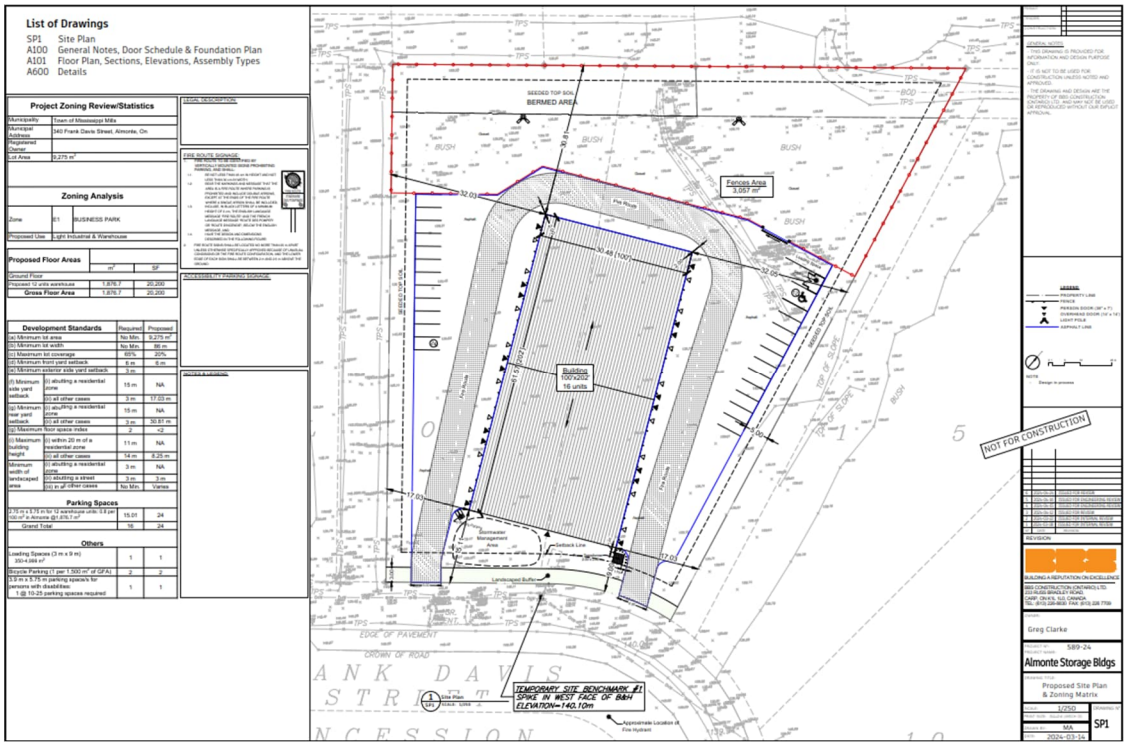
# PROPOSED INDUSTRIAL BUSINESS BAYS
# LOTS 5 & 6, FRANK DAVIS STREET




Project No.: CCO-25-0691

Prepared for:

Pete Van Grootheest
BBS Construction
233 Russ Bradley Road, Unit #1
K0A 1L0

Prepared by:

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Date: April 24th, 2024

egis

Table of Content

# 1.0 PROJECT DESCRIPTION

## 1.1 Purpose

Egis Canada Ltd. (Egis) has been retained by BBS Construction (BBS) to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed Industrial Business Bays Lots development, located at 5 and 6 Frank Davis Street, Almonte ON.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the Municipality of Mississippi Mills (Municipality) the Mississippi Valley Conservation Authority (MVCA), and the Ministry of the Environment, Conservation, and Parks (MECP).

This report should be read in conjunction with the following drawings:

- C101 – Grading and Erosion Sediment Control Plan; and
- C102 – Site Servicing Plan

## 1.2 Site Description

The existing parcel is a undeveloped 0.93ha property. The site is surrounded by ditches to the south, west and north as well as a water easement to the east. The site development is a proposed multi-unit/tenant light industrial facility (warehouse/storage) with a gross floor area of +/- 1,877 $m^2$. The proposed building will include twelve (12) units. It will include potential for outdoor storage use on the land. The intent is to develop the two lots as a single property.

## 1.3 Existing Conditions and Infrastructure

The existing site is currently undeveloped with existing water and sanitary servicing available within the right of way of Frank Davis Street. Stormwater runoff currently flows overland to the ditch to the west of the site.

Sewer and watermain mapping collected from the client indicate that the following services exist across the property frontage within the adjacent municipal right(s)-of-way:

- 250 mm diameter watermain within Frank Davis Street
- 200 mm diameter sanitary sewer within Frank Davis Street

## 1.4 Proposed Development and Statistics

The proposed development consists of a *1877 $m^2$* warehouse building, consisting of 16 storage units. Parking will be provided to the east and west of the building. Two paved entrances off of Frank Davis Street are proposed. Further details are available in the site plan provided by BBS in Appendix B.

### 1.5 Approvals

The proposed development is subject to the Municipality of Mississippi Mills site plan control process. Site plan control requires the Municipality to review, provide concurrence, and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Compliance Approval (ECA) through the MECP is not anticipated to be required for the development since it proposes no manufacturing element to its property usage.

## 2.0 BACKGROUND STUDIES

As the site is located within the Mississippi Mills Business Park. There are master servicing and stormwater reports referenced throughout the report. The background studies referenced include:

- *Mississippi Mills Business Park, Design Brief – Sanitary Sewers and Watermains (*Prepared by Novatech Engineering Consultants LTD*.); and*
- *Stormwater Management Report – Mississippi Mills Business Park Phase 2 & 3 (*Prepared by Novatech Engineering Consultants LTD*.)*

The reports indicated above were utilized in developing the civil design in conjunction with this report and will be referenced throughout.

## 3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on March 21, 2024, regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Only one water service connection and one sanitary service connection permitted.
- Water and wastewater demands shall conform to parent report for the Business Park.
- An onsite manhole shall be incorporated into the design for sanitary as per City of Ottawa guidelines.
- Stormwater management shall be completed to limit post-construction flows to match pre-construction conditions.
- Stormwater management design shall also restrict outflows to the lesser of the pre-construction condition of the parent report for the Business Park.
- Stormwater management design shall be completed as per the City of Ottawa guidelines.
- Stormwater outlet shall be the ditch on Frank Davis Street.
- Direction of flow on drainage drawings to be shown with arrows.
- Profile drawings of proposed services to be included.

# 4.0 WATERMAIN

## 4.1 Existing Watermain

There is an existing 250 mm diameter watermain within Frank Davis Street. The watermain services the existing property and adjacent properties, as well as fire hydrants along Frank Davis Street. There are no existing buildings on the property and therefore no existing water services.

## 4.2 Proposed Watermain

A new 200 mm diameter PVC water service is proposed to service the site. The connection is to be made to the existing 250 mm diameter watermain located within Frank Davis Street. The water service is designed to have a minimum of 2.4 m cover and will be insulated where required by City of Ottawa standards.

The Ontario Building Code (OBC) was used to determine the required fire flow for the site of *9000 L/min*. The detailed calculations for the OBC can be found in Appendix C.

The Fire Underwriters Survey (FUS) fire flow requirements were also analyzed yielding a required fire flow of *4000 L/min.* The detailed calculations for the OBC can be found in Appendix C.

The water demands for the proposed buildings have been calculated to adhere to the Ottawa Design Guidelines: Water Distribution (2010) and can be found in Appendix C. The results have been summarized in Table 1.

*Table 1: Water Demands*

| Design Parameter | Value |
|---|---|
| Site Area | 0.93 ha |
| Industrial – Light | 35,000 L/ha/day |
| Average Day Demand (L/s) | 0.38 |
| Maximum Day Demand (L/s) | 0.56 |
| Peak Hour Demand (L/s) | 1.01 |
| OBC Fire Flow Requirement (L/s) | 150 |

Boundary conditions for the site were provided by the Municipality through via *Mississippi Mills Business Park, Design Brief – Sanitary Sewers and Watermains.* The residual pressure available at the subject site location is 13.61m (19.35 PSI). However, the report notes that watermain looping through the business park would improve

the residual pressure. Watermain looping has been completed since the time the report therefore it can be assumed that the residual pressure at the site location is within the 20-40 PSI suggested within the *Ottawa Water Distribution Guidelines*.

# 5.0 SANITARY DESIGN

## 5.1 Existing Sanitary Sewer

There is an existing 200 mm diameter sanitary sewer within Frank Davis Street.

As there are no existing buildings on the property, it is assumed that there are no existing sanitary services.

## 5.2 Proposed Sanitary Sewer

A new 200 mm diameter PVC gravity sanitary lateral is proposed to be connected to the existing 200 mm diameter sanitary sewer within Frank Davis Street. One sanitary maintenance ehole has been proposed within the site. Refer to civil drawings C101, and C102 for a detailed servicing layout.

The peak design flows for the proposed buildings were calculated using criteria from the Ottawa Sewer Design Guidelines (2012) and are summarized in Table 2. The proposed site development will generate a flow of 2.86 L/s under peak wet weather conditions. See Appendix D for more details.

*Table 2: Sanitary Design Criteria*

| Design Parameter | Value |
|---|---|
| Site Area | 0.93 ha |
| Industrial – Light | 35,000 L/ha/day |
| Light Industrial Peaking Factor | 6.81 |
| Extraneous Flow Allowance | 0.28 L/s/ha |

Table 3 summarized the estimated wastewater flow from the proposed development. Refer to Appendix D for detailed calculations.

*Table 3: Summary of Estimated Sanitary Flow*

| Design Parameter | Total Flow (L/s) |
|---|---|
| Total Estimated Average Dry Weather Flow | 0.42 |
| Total Estimated Peak Dry Weather Flow | 2.61 |
| Total Estimated Peak Wet Weather Flow | 2.86 |

# 6.0 STORM SEWER DESIGN

## 6.1 Existing Storm Sewers

There are no existing storm sewers on the subject property. Water runoff from the site is currently draining towards an existing ditch to the west of the property line. Refer to Appendix E for the existing grading plan.

## 6.2 Proposed Storm Sewers

Due to the shallow ditches within Frank Davis Street, storm servicing has been limited to ditches and culverts. The entire site is to sheet flow towards proposed drainage ditches within the east and west edges of the property. The drainage ditches terminate at a large basin, located adjacent the southeast edge of the proposed building. The stormwater retention area outlets through a 200mm HDPE pipe completed with a 125mm orifice plug and weir above the pipe, with flows directed into the right of way ditches within Frank Davis Street.

# 7.0 PROPOSED STORMWATER MANAGEMENT

## 7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed buildings and into ditches that lead to a temporary storage retention areas. The emergency overland flow route for the proposed site will be directed to the ditching south of the development within Frank Davis Street. The quantitative properties of the storm runoff for both the pre- and post-development flows are further detailed below.

In summary, the following design criteria has been employed in development the stormwater management design for the site:

Quantity Control

- Post-development flows for the 5- and 100-Year are to be restricted to be no greater than 20L/s/ha and 56L/s/ha respectively. These quantities were outlined within *Stormwater Management Report – Mississippi Mills Business Park Phase 2 & 3.*

## 7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where: C = Runoff coefficient

I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)

A = Drainage area in ha

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area, summarized in Table 4:

*Table 4: Runoff Coefficients*

| Land Cover | C |
|---|---|
| Roofs/Concrete/Asphalt | 0.90 |
| Gravel | 0.60 |
| Undeveloped/Grass | 0.20 |

As per the *City of Ottawa – Sewer Design Guidelines (2012)*, the 5-Year balanced C-value must be increased by 25% for a 100-Year storm event to a maximum of 1.0.

## 7.3 Pre-Development Drainage

The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. A summary of the Pre-Development Runoff Calculations can be found in Table 5.

*Table 5: Pre-Development Runoff Summary*

| Drainage Area | Area (ha) | Runoff Coefficient (5-Year) | Runoff Coefficient (100-Year) | 5-Year Peak Flow (L/s) | 100-Year Peak Flow (L/s) |
|---|---|---|---|---|---|
| A1 | 0.93 | 0.20 | 0.25 | 36.20 | 77.27 |

See the Pre-Development Drainage Area Plan in Appendix E and SWM Calculations in Appendix G.

As the predevelopment flows are not governing the proposed released rates for the development. The following Table outlines the required quantities as per *Stormwater Management Report – Mississippi Mills Business Park Phase 2 & 3.*

*Table 6: Allowable Runoff Summary*

| Drainage Area | Area (ha) | Required Release Rate (5-Year) | Required Release Rate (100-Year) | 5-Year Peak Flow (L/s) | 100-Year Peak Flow (L/s) |
|---|---|---|---|---|---|
| A1 | 0.93 | 20 L/s/ha | 56 L/s/ha | 18.53 | 51.92 |

It can be observed that the required release rates are significantly less than the pre-development flows for the site.

## 7.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan found in Appendix F of this report. A summary of the Post-Development Runoff Calculations can be found below.

*Table 7: Post-Development Runoff Summary*

| Drainage Area | Unrestricted Flow (L/s) | | Restricted Flow (L/s) | | Storage Required ($m^3$) | | Storage Provided ($m^3$) | |
|---|---|---|---|---|---|---|---|---|
| | 5-Year | 100-Year | 5-Year | 100-Year | 5-Year | 100-Year | 5-Year | 100-Year |
| B1 | 127.55 | 244.38 | 18.28 | 41.40 | 150.24 | 268.08 | 158.45 | 270.60 |
| Total | 127.55 | 244.38 | 18.28 | 41.40 | 150.24 | 268.08 | 158.45 | 270.60 |

See Appendix F for detailed calculations.

The entirety of the site area is to be retained within the retention area and therefore one drainage area, area B1, has been provided for post development conditions.

### 7.5 Quantity Control

The total post-development runoff for this site has been restricted to match the required release rates outlined in table 6. Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage.

Area B1 has an unrestricted release rate of 127.55 L/s and 244.38 L/s in 5- and 100-Year storm events respectively. As area B1 is to outlet through an orifice plug and weir, the 125mm diameter plug is sized to provide a restricted flow rate of 18.28 L/s and 41.40 L/s in 5- and 100-Year events respectively.

See Appendix G for SWM calculations.

### 7.6 Best Management Practices (BMPs)

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

## 8.0 SITE SERVICING

Site servicing for the site will consist of a 200mm water service lateral and one hydrant. Additionally, a 200mm sanitary service connection and one sanitary maintenance hole will be installed within the site. No storm sewers are proposed, solely culverts.

Due to shallow bedrock within the site, rock breaking will be required in order to provide adequate pipe cover for both the water and sanitary services. Where adequate cover cannot be provided due to ditch crossings, insulation will be installed as recommended on the civil drawing C102.

## 9.0 EROSION AND SEDIMENT CONTROL

### 9.1 Temporary Measures

Before construction begins, temporary silt fence and straw bale/rock flow check dams will be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of erosion and sediment control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown in the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion, or at the instruction of the Municipality, Conservation Authority, or Contract Administrator, shall increase the quantity of erosion and sediment controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The check dams and silt fences shall be inspected weekly and after rain events. Care shall be taken to properly remove sediment from the fences and check dams as required. Inlet sediment control devices (ISCD) are to be placed under the grates of all existing catchbasins and manholes surrounding the site that will come in contact with flows during construction. Any new structures will have an ISCD installed immediately upon installation. The measures for the existing/proposed structures are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any sediment that has accumulated is properly handled and disposed of. Removal of all silt fences and ISCDs prior to removal of the sediments shall not be permitted.

Although not anticipated, work through the winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the problematic area(s). Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the Municipality and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as the ground conditions warrant. Please see the Site Grading and Sediment & Erosion Control Plan for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

## 9.2 Permanent Measures

Rip-rap will be placed at all locations that have the potential for concentrated flow. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip rapped area. Additional rip-rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / Municipality or Conservation Authority.

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

# 10.0 SUMMARY

- One (1) new 1877m$^2$ warehouse building are proposed at 5 and 6 Frank Davis Street.
- A new 200 mm diameter water service is proposed to service the site, extending from the existing 250mm watermain within Frank Davis Street.

- A new 200mm sanitary service is proposed to service the site. The service will extend to the existing 200mm sanitary sewer within Frank Davis Street.
- The proposed storm servicing will be 1-200mm outlet pipe complete with an orifice plug and weir servicing the retention area.
- Storage for the 5- through 100-Year storm events will be provided within the ditched retention area and water will overtop the riprap spillway provided with the proposed weir in major storm events.

# 11.0 RECOMMENDATION

Based on the information presented in this report, we recommend that the Municipality approve this Stormwater Management Report in support of the proposed Industrial Business Bays Lots development.

The report is respectfully being submitted for approval.

Regards,

Egis Canada Ltd.


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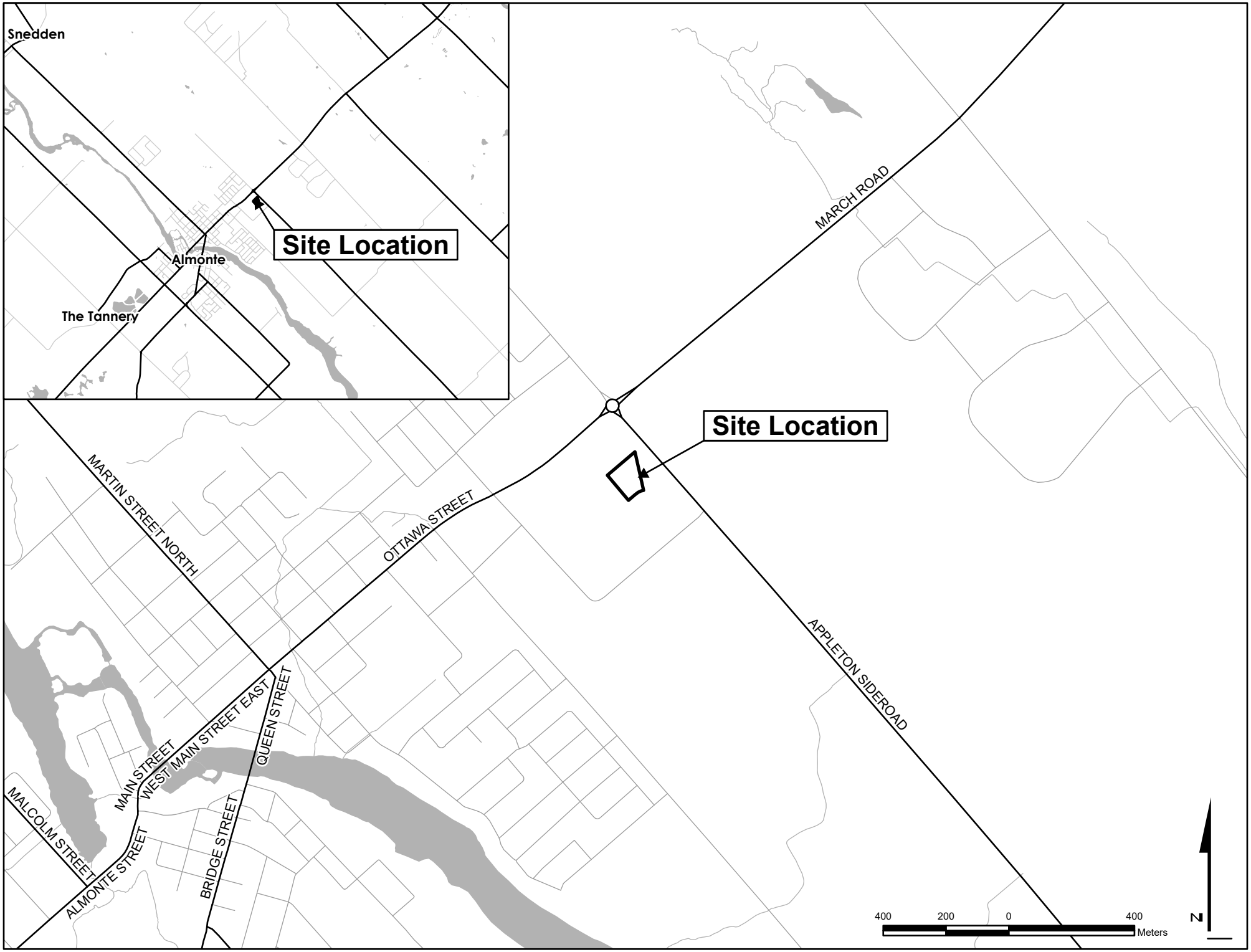
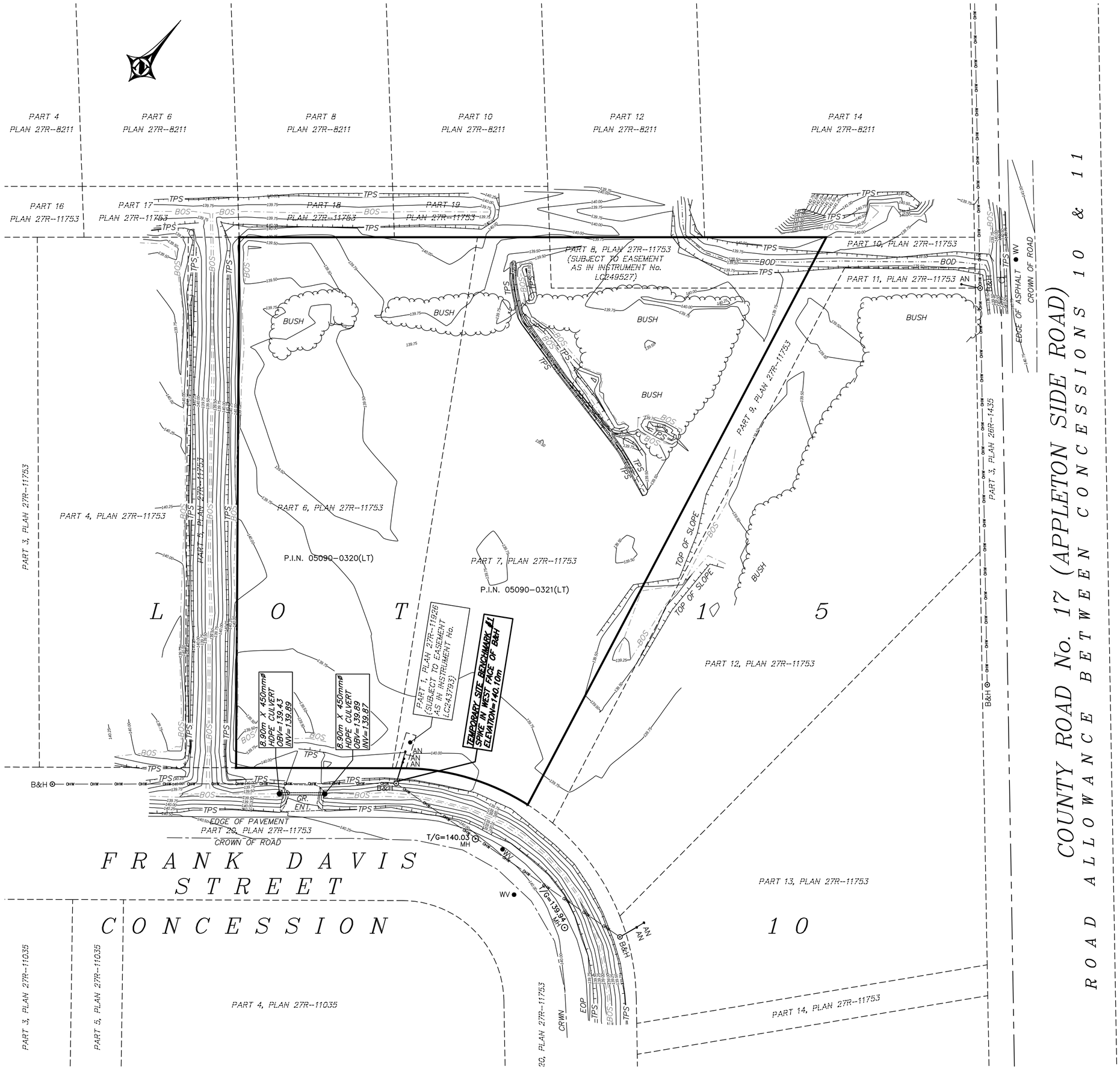
*U:\Infrastructure\2025\CCO-25-0691 BBS_Warehousing-Storage SPC&MV_5&6 Frank Davis Place\03 - Servicing\Report*

# APPENDIX A
# KEY PLAN


Snedden
Almonte
The Tannery
Site Location
Site Location
MARCH ROAD
MARTIN STREET NORTH
OTTAWA STREET
APPLETON SIDEROAD
MALCOLM STREET
ALMONTE STREET
MAIN STREET
WEST MAIN STREET EAST
BRIDGE STREET
QUEEN STREET
400
200
0
400
Meters
N

# APPENDIX B
# BACKGROUND DOCUMENTS




# SKETCH TO ILLUSTRATE TOPOGRAPHY

EGIS SURVEYING INC

SCALE 1 : 500

0 10 20 30 40 50 Metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 609mm IN WIDTH BY 457mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1 : 500.

## METRIC:

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

## LEGEND:

| | | |
|---|---|---|
| BOD | DENOTES | BOTTOM OF DITCH |
| BOS | DENOTES | BOTTOM OF SLOPE |
| TPS | DENOTES | TOP OF SLOPE |
| CRWN | DENOTES | CROWN OF ROAD |
| EOP | DENOTES | EDGE OF PAVEMENT |
| HDPE | DENOTES | HIGH DENSITY POLYETHYLENE CULVERT |
| mm | DENOTES | MILLIMETRE |
| ø | DENOTES | DIAMETER |
| MH | DENOTES | MAINTENANCE HOLE |
| T/G | DENOTES | TOP OF GRATE/TOP OF LID |
| INV | DENOTES | INVERT |
| OBV | DENOTES | OBVERT |
| N,S,E,W | DENOTES | NORTH, SOUTH, EAST, WEST |
| ○ FH TS | DENOTES | FIRE HYDRANT TOP OF SPINDLE ELEVATION |
| ○ B&H | DENOTES | BELL & HYDRO UTILITY POLE |
| ∘ AN | DENOTES | ANCHOR |
| OHW | DENOTES | OVERHEAD WIRES |
| ⊖ | DENOTES | SIGN |

## NOTES:

## GEOGRAPHIC LOCATION:

PART OF LOT 15, CONCESSION 10
GEOGRAPHIC TOWNSHIP OF RAMSAY
TOWN OF MISSISSIPPI MILLS
COUNTY OF LANARK

ALMONTE, ONTARIO

## COORDINATE SYSTEM AND ELEVATIONS:

COORDINATES ARE RELATED TO NAD83 UTM ZONE 18 (CSRS-2010) AND ARE DERIVED FROM REAL-TIME NETWORK (RTN) GPS OBSERVATIONS.

ELEVATIONS ARE GEODETIC (CGVD 28/78) BY GNSS OBSERVATIONS REFERENCED TO THE CANADA HT_2 GEOID MODEL AND ARE ILLUSTRATED VIA SPOT ELEVATIONS.

## BENCHMARKS:

TOPOGRAPHIC INFORMATION DERIVED FROM FIELD SURVEY BY McINTOSH PERRY SURVEYING INC. (MPSI). THIS FIELD WORK WAS COMPLETED ON THE 12TH DAY OF MARCH, 2024.

TEMPORARY SITE BENCHMARK – SPIKE IN FACE OF B&H UTILITY POLE, HAVING AN ELEVATION OF 140.10m.

## UTILITIES:

THE LOCATION AND CONFIGURATION OF UNDERGROUND SERVICES AND UTILITIES WERE NOT INCLUDED IN THIS SURVEY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE CONFIGURATION AND LOCATION OF UNDERGROUND SERVICES AT THE SITE PRIOR TO CONSTRUCTION.

## CAUTION:

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

a) THIS PLAN IS PROTECTED BY COPYRIGHT ©

| | |
|---|---|
| JOB: CSI 25-0915 | DWG: CSI 25-0915 – FRANK DAVIS STREET_TOPO (RF) |
| THIS SKETCH WAS PREPARED FOR: EGIS CANADA | |

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| | |
|---|---|
| EXAMINED BY: J.G. | DRAFTED BY: R.F. |

# List of Drawings



## Project Zoning Review/Statistics

| | |
|---|---|
| Municipality | Town of Mississippi Mills |
| Municipal Address | 340 Frank Davis Street, Almonte, On |
| Registered Owner | |
| Lot Area | 9,275 $m^2$ |

## Zoning Analysis

| | | |
|---|---|---|
| Zone | E1 | BUSINESS PARK |
| Proposed Use | Light Industrial & Warehouse | |

## Proposed Floor Areas

| | $m^2$ | SF |
|---|---|---|
| Ground Floor | | |
| Proposed 12 units warehouse | 1,876.7 | 20,200 |
| **Gross Floor Area** | 1,876.7 | 20,200 |

| Development Standards | | Required | Proposed |
|---|---|---|---|
| (a) Minimum lot area | | No Min. | 9,275 $m^2$ |
| (b) Minimum lot width | | No Min. | 86 m |
| (c) Maximum lot coverage | | 65% | 20% |
| (d) Minimum front yard setback | | 6 m | 6 m |
| (e) Minimum exterior side yard setback | | 3 m | |
| (f) Minimum side yard setback | (i) abutting a residential zone | 15 m | NA |
| | (ii) all other cases | 3 m | 17.03 m |
| (g) Minimum rear yard setback | (i) abutting a residential zone | 15 m | NA |
| | (ii) all other cases | 3 m | 30.81 m |
| (g) Maximum floor space index | | 2 | <2 |
| (i) Maximum building height | (i) within 20 m of a residential zone | 11 m | NA |
| | (ii) all other cases | 14 m | 8.25 m |
| Minimum width of landscaped area | (i) abutting a residential zone | 3 m | NA |
| | (ii) abutting a street | 3 m | 3 m |
| | (iii) in all other cases | No Min. | Varies |
| **Parking Spaces** | | | |
| 2.75 m x 5.75 m for 12 warehouse units: 0.8 per 100 $m^2$ in Almonte @1,876.7 $m^2$ | | 15.01 | 24 |
| Grand Total | | 16 | 24 |
| **Others** | | | |
| Loading Spaces (3 m x 9 m) 350-4,999 $m^2$ | | 1 | 1 |
| Bicycle Parking (1 per 1,500 $m^2$ of GFA) | | 2 | 2 |
| 3.9 m x 5.75 m parking space/s for persons with disabilities: 1 @ 10-25 parking spaces required | | 1 | 1 |

LEGAL DESCRIPTION:

FIRE ROUTE SIGNAGE:

1. FIRE ROUTE TO BE IDENTIFIED BY VERTICALLY MOUNTED SIGNS PROHIBITING PARKING, AND SHALL:
   - 1.1. BE NOT LESS THAN 45 cm IN HEIGHT AND NOT LESS THAN 30 cm IN WIDTH;
   - 1.2. BEAR THE MARKINGS AND MESSAGE THAT THE AREA IS A FIRE ROUTE WHERE PARKING IS PROHIBITED AND INCLUDE DOUBLE ARROWS, EXCEPT AT THE ENDS OF THE FIRE ROUTE WHERE A SINGLE ARROW SHALL BE INCLUDED;
   - 1.3. INCLUDE, IN BLACK LETTERS OF A MINIMUM HEIGHT OF 3 cm, THE ENGLISH LANGUAGE MESSAGE "FIRE ROUTE" AND THE FRENCH LANGUAGE MESSAGE "ROUTE DES POMPER" OR "ROUTE D'INCENDIE", BELOW THE ENGLISH MESSAGE, AND;
   - 1.4. HAVE THE DESIGN AND DIMENSIONS DESCRIBED IN THE FOLLOWING FIGURE:
2. FIRE ROUTE SIGNS SHALL BE LOCATED NO MORE THAN 25 m APART UNLESS OTHERWISE SPECIFICALLY APPROVED BECAUSE OF UNUSUAL CONDISIONS OR THE FIRE ROUTE CONFIGURATION, AND THE LOWER EDGE OF EACH SIGN SHALL BE BETWEEN 2 m AND 2.5 m ABVOVE THE GROUND.


ACCESSIBILITY PARKING SIGNAGE:

NOTES & LEGEND


| | |
|---|---|
| PERMIT | |
| TENDER | |
| CONSTRUCTION | |

GENERAL NOTES

- THIS DRAWING IS PROVIDED FOR INFORMATION AND DESIGN PURPOSE ONLY.
- IT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND APPROVED.
- THE DRAWING AND DESIGN ARE THE PROPERTY OF BBS CONSTRUCTION (ONTARIO) LTD. AND MAY NOT BE USED OR REPRODUCED WITHOUT OUR EXPLICIT APPROVAL.

**LEGEND**

- PROPERTY LINE
- FENCE
- PERSON DOOR (38" x 7')
- OVERHEAD DOOR (14' x 14')
- LIGHT POLE
- ASPHALT LINE

NOTE
- Design in process

NOT FOR CONSTRUCTION

| N° | DATE | REVISION |
|---|---|---|
| 6 | 2024-04-24 | ISSUED FOR REVIEW |
| 5 | 2024-04-16 | ISSUED FOR ENGINEERING REVIEW |
| 4 | 2024-04-15 | ISSUED FOR ENGINEERING REVIEW |
| 3 | 2024-04-12 | ISSUED FOR REVIEW |
| 2 | 2024-03-22 | ISSUED FOR INTERNAL REVIEW |
| 1 | 2024-03-18 | ISSUED FOR INTERNAL REVIEW |

REVISION


BUILDING A REPUTATION ON EXCELLENCE

BBS CONSTRUCTION (ONTARIO) LTD.
233 RUSS BRADLEY ROAD,
CARP, ON K1L 1L0, CANADA
TEL: (613) 226-8830 FAX: (613) 226 7709


OWNER:
Greg Clarke

PROJECT N°: 589-24
PROJECT NAME:
**Almonte Storage Bldgs**

DRAWING TITLE:
Proposed Site Plan
& Zoning Matrix

| | |
|---|---|
| SCALE: | 1/250 |
| PRINT SIZE: | 36x24 (ARCH D) |
| DRAWN BY: | MA |
| DATE: | 2024-03-14 |

DRAWING N°
**SP1**

# APPENDIX C
# WATERMAIN CALCULATIONS

## WATER DEMAND CALCULATIONS

PROJECT: New Warehouse Building
LOCATION: 5 & 6 Frank Davis
CLIENT: BBS Construction Ltd.

| LOCATION | RESIDENTIAL UNITS | | | | | | | | | RESIDENTIAL DEMANDS | | | | | | | | INDUSTRIAL/AMENITY DEMANDS | | | | | | | | | TOTAL DEMANDS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 1540 Star Top Road | UNIT TYPES | | | | | | | AREA | POPULATION | PEAKING FACTORS | | AVERAGE DAY FLOW Q(a) | | MAX DAY FLOW Q(max) | | PEAK HOURLY FLOW Q(h) | | AREA | PEAKING FACTORS | | AVERAGE DAY FLOW Q(a) | | MAX DAY FLOW Q(max) | | PEAK HOURLY FLOW Q(h) | | Average Day | Max Day | Peak Hour |
| | SF | SD | TH | 1BR | 2BR | 3BR | STU. | (ha) | | MAX DAY | PEAK HOUR | (L/s) | (L/min) | (L/s) | (L/min) | (L/s) | (L/min) | (ha) | MAX DAY | PEAK HOUR | (L/s) | (L/min) | (L/s) | (L/min) | (L/s) | (L/min) | (L/s) | (L/s) | (L/s) |
| Proposed Industrial Building | | | | | | | | | | | | | | | | | | 0.93 | 1.5 | 2.7 | 0.376 | 0.023 | 0.564 | 0.03 | 1.014 | 0.06 | 0.38 | 0.56 | 1.01 |
| TOTALS | | | | | | | | | | | | | | | | | | 0.9 | | | 0.4 | 0.023 | 0.6 | 0.03 | 1.0 | 0.06 | 0.38 | 0.56 | 1.01 |

Design Parameters:

| | | |
|---|---|---|
| Single Family | 3.4 | p/p/u |
| TH/SD | 2.7 | p/p/u |
| 1 Bed/Studio | 1.4 | p/p/u |
| 2 Bedroom | 2.1 | p/p/u |
| 3 Bedroom | 3.1 | p/p/u |
| Studio (Avg.) | 1.8 | p/p/u |
| Commercial | 28000 | L/ha/d |
| Industrial - Light | 35000 | L/ha/d |

Notes:
1. Domestic Flow: 350 L/(cap·day)
2. Peaking factors based on 501-3000 population

Q (a) = Average Daily Flow
Q (max) = Maximum Daily Flow
Q (h) = Peak Hour Flow
Q (min) = Night Minimum Hour Flow

Q (max) = Q(a) * Peaking Factor
Q (h) = Q(a) * Peaking Factor
Q (min) = Q(a) * Peaking Factor

REF: CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

Designed: J. Burden
Checked:
Project No.: CCO-25-0691

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# Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

## Building No. / Type: 5 & 6 Frank Davis

An estimate of the Fire Flow required for a given fire area may be estimated by: 

RFF = 220 x C x √A Where:

F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

## A. Determine the Construction Coefficient (C)

Choose the construction type and coefficient to be used in the required fire flow formula:

| | | |
|---|---|---|
| C = 1.5 | Type V Wood Frame Construction | |
| = 0.8 | Type IV-A Mass Timber Construction | |
| = 0.9 | Type IV-B Mass Timber Construction | |
| = 1.0 | Type IV-C Mass Timber Construction | |
| = 1.5 | Type IV-D Mass Timber Construction | |
| = 1.0 | Type III Ordinary Construction | |
| = 0.8 | Type II Noncombustible Construction | |
| = 0.6 | Type I Fire Resistive Construction | |

Input: C = Type III Ordinary Construction = 1.0

## B. Determine Total Effective Floor Area (A)

Input building floor areas:

| Floor No. | | Area ($m^2$) | % Used | Area Used ($m^2$) | Total ($m^2$) |
|---|---|---|---|---|---|
| 1 | = | 1876.6536 Input: | 100% | 1876.6536 | 1876.6536 |

## C. Determine Required Fire Flow

RFF = 220 x C x √A = 9530 L/min

= 10000 L/min *(Rounded to nearest 1,000 L/min)*

## D. Determine Increase or Decrease Based on Occupancy Contents Adjustment Factor

Choose the combusitbility of building contents:

| Option | | Input: | Factor | Fire Flow Change | Adjusted RFF |
|---|---|---|---|---|---|
| Non-Combustible | -25% | | | | |
| Limited Combustible | -15% | Limited Combustible | -15% | -1500 L/min | 8500 L/min |
| Combustible | 0% | | | | |
| Free Burning | 15% | | | | |
| Rapid Burning | 25% | | | | |

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# Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020



## E. Determine the Decrease for Automatic Sprinkler Protection, if Applicable

Choose the sprinkler options that apply:

| Option | | Applicable? | Factor | Fire Flow Change | Adjusted RFF |
|---|---|---|---|---|---|
| Automatic sprinkler conforms to NFPA 13 | -30% | Yes | -30% | -2550 L/min | 5950 L/min |
| Standard water supply for system and Fire Department hose line | -10% | Yes | -10% | -850 L/min | 5100 L/min |
| Fully supervised system | -10% | Yes | -10% | -850 L/min | 4250 L/min |

## F. Determine the Total Increase for Exposures

Choose separation distance and wall lengths:

| Subject Side | Separation Distance (m) | Exposed Wall Type | Wall Length (m) | No. of Storeys | Length-Height Factor | Charge (%) (See FUS-Table 6) | Total Charge (%) | Fire Flow Change (L/min) | Adjusted RFF (L/min) |
|---|---|---|---|---|---|---|---|---|---|
| North | | | | | 0 | 0% | | | |
| South | | | | | 0 | 0% | 0% | 0 | 4250 |
| East | | | | | 0 | 0% | | | |
| West | | | | | 0 | 0% | | | |
| | | | Input: | | | | | | |

## G. Determine the Total Required Fire Flow

| | | |
|---|---|---|
| Total Required Fire Flow, Rounded to the Nearest 1,000 L/min | = | 4000 L/min |
| Total Required Fire Flow (L/sec) | = | 67 L/sec |
| Does the 10,000 L/min (167 L/sec) RFF limit apply, based on "TECHNICAL BULLETIN ISTB-2018-02"? | = | No |
| **Resultant Total Required Fire Flow (L/sec)** | = | 67 L/sec |

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# Ontario Building Code 2006 - Fire Flow Calculations

## Building No. / Type: 5 & 6 Frank Davis



Ontario 2006 Building Code Compendium (Div. B - Part 3)
*Water Supply for Fire-Fighting*

## A. Determine the Major Occupancy Classification of the Building

Refer to OBC Table 3.1.2.1:

| Input: | F3 | *Low hazard industrial occupancies* |
|---|---|---|

## B. Determine the Construction Type & Water Supply Coefficient

Choose the building construction type:

| Input: | 2 | *Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.* |
|---|---|---|

Resulting Water Supply Coefficient (From Table 1): K = 19

## C. Determine Building Volume

| Floor No. | | Area ($m^2$) | Floor Height (m) | Floor Volume ($m^3$) | Total Building Volume ($m^3$) |
|---|---|---|---|---|---|
| 1 | = | 1876.6536 | 8.3 | 15482 | 15482 |
| | | Input: | | | |

## D. Determine Spatial Coefficient Due to Exposures

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

| Exposure Side | | Exposure Distance (m) | Spatial Coefficient | Total Spatial Coefficient $S_{tot} = 1.0 + [S_{north} + S_{south} + S_{east} + S_{west}]$ |
|---|---|---|---|---|
| $S_{north}$ | = | 10.0 | 0 | 1 |
| $S_{east}$ | = | 10.0 | 0 | |
| $S_{south}$ | = | 10.0 | 0 | |
| $S_{west}$ | = | 10.0 | 0 | |
| | | Input: | | |

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# Ontario Building Code 2006 - Fire Flow Calculations



## E. Determine Required On-Site Water Volume

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

$Q = K \times V \times S_{tot}$

*where:*

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

$S_{tot}$ = total of spatial coefficient values from the property line exposures on all sides

Q = 294,158 L

## F. Determine Required On-Site Water Flow Rate

Is the building one-storey with building area not exceeding 600m$^2$ ?

Input: No

| Minimum Flow Rate (from Table 2) = | 9000 L/min | (Q > 270,000 L) |
|---|---|---|

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# APPENDIX D
# SANITARY CALCULATIONS

# CCO-25-0691 - Frank Davis - Sanitary Demands

| | | | |
|---|---|---|---|
| Project: | Frank Davis | | |
| Project No.: | CCO-25-0691 | | |
| Designed By: | JJB | | |
| Checked By: | 0 | | |
| Date: | April 26, 2024 | | |
| Site Area | 0.93 | Gross ha | |
| Duplex | 0 | 0.00 | Persons per unit |
| Apartment | 0 | 0.00 | Persons per unit |
| Total Population | 0 | Persons | |
| Commercial Area | 0.00 | $m^2$ | |
| Amenity Space | 0.00 | $m^2$ | |

DESIGN PARAMETERS

| | | |
|---|---|---|
| Light Industrial Peaking Factor | 6.81 | *Check Ottawa Sewer Design Guidelines Appendix 4B |
| Institutional/Commercial Peaking Factor | 1.5 | *Check technical bulletin ISTB 2018-01 (Either use 1.0 or 1.5) |
| Residential Peaking Factor | 3.80 | ** Using Harmon Formula* = 1+(14/(4+P^0.5))*0.8 |
| | | *where P = population in thousands, Harmon's Correction Factor = 0.8* |
| Mannings coefficient (n) | 0.013 | |
| Demand (per capita) | 350 | L/day |
| Infiltration allowance | 0.28 | L/s/Ha |

EXTRANEOUS FLOW ALLOWANCES

| Infiltration / Inflow | Flow (L/s) |
|---|---|
| Dry | 0.05 |
| Wet | 0.26 |
| Total | 0.26 |

AVERAGE DAILY DEMAND

| DEMAND TYPE | AMOUNT | UNITS | POPULATION / AREA | Flow (L/s) |
|---|---|---|---|---|
| Residential | 350 | L/c/d | | 0 |
| Industrial - Light** | 35,000 | L/gross ha/d | 0.93 | 0.38 |
| Industrial - Heavy** | 55,000 | L/gross ha/d | | 0 |
| Commercial / Amenity | 2,800 | L/(1000m² /d ) | | 0 |
| Hospital | 900 | L/(bed/day) | | 0 |
| Schools | 70 | L/(Student/d) | | 0 |
| Trailer Parks no Hook-Ups | 340 | L/(space/d) | | 0 |
| Trailer Park with Hook-Ups | 800 | L/(space/d) | | 0 |
| Campgrounds | 225 | L/(campsite/d) | | 0 |
| Mobile Home Parks | 1,000 | L/(Space/d) | | 0 |
| Motels | 150 | L/(bed-space/d) | | 0 |
| Hotels | 225 | L/(bed-space/d) | | 0 |
| Office | 75 | L/7.0$m^2$/d | | 0 |
| Tourist Commercial | 28,000 | L/gross ha/d | | 0 |
| Other Commercial | 28,000 | L/gross ha/d | | 0 |

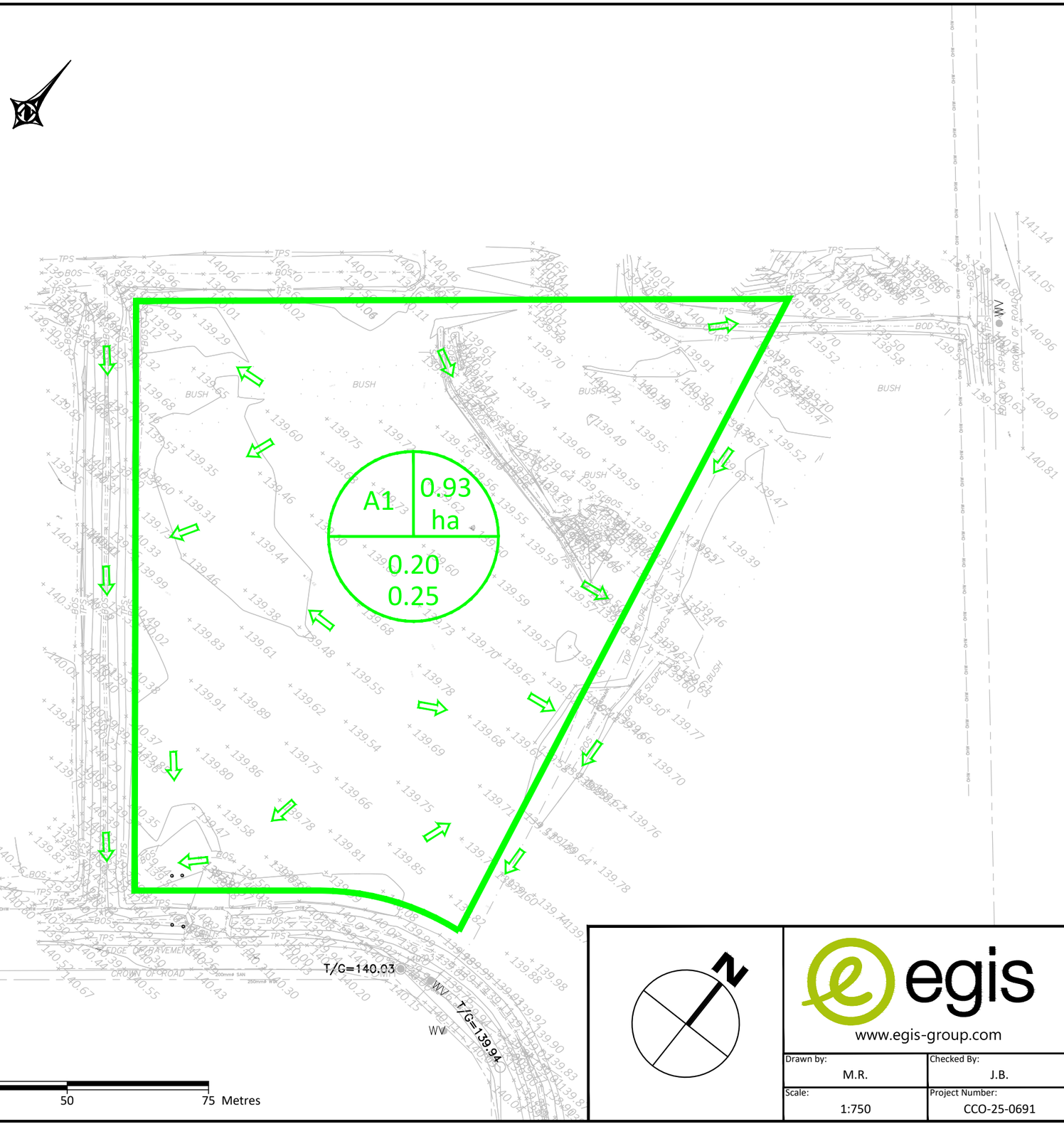
| | | |
|---|---|---|
| AVERAGE RESIDENTIAL FLOW | 0.00 | L/s |
| PEAK RESIDENTIAL FLOW | 0.00 | L/s |
| | | |
| AVERAGE ICI FLOW | 0.38 | L/s |
| PEAK INSTITUTIONAL/COMMERCIAL FLOW | 0.00 | L/s |
| PEAK INDUSTRIAL FLOW | 2.56 | L/s |
| TOTAL PEAK ICI FLOW | 2.56 | L/s |

TOTAL SANITARY DEMAND

| | | |
|---|---|---|
| TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW | 0.42 | L/s |
| TOTAL ESTIMATED PEAK DRY WEATHER FLOW | 2.61 | L/s |
| TOTAL ESTIMATED PEAK WET WEATHER FLOW | 2.82 | L/s |

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

# APPENDIX E
# PRE-DEVELOPMENT DRAINAGE PLAN

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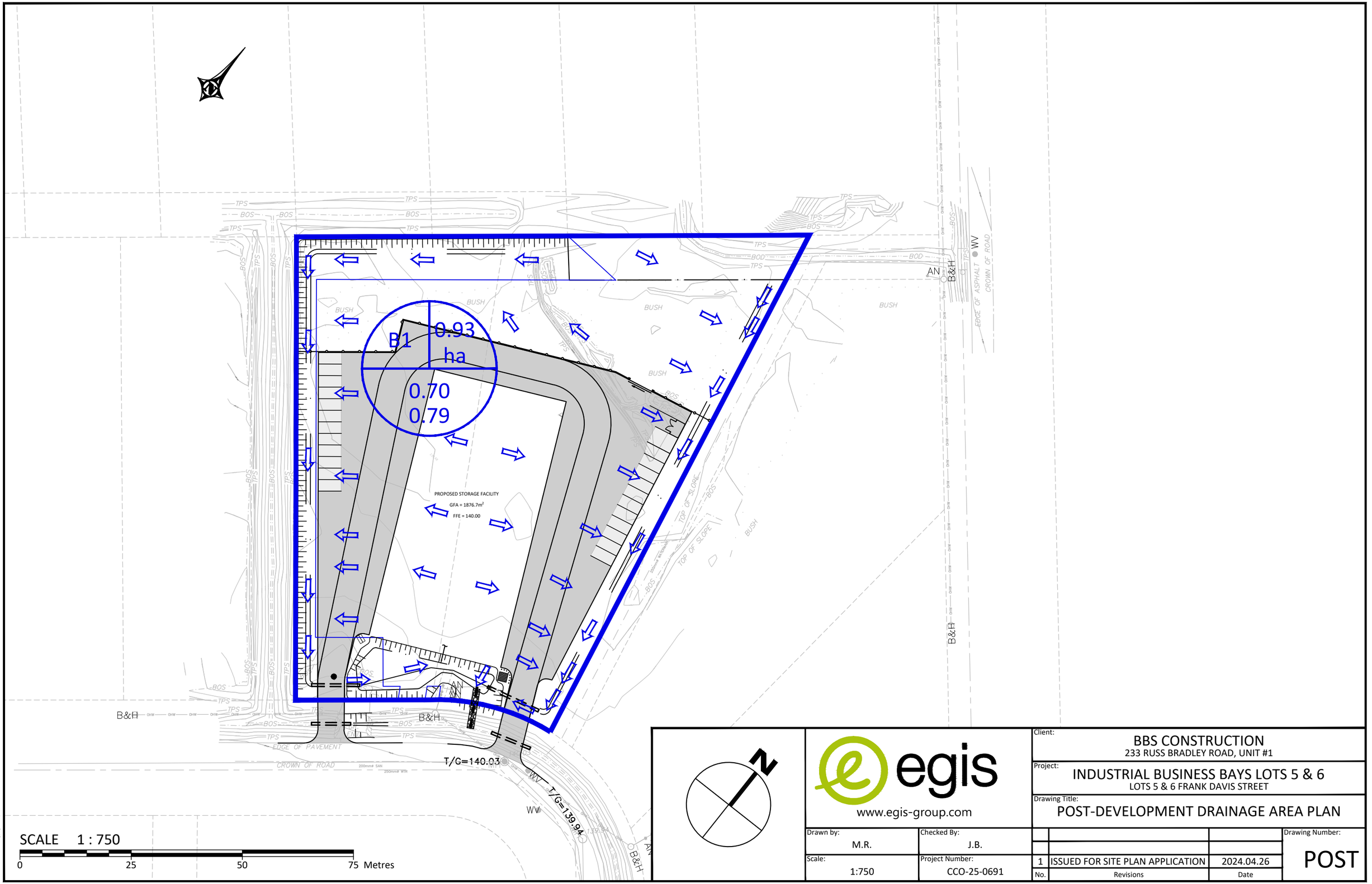
Client: BBS CONSTRUCTION
233 RUSS BRADLEY ROAD, UNIT #1

Project: INDUSTRIAL BUSINESS BAYS LOTS 5 & 6
LOTS 5 & 6 FRANK DAVIS STREET

Drawing Title: PRE-DEVELOPMENT DRAINAGE AREA PLAN

| Drawn by: | Checked By: | | | Drawing Number: |
|---|---|---|---|---|
| M.R. | J.B. | | | PRE |
| Scale: 1:750 | Project Number: CCO-25-0691 | | | |
| | | 1 | ISSUED FOR SITE PLAN APPLICATION | 2024.04.26 |
| | | No. | Revisions | Date |

# APPENDIX F
# POST-DEVELOPMENT DRAINAGE PLAN

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Client: BBS CONSTRUCTION
233 RUSS BRADLEY ROAD, UNIT #1

Project: INDUSTRIAL BUSINESS BAYS LOTS 5 & 6
LOTS 5 & 6 FRANK DAVIS STREET

Drawing Title: POST-DEVELOPMENT DRAINAGE AREA PLAN

| Drawn by: | Checked By: | | | Drawing Number: |
|---|---|---|---|---|
| M.R. | J.B. | | | POST |
| Scale: 1:750 | Project Number: CCO-25-0691 | 1 | ISSUED FOR SITE PLAN APPLICATION | 2024.04.26 |
| | | No. | Revisions | Date |

FILENAME: U:\Infrastructure\2025\CCO-25-0691 BBS, Warehousing Storage EPC&MV_5&6 Frank Davis Place\12 - Drawings\CCO-25-0691 - GP.dwg
LAST SAVED: Friday, April 26, 2024 LAST SAVED BY: m.roper
LAST PLOTTED: Friday, April 26, 2024 CTB FILE USED: ----

# APPENDIX G
# STORMWATER MANAGEMENT CALCULATIONS

CCO-25-0691 - FRANK DAVIS - Runoff Calculations



Pre-Development Runoff Coefficient

| Drainage Area | Area (ha) | Impervious Area ($m^2$) | C | Gravel Area ($m^2$) | C | Pervious Area ($m^2$) | C | $C_{AVG}$ 5-Year | $C_{AVG}$ 100-Year |
|---|---|---|---|---|---|---|---|---|---|
| A1 | 0.93 | 0.00 | 0.90 | 0.00 | 0.50 | 9,269.15 | 0.20 | 0.20 | 0.25 |

Pre-Development Runoff Calculations

| Drainage Area | Area (ha) | C 5-Year | C 100-Year | Tc (min) | I (mm/hr) | | Q (L/s) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 5-Year | 100-Year | 5-Year | 100-Year |
| A1 | 0.93 | 0.20 | 0.25 | 20 | 70.3 | 120.0 | 36.20 | 77.27 |
| Total | 0.93 | | | | | | 36.20 | 77.27 |

Post-Development Runoff Coefficient

| Drainage Area | Area (ha) | Impervious Area ($m^2$) | C | Gravel Area ($m^2$) | C | Pervious Area ($m^2$) | C | $C_{AVG}$ 5-Year | $C_{AVG}$ 100-Year |
|---|---|---|---|---|---|---|---|---|---|
| B1 | 0.93 | 6,681.08 | 0.90 | 0.00 | 0.60 | 2,590.01 | 0.20 | 0.70 | 0.79 |

Post-Development Runoff Calculations

| Drainage Area | Area (ha) | C 5-Year | C 100-Year | Tc (min) | I (mm/hr) | | Q (L/s) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 5-Year | 100-Year | 5-Year | 100-Year |
| B1 | 0.93 | 0.70 | 0.79 | 20 | 70.3 | 120.0 | 127.55 | 244.38 |
| Total | 0.93 | | | | | | 127.55 | 244.38 |

Required Restricted Flow

| Drainage Area | Area (ha) | C 5-Year | C 100-Year | Tc (min) | I 5-Year | I 100-Year | Q 5-Year | Q 100-Year |
|---|---|---|---|---|---|---|---|---|
| A1 | 0.93 | 0.20 | 0.25 | 20 | 70.3 | 120.0 | 36.20 | 77.27 |
| Total | 0.93 | | | | | | 18.54 | 51.92 |

*Pre-development flows have been taken from 'Storm Water Management Report - Mississippi Mills Business Park, Prepared by Novatech Consultants LTD,*

| Drainage Area | Unrestricted Flow (L/s) | | Restricted Flow (L/s) | | Storage Required ($m^3$) | | Storage Provided ($m^3$) | |
|---|---|---|---|---|---|---|---|---|
| | 5-Year | 100-Year | 5-Year | 100-Year | 5-Year | 100-Year | 5-Year | 100-Year |
| B1 | 127.55 | 244.38 | 18.28 | 41.40 | 150.24 | 268.08 | 158.45 | 270.60 |
| Total | 127.55 | 244.38 | 18.28 | 41.40 | 150.24 | 268.08 | 158.45 | 270.60 |

Storage Requirements for Area B1

*5-Year Storm Event*

| Tc (min) | I (mm/hr) | B1 Runoff (L/s) | Allowable Outflow (L/s) | Runoff to be Stored (L/s) | Storage Required ($m^3$) |
|---|---|---|---|---|---|
| 0 | 230.5 | 418.47 | 18.28 | 400.18 | 0.00 |
| 5 | 141.2 | 256.33 | 18.28 | 238.04 | 71.41 |
| 10 | 104.2 | 189.17 | 18.28 | 170.89 | 102.53 |
| 15 | 83.6 | 151.71 | 18.28 | 133.42 | 120.08 |
| 20 | 70.3 | 127.55 | 18.28 | 109.27 | 131.12 |
| 25 | 60.9 | 110.56 | 18.28 | 92.28 | 138.42 |
| 30 | 53.9 | 97.91 | 18.28 | 79.63 | 143.33 |
| 35 | 48.5 | 88.09 | 18.28 | 69.81 | 146.59 |
| 40 | 44.2 | 80.22 | 18.28 | 61.94 | 148.65 |
| 45 | 40.6 | 73.77 | 18.28 | 55.48 | 149.80 |
| 50 | 37.7 | 68.36 | 18.28 | 50.08 | 150.24 |
| 55 | 35.1 | 63.77 | 18.28 | 45.49 | 150.11 |
| 60 | 32.9 | 59.81 | 18.28 | 41.53 | 149.50 |
| 65 | 31.0 | 56.36 | 18.28 | 38.08 | 148.51 |
| 70 | 29.4 | 53.33 | 18.28 | 35.04 | 147.19 |
| 75 | 27.9 | 50.63 | 18.28 | 32.35 | 145.58 |
| 80 | 26.6 | 48.23 | 18.28 | 29.94 | 143.73 |
| Maximum Storage Required 100-Year ($m^3$) = | | | | | 150.24 |

*100-Year Storm Event*

| Tc (min) | I (mm/hr) | B1 Runoff (L/s) | Allowable Outflow (L/s) | Runoff to be Stored (L/s) | Storage Required ($m^3$) |
|---|---|---|---|---|---|
| 0 | 398.6 | 812.12 | 41.40 | 770.73 | 0.00 |
| 5 | 242.7 | 494.47 | 41.40 | 453.08 | 135.92 |
| 10 | 178.6 | 363.79 | 41.40 | 322.39 | 193.43 |
| 15 | 142.9 | 291.12 | 41.40 | 249.73 | 224.76 |
| 20 | 120.0 | 244.38 | 41.40 | 202.98 | 243.58 |
| 25 | 103.8 | 211.57 | 41.40 | 170.18 | 255.26 |
| 30 | 91.9 | 187.17 | 41.40 | 145.77 | 262.39 |
| 35 | 82.6 | 168.24 | 41.40 | 126.84 | 266.37 |
| 40 | 75.1 | 153.10 | 41.40 | 111.70 | 268.08 |
| 45 | 69.1 | 140.68 | 41.40 | 99.28 | 268.06 |
| 50 | 64.0 | 130.30 | 41.40 | 88.90 | 266.70 |
| 55 | 59.6 | 121.47 | 41.40 | 80.08 | 264.26 |
| Maximum Storage Required 100-Year ($m^3$) = | | | | | 268.08 |

CCO-25-0691 - Frank Davis Storage Requirements

Storage Occupied In Area B1

*5-Year Storm Event*

| Pond Storage | | | |
|---|---|---|---|
| Location | Area* | Depth | Volume ($m^3$) |
| West Ditch | 251.27 | 0.280 | 28.91 |
| East Ditch | 309.37 | 0.380 | 51.42 |
| Retention | 258.88 | 0.420 | 78.12 |
| | | Total | 158.45 |

| | |
|---|---|
| Storage Available ($m^3$) = | 158.45 |
| Storage Required ($m^3$) = | 150.24 |

*Pond volumes derived in CAD

*100-Year Storm Event*

| Pond Storage | | | |
|---|---|---|---|
| Location | Area* | Depth | Volume ($m^3$) |
| West Ditch | 518.47 | 0.400 | 70.17 |
| East Ditch | 435.46 | 0.435 | 92.17 |
| Retention | 289.32 | 0.540 | 108.26 |
| | | Total | 270.60 |

| | |
|---|---|
| Storage Available ($m^3$) = | 270.60 |
| Storage Required ($m^3$) = | 268.08 |

*Pond volumes derived in CAD

For Orifice Flow, C= 0.60
For Weir Flow, C= 1.84

| | Orifice 1 | Orifice 2 | Weir 1 | Weir 2 |
|---|---|---|---|---|
| invert elevation | 139.11 | | 139.60 | |
| center of crest elevation | 139.17 | | | |
| orifice width / weir length | 120 mm | | 1.00 m | |
| orifice height | | | | |
| orifice area ($m^2$) | 0.011 | 0.000 | | |

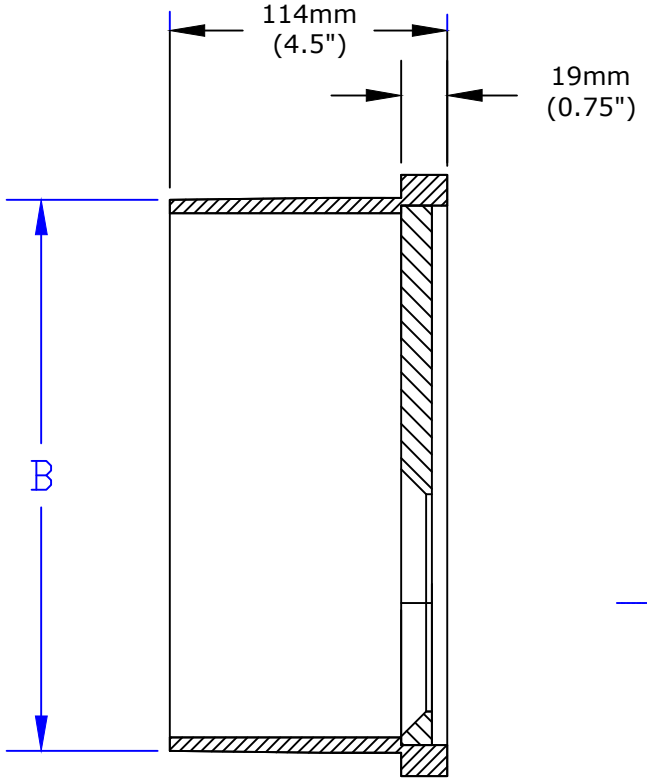
Elevation Discharge Table - Storm Routing

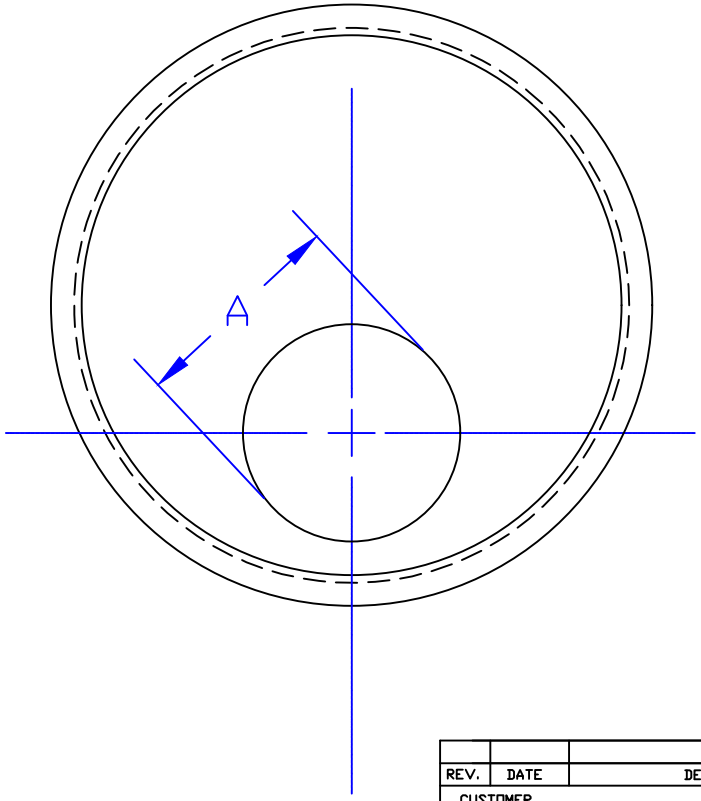
| Elevation | Orifice 1 | | Orifice 2 | | Weir 1 | | Weir 2 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H [m] | Q [$m^3$] | H [m] | Q [$m^3$] | H [m] | Q [$m^3$] | H [m] | Q [$m^3$] | Q [l/s] | |
| 139.31 | 0.14 | 0.011 | | | x | x | | | 11.25 | |
| 139.32 | 0.15 | 0.012 | | | x | x | | | 11.64 | |
| 139.33 | 0.16 | 0.012 | | | x | x | | | 12.02 | |
| 139.34 | 0.17 | 0.012 | | | x | x | | | 12.39 | |
| 139.35 | 0.18 | 0.013 | | | x | x | | | 12.75 | |
| 139.36 | 0.19 | 0.013 | | | x | x | | | 13.10 | |
| 139.37 | 0.20 | 0.013 | | | x | x | | | 13.44 | |
| 139.38 | 0.21 | 0.014 | | | x | x | | | 13.77 | |
| 139.39 | 0.22 | 0.014 | | | x | x | | | 14.10 | |
| 139.40 | 0.23 | 0.014 | | | x | x | | | 14.42 | |
| 139.41 | 0.24 | 0.015 | | | x | x | | | 14.73 | |
| 139.42 | 0.25 | 0.015 | | | x | x | | | 15.03 | |
| 139.43 | 0.26 | 0.015 | | | x | x | | | 15.33 | |
| 139.44 | 0.27 | 0.016 | | | x | x | | | 15.62 | |
| 139.45 | 0.28 | 0.016 | | | x | x | | | 15.90 | |
| 139.46 | 0.29 | 0.016 | | | x | x | | | 16.19 | |
| 139.47 | 0.30 | 0.016 | | | x | x | | | 16.46 | |
| 139.48 | 0.31 | 0.017 | | | x | x | | | 16.74 | |
| 139.49 | 0.32 | 0.017 | | | x | x | | | 17.00 | |
| 139.50 | 0.33 | 0.017 | | | x | x | | | 17.27 | |
| 139.51 | 0.34 | 0.018 | | | x | x | | | 17.53 | |
| 139.52 | 0.35 | 0.018 | | | x | x | | | 17.78 | |
| 139.53 | 0.36 | 0.018 | | | x | x | | | 18.03 | |
| 139.54 | 0.37 | 0.018 | | | x | x | | | 18.28 | 5-Year |
| 139.55 | 0.38 | 0.019 | | | x | x | | | 18.53 | |
| 139.56 | 0.39 | 0.019 | | | x | x | | | 18.77 | |
| 139.57 | 0.40 | 0.019 | | | x | x | | | 19.01 | |
| 139.58 | 0.41 | 0.019 | | | x | x | | | 19.25 | |
| 139.59 | 0.42 | 0.019 | | | x | x | | | 19.48 | |
| 139.60 | 0.43 | 0.020 | | | x | x | | | 19.71 | |
| 139.61 | 0.44 | 0.020 | | | 0.01 | 0.00 | | | 21.78 | |
| 139.62 | 0.45 | 0.020 | | | 0.02 | 0.01 | | | 25.37 | |
| 139.63 | 0.46 | 0.020 | | | 0.03 | 0.01 | | | 29.95 | |
| 139.64 | 0.47 | 0.021 | | | 0.04 | 0.01 | | | 35.33 | |
| 139.65 | 0.48 | 0.021 | | | 0.05 | 0.02 | | | 41.40 | 100-Year |
| 139.66 | 0.49 | 0.021 | | | 0.06 | 0.03 | | | 48.08 | |
| 139.67 | 0.50 | 0.021 | | | 0.07 | 0.03 | | | 55.33 | |
| 139.68 | 0.51 | 0.021 | | | 0.08 | 0.04 | | | 63.10 | |
| 139.69 | 0.52 | 0.022 | | | 0.09 | 0.05 | | | 71.35 | |

Notes: 1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir flow calculated in Bentley's FlowMaster - Trapezoidal Channel at 0.8%, 3:1 side slopes, roughness coeff. Of 0.035
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

A - ORIFICE DIAMETER (125MM)

B - INTERNAL DIAMETER OF OUTLET PIPE (200MM)




| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

CUSTOMER

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DRAWING TITLE

200mm Tempest MHF Plug ICD

| DWG # | DATE | DRAWN BY | SCALE | SHEET | REV |
|---|---|---|---|---|---|
| ON-240424-01D | 04/24/2024 | CR | N.T.S. | 1/1 | 0 |