Burnett Lands - 3370 Greenbank Road

Site Serviceability and Stormwater Management Report

BURNETT LANDS

3370 GREENBANK ROAD

SITE SERVICEABILITY AND STORMWATER MANAGEMENT REPORT

Prepared for:

Claridge Homes

Prepared By:

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December 9, 2016

Novatech File: 111117

Ref: R-2016-170

NOVATECH
Engineers, Planners & Landscape Architects

December 9, 2016

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning Services Branch
110 Laurier Ave. West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Mr. Don Herweyer, Manager of Development Review South**

Reference: **Burnett Lands - 3370 Greenbank Road**
Site Serviceability and Stormwater Management Report
Novatech File No.: 111117

Enclosed herein are six (6) copies of the "Site Serviceability and Stormwater Management Report" for the proposed development of the Burnett Lands located at 3370 Greenbank Road, Ottawa. The report is submitted in support of applications for Official Plan Amendment, Zoning By-Law Amendment and Draft Plan of Subdivision. It will address how the subject development will be serviced with sanitary sewer, storm sewers, watermain and stormwater management.

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

Sincerely,

NOVATECH

Greg MacDonald, P.Eng.
Director, Land Development and Public Sector Projects

Encl.

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1.0 INTRODUCTION

Novatech has been retained by Claridge Homes to prepare a Site Serviceability & Stormwater Management Report for the lands located at 3370 Greenbank Road (herein referred to as the "Burnett Lands"). This report has been prepared in support of the application for Official Plan Amendment, Zoning By-Law Amendment, and Draft Plan of Subdivision, and outlines the servicing and proposed storm drainage and stormwater management strategy for the site.

1.1 Background

The subject site is approximately 15.5 hectares in area and is located immediately north of the Jock River, south of Strandherd Drive and between the Kennedy Burnett Stormwater Management Facility and the existing Greenbank Road as shown on **Figure 1**. The Burnett Municipal Drain is tributary to the Jock River and travels through the subject site. The property currently has farm and accessory structures located near its southern boundary with an existing gravel access on to Greenbank Road. The remainder of the site is currently used for passive agriculture activities. The topography is generally flat with a gentle slope from the northeastern corner to the southwestern corner.

Figure 1: Site Location (Base Map Source: GeoOttawa)

The following describes the existing and planned land uses adjacent to the subject site:

North: Lands to the north, owned by Caivan Communities, are currently under the development approval process and have recently obtained OPA and ZBLA approval (Amendment #144) from the City to permit High Rise and Mid Rise Mixed-Use Residential developments, Mid Rise Residential Dwellings, and a Neighbourhood Park as per *Schedule 1- Land Use Plan, South Nepean Secondary Plan (Area 7)*. Further north of the Caivan Communities' development is the planned Barrhaven Town Centre which will include a variety of retail uses to service the surrounding existing and planned residential developments.

East: Lands east of the subject site contain a mixture of low density residential dwellings (single detached houses), a secondary school (St. Joseph Catholic High School), and an existing vegetated area. Greenbank Road currently forms the eastern boundary of the site. The realigned Greenbank Road will bisect the site as per the design by the City.

South: The Jock River flows west – east along the majority of the southern boundary of the property until it turns south near the southeastern corner of the site. The lands south of Jock River are within the Barrhaven *South Community Design Plan* and are intended for a future district park and residential uses as shown on *Figure 17* of the *Barrhaven South Community Design Plan.*

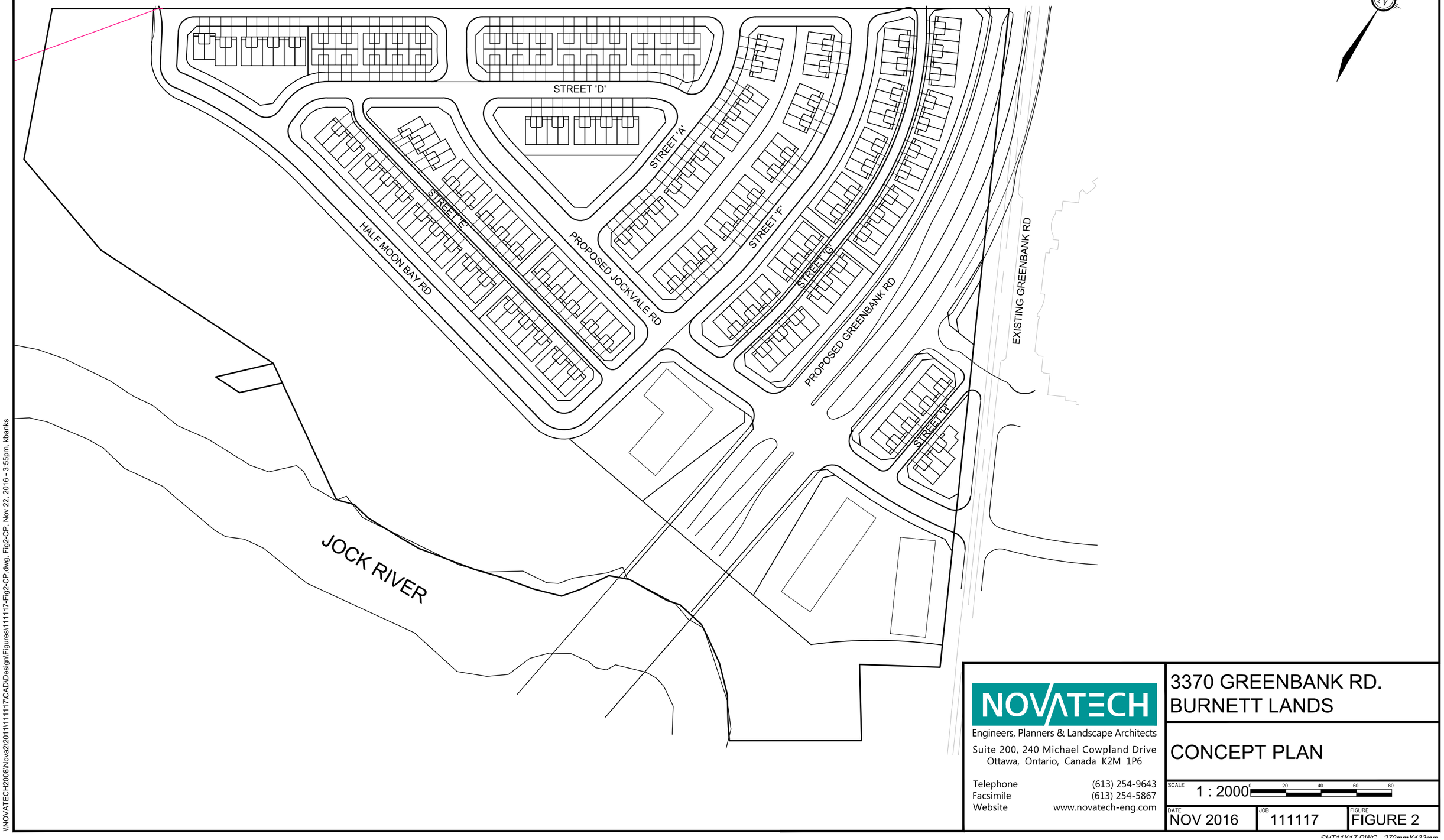
West: The Kennedy Burnett stormwater management facility is located north west of the subject site and drains into the Jock River. Lands immediately west are currently vacant and intended for mostly conservation and residential uses as identified in Schedule B of the Official Plan.

Plans are to develop a residential subdivision, as shown on **Figure 2 – Concept Plan**, which will consist of 247 townhome units and 420 condo units for a total of 667 units.

1.2 Additional Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing for the Burnett Lands. This report should be read in conjunction with the following:

- *South Nepean Collector Sewer Alignment & Finalization Report – Phase 2* prepared by Novatech, dated June 2014
- *Hydrology Report – July 2004: Jock River Flood Risk Mapping (within the City of Ottawa)* prepared by the Rideau Valley Conservation Authority, dated July 2004
- *Hydraulics Report – November 2004: Jock River Flood Risk Mapping (within the City of Ottawa)* prepared by the Rideau Valley Conservation Authority, dated November 2004
- *Greenbank (Burnett Municipal Drain) Headwaters Report*, prepared by Bowfin Environmental Consulting and Muncaster Environmental Planning Inc., dated March 2016.
- *Geotechnical Investigation Proposed Residential Development Burnett Lands, Greenbank Road at the Jock River, Ottawa Ontario,* Prepared by Golder Associates Ltd., dated May 2016 (Report No. 1523044-1000)



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3370 GREENBANK RD.
BURNETT LANDS

CONCEPT PLAN

SCALE 1 : 2000 (0 20 40 60 80)

DATE NOV 2016 | JOB 111117 | FIGURE FIGURE 2

2.0 EXISTING CONDITIONS

2.1 Topography & Drainage

The proposed site is currently undeveloped and consists of agricultural lands. Access to the site is currently provided at Greenbank Road. The site has a gentle slope from north to south, with most overland flow being directed to the existing Burnett Municipal Drain, which flows into the Jock River at the south end of the site boundary. The Burnett Municipal Drain transects the site in a north to south fashion.

2.2 Subsurface Conditions

Golder Associates Ltd. has completed a geotechnical investigation in support of the proposed development. The report is titled "Geotechnical Investigation, Proposed Residential Development, Burnett Lands, Greenbank Road at the Jock River, Ottawa Ontario, dated May 2016 (Report No. 1523044-1000)." The fieldwork for this investigation was carried out between February 18th and 23rd, 2016. The work consisted of advancing nine (9) boreholes to depths ranging from 1.7m to 8.2 m below ground surface. The principal findings of the Geotechnical Investigation are as follows:

- The site was divided into two distinct areas (A and B), with Area 'A' having a thick deposit of silty clay up to 8.2m deep and Area 'B' having a very stiff to stiff layer of silty clay overlying glacial till, or glacial till near the ground surface.
- Area 'A' generally consists of a 1.3 to 3.1 m layer of a silty clay deposit beneath the topsoil layer, which has been weathered to a grey brown crust. Below this is a grey silty clay, which extends to a depth of 3.1 to 8.2 m.
    - In some of the boreholes within Area 'A', glacial till was encountered beneath the silty clay deposit at a depth of 3.1 to 4.3 m.
- Area 'B' generally consists of a 0.6 to 2.5 m layer of a silty clay deposit beneath the topsoil layer, which has been weathered to a grey brown crust. Below this is a silty sand layer which ranges from 0.3 to 0.9 m thick. In all boreholes, glacial till exists below the silty clay and silty sand at depths ranging from 0.3 to 2.5 m.
- Groundwater inflow was observed in some of the boreholes at depths of between 0.92 m and 2.17 m below ground surface.

The report provides engineering guidelines based on Golder Associates interpretation of the borehole information and project requirements. Refer to the above-noted report for complete details.

3.0 SANITARY SERVICING

As per the South Nepean Collector Functional Design Update (FDU) prepared by Dillon Consulting (July 2012), the South Nepean Collector (SNC) is the sanitary outlet for the proposed development and has been sized to accommodate the peak sanitary flows from the proposed Burnett Lands development. Refer to Figure 1, Existing Sanitary Network and Collection Areas, and Table 5.1, Allocation of Commercial/Institutional and Residential Demands to SNC by Collection Area, of the FDU, located in **Appendix A**. The noted figure and table confirms the development is located within the Sanitary Drainage Area 8A of the SNC.

The design criteria used to determine the sanitary flows are based on the City of Ottawa's sewer design guidelines and are as follows:

- Residential Average Flow = 350L/capita/day
- Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Peak Extraneous Flows (Infiltration) = 0.28L/s/ha
- Population Density = 2.7 people/townhouse, 1.8 people/condo
- Minimum Pipe Slope (200mm/250mm) = 0.32% / 0.24%
- Minimum Full Flow Velocity = 0.6m/s
- Maximum Full Flow Velocity = 3.0m/s

In addition to the peak sanitary flows from the proposed Burnett Lands development, the on-site sanitary sewers are sized to accommodate a portion of the peak sanitary flows from the adjacent residential lands located immediately north of the site. The peak sanitary flow from the adjacent lands is based on 100 townhouses per hectare as per the *South Nepean Town Centre Community Design Plan* (July 2006) prepared by the City of Ottawa. For reference a copy of the South Nepean Town Centre Community Design Plan is included in **Appendix B**.

The proposed sanitary sewer system is shown on the General Plan of Services (Drawing **111117-GP**). The Sanitary Drainage Area Plan (Drawing **111117-SAN**) confirms the sanitary drainage areas assumed to outlet in the proposed onsite sanitary sewers. Both drawings are included in **Appendix F**.

The calculated peak sanitary design flow for the development is 39.1L/s: 16.5L/s will outlet into the SNC at the Street D/Jockvale Road intersection and 22.6L/s will outlet into the SNC at the Street F/Jockvale Road intersection. For detailed calculations refer to the Sanitary Sewer Design Sheet located in **Appendix A**.

4.0 WATERMAIN

Ultimately, the Burnett Lands will be serviced with a 250mm and 300 mm looped watermain with connections at both the northeast and northwest limits of the site. At the northeast limits, the watermain will connect to a 400 mm watermain to be located in the realigned Greenbank Road, and at the northwest limits of the site, to a future watermain located within the lands to the north of the site. Refer to the following figures:

- **Figure 3 –** Realigned Greenbank Road Watermain
- **Figure 4 –** Watermain Layout

As the ultimate watermain connections have not been constructed to date, it is proposed to construct approximately 335 m of the 400 mm realigned Greenbank Road watermain from the Greenbank and Jockvale intersection to south of the northeast limits of the site. It is also proposed to install approximately 255 m of watermain between Jockvale Road and the realigned Greenbank Road to provide a looped watermain for the proposed development prior to the connection to the northwest.

It is noted the proposed watermain works are located in a future Zone 3C pressure zone. The realignment of the pressure zone will be completed by the City of Ottawa and once complete will alter the boundary conditions for the development. The realignment is tentatively scheduled for 2018. The City of Ottawa has provided boundary conditions for the pre and post-realignment conditions. This report considers both conditions.

Fire flow demands have been calculated as per the Fire Underwriter's Survey (FUS) and are included in **Appendix C**. However as per the City of Ottawa's technical bulletin ISDTB-2014-02 (Revisions to Ottawa Design Guidelines – Water), the fire flow is capped at 10,000 L/min (167 L/s). Watermain analysis was completed based on the following criteria:

Demands:

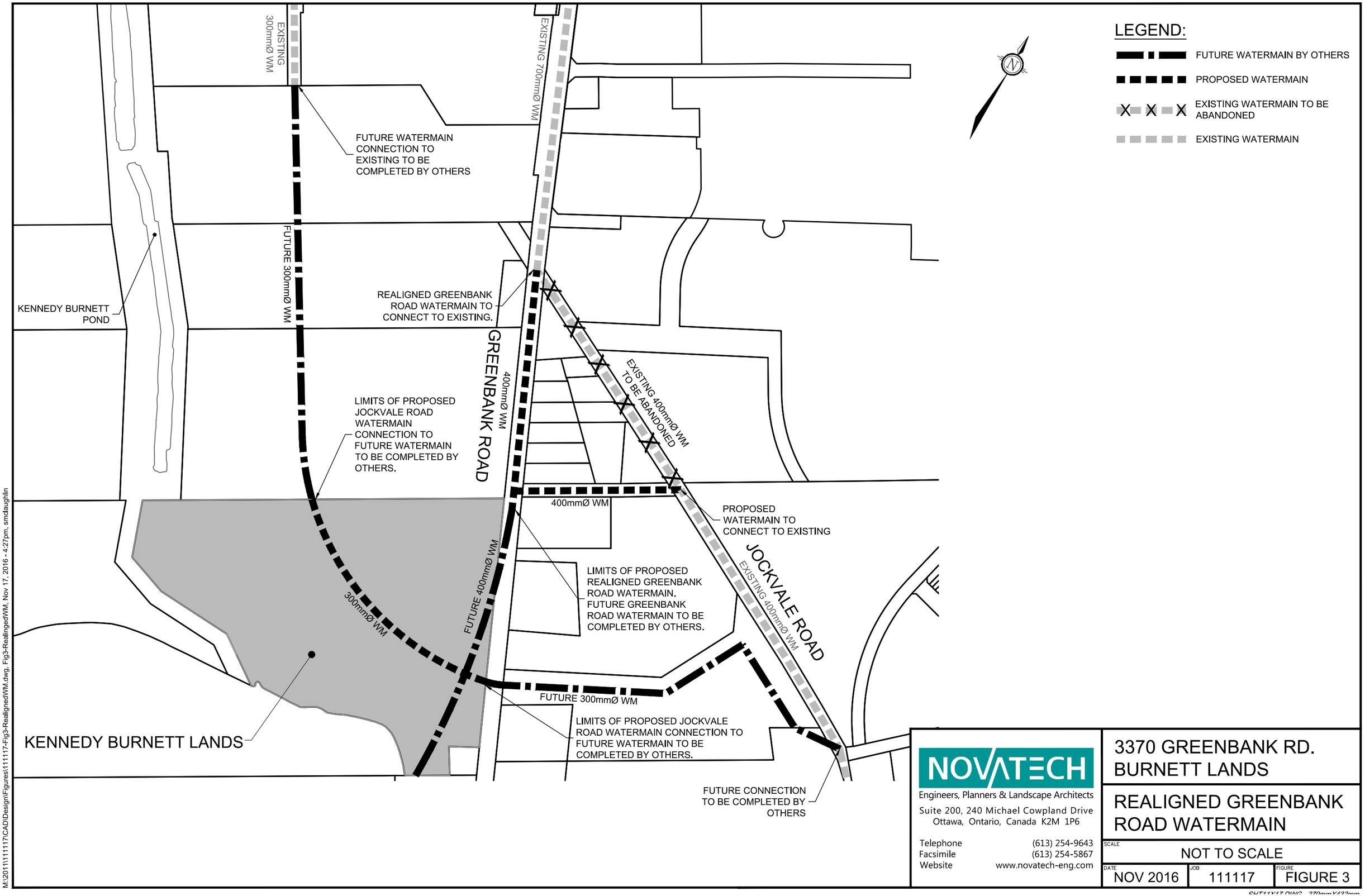
- Townhouse Density 2.7 persons/unit
- Average Daily Demand 350 L/capita/day
- Max. Daily Demand 2.5 x Average Daily Demand
- Peak Hour Demand 2.2 x Maximum Daily Demand
- Fire Flow Demand Fire Underwriters Survey

System Requirements:

- Max. Pressure (System) 690 kPa (100 psi)
- Max. Pressure (Service) 552 kPa (80 psi)
- Min. Pressure 276 kPa (40 psi) excluding fire flows
- Min. Pressure (Fire) 138 kPa (20 psi) including fire flows
- Max. Age (Quality) 192 hours (onsite)

Friction Factors:

- Watermain Size C-Factor
- 200-250 mm 110
- 300-400 mm 120



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3370 GREENBANK RD. BURNETT LANDS

REALIGNED GREENBANK ROAD WATERMAIN

SCALE: NOT TO SCALE

DATE: NOV 2016 | JOB: 111117 | FIGURE: FIGURE 3

HALF MOON BAY ROAD

JOCKVALE ROAD

GREENBANK ROAD

LEGEND

- PROPOSED 250mmØ WATERMAIN PIPE
- PROPOSED 300mmØ WATERMAIN PIPE
- PROPOSED 400mmØ WATERMAIN PIPE
- WATERMAIN NODE
- RESERVOIR
- HYDRANT

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3370 GREENBANK RD. BURNETT LANDS

WATERMAIN LAYOUT

SCALE 1:1500 (0, 15m, 30m, 60m)

DATE NOV 2016 | JOB 111117 | FIGURE FIGURE 4

The high pressure condition (average daily demand) was analyzed to ensure the system meets the design criteria for maximum pressure and quality. The maximum daily demand plus fire flow and peak hour conditions were analyzed to ensure the system meets the design criteria for maximum flow and minimum pressure.

The hydraulic modelling results for the development prior to the City reconfiguring the watermain are listed in **Table 4.1**.

Table 4.1: Water Demand Summary (Pre Watermain Reconfiguration)

Condition	Demand (L/s)	Fire Flow (L/s)	Allowable Max/Min Pressure (kPa/psi)	Max/Min Pressure (kPa/psi)	Time (hrs)
High Pressure	5.8	N/A	690/100 (Max)	669.5/97.1	116
Maximum Daily Demand	14.5	167	138/20 (Min)	142.0/20.6	N/A
Peak Hour	31.8	N/A	276/40 (Min)	424.0/61.5	N/A

The analysis confirms the proposed watermain can service the Burnett Lands prior to the site being included into the realigned Zone 3C pressure zone. It is noted that pressure in the main is greater than 552 kPa/80psi therefore the use of pressure reducing values will be considered during detailed design.

The hydraulic modelling results for the development after the watermain realignment of the watermain are listed in **Table 4.2**.

Table 4.2: Water Demand Summary (Post Watermain Reconfiguration)

Condition	Demand (L/s)	Fire Flow (L/s)	Allowable Max/Min Pressure (kPa/psi)	Max/Min Pressure (kPa/psi)	Time (hrs)
High Pressure	5.8	N/A	690/100 (Max)	533.0/77.3	116
Maximum Daily Demand	14.5	167	138/20 (Min)	142.0/20.6	N/A
Peak Hour	31.8	N/A	276/40 (Min)	424.0/61.5	N/A

The analysis confirms the proposed watermain can service the Burnett Lands after the watermain realignment. It is noted that pressure in the main is greater than 552 kPa/80psi therefore the use of pressure reducing values will be considered during detailed design.

A copy of the boundary conditions provided by the City of Ottawa, fire flow calculations, detailed hydraulic analysis results, and watermain layout figure are included in **Appendix C**.

5.0 STORMWATER MANAGEMENT CRITERIA

The Burnett Lands are tributary to the Jock River, which falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). The following stormwater management criteria have been developed based on the requirements of the RVCA and the City of Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01 (September 2016).

Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method for a 1:5 year return period;
- Inlet control devices (ICDs) will be installed in road and rearyard catchbasins to control inflows to the storm sewers;
- The 100-year hydraulic grade line in the storm sewer shall be at least 0.3 m below the underside of footing (USF) elevations for the proposed development.

Major System (Overland Flow)

- Overland flows are to be confined within the right-of-ways 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 and shall be confined to the road right-of-way, as well as not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- Storm runoff that exceeds the capacity of the minor system is to be stored within road sags;
    - Runoff that exceeds the capacity of the road sags is to be conveyed overland along defined major system flow routes towards the proposed major system outlet to the Jock River.
- ICD flow rates are to be calculated for each drainage area to ensure that the following stormwater management (SWM) objectives are satisfied:
    - Surface water accumulation at street low points, during a 5-year event, shall not be present by the end of the rainfall event;
    - Major system storage in backyards is not to be included/ accounted for in design computations;
    - Maximum flow depths and elevations on streets shall not exceed 0.30 m and shall be confined to the road right-of-way as well as not be within 0.30 m (vertical) to the nearest building opening;
    - The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60;
    - The 100-year hydraulic gradeline within the storm sewers shall not be within 0.30 m to adjacent building underside of footing elevations.

Water Quality & Quantity Control

- An *Enhanced* (80% TSS removal) level of quality control is required for storm outfalls to the Jock River;
- Lot level and conveyance Best Management Practices should be to promote infiltration and treatment of storm runoff.
- Quantity control of post-development runoff to pre-development levels is not required for lands outletting directly to the Jock River, provided that there are no adverse impacts on downstream watercourses, structures, or property resulting from the proposed development.

Erosion and Sediment Control

- Erosion and sediment control measures are to be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).
- 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.

6.0 BURNETT MUNICIPAL DRAIN

Bisecting the site north-to-south is the existing Burnett Municipal Drain – Refer to **Figure 5**. The drain is a tributary to the Jock River, with a total length of approximately 1.3 km. A significant portion of the original Burnett Drain has been replaced by storm sewers. The drain has been fully enclosed and/or abandoned north of the Barrhaven Town Centre commercial plaza. The Burnett Municipal Drain is primarily an open channel between the Barrhaven Town Centre and the confluence with the Jock River, but a portion of the drain is piped across an existing driving range to the north of the Caivan Lands for a distance of approximately 170 m.

Novatech has prepared a memo (South Nepean Collector Culvert Crossings, June 10, 2016 – included in **Appendix E**) that outlines the sizing of culvert crossings to be installed as a part of the Phase 2 South Nepean Collector project. This memo provides an assessment of the design flows and capacity of the existing Burnett Municipal Drain. During the 100-year storm, the peak flow through the drain is approximately 2.7 m^3/s. The existing drain has a cross-section consisting of a 3.0 m bottom width, 0.6 m depth, and side slopes ranging from 2:1 to 4:1. This cross-section gives a bankfull capacity of approximately 3.9 m^3/s, based on Manning's equation.

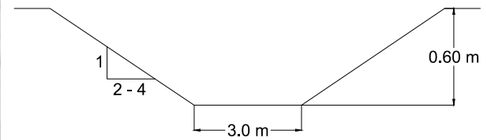
It is recommended that the drain be re-directed to the west, around the boundary of the site, connecting with the existing outlet for the KB Pond – as shown on **Figure 5**. To maintain the capacity of the drain, the realigned channel should maintain a cross-section consistent with the existing drain. Ultimately, it is anticipated that the drain will be abandoned as part of planned future development upstream

Once construction of the subdivision and surrounding developments has been completed, it is anticipated that the municipal drain will be formally abandoned, as the flows originally directed to the drain will be captured by the proposed storm sewer systems.

LEGEND

- PROPERTY BOUNDARY
- WATERCOURSE
- EXISTING BURNETT MUNICIPAL DRAIN
- RE-ALIGNED BURNETT MUNICIPAL DRAIN
- KB POND OUTLET (BURIED PIPE)
- DIRECTION OF FLOW

DRAIN CROSS-SECTION (TYPICAL, NTS)



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3370 GREENBANK RD.
KENNEDY BURNETT LANDS

BURNETT MUNICIPAL DRAIN

SCALE 1 : 2500 (0, 25, 50, 75, 100)

DATE DEC 2016 | JOB 111117 | FIGURE FIGURE 5

M:\2011\111117\CAD\Design\Figures\SWM\111117-Fig5.dwg, Fig5-Ex.Cond, Dec 07, 2016 - 9:24am, kbanks

As a part of the Municipal Drain Headwaters report, the Burnett Drain was classified using the four step process of the Headwater Guidelines:

- Hydrology Classification
  - Municipal drain provides valued hydrologic function (due to flow in spring);
  - Tributary drains are constructed agricultural drains with limited hydrologic function.
- Riparian Classification
  - Municipal Drain and Tributary 1 have limited riparian functions;
  - Tributaries 2 & 3 have limited to contributing riparian functions.
- Fish and Fish Habitat Classification
  - Municipal Dain is considered to have a contributing fish habitat;
  - Tributaries have no value as fish habitat.
- Terrestrial Classification
  - Municipal Drain and Tributaries have limited terrestrial functions.

As a result of these classifications, it is recommended that there is no management required for the tributaries of the Burnett Municipal Drain and that they can be abandoned. It is recommended that the Burnett Municipal Drain be managed through mitigation. Additional information on the Burnett Drain is available in Headwater Report referenced in **Section 1.2** of this report.

7.0 STORMWATER MANAGEMENT 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 stormwater management design for the Burnett Lands conforms to the recommended stormwater management strategy for the planned Environmental Assessment update for the Kennedy-Burnett SWM Facility – refer to **Figure 113221 FIG-6** in **Appendix D**.

7.1 Storm Sewer Design (Minor System)

The proposed storm sewers have been designed using the Rational Method to convey peak flows associated with a 5-year return period. The storm sewer design sheet is provided in **Appendix A**. The corresponding Storm Drainage Area Plan (Drawing **111117-STM**) is provided in **Appendix F**. The design criteria used to size the storm sewers are summarized in **Table 7.1**.

Table 7.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local and Collector Roads	5 Year Return Period
Storm Sewer Design	Rational Method/Modeling
IDF Rainfall Data	Ottawa Sewer Design Guidelines (Oct. 2012)
Initial Time of Concentration (T_c)	15 minutes (rearyards) / 10 minutes (roads)
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

7.2 Inlet Control Devices

Inlet control devices (ICDs) will be installed in all catchbasins to limit inflows to the minor system during large (>1:5 year) storm events.

All catchbasins will have a single connection to the storm sewers. ICDs will be round orifice plugs with diameters of either 83mm, 94mm, 102mm, 127mm, 152mm, or 178mm.

7.3 Overland Flow Path (Major System)

The site has been graded to provide an engineered overland flow route (major system) for large, infrequent storms or in the event that the storm sewer system becomes obstructed. Flows will be directed to the Jock River at the low point in the system. The design of the major system conforms to the design standards outlined in Section 5.5 of the Sewer Design Guidelines.

7.4 Street 'B'/ Caivan Lands

Street 'B' is a shared road between the Burnett Lands and the Caivan Lands to the north. Approximately 1.69 ha of the Burnett Lands development and approximately 2.61 ha of the Caivan Lands will drain to Street 'B'. Since Street 'B' will be constructed as a part of the Burnett Lands Development, the street and tributary areas have been included in the design.

Storm runoff from the Caivan Lands and Street 'B' will be directed to the outlet channel for Kennedy-Burnett SWM facility by a shared storm sewer. Water quality treatment upstream of this outfall will be provided using a hydrodynamic separator at the western end of Street 'B' (refer to the General Plan of services, **111117-GP** in **Appendix F**).

7.5 Water Quality

An *Enhanced* (80% TSS removal) level of water quality control will be provided by using hydrodynamic separators (HDS) upstream of the storm outfalls.

- Storm runoff from the majority of the site will be treated by an HDS unit upstream of the outfall to the Jock River near the southeast corner of the site.
- Storm runoff from Street B will be treated by an HDS unit located upstream of the outfall to the Kennedy-Burnett SWM Facility outlet channel near the northwest corner of the site. This storm outlet and HDS unit will also serve as the storm outlet for the adjacent Caivan development to the north.

In addition to the HDS units, lot level and conveyance Best Management Practices should be considered at the detailed design stage to promote infiltration and treatment of storm runoff;

- Perforated pipes for rear-yard catchbasin leads;
- Direct roof leaders to rear-yard areas;
- Infiltration trenches underlying swales in rear-yard areas;
- The use of fine sandy loam topsoil on residential lawns;

8.0 HYDROLOGIC & HYDRAULIC MODELING

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

8.1 Design Storms

The hydrologic analysis was completed using the following synthetic design. The IDF parameters used to generate the design storms were taken from the *City of Ottawa Sewer Design Guidelines* (October 2012).

4 Hour Chicago Storms:

25mm 4hr Chicago storm
2-year 4hr Chicago storm
5-year 4hr Chicago storm
100-year 4hr Chicago storm
100-year 4hr +20% Chicago storm

The 4-hour Chicago distribution generates the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system.

The proposed drainage system has also been stress tested using a 4-hour Chicago design storm that has a 20% higher intensity and total volume compared to the 100-year event.

Modeling files are provided on the enclosed CD.

8.2 Model Development

The PCSWMM model has been developed to account for both minor and major system flows from the development, and ensure no adverse impacts on the downstream drainage system. The results of the analysis were used to:

- Determine the total major and minor system runoff from the site.
- Calculate the storm sewer hydraulic grade line for the 100-year storm event;
- Evaluate overland flow depths and ponding volumes during the 100-year event; and
- Ensure no ponding in the right-of-ways remains at the end of all storm events;

8.2.1 Storm Drainage Areas

For modeling purposes, the site has been divided into subcatchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The catchment areas are shown on the Storm Drainage Area Plan (**111117-STM**) in **Appendix F**.

8.2.2 Subcatchment Model Parameters

The hydrologic parameters for each subcatchment were developed based on the Concept Plan (**Figure 2**) and the Storm Drainage Area Plan (**111117-STM**). An overview of the modeling parameters is provided in

Table 8.1.

Table 8.1: Hydrologic Modeling Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Imp. (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Burnett Lands - Claridge						
A-01	0.235	0.65	64%	50%	43	0.75%
A-02	0.249	0.65	64%	50%	36	0.75%
A-03	0.127	0.65	64%	75%	36	0.75%
A-04	0.302	0.65	64%	50%	34	0.75%
A-05	0.275	0.65	64%	75%	37	0.75%
A-06	0.274	0.65	64%	60%	37	0.75%
A-07	0.289	0.65	64%	50%	39	0.75%
A-08	0.246	0.65	64%	75%	41	0.75%
A-09	0.081	0.65	64%	50%	23	0.75%
A-10	0.187	0.65	64%	50%	37	0.75%
A-11	0.225	0.65	64%	50%	25	0.75%
A-12	0.036	0.65	64%	100%	24	0.75%
A-13	0.200	0.65	64%	50%	24	0.75%
A-14	0.195	0.65	64%	50%	23	0.75%
A-15	0.105	0.65	64%	100%	30	0.75%
A-16	0.128	0.65	64%	100%	32	0.75%
A-17	0.246	0.65	64%	50%	49	0.75%
A-18	0.272	0.65	64%	50%	32	0.75%
A-19	0.122	0.65	64%	100%	31	0.75%
A-20	0.130	0.65	64%	100%	29	0.75%
A-21	0.217	0.65	64%	50%	27	0.75%
A-22	0.060	0.65	64%	100%	24	0.75%
A-23	0.457	0.65	64%	75%	46	0.75%
A-24	0.209	0.65	64%	75%	28	0.75%
A-25	0.214	0.65	64%	75%	29	0.75%
A-26	0.448	0.65	64%	70%	45	0.75%
A-27	0.190	0.65	64%	75%	32	0.75%
A-28	0.119	0.65	64%	0%	18	0.75%
A-29	0.231	0.65	64%	60%	46	0.75%
A-30	0.498	0.65	64%	50%	71	0.75%
A-31	0.061	0.65	64%	0%	20	0.75%
A-32	0.450	0.65	64%	75%	56	0.75%
A-33	0.816	0.65	64%	50%	117	0.75%

Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Imp. (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
A-34	0.773	0.65	64%	0%	55	0.75%
A-35	0.983	0.65	64%	0%	70	0.75%
A-36	0.450	0.65	64%	0%	60	0.75%
A-37	0.372	0.65	64%	0%	53	0.75%
Street B - Caivan Lands						
B-01	0.092	0.65	64%	50%	28	0.75%
B-02	0.149	0.65	64%	0%	23	0.75%
B-03	0.097	0.65	64%	10%	32	0.75%
B-04	0.825	0.65	64%	50%	110	0.75%
B-05	0.064	0.65	64%	100%	27	0.75%
B-06	0.076	0.65	64%	0%	19	0.75%
B-07	0.127	0.65	64%	40%	32	0.75%
B-08	0.225	0.65	64%	50%	32	0.75%
B-09	0.245	0.65	64%	50%	34	0.75%
B-10	1.115	0.30	14%	0%	149	0.75%
B-11	0.049	0.65	64%	0%	13	0.75%
B-12	0.088	0.65	64%	50%	20	0.75%
B-13	0.097	0.65	64%	50%	22	0.75%
B-14	0.320	0.65	64%	50%	73	0.75%
B-15	0.120	0.65	64%	50%	27	0.75%
B-16	0.136	0.65	64%	50%	31	0.75%
B-17	0.247	0.65	64%	50%	33	0.75%
B-18	0.121	0.65	64%	50%	28	0.75%
B-19	0.107	0.65	64%	50%	22	0.75%
CaivanLands	8.101	0.65	64%	50%	200	0.50%

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of the soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

Horton's Equation:
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: f_o = 76.2 mm/hr
Final infiltration rate: f_c = 13.2 mm/hr
Decay Coefficient: k = 4.14/hr

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.

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter (Table 5.1) is calculated as described in the *Sewer Design Guidelines, October 2012, Section 5.4.5.6*.

Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the concept plan (**Figure 2**). The impervious values correspond to the Runoff Coefficients (C) used in the Rational Method calculations using the equation:

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

For the Storm Sewer Design spreadsheet, typical lots were analyzed with respect to the concept plan and runoff coefficients were determined based on the proposed land use. For development consisting of primarily medium-density residential (multi-unit attached dwellings) a runoff coefficient (C) of 0.65 was selected.

8.2.3 Minor System

Inflows to the storm sewer were modeled based on the ICD specified for the inlet and the maximum depth of ponding. Storage volumes within the right-of-way are based on the grading design. ICD parameters are outlined as follows in **Table 8.2**.

Table 8.2: ICD Parameters

Structure	ICD Size & Inlet Rate			5-year Peak Flow* (L/s)
	Diameter (mm)	Max Head (m)	5-year Capture Rate* (L/s)	
Burnett Lands - Claridge				
CB01-02	127	1.14	37.74	50.15
CB03-04	127	1.23	38.84	48.26
CB05-06	152	1.12	52.87	58.43
CB07-08	127	1.14	37.29	50.69
CB09-10	127	1.04	4.66	4.80
CB11-12	108	1.19	27.44	54.07
CB13-14	102	1.15	23.96	27.65
CB15-16	108	1.15	28.06	56.86
CB17-18	102	1.15	24.77	49.60
CB19	83	1.16	15.85	17.43
CB20-21	156	1.12	57.10	80.41
CB22	108	1.15	27.33	37.97
CB23	108	1.15	26.97	38.91
CB24-25	127	1.14	36.88	44.09

Structure	ICD Size & Inlet Rate			5-year Peak Flow* (L/s)
	Diameter (mm)	Max Head (m)	5-year Capture Rate* (L/s)	
CB26-27	178	1.11	72.35	86.47
CB28	127	1.15	37.09	47.94
CB29	94	1.15	20.45	29.12
CB30-31	127	1.14	36.75	38.46
CB32-33	127	1.14	37.03	44.92
CB34-35	127	1.14	37.01	44.34
CB40-41	178	1.11	72.83	87.24
CB42-43	152	1.12	51.29	52.25
CB44-45	127	1.23	39.15	50.39
CB59	83	1.16	6.67	6.67
CB60	102	1.15	23.68	24.03
CB61	83	1.16	11.03	11.11
CB62	108	1.15	22.43	22.56
CB63	108	1.15	23.50	23.67
CB64	102	1.15	19.31	19.43
CB66	83	1.16	12.35	13.15
CB67-68-69	178	1.17	74.36	85.77
Street B - Caivan Lands				
CB36	83	1.46	15.93	18.08
CB37	102	1.45	24.08	29.14
CB39	83	1.46	16.11	19.63
CB46-47	83	1.46	14.13	15.06
CB48-49	83	1.44	16.16	24.54
CB50-51	127	1.44	37.25	42.30
CB52-53	178	1.41	73.84	92.98
CB54	108	1.45	9.23	9.67
CB55-56	178	1.41	53.29	91.54
CB57-58	178	1.31	49.98	50.85
CB65	83	1.46	11.78	11.90

8.2.4 Major System

The proposed road network was input into the PCSWMM model to calculate the total inflow into the storm sewers (minor system), and to calculate the overland flows and flow depths within the right-of-way (major system).

The roads are represented in the model as open channels. Model input includes:

- Right-of-way cross-sections;

- Length and slope of the road between each high and low point;
- The location of all storm inlets and whether the inlets are in a sag or on-grade.

The elevations used to define the road network in the PCSWMM model are based on the gutter elevations, as opposed to the centerline of road elevations shown on the Grading Plans (**111117-GR1-3** as provided in **Appendix F**). Right-of-way cross sections used in the PCSWMM model are provided in **Appendix D**.

8.2.5 Modeling Files / Schematic

The PCSWMM model schematics and 100-year model output data are provided in **Appendix D**. Digital copies of the modeling files and model output for all storm events are provided on the enclosed CD.

8.3 PCSWMM Model Results

8.3.1 Minor System

The performance of the Burnett Lands storm sewer system has been evaluated using various storm distributions and historical storms. The 4-hour Chicago distribution was found to generate the highest peak flows in the storm sewers and was selected as the critical storm distribution. The results are summarized in **Table 8.3**.

The 100-year 4-hour Chicago storm was also increased by 20% (intensity + total precipitation) to evaluate the impact of an extreme event on the performance of the minor system. The results of this analysis indicate there is no significant impact on the minor system peak flows, due to the fact that inflows to the storm sewer system will be controlled using ICDs.

Table 8.3: Minor System Peak Flows at Outlets

Storm Distribution->	**4hr Chicago**				
Return Period->	25mm	2yr	5yr	100yr	100yr +20%
Burnett Lands - Flows to Jock River					
Minor System - HW-01	591	843	1028	1328	1346
Major System - OverlandOutlet	0	0	0	4	32
Burnett & Caivan Lands - Flows to Fraser-Clarke Drain					
Outlet from Street B - HW-02	720	1063	1531	1596	1622
Offsite Flows					
Greenbank Road - GreenbankOut	237	331	465	867	1083

8.3.2 Major System

The major system network was evaluated using the PCSWMM model to ensure that the ponding depths conform to City standards. A summary of ponding depths and volumes for the 100-year event is provided in **Table 8.4**. Ponding volumes and depths for all storm events (including the 100-yr+20% event and 5-year event) are provided in **Appendix D**.

Table 8.4: Ponding Depths at Catchbasins (100yr Event)

Structure	T/G	Max. Static Ponding (Spill Depth)		100-yr Event (4hr)			
		Elev.	Depth	Elev.	Total Dynamic Depth	Cascading Flow?	Spill Flow
	(m)	(m)	(m)	(m)	(m)	(Y/N)	(L/s)
Burnett Lands - Claridge							
CB01-02	93.25	93.44	0.19	93.41	0.16	N	0
CB03-04	93.18	93.44	0.26	93.42	0.24	N	0
CB05-06	93.05	93.34	0.29	93.19	0.14	N	0
CB07-08	92.92	93.34	0.42	93.08	0.16	N	0
CB09-10	93.01	93.34	0.33	93.26	0.25	N	0
CB15-16	93.20	93.37	0.17	93.43	0.23	Y	56
CB17-18	93.51	93.76	0.25	93.71	0.20	N	0
CB19	93.44	93.64	0.20	93.56	0.12	N	0
CB20-21	93.34	93.60	0.26	93.56	0.22	N	0
CB22	93.49	93.64	0.15	93.64	0.15	N	0
CB23	93.28	93.51	0.23	93.37	0.09	N	0
CB24-25	93.25	93.48	0.23	93.35	0.10	N	0
CB26-27	93.08	93.36	0.28	93.24	0.16	N	0
CB28	92.99	93.34	0.35	93.08	0.09	N	0
CB29	92.98	93.34	0.36	93.08	0.10	N	0
CB30-31	93.31	93.58	0.27	93.60	0.29	Y	77
CB40-41	93.35	93.65	0.30	93.52	0.17	N	0
CB42-43	93.47	93.72	0.25	93.63	0.16	N	0
CB44-45	93.62	93.87	0.25	93.77	0.15	N	0
CB59	93.70	93.91	0.21	93.14	0.00	N	0
CB60	93.50	93.80	0.30	93.81	0.31	Y	1
CB61	93.50	93.78	0.28	93.64	0.14	N	0
CB62	93.49	93.78	0.29	93.77	0.28	N	0
CB63	93.55	93.84	0.29	93.85	0.30	Y	2
CB64	93.66	93.95	0.29	93.91	0.25	N	0
CB66	93.90	94.01	0.11	93.97	0.07	N	0
CB67-68-69	93.66	94.15	0.49	93.83	0.17	N	0
Street B - Caivan Lands							
CB39	93.78	93.86	0.08	93.92	0.14	Y	52
CB46-47	93.67	93.77	0.10	93.84	0.17	Y	52
CB48-49	93.72	93.86	0.14	93.87	0.15	Y	9
CB50-51	93.59	93.84	0.25	93.74	0.15	N	0

Structure	T/G	Max. Static Ponding (Spill Depth)		100-yr Event (4hr)			
		Elev.	Depth	Elev.	Total Dynamic Depth	Cascading Flow?	Spill Flow
	(m)	(m)	(m)	(m)	(m)	(Y/N)	(L/s)
CB52-53	93.52	93.76	0.24	93.77	0.25	Y	4
CB55-56	93.38	93.67	0.29	93.59	0.21	N	0
CB57-58	93.30	93.56	0.26	93.47	0.17	N	0

8.3.3 Hydraulic Grade Line

The results of the analysis were used to ensure that a minimum freeboard of 0.30m is provided between the 100-year HGL and the designed underside of footing elevations. The 100-year HGL is indicated on the Plan and Profile Drawings (**111117-P1-9**). The HGL analysis confirms that all dwellings within the Burnett Lands will have at least 0.30m of freeboard between the modeled hydraulic grade line and the underside of footing elevation.

Storm runoff from the Burnett Lands is to be conveyed to the Jock River, after flowing through a Vortechs unit for water quality treatment.

Peak flows from the subdivision, tributary to the Jock River will not coincide with peak flows in the river. Consequently, a combined frequency analysis was used to assess the maximum HGL in the storm sewers. The hydraulic analysis was initially modeled for two scenarios:

1) 5-year flows in the storm sewers, 100-year flood elevation at the outlet.

2) 100-year flows in the storm sewers, 5-year flood elevation at the outlet.

The 5-year peak flow combined with the 100-year flood elevation of 91.28 at the Jock River and 91.58 at the Fraser-Clarke Drain produced the highest HGL values, and this represents the worst-case scenario. This scenario was used for all subsequent analysis.

Table 8.5 provides a summary of the 5-year peak flow combined with the 100-year flood elevation HGL elevation at each storm manhole within the proposed development. HGL elevations for the 100-year flows in the storm sewers, 5-year flood elevation at the outlet as well as a summary of the HGL elevations for a 20% increase (rainfall intensity and total precipitation) in the 100-year design event. The results of this stress testing indicates that, even under this scenario, the hydraulic grade line in the sewers will only slightly increase (max increase of 0.03m), ensuring that the HGL will remain below the undersides of footing of the proposed units.

Table 8.5: Storm Sewer Hydraulic Grade Line:
5yr-4hr Chicago Distribution, 100-yr WL in Jock River

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elevation (m)	Design USF (m)	Clearance from USF (m)
Burnett Lands - Claridge					
102 (STM)	90.52	93.78	92.04	92.62	0.58
104 (STM)	90.37	93.93	92.03	92.60	0.57

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elevation (m)	Design USF (m)	Clearance from USF (m)
106 (STM)	90.27	93.87	92.04	92.60	0.56
108 (STM)	90.10	93.75	92.01	92.51	0.50
110 (STM)	89.94	93.46	92.00	92.43	0.43
304 (STM)	90.56	93.67	91.72	92.25	0.53
306 (STM)	90.35	93.58	91.72	92.22	0.50
308 (STM)	90.11	93.41	91.70	92.17	0.47
310 (STM)	89.74	93.46	91.66	92.06	0.40
312 (STM)	89.26	93.36	91.65	92.06	0.41
314 (STM)	89.19	92.61	91.58	-	-
316 (STM)	89.00	93.09	91.49	-	-
324 (STM)	88.96	93.34	91.41	-	-
326 (STM)	89.95	93.38	91.35	-	-
328 (STM)	88.91	92.16	91.30	-	-
330 (STM)	88.94	92.53	91.38	-	-
402 (STM)	90.62	93.82	92.02	92.40	0.38
404 (STM)	90.37	93.80	92.01	92.45	0.44
406 (STM)	90.46	93.71	92.04	92.55	0.51
408 (STM)	90.36	93.80	92.04	92.55	0.51
608 (STM)	90.25	93.71	91.99	92.55	0.56
610 (STM)	89.58	93.30	91.79	92.38	0.59
612 (STM)	89.82	93.93	91.64	-	-
614 (STM)	89.92	93.76	91.71	-	-
616 (STM)	90.23	94.27	91.72	92.65	0.93
618 (STM)	90.03	93.65	91.80	92.25	0.45
902 (STM)	90.34	93.98	91.82	92.55	0.73
904 (STM)	90.29	93.76	91.83	92.35	0.52
906 (STM)	90.12	93.53	91.82	92.35	0.53
908 (STM)	89.97	93.57	91.81	92.25	0.44
Street B - Caivan Lands					
200 (STM)	91.55	94.54	92.38	-	-
202 (STM)	91.40	94.14	92.37	-	-
204 (STM)	91.08	93.94	92.26	92.55	0.29
206 (STM)	90.84	93.62	92.14	92.45	0.31
208 (STM)	90.69	93.82	92.06	92.45	0.39
210 (STM)	90.53	93.52	91.89	92.45	0.56
212 (STM)	90.40	93.73	91.80	92.40	0.60
214 (STM)	90.30	93.47	91.73	92.25	0.52
216 (STM)	90.01	93.37	91.65	92.25	0.60

9.0 UTILITIES

The development will be serviced by hydro, phone, cable, and gas from the existing services on Greenbank Road. During detailed design the works will be coordinated with local utilities companies.

10.0 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.

11.0 CONCLUSIONS AND RECOMMENDATIONS

Sanitary Servicing

The analysis of the proposed sanitary servicing conforms the following:

- The site is located within Sanitary Drainage Area 8A of Phase 2 of the SNC.
- The on-site sanitary sewers have been sized to accommodate a portion of the peak sanitary flows from the adjacent lands to the north, to be developed by others.
- The proposed sanitary sewers have adequate capacity to accommodate the peak sanitary flow.

Watermain

The analysis of the proposed watermain network conforms the following:

- Approximately 560m of the 400mm Greenbank Road watermain is to be installed and connected to the existing 400mm Jockvale Road watermain to provide a looped watermain feed for the proposed site.
- Ultimately the site will connect to future watermain, to be completed by others, to the northwest.
- The site is located in a future Zone 3C pressure zone that once complete will increase the pressure in the system onsite.
- This report confirms the proposed watermain can service the site pre and post zone reconfiguration.
- During detailed design the use of pressure reducing valves will be explored.

Stormwater Management

The stormwater management design for the Burnett Lands development conforms to the criteria established as part of this report.

The conclusions based on the results of the stormwater management analysis are as follows:

Storm Drainage / Conveyance

- Storm sewers (minor system) have been designed to convey the uncontrolled 5-year peak flow using the Rational Method.
- Inflows to the minor system will be controlled using inlet control devices (ICDs). Proposed ICDs will consist of round orifice plates with various standard diameters (83mm, 94mm 102mm, 108mm, 127mm, 152mm, and 178mm).
- The site has been graded to provide surface storage at low points along roadways, and a major system outlet to the Jock River for flows which exceed the capacity of the road sags.
- Ponding depths will not exceed 0.30m for all storms up to and including the 100-year event.
- The post-development peak flows from the site will have no adverse impact on the Jock River downstream.
- A minimum clearance of 0.30m will be provided between the 100-year hydraulic grade line (HGL) and the designed underside of footing elevations.

Stormwater Management

- An *Enhanced* level of water quality control (80% TSS removal) will be provided using hydrodynamic separators upstream of the storm outfalls.
- Quantity control is not required for the Burnett Lands, as they are located adjacent to the Jock River.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

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

NOVATECH

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Appendix A

Design Sheets

SANITARY SEWER DESIGN SHEET

CLARIDGE SUBDIVISION

DEVELOPER: CLARIDGE HOMES

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT : 111117
DESIGNED BY: LSC
CHECKED BY: GJM
DATE PREPARED: Dec. 2015
DATE REVISED: Nov. 25/16

LOCATION							CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER								
STREET	FROM MH	TO MH	Condos	TOWNS	POPULATION (in 1000's)	AREA (ha.)	POPULATION (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	Roughness Coef.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap
Future	Stub	201			0.0608	0.225	0.061	0.225	4.00	0.98	0.06	1.05	12.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.05
Street B	201	203		3	0.0081	0.268	0.069	0.493	4.00	1.12	0.14	1.25	36.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.04
Future	Stub	203			0.0805	0.298	0.080	0.298	4.00	1.30	0.08	1.39	12.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.07
Street B	203	205		6	0.0162	0.315	0.166	1.106	4.00	2.68	0.31	2.99	35.5	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.10
Future	Stub	205			0.0878	0.325	0.088	0.325	4.00	1.42	0.09	1.51	12.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.08
Street B	205	207		4	0.0108	0.107	0.264	1.538	4.00	4.28	0.43	4.71	35.5	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.16
Future	Stub	207			0.0791	0.293	0.079	0.293	4.00	1.28	0.08	1.36	12.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.07
Street B	207	209		7	0.0189	0.183	0.362	2.014	4.00	5.87	0.56	6.43	57.8	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.21
Future	Stub	209			0.0510	0.189	0.051	0.189	4.00	0.83	0.05	0.88	12.0	250	251.5	DR 35	0.013	0.35	35.7	0.72	0.02
Future	Stub	213			0.5219	1.933	0.522	1.933	3.96	8.38	0.54	8.92	12.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.45
Street B	213	211		12	0.0324	0.312	0.554	2.245	3.95	8.87	0.63	9.50	100.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.31
Street B	211	209		6	0.0162	0.172	0.571	2.417	3.94	9.12	0.68	9.79	58.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.32
Jockvale	209	601		0	0.0000	0.064	0.984	4.684	3.80	15.16	1.31	16.47	39.4	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.55
Jockvale/Street D	601	SNC		0	0.0000	0.000	0.984	4.684	3.80	15.16	1.31	16.47	3.0	250	251.5	DR 35	0.013	1.00	60.4	1.22	0.27
Street D	401	603		10	0.0270	0.259	0.027	0.259	4.00	0.44	0.07	0.51	79.2	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.03
Jockvale	603	605		5	0.0135	0.224	0.041	0.483	4.00	0.66	0.14	0.79	32.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.03
Jockvale	605	607		11	0.0297	0.460	0.070	0.943	4.00	1.14	0.26	1.40	79.8	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.05
Street D	403	405		25	0.0675	0.600	0.068	0.600	4.00	1.09	0.17	1.26	103.5	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.06
Street D	405	105		3	0.0081	0.078	0.076	0.678	4.00	1.23	0.19	1.41	21.8	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.07
Street A	101	103		4	0.0108	0.213	0.011	0.213	4.00	0.18	0.06	0.23	24.4	200	201.2	DR 35	0.013	0.65	26.9	0.84	0.01
Street A	103	105		5	0.0135	0.147	0.024	0.360	4.00	0.39	0.10	0.49	30.7	200	201.2	DR 35	0.013	0.65	26.9	0.84	0.02
Street A	105	107		7	0.0189	0.219	0.119	1.257	4.00	1.93	0.35	2.28	47.8	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.12
Street A	107	607		6	0.0162	0.272	0.135	1.529	4.00	2.19	0.43	2.62	51.4	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.13
Jockvale	607	609		9	0.0243	0.328	0.230	2.800	4.00	3.72	0.78	4.50	72.5	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.15
Half Moon Bay	301	303		14	0.0378	0.551	0.038	0.551	4.00	0.61	0.15	0.77	91.3	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.04
Half Moon Bay	303	305		16	0.0432	0.594	0.081	1.145	4.00	1.31	0.32	1.63	120.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.08
Half Moon Bay	305	307		0	0.0000	0.016	0.081	1.161	4.00	1.31	0.33	1.64	9.3	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.08
Half Moon Bay	307	609		0	0.0000	0.135	0.081	1.296	4.00	1.31	0.36	1.68	73.2	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.09
Street F	901	903		10	0.0270	0.429	0.027	0.429	4.00	0.44	0.12	0.56	41.9	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.03
Street F	903	905		10	0.0270	0.278	0.054	0.707	4.00	0.88	0.20	1.07	39.9	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.05
Street F	905	907		20	0.0540	0.555	0.108	1.262	4.00	1.75	0.35	2.10	76.3	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.11
Street F	907	609		11	0.0297	0.325	0.138	1.587	4.00	2.23	0.44	2.68	57.0	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.14
Jockvale	609	611		0	0.0000	0.000	0.448	5.683	4.00	7.26	1.59	8.85	6.0	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.29
Jockvale	Stub	615	280	0	0.5040	0.744	0.504	0.744	3.97	8.11	0.21	8.32	10.0	200	201.2	DR 35	0.013	1.00	33.3	1.05	0.25
Street H	617	615		12	0.0324	0.352	0.032	0.352	4.00	0.53	0.10	0.62	75.6	200	201.2	DR 35	0.013	0.50	23.6	0.74	0.03
Jockvale	615	613			0.0000	0.233	0.536	1.329	3.96	8.60	0.37	8.97	74.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.30
Greenbank	701	703		6	0.0162	0.352	0.016	0.352	4.00	0.26	0.10	0.36	45.0	200	201.2	DR 35	0.013	0.65	26.9	0.84	0.01
Greenbank	703	705		8	0.0216	0.480	0.038	0.832	4.00	0.61	0.23	0.85	61.7	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.04

SANITARY SEWER DESIGN SHEET

CLARIDGE SUBDIVISION

DEVELOPER: CLARIDGE HOMES

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT : 111117
DESIGNED BY: LSC
CHECKED BY: GJM
DATE PREPARED: Dec. 2015
DATE REVISED: Nov. 25/16

LOCATION							CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER								
STREET	FROM MH	TO MH	Condos	TOWNS	POPULATION (in 1000's)	AREA (ha.)	POPULATION (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	Roughness Coef.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap
Greenbank	705	707		6	0.0162	0.447	0.054	1.279	4.00	0.88	0.36	1.23	60.5	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.06
Greenbank	707	613		11	0.0297	0.690	0.084	1.969	4.00	1.36	0.55	1.91	93.1	200	201.2	DR 35	0.013	0.35	19.7	0.62	0.10
Jockvale	613	611	140	0	0.2520	0.539	0.872	3.837	3.84	13.56	1.07	14.63	71.1	250	251.5	DR 35	0.013	0.25	30.2	0.61	0.48
Jockvale/Steet F	611	SNC		0	0.0000	0.000	1.320	9.520	3.72	19.89	2.67	22.56	2.8	250	251.5	DR 35	0.013	1.00	60.4	1.22	0.37
						14.20															

Notes: 1 Q(d) = Design Flow (L/sec)
Q(p) = Population Flow (L/sec)
Q(i) = Extraneous Flow (L/sec)

Q(p) = (PxqxM/86,400), where P = Population (2.7 persons per town/semi, 1.8 persons per condo)
q = Average per capita flow = 350 L/cap/day
M = Harmon Formula (maximum of 4.0)

2 Future population based on zoning density

Project: 111117
Location: 3370 Greenbank Rd.
Client: Claridge Homes

DATE: November 2016

NOVATECH
Engineers, Planners & Landscape Architects

Storm Sewer Design Sheet

						FLOW					PROPOSED SEWER								
STREET	FROM	TO	AREA ID	R= 0.30	R= 0.65	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	NOMINAL SIZE (mm)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
Half Moon Bay	MH 304	MH 306	A1		0.235	0.42	0.42	10.00	104.19	44.25	600	609.6	0.30	65.5	351.20	1.20	0.91	306.96	0.13
Half Moon Bay	MH 306	MH 308	A2		0.249	0.45	0.87	10.91	99.63	87.13	600	609.6	0.25	89.4	320.60	1.10	1.36	233.47	0.27
Street E	CB 14	MH 308	A3		0.127	0.23	0.23	10.00	104.19	23.91	250	254.0	1.00	39.4	62.10	1.22	0.54	38.19	0.39
Half Moon Bay	MH 308	MH 310	A4		0.302	0.55	1.65	12.27	93.58	154.38	600	609.6	0.25	73.3	320.60	1.10	1.11	166.22	0.48
Street E	CB 12	MH 310	A5		0.275	0.50	0.50	10.00	104.19	51.78	250	254.0	1.00	39.4	62.10	1.22	0.54	10.33	0.83
Half Moon Bay	MH 310	MH 312	A6		0.274	0.50	2.64	13.38	89.19	235.62	750	762.0	0.15	41.4	450.27	0.99	0.70	214.65	0.52
Street D	MH 402	MH 404	A7-A9		0.616	1.11	1.11	10.00	104.19	115.98	600	609.6	0.25	78.0	320.60	1.10	1.18	204.62	0.36
Jockvale	MH 404	MH 608	A10, A11		0.412	0.74	1.86	11.18	98.33	182.65	600	609.6	0.25	34.2	320.60	1.10	0.52	137.95	0.57
Jockvale	MH 608	MH 110	A12, A13		0.236	0.43	2.28	11.70	95.98	219.22	600	609.6	0.20	79.6	286.76	0.98	1.35	67.54	0.76
Street D	MH 406	MH 408	A14		0.195	0.35	0.35	10.00	104.19	36.71	600	609.6	0.20	105.5	286.76	0.98	1.79	250.04	0.13
Street D	MH 408	MH 106				0.00	0.35	11.79	95.60	33.68	600	609.6	0.20	20.5	286.76	0.98	0.35	253.07	0.12
Street A	MH 102	MH 104				0.00	0.00	10.00	104.19	0.00	600	609.6	0.50	24.3	453.40	1.55	0.26	453.40	0.00
Street A	MH 104	MH 106	A15		0.105	0.19	0.19	10.26	102.83	19.51	600	609.6	0.30	28.2	351.20	1.20	0.39	331.69	0.06
Street A	MH 106	MH 108	A16-A18		0.646	1.17	1.71	12.14	94.10	160.86	600	609.6	0.20	47.2	286.76	0.98	0.80	125.89	0.56
Street A	MH 108	MH 110	A19-A21		0.469	0.85	2.56	12.94	90.86	232.32	675	685.8	0.15	55.4	339.98	0.92	1.00	107.66	0.68
Jockvale	MH 110	MH 610	A22		0.060	0.11	4.95	13.06	90.41	447.50	750	762.0	0.21	76.5	532.76	1.17	1.09	85.27	0.84
Street F	MH 902	MH 904				0.00	0.00	10.00	104.19	0.00	600	609.6	0.31	37.7	357.01	1.22	0.51	357.01	0.00
Street F	MH 904	MH 906	A23		0.457	0.83	0.83	10.51	101.55	83.86	600	609.6	0.20	40.1	286.76	0.98	0.68	202.89	0.29
Street F	MH 906	MH 908	A24		0.209	0.38	1.20	11.20	98.28	118.27	600	609.6	0.20	70.5	286.76	0.98	1.20	168.48	0.41
Street F	MH 908	MH 610	A25, A26		0.662	1.20	2.40	12.39	93.05	223.30	675	685.8	0.15	67.3	339.98	0.92	1.22	116.68	0.66
Jockvale	MH 618	MH 610	A27		0.190	0.34	0.34	10.00	104.19	35.77	600	609.6	0.30	41.1	351.20	1.20	0.57	315.43	0.10
Half Moon Bay	MH 610	MH 312	A28, A29		0.350	0.63	8.32	14.15	86.41	719.38	975	990.6	0.14	79.4	875.66	1.14	1.17	156.28	0.82
Pathway Blk	MH 312	MH 314	A30		0.498	0.90	11.87	15.31	82.56	979.66	1200	1219.2	0.10	58.1	1287.49	1.10	0.88	307.84	0.76
Pathway Blk	MH 314	MH 316				0.00	11.87	16.19	79.89	948.03	1200	1219.2	0.12	120.0	1410.38	1.21	1.66	462.35	0.67
Street H	MH 616	MH 614	A31		0.061	0.11	0.11	10.00	104.19	11.48	450	457.2	0.20	73.5	133.15	0.81	1.51	121.67	0.09
Jockvale	MH 614	MH 612	A32		0.450	0.81	0.92	11.51	96.83	89.41	600	609.6	0.21	24.1	293.84	1.01	0.40	204.43	0.30
Apartment Blk	MH 612	MH 316	A33		0.816	1.47	2.40	11.91	95.08	227.98	600	609.6	0.28	81.4	339.29	1.16	1.17	111.31	0.67
Outlet	MH 316	MH 324				0.00	14.26	17.85	75.35	1074.86	1200	1219.2	0.10	15.3	1287.49	1.10	0.23	212.63	0.83
Outlet	MH 324	MH 326				0.00	14.26	18.08	74.76	1066.46	1200	1219.2	0.28	3.6	2154.39	1.84	0.03	1087.92	0.50
Outlet	MH 326	HW1				0.00	14.26	18.11	74.68	1065.29	1200	1219.2	0.10	47.0	1287.49	1.10	0.71	222.20	0.83

						FLOW					PROPOSED SEWER								
STREET	FROM	TO	AREA ID	R= 0.30	R= 0.65	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	NOMINAL SIZE (mm)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
Street B	MH200	MH202	B01, B02		0.241	0.44	0.44	10.00	104.19	45.37	675	685.8	0.20	37.4	392.57	1.06	0.59	347.20	0.12
Street B	MH202	MH204	B03, B04		0.922	1.67	2.10	10.59	101.19	212.66	675	685.8	0.20	82.6	392.57	1.06	1.30	179.92	0.54
Street B	MH204	MH206	B05, B06, B07		0.267	0.48	2.58	11.88	95.19	245.98	750	762.0	0.20	120.0	519.92	1.14	1.76	273.94	0.47
Street B	MH206	MH208	B08, B09, B10	1.115	0.470	1.78	4.36	13.64	88.23	384.95	750	762.0	0.20	38.5	519.92	1.14	0.56	134.98	0.74
Caivan Lands	CAP	MH208	B12		0.088	0.16	0.16	10.00	104.19	16.57	450	457.2	0.40	12.0	188.30	1.15	0.17	171.73	0.09
Street B	MH208	MH210	B11		0.049	0.09	4.45	14.20	86.22	383.84	750	762.0	0.15	29.3	450.27	0.99	0.50	66.42	0.85
Caivan Lands	CAP	MH210	B13		0.097	0.18	0.18	10.00	104.19	18.26	300	304.8	0.40	12.0	63.87	0.87	0.23	45.60	0.29
Street B	MH210	MH212	B14		0.320	0.58	5.03	14.70	84.54	425.26	750	762.0	0.15	28.5	450.27	0.99	0.48	25.01	0.94
Caivan Lands	CAP	MH212	B15		0.120	0.22	0.22	10.00	104.19	22.59	300	304.8	0.50	12.0	71.41	0.98	0.20	48.81	0.32
Street B	MH212	MH214				0.00	5.03	15.18	82.98	417.39	825	838.2	0.15	35.5	580.56	1.05	0.56	163.17	0.72
Caivan Lands	CAP	MH214	B16		0.136	0.25	0.25	10.00	104.19	25.61	300	304.8	0.50	12.0	71.41	0.98	0.20	45.80	0.36
Street B	MH214	MH216				0.00	5.03	15.74	81.23	408.60	900	914.4	0.10	35.5	597.83	0.91	0.65	189.23	0.68
Caivan Lands	CAP	MH216	B18		0.121	0.22	0.22	10.00	104.19	22.78	300	304.8	0.50	12.0	71.41	0.98	0.20	48.62	0.32
Street B	MH216	MH218	B17		0.274	0.50	5.53	16.39	79.31	438.20	975	990.6	0.10	36.1	740.07	0.96	0.63	301.87	0.59
Caivan Lands	CAP	MH218	B19, Caivan Lands		**7.607**	13.75	13.75	10.00	104.19	1432.22	975	990.6	0.50	12.0	1654.85	2.15	0.09	222.63	0.87
Outlet	MH218	H2				0.00	5.53	17.02	77.55	428.48	1500	1524.0	0.14	79.8	2762.07	1.51	0.88	2333.60	0.16

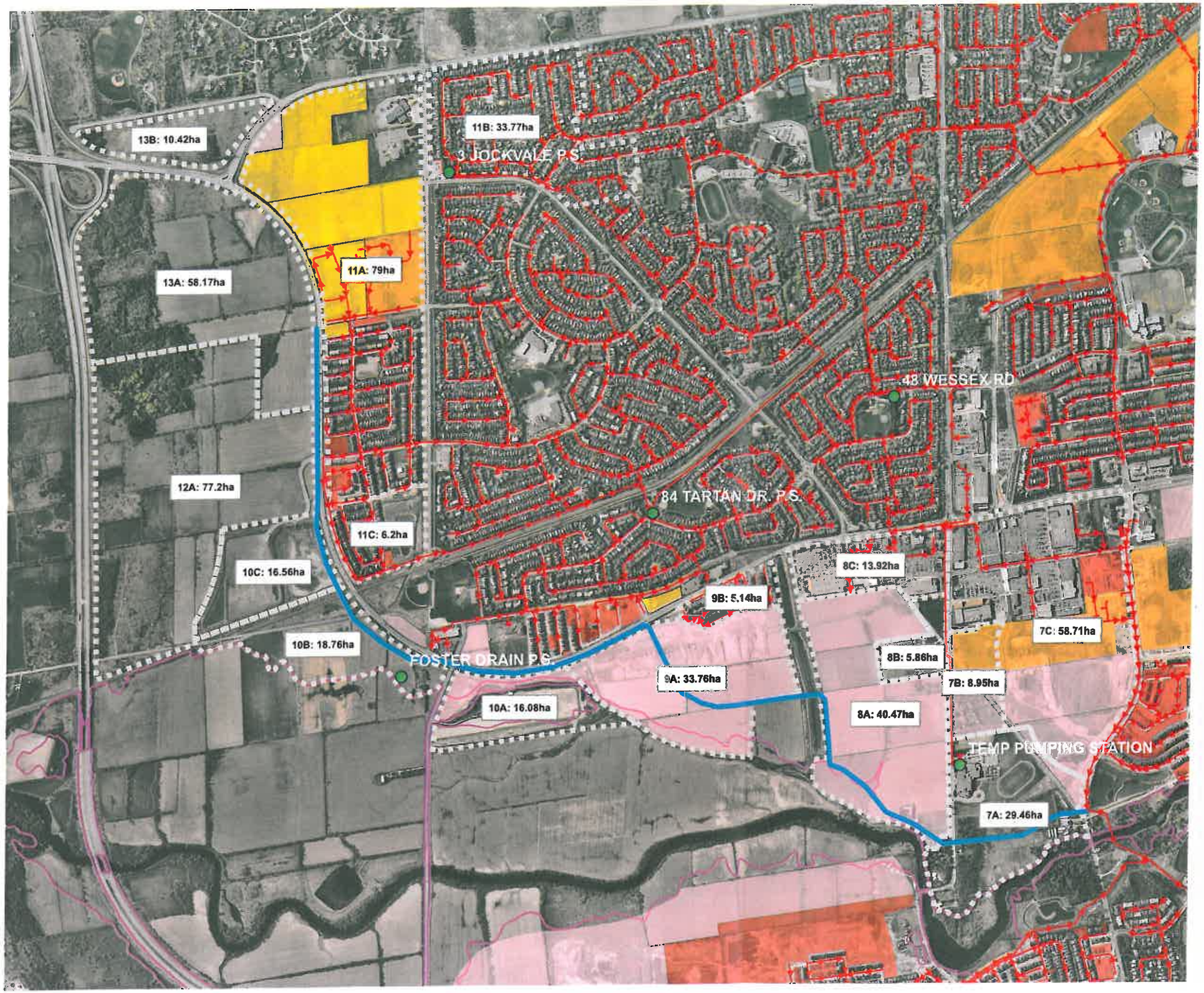
Definitions
Q = 2.78 AIR
Q = Peak Flow, in Litres per second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/h)

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Velocity = 0.80 m/sec.

Includes the remaining 7.5ha portion of the Caivan Lands not included in Area IDs B01-B19 (4.33ha). The total area of the Caivain Lands is 11.83ha.

Appendix B

Sanitary Report Excerpts



Ottawa

City of Ottawa
South Nepean Collector

Figure 01
Existing Sanitary Network and Collection Areas

- Pump Station
- Existing Sanitary Main (With Flow Direction)
- Proposed Alignment for South Nepean Collector
- Collection Area

DEVELOPMENT STATUS

- Registered
- Draft Approved
- Pending
- No Plan
- Floodplain

NOT TO SCALE

MAP DRAWING INFORMATION:
DATA PROVIDED BY THE CITY OF OTTAWA

MAP CREATED BY: BC
MAP CHECKED BY: MBM
MAP PROJECTION: NO PROJECTION

DILLON CONSULTING

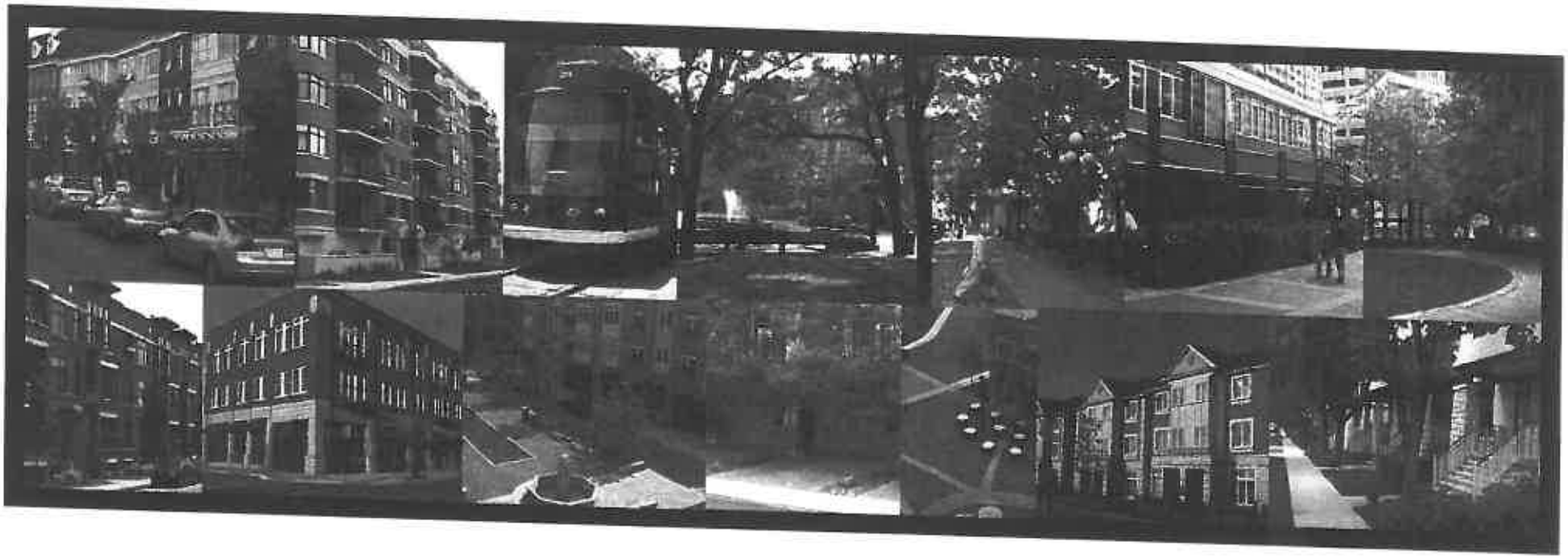
PROJECT: 11-5681
STATUS: FINAL
DATE: 16/07/12

Table 5.1: Allocation of Commercial/Institutional and Residential Demands to SNC by Collection Area

Collection Area	Discharging Node	Estimated from GIS			City of Ottawa VURL Data			Other Space [1] (ha)	Population (PE)	Residential Density (PE/net ha)	Comments	Additional Source(s)
		Gross Institutional/Commercial (ha)	Gross Residential (ha)	Gross Area (ha)	Net Residential (ha)	Units (#)	Unit Density (#/ha)					
7A	70	13.5	7.4	29.5	4.0	605	0.3	9.1	1637	4.25	Flow calculations include St Joseph H.S. Pump Station firm capacity of 7.0 L/s Additional 600 units (TAC)	3.4ppu (TAC)
7B		0.0	9.24	9.24	6.23	1474	136.7	3.0	3321	638.8	Population from split VURL allocated by area. VURL parcel id 323 - inconsistency between net and gross reported area.	2.7ppu (TAC)
8A		0.0	40.0	40.0	24.1	4462	185.1	15.9	12047.4	499.9		2.7ppu (TAC)
8B		5.9	0.0	5.9	0.0	0	0	0.0			Future Commercial area	
8C		13.9	0.0	13.9	0.0	0	0	0.0			Commercial area includes Home Depot	
9A	80	0.0	33.8	33.8	18.6	635	34.1	15.2	2210	116.2		3.4ppu (TAC)
10A	90	0.0	16.1	16.1	9.7	451	28.0	6.4	1533.4	158.0	Assume net population = 60% gross.	3.4ppu (TAC)
10B	100	18.8	0.0	35.3	0.0	0	0	16.5			Allocated as potential future I/C use as directed by TAC	
10C	110	16.6	0.0	35.3	0.0	0	0	18.7			Area includes current Municipal Snow Dump. Flow allowance is made for potential future I/C use	
11C		0.0	6.2	6.2	Note 2			2.5	306	82.7	This area is south of '11 block' in the existing development	From IBI Apr 2010 Report Figure 1
11A	120	12.5	66.5	79.0				26.6	3923	98.3	Institutional includes 4.38ha church site and 6.89 ha institution at northeast corner, as well and Claridge Commercial (0.56ha) and DCR/Phoenix Commercial (0.64ha)	From IBI Apr2010 Report Figure 1
11B		0.0	37.0	37.0				14.8	1550	69.8	Presently serviced by Jockvale pump station; to be redirected to SNC.	Estimated from 2011 Census Block data
12A		77.2	0.0	77.2				0.0			Allow sanitary peak flow 79.0 L/s	Novatech, Employment Lands Report, Revised Jan 2012
13A	130	58.5	0.0	58.5				0.0			Allow sanitary peak flow 62.8 L/s plus Collection Area 13B, total 82.2 L/s	
13B		12.5	0.0	12.5				0.0			Allow sanitary peak flow 19.4 L/s; gravity discharge to Collection Area 13A	IBI/Novatech

Notes:
1. Other space includes other residential space accounting for the difference between gross area (measured with GIS) and net area (provided in VURL data), such as sidewalks, roads, greenspace, etc.
2. Collection Area 11A and 11B population and land use as identified under Additional Source(s). Other space reported as 60% of gross residential area, consistent with VURL average.

South Nepean Town Centre Community Design Plan



Planning and Growth Management Department
Community Planning and Design Division
July 2006
Publication #03-14

OTTAWA CITY COUNCIL
28 AND 29 JUNE 2006
ANDREW S. HAYDON HALL
9:00 a.m.

MINUTES 61

PLANNING AND ENVIRONMENT COMMITTEE REPORT 50

13. SOUTH NEPEAN TOWN CENTRE COMMUNITY DESIGN PLAN AND OFFICIAL PLAN AMENDMENT

COMMITTEE RECOMMENDATIONS

That Council:

1. **Approve the South Nepean Town Centre Community Design Plan in Document 8, which has been submitted under separate cover.**

2. **Adopt Official Plan Amendment No. XX to the City of Ottawa Official Plan (2003), as detailed in Document 5, to implement the Community Design Plan.**

CARRIED

BY-LAW NO. 2006 - 260

A by-law of the City of Ottawa to amend the Official Plan for the City of Ottawa to change the designation of the lands which are the subject of the South Nepean Town Centre Community Design Plan.

WHEREAS Planning and Environment Committee convened a public meeting to consider the adoption of the aforementioned official plan amendment;

AND WHEREAS Planning and Environment Committee recommends the adoption of the aforementioned official plan amendment;

AND WHEREAS Council on June 28, 2006 carried the recommendation of Planning and Environment Committee;

THEREFORE the Council of the City of Ottawa enacts as follows:

1. Attachment A, being Official Plan Amendment No. 44 to the Official Plan for the City of Ottawa is hereby adopted.
2. This by-law shall come into force in accordance with the provisions of the Planning Act, R.S.O. 1990, c.P.13, as amended.

ENACTED AND PASSED this 29th day of June, 2006.

CITY CLERK MAYOR

4.4 Policy Area – High Rise Residential

The High Rise Residential policy area identifies sites within the Town Centre that will accommodate the highest density residential uses, located in proximity to the transit "hub". Apartment buildings will be the only residential type permitted.

Policies

For the High Rise Residential policy area:

(1) Apartments are the only permitted use. As part of an apartment building, retail, office and commercial uses at grade are also permitted.

(2) The minimum building height is 6 storeys and the maximum building height is 12 storeys.

(3) The net density target for residential uses is 300 units per hectare.

(4) At least 90% of required parking for each development must be provided in parking structures, either above-grade or below-grade.

4.5 Policy Area – Mid Rise Residential

The Mid Rise Residential policy area is intended to accommodate the majority of the Town Centre's ground-oriented multiple unit dwellings. This policy area will provide an appropriate transition between the low density neighbourhoods surrounding the Town Centre to the higher intensity uses within it.

Policies

For the Mid Rise Residential policy area:

(1) Apartments, street, block and stacked townhouses, public and institutional uses, schools, places of worship and community facilities are permitted. Ground floor retail uses within a mixed-use building with residential uses above are permitted along Greenbank Road.

(2) The minimum building height is 2 storeys and the maximum building height is 4 storeys.

(3) The net density target for residential uses is 100 units per hectare.

4.6 Policy Area – Neighbourhood Park

The Neighbourhood Park policy area will include both public parks and public plazas. The five public parks within the Town Centre will be designed to support the area's urban nature, as accessible amenities with open frontages and clearly defined entrances that work within the grid pattern of streets and blocks. The two public plazas within the Town Centre will be designed as predominately hard surfaced areas fronted by buildings in order to create a built form edge and generate pedestrian activity.

Policies

For the Neighbourhood Park policy area:

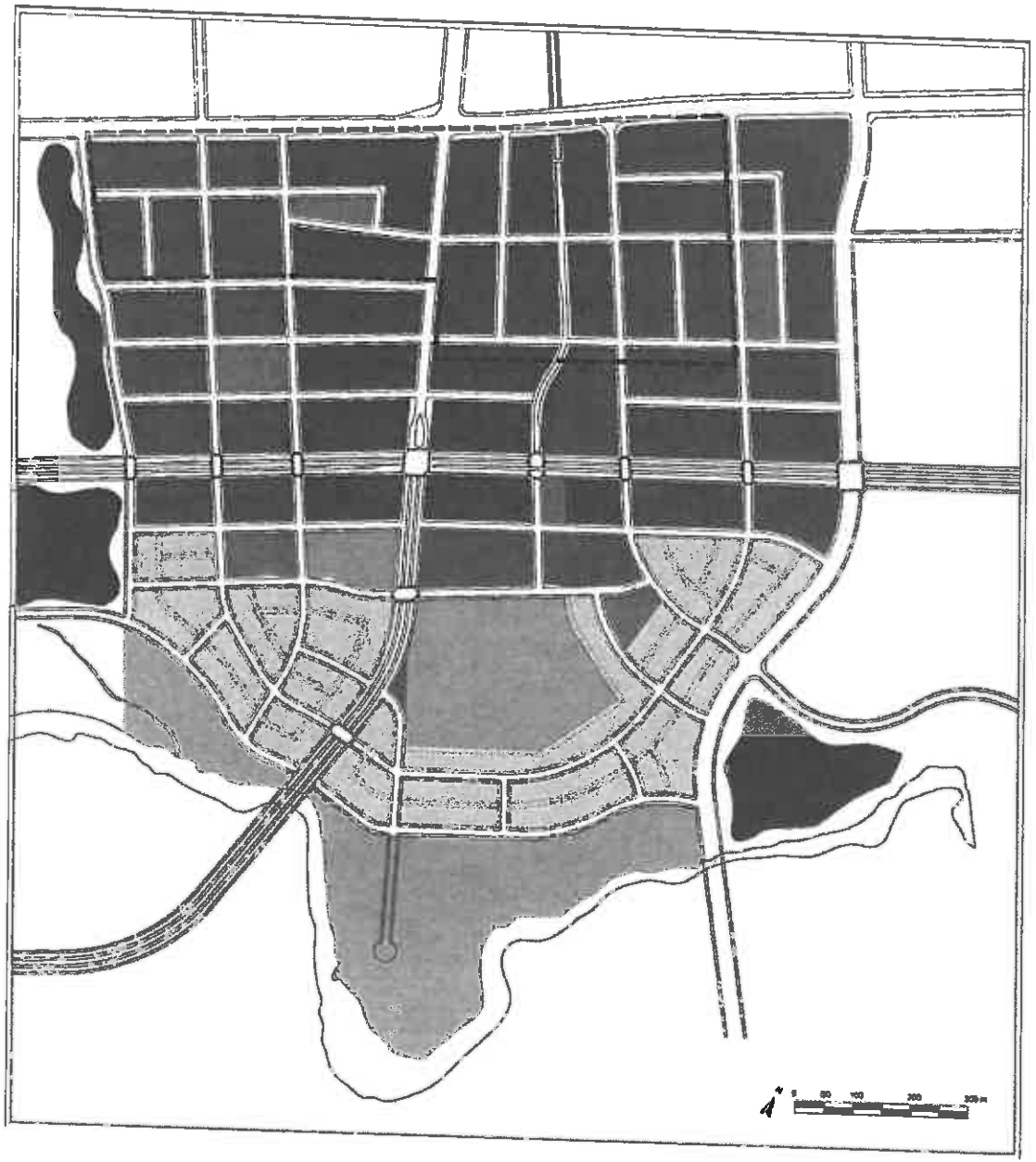
(1) Public parks, public plazas, community facilities, and conservation uses are permitted.

(2) The locations of the five public parks and the two public plazas are identified on Schedule 5 of this CDP.

(3) Acquisition of all neighbourhood parks will be as per Section 8.4 and Schedule 5 of this CDP.

(4) Public parks must:
   (a) Generally be between 0.4 and 1.0 hectares of level land;
   (b) Have at least three sides that are entirely open to the street;
   (c) Not have rear or side yards adjacent on their fourth side;
   (d) Be designed with an emphasis on hard surfacing and seating areas as compared to traditional suburban neighbourhood parks; and
   (e) Not contain sports fields.

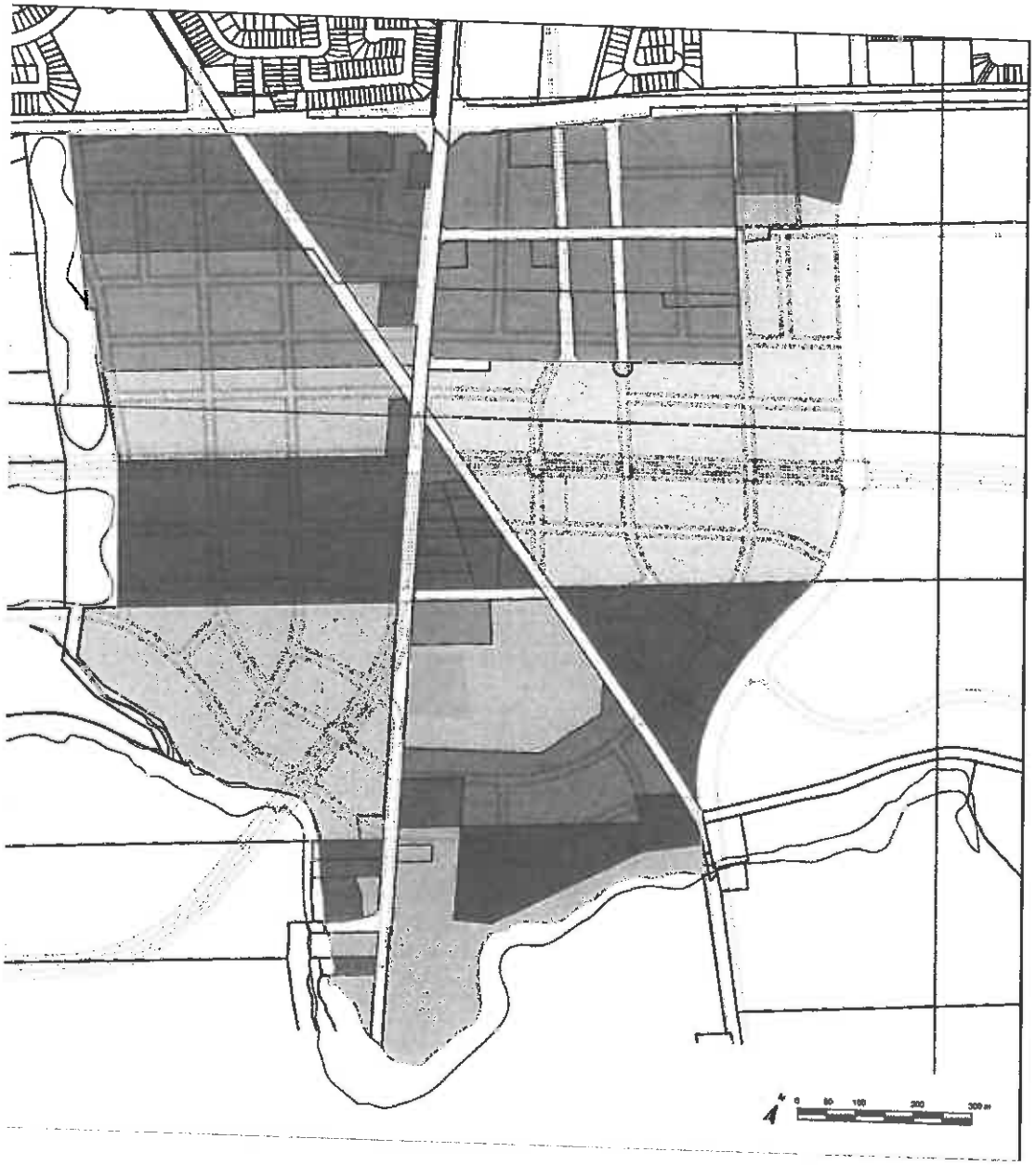
(5) Public plazas must:
   (a) Generally be less than 0.4 hectares of level land;



Schedule 1 - Land Use Plan

- High Rise Mixed-Use
- Mid Rise Mixed-Use
- High Rise Residential
- Mid Rise Residential
- Neighbourhood Park
- District Park
- School
- Civic Complex
- Strandherd Retail District
- Stormwater Management Pond

Property Boundaries



Note:

The colour of different parcels illustrates the boundaries of different parcels, or groups of parcels, and does not indicate land ownership.

Appendix C

Watermain Boundary Conditions, FUS Calculations, and Modelling Results

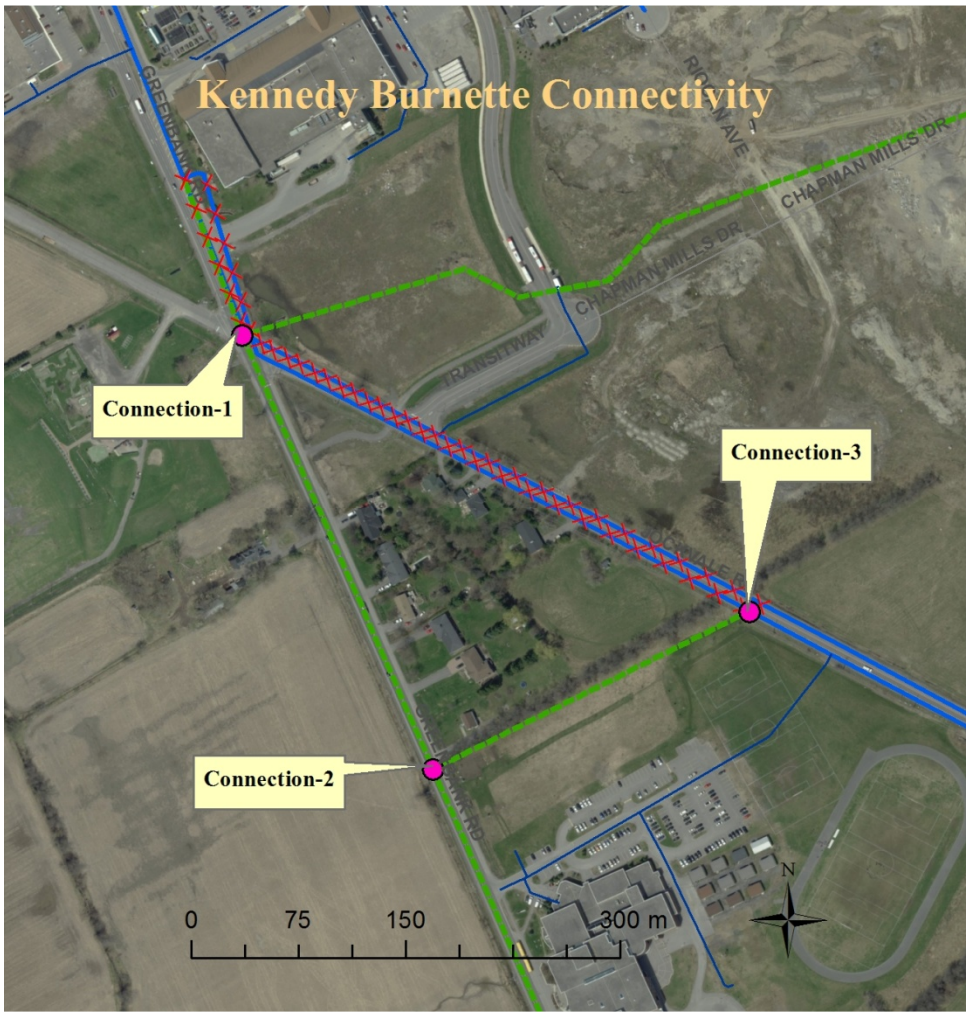
Boundary Conditions at Kennedy Brunette

Information Provided:

Date provided: 19 April 2016

For Residential and School	
Criteria	**Demand (L/s)**
Average Demand	2.7
Maximum Daily Demand	6.7
Peak Hourly Demand	14.8
Fire Flow Demand	250
Maximum Daily + Fire Flow Demand	256.7

Location:



Results:

Connection-1: Pre Zone Configuration

Criteria	Head (m)	Pressure (psi)
Max HGL	162.1	92.9
PKHR	138.5	59.4
MXDY + Fire Flow (250 L/s)	112.3	22.2

Connection-2:

Criteria	Head (m)	Pressure (psi)
Max HGL	161.7	95.3
PKHR	137.9	61.6
MXDY + Fire Flow (250 L/s)	110.5	22.6

Connection-3:

Criteria	Head (m)	Pressure (psi)
Max HGL	161.4	88.2
PKHR	137.6	54.4
MXDY + Fire Flow (250 L/s)	110.1	22.3

Results: Post zone-reconfiguration

Connection-1:

Criteria	Head (m)	Pressure (psi)
Max HGL	174.7	72.6
PKHR	146.3	70.5
MXDY + Fire Flow (250 L/s)	145.4	69.2

Connection-2:

Criteria	Head (m)	Pressure (psi)
Max HGL	147.7	75.5
PKHR	145.7	72.7
MXDY + Fire Flow (250 L/s)	144.3	70.6

Connection-3:

Criteria	Head (m)	Pressure (psi)
Max HGL	147.7	75.8
PKHR	145.6	72.8
MXDY + Fire Flow (250 L/s)	144.1	70.6

Considerations:

1. According to the City of Ottawa Water Design Guidelines as well as the Ontario Building Code, the maximum pressure at any point within a distribution system shall not exceed 80 psi in occupied areas. In scenario-2, measures should be taken to try to reduce the residual pressure below 80 psi without the use of special pressure control equipment. In circumstances where the residual pressure cannot be reduced below 80 psi without the use of pressure control equipment, a pressure reducing valve (**PRV**) should be installed at site.

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.

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 3

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	440			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**880**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**4,675**
		East Side	0 - 3 m		25%	
		South Side	30.1- 45 m		5%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**55%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***13,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435
		Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1950

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 5

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	415			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**830**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	20.1 - 30 m		10%	**4,250**
		East Side	20.1 - 30 m		10%	
		South Side	30.1- 45 m		5%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**50%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***13,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435
		Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1950

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 6

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	506			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,012**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	3.1 - 10 m		20%	**5,525**
		East Side	10.1 - 20 m		15%	
		South Side	3.1 - 10 m		20%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**65%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***14,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 7

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	678			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,356**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**6,120**
		East Side	0 - 3 m		25%	
		South Side	20.1 - 30 m		10%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**60%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***16,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**267**
				or	USGPM	4,227
		Required Duration of Fire Flow (hours)			Hours	3.5
		Required Volume of Fire Flow (m^3)			m^3	3360

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 9

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	252			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**504**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	30.1- 45 m		5%	**2,678**
		East Side	10.1 - 20 m		15%	
		South Side	3.1 - 10 m		20%	
		West Side	30.1- 45 m		5%	
				Cumulative Total	**45%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***9,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**150**
				or	USGPM	2,378
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1080

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 10

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	415			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**830**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	30.1- 45 m		5%	**3,825**
		East Side	> 45.1m		0%	
		South Side	0 - 3 m		25%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**45%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***12,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**200**
				or	USGPM	3,170
		Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1800

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 13

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	275			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**550**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	3.1 - 10 m		20%	**4,080**
		East Side	> 45.1m		0%	
		South Side	0 - 3 m		25%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**60%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***11,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**183**
				or	USGPM	2,906
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1320

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 16

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	575			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,150**	
	F	**Base fire flow without reductions**				**11,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**9,350**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	3.1 - 10 m		20%	**4,675**
		East Side	10.1 - 20 m		15%	
		South Side	30.1- 45 m		5%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**50%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***14,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 20

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	575			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,150**	
	F	**Base fire flow without reductions**				**11,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**9,350**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	3.1 - 10 m		20%	**4,675**
		East Side	20.1 - 30 m		10%	
		South Side	30.1- 45 m		5%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**50%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***14,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 22

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	450			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**900**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	0 - 3 m		25%	**5,100**
		East Side	30.1- 45 m		5%	
		South Side	3.1 - 10 m		20%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**60%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***14,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 25 (6 Towns)

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	500			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,000**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	0 - 3 m		25%	**6,375**
		East Side	20.1 - 30 m		10%	
		South Side	0 - 3 m		25%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**75%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***15,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**250**
				or	USGPM	3,963
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2700

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 32(6 Towns)

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	678			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,356**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**6,120**
		East Side	0 - 3 m		25%	
		South Side	20.1 - 30 m		10%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**60%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***16,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**267**
				or	USGPM	4,227
		Required Duration of Fire Flow (hours)			Hours	3.5
		Required Volume of Fire Flow (m^3)			m^3	3360

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 36

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	415			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**830**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	30.1- 45 m		5%	**4,250**
		East Side	10.1 - 20 m		15%	
		South Side	30.1- 45 m		5%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**50%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***13,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435
		Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1950

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 39

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	442			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**884**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	3.1 - 10 m		20%	**4,675**
		East Side	20.1 - 30 m		10%	
		South Side	0 - 3 m		25%	
		West Side	> 45.1m		0%	
				Cumulative Total	**55%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***13,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**217**
				or	USGPM	3,435
		Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1950

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 41 (6 Towns)

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	443			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**886**	
	F	**Base fire flow without reductions**				**10,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	20.1 - 30 m		10%	**5,100**
		East Side	0 - 3 m		25%	
		South Side	> 45.1m		0%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**60%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***14,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
		Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 43

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	286			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**572**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**1,700**
		East Side	0 - 3 m		25%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**25%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***9,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**150**
				or	USGPM	2,378
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1080

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 46

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	375			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**750**	
	F	**Base fire flow without reductions**				**9,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**7,650**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**1,530**
		East Side	> 45.1m		0%	
		South Side	30.1- 45 m		5%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**20%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***9,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**150**
				or	USGPM	2,378
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1080

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 111117
Project Name: Kennedy Burnette
Date: 07-May-16
Input By: Mark Bowen

Legend: Input by User; No Information or Input Required

Building Description: Node 48 (4 Towns)

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	270			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**540**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 C $(A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		***0***
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**2,720**
		East Side	10.1 - 20 m		15%	
		South Side	0 - 3 m		25%	
		West Side	> 45.1m		0%	
				Cumulative Total	**40%**	
	(1) + (2) + (3)	**Total Required fire Flow, rounded to nearest 1000L/min**			**L/min**	***9,520***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**159**
				or	USGPM	2,515
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1142.4

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS

3370 Greenbank Raod
Hydraulic Analysis

Job No. 111117

Table 1
Watermain Demand Calculations

Node	Unit		Pop.	Demand (L/s)		
	Town	Condo		High Pres.	Max Daily	Peak Hour
1	0	0	0	0.00	0.00	0.00
2	10	0	27	0.11	0.27	0.60
3	0	0	0	0.00	0.00	0.00
4	10	0	27	0.11	0.27	0.60
5	0	0	0	0.00	0.00	0.00
6	8	0	22	0.09	0.22	0.49
7	10	0	27	0.11	0.27	0.60
8	0	0	0	0.00	0.00	0.00
9	0	0	0	0.00	0.00	0.00
10	0	0	0	0.00	0.00	0.00
11	0	0	0	0.00	0.00	0.00
12	10	0	27	0.11	0.27	0.60
13	16	0	44	0.18	0.45	0.98
14	10	0	27	0.11	0.27	0.60
15	10	0	27	0.11	0.27	0.60
16	0	0	0	0.00	0.00	0.00
17	12	0	33	0.13	0.33	0.74
18	0	140	252	1.02	2.55	5.61
19	0	0	0	0.00	0.00	0.00
20	4	0	11	0.04	0.11	0.25
21	6	0	17	0.07	0.17	0.38
22	6	0	17	0.07	0.17	0.38
23	9	0	25	0.10	0.25	0.56
24	8	0	22	0.09	0.22	0.49
25	10	0	27	0.11	0.27	0.60
26	6	0	17	0.07	0.17	0.38
27	7	0	19	0.08	0.19	0.42
28	3	0	9	0.04	0.09	0.20
29	6	0	17	0.07	0.17	0.38

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS

3370 Greenbank Raod
Hydraulic Analysis

Job No. 111117

Table 1
Watermain Demand Calculations

Node	Unit		Pop.	Demand (L/s)		
	Town	Condo		High Pres.	Max Daily	Peak Hour
30	6	0	17	0.07	0.17	0.38
31	6	0	17	0.07	0.17	0.38
32	11	0	30	0.12	0.30	0.67
33	9	0	25	0.10	0.25	0.56
34	0	0	0	0.00	0.00	0.00
35	0	0	0	0.00	0.00	0.00
36	10	0	27	0.11	0.27	0.60
37	0	0	0	0.00	0.00	0.00
38	10	0	27	0.11	0.27	0.60
39	0	0	0	0.00	0.00	0.00
40	10	0	27	0.11	0.27	0.60
41	10	0	27	0.11	0.27	0.60
42	0	0	0	0.00	0.00	0.00
43	0	0	0	0.00	0.00	0.00
44	0	0	0	0.00	0.00	0.00
45	0	0	0	0.00	0.00	0.00
46	0	0	0	0.00	0.00	0.00
47	4	0	11	0.04	0.11	0.25
48	0	0	0	0.00	0.00	0.00
49	8	0	22	0.09	0.22	0.49
50	0	280	504	2.04	5.10	11.23
				5.78	**14.46**	**31.82**

1. Population density: 2.7 people/town
2. High Pressure demand = 350L/s/p/d
3. Maximum Daily demand = 2.5 x High Pressure Demand
4. Peak Hour Demand = 2.2 x Maximum Daily Demand

Table 2
Pipe Data

Pipe	Length (m)	Diameter (mm)	Roughness
1	43	250	110
2	31	250	110
3	32	250	110
4	56	250	110
5	43	250	110
6	50	250	110
7	62	250	110
8	17	250	110
9	50	250	110
10	36	250	110
11	30	250	110
12	45	250	110
13	47	250	110
14	43	250	110
15	20	250	110
16	25	250	110
17	34	250	110
18	26	300	120
19	14	300	120
20	54	300	120
21	33	300	120
22	48	300	120
23	21	300	120
24	44	250	110
25	71	250	110
26	61	250	110
27	34	250	110
28	33	250	110
29	34	250	110

Table 2
Pipe Data

Pipe	Length (m)	Diameter (mm)	Roughness
30	18	250	110
31	42	250	110
32	31	250	110
33	27	250	110
34	46	250	110
35	29	250	110
36	26	250	110
37	7	300	120
38	59	250	110
39	56	250	110
40	71	250	110
41	46	250	110
42	47	250	110
43	36	250	110
44	75	250	110
45	45	250	110
46	73	250	110
47	27	250	110
48	270	400	120
50	54	300	120
51	61	250	110
52	69	250	110
53	51	250	110
54	42	250	110
55	34	300	120
56	13	300	120
57	50	250	110
58	41	300	120
59	36	300	120

Table 3
Pre Configuartion Condition
High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (hrs)
1	93.5	0.00	161.7	68.2	96.7	68
2	93.6	0.11	161.7	68.1	96.6	50
3	93.8	0.00	161.7	67.9	96.3	27
4	93.6	0.11	161.7	68.1	96.6	21
5	93.9	0.00	161.7	67.8	96.1	17
6	93.7	0.09	161.7	68.0	96.4	7
7	93.8	0.11	161.7	67.9	96.3	4
8	94.0	0.00	161.7	67.7	96.0	2
9	93.8	0.00	161.7	67.9	96.3	2
10	94.1	0.00	161.7	67.6	95.9	1
11	94.5	0.00	161.7	67.2	95.3	0
12	94.5	0.11	161.7	67.2	95.3	1
13	94.4	0.18	161.7	67.3	95.4	2
14	94.0	0.11	161.7	67.7	96.0	3
15	93.8	0.11	161.7	67.9	96.3	4
16	93.7	0.00	161.7	68.0	96.4	5
17	93.6	0.13	161.7	68.1	96.6	6
18	93.6	1.02	161.7	68.1	96.6	4
19	93.3	0.00	161.7	68.4	97.0	6
20	93.5	0.04	161.7	68.2	96.7	6
21	93.4	0.07	161.7	68.3	96.8	8
22	93.6	0.07	161.7	68.1	96.6	9
23	93.6	0.10	161.7	68.1	96.6	12
24	93.8	0.09	161.7	67.9	96.3	2
25	93.8	0.11	161.7	67.9	96.3	4
26	93.4	0.07	161.7	68.3	96.8	7
27	94.1	0.08	161.7	67.6	95.9	3
28	93.8	0.04	161.7	67.9	96.3	5
29	93.7	0.07	161.7	68.0	96.4	21

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS

3370 Greenbank Road
Hydraulic Analsis

JOB NO. 111117

Table 3
Pre Configuartion Condition
High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (hrs)
30	93.8	0.07	161.7	67.9	96.3	11
31	93.8	0.07	161.7	67.9	96.3	6
32	93.9	0.12	161.7	67.8	96.1	10
33	93.8	0.10	161.7	67.9	96.3	19
34	93.6	0.00	161.7	68.1	96.6	14
35	93.7	0.00	161.7	68.0	96.4	14
36	93.7	0.11	161.7	68.0	96.4	19
37	93.2	0.00	161.7	68.5	97.1	9
38	93.2	0.11	161.7	68.5	97.1	11
39	93.3	0.00	161.7	68.4	97.0	14
40	93.3	0.11	161.7	68.4	97.0	17
41	93.4	0.11	161.7	68.3	96.8	35
42	93.6	0.00	161.7	68.1	96.6	31
43	93.6	0.00	161.7	68.1	96.6	58
44	94.1	0.00	161.7	67.6	95.9	3
45	94.3	2.04	161.7	67.4	95.6	3
46	94.0	0.00	161.7	67.7	96.0	23
47	94.0	0.04	161.7	67.7	96.0	39
48	94.5	0.00	161.7	67.2	95.3	116
49	94.4	0.09	161.7	67.3	95.4	28
50	93.8	0.00	161.7	67.9	96.3	36
51*	N/A	N/A	161.7	N/A	N/A	N/A

*** Boundary Condition**

Maximum Pressure
Maximum Time

Prepared By:
NOVATECH ENGINEERING CONSULTANTS LTD.
Date: November 14, 2016
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Table 4a
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 3

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	109.2	15.7	22.3
2	93.6	0.3	108.8	15.2	21.5
3	93.8	167.0	108.5	14.7	20.8
4	93.6	0.3	109.1	15.5	22.0
5	93.9	0.0	110.4	16.5	23.3
6	93.7	0.2	110.5	16.8	23.8
7	93.8	0.3	110.7	16.9	23.9
8	94.0	0.0	110.9	16.9	23.9
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.8	17.0	24.2
29	93.7	0.2	110.9	17.2	24.3

Table 4a
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 3

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.6	16.8	23.8
34	93.6	0.0	110.6	17.0	24.0
35	93.7	0.0	110.5	16.8	23.8
36	93.7	0.3	110.4	16.7	23.6
37	93.2	0.0	111.0	17.8	25.3
38	93.2	0.3	110.9	17.7	25.0
39	93.3	0.0	110.7	17.4	24.7
40	93.3	0.3	110.6	17.3	24.5
41	93.4	0.3	110.4	17.0	24.0
42	93.6	0.0	110.2	16.6	23.6
43	94.1	0.0	111.8	17.7	25.1
44	93.6	0.0	109.5	15.9	22.5
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.4	16.6	23.5
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4b
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 5

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.4	16.9	23.9
2	93.6	0.3	110.3	16.7	23.7
3	93.8	0.0	110.2	16.4	23.3
4	93.6	0.3	110.2	16.6	23.5
5	93.9	167.0	110.1	16.2	23.0
6	93.7	0.2	110.3	16.6	23.6
7	93.8	0.3	110.5	16.7	23.7
8	94.0	0.0	110.8	16.8	23.9
9	93.8	0.0	110.9	17.1	24.3
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.3
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.8	16.7	23.7
28	93.8	0.1	110.8	17.0	24.1
29	93.7	0.2	110.8	17.1	24.3

Table 4b
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 5

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.6	16.7	23.7
33	93.8	0.3	110.6	16.8	23.8
34	93.6	0.0	110.5	16.9	24.0
35	93.7	0.0	110.5	16.8	23.8
36	93.7	0.3	110.5	16.8	23.8
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.0	17.8	25.2
39	93.3	0.0	110.9	17.6	24.9
40	93.3	0.3	110.8	17.5	24.8
41	93.4	0.3	110.6	17.2	24.4
42	93.6	0.0	110.5	16.9	24.0
43	93.6	0.0	110.4	16.8	23.8
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.2	16.4	23.3
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4c
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 6

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.5	17.0	24.2
2	93.6	0.3	110.5	16.9	24.0
3	93.8	0.0	110.5	16.7	23.6
4	93.6	0.3	110.4	16.8	23.9
5	93.9	0.0	110.4	16.5	23.4
6	93.7	167.2	109.5	15.8	22.4
7	93.8	0.3	110.1	16.3	23.0
8	94.0	0.0	110.7	16.7	23.7
9	93.8	0.0	110.9	17.1	24.2
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.6
28	93.8	0.1	110.7	16.9	24.0
29	93.7	0.2	110.8	17.1	24.2

Table 4c
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 6

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.7	16.9	23.9
34	93.6	0.0	110.7	17.1	24.2
35	93.7	0.0	110.6	16.9	24.0
36	93.7	0.3	110.6	16.9	24.0
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.0	17.8	25.3
39	93.3	0.0	110.9	17.6	25.0
40	93.3	0.3	110.9	17.6	24.9
41	93.4	0.3	110.7	17.3	24.6
42	93.6	0.0	110.6	17.0	24.2
43	93.6	0.0	110.6	17.0	24.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.6
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4d
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 7

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.6	16.8	23.9
4	93.6	0.3	110.6	17.0	24.1
5	93.9	0.0	110.6	16.7	23.7
6	93.7	0.2	110.1	16.4	23.2
7	93.8	167.3	109.5	15.7	22.2
8	94.0	0.0	110.6	16.6	23.6
9	93.8	0.0	110.8	17.0	24.1
10	94.1	0.0	111.3	17.2	24.3
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.9
22	93.6	0.2	110.9	17.3	24.5
23	93.6	0.3	110.8	17.2	24.4
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.5
28	93.8	0.1	110.7	16.9	24.0
29	93.7	0.2	110.8	17.1	24.2

Table 4d
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 7

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	24.0
34	93.6	0.0	110.7	17.1	24.3
35	93.7	0.0	110.7	17.0	24.1
36	93.7	0.3	110.7	17.0	24.1
37	93.2	0.0	111.2	18.0	25.5
38	93.2	0.3	111.1	17.9	25.4
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.8	17.2	24.3
43	93.6	0.0	110.7	17.1	24.2
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.6	16.8	23.9
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4e
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 9

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.0	17.5	24.8
2	93.6	0.3	111.0	17.4	24.7
3	93.8	0.0	111.0	17.2	24.4
4	93.6	0.3	111.0	17.4	24.7
5	93.9	0.0	111.0	17.1	24.2
6	93.7	0.2	110.9	17.2	24.3
7	93.8	0.3	110.7	16.9	24.0
8	94.0	0.0	110.6	16.6	23.5
9	93.8	167.0	110.3	16.5	23.4
10	94.1	0.0	111.2	17.1	24.2
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.2
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.6
20	93.5	0.1	111.3	17.8	25.2
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.0	17.4	24.7
24	93.8	0.2	111.2	17.4	24.7
25	93.8	0.3	111.3	17.5	24.7
26	93.4	0.2	111.3	17.9	25.4
27	94.1	0.2	110.7	16.6	23.6
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.4

Table 4e
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 9

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.0	17.2	24.4
31	93.8	0.2	110.9	17.1	24.3
32	93.9	0.3	111.0	17.1	24.2
33	93.8	0.3	111.0	17.2	24.4
34	93.6	0.0	111.0	17.4	24.7
35	93.7	0.0	111.0	17.3	24.5
36	93.7	0.3	111.0	17.3	24.6
37	93.2	0.0	111.3	18.1	25.6
38	93.2	0.3	111.2	18.0	25.6
39	93.3	0.0	111.2	17.9	25.3
40	93.3	0.3	111.1	17.8	25.3
41	93.4	0.3	111.1	17.7	25.1
42	93.6	0.0	111.0	17.4	24.7
43	93.6	0.0	111.0	17.4	24.7
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.0	17.2	24.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4f
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 10

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.3	17.8	25.3
2	93.6	0.3	111.3	17.7	25.1
3	93.8	0.0	111.3	17.5	24.8
4	93.6	0.3	111.3	17.7	25.1
5	93.9	0.0	111.3	17.4	24.7
6	93.7	0.2	111.3	17.6	24.9
7	93.8	0.3	111.2	17.4	24.7
8	94.0	0.0	111.2	17.2	24.4
9	93.8	0.0	111.1	17.3	24.5
10	94.1	167.0	110.9	16.8	23.8
11	94.5	0.0	111.5	17.0	24.1
12	94.5	0.3	111.5	17.0	24.1
13	94.4	0.5	111.5	17.1	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.6	17.8	25.2
16	93.7	0.0	111.6	17.9	25.3
17	93.6	0.3	111.6	18.0	25.5
18	93.6	2.6	111.6	18.0	25.5
19	93.3	0.0	111.4	18.1	25.7
20	93.5	0.1	111.4	17.9	25.4
21	93.4	0.2	111.4	18.0	25.5
22	93.6	0.2	111.4	17.8	25.2
23	93.6	0.3	111.3	17.7	25.1
24	93.8	0.2	111.0	17.2	24.4
25	93.8	0.3	111.2	17.4	24.6
26	93.4	0.2	111.4	18.0	25.5
27	94.1	0.2	111.2	17.1	24.3
28	93.8	0.1	111.3	17.5	24.8
29	93.7	0.2	111.3	17.6	25.0

Table 4f
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 10

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.3	17.5	24.9
31	93.8	0.2	111.3	17.5	24.8
32	93.9	0.3	111.3	17.4	24.7
33	93.8	0.3	111.3	17.5	24.8
34	93.6	0.0	111.3	17.7	25.1
35	93.7	0.0	111.3	17.6	25.0
36	93.7	0.3	111.3	17.6	25.0
37	93.2	0.0	111.4	18.2	25.8
38	93.2	0.3	111.4	18.2	25.8
39	93.3	0.0	111.4	18.1	25.7
40	93.3	0.3	111.4	18.1	25.6
41	93.4	0.3	111.4	18.0	25.5
42	93.6	0.0	111.3	17.7	25.2
43	93.6	0.0	111.3	17.7	25.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.9
46	94.0	0.0	111.8	17.8	25.3
47	94.0	0.1	111.8	17.8	25.3
48	94.5	0.0	111.8	17.3	24.6
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.3	17.5	24.8
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4g
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node13

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.6	18.1	25.6
2	93.6	0.3	111.6	18.0	25.5
3	93.8	0.0	111.6	17.8	25.2
4	93.6	0.3	111.6	18.0	25.5
5	93.9	0.0	111.6	17.7	25.0
6	93.7	0.2	111.6	17.9	25.3
7	93.8	0.3	111.6	17.8	25.2
8	94.0	0.0	111.6	17.6	24.9
9	93.8	0.0	111.6	17.8	25.2
10	94.1	0.0	111.5	17.4	24.7
11	94.5	0.0	111.5	17.0	24.1
12	94.5	0.3	110.9	16.4	23.2
13	94.4	167.5	109.9	15.5	22.0
14	94.0	0.3	110.4	16.4	23.2
15	93.8	0.3	110.8	17.0	24.1
16	93.7	0.0	111.0	17.3	24.5
17	93.6	0.3	111.2	17.6	25.0
18	93.6	2.6	111.6	18.0	25.5
19	93.3	0.0	111.6	18.3	25.9
20	93.5	0.1	111.6	18.1	25.6
21	93.4	0.2	111.6	18.2	25.8
22	93.6	0.2	111.6	18.0	25.5
23	93.6	0.3	111.6	18.0	25.5
24	93.8	0.2	111.5	17.7	25.2
25	93.8	0.3	111.6	17.8	25.2
26	93.4	0.2	111.6	18.2	25.8
27	94.1	0.2	111.6	17.5	24.8
28	93.8	0.1	111.6	17.8	25.2
29	93.7	0.2	111.6	17.9	25.3

Table 4g
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node13

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.6	17.8	25.2
31	93.8	0.2	111.6	17.8	25.2
32	93.9	0.3	111.6	17.7	25.0
33	93.8	0.3	111.6	17.8	25.2
34	93.6	0.0	111.6	18.0	25.5
35	93.7	0.0	111.6	17.9	25.3
36	93.7	0.3	111.6	17.9	25.3
37	93.2	0.0	111.6	18.4	26.0
38	93.2	0.3	111.6	18.4	26.0
39	93.3	0.0	111.6	18.3	25.9
40	93.3	0.3	111.6	18.3	25.9
41	93.4	0.3	111.6	18.2	25.8
42	93.6	0.0	111.6	18.0	25.5
43	93.6	0.0	111.6	18.0	25.5
44	94.1	0	111.84	17.74	25.2
45	94.3	5.1	111.8	17.5	24.9
46	94.0	0.0	111.8	17.8	25.3
47	94.0	0.1	111.8	17.8	25.3
48	94.5	0.0	111.8	17.3	24.6
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.6	17.8	25.2
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4h
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 16

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.5	18.0	25.6
2	93.6	0.3	111.5	17.9	25.4
3	93.8	0.0	111.5	17.7	25.1
4	93.6	0.3	111.5	17.9	25.4
5	93.9	0.0	111.5	17.6	25.0
6	93.7	0.2	111.5	17.8	25.3
7	93.8	0.3	111.5	17.7	25.1
8	94.0	0.0	111.5	17.5	24.9
9	93.8	0.0	111.5	17.7	25.2
10	94.1	0.0	111.6	17.5	24.8
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.3	16.8	23.9
13	94.4	0.5	111.0	16.6	23.5
14	94.0	0.3	110.6	16.6	23.5
15	93.8	0.3	110.2	16.4	23.3
16	93.7	167.0	110.1	16.4	23.2
17	93.6	0.3	110.7	17.1	24.2
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.5	18.2	25.8
20	93.5	0.1	111.5	18.0	25.6
21	93.4	0.2	111.5	18.1	25.7
22	93.6	0.2	111.5	17.9	25.4
23	93.6	0.3	111.5	17.9	25.4
24	93.8	0.2	111.6	17.8	25.2
25	93.8	0.3	111.5	17.7	25.1
26	93.4	0.2	111.5	18.1	25.7
27	94.1	0.2	111.5	17.4	24.7
28	93.8	0.1	111.5	17.7	25.1
29	93.7	0.2	111.5	17.8	25.3

Table 4h
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 16

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.5	17.7	25.1
31	93.8	0.2	111.5	17.7	25.1
32	93.9	0.3	111.5	17.6	25.0
33	93.8	0.3	111.5	17.7	25.1
34	93.6	0.0	111.5	17.9	25.4
35	93.7	0.0	111.5	17.8	25.3
36	93.7	0.3	111.5	17.8	25.3
37	93.2	0.0	111.5	18.3	26.0
38	93.2	0.3	111.5	18.3	26.0
39	93.3	0.0	111.5	18.2	25.8
40	93.3	0.3	111.5	18.2	25.8
41	93.4	0.3	111.5	18.1	25.7
42	93.6	0.0	111.5	17.9	25.4
43	93.6	0.0	111.5	17.9	25.4
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.5	17.7	25.1
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4i
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 20

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.1	17.6	25.0
2	93.6	0.3	111.1	17.5	24.9
3	93.8	0.0	111.1	17.3	24.6
4	93.6	0.3	111.1	17.5	24.9
5	93.9	0.0	111.1	17.2	24.4
6	93.7	0.2	111.2	17.5	24.8
7	93.8	0.3	111.2	17.4	24.6
8	94.0	0.0	111.2	17.2	24.4
9	93.8	0.0	111.3	17.5	24.8
10	94.1	0.0	111.4	17.3	24.6
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.3
18	93.6	2.6	111.4	17.8	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	167.1	111.0	17.5	24.8
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.1	17.5	24.8
24	93.8	0.2	111.4	17.6	24.9
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.2	17.1	24.2
28	93.8	0.1	111.1	17.3	24.6
29	93.7	0.2	111.1	17.4	24.7

Table 4i
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 20

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.1	17.3	24.5
31	93.8	0.2	111.1	17.3	24.6
32	93.9	0.3	111.1	17.2	24.4
33	93.8	0.3	111.1	17.3	24.6
34	93.6	0.0	111.1	17.5	24.8
35	93.7	0.0	111.1	17.4	24.7
36	93.7	0.3	111.1	17.4	24.7
37	93.2	0.0	111.2	18.0	25.5
38	93.2	0.3	111.2	18.0	25.5
39	93.3	0.0	111.2	17.9	25.3
40	93.3	0.3	111.2	17.9	25.3
41	93.4	0.3	111.1	17.7	25.2
42	93.6	0.0	111.1	17.5	24.9
43	93.6	0.0	111.1	17.5	24.9
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.7	17.4	24.7
46	94.0	0.0	111.7	17.7	25.2
47	94.0	0.1	111.7	17.7	25.2
48	94.5	0.0	111.7	17.2	24.4
49	94.4	0.2	111.7	17.3	24.6
50	93.8	0.0	111.1	17.3	24.6
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4j
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 22

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.8	17.3	24.5
2	93.6	0.3	110.8	17.2	24.3
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.7	17.1	24.3
5	93.9	0.0	110.7	16.8	23.9
6	93.7	0.2	110.8	17.1	24.2
7	93.8	0.3	110.9	17.1	24.2
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.1	17.6	25.0
21	93.4	0.2	110.8	17.4	24.6
22	93.6	167.2	110.5	16.9	23.9
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.8	17.0	24.1
29	93.7	0.2	110.8	17.1	24.2

Table 4j
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 22

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.8	17.0	24.1
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	24.0
34	93.6	0.0	110.7	17.1	24.2
35	93.7	0.0	110.7	17.0	24.1
36	93.7	0.3	110.7	17.0	24.2
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.1	17.9	25.3
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.8	17.2	24.3
43	93.6	0.0	110.8	17.2	24.3
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	24.0
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4k
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 25

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.3	17.8	25.2
2	93.6	0.3	111.3	17.7	25.1
3	93.8	0.0	111.3	17.5	24.8
4	93.6	0.3	111.3	17.7	25.1
5	93.9	0.0	111.3	17.4	24.6
6	93.7	0.2	111.3	17.6	24.9
7	93.8	0.3	111.3	17.5	24.8
8	94.0	0.0	111.3	17.3	24.5
9	93.8	0.0	111.3	17.5	24.8
10	94.1	0.0	111.2	17.1	24.3
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.3	17.8	25.2
21	93.4	0.2	111.3	17.9	25.4
22	93.6	0.2	111.3	17.7	25.1
23	93.6	0.3	111.3	17.7	25.1
24	93.8	0.2	110.6	16.8	23.9
25	93.8	167.3	109.7	15.9	22.5
26	93.4	0.2	110.7	17.3	24.5
27	94.1	0.2	111.3	17.2	24.3
28	93.8	0.1	111.3	17.5	24.8
29	93.7	0.2	111.3	17.6	24.9

Table 4k
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 25

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.3	17.5	24.8
31	93.8	0.2	111.3	17.5	24.8
32	93.9	0.3	111.3	17.4	24.6
33	93.8	0.3	111.3	17.5	24.8
34	93.6	0.0	111.3	17.7	25.1
35	93.7	0.0	111.3	17.6	24.9
36	93.7	0.3	111.3	17.6	24.9
37	93.2	0.0	111.3	18.1	25.7
38	93.2	0.3	111.3	18.1	25.7
39	93.3	0.0	111.3	18.0	25.5
40	93.3	0.3	111.3	18.0	25.5
41	93.4	0.3	111.3	17.9	25.4
42	93.6	0.0	111.3	17.7	25.1
43	93.6	0.0	111.3	17.7	25.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.3	17.5	24.8
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4I
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 32

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.7	17.1	24.2
5	93.9	0.0	110.7	16.8	23.8
6	93.7	0.2	110.7	17.0	24.1
7	93.8	0.3	110.7	16.9	24.0
8	94.0	0.0	110.8	16.8	23.8
9	93.8	0.0	110.9	17.1	24.3
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.7
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.5
28	93.8	0.1	110.6	16.8	23.8
29	93.7	0.2	110.6	16.9	24.0

Table 4I
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 32

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.8	17.0	24.0
31	93.8	0.2	110.2	16.4	23.3
32	93.9	167.3	109.6	15.7	22.3
33	93.8	0.3	110.2	16.4	23.2
34	93.6	0.0	110.6	17.0	24.1
35	93.7	0.0	110.6	16.9	24.0
36	93.7	0.3	110.7	17.0	24.1
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.1	17.9	25.3
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.7	17.1	24.3
43	93.6	0.0	110.7	17.1	24.3
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	23.9
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4m
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 36

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.2	16.7	23.6
2	93.6	0.3	110.3	16.7	23.6
3	93.8	0.0	110.3	16.5	23.4
4	93.6	0.3	110.4	16.8	23.8
5	93.9	0.0	110.5	16.6	23.6
6	93.7	0.2	110.6	16.9	24.0
7	93.8	0.3	110.8	17.0	24.0
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.3

Table 4m
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 36

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.6	16.8	23.9
34	93.6	0.0	110.6	17.0	24.0
35	93.7	0.0	110.5	16.8	23.9
36	93.7	167.3	109.3	15.6	22.1
37	93.2	0.0	111.0	17.8	25.2
38	93.2	0.3	110.8	17.6	24.9
39	93.3	0.0	110.6	17.3	24.5
40	93.3	0.3	110.4	17.1	24.3
41	93.4	0.3	110.1	16.7	23.7
42	93.6	0.0	109.9	16.3	23.2
43	93.6	0.0	110.1	16.5	23.4
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.7
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4n
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 39

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.6	17.1	24.2
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.8	17.2	24.4
5	93.9	0.0	111.0	17.1	24.2
6	93.7	0.2	111.0	17.3	24.5
7	93.8	0.3	111.1	17.3	24.5
8	94.0	0.0	111.1	17.1	24.3
9	93.8	0.0	111.2	17.4	24.7
10	94.1	0.0	111.4	17.3	24.5
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.3
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.0	17.4	24.7
24	93.8	0.2	111.4	17.6	24.9
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.1	17.0	24.1
28	93.8	0.1	111.1	17.3	24.5
29	93.7	0.2	111.1	17.4	24.7

Table 4n
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 39

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.1	17.3	24.5
31	93.8	0.2	111.1	17.3	24.5
32	93.9	0.3	111.0	17.1	24.3
33	93.8	0.3	111.0	17.2	24.4
34	93.6	0.0	111.0	17.4	24.6
35	93.7	0.0	111.0	17.3	24.5
36	93.7	0.3	110.6	16.9	24.0
37	93.2	0.0	109.9	16.7	23.7
38	93.2	0.3	109.1	15.9	22.6
39	93.3	167.0	108.3	15.0	21.3
40	93.3	0.3	108.8	15.5	21.9
41	93.4	0.3	109.8	16.4	23.2
42	93.6	0.0	110.3	16.7	23.7
43	93.6	0.0	110.5	16.9	24.0
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.8	17.5	24.7
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	111.0	17.2	24.3
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4o
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 41

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.1	16.6	23.5
2	93.6	0.3	110.3	16.7	23.6
3	93.8	0.0	110.4	16.6	23.5
4	93.6	0.3	110.5	16.9	24.0
5	93.9	0.0	110.7	16.8	23.9
6	93.7	0.2	110.8	17.1	24.3
7	93.8	0.3	110.9	17.1	24.3
8	94.0	0.0	111.0	17.0	24.2
9	93.8	0.0	111.1	17.3	24.6
10	94.1	0.0	111.4	17.3	24.5
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	111.0	17.6	25.0
22	93.6	0.2	110.9	17.3	24.6
23	93.6	0.3	110.8	17.2	24.4
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.0	16.9	24.0
28	93.8	0.1	111.0	17.2	24.4
29	93.7	0.2	111.0	17.3	24.5

Table 4o
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 41

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.0	17.2	24.4
31	93.8	0.2	110.9	17.1	24.3
32	93.9	0.3	110.9	17.0	24.0
33	93.8	0.3	110.8	17.0	24.1
34	93.6	0.0	110.8	17.2	24.4
35	93.7	0.0	110.7	17.0	24.2
36	93.7	0.3	110.2	16.5	23.4
37	93.2	0.0	110.6	17.4	24.6
38	93.2	0.3	110.1	16.9	24.0
39	93.3	0.0	109.7	16.4	23.2
40	93.3	0.3	109.4	16.1	22.8
41	93.4	167.3	108.7	15.3	21.7
42	93.6	0.0	109.7	16.1	22.8
43	93.6	0.0	110.0	16.4	23.2
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	24.0
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4p
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 43

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	108.7	15.2	21.5
2	93.6	0.3	109.1	15.5	22.0
3	93.8	0.0	109.5	15.7	22.2
4	93.6	0.3	109.9	16.3	23.1
5	93.9	0.0	110.5	16.6	23.5
6	93.7	0.2	110.6	16.9	24.0
7	93.8	0.3	110.8	17.0	24.0
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.9
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.4

Table 4p
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 43

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.3
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	23.9
34	93.6	0.0	110.6	17.0	24.1
35	93.7	0.0	110.6	16.9	23.9
36	93.7	0.3	110.2	16.5	23.3
37	93.2	0.0	110.9	17.7	25.1
38	93.2	0.3	110.7	17.5	24.8
39	93.3	0.0	110.5	17.2	24.4
40	93.3	0.3	110.3	17.0	24.1
41	93.4	0.3	110.0	16.6	23.5
42	93.6	0.0	109.8	16.2	23.0
43	93.6	167.0	108.4	14.8	20.9
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.7
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4q
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 46

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.7	18.2	25.8
2	93.6	0.3	111.7	18.1	25.6
3	93.8	0.0	111.7	17.9	25.4
4	93.6	0.3	111.7	18.1	25.7
5	93.9	0.0	111.7	17.8	25.2
6	93.7	0.2	111.7	18.0	25.5
7	93.8	0.3	111.7	17.9	25.4
8	94.0	0.0	111.7	17.7	25.1
9	93.8	0.0	111.7	17.9	25.4
10	94.1	0.0	111.8	17.7	25.1
11	94.5	0.0	111.9	17.4	24.7
12	94.5	0.3	111.9	17.4	24.6
13	94.4	0.5	111.8	17.4	24.7
14	94.0	0.3	111.8	17.8	25.2
15	93.8	0.3	111.7	17.9	25.4
16	93.7	0.0	111.7	18.0	25.5
17	93.6	0.3	111.7	18.1	25.6
18	93.6	2.6	111.6	18.0	25.6
19	93.3	0.0	111.7	18.4	26.0
20	93.5	0.1	111.7	18.2	25.8
21	93.4	0.2	111.7	18.3	25.9
22	93.6	0.2	111.7	18.1	25.6
23	93.6	0.3	111.7	18.1	25.6
24	93.8	0.2	111.8	18.0	25.5
25	93.8	0.3	111.7	17.9	25.4
26	93.4	0.2	111.7	18.3	25.9
27	94.1	0.2	111.7	17.6	25.0
28	93.8	0.1	111.7	17.9	25.4
29	93.7	0.2	111.7	18.0	25.5

Table 4q
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 46

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.7	17.9	25.4
31	93.8	0.2	111.7	17.9	25.4
32	93.9	0.3	111.7	17.8	25.2
33	93.8	0.3	111.7	17.9	25.4
34	93.6	0.0	111.7	18.1	25.6
35	93.7	0.0	111.7	18.0	25.5
36	93.7	0.3	111.7	18.0	25.5
37	93.2	0.0	111.7	18.5	26.2
38	93.2	0.3	111.7	18.5	26.2
39	93.3	0.0	111.7	18.4	26.0
40	93.3	0.3	111.7	18.4	26.1
41	93.4	0.3	111.7	18.3	25.9
42	93.6	0.0	111.7	18.1	25.6
43	93.6	0.0	111.7	18.1	25.6
44	94.1	0.0	111.6	17.5	24.8
45	94.3	5.1	110.8	16.5	23.4
46	94.0	167.0	110.2	16.2	22.9
47	94.0	0.1	110.3	16.3	23.2
48	94.5	0.0	110.5	16.0	22.7
49	94.4	0.2	110.7	16.3	23.1
50	93.8	0.0	111.7	17.9	25.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 4r
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 48

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.7	18.2	25.8
2	93.6	0.3	111.7	18.1	25.6
3	93.8	0.0	111.7	17.9	25.4
4	93.6	0.3	111.7	18.1	25.7
5	93.9	0.0	111.7	17.8	25.2
6	93.7	0.2	111.7	18.0	25.5
7	93.8	0.3	111.7	17.9	25.4
8	94.0	0.0	111.7	17.7	25.1
9	93.8	0.0	111.7	17.9	25.4
10	94.1	0.0	111.8	17.7	25.1
11	94.5	0.0	111.9	17.4	24.7
12	94.5	0.3	111.9	17.4	24.6
13	94.4	0.5	111.8	17.4	24.7
14	94.0	0.3	111.8	17.8	25.2
15	93.8	0.3	111.7	17.9	25.4
16	93.7	0.0	111.7	18.0	25.5
17	93.6	0.3	111.7	18.1	25.6
18	93.6	2.6	111.6	18.0	25.6
19	93.3	0.0	111.7	18.4	26.0
20	93.5	0.1	111.7	18.2	25.8
21	93.4	0.2	111.7	18.3	25.9
22	93.6	0.2	111.7	18.1	25.6
23	93.6	0.3	111.7	18.1	25.6
24	93.8	0.2	111.8	18.0	25.5
25	93.8	0.3	111.7	17.9	25.4
26	93.4	0.2	111.7	18.3	25.9
27	94.1	0.2	111.7	17.6	25.0
28	93.8	0.1	111.7	17.9	25.4
29	93.7	0.2	111.7	18.0	25.5

Table 4r
Pre Confiration Condition
Max Daily Demand and Fire Flow at Node 48

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.7	17.9	25.4
31	93.8	0.2	111.7	17.9	25.4
32	93.9	0.3	111.7	17.8	25.2
33	93.8	0.3	111.7	17.9	25.4
34	93.6	0.0	111.7	18.1	25.6
35	93.7	0.0	111.7	18.0	25.5
36	93.7	0.3	111.7	18.0	25.5
37	93.2	0.0	111.7	18.5	26.2
38	93.2	0.3	111.7	18.5	26.2
39	93.3	0.0	111.7	18.4	26.0
40	93.3	0.3	111.7	18.4	26.1
41	93.4	0.3	111.7	18.3	25.9
42	93.6	0.0	111.7	18.1	25.6
43	93.6	0.0	111.7	18.1	25.6
44	94.1	0.0	111.6	17.5	24.8
45	94.3	5.1	110.8	16.5	23.4
46	94.0	0.0	110.6	16.6	23.5
47	94.0	0.1	109.9	15.9	22.5
48	94.5	167.0	109.1	14.6	20.6
49	94.4	0.2	110.0	15.6	22.2
50	93.8	0.0	111.7	17.9	25.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 5
Pre Configuration Condition
Peak Hour Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.00	137.87	44.4	62.9
2	93.6	0.60	137.87	44.3	62.8
3	93.8	0.00	137.87	44.1	62.5
4	93.6	0.60	137.87	44.3	62.8
5	93.9	0.00	137.87	44.0	62.3
6	93.7	0.49	137.87	44.2	62.6
7	93.8	0.60	137.87	44.1	62.5
8	94.0	0.00	137.87	43.9	62.2
9	93.8	0.00	137.87	44.1	62.5
10	94.1	0.00	137.87	43.8	62.1
11	94.5	0.00	137.88	43.4	61.5
12	94.5	0.60	137.88	43.4	61.5
13	94.4	0.98	137.88	43.5	61.7
14	94.0	0.60	137.87	43.9	62.2
15	93.8	0.60	137.87	44.1	62.5
16	93.7	0.00	137.87	44.2	62.6
17	93.6	0.74	137.87	44.3	62.8
18	93.6	5.61	137.87	44.3	62.8
19	93.3	0.00	137.87	44.6	63.2
20	93.5	0.25	137.87	44.4	62.9
21	93.4	0.38	137.87	44.5	63.1
22	93.6	0.38	137.87	44.3	62.8
23	93.6	0.56	137.87	44.3	62.8
24	93.8	0.49	137.87	44.1	62.5
25	93.8	0.60	137.87	44.1	62.5
26	93.4	0.38	137.87	44.5	63.1
27	94.1	0.42	137.87	43.8	62.1
28	93.8	0.20	137.87	44.1	62.5
29	93.7	0.38	137.87	44.2	62.6

Table 5
Pre Configuration Condition
Peak Hour Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.38	137.87	44.1	62.5
31	93.8	0.38	137.87	44.1	62.5
32	93.9	0.67	137.87	44.0	62.3
33	93.8	0.56	137.87	44.1	62.5
34	93.6	0.00	137.87	44.3	62.8
35	93.7	0.00	137.87	44.2	62.6
36	93.7	0.60	137.87	44.2	62.6
37	93.2	0.00	137.87	44.7	63.3
38	93.2	0.60	137.87	44.7	63.3
39	93.3	0.00	137.87	44.6	63.2
40	93.3	0.60	137.87	44.6	63.2
41	93.4	0.60	137.87	44.5	63.1
42	93.6	0.00	137.87	44.3	62.8
43	93.6	0.00	137.87	44.3	62.8
44	94.1	0.00	137.87	43.8	62.1
45	94.3	11.23	137.87	43.6	61.8
46	94.0	0.00	137.87	43.9	62.2
47	94.0	0.25	137.87	43.9	62.2
48	94.5	0.00	137.87	43.4	61.5
49	94.4	0.49	137.87	43.5	61.6
50	93.8	0.00	137.87	44.1	62.5
51*	N/A	N/A	137.9	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 6
Post Configuartion Condition
High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (hrs)
1	93.5	0.00	147.7	54.2	76.9	68
2	93.6	0.11	147.7	54.1	76.7	50
3	93.8	0.00	147.7	53.9	76.4	27
4	93.6	0.11	147.7	54.1	76.7	21
5	93.9	0.00	147.7	53.8	76.3	17
6	93.7	0.09	147.7	54.0	76.6	7
7	93.8	0.11	147.7	53.9	76.4	4
8	94.0	0.00	147.7	53.7	76.1	2
9	93.8	0.00	147.7	53.9	76.4	2
10	94.1	0.00	147.7	53.6	76.0	1
11	94.5	0.00	147.7	53.2	75.4	0
12	94.5	0.11	147.7	53.2	75.4	1
13	94.4	0.18	147.7	53.3	75.6	2
14	94.0	0.11	147.7	53.7	76.1	3
15	93.8	0.11	147.7	53.9	76.4	4
16	93.7	0.00	147.7	54.0	76.6	5
17	93.6	0.13	147.7	54.1	76.7	6
18	93.6	1.02	147.7	54.1	76.7	4
19	93.3	0.00	147.7	54.4	77.1	6
20	93.5	0.04	147.7	54.2	76.9	6
21	93.4	0.07	147.7	54.3	77.0	8
22	93.6	0.07	147.7	54.1	76.7	9
23	93.6	0.10	147.7	54.1	76.7	12
24	93.8	0.09	147.7	53.9	76.4	2
25	93.8	0.11	147.7	53.9	76.4	4
26	93.4	0.07	147.7	54.3	77.0	7
27	94.1	0.08	147.7	53.6	76.0	3
28	93.8	0.04	147.7	53.9	76.4	5
29	93.7	0.07	147.7	54.0	76.6	21

Table 6
Post Configuartion Condition
High Pressure Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)	Age (hrs)
30	93.8	0.07	147.7	53.9	76.4	11
31	93.8	0.07	147.7	53.9	76.4	6
32	93.9	0.12	147.7	53.8	76.3	10
33	93.8	0.10	147.7	53.9	76.4	19
34	93.6	0.00	147.7	54.1	76.7	14
35	93.7	0.00	147.7	54.0	76.6	14
36	93.7	0.11	147.7	54.0	76.6	19
37	93.2	0.00	147.7	54.5	77.3	9
38	93.2	0.11	147.7	54.5	77.3	11
39	93.3	0.00	147.7	54.4	77.1	14
40	93.3	0.11	147.7	54.4	77.1	17
41	93.4	0.11	147.7	54.3	77.0	35
42	93.6	0.00	147.7	54.1	76.7	31
43	93.6	0.00	147.7	54.1	76.7	58
44	94.1	0.00	147.7	53.6	76.0	3
45	94.3	2.04	147.7	53.4	75.7	3
46	94.0	0.00	147.7	53.7	76.1	23
47	94.0	0.04	147.7	53.7	76.1	39
48	94.5	0.00	147.7	53.2	75.4	116
49	94.4	0.09	147.7	53.3	75.6	28
50	93.8	0.00	147.7	53.9	76.4	36
51*	N/A	N/A	147.7	N/A	N/A	N/A

*** Boundary Condition**

Maximum Pressure
Maximum Time

Table 7a
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 3

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	109.2	15.7	22.3
2	93.6	0.3	108.8	15.2	21.5
3	93.8	167.0	108.5	14.7	20.8
4	93.6	0.3	109.1	15.5	22.0
5	93.9	0.0	110.4	16.5	23.3
6	93.7	0.2	110.5	16.8	23.8
7	93.8	0.3	110.7	16.9	23.9
8	94.0	0.0	110.9	16.9	23.9
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.8	17.0	24.2
29	93.7	0.2	110.9	17.2	24.3

Table 7a
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 3

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.6	16.8	23.8
34	93.6	0.0	110.6	17.0	24.0
35	93.7	0.0	110.5	16.8	23.8
36	93.7	0.3	110.4	16.7	23.6
37	93.2	0.0	111.0	17.8	25.3
38	93.2	0.3	110.9	17.7	25.0
39	93.3	0.0	110.7	17.4	24.7
40	93.3	0.3	110.6	17.3	24.5
41	93.4	0.3	110.4	17.0	24.0
42	93.6	0.0	110.2	16.6	23.6
43	94.1	0.0	111.8	17.7	25.1
44	93.6	0.0	109.5	15.9	22.5
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.4	16.6	23.5
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7b
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 5

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.4	16.9	23.9
2	93.6	0.3	110.3	16.7	23.7
3	93.8	0.0	110.2	16.4	23.3
4	93.6	0.3	110.2	16.6	23.5
5	93.9	167.0	110.1	16.2	23.0
6	93.7	0.2	110.3	16.6	23.6
7	93.8	0.3	110.5	16.7	23.7
8	94.0	0.0	110.8	16.8	23.9
9	93.8	0.0	110.9	17.1	24.3
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.3
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.8	16.7	23.7
28	93.8	0.1	110.8	17.0	24.1
29	93.7	0.2	110.8	17.1	24.3

Table 7b
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 5

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.6	16.7	23.7
33	93.8	0.3	110.6	16.8	23.8
34	93.6	0.0	110.5	16.9	24.0
35	93.7	0.0	110.5	16.8	23.8
36	93.7	0.3	110.5	16.8	23.8
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.0	17.8	25.2
39	93.3	0.0	110.9	17.6	24.9
40	93.3	0.3	110.8	17.5	24.8
41	93.4	0.3	110.6	17.2	24.4
42	93.6	0.0	110.5	16.9	24.0
43	93.6	0.0	110.4	16.8	23.8
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.2	16.4	23.3
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7c
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 6

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.5	17.0	24.2
2	93.6	0.3	110.5	16.9	24.0
3	93.8	0.0	110.5	16.7	23.6
4	93.6	0.3	110.4	16.8	23.9
5	93.9	0.0	110.4	16.5	23.4
6	93.7	167.2	109.5	15.8	22.4
7	93.8	0.3	110.1	16.3	23.0
8	94.0	0.0	110.7	16.7	23.7
9	93.8	0.0	110.9	17.1	24.2
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.6
28	93.8	0.1	110.7	16.9	24.0
29	93.7	0.2	110.8	17.1	24.2

Table 7c
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 6

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.7	16.9	23.9
34	93.6	0.0	110.7	17.1	24.2
35	93.7	0.0	110.6	16.9	24.0
36	93.7	0.3	110.6	16.9	24.0
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.0	17.8	25.3
39	93.3	0.0	110.9	17.6	25.0
40	93.3	0.3	110.9	17.6	24.9
41	93.4	0.3	110.7	17.3	24.6
42	93.6	0.0	110.6	17.0	24.2
43	93.6	0.0	110.6	17.0	24.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.6
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7d
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 7

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.6	16.8	23.9
4	93.6	0.3	110.6	17.0	24.1
5	93.9	0.0	110.6	16.7	23.7
6	93.7	0.2	110.1	16.4	23.2
7	93.8	167.3	109.5	15.7	22.2
8	94.0	0.0	110.6	16.6	23.6
9	93.8	0.0	110.8	17.0	24.1
10	94.1	0.0	111.3	17.2	24.3
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.9
22	93.6	0.2	110.9	17.3	24.5
23	93.6	0.3	110.8	17.2	24.4
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.5
28	93.8	0.1	110.7	16.9	24.0
29	93.7	0.2	110.8	17.1	24.2

Table 7d
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 7

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.7	16.9	24.0
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	24.0
34	93.6	0.0	110.7	17.1	24.3
35	93.7	0.0	110.7	17.0	24.1
36	93.7	0.3	110.7	17.0	24.1
37	93.2	0.0	111.2	18.0	25.5
38	93.2	0.3	111.1	17.9	25.4
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.8	17.2	24.3
43	93.6	0.0	110.7	17.1	24.2
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.6	16.8	23.9
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7e
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 9

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.0	17.5	24.8
2	93.6	0.3	111.0	17.4	24.7
3	93.8	0.0	111.0	17.2	24.4
4	93.6	0.3	111.0	17.4	24.7
5	93.9	0.0	111.0	17.1	24.2
6	93.7	0.2	110.9	17.2	24.3
7	93.8	0.3	110.7	16.9	24.0
8	94.0	0.0	110.6	16.6	23.5
9	93.8	167.0	110.3	16.5	23.4
10	94.1	0.0	111.2	17.1	24.2
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.2
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.6
20	93.5	0.1	111.3	17.8	25.2
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.0	17.4	24.7
24	93.8	0.2	111.2	17.4	24.7
25	93.8	0.3	111.3	17.5	24.7
26	93.4	0.2	111.3	17.9	25.4
27	94.1	0.2	110.7	16.6	23.6
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.4

Table 7e
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 9

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.0	17.2	24.4
31	93.8	0.2	110.9	17.1	24.3
32	93.9	0.3	111.0	17.1	24.2
33	93.8	0.3	111.0	17.2	24.4
34	93.6	0.0	111.0	17.4	24.7
35	93.7	0.0	111.0	17.3	24.5
36	93.7	0.3	111.0	17.3	24.6
37	93.2	0.0	111.3	18.1	25.6
38	93.2	0.3	111.2	18.0	25.6
39	93.3	0.0	111.2	17.9	25.3
40	93.3	0.3	111.1	17.8	25.3
41	93.4	0.3	111.1	17.7	25.1
42	93.6	0.0	111.0	17.4	24.7
43	93.6	0.0	111.0	17.4	24.7
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.0	17.2	24.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7f
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 10

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.3	17.8	25.3
2	93.6	0.3	111.3	17.7	25.1
3	93.8	0.0	111.3	17.5	24.8
4	93.6	0.3	111.3	17.7	25.1
5	93.9	0.0	111.3	17.4	24.7
6	93.7	0.2	111.3	17.6	24.9
7	93.8	0.3	111.2	17.4	24.7
8	94.0	0.0	111.2	17.2	24.4
9	93.8	0.0	111.1	17.3	24.5
10	94.1	167.0	110.9	16.8	23.8
11	94.5	0.0	111.5	17.0	24.1
12	94.5	0.3	111.5	17.0	24.1
13	94.4	0.5	111.5	17.1	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.6	17.8	25.2
16	93.7	0.0	111.6	17.9	25.3
17	93.6	0.3	111.6	18.0	25.5
18	93.6	2.6	111.6	18.0	25.5
19	93.3	0.0	111.4	18.1	25.7
20	93.5	0.1	111.4	17.9	25.4
21	93.4	0.2	111.4	18.0	25.5
22	93.6	0.2	111.4	17.8	25.2
23	93.6	0.3	111.3	17.7	25.1
24	93.8	0.2	111.0	17.2	24.4
25	93.8	0.3	111.2	17.4	24.6
26	93.4	0.2	111.4	18.0	25.5
27	94.1	0.2	111.2	17.1	24.3
28	93.8	0.1	111.3	17.5	24.8
29	93.7	0.2	111.3	17.6	25.0

Table 7f
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 10

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.3	17.5	24.9
31	93.8	0.2	111.3	17.5	24.8
32	93.9	0.3	111.3	17.4	24.7
33	93.8	0.3	111.3	17.5	24.8
34	93.6	0.0	111.3	17.7	25.1
35	93.7	0.0	111.3	17.6	25.0
36	93.7	0.3	111.3	17.6	25.0
37	93.2	0.0	111.4	18.2	25.8
38	93.2	0.3	111.4	18.2	25.8
39	93.3	0.0	111.4	18.1	25.7
40	93.3	0.3	111.4	18.1	25.6
41	93.4	0.3	111.4	18.0	25.5
42	93.6	0.0	111.3	17.7	25.2
43	93.6	0.0	111.3	17.7	25.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.9
46	94.0	0.0	111.8	17.8	25.3
47	94.0	0.1	111.8	17.8	25.3
48	94.5	0.0	111.8	17.3	24.6
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.3	17.5	24.8
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7g
Post Confiration Condition
Max Daily Demand and Fire Flow at Node13

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.6	18.1	25.6
2	93.6	0.3	111.6	18.0	25.5
3	93.8	0.0	111.6	17.8	25.2
4	93.6	0.3	111.6	18.0	25.5
5	93.9	0.0	111.6	17.7	25.0
6	93.7	0.2	111.6	17.9	25.3
7	93.8	0.3	111.6	17.8	25.2
8	94.0	0.0	111.6	17.6	24.9
9	93.8	0.0	111.6	17.8	25.2
10	94.1	0.0	111.5	17.4	24.7
11	94.5	0.0	111.5	17.0	24.1
12	94.5	0.3	110.9	16.4	23.2
13	94.4	167.5	109.9	15.5	22.0
14	94.0	0.3	110.4	16.4	23.2
15	93.8	0.3	110.8	17.0	24.1
16	93.7	0.0	111.0	17.3	24.5
17	93.6	0.3	111.2	17.6	25.0
18	93.6	2.6	111.6	18.0	25.5
19	93.3	0.0	111.6	18.3	25.9
20	93.5	0.1	111.6	18.1	25.6
21	93.4	0.2	111.6	18.2	25.8
22	93.6	0.2	111.6	18.0	25.5
23	93.6	0.3	111.6	18.0	25.5
24	93.8	0.2	111.5	17.7	25.2
25	93.8	0.3	111.6	17.8	25.2
26	93.4	0.2	111.6	18.2	25.8
27	94.1	0.2	111.6	17.5	24.8
28	93.8	0.1	111.6	17.8	25.2
29	93.7	0.2	111.6	17.9	25.3

Table 7g
Post Confiration Condition
Max Daily Demand and Fire Flow at Node13

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.6	17.8	25.2
31	93.8	0.2	111.6	17.8	25.2
32	93.9	0.3	111.6	17.7	25.0
33	93.8	0.3	111.6	17.8	25.2
34	93.6	0.0	111.6	18.0	25.5
35	93.7	0.0	111.6	17.9	25.3
36	93.7	0.3	111.6	17.9	25.3
37	93.2	0.0	111.6	18.4	26.0
38	93.2	0.3	111.6	18.4	26.0
39	93.3	0.0	111.6	18.3	25.9
40	93.3	0.3	111.6	18.3	25.9
41	93.4	0.3	111.6	18.2	25.8
42	93.6	0.0	111.6	18.0	25.5
43	93.6	0.0	111.6	18.0	25.5
44	94.1	0	111.84	17.74	25.2
45	94.3	5.1	111.8	17.5	24.9
46	94.0	0.0	111.8	17.8	25.3
47	94.0	0.1	111.8	17.8	25.3
48	94.5	0.0	111.8	17.3	24.6
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.6	17.8	25.2
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7h
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 16

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.5	18.0	25.6
2	93.6	0.3	111.5	17.9	25.4
3	93.8	0.0	111.5	17.7	25.1
4	93.6	0.3	111.5	17.9	25.4
5	93.9	0.0	111.5	17.6	25.0
6	93.7	0.2	111.5	17.8	25.3
7	93.8	0.3	111.5	17.7	25.1
8	94.0	0.0	111.5	17.5	24.9
9	93.8	0.0	111.5	17.7	25.2
10	94.1	0.0	111.6	17.5	24.8
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.3	16.8	23.9
13	94.4	0.5	111.0	16.6	23.5
14	94.0	0.3	110.6	16.6	23.5
15	93.8	0.3	110.2	16.4	23.3
16	93.7	167.0	110.1	16.4	23.2
17	93.6	0.3	110.7	17.1	24.2
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.5	18.2	25.8
20	93.5	0.1	111.5	18.0	25.6
21	93.4	0.2	111.5	18.1	25.7
22	93.6	0.2	111.5	17.9	25.4
23	93.6	0.3	111.5	17.9	25.4
24	93.8	0.2	111.6	17.8	25.2
25	93.8	0.3	111.5	17.7	25.1
26	93.4	0.2	111.5	18.1	25.7
27	94.1	0.2	111.5	17.4	24.7
28	93.8	0.1	111.5	17.7	25.1
29	93.7	0.2	111.5	17.8	25.3

Table 7h
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 16

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.5	17.7	25.1
31	93.8	0.2	111.5	17.7	25.1
32	93.9	0.3	111.5	17.6	25.0
33	93.8	0.3	111.5	17.7	25.1
34	93.6	0.0	111.5	17.9	25.4
35	93.7	0.0	111.5	17.8	25.3
36	93.7	0.3	111.5	17.8	25.3
37	93.2	0.0	111.5	18.3	26.0
38	93.2	0.3	111.5	18.3	26.0
39	93.3	0.0	111.5	18.2	25.8
40	93.3	0.3	111.5	18.2	25.8
41	93.4	0.3	111.5	18.1	25.7
42	93.6	0.0	111.5	17.9	25.4
43	93.6	0.0	111.5	17.9	25.4
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.5	17.7	25.1
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7i
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 20

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.1	17.6	25.0
2	93.6	0.3	111.1	17.5	24.9
3	93.8	0.0	111.1	17.3	24.6
4	93.6	0.3	111.1	17.5	24.9
5	93.9	0.0	111.1	17.2	24.4
6	93.7	0.2	111.2	17.5	24.8
7	93.8	0.3	111.2	17.4	24.6
8	94.0	0.0	111.2	17.2	24.4
9	93.8	0.0	111.3	17.5	24.8
10	94.1	0.0	111.4	17.3	24.6
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.3
18	93.6	2.6	111.4	17.8	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	167.1	111.0	17.5	24.8
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.1	17.5	24.8
24	93.8	0.2	111.4	17.6	24.9
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.2	17.1	24.2
28	93.8	0.1	111.1	17.3	24.6
29	93.7	0.2	111.1	17.4	24.7

Table 7i
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 20

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.1	17.3	24.5
31	93.8	0.2	111.1	17.3	24.6
32	93.9	0.3	111.1	17.2	24.4
33	93.8	0.3	111.1	17.3	24.6
34	93.6	0.0	111.1	17.5	24.8
35	93.7	0.0	111.1	17.4	24.7
36	93.7	0.3	111.1	17.4	24.7
37	93.2	0.0	111.2	18.0	25.5
38	93.2	0.3	111.2	18.0	25.5
39	93.3	0.0	111.2	17.9	25.3
40	93.3	0.3	111.2	17.9	25.3
41	93.4	0.3	111.1	17.7	25.2
42	93.6	0.0	111.1	17.5	24.9
43	93.6	0.0	111.1	17.5	24.9
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.7	17.4	24.7
46	94.0	0.0	111.7	17.7	25.2
47	94.0	0.1	111.7	17.7	25.2
48	94.5	0.0	111.7	17.2	24.4
49	94.4	0.2	111.7	17.3	24.6
50	93.8	0.0	111.1	17.3	24.6
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7j
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 22

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.8	17.3	24.5
2	93.6	0.3	110.8	17.2	24.3
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.7	17.1	24.3
5	93.9	0.0	110.7	16.8	23.9
6	93.7	0.2	110.8	17.1	24.2
7	93.8	0.3	110.9	17.1	24.2
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.1	17.6	25.0
21	93.4	0.2	110.8	17.4	24.6
22	93.6	167.2	110.5	16.9	23.9
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.8	17.0	24.1
29	93.7	0.2	110.8	17.1	24.2

Table 7j
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 22

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.8	17.0	24.1
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	24.0
34	93.6	0.0	110.7	17.1	24.2
35	93.7	0.0	110.7	17.0	24.1
36	93.7	0.3	110.7	17.0	24.2
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.1	17.9	25.3
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.8	17.2	24.3
43	93.6	0.0	110.8	17.2	24.3
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	24.0
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7k
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 25

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.3	17.8	25.2
2	93.6	0.3	111.3	17.7	25.1
3	93.8	0.0	111.3	17.5	24.8
4	93.6	0.3	111.3	17.7	25.1
5	93.9	0.0	111.3	17.4	24.6
6	93.7	0.2	111.3	17.6	24.9
7	93.8	0.3	111.3	17.5	24.8
8	94.0	0.0	111.3	17.3	24.5
9	93.8	0.0	111.3	17.5	24.8
10	94.1	0.0	111.2	17.1	24.3
11	94.5	0.0	111.6	17.1	24.2
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.3
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.3	17.8	25.2
21	93.4	0.2	111.3	17.9	25.4
22	93.6	0.2	111.3	17.7	25.1
23	93.6	0.3	111.3	17.7	25.1
24	93.8	0.2	110.6	16.8	23.9
25	93.8	167.3	109.7	15.9	22.5
26	93.4	0.2	110.7	17.3	24.5
27	94.1	0.2	111.3	17.2	24.3
28	93.8	0.1	111.3	17.5	24.8
29	93.7	0.2	111.3	17.6	24.9

Table 7k
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 25

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.3	17.5	24.8
31	93.8	0.2	111.3	17.5	24.8
32	93.9	0.3	111.3	17.4	24.6
33	93.8	0.3	111.3	17.5	24.8
34	93.6	0.0	111.3	17.7	25.1
35	93.7	0.0	111.3	17.6	24.9
36	93.7	0.3	111.3	17.6	24.9
37	93.2	0.0	111.3	18.1	25.7
38	93.2	0.3	111.3	18.1	25.7
39	93.3	0.0	111.3	18.0	25.5
40	93.3	0.3	111.3	18.0	25.5
41	93.4	0.3	111.3	17.9	25.4
42	93.6	0.0	111.3	17.7	25.1
43	93.6	0.0	111.3	17.7	25.1
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.7
50	93.8	0.0	111.3	17.5	24.8
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7I
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 32

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.7	17.2	24.4
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.7	17.1	24.2
5	93.9	0.0	110.7	16.8	23.8
6	93.7	0.2	110.7	17.0	24.1
7	93.8	0.3	110.7	16.9	24.0
8	94.0	0.0	110.8	16.8	23.8
9	93.8	0.0	110.9	17.1	24.3
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.2
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.4
19	93.3	0.0	111.3	18.0	25.5
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.7
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.7	16.6	23.5
28	93.8	0.1	110.6	16.8	23.8
29	93.7	0.2	110.6	16.9	24.0

Table 7I
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 32

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.8	17.0	24.0
31	93.8	0.2	110.2	16.4	23.3
32	93.9	167.3	109.6	15.7	22.3
33	93.8	0.3	110.2	16.4	23.2
34	93.6	0.0	110.6	17.0	24.1
35	93.7	0.0	110.6	16.9	24.0
36	93.7	0.3	110.7	17.0	24.1
37	93.2	0.0	111.1	17.9	25.4
38	93.2	0.3	111.1	17.9	25.3
39	93.3	0.0	111.0	17.7	25.1
40	93.3	0.3	110.9	17.6	25.0
41	93.4	0.3	110.8	17.4	24.7
42	93.6	0.0	110.7	17.1	24.3
43	93.6	0.0	110.7	17.1	24.3
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	23.9
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7m
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 36

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.2	16.7	23.6
2	93.6	0.3	110.3	16.7	23.6
3	93.8	0.0	110.3	16.5	23.4
4	93.6	0.3	110.4	16.8	23.8
5	93.9	0.0	110.5	16.6	23.6
6	93.7	0.2	110.6	16.9	24.0
7	93.8	0.3	110.8	17.0	24.0
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.8
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.6	17.0	24.1
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.3

Table 7m
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 36

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.2
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.8
33	93.8	0.3	110.6	16.8	23.9
34	93.6	0.0	110.6	17.0	24.0
35	93.7	0.0	110.5	16.8	23.9
36	93.7	167.3	109.3	15.6	22.1
37	93.2	0.0	111.0	17.8	25.2
38	93.2	0.3	110.8	17.6	24.9
39	93.3	0.0	110.6	17.3	24.5
40	93.3	0.3	110.4	17.1	24.3
41	93.4	0.3	110.1	16.7	23.7
42	93.6	0.0	109.9	16.3	23.2
43	93.6	0.0	110.1	16.5	23.4
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.7
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7n
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 39

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.6	17.1	24.2
2	93.6	0.3	110.7	17.1	24.2
3	93.8	0.0	110.7	16.9	24.0
4	93.6	0.3	110.8	17.2	24.4
5	93.9	0.0	111.0	17.1	24.2
6	93.7	0.2	111.0	17.3	24.5
7	93.8	0.3	111.1	17.3	24.5
8	94.0	0.0	111.1	17.1	24.3
9	93.8	0.0	111.2	17.4	24.7
10	94.1	0.0	111.4	17.3	24.5
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.3
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	111.1	17.7	25.1
22	93.6	0.2	111.1	17.5	24.8
23	93.6	0.3	111.0	17.4	24.7
24	93.8	0.2	111.4	17.6	24.9
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.1	17.0	24.1
28	93.8	0.1	111.1	17.3	24.5
29	93.7	0.2	111.1	17.4	24.7

Table 7n
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 39

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.1	17.3	24.5
31	93.8	0.2	111.1	17.3	24.5
32	93.9	0.3	111.0	17.1	24.3
33	93.8	0.3	111.0	17.2	24.4
34	93.6	0.0	111.0	17.4	24.6
35	93.7	0.0	111.0	17.3	24.5
36	93.7	0.3	110.6	16.9	24.0
37	93.2	0.0	109.9	16.7	23.7
38	93.2	0.3	109.1	15.9	22.6
39	93.3	167.0	108.3	15.0	21.3
40	93.3	0.3	108.8	15.5	21.9
41	93.4	0.3	109.8	16.4	23.2
42	93.6	0.0	110.3	16.7	23.7
43	93.6	0.0	110.5	16.9	24.0
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.8	17.5	24.7
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	111.0	17.2	24.3
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7o
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 41

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	110.1	16.6	23.5
2	93.6	0.3	110.3	16.7	23.6
3	93.8	0.0	110.4	16.6	23.5
4	93.6	0.3	110.5	16.9	24.0
5	93.9	0.0	110.7	16.8	23.9
6	93.7	0.2	110.8	17.1	24.3
7	93.8	0.3	110.9	17.1	24.3
8	94.0	0.0	111.0	17.0	24.2
9	93.8	0.0	111.1	17.3	24.6
10	94.1	0.0	111.4	17.3	24.5
11	94.5	0.0	111.7	17.2	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.2
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	111.0	17.6	25.0
22	93.6	0.2	110.9	17.3	24.6
23	93.6	0.3	110.8	17.2	24.4
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.2	17.8	25.3
27	94.1	0.2	111.0	16.9	24.0
28	93.8	0.1	111.0	17.2	24.4
29	93.7	0.2	111.0	17.3	24.5

Table 7o
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 41

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.0	17.2	24.4
31	93.8	0.2	110.9	17.1	24.3
32	93.9	0.3	110.9	17.0	24.0
33	93.8	0.3	110.8	17.0	24.1
34	93.6	0.0	110.8	17.2	24.4
35	93.7	0.0	110.7	17.0	24.2
36	93.7	0.3	110.2	16.5	23.4
37	93.2	0.0	110.6	17.4	24.6
38	93.2	0.3	110.1	16.9	24.0
39	93.3	0.0	109.7	16.4	23.2
40	93.3	0.3	109.4	16.1	22.8
41	93.4	167.3	108.7	15.3	21.7
42	93.6	0.0	109.7	16.1	22.8
43	93.6	0.0	110.0	16.4	23.2
44	94.1	0.0	111.8	17.7	25.0
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.7	16.9	24.0
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7p
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 43

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	108.7	15.2	21.5
2	93.6	0.3	109.1	15.5	22.0
3	93.8	0.0	109.5	15.7	22.2
4	93.6	0.3	109.9	16.3	23.1
5	93.9	0.0	110.5	16.6	23.5
6	93.7	0.2	110.6	16.9	24.0
7	93.8	0.3	110.8	17.0	24.0
8	94.0	0.0	110.9	16.9	24.0
9	93.8	0.0	111.0	17.2	24.4
10	94.1	0.0	111.3	17.2	24.4
11	94.5	0.0	111.6	17.1	24.3
12	94.5	0.3	111.6	17.1	24.3
13	94.4	0.5	111.6	17.2	24.4
14	94.0	0.3	111.6	17.6	24.9
15	93.8	0.3	111.5	17.7	25.1
16	93.7	0.0	111.5	17.8	25.3
17	93.6	0.3	111.5	17.9	25.4
18	93.6	2.6	111.5	17.9	25.3
19	93.3	0.0	111.2	17.9	25.4
20	93.5	0.1	111.2	17.7	25.1
21	93.4	0.2	110.9	17.5	24.9
22	93.6	0.2	110.8	17.2	24.4
23	93.6	0.3	110.7	17.1	24.2
24	93.8	0.2	111.3	17.5	24.8
25	93.8	0.3	111.3	17.5	24.8
26	93.4	0.2	111.3	17.9	25.3
27	94.1	0.2	110.9	16.8	23.8
28	93.8	0.1	110.9	17.1	24.2
29	93.7	0.2	110.9	17.2	24.4

Table 7p
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 43

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	110.9	17.1	24.3
31	93.8	0.2	110.8	17.0	24.1
32	93.9	0.3	110.7	16.8	23.9
33	93.8	0.3	110.7	16.9	23.9
34	93.6	0.0	110.6	17.0	24.1
35	93.7	0.0	110.6	16.9	23.9
36	93.7	0.3	110.2	16.5	23.3
37	93.2	0.0	110.9	17.7	25.1
38	93.2	0.3	110.7	17.5	24.8
39	93.3	0.0	110.5	17.2	24.4
40	93.3	0.3	110.3	17.0	24.1
41	93.4	0.3	110.0	16.6	23.5
42	93.6	0.0	109.8	16.2	23.0
43	93.6	167.0	108.4	14.8	20.9
44	94.1	0.0	111.8	17.7	25.1
45	94.3	5.1	111.8	17.5	24.8
46	94.0	0.0	111.8	17.8	25.2
47	94.0	0.1	111.8	17.8	25.2
48	94.5	0.0	111.8	17.3	24.5
49	94.4	0.2	111.8	17.4	24.6
50	93.8	0.0	110.5	16.7	23.7
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7q
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 46

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.7	18.2	25.8
2	93.6	0.3	111.7	18.1	25.6
3	93.8	0.0	111.7	17.9	25.4
4	93.6	0.3	111.7	18.1	25.7
5	93.9	0.0	111.7	17.8	25.2
6	93.7	0.2	111.7	18.0	25.5
7	93.8	0.3	111.7	17.9	25.4
8	94.0	0.0	111.7	17.7	25.1
9	93.8	0.0	111.7	17.9	25.4
10	94.1	0.0	111.8	17.7	25.1
11	94.5	0.0	111.9	17.4	24.7
12	94.5	0.3	111.9	17.4	24.6
13	94.4	0.5	111.8	17.4	24.7
14	94.0	0.3	111.8	17.8	25.2
15	93.8	0.3	111.7	17.9	25.4
16	93.7	0.0	111.7	18.0	25.5
17	93.6	0.3	111.7	18.1	25.6
18	93.6	2.6	111.6	18.0	25.6
19	93.3	0.0	111.7	18.4	26.0
20	93.5	0.1	111.7	18.2	25.8
21	93.4	0.2	111.7	18.3	25.9
22	93.6	0.2	111.7	18.1	25.6
23	93.6	0.3	111.7	18.1	25.6
24	93.8	0.2	111.8	18.0	25.5
25	93.8	0.3	111.7	17.9	25.4
26	93.4	0.2	111.7	18.3	25.9
27	94.1	0.2	111.7	17.6	25.0
28	93.8	0.1	111.7	17.9	25.4
29	93.7	0.2	111.7	18.0	25.5

Table 7q
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 46

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.7	17.9	25.4
31	93.8	0.2	111.7	17.9	25.4
32	93.9	0.3	111.7	17.8	25.2
33	93.8	0.3	111.7	17.9	25.4
34	93.6	0.0	111.7	18.1	25.6
35	93.7	0.0	111.7	18.0	25.5
36	93.7	0.3	111.7	18.0	25.5
37	93.2	0.0	111.7	18.5	26.2
38	93.2	0.3	111.7	18.5	26.2
39	93.3	0.0	111.7	18.4	26.0
40	93.3	0.3	111.7	18.4	26.1
41	93.4	0.3	111.7	18.3	25.9
42	93.6	0.0	111.7	18.1	25.6
43	93.6	0.0	111.7	18.1	25.6
44	94.1	0.0	111.6	17.5	24.8
45	94.3	5.1	110.8	16.5	23.4
46	94.0	167.0	110.2	16.2	22.9
47	94.0	0.1	110.3	16.3	23.2
48	94.5	0.0	110.5	16.0	22.7
49	94.4	0.2	110.7	16.3	23.1
50	93.8	0.0	111.7	17.9	25.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 7r
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 48

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.0	111.7	18.2	25.8
2	93.6	0.3	111.7	18.1	25.6
3	93.8	0.0	111.7	17.9	25.4
4	93.6	0.3	111.7	18.1	25.7
5	93.9	0.0	111.7	17.8	25.2
6	93.7	0.2	111.7	18.0	25.5
7	93.8	0.3	111.7	17.9	25.4
8	94.0	0.0	111.7	17.7	25.1
9	93.8	0.0	111.7	17.9	25.4
10	94.1	0.0	111.8	17.7	25.1
11	94.5	0.0	111.9	17.4	24.7
12	94.5	0.3	111.9	17.4	24.6
13	94.4	0.5	111.8	17.4	24.7
14	94.0	0.3	111.8	17.8	25.2
15	93.8	0.3	111.7	17.9	25.4
16	93.7	0.0	111.7	18.0	25.5
17	93.6	0.3	111.7	18.1	25.6
18	93.6	2.6	111.6	18.0	25.6
19	93.3	0.0	111.7	18.4	26.0
20	93.5	0.1	111.7	18.2	25.8
21	93.4	0.2	111.7	18.3	25.9
22	93.6	0.2	111.7	18.1	25.6
23	93.6	0.3	111.7	18.1	25.6
24	93.8	0.2	111.8	18.0	25.5
25	93.8	0.3	111.7	17.9	25.4
26	93.4	0.2	111.7	18.3	25.9
27	94.1	0.2	111.7	17.6	25.0
28	93.8	0.1	111.7	17.9	25.4
29	93.7	0.2	111.7	18.0	25.5

Table 7r
Post Confiration Condition
Max Daily Demand and Fire Flow at Node 48

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.2	111.7	17.9	25.4
31	93.8	0.2	111.7	17.9	25.4
32	93.9	0.3	111.7	17.8	25.2
33	93.8	0.3	111.7	17.9	25.4
34	93.6	0.0	111.7	18.1	25.6
35	93.7	0.0	111.7	18.0	25.5
36	93.7	0.3	111.7	18.0	25.5
37	93.2	0.0	111.7	18.5	26.2
38	93.2	0.3	111.7	18.5	26.2
39	93.3	0.0	111.7	18.4	26.0
40	93.3	0.3	111.7	18.4	26.1
41	93.4	0.3	111.7	18.3	25.9
42	93.6	0.0	111.7	18.1	25.6
43	93.6	0.0	111.7	18.1	25.6
44	94.1	0.0	111.6	17.5	24.8
45	94.3	5.1	110.8	16.5	23.4
46	94.0	0.0	110.6	16.6	23.5
47	94.0	0.1	109.9	15.9	22.5
48	94.5	167.0	109.1	14.6	20.6
49	94.4	0.2	110.0	15.6	22.2
50	93.8	0.0	111.7	17.9	25.4
51*	N/A	N/A	112.3	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Table 8
Post Configuration Condition
Peak Hour Check

Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
1	93.5	0.00	137.87	44.4	62.9
2	93.6	0.60	137.87	44.3	62.8
3	93.8	0.00	137.87	44.1	62.5
4	93.6	0.60	137.87	44.3	62.8
5	93.9	0.00	137.87	44.0	62.3
6	93.7	0.49	137.87	44.2	62.6
7	93.8	0.60	137.87	44.1	62.5
8	94.0	0.00	137.87	43.9	62.2
9	93.8	0.00	137.87	44.1	62.5
10	94.1	0.00	137.87	43.8	62.1
11	94.5	0.00	137.88	43.4	61.5
12	94.5	0.60	137.88	43.4	61.5
13	94.4	0.98	137.88	43.5	61.7
14	94.0	0.60	137.87	43.9	62.2
15	93.8	0.60	137.87	44.1	62.5
16	93.7	0.00	137.87	44.2	62.6
17	93.6	0.74	137.87	44.3	62.8
18	93.6	5.61	137.87	44.3	62.8
19	93.3	0.00	137.87	44.6	63.2
20	93.5	0.25	137.87	44.4	62.9
21	93.4	0.38	137.87	44.5	63.1
22	93.6	0.38	137.87	44.3	62.8
23	93.6	0.56	137.87	44.3	62.8
24	93.8	0.49	137.87	44.1	62.5
25	93.8	0.60	137.87	44.1	62.5
26	93.4	0.38	137.87	44.5	63.1
27	94.1	0.42	137.87	43.8	62.1
28	93.8	0.20	137.87	44.1	62.5
29	93.7	0.38	137.87	44.2	62.6

Table 8
Post Configuration Condition
Peak Hour Check

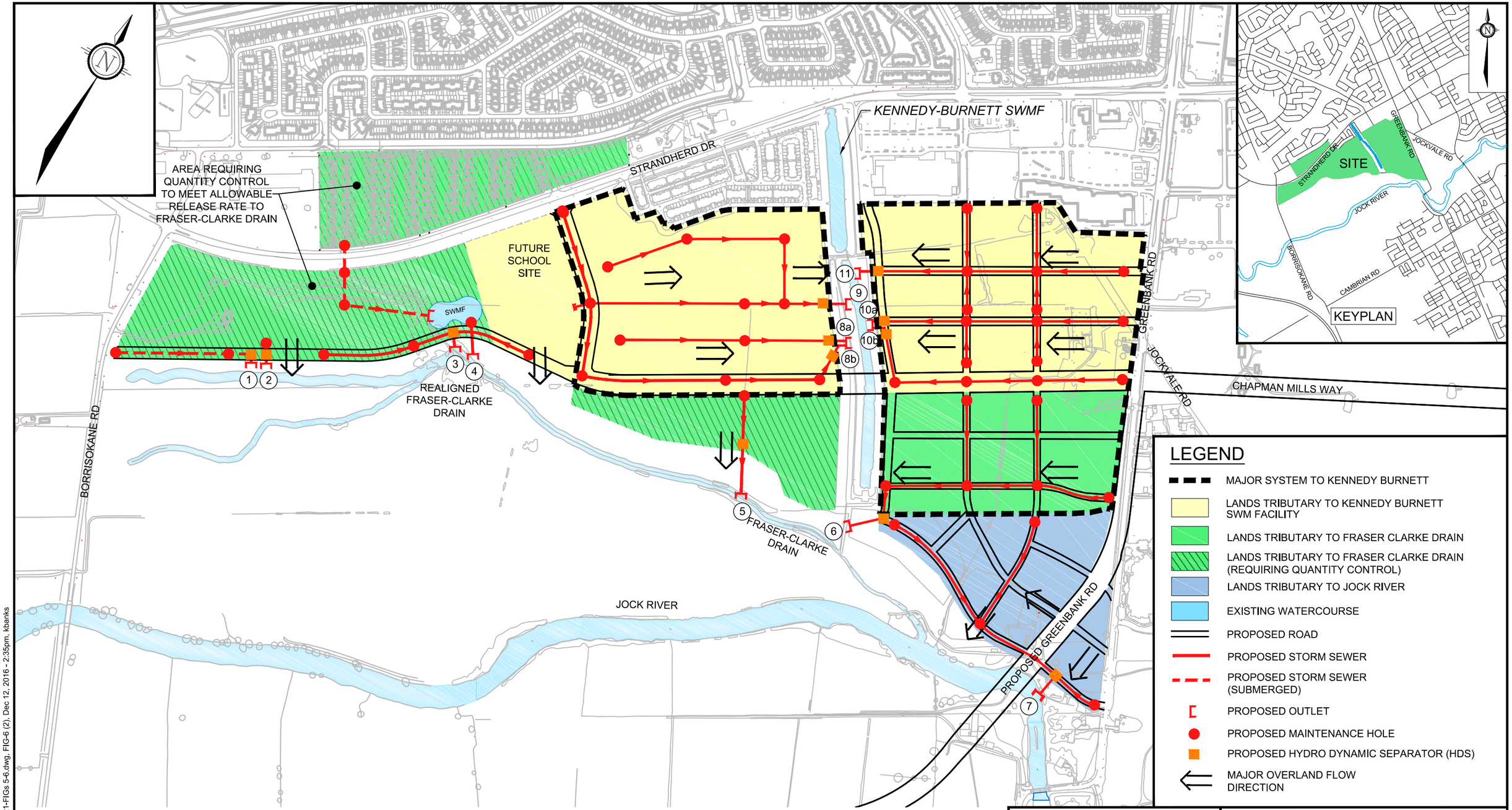
Node	Elevation (m)	Demand (LPS)	Head (m)	Pressure (m)	Pressure (PSI)
30	93.8	0.38	137.87	44.1	62.5
31	93.8	0.38	137.87	44.1	62.5
32	93.9	0.67	137.87	44.0	62.3
33	93.8	0.56	137.87	44.1	62.5
34	93.6	0.00	137.87	44.3	62.8
35	93.7	0.00	137.87	44.2	62.6
36	93.7	0.60	137.87	44.2	62.6
37	93.2	0.00	137.87	44.7	63.3
38	93.2	0.60	137.87	44.7	63.3
39	93.3	0.00	137.87	44.6	63.2
40	93.3	0.60	137.87	44.6	63.2
41	93.4	0.60	137.87	44.5	63.1
42	93.6	0.00	137.87	44.3	62.8
43	93.6	0.00	137.87	44.3	62.8
44	94.1	0.00	137.87	43.8	62.1
45	94.3	11.23	137.87	43.6	61.8
46	94.0	0.00	137.87	43.9	62.2
47	94.0	0.25	137.87	43.9	62.2
48	94.5	0.00	137.87	43.4	61.5
49	94.4	0.49	137.87	43.5	61.6
50	93.8	0.00	137.87	44.1	62.5
51*	N/A	N/A	137.9	N/A	N/A

*** Boundary Condition**

Minimum Pressure

Appendix D

SWM Calculations & PCSWMM Model



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KENNEDY-BURNETT SWMF SERVICING OPTIONS

OPTION 4: HYBRID EXPANDED K-B SWIMF / HDS UNITS

SCALE 1 : 7500 (0, 100, 200, 300)
DATE DEC 2016
JOB 113221
FIGURE FIG-6

M:\2013\113221\CAD\Design\Figures\SWM\113221-FIGs 5-6.dwg, FIG-6 (2), Dec 12, 2016 - 2:35pm, kbanks

Burnett Lands - 3370 Greenbank Road
Post-Development Model Parameters

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Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Burnett Lands - Claridge						
A-01	0.235	0.65	64%	50%	43	0.75%
A-02	0.249	0.65	64%	50%	36	0.75%
A-03	0.127	0.65	64%	75%	36	0.75%
A-04	0.302	0.65	64%	50%	34	0.75%
A-05	0.275	0.65	64%	75%	37	0.75%
A-06	0.274	0.65	64%	60%	37	0.75%
A-07	0.289	0.65	64%	50%	39	0.75%
A-08	0.246	0.65	64%	75%	41	0.75%
A-09	0.081	0.65	64%	50%	23	0.75%
A-10	0.187	0.65	64%	50%	37	0.75%
A-11	0.225	0.65	64%	50%	25	0.75%
A-12	0.036	0.65	64%	100%	24	0.75%
A-13	0.200	0.65	64%	50%	24	0.75%
A-14	0.195	0.65	64%	50%	23	0.75%
A-15	0.105	0.65	64%	100%	30	0.75%
A-16	0.128	0.65	64%	100%	32	0.75%
A-17	0.246	0.65	64%	50%	49	0.75%
A-18	0.272	0.65	64%	50%	32	0.75%
A-19	0.122	0.65	64%	100%	31	0.75%
A-20	0.130	0.65	64%	100%	29	0.75%
A-21	0.217	0.65	64%	50%	27	0.75%
A-22	0.060	0.65	64%	100%	24	0.75%
A-23	0.457	0.65	64%	75%	46	0.75%
A-24	0.209	0.65	64%	75%	28	0.75%
A-25	0.214	0.65	64%	75%	29	0.75%
A-26	0.448	0.65	64%	70%	45	0.75%
A-27	0.190	0.65	64%	75%	32	0.75%
A-28	0.119	0.65	64%	0%	18	0.75%
A-29	0.231	0.65	64%	60%	46	0.75%
A-30	0.498	0.65	64%	50%	71	0.75%
A-31	0.061	0.65	64%	0%	20	0.75%
A-32	0.450	0.65	64%	75%	56	0.75%
A-33	0.816	0.65	64%	50%	117	0.75%
A-34	0.773	0.65	64%	0%	55	0.75%
A-35	0.983	0.65	64%	0%	70	0.75%
A-36	0.450	0.65	64%	0%	60	0.75%
A-37	0.372	0.65	64%	0%	53	0.75%

Burnett Lands - 3370 Greenbank Road
Post-Development Model Parameters

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Area ID	Catchment Area (ha)	Runoff Coefficient	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Street B - Caivan Lands						
B-01	0.092	0.65	64%	50%	28	0.75%
B-02	0.149	0.65	64%	0%	23	0.75%
B-03	0.097	0.65	64%	10%	32	0.75%
B-04	0.825	0.65	64%	50%	110	0.75%
B-05	0.064	0.65	64%	100%	27	0.75%
B-06	0.076	0.65	64%	0%	19	0.75%
B-07	0.127	0.65	64%	40%	32	0.75%
B-08	0.225	0.65	64%	50%	32	0.75%
B-09	0.245	0.65	64%	50%	34	0.75%
B-10	1.115	0.30	14%	0%	149	0.75%
B-11	0.049	0.65	64%	0%	13	0.75%
B-12	0.088	0.65	64%	50%	20	0.75%
B-13	0.097	0.65	64%	50%	22	0.75%
B-14	0.320	0.65	64%	50%	73	0.75%
B-15	0.120	0.65	64%	50%	27	0.75%
B-16	0.136	0.65	64%	50%	31	0.75%
B-17	0.247	0.65	64%	50%	33	0.75%
B-18	0.121	0.65	64%	50%	28	0.75%
B-19	0.107	0.65	64%	50%	22	0.75%
CaivanLands	8.101	0.65	64%	50%	200	0.50%

Burnett Lands - 3370 Greenbank Road

Inlet Control Device Parameters

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Structure	ICD Size & Inlet Rate			5-year Peak Flow* (L/s)
	Diameter (mm)	Max Head (m)	5-year Inlet Capture (L/s)	
Burnett Lands - Claridge				
CB01-02	127	1.14	37.09	50.15
CB03-04	127	1.23	38.53	48.26
CB05-06	152	1.12	52.83	58.43
CB07-08	127	1.14	37.09	50.69
CB09-10	127	1.04	35.42	4.80
CB11-12	108	1.19	27.40	54.07
CB13-14	102	1.15	24.05	27.65
CB15-16	108	1.15	26.93	56.86
CB17-18	102	1.15	24.05	49.60
CB19	83	1.16	15.99	17.43
CB20-21	156	1.12	55.60	80.41
CB22	108	1.15	26.93	37.97
CB23	108	1.15	26.93	38.91
CB24-25	127	1.14	37.09	44.09
CB26-27	178	1.11	72.03	86.47
CB28	127	1.15	37.25	47.94
CB29	94	1.15	20.46	29.12
CB30-31	127	1.14	37.09	38.46
CB32-33	127	1.14	37.09	44.92
CB34-35	127	1.14	37.09	44.34
CB40-41	178	1.11	72.03	87.24
CB42-43	152	1.12	52.83	52.25
CB44-45	127	1.23	38.53	50.39
CB59	83	1.16	15.99	6.67
CB60	102	1.15	24.05	24.03
CB61	83	1.16	15.99	11.11
CB62	108	1.15	26.93	22.56
CB63	108	1.15	26.93	23.67
CB64	102	1.15	24.05	19.43
CB66	83	1.16	15.99	13.15
CB67-68-69	178	1.17	73.95	85.77

Burnett Lands - 3370 Greenbank Road

Inlet Control Device Parameters

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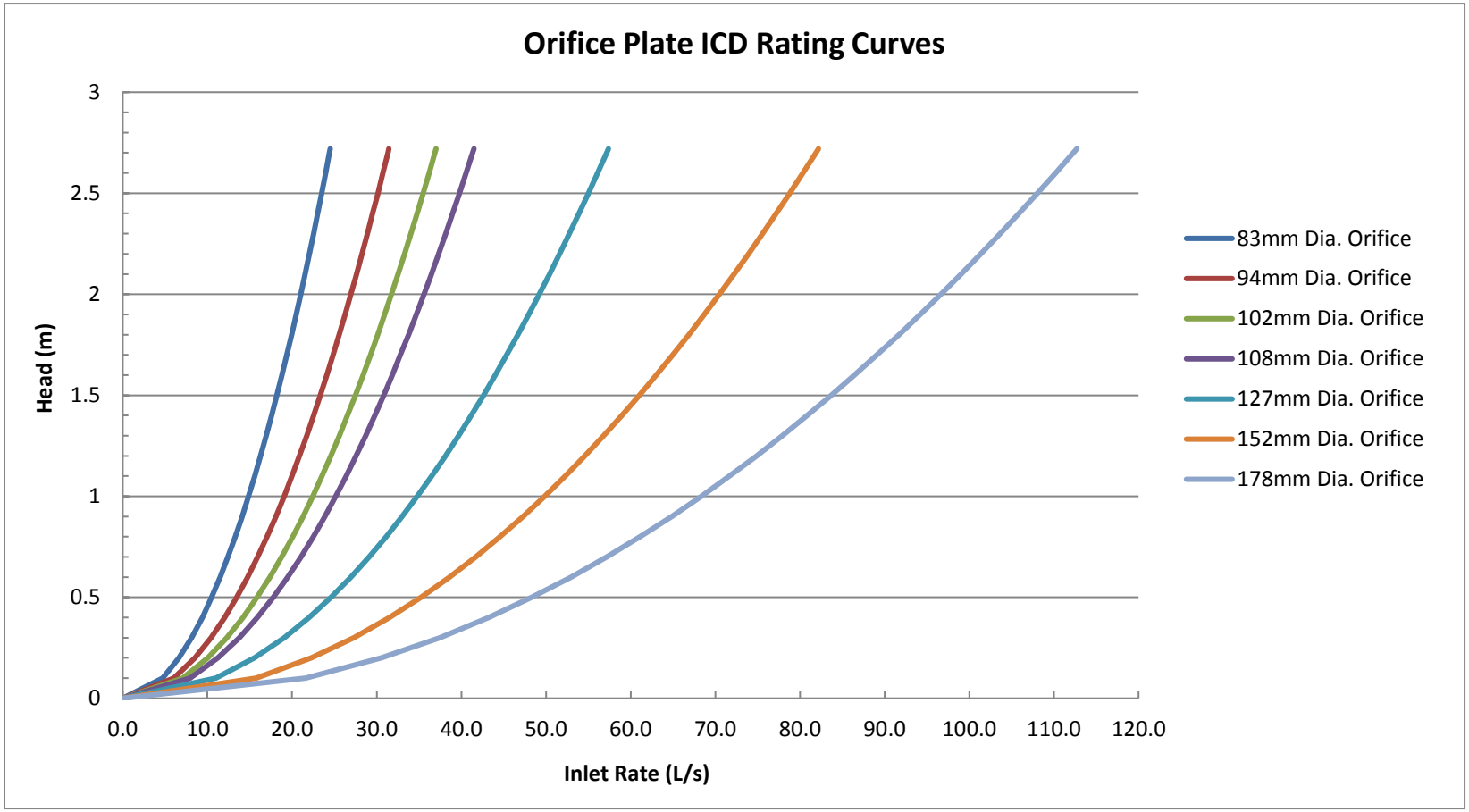
Structure	ICD Size & Inlet Rate			5-year Peak Flow* (L/s)
	Diameter (mm)	Max Head (m)	5-year Inlet Capture (L/s)	
Street B - Caivan Lands				
CB36	83	1.46	17.94	18.08
CB37	102	1.45	27.01	29.14
CB39	83	1.46	17.94	19.63
CB46-47	83	1.46	17.94	15.06
CB48-49	83	1.44	17.82	24.54
CB50-51	127	1.44	41.70	42.30
CB52-53	178	1.41	81.18	92.98
CB54	108	1.45	30.25	9.67
CB55-56	178	1.41	81.18	91.54
CB57-58	178	1.31	78.25	50.85
CB65	83	1.46	17.94	11.90

**From SSA Model, 5-year 4-hour Chicago storm distribution*

Burnett Lands - 3370 Greenbank Road
ICD Rating Curves



Burnett Lands - 3370 Greenbank Road

HGL Elevations

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Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elev - 5yr 4hr (100-yr Fixed) (m)	HGL Elev - 100yr 4hr (5-yr Fixed) (m)	HGL Elev - 100yr 4hr +20% (5-yr Fixed) (m)	Design USF (m)	Clearance 5yr 4hr (100-yr Fixed) (m)	Clearance 100yr 4hr (5-yr Fixed) (m)	Clearance 100yr 4hr +20% (5-yr Fixed) (m)
Burnett Lands - Claridge									
102 (STM)	90.52	93.78	92.04	91.54	91.59	92.62	0.58	1.08	1.03
104 (STM)	90.37	93.93	92.03	91.54	91.59	92.60	0.57	1.06	1.01
106 (STM)	90.27	93.87	92.04	91.53	91.59	92.60	0.56	1.07	1.01
108 (STM)	90.10	93.75	92.01	91.49	91.54	92.51	0.50	1.02	0.97
110 (STM)	89.94	93.46	92.00	91.42	91.46	92.43	0.43	1.01	0.97
304 (STM)	90.56	93.67	91.72	91.15	91.17	92.25	0.53	1.10	1.08
306 (STM)	90.35	93.58	91.72	91.14	91.17	92.22	0.50	1.08	1.05
308 (STM)	90.11	93.41	91.70	91.12	91.15	92.17	0.47	1.05	1.02
310 (STM)	89.74	93.46	91.66	91.08	91.10	92.06	0.40	0.98	0.96
312 (STM)	89.26	93.36	91.65	91.06	91.09	92.06	0.41	1.00	0.97
314 (STM)	89.19	92.61	91.58	90.98	91.00	-	-	-	-
316 (STM)	89.00	93.09	91.49	90.88	90.89	-	-	-	-
324 (STM)	88.96	93.34	91.41	90.79	90.79	-	-	-	-
326 (STM)	89.95	93.38	91.35	90.71	90.72	-	-	-	-
328 (STM)	88.91	92.16	91.30	90.66	90.66	-	-	-	-
330 (STM)	88.94	92.53	91.38	90.75	90.75	-	-	-	-
402 (STM)	90.62	93.82	92.02	91.49	91.53	92.40	0.38	0.91	0.87
404 (STM)	90.37	93.80	92.01	91.48	91.52	92.45	0.44	0.97	0.93
406 (STM)	90.46	93.71	92.04	91.53	91.67	92.55	0.51	1.02	0.88
408 (STM)	90.36	93.80	92.04	91.53	91.60	92.55	0.51	1.02	0.95
608 (STM)	90.25	93.71	91.99	91.46	91.50	92.55	0.56	1.09	1.05
610 (STM)	89.58	93.30	91.79	91.24	91.27	92.38	0.59	1.14	1.11
612 (STM)	89.82	93.93	91.64	91.06	91.08	-	-	-	-
614 (STM)	89.92	93.76	91.71	91.15	91.16	-	-	-	-
616 (STM)	90.23	94.27	91.72	91.15	91.17	92.65	0.93	1.50	1.48
618 (STM)	90.03	93.65	91.80	91.24	91.27	92.25	0.45	1.01	0.98
902 (STM)	90.34	93.98	91.82	91.28	91.31	92.55	0.73	1.27	1.24
904 (STM)	90.29	93.76	91.83	91.28	91.31	92.35	0.52	1.07	1.04
906 (STM)	90.12	93.53	91.82	91.27	91.31	92.35	0.53	1.08	1.04
908 (STM)	89.97	93.57	91.81	91.25	91.29	92.25	0.44	1.00	0.96
Street B - Caivan Lands									
200 (STM)	91.55	94.54	92.38	92.34	92.37	-	-	-	-
202 (STM)	91.40	94.14	92.37	92.33	92.36	-	-	-	-
204 (STM)	91.08	93.94	92.26	91.92	91.95	92.55	0.29	0.63	0.60
206 (STM)	90.84	93.62	92.14	91.69	91.70	92.45	0.31	0.76	0.75
208 (STM)	90.69	93.82	92.06	91.53	91.54	92.45	0.39	0.92	0.91
210 (STM)	90.53	93.52	91.89	91.33	91.34	92.45	0.56	1.12	1.11
212 (STM)	90.40	93.73	91.80	91.21	91.22	92.40	0.60	1.19	1.18
214 (STM)	90.30	93.47	91.73	91.12	91.12	92.25	0.52	1.13	1.13
216 (STM)	90.01	93.37	91.65	90.94	90.94	92.25	0.60	1.31	1.31

Burnett Lands - 3370 Greenbank Road

Ponding in Road Calculations

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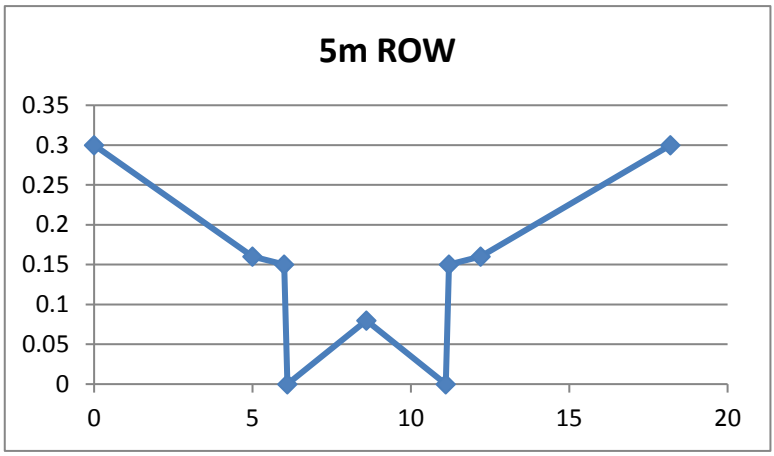
Structure	T/G	Max. Static Ponding (Spill Depth)		5-yr Event				100-yr Event (4hr)					100-yr Event (+20%) (4hr)			
		Elev.	Depth	Elev.	Total Dynamic Depth	Cascading Flow?	Cascade Depth	Elev.	Total Dynamic Depth	Cascading Flow?	Cascade Depth	Spill Flow	Elev.	Total Dynamic Depth	Cascading Flow?	Cascade Depth
	(m)	(m)	(m)	(m)	(m)	(Y/N)	(m)	(m)	(m)	(Y/N)	(m)	(L/s)	(m)	(m)	(Y/N)	(m)
Burnett Lands - Claridge																
CB01-02	93.25	93.44	0.19	93.30	0.05	N	0.00	93.41	0.16	N	0.00	0	93.46	0.21	Y	0.02
CB03-04	93.18	93.44	0.26	93.22	0.04	N	0.00	93.42	0.24	N	0.00	0	93.46	0.28	Y	0.02
CB05-06	93.05	93.34	0.29	93.06	0.01	N	0.00	93.19	0.14	N	0.00	0	93.24	0.19	N	0.00
CB07-08	92.92	93.34	0.42	92.96	0.04	N	0.00	93.08	0.16	N	0.00	0	93.09	0.17	N	0.00
CB09-10	93.01	93.34	0.33	93.06	0.05	N	0.00	93.26	0.25	N	0.00	0	93.31	0.30	N	0.00
CB15-16	93.20	93.37	0.17	93.32	0.12	N	0.00	93.43	0.23	Y	0.06	56	93.46	0.26	Y	0.09
CB17-18	93.51	93.76	0.25	93.66	0.15	N	0.00	93.71	0.20	N	0.00	0	93.73	0.22	N	0.00
CB19	93.44	93.64	0.20	93.32	0.00	N	0.00	93.56	0.12	N	0.00	0	93.62	0.18	N	0.00
CB20-21	93.34	93.60	0.26	93.42	0.08	N	0.00	93.56	0.22	N	0.00	0	93.62	0.28	Y	0.02
CB22	93.49	93.64	0.15	93.54	0.05	N	0.00	93.64	0.15	N	0.00	0	93.67	0.18	Y	0.03
CB23	93.28	93.51	0.23	93.30	0.02	N	0.00	93.37	0.09	N	0.00	0	93.42	0.14	N	0.00
CB24-25	93.25	93.48	0.23	93.25	0.00	N	0.00	93.35	0.10	N	0.00	0	93.40	0.15	N	0.00
CB26-27	93.08	93.36	0.28	93.10	0.02	N	0.00	93.24	0.16	N	0.00	0	93.29	0.21	N	0.00
CB28	92.99	93.34	0.35	92.11	0.00	N	0.00	93.08	0.09	N	0.00	0	93.17	0.18	N	0.00
CB29	92.98	93.34	0.36	93.01	0.03	N	0.00	93.08	0.10	N	0.00	0	93.17	0.19	N	0.00
CB30-31	93.31	93.58	0.27	93.49	0.18	N	0.00	93.60	0.29	Y	0.02	77	93.61	0.30	Y	0.03
CB40-41	93.35	93.65	0.30	93.39	0.04	N	0.00	93.52	0.17	N	0.00	0	93.58	0.23	N	0.00
CB42-43	93.47	93.72	0.25	93.37	0.00	N	0.00	93.63	0.16	N	0.00	0	93.70	0.23	N	0.00
CB44-45	93.62	93.87	0.25	93.68	0.06	N	0.00	93.77	0.15	N	0.00	0	93.78	0.16	N	0.00
CB59	93.70	93.91	0.21	92.75	0.00	N	0.00	93.14	0.00	N	0.00	0	93.39	0.00	N	0.00
CB60	93.50	93.80	0.30	93.27	0.00	N	0.00	93.81	0.31	Y	0.01	1	93.90	0.40	Y	0.10
CB61	93.50	93.78	0.28	92.90	0.00	N	0.00	93.64	0.14	N	0.00	0	93.68	0.18	N	0.00
CB62	93.49	93.78	0.29	93.16	0.00	N	0.00	93.77	0.28	N	0.00	0	93.79	0.30	Y	0.01
CB63	93.55	93.84	0.29	93.29	0.00	N	0.00	93.85	0.30	Y	0.01	2	93.85	0.30	Y	0.01
CB64	93.66	93.95	0.29	93.27	0.00	N	0.00	93.91	0.25	N	0.00	0	93.96	0.30	Y	0.01
CB66	93.90	94.01	0.11	93.35	0.00	N	0.00	93.97	0.07	N	0.00	0	94.01	0.11	N	0.00
CB67-68-69	93.66	94.15	0.49	93.70	0.04	N	0.00	93.83	0.17	N	0.00	0	93.88	0.22	N	0.00
Street B - Caivan Lands																
CB39	93.78	93.86	0.08	93.82	0.04	N	0.00	93.92	0.14	Y	0.06	52	93.93	0.15	Y	0.07
CB46-47	93.67	93.77	0.10	93.43	0.00	N	0.00	93.84	0.17	Y	0.07	52	93.90	0.23	Y	0.13
CB48-49	93.72	93.86	0.14	93.79	0.07	N	0.00	93.87	0.15	Y	0.01	9	93.90	0.18	Y	0.04
CB50-51	93.59	93.84	0.25	93.62	0.03	N	0.00	93.74	0.15	N	0.00	0	93.80	0.21	N	0.00
CB52-53	93.52	93.76	0.24	93.60	0.08	N	0.00	93.77	0.25	Y	0.01	4	93.81	0.29	Y	0.05
CB55-56	93.38	93.67	0.29	93.42	0.04	N	0.00	93.59	0.21	N	0.00	0	93.66	0.28	N	0.00
CB57-58	93.30	93.56	0.26	93.30	0.00	N	0.00	93.47	0.17	N	0.00	0	93.53	0.23	N	0.00

Burnett Lands - 3370 Greenbank Road
Roadway Cross-Sections

Engineers, Planners & Landscape Architects

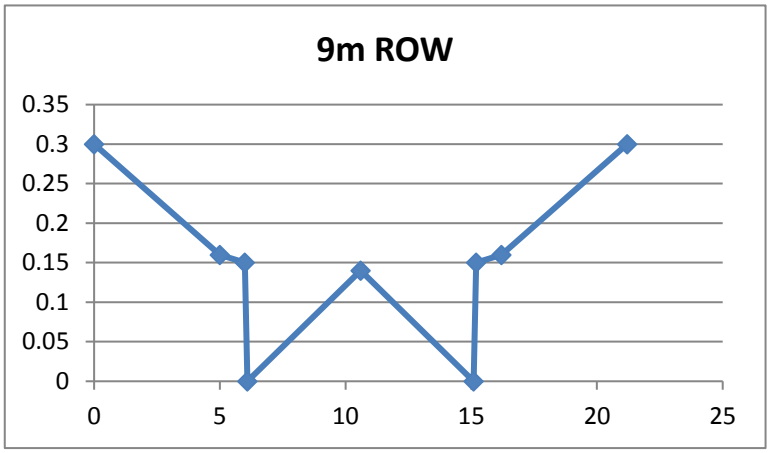
5m - ROW

0	0.3
5	0.16
6	0.15
6.1	0
8.6	0.08
11.1	0
11.2	0.15
12.2	0.16
18.2	0.3



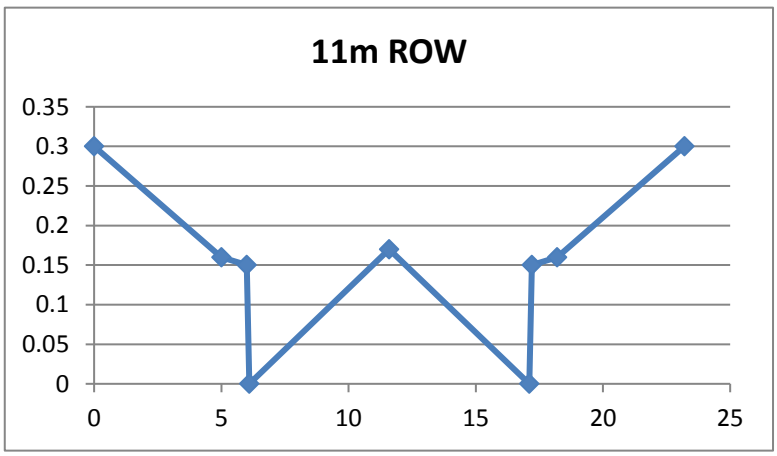
9m - ROW

0	0.3
5	0.16
6	0.15
6.1	0
10.6	0.14
15.1	0
15.2	0.15
16.2	0.16
21.2	0.3



11m - ROW

0	0.3
5	0.16
6	0.15
6.1	0
11.6	0.17
17.1	0
17.2	0.15
18.2	0.16
23.2	0.3



Burnett Lands - 3370 Greenbank Road
Design Storm Time Series Data
Chicago Design Storms

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C25mm-4.stm		C2-4.stm		C5-4.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	1.34	0:10	1.98	0:10	2.49
0:20	1.49	0:20	2.23	0:20	2.77
0:30	1.69	0:30	2.58	0:30	3.14
0:40	1.96	0:40	3.06	0:40	3.62
0:50	2.33	0:50	3.81	0:50	4.31
1:00	2.91	1:00	5.1	1:00	5.37
1:10	3.91	1:10	7.91	1:10	7.19
1:20	6.1	1:20	19.04	1:20	11.14
1:30	14.53	1:30	76.81	1:30	26.25
1:40	58.72	1:40	23.64	1:40	104.19
1:50	17.11	1:50	11.91	1:50	30.86
2:00	8.32	2:00	7.98	2:00	15.15
2:10	5.5	2:10	6.03	2:10	10.07
2:20	4.13	2:20	4.87	2:20	7.58
2:30	3.32	2:30	4.1	2:30	6.11
2:40	2.79	2:40	3.55	2:40	5.14
2:50	2.41	2:50	3.14	2:50	4.45
3:00	2.12	3:00	2.82	3:00	3.93
3:10	1.9	3:10	2.57	3:10	3.53
3:20	1.73	3:20	2.35	3:20	3.21
3:30	1.58	3:30	2.18	3:30	2.94
3:40	1.46	3:40	2.03	3:40	2.72
3:50	1.36	3:50	1.9	3:50	2.53
4:00	1.27	4:00	1.79	4:00	2.37

Burnett Lands - 3370 Greenbank Road
Design Storm Time Series Data
Chicago Design Storms

C100-4.stm		C100-4+20%.stm	
Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr
0:00	0	0:00	0
0:10	4.07	0:10	4.88
0:20	4.54	0:20	5.45
0:30	5.14	0:40	7.14
0:40	5.95	0:50	8.51
0:50	7.09	1:00	10.62
1:00	8.85	1:10	14.28
1:10	11.9	1:20	22.25
1:20	18.54	1:30	53.03
1:30	44.19	1:40	214.27
1:40	178.56	1:50	62.45
1:50	52.04	2:00	30.37
2:00	25.31	2:10	20.08
2:10	16.73	2:20	15.07
2:20	12.56	2:30	12.11
2:30	10.09	2:40	10.16
2:40	8.47	2:50	8.78
2:50	7.32	3:00	7.75
3:00	6.46	3:10	6.95
3:10	5.79	3:20	6.3
3:20	5.25	3:30	5.78
3:30	4.82	3:40	5.34
3:40	4.45	3:50	4.97
3:50	4.14	4:00	4.66
4:00	3.88		

Burnett Lands - 3370 Greenbank Road
Overall Model Schematic

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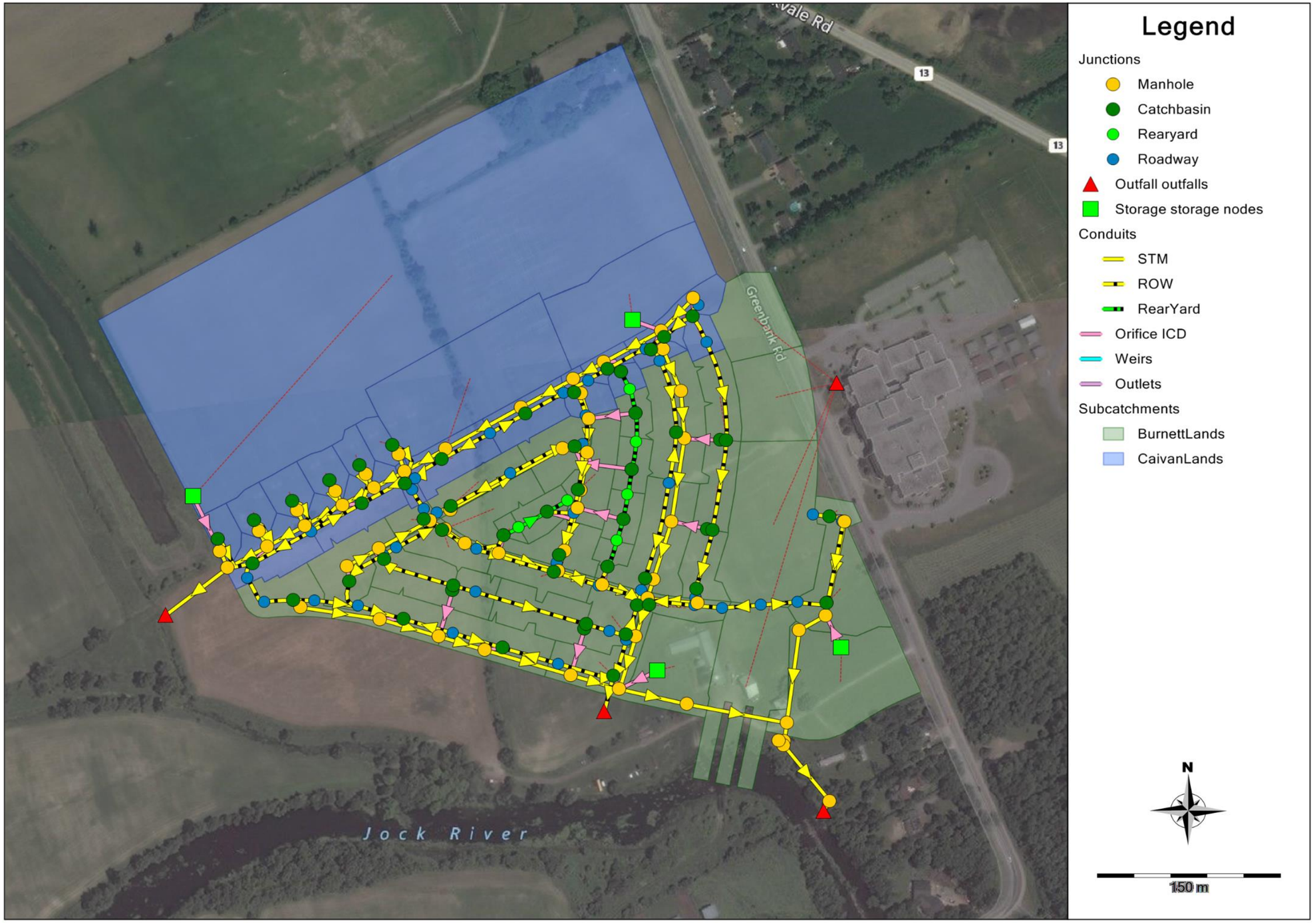
Engineers, Planners & Landscape Architects



```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

M:\2011\111117\CAD\Design\111117 - GP.DWG
M:\2011\111117\CAD\Design\111117 - GP.DWG

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

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Starting Date ............ JAN-21-2016 00:00:00
Ending Date .............. JAN-21-2016 12:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 5.00 sec


WARNING 03: negative offset ignored for Link CB10-11ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB12-13ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB27-28ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB29-30ROADLINK

WARNING 02: maximum depth increased for Node CB07-08

WARNING 02: maximum depth increased for Node CB09-10

WARNING 02: maximum depth increased for Node CB13-14

WARNING 02: maximum depth increased for Node CB13-14ROAD

WARNING 02: maximum depth increased for Node CB32-33

WARNING 02: maximum depth increased for Node CB32-33 ROAD

WARNING 02: maximum depth increased for Node CB34-35

WARNING 02: maximum depth increased for Node CB34-35 ROAD

WARNING 02: maximum depth increased for Node CB57-58

WARNING 02: maximum depth increased for Node CB60

WARNING 02: maximum depth increased for Node CB61

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 57
Number of nodes ........... 162
Number of links ........... 220
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                    Data        Recording
Name                Data Source     Type        Interval
-----------------------------------------------------------
RAIN                C5-4            INTENSITY    10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope    Rain Gage            Outlet
-----------------------------------------------------------------------------------------------
A-01                        0.23     43.00     64.00    0.7500    RAIN                 CB01-02
A-02                        0.25     36.00     64.00    0.7500    RAIN                 CB03-04
A-03                        0.13     36.00     64.00    0.7500    RAIN                 CB13-14ROAD
A-04                        0.30     34.00     64.00    0.7500    RAIN                 CB05-06
A-05                        0.28     37.00     64.00    0.7500    RAIN                 CB11-12ROAD
A-06                        0.27     37.00     64.00    0.7500    RAIN                 CB07-08
A-07                        0.29     39.00     64.00    0.7500    RAIN                 CB15-16
A-08                        0.25     41.00     64.00    0.7500    RAIN                 CB17-18
A-09                        0.08     23.00     64.00    0.7500    RAIN                 CB19
A-10                        0.19     37.00     64.00    0.7500    RAIN                 CB20-21
A-11                        0.23     25.00     64.00    0.7500    RAIN                 CB20-21
A-12                        0.04     24.00     64.00    0.7500    RAIN                 CB59
A-13                        0.20     24.00     64.00    0.7500    RAIN                 CB23
A-14                        0.20     23.00     64.00    0.7500    RAIN                 CB22
A-15                        0.11     30.00     64.00    0.7500    RAIN                 CB64
A-16                        0.13     32.00     64.00    0.7500    RAIN                 CB63
A-17                        0.25     49.00     64.00    0.7500    RAIN                 CB44-45
A-18                        0.27     32.00     64.00    0.7500    RAIN                 CB42-43
A-19                        0.12     31.00     64.00    0.7500    RAIN                 CB62
A-20                        0.13     29.00     64.00    0.7500    RAIN                 CB60
A-21                        0.22     27.00     64.00    0.7500    RAIN                 CB24-25
A-22                        0.06     24.00     64.00    0.7500    RAIN                 CB61
A-23                        0.46     46.00     64.00    0.7500    RAIN                 CB40-41
A-24                        0.21     28.00     64.00    0.7500    RAIN                 CB34-35 ROAD
A-25                        0.21     29.00     64.00    0.7500    RAIN                 CB32-33 ROAD
A-26                        0.45     45.00     64.00    0.7500    RAIN                 CB26-27
A-27                        0.19     32.00     64.00    0.7500    RAIN                 CB30-31
A-28                        0.23     18.00     64.00    0.7500    RAIN                 CB29
A-29                        0.23     46.00     64.00    0.7500    RAIN                 CB09-10
A-30                        0.50     71.00     64.00    0.7500    RAIN                 A30-STOR
A-31                        0.06     20.00     64.00    0.7500    RAIN                 CB66
A-32                        0.45     56.00     64.00    0.7500    RAIN                 CB67-68-69
A-33                        0.82    117.00     64.00    0.7500    RAIN                 A33-STOR
A-34                        0.77     55.00     64.00    0.7500    RAIN                 4-GreenbankOut
A-35                        0.98     70.00     64.00    0.7500    RAIN                 4-GreenbankOut
A-36                        0.45     60.00     64.00    0.7500    RAIN                 4-GreenbankOut
A-37                        0.37     53.00     64.00    0.7500    RAIN                 4-GreenbankOut
B-01                        0.09     28.00     64.00    0.7500    RAIN                 CB36
B-02                        0.15     23.00     64.00    0.7500    RAIN                 CB37
B-03                        0.10     32.00     64.00    0.7500    RAIN                 CB39
B-04                        0.83    110.00     64.00    0.7500    RAIN                 B04_Stor
B-05                        0.06     27.00     64.00    0.7500    RAIN                 CB-65
B-06                        0.08     19.00     64.00    0.7500    RAIN                 CB46-47
B-07                        0.13     32.00     64.00    0.7500    RAIN                 CB48-49
B-08                        0.23     32.00     64.00    0.7500    RAIN                 CB50-51
B-09                        0.25     34.00     64.00    0.7500    RAIN                 CB52-53
B-10                        1.12    149.00     14.00    0.1000    RAIN                 CB52-53
B-11                        0.05     13.00     64.00    0.7500    RAIN                 CB54
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B-12	0.09	20.00	64.00	0.7500	RAIN	CB100
B-13	0.10	22.00	64.00	0.7500	RAIN	CB102
B-14	0.32	73.00	64.00	0.7500	RAIN	CB55-56
B-15	0.12	27.00	64.00	0.7500	RAIN	CB104
B-16	0.14	31.00	64.00	0.7500	RAIN	CB106
B-17	0.27	33.00	64.00	0.7500	RAIN	CB57-58
B-18	0.12	28.00	64.00	0.7500	RAIN	CB108
B-19	0.11	22.00	64.00	0.7500	RAIN	CB110
CaivanLands	8.10	200.00	64.00	0.5000	RAIN	Caivan-Stor

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
01+011	JUNCTION	93.48	0.30	0.0	
01+051	JUNCTION	93.76	0.30	0.0	
01+118	JUNCTION	93.72	0.30	0.0	
01+143	JUNCTION	93.93	0.30	0.0	
02+196	JUNCTION	93.67	0.30	0.0	
02+288	JUNCTION	93.76	0.30	0.0	
02+365	JUNCTION	93.84	0.30	0.0	
02+432	JUNCTION	93.86	0.30	0.0	
02+458	JUNCTION	93.77	0.30	0.0	
02+512	JUNCTION	93.86	0.30	0.0	
02+564	JUNCTION	94.40	0.30	0.0	
03+026	JUNCTION	93.56	0.30	0.0	
03+054	JUNCTION	93.61	0.30	0.0	
03+109	JUNCTION	93.44	0.30	0.0	
03+127	JUNCTION	93.37	0.30	0.0	
03+200	JUNCTION	93.42	0.30	0.0	
03+291	JUNCTION	93.34	0.30	0.0	
03+384	JUNCTION	93.34	0.30	0.0	
04+078	JUNCTION	93.65	0.30	0.0	
04+089	JUNCTION	93.76	0.30	0.0	
04+129	JUNCTION	93.64	0.30	0.0	
04+207	JUNCTION	93.87	0.30	0.0	
05+116	JUNCTION	93.93	0.30	0.0	
05+200	JUNCTION	93.49	0.30	0.0	
06+023	JUNCTION	93.64	0.30	0.0	
06+043	JUNCTION	93.74	0.30	0.0	
06+108	JUNCTION	93.60	0.30	0.0	
06+194	JUNCTION	93.51	0.30	0.0	
06+273	JUNCTION	93.40	0.30	0.0	
06+309	JUNCTION	93.88	0.30	0.0	
06+332	JUNCTION	94.51	0.30	0.0	
06+355	JUNCTION	94.15	0.30	0.0	
09+000	JUNCTION	93.36	0.30	0.0	
09+097	JUNCTION	93.65	0.30	0.0	
09+203	JUNCTION	93.89	0.30	0.0	
10+011	JUNCTION	93.58	0.30	0.0	
10+232	JUNCTION	94.36	0.30	0.0	
102 (STM)	JUNCTION	90.82	2.95	0.0	
104 (STM)	JUNCTION	90.67	3.27	0.0	
106 (STM)	JUNCTION	90.57	3.30	0.0	
106a	JUNCTION	90.50	3.29	0.0	
108 (STM)	JUNCTION	90.40	3.35	0.0	
108a	JUNCTION	90.34	3.21	0.0	
11+000	JUNCTION	94.01	0.30	0.0	
11+086	JUNCTION	94.26	0.30	0.0	
110 (STM)	JUNCTION	90.24	3.22	0.0	
110a	JUNCTION	90.17	3.21	0.0	
200 (STM)	JUNCTION	91.33	3.21	0.0	
202 (STM)	JUNCTION	91.25	2.89	0.0	
202a	JUNCTION	91.14	2.87	0.0	
204 (STM)	JUNCTION	91.01	2.93	0.0	
204a	JUNCTION	90.91	2.90	0.0	
206 (STM)	JUNCTION	90.77	2.85	0.0	
208 (STM)	JUNCTION	90.69	3.13	0.0	
208a	JUNCTION	90.65	3.02	0.0	
210 (STM)	JUNCTION	90.53	2.99	0.0	
212 (STM)	JUNCTION	90.40	3.33	0.0	
214 (STM)	JUNCTION	90.30	3.17	0.0	
216 (STM)	JUNCTION	90.01	3.36	0.0	
304 (STM)	JUNCTION	90.86	2.51	0.0	
306 (STM)	JUNCTION	90.65	2.93	0.0	
306a (STM)	JUNCTION	90.52	2.96	0.0	
308 (STM)	JUNCTION	90.41	3.00	0.0	
310 (STM)	JUNCTION	90.07	3.39	0.0	
312 (STM)	JUNCTION	89.56	3.80	0.0	
314 (STM)	JUNCTION	89.49	3.15	0.0	
316 (STM)	JUNCTION	89.36	3.90	0.0	
324 (STM)	JUNCTION	89.35	3.30	0.0	
326 (STM)	JUNCTION	89.30	3.24	0.0	
328 (STM)	JUNCTION	88.91	3.25	0.0	
330 (STM)	JUNCTION	89.33	3.21	0.0	
402 (STM)	JUNCTION	90.91	2.91	0.0	
402a (STM)	JUNCTION	90.84	2.97	0.0	
404 (STM)	JUNCTION	90.67	3.13	0.0	
404a	JUNCTION	90.63	3.13	0.0	
406 (STM)	JUNCTION	90.45	3.25	0.0	
408 (STM)	JUNCTION	90.36	3.44	0.0	
608 (STM)	JUNCTION	90.55	3.16	0.0	
608a	JUNCTION	90.49	3.13	0.0	
610 (STM)	JUNCTION	89.88	3.42	0.0	
610a	JUNCTION	89.84	3.48	0.0	
612 (STM)	JUNCTION	90.12	4.03	0.0	
614 (STM)	JUNCTION	90.22	3.50	0.0	
616 (STM)	JUNCTION	90.53	3.74	0.0	
618 (STM)	JUNCTION	90.36	3.28	0.0	
902 (STM)	JUNCTION	90.70	3.27	0.0	
904 (STM)	JUNCTION	90.58	3.18	0.0	
906 (STM)	JUNCTION	90.49	3.04	0.0	
908 (STM)	JUNCTION	90.27	3.30	0.0	
908a	JUNCTION	90.19	3.17	0.0	
C100 (STM)	JUNCTION	90.89	2.61	0.0	
C102 (STM)	JUNCTION	90.85	2.65	0.0	
C104 (STM)	JUNCTION	90.81	2.69	0.0	
C106 (STM)	JUNCTION	90.75	2.75	0.0	
C108 (STM)	JUNCTION	90.72	2.78	0.0	
C110 (STM)	JUNCTION	90.67	2.83	0.0	
CB01-02	JUNCTION	92.05	1.50	0.0	
CB03-04	JUNCTION	91.89	1.59	0.0	
CB05-06	JUNCTION	91.85	1.50	0.0	
CB07-08	JUNCTION	91.72	1.65	0.0	
CB09-10	JUNCTION	91.91	1.40	0.0	
CB100	JUNCTION	92.60	1.75	0.0	
CB102	JUNCTION	92.60	1.75	0.0	
CB104	JUNCTION	92.60	1.75	0.0	
CB106	JUNCTION	92.60	1.75	0.0	
CB108	JUNCTION	92.60	1.75	0.0	
CB110	JUNCTION	92.60	1.75	0.0	
CB11-12	JUNCTION	92.38	1.54	0.0	
CB11-12ROAD	JUNCTION	93.62	0.30	0.0	
CB13-14	JUNCTION	92.64	1.61	0.0	
CB13-14ROAD	JUNCTION	93.84	0.41	0.0	
CB15-16	JUNCTION	92.00	1.50	0.0	
CB17-18	JUNCTION	92.31	1.50	0.0	
CB19	JUNCTION	92.24	1.50	0.0	
CB20-21	JUNCTION	92.14	1.50	0.0	
CB22	JUNCTION	92.29	1.50	0.0	
CB23	JUNCTION	92.08	1.50	0.0	
CB24-25	JUNCTION	92.05	1.50	0.0	
CB26-27	JUNCTION	91.88	1.50	0.0	
CB28	JUNCTION	91.78	1.51	0.0	
CB29	JUNCTION	91.78	1.50	0.0	

CB30-31	JUNCTION	92.11	1.50	0.0
CB32-33	JUNCTION	92.42	1.84	0.0
CB32-33 ROAD	JUNCTION	93.62	0.64	0.0
CB34-35	JUNCTION	92.80	1.85	0.0
CB34-35 ROAD	JUNCTION	94.00	0.65	0.0
CB36	JUNCTION	93.06	1.50	0.0
CB37	JUNCTION	92.83	1.50	0.0
CB39	JUNCTION	92.58	1.50	0.0
CB40-41	JUNCTION	92.15	1.50	0.0
CB42-43	JUNCTION	92.27	1.50	0.0
CB44-45	JUNCTION	92.33	1.59	0.0
CB46-47	JUNCTION	92.47	1.50	0.0
CB48-49	JUNCTION	92.54	1.48	0.0
CB50-51	JUNCTION	92.39	1.50	0.0
CB52-53	JUNCTION	92.32	1.50	0.0
CB54	JUNCTION	92.37	1.50	0.0
CB55-56	JUNCTION	92.18	1.50	0.0
CB57-58	JUNCTION	92.20	1.40	0.0
CB59	JUNCTION	92.50	1.50	0.0
CB60	JUNCTION	92.30	1.80	0.0
CB61	JUNCTION	92.30	1.55	0.0
CB62	JUNCTION	92.29	1.50	0.0
CB63	JUNCTION	92.35	1.50	0.0
CB64	JUNCTION	92.46	1.50	0.0
CB-65	JUNCTION	92.50	1.50	0.0
CB66	JUNCTION	92.70	1.50	0.0
CB67-68-69	JUNCTION	92.40	1.56	0.0
HP-01	JUNCTION	93.91	0.30	0.0
HP-03	JUNCTION	93.80	0.30	0.0
RYP-01	JUNCTION	94.00	0.30	0.0
RYP-02	JUNCTION	93.95	0.30	0.0
RYP-03	JUNCTION	93.84	0.30	0.0
RYP-04	JUNCTION	93.78	0.30	0.0
1-HW-01 (STM)	OUTFALL	89.20	1.22	0.0
2-OverlandOutlet	OUTFALL	93.00	0.30	0.0
3-HW-02 (STM)	OUTFALL	89.90	1.22	0.0
4-GreenbankOut	OUTFALL	0.00	0.00	0.0
A30-STOR	STORAGE	92.30	1.70	0.0
A33-STOR	STORAGE	92.30	1.70	0.0
B04_Stor	STORAGE	92.75	1.70	0.0
Caivan-Stor	STORAGE	92.10	1.75	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
{STM}.102-104	102 (STM)	104 (STM)	CONDUIT	22.5	0.5368	0.0130
{STM}.104-106	104 (STM)	106 (STM)	CONDUIT	28.2	0.3015	0.0130
{STM}.106-106a	106 (STM)	106a	CONDUIT	32.1	0.2178	0.0130
{STM}.108-108a	108 (STM)	108a	CONDUIT	37.5	0.1598	0.0130
{STM}.110-110a	110 (STM)	110a	CONDUIT	37.5	0.1972	0.0130
{STM}.306-306a	306 (STM)	306a (STM)	CONDUIT	50.1	0.2593	0.0130
{STM}.308-310	308 (STM)	310 (STM)	CONDUIT	73.3	0.2593	0.0130
{STM}.310-312	310 (STM)	312 (STM)	CONDUIT	41.4	0.1499	0.0130
{STM}.312-314	312 (STM)	314 (STM)	CONDUIT	56.5	0.1009	0.0130
{STM}.314-316	314 (STM)	316 (STM)	CONDUIT	83.4	0.1031	0.0130
{STM}.316-324	316 (STM)	324 (STM)	CONDUIT	15.3	0.0979	0.0130
{STM}.326-328	326 (STM)	328 (STM)	CONDUIT	60.0	0.1000	0.0130
{STM}.328-HW-1	328 (STM)	1-HW-01 (STM)	CONDUIT	9.5	0.1050	0.0130
{STM}.330-336	330 (STM)	326 (STM)	CONDUIT	5.0	0.5000	0.0130
{STM}.402-402a	402 (STM)	402a (STM)	CONDUIT	29.9	0.2340	0.0150
{STM}.404-404a	404 (STM)	404a	CONDUIT	14.1	0.2626	0.0130
{STM}.406-408	406 (STM)	408 (STM)	CONDUIT	105.5	0.2000	0.0130
{STM}.408-106	408 (STM)	106 (STM)	CONDUIT	20.5	0.2003	0.0130
{STM}.608-608a	608 (STM)	608a	CONDUIT	28.5	0.1968	0.0130
{STM}.610-610a	610 (STM)	610a	CONDUIT	33.3	0.1202	0.0130
{STM}.612-316	612 (STM)	316 (STM)	CONDUIT	78.3	0.2005	0.0130
{STM}.614-312	614 (STM)	612 (STM)	CONDUIT	25.1	0.1991	0.0130
{STM}.616-614	616 (STM)	614 (STM)	CONDUIT	80.3	0.2005	0.0130
{STM}.618-610	618 (STM)	610 (STM)	CONDUIT	41.1	0.2989	0.0130
{STM}.902-904	902 (STM)	904 (STM)	CONDUIT	37.7	0.3128	0.0130
{STM}.904-906	904 (STM)	906 (STM)	CONDUIT	40.1	0.1994	0.0130
{STM}.906-908	906 (STM)	908 (STM)	CONDUIT	70.5	0.2001	0.0130
{STM}.908-908a	908 (STM)	908a	CONDUIT	50.7	0.1480	0.0130
106a-108	106a	108 (STM)	CONDUIT	15.1	0.1985	0.0130
108a-110	108a	110 (STM)	CONDUIT	17.8	0.1684	0.0130
110a-610	110a	610 (STM)	CONDUIT	39.0	0.1950	0.0130
200-202	200 (STM)	202 (STM)	CONDUIT	37.4	0.2138	0.0150
202-204	202 (STM)	202a	CONDUIT	53.9	0.2042	0.0150
202a-204	202a	204 (STM)	CONDUIT	28.7	0.2091	0.0150
204-206	204 (STM)	204a	CONDUIT	48.8	0.2048	0.0150
204a-206	204a	206 (STM)	CONDUIT	71.2	0.1967	0.0150
206-208	206 (STM)	208 (STM)	CONDUIT	38.5	0.2078	0.0150
208-208a	208 (STM)	208a	CONDUIT	28.4	0.1410	0.0150
208a-210	208a	210 (STM)	CONDUIT	29.4	0.1360	0.0150
210-212	210 (STM)	212 (STM)	CONDUIT	35.5	0.1408	0.0150
212-214	212 (STM)	214 (STM)	CONDUIT	35.5	0.0845	0.0150
214-216	214 (STM)	216 (STM)	CONDUIT	36.1	0.1524	0.0150
216-H2	216 (STM)	3-HW-02 (STM)	CONDUIT	79.8	0.1378	0.0130
304-306	304 (STM)	306 (STM)	CONDUIT	65.5	0.3053	0.0130
306a-308	306a (STM)	308 (STM)	CONDUIT	39.3	0.2546	0.0130
324-330	324 (STM)	330 (STM)	CONDUIT	5.0	0.5000	0.0150
402a-404	402a (STM)	404 (STM)	CONDUIT	48.1	0.2496	0.0150
404a-608	404a	608 (STM)	CONDUIT	20.1	0.2632	0.0130
608a-110	608a	110 (STM)	CONDUIT	51.1	0.2035	0.0130
610a-312	610a	312 (STM)	CONDUIT	46.1	0.1301	0.0130
908a-610	908a	610 (STM)	CONDUIT	16.6	0.1502	0.0130
C100-208	C100 (STM)	208 (STM)	CONDUIT	25.0	0.2000	0.0150
C102-208a	C102 (STM)	208a	CONDUIT	25.0	0.2000	0.0150
C104-210	C104 (STM)	210 (STM)	CONDUIT	25.0	0.2000	0.0150
C106-212	C106 (STM)	212 (STM)	CONDUIT	25.0	0.2000	0.0150
C108-214	C108 (STM)	214 (STM)	CONDUIT	25.0	0.2000	0.0150
C110-216	C110 (STM)	216 (STM)	CONDUIT	25.0	0.2000	0.0150
CB10-11ROADLINK	CB11-12ROAD	CB11-12	CONDUIT	5.0	0.7400	0.0160
CB12-13ROADLINK	CB13-14	CB13-14ROAD	CONDUIT	10.0	0.0030	0.0160
CB27-28ROADLINK	CB32-33	CB32-33 ROAD	CONDUIT	5.0	0.0061	0.0160
CB29-30ROADLINK	CB34-35 ROAD	CB34-35	CONDUIT	5.0	0.0061	0.0160
CB53-ROAD	CB60	01+051	CONDUIT	15.0	0.2667	0.0320
CB57-ROAD	CB61	06+194	CONDUIT	15.0	0.2667	0.0320
CB59-ROAD	CB59	06+108	CONDUIT	15.0	0.6667	0.0320
CST-01	CB100	CB54	CONDUIT	20.0	2.1505	0.0160
CST-02	CB102	CB55-56	CONDUIT	20.0	3.1015	0.0160
CST-03	CB104	02+196	CONDUIT	20.0	1.6502	0.0160
CST-04	CB106	02+196	CONDUIT	20.0	1.6502	0.0160
CST-05	CB108	CB57-58	CONDUIT	20.0	3.5021	0.0160
CST-06	CB110	CB57-58	CONDUIT	20.0	3.5021	0.0160
RY-00	RYP-01	CB-65	CONDUIT	18.7	1.6045	0.0320
RY-00a	CB-65	CB46-47	CONDUIT	11.2	0.2676	0.0320
RY-01	RYP-01	CB64	CONDUIT	22.6	1.5046	0.0350
RY-02	RYP-02	CB64	CONDUIT	19.3	1.5028	0.0350
RY-03	RYP-02	CB63	CONDUIT	26.6	1.5039	0.0350
RY-04	RYP-03	CB63	CONDUIT	19.3	1.5028	0.0350
RY-05	RYP-03	CB62	CONDUIT	23.3	1.5023	0.0350
RY-06	RYP-04	CB62	CONDUIT	19.3	1.5028	0.0350
RY-07	RYP-04	CB61	CONDUIT	18.7	1.4975	0.0350
RY-08	HP-01	CB59	CONDUIT	14.0	1.5002	0.0320
RY-09	HP-01	CB60	CONDUIT	25.6	1.6018	0.0320
RY-10	HP-03	CB60	CONDUIT	20.0	1.5002	0.0320
S01-00	02+432	CB48-49	CONDUIT	25.5	0.5490	0.0160
S01-01	01+143	CB48-49	CONDUIT	26.5	0.7925	0.0160
S01-02	01+143	01+118	CONDUIT	28.6	0.7343	0.0160
S01-03	01+118	CB42-43	CONDUIT	34.4	0.7268	0.0160
S01-04	01+051	CB42-43	CONDUIT	39.0	0.7436	0.0160
S01-05	01+051	CB24-25	CONDUIT	36.2	1.4090	0.0160
S01-06	01+011	CB24-25	CONDUIT	10.0	2.3006	0.0160
S01-07	01+011	CB23	CONDUIT	10.0	2.0004	0.0160

S03-01a	03+026	CB57-58	CONDUIT	25.0	1.0401	0.0160
S03-01b	03+054	03+026	CONDUIT	24.7	0.2022	0.0160
S03-01c	03+054	CB01-02	CONDUIT	48.0	0.7500	0.0160
S03-02	03+109	CB01-02	CONDUIT	17.6	1.0772	0.0160
S03-03	03+109	03+127	CONDUIT	34.7	0.2019	0.0160
S03-04	03+127	CB03-04	CONDUIT	40.1	0.4743	0.0160
S03-05	03+200	CB03-04	CONDUIT	42.1	0.5706	0.0160
S03-06	03+200	CB05-06	CONDUIT	42.4	0.8721	0.0160
S03-07	03+291	CB05-06	CONDUIT	48.2	0.6015	0.0160
S03-08	03+291	CB07-08	CONDUIT	47.3	0.8872	0.0160
S03-09	03+384	CB07-08	CONDUIT	32.4	1.2968	0.0320
S03-10	03+384	CB28	CONDUIT	30.5	1.1480	0.0160
S03-OUT	CB07-08	2-OverlandOutlet	CONDUIT	30.0	0.2333	0.0320
S04-01	03+127	CB15-16	CONDUIT	25.2	0.6757	0.0160
S04-02	04+078	CB15-16	CONDUIT	44.0	1.0228	0.0160
S04-03	04+089	04+078	CONDUIT	10.8	1.0186	0.0160
S04-04	04+089	CB19	CONDUIT	26.0	1.2309	0.0160
S04-05	04+129	CB19	CONDUIT	11.9	1.6753	0.0160
S04-06	04+129	CB22	CONDUIT	12.6	1.1887	0.0160
S04-07	04+207	CB22	CONDUIT	56.0	0.6786	0.0160
S04-08	04+207	CB44-45	CONDUIT	38.5	0.6494	0.0160
S04-09	01+118	CB44-45	CONDUIT	7.5	1.3388	0.0160
S05-01	04+078	CB17-18	CONDUIT	5.0	2.8011	0.0320
S05-02	CB13-14ROAD	CB17-18	CONDUIT	63.2	0.5219	0.0160
S05-03	05+116	CB13-14ROAD	CONDUIT	18.4	0.4902	0.0160
S05-04	05+116	CB11-12ROAD	CONDUIT	94.9	0.3266	0.0160
S05-05	CB11-12ROAD	05+200	CONDUIT	19.9	0.6546	0.0160
S05-06	05+200	CB09-10	CONDUIT	13.9	3.4429	0.0160
S05-07	03+384	CB09-10	CONDUIT	5.0	6.6144	0.0160
S06-01d	CB19	CB20-21	CONDUIT	6.3	1.5775	0.0320
S06-02	06+108	CB20-21	CONDUIT	40.5	0.6420	0.0160
S06-03	06+108	CB23	CONDUIT	49.0	0.6531	0.0160
S06-04	06+194	CB23	CONDUIT	30.5	0.7541	0.0160
S06-05	06+194	CB28	CONDUIT	69.0	0.7536	0.0160
S06-06	CB28	CB29	CONDUIT	10.0	0.1000	0.0320
S06-07	06+273	CB29	CONDUIT	23.0	1.8264	0.0160
S06-08	06+309	06+273	CONDUIT	24.0	2.0004	0.0160
S06-09	06+332	06+309	CONDUIT	31.5	2.0004	0.0160
S06-10	06+332	06+355	CONDUIT	39.0	0.9231	0.0160
S06-11	06+355	CB67-68-69	CONDUIT	34.7	1.4122	0.0160
S09-00	02+512	CB39	CONDUIT	10.0	0.8000	0.0160
S09-01	09+203	CB39	CONDUIT	12.4	0.8871	0.0160
S09-02	09+203	CB40-41	CONDUIT	63.5	0.8504	0.0160
S09-03	09+097	CB40-41	CONDUIT	40.0	0.7500	0.0160
S09-04	09+097	CB26-27	CONDUIT	85.8	0.6640	0.0160
S09-05	09+000	CB26-27	CONDUIT	10.0	2.8011	0.1600
S09-06	09+000	CB28	CONDUIT	15.0	2.4674	0.1600
S10-01	10+232	CB34-35 ROAD	CONDUIT	72.2	0.4988	0.0160
S10-02	CB34-35 ROAD	CB32-33 ROAD	CONDUIT	76.2	0.4984	0.0160
S10-03	CB32-33 ROAD	CB30-31	CONDUIT	62.0	0.5000	0.0160
S10-04	10+011	CB30-31	CONDUIT	10.0	2.7010	0.0320
S10-05	10+011	06+273	CONDUIT	10.0	1.8003	0.0320
S11-01	11+000	CB66	CONDUIT	15.0	0.7334	0.0160
S11-02	11+086	CB66	CONDUIT	15.0	2.4007	0.0160
S11-03	11+086	CB67-68-69	CONDUIT	81.6	0.7349	0.0160
ST10-00	10+232	CB36	CONDUIT	24.5	0.4075	0.0160
ST6-01a	06+023	CB54	CONDUIT	8.3	0.8384	0.0160
ST6-01b	06+043	06+023	CONDUIT	18.5	0.5394	0.0160
ST6-01c	06+043	CB19	CONDUIT	15.0	2.0004	0.0160
STB-00	02+564	CB36	CONDUIT	12.0	1.1667	0.0160
STB-01	CB36	CB37	CONDUIT	19.5	1.1796	0.0160
STB-02	CB37	02+512	CONDUIT	28.0	0.6072	0.0160
STB-03	02+512	CB46-47	CONDUIT	31.0	0.6129	0.0160
STB-04	02+458	CB46-47	CONDUIT	13.4	0.7463	0.0160
STB-05	02+432	02+458	CONDUIT	12.0	0.7500	0.0160
STB-06	02+432	CB50-51	CONDUIT	36.0	0.7500	0.0160
STB-07	02+365	CB50-51	CONDUIT	33.2	0.7535	0.0160
STB-08	02+365	CB52-53	CONDUIT	44.0	0.7273	0.0160
STB-09	02+288	CB52-53	CONDUIT	30.5	0.7869	0.0160
STB-10	02+288	CB54	CONDUIT	21.4	0.8879	0.0160
STB-11	CB54	CB55-56	CONDUIT	21.4	0.8879	0.0160
STB-12	02+196	CB55-56	CONDUIT	48.0	0.6042	0.0160
STB-13	02+196	CB57-58	CONDUIT	52.0	0.7116	0.0160
OCB01-02	CB01-02	304 (STM)	ORIFICE			
OCB03-04	CB03-04	306 (STM)	ORIFICE			
OCB05-06	CB05-06	308 (STM)	ORIFICE			
OCB07-08	CB07-08	312 (STM)	ORIFICE			
OCB09-10	CB09-10	610a	ORIFICE			
OCB11-12	CB11-12	310 (STM)	ORIFICE			
OCB13-14	CB13-14	306a (STM)	ORIFICE			
OCB15-16	CB15-16	402 (STM)	ORIFICE			
OCB17-18	CB17-18	402a (STM)	ORIFICE			
OCB19	CB19	404 (STM)	ORIFICE			
OCB20-21	CB20-21	404a	ORIFICE			
OCB22	CB22	406 (STM)	ORIFICE			
OCB23	CB23	110 (STM)	ORIFICE			
OCB24-25	CB24-25	108a	ORIFICE			
OCB26-27	CB26-27	908a	ORIFICE			
OCB28	CB28	610 (STM)	ORIFICE			
OCB28-Stor	A30-STOR	312 (STM)	ORIFICE			
OCB29	CB29	610 (STM)	ORIFICE			
OCB30-31	CB30-31	618 (STM)	ORIFICE			
OCB31-Stor	A33-STOR	614 (STM)	ORIFICE			
OCB32-33	CB32-33	908 (STM)	ORIFICE			
OCB34-35	CB34-35	906 (STM)	ORIFICE			
OCB36	CB36	200 (STM)	ORIFICE			
OCB37	CB37	202 (STM)	ORIFICE			
OCB39	CB39	202 (STM)	ORIFICE			
OCB40-41	CB40-41	906 (STM)	ORIFICE			
OCB42-43	CB42-43	106a	ORIFICE			
OCB44-45	CB44-45	106 (STM)	ORIFICE			
OCB46-47	CB46-47	202a	ORIFICE			
OCB48-49	CB48-49	204 (STM)	ORIFICE			
OCB50-51	CB50-51	204a	ORIFICE			
OCB52-53	CB52-53	206 (STM)	ORIFICE			
OCB54	CB54	208 (STM)	ORIFICE			
OCB55-56	CB55-56	210 (STM)	ORIFICE			
OCB57-58	CB57-58	214 (STM)	ORIFICE			
OCB59	CB59	608a	ORIFICE			
OCB60	CB60	108 (STM)	ORIFICE			
OCB61	CB61	110a	ORIFICE			
OCB62	CB62	108 (STM)	ORIFICE			
OCB63	CB63	106 (STM)	ORIFICE			
OCB64	CB64	104 (STM)	ORIFICE			
OCB65	CB-65	202a	ORIFICE			
OCB66	CB66	616 (STM)	ORIFICE			
OCB67-68	CB67-68-69	614 (STM)	ORIFICE			
OCB-B04	B04_Stor	202 (STM)	ORIFICE			
OCB-C100	CB100	C100 (STM)	ORIFICE			
OCB-C102	CB102	C102 (STM)	ORIFICE			
OCB-C104	CB104	C104 (STM)	ORIFICE			
OCB-C106	CB106	C106 (STM)	ORIFICE			
OCB-C108	CB108	C108 (STM)	ORIFICE			
OCB-C110	CB110	C110 (STM)	ORIFICE			
Orifice-55	Caivan-Stor	C110 (STM)	ORIFICE			
VORTECHS	324 (STM)	326 (STM)	WEIR			
10-11	CB11-12ROAD	CB11-12	OUTLET			
12-13	CB13-14ROAD	CB13-14	OUTLET			
27-28	CB32-33 ROAD	CB32-33	OUTLET			
29-30	CB34-35 ROAD	CB34-35	OUTLET			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow

{STM}.102-104	CIRCULAR	0.61	0.29	0.15	0.61	1	470.15
{STM}.104-106	CIRCULAR	0.61	0.29	0.15	0.61	1	352.37
{STM}.106-106a	CIRCULAR	0.61	0.29	0.15	0.61	1	299.48
{STM}.108-108a	CIRCULAR	0.69	0.37	0.17	0.69	1	350.83
{STM}.110-110a	CIRCULAR	0.76	0.46	0.19	0.76	1	515.75
{STM}.306-306a	CIRCULAR	0.61	0.29	0.15	0.61	1	326.79
{STM}.308-310	CIRCULAR	0.61	0.29	0.15	0.61	1	326.80
{STM}.310-312	CIRCULAR	0.76	0.46	0.19	0.76	1	449.67
{STM}.312-314	CIRCULAR	1.22	1.17	0.30	1.22	1	1291.42
{STM}.314-316	CIRCULAR	1.22	1.17	0.30	1.22	1	1305.31
{STM}.316-324	CIRCULAR	1.22	1.17	0.30	1.22	1	1272.17
{STM}.326-328	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2378.14
{STM}.328-HW-1	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2436.50
{STM}.330-336	CIRCULAR	1.22	1.17	0.30	1.22	1	2874.95
{STM}.402-402a	CIRCULAR	0.61	0.29	0.15	0.61	1	269.05
{STM}.404-404a	CIRCULAR	0.61	0.29	0.15	0.61	1	328.85
{STM}.406-408	CIRCULAR	0.61	0.29	0.15	0.61	1	286.99
{STM}.408-106	CIRCULAR	0.61	0.29	0.15	0.61	1	287.22
{STM}.608-608a	CIRCULAR	0.61	0.29	0.15	0.61	1	284.66
{STM}.610-610a	CIRCULAR	0.99	0.77	0.25	0.99	1	811.34
{STM}.612-316	CIRCULAR	0.61	0.29	0.15	0.61	1	287.33
{STM}.614-312	CIRCULAR	0.61	0.29	0.15	0.61	1	286.33
{STM}.616-614	CIRCULAR	0.46	0.16	0.11	0.46	1	133.04
{STM}.618-610	CIRCULAR	0.61	0.29	0.15	0.61	1	350.87
{STM}.902-904	CIRCULAR	0.61	0.29	0.15	0.61	1	358.92
{STM}.904-906	CIRCULAR	0.61	0.29	0.15	0.61	1	286.54
{STM}.906-908	CIRCULAR	0.61	0.29	0.15	0.61	1	287.07
{STM}.908-908a	CIRCULAR	0.69	0.37	0.17	0.69	1	337.70
106a-108	CIRCULAR	0.61	0.29	0.15	0.61	1	285.94
108a-110	CIRCULAR	0.69	0.37	0.17	0.69	1	360.11
110a-610	CIRCULAR	0.76	0.46	0.19	0.76	1	512.86
200-202	CIRCULAR	0.69	0.37	0.17	0.69	1	351.75
202-204	CIRCULAR	0.69	0.37	0.17	0.69	1	343.69
202a-204	CIRCULAR	0.69	0.37	0.17	0.69	1	347.79
204-206	CIRCULAR	0.76	0.46	0.19	0.76	1	455.54
204a-206	CIRCULAR	0.76	0.46	0.19	0.76	1	446.46
206-208	CIRCULAR	0.76	0.46	0.19	0.76	1	458.92
208-208a	CIRCULAR	0.76	0.46	0.19	0.76	1	378.04
208a-210	CIRCULAR	0.76	0.46	0.19	0.76	1	371.17
210-212	CIRCULAR	0.84	0.55	0.21	0.84	1	486.79
212-214	CIRCULAR	0.91	0.66	0.23	0.91	1	475.29
214-216	CIRCULAR	0.91	0.66	0.23	0.91	1	638.35
216-H2	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2791.51
304-306	CIRCULAR	0.61	0.29	0.15	0.61	1	354.55
306a-308	CIRCULAR	0.61	0.29	0.15	0.61	1	323.83
324-330	CIRCULAR	1.22	1.17	0.30	1.22	1	2491.62
402a-404	CIRCULAR	0.61	0.29	0.15	0.61	1	277.88
404a-608	CIRCULAR	0.61	0.29	0.15	0.61	1	329.20
608a-110	CIRCULAR	0.61	0.29	0.15	0.61	1	289.47
610a-312	CIRCULAR	0.99	0.77	0.25	0.99	1	844.32
908a-610	CIRCULAR	0.69	0.37	0.17	0.69	1	340.19
C100-208	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C102-208a	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C104-210	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C106-212	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C108-214	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C110-216	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
CB10-11ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	6953.33
CB12-13ROADLINK	RECT_OPEN	0.30	6.00	0.29	20.00	1	909.75
CB27-28ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	631.09
CB29-30ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	631.09
CB53-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.77
CB57-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.77
CB59-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	187.79
CST-01	9m-ROW	0.30	3.10	0.14	21.20	1	7844.93
CST-02	9m-ROW	0.30	3.10	0.14	21.20	1	9421.17
CST-03	9m-ROW	0.30	3.10	0.14	21.20	1	6872.13
CST-04	9m-ROW	0.30	3.10	0.14	21.20	1	6872.13
CST-05	9m-ROW	0.30	3.10	0.14	21.20	1	10011.21
CST-06	9m-ROW	0.30	3.10	0.14	21.20	1	10011.21
RY-00	TRIANGULAR	0.30	0.27	0.14	1.80	1	291.33
RY-00a	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.98
RY-01	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.93
RY-02	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-03	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.88
RY-04	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-05	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.74
RY-06	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-07	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.32
RY-08	TRIANGULAR	0.30	0.27	0.14	1.80	1	281.70
RY-09	TRIANGULAR	0.30	0.27	0.14	1.80	1	291.08
RY-10	TRIANGULAR	0.30	0.27	0.14	1.80	1	281.70
S01-00	9m-ROW	0.30	3.10	0.14	21.20	1	3963.85
S01-01	9m-ROW	0.30	3.10	0.14	21.20	1	4762.26
S01-02	9m-ROW	0.30	3.10	0.14	21.20	1	4584.08
S01-03	9m-ROW	0.30	3.10	0.14	21.20	1	4560.54
S01-04	9m-ROW	0.30	3.10	0.14	21.20	1	4613.09
S01-05	9m-ROW	0.30	3.10	0.14	21.20	1	6349.97
S01-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	12260.05
S01-07	RECT_OPEN	0.30	3.00	0.28	10.00	1	11432.19
S03-01a	9m-ROW	0.30	3.10	0.14	21.20	1	5455.67
S03-01b	9m-ROW	0.30	3.10	0.14	21.20	1	2405.43
S03-01c	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
S03-02	9m-ROW	0.30	3.10	0.14	21.20	1	5552.13
S03-03	9m-ROW	0.30	3.10	0.14	21.20	1	2403.77
S03-04	9m-ROW	0.30	3.10	0.14	21.20	1	3684.20
S03-05	9m-ROW	0.30	3.10	0.14	21.20	1	4041.05
S03-06	9m-ROW	0.30	3.10	0.14	21.20	1	4995.65
S03-07	9m-ROW	0.30	3.10	0.14	21.20	1	4149.10
S03-08	9m-ROW	0.30	3.10	0.14	21.20	1	5038.93
S03-09	RECT_OPEN	0.30	1.50	0.27	5.00	1	2218.23
S03-10	9m-ROW	0.30	3.10	0.14	21.20	1	5731.78
S03-OUT	RECT_OPEN	0.30	3.00	0.28	10.00	1	1952.23
S04-01	9m-ROW	0.30	3.10	0.14	21.20	1	4397.38
S04-02	9m-ROW	0.30	3.10	0.14	21.20	1	5410.17
S04-03	9m-ROW	0.30	3.10	0.14	21.20	1	5399.02
S04-04	9m-ROW	0.30	3.10	0.14	21.20	1	5935.05
S04-05	9m-ROW	0.30	3.10	0.14	21.20	1	6924.09
S04-06	9m-ROW	0.30	3.10	0.14	21.20	1	5832.45
S04-07	9m-ROW	0.30	3.10	0.14	21.20	1	4406.79
S04-08	9m-ROW	0.30	3.10	0.14	21.20	1	4310.86
S04-09	9m-ROW	0.30	3.10	0.14	21.20	1	6189.83
S05-01	RECT_OPEN	0.30	1.50	0.27	5.00	1	3260.12
S05-02	5m-ROW	0.30	2.40	0.13	18.20	1	2792.80
S05-03	5m-ROW	0.30	2.40	0.13	18.20	1	2706.63
S05-04	5m-ROW	0.30	2.40	0.13	18.20	1	2209.25
S05-05	5m-ROW	0.30	2.40	0.13	18.20	1	3127.72
S05-06	5m-ROW	0.30	2.40	0.13	18.20	1	7173.04
S05-07	9m-ROW	0.30	3.10	0.14	21.20	1	13758.32
S06-01d	RECT_OPEN	0.30	1.50	0.27	5.00	1	2446.54
S06-02	11m-ROW	0.30	3.40	0.14	23.20	1	4697.46
S06-03	11m-ROW	0.30	3.40	0.14	23.20	1	4737.85
S06-04	11m-ROW	0.30	3.40	0.14	23.20	1	5091.20
S06-05	11m-ROW	0.30	3.40	0.14	23.20	1	5089.59
S06-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	1278.03
S06-07	11m-ROW	0.30	3.40	0.14	23.20	1	7923.13
S06-08	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
S06-09	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
S06-10	11m-ROW	0.30	3.40	0.14	23.20	1	5632.85
S06-11	11m-ROW	0.30	3.40	0.14	23.20	1	6967.15
S09-00	9m-ROW	0.30	3.10	0.14	21.20	1	4784.88
S09-01	9m-ROW	0.30	3.10	0.14	21.20	1	5038.64
S09-02	9m-ROW	0.30	3.10	0.14	21.20	1	4933.30
S09-03	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
S09-04	9m-ROW	0.30	3.10	0.14	21.20	1	4359.05
S09-05	RECT_OPEN	0.30	3.00	0.28	10.00	1	1352.80
S09-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	1269.67
S10-01	5m-ROW	0.30	2.40	0.13	18.20	1	2730.15

S10-02	5m-ROW	0.30	2.40	0.13	18.20	1	2729.26
S10-03	5m-ROW	0.30	2.40	0.13	18.20	1	2733.56
S10-04	RECT_OPEN	0.30	3.00	0.28	10.00	1	6642.05
S10-05	RECT_OPEN	0.30	3.00	0.28	10.00	1	5422.66
S11-01	5m-ROW	0.30	2.40	0.13	18.20	1	3310.53
S11-02	5m-ROW	0.30	2.40	0.13	18.20	1	5989.76
S11-03	5m-ROW	0.30	2.40	0.13	18.20	1	3313.94
ST10-00	5m-ROW	0.30	2.40	0.13	18.20	1	2467.78
ST6-01a	11m-ROW	0.30	3.40	0.14	23.20	1	5368.01
ST6-01b	11m-ROW	0.30	3.40	0.14	23.20	1	4305.74
ST6-01c	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
STB-00	9m-ROW	0.30	3.10	0.14	21.20	1	5778.40
STB-01	9m-ROW	0.30	3.10	0.14	21.20	1	5810.07
STB-02	9m-ROW	0.30	3.10	0.14	21.20	1	4168.40
STB-03	9m-ROW	0.30	3.10	0.14	21.20	1	4188.12
STB-04	9m-ROW	0.30	3.10	0.14	21.20	1	4621.40
STB-05	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
STB-06	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
STB-07	9m-ROW	0.30	3.10	0.14	21.20	1	4643.63
STB-08	9m-ROW	0.30	3.10	0.14	21.20	1	4562.20
STB-09	9m-ROW	0.30	3.10	0.14	21.20	1	4745.50
STB-10	9m-ROW	0.30	3.10	0.14	21.20	1	5040.78
STB-11	9m-ROW	0.30	3.10	0.14	21.20	1	5040.78
STB-12	9m-ROW	0.30	3.10	0.14	21.20	1	4158.17
STB-13	9m-ROW	0.30	3.10	0.14	21.20	1	4512.57

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****************
Transect Summary
****************

Transect 11m-ROW
Area:
          0.0003    0.0014    0.0031    0.0056    0.0087
          0.0126    0.0171    0.0224    0.0283    0.0350
          0.0423    0.0503    0.0591    0.0685    0.0787
          0.0895    0.1010    0.1133    0.1262    0.1398
          0.1542    0.1692    0.1849    0.2014    0.2185
          0.2374    0.2590    0.2824    0.3070    0.3324
          0.3586    0.3856    0.4133    0.4417    0.4710
          0.5009    0.5317    0.5632    0.5954    0.6284
          0.6622    0.6967    0.7319    0.7680    0.8047
          0.8423    0.8806    0.9196    0.9594    1.0000
Hrad:
          0.0203    0.0406    0.0608    0.0811    0.1014
          0.1217    0.1420    0.1623    0.1825    0.2028
          0.2231    0.2434    0.2637    0.2840    0.3042
          0.3245    0.3448    0.3651    0.3854    0.4056
          0.4259    0.4462    0.4665    0.4868    0.5071
          0.4758    0.4659    0.4779    0.4994    0.5251
          0.5505    0.5757    0.6006    0.6253    0.6498
          0.6741    0.6982    0.7221    0.7459    0.7696
          0.7931    0.8165    0.8398    0.8630    0.8860
          0.9090    0.9319    0.9547    0.9774    1.0000
Width:
          0.0171    0.0342    0.0512    0.0683    0.0854
          0.1025    0.1196    0.1366    0.1537    0.1708
          0.1879    0.2049    0.2220    0.2391    0.2562
          0.2733    0.2903    0.3074    0.3245    0.3416
          0.3587    0.3757    0.3928    0.4099    0.4270
          0.4954    0.5528    0.5880    0.6121    0.6305
          0.6490    0.6675    0.6860    0.7044    0.7229
          0.7414    0.7599    0.7783    0.7968    0.8153
          0.8337    0.8522    0.8707    0.8892    0.9076
          0.9261    0.9446    0.9631    0.9815    1.0000

Transect 5m-ROW
Area:
          0.0005    0.0019    0.0043    0.0076    0.0119
          0.0172    0.0234    0.0306    0.0387    0.0478
          0.0578    0.0688    0.0807    0.0934    0.1062
          0.1190    0.1318    0.1446    0.1574    0.1703
          0.1832    0.1961    0.2090    0.2220    0.2349
          0.2494    0.2668    0.2857    0.3058    0.3271
          0.3496    0.3732    0.3981    0.4241    0.4512
          0.4796    0.5091    0.5398    0.5717    0.6048
          0.6390    0.6744    0.7110    0.7487    0.7877
          0.8278    0.8691    0.9115    0.9552    1.0000
Hrad:
          0.0225    0.0450    0.0676    0.0901    0.1126
          0.1351    0.1577    0.1802    0.2027    0.2252
          0.2477    0.2703    0.2928    0.3297    0.3737
          0.4176    0.4612    0.5047    0.5480    0.5912
          0.6342    0.6770    0.7197    0.7622    0.8045
          0.6979    0.6515    0.6566    0.6637    0.6724
          0.6826    0.6940    0.7064    0.7197    0.7339
          0.7487    0.7642    0.7802    0.7967    0.8137
          0.8310    0.8487    0.8668    0.8851    0.9037
          0.9225    0.9416    0.9609    0.9804    1.0000
Width:
          0.0210    0.0421    0.0631    0.0842    0.1052
          0.1263    0.1473    0.1684    0.1894    0.2104
          0.2315    0.2525    0.2736    0.2809    0.2813
          0.2818    0.2822    0.2826    0.2831    0.2835
          0.2840    0.2844    0.2848    0.2853    0.2857
          0.3516    0.4042    0.4301    0.4560    0.4819
          0.5078    0.5338    0.5597    0.5856    0.6115
          0.6374    0.6633    0.6892    0.7151    0.7410
          0.7669    0.7928    0.8187    0.8446    0.8705
          0.8964    0.9223    0.9482    0.9741    1.0000

Transect 9m-ROW
Area:
          0.0004    0.0015    0.0034    0.0061    0.0095
          0.0137    0.0186    0.0243    0.0308    0.0380
          0.0460    0.0548    0.0643    0.0746    0.0856
          0.0974    0.1099    0.1232    0.1373    0.1522
          0.1678    0.1841    0.2012    0.2189    0.2367
          0.2557    0.2768    0.2992    0.3223    0.3463
          0.3711    0.3968    0.4232    0.4505    0.4787
          0.5076    0.5374    0.5680    0.5995    0.6317
          0.6648    0.6988    0.7335    0.7691    0.8055
          0.8428    0.8808    0.9197    0.9594    1.0000
Hrad:
          0.0203    0.0406    0.0609    0.0812    0.1015
          0.1218    0.1421    0.1624    0.1827    0.2031
          0.2234    0.2437    0.2640    0.2843    0.3046
          0.3249    0.3452    0.3655    0.3858    0.4061
          0.4264    0.4467    0.4670    0.5004    0.5401
          0.5171    0.5140    0.5356    0.5570    0.5784
          0.5998    0.6211    0.6423    0.6636    0.6848
          0.7059    0.7271    0.7482    0.7692    0.7903
          0.8114    0.8324    0.8534    0.8744    0.8953
          0.9163    0.9372    0.9582    0.9791    1.0000
Width:
          0.0186    0.0371    0.0557    0.0743    0.0929
          0.1114    0.1300    0.1486    0.1671    0.1857
          0.2043    0.2229    0.2414    0.2600    0.2786
          0.2971    0.3157    0.3343    0.3529    0.3714
          0.3900    0.4086    0.4271    0.4336    0.4340
          0.4906    0.5350    0.5553    0.5755    0.5957
          0.6159    0.6361    0.6563    0.6765    0.6968
          0.7170    0.7372    0.7574    0.7776    0.7978
          0.8181    0.8383    0.8585    0.8787    0.8989
          0.9191    0.9394    0.9596    0.9798    1.0000
```

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**********
Control Actions Taken
**********
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	1.039	45.162
Evaporation Loss	0.000	0.000
Infiltration Loss	0.376	16.351
Surface Runoff	0.650	28.232
Final Surface Storage	0.012	0.542
Continuity Error (%)	0.082	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.650	6.496
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.006	0.055
External Outflow	0.659	6.592
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.114	1.141
Final Stored Volume	0.114	1.138
Continuity Error (%)	-0.494	

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*************************
Highest Continuity Errors
*************************
Node 02+196 (99.64%)
Node CB11-12ROAD (-32.99%)
Node 04+078 (9.02%)
Node 02+512 (8.12%)
Node C100 (STM) (6.41%)


**************************
Time-Step Critical Elements
**************************
None


********************************
Highest Flow Instability Indexes
********************************
Link C100-208 (104)
Link C110-216 (103)
Link C108-214 (103)
Link 206-208 (102)
Link C104-210 (101)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     1.82 sec
Average Time Step           :     4.99 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     6.82


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Subcatchment Runoff Summary
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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	45.16	0.00	0.00	14.73	29.94	0.07	44.76	0.663
A-02	45.16	0.00	0.00	14.87	29.80	0.07	46.82	0.660
A-03	45.16	0.00	0.00	14.49	30.44	0.04	24.81	0.674
A-04	45.16	0.00	0.00	15.02	29.65	0.09	55.90	0.657
A-05	45.16	0.00	0.00	14.91	30.01	0.08	51.50	0.664
A-06	45.16	0.00	0.00	14.91	29.86	0.08	51.32	0.661
A-07	45.16	0.00	0.00	14.91	29.76	0.09	54.12	0.659
A-08	45.16	0.00	0.00	14.79	30.14	0.07	46.63	0.667
A-09	45.16	0.00	0.00	14.49	30.19	0.02	15.82	0.669
A-10	45.16	0.00	0.00	14.69	29.99	0.06	35.77	0.664
A-11	45.16	0.00	0.00	15.03	29.64	0.07	41.61	0.656
A-12	45.16	0.00	0.00	14.11	28.94	0.01	6.67	0.641
A-13	45.16	0.00	0.00	14.98	29.69	0.06	37.18	0.657
A-14	45.16	0.00	0.00	14.99	29.68	0.06	36.21	0.657
A-15	45.16	0.00	0.00	14.49	28.92	0.03	19.43	0.640
A-16	45.16	0.00	0.00	14.56	28.92	0.04	23.68	0.640
A-17	45.16	0.00	0.00	14.69	29.99	0.07	47.07	0.664
A-18	45.16	0.00	0.00	14.99	29.68	0.08	50.50	0.657
A-19	45.16	0.00	0.00	14.55	28.92	0.04	22.57	0.640
A-20	45.16	0.00	0.00	14.62	28.92	0.04	24.03	0.640
A-21	45.16	0.00	0.00	14.96	29.71	0.06	40.44	0.658
A-22	45.16	0.00	0.00	14.32	28.93	0.02	11.11	0.641
A-23	45.16	0.00	0.00	15.08	29.83	0.14	83.88	0.661
A-24	45.16	0.00	0.00	14.92	30.01	0.06	39.13	0.664
A-25	45.16	0.00	0.00	14.91	30.01	0.06	40.09	0.665
A-26	45.16	0.00	0.00	15.09	29.78	0.13	82.21	0.659
A-27	45.16	0.00	0.00	14.78	30.14	0.06	36.04	0.667
A-28	45.16	0.00	0.00	15.23	28.93	0.07	41.39	0.641
A-29	45.16	0.00	0.00	14.68	30.09	0.07	44.16	0.666
A-30	45.16	0.00	0.00	14.88	29.79	0.15	93.52	0.660
A-31	45.16	0.00	0.00	14.42	29.77	0.02	11.99	0.659
A-32	45.16	0.00	0.00	14.96	29.96	0.13	83.95	0.663
A-33	45.16	0.00	0.00	14.88	29.80	0.24	153.37	0.660
A-34	45.16	0.00	0.00	15.28	28.87	0.22	137.01	0.639
A-35	45.16	0.00	0.00	15.28	28.87	0.28	174.10	0.639
A-36	45.16	0.00	0.00	14.92	29.25	0.13	84.22	0.648
A-37	45.16	0.00	0.00	14.88	29.29	0.11	69.89	0.649
B-01	45.16	0.00	0.00	14.46	30.23	0.03	18.11	0.669
B-02	45.16	0.00	0.00	14.83	29.34	0.04	28.07	0.650
B-03	45.16	0.00	0.00	14.42	29.87	0.03	19.11	0.661
B-04	45.16	0.00	0.00	14.92	29.75	0.25	154.40	0.659
B-05	45.16	0.00	0.00	14.30	28.93	0.02	11.90	0.641
B-06	45.16	0.00	0.00	14.56	29.62	0.02	14.72	0.656
B-07	45.16	0.00	0.00	14.55	30.03	0.04	24.57	0.665
B-08	45.16	0.00	0.00	14.88	29.79	0.07	42.35	0.660
B-09	45.16	0.00	0.00	14.90	29.78	0.07	45.99	0.659
B-10	45.16	0.00	0.00	37.87	7.07	0.08	47.11	0.157
B-11	45.16	0.00	0.00	14.52	29.66	0.01	9.45	0.657
B-12	45.16	0.00	0.00	14.61	30.07	0.03	16.82	0.666
B-13	45.16	0.00	0.00	14.61	30.07	0.03	18.72	0.666
B-14	45.16	0.00	0.00	14.61	30.07	0.10	61.62	0.666
B-15	45.16	0.00	0.00	14.62	30.06	0.04	23.16	0.666
B-16	45.16	0.00	0.00	14.61	30.07	0.04	26.16	0.666
B-17	45.16	0.00	0.00	14.98	29.69	0.08	50.86	0.657
B-18	45.16	0.00	0.00	14.60	30.08	0.04	23.42	0.666
B-19	45.16	0.00	0.00	14.67	30.01	0.03	20.56	0.664
CaivanLands	45.16	0.00	0.00	15.86	28.74	2.33	1044.59	0.636

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	hr:min
01+011	JUNCTION	0.00	0.00	93.48	0	00:00
01+051	JUNCTION	0.00	0.00	93.76	0	00:00
01+118	JUNCTION	0.00	0.00	93.72	0	00:00
01+143	JUNCTION	0.00	0.00	93.93	0	00:00
02+196	JUNCTION	0.00	0.00	93.67	0	01:30
02+288	JUNCTION	0.00	0.00	93.76	0	00:00
02+365	JUNCTION	0.00	0.00	93.84	0	00:00
02+432	JUNCTION	0.00	0.00	93.86	0	00:00
02+458	JUNCTION	0.00	0.00	93.77	0	00:00
02+512	JUNCTION	0.00	0.01	93.87	0	01:31
02+564	JUNCTION	0.00	0.00	94.40	0	00:00
03+026	JUNCTION	0.00	0.00	93.56	0	00:00
03+054	JUNCTION	0.00	0.00	93.61	0	00:00
03+109	JUNCTION	0.00	0.00	93.44	0	00:00
03+127	JUNCTION	0.00	0.00	93.37	0	00:00
03+200	JUNCTION	0.00	0.00	93.42	0	00:00
03+291	JUNCTION	0.00	0.00	93.34	0	00:00
03+384	JUNCTION	0.00	0.00	93.34	0	00:00
04+078	JUNCTION	0.00	0.01	93.66	0	01:39
04+089	JUNCTION	0.00	0.00	93.76	0	00:00
04+129	JUNCTION	0.00	0.00	93.64	0	00:00
04+207	JUNCTION	0.00	0.00	93.87	0	00:00
05+116	JUNCTION	0.00	0.00	93.93	0	00:00
05+200	JUNCTION	0.00	0.03	93.52	0	01:31
06+023	JUNCTION	0.00	0.00	93.64	0	00:00
06+043	JUNCTION	0.00	0.00	93.74	0	00:00
06+108	JUNCTION	0.00	0.00	93.60	0	00:00
06+194	JUNCTION	0.00	0.00	93.51	0	00:00
06+273	JUNCTION	0.00	0.00	93.40	0	00:00
06+309	JUNCTION	0.00	0.00	93.88	0	00:00
06+332	JUNCTION	0.00	0.00	94.51	0	00:00
06+355	JUNCTION	0.00	0.00	94.15	0	00:00
09+000	JUNCTION	0.00	0.00	93.36	0	00:00
09+097	JUNCTION	0.00	0.00	93.65	0	00:00
09+203	JUNCTION	0.00	0.00	93.89	0	00:00
10+011	JUNCTION	0.00	0.00	93.58	0	00:00
10+232	JUNCTION	0.00	0.00	94.36	0	00:00
102 (STM)	JUNCTION	0.47	1.21	92.04	0	01:29
104 (STM)	JUNCTION	0.63	1.37	92.04	0	01:30
106 (STM)	JUNCTION	0.73	1.47	92.04	0	01:30
106a	JUNCTION	0.80	1.52	92.02	0	01:30
108 (STM)	JUNCTION	0.90	1.61	92.01	0	01:30
108a	JUNCTION	0.96	1.64	91.98	0	01:30
11+000	JUNCTION	0.00	0.00	94.01	0	00:00
11+086	JUNCTION	0.00	0.00	94.26	0	00:00
110 (STM)	JUNCTION	1.06	1.71	91.95	0	01:30
110a	JUNCTION	1.13	1.72	91.89	0	01:30
200 (STM)	JUNCTION	0.27	1.04	92.37	0	01:24
202 (STM)	JUNCTION	0.35	1.12	92.37	0	01:24
202a	JUNCTION	0.45	1.17	92.31	0	01:24
204 (STM)	JUNCTION	0.58	1.25	92.26	0	01:24
204a	JUNCTION	0.68	1.30	92.21	0	01:30
206 (STM)	JUNCTION	0.82	1.36	92.13	0	01:24
208 (STM)	JUNCTION	0.90	1.37	92.06	0	01:24
208a	JUNCTION	0.94	1.34	91.99	0	01:24
210 (STM)	JUNCTION	1.06	1.38	91.91	0	01:24
212 (STM)	JUNCTION	1.18	1.41	91.81	0	01:24
214 (STM)	JUNCTION	1.28	1.44	91.74	0	01:24
216 (STM)	JUNCTION	1.57	1.64	91.65	0	01:28
304 (STM)	JUNCTION	0.43	0.87	91.73	0	01:30
306 (STM)	JUNCTION	0.64	1.07	91.72	0	01:30
306a (STM)	JUNCTION	0.77	1.19	91.71	0	01:30
308 (STM)	JUNCTION	0.88	1.30	91.71	0	01:30
310 (STM)	JUNCTION	1.22	1.60	91.67	0	01:29
312 (STM)	JUNCTION	1.73	2.09	91.65	0	01:30
314 (STM)	JUNCTION	1.80	2.10	91.58	0	01:30
316 (STM)	JUNCTION	1.92	2.13	91.49	0	01:29
324 (STM)	JUNCTION	1.93	2.06	91.41	0	01:30
326 (STM)	JUNCTION	1.98	2.06	91.36	0	01:30
328 (STM)	JUNCTION	2.37	2.39	91.30	0	01:28
330 (STM)	JUNCTION	1.96	2.06	91.38	0	01:28
402 (STM)	JUNCTION	0.39	1.12	92.03	0	01:30
402a (STM)	JUNCTION	0.46	1.18	92.02	0	01:30
404 (STM)	JUNCTION	0.63	1.35	92.02	0	01:30
404a	JUNCTION	0.67	1.38	92.01	0	01:30
406 (STM)	JUNCTION	0.84	1.75	92.20	0	01:22
408 (STM)	JUNCTION	0.94	1.68	92.04	0	01:30
608 (STM)	JUNCTION	0.75	1.45	92.00	0	01:30
608a	JUNCTION	0.80	1.49	91.98	0	01:30
610 (STM)	JUNCTION	1.41	1.92	91.80	0	01:30
610a	JUNCTION	1.45	1.90	91.74	0	01:29
612 (STM)	JUNCTION	1.17	1.52	91.64	0	01:30
614 (STM)	JUNCTION	1.07	1.49	91.71	0	01:30
616 (STM)	JUNCTION	0.76	1.19	91.72	0	01:29
618 (STM)	JUNCTION	0.93	1.43	91.80	0	01:29
902 (STM)	JUNCTION	0.59	1.13	91.83	0	01:30
904 (STM)	JUNCTION	0.71	1.26	91.84	0	01:30
906 (STM)	JUNCTION	0.81	1.34	91.83	0	01:30
908 (STM)	JUNCTION	1.02	1.54	91.81	0	01:30
908a	JUNCTION	1.10	1.62	91.81	0	01:30
C100 (STM)	JUNCTION	0.70	1.18	92.07	0	01:24
C102 (STM)	JUNCTION	0.74	1.14	91.99	0	01:24
C104 (STM)	JUNCTION	0.78	1.10	91.91	0	01:24
C106 (STM)	JUNCTION	0.83	1.07	91.82	0	01:24
C108 (STM)	JUNCTION	0.86	1.03	91.75	0	01:24
C110 (STM)	JUNCTION	0.95	2.24	92.91	0	01:31
CB01-02	JUNCTION	0.04	1.25	93.30	0	01:30
CB03-04	JUNCTION	0.04	1.33	93.22	0	01:30
CB05-06	JUNCTION	0.04	1.21	93.06	0	01:30
CB07-08	JUNCTION	0.05	1.24	92.96	0	01:31
CB09-10	JUNCTION	0.04	1.15	93.06	0	01:30
CB100	JUNCTION	0.04	1.41	94.01	0	01:30
CB102	JUNCTION	0.03	1.40	94.00	0	01:30
CB104	JUNCTION	0.03	1.40	94.00	0	01:30
CB106	JUNCTION	0.04	1.41	94.01	0	01:30
CB108	JUNCTION	0.03	1.40	94.00	0	01:30
CB110	JUNCTION	0.04	1.41	94.01	0	01:30
CB11-12	JUNCTION	0.06	0.79	93.17	0	01:31
CB11-12ROAD	JUNCTION	0.00	0.04	93.66	0	01:30
CB13-14	JUNCTION	0.00	0.00	92.64	0	00:00
CB13-14ROAD	JUNCTION	0.01	0.05	93.89	0	01:30
CB15-16	JUNCTION	0.08	1.31	93.31	0	01:33
CB17-18	JUNCTION	0.12	1.35	93.66	0	01:40
CB19	JUNCTION	0.03	1.08	93.32	0	01:30
CB20-21	JUNCTION	0.05	1.28	93.42	0	01:31
CB22	JUNCTION	0.05	1.25	93.54	0	01:31
CB23	JUNCTION	0.05	1.22	93.30	0	01:31
CB24-25	JUNCTION	0.04	1.20	93.25	0	01:30
CB26-27	JUNCTION	0.04	1.22	93.10	0	01:30
CB28	JUNCTION	0.00	0.32	92.10	0	01:30
CB29	JUNCTION	0.06	1.23	93.01	0	01:30
CB30-31	JUNCTION	0.13	1.38	93.49	0	01:42
CB32-33	JUNCTION	0.00	0.00	92.42	0	00:00
CB32-33 ROAD	JUNCTION	0.01	0.07	93.69	0	01:30
CB34-35	JUNCTION	0.00	0.00	92.80	0	00:00
CB34-35 ROAD	JUNCTION	0.01	0.05	94.05	0	01:30
CB36	JUNCTION	0.03	1.21	94.27	0	01:30
CB37	JUNCTION	0.04	1.22	94.05	0	01:30
CB39	JUNCTION	0.04	1.24	93.82	0	01:30
CB40-41	JUNCTION	0.04	1.24	93.39	0	01:30
CB42-43	JUNCTION	0.03	1.10	93.37	0	01:30

CB44-45	JUNCTION	0.04	1.35	93.68	0	01:30
CB46-47	JUNCTION	0.03	0.96	93.43	0	01:30
CB48-49	JUNCTION	0.05	1.25	93.79	0	01:31
CB50-51	JUNCTION	0.04	1.23	93.62	0	01:30
CB52-53	JUNCTION	0.05	1.28	93.60	0	01:30
CB54	JUNCTION	0.01	0.43	92.80	0	01:30
CB55-56	JUNCTION	0.04	1.24	93.42	0	01:30
CB57-58	JUNCTION	0.03	1.11	93.31	0	01:30
CB59	JUNCTION	0.01	0.25	92.75	0	01:30
CB60	JUNCTION	0.03	0.97	93.27	0	01:30
CB61	JUNCTION	0.02	0.60	92.90	0	01:30
CB62	JUNCTION	0.03	0.87	93.16	0	01:30
CB63	JUNCTION	0.03	0.95	93.30	0	01:30
CB64	JUNCTION	0.02	0.81	93.27	0	01:30
CB-65	JUNCTION	0.02	0.68	93.18	0	01:30
CB66	JUNCTION	0.02	0.65	93.35	0	01:30
CB67-68-69	JUNCTION	0.04	1.29	93.69	0	01:30
HP-01	JUNCTION	0.00	0.00	93.91	0	00:00
HP-03	JUNCTION	0.00	0.00	93.80	0	00:00
RYP-01	JUNCTION	0.00	0.00	94.00	0	00:00
RYP-02	JUNCTION	0.00	0.00	93.95	0	00:00
RYP-03	JUNCTION	0.00	0.00	93.84	0	00:00
RYP-04	JUNCTION	0.00	0.00	93.78	0	00:00
1-HW-01 (STM)	OUTFALL	2.08	2.08	91.28	0	00:00
2-OverlandOutlet	OUTFALL	0.00	0.00	93.00	0	00:00
3-HW-02 (STM)	OUTFALL	1.68	1.68	91.58	0	00:00
4-GreenbankOut	OUTFALL	0.00	0.00	0.00	0	00:00
A30-STOR	STORAGE	0.04	1.40	93.70	0	01:30
A33-STOR	STORAGE	0.05	1.41	93.71	0	01:30
B04_Stor	STORAGE	0.05	1.40	94.15	0	01:30
Caivan-Stor	STORAGE	0.09	1.43	93.53	0	01:31

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr
01+011	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
01+051	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
01+118	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
01+143	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+196	JUNCTION	0.00	0.39	0	01:30	0.000	0.000
02+288	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+365	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+432	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+458	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+512	JUNCTION	0.00	3.88	0	01:30	0.000	0.001
02+564	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+026	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+054	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+109	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+127	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+200	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+291	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+384	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+078	JUNCTION	0.00	11.15	0	01:33	0.000	0.002
04+089	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+129	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+207	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
05+116	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
05+200	JUNCTION	0.00	22.53	0	01:30	0.000	0.018
06+023	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+043	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+108	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+194	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+273	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+309	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+332	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+355	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+000	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+097	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+203	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
10+011	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
10+232	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
102 (STM)	JUNCTION	0.00	15.78	0	01:22	0.000	0.009
104 (STM)	JUNCTION	0.00	26.26	0	01:22	0.000	0.045
106 (STM)	JUNCTION	0.00	110.37	0	01:29	0.000	0.229
106a	JUNCTION	0.00	158.35	0	01:30	0.000	0.296
108 (STM)	JUNCTION	0.00	204.68	0	01:29	0.000	0.371
108a	JUNCTION	0.00	241.07	0	01:30	0.000	0.436
11+000	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
11+086	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
110 (STM)	JUNCTION	0.00	400.38	0	01:30	0.000	0.860
110a	JUNCTION	0.00	410.40	0	01:30	0.000	0.869
200 (STM)	JUNCTION	0.00	73.36	0	01:23	0.000	0.036
202 (STM)	JUNCTION	0.00	209.46	0	01:29	0.000	0.360
202a	JUNCTION	0.00	234.99	0	01:30	0.000	0.402
204 (STM)	JUNCTION	0.00	251.01	0	01:30	0.000	0.441
204a	JUNCTION	0.00	288.23	0	01:30	0.000	0.505
206 (STM)	JUNCTION	0.00	362.04	0	01:30	0.000	0.656
208 (STM)	JUNCTION	0.00	386.50	0	01:30	0.000	0.699
208a	JUNCTION	0.00	403.87	0	01:30	0.000	0.734
210 (STM)	JUNCTION	0.00	479.30	0	01:30	0.000	0.864
212 (STM)	JUNCTION	0.00	504.98	0	01:30	0.000	0.907
214 (STM)	JUNCTION	0.00	577.26	0	01:30	0.000	1.023
216 (STM)	JUNCTION	0.00	1521.63	0	01:30	0.000	3.378
304 (STM)	JUNCTION	0.00	37.48	0	01:30	0.000	0.080
306 (STM)	JUNCTION	0.00	76.89	0	01:31	0.000	0.160
306a (STM)	JUNCTION	0.00	77.25	0	01:31	0.000	0.157
308 (STM)	JUNCTION	0.00	130.13	0	01:30	0.000	0.245
310 (STM)	JUNCTION	0.00	151.15	0	01:30	0.000	0.334
312 (STM)	JUNCTION	0.00	965.09	0	01:30	0.000	2.037
314 (STM)	JUNCTION	0.00	964.54	0	01:30	0.000	2.039
316 (STM)	JUNCTION	0.00	1200.09	0	01:30	0.000	2.438
324 (STM)	JUNCTION	0.00	1200.47	0	01:30	0.000	2.542
326 (STM)	JUNCTION	0.00	1208.78	0	01:30	0.000	2.510
328 (STM)	JUNCTION	0.00	1199.35	0	01:30	0.000	2.504
330 (STM)	JUNCTION	0.00	729.67	0	01:30	0.000	1.723
402 (STM)	JUNCTION	0.00	41.46	0	01:21	0.000	0.096
402a (STM)	JUNCTION	0.00	57.98	0	01:38	0.000	0.219
404 (STM)	JUNCTION	0.00	68.63	0	01:31	0.000	0.243
404a	JUNCTION	0.00	127.08	0	01:31	0.000	0.364
406 (STM)	JUNCTION	0.00	57.61	0	01:22	0.000	0.069
408 (STM)	JUNCTION	0.00	44.12	0	01:22	0.000	0.082
608 (STM)	JUNCTION	0.00	128.74	0	01:31	0.000	0.361
608a	JUNCTION	0.00	135.10	0	01:31	0.000	0.371
610 (STM)	JUNCTION	0.00	634.86	0	01:31	0.000	1.401
610a	JUNCTION	0.00	691.16	0	01:31	0.000	1.479
612 (STM)	JUNCTION	0.00	237.19	0	01:30	0.000	0.407
614 (STM)	JUNCTION	0.00	237.08	0	01:30	0.000	0.402
616 (STM)	JUNCTION	0.00	11.51	0	01:30	0.000	0.019
618 (STM)	JUNCTION	0.00	39.57	0	01:42	0.000	0.186
902 (STM)	JUNCTION	0.00	4.58	0	03:51	0.000	0.009
904 (STM)	JUNCTION	0.00	5.96	0	01:22	0.000	0.019
906 (STM)	JUNCTION	0.00	74.39	0	01:31	0.000	0.149
908 (STM)	JUNCTION	0.00	74.82	0	01:31	0.000	0.144
908a	JUNCTION	0.00	147.25	0	01:31	0.000	0.282
C100 (STM)	JUNCTION	0.00	15.20	0	01:30	0.000	0.030
C102 (STM)	JUNCTION	0.00	17.57	0	01:30	0.000	0.033
C104 (STM)	JUNCTION	0.00	22.00	0	01:30	0.000	0.040
C106 (STM)	JUNCTION	0.00	24.91	0	01:30	0.000	0.044
C108 (STM)	JUNCTION	0.00	22.40	0	01:30	0.000	0.040

C110 (STM)	JUNCTION	0.00	948.05	0	01:33	0.000	2.360
CB01-02	JUNCTION	44.76	44.76	0	01:30	0.070	0.070
CB03-04	JUNCTION	46.82	46.82	0	01:30	0.074	0.074
CB05-06	JUNCTION	55.89	55.89	0	01:30	0.090	0.090
CB07-08	JUNCTION	51.31	51.31	0	01:30	0.082	0.082
CB09-10	JUNCTION	44.16	64.91	0	01:30	0.069	0.088
CB100	JUNCTION	16.82	16.82	0	01:30	0.026	0.026
CB102	JUNCTION	18.72	18.72	0	01:30	0.029	0.029
CB104	JUNCTION	23.16	23.16	0	01:30	0.036	0.036
CB106	JUNCTION	26.15	26.15	0	01:30	0.041	0.041
CB108	JUNCTION	23.41	23.41	0	01:30	0.037	0.037
CB110	JUNCTION	20.56	20.56	0	01:30	0.032	0.032
CB11-12	JUNCTION	0.00	21.84	0	01:30	0.000	0.092
CB11-12ROAD	JUNCTION	51.50	51.50	0	01:30	0.083	0.083
CB13-14	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB13-14ROAD	JUNCTION	24.80	24.80	0	01:30	0.039	0.039
CB15-16	JUNCTION	54.12	54.12	0	01:30	0.086	0.086
CB17-18	JUNCTION	46.63	70.57	0	01:30	0.074	0.114
CB19	JUNCTION	15.81	15.81	0	01:30	0.024	0.024
CB20-21	JUNCTION	77.37	77.37	0	01:30	0.123	0.123
CB22	JUNCTION	36.21	36.21	0	01:30	0.058	0.058
CB23	JUNCTION	37.18	37.18	0	01:30	0.059	0.059
CB24-25	JUNCTION	40.43	40.43	0	01:30	0.064	0.064
CB26-27	JUNCTION	82.20	82.20	0	01:30	0.133	0.133
CB28	JUNCTION	0.00	17.93	0	01:30	0.000	0.007
CB29	JUNCTION	41.38	41.38	0	01:30	0.067	0.067
CB30-31	JUNCTION	36.04	106.80	0	01:30	0.057	0.183
CB32-33	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB32-33 ROAD	JUNCTION	40.09	76.62	0	01:30	0.064	0.127
CB34-35	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB34-35 ROAD	JUNCTION	39.13	39.13	0	01:30	0.063	0.063
CB36	JUNCTION	18.11	18.11	0	01:30	0.028	0.028
CB37	JUNCTION	28.06	29.24	0	01:30	0.044	0.044
CB39	JUNCTION	19.10	19.68	0	01:30	0.029	0.029
CB40-41	JUNCTION	83.87	83.87	0	01:30	0.136	0.136
CB42-43	JUNCTION	50.49	50.49	0	01:30	0.081	0.081
CB44-45	JUNCTION	47.07	47.07	0	01:30	0.074	0.074
CB46-47	JUNCTION	14.72	15.09	0	01:30	0.023	0.023
CB48-49	JUNCTION	24.57	24.57	0	01:30	0.038	0.038
CB50-51	JUNCTION	42.34	42.34	0	01:30	0.067	0.067
CB52-53	JUNCTION	93.09	93.09	0	01:30	0.152	0.152
CB54	JUNCTION	9.45	9.63	0	01:30	0.014	0.014
CB55-56	JUNCTION	61.62	61.62	0	01:30	0.096	0.096
CB57-58	JUNCTION	50.86	53.08	0	01:30	0.081	0.081
CB59	JUNCTION	6.67	6.67	0	01:30	0.010	0.010
CB60	JUNCTION	24.03	24.03	0	01:30	0.038	0.038
CB61	JUNCTION	11.11	11.11	0	01:30	0.017	0.017
CB62	JUNCTION	22.57	22.57	0	01:30	0.035	0.035
CB63	JUNCTION	23.68	23.68	0	01:30	0.037	0.037
CB64	JUNCTION	19.43	19.43	0	01:30	0.030	0.030
CB-65	JUNCTION	11.90	11.90	0	01:30	0.019	0.019
CB66	JUNCTION	11.99	11.99	0	01:30	0.018	0.018
CB67-68-69	JUNCTION	83.94	83.94	0	01:30	0.135	0.135
HP-01	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
HP-03	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-01	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-02	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-03	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-04	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
1-HW-01 (STM)	OUTFALL	0.00	1199.64	0	01:30	0.000	2.521
2-OverlandOutlet	OUTFALL	0.00	0.00	0	00:00	0.000	0.000
3-HW-02 (STM)	OUTFALL	0.00	1521.75	0	01:30	0.000	3.379
4-GreenbankOut	OUTFALL	465.16	465.16	0	01:30	0.747	0.747
A30-STOR	STORAGE	93.51	93.51	0	01:30	0.148	0.148
A33-STOR	STORAGE	153.35	153.35	0	01:30	0.243	0.243
B04_Stor	STORAGE	154.38	154.38	0	01:30	0.245	0.245
Caivan-Stor	STORAGE	1044.25	1044.25	0	01:30	2.328	2.328

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
102 (STM)	JUNCTION	0.32	0.604	1.740
104 (STM)	JUNCTION	0.70	0.723	1.896
106 (STM)	JUNCTION	12.00	0.809	1.837
106a	JUNCTION	12.00	0.913	1.767
108 (STM)	JUNCTION	12.00	0.919	1.747
108a	JUNCTION	12.00	0.957	1.567
110 (STM)	JUNCTION	12.00	0.949	1.510
110a	JUNCTION	12.00	0.958	1.494
200 (STM)	JUNCTION	0.15	0.359	2.165
202 (STM)	JUNCTION	0.17	0.433	1.771
202a	JUNCTION	0.21	0.482	1.702
204 (STM)	JUNCTION	0.24	0.486	1.682
204a	JUNCTION	0.35	0.537	1.601
206 (STM)	JUNCTION	12.00	0.600	1.488
208 (STM)	JUNCTION	12.00	0.611	1.757
208a	JUNCTION	12.00	0.579	1.679
210 (STM)	JUNCTION	12.00	0.535	1.613
212 (STM)	JUNCTION	12.00	0.497	1.915
214 (STM)	JUNCTION	12.00	0.458	1.728
216 (STM)	JUNCTION	12.00	0.420	1.720
304 (STM)	JUNCTION	0.20	0.261	1.639
306 (STM)	JUNCTION	12.00	0.451	1.856
306a (STM)	JUNCTION	12.00	0.582	1.768
308 (STM)	JUNCTION	12.00	0.676	1.701
310 (STM)	JUNCTION	12.00	0.834	1.790
312 (STM)	JUNCTION	12.00	0.873	1.706
314 (STM)	JUNCTION	12.00	0.865	1.054
316 (STM)	JUNCTION	12.00	0.876	1.775
324 (STM)	JUNCTION	12.00	0.714	1.238
326 (STM)	JUNCTION	12.00	0.708	1.182
328 (STM)	JUNCTION	12.00	0.845	0.857
330 (STM)	JUNCTION	12.00	0.838	1.148
402 (STM)	JUNCTION	0.27	0.508	1.793
402a (STM)	JUNCTION	0.33	0.570	1.790
404 (STM)	JUNCTION	0.64	0.689	1.783
404a	JUNCTION	12.00	0.769	1.748
406 (STM)	JUNCTION	0.25	0.691	1.508
408 (STM)	JUNCTION	0.87	0.736	1.766
608 (STM)	JUNCTION	12.00	0.805	1.717
608a	JUNCTION	12.00	0.877	1.639
610 (STM)	JUNCTION	12.00	0.926	1.498
610a	JUNCTION	12.00	0.909	1.580
612 (STM)	JUNCTION	12.00	0.860	2.513
614 (STM)	JUNCTION	12.00	0.881	2.006
616 (STM)	JUNCTION	12.00	0.732	2.552
618 (STM)	JUNCTION	12.00	0.825	1.849
902 (STM)	JUNCTION	0.64	0.515	2.150
904 (STM)	JUNCTION	12.00	0.640	1.925
906 (STM)	JUNCTION	12.00	0.719	1.704
908 (STM)	JUNCTION	12.00	0.857	1.760
908a	JUNCTION	12.00	0.932	1.547
C100 (STM)	JUNCTION	12.00	0.566	1.434
C102 (STM)	JUNCTION	12.00	0.534	1.506
C104 (STM)	JUNCTION	12.00	0.490	1.590
C106 (STM)	JUNCTION	12.00	0.459	1.681
C108 (STM)	JUNCTION	12.00	0.416	1.754
C110 (STM)	JUNCTION	12.00	1.498	0.592
A30-STOR	STORAGE	0.37	1.205	0.300
A33-STOR	STORAGE	0.35	1.159	0.291

B04_Stor	STORAGE	0.35	1.150	0.298
Caivan-Stor	STORAGE	0.21	0.690	0.320

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
A30-STOR	0.000	0	0	0.001	0	0 01:30	92.73
A33-STOR	0.000	0	0	0.001	1	0 01:30	151.28
B04_Stor	0.000	0	0	0.001	0	0 01:30	153.25
Caivan-Stor	0.000	0	0	0.013	1	0 01:31	933.92

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow LPS	Max. Flow LPS	Total Volume 10^6 ltr
1-HW-01 (STM)	99.84	59.31	1199.64	2.521
2-OverlandOutlet	0.00	0.00	0.00	0.000
3-HW-02 (STM)	99.77	79.66	1521.75	3.379
4-GreenbankOut	73.01	24.04	465.16	0.747
System	68.15	163.01	3181.45	6.647

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
{STM}.102-104	CONDUIT	15.78	0 01:22	0.05	0.03	1.00
{STM}.104-106	CONDUIT	20.75	0 01:28	0.07	0.06	1.00
{STM}.106-106a	CONDUIT	109.95	0 01:30	0.38	0.37	1.00
{STM}.108-108a	CONDUIT	204.29	0 01:30	0.55	0.58	1.00
{STM}.110-110a	CONDUIT	400.00	0 01:30	0.88	0.78	1.00
{STM}.306-306a	CONDUIT	77.25	0 01:31	0.26	0.24	1.00
{STM}.308-310	CONDUIT	130.12	0 01:30	0.45	0.40	1.00
{STM}.310-312	CONDUIT	151.95	0 01:30	0.33	0.34	1.00
{STM}.312-314	CONDUIT	964.54	0 01:30	0.83	0.75	1.00
{STM}.314-316	CONDUIT	966.20	0 01:30	0.83	0.74	1.00
{STM}.316-324	CONDUIT	1200.47	0 01:30	1.03	0.94	1.00
{STM}.326-328	CONDUIT	1199.35	0 01:30	0.64	0.50	1.00
{STM}.328-HW-1	CONDUIT	1199.64	0 01:30	0.64	0.49	1.00
{STM}.330-336	CONDUIT	731.87	0 01:30	0.63	0.25	1.00
{STM}.402-402a	CONDUIT	32.64	0 01:38	0.12	0.12	1.00
{STM}.404-404a	CONDUIT	70.05	0 01:31	0.24	0.21	1.00
{STM}.406-408	CONDUIT	41.01	0 01:22	0.14	0.14	1.00
{STM}.408-106	CONDUIT	44.12	0 01:22	0.15	0.15	1.00
{STM}.608-608a	CONDUIT	130.29	0 01:31	0.45	0.46	1.00
{STM}.610-610a	CONDUIT	636.09	0 01:31	0.82	0.78	1.00
{STM}.612-316	CONDUIT	237.04	0 01:30	0.81	0.82	1.00
{STM}.614-312	CONDUIT	237.19	0 01:30	0.81	0.83	1.00
{STM}.616-614	CONDUIT	11.63	0 01:30	0.07	0.09	1.00
{STM}.618-610	CONDUIT	40.08	0 01:44	0.14	0.11	1.00
{STM}.902-904	CONDUIT	4.79	0 01:07	0.02	0.01	1.00
{STM}.904-906	CONDUIT	5.96	0 01:22	0.02	0.02	1.00
{STM}.906-908	CONDUIT	74.82	0 01:31	0.26	0.26	1.00
{STM}.908-908a	CONDUIT	75.53	0 01:33	0.20	0.22	1.00
106a-108	CONDUIT	159.11	0 01:30	0.54	0.56	1.00
108a-110	CONDUIT	241.16	0 01:29	0.65	0.67	1.00
110a-610	CONDUIT	410.64	0 01:30	0.90	0.80	1.00
200-202	CONDUIT	60.78	0 01:23	0.17	0.17	1.00
202-204	CONDUIT	209.14	0 01:30	0.57	0.61	1.00
202a-204	CONDUIT	234.88	0 01:30	0.64	0.68	1.00
204-206	CONDUIT	250.98	0 01:30	0.55	0.55	1.00
204a-206	CONDUIT	288.23	0 01:30	0.63	0.65	1.00
206-208	CONDUIT	361.97	0 01:30	0.79	0.79	1.00
208-208a	CONDUIT	386.43	0 01:30	0.85	1.02	1.00
208a-210	CONDUIT	404.11	0 01:30	0.89	1.09	1.00
210-212	CONDUIT	479.86	0 01:30	0.87	0.99	1.00
212-214	CONDUIT	504.58	0 01:30	0.77	1.06	1.00
214-216	CONDUIT	577.32	0 01:30	0.88	0.90	1.00
216-H2	CONDUIT	1521.75	0 01:30	0.81	0.55	1.00
304-306	CONDUIT	38.09	0 01:31	0.13	0.11	1.00
306a-308	CONDUIT	78.12	0 01:31	0.27	0.24	1.00
324-330	CONDUIT	729.67	0 01:30	0.63	0.29	1.00
402a-404	CONDUIT	61.28	0 01:43	0.21	0.22	1.00
404a-608	CONDUIT	128.74	0 01:31	0.44	0.39	1.00
608a-110	CONDUIT	135.82	0 01:31	0.46	0.47	1.00
610a-312	CONDUIT	692.07	0 01:31	0.90	0.82	1.00
908a-610	CONDUIT	148.29	0 01:31	0.40	0.44	1.00
C100-208	CONDUIT	16.52	0 09:00	0.06	0.07	1.00
C102-208a	CONDUIT	17.99	0 01:30	0.06	0.07	1.00
C104-210	CONDUIT	22.45	0 01:29	0.08	0.09	1.00
C106-212	CONDUIT	25.56	0 01:29	0.09	0.10	1.00
C108-214	CONDUIT	22.68	0 01:30	0.08	0.09	1.00
C110-216	CONDUIT	947.68	0 01:32	3.24	3.81	1.00
CB10-11ROADLINK	CONDUIT	0.00	0 00:00	0.00	0.00	0.07
CB12-13ROADLINK	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CB27-28ROADLINK	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CB29-30ROADLINK	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CB53-ROAD	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CB57-ROAD	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CB59-ROAD	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
CST-01	CHANNEL	0.34	0 01:30	0.21	0.00	0.02
CST-02	CHANNEL	0.00	0 00:00	0.00	0.00	0.07
CST-03	CHANNEL	0.07	0 01:30	0.00	0.00	0.01
CST-04	CHANNEL	0.32	0 01:30	0.43	0.00	0.02
CST-05	CHANNEL	0.00	0 00:00	0.00	0.00	0.01
CST-06	CHANNEL	2.36	0 01:30	0.39	0.00	0.04
RY-00	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-00a	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-01	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-02	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-03	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-04	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-05	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-06	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-08	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-09	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
RY-10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
S01-00	CHANNEL	0.00	0 00:00	0.00	0.00	0.11
S01-01	CHANNEL	0.00	0 00:00	0.00	0.00	0.11
S01-02	CHANNEL	0.00	0 00:00	0.00	0.00	0.00
S01-03	CHANNEL	0.00	0 00:00	0.00	0.00	0.00

S01-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S01-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.01
S01-06	CONDUIT	0.00	0	00:00	0.00	0.00	0.01
S01-07	CONDUIT	0.00	0	00:00	0.00	0.00	0.03
S03-01a	CHANNEL	0.00	0	00:00	0.00	0.00	0.01
S03-01b	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S03-01c	CHANNEL	0.00	0	00:00	0.00	0.00	0.08
S03-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.08
S03-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S03-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S03-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S03-06	CHANNEL	0.00	0	00:00	0.00	0.00	0.02
S03-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.02
S03-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S03-09	CONDUIT	0.00	0	00:00	0.00	0.00	0.07
S03-10	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S03-OUT	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
S04-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.19
S04-02	CHANNEL	0.85	0	01:39	0.01	0.00	0.20
S04-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.02
S04-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S04-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S04-06	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S04-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S04-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S04-09	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S05-01	CONDUIT	11.15	0	01:33	0.03	0.00	0.27
S05-02	CHANNEL	23.99	0	01:30	0.32	0.01	0.31
S05-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.08
S05-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S05-05	CHANNEL	22.53	0	01:30	0.49	0.01	0.13
S05-06	CHANNEL	22.36	0	01:31	0.70	0.00	0.13
S05-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.08
S06-01d	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
S06-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.14
S06-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.03
S06-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.03
S06-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-06	CONDUIT	17.93	0	01:30	0.09	0.01	0.07
S06-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
S06-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-09	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-10	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-11	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
S09-00	CHANNEL	1.19	0	01:31	0.17	0.00	0.09
S09-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S09-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S09-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S09-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.04
S09-05	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
S09-06	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
S10-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S10-02	CHANNEL	36.74	0	01:30	0.30	0.01	0.21
S10-03	CHANNEL	71.73	0	01:30	0.44	0.03	0.39
S10-04	CONDUIT	0.00	0	00:00	0.00	0.00	0.30
S10-05	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
S11-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S11-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S11-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
ST10-00	CHANNEL	0.00	0	00:00	0.00	0.00	0.02
ST6-01a	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ST6-01b	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ST6-01c	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
STB-00	CHANNEL	0.00	0	00:00	0.00	0.00	0.02
STB-01	CHANNEL	1.26	0	01:30	0.11	0.00	0.06
STB-02	CHANNEL	3.88	0	01:30	0.37	0.00	0.06
STB-03	CHANNEL	0.82	0	01:31	0.18	0.00	0.04
STB-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
STB-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
STB-06	CHANNEL	0.00	0	00:00	0.00	0.00	0.05
STB-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.05
STB-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.13
STB-09	CHANNEL	0.00	0	00:00	0.00	0.00	0.13
STB-10	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
STB-11	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
STB-12	CHANNEL	0.00	0	01:30	0.00	0.00	0.07
STB-13	CHANNEL	0.00	0	01:30	0.00	0.00	0.01
OCB01-02	ORIFICE	37.48	0	01:30			1.00
OCB03-04	ORIFICE	38.81	0	01:30			1.00
OCB05-06	ORIFICE	52.67	0	01:30			1.00
OCB07-08	ORIFICE	37.39	0	01:31			1.00
OCB09-10	ORIFICE	55.08	0	01:31			1.00
OCB11-12	ORIFICE	21.36	0	01:31			1.00
OCB13-14	ORIFICE	0.00	0	00:00			0.00
OCB15-16	ORIFICE	27.98	0	01:33			1.00
OCB17-18	ORIFICE	25.35	0	01:40			1.00
OCB19	ORIFICE	14.97	0	01:30			1.00
OCB20-21	ORIFICE	57.03	0	01:31			1.00
OCB22	ORIFICE	27.28	0	01:31			1.00
OCB23	ORIFICE	26.89	0	01:31			1.00
OCB24-25	ORIFICE	36.79	0	01:27			1.00
OCB26-27	ORIFICE	72.07	0	01:30			1.00
OCB28	ORIFICE	17.50	0	01:30			1.00
OCB28-Stor	ORIFICE	92.73	0	01:30			1.00
OCB29	ORIFICE	20.56	0	01:30			1.00
OCB30-31	ORIFICE	39.57	0	01:42			1.00
OCB31-Stor	ORIFICE	151.28	0	01:30			1.00
OCB32-33	ORIFICE	0.00	0	00:00			0.00
OCB34-35	ORIFICE	0.00	0	00:00			0.00
OCB36	ORIFICE	15.93	0	01:30			1.00
OCB37	ORIFICE	24.08	0	01:30			1.00
OCB39	ORIFICE	16.11	0	01:30			1.00
OCB40-41	ORIFICE	72.64	0	01:30			1.00
OCB42-43	ORIFICE	49.84	0	01:30			1.00
OCB44-45	ORIFICE	39.02	0	01:30			1.00
OCB46-47	ORIFICE	14.13	0	01:30			1.00
OCB48-49	ORIFICE	16.15	0	01:31			1.00
OCB50-51	ORIFICE	37.26	0	01:30			1.00
OCB52-53	ORIFICE	73.85	0	01:30			1.00
OCB54	ORIFICE	9.22	0	01:30			1.00
OCB55-56	ORIFICE	53.30	0	01:30			1.00
OCB57-58	ORIFICE	50.08	0	01:30			1.00
OCB59	ORIFICE	6.66	0	01:30			1.00
OCB60	ORIFICE	23.83	0	01:30			1.00
OCB61	ORIFICE	11.02	0	01:30			1.00
OCB62	ORIFICE	22.44	0	01:30			1.00
OCB63	ORIFICE	23.52	0	01:30			1.00
OCB64	ORIFICE	19.32	0	01:30			1.00
OCB65	ORIFICE	11.78	0	01:30			1.00
OCB66	ORIFICE	11.51	0	01:30			1.00
OCB67-68	ORIFICE	74.32	0	01:30			1.00
OCB-B04	ORIFICE	153.25	0	01:30			1.00
OCB-C100	ORIFICE	15.20	0	01:30			1.00
OCB-C102	ORIFICE	17.57	0	01:30			1.00
OCB-C104	ORIFICE	22.00	0	01:30			1.00
OCB-C106	ORIFICE	24.91	0	01:30			1.00
OCB-C108	ORIFICE	22.40	0	01:30			1.00
OCB-C110	ORIFICE	17.66	0	01:26			1.00
Orifice-55	ORIFICE	933.92	0	01:33			1.00
VORTECHS	WEIR	479.03	0	01:30			1.00
10-11	DUMMY	21.84	0	01:30			
12-13	DUMMY	0.00	0	00:00			
27-28	DUMMY	0.00	0	00:00			
29-30	DUMMY	0.00	0	00:00			

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Flow Classification Summary

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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
{STM}.102-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0008
{STM}.104-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0010
{STM}.106-106a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0020
{STM}.108-108a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0020
{STM}.110-110a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0016
{STM}.306-306a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0011
{STM}.308-310	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0011
{STM}.310-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0015
{STM}.312-314	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0012
{STM}.314-316	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
{STM}.316-324	1.48	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0029
{STM}.326-328	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
{STM}.328-HW-1	2.49	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0020
{STM}.330-336	5.92	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0013
{STM}.402-402a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0011
{STM}.404-404a	1.27	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0023
{STM}.406-408	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0005
{STM}.408-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0017
{STM}.608-608a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0025
{STM}.610-610a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0018
{STM}.612-316	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0021
{STM}.614-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0022
{STM}.616-614	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0008
{STM}.618-610	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0010
{STM}.902-904	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0009
{STM}.904-906	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
{STM}.906-908	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0011
{STM}.908-908a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0013
106a-108	1.13	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0032
108a-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0030
110a-610	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0017
200-202	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0004
202-204	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0004
202a-204	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0007
204-206	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0005
204a-206	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0010
206-208	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0019
208-208a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0028
208a-210	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0028
210-212	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0021
212-214	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0026
214-216	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
216-H2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0005
304-306	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0008
306a-308	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0012
324-330	5.59	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0011
402a-404	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0011
404a-608	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0026
608a-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0018
610a-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
908a-610	1.06	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0032
C100-208	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0018
C102-208a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0020
C104-210	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0020
C106-212	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0019
C108-214	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0018
C110-216	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0038
CB10-11ROADLINK	4.03	0.65	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.0000
CB12-13ROADLINK	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB27-28ROADLINK	1.93	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB29-30ROADLINK	1.93	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB53-ROAD	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB57-ROAD	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB59-ROAD	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CST-01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CST-02	1.06	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CST-03	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0000
CST-04	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.02	0.0000
CST-05	1.11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CST-06	1.11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0000
RY-00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-00a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-02	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-05	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-00	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-01	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-02	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-05	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-06	2.90	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-07	2.76	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01a	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01c	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-02	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-04	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-05	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-08	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-09	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-OUT	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-01	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-02	1.00	0.79	0.01	0.00	0.03	0.00	0.00	0.17	0.01	0.0000
S04-03	1.36	0.80	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-05	1.44	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-06	1.22	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-07	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-08	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-09	2.14	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S05-01	3.89	0.79	0.01	0.00	0.06	0.00	0.00	0.14	0.05	0.0000
S05-02	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.85	0.0000
S05-03	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S05-04	1.00	0.64	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S05-05	1.00	0.00	0.64	0.00	0.31	0.04	0.00	0.00	0.09	0.0000
S05-06	1.48	0.00	0.00	0.00	0.00	0.01	0.00	0.99	0.66	0.0000
S05-07	5.63	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-01d	2.64	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-02	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-03	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-04	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-05	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-06	1.07	0.97	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.0000
S06-07	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-11	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-00	1.37	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.55	0.0000

S09-01	1.14	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-02	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-03	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-04	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-05	1.08	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S10-01	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S10-02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.37	0.0000
S10-03	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.68	0.0000
S10-04	1.96	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S10-05	1.76	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S11-01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S11-02	1.21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S11-03	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST10-00	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01a	1.66	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01c	1.21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-00	1.27	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-01	1.00	0.99	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.0000
STB-02	1.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00	0.01	0.0000
STB-03	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.46	0.0000
STB-04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-05	1.12	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-06	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-07	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-08	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-09	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-11	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-12	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.0000
STB-13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.0000

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
{STM}.102-104	0.32	0.32	0.32	0.01	0.01
{STM}.104-106	11.86	11.86	11.88	0.01	0.01
{STM}.106-106a	12.00	12.00	12.00	0.01	0.01
{STM}.108-108a	12.00	12.00	12.00	0.01	0.01
{STM}.110-110a	12.00	12.00	12.00	0.01	0.01
{STM}.306-306a	12.00	12.00	12.00	0.01	0.01
{STM}.308-310	12.00	12.00	12.00	0.01	0.01
{STM}.310-312	12.00	12.00	12.00	0.01	0.01
{STM}.312-314	12.00	12.00	12.00	0.01	0.11
{STM}.314-316	12.00	12.00	12.00	0.01	0.04
{STM}.316-324	12.00	12.00	12.00	0.01	1.21
{STM}.326-328	12.00	12.00	12.00	0.01	0.01
{STM}.328-HW-1	12.00	12.00	12.00	0.01	0.20
{STM}.330-336	12.00	12.00	12.00	0.01	0.14
{STM}.402-402a	0.27	0.27	0.27	0.01	0.01
{STM}.404-404a	10.02	10.02	10.85	0.01	0.01
{STM}.406-408	0.25	0.25	0.25	0.01	0.01
{STM}.408-106	11.99	11.99	11.99	0.01	0.01
{STM}.608-608a	12.00	12.00	12.00	0.01	0.01
{STM}.610-610a	12.00	12.00	12.00	0.01	0.16
{STM}.612-316	12.00	12.00	12.00	0.01	0.01
{STM}.614-312	12.00	12.00	12.00	0.01	0.12
{STM}.616-614	12.00	12.00	12.00	0.01	0.01
{STM}.618-610	12.00	12.00	12.00	0.01	0.01
{STM}.902-904	0.64	0.64	0.64	0.01	0.01
{STM}.904-906	12.00	12.00	12.00	0.01	0.01
{STM}.906-908	12.00	12.00	12.00	0.01	0.01
{STM}.908-908a	12.00	12.00	12.00	0.01	0.01
106a-108	12.00	12.00	12.00	0.01	0.23
108a-110	12.00	12.00	12.00	0.01	0.12
110a-610	12.00	12.00	12.00	0.01	0.12
200-202	0.15	0.15	0.15	0.01	0.01
202-204	0.17	0.17	0.17	0.01	0.01
202a-204	0.21	0.21	0.21	0.01	0.01
204-206	0.24	0.24	0.24	0.01	0.01
204a-206	0.35	0.35	0.35	0.01	0.01
206-208	12.00	12.00	12.00	0.01	0.04
208-208a	12.00	12.00	12.00	0.04	0.26
208a-210	12.00	12.00	12.00	0.10	0.22
210-212	12.00	12.00	12.00	0.01	0.15
212-214	12.00	12.00	12.00	0.09	0.20
214-216	12.00	12.00	12.00	0.01	0.13
216-H2	12.00	12.00	12.00	0.01	0.01
304-306	0.20	0.20	0.20	0.01	0.01
306a-308	12.00	12.00	12.00	0.01	0.01
324-330	12.00	12.00	12.00	0.01	0.14
402a-404	0.33	0.33	0.33	0.01	0.01
404a-608	12.00	12.00	12.00	0.01	0.01
608a-110	12.00	12.00	12.00	0.01	0.01
610a-312	12.00	12.00	12.00	0.01	0.17
908a-610	12.00	12.00	12.00	0.01	0.07
C100-208	12.00	12.00	12.00	0.01	0.09
C102-208a	12.00	12.00	12.00	0.01	0.02
C104-210	12.00	12.00	12.00	0.01	0.01
C106-212	12.00	12.00	12.00	0.01	0.01
C108-214	12.00	12.00	12.00	0.01	0.01
C110-216	12.00	12.00	12.00	0.70	0.87

Analysis begun on: Wed Nov 23 10:02:12 2016
Analysis ended on: Wed Nov 23 10:02:15 2016
Total elapsed time: 00:00:03

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
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M:\2011\111117\CAD\Design\111117 - GP.DWG
M:\2011\111117\CAD\Design\111117 - GP.DWG

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

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Starting Date ............ JAN-21-2016 00:00:00
Ending Date .............. JAN-21-2016 12:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 5.00 sec


WARNING 03: negative offset ignored for Link CB10-11ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB12-13ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB27-28ROADLINK

WARNING 04: minimum elevation drop used for Conduit CB29-30ROADLINK

WARNING 02: maximum depth increased for Node CB07-08

WARNING 02: maximum depth increased for Node CB09-10

WARNING 02: maximum depth increased for Node CB13-14

WARNING 02: maximum depth increased for Node CB13-14ROAD

WARNING 02: maximum depth increased for Node CB32-33

WARNING 02: maximum depth increased for Node CB32-33 ROAD

WARNING 02: maximum depth increased for Node CB34-35

WARNING 02: maximum depth increased for Node CB34-35 ROAD

WARNING 02: maximum depth increased for Node CB57-58

WARNING 02: maximum depth increased for Node CB60

WARNING 02: maximum depth increased for Node CB61

*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 57
Number of nodes ........... 162
Number of links ........... 220
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                          Data        Recording
Name                Data Source           Type        Interval
----------------------------------------------------------------
RAIN                C100-4                INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width    %Imperv    %Slope    Rain Gage            Outlet
-------------------------------------------------------------------------------------------------
A-01                        0.23     43.00      64.00    0.7500    RAIN                 CB01-02
A-02                        0.25     36.00      64.00    0.7500    RAIN                 CB03-04
A-03                        0.13     36.00      64.00    0.7500    RAIN                 CB13-14ROAD
A-04                        0.30     34.00      64.00    0.7500    RAIN                 CB05-06
A-05                        0.28     37.00      64.00    0.7500    RAIN                 CB11-12ROAD
A-06                        0.27     37.00      64.00    0.7500    RAIN                 CB07-08
A-07                        0.29     39.00      64.00    0.7500    RAIN                 CB15-16
A-08                        0.25     41.00      64.00    0.7500    RAIN                 CB17-18
A-09                        0.08     23.00      64.00    0.7500    RAIN                 CB19
A-10                        0.19     37.00      64.00    0.7500    RAIN                 CB20-21
A-11                        0.23     25.00      64.00    0.7500    RAIN                 CB20-21
A-12                        0.04     24.00      64.00    0.7500    RAIN                 CB59
A-13                        0.20     24.00      64.00    0.7500    RAIN                 CB23
A-14                        0.20     23.00      64.00    0.7500    RAIN                 CB22
A-15                        0.11     30.00      64.00    0.7500    RAIN                 CB64
A-16                        0.13     32.00      64.00    0.7500    RAIN                 CB63
A-17                        0.25     49.00      64.00    0.7500    RAIN                 CB44-45
A-18                        0.27     32.00      64.00    0.7500    RAIN                 CB42-43
A-19                        0.12     31.00      64.00    0.7500    RAIN                 CB62
A-20                        0.13     29.00      64.00    0.7500    RAIN                 CB60
A-21                        0.22     27.00      64.00    0.7500    RAIN                 CB24-25
A-22                        0.06     24.00      64.00    0.7500    RAIN                 CB61
A-23                        0.46     46.00      64.00    0.7500    RAIN                 CB40-41
A-24                        0.21     28.00      64.00    0.7500    RAIN                 CB34-35 ROAD
A-25                        0.21     29.00      64.00    0.7500    RAIN                 CB32-33 ROAD
A-26                        0.45     45.00      64.00    0.7500    RAIN                 CB26-27
A-27                        0.19     32.00      64.00    0.7500    RAIN                 CB30-31
A-28                        0.23     18.00      64.00    0.7500    RAIN                 CB29
A-29                        0.23     46.00      64.00    0.7500    RAIN                 CB09-10
A-30                        0.50     71.00      64.00    0.7500    RAIN                 A30-STOR
A-31                        0.06     20.00      64.00    0.7500    RAIN                 CB66
A-32                        0.45     56.00      64.00    0.7500    RAIN                 CB67-68-69
A-33                        0.82    117.00      64.00    0.7500    RAIN                 A33-STOR
A-34                        0.77     55.00      64.00    0.7500    RAIN                 4-GreenbankOut
A-35                        0.98     70.00      64.00    0.7500    RAIN                 4-GreenbankOut
A-36                        0.45     60.00      64.00    0.7500    RAIN                 4-GreenbankOut
A-37                        0.37     53.00      64.00    0.7500    RAIN                 4-GreenbankOut
B-01                        0.09     28.00      64.00    0.7500    RAIN                 CB36
B-02                        0.15     23.00      64.00    0.7500    RAIN                 CB37
B-03                        0.10     32.00      64.00    0.7500    RAIN                 CB39
B-04                        0.83    110.00      64.00    0.7500    RAIN                 B04_Stor
B-05                        0.06     27.00      64.00    0.7500    RAIN                 CB-65
B-06                        0.08     19.00      64.00    0.7500    RAIN                 CB46-47
B-07                        0.13     32.00      64.00    0.7500    RAIN                 CB48-49
B-08                        0.23     32.00      64.00    0.7500    RAIN                 CB50-51
B-09                        0.25     34.00      64.00    0.7500    RAIN                 CB52-53
B-10                        1.12    149.00      14.00    0.1000    RAIN                 CB52-53
B-11                        0.05     13.00      64.00    0.7500    RAIN                 CB54
```

B-12	0.09	20.00	64.00	0.7500	RAIN	CB100
B-13	0.10	22.00	64.00	0.7500	RAIN	CB102
B-14	0.32	73.00	64.00	0.7500	RAIN	CB55-56
B-15	0.12	27.00	64.00	0.7500	RAIN	CB104
B-16	0.14	31.00	64.00	0.7500	RAIN	CB106
B-17	0.27	33.00	64.00	0.7500	RAIN	CB57-58
B-18	0.12	28.00	64.00	0.7500	RAIN	CB108
B-19	0.11	22.00	64.00	0.7500	RAIN	CB110
CaivanLands	8.10	200.00	64.00	0.5000	RAIN	Caivan-Stor

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
01+011	JUNCTION	93.48	0.30	0.0	
01+051	JUNCTION	93.76	0.30	0.0	
01+118	JUNCTION	93.72	0.30	0.0	
01+143	JUNCTION	93.93	0.30	0.0	
02+196	JUNCTION	93.67	0.30	0.0	
02+288	JUNCTION	93.76	0.30	0.0	
02+365	JUNCTION	93.84	0.30	0.0	
02+432	JUNCTION	93.86	0.30	0.0	
02+458	JUNCTION	93.77	0.30	0.0	
02+512	JUNCTION	93.86	0.30	0.0	
02+564	JUNCTION	94.40	0.30	0.0	
03+026	JUNCTION	93.56	0.30	0.0	
03+054	JUNCTION	93.61	0.30	0.0	
03+109	JUNCTION	93.44	0.30	0.0	
03+127	JUNCTION	93.37	0.30	0.0	
03+200	JUNCTION	93.42	0.30	0.0	
03+291	JUNCTION	93.34	0.30	0.0	
03+384	JUNCTION	93.34	0.30	0.0	
04+078	JUNCTION	93.65	0.30	0.0	
04+089	JUNCTION	93.76	0.30	0.0	
04+129	JUNCTION	93.64	0.30	0.0	
04+207	JUNCTION	93.87	0.30	0.0	
05+116	JUNCTION	93.93	0.30	0.0	
05+200	JUNCTION	93.49	0.30	0.0	
06+023	JUNCTION	93.64	0.30	0.0	
06+043	JUNCTION	93.74	0.30	0.0	
06+108	JUNCTION	93.60	0.30	0.0	
06+194	JUNCTION	93.51	0.30	0.0	
06+273	JUNCTION	93.40	0.30	0.0	
06+309	JUNCTION	93.88	0.30	0.0	
06+332	JUNCTION	94.51	0.30	0.0	
06+355	JUNCTION	94.15	0.30	0.0	
09+000	JUNCTION	93.36	0.30	0.0	
09+097	JUNCTION	93.65	0.30	0.0	
09+203	JUNCTION	93.89	0.30	0.0	
10+011	JUNCTION	93.58	0.30	0.0	
10+232	JUNCTION	94.36	0.30	0.0	
102 (STM)	JUNCTION	90.82	2.95	0.0	
104 (STM)	JUNCTION	90.67	3.27	0.0	
106 (STM)	JUNCTION	90.57	3.30	0.0	
106a	JUNCTION	90.50	3.29	0.0	
108 (STM)	JUNCTION	90.40	3.35	0.0	
108a	JUNCTION	90.34	3.21	0.0	
11+000	JUNCTION	94.01	0.30	0.0	
11+086	JUNCTION	94.26	0.30	0.0	
110 (STM)	JUNCTION	90.24	3.22	0.0	
110a	JUNCTION	90.17	3.21	0.0	
200 (STM)	JUNCTION	91.33	3.21	0.0	
202 (STM)	JUNCTION	91.25	2.89	0.0	
202a	JUNCTION	91.14	2.87	0.0	
204 (STM)	JUNCTION	91.01	2.93	0.0	
204a	JUNCTION	90.91	2.90	0.0	
206 (STM)	JUNCTION	90.77	2.85	0.0	
208 (STM)	JUNCTION	90.69	3.13	0.0	
208a	JUNCTION	90.65	3.02	0.0	
210 (STM)	JUNCTION	90.53	2.99	0.0	
212 (STM)	JUNCTION	90.40	3.33	0.0	
214 (STM)	JUNCTION	90.30	3.17	0.0	
216 (STM)	JUNCTION	90.01	3.36	0.0	
304 (STM)	JUNCTION	90.86	2.51	0.0	
306 (STM)	JUNCTION	90.65	2.93	0.0	
306a (STM)	JUNCTION	90.52	2.96	0.0	
308 (STM)	JUNCTION	90.41	3.00	0.0	
310 (STM)	JUNCTION	90.07	3.39	0.0	
312 (STM)	JUNCTION	89.56	3.80	0.0	
314 (STM)	JUNCTION	89.49	3.15	0.0	
316 (STM)	JUNCTION	89.36	3.90	0.0	
324 (STM)	JUNCTION	89.35	3.30	0.0	
326 (STM)	JUNCTION	89.30	3.24	0.0	
328 (STM)	JUNCTION	88.91	3.25	0.0	
330 (STM)	JUNCTION	89.33	3.21	0.0	
402 (STM)	JUNCTION	90.91	2.91	0.0	
402a (STM)	JUNCTION	90.84	2.97	0.0	
404 (STM)	JUNCTION	90.67	3.13	0.0	
404a	JUNCTION	90.63	3.13	0.0	
406 (STM)	JUNCTION	90.45	3.25	0.0	
408 (STM)	JUNCTION	90.36	3.44	0.0	
608 (STM)	JUNCTION	90.55	3.16	0.0	
608a	JUNCTION	90.49	3.13	0.0	
610 (STM)	JUNCTION	89.88	3.42	0.0	
610a	JUNCTION	89.84	3.48	0.0	
612 (STM)	JUNCTION	90.12	4.03	0.0	
614 (STM)	JUNCTION	90.22	3.50	0.0	
616 (STM)	JUNCTION	90.53	3.74	0.0	
618 (STM)	JUNCTION	90.36	3.28	0.0	
902 (STM)	JUNCTION	90.70	3.27	0.0	
904 (STM)	JUNCTION	90.58	3.18	0.0	
906 (STM)	JUNCTION	90.49	3.04	0.0	
908 (STM)	JUNCTION	90.27	3.30	0.0	
908a	JUNCTION	90.19	3.17	0.0	
C100 (STM)	JUNCTION	90.89	2.61	0.0	
C102 (STM)	JUNCTION	90.85	2.65	0.0	
C104 (STM)	JUNCTION	90.81	2.69	0.0	
C106 (STM)	JUNCTION	90.75	2.75	0.0	
C108 (STM)	JUNCTION	90.72	2.78	0.0	
C110 (STM)	JUNCTION	90.67	2.83	0.0	
CB01-02	JUNCTION	92.05	1.50	0.0	
CB03-04	JUNCTION	91.89	1.59	0.0	
CB05-06	JUNCTION	91.85	1.50	0.0	
CB07-08	JUNCTION	91.72	1.65	0.0	
CB09-10	JUNCTION	91.91	1.40	0.0	
CB100	JUNCTION	92.60	1.75	0.0	
CB102	JUNCTION	92.60	1.75	0.0	
CB104	JUNCTION	92.60	1.75	0.0	
CB106	JUNCTION	92.60	1.75	0.0	
CB108	JUNCTION	92.60	1.75	0.0	
CB110	JUNCTION	92.60	1.75	0.0	
CB11-12	JUNCTION	92.38	1.54	0.0	
CB11-12ROAD	JUNCTION	93.62	0.30	0.0	
CB13-14	JUNCTION	92.64	1.61	0.0	
CB13-14ROAD	JUNCTION	93.84	0.41	0.0	
CB15-16	JUNCTION	92.00	1.50	0.0	
CB17-18	JUNCTION	92.31	1.50	0.0	
CB19	JUNCTION	92.24	1.50	0.0	
CB20-21	JUNCTION	92.14	1.50	0.0	
CB22	JUNCTION	92.29	1.50	0.0	
CB23	JUNCTION	92.08	1.50	0.0	
CB24-25	JUNCTION	92.05	1.50	0.0	
CB26-27	JUNCTION	91.88	1.50	0.0	
CB28	JUNCTION	91.78	1.51	0.0	
CB29	JUNCTION	91.78	1.50	0.0	

CB30-31	JUNCTION	92.11	1.50	0.0
CB32-33	JUNCTION	92.42	1.84	0.0
CB32-33 ROAD	JUNCTION	93.62	0.64	0.0
CB34-35	JUNCTION	92.80	1.85	0.0
CB34-35 ROAD	JUNCTION	94.00	0.65	0.0
CB36	JUNCTION	93.06	1.50	0.0
CB37	JUNCTION	92.83	1.50	0.0
CB39	JUNCTION	92.58	1.50	0.0
CB40-41	JUNCTION	92.15	1.50	0.0
CB42-43	JUNCTION	92.27	1.50	0.0
CB44-45	JUNCTION	92.33	1.59	0.0
CB46-47	JUNCTION	92.47	1.50	0.0
CB48-49	JUNCTION	92.54	1.48	0.0
CB50-51	JUNCTION	92.39	1.50	0.0
CB52-53	JUNCTION	92.32	1.50	0.0
CB54	JUNCTION	92.37	1.50	0.0
CB55-56	JUNCTION	92.18	1.50	0.0
CB57-58	JUNCTION	92.20	1.40	0.0
CB59	JUNCTION	92.50	1.50	0.0
CB60	JUNCTION	92.30	1.80	0.0
CB61	JUNCTION	92.30	1.55	0.0
CB62	JUNCTION	92.29	1.50	0.0
CB63	JUNCTION	92.35	1.50	0.0
CB64	JUNCTION	92.46	1.50	0.0
CB-65	JUNCTION	92.50	1.50	0.0
CB66	JUNCTION	92.70	1.50	0.0
CB67-68-69	JUNCTION	92.40	1.56	0.0
HP-01	JUNCTION	93.91	0.30	0.0
HP-03	JUNCTION	93.80	0.30	0.0
RYP-01	JUNCTION	94.00	0.30	0.0
RYP-02	JUNCTION	93.95	0.30	0.0
RYP-03	JUNCTION	93.84	0.30	0.0
RYP-04	JUNCTION	93.78	0.30	0.0
1-HW-01 (STM)	OUTFALL	89.20	1.22	0.0
2-OverlandOutlet	OUTFALL	93.00	0.30	0.0
3-HW-02 (STM)	OUTFALL	89.90	1.22	0.0
4-GreenbankOut	OUTFALL	0.00	0.00	0.0
A30-STOR	STORAGE	92.30	1.70	0.0
A33-STOR	STORAGE	92.30	1.70	0.0
B04_Stor	STORAGE	92.75	1.70	0.0
Caivan-Stor	STORAGE	92.10	1.75	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
{STM}.102-104	102 (STM)	104 (STM)	CONDUIT	22.5	0.5368	0.0130
{STM}.104-106	104 (STM)	106 (STM)	CONDUIT	28.2	0.3015	0.0130
{STM}.106-106a	106 (STM)	106a	CONDUIT	32.1	0.2178	0.0130
{STM}.108-108a	108 (STM)	108a	CONDUIT	37.5	0.1598	0.0130
{STM}.110-110a	110 (STM)	110a	CONDUIT	37.5	0.1972	0.0130
{STM}.306-306a	306 (STM)	306a (STM)	CONDUIT	50.1	0.2593	0.0130
{STM}.308-310	308 (STM)	310 (STM)	CONDUIT	73.3	0.2593	0.0130
{STM}.310-312	310 (STM)	312 (STM)	CONDUIT	41.4	0.1499	0.0130
{STM}.312-314	312 (STM)	314 (STM)	CONDUIT	56.5	0.1009	0.0130
{STM}.314-316	314 (STM)	316 (STM)	CONDUIT	83.4	0.1031	0.0130
{STM}.316-324	316 (STM)	324 (STM)	CONDUIT	15.3	0.0979	0.0130
{STM}.326-328	326 (STM)	328 (STM)	CONDUIT	60.0	0.1000	0.0130
{STM}.328-HW-1	328 (STM)	1-HW-01 (STM)	CONDUIT	9.5	0.1050	0.0130
{STM}.330-336	330 (STM)	326 (STM)	CONDUIT	5.0	0.5000	0.0130
{STM}.402-402a	402 (STM)	402a (STM)	CONDUIT	29.9	0.2340	0.0150
{STM}.404-404a	404 (STM)	404a	CONDUIT	14.1	0.2626	0.0130
{STM}.406-408	406 (STM)	408 (STM)	CONDUIT	105.5	0.2000	0.0130
{STM}.408-106	408 (STM)	106 (STM)	CONDUIT	20.5	0.2003	0.0130
{STM}.608-608a	608 (STM)	608a	CONDUIT	28.5	0.1968	0.0130
{STM}.610-610a	610 (STM)	610a	CONDUIT	33.3	0.1202	0.0130
{STM}.612-316	612 (STM)	316 (STM)	CONDUIT	78.3	0.2005	0.0130
{STM}.614-312	614 (STM)	612 (STM)	CONDUIT	25.1	0.1991	0.0130
{STM}.616-614	616 (STM)	614 (STM)	CONDUIT	80.3	0.2005	0.0130
{STM}.618-610	618 (STM)	610 (STM)	CONDUIT	41.1	0.2989	0.0130
{STM}.902-904	902 (STM)	904 (STM)	CONDUIT	37.7	0.3128	0.0130
{STM}.904-906	904 (STM)	906 (STM)	CONDUIT	40.1	0.1994	0.0130
{STM}.906-908	906 (STM)	908 (STM)	CONDUIT	70.5	0.2001	0.0130
{STM}.908-908a	908 (STM)	908a	CONDUIT	50.7	0.1480	0.0130
106a-108	106a	108 (STM)	CONDUIT	15.1	0.1985	0.0130
108a-110	108a	110 (STM)	CONDUIT	17.8	0.1684	0.0130
110a-610	110a	610 (STM)	CONDUIT	39.0	0.1950	0.0130
200-202	200 (STM)	202 (STM)	CONDUIT	37.4	0.2138	0.0150
202-204	202 (STM)	202a	CONDUIT	53.9	0.2042	0.0150
202a-204	202a	204 (STM)	CONDUIT	28.7	0.2091	0.0150
204-206	204 (STM)	204a	CONDUIT	48.8	0.2048	0.0150
204a-206	204a	206 (STM)	CONDUIT	71.2	0.1967	0.0150
206-208	206 (STM)	208 (STM)	CONDUIT	38.5	0.2078	0.0150
208-208a	208 (STM)	208a	CONDUIT	28.4	0.1410	0.0150
208a-210	208a	210 (STM)	CONDUIT	29.4	0.1360	0.0150
210-212	210 (STM)	212 (STM)	CONDUIT	35.5	0.1408	0.0150
212-214	212 (STM)	214 (STM)	CONDUIT	35.5	0.0845	0.0150
214-216	214 (STM)	216 (STM)	CONDUIT	36.1	0.1524	0.0150
216-H2	216 (STM)	3-HW-02 (STM)	CONDUIT	79.8	0.1378	0.0130
304-306	304 (STM)	306 (STM)	CONDUIT	65.5	0.3053	0.0130
306a-308	306a (STM)	308 (STM)	CONDUIT	39.3	0.2546	0.0130
324-330	324 (STM)	330 (STM)	CONDUIT	5.0	0.5000	0.0150
402a-404	402a (STM)	404 (STM)	CONDUIT	48.1	0.2496	0.0150
404a-608	404a	608 (STM)	CONDUIT	20.1	0.2632	0.0130
608a-110	608a	110 (STM)	CONDUIT	51.1	0.2035	0.0130
610a-312	610a	312 (STM)	CONDUIT	46.1	0.1301	0.0130
908a-610	908a	610 (STM)	CONDUIT	16.6	0.1502	0.0130
C100-208	C100 (STM)	208 (STM)	CONDUIT	25.0	0.2000	0.0150
C102-208a	C102 (STM)	208a	CONDUIT	25.0	0.2000	0.0150
C104-210	C104 (STM)	210 (STM)	CONDUIT	25.0	0.2000	0.0150
C106-212	C106 (STM)	212 (STM)	CONDUIT	25.0	0.2000	0.0150
C108-214	C108 (STM)	214 (STM)	CONDUIT	25.0	0.2000	0.0150
C110-216	C110 (STM)	216 (STM)	CONDUIT	25.0	0.2000	0.0150
CB10-11ROADLINK	CB11-12ROAD	CB11-12	CONDUIT	5.0	0.7400	0.0160
CB12-13ROADLINK	CB13-14	CB13-14ROAD	CONDUIT	10.0	0.0030	0.0160
CB27-28ROADLINK	CB32-33	CB32-33 ROAD	CONDUIT	5.0	0.0061	0.0160
CB29-30ROADLINK	CB34-35 ROAD	CB34-35	CONDUIT	5.0	0.0061	0.0160
CB53-ROAD	CB60	01+051	CONDUIT	15.0	0.2667	0.0320
CB57-ROAD	CB61	06+194	CONDUIT	15.0	0.2667	0.0320
CB59-ROAD	CB59	06+108	CONDUIT	15.0	0.6667	0.0320
CST-01	CB100	CB54	CONDUIT	20.0	2.1505	0.0160
CST-02	CB102	CB55-56	CONDUIT	20.0	3.1015	0.0160
CST-03	CB104	02+196	CONDUIT	20.0	1.6502	0.0160
CST-04	CB106	02+196	CONDUIT	20.0	1.6502	0.0160
CST-05	CB108	CB57-58	CONDUIT	20.0	3.5021	0.0160
CST-06	CB110	CB57-58	CONDUIT	20.0	3.5021	0.0160
RY-00	RYP-01	CB-65	CONDUIT	18.7	1.6045	0.0320
RY-00a	CB-65	CB46-47	CONDUIT	11.2	0.2676	0.0320
RY-01	RYP-01	CB64	CONDUIT	22.6	1.5046	0.0350
RY-02	RYP-02	CB64	CONDUIT	19.3	1.5028	0.0350
RY-03	RYP-02	CB63	CONDUIT	26.6	1.5039	0.0350
RY-04	RYP-03	CB63	CONDUIT	19.3	1.5028	0.0350
RY-05	RYP-03	CB62	CONDUIT	23.3	1.5023	0.0350
RY-06	RYP-04	CB62	CONDUIT	19.3	1.5028	0.0350
RY-07	RYP-04	CB61	CONDUIT	18.7	1.4975	0.0350
RY-08	HP-01	CB59	CONDUIT	14.0	1.5002	0.0320
RY-09	HP-01	CB60	CONDUIT	25.6	1.6018	0.0320
RY-10	HP-03	CB60	CONDUIT	20.0	1.5002	0.0320
S01-00	02+432	CB48-49	CONDUIT	25.5	0.5490	0.0160
S01-01	01+143	CB48-49	CONDUIT	26.5	0.7925	0.0160
S01-02	01+143	01+118	CONDUIT	28.6	0.7343	0.0160
S01-03	01+118	CB42-43	CONDUIT	34.4	0.7268	0.0160
S01-04	01+051	CB42-43	CONDUIT	39.0	0.7436	0.0160
S01-05	01+051	CB24-25	CONDUIT	36.2	1.4090	0.0160
S01-06	01+011	CB24-25	CONDUIT	10.0	2.3006	0.0160
S01-07	01+011	CB23	CONDUIT	10.0	2.0004	0.0160

S03-01a	03+026	CB57-58	CONDUIT	25.0	1.0401	0.0160
S03-01b	03+054	03+026	CONDUIT	24.7	0.2022	0.0160
S03-01c	03+054	CB01-02	CONDUIT	48.0	0.7500	0.0160
S03-02	03+109	CB01-02	CONDUIT	17.6	1.0772	0.0160
S03-03	03+109	03+127	CONDUIT	34.7	0.2019	0.0160
S03-04	03+127	CB03-04	CONDUIT	40.1	0.4743	0.0160
S03-05	03+200	CB03-04	CONDUIT	42.1	0.5706	0.0160
S03-06	03+200	CB05-06	CONDUIT	42.4	0.8721	0.0160
S03-07	03+291	CB05-06	CONDUIT	48.2	0.6015	0.0160
S03-08	03+291	CB07-08	CONDUIT	47.3	0.8872	0.0160
S03-09	03+384	CB07-08	CONDUIT	32.4	1.2968	0.0320
S03-10	03+384	CB28	CONDUIT	30.5	1.1480	0.0160
S03-OUT	CB07-08	2-OverlandOutlet	CONDUIT	30.0	0.2333	0.0320
S04-01	03+127	CB15-16	CONDUIT	25.2	0.6757	0.0160
S04-02	04+078	CB15-16	CONDUIT	44.0	1.0228	0.0160
S04-03	04+089	04+078	CONDUIT	10.8	1.0186	0.0160
S04-04	04+089	CB19	CONDUIT	26.0	1.2309	0.0160
S04-05	04+129	CB19	CONDUIT	11.9	1.6753	0.0160
S04-06	04+129	CB22	CONDUIT	12.6	1.1887	0.0160
S04-07	04+207	CB22	CONDUIT	56.0	0.6786	0.0160
S04-08	04+207	CB44-45	CONDUIT	38.5	0.6494	0.0160
S04-09	01+118	CB44-45	CONDUIT	7.5	1.3388	0.0160
S05-01	04+078	CB17-18	CONDUIT	5.0	2.8011	0.0320
S05-02	CB13-14ROAD	CB17-18	CONDUIT	63.2	0.5219	0.0160
S05-03	05+116	CB13-14ROAD	CONDUIT	18.4	0.4902	0.0160
S05-04	05+116	CB11-12ROAD	CONDUIT	94.9	0.3266	0.0160
S05-05	CB11-12ROAD	05+200	CONDUIT	19.9	0.6546	0.0160
S05-06	05+200	CB09-10	CONDUIT	13.9	3.4429	0.0160
S05-07	03+384	CB09-10	CONDUIT	5.0	6.6144	0.0160
S06-01d	CB19	CB20-21	CONDUIT	6.3	1.5775	0.0320
S06-02	06+108	CB20-21	CONDUIT	40.5	0.6420	0.0160
S06-03	06+108	CB23	CONDUIT	49.0	0.6531	0.0160
S06-04	06+194	CB23	CONDUIT	30.5	0.7541	0.0160
S06-05	06+194	CB28	CONDUIT	69.0	0.7536	0.0160
S06-06	CB28	CB29	CONDUIT	10.0	0.1000	0.0320
S06-07	06+273	CB29	CONDUIT	23.0	1.8264	0.0160
S06-08	06+309	06+273	CONDUIT	24.0	2.0004	0.0160
S06-09	06+332	06+309	CONDUIT	31.5	2.0004	0.0160
S06-10	06+332	06+355	CONDUIT	39.0	0.9231	0.0160
S06-11	06+355	CB67-68-69	CONDUIT	34.7	1.4122	0.0160
S09-00	02+512	CB39	CONDUIT	10.0	0.8000	0.0160
S09-01	09+203	CB39	CONDUIT	12.4	0.8871	0.0160
S09-02	09+203	CB40-41	CONDUIT	63.5	0.8504	0.0160
S09-03	09+097	CB40-41	CONDUIT	40.0	0.7500	0.0160
S09-04	09+097	CB26-27	CONDUIT	85.8	0.6640	0.0160
S09-05	09+000	CB26-27	CONDUIT	10.0	2.8011	0.1600
S09-06	09+000	CB28	CONDUIT	15.0	2.4674	0.1600
S10-01	10+232	CB34-35 ROAD	CONDUIT	72.2	0.4988	0.0160
S10-02	CB34-35 ROAD	CB32-33 ROAD	CONDUIT	76.2	0.4984	0.0160
S10-03	CB32-33 ROAD	CB30-31	CONDUIT	62.0	0.5000	0.0160
S10-04	10+011	CB30-31	CONDUIT	10.0	2.7010	0.0320
S10-05	10+011	06+273	CONDUIT	10.0	1.8003	0.0320
S11-01	11+000	CB66	CONDUIT	15.0	0.7334	0.0160
S11-02	11+086	CB66	CONDUIT	15.0	2.4007	0.0160
S11-03	11+086	CB67-68-69	CONDUIT	81.6	0.7349	0.0160
ST10-00	10+232	CB36	CONDUIT	24.5	0.4075	0.0160
ST6-01a	06+023	CB54	CONDUIT	8.3	0.8384	0.0160
ST6-01b	06+043	06+023	CONDUIT	18.5	0.5394	0.0160
ST6-01c	06+043	CB19	CONDUIT	15.0	2.0004	0.0160
STB-00	02+564	CB36	CONDUIT	12.0	1.1667	0.0160
STB-01	CB36	CB37	CONDUIT	19.5	1.1796	0.0160
STB-02	CB37	02+512	CONDUIT	28.0	0.6072	0.0160
STB-03	02+512	CB46-47	CONDUIT	31.0	0.6129	0.0160
STB-04	02+458	CB46-47	CONDUIT	13.4	0.7463	0.0160
STB-05	02+432	02+458	CONDUIT	12.0	0.7500	0.0160
STB-06	02+432	CB50-51	CONDUIT	36.0	0.7500	0.0160
STB-07	02+365	CB50-51	CONDUIT	33.2	0.7535	0.0160
STB-08	02+365	CB52-53	CONDUIT	44.0	0.7273	0.0160
STB-09	02+288	CB52-53	CONDUIT	30.5	0.7869	0.0160
STB-10	02+288	CB54	CONDUIT	21.4	0.8879	0.0160
STB-11	CB54	CB55-56	CONDUIT	21.4	0.8879	0.0160
STB-12	02+196	CB55-56	CONDUIT	48.0	0.6042	0.0160
STB-13	02+196	CB57-58	CONDUIT	52.0	0.7116	0.0160
OCB01-02	CB01-02	304 (STM)	ORIFICE			
OCB03-04	CB03-04	306 (STM)	ORIFICE			
OCB05-06	CB05-06	308 (STM)	ORIFICE			
OCB07-08	CB07-08	312 (STM)	ORIFICE			
OCB09-10	CB09-10	610a	ORIFICE			
OCB11-12	CB11-12	310 (STM)	ORIFICE			
OCB13-14	CB13-14	306a (STM)	ORIFICE			
OCB15-16	CB15-16	402 (STM)	ORIFICE			
OCB17-18	CB17-18	402a (STM)	ORIFICE			
OCB19	CB19	404 (STM)	ORIFICE			
OCB20-21	CB20-21	404a	ORIFICE			
OCB22	CB22	406 (STM)	ORIFICE			
OCB23	CB23	110 (STM)	ORIFICE			
OCB24-25	CB24-25	108a	ORIFICE			
OCB26-27	CB26-27	908a	ORIFICE			
OCB28	CB28	610 (STM)	ORIFICE			
OCB28-Stor	A30-STOR	312 (STM)	ORIFICE			
OCB29	CB29	610 (STM)	ORIFICE			
OCB30-31	CB30-31	618 (STM)	ORIFICE			
OCB31-Stor	A33-STOR	614 (STM)	ORIFICE			
OCB32-33	CB32-33	908 (STM)	ORIFICE			
OCB34-35	CB34-35	906 (STM)	ORIFICE			
OCB36	CB36	200 (STM)	ORIFICE			
OCB37	CB37	202 (STM)	ORIFICE			
OCB39	CB39	202 (STM)	ORIFICE			
OCB40-41	CB40-41	906 (STM)	ORIFICE			
OCB42-43	CB42-43	106a	ORIFICE			
OCB44-45	CB44-45	106 (STM)	ORIFICE			
OCB46-47	CB46-47	202a	ORIFICE			
OCB48-49	CB48-49	204 (STM)	ORIFICE			
OCB50-51	CB50-51	204a	ORIFICE			
OCB52-53	CB52-53	206 (STM)	ORIFICE			
OCB54	CB54	208 (STM)	ORIFICE			
OCB55-56	CB55-56	210 (STM)	ORIFICE			
OCB57-58	CB57-58	214 (STM)	ORIFICE			
OCB59	CB59	608a	ORIFICE			
OCB60	CB60	108 (STM)	ORIFICE			
OCB61	CB61	110a	ORIFICE			
OCB62	CB62	108 (STM)	ORIFICE			
OCB63	CB63	106 (STM)	ORIFICE			
OCB64	CB64	104 (STM)	ORIFICE			
OCB65	CB-65	202a	ORIFICE			
OCB66	CB66	616 (STM)	ORIFICE			
OCB67-68	CB67-68-69	614 (STM)	ORIFICE			
OCB-B04	B04_Stor	202 (STM)	ORIFICE			
OCB-C100	CB100	C100 (STM)	ORIFICE			
OCB-C102	CB102	C102 (STM)	ORIFICE			
OCB-C104	CB104	C104 (STM)	ORIFICE			
OCB-C106	CB106	C106 (STM)	ORIFICE			
OCB-C108	CB108	C108 (STM)	ORIFICE			
OCB-C110	CB110	C110 (STM)	ORIFICE			
Orifice-55	Caivan-Stor	C110 (STM)	ORIFICE			
VORTECHS	324 (STM)	326 (STM)	WEIR			
10-11	CB11-12ROAD	CB11-12	OUTLET			
12-13	CB13-14ROAD	CB13-14	OUTLET			
27-28	CB32-33 ROAD	CB32-33	OUTLET			
29-30	CB34-35 ROAD	CB34-35	OUTLET			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow

{STM}.102-104	CIRCULAR	0.61	0.29	0.15	0.61	1	470.15
{STM}.104-106	CIRCULAR	0.61	0.29	0.15	0.61	1	352.37
{STM}.106-106a	CIRCULAR	0.61	0.29	0.15	0.61	1	299.48
{STM}.108-108a	CIRCULAR	0.69	0.37	0.17	0.69	1	350.83
{STM}.110-110a	CIRCULAR	0.76	0.46	0.19	0.76	1	515.75
{STM}.306-306a	CIRCULAR	0.61	0.29	0.15	0.61	1	326.79
{STM}.308-310	CIRCULAR	0.61	0.29	0.15	0.61	1	326.80
{STM}.310-312	CIRCULAR	0.76	0.46	0.19	0.76	1	449.67
{STM}.312-314	CIRCULAR	1.22	1.17	0.30	1.22	1	1291.42
{STM}.314-316	CIRCULAR	1.22	1.17	0.30	1.22	1	1305.31
{STM}.316-324	CIRCULAR	1.22	1.17	0.30	1.22	1	1272.17
{STM}.326-328	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2378.14
{STM}.328-HW-1	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2436.50
{STM}.330-336	CIRCULAR	1.22	1.17	0.30	1.22	1	2874.95
{STM}.402-402a	CIRCULAR	0.61	0.29	0.15	0.61	1	269.05
{STM}.404-404a	CIRCULAR	0.61	0.29	0.15	0.61	1	328.85
{STM}.406-408	CIRCULAR	0.61	0.29	0.15	0.61	1	286.99
{STM}.408-106	CIRCULAR	0.61	0.29	0.15	0.61	1	287.22
{STM}.608-608a	CIRCULAR	0.61	0.29	0.15	0.61	1	284.66
{STM}.610-610a	CIRCULAR	0.99	0.77	0.25	0.99	1	811.34
{STM}.612-316	CIRCULAR	0.61	0.29	0.15	0.61	1	287.33
{STM}.614-312	CIRCULAR	0.61	0.29	0.15	0.61	1	286.33
{STM}.616-614	CIRCULAR	0.46	0.16	0.11	0.46	1	133.04
{STM}.618-610	CIRCULAR	0.61	0.29	0.15	0.61	1	350.87
{STM}.902-904	CIRCULAR	0.61	0.29	0.15	0.61	1	358.92
{STM}.904-906	CIRCULAR	0.61	0.29	0.15	0.61	1	286.54
{STM}.906-908	CIRCULAR	0.61	0.29	0.15	0.61	1	287.07
{STM}.908-908a	CIRCULAR	0.69	0.37	0.17	0.69	1	337.70
106a-108	CIRCULAR	0.61	0.29	0.15	0.61	1	285.94
108a-110	CIRCULAR	0.69	0.37	0.17	0.69	1	360.11
110a-610	CIRCULAR	0.76	0.46	0.19	0.76	1	512.86
200-202	CIRCULAR	0.69	0.37	0.17	0.69	1	351.75
202-204	CIRCULAR	0.69	0.37	0.17	0.69	1	343.69
202a-204	CIRCULAR	0.69	0.37	0.17	0.69	1	347.79
204-206	CIRCULAR	0.76	0.46	0.19	0.76	1	455.54
204a-206	CIRCULAR	0.76	0.46	0.19	0.76	1	446.46
206-208	CIRCULAR	0.76	0.46	0.19	0.76	1	458.92
208-208a	CIRCULAR	0.76	0.46	0.19	0.76	1	378.04
208a-210	CIRCULAR	0.76	0.46	0.19	0.76	1	371.17
210-212	CIRCULAR	0.84	0.55	0.21	0.84	1	486.79
212-214	CIRCULAR	0.91	0.66	0.23	0.91	1	475.29
214-216	CIRCULAR	0.91	0.66	0.23	0.91	1	638.35
216-H2	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2791.51
304-306	CIRCULAR	0.61	0.29	0.15	0.61	1	354.55
306a-308	CIRCULAR	0.61	0.29	0.15	0.61	1	323.83
324-330	CIRCULAR	1.22	1.17	0.30	1.22	1	2491.62
402a-404	CIRCULAR	0.61	0.29	0.15	0.61	1	277.88
404a-608	CIRCULAR	0.61	0.29	0.15	0.61	1	329.20
608a-110	CIRCULAR	0.61	0.29	0.15	0.61	1	289.47
610a-312	CIRCULAR	0.99	0.77	0.25	0.99	1	844.32
908a-610	CIRCULAR	0.69	0.37	0.17	0.69	1	340.19
C100-208	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C102-208a	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C104-210	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C106-212	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C108-214	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
C110-216	CIRCULAR	0.61	0.29	0.15	0.61	1	248.72
CB10-11ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	6953.33
CB12-13ROADLINK	RECT_OPEN	0.30	6.00	0.29	20.00	1	909.75
CB27-28ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	631.09
CB29-30ROADLINK	RECT_OPEN	0.30	3.00	0.28	10.00	1	631.09
CB53-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.77
CB57-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.77
CB59-ROAD	TRIANGULAR	0.30	0.27	0.14	1.80	1	187.79
CST-01	9m-ROW	0.30	3.10	0.14	21.20	1	7844.93
CST-02	9m-ROW	0.30	3.10	0.14	21.20	1	9421.17
CST-03	9m-ROW	0.30	3.10	0.14	21.20	1	6872.13
CST-04	9m-ROW	0.30	3.10	0.14	21.20	1	6872.13
CST-05	9m-ROW	0.30	3.10	0.14	21.20	1	10011.21
CST-06	9m-ROW	0.30	3.10	0.14	21.20	1	10011.21
RY-00	TRIANGULAR	0.30	0.27	0.14	1.80	1	291.33
RY-00a	TRIANGULAR	0.30	0.27	0.14	1.80	1	118.98
RY-01	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.93
RY-02	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-03	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.88
RY-04	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-05	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.74
RY-06	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.78
RY-07	TRIANGULAR	0.30	0.27	0.14	1.80	1	257.32
RY-08	TRIANGULAR	0.30	0.27	0.14	1.80	1	281.70
RY-09	TRIANGULAR	0.30	0.27	0.14	1.80	1	291.08
RY-10	TRIANGULAR	0.30	0.27	0.14	1.80	1	281.70
S01-00	9m-ROW	0.30	3.10	0.14	21.20	1	3963.85
S01-01	9m-ROW	0.30	3.10	0.14	21.20	1	4762.26
S01-02	9m-ROW	0.30	3.10	0.14	21.20	1	4584.08
S01-03	9m-ROW	0.30	3.10	0.14	21.20	1	4560.54
S01-04	9m-ROW	0.30	3.10	0.14	21.20	1	4613.09
S01-05	9m-ROW	0.30	3.10	0.14	21.20	1	6349.97
S01-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	12260.05
S01-07	RECT_OPEN	0.30	3.00	0.28	10.00	1	11432.19
S03-01a	9m-ROW	0.30	3.10	0.14	21.20	1	5455.67
S03-01b	9m-ROW	0.30	3.10	0.14	21.20	1	2405.43
S03-01c	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
S03-02	9m-ROW	0.30	3.10	0.14	21.20	1	5552.13
S03-03	9m-ROW	0.30	3.10	0.14	21.20	1	2403.77
S03-04	9m-ROW	0.30	3.10	0.14	21.20	1	3684.20
S03-05	9m-ROW	0.30	3.10	0.14	21.20	1	4041.05
S03-06	9m-ROW	0.30	3.10	0.14	21.20	1	4995.65
S03-07	9m-ROW	0.30	3.10	0.14	21.20	1	4149.10
S03-08	9m-ROW	0.30	3.10	0.14	21.20	1	5038.93
S03-09	RECT_OPEN	0.30	1.50	0.27	5.00	1	2218.23
S03-10	9m-ROW	0.30	3.10	0.14	21.20	1	5731.78
S03-OUT	RECT_OPEN	0.30	3.00	0.28	10.00	1	1952.23
S04-01	9m-ROW	0.30	3.10	0.14	21.20	1	4397.38
S04-02	9m-ROW	0.30	3.10	0.14	21.20	1	5410.17
S04-03	9m-ROW	0.30	3.10	0.14	21.20	1	5399.02
S04-04	9m-ROW	0.30	3.10	0.14	21.20	1	5935.05
S04-05	9m-ROW	0.30	3.10	0.14	21.20	1	6924.09
S04-06	9m-ROW	0.30	3.10	0.14	21.20	1	5832.45
S04-07	9m-ROW	0.30	3.10	0.14	21.20	1	4406.79
S04-08	9m-ROW	0.30	3.10	0.14	21.20	1	4310.86
S04-09	9m-ROW	0.30	3.10	0.14	21.20	1	6189.83
S05-01	RECT_OPEN	0.30	1.50	0.27	5.00	1	3260.12
S05-02	5m-ROW	0.30	2.40	0.13	18.20	1	2792.80
S05-03	5m-ROW	0.30	2.40	0.13	18.20	1	2706.63
S05-04	5m-ROW	0.30	2.40	0.13	18.20	1	2209.25
S05-05	5m-ROW	0.30	2.40	0.13	18.20	1	3127.72
S05-06	5m-ROW	0.30	2.40	0.13	18.20	1	7173.04
S05-07	9m-ROW	0.30	3.10	0.14	21.20	1	13758.32
S06-01d	RECT_OPEN	0.30	1.50	0.27	5.00	1	2446.54
S06-02	11m-ROW	0.30	3.40	0.14	23.20	1	4697.46
S06-03	11m-ROW	0.30	3.40	0.14	23.20	1	4737.85
S06-04	11m-ROW	0.30	3.40	0.14	23.20	1	5091.20
S06-05	11m-ROW	0.30	3.40	0.14	23.20	1	5089.59
S06-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	1278.03
S06-07	11m-ROW	0.30	3.40	0.14	23.20	1	7923.13
S06-08	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
S06-09	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
S06-10	11m-ROW	0.30	3.40	0.14	23.20	1	5632.85
S06-11	11m-ROW	0.30	3.40	0.14	23.20	1	6967.15
S09-00	9m-ROW	0.30	3.10	0.14	21.20	1	4784.88
S09-01	9m-ROW	0.30	3.10	0.14	21.20	1	5038.64
S09-02	9m-ROW	0.30	3.10	0.14	21.20	1	4933.30
S09-03	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
S09-04	9m-ROW	0.30	3.10	0.14	21.20	1	4359.05
S09-05	RECT_OPEN	0.30	3.00	0.28	10.00	1	1352.80
S09-06	RECT_OPEN	0.30	3.00	0.28	10.00	1	1269.67
S10-01	5m-ROW	0.30	2.40	0.13	18.20	1	2730.15

S10-02	5m-ROW	0.30	2.40	0.13	18.20	1	2729.26
S10-03	5m-ROW	0.30	2.40	0.13	18.20	1	2733.56
S10-04	RECT_OPEN	0.30	3.00	0.28	10.00	1	6642.05
S10-05	RECT_OPEN	0.30	3.00	0.28	10.00	1	5422.66
S11-01	5m-ROW	0.30	2.40	0.13	18.20	1	3310.53
S11-02	5m-ROW	0.30	2.40	0.13	18.20	1	5989.76
S11-03	5m-ROW	0.30	2.40	0.13	18.20	1	3313.94
ST10-00	5m-ROW	0.30	2.40	0.13	18.20	1	2467.78
ST6-01a	11m-ROW	0.30	3.40	0.14	23.20	1	5368.01
ST6-01b	11m-ROW	0.30	3.40	0.14	23.20	1	4305.74
ST6-01c	11m-ROW	0.30	3.40	0.14	23.20	1	8291.98
STB-00	9m-ROW	0.30	3.10	0.14	21.20	1	5778.40
STB-01	9m-ROW	0.30	3.10	0.14	21.20	1	5810.07
STB-02	9m-ROW	0.30	3.10	0.14	21.20	1	4168.40
STB-03	9m-ROW	0.30	3.10	0.14	21.20	1	4188.12
STB-04	9m-ROW	0.30	3.10	0.14	21.20	1	4621.40
STB-05	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
STB-06	9m-ROW	0.30	3.10	0.14	21.20	1	4632.94
STB-07	9m-ROW	0.30	3.10	0.14	21.20	1	4643.63
STB-08	9m-ROW	0.30	3.10	0.14	21.20	1	4562.20
STB-09	9m-ROW	0.30	3.10	0.14	21.20	1	4745.50
STB-10	9m-ROW	0.30	3.10	0.14	21.20	1	5040.78
STB-11	9m-ROW	0.30	3.10	0.14	21.20	1	5040.78
STB-12	9m-ROW	0.30	3.10	0.14	21.20	1	4158.17
STB-13	9m-ROW	0.30	3.10	0.14	21.20	1	4512.57

```
****************
Transect Summary
****************

Transect 11m-ROW
Area:
          0.0003    0.0014    0.0031    0.0056    0.0087
          0.0126    0.0171    0.0224    0.0283    0.0350
          0.0423    0.0503    0.0591    0.0685    0.0787
          0.0895    0.1010    0.1133    0.1262    0.1398
          0.1542    0.1692    0.1849    0.2014    0.2185
          0.2374    0.2590    0.2824    0.3070    0.3324
          0.3586    0.3856    0.4133    0.4417    0.4710
          0.5009    0.5317    0.5632    0.5954    0.6284
          0.6622    0.6967    0.7319    0.7680    0.8047
          0.8423    0.8806    0.9196    0.9594    1.0000
Hrad:
          0.0203    0.0406    0.0608    0.0811    0.1014
          0.1217    0.1420    0.1623    0.1825    0.2028
          0.2231    0.2434    0.2637    0.2840    0.3042
          0.3245    0.3448    0.3651    0.3854    0.4056
          0.4259    0.4462    0.4665    0.4868    0.5071
          0.4758    0.4659    0.4779    0.4994    0.5251
          0.5505    0.5757    0.6006    0.6253    0.6498
          0.6741    0.6982    0.7221    0.7459    0.7696
          0.7931    0.8165    0.8398    0.8630    0.8860
          0.9090    0.9319    0.9547    0.9774    1.0000
Width:
          0.0171    0.0342    0.0512    0.0683    0.0854
          0.1025    0.1196    0.1366    0.1537    0.1708
          0.1879    0.2049    0.2220    0.2391    0.2562
          0.2733    0.2903    0.3074    0.3245    0.3416
          0.3587    0.3757    0.3928    0.4099    0.4270
          0.4954    0.5528    0.5880    0.6121    0.6305
          0.6490    0.6675    0.6860    0.7044    0.7229
          0.7414    0.7599    0.7783    0.7968    0.8153
          0.8337    0.8522    0.8707    0.8892    0.9076
          0.9261    0.9446    0.9631    0.9815    1.0000

Transect 5m-ROW
Area:
          0.0005    0.0019    0.0043    0.0076    0.0119
          0.0172    0.0234    0.0306    0.0387    0.0478
          0.0578    0.0688    0.0807    0.0934    0.1062
          0.1190    0.1318    0.1446    0.1574    0.1703
          0.1832    0.1961    0.2090    0.2220    0.2349
          0.2494    0.2668    0.2857    0.3058    0.3271
          0.3496    0.3732    0.3981    0.4241    0.4512
          0.4796    0.5091    0.5398    0.5717    0.6048
          0.6390    0.6744    0.7110    0.7487    0.7877
          0.8278    0.8691    0.9115    0.9552    1.0000
Hrad:
          0.0225    0.0450    0.0676    0.0901    0.1126
          0.1351    0.1577    0.1802    0.2027    0.2252
          0.2477    0.2703    0.2928    0.3297    0.3737
          0.4176    0.4612    0.5047    0.5480    0.5912
          0.6342    0.6770    0.7197    0.7622    0.8045
          0.6979    0.6515    0.6566    0.6637    0.6724
          0.6826    0.6940    0.7064    0.7197    0.7339
          0.7487    0.7642    0.7802    0.7967    0.8137
          0.8310    0.8487    0.8668    0.8851    0.9037
          0.9225    0.9416    0.9609    0.9804    1.0000
Width:
          0.0210    0.0421    0.0631    0.0842    0.1052
          0.1263    0.1473    0.1684    0.1894    0.2104
          0.2315    0.2525    0.2736    0.2809    0.2813
          0.2818    0.2822    0.2826    0.2831    0.2835
          0.2840    0.2844    0.2848    0.2853    0.2857
          0.3516    0.4042    0.4301    0.4560    0.4819
          0.5078    0.5338    0.5597    0.5856    0.6115
          0.6374    0.6633    0.6892    0.7151    0.7410
          0.7669    0.7928    0.8187    0.8446    0.8705
          0.8964    0.9223    0.9482    0.9741    1.0000

Transect 9m-ROW
Area:
          0.0004    0.0015    0.0034    0.0061    0.0095
          0.0137    0.0186    0.0243    0.0308    0.0380
          0.0460    0.0548    0.0643    0.0746    0.0856
          0.0974    0.1099    0.1232    0.1373    0.1522
          0.1678    0.1841    0.2012    0.2189    0.2367
          0.2557    0.2768    0.2992    0.3223    0.3463
          0.3711    0.3968    0.4232    0.4505    0.4787
          0.5076    0.5374    0.5680    0.5995    0.6317
          0.6648    0.6988    0.7335    0.7691    0.8055
          0.8428    0.8808    0.9197    0.9594    1.0000
Hrad:
          0.0203    0.0406    0.0609    0.0812    0.1015
          0.1218    0.1421    0.1624    0.1827    0.2031
          0.2234    0.2437    0.2640    0.2843    0.3046
          0.3249    0.3452    0.3655    0.3858    0.4061
          0.4264    0.4467    0.4670    0.5004    0.5401
          0.5171    0.5140    0.5356    0.5570    0.5784
          0.5998    0.6211    0.6423    0.6636    0.6848
          0.7059    0.7271    0.7482    0.7692    0.7903
          0.8114    0.8324    0.8534    0.8744    0.8953
          0.9163    0.9372    0.9582    0.9791    1.0000
Width:
          0.0186    0.0371    0.0557    0.0743    0.0929
          0.1114    0.1300    0.1486    0.1671    0.1857
          0.2043    0.2229    0.2414    0.2600    0.2786
          0.2971    0.3157    0.3343    0.3529    0.3714
          0.3900    0.4086    0.4271    0.4336    0.4340
          0.4906    0.5350    0.5553    0.5755    0.5957
          0.6159    0.6361    0.6563    0.6765    0.6968
          0.7170    0.7372    0.7574    0.7776    0.7978
          0.8181    0.8383    0.8585    0.8787    0.8989
          0.9191    0.9394    0.9596    0.9798    1.0000
```

```
**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         1.749        76.002
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.486        21.107
Surface Runoff ...........         1.245        54.106
Final Surface Storage ....         0.012         0.543
Continuity Error (%) .....         0.323


**************************        Volume        Volume
Flow Routing Continuity        hectare-m       10^6 ltr
**************************     ---------      ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         1.245        12.450
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.002         0.025
External Outflow .........         1.264        12.642
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.070         0.696
Final Stored Volume ......         0.070         0.696
Continuity Error (%) .....        -1.268


************************
Highest Continuity Errors
************************
Node 06+194 (-22.16%)
Node CB11-12ROAD (-16.70%)
Node 02+196 (-12.32%)
Node 02+512 (-3.77%)
Node 316 (STM) (-2.66%)


**************************
Time-Step Critical Elements
**************************
Link 208-208a (2.63%)
Link C110-216 (1.39%)


********************************
Highest Flow Instability Indexes
********************************
Link VORTECHS (114)
Link 324-330 (109)
Link {STM}.330-336 (96)
Link {STM}.316-324 (90)
Link {STM}.314-316 (88)


************************
Routing Time Step Summary
************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     4.76 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     6.68
```

```
**************************
Subcatchment Runoff Summary
**************************

-----------------------------------------------------------------------------------------------------------
                          Total      Total      Total      Total      Total      Total      Peak    Runoff
                         Precip      Runon       Evap      Infil     Runoff     Runoff    Runoff    Coeff
Subcatchment                 mm         mm         mm         mm         mm  10^6 ltr       LPS
-----------------------------------------------------------------------------------------------------------
A-01                      76.00       0.00       0.00      17.96      57.58       0.14     86.67    0.758
A-02                      76.00       0.00       0.00      18.19      57.34       0.14     89.11    0.755
A-03                      76.00       0.00       0.00      17.62      58.18       0.07     49.91    0.766
A-04                      76.00       0.00       0.00      18.48      57.05       0.17    104.88    0.751
A-05                      76.00       0.00       0.00      18.27      57.52       0.16     97.73    0.757
A-06                      76.00       0.00       0.00      18.26      57.37       0.16     97.29    0.755
A-07                      76.00       0.00       0.00      18.27      57.27       0.17    102.56    0.753
A-08                      76.00       0.00       0.00      18.05      57.74       0.14     89.84    0.760
A-09                      76.00       0.00       0.00      17.62      57.93       0.05     31.75    0.762
A-10                      76.00       0.00       0.00      17.89      57.65       0.11     69.70    0.759
A-11                      76.00       0.00       0.00      18.50      57.03       0.13     78.02    0.750
A-12                      76.00       0.00       0.00      17.23      48.71       0.02     11.43    0.641
A-13                      76.00       0.00       0.00      18.40      57.13       0.11     69.98    0.752
A-14                      76.00       0.00       0.00      18.42      57.11       0.11     68.09    0.751
A-15                      76.00       0.00       0.00      17.62      48.69       0.05     33.33    0.641
A-16                      76.00       0.00       0.00      17.71      48.68       0.06     40.62    0.641
A-17                      76.00       0.00       0.00      17.88      57.66       0.14     91.77    0.759
A-18                      76.00       0.00       0.00      18.43      57.10       0.16     94.95    0.751
A-19                      76.00       0.00       0.00      17.70      48.68       0.06     38.72    0.641
A-20                      76.00       0.00       0.00      17.79      48.68       0.06     41.25    0.641
A-21                      76.00       0.00       0.00      18.36      57.17       0.12     76.26    0.752
A-22                      76.00       0.00       0.00      17.43      48.69       0.03     19.05    0.641
A-23                      76.00       0.00       0.00      18.62      57.15       0.26    156.84    0.752
A-24                      76.00       0.00       0.00      18.27      57.51       0.12     74.24    0.757
A-25                      76.00       0.00       0.00      18.26      57.52       0.12     76.12    0.757
A-26                      76.00       0.00       0.00      18.63      57.10       0.26    153.65    0.751
A-27                      76.00       0.00       0.00      18.04      57.75       0.11     69.48    0.760
A-28                      76.00       0.00       0.00      18.99      56.02       0.13     76.79    0.737
A-29                      76.00       0.00       0.00      17.88      57.76       0.13     86.15    0.760
A-30                      76.00       0.00       0.00      18.20      57.33       0.29    177.82    0.754
A-31                      76.00       0.00       0.00      17.53      57.52       0.03     24.31    0.757
A-32                      76.00       0.00       0.00      18.36      57.42       0.26    158.56    0.756
A-33                      76.00       0.00       0.00      18.20      57.33       0.47    291.72    0.754
A-34                      76.00       0.00       0.00      19.13      55.88       0.43    254.07    0.735
A-35                      76.00       0.00       0.00      19.13      55.88       0.55    322.85    0.735
A-36                      76.00       0.00       0.00      18.28      56.75       0.26    159.31    0.747
A-37                      76.00       0.00       0.00      18.21      56.82       0.21    132.74    0.748
B-01                      76.00       0.00       0.00      17.58      57.98       0.05     36.54    0.763
B-02                      76.00       0.00       0.00      18.12      56.91       0.08     53.60    0.749
B-03                      76.00       0.00       0.00      17.53      57.63       0.06     38.76    0.758
B-04                      76.00       0.00       0.00      18.28      57.25       0.47    292.34    0.753
B-05                      76.00       0.00       0.00      17.41      48.70       0.03     20.40    0.641
B-06                      76.00       0.00       0.00      17.71      57.34       0.04     29.20    0.754
B-07                      76.00       0.00       0.00      17.70      57.75       0.07     48.83    0.760
B-08                      76.00       0.00       0.00      18.21      57.32       0.13     80.50    0.754
B-09                      76.00       0.00       0.00      18.24      57.30       0.14     87.29    0.754
B-10                      76.00       0.00       0.00      51.72      24.07       0.27     97.39    0.317
B-11                      76.00       0.00       0.00      17.66      57.39       0.03     18.84    0.755
B-12                      76.00       0.00       0.00      17.77      57.78       0.05     33.18    0.760
B-13                      76.00       0.00       0.00      17.78      57.77       0.06     36.88    0.760
B-14                      76.00       0.00       0.00      17.77      57.77       0.18    121.50    0.760
B-15                      76.00       0.00       0.00      17.79      57.76       0.07     45.60    0.760
B-16                      76.00       0.00       0.00      17.77      57.77       0.08     51.58    0.760
B-17                      76.00       0.00       0.00      18.39      57.13       0.16     95.77    0.752
B-18                      76.00       0.00       0.00      17.77      57.78       0.07     46.21    0.760
B-19                      76.00       0.00       0.00      17.86      57.68       0.06     40.18    0.759
CaivanLands               76.00       0.00       0.00      21.68      53.76       4.36   2057.72    0.707


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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min
01+011	JUNCTION	0.00	0.00	93.48	0 00:00
01+051	JUNCTION	0.00	0.00	93.76	0 01:31
01+118	JUNCTION	0.00	0.04	93.76	0 01:31
01+143	JUNCTION	0.00	0.00	93.93	0 00:00
02+196	JUNCTION	0.00	0.04	93.71	0 01:30
02+288	JUNCTION	0.00	0.01	93.77	0 01:41
02+365	JUNCTION	0.00	0.00	93.84	0 00:00
02+432	JUNCTION	0.00	0.01	93.87	0 01:38
02+458	JUNCTION	0.00	0.07	93.84	0 01:37
02+512	JUNCTION	0.00	0.06	93.92	0 01:30
02+564	JUNCTION	0.00	0.00	94.40	0 00:00
03+026	JUNCTION	0.00	0.00	93.56	0 00:00
03+054	JUNCTION	0.00	0.00	93.61	0 00:00
03+109	JUNCTION	0.00	0.00	93.44	0 00:00
03+127	JUNCTION	0.00	0.06	93.43	0 01:39
03+200	JUNCTION	0.00	0.00	93.42	0 00:00
03+291	JUNCTION	0.00	0.00	93.34	0 00:00
03+384	JUNCTION	0.00	0.00	93.34	0 00:00
04+078	JUNCTION	0.00	0.06	93.71	0 01:31
04+089	JUNCTION	0.00	0.00	93.76	0 00:00
04+129	JUNCTION	0.00	0.00	93.64	0 00:00
04+207	JUNCTION	0.00	0.00	93.87	0 00:00
05+116	JUNCTION	0.00	0.00	93.93	0 00:00
05+200	JUNCTION	0.00	0.05	93.54	0 01:30
06+023	JUNCTION	0.00	0.00	93.64	0 00:00
06+043	JUNCTION	0.00	0.00	93.74	0 00:00
06+108	JUNCTION	0.00	0.00	93.60	0 00:00
06+194	JUNCTION	0.00	0.01	93.52	0 01:31
06+273	JUNCTION	0.00	0.05	93.45	0 01:37
06+309	JUNCTION	0.00	0.00	93.88	0 00:00
06+332	JUNCTION	0.00	0.00	94.51	0 00:00
06+355	JUNCTION	0.00	0.00	94.15	0 00:00
09+000	JUNCTION	0.00	0.00	93.36	0 00:00
09+097	JUNCTION	0.00	0.00	93.65	0 00:00
09+203	JUNCTION	0.00	0.03	93.92	0 01:31
10+011	JUNCTION	0.00	0.02	93.60	0 01:36
10+232	JUNCTION	0.00	0.00	94.36	0 00:00
102 (STM)	JUNCTION	0.04	0.71	91.54	0 01:34
104 (STM)	JUNCTION	0.07	0.87	91.54	0 01:34
106 (STM)	JUNCTION	0.13	0.96	91.53	0 01:34
106a	JUNCTION	0.20	1.02	91.52	0 01:34
108 (STM)	JUNCTION	0.29	1.09	91.49	0 01:34
108a	JUNCTION	0.35	1.12	91.46	0 01:34
11+000	JUNCTION	0.00	0.00	94.01	0 00:00
11+086	JUNCTION	0.00	0.00	94.26	0 00:00
110 (STM)	JUNCTION	0.45	1.18	91.42	0 01:35
110a	JUNCTION	0.52	1.18	91.34	0 01:35
200 (STM)	JUNCTION	0.04	0.48	91.81	0 01:40
202 (STM)	JUNCTION	0.07	0.56	91.81	0 01:40
202a	JUNCTION	0.08	0.61	91.75	0 01:40
204 (STM)	JUNCTION	0.09	0.69	91.70	0 01:40
204a	JUNCTION	0.10	0.74	91.65	0 01:40
206 (STM)	JUNCTION	0.22	0.80	91.57	0 01:39
208 (STM)	JUNCTION	0.28	0.79	91.48	0 01:38
208a	JUNCTION	0.31	0.74	91.39	0 01:38
210 (STM)	JUNCTION	0.42	0.77	91.30	0 01:38
212 (STM)	JUNCTION	0.54	0.80	91.20	0 01:37
214 (STM)	JUNCTION	0.64	0.82	91.12	0 01:36
216 (STM)	JUNCTION	0.92	0.99	91.00	0 01:36
304 (STM)	JUNCTION	0.03	0.29	91.15	0 01:37
306 (STM)	JUNCTION	0.06	0.49	91.14	0 01:37
306a (STM)	JUNCTION	0.15	0.61	91.13	0 01:36
308 (STM)	JUNCTION	0.26	0.71	91.12	0 01:36
310 (STM)	JUNCTION	0.59	1.01	91.08	0 01:35
312 (STM)	JUNCTION	1.11	1.51	91.06	0 01:35
314 (STM)	JUNCTION	1.17	1.50	90.98	0 01:35
316 (STM)	JUNCTION	1.28	1.52	90.88	0 01:35
324 (STM)	JUNCTION	1.29	1.43	90.78	0 01:35
326 (STM)	JUNCTION	1.34	1.41	90.71	0 01:32
328 (STM)	JUNCTION	1.72	1.75	90.66	0 01:33
330 (STM)	JUNCTION	1.31	1.43	90.75	0 01:33
402 (STM)	JUNCTION	0.05	0.59	91.50	0 01:33
402a (STM)	JUNCTION	0.07	0.66	91.50	0 01:33
404 (STM)	JUNCTION	0.08	0.82	91.49	0 01:34
404a	JUNCTION	0.09	0.85	91.48	0 01:34
406 (STM)	JUNCTION	0.50	1.08	91.54	0 01:34
408 (STM)	JUNCTION	0.37	1.18	91.54	0 01:34
608 (STM)	JUNCTION	0.15	0.92	91.47	0 01:34
608a	JUNCTION	0.20	0.96	91.45	0 01:33
610 (STM)	JUNCTION	0.80	1.36	91.24	0 01:35
610a	JUNCTION	0.83	1.33	91.17	0 01:35
612 (STM)	JUNCTION	0.54	0.98	91.10	0 01:22
614 (STM)	JUNCTION	0.45	1.02	91.24	0 01:22
616 (STM)	JUNCTION	0.13	1.20	91.73	0 01:22
618 (STM)	JUNCTION	0.31	0.88	91.24	0 01:35
902 (STM)	JUNCTION	0.04	0.58	91.28	0 01:35
904 (STM)	JUNCTION	0.10	0.70	91.28	0 01:35
906 (STM)	JUNCTION	0.19	0.79	91.28	0 01:35
908 (STM)	JUNCTION	0.41	0.99	91.26	0 01:35
908a	JUNCTION	0.48	1.06	91.25	0 01:35
C100 (STM)	JUNCTION	0.08	0.59	91.48	0 01:39
C102 (STM)	JUNCTION	0.11	0.54	91.39	0 01:38
C104 (STM)	JUNCTION	0.14	0.49	91.30	0 01:37
C106 (STM)	JUNCTION	0.19	0.45	91.20	0 01:37
C108 (STM)	JUNCTION	0.22	0.40	91.12	0 01:36
C110 (STM)	JUNCTION	0.46	2.19	92.86	0 01:39
CB01-02	JUNCTION	0.13	1.36	93.41	0 01:34
CB03-04	JUNCTION	0.22	1.52	93.41	0 01:51
CB05-06	JUNCTION	0.11	1.34	93.19	0 01:33
CB07-08	JUNCTION	0.16	1.36	93.08	0 01:35
CB09-10	JUNCTION	0.13	1.35	93.26	0 01:37
CB100	JUNCTION	0.09	1.43	94.03	0 01:30
CB102	JUNCTION	0.09	1.43	94.03	0 01:30
CB104	JUNCTION	0.09	1.44	94.04	0 01:30
CB106	JUNCTION	0.09	1.44	94.04	0 01:30
CB108	JUNCTION	0.09	1.43	94.03	0 01:30
CB110	JUNCTION	0.10	1.43	94.03	0 01:30
CB11-12	JUNCTION	0.11	1.21	93.59	0 01:32
CB11-12ROAD	JUNCTION	0.00	0.06	93.68	0 01:30
CB13-14	JUNCTION	0.00	0.00	92.64	0 00:00
CB13-14ROAD	JUNCTION	0.01	0.06	93.90	0 01:30
CB15-16	JUNCTION	0.22	1.43	93.43	0 01:39
CB17-18	JUNCTION	0.23	1.40	93.71	0 01:31
CB19	JUNCTION	0.12	1.32	93.56	0 01:36
CB20-21	JUNCTION	0.16	1.42	93.56	0 01:37
CB22	JUNCTION	0.16	1.35	93.64	0 01:38
CB23	JUNCTION	0.16	1.29	93.37	0 01:40
CB24-25	JUNCTION	0.12	1.29	93.34	0 01:34
CB26-27	JUNCTION	0.13	1.36	93.24	0 01:34
CB28	JUNCTION	0.12	1.29	93.07	0 01:46
CB29	JUNCTION	0.17	1.30	93.08	0 01:46
CB30-31	JUNCTION	0.28	1.49	93.60	0 01:36
CB32-33	JUNCTION	0.00	0.00	92.42	0 00:00
CB32-33 ROAD	JUNCTION	0.02	0.09	93.71	0 01:30
CB34-35	JUNCTION	0.00	0.00	92.80	0 00:00
CB34-35 ROAD	JUNCTION	0.01	0.07	94.07	0 01:30
CB36	JUNCTION	0.08	1.24	94.30	0 01:30
CB37	JUNCTION	0.09	1.26	94.09	0 01:30
CB39	JUNCTION	0.10	1.34	93.92	0 01:30
CB40-41	JUNCTION	0.14	1.37	93.52	0 01:35

CB42-43	JUNCTION	0.11	1.36	93.63	0	01:35
CB44-45	JUNCTION	0.12	1.44	93.77	0	01:30
CB46-47	JUNCTION	0.14	1.37	93.84	0	01:36
CB48-49	JUNCTION	0.17	1.33	93.87	0	01:39
CB50-51	JUNCTION	0.12	1.35	93.74	0	01:34
CB52-53	JUNCTION	0.21	1.45	93.77	0	01:42
CB54	JUNCTION	0.06	1.24	93.61	0	01:30
CB55-56	JUNCTION	0.16	1.41	93.59	0	01:35
CB57-58	JUNCTION	0.14	1.27	93.47	0	01:35
CB59	JUNCTION	0.03	0.64	93.14	0	01:30
CB60	JUNCTION	0.08	1.51	93.81	0	01:30
CB61	JUNCTION	0.05	1.34	93.64	0	01:30
CB62	JUNCTION	0.07	1.48	93.77	0	01:30
CB63	JUNCTION	0.07	1.50	93.85	0	01:30
CB64	JUNCTION	0.07	1.45	93.91	0	01:30
CB-65	JUNCTION	0.09	1.33	93.83	0	01:37
CB66	JUNCTION	0.07	1.27	93.97	0	01:31
CB67-68-69	JUNCTION	0.13	1.43	93.83	0	01:34
HP-01	JUNCTION	0.00	0.00	93.91	0	00:00
HP-03	JUNCTION	0.00	0.01	93.81	0	01:31
RYP-01	JUNCTION	0.00	0.00	94.00	0	00:00
RYP-02	JUNCTION	0.00	0.00	93.95	0	00:00
RYP-03	JUNCTION	0.00	0.01	93.85	0	01:31
RYP-04	JUNCTION	0.00	0.00	93.78	0	00:00
1-HW-01 (STM)	OUTFALL	1.43	1.43	90.63	0	00:00
2-OverlandOutlet	OUTFALL	0.00	0.01	93.01	0	01:36
3-HW-02 (STM)	OUTFALL	1.02	1.02	90.92	0	00:00
4-GreenbankOut	OUTFALL	0.00	0.00	0.00	0	00:00
A30-STOR	STORAGE	0.12	1.52	93.82	0	01:32
A33-STOR	STORAGE	0.13	1.65	93.95	0	01:32
B04_Stor	STORAGE	0.13	1.53	94.28	0	01:32
Caivan-Stor	STORAGE	0.22	1.58	93.68	0	01:41

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr
01+011	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
01+051	JUNCTION	0.00	0.00	0	01:30	0.000	0.000
01+118	JUNCTION	0.00	33.41	0	01:30	0.000	0.013
01+143	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+196	JUNCTION	0.00	49.06	0	01:30	0.000	0.020
02+288	JUNCTION	0.00	4.15	0	01:38	0.000	0.001
02+365	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
02+432	JUNCTION	0.00	9.91	0	01:31	0.000	0.002
02+458	JUNCTION	0.00	11.98	0	01:30	0.000	0.004
02+512	JUNCTION	0.00	52.02	0	01:30	0.000	0.026
02+564	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+026	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+054	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+109	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+127	JUNCTION	0.00	55.11	0	01:36	0.000	0.059
03+200	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+291	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
03+384	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+078	JUNCTION	0.00	77.25	0	01:30	0.000	0.057
04+089	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+129	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
04+207	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
05+116	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
05+200	JUNCTION	0.00	61.34	0	01:30	0.000	0.056
06+023	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+043	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+108	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+194	JUNCTION	0.00	1.24	0	01:30	0.000	0.000
06+273	JUNCTION	0.00	74.81	0	01:36	0.000	0.061
06+309	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+332	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
06+355	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+000	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+097	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
09+203	JUNCTION	0.00	15.59	0	01:28	0.000	0.004
10+011	JUNCTION	0.00	79.32	0	01:33	0.000	0.062
10+232	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
102 (STM)	JUNCTION	0.00	23.33	0	01:30	0.000	0.004
104 (STM)	JUNCTION	0.00	40.45	0	01:30	0.000	0.056
106 (STM)	JUNCTION	0.00	122.89	0	01:34	0.000	0.376
106a	JUNCTION	0.00	179.06	0	01:34	0.000	0.544
108 (STM)	JUNCTION	0.00	236.47	0	01:34	0.000	0.674
108a	JUNCTION	0.00	274.75	0	01:34	0.000	0.803
11+000	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
11+086	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
110 (STM)	JUNCTION	0.00	438.37	0	01:34	0.000	1.569
110a	JUNCTION	0.00	447.33	0	01:34	0.000	1.599
200 (STM)	JUNCTION	0.00	24.26	0	01:21	0.000	0.046
202 (STM)	JUNCTION	0.00	215.60	0	01:32	0.000	0.641
202a	JUNCTION	0.00	247.71	0	01:39	0.000	0.739
204 (STM)	JUNCTION	0.00	264.15	0	01:40	0.000	0.810
204a	JUNCTION	0.00	303.37	0	01:41	0.000	0.941
206 (STM)	JUNCTION	0.00	384.56	0	01:43	0.000	1.350
208 (STM)	JUNCTION	0.00	405.50	0	01:40	0.000	1.423
208a	JUNCTION	0.00	421.54	0	01:39	0.000	1.472
210 (STM)	JUNCTION	0.00	497.79	0	01:38	0.000	1.740
212 (STM)	JUNCTION	0.00	519.92	0	01:38	0.000	1.808
214 (STM)	JUNCTION	0.00	595.08	0	01:36	0.000	2.055
216 (STM)	JUNCTION	0.00	1672.13	0	01:37	0.000	6.459
304 (STM)	JUNCTION	0.00	39.29	0	01:35	0.000	0.135
306 (STM)	JUNCTION	0.00	86.73	0	01:54	0.000	0.334
306a (STM)	JUNCTION	0.00	103.08	0	01:53	0.000	0.349
308 (STM)	JUNCTION	0.00	154.90	0	01:51	0.000	0.544
310 (STM)	JUNCTION	0.00	174.39	0	01:50	0.000	0.699
312 (STM)	JUNCTION	0.00	1043.92	0	01:36	0.000	3.963
314 (STM)	JUNCTION	0.00	1044.05	0	01:36	0.000	3.925
316 (STM)	JUNCTION	0.00	1302.88	0	01:36	0.000	4.688
324 (STM)	JUNCTION	0.00	1302.91	0	01:36	0.000	6.889
326 (STM)	JUNCTION	0.00	1302.96	0	01:36	0.000	6.893
328 (STM)	JUNCTION	0.00	1303.09	0	01:36	0.000	4.771
330 (STM)	JUNCTION	0.00	790.90	0	01:36	0.000	3.415
402 (STM)	JUNCTION	0.00	29.28	0	01:39	0.000	0.164
402a (STM)	JUNCTION	0.00	59.19	0	01:57	0.000	0.324
404 (STM)	JUNCTION	0.00	85.49	0	01:56	0.000	0.379
404a	JUNCTION	0.00	152.25	0	01:56	0.000	0.608
406 (STM)	JUNCTION	0.00	56.03	0	01:30	0.000	0.115
408 (STM)	JUNCTION	0.00	48.59	0	01:28	0.000	0.127
608 (STM)	JUNCTION	0.00	156.29	0	01:56	0.000	0.616
608a	JUNCTION	0.00	160.89	0	01:56	0.000	0.645
610 (STM)	JUNCTION	0.00	696.09	0	01:35	0.000	2.680
610a	JUNCTION	0.00	756.16	0	01:35	0.000	2.837
612 (STM)	JUNCTION	0.00	260.28	0	01:33	0.000	0.818
614 (STM)	JUNCTION	0.00	259.59	0	01:33	0.000	0.810
616 (STM)	JUNCTION	0.00	61.76	0	01:22	0.000	0.054
618 (STM)	JUNCTION	0.00	41.20	0	01:36	0.000	0.310
902 (STM)	JUNCTION	0.00	20.55	0	01:24	0.000	0.006
904 (STM)	JUNCTION	0.00	51.59	0	01:25	0.000	0.034
906 (STM)	JUNCTION	0.00	95.14	0	01:56	0.000	0.303
908 (STM)	JUNCTION	0.00	104.70	0	01:56	0.000	0.302
908a	JUNCTION	0.00	162.53	0	01:55	0.000	0.582
C100 (STM)	JUNCTION	0.00	15.34	0	01:30	0.000	0.043
C102 (STM)	JUNCTION	0.00	17.76	0	01:30	0.000	0.049
C104 (STM)	JUNCTION	0.00	22.25	0	01:30	0.000	0.060
C106 (STM)	JUNCTION	0.00	25.17	0	01:30	0.000	0.068

C108 (STM)	JUNCTION	0.00	38.69	0	02:03	0.000	0.062
C110 (STM)	JUNCTION	0.00	1077.82	0	01:39	0.000	4.405
CB01-02	JUNCTION	86.67	86.67	0	01:30	0.135	0.135
CB03-04	JUNCTION	89.11	90.06	0	01:30	0.143	0.201
CB05-06	JUNCTION	104.87	104.87	0	01:30	0.172	0.172
CB07-08	JUNCTION	97.28	97.28	0	01:30	0.157	0.157
CB09-10	JUNCTION	86.15	145.07	0	01:30	0.133	0.189
CB100	JUNCTION	33.18	33.18	0	01:30	0.050	0.050
CB102	JUNCTION	36.88	36.88	0	01:30	0.056	0.056
CB104	JUNCTION	45.59	45.59	0	01:30	0.069	0.069
CB106	JUNCTION	51.57	51.57	0	01:30	0.078	0.078
CB108	JUNCTION	46.20	46.20	0	01:30	0.070	0.070
CB110	JUNCTION	40.18	40.18	0	01:30	0.062	0.062
CB11-12	JUNCTION	0.00	30.01	0	01:30	0.000	0.129
CB11-12ROAD	JUNCTION	97.73	97.73	0	01:30	0.158	0.158
CB13-14	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB13-14ROAD	JUNCTION	49.90	49.90	0	01:30	0.074	0.074
CB15-16	JUNCTION	102.55	149.94	0	01:30	0.165	0.224
CB17-18	JUNCTION	89.83	137.38	0	01:30	0.142	0.218
CB19	JUNCTION	31.75	62.74	0	01:29	0.047	0.059
CB20-21	JUNCTION	147.70	147.70	0	01:30	0.236	0.241
CB22	JUNCTION	68.09	68.09	0	01:30	0.111	0.111
CB23	JUNCTION	69.98	70.02	0	01:30	0.114	0.114
CB24-25	JUNCTION	76.25	76.25	0	01:30	0.124	0.124
CB26-27	JUNCTION	153.65	153.65	0	01:30	0.256	0.256
CB28	JUNCTION	0.00	78.41	0	01:37	0.000	0.089
CB29	JUNCTION	76.79	106.76	0	01:37	0.129	0.191
CB30-31	JUNCTION	69.48	207.92	0	01:30	0.110	0.354
CB32-33	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB32-33 ROAD	JUNCTION	76.12	145.75	0	01:30	0.123	0.243
CB34-35	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
CB34-35 ROAD	JUNCTION	74.23	74.23	0	01:30	0.120	0.120
CB36	JUNCTION	36.54	36.54	0	01:30	0.054	0.054
CB37	JUNCTION	53.60	73.11	0	01:30	0.085	0.093
CB39	JUNCTION	38.75	50.49	0	01:26	0.056	0.060
CB40-41	JUNCTION	156.84	161.92	0	01:30	0.261	0.264
CB42-43	JUNCTION	94.94	114.29	0	01:30	0.155	0.168
CB44-45	JUNCTION	91.76	91.76	0	01:30	0.142	0.143
CB46-47	JUNCTION	29.20	73.72	0	01:30	0.044	0.072
CB48-49	JUNCTION	48.83	48.83	0	01:30	0.073	0.073
CB50-51	JUNCTION	80.49	80.49	0	01:30	0.129	0.130
CB52-53	JUNCTION	184.67	184.67	0	01:30	0.409	0.409
CB54	JUNCTION	18.84	36.44	0	01:30	0.028	0.036
CB55-56	JUNCTION	121.49	178.44	0	01:30	0.185	0.210
CB57-58	JUNCTION	95.76	162.61	0	01:30	0.156	0.188
CB59	JUNCTION	11.43	11.43	0	01:29	0.018	0.018
CB60	JUNCTION	41.25	41.25	0	01:29	0.063	0.063
CB61	JUNCTION	19.05	19.05	0	01:29	0.029	0.029
CB62	JUNCTION	38.72	38.72	0	01:29	0.059	0.059
CB63	JUNCTION	40.62	40.62	0	01:29	0.062	0.062
CB64	JUNCTION	33.33	33.33	0	01:29	0.051	0.051
CB-65	JUNCTION	20.40	20.40	0	01:29	0.031	0.044
CB66	JUNCTION	24.30	24.30	0	01:30	0.035	0.035
CB67-68-69	JUNCTION	158.55	158.55	0	01:30	0.259	0.259
HP-01	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
HP-03	JUNCTION	0.00	1.43	0	01:30	0.000	0.000
RYP-01	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-02	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
RYP-03	JUNCTION	0.00	2.70	0	01:30	0.000	0.000
RYP-04	JUNCTION	0.00	0.00	0	00:00	0.000	0.000
1-HW-01 (STM)	OUTFALL	0.00	1303.10	0	01:36	0.000	4.758
2-OverlandOutlet	OUTFALL	0.00	4.17	0	01:36	0.000	0.002
3-HW-02 (STM)	OUTFALL	0.00	1672.18	0	01:37	0.000	6.459
4-GreenbankOut	OUTFALL	868.92	868.92	0	01:30	1.447	1.447
A30-STOR	STORAGE	177.81	177.81	0	01:30	0.285	0.285
A33-STOR	STORAGE	291.70	291.70	0	01:30	0.468	0.468
B04_Stor	STORAGE	292.32	292.32	0	01:30	0.472	0.472
Caivan-Stor	STORAGE	2057.67	2057.67	0	01:30	4.355	4.355

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

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
102 (STM)	JUNCTION	0.12	0.102	2.242
104 (STM)	JUNCTION	0.28	0.223	2.396
106 (STM)	JUNCTION	0.40	0.309	2.337
106a	JUNCTION	0.50	0.408	2.272
108 (STM)	JUNCTION	0.51	0.408	2.258
108a	JUNCTION	0.57	0.430	2.094
110 (STM)	JUNCTION	0.58	0.418	2.041
110a	JUNCTION	0.62	0.416	2.036
206 (STM)	JUNCTION	0.22	0.036	2.052
208 (STM)	JUNCTION	0.20	0.025	2.343
306a (STM)	JUNCTION	0.02	0.002	2.348
308 (STM)	JUNCTION	0.31	0.093	2.284
310 (STM)	JUNCTION	0.59	0.248	2.376
312 (STM)	JUNCTION	0.67	0.287	2.292
314 (STM)	JUNCTION	0.73	0.266	1.653
316 (STM)	JUNCTION	12.00	0.262	2.389
324 (STM)	JUNCTION	0.56	0.084	1.868
326 (STM)	JUNCTION	0.72	0.061	1.829
328 (STM)	JUNCTION	12.00	0.199	1.503
330 (STM)	JUNCTION	12.00	0.206	1.780
402a (STM)	JUNCTION	0.09	0.046	2.314
404 (STM)	JUNCTION	0.24	0.158	2.314
404a	JUNCTION	0.40	0.241	2.276
406 (STM)	JUNCTION	0.05	0.028	2.171
408 (STM)	JUNCTION	0.32	0.236	2.266
608 (STM)	JUNCTION	0.43	0.278	2.244
608a	JUNCTION	0.50	0.346	2.170
610 (STM)	JUNCTION	0.63	0.369	2.055
610a	JUNCTION	0.65	0.339	2.150
612 (STM)	JUNCTION	0.57	0.323	3.050
614 (STM)	JUNCTION	0.55	0.413	2.474
616 (STM)	JUNCTION	0.40	0.740	2.544
618 (STM)	JUNCTION	0.52	0.269	2.405
904 (STM)	JUNCTION	0.19	0.083	2.482
906 (STM)	JUNCTION	0.37	0.167	2.256
908 (STM)	JUNCTION	0.54	0.303	2.314
908a	JUNCTION	0.62	0.373	2.106
C110 (STM)	JUNCTION	0.70	1.452	0.638
A30-STOR	STORAGE	0.79	1.321	0.184
A33-STOR	STORAGE	0.70	1.400	0.050
B04_Stor	STORAGE	0.70	1.275	0.173
Caivan-Stor	STORAGE	0.68	0.844	0.166

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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	Average Volume	Avg Pcnt	E&I Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m3	Full	Loss	1000 m3	Full	days	hr:min	LPS
A30-STOR	0.001	1	0	0.034	15	0	01:32	96.77
A33-STOR	0.002	2	0	0.053	70	0	01:32	164.92
B04_Stor	0.002	1	0	0.054	18	0	01:32	160.61
Caivan-Stor	0.024	1	0	0.483	28	0	01:41	1063.47

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow LPS	Max. Flow LPS	Total Volume 10^6 ltr
1-HW-01 (STM)	99.90	152.35	1303.10	4.758
2-OverlandOutlet	2.78	2.85	4.17	0.002
3-HW-02 (STM)	99.83	211.96	1672.18	6.459
4-GreenbankOut	76.38	61.99	868.92	1.447
System	69.72	429.14	3635.40	12.667

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
{STM}.102-104	CONDUIT	23.33	0	01:30	0.17	0.05	1.00
{STM}.104-106	CONDUIT	40.73	0	01:30	0.18	0.12	1.00
{STM}.106-106a	CONDUIT	123.23	0	01:34	0.43	0.41	1.00
{STM}.108-108a	CONDUIT	236.59	0	01:34	0.64	0.67	1.00
{STM}.110-110a	CONDUIT	438.22	0	01:34	0.96	0.85	1.00
{STM}.306-306a	CONDUIT	103.08	0	01:53	0.72	0.32	0.90
{STM}.308-310	CONDUIT	158.01	0	01:50	0.54	0.48	1.00
{STM}.310-312	CONDUIT	174.62	0	01:50	0.38	0.39	1.00
{STM}.312-314	CONDUIT	1044.05	0	01:36	0.89	0.81	1.00
{STM}.314-316	CONDUIT	1044.12	0	01:36	0.89	0.80	1.00
{STM}.316-324	CONDUIT	1302.91	0	01:36	1.12	1.02	1.00
{STM}.326-328	CONDUIT	1303.09	0	01:36	0.69	0.55	1.00
{STM}.328-HW-1	CONDUIT	1303.10	0	01:36	0.69	0.53	1.00
{STM}.330-336	CONDUIT	790.95	0	01:36	0.68	0.28	1.00
{STM}.402-402a	CONDUIT	33.74	0	01:57	0.45	0.13	0.98
{STM}.404-404a	CONDUIT	94.06	0	01:56	0.68	0.29	1.00
{STM}.406-408	CONDUIT	48.26	0	01:54	0.48	0.17	1.00
{STM}.408-106	CONDUIT	64.54	0	01:53	0.35	0.22	1.00
{STM}.608-608a	CONDUIT	159.68	0	01:56	0.69	0.56	1.00
{STM}.610-610a	CONDUIT	695.97	0	01:35	0.90	0.86	1.00
{STM}.612-316	CONDUIT	260.45	0	01:33	0.89	0.91	1.00
{STM}.614-312	CONDUIT	260.28	0	01:33	0.89	0.91	1.00
{STM}.616-614	CONDUIT	51.03	0	01:22	0.35	0.38	1.00
{STM}.618-610	CONDUIT	45.81	0	02:04	0.23	0.13	1.00
{STM}.902-904	CONDUIT	20.55	0	01:24	0.17	0.06	0.97
{STM}.904-906	CONDUIT	51.59	0	01:25	0.28	0.18	1.00
{STM}.906-908	CONDUIT	104.70	0	01:56	0.37	0.36	1.00
{STM}.908-908a	CONDUIT	106.16	0	01:56	0.29	0.31	1.00
106a-108	CONDUIT	179.21	0	01:34	0.61	0.63	1.00
108a-110	CONDUIT	274.68	0	01:34	0.74	0.76	1.00
110a-610	CONDUIT	447.24	0	01:34	0.98	0.87	1.00
200-202	CONDUIT	37.74	0	01:50	0.17	0.11	0.75
202-204	CONDUIT	214.03	0	01:39	0.86	0.62	0.85
202a-204	CONDUIT	247.42	0	01:40	1.01	0.71	0.89
204-206	CONDUIT	264.48	0	01:41	0.80	0.58	0.94
204a-206	CONDUIT	305.67	0	01:43	0.70	0.68	0.99
206-208	CONDUIT	385.01	0	01:43	0.84	0.84	1.00
208-208a	CONDUIT	405.64	0	01:40	0.89	1.07	0.99
208a-210	CONDUIT	421.70	0	01:39	0.95	1.14	0.94
210-212	CONDUIT	497.87	0	01:38	0.96	1.02	0.89
212-214	CONDUIT	520.04	0	01:38	0.87	1.09	0.85
214-216	CONDUIT	595.16	0	01:37	1.07	0.93	0.79
216-H2	CONDUIT	1672.18	0	01:37	0.99	0.60	0.83
304-306	CONDUIT	45.12	0	01:54	0.63	0.13	0.63
306a-308	CONDUIT	110.63	0	01:52	0.52	0.34	1.00
324-330	CONDUIT	790.90	0	01:36	0.68	0.32	1.00
402a-404	CONDUIT	69.48	0	01:56	0.80	0.25	1.00
404a-608	CONDUIT	156.29	0	01:56	0.83	0.47	1.00
608a-110	CONDUIT	163.60	0	01:58	0.57	0.57	1.00
610a-312	CONDUIT	756.15	0	01:35	0.98	0.90	1.00
908a-610	CONDUIT	162.77	0	01:55	0.44	0.48	1.00
C100-208	CONDUIT	15.84	0	01:33	0.09	0.06	0.98
C102-208a	CONDUIT	17.57	0	01:37	0.08	0.07	0.93
C104-210	CONDUIT	21.77	0	01:34	0.13	0.09	0.84
C106-212	CONDUIT	24.71	0	01:34	0.16	0.10	0.78
C108-214	CONDUIT	37.21	0	02:04	0.26	0.15	0.70
C110-216	CONDUIT	1077.82	0	01:39	3.69	4.33	1.00
CB10-11ROADLINK	CONDUIT	0.00	0	00:00	0.00	0.00	0.12
CB12-13ROADLINK	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
CB27-28ROADLINK	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
CB29-30ROADLINK	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
CB53-ROAD	CONDUIT	0.00	0	01:30	0.02	0.00	0.01
CB57-ROAD	CONDUIT	1.24	0	01:30	0.20	0.01	0.15
CB59-ROAD	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
CST-01	CHANNEL	17.62	0	01:30	0.53	0.00	0.11
CST-02	CHANNEL	18.60	0	01:30	0.15	0.00	0.37
CST-03	CHANNEL	23.00	0	01:30	0.76	0.00	0.13
CST-04	CHANNEL	26.06	0	01:30	0.86	0.00	0.13
CST-05	CHANNEL	23.06	0	01:30	0.54	0.00	0.30
CST-06	CHANNEL	21.58	0	01:30	0.39	0.00	0.31
RY-00	CONDUIT	0.00	0	00:00	0.00	0.00	0.22
RY-00a	CONDUIT	11.24	0	01:42	0.26	0.09	0.51
RY-01	CONDUIT	0.00	0	00:00	0.00	0.00	0.42
RY-02	CONDUIT	0.00	0	00:00	0.00	0.00	0.42
RY-03	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
RY-04	CONDUIT	2.70	0	01:30	0.08	0.01	0.51
RY-05	CONDUIT	0.04	0	01:31	0.08	0.00	0.49
RY-06	CONDUIT	0.00	0	00:00	0.00	0.00	0.47
RY-07	CONDUIT	0.00	0	00:00	0.00	0.00	0.23
RY-08	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
RY-09	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
RY-10	CONDUIT	1.43	0	01:30	0.08	0.01	0.51
S01-00	CHANNEL	9.91	0	01:31	0.05	0.00	0.28
S01-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.26
S01-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S01-03	CHANNEL	26.17	0	01:31	0.10	0.01	0.32
S01-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.26
S01-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.15
S01-06	CONDUIT	0.00	0	00:00	0.00	0.00	0.15
S01-07	CONDUIT	0.00	0	00:00	0.00	0.00	0.16
S03-01a	CHANNEL	0.00	0	00:00	0.00	0.00	0.28
S03-01b	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S03-01c	CHANNEL	0.00	0	00:00	0.00	0.00	0.27
S03-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.27
S03-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.10
S03-04	CHANNEL	53.13	0	01:39	0.11	0.01	0.47
S03-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
S03-06	CHANNEL	0.00	0	00:00	0.00	0.00	0.23
S03-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.23
S03-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.26
S03-09	CONDUIT	0.00	0	00:00	0.00	0.00	0.26
S03-10	CHANNEL	0.00	0	00:00	0.00	0.00	0.14
S03-OUT	CONDUIT	4.17	0	01:36	0.06	0.00	0.02
S04-01	CHANNEL	55.11	0	01:36	0.10	0.01	0.49

S04-02	CHANNEL	67.64	0	01:31	0.11	0.01	0.48
S04-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.10
S04-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.19
S04-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.19
S04-06	CHANNEL	0.00	0	00:00	0.00	0.00	0.25
S04-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.25
S04-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.24
S04-09	CHANNEL	33.41	0	01:30	0.15	0.01	0.32
S05-01	CONDUIT	77.25	0	01:30	0.12	0.02	0.43
S05-02	CHANNEL	47.72	0	01:30	0.32	0.02	0.43
S05-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.10
S05-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.11
S05-05	CHANNEL	61.34	0	01:30	0.64	0.02	0.18
S05-06	CHANNEL	60.85	0	01:30	0.51	0.01	0.48
S05-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.42
S06-01d	CONDUIT	31.86	0	01:29	0.08	0.01	0.55
S06-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.36
S06-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.16
S06-04	CHANNEL	0.10	0	01:31	0.04	0.00	0.16
S06-05	CHANNEL	0.10	0	01:31	0.05	0.00	0.15
S06-06	CONDUIT	78.35	0	01:37	0.16	0.06	0.30
S06-07	CHANNEL	72.72	0	01:37	0.63	0.01	0.23
S06-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S06-09	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-10	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
S06-11	CHANNEL	0.00	0	00:00	0.00	0.00	0.28
S09-00	CHANNEL	16.63	0	01:26	0.13	0.00	0.32
S09-01	CHANNEL	15.59	0	01:28	0.13	0.00	0.27
S09-02	CHANNEL	6.89	0	01:31	0.11	0.00	0.32
S09-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.28
S09-04	CHANNEL	0.00	0	00:00	0.00	0.00	0.26
S09-05	CONDUIT	0.00	0	00:00	0.00	0.00	0.26
S09-06	CONDUIT	0.00	0	00:00	0.00	0.00	0.14
S10-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.11
S10-02	CHANNEL	69.99	0	01:30	0.36	0.03	0.26
S10-03	CHANNEL	139.54	0	01:30	0.43	0.05	0.62
S10-04	CONDUIT	79.32	0	01:33	0.05	0.01	0.53
S10-05	CONDUIT	74.81	0	01:36	0.26	0.01	0.13
S11-01	CHANNEL	0.00	0	00:00	0.00	0.00	0.12
S11-02	CHANNEL	0.00	0	00:00	0.00	0.00	0.12
S11-03	CHANNEL	0.00	0	00:00	0.00	0.00	0.28
ST10-00	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
ST6-01a	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
ST6-01b	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ST6-01c	CHANNEL	0.00	0	00:00	0.00	0.00	0.19
STB-00	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
STB-01	CHANNEL	19.60	0	01:30	0.27	0.00	0.16
STB-02	CHANNEL	47.84	0	01:30	0.57	0.01	0.19
STB-03	CHANNEL	46.86	0	01:30	0.20	0.01	0.36
STB-04	CHANNEL	11.98	0	01:30	0.10	0.00	0.41
STB-05	CHANNEL	1.10	0	01:38	0.05	0.00	0.14
STB-06	CHANNEL	1.10	0	01:38	0.10	0.00	0.26
STB-07	CHANNEL	0.00	0	00:00	0.00	0.00	0.24
STB-08	CHANNEL	0.00	0	00:00	0.00	0.00	0.41
STB-09	CHANNEL	4.15	0	01:38	0.01	0.00	0.42
STB-10	CHANNEL	0.22	0	01:41	0.14	0.00	0.06
STB-11	CHANNEL	91.27	0	01:45	0.17	0.02	0.46
STB-12	CHANNEL	21.03	0	01:30	0.09	0.01	0.39
STB-13	CHANNEL	22.82	0	01:30	0.12	0.01	0.33
OCB01-02	ORIFICE	39.29	0	01:35			1.00
OCB03-04	ORIFICE	41.63	0	01:51			1.00
OCB05-06	ORIFICE	55.42	0	01:33			1.00
OCB07-08	ORIFICE	39.20	0	01:36			1.00
OCB09-10	ORIFICE	60.25	0	01:37			1.00
OCB11-12	ORIFICE	26.81	0	01:32			1.00
OCB13-14	ORIFICE	0.00	0	00:00			0.00
OCB15-16	ORIFICE	29.28	0	01:39			1.00
OCB17-18	ORIFICE	25.82	0	01:31			1.00
OCB19	ORIFICE	16.62	0	01:36			1.00
OCB20-21	ORIFICE	60.15	0	01:37			1.00
OCB22	ORIFICE	28.35	0	01:38			1.00
OCB23	ORIFICE	27.74	0	01:40			1.00
OCB24-25	ORIFICE	38.16	0	01:34			1.00
OCB26-27	ORIFICE	76.21	0	01:34			1.00
OCB28	ORIFICE	38.24	0	01:46			1.00
OCB28-Stor	ORIFICE	96.77	0	01:32			1.00
OCB29	ORIFICE	21.09	0	01:46			1.00
OCB30-31	ORIFICE	41.20	0	01:36			1.00
OCB31-Stor	ORIFICE	164.92	0	01:32			1.00
OCB32-33	ORIFICE	0.00	0	00:00			0.00
OCB34-35	ORIFICE	0.00	0	00:00			0.00
OCB36	ORIFICE	16.09	0	01:30			1.00
OCB37	ORIFICE	24.42	0	01:30			1.00
OCB39	ORIFICE	16.75	0	01:30			1.00
OCB40-41	ORIFICE	76.63	0	01:35			1.00
OCB42-43	ORIFICE	55.84	0	01:35			1.00
OCB44-45	ORIFICE	40.38	0	01:30			1.00
OCB46-47	ORIFICE	16.98	0	01:36			1.00
OCB48-49	ORIFICE	16.73	0	01:39			1.00
OCB50-51	ORIFICE	39.03	0	01:34			1.00
OCB52-53	ORIFICE	78.89	0	01:42			1.00
OCB54	ORIFICE	16.09	0	01:30			1.00
OCB55-56	ORIFICE	56.93	0	01:35			1.00
OCB57-58	ORIFICE	53.88	0	01:35			1.00
OCB59	ORIFICE	11.37	0	01:30			1.00
OCB60	ORIFICE	30.03	0	01:30			1.00
OCB61	ORIFICE	16.75	0	01:30			1.00
OCB62	ORIFICE	29.78	0	01:30			1.00
OCB63	ORIFICE	29.95	0	01:30			1.00
OCB64	ORIFICE	26.28	0	01:30			1.00
OCB65	ORIFICE	16.72	0	01:37			1.00
OCB66	ORIFICE	16.32	0	01:31			1.00
OCB67-68	ORIFICE	78.33	0	01:34			1.00
OCB-B04	ORIFICE	160.61	0	01:32			1.00
OCB-C100	ORIFICE	15.34	0	01:30			1.00
OCB-C102	ORIFICE	17.76	0	01:30			1.00
OCB-C104	ORIFICE	22.25	0	01:30			1.00
OCB-C106	ORIFICE	25.17	0	01:30			1.00
OCB-C108	ORIFICE	22.68	0	01:30			1.00
OCB-C110	ORIFICE	19.31	0	01:23			1.00
Orifice-55	ORIFICE	1063.47	0	01:45			1.00
VORTECHS	WEIR	513.77	0	01:35			1.00
10-11	DUMMY	30.01	0	01:30			
12-13	DUMMY	0.00	0	00:00			
27-28	DUMMY	0.00	0	00:00			
29-30	DUMMY	0.00	0	00:00			

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Flow Classification Summary
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	Adjusted	--- Fraction of Time in Flow Class ----							Avg.	Avg.
	/Actual		Up	Down	Sub	Sup	Up	Down	Froude	Flow
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Number	Change
{STM}.102-104	1.00	0.00	0.01	0.00	0.14	0.00	0.00	0.85	0.01	0.0001
{STM}.104-106	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0001
{STM}.106-106a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0004
{STM}.108-108a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0007
{STM}.110-110a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0009
{STM}.306-306a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0001
{STM}.308-310	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0007
{STM}.310-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0019
{STM}.312-314	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0010
{STM}.314-316	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0019
{STM}.316-324	1.48	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0052

{STM}.326-328	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0012
{STM}.328-HW-1	2.49	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0013
{STM}.330-336	5.92	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0014
{STM}.402-402a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0001
{STM}.404-404a	1.27	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.34	0.0002
{STM}.406-408	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.38	0.0001
{STM}.408-106	1.00	0.00	0.00	0.00	0.92	0.00	0.00	0.08	0.20	0.0002
{STM}.608-608a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0005
{STM}.610-610a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0011
{STM}.612-316	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0023
{STM}.614-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0024
{STM}.616-614	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0010
{STM}.618-610	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0009
{STM}.902-904	1.00	0.00	0.77	0.00	0.23	0.00	0.00	0.00	0.00	0.0001
{STM}.904-906	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0003
{STM}.906-908	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0004
{STM}.908-908a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0012
106a-108	1.13	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0010
108a-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0009
110a-610	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0009
200-202	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.05	0.0001
202-204	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.28	0.0001
202a-204	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.43	0.0002
204-206	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.0001
204a-206	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0002
206-208	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0002
208-208a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0002
208a-210	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0003
210-212	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0002
212-214	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0003
214-216	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0003
216-H2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0002
304-306	1.00	0.00	0.00	0.00	0.41	0.00	0.00	0.58	0.40	0.0000
306a-308	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0005
324-330	5.59	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0028
402a-404	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.42	0.0001
404a-608	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.23	0.0002
608a-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0004
610a-312	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0010
908a-610	1.06	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0026
C100-208	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C102-208a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
C104-210	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0001
C106-212	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0001
C108-214	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0002
C110-216	1.00	0.00	0.00	0.00	0.84	0.00	0.00	0.16	0.14	0.0010
CB10-11ROADLINK	4.03	0.57	0.00	0.00	0.02	0.00	0.00	0.41	0.00	0.0000
CB12-13ROADLINK	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB27-28ROADLINK	1.93	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB29-30ROADLINK	1.93	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB53-ROAD	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CB57-ROAD	1.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.0000
CB59-ROAD	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CST-01	1.00	0.97	0.00	0.00	0.01	0.01	0.00	0.01	0.03	0.0000
CST-02	1.06	0.90	0.07	0.00	0.03	0.00	0.00	0.00	0.00	0.0000
CST-03	1.00	0.00	0.97	0.00	0.01	0.02	0.00	0.00	0.03	0.0000
CST-04	1.00	0.00	0.97	0.00	0.01	0.02	0.00	0.00	0.03	0.0000
CST-05	1.11	0.91	0.06	0.00	0.03	0.00	0.00	0.00	0.01	0.0000
CST-06	1.11	0.91	0.05	0.00	0.04	0.00	0.00	0.00	0.01	0.0000
RY-00	1.00	0.95	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-00a	1.00	0.91	0.01	0.00	0.04	0.00	0.04	0.00	0.02	0.0000
RY-01	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-02	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-03	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-04	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.05	0.0000
RY-05	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.05	0.0000
RY-06	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-07	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-09	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
RY-10	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.06	0.0000
S01-00	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.29	0.0000
S01-01	1.00	0.89	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-02	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-03	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.42	0.0000
S01-04	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-05	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-06	2.90	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S01-07	2.76	0.89	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01a	1.00	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-01c	1.00	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-02	1.00	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-03	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-04	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.59	0.0000
S03-05	1.00	0.87	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-06	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-07	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-08	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-09	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-10	1.00	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S03-OUT	1.00	0.97	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.0000
S04-01	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.76	0.0000
S04-02	1.00	0.69	0.01	0.00	0.13	0.00	0.00	0.17	0.00	0.0000
S04-03	1.36	0.70	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-04	1.00	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-05	1.44	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-06	1.22	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-07	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-08	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S04-09	2.14	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.65	0.0000
S05-01	3.89	0.68	0.02	0.00	0.13	0.00	0.00	0.17	0.06	0.0000
S05-02	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.80	0.0000
S05-03	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S05-04	1.00	0.56	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S05-05	1.00	0.00	0.56	0.00	0.34	0.09	0.00	0.00	0.18	0.0000
S05-06	1.48	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.58	0.0000
S05-07	5.63	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-01d	2.64	0.90	0.02	0.00	0.08	0.00	0.00	0.00	0.00	0.0000
S06-02	1.00	0.90	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-03	1.00	0.89	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-04	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.72	0.0000
S06-05	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.73	0.0000
S06-06	1.07	0.89	0.00	0.00	0.08	0.00	0.02	0.00	0.01	0.0000
S06-07	1.00	0.00	0.00	0.00	0.09	0.01	0.00	0.90	1.36	0.0000
S06-08	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S06-11	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-00	1.37	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.55	0.0000
S09-01	1.14	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.62	0.0000
S09-02	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.59	0.0000
S09-03	1.00	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-04	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-05	1.08	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S09-06	1.00	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S10-01	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S10-02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.38	0.0000
S10-03	1.00	0.00	0.00	0.00	0.17	0.00	0.00	0.83	0.62	0.0000
S10-04	1.96	0.83	0.03	0.00	0.14	0.00	0.00	0.00	0.00	0.0000
S10-05	1.76	0.00	0.86	0.00	0.14	0.00	0.00	0.00	0.02	0.0000
S11-01	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S11-02	1.21	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
S11-03	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST10-00	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01a	1.66	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01b	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
ST6-01c	1.21	0.92	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.0000

STB-00	1.27	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-01	1.00	0.96	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.0000
STB-02	1.00	0.00	0.96	0.00	0.03	0.01	0.00	0.00	0.03	0.0000
STB-03	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.43	0.0000
STB-04	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.81	0.0000
STB-05	1.12	0.00	0.00	0.00	0.95	0.05	0.00	0.00	0.68	0.0000
STB-06	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.38	0.0000
STB-07	1.00	0.93	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-08	1.00	0.87	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
STB-09	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.37	0.0000
STB-10	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.48	0.0000
STB-11	1.00	0.90	0.06	0.00	0.02	0.00	0.03	0.00	0.00	0.0000
STB-12	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.88	0.0000
STB-13	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	1.00	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
{STM}.102-104	0.12	0.12	0.12	0.01	0.01
{STM}.104-106	0.35	0.35	0.35	0.01	0.01
{STM}.106-106a	0.44	0.44	0.44	0.01	0.01
{STM}.108-108a	0.51	0.51	0.52	0.01	0.01
{STM}.110-110a	0.58	0.58	0.58	0.01	0.05
{STM}.308-310	0.33	0.33	0.33	0.01	0.01
{STM}.310-312	0.59	0.59	0.59	0.01	0.01
{STM}.312-314	0.67	0.67	0.67	0.01	0.39
{STM}.314-316	0.76	0.76	0.76	0.01	0.31
{STM}.316-324	12.00	12.00	12.00	0.11	0.90
{STM}.326-328	12.00	12.00	12.00	0.01	0.01
{STM}.328-HW-1	12.00	12.00	12.00	0.01	0.64
{STM}.330-336	12.00	12.00	12.00	0.01	0.39
{STM}.404-404a	0.35	0.35	0.36	0.01	0.01
{STM}.406-408	0.05	0.05	0.05	0.01	0.01
{STM}.408-106	0.37	0.37	0.37	0.01	0.01
{STM}.608-608a	0.46	0.46	0.46	0.01	0.01
{STM}.610-610a	0.63	0.63	0.63	0.01	0.52
{STM}.612-316	0.66	0.66	0.66	0.01	0.32
{STM}.614-312	0.55	0.55	0.56	0.01	0.44
{STM}.616-614	0.40	0.40	0.41	0.01	0.01
{STM}.618-610	0.52	0.52	0.52	0.01	0.01
{STM}.904-906	0.21	0.21	0.21	0.01	0.01
{STM}.906-908	0.40	0.40	0.40	0.01	0.01
{STM}.908-908a	0.54	0.54	0.54	0.01	0.01
106a-108	0.50	0.50	0.50	0.01	0.01
108a-110	0.57	0.57	0.57	0.01	0.10
110a-610	0.62	0.62	0.62	0.01	0.21
206-208	0.20	0.20	0.20	0.01	0.20
208-208a	0.01	0.01	0.01	0.33	0.01
208a-210	0.01	0.01	0.01	0.39	0.01
210-212	0.01	0.01	0.01	0.17	0.01
212-214	0.01	0.01	0.01	0.33	0.01
306a-308	0.02	0.02	0.02	0.01	0.01
324-330	12.00	12.00	12.00	0.01	0.40
402a-404	0.09	0.09	0.09	0.01	0.01
404a-608	0.40	0.40	0.40	0.01	0.01
608a-110	0.50	0.50	0.50	0.01	0.01
610a-312	0.65	0.65	0.65	0.01	0.54
908a-610	0.62	0.62	0.62	0.01	0.01
C110-216	0.65	0.65	0.65	1.25	0.65

Analysis begun on: Wed Nov 23 10:04:45 2016

Analysis ended on: Wed Nov 23 10:04:49 2016
Total elapsed time: 00:00:04

Appendix E

Burnett Municipal Drain Analysis

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Engineers, Planners & Landscape Architects

M E M O R A N D U M

DATE: **JUNE 10, 2016**

TO: **BOB DOWDELL, E.I.T. & EDSON DONNELLY, C.E.T.**

FROM: **CONRAD STANG, M.A.SC., P.ENG.**

RE: **SOUTH NEPEAN COLLECTOR CULVERT CROSSINGS**

CC: **MIKE PETEPIECE, P.ENG.**

This technical memorandum provides details on the sizing and location of the proposed access road culvert crossings which will be installed as part of Phase 2 of the South Nepean Collector (SNC). It is anticipated that the proposed culverts will remain in place until such time that the subject lands are developed. The location of the proposed culvert crossings and corresponding drainage areas are shown on the attached figure (DSK54):

- Culvert C1: Burnett Municipal Drain
- Culvert C2: Ditch draining Mion property west of K-B SWMF
- Culvert C3: Ditch adjacent the K-B SWMF

Design Criteria

The culverts are to convey the 10-year peak flows from their respective upstream drainage areas without overtopping the access road, as per Section 6.4.2 of the City of Ottawa Sewer Design Guidelines (October, 2012). For the 600mm culverts this corresponds to a Headwater / Depth (HW/D) of 1.5 (300mm cover), which corresponds to the maximum HW/D ratio as recommended by MTO. Excess flows will overtop the access road and graded back towards the downstream watercourse, as shown in the detail on the attached figure (DSK54).

Design Flows

The culvert crossings have been designed based on current City of Ottawa standards and rainfall data. Peak flows were estimated using the Visual Otthymo hydrologic model; modeling parameters and results are attached. The 12-hour SCS distribution generated the highest peak flows and was selected as the critical storm distribution for sizing the proposed culverts. Simulated peak flows at the proposed culvert crossings are provided in Table 1.

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Table 1: Simulated Peak Flows at Proposed Culvert Crossings

Culvert	Culvert Dimensions	Return Period (years)	Peak Flow (m^3/s)	HW/D (m)	Freeboard (m)
Culvert C1 Burnett Municipal Drain (29.27 ha)	3x 600mm Dia. CSP Culverts L = 8.0m S = 0.75% *Inv. = 91.10m	2-year	0.63	0.82	0.41
		5-year	1.10	1.13	0.22
		10-year	1.44	1.37	0.08
		25-year	1.90	1.65	0.09 Overtopping
		50-year	2.26	1.75	0.15 Overtopping
		100-year	2.66	1.84	0.20 Overtopping
Culvert C2 Mion/Pavic Ditch (5.11 ha)	1x 600mm Dia. CSP Culvert L = 8.0m S = 0.50% *Inv. = 92.30m	2-year	0.09	0.46	0.63
		5-year	0.16	0.64	0.51
		10-year	0.21	0.77	0.44
		25-year	0.28	0.93	0.34
		50-year	0.34	1.07	0.26
		100-year	0.40	1.21	0.17
Culvert C3 KB-SWMF Ditch (1.36 ha)	1x 1000mm Dia. CSP Culvert L = 12.0m S = 0.60% *Inv. = 92.35m	2-year	0.04	0.15	1.85
		5-year	0.07	0.20	1.80
		10-year	0.09	0.23	1.77
		25-year	0.12	0.26	1.74
		50-year	0.15	0.30	1.70
		100-year	0.17	0.32	1.68

**Inverts to be confirmed in the field.*

Culvert Crossings

The proposed culvert crossings were designed using Autodesk Hydraflow Express culvert sizing software – supporting calculations are attached. A summary of the proposed culvert crossings is provided below.

Culvert C1: Burnett Municipal Drain (3x 600mm CSP Culverts)

The Burnett Municipal Drain was established in the late 1960's after the passing of By-Law No. 107-68 (Township of Nepean). A copy of the Burnett Municipal Drain By-Law and October 16th, 1968 Engineers report is attached. Land use in the watershed has changed substantially since the adoption of the By-Law and a significant portion of the upstream drainage area has been redirected to the Kennedy-Burnett SWM Facility. It is anticipated that this drain will be abandoned in the near future as development proceeds within the remaining undeveloped areas south of Strandherd Drive.

The Burnett Municipal Drain is a trapezoidal channel with a 3m bottom width, 0.60m depth and side slopes ranging from 2:1 to 4:1. Based on Manning's equation, the Burnett Municipal Drain has a bankfull capacity of 3.88 m^3/s, which is sufficient to convey the 100-year peak flow from the current upstream drainage area (which is considerably smaller than the original drainage area from the 1968 Engineer's Report).

As per the 1968 by-law, an existing 900mm diameter CSP culvert was installed downstream of the proposed SNC crossing to provide access to the Kelvin Burnett property. The proposed crossing should therefore provide at least a similar flow capacity (approximately 900 L/s).

Based on current design standards, the proposed culvert crossing should be three (3) 600mm diameter CSP culverts, which will provide capacity for a 5-year return period flowing full and a 10-

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year return period without over topping the access road. Refer to the attached detailed calculations. Storm events greater than the 10-year return period will overtop the access road, but the grading will confine excess flows to the downstream ditch. The middle 600mm CSP culvert will be countersunk 0.10m.

Culvert C2: Mion Ditch (600mm CSP Culvert)

The west watercourse is an intermittent ditch that runs north-to-south through the Mion property. The ditch is a V-bottom ditch with a 0.30m depth and 3:1 / 6:1 side slopes. Based on Manning's equation, the capacity of the ditch is 0.23 m^3/s, which corresponds to a 10-year storm.

A 600mm diameter CSP culvert has capacity to convey storm events up-to and including the 100-year storm event (0.40 m^3/s) without overtopping the access road. Refer to the attached detailed calculations. The 600mm CSP culvert will be countersunk 0.10m.

Culvert C3: KB-SWMF Ditch (1000mm CSP Culvert)

The watercourse west of the KB-SWMF is a deep intermittent ditch that runs north-to-south adjacent the K-B SWMF. The ditch is a V-bottom ditch with a 2.0m depth and 2.5:1 side slopes. Based on Manning's equation, the capacity of the ditch is 21.06 m^3/s. The estimated 100-year peak flows from the 1.36 ha catchment are 0.17 m^3/s; therefore, the ditch has ample capacity to convey large peak flows.

Due to the dimensions of the ditch, a 1000mm diameter CSP culvert is recommended. The capacity of the culvert (HW/D=1.0) is 1.10 m^3/s. Flows should not overtop the culvert, but if they do they will spill into the KB-SWMF. Refer to the attached detailed calculations.

Access Road

For culvert crossings C1 and C2, the 6.0m wide access road will be graded adjacent the culvert crossing in order to have two (2) 3.0m wide depressions, which will act as a weir for flows in excess of the culvert capacity. Refer to the cross-section detail on the attached Figure (DSK54).

Attachments:

- Culvert Locations and Sizes (Figure DSK54)
- Visual Otthymo Modeling Parameters and Results
- Detailed Culvert and Ditch Calculations
- Burnett Municipal Drain By-Law

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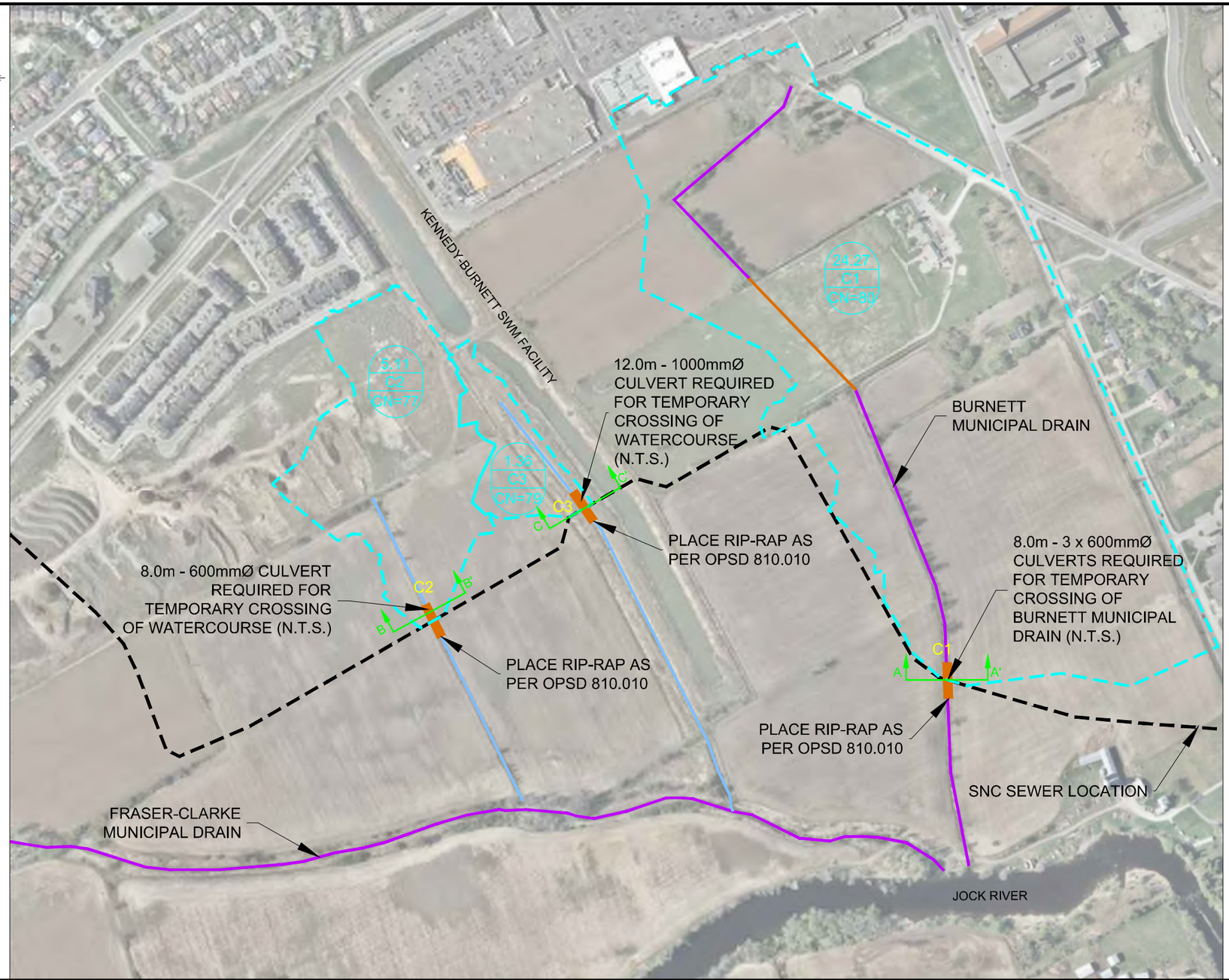
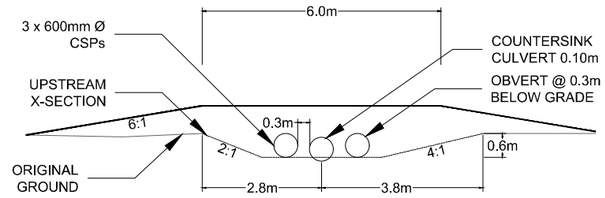
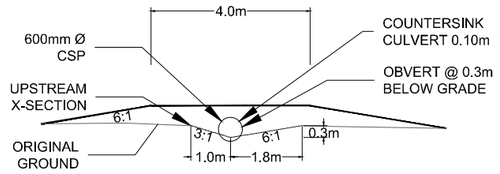
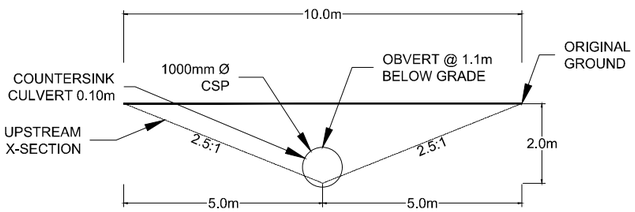




TEMPORARY CROSSING
CROSS SECTION A-A' (C1)
SCALE: 1:150



TEMPORARY CROSSING
CROSS SECTION B-B' (C2)
SCALE: 1:150



TEMPORARY CROSSING
CROSS SECTION C-C' (C3)
SCALE: 1:150

LEGEND

- CULVERT
- WATERCOURSE
- MUNICIPAL DRAIN
- PROPOSED ALIGNMENT OF THE SOUTH NEPEAN COLLECTOR (SNC)
- DRAINAGE AREA BOUNDARY

24.27 (CATCHMENT AREA (ha))
C1 (AREA ID)
CN=80 (RUNOFF CURVE NUMBER)

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Website www.novatech-eng.com

SOUTH NEPEAN COLLECTOR SEWER PHASE 2

REQUIRED CULVERT LOCATIONS AND SIZES

SCALE 1 : 5000 (0 50 100 150 200)
DATE JUN 2016 | JOB 115075 | FIGURE DSK54

South Nepean Collector Phase 2: Culvert Crossings
Existing Conditions Hydrologic Model Parameters and Results
115075

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Time to Peak Calculations
(Uplands Overland Flow Method)

Area ID	Area (ha)	CN	Ia	Overland Flow						Concentrated Overland Flow						Channel Flow				Overall			
				Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)	Time to Peak (min)	Time to Peak (hrs)
C1: Burnett MD	29.27	80	6.4	100	95.50	94.50	1.0%	0.28	5.95	150	94.50	92.75	1.2%	0.30	8.33	400	0.7%	0.38	18	32	21	21	0.36
C2: West Ditch	5.11	77	7.6	100	93.30	93.00	0.3%	0.15	11.11	125	93.00	92.75	0.2%	0.13	16.03	150	0.5%	0.32	8	35	23	23	0.39
C3: KB SWMF Ditch	1.36	79	6.8	50	93.35	93.15	0.4%	0.17	4.90	25	93.15	93.05	0.4%	0.16	2.60	150	0.6%	0.35	7	15	10	10	0.17

Ia = 0.10 x S

Model Results: 12-hour SCS Storm Distribution

Area ID	Peak Flow (m^3/s) (Return Period)					
	2-year	5-year	10-year	25-year	50-year	100-year
C1: Burnett MD	0.63	1.10	1.44	1.90	2.26	2.66
C2: West Ditch	0.09	0.16	0.21	0.28	0.34	0.40
C3: KB SWMF Ditch	0.04	0.07	0.09	0.12	0.15	0.17

Culvert Report

2-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

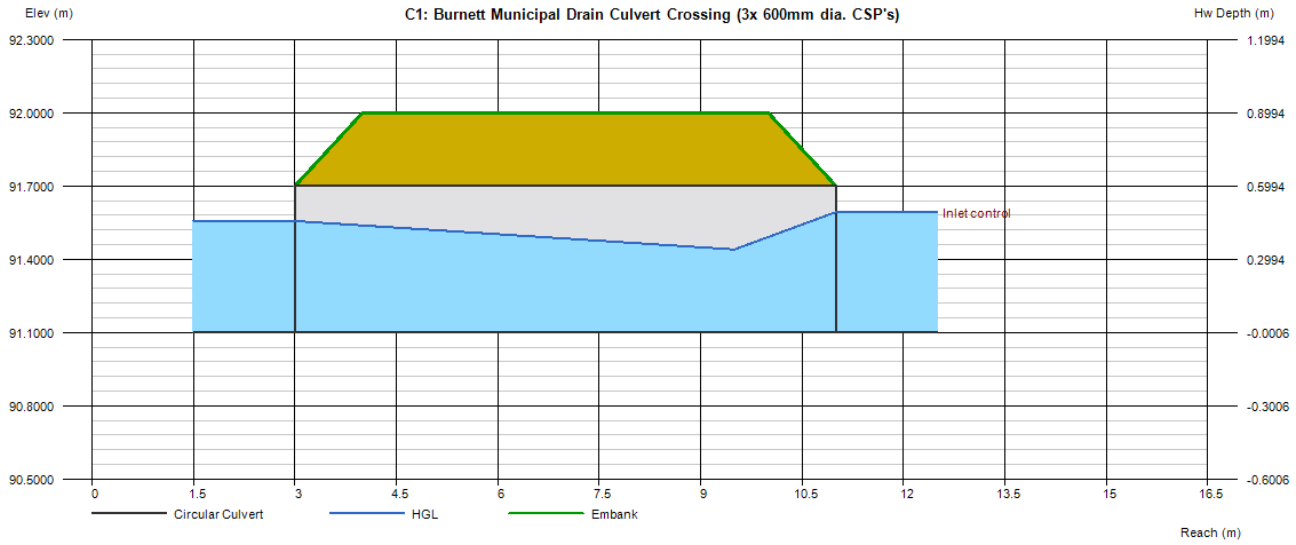
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	2.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.7000
Qpipe (cms)	=	0.7000
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.0109
Veloc Up (m/s)	=	1.5645
HGL Dn (m)	=	91.5565
HGL Up (m)	=	91.4135
Hw Elev (m)	=	91.5931
Hw/D (m)	=	0.8208
Flow Regime	=	Inlet Control



Culvert Report

5-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

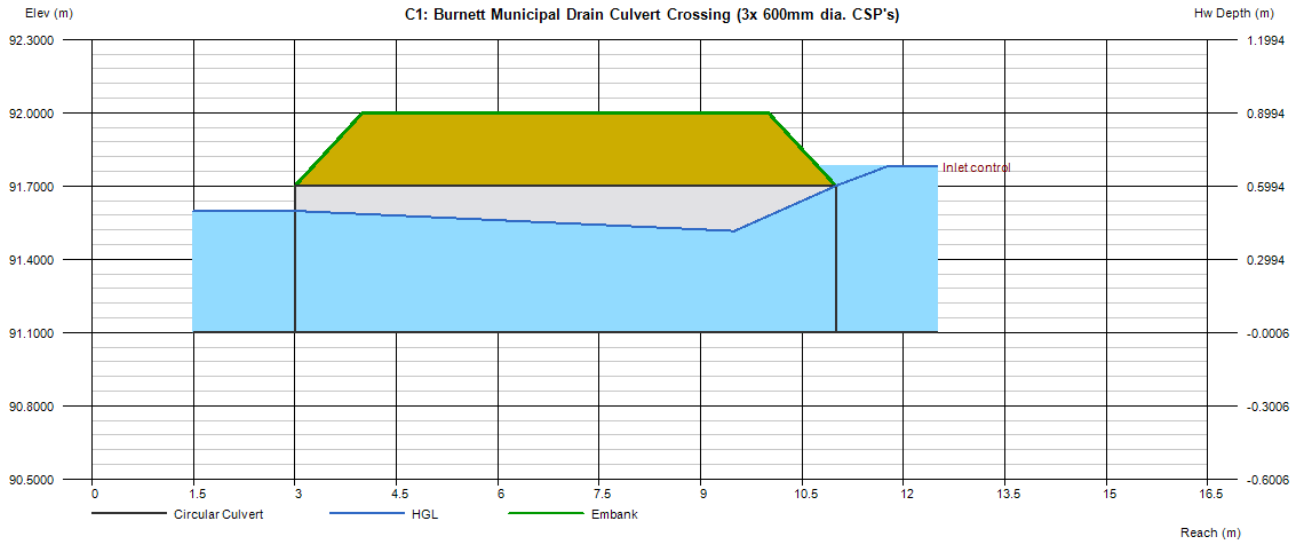
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	2.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	1.1000
Qpipe (cms)	=	1.1000
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.4614
Veloc Up (m/s)	=	1.8514
HGL Dn (m)	=	91.5981
HGL Up (m)	=	91.4967
Hw Elev (m)	=	91.7793
Hw/D (m)	=	1.1311
Flow Regime	=	Inlet Control



Culvert Report

10-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

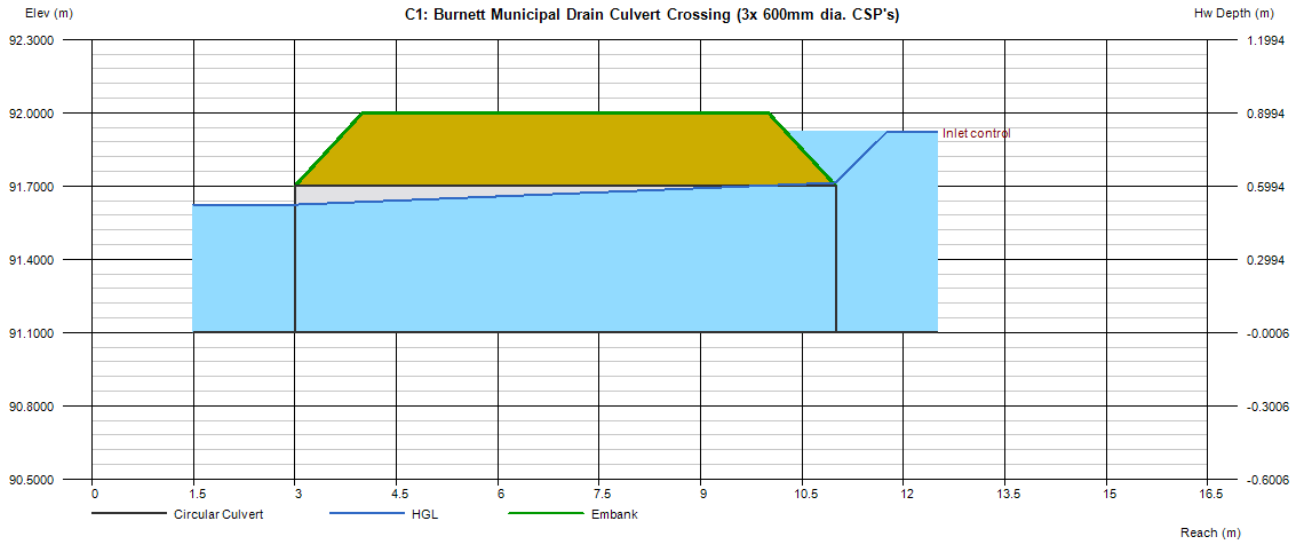
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	2.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	1.4000
Qpipe (cms)	=	1.4000
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.7823
Veloc Up (m/s)	=	1.6505
HGL Dn (m)	=	91.6237
HGL Up (m)	=	91.7136
Hw Elev (m)	=	91.9199
Hw/D (m)	=	1.3655
Flow Regime	=	Inlet Control



Culvert Report

25-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

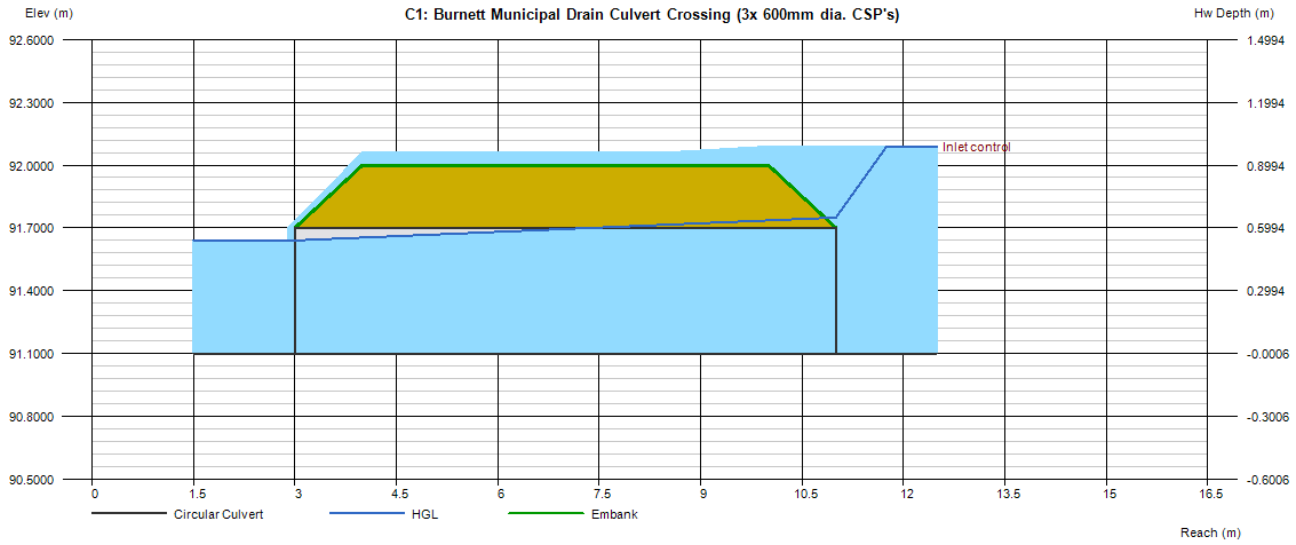
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	2.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	1.9000
Qpipe (cms)	=	1.6221
Qovertop (cms)	=	0.2779
Veloc Dn (m/s)	=	2.0174
Veloc Up (m/s)	=	1.9123
HGL Dn (m)	=	91.6400
HGL Up (m)	=	91.7494
Hw Elev (m)	=	92.0880
Hw/D (m)	=	1.6457
Flow Regime	=	Inlet Control



Culvert Report

50-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

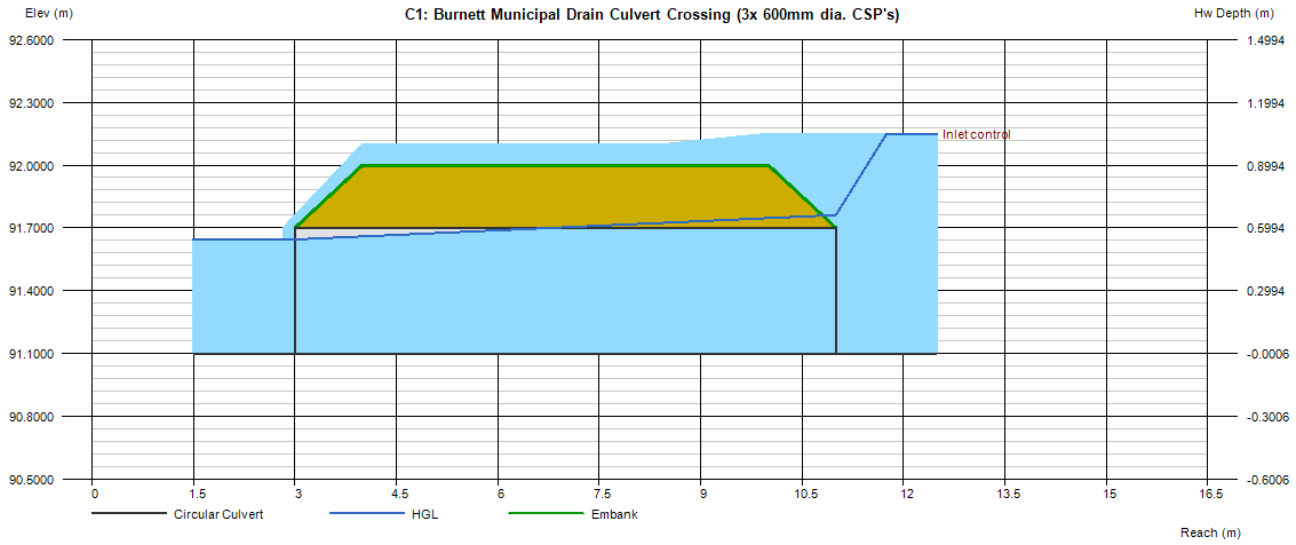
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	2.0000
Qmax (cms)	=	3.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	2.3000
Qpipe (cms)	=	1.6952
Qovertop (cms)	=	0.6048
Veloc Dn (m/s)	=	2.0950
Veloc Up (m/s)	=	1.9985
HGL Dn (m)	=	91.6448
HGL Up (m)	=	91.7612
Hw Elev (m)	=	92.1492
Hw/D (m)	=	1.7477
Flow Regime	=	Inlet Control



Culvert Report

100-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 29 2016

C1: Burnett Municipal Drain Culvert Crossing (3x 600mm dia. CSP's)

Invert Elev Dn (m)	=	91.1000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0076
Invert Elev Up (m)	=	91.1006
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	3
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

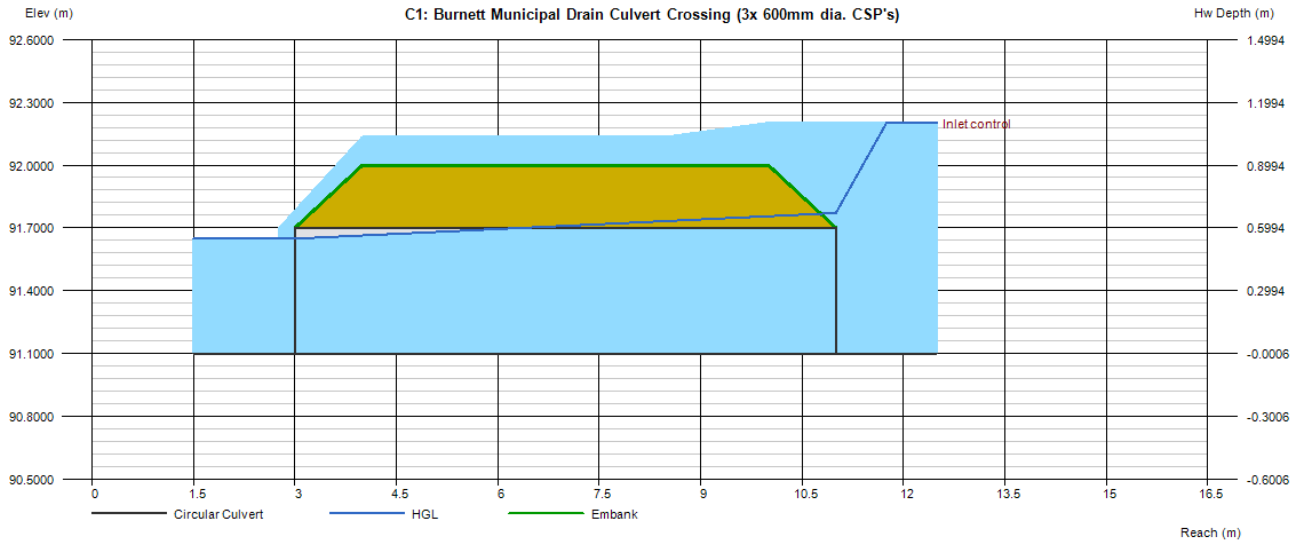
Top Elevation (m)	=	92.0000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	2.0000
Qmax (cms)	=	3.0000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	2.7000
Qpipe (cms)	=	1.7556
Qovertop (cms)	=	0.9444
Veloc Dn (m/s)	=	2.1591
Veloc Up (m/s)	=	2.0697
HGL Dn (m)	=	91.6486
HGL Up (m)	=	91.7709
Hw Elev (m)	=	92.2017
Hw/D (m)	=	1.8352
Flow Regime	=	Inlet Control



Culvert Report

2-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

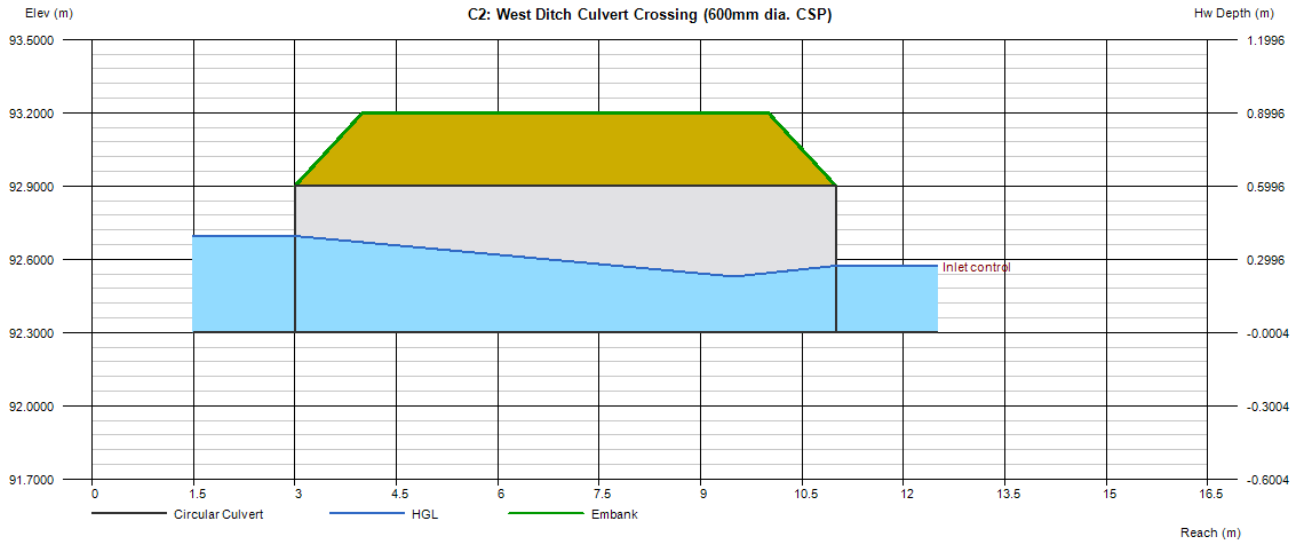
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.0900
Qpipe (cms)	=	0.0900
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.4555
Veloc Up (m/s)	=	1.1656
HGL Dn (m)	=	92.6953
HGL Up (m)	=	92.4910
Hw Elev (m)	=	92.5734
Hw/D (m)	=	0.4550
Flow Regime	=	Inlet Control



Culvert Report

5-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

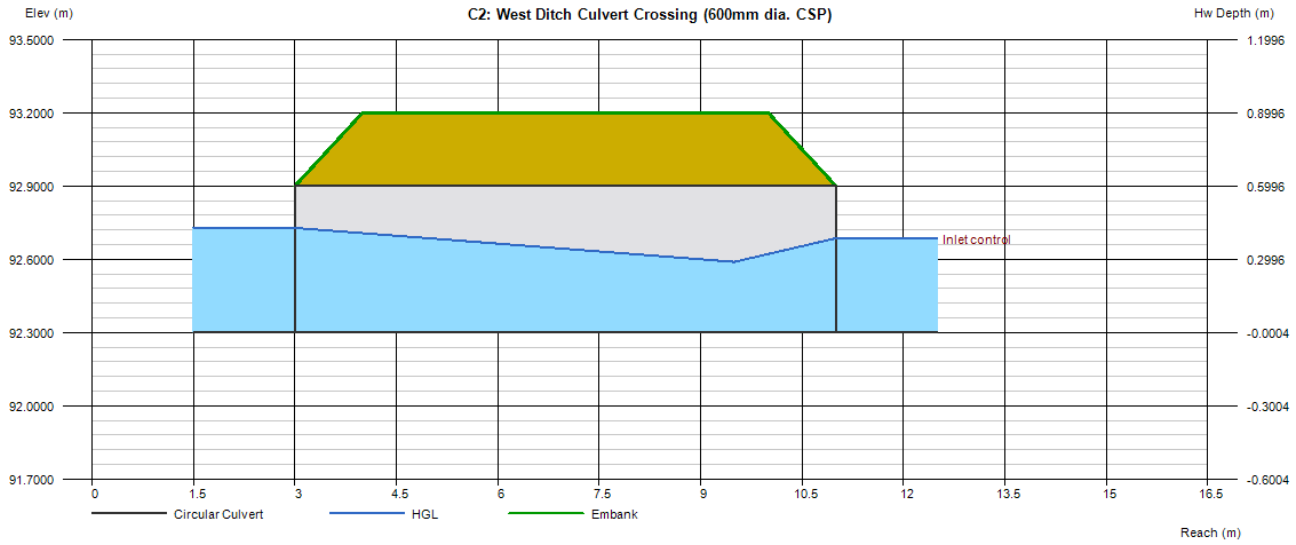
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.1600
Qpipe (cms)	=	0.1600
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.7407
Veloc Up (m/s)	=	1.3844
HGL Dn (m)	=	92.7284
HGL Up (m)	=	92.5573
Hw Elev (m)	=	92.6860
Hw/D (m)	=	0.6428
Flow Regime	=	Inlet Control



Culvert Report

10-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

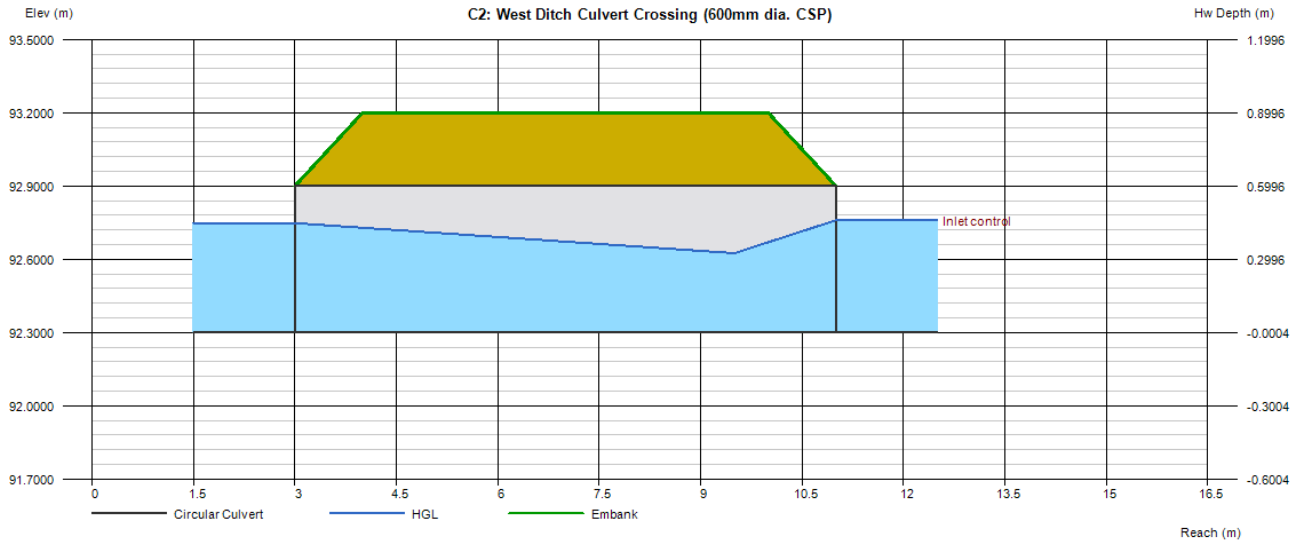
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.2100
Qpipe (cms)	=	0.2100
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.9273
Veloc Up (m/s)	=	1.5101
HGL Dn (m)	=	92.7481
HGL Up (m)	=	92.5966
Hw Elev (m)	=	92.7595
Hw/D (m)	=	0.7652
Flow Regime	=	Inlet Control



Culvert Report

25-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

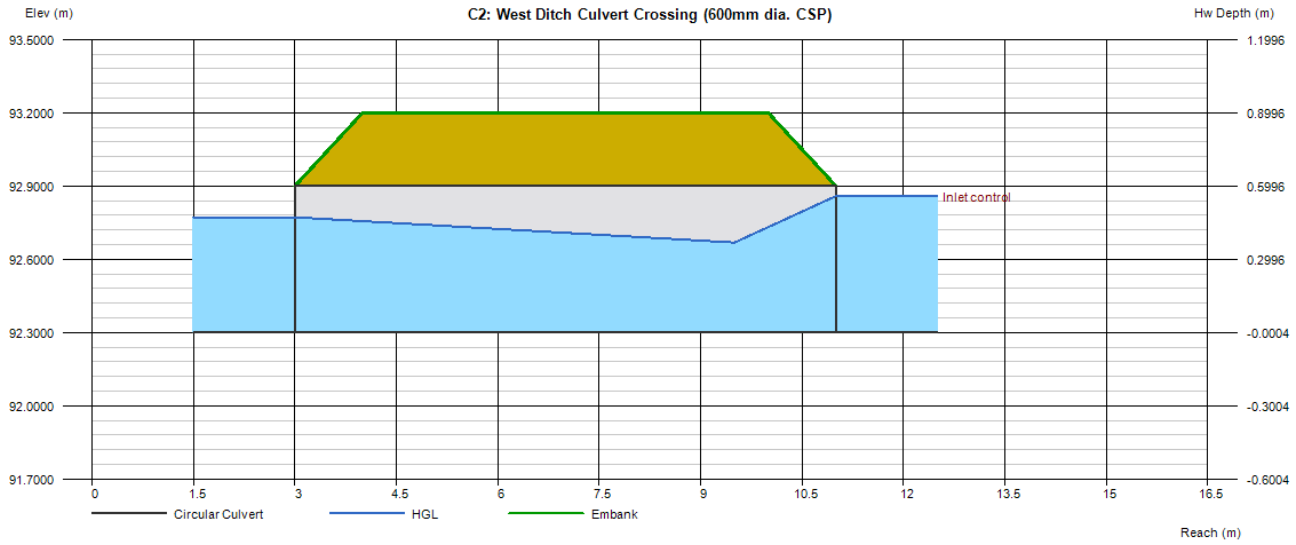
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.2800
Qpipe (cms)	=	0.2800
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.1731
Veloc Up (m/s)	=	1.6682
HGL Dn (m)	=	92.7722
HGL Up (m)	=	92.6447
Hw Elev (m)	=	92.8585
Hw/D (m)	=	0.9302
Flow Regime	=	Inlet Control



Culvert Report

50-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

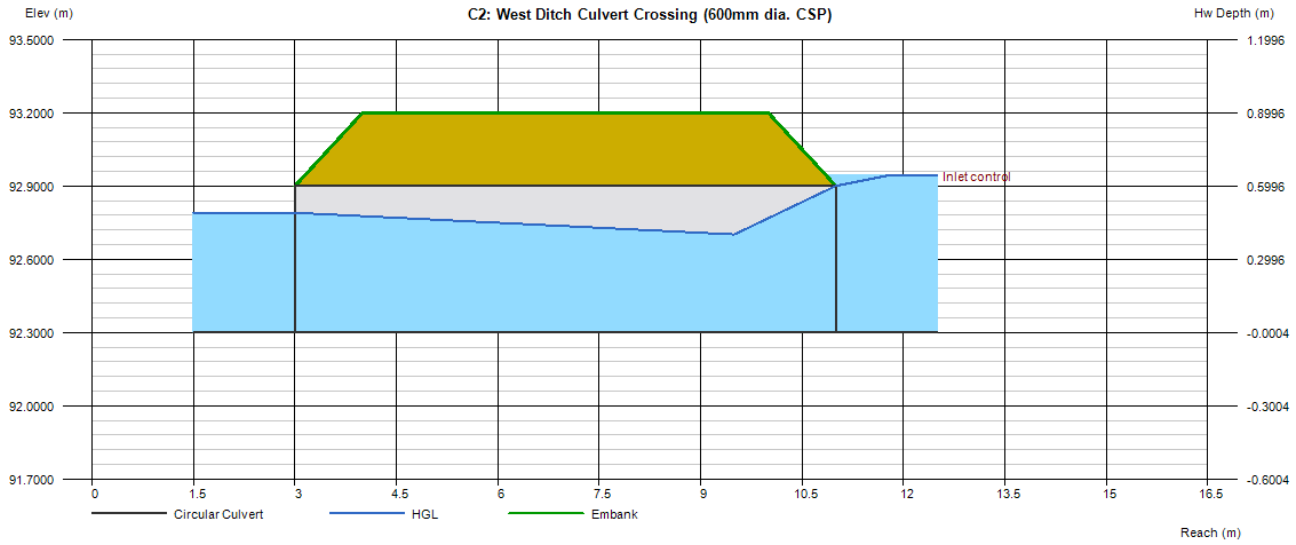
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.3400
Qpipe (cms)	=	0.3400
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.3741
Veloc Up (m/s)	=	1.7957
HGL Dn (m)	=	92.7905
HGL Up (m)	=	92.6813
Hw Elev (m)	=	92.9420
Hw/D (m)	=	1.0693
Flow Regime	=	Inlet Control



Culvert Report

100-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 9 2016

C2: West Ditch Culvert Crossing (600mm dia. CSP)

Invert Elev Dn (m)	=	92.3000
Pipe Length (m)	=	8.0000
Slope (%)	=	0.0049
Invert Elev Up (m)	=	92.3004
Rise (mm)	=	600.0
Shape	=	Circular
Span (mm)	=	600.0
No. Barrels	=	1
n-Value	=	0.016
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

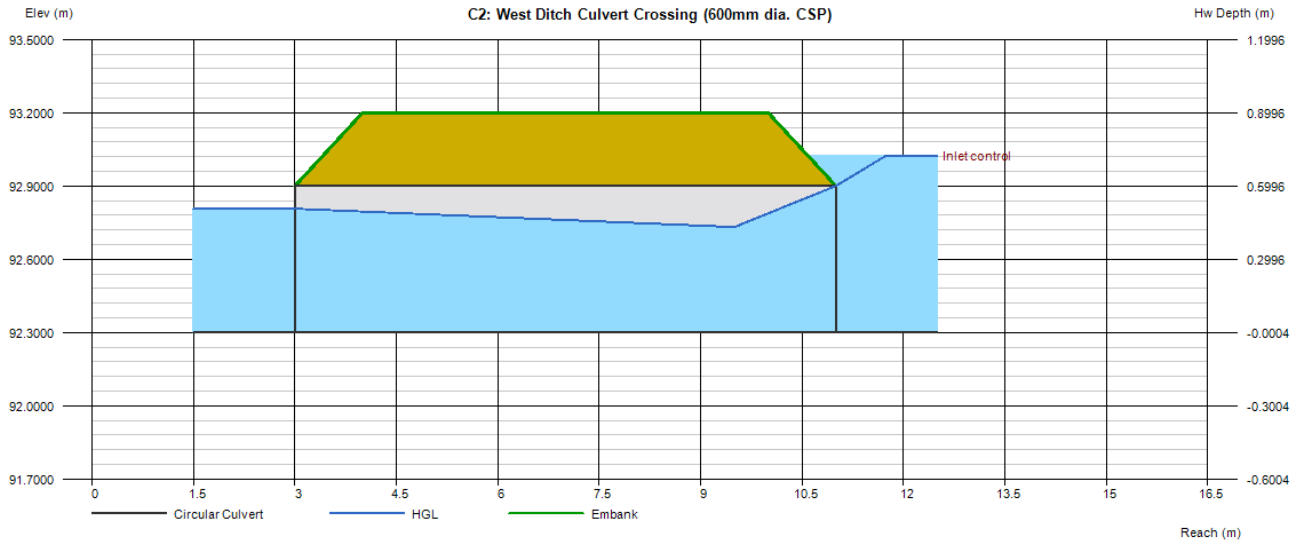
Top Elevation (m)	=	93.2000
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.4000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.4000
Qpipe (cms)	=	0.4000
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.5694
Veloc Up (m/s)	=	1.9217
HGL Dn (m)	=	92.8071
HGL Up (m)	=	92.7145
Hw Elev (m)	=	93.0256
Hw/D (m)	=	1.2087
Flow Regime	=	Inlet Control



Culvert Report

2-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

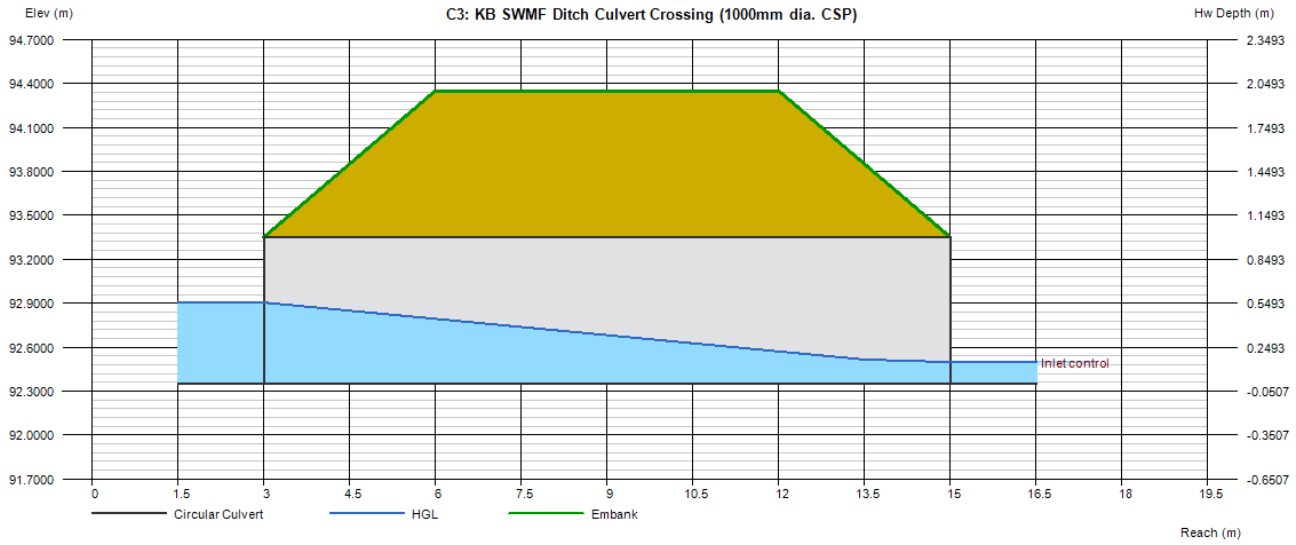
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.0400
Qpipe (cms)	=	0.0400
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.0894
Veloc Up (m/s)	=	0.8567
HGL Dn (m)	=	92.9048
HGL Up (m)	=	92.4602
Hw Elev (m)	=	92.4986
Hw/D (m)	=	0.1479
Flow Regime	=	Inlet Control



Culvert Report

5-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

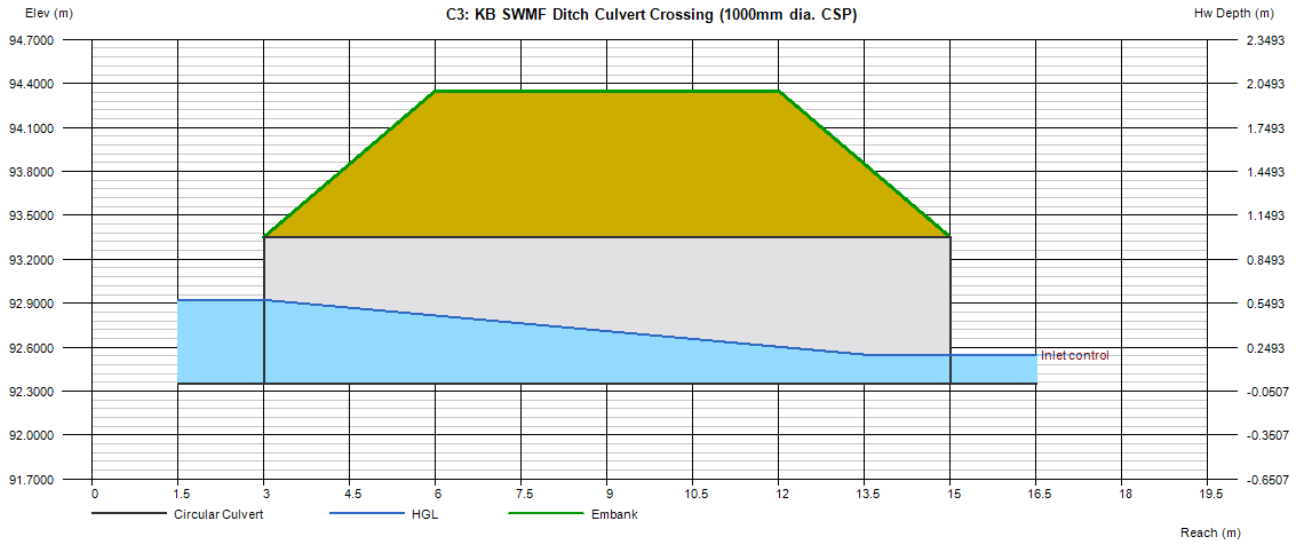
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.0700
Qpipe (cms)	=	0.0700
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.1505
Veloc Up (m/s)	=	0.9911
HGL Dn (m)	=	92.9227
HGL Up (m)	=	92.4961
Hw Elev (m)	=	92.5484
Hw/D (m)	=	0.1977
Flow Regime	=	Inlet Control



Culvert Report

10-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

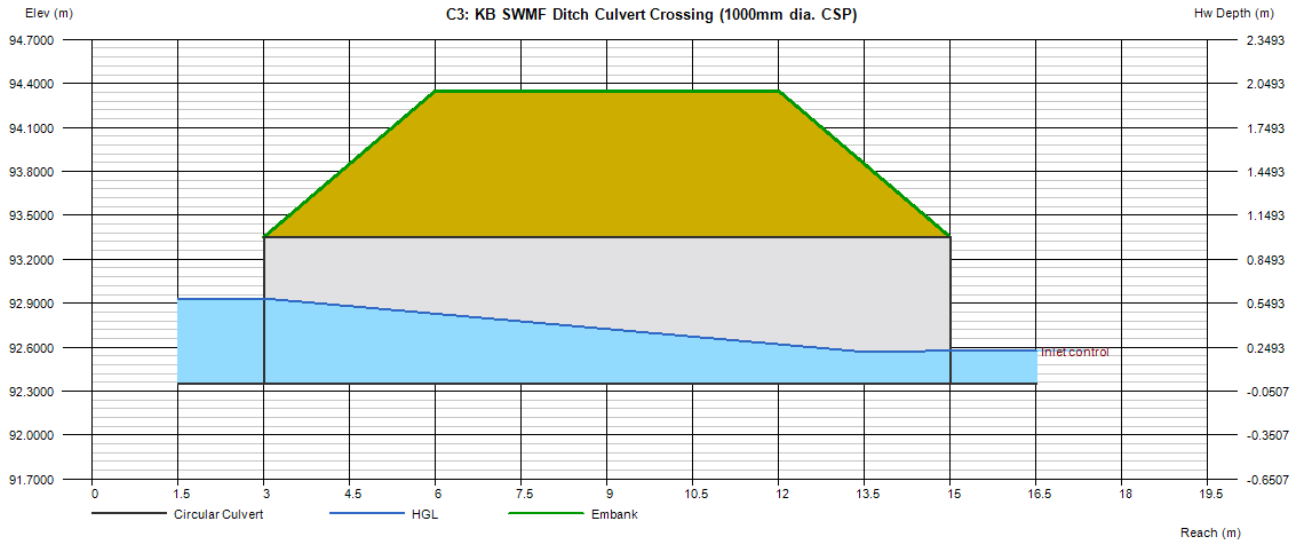
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.0900
Qpipe (cms)	=	0.0900
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.1895
Veloc Up (m/s)	=	1.0598
HGL Dn (m)	=	92.9326
HGL Up (m)	=	92.5159
Hw Elev (m)	=	92.5763
Hw/D (m)	=	0.2256
Flow Regime	=	Inlet Control



Culvert Report

25-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

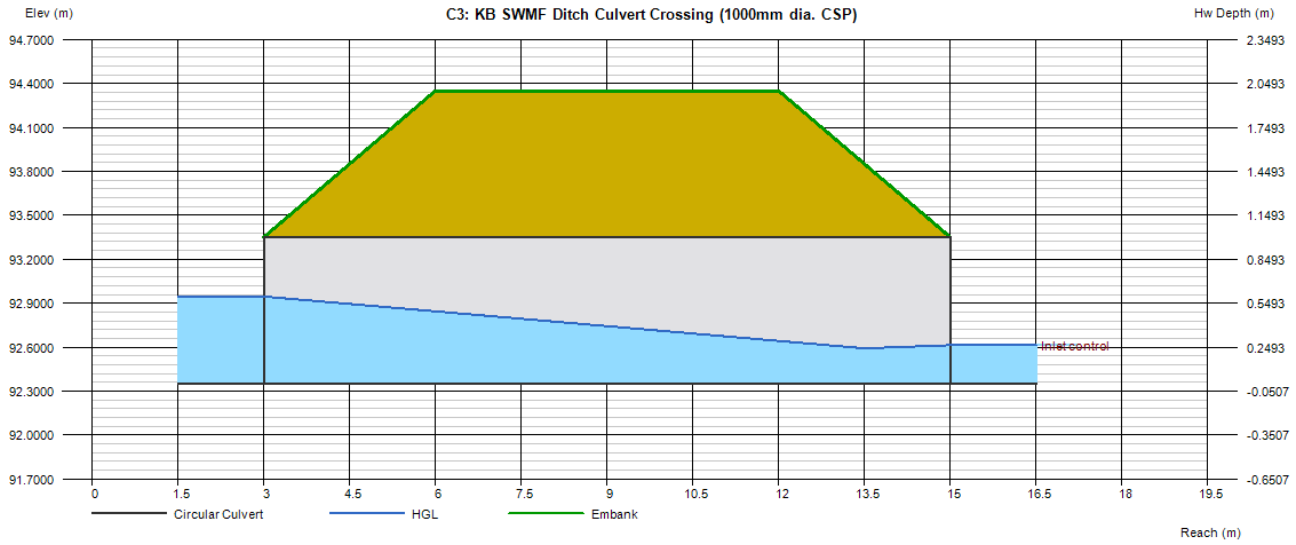
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.1200
Qpipe (cms)	=	0.1200
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.2461
Veloc Up (m/s)	=	1.1449
HGL Dn (m)	=	92.9456
HGL Up (m)	=	92.5419
Hw Elev (m)	=	92.6136
Hw/D (m)	=	0.2629
Flow Regime	=	Inlet Control



Culvert Report

50-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

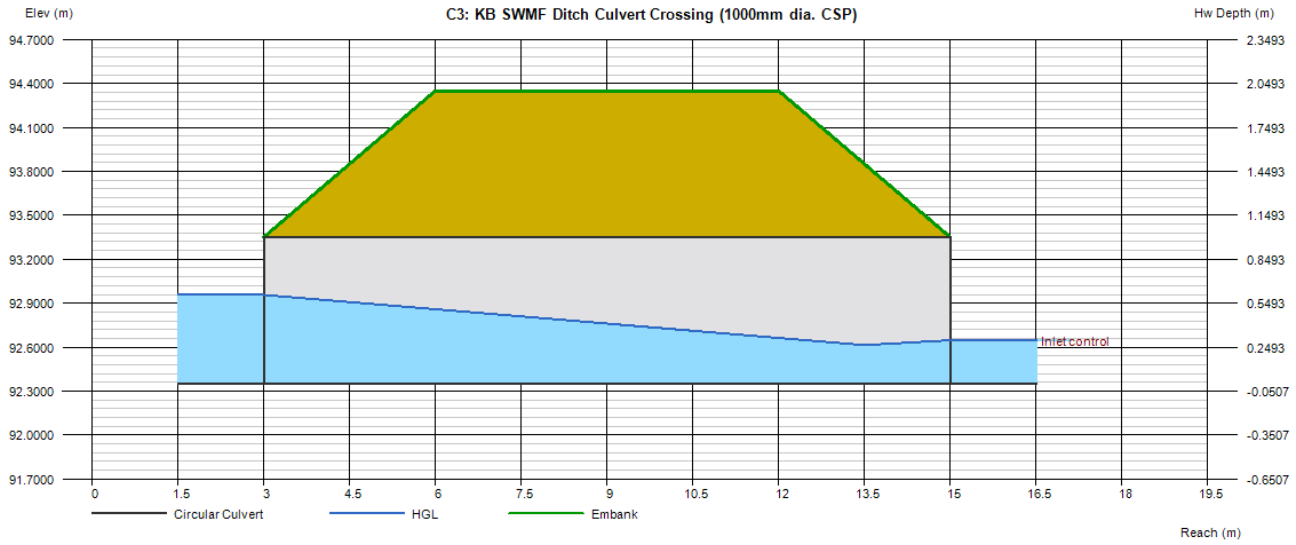
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.1500
Qpipe (cms)	=	0.1500
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.3006
Veloc Up (m/s)	=	1.2156
HGL Dn (m)	=	92.9571
HGL Up (m)	=	92.5650
Hw Elev (m)	=	92.6472
Hw/D (m)	=	0.2965
Flow Regime	=	Inlet Control



Culvert Report

100-year 12-hour SCS Storm

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

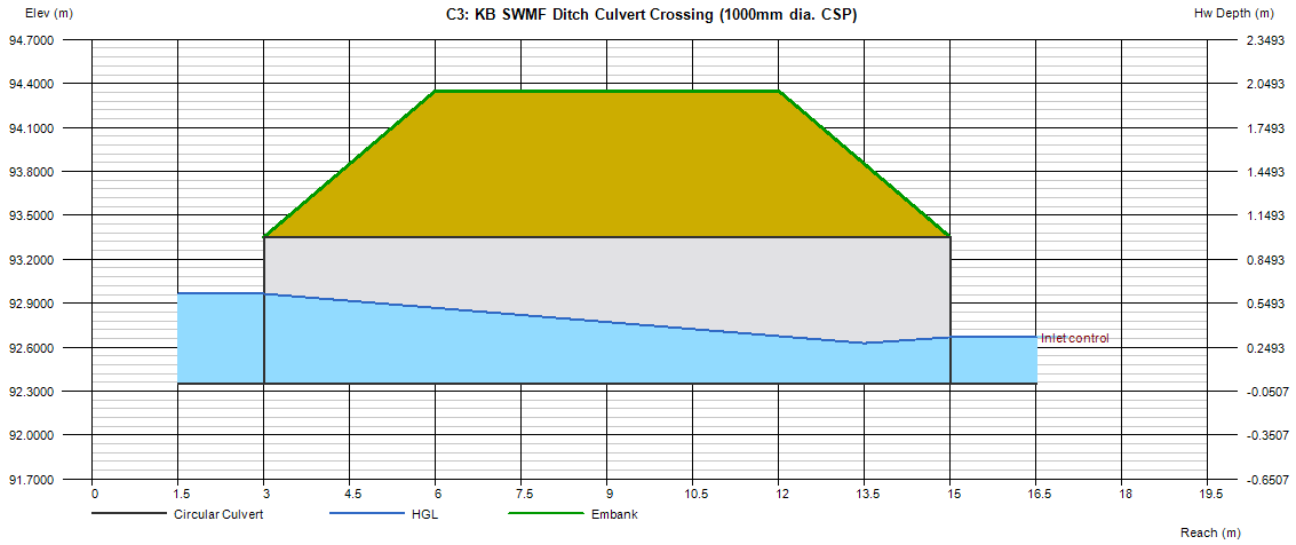
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	0.2000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	0.1700
Qpipe (cms)	=	0.1700
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	0.3360
Veloc Up (m/s)	=	1.2582
HGL Dn (m)	=	92.9642
HGL Up (m)	=	92.5791
Hw Elev (m)	=	92.6682
Hw/D (m)	=	0.3175
Flow Regime	=	Inlet Control



Culvert Report

Full Flow Capacity (HW/D = 1.0)

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jun 10 2016

C3: KB SWMF Ditch Culvert Crossing (1000mm dia. CSP)

Invert Elev Dn (m)	=	92.3500
Pipe Length (m)	=	12.0000
Slope (%)	=	0.0058
Invert Elev Up (m)	=	92.3507
Rise (mm)	=	1000.0
Shape	=	Circular
Span (mm)	=	1000.0
No. Barrels	=	1
n-Value	=	0.020
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

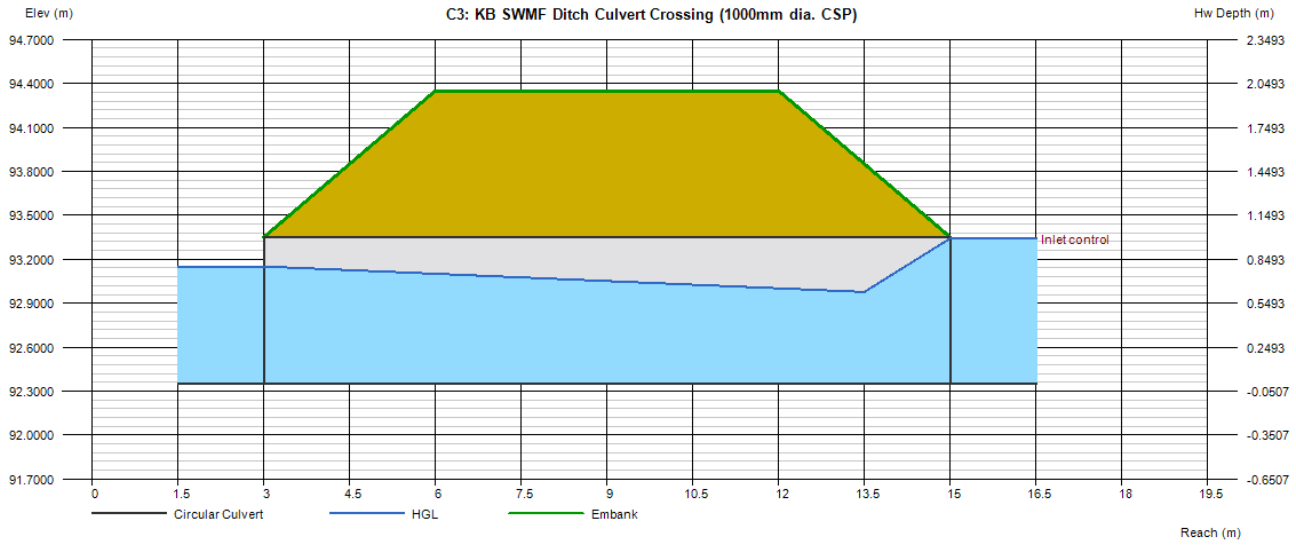
Top Elevation (m)	=	94.3500
Top Width (m)	=	6.0000
Crest Width (m)	=	6.0000

Calculations

Qmin (cms)	=	0.0000
Qmax (cms)	=	1.3000
Tailwater Elev (m)	=	(dc+D)/2

Highlighted

Qtotal (cms)	=	1.1000
Qpipe (cms)	=	1.1000
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.6315
Veloc Up (m/s)	=	2.2284
HGL Dn (m)	=	93.1508
HGL Up (m)	=	92.9523
Hw Elev (m)	=	93.3430
Hw/D (m)	=	0.9923
Flow Regime	=	Inlet Control



South Nepean Collector Phase 2: Culvert Crossings
Ditch Capacities (Manning's Equation)

NOVATECH
Engineers, Planners & Landscape Architects

C1: Burnett Municipal Drain		
Parameter	**Units**	**Value**
Depth	m	0.60
Bottom Width	m	3.00
Side slope (L)	1 to X	2.0
Side slope (R)	1 to X	4.0
Top Width (L)	m	1.20
Top Width (R)	m	2.40
Area	m^2	2.880
Perimeter	m	6.82
R=A/P	m	0.42
n		0.035
Slope	m/m	0.007
Q_{max}	m^3/s	3.877
V_{max}	m/s	1.346

Trapezoidal Channel (different side slopes)

C2: West Ditch		
Parameter	**Units**	**Value**
Depth	m	0.30
Side slope (L)	1 to X	3.0
Side slope (R)	1 to X	6.0
Top Width (L)	m	0.90
Top Width (R)	m	1.80
Area	m^2	0.405
Perimeter	m	2.77
R=A/P	m	0.15
n		0.035
Slope	m/m	0.005
Q_{max}	m^3/s	0.227
V_{max}	m/s	0.560

V-bottom ditch (different side slopes)

C3: KB SWMF Ditch		
Parameter	**Units**	**Value**
Depth	m	2.00
Side slope (L)	1 to X	2.5
Side slope (R)	1 to X	2.5
Top Width (L)	m	5.00
Top Width (R)	m	5.00
Area	m^2	10.000
Perimeter	m	10.77
R=A/P	m	0.93
n		0.035
Slope	m/m	0.006
Q_{max}	m^3/s	21.063
V_{max}	m/s	2.106

V-bottom ditch (same side slopes)

CORPORATION OF THE TOWNSHIP OF NEPEAN

By-Law No. 107-68

(The Drainage Act, 1962-63, Section 27, Form 4)

A By-law to provide for Drainage Work in the Township of Nepean, in the County of Carleton and for borrowing on the credit of the Municipality the sum of Five Thousand, Six Hundred and Thirty-Three ($5,633.00) Dollars, for completing the same.

- - - - - - -

WHEREAS the requisite number of owners, as shown by the last revised Assessment Roll, of the property hereinafter set forth requiring drainage have petitioned the Council of the said Township of Nepean praying that the following lands and roads may be drained by a drainage works.

Plan and Profile:

The accompanying plan, profile and specifications dated October 16th, 1968 are to form a part of this report. The plan will show the area of the watershed, and the drain. The profile and specifications will show the extent of work, the bench marks, grades and disposal of materials, etc.

Recommendation:

It is our recommendation that this drain be reconstructed from station 0 + 00 to station 15 + 31 where it enters the present road ditch. At this location the present road ditch will carry the water to the south side of the forced road where construction is to continue from station 19 + 98. The drain then flows east to the present railway culvert which is of sufficient size and the drain has been designed to flow through it at its present elevation. From this location the drain still flows easterly to the Township Road between lots 15 and 16, Concession 3 at station 43 + 70. The present culvert through this road is to be lowered to the designed grade for this location and from here the drain flows east to its outlet in the Jock River at station 86 + 25.

AND WHEREAS the Council has procured a report made by Alex J. Graham, C.E., hereto attached and marked Schedule "C" of By-Law No. 107-68.

AND WHEREAS the Council is of opinion that the drainage of the area described is desirable:

THEREFORE the Council of the Township of Nepean pursuant to The Drainage Act, 1962-63, enacts as follows:

1. The report is hereby adopted, and the drainage works as therein indicated and set forth are hereby authorized and shall be completed in accordance therewith.

2. The Corporation of the Township of Nepean may borrow on the credit of the Corporation the sum of $5,633.00, being the funds necessary for the drainage works, not otherwise provided for, provided that such sum shall be reduced by the amount of grants and commuted payments with respect to the land and roads assessed, and may issue Debentures of the Corporation to that amount in sums of not less than Fifty Dollars each, and payable within ten years from the date of the said Debentures, with interest at the rate of 8 per centum per annum, that is to say annually with coupons.

3. For paying the sum of $2,914.65 the amount charged against such lands and roads for benefit, and the sum of $2,718.35 the amount charged against such lands and roads for outlet liability, and the sum of $Nil the amount charged against such lands and roads for injuring liability, and the sum of Nil the amount charged against lands and roads for improvement, apart from lands and roads belonging to or controlled by the Municipality, and for covering interest thereon for ten years at the rate of 8 per centum per annum, the following total special rates, over and above all other rates, shall be assessed, levied, and collected (in the same manner and at the same time as other taxes are levied and collected) upon and from the undermentioned parcels of land and parts of parcels and roads, and the amount of the total special rates and interest against each parcel or part of parcel respectively shall be divided into ten equal parts and one such part shall be assessed, levied and collected as aforesaid, in each year, for ten years after the passing of this by-law during which the Debentures have to run, provided that no greater amount shall be levied than is required after taking into account and crediting the amount of grants under subsection 3 of section 64 of The Drainage Act, 1962-63, the amount of moneys paid under a by-law passed under subsection 4 of section 40 of that Act and commuted payments with respect to lands and roads assessed.

4. For paying the sum of$590.43 the amount assessed against such roads and lands of the Municipality, and for covering interest thereon for ten years at the rate of 8 per cent per annum, a special rate, sufficient to produce the required yearly amount therefor, shall, over and above all other rates, be levied and collected (in the same manner and at the same time as other taxes are levied and collected) upon and from the whole rateable property in the Township of Nepean in each year for ten years, after the passing of this by-law, during which the Debentures have to run.

5. This by-law comes into force on the passing thereof and may be cited as the "Burnett Municipal Drain By-Law".

First Reading December 9th, 1968.

Second Reading December 9th, 1968.

Third Reading January 6th, 1969.

Enacted this 6th day of January, 1969.

D. A. Moodie Reeve

D. B. Robbs Clerk

TOWNSHIP OF NEPEAN

BURNETT MUNICIPAL DRAIN

SCHEDULE OF ASSESSMENT

No.	Lot	Name	Acreage Assessed	Main Drain Benefit	Main Drain Outlet	Total	Estimated Grant	Balance Payable	To Cover Interest For 10 yrs. at 8%	Total Special Rate	Annual Assessment During Each Year For 10 years
S½	Lot 19	Don Fraser	19		198.18	198.18	132.13	66.05	32.36	98.41	9.84
N½ S. pt.	Lot 18	Lorne Burnett	43	549.77	517.25	1,067.02	711.31	355.71	174.29	530.00	53.00
S Pt.	Lot 18	Robert Mowat	6		74.28	74.28	49.54	24.74	12.13	36.87	3.69
Pt. W3/4 N½	Lot 17	Mrs. E. Monk	8	96.25	99.84	196.09	130.72	65.37	30.05	97.42	9.74
Pt. W3/4 N½	Lot 17	Sala & Riccivto	11	76.23	136.18	212.41	141.62	70.79	34.69	105.48	10.55
S½	Lot 17	Carl Fraser	20	160.93	149.37	310.50	206.99	103.51	50.72	154.23	15.42
N1/3 & Pt S2/3	L16	Patrick Moloughney	15	249.10	223.80	472.90	315.27	157.63	77.24	234.87	23.49
S2/3 Less 30ac	L16	Fergus Houlahan	49	381.15	492.36	873.51	582.30	291.21	142.69	433.90	43.39
E2/3 N½	Lot 15	Carl Fraser	19	204.05	107.16	311.21	207.47	103.74	50.83	154.57	15.46
S½	Lot 15	Wm. Clark	18	204.05	73.98	278.03	185.35	92.68	45.41	138.09	13.81
Pt.E7/15 N3/8	L.14	Mrs. H. Houlahan	16	233.70	50.72	284.42	189.63	94.79	46.45	141.24	14.12
S. 5/8	Lot 14	John Houlahan	13	294.52	34.71	329.23	219.49	109.74	53.77	163.51	16.35
Pt. E.½	Lot 13	Kelvin Burnett	9	208.10	--	208.10	138.76	69.34	33.98	103.32	10.33
Forced Road in Concession 3			--	122.82	254.64	377.36	--	--	--	--	--
Township Road Between Lots 15 & 16			--	76.23	136.94	213.07	--	--	--	--	--
Canadian National Railways			--	57.75	168.94	226.69	--	--	--	--	--
		Totals		$2,914.65	$2,718.35	$5,633.00	$3,210.58	$1,605.30	$784.71	$2,391.91	$239.19

ENGINEER'S REPORT

BURNETT MUNICIPAL DRAIN

TOWNSHIP OF NEPEAN

Graham, Berman and Associates Ltd.,
Consulting Engineers,
Ottawa 8, Ontario.

October 16th, 1968.

Schedule "C" By-Law 107-68

October 16th, 1968.

The Reeve and Members of Council,
Township of Nepean,
3895 Richmond Road,
Ottawa 6, Ontario.

Gentlemen:

In answer to the prayer of a petition of over half the property owners concerned, requesting that the Burnett Award Ditch be re-constructed to relieve the present flooding conditions and provide adequate outlet for tile drains. This drain is to be reconstructed under section 3 of the Drainage Act 1962-63 and by reason of a motion passed in Council, I have caused a survey to be made, prepared plan, profile and schedule of assessment, and beg to report as follows:

The drainage works shall be known as the Burnett Municipal Drain.

Plan and Profile:

The accompanying plan, profile and specifications dated October 16th, 1968 are to form a part of this report. The plan will show the area of the watershed, and the drain. The profile and specifications will show the extent of work, the bench marks, grades and disposal of materials, etc.

Recommendation:

It is our recommendation that this drain be reconstructed from station 0 + 00 to station 15 + 31 where it enters the present road ditch. At this location the present road ditch will carry the water to the south side of the forced road where construction is to continue from station 19 + 98. The drain then flows east to the present railway culvert which is of sufficient size and the drain has been designed to flow through it at its present elevation. From this location the drain still flows easterly to the Township Road between lots 15 and 16, Concession 3 at station 43 + 70. The present culvert through this road is to be lowered to the designed grade for this location and from here the drain flows east to its outlet in the Jack River at station 86 + 25.

Farm Crossings:

A Severance Allowance is made in this report under Section 8 (6) of the Drainage Act 1962-63, culvert dimensions are stated in the following Schedule of Allowance.

Township of Nepean:

Concession 3:

N½	Lot 18	Lorne Burnett	1-24"Ø x 16' x 16 gauge CMP	$81.52
S½	Lot 18	Lorne Burnett	1-24"Ø x 16' x 16 gauge CMP	81.52
Pt.W3/4 N½	Lot 17	Mrs. E. Monk	1-24"Ø x 16' x 16 gauge CMP	81.52
W3/4 N½	Lot 17	Dale & Macalvie	1-24"Ø x 16' x 16 gauge CMP	81.52
S½	Lot 17	Clark Fraser	1-24"Ø x 16' x 16 gauge CMP	81.52
N 1/3	Lot 16	Patrick McLoughney	1-30"Ø x 16' x 16 gauge CMP	92.08
Pt S2/3	Lot 16	Fergus Houlahen	1-30"Ø x 16' x 16 gauge CMP	92.08
E2/3 N½	Lot 15	Carl Fraser	1-36"Ø x 16' x 16 gauge CMP	104.88
S½	Lot 15	Wm. Clark	1-36"Ø x 16' x 16 gauge CMP	104.88

.....2

Pt E7/15	Lot 14	Mrs. H. Houlahan	1-36"Ø x 16' x 16 gauge CMP	$104.88
S 5/8	Lot 14	John Houlahan	1-36"Ø x 16' x 16 gauge CMP	104.88
E Pt	Lot 13	Kelvin Burnett	1-36"Ø x 16' x 16 gauge CMP	104.88
			Total	$1,116.16

These allowances will, in my opinion, adequately compensate the above property owners for the cost and installation of the above culverts.

Road Bridges and Culverts:

The present 24"Ø x 48' CMP through the forced road in Concession 3 is sufficient in size, and the drain has been designed to flow through it at its present grade.

The present 30"Ø x 26' CMP through the Township Road between lots 15 and 16, Concession 3 is sufficient in size and requires only to be lowered to the designed grade at this location.

Estimated Costs $200.00

These estimated costs have not been included in the Estimated cost of construction as it is expected that the Township of Nepean's Road Department will accept this responsibility as part of their maintenance program.

Railroad Culvert:

The present culvert through the Canadian National Railway which consists of a 24"Ø CMP on the south side, and a 2' x 2.75' timber culvert on the north side of the tracks is sufficient in size, and the drain has been designed to flow through at the present grade.

Land Damage:

The amounts shown in the following allowances will, in my opinion, adequately compensate the property owners indicated for land or crop damage (if any) under Section 8 (1) of the Drainage Act 1962 63.

N½	Lot 18	Lorne Burnett	$66.00
S½	Lot 18	Lorne Burnett	62.00
Pt W3/4 N½	Lot 17	Mrs. E. Monk	9.00
W3/4 N½	Lot 17	Sala & Riccivto	18.00
S½	Lot 17	Clark Fraser	38.00
N 1/3	Lot 16	Patrick Mcloughney	59.00
Pt S2/3	Lot 16	Fergus Houlahan	90.00
E2/3 N½	Lot 15	Carl Fraser	81.00
S½	Lot 15	Wm. Clark	81.00
PtE7/15 & N 3/8	Lot 14	Mrs. Helen Houlahan	63.00
S 5/8	Lot 14	John Houlahan	63.00
EPt	Lot 13	Kelvin Burnett	96.00
		Total	$726.00

.....3

Distribution of Costs:

The estimated costs for this construction are apportioned to the properties responsible for benefit and outlet as determined by their areas, locations, and run-off.

In my opinion, no liability for injury will exist because of this construction, and for this reason no injury liability column will appear in the Schedule of Assessment, this being in my estimation a fair distribution of costs.

Future Maintenance:

This drain will be maintained by the Township of Nepean, and the costs of such future maintenance will be apportioned to the property owners in the same proportioned to the property owners in the same proportions as in the attached Schedule of Assessment.

The "Estimated Costs" and incidental expenses are as follows:

Earth Excavation and Spreading of 1,992 c.y. @ .60¢	$1,195.20
Hard Pan Excavation 282 c.y. @ $1.60	451.20
Brushing	40.00
Farm Crossings	1,116.16
Land Damage Section 8 (1) of the Drainage Act 1962-63	726.00
Engineer's Fees and Expenses	884.44
Contingencies	470.00
Clerk's Fees	200.00
Printing and Publishing By-Law	125.00
Advertising and Letting Contract	85.00
Court of Revision	150.00
Supervision of Construction	190.00
Total Estimated Cost	$5,633.00

Grants:

Under Section 61, 63 and 64 of the Drainage Act 1962-63, a Provincial Grant of 33 1/3% of the cost of construction for Agricultural Lands may be obtained.

A subsequent grant by Federal A.R.D.A. through the Provincial grant administration media will further reduce Agricultural assessments by another one-third.

The assessments are then payable two-thirds by grant, and one-third by property assessment.

Respectfully submitted this 16th day of October, 1968.

REGISTERED PROFESSIONAL ENGINEER
CIVIL
A. J. GRAHAM
PROVINCE OF ONTARIO

GRAHAM, BERMAN AND ASSOCIATES LTD.

John S. Morrison

John S. Morrison,
Drainage Manager.

SCHEDULE OF ASSESSMENT JOB NO. 1882 DATE: Oct. 16/68

BURNETT MUNICIPAL DRAIN

TOWNSHIP OF NEPEAN

Conc.	Lot	Name	Acreage Assessed	Main Drain Benefit	Main Drain Outlet	Total
3	S½ Lot 19	Don Fraser	13		198.18	198.18
	N½ Spt Lot 18	Lorne Burnett	43	549.77	517.25	1,067.02
	S Pt. Lot 18	Robert Nowat	6		74.28	74.28
	Pt W3/4 N½ L.17	Mrs. E. Monk	8	96.25	99.84	196.09
	Pt W3/4 N½ Lot 17	Sala & Riccivto	11	76.23	136.18	212.41
	S½ Lot 17	Carl Fraser	20	160.93	149.37	310.50
	N1/3 & PtS2/3 L.16	Patrick Naloughney	15	249.10	223.80	472.90
	S2/3 Less 30ac L. 16	Fergus Houlahan	49	381.15	492.36	873.51
	E2/3 N½ Lot 15	Carl Fraser	19	204.05	107.16	311.21
	S½ Lot 15	Wm. Clark	18	204.05	73.98	278.03
	Pt E7/15 N3/8 L.14	Mrs. H Houlahan	16	233.70	50.72	284.42
	S5/8 Lot 14	John Houlahan	13	294.52	34.71	329.23
	Pt E½ Lot 13	Kelvin Burnett	9	208.10		208.10
	Forced Road in Concession 3			122.82	254.64	377.46
	Township Road Between Lots 15 and 16			76.23	136.84	213.07
	Canadian National Railways			57.75	168.94	226.69
		Totals		$2,914.65	$2,718.35	$5,633.00

SUMMARY OF ASSESSMENT

LANDS:

Township Roads	$ 590.43
Non Agricultural Lands	$ 226.69
Land used for Agricultural Purposes	$4,815.88

GRANTS ON AGRICULTURAL LANDS

Estimated Provincial Grant of 33 1/3%	$1,605.29
Estimated Federal A.R.D.A. Grant of 33 1/3%	$1,605.29
Estimated Property Assessments	$1,605.30

SUMMARY OF ASSESSMENT

LANDS

Township roads	$ 590.43
Non Agricultural Lands	422.78
Land used for Agricultural Purposes	$4,619.79

Grants on Agricultural Lands

Estimated Provincial Grant of 33 1/3 %	$1,539.93
Estimated Federal A.R.D.A. Grant of 33 1/3%	$1,539.93
Estimated Property Assessments	$1,539.93

SUPPLEMENT TO THE GENERAL SPECIFICATIONS

BURNETT MUNICIPAL DRAIN

TOWNSHIP OF NEPEAN

Graham, Berman and Associates Ltd.,
Consulting Engineers,
Ottawa 8, Ontario.

October 16th, 1968.

Meaning of Terms:

"Municipal Council" - shall mean the Municipal Council of Nepean Township.

"Reeve" - shall mean the Reeve of Nepean Township.

"Engineer" - shall mean the Engineer in charge of the works, or his authorized representatives.

"Contractor" - shall mean the Contractor or Contractors performing the work, or their foreman on the grounds.

Nature of Work:

The accompanying plan, profile and specifications dated October 16th, 1968 apply to and govern this construction.

8,625 linear feet of open drain as follows:

Earth Excavation and Spreading of 1,992 c.y.

Hardpan Excavation and Spreading of 282 c.y.

Brushing

A Severence Allowance under Section 8 (6) of the Drainage Act 1962-63 is applied on this drain.

Center-line:

The present watercourse is to be the center-line of construction.

Important:

(a) The Engineer must be notified at least 5 days prior to the starting of work on this contract.

(b) Fences may be opened to allow construction equipment to go through them, and are to be closed immediately after that piece of equipment passes through, if fences are found to be left opened, they will be closed at the "Contractor's Expense".

GENERAL SPECIFICATIONS

Municipal Drainage (Open Drains)

Graham, Berman & Associates Ltd.
St.Thomas & Ottawa, Ontario.

1. These specifications are drawn up to cover the work as outlined in the Engineer's Report on the drain, and as further outlined in the supplement to General Specifications.

Where there is any doubt as to the meaning or intention of the specifications, it shall be the Contractor's duty to obtain a ruling in writing from the Engineer before proceeding with the work.

2. Supply of Labour and Materials:

The Contractor shall supply all materials, labour, equipment, tools, machinery etc. for the full and proper completion of this work in accordance with the specifications, plan and profile. All work must be done in a neat and workmanlike manner, and to the satisfaction of the Engineer.

3. Roads to be kept open:

All roads, public and private are to be kept open and in passable condition during the continuance of this work.

4. Relief Ditches:

Should the Contractor deem it necessary to dig relief ditches on any part of this work, he shall do so and refill same entirely at his own expense.

5. Damages:

a) In case of damage being done to any farm or other property along the line of work by blasting or other operations, the Contractor shall be held liable for such damage.

b) The Owner or Occupant of the property on which the drainage works is located shall be responsible for the protection of all livestock on said property during construction, and shall be liable for any damages caused to or by such livestock.

c) The Contractor shall also rebuild and leave in as good condition as before construction, all fences removed in order to execute this work.

i) Fences crossing the drainage works must be closed immediately after the construction equipment has passed through them.

ii) Fences parallel to the drain must be replaced immediately after the work is completed in each section.

d) When hay or other produce is growing on lands adjacent to the proposed work, the Contractor must give the Owner ten days'

/notice

notice in writing to remove the same before he begins work on that portion, otherwise he shall be held liable for any damage caused.

6. Clearing and Grubbing:

a) Trees or brush growing in or on the banks of the drain are to be grubbed out clean. Trees having a stump diameter of 6" or over are to be cut into log lengths and piled clear of the spread materials. The stumps are to be piled in a corner of the field from which they were taken, adjacent to, but not closer than 4 feet to the edge of the drain. Branches and brush under 6" in diameter are to be piled on the excavated materials for disposal by the Property Owner.

b) At locations where the drain passes through brush or wood-lots, it is necessary that a strip of land be cleared along one side of the drain; the locations and dimensions will be given in the Supplement Specifications. However it is not intended that large trees growing within this specified area should be cut unless it is apparent that excessive damage will be caused to them. Stumps are not to exceed 1 ft. in height, and brush and branches are to be disposed of as in section (a) above.

Payment for this work will be made under the lump sum tender item "Cutting Brush".

7. Disposal of Materials:

The excavated materials shall be disposed of so as to do as little damage to lands and crops as possible.

a) Earth excavated from the drain is to be taken back a distance of 10 feet, leaving a clean berm 10 feet wide along the edge of the drain; and to be spread over the adjoining lands in such a manner that the elevation of the completed work does not exceed the elevation of the adjoining lands by more than 6" on cultivated lands and 12" on unworked or bush lands.

The completed work is to have a neat appearance and to be comparatively smooth.

b) Hard Pan and Rock excavated from the drain is to be taken back 4 feet from the edge of the drain and left in a pile so that it may be disposed of by the Property Owner.

c) Water Courses where necessary will be cut through the spread materials every 200 feet or in the low spots along the drain to allow surface drainage of the surrounding areas.

d) Re-location of Drain: At locations where the drain is to be removed from a road allowance, materials excavated from the new drain may be used to fill the road ditch in such a manner so as to allow the water from the road to enter the new drain. Excess materials are to be spread on the adjoining lands as above.

e) Straightening: At locations where straightening occurs the upper end of the old water course is to be filled level to the shoulders for a distance of 20 feet, and the excavated material put in the old drain when the intervening distance does not exceed 100 feet. Where the distance exceeds 100, the shoulders

/ are

are to be pushed into the bottom of the remainder of the abandoned watercourse, and so shaped that the water will run out of the low end, and in such a manner as to allow the Property Owner to travel through the drain and gradually reclaim the land.

f) Boulders: All boulders having a cubic content of 1 cubic foot or more are to be neatly placed along the edge of the drain at a distance of approximately 4 feet from it.

The price for the above materials disposal is to be included in the bid price per cubic yard for excavation.

8. Description of Ditch:

The ditch is to be constructed to the grades, widths and side slopes as shown on the accompanying profile.

The bottom width shall not be increased without maintaining the specified side slopes.

The grade is to be constructed to provide a constant slope to the end of the ditch so that no water will be stagnant therein.

9. Centre Line:

The Centre Line shall be the Centre Line of the present ditch, provided the fences are far enough back from the shoulders to allow for the proper width of bottom and side slope as shown on the accompanying profile. In locations where fences are too close, the Centre Line may be moved away from the fence a sufficient distance so that bottom widths and side slopes may be maintained.

At locations where the drain is to be removed from a road allowance, the centre line will be staked by the Engineer to allow for a clear berm of 3 feet between the property line and the edge of the drain.

At locations where excessive meanderings of the present stream take place, straightening may be required; in such cases the Centre Line will be staked in the field by the Engineer.

10. Grades and Centre Line:

Grades and Centre Line will be given by the Engineer upon receiving 5 clear days notice in writing that such Grades and Centre Line are required.

The Contractor will take precautions to ensure that Grades and Line so set will not be disturbed during construction.

Any subsequent setting of Line and Grade on the project will be charged to the Contractor.

11. Inspection:

Upon completion of the work there should be a continuous ditch or water course of the size and dimensions according to the plan, profile and specifications.

Any foreign material accumulated in the drain will be removed by the Contractor, unless he can clearly show that he is not responsible for the foreign material being in the drain.

The Contractor, when he considers all work to have been so completed, must notify the Engineer that he requires an inspection of the works to be made and he, or his representative, will accompany the Engineer on this inspection.

12. Classification of Materials:

Earth shall mean clay, loam, sand, small stones, gravel and muck, etcetera.

Hard Pan shall mean materials other than rock that require the use of picks, bars, dynamite, etc. for their removal.

Rock shall mean strata rock or boulders having a cubic content of 1½ cubic feet or more.

Prices are to be submitted separately to cover each type of material.

13. Farm Bridges and Culverts:

The Contractor shall, as part of this contract, clean out or lower Farm Bridges and Culverts considered to be large enough for their locations.

The Contractor shall notify the Owner four clear days in writing to remove farm bridges that are not large enough to meet specifications; if the bridges are not removed, the Contractor may, after four days, remove same, exercising normal caution so as not to unduly damage the materials, piling same neatly 15 feet from the edge of the drain.

The Contractor may remove the flooring to clean out under a bridge that is of sufficient size; however, he must replace this flooring in as good condition as before it was removed.

The responsibility for the replacement of culverts or the construction of new ones is set forth in the Supplement Specifications.

Payment for the above work is to be included in the bid price per cubic yard for earth excavation.

14. Road Bridges and Culverts:

The Contractor shall notify the road Superintendent concerned as to the date and time the excavating equipment will be at the site of the road bridge or culvert.

The Contractor will construct the ditch to the ends of the present bridge or culvert.

The Contractor will clean all culverts that are of sufficient size and set at the required grade.

The Contractor will lower the grade and otherwise clear out under bridges having sufficient size for their locations. Payment for this work is deemed to be included in the bid price per cubic yard for earth excavation.

14. Road Bridges and Culverts: (Continued)

Work other than the above that may be required by the Road Superintendent will be paid for on an hourly basis by the Road Department responsible for the upkeep of this section of road.

15. Right to Increase or Decrease:

The Municipal Council reserves the right to increase the work as it deems necessary and the contract price per cubic yard shall remain the same.

16. Sub-Letting:

No portion of the work is to be sub-let without the consent of the Municipal Council and the Engineer.

17. Deposit:

A cash deposit or certified cheque on a chartered bank in the amount of 10% of the tender price must accompany each tender, such deposit will be returned to the unsuccessful bidders within 7 days of tender closing.

18. Date of Completion:

The whole work shall be completed on or before the _____ day of _____, 196___ and when the Contractor considers that the work is completed, he must notify the Engineer in writing that he requires a final inspection thereof.

19. Payment:

Cash payment will be made monthly equal to 90% of the value of the work completed on the certificate of the Engineer, when the value of work completed within the month amounts to Three Hundred Dollars ($300.00) or more. The remaining 10% will be retained until 60 days after the whole work has been accepted as finished.

20. The Municipal Council reserves the right to reject any and all tenders.

21. The Contractor shall comply with the regulations of the Workmen's Compensation Board of Ontario.

22. Damages caused to public utilities installation shall be the responsibility of the General Contractor.

Prior to starting this work, he shall obtain from the public utilities (i.e. telephone, hydro, gas) the locations, if any, of all their installations along these works.

Township of Nepean

TENDER FORM

I/WE OF
do hereby tender and agree to construct the
in accordance with the attached specifications and drawings.

I/WE have examined the site of the above work and are thoroughly familiar with the work that is to be done.

I/WE tender and agree to perform the above mentioned work for the following prices:

EXTENT OF WORK:

	TOTAL PRICE
Earth Excavation and Spreading of 1,992 c.y.....	
Hardpan Excavation and Spreading of 282 c.y.....	
Brushing.....	

TOTAL CONTRACT PRICE _____

I/WE guarantee that the above work will be completed on the day of , 196 .

I/WE enclose a certified cheque or cash deposit for the sum of ($), being 10% of the tender price, and further agree to furnish a suitable bond for 100% of the contract price within 7 days of notification of acceptance of tender, if so requested. In such case, the deposit will be returned on the signing of the contract.

The deposit or bonds of the successful bidder may be retained by the Clerk until 60 days after the above work has been completed and accepted, or in the event the tender is unsuccessful, it shall be returned within 7 days.

Offered on behalf of Contractor:

NAME: _____

ADDRESS: _____

_____

POSITION: _____

DATE: _____

Accepted on behalf of the Municipality

MAYOR: _____

CLERK: _____

DATE: _____

Appendix F

Engineering Drawings

General Plan of Services	*111117-GP*	*(revision 1)*
Grading Plan	*111117-GR*	*(revision 1)*
Sanitary Drainage Area Plan	*111117-SAN*	*(revision 1)*
Storm Drainage Area Plan	*111117-STM*	*(revision 1)*

LEGEND

507 200mmØ	PROPOSED SANITARY MANHOLE & SEWER
300mmØ	PROPOSED SANITARY FORCE MAIN
304 675mmØ	PROPOSED STORM MANHOLE & SEWER
CB 224 250mmØ	PROPOSED CATCHBASIN/MANHOLE & LEAD
CB 34	PROPOSED CATCHBASIN & LEAD
200mmØ	PROPOSED WATERMAIN
V&VB	PROPOSED VALVE & VALVE BOX LOCATION
HYD	PROPOSED FIRE HYDRANT C/W LEAD
45°	PROPOSED WATERMAIN BEND
	DIRECTION OF FLOW
	PROPOSED SERVICES LOCATION
	PROPOSED ROAD CROSSING HEAD WALL

KEY PLAN
N.T.S

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, 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
1	ISSUED WITH DRAFT PLAN OF SUBDIVISION	DEC 6/16	GJM

SCALE 1:750

1:750 — 0 15 30

DESIGN	GJM/LSC
CHECKED	GJM
DRAWN	LSC
CHECKED	GJM
APPROVED	GJM

LICENSED PROFESSIONAL ENGINEER G.J. MacDONALD DEC 9/16 PROVINCE OF ONTARIO

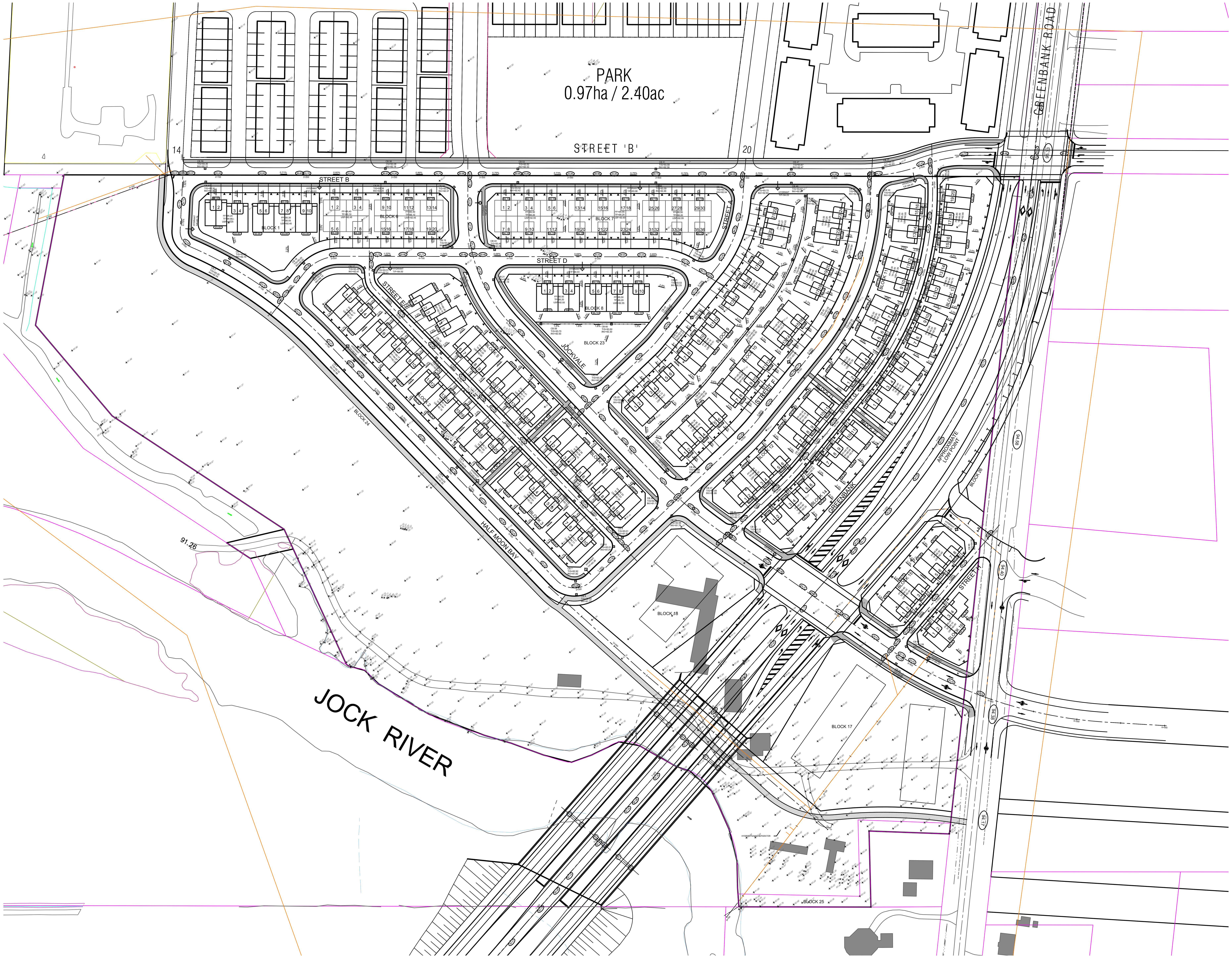
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

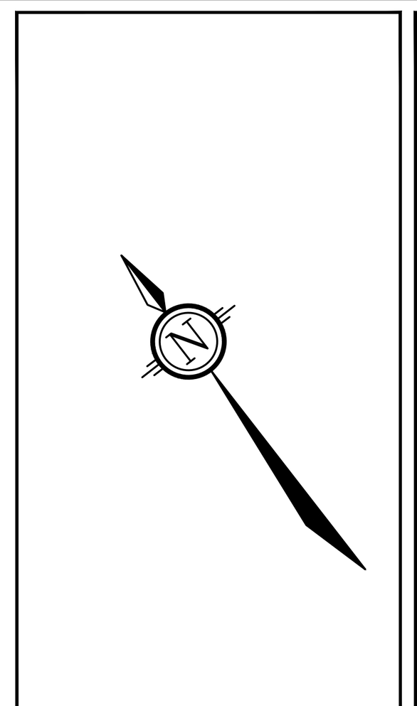
LOCATION
CITY OF OTTAWA
3370 GREENBANK ROAD

DRAWING NAME
GENERAL PLAN OF SERVICES

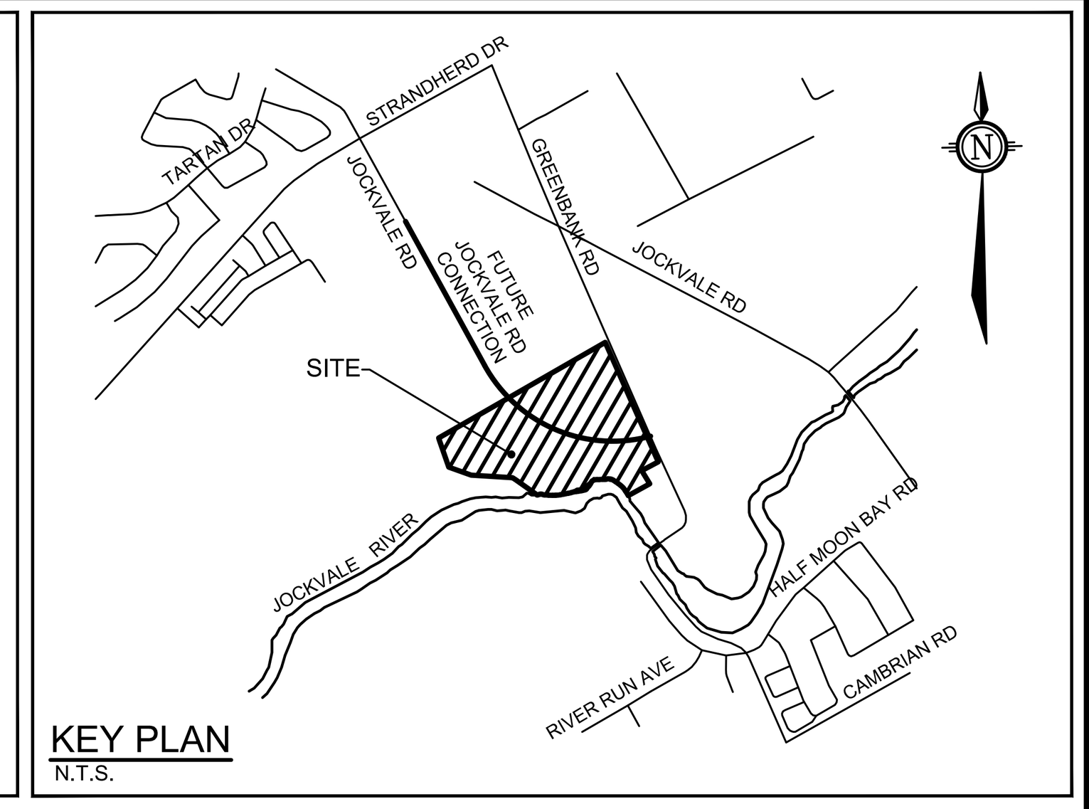
PROJECT No. 111117
REV # 1
DRAWING No. 111117-GP

PLANB1.DWG - 1000mmx707mm
DVIEW 51.17°





NORTH



KEY PLAN
N.T.S.

LEGEND

	IRON BAR & PROPERTY LINE
	LEGAL ADJACENT
130.71	PROPOSED ROAD ELEVATION
131.35	PROPOSED GARAGE ELEVATION
127.25	PROPOSED TERRACE ELEVATION
+ 130.49	*EXISTING TOPO SURFACE ELEVATION*
3.2%	PROPOSED SLOPE
FF=132.35	PROPOSED FINISHED FLOOR ELEVATION
TF=132.05	PROPOSED TOP OF FOUNDATION ELEVATION
USF=129.40	PROPOSED UNDERSIDE OF FOOTING ELEVATION

M:\2011\111117\CAD\Design\111117 - GR.DWG, OVERALL, Dec 12, 2016 - 3:55pm, mfang

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DVIEW 51.17°

No.	REVISION	DATE	BY
1	ISSUED WITH DRAFT PLAN OF SUBDIVISION	DEC 6/16	GJM

SCALE
1:1000

1:1000
0 10 20 30 40

DESIGN	GJM/LSC
CHECKED	GJM
DRAWN	LSC
CHECKED	GJM
APPROVED	GJM

LICENSED PROFESSIONAL ENGINEER
G.J. MacDONALD
Dec 9/16
PROVINCE OF ONTARIO

NOVATECH
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Ottawa, Ontario, Canada K2M 1P6
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Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
3370 GREENBANK ROAD

DRAWING NAME
GRADING PLAN

PROJECT No. 111117
REV REV # 1
DRAWING No. 111117-GR

PLANB1.DWG - 1000mmx707mm

NOTE:
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NOTE:
CONTRACTOR TO CONFIRM ELEVATIONS OF INFRASTRUCTURE IN THE STREET PRIOR TO EXTENDING SERVICES INTO THE SITE AND SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES IMMEDIATELY.

No.	REVISION	DATE	BY
1	ISSUED WITH DRAFT PLAN OF SUBDIVISION	DEC 6/16	GJM

SCALE 1:750

DESIGN GJM/LSC
CHECKED GJM
DRAWN LSC
CHECKED GJM
APPROVED GJM

FOR REVIEW ONLY

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LOCATION
CITY OF OTTAWA
3370 GREENBANK ROAD

DRAWING NAME
SANITARY DRAINAGE AREA PLAN

PROJECT No. 111117
REV REV # 1
DRAWING No. 111117-SAN1

PLANB1.DWG - 1000mmx707mm

PARK
0.97ha / 2.40ac

GREENBANK ROA

LEGEND

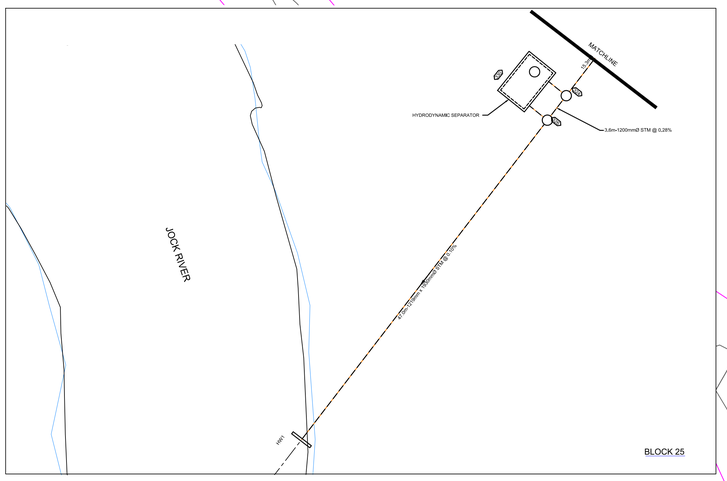
- PROPOSED STORM MANHOLE & SEWER
- PROPOSED CATCHBASIN/MANHOLE & LEAD
- PROPOSED CATCHBASIN & LEAD
- PROPOSED REAR YARD CATCHBASIN & SUB-DRAIN
- PROPOSED SERVICES LOCATION
- PROPOSED ROAD CROSSING HEAD WALL
- FUTURE DEVELOPMENT BY OTHERS

HYDRODYNAMIC SEPARATOR EXACT LOCATION TO BE CONFIRMED

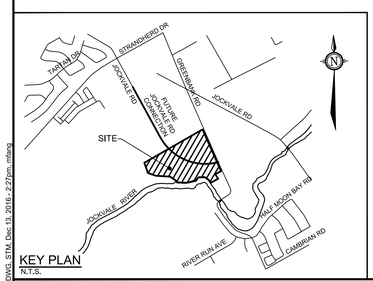
SHARED STORM OUTLET STREET8/CANYAN LANDS

JOCK RIVER

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK 6
BLOCK 7
BLOCK 8
BLOCK 9
BLOCK 10
BLOCK 11
BLOCK 12
BLOCK 13
BLOCK 14
BLOCK 15
BLOCK 16
BLOCK 17
BLOCK 18
BLOCK 19
BLOCK 20
BLOCK 21
BLOCK 22
BLOCK 23
BLOCK 24
BLOCK 25



STORM OUTLET DETAIL
SCALE: 1:300



KEY PLAN
N.T.S.

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SCALE 1:750
1:750
0 15 30

DESIGN GJM/LSC
CHECKED GJM
DRAWN LSC
CHECKED GJM
APPROVED GJM

FOR REVIEW ONLY

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LOCATION
CITY OF OTTAWA
3370 GREENBANK ROAD

DRAWING NAME
STORM DRAINAGE AREA PLAN

PROJECT No. 111117
REV REV # 1
DRAWING No. 111117-STM1

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DVIEW 51.17*

PLAMAP1.DWG - 1000mmx700mm