Report

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Design Brief
The Burroughs Kanata
319 Huntmar Drive

Prepared for The Burroughs Kanata LP
by IBI Group

May 2021

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1 Introduction

1.1 Scope

The purpose of this Design Brief is to provide stakeholder regulators with the project background together with the design philosophy and criteria incorporated in the development design. This report will provide a logical framework to assist reviewers with evaluation of the design of the development.

The property owner, The Burroughs Kanata LP, wishes to proceed with the development of the subject lands in accordance with the policies set out by the Planning Department of the City of Ottawa. This Design Brief is being prepared in support of the Site Plan Application for the development of the current draft plan, which is located in the Kanata West Business Park. This report will present a detailed servicing scheme to support development of the subject properties, including a recommended servicing plan for the major municipal infrastructure. This report will include sections on water supply, wastewater disposal, stormwater management and erosion and sediment control.

1.2 Subject Site

The subject property is identified as Block 2 on subdivision plan 4M-1554. The subject property is located at the northwest quadrant of Huntmar Drive and Highway 417 and is bordered by Huntmar Drive to the east. **Figure 1** indicates the location of the subject property. **Figure 2** shows the current aerial view of the site.

Block 2 has an area of 3.23 Ha and is proposed to consist of 4 apartment buildings totalling 424 residential units along with an amenity building. Both surface and underground parking stalls are proposed.

1.3 Phasing

The subject site is proposed to be services as a single phase. All municipal servicing parking lots and entrances identified on the servicing drawings are proposed to be constructed upon receipt of the requisite approvals.

1.4 Previous Studies

Design of this project has been undertaken in accordance with the following reports:

- Design Brief, Tanger Outlet Centers, 333 Huntmar Drive, prepared by IBI Group, revised February 2013. This study provides the watermain analysis and confirmation of sanitary sewer capacity. Sanitary and water servicing stubs were designed and constructed to service the subject lands within the Tanger project.
- Design Brief, Pond 6 East, 333 Huntmar Drive, prepared by IBI Group, revised October 2013. This study provides the stormater management analysis for the subject lands.

1.5 Pre-Consultation

A pre-consultation meeting was held with the City of Ottawa in May of 2020 to discuss the particulars of the subject site. Notes from this meeting can be found in **Appendix A**. Outside of standard development criteria, no specific engineering concerns were raised with respect to the proposed development.

1.6 Geotechnical Considerations

The Owners have completed a preliminary geotechnical investigation for the proposed development. The report (No. PG5287-1) was completed by Paterson Group Inc. in January 2021

Among other items, the reports comment on the following:

- Site grading;
- Foundation design;
- Pavement structure;
- Infrastructure construction;
- Groundwater Control
- Design for Earthquakes
- Corrosion potential;
- Environmental considerations;
- Limit of Hazard Lands;
- Grade raise considerations

Most of the soils consist of silty clay and/or fill material. While many other geotechnical recommendations are provided in the reports, two of those include maximum grade raises in the order of 2 meters with 5m of the proposed buildings and 3m for the remainder of the site. Long-term groundwater lowering should be controlled with the use of clay dykes in sewer trenches.

2 WATER SUPPLY

2.1 Existing Conditions

The Kanata West community is located in the City's 3W water pressure zone. Potable water to this area is pressurized at the Glen Cairn Pump Station where a major water storage reservoir (Glen Cairn Reservoir) is located. Major watermains into this pressure zone from the pump station are located along Castlefrank Road (going north), Hazeldean Road and Campeau Drive (going west) and Terry Fox Drive (going south). In support of the KWCP, including the subject site, the June 2006 Master Servicing Study completed a review of the existing water plan adjacent to the KWCP and made recommendations for improvements and expansion to the City's water transmission and distribution system to support the proposed development.

As part of the adjacent Arcadia development, a 600 mm watermain was extended from Didsbury Road along the Campeau Drive corridor to Huntmar Drive. The 600 mm watermain extended south on Huntmar Drive and was extended across Highway 417. Those works also included providing a 200 mm diameter service to the subject site. The Tanger Outlets Centre site was developed in 2014. The local water plan for that site included a 200 mm diameter extension in the Feedmill Creek crossing which presently terminates at the subject site. Existing watermains adjacent to the subject site are shown on Site Servicing plan C-001 located in **Appendix D**. In summary, existing 200mm watermain stubs are located at the NW and SE of the subject site.

2.2 Design Criteria

A hydraulic model of the water distribution system for the Tanger Outlets Centre and Kanata West Business Park (KWBP) has been prepared using H20 MAP Software by MWH Soft Inc. The hydraulic model includes the watermains recently constructed in the Tanger Outlets Centre, the new 600 mm watermain on Huntmar Drive, and the proposed watermains in the KWBP and the subject site. The City of Ottawa has provided a hydraulic boundary condition at the intersection of Huntmar and Campeau Drives; the specific boundary conditions are:

Max HGL (High Pressure Check) = 164.1

Peak Hour = 154.1

Max Day + Fire (Fire Flow rate 216 l/s) = 151.1

The following parameters were also used in the analysis for the subject site:

Table 1

DEVELOPMENT TYPE	BLOCKS	DEMANDS		
		AVERAGE DAY	MAXIMUM DAY	PEAK HOUR
Residential	Subject Site	350 l/bed/d	875 l//bed/d	1925 l/bed/d
Prestige Business Park	KWBP	35,000 l/ha/d	52,500 l/ha/d	94,500 l/ha/d
High Profile Business Park & Extensive Employment	Tanger Outlets Centre	50,000 l/ha/d	75,000 l/ha/d	135,000 l/ha/d

In the water analysis for the Tanger Outlets Centre and KWBP, a target fire demand of 13,000 l/min (216.7 l/s) was used to confirm the system's fire fighting capacity. Fire flow requirement

calculations using the Fire Underwriter's Survey (FUS) method for the subject site were completed using the latest architectural information. Results of the calculations, which are included in **Appendix A**, show a fire flow rate of 12,000 l/min for the proposed residential buildings which is less than the 13,000 l/min used in the model.

The watermain design for the proposed development is in accordance with the following City of Ottawa design criteria:

- Minimum pressure during peak hour — 276 kPa (40 psi)
- Minimum pressure during maximum day plus fire — 140 kPa (20 psi)
- Fire flow rate — 13,000 k/min (216.7 l/s)
- Maximum pressure in unoccupied areas — 689 kPa (100 psi)
- Maximum pressure in occupied areas — 552 kPa (80 psi)

A copy of the water demand calculation sheets for the subject site, as well as details of the boundary conditions are included in **Appendix A**.

2.3 Proposed Water Distribution Plan

The proposed water distribution system for the subject site is shown on Site Servicing plan C-001 located in **Appendix D**. A 200 mm watermain is proposed to service the site. A connection to the existing 200 mm watermain on the Tanger Outlets Centre will be made along the Feedmill Creek crossing. A connection to the existing 600 mm watermain will be made at the proposed chamber at the south east corner of the site adjacent to Huntmar Drive.

Results of the Hydraulic modeling are included in **Appendix D** and are summarized as follows:

CRITERIA	RESULTS
Basic Day Pressure Check (kPa)	613 to 623
Design Fire Flow (l/s) @ 140 kPa Residual Pressure during Maximum Day	276 to 452
Peak Hour Pressure (kPa)	512 to 523

A comparison of the results and design criteria is summarized as follows:

Max HGL (High Pressure Check) – All nodes have pressures greater than 552 kPa, requiring the use of pressure reducing valves for each building. All pressures are less than the maximum pressure in unoccupied areas of 689 kPa.

Design Fire Flow – The fire flow rates exceed the target rate of 216.7 l/s.

Peak Hour – The minimum peak hour pressure on the site is 512 kPa which exceeds the minimum requirement of 276 kPa.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

The site was designed to be serviced by the existing sanitary sewers within the Tanger Mall site. A 200mm sanitary sewer stub to service the subject lands was left the NW corner of the site during construction of the mall. A copy of the Tanger Mall sanitary drainage area plan and sewer design sheets have been included in **Appendix B**.

3.2 Proposed Site

As described above in section 1.1, the proposed development is to be of 424 residential units. There are no other significant waste water generators for this site. Sanitary sewer flows are estimated using the specific City of Ottawa identified below.

3.3 Criteria

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria has been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

- Minimum Velocity 0.6 m/s
- Maximum Velocity 3.0 m/s
- Manning Roughness Coefficient 0.013
- Total site area 3.23 Ha
- Population per unit 1.8
- Per capita residential flows 280 l/cap/day
- Infiltration Allowance 0.33 L/s/Ha
- Minimum Sewer Slopes - 200 mm diameter 0.32%

3.4 Sanitary Sewer Design

Given the above criteria, total wastewater flow from the proposed development will be 9.22 l/s. The detailed sewer calculations and sanitary drainage area plan are included in **Appendix B**.

The sanitary sewer design sheet for the Tanger Mall confirms flows from the subject lands have been accounted for within the KWBP sanitary sewer design. The Tanger Mall sanitary sewer design sheet can be found in **Appendix B**.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

The subject site, the 3.23 ha Block 2 located immediately south of Feedmill Creek, is generally open and uncultivated. The topography on Block 2 is inconsistent but is generally sloping to the north east and currently draining via ditching and overland flow directly to Feedmill Creek.

4.2 Synopsis of Previous SWM Studies

The stormwater management objectives for the subject lands were assessed during the design of the Kanata West Pond 6 East. Both the minor flow and major flow from the subject lands are tributary directly to Feedmill Creek. **Figure 2** from that report can be found in **Appendix C** confirming the above. To provide Quality Control the previous study did design and specify an Oil/Grit separator to be installed to provide treatment. This report maintains those recommendations.

4.3 Objective

The stormwater management objectives for the subject lands are as follows;

- Minor system sized for 2 year rational flows tributary to oil/grit separator (OGS)
- OGS to outlet directly to Feedmill Creek via headwall
- Inlet Control Devices sized to ensure no ponding during 2 year storm even
- Flows in excess of 2 year storm to overland flow to one of three outlet channels proposed to connect site to Feedmill Creek.
- 0.3m freeboard maintained from all building entrance elevations with downstream highpoint elevations.

4.4 Design Constraints and Regulatory Requirements

4.4.1 Water Quality Control

As part of the development of the Tanger Mall site, the oil/grit separator (OGS) was designed and approved by the City of Ottawa and the MECP. The MECP ECA #4648-A2KQFP confirms the sizing and approval of the OGS, please find this ECA in **Appendix C**.

The OGS specification data from the manufacturer is included in **Appendix C**. It is anticipated that the manufacture supplied data will be updated once the initial review of the application package has been completed by the regulatory authorities.

The proposed OGS is to be located to the north east of the development, south of Feedmill Creek. The unit will provide water quality control at the Enhanced Level of Protection, or 80% removal of total suspended solids, for the proposed development and will discharge to Feedmill Creek.

4.4.2 Water Quantity Control

As part of the design as part of Pond 6 East, Feedmill Creek was analyzed and found to be able to receive the both the controlled minor system and uncontrolled major system flows. As such, the minor system was designed to convey flows up to the maximum OGS size, identified in the ECA, with the intention to ensure no surface ponding during 2 year storm events occurs. To that end, the SWM calculations in **Appendix C** analyse the 2 year storm event. In all cases the 2 year

ponding is less than 3 cubic meters, which is a practical low limit. This small volume would be accommodated within the catchbasins themselves and would not likely result in any surface ponding for more than a minute or two.

4.5 Minor Storm Sewer Design Criteria

The minor storm sewers for 319 Huntmar Drive will be sized based on the standards of both the City of Ottawa and the provincial Ministry of the Environment (MECP). Some of the key criteria will include the following:

- Sewer Sizing by Rational Method
- Runoff Coefficients: Extensive Employment Development C=0.90
  Heritage Lands C=0.20
- Initial T of C 10 min
- Min Velocity: City Design Guidelines 0.80 m/s

All of the minor storm sewers on Block 2 will be sized based on the rational method and the City of Ottawa 1:2 yr. event. Minor storm flow into these sewers will be controlled by Inlet Control Devices (ICD) to limit flows and prevent sewer surcharging. Recommended ICD's are tabulated on the design drawings. In the event of a rare rain event, major storm routing will be to Feedmill Creek. Major storm routing is indicated on the Site Grading and Drainage Plan.

The storm sewer design sheet and related drainage area plan are included in **Appendix D**.

4.6 Setbacks

Development setbacks along Feedmill Creek were reviewed in the 2006 KWSS and were recommended to be 15 m from the creek high water levels. In 2010, a Class Environmental Assessment and Implementation Plan Kanata West Development Areas were prepared by the City. The EA document also reviewed setbacks for Feedmill Creek and recommended that in most locations, the creek corridor limit be 13 meters from top of embarkment or 30 meters from the high water level whichever is greater. Comments from the MVCA in response to the first submission of the development application for 333 Huntmar Road recommended that development setbacks be determined by the greater of a 30 m setback from the normal high water level or 15 m from top of embankment. Accordingly, the normal high water level was determined in the field by the MVCA and the current draft plan of subdivision indicates the location of the 30 m setback from the normal high water level and/or the 15 m setback from the top of embankment. It is that criteria that will determine the development limit relative to Feedmill Creek for Block 2. That limit is indicated on the design drawings.

4.7 System Concept

The following section provides a description of how the storm system will function. The proposed stormwater system incorporates standard urban drainage design and stormwater management features that can be summarized as follows:

The on-site minor storm sewers were sized using the rational method as per MECP guidelines. To restrict the minor system, inlet control devices were sized to ensure no ponding during the 2 year storm event using modified rational calculations. The sum of the on-site ICD and roof flow restrictions is 700 L/s which is less than the flow rate of 707.9 L/s as shown on the approved ECA for the subject lands.

Flows in excess of the ICD flow rates will flow overland to Feedmill Creek via prescribed flow channels. The above is in keeping with the current approved City of Ottawa and MECP design standards.

4.8 Infiltration

The KWBP Design Brief maintained the infiltration targets established within previous studies completed for the Kanata West Area, namely the Kanata West Master Servicing Study. The design of the Tanger Mall site considered the whole area (including the subject lands) when establishing both the target infiltration rate and the infiltration galleries to provide the required infiltration. All required infiltration galleries to meet the target infiltration rates are located on the Tanger Mall site. Calculations confirming that no additional infiltration from the subject lands is required can be found in **Appendix C**.

5 SEDIMENT AND EROSION CONTROL PLAN

During construction, existing stream and storm water conveyance systems can be exposed to significant sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings may be used such as;

- The installation of straw bales within existing drainage features surrounding the site;
- Bulkhead barriers will be installed in the outlet pipes;
- Sediment capture filter socks will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a “filter sock.” Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Thus, these structures will be constructed with a sediment capture filer sock. These will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed.

The Sediment and Erosion Control Plan C-900 is included in **Appendix D**.

6 APPROVALS AND PERMIT REQUIREMENTS

6.1 City of Ottawa

The City of Ottawa will review all and approve most development applications as they relate to provision of water supply, wastewater collection and stormwater conveyance and treatment. Ultimately, the City will issue a Commence Work Notice to permit construction to begin.

6.2 Province of Ontario

The subject lands will outlet to an existing sanitary sewer stub located on the subject lands and the storm sewer system is not servicing any upstream drainage areas. Given the single ownership on the subject block and residential nature of the development, no Environmental Compliance Certificate application is anticipated to be completed.

6.3 Conservation Authority

The Mississippi Valley Conservation Authority will issue all required permits on behalf of DFO for works in and adjacent to Feedmill Creek.

6.4 Federal Government

There are no required permits, authorizations or approvals by the federal government for the proposed development.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusion

The Servicing strategy can be summarized as follows:

- Adequate fire flow protection and domestic supply will be provided from connecting to and looping the existing watermain stubs located at the NW and SE corners of the site.
- Sanitary design flows under the proposed condition can be accommodated by the existing sanitary sewers with no negative impact on downstream sewers anticipated.
- Stormwater can be treated on-site via an proposed oil-grit separator, no ponding will occur during the 2 year storm event and flows in excess of the 2 year storm will be routed direct to Feedmil Creek.
- Erosion and sediment control measures have been outlined for the construction of the development.

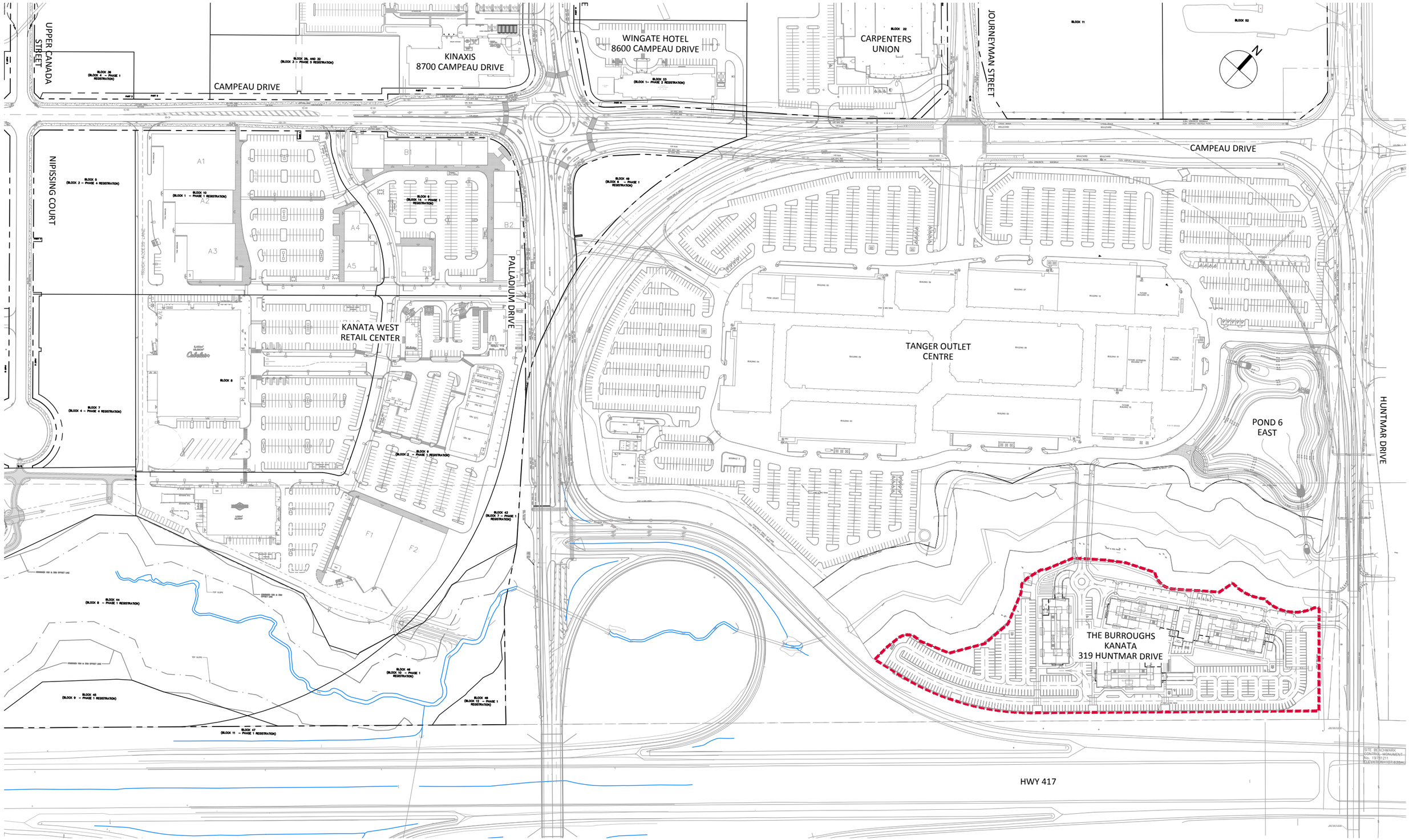
This report has illustrated that the proposed site can be serviced by the adjacent existing municipal services. All municipal infrastructure designs have been done in conformance with current City of Ottawa and MECP guidelines.

Based on the information provided within this report, the site plan prepared for the subject parcel can be serviced to meet City of Ottawa requirements.

IBI GROUP

Demetrius Yannoulopoulos, P. Eng.
Director, Office Lead

James Battison C.E.T.



W: \127255_8555Campeau\7.0_Production\7.03_Design\04_Civil_Land\Figures\Figure-1.dwg Layout Name: FIGURE 1 Plot Scale: 1:5.13 Plotted At: 5/12/2021 Last Saved By: dsiurna Last Saved At: May. 12, 21

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE BURROUGHS KANATA 319 HUNTMAR DRIVE	LOCATION PLAN	FIGURE 1

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Project Title
THE BURROUGHS KANATA
319 HUNTMAR DRIVE

Drawing Title
EXISTING CONDITIONS

Sheet No.
FIGURE 2

APPENDIX A

8555 Campeau Drive
Pre-Consultation Meeting

Circulation	Role	Organization
Mark Young	Planner	City of Ottawa
Justin Armstrong	Project Manager (Infrastructure)	
Mike Giampa	Project Manager (Transportation)	
Mike Russett	Planner (Parks)	
Randolph Wang	Planner (Urban Design)	
Erica Ogden	Planner	MVCA
Stephen Kapusta	Planner	MTO
Jennifer Mondell	Applicant	Blevins Developments Ltd.
N/A	Owner	Riocan Holdings Inc.

Comments from Applicant

1. The development of a mixed-use development block, including a hotel and two apartment buildings. The main access is on the east side of the site to Huntmar Drive.
2. Existing Pylon Sign to remain.
3. Lot Area 32,263 sq. m.

Planning Comments:

1. The concept is a positive addition to the community and meets the requirements
2. Zoning MC H(45) – The proposal appears to meet all Zoning By-law requirements.
3. Kanata West Concept Plan. Please consult Section 4.1.4(1) for additional design guidelines applicable to the Empolyment Entertainment and Leisure District.
4. A private road agreement may be required.
5. A joint use and maintenance agreement may be required.
6. If the parcel is proposed to be severed please advise and clearly indicate the proposed lot lines on subsequent plans.
7. A Planning Rationale is required.

Urban Design Comments

PRUD's pre-consultation comments on the proposed site plan control application.

1. A Design Brief is required as part of the submission. The Terms of Reference for the Design Brief is attached for convenience.
2. The property is located within a Design Priority Area. Therefore, a visit to the UDRP for review is required. Please contact Matthew Ippersiel

matthew.ippersiel@ottawa.ca for scheduling details as the UDRP has been moved online during the pandemic.

3. As indicated in the Design Brief Terms of Reference, the applicant is encouraged to explore alternative concepts before finalizing the site plan. The site plan should aim at achieving a sense of place through design of public realm, including streets and public spaces, placement of buildings, and proper arrangement of parking. The attached diagrams are intended to show how the site plan concept may be improved through a few quick illustrations. In Alternatives 1 and 2, all building footprints remain the same as proposed. In Alternative 1a and 2a, the footprint of the hotel is slightly adjusted to reduce the number of units facing the highway while maintaining the same GFA.

Parks Planning:

1. confirm parkland dedication requirements
2. plan for amenity/park space for the residential development area
3. ownership of amenity/park space - i.e. city v.s. POPS
4. Please advise regarding market/demographic model for the residential area - i.e. seniors/all ages

Engineering Comments:

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)

- ⇨ City of Ottawa Accessibility Design Standards (2012)
- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Servicing for the site should be provided as per the Kanata West Master Servicing Study (KWMSS).

5. Stormwater management for the site is to be as per the KWMSS. An infiltration target equal to 50-70mm/year of runoff and increased by 25% post-development should be provided. As per the KWMSS, the stormwater runoff from the site is to be routed to MSS Pond 2 which is to be located east of Huntmar near the confluence of Feedmill Creek and the Carp River. If Pond 2 is not available to meet the schedule of this proposed development, temporary water quality treatment measures will need to be implemented for the site and post-development flows will need to be controlled to pre-development flows until such time as the site run-off can be permanently routed to Pond 2.

6. District Meter Area (DMA) chamber will need to be provided for the site's water service as per the City's Water Distribution Guidelines Section 4.4.7.2.

7. As per the City's Water Distribution Guidelines Section 4.3.1, redundancy will need to be provided for the site's water service due to the number of homes/basic day water demand being proposed as part of the development.

8. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

    i. Location of service

    ii. Type of development and the amount of fire flow required (as per FUS, 1999).

    iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

9. A Geotechnical Report/Slope Stability Study should confirm that the offset distances between the proposed buildings and Feedmill Creek are appropriate from a slope stability standpoint.

10. MOECC ECA Requirements

If the parcel north of Feedmill Creek containing the Tanger Development and the proposed hotel site parcel south of Feedmill Creek are to be severed on title, and the proposed hotel site is to obtain its sanitary servicing via the Tanger site, an ECA is expected to be required for the private sanitary sewer that would be servicing multiple parcels. If the two parcels remain as one on title, it is not anticipated that an ECA will be required.

It is anticipated that an ECA may be required to discharge the site's stormwater run-off directly to Feedmill Creek in advance of the commissioning of MSS Pond 2.

If it is anticipated that an ECA will be required, please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation:

For residential applications: Charlie Primeau

(613) 521-3450, ext. 251

Charlie.Primeau@ontario.ca

For I/C/I applications: Emily Diamond

(613) 521-3450, ext. 238

Emily.Diamond@ontario.ca

11. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x21746 or by email at Justin.Armstrong@ottawa.ca.

Transportation Planning:

1. Please proceed to the scoping step (2) of the TIA.
2. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
3. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
4. ROW protection on Huntmar Drive is 37.5 m.
5. A Noise Impact Study is required.
6. Clear throat requirements as per TAC guidelines for an arterial road.

MTO:

1. 14 metre setback for all structures and bylaw required elements on the site plan.
2. Photometric plan to ensure that there is no light spill over onto our right of way.
3. Security fencing along highway 417.
4. Stormwater management report to the Ministry's satisfaction.

We would like to see a Traffic study, but we don't foresee there being any issues.

Planning Forester:

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City;
2. Tree removal
    a. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
    b. any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
3. The TCR must list all trees on site by species, diameter and health condition – separate stands of trees may be combined using averages
4. The TCR must clearly show where tree removal will occur.
5. Tree permits for geotechnical work are possible, but tree removal must be limited to areas required for machinery access and drilling; please provide a plan supported by the TCR showing travel routes and landings
6. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
7. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

Environment:

1. Watercourse corridor City-owned and is the Feedmill Creek which is part of the City's natural heritage system and is considered a significant valley. As such,

this development proposal will triggers an EIS. The EIS that was completed at the subdivision and this can be used for the current development but will need to be up-dated with a current site visit, and the current plan.
2. Requirement for restoration plantings within the corridor as part of the Kanata West
3. A TCR will be required, can be combined as part of the EIS.

Mississippi Valley Conservation Authority:

Thank you for the opportunity to provide some pre-consultation comments on the proposed site plan. I have been working from home during the pandemic and have not yet had a change to go into the office to review the previous files related to the Tanger Outlet Mall and the crossing of Feedmill Creek. Once I have a change to get into the office, I will be able to provide you with some of the background regarding hazard setbacks, etc. from Feedmill Creek.

What I can provide you with to date regarding stormwater management is as follows:

- 80% removal of total suspended solids is the requirement for stormwater quality
- Feedmill Creek is defined as a cool water fish habitat and any stormwater management must be designed to reduce water temperatures.
- Low Impact Development will be required, with targets for infiltration.

It appears a corridor around Feedmill Creek has already been acquired by the City. Important to note, the regulation limit does extent beyond the corridor. Approvals for development and/or fill placement within the Regulation Limit would be required under Ontario Regulation 153/06. The greatest extent of the hazard is the meander belt allowance, see attached map.

Local restoration and enhancement within Feedmill Creek will be required and consideration must be given to the enhancements planned for the area.

I would recommend the proponent also refer to the City Stream Watch Report for Feedmill Creek and Feedmill Creek Stormwater Management Criteria Study, prepared by J.F. Sabourin and Associates Inc., dated April 30, 2018.

Requested Plans and Studies

1. A list of required plans and studies required for a complete Site Plan Control application have been attached.

Process

1. This is a pre-consultation for Site Plan Control application at 8555 Campeau Drive and the associated requirements for a complete application.

2. This proposal will trigger a New Site Plan Control application, Manager Approval, subject to Public Consultation. The proposal would fall under the 'complex' category as per the Site Plan Control Subtype Threholds. The application form, timeline and fees can be found here.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at Mark.Young@ottawa.ca or at 613-580-2424 extension 41396 if you have any questions.

Sincerely,

Mark Young MCIP RPP
Planner III
Development Review - West

Boundary Conditions at KWBP(Campeau Dr.) West

Boundary Conditions at Jun-1:

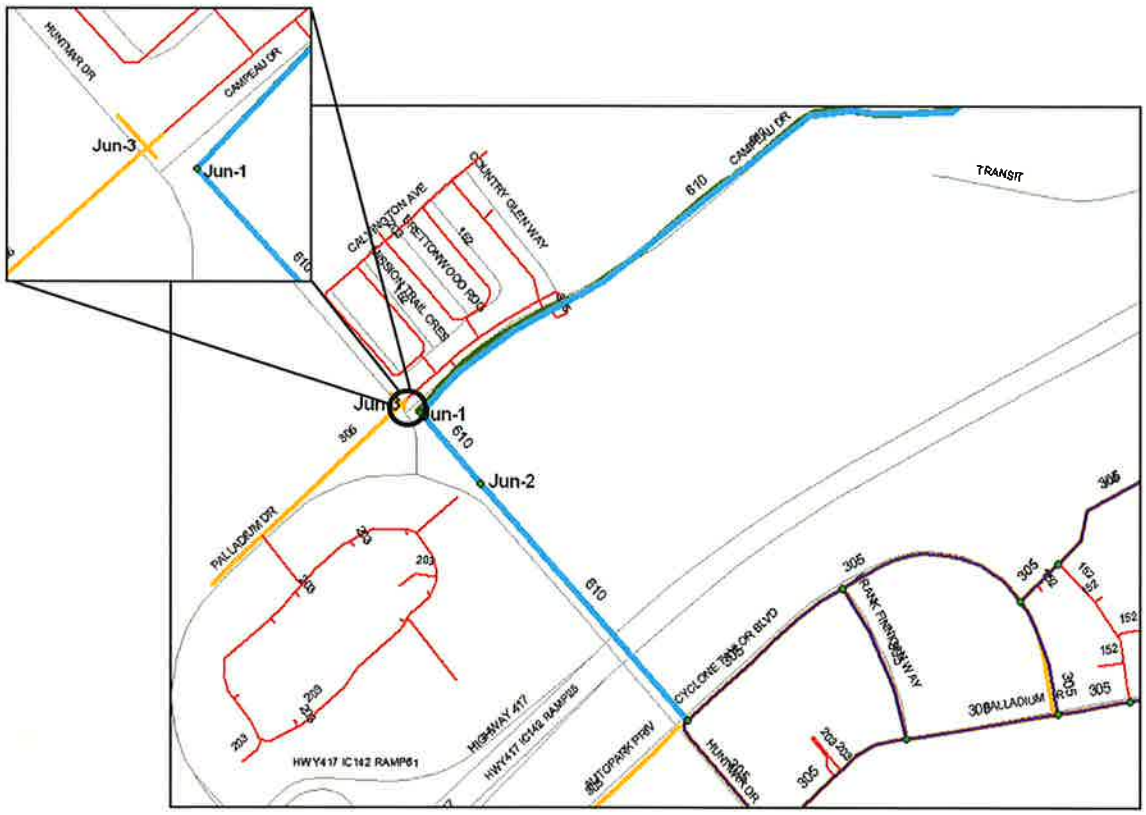
Max HGL = 164.1m
PKHR = 154.1m
MXDY+Fire (216 L/s) =151.1m

To ensure adequate fire supple and system reliability, the development is subject to the the following conditions:

1. Provide a 25m connection between Jun-3 and Jun-1 as shown in figure below.
2. To construct only after 610mm pipe built from Jun-1 to Cyclone Taylor Blvd.
3. Provide a connection between Huntmar Dr. 610mm pipe and 203mm pipe off (Jun-2) the east side of the loop. This is need for a reliability purposes.

In response to the client request, we were unable to provide the boundary conditions at the locations requested due to a lack of fire supply.

Location of Connections:



IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 319 Huntmar Drive City of
LOCATION : Ottawa
DEVELOPER : The Burroughs Kanata LP

FILE: 127255.6.04
DATE PRINTED: 14-May-21
DESIGN: JEB
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	UNITS			POP'N	INDTRL	INST.	RETAIL										
	SF	APT	ST		(ha.)	(ha.)	(m^2)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
BLDG A		106		191				0.77	0.00	0.77	1.93	0.00	1.93	4.25	0.00	4.25	11,000
BLDG B		106		191				0.77	0.00	0.77	1.93	0.00	1.93	4.25	0.00	4.25	12,000
BLDG C		106		191				0.77	0.00	0.77	1.93	0.00	1.93	4.25	0.00	4.25	11,000
BLDG D		106		191				0.77	0.00	0.77	1.93	0.00	1.93	4.25	0.00	4.25	10,000
Totals										3.08			7.73			17.00	

ASSUMPTIONS

RESIDENTIAL DENSITIES

- Single Family (SF) — 3.4 p / p / u
- Apartment (APT) average — 1.8 p / p / u
- Stacked Townhouse (ST) — 2.3 p / p / u

AVG. DAILY DEMAND

- Residential — 350 l / cap / day
- Industrial — 50,000 l / ha / day
- Institutional — 35,000 l / ha / day
- Retail (Shopping Centre) — 2,500 l / 1000m^2 / day

MAX. DAILY DEMAND

- Residential — 875 l / cap / day
- Industrial (Business Park) — 75,000 l / ha / day
- Institutional — 52,500 l / 1000m^2 / day
- Retail (Shopping Centre) — 3750 l / 1000m^2 / day

MAX. HOURLY DEMAND

- Residential — 1,925 l / cap / day
- Industrial (Business Park) — 135,000 l / ha / day
- Institutional — 94,500 l / 1000m^2 / day
- Retail (Shopping Centre) — 6,750 l / 1000m^2 / day

Fire Flow Requirement from Fire Underwriters Survey

319 Huntmar - Building A

Building Floor Area	1205	m^2
100% of floors 1 and 2	2410	m^2
50% of floors 3-9	4218	m^2
Area	6628	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	6,628	m^2		1.0 ordinary
				0.8 non-combustible
F	14,328	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment

Use	-15%		-25% non-combustible
			-15% limited combustible
Adjustment	-2100	l/min	0% combustible
Fire flow	11,900	l/min	+15% free burning
			+25% rapid burning

Sprinkler Adjustment

Use	-30%	
Adjustment	-3570	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north					
east					
south					
west	4.0	22.0	9	198	20%
Total					20%

Adjustment	2,380	l/min
Total adjustments	(1,190)	l/min
Fire flow	10,710	l/min
Use	**11,000**	**l/min**
	183.3	**l/s**

* Exposure charges from Technical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Adjacent Hydrants

46m	5700	l/min
16m	5700	l/min
86m	3800	l/min
	15200	l/min

Fire Flow Requirement from Fire Underwriters Survey

319 Huntmar - Building B

Building Floor Area	1205	m^2
100% of floors 1 and 2	2410	m^2
50% of floors 3-9	4218	m^2
Area	6628	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	6,628	m^2		1.0 ordinary
				0.8 non-combustible
F	14,328	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment

Use	-15%		-25% non-combustible
			-15% limited combustible
Adjustment	-2100	l/min	0% combustible
Fire flow	11,900	l/min	+15% free burning
			+25% rapid burning

Sprinkler Adjustment

Use	-30%	
Adjustment	-3570	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north					
east	4.0	22.0	9	198	20%
south	21.0	54.0	9	486	10%
west	31.0	22.0	9	198	5%
Total					35%

Adjustment	4,165	l/min
Total adjustments	595	l/min
Fire flow	12,495	l/min
Use	**12,000**	**l/min**
	200.0	**l/s**

* Exposure charges from Technical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Adjacent Hydrants

46m	5700	l/min
16m	5700	l/min
86m	3800	l/min
	15200	l/min

Fire Flow Requirement from Fire Underwriters Survey

319 Huntmar - Building C

Building Floor Area	1205	m^2
100% of floors 1 and 2	2410	m^2
50% of floors 3-9	4218	m^2
Area	6628	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	6,628	m^2		1.0 ordinary
				0.8 non-combustible
F	14,328	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment			
			-25% non-combustible
			-15% limited combustible
Use	-15%		0% combustible
			+15% free burning
Adjustment	-2100	l/min	+25% rapid burning
Fire flow	11,900	l/min	

Sprinkler Adjustment

Use	-30%	
Adjustment	-3570	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	21.0	54.0	9	486	10%
east					
south					
west	24.0	22.0	9	198	10%
Total					20%

Adjustment	2,380	l/min
Total adjustments	(1,190)	l/min
Fire flow	10,710	l/min
Use	**11,000**	**l/min**
	183.3	**l/s**

* Exposure charges from Technical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Adjacent Hydrants

46m	5700	l/min
16m	5700	l/min
86m	3800	l/min
	15200	l/min

Fire Flow Requirement from Fire Underwriters Survey

319 Huntmar - Building D

Building Floor Area	1205	m^2
100% of floors 1 and 2	2410	m^2
50% of floors 3-9	4218	m^2
Area	6628	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	6,628	m^2		1.0 ordinary
				0.8 non-combustible
F	14,328	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment

Use	-15%		-25% non-combustible
			-15% limited combustible
Adjustment	-2100	l/min	0% combustible
Fire flow	11,900	l/min	+15% free burning
			+25% rapid burning

Sprinkler Adjustment

Use	-30%	
Adjustment	-3570	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north					
east	24.0	22.0	9	198	10%
south					
west					
Total					10%

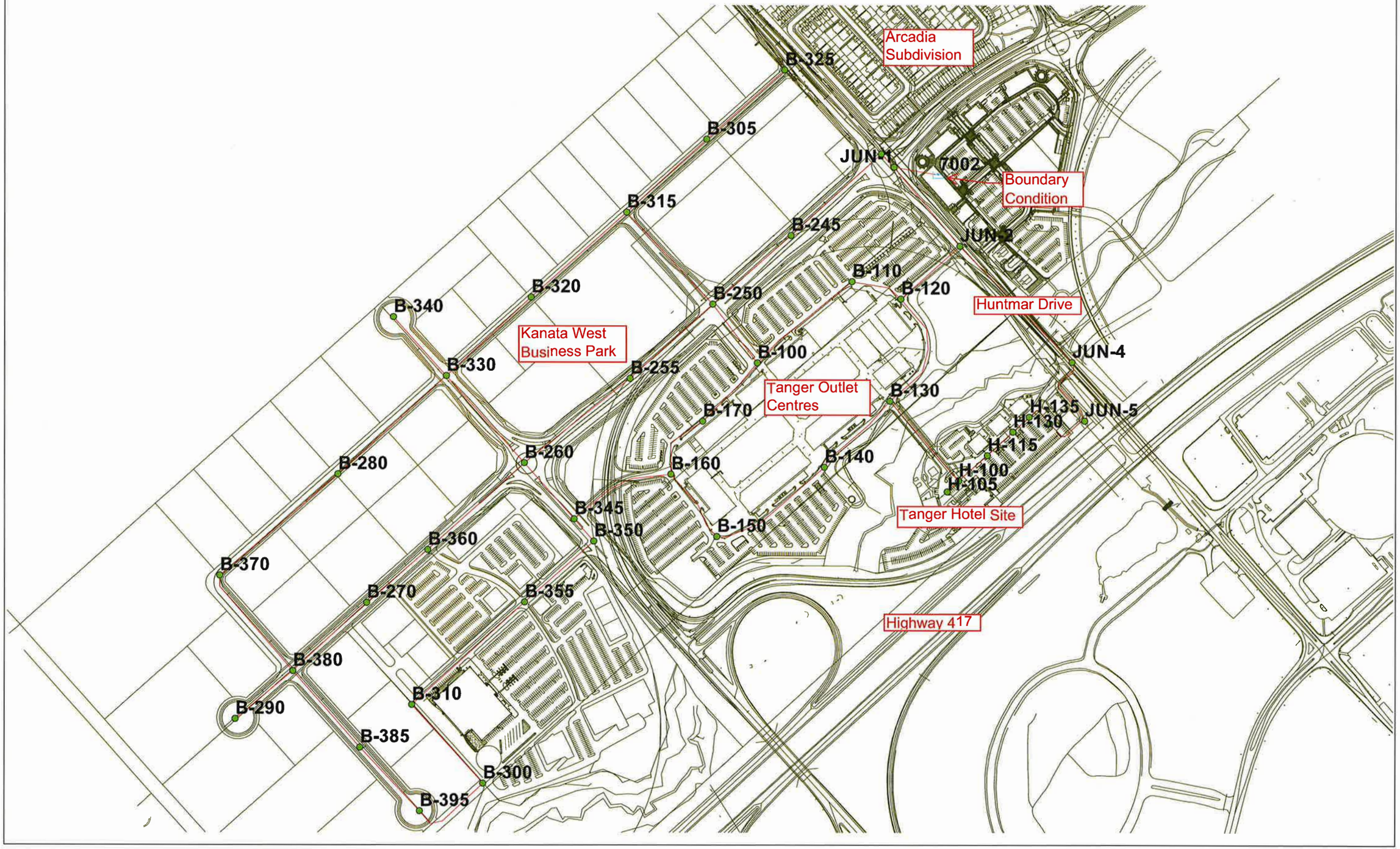
Adjustment	1,190	l/min
Total adjustments	(2,380)	l/min
Fire flow	9,520	l/min
Use	**10,000**	**l/min**
	166.7	**l/s**

* Exposure charges from Technical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Adjacent Hydrants

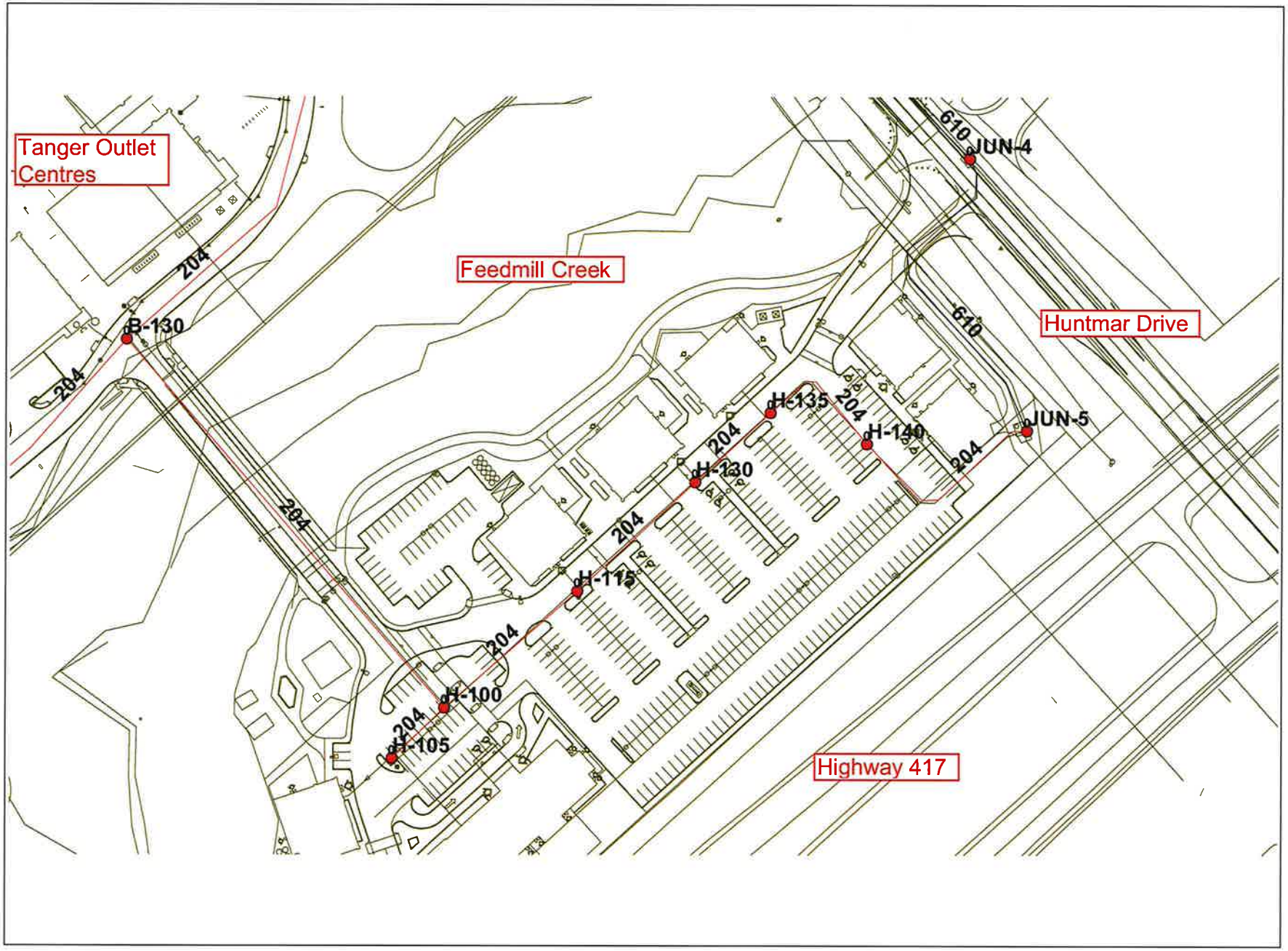
46m	5700	l/min
16m	5700	l/min
86m	3800	l/min
	15200	l/min

Overall Water Model



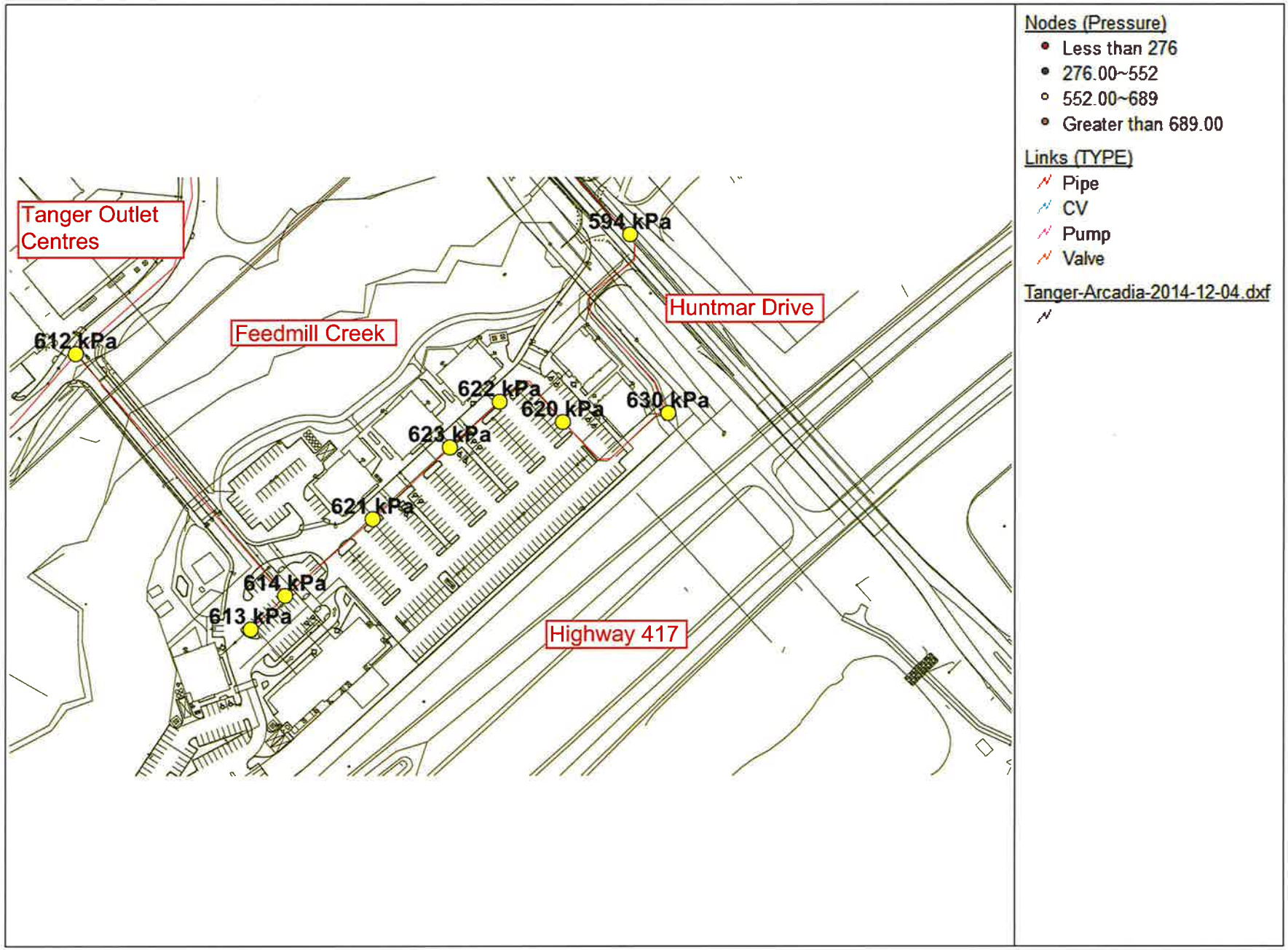
Date: Thursday, December 04, 2014

Pipe Sizes and Node ID's



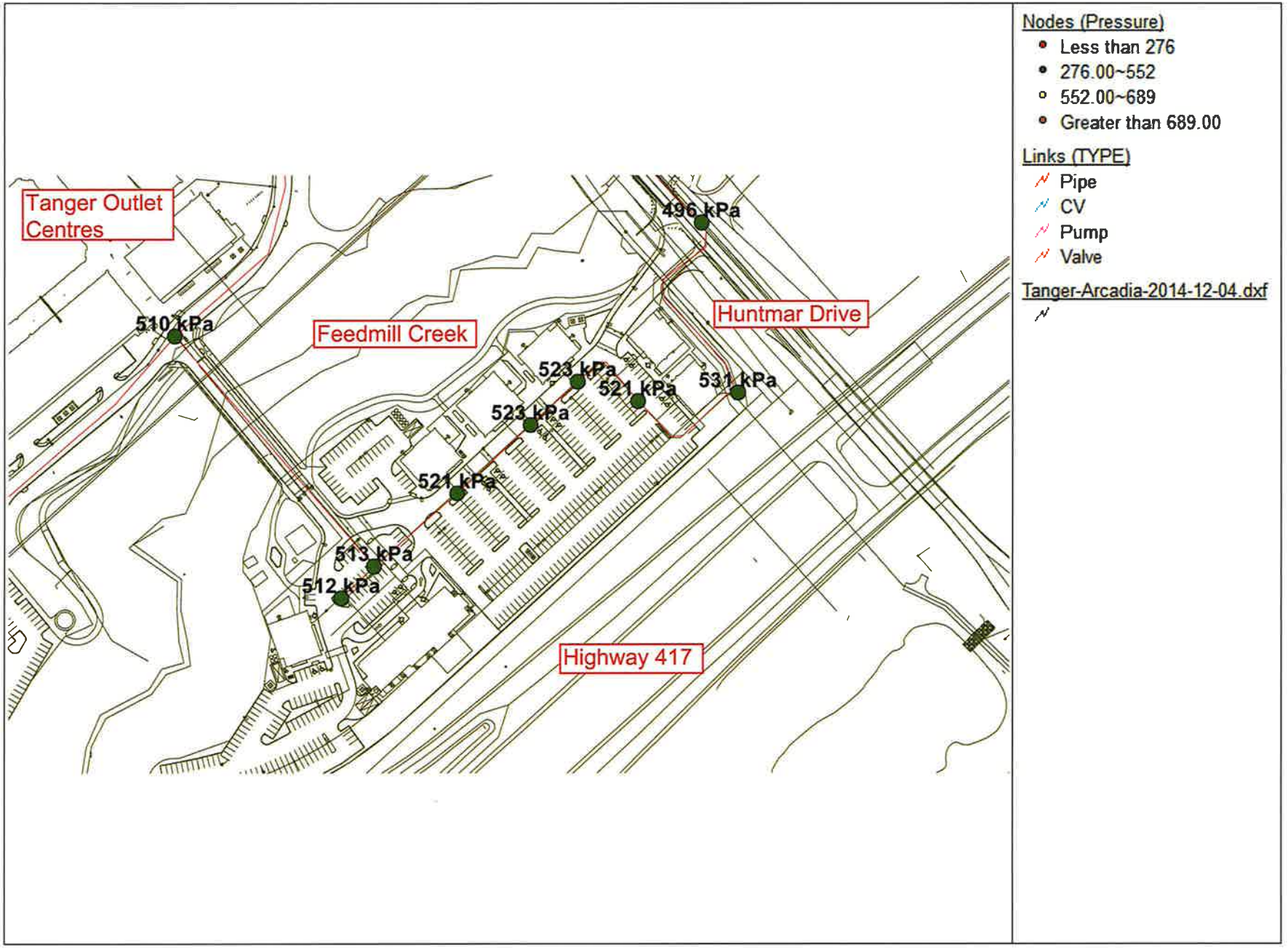
Date: Thursday, December 04, 2014

Tanger Hotel - Basic Day Pressures



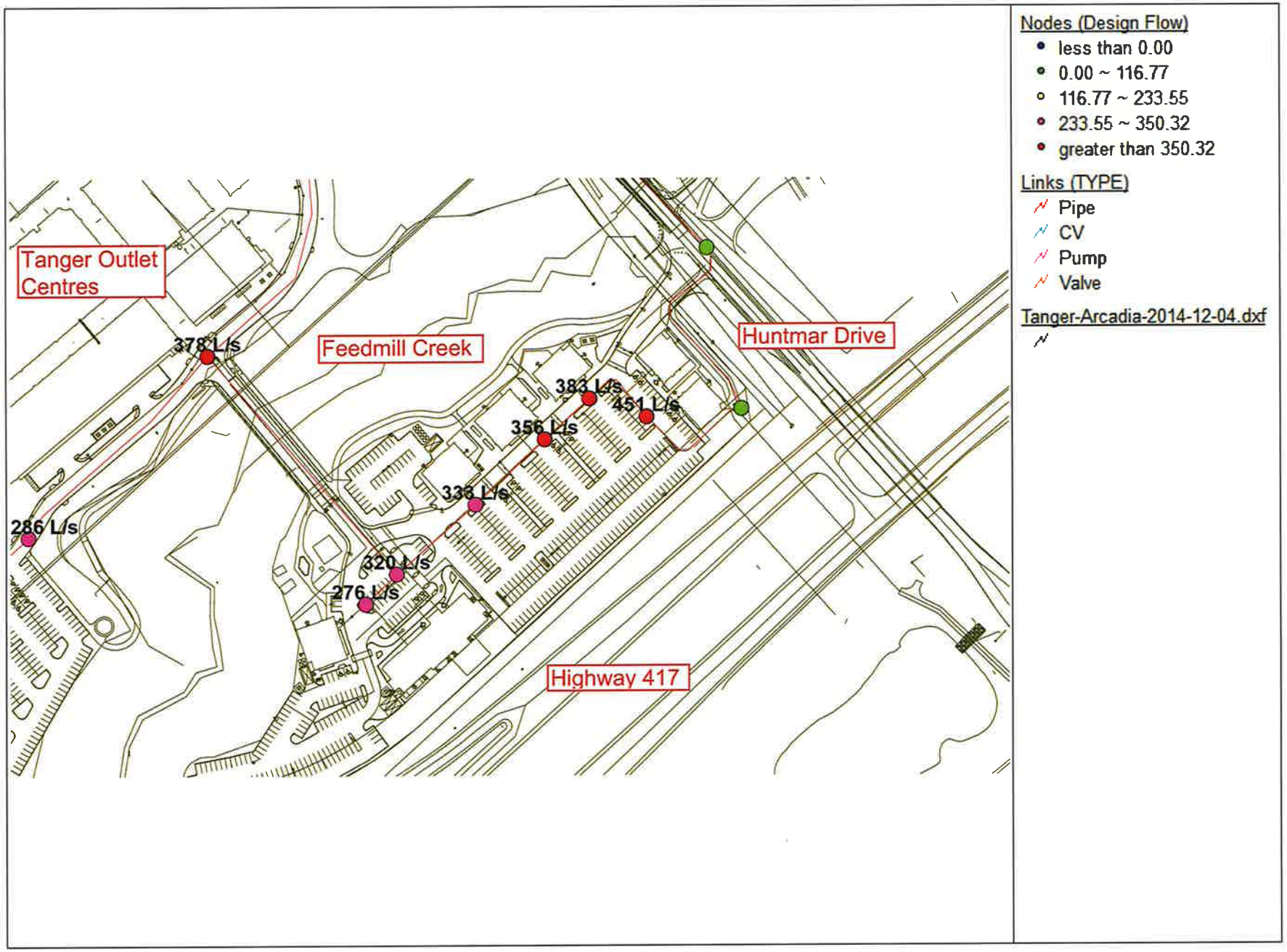
Date: Thursday, December 04, 2014

Tanger Hotel - Peak Hour Pressures



Date: Thursday, December 04, 2014

Tanger Hotel - Max Day + Fire - Fireflows



Date: Thursday, December 04, 2014

Basic Day HGL 164.1m - Junction Report

	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	B-100	0.48	101.65	163.88	609.85
2	B-110	1.30	101.70	163.94	609.94
3	B-120	1.51	101.35	163.98	613.72
4	B-130	1.34	101.50	163.97	612.15
5	B-140	1.59	101.50	163.92	611.63
6	B-150	1.38	101.65	163.87	609.71
7	B-160	0.52	101.75	163.85	608.57
8	B-170	0.87	101.50	163.87	611.13
9	B-245	2.77	101.00	163.96	616.99
10	B-250	0.00	102.10	163.88	605.42
11	B-255	1.60	102.70	163.84	599.10
12	B-260	1.18	104.50	163.79	581.02
13	B-270	0.57	105.00	163.76	575.77
14	B-280	2.62	105.25	163.75	573.24
15	B-290	2.04	106.35	163.74	562.38
16	B-300	0.00	104.60	163.73	579.44
17	B-305	0.92	102.20	163.87	604.29
18	B-310	1.85	104.80	163.73	577.48
19	B-315	1.38	102.15	163.87	604.79
20	B-320	1.56	102.95	163.82	596.43
21	B-325	0.44	101.90	163.87	607.22
22	B-330	0.97	104.30	163.79	582.94
23	B-340	1.17	104.70	163.79	579.02
24	B-345	0.75	104.75	163.79	578.57
25	B-350	0.00	105.00	163.79	576.06
26	B-355	5.30	104.50	163.74	580.46
27	B-360	0.49	105.00	163.77	575.89
28	B-370	3.70	106.30	163.74	562.86
29	B-380	1.91	105.75	163.74	568.27
30	B-385	1.74	105.65	163.73	569.18
31	B-395	1.81	105.90	163.73	566.70
32	H-100	0.00	101.40	164.01	613.57
33	H-105	0.36	101.50	164.01	612.59
34	H-115	0.01	100.70	164.03	620.60
35	H-130	0.01	100.50	164.05	622.72
36	H-135	0.01	100.60	164.06	621.85
37	H-140	0.02	100.85	164.07	619.54
38	JUN-1	0.00	100.20	164.10	626.14
39	JUN-2	0.00	101.50	164.10	613.38
40	JUN-3	0.00	100.25	164.08	625.47
41	JUN-4	0.00	103.50	164.09	593.78
42	JUN-5	0.00	99.85	164.09	629.55

Peak Hour HGL 154.1m - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		B-100	1.30	101.65	153.36	506.70
2		B-110	3.50	101.70	153.52	507.79
3		B-120	4.08	101.35	153.64	512.38
4		B-130	3.61	101.50	153.59	510.47
5		B-140	4.30	101.50	153.40	508.58
6		B-150	3.72	101.65	153.27	505.80
7		B-160	1.41	101.75	153.23	504.51
8		B-170	2.36	101.50	153.28	507.37
9		B-245	4.99	101.00	153.64	515.79
10		B-250	0.00	102.10	153.36	502.29
11		B-255	2.88	102.70	153.22	495.04
12		B-260	2.13	104.50	153.08	476.02
13		B-270	1.02	105.00	152.97	470.07
14		B-280	4.71	105.25	152.95	467.40
15		B-290	3.66	106.35	152.92	456.37
16		B-300	0.00	104.60	152.90	473.26
17		B-305	1.66	102.20	153.31	500.84
18		B-310	3.34	104.80	152.90	471.29
19		B-315	2.48	102.15	153.31	501.36
20		B-320	2.80	102.95	153.15	491.93
21		B-325	0.79	101.90	153.31	503.78
22		B-330	1.75	104.30	153.07	477.88
23		B-340	2.11	104.70	153.06	473.94
24		B-345	1.35	104.75	153.08	473.56
25		B-350	0.00	105.00	153.06	470.93
26		B-355	9.55	104.50	152.91	474.37
27		B-360	0.88	105.00	153.01	470.45
28		B-370	6.66	106.30	152.92	456.85
29		B-380	3.45	105.75	152.93	462.29
30		B-385	3.14	105.65	152.90	463.04
31		B-395	3.26	105.90	152.90	460.52
32		H-100	0.00	101.40	153.76	513.10
33		H-105	0.98	101.50	153.76	512.12
34		H-115	0.04	100.70	153.83	520.65
35		H-130	0.03	100.50	153.90	523.24
36		H-135	0.04	100.60	153.94	522.67
37		H-140	0.06	100.85	153.99	520.77
38		JUN-1	0.00	100.20	154.09	528.06
39		JUN-2	0.00	101.50	154.08	515.27
40		JUN-3	0.00	100.25	154.03	526.99
41		JUN-4	0.00	103.50	154.08	495.66
42		JUN-5	0.00	99.85	154.08	531.42

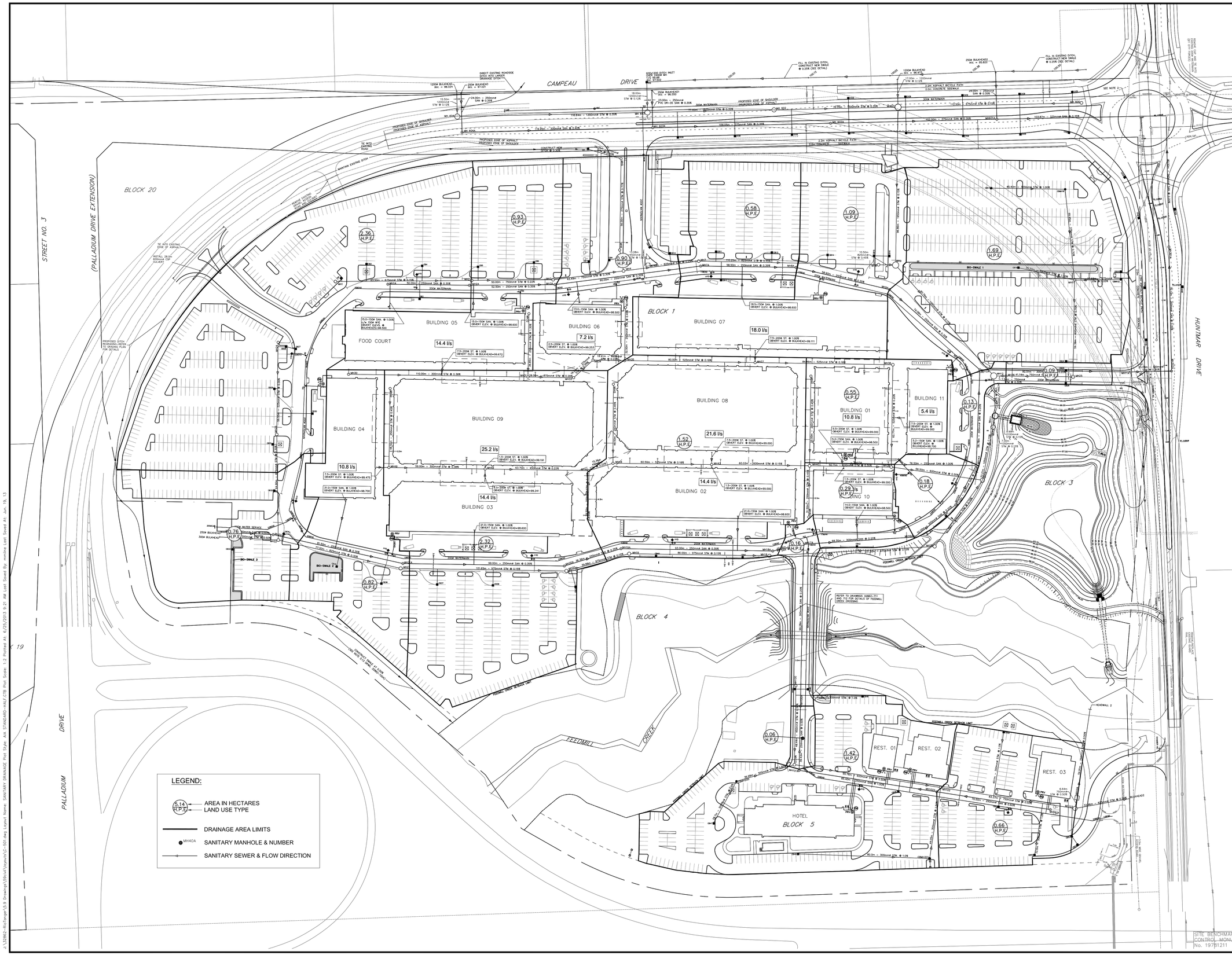
Max Day + Fire - Fireflow Report

		ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critcal Node 2 Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
1		B-100	217.39	B-100	373.70	139.79	419.80	419.80	B-100	139.96	115.93	419.80	419.80
2		B-110	218.61	B-110	346.85	137.10	366.85	366.88	B-110	139.96	115.98	366.88	366.85
3		B-120	218.94	B-290	402.99	142.47	917.88	490.11	B-120	139.96	115.63	490.11	490.11
4		B-130	218.68	B-130	354.95	137.72	377.71	377.74	B-130	139.96	115.78	377.74	377.71
5		B-140	219.06	B-140	271.28	129.18	286.14	286.15	B-140	139.96	115.78	286.15	286.14
6		B-150	218.74	B-150	273.18	129.53	288.32	288.33	B-150	139.96	115.93	288.33	288.32
7		B-160	217.45	B-160	339.49	136.39	360.19	360.19	B-160	139.96	116.03	360.19	360.19
8		B-170	217.98	B-170	320.58	134.22	332.52	332.52	B-170	139.96	115.78	332.52	332.52
9		B-245	220.01	B-290	387.93	140.59	654.67	686.35	B-290	114.75	112.71	654.67	654.67
10		B-250	217.61	B-290	363.94	139.24	508.18	544.51	B-290	102.56	112.57	508.18	508.18
11		B-255	218.27	B-290	341.44	137.54	434.80	445.21	B-290	127.78	115.74	434.81	434.80
12		B-260	217.60	B-290	320.38	137.19	382.60	394.86	B-290	123.60	117.11	382.60	382.60
13		B-270	217.21	B-290	274.10	132.97	311.29	313.51	B-290	136.36	118.92	311.29	311.29
14		B-280	219.00	B-280	153.32	120.90	224.61	224.61	B-280	139.96	119.53	224.61	224.61
15		B-290	219.33	B-290	162.13	122.89	229.34	229.34	B-290	139.96	120.63	229.34	229.34
16		B-300	217.89	B-300	157.69	120.69	225.33	225.33	B-300	139.96	118.88	225.33	225.33
17		B-305	216.67	B-305	230.32	125.70	258.15	258.16	B-305	139.96	116.48	258.16	258.15
18		B-310	218.53	B-310	138.09	118.89	217.78	217.78	B-310	139.96	119.08	217.78	217.78
19		B-315	218.11	B-370	360.23	138.91	496.84	411.40	B-305	139.47	116.38	411.06	411.06
20		B-320	217.48	B-320	254.55	128.93	277.22	277.23	B-320	139.96	117.23	277.23	277.22
21		B-325	216.67	B-325	104.13	112.53	204.94	204.94	B-325	139.96	116.18	204.94	204.94
22		B-330	218.09	B-340	295.10	134.41	325.82	328.18	B-340	136.01	118.18	325.82	325.82
23		B-340	219.37	B-340	194.92	124.59	244.86	244.86	B-340	139.96	118.98	244.86	244.86
24		B-345	217.42	B-350	313.13	136.70	352.79	353.34	B-350	139.13	118.95	352.79	352.79
25		B-350	217.72	B-350	288.51	134.44	319.03	319.03	B-350	139.96	119.28	319.03	319.03
26		B-355	217.89	B-355	175.25	122.38	233.26	233.26	B-355	139.96	118.78	233.26	233.26
27		B-360	219.43	B-290	288.94	134.49	332.55	332.95	B-290	139.36	119.22	332.55	332.55
28		B-370	217.10	B-370	197.08	126.41	245.79	245.80	B-370	139.96	120.58	245.80	245.79
29		B-380	218.27	B-290	257.05	131.98	293.79	297.19	B-290	134.06	119.43	293.79	293.79
30		B-385	221.12	B-385	204.35	126.50	253.74	253.75	B-385	139.96	119.93	253.75	253.74
31		B-395	217.51	B-395	168.04	123.05	230.25	230.25	B-395	139.96	120.18	230.26	230.25
32		H-100	216.67	H-105	314.56	133.50	319.74	320.24	H-105	138.98	115.58	319.75	319.74
33		H-105	217.21	H-105	261.70	128.21	275.78	275.78	H-105	139.96	115.78	275.78	275.78
34		H-115	216.69	H-115	330.99	134.48	332.53	332.53	H-115	139.96	114.98	332.53	332.53
35		H-130	216.69	H-130	351.62	136.38	356.24	356.25	H-130	139.96	114.78	356.25	356.24
36		H-135	216.69	H-135	368.71	138.23	382.59	382.60	H-135	139.96	114.88	382.60	382.59
37		H-140	216.70	H-140	399.91	141.66	451.49	451.49	H-140	139.96	115.13	451.49	451.49

Peak Hour HGL 154.1m - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
1		453	JUN-1	JUN-3	26.14	297.00	120.00	51.30	0.74	0.06	2.27
2		469	JUN-1	JUN-2	145.95	610.00	120.00	36.74	0.13	0.01	0.04
3		473	B-245	JUN-3	172.60	297.00	120.00	-51.30	0.74	0.39	2.27
4		475	B-250	B-255	157.97	297.00	120.00	30.76	0.44	0.14	0.88
5		477	B-360	B-260	184.36	297.00	120.00	-19.28	0.28	0.07	0.37
6		479	B-380	B-370	173.91	250.00	110.00	3.04	0.06	0.01	0.03
7		481	B-290	B-380	106.31	250.00	110.00	-3.66	0.07	0.00	0.05
8		485	B-310	B-300	150.23	250.00	110.00	-0.83	0.02	0.000	0.00
9		489	B-250	B-100	104.68	204.00	110.00	0.01	0.000	0.00	0.00
10		491	B-100	B-110	177.45	204.00	110.00	-10.69	0.33	0.16	0.91
11		493	B-120	B-110	76.66	204.00	110.00	14.19	0.43	0.12	1.54
12		495	B-120	B-130	180.37	204.00	110.00	5.32	0.16	0.05	0.25
13		497	B-130	B-140	132.76	204.00	110.00	13.71	0.42	0.19	1.45
14		499	B-140	B-150	186.62	204.00	110.00	9.41	0.29	0.13	0.72
15		501	B-150	B-160	110.94	204.00	110.00	5.69	0.17	0.03	0.28
16		503	B-170	B-160	99.49	204.00	110.00	7.04	0.22	0.04	0.42
17		505	B-100	B-170	113.62	204.00	110.00	9.40	0.29	0.08	0.72
18		507	JUN-2	B-120	112.65	204.00	110.00	23.59	0.72	0.44	3.95
19		525	B-250	B-315	178.70	297.00	120.00	15.54	0.22	0.04	0.25
20		527	B-260	B-330	166.12	250.00	110.00	4.38	0.09	0.01	0.06
21		529	B-330	B-340	112.16	250.00	110.00	2.11	0.04	0.00	0.02
22		531	B-350	B-345	42.25	250.00	110.00	-12.06	0.25	0.02	0.42
23		533	B-270	B-360	114.57	297.00	120.00	-18.40	0.27	0.04	0.34
24		535	B-370	B-280	220.49	204.00	110.00	-3.62	0.11	0.03	0.12
25		537	B-380	B-270	142.19	297.00	120.00	-17.38	0.25	0.04	0.31
26		539	B-255	B-260	192.02	297.00	120.00	27.88	0.40	0.14	0.74
27		541	B-245	B-250	147.79	297.00	120.00	46.31	0.67	0.28	1.88
28		557	B-320	B-315	181.36	204.00	110.00	-10.61	0.32	0.16	0.90
29		559	B-345	B-260	106.53	250.00	110.00	-2.09	0.04	0.00	0.02
30		561	B-345	B-160	156.52	204.00	110.00	-11.32	0.35	0.16	1.01
31		563	B-380	B-385	143.94	250.00	110.00	7.23	0.15	0.02	0.16
32		565	B-385	B-395	123.78	250.00	110.00	4.09	0.08	0.01	0.06
33		567	B-395	B-300	119.52	250.00	110.00	0.83	0.02	0.000	0.00
34		569	B-310	B-355	216.24	204.00	110.00	-2.51	0.08	0.01	0.06
35		571	B-355	B-350	131.09	204.00	110.00	-12.06	0.37	0.15	1.14
36		575	7002	JUN-1	64.97	610.00	120.00	88.04	0.30	0.01	0.19
37		577	B-280	B-330	207.26	204.00	110.00	-8.33	0.25	0.12	0.57
38		579	B-320	B-330	164.53	204.00	110.00	7.81	0.24	0.08	0.51
39		581	B-315	B-305	153.64	250.00	110.00	2.45	0.05	0.00	0.02
40		583	B-305	B-325	147.89	250.00	110.00	0.79	0.02	0.000	0.00
41		585	JUN-5	JUN-4	107.57	610.00	120.00	-13.15	0.04	0.000	0.01
42		587	JUN-4	JUN-2	229.13	610.00	120.00	-13.15	0.04	0.00	0.01
43		589	B-130	H-100	149.38	204.00	110.00	-12.00	0.37	0.17	1.13
44		591	H-105	H-100	22.38	204.00	110.00	-0.98	0.03	0.000	0.01
45		593	H-100	H-115	54.28	204.00	110.00	-12.98	0.40	0.07	1.31
46		595	H-130	H-115	49.20	204.00	110.00	13.02	0.40	0.06	1.31
47		597	H-135	H-130	31.41	204.00	110.00	13.05	0.40	0.04	1.32
48		599	H-140	H-135	42.29	204.00	110.00	13.09	0.40	0.06	1.33
49		601	JUN-5	H-140	64.73	204.00	110.00	13.15	0.40	0.09	1.34

APPENDIX B



No.	Date	Issued/Revision	By
06			
05			
04			
03	13:06:25	ISSUED FOR MOE APPROVAL	J.I.M.
02	13:05:07	RE-ISSUED FOR SITE PLAN APPROVAL	J.I.M.
01	13:01:31	ISSUED FOR SITE PLAN APPLICATION	J.I.M.

PROJECT ARCHITECT

TURNER FLEISCHER

TURNER FLEISCHER ARCHITECTS INC.
67 Lesmill Road Toronto ON Canada M3B 2T8
Telephone (416) 425-2222 *Facsimile* (416) 425-6717
turnerfleischer.com

DESIGN ARCHITECT

CREATE
Architecture Planning & Design PLLC

The Chrysler Building
405 Lexington Avenue, Tower Suite 70
New York, NY 10174

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www.createworldwide.com

SITE/ CIVIL

IBI GROUP

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Fax: (416) 596-0644

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Canada K1S 5N4
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FAX (613)225-9868

ELECTRICAL

HAMMERSCHLAG + JOFFE I N C.

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F: (416) 444.1463
E: dwg@hamjof.com

PLANNER

FOTENN PLANNING & URBAN DESIGN

223 McLeod Street | Ottawa, ON | K2P 0Z8
T: 613,730,5709 ext.234 | F: 613,730,1136

DEVELOPER

RIOCAN

RioCan Real Estate Investment Trust
2300 Yonge Street
Suite 500
Toronto, Ontario
M4P 1E4
(416) 646 8330

DEVELOPER

TangerOutlets

Tanger Outlets
3200 Northline Avenue, Suite 360
Greensboro, North Carolina
27408

PROJECT

TANGER OUTLET CENTRES

KANATA ONTARIO

DWG. TITLE

SANITARY DRAINAGE AREA PLAN

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
07/05/13
PROVINCE OF ONTARIO

PROJECT NO. 32862	DATE JANUARY 2013
DRAWN BY M.M.	SCALE 1 : 1000
CHECKED BY J.I.M.	FILE NAME: —
	PLOT SCALE: 1:1
	DRAWING NUMBER: C-501

TRUE NORTH

SITE BENCHMARK
CONTROL MONUMENT
No. 19781211

J:\32862-RioTanger\5.0 Drawings\3Revit\Layout\C-501.dwg Layout Name: SANITARY DRAINAGE Plot Style: AIA STANDARD-HALF.CTB Plot Scale: 1:2 Plotted At: 6/25/2013 9:21 AM Last Saved By: mmima Last Saved At: Jun 19, 13

IBI GROUP
IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: TANGER OUTLET CENTRES
LOCATION: CITY OF OTTAWA
CLIENT: RIO-CAN MANAGEMENT INC

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			TOTAL FLOW	PROPOSED SEWER DESIGN						
				UNIT TYPES				AREA	POPULATION		PEAK FACTOR	PEAK FLOW	AREA (Ha)						PEAK FLOW	AREA (Ha)		FLOW		CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
													INSTITUTIONAL		HIGH PROFILE EMPLOY		PRESTIGE BUSINESS PK										(full)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH	APT	(Ha)	IND	CUM		(L/s)	IND	CUM	IND	CUM	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
Tanger Site		1A	2A						0.0		4.00	0.00			2.36	2.36			2.05	2.36	2.36	0.66	2.71	36.70	50.00	250	0.35	0.724	33.99	92.62
		2A	3A						0.0		4.00	0.00			0.93	3.29			2.86	0.93	3.29	0.92	3.78	36.70	52.50	250	0.35	0.724	32.93	89.71
		3A	7A						0.0		4.00	0.00			0.90	4.19			3.64	0.90	4.19	1.17	4.81	36.70	90.00	250	0.35	0.724	31.89	86.89
		7A	8A						0.0		4.00	0.00			0.58	4.77			4.14	0.58	4.77	1.34	5.48	36.70	58.50	250	0.35	0.724	31.23	85.08
		8A	9A						0.0		4.00	0.00			1.09	5.86			5.09	1.09	5.86	1.64	6.73	36.70	58.90	250	0.35	0.724	29.98	81.67
		9A	12A						0.0		4.00	0.00			1.69	7.55			6.55	1.69	7.55	2.11	8.67	36.70	74.08	250	0.35	0.724	28.03	76.38
Tanger Site		BLKHD	22A						0.0		4.00	0.00			0.76	0.76			0.66	0.76	0.76	0.21	0.87	43.87	32.00	250	0.50	0.866	43.00	98.01
		22A	21A						0.0		4.00	0.00			0.82	1.58			1.37	0.82	1.58	0.44	1.81	36.70	81.50	250	0.35	0.724	34.89	95.06
		21A	20A						0.0		4.00	0.00			2.32	3.90			3.39	2.32	3.90	1.09	4.48	36.70	99.00	250	0.35	0.724	32.23	87.80
		20A	19A						0.0		4.00	0.00			0.00	3.90			3.39	0.00	3.90	1.09	4.48	36.70	36.36	250	0.35	0.724	32.23	87.80
		19A	18A						0.0		4.00	0.00			1.52	5.42			4.70	1.52	5.42	1.52	6.22	36.70	93.00	250	0.35	0.724	30.48	83.05
		18A	17A						0.0		4.00	0.00			0.00	5.42			4.70	0.00	5.42	1.52	6.22	36.70	19.36	250	0.35	0.724	30.48	83.05
Hotel Site		103A	102A						0.0		4.00	0.00			0.66	0.66			0.57	0.66	0.66	0.18	0.76	48.06	70.50	250	0.60	0.948	47.30	98.42
		102A	101A						0.0		4.00	0.00			1.42	2.08			1.81	1.42	2.08	0.58	2.39	62.04	85.40	250	1.00	1.224	59.65	96.15
		101A	100A						0.0		4.00	0.00			0.06	2.14			1.86	0.06	2.14	0.60	2.46	43.87	39.43	250	0.50	0.866	41.41	94.40
Feedmill Creek Crossing		100A	17A						0.0		4.00	0.00			0.16	2.30			2.00	0.16	2.30	0.64	2.64	45.12	99.28	300	0.20	0.618	42.48	94.15
Tanger Site		17A	16A						0.0		4.00	0.00			0.29	8.01			6.95	0.29	8.01	2.24	9.20	45.12	68.30	300	0.20	0.618	35.92	79.62
		16A	15A						0.0		4.00	0.00			0.18	8.19			7.11	0.18	8.19	2.29	9.40	45.12	32.00	300	0.20	0.618	35.71	79.16
		15A	14A						0.0		4.00	0.00			0.00	8.19			7.11	0.00	8.19	2.29	9.40	45.12	27.12	300	0.20	0.618	35.71	79.16
Tanger Site		13A	14A						0.0		4.00	0.00			0.55	0.55			0.48	0.55	0.55	0.15	0.63	62.04	76.50	250	1.00	1.224	61.41	98.98
Tanger Site		14A	12A						0.0		4.00	0.00			0.13	8.87			7.70	0.13	0.13	0.04	7.74	45.12	58.78	300	0.20	0.618	37.38	82.85
Tanger Site/Huntmar		12A	11A						0.0		4.00	0.00			0.09	16.51			14.33	0.09	0.09	0.03	14.36	45.12	92.51	300	0.20	0.618	30.76	68.18
		11A	302A						0.0		4.00	0.00			0.00	16.51			14.33	0.00	0.22	0.06	14.39	45.12	25.03	300	0.20	0.618	30.72	68.10
		302A	301A						0.0		4.00	0.00			0.29	16.80			14.58	0.29	8.06	2.26	16.84	45.12	76.13	300	0.20	0.618	28.28	62.67
		301A	EX.						0.0		4.00	0.00			0.37	17.17			14.90	0.37	8.43	2.36	17.26	45.12	80.50	300	0.20	0.618	27.85	61.73
External (West)			604A						0.0		4.00	0.00					52.66	52.66	32.00	52.66	52.66	14.74	46.74	63.80		300	0.40	0.874	17.06	26.74
External (North)			604A						0.0		4.00	0.00					4.76	4.76	2.89	4.76	4.76	1.33	4.23	36.70	24.00	250	0.35	0.724	32.48	88.49
Campeau Drive		604A	603A						0.0		4.00	0.00					0.44	57.86	35.16	0.44	57.86	16.20	51.36	63.80	116.95	300	0.40	0.874	12.44	19.50
External (North)			603A						0.0		4.00	0.00					5.14	5.14	3.12	5.14	5.14	1.44	4.56	36.70	23.00	250	0.35	0.724	32.14	87.57
Campeau Drive		603A	602A						0.0		4.00	0.00					0.50	63.50	38.59	0.50	63.50	17.78	56.37	108.21	109.05	375	0.35	0.949	51.85	47.91
Campeau Drive		602A	601A						0.0		4.00	0.00					0.50	64.00	38.89	0.50	64.00	17.92	56.81	108.21	102.00	375	0.35	0.949	51.40	47.50
External (North)			601A						0.0		4.00	0.00					5.00	5.00	3.04	5.00	5.00	1.40	4.44	36.70	29.00	250	0.35	0.724	32.26	87.91
Campeau Drive		601A	600A						0.0		4.00	0.00					0.39	69.39	42.16	0.39	77.45	21.69	63.85	108.21	103.87	375	0.35	0.949	44.36	41.00

Design Parameters:

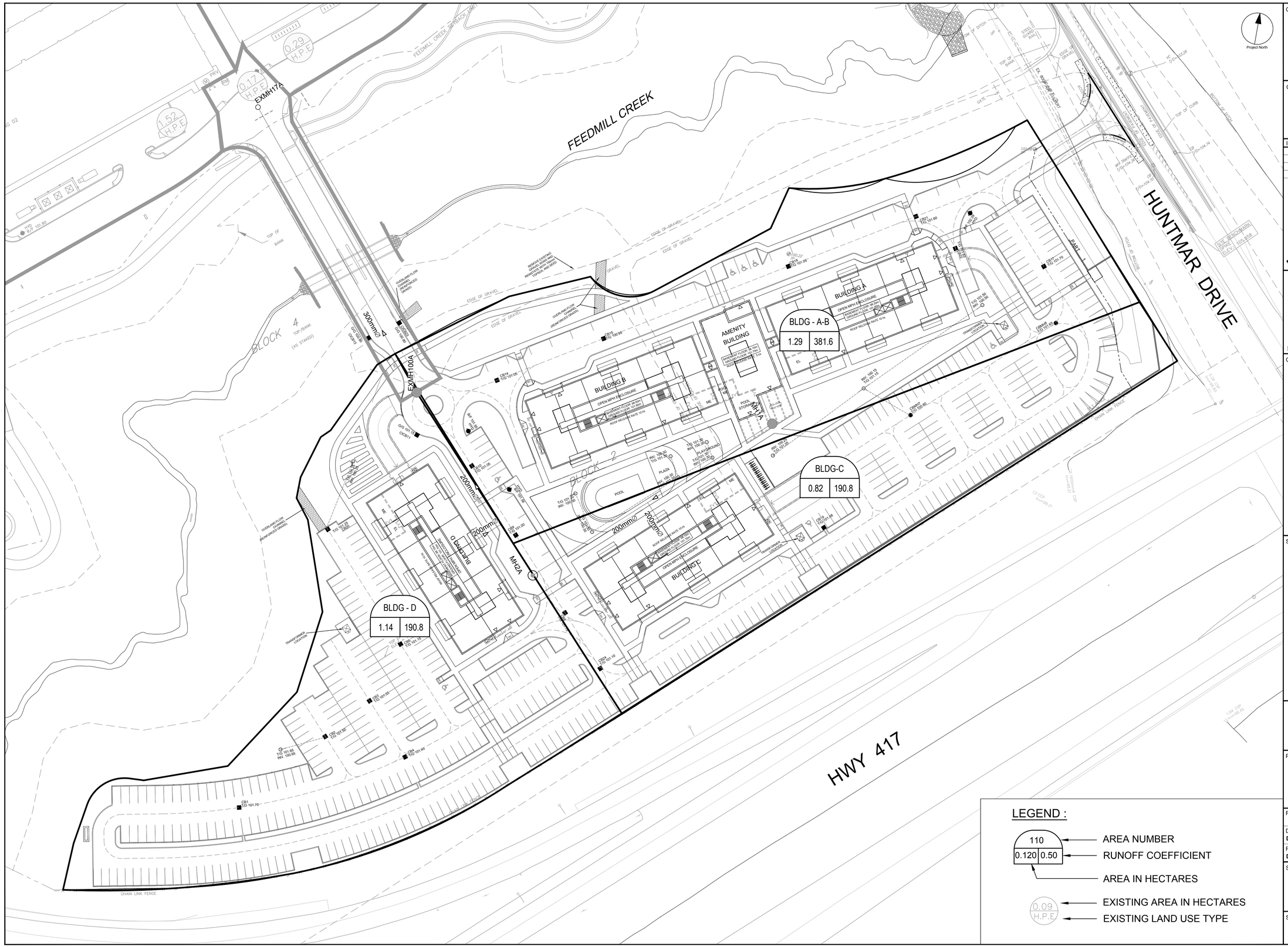
Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	2.3	p/p/u	EMP	50,000	L/Ha/day	1.5
Other	60	p/p/Ha	BUSS	35,000	L/Ha/day	1.5

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: J.I.M.
Checked: P.K.
Dwg. Reference: 32862 C-501/C-501A

No.	Revision	Date
1.	1st Submission for Site Plan Application	30/01/2013
2.	2nd Submission for Site Plan Application	20/05/2013
3.	Submitted For MOE Application	25/06/2013

File Reference: 32862.5.7.1
Date: 25/01/2013
Sheet No: 1 of 1



CLIENT

THE BURROUGHS KANATA LP

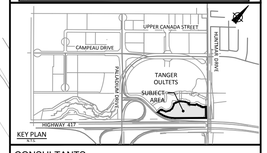
6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

C-010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS



CONSULTANTS

1:500 0 5 15 25m

SEAL

LICENCED PROFESSIONAL ENGINEER
L.D. G. Yannoulopoulos
2020/05/14
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO: 127255	
DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: D.G.Y.	APPROVED BY: D.G.Y.

SHEET TITLE
SANITARY DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-400	2

SCALE CHECK

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: W:\127255_8595Campeau\7.0_Production\7.03_Design\04_Civil\Sheets\C-400 SANITARY DRAINAGE AREA PLAN.dwg Last Saved: April 29, 2021, by dsiuma Plotted: Monday, May 17, 2021 2:46:13 PM by Don Siuma

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Ottawa, Ontario K1S 5N4 Canada
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SANITARY SEWER DESIGN SHEET

319 Huntmar Drive CITY
OF OTTAWA
The Burroughs Kanata LP

LOCATION				RESIDENTIAL									ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH		SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL				IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
														IND	CUM	IND	CUM	IND	CUM														
Site		MH1A	MH2A	2.11				318		572.4	572.4	3.35	6.22	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	2.11	2.11	0.70	0.00	0.00	6.92	21.64	85.75	200	0.40	0.667	14.72	68.03%
Site		MH2A	EX SAN	1.14				106		190.8	763.2	3.30	8.16	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.14	3.25	1.07	0.00	0.00	9.23	20.24	65.56	200	0.35	0.624	11.01	54.40%

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: JEB
Checked: DY
Dwg. Reference: 127255-400

No.	Revision	Date
1.	Issued for Site Plan Application	2021-05-14

File Reference: 127255.6.04
Date: 2021-05-14
Sheet No: 1 of 1

APPENDIX C

Ontario

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

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 4648-A2KQFP
Issue Date: September 28, 2015

RioCan Management Inc.
2300 Yonge Street, Suite 500
Toronto, Ontario
M4P 1E4

Site Location: 333 Huntmar Drive - Tanger Outlet Centre
Kanata West Pond 6 East SWM Facility
Part of Lots 3 and 4, Concession 1 (Huntley)
City of Ottawa

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

amendment of wastewater infrastructure servicing the approximately 20 hectare Tanger Outlet Mall and Hotel Site commercial development, located between Palladium Drive and Huntmar Drive, immediately south of Campeau Drive in the City of Ottawa, including stormwater management facilities for the collection, treatment and disposal of stormwater run-off from the development and from approximately 25.2 hectares of land external to the development and draining to the Tanger Outlet Centre SWM Facility, identified as Pond 6 East providing Enhanced Level water quality control and erosion protection, and attenuating post-development peak flows to targeted outflow rates established in the Kanata West Master Servicing Study for various storm events, discharging via Feedmill Creek to the Carp River and the Ottawa River, to increase the catchment area draining to the Kanata West Pond 6 East, consisting of the following:

Proposed Works:

stormwater management facility (Pond 6 East - revised catchment area 45.74 hectares): - a wet pond located west of Huntmar Drive, south of Campeau Drive, adjacent to and on the north side of Feedmill Creek with a sediment forebay, having a permanent pool volume of 10,477 m^3, an extended detention volume of 1,830 m^3, and a total storage volume of approximately 24,525 m^3, including the permanent pool volume, at a total depth of approximately 5.4 m, discharging to Feedmill Creek, just upstream of Huntmar Drive;

Previous Works:

sanitary sewer on Huntmar Drive from the development, and on Campeau Drive, connecting to an existing 375 mm diameter sanitary sewer at the intersection of Huntmar Drive and Campeau Drive which discharges to the Signature Ridge Pumping Station at Didsbury Road and Terry Fox Drive to the east;

storm sewer on Campeau Drive, west from Huntmar Drive, connecting through the Tanger Outlet Mall development to the stormwater management facility, identified below;

stormwater management facility (Pond 6 East - catchment area 39.35 hectares): - a wet pond located west of Huntmar Drive, south of Campeau Drive, adjacent to and on the north side of Feedmill Creek with a sediment forebay, having a permanent pool volume of 10,477 m^3, an extended detention volume of 1,766 m^3, and a total storage volume of approximately 23,610 m^3, including the permanent pool volume, at a total depth of approximately 5.4 m, discharging to Feedmill Creek, just upstream of Huntmar Drive;

oil and grit separator and outfall (catchment area 2.37 hectares): - a temporary oil and grit separator (Model Number Vortechs 16000 or Equivalent), receiving flows from the approximately 2.4 hectare Tanger Outlet Centre Hotel Site, located west of Huntmar Drive, adjacent to and on the south side of Feedmill Creek, having a sediment storage capacity of 5.43 m^3, an oil storage capacity of 3,175 L, a total storage volume of 18,349 L, and a peak treatment capacity of 707.9 L/s, discharging via an 825 mm diameter storm sewer outfall to Feedmill Creek, just upstream of Huntmar Drive;

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

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

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

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

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

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

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

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

"Owner" means RioCan Management Inc. and includes their successors and assignees;

"Previous Works" means those portions of the sewage Works previously approved under an Approval;

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

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

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

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

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

(2) The designation of the City of Ottawa as the operating authority of the site on the application for approval of the Works does not relieve the Owner from the responsibility of complying with any and all of the Conditions of this Approval.

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

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

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

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

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

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority necessary to construct or operate the sewage Works; or

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

(8) This Approval includes the treatment and disposal of stormwater run-off from the Tanger Outlet Mall commercial development, located between Palladium Drive and Huntmar Drive, immediately south of Campeau Drive in the Kanata West Business Park (approximately 19.75 hectares). This Approval is also for the treatment and disposal of stormwater run-off from lands to the north and adjacent to the commercial development draining to the stormwater management facility (Pond 6 East), for a total drainage area of 45.74 hectares, assuming an average imperviousness of 93%. Any future development changes within the total drainage area that might increase the required storage volumes or increase the flows to or from the wet pond or any structural/physical changes to the wet pond including the inlets or outlets will require an amendment to this Approval. This Approval is also for the temporary oil and grit separator and outfall for the Tanger Outlet Centre Hotel Site. Any modification or removal of the temporary outfall to Feedmill Creek will require an amendment to this Approval.

2. EXPIRY OF APPROVAL

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

3. CHANGE OF OWNER

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

(a) change of Owner;

(b) change of address of the Owner;

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

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

(2) In the event of any change in ownership of the Works, other than a change in ownership to the municipal, i.e. assumption of the Works, the Owner shall notify the succeeding owner in writing of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

(3) Notwithstanding any other requirements in this Approval, upon transfer of the ownership of the Works to a municipality, if applicable, any reference to the "District Manager" within the Terms and Conditions of this Approval shall be replaced with "Water Supervisor".

4. OPERATION AND MAINTENANCE

(1) The Owner shall ensure that the design minimum liquid retention volume is maintained at all times.

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

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

(a) the name of the Works

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

5. MONITORING AND REPORTING

(1) The Owner shall carry out a monitoring program for the inspection and maintenance of the Works as per the standardized SWM monitoring program specified by the City of Ottawa for the Kanata West Area and the requirements of the Mississippi Valley Conservation Authority.

(2) The Owner shall copy the District Manager on any and all reports submitted to the City of Ottawa and/or the Mississippi Valley Conservation Authority related to the operation and maintenance of the Works.

(3) After the Owner obtains a minimum of **two (2) years** of monitoring results following completion of the Works, the requirement to copy the District Manager in subsection (2) above may be modified by the District Manager upon written request.

6. TEMPORARY EROSION AND SEDIMENT CONTROL

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

(2) The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

7. RECORD KEEPING

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

Schedule "A"

1. Application for Environmental Compliance Approval, dated June 25, 2013 and received on July 3, 2013, submitted by IBI Group;

2. Application for Environmental Compliance Approval, dated June 28, 2013 and received on July 3, 2013, submitted by IBI Group, including a set of Engineering Drawings;

3. Supplementary information, dated July 10, 2013, submitted by IBI Group;

4. Design Brief, Tanger Outlet Centres, 333 Huntmar Drive, dated June 2013, prepared by IBI Group;

5. Kanata West Business Park, Stormwater Management Report and Pond 6 East Design Brief, 333 Huntmar Drive - Tanger Outlet Centres, dated June 2013, prepared by IBI Group;

6. Pipe Data Form for the storm and sanitary sewers including the storm and sanitary sewer design sheets;

7. E-mails from Peter Deir of IBI Group to the Ministry, dated August 1, 2013 and August 7, 2013;

8. Letter from Peter Spal of IBI Group to the Ministry, dated August 14, 2013;

9. Application for Environmental Compliance Approval, dated June 29, 2015 and received on July 13, 2015, submitted by the City of Ottawa;

10. Copy of letter from Stuart Craig of RioCan Management Inc. to West Ottawa Land Holdings Inc. and West Ottawa Land Holdings (2) Inc., dated June 24, 2015;

11. Amendment to Kanata West Business Park Stormwater Management Report and Pond 6 East Design Brief 333 Huntmar Drive - Tanger Outlet Centres, dated July 6, 2015, prepared by IBI Group;

12. Copy of letter from Myra Van Die of Mississippi Valley Conservation Authority to the City of Ottawa, dated July 10, 2015;

13. Copy of Memorandum from Don Moss of Greenland International Consulting Ltd. to Don Herweyer, dated June 14, 2013;

14. E-mail from Peter Deir of IBI Group to the Ministry, dated September 23, 2015; and

15. E-mail from Peter Deir of IBI Group to the Ministry, dated September 25, 2015.

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

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

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

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

4. Condition 4 is included to require that the Works be properly operated and maintained such that the environment is protected.

5. Condition 5 is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives specified in the Approval and that the Works do not cause any impairment to the receiving watercourse.

6. Condition 6 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction, until they are no longer required.

7. Condition 7 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 3371-9A5GTU issued on August 15, 2013.

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

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are

substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

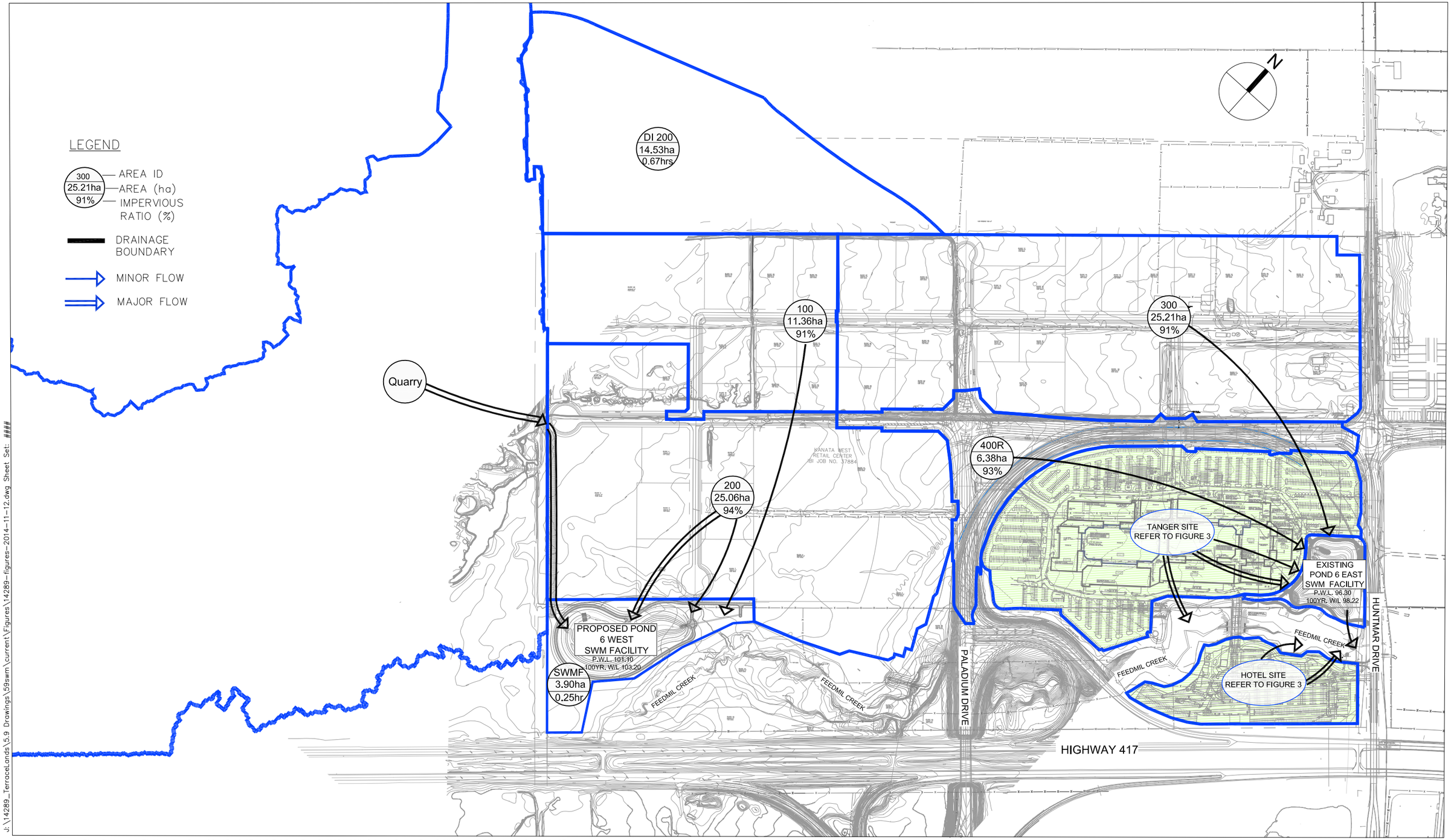
The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 28th day of September, 2015

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

DC/

c: District Manager, MOECC Ottawa office
Water Supervisor, MOECC Ottawa office
West Ottawa Land Holdings Inc. and West Ottawa Land Holdings (2) Inc.
Peter Spal, IBI Group



J:\14289_TerraceLands\5.9 Drawings\59swm\current\Figures\14289-figures-2014-11-12.dwg Sheet Set: ####

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IBI GROUP

Scale

N.T.S.

Project Title

TANGER OUTLETS CENTRE STORMWATER MANAGEMENT FACILITY

Drawing Title

POST-DEVELOPMENT SWM DRAINAGE BOUNDARIES OVERALL SITE

Sheet No.

FIGURE 2

Tanger Infiltration calcs (including 'Hotel Site')

Peter Deir <PDeir@IBIGroup.com>

Fri 5/7/2021 1:56 PM

To: Demetrius Yannoulopoulos <dyannoulopoulos@IBIGroup.com>; James Battison <James.Battison@ibigroup.com>
Cc: Peter Spal <pspal@IBIGroup.com>

2 attachments (269 KB)

WTR-infiltration-calculations-2013-09-17.pdf; WTR_tanger_swm_rpt_dsgn_brf_2013-10-24-text.pdf;

Hi D.,
Please see attached calculations from the 2013 Tanger SWM report (also attached for reference).
These calculations document the infiltration provided by the infiltration galleries on the Tanger site accommodates the 'Hotel Site', no additional infiltration required.
Thanks,

Peter Deir P.ENG., LEED® AP

IBI GROUP
Suite 400, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 ext 64056 fax +1 613 225 9868

Infiltration Calculations
Tanger Outlets Centre and
Hotel Site

The Site Specific Hydrogeological Analysis of the site indicates existing site infiltration is approximately 69.25mm/year. The KWMSS indicated that post development infiltration rates are to be increased by 25% above this rate, to 87mm/year. The subject site has a certain amount of infiltration under every rainfall event which will contribute to the required infiltration rate of approximately 87 mm/year. This site will also be provided with infiltration galleries fed by rooftop drains. The subject site has been modeled using hydrological computer model to confirm effective runoff coefficient, which accounts for depression storage and initial abstraction losses. Evapotranspiration losses from the pervious areas have also been accounted for using the MOE Stormwater Management Planning and Design Manual (March, 2003) Table 3.1. The following table outlines the infiltration calculations for the site.

1. <u>Infiltration Volume Summary:</u>

Area ID		Area (ha)	Effective Runoff Coefficient	ET (m^3)	Infiltration Volume (m^3)		Balance (m^3)
					Req'd	Prov'd	
Campeau Dr Extension/Palladium							
400R		5.45	0.952	1431	4742	954	-3787
Tanger Site							
401		5.32	0.991	279	4628	162	-4466
402		3.93	0.990	206	3419	0	-3419
403		0.83	0.988	44	722	0	-722
404		4.08	0.991	214	3550	139	-3411
405		0.66	0.264	3465	574	1002	428
Pond 6 East	Grassed Area	0.49	0.264	2573	1340	744	-579
	Permanent Pool	1.05	0.843	n/a		17	
Hotel Site							
500		2.29	0.992	120	1992	56	-1936
501		0.27	1.000	0	235	0	-235
500A		1.37	0.204	7193	1192	2840	1648
Totals		**25.74**	**0.901**	**15524**	**22394**	**5916**	**-16478**

Where:

- Effective Runoff Coefficient is the runoff coefficient from the 25 mm 4 hour Chicago storm event (SWMHYMO) accounting for depression storage and initial abstraction losses
- ET is Evapotranspiration losses, which are based on the MOE Stormwater Management Planning and Design Manual (March, 2003) Table 3.1, indicating 525mm/year for Urban Lawns/Shallow Rooted Crops in Clay.
- Required infiltration is based on the 86mm/year as per the KWMSS (25% increase of existing condition 69mm/year)
- Provided infiltration is based on drainage area, Effective Runoff Coefficient and annual precipitation of 920 mm/year as obtained from the Government of Canada Climate Normals Data for Station Ottawa CDA (January through December). Example calculation for Area 405 is provided below:

$$Provided\ Infiltration\ Volume = \left[(1 - 0.264)\ x\ 0.66ha\ x \frac{920mm}{year} x\ 10\right] - 3465 = 1002m^3$$

2. Calculation of Infiltration from Bottom of SWM Facility

$$Q = kiA = \frac{1x10^{-9}m}{s} x 0.0102 x 5433m^2 x \frac{3600s}{hr} x \frac{24hr}{day} x \frac{365days}{year} = 17.6m^3/year$$

Where:

- *i* is the hydraulic gradient calculated as:
  - $i = \frac{96.30-95.38}{90m} = 0.0102$
    Where 96.30m is the permanent water level in Pond 6 East, 95.38m is the invert of the adjacent Feedmill Creek. The distance from the approximate centroid of the SWM facility to Feedmill Creek is approximately 90m.
- 0.036 mm/hour is the hydraulic conductivity of silty clay
- A is the area of the bottom of the pond.

On an annual basis, approximately 22394m^3 of infiltration is required for the site based on the 25.74ha drainage area and 87mm/year infiltration target. Based on the hydrological modeling completed, the site will provide approximately 5916m^3 of infiltration on an annual basis, or 23mm/year. This approximation is a conservative estimate and based on hydrological simulations using a relatively high volume 25 mm 4 hour Chicago storm event. In reality, the percentage of infiltration is much higher since typical storm events are about 1 to 5 mm. The above calculations indicate that additional stormwater management measures will be required to meet the required infiltration targets for the site.

Therefore, it is proposed that the balance of the required infiltration for the site will be provided by Infiltration Galleries fed by rooftop drains. The proposed infiltration galleries have been sized to maximize infiltration potential for the site. The sizing was based on individual roof drainage area, daily precipitation data (taken for wet year to minimize overflow), infiltration through the bottom and the bottom 1/3 of the side walls, and percolation rates confirmed by Hydrogeological investigation of the site. The sizing of the galleries has been tailored for each Building roof area, with average overflow volume calculated at approximately 6% of annual runoff volume into the galleries. Detailed building specific example calculation is provided herewith for reference. The calculations are also based on 95% of the annual 920mm precipitation from rooftops being available as runoff to fill the infiltration galleries. A summary of the infiltration calculations are provided below:

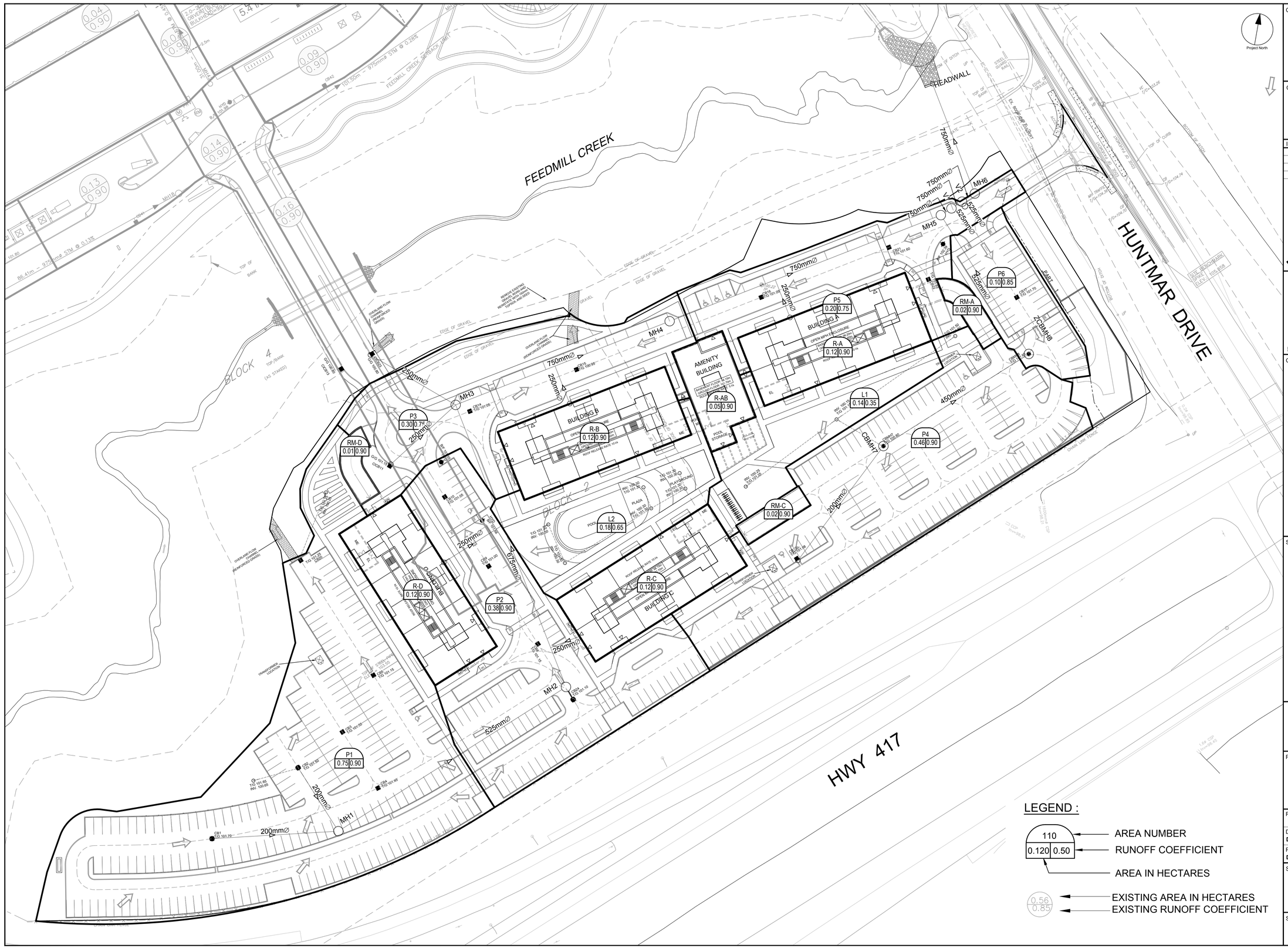
3. Infiltration Gallery Calculations on an Annual Basis:

Building ID	Area (m^2)	Annual Runoff Volume (m^3)	Overflow Volume (m^3)	Annual Volume Infiltrated (m^3)
Building03	3732	3262	193	3069
Building04	2679	2341	166	2175
Building05	3519	3076	232	2843
Building06	1505	1315	109	1206
Building07	5025	4392	242	4150
Building09	6857	5993	453	5540
	Totals	20379	1395	18984

Where:

- Annual Runoff Volume is based on rooftop area and 95% of the annual 920mm precipitation (874mm/year) from rooftops available as runoff
- Overflow Volume is based on building specific infiltration gallery sizing

The balance of required infiltration will be provided by infiltration galleries fed by rooftop drains. The infiltration galleries will provide an additional 18984m^3 of infiltration on an annual basis, or 74mm/year. The total infiltration provided by the site is therefore 97mm/year, above the required post-development rate of 86mm/year.



LEGEND :

- 110 / 0.120 | 0.50 — AREA NUMBER; RUNOFF COEFFICIENT; AREA IN HECTARES
- 0.56 / 0.85 — EXISTING AREA IN HECTARES; EXISTING RUNOFF COEFFICIENT

CLIENT

THE BURROUGHS KANATA LP

6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

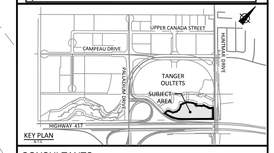
ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

SHEET LIST: C-010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS

KEY PLAN



CONSULTANTS

1:500 (0, 5, 15, 25m)

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2020/05/14
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO: 127255	
DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: D.G.Y.	APPROVED BY: D.G.Y.

SHEET TITLE
STORM DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-500	2

SCALE CHECK

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: W:\127255_8505\Campeau\7.0_Production\7.03_Design\04_Civil\Sheets\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: May 11, 2021, by dsiuma Plotted: Monday, May 17, 2021 2:48:47 PM by Don Siuma

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

STORM SEWER DESIGN SHEET

319 Huntmar Drive
City of Ottawa
The Burroughs Kanata LP

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.30	C= 0.35	C= 0.57	C= 0.65	C= 0.69	C= 0.75	C= 0.85	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Site	P1	MH1	MH2										0.75	1.88	1.88	10.00	1.75	11.75	76.81	104.19	122.14	178.56	144.12	195.52	229.20	335.07	0.00	0.00	144.12	173.76	81.50	525			0.15	0.778	29.64	17.06%
Site	P2, R-C, R-D, L2	MH2	MH3						0.18				0.62	1.88	3.75	11.75	1.66	13.41	70.69	95.79	112.25	164.03	265.30	359.50	421.26	615.59	0.00	0.00	265.30	339.63	91.60	675			0.15	0.919	74.33	21.89%
Site	P3. R-B, R-AB	MH3	MH4								0.30		0.17	1.05	4.80	13.41	1.17	14.58	65.80	89.08	104.35	152.44	316.10	427.94	501.29	732.27	0.00	0.00	316.10	449.81	69.50	750			0.15	0.986	133.71	29.73%
Site	P5, R-A	MH4	MH5								0.20		0.12	0.72	5.52	14.58	1.49	16.07	62.77	84.93	99.47	145.27	346.57	468.93	549.19	802.05	0.00	0.00	346.57	449.81	88.08	750			0.15	0.986	103.24	22.95%
Site	P4, L1	CBMH7	CBMH8				0.14						0.47	1.31	1.31	10.00	1.07	11.07	76.81	104.19	122.14	178.56	100.78	136.72	160.27	234.30	0.00	0.00	100.78	133.02	52.05	450			0.20	0.810	32.24	24.23%
Site	P6	CBMH8	MH5									0.10		0.24	1.55	11.07	0.91	11.98	72.92	98.86	115.86	169.33	112.92	153.08	179.40	262.20	0.00	0.00	112.92	200.65	49.17	525			0.20	0.898	87.72	43.72%
Site		MH5	VI											0.00	7.07	16.07	0.06	16.13	59.35	80.25	93.97	137.19	419.60	567.35	664.30	969.89	0.00	0.00	419.60	519.40	3.81	750			0.20	1.139	99.80	19.22%
Street No. 8	S107	VI	V2											0.00	7.07	16.13	0.06	16.18	59.23	80.09	93.77	136.91	418.75	566.19	662.93	967.88	0.00	0.00	418.75	519.40	3.79	750			0.20	1.139	100.65	19.38%
Street No. 9	S108	V2	MH6											0.00	7.07	16.18	0.07	16.25	59.11	79.93	93.58	136.63	417.91	565.04	661.58	965.90	0.00	0.00	417.91	519.40	4.56	750			0.20	1.139	101.49	19.54%
Street No. 10	S109	MH6	HEADWALL											0.00	7.07	16.25	0.52	16.77	58.97	79.73	93.35	136.29	416.90	563.66	659.96	963.52	0.00	0.00	416.90	519.40	35.63	750			0.20	1.139	102.50	19.73%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: JEB

Checked: DY

Dwg. Reference: 127255-500

No.	Revision	Date
1.	Issued for Site Plan Application	2021-05-15

File Reference: 127255.6.04
Date: 2021-05-14
Sheet No: 1 of 1

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PROJECT: 319 HUNTMAR RD
DATE: 2021-04-19
FILE: 127255-6.4
REV #: -
DESIGNED BY: JB
CHECKED BY: D.G.Y.

STORMWATER MANAGEMENT

Maximum Allowable Release Rate

Maximum Flow to Creek (per KWBP Pond 6 approved report) 1218 l/s
Maximum allowable peak flow from OGS to creek per MOE ECA 707 l/s

Maximum Allowable Release Rate ($Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$)

$Q_{max\ allowable}$ = 700.00 L/s per MOE ECA

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = $732.951 / (T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	Roof Area A														
Area (Ha)	0.120														
C =	1.00	Restricted Flow Q_r (L/s)=	10.000												
100-Year Ponding															
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)										
27	98.66	32.91	10.00	22.91	37.12										
28	96.27	32.12	10.00	22.12	37.16										
29	94.01	31.36	10.00	21.36	**37.17**										
30	91.87	30.65	10.00	20.65	37.17										
31	89.83	29.97	10.00	19.97	37.14										

Drainage Area	Roof Area A														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
5-Year Ponding															
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)										
14	86.93	26.10	10.00	16.10	13.52										
15	83.56	25.09	10.00	15.09	13.58										
16	80.46	24.16	10.00	14.16	**13.59**										
17	77.61	23.30	10.00	13.30	13.57										
18	74.97	22.51	10.00	12.51	13.51										

Drainage Area	Roof Area A														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
2-Year Ponding															
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)										
10	76.81	23.06	10.00	13.06	7.84										
11	73.17	21.97	10.00	11.97	7.90										
12	69.89	20.98	10.00	10.98	**7.91**										
13	66.93	20.09	10.00	10.09	7.87										
14	64.23	19.29	10.00	9.29	7.80										

Drainage Area	Roof Area B														
Area (Ha)	0.120														
C =	1.00	Restricted Flow Q_r (L/s)=	10.000												
100-Year Ponding															
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)										
27	98.66	32.91	10.00	22.91	37.12										
28	96.27	32.12	10.00	22.12	37.16										
29	94.01	31.36	10.00	21.36	**37.17**										
30	91.87	30.65	10.00	20.65	37.17										
31	89.83	29.97	10.00	19.97	37.14										

Drainage Area	Roof Area B														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
5-Year Ponding															
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)										
14	86.93	26.10	10.00	16.10	13.52										
15	83.56	25.09	10.00	15.09	13.58										
16	80.46	24.16	10.00	14.16	**13.59**										
17	77.61	23.30	10.00	13.30	13.57										
18	74.97	22.51	10.00	12.51	13.51										

Drainage Area	Roof Area B														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
2-Year Ponding															
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)										
10	76.81	23.06	10.00	13.06	7.84										
11	73.17	21.97	10.00	11.97	7.90										
12	69.89	20.98	10.00	10.98	**7.91**										
13	66.93	20.09	10.00	10.09	7.87										
14	64.23	19.29	10.00	9.29	7.80										

Drainage Area	Roof Area C														
Area (Ha)	0.120														
C =	1.00	Restricted Flow Q_r (L/s)=	10.000												
100-Year Ponding															
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)										
27	98.66	32.91	10.00	22.91	37.12										
28	96.27	32.12	10.00	22.12	37.16										
29	94.01	31.36	10.00	21.36	**37.17**										
30	91.87	30.65	10.00	20.65	37.17										
31	89.83	29.97	10.00	19.97	37.14										

Drainage Area	Roof Area C														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
5-Year Ponding															
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)										
14	86.93	26.10	10.00	16.10	13.52										
15	83.56	25.09	10.00	15.09	13.58										
16	80.46	24.16	10.00	14.16	**13.59**										
17	77.61	23.30	10.00	13.30	13.57										
18	74.97	22.51	10.00	12.51	13.51										

Drainage Area	Roof Area C														
Area (Ha)	0.120														
C =	0.90	Restricted Flow Q_r (L/s)=	10.000												
2-Year Ponding															
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)										
10	76.81	23.06	10.00	13.06	7.84										
11	73.17	21.97	10.00	11.97	7.90										
12	69.89	20.98	10.00	10.98	**7.91**										
13	66.93	20.09	10.00	10.09	7.87										
14	64.23	19.29	10.00	9.29	7.80										

Drainage Area	Roof Area D				
Area (Ha)	0.120				
C =	1.00	Restricted Flow Q_r (L/s)=		10.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
27	98.66	32.91	10.00	22.91	37.12
28	96.27	32.12	10.00	22.12	37.16
29	94.01	31.36	10.00	21.36	**37.17**
30	91.87	30.65	10.00	20.65	37.17
31	89.83	29.97	10.00	19.97	37.14

Drainage Area	Roof Area D				
Area (Ha)	0.120				
C =	0.90	Restricted Flow Q_r (L/s)=		10.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
14	86.93	26.10	10.00	16.10	13.52
15	83.56	25.09	10.00	15.09	13.58
16	80.46	24.16	10.00	14.16	**13.59**
17	77.61	23.30	10.00	13.30	13.57
18	74.97	22.51	10.00	12.51	13.51

Drainage Area	Roof Area D				
Area (Ha)	0.120				
C =	0.90	Restricted Flow Q_r (L/s)=		10.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	23.06	10.00	13.06	7.84
11	73.17	21.97	10.00	11.97	7.90
12	69.89	20.98	10.00	10.98	**7.91**
13	66.93	20.09	10.00	10.09	7.87
14	64.23	19.29	10.00	9.29	7.80

Drainage Area	Roof Area AB				
Area (Ha)	0.050				
C =	1.00	Restricted Flow Q_r (L/s)=		5.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
22	112.88	15.69	5.00	10.69	14.11
23	109.68	15.25	5.00	10.25	14.14
24	106.68	14.83	5.00	9.83	**14.15**
25	103.85	14.43	5.00	9.43	14.15
26	101.18	14.06	5.00	9.06	14.14

Drainage Area	Roof Area AB				
Area (Ha)	0.050				
C =	0.90	Restricted Flow Q_r (L/s)=		5.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
12	94.70	11.85	5.00	6.85	4.93
13	90.63	11.34	5.00	6.34	4.94
14	86.93	10.88	5.00	5.88	**4.94**
15	83.56	10.45	5.00	5.45	4.91
16	80.46	10.07	5.00	5.07	4.86

Drainage Area	Roof Area AB				
Area (Ha)	0.050				
C =	0.90	Restricted Flow Q_r (L/s)=		5.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	10.69	5.00	5.69	2.73
9	80.87	10.12	5.00	5.12	2.76
10	76.81	9.61	5.00	4.61	**2.76**
11	73.17	9.15	5.00	4.15	2.74
12	69.89	8.74	5.00	3.74	2.70

Drainage Area	P1				
Area (Ha)	0.750				
C =	1.00	Restricted Flow Q_r (L/s)=		230.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
6	226.01	471.23	230.00	241.23	86.84
7	211.67	441.33	230.00	211.33	88.76
8	199.20	415.33	230.00	185.33	**88.96**
9	188.25	392.51	230.00	162.51	87.76
10	178.56	372.30	230.00	142.30	85.38

Drainage Area	P1				
Area (Ha)	0.750				
C =	0.90	Restricted Flow Q_r (L/s)=		230.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
1	203.51	381.89	230.00	151.89	9.11
2	182.69	342.82	230.00	112.82	13.54
3	166.09	311.66	230.00	81.66	**14.70**
4	152.51	286.18	230.00	56.18	13.48
5	141.18	264.92	230.00	34.92	10.48

Drainage Area	P1				
Area (Ha)	0.750				
C =	0.90	Restricted Flow Q_r (L/s)=		230.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
-1	192.83	361.85	230.00	131.85	-7.91
0	167.22	313.79	230.00	83.79	0.00
1	148.14	277.99	230.00	47.99	**2.88**
2	133.33	250.19	230.00	20.19	2.42
3	121.46	227.93	230.00	-2.07	-0.37

Drainage Area	P2				
Area (Ha)	0.380				
C =	1.00	Restricted Flow Q_r (L/s)=		160.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
3	286.05	302.18	160.00	142.18	25.59
4	262.41	277.21	160.00	117.21	28.13
5	242.70	256.39	160.00	96.39	**28.92**
6	226.01	238.76	160.00	78.76	28.35
7	211.67	223.61	160.00	63.61	26.71

Drainage Area	P2				
Area (Ha)	0.380				
C =	0.90	Restricted Flow Q_r (L/s)=		160.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
-1	266.98	253.83	160.00	93.83	-5.63
0	230.48	219.13	160.00	59.13	0.00
1	203.51	193.49	160.00	33.49	**2.01**
2	182.69	173.69	160.00	13.69	1.64
3	166.09	157.91	160.00	-2.09	-0.38

Drainage Area	P2				
Area (Ha)	0.380				
C =	0.90	Restricted Flow Q_r (L/s)=		100.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
0	167.22	158.99	100.00	58.99	0.00
1	148.14	140.85	100.00	40.85	2.45
2	133.33	126.77	100.00	26.77	**3.21**
3	121.46	115.48	100.00	15.48	2.79
4	111.72	106.22	100.00	6.22	1.49

Drainage Area	P3				
Area (Ha)	0.300				
C =	0.94	Restricted Flow Q_r (L/s)=		65.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
9	188.25	147.19	65.00	82.19	44.38
10	178.56	139.61	65.00	74.61	44.77
11	169.91	132.85	65.00	67.85	**44.78**
12	162.13	126.77	65.00	61.77	44.47
13	155.11	121.27	65.00	56.27	43.89

Drainage Area	P3				
Area (Ha)	0.300				
C =	0.75	Restricted Flow Q_r (L/s)=		65.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
2	182.69	114.27	65.00	49.27	5.91
3	166.09	103.89	65.00	38.89	7.00
4	152.51	95.39	65.00	30.39	**7.29**
5	141.18	88.31	65.00	23.31	6.99
6	131.57	82.30	65.00	17.30	6.23

Drainage Area	P3				
Area (Ha)	0.300				
C =	0.75	Restricted Flow Q_r (L/s)=		65.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
0	167.22	104.60	65.00	39.60	0.00
1	148.14	92.66	65.00	27.66	1.66
2	133.33	83.40	65.00	18.40	**2.21**
3	121.46	75.98	65.00	10.98	1.98
4	111.72	69.88	65.00	4.88	1.17

Drainage Area	P4				
Area (Ha)	0.460				
C =	1.00	Restricted Flow Q_r (L/s)=		130.000	
100-Year Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
6	226.01	289.02	130.00	159.02	57.25
7	211.67	270.68	130.00	140.68	59.09
8	199.20	254.74	130.00	124.74	**59.87**
9	188.25	240.74	130.00	110.74	59.80
10	178.56	228.34	130.00	98.34	59.00

Drainage Area	P4				
Area (Ha)	0.460				
C =	0.90	Restricted Flow Q_r (L/s)=		130.000	
5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
1	203.51	234.22	130.00	104.22	6.25
2	182.69	210.26	130.00	80.26	9.63
3	166.09	191.15	130.00	61.15	**11.01**
4	152.51	175.52	130.00	45.52	10.93
5	141.18	162.49	130.00	32.49	9.75

Drainage Area	P4				
Area (Ha)	0.460				
C =	0.90	Restricted Flow Q_r (L/s)=		130.000	
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
0	167.22	192.46	130.00	62.46	0.00
1	148.14	170.50	130.00	40.50	2.43
2	133.33	153.45	130.00	23.45	**2.81**
3	121.46	139.79	130.00	9.79	1.76
4	111.72	128.58	130.00	-1.42	-0.34

Drainage Area	P5
Area (Ha)	0.200
C =	0.94
Restricted Flow Q_r (L/s)=	40.000

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
6	226.01	117.81	40.00	77.81	28.01
7	211.67	110.33	40.00	70.33	29.54
8	199.20	103.83	40.00	63.83	**30.64**
9	188.25	98.13	40.00	58.13	31.39
10	178.56	93.07	40.00	53.07	31.84

Drainage Area	P5
Area (Ha)	0.200
C =	0.75
Restricted Flow Q_r (L/s)=	40.000

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
2	182.69	76.18	40.00	36.18	4.34
3	166.09	69.26	40.00	29.26	5.27
4	152.51	63.60	40.00	23.60	**5.66**
5	141.18	58.87	40.00	18.87	5.66
6	131.57	54.86	40.00	14.86	5.35

Drainage Area	P5
Area (Ha)	0.200
C =	0.75
Restricted Flow Q_r (L/s)=	40.000

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
1	148.14	61.78	40.00	21.78	1.31
2	133.33	55.60	40.00	15.60	1.87
3	121.46	50.65	40.00	10.65	**1.92**
4	111.72	46.59	40.00	6.59	1.58
5	103.57	43.19	40.00	3.19	0.96

Drainage Area	P6
Area (Ha)	0.100
C =	1.00
Restricted Flow Q_r (L/s)=	20.000

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
10	178.56	49.64	20.00	29.64	17.78
11	169.91	47.23	20.00	27.23	17.97
12	162.13	45.07	20.00	25.07	**18.05**
13	155.11	43.12	20.00	23.12	18.03
14	148.72	41.34	20.00	21.34	17.93

Drainage Area	P6
Area (Ha)	0.100
C =	0.85
Restricted Flow Q_r (L/s)=	20.000

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
3	166.09	39.25	20.00	19.25	3.46
4	152.51	36.04	20.00	16.04	3.85
5	141.18	33.36	20.00	13.36	**4.01**
6	131.57	31.09	20.00	11.09	3.99
7	123.30	29.14	20.00	9.14	3.84

Drainage Area	P6
Area (Ha)	0.100
C =	0.85
Restricted Flow Q_r (L/s)=	20.000

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
1	148.14	35.01	20.00	15.01	0.90
2	133.33	31.51	20.00	11.51	1.38
3	121.46	28.70	20.00	8.70	**1.57**
4	111.72	26.40	20.00	6.40	1.54
5	103.57	24.47	20.00	4.47	1.34

Drainage Area	L1
Area (Ha)	0.140
C =	0.44
Restricted Flow Q_r (L/s)=	10.000

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)
13	155.11	26.41	10.00	16.41	12.80
14	148.72	25.32	10.00	15.32	12.87
15	142.89	24.33	10.00	14.33	**12.90**
16	137.55	23.42	10.00	13.42	12.88
17	132.63	22.58	10.00	12.58	12.84

Drainage Area	L1
Area (Ha)	0.140
C =	0.35
Restricted Flow Q_r (L/s)=	10.000

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
5	141.18	19.23	10.00	9.23	2.77
6	131.57	17.92	10.00	7.92	2.85
7	123.30	16.80	10.00	6.80	**2.85**
8	116.11	15.82	10.00	5.82	2.79
9	109.79	14.96	10.00	4.96	2.68

Drainage Area	L1
Area (Ha)	0.140
C =	0.35
Restricted Flow Q_r (L/s)=	10.000

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
2	133.33	18.16	10.00	8.16	0.98
3	121.46	16.55	10.00	6.55	1.18
4	111.72	15.22	10.00	5.22	**1.25**
5	103.57	14.11	10.00	4.11	1.23
6	96.64	13.16	10.00	3.16	1.14

Sizing Estimate

Provided by Jennifer Knowles on January 21, 2013

TANGER OUTLET MALL – HOTEL SITE, Ottawa, ON
Stormwater Treatment System Design Summary

Information provided by IBI Group:

- Drainage area = 2.6 ha
- Runoff coefficient = 0.9
- 5 yr flow (rational method) = 678 L/s
- 100 yr (inlet control) = 760 L/s
- Pipe size = 750 mm CONC

- Sediment removal efficiency required = 80%
- Sediment particle gradation = 50 microns

Sizing Summary:

The Vortechs® Stormwater Treatment System is a hydrodynamic separator designed to enhance gravitational separation of floating and settleable materials from stormwater flows. Stormwater flows enter the unit tangentially to the treatment chamber, which promotes a gentle swirling motion. As stormwater circles the treatment chamber, pollutants migrate toward the center of the unit where velocities are the lowest. Sediments accumulate in the bottom of the swirl chamber, while floating debris, oil and grease form a floating layer trapped upstream of the floatables baffle wall.

For this project the Vortechs system was designed to remove at least 80% of an average particle size of 50 microns based on historical rainfall data. For this site CONTECH Construction Products recommends the following:

Vortechs Model & Configuration	Peak Treatment Capacity (l/s)	Sediment Storage Capacity (cubic meters)	Oil Spill Capacity (liters)	Total Holding Capacity (liters)	Heaviest Pick Weight (kg)
16000 in-line	707.9	5.43	3175	18349	22300

We have supplied project specific efficiency and flow calculations for your use and review.

Maintenance:

Like any stormwater best management practice, the Vortechs system requires regular inspection and maintenance to ensure optimal performance. Maintenance frequency will be driven by site conditions. Quarterly visual inspections are recommended, at which time the accumulation of pollutants can be determined. On average, the Vortechs system requires annual removal of accumulated pollutants.

Thank you for the opportunity to present this information to you and your client.

200 Enterprise Drive, Scarborough ME 04074
Toll-free: 877.907.8676 Fax: 207.885.9825

VORTECHS SYSTEM® ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON AN AVERAGE PARTICLE SIZE OF 50 MICRONS
TANGER OUTLET MALL – HOTEL SITE
OTTAWA, ON
MODEL 16000 IN-LINE

CONTECH ENGINEERED SOLUTIONS

Design Ratio[1] = $\frac{\text{(2.6 hectares) x (0.9) x (2.775)}}{\text{(10.5 m2)}}$ **= 0.61**

Rainfall Intensity mm/hr	Operating Rate[2] % of capacity	Flow Treated (l/s)	% Total Rainfall Volume[3]	Rmvl. Effcy[4] (%)	Rel. Effcy (%)
0.5	0.5	3.2	10.7%	100.0%	10.7%
1.0	0.9	6.5	9.3%	100.0%	9.3%
1.5	1.4	9.7	10.3%	98.0%	10.1%
2.0	1.8	13.0	8.6%	98.0%	8.4%
2.5	2.3	16.2	6.7%	97.0%	6.5%
3.0	2.7	19.5	5.8%	97.0%	5.6%
3.6	3.2	22.7	5.0%	95.8%	4.8%
4.1	3.7	25.9	4.4%	95.8%	4.2%
4.6	4.1	29.2	2.3%	94.1%	2.2%
5.1	4.6	32.4	4.2%	94.1%	3.9%
6.4	5.7	40.5	7.4%	92.6%	6.8%
7.6	6.9	48.6	4.0%	91.2%	3.7%
8.9	8.0	56.7	3.5%	88.3%	3.1%
10.2	9.2	64.9	1.8%	87.1%	1.6%
11.4	10.3	73.0	3.8%	85.8%	3.2%
12.7	11.5	81.1	1.4%	84.0%	1.2%
19.1	17.2	121.6	5.2%	74.0%	3.9%
25.4	22.9	162.1	2.4%	67.0%	1.6%
38.1	34.4	243.2	2.3%	52.4%	1.2%
					92.1%

% rain falling at >38.1 mm/hr =	0.8%
Assumed Removal Efficiency of remaining % =	0.0%
Removal Efficiency Adjustment[5] =	6.5%
Predicted Net Annual Load Removal Efficiency =	**86%**

1 - Design Ratio = (Total Drainage Area) x (Runoff Coefficient) x (Rational Method Conversion) / Grit Chamber Area
- The Total Drainage Area and Runoff Coefficient are specified by the site engineer.
- The rational method conversion based on the units in the above equation is 2.775.

2 - Operating Rate (% of capacity) = percentage of peak operating rate of 68 l/s/m^2.

3 - Based on 10 years of rainfall data from Canadian Station 6105976, Ottawa CDA, ON

4 - Based on Contech Construction Products laboratory verified removal of an average particle size of 50 microns (see Vortechs Guide).

5- Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Calculated by:	JAK	1/21	Checked by:

VORTECHS SYSTEM® ESTIMATED FLOW CALCULATIONS
TANGER OUTLET MALL – HOTEL SITE
OTTAWA, ON
MODEL 16000 IN-LINE

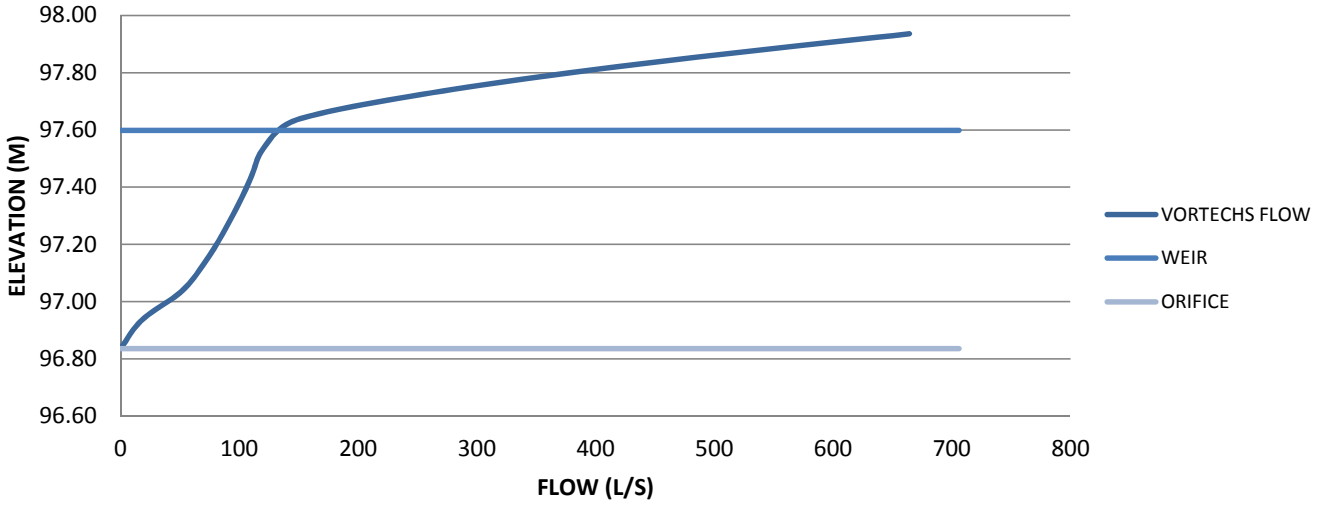
CONTECH ENGINEERED SOLUTIONS

Vortechs Orifice		Weir	
Cd =	308	Cd =	1861
A (m^2) =	0.062	Weir Crest Length (m) =	1.396
Crest Elevation (m) =	96.84	Crest Elevation (m) =	97.60

Head (m)	Elevation (m)	Orifice Flow (l/s)	Weir Flow (l/s)	Total Flow (l/s)
0.00	96.84	0.00	0.00	0.00
0.10	96.94	17.92	0.00	17.92
0.20	97.04	51.31	0.00	51.31
0.30	97.14	70.73	0.00	70.73
0.40	97.24	85.86	0.00	85.86
0.50	97.34	98.70	0.00	98.70
0.60	97.44	110.05	0.00	110.05
0.70	97.54	120.34	0.00	120.34
0.80	97.64	129.81	19.01	148.82
0.90	97.74	138.64	132.68	271.32
1.00	97.84	146.93	300.92	447.85
1.10	97.94	154.79	509.57	664.36
1.12	97.95	156.16	550.82	706.98

Calculated by: JAK | 1/21

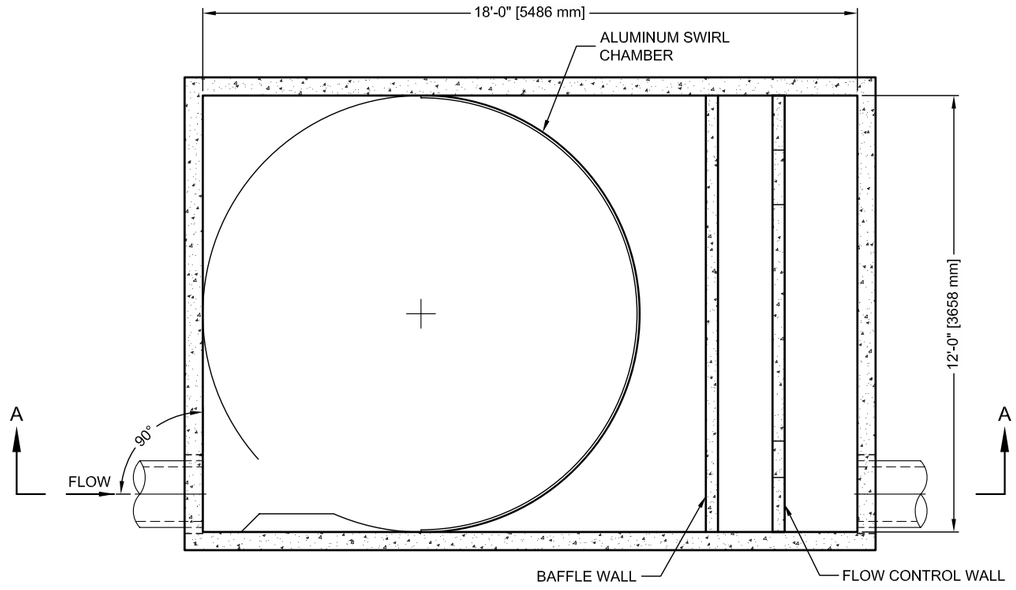
VORTECHS STAGE DISCHARGE CURVE



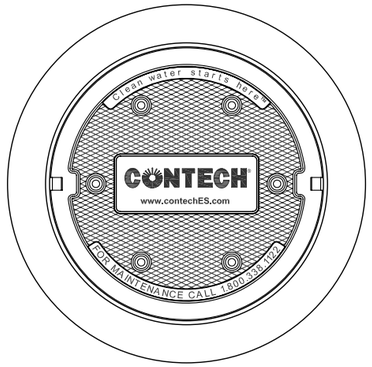
VORTECHS 16000 DESIGN NOTES

VORTECHS 16000 RATED TREATMENT CAPACITY IS 25 CFS, OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED RATED TREATMENT CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD INLET/OUTLET CONFIGURATION IS SHOWN. FOR OTHER CONFIGURATION OPTIONS , PLEASE CONTACT YOUR CONTECH CONSTRUCTION PRODUCTS REPRESENTATIVE. www.contech-cpi.com



SECTION B-B



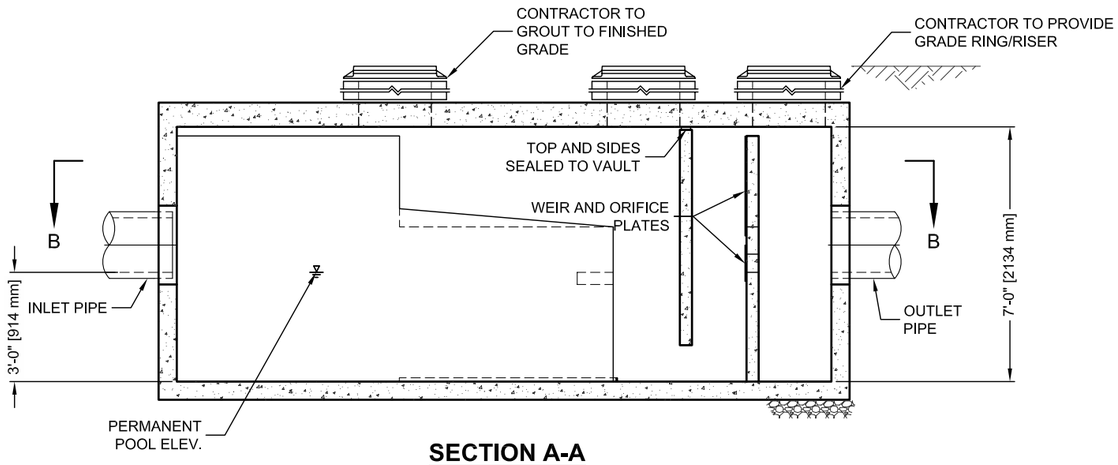
FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			*
WATER QUALITY FLOW RATE (CFS)			*
PEAK FLOW RATE (CFS)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD



SECTION A-A

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. INLET PIPE(S) MUST BE PERPEDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

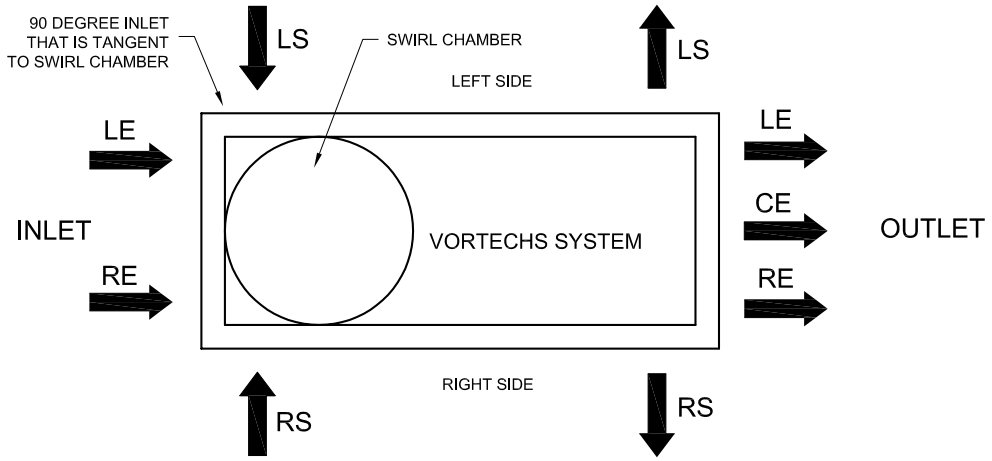
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

Vortechs®

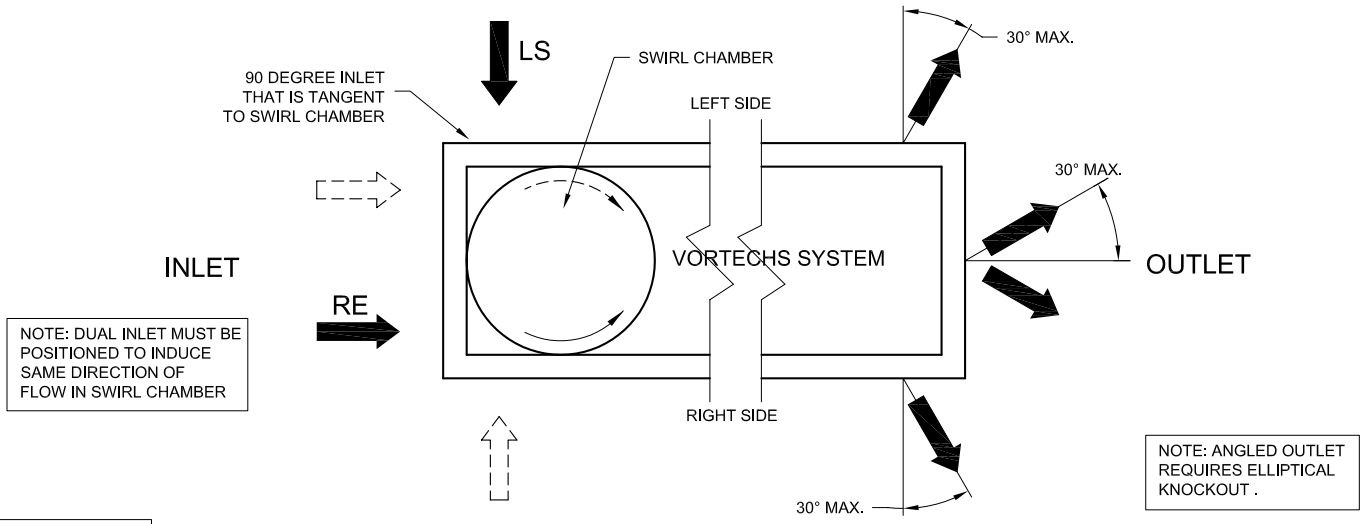
CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

VORTECHS 16000 STANDARD DETAIL

NOTE: INLET PIPE MUST BE PERPENDICULAR TO WALL IT IS ENTERING ON



TYPICAL INLET/OUTLET
ORIENTATION OPTIONS



NOTE: DUAL INLET MUST BE POSITIONED TO INDUCE SAME DIRECTION OF FLOW IN SWIRL CHAMBER

NOTE: ANGLED OUTLET REQUIRES ELLIPTICAL KNOCKOUT .

DUAL INLET
ORIENTATION OPTIONS

ANGLED OUTLET
ORIENTATION OPTIONS

ORIENTATION KEY

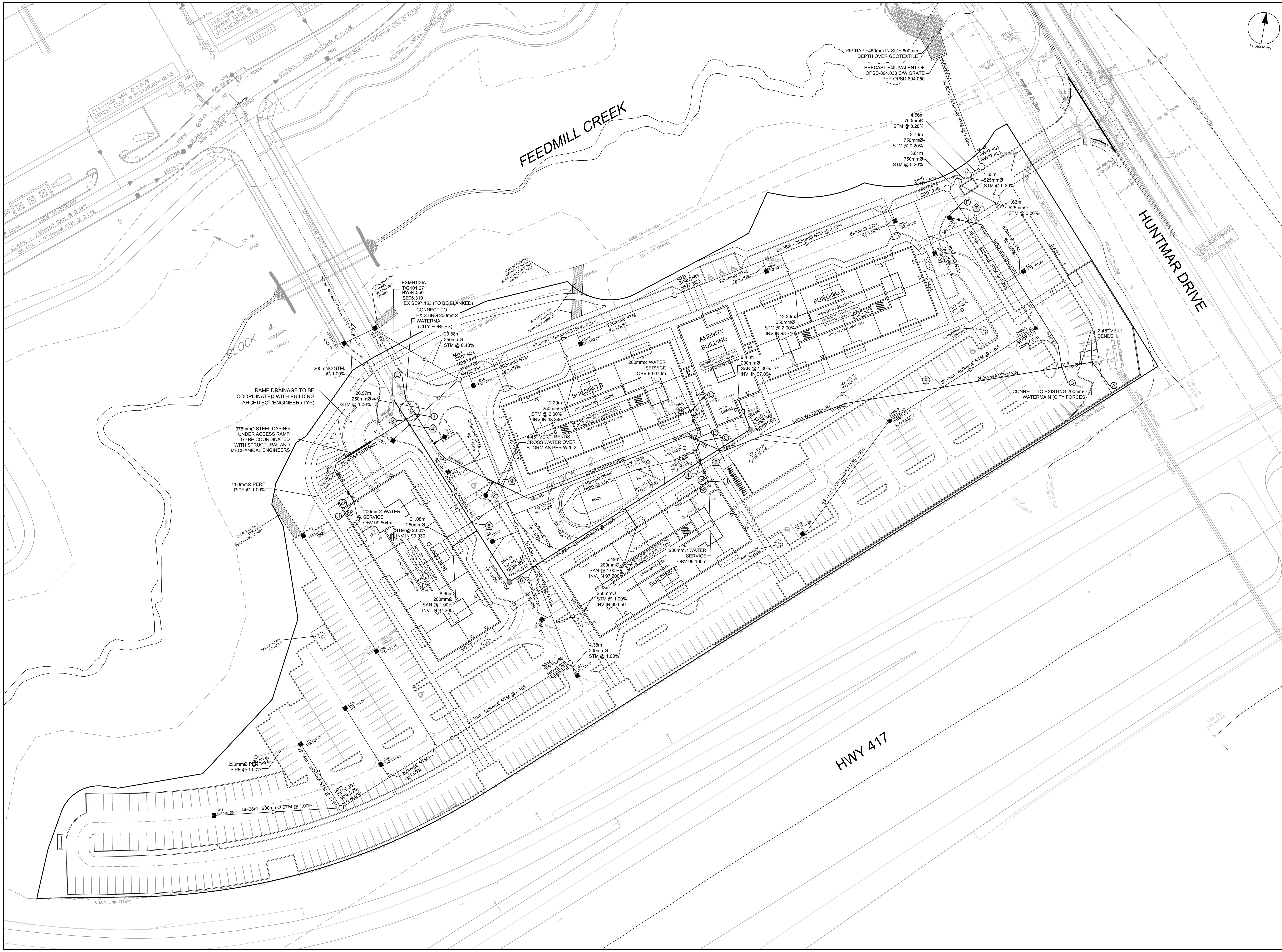
LE = LEFT END
RE = RIGHT END
LS = LEFT SIDE
RS = RIGHT SIDE
CE = CENTER END

CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

TYPICAL VORTECHS® SYSTEM ORIENTATIONS

DATE: 4/7/06	SCALE: NONE	FILE NAME: TYPVX ORIENTATION	DRAWN: GMC	CHECKED: NDG

APPENDIX D



CLIENT

THE BURROUGHS KANATA LP

6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

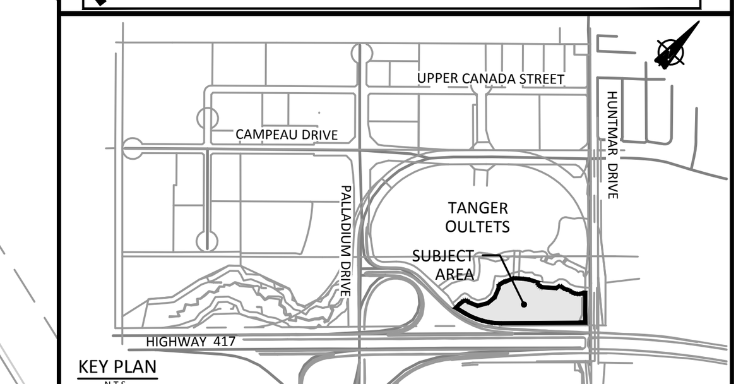
COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

SEE 010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS

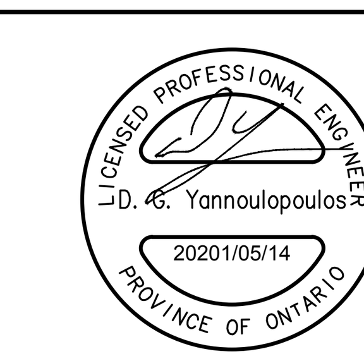


KEY PLAN

CONSULTANTS

1:500 0 5 15 25m

SEAL



IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO:
127255

DRAWN BY:	CHECKED BY:
D.P.S.	J.B.
PROJECT MGR:	APPROVED BY:
D.G.Y.	D.G.Y.

SHEET TITLE
GENERAL PLAN OF SERVICES

SHEET NUMBER: C-001
ISSUE: 2

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

UTILITY LEGEND

- TRANSFORMER
- TRANSFORMER C/W CONCRETE WINGS
- HYDRO SWITCHGEAR
- HYDRO MANHOLE
- BELL PEDESTAL
- GLB — BELL GRADE LEVEL BOX (l=600mm, w=1200mm, d=750mm) C/W 1.5 x 3.0m easement
- FC — BELL FIBER CABINET (l=1200mm, w=750mm, d=500mm)
- CSP — BELL CENTRAL SPLITTING POINTS (l=1175mm, w=1200mm, d=500mm)
- ROGERS PEDESTAL
- ROGERS VAULT (l=1000mm, w=1000mm, d=1200mm) C/W 1m x 2m easement
- P30 — STREET LIGHT
- STREET LIGHT DISCONNECT
- STREET LIGHT GROUNDING
- H/B/T/G/S — JOINT UTILITY TRENCH
- H — HYDRO CABLE AND DUCTS
- B — BELL CABLE
- BB — BELL DUCTS
- T — ROGERS CABLE
- TT — ROGERS DUCTS
- G — GAS
- S — STREET LIGHT CABLE
- UTILITY DROP LOCATIONS
- 10-DUCTS 6-H 4-T — CONCRETE ENCASED DUCT BANK C/W NUMBER OF DUCTS
- CMB — COMMUNITY MAILBOX
- PROPOSED TREE LOCATION
- ROOT MANAGEMENT BARRIER

SEDIMENT EROSION LEGEND

- HEAVY DUTY SILT FENCE
- SNOW FENCE
- STRAW BALE CHECK DAM
- STRAW BALE CHECK DAM WITH FILTER CLOTH
- ROCK CHECK DAM
- SEDIMENT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH

GENERAL LEGEND

- LIMIT OF CONSTRUCTION
- PHASING LINE
- BARRIER CURB
- MOUNTABLE CURB
- DEPRESSED BARRIER CURB
- CONCRETE SIDEWALK
- TACTILE WALKING SURFACE INDICATOR
- ASPHALT SIDEWALK / PATHWAY
- BUS — BUS STOP CONCRETE / ASPHALT

SERVICING LEGEND

- MH118A — SANITARY MANHOLE
- 200mmØ SAN — SANITARY SEWER
- MH109 / MH118 — STORM MANHOLE
- 825mmØ STM — STORM SEWER - LESS THAN 900Ø
- 900mmØ STM — STORM SEWER - 900Ø AND GREATER
- 200Ø WATERMAIN — WATERMAIN
- CB100 T/G 104.10 — STREET CATCHBASIN C/W TOP OF GRATE
- CICB101 G/G 104.25 — CURB INLET CATCHBASIN C/W GUTTER GRADE
- DCB100 T/G 104.10 — DOUBLE CATCHBASIN C/W TOP OF GRATE
- DCICB101 G/G 104.25 — DITCH INLET CATCHBASIN C/W GUTTER GRADE
- CBMH100 T/G 103.59 — CATCHBASIN MANHOLE C/W TOP OF GRATE
- CBMH101 T/G 103.59 — DITCH INLET MANHOLE C/W TOP OF GRATE
- CB100 T/G 104.10 — ICD LOCATION
- RYCB T/G 104.35 — REAR YARD CATCHBASIN IN ROAD CONNECTING STRUCTURE C/W SOLID GRATE
- T/G 104.35 INV 103.35 — REAR YARD "TEE" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
- T/G 104.50 INV 103.50 — REAR YARD "END" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
- T/G 104.35 INV 103.35 — REAR YARD "CUSTOM ANGLED " CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
- T/G 104.35 INV 103.35 — REAR YARD "THREE WAY" CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
- PERFORATED REAR YARD SUBDRAIN
- 300mmØ CSP — CSP CULVERT C/W DIAMETER
- V&VB — VALVE AND VALVE BOX
- V&VC — VALVE AND VALVE CHAMBER
- HYD 104.35 — FIRE HYDRANT C/W BOTTOM OF FLANGE ELEVATION
- 200Ø WM — RED — 150Ø WM — WATERMAIN REDUCER
- 2 VBENDS — VERTICAL BEND LOCATION
- SINGLE SERVICE LOCATION
- DOUBLE SERVICE LOCATION
- BH 12 102.00 — INFERRED BEDROCK (SEE GEOTECHNICAL REPORT)
- HGL 101.79 — 100 YEAR STORM HYDRAULIC GRADE LINE AT MANHOLE
- S/T HGL 101.79 — STRESS TEST STORM HYDRAULIC GRADE LINE AT MANHOLE
- 108 102.40 — UNDERSIDE OF FOOTING ELEVATION (WITH LOT #)
- CLAY SEAL IN SEWER / WATERMAIN TRENCH

GRADING LEGEND

- PROPOSED SWALE C/W FLOW DIRECTION
- 0.5% — PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- 1.0% — SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- x 104.62 — PROPOSED SPOT GRADE
- x104.40 (S) — PROPOSED SWALE GRADE
- x104.50 (SWP) — PROPOSED SWALE HIGH POINT GRADE
- 104.60 103.90 × — LOT CORNER GRADE C/W EXISTING GRADE
- 86.45 EX × — TIE INTO EXISTING GRADE
- 96.79 — FULL STATIC PONDING GRADE
- 0.5% 103.90 — RETAINING WALL C/W TOP OF WALL AND GRASS GRADE
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- PRESSURE REDUCING VALVE
- F.F.L. 96.32 T./FND. 95.96 U.S.F. 93.36 RISERS 2 T.O.F. 96.32 M.U.D. — FINISHED FLOOR ELEVATION; TOP OF FOUNDATION ELEVATION; UNDERSIDE OF FOOTING ELEVATION; TOTAL NUMBER OF RISERS; MINIMUM UNDERSIDE OF FOOTING (Based on the higher of the sewer obverts, or hydraulic grade line)
- M.G.G. 101.50 — MINIMUM GARAGE GRADE
- MINIMUM GRASS GRADE
- WU — WALKUP UNIT
- WO — WALKOUT UNIT
- NS — NON-STANDARD FOUNDATION (Frost cover not provided for standard unit)
- BS — BACKSPLIT UNIT (1.5m frost cover on footings)
- NOISE FENCE LOCATION
- NOISE FENCE GATE

CATCH BASIN DATA TABLE

STRUCTURE ID	AREA ID	STRUCTURE	COVER	ELEVATION TOP OF GRATE	ELEVATION INVERT INLET	ELEVATION INVERT OUTLET	OUTLET PIPE DIAMETER (mm)	OUTLET PIPE TYPE	HEAD (m)	FLOW (l/s)	ICD TYPE
CB1	P1	OPSD 705.010	S19	101.70		100.100	200	PVC DR-35	1.50	57.5	TEMPEST HF
CB2	P1	OPSD 705.010	S19	101.50		99.900	200	PVC DR-35	1.50	57.5	TEMPEST HF
CB3	P1	OPSD 705.010	S19	101.35		99.750	200	PVC DR-35			
CB4	P1	OPSD 705.010	S19	101.45	99.550	99.450	250	PVC DR-35	1.88	57.5	TEMPEST HF
CB5	P1	OPSD 705.010	S19	101.15	99.250	99.200	250	PVC DR-35	1.83	57.5	TEMPEST HF
CB20	P1	OPSD 705.010	S19	101.25		99.650	200	PVC DR-35			
CB24	P2	OPSD 705.010	S19	101.10		99.500	200	PVC DR-35	1.50	25.0	TEMPEST HF
CB8	P2	OPSD 705.010	S19	101.15		99.550	200	PVC DR-35	1.50	25.0	TEMPEST HF
CB9	P2	OPSD 705.010	S19	101.00		99.400	200	PVC DR-35	1.50	25.0	TEMPEST HF
CB10	P2	OPSD 705.010	S19	101.05		99.450	200	PVC DR-35	1.50	25.0	TEMPEST HF
CICB11	P3	OPSD 705.010	S22&23	101.15		99.550	200	PVC DR-35	1.50	16.3	TEMPEST HF
CICB13	P3	OPSD 705.010	S22&23	100.80		99.200	200	PVC DR-35			
CICB23	P3	OPSD 705.010	S22&23	100.80	99.050	99.000	250	PVC DR-35	1.68	16.3	TEMPEST HF
CB14	P3	OPSD 705.010	S19	101.05		99.450	200	PVC DR-35	1.50	16.3	TEMPEST HF
CB15	P3	OPSD 705.010	S19	100.95		99.350	200	PVC DR-35	1.50	16.3	TEMPEST HF
CB16	P5	OPSD 705.010	S19	101.05		99.450	200	PVC DR-35	1.50	13.3	VORTEX
CB21	P5	OPSD 705.010	S19	101.60		100.000	200	PVC DR-35	1.50	13.3	VORTEX
CB22	P5	OPSD 705.010	S19	101.63		100.030	200	PVC DR-35	1.50	13.3	VORTEX
CB17	P6	OPSD 705.010	S19	101.70		100.100	200	PVC DR-35	1.50	20.0	
CB19	P4	OPSD 705.010	S19	101.08		99.480	200	PVC DR-35			
CBMH8	P4	OPSD 705.010		101.65		97.835	200	PVC DR-35	3.72	130.0	Tempest HF

Bold font indicates CB's with ICD's

Revision: 2021-05-14

NOTES :

1. ALL MATERIALS AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS & SPECIFICATIONS OR OPSD/OPSS IF CITY DRAWINGS AND SPECIFICATIONS DO NOT APPLY.
2. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES PRIOR TO CONSTRUCTION AND SHALL PROTECT AND ASSUME RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOW ON THESE DRAWINGS.
3. FOR GEOTECHNICAL INFORMATION REFER TO GEOTECHNICAL REPORT PG5287-1 PREPARED BY PATERSON GROUP.
4. FOR GEODETIC BENCHMARK AND GEOMETRIC LAYOUT OF STREET AND LOTS, REFER TO TOPOGRAPHICAL SURVEY AND PLAN OF SUBDIVISION PREPARED BY STANTEC GEOMATICS BENCHMARK BASED ON CAN--NET VIRTUAL REFERENCE SYSTEM NETWORK.
5. ROADWAY SECTIONS REQUIRING GRADE RAISE TO PROPOSED SUB GRADE LEVEL TO BE FILLED WITH ACCEPTABLE NATIVE EARTH BORROW OR IMPORTED OPSS SELECTED SUBGRADE MATERIAL IF NATIVE MATERIAL IS DEFICIENT AS PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
6. IN AREAS WHERE EXISTING GROUND IS BELOW THE PROPOSED ELEVATION OF SEWER AND WATERMAINS, GRADE RAISING AND FILLING IS TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT. AS PER CITY GUIDELINES ALL WATERMAINS IN FILL AREAS ARE TO BE TIED WITH RESTRAINING JOINTS AND THRUST BLOCKS.
7. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
8. STRAW BALE SEDIMENT TRAPS TO BE PLACED AND MAINTAINED IN EXISTING AND CONSTRUCTED ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED (IF APPLICABLE).
9. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
10. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE COMPLETED BY CITY FORCES. CONTRACTOR IS TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
11. ALL LEADS FOR STREET CB's TO AND CICB's CONNECTED TO MAIN SHALL BE 250mmØ PVC DR35 @ MIN 2% SLOPE UNLESS NOTED OTHERWISE. ALL LEADS FOR RYCB's CONNECTED TO MAIN SHALL BE 200mmØ PVC DR35 @ MIN 1% SLOPE UNLESS NOTED OTHERWISE.
12. THESE DRAWINGS ARE NOT TO BE SCALED OR USED FOR LAYOUT PURPOSES.

ROADWAY STRUCTURE:

ALL LANES AND PARKING AREAS :(640mm)

40mm	- WEAR COURSE - SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm	- BINDER COURSE -SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm	- BASE - OPSS GRANULAR "A" CRUSHED STONE
400mm	- SUBBASE - OPSS GRANULAR "B" TYPE II

SAN STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
EXMH17A	101.58	SE94.350				1200mmø OPSD-701.010
EXMH100A	101.27	SE96.310		NW94.550		1200mmø OPSD-701.010
MH1A	101.51	NW97.000		SW96.947		1200mmø OPSD-701.010
MH2A	101.27	NE96.604		NW96.540		1200mmø OPSD-701.010

STM STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
CBMH7	100.80	SW98.022		NE98.074		1200mmø OPSD-701.010
HEADWALL	98.81	SE97.350				PRECAST EQUIVALENT OF OPSD-804.030
MH1	101.82	W98.720 NW99.000		NE98.391		1200mmø OPSD-701.010
MH2	101.19	SW98.269 SE98.956		NW98.059		1200mmø OPSD-701.010
MH3	101.21	SE97.922 W98.708 SW98.735		NE97.787		1200mmø OPSD-701.010
MH4	101.49	SW97.683		NE97.663		1200mmø OPSD-701.010
MH5	102.50	SW97.531 SE97.736		NE97.511		1800mmø OPSD-701.012
MH6	102.77	SW97.481		NW97.421		1800mmø OPSD-701.012
V1	102.70	SW97.503		NE97.088 SE91.313		1800mmø OPSD-701.012
V2	102.57	SW97.080		NE97.490 SE97.308		1500mmø OPSD-701.011

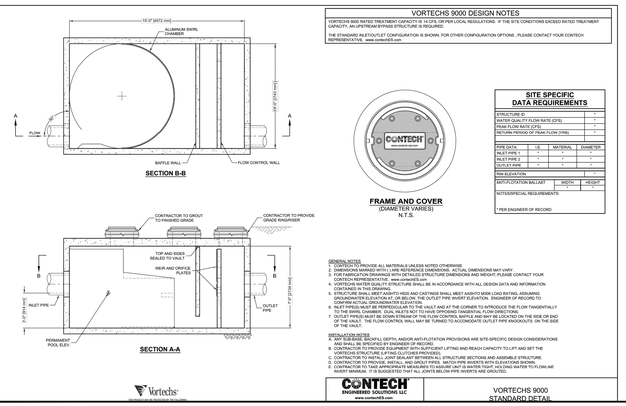
Pipe Interference Table

Crossing No.	PIPE 1	PIPE 2	Clearance
1	WTR Bottom 98.953	SAN Top 97.081	1.872
2	WTR Bottom 98.834	SAN Top 97.108	1.726
3	WTR Bottom 98.789	SAN Top 96.543	2.246
4	STM Bottom 98.929	SAN Top 96.550	2.380
5	STM Bottom 98.849	SAN Top 96.671	2.178
6	STM Bottom 97.911	SAN Top 96.843	1.068
7	WTR Bottom 99.778	STM Top 98.373	1.405
8	STM Bottom 97.953	WTR Top 97.453	0.500
9	WTR Bottom 99.250	STM Top 98.750	0.500

WATERMAIN SCHEDULE

	Station	Description	Finished Grade	Top of Watermain	Watermain Cover	As Built Watermain	
A	0+000.00	REMOVE EXISTING 200ø CAP,ADD 45 VERT. BEND	102.10	95.89	6.21		
	0+003.40	45 VERT. BEND	102.01	98.93	3.08		
	0+004.82	200V&VB	101.83	99.43	2.40		
B	0+009.30	200TEE	101.71	99.31	2.40		
	0+020.00	-	101.52	97.25	4.27		
	0+040.00	-	101.28	97.25	4.03		
	0+060.00	-	101.01	98.61	2.40		
	0+075.36	11.25 BEND	101.29	98.89	2.40		
	0+080.00	-	101.40	99.00	2.40		
	0+100.00	-	101.31	98.91	2.40		
	0+114.82	45 BEND	101.48	99.08	2.40		
D	0+120.00	-	101.47	99.07	2.40		
C	0+122.21	200TEE	101.41	99.01	2.40		
	0+123.96	200TEE	101.39	98.99	2.40		
	0+126.35	45 BEND	101.35	98.95	2.40		
	01+40.00	-	101.40	99.00	2.40		
	0+160.00	-	101.40	99.00	2.40		
	0+177.81	45 BEND	101.37	98.97	2.40		
	0+180.00	-	101.39	98.99	2.40		
	0+185.94	45 BEND VERTICAL BEND	101.48	99.08	2.40		
	0+186.38	45 BEND VERTICAL BEND	101.48	99.45	2.03		INSULATE W/M PER W25.2
	0+187.73	45 BEND VERTICAL BEND	101.49	99.45	2.04		INSULATE W/M PER W25.2
	0+188.17	45 BEND VERTICAL BEND	101.50	99.10	2.40		
	0+169.69	HYDRANT TEE	101.57	99.17	2.40		
	0+200.00	-	101.16	98.76	2.40		
	0+205.44	22.5 BEND	101.17	98.77	2.40		
	0+208.83	11.25 BEND	101.23	98.83	2.40		
	0+211.16	HYDRANT TEE	101.28	98.88	2.40		
	0+220.00	-	101.34	98.94	2.40		
	0+221.70	200TEE	101.50	99.10	2.40		
E	0+226.61	REMOVE EXISTING 200Ø CAP AND CONNECT	101.33	98.47	2.86		
B	0+000.00	200TEE	101.71	99.31	2.40		
	0+002.06	22.5 BEND	101.83	99.43	2.40		
	0+020.00	-	101.54	99.44	2.40		
	0+040.00	-	102.11	99.71	2.40		
	0+049.51	45 BEND	102.45	100.05	2.40		
	0+056.70	MULLER VALVE	102.57	100.17	2.40		
F	0+059.57	HYDRANT	102.32	99.92	2.40		
D	0+000.00	200TEE	101.41	99.01	2.40		
	0+002.38	45 BEND	101.37	98.97	2.40		
	0+005.99	200V&VB	101.46	99.06	2.40		
G	0+008.88	200mmø SERVICE CONNECTION	101.56	99.16	2.40		
C	0+000.00	200TEE	101.39	98.99	2.40		
	0+003.19	45 BEND	101.42	99.02	2.40		
	0+010.04	200V&VB	101.41	99.01	2.40		
H	0+013.06	200mmø SERVICE CONNECTION	101.47	99.07	2.40		
I	0+000.00	200TEE	101.50	99.10	2.40		
	0+015.72	STEEL CASING	101.31	98.91	2.40		
	0+024.82	STEEL CASING	101.27	98.87	2.40		
	0+028.03	45 BEND	101.26	98.86	2.40		
	0+030.30	45 BEND	101.31	98.91	2.40		
	0+038.27	200V&VB	101.52	99.12	2.40		
J	0+041.23	200mmø SERVICE CONNECTION	101.61	99.21	2.40		

REVISED 2021-05-10



VORTECHS 9000 DESIGN NOTES

VORTECHS 9000 RATED TREATMENT CAPACITY IS 14 CFS, OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED RATED TREATMENT CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD INLET/OUTLET CONFIGURATION IS SHOWN. FOR OTHER CONFIGURATION OPTIONS , PLEASE CONTACT YOUR CONTECH REPRESENTATIVE : www.contech-cpi.com

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (CFS)	*
PEAK FLOW RATE (CFS)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SITE DATA	ID	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION	*		
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*
NOTES/SPECIAL REQUIREMENTS:		
* PER ENGINEER OF RECORD		

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

GRADING NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR LOCAL CONTECH REPRESENTATIVE.
4. VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. THE VORTECHS STRUCTURE'S CASTO NEEDS AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING. ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. THE INLET PIPE(S) MUST BE RADIALLY ALIGNED WITH THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMODATE OUTLET PIPE MAGNOUTS ON THE SIDE OF THE VAULT.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT OF SUFFICIENT CAPACITY FOR LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO BACKFILL AROUND STRUCTURE IN ACCORDANCE WITH ENGINEER OF RECORD'S PLANS.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, INCLUDING WATER TIGHT INLINE INVERT BRANCH. IT IS RECOMMENDED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contech-cpi.com

VORTECHS 9000
STANDARD DETAIL

CLIENT

THE BURROUGHS KANATA LP

6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

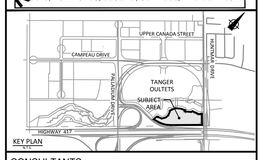
IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

C-010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS



CONSULTANTS

SEAL

LICENSED PROFESSIONAL ENGINEER
L.D. (G. Yannoulopoulos
2020/05/14
PROVINCE OF ONTARIO

IBI GROUP
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Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT
THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO: 127255

DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: D.G.Y.	APPROVED BY: D.G.Y.

SHEET TITLE
GENERAL NOTES, LEGEND AND CB DATA TABLE

SHEET NUMBER C-010 | ISSUE 2

CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: W:\127255_8555\Campaign\7.0_Production\7.03_Design\04_Civil\Sheets\C-010 GENERAL NOTES LEGEND AND CB DATA TABLE.dwg Last Saved: May 14, 2021, by dsuma Plotted: Monday, May 17, 2021 2:45:00 PM by Don Suma

CLIENT

THE BURROUGHS KANATA LP

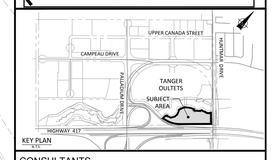
6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS



CONSULTANTS

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SEAL

LICENCED PROFESSIONAL ENGINEER
L.D. G. Tannoulopoulos
20201/05/14
PROVINCE OF ONTARIO

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

PROJECT

THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO: 127255	
DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: D.G.Y.	APPROVED BY: D.G.Y.

SHEET TITLE

SITE GRADING PLAN

SHEET NUMBER	ISSUE
C-200	2

SCALE CHECK 1:500 @ ISO A1

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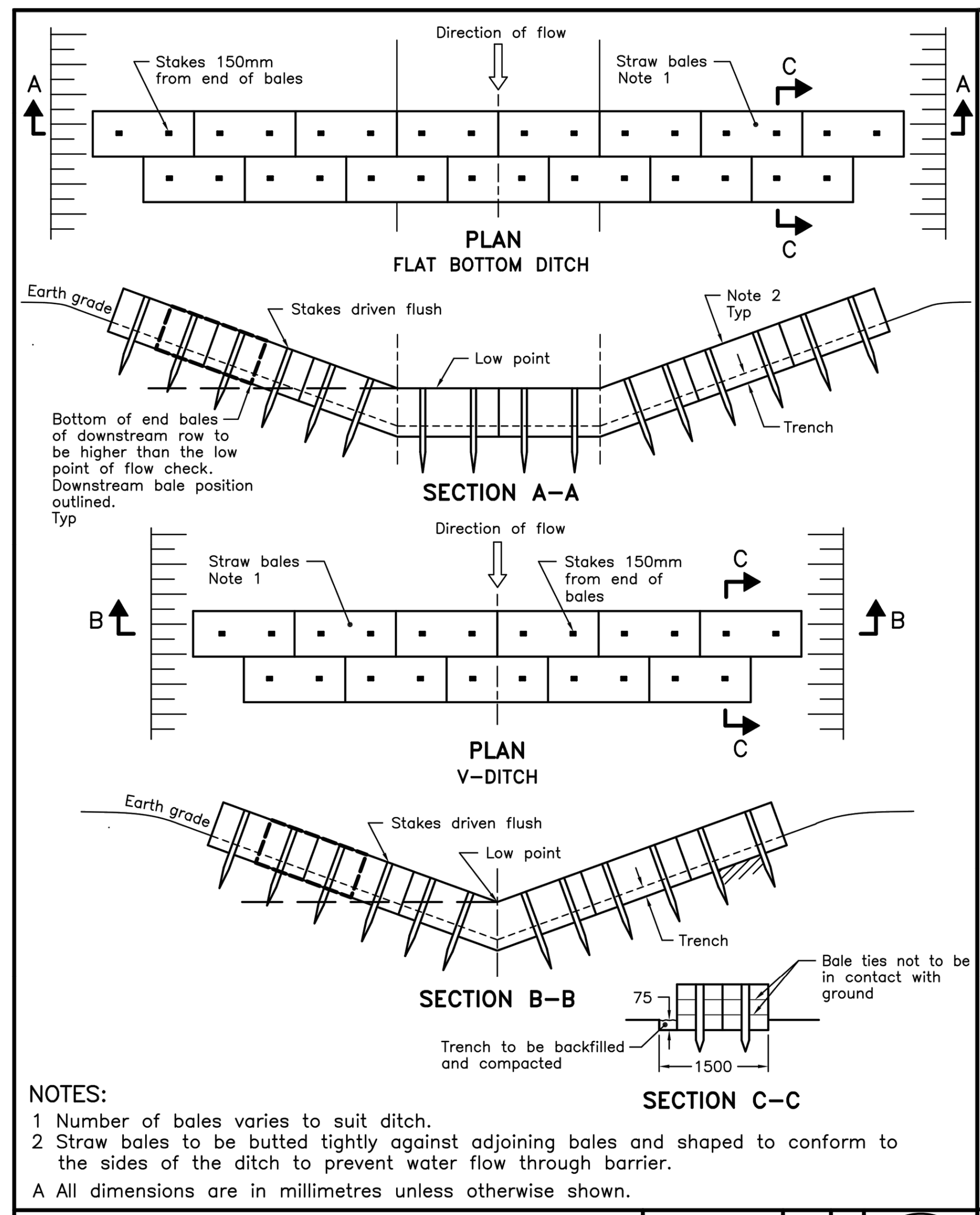
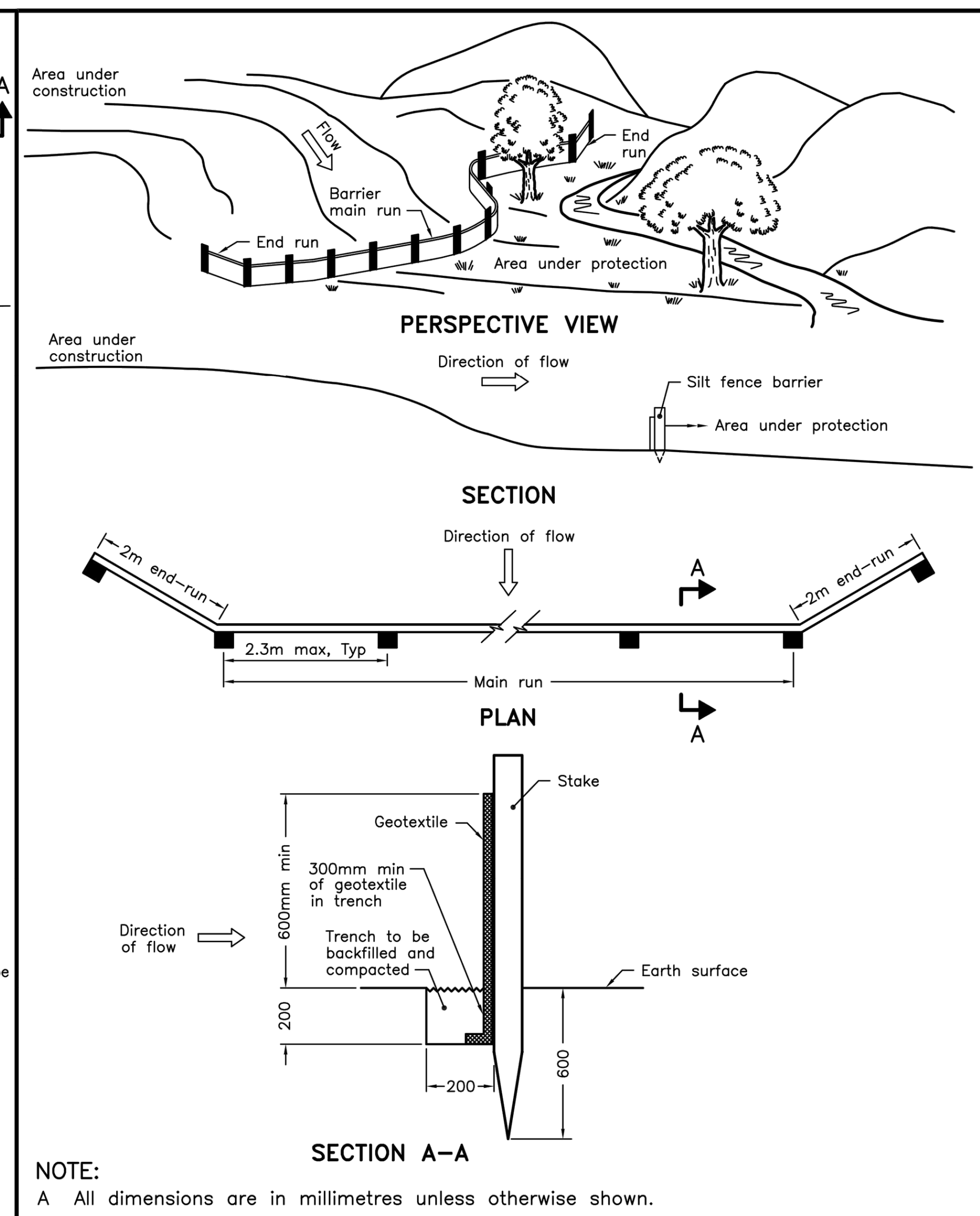
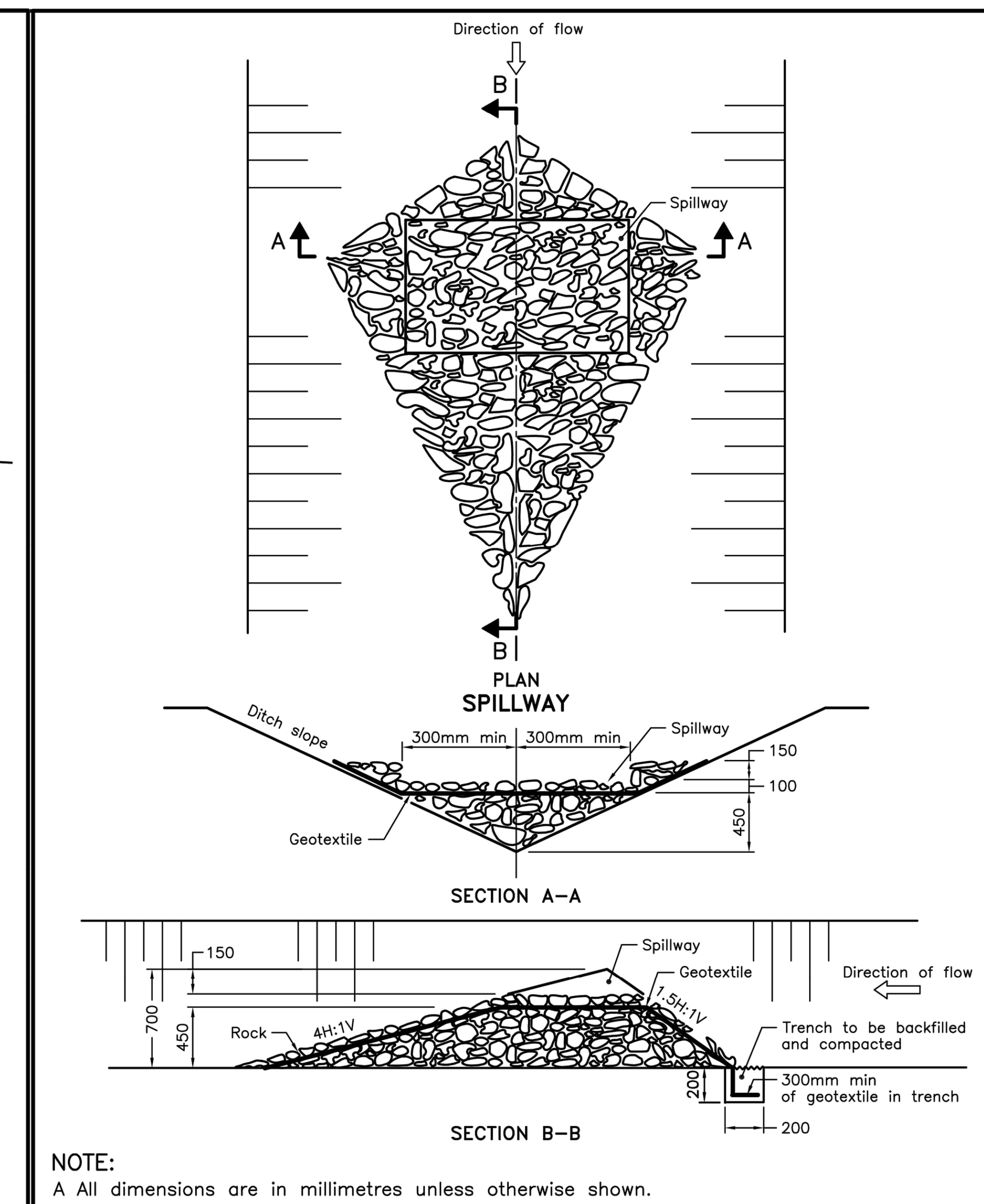
CITY PLAN No. xxxxx







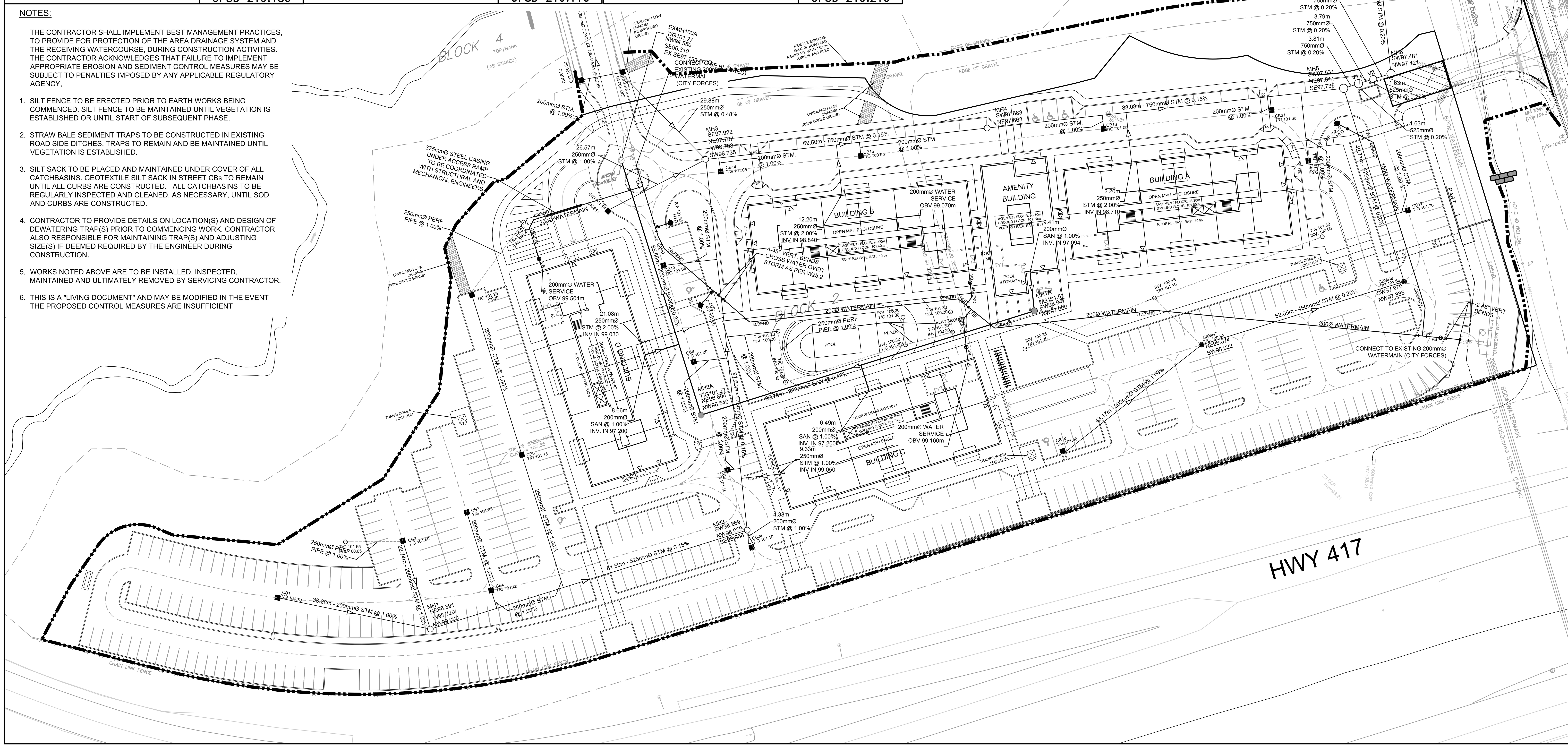
LEGEND:

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH

NOTES:

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
6. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT



CLIENT

THE BURROUGHS KANATA LP

6783 WELLINGTON ROAD
RR #22 CAMBRIDGE
ON, N3C 2V4

ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CLIENT REVIEW	2021-04-16
2	ISSUED FOR SPA	2021-05-14

NOT FOR CONSTRUCTION

SEE C-010, FOR NOTES, LEGEND, CB TABLE, AND DETAILS

KEY PLAN

LEGEND

1:500

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2021/05/14
PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
THE BURROUGHS KANATA

319 HUNTMAR DRIVE

PROJECT NO:	
127255	
DRAWN BY: D.P.S.	CHECKED BY: J.B.
PROJECT MGR: D.G.Y.	APPROVED BY: D.G.Y.

SHEET TITLE
EROSION AND SEDIMENTATION CONTROL PLAN

SHEET NUMBER	ISSUE
C-900	2

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx