Peralta Engineering

ENGINEER'S REPORT

(Drainage Act, RSO 1990, c. D.17)

PROJECT **Jamis Drain and Branches**
Part of Lot 10, Concession 1 E.D.
(Geographic Township of Gosfield South)
Town of Kingsville, County of Essex
Project No. D22-114

January 15, 2024

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Peralta Engineering

PREAMBLE

MUNICIPAL DRAINS AND THE DRAINAGE ACT

The "Drainage Act" is one of the oldest pieces of legislation in Ontario, passed in 1859. It provides a democratic procedure for the construction, improvement and maintenance of drainage works. A procedure whereby the Municipality may assist in providing a legal drainage outlet for surface and subsurface waters not attainable under common law. Accordingly, provides much-needed assistance to facilitate the problems of obtaining a legal drainage outlet, engineering and cost distribution.

The Drainage Act provides a legal procedure by which an "area requiring drainage" may receive an outlet drain constructed to dispose of excess stormwater runoff to a sufficient outlet. This drainage infrastructure is otherwise known as a "Municipal Drain". Municipal Drains are identified by Municipal By-Law that adopts an Engineer's Report. The drainage engineer has the obligation to prepare an unbiased Engineer's Report based on information presented in written form, orally, and from visual inspection; in accordance with currently accepted design criteria. These reports form the legal basis for construction and management of the Municipal Drain. As such, an Engineer's Report shall contain specific details such as plans, profiles, and specifications that define the location, size and depth of the drainage infrastructure, together with establishing how costs are shared amongst all stakeholders.

Through the democratic procedure, the Engineer's Report is presented to all Stakeholders in front of Municipal Council (or a Drainage Board appointed by Council) for consideration. The Drainage Act provides an appeal process to address various aspects of Municipal Drains. These appeal bodies are the Court of Revision, the Ontario Drainage Tribunal and the Drainage Referee.

For additional information, Fact Sheets, and reference materials regarding the Drainage Act and Municipal Drains, please visit: **http://www.omafra.gov.on.ca/english/landuse/drainage.html**

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Mayor and Municipal Council
Corporation of the Town of Kingsville
2021 Division Road North
Kingsville, Ontario N9Y 2Y9

I. INTRODUCTION

In accordance with the instructions received by email on November 9, 2022, from the Town of Kingsville's Drainage Department, we have completed the necessary survey, examinations, investigations, etc. and have prepared the following report to provide for drainage improvements for an existing agricultural property currently owned by Solid Rock Homes Inc. (290-38900) and to facilitate its future development. The proposed work generally provides for a new covered drainage system through private lands and stormwater management (SWM) provisions to facilitate the development of the existing lands and future residential lot severances. These investigations were initiated by a resolution passed by Council for our firm to undertake the preparation of an Engineer's Report for the creation of this Municipal Drain, in accordance with provisions under the Drainage Act. Drawings showing the alignment of the Jamis Drain and Branches, the general details of the proposed works, and the lands affected within the general watershed area of the drain, are included herein as part of this report.

The request for a new Municipal Drain was submitted through a Petition by Solid Rock Homes Inc. (290-38900), to provide an Engineer's Report for the creation of a municipal drainage system to permit the development of their property.

Our appointment and the works relative to the construction of a new municipal drainage system within various private lands, to accommodate the development of the residential severances from the agricultural lands currently owned by Solid Rock Homes Inc. (290-38900) are being provided for under this report, in accordance with Section 4(1)(a) and/or (b) of the "Drainage Act, RSO 1990, Chapter D.17, as amended in 2021". We have performed all of the necessary surveys, investigations, etc., for the Jamis Drain and Branches, and we report thereon as follows.

II. BACKGROUND

Solid Rock Homes Inc. is in the process of undergoing lot severances fronting on Road 2 East and within the subject lands. Heide Mikkelsen, P.Eng., of our firm, was retained and instructed by the Owner of Solid Rock Homes Inc. to provide a Site Plan, Stormwater Management (SWM) design, and a site grading plan to accommodate the proposed lot severances. Through our evaluation, it was determined that the subject property (and the proposed residential building lots) does not have a direct and/or sufficient drainage outlet to a Municipal Drain or Natural Watercourse. With no sufficient drainage outlet to facilitate the subject property, a meeting was coordinated with Town Staff to review the general requirements to establish an appropriate resolution to satisfy the Town's drainage conditions for severance. Based on dialogue and correspondence with the Town of Kingsville, they have indicated their support of a Consent Application (severances) so long that a drainage outlet, stormwater management, and grading plan are provided for approval. Prior to proceeding with a Consent Application, a Petition through the provisions of the Drainage Act will be required to ensure a sufficient drainage outlet and overall drainage plan is in place to facilitate the property and the severed lots. As a result, the Owner has petitioned for a New Municipal Drain.

Upon receiving the appointment for this project, we also received the completed Petition Form for Drainage Works by the Owners and supporting documentation. The Petition form was signed by the Secretary/Treasurer, Adam Penner, requesting a new stormwater drain for the proposed residential lots.

The dialogue and information gathered helped us understand the general history and the purpose of the request for drainage improvements by the Owner. It further demonstrated the reason for the submitted Petition pursuant to Section 4(1)(a) and/or (b), in accordance with the "Drainage Act, RSO 1999, Chapter D. 17, as amended 2021".

III. DRAINAGE HISTORY AND WATERSHED CHARACTERISTICS

The subject agricultural property, prior to severance, is approximately 14.44 acres (5.844 hectares) and is located along the south side of Road 2 East and approximately 120 metres east of the intersection of County Road 45 and Road 2 East. The County of Essex Official Plan has identified that the frontage of these lands is within the settlement area of the Hamlet of Ruthven. However, it is currently zoned agricultural (A1). A Plan of Survey has been created to identify the intended lot structure of the proposed lot severances. The Plan of Survey identifies the creation of seven (7) Parts representing a lot structure for the entire subject property. Each of the seven (7) severances vary in size ranging from 0.24 acres (0.099 hectares) to 10.56 acres (4.274 hectares). These new severances have been further outlined within the Plan of Survey as Parts 1 through 7. To our knowledge, the proposed severance has yet to be approved by the Town of Kingsville and would be subject to approval through the Planning Act. With this in mind, the Owner would like to provide a drainage outlet and overall drainage plan for all seven (7) residential lots severance identified within the Plan of Survey.

The topography of the lands affected by the Petition, and within Lot 10 of Concession 1 E.D., are generally flat with a natural north-to-south gradient with very little to no relief. The subject property forms part of the overall watershed contributing to an existing Natural Watercourse (south of the subject property) that commences on the north side of County Road 20, where it extends downstream, crossing County Road 20 and through private lands to its outlet into Lake Erie.

The original subject farm property has never been previously assessed to a Municipal Drain. However, the subject property was identified within the Reconsidered Engineer's Report for the "Union Avenue Drain", dated November 9, 1987, prepared by Lou Zarlenga, P.Eng. and William J. Setterington, P.Eng. and passed through the Township of Gosfield South By-Law No. 524. This report clearly identified that the Owner of the subject property at that time, Mrs. Anna Meleg, established that "*…she had no desire to drain her property into the new drain*". As such, the property did not form part of the drain's watershed and was not assessed for any costs associated with this Municipal Drain. The report further identified that *"any future plans to connect this described property into the new drain should not be permitted"*. With the natural topography of the subject lands having a north-to-south gradient, the creation of the Union Avenue Drain, together with the development of the surrounding lands, had essentially cut off the subject property from its natural conveyance to the Natural Watercourse.

As part of our evaluation of alternative drainage outlets for the subject lands, we further evaluated the existing Municipal Drain on the north side of Road 2 East, known as the "Ruthven Storm Sewer Drain". This Municipal Drain was created through an Engineer's report dated February 6, 1948, and prepared by C.G.R. Armstrong, P.Eng. This drainage system is the primary drainage outlet for a large portion of the Hamlet of Ruthven utilizing the Esseltine Drain as its drainage outlet.

The project site is predominantly located within Parkhill Loam and Berrien Sandy Loam soil types. These soils are categorized as Hydrological Soil Group C and are described as poorly drained with a low infiltration rate when thoroughly wetted and consist chiefly of soils with a layer that impedes the downward movement of water and soil with moderately fine to fine structure. As a result, these soils require effective artificial drainage to be productive.

IV. PRELIMINARY INVESTIGATIONS AND ON-SITE MEETING

Upon reviewing the submitted Petition and supporting information, together with the discussions with the Town of Kingsville staff, we arranged to schedule the required On-Site Meeting for this project. With the uncertainty of the potential drainage outlet, we felt it was prudent to invite all landowners surrounding the project site, south of the subject property. The On-Site Meeting was scheduled for February 10, 2023, and the following stakeholders were in attendance at said meeting:

Name	Affiliation
Adam Penner	Representative of Solid Rock Homes Inc.
Ken Vegh	Town of Kingsville Drainage Superintendent
Heide Mikkelsen, P.Eng.	N.J. Peralta Engineering Ltd.
Tony Peralta, P.Eng.	N.J. Peralta Engineering Ltd.

At the onset of this meeting, Ken Vegh made introductions and generally advised that a written notice had been submitted by the Owners of Parcel 290-38900, to initiate the construction of a Municipal Drain, to provide a drainage outlet that will facilitate the future development of the property.

We engaged in a discussion regarding "What is a Municipal Drain", the general responsibilities of the stakeholders through the Drainage Act, and the general requirements for the creation of a Municipal Drain to facilitate the proposed development. We proceeded to discuss the reason for the Drainage Petition related to the future development of the subject property. Adam Penner, the representative of the subject lands, confirmed their request to proceed with the creation of a Municipal Drain toward a viable drainage outlet for the creation of lot severances along Road 2 East.

Tony Peralta identified that this meeting was intended to address the necessary drainage improvements required. As such, Tony Peralta reviewed the Petition brought forward and discussed the general area that requires drainage. He then proceeded to discuss the Drainage Act process, the Engineer's Report, required public meetings and appeal processes. Tony Peralta inquired whether any additional supporting documentation could be provided to confirm the intended lot structure and developed area. Adam Penner advised that this information can be provided as it becomes available.

The general drainage patterns of the subject property and surrounding area were reviewed. The drainage history related to this property was discussed, together with the evaluation of potential drainage outlets surrounding the subject property. It was further discussed that the general topography of these lands extended from north to south. However, through the development of the surrounding lands, this property has essentially been cut off from its natural conveyance and drainage outlet. With all lands in the area, conveying runoff to the existing natural watercourse located north of County Road 20, a potential solution may be to provide a new separate drainage outlet to this natural watercourse. This solution may require the installation of a new drainage outlet through the neighbouring lands to the south to a sufficient outlet. With a new drainage system potentially constructed through private lands, allowances will likely be required to compensate those lands in which the new drainage system will reside. In order to establish a reasonable value for allowances, it was suggested that a Real Estate Land Appraisal be initiated to help determine fair market value.

All parties had discussed and agreed that since this project has been initiated for the development of the subject property, all costs associated with this project are being provided for the sole benefit of the development. Therefore, it is likely that the entire cost of this project would be borne by the developer.

Those in attendance were also advised that this project is under the jurisdiction of the Department of Fisheries and Oceans (DFO), Ministry of Natural Resources and Forestry (MNRF), Ministry of the Environment, Conservation and Parks (MECP) and the Essex Region Conservation Authority (ERCA). The final design of the improvements may be governed by further requirements of these agencies.

Based on the information gathered at this meeting, the Engineer will evaluate the area that requires drainage, and confirm the validity of the Petition. If valid, Adam Penner was advised that the Engineer would contact him once they have completed their survey towards establishing appropriate drainage outlet options, and review any potential implications.

On this note, the On-Site Meeting had concluded.

V. AREA REQUIRING DRAINAGE AND THE VALIDITY OF THE PETITION

In accordance with Section 4 of the Drainage Act, we performed a review of the "Area Requiring Drainage" for this Petition. Based on the information provided, the discussions at the On-Site Meeting, and our review of the additional information gathered, we were able to confirm the "Area Requiring Drainage". At the time when the Petition was submitted, the Consent Application for severances had yet to be officially submitted to the Town for approval. Therefore, the Petition was submitted on behalf of the original Parcel 290-38900. The entire parcel consisted of a total area of approximately 14.44 acres (5.844 hectares) that is currently without a sufficient outlet. From our understanding and upon further review, all surrounding lands contribute to an existing drainage system or form part of an existing Municipal Drain watershed. Therefore, we find that only the subject property shall be defined as the "Area Requiring Drainage".

In accordance with Section 4 and Section 9 of the Drainage Act, the validity of the Petition shall be determined by the Engineer, as it relates to the "Area Requiring Drainage". Moreover, Section 9(2)(c) obligates the Engineer to establish the requirements for a Petition to comply with Section 4. Accordingly, we herewith provide the following comments as they relate to the validity of the submitted Petition and the requirements for its compliance:

- **Section 4(1)(a)** requires that *"**the majority in number** of the owners, as shown by the last revised assessment roll of lands in the area, including the owners of any roads in the area;"*

  Based on the "Area Requiring Drainage", as described above, we find that only one (1) property is within the area requiring drainage and the Owners of said property have signed the Petition. **Therefore, the Petition satisfies the requirements under Section 4(1)(a).**

- **Section 4(1)(b)** requires that *"the owner or owners, as shown by the last revised assessment roll, of lands in the area representing at least **60 percent** of the hectarage in the area;"*

  Based on the "Area Requiring Drainage", as described above, we find that **100** percent of the hectarage within this area has signed the Petition. **Therefore, the Petition satisfies the requirements under Section 4(1)(b).**

Therefore, in accordance with the provisions of the Drainage Act, we find that the current Petition is considered a valid Petition pursuant to Section 4(1)(a) and/or (b) of the Drainage Act, RSO 1990, Chapter D.17, as amended in 2021. Based on the sufficiency of the Drainage Petition, and our understanding of the general scope of work for this project, we continued with our investigations and field survey for the project.

VI. FIELD SURVEY AND INVESTIGATIONS

Following the On-Site Meeting and establishment of a valid petition, we arranged for our Survey Crew to attend the site and perform a topographic survey, including taking the necessary levels and details along the Road 2 East frontage of the proposed development and through private lands extending southerly from the subject property to the natural watercourse located north of County Road 20. We further located and verified all existing Municipal Drain and private drainage systems along Road 2 East and between the neighbouring properties to the south to determine if an alignment was available for a separate drainage system towards a sufficient outlet to the south. We also reviewed the condition and capacity of existing

adjacent drainage systems. We also took numerous cross-sections at general locations and where necessary, for us to complete our design calculations, estimates and specifications.

For the purpose of establishing the watershed area, we investigated and reviewed all of the past Engineer's Reports in the vicinity of the proposed drainage system. We also carried out site visits to cross-check the watershed, drainage patterns, and existing outlet locations. In addition, we utilized the latest LiDAR information to cross-check the drainage patterns of the project site. All of the above investigations not only provided us with the correct watershed area affecting the size of the drainage system but also provided us with accurate information to assist us with the preparation of our Construction and Maintenance Schedules of Assessment for this project.

The Ministry of the Environment, Conservation and Parks (MECP) currently regulates the Endangered Species Act, 2007. New regulation provisions under Ontario Regulation 242/08, Section 23.9 allows the Town to conduct repairs, maintenance, and improvements, within existing Municipal Drains, under the Drainage Act and these works are exempt from Sections 9 and 10 of the Endangered Species Act, so long as the rules in the regulation are followed. If eligible, the regulatory provision allows Municipalities to give notice to the Ministry by registering their drainage activities through an online registry system. Seeing that this project is proceeding through a petition request, this project would not qualify for the exemption under Section 23.9. Therefore, a formal submission to the MECP is required to obtain guidance for this project, relative to the Endangered Species Act.

As part of our appointment to this project, our office provided the ERCA with a notice advising of the proposed drainage works. The ERCA had responded, acknowledging the project and further provided general comments for the Town and the Engineer to consider. Once we had established a general scope of work on this project, our office engaged in correspondence with the ERCA to provide general details of the project and to address any comments and/or concerns that they would have as it relates to the established scope of work.

VII. FURTHER INVESTIGATIONS, ANALYSIS, AND SUFFICIENCY OF OUTLET

In utilizing the latest Light Detection and Ranging (LiDAR) data from 2017, available through Land Information Ontario (LIO) and prepared by the Ministry of Natural Resources and Forestry (MNRF), we have gathered basic data on the general topography of the subject property and the land to the south, as outlined in Figure 1.

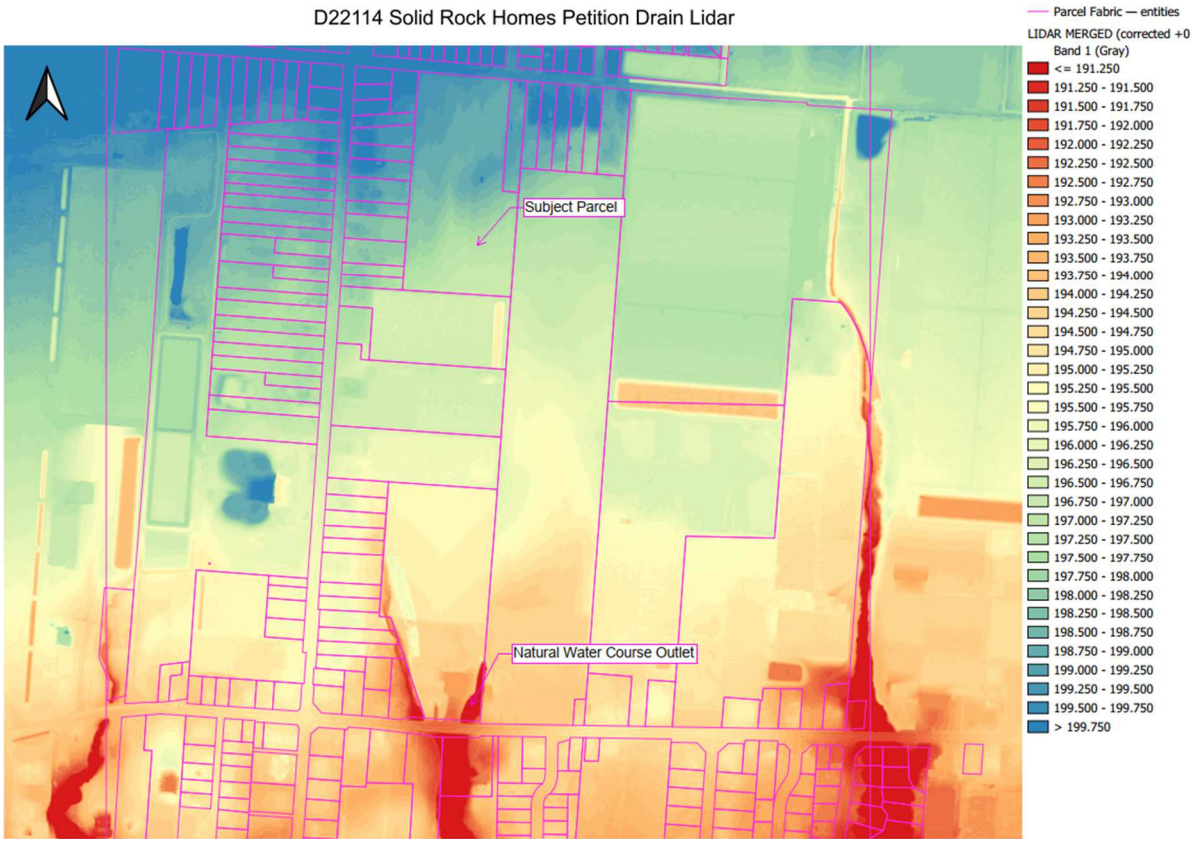

Figure 1 -2017 LiDAR Map Illustrating Land Elevations of Project Site

Figure 1 demonstrates the natural conveyance of land from north to south that is naturally directed to the existing Natural Watercourse located north of County Road 20 and has historically formed part of the existing watershed. The lands surrounding and upstream of this natural watercourse have slowly developed over time, limiting the drainage capabilities of the subject property. With the development of the lands adjacent to and south of the subject property, the natural surface conveyance of storm runoff from the property has been disconnected from its natural drainage outlet to the south. Currently, any rainfall over the subject property ponds along the south end of the lands, slowly infiltrates into the soil and eventually dissipates into the groundwater table. Based on the natural topography and historic drainage patterns, it is expected that this runoff will eventually find its way to the Natural Watercourse located north of County Road 20, through the water table and by hydrogeological means.

With the site having significant challenges with determining an appropriate drainage outlet for the subject property, a considerable amount of investigations were required to identify available drainage systems surrounding the property and establish whether they would be appropriate to connect to.

In regard to Municipal Drains, the adjacent Union Avenue Drain was designed without consideration of this property's contribution, as previously noted. Upon further review and analysis, we found that this drainage system has a generally low level of service and the analysis confirmed that this system had insufficient capacity to subsequently connect this property to the system. On the north side of Road 2 East resides the Ruthven Storm Sewer Drain. This drainage system provides a sufficient outlet for a large portion of the Hamlet of Ruthven. Based on the analysis of this system, it too has a very low level of service and would not support additional flows from the subject property.

In addition to the Municipal Drains in the vicinity, we found private drainage systems associated with the development of the adjacent properties. However, these drainage systems were intended and designed to accommodate runoff from each development site through site plan control. Therefore, there was no means to add additional flows from the subject property to these drainage systems.

The natural watercourse located north of County Road 20, in which the subject lands currently contribute, has been previously deemed a sufficient outlet for the Union Avenue Drain and the Bert Mucci Drain. Based on the general topography and the subject property's historical contributions to the natural watercourse, we find that it is only natural for the subject property to continue contributing to its natural drainage outlet. Through our analysis, we find that this natural watercourse and the downstream road crossing have sufficient hydraulic capacity to accept runoff from the subject lands. However, with the site intended to be developed from agricultural to residential land use, stormwater management (SWM) provisions will be required to maintain the pre-development contributions to the drainage system and to ensure no adverse impacts to the overall drainage system.

VIII. FINDINGS AND RECOMMENDATIONS

Based on our topographic survey, detailed investigations, discussions, and review with affected landowners and the Town, we have proceeded to establish details to adequately address the specified improvements required to provide a sufficient outlet for the proposed development. Our findings and recommendations are outlined in the following paragraphs.

ERCA, DFO, and MECP Considerations

During the course of our investigations, this drainage project was initially discussed with Ashley Gyori and James Bryant, P.Eng., of the ERCA, to deal with any ERCA concerns and comments related to this Municipal Drain and the overall development. The proposed drainage works will not be located within the regulated area of the ERCA. However, the drainage system is proposed to outlet to the existing natural watercourse that is located within an area that is under the jurisdiction of the ERCA. Therefore, any proposed works will require an ERCA review and approval for the construction of the proposed drainage system. The ERCA had also made reference to an ongoing drainage appointment assigned to the engineering consulting firm, Baird AE, related to the extension of the Union Avenue Drain downstream to a sufficient outlet to address erosion issues downstream of County Road 20. As part of our analysis and review, the new drainage system being proposed shall not have any adverse effects on the existing natural watercourse, as provisions have been included to restrict peak flows to pre-development conditions, together with addressing any potential contributions of erosion to the system. Upon the ERCA's request, design proposals were submitted to the ERCA for their review and consideration. Further to the above, the correspondence with the ERCA is included herein as **Appendix "A"**.

With respect to the DFO, the proposed drainage works were "Self-Assessed" by the Engineer, through the DFO website and supporting documentation to determine whether this project shall be reviewed by the DFO. Through our research and with the proposed drainage system not having any status or drain classification with the DFO, a request for review was submitted to the DFO for their evaluation. As a result, DFO provided a "Letter of Advice" that confirms that the proposed works under this project will likely not result in impacts on fish and fish habitat, so long as standard measures for fish habitat and migration are implemented. A copy of the DFO Letter of Advice is included in **Appendix "A"**.

The Ministry of Natural Resources and Forestry (MNRF) has transitioned the responsibilities of the Species at Risk Provincial Legislation to the Ministry of the Environment, Conservation and Parks (MECP). With the proposed works proceeding under Section 4 of the Drainage Act, this project would not qualify for exemptions under Section 23.9 of the Endangered Species Act, 2007. Therefore, following the "Guidelines for Activities Under the Drainage Act" presentation to the Drainage Superintendents of Ontario (DSAO) Member Chapters, dated June 21st – 24th, 2021, our office provided the MECP with an Endangered Species and Critical Habitat Review submission for their evaluation and comments. This document outlines the potential impacts on affected species and their habitat, together with measures for avoidance and minimizing adverse effects. A copy of our submission as well as their response and mitigation measures has been included in **Appendix "A**.

Through correspondence with the ERCA, the DFO, and our submission through the Endangered Species Act, we have provided for all of the ERCA, DFO, and MECP concerns and comments in our design and recommend that these drainage works be constructed in total compliance with all of the above.

Proposed Drainage System

Prior to the completion of our Engineer's Report for this project, we had discussions with the Owner and the Town of Kingsville, to review the particulars of the proposed drainage system in great length and detail. From our investigations, examinations, calculations, discussions and determinations with the affected parties, the following findings were noted and recommendations regarding the proposed drainage system are provided as follows:

1. Parcel 290-38900, currently owned by Solid Rock Homes Inc., is an existing agricultural parcel of land, a portion of which is within the Hamlet of Ruthven, as designated through the County of Essex Official Plan. Through correspondence with the Town of Kingsville, the Town has confirmed that they would support the creation of seven (7) residential building lots severed from the existing agricultural lands through the Consent Application process. In order to satisfy the requirements of Consent, the subject severances shall require a legal drainage outlet, grading plan, and a stormwater management plan to facilitate these lands. A Plan of Survey has been created to demonstrate the intended lot layout of the proposed seven (7) lots and dated February 23, 2022. The proposed residential severances have been identified on this plan as Parts 1 through 7, of the Plan of Survey and have been utilized as a reference for this project. A copy of this plan is included within this report and is identified as **Appendix "B"**.

2. Based on the drainage history, topography, and availability of a drainage outlet, this site presents challenges related to acquiring a direct drainage outlet for the property. The overall site forms part of the watershed contributing to the existing Natural Watercourse that commences north of County Road 20. Over time, the natural conveyance of surface water has been altered by the development of the adjacent and downstream lands. As a result of the developed lands surrounding the site, any surface runoff is without direct access to a drainage outlet. However, based on the natural topography, it is assumed that all subsurface water from this site utilizes the natural watercourse as its primary drainage outlet.

3. Upon the evaluation of the availability of drainage outlets, we find that all existing drainage systems adjacent to the subject property currently do not have sufficient capacity to accept the additional

runoff created by the proposed development within the subject site. In order to utilize any of the adjacent drainage systems, significant upgrades would be required to facilitate the added flows. Therefore, it is recommended that a new drainage system be installed to serve the subject property and future severances that extend from the subject property to a sufficient outlet into the natural watercourse located north of County Road 20. The new drainage outlet (Main Drain) shall extend from the north limit of the subject property adjacent to Road 2 East, at Station 0+000.0, through the subject property and extend downstream through the lands currently owned by Southshore Greenhouses Inc. (290-17400) to its outlet into the Natural Watercourse, at Station 0+992.8.

4. The proposed outlet of this drainage system shall be located at the top end of the existing Natural Watercourse, located north of County Road 20, at approximately 0+992.8. At this location, there are various drainage outlet pipes, together with quarried limestone erosion protection from the top of the slope to the toe of the channel. As part of the installation of the proposed drainage system, we recommend the installation of additional sloped quarried limestone erosion protection to supplement and/or reinforce the existing erosion protection features.

5. At the top end of the existing Natural Watercourse, north of County Road 20, resides the outlet of the Union Avenue Drain, along with outlets for other private drainage systems from neighbouring lands. Based on its sufficient depth and steep gradient, this portion of the Natural Watercourse has previously been established as a sufficient outlet for these drainage systems. Although the ability for surface water from this site to reach the natural outlet has been significantly altered over the years, the natural gradient of the contributing lands allows for subsurface flows from this site to utilize this Natural Watercourse as its primary drainage outlet. Therefore, we find that the subject property has historically formed part of, and currently conveys its runoff to the existing Natural Watercourse. With provisions for stormwater management to reduce peak flows to pre-development rates, together with providing erosion control and flow attenuation at the outlet, we find that the flows directed to the top end of the existing Natural Watercourse from this site, at Station 0+992.8, shall not create any adverse impacts related to peak flow and erosion. Therefore, we find that the existing Natural Watercourse is deemed a sufficient outlet for this new drainage system.

6. With the proposed severances within the subject property, the site will endure increased impermeable conditions (buildings, concrete, gravel, etc.) relative to the existing bare agricultural lands. As such, precipitation that falls onto the developed site will not have an opportunity to be absorbed into the soil and provide natural flow attenuation towards the drainage outlet. As a result of increased impermeable conditions, the amount of stormwater runoff conveyed from the developed site will increase and create an additional volume of runoff. In order to control the stormwater discharge from the developed site, it is recommended that a Stormwater Management (SWM) facility be utilized to collect the increased runoff and control the stormwater runoff and discharge from a site for storms up to the 1:100 year event (1% chance of occurrence each year). The communal SWM facility that forms part of this project and is identified as the grassed storage area, shall be installed across the south limit of Parts 2 through 7 and across a portion of Part 1. The proposed grassed storage area shall outlet into the Main Drain at Station 0+100.4 and shall restrict peak flows to a pre-development flow rate (or less). A SWM Report has been prepared for the development of the subject property and is included herein as **Appendix "C"**.

7. The development of residential building lots increased the imperviousness of the lands and produced unwanted oils and sediments from rooftops, asphalts, and gravel materials. A stormwater oil and grit separator is an underground device that captures oil and sediments from stormwater runoff and snowmelt. It prevents pollutants from entering the natural watercourse and eventually Lake Erie. Therefore, we recommend that an oil and grit separator be installed as part of this drainage system, and located at Station 0+119.2, to serve all of the severances within the subject property.

8. Based on the topography of the subject lands, a large portion of surface runoff from Part 1 cannot be conveyed to the proposed grassed storage area. Therefore, in order to contain surplus runoff during the 1:100-year storm event, we recommend that a berm be installed along the east, west and south limits of the subject property to contain excess runoff from Part 1. This berm shall have a minimum top width of 3.0 metres wide, with a minimum 4.0 horizontal to 1.0 vertical side slopes and a top elevation set to 197.440 metres.

9. In order to collect surface runoff from Road 2 East and the lot grading of the proposed severances, Branch Drains shall be required alongside the frontages of the proposed residential building lots. The Branch Drains are as follows:

   West Branch – Extends from Station 0+000.0 (at the Main Drain) and across the frontages of a portion of Part 1 and through Parts 2 through 4, to its top end at Station 0+078.4 W.

   East Branch – Extends from Station 0+000.0 (at the Main Drain) and across the frontages of a portion of Part 1 and Parts 5 through 7, to its top end at Station 0+070.1 E.

10. These new Branch Drains shall be accompanied by boulevard swales along the frontages of the proposed severances that have been established based on the existing road elevations and the minimum lot grading elevation. These swales shall collect surface runoff from the existing Road 2 East and adjacent lands that shall be directed into the inline catch basin maintenance holes detailed within the accompanying drawings. The proposed swale grading within the boulevard has been established based on the existing roadway and the proposed minimum building envelope elevations.

11. Upon the completion of the works outlined within this project, it is understood that new driveways shall be installed over the Branch Drains to facilitate the new residential lots. At the time when the lots are developed, the new driveway locations and elevations for each lot shall replace the high points of each swale section. Therefore, upon the installation of the future driveways, the swales shall be regraded to provide positive drainage to the existing catch basin maintenance holes.

12. We recommend that the new drainage system and the SWM facility, together with all ancillary work required to complete the proper functionality of the proposed drainage system as described above, be conducted and performed as part of this project. We further recommend that all related appurtenances be constructed as part of this drainage project and be completed to the satisfaction of the Town's Drainage Superintendent, and the Consulting Engineer.

13. All working corridors established as part of this new Municipal Drain shall be a free unencumbered and uninterrupted easement in perpetuity on, in, over, under, across, alongside and through the lands described herein, for the purpose of installing, maintaining, replacing, altering, cleaning, repairing, providing, and operating the proposed drainage system. We further recommend that this area shall remain free and clear of any new buildings, structures, fences, concrete or asphalt paving, or other structures or obstructions of any kind. In the event, that any such item is placed on any of the lands referred to herein, the Owner or Owners of the said lands at the time shall be liable for the cost incurred by the transferee, its servants, agents, and assigns, in the removal of such items.

14. Based on the above, we recommend that this new Municipal drainage system, including the Branches, together with all associated drainage structures and SWM provisions, be hereinafter known as the **JAMIS DRAIN AND BRANCHES.**

In summary, we recommend that the proposed Jamis Drain and Branches be constructed at the locations and alignments detailed in the accompanying drawings, and in accordance with this report and attached specifications. Furthermore, all works associated with this project shall be carried out in accordance with Section 4(1)(a) and/or (b), pursuant to the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

IX. ALLOWANCES AND COMPENSATION

The new Jamis Drain and Branches shall be constructed within the private lands and along the Road 2 East right-of-way. As such, lands directly affected by these works are subject to allowances and compensation related to this new drainage system.

LAND APPRAISAL

Based on the general scope and direction of this project, we recognized that lands outside the development will be affected by the proposed drainage system and an allowance will likely be required to compensate these lands impacted by this project. To ensure that we are fair and reasonable with the allowances issued to these lands along the drain, we determined that it would be prudent to have the lands impacted by these works evaluated and appraised to establish their fair market value.

In order to obtain a fair and unbiased opinion on the fair market value of the associated lands, we reached out to a reputable Land Appraiser who is familiar with this area and the lands affected. As a result, we retained Fuerland Realty Ltd. (Fuerland), located in the City of Windsor, to complete this evaluation. On May 12, 2023, Fuerland provided us with their Appraisal Reports for lands affected by this project.

A copy of the Appraisal Report is included herein as **Appendix "D"**. As a result, these values were utilized in establishing the allowances and compensation to all affected properties.

ALLOWANCES FOR LAND TAKEN

We find that the following Owners are entitled to and should receive the following amount as compensation for the Value of Land Taken related to the use of the affected lands, in order to construct the Jamis Drain and Branches, in Lot 10, Concession 1 ED, namely:

	Owner	Description	Area Affected (Hectares)	Compensation
1.	Town of Kingsville	Road 2 East	--	$ 1.00
2.	Solid Rock Homes Inc. (290-38900) – Part 1 (Severance 1)	Pt. Lot 10, Concession 1 ED	4.274	$ 1.00
3.	Solid Rock Homes Inc. (290-38900) – Part 2 (Severance 2)	Pt. Lot 10, Concession 1 ED	0.267	$ 1.00
4.	Solid Rock Homes Inc. (290-38900) – Part 3 (Severance 3)	Pt. Lot 10, Concession 1 ED	0.267	$ 1.00
5.	Solid Rock Homes Inc. (290-38900) – Part 4 (Severance 4)	Pt. Lot 10, Concession 1 ED	0.267	$ 1.00
6.	Solid Rock Homes Inc. (290-38900) – Part 5 (Severance 5)	Pt. Lot 10, Concession 1 ED	0.436	$ 1.00
7.	Solid Rock Homes Inc. (290-38900) – Part 6 (Severance 6)	Pt. Lot 10, Concession 1 ED	0.099	$ 1.00
8.	Solid Rock Homes Inc. (290-38900) – Part 7 (Severance 7)	Pt. Lot 10, Concession 1 ED	0.270	$ 1.00
9.	Simoni Farms Ltd. (290-17300)	Pt. Lot 10, Concession 1 ED	0.077	$ 2,616.00
10.	Southshore Greenhouse Inc. (290-17400)	Pt. Lot 10, Concession 1 ED	0.210	$ 7,135.00
11.	Five Star Farms (290-39602)	Pt. Lot 10, Concession 1 ED	0.053	$ 1,800.00
12.	Michele & Angiolina Ingratta (290-39800)	Pt. Lot 10, Concession 1 ED	0.020	$ 680.00
	TOTAL FOR LAND TAKEN			**$ 12,239.00**

A portion of the lands required to construct and maintain the Jamis Drain and Branches are situated within the private lands currently owned by Solid Rock Homes Inc. (290-38900) and adjacent to Road 2 East. With these lands forming part of the development, a nominal value of $1.00 shall be paid to establish the legal right for the Municipal Drain within these lands and further establish the right to access the drain for future maintenance. The land taken for the construction and future maintenance of the new Main Drain within Part 1 shall consist of a strip of land having a total distance of 6.00 metres onto the adjoining properties. The land taken for the construction and future maintenance of the new East and West Branch drain alignments are situated alongside the south limit of Road 2 East and within Severance 1 through 7 and shall be established as a strip of land that extends 3.00 metres to the south of the right-of-way limit.

Where the new drainage system is installed within private lands outside of the development of these proposed severances, these lands shall be compensated for the use of the land. The maintenance corridor shall be established for the initial construction and future maintenance of the new covered drainage system.

With the new drainage system installed as a piped drain along the property limit, no lands will be taken out of production permanently and these lands will still be available to the affected landowner, nor will it affect the use or development of these properties. Therefore, the value of the land required for the new alignment of this Municipal Drain has been determined based on one-quarter (1/4) of the Market Value of the affected lands. As noted above, the current Market Value of raw agricultural lands in the vicinity of the project site is approximately $55,000.00 per acre ($22,258.00 per hectare). Therefore, the compensation rate for the construction and periodic future use of the agricultural lands required for the Jamis Drain and Branches, within the affected lands, comprises of a rate of **$13,750.00 per acre ($33,977.00 per hectare)**. The land taken for the construction and future maintenance of the new drain alignment along the private lands shall be established as a strip of land extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres.

We have provided for the Land Taken compensation in our estimate, as is provided for under Section 29 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

COMPENSATION FOR DAMAGES

All areas disturbed by this work are located along the associated property line of the affected lands. These lands are located within the setback distances of the developable lands and consist of grassed/gravel areas. These lands affected by the initial construction are specified for full restoration. As such, the works will not have any indirect damage to the adjacent lands. Accordingly, no allowances or compensation for damages will be provided for under Section 30 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

X. ESTIMATE OF COST

Our estimate of the total cost of this work, including all incidental expenses, is the sum of **Five Hundred Five Thousand Nine Hundred Sixty-Nine Dollars ($505,969.00)** made up as follows:

CONSTRUCTION ITEMS					
Item	Description	Est Qty	Unit	Unit Price	Total
1.	**Exploratory Excavations;** Provide all labour and equipment to coordinate and perform exploratory excavations at key locations prior to commencing any construction works, to ensure that the proposed drainage system will not conflict with existing utilities or drainage schemes.	1.0	Lump Sum	$2,000.00	$2,000.00
2.	**Traffic Control;** Supply, install and maintain traffic control measures, including signs, flashers, flaggers, and other traffic control devices to Ontario Traffic Manuals and MTO Roadside Safety Manual requirements. Remove all components upon the completion of the project.	1.0	Lump Sum	$2,000.00	$2,000.00

Item	Description	Est Qty	Unit	Unit Price	Total
3.	**Water, Sediment, and Erosion Control Plan;** Provide a Water Control, Sediment, and Erosion Control Plan required to obtain the necessary permits and approval; Provide all labour, equipment, and materials to implement the Water Control, Sediment, and Erosion Control Plans as outlined within the specifications, complete.	1.0	Lump Sum	$1,000.00	$1,000.00
4.	**CBMH-1 to CBMH-2;** Supply and install approximately 20.5 lineal metres of 150mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	20.5	Lineal Metre	$120.00	$2,500.00
5.	**CBMH-2 to CBMH-3;** Supply and install approximately 21.9 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	21.9	Lineal Metre	$130.00	$2,900.00
6.	**CBMH-3 to CBMH-4;** Supply and install approximately 22.9 lineal metres of 250mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	22.9	Lineal Metre	$150.00	$3,500.00
7.	**CBMH-4 to CBMH-5;** Supply and install approximately 13.1 lineal metres of 250mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, removal of existing culvert pipe, restoration of farm access with granular backfill, compaction, and restoration, complete.	13.1	Lineal Metre	$150.00	$2,000.00
8.	**CBMH-5 to CBMH-6;** Supply and install approximately 7.4 lineal metres of 250mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, compaction, and restoration, complete.	7.4	Lineal Metre	$150.00	$1,200.00

Item	Description	Est Qty	Unit	Unit Price	Total
9.	**CBMH-6 to CBMH-7;** Supply and install approximately 25.9 lineal metres of 250mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	25.9	Lineal Metre	$150.00	$3,900.00
10.	**CBMH-7-to CBMH-8;** Supply and install approximately 16.5 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	16.5	Lineal Metre	$130.00	$2,200.00
11.	**CBMH-8 to CBMH-9;** Supply and install approximately 20.3 lineal metres of 150mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	20.3	Lineal Metre	$120.00	$2,500.00
12.	**CBMH-5 to CBMH-10;** Supply and install approximately 50.2 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	50.2	Lineal Metre	$140.00	$7,100.00
13.	**CBMH-10 to CBMH-11;** Supply and install approximately 50.2 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	50.2	Lineal Metre	$140.00	$7,100.00
14.	**CBMH-11 to DICB-12;** Supply and install approximately 9.0 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	9.0	Lineal Metre	$140.00	$1,300.00
15.	**CBMH-11 to CBMH-13;** Supply and install approximately 7.9 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	7.9	Lineal Metre	$140.00	$1,200.00

Item	Description	Est Qty	Unit	Unit Price	Total
16.	**CBMH-13 to DICB-14;** Supply and install approximately 9.5 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	9.5	Lineal Metre	$140.00	$1,400.00
17.	**CBMH-11 to OGS;** Supply and install approximately 18.8 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	18.8	Lineal Metre	$130.00	$2,500.00
18.	**OGS to JB-15;** Supply and install approximately 104.6 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	104.6	Lineal Metre	$130.00	$13,600.00
19.	**JB-15 to JB-16;** Supply and install approximately 91.2 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	91.2	Lineal Metre	$130.00	$11,900.00
20.	**DICB-17 to CBMH-18;** Supply and install approximately 20.9 lineal metres of 150mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	20.9	Lineal Metre	$120.00	$2,600.00
21.	**JB-16 to CBMH-18;** Supply and install approximately 73.2 lineal metres of 200mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	73.2	Lineal Metre	$130.00	$9,600.00
22.	**CBMH-18 to JB-19;** Supply and install approximately 150.0 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	150.0	Lineal Metre	$140.00	$21,000.00

Item	Description	Est Qty	Unit	Unit Price	Total
23.	**JB-19 to JB-20;** Supply and install approximately 150.0 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	150.0	Lineal Metre	$140.00	$21,000.00
24.	**JB-20 to JB-21;** Supply and install approximately 150.0 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	150.0	Lineal Metre	$140.00	$21,000.00
25.	**JB-21 to JB-22;** Supply and install approximately 145.0 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	145.0	Lineal Metre	$140.00	$20,300.00
26.	**JB-22 to 0+992.8;** Supply and install approximately 9.6 lineal metres of 300mm diameter solid heavy duty, 320kPa, smoothwall plastic pipe including bell and gasket joining system, excavation, granular bedding, native backfill, compaction, and restoration, complete.	9.6	Lineal Metre	$140.00	$1,400.00
27.	**CBMH 1, 2, 3, 4, 6, 7, 8 ,9, 10, 13;** Supply and install 600x600mm precast concrete catch basin maintenance hole approximately 2.5 m deep with 600mm square cast iron frame and grate, including adjustment units, excavation, bedding, connections, 600mm sump, backfill, compaction, and restoration, complete.	10.0	Each	$3,600.00	$36,000.00
28.	**DICB 12, 14, 17;** Supply and install 600x600mm Type A precast concrete catch basin, approximately, 1.5 m deep with 4:1 slope honeycomb grate, excavation, bedding, connections, 600mm sump, backfill, compaction, and restoration, complete.	3.0	Each	$3,500.00	$10,500.00

Item	Description	Est Qty	Unit	Unit Price	Total
29.	**CBMH 5, 11, 18;** Supply and install 1200mm dia. precast concrete junction box maintenance hole approximately 2.25 m deep with 600mm square cast iron frame and grate, including adjustment units, excavation, bedding, connections, 600mm sump, backfill, compaction, and restoration, complete.	3.0	Each	$6,100.00	$18,300.00
30.	**JB 15, 16, 19, 20, 21, 22;** Supply and install 600 dia. HDPE basin junction box maintenance hole approximately 2.5 m deep with flat steel plate, excavation, bedding, connections, 600mm sump, backfill, compaction, and restoration, complete.	6.0	Each	$1,000.00	$6,000.00
31.	**Station 0+078.4 W to 0+070.1 E;** Provide all labour, equipment, and material to construct all swales, strip the existing soil of all vegetation, scavenging topsoil and windrowing along the existing lands with good and clean clay material, including placement, compaction, swale grading, spreading of topsoil, seeding and mulching, and cleanup, and restoration, complete.	148.5	Lineal Metre	$44.00	$6,600.00
32.	**Station 0+000.0 to 0+119.2;** Provide all labour, equipment, and material to construct all swales, strip the existing soil of all vegetation, scavenging topsoil and windrowing along the existing lands with good and clean clay material, including placement, compaction, swale grading, spreading of topsoil, seeding and mulching, and cleanup, and restoration, complete.	238.4	Lineal Metre	$33.00	$7,900.00
33.	**Service Connections and Cleanouts;** Supply and install 150mm diameter HDPE smoothwall stubs for storm drainage connection, including insert-a tee, pipe, tee, riser pipe, metal cap, plastic end cap, marker post, connections, excavation, backfill, compaction, and restoration, complete.	6.0	Each	$1,100.00	$6,600.00
34.	**Excavation of Grassed Storage Areas;** Supply and provide and labour, equipment and material to construct the stormwater management depressions while keeping the clay material (approximately 2,150.0 cu.m.) on-site for the Owner's future use. Include excavation, compaction as necessary, placement of topsoil, and seeding, complete.	1.0	Lump Sum	$37,400.00	$37,400.00

Item	Description	Est Qty	Unit	Unit Price	Total
35.	**Construction of the Cutoff Berm;** Provide all labour, equipment and material to construct an earthen berm (approximately 2,150.0 cubic metres) with salvaged clay material (from the pond), including placement, compaction, spreading of topsoil, seeding and mulching, and cleanup, and restoration, complete.	300.0	Lineal Metre	$63.00	$18,800.00
36.	**Station 0+119.2 to 1+0+992.8;** Place scavenged topsoil and carry out seeding and mulching for all other disturbed areas over the covered drain alignment (approximately 5,250 square metres), complete.	1.0	Lump Sum	$7,900.00	$7,900.00
37.	**Oil and Grit Separator (OGS) Unit;** Supply and install an OGS unit designed for the expected flow rate per Manufacturer's design and installation instructions (see Stormwater Management Report for details).	1.0	Lump Sum	$40,000.00	$40,000.00
38.	**Erosion Protection;** Supply and install 300mm thick quarried limestone erosion protection on non-woven geotextile at the downstream end of the covered drain, including excavation, placement, grading, complete.	1.0	Lump Sum	$6,100.00	$6,100.00
39.	**Final Cleanup and Restoration;** Provide all labour, and materials to clean up the project site on completion of the work, complete.	1.0	Lump Sum	$3,000.00	$3,000.00
	TOTAL FOR CONSTRUCTION				**$373,800.00**
	Net HST (1.76%)				**$6,579.00**
				TOTAL FOR CONSTRUCTION = $380,379.00	

INCIDENTALS	
Report, Estimates and Specifications	$ 27,400.00
Survey, Assistance, Expenses and Drawings	$ 17,200.00
Conduct Hydraulic Analysis, Modeling and Stormwater Management (SWM) Report	$ 24,000.00
Real Estate Appraisal Report	$ 1,500.00
Duplicating Report and Drawings	$ 1,000.00
Estimated Cost for Letting Contract (including. the preparation of Tender Documents and Tender Review	$ 1,800.00
Estimated Cost for Full-Time Inspection, Supervision and Project Management during Construction (approx 2-week duration)	$ 11,900.00
Net HST on the above items (1.76%)	$ 1,492.00
Estimate Cost for ERCA Permit	$ 800.00
TOTAL FOR INCIDENTALS =	**$ 87,092.00**
ALLOWANCES (brought forward) =	**$ 12,239.00**
TOTAL FOR CONSTRUCTION (brought forward) =	**$ 380,379.00**
TOTAL ESTIMATE =	**$479,710.00**

XI. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached design drawings for the construction of the Jamis Drain and Branches, consisting of Sheets 1 through 10. The design drawings illustrate the proposed alignment of the drainage works, together with the affected landowners, the approximate drain watershed, and the details relative to the various improvements.

Furthermore, Benchmarks were established therein for the project site. The drawings attached within **Appendix "E"**, have been reduced in size and the scale therefore varies. However, full-scale drawings can be viewed at the Town of Kingsville Municipal Office, if required.

Also attached, we have prepared Standard Specifications and Special Provisions which set out the required construction details for the various aspects of the to be conducted under this report.

XII. CONSTRUCTION SCHEDULE OF ASSESSMENT RATIONALE

We would recommend that all of the costs associated with the construction of the Jamis Drain and Branches, be assessed in accordance with the attached **Construction Schedule of Assessment**. In general terms, the drainage system is intended to facilitate the creation of several severances from the lands currently owned by Solid Rock Homes Inc. (290-38900). As such, all costs associated with the initial construction of this new Municipal Drain shall be assessed entirely to the retained property.

Distribution of Unforeseen Costs (Special Assessments Section 26)

During construction, it may become necessary to temporarily or permanently relocate existing utilities that may conflict with the works outlined within this report. Under these circumstances, the relocation of these utilities shall be assessed for any relocation costs against the public utility having jurisdiction in accordance with Section 26 of the Drainage Act. In accordance with Section 69 of the Drainage Act, the utility company is allowed the option to carry out this work utilizing their own forces and at their own cost. However, should they not exercise this option within a reasonable time, the Town may arrange to have this work completed and the costs for such works shall be charged to the appropriate public utility. Furthermore, any unforeseen construction costs directly related to the Section 26 works shall be assessed entirely, as an extra, to the applicable Road Authority or Utility.

XIII. FUTURE MAINTENANCE

After the completion of all of the works associated with this Engineer's Report, we recommend that the Jamis Drain and Branches be administered and maintained in the future by the Town of Kingsville. All of which shall remain in the proportions therein contained until otherwise varied and/or determined under the provisions of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021" or per subsequent amendments made thereto.

Main Drain

When future maintenance is performed on the Main Drain portion through private lands, between Station 0+000.0 and Station 0+992.8, as identified within the accompanying drawings and under this report, we recommend that it be kept up and maintained in the future at the expense of the lands and road outlined in the "Maintenance Schedule of Assessment – Main Drain" attached herein and labelled **Appendix "F"**.

The maintenance work would include the drainage pipe, granular bedding, native fill backfill, and the associated quarried limestone erosion protection associated with the outlet of the drainage system. These maintenance works shall also include 33.3% of CBMH-5, together with 100% of CBMH-10 through CBMH-14, JB-15 through JB-22 and CBMH-18. Any drainage structure not identified above, or further identified in the proceeding headings, would be considered a private feature and not form part of the Municipal Drain (i.e. DICB-17 and its connection to the system). Any maintenance works associated with any private features shall be the full responsibility of the lands in which this feature resides and/or benefits.

West Branch

When future maintenance is performed on the West Branch portion of the drainage system adjacent to the proposed severances and alongside Road 2 East, between Station 0+000.0 to 0+078.4W, as identified within the accompanying drawings. With a new West Branch Drain required as part of development, the entire covered portion provides access to each residential building and further improves its appearance, together with increasing the market value of each residential building lot. The enclosed drainage system also serves to protect the travelling public along Road 2 East. Therefore, when future maintenance is performed on the West Branch, we wish to establish that it shall be maintained in the future at the expense of the lands and road outlined in the "Maintenance Schedule of Assessment – West Branch" attached herein and labelled **Appendix "F"**.

The maintenance work would include the drainage pipe, granular bedding, and granular backfill within driveway limits, with native fill backfill and topsoil topping in boulevard areas. These maintenance works shall also include 33.3% of CBMH-5, together with CBMH-1 through CBMH-4 and associated service connections to the cleanout. Any drainage structure not identified above, would be considered a private feature and would not form part of the Municipal Drain (ie. service connections from the cleanout to the home). Should concrete, asphalt or other special surfaces over the new covered drain require removal as part of the maintenance work, these surfaces shall be repaired or replaced as part of the work. Likewise, if any fencing, gate, decorative walls, sprinklers, or other special features exist that will be impacted by the maintenance work, they are also to be removed and restored or replaced as part of the maintenance work. However, the cost of the supply and installation of any special surface material other than select imported clay, topsoil topping and granular driveways, along with any special feature, where applicable, shall be assessed entirely to the benefiting owner.

East Branch

When future maintenance is performed on the East Branch portion of the drainage system adjacent to the proposed severances and alongside Road 2 East, between Station 0+000.0 to 0+070.1E, as identified within the accompanying drawings. With a new East Branch Drain required as part of development, the entire covered portion provides access to each residential building and further improves its appearance, together with increasing the market value of each residential building lot. The enclosed drainage system also serves to protect the travelling public along Road 2 East. Therefore, when future maintenance is performed on the West Branch, we wish to establish that it shall be maintained in the future at the expense of the lands and road outlined in the "Maintenance Schedule of Assessment – East Branch" attached herein and labelled **Appendix "F"**.

The maintenance work would include the drainage pipe, granular bedding, and granular backfill within driveway limits, with native fill backfill and topsoil topping in boulevard areas. These maintenance works shall also include 33.3% of CBMH-5, together with CBMH-6 through CBMH-9, and associated service connections to the cleanout. Any drainage structure not identified above, would be considered a private feature and would not form part of the Municipal Drain (ie. service connections from the cleanout to the home). Should concrete, asphalt or other special surfaces over the new covered drain require removal as part of the maintenance work, these surfaces shall be repaired or replaced as part of the work. Likewise, if any fencing, gate, decorative walls, sprinklers, or other special features exist that will be impacted by the maintenance work, they are also to be removed and restored or replaced as part of the maintenance work. However, the cost of the supply and installation of any special surface material other than select imported clay, topsoil topping and granular driveways, along with any special feature, where applicable, shall be assessed entirely to the benefiting owner.

Grassed Storage Area & Oil and Grit Separator (OGS)

When future maintenance is performed on the grassed storage area and OGS, we recommend it be kept up and maintained in accordance to the accompanying drawings and specifications. For any costs associated to the maintenance of these drainage features, we recommend that is be maintained at the expense of the lands outlined in the "Maintenance Schedule of Assessment – Grassed Storage Area & Oil and Grit Separator (OGS)" attached herein and labelled **"Appendix "F."**

Maintenance Schedules of Assessment

The assessment proportions as outlined in each of the "Maintenance Schedules of Assessment" included in **Appendix "F"** have been established on the basis of an estimated future maintenance cost of **$5,000.00**. However, these assessment charges shall not be made until such time that maintenance works are conducted to said drain in the future. Therefore, when **$5,000.00** worth of future maintenance work is carried out to this drain, the assessment of each of the individual affected property owners and roads shall be as listed in the attached Maintenance Schedule of Assessment. It should be clearly understood that the amounts shown within this Maintenance Schedule are only for prorating future maintenance costs on the above-described drain.

Development Phasing

The subject property currently owned by Solid Rock Homes Inc. (290-38900) is currently zoned as agricultural land. Therefore the proposed severances and zoning changes are subject to the Town's approval through the Planning Act. Therefore, should the severances not proceed, the retained agricultural lands, contributing to the Jamis Drain and Branches, shall replace Future Severance 1 through Severance 7 within the attached "Maintenance Schedules of Assessment".

XIV. FUTURE MAINTENANCE WORKING CORRIDORS

Once all construction has been completed for this project, the Contractor shall be expected to keep all future equipment and forces within the following working corridors for any future maintenance performed on the new alignment of the Jamis Drain and Branches:

Main Drain:

1. **From Station 0+000.0** to **Station 0+123.4**: The Contractor may utilize the full road right-of-way of Road 2 East, to access the existing driveway as part of the subject private lands. Once access is obtained, the Contractor shall utilize a strip of land that extends from the south right-of-way limit of Road 2 East onto Part 1 and extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres.

2. **From Station 0+123.4 to Station 0+385.7**: The Contractor may utilize a strip of land extending 3.0 metres on both sides of the pipe, having a total distance of 6.00 metres through Part 1.

3. **From Station 0+385.7 to Station 0+992.8**: The Contractor may utilize a strip of land extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres. This strip of land resides along the existing property line and extends onto the abutting lands to the east and west, along the course of the drain alignment.

West Branch:

From **Station 0+000.0 to Station 0+078.4 W** – The Contractor may utilize the full right of way of Road 2 East. The Contractor shall also have access to a strip of land for a total width of 3.0 metres extending onto private lands of Parts 1, 2, 3 and 4 of the accompanying Plan of Survey included in **"Appendix B."**

East Branch:

From **Station 0+000.0 to Station 0+070.1 E** – The Contractor may utilize the full right of way of Road 2 East. The Contractor shall also have access to a strip of land for a total width of 3.0 metres extending onto private lands of Parts 1, 5, 6 and 7 of the accompanying Plan of Survey included in **"Appendix B."**

Grassed Storage Areas & Oil and Grit Separator (OGS)

The Contractor shall utilize the full road right of way of Road 2 East, to access the existing driveway as associated with Part 1 of the subject lands. Once access is obtained, the Contractor shall utilize a 25.8-metre strip of land along the south limit of Parts 2, 3, 4, 5 and 7 encompassed by the grassed storage areas.

XV. FUTURE MAINTENANCE SUMMARY

All of the above provisions for the future maintenance of the Jamis Drain and Branches shall remain as aforesaid until otherwise varied and/or determined under the provisions of the "Drainage Act, RSO 1990, Chapter, D.17, as amended 2021", or subsequent amendments made thereto.

All of which is respectfully submitted,

N.J. PERALTA ENGINEERING LTD.

Antonio B. Peralta, P.Eng.

ABP/kk

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CONSTRUCTION SCHEDULE OF ASSESSMENT

5. PRIVATELY OWNED - AGRICULTURAL LANDS (non-grantable):

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
290-38900	1 ED	10	14.44	14.44	5.844	Solid Rock Homes Inc.	$ 479,710.00	$ -	$ -	$ 479,710.00
Total on Privately Owned - Agricultural Lands (non-grantable)							**$ 479,710.00**	**$ -**	**$ -**	**$ 479,710.00**
TOTAL ASSESSMENT				**14.44**	**5.844**		**$ 479,710.00**	**$ -**	**$ -**	**$ 479,710.00**

1 Hectare = 2.471 Acres

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Peralta Engineering

STANDARD SPECIFICATIONS

General

(Revised January 2024)

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I. GENERAL CONDITIONS FOR SPECIFICATIONS

The specifications, together with the accompanying drawings and appendices, delineate the furnishing of all labour, equipment, materials, and supplies required for the performance of all operations relating to the construction and/or improvements of a Municipal Drain under the most recent revision of the Drainage Act and/or amendments made thereto. These specifications serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. "Special Provisions" are included as part of the overall document and shall be read in conjunction with these standard specifications. Where a discrepancy occurs between the requirements of the Standard Specifications and the Special Provisions, the Special Provisions shall govern. In the event that the Specifications, Information to Tenderers, or the Form of Agreement do not apply to a specific condition or circumstance with respect to this project, the applicable section or sections from the Canadian Construction Documents Committee (CCDC) shall govern and be used to establish the requirements of the work.

Any reference to "Drainage Superintendent" and/or "Consulting Engineer" within this document shall refer to the person (or persons) appointed by the Council of the Municipality having jurisdiction over the drainage works.

All work shall be done in a first-class and workmanlike manner, complete in all respects and including all items specified herein, or as necessary for the accomplishment of a complete, satisfactory, and approved installation.

II. REVIEW OF SITE, PLANS, AND SPECIFICATIONS

As part of the Tender process, each tenderer shall visit the site(s) and review all documentation associated with the project prior to their tender submission and satisfy themselves with the full extent of the scope of work and conditions to complete the project. The Contractor may request, at any time prior to the closing of the tender, to examine any associated information available from the Drainage Superintendent and/or Consulting Engineer. Claims that there are any misunderstandings of the terms and conditions of the Contract related to site conditions will not be permitted.

The quantities identified within the Construction Items, Drawings and/or Specifications are estimates only and are intended for the sole purpose of identifying the general extent of the proposed work. The tenderer shall be responsible to verify the quantities for accuracy prior to submitting their tender.

III. MAINTENANCE PERIOD

The successful tenderer shall guarantee and warrant the work for a period of twelve (12) months from the time that substantial completion is issued. Upon the expiry of the maintenance period, with ordinary wear and tear, the work shall remain in such condition as will meet with the approval of the Consulting Engineer, and it will be responsible for rectification in a manner satisfactory to the Consulting Engineer. The cost thereof, of any imperfect work due to or arising from materials, equipment or plant incorporated into or used in the construction thereof, or due to or arising from workmanship or methods of construction, that is discovered by any means at any time prior to the issuance of the Final Certificate. The Consulting Engineer shall decide as to the nature, extent, cause of, and responsibility for imperfect work and the necessity for and the method of rectification thereof. In the event that the Contractor fails to comply with the above and address any deficiencies, the Municipality may complete these deficiencies, with the guidance of the Consulting Engineer, to make such repairs or complete such works, and the whole costs, charges and/or expenses so incurred may be deducted from any amount due or collected from the Contractor.

IV. LIABILITY OF THE CONTRACTOR

The Contractor, its agents, workforce and/or sub-contractors, shall satisfy itself as to the exact location, nature and extent of any existing structure, utility or other objects that it may encounter during the course of the work. The Contractor will be responsible for any damage caused by it to any person, property, public utilities, and/or municipal infrastructure. The Contractor shall indemnify and save harmless, the Municipality and the Consulting Engineer for any damages which it may cause or sustain during the progress of the work. The Contractor shall not hold the Municipality or the Consulting Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.

V. GENERAL COORDINATION

The Contractor shall be responsible for the coordination with other organizations, agencies, and utility companies in connection with the works. The Contractor shall not take action against the Municipality or the Engineer for delays caused by the site being unavailable to them by the Municipality or Consulting Engineer because of the acts, omissions, conduct or misconduct of other organizations or utility companies engaged in other work.

VI. LEGAL SURVEY BARS AND MONUMENTS

The Contractor is to note that legal survey bars may exist within the work site, and it shall take whatever steps necessary to protect these features. If any iron bar or monument is damaged or removed by the Contractor, it shall arrange for an Ontario Land Surveyor licensed in the Province of Ontario to restore same, all at the Contractor's expense.

VII. MAINTAINING CONVEYANCE

The drainage works shall not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work shall be completed during times when the drain is dry or frozen.

When performing excavation work, care should be taken not to interfere with, plug up, or damage any existing surface drains, swales, and lateral or main tile ends. The Contractor shall be responsible to maintain permanent flow at all times. Temporary damming of flow is permitted to conduct the necessary works. However, the Contractor is responsible to monitor and ensure no damage occurs as a result of its actions. Under no circumstances shall temporary damming be permitted for an extended period (ie. overnight, etc.) without a suitable water control plan approved by the Drainage Superintendent, Consulting Engineer and/or the Conservation Authority.

VIII. APPROVALS, PERMITTING, AND INSPECTION

The works proposed under this project is subject to the approval, inspection, regulations, and by-laws of all Municipal, Provincial, and Federal entity, or any other agency having jurisdiction associated with the drainage works established herein. The Contractor shall ensure that all applicable permits and approvals are procured from all affected authorities prior to carrying out any of the prescribed works identified within the Contract, or in the vicinity of any public utility, railway and/or road authority.

The drainage works forming part of this project, including all appurtenances, shall be completely inspected by the Town Drainage Superintendent and/or the Consulting Engineer's Inspector prior to its completion. Under no circumstance shall the Contractor commence the construction or backfill of any underground feature without the site presence of the Drainage Superintendent and/or the Consulting Engineer's Inspector to inspect and approve said installation. The Contractor shall provide a minimum of forty-eight (48) hours' notice to the Drainage Superintendent and/or the Consulting Engineer prior to the commencement of the work. All works shall be performed during normal working hours of the Drainage Superintendent and/or the Consulting Engineer from Monday to Friday unless written authorization is provided by them to amend these working hours.

Upon completion of the works and prior to the demobilization and removal of all equipment and materials from the site, the Contractor shall notify the Drainage Superintendent and/or Consulting Engineer to arrange a final inspection of the works. The final inspection is intended to ensure that all aspects of the drainage work are satisfactorily completed and/or identify any outstanding deficiencies. Any outstanding deficiencies shall be addressed expeditiously as weather permits.

IX. TRAFFIC CONTROL

The Contractor shall ensure that the travelling public is always protected while utilizing the roadway for its access. The Contractor shall be required to carry out all the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including provision of all lights, signs, flag persons, and barricades required to protect the safety of the travelling public. The Contractor shall be required to submit a Traffic Control Plan to the Consulting Engineer for approval from the governing Road Authorities. The Traffic Control Plan shall be carried out in accordance with the requirements of the Ontario Traffic Manual's Book 7 for Temporary Conditions. Should the Contractor have to close any roads for the proposed works, it shall arrange to obtain the necessary authorizations from the Municipality, County, or Provincial Roads Departments (if applicable) and distribute notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etc. are contacted about the disruption to access

at least 48 hours in advance of same. All detour routes shall be established in consultation with the Municipality and County Roads Department (if applicable).

Due to the extent of the work and the area for carrying out the work, the Contractor shall be required to carry out all of the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including the provision of all lights, signs, flag persons, and barricades required to protect the safety of the travelling public. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include but not be limited to all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to make good any damage caused.

The Contractor shall note that any deviation from the specified access for the construction of the culvert without the explicit approval of the adjacent landowners and the Drainage Superintendent could result in the Contractor being liable for damages sustained. The value for such damage shall be determined by the Drainage Superintendent and the Consulting Engineer and be subsequently deducted from the Contract Price. Where applicable, the Contractor shall be responsible for any damage caused by them to any portion of the road right-of-way. They shall take whatever precautions are necessary to avoid damage to the roadway. Any damage to the roadway must be restored to its' original condition upon completion of the works.

X. FENCING AND/OR STRUCTURES

Where it is necessary to take down any fence and/or structure to proceed with the work, same shall be done by the Contractor across or along that portion of the work where such fence and/or structure is located. The Contractor shall be required to exercise extreme care in the removal of any fencing and/or structure, to ensure minimum damage to same. The Contractor shall be required to replace any fence and/or structure that is taken down in order to proceed with the work, and the fence and/or structure shall be replaced in a neat and workmanlike manner. The Contractor shall not be required to procure any new materials for rebuilding the fence and/or structure provided that it has used reasonable care in the removal and replacement of same. When any fence and/or structure is removed by the Contractor, and the Owner thereof deems it advisable and procures new material for replacing the fence and/or structure so removed, the Contractor shall replace the fence and/or structure using new materials and the materials from the present fence and/or structure shall remain the property of the Owner.

XI. BENCHMARKS

For use by the Contractor, Benchmarks have been established along the course of the work. The plans include details illustrating the available Benchmarks and the work to be carried out. Benchmarks have been indicated and the Elevations have been shown and shall be utilized by the Contractor in carrying out its work. The Contractor shall note that specific design elevations and grades have been provided for the proposed works. The plans also set out side slopes, bottom width, and other requirements relative to its installation. In all cases, the Contractor is to utilize the specified Benchmarks to establish the identified elevations and grades. The Contractor shall ensure that it takes note of the direction of flow and sets all grades to match the direction of flow within the drain.

XII. ENVIRONMENTAL CONSIDERATIONS

Prior to commencing work, the Contractor must familiarize themselves with all associated environmental approvals and mitigations. The Contractor shall review the results of any environmental reviews performed for the project, including documents for the purpose of identification of known Species at Risk within the project area and mitigation measures for species and habitat protection. It is the responsibility of the Contractor to make certain that necessary provisions are undertaken to ensure the protection of all Species at Risk and their habitats throughout the course of construction. The Contractor will be responsible for providing the necessary equipment and materials required by any mitigation plans and shall contact the Drainage Superintendent immediately if any Endangered Species are encountered during construction.

XIII. FINAL CLEANUP AND RESTORATION

The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no portion shall be left in any untidy or incomplete state before subsequent portions are undertaken. Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition. The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no work shall be left in any untidy or incomplete state before subsequent portions are undertaken.

Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include, but not be limited to, all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to make good any damage caused. Any damages caused, resulting from non-compliance with the above-noted provisions, shall be restored by the Contractor to its original condition, at the Contractor's expense. All roadways, driveways and access bridges, or any other means of access onto the job site shall be fully restored to their former condition at the Contractor's expense. In the event that the Contractor fails to satisfactorily clean up any portion of these accesses, the Consulting Engineer shall order such cleanup to be carried out by others and the cost of same to be deducted from any monies owing to the Contractor.

XIV. GENERAL CONDITIONS

a) The Drainage Superintendent or Consulting Engineer shall have the authority to carry out minor changes to the work where such changes do not lessen the efficiency of the work.

b) The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and Consulting Engineer can review same and check that the work will generally conform with the design and project intent.

c) The Contractor will be responsible for any damage caused by it to any portion of the Municipal Road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of the road, the travelled portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If

any part of the travelled portion of the road is damaged by the Contractor, the Municipality shall have the right to have the necessary repair work done by its employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the Municipality. The Contractor, upon completing the works, shall clean all debris and junk, etc., from the roadside of the drain, and leave the site in a neat and workmanlike manner. The Contractor shall be responsible for keeping all public roadways utilized for hauling materials free and clear of mud and debris.

d) The Contractor will be required to submit to the Municipality, a Certificate of Good Standing from the Workplace Safety and Insurance Board prior to the commencement of the work and the Contractor will be required to submit to the Municipality, a Certificate of Clearance for the project from the Workplace Safety and Insurance Board before Final Payment is made to the Contractor.

e) The Contractor shall furnish a Performance and Maintenance Bond along with a separate Labour and Material Payment Bond within ten (10) days after notification of the execution of the Agreement by the Owner unless otherwise established within the Tender Documents. One copy of said bonds shall be bound into each of the executed sets of the Contract. Each Performance and Maintenance Bond and Labour and Material Payment Bond shall be in the amount of 100% of the total Tender Price. All Bonds shall be executed under corporate seal by the Contractor and a surety company, authorized by law to carry out business in the Province of Ontario. The Bonds shall be acceptable to the Owner in every way and shall guarantee faithful performance of the contract during the period of the contract, including the period of guaranteed maintenance which will be in effect for twelve (12) months after substantial completion of the works.

The Tenderer shall include the cost of bonds in the unit price of the Tender items as no additional payment will be made in this regard.

f) The Contractor shall be required, as part of this Contract, to provide Comprehensive Liability Insurance coverage for not less than $5,000,000.00 on this project unless otherwise established in the Tender Documents, and shall name the Municipality and its' officials, and the Consulting Engineer and its staff as additional insured under the policy. The Contractor must submit a copy of this policy to both the Municipal Clerk and the Consulting Engineer prior to the commencement of work.

g) Monthly progress orders for payment shall be furnished the Contractor by the Drainage Superintendent. Said orders shall be for not more than 90% of the value of the work done and the materials furnished on the site. The paying of the full 90% does not imply that any portion of the work has been accepted. The remaining 10% will be paid 60 days after the final acceptance and completion of the work and payment shall not be authorized until the Contractor provides the following:

i) a Certificate of Clearance for the project from the Workplace Safety and Insurance Board
ii) proof of advertising
iii) a Statutory Declaration, in a form satisfactory to the Consulting Engineer and the Municipality, that all liabilities incurred by the Contractor and its Sub-Contractors in carrying out the Contract have been discharged and that all liens in respect of the Contract and Sub-Contracts thereunder have expired or have been satisfied, discharged or provided for by payment into Court.

The Contractor shall satisfy the Consulting Engineer or Municipality that there are no liens or claims against the work and that all of the requirements as per the Construction Act, 2018 and its' subsequent amendments have been adhered to by the Contractor.

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Peralta Engineering

STANDARD SPECIFICATIONS

FOR ENCLOSURE/COVERED DRAIN INSTALLATIONS

(Revised January 2024)

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I. GENERAL INFORMATION FOR SPECIFICATIONS

These specifications, together with the accompanying drawings and appendices, delineate the furnishing of all labour, equipment, materials and supplies required for the performance of all operations relating to the construction and/or improvements of a Municipal Drain under the most recent revision of the Drainage Act and/or amendments made thereto. These specifications serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. "Special Provisions" are included as part of the overall document and shall be read in conjunction with these standard specifications. Where a discrepancy occurs between the requirements of the Standard Specifications and the Special Provisions, the Special Provisions shall govern. In the event that the Specifications, Information to Tenderers, or the Form of Agreement do not apply to a specific condition or circumstance with respect to this project, the applicable section or sections from the Canadian Construction Documents Committee (CCDC) shall govern and be used to establish the requirements of the work.

Any reference to "Drainage Superintendent" and/or "Consulting Engineer" within this document shall refer to the person (or persons) appointed by the Council of the Municipality having jurisdiction over the drainage works

All work shall be done in a first-class and workmanlike manner, complete in all respects and including all items specified herein, or as necessary for the accomplishment of a complete, satisfactory, and approved installation.

II. TRAFFIC CONTROL

The Contractor shall ensure that the travelling public is always protected while utilizing the roadway for its access. The Contractor shall be required to carry out all the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including the provision of all lights, signs, flag persons, and barricades required to protect the safety of the travelling public. The Contractor shall be required to submit a Traffic Control Plan to the Consulting Engineer for approval from the governing Road Authorities. The Traffic Control Plan shall be carried out in accordance with the requirements of the Ontario Traffic Manual's Book 7 for Temporary Conditions. Should the Contractor have to close the road for the proposed works, it shall arrange to obtain the necessary authorizations from the Municipality and County Roads Departments (if applicable) and distribute notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etc. are contacted about the disruption to access at least 48 hours in advance of same. All detour routes shall be established in consultation with the Municipality and County Roads Department.

Due to the extent of the work and the area for carrying out the work, the Contractor shall be required to carry out all of the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including the provision of all lights, signs, flag persons, and barricades required to protect the safety of the travelling public. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include but not be limited to all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to make good any damage caused.

The Contractor shall note that any deviation from the specified access for the construction of the enclosure/covered drain without the explicit approval of the adjacent landowners and the Drainage Superintendent could result in the Contractor being liable for damages sustained. The value for such damage shall be determined by the Drainage Superintendent and the Consulting Engineer and be subsequently deducted from the Contract Price. Where applicable, the Contractor shall be responsible for any damage caused by them to any portion of the road right-of-way. They shall take whatever precautions are necessary to avoid damage to the roadway. Any damage to the roadway must be restored to its' original condition upon completion of the works.

III. REMOVAL OF BRUSH, TREES AND DEBRIS

Where there is any brush, trees or debris along the course of the drainage works, including the full width of the access, all such brush, trees or debris shall be close-cut and grubbed out, and the whole shall be chipped up for recycling, burned, hauled away or satisfactorily disposed of by the Contractor at its expense. Prior to and during the course of the burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment and shall ensure that the Environmental Protection Act is not violated. The Contractor will be required to notify the local fire authorities and cooperate with them in the carrying out of any work. The removal of brush and trees shall be carried out in close consultation with the Drainage Superintendent or Consulting Engineer to ensure that no decorative trees or shrubs are disturbed by the operations of the Contractor that can be saved. It is the intent of this project to save as many trees and bushes as practical within the roadway allowances and on private lands.

The Contractor shall protect all other trees, bushes, and shrubs located along the length of the drainage works except for those trees that are established within the accompanying drawings or in consultation with the Drainage Superintendent, the Consulting Engineer, and the affected Owner(s). The Contractor shall note that protecting and saving the trees may require the Contractor to carry out handwork around the trees, bushes, and shrubs to complete the necessary final site grading and restoration.

Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain to stand, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

The Contractor shall remove all deleterious materials and debris along the course of the open drain and any such materials located in the bridge culverts while carrying out its cleaning of same. All such deleterious

materials and debris shall be loaded up and hauled away by the Contractor to a site to be obtained by it at their expense.

If applicable, where identified on the drawings, and to ensure a safe separation distance is maintained, the Contractor shall install tree protection fencing at the projected limit of the excavation and beneath the drip line of the identified tree(s). The fencing shall be comprised of orange vinyl snow fencing secured at 3.00-metre intervals with iron T-posts driven 600mm into the ground and should be in place until construction work is completed. During construction, no equipment, materials or tools shall be stored beyond the tree protection fencing.

IV. FENCING AND/OR STRUCTURES

Where it is necessary to take down any fence and/or structure to proceed with the work, same shall be done by the Contractor across or along that portion of the work where such fence and/or structure is located. The Contractor shall be required to exercise extreme care in the removal of any fencing and/or structure, to ensure minimum damage to same. The Contractor shall be required to replace any fence and/or structure that is taken down in order to proceed with the work, and the fence and/or structure shall be replaced in a neat and workmanlike manner. The Contractor shall not be required to procure any new materials for rebuilding the fence and/or structure provided that it has used reasonable care in the removal and replacing of same. When any fence and/or structure is removed by the Contractor, and the Owner thereof deems it advisable and procures new material for replacing the fence and/or structure so removed, the Contractor shall replace the fence and/or structure using new materials and the materials from the present fence and/or structure shall remain the property of the Owner.

V. UTILITIES

The Contractor will be responsible at all times for complete investigation to determine the location of all such utilities or structures known or unknown, and it shall indemnify and save harmless the Engineer and the Municipality for any responsibility, injury, or liability arising from any damage to such utilities or structures by the Contractor.

The Contractor shall protect all other services located in the vicinity of the proposed drainage works including any sanitary sewers and connections, watermains and connections, telephone and gas services, along with any private systems and services. Any damaged components shall be replaced by the Contractor, totally at its own expense and it shall fully restore the functionality of same.

The Contractor shall further contact or notify such Utility Company or Commission of its intention to carry out work in the area and cooperate with such Utility Company or Commission in the location, maintenance and preservation of all such utilities. The location of the pipes and appurtenances as shown on the drawings is approximate and may be changed by the Engineer if deemed advantageous for the progress of the work.

VI. NOTICE OF PROJECT COMMENCEMENT AND HOURS OF OPERATION

The Contractor shall provide a minimum of forty-eight (48) hours' notice to the Drainage Superintendent and/or the Consulting Engineer prior to the commencement of the work. The installation of the culvert structure is to be performed during normal working hours of the Drainage Superintendent and/or the Consulting Engineer from Monday to Friday unless written authorization is provided by them to amend such working hours.

VII. EXCAVATIONS, REMOVALS AND DISPOSALS

All excavation shall be made in compliance with the drawings and in such a manner and at such depths and widths as will give ample room for installing the pipe, the bracing, sheeting, or otherwise supporting the sides of the excavation and for the pumping of groundwater if encountered. The Contractor is fully responsible for the safety of all its men and equipment and must conform completely with the provisions of the "Construction Safety Act" and "Regulations for Construction Projects".

Where an existing culvert is being replaced, the Contractor shall be required to excavate and completely remove the existing culvert and headwalls in their entirety, as well as any other deleterious materials that may be encountered in removing such materials, unless otherwise noted. All unsuitable or deleterious materials from the excavation and removal of existing culverts and the drain shall be hauled away and disposed of by the Contractor to a site to be obtained by it at its own expense. In all cases, the disposal of any trucked material with be the responsibility of the Contractor and it shall ensure that any permits required for fill disposal are obtained from the appropriate authority. The Contractor will be responsible for keeping all private and public roadways free and clear of mud and debris resulting from its use of same for access and hauling purposes.

The Contractor is to note that when replacing the existing structures, it shall be required to excavate a trench having a width not less than the new pipe outside diameter plus a 600mm working width on both sides of the new pipe.

During the course of its excavation operations, the Contractor will be required to salvage all available topsoil. Where necessary, this material shall be stockpiled by the Contractor in order to avoid contamination and shall be utilized in carrying out any topsoil placement along all specified or disturbed areas, in preparation for the seeding and mulching operation to be carried out as part of the restoration works.

The bottom of the trenches must be carefully excavated and trimmed to the elevation and shape of the bottom of the pipe. The bottom of the trenches shall be recessed to receive the pipe in order to allow the pipe to be uniformly supported for its entire length. Corrections in the depth of excavation caused by the Contractor excavating to an extent greater than that required for the elevation of the pipe shall be made by bedding the pipe with 20mm (3/4") clear stone granular material is placed at the time that the pipes are being installed, at the Contractors expense.

No extras will be allowed for excavating any hardpan, boulders, rocks, ice or other obstacles found in the excavation or in the line of the trench or for any pumping or baling of water required in the excavation of the work. The trench must be drained or pumped in order to avoid the necessity of making joints under water. The trench must also be drained to avoid any possibility of groundwater entering the pipe in the trench until the installation has been successfully completed.

VIII. PIPE INSTALLATION

The new pipe shall be set in the alignment and to the grade elevations established in the accompanying drawings. The same shall not be altered unless otherwise directed by the Drainage Superintendent or Consulting Engineer prior to construction of same. Any changes relative to the enclosure/covered drain must be approved by the Consulting Engineer prior to proceeding with construction.

The Contractor shall lay the enclosure/covered drain pipe to the lines, levels, and grades as shown in the accompanying drawings or as may be laid out and established by the Engineer prior to the time of construction. The Contractor shall be held responsible for said lines, levels and grades of the drain pipe and should the Engineer determine that the Contractor has not satisfactorily adhered to such lines, levels and grades, it may direct the Contractor to take up and re-lay any portion of the drain which does not conform to such lines, levels and grades.

Laser control must be provided to maintain drain lines and grades, and the Contractor shall have a qualified Operator to set up and operate the equipment. In some instances, but only at the discretion of the Engineer, an approved system of batter boards may be utilized for this purpose; However, the cost of placing grade stakes and determining the cut information shall be provided by or paid for entirely by the Contractor.

The Contractor should note that, because the pipe is being installed with an excavator, it is expected that they will provide a minimum of 150mm (6") of either compacted MTO Granular "A", Granular "B" (Type II) or 20mm (3/4") clear stone bedding material, as outlined within OPSS Form 1010 The Contractor shall ensure that a good firm base is provided under the drain pipe, and they shall provide for this item as part of their tender price.

HDPE Pipe Installation

When HDPE plastic pipes are specified, they shall be joined together with the use of a water-tight bell and gasket joining system, secured in accordance with the Manufacturer's recommendations. The minimum length of a continuous pipe section shall be no less than 6.10 metres (20.00 ft.). The HDPE plastic pipe for this installation must be of the length, size, and strength identified in the Drawings, Special Provisions, and approved by the Drainage Superintendent and the Consulting Engineer prior to its placement in the drain.

For new smoothwall HDPE culvert pipes that are shown on the Drawings to have sloped quarried limestone erosion protection at their ends, both ends of the pipe shall be securely anchored against floatation utilizing two (2) steel T-bar fence posts having a minimum length of 1.80 metres (6.00 ft.) or approved equal, on each side of the pipe, together with heavy steel galvanized wire secured between them across the top of the pipe. The top of each post shall be set no higher than the top of the proposed culvert. Pipe anchors shall be installed in accordance with the "Floatation Anchor Details" outlined within the accompanying drawings.

Aluminized Steel Pipe Installation

When Aluminized Steel Corrugated Hel-Cor pipe and/or Aluminized Steel Type II UltraFlo pipe is specified, the culvert shall be installed with a minimum number of couplers and longer pipe sections are to be utilized whenever possible. Under no circumstances shall the culvert sections be less than 4.00 metres in length. All pipe lengths shall be of the size and gauge noted in the drawings and shall be coupled together with Aluminized Steel Type II 10C having a thickness consistent with the culvert pipe material. The overall pipe for this installation

must be of the length, size, and thickness as identified in the Drawings, Special Provisions, and approved by the Drainage Superintendent and/or the Consulting Engineer prior to its placement in the drain.

General Pipe Installation

The Contractor shall be required to provide all labour, equipment and materials to set the pipe to the required design grades. Where couplers are required, the Contractor shall utilize the appropriate coupler provided by and per the specifications of the Manufacturer. The Contractor shall supply all material and labour to provide a non-woven filter cloth wrap around the full circumference of the coupler joint connection, as part of their tender price. The filter cloth wrap connection shall be a minimum of 250mm (10") wider than the width of the proposed coupler and shall overlap a minimum of 200mm (8"), as available from Underground Specialties Inc., of Windsor, Ontario, or equal. The specific type to be utilized shall be approved by the Drainage Superintendent and/or the Consulting Engineer prior to its placement. The installation of all joints must be inspected and approved by the Drainage Superintendent or Consulting Engineer prior to any backfilling of same.

The Contractor shall also note that the placement of the enclosure/covered drain is to be performed totally in the dry, and it shall be prepared to take whatever steps are necessary to ensure same, all to the satisfaction of the Drainage Superintendent and/or Consulting Engineer. The installation of the complete length of pipe, including all appurtenances, shall be completely inspected by the Drainage Superintendent and/or the Consulting Engineer's Inspector prior to backfilling any portions of same. Under no circumstance shall the Contractor commence the construction or backfill of the pipe without the site presence of the Drainage Superintendent and/or the Consulting Engineer's Inspector to inspect and approve said installation.

All pipe materials shall be stored and handled by the Contractor at its own expense. It shall be responsible for the safe storage of all materials, for obtaining storage areas, for the safe transportation and distribution of all the materials at the job site, and for inspection in order to determine defects and breakage. No additional recompense will be allowed to the Contractor for any loss incurred by it in the storage and handling of the materials.

Pipe, fittings, and all accessory appurtenances must be loaded and unloaded by lifting with means of a hoist or a skid to avoid shock or damage. Under no circumstances shall any drain material or materials for drain appurtenances be dropped.

If the drain pipe is laid in freezing weather, the Contractor shall take all the necessary precautions to prevent damage to the pipe or to any of the materials used in the construction of the work. In addition, the Contractor shall take care that no frozen ground or backfill is placed in the trench backfilling adjacent to the drain pipe. All pipe and the various other materials used in the placing of said pipe shall be installed in strict compliance with the Manufacturer's recommendations.

The installation of the complete length of the new culvert pipe, including all appurtenances, shall be completely inspected by the Drainage Superintendent and/or the Consulting Engineer's Inspector prior to backfilling any portions of same. Under no circumstance shall the Contractor commence the construction or backfill of the culvert pipe without the site presence of the Drainage Superintendent and/or the Consulting Engineer's Inspector to inspect and approve the said installation.

IX. DRAINAGE STRUCTURE INSTALLATION

Where required, all materials for the catchbasins shall comply with Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD) with respect to materials, qualities, and installation details. The catchbasins and maintenance holes shall be founded on a good, dry, firm, undisturbed earth base for its entire bottom surface area, or 20mm (3/4") clear stone bedding, if necessary. Corrections in depth of excavation caused by the Contractor excavating to an extent greater than that required for the structures shall be backfilled to the proper grade elevation by embedding the catchbasin maintenance holes floor area with 20mm (3/4") clear stone granular bedding. A sump is to be provided in each structure which shall be a minimum of 450mm deep measured from the proposed invert of the covered drain or connection to the proposed concrete floor elevation of the structure. The structure shall be set to allow for connection of all of the inlet and outlet pipes and shall be installed as shown and detailed on the Drawings. The top elevation of the structure shall be installed to the elevations noted on the Drawings or as further directed by the Drainage Superintendent or the Consulting Engineer. All structure sections and adjustment units shall be joined together with standard gasket material, caulking, or grout as required by the Manufacturer, or as set out in the applicable OPSS and OPSD.

All structures, where applicable, shall include a minimum of three (3) adjustment units in accordance with OPSD 704.011. All work shall be completed as shown and detailed on the Drawings.

The Contractor shall connect all covered drains and connections in the catchbasin maintenance holes with the use of a mortar joint or standard rubber boot cast into the units by the Manufacturer. Said mortar joint shall be provided at the internal and exterior of the catchbasin maintenance holes wall for the full circumference of the covered drain and be of a sufficient mass to produce a sealed joint, all to be performed to the satisfaction of the Drainage Superintendent or the Consulting Engineer. Where possible, the Contractor shall employ a standard factory fitting or adapter to connect between the various pipes, tiles, and catchbasin maintenance holes, otherwise a mortar joint connection can be utilized.

X. ENCLOSURE/COVERED DRAIN BACKFILL

Where the new enclosure/covered drain pipe is located under the driveway, the Contractor shall backfill the entire trench for the width of the driveway with Granular Type II "B" or Granular "A", or locally approved equivalent compacted in place to a minimum 98% of Standard Proctor Density with the exception of the top 300mm which should be backfilled with Granular "A" material also compacted in place to a Standard Proctor Density of 100%. Where the new enclosure/covered drain pipe is located along the lawn area, the Contractor shall be required to backfill the entire trench with good clean native backfill material with the exception of the top 100mm which shall be good clean black loamy topsoil readied for seeding and mulching. It should be noted that if there is a shortage of native backfill material available, the Contractor shall supply same all at its own expense. The Contractor should also note that prior to commencing its excavation that all existing topsoil should be scavenged for reuse on the project; if there is a shortage, the Contractor shall be required to supply the balance of the topsoil needed, all at its own expense. All of the native backfill material shall be compacted in place to a minimum Standard Proctor Density of 96%.

All backfill material shall be placed in compacted in maximum lifts of approximately 300mm thick. The Contractor is required to provide whatever mechanical equipment necessary, such as jumping jack and/or plate tamper, in order to achieve the necessary compaction levels, especially along the haunches of the new

pipe. All areas shall be graded in accordance with the profile and cross-sections shown in the accompanying drawings, including provision of cross-fall on boulevard areas as shown therein.

XI. CONSTRUCTING NEW SWALES

The Contractor shall provide all labour, equipment, and materials in order to construct the swales, to the lines, levels, and grades as is shown and detailed in the accompanying drawings. The centreline of the finished swale grade elevation and swale cross-section, at various locations along the length of the drain, are to be provided as shown and detailed in the design drawings. The Contractor shall be required to strictly adhere to this swale design unless otherwise directed and approved by the Consulting Engineer.

The swale shall generally be constructed with a V-section centered over the proposed lawn piping, or as the alignment shows in the drawings, to ensure positive flow of the surface drainage into the sloped quarried limestone end treatments which act as outlets for the swale sections or other surface inlet structures, if applicable. All materials excavated from the swale including all deleterious materials shall be hauled away and disposed of by the Contractor to a site to be obtained by it at its own expense.

The alignment of the swales throughout shall be to the satisfaction of the Drainage Superintendent and the Consulting Engineer. All of the work shall be done in a neat, thorough, and workmanlike manner also to their full satisfaction.

XII. SLOPED QUARRIED LIMESTONE EROSION PROTECTION

When specified, the Contractor shall install sloped quarried limestone end protection at both ends of the pipe, or where shown, on a slope no steeper than 1.50 horizontal to 1.00 vertical and shall extend from the end of the new pipe to the top elevation shown. The top 305mm (12") of backfill material over the ends of the pipe, from the invert of said pipe to the top of the driveway elevation of the enclosure/covered drain, shall be quarried limestone. The quarried limestone to be placed on the sloped ends of the enclosure/covered drain shall be underlain with a synthetic non-woven geotextile filter fabric. The sloped quarried limestone protection is to be rounded as shown on the plan details and shall also extend along the drain side slopes to a point directly in line with the ends of the culvert pipe. All work shall be completed to the satisfaction of the Drainage Superintendent and/or the Consulting Engineer.

The quarried limestone shall be provided as shown and detailed and shall vary in size from a minimum of 100mm (4") to a maximum of 250mm (10"). The quarried limestone pieces shall be carefully tamped into place with the use of a shovel bucket so that, when complete, the quarried limestone erosion protection shall be consistent, uniform, and tightly laid in place. Prior to placing the quarried limestone, the Contractor shall place non-woven geotextile filter fabric "MacTex MX140" conforming to OPSS 1860 Class 1 or approved equal, as an underlay underneath all areas to be covered in quarried limestone erosion protection. The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried limestone. The placement of the geotextile filter fabric and the quarried limestone, and the completion of the quarried limestone erosion protection shall be conducted to the satisfaction of the Drainage Superintendent and/or Consulting Engineer.

XIII. PRECAST INTERLOCKING CONCRETE BLOCK HEADWALLS

When precast interlocking concrete block headwalls are specified, the concrete blocks shall be rectangular in shape with square corners and be a minimum size of 600mm x 600mm x 1200mm (2' x 2' x 4'), as available from Underground Specialties Inc./Wolseley Inc. (Canada) or approved equal. Blocks with modified lengths may be utilized to fill in staggered sections of the block wall. All blocks shall be cast in one pour with no cold joints and shall have a minimum compression strength of 20MPa at 28 days. All precast concrete blocks shall be formed with interlocking pockets and tenons and each block shall be assembled in a staggered formation to prevent sliding at the interface between blocks. All precast concrete blocks shall be uniform in size with relatively smooth and consistent joints and shall have a stone exterior finish. Each block shall be fitted with a lifting ring that will not interfere with the assembly of the block wall once they are set in place. Cap blocks shall be utilized on the top course of the wall with the top of the cap blocks having a stone exterior finish. The precast interlocking concrete block headwalls are available from Underground Specialties Inc./Wolseley Inc. (Canada), or approved equal.

Precast interlocking blocks that abut the pipe shall be cast as one solid piece and shall be cut and shaped to fit closely around the perimeter of the pipe. The face of the wall shall not extend beyond the end of the pipe. All minor gaps between the blocks and the pipe shall be sealed with no shrink grout for the full depth of the blocks. At the base of the wall, a base block shall be used at the bottom of the interlocking block wall. The base block shall be founded on a firm solid base. When necessary, the Contractor shall provide a minimum of 200mm thickness of level compacted granular bedding, or a lean concrete footing, as a firm foundation for the blocks. The base block shall be set level and shall convey a vertical projection throughout its full height and shall include filter cloth behind the wall for the full height of the blocks to prevent soil migration through any joints. Filter cloth fabric shall be non-woven geotextile material and be minimum "MacTex MX 140" meeting OPSS Class I. Both headwalls shall be assembled concurrently with a continuous uni-axial geogrid SG350, or equal, installed across the entire structure at every second course of blocks, to tie each headwall to the other. In the event that the distance between headwalls exceeds 10.00 metres (32.81 ft.), the Contractor shall install the uni-axial geogrid for a distance of 3.00 metres (9.84 ft.) inward from each headwall and at every second course. Both the non-woven filter cloth and the uni-axial geogrid are available from Armtec Construction Products or approved equal.

The blocks shall extend up from the pipe invert and cross the full width of the drain and be embedded a minimum of 500mm into the drain banks. Where required for the top of the block wall to match the height of the completed driveway, the Contractor shall embed the bottom course of blocks into the drain bottom at the appropriate depth to achieve the required top elevation of the wall.

The Contractor shall arrange for the Supplier to provide interlocking block layout drawings outlining block assembly of the proposed headwall to the Consulting Engineer for approval prior to proceeding with fabrication and assembly of same. The Contractor shall arrange with the Supplier for technical assistance with the assembly of the structure on-site in full accordance with the requirements of the Supplier. All assembly installation shall be carried out to avoid any damage to the pipe and shall follow the Supplier's recommendation in every respect to ensure a proper and safe installation.

The precast interlocking concrete block headwalls shall be installed vertically and shall extend from the end of the new pipe to the top elevation of the driveway. Under no circumstances shall the interlocking block wall be installed with an outward projection. When complete, the outside face of the headwall shall be installed flush with the end of the proposed culvert. The precast interlocking concrete block headwall shall be installed

perpendicular to the drain banks. Headwalls are to be installed so that daylighting is provided off the travelled roadway, if required. The daylighting is to be designed to deflect outwardly from approximately the extreme roadside face of the new culvert to a point just beyond the top bank of the drain. The outward projection of the new headwalls shall be deflected at approximately a 45-degree angle, and the maximum outward deflection shall not be greater than shown on the accompanying Drawings, parallel to the projection of the straight portion of the finished wall. The straight portion of the precast interlocking concrete block headwall shall be installed perpendicular to the drain banks. The Contractor shall also be required to backfill the area behind the new headwall with granular fill.

The Contractor shall also be required to satisfactorily backfill the area in behind the new headwall with granular fill as already specified in the preceding paragraphs for backfilling of the bridge culvert. The top elevation of the headwalls, opposite the travelled roadway, are to be set no less than 75mm (3"), below the existing ground elevation, unless shown on the drawings. The alignment of these headwalls shall be performed to the satisfaction of the Drainage Superintendent or the Consulting Engineer. The installation of the precast interlocking concrete block headwalls shall also comply with the "Block Headwall Installation Instructions for Culverts" provided by Underground Specialties Inc./Wolseley Inc., or equal.

Upon completion of the headwall installation, the Contractor shall also provide sloped quarried limestone erosion protection adjacent and along all of the new concrete headwalls, at the general locations and to the widths shown within the details included therein. Furthermore, the installation of the quarried limestone shall adhere to the parameters outlined in Section XV. Sloped Quarried Limestone Erosion Protection – Concrete Block Headwalls.

XIV. CONCRETE-FILLED JUTEBAG HEADWALLS

When specified, the Contractor shall install new concrete jutebag headwalls at the locations and parameters indicated on the drawing. When constructing the concrete jutebag headwalls, the Contractor shall place the bags so that the completed headwall will have an inward batter from the bottom of the pipe to the top of the finished headwall. The slope of the headwall shall be one (1) unit horizontal to five (5) units vertical. The Contractor shall satisfactorily backfill behind the jutebag headwalls with granular material similar to the rest of the structure, and the same compaction levels specified herein for backfilling the adjacent culvert. The placing of the jutebag headwalls and the backfilling shall be performed in lifts simultaneously. The granular backfill shall be placed and compacted in lifts not to exceed 305mm (12") in thickness.

The concrete jutebag headwalls shall be constructed by filling jutebags with concrete. All concrete used to fill the jutebags shall have a minimum compressive strength of 21MPa in 28 days and shall be provided and placed only as a wet mix. Under no circumstance shall the concrete to be used for filling the jutebags be placed as a dry mix. The jutebags, before being filled with concrete, shall have a dimension of 460mm (18") x 660mm (26"). The jutebags shall be filled with concrete so that when they are laid flat, they will be approximately 100mm (4") thick, 305mm (12") to 380mm (15") wide and 460mm (18") long. The completed jutebag headwalls shall be securely embedded a minimum of 500mm (20") measured perpendicular to the sideslopes of the drain.

If indicated on the Drawings, daylighting may be installed off the travelled roadway, and the same are designed to deflect outwardly. The outward deflection shall be deflected at the specified angle to the straight portion of the finished headwall. The top elevations of the daylighted headwalls are to be set no less than 75mm (3")

below the existing ground elevation, unless otherwise designed. The alignment of these headwalls shall be performed to the satisfaction of the Drainage Superintendent or Consulting Engineer.

Upon completion of the jute bag headwall the Contractor shall cap the top row of concrete-filled bags with a layer of plain concrete, minimum 150mm (6") thick, and hand trowelled to obtain a brushed finish appearance. If the cap is made more than 150mm thick, the Contractor shall provide two (2) continuous 15M reinforcing bars (or equivalent mesh) set at mid-depth and equally spaced in the cap. The Contractor shall fill all voids between the concrete-filled jutebags and the corrugated steel pipe with concrete, particular care being taken underneath the pipe haunches to fill all voids. All concrete used for the footing, cap and bags shall have a minimum compressive strength of 21MPa in 28 days and include 6% ± 1% air entrainment.

XV. SLOPED QUARRIED LIMESTONE EROSION PROTECTION – CONCRETE BLOCK HEADWALLS

The sloped quarried limestone erosion protection shall be embedded into the sideslopes of the drain at a minimum thickness of 305mm and shall be underlain in all cases with a synthetic filter mat. The filter mat shall not only be laid along the flat portion of the erosion protection but also contoured to the exterior limits of the quarried limestone and the unprotected slope. The width and slope of the general erosion protection shall be as established in the accompanying drawing or as otherwise directed by the Drainage Superintendent and/or the Consulting Engineer during construction. In placing the erosion protection, the Contractor shall carefully tamp the quarried limestone pieces into place with the use of a shovel bucket so that the erosion protection when completed will be consistent, uniform and tightly laid. In no instance shall the quarried limestone protrude beyond the exterior contour of the unprotected drain sideslopes along either side of said protection. The synthetic filter mat to be used shall be **non-woven** geotextile MacTex MX 140 conforming to OPSS 1860 Class I, as available from Armtec Construction Products, or approved equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm (4") to a maximum of 250mm (10"), and is available from Walker Aggregates, in Amherstburg, Ontario, or approved equal.

XVI. BENCHMARKS

For use by the Contractor, we have established a Benchmark at the location where the structures are being replaced. The Drawings include details illustrating the work to be carried out. Benchmarks have been indicated and the Elevations have been shown and shall be utilized by the Contractor in carrying out its work. The Contractor shall note that a specific design elevation grade has been provided for the invert at each end of the pipe in the accompanying Drawings. The Drawings also sets out the pipe size, materials, and other requirements relative to the installation of the enclosure/covered drain structure. In all cases, the Contractor is to utilize the specified drain grade to set any new pipe installation. The Contractor shall ensure that it takes note of the direction of flow and sets all pipes to assure that all grades flow from upstream to downstream to match the direction of flow within the drain.

XVII. ANCILLARY WORK

During the course of any repair or improvements, the Contractor will be required to protect or extend any existing tile ends or swales to maintain the drainage from the adjacent lands. All existing tiles shall be extended utilizing Boss 1000 or equal plastic pipe of the same diameter as the existing tile and shall be installed in accordance with the **"Standard Lateral Tile Detail"** unless otherwise noted. Connections shall be made using a Manufacturer's coupling wherever possible. Openings into new pipes shall be neatly saw-cut to the satisfaction of the Drainage Superintendent and/or the Consulting Engineer. For other connections, the Contractor shall utilize a grouted connection. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland Cement with just sufficient water added to provide a stiff plastic mix. The mortar joint shall be of sufficient mass around the full circumference of the joint on the exterior side to ensure a tight, solid seal. The Contractor is to note that any intercepted pipes along the length of the existing pipes are to be extended and diverted to the downstream end of the new pipe unless otherwise noted in the accompanying drawings.

Where the enclosure/covered drain installation interferes with the discharge of an existing swale, the Contractor shall re-grade the existing swales to allow for the surface flows to freely enter the drain. Any disturbed grass areas shall be fully restored with topsoil, seed and mulch. The Contractor shall also be required as part of the enclosure/covered drain replacement to excavate and widen the drain bottom where required to fit the new pipes in order to provide a smooth transition between the new culvert installation and the existing drain.

The Contractor, when doing their excavation or any other portion of the work, shall be very careful not to interfere with, plug up or damage, any existing surface drains, swales and lateral or main tile ends. If it is found that said existing drains are interfered with in any way, the Contractor will be required to unplug or repair said drains immediately, at no extra cost to the project. If it is found that any existing lateral tiles or main tile drains or tile ends have been cut off or damaged in any way during the course of the work, the Contractor will be required to either repair or replace same, to the satisfaction of the Drainage Superintendent and the Consulting Engineer.

The Contractor shall take steps to protect all legal survey bars during the course of its work. If any bars are removed or damaged, the Contractor shall arrange for an Ontario Land Surveyor licensed in the Province of Ontario to replace same, all at its cost.

All of the work required towards the installation and improvements to all structures shall be performed in a neat and workmanlike manner and the general site shall be restored to its' original condition, and all of same is to be performed to the satisfaction of the Drainage Superintendent and the Consulting Engineer.

XVIII. TOPSOIL, SEED AND MULCH

During the course of its excavation operations, the Contractor will be required to salvage all available topsoil. Where necessary, this material shall be stockpiled by the Contractor in order to avoid contamination and shall be utilized in carrying out the topsoil placement along all specified newly excavated and filled or disturbed areas, in preparation for the seeding and mulching operation to be carried out as part of the restoration works. The Contractor shall be required to use the scavenged topsoil stripped from the drain banks. The balance of the topsoil required shall be obtained by the Contractor at its own expense.

The Contractor shall be required to restore all existing grassed areas and drain side slopes damaged or distrubed by the structure installation and/or removal, and place topsoil and seed and mulch over said areas including any specific areas noted on the Drawings. The Contractor shall be required to provide all the material and to cover the above-mentioned surface areas with approximately 50mm of good, clean, dry topsoil on slopes and 100mm of good, clean, dry topsoil on horizontal surfaces, fine graded and spread in place ready for seeding and mulching. The Contractor is to note that prior to fine grading the topsoil over the backfilled areas, positive drainage is to be provided off of these areas and into the swales, and the Contractor shall also be required to make minor changes where necessary to ensure same. The Contractor shall be required to restore all existing grassed areas and roadway boulevard areas damaged by the enclosure/covered drain work, and shall provide topsoil and seed and mulch over all of these areas. The placing and grading of all topsoil shall be carefully carried out according to Ontario Provincial Standard Specifications, Form 802, dated November 2010, or as subsequently amended or as amended by these Specifications. Once the topsoil has been properly placed and fine graded, the Contractor shall seed and mulch the area. Seeding and mulching operations shall be carried out according to Ontario Provincial Standard Specifications, Form 572, dated November 2003, or as subsequently amended or as amended by these Specifications. The seeding mixture shall be OSECO Seed Mixture Canada No. 1, as available from Morse Growers Supply in Leamington, or equal. As part of the seeding and mulching operation, the Contractor will be required to provide either a hydraulic mulch mix or a spread straw mulch with an adhesive binder in accordance with OPSS 1103.05.03 dated November 2016, or as subsequently amended, to ensure that the grass seed will be protected during germination and provide a thick, uniform cover to protect against erosion, where necessary. All work shall be completed to the satisfaction of the Drainage Superintendent or the Consulting Engineer.

All of the work relative to the placement of topsoil and the seeding and mulching operation shall be meticulously done and completed in a good and workmanlike manner all to the satisfaction of the Drainage Superintendent or Consulting Engineer.

XIX. XVI. FINAL CLEANUP AND RESTORATION

The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no portion shall be left in any untidy or incomplete state before subsequent portions are undertaken.
All roadways, driveways and access bridges, or any other means of access onto the job site shall be fully restored to their former condition at the Contractor's expense. Before authorizing Final Payment, the Drainage Superintendent or the Consulting Engineer shall inspect the work in order to be sure that the proper restoration has been performed. In the event that the Contractor fails to satisfactorily clean up any portion of these accesses, the Consulting Engineer shall order such cleanup to be carried out by others and the cost of same to be deducted from any monies owing to the Contractor.

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Peralta Engineering

SPECIAL PROVISIONS

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PROJECT **Jamis Drain and Branches**
Part of Lot 10, Concession 1 E.D.
(Geographic Township of Gosfield South)
Town of Kingsville, County of Essex
Project No. D22-114

I. GENERAL SCOPE OF WORK

These specifications, along with the Report, Appendices, Standard Specifications and the accompanying drawings, consider the furnishings of all labour, equipment and materials required for the performance of all operations related to the creation of a new Municipal Drain known as the "Jamis Drain and Branches" under the provisions of the "Drainage Act, RSO 1990, Chapter, D.17, as amended 2021". This new drainage system shall consist of a new smoothwall HDPE plastic pipe with bell and gasket joining system connections (or approved equal), granular bedding, new precast concrete catch basin maintenance holes, HDPE plastic junction boxes, ditch inlet catch basins, and an Oil Grit Separator with all appurtenances. These works shall include the excavation and construction of grassed storage areas and overflows, surface water inlets, cutoff berms, stormwater service connections, and scavenging any available topsoil. These works shall also include the supply and placement of fill material, with swale construction, topsoil, seeding and mulching, and all other ancillary work which provides a complete and satisfactory job.

All work shall be carried out in accordance with these Special Provisions and Standard Specifications that serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. The Contractor shall review the information outlined within **Appendix "A", "Appendix "B",** and **Appendix "C"**. The works shall be further carried out in accordance with the accompanying drawings labeled herein as **Appendix "E"**. Where there are differences between the Special Provisions and the Standard Specifications included herein, the Special Provisions shall govern. The covered drainage system shall be of the size, type, depth, etc., as is shown in the accompanying drawings, as determined from the **Benchmark**, and as may be further laid out at the site at the time of construction. All work carried out under this project shall be completed to the satisfaction of the Drainage Superintendent or the Consulting Engineer.

II. CONSERVATION AUTHORITY AND DFO CONSIDERATIONS

The Contractor shall be required to implement stringent erosion and sedimentation controls during the course of the work to minimize the amount of silt and sediment being carried downstream. It is intended that work on this project be carried out during relatively dry weather to ensure the proper site and drain conditions and to avoid conflicts with sediment being deposited into the outlet drainage systems. All disturbed areas shall be restored as quickly as possible with grass seeding and mulching installed to ensure a protective cover and to minimize any erosion from the work site subsequent to construction. The Contractor may be required to provide temporary silt fencing and straw bales as outlined further in these specifications.

All of the work shall be carried out in accordance with any permits or authorizations issued by the Conservation Authority or the Department of Fisheries and Oceans (DFO), copies of which shall be provided, if available. The Contractor is advised that no work shall be carried out in the existing drain from March 15 to July 15, of any given year.

As part of its work, the Contractor shall implement the following measures that shall ensure that any potential adverse effects on fish and fish habitat shall be mitigated:

a. As per standard requirements, work shall not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work shall be done in the dry.

b. All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition than what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.

c. To prevent sediment entry into the drain, in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with related Ontario Provincial Standards. It is incumbent on the proponent and its contractors to ensure that sediment and erosion control measures are functioning properly and are maintained/upgraded as required.

d. Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.

e. All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.

Not only shall the Contractor comply with all of the above, but it shall also be required to further comply with notes included within the correspondence with the ERCA and the Letter of Advice provided by the DFO. Both of these documents are included in **Appendix "A"**.

III. MECP CONSIDERATIONS

The Ministry of Natural Resources and Forestry (MNRF) has transitioned the responsibilities of the Species at Risk Provincial Legislation to the Ministry of the Environment, Conservation and Parks (MECP). With the proposed works proceeding under Section 4 of the Drainage Act, this project would not qualify for exemptions under Section 23.9 of the Endangered Species Act, 2007. Therefore, following the "Guidelines for Activities Under the Drainage Act" presentation to the Drainage Superintendents of Ontario (DSAO) Member Chapters, dated June 21st – 24th, 2021, our office provided the MECP with an Endangered Species and Critical Habitat Review submission for their review and comments. This document outlines the potential impacts on affected species and their habitat, together with measures for avoidance and minimizing adverse effects. A copy of our submission has been included in **Appendix "A"**.

Prior to commencing work, it is the responsibility of the Contractor to make certain that necessary provisions are undertaken to ensure the protection of all Species at Risk and their habitats throughout the course of construction. The Contractor will be responsible for providing the necessary equipment and materials required by the mitigations and shall contact the Drainage Superintendent immediately if any Endangered Species are encountered during construction.

IV. ACCESS TO WORK

The Contractor is advised that a portion of the work shall be carried out along the Road 2 East right-of-way and extends through private lands. The Contractor shall have access to the full length of the roadway abutting the proposed drainage works along Road 2 East. The Contractor may use the entire width of the Road 2 East right-of-way as necessary to permit the completion of the work required to be carried out for this project. The Contractor may also utilize the access for Part 1 of the Plan of Survey included in **"Appendix B"** to gain access to the established working corridors on private lands.

In addition to the access from Road 2 East, the Contractor may utilize the existing access at 1670 County Road 20 from County Road 20 to gain access to the established working corridors on private lands.

Under no circumstances shall the Contractor utilize other private lands. The Contractor shall note that any deviation from the above-mentioned accesses without the explicit approval of the adjacent landowners and the Drainage Superintendent could result in the Contractor being liable for damages sustained. The value for such damage shall be determined by the Drainage Superintendent and the Consulting Engineer and be subsequently deducted from the Contract Price.

V. WORKING CORRIDORS

Initial Construction

Once access is obtained onto private lands, the Contractor shall be expected to keep the construction equipment and forces within the following areas during the initial construction:

Main Drain:

1. **From Station 0+000.0** to **Station 385.7**: Once access is obtained, the Contractor shall utilize a strip of land that extends from the south right-of-way limit of Road 2 East onto the subject property and extending 10.0 metres on both sides of the pipe alignment, having a total distance of 20.00 metres.

2. **From Station 0+385.7** to **Station 0+992.8**: The Contractor may utilize a strip of land extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres. This strip of land resides along the existing property line and extends onto the abutting lands to the east and west, along the course of the drain alignment.

West Branch:

3. **From Station 0+000.0** to **Station 0+078.4 W:** Once access is obtained, the Contractor shall utilize a strip of land for a total width of 10.0 metres extending onto private lands of Parts 1, 2, 3 and 4 of the accompanying Plan of Survey included in **"Appendix B."**

East Branch:

4. **From Station 0+000.0** to **Station 0+070.1 E:** Once access is obtained, the Contractor shall utilize a strip of land for a total width of 10.0 metres extending onto private lands of Parts 1, 5, 6 and 7 of the accompanying Plan of Survey included in **"Appendix B."**

Future Maintenance

For any future maintenance performed on the new alignment of the Jamis Drain and Branches, the contractor shall be expected to keep all equipment and forces within the following working corridors:

Main Drain:

1. **From Station 0+000.0** to **Station 0+123.4**: Once access is obtained, the Contractor shall utilize a strip of land that extends from the south right-of-way limit of Road 2 East onto Part 1 and extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres.

2. **From Station 0+123.4** to **Station 0+385.7**: The Contractor may utilize a strip of land extending 3.0 metres on both sides of the pipe, having a total distance of 6.00 metres through Part 1.

3. **From Station 0+385.7** to **Station 0+992.8**: The Contractor may utilize a strip of land extending 3.00 metres to the west and 3.00 metres to the east of the pipe centreline, for a total distance of 6.00 metres. This strip of land resides along the existing property line and extends onto the abutting lands to the east and west, along the course of the drain alignment.

West Branch:

4. **From Station 0+000.0** to **Station 0+078.4 W:** Once access is obtained, the Contractor shall utilize a strip of land for a total width of 3.0 metres extending onto private lands of Parts 1, 2, 3 and 4 of the accompanying Plan of Survey included in **"Appendix B."**

East Branch:

5. **From Station 0+000.0** to **Station 0+070.1 E:** Once access is obtained, the Contractor shall utilize a strip of land for a total width of 3.0 metres extending onto private lands of Parts 1, 5, 6 and 7 of the accompanying Plan of Survey included in **"Appendix B."**

General

The Contractor shall refrain from using any other lands within the subject work site unless otherwise permitted by the Owner and Drainage Superintendent during construction. Confirmation of other permitted working areas must be obtained from the Owner and Drainage Superintendent in writing.

The Owner may permit access to the Contractor to stockpile any excess excavated materials for future use by the Owner.

Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include, but not be limited to all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to make good any damage caused. Any damages caused, resulting from non-compliance with the above-noted provisions, shall be restored by the Contractor to its original condition, at the Contractor's expense.

The Contractor is advised that all excavated material from the work along the residential and lawn area shall be hauled away and disposed of by the Contractor at its own expense. In all cases, the disposal of any trucked material will be the responsibility of the Contractor and any work at the disposal site shall be established between the Contractor and the Site Owner. The Contractor shall ensure that any permits required for fill disposal are obtained from the appropriate authority. The Contractor shall be responsible for keeping all private and public roadways free and clear of mud and debris resulting from its use of same for access and hauling purposes.

VI. COVERED DRAINAGE DETAILS

Geometry and Alignment

The proposed drain excavation shall be of the size, shape, type, depth, width, etc., as shown in the accompanying drawings and as determined from the Benchmark. When works are completed adjacent to a fence row or the travelled portion of the roadway/laneway, all excavation, sloping and widening shall be completed from the furthest side of the drain from this feature, unless otherwise noted or established by the Drainage Superintendent and/or Consulting Engineer.

The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and/or Consulting Engineer can review and verify that the work will generally conform with the design and project intent. The cost of placing layout stakes shall form part of their tender price.

Profile

The excavation and installation of the proposed drain must adhere to the depths and grades as established within the accompanying profile. The Contractor shall ensure that the profile grades are constructed with an even gradient to prevent standing water. Laser Control must be provided to maintain lines and grades, and the Contractor shall have a qualified Operator to set up and operate the equipment. In some instances, but only at the discretion of the Consulting Engineer, an approved system of batter boards or stakes may

be utilized for this purpose. However, the cost of placing grade stakes and determining the cut information shall be provided by or paid for entirely by the Contractor.

VII. BRUSHING, GRUBBING, AND PREPARATION FOR THE NEW DRAIN ALIGNMENT

Prior to the installation of the proposed covered drainage system, the existing alignment between Station 0+0+385.7 and Station 0+992.8, the Contractor shall prepare these lands for this operation. The Contractor shall remove all existing brush, trees and tree stumps, which exist within the new drain alignment. Brush, trees and tree stumps removed from these lands may either be put into piles by the Contractor at locations where they can be safely burned, or they shall be trucked away and disposed of off-site. If the materials are intended to be burned on-site, the Contractor shall, prior to and during the burning operations, comply with the guidelines prepared by the Air Quality Branch of the Ministry of Environment and shall ensure that the Environmental Protection Act is not violated. The Contractor shall be required to notify the Municipality and advise them of their burning operations. The Contractor shall also be required to contact the local Fire Chief and notify them of these operations to avoid any false alarms.

The Contractor shall also be required to grub out and close-cut all of the vegetation which exists along the alignment and dispose of same to a site to be obtained by the Contractor at his own expense. In order to conserve topsoil to finish off the filling of the covered drain, the Contractor shall strip all topsoil along the ditch headlands on both sides of the existing ditch and said topsoil is to be stockpiled along the drain a sufficient distance away to allow for temporary piling of backfill material.

Also, as part of his cleanup work, the Contractor shall be required to load up and haul away and dispose of all deleterious materials along the course of the drainage works. All overhanging branches and limbs shall be neatly cut and pruned taking care to protect trees where they can be preserved. All such removed material shall be disposed of as noted above.

VIII. DETAILS OF COVERED DRAIN WORK

The Contractor shall carry out the necessary excavation, together with all required labour and material, to construct a new covered drain at the location and alignment shown on the accompanying drawings. The covered drain shall consist of 320kPa, smoothwall HDPE plastic pipe assembled together with the use of a bell and gasket joining system, connected to a series of specified 600mm square pre-cast concrete inline catch basin maintenance holes with cast iron frame and grates, ditch inlet catch basins, 1200mm diameter pre-cast concrete maintenance holes, 600mm diameter HDPE plastic basin junction boxes and Oil Grit Seperator.

IX. ALTERNATIVE COVERED DRAINAGE SYSTEM INSTALLATION

Given the proposed diameter and length of drainage pipe to be installed for this project, consideration will be given to the installation of a coiled flexible dual-wall drainage pipe installed utilizing a drainage tile plow with appropriate boot attachments, pending approval from the Engineer. The flexible dual-wall drainage pipe and connections shall meet ASTM F3390 and F667 standards, or approved equal, with soil-tight connections joined together with split couplers and/or tile tape and installed per manufacturers

recommendations. Furthermore, the Contractor would have to demonstrate competent understanding of the installation of dual-wall flexible drainage pipe utilizing a drainage tile plow with GPS guidance, for its installation.

X. PRIVATE STORM CONNECTIONS

All private service connections (private drain connection/PDC) shall be 150mm in diameter and teed into the covered drain and shall be constructed where directed by the Engineer or as shown on the drawings. The Contractor shall supply and install at the street line, a piece of 5cm x 10cm lumber, painted green, which will be of sufficient length to go from the invert of the private service connection to 30cm above finished ground elevation.

The pipe materials for the private service connections shall be of PVC smoothwall plastic pipe or equivalent. All connections shall be made utilizing factory tees, saddles, and fittings installed in accordance with the Manufacturer's recommendations.

Where shown on the plans, the Contractor shall supply and install a cleanout at the end of the new storm service connection located 1.50 metres east of the proposed drain alignment and in accordance with the **"Typical Service Connection and Cleanout Detail"** on Sheet 8 of the accompanying drawings. The cleanout cap shall be installed with a metal insert for future identification with the use of a metal detector.

Where the depth of the main sewer permits, all private service connections shall be laid on a grade of 1cm per metre, or as shown on the plans.

XI. DRAINAGE STRUCTURES

All structures shall be to the description as described within the drawings or within these specifications. The Contractor shall follow all installation guidelines provided by the Manufacturer in all cases. All drainage structures shall be installed as described within Section IX. DRAINAGE STRUCTURE INSTALLATION of the Standard Specifications for Enclosures/Covered Drain Installation.

Junction Boxes

Where specified through private lands, 600mm diameter HDPE basin junction boxes shall be installed with a solid steel lid. The removable solid steel lid shall be soil-tight and fastened securely to the HDPE Structure to avoid displacement while being buried. The top of the junction box shall be set approximately 305 mm (12") below the existing ground elevation.

Oil Grit Separator

An Oil Grit Separator (OGS) has been specified for this project and shall meet all specified parameters. The unit specified is sourced by Advanced Design Systems (ADS) Pipe. This unit shall meet the specifications as outlined in the "ADS OGS Sizing Summary" included within the attached "Stormwater Management Report" forming part of **Appendix "C"**.

The installation of the OGS unit shall be in accordance with the ADS recommended installation guidelines, utilizing a Class I (ASTM D2321) structural backfill material, or approved equal. The Contractor shall contact their local supplier representative for further information.

XII. EARTHWORKS AND EXCAVATIONS

Grassed Storage Areas

Also forming part of this Municipal Drain are the two grassed storage areas intended to store excess stormwater runoff from the project site. These areas shall be constructed to the general shape and dimensions as indicated in the "**SWM Grading Plan – Proposed Grassed Storage Area**" details on Sheet 8 of the accompanying drawings. The grassed storage area shall also conform to the details outlined within the attached "Stormwater Management Report" forming part of **Appendix "C"**. The bottom of the grassed storage areas shall be graded to the outlet pipes as noted within the accompanying drawings. The excavation of the side slopes of the pond shall be no steeper than 4 horizontal to 1 vertical. All excavated materials are intended to remain on-site and utilized for the construction of the proposed berms within the project site. Once the excavation process has been completed, the entirety of the excavated areas shall be covered with topsoil and seed as described in section XVIII. TOPSOIL, SEED AND MULCH of the Standard Specifications for Enclosures/Covered Drain Installation.

Construction of Cutoff Berms

Also forming part of this Municipal Drain is a cutoff berm located at the southern limits of the Solid Rock Homes Inc. (290-38900) Severance 1 to restrict and convey overland flow to this drain.

The Contractor shall provide all labour, material, and equipment, to construct the new earthen berms, to the lines, levels, and grades as is shown in the and detailed on Sheet 5 of the accompanying drawings. The earthen berms shall further be constructed to the minimum elevations, and top widths, as noted on the plans. The finished side slopes shall be no steeper than indicated on the plans, profiles and cross-sections for each section of the berm.

The Contractor is advised that the berm shall be constructed utilizing material excavated from the construction of the grassed storage area. Any excess fill material may be utilized to supplement the berm construction or placed elsewhere on site per the Owner's direction. Otherwise, the excess fill material shall be hauled away and disposed of by the Contractor at its own expense. It is expected that the excavation work from the grassed storage areas and swale construction will provide sufficient material for the construction of the entire berm. Should adequate fill not be available onsite for the proposed berm construction, the Contractor shall provide imported fill material to make up for the shortfall in materials needed to construct the berms.

Once the berm installation is complete, the entirety of the constructed berm shall be covered with top soil and seed as described in section XVIII. TOPSOIL, SEED AND MULCH of the Standard Specifications for Enclosures/Covered Drain Installation.

In all cases, the disposal of any deleterious trucked material will be the responsibility of the Contractor and any work at the disposal site shall be established between the Contractor and the site owner. The Contractor

shall ensure that any permits required for fill disposal are obtained from the appropriate authority. The Contractor will be responsible for keeping all private and public roadways free and clear of mud and debris resulting from its use of same for access and hauling purposes.

XIII. EROSION PROTECTION

At specified locations where detailed on the plans, the Contractor shall supply and install all materials and labour to place general erosion protection as shown and detailed on the plans. More specifically, quarried limestone on non-woven filter cloth shall be installed at the grassed storage area and berm overflow spillways, together with supplementing the existing quarried limestone at the outlet portion of the new Municipal Drain. The installation procedure and material characteristics shall conform to section XII. SLOPED QUARRIED LIEMSTONE EROSION PROTECTION of the Standard Specifications for Enclosures/Covered Drain Installation.

XIV. GENERAL CONSTRUCTION PROVISIONS

The Contractor is to note that several legal survey bars exist within the work area and it is to take whatever steps necessary to protect all of same. If any bars are damaged or removed by the Contractor, it shall arrange for an Ontario Land Surveyor licensed in the Province of Ontario to restore same, all at its cost.

The Contractor is to note that there are existing public utilities near the alignment of the drainage system along Road 2 East. The contractor shall verify the location and depth of this utility as well as any other possibly conflicting utilities as part of their exploratory excavations. Additionally, the Contractor shall take extreme care when performing its works around these utilities.

The alignment of the covered drain throughout shall be to the full satisfaction of the Drainage Superintendent. The whole of the work shall be done in a neat, thorough and workmanlike manner to the full satisfaction of the Drainage Superintendent.

The Contractor shall satisfy itself as to the exact location, nature and extent of any existing structure, utility or other object that it may encounter during the course of the work. The Contractor shall indemnify and save harmless, the Municipality and the Engineer for any damages which it may cause or sustain during the progress of the work. The Contractor shall not hold the Municipality of Lakeshore, County of Essex or the Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.

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APPENDIX "A"

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Essex Region Conservation Authority
Correspondence

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Nolan Harris

From: Summer Locknick <SLocknick@erca.org>
Sent: January 18, 2024 2:32 PM
To: Tony Peralta
Cc: James Bryant
Subject: RE: Jamis Drain and the Solid Rock Homes Development

Good afternoon Tony,

Thank you for providing the Preliminary Reports and Drawings for the Jamis Drain and Branches, Project No. D22-114. Staff have had an opportunity to review the preliminary reports/drawings and the available information and can confirm that this proposal, as presented in the preliminary stages, is something that this office can support.

We look forward to receiving the Final Drainage Report and Drawings. A completed Application for Permit form will be required from the municipality.

If you have any questions, please do not hesitate to contact this office.

Kind regards,

SUMMER LOCKNICK
Regulations Analyst
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
slocknick@erca.org essexregionconservation.ca

From: Tony Peralta <tony@peraltaengineering.com>
Sent: Thursday, January 18, 2024 1:22 PM
To: Summer Locknick <SLocknick@erca.org>
Cc: James Bryant <JBryant@erca.org>
Subject: FW: Jamis Drain and the Solid Rock Homes Development

Good afternoon Summer;

Unfortunately, my first attempt to send you this email was stuck in my outbox due to its size and I didn't realize that it was not sent.

Below and the following link includes the reference emails related to this project: Jamis Drain Reference Info

If you have any questions or concerns, please feel free to contact us.

Regards,

Tony Peralta, P.Eng.
tony@peraltaengineering.com | 519-733-6587 x 122
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

From: Jessie Hou <jessie@peraltaengineering.com>
Sent: Thursday, January 11, 2024 6:10 PM
To: James Bryant <JBryant@erca.org>
Cc: Heide Mikkelsen <heide@peraltaengineering.com>; Tony Peralta <tony@peraltaengineering.com>
Subject: RE: Jamis Drain and the Solid Rock Homes Development

Good afternoon James,

Thank you for the comments and please see the attached revised SWM Report for the proposed Solid Rock Homes development.

Regarding the comments,

1. It is a typo, which should be “1:100-year maximum allowable flow rate for Watershed-2” instead of “stress test flow rate for Watershed-2”. We have also corrected the 1st paragraph of Section V on Page 3/7 of the SWM Report for Watershed-1.
2. The Shape Factor could be smaller as Watershed-2 is relatively remaining the pre-development conditions. We just would like to be more conservative by using a larger Shape Factor.

Please let us know if you have any further questions.

Regards,

Jessie (Jun) Hou, E.I.T.
jessie@peraltaengineering.com | 519-733-6587
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

From: James Bryant <JBryant@erca.org>
Sent: Wednesday, January 10, 2024 2:25 PM
To: Heide Mikkelsen <heide@peraltaengineering.com>
Cc: Tony Peralta <tony@peraltaengineering.com>
Subject: Jamis Drain and the Solid Rock Homes Development

Hi Heide and Tony,

I have completed a review of the Drainage Report and the SWM report for the Jamis Drain (and associated branches) and the SWM Report for the proposed solid Rock Homes development. The Drainage Report seems to address the necessary concerns and will not have any negative impacts to the downstream receiver or exacerbate existing conditions with respect to erosion (as identified in an ongoing Engineer's Report under the Drainage Act by others). The SWM report appears to address the necessary concerns with respect to these same elements (flood attenuation, quality control, and erosion control). However, below are some very basic comments/questions that I hope to receive some simple clarification for.

1. Page 4 of 7 of the SWM Report, Section VII, 1st paragraph, specifies that the 150mm stress test event calculated release rate from Watershed-2 (the undeveloped retained portion) is ~85 L/s. This value appears to be roughly double the values calculated within the Hydrographs for Watershed-2 and displayed in the tables. Image below is from Appendix SWM-B:

Hydrograph Detention Summary Table (Watershed 1 & 2)

Hydrograph ID	Rainfall Event Description	Allowable Flow Rate (cms)	[Watershed-1] Peak Flow Rate (cms)	[Watershed-2] Peak Flow Rate (cms)	[Watershed 1 & 2] Peak Flow Rate (cms)
No. 5	100-yr 4-hr 81.6mm	0.125	0.035	0.037	0.072
No. 6	100-yr 24-hr 108mm	0.125	0.035	0.037	0.072
No. 7	150mm Stress Test	N/A	0.036	0.039	0.075

The Stage/Storage/Discharge Tables also indicate roughly 40L/s under stress test conditions, with a HWL of 197.30m.

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	195.83	0.00	---	---	---	---	---	---	---	---	---	0.000
0.67	0.2	196.50	0.03 oc	---	---	---	---	---	---	---	---	---	0.026
0.77	6.7	196.60	0.03 oc	---	---	---	---	---	---	---	---	---	0.028
0.87	61.2	196.70	0.03 oc	---	---	---	---	---	---	---	---	---	0.030
0.97	220.9	196.80	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.07	509.3	196.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.17	933.8	197.00	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.27	1,500.2	197.10	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.37	2,211.8	197.20	0.04 oc	---	---	---	---	---	---	---	---	---	0.038
1.47	3,081.6	197.30	0.04 oc	---	---	---	---	---	---	---	---	---	0.040
1.57	4,114.3	197.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.041
1.61	4,570.7	197.44	0.04 oc	---	---	---	---	---	---	---	---	---	0.042

While there is no risk associated with this, can you please confirm that the discharge is 40 L/s under stress test conditions for Watershed-2, and modify any language within the report accordingly as the documnt may be referenced in the future.

2. In Watershed-2, the post-development hydrographs have a Shape Factor of 484. Considering the "post development" condition for Watershed-2 is remaining as relatively undisturbed agricultural land (unsure of actual slope of topography), is 484 representing this area appropriately for these calcluations? Again, I do not see risk associated with the current calculation; however, I'm curious to know if I am misinterpreting the application here.

Other than those two questions, I do not see anyting else in my review at this time. We would of course require the full application and associated documents for each part of the project at the right time. Drainage Act would be separate ($800 is only for the Drainage Act portion) and there are assoicated fees related to the development file. Additionally, Planning Fees will be charged for the Consent Application that is circulated to us by the Town. In this instance, I have reviewed the majority of the work and feel confident in the proposal at this stage.

Please feel free to call me on my cell if needed.

—
JB

JAMES BRYANT, P.Eng.
Director of Watershed Management Services
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 | Essex, Ontario | N8M 1Y6
P. 519-776-5209 x 246 | F. 519-776-8688
jbryant@erca.org www.essexregionconservation.ca

While this email is sent when it is convenience for me, I do not expect a response or action outside of your own regular working hours.

The ERCA Office is open to the public **Tuesdays, Wednesdays and Thursdays** to provide "counter service"; however, services continue to be delivered online and through email. Please consult ERCA's website for more information and direction regarding online services (i.e. permitting, cottage bookings, seasonal passes etc.)

Kiara Kirkland

From: Tony Peralta
Sent: November 4, 2023 10:49 AM
To: drainage@erca.org
Cc: Lu-Ann Marentette; James Bryant (JBryant@erca.org); Summer Locknick; Heide Mikkelsen; Jessie Hou
Subject: RE: Solid Rock Homes Petition (Jamis Drain) - Town of Kingsville - D22-114
Attachments: 20231103 - Stormwater Management Report - Solid Rock Homes Inc. Development - E21-092.pdf; 20231103 D22114 Solid Rock Homes Inc. - Residential Development - Review and Approval - R.pdf; 20231103 D22114_Jamis Drain and Branches - Preliminary for Review - R.pdf

Good morning;

Further to the previous correspondence outlined below, we have completed our preliminary design for the above-noted project. As a result, we wish to provide you with a copy of our proposal for review.

As previously established, we have been appointed by the Town of Kingsville, under Section 4 of the Drainage Act, to provide an Engineer's Report to provide a legal drainage outlet to facilitate the development of the lands currently owned by Solid Rock Homes Inc (290-38900), in Part of Lot 10, Concession 1 E.D., in Kingsville. Currently, the subject property is without a legal drainage outlet and has never been part of a Municipal Drain watershed. The subject property has historically formed part of the overall watershed contributing to an existing Natural Watercourse (south of the subject property) that commences on the north side of County Road 20 and extends across this road, through private lands, and into Lake Erie. Unfortunately, with the continual development of the adjacent lands over time, surface runoff from the subject property has been disconnected from its natural drainage outlet. However, based on the associated sandy soils, any accumulated runoff on the site will eventually find its way to its natural drainage outlet.

After evaluating all available drainage outlets surrounding the subject property, it was determined that the only viable drainage outlet for this property is to convey all flows to its natural drainage outlet into the Natural Watercourse. With the limited capacity associated with the existing drainage infrastructure conveyed to this outlet, we propose a separate drainage system to facilitate the subject property.

Further to ERCA's comments below, we understand that there should be no adverse impacts to the drainage scheme upstream or downstream and consideration shall be given to the existing assignment to incorporate the natural watercourse as a legalized municipal drain to establish a sufficient outlet. As already noted, the subject lands have always formed part of the Natural Watercourse watershed as agricultural lands. With the proposed development of the subject lands, stormwater management provisions have been included as part of this project to reduce the discharge to pre-development flows (or less). Please refer to the attached Stormwater Management (SWM) Report for the "Solid Rock Homes Inc. Proposed Residential Development". With the provisions outlined within the accompanying drainage plans, together with the SWM report, we confirm that our proposal will have no adverse impacts on the downstream watercourse.

The new drainage system includes a HDPE covered drain varying in size from 150mm to 300mm dia. The drainage system will include various surface inlets, a stormwater management storage area, OGS, and various maintenance accesses throughout. This new drainage system in its entirety shall hereinafter be known as the **Jamis Drain and Branches**.

We have reviewed the DFO website as it relates to the Fisheries Act and have performed a "Self Assessment" for this project with a Request for Review submission and have received the necessary approval from DFO. Also, as it relates to

the Endangered Species Act, we have made Species at Risk and Critical Habitat submissions to the MECP for their consideration.

We trust that this information is satisfactory. However, if you have any concerns or require additional information, please contact us at your earliest opportunity as we intend to finalize this report shortly.

Regards,

Tony Peralta, P.Eng.
tony@peraltaengineering.com | 519-733-6587 x 122
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

From: Ashley Gyori <AGyori@erca.org>
Sent: Friday, March 24, 2023 11:07 AM
To: Matthew Shiha <matthew@peraltaengineering.com>; Tony Peralta <tony@peraltaengineering.com>
Cc: Ken Vegh <kvegh@kingsville.ca>
Subject: RE: Solid Rock Homes Petition Drain - Town of Kingsville - D22-114

Good morning Matthew and Tony,

Further to Tony's instructions on March 22nd, 2023, I have the following comments to provide with respect to the above project.

A review of the floodplain mapping indicates that the proposed enclosed drainage system is not within a Regulated Area that is under the jurisdiction of the Essex Region Conservation Authority; however, based on your correspondence, this covered drainage system will be outletting to a natural watercourse that is located within an area that is under the jurisdiction of the Essex Region Conservation Authority (Section 28 of the *Conservation Authorities Act*). As such, any proposed works, will require review from this office and an approval prior to the works being undertaken.

At this time, we do not expect that there will be any extraneous comments or concerns with respect to this project; however, the engineering report will need to confirm that the level of service of the proposed drainage system is appropriate and that there are no adverse impacts to the drainage scheme upstream or downstream. We cannot be more specific in this regard without an actual proposal to review. Prior to your office moving forward with the final report, we kindly request that you provide us with the opportunity to review the preliminary design so that any additional or outstanding ERCA comments can be addressed prior to the meeting of consideration.

Additionally, in August 2020, our office received correspondence from Baird AE regarding improvements to the watercourse and incorporating the natural watercourse as a legalized municipal drain to establish a sufficient outlet. As per your correspondence, the conversion of the natural watercourse to a municipal drain will not be proceeding; however, as our previous records indicate that there were issues related to a sufficient outlet

through the natural watercourse, as well as erosion concerns, the engineering report will need to address these items.

It should be noted that the above comments are with respect to the proposed drainage works as they relate to Section 28 of the *Conservation Authorities* Act only. It is the proponent's responsibility to ensure that all municipal, provincial, and federal authorizations have been obtained and that all current applicable legislation is adhered to.

If you have any questions, please do not hesitate to contact me.

Kind regards,

ASHLEY GYORI
Regulations Analyst
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
agyori@erca.org • essexregionconservation.ca

From: Matthew Shiha <matthew@peraltaengineering.com>
Sent: Monday, February 13, 2023 10:31 AM
To: Ashley Gyori <AGyori@erca.org>
Cc: Tony Peralta <tony@peraltaengineering.com>; Ken Vegh <kvegh@kingsville.ca>
Subject: Solid Rock Homes Petition Drain - Town of Kingsville - D22-114

Good Morning Ashley,

We have been appointed by the Town of Kingsville, under Section 4 of the Drainage Act, to provide an Engineer's Report for the installation of a covered drainage system. This covered drainage system has been petitioned to facilitate the severance of seven residential properties from an agricultural property. The subject parcel is located within Concession 1 E.D., Lot 10, within Kingsville. The original petition has been submitted by Adam Penner on behalf of Solid Rock Homes Inc., as part of their development.

The proposed Municipal Drain shall outlet into a nearby Natural Watercourse, approximately 650.0m south of the subject parcel.

For your reference, please find attached a map showing the general location of the proposed Municipal Drain.

At this time, we would kindly request any initial comments or concerns relating to this appointment. Thank you for your time and attention to this project. We look forward to your response.

Regards,

Matthew Shiha, E.I.T.
matthew@peraltaengineering.com | 519-733-6587 x 145
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

Department of Fisheries and Oceans – Letter of Advice

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Kiara Kirkland

From: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Sent: March 13, 2023 2:15 PM
To: Tony Peralta
Cc: Ken Vegh (kvegh@kingsville.ca); Matthew Shiha
Subject: RE: 23-HCAA-00439 - Drain Installation, Town of Kingsville - Request for Review - Solid Rock Homes Drainage Petition D22-114
Attachments: General Mitigation Summary.pdf

Dear Tony Peralta:

Subject: Drain Installation, Union Avenue Drain, Unrated Drain, Town of Kingsville (23-HCAA-00439) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on March 2, 2023. We understand that you propose to:

- Utilizing smoothwall HDPE pipes sized to convey standard design flows and connected into the open channel of an existing natural watercourse south of the property;
- Not increase the footprint below the high water mark.

Our review considered the following information:

- Request for Review form and associated documents.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*;
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*;

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations.

Provided that the plans are implemented in the manner, and during the timeframe described, the Program is of the view that your proposal will not require an authorization under the *Fisheries Act*, or the *Species at Risk Act*. Additional information on measures to protect fish and fish habitat can be found in the attached document.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, and the *Species at Risk Act.*

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to FisheriesProtection@dfo-mpo.gc.ca or 1-855-852-8320.

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Carter Bryant at Carter.Bryant@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Carter Bryant
Biologist, Triage and Planning
Fish and Fish Habitat Protection Program

From: Tony Peralta <tony@peraltaengineering.com>
Sent: Thursday, March 2, 2023 5:36 PM
To: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Cc: Ken Vegh (kvegh@kingsville.ca) <kvegh@kingsville.ca>; Matthew Shiha <matthew@peraltaengineering.com>
Subject: 23-HCAA-00439 - Drain Installation, Town of Kingsville - Request for Review - Solid Rock Homes Drainage Petition D22-114

Good afternoon;

Our office has been appointed by the Town of Kingsville to provide an Engineer's Report, under Section 4 of the Drainage Act, for the installation of a new covered drain system. This covered drainage system has been requested by the adjacent landowner to facilitate the severance of multiple residential properties from the agricultural property.

The subject property is currently without a legal drainage outlet and is a minimum of 650m from a viable drainage outlet. Additionally, we have also reviewed the DFO Aquatic Species at Risk maps which have stated there are no aquatic species at risk within the vicinity of our project, per our attached documents.

This proposed covered Municipal Drain will run between existing agricultural properties in a southerly direction and discharge to the top end of a naturally forming channel located north of County Road 20, which is connected to Lake Erie through an existing ravine.

We have been working in close consultation with the Town of Kingsville, the Essex Region Conservation Authority (ERCA) and other consultants to continue with the development. At this time, we are seeking input from the DFO to address any comments and concerns as they relate to the Fisheries Act and/or SAR.

Based on the DFO Self-Assessment website, we would kindly request a review of this project.

Please find attached the following documents:

1. "Request for Review" form
2. Appendix ‘A’ - Maps illustrating the project site and location
3. Appendix ‘B’ - Photos of the site and existing roadside ditch

I trust that this information is satisfactory to conduct your review. However, we understand that you may have questions and/or concerns. If so, please feel free to contact us using the information provided below.

We look forward to your response.

Regards,

Tony Peralta, P.Eng.
tony@peraltaengineering.com | 519-733-6587 x 122
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

General Mitigation for the protection of Fish and Fish Habitat

- Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed and migrate. Timing windows can be found at https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html.

- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas
    - Dewater gradually to reduce the potential for stranding fish

- Screen intake pipes to prevent entrainment or impingement of fish
    - Use the code of practice for water intake screens

- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity
    - Limit access to banks or areas adjacent to waterbodies
    - Prune or top the vegetation instead of grubbing/uprooting
    - Limit grubbing on watercourse banks to the area required for the footprint of works, undertaking or activity
    - Construct access points and approaches perpendicular to the watercourse or waterbody
    - Remove vegetation or species selectively and in phases
    - Re-vegetate the disturbed area with native species suitable for the site

- Replace/restore any disturbed habitat features and remediate any areas impacted by the work, undertaking or activity

- Conduct in-water undertakings and activities during periods of low flow or low water levels

- Limit the duration of in-water works, undertakings and activities so that it does not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, migrating)

- Maintain an appropriate depth and flow (i.e., base flow and seasonal flow of water) for the protection of fish and fish habitat

- Avoid obstructing and interfering with the movement and migration of fish

- Develop and implement an erosion and sediment control plan avoid or minimize the introduction of sediment into any waterbody during all phases of the work, undertaking or activity
    - Install effective erosion and sediment control measures prior to beginning work, undertaking or activity in order to stabilize all erodible and exposed areas
    - Regularly inspect and maintain the erosion and sediment control measures and structures during all phases of the project
    - Regularly monitor the watercourse for signs of sedimentation during all phases of the work, undertaking or activity and take corrective action
    - Keep the erosion and sediment control measures in place until all disturbed ground has been permanently stabilized
    - Remove all exposed non-biodegradable sediment control materials once site is stabilized
    - Use biodegradable erosion and sediment control materials whenever possible

    - Install settling basin and / or filtration systems for water flowing onto the site and water being pumped or diverted from the site
        - Do not release runoff water until suspended sediment has resettled in settling basin and runoff water is clear
        - Dewater gradually to prevent sediment resuspension and bank destabilization
    - Dispose of, and stabilize all excavated material above the High Water Mark or top of bank of nearby waterbodies and ensure sediment re-entry to the watercourse is prevented
    - Schedule work to avoid wet, windy and rainy periods (and heed weather advisories) that may result in high flow volumes and/ or increase erosion and sedimentation
    - Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse
        - Maintain the natural flow regime for any diversion works
    - Schedule work to avoid wet, windy and rainy periods (and heed weather advisories)
    - Operate machinery on land, or from barges or on ice

- Do not deposit any deleterious substances in the water course

- Develop and implement a response plan to avoid a spill of deleterious substances
    - Stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse
    - Keep an emergency spill kit on site during the work, undertaking or activity
    - Report any spills of sewage, oil, fuel or other deleterious material, whether near or directly into a water body
    - Ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse
    - Clean-up and appropriately dispose of the sediment-laden water and deleterious substances
    - Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the watercourse
    - Maintain all machinery on site in a clean condition and free of fluid leaks
    - Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water
    - Dispose all construction, demolition or commercial logging materials waste above the high water mark of nearby waterbodies to prevent re-entry

- Aquatic invasive species are introduced and spread through transporting sands and sediments and using contaminated construction equipment. To prevent aquatic invasive species during construction in aquatic environments:
    - clean, drain and dry any equipment used in the water
    - never move organisms or water from one body of water to another

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Ministry of the Environment, Conservation and Parks Endangered Species and Critical Habitat Review Submission

Peralta Engineering

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Kiara Kirkland

From: Matthew Shiha
Sent: September 14, 2023 1:54 PM
To: sarontario@ontario.ca
Cc: Tony Peralta; Lu-Ann Marentette
Subject: RE: Drain Installation, Town of Kingsville - MECP Request for Review - Solid Rock Homes Drainage Petition D22-114

Good Afternoon,

Concerning the correspondence below, we have not yet received a response on the status of the MECP's review of the proposed covered Municipal Drain. It has been approximately six months since our original submission to seek input from the MECP to obtain guidance on whether the proposed Municipal Drain requires authorization under the Endangered Species Act. Having not received a response to our original email, we are under the impression that there are no concerns with this project. Given this information, please be advised that we will be moving forward with this project unless comments are received in the interim.

Regards,

Matthew Shiha, E.I.T.
matthew@peraltaengineering.com | 519-733-6587 x 145
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

IMPORTANT: We have temporarily relocated to Unit 1-38 Erie Street North, Leamington ON N8H 2Z3 during the construction of the new office building at our Kingsville location.

From: Tony Peralta <tony@peraltaengineering.com>
Sent: Thursday, March 2, 2023 5:46 PM
To: sarontario@ontario.ca
Cc: Ken Vegh (kvegh@kingsville.ca) <kvegh@kingsville.ca>; Matthew Shiha <matthew@peraltaengineering.com>
Subject: Drain Installation, Town of Kingsville - MECP Request for Review - Solid Rock Homes Drainage Petition D22-114

Good afternoon;

Our office has been appointed by the Town of Kingsville to provide an Engineer's Report, under Section 4 of the Drainage Act, for the installation of a new covered drain system. This covered drainage system has been requested by the adjacent landowner to facilitate the severance of multiple residential properties from the agricultural property.

The subject property is currently without a legal drainage outlet and is a minimum of 650m from a viable drainage outlet. This proposed covered Municipal Drain will run between existing agricultural properties in a southerly direction and discharge to the top end of a naturally forming channel located north of County Road 20, which is connected to Lake Erie through an existing ravine.

We have been working in close consultation with the Town of Kingsville, the Essex Region Conservation Authority (ERCA), the Department of Fisheries and Oceans Canada (DFO) and other consultants to continue with the development. At this time, we are seeking input from the MECP to obtain guidance on whether the proposed Municipal Drain requires authorization under the Endangered Species Act.

Please find attached a letter outlining our MECP Endangered Species and Critical Habitat Review and Findings for your review.

I trust that this information is satisfactory to conduct your review. However, we understand that you may have questions and/or concerns. If so, please feel free to contact us using the information provided below.

We look forward to your response.

Regards,

Tony Peralta, P.Eng.
tony@peraltaengineering.com | 519-733-6587 x 122
N.J. Peralta Engineering Ltd. - Consulting Engineers
45 Division St. N., Kingsville ON N9Y 1E1
peraltaengineering.com

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Peralta Engineering

PROJECT **Solid Rock Homes Drainage Petition**
Geographic Township of Gosfield South
Town of Kingsville, County of Essex
Project No. D22-114

March 2, 2023

Subject: MECP Endangered Species & Critical Habitat Review

I. INTRODUCTION

We have been appointed by the Town of Kingsville to prepare a Drainage Report under Section 4 of the Drainage Act for the creation of a new Municipal Drain, to facilitate residential development in accordance with the Town of Kingsville's requirements. With the construction of a new Municipal Drain, this project does not qualify for the exemption under the Endangered Species Act (ESA) administered through the Ministry of the Environment, Conservation and Parks (MECP). This letter has been prepared to obtain guidance on whether the proposed Municipal Drain requires authorization under the ESA in order to remain in compliance with the Act.

II. LOCATION

The proposed Solid Rock Homes Drainage Petition as shown in **Appendix "I"**, Figures 1 and 2, is located within the Town of Kingsville, east of the intersection of County Road 45 and Road 2 East . The subject agricultural property and proposed development site is located on the south side of Road 2 East.

III. BACKGROUND AND DESCRIPTION OF WORK

With the intention to develop the subject property into multiple residential building lots, the affected landowner has petitioned for the creation of a new Municipal Drain to facilitate their development, as required by the Town of Kingsville. The proposed covered drainage system is intended to serve the proposed residential development and will discharge into the existing open channel of a natural watercourse to its outlet into Lake Erie.

The works will include the installation of approximately 650.0 meters of a new covered drainage between two existing greenhouse developments. It is intended that the proposed covered drainage system will outlet into an existing natural watercourse located south of the subject property. **Appendix "II"** provides photos of the project site, taken April 6, 2022 of existing site conditions and proposed outlet.

N.J. Peralta Engineering Ltd.
45 Division St. N. Kingsville ON N9Y 1E1
519-733-6587

IV. ERCA AND DFO CONSIDERATIONS

At the onset of this project, preliminary details of the project were provided to the Essex Region Conservation Authority (ERCA) for initial comments, as a regulatory requirement through the Drainage Act. Based on those comments, no concerns were brought forward regarding Endangered Species or their habitat. Additionally, our office submitted a Request for Review to the DFO. We will continue to engage in further correspondence with ERCA and DFO, regarding specific requirements for the approval of the covered drainage system.

V. HABITAT ASSESSMENT AND SPECIES AT RISK RECORDS

Based on MECP's information presented to the Drainage Superintendents of Ontario (DSAO) Member Chapters on June 21st-24th, 2021, we have utilized this information as referenced to conduct our review of Species at Risk data. From our research of the general area pertaining to the proposed Petition Drain, we have reviewed the available screening maps to determine if there is any presence of Species at Risk (SAR). Utilizing the sources provided by MECP, **Appendix "III"** includes a table outlining our findings related to the potential SAR within the project area. In addition to this table, we have also included associated maps that accompany our review. More specifically:

Figure 1: D.F.O. Mapping

Figure 2: Natural Heritage Information Centre Mapping

Figure 3: iNaturalist Community Mapping and Observations

Figure 4: Ontario Breeding Birds Atlas

Figure 5: eBird Birding Community Sightings and Observations Map

Figure 6: Ontario Butterfly Atlas

Figure 7: Ontario Moth Atlas

It has been previously noted that the Town of Kingsville is known to occupy the Eastern Foxsnake (Carolinian population), Bank Swallow (threatened), and Barn Swallow (threatened). Standard Mitigation and avoidance measures shall be provided to the Contractor, in the event that they come across any of these species.

VI. AVOIDANCE AND/OR MINIMIZATION OF ADVERSE EFFECTS

Under the Endangered Species Act legislation, we understand the importance to protect and/or avoid endangered species and their habitat. As such, we shall make every effort to implement the following minimum requirements related to this project:

- **Timing Windows** – With this project having aquatic implications, we intend to adhere to the no in-water works timing window set between March 15th and July 15th of any given year.

- **Avoidance of Key Habitat and Location of Present Work** – Due to the nature of this project, the works proposed under this project carefully considers the implications to endangered species and their habitat. As such, the drainage work is situated where there is the least impact to the affected species.

- **Sediment Control** - Prior to starting work, a sediment and erosion control plan shall be developed. This will include silt fences or similar, to provide isolation of the work area and prevent sediment materials including silts, clays and sand from entering the drain.

- **Construction Practices** - Best management practices and procedures will be implemented on-site to ensure a clean worksite with proper machine maintenance and operation for the minimization and containment of spills.

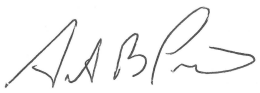
VII. CONCLUSION

Based on our review of the available resources outlined within our letter, we anticipate that there should not be any species or habitat at risk within the work area. Based on the information outlined throughout this letter, we are asking for guidance by the MECP on whether the proposed Municipal Drain requires authorization under the ESA.

We trust that you find all of the above and enclosed satisfactory. However, should you have any questions relating to same, please contact us immediately. Thank you for your cooperation and assistance with this project, we look forward to receiving your response on how we need to proceed with this project in order to satisfy your Ministry.

All of which is respectfully submitted,

N.J. PERALTA ENGINEERING LTD.



Antonio B. Peralta, P.Eng.

Encl.
cc. Ken Vegh, Drainage Superintendent

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APPENDIX "I"

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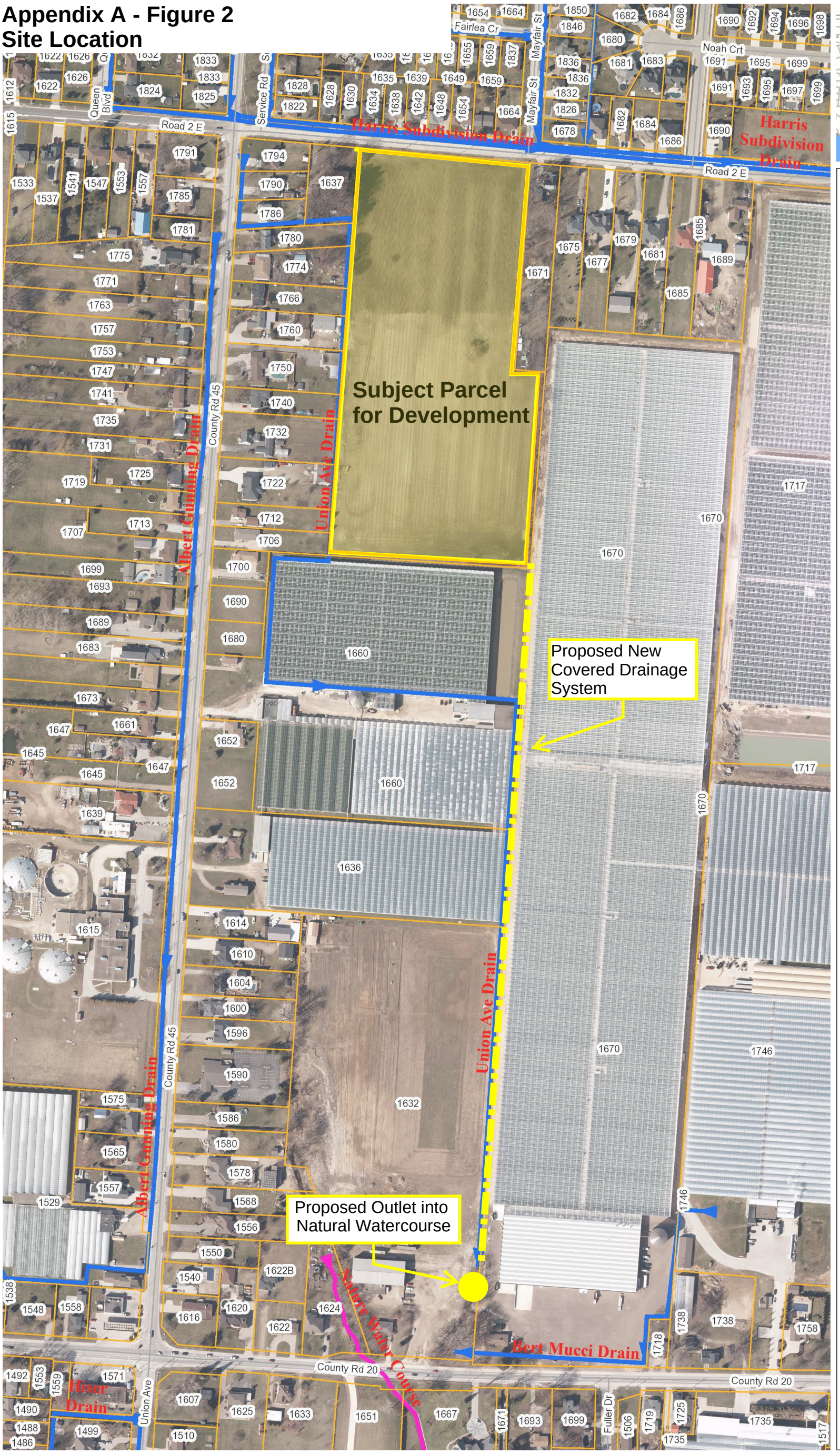
<u>Appendix 'A'</u> - Figure 1
Key Plan

MECP Endangered Species & Critical Habitat Review
Solid Rock Homes Drainage Petition - Town of Kingsville, ON

Appendix A - Figure 2
Site Location



Legend

- Essex Municipalities
  - <all other values>
  - Kingsville
- Street
- Kingsville Assessment
- Drainage Lines
  - <all other values>
  - Award
  - Channelized
  - Natural Courses

0 58.34 116.7 Meters

1: 3,500 N 1/10/2023

Notes

Enter Map Description

APPENDIX "II"

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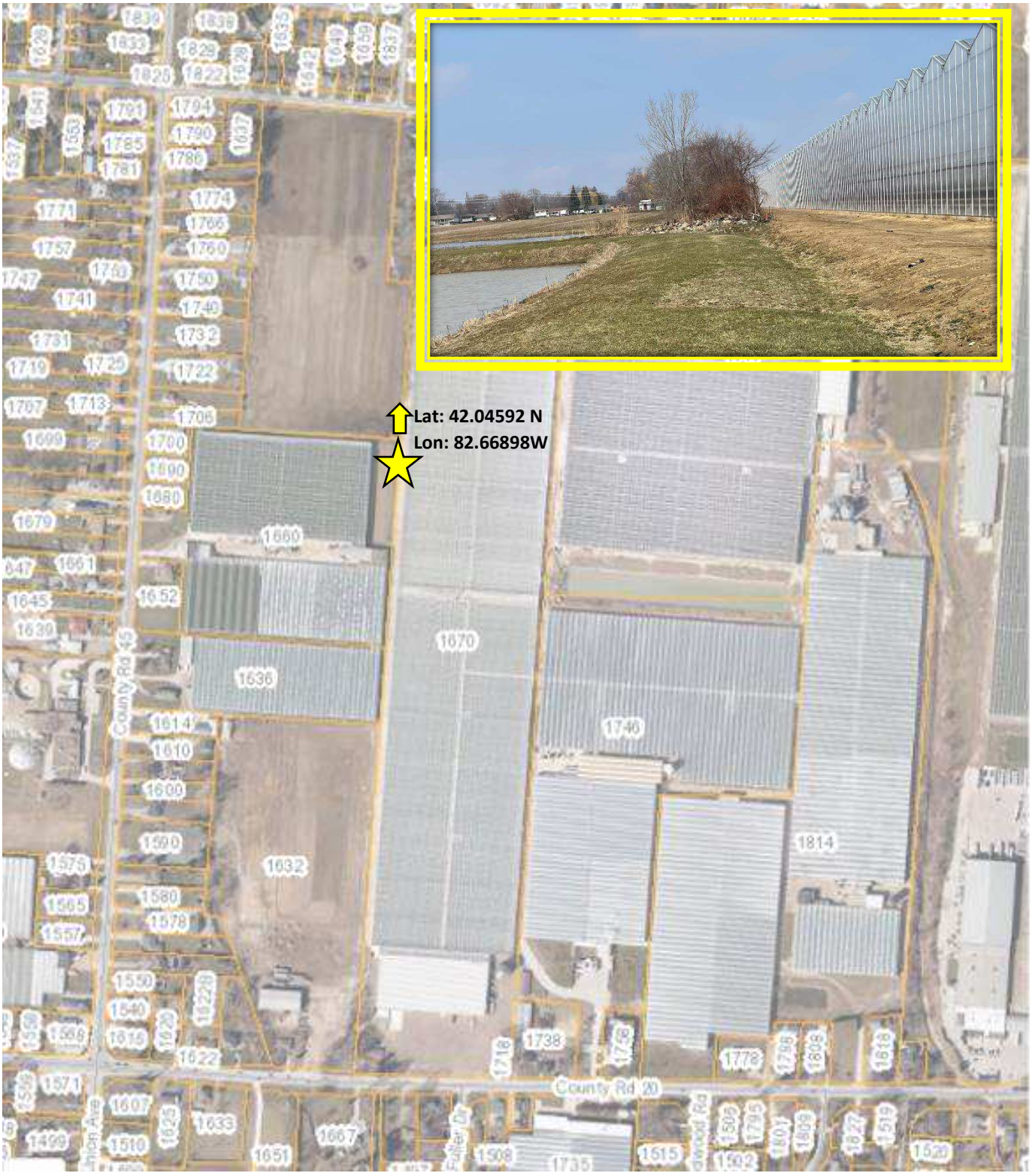
Picture #1

Approx. Photo Location Coordinates:	Lat: 42.04592° N Lon: 82.66898° W
Description:	Looking at the Southeast corner of the subject property and the top end of the proposed new covered drainage system.
Date of Photo:	April 6, 2022



Picture #2

Approx. Photo Location Coordinates:	Lat: 42.04592° N Lon: 82.66898° W
Description:	Looking south at the corner of the subject property towards the intended outlet location
Date of Photo:	April 6, 2022

Picture #3

Approx. Photo Location Coordinates:	Lat: 42.04375° N Long: 82.66912° W
Description:	Looking south towards the intended outlet location
Date of Photo:	April 6, 2022

Picture #4

Approx. Photo Location Coordinates:	Lat: 42.04055° N Long: 82.66932° W
Description:	Looking north from the outlet into the Natural watercourse
Date of Photo:	April 6, 2022

Picture #5

Approx. Photo Location Coordinates:	Lat: 42.04055° N Long: 82.66932° W
Description:	Looking south from the outlet into the Natural watercourse
Date of Photo:	April 6, 2022

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APPENDIX "III"

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HABITAT ASSESSMENT & SPECIES AT RISK REVIEW

SUMMARY OF FINDINGS

1. D.F.O. Aquatic Species at Risk and Drain Classification
URL: dfo-mpo.gc.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Results/Findings:

Aquatic Species at Risk

- None

Critical Habitat

- None

2. Natural Heritage Information Centre
URL: lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA

Results/Findings:

NHIC Station: 17LG6156 identified:

- Colonial Waterbird Nesting Area
- Massasauga Carolinian Population
- Barn Owl

NHIC Station: 17LG6155 identified:

- Colonial Waterbird Nesting Area
- Massasauga Carolinian Population
- Silver Chub
- Red-Headed Woodpecker
- American Water-willow
- Barn Owl
- Eastern Mole
- Eastern Meadowlark

3. INaturalist Community Mapping & Observations
URL: inaturalist.org

Results/Findings:

Critical Habitat or Endangered Species Spotted:

- None

Other species spotted within project area:

- Cross Orbweaver
- Western Spotted Orbweaver
- Greater Scaup
- Brambles
- Genus Chironomus

4. Ontario Bird Breeding Atlas
URL: www.birdsontario.org

Results/Findings:

Species at Risk birds breeding within square 17TLG65:

- Acadian Flycatcher (Endangered)
- Bald Eagle (Special Concern)
- Bank Swallow (Threatened)
- Barn Swallow (Threatened)
- Black Tern (Special Concern)
- Bobolink (Threatened)
- Chimney Swift (Threatened)
- Common Nighthawk (Special Concern)
- Eastern Meadowlark (Threatened)
- Eastern Wood-Pewee (Special Concern)
- Least Bittern (Threatened)
- Prothonotary Warbler (Endangered)
- Wood Thrush (Special Concern)
- Yellow-breasted Chat (Endangered)

5. eBird
URL: www.ebird.org/about

Results/Findings: **Species at Risk birds sighted near proposed site area:**

- No sightings within the project site

6. Ontario Butterfly Atlas
URL: www.ontarioinsects.org/atlas

Results/Findings: **Species at Risk Butterflies recorded within square 17LG57:**

- Monarch (Special Concern)

7. Ontario Moth Atlas
URL: www.ontarioinsects.org/moth/

Results/Findings: **Species at Risk Moths recorded within square 17LG57:**

- None

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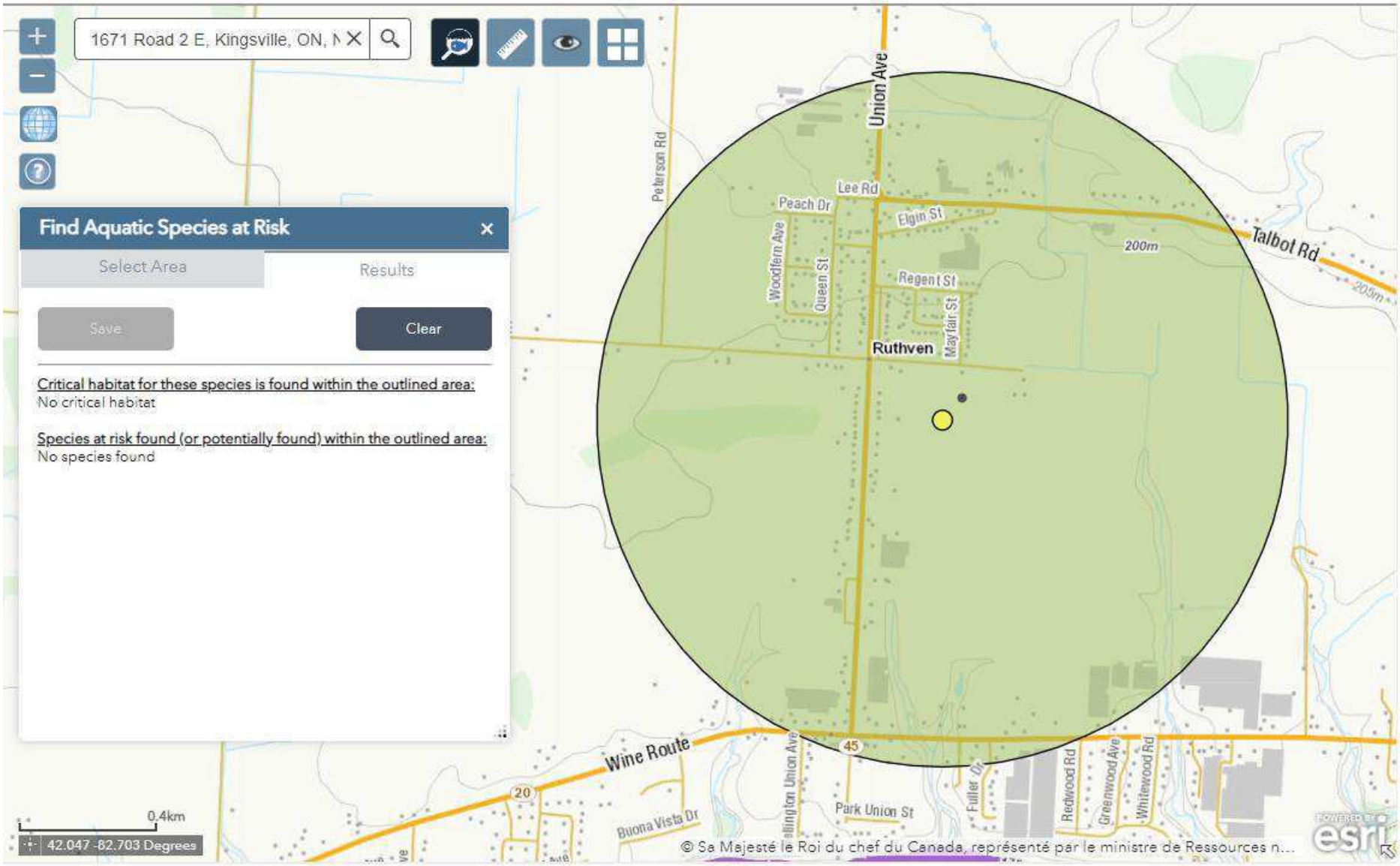
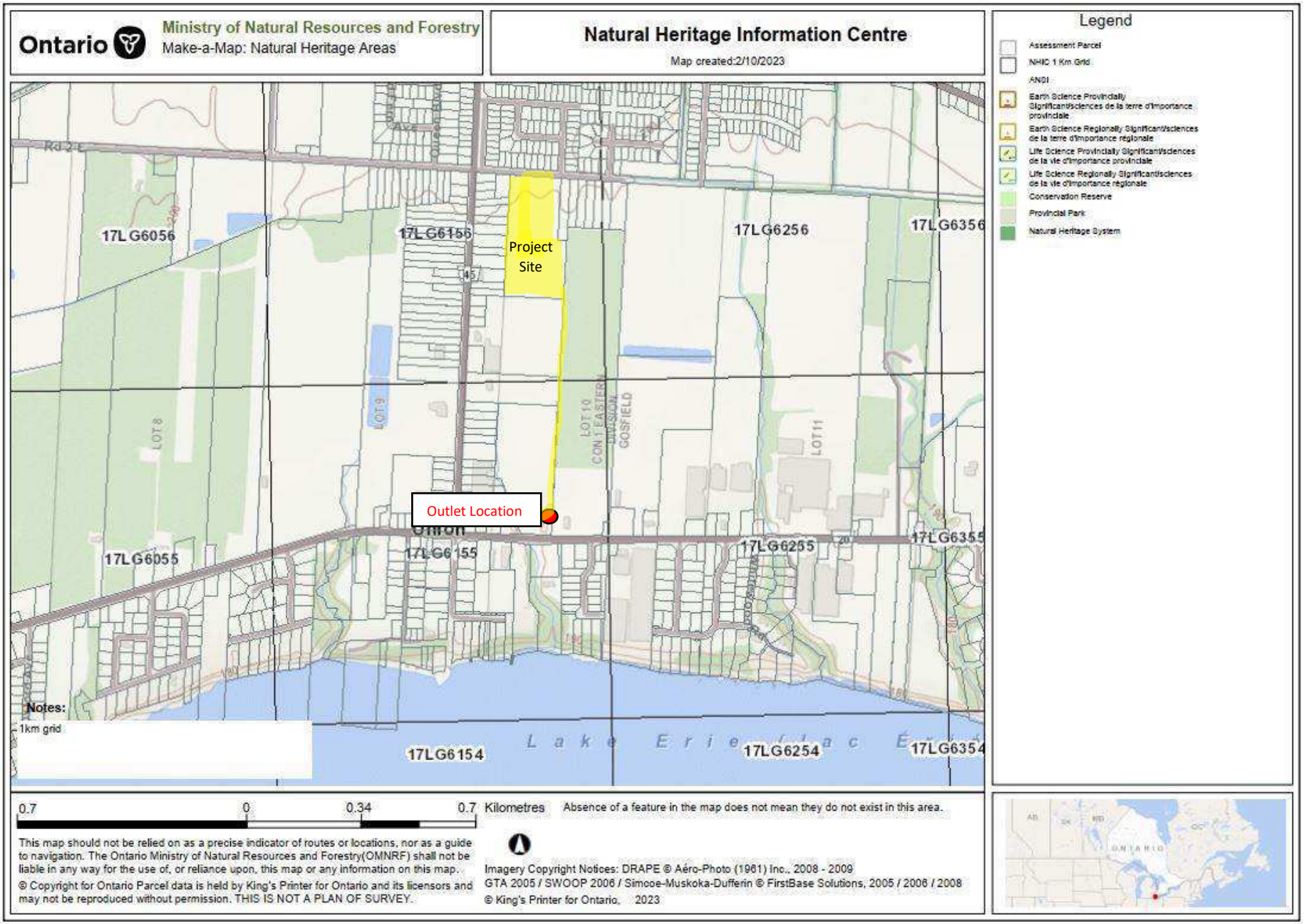
Figure 1 - DFO Aquatic Species and Critical Habitat Map



Date Checked: 2023-02-10

Figure 2 – Natural Heritage Information Centre



Date Checked: 2022-02-10

Square 17LG6156

NHIC Data

To work further with this data select the content and copy it into your own word or excel documents.

OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
726150	WILDLIFE CONCENTRATION AREA	Colonial Waterbird Nesting Area		SNR			17LG6156	
726150	SPECIES	Massasauga (Carolinian population)	Sistrurus catenatus pop. 2		END	END	17LG6156	
726150	SPECIES	Barn Owl	Tyto alba		END	END	17LG6156	

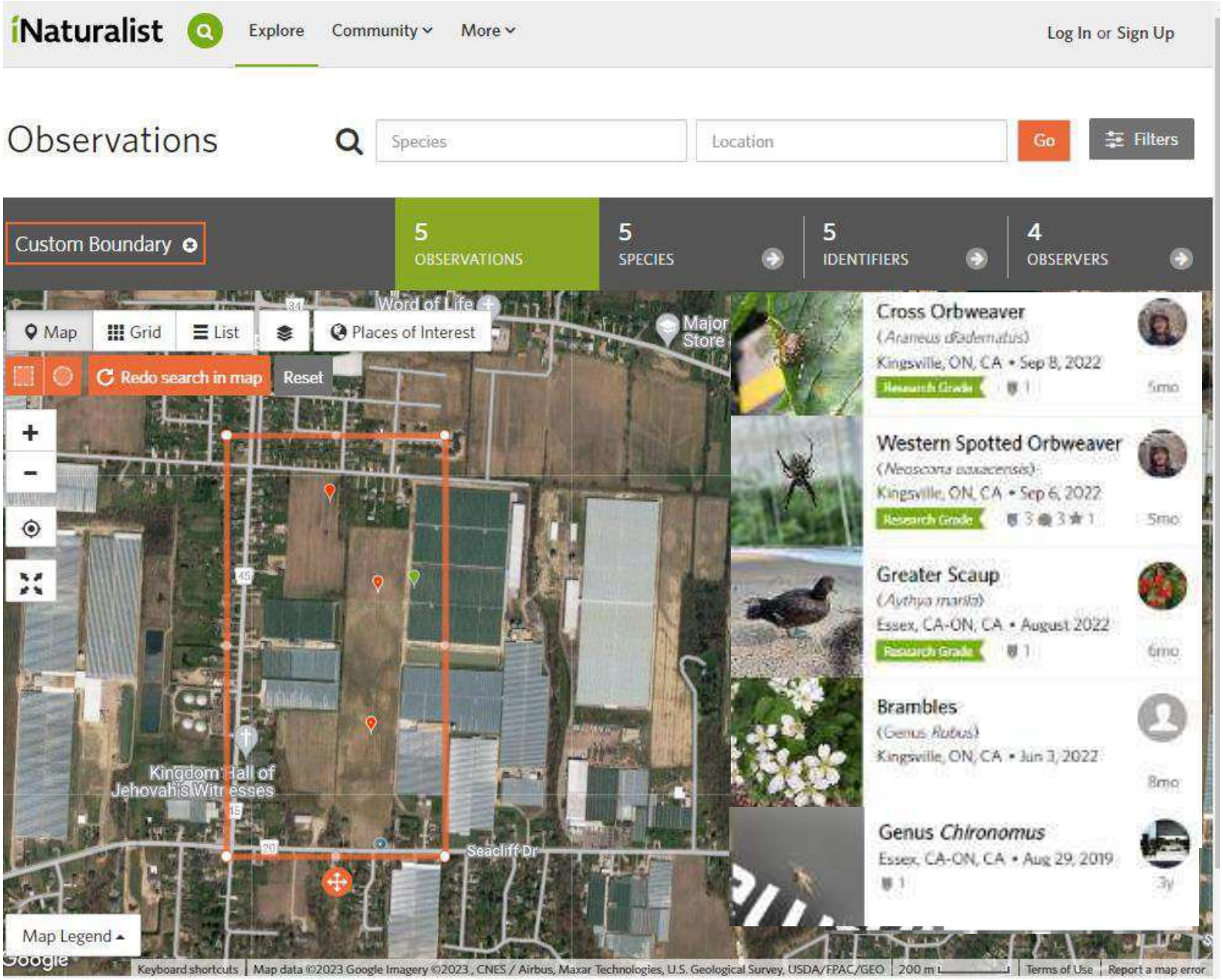
SQAURE 17LG6155

NHIC Data

To work further with this data select the content and copy it into your own word or excel documents.

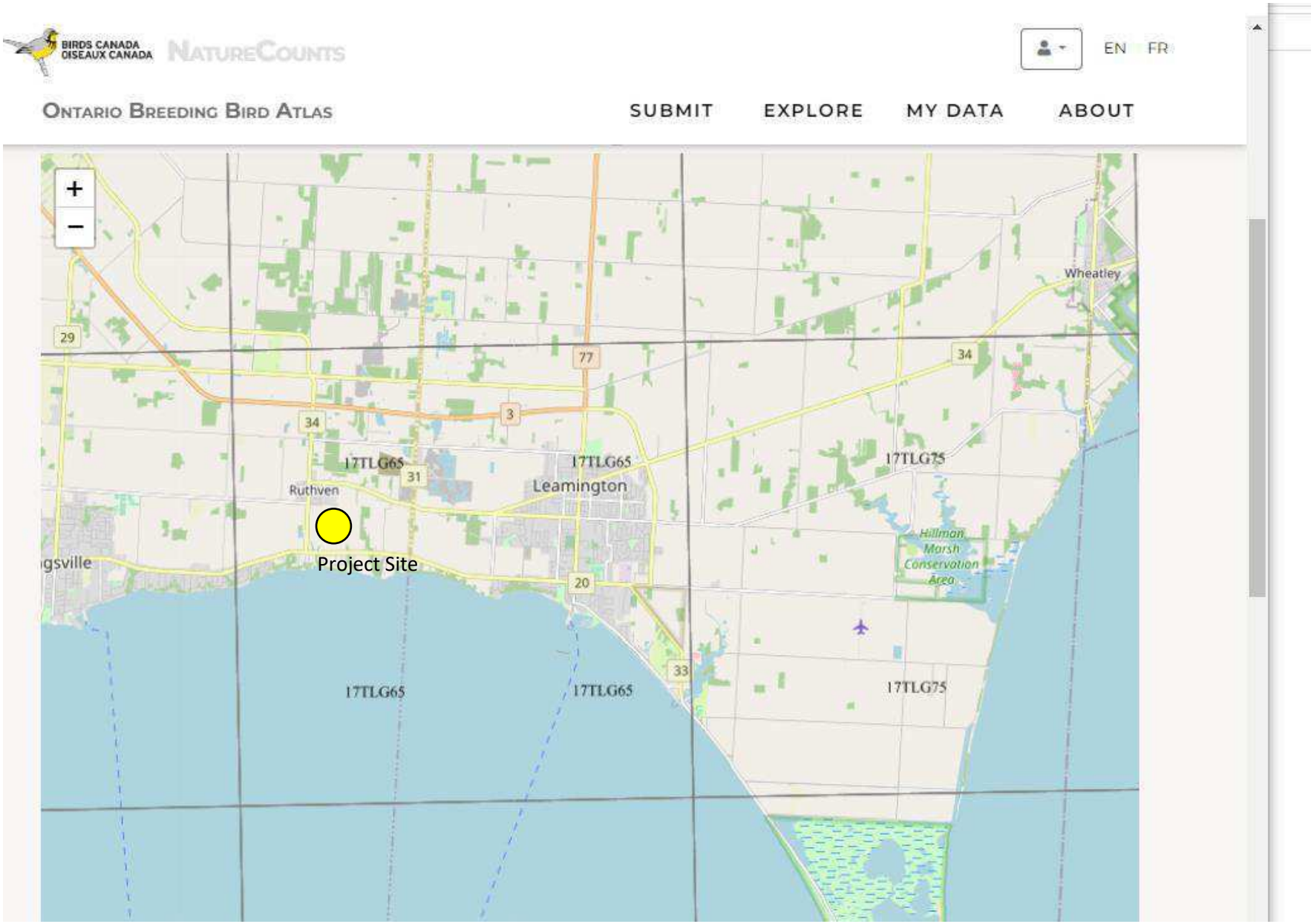
OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
726149	WILDLIFE CONCENTRATION AREA	Colonial Waterbird Nesting Area		SNR			17LG6155	
726149	SPECIES	Massasauga (Carolinian population)	Siatrurus catenatus pop. 2		END	END	17LG6155	
726149	SPECIES	Silver Chub	Macrhybopsis storeriana		THR	END	17LG6155	
726149	SPECIES	Red-headed Woodpecker	Melanerpes erythrocephalus		SC	END	17LG6155	
726149	SPECIES	American Water-willow	Justicia americana		THR	THR	17LG6155	
726149	SPECIES	Barn Owl	Tyto alba		END	END	17LG6155	
726149	SPECIES	Eastern Mole	Scalopus aquaticus		SC	SC	17LG6155	
726149	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17LG6155	

Figure 3 - INaturalist Community Mapping and Observations



Date Checked: 2022-02-10

Figure 4 – Ontario Breeding Bird Atlas (Square 17TLG65 Map) - Square Summary Attached



BIRDS CANADA
OISEAUX CANADA

Square Summary (17TLG65) [change]

	#species				#hours		#pc done	
	poss	prob	conf	total	total	peak	road	offrd
Curr.	16	13	18	47	17.4	13.3	0	0
Prev.	14	16	40	70	35.5	—	25	

Region summary (#1: Essex, ON)

#squares	#sq with data	#species	#squares (pc)	
			target	compl.
38	32	132	38	5
38	38	151	0	23

Target number of point counts in this square: 25 in total: 20 road side, 5 off road (Broadleaf Forest in 1, Wetland in 4). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Prev.	Code	%
Canada Goose	FY	FY	78
Mute Swan			31
Trumpeter Swan ‡			9
Wood Duck	FY		59
Blue-winged Teal §			12
Northern Shoveler ‡			3
Gadwall ‡			3
American Wigeon ‡			3
Mallard	FY	NE	81
American Black Duck ‡			3
Northern Pintail ‡			0
Green-winged Teal ‡			6
Redhead †			3
Hooded Merganser ‡			12
Ruddy Duck ‡			3
Wild Turkey			59
Ring-necked Pheasant ‡			0
Pied-billed Grebe			15
Rock Pigeon (Feral Pigeon)	H		0
Mourning Dove	FY	FY	93
Yellow-billed Cuckoo	H		56
Black-billed Cuckoo	H		28
Coccyzus sp. ‡	S		0
Common Nighthawk §	P		12
Chuck-will's-widow †			0
Eastern Whip-poor-will ‡			0
Chimney Swift §	P	H	56
Ruby-throated Hummingbird			62
King Rail †			3
Virginia Rail			9
Sora			9
Common Gallinule §			12
American Coot ‡			6

SPECIES	Prev.	Code	%
Sandhill Crane			15
Killdeer §	NE	A	90
American Woodcock	D		28
Wilson's Snipe ‡			0
Wilson's Phalarope †			3
Spotted Sandpiper	FY		65
Ring-billed Gull §			6
Herring Gull §	NY		3
Caspian Tern ‡			0
Black Tern †			3
Common Tern § ‡			0
Forster's Tern †			0
Double-crested Cormorant §			21
American White Pelican †			0
American Bittern ‡			9
Least Bittern †			18
Great Blue Heron §			15
Great Egret †			0
Green Heron §	FY		50
Black-crowned Night-Heron †			9
Turkey Vulture		H	56
Osprey			34
Northern Harrier	H		6
Sharp-shinned Hawk ‡			0
Cooper's Hawk	NY		40
Bald Eagle §	NY		53
Broad-winged Hawk ‡			0
Red-tailed Hawk	NY	NY	71
Eastern Screech-Owl	FY		37
Great Horned Owl			0
Long-eared Owl ‡			0
Short-eared Owl †			0
Belted Kingfisher	P		53

SPECIES	Prev.	Code	%
Red-headed Woodpecker †	FY		21
Red-bellied Woodpecker	D		71
Downy Woodpecker	H	S	87
Hairy Woodpecker			34
Northern Flicker	T	H	78
American Kestrel §	H		21
Merlin ‡			0
Peregrine Falcon ‡			0
Eastern Wood-Pewee §	S		78
Acadian Flycatcher †			9
Alder Flycatcher ‡			0
Willow Flycatcher	T	S	62
Least Flycatcher ‡	H		9
Eastern Phoebe			40
Great Crested Flycatcher			68
Eastern Kingbird	A	FY	84
White-eyed Vireo †			6
Yellow-throated Vireo			9
Warbling Vireo	T	T	84
Red-eyed Vireo	T	S	81
Blue Jay	CF	FY	84
American Crow	FY	H	46
Black-capped Chickadee	H		75
Tufted Titmouse			31
Horned Lark §	S		56
Northern Rough-winged Swallow	FY	S	40
Purple Martin §	CF	H	78
Tree Swallow	NY	NY	93
Bank Swallow §	AE	AE	34
Barn Swallow §	FY	V	87
Cliff Swallow §	AE	NU	65
White-breasted Nuthatch		H	68
Brown Creeper			0

Breeding Bird Atlas - Summary Sheet for Square 17TLG65 (page 2 of 2)

SPECIES	Prev.	Code	%
Blue-gray Gnatcatcher	S		50
House Wren	AE	CF	90
Sedge Wren ‡			0
Marsh Wren	FY		21
Carolina Wren	FY	T	78
European Starling	NY	AE	90
Gray Catbird	A	A	75
Brown Thrasher	FY	S	50
Northern Mockingbird	FY		3
Eastern Bluebird	FY		31
Veery ‡			0
Wood Thrush §			40
American Robin	NE	CF	96
Cedar Waxwing	P	H	81
House Sparrow	AE	AE	87
House Finch	S	P	75
American Goldfinch	FY	T	87
Grasshopper Sparrow ‡			0
Chipping Sparrow	CF	S	87
Field Sparrow §	S	T	46
Vesper Sparrow		S	50
Savannah Sparrow	T	T	65
Song Sparrow	CF	T	81
Swamp Sparrow			18
Eastern Towhee §			28
Yellow-breasted Chat †			9
Yellow-headed Blackbird †			0
Bobolink §			37
Eastern Meadowlark §	T		25
Orchard Oriole	FY		40
Baltimore Oriole	NY	CF	90
Red-winged Blackbird	NE	NE	96
Brown-headed Cowbird	FY	D	96

SPECIES	Prev.	Code	%
Brewer's Blackbird §			0
Common Grackle	CF	CF	96
Ovenbird			0
Blue-winged Warbler			3
Prothonotary Warbler †			18
Mourning Warbler ‡			3
Common Yellowthroat	A	S	68
Hooded Warbler ‡			3
American Redstart		S	25
Cerulean Warbler †			0
Yellow Warbler	CF	AE	90
Chestnut-sided Warbler ‡			0
Pine Warbler ‡			3
Scarlet Tanager			6
Northern Cardinal	A	NY	90
Rose-breasted Grosbeak			56
Indigo Bunting	CF	P	84
Dickcissel †		T	37

This list includes all breeding species expected in the region #1 (Essex). Underlined species are those that you should try to add to this square (17TLG65). They have not yet been reported in this square, but have been reported in more than 50% of the squares in this region so far. "Prev." is the code for the highest breeding evidence for that species in square 17TLG65 in the previous atlas. "Code" is the code for the highest breeding evidence for that species in square 17TLG65 over the last 5 years. The % columns give the percentage of squares in that region where that species was reported (this gives an idea of the expected chance of finding that species in region #1). Rare/Colonial Species Report Forms should be completed for species marked: § (Species of interest), ‡ (regionally rare), † (provincially rare). An up-to-date version of this sheet is available from https://naturecounts.ca//nc//atlas/summaryform.jsp?squareID=17TLG65&lang=EN Data current as of **8/02/2023 23:22**.

Figure 5 – eBird Birding Community Sightings and Observations

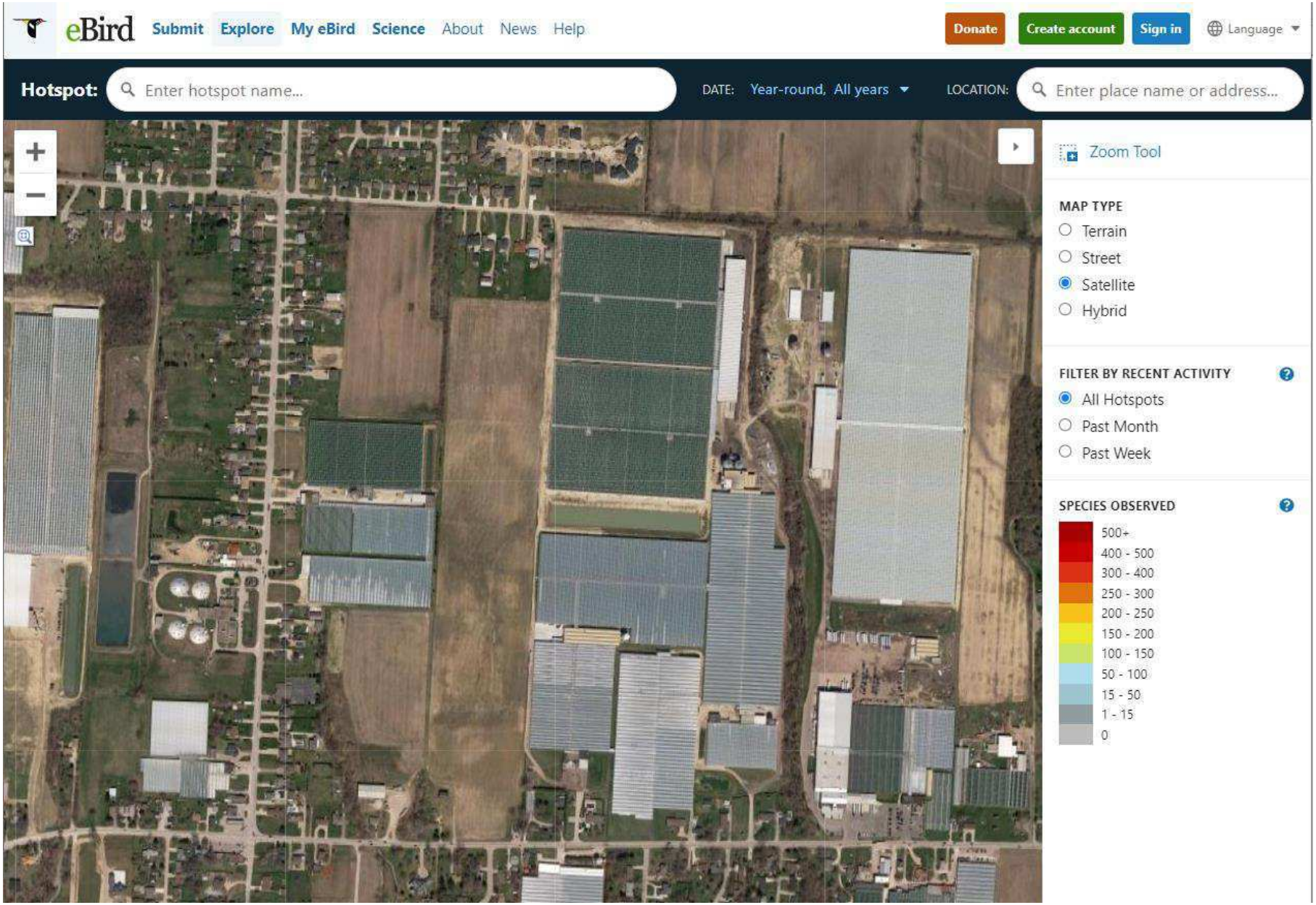
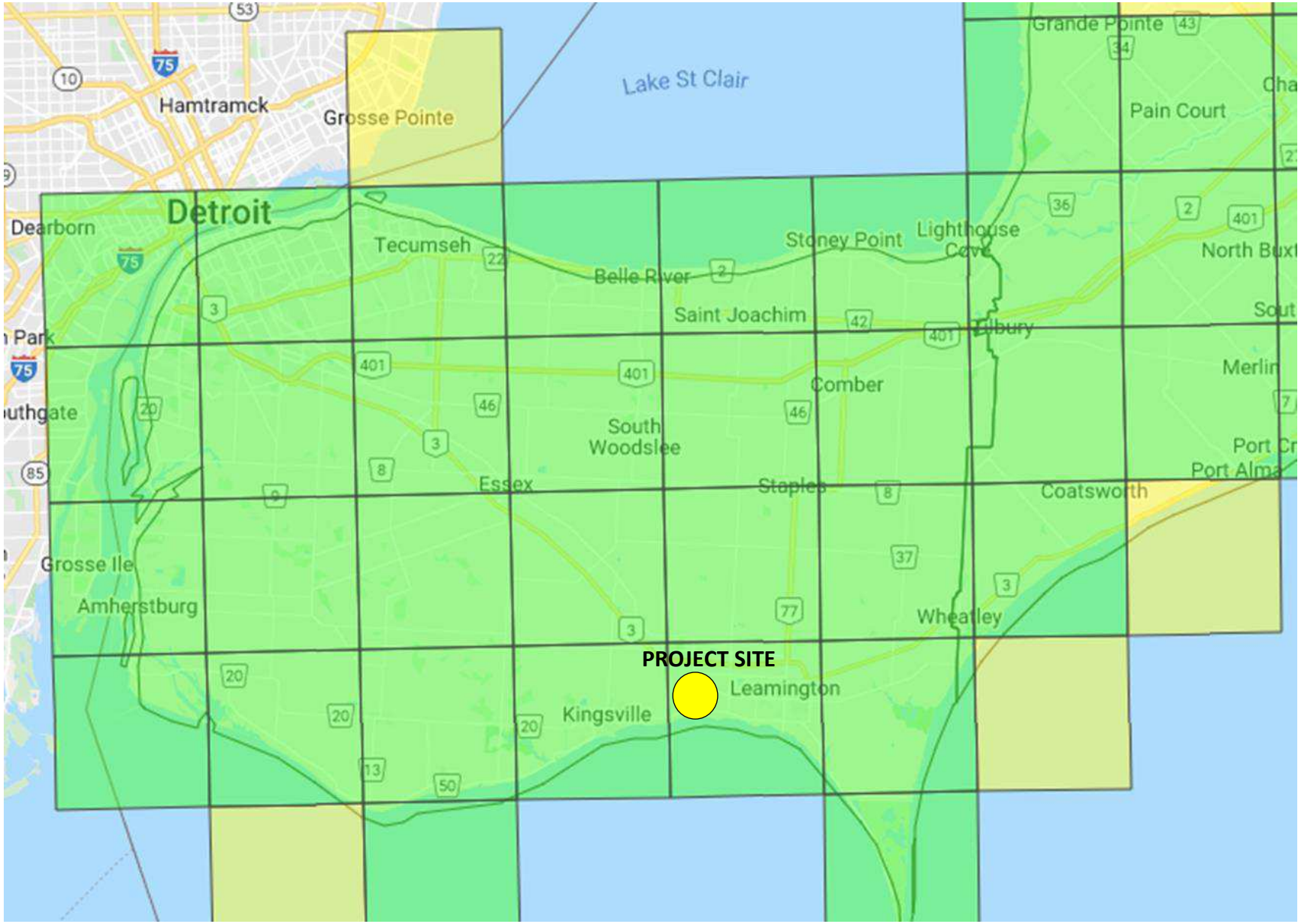


Figure 6 – Ontario Butterfly Atlas



Ontario Butterfly Atlas – Species Data

Toronto Entomologists' Association

Species list in taxonomic order for square 17LG65

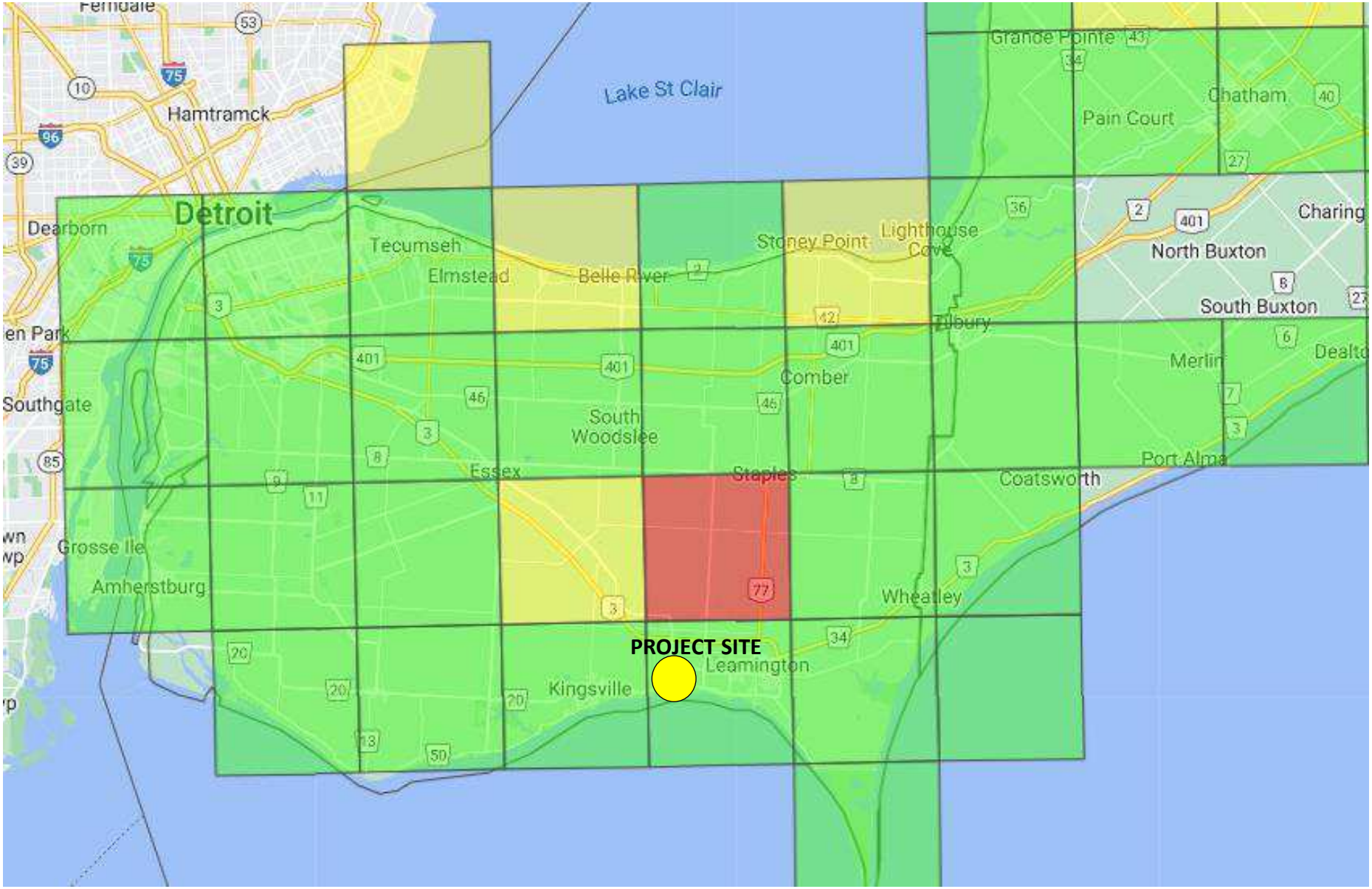
All species

Number of rows of data displayed below: 69.

Species #	Common Name	Scientific Name	# of Records	Earliest in Yr (adults)	Latest in Yr (adults)	Earliest Yr	Latest Yr
1	Silver-spotted Skipper	Epargyreus clarus	65	May 2	Nov. 1	1937	2022
9	Juvenal's Duskywing	Erynnis juvenalis	3	May 28	Jun. 2	1937	1937
10	Horace's Duskywing	Erynnis horatius	1	Aug. 11	Aug. 11	2022	2022
15	Wild Indigo Duskywing	Erynnis baptisiae	69	May 18	Nov. 1	1937	2021
19	Common Checkered Skipper	Pyrgus communis	155	May 3	Nov. 21	2008	2022
20	Common Sootywing	Pholisora catullus	46	May 4	Sep. 7	1929	2021
23	Least Skipper	Ancyloxypha numitor	56	May 20	Oct. 9	2008	2021
25	European Skipper	Thymelicus lineola	6	Jun. 3	Jul. 1	1983	2019
26	Fiery Skipper	Hylephila phyleus	77	Jul. 14	Nov. 11	1991	2022
28	Leonard's Skipper	Hesperia leonardus	1	Aug. 12	Aug. 12	2012	2012
30	Peck's Skipper	Polites peckius	88	May 20	Oct. 25	1981	2022
31	Tawny-edged Skipper	Polites themistocles	4	May 30	Aug. 25	1985	2016
33	Long Dash Skipper	Polites mystic	1	Jun. 11	Jun. 11	1929	1929
35	Northern Broken-Dash	Wallengrenia egeremet	1	Aug. 5	Aug. 5	2013	2013
37	Sachem	Atalopedes campestris	26	Jul. 30	Oct. 22	1991	2012
39	Mulberry Wing	Poanes massasoit	1	Jul. 18	Jul. 18	1982	1982
40	Hobomok Skipper	Poanes hobomok	1	Jun. 11	Jun. 11	1929	1929
42	Broad-winged Skipper	Poanes viator	1	Aug. 9	Aug. 9	1997	1997
43	Dion Skipper	Euphyes dion	1	Jul. 31	Jul. 31	2020	2020
47	Dun Skipper	Euphyes vestris	3	Jul. 17	Jul. 27	1982	2020
53	Pipevine Swallowtail	Battus philenor	2	May 29	May 30	2012	2012
54	Zebra Swallowtail	Eurytides marcellus	2	Jun. 11	Jul. 4	1929	1993
55	Black Swallowtail	Papilio polyxenes	109	May 4	Oct. 9	1937	2022
57	Eastern Giant Swallowtail	Papilio cresphontes	28	May 7	Sep. 29	1937	2020
58	Eastern Tiger Swallowtail	Papilio glaucus	22	May 30	Aug. 29	1982	2021
60	Spicebush Swallowtail	Papilio troilus	11	May 3	Aug. 6	1937	1983
61	Checkered White	Pontia protodice	1	Oct. 6	Oct. 6	1999	1999
63	Mustard White	Pieris oleracea	1	Jul. 10	Jul. 10	1919	1919
65	Cabbage White	Pieris rapae	175	Apr. 7	Nov. 18	1986	2021
69	Clouded Sulphur	Colias philodice	157	May 2	Nov. 25	1983	2022
70	Orange Sulphur	Colias eurytheme	161	May 2	Nov. 25	1983	2022
76	Cloudless Sulphur	Phoebis sennae	1	Nov. 18	Nov. 18	2016	2016
78	Little Yellow	Pyrisitia lisa	13	May 3	Oct. 25	1983	2015
80	Dainty Sulphur	Nathalis iole	12	May 4	Sep. 29	2012	2012

82	American Copper	Lycaena phlaeas	2	May 29	Jun. 1	1937	1937
84	Bronze Copper	Lycaena hyllus	16	Jun. 6	Oct. 10	1940	2016
88	Acadian Hairstreak	Satyrium acadica	1	Jul. 10	Jul. 10	1931	1931
91	Banded Hairstreak	Satyrium calanus	9	Jun. 24	Jul. 21	1931	2021
93	Striped Hairstreak	Satyrium liparops	1	Jul. 25	Jul. 25	1982	1982
104	Gray Hairstreak	Strymon melinus	25	May 2	Oct. 12	1982	2018
106	Marine Blue	Leptotes marina	1	Aug. 9	Aug. 9	2008	2008
107	Eastern Tailed Blue	Cupido comyntas	80	May 20	Nov. 1	1937	2022
110	Summer Azure	Celastrina neglecta	29	Jun. 8	Sep. 24	2020	2022
111	Azure sp.	Celastrina sp.	32	Apr. 18	Sep. 26	1982	2022
117	American Snout	Libytheana carinenta	15	May 4	Nov. 13	1974	2015
118	Variegated Fritillary	Euptoieta claudia	40	May 3	Nov. 9	1998	2013
119	Great Spangled Fritillary	Speyeria cybele	4	Jun. 26	Sep. 8	1931	2021
120	Aphrodite Fritillary	Speyeria aphrodite	1	Jun. 27	Jun. 27	1931	1931
130	Silvery Checkerspot	Chlosyne nycteis	1			2021	2021
132	Pearl Crescent	Phyciodes tharos	62	May 19	Oct. 25	2011	2021
133	Northern Crescent	Phyciodes cocyta	49	Jun. 4	Sep. 29	1929	2021
136	Question Mark	Polygonia interrogationis	34	May 2	Oct. 23	1931	2022
137	Eastern Comma	Polygonia comma	19	Apr. 7	Nov. 21	1982	2022
142	Compton Tortoiseshell	Nymphalis l-album	2	Mar. 28	Aug. 27	1986	1994
143	Mourning Cloak	Nymphalis antiopa	27	Mar. 27	Oct. 25	1982	2021
144	Milbert's Tortoiseshell	Aglais milberti	4	Mar. 30	Aug. 10	1983	2016
145	American Lady	Vanessa virginiensis	28	Apr. 16	Nov. 1	1982	2021
146	Painted Lady	Vanessa cardui	54	May 6	Nov. 1	1982	2020
147	Red Admiral	Vanessa atalanta	90	Apr. 15	Nov. 1	1982	2021
148	Common Buckeye	Junonia coenia	103	May 3	Nov. 25	1982	2022
150	Red-spotted Purple	Limenitis arthemis astyanax	14	Jun. 8	Sep. 6	1890	2022
151	Viceroy	Limenitis archippus	32	Jun. 8	Oct. 9	1976	2021
152	Hackberry Emperor	Asterocampa celtis	21	Jun. 15	Oct. 8	1982	2022
153	Tawny Emperor	Asterocampa clyton	1	Jul. 17	Jul. 17	1982	1982
155	Eyed Brown	Lethe eurydice	1	Jul. 6	Jul. 6	1931	1931
156	Appalachian Brown	Lethe appalachia	1	Jun. 15	Jun. 15	1982	1982
157	Little Wood-Satyr	Megisto cymela	7	Jun. 3	Jul. 6	1931	2021
159	Common Wood-Nymph	Cercyonis pegala	2	Jul. 10	Jul. 10	1931	1931
167	Monarch	Danaus plexippus	179	May 3	Nov. 9	1982	2022

Figure 7 – Ontario Moths Atlas



Ontario Moth Atlas – Species Data

Toronto Entomologists' Association

Species list in taxonomic order for square 17LG65

Data for all species

Number of rows of data displayed below: 40.

Species #	Common Name	Scientific Name	# of Records	Earliest in Yr (adults)	Latest in Yr (adults)	Earliest Yr	Latest Yr
890022.00	Rosy Maple Moth	Dryocampa rubicunda	4			1982	1982
890055.00	Io Moth	Automeris io	5	Jun 23	Jul 3	1982	1994
890070.00	Polyphemus Moth	Antheraea polyphemus	7	May 11	Jul 5	1982	2019
890072.00	Luna Moth	Actias luna	8	Jun 1	Jun 15	1982	1984
890079.00	Promethea Moth	Callosamia promethea	4	Jul 17	Jul 23	1982	1982
890082.00	Cecropia Moth	Hyalophora cecropia	15	May 28	Jul 15	1982	2019
890086.00	Pink-spotted Hawkmoth	Agrius cingulata	1	Oct 16	Oct 16	1994	1994
890090.00	Carolina Sphinx	Manduca sexta	10	Jul 23	Sep 20	1982	1994
890091.00	Five-spotted Hawkmoth	Manduca quinquemaculata	7	Jul 16	Oct 12	1982	1995
890102.00	Elm Sphinx	Ceratomia amyntor	5	Jun 27	Aug 20	1982	1994
890103.00	Waved Sphinx	Ceratomia undulosa	4	Jul 20	Jul 30	1982	1982
890111.00	Great Ash Sphinx	Sphinx chersis	2			1982	1982
890118.00	Laurel Sphinx	Sphinx kalmiae	1	Jul 18	Jul 18	1982	1982
890128.00	Hermit Sphinx	Lintneria eremitus	1	Jul 23	Jul 23	1982	1982
890140.00	Twin-spotted Sphinx	Smerinthus jamaicensis	2	Jun 13	Aug 3	1982	1982
890144.00	Blinded Sphinx	Paonias excaecata	3	Jun 17	Jul 16	1982	1985
890145.00	Small-eyed Sphinx	Paonias myops	1	Jul 20	Jul 20	1982	1982
890147.00	Walnut Sphinx	Amorpha juglandis	2	Jul 20	Jul 30	1982	1982

890128.00	Hermit Sphinx	Lintneria eremitus	1	Jul 23	Jul 23	1982	1982
890140.00	Twin-spotted Sphinx	Smerinthus jamaicensis	2	Jun 13	Aug 3	1982	1982
890144.00	Blinded Sphinx	Paonias excaecata	3	Jun 17	Jul 16	1982	1985
890145.00	Small-eyed Sphinx	Paonias myops	1	Jul 20	Jul 20	1982	1982
890147.00	Walnut Sphinx	Amorpha juglandis	2	Jul 20	Jul 30	1982	1982
890148.00	Modest Sphinx	Pachysphinx modesta	4	Jul 13	Jul 23	1982	1993
890177.00	Hummingbird Clearwing	Hemaris thysbe	1	Jun 20	Jun 20	1982	1982
890179.00	Snowberry Clearwing	Hemaris diffinis	2	Jun 28	Jul 26	1982	1982
890182.00	Pandorus Sphinx	Eumorpha pandorus	6	Jul 12	Oct 12	1982	2018
890184.00	Achemon Sphinx	Eumorpha achemon	9	Jun 21	Jul 26	1982	1996
890192.00	Abbott's Sphinx	Sphecodina abbottii	2	May 24	Aug 10	1982	1984
890193.00	Lettered Sphinx	Deidamia inscripta	1	Jun 8	Jun 8	1983	1983
890194.00	Nessus Sphinx	Amphion floridensis	4	Jun 8	Jun 20	1982	1984
890207.00	Virginia Creeper Sphinx	Darapsa myron	5	Jun 20	Aug 9	1982	1985
890211.00	Tersa Sphinx	Xylophanes tersa	1	Oct 12	Oct 12	1995	1995
890217.00	White-lined Sphinx	Hyles lineata	8	Jun 10	Oct 13	1982	1995
930003.00	Sigmoid Prominent	Clostera albosigma	2	May 15	May 15	2019	2019
930004.00	Angle-lined Chocolate-tip	Clostera inclusa	1	Mar 22	Mar 22	1967	1967
930019.00	Common Gluphisia	Gluphisia septentrionis	2	Jul 6	Jul 26	2019	2019
930038.00	Walnut Caterpillar Moth	Datana integerrima	3	Jun 14	Jul 26	1940	2019
930039.00	Spotted Datana	Datana perspicua	2	Jul 27	Jul 27	2017	2019
930280.00	Nais Tiger Moth	Apantesis nais	1	Jul 31	Jul 31	2019	2019
930316.00	Virginian Tiger Moth	Spilosoma virginica	2	Jul 24	Aug 15	2018	2019
930317.00	Salt Marsh Moth	Estigmene acrea	1			2018	2018
930319.00	Fall Webworm Moth	Hyphantria cunea	2			2019	2019
930335.00	Isabella Tiger	Pyrrharctia isabella	2	Aug 1	Sep 12	2018	2019
930370.00	Hickory Tussock Moth	Lophocampa caryae	1			2018	2018

APPENDIX "B"

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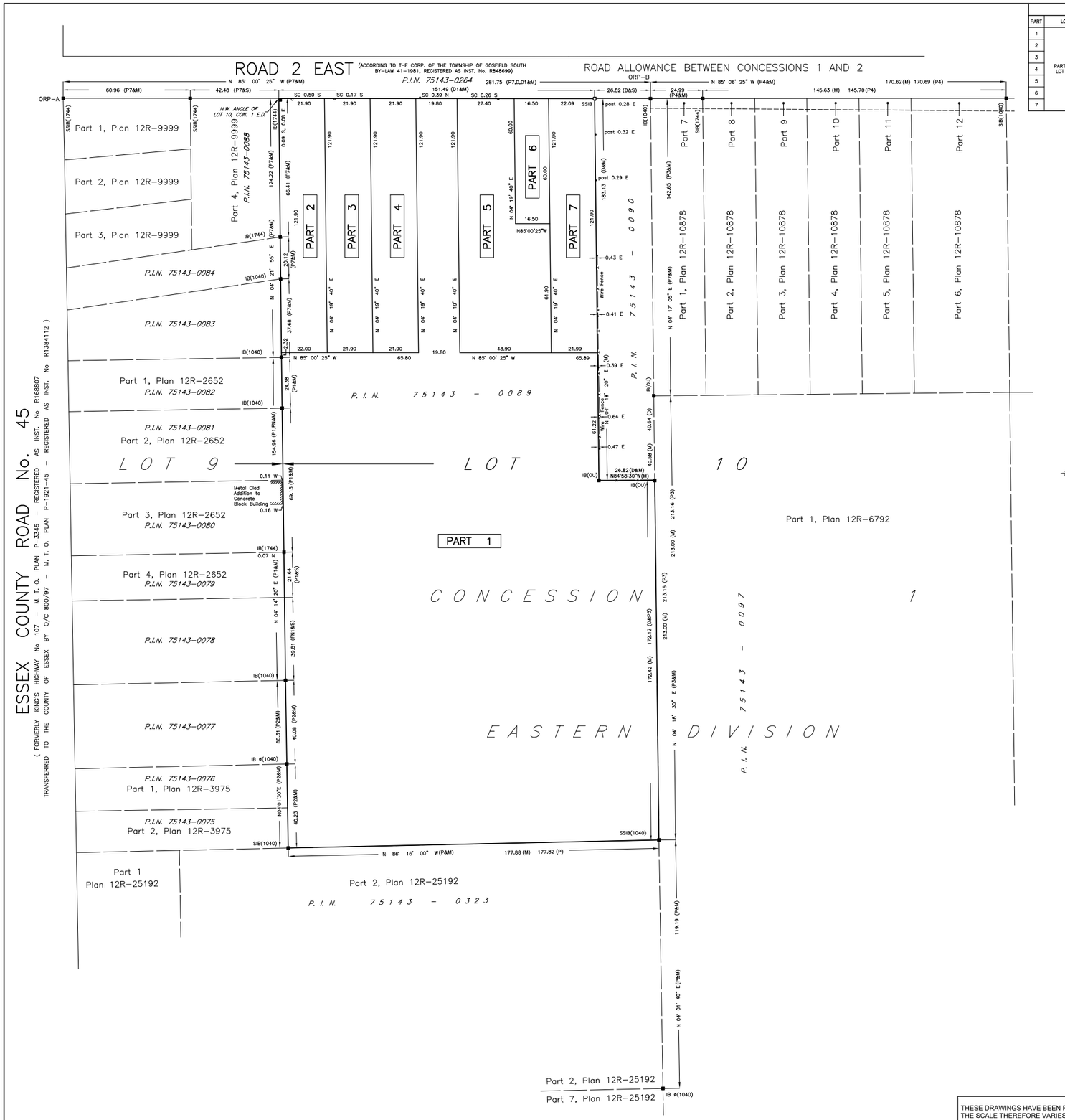

PARTS SCHEDULE				
PART	LOT	CON/PLAN	P.I.N.	AREA
1	PART OF LOT 10	CONCESSION 1 EASTERN DIVISION	ALL OF 75143-0089	4.274 ha.
2				0.267 ha.
3				0.267 ha.
4				0.267 ha.
5				0.436 ha.
6				0.099 ha.
7				0.270 ha.

PLAN OF SURVEY
OF
PART OF LOT 10
CONCESSION 1 EASTERN DIVISION
GEOGRAPHIC TOWNSHIP OF GOSFIELD SOUTH
NOW IN THE
TOWN OF KINGSVILLE
COUNTY OF ESSEX, ONTARIO
VERHAEGEN LAND SURVEYORS, A DIVISION OF J.D. BARNES LTD.

SCALE = 1:750

METRES
0 7.50 15.00 30.00 45.00 75.00

THE INTENDED PLOT SIZE OF THIS PLAN IS 915mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:750

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

INTEGRATION DATA		
OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17 NAD83 (CSRS) (2010.0). COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.		
POINT ID	NORTHING	EASTING
ORP-A	4656620.17	361627.07
ORP-B	4656595.65	361907.70
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.		

FOR BEARING COMPARISONS THE FOLLOWING ROTATIONS WERE APPLIED TO CONVERT TO GRID BEARINGS	
PLAN	CLOCKWISE ROTATION
P1, P3 & P4	1° 04' 10"
P2	1° 12' 30"
P7	1° 08' 45"

LEGEND AND NOTES
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS)(2010.0).

DISTANCES ON THIS PLAN ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999808.

ALL MONUMENTS SHOWN THUSLY □ ARE IRON BARS (IB) UNLESS OTHERWISE NOTED.
SIB DENOTES 25mm X 25mm X 1.22m STANDARD IRON BAR
SSIB DENOTES 25mm X 25mm X 0.61m SHORT STANDARD IRON BAR
IB DENOTES 16mm X 16mm X 0.61m IRON BAR
IB # DENOTES 19mm diameter X 0.61m ROUND IRON BAR
CC DENOTES CUT-CROSS
CP DENOTES 5mm X 50mm STEEL PIN
PB DENOTES PLASTIC BAR
■ DENOTES SURVEY MONUMENT FOUND
□ DENOTES SURVEY MONUMENT SET AND MARKED 1744
WIT. DENOTES WITNESS ⊥ DENOTES PERPENDICULAR
(S) DENOTES SET (M) DENOTES MEASURED
ORP DENOTES OBSERVED REFERENCE POINT
ALL SET SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11(4) OF O.REG. 525/91.

(S/P) DENOTES SET PROPORTIONALLY
(P) DENOTES PLAN 12R-25192
(P2) DENOTES PLAN 12R-3975
(P4) DENOTES PLAN 12R-10878
(P6) DENOTES PLAN 12R-25555
(FN) DENOTES FIELD NOTES FOR PLAN 12R-9999
(FN1) DENOTES FIELD NOTED BY (1040) Dated: Sept. 18, 1978. Plan File: 2A4532
(FN2) DENOTES FIELD NOTES FOR PLAN 12R-3975
(D) DENOTES INST. No. R14267225
(D1) DENOTES INST. No. R961040
(1744) DENOTES VERHAEGEN SURVEYORS INC., O.L.S.
(A) DENOTES C.G.R. ARMSTRONG, O.L.S.
(1040) DENOTES WILLIAM J. SETTERINGTON, O.L.S.
(OU) DENOTES ORIGIN UNKNOWN
(NI) DENOTES NOT IDENTIFIABLE
(P1) DENOTES PLAN 12R-2652
(P3) DENOTES PLAN 12R-6792
(P5) DENOTES PLAN 12R-26157
(P7) DENOTES PLAN 12R-9999

SURVEYOR'S CERTIFICATE
I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THIS SURVEY WAS COMPLETED ON THE 16th. DAY OF FEBRUARY, 2022.

DATE FEBRUARY 23, 2022.

ALEC S. MANTHA
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER XXXXXXX

THESE DRAWINGS HAVE BEEN REDUCED IN SIZE AND THE SCALE THEREFORE VARIES.
FULL SCALE DRAWINGS CAN BE VIEWED AT THE MUNICIPAL OFFICES IF REQUIRED.

VERHAEGEN LAND SURVEYORS SURVEYING MAPPING GIS
A Division of J. D. Barnes Limited
187 TALBOT ST E, LEAMINGTON, ON, N8H 1L8
T: (519) 322-2175 F: (519) 322-2675 www.jdbarnes.com

DRAWN BY: CWM | CHECKED BY: SP
CAD Date: February 25th, 2022
CAD File: 21-48-298-00.dwg

REFERENCE NO.: 21-48-298-00
FILE NO.: E-GOSFIELD SOUTH-1 E.D.-10

APPENDIX "C"

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Peralta Engineering

STORMWATER MANAGEMENT REPORT

PROJECT **Solid Rock Homes Inc.**
Proposed Residential Development
Road 2 East (290-38900)
Kingsville, ON N0P 2G0
Project No. E21-092

January 11, 2024

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Peralta Engineering

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November 3, 2023
(Revised December 18, 2023)
(Revised January 11, 2024)

I. INTRODUCTION

We have been retained by Solid Rock Homes Inc. to prepare a Stormwater Management (SWM) Report to support the proposed Residential Development. The entire property is approximately 5.845 hectares (14.443 acres) in size and is divided into two (2) distinct watersheds. We have performed a topographic survey of the entire property and have noted the existing site drainage. The calculations showing the SWM requirements for the proposed Residential Development are included in the appendices and should be read in conjunction with the associated Jamis Drain Drawings and Solid Rock Homes Inc. Residential Development Drawings.

II. LOCATION

This property is located in Lot 10, Concession 1 E.D., in the former Geographic Township of Gosfield South, now in the Town of Kingsville. The subject area consists of a single parcel with the tax roll number 290-38900 and is located on Road 2 East. The site is zoned A1 – General Agricultural Zone.

III. SCOPE OF WORK

The Client has indicated that we are to provide the design of the SWM facility for the proposed Residential Development. The Client plans on severing the north part of the subject property, approximately 1.847 hectares (4.564 acres), for six (6) residential lots as shown on the plans. The south part of the subject property, approximately 3.998 hectares (9.879 acres), will remain as farmland with a single house, a pole barn and the accessory driveway.

IV. DRAINAGE PATTERNS

The original undeveloped lands have never been previously assessed to any Municipal Drains. Through a detailed review of historical drainage records, the topographic survey, and the lidar data, the information indicates that the natural topography of the subject lands has a north-to-south gradient and was draining southerly to the existing natural watercourse located north of County Road 20 via overland conveyance.

However, the creation of the Union Avenue Drain, together with the development of the surrounding lands, had essentially cut off the subject property from its natural conveyance to the natural watercourse. The stormwater likely pools in the southeast corner of the subject property during large storm events and slowly infiltrates into the soil and eventually dissipates into the groundwater table or finds its way to the existing natural watercourse.

With regards to Municipal Drains, the adjacent Union Avenue Drain was designed without consideration of this property's contribution. Upon further review and analysis, we found that this drainage system has a generally low level of service and the analysis confirmed that this system had insufficient capacity to subsequently connect this property to the system. On the north side of Road 2 East resides the Ruthven Storm Sewer Drain. This drainage system provides a sufficient outlet for a large portion of the Hamlet of Ruthven. Based on the analysis of this system, it too has a very low level of service and would not support additional flows from the subject property.

In addition to the Municipal Drains in the vicinity, we found private drainage systems associated with the development of the adjacent properties. However, these drainage systems were intended and designed to accommodate runoff from each development through site plan control. Therefore, there was no means to add additional flows from the subject property to these drainage systems.

Based on the general topography and its historical contributions to the existing natural watercourse located north of County Road 20, we find that it is only natural for the subject property to continue contributing to its natural drainage outlet. However, with the site intended to be developed from agricultural to residential land use, it is anticipated that SWM provisions will be required to maintain the pre-development contributions to the drainage system and to ensure that there are no adverse impacts to the overall drainage system.

The existing natural watercourse eventually drains to Lake Erie through the existing 900mm diameter CSP across County Road 20. The field survey and investigations state that the existing 900mm diameter CSP is in fair condition and the existing 1,000mm diameter CSP downstream is in good condition. When our office was determining the drainage outlet for the greenhouse site to the east, we analyzed the existing natural watercourse watershed and noticed that the subject property was not assessed to any Municipal Drains. When sizing the drainage outlet for the greenhouse site based on the capacity of the existing 900mm diameter CSP, we included the subject property in the analysis and reserved capacity for the subject property. The calculated 1:100-year maximum allowable flow rate for the subject property is 125 l/s (4.41 cfs), please see the attached calculation sheet located in **Appendix "SWM-A"**.

V. GRASSED STORAGE AREA – QUANTITY (WATERSHED-1)

The grassed storage area has been designed using the recommendations set out in the Windsor/Essex Region Stormwater Management Standards Manual. The design utilizes the 1:100-year 4-hour Chicago Storm, 1:100-year 24-hour 108mm Storm, and stress tested with the SCS Type II 24-hour 150mm rainfall. The calculated 1:100-year maximum allowable flow rate for Watershed-1 is 40 l/s (1.41 cfs).

Our calculations indicate that the proposed 200mm diameter smoothwall outlet pipe will restrict the 1:100-year peak flow rate for Watershed-1 to 35 l/s (1.24 cfs), which is less than the maximum allowable flow rate.

The calculated 1:100-year high water level for the grassed storage area is 198.387 metres, leaving a freeboard of approximately 0.337 metres to the lowest point on the top bank of the grassed storage area. The calculated stress test high water level for the grassed storage area is 198.549 metres, leaving a freeboard of approximately 0.175 metres to the lowest point on the top bank of the grassed storage area.

Infiltration has been reviewed and is expected to occur, however, it was not considered in order to remain conservative.

Water from the grassed storage area will discharge through a 200mm diameter smoothwall outlet pipe to the outlet catch basin (CB18), which is on the southeast side of the subject property. From the outlet catch basin, water will discharge through the 300mm diameter smoothwall plastic pipe to the existing natural watercourse.

VI. GRASSED STORAGE AREA – QUALITY (WATERSHED-1)

It is expected that a "Normal" level (70% TSS removal efficiency) of water quality treatment will be achieved for the discharge of stormwater from the SWM facility in this area. The runoff from Watershed-1 will be treated by an Environmental Technology Verification (ETV) certified Oil Grit Separator (OGS) (ADS FD-5HC or an approved equivalent) in accordance with the attached manufacturer's suggested sizing and calculation sheet located in **Appendix "SWM-D"**. The OGS will provide quality treatment for oil and sediments prior to discharging into the existing natural watercourse.

VII. CONTAINMENT AREA – QUANTITY (WATERSHED-2)

The containment area has been designed using the recommendations set out in the Windsor/Essex Region Stormwater Management Standards Manual. The design utilizes the 1:100-year 4-hour Chicago Storm, 1:100-year 24-hour 108mm Storm, and stress tested with the SCS Type II 24-hour 150mm rainfall. The calculated 1:100-year maximum allowable flow rate for Watershed-2 is 86 l/s (3.04 cfs).

Our calculations indicate that the proposed 150mm diameter smoothwall outlet pipe will restrict the 1:100-year peak flow rate for Watershed-2 to 37 l/s (1.31 cfs), which is less than the maximum allowable flow rate.

The calculated 1:100-year high water level for the containment area is 197.116 metres, leaving a freeboard of approximately 0.324 metres to the perimeter of the containment area and 1.610 metres to the lowest point in the existing pole barn. The calculated stress test high water level for the containment area is 197.267 metres, leaving a freeboard of approximately 0.173 metres to the perimeter of the containment area and 1.459 metres to the lowest point in the existing pole barn.

Again, infiltration has been reviewed and is expected to occur, however, it was not considered in order to remain conservative.

Water from the containment area will discharge through a 150mm diameter smoothwall outlet pipe to the outlet catch basin (CB18), which is on the southeast side of the subject property. From the outlet catch basin, water will discharge through the 300mm diameter smoothwall plastic pipe to the existing natural watercourse.

VIII. CONTAINMENT AREA – QUALITY (WATERSHED-2)

Water from Watershed-2 will drain to the grassed containment area via overland conveyance and be polished naturally by the grassed area.

IX. PROPOSED DRAINAGE

Roof leaders from the new houses shall discharge to the grass swales where practical. Cleanouts are to be provided on the downspout collection pipes as required per the Ontario Building Code (OBC) where there are not catch basins to provide access.

We have designed a berm along the southwest, south, and southeast sides of the site to ensure that the stormwater remains on-site and is conveyed to the proposed containment area and outlet.

Storm events in excess of the 150mm stress test storm may exceed the storage capacity of the SWM facility and overflow to the existing natural watercourse.

X. SEDIMENT CONTROL DURING CONSTRUCTION

The Client and their Contractor are required to use sediment control measures during the construction of this site. These measures may include but are not limited to the following:

a) Silt fencing along the perimeter of the site as required.

b) Perimeter swales and flow checks to filter site runoff prior to discharging to any drain.

c) During the construction of the site when water quality is at its worst, non-woven filter cloth catch basin filters are to be installed to maintain efficiency of the SWM system through sediment removal. The filters shall be closely monitored to maintain their optimum efficiency. It is expected that these catch basin sediment filters will be maintained until the site has been stabilized; generally, once a good grass catch has been achieved and the site and driveways have been final graded. All materials accumulated in the filter and basin shall be removed in accordance with the MOE publication "Guidelines for Use at Contaminated Sites in Ontario" (1997).

d) The Client shall take an active role in ensuring that Builders and Contractors working on the site keep driveways cleaned of dirt and mud that may be transported off the site. The Client is responsible to keep all public roadways clear of mud and debris.

e) The Client shall arrange and pay for the cleanout and disposal of accumulated sediment materials in the receiving watercourse that can be proven to be directly attributed to the construction of the subject works.

Details of sediment control measures are included in **Appendix "SWM-E"** attached to the back of this Report. If necessary, the Client/Contractor may contact the Engineer to discuss details of the sediment control procedures to be utilized before construction takes place.

XI. SWM SYSTEM SEDIMENT CONTROL MONITORING AND MAINTENANCE

Notes for the proper clean up and disposal of materials accumulated in the SWM system include:

a) The Client shall set up a maintenance monitoring program to check sediment build-up in the receiving watercourse, catch basins, manholes, and sediment collection pools on a regular basis.

b) The Client shall coordinate site inspections which shall be carried out once a month after site grading is completed. Additional inspections shall be made after significant rainfall events (25mm or greater) and if warranted by observations of the site conditions. Inspections may be less frequent when the site has been stabilized.

c) The Client shall keep a log of inspections made and shall include the date and time of the inspection, Inspector's name, the condition of the collection and treatment systems, and any cleaning or repairs carried out. The log shall be available for review by the Town, local conservation authority, or any other required approval agencies at all times.

d) The Client shall arrange for the cleanout of accumulated materials in the storm drainage system, catch basins, maintenance holes, and sediment basins and disposal of same by a licensed Contractor who shall have regard to the MOE publication "Guidelines for Use at Contaminated Sites in Ontario" (1997). Cleanout should be completed on an annual basis as required or when 80% of the storage capacity of a SWM system feature is attained.

XII. USE OF THE STORMWATER MANAGEMENT SYSTEM

This SWM facility is designed for the quality and quantity treatment of stormwater runoff from this residential site only.

XIII. CONCLUSIONS AND RECOMMENDATIONS

Effective SWM can be provided by the use of these permanent design features as well as temporary measures during construction to address the primary concerns.

This design has been completed using the normal recommendations for an installation of this nature. A copy of this Report and Plans will be submitted to the Essex Region Conservation Authority for their review.

We trust that the Town will find the above and the enclosed satisfactory for their purposes. Should there be any questions or any clarifications required relative to this detention and drainage design, we should be contacted.

All of which is respectfully submitted,

N.J. PERALTA ENGINEERING LTD.

Heide Mikkelsen, P.Eng.

HCM/nn

APPENDIX "SWM-A"

Grassed Storage Area Calculations

(Watershed-1)

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Project: D22-114 File: Drain Capacity
Date: 02/11/2023

PRE-DEVELOPMENT CALCULATIONS FOR SOLID ROCK HOMES DEVELOPMENT

NATURAL WATER COURSE

Preliminary Summary of Assessed Areas

Description		AREA HECTARES	ACRES	C	CA	
290-39000						
290-39002						
290-39004		0.670	1.656	0.38	0.629	
290-39006						
290-39100		0.206	0.509	0.29	0.148	1987 Union Avenue Drain Report
290-39200		0.251	0.620	0.34	0.211	
290-39201		0.275	0.680	0.34	0.231	
290-39202		0.312	0.770	0.55	0.424	
290-39300		0.393	0.971	0.43	0.418	
290-39301		0.219	0.541	0.35	0.189	
290-39400		0.405	1.001	0.29	0.290	
290-39500		0.405	1.001	0.37	0.370	
290-39600		0.207	0.512	0.33	0.169	
290-39601		0.198	0.489	0.36	0.176	
290-39602		2.833	7.000	0.10	0.700	
290-39-605, 700 & 710		0.407	1.006	0.38	0.382	
290-17400		15.440	38.152	0.10	3.815	
Road	2nd Concession	0.071	0.175	0.55	0.096	
Road	County Road 45	0.287	0.709	0.65	0.461	
290-17500		0.097	0.240	0.40	0.096	1995 Mucci Report
290-17600		0.595	1.470	0.33	0.485	
290-17601		3.015	7.450	0.10	0.745	
290-38900	(Subject Property)	5.883	14.536	0.10	1.454	Lidar
Road	County Road 20	2.550	6.301	0.60	3.781	
		34.718	85.790		15.270	

Average "C" = $\frac{15.270}{85.790}$ = 0.18 for pre-development

Share of Capacity = $\frac{1.454}{15.270}$ = 0.095196 = 9.52%

Capacity of Downstream Pipe

			Capacity Shared to (290-38900)		
RD20 Crossing	Annular 900mm Dia. CSP @1.8% Grade (Actual)	1315.600 L/S	125.24 L/s	4.42 cfs	C.Rd20 Crossing

Determin Area for SWM Detention Design

Parcel Area

Parcel (290-38900)		14.44 ac.	5.845 ha.
	Total =	14.44 ac.	5.845 ha.

Area Drains to Natural Watercourse

Parcel (290-38900) (Lidar Analysis for Southshore Project E19-031)		14.54 ac.	5.883 ha.
	Total =	14.54 ac.	5.883 ha.

Area to be Developed to Grassed Storage Area (Watershed-1)

Residential Lots Development		3.96 ac.	1.603 ha.
Access Driveway		0.60 ac.	0.244 ha.
	Total =	4.56 ac.	1.847 ha.

Remaining Area to be Developed to Containment Area (Watershed-2)

Agricultural Farmland with a House and Farm Building		9.88 ac.	3.998 ha.
	Total =	9.88 ac.	3.998 ha.

Existing Pre-Development Runoff Conditions

Existing Soil Type

Description		Area (Ac.)	Area (Ha.)	"CN"	CNxA
Parkhill Loam - Hydrologic Group C		14.44	5.845	85	497
	Total =	14.44	5.845	85	497

Maximum Allowable Discharge Flow Rate

Share of Capacity of 900mm Dia. CSP Tile Crossing County Road 20	**125.2 L/s**

Per the attached capacity analysis sheet, the post-development discharge flow rate must be restricted to 125.2 L/s for the area proposed to be developed.

Hydrograph Detention Summary Table (Watershed 1 & 2)

Hydrograph ID	Rainfall Event Description	Allowable Flow Rate (cms)	[Watershed-1] Peak Flow Rate (cms)	[Watershed-2] Peak Flow Rate (cms)	[Watershed 1 & 2] Peak Flow Rate (cms)
No. 5	100-yr 4-hr 81.6mm	0.125	0.035	0.037	0.072
No. 6	100-yr 24-hr 108mm	0.125	0.035	0.037	0.072
No. 7	150mm Stress Test	N/A	0.036	0.039	0.075

Determin Area for SWM Detention Design

Parcel Area

Parcel (290-38900)		14.44 ac.	5.845 ha.
	Total =	14.44 ac.	5.845 ha.

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Parcel (290-38900) (Lidar Analysis for Southshore Project E19-031)		14.54 ac.	5.883 ha.
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Access Driveway		0.60 ac.	0.244 ha.
	Total =	4.56 ac.	1.847 ha.

Existing Pre-Development Runoff Conditions (Watershed-1)

Existing Soil Type

Description		Area (Ac.)	Area (Ha.)	"CN"
Parkhill Loam - Hydrologic Group C		4.56	1.847	85
	Total =	4.56	1.847	85

Maximum Allowable Discharge Flow Rate

Share of Capacity of 900mm Dia. CSP Tile Crossing County Road 20 **39.6 L/s**

Per the attached capacity analysis sheet, the post-development discharge flow rate must be restricted to 39.6 L/s for Watershed-1 area.

Proposed Post-Development Runoff Conditions (Watershed-1)

Typical lot sizes of 1/5 to 2/3 acre with impervious area up to 65%

Description		Area (Ac.)	Area (Ha.)	"CN"	Rational "C"
Residential Lots Development		3.96	1.603	91	0.61
Access Driveway		0.60	0.244	82	0.40
	Total =	4.56	1.847	90	0.58

Hydrograph Detention Summary Table (Watershed-1)

Hydrograph ID	Rainfall Event Description	Allowable Flow Rate (cms)	Detention Peak Flow Rate (cms)	Max. Storage Volume (cum)	Water Level (m)
No. 4	100-yr 4-hr 81.6mm	0.040	0.035	728	198.387
No. 7	100-yr 24-hr 108mm	0.040	0.035	687	198.369
No. 10	150mm Stress Test	N/A	0.036	1,148	198.549

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Hydrograph Report

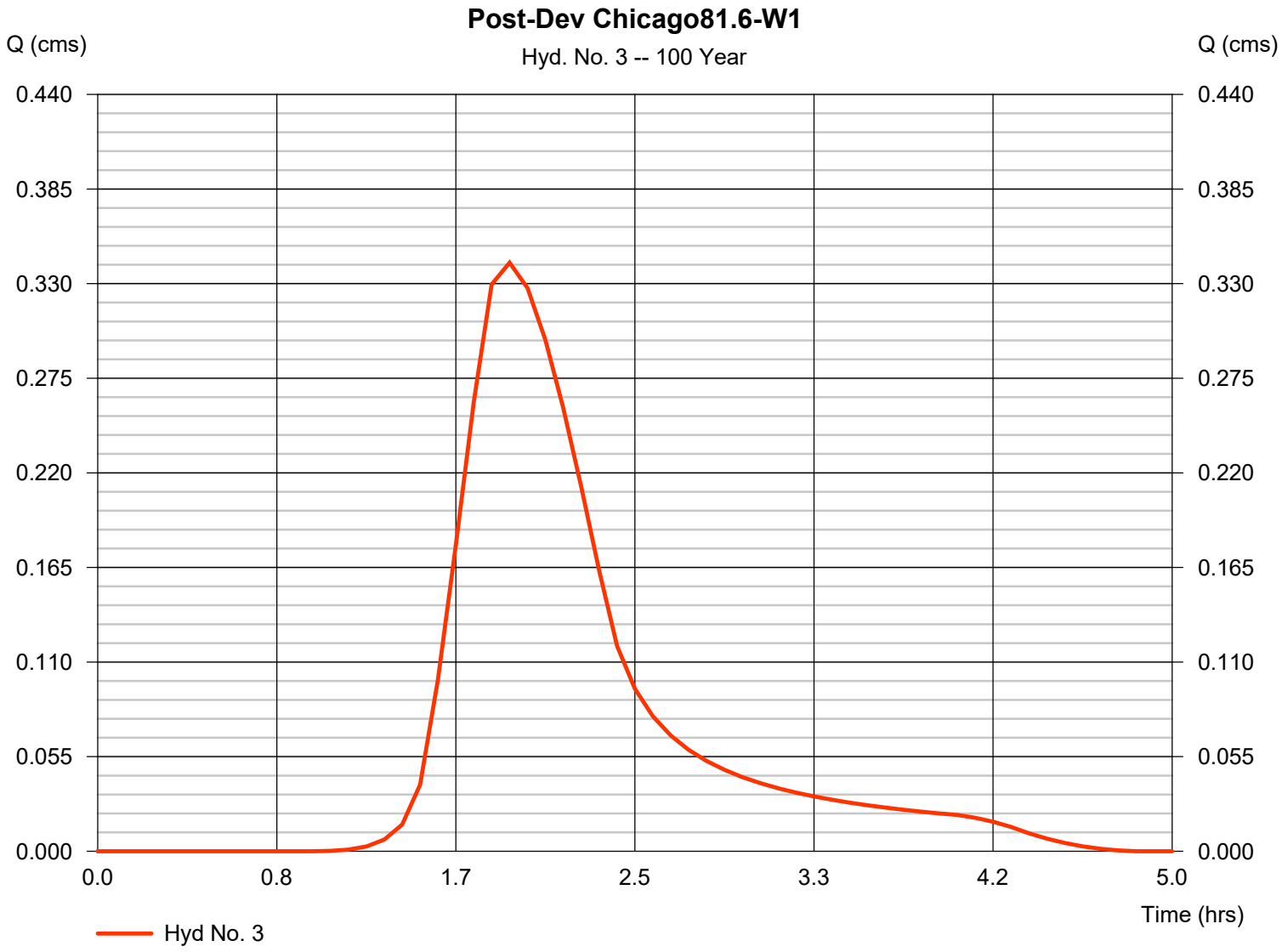
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 3

Post-Dev Chicago81.6-W1

Hydrograph type	=	Chicago Runoff	Peak discharge	=	0.342 cms
Storm frequency	=	100 yrs	Time to peak	=	1.92 hrs
Time interval	=	5 min	Hyd. volume	=	1,054.7 cum
Drainage area	=	1.847 hectare	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	81.60 mm	Distribution	=	Custom
Storm duration	=	4 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 1.847



Hydrograph Report

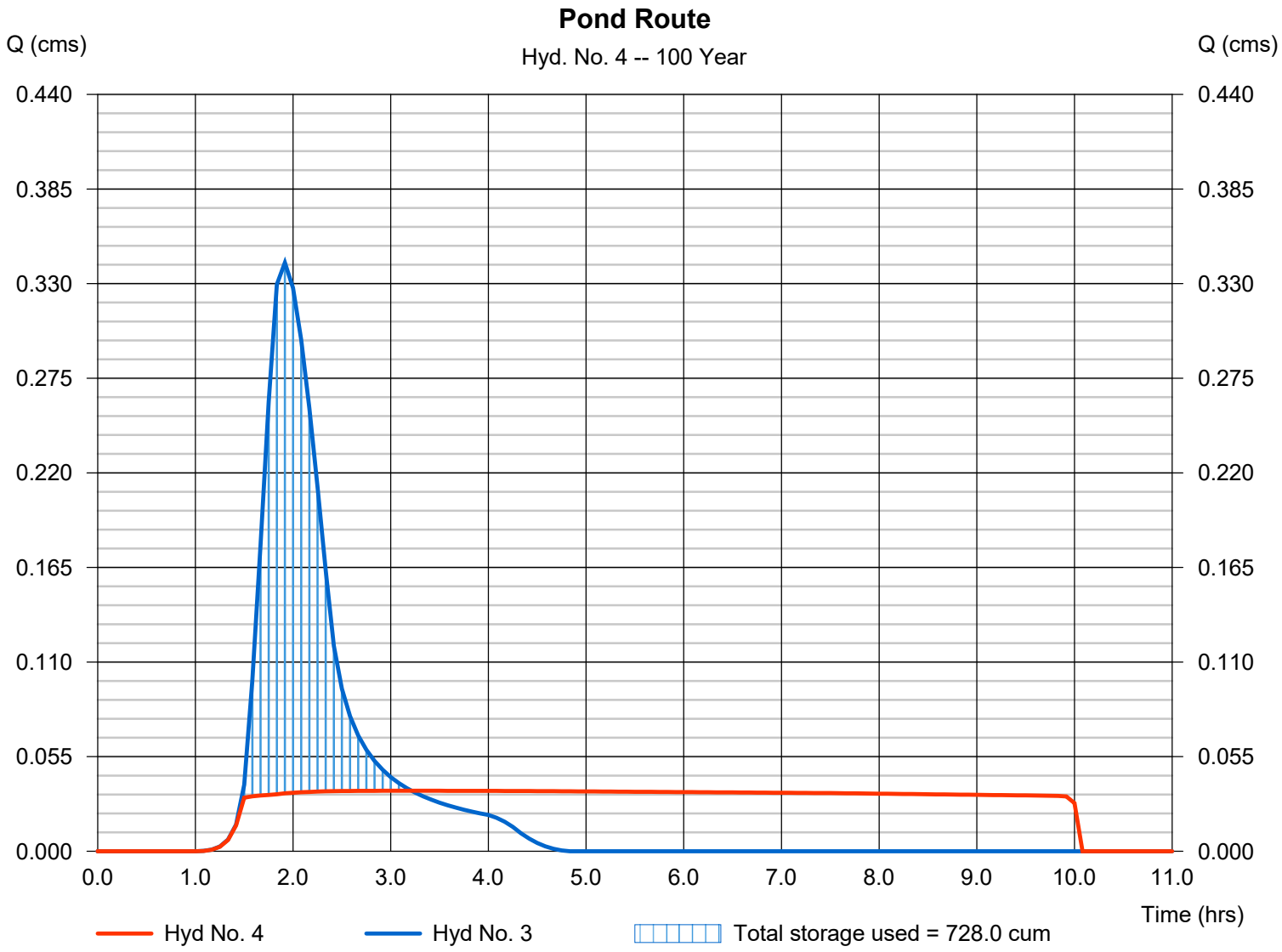
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 4

Pond Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.035 cms
Storm frequency	=	100 yrs	Time to peak	=	3.25 hrs
Time interval	=	5 min	Hyd. volume	=	1,058.0 cum
Inflow hyd. No.	=	3 - Post-Dev Chicago81.6-W1	Max. Elevation	=	198.39 m
Reservoir name	=	Grassed Storage	Max. Storage	=	728.0 cum

Storage Indication method used.



Pond Report

Pond No. 15 - Grassed Storage

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 196.900 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	196.90	01	0.0	0.0
1.00	197.90	01	1.4	1.4
1.01	197.91	07	0.0	1.5
1.10	198.00	627	21.0	22.5
1.30	198.20	2,219	268.4	290.8
1.50	198.40	2,471	468.7	759.5
1.70	198.60	2,732	520.1	1,279.6
1.80	198.70	2,867	279.9	1,559.5
1.82	198.72	2,899	69.2	1,628.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 200.00	0.00	0.00	0.00
Span (mm)	= 200.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 196.900	0.000	0.000	0.000
Length (m)	= 287.800	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	196.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1.4	197.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.031
1.01	1.5	197.91	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.10	22.5	198.00	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.30	290.8	198.20	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.50	759.5	198.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.70	1,279.6	198.60	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.80	1,559.5	198.70	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.82	1,628.7	198.72	0.04 oc	---	---	---	---	---	---	---	---	---	0.038

Hydrograph Report

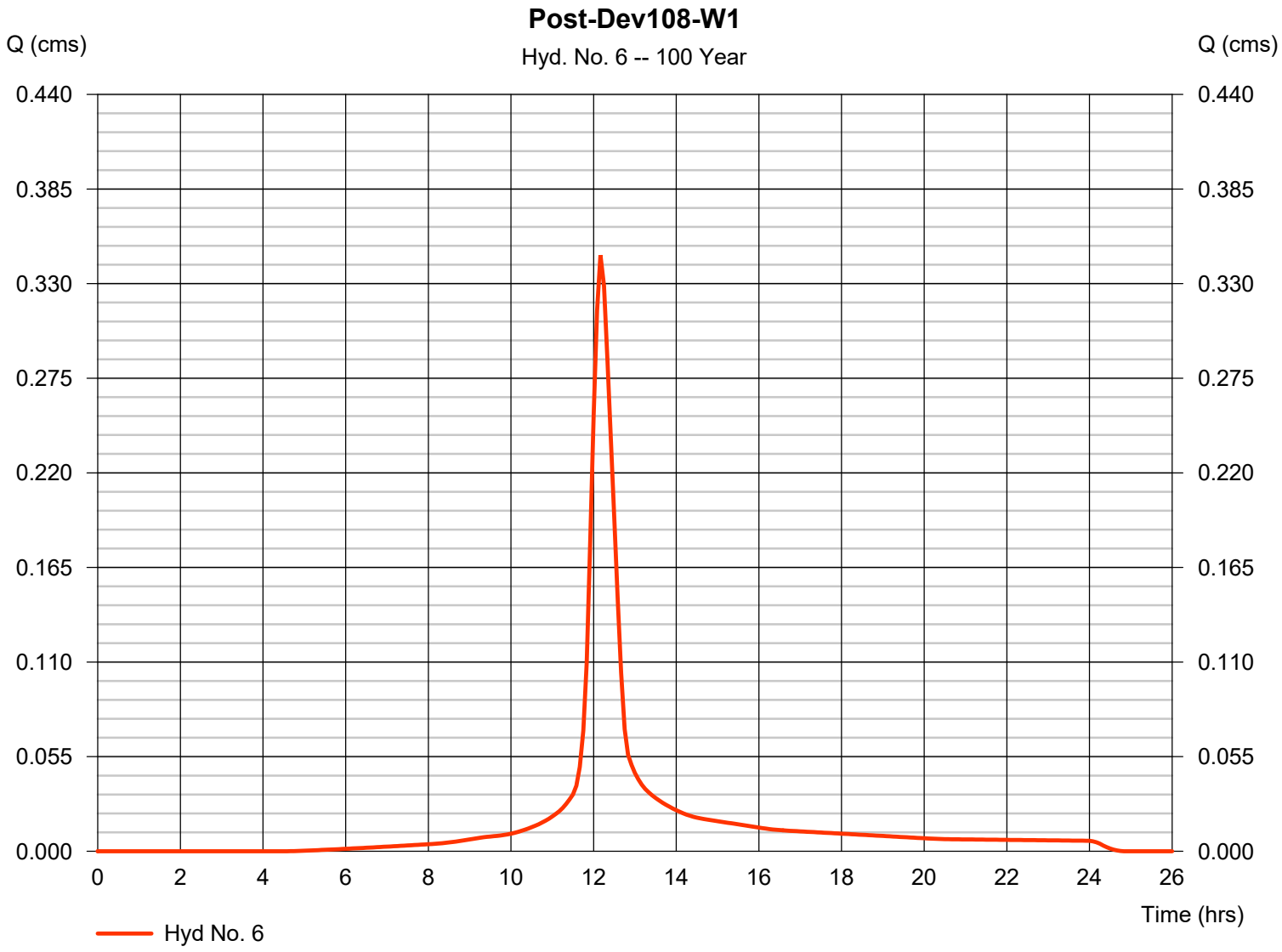
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 6

Post-Dev108-W1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.347 cms
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	1,528.2 cum
Drainage area	=	1.847 hectare	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	108.00 mm	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 1.847



Hydrograph Report

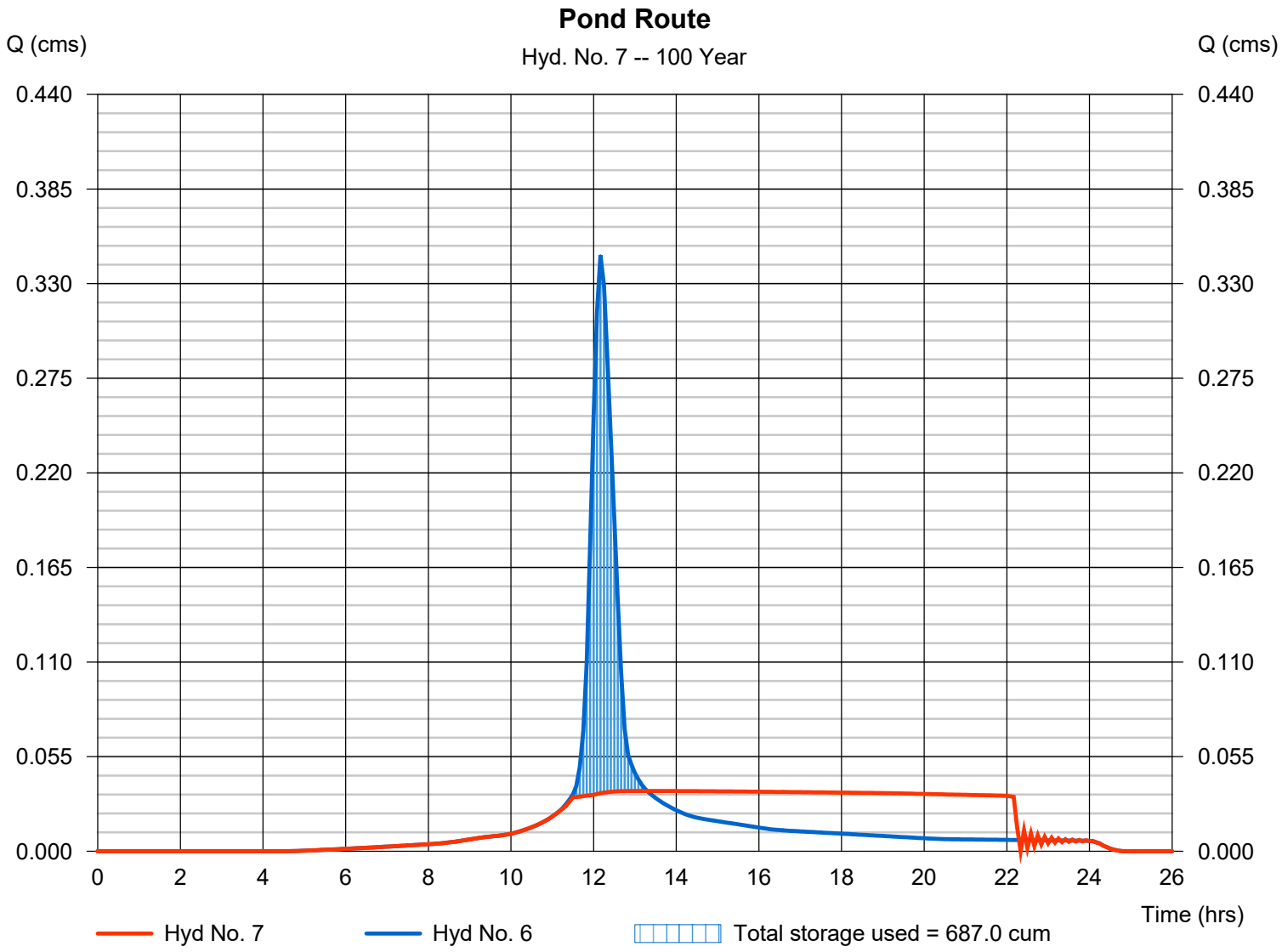
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 7

Pond Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.035 cms
Storm frequency	=	100 yrs	Time to peak	=	13.33 hrs
Time interval	=	5 min	Hyd. volume	=	1,528.2 cum
Inflow hyd. No.	=	6 - Post-Dev108-W1	Max. Elevation	=	198.37 m
Reservoir name	=	Grassed Storage	Max. Storage	=	687.0 cum

Storage Indication method used.



Pond Report

Pond No. 15 - Grassed Storage

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 196.900 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	196.90	01	0.0	0.0
1.00	197.90	01	1.4	1.4
1.01	197.91	07	0.0	1.5
1.10	198.00	627	21.0	22.5
1.30	198.20	2,219	268.4	290.8
1.50	198.40	2,471	468.7	759.5
1.70	198.60	2,732	520.1	1,279.6
1.80	198.70	2,867	279.9	1,559.5
1.82	198.72	2,899	69.2	1,628.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 200.00	0.00	0.00	0.00
Span (mm)	= 200.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 196.900	0.000	0.000	0.000
Length (m)	= 287.800	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	196.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1.4	197.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.031
1.01	1.5	197.91	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.10	22.5	198.00	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.30	290.8	198.20	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.50	759.5	198.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.70	1,279.6	198.60	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.80	1,559.5	198.70	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.82	1,628.7	198.72	0.04 oc	---	---	---	---	---	---	---	---	---	0.038

Hydrograph Report

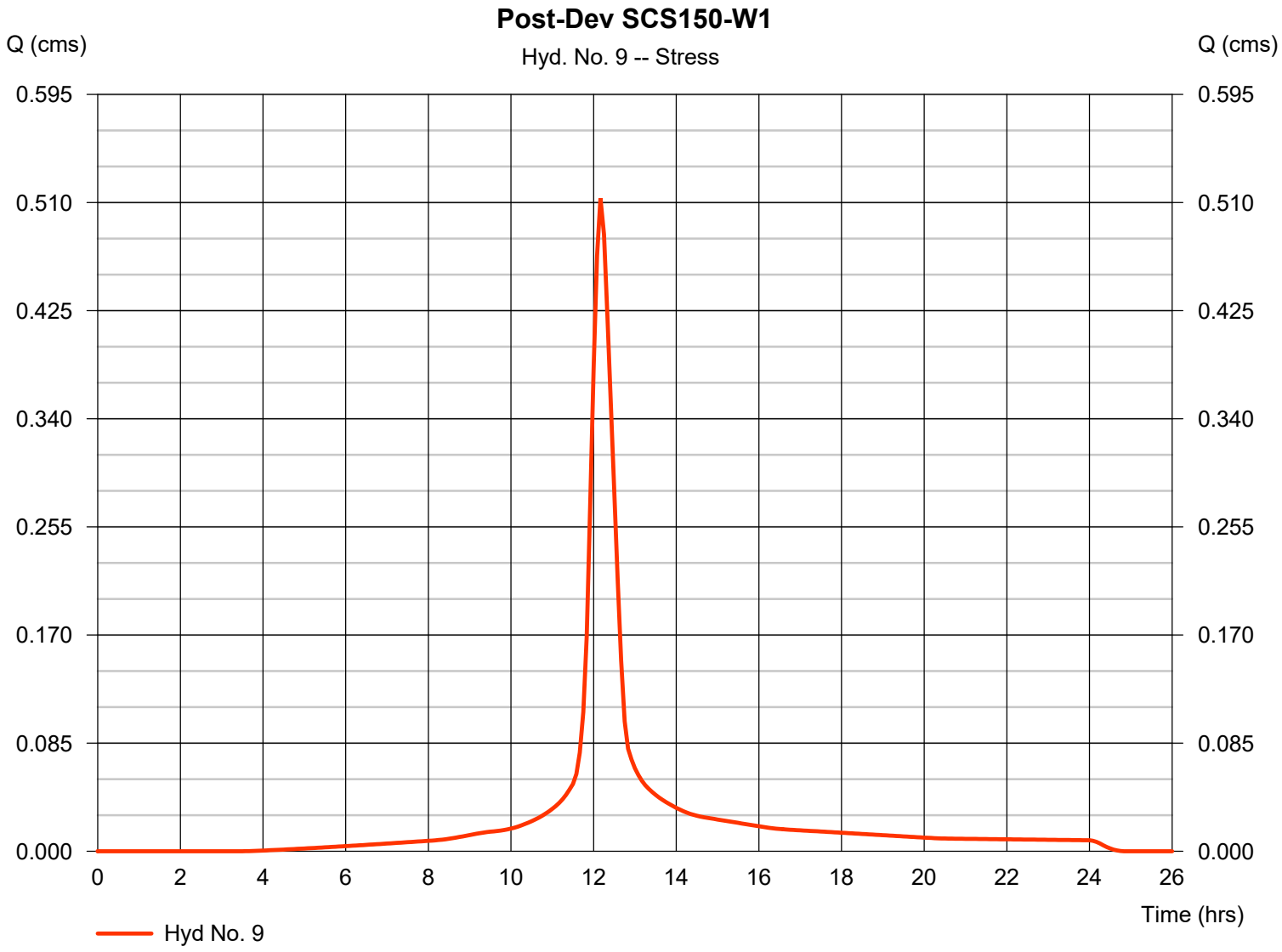
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 9

Post-Dev SCS150-W1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.513 cms
Storm frequency	=	Stress	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	2,299.9 cum
Drainage area	=	1.847 hectare	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	150.00 mm	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 1.847



Hydrograph Report

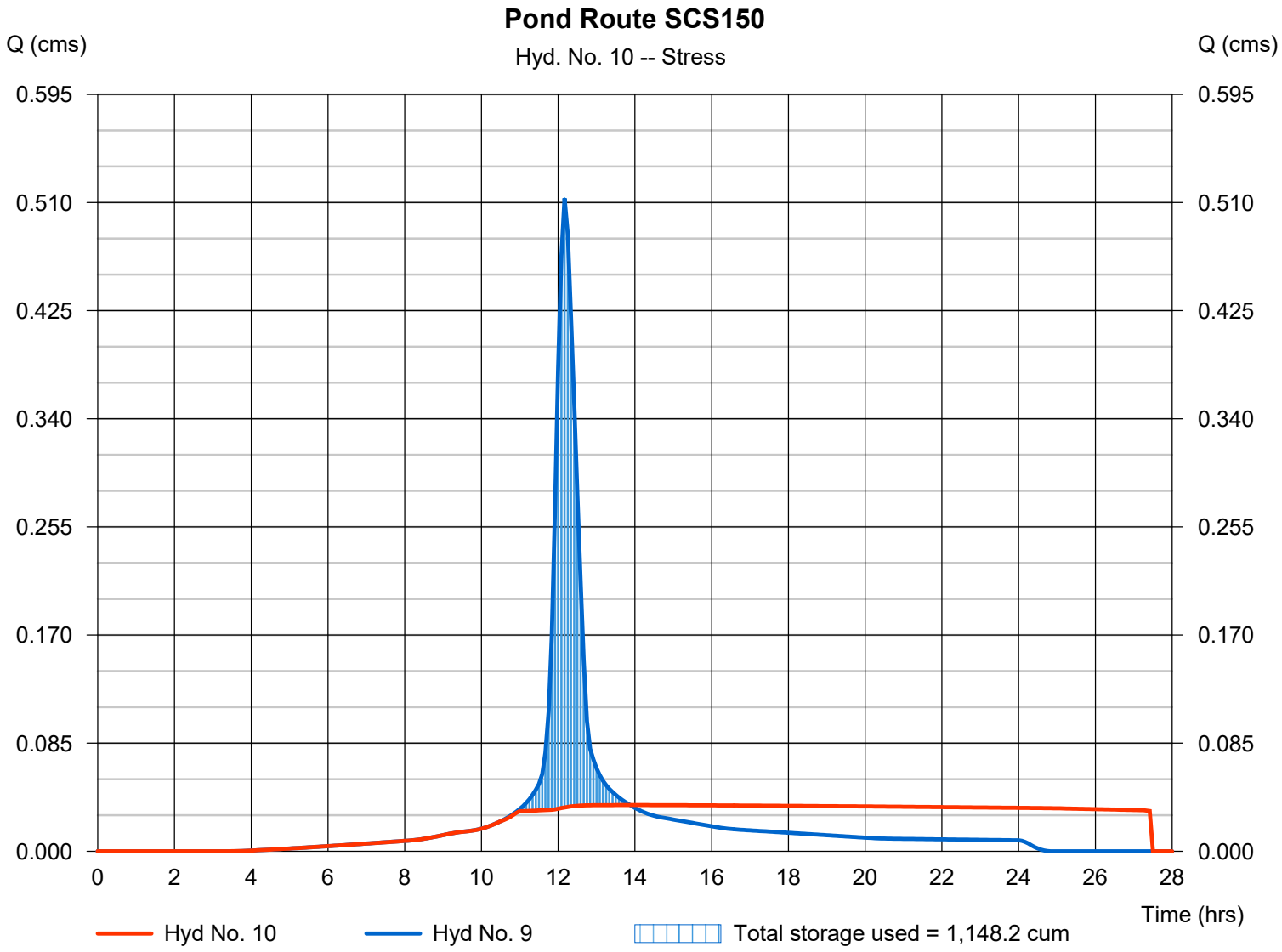
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 10

Pond Route SCS150

Hydrograph type	=	Reservoir	Peak discharge	=	0.036 cms
Storm frequency	=	Stress	Time to peak	=	13.83 hrs
Time interval	=	5 min	Hyd. volume	=	2,300.2 cum
Inflow hyd. No.	=	9 - Post-Dev SCS150-W1	Max. Elevation	=	198.55 m
Reservoir name	=	Grassed Storage	Max. Storage	=	1,148.2 cum

Storage Indication method used.



Pond Report

Pond No. 15 - Grassed Storage

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 196.900 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	196.90	01	0.0	0.0
1.00	197.90	01	1.4	1.4
1.01	197.91	07	0.0	1.5
1.10	198.00	627	21.0	22.5
1.30	198.20	2,219	268.4	290.8
1.50	198.40	2,471	468.7	759.5
1.70	198.60	2,732	520.1	1,279.6
1.80	198.70	2,867	279.9	1,559.5
1.82	198.72	2,899	69.2	1,628.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 200.00	0.00	0.00	0.00
Span (mm)	= 200.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 196.900	0.000	0.000	0.000
Length (m)	= 287.800	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	196.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1.4	197.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.031
1.01	1.5	197.91	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.10	22.5	198.00	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.30	290.8	198.20	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.50	759.5	198.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.70	1,279.6	198.60	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.80	1,559.5	198.70	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.82	1,628.7	198.72	0.04 oc	---	---	---	---	---	---	---	---	---	0.038

APPENDIX "SWM-B"

Containment Area Calculations

(Watershed-2)

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Determin Area for SWM Detention Design

Parcel Area

Parcel (290-38900)		14.44 ac.	5.845 ha.
	Total =	14.44 ac.	5.845 ha.

Area Drains to Natural Watercourse

Parcel (290-38900) (Lidar Analysis for Southshore Project E19-031)		14.54 ac.	5.883 ha.
	Total =	14.54 ac.	5.883 ha.

Remaining Area to be Developed to Containment Area (Watershed-2)

Agricultural Farmland with a House and Farm Building		9.88 ac.	3.998 ha.
	Total =	9.88 ac.	3.998 ha.

Existing Pre-Development Runoff Conditions (Watershed-2)

Existing Soil Type

Description		Area (Ac.)	Area (Ha.)	"CN"
Parkhill Loam - Hydrologic Group C		9.88	3.998	85
	Total =	9.88	3.998	85

Maximum Allowable Discharge Flow Rate

Share of Capacity of 900mm Dia. CSP Tile Crossing County Road 20 **85.7 L/s**

Per the attached capacity analysis sheet, the post-development discharge flow rate must be restricted to 85.7 L/s for Watershed-2 area.

Proposed Post-Development Runoff Conditions (Watershed-2)

Description		Area (Ac.)	Area (Ha.)	"CN"	Rational "C"
House and Pole Barn		0.11	0.046	98	0.90
Driveway and Other Covered Area		0.87	0.353	98	0.80
Balance of Area (Grass or Crop)		8.89	3.599	85	0.20
	Total =	9.88	3.998	86	0.26

Hydrograph Detention Summary Table (Watershed-2)

Hydrograph ID	Rainfall Event Description	Allowable Flow Rate (cms)	Detention Peak Flow Rate (cms)	Max. Storage Volume (cum)	Water Level (m)
No. 13	100-yr 4-hr 81.6mm	0.086	0.037	1,553	197.107
No. 16	100-yr 24-hr 108mm	0.086	0.037	1,616	197.116
No. 19	150mm Stress Test	N/A	0.039	2,798	197.267

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Hydrograph Report

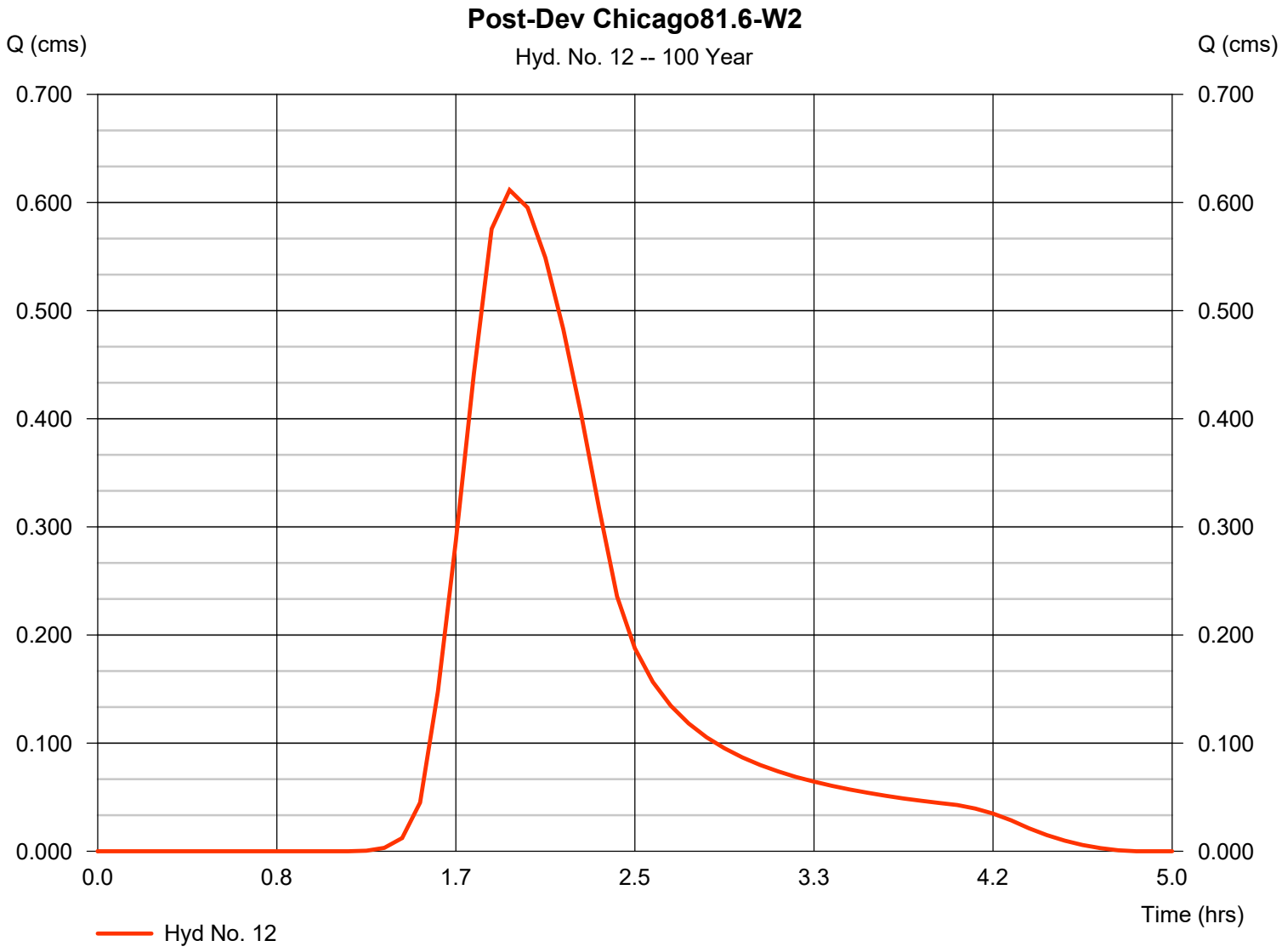
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 12

Post-Dev Chicago81.6-W2

Hydrograph type	=	Chicago Runoff	Peak discharge	=	0.612 cms
Storm frequency	=	100 yrs	Time to peak	=	1.92 hrs
Time interval	=	5 min	Hyd. volume	=	1,933.2 cum
Drainage area	=	3.998 hectare	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	81.60 mm	Distribution	=	Custom
Storm duration	=	4 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 3.998



Hydrograph Report

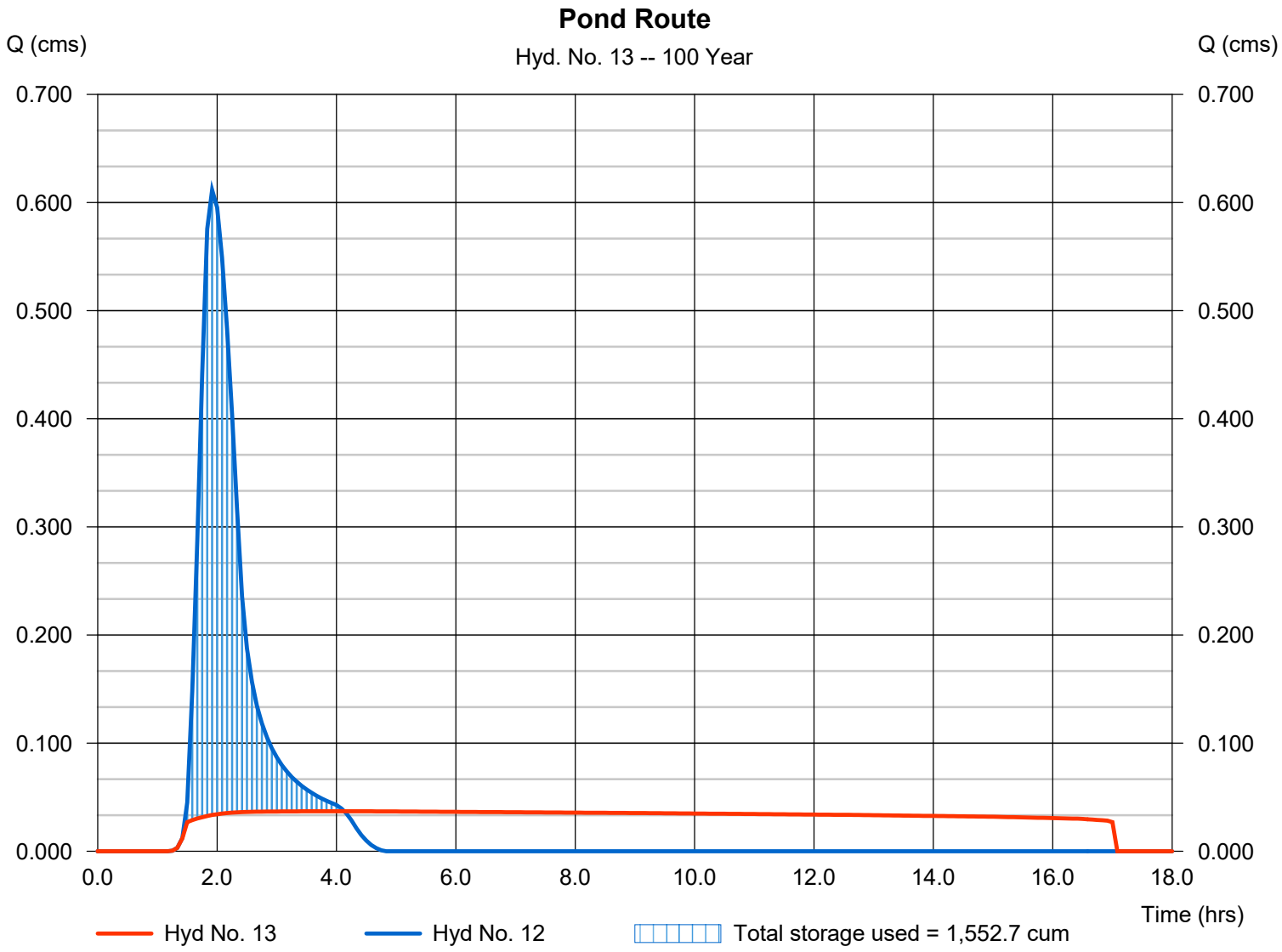
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 13

Pond Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.037 cms
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	1,934.4 cum
Inflow hyd. No.	=	12 - Post-Dev Chicago81.6-W2	Max. Elevation	=	197.11 m
Reservoir name	=	Containment Area	Max. Storage	=	1,552.7 cum

Storage Indication method used.



Pond Report

Pond No. 16 - Containment Area

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 195.834 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	195.83	00	0.0	0.0
0.67	196.50	00	0.2	0.2
0.77	196.60	185	6.4	6.7
0.87	196.70	1,017	54.5	61.2
0.97	196.80	2,258	159.7	220.9
1.07	196.90	3,560	288.4	509.3
1.17	197.00	4,970	424.5	933.8
1.27	197.10	6,389	566.5	1,500.2
1.37	197.20	7,870	711.6	2,211.8
1.47	197.30	9,556	869.8	3,081.6
1.57	197.40	11,121	1,032.7	4,114.3
1.61	197.44	11,695	456.4	4,570.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 150.00	0.00	0.00	0.00
Span (mm)	= 150.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 195.834	0.000	0.000	0.000
Length (m)	= 20.900	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	195.83	0.00	---	---	---	---	---	---	---	---	---	0.000
0.67	0.2	196.50	0.03 oc	---	---	---	---	---	---	---	---	---	0.026
0.77	6.7	196.60	0.03 oc	---	---	---	---	---	---	---	---	---	0.028
0.87	61.2	196.70	0.03 oc	---	---	---	---	---	---	---	---	---	0.030
0.97	220.9	196.80	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.07	509.3	196.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.17	933.8	197.00	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.27	1,500.2	197.10	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.37	2,211.8	197.20	0.04 oc	---	---	---	---	---	---	---	---	---	0.038
1.47	3,081.6	197.30	0.04 oc	---	---	---	---	---	---	---	---	---	0.040
1.57	4,114.3	197.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.041
1.61	4,570.7	197.44	0.04 oc	---	---	---	---	---	---	---	---	---	0.042

Hydrograph Report

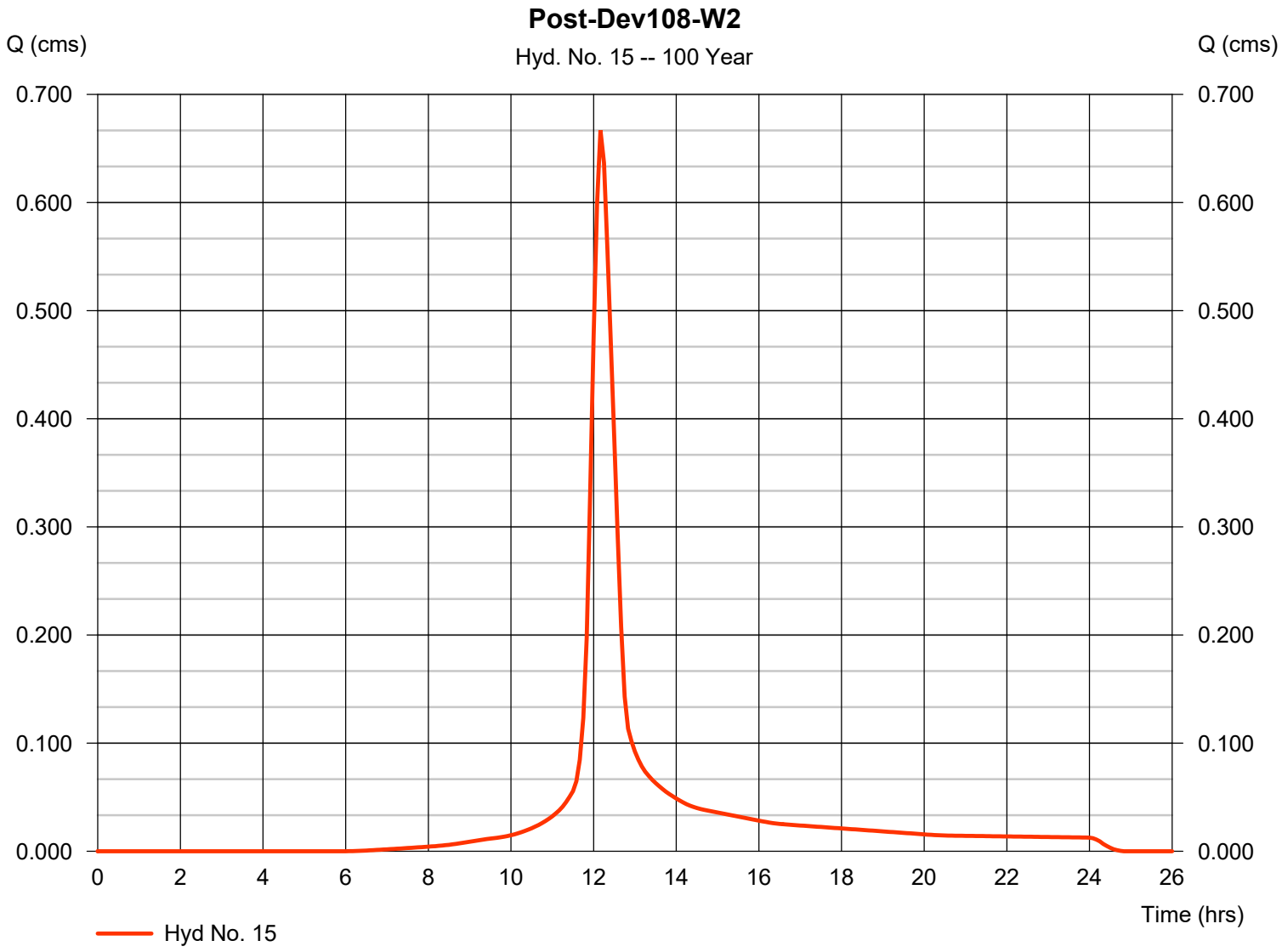
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 15

Post-Dev108-W2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.667 cms
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	2,906.7 cum
Drainage area	=	3.998 hectare	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	108.00 mm	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 3.998



Hydrograph Report

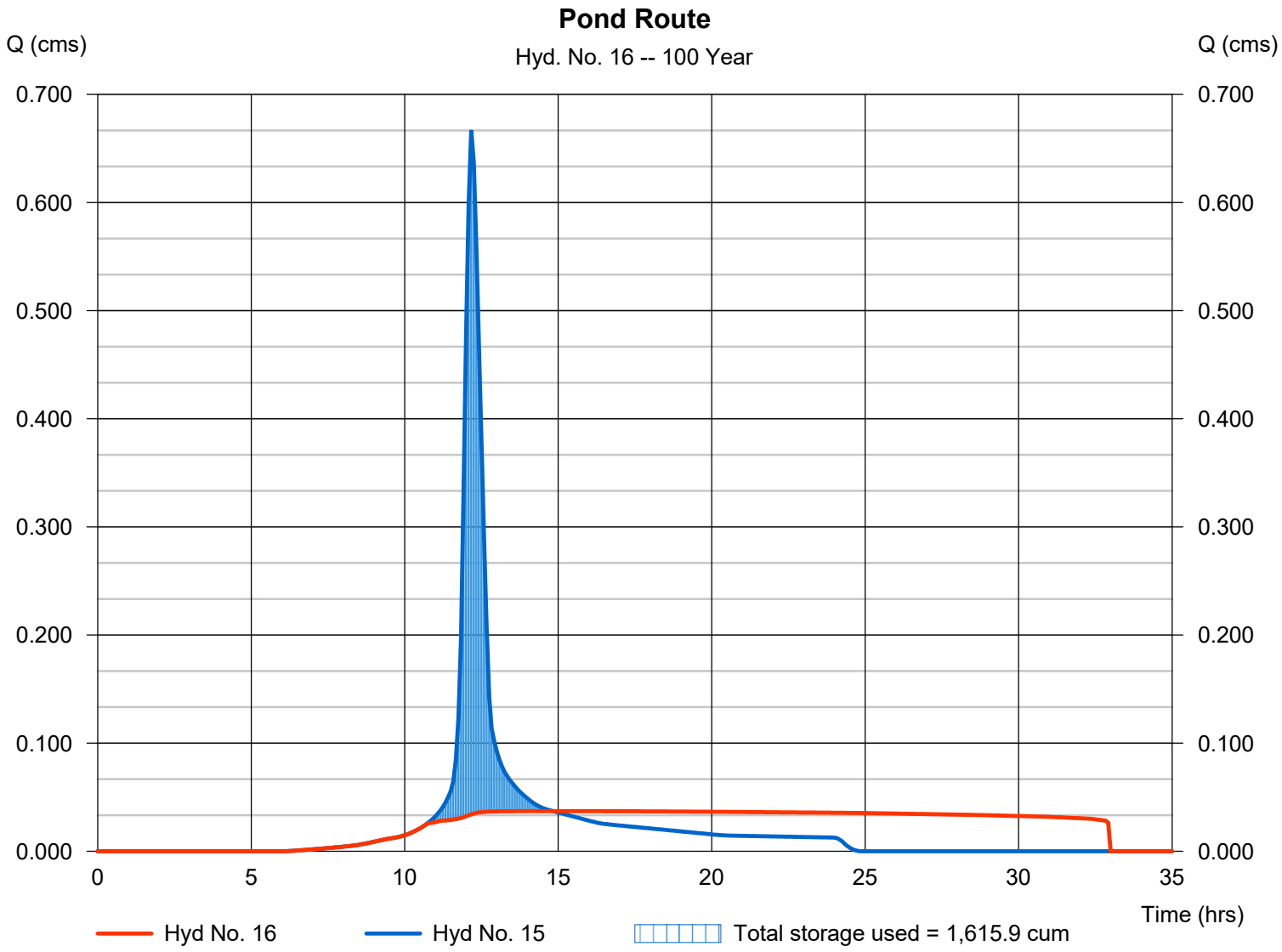
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 16

Pond Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.037 cms
Storm frequency	=	100 yrs	Time to peak	=	14.83 hrs
Time interval	=	5 min	Hyd. volume	=	2,909.5 cum
Inflow hyd. No.	=	15 - Post-Dev108-W2	Max. Elevation	=	197.12 m
Reservoir name	=	Containment Area	Max. Storage	=	1,615.9 cum

Storage Indication method used.



Pond Report

Pond No. 16 - Containment Area

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 195.834 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	195.83	00	0.0	0.0
0.67	196.50	00	0.2	0.2
0.77	196.60	185	6.4	6.7
0.87	196.70	1,017	54.5	61.2
0.97	196.80	2,258	159.7	220.9
1.07	196.90	3,560	288.4	509.3
1.17	197.00	4,970	424.5	933.8
1.27	197.10	6,389	566.5	1,500.2
1.37	197.20	7,870	711.6	2,211.8
1.47	197.30	9,556	869.8	3,081.6
1.57	197.40	11,121	1,032.7	4,114.3
1.61	197.44	11,695	456.4	4,570.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 150.00	0.00	0.00	0.00
Span (mm)	= 150.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 195.834	0.000	0.000	0.000
Length (m)	= 20.900	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	195.83	0.00	---	---	---	---	---	---	---	---	---	0.000
0.67	0.2	196.50	0.03 oc	---	---	---	---	---	---	---	---	---	0.026
0.77	6.7	196.60	0.03 oc	---	---	---	---	---	---	---	---	---	0.028
0.87	61.2	196.70	0.03 oc	---	---	---	---	---	---	---	---	---	0.030
0.97	220.9	196.80	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.07	509.3	196.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.17	933.8	197.00	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.27	1,500.2	197.10	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.37	2,211.8	197.20	0.04 oc	---	---	---	---	---	---	---	---	---	0.038
1.47	3,081.6	197.30	0.04 oc	---	---	---	---	---	---	---	---	---	0.040
1.57	4,114.3	197.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.041
1.61	4,570.7	197.44	0.04 oc	---	---	---	---	---	---	---	---	---	0.042

Hydrograph Report

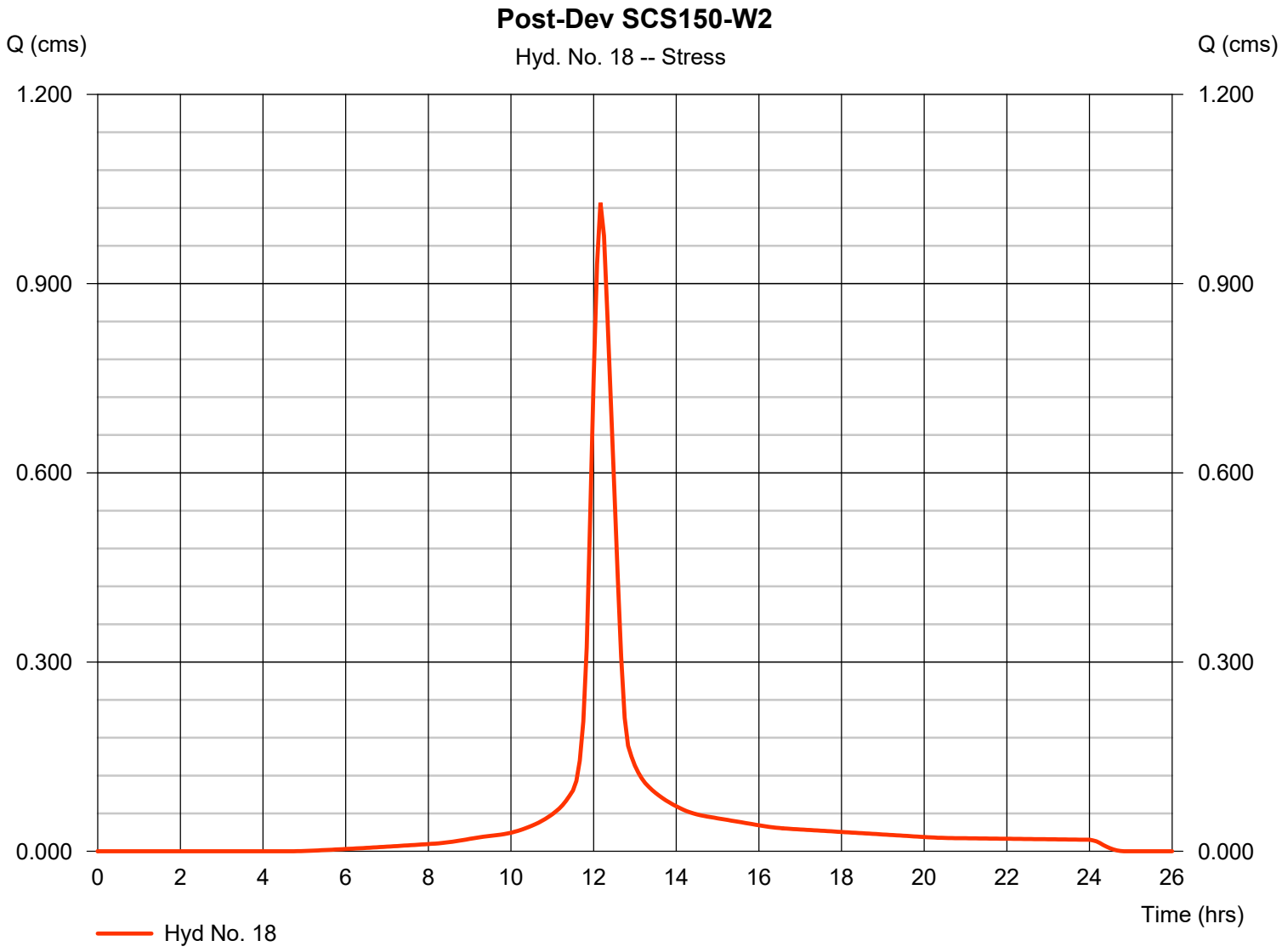
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 18

Post-Dev SCS150-W2

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.028 cms
Storm frequency	=	Stress	Time to peak	=	12.17 hrs
Time interval	=	5 min	Hyd. volume	=	4,523.7 cum
Drainage area	=	3.998 hectare	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 m
Tc method	=	User	Time of conc. (Tc)	=	25.00 min
Total precip.	=	150.00 mm	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.641 x 98) + (0.273 x 98) + (0.450 x 98) + (0.100 x 98) + (0.288 x 91) + (0.380 x 74)] / 3.998



Hydrograph Report

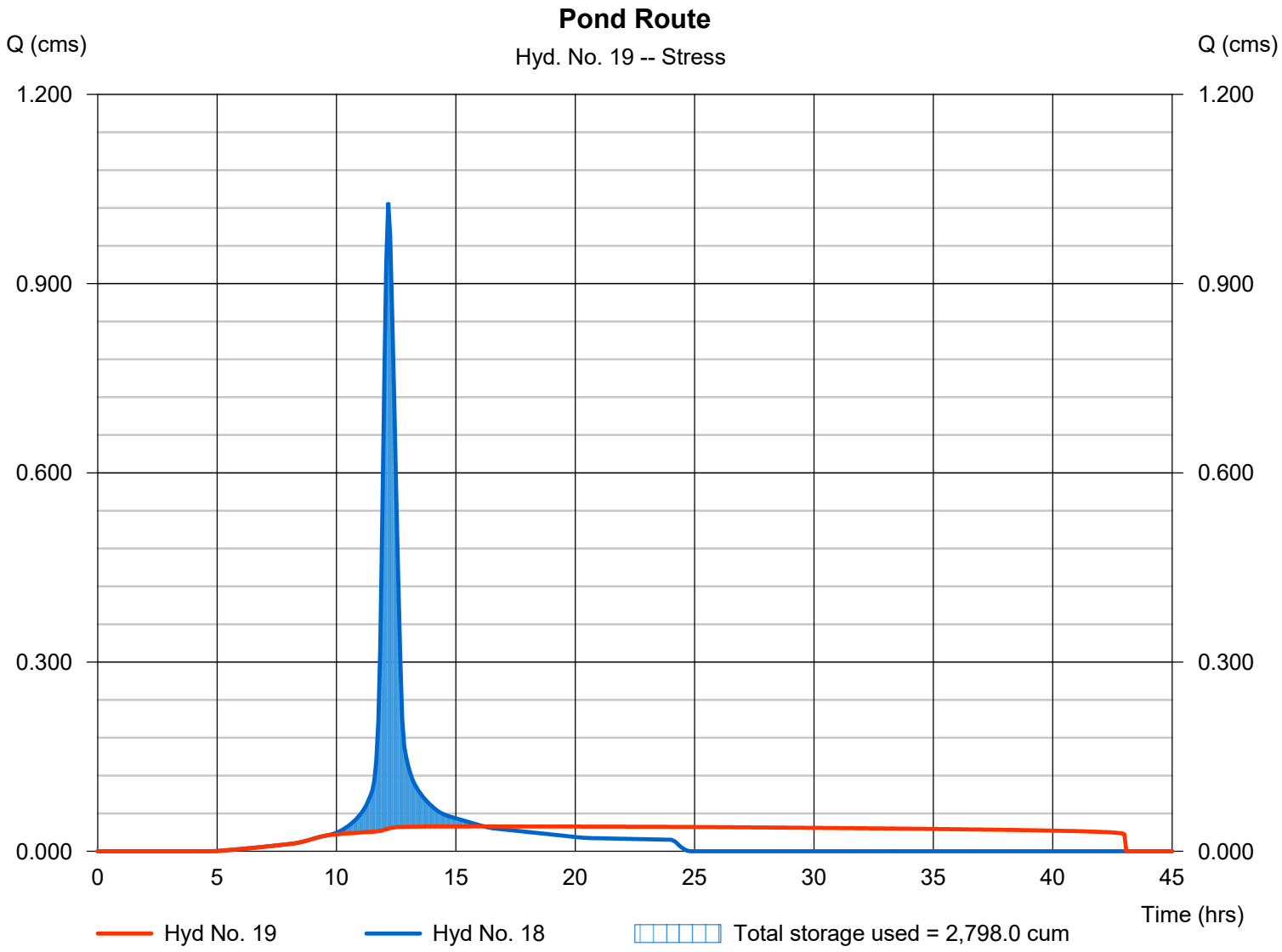
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Thursday, 11 / 2 / 2023

Hyd. No. 19

Pond Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.039 cms
Storm frequency	=	Stress	Time to peak	=	16.17 hrs
Time interval	=	5 min	Hyd. volume	=	4,525.4 cum
Inflow hyd. No.	=	18 - Post-Dev SCS150-W2	Max. Elevation	=	197.27 m
Reservoir name	=	Containment Area	Max. Storage	=	2,798.0 cum

Storage Indication method used.



Pond Report

Pond No. 16 - Containment Area

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 195.834 m

Stage / Storage Table

Stage (m)	Elevation (m)	Contour area (sqm)	Incr. Storage (cum)	Total storage (cum)
0.00	195.83	00	0.0	0.0
0.67	196.50	00	0.2	0.2
0.77	196.60	185	6.4	6.7
0.87	196.70	1,017	54.5	61.2
0.97	196.80	2,258	159.7	220.9
1.07	196.90	3,560	288.4	509.3
1.17	197.00	4,970	424.5	933.8
1.27	197.10	6,389	566.5	1,500.2
1.37	197.20	7,870	711.6	2,211.8
1.47	197.30	9,556	869.8	3,081.6
1.57	197.40	11,121	1,032.7	4,114.3
1.61	197.44	11,695	456.4	4,570.7

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (mm)	= 150.00	0.00	0.00	0.00
Span (mm)	= 150.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (m)	= 195.834	0.000	0.000	0.000
Length (m)	= 20.900	0.000	0.000	0.000
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .011	.013	.013	n/a
Orifice Coeff.	= 0.80	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (m)	= 0.000	0.000	0.000	0.000
Crest El. (m)	= 0.000	0.000	0.000	0.000
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(cm/hr) = 0.000

TW Elev. (m) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage m	Storage cum	Elevation m	Clv A cms	Clv B cms	Clv C cms	PrfRsr cms	Wr A cms	Wr B cms	Wr C cms	Wr D cms	Exfil cms	User cms	Total cms
0.00	0.0	195.83	0.00	---	---	---	---	---	---	---	---	---	0.000
0.67	0.2	196.50	0.03 oc	---	---	---	---	---	---	---	---	---	0.026
0.77	6.7	196.60	0.03 oc	---	---	---	---	---	---	---	---	---	0.028
0.87	61.2	196.70	0.03 oc	---	---	---	---	---	---	---	---	---	0.030
0.97	220.9	196.80	0.03 oc	---	---	---	---	---	---	---	---	---	0.032
1.07	509.3	196.90	0.03 oc	---	---	---	---	---	---	---	---	---	0.034
1.17	933.8	197.00	0.04 oc	---	---	---	---	---	---	---	---	---	0.035
1.27	1,500.2	197.10	0.04 oc	---	---	---	---	---	---	---	---	---	0.037
1.37	2,211.8	197.20	0.04 oc	---	---	---	---	---	---	---	---	---	0.038
1.47	3,081.6	197.30	0.04 oc	---	---	---	---	---	---	---	---	---	0.040
1.57	4,114.3	197.40	0.04 oc	---	---	---	---	---	---	---	---	---	0.041
1.61	4,570.7	197.44	0.04 oc	---	---	---	---	---	---	---	---	---	0.042

300 Dia. Full Flow Capacity
Worksheet for Circular Channel

Project Description	
Project File	c:\docume~1\admini~1\desktop\temp\d22114\d22114.fm2
Worksheet	Full Flow
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coefficient	0.011	
Channel Slope	0.004000	m/m
Depth	0.300	m
Diameter	300.00	mm

Results		
Discharge	72.3	l/s
Flow Area	0.07	m²
Wetted Perimeter	0.94	m
Top Width	0.00	m
Critical Depth	0.21	m
Percent Full	100.00	
Critical Slope	0.005736	m/m
Velocity	1.02	m/s
Velocity Head	0.05	m
Specific Energy	FULL	m
Froude Number	FULL	
Maximum Discharge	0.08	m³/s
Full Flow Capacity	0.07	m³/s
Full Flow Slope	0.004000	m/m

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APPENDIX "SWM-C"

Pipe Calculations

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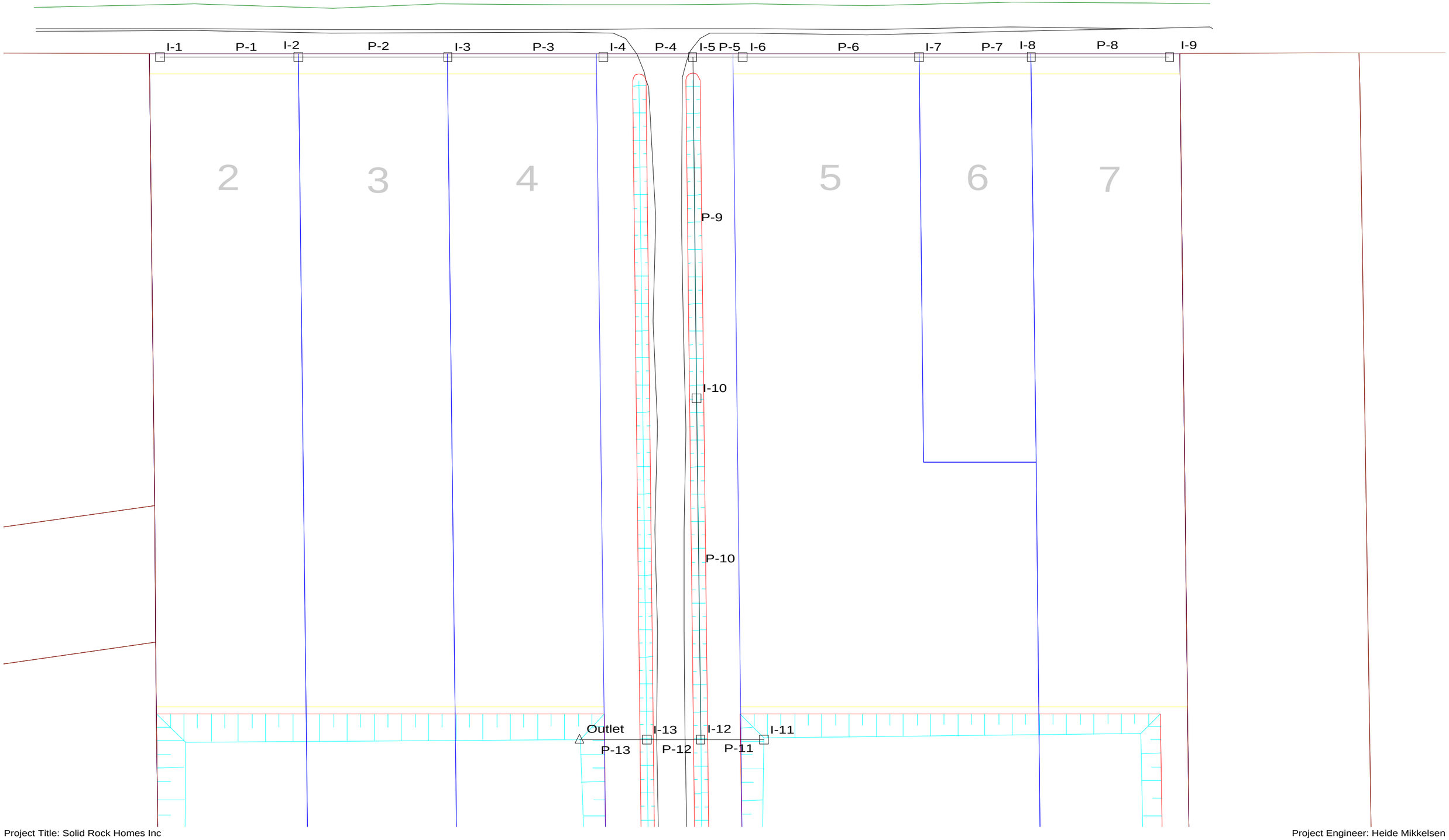

Project Title: Solid Rock Homes Inc
c:\docume~1\admini~1\desktop\temp\e21092\lots4.stm
11/02/23 11:19:33 AM

N. J. Peralta Engineering Ltd.
 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Project Engineer: Heide Mikkelsen
StormCAD v1.5 [158]

STORM SEWER DESIGN SHEET

Pipe	Up Node	Dn Node	Inlet A (m^2)	C	Inlet CA (m^2)	Tot CA (m^2)	TC (min)	Add. Q (m^3/s)	Sys Flow Time (min)	I (mm/hr)	Length (m)	S (m/m)	Size	Roughness	Cap (m^3/s)	Q (m^3/s)	Velocity (m/s)	Up HGL (m)
P-1	I-1	I-2	623.2	0.60	374.8	374.8	20.00	0.0000	20.00	69.96	20.50	0.010000	150 mm	0.011	0.0188	0.0073	0.40	198.590
P-2	I-2	I-3	1,244.1	0.60	750.0	1,124.7	20.00	0.0000	20.86	67.90	22.00	0.010000	200 mm	0.011	0.0404	0.0212	0.65	198.560
P-3	I-3	I-4	1,241.9	0.60	749.5	1,874.3	20.00	0.0000	21.42	66.63	23.00	0.010000	250 mm	0.011	0.0733	0.0347	0.68	198.499
P-4	I-4	I-5	702.5	0.61	428.1	2,302.4	20.00	0.0000	21.98	65.42	13.00	0.010000	250 mm	0.011	0.0733	0.0418	0.83	198.448
P-5	I-6	I-5	858.1	0.61	523.1	2,412.3	20.00	0.0000	21.93	65.52	7.50	0.010000	250 mm	0.011	0.0733	0.0439	0.87	198.432
P-6	I-7	I-6	1,338.8	0.60	808.2	1,889.2	20.00	0.0000	21.30	66.89	26.00	0.010000	250 mm	0.011	0.0733	0.0351	0.69	198.492
P-7	I-8	I-7	1,182.2	0.60	710.0	1,081.1	20.00	0.0000	20.86	67.89	16.50	0.010000	200 mm	0.011	0.0404	0.0204	0.63	198.534
P-8	I-9	I-8	620.0	0.60	371.1	371.1	20.00	0.0000	20.00	69.96	20.50	0.010000	150 mm	0.011	0.0188	0.0072	0.40	198.564
P-9	I-5	I-10	0.0	0.00	0.0	4,714.7	20.00	0.0000	22.24	64.87	50.00	0.004000	300 mm	0.011	0.0841	0.0849	1.07	198.405
P-10	I-10	I-12	508.0	0.40	203.2	4,917.9	20.00	0.0000	23.02	63.30	50.00	0.004000	300 mm	0.011	0.0841	0.0864	1.09	198.201
P-11	I-11	I-12	0.0	0.55	0.0	0.0	20.00	0.0000	20.00	69.96	9.50	0.004000	300 mm	0.011	0.0841	0.0000	0.00	197.990
P-12	I-12	I-13	712.0	0.40	284.8	5,202.7	20.00	0.0000	23.78	61.85	8.00	-0.004000	300 mm	0.011	-0.0841	0.0894	1.13	197.990
P-13	I-13	Outlet	1,220.0	0.40	488.0	5,690.7	20.00	0.0000	23.90	61.63	10.00	-0.004000	300 mm	0.011	-0.0841	0.0974	1.23	197.954

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APPENDIX "SWM-D"

OGS Calculations

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ADS OGS Sizing Summary

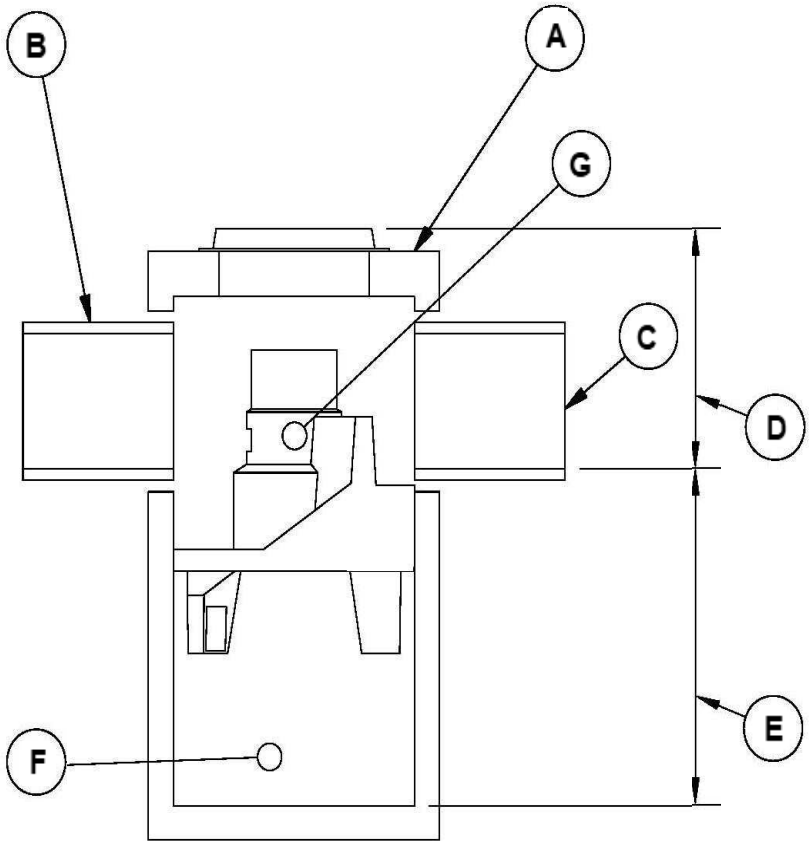
Project Name:	Solid Rock Home Inc. Residential Development
Consulting Engineer:	Peralta Engineering
Location:	Kingsville, ON
Sizing Completed By:	C. Neath
Email:	cody.neath@adspipe.com

Treatment Requirements		
Treatment Goal:	Normal (MOE)	
Selected Parameters:	70% TSS	90% Volume
Selected Unit:	**FD-5HC**	

Site Details	
Site Area:	1.847 ha
% Impervious:	---
Rational C:	0.90
Rainfall Station:	Windsor, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	---

Summary of Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	72.0%	88.6%
FD-5HC	76.0%	>90%
FD-6HC	78.0%	>90%
FD-8HC	82.0%	>90%
FD-10HC	86.0%	>90%

FD-5HC Specification	
Unit Diameter (A):	1,500 mm
Inlet Pipe Diameter (B):	300 mm
Outlet Pipe Diameter (C):	300 mm
Height, T/G to Outlet Invert (D):	2000 mm
Height, Outlet Invert to Sump (E):	1780 mm
Sediment Storage Capacity (F):	1.29 m³
Oil Storage Capacity (G):	1,135 L
Recommended Sediment Depth for Maintenance:	475 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	566 L/s



Site Elevations:	
Rim Elevation:	190.00
Inlet Pipe Elevation:	188.00
Outlet Pipe Elevation:	188.00

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name:	Solid Rock Home Inc. Residential Development
Consulting Engineer:	Peralta Engineering
Location:	Kingsville, ON

Net Annual Removal Efficiency Summary: FD-5HC

Rainfall Intensity(1)	Rational Equation Flowrate	Surface Loading Rate	Fraction of Rainfall(1)	FD-5HC Removal Efficiency	Weighted Net-Annual Removal Efficiency
mm/hr	L/s	L/min/m^2	%	%	%
3.00	13.9	470	13.2%	85%	11.3%
4.00	18.5	627	9.6%	83%	8.0%
5.00	23.1	784	7.5%	81%	6.1%
6.00	27.7	941	6.0%	80%	4.8%
7.00	32.3	1097	4.8%	79%	3.8%
8.00	36.9	1254	4.1%	78%	3.2%
9.00	41.6	1411	3.6%	77%	2.8%
10.00	46.2	1568	3.2%	76%	2.4%
11.00	50.8	1725	2.8%	76%	2.1%
12.00	55.4	1881	2.5%	75%	1.9%
15.00	69.3	2352	6.6%	73%	4.8%
20.00	92.4	3136	8.3%	71%	5.9%
25.00	115.4	3919	5.8%	70%	4.1%
30.00	138.5	4703	4.6%	69%	3.2%
35.00	161.6	5487	3.8%	68%	2.6%
40.00	184.7	6271	2.9%	67%	1.9%
45.00	207.8	7055	2.4%	66%	1.6%
50.00	230.9	7839	1.8%	66%	1.2%
65.00	300.1	10191	6.6%	64%	4.2%
				Total Net Annual Removal Efficiency:	75.8%
				Total Runoff Volume Treated:	>90%

Notes:

(1) Based on Windsor/Essex Region Stormwater Manual 2018, Table 3.4.1.5

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

APPENDIX "SWM-E"

Sediment Control Measures

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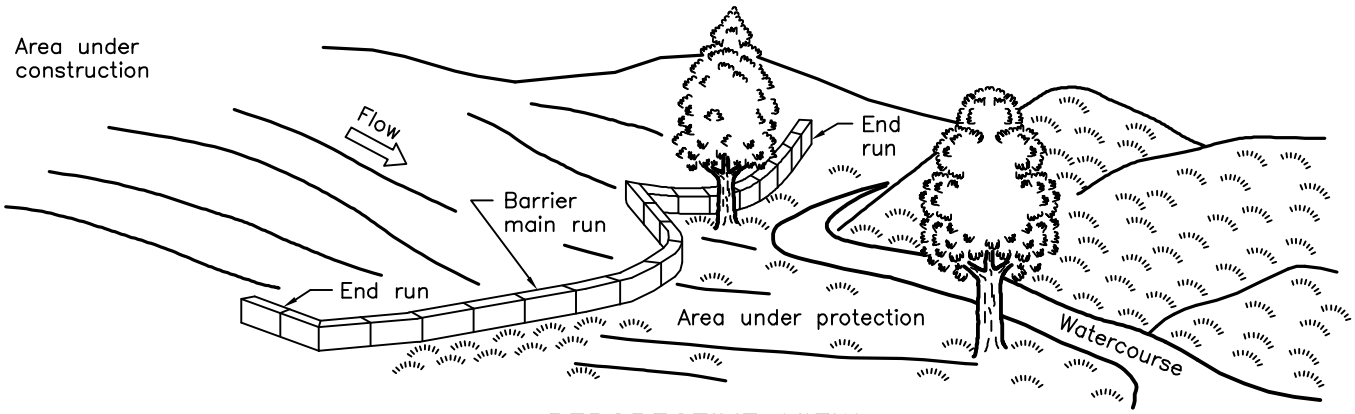
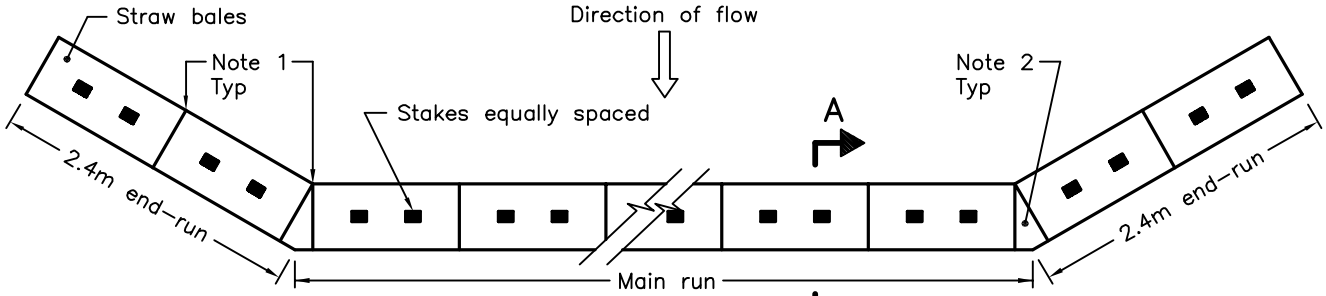
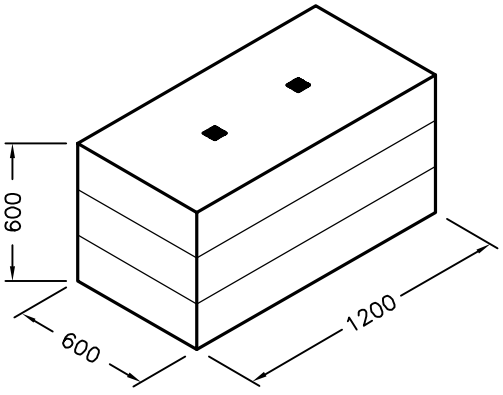


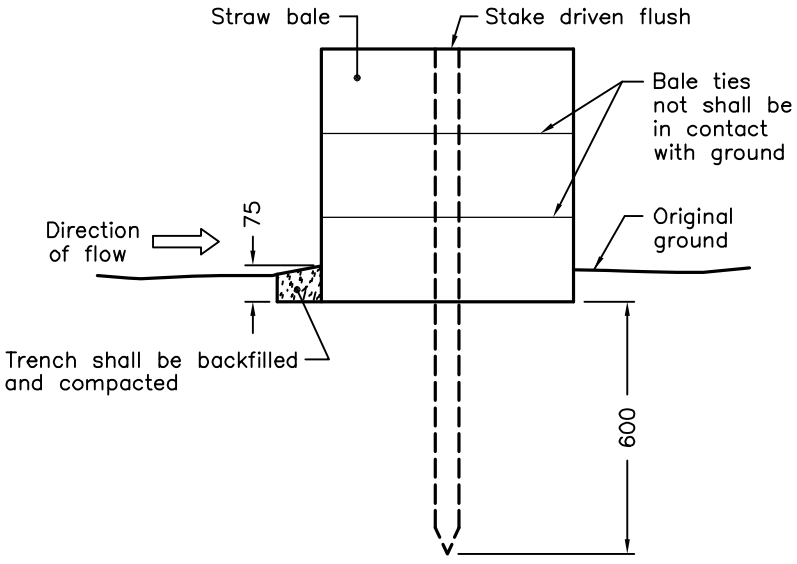
PERSPECTIVE VIEW



PLAN A



ISOMETRIC VIEW



SECTION A–A

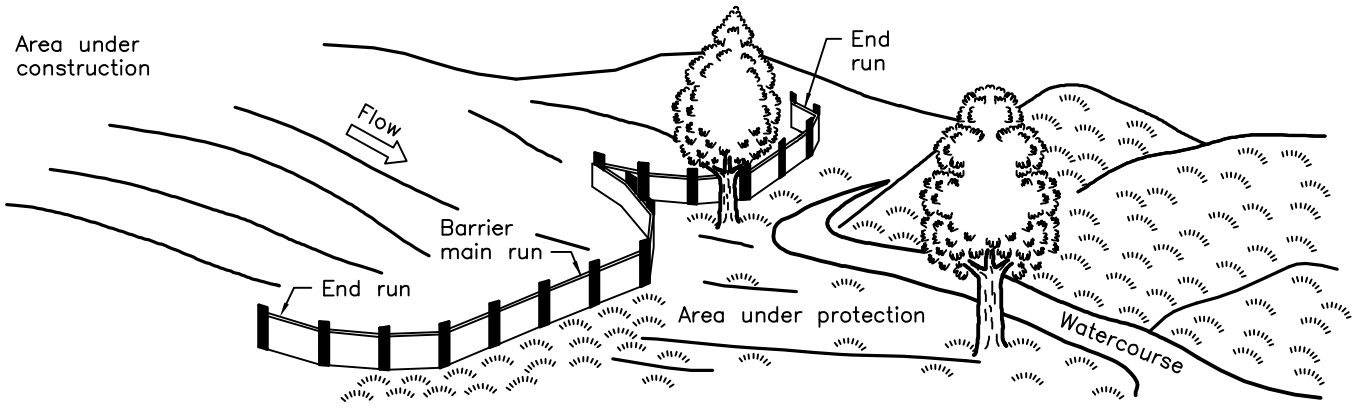
NOTES:

1 Straw bales shall be butted tightly against adjoining bales to prevent sediment flow through barrier.

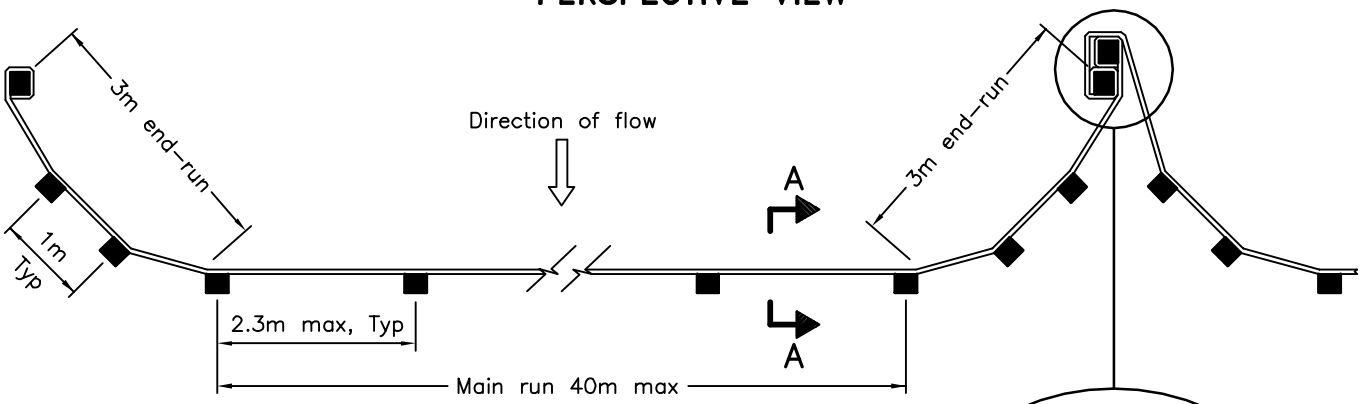
2 Caulk and compact gaps with loose straw.

A All dimensions are in millimetres unless otherwise shown.

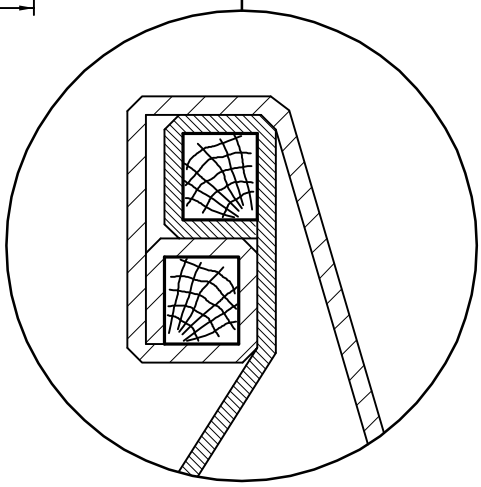
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
LIGHT–DUTY STRAW BALE BARRIER			
	OPSD 219.100		



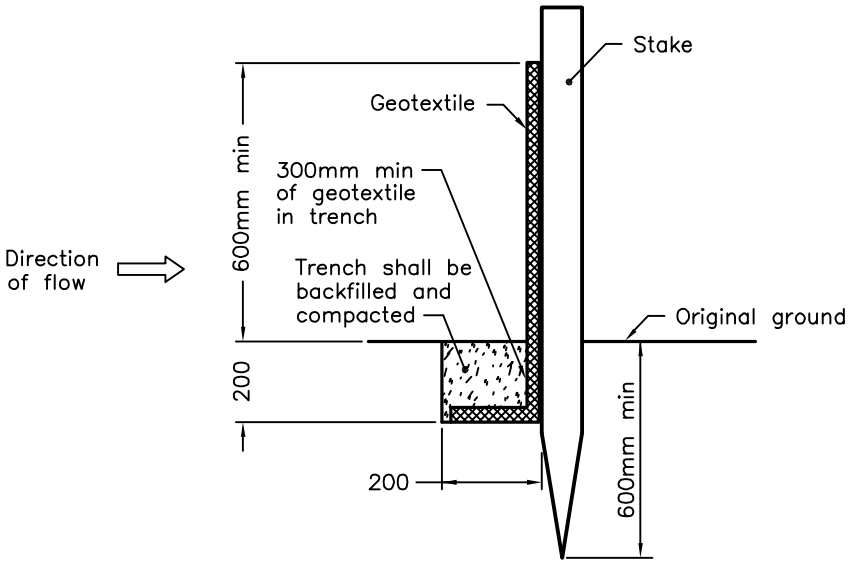
PERSPECTIVE VIEW



PLAN



JOINT DETAIL

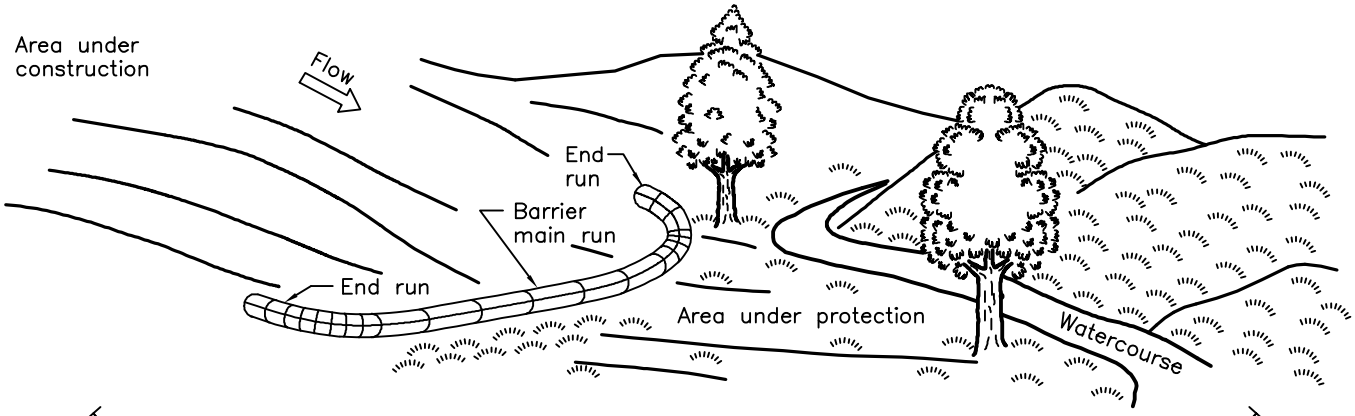


SECTION A–A

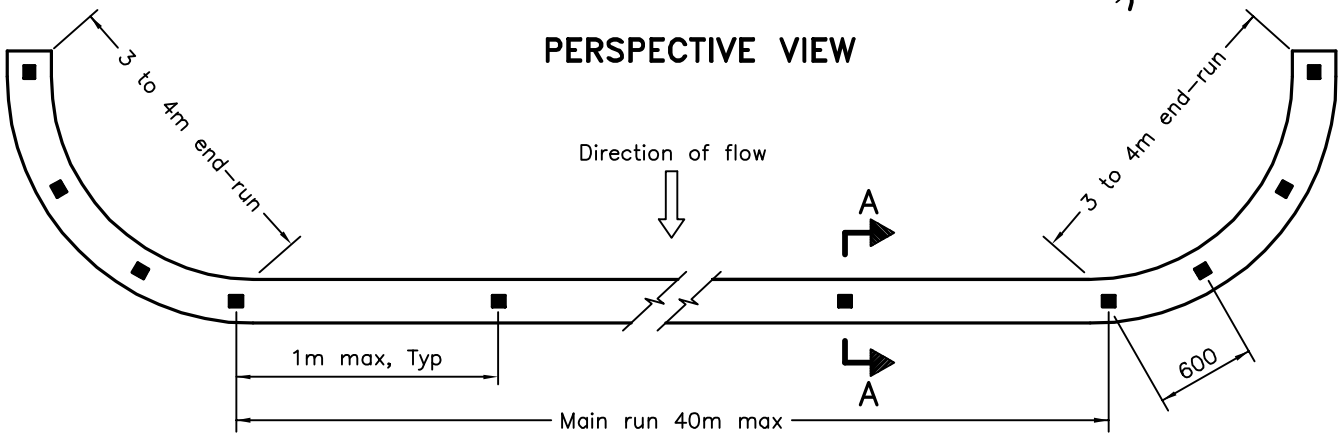
NOTE:

A All dimensions are in millimetres unless otherwise shown.

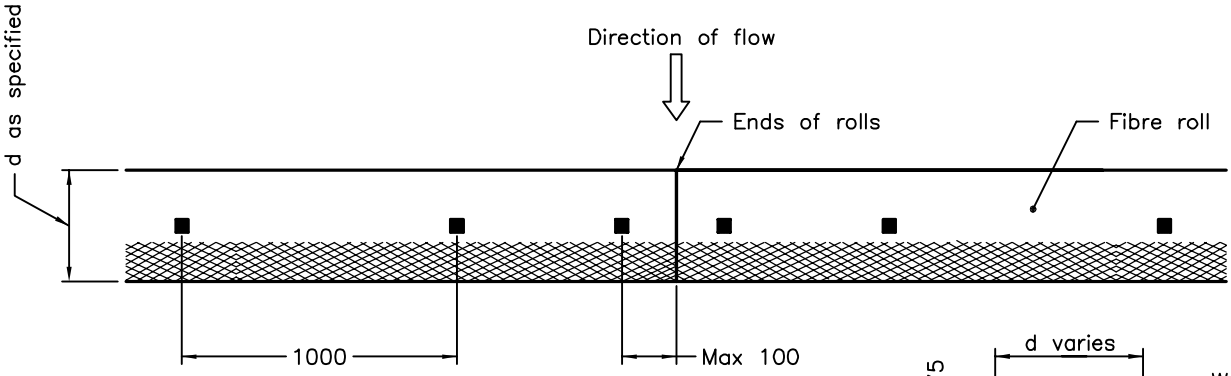
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
LIGHT–DUTY SILT FENCE BARRIER			
	OPSD 219.110		



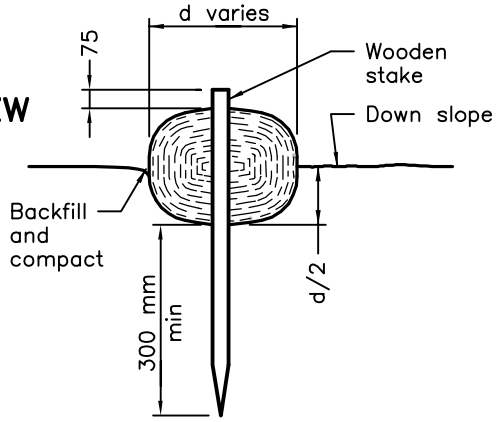
PERSPECTIVE VIEW



PLAN



FIBRE ROLL PLAN VIEW

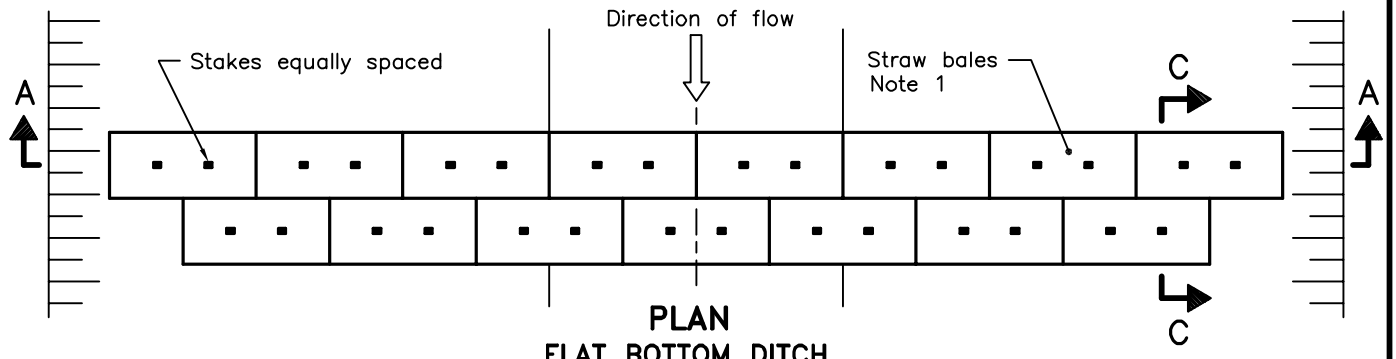


SECTION A–A

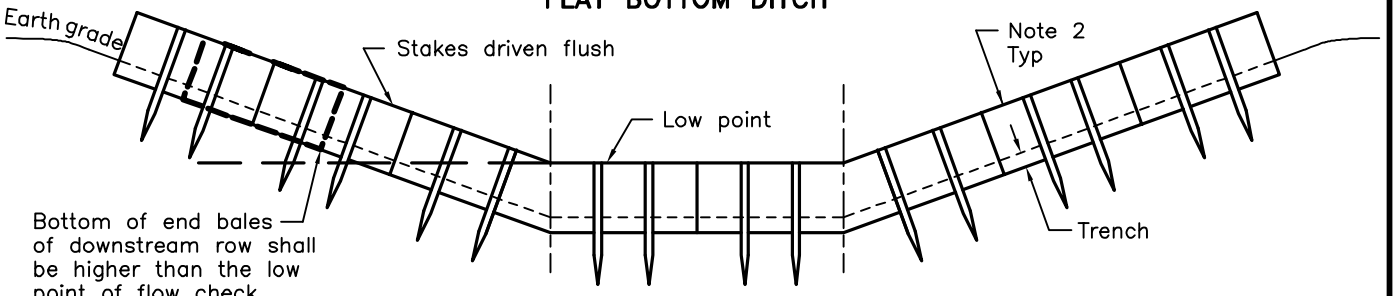
NOTES:

1 Remove all surface obstructions greater than 50mm from ground surface.
2 Ends of rolls shall be butted tightly together.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
LIGHT–DUTY FIBRE ROLL BARRIER			
	OPSD 219.120		

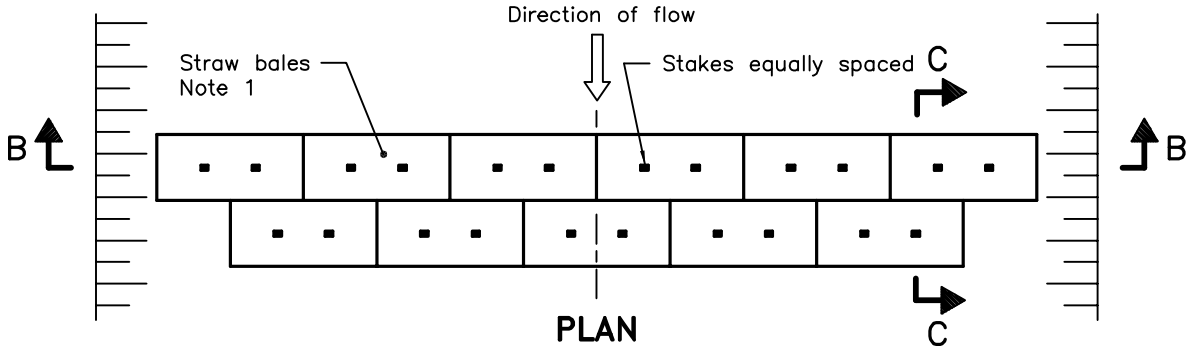


PLAN
FLAT BOTTOM DITCH

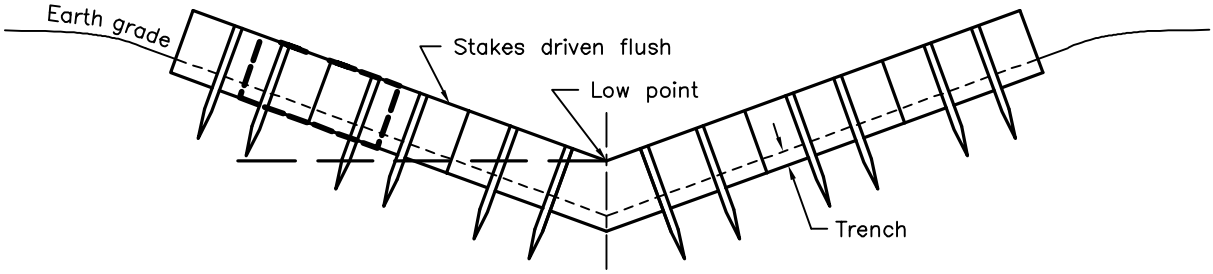


Bottom of end bales of downstream row shall be higher than the low point of flow check. Downstream bale position outlined. Typ

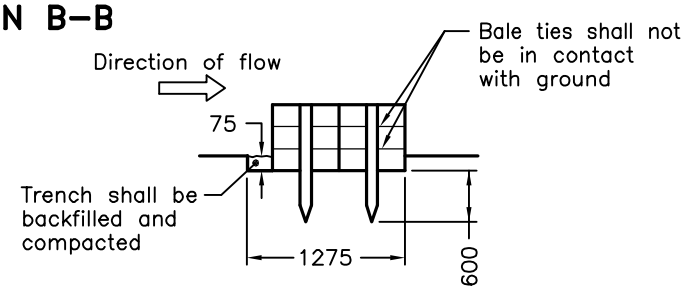
SECTION A–A



PLAN
V–DITCH



SECTION B–B



SECTION C–C

NOTES:

1 Number of bales varies and shall suit ditch.
2 Straw bales shall be butted tightly against adjoining bales and shaped to conform to the sides of the ditch to prevent water flow through barrier.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
STRAW BALE FLOW CHECK DAM			
	OPSD 219.180		

APPENDIX “D”

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APPRAISAL REPORT
MARKET VALUE OF PARTIAL TAKINGS OF AGRICULTURAL LANDS
&
WATERFRONT LANDS
LOCATED
ADJACENT TO SOLID ROCK HOMES
PROPOSED DRAINAGE SYSTEM,
TOWN OF KINGSVILLE, ON

FOR

THE TOWN OF KINGSVILLE
C/O PERALTA ENGINEERING

BY

Fuerland
REALTY LTD. BROKERAGE
2260 Foster Avenue, Windsor, Ontario N8W 5C9

Fuerland
REALTY LTD. BROKERAGE
2260 Foster Avenue. Windsor. Ontario N8W 5C9
Phone # (519) 966-0881 Fax# (519) 966-3209

May 16th 2023

THE TOWN OF KINGSVILLE
Re: Solid Rock Homes Proposed Drainage System
c/o Peralta Engineering

Re: Appraisal of Market Values of Partial Land Takings of
Agricultural Land Adjacent to the Solid Rock Homes Proposed Drainage System
Located in the Town of Kingsville, ON - Applicant: Town of Kingsville
Our File# FR23 – 14648

As requested, we have completed an investigation and valuation analysis to estimate the current market value range of vacant agricultural properties located adjacent to the Solid Rock Homes Proposed Drainage System, Town of Kingsville, Ontario as of May 12th 2023, the date of our review. The only intended use of this report is to assist the Town of Kingsville in their negotiations with the current land owners for the acquisition of partial takings of the properties for the purposes of establishing the Solid Rock Homes Proposed Drainage System.

The properties involved are of various sizes, however they are primarily agricultural areas to be acquired for the purposes of establishing 10 foot± buffer strips.

This appraisal report, containing 27 pages plus addenda, is valid only if it bears the original signature of the author(s) and all conclusions are subject to all Terms of Reference, Assumptions and Limiting Conditions contained herein.

Current Market Value Range of Partial Takings
FORTY-FIVE THOUSAND TO FIFTY-FIVE THOUSAND DOLLARS PER ACRE
$45,000 to $55,000 per acre

Current Market Value Range of Partial Takings Waterfront Sites
THIRTY-SIX DOLLARS TO FIFTY DOLLARS PER SQUARE FOOT
$36.00 to $50.00 PSF

Respectfully,
FUERLAND REALTY LTD

Don Fuerth B.A., AACI, P. App

Respectfully,
FUERLAND REALTY LTD.

Cara Pazur, B.A., AIC Candidate Member

EXECUTIVE SUMMARY

EFFECTIVE/REVIEW DATE:	May 12th 2023
INTEREST VALUED	Fee Simple Estate
PURPOSE AND INTENDED USE:	The purpose of this appraisal is to provide an estimate the current market value range of agricultural properties located adjacent to the Proposed Solid Rock Homes Drainage System, Town of Kingsville as of May 12th 2023, the date of our review. The only intended use of this report is to assist the Town of Kingsville in their negotiations with the current land owners for the acquisition of partial takings of the properties for the purposes of establishing the Proposed Solid Rock Homes Drainage System.
ADDRESS OF PROPERTY:	Agricultural Land Adjacent to the Proposed Solid Rock Homes Drainage System, Town of Kingsville, ON
ROLL NUMBER:	N/A
PIN NUMBER:	N/A
REGISTERED OWNER:	N/A
LEGAL DESCRIPTIONS:	N/A
TYPE OF PROPERTY:	Agricultural Property
IMPROVEMENTS - EXISTING:	None Considered
LAND AREA:	Various
ZONING:	Agricultural
HIGHEST AND BEST USE:	As Vacant: Agricultural site As Improved: N/A
MARKET CONDITIONS	Positive
MARKET EXPOSURE	± 6 to ± 9 Months
VALUE ESTIMATES:	**Direct Comparison Approach –** **$45,000 to $55,000 per acre Non-Waterfront** **$35.00psf to $50psf Waterfront**

AGRICULTURAL OVERVIEW
Essex County is a Rich Agricultural Neighbourhood

2022 FCC Farmland Values Report
Published March 13th 2023

This report covers the period from January 1st to December 31st 2022

National Trends

The average value of cultivated Canadian farmland increased by 12.8% in 2022. This is the highest increase recorded since 2014 and follows gains of 8.3% in 2021 and 5.4% in 2020.

This increase occurred amid strong farm income, elevated input prices and rising interest rates. The demand for farmland remained robust and the supply of farmland available for sale continued to be limited.

Historically, we have seen that farmland values take time to adjust to economic changes. Moreover, with prices for most principal field crops reaching record highs, demand for well-situated farmland remained robust.

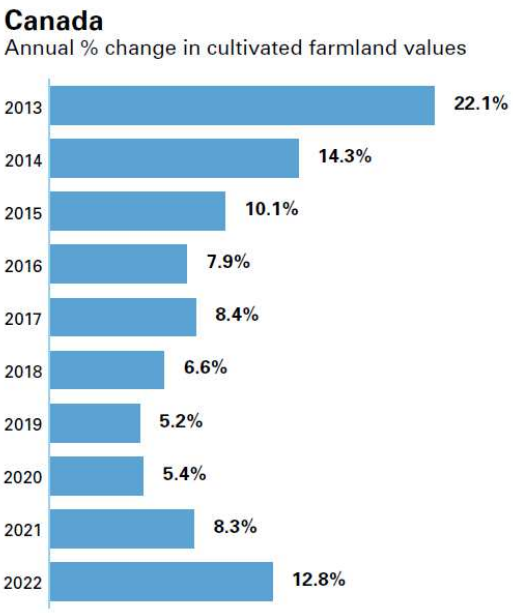
% Change in farmland values		
Provinces	**2022**	**2021**
B.C.	8.0%	18.1%
Alta.	10.0%	3.6%
Sask.	14.2%	7.4%
Man.	11.2%	9.9%
Ont.	19.4%	22.2%
Que.	11.0%	10.0%
N.B.	17.1%	5.2%
N.S.	11.6%	12.3%
P.E.I.	18.7%	15.2%
N.L., N.W.T., Nvt. and Yukon	N/A*	N/A*
Canada	12.8%	8.3%

*There was an insufficient number of publicly reported transactions to accurately assess farmland values in Newfoundland and Labrador, Northwest Territories, Nunavut and Yukon.

The highest average provincial increases in farmland values were observed in Ontario, Prince Edward Island and New Brunswick, with increases of 19.4%, 18.7% and 17.1%, respectively. Saskatchewan followed with a 14.2% increase. Five provinces had average increases below the national average at 11.6% in Nova Scotia, 11.2% in Manitoba, 11.0% in Quebec and 10.0% in Alberta.

British Columbia is the only province to have recorded a single-digit increase at 8.0%, but it is also a market where land values on a per-acre basis are the highest on average.

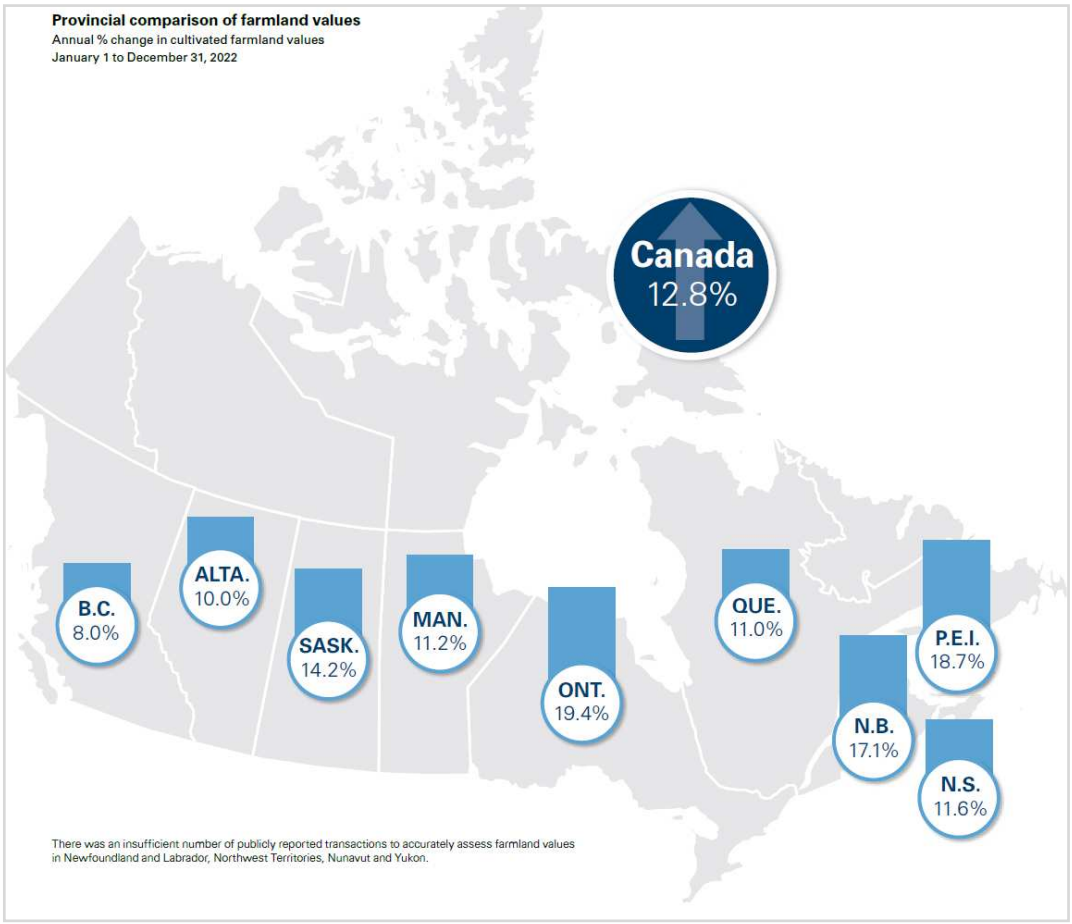
There were insufficient publicly reported sales in Newfoundland and Labrador, Northwest Territories, Nunavut and Yukon to fully assess changes in farmland values in those regions.



Demand for irrigated land also continued to increase, with the greatest average increases occurring in areas of Alberta at 29.9%, Saskatchewan at 26.0%, British Columbia at 8.3% and Manitoba at 3.8%. Producers are looking for land that can be irrigated to alleviate drought and other water issues. There has been an uptick in interest in irrigated land across the country, although a limited number of reported sales prevent reporting land value estimates in other provinces at this time.

For the first time, this report includes specific pastureland values in addition to farmland values. Pastureland is present in many parts of the country and is mainly used for grazing livestock. Pastureland is typically unsuitable for crops and traditionally sells for less than cultivated land.

At this time, there were insufficient pastureland sales in eastern Canada (Ontario, Quebec and Atlantic provinces) to publish the values, so the report focuses on data from the western provinces.
The most significant increase in pastureland values occurred in Manitoba, with an average increase of 18.5%. Alberta recorded an increase of 5.5%, followed by British Columbia at 3.7% and Saskatchewan at 2.8%.

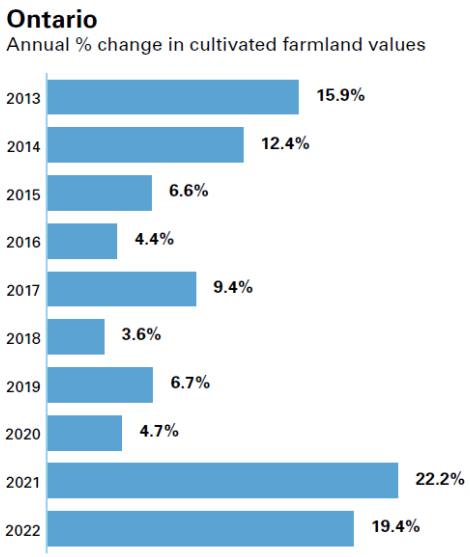


Ontario

Average values for cultivated farmland in Ontario increased by 19.4% in 2022, which is the largest increase of all provinces. In 2021, Ontario experienced a record increase of 22.2% following a modest increase of 4.7% in 2020.

Stable to increasing demand, along with limited supply in many areas of the province, led to these higher values. Demand was high from large, intensive, supply-managed farm operations, cash crop producers, hobby farmers and investors in areas close to large urban centres.

Several regions recorded increases in value close or equal to 23%, including South West (23.0%), South East (22.9%), Mid Western (23.0%) and Central East (23.3%). Areas within these regions that had the lowest value per acre are the ones that generally experienced larger percentage increases. Areas that saw large increases in 2021 were more stable in 2022.

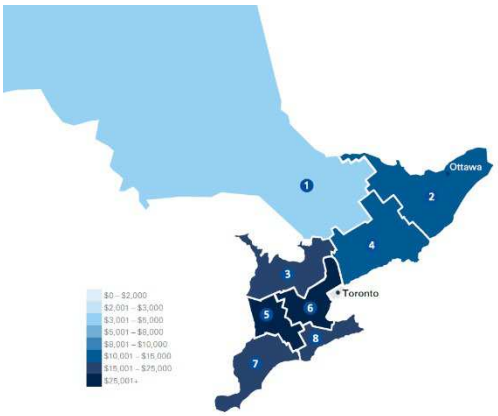


In the Southern region, farmland value increased 19.7%, with variations throughout the region. The largest increases occurred in the Chatham-Kent and Essex areas. Like many other regions, limited available land supply increased values.

The Eastern region of the province saw land value increases of 14.9%, which is below the provincial average. There was an influx of producers selling land in the western regions of Ontario and settling in the east where land parcels were less expensive, but yields remained strong.

In the Central West region, values increased by 10.3% on average. There was continued demand for land from a diverse group of buyers.

The Northern Region reported increased values of 13.1%. However, market data was limited in the western half of the Northern region, so the reported increases occurred mainly in the eastern half of the region.



Cultivated Land
Ontario farmland regions

		% Change	Value$/Acre*	Value Range**
1	Northern	13.1%	$4,400	$2,500 – $7,000
2	Eastern	14.9%	$11,100	$5,700 – $18,900
3	Mid Western	23.0%	$17,700	$10,900 – $25,300
4	Central East	23.3%	$12,800	$7,900 – $23,700
5	South West	23.0%	$28,900	$16,900 – $39,000
6	Central West	10.3%	$25,600	$15,100 – $35,700
7	Southern	19.7%	$20,400	$13,500 – $29,800
8	South East	22.9%	$19,200	$11,600 – $31,100

NEIGHBOURHOOD

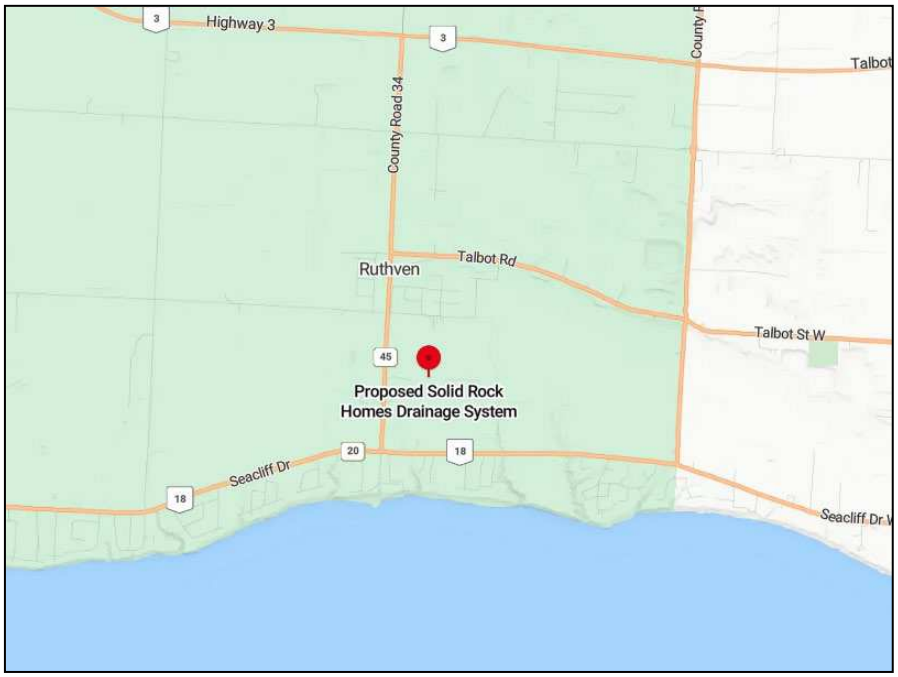
The subject properties are located in the Town of Kingsville, on the east side of Union Avenue and the north side of Seacliff Drive.

In the immediate neighbourhood of the subject properties are cash crop farms, greenhouse properties and single-family residential dwellings.

No adverse influences have been noted in the area and zoning bylaws are in effect and enforced.

In summary, the subject properties are located in rural neighbourhoods close to the centre of an active and growing greenhouse industry with ready access to all major arteries.

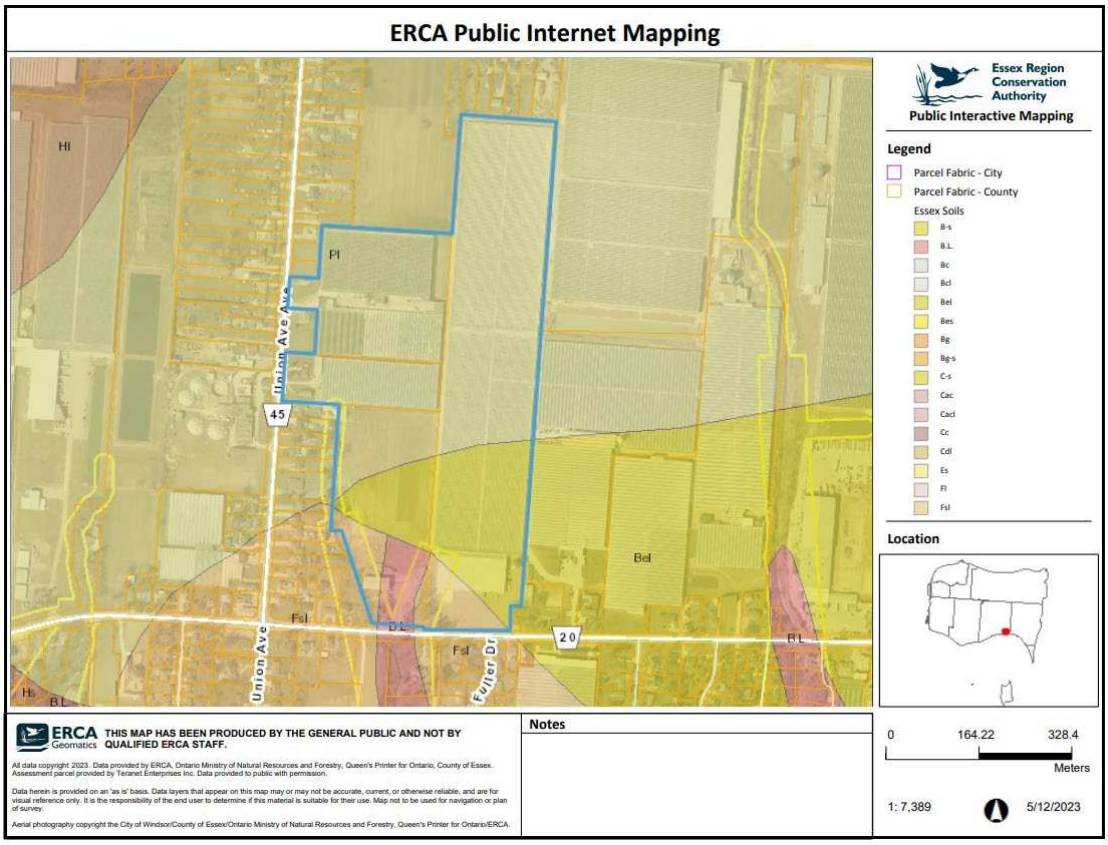
Location Map



Site Descriptions

i) Location:	Rural – Agricultural Greenhouse operations, cash crop farm and residential dwellings dominate the surrounding area.
ii) Dimensions:	Irregular
iii) Area:	Various - Total Property source: [MCAP & Geowarehouse Applicant]
iv) Topography:	Basically level.
v) Services:	Typical municipal utilities and services are available.

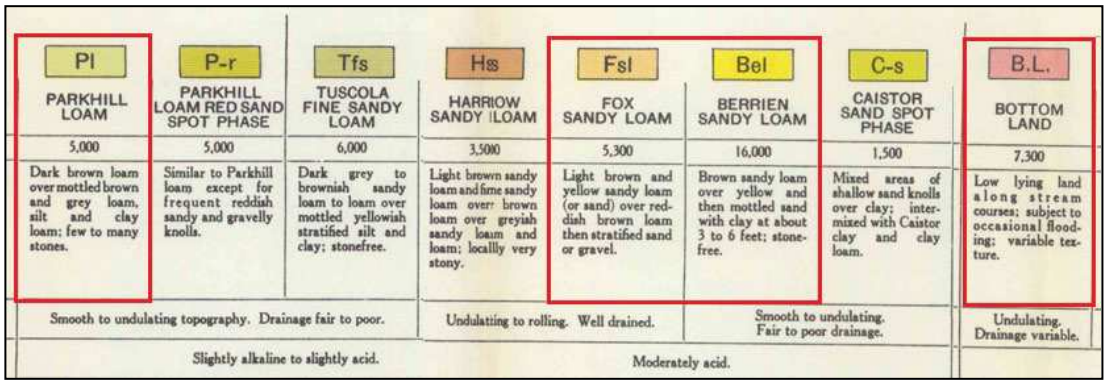
vi) Soil Conditions:



The above figure is an excerpt from a 1947 Soil Survey Map and taken from Essex Region Conservation Authority Public Interactive Mapping System. The survey was first taken in 1939.
The map identifies the affected properties' soil types as:

- Bel – Berrien Sandy Loam
- Pl – Parkhill Loam
- Fsl – Fox Sandy Loam
- B.L – Bottom Land

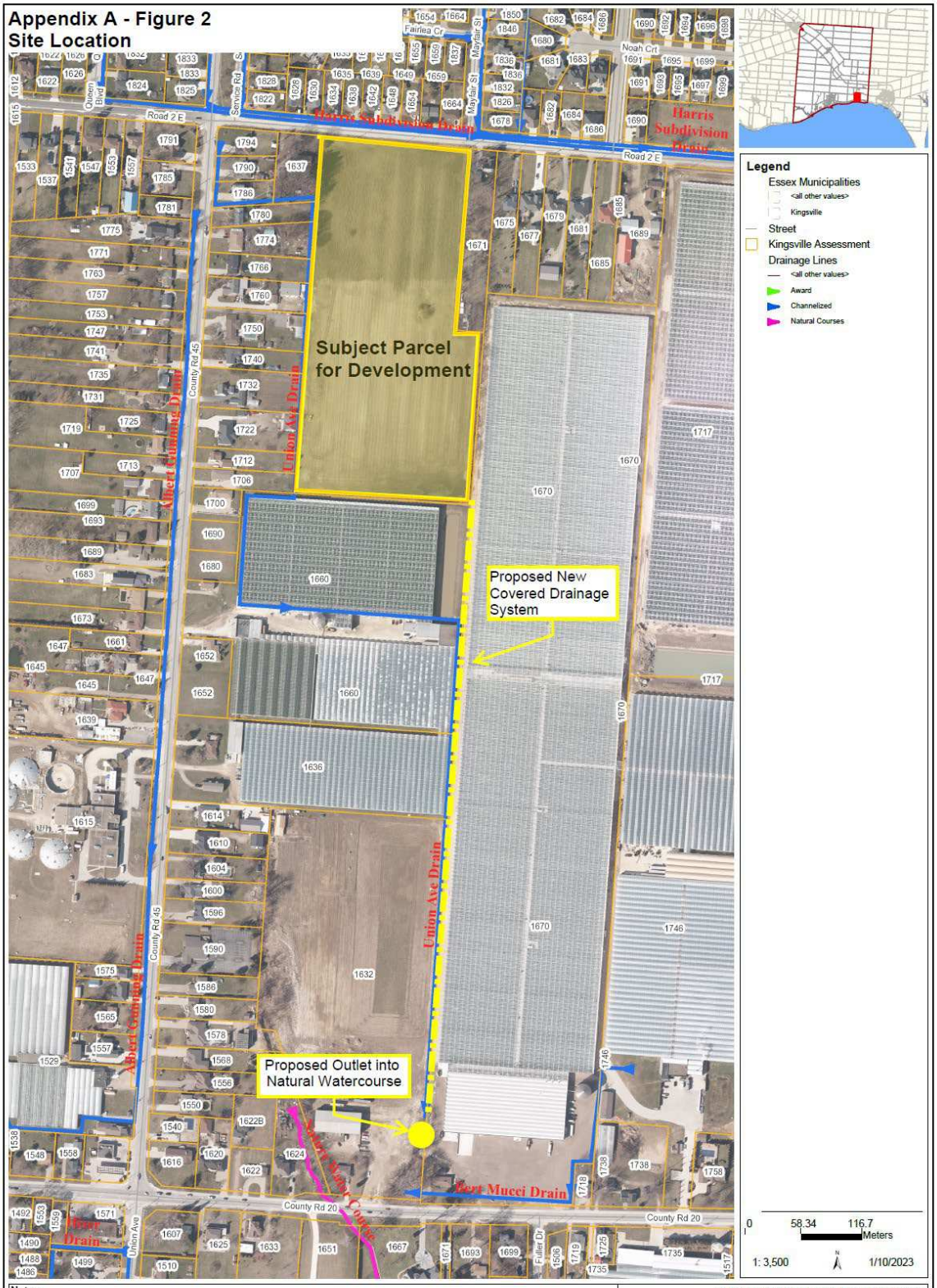
Soil Characteristics



Pl	P-r	Tfs	Hs	Fsl	Bel	C-s	B.L.
PARKHILL LOAM	PARKHILL LOAM RED SAND SPOT PHASE	TUSCOLA FINE SANDY LOAM	HARRIOW SANDY LOAM	FOX SANDY LOAM	BERRIEN SANDY LOAM	CAISTOR SAND SPOT PHASE	BOTTOM LAND
5,000	5,000	6,000	3,500	5,300	16,000	1,500	7,300
Dark brown loam over mottled brown and grey loam, silt and clay loam; few to many stones.	Similar to Parkhill loam except for frequent reddish sandy and gravelly knolls.	Dark grey to brownish sandy loam to loam over mottled yellowish stratified silt and clay; stonefree.	Light brown sandy loam and fine sandy loam over brown loam over greyish sandy loam and loam; locallly very stony.	Light brown and yellow sandy loam (or sand) over reddish brown loam then stratified sand or gravel.	Brown sandy loam over yellow and then mottled sand with clay at about 3 to 6 feet; stonefree.	Mixed areas of shallow sand knolls over clay; intermixed with Caistor clay and clay loam.	Low lying land along stream courses; subject to occasional flooding; variable texture.
Smooth to undulating topography. Drainage fair to poor.			Undulatting to rolling. Well drained.		Smooth to undulating. Fair to poor drainage.		Undulating. Drainage variable.
Slightly alkaline to slightly acid.			Moderately acid.				

DFO Request for Review
Solid Rock Homes Drainage Petition - Town of Kingsville, ON

Appendix A - Figure 2
Site Location



Notes
Enter Map Description

LAND USE CONROLS

Land use in the Province of Ontario is regulated by the Planning Act, 1990, Statutes of Ontario, 1990, Chapter 1, as amended, and is administered by the Minister of Municipal Affairs. The Planning Act addressed implementation of the Official plan and the Zoning By-Law.

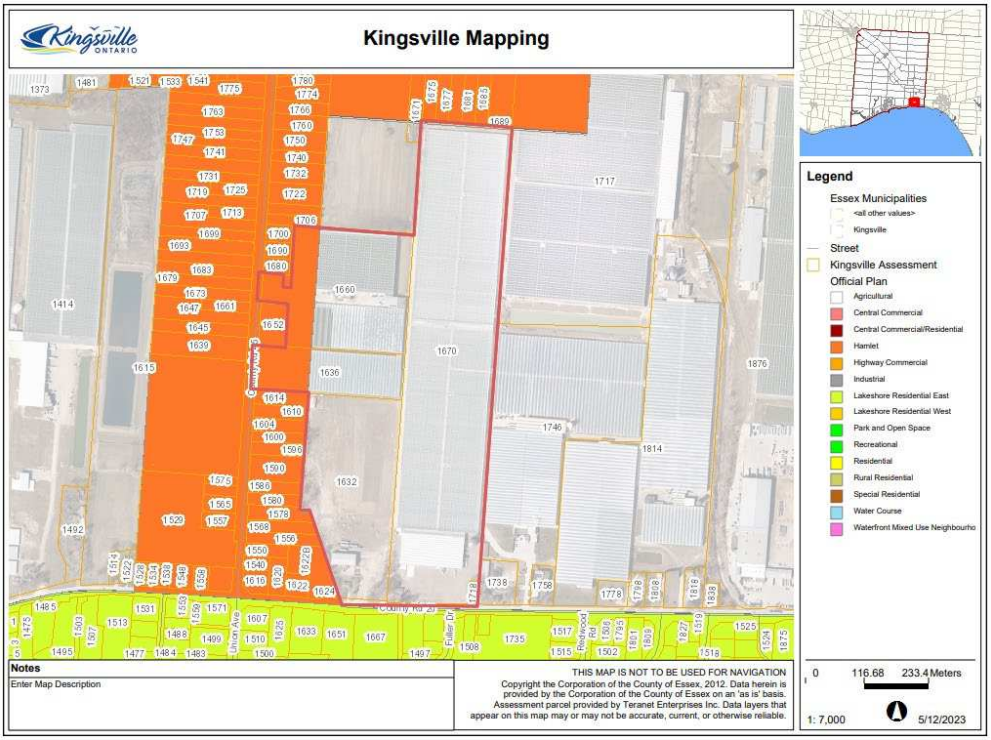
OFFICIAL PLAN

The Planning Act, 1990, as amended, Chapter 1 (h) defines Official Plan: "official plan" means a document approved by the Minister, containing objectives and policies established primarily to provide guidance for the physical development of a municipality or a part thereof an area that is without municipal organization, while having regard to relevant social, economic and environment matters.

The Official Plan for the Municipality of Kingsville applies to all lands within the corporate limits. The restructured Municipality was incorporated on January 1st, 1999 joining the former Town of Kingsville and the Townships of Gosfield North and South into the Municipality of Kingsville. According to Statistics Canada the 2001 population was 19,619 and the total land area of 60,945 acres. Geographically, Kingsville is located in the south of Essex County bordered by the Town of Leamington to the east, the Town of Lakeshore to the North, the Town of Essex to the west and Lake Erie to the south.

In accordance with Section 17 of the Planning Act, R.S.O. 1990 the Council of a municipality may provide for the preparation of a plan suitable for adoption as the Official Plan of the municipality. An official plan is defined in the Planning Act as a document, approved by the Minister, containing objectives and policies established primarily to provide guidance for the physical development of a municipality while having regard to relevant social, economic and environmental matters. Section 24 of the Act further provides that where an Official Plan is in effect no public work shall be undertaken and no by-law passed for any purpose unless it is in conformity with the Official Plan.

The Official Plan for the Town of Kingsville designates the subject properties as **Agricultural.** Areas designated Agricultural represent the majority of the land area in the Municipality of Kingsville. Agriculture is an extremely important component of Kingsville's land use.



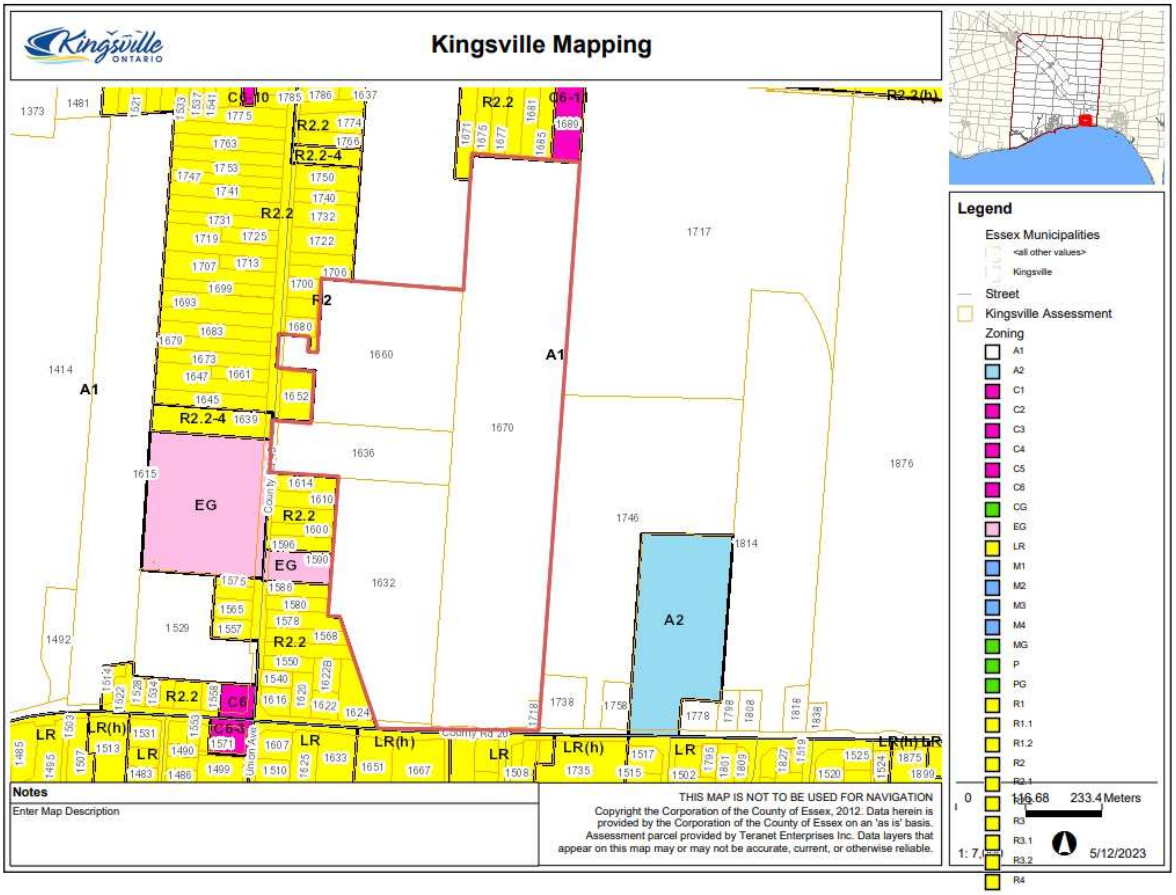
ZONING

While Official Plans set out the general long-range policy framework for future land use, Zoning By-Laws take precedence and put those objectives of the Official Plan into effect and provide for their day-to-day administration.

Unlike the Official Plan, the Zoning By-Law contains very specific and legally enforceable regulations. Any new development or construction that fails to comply with a municipality's Zoning By-Law is not permitted and will be denied a building permit.

Zoning By-Laws define zones for various types of uses and establish the specific type of land use in each zone (i.e. residential, commercial, agricultural, institutional, industrial etc.). The by-laws will also set standard for erecting buildings (i.e. minimum lot size, frontage, set-backs from streets, side yard clearances, building heights, parking requirements, etc.)

According to the Town of Kingsville the subject properties are zoned as Agricultural A-1.



HIGHEST AND BEST USE

The term "Highest and Best Use" is generally considered in appraisal terminology as the most profitable likely use to which a property can be put which will result in the greatest net return over a given period of time. For an asset to have value, it must be capable of providing some form of beneficial utility or enjoyment to the owner or user. An examination of the highest and best use or most probable use is, therefore, critical to the appraisal process.

The Highest and Best Use analysis provides a focus for the choice of an appropriate valuation methodology. If a property's current use is its highest and best use, its most probable selling price will ordinarily be a function of the existing use. Should the use of either the land as if vacant, or an alternative use of the land and structures as developed be found to represent the most beneficial use, the market value of the asset will likely be governed by this alternative.

The estimation and analysis of this optimum and probable use to which the property may be put normally encompasses consideration of the compatibility of the existing use and any suggested alternative use for which a property may be utilized in conjunction with:

(a) the Zoning, Official Planning and other legal and political restraints on the use of the property;

(b) the economic and market trends, supply and demand situation for the suggested use;

(c) the expectations of the surrounding community;

(d) the financial feasibility of the contemplated use; and,

(e) the physical attributes and limitations of the site and its location, including the availability of services necessary to support alternative uses.

The highest and best use of the site as if vacant, considering the location, alternate potential feasible and legal uses as well as current zoning and land uses in the neighbourhood would be for agricultural purposes.

APPROACHES TO VALUE

There are three traditional approaches to value typically utilized in the valuation of real property. Within each approach are numerous methods. The type of property and the interest being valued determines what approaches and methods are applicable.

COST APPROACH

This method is based on the cost of a property's improvements, less all sources of depreciation. The resulting figure is added to the estimated land value, utilizing the Direct Comparison Approach.

DIRECT COMPARISON APPROACH

The Direct Comparison Approach considers that a property's value is directly related to prices paid for other competitive and like properties. This approach to value directly compares sale prices per physical units of measure (i.e. suites, rooms, square feet, front foot, acres, etc.).

INCOME APPROACH

The Income Approach considers a property's ability to provide an income stream over its economic life as a reflection of its present value.

APPLICABLE APPROACHES

Each of the above approaches can be applied to some extent in the valuation of vacant lands. The Direct Comparison Approach is often the most effective. The Income Approach and the Cost Approach were not considered applicable to this type of property.

DIRECT COMPARISON APPROACH

The principle of substitution proposes that a prudent buyer will not pay more for a property than it would cost to buy an equally desirable substitute property, provided that there is not undue delay in making the acquisition. The Direct Comparison Approach is based upon this principle. Seldom is there any commodity that is bought or sold that does not undergo a comparative analysis. One of the basic principles in the marketplace is to decide by direct comparison whether the price of a commodity is fair.

There are five basic steps in the Direct Comparison Approach:

1. Assemble current sales of properties that are as closely comparable to the subject as possible. In addition to sales data, consideration should be given to current listings.

2. All pertinent data such as sale price, date, legal description, etc., should be validated.

3. The data derived from each sale should be analyzed with regards to date of sale (time), terms, location, motivation, marketing time, physical condition, etc.

4. Each sale is then compared to the subject property with adjustments made to the comparable sale to compensate for inferior or superior qualities.

5. The data is weighed and correlated to arrive at an indicated value for the subject property.

The method is relatively simple in its approach since it considers the same criteria utilized by a prospective purchaser. Its reliability depends on the similarity between the comparable and the subject property plus the skill and care exercised in making adjustments for various differences that exist.

Preamble

In an ideal market situation for applying the Comparison Approach to value, the following conditions would prevail:

- A large number of sales have occurred between buyers and sellers who are knowledgeable of the local market.
- The sales are closely comparable to the subject property.
- The terms of the sale are identical.
- The sales are all very recent.
- The sales are “normally distributed” in a statistical sense.

Unfortunately, even in the best of conditions, there are usually insufficient sales that are reasonably comparable. The question must be asked “What is a good comparable?” The limits on comparability depend on the type of property involved. A good comparable is one that would be a reasonable alternative for most prospective buyers who would be interested in the subject property.

Although none of the following properties are exactly identical to the subject property, they lend insight into how the market would react to the subject property.

SITE VALUE

There are several methods for developing a value for the underlying site. The site value is required for the Cost Approach calculations but can also be used for the development of ratios in the Income Approach.

1. Comparative Sales Method – sales and other data for similar parcels of land are analyzed, compared, and adjusted to provide a value indication for the land being appraised. In the comparison process, the similarity or dissimilarity of the parcels is considered. This is the most common technique for valuing land and it is the preferred method of land valuation, provided there are sufficient comparable land sales available for analysis.
2. The Abstraction Method – is used where few sales are found. It involves allocation of the appraised total value of the property between land and buildings. Reliance is placed on typical ratios of land to improvement in the particular category under consideration.
3. Extraction – is a technique whereby the depreciated value of the building is extracted from the total sale price of an improved property to indicate the value of the land.
4. Subdivision Development – can be used where a project is proposed for a site by estimating the probable selling price of the units and extracting all expenses including builder's profit.
5. Land Residual Technique – capitalizes into value the residual income imputable to the land as obtained with a new building improvement which is the highest and best use of the land.

In most instances, the Comparative Sales Method is the most reliable technique, particularly when there are sufficient comparable sites for comparison.

COMPARATIVE SALES METHOD

The comparative Sales Method is identical to the Direct Comparison Approach and remains the best method for this type of property provided comparable sales can be found. In this case a number of comparable sales were found in the vicinity of the Property.

Adjustments for items below were considered but not necessarily applied:

Rights Conveyed
Financing Adjustments
Conditions of Sale
Date of Sale
Location
Site Size
Other Adjustments

RECENT RELATED LAND SALES OF AGRICULTURAL PROPERTIES
TOWNS OF LEAMINGTON & KINGSVILLE

NO	REFERENCE	ADDRESS	DATE	SALE PRICE	ACREAGE	PRICE/ACRE
44	PIN# 751690111	2345 Graham Side Road Kingsville	01/06/21	$1,500,000	46.87	$32,003
45	PIN# 751730136	412 Highway 18 Kingsville	01/06/21	$703,000	36.73	$19,139
46	PIN# 750840080	1324 Highway 77 Leamington	01/25/21	$3,013,500	102.05	$29,529
47	PIN# 751480285	1246 County Road 34 Kingsville	02/28/22	$762,375	28.22	$27,015
48	PIN# 751480184	1474 County Road 34 Kingsville	02/28/22	$2,096,750	68.85	$30,453
49	PIN# 751480121	Pt Lt 24 Con 4 Gosfield	03/26/21	$1,125,000	44.94	$25,033
50	PIN# 751480249	2229 Road 5E Kingsville	03/26/21	$1,275,000	50.67	$25,162
51	PIN# 750850164	Pt Lt 6 Con 11 Mersea Leamington	04/23/21	$6,483,000	144.34	$44,914
52	PIN# 750860228	521 Mersea Road 8 Leamington	04/29/21	$4,165,000	99.17	$41,998
53	PIN# 751350630	508 Mersea Road 3 Leamington	06/15/21	$2,000,000	34.54	$57,903
54	PIN# 750840116	Pt Lt7 Con 10 Mersea Leamington	07/28/21	$2,462,500	49.59	$49,657
55	PIN# 750840124	709 Mersea Road 10 Leamington	07/28/21	$2,827,500	49.01	$57,692
56	PIN# 750840054	1148 Highway 77 Leamington	10/29/21	$1,270,000	41.2	$30,825
57	PIN# 750870144	Pt Lt Con 9 Mersea Leamington	11/01/21	$1,550,000	49.50	$31,313
59	PIN# 750990165	Pt Lt 229 Con STR Mersea Leamington	11/05/21	$1,000,000	31.11	$32,144
		AVERAGE		**$2,148,908.33**	**58.45**	**$35,652.00**
			2022			
60	PIN# 750950072	211 Mersea Road 3 Leamington	01/12/22	$1,550,000	28.93	$53,577
61	PIN# 751480184	1498 County Road 34 Kingsville	02/28/22	$1,863,875	34.55	$53,947
62	PIN# 751480285	1246 County Road 34 Kingsville	02/28/22	$762,375	28.22	$27,015
63	PIN# 751480184	1474 County Road 34 Kingsville	02/28/22	$2,096,750	68.85	$30,453
64	PIN# 751840873	787 County RD 20 Gosfield South	06/08/22	$2,500,000	85.55	$29,222
65	PIN# 750920535	810 Mersea Road 8 Leamington	06/28/22	$4,120,948	79.67	$51,725
66	PIN# 750840076	PT Lt 9 CON 11 Mersea Leamington	09/16/22	$2,237,725	65.49	$34,698
67	PIN# 751690170	PT LT 6 Con 2 ED Gosfield Concession	12/07/22	$2,821,550	50.03	$56,397
68	PIN# 750970546	PT LT 7, CON 4 Mersea Leamington	12/22/22	$1,378,812	30.01	$45,945
		AVERAGE		**$2,148,003.89**	**52.37**	**$42,553.22**

Chart #1 Observations
COMPARABLE SALES - 2022

	Low +/-	High + /-	Average +/-
Sale Date	01/12/22	December 2022	
Sale Price	$762,375	$4,120,948	$2,148,004
Number of Acres	28.22	85.55	52.37
Sale Price Range	$27,015	$56,397	$42,533

The previous two charts in this section provide summaries of pertinent information with respect to each transaction. All of the reference properties have a primary zoning designation of "A" agricultural and all are considered to be arms-length transactions.

Chart # 1 was a summary of properties purchased in the Town of Leamington and Town of Kingsville where the bulk of the greenhouse production in Ontario occurs.

- The average sale price per acre of these transactions was $35,362 per acre.
- The range was from $19,139 per acre to $57,903 per acre.

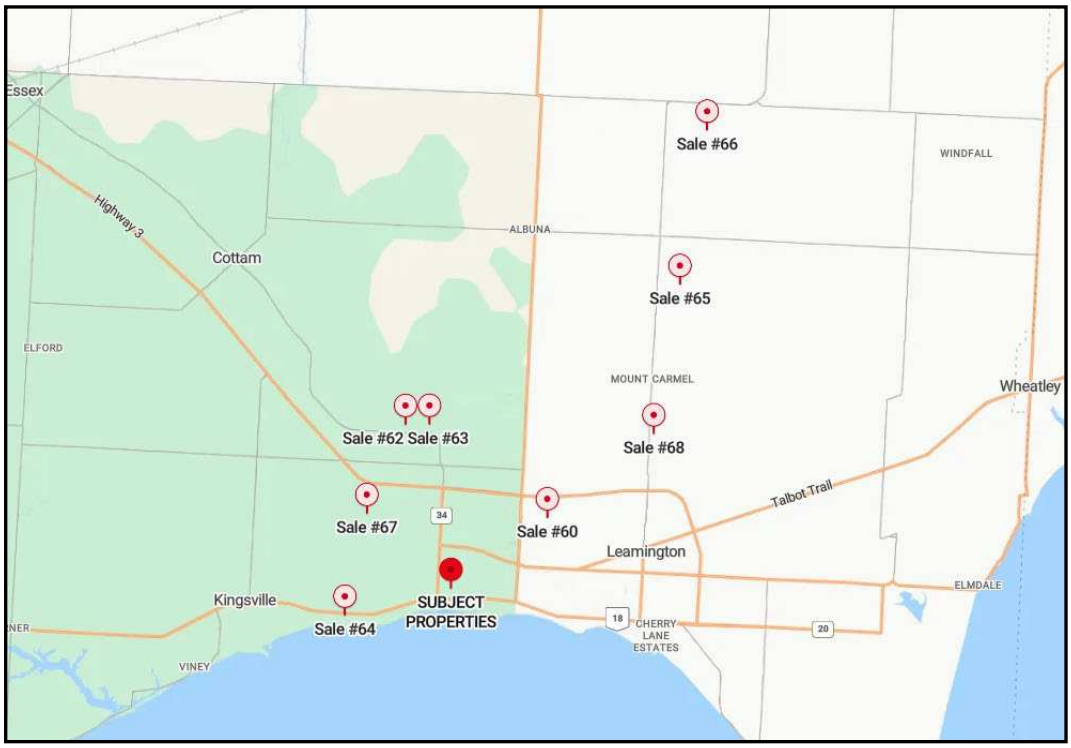
These sales represent sales of properties purchased primarily for greenhouse construction
Highest and best use of the properties in the area affected by the required drain is greenhouse construction

The following 9 sales selected from the above list were purchased specifically for greenhouse construction. They were reviewed and analyzed as being more indicative of the subject site value.

Chart # 2

#	REF.	ADDRESS	DATE	SALE PRICE	ACREAGE	PRICE/ACRE
60	PIN# 750950072	211 Mersea Road 3 Leamington	01/12/22	$1,550,000	28.93	$53,577
61	PIN# 751480184	1498 County Road 34 Kingsville	02/28/22	$1,863,875	34.55	$53,947
62	PIN# 751480285	1246 County Road 34 Kingsville	02/28/22	$762,375	28.22	$27,015
63	PIN# 751480184	1474 County Road 34 Kingsville	02/28/22	$2,096,750	68.85	$30,453
64	PIN# 751840873	787 County RD 20 Gosfield South	06/08/22	$2,500,000	85.55	$29,222
65	PIN# 750920535	810 Mersea Road 8 Leamington	06/28/22	$4,120,948	79.67	$51,725
66	PIN# 750840076	PT Lt 9 CON 11 Mersea Leamington	09/16/22	$2,237,725	65.49	$34,698
67	PIN# 751690170	PT LT 6 Con 2 ED Gosfield Concession	12/07/22	$2,821,550	50.03	$56,397
68	PIN# 750970546	PT LT 7, CON 4 Mersea Leamington	12/22/22	$1,378,812	30.01	$45,945
	Average			**$2,148,003.89**	**52.37**	**$42,553.22**

Comparable Sales Map



Nine sales in the subject immediate neighbourhood were selected for adjustment and considered most similar to the subject property. These sales represent sales of properties purchased specifically for cash crop and greenhouse construction.

The most appropriate adjustment method in this case is the "Property to Property Comparison", whereby we attempt to bracket the subject property between comparable sales both superior (more valuable) and inferior (less valuable). If a significant item or component of the comparable property is superior to or more favourable than the subject, a minus (-) adjustment is considered, thus reducing the indicated value of the subject. If a significant item in the comparable property is inferior to, or less favourable than, the subject Property, a plus (+) adjustment is considered, thus increasing the indicated value of the subject. This approach emphasizes individual comparable sales as a whole and undivided entity, which is exactly what a buyer does.

Adjustments are based on both quantitative market data and qualitative considerations. An adjusted rate paid per acre was then estimated and applied to the Property's gross acreage in order to estimate its Market Value.

Rights Conveyed

In analyzing the sales used it was determined that in all cases the rights conveyed were Fee Simple and no adjustment was required.

Financing
There was insufficient information available concerning the sales to determine if there were any unusual financing conditions that may have influenced the prices payable so it was assumed that all sales took place under normal circumstances with no adjustments required for financing.

Conditions of Sale Adjustment
Each of the transactions was reported to have involved cash to the vendor with no unusual conditions or restrictions.

Time
The most recent report published by FCC for spring 2023 indicates that farm land values in Ontario increased 19.4% in 2022, 22.2 % in 2021, 4.7% in 2020, 8.7% in 2018 and 8.4 per cent in 2017, following gains of 7.9 per cent in 2016 and 10.1 per cent in 2015.

The sales chosen for consideration represent sales over the past 20 months. Considering the above, it would appear from the above that an upward adjustment of 1.6% per month would need to be applied to the selected sales for time.

Location
The subject is located in the Town of Kingsville and all sales were within the same community/similar location. Therefore, no adjustments were made for the location.

Lot Size
Typically, based on the principle of "economy of scale" larger parcels tend to sell for less per unit than do smaller parcels. It was assumed for the purposes of this report that the value would be based on an average property size of 50 acres.

Sales with acreages below 35 acres were given a downward adjustment of 5% and sales above 40 acres in size were given an upward adjustment of 10%.

Zoning
All comparable sales had similar zoning to the subject site with no adjustment considered appropriate.

Services
The subject properties have typical rural municipal services available and no adjustment was considered appropriate.

Soil Type
All sales have a similar soil type in comparison to the subject; therefore, no adjustment was considered appropriate.

Generally speaking, the primary factor influencing value is the location and the closer a property is to a larger centre the greater its value. Other factors that contribute significantly to a property's value are tiling, configuration, soil type, municipal amenities available and most importantly workable acres available.

SUMMARY ADJUSTMENT CHART

#	ADDRESS	DATE	SALE PRICE	ACRES	SALE PRICE PER ACRE	TIME @ 1.6% PER MONTH	SIZE @ 5% to 10% +/-	ADJUSTED PRICE PER ACRE
60	211 Mersea Road 3 Leamington	01/12/22	$1,550,000	28.93	$53,577	**25.6%**	**-5%**	**$63,928**
61	1498 County Road 34 Kingsville	02/28/22	$1,863,875	34.55	$53,947	**23.20%**	**-5%**	**$63,139**
62	1246 County Road 34 Kingsville	02/28/22	$762,375	28.22	$27,015	**23.2%**	**-5%**	**$31,618**
63	1474 County Road 34 Kingsville	02/28/22	$2,096,750	68.85	$30,453	**23.2%**	**+10%**	**$41,339**
64	787 County RD 20 Gosfield South	06/08/22	$2,500,000	85.55	$29,222	**17.43%**	**+10%**	**$37,747**
65	810 Mersea Road 8 Leamington	06/28/22	$4,120,948	79.67	$51,725	**15.83%**	**+10%**	**$65,921**
66	PT Lt 9 CON 11 Mersea Leamington	09/16/22	$2,237,725	65.49	$34,698	**12.8%**	**+10%**	**$43,053**
67	PT LT 6 Con 2 ED Gosfield Concession	12/07/22	$2,821,550	50.03	$56,397	**8.0%**	**+10%**	**$67,000**
68	PT LT 7, CON 4 Mersea Leamington	12/22/22	$1,378,812	30.01	$45,945	**8.0%**	**-5%**	**$47,140**
	Average		**$2,148,003.89**	**52.37**	**$42,553.22**	**17.47%**	**-0.02**	**$51,209.44**
	SUBJECT	**05/11/23**						**MEDIAN $47,140**

Even properties which are side by side must be considered on an individual basis and under no circumstances can they be considered identical enough to apply the same unit value (per acre) to arrive at a market value for the property.

Each property is unique and the presence or lack of improvements, municipal services, variation in configurations, tiling etc. can significantly impact on the per acre value.

Two common statistical measures are the mean and the median. Both measure central tendency and are used to identify typical variate in a population or sample.

The subject properties areas in the center of a greenhouse area, within driving distance of all usual amenities.

Services available to the sites include municipal water, hydro, gas and telephone.

The average adjusted sale price indicated from the adjusted value of the nine sales selected as being most similar to the subject property was $51,209 per acre. The median sale price was $47,140 per acre.

The partial takings have a desirable configuration and a good soil type, being close proximity to the Solid Rock Homes Proposed Drainage System.

In consideration of the above and after reviewing those sales considered most suitable for comparison with the subject property in terms of location, size, soil type municipal services, the appraiser is of the opinion that a value of $45,000 to $55,000 per acre is indicative of the per acre value.

The estimated land value range from the Comparison Approach to Value is:

Current Market Value Range of Partial Takings
FORTY-FIVE THOUSAND TO FIFTY-FIVE THOUSAND DOLLARS PER ACRE
$45,000 to $55,000 per acre

DOWNSTREAM (Waterfront Lands) Located at 1967 and 1971 Seacliff Drive

COMPARISON APPROACH
Comparable Sale # 1

Sold (Vacant Land) — **1509 KENYON POINT ROAD**

Windsor-Essex County Association of REALTORS®

1 / 16

MLS® #:	20011175	Start Date:	04-Sep-20	Area:	WE/30/35
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$2,199,900.00	Ppty Size:	187.35 X IRREG	Approx. Taxes:	$4730.09 /2020
Sale Price:	$1,750,000	Sale Date:	13-Nov-20	Closing:	20-Nov-20
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	2.435/N/A or Unknown	Sewer/Avail:	Septic System/Unknown		

Seller: SHANNON MARIE OMSTEAD

L/Br: JUMP REALTY INC. - 300
L/Sp: 3222 (STACEY DINIRO)

ONE OF A KIND LAKEFRONT BUILDING LOT. PANORAMIC VIEWS OF LAKE ERIE IN A PRESTIGIOUS NEIGHBOURHOOD. TREED RAVINE ON THE WEST SIDE OF PROPERTY. SELLER HAS THE RIGHT TO ACCEPT OR REFUSE ANY OFFER.

No- Mandatory Plan **No**- Devel. Permit **Not Available**- Bldg Permit

Comparable Sale # 2

Sold (Vacant Land) — **200 ROBSON ROAD #PT 1**

1 / 13

MLS® #:	21001952	Start Date:	18-Feb-21	Area:	WE/40/47
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$389,900.00	Ppty Size:	59.8 X IRREG	Approx. Taxes:	$1670 /2021
Sale Price:	$325,000	Sale Date:	23-Feb-21	Closing:	23-Mar-21
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	/N/A or Unknown	Sewer/Avail:	Sanitary/At Lot Line		

Seller: PETER SAWATZKY & ELIZABETH SAWATZKY

L/Br: CENTURY 21 ERIE SHORES REALTY INC. - 210
L/Sp: 2572 (ARON BLATZ), 3089 (TYLER STEVEN BLATZ)

Breathtaking waterfront building lot on the shores of Lake Erie. The breakwall is newly built to ERCA requirements consisting of a primary high-density rock "180 lbs per cubic ft", secondary concrete breakwall and side yard concrete flankage walls. The build envelope is 1800 sq ft per floor. With its warm sense of community, and only moments to shops, eateries, parks & marina, this property provides all the elements for relaxing, comfortable and easy-care living. Build your dream home today! Please note that the house drawings are conceptual only and are for the convenience of reference.

No- Mandatory Plan **No**- Devel. Permit **Not Available**- Bldg Permit

Comparable Sale # 3

Sold (Vacant Land) — **200 ROBSON ROAD #PT 2**

1 / 13

MLS® #:	21001953	Start Date:	18-Feb-21	Area:	WE/40/47
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$389,900.00	Ppty Size:	59.8 X IRREG	Approx. Taxes:	$1670 /2020
Sale Price:	$325,000	Sale Date:	23-Feb-21	Closing:	23-Mar-21
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	/N/A or Unknown	Sewer/Avail:	Sanitary/At Lot Line		

Seller: PETER SAWATZKY & ELIZABETH SAWATZKY

L/Br: CENTURY 21 ERIE SHORES REALTY INC. - 210
L/Sp: 2572 (ARON BLATZ), 3089 (TYLER STEVEN BLATZ)

Breathtaking waterfront building lot on the shores of Lake Erie. The breakwall is newly built to ERCA requirements consisting of a primary high-density rock "180 lbs per cubic ft", secondary concrete breakwall and side yard concrete flankage walls. The build envelope is 1800 sq ft per floor. With its warm sense of community, and only moments to shops, eateries, parks & marina, this property provides all the elements for relaxing, comfortable and easy-care living. Build your dream home today! Please note that the house drawings are conceptual only and are for the convenience of reference.

No- Mandatory Plan **No**- Devel. Permit **Not Available**- Bldg Permit

Comparable Sale # 4

Sold (Vacant Land) — **10950 RIVERSIDE DRIVE**

1 / 4

MLS® #:	20009825	Start Date:	05-Aug-20	Area:	WE/00/04
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$999,000.00	Ppty Size:	88.62 X 355.32	Approx. Taxes:	$4989.66 /2020
Sale Price:	$975,000	Sale Date:	19-Mar-21	Closing:	01-Jun-21
Hydro:	On Road	Telephone:	On Road	Gas:	On Road
Waterfront:	Waterfront On Lake	Water/Avail:	/Nearby		
Acreage:	0.648	Sewer/Avail:	Sanitary/At Lot Line		

Seller: RICHARD PHILIP HALLER

L/Br: RE/MAX PREFERRED REALTY LTD. - 585
L/Sp: 900 (MARK LALOVICH), 2788 (RUSSEL LALOVICH) , 3210 (JOSHUA SHEPLEY)

CHOICE WATERFRONT LOT overlooking the channels of the Detroit River into Lake St. Clair, frontage at the water of 85.19', property includes a deep water dock for a larger boat, superior concrete breakwall, located along a stretch of high end waterfront homes, steps from the Ganatchio Trail & Sandpoint Beach! '2020 Survey Available' Note: Dock is subject to a pending Licence Agreement w/ Windsor Port Authority - Contact L/A for further details.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable Sale # 5

Sold (Vacant Land) — **11200 RIVERSIDE**

1 / 4

MLS® #:	21001619	Start Date:	10-Feb-21	Area:	WE/00/04
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$474,900.00	Ppty Size:	44.78 X 285 X I	Approx. Taxes:	$3533.60 /2020
Sale Price:	$450,000	Sale Date:	13-Apr-21	Closing:	20-Aug-21
Hydro:	Unknown	Telephone:	Unknown	Gas:	Unknown
Waterfront:	Waterfront On Lake	Water/Avail:	/Unknown		
Acreage:	/N/A or Unknown	Sewer/Avail:	Unknown/Unknown		

Seller: DR. N. KANUNGO MEDICINE PROFESSIONAL CORPORATION

L/Br: ROYAL LEPAGE BINDER REAL ESTATE - 649
L/Sp: 899 (DENISE CROW)

PRIME WATERFRONT VACANT LAND TO BUILD YOUR DREAM HOME. $474,900 PLUS HST (IF APPLICABLE). APPROX 44.78 X 47.01 (WATER SIDE) X 285.01 (WEST) X APPROX 280 FT (EAST). SERVICES AT THE ROAD.

No- Mandatory Plan **No**- Devel. Permit **Not Available**- Bldg Permit

Comparable Sale # 6

Sold (Vacant Land) — **V/L OLD TECUMSEH ROAD**

1 / 16

MLS® #:	21004849	Start Date:	13-Apr-21	Area:	WE/60/61
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$995,000.00	Ppty Size:	71.75 X IRREG	Approx. Taxes:	$6046.76 /2020
Sale Price:	$1,510,000	Sale Date:	27-Apr-21	Closing:	10-May-21
Hydro:	On Road	Telephone:	On Road	Gas:	On Road
Waterfront:	Waterfront On Lake	Water/Avail:	/Available		
Acreage:	0.86	Sewer/Avail:	Sanitary/Available		

Seller: KAREN HARRIS

L/Br: MICHAEL TOMEK REALTY LIMITED - 762
L/Sp: 838 (MIKE TOMEK)

This spectacular lakefront building site offers the ultimate opportunity for the home of your dreams. Mature trees, excellent depth, large boat dock with a 900 sq ft platform to soak up the sun or enjoy fabulous sunsets. Services at the road. Located between addresses 894 and 900. No offers will be viewed before April 27. No escalation clauses. Please include Schedule B in supplements in all offers.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 7

Sold (Vacant Land) — **1105 Heritage Road**

1 / 12

MLS® #:	20009578	Start Date:	03-Aug-20	Area:	WE/30/33
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$495,000.00	Ppty Size:	75.85'X359.01'	Approx. Taxes:	$3050.00 /2019
Sale Price:	$475,000	Sale Date:	30-Apr-21	Closing:	14-May-21
Hydro:	On Road	Telephone:	On Road	Gas:	On Road
Waterfront:	Waterfront On Lake	Water/Avail:	/Nearby		
Acreage:	0.497	Sewer/Avail:	Sanitary/Nearby		

Seller: **Charles Richard Glennie/Donald Alexander Glennie**

L/Br: **PINNACLE PLUS REALTY LTD.**
L/Sp: **2262 (BARBARA MANERY, ASA, ABR), 3082 (CHRIS BISHOP)**

A RARE FIND TODAY, BUILD YOUR DREAM HOME OVER LOOKING LAKE ERIE. VACANT WATER FRONT LOT ON LAKE ERIE AT 1105 HERITAGE ROAD ON CEDAR BEACH, W/APPROX 75' OF SHORELINE, CLOSE TO MARINAS, PUBLIC BEACHES AND THE TOWN OF KINGSVILLE. CALL TODAY TO ARRANGE A VIEWING. BUYER TO SATISFY THEMSELVES WITH VERIFYING ALL SERVICES, BUILDING REQUIREMENTS, AND ERCA APPROVALS.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 8

Sold (Vacant Land) — **983 WATERS BEACH DRIVE**

1 / 30

MLS® #:	21004652	Start Date:	09-Apr-21	Area:	WE/20/21
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$750,000.00	Ppty Size:	99.25 X 330.49	Approx. Taxes:	$2953.59 /2020
Sale Price:	$685,000	Sale Date:	08-Jun-21	Closing:	09-Jul-21
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	0.712	Sewer/Avail:	Other, See Remarks/Unknown		

Seller: **DOUGLAS J. QUICK**

L/Br: **REMO VALENTE REAL ESTATE (1990) LIMITED - 790**
L/Sp: **1975 (BOB QUICK)**

Large choice Lakefront building lot on quiet dead end street - nearly 100 foot frontage on Lake Erie - new engineered & ERCA Approved Shoreline protection completed in 2019 - ERCA approved buildable lot - the perfect spot to build your big Lakefront Dream home - septic system required - Water, Gas, Hydro at the lot line - L/S is related to Seller.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 9

Sold (Vacant Land) — **43 SULLIVAN**

1 / 3

MLS® #:	21010393	Start Date:	19-Jun-21	Area:	WE/20/22
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$249,000.00	Ppty Size:	40 ' X IRREGULA	Approx. Taxes:	$1800 /2020
Sale Price:	$436,130	Sale Date:	28-Jun-21	Closing:	27-Aug-21
Hydro:	On Road	Telephone:	On Road	Gas:	On Road
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	/N/A or Unknown	Sewer/Avail:	Sanitary/At Lot Line		

Seller: **JANICE PIDSKALNY**

L/Br: **MICHAEL TOMEK REALTY LIMITED - 762**
L/Sp: **838 (MIKE TOMEK)**

A rare opportunity to own a serviced building site overlooking Colchester Harbour in an historic area of the village of Colchester. What a spot for a vacation or retirement home in a fantastic location two blocks from from our wonderful beach, marina and park and within walking distance to restaurants and fabulous wineries. No offers will be viewed before June 28. No pre-emptives or escalation clauses.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 10

Sold (Vacant Land) — **200 ROBSON ROAD #PT 1**

1 / 12

MLS® #:	22006481	Start Date:	29-Mar-22	Area:	WE/40/47
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$450,000.00	Ppty Size:	60 X IRREG (TW	Approx. Taxes:	$1670 /2020
Sale Price:	$425,000	Sale Date:	05-Apr-22	Closing:	18-May-22
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	/N/A or Unknown	Sewer/Avail:	Sanitary/At Lot Line		

Seller: **KAMALU HOLDINGS LTD.**

L/Br: **BUCKINGHAM REALTY (WINDSOR) LTD. - 70**
L/Sp: **956 (HUGH O`BRIEN)**

FABULOUS WATERFRONT BUILDING LOT WITH NEW BREAKWALL BUILT TO ERCA REQUIREMENTS. THE BUILDING ENVELOPE IS DESIGNATED AT 1,800 SQ FT PER FLOOR. BUILD YOUR WATERFRONT DREAM HOME TODAY!NOTE: MODEL HOME RENDERINGS ARE FOR ARTISTIC PURPOSES. PLEASE SEE DOCUMENTS FOR ADDT'L INFO. THE SELLER HAS THE RIGHT TO ACCEPT OR REJECT ANY OFFERS.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 11

Sold (Vacant Land) — **200 ROBSON ROAD #PT 2**

1 / 13

MLS® #:	22006482	Start Date:	29-Mar-22	Area:	WE/40/47
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$450,000.00	Ppty Size:	60 X IRREG (TW	Approx. Taxes:	$1670 /2022
Sale Price:	$425,000	Sale Date:	05-Apr-22	Closing:	18-May-22
Hydro:	At Lot Line	Telephone:	At Lot Line	Gas:	At Lot Line
Waterfront:	Waterfront On Lake	Water/Avail:	/At Lot Line		
Acreage:	/N/A or Unknown	Sewer/Avail:	Sanitary/At Lot Line		

Seller: **KAMALU HOLDINGS LTD.**

L/Br: **BUCKINGHAM REALTY (WINDSOR) LTD. - 70**
L/Sp: **956 (HUGH O`BRIEN)**

FABULOUS WATERFRONT BUILDING LOT WITH NEW BREAKWALL BUILT TO ERCA REQUIREMENTS. THE BUILDING ENVELOPE IS DESIGNATED AT 1,800 SQ FT PER FLOOR. BUILD YOUR WATERFRONT DREAM HOME TODAY! PLEASE SEE DOCUMENTS FOR ADDT'L INFO. NOTE: MODEL HOME RENDERINGS ARE FOR ARTISTIC PURPOSES ONLY.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

Comparable # 12

Sold (Vacant Land) — **Maple Grove DRIVE**

1 / 1

MLS® #:	22017387	Start Date:	29-Jul-22	Area:	WE/20/21
Type:	Residential Lots	Type Details:	Single Family		
List Price:	$750,000.00	Ppty Size:	75 x 335	Approx. Taxes:	$1900 /2021
Sale Price:	$787,500	Sale Date:	28-Jul-22	Closing:	31-Aug-22
Hydro:	Unknown	Telephone:	Unknown	Gas:	Unknown
Waterfront:	Waterfront On Lake	Water/Avail:	/Unknown		
Acreage:	0.549/N/A or Unknown	Sewer/Avail:	Unknown/Unknown		

Seller: **Tompkins**

L/Br: **BILL KEHN REALTY GROUP**
L/Sp: **3048 (BILL KEHN)**

No doubt about it. This is the best lakefront lot available for you to build your next dream home. This lot is located in very quiet spot off of County Rd 50. There is also deeded access to a 6 acre private park for your use. This rarely available property is 75' wide x 335' deep and is located in heart of the wine region and is just a few short minutes drive from Harrow and Kingsville. This lot could be combined with the home available for sale at 983 Maple Grove Dr. to give you a unheard of 150' frontage on Lake Erie.

No- Mandatory Plan **No**- Devel. Permit **Mandatory**- Bldg Permit

In arriving at a value for the site of the subject property, consideration was given to square footage of the sites.

SELECTED VACANT WATERFRONT LAND SALES SUMMARY CHART

#	MLS NO	ADDRESS	DATE/	DOM	SALE PRICE	Frontage	Price per Front Foot	Square Footage	Price PSF
1	20011175	1509 Kenyon Point Kingsville	11/13/20	70	$1,750,000	187.35’	$9,340	106,068.60	$16.44
2	21001952	200 Robson Rd Lot 1 Leamington	03/23/21	7	$325,000	60’	5,417	7,083	45.88
3	21001953	200 Robson Road Lot 2 Leamington	02/23/21	7	$325,000	60’	5,417	7,352	44.21
4	20009825	10950 Riverside Drive Windsor	03/19/21	229	$975,000	88.62’	11,002	28,226.9	34.54
5	21001619	11200 Riverside Dr. Windsor	04/13/21	63	$450,000	44.78’	10,049	18,295.20	24.60
6	21004849	V/L Old Tecumseh Rd. Lakeshore	04/27/21	15	$1,510,000	71.75	21,025	37,461.60	40.31
7	20009578	1105 Heritage	04/3021	270	$475,000	75.85’	6,262	21,649.32	21.94
8	21004652	983 Waters Beach Essex	06/08/21	61	$685,000	99,25’	6,902	31,012.72	22.09
9	21010393	43 Sullivan Harrow	06/28/21	10	$436,130	40’	10,903	12,819.80	34.02
10	22006481	200 Robson Rd. – Lot # 1*	04/05/22	7	$425,000	60’	7,083	7,620.84	55.75
11	22006482	200 Robson R.- Lot 2* Leamington	05/05/22	7	$425,000	60’	7,083	7,352	57.80
12	22017387	Maple Grove Drive Harrow	07/08/22	5	$787,500	75’	11,025	23,914.44	40.77
		Average			**$714,052.50**	**72.37’**	**$9,292.33**	**25,738.04**	**$36.53**

Chart Observations 1

	Low +/-	High + /-	Average +/-
Sale Date	November - 2020	July - 2022	
Sale Price	$325,000	$1,750,000	$714,053
Front Feet	40’	187.35’	72.37’
Sale Price Per Front Foot	$5,417	$21,025	$9,292
Square Footage	7,083sf	106,068sf	23,758sf
Sale Price PSF	$16.44psf	$57.80psf	$36.53psf

The previous charts in this section provide summaries of pertinent information with respect to each transaction. All of the reference properties have a primary zoning designation of "R" Residential or comparable type zoning and all are considered to be arms-length transactions.

A steady increase in waterfront values is noted across all of Windsor and Essex County. Comparable sales #2 and # 3 both resold with an increase of 30.7% over a period of 12.5 months. This would indicate an increase of 2.5% per month for waterfront sites.

The unadjusted range was from $5,147 per front foot to $21,025 per front foot, with the average price paid being $9,249psf per front foot.

The lower values were for dated sales, inferior locations and minimal municipal amenities available.

The subjects are in an average waterfront location in the Town of Kingsville with typical municipal services.

After analysing this data, a per square foot value was selected and applied to the subject properties size to estimate its unit market value as of the effective date.

The most appropriate adjustment method in this case is the "Property to Property Comparison", whereby we attempt to bracket the subject property between comparable sales both superior (more valuable) and inferior (less valuable). If a significant item or component of the comparable property is superior to or more favourable than the subject, a minus (-) adjustment is considered, thus reducing the indicated value of the subject. If a significant item in the comparable property is inferior to, or less favourable than, the subject Property, a plus (+) adjustment is considered, thus increasing the indicated value of the subject. This approach emphasizes individual comparable sales as a whole and undivided entity, which is exactly what a buyer does.

Adjustments are based on both quantitative market data and qualitative considerations. An adjusted rate paid per square foot was then estimated and applied to the Property's acreage area in order to estimate its Market Value.

Location
An adjustment was made to the indicated values for significant variations in location. The subject was considered to be in an average to good location.

Lot Size
Lot sizes were considered a contributing factor in prices paid and adjustments were made based on significant variations in site sizes.

The subject sites are considerable larger than all of the comparable sales and according to the principle of Economy of Scale would sell for less per front foot/per square foot than smaller sales.
The largest comparable sale, #1, consisted of 106,069± sf and sold for $16.44 ±psf. The smallest sale, #11, consisted of 7,352±sf and sold for $57.80±psf. The Sale # 11 sold at a value that was 28.44% of sale # 11.

Zoning
All comparable sales had similar zoning to the subject property.

Adjustment Chart – Chart # 2

#	ADDRESS	DATE	SALE PRICE	TIME	LOCATION	Frontage	Price per Front Foot	Square Footage	Price PSF	Adjusted Price PFF
1	1509 Kenyon Point Kingsville	11/13/20	$1,750,000	+	-	187.35’	$9,340	106,068.60	$16.44	$11,021
2	200 Robson Rd Lot 1 Leamington	03/23/21	$325,000	+	-	60’	5,417	7,083	45.88	$6,067
3	200 Robson Road Lot 2 Leamington	02/23/21	$325,000	+	-	60’	5,417	7,352	44.21	$6,067
4	10950 Riverside Drive Windsor	03/19/21	$975,000	+	-	88.62’	11,002	28,226.9	34.54	$10,990
5	V/L Old Tecumseh Rd. Lakeshore	04/27/21	$1,510,000	+	-	71.75’	10,049	18,295.20	24.60	$10,039
6	1105 Heritage	04/3021	$475,000	+	-	75.85’	21,025	37,461.60	40.31	8,454
7	983 Waters Beach Essex	06/08/21	$685,000	+	=	99,25’	6,262	21,649.32	21.94	8,454
8	43 Sullivan Harrow	06/28/21	$436,130	+	=	40’	6,902	31,012.72	22.09	12,004
9	200 Robson Rd. Lot # 1*	04/05/22	$425,000	+	-	60’	10,903	12,819.80	34.02	7,791
10	200 Robson R.- Lot 2* Leamington	05/05/22	$425,000	+	-	60’	7,083	7,620.84	55.75	7,791
11	Maple Grove Drive Harrow	07/08/22	$787,500	+	-	75’	7,083	7,352	57.80	11,576
	Average		**$738,057.27**			**75.21’**	**$9,134.82**	**25,903.82**	**$36.14**	**$9,114.00**

The foregoing summary charts supply statistical information about sales in the market place. Although the more traditional appraisal analysis techniques are utilized, the results of the statistical analysis are of general assistance.

Generally speaking the primary factor influencing value is location and the closer a property is to a larger centre the greater its value. Other factors that contribute significantly to a property’s value are configuration, municipal amenities available and most importantly size.

Based on the foregoing observations and considering the size, shape and location of the subject sites, a per square foot value for the subject sites is estimated to be approximately $36 per square foot to $50 per square foot.

Current Market Value Range of Partial Takings Waterfront
THIRTY-SIX DOLLARS TO FIFTY DOLLARS PER SQUARE FOOT
$36.00 to $50.00 PSF

EXTRAORDINARY ASSUMPTIONS AND LIMITING CONDITIONS:

The certification that appears in this appraisal report is subject to compliance with the Personal Information and Electronics Documents Act (PIPEDA), Canadian Uniform Standards of Professional Appraisal Practice ("CUSPAP") and the following conditions:

1. This report is prepared at the request of the client and for the specific use referred to herein. It is not reasonable for any other party to rely on this appraisal without first obtaining written authorization from the client, the authors, subject to the qualification below. Liability is expressly denied to any person other than the client and those who obtain written consent and, accordingly, no responsibility is accepted for any damage suffered by any such person as a result of decisions made or actions based on this report. Diligence by all intended users is assumed.

2. Because market conditions, including economic, social and political factors change rapidly and, on occasion, without warning, the market value estimate expressed as of the date of this appraisal cannot be relied upon as of any other date except with further advice from the appraiser and confirmed in writing.

3. The appraiser will not be responsible for matters of a legal nature that affect either the property being appraised or the title to it. No registry office search has been performed and the appraiser assumes that the title is good and marketable and free and clear of all encumbrances including leases, unless otherwise noted in this report. The property is appraised on the basis of it being under responsible ownership.

4. The subject property is presumed to comply with government regulations including zoning, building codes and health regulations and, if it doesn't comply, its non-compliance may affect market value.

5. No survey of the property has been made. Any sketch in the appraisal report shows approximate dimensions and is included only to assist the reader of the report in visualizing the property.

6. This report is completed on the basis that testimony or appearance in court concerning this appraisal is not required unless specific arrangements to do so have been made beforehand. Such arrangements will include, but not necessarily be limited to, adequate time to review the appraisal report and data related thereto and the provision of appropriate compensation.

7. Unless otherwise stated in this report, the appraiser has no knowledge of any hidden or unapparent conditions of the property (including, but not limited to, its soils, physical structure, mechanical or other operating systems, its foundation, etc.) or adverse environmental conditions (on it or a neighbouring property, including the presence of hazardous wastes, toxic substances, etc.) that would make the property more or less valuable. It has been assumed that there are no such conditions unless they were observed at the time of inspection or became apparent during the normal research involved in completing the appraisal. This report should not be construed as an environmental audit or detailed property condition report, as such reporting is beyond the scope of this report and/or the qualifications of the appraiser. The author makes no guarantees or warranties, express or implied, regarding the condition of the property, and will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. The bearing capacity of the soil is assumed to be adequate.

8. The appraiser is not qualified to comment on environmental issues that may affect the market value of the property appraised, including but not limited to pollution or contamination of land, buildings, water, groundwater or air. Unless expressly stated, the property is assumed to be free and clear of pollutants and contaminants, including but not limited to moulds or mildews or the conditions that might give rise to either, and in compliance with all regulatory environmental requirements, government or otherwise, and free of any environmental condition, past, present or future, that might affect the market value of the property appraised. If the party relying on this report requires information about environmental issues then that party is cautioned to retain an expert qualified in such issues. We expressly deny any legal liability relating to the effect of environmental issues on the market value of the subject property.

9. The analyses set out in this report relied on written and verbal information obtained from a variety of sources we considered reliable. Unless otherwise stated herein, we did not verify client-supplied information, which we believed to be correct.

10. The term "inspection" refers to observation and reporting of the general material finishing and conditions seen for the purposes of a standard appraisal inspection. The inspection scope of work includes the identification of marketable characteristics/amenities offered for comparison and valuation purposes only, in accordance with the CUSPAP.

11. The opinions of value and other conclusions contained herein assume satisfactory completion of any work remaining to be completed in a good and workmanlike manner. Further inspection may be required to confirm completion of such work. The appraiser has not confirmed that all mandatory building inspections have been completed to date, nor has the availability/issuance of an occupancy permit been confirmed. The appraiser has not evaluated the quality of construction, workmanship or materials. It should be clearly understood that this physical inspection does not imply compliance with any building code requirements as this is beyond the professional expertise of the appraiser.

12. The contents of this report are confidential and will not be disclosed by the author to any party except as provided for by the provisions of the CUSPAP and/or when properly entered into evidence of a duly qualified judicial or quasi-judicial body. The appraiser acknowledges that the information collected herein is personal and confidential and shall not use or disclose the contents of this report except as provided for in the provisions of the CUSPAP and in accordance with the appraiser's privacy policy. The client agrees that in accepting this report, it shall maintain the confidentiality and privacy of any personal information contained herein and shall comply in all material respects with the contents of the appraiser's privacy policy and in accordance with the PIPEDA.

13. The appraiser has agreed to enter into the assignment as requested by the client named in the report for the use specified by the client, which is stated in the report. The client has agreed that the performance of this appraisal and the report format are appropriate for the intended use.

14. Written consent from the authors must be obtained before any part of the appraisal report can be used for any use by anyone except the client and other intended users identified in the report. Where the client is the mortgagee and the loan is insured, liability is extended to the mortgage insurer. Liability to any other party or for any other use is expressly denied regardless of who pays the appraisal fee.

15. This report form is the property of the Appraisal Institute of Canada (AIC) and for use only by AIC members in good standing. Use by any other person is a violation of AIC copyright. This appraisal report, its content and all attachments/addendums and their content are the property of the author. The client, intended users and any appraisal facilitator are prohibited, strictly forbidden and no permission is expressly or implicitly granted or deemed to be granted, to modify, alter, merge, publish (in whole or in part) screen scrape, database scrape, exploit, reproduce, decompile, reassemble or participate in any other activity intended to separate, collect, store, reorganize, scan, copy, manipulate electronically, digitally, manually or by any other means whatsoever this appraisal report, addendum, all attachments and the data contained within for any commercial, or other, use.

16. If transmitted electronically, this report will have been digitally signed and secured with personal passwords to lock the appraisal file. Due to the possibility of digital modification, only originally signed reports and those reports sent directly by the appraiser, can be relied upon without fault.

17. Where the intended use of this report is for financing or mortgage lending, it is a condition of reliance on this report that the authorized user has or will conduct loan underwriting and rigorous due diligence in accordance with the standards of a reasonable and prudent lender, including but not limited to ensuring the borrower's demonstrated willingness and capacity to service his/her debt obligations on a timely basis, and to conduct such loan underwriting and due diligence in accordance with the standards set out by the Office of the Superintendent of Financial Institutions (OSFI) Residential Mortgage Underwriting Practices and Procedures B-22, even when not otherwise required by law. Liability is expressly denied to those that do not meet this condition.

CERTIFICATION

I certify that, to the best of my knowledge and belief:

- The statements of fact contained in the accompanying report are to the best of our knowledge true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are our impartial and unbiased professional analyses, opinions, and conclusions.
- We have no present or prospective interest in the property that is the subject of this report, and we have no personal and/or professional interest or bias with respect to the parties involved with this assignment.
- We have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;
- Our engagement in and compensation is not contingent upon or reporting predetermined results, the amount of value estimate, a conclusion favouring the client, or the occurrence of a subsequent event.
- Our analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and the Canadian Uniform Standards of Professional Appraisal Practice of the Appraisal Institute of Canada.
- We have the knowledge and experience to complete this assignment competently, and where applicable this report is co-signed in compliance with the Canadian Uniform Standards of Professional Appraisal Practice of the Appraisal Institute of Canada.
- Except as herein disclosed, no one has provided significant professional assistance to the person(s) signing this report;
- The use of this report is subject to the requirements of the Appraisal Institute of Canada relating to review by its duly authorized representatives.
- Don Fuerth, AACI, P.App. personally inspected the Subject Property from the street on May 12th 2023. No one, other than those named in the certification pages herein, provided assistance to the undersigned with preparation of this report.
- As of the dated of this report, Don Fuerth, AACI, P.App. has completed the requirements of the continuing education program of the Appraisal Institute of Canada.

Based upon the data, analyses and conclusions contained herein, the market value range of the partial takings in the properties located adjacent to Solid Rock Homes Proposed Drainage System, Town of Kingsville, Ontario; as at May 12th 2023 is at:

Current Market Value Range of Partial Takings
FORTY-FIVE THOUSAND TO FIFTY-FIVE THOUSAND DOLLARS PER ACRE
$45,000 to $55,000 per acre
Current Market Value Range of Partial Takings Waterfront Sites
THIRTY-SIX DOLLARS TO FIFTY DOLLARS PER SQUARE FOOT
$36.00 to $50.00 PSF

APPRAISER

Respectfully,
FUERLAND REALTY LTD

Don Fuerth B.A., AACI, P. App

NAME: Don Fuerth
AIC DESIGNATION/STATUS: AACI, P.App
Membership #: 702855
DATE OF REPORT/DATE SIGNED: May 16th 2023
PERSONALLY INSPECTED THE SUBJECT PROPERTY: Yes
DATE OF REVIEW: May 12th 2023

AIC CANDIDATE MEMBER

Respectfully,
FUERLAND REALTY LTD.

Cara Pazur, B.A., AIC Candidate Member

NAME: Cara Pazur
AIC DESIGNATION/STATUS: AIC Candidate Member
Membership #: 918332
DATE OF REPORT/DATE SIGNED: May 16th 2023
PERSONALLY INSPECTED THE SUBJECT PROPERTY: No
DATE OF REVIEW: May 12th 2023

ADDENDA

Curriculum Vitae and Clients Served – 2023

Don Fuerth B.A., AACI, P.App.
Professional Appraiser, Real Estate Broker, Realtor®
2260 Foster Avenue, Windsor, ON N8W 5C9
Telephone: (519) 966-0881
Email: dfuerth@fuerlandrealty.com

Summary
Don Fuerth is an experienced professional Real Estate Broker and Appraiser who has Land Use and Land Development experience. He has completed a variety of appraisal and consulting assignments to assist in Mortgage Financing, Power of Sale, Deemed Dispositions, HST and Capital Gains Issues involving Canada Revenue Agency (CRA), Expropriation, Family Law, Assessment Appeals and Litigation support.

Experience

Real Estate Appraiser

Fuerland Realty Ltd., Don Fuerth Broker/Owner
Appraiser of single and multi-family residential, agricultural, commercial, institutional and industrial properties since September 1995.

Real Estate Broker

Real Estate Brokerage - Fuerland Realty Ltd. We are an active brokerage providing assistance in purchases, sales, leasing and construction for all types of real estate. We maintain MLS® membership to obtain legal access to various real estate board open market systems.

Real Estate Appraisal and Counseling involves one or more of the following services:

- Real Estate Appraisal,
- Litigation support,
- Expropriation Appraisals including Injurious Affection Studies,
- Assessment Appeals,
- Property Tax Issues,
- Project feasibility study and analysis, and
- Property portfolio analysis and evaluation.

Experience

2001 – Present Chief Appraiser Fuerland Realty Ltd.
1994 – 2000 Associate Appraiser E.S. Gorski & Associates

Related Experience

- Graduated from University of Windsor 1963
- Teacher's Certificate from University of Western Ontario -1965
- 1963 – 1980 Head of Modern Language Department and Guidance Counselor
- 1970 – 1988 Full time dairy and cash crop farmer
- 1988 – 1990 Full time construction and excavation contractor
- December 1990 successfully completed the "Salesperson Program" in real estate as presented by The Ontario Real Estate Association
- Licensed under the Ontario Real Estate and Business Brokers Act as a Broker, December 2nd 2002. Registration No. 3349461
- Director Windsor/Essex County Real Estate Board 1998 – 2002
- President Windsor/Essex County Real Estate Board 2002 – 2003
- Past President Windsor/Essex County Real Estate Board 2003 – 2004
- Chairman Building Committee Windsor/Essex County Real Estate Board 1998 – 2004
- Full member, National Commercial Council, Canadian Real Estate Association, 2001, also a Full Member, Commercial Council Windsor/Essex County Real Estate Board.

Appraisal Assignments have included:

- Funeral Homes
- Institutional buildings
- Retirement Homes
- Special Use Properties
- Rooming Houses
- Office Towers
- Apartment buildings
- Real property housing a single dwelling
- Multi-family buildings
- Industrial properties
- Churches
- Retail commercial properties
- Hotels/Motels
- Mobile Home/Trailer Parks
- Marinas
- Golf Courses
- Farms and Farm Land
- Intensive Farms (e.g. Livestock, Greenhouse and Winery Operations)
- Agricultural support properties
- Market Rent Studies
- Land
    - Commercial/industrial/residential land awaiting development
    - Building lots – on water and not on water

Professional Education

AACI Accredited Appraiser Canadian Institute Certificate # 702855
The Appraisal Institute of Canada awarded use of this professional designation on October 28th 2003.

P.App Professional Appraiser
Granted by the Appraisal Institute of Canada to all holders of the AACI designation.

CRA Canadian Residential Appraiser, Relinquished October 28th 2003

B.A. Bachelor of Arts granted by the University of Windsor May 1963

Membership

- Appraisal Institute of Canada
- Ontario Real Estate Association
- The Canadian Real Estate Association
- The Windsor/Essex County Real Estate Board
- The Commercial Council of Canadian Real Estate Association
- Together with full access to numerous other Real Estate Boards.

Clients Served (partial list only)

- Libro Credit Union
- Motor City Community Credit Union
- Bank of Montreal
- Canadian Imperial Bank of Commerce
- Royal Lepage Relocation
- Canada Mortgage and Housing Corp.
- Farm Credit
- County of Essex
- Town of Tecumseh
- Town of Amherstburg
- Town of Kingsville
- Royal Bank of Canada
- Prudential Relocation
- London Life - Freedom Financial
- Remax Relocation
- Hydro One Networks
- Unimor Capital Corporation
- Windsor Family Credit Union
- Ing Mortgages
- First National Financial Corporation
- Korea Exchange Bank
- Manulife Bank
- Ukrainian Credit Union
- Concentra Financial Services
- Law Firms
    - McCarthy Tetrault
    - Paul Mullins
    - Hickey & Byrne
    - Paroian & Skipper
    - And many more
- Accounting Firms
    - KPMG Inc.
    - Ernst & Young
    - LBDO Dunwoody & Associates
    - Deloitte & Touche
    - Hyatt Lassaline
    - Collins Barrow

INSURANCE CERTIFICATE - CERTIFICAT D'ASSURANCE

Named Insured/Assure nomme:	**MEMBERS OF THE APPRAISAL INSTITUTE OF CANADA**
Insured/Assure:	Donald Fuerth
Address of Insured/	2260 Foster Ave
Adresse de l'assure:	Windsor, ON N8W 5C9
Certificate Number/Certificat No.:	AIC 02148
Policy Period For Insured/Periode d'assurance pour l'assure:	December 31, 2022 To December 31, 2023
AIC Membership	AACI - Accredited Appraiser Canadian Institute

This is to confirm for the indicated type of practice that the following insurance is in effect/

La present certificat confirme que l'assurance suivante est en vigueur pour la categorie de pratique indique:

Master Policy/contrat-cadre

Insurer	Policy No.	Policy Period	Coverage
Trisura Guarantee Insurance Company	NPL1003080	December 31, 2022 to December 31, 2023	Appraisers Professional Liability Insurance/ Assurance de Responsabilite Professionnelle des Evaluateurs

Sum Insured/Montant assure:

$2,000,000 each occurrence and $2,000,000 in the aggregate annually./

$2,000,000 par sinistre et $2,000,000 montant de la garantie par armee d'assurance.

Date: December 28, 2022

Authorized Representative

HUB International Canada
595 Bay Street, Suite 900, Toronto, ON M5G 2E3
Tel: 416-619-8242 aicinsurance@hubinternational.com

INSURANCE CERTIFICATE - CERTIFICAT D'ASSURANCE

Named Insured/Assure nomme:	**MEMBERS OF THE APPRAISAL INSTITUTE OF CANADA**
Insured/Assure:	Cara Pazur
Address of Insured/	2260 Foster Avenue
Adresse de l'assure:	Windsor, ON N8W 5C9
Certificate Number/Certificat No.:	AIC 11454
Policy Period For Insured/Periode d'assurance pour l'assure:	December 31, 2022 To December 31, 2023
AIC Membership	Candidate - Candidate Member

This is to confirm for the indicated type of practice that the following insurance is in effect/

La present certificat confirme que l'assurance suivante est en vigueur pour la categorie de pratique indique:

Master Policy/contrat-cadre

Insurer	Policy No.	Policy Period	Coverage
Trisura Guarantee Insurance Company	NPL1003080	December 31, 2022 to December 31, 2023	Appraisers Professional Liability Insurance/ Assurance de Responsabilite Professionnelle des Evaluateurs

Sum Insured/Montant assure:

$2,000,000 each occurrence and $2,000,000 in the aggregate annually./

$2,000,000 par sinistre et $2,000,000 montant de la garantie par armee d'assurance.

Date: December 29, 2022

Authorized Representative

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APPENDIX “E”

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PLAN, PROFILE, SECTIONS & DETAILS

OF THE

JAMIS DRAIN AND BRANCHES

(Part of Lot 10, Concession 1 E.D.)

IN THE

TOWN OF KINGSVILLE
(Geographic Township of Gosfield South)

IN THE

COUNTY OF ESSEX • ONTARIO

TOWN OF KINGSVILLE

MAYOR: DENNIS ROGERS
CLERK: PAULA PARKER
DRAINAGE SUPERINTENDENT: LU-ANN MARENTETTE

BENCHMARK:

1) TOP NUT OF EXISTING FIRE HYDRANT (NO. K398) LOCATED ON THE SOUTH SIDE OF ROAD 2 EAST, APPROXIMATELY 153.9m EAST OF THE INTERSECTION OF COUNTY ROAD 45 AND ROAD 2 EAST.
ELEV. = 200.342m

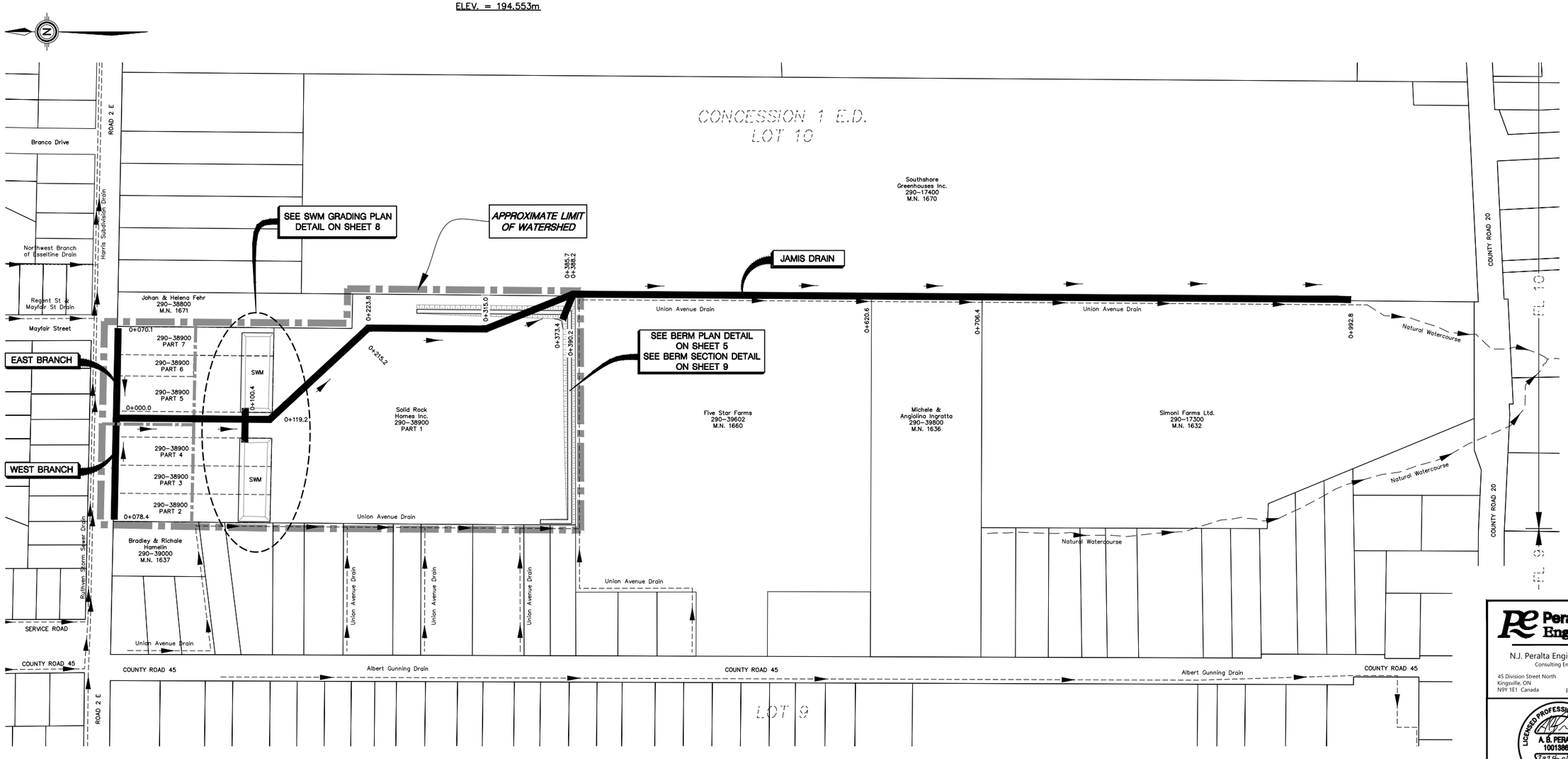
2) TOP GRATE OF EXISTING ROUND CATCH BASIN LOCATED IN THE NORTHWEST CORNER OF M.N. 1660.
ELEV. = 196.343m

3) TOP OF NAIL SET IN WEST FACE OF EXISTING HYDRO POLE LOCATED ON THE NORTH SIDE OF COUNTY ROAD 20, IN THE SOUTHWEST CORNER OF M.N. 1670.
ELEV. = 194.553m

SHEET INDEX

GENERAL NOTES:

1. THE ACCURACY OF THE UTILITIES SHOWN ON THESE DRAWINGS ARE NOT GUARANTEED BY THE OWNER OR N. J. PERALTA ENGINEERING LTD.; OTHER UTILITIES MAY BE PRESENT OR THE UTILITIES SHOWN MAY DIFFER IN SIZE OR LOCATION SHOWN. THE CONTRACTOR SHALL LOCATE, AND VERIFY DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION AND ADVISE ENGINEER OF ANY UTILITY CONFLICTS THAT MAY BE ENCOUNTERED.
2. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE. PROPERTY LINES ARE BASED ON THE PLAN OF SURVEY REFERENCE NO. 21-48-298-00 (DATED FEBRUARY 23, 2022) AND TOWN OF KINGSVILLE GIS INFORMATION.
3. ALL CBMH'S ARE TO BE 600mm SQUARE PRECAST CONCRETE WITH MINIMUM 450mm DEEP SUMP AND CAST IRON FRAME AND GRATE (OPSD – 400.020) UNLESS OTHERWISE NOTED.
4. ALL JUNCTION BOXES (JB-X) SHALL BE FITTED WITH A SOILTIGHT STEEL PLATE WITH NON-WOVEN FILTER CLOTH UNDERLAY AND SECURED AGAINST SLIDING, TRACEABLE WITH A METAL DETECTOR, AND 600mm DEEP SUMP. THE TOP OF THE JUNCTION BOX SHALL BE SET A MINIMUM OF 300mm BELOW EXISTING GROUND ELEVATION.
5. ALL COVERED DRAINS TO HAVE MINIMUM 300mm OF COVER.
6. TOPSOIL SHALL BE PLACED ON ALL NEWLY EXCAVATED SWALES AND ANY DISTURBED BOULEVARDS AREAS THAT WILL BE SEEDED AND MULCHED.
7. CONTRACTOR IS RESPONSIBLE TO PROTECT ALL PRIVATE FEATURES (SUCH AS FENCES, SPRINKLERS, FLOWER BEDS, ETC.). IN THE EVENT THAT A PRIVATE FEATURE IS IN THE ALIGNMENT OF THE NEW COVERED DRAINAGE SYSTEM, THE CONTRACTOR SHALL CAREFULLY REMOVE AND RE-INSTALL THE PRIVATE FEATURE TO ITS ORIGINAL STATE, UNLESS OTHERWISE NOTED.
8. ALL CBMH'S SHALL HAVE A MINIMUM OF 3 ADJUSTMENT UNITS AS PER OPSD 704.011.
9. ALL HDPE DRAIN PIPE TO BE 320 kPa OR APPROVED EQUAL.
10. ENSURE THAT THERE IS A MINIMUM 0.50m VERTICAL SEPARATION WITH THE PIPE LENGTHS CENTERED OVER ANY WATERMAIN.
11. STORM SERVICE CONNECTIONS SHALL BE LOCATED AS SHOWN ON THE PLANS AND TO STANDARD DETAILS. IT IS RECOMMENDED THAT ALL SERVICE CONNECTIONS TO THE HOME BE FITTED WITH CHECK VALVES (BY OTHERS).
12. UPON THE COMPLETION OF THE WORKS OUTLINED WITHIN THIS PROJECT AND PRIOR TO THE INSTALLATION OF ANY NEW DRIVEWAY ACCESSES, A MINIMUM OF 450mm OF BACKFILL MATERIAL SHALL BE STRIPPED AWAY AND REPLACED WITH GRANULAR 'A' BACKFILL COMPACTED TO A MINIMUM STANDARD PROCTOR DENSITY OF 98%.
13. PROPOSED SWALES SHALL BE CENTRED OVER THE NEW DRAIN ALIGNMENTS, OR AS OTHERWISE NOTED ON THE PLANS.



DENOTES OVERALL WATERSHED LIMIT

DENOTES SUB-WATERSHED LIMITS OF BRANCH DRAINS

WATERSHED PLAN
Scale = 1:1,500

THESE DRAWINGS HAVE BEEN REDUCED IN SIZE AND THE SCALE THEREFORE VARIES.
FULL SCALE DRAWINGS CAN BE VIEWED AT THE MUNICIPAL OFFICES IF REQUIRED.

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A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.: D22-114
SHEET No.: 1 OF 10

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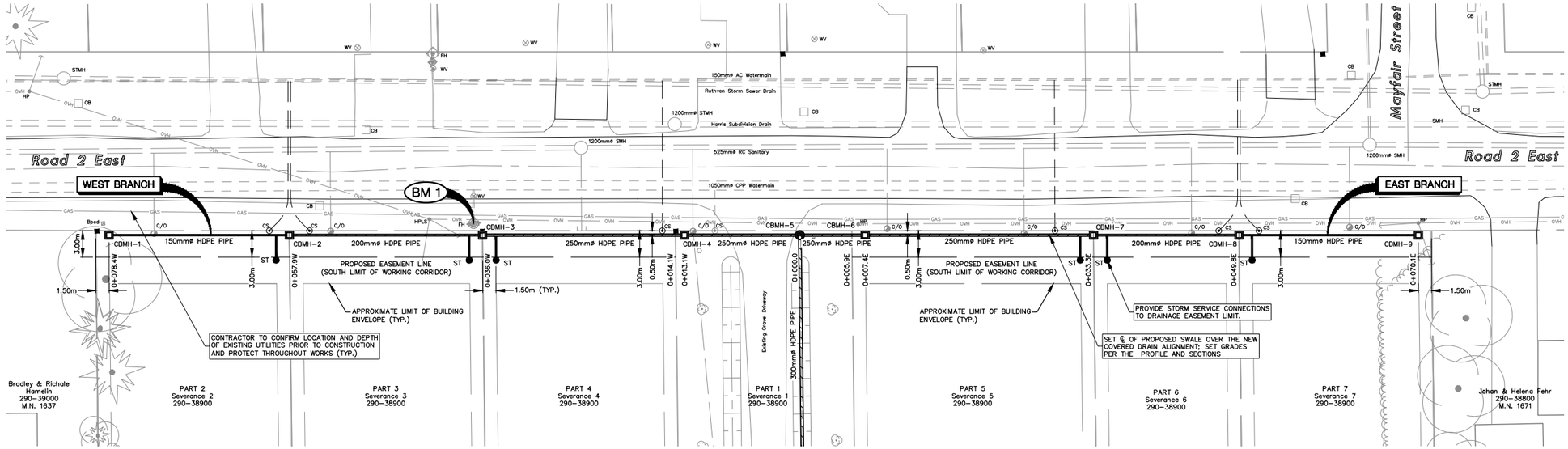


JAMIS DRAIN PLAN - WEST AND EAST BRANCH

Scale = 1:250

0+078.4 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-1 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.480m

0+068.1 HIGH POINT OF PROPOSED SWALE

0+059.4 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION
0+057.9 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-2 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.470m

0+057.9 PROPOSED PROPERTY LINE BETWEEN SER. 2 & 3

0+047.0 HIGH POINT OF PROPOSED SWALE

0+037.5 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION
0+036.0 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-3 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.450m

0+036.0 PROPOSED PROPERTY LINE BETWEEN SER. 3 & 4
0+034.5 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+024.6 HIGH POINT OF PROPOSED SWALE

0+014.1 PROPOSED EAST LIMIT OF SER. 4

0+013.1 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-4 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.500m

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+005.9 PROPOSED WEST LIMIT OF SER. 5

0+007.4 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-6 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.450m

0+020.3 HIGH POINT OF PROPOSED SWALE

0+031.8 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION
0+033.3 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-7 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.450m

0+033.3 PROPOSED PROPERTY LINE BETWEEN SER. 5 & 6
0+034.8 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

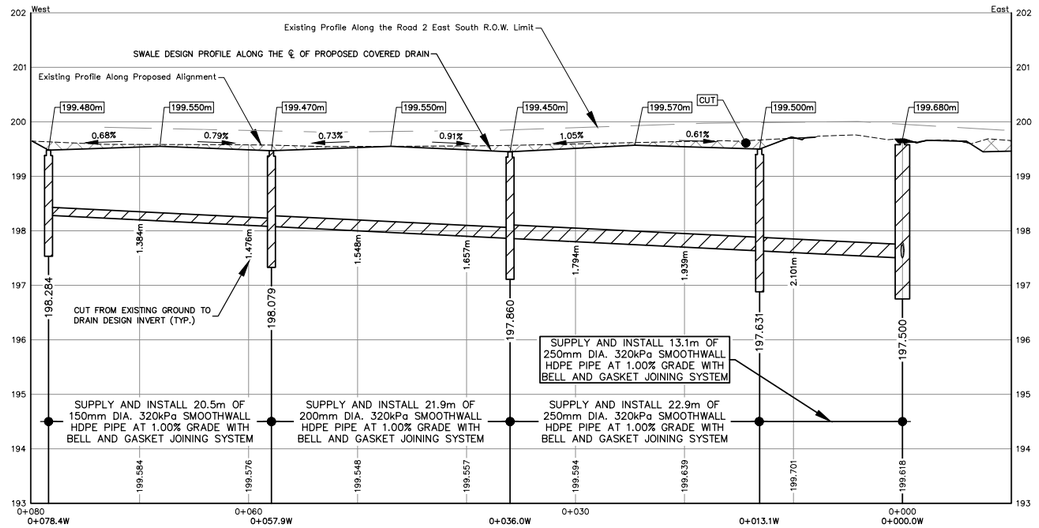
0+041.5 HIGH POINT OF PROPOSED SWALE

0+049.8 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-8 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.150m

0+049.8 PROPOSED PROPERTY LINE BETWEEN SER. 6 & 7
0+051.3 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

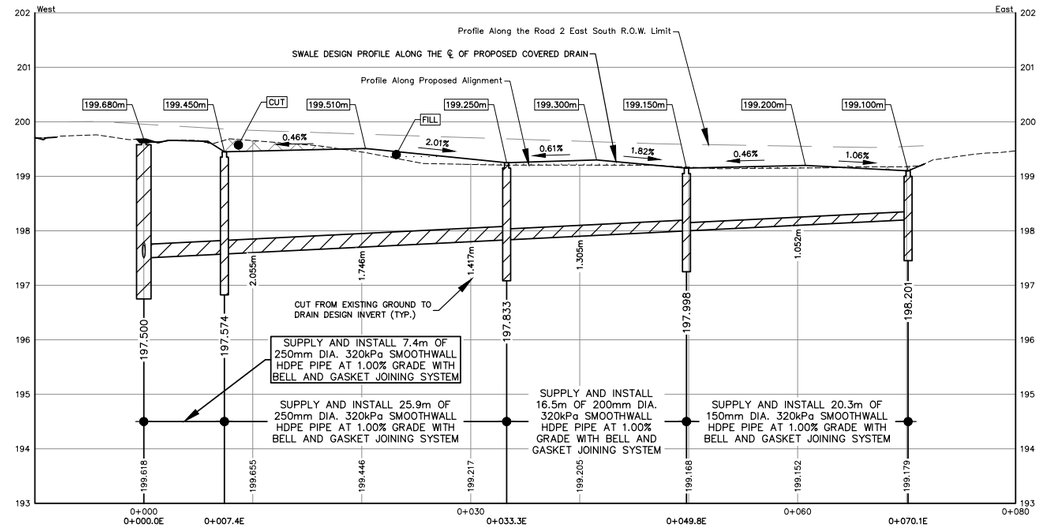
0+060.0 HIGH POINT OF PROPOSED SWALE

0+070.1 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-9 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.100m



JAMIS DRAIN PROFILE - WEST BRANCH

Scale = 1:250 Hor.
1:50 Ver.



JAMIS DRAIN PROFILE - EAST BRANCH

Scale = 1:250 Hor.
1:50 Ver.

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PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.: D22-114
SHEET No.: 2 OF 10

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Original Sheet Size ARCH D 1:1 0 20mm 40mm 60mm 80mm 100mm

0+000.5 Road 2 East South R.O.W. Limit

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-A WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP. SET TOP ELEVATION = 199.680m.

0+050.2 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-10 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP. SET TOP ELEVATION = 198.896m

0+100.4 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-11 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP. SET TOP ELEVATION = 198.466m

0+119.2 PROVIDE AND INSTALL A FD-5HC GSS BY ADS OR EQUAL. ALL TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. SET TOP ELEVATION = 198.670m

0+223.8 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-15 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 197.796m±

0+315.0 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-15 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 196.170m±

0+385.7 Property Line Between 290-38900 & 290-17400

0+388.2 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-18 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP. SET TOP ELEVATION = 195.948m

0+392.2 Existing MH - Union Avenue Drain

0+390.2 Property Line Between 290-38900 & 290-38602

0+505.8 Existing MH - Union Avenue Drain

0+538.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-20 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 196.000m±

0+620.6 Property Line Between 290-38602 & 290-38800

0+626.3 Existing MH - Union Avenue Drain

0+688.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-20 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 195.810m±

0+706.4 Property Line Between 290-38800 & 290-17300

0+816.7 Existing MH - Union Avenue Drain

0+838.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-20 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 194.960m±

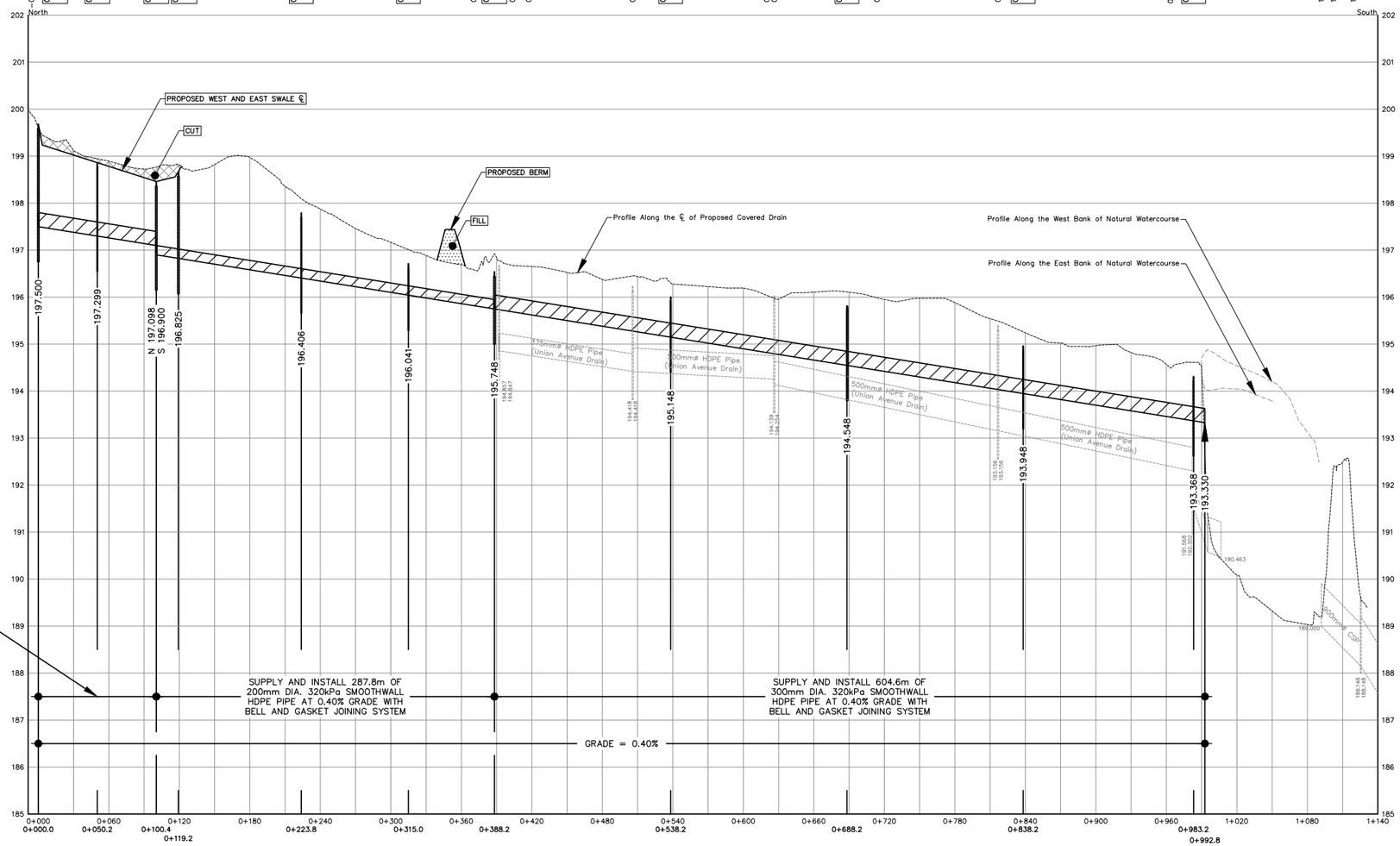
0+982.6 Existing MH - Union Avenue Drain

0+983.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE AB-20 WITH STEEL PLATE AND 600mm DEEP SUMP. SET TOP ELEVATION = 194.370m±

1+091.8 North End of Existing 900mmø CSP

1+095.3 Property Line Between 290-17300 & County Road 20 North R.O.W. Limit

1+123.3 Property Line Between County Road 20 North R.O.W. Limit & 290-15801



JAMIS DRAIN - MAIN DRAIN OVERALL PROFILE

Scale = 1:2000 Hor.
1:50 Ver.

THESE DRAWINGS HAVE BEEN REDUCED IN SIZE AND THE SCALE THEREFORE VARIES.
FULL SCALE DRAWINGS CAN BE VIEWED AT THE MUNICIPAL OFFICES IF REQUIRED.

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100138883
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	3 OF 10

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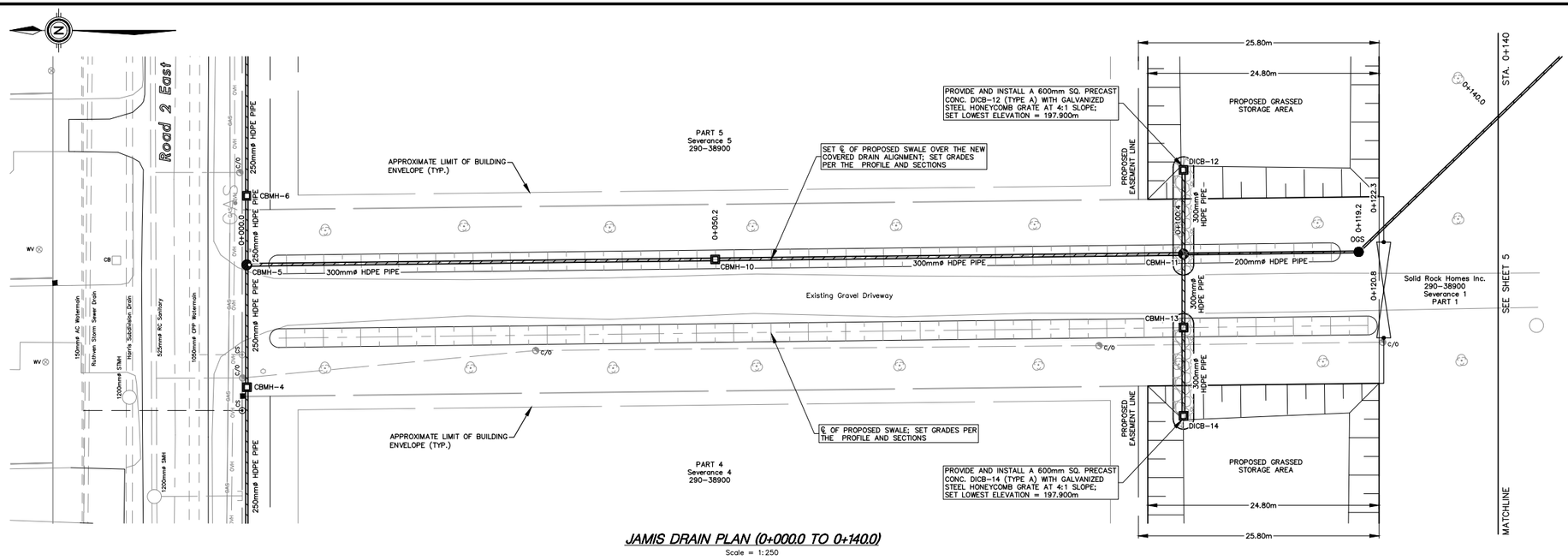


JAMIS DRAIN PLAN (0+000.0 TO 0+140.0)

Scale = 1:250

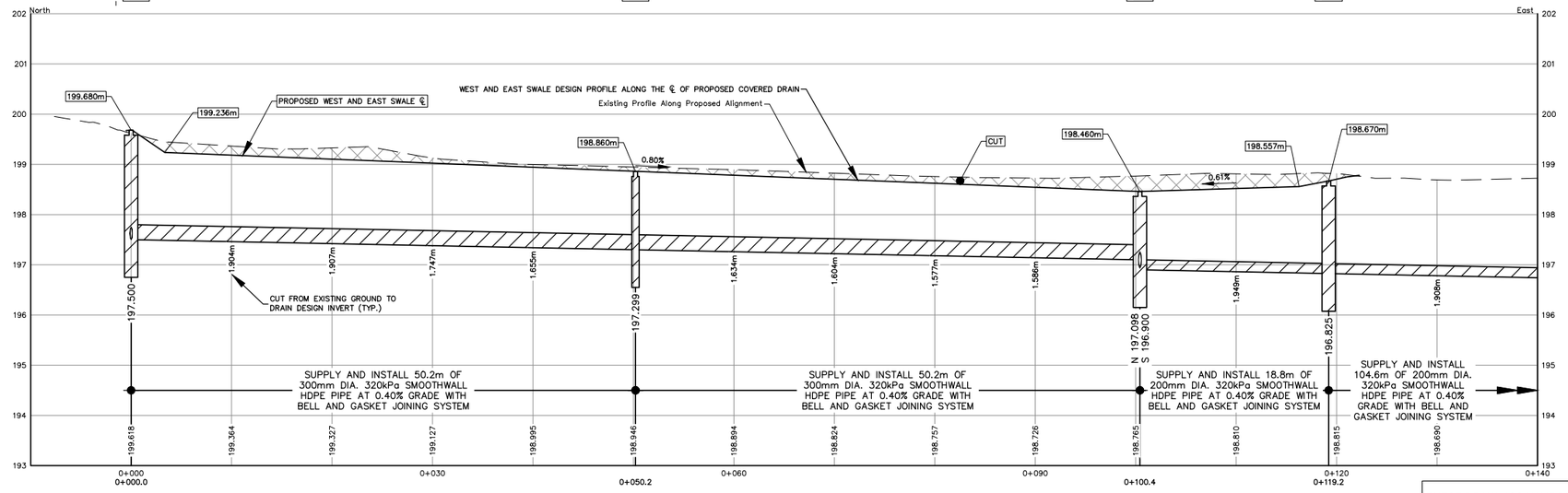
-0+000.5 Road 2 East South R.O.W. Limit

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-4 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+050.2 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-10 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.860m

0+100.4 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-11 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.460m

0+119.2 PROVIDE AND INSTALL A FD-5HC OGS BY ADS OR EQUAL. ALL TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS; SET TOP ELEVATION = 198.670m



JAMIS DRAIN PROFILE (0+000.0 TO 0+140.0)

Scale = 1:250 Hor.
1:50 Ver.

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PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	4 OF 10

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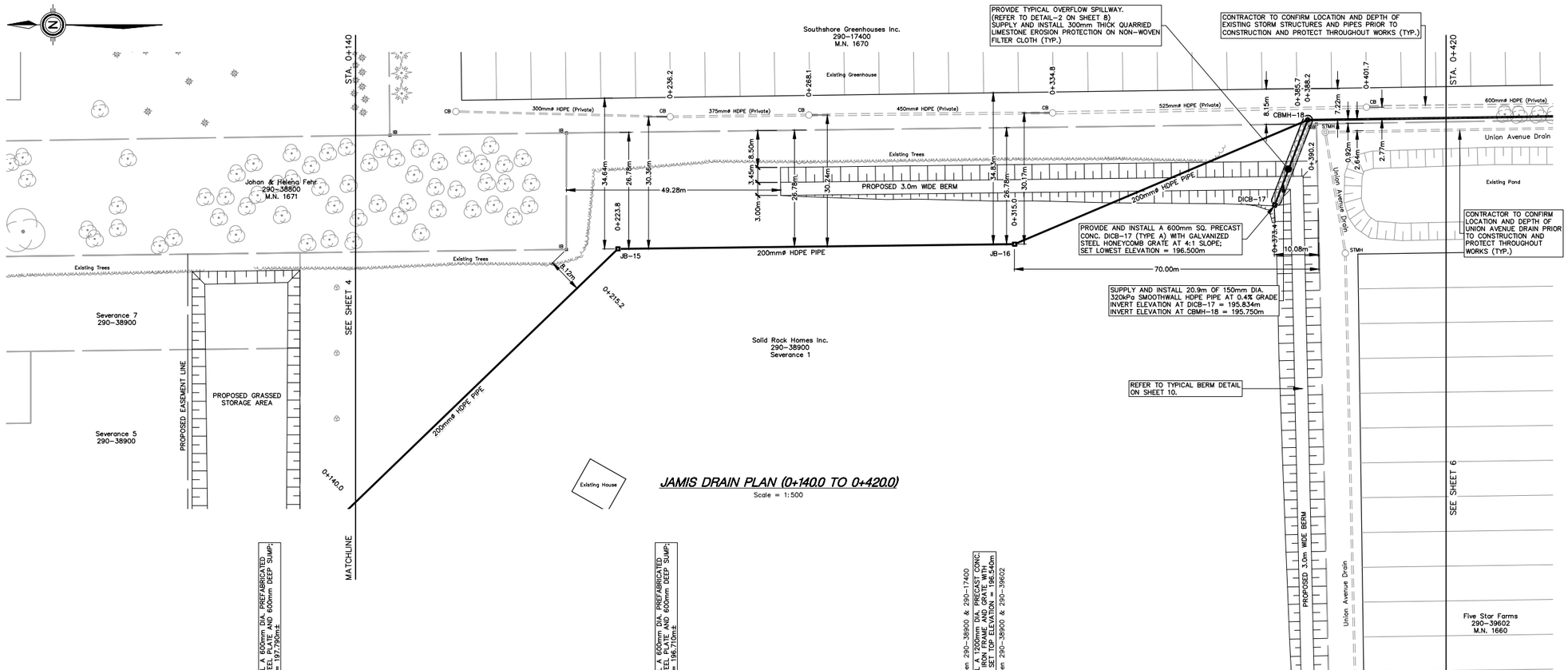
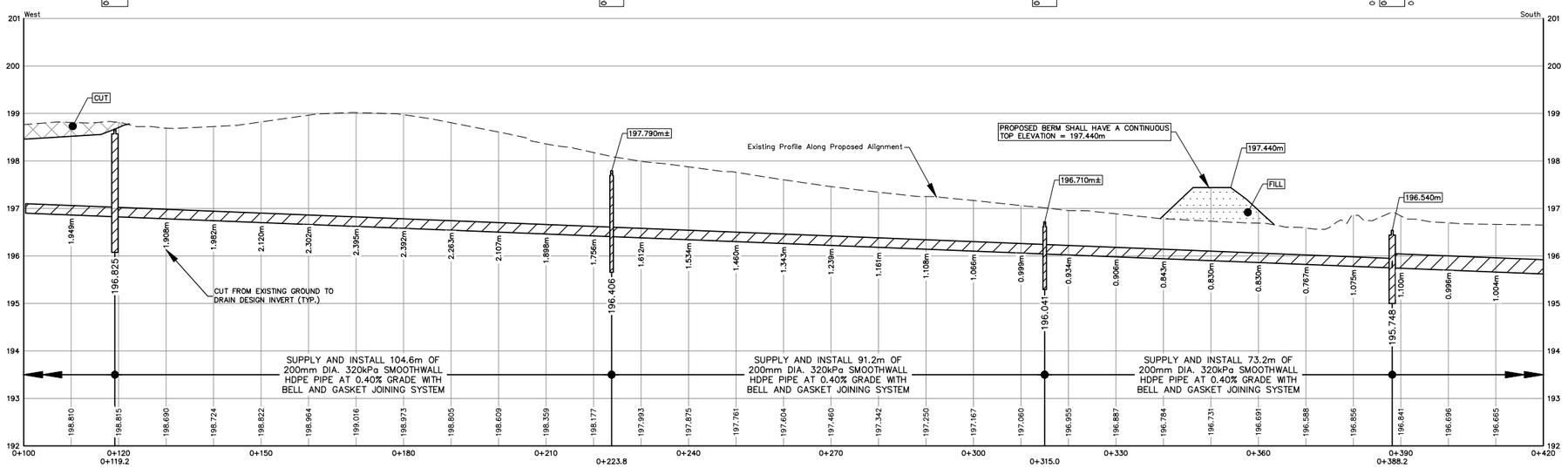


JAMIS DRAIN PLAN (0+140.0 TO 0+420.0)

Scale = 1:500



JAMIS DRAIN PROFILE (0+140.0 TO 0+420.0)

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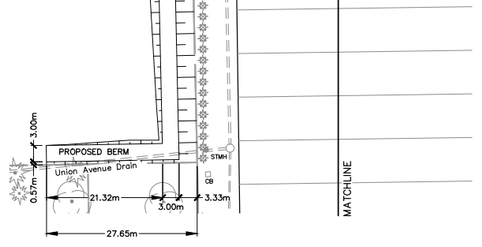
1:50 Ver.



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100138683
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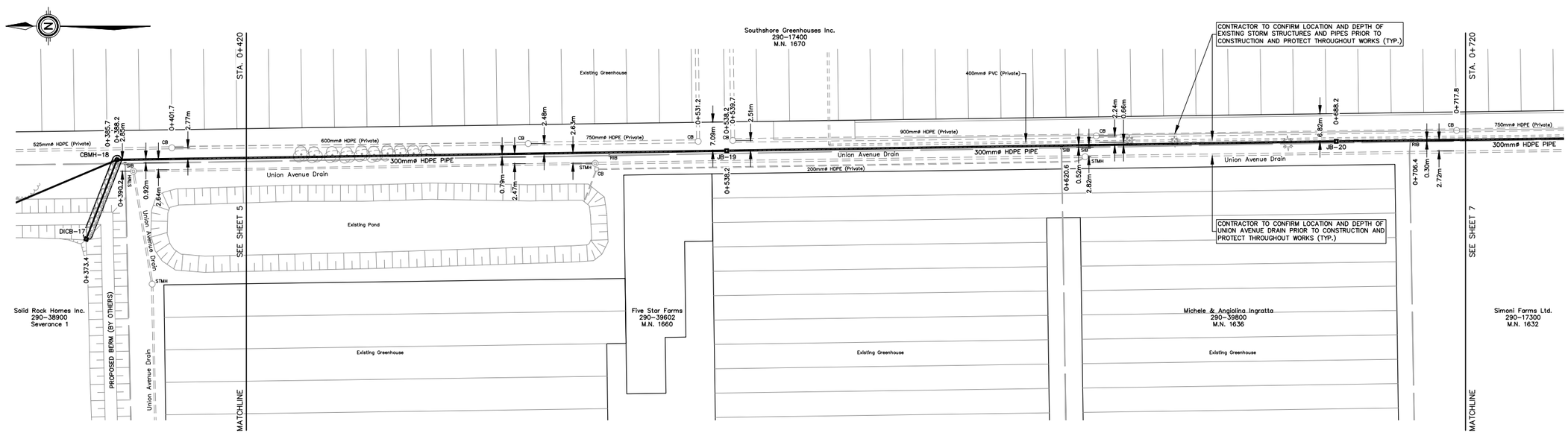
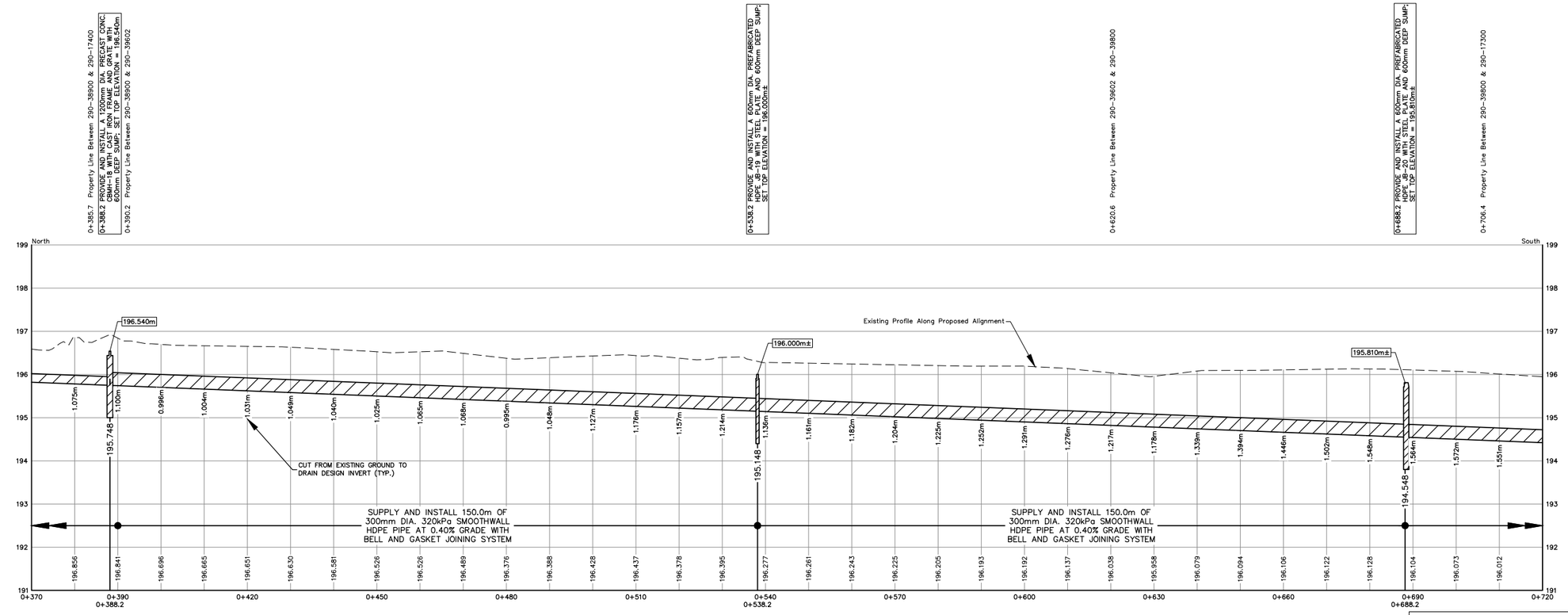
DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	5 OF 10



JAMIS DRAIN PLAN (0+420.0 TO 0+720.0)

Scale = 1:500



JAMIS DRAIN PROFILE (0+420.0 TO 0+720.0)

Scale = 1:500 Hor.
1:50 Ver.

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100138083
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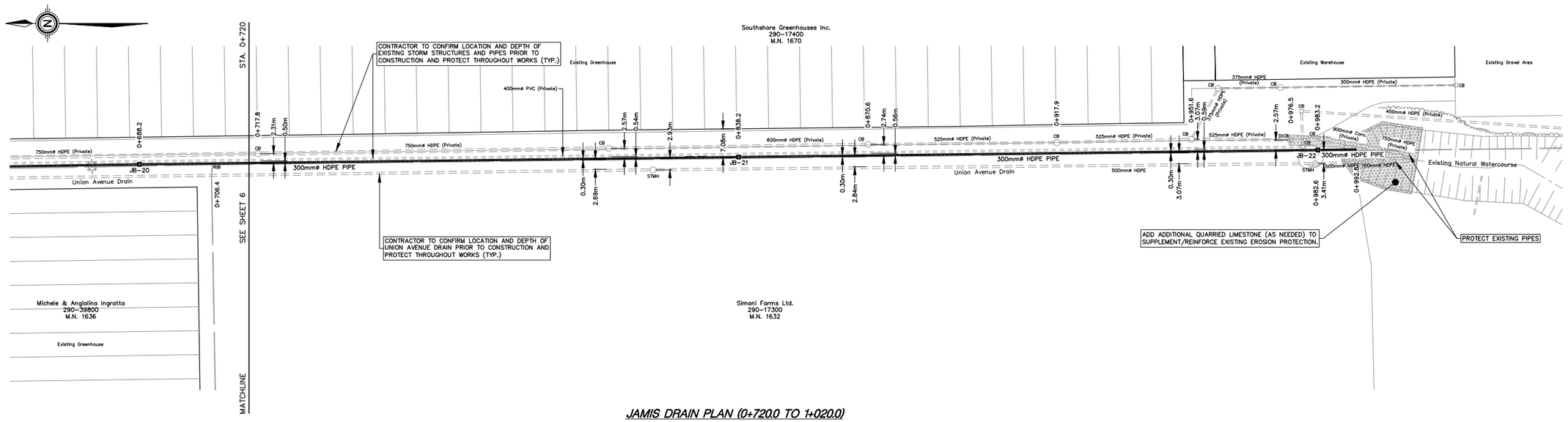
DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.: D22-114

SHEET No.: 6 OF 10



JAMIS DRAIN PLAN (0+720.0 TO 1+020.0)

Scale = 1:500

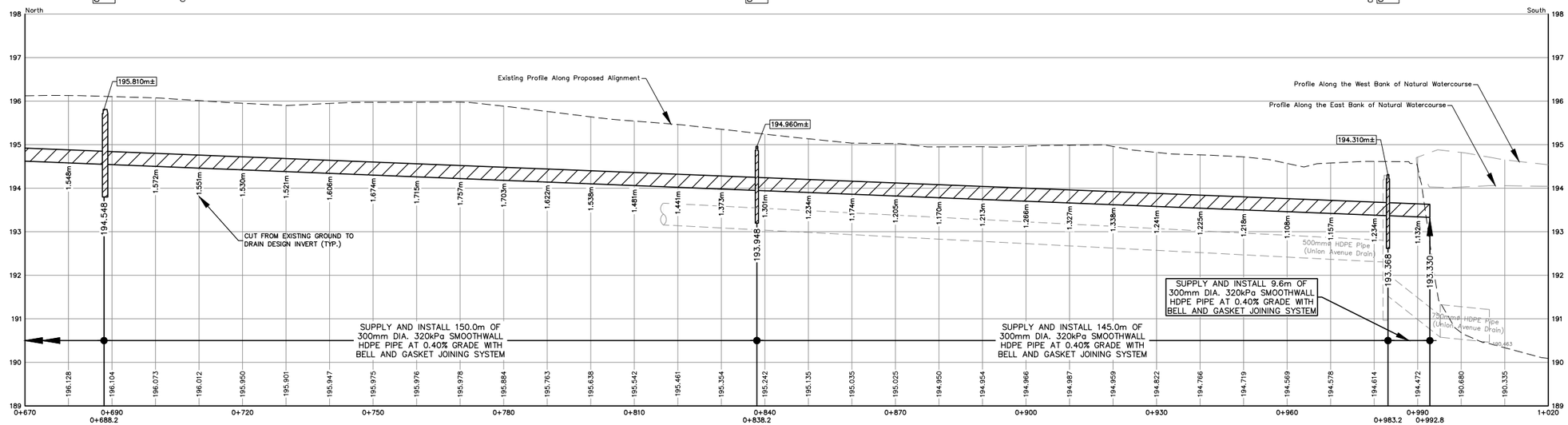
0+688.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-20 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 195.810m±

0+706.4 Property Line Between 290-39800 & 290-17300

0+838.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-21 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.960m±

0+982.6 Existing MH - Union Avenue Drain

0+983.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-22 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.310m±



JAMIS DRAIN PROFILE (0+720.0 TO 1+020.0)

Scale = 1:500 Hor.
1:50 Ver.

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peraltaengineering.com

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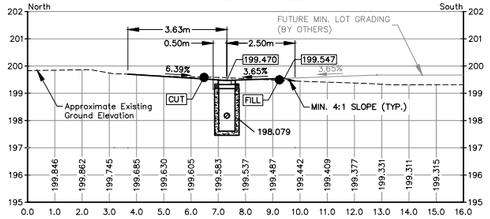
A.B. PERALTA
100138083
PROVINCE OF ONTARIO
January 15, 2024

DATE: JANUARY 15, 2024

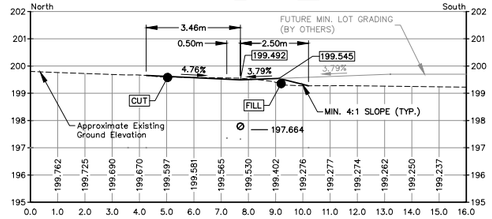
DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	7 OF 10



WEST BRANCH - STATION 0+057.9

Scale = 1:100



EAST BRANCH - STATION 0+016.4

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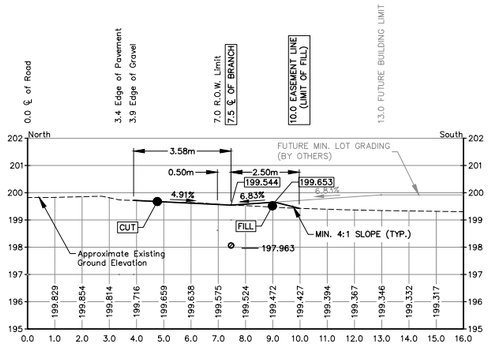

WEST BRANCH - STATION 0+046.3

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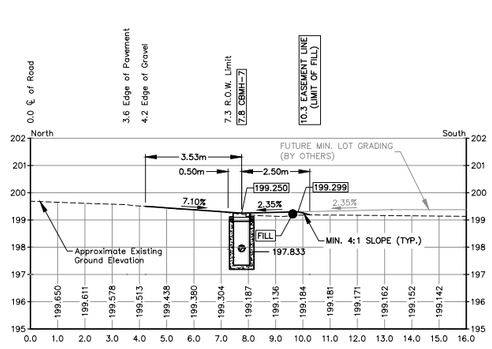

EAST BRANCH - STATION 0+033.3

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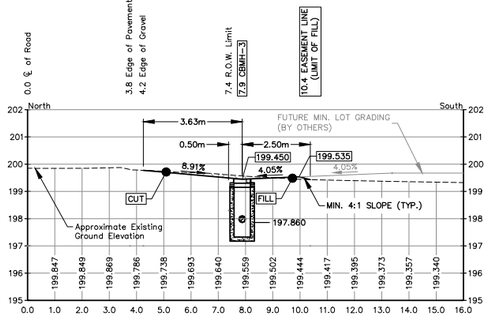

WEST BRANCH - STATION 0+036.0

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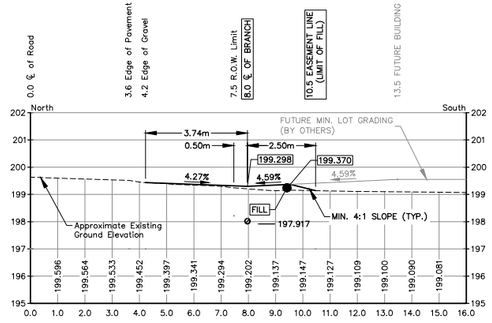

EAST BRANCH - STATION 0+041.7

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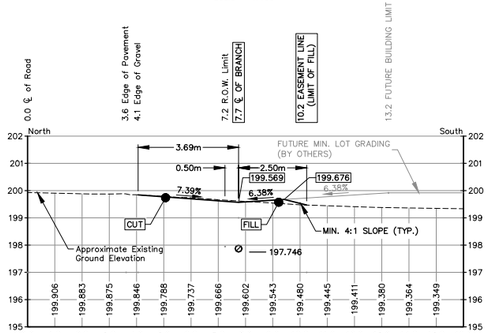

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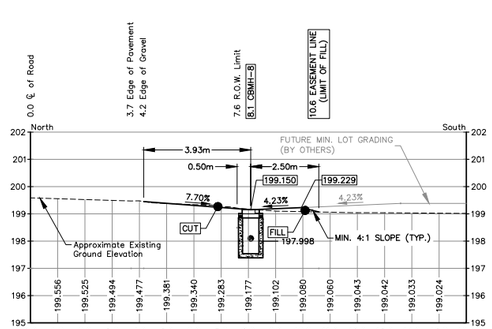
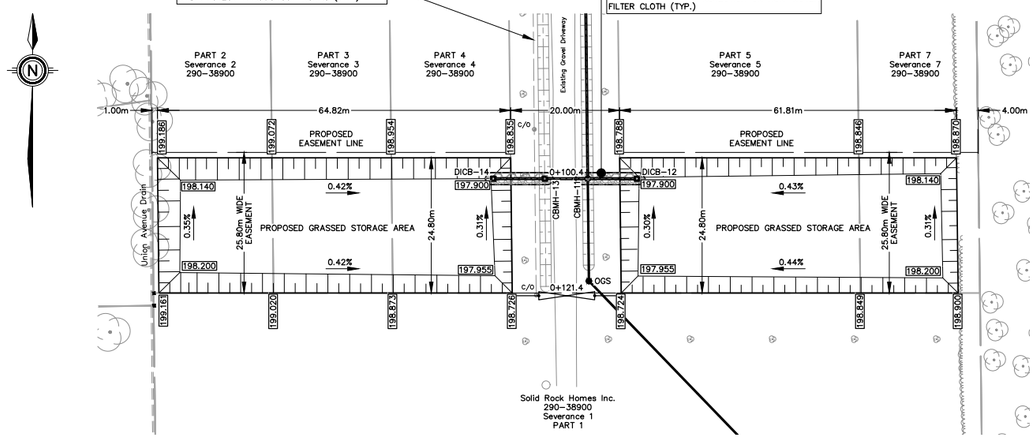


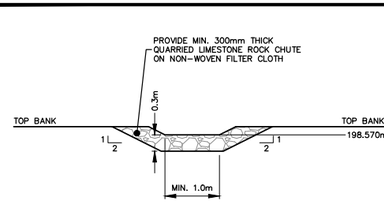
EAST BRANCH - STATION 0+049.8

Scale = 1:100



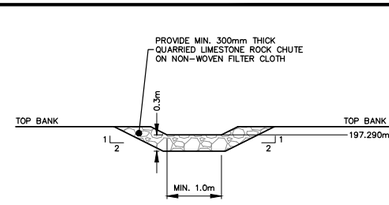
SWM GRADING PLAN - PROPOSED GRASSED STORAGE AREA

Scale = 1:500



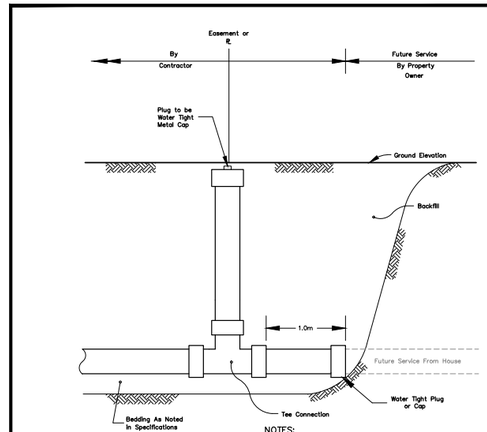
TYPICAL OVERFLOW SPILLWAY DETAIL - 1

Scale = N.T.S.



TYPICAL OVERFLOW SPILLWAY DETAIL - 2

Scale = N.T.S.



TYPICAL SERVICE CLEAN-OUT

Scale = N.T.S.

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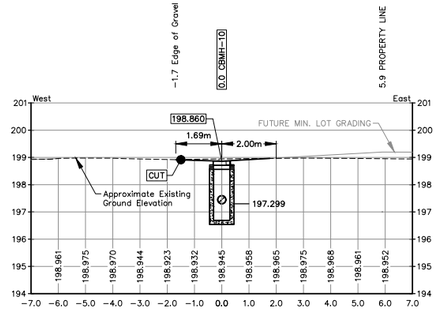
peraltaengineering.com

LICENSED PROFESSIONAL ENGINEER
A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	8 OF 10



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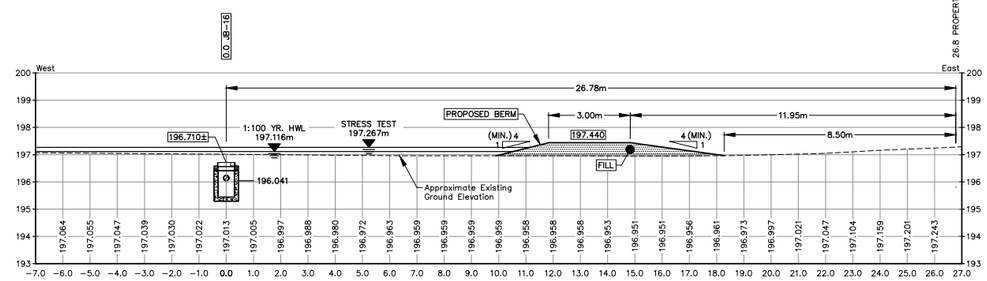

STATION 0+315.0
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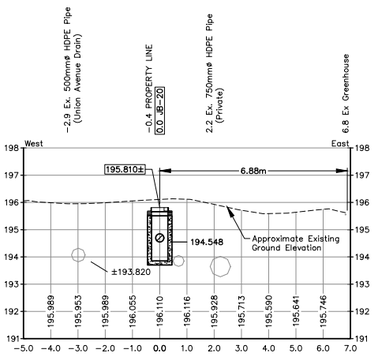

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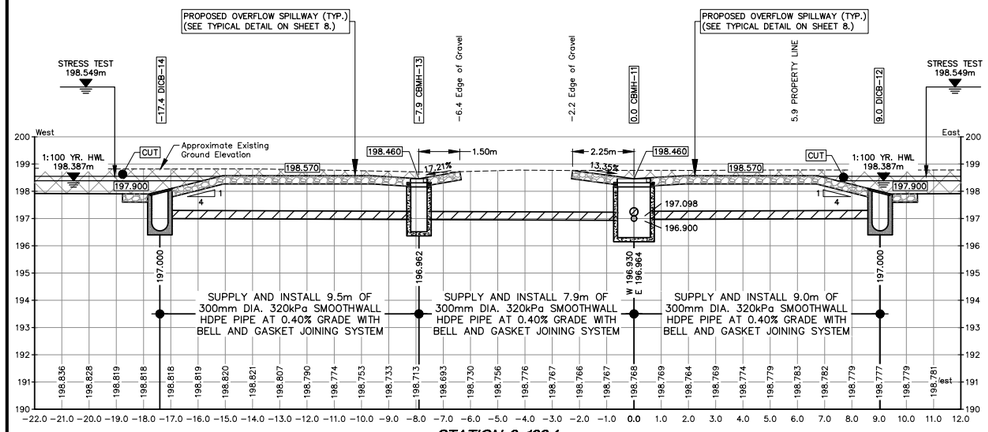

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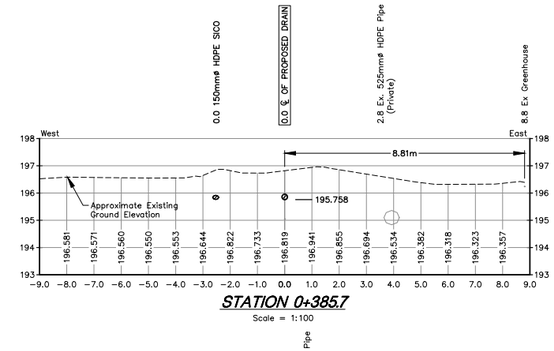

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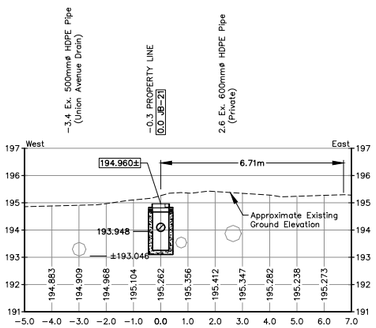

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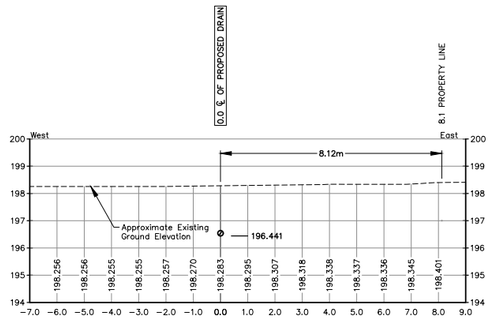

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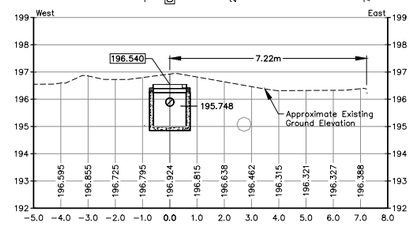

STATION 0+388.2
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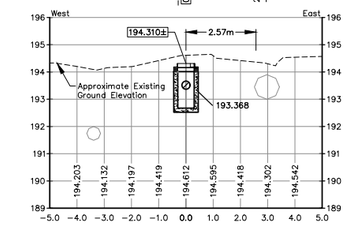

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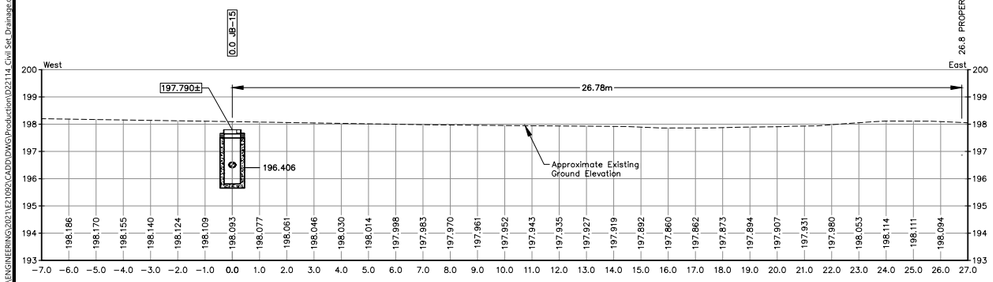

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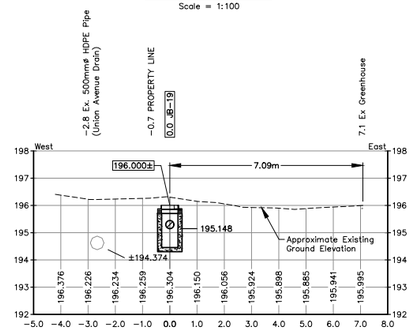

STATION 0+538.2
Scale = 1:100

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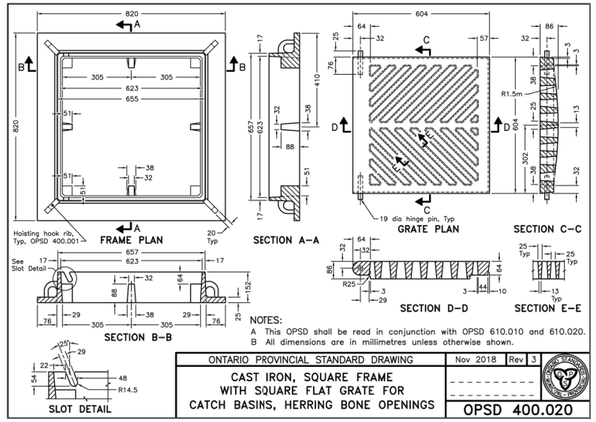
LICENSED PROFESSIONAL ENGINEER
A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

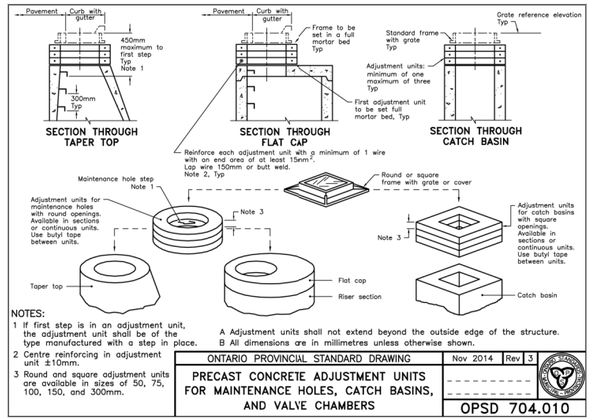
DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

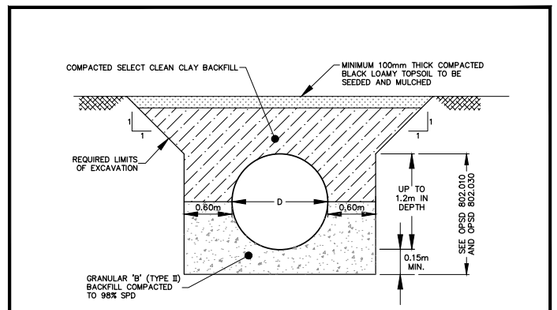
PROJECT No.:	SHEET No.:
D22-114	9 OF 10



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		
	OPSD 400.020	



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		
	OPSD 704.010	



TYPICAL BOULEVARD BACKFILL DETAIL

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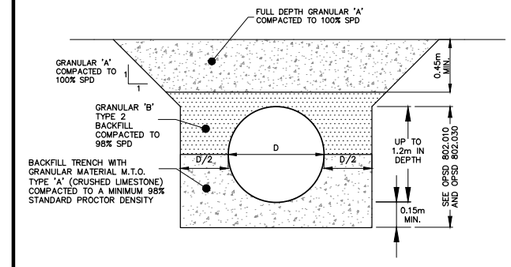
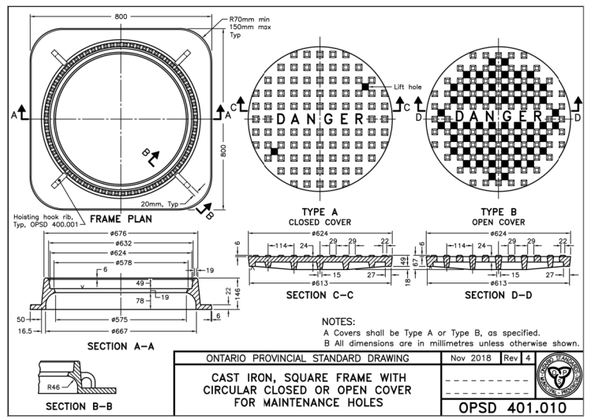
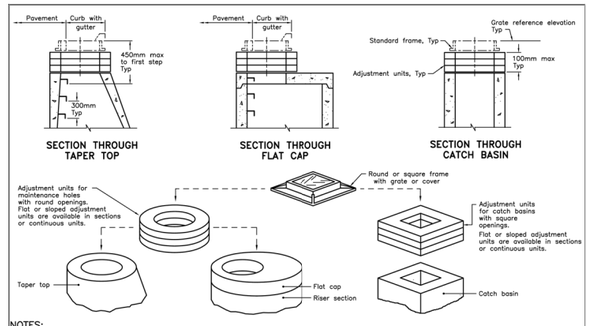


TYPICAL DRIVEWAY BACKFILL DETAIL

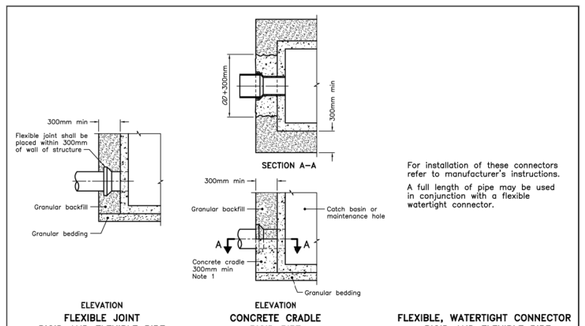
Scale = N.T.S.



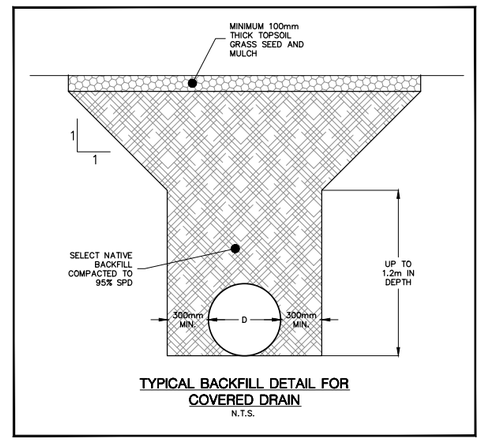
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 4
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		
	OPSD 401.010	



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2008	Rev 1
HIGH DENSITY POLYETHYLENE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		
	OPSD 704.011	

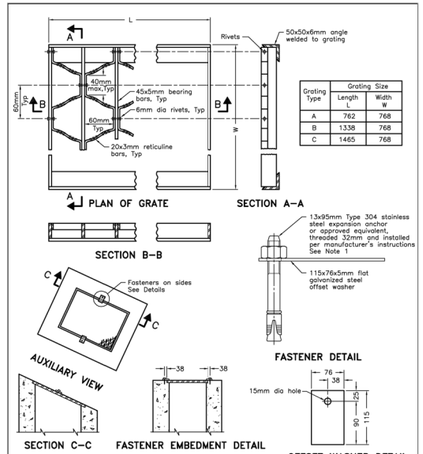


ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 4
SUPPORT FOR PIPE AT CATCH BASIN OR MAINTENANCE HOLE		
	OPSD 708.020	



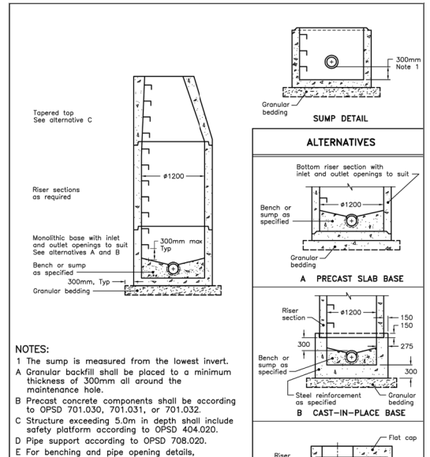
TYPICAL BACKFILL DETAIL FOR COVERED DRAIN

N.T.S.

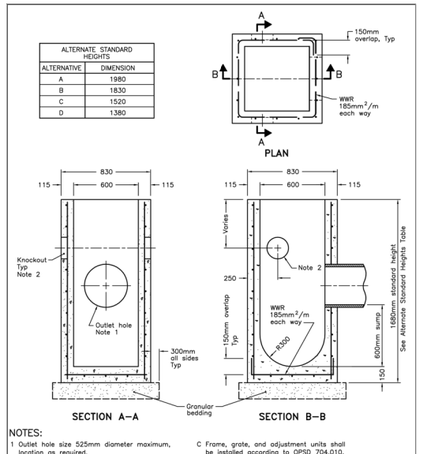


Grating Type	Grating Size Length L	Width W
A	762	768
B	1338	768
C	1465	768

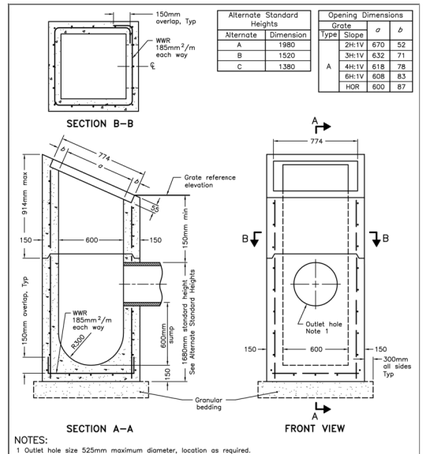
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 3
GALVANIZED STEEL HONEYCOMB GRATING FOR DITCH INLETS		
	OPSD 403.010	



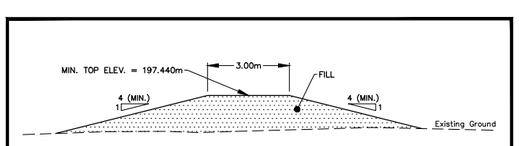
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		
	OPSD 701.010	



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		
	OPSD 705.010	



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE DITCH INLET 600 x 600mm		
	OPSD 705.030	



TYPICAL BERM DETAIL

Scale = N.T.S.

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LICENSED PROFESSIONAL ENGINEER A. B. PERALTA 100138883 2024-01-15 PROVINCE OF ONTARIO

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DATE: JANUARY 15, 2024		
DESIGNED BY: A.B.P.	DRAWN BY: J.H.	CHECKED BY: A.B.P.
PROJECT No.: D22-114	SHEET No.: 10 OF 10	

APPENDIX "F"

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Maintenance Schedule of Assessment

Main Drain – Station 0+000.0 to Station 0+992.8

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MAINTENANCE SCHEDULE OF ASSESSMENT
Main Drain - Station 0+000.0 to Station 0+992.8

3. MUNICIPAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
Road 2 East				0.38	0.154	Town of Kingsville	$ 83.00	$ 116.00	$ -	$ 199.00
Total on Municipal Lands							**$ 83.00**	**$ 116.00**	**$ -**	**$ 199.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
290-38900 (Part 1)	1 ED	10	10.56	10.56	4.274	Solid Rock Homes Inc.	$ 1,756.00	$ 1,490.00	$ -	$ 3,246.00
290-38900 (Part 2)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 110.00	$ 155.00	$ -	$ 265.00
290-38900 (Part 3)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 110.00	$ 155.00	$ -	$ 265.00
290-38900 (Part 4)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 110.00	$ 155.00	$ -	$ 265.00
290-38900 (Part 5)	1 ED	10	1.08	1.08	0.436	Solid Rock Homes Inc.	$ 179.00	$ 203.00	$ -	$ 382.00
290-38900 (Part 6)	1 ED	10	0.25	0.25	0.099	Solid Rock Homes Inc.	$ 41.00	$ 69.00	$ -	$ 110.00
290-38900 (Part 7)	1 ED	10	0.67	0.67	0.270	Solid Rock Homes Inc.	$ 111.00	$ 157.00	$ -	$ 268.00
Total on Privately Owned - Non-Agricultural Lands							**$ 2,417.00**	**$ 2,384.00**	**$ -**	**$ 4,801.00**
TOTAL ASSESSMENT				**14.91**	**6.033**		**$ 2,500.00**	**$ 2,500.00**	**$ -**	**$ 5,000.00**

1 Hectare = 2.471 Acres

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Maintenance Schedule of Assessment

West Branch Drain – Station 0+000.0 to Station 0+078.4 W

Peralta Engineering

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MAINTENANCE SCHEDULE OF ASSESSMENT
West Branch Drain - Station 0+000.0 to Station 0+078.4 W

3. MUNICIPAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
Road 2 East				0.19	0.077	Town of Kingsville	$ 1,642.00	$ 210.00	$ -	$ 1,852.00
Total on Municipal Lands							**$ 1,642.00**	**$ 210.00**	**$ -**	**$ 1,852.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
290-38900 (Part 1)	1 ED	10	10.56	0.30	0.121	Solid Rock Homes Inc.	$ 254.00	$ 203.00	$ -	$ 457.00
290-38900 (Part 2)	1 ED	10	0.66	0.33	0.133	Solid Rock Homes Inc.	$ 618.00	$ 279.00	$ -	$ 897.00
290-38900 (Part 3)	1 ED	10	0.66	0.33	0.133	Solid Rock Homes Inc.	$ 618.00	$ 279.00	$ -	$ 897.00
290-38900 (Part 4)	1 ED	10	0.66	0.33	0.133	Solid Rock Homes Inc.	$ 618.00	$ 279.00	$ -	$ 897.00
Total on Privately Owned - Non-Agricultural Lands							**$ 2,108.00**	**$ 1,040.00**	**$ -**	**$ 3,148.00**
TOTAL ASSESSMENT				**1.48**	**0.598**		**$ 3,750.00**	**$ 1,250.00**	**$ -**	**$ 5,000.00**

1 Hectare = 2.471 Acres

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Maintenance Schedule of Assessment

East Branch Drain – Station 0+000.0 to Station 0+070.1 E

Peralta Engineering

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MAINTENANCE SCHEDULE OF ASSESSMENT
East Branch Drain - Station 0+000.0 to Station 0+070.1 E

3. MUNICIPAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
Road 2 East				0.19	0.077	Town of Kingsville	$ 1,492.00	$ 200.00	$ -	$ 1,692.00
Total on Municipal Lands							**$ 1,492.00**	**$ 200.00**	**$ -**	**$ 1,692.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
290-38900 (Part 1)	1 ED	10	10.56	0.30	0.121	Solid Rock Homes Inc.	$ 230.00	$ 194.00	$ -	$ 424.00
290-38900 (Part 5)	1 ED	10	1.08	0.54	0.218	Solid Rock Homes Inc.	$ 1,144.00	$ 348.00	$ -	$ 1,492.00
290-38900 (Part 6)	1 ED	10	0.25	0.25	0.099	Solid Rock Homes Inc.	$ 313.00	$ 238.00	$ -	$ 551.00
290-38900 (Part 7)	1 ED	10	0.67	0.33	0.135	Solid Rock Homes Inc.	$ 571.00	$ 270.00	$ -	$ 841.00
Total on Privately Owned - Non-Agricultural Lands							**$ 2,258.00**	**$ 1,050.00**	**$ -**	**$ 3,308.00**
TOTAL ASSESSMENT				**1.61**	**0.650**		**$ 3,750.00**	**$ 1,250.00**	**$ -**	**$ 5,000.00**

1 Hectare = 2.471 Acres

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Maintenance Schedule of Assessment

Stormwater Management Pond & Oil and Grit Separator

Peralta Engineering

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MAINTENANCE SCHEDULE OF ASSESSMENT
Stormwater Management (SWM) Pond & Oil and Grit Separator (OGS)

3. MUNICIPAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
Road 2 East				0.38	0.154	Town of Kingsville	$ 242.00	$ 250.00	$ -	$ 492.00
Total on Municipal Lands							**$ 242.00**	**$ 250.00**	**$ -**	**$ 492.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
290-38900 (Part 1)	1 ED	10	10.56	0.80	0.324	Solid Rock Homes Inc.	$ 379.00	$ 324.00	$ -	$ 703.00
290-38900 (Part 2)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 312.00	$ 334.00	$ -	$ 646.00
290-38900 (Part 3)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 312.00	$ 334.00	$ -	$ 646.00
290-38900 (Part 4)	1 ED	10	0.66	0.66	0.267	Solid Rock Homes Inc.	$ 312.00	$ 334.00	$ -	$ 646.00
290-38900 (Part 5)	1 ED	10	1.08	1.08	0.436	Solid Rock Homes Inc.	$ 511.00	$ 437.00	$ -	$ 948.00
290-38900 (Part 6)	1 ED	10	0.25	0.25	0.099	Solid Rock Homes Inc.	$ 116.00	$ 149.00	$ -	$ 265.00
290-38900 (Part 7)	1 ED	10	0.67	0.67	0.270	Solid Rock Homes Inc.	$ 316.00	$ 338.00	$ -	$ 654.00
Total on Privately Owned - Non-Agricultural Lands							**$ 2,258.00**	**$ 2,250.00**	**$ -**	**$ 4,508.00**
TOTAL ASSESSMENT				**5.15**	**2.083**		**$ 2,500.00**	**$ 2,500.00**	**$ -**	**$ 5,000.00**

1 Hectare = 2.471 Acres

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PLAN, PROFILE, SECTIONS & DETAILS

OF THE

JAMIS DRAIN AND BRANCHES

(Part of Lot 10, Concession 1 E.D.)

IN THE

TOWN OF KINGSVILLE
(Geographic Township of Gosfield South)

IN THE

COUNTY OF ESSEX • ONTARIO

TOWN OF KINGSVILLE

MAYOR: DENNIS ROGERS
CLERK: PAULA PARKER
DRAINAGE SUPERINTENDENT: LU-ANN MARENTETTE

BENCHMARK:

1) TOP NUT OF EXISTING FIRE HYDRANT (NO. K398) LOCATED ON THE SOUTH SIDE OF ROAD 2 EAST, APPROXIMATELY 153.9m EAST OF THE INTERSECTION OF COUNTY ROAD 45 AND ROAD 2 EAST.
ELEV. = 200.342m

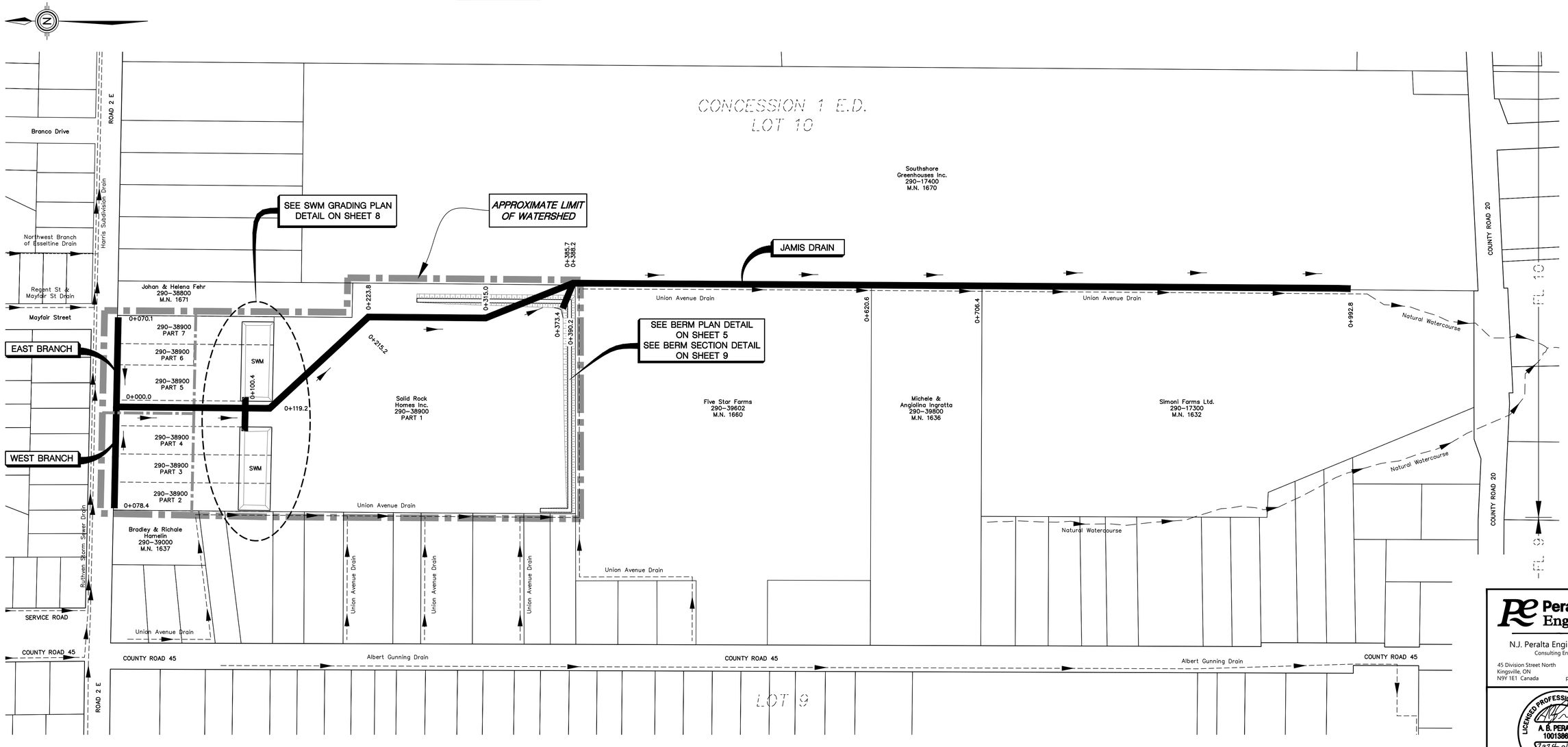
2) TOP GRATE OF EXISTING ROUND CATCH BASIN LOCATED IN THE NORTHWEST CORNER OF M.N. 1660.
ELEV. = 196.343m

3) TOP OF NAIL SET IN WEST FACE OF EXISTING HYDRO POLE LOCATED ON THE NORTH SIDE OF COUNTY ROAD 20, IN THE SOUTHWEST CORNER OF M.N. 1670.
ELEV. = 194.553m

SHEET INDEX	
SHT. No.	DESCRIPTION
1	COVER AND WATERSHED PLAN
	PLAN AND PROFILE
2	PLAN AND PROFILE – WEST AND EAST BRANCH
3	OVERALL PROFILE – MAIN DRAIN
4	PLAN AND PROFILE – (STA. 0+000.0 TO STA. 0+140.0)
5	PLAN AND PROFILE – (STA. 0+140.0 TO STA. 0+420.0)
6	PLAN AND PROFILE – (STA. 0+420.0 TO STA. 0+720.0)
7	PLAN AND PROFILE – (STA. 0+720.0 TO STA. 1+020.0)
	CROSS SECTIONS AND DETAILS
8	CROSS SECTIONS – BRANCHES AND SWM GRADING DETAILS
9	CROSS SECTIONS – MAIN DRAIN
10	STANDARD DETAILS
PROJECT NO. D22-114	

GENERAL NOTES:

1. THE ACCURACY OF THE UTILITIES SHOWN ON THESE DRAWINGS ARE NOT GUARANTEED BY THE OWNER OR N. J. PERALTA ENGINEERING LTD.; OTHER UTILITIES MAY BE PRESENT OR THE UTILITIES SHOWN MAY DIFFER IN SIZE OR LOCATION SHOWN. THE CONTRACTOR SHALL LOCATE, AND VERIFY DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION AND ADVISE ENGINEER OF ANY UTILITY CONFLICTS THAT MAY BE ENCOUNTERED.
2. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE. PROPERTY LINES ARE BASED ON THE PLAN OF SURVEY REFERENCE NO. 21-48-298-00 (DATED FEBRUARY 23, 2022) AND TOWN OF KINGSVILLE GIS INFORMATION.
3. ALL CBMH'S ARE TO BE 600mm SQUARE PRECAST CONCRETE WITH MINIMUM 450mm DEEP SUMP AND CAST IRON FRAME AND GRATE (OPSD – 400.020) UNLESS OTHERWISE NOTED.
4. ALL JUNCTION BOXES (JB–X) SHALL BE FITTED WITH A SOILTIGHT STEEL PLATE WITH NON–WOVEN FILTER CLOTH UNDERLAY AND SECURED AGAINST SLIDING, TRACEABLE WITH A METAL DETECTOR, AND 600mm DEEP SUMP. THE TOP OF THE JUNCTION BOX SHALL BE SET A MINIMUM OF 300mm BELOW EXISTING GROUND ELEVATION.
5. ALL COVERED DRAINS TO HAVE MINIMUM 300mm OF COVER.
6. TOPSOIL SHALL BE PLACED ON ALL NEWLY EXCAVATED SWALES AND ANY DISTURBED BOULEVARDS AREAS THAT WILL BE SEEDED AND MULCHED.
7. CONTRACTOR IS RESPONSIBLE TO PROTECT ALL PRIVATE FEATURES (SUCH AS FENCES, SPRINKLERS, FLOWER BEDS, ETC.). IN THE EVENT THAT A PRIVATE FEATURE IS IN THE ALIGNMENT OF THE NEW COVERED DRAINAGE SYSTEM, THE CONTRACTOR SHALL CAREFULLY REMOVE AND RE–INSTALL THE PRIVATE FEATURE TO ITS ORIGINAL STATE, UNLESS OTHERWISE NOTED.
8. ALL CBMH'S SHALL HAVE A MINIMUM OF 3 ADJUSTMENT UNITS AS PER OPSD 704.011.
9. ALL HDPE DRAIN PIPE TO BE 320 kPa OR APPROVED EQUAL.
10. ENSURE THAT THERE IS A MINIMUM 0.50m VERTICAL SEPARATION WITH THE PIPE LENGTHS CENTERED OVER ANY WATERMAIN.
11. STORM SERVICE CONNECTIONS SHALL BE LOCATED AS SHOWN ON THE PLANS AND TO STANDARD DETAILS. IT IS RECOMMENDED THAT ALL SERVICE CONNECTIONS TO THE HOME BE FITTED WITH CHECK VALVES (BY OTHERS).
12. UPON THE COMPLETION OF THE WORKS OUTLINED WITHIN THIS PROJECT AND PRIOR TO THE INSTALLATION OF ANY NEW DRIVEWAY ACCESSES, A MINIMUM OF 450mm OF BACKFILL MATERIAL SHALL BE STRIPPED AWAY AND REPLACED WITH GRANULAR 'A' BACKFILL COMPACTED TO A MINIMUM STANDARD PROCTOR DENSITY OF 98%.
13. PROPOSED SWALES SHALL BE CENTRED OVER THE NEW DRAIN ALIGNMENTS, OR AS OTHERWISE NOTED ON THE PLANS.



DENOTES OVERALL WATERSHED LIMIT

DENOTES SUB–WATERSHED LIMITS OF BRANCH DRAINS

WATERSHED PLAN
Scale = 1:1,500

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LICENSED PROFESSIONAL ENGINEER
A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	1 OF 10

Original Sheet Size: ARCH D 100mm 80mm 60mm 40mm 20mm 0 1:1

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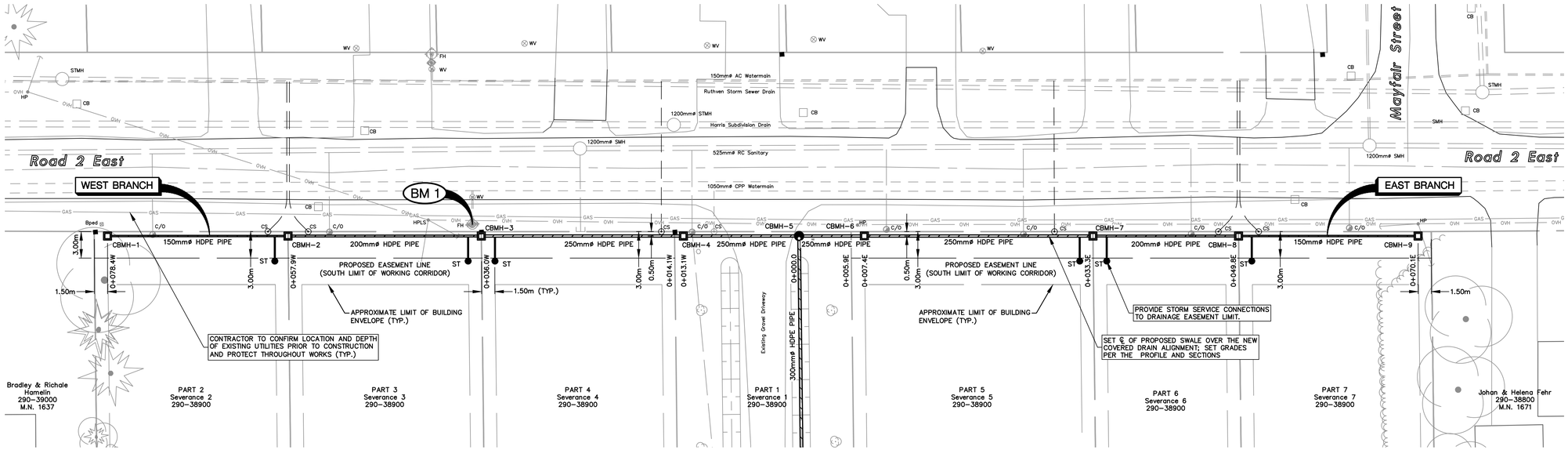


JAMIS DRAIN PLAN - WEST AND EAST BRANCH

Scale = 1:250

0+078.4 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-1 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.480m

0+068.1 HIGH POINT OF PROPOSED SWALE

0+059.4 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+057.9 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-2 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.470m

0+057.9 PROPOSED PROPERTY LINE BETWEEN SER. 2 & 3

0+047.0 HIGH POINT OF PROPOSED SWALE

0+037.5 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+036.0 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-3 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.450m

0+036.0 PROPOSED PROPERTY LINE BETWEEN SER. 3 & 4

0+034.5 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+024.6 HIGH POINT OF PROPOSED SWALE

0+014.1 PROPOSED EAST LIMIT OF SER. 4

0+013.1 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-4 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.500m

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+005.9 PROPOSED WEST LIMIT OF SER. 5

0+007.4 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-6 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.450m

0+020.3 HIGH POINT OF PROPOSED SWALE

0+031.8 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+033.3 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-7 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.250m

0+033.3 PROPOSED PROPERTY LINE BETWEEN SER. 5 & 6

0+034.8 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

0+041.5 HIGH POINT OF PROPOSED SWALE

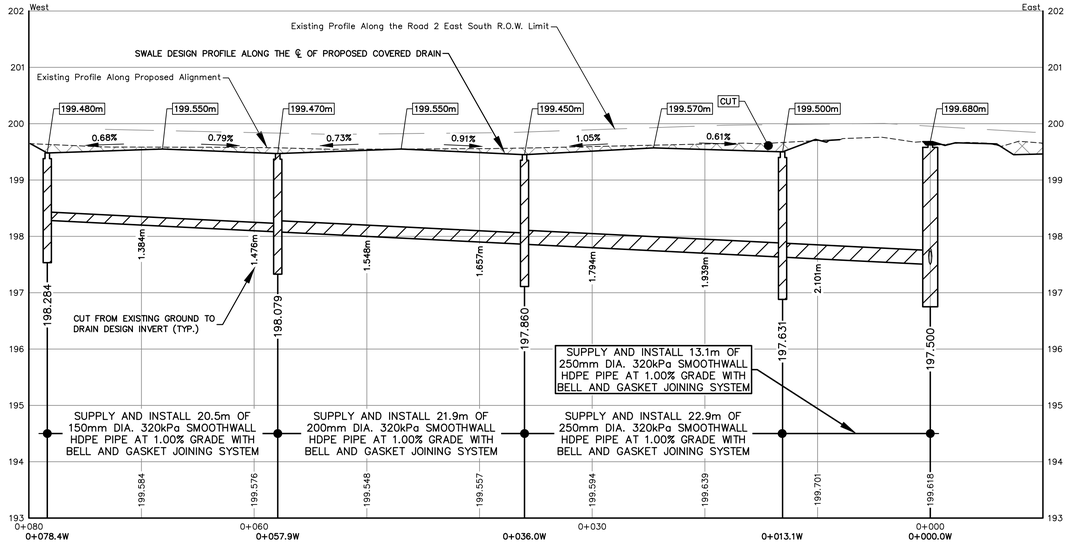
0+049.8 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-8 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.150m

0+049.8 PROPOSED PROPERTY LINE BETWEEN SER. 6 & 7

0+051.3 PROVIDE AND INSTALL 150mmø STORM SERVICE CONNECTION

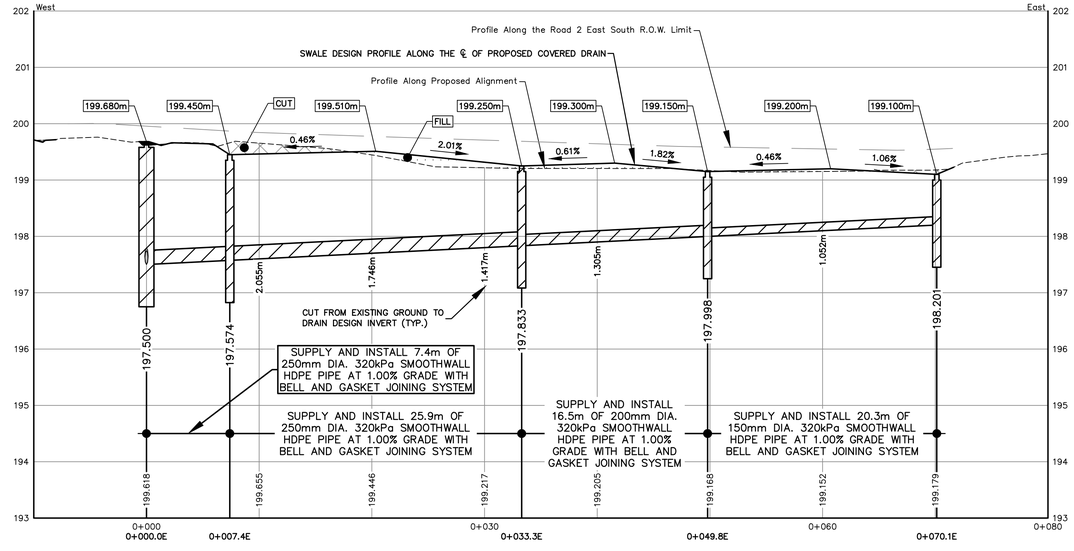
0+060.0 HIGH POINT OF PROPOSED SWALE

0+070.1 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-9 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.100m



JAMIS DRAIN PROFILE - WEST BRANCH

Scale = 1:250 Hor.
1:50 Ver.



JAMIS DRAIN PROFILE - EAST BRANCH

Scale = 1:250 Hor.
1:50 Ver.

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PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	2 OF 10

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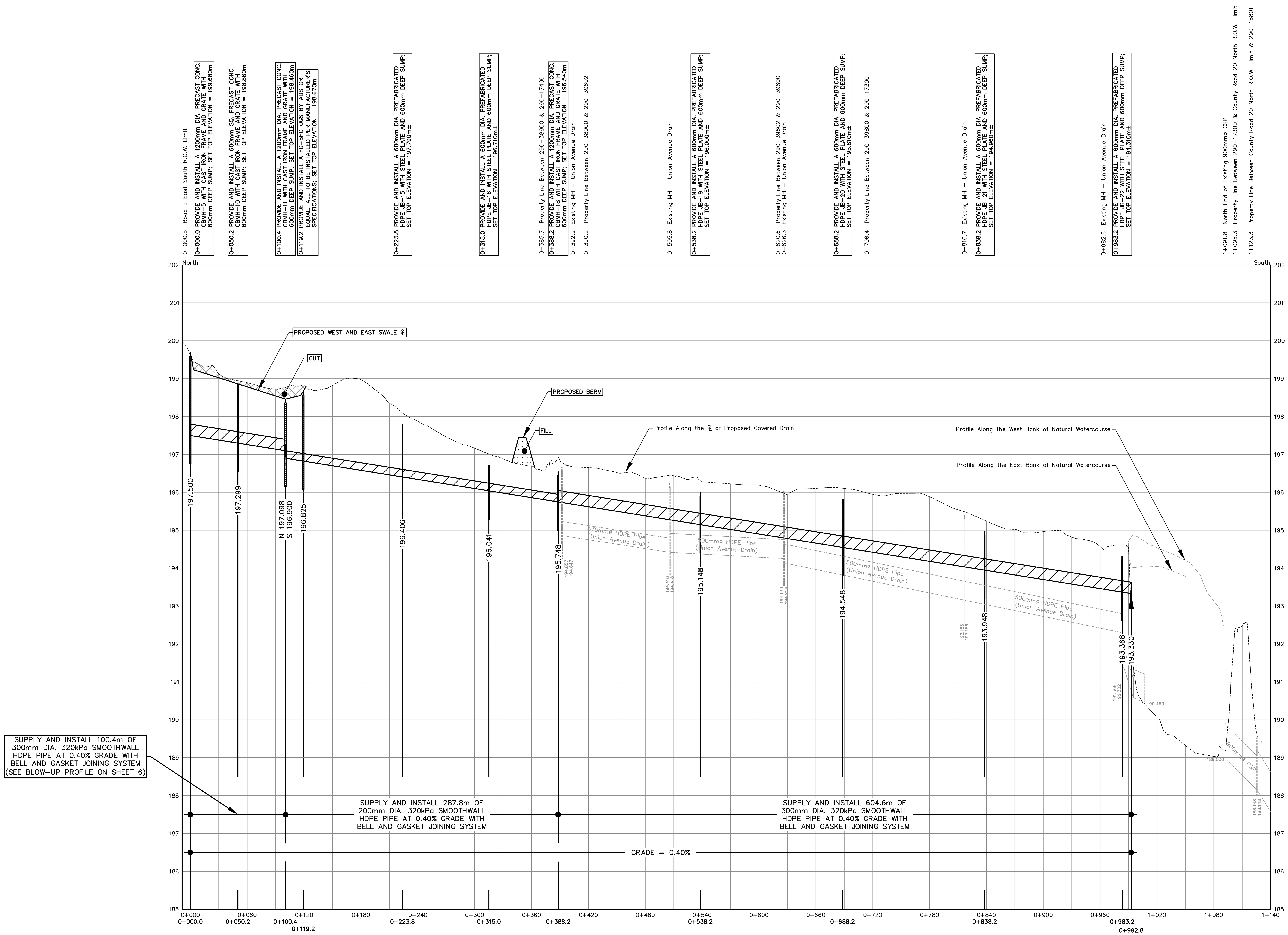

0+000.5 Road 2 East South R.O.W. Limit
0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m
0+050.2 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-10 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.860m
0+100.4 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-11 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.460m
0+119.2 PROVIDE AND INSTALL A FD-5HC OGS BY ADS OR EQUAL. ALL TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS; SET TOP ELEVATION = 198.670m
0+223.8 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-15 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 197.790m±
0+315.0 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-16 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 196.710m±
0+385.7 Property Line Between 290-38900 & 290-17400
0+388.2 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-18 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 196.540m
0+392.2 Existing MH - Union Avenue Drain
0+390.2 Property Line Between 290-38900 & 290-39602
0+505.8 Existing MH - Union Avenue Drain
0+538.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-19 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 196.000m±
0+620.6 Property Line Between 290-39602 & 290-39800
0+626.3 Existing MH - Union Avenue Drain
0+688.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-20 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 195.810m±
0+706.4 Property Line Between 290-39800 & 290-17300
0+816.7 Existing MH - Union Avenue Drain
0+838.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-21 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.960m±
0+982.6 Existing MH - Union Avenue Drain
0+983.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-22 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.310m±
1+091.8 North End of Existing 900mmø CSP
1+095.3 Property Line Between 290-17300 & County Road 20 North R.O.W. Limit
1+123.3 Property Line Between County Road 20 North R.O.W. Limit & 290-15801
North
South
PROPOSED WEST AND EAST SWALE ℄
CUT
PROPOSED BERM
FILL
Profile Along the ℄ of Proposed Covered Drain
Profile Along the West Bank of Natural Watercourse
Profile Along the East Bank of Natural Watercourse
375mmø HDPE Pipe (Union Avenue Drain)
500mmø HDPE Pipe (Union Avenue Drain)
500mmø HDPE Pipe (Union Avenue Drain)
500mmø HDPE Pipe (Union Avenue Drain)
900mmø CSP
197.500
197.299
N 197.098
S 196.900
196.825
196.406
196.041
195.748
195.148
194.548
193.948
193.368
193.330
SUPPLY AND INSTALL 100.4m OF 300mm DIA. 320kPa SMOOTHWALL HDPE PIPE AT 0.40% GRADE WITH BELL AND GASKET JOINING SYSTEM (SEE BLOW-UP PROFILE ON SHEET 6)
SUPPLY AND INSTALL 287.8m OF 200mm DIA. 320kPa SMOOTHWALL HDPE PIPE AT 0.40% GRADE WITH BELL AND GASKET JOINING SYSTEM
SUPPLY AND INSTALL 604.6m OF 300mm DIA. 320kPa SMOOTHWALL HDPE PIPE AT 0.40% GRADE WITH BELL AND GASKET JOINING SYSTEM
GRADE = 0.40%
0+000.0
0+050.2
0+100.4
0+119.2
0+223.8
0+315.0
0+388.2
0+538.2
0+688.2
0+838.2
0+983.2
0+992.8

JAMIS DRAIN - MAIN DRAIN OVERALL PROFILE

Scale = 1:2000 Hor.
1:50 Ver.

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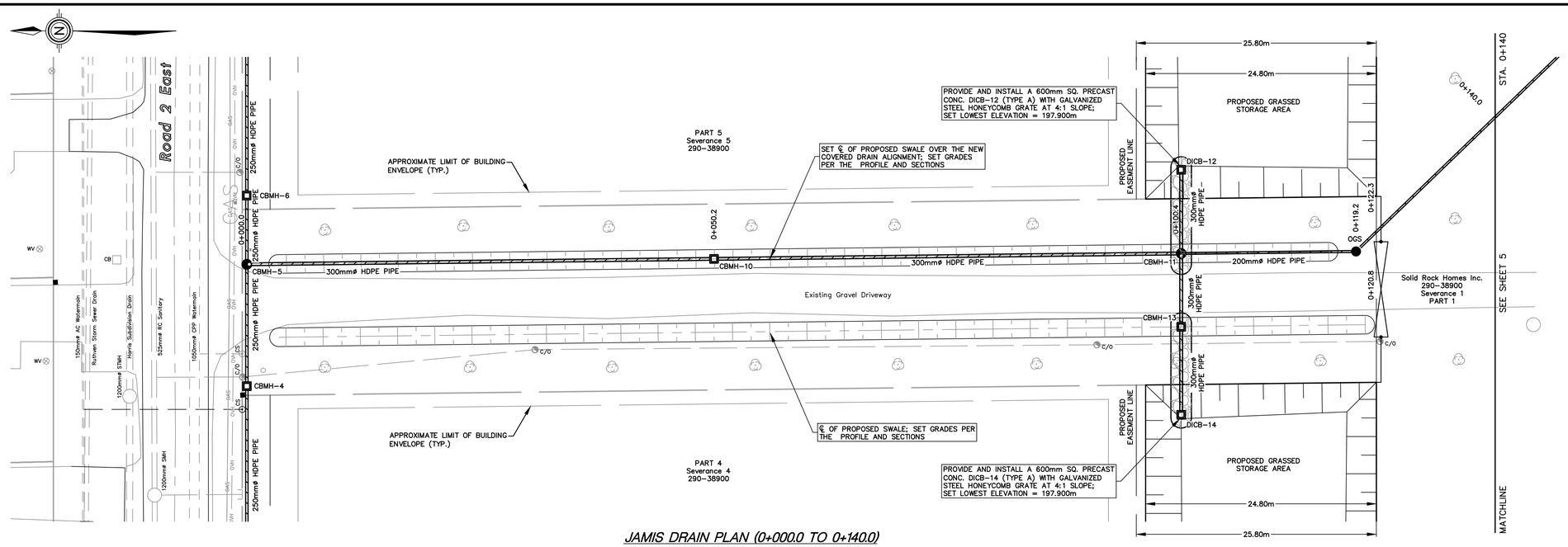
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	3 OF 10



JAMIS DRAIN PLAN (0+000.0 TO 0+140.0)

Scale = 1:250

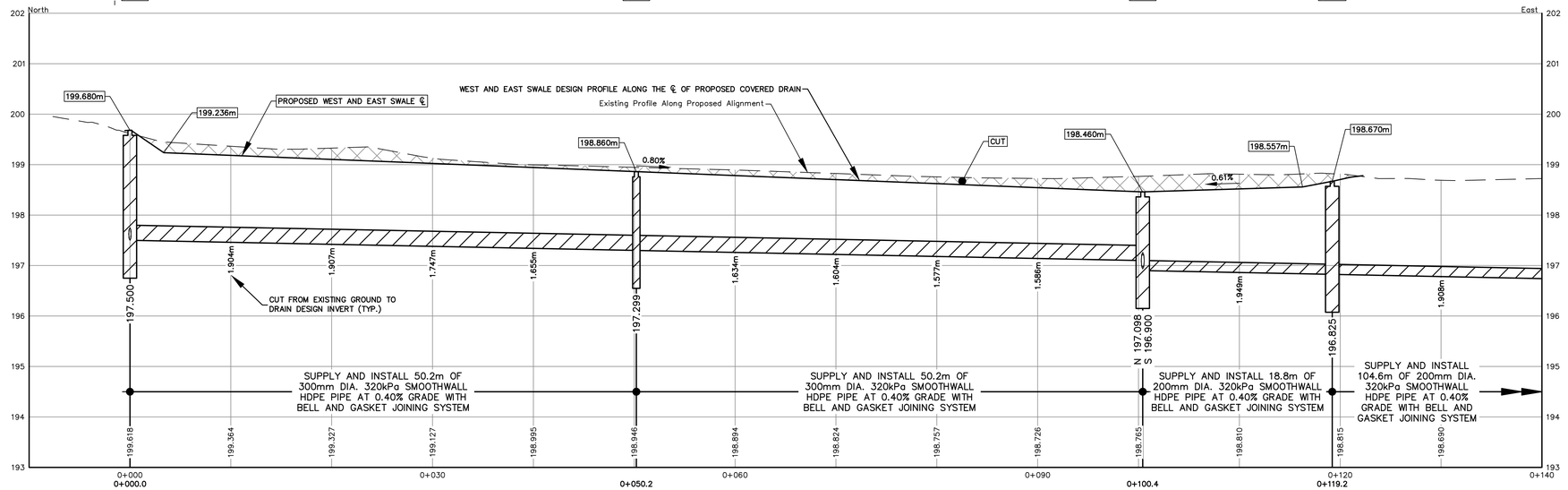
0+000.5 Road 2 East South R.O.W. Limit

0+000.0 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-5 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 199.680m

0+050.2 PROVIDE AND INSTALL A 600mm SQ. PRECAST CONC. CBMH-10 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.860m

0+100.4 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-11 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 198.460m

0+119.2 PROVIDE AND INSTALL A TD-540 OGS BY ADS OR EQUAL AS PER MANUFACTURER'S SPECIFICATIONS; SET TOP ELEVATION = 198.670m



JAMIS DRAIN PROFILE (0+000.0 TO 0+140.0)

Scale = 1:250 Hor.
1:50 Ver.

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LICENSED PROFESSIONAL ENGINEER
A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	4 OF 10

Original Sheet Size: ARCH D

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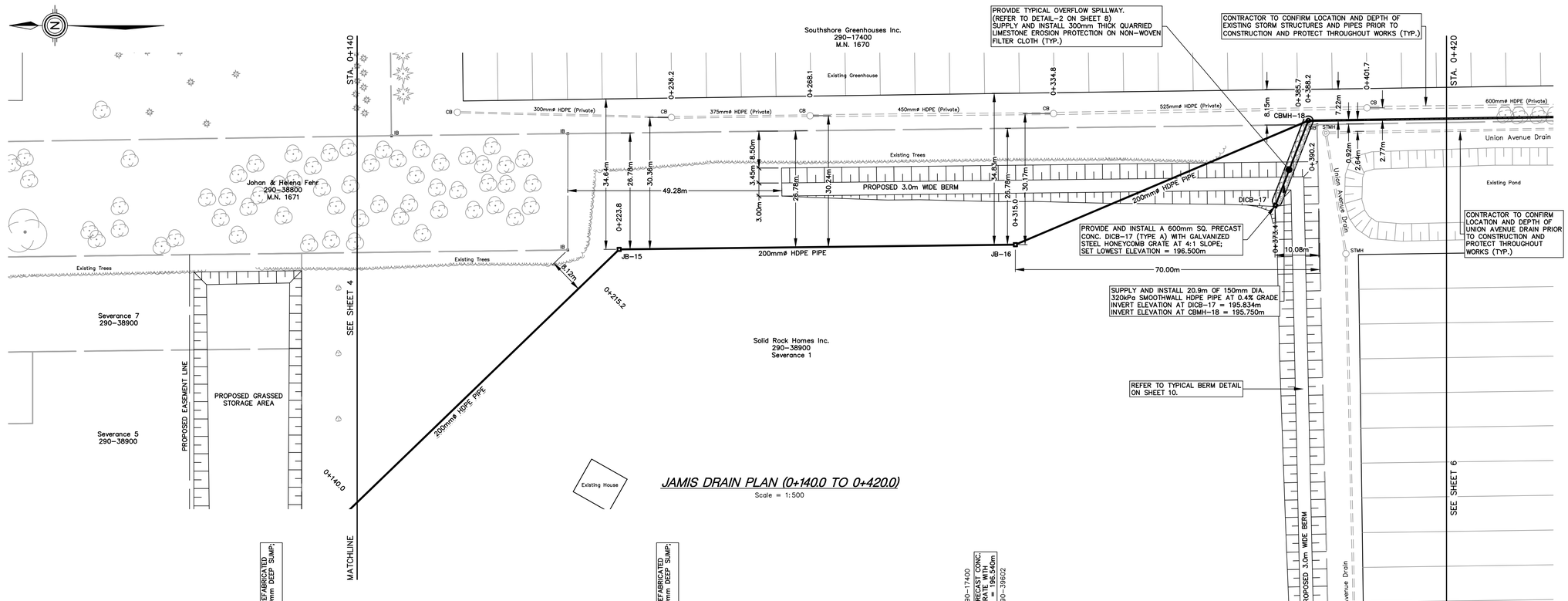


JAMIS DRAIN PLAN (0+140.0 TO 0+420.0)

Scale = 1:500

0+119.2 PROVIDE AND INSTALL A FD-4HC OSS BY ADS OR EQUAL, ALL TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS; SET TOP ELEVATION = 198.670m

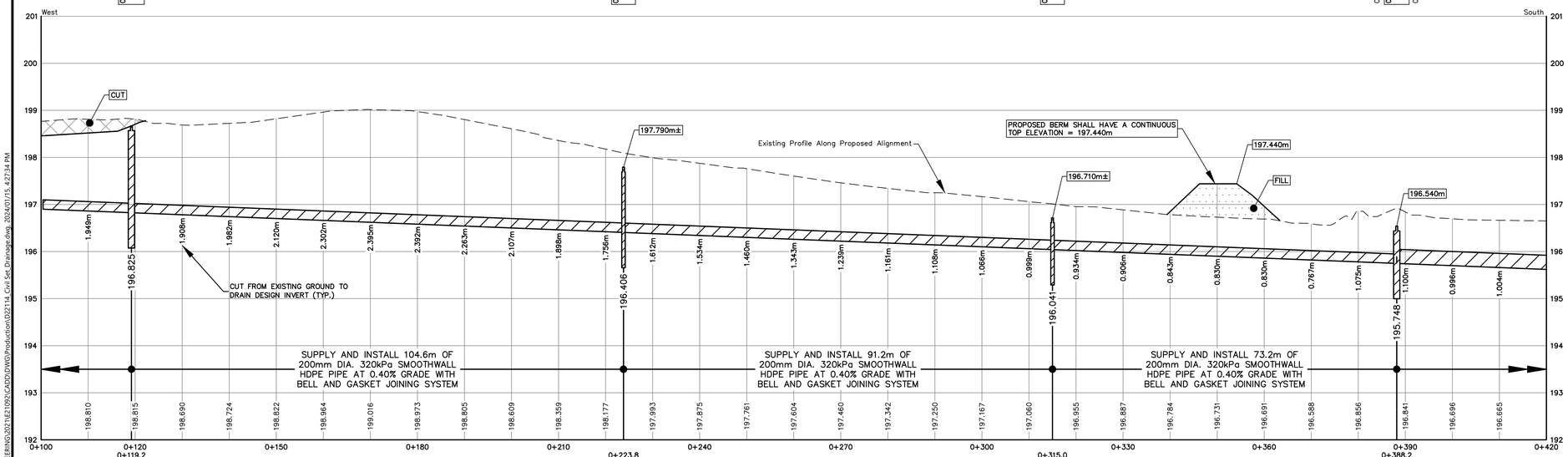
0+223.8 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-15 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 197.790m±

0+315.0 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-16 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 196.710m±

0+385.7 Property Line Between 290-38900 & 290-17400

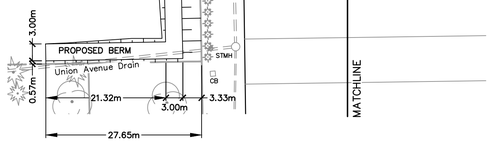
0+388.2 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-18 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 196.540m

0+390.2 Property Line Between 290-38900 & 290-39602



JAMIS DRAIN PROFILE (0+140.0 TO 0+420.0)

Scale = 1:500 Hor.
1:50 Ver.



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PROVINCE OF ONTARIO

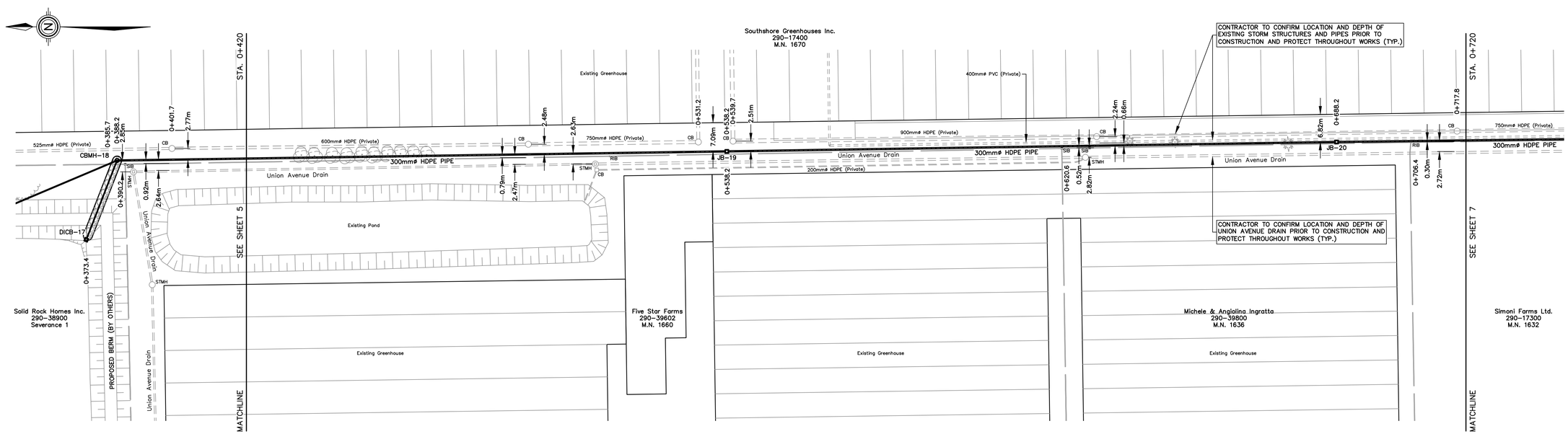
DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.: D22-114

SHEET No.: 5 OF 10

Z:\PROJECTS\ENGINEERING\2022\D22114\2D\CADD\DWG\Production\D22114 Civil Set Drainage.dwg 2024/01/15 4:27:34 PM



JAMIS DRAIN PLAN (0+420.0 TO 0+720.0)

Scale = 1:500

0+385.7 Property Line Between 290-38900 & 290-17400

0+388.2 PROVIDE AND INSTALL A 1200mm DIA. PRECAST CONC. CBMH-18 WITH CAST IRON FRAME AND GRATE WITH 600mm DEEP SUMP; SET TOP ELEVATION = 196.540m

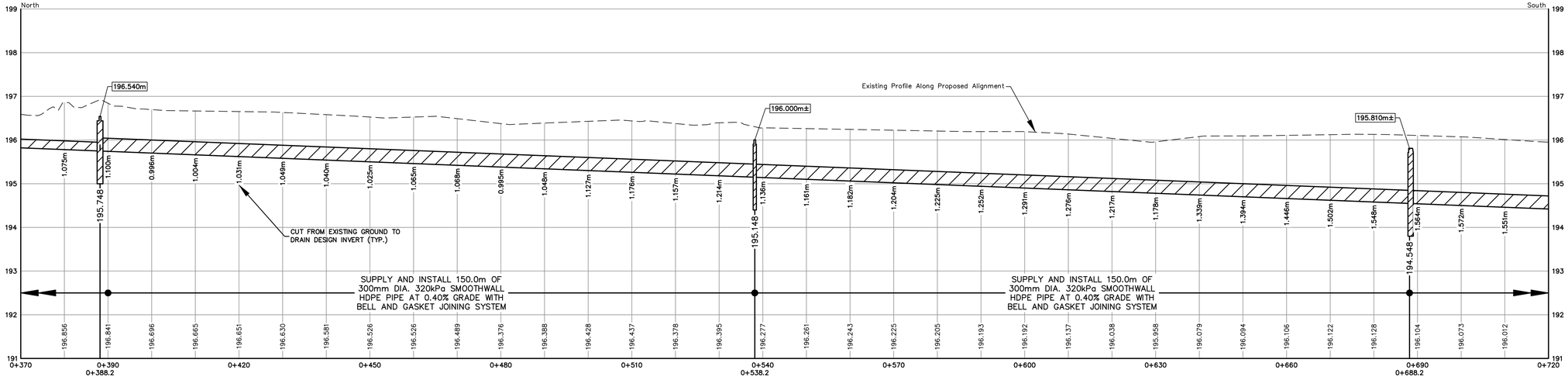
0+390.2 Property Line Between 290-38900 & 290-39602

0+538.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-19 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 196.000m±

0+620.6 Property Line Between 290-39602 & 290-39800

0+688.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-20 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 195.810m±

0+706.4 Property Line Between 290-39800 & 290-17300



JAMIS DRAIN PROFILE (0+420.0 TO 0+720.0)

Scale = 1:500 Hor.
1:50 Ver.

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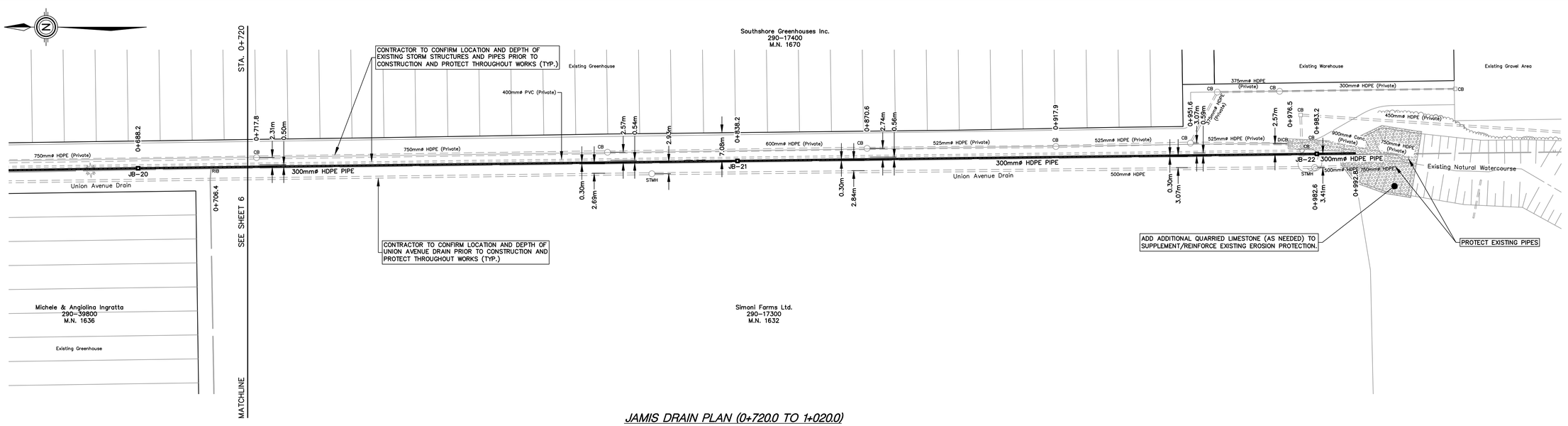
LICENSED PROFESSIONAL ENGINEER
A. B. PERALTA
100138683
2024-01-15
PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

DESIGNED BY:	DRAWN BY:	CHECKED BY:
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	6 OF 10



JAMIS DRAIN PLAN (0+720.0 TO 1+020.0)

Scale = 1:500

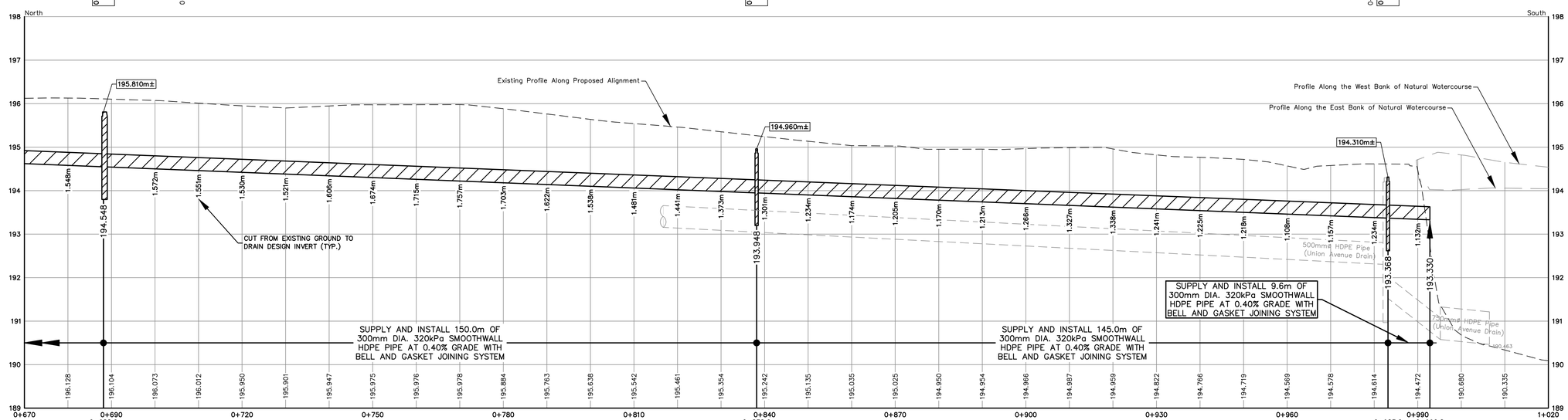
0+688.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-20 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 195.810m±

0+706.4 Property Line Between 290-39800 & 290-17300

0+838.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-21 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.960m±

0+982.6 Existing MH - Union Avenue Drain

0+983.2 PROVIDE AND INSTALL A 600mm DIA. PREFABRICATED HDPE JB-22 WITH STEEL PLATE AND 600mm DEEP SUMP; SET TOP ELEVATION = 194.310m±



JAMIS DRAIN PROFILE (0+720.0 TO 1+020.0)

Scale = 1:500 Hor.
1:50 Ver.

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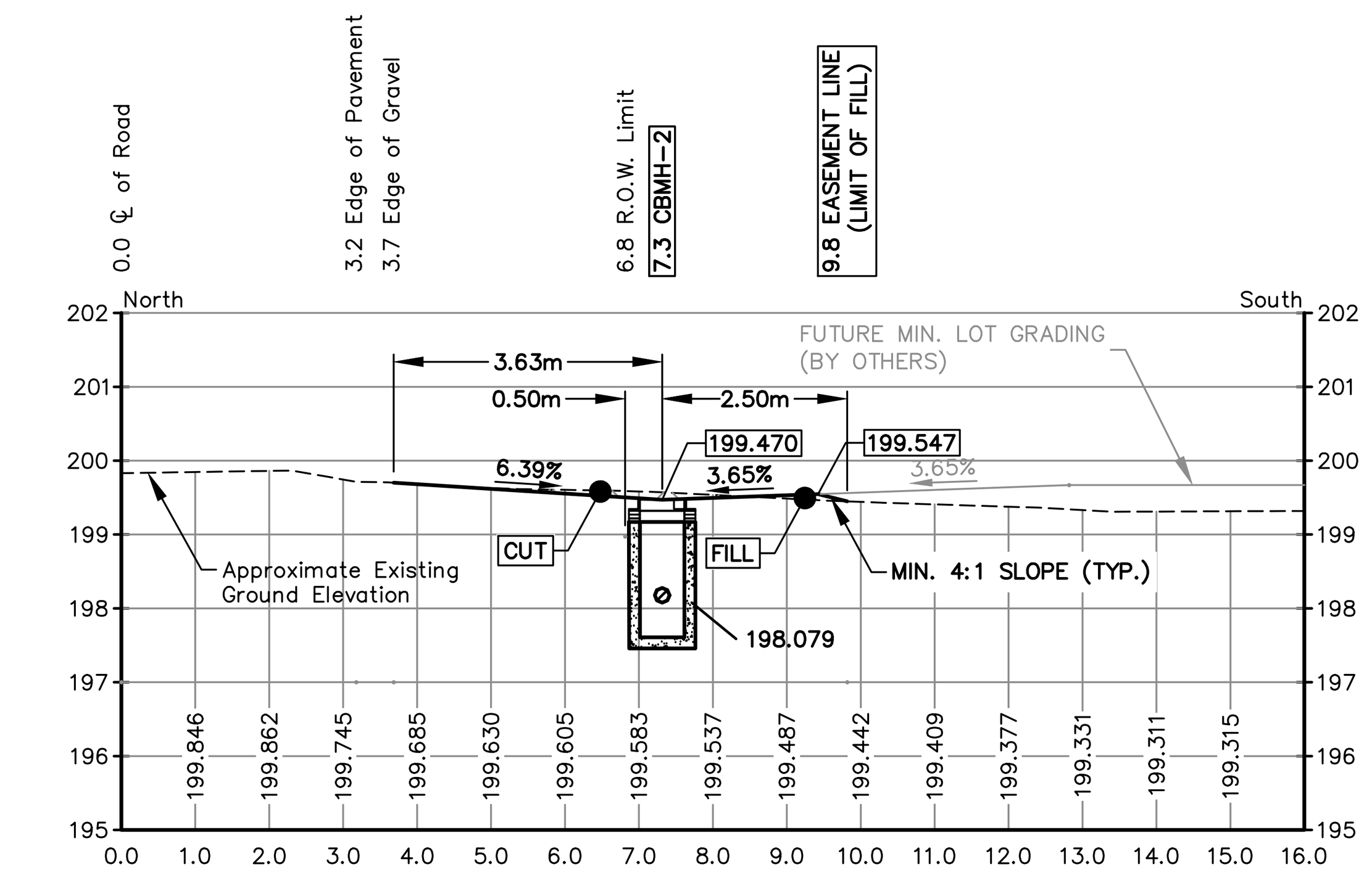
D22-114	7 OF 10



WEST BRANCH - STATION 0+057.9
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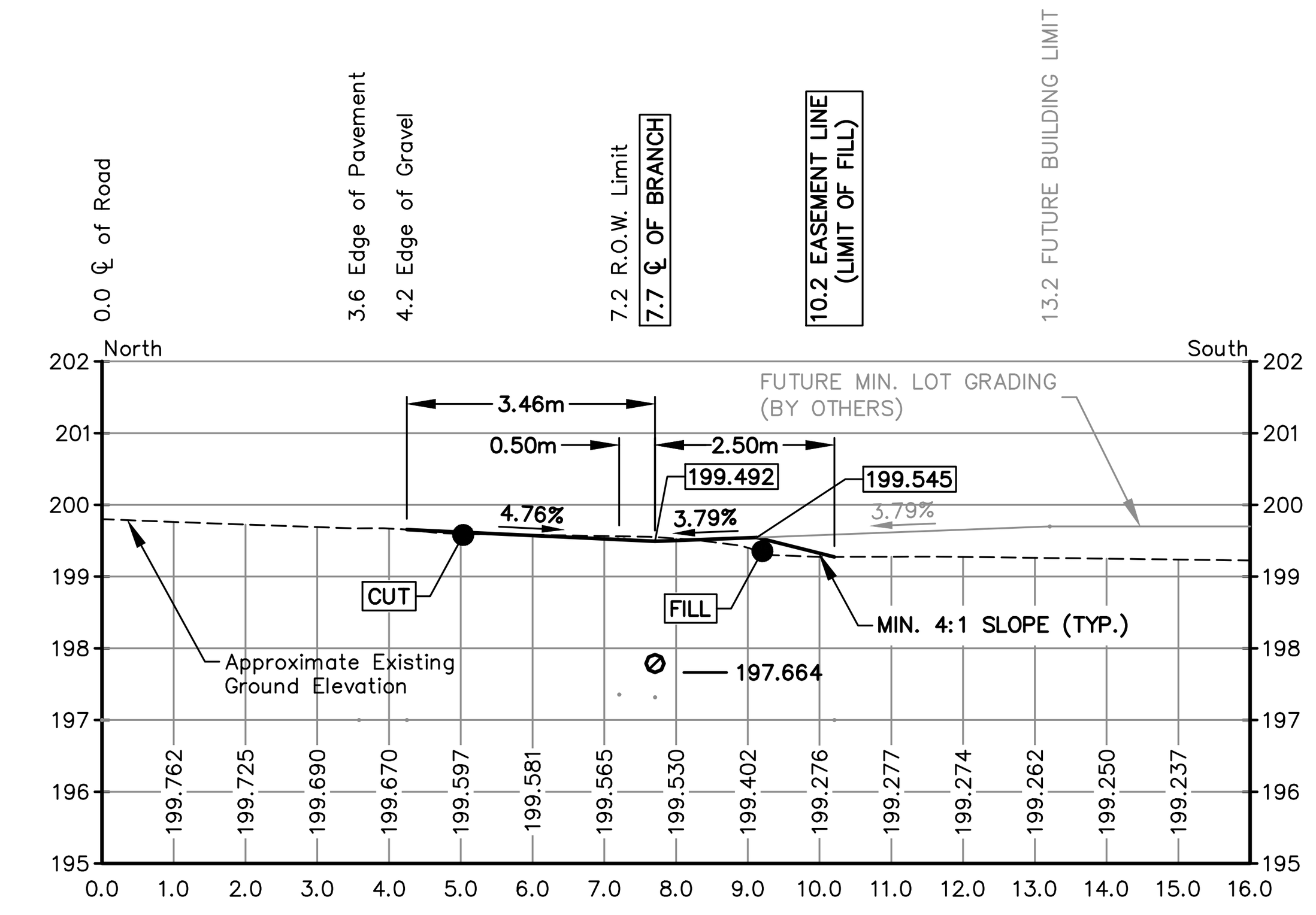

EAST BRANCH - STATION 0+016.4
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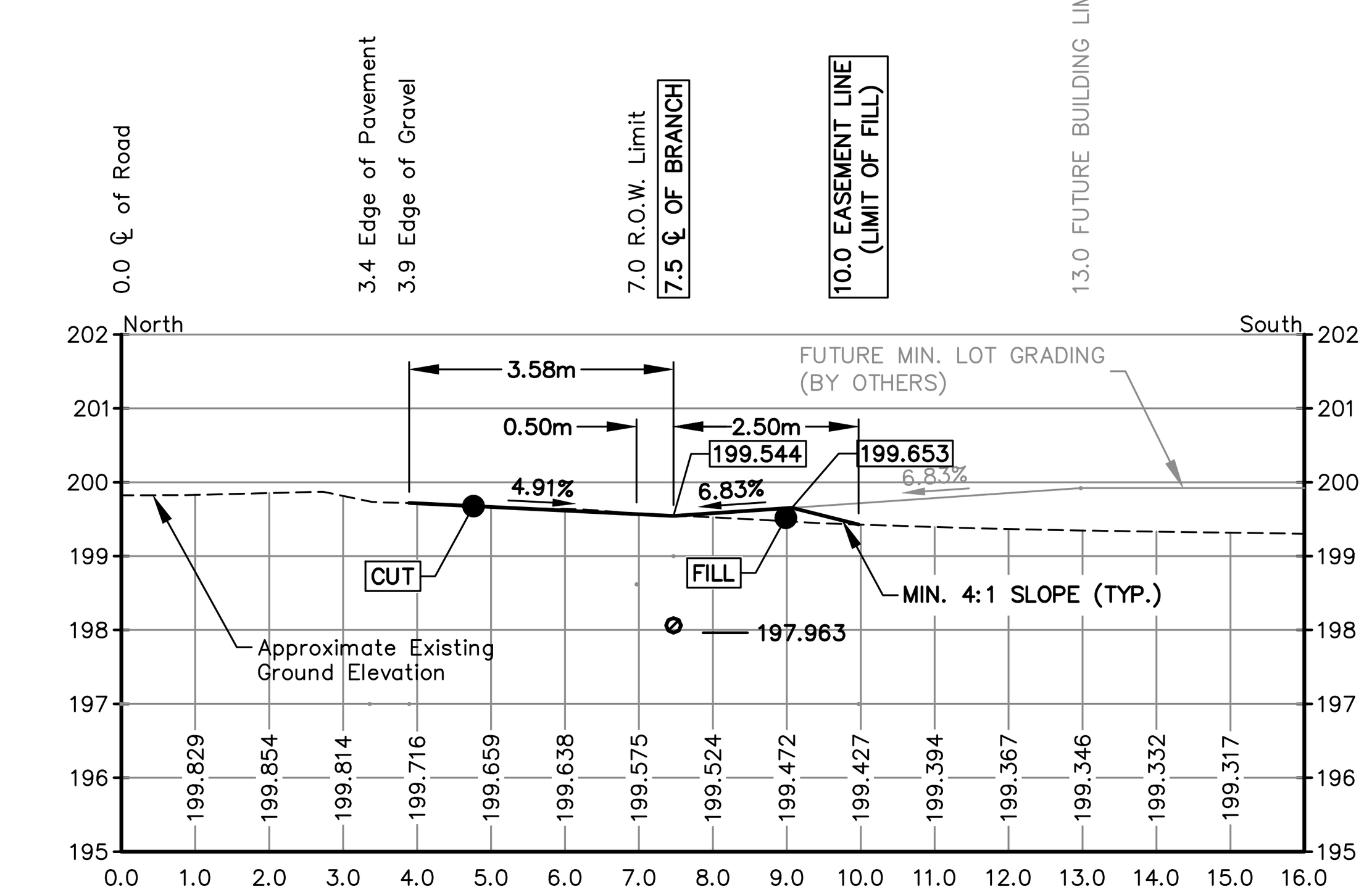

WEST BRANCH - STATION 0+046.3
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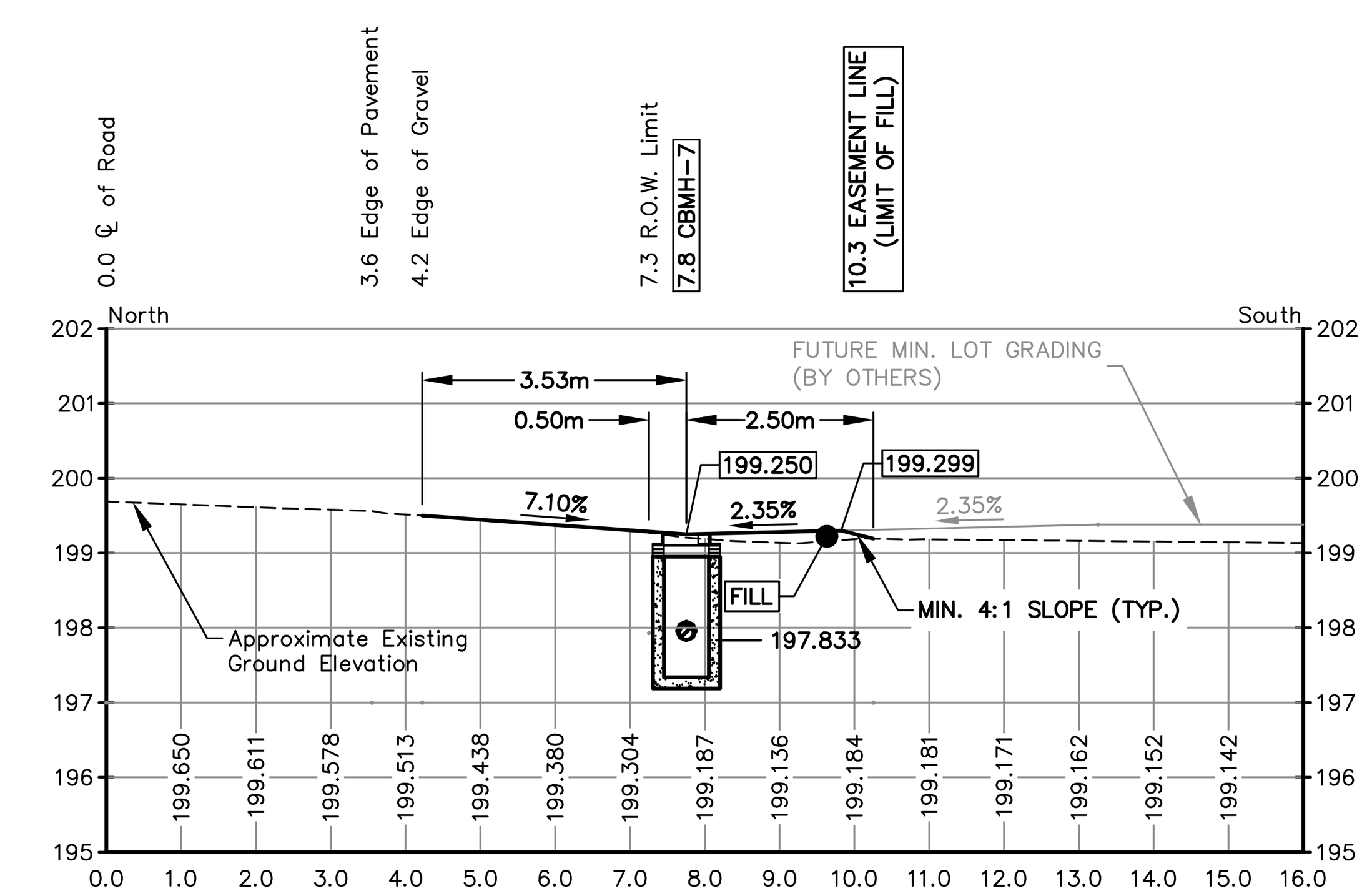

EAST BRANCH - STATION 0+033.3
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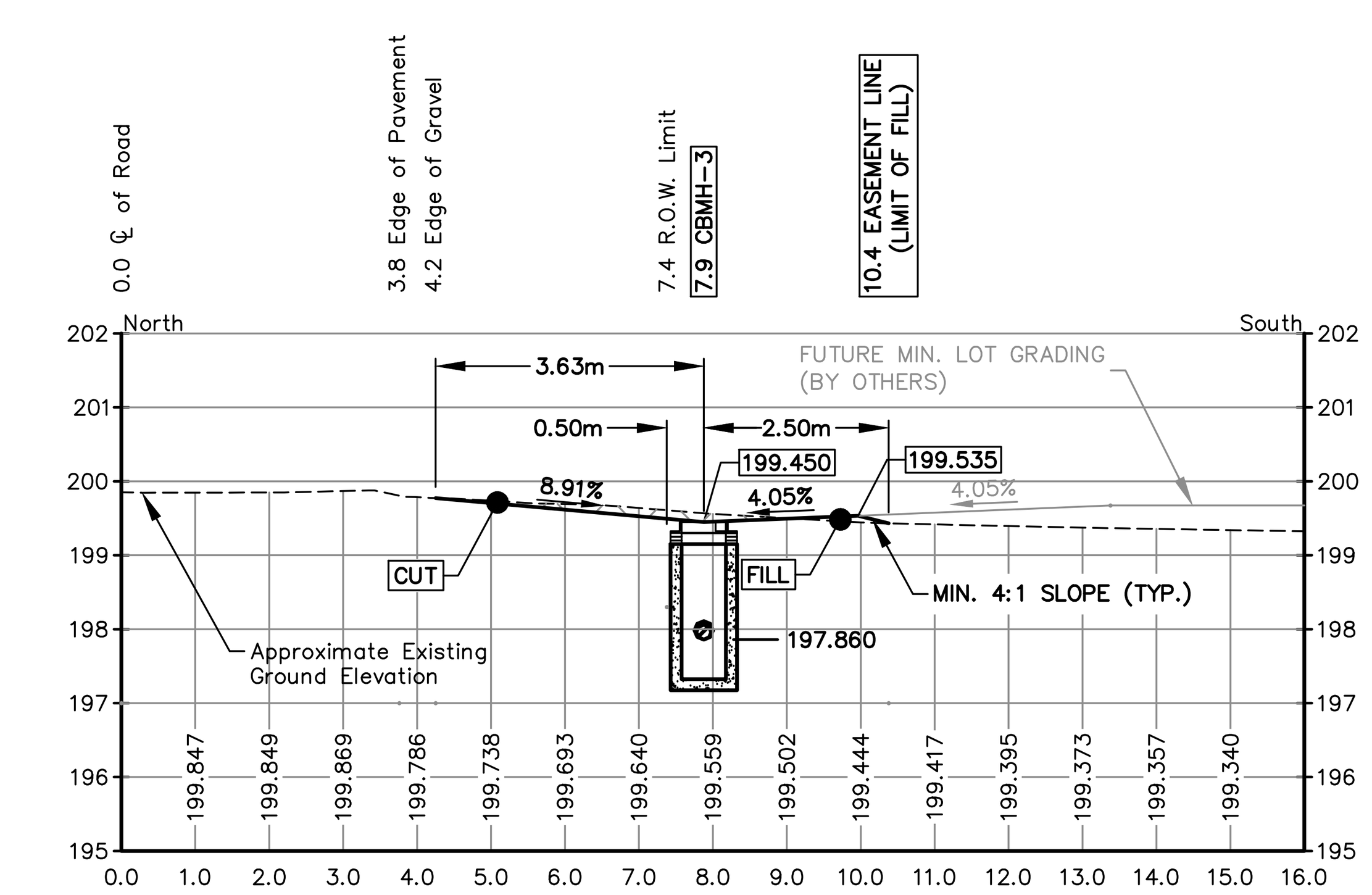

WEST BRANCH - STATION 0+036.0
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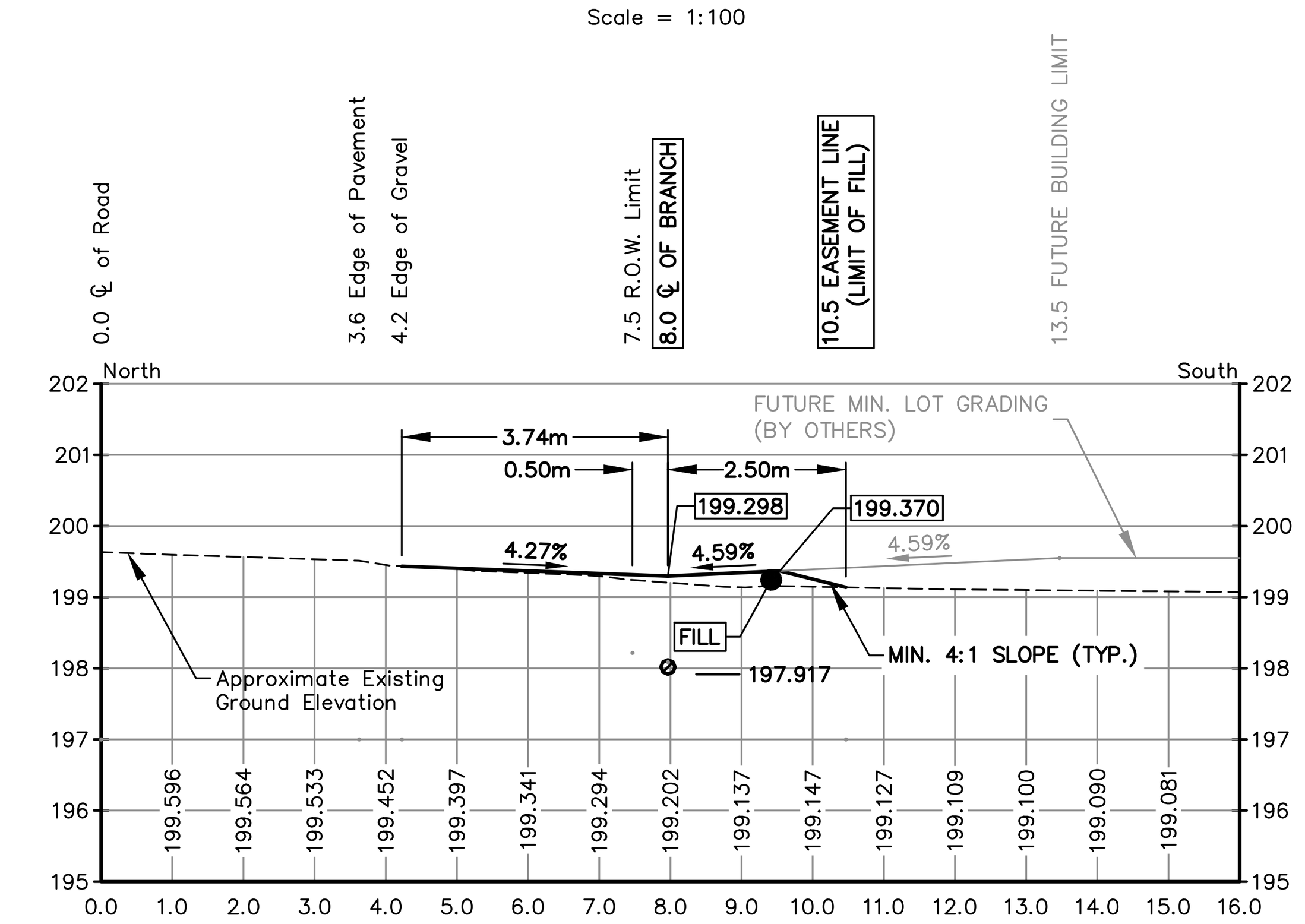

EAST BRANCH - STATION 0+041.7
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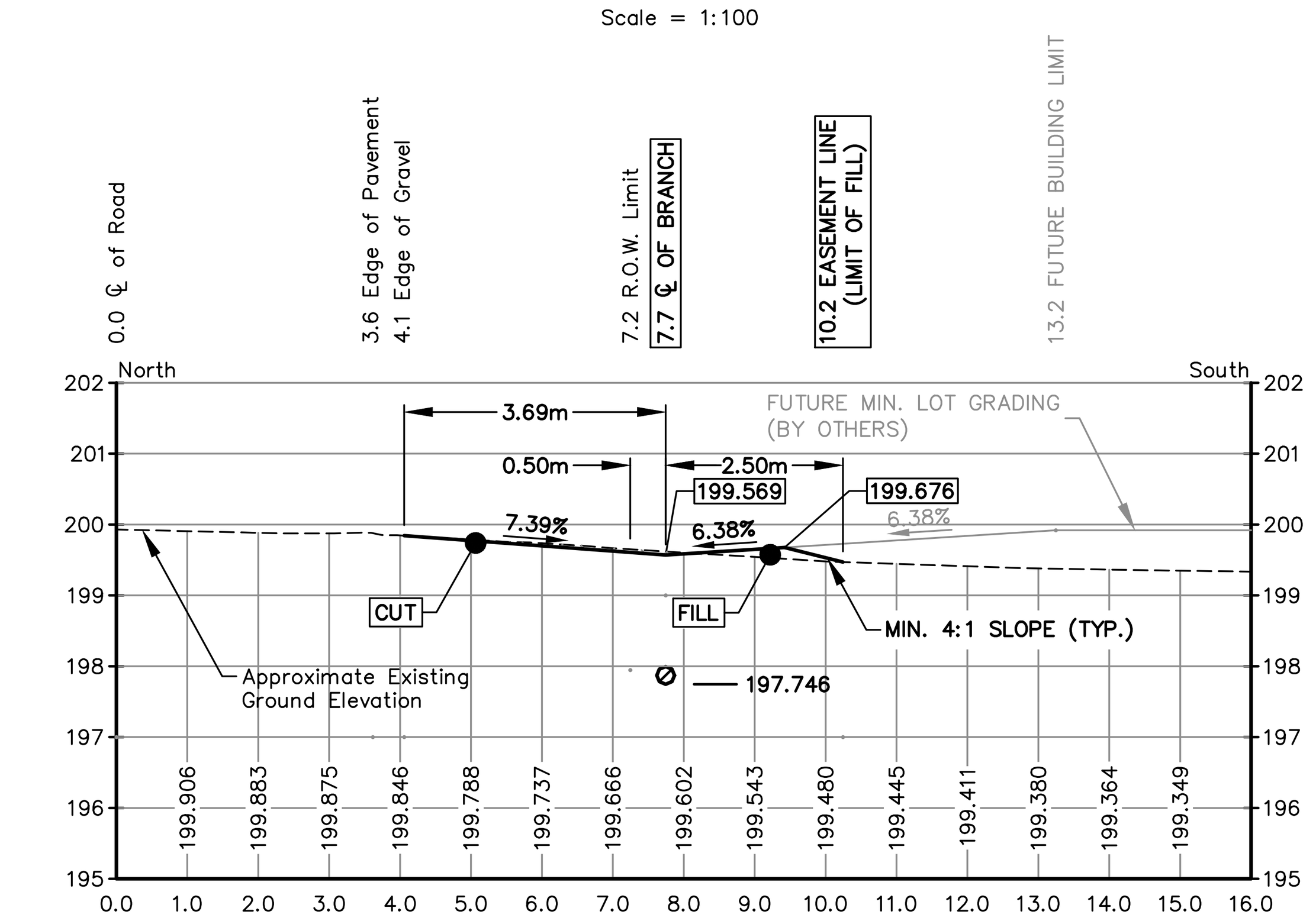

WEST BRANCH - STATION 0+024.6
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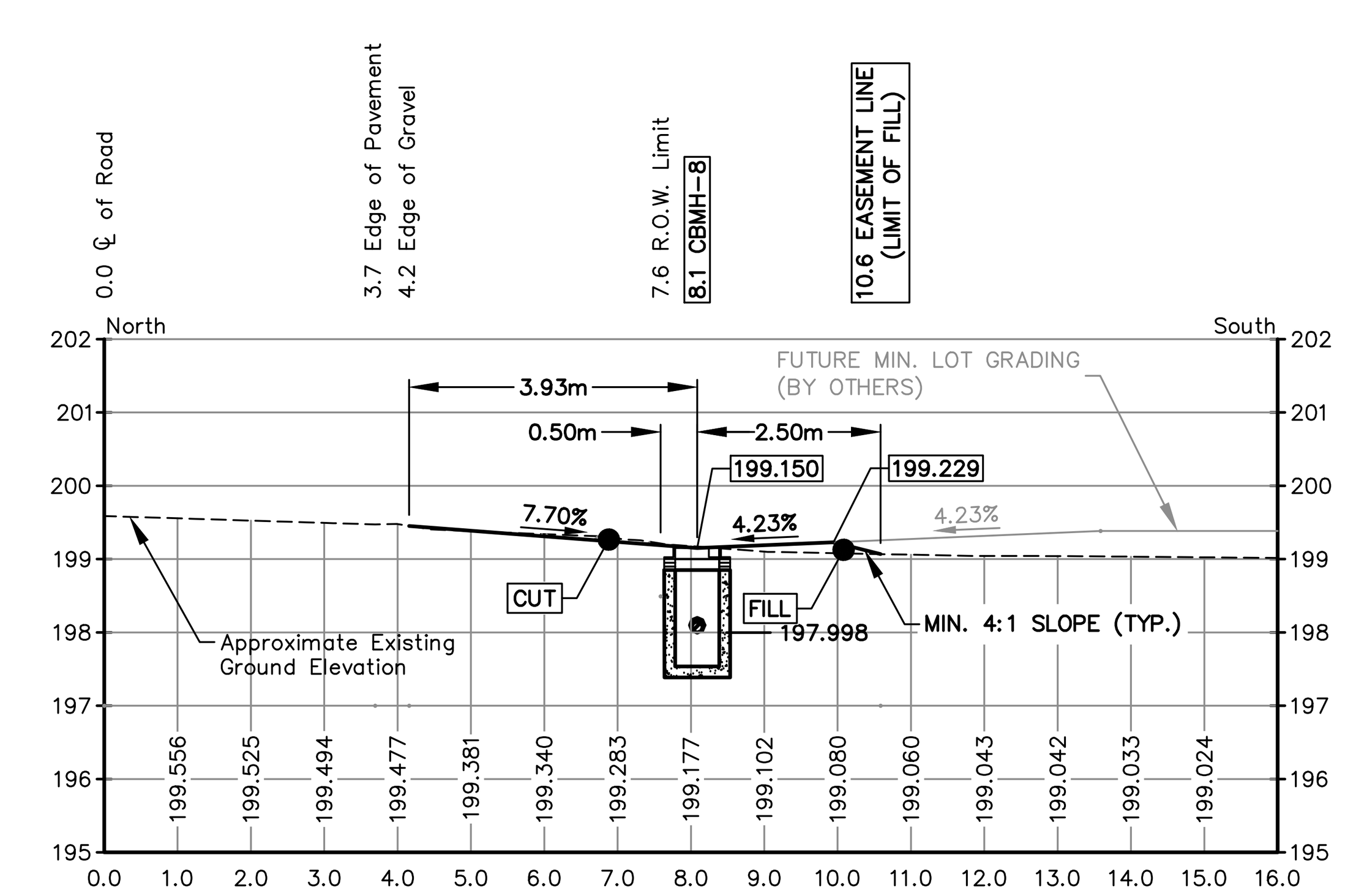

EAST BRANCH - STATION 0+049.8
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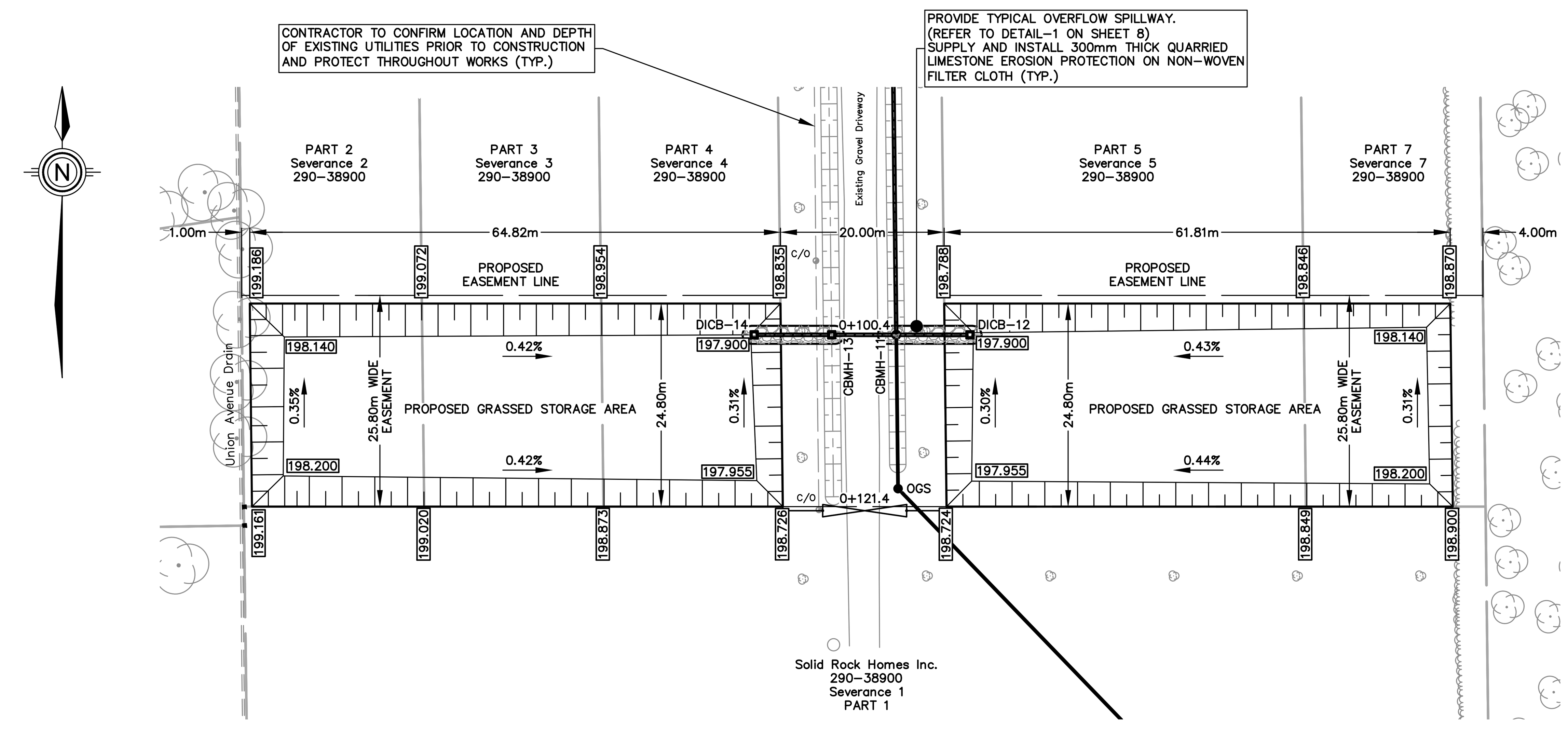
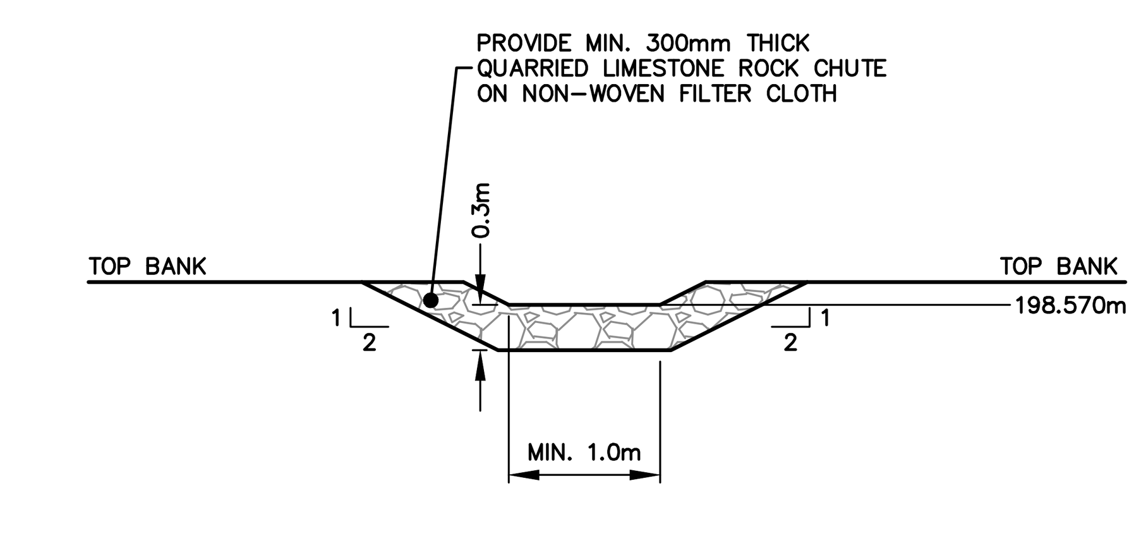
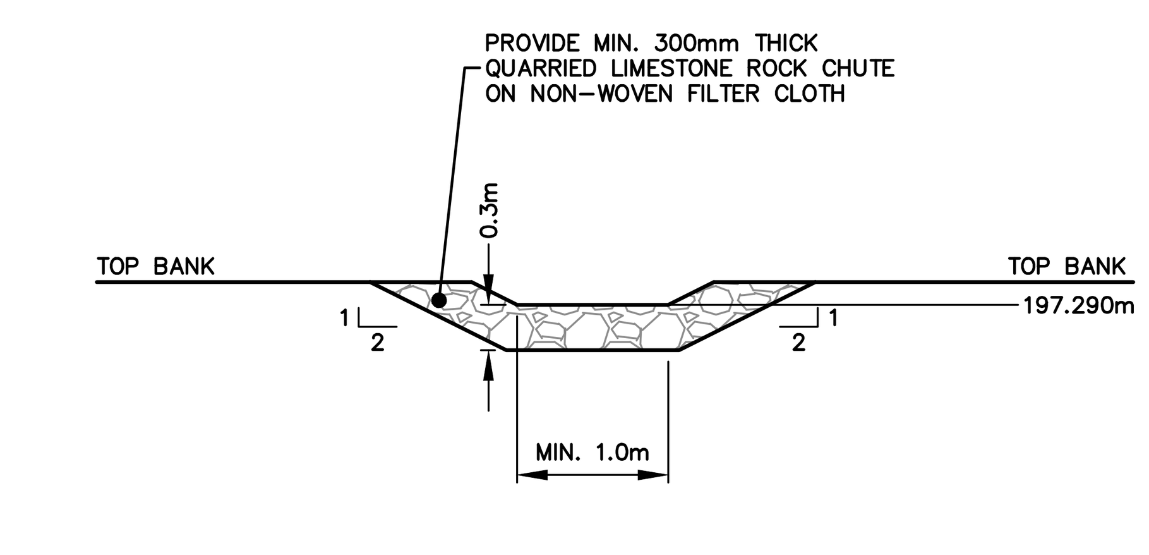


SWM GRADING PLAN - PROPOSED GRASSED STORAGE AREA
Scale = 1:500



TYPICAL OVERFLOW SPILLWAY DETAIL - 1
Scale = N.T.S.



TYPICAL OVERFLOW SPILLWAY DETAIL - 2
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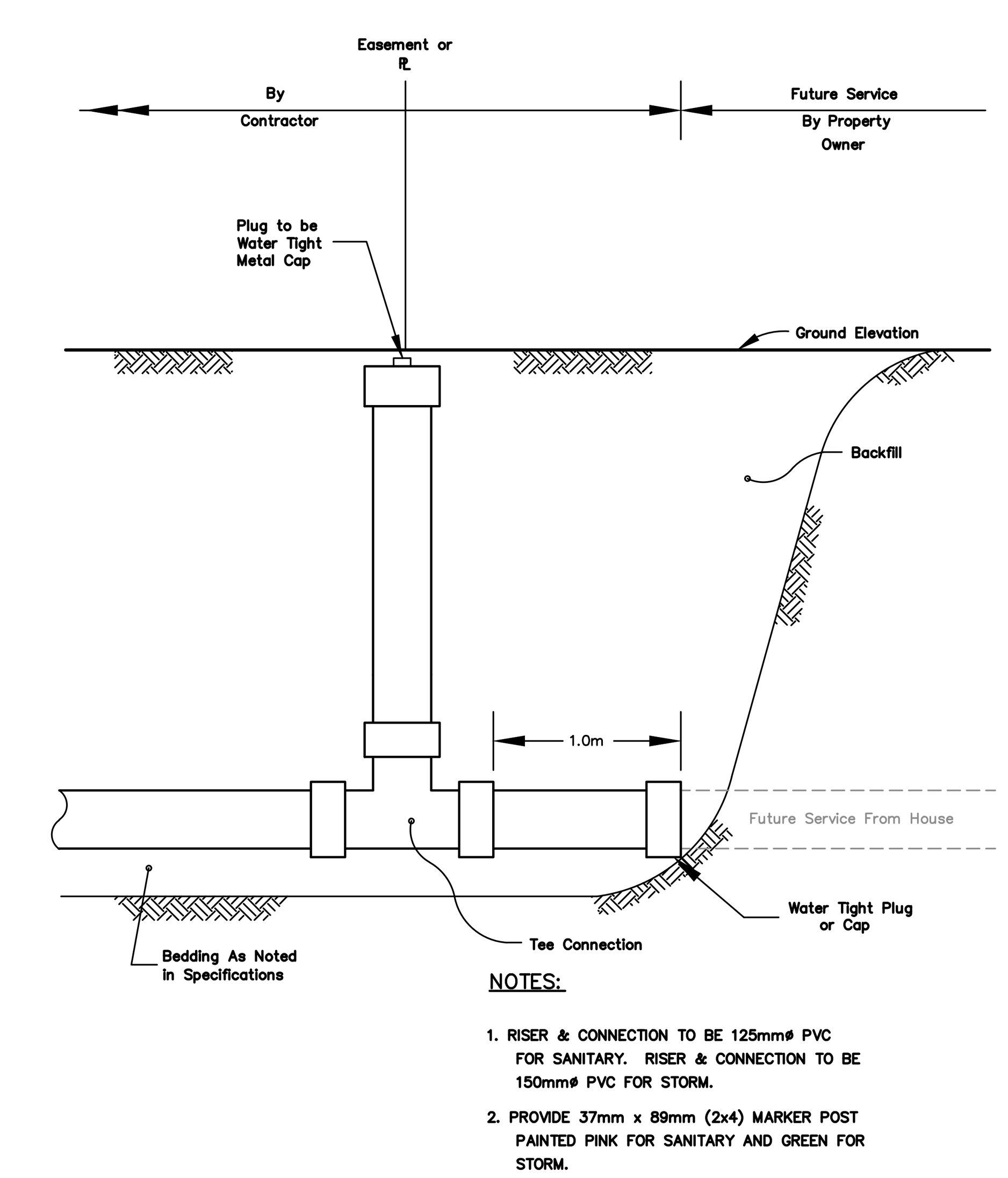

TYPICAL SERVICE CLEAN-OUT
Scale = N.T.S.

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LICENSED PROFESSIONAL ENGINEER A. B. PERALTA 100138683 2024-01-15 PROVINCE OF ONTARIO

DATE: JANUARY 15, 2024

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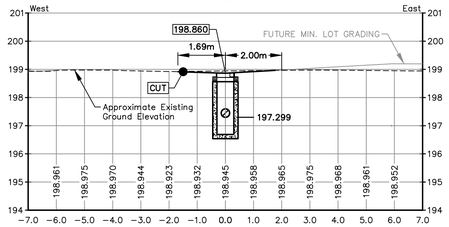
A.B.P.	J.H.	A.B.P.

PROJECT No.:	SHEET No.:
D22-114	8 OF 10



STATION 0+050.2

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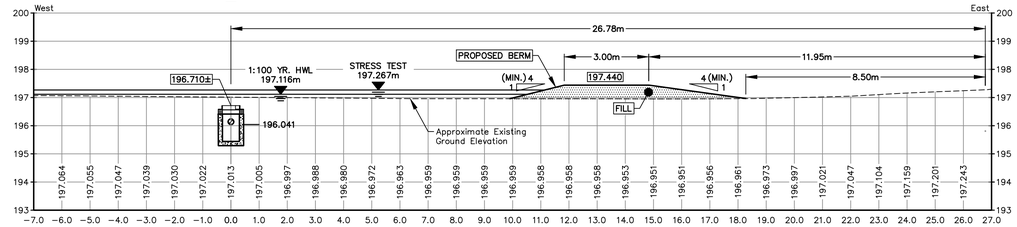

STATION 0+315.0

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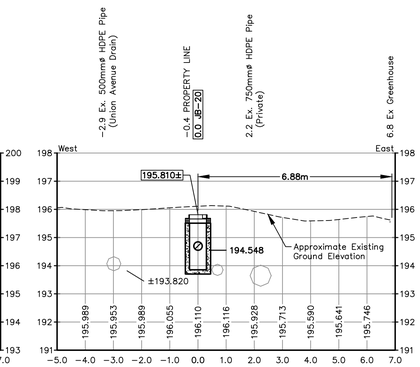

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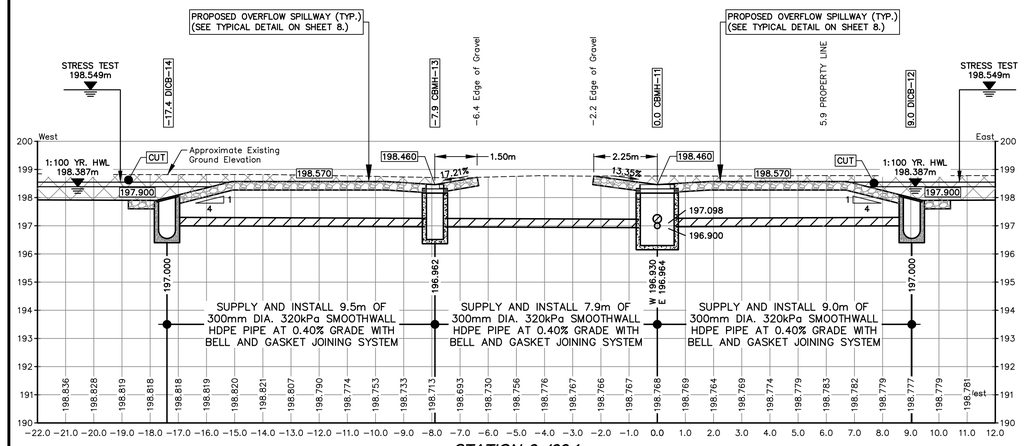

STATION 0+100.4

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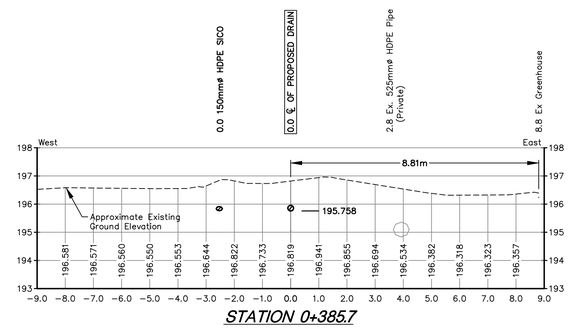

STATION 0+385.7

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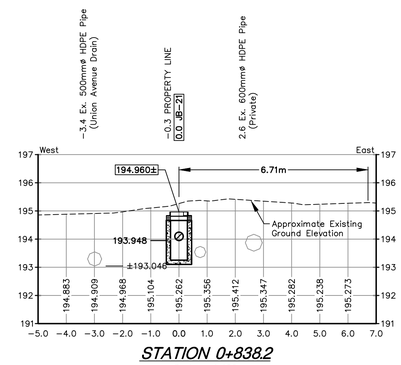

STATION 0+838.2

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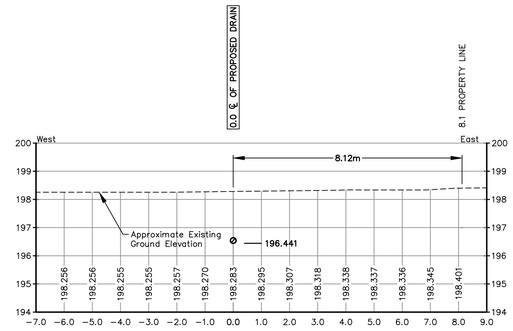

STATION 0+215.2

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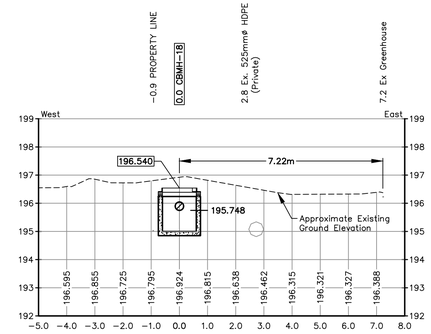
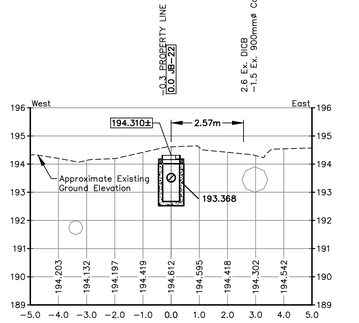


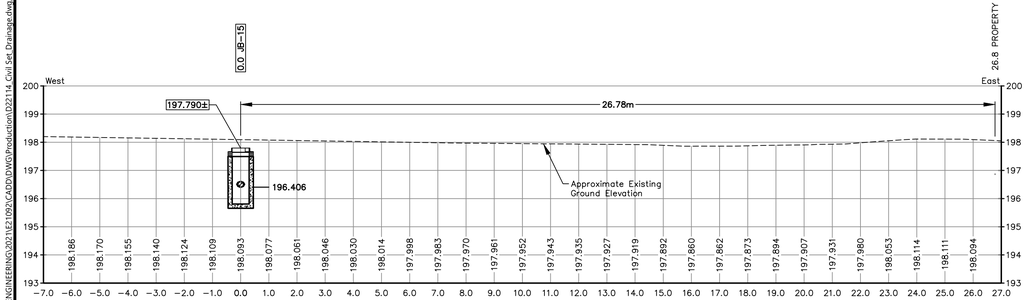
STATION 0+388.2

Scale = 1:100



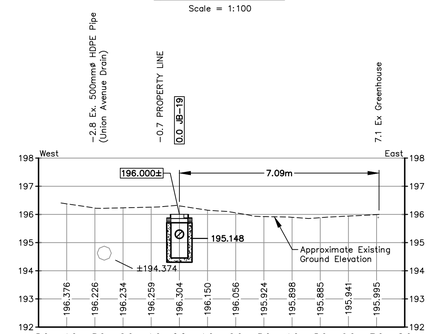
STATION 0+983.2

Scale = 1:100



STATION 0+223.8

Scale = 1:100



STATION 0+538.2

Scale = 1:100

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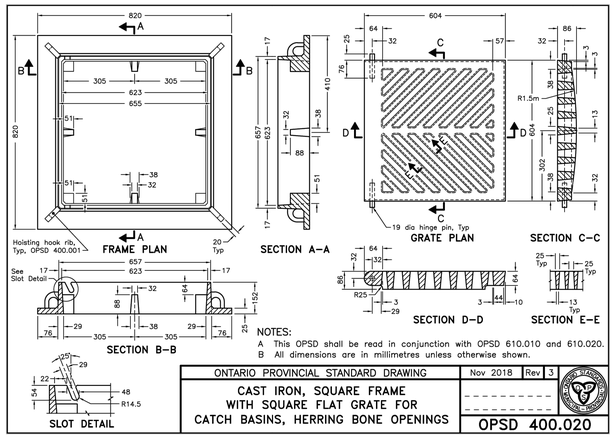
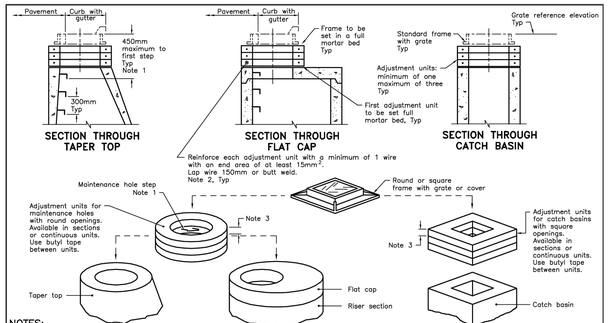
PROJECT No.:	SHEET No.:
D22-114	9 OF 10



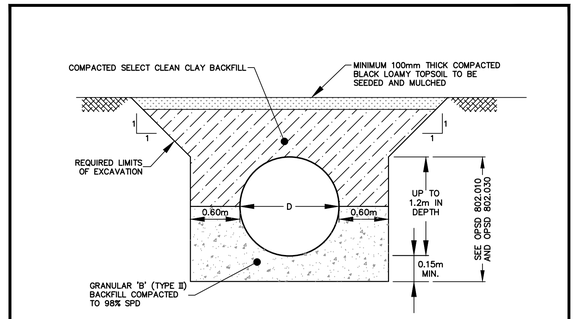
NOTES:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		
	OPSD 400.020	

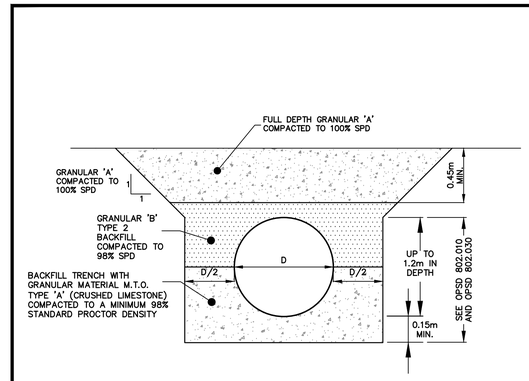


NOTES:
1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.
A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

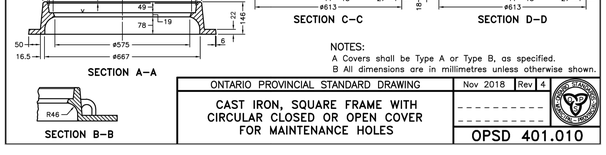
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		
	OPSD 704.010	



TYPICAL BOULEVARD BACKFILL DETAIL
Scale = N.T.S.

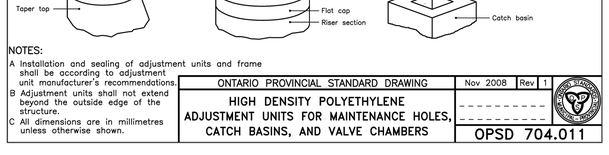


TYPICAL DRIVEWAY BACKFILL DETAIL
Scale = N.T.S.



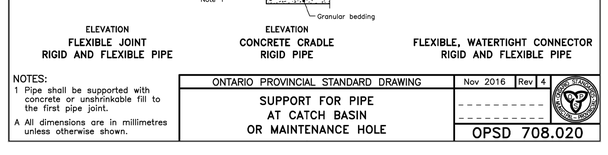
NOTES:
A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 4
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		
	OPSD 401.010	



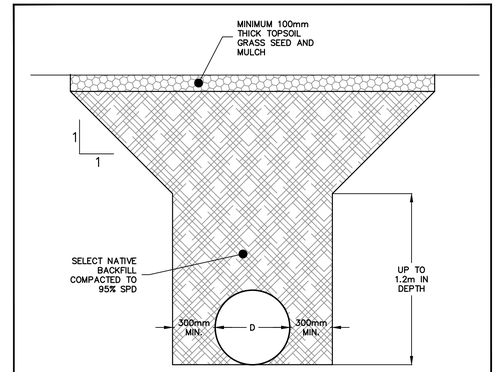
NOTES:
A Installation and sealing of adjustment units and frame shall be according to adjustment unit manufacturer's recommendations.
B Adjustment units shall not extend beyond the outside edge of the structure.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2008	Rev 1
HIGH DENSITY POLYETHYLENE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		
	OPSD 704.011	

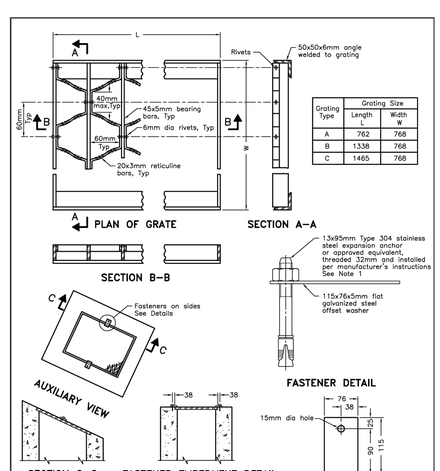


NOTES:
1 Pipe shall be supported with concrete or unshrinkable fill to the first pipe joint.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 4
SUPPORT FOR PIPE AT CATCH BASIN OR MAINTENANCE HOLE		
	OPSD 708.020	



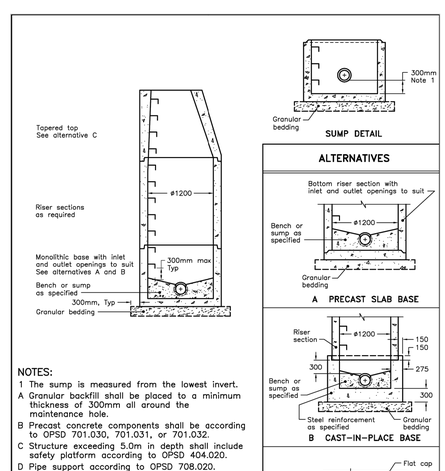
TYPICAL BACKFILL DETAIL FOR COVERED DRAIN
N.T.S.



Grating Type	Grating Size Length L	Width W
A	762	768
B	1338	768
C	1465	768

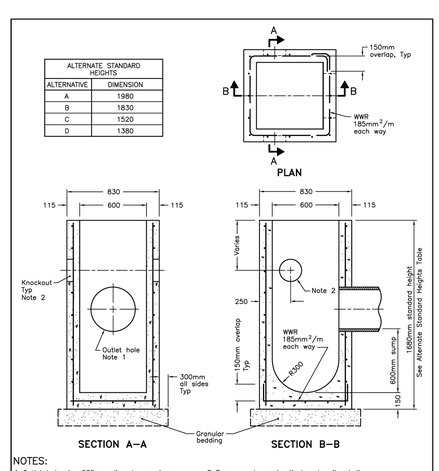
NOTES:
1 Equivalent (13x100mm Galvanized J-Bolt) cast-in-place anchor may be used.
A Fastener shall be inserted to maintain minimum concrete cover requirements.
B All steel components and rivets shall be galvanized.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 3
GALVANIZED STEEL HONEYCOMB GRATING FOR DITCH INLETS		
	OPSD 403.010	



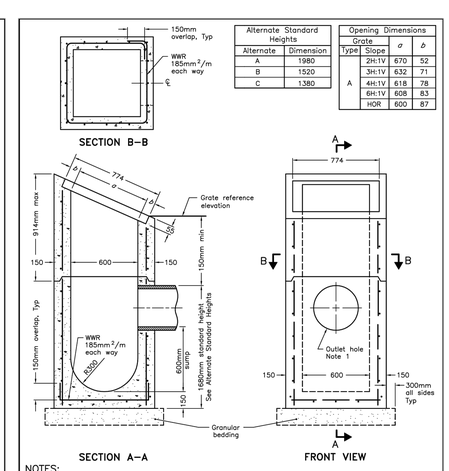
NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		
	OPSD 701.010	



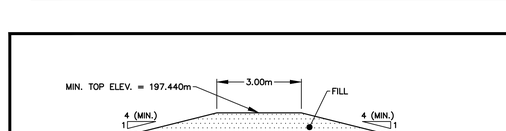
NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are in millimetres
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		
	OPSD 705.010	



NOTES:
1 Outlet hole size 525mm maximum diameter, location as required.
A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope shall be 6H:1V or flatter.
B Center reinforcing in wall and slab ±25mm.
C Granular backfill shall be placed to a minimum thickness of 300mm all around the ditch inlet.
D Grating shall be according to OPSD 403.010.
E Pipe support shall be according to OPSD 708.020.
F All dimensions are nominal.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE DITCH INLET 600 x 600mm		
	OPSD 705.030	



TYPICAL BERM DETAIL
Scale = N.T.S.

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