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.009
00575> remark:Carp Tributary @ Carp River - XP2054
00576> 009:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P3 91.68 6.001 No_date 6:15 42.53
00577> [IaREC= 4.00: SMIN= 43.01: SMAX= 153.94: SK=1.000]
00578> [InterEventTime= 12.00]
00579> [LOSS= 2 : CN= 80.51]
00580> [Previous area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=.200:SCP=.0]
00581> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400. :MNI=.013:SCI=.0]
00582> [IaRECimp= 2.00: IaRECper= 4.00]
00583> [SMIN= 26.32: SMAX=175.50: SK=1.000]
00584> 009:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
COMPUTE DUALHYD 01:P3 91.68 6.001 No_date 6:15 42.53
00585> Major System / 02:P3maj .00 .000 No_date 0:00 .00
00586> Minor System \ 03:P3min 91.68 6.001 No_date 6:15 42.53
00587> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00588> 009:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:SWM3 2.60 .142 No_date 6:05 30.76
00589> [CN= 82.0: N= 2.00]
00590> [Tp=.25:DT= 5.00]
00591> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00592> [InterEventTime= 12.00]
00593> 009:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
00594> + 03:P3min 91.68 6.001 No_date 6:15 42.53
00595> + 04:SWM3 2.60 .142 No_date 6:05 30.76
00596> [DT= 5.00] SUM= 01:P3in 94.28 6.141 No_date 6:10 42.21
00597> 009:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P3in 94.28 6.141 No_date 6:10 42.21
00600> [RDT= 5.00] out<- 02:Plout 94.28 1.267 No_date 7:45 42.21
00601> [MxStoUsed=.2506E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00602> 009:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 02:P3out 94.28 1.267 No_date 7:45 42.21
00603> + 03:P3OVP .00 .000 No_date 0:00 .00
00604> [DT= 5.00] SUM= 01:NHYD 94.28 1.267 No_date 7:45 42.21
00605> 009:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 08:500 94.28 1.267 No_date 7:45 42.21
00606> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00607> [InterEventTime= 12.00]
00608> 009:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
** END OF RUN : 9
00609> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.009
00610> remark:South Pond @ Carp River
00611> 009:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 08:500 94.28 1.267 No_date 7:45 42.21
00612> + 09:101-2 154.85 2.799 No_date 7:35 44.57
00613> [DT= 5.00] SUM= 249.13 4.058 No_date 7:35 43.68
00614> 009:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 01:P254 249.13 4.058 No_date 7:35 43.68
00615> 009:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
** END OF RUN : 9
00616> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.009
00617> remark:HEC-RAS Inflow Node 2054 / Station 44751
00618> 009:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS STANDHYD01:P2 23.14 1.688 No_date 6:10 45.75
00619> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00620> [InterEventTime= 12.00]
00621> 009:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 01:P2 23.14 1.688 No_date 6:10 45.75
00622> + 02:P2maj .00 .000 No_date 0:00 .00
00623> + 04:SWM2 2.60 .142 No_date 6:05 30.76
00624> [DT= 5.00] SUM= 24.13 1.754 No_date 6:10 45.36
00625> 009:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ROUTE RESERVOIR -> 01:P2in 24.13 1.754 No_date 6:10 45.36
00626> [RDT= 5.00] out<- 02:Plout 24.13 .553 No_date 7:15 45.36
00627> [MxStoUsed=.5773E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00628> 009:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 02:P2out 24.13 .553 No_date 7:15 45.36
00629> + 03:P2OVP .00 .000 No_date 0:00 .00
00630> [DT= 5.00] SUM= 06:PND2 24.13 .553 No_date 7:15 45.36
00631> 009:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 06:PND2 24.13 .553 No_date 7:15 45.36
00632> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00633> [InterEventTime= 12.00]
00634> 009:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
** END OF RUN : 9
00635> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.009
00636> remark:POND2-outflow/overflow
00637> 009:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS NASHYD 04:CRFP 24.18 .848 No_date 6:30 30.76
00638> [CN= 82.0: N= 2.00]
00639> [Tp=.50:DT= 5.00]
00640> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00641> [InterEventTime= 12.00]
00642> 009:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS STANDHYD05:28 12.50 .716 No_date 6:00 28.27
00643> [XIMP=.38:TIMP=.45]
00644> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00645> [Previous area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=.200:SCP=.0]
00646> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1400. :MNI=.013:SCI=.0]
00647> [IaRECimp= 2.00: IaRECper= 4.00]
00648> 009:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 04:CRFP 24.18 .848 No_date 6:30 30.76
00649> + 05:28 12.50 .716 No_date 6:00 28.27
00650> [DT= 5.00] SUM= 07:2065 60.81 1.679 No_date 6:30 36.04

00676> 009:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 07:2065 60.81 1.679 No_date 6:30 36.04
00677> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.009
00678> remark:HEC-RAS Inflow Node 2065 / Station 44548
00679> 009:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS STANDHYD05:100-1 61.17 2.291 No_date 6:05 28.27
00680> [XIMP=.38:TIMP=.45]
00681> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00682> [Previous area: IAPER= 4.67:SLPP=1.00:LGP= 40. :MNP=.200:SCP=.0]
00683> [Impervious area: IAIMP= 1.57:SLPI=.50:LGI=1700. :MNI=.013:SCI=.0]
00684> [IaRECimp= 2.00: IaRECper= 4.00]
00685> 009:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
CONTINUOUS NASHYD 06:102-1 39.80 .700 No_date 7:20 27.89
00686> [CN= 78.0: N= 2.00]
00687> [Tp= 1.10:DT= 5.00]
00688> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00689> [InterEventTime= 12.00]
00690> 009:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
ADD HYD 05:100-1 61.17 2.291 No_date 6:05 28.27
00691> + 06:102-1 39.80 .700 No_date 7:20 27.89
00692> [DT= 5.00] SUM= 10:3894 100.97 2.598 No_date 6:10 28.12
00693> 009:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
SAVE HYD 10:3894 100.97 2.598 No_date 6:10 28.12
00694> filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.009
00695> remark:HEC-RAS Inflow Node 3894 / Station 43966
00696> ** END OF RUN : 9
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00811> + 03:P3min 91.68 7.415 No_date 6:10 51.08
00812> + 04:SWM3 2.60 .184 No_date 6:05 38.93
00813> [DT= 5.00] SUM= 01:P3min 94.28 7.596 No_date 6:10 50.75
00814> 010:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00815> ROUTE RESERVOIR -> 01:P3in 94.28 7.596 No_date 6:10 50.75
00816> [RDT= 5.00] out<- 02:P3out 94.17 1.750 No_date 7:30 50.75
00817> overflow <= 03:P3OVF .11 .181 No_date 7:30 50.75
00818> [MxStoUsed=.2902E+01, TotOvfVol=.5421E-02, N-Ovf= 1, TotDurOvf= 0 hrs
00819> 010:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00820> ADD HYD + 02:P3out 94.17 1.750 No_date 7:30 50.75
00821> [IaRec= 4.00; SMIN= 12.00]-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00822> [DT= 5.00] SUM= 08:500 94.28 1.931 No_date 7:30 50.75
00823> SAVE HYD 08:500-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00824> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.010
00825> remark:South Pond @ Carp River
00826> 010:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00827> ADD HYD + 09:101-2 154.85 4.636 No_date 6:50 53.22
00828> [DT= 5.00] SUM= 10:2054 249.13 6.303 No_date 7:20 52.29
00830> 010:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00831> SAVE HYD 10:2054 249.13 6.303 No_date 7:20 52.29
00832> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.010
00833> remark:HEC-RAS Inflow Node 2054 / Station 44751
00834> 010:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00835> CONTINUOUS STANDHYD01:P2 23.14 2.057 No_date 6:10 54.46
00837> [XIMP= 47;TIMP=.59]
00838> [LOSS= 2 :CN= 80.5]
00839> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
00840> [Impervious area :IaImp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
00841> [IaRecImp= 2.00;IaRecCper= 4.00]
00842> [SMIN= 26.32;SMAX=175.50;SK=1.000]
00843> 010:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00844> COMPUTE DUALHYD 01:P2 23.14 2.057 No_date 6:10 54.46
00845> Major System / 02:P2maj .00 .000 No_date 0:00 .00
00846> Minor System \ 03:P2min 23.14 2.057 No_date 6:10 54.46
00847> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00848> CONTINUOUS NASHYD 04:SWM2 .99 .085 No_date 6:05 45.08
00850> [CN= 90.0; N= 2.00]
00851> [Tp= .25;DT= 5.00]
00852> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00853> [InterEventTime= 12.00]
00854> 010:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00855> ADD HYD + 02:P2maj .00 .000 No_date 0:00 .00
00856> + 03:P2min 23.14 2.057 No_date 6:10 54.46
00857> [DT= 5.00] SUM= 04:SWM2 24.13 2.140 No_date 6:10 54.07
00859> 010:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00860> ROUTE RESERVOIR -> 01:P2in 24.13 2.140 No_date 6:10 54.07
00861> [RDT= 5.00] out<- 02:P2out 24.12 .700 No_date 7:10 54.07
00862> overflow <= 03:P2OVF .01 .014 No_date 7:10 54.07
00863> [MxStoUsed=.6746E+00, TotOvfVol=.4142E-03, N-Ovf= 1, TotDurOvf= 0 hrs
00864> 010:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00865> ADD HYD + 02:P2out 24.12 .700 No_date 7:10 54.07
00866> + 03:P2OVF .01 .014 No_date 7:10 54.07
00867> [DT= 5.00] SUM= 06:PND2 24.13 .714 No_date 7:10 54.07
00868> CONTINUOUS NASHYD 04:CRFP 24.18 1.091 No_date 6:30 38.93
00870> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.010
00871> remark:POND2-outflow/overflow
00872> 010:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00873> [CN= 82.0; N= 2.00]
00874> [Tp= .50;DT= 5.00]
00875> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00877> [InterEventTime= 12.00]
00878> 010:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00879> CONTINUOUS STANDHYD05:28 12.50 .955 No_date 6:00 35.23
00880> [XIMP= 38;TIMP=.45]
00881> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00882> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 205.;MNP=.100;SCP=.0]
00883> [Impervious area :IaImp= 1.57;SLPI=.80;LGI=1700.;MNI=.013;SCI=.0]
00884> [IaRecImp= 2.00;IaRecCper= 4.00]
00885> 010:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00886> ADD HYD + 04:CRFP 24.18 1.091 No_date 6:30 38.93
00887> + 05:28 12.50 .955 No_date 6:00 35.23
00888> [DT= 5.00] SUM= 06:PND2 24.13 .714 No_date 7:10 54.07
00889> [DT= 5.00] SUM= 07:2065 60.81 2.181 No_date 6:25 44.18
00890> 010:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00891> SAVE HYD 07:2065 60.81 2.181 No_date 6:25 44.18
00892> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.010
00893> remark:HEC-RAS Inflow Node 2065 / Station 44548
00894> 010:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00895> CONTINUOUS STANDHYD05:100-1 61.17 2.769 No_date 6:05 35.23
00896> [XIMP= 38;TIMP=.45]
00897> [Horton parameters: Fo= 76.20;Fc= 13.20;DCAY=4.00; F= .00]
00898> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 1200.;MNP=.100;SCP=.0]
00899> [Impervious area :IaImp= 1.57;SLPI=.80;LGI=1700.;MNI=.013;SCI=.0]
00900> [IaRecImp= 2.00;IaRecCper= 4.00]
00901> 010:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00902> CONTINUOUS NASHYD 06:102-1 39.80 .907 No_date 7:15 35.70
00903> [CN= 78.0; N= 2.00]
00904> [Tp= 1.10;DT= 5.00]
00905> [IaRec= 4.00; SMIN= 29.88; SMAX=199.22; SK=1.000]
00906> [InterEventTime= 12.00]
00907> 010:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00908> ADD HYD + 05:100-1 61.17 2.769 No_date 6:05 35.23
00909> + 06:102-1 39.80 .907 No_date 7:15 35.70
00910> [DT= 5.00] SUM= 10:3894 100.97 3.201 No_date 6:10 35.41
00911> 010:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00912> SAVE HYD 10:3894 100.97 3.201 No_date 6:10 35.41
00913> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.010
00914> remark:HEC-RAS Inflow Node 3894 / Station 43966
00915> ** END OF RUN **
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00917> *****
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00923> RUN:COMMAND#
00924> 011:0001-----
00925> START
00926> [TZERO = .00 hrs on 0]
00927> [METOVS = 1 (1=imperial, 2=metric output)]
00928> [NFORM = 1]
00929> [NTRIN = 11]
00930> 011:0002-----
00931> READ STORM
00932> Filename = storm.001
00933> Comment =
00934> [SDT=30.00;SDUR= 12.00;PTOT= 77.93]
00935> 011:0003-----
00936> DEFAULT VALUES
00937> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00938> [read pr= 1]
00939> FILENAME= ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00940> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00941> Horton's infiltration equation parameters:
00942> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00943> Parameters for PERVIOUS surfaces in STANDHYD:
00944> [IaPer= 4.67 mm] [LGP=40.00 mm] [MNP= .250]
00945> Parameters for IMPERVIOUS surfaces in STANDHYD:

00946> [IaImp= 1.57 mm] [CLL= 1.50] [MNI=.013]
00947> Parameters used in NASHYD:
00948> [IaRecImp= 2.00;IaRecCper= 4.00]
00949> 011:0004-----
00950> COMPUTE API
00951> [APIini= 20.00; APIkdy= .9000; APIkdt= .9978]
00952> [APImax= 94.94; APIavg= 57.70; APImin= 21.13]
00953> 011:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00954> READ HYD 09:101-3 69.53 2.449 No_date 6:50 62.74
00955> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.011
00956> Comment = GRANITE RIDGE AREA 101-3
00957> 011:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00958> CONTINUOUS STANDHYD01:P1 77.13 9.247 No_date 6:10 69.19
00959> [XIMP= 45;TIMP=.70]
00960> [LOSS= 2 :CN= 80.5]
00961> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
00962> [Impervious area :IaImp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
00963> [SMIN= 26.32;SMAX=175.50;SK=1.000]
00964> 011:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00965> COMPUTE DUALHYD 01:P1 77.13 9.247 No_date 6:10 69.19
00967> Major System / 02:P1maj .00 .000 No_date 0:00 .00
00968> Minor System \ 03:P1min 77.13 9.247 No_date 6:00 69.81
00969> [MjSysSto=.1518E+04, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00970> 011:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00971> CONTINUOUS NASHYD 04:SWM1 4.50 .490 No_date 6:05 57.45
00972> [CN= 90.0; N= 2.00]
00973> [Tp= .25;DT= 5.00]
00974> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
00975> [InterEventTime= 12.00]
00976> 011:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00977> ADD HYD + 02:P1maj .00 .000 No_date 0:00 .00
00978> + 03:CRTRIB 77.13 7.710 No_date 6:00 69.81
00979> + 04:SWM1 4.50 .490 No_date 6:05 57.45
00980> + 09:101-3 69.53 2.449 No_date 6:50 62.74
00981> [DT= 5.00] SUM= 01:P1in 151.16 10.420 No_date 6:35 66.19
00982> 011:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00983> ROUTE RESERVOIR -> 01:P1in 151.16 10.420 No_date 6:35 66.19
00984> [RDT= 5.00] out<- 02:P1out 151.16 4.881 No_date 7:10 66.19
00985> [MxStoUsed=.3677E+01]
00986> 011:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00987> CONTINUOUS NASHYD 03:CRTRIB 3.69 .345 No_date 6:05 50.73
00988> [CN= 82.0; N= 2.00]
00989> [Tp= .25;DT= 5.00]
00990> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
00991> [InterEventTime= 12.00]
00992> 011:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00993> ADD HYD + 03:CRTRIB 151.16 10.420 No_date 6:35 66.19
00994> + 04:SWM1 4.50 .490 No_date 6:05 57.45
00995> [DT= 5.00] SUM= 09:1012NC 154.85 10.655 No_date 6:30 65.82
00996> 011:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
00997> ADD HYD 02:P1out 151.16 4.881 No_date 7:10 66.19
00998> + 03:CRTRIB 3.69 .345 No_date 6:05 50.73
00999> [DT= 5.00] SUM= 09:101-2 154.85 4.992 No_date 7:00 65.82
01000> 011:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01001> SAVE HYD 09:101-2 154.85 4.992 No_date 7:00 65.82
01002> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.011
01003> remark:Carp Tributary @ Carp River
01004> 011:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01005> CONTINUOUS STANDHYD01:P3 91.68 9.832 No_date 6:10 63.26
01006> [XIMP= 34;TIMP=.43]
01007> [LOSS= 2 :CN= 80.5]
01008> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
01009> [Impervious area :IaImp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
01010> [IaRecImp= 2.00;IaRecCper= 4.00]
01011> [SMIN= 26.32;SMAX=175.50;SK=1.000]
01012> 011:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01013> COMPUTE DUALHYD 01:P3 91.68 9.832 No_date 6:10 63.26
01014> Major System / 02:P3maj .00 .000 No_date 0:00 .00
01015> Minor System \ 03:P3min 91.68 9.170 No_date 6:05 63.37
01016> [MjSysSto=.4302E+03, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01017> 011:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01018> CONTINUOUS NASHYD 04:SWM3 2.60 .243 No_date 6:05 50.73
01019> [CN= 82.0; N= 2.00]
01020> [Tp= .25;DT= 5.00]
01021> [IaRec= 4.00; SMIN= 23.09; SMAX=153.94; SK=1.000]
01022> [InterEventTime= 12.00]
01023> 011:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01024> ADD HYD + 02:P3maj .00 .000 No_date 0:00 .00
01025> + 03:P3min 91.68 9.170 No_date 6:05 63.37
01026> + 04:SWM3 2.60 .243 No_date 6:05 50.73
01027> [DT= 5.00] SUM= 01:P3in 94.28 9.413 No_date 6:05 63.02
01028> 011:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01029> ROUTE RESERVOIR -> 01:P3in 94.28 9.413 No_date 6:05 63.02
01030> [RDT= 5.00] out<- 02:P3out 81.81 1.750 No_date 6:35 63.02
01031> overflow <= 03:P3OVF 12.47 4.181 No_date 6:35 63.02
01032> [MxStoUsed=.2902E+01, TotOvfVol=.7858E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01033> CONTINUOUS NASHYD 04:SWM2 .99 .085 No_date 6:05 45.08
01034> 011:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01035> ADD HYD 02:P3out 81.81 1.750 No_date 6:35 63.02
01036> + 03:P3OVF 12.47 4.181 No_date 6:35 63.02
01037> [DT= 5.00] SUM= 08:500 94.28 6.931 No_date 6:35 63.02
01038> 011:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01039> SAVE HYD 08:500 94.28 6.931 No_date 6:35 63.02
01040> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.011
01041> remark:South Pond @ Carp River
01042> 011:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01043> ADD HYD 08:500 94.28 6.931 No_date 6:35 63.02
01044> + 09:101-2 154.85 4.992 No_date 7:00 65.82
01045> [DT= 5.00] SUM= 10:2054 249.13 11.809 No_date 6:35 64.76
01046> 011:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01047> SAVE HYD 10:2054 249.13 11.809 No_date 6:35 64.76
01048> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.011
01049> remark:HEC-RAS Inflow Node 2054 / Station 44751
01050> 011:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01051> CONTINUOUS STANDHYD01:P2 23.14 2.664 No_date 6:10 66.81
01052> [XIMP= 47;TIMP=.59]
01053> [LOSS= 2 :CN= 80.5]
01054> [Pervious area :IaPer= 4.67;SLPP=1.00;LGP= 40.;MNP=.200;SCP=.0]
01055> [Impervious area :IaImp= 1.57;SLPI=.50;LGI=1400.;MNI=.013;SCI=.0]
01056> [SMIN= 26.32;SMAX=175.50;SK=1.000]
01057> 011:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01058> COMPUTE DUALHYD 01:P2 23.14 2.664 No_date 6:10 66.81
01059> Major System / 02:P2maj .00 .000 No_date 0:00 .00
01060> Minor System \ 03:P2min 23.14 2.310 No_date 6:00 67.33
01061> [MjSysSto=.3043E+03, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01062> 011:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01063> CONTINUOUS NASHYD 04:SWM2 .99 .108 No_date 6:05 57.44
01064> [CN= 90.0; N= 2.00]
01065> [Tp= .25;DT= 5.00]
01066> [IaRec= 4.00; SMIN= 12.64; SMAX= 84.28; SK=1.000]
01067> [InterEventTime= 12.00]
01068> 011:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01069> ADD HYD 02:P2maj .00 .000 No_date 0:00 .00
01070> + 03:P2min 23.14 2.310 No_date 6:00 67.33
01071> + 04:SWM2 .99 .108 No_date 6:05 57.44
01072> [DT= 5.00] SUM= 01:P2in 24.13 2.418 No_date 6:05 66.92
01073> 011:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01074> ROUTE RESERVOIR -> 01:P2in 24.13 2.418 No_date 6:05 66.92
01075> [RDT= 5.00] out<- 02:P2out 21.11 .700 No_date 6:30 66.92
01076> overflow <= 03:P2OVF 3.02 1.689 No_date 6:30 66.92
01077> [MxStoUsed=.6729E+00, TotOvfVol=.2019E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01078> CONTINUOUS NASHYD 04:SWM2 .99 .108 No_date 6:05 57.44
01079> 011:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R-V-
01080> ADD HYD 02:P2out 21.11 .700 No_date 6:30 66.92
01081> + 03:P2OVF 3.02 1.689 No_date 6:30 66.92

01081> [DT= 5.00] SUM= 06:PND2 24.13 2.389 No_date 6:30 66.92
01082> SAVE HYD 04:CRFP 24.18 1.434 No_date 6:30 50.73
01083> [CN= 82.0: N= 2.00] [IaPer= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
01084> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.011
01085> remark:POND2-outflow/overflow
01086> 011:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01087> CONTINUOUS NASHYD 04:CRFP 24.18 1.434 No_date 6:30 50.73
01088> [IaRec= 2.00: IaRcPcr= 4.00]
01089> [IaRec= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01090> [InterEventTime= 12.00]
01091> 011:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01092> CONTINUOUS STANDHYD05:28 12.50 1.331 No_date 6:00 45.43
01093> [XIMP= 38:TIMP= 45]
01094> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01095> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 205.:MNP= 100:SCP= .0]
01096> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI= .013:SCI= .0]
01097> [IaRecImp= 2.00: IaRcCper= 4.00]
01098> 011:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01099> ADD HYD 04:CRFP 24.18 1.434 No_date 6:30 50.73
01100> + 05:28 12.50 1.331 No_date 6:00 45.43
01101> [DT= 5.00] SUM= 06:PND2 24.13 2.389 No_date 6:30 66.92
01102> + 06:PND2 24.18 1.434 No_date 6:30 50.73
01103> [CN= 82.0: N= 2.00] [IaPer= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
01104> [IaRec= 2.00: IaRcCper= 4.00]
01105> 011:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01106> SAVE HYD 07:2065 60.81 4.500 No_date 6:30 56.06
01107> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.011
01108> remark:HEC-RAS Inflow Node 2065 / Station 44548
01109> 011:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01110> CONTINUOUS STANDHYD05:100-1 61.17 3.498 No_date 6:05 45.43
01111> [XIMP= 38:TIMP= 45]
01112> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01113> [Pervious area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP= 100:SCP= .0]
01114> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI= .013:SCI= .0]
01115> [IaRecImp= 2.00: IaRcCper= 4.00]
01116> 011:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01117> CONTINUOUS NASHYD 06:102-1 39.80 1.210 No_date 7:15 47.07
01118> [CN= 78.0: N= 2.00]
01119> [IaRec= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01120> [InterEventTime= 12.00]
01121> 011:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01122> ADD HYD 05:100-1 61.17 3.498 No_date 6:05 45.43
01123> + 02:102-1 39.80 1.210 No_date 7:15 47.07
01124> [DT= 5.00] SUM= 10:3894 100.97 4.128 No_date 6:10 46.08
01125> 011:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01126> SAVE HYD 10:3894 100.97 4.128 No_date 6:10 46.08
01127> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.011
01128> remark:HEC-RAS Inflow Node 3894 / Station 43966
01129> ** END OF RUN : 11
01130>
01131> *****
01132>
01133>
01134>
01135>
01136>
01137> RUN:COMMAND#
01138> 012:0000-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01139> START
01140> [TZERO = .00 hrs on 0]
01141> [METOUT= 2 (1=imperial, 2=metric output)]
01142> [NFORM= 1]
01143> [NRUN = 12]
01144> 012:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01145> READ STORM
01146> Filename = storm.001
01147> Comment =
01148> [Fo= 76.20:SDUR= 12.00:PTOT= 84.94]
01149> 012:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01150> DEFAULT VALUES
01151> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01152> ICASDir = 1 (read and print data)
01153> FileTitle = ***** YOUR COMMENTS ON THIS LINE AND THE NEXT ONE *****
01154> ***** PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 *****
01155> Horton's infiltration equation parameters:
01156> [Fo= 76.20 mm/hr] [Fc= 13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01157> Parameters for Pervious surfaces in STANDHYD:
01158> [MjSysSto= 2990E+04 TotOvfVol= 0.000E+00 N-Ovf= 0 TotDurOvf= 0 hrs]
01159> Parameters for IMPERVIOUS surfaces in STANDHYD:
01160> [IaImp= 1.57 mm] [CI= 1.50] [MNI= .013]
01161> Parameters used in NASHYD:
01162> [Ia= 4.67 mm] [N= 2.00]
01163> 012:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01164> COMPUTE API
01165> [APIini= 20.00: APIkdy= 9000: APIkdt= .9978]
01166> [APIini=101.76: APIavg= 61.20: APImin= 21.23]
01167> 012:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01168> READ HYD 09:53 2.721 No_date 6:50 69.46
01169> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.012
01170> Comment = GRANITE RIDGE AREA 101-3
01171> 012:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01172> CONTINUOUS STANDHYD01:P1 77.13 10.283 No_date 6:05 76.10
01173> [LOSS= 2 :CN= 80.5]
01174> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
01175> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI= .013:SCI= .0]
01176> [IaRecImp= 2.00: IaRcCper= 4.00]
01177> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01178> 012:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01179> COMPUTE DUALHYD 01:P1 77.13 10.283 No_date 6:05 76.10
01180> Major System \ 02:P1maj .00 .000 No_date 0:00 .00
01181> Minor System \ 03:P1min 77.13 7.710 No_date 5:55 76.85
01182> [MjSysSto= 2990E+04 TotOvfVol= 0.000E+00 N-Ovf= 0 TotDurOvf= 0 hrs]
01183> 012:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01184> SAVE HYD 07:2065 60.81 4.500 No_date 6:30 56.06
01185> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.012
01186> remark:HEC-RAS Inflow Node 2065 / Station 44548
01187> 012:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01188> CONTINUOUS STANDHYD05:100-1 61.17 3.498 No_date 6:05 50.73
01189> [XIMP= 38:TIMP= 45]
01190> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01191> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 205.:MNP= 100:SCP= .0]
01192> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI= .013:SCI= .0]
01193> [IaRecImp= 2.00: IaRcCper= 4.00]
01194> 012:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01195> CONTINUOUS NASHYD 06:102-1 39.80 1.210 No_date 7:15 53.48
01196> [CN= 78.0: N= 2.00]
01197> [IaRec= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01198> [InterEventTime= 12.00]
01199> 012:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
02000> ADD HYD 05:100-1 61.17 3.498 No_date 6:05 50.73
02001> + 03:CRTRIB 3.69 .391 No_date 6:05 57.33
02002> [DT= 5.00] SUM= 09:101-2 154.85 10.996 No_date 6:30 72.70
02003> 012:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
02004> ADD HYD 02:P1out 151.16 5.101 No_date 7:15 73.08
02005> + 03:CRTRIB 3.69 .391 No_date 6:05 57.33
02006> [DT= 5.00] SUM= 09:101-2 154.85 5.216 No_date 7:00 72.70
02007> 012:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
02008> SAVE HYD 09:101-2 154.85 5.216 No_date 7:00 72.70

021216> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.012
021217> remark:Carp Tributary @ Carp River - XP2054
021218> 012:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021219> CONTINUOUS STANDHYD01:P3 91.68 10.895 No_date 6:10 70.03
021220> [XIMP= 34:TIMP= 43]
021221> [LOSS= 2 :CN= 80.5]
021222> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
021223> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI= .013:SCI= .0]
021224> [IaRecImp= 2.00: IaRcCper= 4.00]
021225> [SMIN= 26.32: SMAX=175.50: SK=1.000]
021226> 012:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021227> COMPUTE DUALHYD 01:P3 91.68 10.895 No_date 6:10 70.03
021228> Major System \ 02:P2maj .00 .000 No_date 0:00 .00
021229> Minor System \ 03:P3min 91.68 9.170 No_date 6:00 70.64
021230> [MjSysSto= 1690E+04 TotOvfVol= 0.000E+00 N-Ovf= 0 TotDurOvf= 0 hrs]
021231> 012:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021232> CONTINUOUS NASHYD 04:SWM3 2.60 .276 No_date 6:05 57.33
021233> [CN= 82.0: N= 2.00]
021234> [IaRec= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
021235> [InterEventTime= 12.00]
021236> 012:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021237> ADD HYD 02:P3min 91.68 9.170 No_date 6:00 70.64
021238> + 03:P3min 2.60 .276 No_date 6:05 57.33
021239> [DT= 5.00] SUM= 01:P3in 94.28 9.446 No_date 6:05 70.28
021240> 012:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021241> ROUTE RESERVOIR -> 02:P2maj 24.13 2.430 No_date 6:05 73.76
021242> [RDT= 5.00] out< 02:P2out 19.89 .700 No_date 6:25 73.76
021243> overflow <= 03:P2OVf 4.24 1.706 No_date 6:25 73.76
021244> [MxStoUsed= 2905E+01 TotOvfVol= 1312E+01 N-Ovf= 3 TotDurOvf= 1 hrs]
021245> 012:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021246> ADD HYD 02:P2maj 24.13 2.430 No_date 6:05 73.76
021247> + 03:P2OVf 19.89 .700 No_date 6:25 73.76
021248> [DT= 5.00] SUM= 08:500 94.28 9.378 No_date 6:30 70.28
021249> 012:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021250> SAVE HYD 08:500 94.28 9.378 No_date 6:30 70.28
021251> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.012
021252> remark:South Pond @ Carp River
021253> 012:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021254> ADD HYD 08:500 94.28 9.378 No_date 6:30 70.28
021255> + 09:101-2 154.85 5.216 No_date 7:00 72.70
021256> [DT= 5.00] SUM= 249.13 14.403 No_date 6:40 71.78
021257> 012:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021258> SAVE HYD 10:2054 249.13 14.403 No_date 6:40 71.78
021259> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.012
021260> remark:HEC-RAS Inflow Node 2054 / Station 44751
021261> 012:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021262> CONTINUOUS STANDHYD01:P2 23.14 2.973 No_date 6:05 73.65
021263> [XIMP= 47:TIMP= 59]
021264> [LOSS= 2 :CN= 80.5]
021265> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
021266> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI= .013:SCI= .0]
021267> [IaRecImp= 2.00: IaRcCper= 4.00]
021268> [SMIN= 26.32: SMAX=175.50: SK=1.000]
021269> 012:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021270> COMPUTE DUALHYD 01:P2 23.14 2.973 No_date 6:05 73.65
021271> Major System \ 02:P2maj .00 .000 No_date 0:00 .00
021272> Minor System \ 03:P2min 23.14 2.310 No_date 5:55 74.17
021273> [MjSysSto= 7113E+03 TotOvfVol= 0.000E+00 N-Ovf= 0 TotDurOvf= 0 hrs]
021274> 012:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021275> SAVE HYD 10:2054 249.13 14.403 No_date 6:40 71.78
021276> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.012
021277> remark:HEC-RAS Inflow Node 2054 / Station 44751
021278> 012:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021279> CONTINUOUS STANDHYD01:P2 23.14 2.973 No_date 6:05 73.65
021280> [XIMP= 47:TIMP= 59]
021281> [LOSS= 2 :CN= 80.5]
021282> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 40.:MNP= 200:SCP= .0]
021283> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI= .013:SCI= .0]
021284> [IaRecImp= 2.00: IaRcCper= 4.00]
021285> [SMIN= 26.32: SMAX=175.50: SK=1.000]
021286> 012:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021287> ADD HYD 02:P2min 23.14 2.310 No_date 5:55 74.17
021288> + 04:SWM2 .99 .120 No_date 6:05 64.29
021289> [DT= 5.00] SUM= 01:P2in 24.13 2.430 No_date 6:05 73.76
021290> 012:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021291> ROUTE RESERVOIR -> 02:P2maj 24.13 2.430 No_date 6:05 73.76
021292> [RDT= 5.00] out< 02:P2out 19.89 .700 No_date 6:25 73.76
021293> overflow <= 03:P2OVf 4.24 1.706 No_date 6:25 73.76
021294> [MxStoUsed= 6738E+00 TotOvfVol= 3131E+00 N-Ovf= 2 TotDurOvf= 1 hrs]
021295> 012:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021296> ADD HYD 02:P2min 23.14 2.310 No_date 5:55 74.17
021297> + 03:P2OVf 4.24 1.706 No_date 6:25 73.76
021298> [DT= 5.00] SUM= 06:PND2 24.13 2.406 No_date 6:25 73.76
021299> 012:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021300> SAVE HYD 06:PND2 24.13 2.406 No_date 6:25 73.76
021301> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.012
021302> remark:POND2-outflow/overflow
021303> 012:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021304> CONTINUOUS NASHYD 04:CRFP 24.18 1.623 No_date 6:30 57.33
021305> [CN= 82.0: N= 2.00]
021306> [IaRec= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
021307> [InterEventTime= 12.00]
021308> 012:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021309> CONTINUOUS STANDHYD05:28 12.50 1.510 No_date 6:00 50.97
021310> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
021311> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 205.:MNP= 100:SCP= .0]
021312> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI= .013:SCI= .0]
021313> [IaRecImp= 2.00: IaRcCper= 4.00]
021314> 012:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021315> ADD HYD 04:CRFP 24.18 1.623 No_date 6:30 57.33
021316> + 05:28 12.50 1.510 No_date 6:00 50.97
021317> [DT= 5.00] SUM= 07:2065 60.81 4.900 No_date 6:25 62.54
021318> Major System \ 02:P1maj .00 .000 No_date 0:00 .00
021319> Minor System \ 03:P1min 77.13 7.710 No_date 5:55 76.85
021320> [MjSysSto= 2990E+04 TotOvfVol= 0.000E+00 N-Ovf= 0 TotDurOvf= 0 hrs]
021321> 012:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021322> SAVE HYD 07:2065 60.81 4.900 No_date 6:25 62.54
021323> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.012
021324> remark:HEC-RAS Inflow Node 2065 / Station 44548
021325> 012:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021326> CONTINUOUS STANDHYD05:100-1 61.17 3.498 No_date 6:05 50.73
021327> [XIMP= 38:TIMP= 45]
021328> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
021329> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGP= 205.:MNP= 100:SCP= .0]
021330> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI= .013:SCI= .0]
021331> [IaRecImp= 2.00: IaRcCper= 4.00]
021332> 012:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021333> CONTINUOUS NASHYD 06:102-1 39.80 1.380 No_date 7:15 53.48
021334> [CN= 78.0: N= 2.00]
021335> [IaRec= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
021336> [InterEventTime= 12.00]
021337> 012:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021338> ADD HYD 05:100-1 61.17 4.021 No_date 6:05 50.97
021339> + 06:102-1 39.80 1.380 No_date 7:15 53.48
021340> [DT= 5.00] SUM= 100.97 4.669 No_date 6:05 51.96
021341> 012:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
021342> SAVE HYD 10:3894 100.97 4.669 No_date 6:05 51.96
021343> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.012
021344> remark:HEC-RAS Inflow Node 3894 / Station 43966
021345> ** END OF RUN : 12
021346> *****
021347>
021348>
021349>
021350>

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01351> RUN:COMMAND#
01352> 013 0001-----
01353> START
01354> [TZERO = .00 hrs on 0]
01355> [METOUT= 2 (1=imperial, 2=metric output)]
01356> [NSTORM = 1]
01357> [NRUN = 13]
01358>
01359> READ STORM
01360> Filename = storm.001
01361> Comment =
01362> [SDT=10.00:SDUR= 12.00:PTOT= 93.91]
01363>
01364> DEFAULT VALUES
01365> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01366> ICASedv = 1 (read and print data)
01367> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ----
01368>
01369> Horton's infiltration equation parameters:
01370> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01371> Parameters for PERVIOUS surfaces in STANDHYD:
01372> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
01373> Parameters for IMPERVIOUS surfaces in STANDHYD:
01374> [Iimp= 1.57 mm] [LGI= 1.50] [MNI= .013]
01375> Parameters used in NASHYD:
01376> [Ia= 4.67 mm] [N= 2.00]
01377>
01378> 013 0004-----
01379> COMPUTE API
01380> [APIini= 20.00: APIkdy= 9000: APIkdt= .9993]
01381> [APImax=110.44: APIavg= 66.21: APImin= 20.46]
01382>
01383> 013 0005-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01384> READ HYD 09:101-3 69.53 3.093 No_date 6:45 78.11
01385> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.013
01386> Comment = GRANITE RIDGE AREA 101-3
01387>
01388> 013 0006-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01389> CONTINUOUS STANDHYD01:P1 77.13 11.641 No_date 6:05 84.97
01390> [XIMP= 45:TIMP= 70]
01391> [LOSS= 2 :CN= 80.5]
01392> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01393> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01394> [IaRECimp= 2.00: IaRECper= 4.00]
01395> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01396>
01397> 013 0007-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01398> COMPUTE DUALHYD 01:P1 77.13 11.641 No_date 6:05 84.97
01399> Major System / 02:P1maj 1.75 2.669 No_date 6:15 84.97
01400> Minor System \ 03:P1min 75.38 7.710 No_date 5:55 86.57
01401> [MjSysStor=.3857E+04, TotOvfVol=.1485E+04, N-Ovf= 1, TotDurOvf= 0 hrs]
01402>
01403> 013 0008-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01404> CONTINUOUS NASHYD 04:SWM1 4.50 .619 No_date 6:05 73.10
01405> [CN= 90.0: N= 2.00]
01406> [Tp= .25:DT= 5.00]
01407> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01408> [InterEventTime= 12.00]
01409>
01410> 013 0009-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01411> ADD HYD 02:P1maj 1.75 2.669 No_date 6:15 84.97
01412> + 03:P1min 75.38 7.710 No_date 5:55 86.57
01413> + 04:SWM1 4.50 .619 No_date 6:05 73.10
01414> [DT= 5.00] SUM= 01:P1lin 151.16 13.658 No_date 6:15 82.26
01415>
01416> 013 0010-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01417> ROUTE RESERVOIR -> 01:P1lin 151.16 13.658 No_date 6:15 82.26
01418> * [RDT= 5.00] out<= 02:P1out 151.16 5.442 No_date 7:15 82.26
01419> [MxStoUsed=.4772E+01]
01420>
01421> 013 0011-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01422> CONTINUOUS NASHYD 03:CRTRIB 3.69 .450 No_date 6:05 65.86
01423> [CN= 82.0: N= 2.00]
01424> [Tp= .25:DT= 5.00]
01425> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01426> [InterEventTime= 12.00]
01427>
01428> 013 0012-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01429> ADD HYD 01:P1lin 151.16 13.658 No_date 6:15 82.26
01430> + 03:CRTRIB 3.69 .450 No_date 6:05 65.86
01431> [DT= 5.00] SUM= 01:P1lin 154.85 14.069 No_date 6:15 81.87
01432>
01433> 013 0013-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01434> ADD HYD 02:P1out 151.16 5.442 No_date 7:15 82.26
01435> + 03:CRTRIB 3.69 .450 No_date 6:05 65.86
01436> [DT= 5.00] SUM= 09:101-2 154.85 5.563 No_date 7:05 81.87
01437>
01438> 013 0014-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01439> SAVE HYD 09:101-2 154.85 5.563 No_date 7:05 81.87
01440> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-2.013
01441> remark:Carp Tributary @ Carp River - XP2054
01442>
01443> 013 0015-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01444> CONTINUOUS STANDHYD01:P3 91.68 12.428 No_date 6:05 78.73
01445> [XIMP= 34:TIMP= 43]
01446> [LOSS= 2 :CN= 80.5]
01447> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01448> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01449> [IaRECimp= 2.00: IaRECper= 4.00]
01450> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01451>
01452> 013 0016-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01453> COMPUTE DUALHYD 01:P3 91.68 12.428 No_date 6:05 78.73
01454> Major System / 02:P3maj .00 .000 No_date 0:00 .00
01455> Minor System \ 03:P3min 91.68 9.170 No_date 5:55 79.33
01456> [MjSysStor=.4136E+04, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
01457>
01458> 013 0017-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01459> CONTINUOUS NASHYD 04:SWM3 2.60 .317 No_date 6:05 65.86
01460> [CN= 82.0: N= 2.00]
01461> [Tp= .25:DT= 5.00]
01462> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01463> [InterEventTime= 12.00]
01464>
01465> 013 0018-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01466> ADD HYD 02:P3maj .00 .000 No_date 0:00 .00
01467> + 03:P3min 91.68 9.170 No_date 5:55 79.33
01468> + 04:SWM3 2.60 .317 No_date 6:05 65.86
01469> [DT= 5.00] SUM= 01:P3lin 94.28 9.487 No_date 6:05 78.96
01470>
01471> 013 0019-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01472> ROUTE RESERVOIR -> 01:P3lin 94.28 9.487 No_date 6:05 78.96
01473> [RDT= 5.00] out<= 02:P3out 69.53 1.750 No_date 6:25 78.96
01474> overflow <= 03:P3OVF 24.75 7.677 No_date 6:25 78.96
01475> [MxStoUsed=.2904E+01, TotOvfVol=.1954E+01, N-Ovf= 3, TotDurOvf= 1 hrs]
01476>
01477> 013 0020-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01478> ADD HYD 02:P3out 69.53 1.750 No_date 6:25 78.96
01479> + 03:P3OVF 24.75 7.677 No_date 6:25 78.96
01480> [DT= 5.00] SUM= 08:500 94.28 9.427 No_date 6:25 78.96
01481>
01482> 013 0021-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01483> SAVE HYD 08:500 94.28 9.427 No_date 6:25 78.96
01484> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-500.013
01485> remark:South Pond @ Carp River
01486>
01487> 013 0022-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01488> ADD HYD 08:500 94.28 9.427 No_date 6:25 78.96
01489> + 09:101-2 154.85 5.563 No_date 7:05 81.87
01490> [DT= 5.00] SUM= 10:2054 249.13 14.759 No_date 6:55 80.76
01491>
01492> 013 0023-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01493> SAVE HYD 10:2054 249.13 14.759 No_date 6:55 80.76
01494> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2054.013
01495> remark:HEC-RAS Inflow Node 2054 / Station 44751
01496>
01497> 013 0024-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01498> CONTINUOUS STANDHYD01:P2 23.14 3.377 No_date 6:05 82.45
01499> [XIMP= 47:TIMP= 59]
01500> [LOSS= 2 :CN= 80.5]
01501> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01502> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01503> [IaRECimp= 2.00: IaRECper= 4.00]
01504> [SMIN= 26.32: SMAX=175.50: SK=1.000]
01505>
01506> 013 0025-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-

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01486> COMPUTE DUALHYD 01:P2 23.14 3.377 No_date 6:05 82.45
01487> Major System / 02:P2maj .28 .408 No_date 6:20 82.45
01488> Minor System \ 03:P2min 22.86 2.310 No_date 5:55 82.67
01489> [MjSysStor=.1157E+04, TotOvfVol=.2311E+03, N-Ovf= 1, TotDurOvf= 0 hrs]
01490>
01491> 013 0026-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01492> CONTINUOUS NASHYD 04:SWM2 .99 .136 No_date 6:05 73.10
01493> [CN= 90.0: N= 2.00]
01494> [Tp= .25:DT= 5.00]
01495> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01496> [InterEventTime= 12.00]
01497>
01498> 013 0027-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01499> ADD HYD 02:P2maj .28 .408 No_date 6:20 82.45
01500> + 03:P2min 22.86 2.310 No_date 5:55 82.67
01501> + 04:SWM2 .99 .136 No_date 6:05 73.10
01502> [DT= 5.00] SUM= 01:P2in 24.13 2.831 No_date 6:20 82.28
01503>
01504> 013 0028-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01505> ROUTE RESERVOIR -> 01:P2in 24.13 2.831 No_date 6:20 82.28
01506> [RDT= 5.00] out<= 02:P2out 18.58 .700 No_date 6:20 82.28
01507> overflow <= 03:P2OVF 5.55 2.065 No_date 6:20 82.28
01508> [MxStoUsed=.6739E+00, TotOvfVol=.4564E+00, N-Ovf= 1, TotDurOvf= 1 hrs]
01509>
01510> 013 0029-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01511> ADD HYD 02:P2out 18.58 .700 No_date 6:20 82.28
01512> + 03:P2OVF 5.55 2.065 No_date 6:20 82.28
01513> [DT= 5.00] SUM= 06:PND2 24.13 2.765 No_date 6:20 82.28
01514>
01515> 013 0030-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01516> SAVE HYD 06:PND2 24.13 2.765 No_date 6:20 82.28
01517> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-PND2.013
01518> remark:POND2-outflow/overflow
01519>
01520> 013 0031-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01521> CONTINUOUS NASHYD 04:CRFP 24.18 1.865 No_date 6:30 65.86
01522> [CN= 82.0: N= 2.00]
01523> [Tp= .50:DT= 5.00]
01524> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01525> [InterEventTime= 12.00]
01526>
01527> 013 0032-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01528> CONTINUOUS STANDHYD05:28 12.50 1.740 No_date 6:00 57.94
01529> [XIMP= 38:TIMP= 45]
01530> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01531> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP= .0]
01532> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI=.013:SCI= .0]
01533> [IaRECimp= 2.00: IaRECper= 4.00]
01534>
01535> 013 0033-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01536> ADD HYD 04:CRFP 24.18 1.865 No_date 6:30 65.86
01537> + 05:28 12.50 1.740 No_date 6:00 57.94
01538> [DT= 5.00] SUM= 07:2065 60.81 5.780 No_date 6:20 70.75
01539>
01540> 013 0034-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01541> SAVE HYD 07:2065 60.81 5.780 No_date 6:20 70.75
01542> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-2065.013
01543> remark:HEC-RAS Inflow Node 2065 / Station 44548
01544>
01545> 013 0035-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01546> CONTINUOUS STANDHYD05:100-1 61.17 4.569 No_date 6:05 57.94
01547> [XIMP= 38:TIMP= 45]
01548> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01549> [Pervious area: Iaper= 4.67:SLPP= 1.00:LGI=1200.:MNP=.100:SCP= .0]
01550> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 1700.:MNI=.013:SCI= .0]
01551> [IaRECimp= 2.00: IaRECper= 4.00]
01552>
01553> 013 0036-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01554> CONTINUOUS NASHYD 06:102-1 39.80 1.601 No_date 7:10 61.80
01555> [CN= 78.0: N= 2.00]
01556> [Tp= 1.10:DT= 5.00]
01557> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01558> [InterEventTime= 12.00]
01559>
01560> 013 0037-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01561> ADD HYD 05:100-1 61.17 4.569 No_date 6:05 57.94
01562> + 06:102-1 39.80 1.601 No_date 7:10 61.80
01563> [DT= 5.00] SUM= 10:3894 100.97 5.351 No_date 6:05 59.46
01564>
01565> 013 0038-----ID-NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01566> SAVE HYD 10:3894 100.97 5.351 No_date 6:05 59.46
01567> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-3894.013
01568> remark:HEC-RAS Inflow Node 3894 / Station 43966
01569>
01570> 013 0002-----FINISH-----
01571> *****
01572> WARNINGS / ERRORS / NOTES
01573>
01574> 013 0001-----ROUTE RESERVOIR-----
01575> *** WARNING: STORAGE-Q values were extrapolated.
01576> Increase curve or use overflow option.
01577> Simulation ended on 2017-07-14 at 10:13:49
01578>
01579> *****

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00001> 2
00002> *%-----
00003> *%
00004> *% ##### INPUT FILE FOR CARP RIVER, CITY OF KANATA #####
00005> *% ##### FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009 #####
00006> *% ##### INCLUDES BEST MANAGEMENT PRACTICES #####
00007> *% ##### EVENT BASED MODELING (5 MINUTE TIMESTEP) #####
00008> *%
00009> *%
00010> *% REFERENCE DRAINAGE AREA PLANS:
00011> *% -----
00012> *% FIGURE 8.1
00013> *%-----
00014> *% EVENT BASED SIMULATION
00015> *%-----
00016> START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[1]
00017> C25mm=3.stm
00018> *%
00019> READ STORM STORM_FILENAME=["storm.001"]
00020> *%-----
00021> DEFAULT VALUES ICASEDef=[1], read and print values
00022> DEFVAL_FILENAME=["ottawa.def"]
00023> *%
00024> COMPUTE API API=[20], APIK=[0.9]/day
00025> *%-----
00026> *% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
00027> *%-----
00028> READ HYD ID=[9], NHYD=["101-3"],
00029> HYD_FILENAME=["H-101-3"]
00030> *%-----
00031> *% FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
00032> *% (GLEN CAIRN SWMP OUTLET CHANNEL)
00033> *%-----
00034> *% HEADWATER P1
00035> *%-----
00036> CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
00037> XIMP=[0.45], TIMP=[0.70], DWF=[0](cms), LOSS=[2],
00038> SCS curve number CN=[78],
00039> Pervious surfaces: IAPER=[5.2](mm), SLPP=[1.0](%),
00040> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00041> Impervious surfaces: IAimp=[1.57](mm), SLP=[0.5](%),
00042> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00043> Continuous simulation parameters:
00044> IARCPper=[4](hrs), IARCImp=[2](hrs),
00045> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00046> InterEventTime=[12](hrs), END=-1
00047> *%
00048> *ROUTING OF PERFORATED PIPES
00049> *%-----
00050> DIVERT HYD IDin=[1], NIDout=[2]max five,
00051> outflow hydrographs (ID, NHYD)=[2,"P1BMP1"/3,"P1STM1"]
00052> flow distribution table: (modify as necessary)
00053> Note: all flows are in (cms)
00054>


| QIDi                     | QIDii | QTOTAL |
|--------------------------|-------|--------|
| [ 0.000 + 0.000 = 0.00 ] |       |        |
| [ 0.048 + 0.203 = 0.25 ] |       |        |
| [ 0.095 + 0.405 = 0.50 ] |       |        |
| [ 0.143 + 0.608 = 0.75 ] |       |        |
| [ 0.190 + 0.810 = 1.00 ] |       |        |
| [ 0.285 + 1.215 = 1.50 ] |       |        |
| [ 0.380 + 1.620 = 2.00 ] |       |        |
| [ 0.475 + 2.025 = 2.50 ] |       |        |
| [ 0.570 + 2.430 = 3.00 ] |       |        |
| [ 0.760 + 3.240 = 4.00 ] |       |        |
| [ 0.950 + 4.050 = 5.00 ] |       |        |
| [ 1.140 + 4.860 = 6.00 ] |       |        |
| [ 1.330 + 5.670 = 7.00 ] |       |        |


00068> *%
00069> DIVERT HYD IDin=[2], NIDout=[2]max five,
00070> outflow hydrographs (ID, NHYD)=[4,"P1BMP2"/5,"P1STM2"]
00071> flow distribution table: (modify as necessary)
00072> Note: all flows are in (cms)
00073>


| QIDi                     | QIDii | QTOTAL |
|--------------------------|-------|--------|
| [ 0.000 + 0.000 = 0.00 ] |       |        |
| [ 0.016 + 0.032 = 0.05 ] |       |        |
| [ 0.031 + 0.064 = 0.10 ] |       |        |
| [ 0.047 + 0.095 = 0.14 ] |       |        |
| [ 0.063 + 0.127 = 0.19 ] |       |        |
| [ 0.094 + 0.191 = 0.29 ] |       |        |
| [ 0.126 + 0.254 = 0.38 ] |       |        |
| [ 0.157 + 0.318 = 0.48 ] |       |        |
| [ 0.189 + 0.381 = 0.57 ] |       |        |
| [ 0.252 + 0.508 = 0.76 ] |       |        |
| [ 0.315 + 0.635 = 0.95 ] |       |        |
| [ 0.378 + 0.762 = 1.14 ] |       |        |
| [ 0.441 + 0.889 = 1.33 ] |       |        |


00086> *%
00087> *%
00088> ROUTE RESERVOIR IDout=[7], NHYD=["P1BMP3"], IDin=[4],
00089> RDT=[5](min),
00090> TABLE of ( OUTFLOW-STORAGE ) values
00091> (cms) - (ha-m)
00092> [ 0.0 , 0.0 ]
00093> [ 0.005 , 0.006 ]
00094> [ 0.007 , 0.017 ]
00095> [ 0.008 , 0.0258 ]
00096> [ 0.009 , 0.0344 ]
00097> [ 0.0108 , 0.0430 ]
00098> [ -1 , -1 ] (max twenty pts)
00099> IDovf=[8], NHYDovf=["P1STM3"]
00100> *%-----
00101> COMPUTE DUALHYD IDin=[3], CINLET=[7.71](cms), NINLET=[1],
00102> MAJID=[1], MAJNHYD=["P1maj"],
00103> MINID=[2], MINNHYD=["P1min"],
00104> TMJSTO=[3857](cu-m)
00105> *%
00106> CONTINUOUS NASHYD ID=[7], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
00107> DWF=0 CN=90 IA=9.8 N=2 TP=0.25
00108> Continuous simulation parameters:
00109> IARCPper=[4](hrs),
00110> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00111> InterEventTime=[12](hrs)
00112> Baseflow simulation parameters:
00113> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00114> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00115> VHydCond=[10](mm/hr), END=-1
00116> *%
00117> ADD HYD IDsum=[10], NHYD=["P1in"], IDs to add=[1,2,5,7,8,9]
00118> *%
00119> ROUTE RESERVOIR IDout=[2], NHYD=["P1SWM"], IDin=[10],
00120> RDT=[5](min),
00121> TABLE of ( OUTFLOW-STORAGE ) values
00122> (cms) - (ha-m)
00123> [ 0.000 , 0.000 ]
00124> [ 0.050 , 0.499 ]
00125> [ 1.500 , 2.030 ]
00126> [ 2.500 , 2.810 ]
00127> [ 4.500 , 2.920 ]
00128> [ 4.800 , 3.500 ]
00129> [ 5.000 , 3.930 ]
00130> [ 5.300 , 4.500 ]
00131> [ -1 , -1 ](max twenty pts)
00132> *%
00133> CONTINUOUS NASHYD ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
00134> DWF=0 CN=82 IA=9.8 N=2 TP=0.25
00135> Continuous simulation parameters:

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00136> IARCPper=[4](hrs),
00137> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00138> InterEventTime=[12](hrs)
00139> Baseflow simulation parameters:
00140> BaseFlowOption=[1],
00141> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00142> VHydCond=[10](mm/hr), END=-1
00143> *%
00144> * CARP RIVER TRIBUTARY AT CARP RIVER
00145> *-----
00146> ADD HYD IDsum=[9], NHYD=["B101-2"], IDs to add=[2,3]
00147> *%
00148> *SAVE HYD ID=[9], # OF PCYCLES=[1], ICASEsh=[1]
00149> *% HYD_COMMENT=["Carp Tributary @ Carp River - XP2054"]
00150> *%-----
00151> * FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
00152> * (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
00153> *-----
00154> * SOUTH POND P3
00155> * 10yr control
00156> *-----
00157> CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
00158> XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
00159> SCS curve number CN=[78],
00160> Pervious surfaces: IAPER=[5.2](mm), SLPP=[1.0](%),
00161> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00162> Impervious surfaces: IAimp=[1.57](mm), SLP=[0.5](%),
00163> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00164> Continuous simulation parameters:
00165> IARCPper=[4](hrs), IARCImp=[2](hrs),
00166> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00167> InterEventTime=[12](hrs), END=-1
00168> *%
00169> *ROUTING OF PERFORATED PIPES
00170> *%-----
00171> DIVERT HYD IDin=[1], NIDout=[2]max five,
00172> outflow hydrographs (ID, NHYD)=[2,"P3BMP1"/3,"P3STM1"]
00173> flow distribution table: (modify as necessary)
00174> Note: all flows are in (cms)
00175>


| QIDi                     | QIDii | QTOTAL |
|--------------------------|-------|--------|
| [ 0.000 + 0.000 = 0.00 ] |       |        |
| [ 0.065 + 0.194 = 0.25 ] |       |        |
| [ 0.130 + 0.387 = 0.50 ] |       |        |
| [ 0.195 + 0.581 = 0.75 ] |       |        |
| [ 0.260 + 0.774 = 1.00 ] |       |        |
| [ 0.390 + 1.161 = 1.50 ] |       |        |
| [ 0.520 + 1.548 = 2.00 ] |       |        |
| [ 0.650 + 1.935 = 2.50 ] |       |        |
| [ 0.780 + 2.322 = 3.00 ] |       |        |
| [ 1.040 + 3.096 = 4.00 ] |       |        |
| [ 1.300 + 3.870 = 5.00 ] |       |        |
| [ 1.560 + 4.644 = 6.00 ] |       |        |
| [ 1.820 + 5.418 = 7.00 ] |       |        |


00189> *%
00190> DIVERT HYD IDin=[2], NIDout=[2]max five,
00191> outflow hydrographs (ID, NHYD)=[4,"P3BMP2"/5,"P3STM2"]
00192> flow distribution table: (modify as necessary)
00193> Note: all flows are in (cms)
00194>


| QIDi                     | QIDii | QTOTAL |
|--------------------------|-------|--------|
| [ 0.000 + 0.000 = 0.00 ] |       |        |
| [ 0.022 + 0.043 = 0.07 ] |       |        |
| [ 0.043 + 0.087 = 0.13 ] |       |        |
| [ 0.065 + 0.130 = 0.20 ] |       |        |
| [ 0.086 + 0.174 = 0.26 ] |       |        |
| [ 0.129 + 0.261 = 0.39 ] |       |        |
| [ 0.172 + 0.348 = 0.52 ] |       |        |
| [ 0.215 + 0.435 = 0.65 ] |       |        |
| [ 0.259 + 0.521 = 0.78 ] |       |        |
| [ 0.345 + 0.695 = 1.04 ] |       |        |
| [ 0.431 + 0.869 = 1.30 ] |       |        |
| [ 0.517 + 1.043 = 1.56 ] |       |        |
| [ 0.603 + 1.217 = 1.82 ] |       |        |


00209> *%
00209> ROUTE RESERVOIR IDout=[7], NHYD=["P3BMP3"], IDin=[4],
00210> RDT=[5](min),
00211> TABLE of ( OUTFLOW-STORAGE ) values
00212> (cms) - (ha-m)
00213> [ 0.000 , 0.000 ]
00214> [ 0.0054 , 0.0093 ]
00215> [ 0.0070 , 0.0186 ]
00216> [ 0.0085 , 0.0280 ]
00217> [ 0.0101 , 0.0373 ]
00218> [ 0.0117 , 0.0466 ]
00219> [ -1 , -1 ]
00220> IDovf=[8], NHYDovf=["P3STM3"]
00221> *%-----
00222> COMPUTE DUALHYD IDin=[3], CINLET=[5.20](cms), NINLET=[1],
00223> MAJID=[1], MAJNHYD=["P3maj"],
00224> MINID=[2], MINNHYD=["P3min"],
00225> TMJSTO=[4250](cu-m)
00226> *%
00227> CONTINUOUS NASHYD ID=[7], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
00228> DWF=0 CN=82 IA=9.8 N=2 TP=0.25
00229> Continuous simulation parameters:
00230> IARCPper=[4](hrs),
00231> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00232> InterEventTime=[12](hrs)
00233> Baseflow simulation parameters:
00234> BaseFlowOption=[1],
00235> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00236> VHydCond=[10](mm/hr), END=-1
00237> *%
00238> ADD HYD IDsum=[10], NHYD=["P3in"], IDs to add=[1,2,5,7,8]
00239> *%
00240> ROUTE RESERVOIR IDout=[2], NHYD=["P3SWM"], IDin=[10],
00241> RDT=[5](min),
00242> TABLE of ( OUTFLOW-STORAGE ) values
00243> (cms) - (ha-m)
00244> [ 0.000 , 0.000 ]
00245> [ 0.050 , 0.427 ]
00246> [ 0.300 , 1.568 ]
00247> [ 0.800 , 2.120 ]
00248> [ 1.750 , 2.905 ]
00249> [ -1 , -1 ]
00250> IDovf=[3], NHYDovf=["P3OVF"]
00251> *%
00252> * SOUTH POND (P3) AT CARP RIVER
00253> *-----
00254> ADD HYD IDsum=[8], NHYD=["B500"], IDs to add=[2,3]
00255> *%
00256> *SAVE HYD ID=[8], # OF PCYCLES=[1], ICASEsh=[1]
00257> *% HYD_COMMENT=["South Pond @ Carp River"]
00258> *%-----
00259> * HEC-RAS inflow hydrograph @ 44751
00260> * NODE 2054
00261> *-----
00262> ADD HYD IDsum=[10], NHYD=["B2054"], IDs to add=[8,9]
00263> *%
00264> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00265> *% HYD_COMMENT=["HEC-RAS inflow Node 2054 / Station 44751"]
00266> *%-----
00267> *% LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
00268> *% (28/35/36)
00269> *%-----
00270> *% NORTH POND P2

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00271> * 10yr control
00272> *****
00273> CONTINUOUS STANDHYD ID=[1], NHYD=['P2'], DT=[5](min), AREA=[23.14](ha),
XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
00274> SCS curve number CN=[78],
00275> Pervious surfaces: IAPER=[5.2](mm), SLPP=[1.0](%),
00276> LGP=[40](m), MNP=[0.20], SCP=[0](min),
00277> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[0.5](%),
00278> LGI=[1400](m), MNI=[0.013], SCI=[0](min)
00279>
00280> Continuous simulation parameters:
00281> IARECper=[4](hrs), IARECimp=[2](hrs),
00282> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00283> InterEventTime=[12](hrs), END=-1
00284> *
00285> DIVERT HYD IDin=[1], NIDout=[2]max five,
00286> outflow hydrographs (ID, NHYD)=[2,"P2BMP1"/3,"P2STM1"]
00287> flow distribution table: (modify as necessary)
00288> Note: all flows are in (cms)
00289>
00290> QIDi = QTOTAL
00291> [ 0.000 + 0.000 = 0.00 ]
00292> [ 0.048 + 0.203 = 0.25 ]
00293> [ 0.095 + 0.405 = 0.50 ]
00294> [ 0.143 + 0.608 = 0.75 ]
00295> [ 0.190 + 0.810 = 1.00 ]
00296> [ 0.285 + 1.215 = 1.50 ]
00297> [ 0.380 + 1.620 = 2.00 ]
00298> [ 0.475 + 2.025 = 2.50 ]
00299> [ 0.570 + 2.430 = 3.00 ]
00300> [ 0.760 + 3.240 = 4.00 ]
00301> [ 0.950 + 4.050 = 5.00 ]
00302> [ 1.140 + 4.860 = 6.00 ]
00303> [ 1.330 + 5.670 = 7.00 ] end
00304> *
00304> DIVERT HYD IDin=[2], NIDout=[2]max five,
00305> outflow hydrographs (ID, NHYD)=[4,"P2BMP2"/5,"P2STM2"]
00306> flow distribution table: (modify as necessary)
00307> Note: all flows are in (cms)
00308>
00309> QIDi = QTOTAL
00310> [ 0.000 + 0.000 = 0.00 ]
00311> [ 0.016 + 0.032 = 0.05 ]
00312> [ 0.031 + 0.064 = 0.10 ]
00313> [ 0.047 + 0.095 = 0.14 ]
00314> [ 0.063 + 0.127 = 0.19 ]
00315> [ 0.094 + 0.191 = 0.29 ]
00316> [ 0.126 + 0.254 = 0.38 ]
00317> [ 0.157 + 0.318 = 0.48 ]
00318> [ 0.189 + 0.381 = 0.57 ]
00319> [ 0.252 + 0.508 = 0.76 ]
00320> [ 0.315 + 0.635 = 0.95 ]
00321> [ 0.378 + 0.762 = 1.14 ]
00322> [ 0.441 + 0.889 = 1.33 ] end
00323> *
00323> ROUTE RESERVOIR IDout=[7], NHYD=['P2BMP3'], IDin=[4],
00324> RDT=[5](min)
00325> TABLE of ( OUTFLOW-STORAGE ) values
00326> (cms) - (ha-m)
00327> [ 0.000 , 0.000 ]
00328> [ 0.0015 , 0.0025 ]
00329> [ 0.0019 , 0.0051 ]
00330> [ 0.0023 , 0.0076 ]
00331> [ 0.0027 , 0.0101 ]
00332> [ 0.0032 , 0.0127 ]
00333> [ -1 , -1 ]
00334> IDovf=[8], NHYDovf=['P2STM3']
00335> *
00336> COMPUTE DUALHYD IDin=[3], CINLET=[1.79](cms), NINLET=[1],
00337> MAJID=[1], MAJNHYD=['P2ma*'],
00338> MINID=[2], MINNHYD=['P2min*'],
00339> TMJSTO=[1157](cu-m)
00340> *
00341> CONTINUOUS NASHYD ID=[7], NHYD=['SWM2'] DT=[5](min), AREA=[0.99](ha),
00342> DWF=0 CN=90 IA=9.8 N=2 TP=0.25
00343> Continuous simulation parameters:
00344> IARECper=[4](hrs),
00345> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00346> InterEventTime=[12](hrs)
00347> Baseflow simulation parameters:
00348> BaseFlowOption=[1],
00349> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00350> VHydCond=[10](mm/hr), END=-1
00351> *
00352> ADD HYD IDsum=[10], NHYD=['P2in*'], IDs to add=[1,2,5,7,8]
00353> *
00354> ROUTE RESERVOIR IDout=[2], NHYD=['P2out*'], IDin=[10],
00355> RDT=[5](min)
00356> TABLE of ( OUTFLOW-STORAGE ) values
00357> (cms) - (ha-m)
00358> [ 0.000 , 0.000 ]
00359> [ 0.030 , 0.130 ]
00360> [ 0.150 , 0.277 ]
00361> [ 0.350 , 0.441 ]
00362> [ 0.700 , 0.675 ]
00363> [ -1 , -1 ] (max twenty pts)
00364> IDovf=[3], NHYDovf=['P2OV*']
00365> *
00366> ADD HYD IDsum=[6], NHYD=['PND2*'], IDs to add=[2,3]
00367> *
00369> CONTINUOUS NASHYD ID=[4], NHYD=['CRFP'] DT=[5](min), AREA=[24.18](ha),
00370> DWF=0 CN=82 IA=9.8 N=2 TP=0.50
00371> Continuous simulation parameters:
00372> IARECper=[4](hrs),
00373> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00374> InterEventTime=[12](hrs)
00375> Baseflow simulation parameters:
00376> BaseFlowOption=[1],
00377> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00378> VHydCond=[10](mm/hr), END=-1
00379> *
00380> CONTINUOUS STANDHYD ID=[5], NHYD=['28*'], DT=[5](min), AREA=[12.5](ha),
00381> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00382> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00383> DCAY=[4]/(hr), F=[0](mm),
00384> Pervious surfaces: IAPER=[4.67](mm), SLDP=[1.0](%),
00385> LGP=[205](m), MNP=[0.10], SCP=[0](min),
00386> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[1.0](%),
00387> LGI=[700](m), MNI=[0.013], SCI=[0](min),
00388> Continuous simulation parameters:
00389> IARECper=[4](hrs), IARECimp=[2](hrs),
00390> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00391> InterEventTime=[12](hrs), END=-1
00392> *
00393> * NORTH POND (P2) AT CARP RIVER
00394> * HEC-RAS inflow hydrograph @ 44548
00395> * NODE 2065
00396> * (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
00397> * (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
00398> *
00399> ADD HYD IDsum=[7], NHYD=['B2065*'], IDs to add=[4,5,6]
00400> *
00401> SAVE HYD ID=[7], # OF PCYCLES=[1], ICASEsh=[1]
00402> HYD_COMMENT=['HEC-RAS Inflow Node 2065 / Station 44548*']
00403> *
00404> * LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
00405> * (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)

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00406> *
00407> CONTINUOUS STANDHYD ID=[5], NHYD=['100-1*'], DT=[5](min), AREA=[61.17](ha),
00408> XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
00409> Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
00410> DCAY=[4]/(hr), F=[0](mm),
00411> Pervious surfaces: IAPER=[4.67](mm), SLPP=[0.8](%),
00412> LGP=[1200](m), MNP=[0.10], SCP=[0](min),
00413> Impervious surfaces: IAIMP=[1.57](mm), SLPI=[0.8](%),
00414> LGI=[1700](m), MNI=[0.013], SCI=[0](min)
00415> Continuous simulation parameters:
00416> IARECper=[4](hrs), IARECimp=[2](hrs),
00417> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00418> InterEventTime=[12](hrs), END=-1
00419> *
00420> * LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
00421> * (USED IN MODEL CALIBRATION)
00422> *
00423> CONTINUOUS NASHYD ID=[6], NHYD=['102-1*'], DT=[5](min), AREA=[39.8](ha),
00424> DWF=[0](cms), CN/C=[78], IA=[9.8](mm),
00425> N=[2], TP=[1.10]hrs
00426> Continuous simulation parameters:
00427> IARECper=[4](hrs),
00428> SMIN=[-1](mm), SMAX=[-1](mm), SK=[1]/(mm),
00429> InterEventTime=[12](hrs)
00430> Baseflow simulation parameters:
00431> BaseFlowOption=[1],
00432> InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
00433> VHydCond=[10](mm/hr), END=-1
00434> *
00435> * HEC-RAS inflow hydrograph @ 43966
00436> * (Hazeldean Creek @ Carp River)
00437> *
00438> ADD HYD IDsum=[10], NHYD=['B3894*'], IDs to add=[5,6]
00439> *
00440> SAVE HYD ID=[10], # OF PCYCLES=[1], ICASEsh=[1]
00441> HYD_COMMENT=['HEC-RAS Inflow Node 3894 / Station 43966*']
00442> *
00443> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[2]
00444> S2-24.stm
00445> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[3]
00446> S5-24.stm
00447> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[4]
00448> S10-24.stm
00449> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[5]
00450> S25-24.stm
00451> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[6]
00452> S50-24.stm
00453> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[7]
00454> S100-24.stm
00455> *
00456> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[8]
00457> S2-12.stm
00458> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[9]
00459> S5-12.stm
00460> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[10]
00461> S10-12.stm
00462> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[11]
00463> S25-12.stm
00464> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[12]
00465> S50-12.stm
00466> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[13]
00467> S100-12.stm
00468> *
00469> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[14]
00470> * C2-3.stm
00471> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[15]
00472> * C5-3.stm
00473> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[16]
00474> * C10-3.stm
00475> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[17]
00476> * C25-3.stm
00477> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[18]
00478> * C50-3.stm
00479> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[19]
00480> * C100-3.stm
00481> *
00482> * START TZERO=[0], METOUT=[2], NSTORM=[1], NRUN=[20]
00483> * C25mm-3.stm
00484> *
00485> FINISH
00486>
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00001> =====
00002>
00003> SSSSS W W M M H H Y Y M M O O 999 999
00004> S W W M M M M H H Y Y M M M O O 9 9 9 9
00005> SSSSS W W M M M H H H H Y Y M M M O O ## 9 9 9 9 Ver 4.05
00006> S W W M M M H H Y Y M M O O 9999 9999 Sept 2011
00007> SSSSS W W M M H H Y Y M M O O 9 9 9 9
00008> StormWater Management Hydrologic Model 999 999
00009>
00010>
00011> *****
00012> ***** SWMHYMO Ver/4.05 *****
00013> ***** A single event and continuous hydrologic simulation model *****
00014> ***** based on the principles of HYMO and its successors *****
00015> ***** OTTHYMO-83 and OTTHYMO-89. *****
00016> *****
00017> ***** Distributed by: J.F. Sabourin and Associates Inc. *****
00018> ***** Ottawa, Ontario: (613) 836-3884 *****
00019> ***** Gatineau, Quebec: (819) 243-6858 *****
00020> ***** E-Mail: swmhyo@jfaa.com *****
00021> *****
00022> *****
00023> *****
00024> ***** Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD *****
00025> ***** Nepean SERIAL#5320763 *****
00026> *****
00027> *****
00028> *****
00029> ***** PROGRAM ARRAY DIMENSIONS *****
00030> ***** Maximum value for ID numbers : 10 *****
00031> ***** Max. number of rainfall points: 105408 *****
00032> ***** Max. number of flow points : 105408 *****
00033> *****
00034> *****
00035> ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
00036> *****
00037> ***** ID: Hydrograph Identification numbers, (1-10). *****
00038> ***** NHTD: Hydrograph reference numbers, (6 digits or characters). *****
00039> ***** AREA: Drainage area associated with hydrograph, (ac.) or (ha.). *****
00040> ***** PEAK: Peak flow of simulated hydrograph, (ft³/s) or (m³/s). *****
00041> ***** TpeakDate_hh:mm is the date and time of the peak flow. *****
00042> ***** R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). *****
00043> ***** R.C.: Runoff Coefficient of simulated hydrograph, (ratio). *****
00044> ***** *: see WARNING or NOTE message printed at end of run. *****
00045> ***** **: see ERROR message printed at end of run. *****
00046> *****
00047> *****
00048> *****
00049> *****
00050> *****
00051> *****
00052> *****
00053> ***** SUMMARY OUTPUT *****
00054> *****
00055> * DATE: 2017-07-14 TIME: 11:39:06 RUN COUNTER: 000744 *
00056> *****
00057> * Input filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.dat*
00058> * Output filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.out*
00059> * Summary filename: M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\CR-BMPE5.sum*
00060> * User comments:
00061> * 1:
00062> * 2:
00063> * 3:
00064> *****
00065> *****
00066> *****
00067> RUN:COMMAND#
00068> *****
00069> START
00070> [TZERO = .00 hrs on 0]
00071> [METOUT= 2 (1=imperial, 2=metric output)]
00072> [NSTORM= 1]
00073> [ENR = 1]
00074> 001-0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00075> READ STORM
00076> Filename = storm.001
00077> Comment =
00078> [SDT=10.0] [SDUR= 3.00] [PTOT= 25.00]
00079> 001-0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
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00136> ***** + 05:P1STM2 9.73 .378 No_date 1:30 17.57
00137> ***** + 07:SWM1 4.50 .079 No_date 1:35 8.24
00138> ***** + 132:P1STM3 1.71 .132 No_date 1:55 17.57
00139> ***** + 09:101-3 69.53 .605 No_date 2:30 14.68
00140> ***** [DT= 5.00] SUM= 10:P1in 147.95 3.262 No_date 1:35 15.93
00141> ***** [ID:NHYD]-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00142> ***** ROUTE RESERVOIR -> 10:P1in 147.95 3.262 No_date 1:35 15.93
00143> ***** [RDT= 5.00] out<= 02:P1SWM 147.95 .819 No_date 3:30 15.93
00144> ***** [MxStoUsed= 1311E+01]
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00271> [IaREClmp= 2.00: IaRECPer= 4.00]
00272> 001-0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00273> ADD HYD + 05:28 24.18 .196 No_date 2:00 5.92
00274> + 05:28 12.50 .519 No_date 1:15 10.12
00275> + 06:PND2 23.08 .145 No_date 3:15 15.96
00276> [DT= 5.00] SUM= 07:B2065 59.76 .563 No_date 1:15 10.68
00277> 001-0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00278> SAVE HYD 07:B2065 59.76 .563 No_date 1:15 10.68
00279> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2065.001
00280> remark:HEC-RAS Inflow Noe 2065 / Station 44548
00281> 001-0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00282> CONTINUOUS STANDHYD05:100-1 61.17 1.610 No_date 1:25 10.12
00283> [XIMP= 38:TIMP= 45]
00284> [Horton parameters: F0= 76.20:F0c= 13.20:DCAV=4.00: F= .00]
00285> [Previous area: IAper= 4.67:SLPP= .80:LGP=1200.:MNP=100:SCP= .0]
00286> [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
00287> [IaREClmp= 2.00: IaRECPer= 4.00]
00288> 001-0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00289> CONTINUOUS NASHYD 06:102-1 39.80 .165 No_date 3:00 5.00
00290> [CN= 78.0: N= 2.00]
00291> [Tp= 1.10:DT= 5.00]
00292> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00293> [InterEventTime= 12.00]
00294> 001-0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00295> ADD HYD + 05:100-1 61.17 1.610 No_date 1:25 10.12
00296> + 06:102-1 39.80 .165 No_date 3:00 5.00
00297> [DT= 5.00] SUM= 10:B3894 100.97 1.631 No_date 1:25 8.10
00298> 001-0043-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00299> SAVE HYD 10:B3894 100.97 1.631 No_date 1:25 8.10
00300> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B3894.001
00301> remark:HEC-RAS Inflow Noe 3894 / Station 43966
00302> *** END OF RUN : 7
00303>
00304>
00305>
00306>
00307>
00308>
00309>
00310> RUN:COMMAND#
00311> 008:0001-----
00312> START
00313> [TZERO = 0.0 hrs on 0]
00314> [METOUT= 2 (1=imperial, 2=metric output)]
00315> [NSTORM= 1]
00316> [NRUN = 8]
00317> 008:0002-----
00318> READ STORM
00319> Filename = storm.001
00320> Comment =
00321> [SDT=30.00:SDUR= 12.00:PTOT= 42.34]
00322> 008:0003-----
00323> DEFEND VALUES
00324> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\ottawa.def
00325> [ICASEdv = 1 (read and print data)]
00326> [FILETitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---]
00327> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----]
00328> Horton's infiltration parameters:
00329> [F0= 76.20 mm/hr] [F0c= 13.20 mm/hr] [DCAV= 1.66 /hr] [F= .00 mm]
00330> Parameters for PERVIOUS surfaces in STANDHYD:
00331> [IAper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00332> Parameters for IMPERVIOUS surfaces in STANDHYD:
00333> [IAimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00334> Parameters used in NASHYD:
00335> [Ia= 4.67 mm] [N= 2.00]
00336> 008:0004-----
00337> COMPUTE API
00338> [APImax= 20.00: APIkdy= 9000: APIkdt= 9978]
00339> [APImin= 60.24: APIavg= 39.87: APImin= 20.59]
00340> 008:0005-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00341> READ HYD 09:101-3 69.53 1.068 No_date 7:05 29.55
00342> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-101-3.008
00343> [MIN= GRANITE BRICE AREA 101-3]
00344> 008:0006-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00345> CONTINUOUS STANDHYD01:P1 77.13 3.895 No_date 6:15 33.72
00346> [XIMP= 45:TIMP= 70]
00347> [LOSS= 2 :CN= 78.0]
00348> [Impervious area: IAper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00349> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00350> [IaREClmp= 2.00: IaRECPer= 4.00]
00351> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00352> 008:0007-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00353> DIVERT HYD -> 02:P1 77.13 3.895 No_date 6:15 33.72
00354> diverted <= 02:P1BMP1 14.68 .740 No_date 6:15 33.72
00355> diverted <= 03:P1STM1 62.50 3.155 No_date 6:15 33.72
00356> 008:0008-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00357> DIVERT HYD -> 02:P1BMP1 14.68 .740 No_date 6:15 33.72
00358> diverted <= 04:P1BMP2 4.79 .245 No_date 6:15 33.72
00359> diverted <= 05:P1STM2 9.68 .495 No_date 6:15 33.72
00360> 008:0009-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00361> ROUTE RESERVOIR -> 04:P1BMP2 4.79 .245 No_date 6:15 33.72
00362> [RDT= 5.00] out<= 07:P1BMP3 2.18 .011 No_date 6:15 33.72
00363> [MxStoUsed= 4299E-01: TotOvfVol= 2.61 .233 No_date 6:20 33.72]
00364> [MxStoUsed= 4299E-01: TotOvfVol= 8813E-01: N-Ovf= 3: TotDurOvf= 6.hrs]
00365> 008:0010-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00366> COMPUTE DUALHYD 03:P1STM1 62.50 3.155 No_date 6:15 33.72
00367> [Major System / 01:P1maj] .00 .000 No_date 0:00 .00
00368> [Minor System / 02:P1min] 62.50 3.155 No_date 6:15 33.72
00369> [MjSysSto= 0000E+00: TotOvfVol= 0.000E+00: N-Ovf= 0: TotDurOvf= 0.hrs]
00370> 008:0011-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00371> CONTINUOUS NASHYD 07:SWM1 4.50 .186 No_date 6:10 23.33
00372> [CN= 90.0: N= 2.00]
00373> [Tp= 25:DT= 5.00]
00374> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00375> [InterEventTime= 12.00]
00376> 008:0012-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00377> ADD HYD 01:P1maj .00 .000 No_date 0:00 .00
00378> + 02:P1min 62.50 3.155 No_date 6:15 33.72
00379> + 05:P1STM2 9.68 .495 No_date 6:15 33.72
00380> + 07:SWM1 4.50 .186 No_date 6:10 23.33
00381> + 08:P1STM3 2.61 .233 No_date 6:20 33.72
00382> [DT= 5.00] SUM= 09:101-3 69.53 1.068 No_date 7:05 29.55
00383> 008:0013-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00384> ROUTE RESERVOIR -> 10:P1in 148.83 4.847 No_date 6:15 31.46
00385> [RDT= 5.00] out<= 02:P1SWM 148.83 1.533 No_date 8:15 31.46
00386> [MxStoUsed= 2056E+01]
00387> 008:0014-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00388> CONTINUOUS NASHYD 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00389> [CN= 82.0: N= 2.00]
00390> [Tp= .25:DT= 5.00]
00391> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00392> [InterEventTime= 12.00]
00393> 008:0015-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00394> ADD HYD 02:P1SWM 148.83 1.533 No_date 8:15 31.46
00395> + 03:CRTRIB 3.69 .115 No_date 6:10 18.79
00396> [DT= 5.00] SUM= 09:R101-2 152.52 1.552 No_date 8:10 31.15
00397> 008:0016-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00398> CONTINUOUS STANDHYD01:P3 91.68 3.720 No_date 6:15 28.71
00399> [XIMP= 34:TIMP= 43]
00400> [LOSS= 2 :CN= 78.0]
00401> [Impervious area: IAper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00402> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00403> [IaREClmp= 2.00: IaRECPer= 4.00]
00404> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00405>

00406> 008:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00407> DIVERT HYD -> 01:P3 91.68 3.720 No_date 6:15 28.71
00408> diverted <= 02:P2BMP1 23.84 .967 No_date 6:15 28.71
00409> diverted <= 03:P3STM1 70.99 2.879 No_date 6:15 28.71
00410> 008:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00411> DIVERT HYD -> 02:P3BMP1 23.84 .967 No_date 6:15 28.71
00412> diverted <= 04:P3BMP2 7.82 .321 No_date 6:15 28.71
00413> diverted <= 05:P3STM2 15.69 .646 No_date 6:15 28.71
00414> 008:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00415> ROUTE RESERVOIR -> 04:P3BMP2 7.82 .321 No_date 6:15 28.71
00416> [RDT= 5.00] out<= 07:P3BMP3 2.82 .012 No_date 6:10 28.71
00417> overflow <= 08:P3STM3 5.00 .309 No_date 6:20 28.71
00418> [MxStoUsed= 4658E-01: TotOvfVol= 1436E+01: N-Ovf= 3: TotDurOvf= 6.hrs]
00419> 008:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00420> COMPUTE DUALHYD 03:P3STM1 70.99 2.879 No_date 6:15 28.71
00421> Major System / 01:P3maj .00 .000 No_date 0:00 .00
00422> Minor System / 02:P3min 70.99 2.879 No_date 6:15 28.71
00423> [MjSysSto= 0000E+00: TotOvfVol= 0.000E+00: N-Ovf= 0: TotDurOvf= 0.hrs]
00424> 008:0021-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00425> CONTINUOUS NASHYD 07:SWM3 2.60 .081 No_date 6:10 18.79
00426> [CN= 82.0: N= 2.00]
00427> [Tp= .25:DT= 5.00]
00428> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00429> [InterEventTime= 12.00]
00430> 008:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00431> ADD HYD 01:P3maj .00 .000 No_date 0:00 .00
00432> + 02:P3min 70.99 2.879 No_date 6:15 28.71
00433> + 07:SWM3 2.60 .081 No_date 6:10 18.79
00434> + 07:SWM3 2.60 .081 No_date 6:10 18.79
00435> + 08:P3STM3 5.00 .309 No_date 6:20 28.71
00436> [DT= 5.00] SUM= 10:P3in 94.28 3.907 No_date 6:15 28.44
00437> 008:0023-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00438> remark:HEC-RAS Inflow Noe 2054 / Station 44518
00439> [RDT= 5.00] out<= 02:P3SWM 94.28 .562 No_date 8:45 28.44
00440> overflow <= 03:P3OVF .00 .000 No_date 0:00 .00
00441> [MxStoUsed= 1858E+01: TotOvfVol= 0.000E+00: N-Ovf= 0: TotDurOvf= 0.hrs]
00442> 008:0024-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00443> ADD HYD 02:P3SWM 94.28 .562 No_date 8:45 28.44
00444> + 03:P3OVF .00 .000 No_date 0:00 .00
00445> [DT= 5.00] SUM= 08:B500 94.28 .562 No_date 8:45 28.44
00446> 008:0025-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00447> ADD HYD 08:B500 94.28 .562 No_date 8:45 28.44
00448> [DT= 5.00] SUM= 10:B2054 246.81 2.105 No_date 8:20 30.12
00449> 008:0026-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00450> SAVE HYD 10:B2054 246.81 2.105 No_date 8:20 30.12
00451> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2054.008
00452> remark:HEC-RAS Inflow Noe 2054 / Station 44518
00453> 008:0027-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00454> CONTINUOUS STANDHYD01:P2 23.14 1.088 No_date 6:15 31.82
00455> [XIMP= 47:TIMP= 59]
00456> [LOSS= 2 :CN= 78.0]
00457> [Impervious area: IAper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00458> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00459> [IaREClmp= 2.00: IaRECPer= 4.00]
00460> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00461> 008:0028-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00462> DIVERT HYD -> 02:P2BMP1 23.14 1.088 No_date 6:15 31.82
00463> diverted <= 02:P2BMP2 4.42 .207 No_date 6:15 31.82
00464> diverted <= 03:P2STM1 18.76 .881 No_date 6:15 31.82
00465> 008:0029-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00466> DIVERT HYD -> 02:P2BMP1 4.42 .207 No_date 6:15 31.82
00467> diverted <= 02:P2BMP2 1.43 .068 No_date 6:15 31.82
00468> diverted <= 05:P2STM2 2.89 .138 No_date 6:15 31.82
00469> 008:0030-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00470> ROUTE RESERVOIR -> 04:P2BMP2 1.43 .068 No_date 6:15 31.82
00471> [RDT= 5.00] out<= 07:P2BMP3 .68 .003 No_date 6:15 31.82
00472> [MxStoUsed= 1270E-01: TotOvfVol= 2382E+01: N-Ovf= 4: TotDurOvf= 6.hrs]
00473> 008:0031-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00474> COMPUTE DUALHYD 03:P2STM1 18.76 .881 No_date 6:15 31.82
00475> Major System / 01:P2maj .00 .000 No_date 0:00 .00
00476> Minor System / 02:P2min 18.76 .881 No_date 6:15 31.82
00477> [MjSysSto= 0000E+00: TotOvfVol= 0.000E+00: N-Ovf= 0: TotDurOvf= 0.hrs]
00478> 008:0032-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00479> CONTINUOUS NASHYD 07:SWM2 .99 .041 No_date 6:10 23.33
00480> [CN= 90.0: N= 2.00]
00481> [Tp= 25:DT= 5.00]
00482> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00483> [InterEventTime= 12.00]
00484> 008:0033-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00485> ADD HYD 01:P2maj .00 .000 No_date 0:00 .00
00486> + 05:P2STM2 2.89 .138 No_date 6:15 31.82
00487> + 07:SWM2 .99 .041 No_date 6:10 23.33
00488> [DT= 5.00] SUM= 10:P2in 23.39 1.123 No_date 6:15 31.46
00489> 008:0034-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00490> ROUTE RESERVOIR -> 10:P2in 23.39 1.123 No_date 6:15 31.46
00491> [RDT= 5.00] out<= 02:P2out 23.39 .310 No_date 7:30 31.46
00492> overflow <= 03:P2OVF .00 .000 No_date 0:00 .00
00493> [MxStoUsed= 4080E+00: TotOvfVol= 0.000E+00: N-Ovf= 0: TotDurOvf= 0.hrs]
00494> 008:0035-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00495> ADD HYD 02:P2out 23.39 .310 No_date 7:30 31.46
00496> [DT= 5.00] SUM= 06:PND2 23.39 .310 No_date 0:00 .00
00497> 008:0036-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00498> CONTINUOUS NASHYD 04:CRFP 24.18 .494 No_date 6:35 18.79
00499> [CN= 82.0: N= 2.00]
00500> [Tp= .50:DT= 5.00]
00501> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00502> [InterEventTime= 12.00]
00503> 008:0037-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00504> CONTINUOUS STANDHYD05:28 12.50 .445 No_date 6:00 18.26
00505> [XIMP= 38:TIMP= 45]
00506> [Horton parameters: F0= 76.20:F0c= 13.20:DCAV=4.00: F= .00]
00507> [Previous area: IAper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
00508> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1700.:MNI=.013:SCI= .0]
00509> [IaREClmp= 2.00: IaRECPer= 4.00]
00510> 008:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00511> ADD HYD 04:CRFP 24.18 .494 No_date 6:35 18.79
00512> + 05:28 12.50 .445 No_date 6:00 18.26
00513> + 06:PND2 23.39 .310 No_date 7:30 31.46
00514> [DT= 5.00] SUM= 07:B2065 60.07 .888 No_date 6:35 23.62
00515> 008:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00516> SAVE HYD 07:B2065 60.07 .888 No_date 6:35 23.62
00517> filename:M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SMHYMO\H-B2065.008
00518> remark:HEC-RAS Inflow Noe 2065 / Station 44548
00519> 008:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00520> CONTINUOUS STANDHYD05:100-1 61.17 1.647 No_date 6:10 18.26
00521> [XIMP= 38:TIMP= 45]
00522> [Horton parameters: F0= 76.20:F0c= 13.20:DCAV=4.00: F= .00]
00523> [Previous area: IAper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
00524> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1700.:MNI=.013:SCI= .0]
00525> [IaREClmp= 2.00: IaRECPer= 4.00]
00526> 008:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00527> CONTINUOUS NASHYD 06:102-1 39.80 .404 No_date 7:25 16.64
00528> [CN= 82.0: N= 2.00]
00529> [Tp= 1.10:DT= 5.00]
00530> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00531> [InterEventTime= 12.00]
00532> 008:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
00533> ADD HYD 06:102-1 39.80 .404 No_date 7:25 16.64
00534> + 06:102-1 39.80 .404 No_date 7:25 16.64
00535> [DT= 5.00] SUM= 10:B3894 100.97 1.794 No_date 6:10 17.62
00536>

00541> 008:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00542> SAVE HYD 10:B3894 100.97 1.794 No_date 6:10 17.62
00543> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.008
00544> remark:HEC-RAS Inflow Node 3894 / Station 43966
00545> ** END OF RUN : 8
00546>
00547> *****
00548>
00549>
00550>
00551>
00552>
00553> RUN:COMMAND#
00554> 009:0001-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00555> START
00556> [TZERO = .00 hrs on 0]
00557> [METOUT= 2 (1=imperial, 2=metric output)]
00558> [NSTORE= 1]
00559> [NRUN = 9]
00560> 009:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00561> READ STORM
00562> filename = storm.001
00563> Comment =
00564> [SDT=30.00:SDUR= 12.00:PTOT= 56.18]
00565> 009:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00566> DEFAULT VALUES
00567> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
00568> [ICSEdV = 1 (read or print data)]
00569> FILENAME= ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
00570> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00571> Horton's infiltration equation parameters:
00572> [Fo= 76.20 mm/hr] [Foc=13.20 mm/hr] [DCAY= 1.66 /hr] [F = .00 mm]
00573> Parameters for PREVIOUS surfaces in STANDHYD:
00574> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00575> Parameters for IMPERVIOUS surfaces in STANDHYD:
00576> [Iaimp= 1.57 mm] [CLI= 1.50] [MNI= .013]
00577> Parameters used in NASHYD:
00578> [Iaimp= 4.67 mm] [M= 2.00]
00579> 009:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00580> COMPUTE API
00581> [APIini= 20.00: APIkdy= 9000: APIkdt= .9978]
00582> [APImax= 73.73: APIav= 46.81: APImin= 20.80]
00583> 009:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00584> READ HYD 09:101-3 69.53 1.597 No_date 6:55 42.20
00585> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.009
00586> Comment = GRANITE RIDGE AREA 101-3
00587> 009:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00588> CONTINUOUS STANDHYD01:P3 77.13 5.835 No_date 6:10 47.05
00589> [XIMP= 45:TIMP= 70]
00590> [LOSS= 2 :CN= 78.0]
00591> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00592> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00593> [IaRECimp= 2.00: IaRECper= 4.00]
00594> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00595> 009:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00596> DIVERT HYD -> 01:P1 77.13 5.835 No_date 6:10 47.05
00597> diverted <= 02:P1BMP1 14.68 1.109 No_date 6:10 47.05
00598> diverted <= 03:P2STM2 4.50 .308 No_date 6:05 36.39
00599> 009:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06000> DIVERT HYD -> 02:P1BMP1 14.68 1.109 No_date 6:10 47.05
06001> diverted <= 04:P1BMP2 4.80 .368 No_date 6:10 47.05
06002> diverted <= 05:P1STM2 9.71 .741 No_date 6:10 47.05
06003> 009:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06004> ROUTE RESERVOIR -> 04:P1BMP2 4.80 .368 No_date 6:10 47.05
06005> [RDT= 5.00] out<- 07:P1BMP3 1.61 .011 No_date 6:00 47.05
06006> overflow <= 08:P1STM3 3.19 .354 No_date 6:15 47.05
06007> [MxStoUsed=.4299E+01, TotOvfVol=.1503E+00, N-Ovf= 3, TotDurOvf= 6 hrs]
06008> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06009> COMPUTE DUALHYD 03:P1STM1 62.50 4.727 No_date 6:10 47.05
06010> Major System / 01:P1maj .00 .000 No_date 0:00 .00
06011> Minor System \ 02:P1min 62.50 4.727 No_date 6:10 47.05
06012> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
06013> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06014> 009:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06015> CONTINUOUS NASHYD 07:SWM1 4.50 .308 No_date 6:05 36.39
06016> [CN= 90.0: N= 2.00]
06017> [Tp= .25:DT= 5.00]
06018> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
06019> [InterEventTime= 12.00]
06020> 009:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06021> ADD HYD 01:P1maj .00 .000 No_date 0:00 .00
06022> + 02:P1min 62.50 4.727 No_date 6:10 47.05
06023> + 05:P1STM2 9.71 .741 No_date 6:10 47.05
06024> + 01:SWM1 4.50 .308 No_date 6:05 36.39
06025> + 08:P1STM3 3.19 .354 No_date 6:15 47.05
06026> + 09:101-3 69.53 1.597 No_date 6:55 42.20
06027> [DT= 5.00] SUM= 10:P1in 149.43 7.329 No_date 6:15 44.47
06028> 009:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06029> ROUTE RESERVOIR -> 02:P1in 149.43 7.329 No_date 6:15 44.47
06030> [RDT= 5.00] out<- 02:P1SWM 149.43 2.466 No_date 7:50 44.47
06031> [MxStoUsed=.2784E+01]
06032> 009:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06033> CONTINUOUS NASHYD 03:CRTRIB 3.69 .202 No_date 6:05 30.76
06034> [CN= 82.0: N= 2.00]
06035> [Tp= 25:DT= 5.00]
06036> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06037> [InterEventTime= 12.00]
06038> 009:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06039> ADD HYD 02:P1SWM 149.43 2.466 No_date 7:50 44.47
06040> + 03:CRTRIB 3.69 .202 No_date 6:05 30.76
06041> [DT= 5.00] SUM= 09:B101-2 153.12 2.502 No_date 7:45 44.14
06042> 009:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06043> CONTINUOUS STANDHYD01:P3 91.68 5.804 No_date 6:15 41.32
06044> [XIMP= 34:TIMP= 45]
06045> [LOSS= 2 :CN= 78.0]
06046> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
06047> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
06048> [IaRECimp= 2.00: IaRECper= 4.00]
06049> [SMIN= 29.88: SMAX=199.22: SK=1.000]
06050> 009:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06051> DIVERT HYD -> 01:P3 91.68 5.804 No_date 6:15 41.32
06052> diverted <= 02:P3BMP1 23.84 1.509 No_date 6:15 41.32
06053> diverted <= 03:P3STM1 70.98 4.492 No_date 6:15 41.32
06054> 009:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06055> DIVERT HYD -> 02:P3BMP2 7.84 .500 No_date 6:15 41.32
06056> diverted <= 04:P3BMP2 15.77 1.009 No_date 6:15 41.32
06057> diverted <= 05:P3STM2 15.77 1.009 No_date 6:15 41.32
06058> 009:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06059> ROUTE RESERVOIR -> 04:P3BMP2 7.84 .500 No_date 6:15 41.32
06060> [RDT= 5.00] out<- 07:P3BMP3 2.01 .012 No_date 6:00 41.32
06061> overflow <= 08:P3STM3 5.83 .488 No_date 6:15 41.32
06062> [MxStoUsed=.4655E-01, TotOvfVol=.2410E+00, N-Ovf= 1, TotDurOvf= 7 hrs]
06063> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06064> COMPUTE DUALHYD 01:P3maj 70.98 4.492 No_date 6:15 41.32
06065> Major System / 01:P3maj .00 .000 No_date 0:00 .00
06066> Minor System \ 02:P3min 70.98 4.492 No_date 6:15 41.32
06067> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
06068> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06069> 009:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06070> CONTINUOUS NASHYD 07:SWM3 2.60 .142 No_date 6:05 30.76
06071> [CN= 82.0: N= 2.00]
06072> [Tp= .25:DT= 5.00]
06073> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
06074> [InterEventTime= 12.00]
06075> 009:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
06076> ADD HYD 01:P3maj .00 .000 No_date 0:00 .00
06077> + 02:P3min 70.98 4.492 No_date 6:15 41.32

00676> + 05:P3STM2 15.77 1.009 No_date 6:15 41.32
00677> + 07:SWM3 2.60 .142 No_date 6:05 30.76
00678> + 08:P3STM3 5.83 .488 No_date 6:15 41.32
00679> [DT= 5.00] SUM= 10:P3in 95.18 6.124 No_date 6:15 41.03
00680> 009:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00681> ROUTE RESERVOIR -> 10:P3in 95.18 6.124 No_date 6:15 41.03
00682> [RDT= 5.00] out<- 02:P3SWM 95.18 1.227 No_date 7:50 41.03
00683> overflow <= 03:P3OVF .00 .000 No_date 0:00 .00
00684> [MxStoUsed=.2473E+01, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00685> 009:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00686> ADD HYD 02:P3SWM 95.18 1.227 No_date 7:50 41.03
00687> + 03:P3OVF .00 .000 No_date 0:00 .00
00688> [DT= 5.00] SUM= 08:B500 95.18 1.227 No_date 7:50 41.03
00689> 009:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00690> ADD HYD 08:B500 95.18 1.227 No_date 7:50 41.03
00691> + 09:B101-2 153.12 2.502 No_date 7:45 44.14
00692> [DT= 5.00] SUM= 10:B2054 248.31 3.729 No_date 7:45 42.95
00693> 009:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00694> SAVE HYD 10:B2054 248.31 3.729 No_date 7:45 42.95
00695> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.009
00696> remark:HEC-RAS Inflow Node 2054 / Station 44751
00697> 009:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00698> CONTINUOUS STANDHYD01:P2 23.14 1.650 No_date 6:10 44.82
00699> [XIMP= 47:TIMP= 59]
00700> [LOSS= 2 :CN= 78.0]
00701> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP=.200:SCP= .0]
00702> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
00703> [IaRECimp= 2.00: IaRECper= 4.00]
00704> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00705> 009:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00706> DIVERT HYD -> 01:P2 23.14 1.650 No_date 6:10 44.82
00707> diverted <= 02:P2BMP1 4.41 .314 No_date 6:10 44.82
00708> diverted <= 03:P2STM1 18.76 1.337 No_date 6:10 44.82
00709> 009:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00710> DIVERT HYD -> 02:P2BMP1 4.41 .314 No_date 6:10 44.82
00711> diverted <= 04:P2BMP2 1.43 .102 No_date 6:10 44.82
00712> diverted <= 05:P2STM2 2.88 .207 No_date 6:10 44.82
00713> 009:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00714> ROUTE RESERVOIR -> 04:P2BMP2 1.43 .102 No_date 6:10 44.82
00715> [RDT= 5.00] out<- 07:P2BMP3 1.50 .003 No_date 6:00 44.82
00716> overflow <= 08:P2STM3 .93 .098 No_date 6:15 44.82
00717> [MxStoUsed=.1270E-01, TotOvfVol=.4165E-01, N-Ovf= 3, TotDurOvf= 6 hrs]
00718> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00719> COMPUTE DUALHYD 03:P2STM1 18.76 1.337 No_date 6:10 44.82
00720> Major System / 01:P2maj .00 .000 No_date 0:00 .00
00721> Minor System \ 02:P2min 18.76 1.337 No_date 6:10 44.82
00722> [MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00723> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00724> CONTINUOUS NASHYD 07:SWM2 .99 .068 No_date 6:05 36.39
00725> [CN= 90.0: N= 2.00]
00726> [Tp= .25:DT= 5.00]
00727> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00728> [InterEventTime= 12.00]
00729> 009:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00730> ADD HYD 01:P2maj .00 .000 No_date 0:00 .00
00731> + 02:P2min 18.76 1.337 No_date 6:10 44.82
00732> + 05:P2STM2 2.88 .207 No_date 6:10 44.82
00733> + 07:SWM2 .99 .068 No_date 6:05 36.39
00734> + 08:P2STM3 1.43 .102 No_date 6:15 44.82
00735> [DT= 5.00] SUM= 10:P2in 23.57 1.708 No_date 6:10 44.47
00736> 009:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00737> ROUTE RESERVOIR -> 10:P2in 23.57 1.708 No_date 6:10 44.47
00738> [RDT= 5.00] out<- 03:P2OVF 1.00 .000 No_date 0:00 .00
00739> overflow <= 07:P2OVF 1.00 .000 No_date 0:00 .00
00740> [MxStoUsed=.5570E+00, TotOvfVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs]
00741> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00742> 009:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00743> ADD HYD 02:P2out 23.57 .523 No_date 7:15 44.47
00744> + 03:P2OVF .00 .000 No_date 0:00 .00
00745> [DT= 5.00] SUM= 06:PND2 23.57 .523 No_date 7:15 44.47
00746> 009:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00747> CONTINUOUS NASHYD 04:CRFP 24.18 .848 No_date 6:30 30.76
00748> [CN= 82.0: N= 2.00]
00749> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00750> [InterEventTime= 12.00]
00751> 009:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00752> CONTINUOUS STANDHYD05:28 12.50 .716 No_date 6:00 28.27
00753> [XIMP= 38:TIMP= 45]
00754> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00755> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP= .0]
00756> [Impervious area: Iaimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI= .0]
00757> [IaRECimp= 2.00: IaRECper= 4.00]
00758> 009:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00759> ADD HYD 04:CRFP 24.18 .848 No_date 6:30 30.76
00760> + 05:28 12.50 .716 No_date 6:00 28.27
00761> + 06:PND2 23.57 .523 No_date 7:15 44.47
00762> [DT= 5.00] SUM= 07:B2065 60.25 1.646 No_date 6:30 35.60
00763> 009:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00764> SAVE HYD 07:B2065 60.25 1.646 No_date 6:30 35.60
00765> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.009
00766> remark:HEC-RAS Inflow Node 2065 / Station 44548
00767> 009:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00768> CONTINUOUS STANDHYD05:100-1 61.17 2.291 No_date 6:05 28.27
00769> [XIMP= 38:TIMP= 45]
00770> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00771> [Pervious area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP= .0]
00772> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
00773> [IaRECimp= 2.00: IaRECper= 4.00]
00774> 009:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00775> CONTINUOUS NASHYD 06:102-1 39.80 .700 No_date 7:20 27.89
00776> [CN= 78.0: N= 2.00]
00777> [Tp= 1.10:DT= 5.00]
00778> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
00779> [InterEventTime= 12.00]
00780> 009:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00781> ADD HYD 05:100-1 61.17 2.291 No_date 6:05 28.27
00782> + 06:102-1 39.80 .700 No_date 7:20 27.89
00783> [DT= 5.00] SUM= 10:B3894 100.97 2.598 No_date 6:10 28.12
00784> 009:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00785> SAVE HYD 10:B3894 100.97 2.598 No_date 6:10 28.12
00786> filename :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.009
00787> remark:HEC-RAS Inflow Node 3894 / Station 43966
00788> ** END OF RUN : 9
00789> *****
00790>
00791>
00792> RUN:COMMAND#
00793> START
00794> [TZERO = .00 hrs on 0]
00795> [METOUT= 2 (1=imperial, 2=metric output)]
00796> [NSTORE= 1]
00797> [NRUN = 10]
00800> 010:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00801> READ STORM
00802> filename = storm.001
00803> Comment =
00804> [SDT=30.00:SDUR= 12.00:PTOT= 65.22]
00805> 010:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
00806> DEFAULT VALUES
00807> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def

00811> ICASEdv = 1 (read and print data)
00812> FileTitle= ----- ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE -----
00813> ----- PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60 -----
00814> Horton's infiltration equation parameters:
00815> [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
00816> Parameters for PERVIOUS surfaces in STANDHYD:
00817> [Iaper= 4.67 mm] [LGP=40.00 m] [MNP= .250]
00818> Parameters for IMPERVIOUS surfaces in STANDHYD:
00819> [Iaimp= 1.57 mm] [LCI= 1.50] [MNI= .013]
00820> Parameters used in NASHYD:
00821> [Ia= 4.67 mm] [N= 2.00]
00822> 010:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00823> COMPUTE API [APInl= 20.00: APIkdy= 9000: APIkdt= .9978]
00825> [APImax= 82.54: APIavg= 51.33: APImin= 20.94]
00826> 010:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00827> READ HYD 09:101-3 69.53 1.944 No_date 6:50 50.67
00828> Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.010
00829> Comment = GRANITE RIDGE AREA 101-3
00830> 010:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00831> CONTINUOUS STANDHYD01:P1 77.13 7.297 No_date 6:10 55.85
00832> [XIMP= 45:TIMP= 70]
00833> [LOSS= 2 :CN= 78.0]
00834> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00835> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
00836> [IaRECimp= 2.00: IaRECper= 4.00]
00837> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00838> 010:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00839> * DIVERT HYD -> 01:P3mJ 77.13 7.297 No_date 6:10 55.85
00840> diverted <= 02:P1BMP1 14.67 1.386 No_date 6:10 55.85
00841> diverted <= 03:P1STM1 62.49 5.910 No_date 6:10 55.85
00842> 010:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00843> * DIVERT HYD -> 02:P1BMP3 14.67 1.386 No_date 6:10 55.85
00844> diverted <= 04:P1BMP2 4.81 4.60 No_date 6:10 55.85
00845> diverted <= 05:P1STM2 9.73 9.27 No_date 6:10 55.85
00846> 010:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00847> ROUTE RESERVOIR -> 04:P1BMP2 4.81 4.60 No_date 6:10 55.85
00848> [RDT= 5.00] out<- 02:P1min 1.38 4.44 No_date 6:10 55.85
00849> overflow <= 08:P1STM3 3.44 444 No_date 6:10 55.85
00850> [MxStoUsed=.4298E-01, TotOVVol=.1919E+00, N-Ovf= 2, TotDurOvf= 6 hrs
00851> 010:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00852> COMPUTE DUALHYD 03:P1STM1 62.49 5.910 No_date 6:10 55.85
00853> Major System / 00 No_date 0:00 0.00
00854> Minor System \ 02:P1min 62.49 5.910 No_date 6:10 55.85
00855> [MjSysSto=.0000E+00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00856> 010:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00857> CONTINUOUS NASHYD 07:SWM1 4.50 3.85 No_date 6:05 45.08
00858> [CN= 82.0: N= 2.00]
00859> [Tp= 25:DT= 5.00]
00860> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00861> [InterEventTime= 12.00]
00862> 010:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00863> ADD HYD + 01:P3mJ 62.49 5.910 No_date 6:10 55.85
00864> + 02:P1min 9.73 9.27 No_date 6:10 55.85
00865> + 05:P1STM2 4.50 3.85 No_date 6:05 45.08
00866> + 07:SWM1 3.44 4.44 No_date 6:10 55.85
00867> + 08:P1STM3 9.73 9.27 No_date 6:10 55.85
00868> [RDT= 5.00] out<- 02:P1min 1.38 4.44 No_date 6:10 55.85
00869> [MxStoUsed=.2947E+01, TotOVVol=.1496E+00, N-Ovf= 1, TotDurOvf= 53.12
00870> 010:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00871> ROUTE RESERVOIR -> 10:P1in 149.68 9.171 No_date 6:10 53.12
00872> [RDT= 5.00] out<- 02:P1SWM 149.68 4.513 No_date 7:05 53.12
00873> [MxStoUsed=.2947E+01]
00874> 010:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00875> CONTINUOUS NASHYD 03:CRTRIB 3.69 2.62 No_date 6:05 38.93
00876> [CN= 82.0: N= 2.00]
00877> [Tp= 25:DT= 5.00]
00878> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00879> [InterEventTime= 12.00]
00880> 010:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00881> ADD HYD + 02:P1SWM 149.68 4.513 No_date 7:05 53.12
00882> + 03:CRTRIB 3.69 2.62 No_date 6:05 38.93
00883> [RDT= 5.00] SUM= 61:102-1 153.37 4.617 No_date 6:15 52.77
00884> 010:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00885> CONTINUOUS STANDHYD01:P3 91.68 7.198 No_date 6:10 49.77
00886> [XIMP= 34:TIMP= 43]
00887> [LOSS= 2 :CN= 78.0]
00888> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00889> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
00890> [IaRECimp= 2.00: IaRECper= 4.00]
00891> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00892> 010:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00893> * DIVERT HYD -> 02:P1BMP1 23.84 1.871 No_date 6:10 49.77
00894> diverted <= 02:P1BMP1 23.84 1.871 No_date 6:10 49.77
00895> diverted <= 03:P1STM1 70.98 5.571 No_date 6:10 49.77
00896> 010:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00897> * DIVERT HYD -> 02:P1BMP2 23.84 1.871 No_date 6:10 49.77
00898> diverted <= 04:P1BMP2 7.85 6.20 No_date 6:10 49.77
00899> diverted <= 05:P1STM2 15.81 1.251 No_date 6:10 49.77
00900> 010:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00901> ROUTE RESERVOIR -> 04:P1BMP2 7.85 6.20 No_date 6:10 49.77
00902> [RDT= 5.00] out<- 07:P1BMP3 1.70 .012 No_date 5:50 49.77
00903> [MxStoUsed=.4657E-01, TotOVVol=.3065E+00, N-Ovf= 3, TotDurOvf= 7 hrs
00904> 010:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00905> COMPUTE DUALHYD 03:P1STM1 70.98 5.571 No_date 6:10 49.77
00906> Major System / 01:P3mJ .00 0.00 No_date 0:00 0.00
00907> Minor System \ 02:P1min 70.98 5.200 No_date 6:05 49.86
00908> [MjSysSto=.2582E+03, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00909> 010:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00910> CONTINUOUS NASHYD 07:SWM3 2.60 1.84 No_date 6:05 38.93
00911> [CN= 82.0: N= 2.00]
00912> [Tp= 25:DT= 5.00]
00913> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00914> [InterEventTime= 12.00]
00915> 010:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00916> ADD HYD 01:P3mJ 91.68 7.198 No_date 6:10 49.77
00917> + 02:P1min 15.81 1.251 No_date 6:10 49.77
00918> + 05:P1STM2 2.60 1.84 No_date 6:05 38.93
00919> + 07:SWM3 6.16 6.07 No_date 6:15 49.77
00920> [DT= 5.00] SUM= 01:P3in 95.54 7.226 No_date 6:15 49.54
00921> 010:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00922> ROUTE RESERVOIR -> 10:P1in 95.54 7.226 No_date 6:15 49.54
00923> [RDT= 5.00] out<- 02:P1SWM 95.54 1.724 No_date 7:35 49.54
00924> overflow <= 03:P1OVF .00 0.00 No_date 0:00 0.00
00925> [MxStoUsed=.2883E+01, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00926> 010:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00927> ADD HYD + 03:P1OVF 95.54 1.724 No_date 7:35 49.54
00928> + 08:B500 95.54 1.724 No_date 7:35 49.54
00929> [DT= 5.00] SUM= 08:B500 95.54 1.724 No_date 7:35 49.54
00930> 010:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00931> ADD HYD + 09:B101-2 153.37 4.617 No_date 6:15 52.77
00932> [DT= 5.00] SUM= 10:B2054 248.92 6.248 No_date 7:15 51.53
00933> 010:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00934> SAVE HYD 10:B2054 248.92 6.248 No_date 7:15 51.53
00935> [MxStoUsed=.108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.010
00936> remark:HEC-RAS Inflow Node 2054 / Station 44751]
00937> 010:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00938> CONTINUOUS STANDHYD01:P2 23.14 2.016 No_date 6:10 53.46
00939> [XIMP= 47:TIMP= 59]
00940> [LOSS= 2 :CN= 81]
00941> [Pervious area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
00942> [Impervious area: Iaimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=.0]
00943> [IaRECimp= 2.00: IaRECper= 4.00]
00944> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00945>
00946> [IaRECimp= 2.00: IaRECper= 4.00]
00947> [SMIN= 29.88: SMAX=199.22: SK=1.000]
00948> 010:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00949> DIVERT HYD -> 01:P2 23.14 2.016 No_date 6:10 53.46
00950> diverted <= 02:P2BMP1 4.41 3.83 No_date 6:10 53.46
00951> diverted <= 03:P2STM1 18.76 1.633 No_date 6:10 53.46
00952> 010:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00953> DIVERT HYD -> 02:P2BMP1 4.41 3.83 No_date 6:10 53.46
00954> diverted <= 04:P2BMP2 1.43 1.27 No_date 6:10 53.46
00955> diverted <= 05:P2STM2 2.89 2.56 No_date 6:10 53.46
00956> 010:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00957> ROUTE RESERVOIR -> 04:P2BMP2 1.43 1.27 No_date 6:10 53.46
00958> [RDT= 5.00] out<- 02:P2BMP1 4.41 3.83 No_date 6:10 53.46
00959> overflow <= 08:P2STM3 1.01 1.22 No_date 6:15 53.46
00960> [MxStoUsed=.1270E-01, TotOVVol=.5386E-01, N-Ovf= 2, TotDurOvf= 6 hrs
00961> 010:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00962> COMPUTE DUALHYD 03:P2STM1 18.76 1.633 No_date 6:10 53.46
00963> Major System / 01:P2mJ 1.00 0.00 No_date 0:00 53.11
00964> Minor System \ 02:P2min 18.76 1.633 No_date 6:10 53.46
00965> [MjSysSto=.0000E+00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00966> 010:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00967> CONTINUOUS NASHYD 07:SWM2 .99 .085 No_date 6:05 45.08
00968> [CN= 90.0: N= 2.00]
00969> [Tp= 25:DT= 5.00]
00970> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
00971> [InterEventTime= 12.00]
00972> 010:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00973> ADD HYD + 01:P2mJ 18.76 1.633 No_date 6:10 53.46
00974> + 02:P2min 2.89 2.56 No_date 6:10 53.46
00975> + 05:P2STM2 .99 .085 No_date 6:05 45.08
00976> + 07:SWM2 1.01 1.22 No_date 6:15 53.46
00977> [DT= 5.00] SUM= 01:P2mJ 12.65 2.093 No_date 6:10 53.11
00978> 010:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00979> ROUTE RESERVOIR -> 10:P2in 23.65 2.093 No_date 6:10 53.11
00980> [RDT= 5.00] out<- 02:P2out 23.65 6.69 No_date 7:10 53.11
00981> overflow <= 03:P2OVF .00 0.00 No_date 0:00 .00
00982> [MxStoUsed=.6545E-00, TotOVVol=.0000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
00983> 010:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00984> ADD HYD + 02:P2out 23.65 6.69 No_date 7:10 53.11
00985> + 03:P2OVF .00 0.00 No_date 0:00 .00
00986> [DT= 5.00] SUM= 06:PND2 23.65 6.69 No_date 7:10 53.11
00987> 010:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00988> CONTINUOUS NASHYD 04:CRPP 24.18 1.091 No_date 6:30 38.93
00989> [CN= 82.0: N= 2.00]
00990> [Tp= 50:DT= 5.00]
00991> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
00992> [InterEventTime= 12.00]
00993> 010:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
00994> CONTINUOUS STANDHYD05:28 12.50 .955 No_date 6:00 35.23
00995> [XIMP= 38:TIMP= 45]
00996> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
00997> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
00998> [Impervious area: Iaimp= 1.57:SLPI= 1.00:LGI= 700.:MNI=.013:SCI=.0]
00999> [IaRECimp= 2.00: IaRECper= 4.00]
01000> 010:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01001> ADD HYD 04:CRPP 24.18 1.091 No_date 6:30 38.93
01002> + 06:PND2 23.65 6.69 No_date 7:10 53.11
01003> [DT= 5.00] SUM= 07:B2065 60.33 2.148 No_date 6:25 43.72
01004> 010:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01005> SAVE HYD 07:B2065 60.33 2.148 No_date 6:25 43.72
01006> [MxStoUsed=.108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.010
01007> remark:HEC-RAS Inflow Node 2065 / Station 44548]
01008> 010:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01009> CONTINUOUS STANDHYD05:100-1 61.17 2.769 No_date 6:05 35.23
01010> [XIMP= 38:TIMP= 45]
01011> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01012> [Pervious area: Iaper= 4.67:SLPP=1.00:LGP= 1200.:MNP= 100:SCP= .0]
01013> [Impervious area: Iaimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=.0]
01014> [IaRECimp= 2.00: IaRECper= 4.00]
01015> 010:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01016> ADD HYD + 06:102-1 39.80 .907 No_date 7:15 35.70
01017> [CN= 78.0: N= 2.00]
01018> [Tp= 1.10:DT= 5.00]
01019> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01020> [InterEventTime= 12.00]
01021> 010:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01022> ADD HYD + 06:102-1 39.80 .907 No_date 7:15 35.70
01023> [DT= 5.00] SUM= 10:B3894 100.97 3.201 No_date 6:10 35.41
01024> 010:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01025> SAVE HYD + 01:B3894 100.97 3.201 No_date 5:30 35.41
01026> filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.010
01027> remark:HEC-RAS Inflow Node 3894 / Station 43966
01028> ** END OF RUN : 10
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01081 011:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01082 * DIVERT HYD -> 01:P1 77.13 9.137 No.date 6:10 68.30
01083 diverted <= 02:P1BMP1 14.67 1.736 No.date 6:10 68.30
01084 diverted <= 03:P1STM1 62.49 7.401 No.date 6:10 68.30
01085 011:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01086 * DIVERT HYD -> 02:P1BMP1 14.67 1.736 No.date 6:10 68.30
01087 diverted <= 04:P1BMP2 4.82 .576 No.date 6:10 68.30
01088 diverted <= 05:P1STM2 9.73 1.160 No.date 6:10 68.30
01089 011:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01090 ROUTE RESERVOIR -> 04:P1BMP2 4.82 .576 No.date 6:10 68.30
01091 [RDT= 5.00] out<= 07:P1BMP3 1.15 .011 No.date 5:45 68.30
01092 overflow <= 08:P1STM3 3.67 .560 No.date 6:10 68.30
01093 {MxStoUsed=4298E-01, TotOvfVol=250E+00, N-Ovf= 2, TotDurOvf= 7 hrs
011001 011:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01095 COMPUTE DUALHYD 03:P1STM1 62.49 7.401 No.date 6:10 68.30
01096 Major System / 01:P1maj .00 .000 No.date 0:00 .00
01097 Minor System \ 02:P1min 62.49 7.401 No.date 6:10 68.30
01098 [MjSysStoc=0000E+00, TotOvfVol=0.000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01099 011:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01100 CONTINUOUS NASHYD 07:SWM1 4.50 .490 No.date 6:05 57.45
01101 [CN= 90.0: N= 2.00]
01102 [Tp= .25:DT= 5.00]
01103 [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01104 [InterEventTime= 12.00]
01105 011:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01106 ADD HYD 01:P1maj .00 .000 No.date 0:00 .00
01107 + 02:P1min 62.49 7.401 No.date 6:10 68.30
01108 + 05:P1STM2 9.73 1.160 No.date 6:10 68.30
01109 [IaREC= 2.00: IaRCP= 4.00]
01110 + 07:SWM1 4.50 .490 No.date 6:05 57.45
01111 + 08:P1STM3 3.67 .560 No.date 6:10 68.30
01112 + 09:B101-3 69.53 2.449 No.date 6:50 62.74
01113 [DT= 5.00] SUM= 10:P1in 149.92 11.540 No.date 6:10 65.40
01114 ROUTE RESERVOIR -> 10:P1in 149.92 11.540 No.date 6:10 65.40
01115 [RDT= 5.00] out<= 02:P1SWM 149.92 4.810 No.date 7:15 65.40
01116 {MxStoUsed=3523E+01}
01117 011:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01118 CONTINUOUS NASHYD 01:CRTRIB 3.69 .345 No.date 6:05 50.73
01119 [CN= 82.0: N= 2.00]
01120 [Tp= .25:DT= 5.00]
01121 [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01122 [InterEventTime= 12.00]
01123 011:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01124 ADD HYD 02:P1SWM 149.92 4.810 No.date 7:15 65.40
01125 + 03:CRTRIB 3.69 .345 No.date 6:05 50.73
01126 [DT= 5.00] SUM= 09:B101-2 153.61 4.918 No.date 7:00 65.05
01127 011:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01128 CONTINUOUS NASHYD 01:P3 91.68 9.594 No.date 6:10 61.83
01129 [XIMP= 34:TIMP= 43]
01130 [LOSS= 2 :CN= 78.0]
01131 [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01132 [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .7]
01133 [IaREC= 2.00: IaRCP= 4.00]
01134 [SMIN= 29.88: SMAX=199.22: SK=1.000]
01135 011:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01136 * DIVERT HYD -> 01:P3 91.68 9.594 No.date 6:10 61.83
01137 diverted <= 02:P3BMP1 23.84 2.494 No.date 6:10 61.83
01138 diverted <= 03:P3STM1 70.97 7.426 No.date 6:10 61.83
01139 011:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01140 * DIVERT HYD -> 02:P3BMP1 23.84 2.494 No.date 6:10 61.83
01141 diverted <= 04:P3BMP2 7.86 .826 No.date 6:10 61.83
01142 diverted <= 05:P3STM2 15.84 1.668 No.date 6:10 61.83
01143 ROUTE RESERVOIR -> 04:P3BMP2 7.86 .826 No.date 6:10 61.83
01144 [RDT= 5.00] out<= 07:P3BMP3 1.39 .012 No.date 5:40 61.83
01145 overflow <= 08:P3STM3 6.48 .804 No.date 6:15 61.83
01146 {MxStoUsed=4656E-01, TotOvfVol=4005E+00, N-Ovf= 2, TotDurOvf= 7 hrs
01147 011:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01148 COMPUTE DUALHYD 03:P3STM1 70.97 7.426 No.date 6:10 61.83
01149 Major System / 01:P3maj .00 .000 No.date 0:00 .00
01150 Minor System \ 02:P3min 70.97 7.426 No.date 5:55 62.28
01151 [MjSysStoc=3052E+04, TotOvfVol=0.000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01152 011:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01153 CONTINUOUS NASHYD 07:SWM3 2.60 .243 No.date 6:05 50.73
01154 [CN= 82.0: N= 2.00]
01155 [Tp= .25:DT= 5.00]
01156 [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01157 [InterEventTime= 12.00]
01158 011:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01159 ADD HYD 01:P3maj .00 .000 No.date 0:00 .00
01160 + 02:P3min 70.97 7.426 No.date 5:55 62.28
01161 + 05:P3STM2 15.84 1.668 No.date 6:10 61.83
01162 + 06:P3SWM1 82.38 1.750 No.date 6:45 61.86
01163 + 08:P3STM3 6.48 .804 No.date 6:15 61.83
01164 [DT= 5.00] SUM= 10:P3in 95.89 7.908 No.date 6:10 61.86
01165 011:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01166 ROUTE RESERVOIR -> 10:P3in 95.89 7.908 No.date 6:10 61.86
01167 [RDT= 5.00] out<= 03:P3OVF 13.51 5.003 No.date 6:45 61.86
01168 overflow <= 03:P3OVF 13.51 5.003 No.date 6:45 61.86
01169 {MxStoUsed=2903E+01, TotOvfVol=8360E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01170 011:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01171 ADD HYD 02:P3SWM 82.38 1.750 No.date 6:45 61.86
01172 + 07:P3OVF 13.51 5.003 No.date 6:45 61.86
01173 [DT= 5.00] SUM= 08:B500 95.89 6.753 No.date 6:45 61.86
01174 011:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01175 ADD HYD 08:B500 95.89 6.753 No.date 6:45 61.86
01176 + 09:B101-2 153.61 4.918 No.date 7:00 65.05
01177 [DT= 5.00] SUM= 10:B2054 249.51 11.650 No.date 6:45 63.82
01178 011:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01179 SAVE HYD 10:B2054 249.51 11.650 No.date 6:45 63.82
01180 filename M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.011
01181 remark:HEC-RAS Inflow Node 2054 / Station 44751
01182 011:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01183 CONTINUOUS STANDHYD01:P2 23.14 2.620 No.date 6:10 65.73
01184 [XIMP= 47:TIMP= 59]
01185 [LOSS= 2 :CN= 78.0]
01186 [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01187 [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .7]
01188 [IaREC= 2.00: IaRCP= 4.00]
01189 [SMIN= 29.88: SMAX=199.22: SK=1.000]
01190 011:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01191 DIVERT HYD -> 01:P2 23.14 2.620 No.date 6:10 65.73
01192 diverted <= 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
01193 diverted <= 03:P1STM1 62.49 8.236 No.date 6:05 75.19
01194 012:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01195 * DIVERT HYD -> 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
01196 diverted <= 04:P1BMP2 4.82 .641 No.date 6:05 75.19
01197 diverted <= 05:P1STM2 9.74 1.291 No.date 6:05 75.19
01198 012:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01199 ROUTE RESERVOIR -> 04:P1BMP2 4.82 .641 No.date 6:05 75.19
01200 [RDT= 5.00] out<= 07:P1BMP3 1.05 .011 No.date 5:40 75.19
01201 overflow <= 08:P1STM3 3.77 .625 No.date 6:10 75.19
01202 {MxStoUsed=4296E-01, TotOvfVol=2832E+00, N-Ovf= 2, TotDurOvf= 7 hrs
01203 012:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01204 COMPUTE DUALHYD 03:P1STM1 62.49 8.236 No.date 6:05 75.19
01205 Major System / 01:P1maj .00 .000 No.date 0:00 .00
01206 Minor System \ 02:P1min 62.49 7.710 No.date 6:00 75.30
01207 [MjSysStoc=2999E+03, TotOvfVol=0.000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01208 012:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01209 CONTINUOUS NASHYD 07:SWM1 4.50 .547 No.date 6:05 64.29
01210 [CN= 90.0: N= 2.00]
01211 [Tp= .25:DT= 5.00]
01212 [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01213 [InterEventTime= 12.00]
01214 012:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01215 ADD HYD 01:P1maj .00 .000 No.date 0:00 .00
01216 + 02:P1min 62.49 7.710 No.date 6:00 75.30

01216 ADD HYD 01:P2maj .00 .000 No.date 0:00 .00
01217 + 02:P2min 18.76 1.790 No.date 6:00 66.56
01218 + 05:P2STM2 2.89 .330 No.date 6:10 65.73
01219 + 07:SWM2 .99 .108 No.date 6:05 57.44
01220 + 08:P2STM3 1.08 .159 No.date 6:10 65.73
01221 [DT= 5.00] SUM= 10:P2in 23.72 2.383 No.date 6:10 66.04
01222 ROUTE RESERVOIR -> 10:P2in 23.72 2.383 No.date 6:10 66.04
01223 [RDT= 5.00] out<= 02:P2out 21.06 .700 No.date 6:30 66.04
01224 overflow <= 03:P2OVF 2.66 1.534 No.date 6:30 66.04
01225 {MxStoUsed=6741E+00, TotOvfVol=1758E+00, N-Ovf= 3, TotDurOvf= 1 hrs
01226 011:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01227 ADD HYD 03:P2OVF 2.66 1.534 No.date 6:30 66.04
01228 + 03:P2OVF 2.66 1.534 No.date 6:30 66.04
01229 [DT= 5.00] SUM= 06:PND2 23.72 2.234 No.date 6:30 66.04
01230 011:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01231 CONTINUOUS NASHYD 04:CRFP 24.18 1.434 No.date 6:30 50.73
01232 [CN= 82.0: N= 2.00]
01233 [Tp= .50:DT= 5.00]
01234 [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01235 [InterEventTime= 12.00]
01236 011:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01237 CONTINUOUS STANDHYD05:28 12.50 1.331 No.date 6:00 45.43
01238 [XIMP= 38:TIMP= 45]
01239 [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01240 [Previous area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
01241 [Impervious area: IAimp= 1.57:SLPI= 1.00:LGI= 700.:MNI=.013:SCI= .0]
01242 [IaREC= 2.00: IaRCP= 4.00]
01243 011:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01244 ADD HYD 04:CRFP 24.18 1.434 No.date 6:30 50.73
01245 + 05:28 12.50 1.331 No.date 6:00 45.43
01246 [DT= 5.00] SUM= 06:PND2 23.72 2.234 No.date 6:30 66.04
01247 011:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01248 SAVE HYD 07:B2065 60.40 4.345 No.date 6:30 55.65
01249 filename M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.011
01250 remark:HEC-RAS Inflow Node 2065 / Station 44548
01251 011:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01252 CONTINUOUS STANDHYD05:100-1 61.17 3.498 No.date 6:05 45.43
01253 [XIMP= 38:TIMP= 45]
01254 [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01255 [Previous area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP= 100:SCP= .0]
01256 [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
01257 [IaREC= 2.00: IaRCP= 4.00]
01258 011:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01259 CONTINUOUS NASHYD 06:102-1 39.80 1.210 No.date 7:15 47.07
01260 [CN= 78.0: N= 2.00]
01261 [Tp= 1.10:DT= 5.00]
01262 [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01263 [InterEventTime= 12.00]
01264 011:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01265 ADD HYD 05:100-1 61.17 3.498 No.date 6:05 45.43
01266 + 03:102-1 39.80 1.210 No.date 7:15 47.07
01267 [DT= 5.00] SUM= 10:B3894 100.97 4.128 No.date 6:10 46.08
01268 012:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01269 SAVE HYD 10:B3894 100.97 4.128 No.date 6:10 46.08
01270 filename M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.011
01271 remark:HEC-RAS Inflow Node 3894 / Station 43966
01272 ** END OF RUN : 11
01273 *****
01274 RUN:COMMANDH
01275 012:0001-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01276 START
01277 [TZERO = .00 hrs on 0]
01278 [METOUT= 2 (1=imperial, 2=metric output)]
01279 [INSTORM= 1]
01280 [ARUN = 12]
01281 012:0002-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01282 READ STORM
01283 Filename = storm.001
01284 Comment =
01285 [SET=30.:SDUR= 12.00:PTOT= 84.94]
01286 012:0003-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01287 DEFAULT VALUES
01288 Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\ottawa.def
01289 ICASEdv = 1 (read and print data)
01290 FileTitles =
01291 PARAMETER VALUES MUST BE ENTERED AFTER COLUMN 60
01292 Horton's infiltration equation parameters:
01293 [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F= .00 mm]
01294 Parameters for PRRVIOUS surfaces in STANDHYD:
01295 [Iaper= 4.67 mm] [LGP=40.00 mm] [MNP= .250]
01296 Parameters for IMPERVIOUS surfaces in STANDHYD:
01297 [IAimp= 1.57 mm] [CLI= 1.50] [MNI=.013]
01298 Parameters used in NASHYD:
01299 [Ia= 4.67 mm] [N= 2.00]
01300 012:0004-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01301 COMPUTE API
01302 [APIini= 20.00: APIkdy= .9000: APIkdt= .9978]
01303 [APImax=101.76: APIavg= 61.20: APImin= 21.23]
01304 012:0005-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01305 READ HYD 03:101-3 69.53 2.721 No.date 6:50 69.46
01306 Filename = M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-101-3.012
01307 Comment = GRANITE RIDGE AREA 101-3
01308 012:0006-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01309 CONTINUOUS STANDHYD01:P1 77.13 10.168 No.date 6:05 75.19
01310 [XIMP= 45:TIMP= 70]
01311 [LOSS= 2 :CN= 78.0]
01312 [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01313 [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01314 [IaREC= 2.00: IaRCP= 4.00]
01315 [SMIN= 29.88: SMAX=199.22: SK=1.000]
01316 012:0007-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01317 * DIVERT HYD -> 01:P1 77.13 10.168 No.date 6:05 75.19
01318 diverted <= 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
01319 diverted <= 03:P1STM1 62.49 8.236 No.date 6:05 75.19
01320 012:0008-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01321 * DIVERT HYD -> 02:P1BMP1 14.66 1.932 No.date 6:05 75.19
01322 diverted <= 04:P1BMP2 4.82 .641 No.date 6:05 75.19
01323 diverted <= 05:P1STM2 9.74 1.291 No.date 6:05 75.19
01324 012:0009-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01325 ROUTE RESERVOIR -> 04:P1BMP2 4.82 .641 No.date 6:05 75.19
01326 [RDT= 5.00] out<= 07:P1BMP3 1.05 .011 No.date 5:40 75.19
01327 overflow <= 08:P1STM3 3.77 .625 No.date 6:10 75.19
01328 {MxStoUsed=4296E-01, TotOvfVol=2832E+00, N-Ovf= 2, TotDurOvf= 7 hrs
01329 012:0010-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01330 COMPUTE DUALHYD 03:P1STM1 62.49 8.236 No.date 6:05 75.19
01331 Major System / 01:P1maj .00 .000 No.date 0:00 .00
01332 Minor System \ 02:P1min 62.49 7.710 No.date 6:00 75.30
01333 [MjSysStoc=2999E+03, TotOvfVol=0.000E+00, N-Ovf= 0, TotDurOvf= 0 hrs
01334 012:0011-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01335 CONTINUOUS NASHYD 07:SWM1 4.50 .547 No.date 6:05 64.29
01336 [CN= 90.0: N= 2.00]
01337 [Tp= .25:DT= 5.00]
01338 [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01339 [InterEventTime= 12.00]
01340 012:0012-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.V.-
01341 ADD HYD 01:P1maj .00 .000 No.date 0:00 .00
01342 + 02:P1min 62.49 7.710 No.date 6:00 75.30

01351> + 05:P1STM2 9.74 1.291 No_date 6:05 75.19
01352> + 07:SWM2 4.50 .547 No_date 6:05 64.29
01353> + 08:P1STM3 3.77 .625 No_date 6:10 75.19
01354> + 09:101-3 6.50 2.721 No_date 6:50 69.46
01355> [DT= 5.00] SUM= 10:P1in 150.02 12.316 No_date 6:10 72.25
01356> 012:0013-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01357> ROUTE RESERVOIR -> 10:P1in 150.02 12.316 No_date 6:10 72.25
01358> [RDT= 5.00] out<= 02:P1SWM 150.02 4.999 No_date 7:15 72.25
01359> {MxStoUsed= .3929E+01}
01360> 012:0014-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01361> CONTINUOUS NASHYD 03:CRTRIB 3.69 .391 No_date 6:05 57.33
01362> [CN= 82.0: N= 2.00]
01363> [Tpe= .25:DT= 5.00]
01364> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01365> [InterEventTime= 12.00]
01366> 012:0015-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01367> ADD HYD 02:P1SWM 150.02 4.999 No_date 7:15 72.25
01368> + 03:CRTRIB 3.69 .391 No_date 6:05 57.33
01369> [DT= 5.00] SUM= 09:101-2 153.71 5.113 No_date 7:00 71.89
01370> 012:0016-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01371> CONTINUOUS STANDHYD01:P3 91.68 10.651 No_date 6:10 68.54
01372> [XIMP= .34:TIMP= .43]
01373> [LOSS= 2 :CN= 78.0]
01374> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01375> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01376> [IaRECimp= 2.00: IaRCper= 4.00]
01377> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01378> 012:0017-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01379> * DIVERT HYD -> 01:P3 91.68 10.651 No_date 6:10 68.54
01380> diverted <= 02:P3BMP1 23.84 2.769 No_date 6:10 68.54
01381> diverted <= 03:P3STM1 70.97 8.244 No_date 6:10 68.54
01382> 012:0018-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01383> * DIVERT HYD -> 04:P3BMP2 7.87 .917 No_date 6:10 68.54
01384> diverted <= 04:P3BMP2 7.87 .917 No_date 6:10 68.54
01385> diverted <= 05:P3STM2 15.85 1.852 No_date 6:10 68.54
01386> 012:0019-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01387> ROUTE RESERVOIR -> 04:P3BMP2 7.87 .917 No_date 6:10 68.54
01388> [RDT= 5.00] out<= 02:P3BMP3 96.03 8.761 No_date 6:25 68.54
01389> overflow <= 08:P3STM3 6.60 .904 No_date 6:10 68.54
01390> {MxStoUsed= .4658E-01, TotOfVol= .4525E+00, N-Ovf= 2, TotDurOvf= 7.hrs
01391> 012:0020-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01392> COMPUTE DUALHYD 03:P3STM1 70.97 8.244 No_date 6:10 68.54
01393> Major System / 01:P2maj 1.81 1.174 No_date 6:25 68.54
01394> Minor System \ 02:P3min 70.16 5.200 No_date 5:55 69.10
01395> [MjSysSto= .4250E+04, TotOfVol= .5554E+03, N-Ovf= 1, TotDurOvf= 0.hrs
01396> 012:0021-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01397> CONTINUOUS NASHYD 07:SWM1 2.60 .276 No_date 6:05 57.33
01398> [CN= 82.0: N= 2.00]
01399> [Tpe= .25:DT= 5.00]
01400> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01401> [InterEventTime= 12.00]
01402> 012:0022-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01403> ADD HYD 01:P2maj 1.81 1.174 No_date 6:25 68.54
01404> + 02:P3min 70.16 5.200 No_date 5:55 69.10
01405> + 05:P3STM2 15.85 1.852 No_date 6:10 68.54
01406> + 07:SWM3 2.60 .276 No_date 6:05 57.33
01407> + 08:P3STM3 6.60 .904 No_date 6:10 68.54
01408> [DT= 5.00] SUM= 08:P500 96.03 8.761 No_date 6:25 68.54
01409> 012:0023-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01410> ROUTE RESERVOIR -> 10:P3in 96.03 8.761 No_date 6:25 68.65
01411> [RDT= 5.00] out<= 02:P3SWM 76.75 1.750 No_date 6:35 68.65
01412> overflow <= 03:P3OVF 19.28 5.826 No_date 6:35 68.65
01413> {MxStoUsed= .2904E+01, TotOfVol= .1333E+01, N-Ovf= 2, TotDurOvf= 1.hrs
01414> 012:0024-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01415> ADD HYD 02:P3SWM 76.75 1.750 No_date 6:35 68.65
01416> + 03:P3OVF 19.28 5.826 No_date 6:35 68.65
01417> [DT= 5.00] SUM= 08:P500 96.03 8.761 No_date 6:35 68.65
01418> 012:0025-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01419> ADD HYD 08:P500 96.03 8.761 No_date 6:35 68.65
01420> + 09:101-2 153.71 5.113 No_date 7:00 71.89
01421> [DT= 5.00] SUM= 10:B2054 249.74 12.629 No_date 6:35 70.64
01422> 012:0026-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01423> SAVE HYD 01:P2maj 1.81 1.174 No_date 6:25 68.54
01424> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2054.012
01425> remark:HEC-RAS Inflow Node 2054 / Station 44751
01426> 012:0027-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01427> CONTINUOUS STANDHYD01:P2 23.14 2.926 No_date 6:05 72.54
01428> [XIMP= .47:TIMP= .50]
01429> [LOSS= 2 :CN= 78.0]
01430> [Previous area: Iaper= 5.20:SLPP=1.00:LGP= 40.:MNP= 200:SCP= .0]
01431> [Impervious area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI= .0]
01432> [IaRECimp= 2.00: IaRCper= 4.00]
01433> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01434> 012:0028-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01435> DIVERT HYD -> 01:P2 23.14 2.926 No_date 6:05 72.54
01436> diverted <= 02:P2BMP1 4.41 .556 No_date 6:05 72.54
01437> diverted <= 03:P2STM1 18.76 2.370 No_date 6:05 72.54
01438> 012:0029-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01439> DIVERT HYD -> 02:P2BMP2 4.41 .556 No_date 6:05 72.54
01440> diverted <= 04:P2STM2 1.43 .184 No_date 6:05 72.54
01441> diverted <= 05:P2STM2 2.89 .371 No_date 6:05 72.54
01442> 012:0030-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01443> ROUTE RESERVOIR -> 07:P2BMP2 1.43 .184 No_date 6:05 72.54
01444> [RDT= 5.00] out<= 07:P2BMP3 3.32 .003 No_date 5:45 72.54
01445> overflow <= 08:P2STM3 1.11 .179 No_date 6:10 72.54
01446> {MxStoUsed= .1270E-01, TotOfVol= .8066E-01, N-Ovf= 1, TotDurOvf= 7.hrs
01447> 012:0031-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01448> COMPUTE DUALHYD 03:P2STM1 18.76 2.370 No_date 6:05 72.54
01449> Major System / 01:P2maj .00 .000 No_date 0:00 .00
01450> Minor System \ 02:P2min 18.76 1.790 No_date 5:55 73.43
01451> [MjSysSto= .6598E+03, TotOfVol= .0000E+00, N-Ovf= 0, TotDurOvf= 0.hrs
01452> 012:0032-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01453> CONTINUOUS NASHYD 07:SWM2 .99 .120 No_date 6:05 64.29
01454> [CN= 90.0: N= 2.00]
01455> [Tpe= .25:DT= 5.00]
01456> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01457> [InterEventTime= 12.00]
01458> 012:0033-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01459> ADD HYD 01:P2maj .00 .000 No_date 0:00 .00
01460> + 02:P2min 18.76 1.790 No_date 5:55 73.43
01461> + 05:P2STM2 2.89 .371 No_date 6:05 72.54
01462> + 07:SWM2 .99 .120 No_date 6:05 64.29
01463> + 08:P2STM3 1.11 1.179 No_date 6:10 72.54
01464> [DT= 5.00] SUM= 10:P2in 23.75 2.457 No_date 6:05 72.90
01465> 012:0034-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01466> ROUTE RESERVOIR -> 10:P2in 23.75 2.457 No_date 6:05 72.90
01467> [RDT= 5.00] out<= 02:P2out 19.82 .700 No_date 6:25 72.90
01468> overflow <= 07:P2OVF 3.93 3.116 No_date 6:25 72.90
01469> {MxStoUsed= .6745E+00, TotOfVol= .2866E+00, N-Ovf= 2, TotDurOvf= 1.hrs
01470> 012:0035-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01471> ADD HYD 02:P2out 19.82 .700 No_date 6:25 72.90
01472> + 03:P2OVF 3.93 3.116 No_date 6:25 72.90
01473> [DT= 5.00] SUM= 01:P2maj 1.81 1.174 No_date 6:25 72.90
01474> 012:0036-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01475> CONTINUOUS NASHYD 04:CRFP 24.18 1.623 No_date 6:30 57.33
01476> [CN= 82.0: N= 2.00]
01477> [Tpe= .50:DT= 5.00]
01478> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01479> [InterEventTime= 12.00]
01480> 012:0037-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01481> CONTINUOUS STANDHYD05:28 12.50 1.510 No_date 6:00 50.97
01482> [XIMP= .38:TIMP= .45]
01483> [Horton parameters: F= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01484> [Previous area: Iaper= 4.67:SLPP=1.00:LGP= 205.:MNP= 100:SCP= .0]
01485> [Impervious area: IAimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI= .0]

01486> [IaRECimp= 2.00: IaRCper= 4.00]
01487> 012:0038-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01488> ADD HYD 05:28 24.18 1.623 No_date 6:30 57.33
01489> + 05:28 12.50 1.510 No_date 6:00 50.97
01490> + 06:PND2 23.75 2.316 No_date 6:25 72.90
01491> [DT= 5.00] SUM= 07:B2065 60.43 4.810 No_date 6:25 62.13
01492> 012:0039-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01493> SAVE HYD 07:B2065 60.43 4.810 No_date 6:25 62.13
01494> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B2065.012
01495> remark:HEC-RAS Inflow Node 2065 / Station 44548
01496> 012:0040-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01497> CONTINUOUS STANDHYD05:100-1 61.17 4.021 No_date 6:05 50.97
01498> [XIMP= .38:TIMP= .45]
01499> [Horton parameters: F= 76.20:Fc= 13.20:DCAY=4.00: F= .00]
01500> [Previous area: Iaper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP= .0]
01501> [Impervious area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI= .0]
01502> [IaRECimp= 2.00: IaRCper= 4.00]
01503> 012:0041-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01504> CONTINUOUS NASHYD 06:102-1 39.80 1.380 No_date 7:15 53.48
01505> [CN= 78.0: N= 2.00]
01506> [Tpe= 1.10:DT= 5.00]
01507> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01508> [InterEventTime= 12.00]
01509> 012:0042-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01510> ADD HYD 05:100-1 61.17 4.021 No_date 6:05 50.97
01511> + 06:102-1 39.80 1.380 No_date 7:15 53.48
01512> [DT= 5.00] SUM= 10:B3894 100.97 4.669 No_date 6:05 51.96
01513> 012:0043-----ID:NHYD-----AREA-----OPEAK-TpeakDate_hh:mm-----R.-V.-
01514> SAVE HYD 10:B3894 100.97 4.669 No_date 6:05 51.96
01515> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWMHYMO\H-B3894.012
01516> remark:HEC-RAS Inflow Node 3894 / Station 43966
01517> *** END OF RUN : 12
01518> *****
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01614> *****
01615> *****
01616> *****
01617> *****
01618> *****
01619> *****
01620> *****

01621> 013:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01622> * DIVERT HYD -> 01:P3 91.68 12.170 No_date 6:05 77.19
01623> diverted <= 02:P3BMP1 23.84 3.164 No_date 6:05 77.19
01624> diverted <= 03:P3STM1 70.97 9.420 No_date 6:05 77.19
01625> 013:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01626> * DIVERT HYD -> 02:P3BMP1 23.84 3.164 No_date 6:05 77.19
01627> diverted <= 04:P3BMP2 7.87 1.048 No_date 6:05 77.19
01628> diverted <= 05:P3STM2 15.87 2.116 No_date 6:05 77.19
01629> 013:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01630> ROUTE RESERVOIR -> 04:P3BMP2 7.87 1.048 No_date 6:05 77.19
01631> [RDT= 5.00] out<- 07:P3BMP3 1.14 .012 No_date 5:20 77.19
01632> overflow <= 08:P3STM3 6.73 1.037 No_date 6:10 77.19
01633> {MxStoUsed=.4658E+01, TotOvVol=.5199E+00, N-Ovf= 2, TotDurOvf= 1 hrs
01634> 013:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01635> COMPUTE DUALHYD 03:P3STM1 70.97 9.420 No_date 6:05 77.19
01636> Major System / 01:P3maj 4.37 3.595 No_date 6:15 77.19
01637> Minor System / 02:P3min 66.60 5.200 No_date 5:50 77.97
01638> {MjSysStor=.4250E+04, TotOvVol=.3376E+04, N-Ovf= 1, TotDurOvf= 1 hrs
01639> 013:0021-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01640> CONTINUOUS NASHYD 07:SWM3 2.60 .317 No_date 6:05 65.86
01641> [CN= 82.0: N= 2.00]
01642> [Tp= .25:DT= 5.00]
01643> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01644> [InterEventTime= 12.00]
01645> 013:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01646> ADD HYD 01:P3maj 4.37 3.595 No_date 6:15 77.19
01647> + 02:P3min 66.60 5.200 No_date 5:50 77.97
01648> + 03:P3STM2 15.87 2.116 No_date 6:05 77.19
01649> + 07:SWM3 2.60 .317 No_date 6:05 65.86
01650> + 08:P3STM3 6.73 1.037 No_date 6:10 77.19
01651> [DT= 5.00] SUM= 10:P3in 96.17 12.063 No_date 6:15 77.42
01652> 013:0023-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01653> ROUTE RESERVOIR -> 02:P3SNW 96.17 12.063 No_date 6:15 77.42
01654> [RDT= 5.00] out<- 02:P3SNW 70.69 1.750 No_date 6:25 77.42
01655> overflow <= 03:P3OVF 25.48 8.724 No_date 6:25 77.42
01656> {MxStoUsed=.2904E+01, TotOvVol=.1973E+01, N-Ovf= 2, TotDurOvf= 1 hrs
01657> 013:0024-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01658> ADD HYD 70.69 1.750 No_date 6:25 77.42
01659> + 03:P3OVF 25.48 8.724 No_date 6:25 77.42
01660> [DT= 5.00] SUM= 08:B500 96.17 10.474 No_date 6:25 77.42
01661> 013:0025-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01662> ADD HYD 08:B500 96.17 10.474 No_date 6:25 77.42
01663> + 10:B2054 153.81 2.499 No_date 6:10 77.05
01664> [DT= 5.00] SUM= 10:B2054 249.99 15.617 No_date 6:25 79.43
01665> 013:0026-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01666> SAVE HYD 10:B2054 249.99 15.617 No_date 6:25 79.43
01667> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B2054.013
01668> remark:HEC-RAS Inflow Node 2054 / Station 44548
01669> 013:0027-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01670> CONTINUOUS STANDHYD01:P2 23.14 3.329 No_date 6:05 81.29
01671> [XIMP=.47:TIMP=.59]
01672> [LOSS= 2:CN= 78.0]
01673> [Pervious area: Iaper= 5.20:SLP=1.00:LGP=.40:.MNP=.200:SCP=.0]
01674> [Impervious area: Iaimp= 1.57:SLP=.50:LGI=1400:.MNI=.013:SCI=.0]
01675> [IaRECimp= 2.00: IaRECP= 4.00]
01676> [SMIN= 29.88: SMAX=199.22: SK=1.000]
01677> 013:0028-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01678> DIVERT HYD -> 01:P2 23.14 3.329 No_date 6:05 81.29
01679> diverted <= 02:P2BMP1 4.41 .633 No_date 6:05 81.29
01680> diverted <= 03:P2STM1 18.76 2.697 No_date 6:05 81.29
01681> 013:0029-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01682> DIVERT HYD -> 02:P2BMP1 4.41 .633 No_date 6:05 81.29
01683> diverted <= 04:P2BMP2 1.44 .210 No_date 6:05 81.29
01684> diverted <= 05:P2STM2 2.90 .423 No_date 6:05 81.29
01685> 013:0030-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01686> ROUTE RESERVOIR -> 04:P2BMP2 1.44 .210 No_date 6:05 81.29
01687> [RDT= 5.00] out<- 07:P2BMP3 .29 .003 No_date 5:35 81.29
01688> overflow <= 08:P2STM3 1.15 .205 No_date 6:10 81.29
01689> {MxStoUsed=.1270E-01, TotOvVol=.9309E-01, N-Ovf= 2, TotDurOvf= 1 hrs
01690> 013:0031-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01691> COMPUTE DUALHYD 03:P2STM1 18.76 2.697 No_date 6:05 81.29
01692> Major System / 01:P2maj 18.07 .132 No_date 6:25 81.29
01693> Minor System / 02:P2min 18.67 1.790 No_date 6:20 82.22
01694> {MjSysStor=.1157E+04, TotOvVol=.6610E+02, N-Ovf= 1, TotDurOvf= 0.8hrs
01695> 013:0032-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01696> CONTINUOUS NASHYD 07:SWM2 .99 .136 No_date 6:05 73.10
01697> [CN= 90.0: N= 2.00]
01698> [Tp= .25:DT= 5.00]
01699> [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
01700> [InterEventTime= 12.00]
01701> 013:0033-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01702> ADD HYD 01:P2maj .08 .132 No_date 6:25 81.29
01703> + 02:P2min 18.67 1.790 No_date 6:20 82.22
01704> + 05:P2STM2 2.90 .423 No_date 6:05 81.29
01705> + 07:SWM2 .99 .136 No_date 6:05 73.10
01706> + 08:P2STM3 1.15 .205 No_date 6:10 81.29
01707> [DT= 5.00] SUM= 10:P2in 23.79 2.550 No_date 6:05 82.22
01708> 013:0034-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01709> ROUTE RESERVOIR -> 10:P2in 23.79 2.550 No_date 6:05 82.22
01710> [RDT= 5.00] out<- 02:P2out 18.22 .700 No_date 6:20 82.22
01711> overflow <= 03:P2OVF 5.57 1.793 No_date 6:20 82.22
01712> {MxStoUsed=.6656E+00, TotOvVol=.4581E+00, N-Ovf= 1, TotDurOvf= 1 hrs
01713> 013:0035-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01714> ADD HYD 02:P2out 18.22 .700 No_date 6:20 82.22
01715> + 03:P2OVF 5.57 1.793 No_date 6:20 82.22
01716> [DT= 5.00] SUM= 06:PND2 23.79 2.493 No_date 6:20 82.22
01717> 013:0036-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01718> CONTINUOUS NASHYD 04:CRFP 24.18 1.865 No_date 6:30 65.86
01719> [CN= 82.0: N= 2.00]
01720> [Tp= .50:DT= 5.00]
01721> [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
01722> [InterEventTime= 12.00]
01723> 013:0037-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01724> CONTINUOUS STANDHYD05:28 12.50 1.740 No_date 6:00 57.94
01725> [XIMP=.38:TIMP=.45]
01726> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F=.00]
01727> [Pervious area: Iaper= 4.67:SLP=1.00:LGP= 205:.MNP=.100:SCP=.0]
01728> [Impervious area: Iaimp= 1.57:SLP=.80:LGI=700:.MNI=.013:SCI=.0]
01729> [IaRECimp= 2.00: IaRECP= 4.00]
01730> 013:0038-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01731> ADD HYD 04:CRFP 24.18 1.865 No_date 6:30 65.86
01732> + 05:28 12.50 1.740 No_date 6:00 57.94
01733> + 06:PND2 23.79 2.493 No_date 6:20 82.22
01734> [DT= 5.00] SUM= 07:B2065 60.47 5.508 No_date 6:20 70.66
01735> 013:0039-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01736> SAVE HYD 07:B2065 60.47 5.508 No_date 6:20 70.66
01737> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B2065.013
01738> remark:HEC-RAS Inflow Node 2065 / Station 44548
01739> 013:0040-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01740> CONTINUOUS STANDHYD05:100-1 61.17 4.569 No_date 6:05 57.94
01741> [XIMP=.38:TIMP=.45]
01742> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00: F=.00]
01743> [Pervious area: Iaper= 4.67:SLP=.80:LGP=1200:.MNP=.100:SCP=.0]
01744> [Impervious area: Iaimp= 1.57:SLP=.80:LGI=1700:.MNI=.013:SCI=.0]
01745> [IaRECimp= 2.00: IaRECP= 4.00]
01746> 013:0041-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01747> CONTINUOUS NASHYD 06:102-1 39.80 1.601 No_date 7:10 61.80
01748> [CN= 78.0: N= 2.00]
01749> [Tp= 1.10:DT= 5.00]
01750> [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
01751> [InterEventTime= 12.00]
01752> 013:0042-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01753> ADD HYD 05:102-1 61.17 4.569 No_date 6:05 57.94
01754> + 06:102-1 39.80 1.601 No_date 7:10 61.80
01755> [DT= 5.00] SUM= 10:B3894 100.97 5.351 No_date 6:05 59.46

01756> 013:0043-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01757> SAVE HYD 10:B3894 100.97 5.351 No_date 6:05 59.46
01758> fname :M:\2008\108195\SUBDIV-1\DATA\CALCUL-1\SWHYMO\H-B3894.013
01759> remark:HEC-RAS Inflow Node 3894 / Station 43966
01760> 013:0002-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-
01761> FINISH
01762> *****
01763> *****
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Kizell Lands - Fernbank 5618 Hazeldean Road
Design Storm Time Series Data
SCS Design Storms - MTO Distribution



| S2-12.stm | | S5-12.stm | | S10-12.stm | | S100-12.stm | |
|-----------|-----------|-----------|-----------|------------|-----------|-------------|-----------|
| Duration | Intensity | Duration | Intensity | Duration | Intensity | Duration | Intensity |
| min | mm/hr | min | mm/hr | min | mm/hr | min | mm/hr |
| 0:00 | 1.08 | 0:00 | 1.44 | 0:00 | 1.68 | 0:00 | 2.40 |
| 0:15 | 1.08 | 0:15 | 1.44 | 0:15 | 1.68 | 0:15 | 2.40 |
| 0:30 | 1.08 | 0:30 | 1.44 | 0:30 | 1.68 | 0:30 | 2.40 |
| 0:45 | 1.08 | 0:45 | 1.44 | 0:45 | 1.68 | 0:45 | 2.40 |
| 1:00 | 1.08 | 1:00 | 1.44 | 1:00 | 1.68 | 1:00 | 2.40 |
| 1:15 | 1.08 | 1:15 | 1.44 | 1:15 | 1.68 | 1:15 | 2.40 |
| 1:30 | 1.08 | 1:30 | 1.44 | 1:30 | 1.68 | 1:30 | 2.40 |
| 1:45 | 1.08 | 1:45 | 1.44 | 1:45 | 1.68 | 1:45 | 2.40 |
| 2:00 | 1.30 | 2:00 | 1.73 | 2:00 | 2.02 | 2:00 | 2.88 |
| 2:15 | 1.30 | 2:15 | 1.73 | 2:15 | 2.02 | 2:15 | 2.88 |
| 2:30 | 1.30 | 2:30 | 1.73 | 2:30 | 2.02 | 2:30 | 2.88 |
| 2:45 | 1.30 | 2:45 | 1.73 | 2:45 | 2.02 | 2:45 | 2.88 |
| 3:00 | 1.73 | 3:00 | 2.30 | 3:00 | 2.69 | 3:00 | 3.84 |
| 3:15 | 1.73 | 3:15 | 2.30 | 3:15 | 2.69 | 3:15 | 3.84 |
| 3:30 | 1.73 | 3:30 | 2.30 | 3:30 | 2.69 | 3:30 | 3.84 |
| 3:45 | 1.73 | 3:45 | 2.30 | 3:45 | 2.69 | 3:45 | 3.84 |
| 4:00 | 2.59 | 4:00 | 3.46 | 4:00 | 4.03 | 4:00 | 5.76 |
| 4:15 | 2.59 | 4:15 | 3.46 | 4:15 | 4.03 | 4:15 | 5.76 |
| 4:30 | 3.46 | 4:30 | 4.61 | 4:30 | 5.38 | 4:30 | 7.68 |
| 4:45 | 3.46 | 4:45 | 4.61 | 4:45 | 5.38 | 4:45 | 7.68 |
| 5:00 | 5.18 | 5:00 | 6.91 | 5:00 | 8.06 | 5:00 | 11.52 |
| 5:15 | 5.18 | 5:15 | 6.91 | 5:15 | 8.06 | 5:15 | 11.52 |
| 5:30 | 20.74 | 5:30 | 27.65 | 5:30 | 32.26 | 5:30 | 46.08 |
| 5:45 | 57.02 | 5:45 | 76.03 | 5:45 | 88.70 | 5:45 | 126.72 |
| 6:00 | 7.78 | 6:00 | 10.37 | 6:00 | 12.10 | 6:00 | 17.28 |
| 6:15 | 7.78 | 6:15 | 10.37 | 6:15 | 12.10 | 6:15 | 17.28 |
| 6:30 | 3.46 | 6:30 | 4.61 | 6:30 | 5.38 | 6:30 | 7.68 |
| 6:45 | 3.46 | 6:45 | 4.61 | 6:45 | 5.38 | 6:45 | 7.68 |
| 7:00 | 2.59 | 7:00 | 3.46 | 7:00 | 4.03 | 7:00 | 5.76 |
| 7:15 | 2.59 | 7:15 | 3.46 | 7:15 | 4.03 | 7:15 | 5.76 |
| 7:30 | 2.59 | 7:30 | 3.46 | 7:30 | 4.03 | 7:30 | 5.76 |
| 7:45 | 2.59 | 7:45 | 3.46 | 7:45 | 4.03 | 7:45 | 5.76 |
| 8:00 | 1.51 | 8:00 | 2.02 | 8:00 | 2.35 | 8:00 | 3.36 |
| 8:15 | 1.51 | 8:15 | 2.02 | 8:15 | 2.35 | 8:15 | 3.36 |
| 8:30 | 1.51 | 8:30 | 2.02 | 8:30 | 2.35 | 8:30 | 3.36 |
| 8:45 | 1.51 | 8:45 | 2.02 | 8:45 | 2.35 | 8:45 | 3.36 |
| 9:00 | 1.51 | 9:00 | 2.02 | 9:00 | 2.35 | 9:00 | 3.36 |
| 9:15 | 1.51 | 9:15 | 2.02 | 9:15 | 2.35 | 9:15 | 3.36 |
| 9:30 | 1.51 | 9:30 | 2.02 | 9:30 | 2.35 | 9:30 | 3.36 |
| 9:45 | 1.51 | 9:45 | 2.02 | 9:45 | 2.35 | 9:45 | 3.36 |
| 10:00 | 0.86 | 10:00 | 1.15 | 10:00 | 1.34 | 10:00 | 1.92 |
| 10:15 | 0.86 | 10:15 | 1.15 | 10:15 | 1.34 | 10:15 | 1.92 |
| 10:30 | 0.86 | 10:30 | 1.15 | 10:30 | 1.34 | 10:30 | 1.92 |
| 10:45 | 0.86 | 10:45 | 1.15 | 10:45 | 1.34 | 10:45 | 1.92 |
| 11:00 | 0.86 | 11:00 | 1.15 | 11:00 | 1.34 | 11:00 | 1.92 |
| 11:15 | 0.86 | 11:15 | 1.15 | 11:15 | 1.34 | 11:15 | 1.92 |
| 11:30 | 0.86 | 11:30 | 1.15 | 11:30 | 1.34 | 11:30 | 1.92 |
| 11:45 | 0.86 | 11:45 | 1.15 | 11:45 | 1.34 | 11:45 | 1.92 |
| 12:00 | 0.00 | 12:00 | 0.00 | 12:00 | 0.00 | 12:00 | 0.00 |

Kizell Lands - Fernbank 5618 Hazeldean Road
Design Storm Time Series Data
Chicago Design Storms



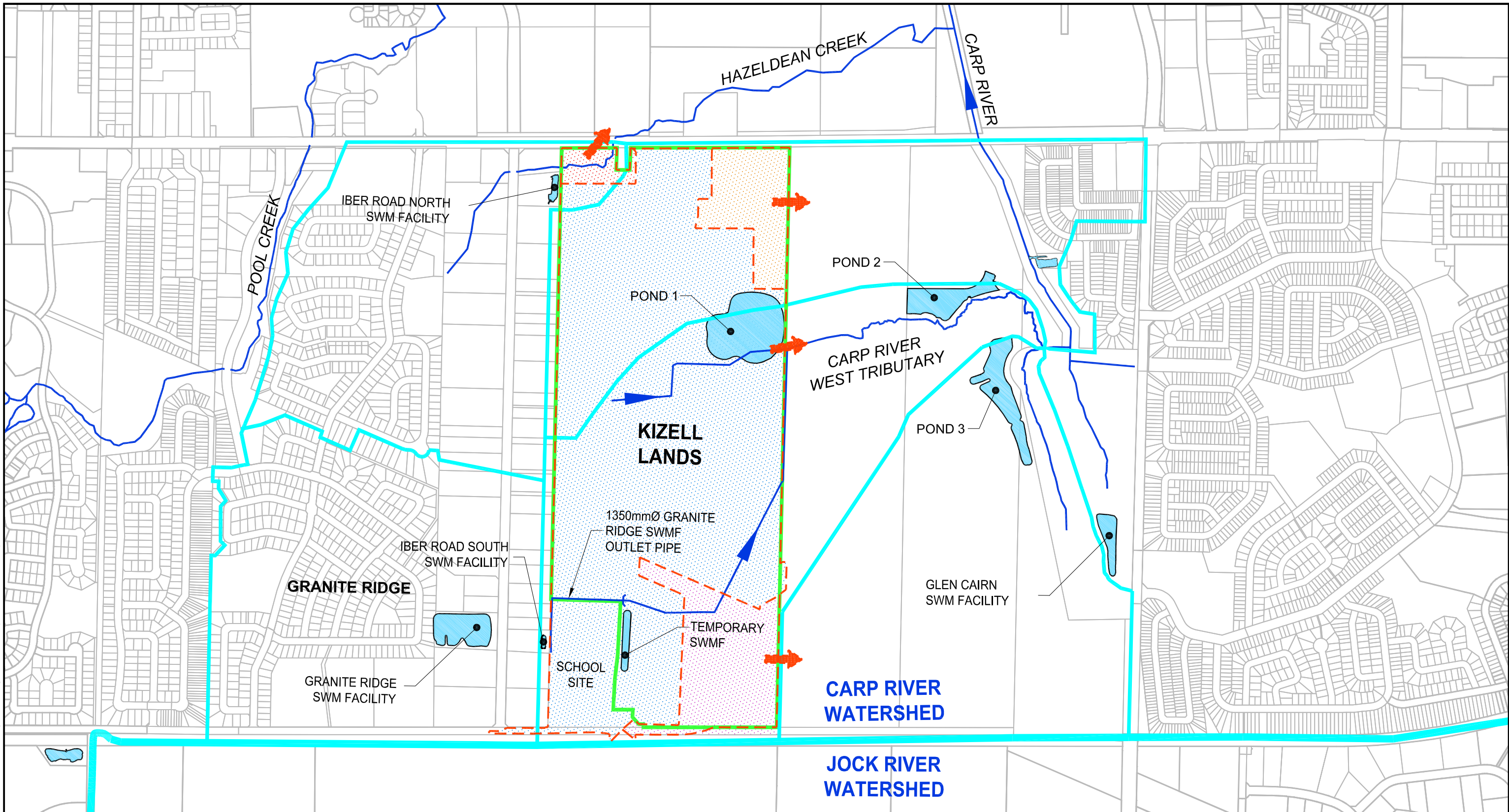
| C25mm-3.stm | | C2-3.stm | | C5-3.stm | |
|-------------|-----------|----------|-----------|----------|-----------|
| Duration | Intensity | Duration | Intensity | Duration | Intensity |
| min | mm/hr | min | mm/hr | min | mm/hr |
| 0:00 | 0 | 0:00 | 0 | 0:00 | 0 |
| 0:10 | 2.21 | 0:10 | 2.81 | 0:10 | 3.68 |
| 0:20 | 2.75 | 0:20 | 3.5 | 0:20 | 4.58 |
| 0:30 | 3.68 | 0:30 | 4.69 | 0:30 | 6.15 |
| 0:40 | 5.73 | 0:40 | 7.3 | 0:40 | 9.61 |
| 0:50 | 14.29 | 0:50 | 18.21 | 0:50 | 24.17 |
| 1:00 | 60.28 | 1:00 | 76.81 | 1:00 | 104.19 |
| 1:10 | 18.9 | 1:10 | 24.08 | 1:10 | 32.04 |
| 1:20 | 9.7 | 1:20 | 12.36 | 1:20 | 16.34 |
| 1:30 | 6.53 | 1:30 | 8.32 | 1:30 | 10.96 |
| 1:40 | 4.94 | 1:40 | 6.3 | 1:40 | 8.29 |
| 1:50 | 3.99 | 1:50 | 5.09 | 1:50 | 6.69 |
| 2:00 | 3.37 | 2:00 | 4.29 | 2:00 | 5.63 |
| 2:10 | 2.92 | 2:10 | 3.72 | 2:10 | 4.87 |
| 2:20 | 2.58 | 2:20 | 3.29 | 2:20 | 4.3 |
| 2:30 | 2.32 | 2:30 | 2.95 | 2:30 | 3.86 |
| 2:40 | 2.1 | 2:40 | 2.68 | 2:40 | 3.51 |
| 2:50 | 1.93 | 2:50 | 2.46 | 2:50 | 3.22 |
| 3:00 | 1.79 | 3:00 | 2.28 | 3:00 | 2.98 |

| C10-3.stm | | C100-3.stm | |
|-----------|-----------|------------|-----------|
| Duration | Intensity | Duration | Intensity |
| min | mm/hr | min | mm/hr |
| 0:00 | 0 | 0:00 | 0 |
| 0:10 | 4.25 | 0:10 | 6.05 |
| 0:20 | 5.29 | 0:20 | 7.54 |
| 0:30 | 7.11 | 0:30 | 10.16 |
| 0:40 | 11.13 | 0:40 | 15.97 |
| 0:50 | 28.1 | 0:50 | 40.65 |
| 1:00 | 122.14 | 1:00 | 178.56 |
| 1:10 | 37.28 | 1:10 | 54.05 |
| 1:20 | 18.95 | 1:20 | 27.32 |
| 1:30 | 12.7 | 1:30 | 18.24 |
| 1:40 | 9.59 | 1:40 | 13.74 |
| 1:50 | 7.73 | 1:50 | 11.06 |
| 2:00 | 6.5 | 2:00 | 9.29 |
| 2:10 | 5.63 | 2:10 | 8.02 |
| 2:20 | 4.97 | 2:20 | 7.08 |
| 2:30 | 4.46 | 2:30 | 6.35 |
| 2:40 | 4.05 | 2:40 | 5.76 |
| 2:50 | 3.71 | 2:50 | 5.28 |
| 3:00 | 3.43 | 3:00 | 4.88 |

Appendix C: Drawings

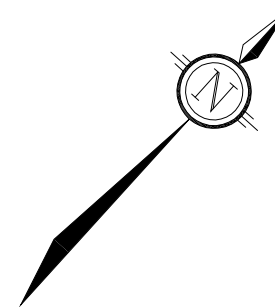
| | |
|-----------------------------|--------------|
| Drainage Areas | 108195-DSK-7 |
| Master Grading Plan | 108195-GR |
| Water Distribution Plan | 108195-WTR |
| Sanitary Drainage Area Plan | 108195-SAN |
| Storm Drainage Area Plan | 108195-STM |
| Pond 1 - Layout Plan | 108195-SWM |

M:\2008\108195\Subdivision\CAD\Design\Figures\DSK\DWG\DSK-7 Drainage Areas.dwg, 11x17 landscape, Jul 07, 2017 - 3:44pm, dduffon



LEGEND

- PRE DEVELOPMENT DRAINAGE AREA BOUNDARY
- - - POST DEVELOPMENT DRAINAGE AREA BOUNDARY
- SITE BOUNDARY
- ▶ EXISTING DRAINAGE PATH AND FLOW DIRECTION
- ▶ POST DEVELOPMENT FLOW DIRECTION
- DRAINAGE AREA TO POND 1
- DRAINAGE AREA TO POND 2
- DRAINAGE AREA TO POND 3
- DRAINAGE AREA TO HAZELDEAN CREEK



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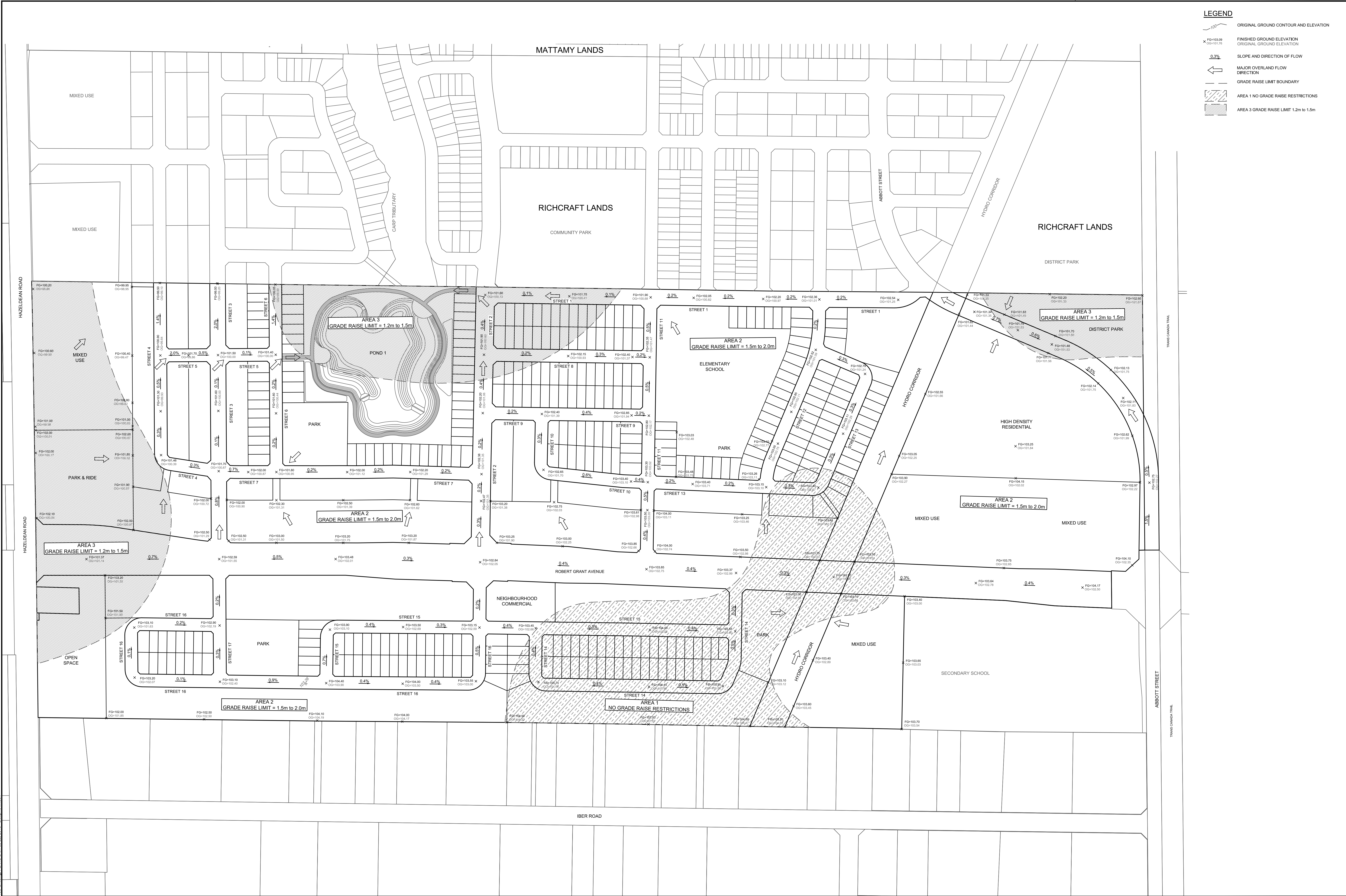
DRAINAGE AREAS

SCALE 1 : 500

DATE JULY 7, 2017 JOB 108195 FIGURE DSK-7

LEGEND

- ORIGINAL GROUND CONTOUR AND ELEVATION
- X FG=103.00 OG=101.75 FINISHED GROUND ELEVATION ORIGINAL GROUND ELEVATION
- 0.3% SLOPE AND DIRECTION OF FLOW
- ← MAJOR OVERLAND FLOW DIRECTION
- GRADE RAISE LIMIT BOUNDARY
- AREA 1 NO GRADE RAISE RESTRICTIONS
- AREA 3 GRADE RAISE LIMIT 1.2m to 1.5m



NOTE:
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| No. | REVISION | DATE | BY |
|-----|---------------------------|-----------|-----|
| 3. | DRAFT PLAN RESUBMISSION | FEB 23/18 | MAB |
| 2. | REVISED PER CITY COMMENTS | JUL 20/17 | MAB |
| 1. | DRAFT PLAN APPLICATION | NOV 9/16 | MAB |

SCALE

1:2000

0 20 40 60 80

FOR REVIEW ONLY

DESIGN: LRW

CHECKED: MAB

DRAWN: DTD

CHECKED: MAB

APPROVED: JGR

PROFESSIONAL ENGINEER
 L.R. WILSON
 10160965
 PROVINCE OF ONTARIO

PROFESSIONAL ENGINEER
 M.A. BISSETT
 2018, 02, 13
 PROVINCE OF ONTARIO

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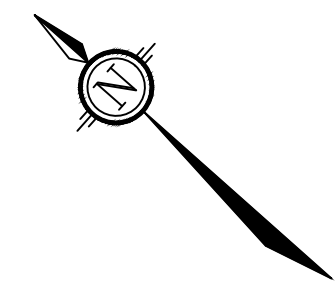
PROJECT No. 108195

REV # 3

108195-GRD

MASTER GRADING PLAN

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DOUBLE DECK LANDS

POND 2

MATTAMY LANDS

ELEMENTARY SCHOOL

RICHCRAFT LANDS

COMMUNITY PARK

RICHCRAFT LANDS

DISTRICT PARK

POND 1

ELEMENTARY SCHOOL

PARK

HIGH DENSITY RESIDENTIAL

SECONDARY SCHOOL

ROBERT GRANT AVENUE

NEIGHBOURHOOD COMMERCIAL

MIXED USE

5654 HAZELDEAN ROAD

OPEN SPACE

PARK

PARK

MIXED USE

RES2

5.19 ha

404.9

5.05 ha

518.1

7.81 ha

841.2

2.38 ha

MU2

200.3

1.83 ha

7

996.4

12.69 ha

6

996.4

11.05 ha

9

502.7

2.08 ha

8

910.1

5.28 ha

10

680.0

1.64 ha

11

0.0

LEGEND

- 0.23 — AREA IN HECTARES
- A1-1 — AREA ID
- 6.0 — POPULATION EQUIVALENT
- 1500 WM — PROPOSED WATERMAIN AND SIZE
- 3000 WM — EXISTING / PROPOSED (BY OTHERS) WATERMAIN AND SIZE
- WATER SERVICE BOUNDARY
- PIPE NODE AND IDF

C:\Users\104155636\OneDrive\Documents\CAD\Drawings\104155636\WTR\PLANS\B1 - Jan 26, 2018 - 3:24pm - MAB

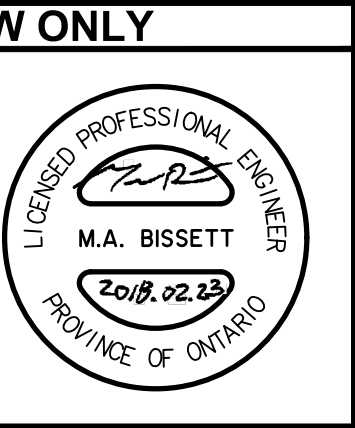
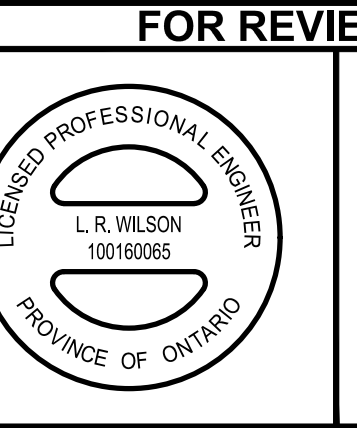
NOTE:
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| No. | REVISION | DATE | BY |
|-----|---------------------------|-----------|-----|
| 3. | DRAFT PLAN RESUBMISSION | FEB 23/18 | MAB |
| 2. | REVISED PER CITY COMMENTS | JUL 2017 | MAB |
| 1. | DRAFT PLAN APPLICATION | NOV 9/16 | MAB |

SCALE

1:2000

| DESIGN | LRW |
|----------|-----|
| CHECKED | MAB |
| DRAWN | DTD |
| CHECKED | MAB |
| APPROVED | JGR |



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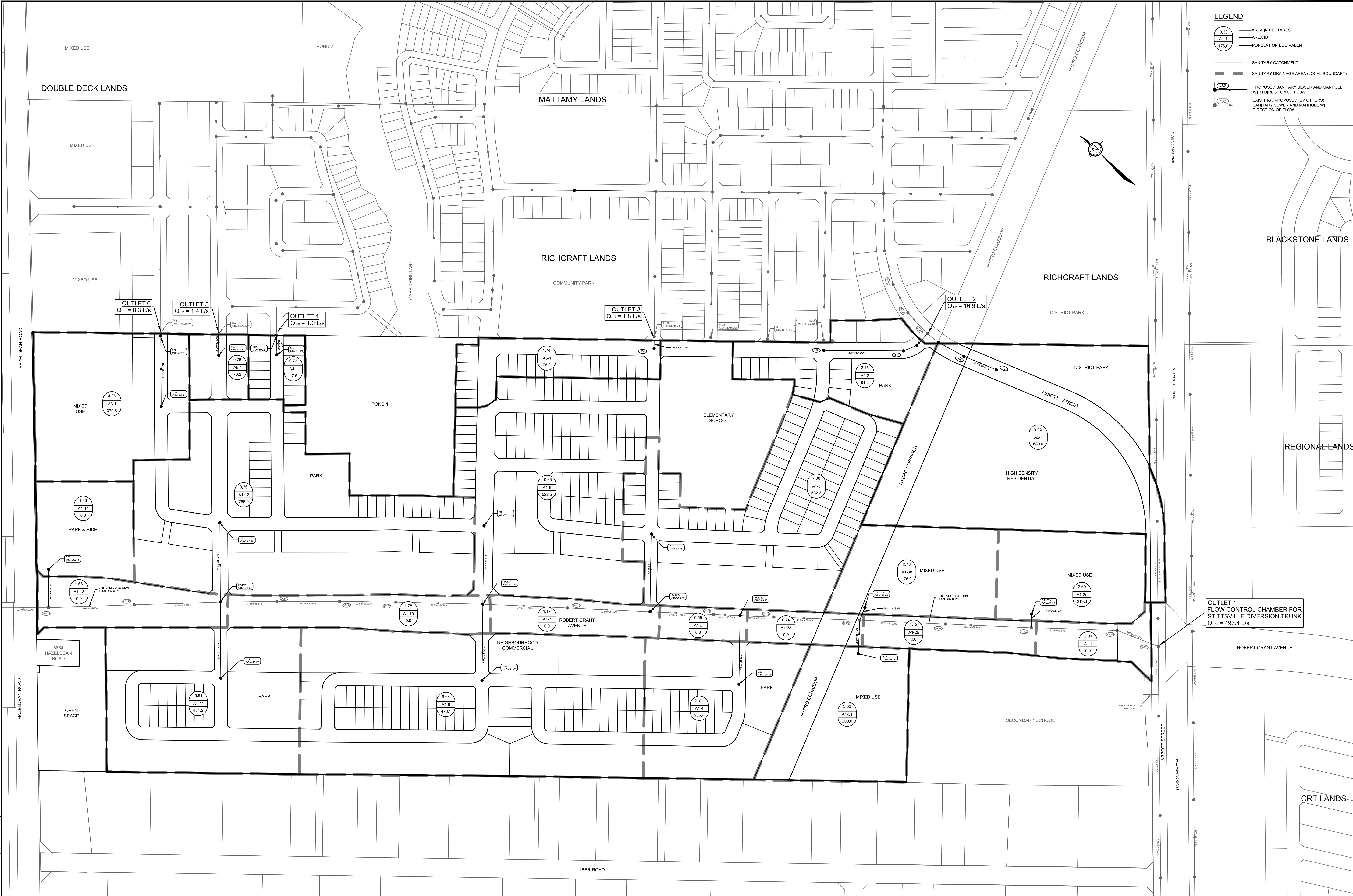
WATER DISTRIBUTION PLAN

| PROJECT No. | REV | REV # | DRAWING No. |
|-------------|-----|-------|-------------|
| 108195 | | | 108195-WTR |

PLANS\B1 - Jan 26, 2018 - 3:24pm - MAB

LEGEND

- AREA IN HECTARES
- AREA ID
- POPULATION EQUIVALENT
- SANITARY CATCHMENT
- SANITARY DRAINAGE AREA (LOCAL BOUNDARY)
- PROPOSED SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW
- EXISTING / PROPOSED (BY OTHERS) SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW

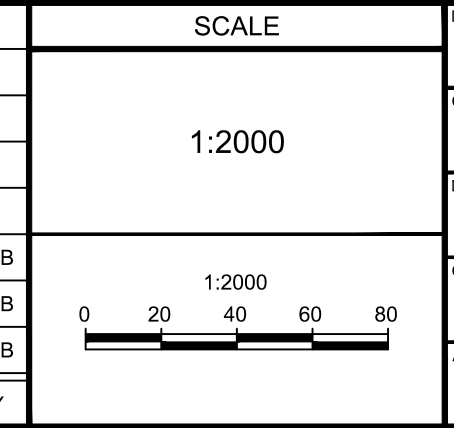


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NOTE:
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| No. | REVISION | DATE | BY |
|-----|---------------------------|-----------|-----|
| 3. | DRAFT PLAN RESUBMISSION | FEB 23/18 | MAB |
| 2. | REVISED PER CITY COMMENTS | JUL 20/17 | MAB |
| 1. | DRAFT PLAN APPLICATION | NOV. 9/16 | MAB |

| DESIGN | LRW |
|----------|-----|
| CHECKED | MAB |
| DRAWN | DTD |
| CHECKED | MAB |
| APPROVED | JGR |



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PROFESSIONAL ENGINEER
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 10160965
 PROVINCE OF ONTARIO

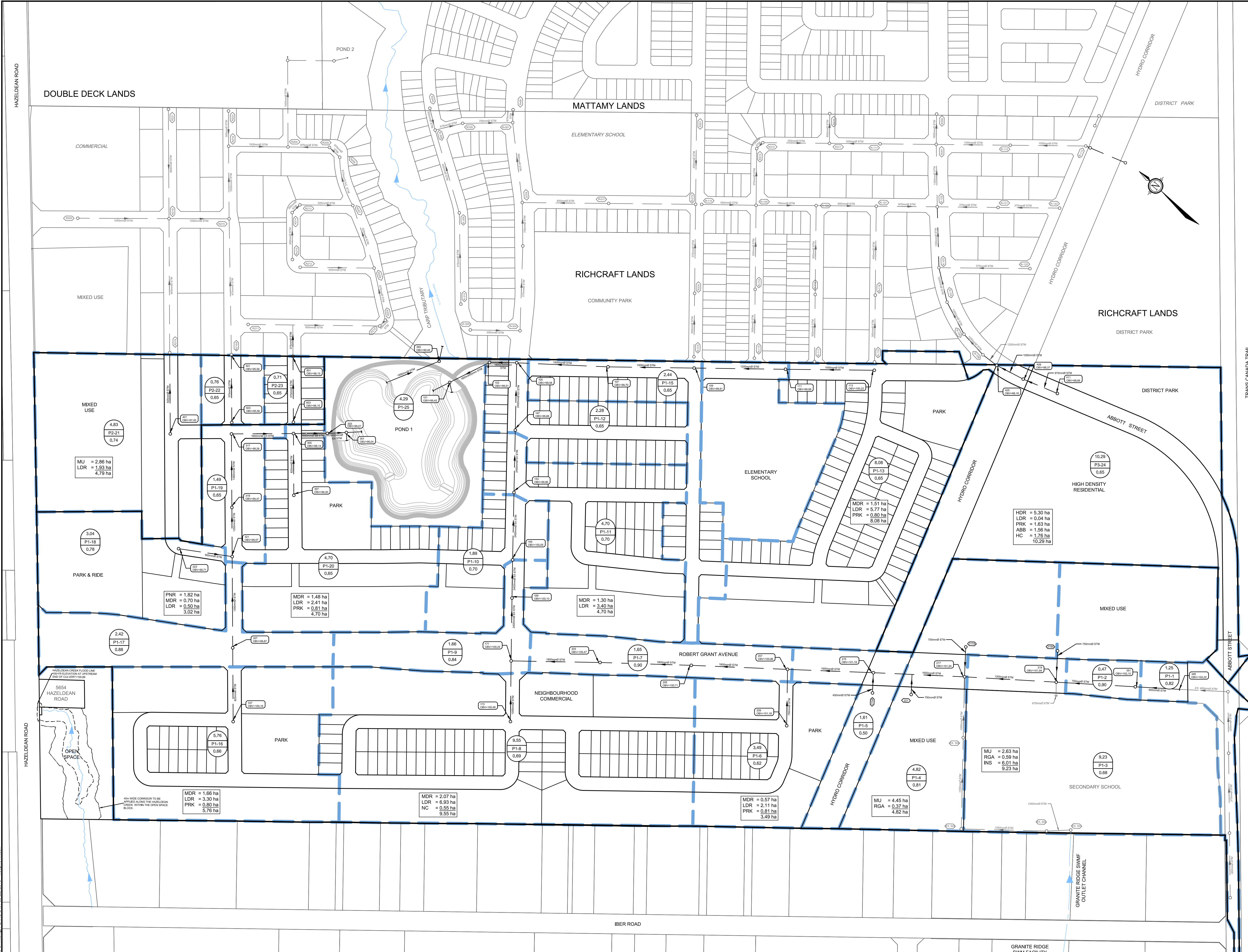
PROFESSIONAL ENGINEER
 M.A. BISSETT
 2018, 02.13
 PROVINCE OF ONTARIO

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SANITARY DRAINAGE AREA PLAN

PROJECT No. 108195
 REV # 3
 DRAWING No. 108195-SAN



- LEGEND**
- 0.24 ha — AREA (hectares)
 - 88a — AREA ID
 - 0.65 — RUN-OFF COEFFICIENT
 - STORM CATCHMENT
 - STORM DRAINAGE AREA (LOCAL BOUNDARY)
 - PROPOSED STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
 - FUTURE / EXISTING STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
- LAND USE ABBREVIATIONS:**
- LDR = LOW DENSITY RESIDENTIAL
 - MDR = MEDIUM DENSITY RESIDENTIAL
 - HDR = HIGH DENSITY RESIDENTIAL
 - MU = MIXED USE
 - PRK = PARK
 - HC = HYDRO CORRIDOR
 - NC = NEIGHBOURHOOD COMMERCIAL
 - INS = INSTITUTIONAL
 - PNR = PARK N RIDE
 - RGA = ROBERT GRANT AVENUE
 - ABB = ABBOTT STREET

NOTE:
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

| No. | REVISION | DATE | BY |
|-----|------------------------------------|-----------|-----|
| 3. | DRAFT PLAN RESUBMISSION | FEB 23/18 | MAB |
| 2. | REVISED PER CITY AND MVCA COMMENTS | JUL 20/17 | MAB |
| 1. | DRAFT PLAN APPLICATION | NOV 9/16 | MAB |

| SCALE | DESIGN | CHECKED | DRAWN | APPROVED |
|---------------|--------|---------|-------|----------|
| 1:2000 | LRW | MAB | DTD | MAB |
| 0 20 40 60 80 | | | | JGR |

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STORM DRAINAGE AREA PLAN

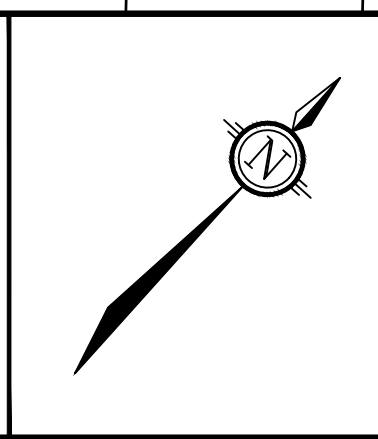
PROJECT No. 108195
 REV # 3
 DRAWING No. 108195-STM

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NOTE:
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 WATERMANS, SEWERS AND OTHER
 UNDERGROUND AND OVERGROUND UTILITIES AND
 STRUCTURES IS NOT NECESSARILY SHOWN ON
 THE CONTRACT DRAWINGS, AND WHERE SHOWN,
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|-----|---------------------------|-----------|-----|
| 3. | DRAFT PLAN RESUBMISSION | FEB 23/18 | MAB |
| 2. | REVISED PER CITY COMMENTS | JUL 2017 | MAB |
| 1. | DRAFT PLAN APPLICATION | NOV 09/16 | MAB |



| SCALE | |
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| DESIGN | DATE | BY |
|--------|------|----|
| MAB | | |
| MJP | | |
| DTD | | |
| MAB | | |
| JGR | | |

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**STORMWATER MANAGEMENT
 POND LAYOUT**

PROJECT No. 108195
 REV. REV # 3
 DRAWING No. 108195-SWM

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