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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

CAIVAN GREENBANK NORTH INC. 3713 BORRISOKANE ROAD

CITY OF OTTAWA

PROJECT NO.: 19-1134

APRIL 2020 – REV. 2

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SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
3713 BORRISOKANE ROAD

CAIVAN GREENBANK NORTH INC.

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FOR
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CAIVAN GREENBANK NORTH INC.
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Caivan Greenbank North Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 3713 Borrisokane Road.

The subject property is located within the City of Ottawa, Rideau-Goulbourn Ward. As illustrated in ***Figure 1***, the subject property is located approximately 500 m south of the intersection of Borrisokane Road and Cambrian Road. Comprised of a single parcel of land, the subject property measures approximately ***31.5 ha*** and is zoned Mineral Extraction.

Figure 1: Site Location

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The proposed SPC would allow for the phased development of a 1-storey assembly plant and a 2-storey administration building. The development includes surface parking areas and drive aisles with access from both Borrisokane Road and the future roadway located south of the subject site. The development will include a ***9380 m²*** assembly plant proposed to be constructed in Phase I and ***2456 m²*** administration building proposed to be constructed in Phase II. The proposed development occupies ***7.35 ha*** of the subject site. A copy of the Site Plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed development is supported by private services.

In accordance with the PSA expansion application, it is contemplated to service the development via the services proposed by City Application No. D07-16-19-0005 (***The Ridge Subdivision Servicing Design***). Further design details will be provided on approval of the PSA.

1.1 Existing Conditions

The existing site includes a rock quarry with vegetated areas and piles of fill. The elevations range between 110.82 m and 99.60 m, with a minimal grade change of approximately 0.50% from the Southeast to the Northwest corner of the property. Stormwater runoff is currently directed towards the existing roadside ditch along Borrisokane Road.

Sewer and watermain layout, collected from ***The Ridge Subdivision Servicing Design***, indicates that the following services will exist within the future municipal right-of-ways:

Future Roadway (South of Subject Site)

- 300 mm diameter PVC watermain;
- 200 mm diameter PVC sanitary sewer tributary to the trunk sewer within Cambrian Road; and
- 1500 mm diameter concrete storm sewer tributary to the Drummond Pond.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

Ontario Water Resources Act (OWRA) s.53 approval will be required from the Ministry of the Environment, Conservation and Parks (MECP) for stormwater discharge to both the interim Phase I connection to the existing drainage ditch along Borrisokane Road and to the future Phase II connection to the Drummond stormwater management pond. The ECA approvals fall under the Transfer of Review process through the City of Ottawa.

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1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

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2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002*, October 2012.
  (City Standards)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-03**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-03*)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISDTB-2018-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch,
  January 1, 2010 Update.
  (OBC)

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- **Design Brief for The Ridge (Brazeau Lands)**
  David Schaeffer Engineering Ltd., 18-1030, Rev. 1, October 4, 2019.
  (The Ridge Subdivision Servicing Design)

- **Geotechnical Investigation**
  Paterson Group, PG5155-1, Rev. 1, December 3, 2019.
  (Geotechnical Report)

- **Geotechnical Investigation – Sewage System Layout Plan**
  Paterson Group, PG3959, Rev. 1, April 15, 2020.

- **Response to Site Plan Comments**
  Paterson Group, PE4810-LET.02, April 22, 2020.

- **Hydrogeological Study for a Private Well Supply – Proposed Commercial/Industrial Development**
  Paterson Group, PH3959-REP.03, March 18, 2020.

- **Master Servicing Study – Barrhaven South Urban Expansion Area**
  J.L. Richards & Associates Limited, Revision 2, May 2018.
  (BSUEA MSS)

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3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies outside of the City of Ottawa BARR pressure zone, as shown by the Pressure Zone map in ***Appendix B***. As per ***The Ridge Subdivision Servicing Design***, a 300 mm diameter watermain is proposed within the future roadway right-of-way, located south of the development. Municipal services are not immediately available to site at the time of application. Refer to drawing ***EX-1,*** accompanying this report, for further details.

3.2 Water Supply Servicing Design

Since the subject property does not have immediate access to municipal service, it is proposed to service the development by connecting to the existing on-site well. As illustrated by drawing ***SSP-1***, the well is located east of the future roadway site entrance. A hydrogeological study for a private well supply has been prepared by Paterson Group (PH3959-REP.03) and was submitted to the City of Ottawa under separate cover.

Firefighting water storage tanks and a fire pump house are proposed in order to protect the development during firefighting conditions. As per coordination with Lowe Fire Protection Inc, each storage tank has a volume of ***52,000 gal***. The storage tanks and pump house have been designed by Lowe Fire Protection Inc. Refer to design included in ***Appendix B*** for further details.

3.3 Water Supply Servicing Design – Future Servicing

As per ***The Ridge Subdivision Servicing Design*** (D07-16-19-0005), a 300 mm diameter watermain is proposed within the future roadway south of the subject site. In accordance with the PSA expansion application, it is contemplated to service the development via the future watermain. The contemplated servicing layout is subject to PSA expansion approval. Further design details will be provided on approval of the PSA. Drawing ***SSP-ULT***, included in ***Drawings/Figures*** for a conceptual watermain layout is provided to support the PSA Planning submission. Existing well to be decommissioned in accordance with Geotechnical recommendations and applicable legislation.

3.4 Water Supply Conclusion

The subject property lies outside of the City of Ottawa BARR pressure zone. Municipal services are not immediately available to site at the time of application, as a result private services are proposed on-site. A hydrogeological study for a private well supply has been prepared by Paterson Group (PH3959-REP.03) and was submitted to the City of Ottawa under separate cover.

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Firefighting water storage tanks and a fire pump house are proposed in order to protect the development during firefighting conditions. Refer to Lowe Fire Protection design included in ***Appendix B*** for further details. Wastewater Servicing

3.5 Existing Wastewater Services

The subject site will lie within the Cambrian Road trunk collection area. As per ***The Ridge Subdivision Servicing Design,*** a 200 mm diameter sanitary sewer is proposed within the future roadway located south of the subject site. Municipal services up to the subject site were not immediately available at the time of application. Refer to drawing ***EX-1,*** accompanying this report, for further details.

3.6 Wastewater Design

Since the subject property does not have immediate access to municipal service, it is proposed that the development will be serviced via a private septic system. Wastewater servicing needs will be provided via a private septic system, designed in accordance with Part 8 of the ***OBC***. Detailed septic system designs prepared by Paterson Group (PG3959) are included in ***Appendix C***. Refer to drawing ***SSP-2*** and ***SSP-4***, accompanying this report, for the proposed sanitary servicing layout.

3.7 Wastewater Design – Future Servicing

As per ***The Ridge Subdivision Servicing Design***, a 200 mm diameter sanitary sewer is proposed within the future roadway south of the subject site. In accordance with the PSA expansion application, it is contemplated to service the development via the future sanitary sewer. The contemplated servicing layout is subject to PSA expansion approval. Further design details will be provided on approval of the PSA. Drawing ***SSP-ULT***, included in ***Drawings/Figures*** for a conceptual sanitary sewer layout is provided to support the PSA Planning submission. Septic system to be decommissioned in accordance with Geotechnical recommendations and applicable legislation.

3.8 Wastewater Servicing Conclusions

The subject site will lie within the Cambrian Road trunk collection area. As per ***The Ridge Subdivision Servicing Design,*** a 200 mm diameter sanitary sewer is proposed within the future roadway located south of the subject site. Municipal services up to the site were not immediately available at the time of application.

Since the subject property does not have immediate access to municipal service, it is proposed that the development will be serviced via a private septic system, designed by Paterson Group. Refer to design details included in ***Appendix C*** for further details.

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4.0 STORMWATER MANAGEMENT

4.1 Existing Stormwater Services

In accordance with the ***BSUEA MSS***, stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Jock River sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa. Refer to ***Appendix D*** for the *BSUEA Extents, Drainage Divide and Culverts* figure included in the ***BSUEA MSS*** for an illustration of the local drainage boundaries.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Jock River Subwatershed, and is subject to review by the Rideau Valley Conservation Authority (RVCA).

It was determined that the existing site contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 1,*** below:

Table 1
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	145.6
5-year	195.8
100-year	416.6

4.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with JFSA, where the proposed development is required to:

- Meet a post-development release rate, which is established based on modelling results for the future Drummond SWMF;
- Meet the quality control target of 80% TSS removal as per the Jock River Reach One Subwatershed Study (Stantec, 2007); and,
- Preserve pre-infiltration condition levels (Section 5.3.4 of ***BSUEA MSS***).

Based on the above, the allowable release rate for the proposed development is ***253 L/s***.

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4.3 Proposed Stormwater Management System

To meet the stormwater objectives the proposed development will utilize surface storage.

Runoff collected along the western side of the subject site (U1) will flow to overland towards the existing Borrisokane Road ditch. Once collected within the Borrisokane roadside ditch, stormwater will be conveyed approximately 1 km downstream towards the Jock River. Stormwater within this area is considered clean as it is collected within landscaped areas. Refer to drawing ***STM-1***, accompanying this report, for a detailed drainage plan.

Runoff collected along the southern side of the subject site (U2) will flow overland towards the future roadway roadside ditch. Stormwater within this area is considered clean as it is collected within landscaped areas. Refer to drawing ***STM-1***, accompanying this report, for a detailed drainage plan.

Uncontrolled areas, as shown by drawing ***STM-1*** provided along with this report, will be released uncontrolled to municipal right-of-ways and will be compensated for in areas with flow attenuation controls. The proposed major system will ultimately be the Borrisokane Road ditch system. Refer to the stormwater calculations included in ***Appendix D*** for further details.

In accordance with the ***BSUEA MSS***, the subject site is required to retain up to the 25 mm storm event on-site. Stormwater runoff from the development is proposed to be collected via an internal storm sewer network and conveyed to a stormwater infiltration area located within the eastern portion of the site. Based on a site area of ***7.35 ha***, ***1,837 m^3*** of stormwater is required to be retained on-site. Refer to drawing ***GP-1***, accompanying this report, and detailed calculations located in ***Appendix D*** for further details. Refer to *Response to Site Plan Comments* prepared by Paterson Group (PE410-LET.02) located in ***Appendix D*** for a groundwater impact assessment. Information on the infiltration outlet pipe has been provided by Paterson Group (PG5955-MEMO.02) and is also included in ***Appendix D***.

Stormwater runoff collected from parking areas and drive aisles will be conveyed via the internal storm sewer network towards the infiltration area. As depicted on drawing ***SSP-1***, stormwater quality controls to an enhanced level of treatment will be achieved with the use of an *Aquashield AS-5* oil/grit separator (OGS) or an approved equivalent. Pre-treatment of stormwater runoff will be treated to an enhanced level (80% TSS removal). Refer to ***Appendix D*** for detailed sizing report.

Stormwater runoff collected from the rooftop, foundation, and landscaped areas will be conveyed directly to the infiltration area. Stormwater is considered clean and therefore does not require pre-treatment.

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Stormwater is proposed to be conveyed from the infiltration area towards the Borrisokane Road ditch via a swale within the future pond parcel. Refer to drawing ***DS-1*** for the proposed ditch grading.

Table 2, below, summarizes each sub-catchment. ***Appendix D*** contains a detailed outline of available storage and inlet controls.

Table 2
Drainage Area Storage Volume Analysis 100-Year 6-Hour Storm

Catchment ID	Structure ID	Average Volume (1000 m^3)	Available Percent Full (%)	Maximum Outflow (L/s)
LIDPOND, ROOF, PARKING, L1, L2	LIDPOND	2.73	15	20.9

Table 3, below, summarizes the results of the EPASWMM model at the outfall. Model input and output summary is included in ***Appendix D***.

Table 3
Summary of Storage and Peak Flow Rates for the 5 and 100-Year Storm Distribution

Outfall Node	5-Year (L/s)	100-Year (L/s)
System (Uncontrolled & Attenuated)	**13.6**	**211.0**

As indicated by ***Table 3***, the estimated flow rate generated from the subject site in a 100-year storm event is ***211.0 L/s*** achieved by the use of an infiltration pond. The proposed stormwater management strategy adheres to ***The Ridge Subdivision Servicing Design***.

Table 4, below, summarizes the relevant ***City Standards*** employed in the design of the proposed storm sewer system referred to as the minor system.

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Table 4
Storm Sewer Design Criteria

Design Parameter	Value
Intensity Duration Frequency Curve (IDF) 5-year storm event. A = 998.071 B = 6.053 C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.0 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	3.0 m/s
Additional Considerations	Storm sewer maintenance holes serving sewers 900 mm diameter and less shall be constructed with 300 mm deep sumps. Maintenance holes for storm sewers greater than 900 mm must be benched.
Extracted from Sections 5 and 6 of the City of Ottawa Sewer Design Guidelines, November 2004.	

4.4 Proposed Stormwater Management System – Future Servicing

In accordance with the PSA expansion application, it is contemplated to service the development via the future stormwater management facility (Drummond SWM Pond). The contemplated servicing layout is subject to PSA expansion approval. Further design details will be provided on approval of the PSA. Drawing ***SSP-ULT***, included in ***Drawings/Figures*** for a conceptual storm sewer layout is provided to support the PSA Planning submission.

A *Master Storm Drainage Plan* was prepared by J.L. Richards and was included in the ***BSUEA MSS***. As per the *Master Storm Drainage Plan*, the subject site is situated between the future Drummond Stormwater Management Pond (Drummond SWM Pond) and the Brazeau Stormwater Management Pond (Brazeau SWM Pond). Based on the existing topography of the site, stormwater runoff will be tributary to the future Drummond SWM Pond block, located north of the subject site. The future Drummond SWM Pond is ultimately tributary to the Jock River, located approximately 1 km downstream. Refer to *Master Storm Drainage Plan*, included in ***Appendix D*****,** for further details.

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4.5 Stormwater Servicing Conclusions

Stormwater is proposed to be conveyed from the infiltration area towards the Borrisokane Road ditch via a swale within the pond parcel. Post development stormwater runoff will be restricted to a release rate of ***253 L/s***, based on coordination with JFSA. The estimated flow rate generated from the subject site in a 100-year storm event is ***211.0 L/s*** achieved by the use of an infiltration pond.

In accordance with the ***BSUEA MSS***, the subject site is required to retain up to the 25 mm storm event on-site. Stormwater runoff from the development is proposed to be collected via an internal storm sewer network and conveyed to a stormwater infiltration area located within the eastern portion of the site. Based on a site area of ***7.35 ha***, ***1,837 m^3*** of stormwater is required to be retained on-site.

Stormwater runoff collected from parking areas and drive aisles will be conveyed via the internal storm sewer network towards the infiltration area. As depicted by drawing ***SSP-1***, stormwater quality controls to an enhanced level of treatment will be achieved with the use of an Aquashield AS-5 OGS or an approved equivalent. Remainder of stormwater runoff is considered clean and therefore is not anticipated to require additional quality measures.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval.

5.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

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6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers; and
- Clean and change filter cloth at catch basins.

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7.0 CONCLUSION AND RECOMMENDATIONS

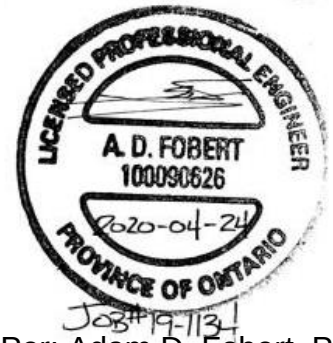
David Schaeffer Engineering Ltd. (DSEL) has been retained by Caivan Greenbank North Inc. to prepare a Site Servicing and Stormwater Management Report in support of the application for a Site Plan Control (SPC) at 3713 Borrisokane Road. The preceding report outlines the following:

- Municipal services are not immediately available to site at the time of application, as a result private services are proposed on-site;
- The subject property does not have immediate access to municipal wastewater service, it is proposed that the development will be serviced via a private septic system;
- Post development stormwater runoff will be restricted to a release rate of ***253 L/s***, based on coordination with JFSA. Stormwater storage will be provided by the use of an infiltration pond;
- In accordance with the ***BSUEA MSS***, the subject site is required to retain up to the 25 mm storm event on-site. Stormwater runoff from the development is proposed to be collected via an internal storm sewer network and conveyed to a stormwater infiltration area located within the eastern portion of the site. Based on a site area of ***7.35 ha***, ***1,837 m^3*** of stormwater is required to be retained on-site; and
- Stormwater runoff collected from parking areas and drive aisles will be conveyed via the internal storm sewer network towards the infiltration area. As depicted by drawing ***SSP-1***, stormwater quality controls to an enhanced level of treatment will be achieved with the use of an Aquashield AS-5 OGS or an approved equivalent. Remainder of stormwater runoff is considered clean and therefore is not anticipated to require additional quality measures.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Alison J. Gosling, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

19-1134 15/01/2020

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	SSP-1

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Alison Gosling

To: Hugo Lalonde
Subject: RE: ABIC pre-consult

From: Moore, Sean <Sean.Moore@ottawa.ca>
Sent: October-30-19 2:20 PM
To: Julie Carrara <carrara@fotenn.com>; Frank Cairo <frank.cairo@caivan.com>
Cc: Shillington, Jeffrey <jeff.shillington@ottawa.ca>; Rehman, Sami <Sami.Rehman@ottawa.ca>; Xu, Lily <Lily.Xu@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>
Subject: 3713 Borrisokane Road

Hi Julie,

Concerning the September 30th 2019 preconsultation meeting for 3713 Borrisokane Road please find below the submission requirements for the proposed Site Plan Control, Zoning By-law Amendment and Official Plan Amendment applications. Let me know if you have any questions/clarifications.

Zoned: ME2
Official Plan Designation: 'Mineral Aggregate Resource' Area

The project: A proposal at 3713 Borrisokane for a 125,000 s.f advanced manufacturing building and visitor experience centre. It is understood that the application will now come forward on private services (private water and private wastewater).

List of required Plans/Reports with your application:

Required Plans:
- Site Plan (3 copies)
- Landscape Plan (3 copies)
- Grading Plan (3 copies)
- Site Servicing Plan (3 copies)
- Survey Plan (2 copies)
- Architectural Elevation Plans (3 copies)
- Erosion and Sediment Control Plan (3 copies)
- Roadway Modification (if required through the TIA)

Required Reports:
- Planning Rationale, with Integrated Environmental Review (3 copies)
- Hydrogeological Report and Terrain Analysis (3 copies)]
- Groundwater Impact Assessment – concerning Kars Esker
- Stormwater Management Report (3 copies)
- Transportation Impact Assessment (3 copies)
- Detailed Noise Control Study (3 copies) – impact on adjacent residential / urban boundary lands
- Geotechnical Study (3 copies)
- Phase 1 ESA (3 copies) – to conformity with OReg 153/04
- Environmental Impact Statement (2 copies)

- Tree Conservation Report (3 copies) – if trees are identified on the site
- Confirmation from the MNR the Sand and Gravel resource has been depleted and/or the resource is not suitable for exploitation.

All required plans & reports are to be provided in digital format (.pdf) at application submission in addition to any required hard copies.

Site Plan Control Fee: $32,106.89
Complex (Manager Approval)
Conservation Authority Fee $995

Zoning By-law amendment Fee: $16,960.99
Complex (Manager Approval)
Conservation Authority Fee $370

Official Plan amendment Fee: $20,760.99
Complex (Manager Approval)
Conservation Authority Fee $735

Planning Policy Comments:

- The current Official Plan designation is 'Mineral Aggregate Resources' area (Section 3.7.4) and the lands are located in the Rural Area of the Official Plan. Section 3.7.4, policy 15 states that:

  "Where the sand, gravel or bedrock mineral aggregate resources of a property have been fully extracted, the site fully rehabilitated and an aggregate license surrendered, the property may be used for other purposes. Under this circumstance the City will not require the proponent to amend the Official Plan; instead the Plan will be amended to accurately reflect the new use at the time of the next comprehensive Official Plan update or through a general Official Plan amendment"

  However,

- Section 3.7.4, policy 17 states:

  In Sand and Gravel Resource Areas where it is shown that resources are depleted or not suitable for exploitation, the property may be used for purposes listed in Section 3.7.3 or additional new uses as follows: [Ministerial Modification 28, November 10, 2003] [Amendment #150, December 21, 2017]

  a. If the lands are predominantly surrounded by an Agriculture Resource designation, the uses identified in Section 3.7.3 for Agricultural Resource Areas may be permitted. Where a pit license has been surrendered and the pit was located on prime agricultural lands, the site will be rehabilitated for productive agricultural use except where extraction has occurred below the water table; or if the lands are predominantly surrounded by designations other than Agricultural Resource, the uses in Section 3.7.2 for the General Rural Area, including farming, may be permitted

- If the use was a 'General Rural' or 'Agricultural' use, suitable to those applicable designations no applicant driven OPA would be required. However, when we examine the policies of

Sections 3.7.2 and 3.7.3, it is apparent that the proposed office and industrial use are more suited to for the Rural Employment Area (3.7.5). At this time in the City's new OP review we are not in a position to recommend any new Rural Employment Area's, but would suggest a proponent driven OPA to Section 3.7.2 for a site specific policy at 3713 Borrisokane.

- It is our opinion that because an exception policy is required for Section 3.7.2 to permit this type of use, we can not rely on Policy 15 (Section 3.7.4). Therefore an Official Plan Amendment is required to bring in this special policy to the General Rural Area Section.

Environmental Comments:

- An EIS will be required as outlined in OP Section 4.7.8. The requirements are outlined in the EIS guidelines: https://documents.ottawa.ca/sites/documents/files/documents/eis_guidelines2015_en.pdf
- There are species at risk identified on the property and within the vicinity. The EIS should also address significant woodlands and other natural features on the subject property. For Site Plan Control, a Tree Conservation Report (TCR) is required, which can be combined with the EIS to reduce duplications.

  TCR guidelines are : https://ottawa.ca/en/living-ottawa/environment/trees-and-forests/tree-protection#tree-conservation-report-guidelines

- We will require a Groundwater Impact Assessment to understand development impacts on the Kars Esker and potential for interfering with the groundwater regime

Engineering Comments:

- The Stormwater Management Report will need to outline the drainage area, storm sewer design and outlet. Including quality and quantity criteria

Transportation Comments:

- We will require confirmation on how private development will be permitted to front onto the Borrisokane Road (MTO corridor). This property will need 'public street' frontage, and we should discuss how we are resolving this segment of MTO service corridor/road (do we deal with this through the Zoning By-law Amendment?)

Regards,

Sean Moore MCIP, RPP
Planner III | Urbaniste III
Development Review (South Services) | Examen des projets d'aménagement (services sud)
Planning, Infrastructure and Economic Development | Services de planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext./poste 16481
ottawa.ca/planning / ottawa.ca/urbanisme

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Alison Gosling

To: Hugo Lalonde
Subject: RE: 3713 Borrisokane Road - rural servicing

From: Hugo Lalonde <hugo.lalonde@caivan.com>
Sent: April 14, 2020 1:27 PM
To: Alison Gosling <AGosling@dsel.ca>; Adam Fobert <AFobert@dsel.ca>; Steve Pichette <SPichette@dsel.ca>
Subject: FW: 3713 Borrisokane Road - rural servicing

See below and attached from City on pre-infiltration treatment. Other than typical parking lot run off there is no anticipated pollutants associated with this use.

Thanks

HUGO LALONDE
Director, Land Development
2934 Baseline Road, Suite 302
Ottawa, ON K2H 1B2
C: 613-295-5082 O: 613-518-1864 ext. 503

CAIVAN
COMMUNITIES

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From: Moore, Sean <Sean.Moore@ottawa.ca>
Sent: Tuesday, April 14, 2020 1:20 PM
To: Hugo Lalonde <hugo.lalonde@caivan.com>
Subject: FW: 3713 Borrisokane Road - rural servicing

Hi Hugo,

Please find below some comments from John Bougadis with a related attachment

Sean

"Pretreatment off runoff in pollution hot spots and parking lots will be required prior to infiltration (see highlighted text in attached PDF)."

From: Moore, Sean <Sean.Moore@ottawa.ca>
Sent: April 09, 2020 16:39
To: hugo.lalonde@caivan.com; Michael Killam <mkillam@patersongroup.ca>; spichette@dsel.ca
Cc: Kearney, Michel <Michel.Kearney@ottawa.ca>; Nielsen, Gen <Gen.Nielsen@ottawa.ca>; Bougadis, John <John.Bougadis@ottawa.ca>; Rogers, Christopher <Christopher.Rogers@ottawa.ca>; Xu, Lily <Lily.Xu@ottawa.ca>;

Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Subject: 3713 Borrisokane Road - rural servicing

Hugo,

Please find a key summary of todays meeting. Please advise if you have any questions with the information provided.

There are 4 steps to rural servicing of this property:

1. Septic tank detail is required to understand or confirm that the tanks are above the water and will not draw water
2. The private well has been addressed through the Hydrogeological Report and no interaction with the leachate plume is expected. It is thought that the water feeding the leaching beds is good for infiltration
3. The on-site stormwater facility will be an infiltration pond. This will be independent of the suburban SWM facility to the immediate north. We will need to confirm that the bottom of this infiltration facility does no go deeper than the ground water table
4. An ECA would be required for full build-out of the site (both office and manufacturing facility). This is because the site would have over 10,000 l/day going to the septic system. An ECA could take 8-10 months as a direct submission to the Ministry. There are two ways of dealing with this:
    A. The City could require the applicant to preconsult with the Ministry now and approve a site plan that deals with the full build-out so we do not piecemeal the ECA requirement. OR
    B. The City could use a 2 phased approach to the site plan approval process. Phase 1 approval could illustrate the manufacturing facility and the private septic servicing to accommodate that facility. A phase 2 site plan would be required at a later date to come forward with the office and the remainder of the private septic servicing. This means that the site can proceed without the 8-10 month delay and Ministry approval. We could approve an overall Master Site Plan where the office is ghosted out such that we have an idea of what will come forward as a future site plan.

- Note 1: Site Plan would only proceed if it can be demonstrated that the site does not have any potential impact on the plume (by staying above the water table).
- Note 2: There is a process for an expedited ECA that could be discussed with Jeff Shillington.

The next submission is expected mid to end of next week from Caivan.

Regards,

Sean Moore
Senior Planner
City of Ottawa
Planning, Infrastructure and Economic Development Dept.

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Table 2.8.1 Types of stormwater source areas, typical runoff characteristics and opportunities for treatment and use

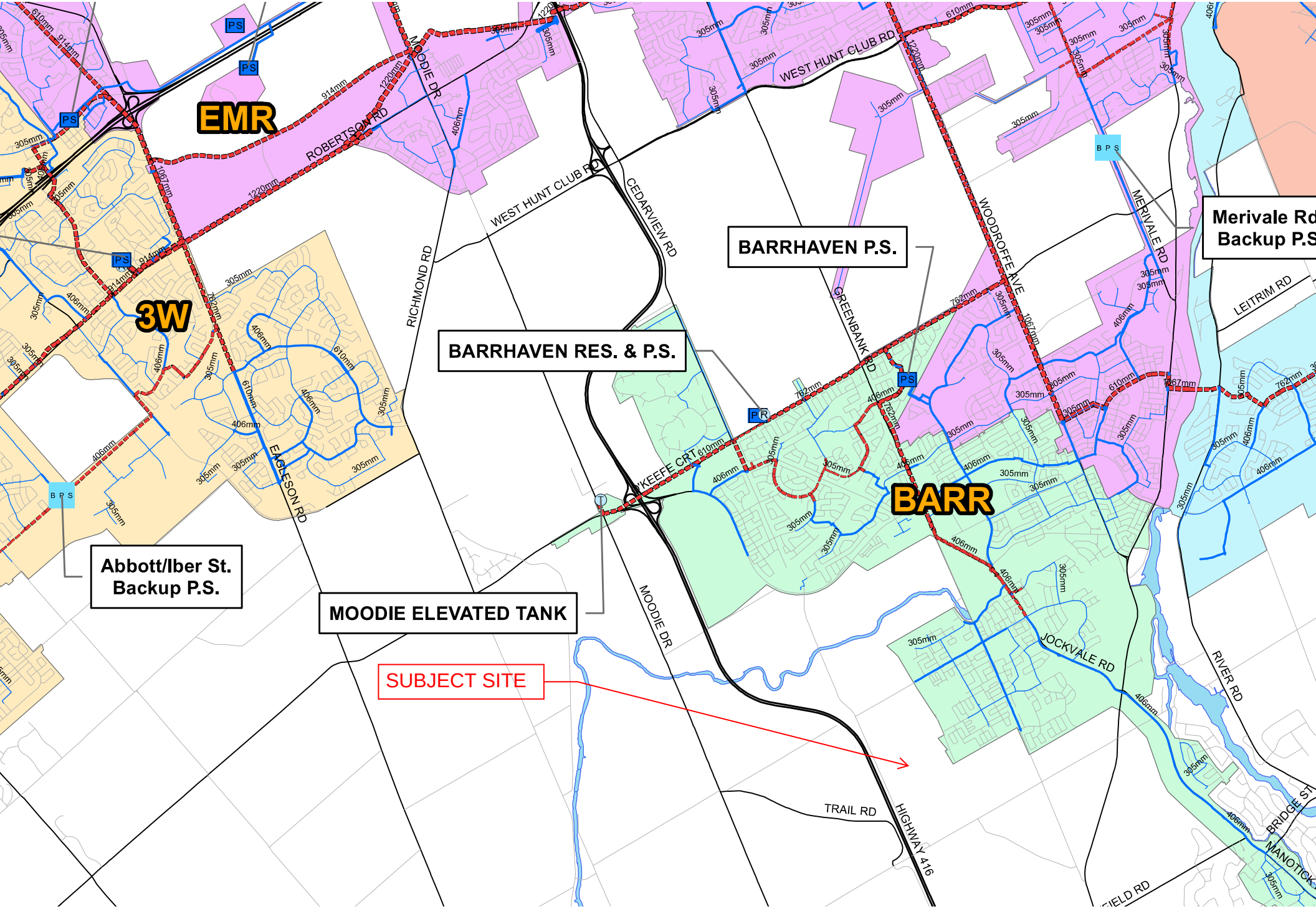
Stormwater Source Area	Runoff Characteristics	Opportunities	Principles
Foundation drains, slab underdrains, road or parking lot underdrains	Relatively clean, cool water.	Suitable for infiltration or direct discharge to receiving watercourses.	Should not be directed to stormwater management facility that receives road or parking lot runoff.
Roof drains, roof terrace area drains, overflow from green roofs	Moderately clean water, contaminants may include asphalt granules, low levels of hydrocarbons and metals from decomposition of roofing materials, animal droppings, natural organic matter and fall out from airborne pollutants, potentially warm water.	- Infiltration; - Filtration; - Harvesting with rain barrels or cisterns and use for non-potable purposes (*e.g.*, irrigation, toilet flushing) after pretreatment; - Attenuation and treatment in wet pond or wetland detention facility.	Runoff should be treated with a sedimentation and/or filtration practice prior to infiltration. Where possible, runoff should not be directed to end-of-pipe facilities to capitalize on potential for infiltration or harvesting. Flow moderation (quantity control) prior to discharge to receiving watercourse is required.
Low and medium traffic roads and parking lots, driveways, pedestrian plazas, walkways	Moderately clean water, contaminants may include low levels of sediment, de-icing salt constituents, hydrocarbons, metals and natural organic matter. Typically warm water.	- Infiltration after pretreatment; - Filtration after pre-treatment; - Harvesting with cisterns or permeable pavement reservoirs and use for outdoor non-potable purposes (*e.g.*, vehicle washing, irrigation) after pretreatment; - Attenuation and treatment in wet pond or wetland detention facility.	Runoff should be treated with a sedimentation and/or filtration practice prior to infiltration. Flow moderation (quantity control) prior to discharge to receiving watercourse is required. Water quality should be tested prior to use for non-potable purposes.
High traffic roads and parking lots	Potential for high levels of contamination with sediment, de-icing salt constituents hydrocarbons and metals. Typically warm water.	- Filtration after sedimentation pre-treatment; - Attenuation and treatment in wet pond or wetland detention facility; - Infiltration after pretreatment only where groundwater uses are limited.	Runoff should be treated with a sedimentation and/or filtration pretreatment practice prior to infiltration.
Pollution hot spots* such as vehicle fueling, servicing or demolition areas, outdoor storage and handling areas for hazardous materials, some heavy industry sites	Potential for high levels of contamination with sediment, de-icing salt constituents, hydrocarbons, metals, and other toxicants.	- Attenuation and treatment in wet pond, wetland or hybrid detention facility; - Potential requirement for sedimentation pretreatment; - Infiltration and harvesting practices not recommended.	Runoff from these sources should not be infiltrated or used for irrigation. Spill containment or mitigation devices recommended contingent on size of storage facilities.

* *Pollution hot spots* are areas where certain land uses or activities have the potential to generate highly contaminated runoff (*e.g.*, vehicle fuelling, service or demolition areas, outdoor storage and handling areas for hazardous materials and some heavy industry sites).

APPENDIX B

Water Supply

City of Ottawa - Water Distribution System



LOWE FIRE PROTECTION INC.

Mike VanAsseldonk
101-2435 Holly Lane
Ottawa, Ontario K1V 7P2
mike@lowefire.ca

Telephone: 613-739-5693 (739-LOWE)
Fax: 613-739-2922

April 22, 2020 REV 1

BBS Construction

ATT:

ABIC Water Storage Requirements for Fire Protection
3713 Borrisokane Road
Ottawa, Ontario

Dear Sir:

Please find below our calculations for the water storage requirements for the fire protection systems as per the OBC and NFPA 13 for the above referenced project.

Assembly Plant Calculation:

- Ordinary Hazard Group 2 Occupancy
- Design density of 0.20 gpm/1500 sqft = 300 gpm
- 10% sprinkler system overage = 30 gpm
- Inside and outside hoses = 250 gpm
- Total Assembly Plant Demand = 580 gpm.

- 580 gpm x 90 minute duration = 52,200 gpm

TOTAL WATER STORAGE REQUIREMENT FOR FIRE PROTECTION = $52,200.00 gallons minimum

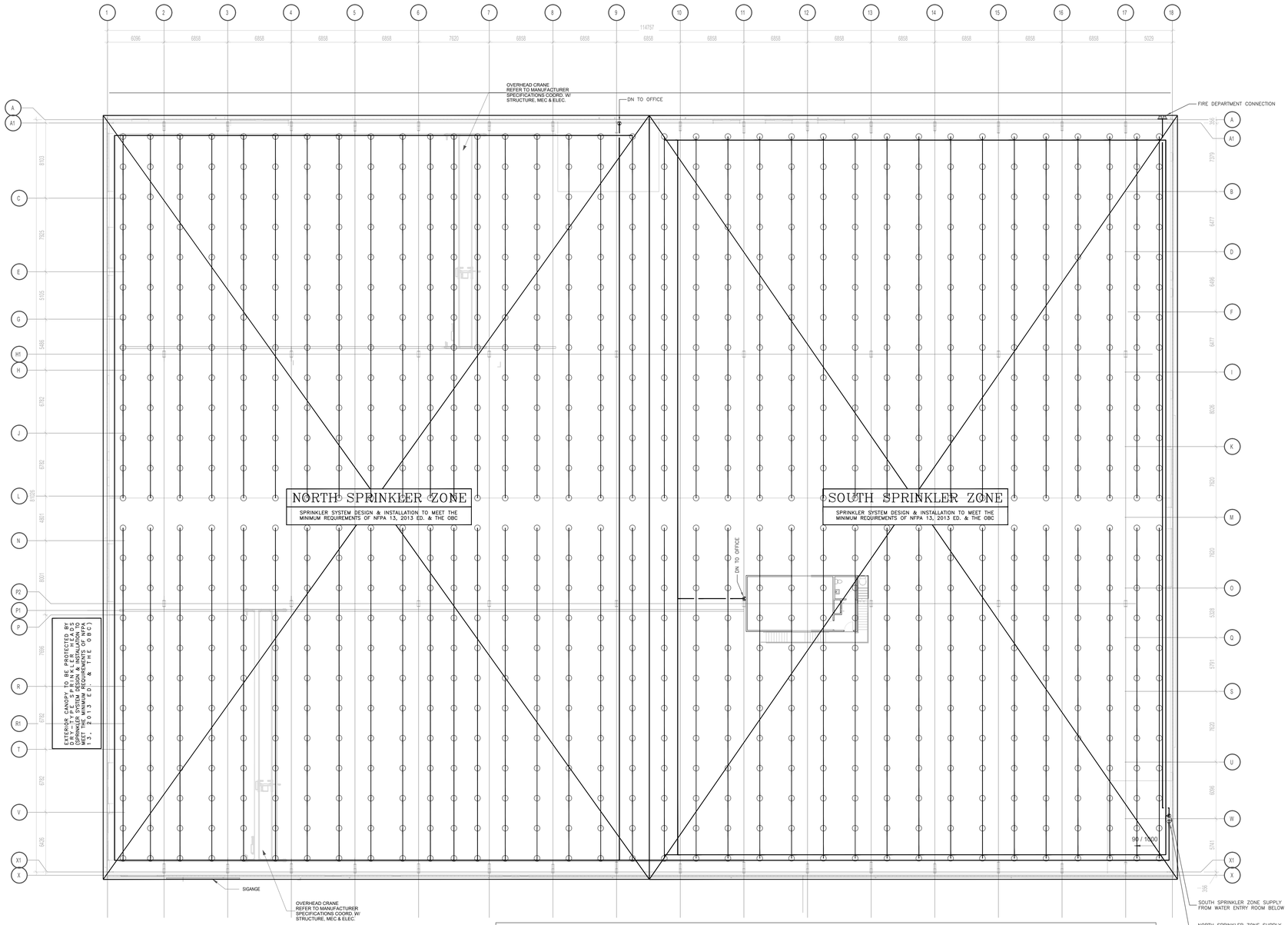
The above calculation is based on:

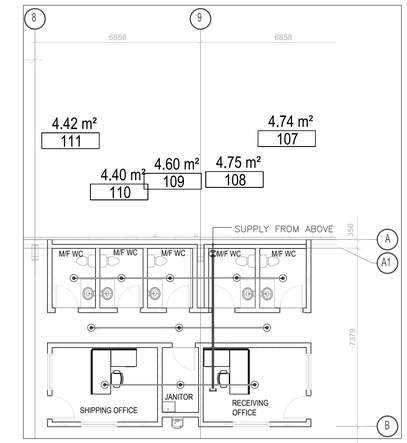
- Off site sprinkler system monitoring of alarms, troubles and supervisory signals is not provided.

We trust the above calculation is satisfactory to your needs. Should we be of any further assistance, please do not hesitate to contact the undersigned.

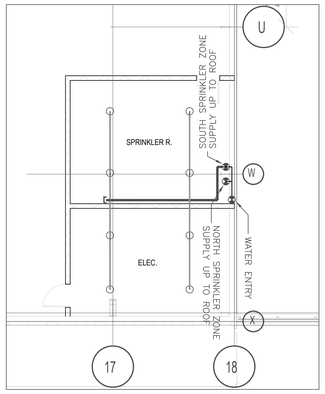
Yours truly,
Lowe Fire Protection Inc.

Mike VanAsseldonk

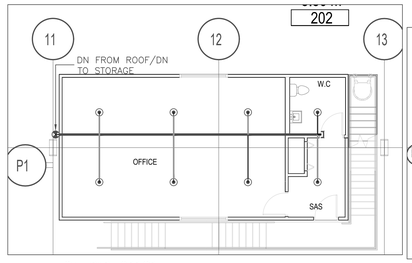




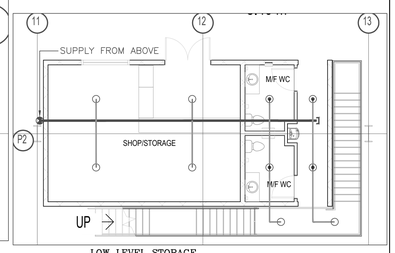
SHIPPING



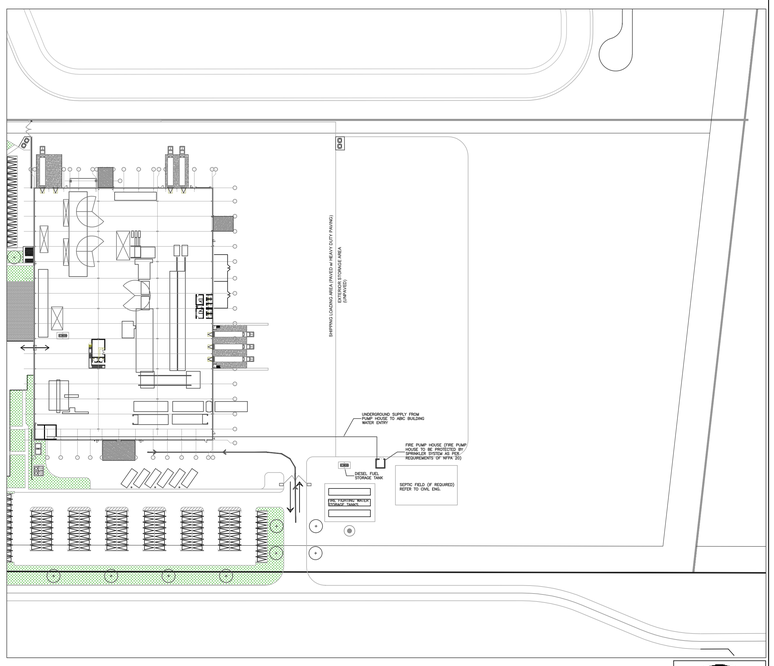
SPRINKLER/ELEC. RMS.



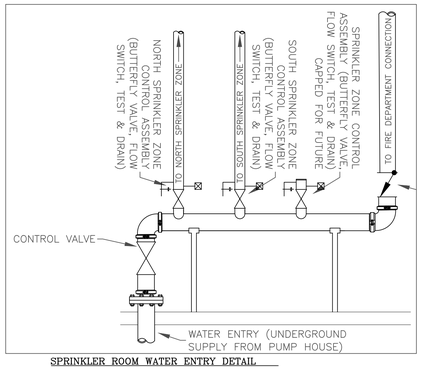
HIGH LEVEL OFFICE



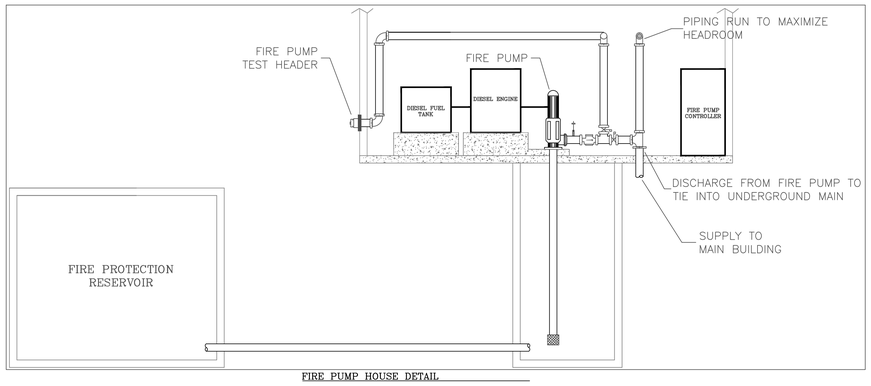
LOW LEVEL STORAGE



SITE PLAN



SPRINKLER ROOM WATER ENTRY DETAIL



FIRE PUMP HOUSE DETAIL

REGISTERED PROFESSIONAL ENGINEER
R. GOUBKO
PROVINCE OF ONTARIO

North Arrow

LOWE FIRE PROTECTION INC.
2435 Holly Lane, Suite 101
Ottawa, Ontario K1V 7P2
TEL: (613) 739-5693
FAX: (613) 739-2922

FABRICATION NOTES

WET PIPING

SPRINKLER SYSTEM: MAINS – BLACK PIPE SCHEDULE 10 UTILIZING WELDED OUTLETS AND / OR MECHANICAL TEES, JOINED BY GROOVED FITTINGS AND COUPLINGS

SPRINKLER SYSTEM: LINES – BLACK PIPE SCHEDULE 10 UTILIZING WELDED OUTLETS AND / OR OUTLET – T's, JOINED BY GROOVED FITTINGS AND COUPLINGS
– BLACK SCHEDULE 40 PIPE UTILIZING STANDARD WEIGHT SCREWED FITTINGS

SYM.	MODEL	CABINET	TOTAL
FX	XXX	XXX	X
FX	XXX	WALL HUNG	X
TOTAL EXTINGUISHERS			

WET SYS. ✓ DELUGE SYS.
DRY SYS. PRE-ACTION SYS.

DESIGN NOTES

ADMINISTRATIVE AREAS/MEETING AREA/BREAK ROOMS
– LIGHT HAZARD: 4.1MM/MIN (0.1GPM/SF) OVER 139.4SQM.(1500 SF.)

MECHANICAL ROOMS/ELECTRICAL ROOMS/SHOP AREA
ORDINARY HAZARD GROUP II: 8.1MM/MIN (0.20 GPM/SF) OVER 139.4SQM (1500 SF.)

HIGH BAY STORAGE AREAS/ ROOM 138
HIGH PILE STORAGE: CLASS IV UNENCAPSULATED COMMODITIES RACK STORAGE WITH MORE THATN 8FT AISLE & UP TO 6.1 M (20 FT): 20.17MM/MIN (0.495 GPM/SF) OVER 185.85QM (2000 SF) WITH HIGH TEMPERATURE SPRINKLER

NOTES: AS PER NFPA 13 11.2.3.2.3.1 QUICK RESPONSE SPRINKLER SHALL BE PERMITTED TO BE REDUCED WITHOUT REVISING THE DENSITY

Hydraulic Reference Points

1. ALL SPRINKLER SYSTEM DESIGN, HYDRAULIC CALCULATIONS, SYSTEM COMPONENTS, MATERIAL, INSTALLATION AND TESTING AS PER LATEST EDITION OF NFPA 13.
2. IMPORTANT – TO PREVENT FREEZING OF WATER IN "WET" PIPE SPRINKLER PIPING, OWNER (OR OTHERS) TO PROVIDE SUFFICIENT HEAT THROUGHOUT AREAS WHERE SPRINKLER PIPES ARE INSTALLED.
3. ALL SPRINKLER PIPING ON "DRY" PIPE SPRINKLER SYSTEMS ARE TO BE INSTALLED TO ALLOW DRAINAGE.
4. (XX) INDICATES HYDRAULIC NODE POINT

Fire Protection Legend

Symbol	Description	TOTAL
○	1/2" x150° BRASS UPRIGHT QR 5.6K	X
◉	1/2" x 155° CHROME RECESSED PENDANT QR 5.6K	X
	TOTAL SPRINKLERS THIS SHEET	X
	TOTAL SPRINKLERS THIS PROJECT	X

Drawing Title: FIRE PROTECTION PLAN FOR PERMIT

		Revisions:		Date:
Contract No.	10-XXX-CX	00	ISSUED FOR PERMIT	27/03/20
Drawn By	GL			
Scale	1:200			
Date	27/03/20			
Approval By	MV			

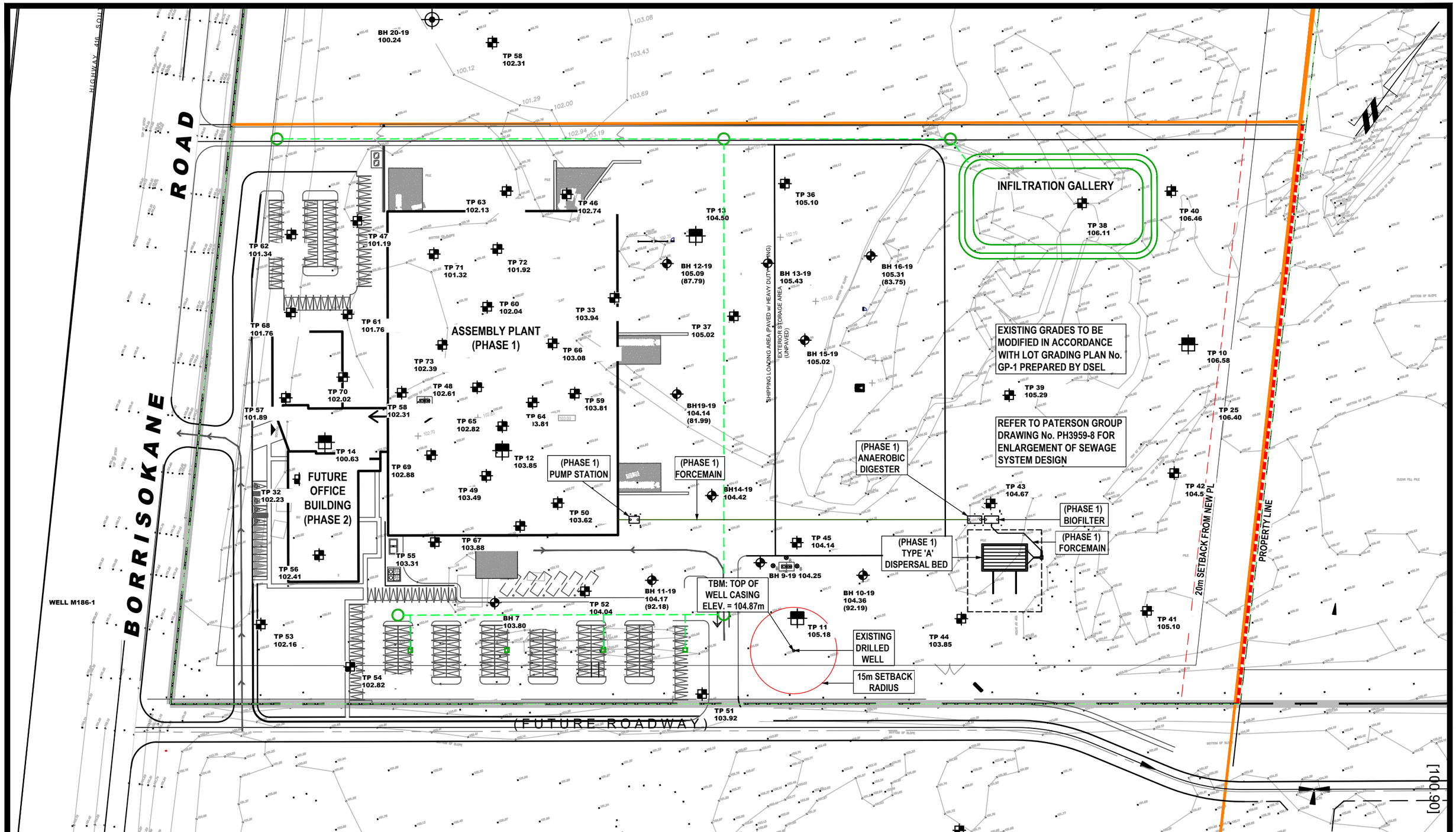
Project:
ABIC OFFICE/ASSEMBLY PLANT
3713 BORRISOKANE RD.
OTTAWA, ON

Contract with:
BBS CONSTRUCTION (ONTARIO) LTD.
1805 WOODWARD DR., OTTAWA, ON

SHEET 1 OF 1

APPENDIX C

Wastewater Collection



patersongroup
consulting engineers
154 Colonnade Road, Ottawa, Ontario K2E 7J5

DD/MM/YY	Description	Rev.
15/04/20	Issued for Septic Permit	1
13/04/20	Issued for Preliminary Revew	0

Client: **CAIVAN BARRHAVEN RENTAL**

Project: **PROPOSED ASSEMBLY BUILDING**
3713 BORRISOKANE ROAD
OTTAWA (NEPEAN), ONTARIO

Drawing: **PHASE 1: SITE LAYOUT PLAN**

Scale: 1:1250	Drawn by: HV
Date: 04/2020	Checked by: MK
Drawing no.: PH3959-7	

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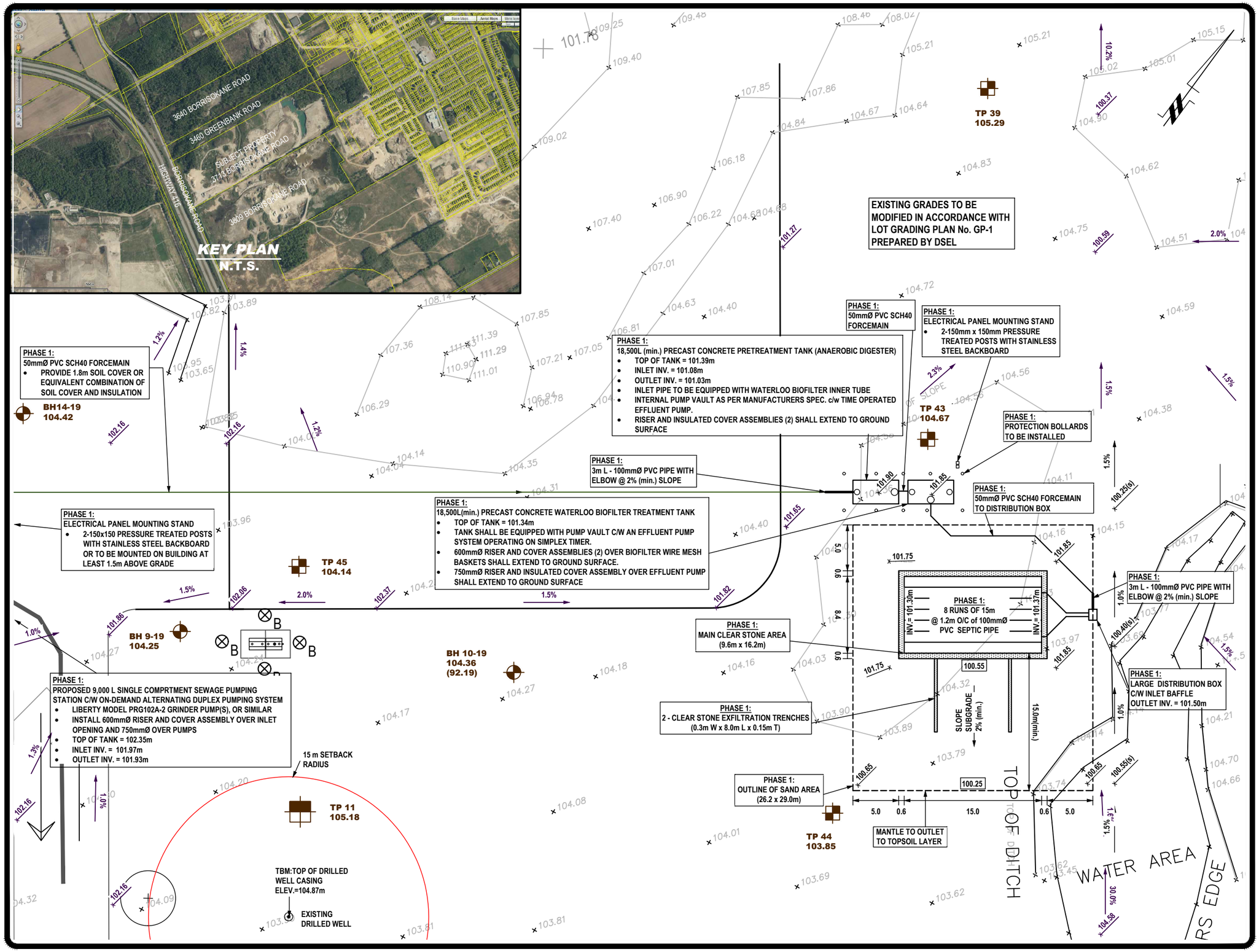

LEGEND:

	Test Pit Location
	Borehole Location
x 100.99	Existing Ground Surface Elev. (m)
x 102.30	Proposed Ground Surface Elev. (m)
x 100.37	Proposed Grounds Surface Elev. (m) as per DSEL
100.25	Proposed Subgrade Elev. (m)
x 100.45	Proposed Swale Elev. (m)
	Proposed Structure

BENCHMARK INFORMATION:

TBM: Top of Drilled Well Casing (See Plan)
Assumed Elevation = 104.87m

REFERENCE:

Proposed Grading Information obtain from grading plan GP-1, Job No. 19-1134, dated December 2019, by DSEL

Site Plan Information obtained from Collectif D'Architects, dated November 29, 2019

Topographic Information obtained from Topographic Survey Job No.18-10-145-00 dated June 10, 2019, By J.D. Barnes Ltd.

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CAIVAN BARRHAVEN RENTAL

Project:

PROPOSED ASSEMBLY BUILDING

3713 BORRISOKANE ROAD OTTAWA (NEPEAN), ONTARIO

Drawing:

PHASE 1: SEWAGE SYSTEM LAYOUT PLAN

Scale: 1:400	Drawn by: HV
Date: 04/2020	Checked by: MK

Drawing No.: **PH3959-8**

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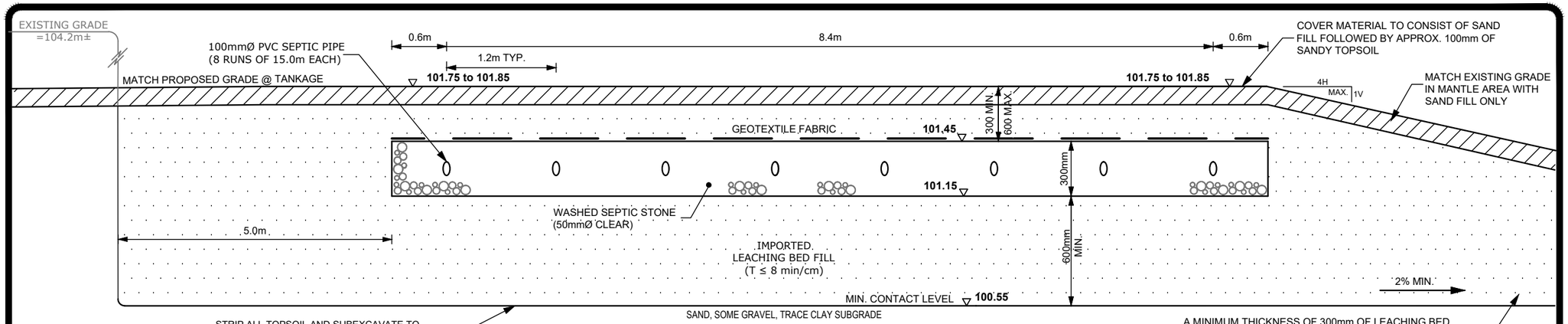

PROFILE

N.T.S.

NOTES:

1) ESTIMATE OF DESIGN SEWAGE FLOW (Q)

PROPOSED SEWAGE FLOWS

FACTORY EMPLOYEES: 40 EMPLOYEES @ 2 SHIFTS X 75 L/D =	6000 L/D
FACTORY OFFICE SPACE: (80m² / 9.3) x 75 L/D =	650 L/D

TOTAL DESIGN DAILY SANITARY SEWAGE FLOW = 6,650 L/D

2) GENERAL REQUIREMENTS FOR TANKAGE

- ALL TANKS SHALL CONSIST OF PRECAST CONCRETE TANKS CONFORMING TO CSA-B66-10.
- THE ACTUAL TANK CONFIGURATION MAY DIFFER FROM THAT SHOWN PROVIDED THE MINIMUM SPECIFIED WORKING CAPACITY OF THE TANK MEET THE DESIGN REQUIREMENTS.
- ALL SEPTIC TANKS MUST BE CPA OR CSA CERTIFIED AND SHALL BE DESIGNED TO WITHSTAND ALL APPLICABLE LOADS. CONTRACTOR TO PROVIDE SHOP DRAWINGS STAMPED BY A STRUCTURAL ENGINEER.
- TANKS SHALL BE BEDDED ON A LAYER OF OPSS GRANULAR A COMPACTED TO AT LEAST 95% OF ITS SPMDD.
- TANKS SHALL BE CONNECTED USING SCH 40 PVC SEWER PIPE WITH WATERTIGHT CONNECTIONS USING STAINLESS STEEL LINK SEALS OR APPROVED EQUAL.
- LEAKAGE TEST SHALL BE CARRIED OUT BY THE CONTRACTOR AND OBSERVED BY THE CONSULTANT ON ALL TANKS PRIOR TO BACKFILLING. FILL TANKS TO AT LEAST THE TOP OF THE TANK LID AND ALLOW TO STAND FOR AT LEAST 24 HOURS.
- BACKFILL TANKS USING OPSS GRANUALR B TYPE 1 BACKFILL OR CLEAN SAND FILL. PLACE BACKFILL IN UNIFORM LAYERS NOT EXCEEDING 300MM THICKNESS AND COMPACT TO AT LEAST 90% OF SPMDD.
- FINAL GRADING SHALL BE SHAPED TO ENSURE THAT SURFACE WATER IS DIRECTED AWAY FROM ALL TANKS.
- WORK AREA SHALL BE COVERED WITH A LAYER OF TOPSOIL OF AT LEAST 100MM IN THICKNESS AND SEEDED.

3) SEWAGE PUMPING STATION

- INSTALL NEW 9,000L SINGE COMPARTMENT SEWAGE PUMPING STATION.
- 600MMØ RISER AND INSULATED COVER ASSEMBLY SHALL BE INSTALLED OVER TANK INLET ACCESS OPENING AND A 750MMØ RISER AND INSULATED COVER ASSEMBLY SHALL BE INSTALLED OVER THE OPENING TO THE SEWAGE PUMPS. RISERS SHALL EXTEND TO AT LEAST 50MM ABOVE FINISHED GRADE AND MUST BE SECURED OR LOCKABLE.
- THE SEWAGE PUMPING STATION SHALL BE EQUIPPED WITH AN ON-DEMAND, ALTERNATING DUPLEX GRINDER PUMP SYSTEM (I.E. LIBERTY MODEL PRG102A-2 GRINDER PUMP(S), OR SIMILAR).
- THE PUMPS SHALL BE OPERATED BY A WATERLOO SMART PANEL.
- CONTROL PANEL SHALL BE EQUIPPED WITH AN AUDIBLE AND VISUAL HIGH WATER ALARM.
- CONTROL PANEL TO BE MOUNTED ON 2-150MM X 150MM PRESSURE TREATED POSTS WITH STAINLESS STEEL BACKBOARD.
- THE PUMP DOSE VOLUME SHALL BE SET AT 900L.
- INSTALL REQUIRED FITTINGS AND PIPING FROM PUMP DISCHARGE ASSEMBLY AND CONNECT TO A 50MMØ SCH40 PVC FORCEMAIN.

4) FORCEMAIN / DISTRIBUTION BOX

- FORCEMAIN SHALL CONSIST OF 50mm THICK PVC SCH 40 PVC PRESSURE PIPE
- FORCEMAIN TO BE BEDDED ON 150mm THICK LAYER OF GRANULAR 'A' FILL COMPACTED TO AT LEAST 95% OF SPMDD.
- FORCEMAIN SHALL BE PROVIDED WITH 1.8M MIN. SOIL COVER OR AN EQUIVALENT COMBINATION OF SOIL COVER AND INSULATION.
- FORCEMAIN SHALL OUTLET TO A (min.) 3.0m LONG 100mmØ PVC SDR 28 SEWER PIPE AT 2.0% (min.) SLOPE TOWARDS THE PRETREATMENT TANK.
- 100mmØ SEWER PIPE TO OUTLET TO THE PRETREATMENT TANK (ANAEROBIC DIGESTER)

5) PRETREATMENT TANK (ANAEROBIC DIGESTER)

- A 18,500 L SINGLE COMPARTMENT PRECAST CONCRETE SEPTIC TANKS SHALL BE INSTALLED. (DESIGNED TO SUPPORT UP TO 7,500 L/DAY)
- A WATERLOO INNER TUBE SHALL BE INSTALLED ON THE INLET PIPE IN THE TANK.
- EFFLUENT FILTERS TO BE INSTALLED ACCORDING TO MANUFACTURER'S GUIDELINES (IF REQUIRED).
- 600mmØ RISER AND INSULATED COVER ASSEMBLY SHALL BE INSTALLED OVER TANK ACCESS OPENING AT INLET, AND 750mmØ RISER AND INSULATED COVER ASSEMBLY SHALL BE INSTALLED OVER PUMP ACCESS OPENING.
- RISERS SHALL EXTEND TO AT LEAST 50MM ABOVE FINISHED GRADE.
- AN INTERNAL PUMP CHAMBER SHALL BE INSTALLED IN THE PRETREATMENT TANK.
- PUMP CHAMBER TO HAVE A 3,750 L (min.) INTERNAL PUMP CAPACITY, 3,750 L (min.) EXTERNAL PUMP CAPACITY AND A 1,500 L(min.) RESERVE CAPACITY.
- THE PUMP VAULT SHALL BE EQUIPPED WITH A TIME CONTROLLED SIMPLEX EFFLUENT PUMP SYSTEM (I.E. LITTLE GIANT MODEL WS50M-12 EFFLUENT PUMP, OR SIMILAR) TO DOSE THE WATERLOO BIOFILTER TREATMENT TANK.
- PUMP & FLOAT TREE TO BE BE INSTALLED AS PER MANFACTURER'S SPECIFICATIONS.
- THE PUMP SHALL BE OPERATED BY A CUSTOM WATERLOO SMART PANEL.
- CONTROL PANEL SHALL BE EQUIPPED WITH AN AUDIBLE AND VISUAL HIGH WATER ALARM AND HAVE REMOTE ALARM CAPABILITIES.
- CONTROL PANEL TO BE MOUNTED ON 2-150MM X 150MM PRESSURE TREATED POSTS WITH STAINLESS STEEL BACKBOARD.

6) BIOFILTER

- THE WATERLOO BIOFILTER TREATMENT TANK SHALL CONSIST OF 18,500L SINGLE-COMPARTMENT PRECAST CONCRETE TANKS (DESIGNED TO SUPPORT UP TO 7,500 L/DAY).
- THE BIOFILTER TANK WILL CONTAIN 2 WIRE MESH BASKETS CONTAINING APPROXIMATELY 10.5M³ (min.) OF BIOFILTER MEDIUM TOTAL.
- THE WASTEWATER FROM THE PUMP VAULT SHALL BE DOSED USING SPRAY NOZZLES OVER EACH OF THE BASKETS IN BIOFILTER TANK AT A LOADING RATE OF APPROXIMATELY 633L/M³/DAY.
- THE TREATED EFFLUENT IS COLLECTED IN THE BOTTOM OF THE TANK.
- BIOFILTER TANK IS EQUIPPED WITH AN EFFLUENT PUMP OPERATING ON SIMPLEX TIMER. THE EFFLUENT PUMP WILL CONSIST OF A LITTLE GIANT MODEL WS50M-12 EFFLUENT PUMP, OR SIMILAR.
- THE EFFLUENT PUMP SHALL BE OPERATED BY THE CUSTOM WATERLOO SMART PANEL.
- 600mmØ RISER AND INSULATED COVER ASSEMBLIES SHALL BE INSTALLED OVER BIOFILTER WIRE MESH BASKETS AND 750mmØ RISER AND INSULATED COVER ASSEMBLY OVER THE OPENINGS TO THE EFFLUENT PUMPS.
- RISERS SHALL EXTEND TO AT LEAST 50MM ABOVE FINISHED GRADE.

7) TREATED EFFLUENT FORCEMAIN

- A 50MMØ (NOMINAL) PVC SCH40 FORCEMAINS SHALL BE USED TO CARRY THE EFFLUENT FROM THE WATERLOO BIOFILTER TREATMENT UNIT TO THE DISTRIBUTION BOX AT THE LEACHING BED.
- FORCEMAINS TO BE PROVIDED WITH 1.2m (min.) OF SOIL COVER AND SHALL GRAVITY DRAIN.
- FORCEMAIN SHALL OUTLET TO A 3.0m L x 100mmØ SOLID PVC SDR 28 SEWER PIPE @ 2.0%(min.) SLOPE TOWARDS THE DISTRIBUTION BOX.
- LARGE 4 OUTLET (min.) DISTRIBUTION BOX SHALL TO BE INSTALLED.
- DISTRIBUTION BOX SHALL CONNECT TO THE LEACHING BED BY WAY OF 100mmØ SOLID PVC SDR 28 SEWER PIPE @ 2.0% (min.) SLOPE.

8) DISPOSAL FIELD CONSTRUCTION GUIDELINES

- THE DISPOSAL FIELD SHALL CONSIST OF A TYPE "A" DISPERSAL BED COMPRISED OF 8 RUNS OF 15M EACH RUN @ 1.2M O/C SPACING OF 100MMØ PERFORATED PVC SEPTIC PIPE.
- CLEAR STONE AREA REQUIRED = Q/50 = 6,650/50 = 133M²
- CLEAR STONE AREA PROVIDED = 155.5M²
- EXISTING SOILS CONSIST OF SANDY FILL MATERIAL OVER IN SITU SAND MATERIAL, A CONSERVATIVE T TIME OF 40 min./cm. SHALL BE USED
- SAND AREA REQUIRED = QT/400 = 6,650(40)/400 = 665M²
- SAND AREA PROVIDED = 759.8M²
- HYDRAULIC LOADING RATE = 8.8 L/D/M2
- REMOVE ALL ORGANICS AND SUBEXCAVATE TO AT LEAST ELEVATION 100.55M, WHICHEVER IS GREATER.
- THE SUBGRADE SURFACE SHALL BE SCARIFIED UNDER DRY CONDITIONS.
- THE SPECIFIED TOP OF THE SAND LAYER (ELEV. 101.15M), BELOW THE CLEAR STONE DISTRIBUTION AREA, SHOULD BE ESTABLISHED WITH IMPORTED SAND FILL, HAVING A PERCOLATION RATE OF NOT GREATER THAN 8 MIN/CM (600MM THICKNESS MINIMUM).
- LEACHING BED SAND FILL SHALL BE UNIFORM SAND WITH GRADING LIMITS SIMILAR TO 100% PASSING 13.2MM SIEVE, LESS THAN 5% PASSING 0.075MM SIEVE AND HAVING A PERCOLATION RATE OF 6 TO 8 MIN/CM. LEACHING BED FILL SHALL BE PRE-APPROVED BY THE CONSULTANT.
- THE SAND AREA OUTSIDE OF THE LIMITS OF THE DISTRIBUTION AREA SHALL CONSIST OF A MINIMUM THICKNESS OF 300MM OF UNIFORM SAND HAVING A PERCOLATION RATE OF NOT GREATER THAN 8 MIN/CM. MATCH EXISTING GRADE WITH ADDITIONAL LEACHING BED FILL.
- THE DISTRIBUTION PIPES SHALL BE EMBEDDED IN A 300MM THICK LAYER OF WASHED SEPTIC STONE.
- THE INVERT LEVEL OF THE DISTRIBUTION PIPES SHALL BE SET AT ELEVATION 101.37M AT THE HEADER AND ELEVATION 101.30M AT THE FOOTER.
- THE ENDS OF EACH RUN SHALL BE INTERCONNECTED WITH A SOLID FOOTER PIPE.
- THE MAIN CLEAR STONE LAYER SHALL BE COVERED WITH AN APPROVED GEOTEXTILE FABRIC.
- THE SURFACE OF THE BED SHOULD BE COVERED WITH SAND FILL FOLLOWED BY APPROXIMATELY 100MM OF SANDY TOPSOIL. THE BED AREA SHOULD BE VEGETATED.
- THE TOTAL THICKNESS OF THE COVER OVER THE CLEAR STONE DISTRIBUTION LAYER SHALL RANGE BETWEEN 0.3M AND 0.6M.
- THE SIDES OF THE BED SHOULD BE SLOPED AT 4H:1V OR SHALLOWER.

9) MINIMUM CLEARANCE DISTANCE FROM LEACHING BED

- 6.0M FROM ANY PROPERTY LINE
- 8.0M FROM ANY STRUCTURE
- 15.0M FROM EXISTING DRAINAGE COURSE
- 18.0M FROM ANY DRILLED WELL
- 5.0M FROM ANY TREES UNLESS OTHERWISE APPROVED
- 5.0M FROM DRIVEWAY

10) MINIMUM CLEARANCE DISTANCE FROM TANK(S)

- 1.5M FROM ANY STRUCTURE
- 15.0M FROM ANY DRILLED WELL OR EXISTING DRAINAGE COURSE
- 3.0M FROM ANY PROPERTY LINE

** EXISTING GRADING TO BE DRASTICALLY MODIFIED, IN ACCORDANCE WITH PROPOSED GRADING PROVIDED IN LOT GRADING PLAN GP-1, JOB No. 19-1134, DATED DECEMBER 20,19 BY DSEL**

TEST PIT INFORMATION

SOILS INFORMATION GATHERED BY PATERSON GROUP INC. ON OCTOBER 4, 2019 & MARCH 13, 2020.

TP 39, ELEV. 105.29m

0-0.15	FILL: SILTY CLAY, SOME GRAVEL & ORGANICS
0.15-5.50	FILL: BR. SAND, SOME CLAY, GRAVEL, CONST. DEBRIS

- TP DRY UPON COMPLETION

TP 43, ELEV. 104.67m

0-0.20	FILL: SILTY CLAY, SOME TOPSOIL, TRACE GRAVEL
0.20-2.90	FILL: BR. SILTY CLAY, SOME SAND GRAVEL, COBBLES, TR. CONSTRUCTION DEBRIS
2.90-5.20	FILL: GR. SILTY CLAY, SOME SAND GRAVEL, COBBLES

-GROUNDWATER INFILTRATION @ 4.9m DEPTH (99.77m)

TP 44, ELEV. 103.85m

0-0.15	FILL: BR. SILTY CLAY, SOME SAND GRAVEL
0.15-3.70	FILL: BR. SAND, SOME GRAVEL, COBBLES TR. CONSTRUCTION DEBRIS
3.70-5.20	FILL: BR. SAND, SOME GRAVE, COBBLES TRACE CLAY

-GROUNDWATER INFILTRATION @4.6m DEPTH (99.25m)

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CAIVAN BARRHAVEN RENTAL

Project:

PROPOSED ASSEMBLY BUILDING

3713 BORRISOKANE ROAD OTTAWA (NEPEAN), ONTARIO

Drawing:

PHASE 1: SEWAGE SYSTEM DETAIL & NOTES

Scale: N.T.S.	Drawn by: HV
Date: 04/2020	Checked by: MK

Drawing No.: **PH3959-9**

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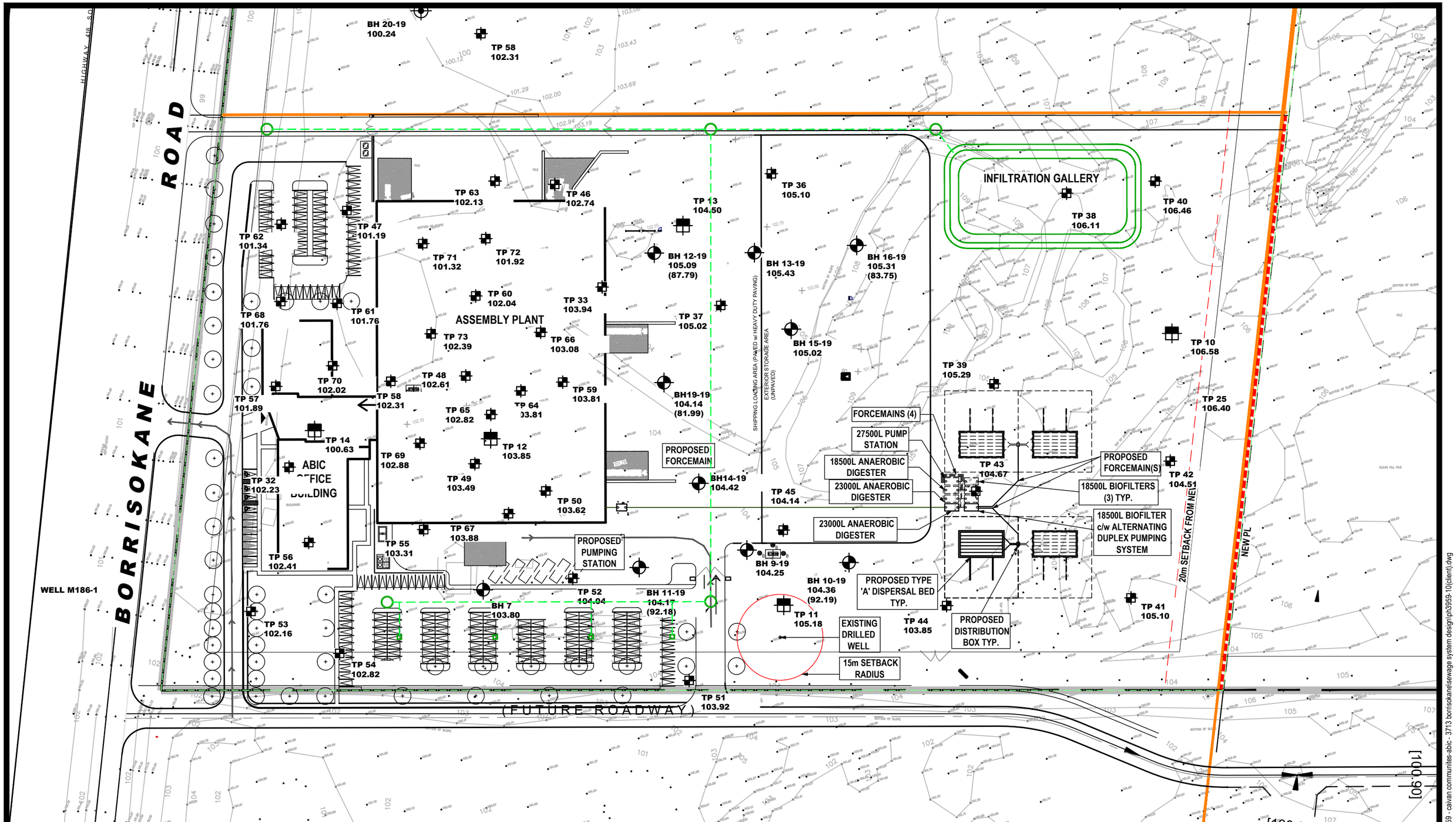

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Project: **PROPOSED ASSEMBLY BUILDING**
3713 BORRISOKANE ROAD
OTTAWA (NEPEAN), ONTARIO

Drawing: **SITE LAYOUT PLAN**

Scale: 1:1250	Drawn by: HV
Date: 04/2020	Checked by: MK
Drawing no.: PH3959-10	

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APPENDIX D

Stormwater Management

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	7.35	ha
C	0.20	Rational Method runoff coefficient
L	303.23	m
Up Elev	109.4	m
Dn Elev	100.42	m
Slope	3.0	%
Tc	35.6	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	**5-year**	**100-year**	
i	35.6	48.0	81.6	mm/hr
Q	145.6	195.8	416.6	L/s

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

DSEL©

STORAGE SUMMARY
STORAGE VOLUME AVAILABLE BELOW OVERFLOW

Total Site		
Rainfall (mm)	**Drainage Area (sq.m)**	**Volume Required (cu.m)**
25	73509.63	1837.7

Phase 1		
Rainfall (mm)	**Drainage Area (sq.m)**	**Volume Required (cu.m)**
25	61047.15	1526.2

Phase 2		
Rainfall (mm)	**Drainage Area (sq.m)**	**Volume Required (cu.m)**
25	12462.48	311.6

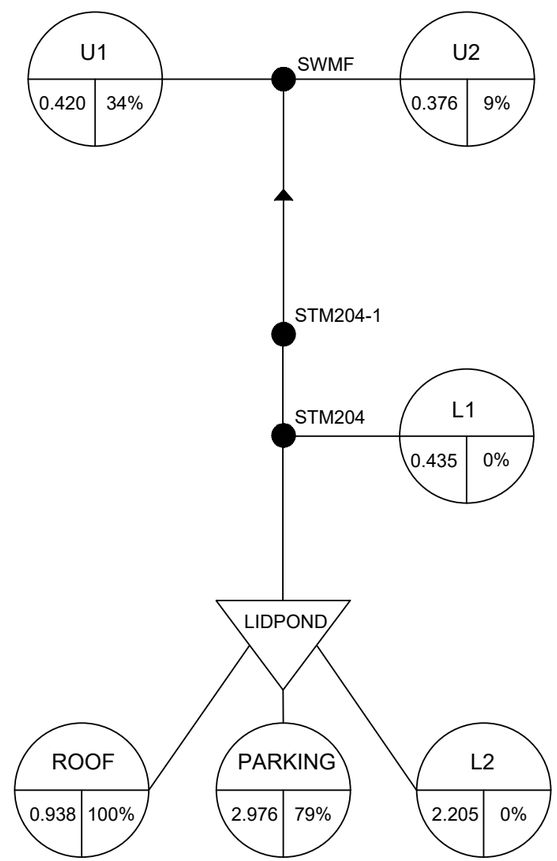
Storm Sewer Calculation Sheet
Ultimate - Phase II Conditions
2 Year Storm Event

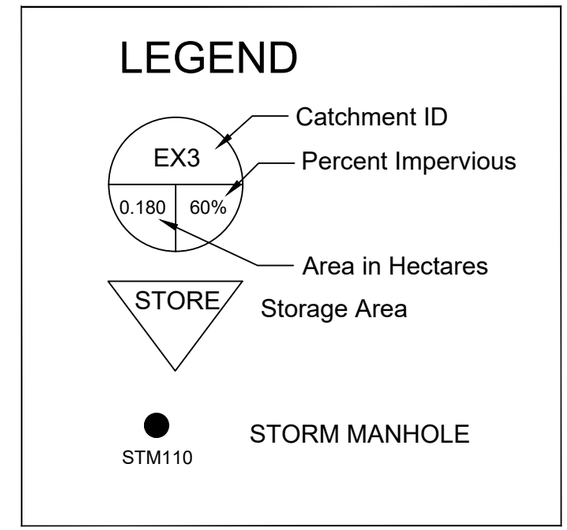
										Sewer Data								
Area ID	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**i_{2YR}**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
CB12	CB12	STM100	0.078	0.56	0.04	0.04	10.0	76.8	9.4	200	1.00	59.6	0.031	0.050	1.04	32.8	1.0	0.29
STM100	STM100	STM101	0.757	0.76	0.57	0.62	11.0	73.3	125.8	525	0.20	113.9	0.216	0.131	0.89	192.3	2.1	0.65
STM101	STM101	STM102	0.920	0.68	0.62	1.24	13.1	66.7	230.2	525	0.32	134.9	0.216	0.131	1.12	243.3	2.0	0.95
							15.1											
	BLDG A	STM200	0.246	0.90	0.22	0.22												
STM200	STM200	STM201	0.385	0.63	0.24	0.46	10.0	76.8	99.1	450	0.25	34.6	0.159	0.113	0.90	142.6	0.6	0.70
	STM201	STM202			0.00	0.46	10.6	74.4	96.0	450	1.00	10.4	0.159	0.113	1.79	285.1	0.1	0.34
STM202	STM202	STM203	0.352	0.90	0.32	0.78	10.7	74.1	160.8	525	0.20	156.8	0.216	0.131	0.89	192.3	2.9	0.84
CB8	STM203	STM102	0.238	0.90	0.21	1.00	13.7	65.1	179.9	525	0.20	31.7	0.216	0.131	0.89	192.3	0.6	0.94
							14.3											
	STM102	OGS				2.24	15.1	61.6	382.7	600	0.70	1.5	0.283	0.150	1.82	513.7	0.0	0.74
	OGS	SWM AREA				2.24	15.1	61.5	382.5	600	0.60	87.9	0.283	0.150	1.68	475.6	0.9	0.80
							16.0											

CB12					**STM100**					**STM101**					**STM200**			
	Imp.	Perv.	Total			Imp.	Perv.	Total			Imp.	Perv.	Total			Imp.	Perv.	Total
Area	0.041	0.038	0.078		Area	0.603	0.154	0.757		Area	0.630	0.290	0.920		Area	0.238	0.148	0.385
C	0.9	0.2	0.56		C	0.9	0.2	0.76		C	0.9	0.2	0.68		C	0.9	0.2	0.63

STM202					**CB8**			
	Imp.	Perv.	Total			Imp.	Perv.	Total
Area	0.352	0.000	0.352		Area	0.238	0.000	0.238
C	0.9	0.2	0.90		C	0.9	0.2	0.90

FIGURE 1 - HYDROLOGIC MODEL SCHEMATIC





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;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           LPS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           01/01/2000
START_TIME           00:01:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:01:00
END_DATE             01/02/2000
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         0:00:02
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
```

```
1                INTENSITY 0:10     1.0      TIMESERIES CH6H100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width
%Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- -------- ----------------
ROOF             1                LIDPOND          0.9376   100      115      1.5
   0
PARKING          1                LIDPOND          2.9764   79       125      1.5
   0
L1               1                STM204           0.435    0        30       33
   0
U1               1                SWMF             0.42     34       40       1.5
   0
U2               1                SWMF             0.376    9        40       1.5
   0
L2               1                LIDPOND          2.205    0        125      1.5
   0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
ROOF             0.013      0.25       1.57       4.67       0          OUTLET
PARKING          0.013      0.25       1.57       4.67       0          OUTLET
L1               0.013      0.25       1.57       4.67       0          OUTLET
U1               0.013      0.25       1.57       4.67       0          OUTLET
U2               0.013      0.25       1.57       4.67       0          OUTLET
L2               0.013      0.25       1.57       4.67       0          OUTLET

[INFILTRATION]
;;Subcatchment   MaxRate    MinRate    Decay      DryTime    MaxInfil
;;-------------- ---------- ---------- ---------- ---------- ----------
ROOF             76.2       13.2       4.14       7          0
PARKING          76.2       13.2       4.14       7          0
L1               76.2       13.2       4.14       7          0
U1               76.2       13.2       4.14       7          0
U2               76.2       13.2       4.14       7          0
L2               76.2       13.2       4.14       7          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
STM204           98.45      5          0          0          0
STM204-1         98.44      5          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
```

```
;;-------------- ---------- ---------- ---------------- -------- ----------------
SWMF             96         FREE                         NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params
    N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ----------
---------------------------- -------- --------          -------- --------
LIDPOND          97.5     5          0          TABULAR    LIDCURVE
    0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset
OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ----------
---------- ---------- ----------
P3               LIDPOND          STM204           26.3       0.013      98.5
98.45      0          0
P1               STM204-1         SWMF             24         0.013      *
*          0          0
P2               STM204           STM204-1         1.2        0.013      *
*          0          0

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4
Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ----------
---------- ----------
P3               CIRCULAR     0.3              0          0          0          1

P1               CIRCULAR     0.3              0          0          0          1

P2               CIRCULAR     0.3              0          0          0          1


[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------
P3               1.3        1.3        0          NO         0
P2               0.5        0.5        0          NO         0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
LIDCURVE         Storage    0          1959
LIDCURVE                    0.2        2535
LIDCURVE                    0.7        2598.9
LIDCURVE                    0.8        2832
LIDCURVE                    1.1        2731.4
LIDCURVE                    1.4        2935
```

```
;
CB101CURVE       Storage    0.81       0.4
CB101CURVE                  2.31       0.4
CB101CURVE                  2.41       821.1
CB101CURVE                  2.51       3383.5
CB101CURVE                  2.61       7487.9
;
100-YEAR         Tidal      0          94.81
100-YEAR                    6          94.81
100-YEAR                    12         0
100-YEAR                    24         0

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;2yr12hrS
2yr12hrS         FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\2yr12hrS.dat"
;
;5yr12hrS
5yr12hrS         FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\5yr12hrS.dat"
;
;10yr12hrS
10yr12hrS        FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\10yr12hrS.dat"
;
;25yr12hrS
25yr12hrS        FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\25yr12hrS.dat"
;
;50yr12hrS
50yr12hrS        FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\50yr12hrS.dat"
;
;100yr12hrS
100yr12hrS       FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\100yr12hrS.dat"
;
CH4H005          FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\CH4H005.dat"
;
;100-year Storm, 4 Hour Chicago Distribution
CH4H100          FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\CH4H100.dat"
;
CH6H100          FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\CH6H100.dat"
;
CH3H100          FILE "P:\General Administrative\5 - DSEL Templates\Site
```

```
Plan\EPASWMM Template\rainfall\CH3H100.dat"
;
;3 hour chicago storm + 20%
CH3H100x         FILE "P:\General Administrative\5 - DSEL Templates\Site
Plan\EPASWMM Template\rainfall\CH3H100x.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 12500.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
STM204           3396.770           6366.782
STM204-1         3385.236           6955.017
SWMF             3373.702           8731.257
LIDPOND          3996.540           5743.945

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
ROOF             1739.716           5544.021
ROOF             955.402            6409.073
ROOF             297.963            5451.749
PARKING          3681.277           4267.590
PARKING          3081.507           5017.301
PARKING          2458.670           4209.920
L1               5268.166           7047.289
L1               6029.412           5928.489
L1               4818.339           5951.557
L1               5268.166           7093.426
U1               455.594            8108.420
U1               559.400            8258.362
U1               1147.636           7243.368
U1               -74.971            7243.368
U1               570.934            8281.430
U2               6211.073           8835.063
U2               6810.842           7935.409
```

```
U2                5726.644           7900.807
U2                6211.073           8846.597
L2                5000.000           5386.390
L2                5911.188           4371.396
L2                4342.561           4325.260
L2                5034.602           5444.060

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
1                 1666.667           9307.958
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
--------------------------------------------------------------


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

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 01/01/2000 00:01:00
Ending Date .............. 01/02/2000 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001524 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.605        82.291
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.234        31.888
Surface Runoff ...........         0.365        49.682
Final Storage ............         0.005         0.744
Continuity Error (%) .....        -0.027
```

```
  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.365         3.650
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........         0.096         0.960
  Flooding Loss ............         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.269         2.690
  Continuity Error (%) .....         0.008


  ***************************
  Time-Step Critical Elements
  ***************************
  Link P2 (97.38%)


  *******************************
  Highest Flow Instability Indexes
  *******************************
  All links are stable.


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     0.49 sec
  Average Time Step           :     0.68 sec
  Maximum Time Step           :     2.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00


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


-------------------------------------------------------------------------------------
-----------------------------------------
                            Total      Total      Total      Total     Imperv
Perv      Total       Total     Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff
```

```
Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                  mm         mm         mm         mm         mm
  mm         mm    10^6 ltr      LPS

-------------------------------------------------------------------------------
-----------------------------------------
  ROOF                       82.29       0.00       0.00       0.00      80.76
0.00      80.76        0.76   462.07   0.981
  PARKING                    82.29       0.00       0.00      11.88      63.79
5.41      69.19        2.06  1186.54   0.841
  L1                         82.29       0.00       0.00      55.01       0.00
27.31      27.31        0.12    84.47   0.332
  U1                         82.29       0.00       0.00      38.21      27.47
16.11      43.58        0.18    99.76   0.530
  U2                         82.29       0.00       0.00      53.59       7.28
21.31      28.58        0.11    46.60   0.347
  L2                         82.29       0.00       0.00      62.99       0.00
19.30      19.30        0.43   123.34   0.235


  ******************
  Node Depth Summary
  ******************

  -------------------------------------------------------------------------------
                                 Average  Maximum  Maximum  Time of Max    Reported
                                   Depth    Depth      HGL   Occurrence   Max Depth
  Node                 Type       Meters   Meters   Meters  days hr:min      Meters
  -------------------------------------------------------------------------------
  STM204               JUNCTION     0.07     0.23    98.68     0  01:59        0.23
  STM204-1             JUNCTION     0.03     0.09    98.53     0  01:59        0.09
  SWMF                 OUTFALL      0.03     0.09    96.09     0  01:59        0.09
  LIDPOND              STORAGE      1.06     1.18    98.68     0  06:01        1.18


  *******************
  Node Inflow Summary
  *******************


-------------------------------------------------------------------------------
--------------
                                  Maximum  Maximum                  Lateral
Total        Flow
                                  Lateral    Total  Time of Max      Inflow
Inflow     Balance
                                   Inflow   Inflow   Occurrence      Volume
Volume       Error
  Node                 Type           LPS      LPS  days hr:min    10^6 ltr    10^6
ltr     Percent
```

```
--------------------------------------------------------------------------------
--------------
  STM204                JUNCTION     84.47    84.47     0  01:59       0.119
0.689       0.008
  STM204-1              JUNCTION      0.00    65.95     0  01:59           0
0.67       0.003
  SWMF                  OUTFALL     146.37   210.98     0  01:59        0.29
0.96       0.000
  LIDPOND               STORAGE    1748.46  1765.53     0  01:59        3.24
3.26       0.012


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  *********************
  Node Flooding Summary
  *********************

  No nodes were flooded.


  **********************
  Storage Volume Summary
  **********************


--------------------------------------------------------------------------------
---------------
                         Average     Avg  Evap Exfil       Maximum     Max    Time
of Max    Maximum
                          Volume    Pcnt  Pcnt  Pcnt        Volume    Pcnt
Occurrence    Outflow
  Storage Unit           1000 m3    Full  Loss  Loss       1000 m3    Full    days
hr:min        LPS

--------------------------------------------------------------------------------
---------------
  LIDPOND                  2.726      15     0     0         3.063      16       0
06:01      20.94


  **********************
  Outfall Loading Summary
  **********************
```

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
SWMF	99.29	13.63	210.98	0.960
System	99.29	13.63	210.98	0.960

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
P3	CONDUIT	20.94	0 06:01	0.59	0.50	0.55
P1	CONDUIT	65.97	0 01:59	3.47	0.21	0.31
P2	CONDUIT	65.95	0 01:59	1.70	0.75	0.54

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
P3	1.00	0.03	0.00	0.00	0.92	0.00	0.05	0.00	0.01	0.00
P1	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00
P2	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00

****

Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Thu Apr 23 17:20:02 2020
Analysis ended on: Thu Apr 23 17:20:03 2020
Total elapsed time: 00:00:01

AquaShield™ STORMWATER TREATMENT SOLUTIONS

6L]LQJ5HSRUW

^ .DQDVVDV'UDLQ/6XLWH /&KDWDQRRJD71 ^ /3KRQH ·^ ····/)D[· ˇ /ZZZ.DTXDVKLHOGLQF.FRP

6LWH,QIRUPDWLRQ

3URMHFW1DPH: ^ %RULUVRNDQH5RDG

6LWH&RXQW KHFNDFUHV: ^ˇˇˇ

8QLW'HVF2*6

5XQRII &RHII: ^

8QLW&RXQW:

7DUJHW5HPRYDO(IILFLHQF\: EDVHG RQ1-'(3

3URGXFW5HFRPPHQGDWLRQ

$TXD6ZLUO0RGHO	1HW&QQXDO766 5HPRYDO(IILFLHQF\	&KDPEHU'LPHQVLRQ	0DLQ&RQQ,QVLGH'LPHQVLRQ		2LOHUV&RXUDJH&DSDFLW	&DSDFLW
			2II&HQWH	%<3ˇ		
$6ˇ	·	ˇˇ PP	PP	^ˇˇ PP	/	ˇP

5DLQIDOO,QIRUPDWLRQ

1&'&6WDWLRQ: 277$:$0$&'21$/'&$57,(5,17/$ '&W5DQJH: ˇ ^ˇˇ UHDGLQJV WDNHQ KRXUO EHWZ HHQ ˝ˇˇ^ VR ^ a \HDUV

5DLQIDOO(YHQW5DQJH PP KUH	5DLQIDOO,QWHUYDO3RLQW PP KUH	2SHUDWLQJ5DWH/SV P A	7RWDO&5DLQIDOO	5HP RYDO(IILFLHQF\	5HGXFWLYH(IILFLHQF\
	ˇ	^ˇ	·	˝ˇ	·^
	ˇ	ˇˇˇ	ˇ	·˝ ·	˝ ˝
ˇ	ˇ	· ˇˇ	ˇ·	·ˇ	˝˝ˇ
ˇ ˇ	ˇˇ	ˇ	ˇˇ·	· ˇ·	ˇ ˝
ˇ ^	ˇˇ	ˇ		^ˇˇ	
^ ·	^ˇ	ˇ	˝˝	ˇ˝^	˝
· ˝	·ˇ	ˇ ˇ	·	ˇ	^
˝	˝ˇ	· ˇ	·	ˇˇ	
ˇ	ˇ	^		ˇ^	

7RWDO&XPXODWLYH5DLQIDOO: ˝^·ˇ 1HW&QQXDO: ·

6DOHV&JHQW,QIRUPDWLRQ

&JHQW1DPH: (PPDQXHO'LRQ

3KRQH:

&RPSDQ\1DPH: 6RODQR

)D[:

&GGUHVV:

(PDLO:HGLRQ#VRODQR FRP

&LW6WDW=LS: 21

)RRWQRWHV

5HFRPPHGHGDVKRXUO SUHSDUDWRQUDLQDOOGDW LQFKHV 1DWRQDO&OPDWH'DW&HQWU1&'&

%DVHGRQ7HQQHVVHH7HFK8QLYHUVWDERUDWU VWXWH RI WKH&TXD6ZLUO 0RGHO6 IRU2. VOF DSDUWF HV˜ ˇPLF EQV1HDU

˝ 5DLQIDOO(YHQW DF XDWGDVDF RXDWH SHUF HQWHRI LQGLYGXDOHYHQW ZZZ VRWP ZDWUF HQWUQHWV]LQJ F WUWLD &HQWUIRU: DWUVKG3URWF WRQ

1&'&GDWPD QRWEHF RQ FRXWH VXSSLQJ GDV PRQWV DQGRU\HDUVLQWKHUDQJHRI GDWV

ˇ 7KH$TXD6ZLUO ,QWUDO%\SDVV%<3 SURYGHVIXOOWHDWHQWWH WHILUWXV KZHOHWHSHDNGHVJLQVRWP LVGLYHUWGDQGF HQQHGWKURXJKWHPDLQF RYHDQF HSLSH3HDV HUHUWR \RXUGF DU-SUHV EWDWHIRUP RUHLQRUP DWRQ

: KHQDSSOF EGH WHSHUUP DQF HXHZDVDGXVWHGYD3HF HY6F DQJ WRSURYGHHVWDWGV]LQJ SHU1-'(3 36' G ˇˇ PLF EQV

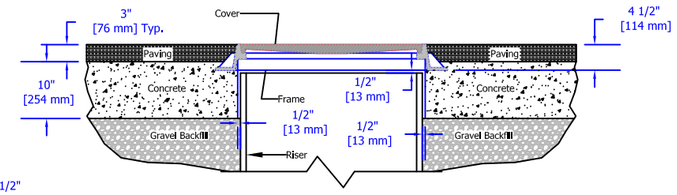
STANDARD NOTE:

1. System shall be designed for the following capacities:
   Peak Treatment Flow: 4.4 cfs [124 L/s]
   Sediment Storage: 45 ft³ [1.3 m³]
   Oil/Debris Storage: 270 gal. [1022 L]

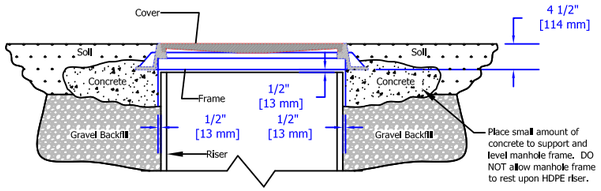
*** Please see accompanied Aqua-Swirl specification notes.**
*** See Site Plan for actual system orientation.**

Bollards shall be placed around access riser(s) in non-traffic areas to prevent inadvertent loading by maintenance vehicles.

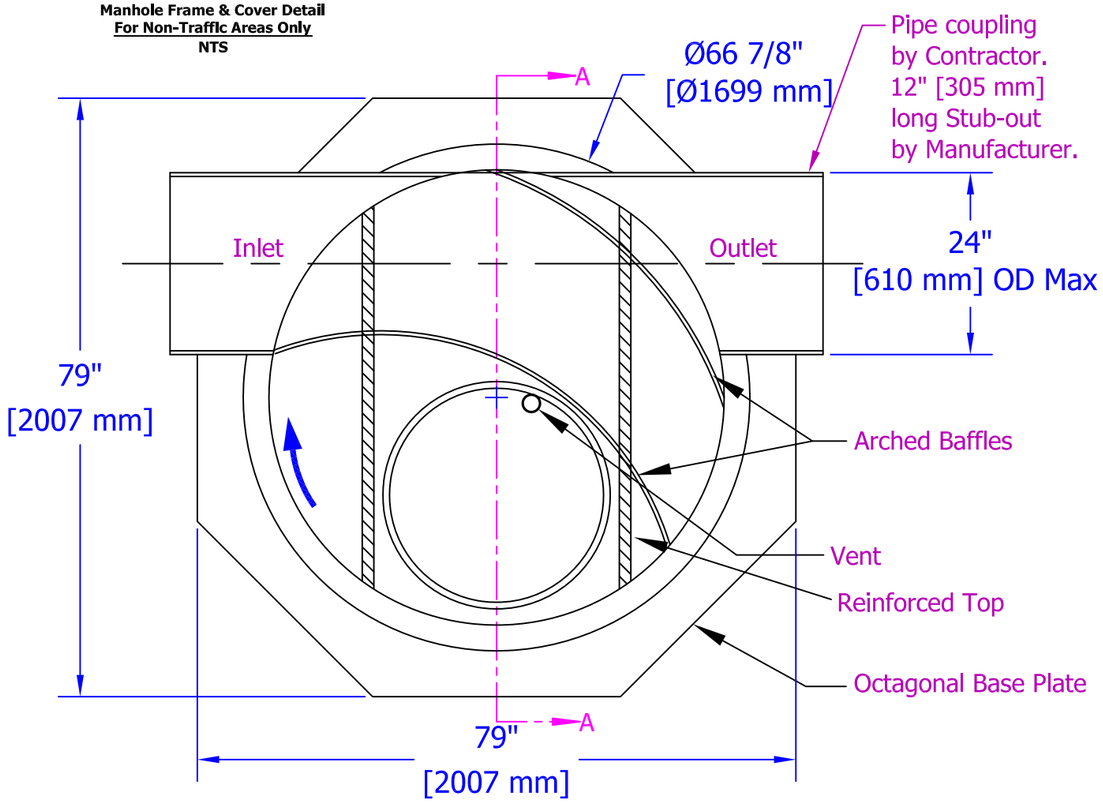
If traffic loading (H-20) is required or anticipated, a concrete pad must be placed over the entire Stormwater Treatment System. Sample details of concrete pad available upon request.



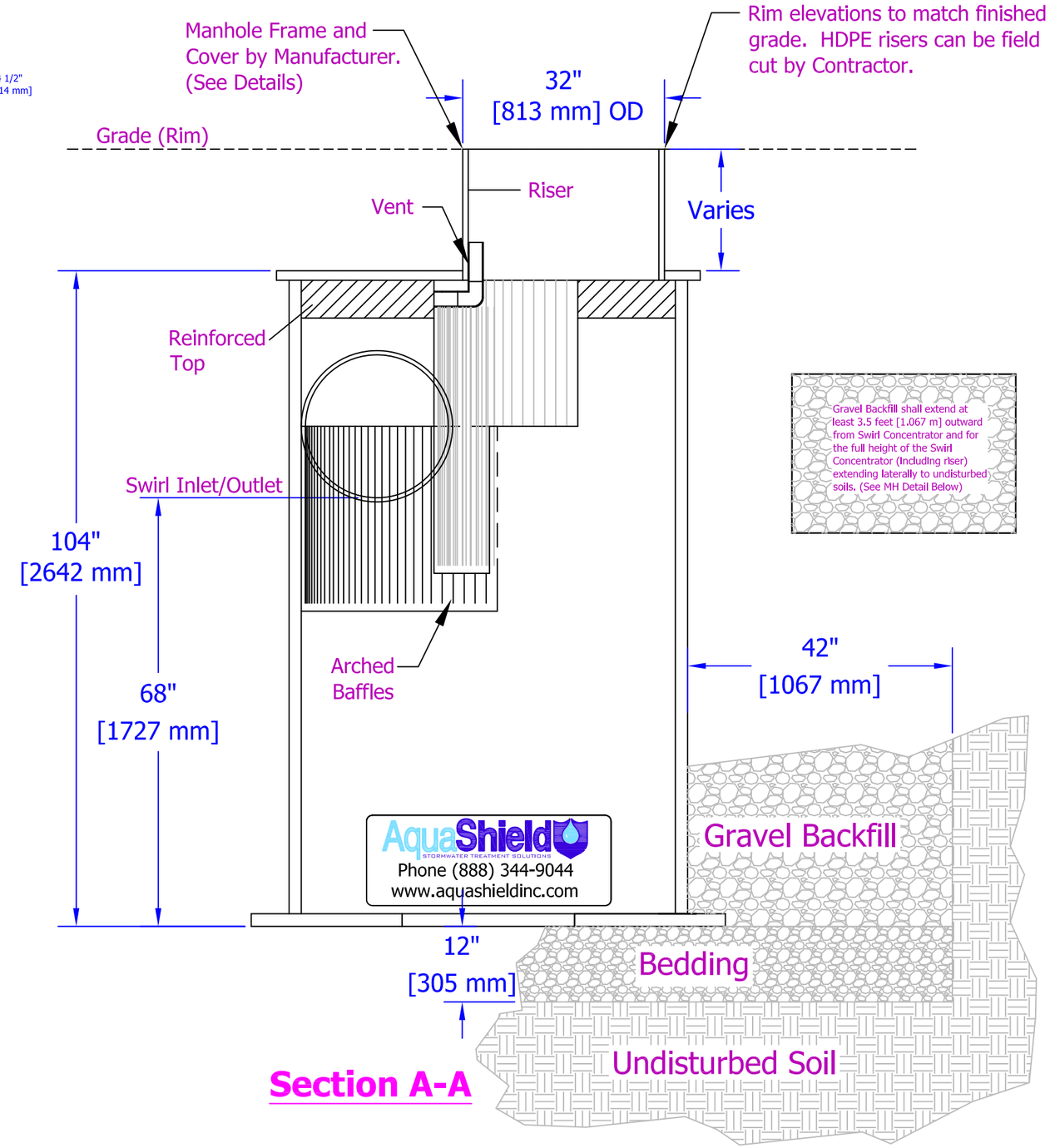
Manhole Frame & Cover Detail
For H-20 Traffic Loading Areas
NTS



Manhole Frame & Cover Detail
For Non-Traffic Areas Only
NTS



Plan View



Section A-A

AquaShield STORMWATER TREATMENT SOLUTIONS
2705 Kanasita Drive, Chattanooga, TN 37343
Phone (888) 344-9044 Fax (423) 826-2112
www.aquashieldinc.com

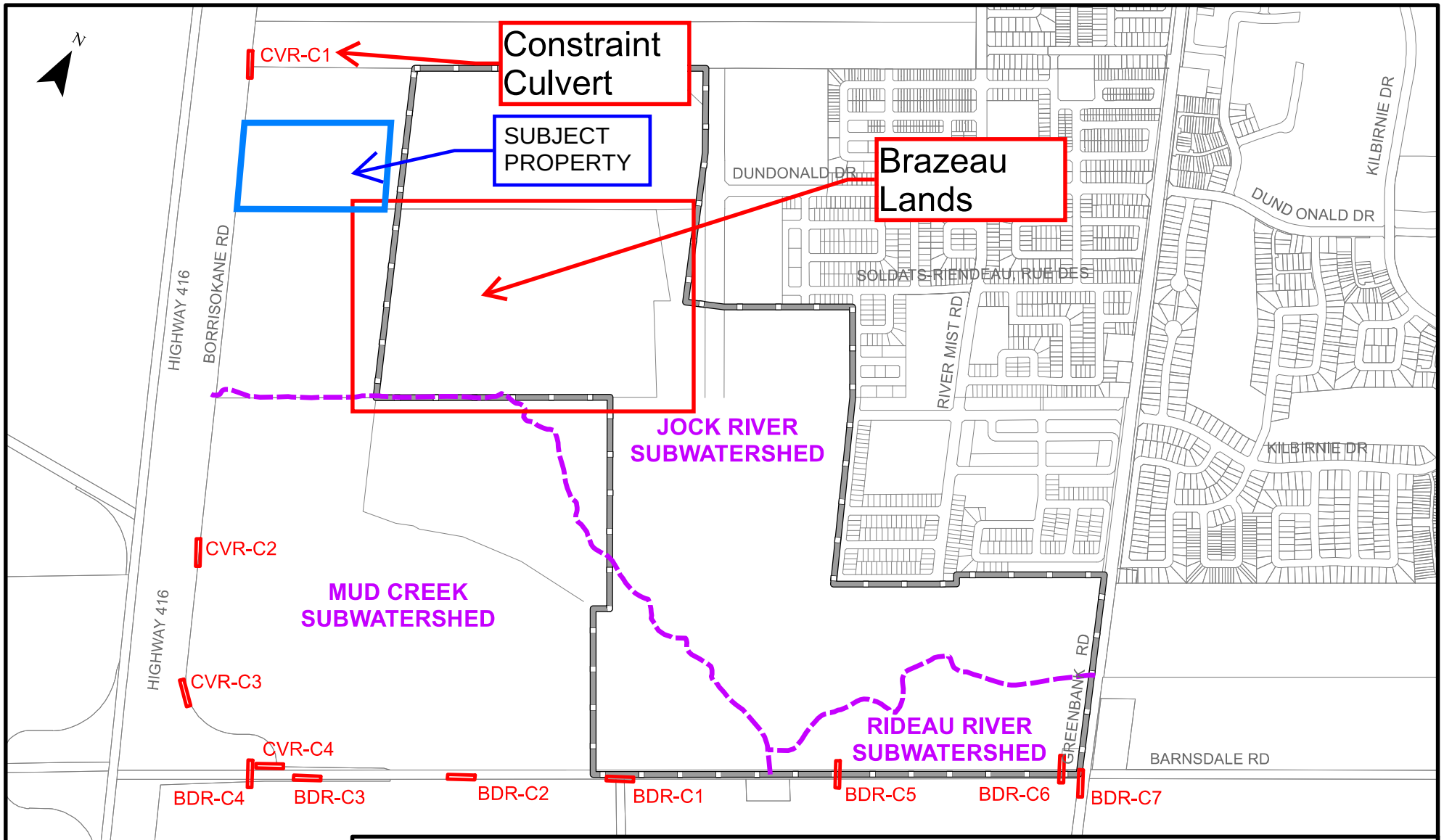
Document:	AS-5 STD
Drawn By:	BLR
Scale:	1:20
Date:	12/21/07

U.S. Patent No. 6524473 and other Patent Pending

Aqua-Swirl Concentrator Model AS-5 CFD Standard Detail

Barrhaven South Urban Expansion Area Excerpts
J.L. Richards & Associates Limited

JLR No. 26610
May 4, 2018 Rev2



Legend

- Culvert
- Subwatershed Limits

Study Area

PROJECT:

BARRHAVEN SOUTH URBAN EXPANSION AREA

OTTAWA, ONTARIO

DRAWING:

BSUEA EXTENTS, DRAINAGE DIVIDE AND CULVERTS

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS
www.jlrichards.ca

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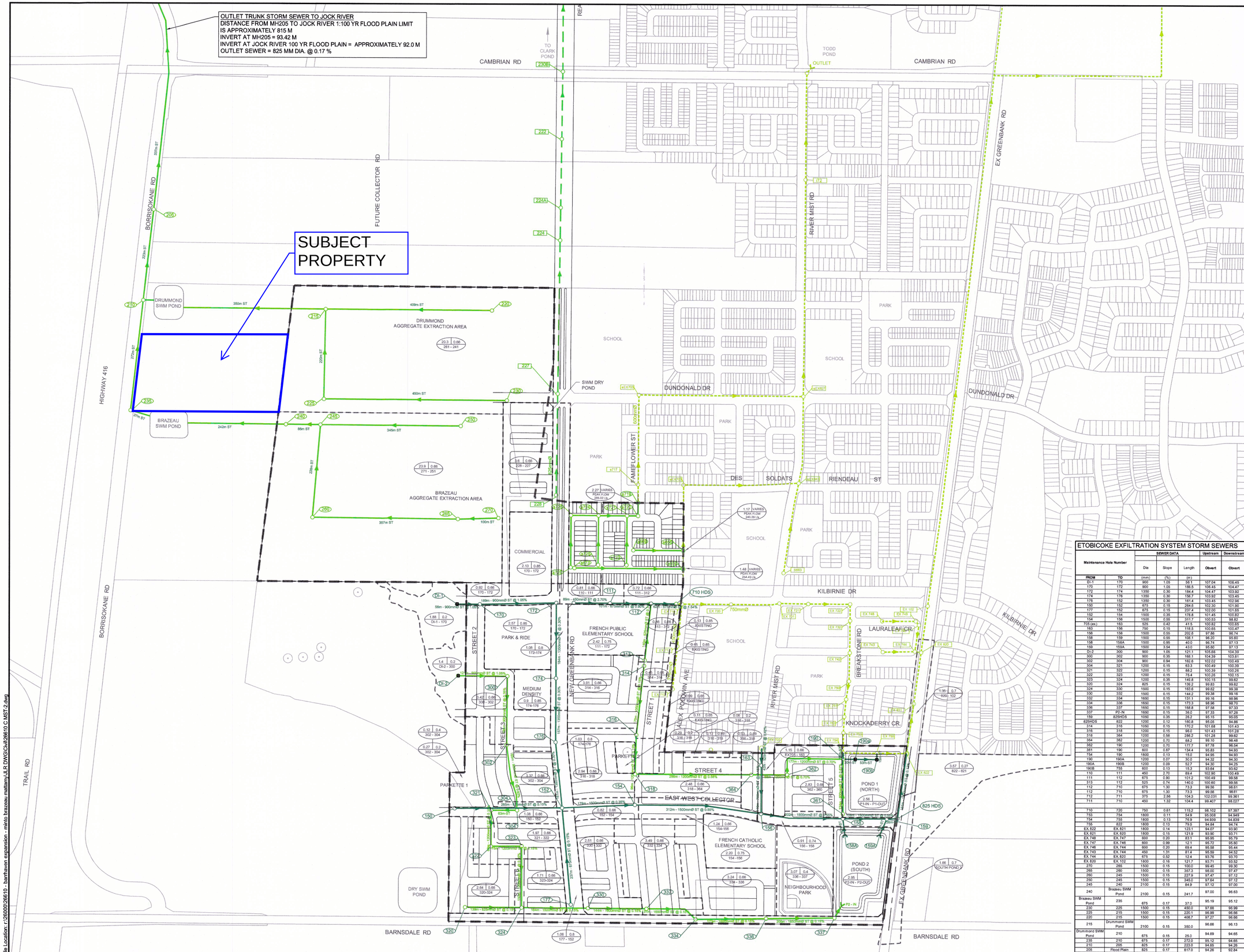
DESIGN:	BP
DRAWN:	KTK
CHECKED:	GF
JLR #:	26610

DRAWING #:

FIGURE 3-1

File Location: R:\26000\26610 - Barrhaven Expansion - Minto Brazeau Mattamy\JLR DWG\GIS\26610 C BSUEA EXTENTS.mxd

Plot Date: September 12, 2017 8:45:23 AM



LEGEND

- PROPOSED STORM (EES SYSTEM), PER 2018 BSUEA MSS
- PROPOSED STORM (CONVENTIONAL), PER 2018 BSUEA MSS
- FUTURE STORM, PER 2014 BS MSS
- EXISTING STORM
- DRAINAGE BOUNDARY
- LIMIT OF STUDY AREA FOR BSUEA
- 710 HDS — HYDROLOGY DYNAMIC SEPARATOR
- 5.48 | 0.67 | 318 - 364 — AREA IN HECTARES*; RUNOFF COEFFICIENT*; PIPE REACH UPSTREAM MAINTENANCE HOLE TO DOWNSTREAM MAINTENANCE HOLE

* IF RED, AREAS DESIGNATED AS COMMERCIAL, SCHOOLS OR PARKS

NOTE:

ROADWAYS WITHIN A DRAINAGE AREA WHICH IS TRIBUTARY TO AN EES SEWER, ARE TO BE DESIGNED WITH EES SEWERS. CONVERSELY, ROADWAYS WITHIN A DRAINAGE AREA WHICH IS TRIBUTARY TO A CONVENTIONAL SEWER, ARE TO BE DESIGNED WITH CONVENTIONAL SEWERS.

No.	ISSUE / REVISION	DD/MM/YY
4	ISSUED FOR PLANNING COMMITTEE APPROVAL	04/05/18
3	ADDRESS COMMENTS, RE-ISSUE BSUEA MSS 2ND SUBMISSION	26/02/18
2	ISSUED AS PART OF DRAFT MSS	20/09/17
1	ISSUED FOR PRE-TAC WORKING MEETING	31/08/17

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VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:4000

CLIENT:

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP: LICENSED PROFESSIONAL ENGINEER M. N. L. DALRYMPLE PROVINCE OF ONTARIO May 4/18

PROJECT NORTH

PROJECT:

BARRHAVEN SOUTH URBAN EXPANSION AREA (BSUEA)

-

DRAWING:

MASTER STORM DRAINAGE PLAN EES

DESIGN: JW

DRAWN: CJM

CHECKED: LD

JLR #: 26610

DRAWING #: MST-2

PLOT DATE: May 4, 2018 9:44:19 AM

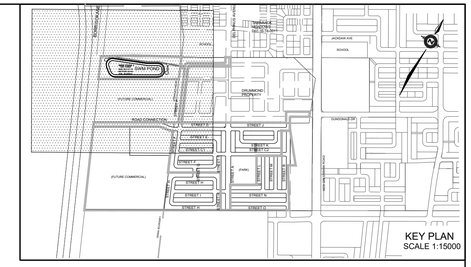
File Location: r:\26000\26610 - barrhaven expansion - minto brazeau mattamy\JLR DWG\civil\26610 C MST-2.dwg

ETOBICOKE EXFILTRATION SYSTEM STORM SEWERS

Maintenance Hole Number		SEWER DATA			Upstream	Downstream
		Dia	Slope	Length	Obvert	Obvert
FROM	TO	(mm)	(%)	(m)		
D-1	170	900	1.05	56.1	107.04	106.45
170	172	900	1.05	186.5	106.45	104.47
172	174	1350	0.30	184.4	104.47	103.92
174	176	1350	0.30	156.7	103.92	103.45
176	152	1350	0.30	161.4	103.45	102.96
150	152	675	0.15	264.6	102.30	101.90
177	152	675	0.15	237.4	102.00	101.65
152	154	1500	0.35	178.8	101.45	100.82
154	156	1500	0.55	311.7	100.53	98.82
705 (ex.)	163	525	0.42	41.5	100.82	100.65
163	156	750	0.15	118.5	100.65	100.47
156	158	1500	0.55	202.6	97.86	96.74
158	159	1500	0.55	108.1	96.20	95.60
158	158A	1500	0.95	40.0	96.74	97.13
159	159A	1350	3.54	43.0	95.80	97.13
D-2	300	900	1.05	121.1	105.68	104.39
300	302	900	0.35	168.1	104.39	103.81
302	304	900	0.94	162.6	102.02	100.49
304	321	1200	0.15	63.3	100.49	100.39
321	322	1200	0.15	88.2	100.39	100.28
322	323	1200	0.15	75.4	100.26	100.15
323	324	1200	0.35	140.8	100.15	99.62
320	324	825	0.15	138.2	99.83	99.62
324	330	1500	0.15	183.6	99.62	99.38
330	332	1500	0.15	144.2	99.38	99.16
332	334	1650	0.15	131.1	99.16	98.96
334	336	1650	0.15	173.3	98.96	98.70
336	337	1650	0.15	168.8	97.58	97.33
337	P2-IN	1650	0.15	36.0	97.33	97.28
159	825HDS	1050	0.35	26.2	95.15	95.05
825HDS	822	1200	0.12	160.8	95.05	94.86
314	318	1050	0.15	170.2	101.68	101.43
316	318	1200	0.15	96.0	101.43	101.28
318	364	1200	0.55	286.2	101.28	99.62
364	362	1200	0.70	88.2	99.10	98.48
362	190	1200	0.70	177.7	97.78	96.54
361	190	600	0.67	134.4	95.83	94.93
754	190	1800	0.13	15.0	94.95	94.93
190	190A	1200	0.07	30.0	94.32	94.30
190A	190B	1200	0.09	52.7	94.30	94.25
190B	755	600	0.13	15.3	93.84	93.82
110	111	450	2.70	89.4	102.90	100.49
111	112	675	0.90	121.2	100.49	99.58
313	112	525	0.74	140.0	100.60	99.56
112	710	675	1.30	73.3	99.56	98.61
112	711	375	2.56	104.3	102.031	99.361
711	710	450	1.32	104.4	99.407	98.027
710	720	750	0.61	115.2	98.102	97.397
753	754	1800	0.11	54.9	95.008	94.943
754	755	1800	0.13	76.9	94.939	94.839
755	822	1800	0.13	79.5	94.84	94.74
EX. 822	EX. 821	1800	0.14	123.1	94.07	93.90
EX. 821	EX. 820	1800	0.15	121.9	93.90	93.71
EX. 748	EX. 747	600	0.20	83.1	95.95	95.79
EX. 747	EX. 746	600	0.99	12.1	95.72	95.60
EX. 746	EX. 744	600	0.20	69.4	95.58	95.44
EX. 743	EX. 744	450	1.31	81.4	95.92	94.92
EX. 744	EX. 820	675	0.32	12.4	93.76	93.70
EX. 820	EX. 102	1800	0.16	121.7	93.71	93.52
270	265	1500	0.15	100.0	99.45	99.30
265	260	1500	0.15	357.3	98.00	97.47
260	245	1500	0.15	227.9	97.47	97.12
250	245	1500	0.15	345.0	97.84	97.12
245	240	2100	0.15	84.9	97.12	97.00
240	Brazeau SWM Pond	2100	0.15	241.7	97.00	96.63
Brazeau SWM Pond	235	675	0.17	37.0	95.19	95.12
230	225	1500	0.15	450.0	97.66	95.99
225	215	1500	0.15	220.1	96.99	96.66
220	215	1500	0.15	408.7	97.27	96.66
215	Drummond SWM Pond	2100	0.15	350.0	96.66	96.13
Drummond SWM Pond	210	675	0.15	25.0	94.69	94.65
235	210	675	0.17	272.0	95.12	94.65
210	205	825	0.17	223.0	94.65	94.26
205	Flood Plain	825	0.17	617.0	94.26	92.94
900	227 (ex.)	975	0.15	120.0	97.93	97.75

Design Brief for Caivan Communities
The Ridge (Brazeau Lands)
David Schaeffer Engineering Ltd.

DSEL No. 18-1030
October 4, 2019 Rev1



LEGEND

STORM DRAINAGE BOUNDARY
SUB-DRAINAGE BOUNDARY
STORM DRAINAGE BOUNDARY (OTHER PHASES)

STORM FREQUENCY — 2Yr
UPSTREAM MH TO DOWNSTREAM MH — 43 - 44
AREA IN HECTARES — 0.37
RUNOFF COEFFICIENT — 0.51

EXTERNAL 2.78AC = — 2.78AC=14.40
EXTERNAL TIME OF CONCENTRATION — TC=14.5 MIN
EXTERNAL BLENDED RUNOFF COEFFICIENT — C= 0.70
EXTERNAL STORM FREQUENCY — 2YR

STORM FREQUENCY (OTHER PHASE) — 2 YR
UPSTREAM MH TO DOWNSTREAM MH (OTHER PHASE) — 303 - 305
AREA IN HECTARES (OTHER PHASE) — 7.86
RUNOFF COEFFICIENT (OTHER PHASE) — 0.75

STREET CATCHBASIN & LEAD
STREET CATCHBASIN WITH CLOSED LID & LEAD
MAINTENANCE HOLE — MH202

CURB INLET CATCHBASIN & LEAD
CATCHBASIN/ MAINTENANCE HOLE — CBMH201

INTERCONNECTED CATCH BASIN & LEADS
CAP

OVERLAND FLOW DIRECTION

EXTERNAL OVERLAND FLOW DIRECTION

EMERGENCY OVERLAND FLOW DIRECTION

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
2	A.D.F.	19-10-04	1ST SUBMISSION
1	A.D.F.	19-09-19	ISSUED FOR CLIENT REVIEW

TOPOGRAPHIC INFORMATION
JD BARNES LIMITED PROJECT NUMBER 18-10-145-00 SURVEY DATED JULY 26, 2019

LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY JD BARNES LTD, PROJECT 18-10-145-00, DATED AUGUST 22, 2019

BENCH MARK No. 001196403710
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196403710 HAVING A PUBLISHED ELEVATION OF 91.724 METERS.

CAIVAN COMMUNITIES

THE RIDGE
PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER
A. D. FOBERT
100090326
2019-10-04
PROVINCE OF ONTARIO

Ottawa CITY OF OTTAWA

STORM DRAINAGE PLAN

© DSEL

DRAWN BY: G.G.G.	CHECKED BY: A.D.F.	PROJECT No.	18-1030
DESIGNED BY: C.M.K.	CHECKED BY: A.D.F.		
SCALE:		SHEET No.	80

HORIZ. 1:1000 0 10 20 30 40

CITY PLAN No. XXXXXX

CITY FILE No. D07-16-18-0011

patersongroup **memorandum**

consulting engineers

re: **Geotechnical Recommendations - Infiltration Outlet Pipe for Storm Water Storage Area Borrisokane Road**

Proposed Warehouse Complex - Borrisokane Road - Ottawa

to: Caivan Greenbank North Inc. - **Mr. Hugo Lalonde**

date: April 13, 2020

file: PG5155-MEMO.02

Further to your request, Paterson Group (Paterson) has prepared the following memorandum to provide recommendations for the potential location of the outlet pipe for the proposed storm water storage area. The current memorandum should be read in conjunction with Paterson Report PG5155-1 Revision 1 dated February 10, 2020.

Background

It is understood that an outlet pipe to further promote infiltration is proposed for the stormwater storage area. The pipe is to be placed on the north east corner of the site next to the proposed storm water storage area. Based on the proposed drawing and the results from our geotechnical investigation, the bottom of the storage area will be in a native silty sand layer. The bottom elevation of the proposed storage area is 97.50 m. The infiltration outlet pipe should be placed within the native sand deposit to promote the highest infiltration rate.

Soils Assessment

Based on our available test hole information, two areas adjacent to the stormwater storage area are recommended for the outlet pipe due to the expected silty sand layer at the anticipated invert elevation. Based on our testing information, it is expected that the infiltration rate for the sand layer will be 52 mm/hr with a hydraulic conductivity of 5×10^{-5} m/s. The proposed outlet pipe areas are indicated on the attached drawing. Long-term groundwater is expected at elevation 95.5 m with a high groundwater level of 97.0 m within the east portion of the subject block. A localized lowering of the perched water level for the recommended north-central infiltration area is expected due to the regrading of the site. However, an elevated groundwater level may be encountered just below the proposed infiltration area for the north-central infiltration area.

We trust that this information satisfies your requirements.

Best Regards,

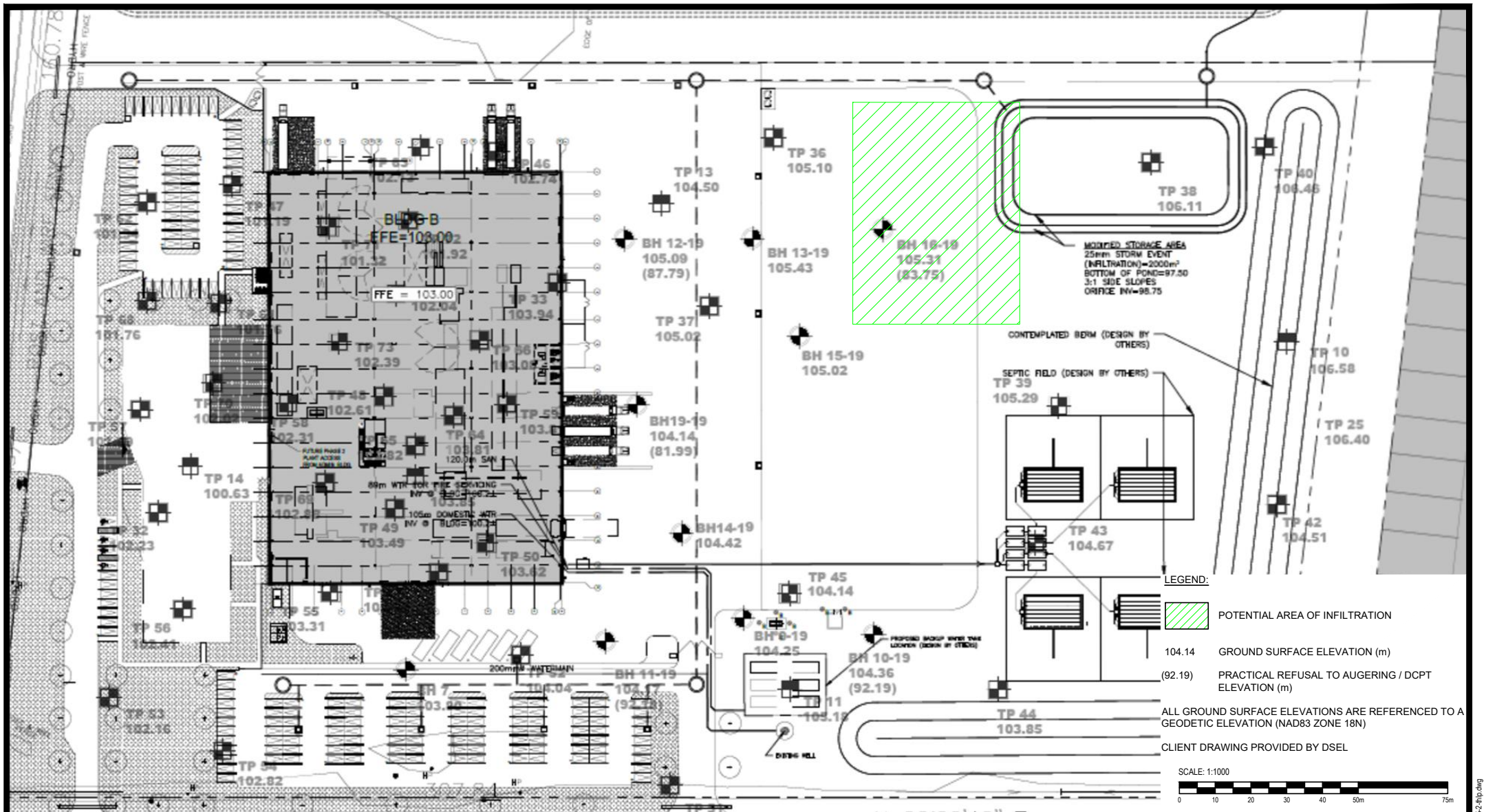
Paterson Group Inc.

April 15, 2020

LICENSED PROFESSIONAL ENGINEER
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

Joey R. Villenueve, M.A.Sc, P.Eng.

David J. Gilbert, P.Eng.



LEGEND:

POTENTIAL AREA OF INFILTRATION

104.14 GROUND SURFACE ELEVATION (m)

(92.19) PRACTICAL REFUSAL TO AUGERING / DCPT ELEVATION (m)

ALL GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC ELEVATION (NAD83 ZONE 18N)

CLIENT DRAWING PROVIDED BY DSEL

SCALE: 1:1000

0 10 20 30 40 50m 75m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CAIVAN GREENBANK NORTH INC.

GEOTECHNICAL INVESTIGATION
3713-BORRISOKANE-PROPOSED COMMERCIAL DEVELOPMENT

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1000	Date: 04/2020
Drawn by: NFRV	Report No.: PG5155-1
Checked by: JV	Dwg. No.: PG5155-2
Approved by: DJG	Revision No.:

c:\users\nicholas\desktop\5155\pg5155-2-thp.dwg

patersongroup

Consulting Engineers

154 Colonnade Road South
Ottawa, Ontario
Canada, K2E 7J5
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Fax: (613) 226-6344

Geotechnical Engineering
Environmental Engineering
Hydrogeology
Geological Engineering
Materials Testing
Building Science
Archaeological Services

www.patersongroup.ca

April 22, 2020
File: PE4810-LET.02

Caivan Communities
2934 Baseline Road, Suite 204
Ottawa, Ontario
K2H 1B2

Attention: **Mr. Hugo Lalonde**

Subject: **Response to Site Plan Comments**
City File No. D01-01-20-0001, D02-02-20-0002, D07-12-20-0002
Re: Environmental Comments – 3713 Borisokane Road, Ottawa

Dear Sir,

Paterson Group (Paterson) have prepared this letter in response to the Environmental Comments issued by the City of Ottawa (City), with regards to the proposed development of 3713 Borisokane Road. More specifically, this letter addresses Comment 1 and the potential for leachate-related groundwater impacts.

Comment 1

The site is located approximately 150 m east and down-gradient of the Trail Rd landfill. The phase one ESA has not considered the landfill as a potentially contaminating activity impacting the site given its distance, and thus, the phase two ESA has not tested groundwater for leachate-related parameter.

Response

The Report for the 2018 Monitoring and Operating Program for the Trail Road Landfill Site, prepared by Dillon Consulting and dated May 2019, was reviewed by Paterson as part of the Phase I ESA, the findings of which are discussed below.

Groundwater Leachate-Related Parameters

The Trail Road Landfill Site and surrounding lands are situated on a northwest-southeast trending ridge of glacially deposited sand and gravel. A deep sand and gravel aquifer is present beneath the entire site, while a shallow sand aquifer is present above a discontinuous clay layer, which has an influence over the local hydrogeology and thereby landfill leachate groundwater influences in the area.

The groundwater flow beneath the eastern portion of the landfill site generally flows to the northwest, towards the dewatering pond, in both the shallow and deep aquifers. The landfill site is therefore oriented down-gradient relative to the subject property.

Based on analytical testing completed as part of the 2018 monitoring program, no volatile organic compounds (VOC) were detected in the shallow aquifer Monitoring Well M8B-2 (situated along the east side of Borisokane Road immediately west of the subject property). While alkalinity and dissolved organic carbon (DOC) parameters were considered to be slightly elevated relative to previous monitoring events, the groundwater at this location was not considered to have been impaired by landfill leachate.

Upper to mid deep aquifer Monitoring Wells M180-1, M79-1 and M8B-1, situated along the east side of Borisokane Road immediately southwest, west and northwest of the subject property, were also sampled as part of the 2018 monitoring program. Several leachate indicator parameter concentrations at each of the monitoring well locations were elevated when compared to reference values, including chloride, calcium, alkalinity and hardness. These parameters were considered to be associated with the use of road salt and not representative of leachate impacts.

No VOC concentrations were identified in monitoring wells M79-1 and M8B-1, while a concentration of m/p-xylene (0.8µg/L) was identified at M180-1, southwest of the subject property. The identified concentration is well below the Ministry of the Environment, Conservation and Parks (MECP) Table 3 concentration of 4,200 µg/L. As noted previously, Dillon identified no interpreted landfill leachate impairment at these locations. Paterson concurs with the opinion presented by Dillon; in our opinion the trace xylene concentration identified is associated with vehicular traffic along Highway No. 416.

Based on the separation distance and down-gradient orientation of the Trail Road Landfill Site relative to the subject property, in combination with the findings of the 2018 Monitoring and Operating Program prepared by Dillon, **it is our opinion that the Trail Road Landfill Site has not impacted the subject property and therefore does not represent an area of potential environmental concern on the subject land.** The findings of the Phase I and Phase II ESA reports prepared by Paterson are considered to satisfy O.Reg.153/04 for the purpose of filing a Record of Site Condition.

We trust this information satisfies your requirements.

Paterson Group Inc.

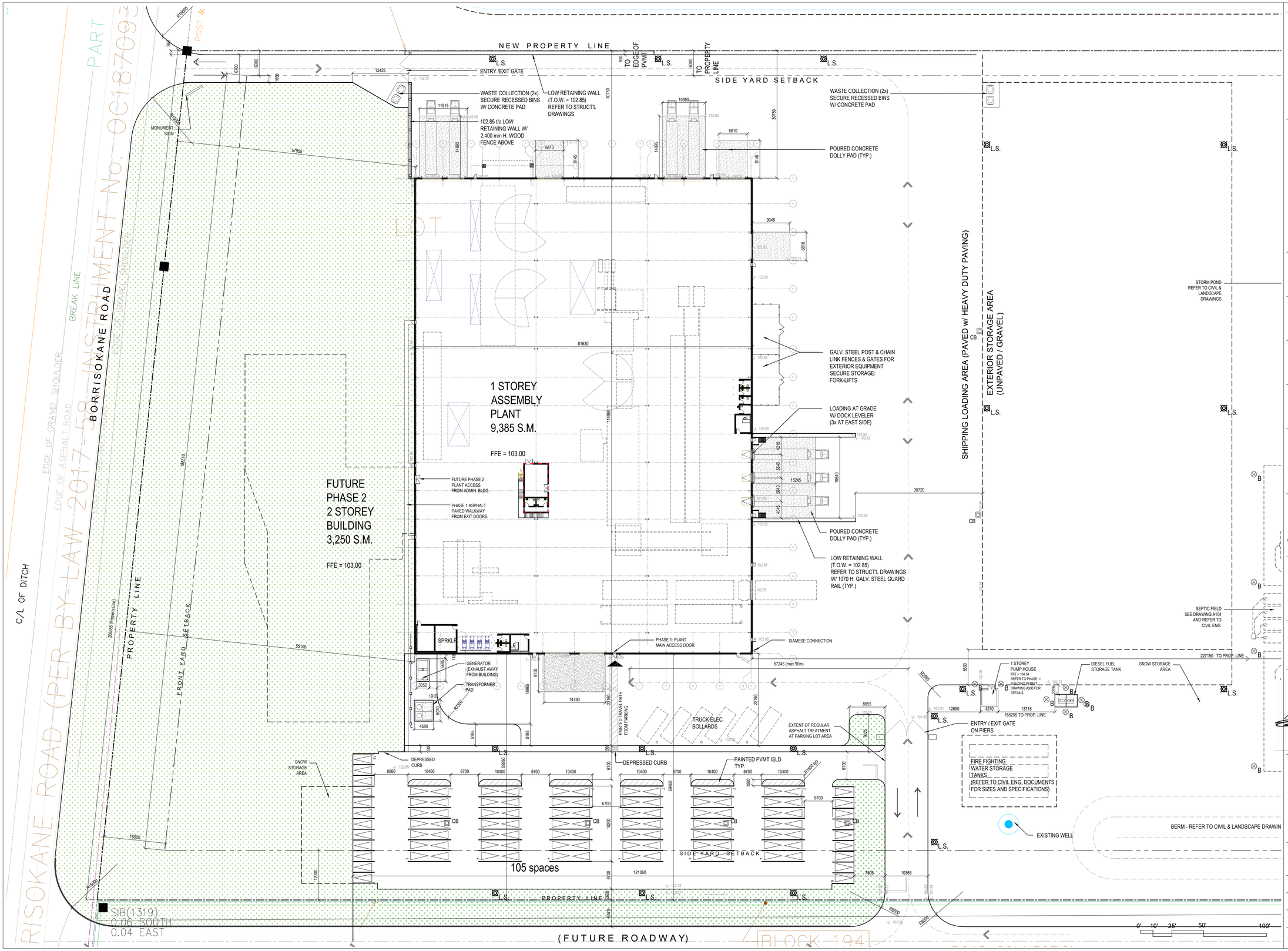
Karyn Munch, P.Eng. QP$_{ESA}$

Mark D'Arcy, P.Eng. QP$_{ESA}$

Report Distribution:

- Caivan Communities
- City of Ottawa

DRAWINGS / FIGURES



No.	Date	Émis pour / Object
1	2020-04-03	ISSUED FOR BUILDING PERMIT
2	2020-04-17	SPC_CITY_COMMENTS

Engineer / Trade Consultants (Mechanical / Electrical)

wsp

Goodkey Weedmark Consulting Engineers

DILFO MECHANICAL | HVAC SERVICES PLUMBING & HEATING

DRYCORE ELECTRIC • ÉLECTRIQUE

Engineer (Structural)

CLELAND JARDINE ENGINEERING LTD. 2000 WELLINGTON ST. OTTAWA, ONTARIO K1G 1A8 (613) 731-7337

Landscape Architect

NAK design strategies

Urban Planner

FOTENN PLANNING+DESIGN

Engineer (Civil)

DSEL david schaeffer engineering ltd

Owner

ABIC ADVANCED BUILDING INNOVATION COMPANY

Architect — Collectif d'architectes / Architects Collective

figurr

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3550, Saint-Antoine O.
Montréal QC H4C 1A9
T. 514 861-6122

fig. 2
190 Somerset St W #206
Ottawa ON K2P 0J4
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www.figurr.ca

Design Builder

BBS CONSTRUCTION (ONTARIO)LTD
1805 WOODWARD DRIVE
OTTAWA, ON K2C 0P9
CANADA (613) 226-8830 Fax: (613) 226-7709
www.bbsconstruction.ca

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Sceau / Seal

ONTARIO ASSOCIATION OF ARCHITECTS
ROBERTO CAMPOS LICENCE 7401

Note:

L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / Project

ABIC OFFICE / ASSEMBLY PLANT

3713 BORRISOKANE RD.
Ottawa, Ontario

NORTH / TRUE NORTH

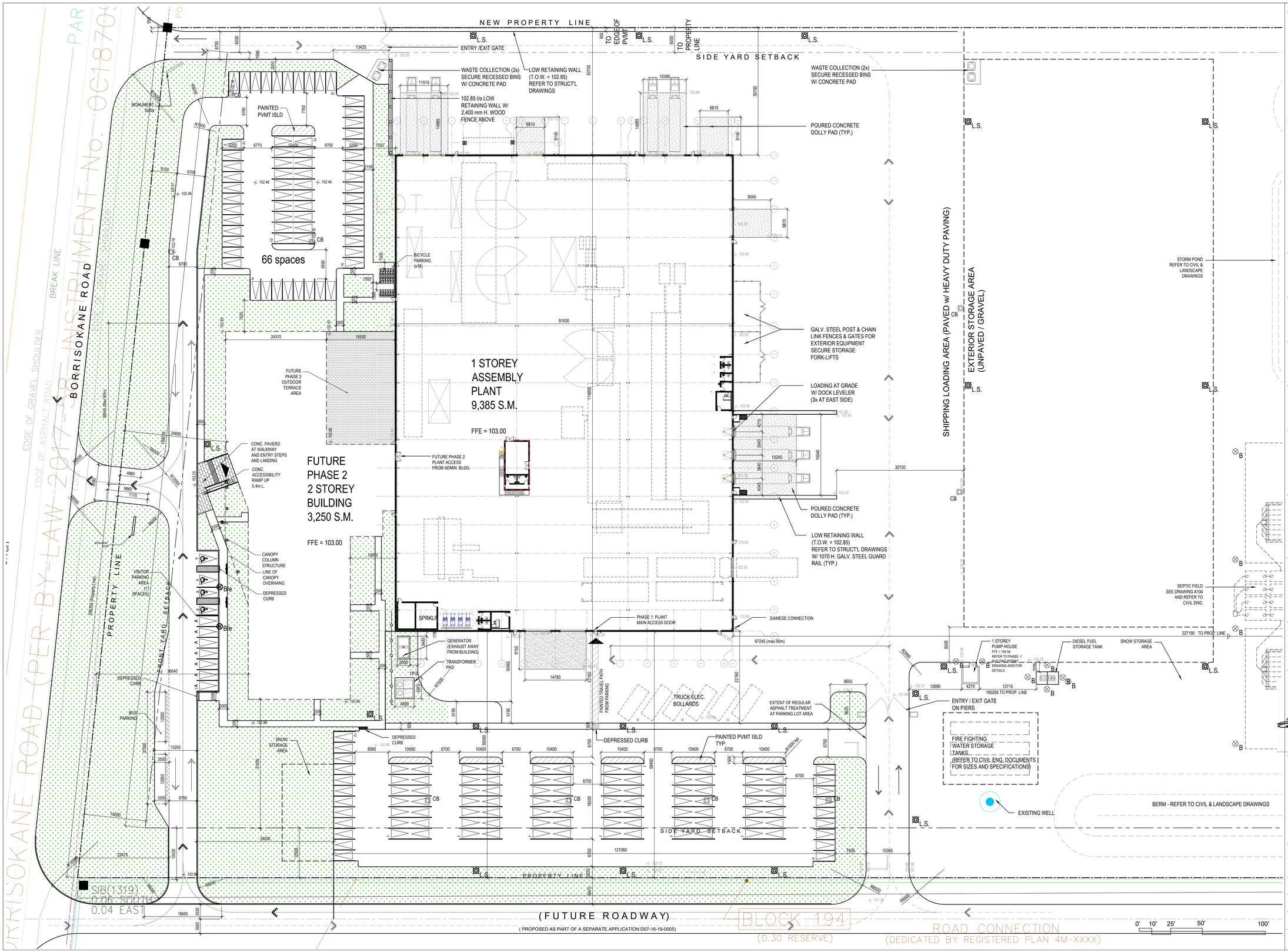
Titre / Title

SITE PLAN - PHASE 1

Dessiné par / Drawn by: GB,TS	No. projet / Project number: 1944
Vérifié par / Verified by: RC	No. dessin / Drawing number: A105a
Échelle / Scale: 1:500	Révision / Revision: 0
Date de création du dessin / Drawing creation date: 2019-09-19	

D07-12-20-0002 — TO BE READ IN CONJUNCTION WITH DRAWING A104a

PLAN # 18112



No.	Date	Émis pour / Object
1	2020-04-02	COORDINATION
2	2020-04-17	SPC_CITY_COMMENTS

Engineer / Trade Consultants (Mechanical / Electrical)

wsp

Goodkey Weedmark Consulting Engineers

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DRYCORE ELECTRIC • ÉLECTRIQUE

Engineer (Structural)

CLELAND JARDINE ENGINEERING LTD

Landscape Architect

NAK design strategies

Urban Planner

FOTENN PLANNING+DESIGN

Engineer (Civil)

DSEL david schaeffer engineering ltd

Owner

ABIC ADVANCED BUILDING INNOVATION COMPANY

Architect — Collectif d'architectes / Architects Collective

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Sceau / Seal

ONTARIO ASSOCIATION OF ARCHITECTS
ROBERTO CAMPOS LICENCE 7401

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Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / Project

ABIC OFFICE / ASSEMBLY PLANT

3713 BORRISOKANE RD.
Ottawa, Ontario

NORTH / TRUE NORTH

Titre / Title

SITE PLAN - PHASE 2

Dessiné par / Drawn by: GB,TS	No. projet / Project number: 1944
Vérifié par / Verified by: RC	No. dessin / Drawing number: A105b
Échelle / Scale: 1:500	Révision / Revision: 0
Date de création du dessin / Drawing creation date: 2019-09-19	

TO BE READ IN CONJUNCTION WITH DRAWING **A104b**

D07-12-20-0002

PLAN # 18112

TOPOGRAPHIC DETAIL

PART OF LOTS 7, 8 AND 9 CONCESSION 3 (RIDEAU FRONT)

GEOGRAPHIC TOWNSHIP OF NEPEAN

NOW IN THE

CITY OF OTTAWA

SCALE 1 : 1500

J.D. BARNES LIMITED

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

ELEVATION

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE PUBLISHED BENCHMARK NO. 00119640371O, HAVING AN ELEVATION OF 91.724 m.

LEGEND

SP_SPOT	DENOTES	SPOT ELEVATION
HP	DENOTES	HYDRO POLE
PL_POST	DENOTES	POST
NA_TOPSL	DENOTES	TOP OF SLOPE
NA_BOTSL	DENOTES	BOTTOM OF SLOPE
LI_BREAK	DENOTES	BREAK LINE
SU_AEDGE	DENOTES	EDGE OF ASPHALT
CL_ROAD	DENOTES	CENTRELINE OF ROAD
NA_WATER	DENOTES	EDGE OF WATER
DI_TOP	DENOTES	TOP OF DITCH
DI_BTM	DENOTES	BOTTOM OF DITCH
DI_CL	DENOTES	CENTRELINE OF DITCH
FE_PW	DENOTES	POST AND WIRE FENCE
SU_GRVRD	DENOTES	GRAVEL ROAD

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
2430 DON REED DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	CF	18-10-145-00

FILE: G:\18-10-145\00\Drawing\TOPO\18-10-145-00_TOPO.dwg DATE: 06/10/19

PLOTTED: 7/10/2019

PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALT CONCRETE
50mm SUPERPAVE 19.0 ASPHALT CONCRETE
150mm GRANULAR "A" CRUSH STONE
400mm GRANULAR "B" TYPE II

ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION

NOTE: ALL EXISTING TREES, SHRUBS ETC. WITHIN LOTS, BLOCKS AND ROADS TO BE REMOVED, UNLESS OTHERWISE NOTED

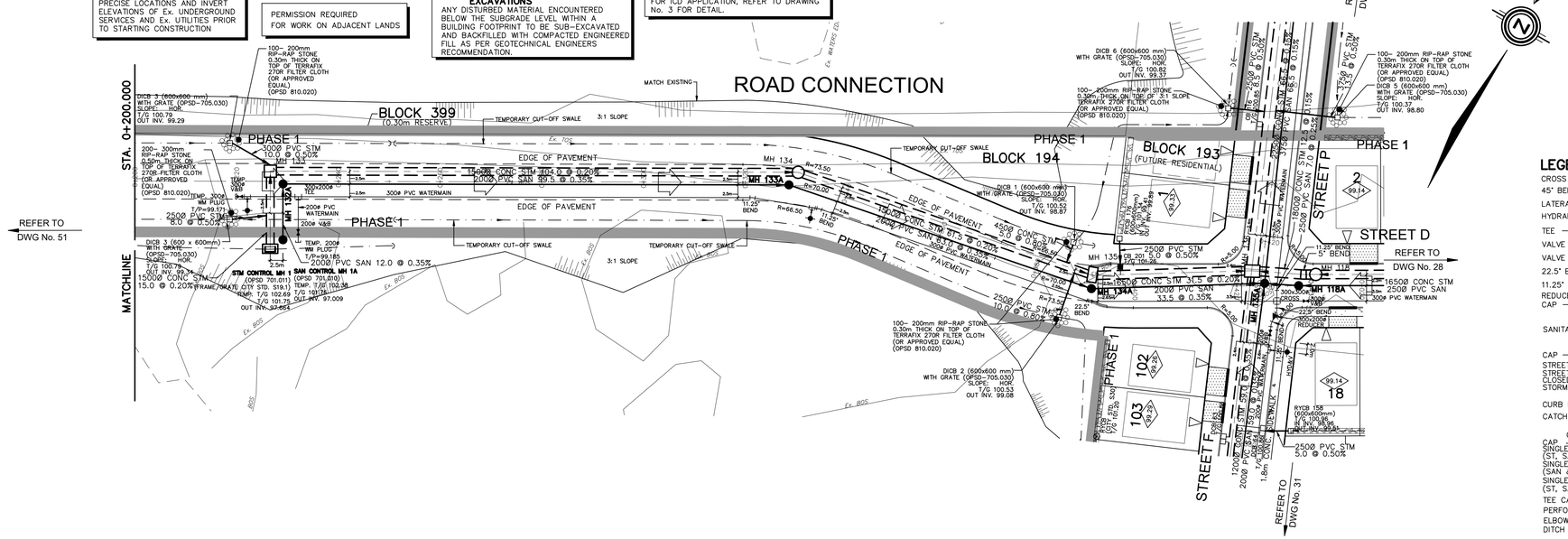
PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

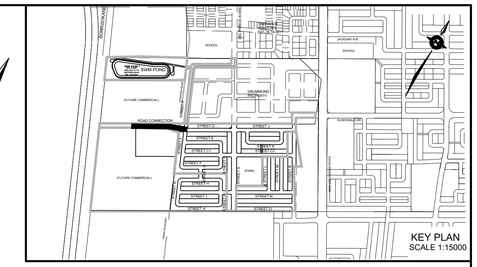
NOTE FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

NOTE: RE: TEST PIT/BOREHOLE EXCAVATIONS
ANY DISTURBED MATERIAL ENCOUNTERED BELOW THE SUBGRADE LEVEL WITHIN A BUILDING FOOTPRINT TO BE SUB-EXCAVATED AND BACKFILLED WITH COMPACTED ENGINEERED FILL AS PER GEOTECHNICAL ENGINEERS RECOMMENDATION.

NOTE RE: DEEP SERVICE CONNECTION
FOR DEEP SANITARY SERVICE CONNECTIONS, REFER TO THE DETAIL ON DWG. 3

NOTE: ICD
FOR ICD APPLICATION, REFER TO DRAWING No. 3 FOR DETAIL.

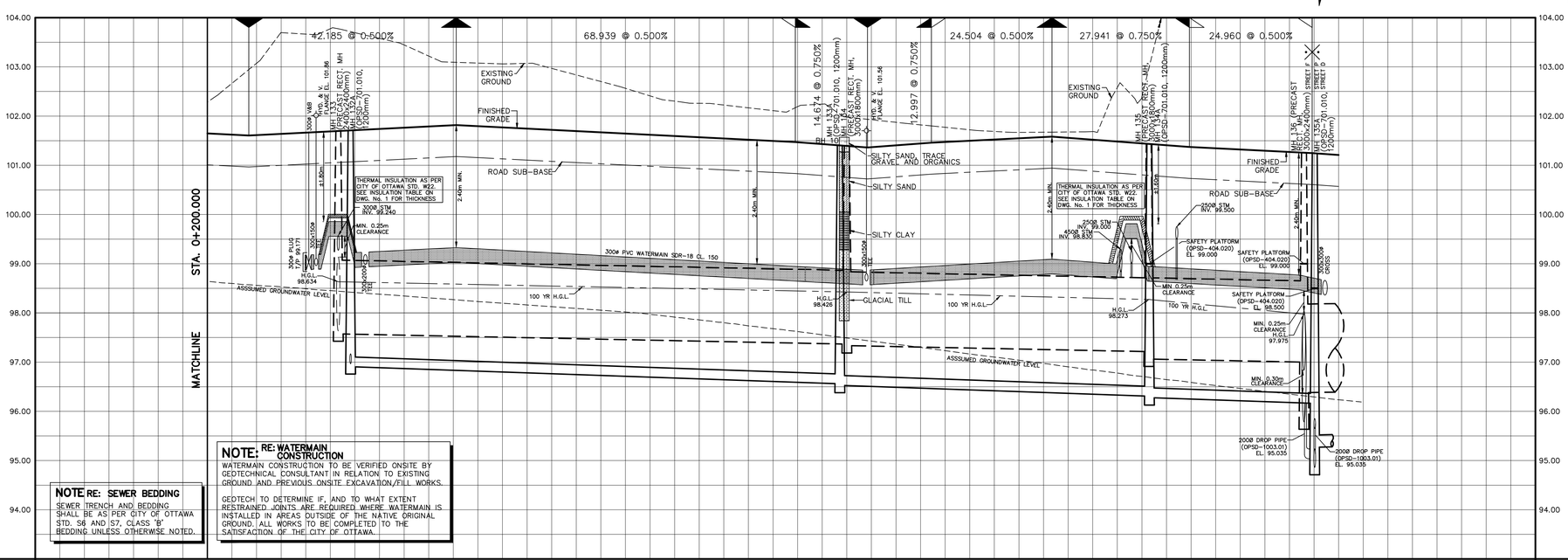




LEGEND

CROSS
45° BEND
LATERAL
HYDRANT, VALVE & VB
TEE
VALVE & VC
VALVE & VB
22.5° BEND
11.25° BEND
REDUCER
CAP
SANITARY MAINTENANCE HOLE
CAP
STREET CATCHBASIN & LEAD
STREET CATCHBASIN WITH CLOSED LID & LEAD
STORM MAINTENANCE HOLE
CURB INLET CATCHBASIN & LEAD
CATCHBASIN/ MAINTENANCE HOLE
INTERCONNECTED CATCH BASIN & LEADS
CAP
SINGLE SERVICE LOCATION (ST, SAN & WM)
SINGLE SERVICE LOCATION (SAN & WM)
SINGLE SERVICE LOCATION (ST, SAN & WM)
TEE CATCHBASIN
PERFORATED PIPE
ELBOW CATCHBASIN
DITCH AND CULVERT

HYDRO TRANSFORMER
STREET LIGHT STANDARD
CONCRETE SIDEWALK
CURB & DEPRESSED CURB
ASPHALT SIDEWALK
CHAINLINK FENCE (1.5m UNLESS OTHERWISE NOTED)
NOISE BARRIER (2.5m UNLESS OTHERWISE NOTED)
DECORATIVE FENCE (SEE LANDSCAPE DWGS FOR DETAIL)
CONSTRUCTION FENCE
POST AND RAIL FENCE
PHASING LIMITS
PROPERTY BOUNDARY
BOREHOLE (BH)
TEST PIT (TP)
AUGER HOLE (AH)
MONITORING WELL LOCATION
CONCEPTUAL WELL LOCATION
AS PER GEOTECHNICAL REPORT
TOP OF FOUNDATION ELEVATION
FINISHED FLOOR ELEVATION
UNDERSIDE OF FOOTING ELEVATION
NUMBER OF RISERS
UNITS REQUIRING PRESSURE REDUCING VALVES
WALKOUT UNITS
SLAB ON GRADE
OVERLAND FLOW DIRECTION
EXTERNAL OVERLAND FLOW DIRECTION
EMERGENCY OVERLAND FLOW DIRECTION
TACTILE WALKING SURFACE INDICATOR (AS PER CITY OF OTTAWA STD. SC6, SC7, SC7.1, SC7.2, SC7.3)
PREVIOUS PHASES
CLAY SEAL (REFER TO GENERAL NOTES. No. 18. ON DWG. No. 1, AND GEOTECHNICAL CONSULTANT'S SPECIFICATIONS)
MIN. USF AS PER GEOTECHNICAL CONSULTANT'S RECOMMENDATION



NOTE: RE: WATERMAIN CONSTRUCTION
WATERMAIN CONSTRUCTION TO BE VERIFIED ONSITE BY GEOTECHNICAL CONSULTANT IN RELATION TO EXISTING GROUND AND PREVIOUS ONSITE EXCAVATION/FILL WORKS.

GEOTECH TO DETERMINE IF, AND TO WHAT EXTENT RESTRAINED JOINTS ARE REQUIRED WHERE WATERMAIN IS INSTALLED IN AREAS OUTSIDE OF THE NATIVE ORIGINAL GROUND. ALL WORKS TO BE COMPLETED TO THE SATISFACTION OF THE CITY OF OTTAWA.

NOTE RE: SEWER BEDDING
SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
2	A.D.F.	19–10–04	1ST SUBMISSION
1	A.D.F.	19–09–19	ISSUED FOR CLIENT REVIEW

TOPOGRAPHIC INFORMATION
JD BARNES LIMITED PROJECT NUMBER 18–10–145–00 SURVEY DATED JULY 26, 2019

LEGAL INFORMATION
CALCULATED M–PLAN PROVIDED BY JD BARNERS LTD, PROJECT 18–10–145–00, DATED AUGUST 22, 2019

BENCH MARK No. 001196403710
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196403710 HAVING A PUBLISHED ELEVATION OF 91.724 METERS.

CAIVAN COMMUNITIES

THE RIDGE PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER A.D. FOBERT 100090526 2019-10-04 PROVINCE OF ONTARIO

Ottawa CITY OF OTTAWA

PLAN AND PROFILE OF © DSEL

Road Connection

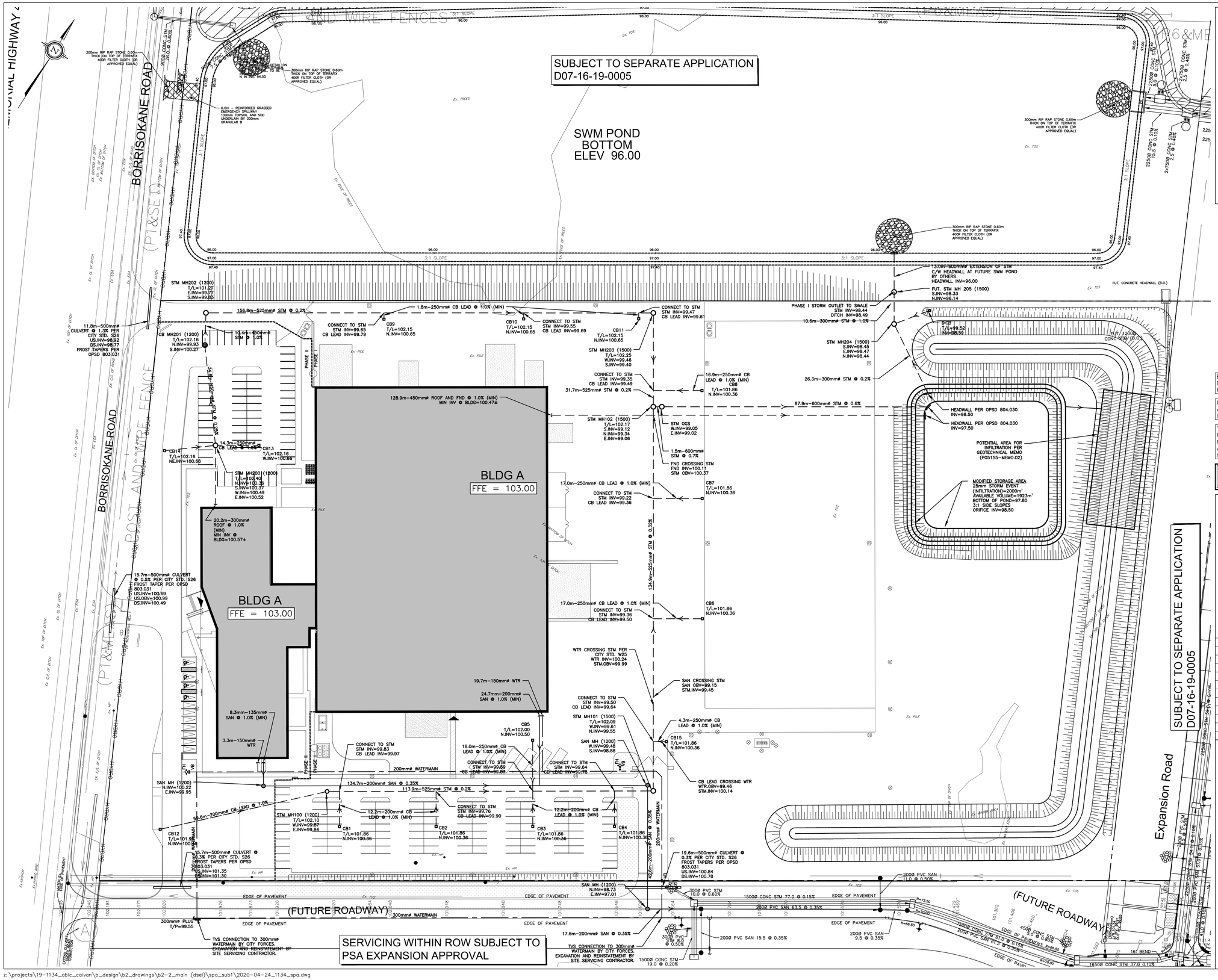
(STA. 0+200.000 TO STA. 424.615)

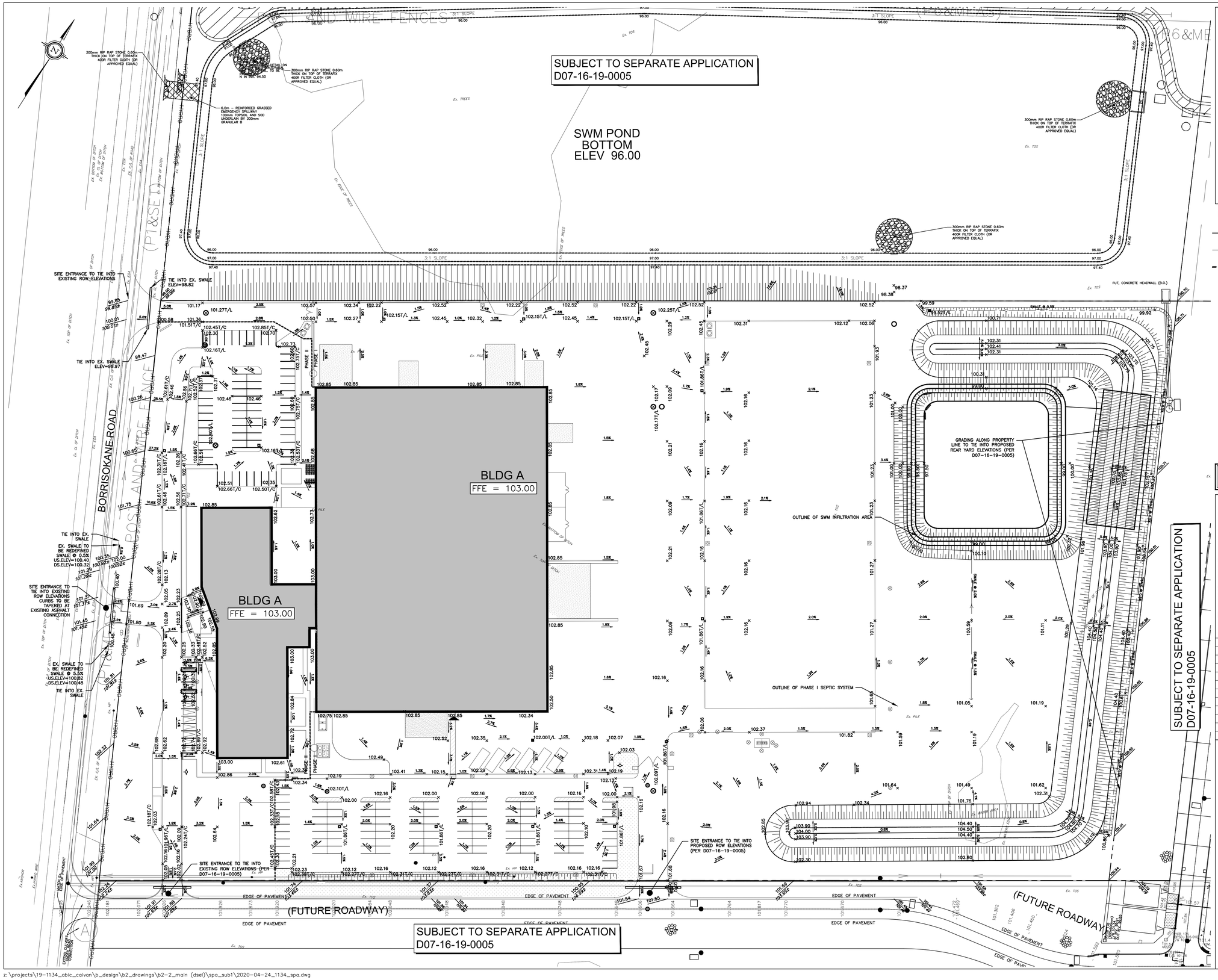
DRAWN BY: G.G.G.	CHECKED BY: A.D.F.	PROJECT No.	18–1030
DESIGNED BY: C.M.K.	CHECKED BY: A.D.F.	SHEET No.	52

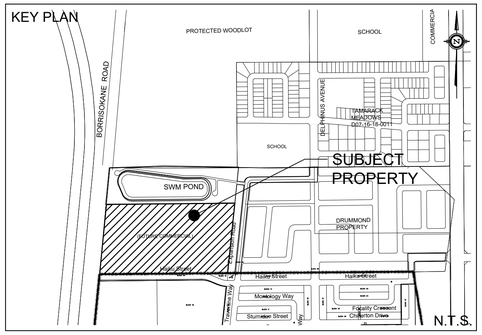
SCALE: VERT. 1:50 (0, 0.5, 1.0, 1.5, 2.0) HORZ. 1:500 (0, 5, 10, 15, 20)

CITY PLAN No. XXXXXX

CITY FILE No. D07-16-18-0011


SUBJECT TO SEPARATE APPLICATION
D07-16-19-0005
SWM POND
BOTTOM
ELEV 96.00
BORRISOKANE ROAD
BLDG A
FFE = 103.00
BLDG A
FFE = 103.00
(FUTURE ROADWAY)
(FUTURE ROADWAY)
Expansion Road
SUBJECT TO SEPARATE APPLICATION
D07-16-19-0005
SERVICING WITHIN ROW SUBJECT TO
PSA EXPANSION APPROVAL
STM MH202 (1200)
T/L=101.27
E.INV=99.77
S.INV=99.55
156.8m–525mmø STM @ 0.2%
1.8m–250mmø CB LEAD @ 1.0% (MIN)
CONNECT TO STM
STM INV=99.65
CB LEAD INV=99.79
CB9
T/L=102.15
N.INV=100.65
CB10
T/L=102.15
N.INV=100.65
CONNECT TO STM
STM INV=99.55
CB LEAD INV=99.69
CONNECT TO STM
STM INV=99.47
CB LEAD INV=99.61
CB11
T/L=102.15
N.INV=100.65
STM MH203 (1500)
T/L=102.25
W.INV=99.46
S.INV=99.40
CONNECT TO STM
STM INV=99.35
CB LEAD INV=99.49
31.7m–525mmø STM @ 0.2%
16.9m–250mmø CB
LEAD @ 1.0% (MIN)
CB8
T/L=101.86
N.INV=100.36
87.9m–600mmø STM @ 0.6%
128.9m–450mmø ROOF AND FND @ 1.0% (MIN)
MIN INV @ BLDG=100.47±
STM MH102 (1500)
T/L=102.17
S.INV=99.12
N.INV=99.34
E.INV=99.06
STM OGS
W.INV=99.05
E.INV=99.02
1.5m–600mmø
STM @ 0.7%
FND CROSSING STM
FND INV=100.11
STM OBV=100.37
17.0m–250mmø CB LEAD @ 1.0% (MIN)
CONNECT TO STM
STM INV=99.22
CB LEAD INV=99.36
CB7
T/L=101.86
N.INV=100.36
134.9m–525mmø STM @ 0.32%
17.0m–250mmø CB LEAD @ 1.0% (MIN)
CONNECT TO STM
STM INV=99.36
CB LEAD INV=99.50
CB6
T/L=101.86
N.INV=100.36
WTR CROSSING STM PER
CITY STD. W25
WTR INV=100.24
STM.OBV=99.99
SAN CROSSING STM
SAN OBV=99.15
STM.INV=99.45
CONNECT TO STM
STM INV=99.50
CB LEAD INV=99.64
STM MH101 (1500)
T/L=102.09
W.INV=99.61
N.INV=99.55
4.3m–250mmø CB
LEAD @ 1.0% (MIN)
CB15
T/L=101.86
N.INV=100.36
SAN MH (1200)
W.INV=99.46
S.INV=98.88
CB LEAD CROSSING WTR
WTR.OBV=99.46
STM.INV=100.14
19.7m–150mmø WTR
24.7mm–200mmø
SAN @ 1.0% (MIN)
CB5
T/L=102.00
N.INV=100.50
8.3mm–135mmø
SAN @ 1.0% (MIN)
3.3m–150mmø
WTR
CONNECT TO STM
STM INV=99.83
CB LEAD INV=99.97
18.0m–250mmø CB
LEAD @ 1.0% (MIN)
CONNECT TO STM
STM INV=99.89
CB LEAD INV=99.85
CONNECT TO STM
STM INV=99.64
CB LEAD INV=99.78
200mmø WATERMAIN
SAN MH (1200)
N.INV=100.22
E.INV=99.95
134.7m–200mmø SAN @ 0.35%
113.9m–525mmø STM @ 0.2%
STM MH100 (1200)
T/L=102.10
W.INV=99.87
E.INV=99.84
12.2m–200mmø CB
LEAD @ 1.0% (MIN)
CONNECT TO STM
STM INV=99.76
CB LEAD INV=99.90
12.2m–200mmø CB
LEAD @ 1.0% (MIN)
CB1
T/L=101.86
N.INV=100.36
CB2
T/L=101.86
N.INV=100.36
CB3
T/L=101.86
N.INV=100.36
CB4
T/L=101.86
N.INV=100.36
59.6m–200mmø CB LEAD @ 1.0%
CB12
T/L=101.86
N.INV=100.36
15.7m–500mmø CULVERT @
0.3% PER CITY STD. S26
FROST TAPERS PER OPSD
803.031
US.INV=101.35
DS.INV=101.30
19.6m–500mmø CULVERT @
0.3% PER CITY STD. S26
FROST TAPERS PER OPSD
803.031
US.INV=100.84
DS.INV=100.78
42.6m–200mmø SAN @ 0.35%
200mmø WATERMAIN
SAN MH (1200)
N.INV=98.73
E.INV=97.01
300mmø PVC STM
10.0 @ 0.60%
15000 CONC STM 77.0 @ 0.15%
200ø PVC SAN 63.5 @ 0.35%
200ø PVC SAN
11.0 @ 0.50%
EDGE OF PAVEMENT
300mmø PLUG
T/P=99.55
300mmø WATERMAIN
TVS CONNECTION TO 300mmø
WATERMAIN BY CITY FORCES.
EXCAVATION AND REINSTATEMENT BY
SITE SERVICING CONTRACTOR.
17.6m–200mmø SAN @ 0.35%
300mmø PVC
STM @
0.50%
200ø PVC SAN 15.5 @ 0.35%
TVS CONNECTION TO 300mmø
WATERMAIN BY CITY FORCES.
EXCAVATION AND REINSTATEMENT BY
SITE SERVICING CONTRACTOR.
15000 CONC STM
19.0 @ 0.20%
200ø PVC
SAN @
9.5 @ 0.35%
15000 CONC STM 81.0 @ 0.15%
200ø PVC SAN 81.5 @ 0.35%
167 BEND
16500 CONC STM 37.0 @ 0.10%
STM MH204 (1500)
S.INV=98.45
E.INV=98.47
N.INV=98.44
26.3m–300mmø STM @ 0.2%
HEADWALL PER OPSD 804.030
INV=98.50
HEADWALL PER OPSD 804.030
INV=97.50
POTENTIAL AREA FOR
INFILTRATION PER
GEOTECHNICAL MEMO
(PG5155–MEMO.02)
MODIFIED STORAGE AREA
25mm STORM EVENT
(INFILTRATION)=2000m³
AVAILABLE VOLUME=1923m³
BOTTOM OF POND=97.80
3:1 SIDE SLOPES
ORIFICE INV=98.50
13.0m–600mmø EXTENSION OF STM
C/W HEADWALL AT FUTURE SWM POND
BY OTHERS
HEADWALL INV=96.00
FUT. STM MH 205 (1500)
S.INV=98.33
N.INV=96.14
PHASE I STORM OUTLET TO SWALE
STM INV=98.44
DITCH INV=98.49
10.6m–300mmø STM @ 1.0%
FUT. CONCRETE HEADWALL (B.O.)
11.8m–500mmø
CULVERT @ 1.3% PER
CITY STD. S26
US.INV=98.92
DS.INV=98.77
FROST TAPERS PER
OPSD 803.031
CB MH201 (1200)
T/L=102.16
N.INV=99.93
S.INV=100.27
10.4m–450mmø
STM @ 1.0%
54.6m–450mmø STM @ 0.25%
14.3m–250mmø
CB LEAD @ 1.0%
CB13
T/L=102.16
W.INV=100.66
CB14
T/L=102.16
NE.INV=100.66
STM MH200 (1200)
T/L=103.40
N.INV=100.38
S.INV=100.37
W.INV=100.49
E.INV=100.52
20.2m–300mmø
ROOF @ 1.0%
(MIN)
MIN INV @
BLDG=100.57±
15.7m–500mmø CULVERT
@ 0.5% PER CITY STD. S26
FROST TAPER PER OPSD
803.031
US.INV=100.69
US.OBV=100.99
DS.INV=100.49
300mm RIP RAP STONE 0.60m
THICK ON TOP OF TERRAFIX
400R FILTER CLOTH (OR
APPROVED EQUAL)
6.0m – REINFORCED GRASSED
EMERGENCY SPILLWAY
100mm TOPSOIL AND SOD
UNDERLAIN BY 300mm
GRANULAR B
DETAIL ON
DRAWING 10
IN INV 94.00
9000 CONC STM
26.0 @ 0.2%
2250ø CONC STM
15.5 @ 0.5%
2x7500 CONC STM
2.5 @ 0.42%
Ex. TREES
Ex. TOS
3:1 SLOPE
Ex. EDGE OF TREES
Ex. PILE
Ex. HP
Ex. MANHOLE
Ex. CB
Ex. GAS
Ex. CL OF DITCH
Ex. TOP OF DITCH
Ex. BOTTOM OF DITCH
Ex. CL OF ROAD
Ex. EDGE OF PAVEMENT
Ex. CL OF WATER
Ex. EDGE OF WATER
Ex. CL OF WATER
Ex. WATER
Ex. WATER MAIN
Ex. WATER SERV.
Ex. WATER VALVE
Ex. WATER BRK.





LEGEND

- PROPERTY LINE
- PROPOSED SWALE
- PROPOSED PERFORATED SUBDRAIN
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED BOTTOM OF WALL ELEVATION
- PROPOSED TOP OF WALL ELEVATION
- PROPOSED TOP OF LID ELEVATION
- EXISTING GRADE AND DIRECTION
- PROPOSED GRADE AND DIRECTION
- 3:1 SLOPE — PROPOSED 3:1 TERRACING
- PROPOSED/EXISTING SPOT ELEVATION
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED CB "1" OR CB "L"
- PROPOSED FIRE HYDRANT
- EMERGENCY FLOW ROUTE
- SURFACE PONDING AREA
- MAX PONDING

NOT FOR CONSTRUCTION

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED
PROJ. NO. 18-10-145-00
DATED JULY 10, 2019

SITE PLAN INFORMATION
SITE PLAN PROVIDED BY
PROJ. NO. FIGURR COLLECTIF D'ARCHITECTES
DATED APRIL 17, 2020

GEOTECHNICAL STUDY
GEOTECHNICAL RECOMMENDATIONS PROVIDED BY PATERSON GROUP
PROJ. NO. PG2155-1
DATED FEBRUARY 10, 2020

SITE SERVICING AND STORMWATER MANAGEMENT STUDY
SERVICING AND STORMWATER MANAGEMENT RECOMMENDATIONS PROVIDED BY DSEL
PROJ. NO. 19-1134
DATED APRIL 2020

BENCH MARK
LOCATION: CONCRETE ROAD BRIDGE OVER JOCK RIVER (N45°15'39, W75°44'06).
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 00119640371O HAVING A PUBLISHED ELEVATION OF 91.724 METERS

No.	BY	YY.MM.DD	DESCRIPTION
2	A.J.G.	20.04.24	ISSUED FOR MUNICIPAL REVIEW
1	A.J.T.	20.01.15	ISSUED FOR MUNICIPAL REVIEW

PROJECT No. 19-1134

LICENSED PROFESSIONAL ENGINEER A. D. FOBERT 100090526 2020-04-24 PROVINCE OF ONTARIO

GRADING PLAN - ULTIMATE
3713 BORRISOKANE ROAD

© DSEL

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Tel. (613) 518-1864

DSEL
david schaeffer engineering ltd
SMART SURVEYING™
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY:	A.J.G.	CHECKED BY:	R.D.F.	DRAWING NO.	SHEET NO.
DESIGNED BY:	B.N.C.	CHECKED BY:	S.J.P.	GP-ULT	1 of 1
SCALE:	1:600	DATE:	DECEMBER 2019		

CITY FILE No.: D07-12-XX-XXXX
CITY PLAN No.: XXXXX

z:\projects\19-1134_abic_caivan\b_design\b2_drawings\b2-2_main (dsel)\spa_sub1\2020-04-24_1134_spa.dwg