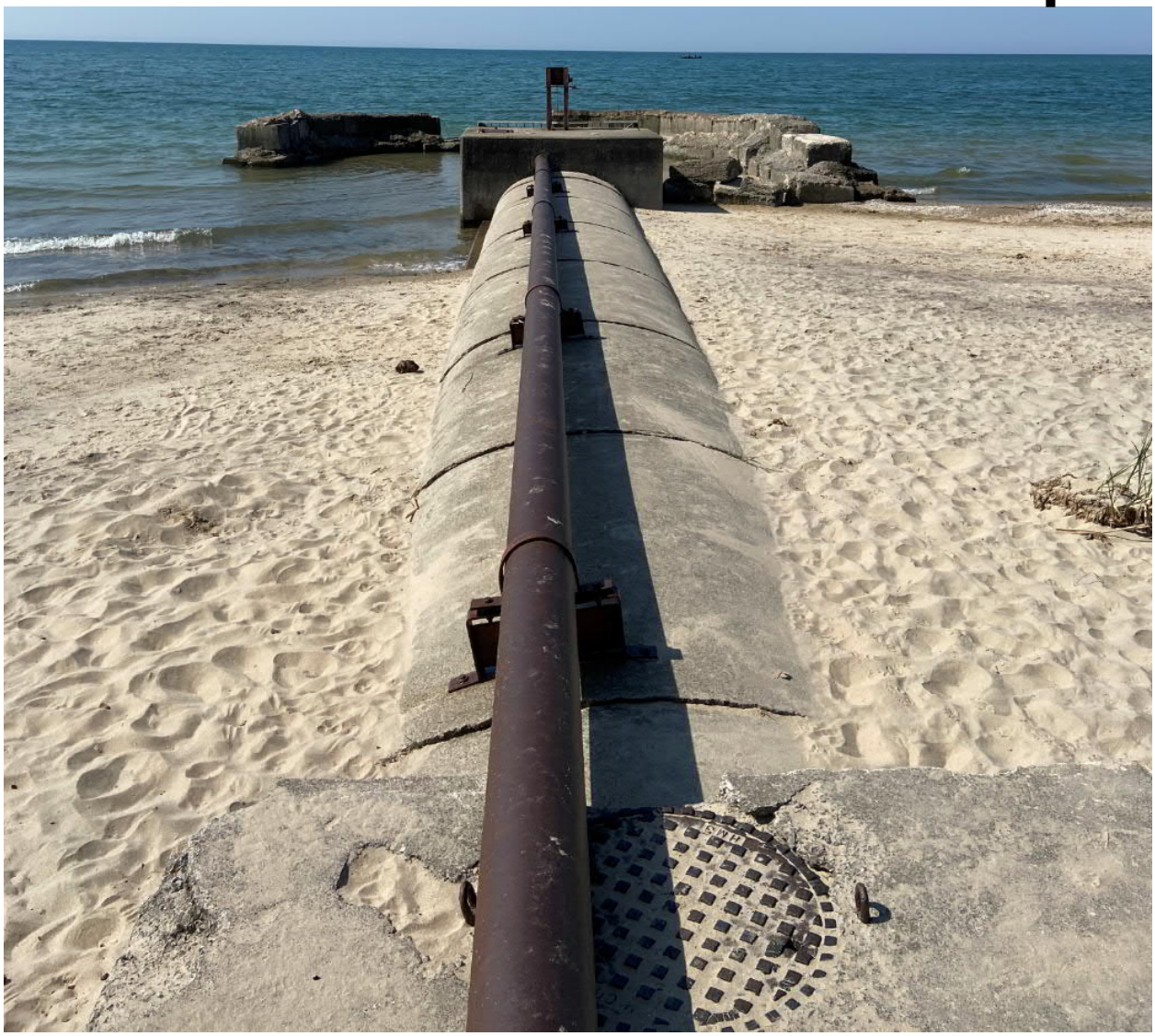
PORT COLBORNE

Oil Mill Creek Drain Stormwater Baseline Report



June 21, 2021

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EWA Engineering Inc.
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Revision and Version Tracking

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Submission Date: June 21, 2021

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Prepared by:

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EWA Engineering Inc.
Principal Engineer

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1 Introduction

This report is the Baseline Drainage Report and provides a summary assessment of the existing condition and drainage issues of the Oil Mill Creek Drain. The Baseline Drainage Report presents the current, as of 2019, baseline or reference condition from which all proposed improvements will be reviewed, planned and designed to address. In some cases, a drainage issue may be identified in the Baseline Report but deferred from a specific implementation in the specific Drain Engineer's report. The Baseline Report provides the total needs of the drain works but does not provide specific recommendations on implementation.

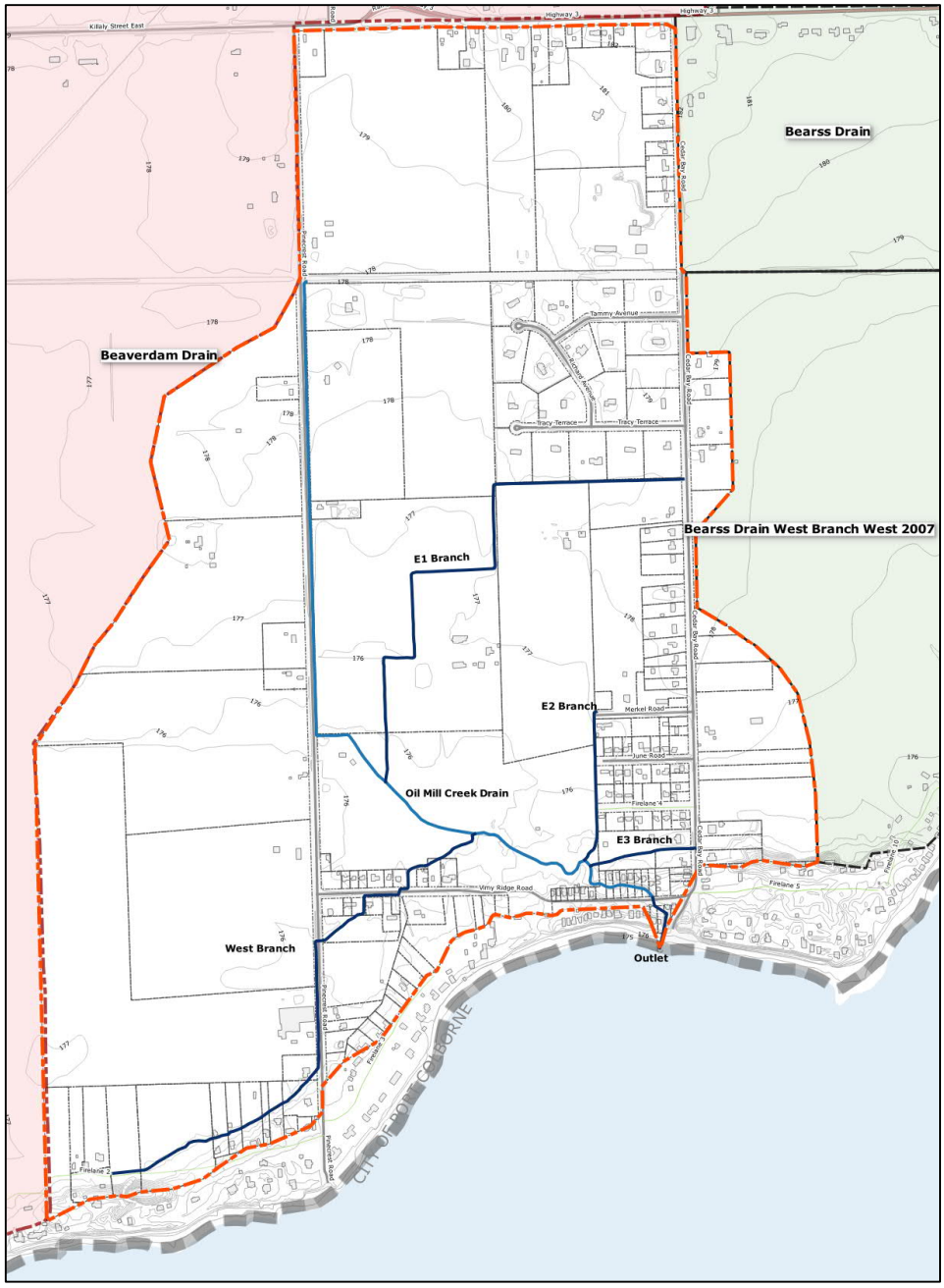


Figure 1 Municipal Drains – OMC Boundary

1.1 Drain History

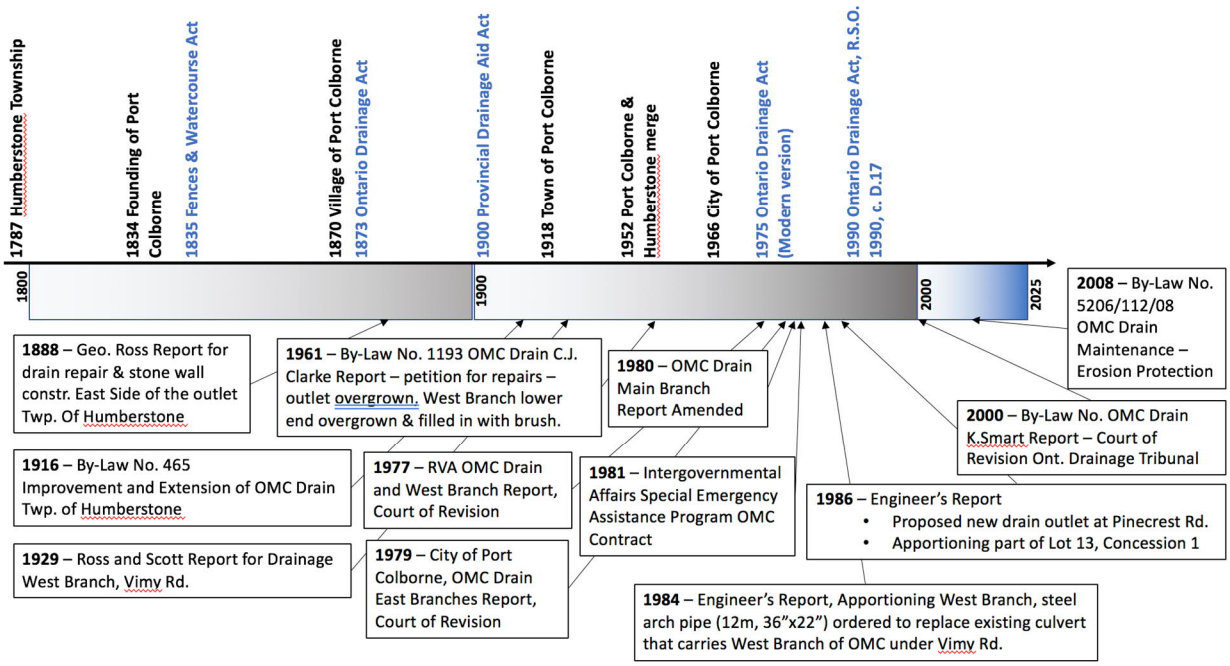


Figure 2 Drain Milestones Timeline

The Drain design overall dates from the work done by RV Anderson (RVA) in 1977 and 1979 with the grade lines shown on drawings in imperial measurements. Conversion of this data from feet to meters and implementation using modern GIS and UTM NAD 83 datums results in slight differences from the original designs. These design grade lines are shown on the included Baseline Drawings.

The main branch had a section from station 2+50 commencing at a listed 48" cast in place (CIP) culvert to 19+00 where the West Branch confluence connects, given as 1660 LF (Linear Feet – LF) with a design slope of 0.06%, which is a slope of 0.6m per 1000m. As a given slope this is very low. It is essentially a flat grade that requires a water surface to move the flow to outlet.

This was very likely part of the motivation for the work conducted in the 1980s for additional outlets, specifically the 1986 Engineer's report for a new outlet along Pinecrest Rd.

Bylaw # 1336/29/83 Oil Mill Creek Main Branch for work done in the apportioned total of $ 40,361.77. Maintenance work was undertaken in 1983 on the West Branch in the amount of $19,558.13 and allocated to the listed properties in the Report (RVA 1979).

Maintenance work was completed in 1988 on E1 Branch and in 1990 on both E2, E3.

City Engineer's report CE#86-40 was presented but tabled on April 2, 1986 pending a special meeting to update the public and receive input from persons in attendance. The

report identified that 690m of ditch, plus 166m of 1400mm pipe be constructed including rip rap and grating at an estimated $102,000 cost including $30,000 for engineering fees be presented for consideration as a pre-liminary report. It does not appear that this work was approved for construction.

A report for enclosing the outlet was prepared by K.Smart & Associates in 1999. A Drainage Tribunal was held on September 20, 2000 with 15 appellants with a proposed project estimate of $72,000 for 61m to enclose the outlet portion of the drain south of Vimy Rd. The major problem facing the engineer was the methods used to apportion the costs. Tribunal decision points worth noting are as follows:

- That all parcels of property in the draining scheme or watershed have a responsibility to make a contribution to the proposed works. That the levy of $100 per parcel on all parcels in the drainage scheme is appropriate. (Allocated as ½ the total outlet liability cost.)

- The inclusion of Walnut Park properties as contributors to these improvements is justified. (Note: Walnut Park properties are not in the watershed but access to the properties is from the watershed.)

- The Tribunal reduced additional $200 assessments for the short-listed area upstream properties and increased the benefit assessment to the four properties adjacent to the proposed enclosed drain works.

This work proceeded to construction.

1.2 Oil Mill Creek Drain Basics:

The Oil Mill Creek Drain serves an area of 255.7 hectares based on the defined drain boundary. The main branch of the drain is 2,008m in length from the drain origin, which is defined as the south side of the Friendship Trail to the outlet into Lake Erie.

The watershed boundary is south of Highway 3 with a high point midway between Pinecrest Rd and Cedar Bay Rd being 182m. The outlet at the lake varies with the change in Lake Levels but the recorded average lake level is given as 174.15 IGLD.

- Watershed average fall (slope) is given as 0.27% or 2.7m per 1000m

- Drain average fall (slope) is given as 0.13% or 1.3m per 1000m

This slope characterises the Oil Mill Creek drain as low slope or slow watershed.

The lower portion of the drain is highly influenced by Lake Erie's water elevation with a littoral sand beach influenced outlet that has a specially constructed outlet including a J-shaped break wall.

The Oil Mill Creek drain can be segregated into several distinct geographic areas as follows:

- E1 Branch
- E2 and E3 Branches
- West Branch
- Oil Mill Creek Drain

These five zones are described in more detail as follows.

Oil Mill Creek E1 Branch

E1 is 1277m long and with an overall grade of 0.23%. It's been over dug from the original RVA profile in several places.

Oil Mill Creek E2 & E3 Branches

E2 was lowered from its original intended profile mostly at the outlet as expected creating a considerable grade back to Merkel Road (original grade RVA 0.44% now 0.54%. The 325m Drain has an overall grade of 0.54% making it the steepest portion of the Oil Mill Creek drains.

E3 is 223m long with an overall grade of 0.22% corresponding to 2.2m over 1000m of fall. The survey recorded significant ponded or still water with a culvert submerged.

Oil Mill Creek West Branch

The West Branch has a very low grade profile over it's 1265m of length making it one of the poorer functioning portions of the Oil Mill Creek. The overall grade is 0.05% or 0.5m per 1000m.

Oil Mill Creek Drain

The Oil Mill Creek Drain has by design a very low grade in the first 600m of the drain, roughly to the point of confluence with the West Branch outlet. From the point adjacent to the Pinecrest Road, there is an improved grade line to the Friendship Trail.

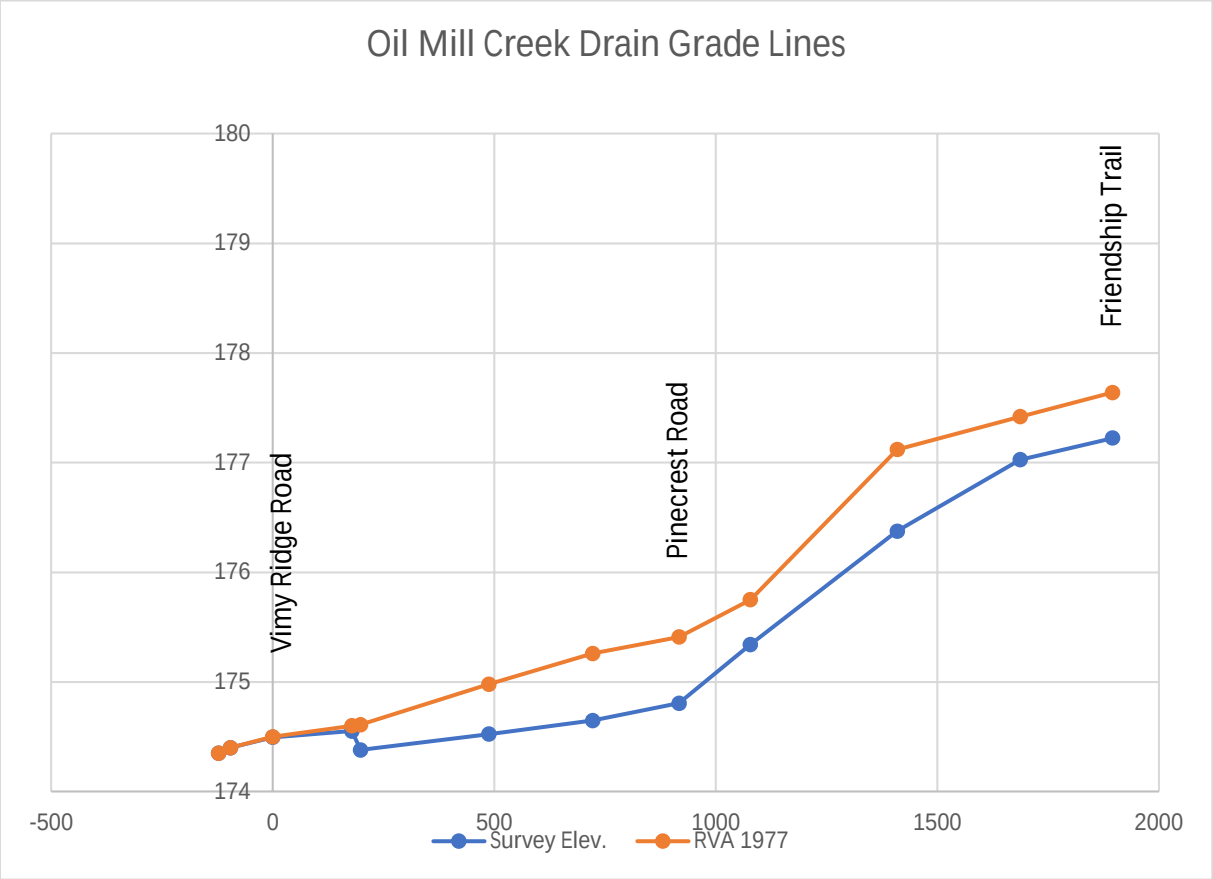


Figure 3 Oil Mill Creek Main Drain Design vs Survey Grades

The original 1977 lower reach design grade called for 1660 Linear Feet (LF) @ 0.06% grade trapezoidal shaped drain with a 5 ft wide drain bottom.

For a more detailed view of the original drain design grade lines and channel dimensions see the Baseline Drawings included in Appendix B.

1.3 RFP Drainage Issue Identification

The following were identified as issues that require investigation as part of the scope of drainage services to be covered in the final report.

1. The existing outlet is working but is to be reviewed for operational improvements including a review of the existing 'j' shaped break wall structure.

2. The existing outlet includes a pump configuration with a manhole for wetwell and an existing pipe for discharge. Investigate the cost vs benefit to re-instate the pump and to consider a new pump station configuration.

3. The existing park located on the main branch of the drain is to be reviewed in the context of the park relationship with the Drain. Specifically, including a stormwater management feature such as a pond or wetland along with re-alignment of the existing channels to make improvements by increasing the available flow volumes for larger precipitation events.

4. Ensure that the catchment boundaries between adjacent drains are consistent.

5. Investigate additional service capabilities to the Richard Avenue, Tammy Avenue and Tracy Terrace area, referred to as Bell Acres.

6. Review existing service to Merkel, June and Firelane 4.

7. Review structural (current condition) and capacity of culverts.

8. There was a drawing presented to introduce a second outlet for the West Branch down Pinecrest Rd. However, this work does not appear to have progressed to a report.

9. Investigate the benefits vs costs of a second outlet at or near 2685 Vimy Ridge Road. This location would be protected from storms as it is on the back side of the point.

2 Study Approach

All drainage work is legislated by the Provincial Drainage Act.

A one-third agricultural grant is available to all eligible farmlands to help with the cost of drainage repairs and capital projects through the Agricultural Drainage Infrastructure Program (ADIP) managed by the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA).

Work is done within the guidelines established by the Department of Fisheries and Oceans (DFO) and the Endangered Species Act as established by the Ministry of Natural Resources and Forestry (MNRF). Design is to be compliant with the requirements. Design work is prepared and submitted for review by the relevant Conservation Authority (NPCA) for compliance with Section 28 Regulations and in accordance with the 'Drainage Act and Conservation Authorities Act Protocol'.

Drainage Act and Conservation Authorities Act Protocol
Working as part of a multi-stakeholder Drainage Act & Section 28 Regulations Team (DART), co-chaired by the Ministry of Natural Resources and the Ministry of Agriculture, Food and Rural Affairs, Conservation Authorities, in partnership with representatives from the drainage sector, agricultural sector, and municipalities have completed a protocol for drain maintenance and repair activities.
The purpose of this provincially approved document is to improve communications, promote best practices, and streamline the permitting process under the Conservation Authorities Act for municipal drain maintenance and repair work performed under the Drainage Act.
Read the report ***Drainage Act and Conservation Authorities Act Protocol,*** online at:
https://conservationontario.ca/

The Municipal Drainage Act requires a specific process for establishing and making alterations to a Municipal Drain. The Act was prepared with a specific process to be followed. The process for a drainage project improvement under Section 78 of the Act is as follows:

- Under Section 78 of the Act, Council appoints an Engineer to initiate a study and to prepare a report.
- On Site Meeting, notice required by the clerk of the Municipality.
- Preparation of a Preliminary Report
    - Identification of the issues to be improved.
    - The preferred method for improvement.
    - An estimate of the costs for improvement, and
    - The principles for revising, changing or otherwise adjusting the drainage schedule of cost sharing.
- Field Survey
- Detailed Design
- Final Drainage Report Preparation
- Drainage Report Review and Consideration
- Contract Tendering
- Construction
- Post Construction Final Documentation of the Drainage Report

The appointed Engineer shall conduct a drainage wide site review based on this baseline document and provide recommendations in the Drainage Report.

The preliminary Report and Engineer's Drain Report has been segregated into three sub-reports as follows:

1. Baseline Report, presents clear identification of the current drain with particular emphasis on current drain issues that are to be resolved through the improvement works. Also included in this report are environmental criteria and constraints that will or may impact the preferred solution(s).

2. Drain Hydrology and Hydraulics Assessment Report, establishes the current performance of the drain against selected standards.

3. Drain Report, proposed preferred solution including plan & profiles.

2.1 Methodology

The baseline assessment is performed from site inspections and a technical review of the available data.

The culvert inventory and assessment are preliminary at this time. Depending on the findings, more detailed assessments may be performed.

2.1.1 Drainage Objectives:

The objective of a drain is to provide a clear unobstructed flow with depth to provide adequate private drain connection outlets. The following image exemplifies a traditional "good" drain profile and cross-section with contributary flows from a tile drain connected to the drain.

Figure 4 Example of clear drain

While the figure shows clear and unimpeded flow, the following image shows an obstructed flow.

The presence of trees allowed to grow within the drain banks previously, particularly ash trees which are now dead or dying from the emerald ash borer will provide a source of wood debris that may potentially block the drain and cause backwater or other degradations in performance.

It's not desirable from an equipment and drain maintenance view point to have trees within the working allowance. The purpose of the allowance is for machine access to conduct future maintenance of the drain working from the preferred side of a drain. However, it is not environmentally sustainable or appropriate to remove all trees from the working allowance. Trees provide several benefits to the function of drains while also posing a risk to drain function depending on type of tree and placement. All trees growing within a constructed drain between the top of banks are to be avoided. Where a mature tree is already established and is an individual tree, it can be accommodated by having drainage machinery work around the tree.

New trees can be planted adjacent to a drain following two key criteria:

- The trees are planted back from the top of bank, (the exact distance is determined by tree type and local conditions).

- The trees are planted with adequate space to provide future maintenance. Grouping of planted trees is encouraged given that the spacing of the trees and the arrangement permits future maintenance. This is accomplished by providing an angled approach along the tree edge line to the drain and increasing the tree plant density only as the distance from the drain increases.

From Chatham Kent website, providing advice on tree placement within drain influences.

"Individual hardwood trees may be allowed every 100 feet. Trees of any type shall not be planted within 25' of an existing tile drain (solid tile, wrap joints) or 35' from existing open drain. In certain circumstances where an owner owns property on both sides of the open drain, upon consultation with the Drainage Superintendent, a windbreak may be permitted on one side. On existing drains where windbreaks exist, costs due to trucking material will be the direct responsibility of the owner and not the upstream ratepayers."

The presence of existing trees on an existing drain does not require a clear cut approach to improving the function of the drain. Trees can be selectively removed to achieve a drain benefit.

Individual trees that are currently healthy and with a good expectation for continued good health should be preserved and protected during construction. Trees that group both side of the drain and create an obstruction to flow are to be removed.

Tree Benefits to Drains

While trees can impede flow and through dead limbs or other debris cause problems with backwater effects, there is an overall recognized benefit for trees on a municipal drain. The primary benefit is through soil stabilization by tree roots, although it is not uncommon for a drain under a meander influence to erode the soil from under the tree roots. There are trees, such as willows, whose roots will seek out water and these trees

should be avoided along closed conduit drains, as the roots will potentially clog the drain.

There is a recognized benefit from trees to provide shade or canopy to protect the drain with standing water from having a detrimental effect on fish species. While many drains are more likely to be a habitat for warmwater species, there is a real benefit from trees providing shade. As such, there is a stated preferred side for trees based on this benefit, which is the south and west side of a drain.

2.1.2 Municipal Drains and Environmental Improvements

In the past, Municipal Drains have been created to convert functioning wetlands to functioning farmland. Examples of this can be seen at significant scales in Ontario; Holland Marsh area, Thedford area (former Lake Smith) and throughout Chatham Kent area.

There is an unquestionable contradiction between removing the water to promote farming and retaining the water to support native flora and fauna. The engineering and drainage community have come to appreciate that a straight line to the lake with the highest grade possible to move the most water the fastest off the fields may not be in the best interest of all ratepayers. There is an expectation that drainage can be used to ensure that farming practices are achieved to a reasonable extent on designated lands. However, drainage does not have to negatively impact existing native flora and fauna for the benefit of the community as a whole.

The distinction is made in the pursuit of water management strategies within the Drainage Act and not to just focus on moving water away from farmland for the benefit of landowners. The issue is managing the water cycle through all stages:

- Spring Freshet: snow meltwater runoff potentially with spring rain.
- Summer Convective storm: high intensity sudden but short and not widespread thundershowers.
- Large Air mass precipitation event: longer duration lower intensity but high yield precipitation event.
- Drought: time between precipitation events.

Water management practices change as our understanding of the hydrologic cycle and land management practices improve through research. The following describes past stages of water management practices:

- Pre- 1940 introduction of farming to areas that require drainage to grow crops. From introduction of the drainage act, areas previously identified as bogs, swamps or lakes are drained to provide high quality soil for farming.
- 1950s to 60s sought to move water off the land as quickly as possible, leading to erosion and quality problems as well as environmental degradation.
- 1970s and 80s introduced urban areas to stormwater management ponds which decreased peak runoff but increased erosion and geomorphological forms.

Ponds also increased temperature in the resulting runoff as well as changing stream chemistry.

- 1990s to 00s implemented geomorphological assessment of streams to enhance and to mimic natural systems including profile of cold water and warm water streams through modelling of baseflow contributions to runoff and baseflow management. Storm Water Management (SWM) in urban areas with a treatment train approach to water management to address both quantity and quality of runoff.

- 2010 to present features low impact development and soil conservation practices through buffer strips and low tillage practices. Low impact development practices use runoff control techniques to reduce runoff impacts through a watershed as well as controlling through end point practices such as SWM ponds.

The following figure illustrates features associated with a traditional approach to ditching or a typical view of a ditch.

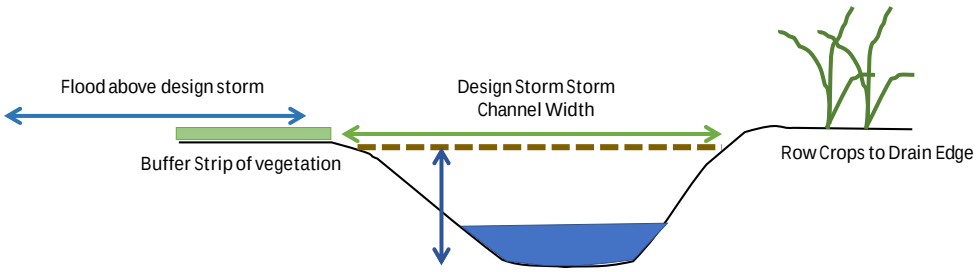


Figure 5 Cross-section ditch view

Figure 6 Trapezoidal Ditching Under Construction

The traditional ditch has the following features:

- A trapezoidal channel design with a bottom width, a depth and a top width that defines the capacity of the ditch.

- The illustration shows a farm use that occurs up to the ditch edge while the opposite bank illustrates a buffer strip of vegetation between the row crops and the ditch top of bank.

- Where the storm exceeds the ditch capacity, the flooding spills out to either side on to the ratepayer lands. The ditch requires an easement equal to the top width of the ditch, which determines the total capacity.

The following figure illustrates a naturalized channel design approach to a ditch or creek channel.

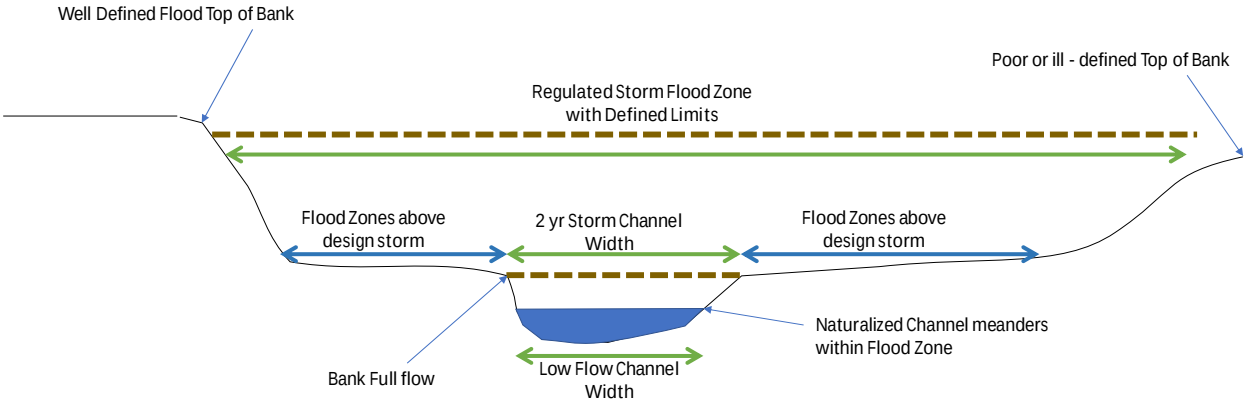


Figure 7 Naturalized Channel cross-section

Figure 8 Naturalized Channel with Pools and Riffles

A naturalized channel design has the following features:

- The natural channel has a pool and riffle design that alternates through a sinusoidal pattern defined by the size, type of watershed and geologic materials composing the watershed.

- The channel is designed to mimic a natural stream that would occur had the creek or stream occurred through geological processes.

- The area above the channel is a flood zone.

- The channel has a specific design capacity while the flood zone has a larger design capacity and the risk to flooding is defined by these capacities.

- Tree and vegetation plantings will grow into a mature canopy that provides shade at the planned locations within the flood zone.

These changes in practice and expectation have resulted in greater analysis requirements during drainage design to assess not only the basic drain performance but its potential negative or positive impact on the environment. Negative or positive impacts are regulated under various legislation within Canada but the primary bodies that implement the regulations are:

- Government of Canada Fisheries and Oceans (DFO), specifically approvals on culverts to assess potential negative impacts on fish habitats and species. Important to recognize that habitat impacts can be assessed whether the fish species is present in the specific portion of the stream or not.

- Ministry of the Environment, Conservation and Parks, (MECP), can assess habitat impacts of proposed projects that affect terrestrial or aquatic habitats (SAR). Environmental Compliance Application (ECA) if required.

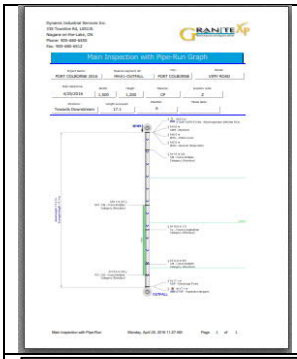
- Government of Ontario Ministry of Natural Resources and Forestry (MNRF) can assess habitat impacts of proposed projects that affect terrestrial or aquatic habitats.

- Niagara Peninsula Conservation Authority, NPCA is responsible for regulated flood zones, lands within the designated areas.

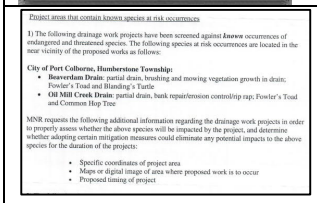
- Lastly, the Government of Ontario Ministry of Agriculture, Food and Rural Affairs OMAFRA has responsible oversight under the Drainage Act of Ontario

2.2 Document Record

The following is a list of the documents that are relevant to the Oil Mill Creek Municipal Drain.

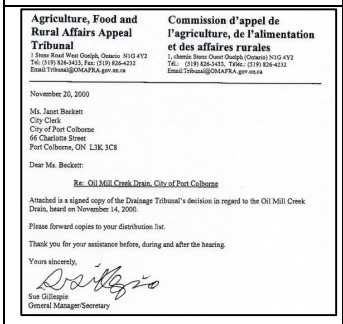


Vimy Ridge Rd. Storm System CCTV Inspection
Dynamic Industrial Services
April 25, 2015



MNR Letter to Mr. Landry
November 25, 2008
to inform of 2008 drain works screening for endangered and threatened species. Specific reference to Oil Mill Creek:

- Fowler's Toad, and
- Common Hop Tree



Agriculture, Food and Rural Affairs Appeal Tribunal
Commission d'appel de l'agriculture, de l'alimentation et des affaires rurales

November 20, 2000

Ms. Janet Beckett
City Clerk
City of Port Colborne
66 Charlotte Street
Port Colborne, ON L3K 3C8

Dear Ms. Beckett:

Re: Oil Mill Creek Drain, City of Port Colborne

Attached is a signed copy of the Drainage Tribunal's decision in regard to the Oil Mill Creek Drain, heard on November 14, 2000.

Please forward copies to your distribution list.

Thank you for your assistance before, during and after the hearing.

Yours sincerely,

Sue Gillespie
General Manager/Secretary

Drainage tribunal Oil Mill Creek held November 14, 2000

This tribunal makes the following order with respect to the Engineers report concerning the Oil Mill Creek Drain dated January 31, 2000, and the decision of the Court of Revision:

1. The engineers report and recommendations with respect to the scope of work is approved.

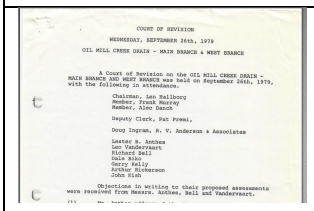
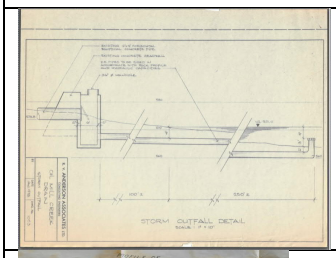
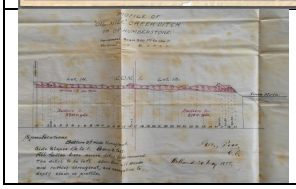
2. The $200.00 benefit assessment made against the 38 properties on the sand ridge (Roll Numbers 040-00229500 to 040-00233100 inclusive and Vimy Road) as identified in the Appendix "A" hereto shall be deleted, and the $7,600.00 of the cost of the project affected thereby shall be reallocated as set out below.

3. All parcels in the watershed shall be assigned a further $10.00 per parcel benefit assessment over the present benefit assessment as shown in the May 10 Court of Revision Schedule A (Schedule of Assessment for Construction), thereby raising $2,640.00 of the cost mentioned in the previous paragraph.

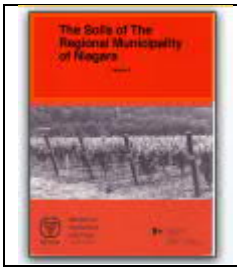
4. The benefit assessment for the four (4) following properties shall be increased in the following amounts:

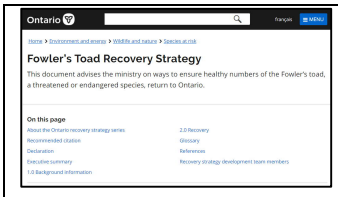
Roll No.	Owner	Amount
040-00232800	C. & C. Clemency	$500.00
040-00232900	S. & A. Turley	$1350.00
040-00233000	L. Kitney	$400.00
040-00233100	H. & C. Moore	$2710.00
		$4960.00

A summary of the total assessment to these properties is set out in Appendix B attached hereto.

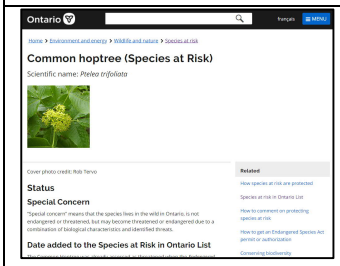
	5. That Schedule B of the Engineer's Report, being the **Schedule of Assessment for Future Maintenance**, as revised by the Court of Revision on May 10, 2000, be further revised so that each of the properties identified in Appendix A of this decision (Roll Numbers 040-00229500 to 040-00233100 inclusive and Vimy Road) shall have the benefit of a $200.00 reduction, and that the total of the assessments be adjusted accordingly. 6. That before the final passing of the By-Law, the engineer is to prepare revised Schedules of Assessment as may be required as a result of the foregoing orders. The same shall be appended to the By-Law implementing the report and this decision. 7. That except as allowed or noted herein, all other appeals made pursuant to the Drainage Act are dismissed. 8. That the non-administrative cost of the City of Port Colborne with respect to this appeal shall form part of the cost of the drainage works and there shall be no other order as to cost. And all parties shall be responsible for their own cost.
	**1979 Court of Revision** LB Anthes – allowed R. Bell – disallowed L. Vandervaart – allowed. Injuring liability assessments in the amount of $146.30 and $40.00 be credited J.Kish – disallowed G.Kelly – assessment appeal disallowed. Engineer will arrange for relocation of the ditch with the extra cost
	**Proposed Polyethylene (PE) outfall** Dated: Jan. 1978 Not constructed.
	**Profile of Oil Mill Creek Ditch Tp of Humberstone** **Geo. Ross, Welland, 30 May 1888** Nice bit of drafting from 1888.

Other Reference Works:

	The Soils of The Regional Municipality of Niagara Volume 2 Ministry of Agriculture and Food, David Ramsay, Minister Report No. 60 of the Ontario Institute of Pedology 1989



Fowler's Toad Recovery Strategy
This document advises the ministry on ways to ensure healthy numbers of the Fowler's toad, a threatened or endangered species, return to Ontario.
https://www.ontario.ca/page/fowlers-toad-recovery-strategy



Common hoptree (Species at Risk)
Scientific name: Ptelea trifoliata
https://www.ontario.ca/page/common-hoptree-species-risk

3 Oil Mill Creek Drain

This section describes the original drain design.

The Oil Mill Creek Drain Plan & Profile that is included in Appendix B includes the most recent survey conducted in 2020. The survey provides detailed information on the major road crossings and some sections with channel definition survey data are provided in key locations. The City of Port Colborne has supplemented the original survey data with RTK GPS survey of specific locations.

The drain provides service to agriculture and residential lands as shown in the following figure. The property categories are provided by GIS data from the property database.

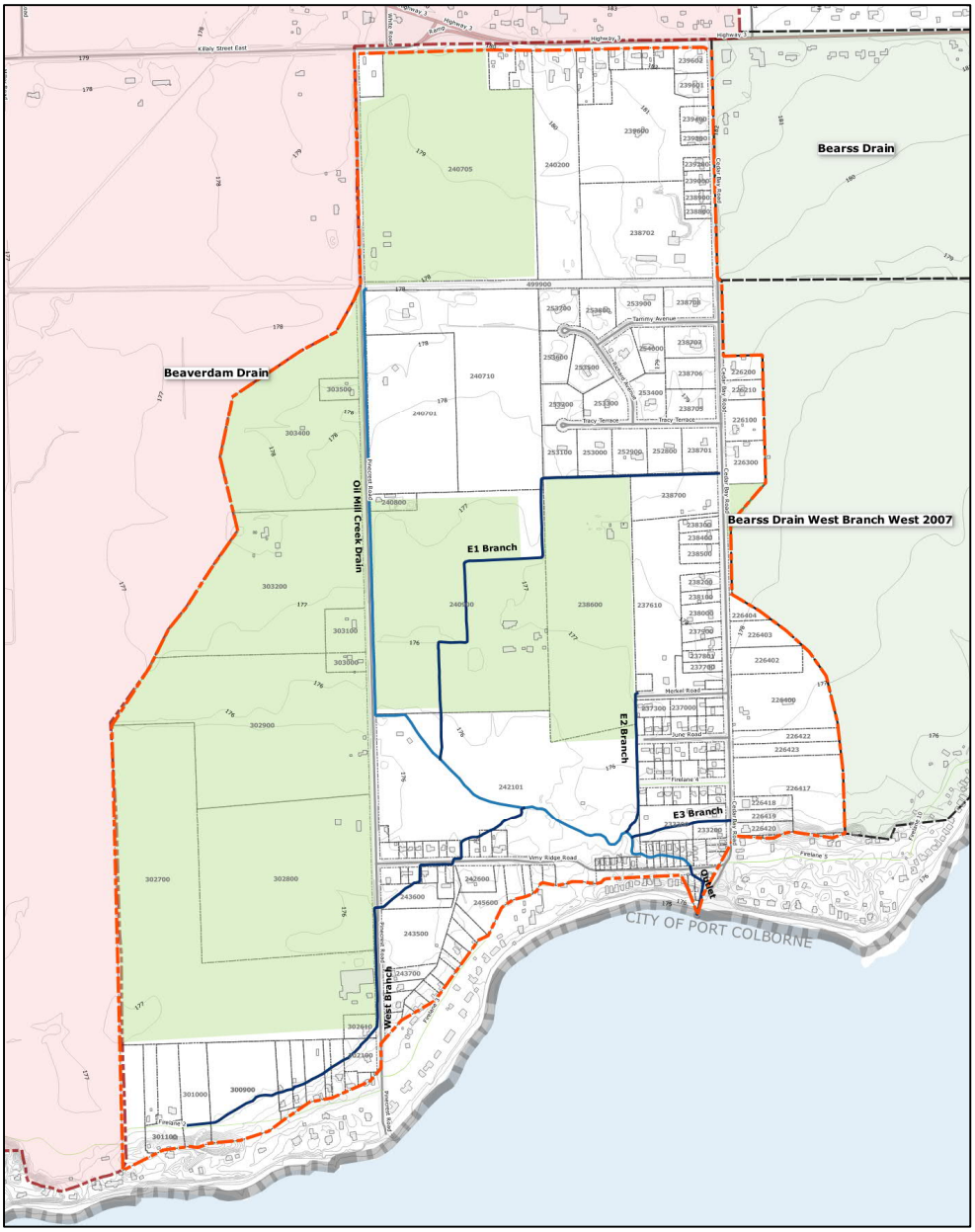


Figure 9 Agricultural Property

The agriculture areas shown in green as revealed using the 2021 orthophoto GIS view. 44% of the total catchment is visually identified as farm properties but will be confirmed by the City's property data.

3.1 Catchment Soils

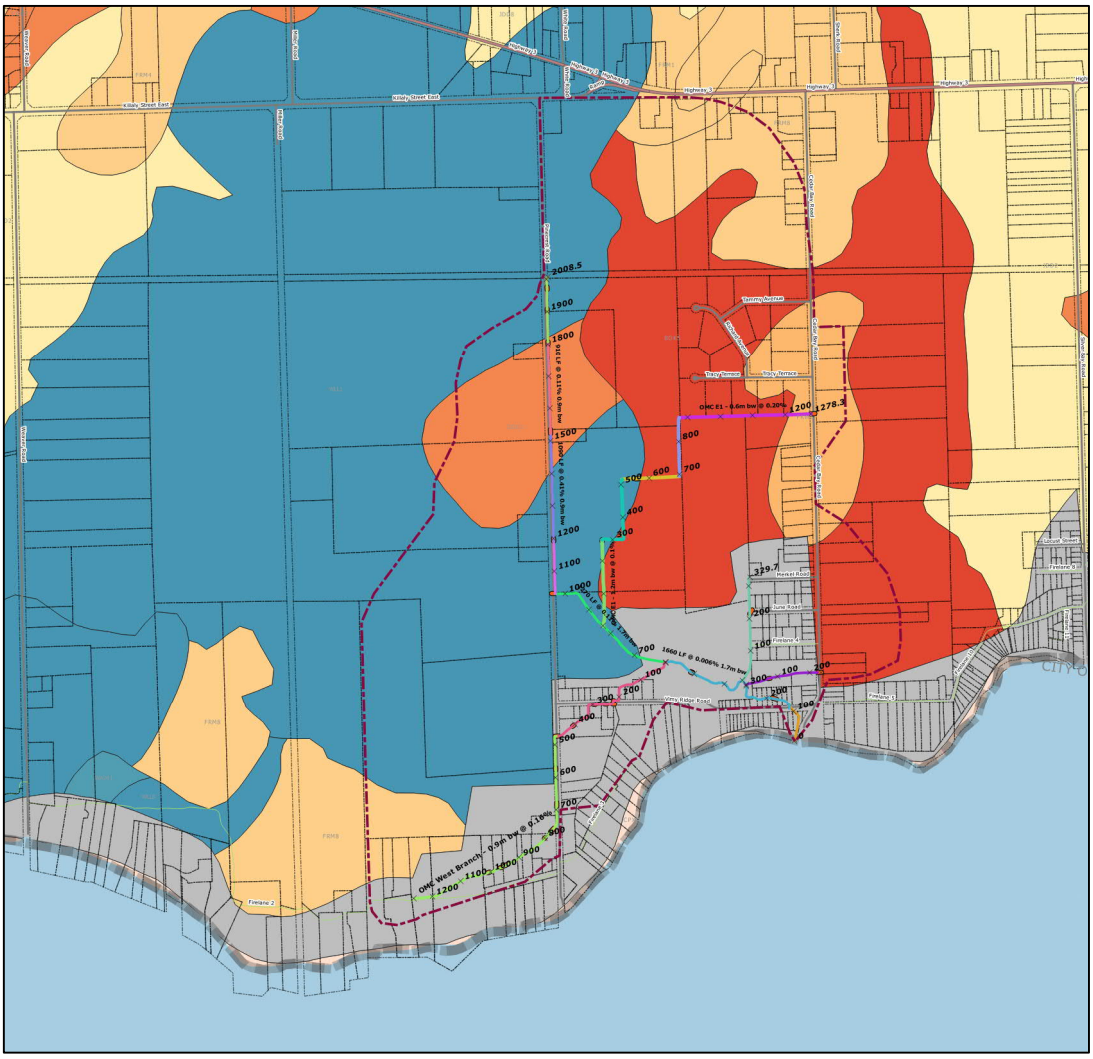


Figure 10 Oil Mill Creek Soils

The two predominate soils within the catchment are Welland Clay (blue) to the west and Bok (red) to the east with lobes of Chingcousy, Farmington and Franktown (light shades). The grey is a series labeled 'not mapped' and is generally representative of the sand dunes Lake Erie shoreline, which was deemed unsuitable for farming and thus not mapped.

Table 1 Oil Mill Creek Soils Table

BOK	Brooke Soil, 50 to100cm variable textures over mainly limestone and dolostone bedrock.
CHINGUACOUSY	Mainly clay loam till. Imperfectly drained.

FARMINGTON Loam	10 to 20cm variable textures over mainly limestone and dolostone bedrock. Drainage is rapid. Brunisolic Gray Brown Luvisol
	20 to 50 cm variable textures over mainly limestone and dolostone bedrock. Imperfectly drain. Gleyed Melanci Brunisol
WELLAND Clay	Mainly reddish-hued lacustrine heavy clay. Drainage is poor.
NM	Not Mapped, covers all of the urban area, sand dune along Firelane, the Chicken processing lands and the former golf course.

From The Soils of Regional Municipality of Niagara, volume 2, dated 1989, from which the GIS data is shown.

The Drain conveyance is for a main drain with branches. Branches can be one of four possible types of branches:

- Municipal Branch Drain connection; forms part of the regulated drain with schedule assessments reflecting area, connection adjacency, etc. The Oil Mill Creek Drain possesses four such identified branch drains.

- ROW ditches that connect to the Drain but are not part of the regulated drain.

- Private drain connections that depend on the Municipal Drain but are not part of the Drain. Ideally, each of these will have an established and recognized connection elevation to suit the upstream grade.

- Municipal Drain Features that form part of the drain but are technically ancillary to the drain itself. Examples include:
  - Flood Gate Control structures, including flap gates,
  - Pumping stations,
  - Water Quality control features such as;
    - Stormwater Management Control Ponds,
    - Sediment Basins,
    - Drain related wetlands, and
    - Other runoff quality control measures.
  - Culverts and Bridges.

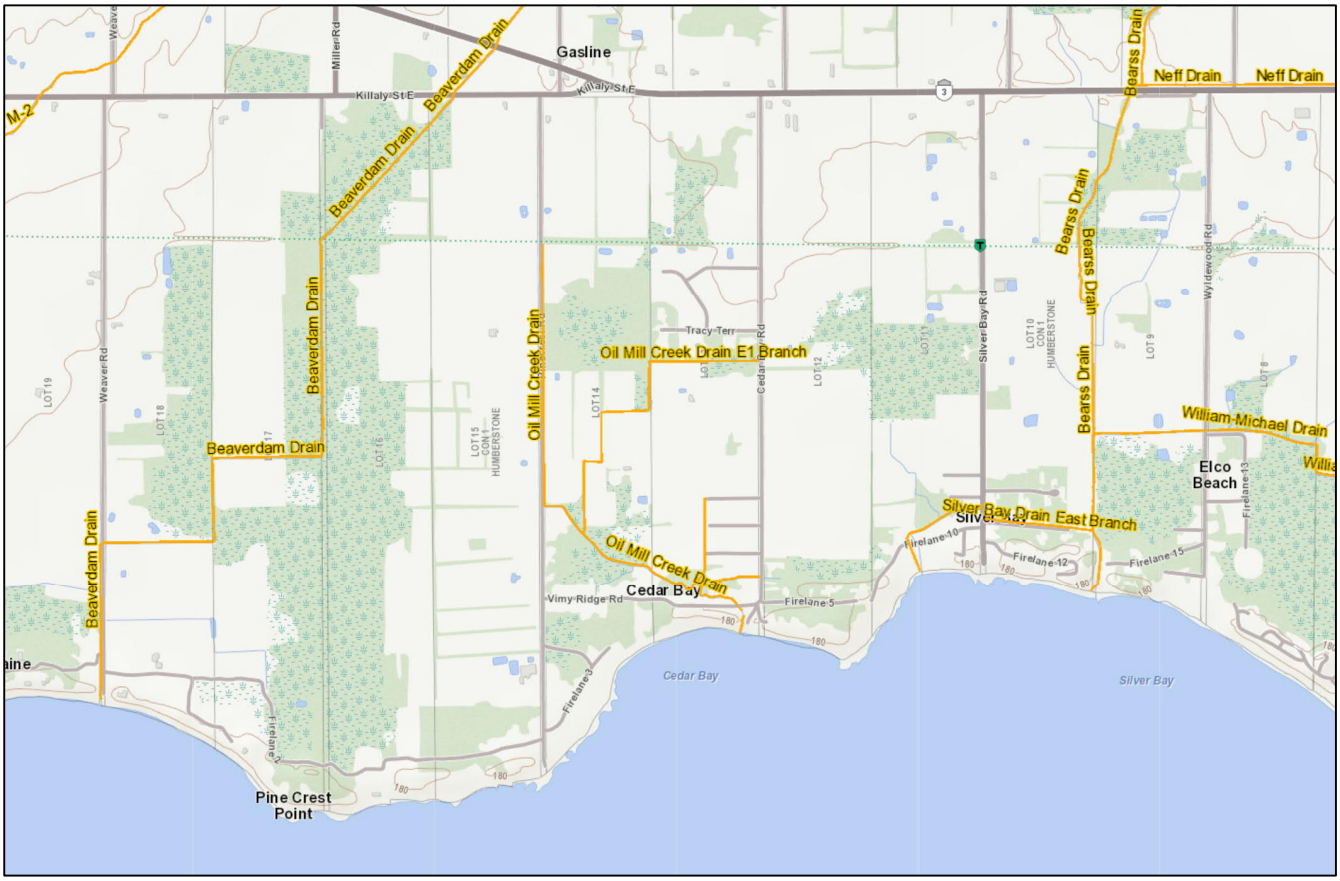


Figure 11 AgAtlas Adjacent Drains

Generally, the drainage system has a well defined course throughout its length, consisting of natural open water courses, artificially made open ditches, roadside ditches, and roadway and private crossings. Typically, the channel cross-sections are well defined, trapezoidal in shape, with typically steep to almost vertical side slopes in variable depths and lengths.

3.2 Drainage Needs

Maintenance Activities Performed Under an Existing Engineer's Report may include:

- Brushing of banks and work zone
- Bottom cleanout of sediment and debris
- Culvert repairs
- Erosion control
- Catch basin repairs
- Tile flushing

Construction Activities Requiring an Engineer's Report may include:

- Construction of new tile drains
- Construction of new culverts
- Realignment of open ditches
- Wetland restoration projects
- Excavation and brushing of open ditches

The opportunity to add water quality control features as part of the drain should be investigated and assessed wherever the opportunity is identified. Where such features may require future maintenance, such as sedimentation basins, the Engineer's report is to be explicit on frequency and trigger points for maintenance activities.

3.3 Condition Appraisal

The following describes the existing open channel condition through the drain and the structures that are a key feature of the drain.

3.3.1 Drain Grade

The east – west portions of the Drain are generally low grades with the middle of the Drain extending north that has a better grade lines for flow.

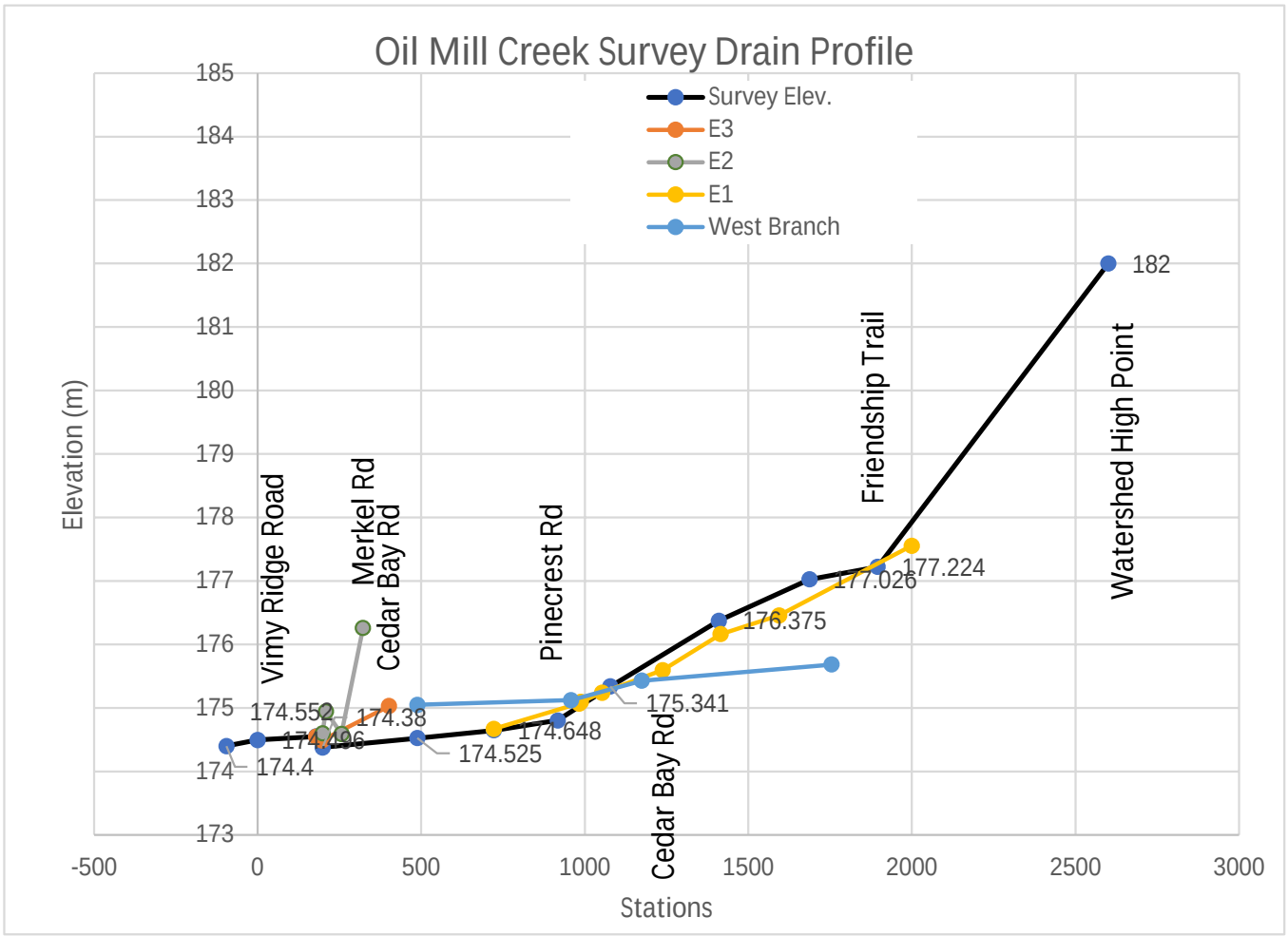


Figure 12 Oil Mill Creek Drain Profile

3.3.2 Oil Mill Creek Outlet Structure

The Oil Mill Creek Outlet Structure is designed to reduce seiche event water levels from driving back into the drain.

Figure 13 Oil Mill Creek Outlet Structure

The primary outlet elements include the follow infrastructure features:

1. Large Concrete block J hook break wall installed to protect the concrete structure from shove ice in the winter storms.
2. Steel Grate with winch to open installed on a 15 degree angle over a 2.6m x 3.8m concrete trapezoidal outlet
3. 1800x1200 Oval Concrete Pipe
4. Concrete chamber Access structure
5. 1870x1270 Oval Concrete Pipe
6. 2.5m concrete manhole pump chamber with 250mm discharge pipe to outlet
7. 1870 x 1270 Oval Concrete Pipe
8. Flap Gate was installed to protect flooding into the drain from the lake seiche/surge. Open and closing of the gate is by winch.
9. 1790x1300 Arch Aluminized Steel Pipe
10. Concrete box culvert crossing Vimy Ridge Rd
11. Steel Grate on entrance to culvert

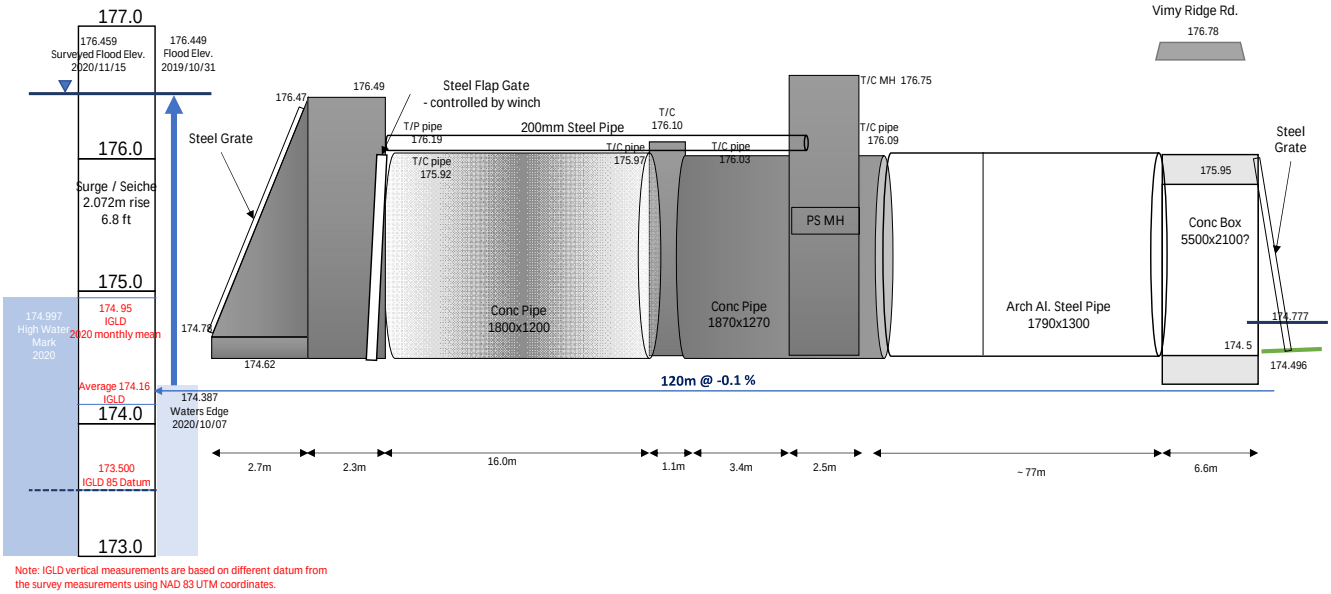


Figure 14 Oil Mill Creek Outlet Profile

A large format copy of this outlet drawing is included in Appendix B, see drawing OM-P6.

The outlet as designed is a good arrangement for discharging by gravity to the lake. There is the issue that the outlet invert located on the north side of Vimy Ridge Rd. is lower than the lip of the outlet to the lake, which compromises the outlet as a positive grade to the lake infrastructure. The reverse grade is 0.12m height lost over 120m of distance. There are some key infrastructure items that are currently non-functional and/or compromised.

- The existing grate covered trapezoidal concrete discharge is in reasonable condition but experiences intrusion of drift sand requiring maintenance to keep the ‘throat’ of the outlet clear. There is regular maintenance on the winch that is required to maintain access into and out of the outlet.

- Pump Manhole is a 2.5m concrete manhole with a steel accessway (hatch) on the top for ingress. There is no pump installed and the 250mm discharge pipe is rusty but does not appear to be compromised (a site inspection is planned as part of the Drain Report). While this part of the outlet is not currently functioning, it does not obstruct the existing performance of the outlet. An assessment of the pumping arrangement and associated benefits will be made in the Final Report.

- The CCTV inspection, performed in 2015, recorded several cracks within the existing concrete pipes. These cracks should be monitored and re-inspected again in 2026 to assess if they are stable or increasing.

- Flap Gate is installed to prevent high lake levels from moving water inland into the drainage system, ‘flowing backwards’. This infrastructure is working but requires inspection to confirm the function and if improvements can be identified such as seats to prevent water from flowing in during highwater events, (seiche). Currently, the winch and cable controls open or closing of the flap gate.

During these seiche and storm events where the lake levels are pushed high over short duration periods (3 to 8 hours), the static level has been noted as high as 176.5 from survey's of inland impacts in the neighboring municipality, Fort Erie. The dynamic impact elevation is not known but is considered to be higher than the static level. This varies with the rise and fall of lake levels.

Lake Erie Levels

In geologic time, Lake Erie levels have varied depending on glaciation and on the various flow sills that have existed into and out of the Great Lakes basin. These sills have changed in elevation as landforms rebounded from the effects of glaciation. In the modern period, Lake Erie levels are dominated by flows from Lake Huron and out of Lake Erie into the Niagara River and Welland Canal system.

The following historic Lake levels are provided by the Government of Canada's Fisheries & Oceans Hydrographic Service based on 100+ years of monitoring data and statistics. The values are quoted in monthly mean water levels reference to IGLD 1985.

Yearly Average	Minimum Monthly	Maximum Monthly
174.15	**173.18**	**175.04**

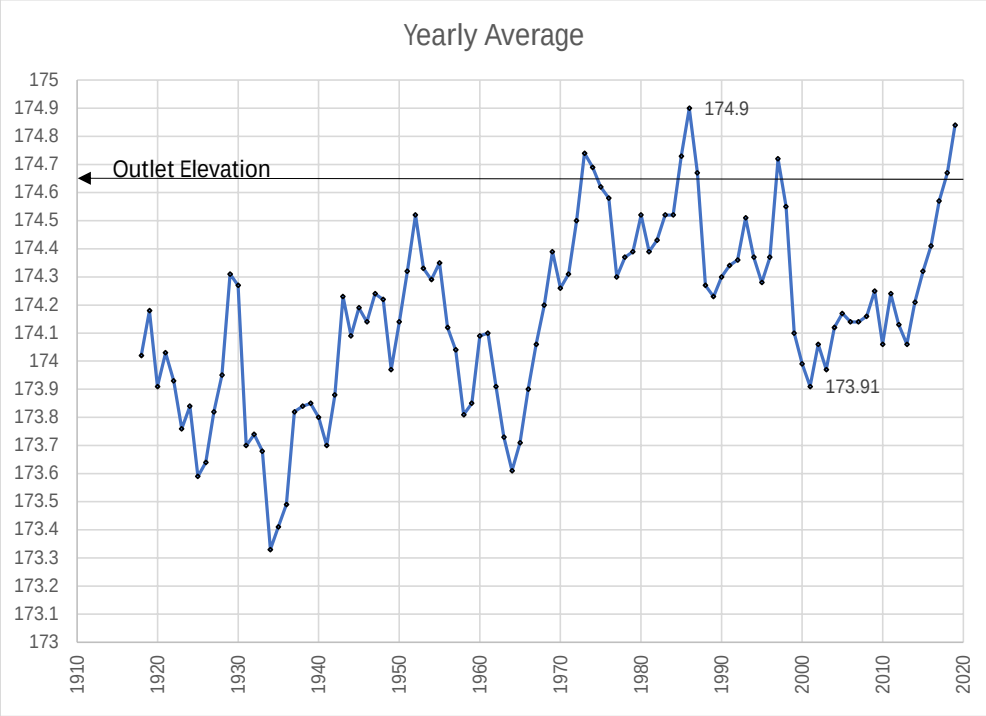


Figure 15 Lake Erie monthly mean water levels, m to IGLD 1985

The chart shows that for the past two years, water levels are above average conditions. Adding wave set up to this further influences the Oil Mill Creek Drain outlet.

Cedar Bay

Lake Erie water quality effects and the potential cause (or causes) is too large and significant of a topic to be covered in this report. Lake Erie phosphorous levels, Algae blooms and hypoxic zones within the Lake are well documented but these are larger lake scale effects than the observed localized effects within Cedar Bay; however, a relationship between all aspects of the Lake cannot be excluded nor is it reasonable to just focus on the Municipal drains as a contributor to water quality concerns. However, it is reasonable to expect that the municipal drain would be designed to not only enhance drainage for upstream ratepayers but also to enhance water quality or to mitigate through design the potential negative effects of runoff. Contributory to these concerns would be changes in land use in upstream areas along with changes such as Climate Change that affect both precipitation events and also heating impacts between events.

3.3.3 Channel Grades

The survey provides a physical measurement of the existing drain channel grade lines for comparison against the original design completed by RVA in 1979. The survey is potentially showing the changes created by maintenance work completed in 1980s, 2010 and the last maintenance was in March 2019, which is a deeper channel as shown in Figure 16 Oil Mil Creek Drain Channel Grades Existing vs Design, (blue arrows are the surveyed grades).

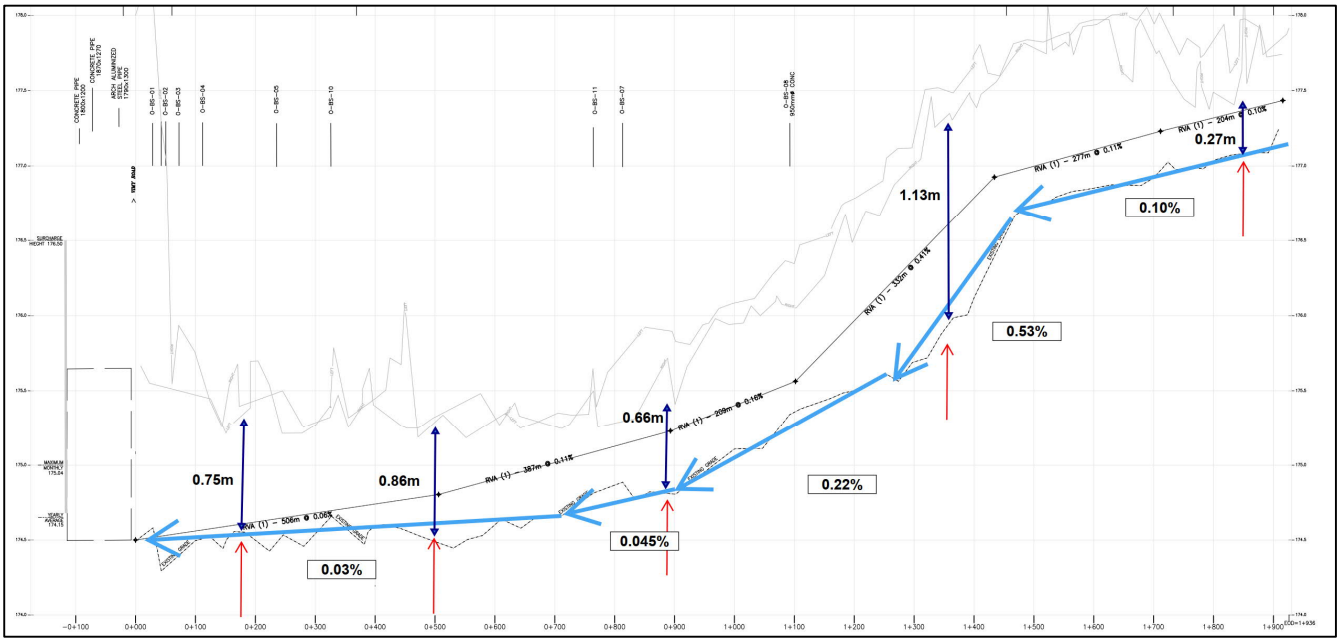


Figure 16 Oil Mil Creek Drain Channel Grades Existing vs Design

From the survey, it would appear as though the channel was deepened from 0+400 to 1+100 with significant deeper works completed around 0+800 to 0+900. There is the original design work presented in feet which was converted to metric and sometimes presents at a different survey reference height. While the deeper channel may have increased the capacity of the channel by a small amount the lower grade through the last 700m of the drain to the inlet of the box culvert on Vimy Ridge Rd. which creates a flat water or very small positive grade towards the outlet. This compromises the drain by reducing the slope of the channel which has a more significant impact on capacity than the relatively small increase in depth and cross-sectional capacity.

3.3.4 Channel Condition

From the survey of the Drain, there were 16 cross-sectional surveys selected as x-sections to be analyzed. The chart of x-sections included in Appendix B shows the calculated flow achieved for each x-section. The hydraulic model was implemented using depth data and bottom-width data for each of the channel links in the model.

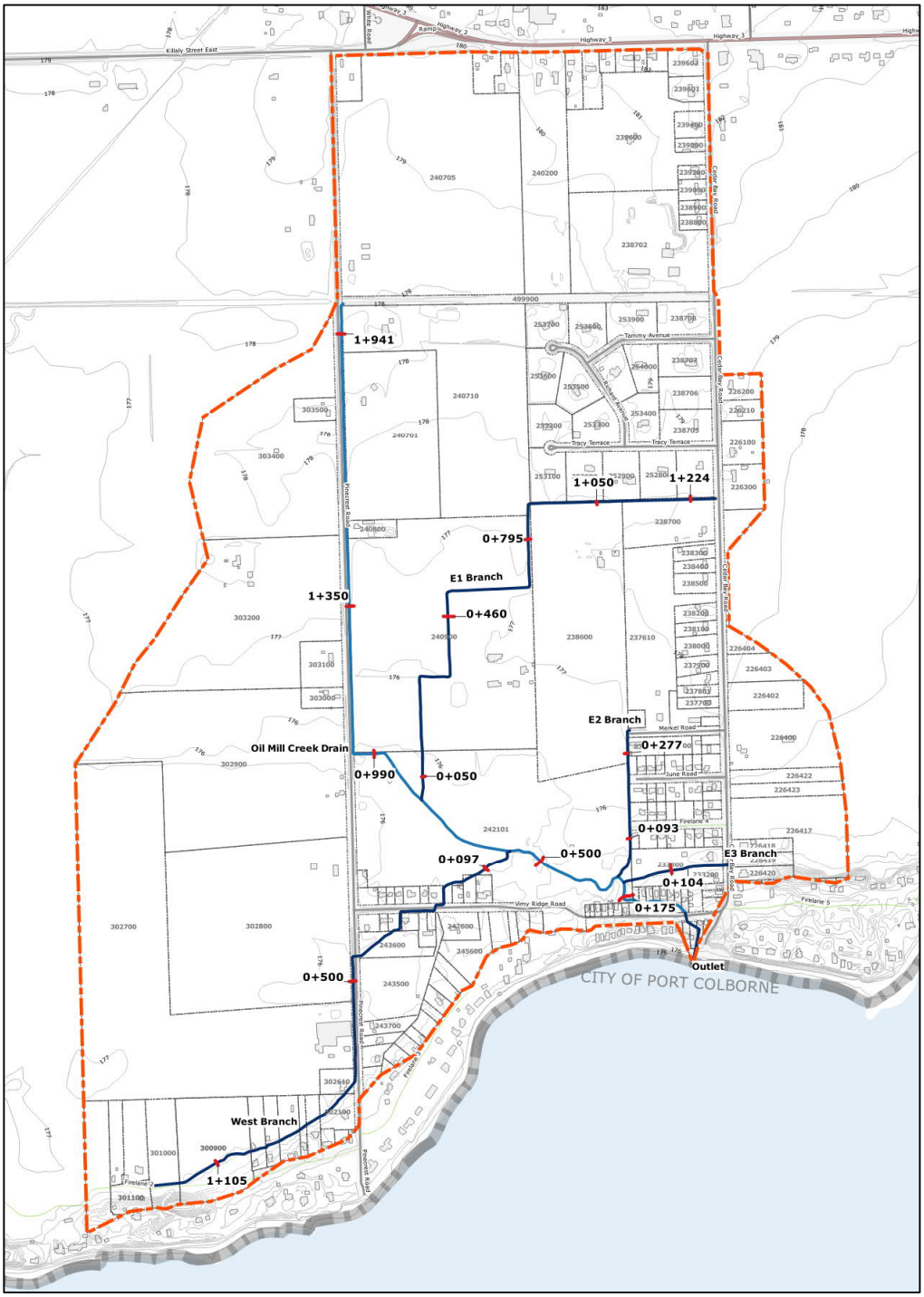


Figure 17 OMC Drain X-sections

Drain X-sections are shown looking upstream. From this chart, the following basic channel properties are calculated.

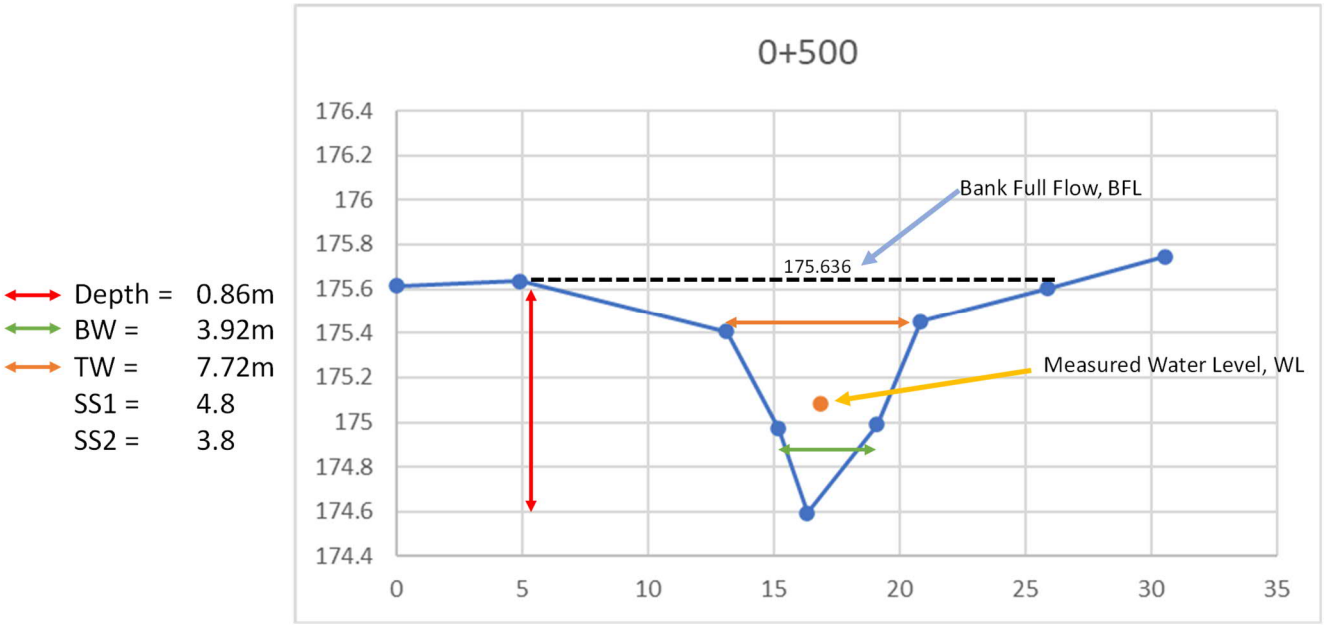


Figure 18 X-section OMC 0+500

The Design Slope for each section is shown on the Baseline Drawing profiles, which for this section is shown to be 0.0006.

Capacity of the channel is influenced by the selection of the Manning's 'n' used in the formula. There's significant information available for selecting 'n' but the following shows the range of values for a 'natural' stream.

- Natural streams - clean and straight 0.030
- Natural streams - major rivers 0.035
- Natural streams - sluggish with deep pools 0.040
- Natural channels, very poor condition 0.060

From the MTO Drainage Manual the suggested value for n of an earth channel with grass and some weeds is 0.030 to 0.035. This compared to the following for a "not maintained" channel:

- Clean bottom, brush on sides 0.05 - 0.08
- Some weeds, heavy brush on banks 0.05 – 0.07
- For tree within channel with branches submerged add 0.01 to 0.02.

The capacity of the existing channel can be determined from these values based on the survey and past design information. This hydraulic analysis is presented in the Oil Mill Creek Watershed Report.

Table 2 Channel Capacities, cubic metres per second

Oil Mill Creek			WB Branch Drain			OMC E1 Branch			OMC E2 Branch			OMC E3 Branch		
STA	Upstream Area	Capacity Q, cms	STA	Upstream Area	Capacity Q, cms	STA	Upstream Area	Capacity Q, cms	STA	Upstream Area	Capacity Q, cms	STA	Upstream Area	Capacity Q, cms
0+175	259.8	1.085	0+097	56.5	1.282	0+050	57.1	0.746	0+093	15	0.533	0+104	12.4	0.599
0+500	228.0	1.516	0+500	49.0	0.430	0+460	48.8	0.941	0+277	9.5	0.469			
0+880	95.2	1.131	1+105	6.5	0.204	0+795	30.7	0.830						
1+350	47.3	3.062				1+050	10.8	0.771						
1+841	45.3	0.061				1+224	8.3	0.204						

3.3.5 Oil Mill Creek Drain Structures

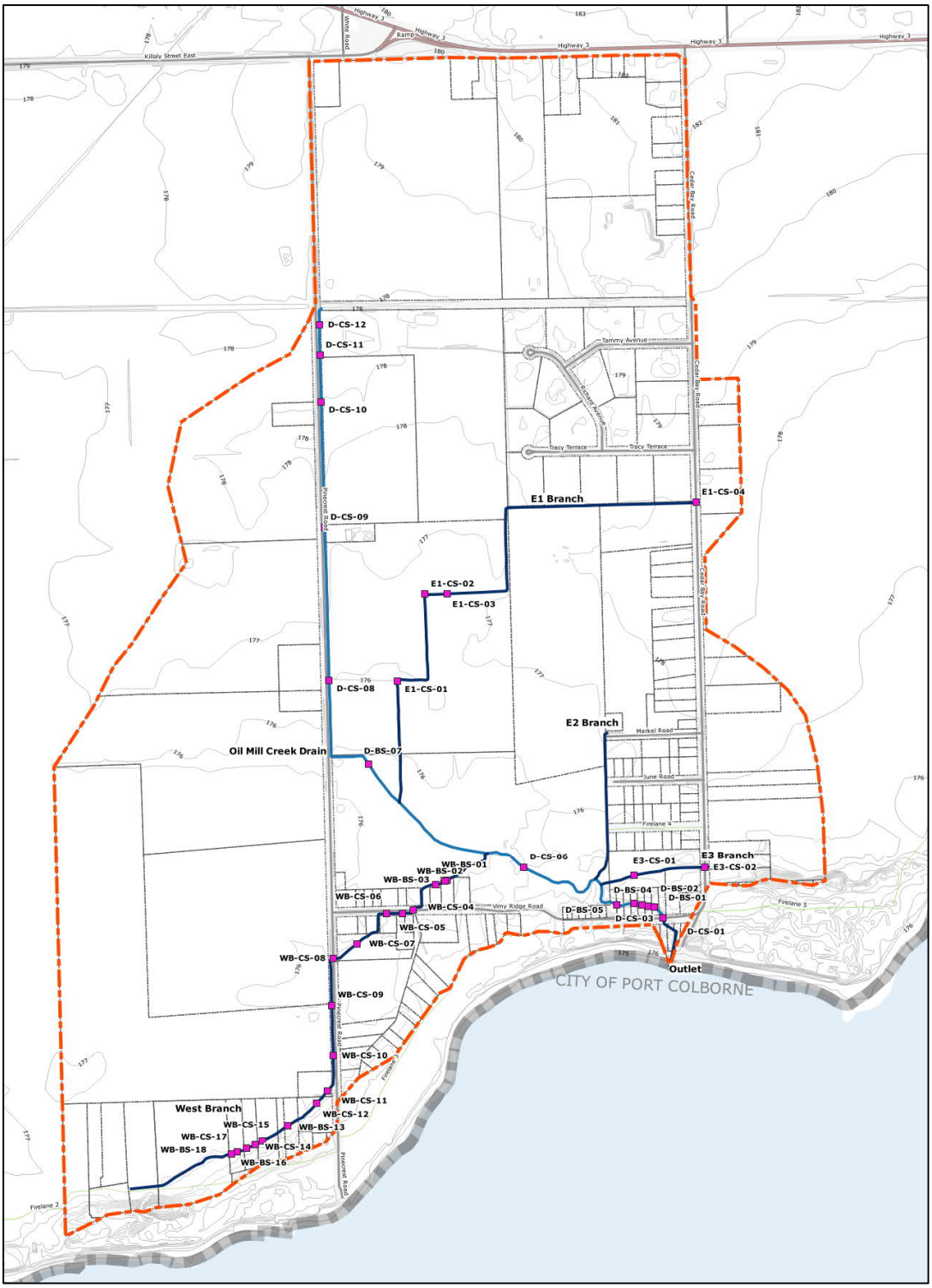


Figure 19 Oil Mill Creek Bridge and Culvert Drain Structures

Culverts are organized into two classes; those that are part of the drain and those that complementary to the drain but assigned to the Road Right of Way (ROW) for their functional purpose and assessment. ROW culverts are not part of the drain and thus not assessed.

Table 3 Oil Mill Creek Drain Culverts

NameID	Crossing	Crossing Height	Drain	Culv_type	Culv_desc	num_culv
E1-CS-01			E1 Branch	Culvert	CSP 750	
E1-CS-02			Private connection	Culvert	CSP 300	
E1-CS-03			E1 Branch	Culvert	CSP 600	2
E1-CS-04			E1 Branch	Culvert	CSP 600	
E3-CS-01			E3 Branch	Culvert	HDPE 2W 450	
E3-CS-02			E3 Branch	Culvert	PE 450	
O-BS-01		176.339	Oil Mill Creek Drain	Bridge	BO 10.8x1.76	
O-BS-02		175.862	Oil Mill Creek Drain	Bridge	BO 9.00x1.57	
O-BS-04		175.748	Oil Mill Creek Drain	Bridge	BO 3.3x1.14	
O-BS-05		175.872	Oil Mill Creek Drain	Bridge	BO 5.9x1.38	
O-BS-07		175.88	Oil Mill Creek Drain	Ped Bridge	BO 4.3x1.00	
O-CS-01	Vimy Ridge Rd	176.782	Oil Mill Creek Drain	Conc Box	ConcBox 3500x2100	1
O-CS-03			Oil Mill Creek Drain	Culvert	1400	1
O-CS-06	Centennial Park Entrance		Oil Mill Creek Drain	Culvert	CSPA 1600x1200	2
O-CS-08		176.432	Oil Mill Creek Drain	Culvert	Conc 950	1
O-CS-09			Oil Mill Creek Drain	Culvert	PE 750	1
O-CS-10			Oil Mill Creek Drain	Culvert	CSP 750	1
O-CS-11			Oil Mill Creek Drain	Culvert	CSPE 900x600	1
O-CS-12			Oil Mill Creek Drain	Culvert	PE 600	1
WB-BS-01	Private Lane		West Branch	Bridge		
WB-BS-02			West Branch	Bridge		
WB-BS-03			West Branch	Bridge		
WB-BS-13	Firelane 2		West Branch	Bridge		
WB-BS-16	Firelane 2		West Branch	Bridge		
WB-BS-18	Firelane 2		West Branch	Bridge		
WB-CS-04	VIMY RIDGE RD.		West Branch	Culvert	CSP E 600x900	
WB-CS-05	#2595 VIMY RD. DRIVEWAY		West Branch	Culvert	CSP Arch 600x800	
WB-CS-06	#2555 VIMY RD. DRIVEWAY		West Branch	Culvert	CSP Arch 600x900	
WB-CS-07	PRIVATE DRIVEWAY		West Branch	Culvert		
WB-CS-08	PINECREST RD.		West Branch	Culvert	CSP Arch 550x900	
WB-CS-09	462 PINECREST RD. DRIVEWAY		West Branch	Culvert	CSP 450	
WB-CS-10	462 PINECREST RD. DRIVEWAY		West Branch	Culvert	CSP 600	
WB-CS-11	446 PINECREST RD. DRIVEWAY		West Branch	Culvert	CSP 450	
WB-CS-12	426 PINECREST RD. DRIVEWAY		West Branch	Culvert	CSP Arch 550x900	
WB-CS-14	2366 FIRELANE 2		West Branch	Culvert	CSP 450	
WB-CS-15	2334 FIRELANE 2		West Branch	Culvert	PE 300	
WB-CS-17	316 FIRELANE 2		West Branch	Culvert	CSP 350	

Of these culverts, D-CS-01 crossing Vimy Ridge Rd. a CIP Concrete Box culvert has an Ontario Structure Inspection Manual (OSIM) inspection in 2019 that confirms the existing structure is stable but excludes direct inspection from the inlet grates being closed during the inspection.

Table 4 OSIM Inspection Summary Vimy Ridge Rd. D-CS-01

Ontario Structure Inspection Manual - Summary Report

Structure Name **OIL MILL CREEK DRAIN LOT 13**

Element Group	Element Name	Unit	Quantity			
			Good (5%Unit)	Fair (25%Unit)	Poor (75%Unit)	Total (Weighted)
Culverts	**Barrels**	**Sq.m.**	**30.8**	**0**	**0**	**1.54**
Comments	Limited inspection due to grate blocking way, however no performance deficiences were noted.					
Culverts	**Inlet Components**	**N/A**	**9.25**	**2.5**	**0**	**1.0875**
Comments	Light to medium scaling throughout inlet. Grate has been replaced since last inspection					
Decks	**Wearing Surface**	**Sq.m.**	**100**	**10**	**0**	**7.5**
Comments	Light asphalt cracking.					
Embankments & Streams	**Streams and Waterways**	**All**	**1**	**0**	**0**	**0.05**
Comments	Stream does not continue on both sides of the culvert.					
Foundations	**Foundation (below ground level)**	**N/A**	**0**	**0**	**0**	**0**
Comments	Foundation is not visible, but seems to be in stable condition.					
Retaining walls	**Walls**	**Sq.m.**	**14**	**1**	**0**	**0.95**
Comments						

3.4 Overall Drain Performance

The following sections describe the existing Oil Mill Creek Drain and compliance with accepted design standards and practices.

- Compliance with design objectives; the drain is providing a service to all ratepayers within the watershed on a multi-objective basis that includes both quantity and quality objectives.
- Report on design storm criteria
    - Quantity criteria are considered to be acceptable risk factors:
        - 1 in 2 year flood for channels through agricultural lands.
        - 1 in 5 year flood for channels through residential fringe lands.
        - 1 in 5 year flood of private crossings.
        - 1 in 10 year flood for Port Colborne road crossings.
        - 1 in 25 year flood of Regional Road crossings.
        - MTO crossings are required to meet MTO guidelines for highway crossings, (refer to MTO Highway Drainage Design Standards, January 2008)

- Quality Objectives include:
    - Suspended Solids and Sediment (often referred to as Total Suspended Solids or TSS) TSS is often related to types of agricultural practices and the presence or absence of drain buffers that reduce direct runoff contributions of TSS. Mitigations through effective design and practices are recommended for implementation in the Design Report.
    - Phosphorous and Nitrogen are nutrients and part of the natural cycle. They are applied to farm land as commercial fertilizers that may runoff and cause excess growth of aquatic plants that affect watershed and receiving water as an ecosystem. Reductions at source is the best practice but practices including the use of wetlands aid in treating excess contributions of these nutrients to the watershed and receiving waters.

3.4.1 Quantity Issues

Figure 23 NPCA supplied Regulated Flood limits and Areas shows the forecasted regulated flood limits and a map based figure of flood lines is included in Appendix D.

For more detail on the modelling of predicted flows refer to the Oil Mill Creek Hydrology and Hydraulics Report.

3.4.2 Quality Issues

The following measures are the generally accepted techniques for improving water quality in a watercourse:

In general, the specific restoration measures recommended can be summarized into the following categories:

- Buffer plantings;
- Channel modifications;
- Wetland creation; and
- Using existing wetlands during high water events.

3.5 Environmental Appraisal

The improvement of the drain should be performed while minimizing or mitigating any negative environmental effects. The existing drain has been functioning in much the same way as it is now for more than 100 years and is proposed to continue to function.

The Port Colborne area has environmental issues historically that are well documented. The relevant issues for the Oil Mill Creek drain are:

- Water Quality in the receiving water of Lake Erie.

3.5.1 Ministry of Natural Resources and Forestry

The recommendation from MNRF was to conduct the three activities of:

I. Habitat Inventory

II. Potential Species at Risk (SAR) on the property

III. SAR Surveys

Each of these activities will be given consideration during the design phased to identify potential constraints that impact the existing drain and any proposed improvements.

3.5.1.1 Species At Risk (SARs)

The following is the information provided by MNR for designated species at risk within the project area.

Table 5 Species at Risk Designation for Port Colborne Area

Species At Risk Designations	
ENDANGERED	
THREATENED	
SPECIAL CONCERN	
EXTIRPATED	
AMPHIBIANS	
Fowler's Toad (*Anaxyrus fowleri*)	Known to Occur
BIRDS	
Barn Owl (*Tyto alba*)	Suspected to Occur
Black Tern (*Childonias niger*)	Known to Occur
Bobolink (*Dolichonyx oryzivorus*)	Suspected to Occur
Cerulean Warbler (*Dendoica cerulea*)	Known to Occur
Chimney Swift (*Chaetura pelagica*)	Suspected to Occur
Common Nighthawk (*Chordeiles minor*)	Suspected to Occur
Least Bittern (*Ixobrychus exilis*)	Known to Occur
Peregrine Falcon (*Falco peregrinus*)	Known to Occur
Short-eared Owl (*Asio flammeus*)	Known to Occur
FISH	
INSECTS	
Monarch Butterfly (*Danaus plexippus*)	Known to Occur

The drainage works, as considered from past works and general construction practices are not forecast to impact bird species in any direct way. There is a clear risk of work in and around the drainage system that could impact amphibians and reptiles and for this we will specify mitigating measures to be implemented during construction.

Those mitigation measures may include:

- Pre-construction survey to confirm that no species at risk are present and/or put at risk through construction. The pre-construction survey will be conducted within a specific time window relative the construction work being undertaken.

- Intervention during construction will occur if a reptile or amphibian is found within the construction site. A qualified person will assess the animal and determine if it is or is not a species at risk and a local re-location effort will occur.

3.5.2 Federal Species at Risk (SAR)

The SAR from the Federal web site listing for Ontario location is provided in Appendix C. Not all species will be likely to occur in the Port Colborne area, and not in the specific habitats of the Oil Mill Creek Drain. The contractor will be directed to this information with a requirement to ensure that no species at risk are adversely affected.

3.5.3 Fisheries

The long history of the drain confirms that the works being considered are unlikely to cause a change in environment that is distinctly different from what is currently in existence.

From the DFO and the Ontario Agricultural Information Atlas the Oil Mill Creek drain classification (see figure below) is as a Category F Drain.

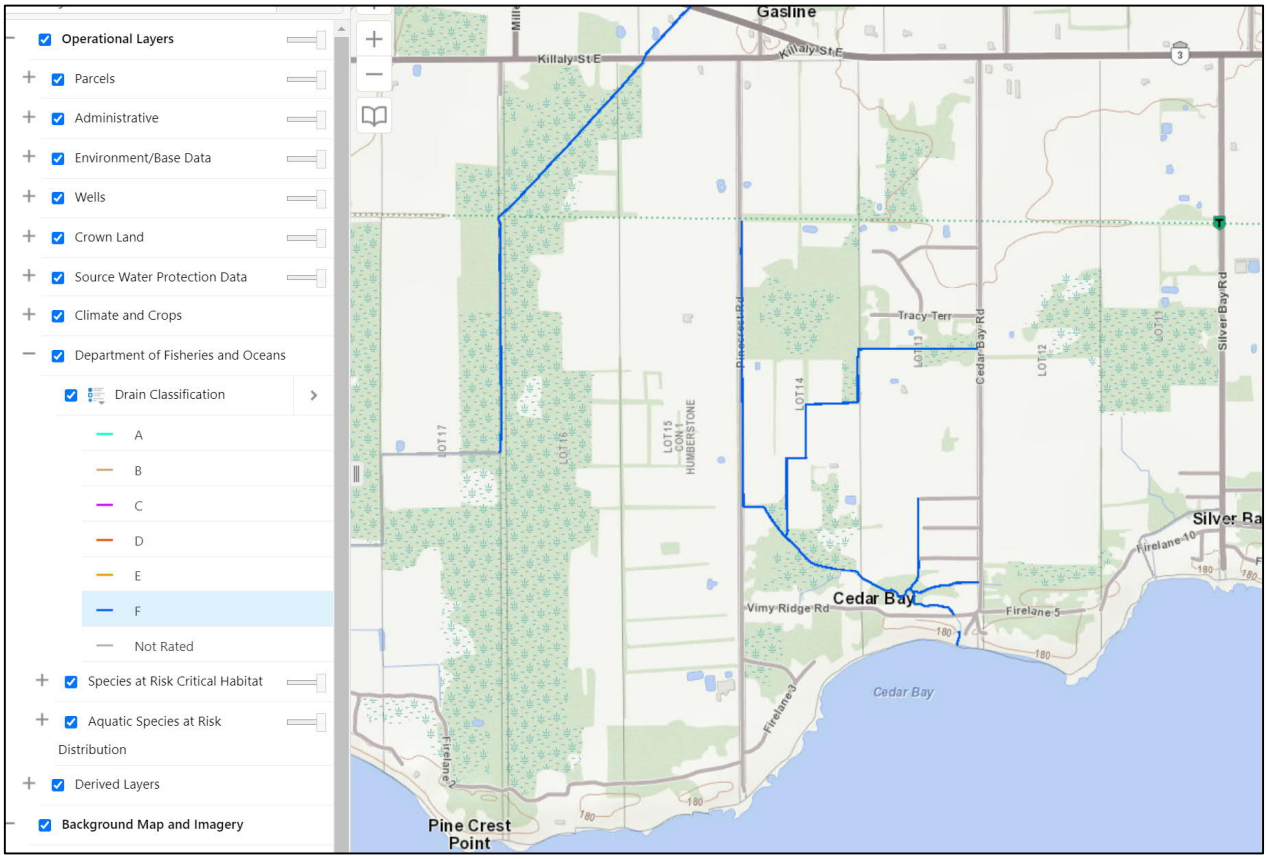


Figure 20 Ontario Agricultural Information Atlas – DFO Drain Classification

From DFO Advisory Report 2013/061

Agricultural watercourses in Ontario have been designated as municipal drains. To streamline regulatory processes for maintenance works, these watercourses are classified based on temperature, permanency of flow, and fish species present. Currently, maintenance works on three drain types require a site specific review by Fisheries and Oceans Canada (DFO) including Types D and E drains. These drain types contain sensitive fish species or may have species at risk (SAR) present and/or mapped critical habitat [includes fishes and/or mussels that are listed as Threatened or Endangered under the Species at Risk Act (SARA)]. These three drain types are more sensitive to municipal drain maintenance works, which typically involve dredging the bottom of the drain and removing excess sediment. Drain types D and E are classified based on temperature and fish data that have been collected in the field. SAR presence is determined by using the Species at Risk Maps, or by detecting species at risk during fish sampling. If either source indicates the presence of SAR, then a SAR class will be applied.

Table 1. Summary of key characteristics of each drain classification.

TYPE	Flow	Spawning Period	Species	Time Since Last Clean-out	Authorization
A	Permanent	Fall or Combination Spring / Fall	No sensitive fish species present	N/A	Class A
B*	Permanent	Spring	Sensitive species present	Less than 10 years	Class B
C	Permanent	Spring	No sensitive species present	N/A	Class C
D	Permanent	Fall or Combination Spring / Fall	Sensitive species present	N/A	Project specific
E	Permanent	Spring	Sensitive species present	N/A	Project specific
F	Intermittent	N/A	N/A	N/A	None required (work done in dry or low flow)
Not Rated	Unknown	Unknown	Unknown	Unknown	Site specific or assess drain
SAR	N/A	N/A	Species at risk present	N/A	Site specific

* Note: No new Class B drains will be assigned, and any existing Class B drains will not change classification unless new data becomes available to support the reclassification to Class A, C, D, or SAR. Time since last clean out is no longer collected as part of the Drain Classification Project as per a decision made by the Drainage Action Working Group in 2010.

3.5.4 Migratory Birds Convention Act

The Migratory Birds Convention Act, 1994 (MBCA) provides protection to migratory birds, their eggs and nests. The Act is Federal and administered by Environment Canada and Climate Change Canada (ECCC).

From their website the following identifies two primary consideration for the drain improvement works considered for Oil Mill Creek

- General Nesting period mid-March to late August (with regional variations.)
- Exceptions include:

- Species that may nest earlier, such as Great Blue Heron and American Woodcock in March, or those which may nest later such as Cedar Waxwing, Bohemian Waxwing, Pine Siskin, American Goldfinch, Common Murre and Great Blue Heron until the end of September, or Leach's Storm-Petrel, Fork-tailed Storm-Petrel and Northern Gannet in October;

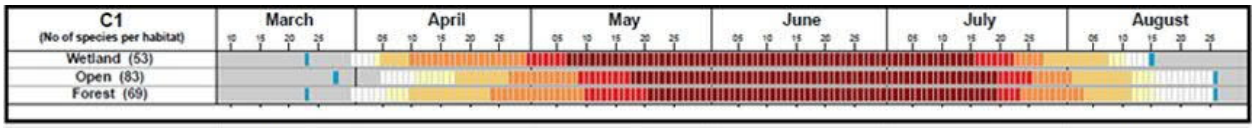


Figure 21 Nesting Period for C1 applicable to Port Colborne

The proposed work of reducing the dead ash within the drain could have a nesting impact if conducted within the general nesting period. Work to remove trees will be scheduled outside of the general nesting period and effort to ensure exceptions to the general nesting are not impacted will be made by a qualified person.

Topside vegetation removal; trunk, limbs, branches will occur prior to the general nesting period and preferably during frozen ground conditions. Some vegetation removal could be scheduled after the nesting period for the following construction year; however, preceding construction is preferred. Full removal of the stump will be scheduled with excavations associated with the drainage works.

Warning

The technical information contained in the "General nesting periods of migratory birds in Canada" published on this web site is general information that constitutes advice only. All persons must adhere to all pertinent laws (for example provincial or territorial laws), regulations and permit requirements including but not restricted to the Migratory Birds Convention Act, 1994 (MBCA) and the Migratory Birds Regulations (MBR). It is important to note that some species of birds protected under the MBCA have also been listed in Schedule 1 of the Species at Risk Act (SARA). These species receive protection from both the MBCA and SARA. This information does not provide an authorization for harming or killing migratory birds or for the disturbance, destruction or taking of nests or eggs as prohibited under the MBR. This information does not provide a guarantee that the activities will avoid contravening the MBR or other laws and regulations. This is general information not intended to be relied on as official advice concerning the legal consequences of any specific activity. It is not a substitute for the MBCA, the MBR, or any other legislation.

It is the responsibility of individuals and companies to assess their risk with regards to migratory birds and design relevant avoidance and mitigation measures (see the Specific consideration related to determining the presence of nests and the Guide for Developing Beneficial Management Practices for Migratory Bird Conservation). Since the "General nesting periods of migratory birds in Canada" applies to large geographical areas, it is possible that local nesting periods could have a different starting date and/or duration than published dates due to micro-climatic conditions in specific areas (e.g. high elevation sites or coastal sites) as well as inter-annual variation due to factors such as early spring or cold, wet summer. The technical information published on this web site will be updated as new data become available, which could result in the changing of dates and/or limits of the nesting zones.

Please contact Environment and Climate Change Canada's Wildlife Service office in your region for further technical information.

Ontario Region
Canadian Wildlife Service
Environment and Climate Change Canada

4905 Dufferin Street
Toronto ON
M3H 5T4

3.5.5 Ministry of Environment, Conservation and Parks

Works carried out under the Drainage Act are exempt from seeking an Environmental Compliance Approval (ECA formerly CofA) issued by the MECP. If the watershed hyas 50% urban area then an ECA may be expected as an application to be reviewed by the MECP.

Under the Ontario Water Resources Act, 1990 consideration to Water Taking Permits will be reviewed during the design period. Note that there are none shown for the Oil Mill Creek at this time. Also the discharge of deleterious substances including excess sediment will be given consideration in the design and specifications for construction execution practices to minimize and/or mitigate construction impacts downstream.

The following figure shows the placement of water well records within the area of drains.

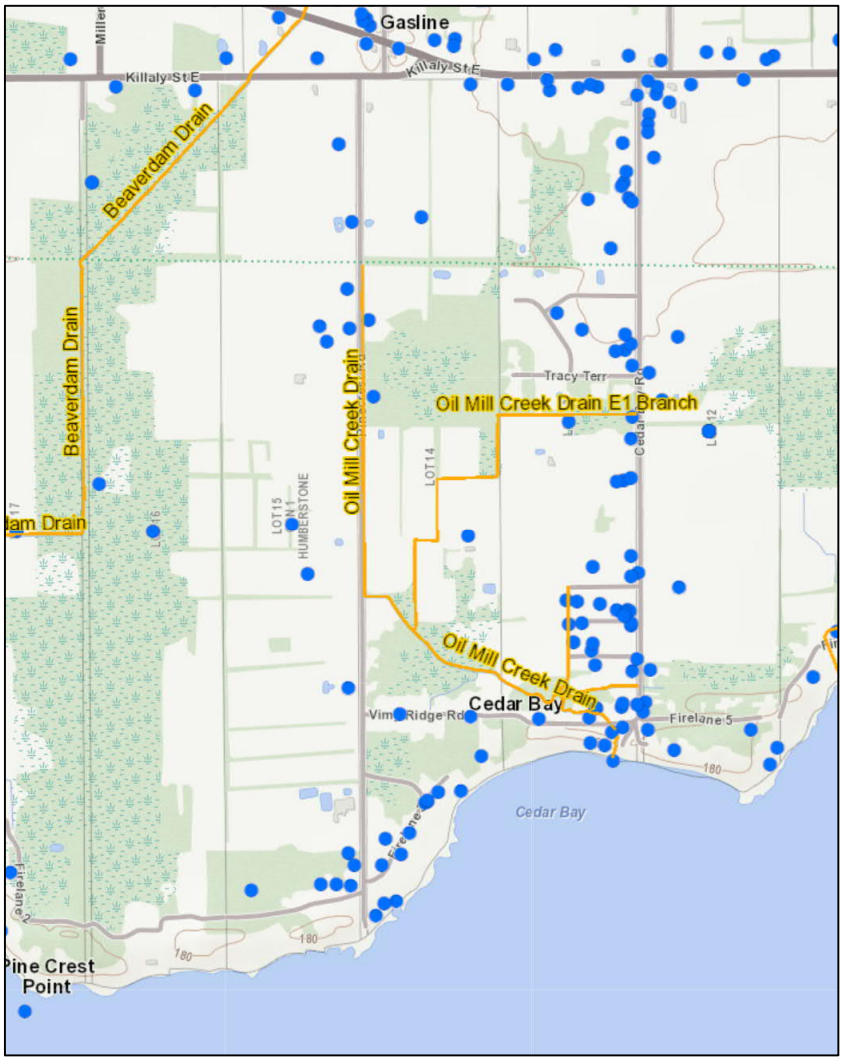


Figure 22 Water Well Records

The presence of the overlying limestone series Onondaga, that is above a rock series that is very low permeability along with the parent soil material of predominately clay suggests that interactions with local municipal drains are unlikely to be a consideration for negative groundwater effects.

3.5.6 Conservation Authority

Niagara Peninsula Conservation Authority provides control through regulated authority on a variety of environmental areas including the following;

- Wetlands; designated or not.
- Watercourses; including shorelines of the Great Lakes and inland lakes.
- Regulated areas adjacent to wetlands and watercourses.
- Hazardous lands, and
- Other areas that could interfere with the hydrologic function of the wetland.

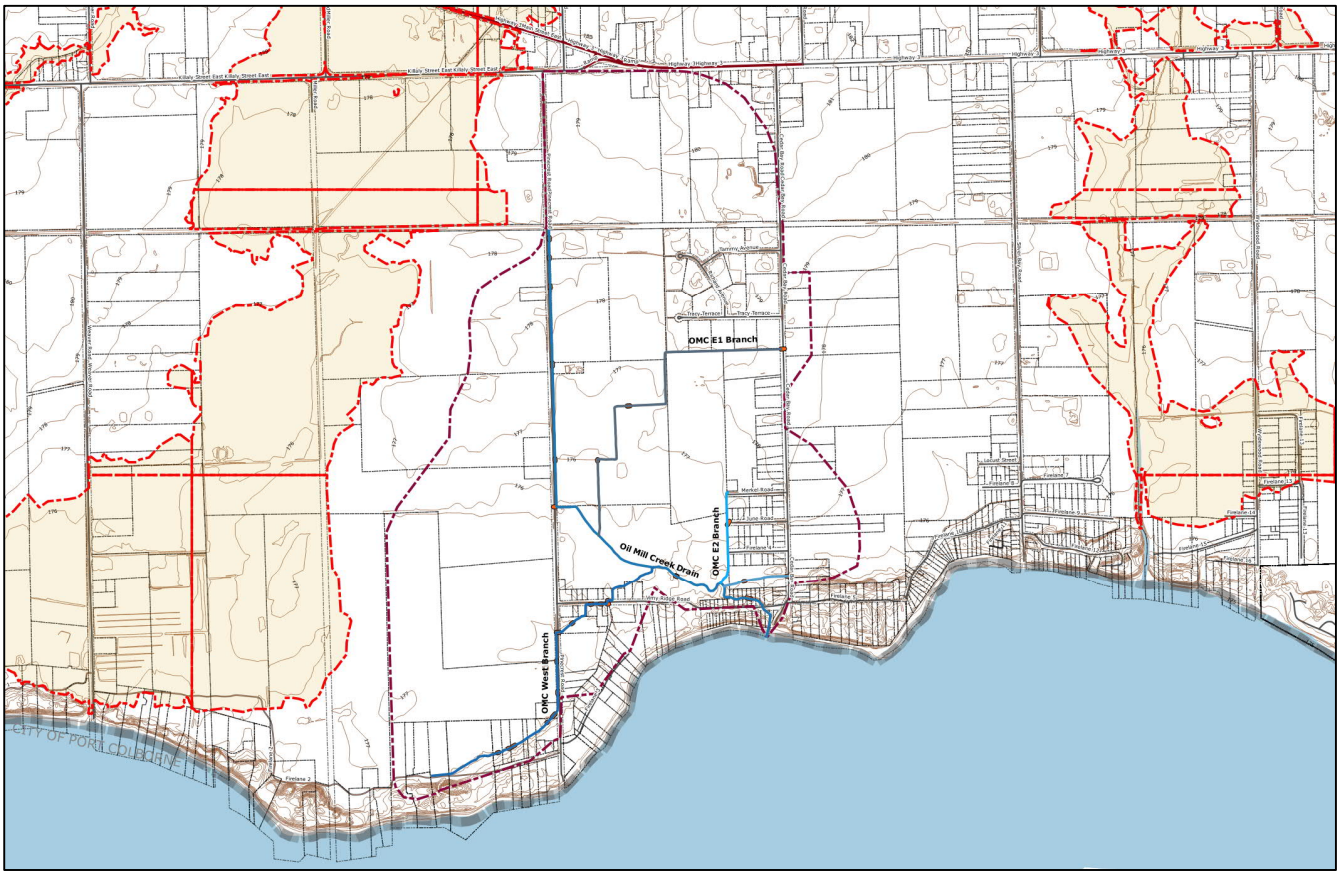


Figure 23 NPCA supplied Regulated Flood limits and Areas

This shows that the Oil Mill Creek watershed is not a regulated flood area. It may experience flooding but it does not meet the regulatory requirements for a regulated flood zone under the regulations. This is contrasted by the two drain watersheds to the west and east of the Oil Mill Creek watershed; The Beaver Dam Drain and the Bearss Drain watershed.

The unregulated flood zones have an impact on the drain maintenance activities with regards to permits and approvals required making it slightly easier to perform work in and adjacent to the drain.

The other impact on regulated areas within the jurisdiction of the NPCA is works impacting regulated wetlands.

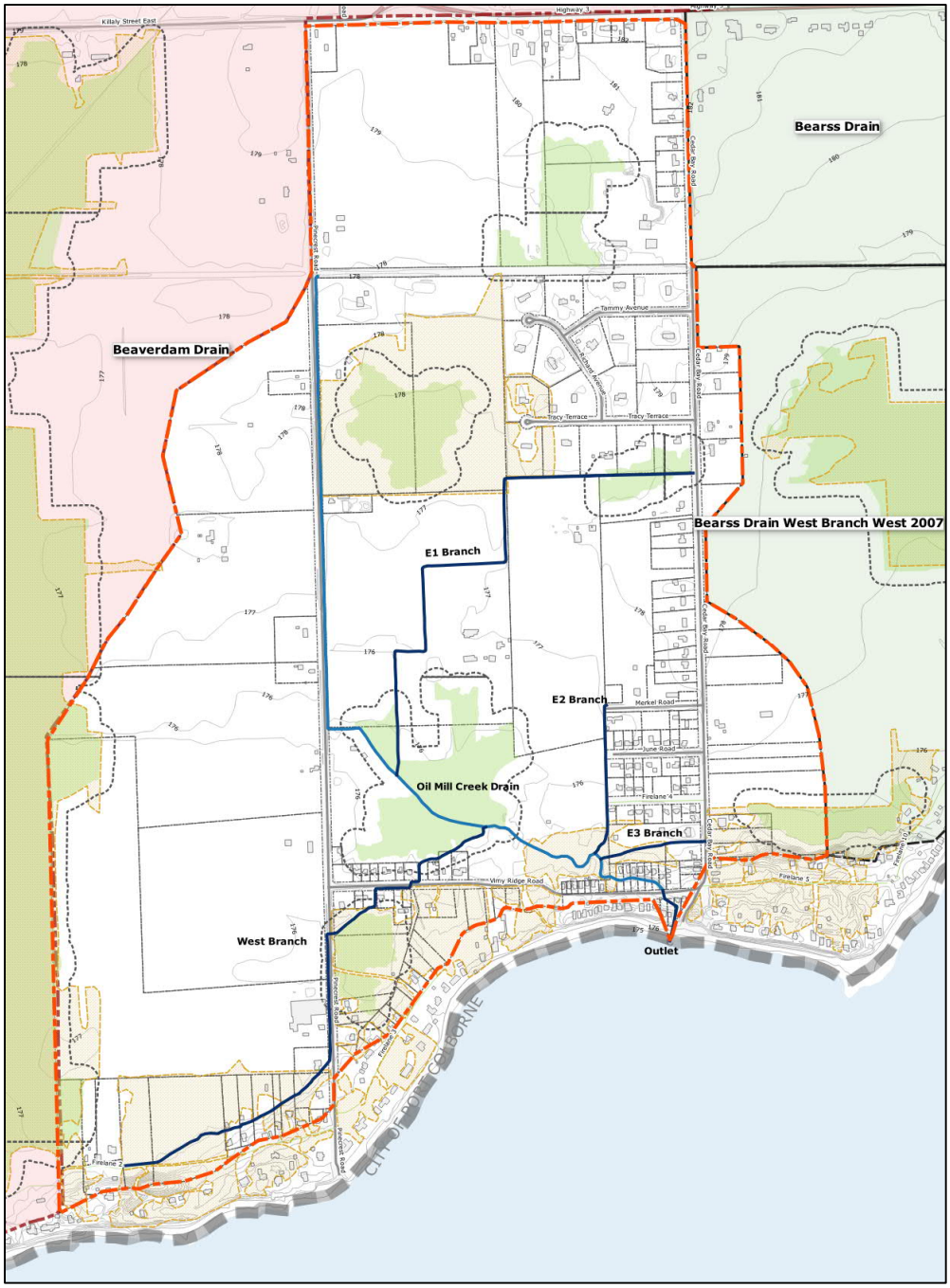


Figure 24 NPCA regulated wetlands and woodlots

Figure 24 NPCA regulated wetlands shows the regulated wetlands in green and the 30m buffer as a black dashed lines. Works that would impact the wetland are regulated within the 30m buffer. Existing municipal drains are recognized as infrastructure to be

maintained and a Drainage Act and Conservation Authorities Act Protocol provides a means for seeking and obtaining approval for performing works within the two acts.

3.5.7 Cultural Heritage Resources

The drains already exist and cultural heritage impacts may have already been affected by past construction activities. Where a drain is to be moved to a new location, then a pre-construction investigation will be conducted prior to the start of construction.

During construction in the event that specific artifacts are uncovered by excavation or other works, then a qualified person will be contacted, attend the site and make a determination of the potential significance along with recommending specific measures to continue construction.

3.6 Stakeholders

All ratepayers within the watershed are stakeholders. Additional interests as potential stakeholders as discussed in the following sections.

3.6.1 Navigable Waters

Under the revised legislation, Navigation Protection Act, 1985 (2012 amendments).

The Oil Mill Creek drain is not listed and specific approval for the works is not considered required with the exception of the outlets to the Lake Erie. As no open water or channel exists to the Lake, navigable waters is not considered applicable to the drain.

3.6.2 Road Authorities

The Ministry of Ontario is not responsible for any roadways within the drainage catchment. Highway #3 southern boundary limit marks the northern limit of the catchment.

There are no Regional Roads present in the Oil Mill Creek Catchment.

There are local Municipal Roads.

Key north/south roads include:

- Pinecrest Rd.
- Cedar Bay Rd.

Key east/west roads include:

- Vimy Ridge Rd.
- Firelane 4
- June Rd.
- Tracey Terrace
- Tammy Ave
- Richard Ave.
- Friendship Trail (former CNR) is not a road but is similar.

Private Roads

- Firelane 2
- Firelane 3
- Merkel Rd

The GIS provides a subsect of the parcel files for a Right of Way data set as shown in green in Figure 25 Oil Mill Creek Right of Way (road ROWs).

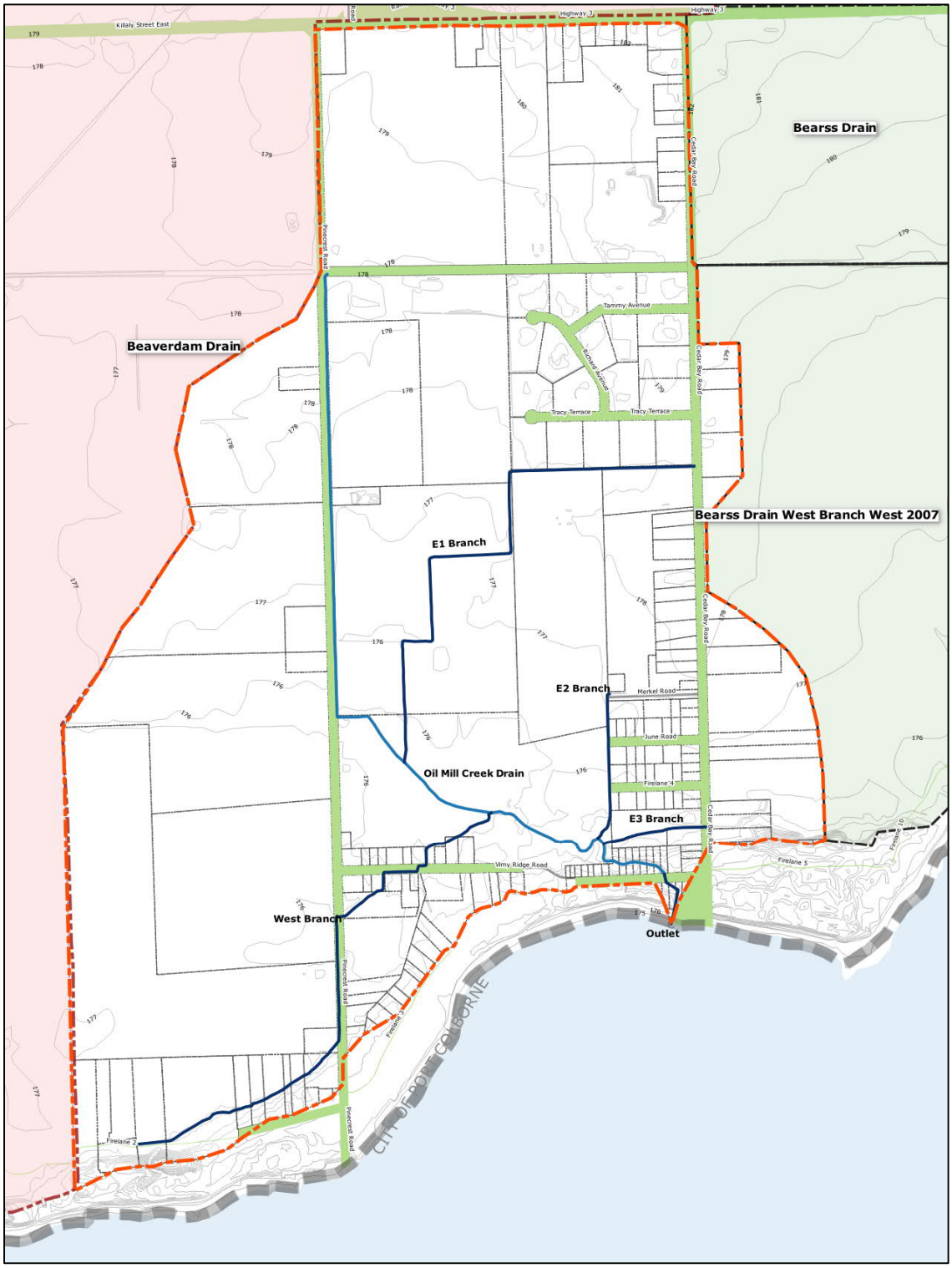


Figure 25 Oil Mill Creek Right of Way (road ROWs)

Highway 3 is shown but is not actually in the catchment pending finalization of the catchment boundary.

3.6.3 Potential Utility Conflicts

Utility conflicts will be identified based on the information provided through other drains and from correspondence.

Gas infrastructure is in the area as is the Niagara Regional Broadband Network on the Friendship Trail.

3.7 Outlet Maintenance Works

The existing outlet features a J wall barrier composed of large concrete blocks. With the recent years of high lake levels and the force of shove ice, the blocks have been displaced from their original position.

4 Oil Mill Creek Drain Baseline Summary

The Oil Mill Creek Drain continues to function and provide service to the residents and businesses within the watershed. The following are design scope items for investigation in the Design Report.

1. Outlet Improvements –
    a. Flap gate function requires inspection and assessment.
    b. Internal CCTV video identified issues with cracks in the concrete pipe and defects in the large diameter steel pipe. Assessment for final report.
    c. Former pumping system is currently not being used and is to be assessed for the final report. The existing pump infrastructure may require significant upgrades. The benefit for future pumping using this existing infrastructure or new is to be determined.
2. Existing problems with the poor grade from over excavation, lack of positive grade line to the outlet. Review options to address including cross-section improvements.
3. Assess the opportunity for quality and quantity improvements on the channel through the existing City owned park property.
4. Review improvements to existing E1, E2 and E3 to serve local road swales.
    a. Consider Re-aligning E1 from existing first bend south along the lot line to connect to the existing OMC main channel.
    b. Review existing E2 performance using Hydrologic model.
    c. Review existing E3 performance using Hydrologic model.
5. Investigate options for improving the connection of the Bell Acres subdivision to the drain. Existing (3) outlets and a review of the roadside drainage along Cedar Bay Rd.
    a. Connect to E2 extension to divert Cedar Bay Rd. runoff into new outlet. Connects through existing NPCA wetland.
    b. Extend E1 north to the Friendship Trail.
6. Investigate potential drainage improvements for the west side property owners on Cedar Bay Rd for sufficient outlet north of Merkel Rd and south of E1 Branch.
7. Review improvements for the West Branch;
    a. The existing design is a low grade to outlet with perched culverts that could be improved with a new grade line and culverts sized and on grade for the improved design.
    b. A new outlet to Lake Erie on Pinecrest Rd to improve the flows through the system as a whole.
8. Culverts required to be replaced.
    a. WB-CS09 – 5m 450mm appears undersized compared to upstream and downstream culverts.

b. O-CS-10 – existing culvert in poor condition – assess for replacement

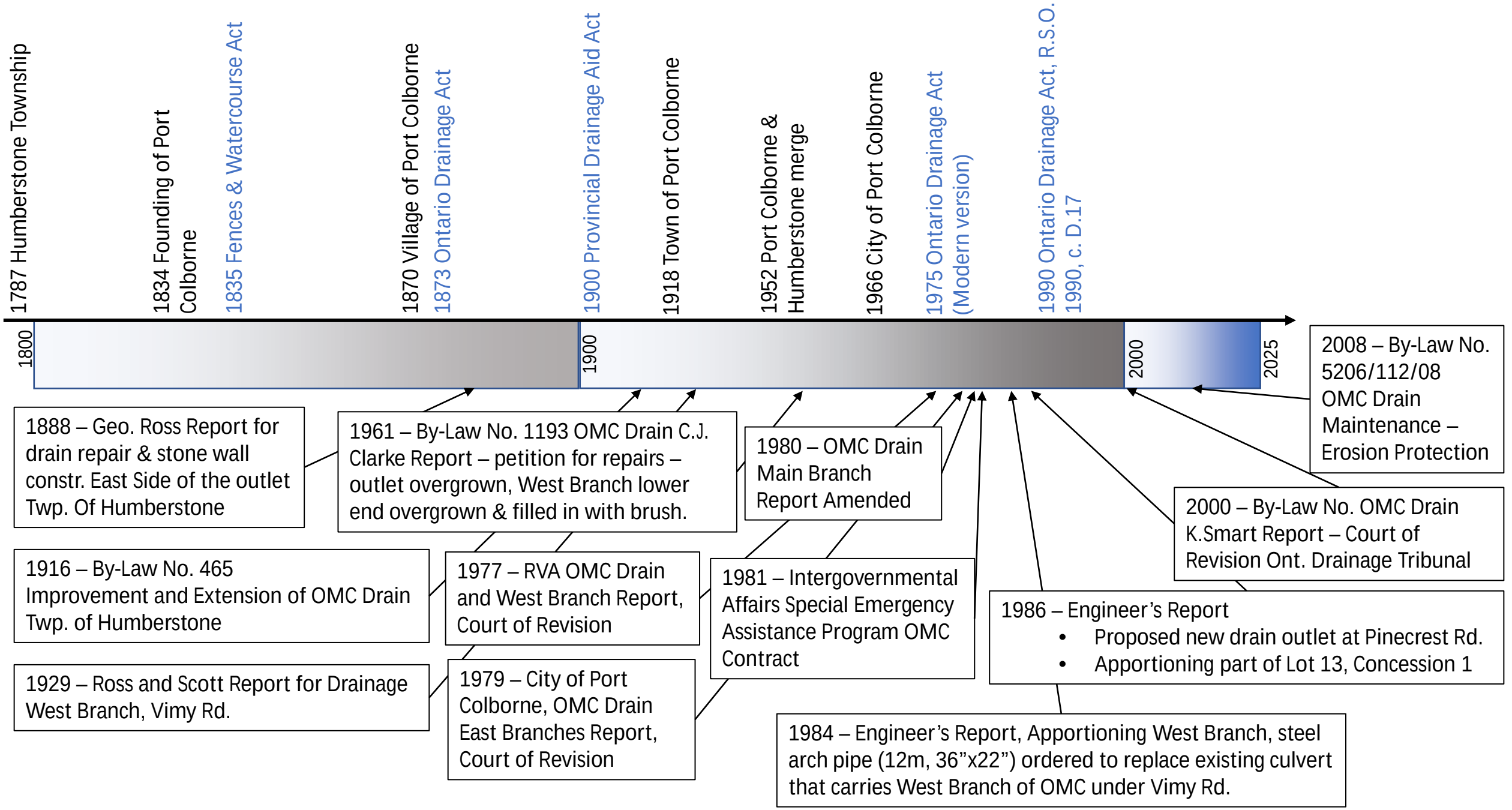
c. O-CS-08 CONC culvert has a perched inlet from improper install. Recommend methods to address.

d. WB-CS-05 Elliptical Culvert to be replaced.

e. All culverts will be assessed for structural condition and capacity for the final report.

9. Channels that are below design capacity based on x-sections:
    a. E1 outlet segment has lower capacity than upstream.
    b. OMC drain segment from 0+050 to 0+450.

Appendix A:
Oil Mill Creek Drain History & Consultation Record


1787 Humberstone Township
1834 Founding of Port Colborne
1835 Fences & Watercourse Act
1870 Village of Port Colborne
1873 Ontario Drainage Act
1900 Provincial Drainage Aid Act
1918 Town of Port Colborne
1952 Port Colborne & Humberstone merge
1966 City of Port Colborne
1975 Ontario Drainage Act (Modern version)
1990 Ontario Drainage Act, R.S.O. 1990, c. D.17
1800
1900
2000
2025
2008 – By-Law No. 5206/112/08 OMC Drain Maintenance – Erosion Protection
1888 – Geo. Ross Report for drain repair & stone wall constr. East Side of the outlet Twp. Of Humberstone
1961 – By-Law No. 1193 OMC Drain C.J. Clarke Report – petition for repairs – outlet overgrown, West Branch lower end overgrown & filled in with brush.
1980 – OMC Drain Main Branch Report Amended
2000 – By-Law No. OMC Drain K.Smart Report – Court of Revision Ont. Drainage Tribunal
1916 – By-Law No. 465 Improvement and Extension of OMC Drain Twp. of Humberstone
1977 – RVA OMC Drain and West Branch Report, Court of Revision
1981 – Intergovernmental Affairs Special Emergency Assistance Program OMC Contract
1986 – Engineer's Report
• Proposed new drain outlet at Pinecrest Rd.
• Apportioning part of Lot 13, Concession 1
1929 – Ross and Scott Report for Drainage West Branch, Vimy Rd.
1979 – City of Port Colborne, OMC Drain East Branches Report, Court of Revision
1984 – Engineer's Report, Apportioning West Branch, steel arch pipe (12m, 36"x22") ordered to replace existing culvert that carries West Branch of OMC under Vimy Rd.

Oil Mill Creek Municipal Drain (RE), 2000 ONAFRAAT 30 (CanLII)

Agriculture, Food and Rural Affairs Appeal Tribunal
1 Stone Road West
Guelph, (Ontario) N1G 4Y2
Tel: (519) 826-3433, Fax: (519) 826-4232
Email: AFRAAT@ontario.ca

Tribunal d'appel de l'agriculture, de l'alimentation et des affaires rurales
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Guelph (Ontario) N1G 4Y2
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Email: AFRAAT@ontario.ca

AGRICULTURE, FOOD AND RURAL AFFAIRS APPEAL TRIBUNAL

APPEAL:	**Oil Mill Creek Municipal Drain City of Port Colborne**
CITATION:	**Oil Mill Creek Municipal Drain (RE) 2000 ONAFRAAT 30**
STATUTE:	***Drainage Act***
HEARING:	**September 20, 2000**
DATE OF DECISION:	**November 16, 2000**
FILE NUMBER:	**2000-30**
NEUTRAL CITATION:	**2000 ONAFRAAT 30**

Oil Mill Creek Municipal Drain
City of Port Colborne

IN THE MATTER OF THE DRAINAGE ACT R.S.O. 1990, CHAPTER D.17, AS AMENDED.

AND IN THE MATTER OF:

An appeal to the Agriculture, Food and Rural Affairs Appeal Tribunal by Bernard Fallon, Gerald Maslona, Robert Hay, David Hay, Edward S. Kaj, John DeFranks, Cynthia DeFranks, John Sloan, Mary W. Gutai, Doris Baker, John Y. Sloan, Cheryl Cox, Emo Kessler, Elizabeth O'Conner, Dea McAulliff and others under Section 48 and 54 of the *Drainage Act* from the report of the engineer on the **Oil Mill Creek Municipal Drain, Municipality of the City of Port Colborne**.

HEARING DATE: September 20, 2000

Before:

John Taylor Vice-Chair, Jack Young Vice-Chair, Anna Andres and Russell Piper Members.

Appearances:

Numerous appellants and others.
John Kuntze, P. Eng., of the firm of K. Smart Associates Limited.
Rene Landry, Port Colborne Drainage Superintendent.

PRELIMINARY MATTERS

Background

This appeal was heard at City Hall in the City of Port Colborne on September 20, 2000. The appeal relates to a report prepared by K. Smart Associates Limited dated January 31, 2000. This report was requisitioned by the City Drainage Superintendent on the instructions of City Council pursuant to Section 78 of the Drainage Act, which empowers a Municipality of its own initiative to require a report if the Municipality believes that improvements are required to a drainage work for its better use and maintenance. The city further requisitioned the engineer to prepare new assessment schedules for future maintenance of the drain given the large increase in the number of individual property owners in the watershed as a result of the division of various properties over the years. The city felt that it was hindered in initiating maintenance projects on the Oil Mill Creek Drain because of the lack of an appropriate system for determining the apportionment of the cost of maintenance and repair, among the various property owners within the drainage area.

The engineer reviewed the historical records relating to this drainage scheme and it seems that as far back at 1888 drainage reports were prepared and adopted by council that implemented drainage works within this drainage scheme.

The drainage scheme is located in what was formerly Humberstone Township. It lies immediately north of the shore of Lake Erie and it extends in a northerly direction to its upper limit at the south side of Regional Road Number 5 and Kings Highway # 3. Various reports over the years created a main drain into which several branches were developed. As is well known the north shore of Lake Erie in this area has a natural sand ridge. At some point in this sand ridge the outlet for the Oil Mill Creek Drain has to penetrate through the sand ridge to provide an outlet into Lake Erie. As far as the records indicated, this outlet penetrates the sand ridge at a point just westerly of Cedar Bay Road and through the properties now owned by H. & C. Moore and S. & A. Turley.

The natural forces on Lake Erie cause the sands along the lakeshore to shift and in most years would have blocked off the outlet for this drain. In 1916 a report was adopted by council and a substantial outlet culvert (beach culvert) was constructed extending from the shore of the lake through sand ridge, this covered outlet still remains in place and seems to be still functional. Over the years improvements were made to include a "C" curved shaped concrete dyke that was intended to prevent sand from blocking the end of the culvert. There was also a gate installed at the outlet end of the culvert that would hopefully prevent the rush of water from the lake back into the drainage system. Moreover at a later date the Municipality put in a small pump at the inlet part of this culvert in order to reduce the height of the water upstream of the culvert in years when the gate flap had to be closed due to high waters on the lake. All of these improvements will remain in place and the present report under consideration does not purport to make any changes to the system at that location.

The report proposes to deal with an open section of the drain leading from the inlet of the aforesaid concrete beach culvert upstream some 61 meters to the south face of a bridge on the Vimy Road which crosses the drain. For the most part, except for road crossings and access bridges, the Oil Mill Creek Drain is an open drain upstream from

the beach culvert. This report deals only with the closing in of that short section of 61 meters between the Vimy Road Bridge and the beach culvert under the sand ridge, with a new culvert.

The engineer testified that the outlet or beach culvert is approximately 6' by 4' and the proposed covered pipe for the 61 meters will also be of similar size and capacity. The proposed style of pipe will be a steel smooth surface interior called Ultraflow. The works provide for the realignment of this pipe in the ditch so that it would only have one bend between the bridge and the lake. The pipe will be covered with earth brought onto the site and the surface seeded. The end result will be that the yards of the Moore and Turley properties will no longer have an open ditch in them but rather the underground pipe will have no visibility whatsoever. In particular the Moore property will be changed entirely. Currently the Moore residence overlooks the open drain when looking toward the lake with the drain completely occupying the rear yard as well as the only frontage that the Moore lot has on the lake.

Except for this proposed work south of the Vimy Road Bridge, the report contemplates no other works or improvements or repairs upstream of the bridge. The total work proposed including administration and engineering is anticipated to cost $72,000.00. Included in this works is approximately $1,400.00 allowances to the property owners on which the works will be carried out.

The major problem facing the engineer was apportioning out the cost of the project to all those property owners within the drainage system. He firstly had to decide what apportionment would be assessed as outlet liability and the portion to be assessed as benefit. Notwithstanding how fair he thought he was being, the results of the engineers' apportionment has raised the greatest number of appeals to this report. The methods used by the engineer will be dealt with later in these reasons.

NATURE OF APPEALS

Fifteen landowners filed appeals. The bulk of these appeals related to the assessments but some landowners were appealing against the report. The thrust of these complaints can be categorized as follows:

1. Some appellants submit that the works proposed are not necessary. They believe that the drain has operated very well for several decades and that the section below the Vimy Road Bridge which is proposed to be enclosed in the pipe, is more than adequate to handle the volume of water that enters the drain. They claim that there is no evidence of deterioration of the walls of the open drain and that the proposed pipe will not increase the flows. These appellants see the city's concern of possible cave in of these walls as being more imagined than real.

2. A number of the other appellants claim that the report does not go far enough. These appellants find that water accumulates upstream of the Vimy Road Bridge and that the open ditch in front of the homes built along the lots north of the Vimy Road has widened over the years. A number of these homes have footbridges over the drain leading from the road to their cottages, some of these bridges have been washed out and have had to be replaced from time to time. Some owners in fact have, of their own accord, put in culverts which if completed would lessen the capacity of the drain. They submit that the report should have done something about cleaning this portion of the drain so that the water levels would be lower.

3. The bulk of the appeals are against the assessments. Most of these appellants had also appealed to the court of revision and were dissatisfied with the results at that court. The majority of these appellants own property on either side of the Vimy Road going west from the Vimy Road Bridge. There were few appellants that own properties on the drain branches.

A group of these appellants (The Sand Ridge Group) banded together and made a very extensive common presentation in support of their appeals. The Tribunal was very impressed with the work that went behind this presentation, and congratulates these appellants for this fine presentation and the fact that it consolidated the various points of view of the appellants.

To understand the direction of the appeal, it first necessary to set out the approach adopted by the engineer in distributing the assessments. The primary step taken was to make a determination of what portion of the cost of the proposed works should be assessed for outlet liability and for benefit. Since the work is at the very outlet of the drain then all property owners within the water shed were targeted for some form of assessment. It was the engineer's determination that 67% of the total cost should be recovered as outlet liability and the remaining 33% being recovered from properties receiving an ordinary or special benefit. The engineer opined that strict allocation

of the 67% of outlet liability to the upstream lands on an area basis would bring to bear an unreasonably disproportionate share on large parcels such as farmland parcels. The engineer pointed out that over the years the number of individual parcels in the watershed grew from 15 properties in 1916, to 144 properties in 1961 and to 236 properties in the year 2000, the current report. To bring more fairness and justice among the properties contributing to outlet liability Mr. Kuntze determined that one-half of the total outlet liability assessment should be recovered on a **per parcel or per lot** basis. Accordingly he proceeded to assess $100.00 to each parcel assessed in the watershed which would have raised one-half of the outlet liability. The remaining one-half he assessed on a property area basis or the usual method of allocating outlet liability.

The next step was to apportion the benefit assessment which in the aggregate was to total 33% of the total cost of the project or $23,300.00. The engineer submitted that the proposed works in covering up the open ditch downstream of the Vimy Road Bridge was going to be a benefit not only to the properties fronting on this ditch but as well as some of the properties upstream of the bridge in the immediate vicinity of the proposed works. Accordingly he apportioned $7,600.00 of the total cost among 38 nearby properties at a rate of $200.00 each. The remainder of the benefit liability was apportioned among the Vimy Road itself ($9,000.00) and the remaining $6,700.00 to the four (4) lots or properties that were immediately adjacent to the works.

While there was not much opposition to the concept of assessing a $100.00 levy to all parcels in the watershed, there was substantial objection to the following two approaches;

1. The $200.00 benefit assessment of the 38 lots, and

2. The assessment of only $6,700.00 to the properties which immediately abutted the new works.

The Sand Ridge Group focused their opposition on the apportionment of the benefit assessments. The gist of their arguments can be summarized as follows:

1. Houses built on the top of the sand ridge contributed little or no water that ended up in the Oil Mill Creek Drain. They submit that the sand ridge absorbs most of the rainfall and discharges it directly into Lake Erie. They point out that below the sand dunes or ridges there is a strata of rock which is tilted toward the lake so that water percolating through the sand is directed toward the lake rather than to the drain.

2. They complain that the engineer's belief that the 38 properties nearby the works receive some benefit more than the upstream properties is without foundation. They further submit that such an approach made by the engineer in this case has no basis in the Drainage Act and there is not precedent set for the same by either the tribunal or the referee's court.

3. They further submit that the engineer has greatly understated the direct benefit or special benefit that the four (4) properties abutting the proposed works will achieve. Particularly in the case of the Moore property through which the bulk of the pipe will be constructed, will derive a direct benefit that will greatly enhance the value of that property. They submit that more if not all of the cost of the project should be downloaded on the Moore property or it and the other properties abutting on the works.

The Court of Revision had previously heard the assessment appeals. The only relief granted by the Court of Revision was to add a number of properties to the east of the proposed works and east of Cedar Bay Road called "The Walnut Park" properties. In fact these properties were not in the watershed as the contours and elevations of the land at the edge of the water shed seem to make it impossible for meteoric water to find it's way into the Oil Mill Creek Drain. On advice from the engineer, the Court of Revision felt justified in including these properties because access to them was gained by the roads within the water shed, therefore an indirect benefit to the Walnut Park properties was to be derived by having a well maintained and operational water shed. It seems that the Walnut Park properties are not in any other nearby watershed and should be deemed to be included in this scheme. No one appeared before the Tribunal owning or representing any property owner in the area considered to be the Walnut Park properties.

Mr. Bernard Fallon, a property owner whose principal residence is built on the sand ridge along Lake Erie and extends northerly near the west branch of the Oil Mill Creek Drain also filed appeals. It was his submission that none of the waters on his properties ever reached this drain and therefore he should be excluded.

Ms. Cheryl Cox, a property owner on the East Side of Cedar Bay Road and north of the Walnut Park properties whose lands lie entirely in the watershed, also complained on two grounds. Firstly: That she was assessed for two properties while she really only owned one. The reason for the separate assessments is the fact that she wishes to keep her two lots separate for Planning Act purposes so that the properties would not merge and be treated as one property. Her second objection was the fact that there were not good flows in the East Branch of the Oil Mill Creek Drain and that water ponded on neighbouring properties. She felt that the works should be extended. Finally Mrs. Cox submitted that maintenance and improvements should be conducted throughout the drainage system which would result in a more informed assessment on the exact volumes of water that the Oil Mill Creek Drain generates. She fears that the sizing of the proposed closed culvert may not be adequate to handle all of the waters generated by the watershed.

Another appellant was Ms. Dea McAuliffe who owns a property at 2862 Vimy Road. Her complaint was that the section of the drain that flows in front of her property has water lying in it at all times and some work should be done so that the outlet can either be cleaned or lowered so less water would be left to accumulate. She also complains about the fact that she was one of the 38 properties targeted for the special $200.00 assessment.

While all appellants have not been specifically identified in these reasons, we nevertheless feel that the points of view that have been expressed by those who spoke and in particular by the submissions made by The Sand Ridge Group, fairly represent views and objections of all the appellants.

RESPONSE BY ENGINEER

The engineer called Mr. Rene Landry, the City of Port Colborne Drainage Superintendent to address some of the concerns raised by the appellants. Mr. Landry is a certified Survey and Engineer's technician since the 1980's since his employ with the City of Port Colborne, some 10 years. He pointed out that the city has done maintenance up and down the drain as best it could. A lot of this included unplugging sand at the outlet gate at the shore of Lake Erie. One of his complaints was of the state of the assessment schedules from the past engineers' reports which were inadequate to allocate maintenance costs out to the appropriate properties within the watershed. His concern and the concern of council was that the state of the walls lining the outlet of the Oil Mill Creek Drain below the Vimy Road Bridge seem precipitous and fragile. The city felt that since it has an obligation under the Drainage Act to maintain drains in a good state of repair, it could not justify ignoring this apparent fragility. If one of these walls were to collapse at the time of a large storm event, the drain outlet would become blocked and the upstream properties would be flooded. Moreover access to the open drain into the backyard of properties where it is located made it extremely difficult for heavy equipment to gain access to the drain on an emergency basis. For those and other reasons Council felt that this section of the drain should be closed in, to avoid the apparent shortcomings of this section. Mr. Landry concluded that the new pipe and the proposed depth would be more than adequate to handle the volumes generated by the watershed, even in the case where all upstream branches were properly improved and maintained.

Mr. Kuntze gave further evidence that he shared the same concerns as the drainage superindentant and council. He suggested that the Municipality could well be found negligent if the walls in this section of the open drain were to collapse. He confirmed that the covered pipe its size and its depth of placement are adequate for this system. He noted that none of the past reports ever questioned the size of the outlet pipe put in through the sand ridge in 1916.

With respect to his approach to allocating the assessments, Mr. Kuntze admitted that the $200.00 assessment to the 38 properties was a little unusual. He could not make reference to other drainage reports where that concept was introduced, he admitted that his arguments supporting the same were weak. However he suggested that if the Tribunal were to vary that section of his report that it should not download the cost which that special assessment was designed to cover to the Moore property or the other adjacent properties to the works. He did feel strongly however, that the $100.00 assessment for each parcel in the drainage scheme was justified and there was precedent for it. He felt that despite the fact that agricultural properties were eligible for a 1/3 grant from the Province, they should not bear an extra burden because the nature of the present works was not to give them any more benefit than any other parcel in the drainage scheme. Moreover he justified the nominal parcel assessment against the Walnut Park properties despite the fact that it did not appear that any waters generated on such properties actually flowed into the system.

DECISION OF THE TRIBUNAL

After careful consideration of the evidence filed and the submissions made the Tribunal finds:

1. The City of Port Colborne has raised proper concerns about the fragile nature of the walls that line banks of the Oil Mill Creek Drain below the Vimy Road Bridge.

2. Procurement of an engineers report pursuant to Section 78 of the Drainage Act was a proper exercise by the Municipality of its powers under the Act.

3. That all parcels of property in the drainage scheme or watershed have a responsibility to make a contribution to the proposed works.

4. That the levy of $100.00 per parcel on all parcels in the drainage scheme is appropriate.

5. The inclusion of the Walnut Park properties as contributors to these improvements is justified.

6. The special levy of $200.00 to the 38 properties on the sand ridge is **not** justified.

7. The benefit assessment to the Clemency, Turley, Kitney and Moore properties (Roll numbers 040-00232800, 040-00232900, 040-00233000 and 040-00233100 respectively) has been under valued.

8. The Schedule of assessments both for construction and for future maintenance will require alteration.

ORDER OF THE TRIBUNAL

This Tribunal makes the following order with respect to the Engineers report concerning the Oil Mill Creek Drain dated January 31, 2000, and the decision of the Court of Revision:

1. The engineers report and recommendations with respect to the scope of work is approved.

2. The $200.00 benefit assessment made against the 38 properties on the sand ridge (Roll Numbers 040-00229500 to 040-00233100 inclusive and Vimy Road) as identified in the Appendix "A" hereto shall be deleted, and the $7,600.00 of the cost of the project affected thereby shall be reallocated as set out below.

3. All parcels in the watershed shall be assigned a further $10.00 per parcel benefit assessment over the present benefit assessment as shown in the May 10 Court of Revision Schedule A (Schedule of Assessment for Construction), thereby raising $2,640.00 of the cost mentioned in the previous paragraph.

4. The benefit assessment for the four (4) following properties shall be increased in the following amounts:

Roll No.	Owner	Amount
040-00232800	C. & C. Clemency	$500.00
040-00232900	S. & A. Turley	$1350.00
040-00233000	L. Kitney	$400.00
040-00233100	H. & C. Moore	$2710.00
		$4960.00

A summary of the total assessment to these properties is set out in Appendix B attached hereto.

5. That Schedule B of the Engineer's Report, being the **Schedule of Assessment for Future Maintenance**, as revised by the Court of Revision on May 10, 2000, be further revised so that each of the properties identified in Appendix A of this decision (Roll Numbers 040-00229500 to 040-00233100 inclusive and Vimy Road) shall have the benefit of a $200.00 reduction, and that the total of the assessments be adjusted accordingly.

6. That before the final passing of the By-Law, the engineer is to prepare revised Schedules of Assessment as may be required as a result of the foregoing orders. The same shall be appended to the

By-Law implementing the report and this decision.

7. That except as allowed or noted herein, all other appeals made pursuant to the Drainage Act are dismissed.

8. That the non-administrative cost of the City of Port Colborne with respect to this appeal shall form part of the cost of the drainage works and there shall be no other order as to cost. And all parties shall be responsible for their own cost.

Dated at Tilbury, Ontario on this 16th day of November, 2000.

APPENDIX "A"

AGRICULTURE, FOOD AND RURAL AFFAIRS APPEAL TRIBUNAL
OIL MILL CREEK DRAIN

Properties for $200.00 Reduction(Order #2)

Roll Number	***Owner***
040-00229500	D. Vesper
040-00229600	H. & E. Vesper
040-00229700	T. Marriott
040-00229800	T. Marriott
040-00229900	H. & C. Moore
040-00230000	Winkley, Schultz & Sherk
040-00230100	F. & T. Jance
040-00230200	M. Brady
040-00230300	Vimy Ridge Corp.
040-00230400	R. Garant
040-00230500	C. & D. McAuliffe
040-00230600	T. Scime
040-00230700	McAuliffe, Scime & Nieman
040-00230800	C. Reid
040-00230900	E. & L. Norman
040-00231000	C. Borowiak
040-00231100	R. & K. Wilson, W. Canavan
040-00231200	PJDB Properties Inc.
040-00231300	C. Rusk
040-00231400	J. & C. Stoklosa
040-00231500	R. & J. Hay
040-00231600	G. Wilkes
040-00231700	J. Postlethwaite
040-00231800	R. Traquair
040-00231900	L. Staples
040-00232000	R. Woodworth
040-00232100	J. & C. Sloan
040-00232200	J. & C. DeFranks
040-00232300	G. & C. Maslona
040-00232400	E. & D. Kaj
040-00232500	D. Baker
040-00232600	Vimy RidgeCorp.
040-00232700	P. & E. Meyer
040-00232800	C. & C. Clemency
040-00232900	S. & A. Turley
040-00233000	L. Kitney
040-00233100	H. & C. Moore

APPENDIX "B"

AGRICULTURE, FOOD AND RURAL AFFAIRS APPEAL TRIBUNAL
OIL MILL CREEK DRAIN

Specific Revision Ordered by Tribunal (Orders #2, 3, 4)

-

Summary of Benefit Assessments

-

Owner	C. & C. Clemency	S. & A. Turley	L. Kitney	H. & C. Moore	Total
Roll No.	040-00232800	040-00232900	040-00233000	040-00233100	--------
May 10/00 Benefit Assessment (C.O.R.*)	$790.00	$2,290.00	$490.00	$4,290.00	$7,860.00
Reduction in Assessment (Order #2)	($200.00)	($200.00)	($200.00)	($200.00)	($800.00)
Increase in Assessment (Order #3)	$10.00	$10.00	$10.00	$10.00	$40.00
Increase in Benefit Assessment (Order #4)	$500.00	$1,350.00	$400.00	$2,710.00	$4,960.00
Revised Benefit Assessment	$1,100.00	$3,450.00	$700.00	$6,810.00	$12,060.00

-

* Court of Revision

-
-
-
-
-

COURT OF REVISION

WEDNESDAY, SEPTEMBER 26th, 1979

OIL MILL CREEK DRAIN - MAIN BRANCH & WEST BRANCH

A Court of Revision on the OIL MILL CREEK DRAIN - MAIN BRANCH AND WEST BRANCH was held on September 26th, 1979, with the following in attendance.

Chairman, Len Hallborg
Member, Frank Murray
Member, Alec Danch

Deputy Clerk, Pat Premi,

Doug Ingram, R. V. Anderson & Associates

Lester B. Anthes
Leo Vandervaart
Richard Bell
Dale Biko
Garry Kelly
Arthur Rickerson
John Kish

Objections in writing to their proposed assessments were received from Messrs. Anthes, Bell and Vandervaart.

(1) Mr. Anthes addressed the Court stating that his whole property is porous sand and drains into the lake and that in his opinion he should not be assessed for this drain.

Mr. Ingram advised that the same assessments were used in this report as in the previous report but that he would arrange for Mr. Hellinga to meet him on the site tomorrow and Mr. Hellinga would report his findings and recommendations back to the Court.

(2) Mr. Bell stated he thinks his property would be better drained under the East Branch and that his assessment should be transferred.

Mr. Ingram advised Mr. Bell is paying for outlet benefit under this drain. He advised that he will be charged again under the Act for the East Branch.

Mr. Ingram stated Mr. Bell won't be charged an injuring liability under the East Branch and this could be a benefit to his payments on the East Branch.

Mr. Bell suggested the drain on Godfrey Knoll's property be taken over by the municipality.

Mr. Ingram advised that the East Branch utilizes this drain and will become a municipal drain.

Mr. Bell advised that the Pinecrest Road municipal drain should be cleared on a regular basis by the City with

Mr. Ingram advised Mr. Vandervaart is paying for outlet and injuring liability in the same proportion as the former owner.

(4) Mr. John Kish stated he objected to his $55.50 assessment stating he pays high taxes and there are no street lights out there. He said his lights at Cedar Bay Inn provide the only lighting in the area.

Alderman Murray advised that the matter of street lights has nothing to do with the drainage court of revision but that the residents could petition for street lights should they so desire. Alderman Murray volunteered to bring the matter to the Public Works Committee at their next meeting.

(5) Mr. Bell spoke on behalf of Mr. Garry Kelly who requested his assessment reduced and the ditch on his property relocated if possible.

Mr. Ingram advised he would have Mr. Hellinga look at relocating the ditch and filling in the existing ditch.

APPELLANT	COMPLAINT	DECISION OF THE COURT
L. B. Anthes	See Above	Allowed
R. Bell	See Above	Disallowed
L. Vandervaart	See Above	Allowed. The Court recommended that the injuring liability assessments in the amount of $146.30 and $40.00 be credited to any charges levied against Mr. Vandervaart under the/East Branch Drain. /proposed
J. Kish	See Above	Disallowed
G. Kelly	See Above	Assessment appeal disallowed Engineer's will arrange for relocation of the ditch with the the extra cost to be borne by Mr. Kelly

The Court adjourned at 8:35 P.M.

CHAIRMAN

Patricia Remi
DEPUTY CLERK

Appendix B:

Oil Mill Creek Drain Drawings and Figures

Oil Mill Creek Municipal Drain

City of Port Colborne

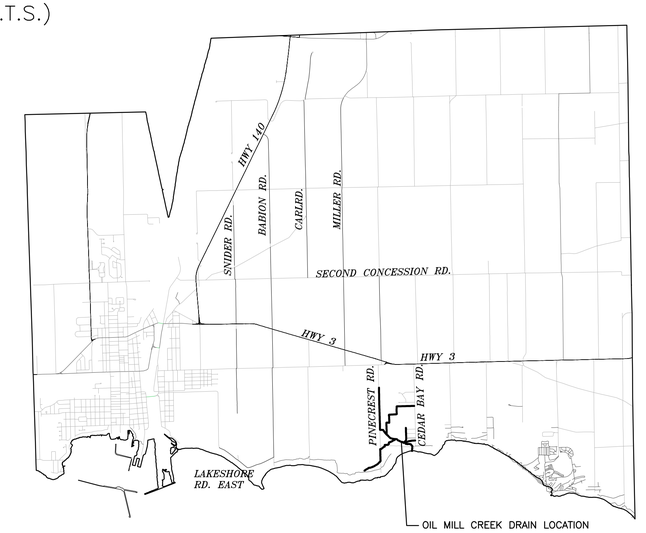
JUNE 21, 2021

BASELINE DRAWINGS

OIL MILL CREEK MUNICIPAL DRAIN - 2021

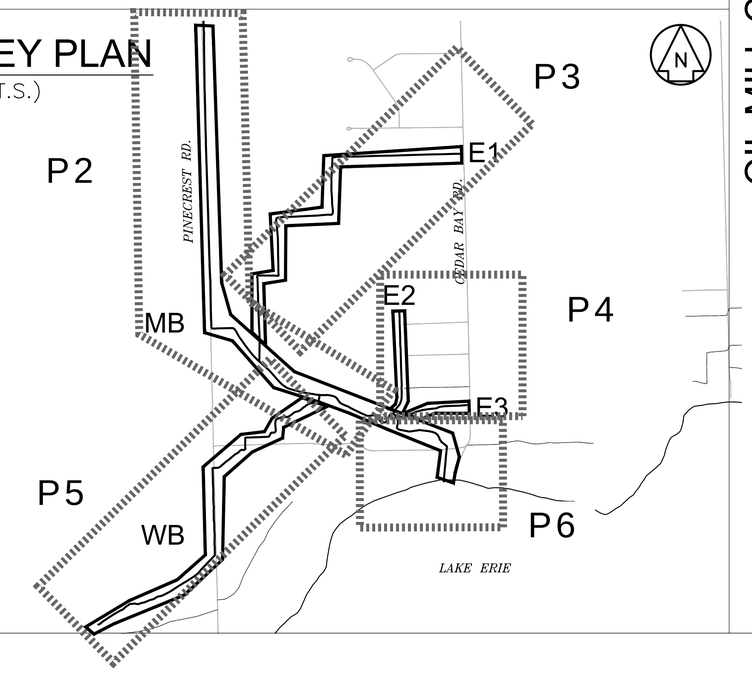
LOCATION PLAN

(N.T.S.)



KEY PLAN

(N.T.S.)



LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2018
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
175.00 PR.	PROPOSED DRAIN CENTERLINE ELEVATION
175.00 EX.	PROPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979
	BRIDGE STRUCTURES
	Water Level from Survey data, indicative

DRAWING INDEX

EWA Engineering Inc.
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OIL MILL CREEK DRAIN

KILLALY STREET EAST
HIGHWAY #3
FRIENDSHIP TRAIL
FRIENDSHIP TRAIL
PINEHURST ROAD
CEDAR BAY ROAD
MERKEL ROAD
JUNE ROAD
FIRELANE 4
VIMY RIDGE ROAD
VIMY RIDGE ROAD

BEARSS DRAIN
BEAVER DAM DRAIN
BEARSS DRAIN WEST

0-CS-12 600mmø HDPE
0-CS-11 600mmø x 900mmø CSPE
0-CS-10 750mmø CSP
0-CS-09 750mmø HDPE
0-CS-08 950mmø CONC
0-CS-04 450mmø CONC
WB-CS-05 800mmø x 600mmø CSPE
WB-CS-06 800mmø x 600mmø CSPE
WB-CS-07 900mmø x 600mmø CSPA M
WB-CS-08 1400mmø x 800mmø CSPA
WB-CS-09 450mmø CSP
WB-CS-10 600mmø CSP
WB-CS-11 450mmø CSP
WB-CS-12 450mmø CSPA
WB-CS-14 450mmø CSP
WB-CS-15 300mmø HDPE
WB-CS-17 350mmø CSP
WB-CS-04 900mmø x 600mmø CSPE
E1-CS-01 1100mmø x650mmø CSP
E1-CS-02 700mmø CSP
E1-CS-03 600mmø CSP
E1-CS-04 600mmø CSP
E2-CS-001 350mmø HDPE
E3-CS-01 450mmø HDPE
E3-CS-02 450mmø HDPE
0-CS-06 TWIN 1100mmø CSP
0-CS-03 1400mmø CSP
0-CS-01 ConcBox 3500 x 2100

E1 BRANCH
E2 BRANCH
E3 BRANCH
WEST BRANCH
OIL MILL CREEK DRAIN

OIL MILL CREEK DRAIN ORIGINAL BENCHMARK AT NORTH EAST CORNER OF HEADWALL 0-CS-001
0+000
N 4748538.238
E 648999.520
E 176.870

SHORE LINE
SHORE LINE
SHORE LINE

LAKE ERIE

0 500m 1000m

NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED

BENCHMARK INFORMATION:

- 0+000 OIL MILL CREEK DRAIN LOCATED ON NORTH EAST CORNER OF HEADWALL (0-CS-001)

PLAN VIEW LEGEND:

- DRAINAGE AREA BOUNDARY
- DRAIN CENTERLINE
- PROPOSED DRAIN CENTERLINE
- 0+000 DRAIN CHAINAGE
- ABREAVEATED ROLL NUMBERS
- X.SD-02 SITE SPECIFIC DETAIL I.D.
- BOUNDARY OF AREA CAPTURED IN SITE DETAIL
- DRAINAGE WORK PROPOSED
- *DRAINAGE WORK COMPLETED – TO BE ASSESSED*

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	JUNE 21,2021

OIL MILL CREEK DRAIN PLAN

BASELINE DRAWINGS

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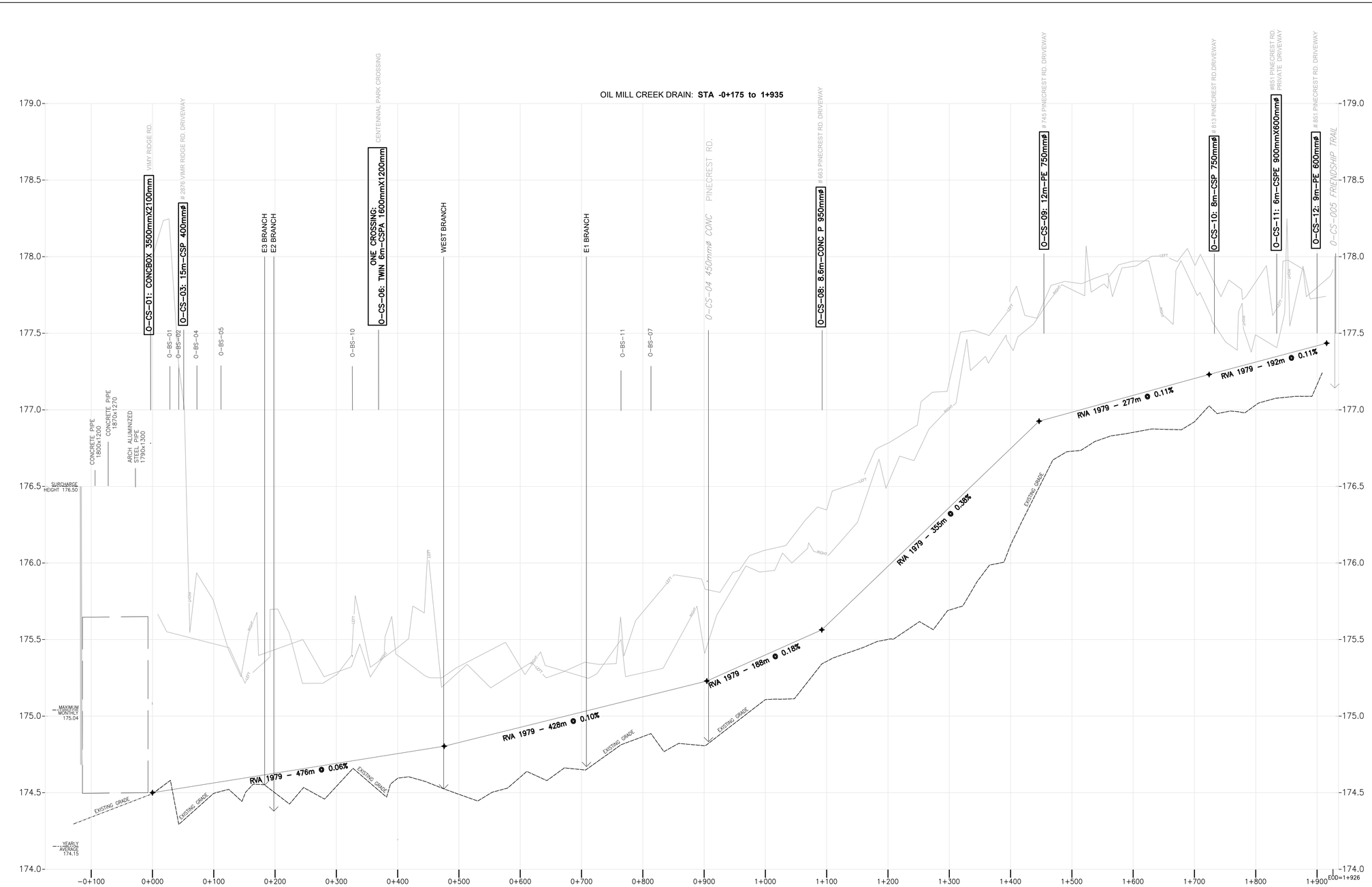
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	OM.PLAN
DESIGNED BY :	DATE :	SCALE :	
PCM	21–JUNE–21	F.T.P.	



NOTES:

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THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE DONE TO THEM.

SPATIAL DATA:

- HORIZONTAL DATUM: UTM NAD83–CSRS ZONE 17N
- VERTICAL DATUM: CGVD28–1978
- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.02m

LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2018
LEFT	LEFT BANK
RIGHT	RIGHT BANK
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	EXISTING STRUCTURE DETAILS
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	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979
	BRIDGE STRUCTURES

NO.	REVISION DESCRIPTION	DATE
2	Updated from Survey July 20,2021	Oct 5, 2021
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK MUNICIPAL DRAIN PROFILE

STA –0+130 to 1+930

BASELINE DRAWINGS

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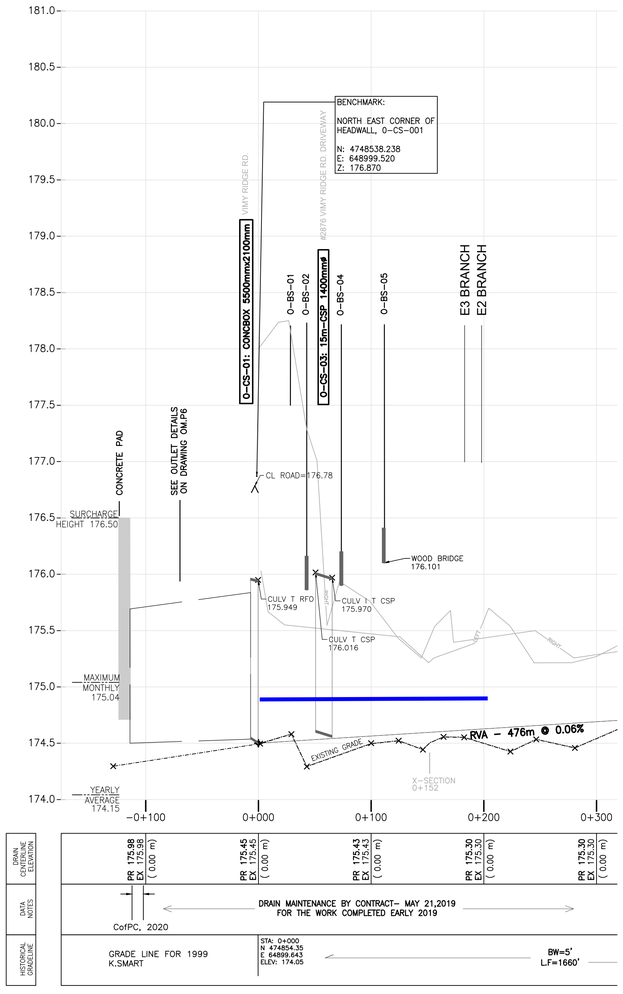
TJF	PCM	–	OM.PO
DESIGNED BY :	DATE :	SCALE :	
PCM	21–JUNE–21	FIT TO PAGE	

OIL MILL CREEK DRAIN
STA -0+150 to 0+300



174.82
WL avg.

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OIL MILL CREEK MUNICIPAL DRAIN PROFILE
STA -0+150 to 0+300

BASELINE DRAWINGS

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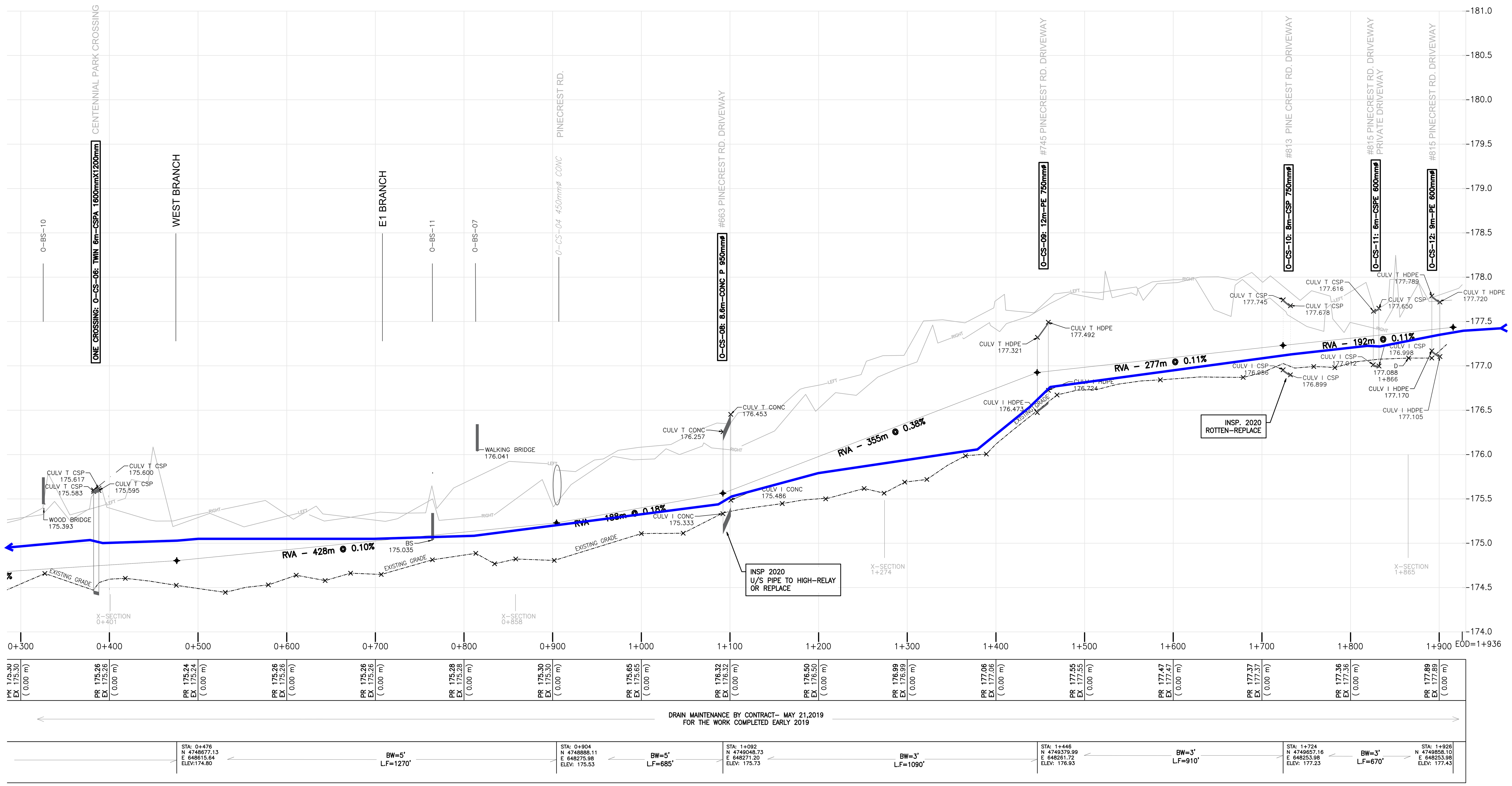
TJF	PCM	-	OM.P1
DESIGNED BY :	DATE :	SCALE :	
PCM	21-JUNE-21	H=1:2500 V=1:25	

OIL MILL CREEK DRAIN
STA 0+300 to 1+936



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NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK MUNICIPAL DRAIN PROFILE
STA 0+300 to 1+936

BASELINE DRAWINGS

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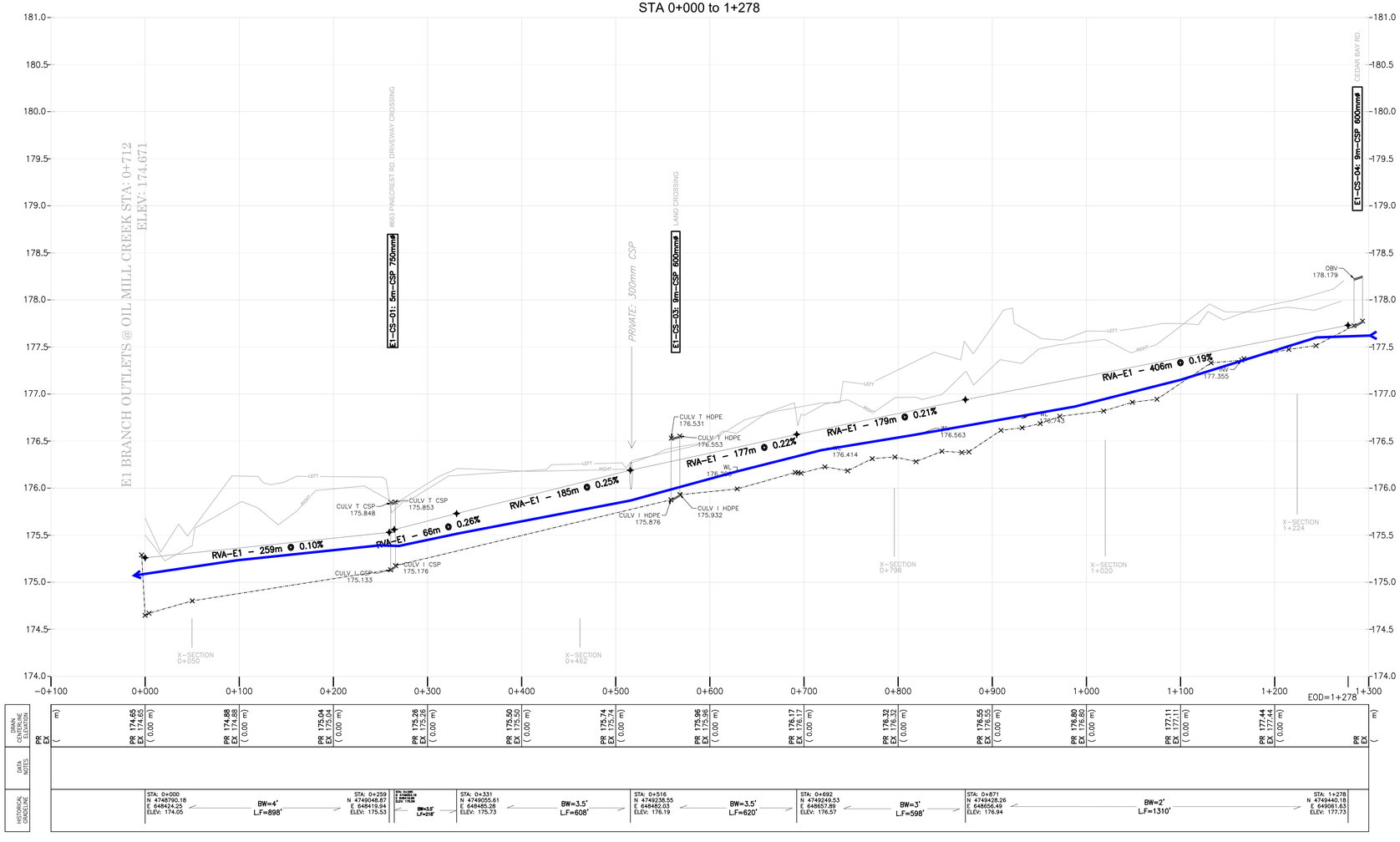
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	-	OM.P2
DESIGNED BY :	DATE :	SCALE :	
PCM	21-JUNE-21	H=1:2500 V=1:25	

E1 BRANCH
STA 0+000 to 1+278



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	BRIDGE STRUCTURES

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK E1 BRANCH DRAIN PROFILE

STA 0+000 to 1+278

BASELINE DRAWINGS

EWA Engineering Inc.
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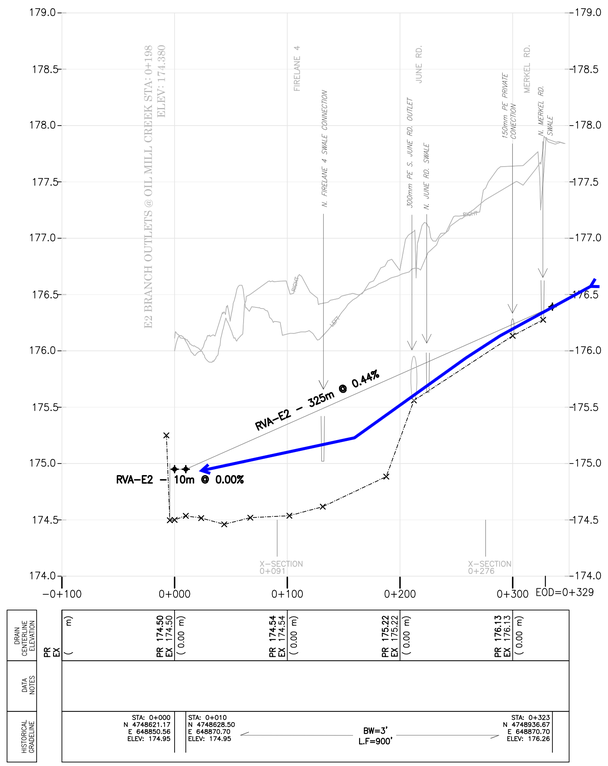
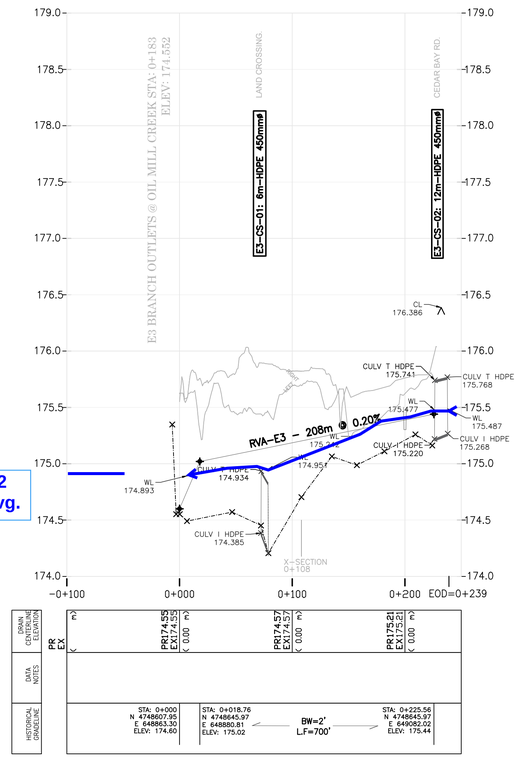
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	OM.P3
DESIGNED BY :	DATE :	SCALE :	
PCM	21–JUNE–21	H=1:2500 V=1:25	

E2 BRANCH
STA 0+000 to 0+329



E3 BRANCH
STA 0+000 to 0+239



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LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
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	PROPOSED DRAIN GRADELINE-EWA, 2018
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	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979
	BRIDGE STRUCTURES

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK E2/E3 BRANCH
DRAIN PROFILE
STA 0+000 to 0+329
DRAIN PROFILE
STA 0+000 to 0+239

BASELINE DRAWINGS

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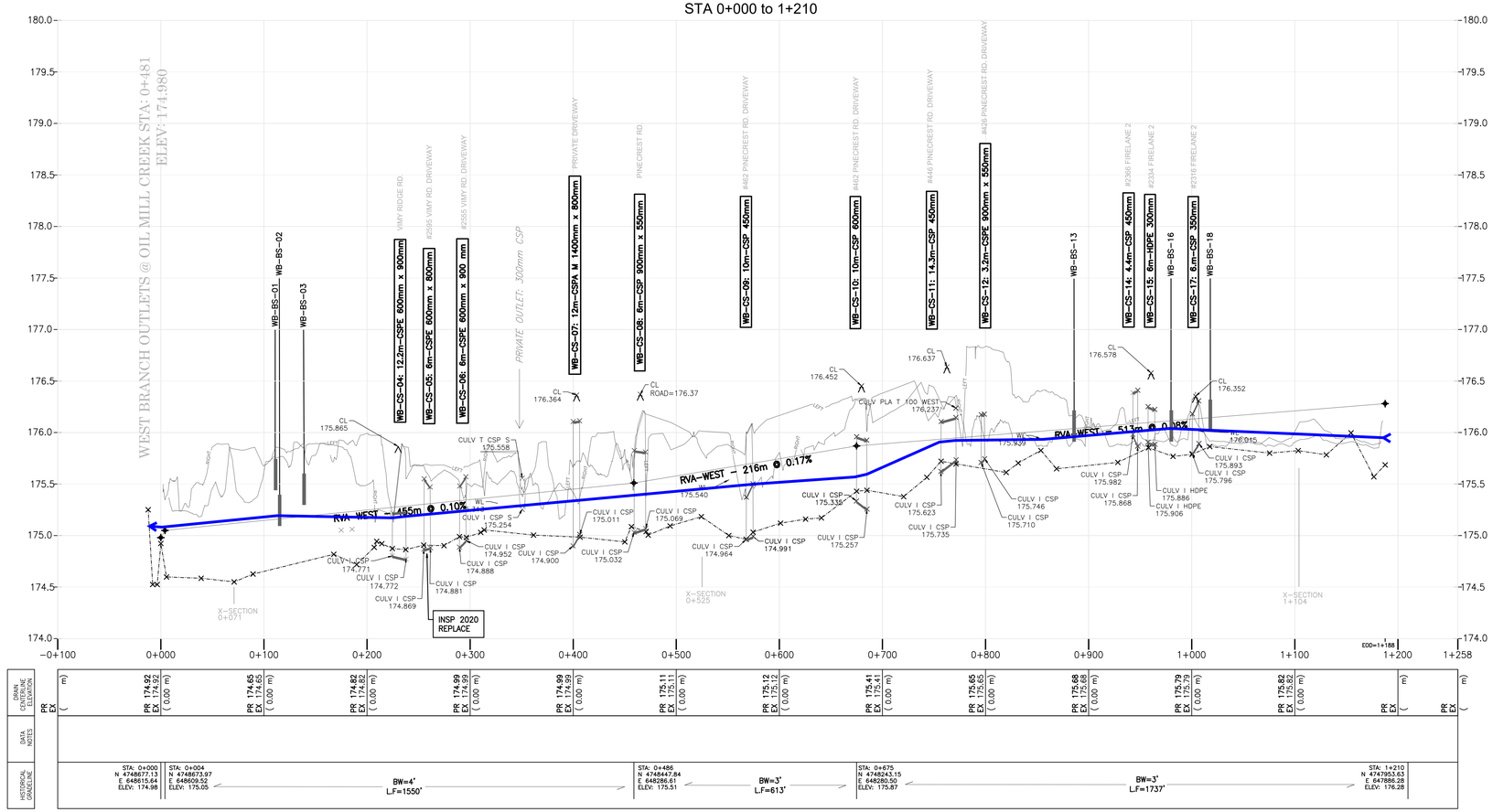
DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	-	OM.P4
DESIGNED BY :	DATE :	SCALE :	
PCM	21-JUNE-21	H=1:2500 V=1:25	

WEST BRANCH DRAIN
STA 0+000 to 1+210



NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE DONE TO THEM.

SPATIAL DATA:

- HORIZONTAL DATUM: UTM NAD83–CSRS ZONE 17N
- VERTICAL DATUM: CGVD28–1978
- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.02m

LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2018
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
175.00 PR.	PROPOSED DRAIN CENTERLINE ELEVATION
175.00 EX.	PROPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979
	BRIDGE STRUCTURES

NO.	REVISION DESCRIPTION	DATE
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK WEST BRANCH DRAIN PROFILE

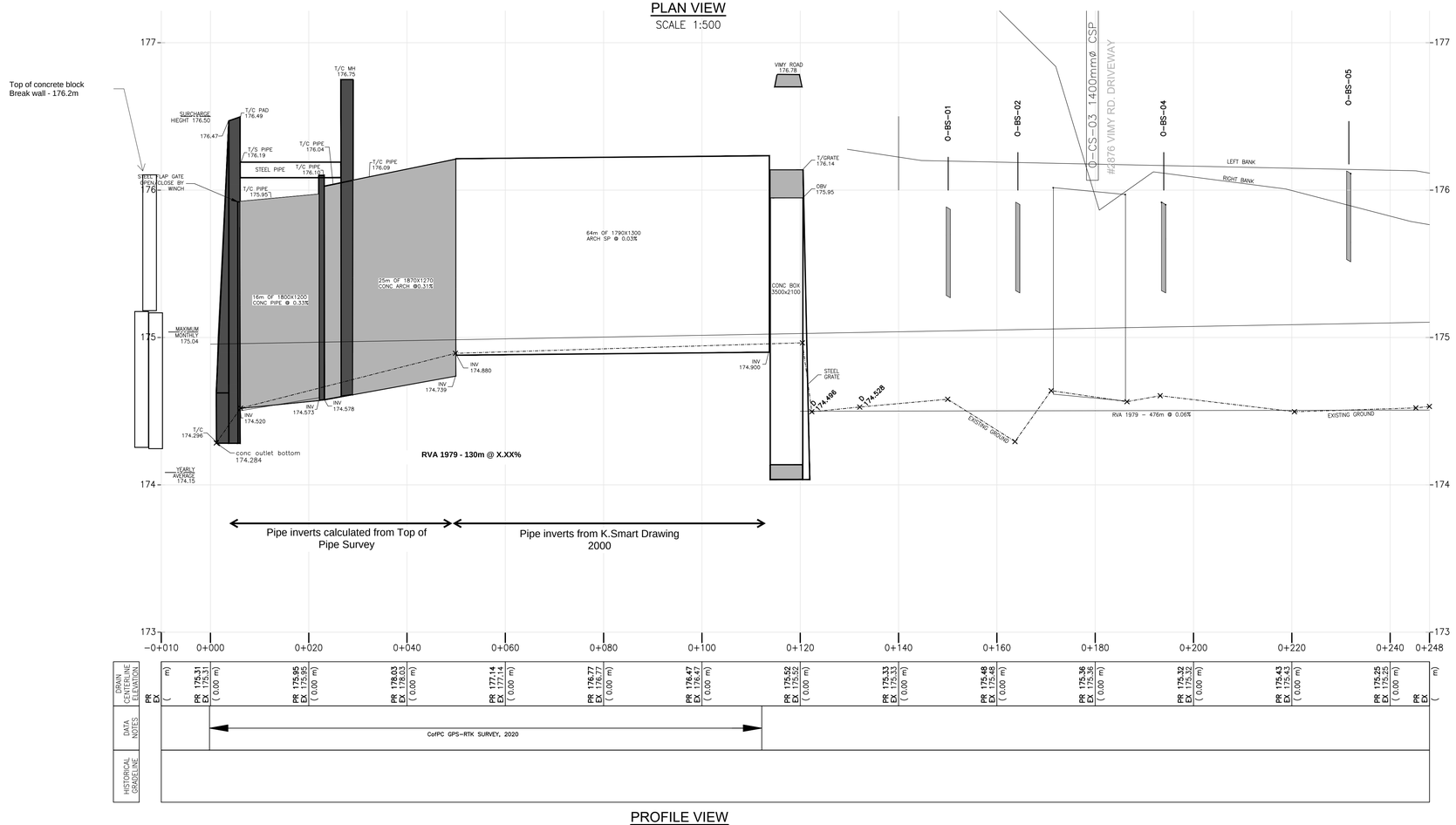
STA 0+000 to 1+210

BASELINE DRAWINGS

EWA Engineering Inc.
647.400.2824
www.ewaeng.com

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	OM.P5
DESIGNED BY :	DATE :	SCALE :	
PCM	21–JUNE–21	H=1:2500 V=1:25	

PLAN VIEW
SCALE 1:500



PROFILE VIEW
SCALE H:1:500 V:1:30

NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

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SPATIAL DATA:

- HORIZONTAL DATUM: UTM NAD83-CSRS ZONE 17N
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- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.02m

LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE-EWA, 2018
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
175.00 PR.	PROPOSED DRAIN CENTERLINE ELEVATION
175.00 EX.	PORPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

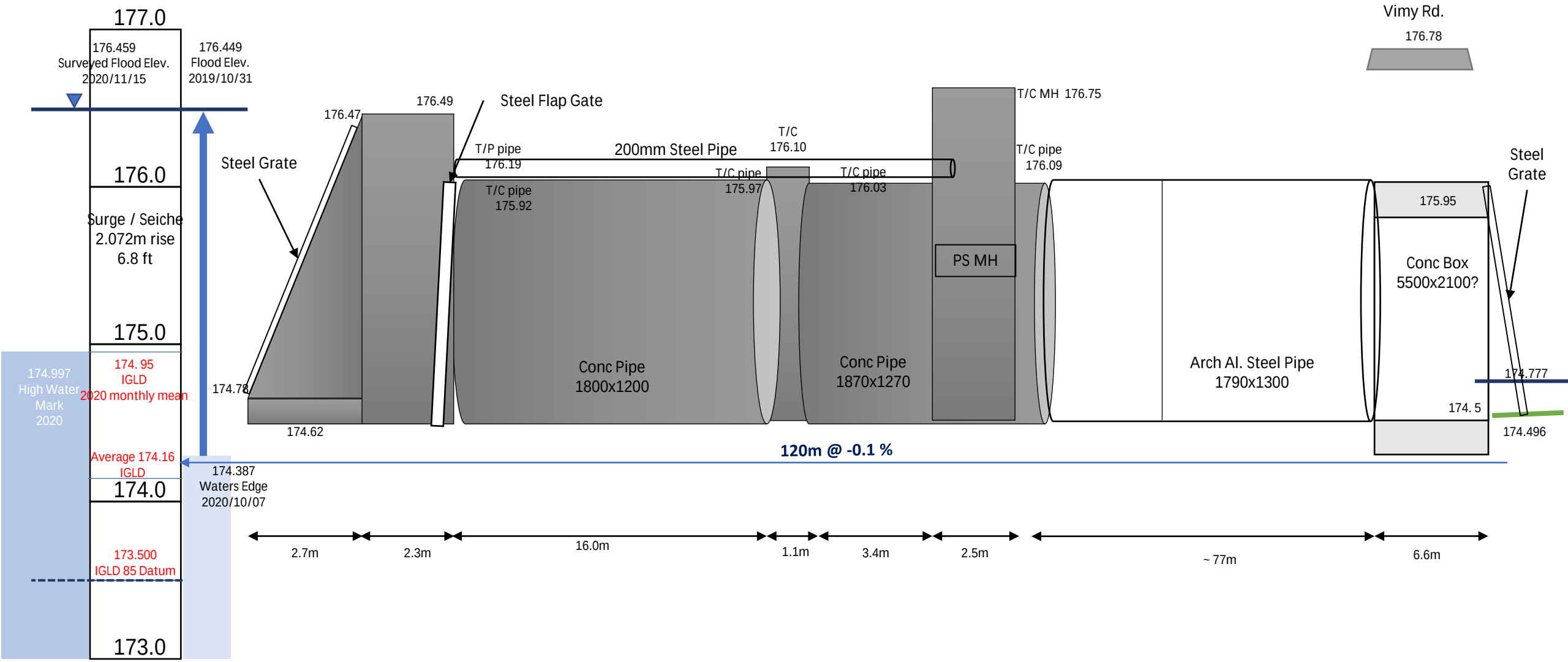
NO.	REVISION DESCRIPTION	DATE
2	Updated from Survey July 20,2021	Oct 5, 2021
1	ISSUED FOR BASELINE REPORT	JUNE 21, 2021

OIL MILL CREEK OUTLET DRAIN PLAN/PROFILE
STA 0+000 to 0+248

BASELINE DRAWINGS

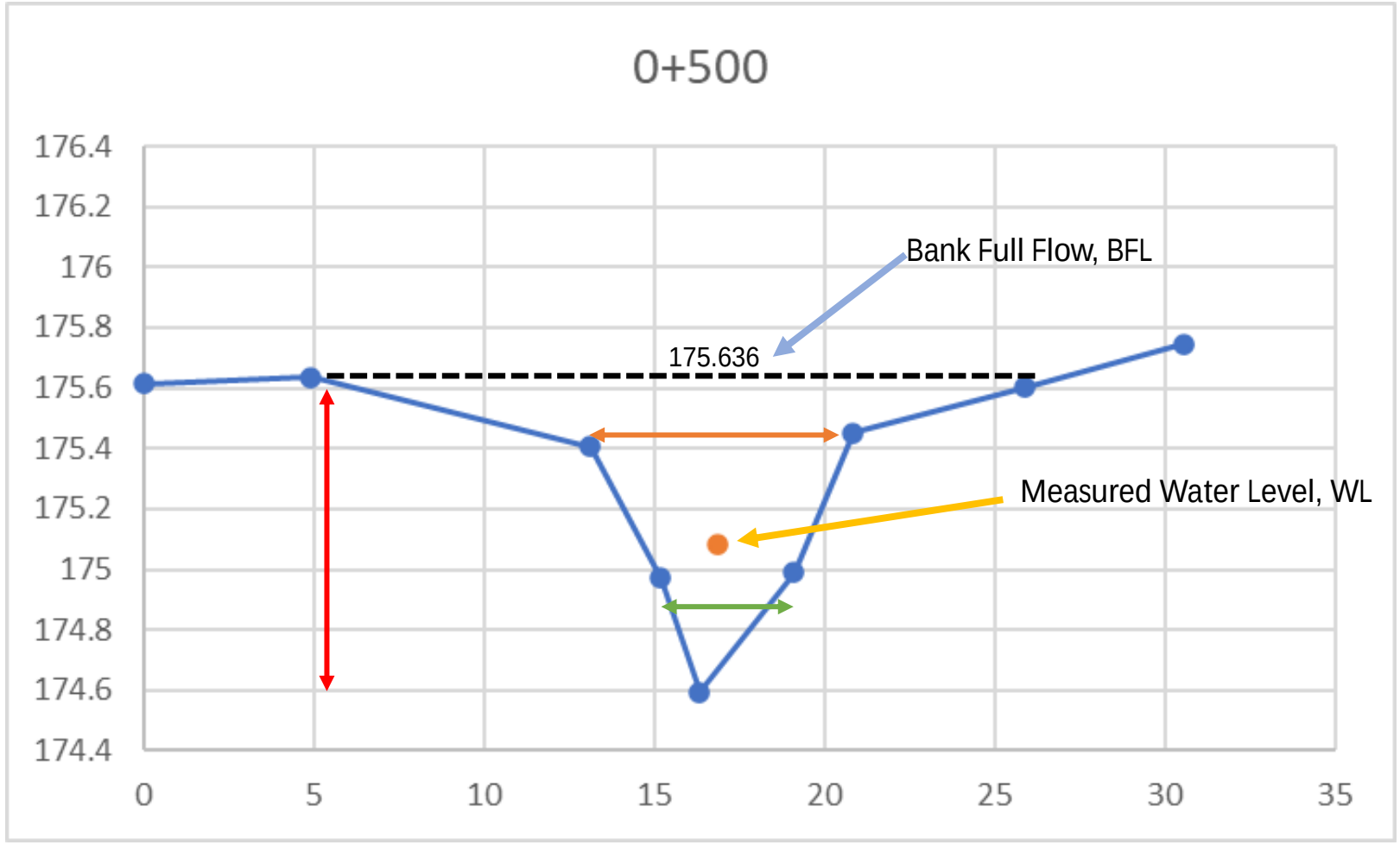
EWA Engineering Inc.
647.400.2824
www.ewaeng.com

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	OM.P6
DESIGNED BY :	DATE :	SCALE :	
PCM	21-JUNE-21	AS SHOWEN	

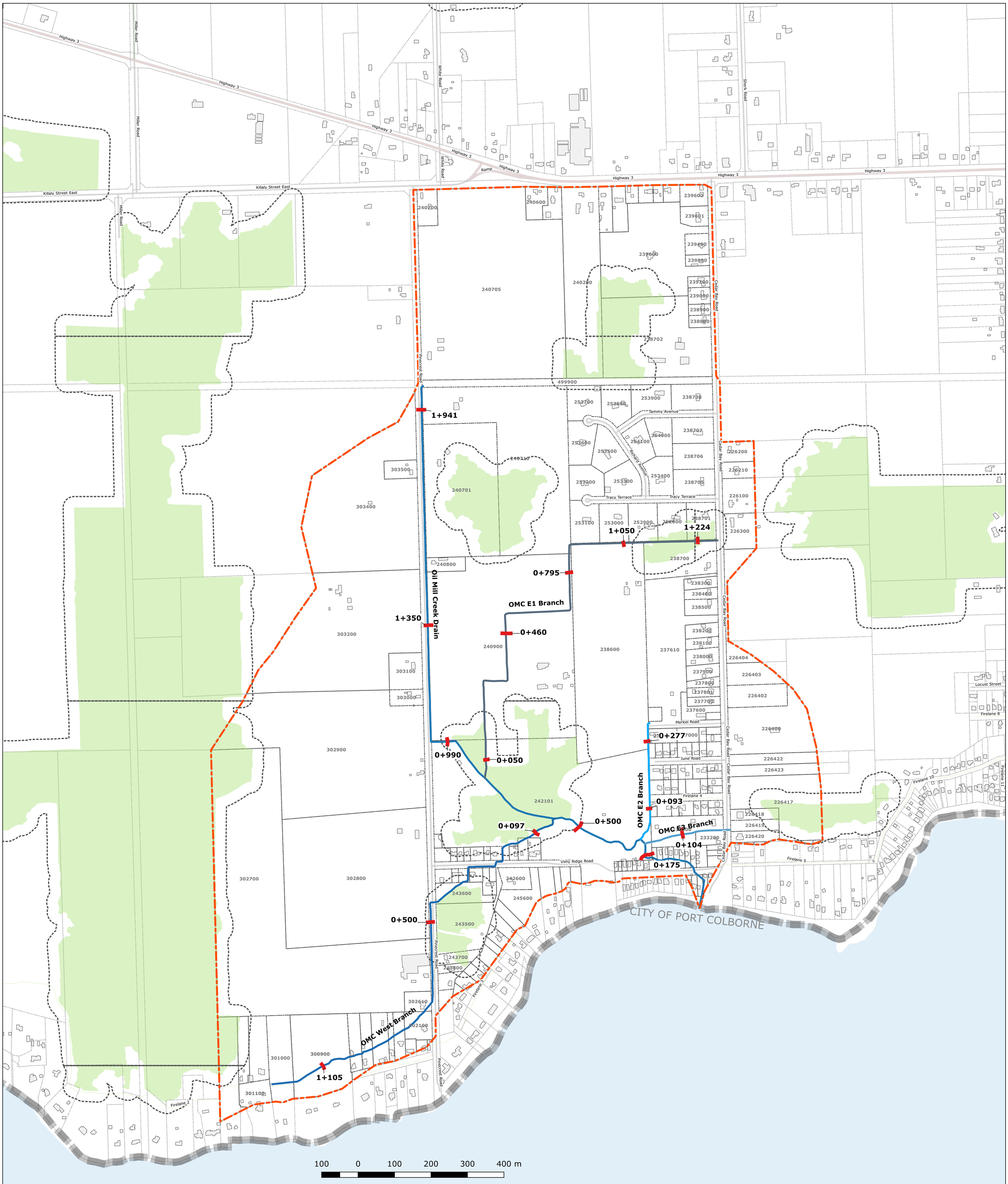


Note: IGLD vertical measurements are based on different datum from the survey measurements using NAD 83 UTM coordinates.

Depth = 0.86m
BW = 3.92m
TW = 7.72m
SS1 = 4.8
SS2 = 3.8



Oil Mill Creek Municipal Drain



Map Legend

- Xsections
- OldMill_catchment
- BuildingFootprints

oldmill_cl
- Oil Mill Creek Drain
- OMC E1 Branch
- OMC E2 Branch
- OMC E3 Branch
- OMC West Branch

- GR_WetlandAllowance_NPCA
- GR_RegulatedWetlands_NPCA
- MUNICIPAL_BOUNDARY_LOWER_AND_SINGLE_TIER
- OMC_parcels
- Ownership_Parcels

Road_Segments
- MUN
- ON
- PRIV
- RMN
- Lake_&_Canal

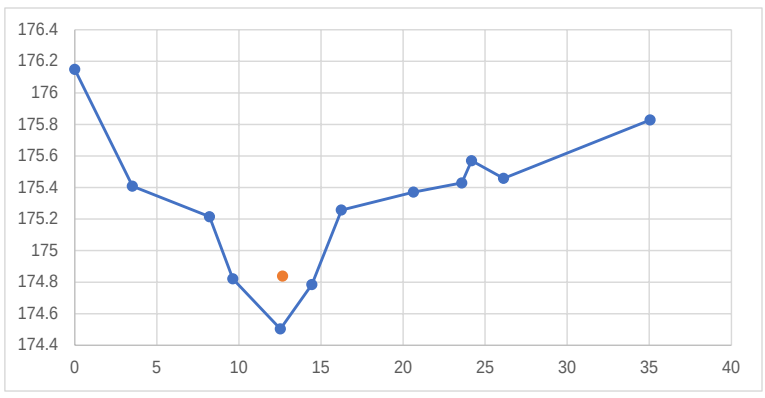
EWA Engineering Inc.
84 Main Street, Unionville, ON L3R 2E7
647.400.2824

Printed on: 2021-04-12T18:07:28.437

Oil Mill Creek

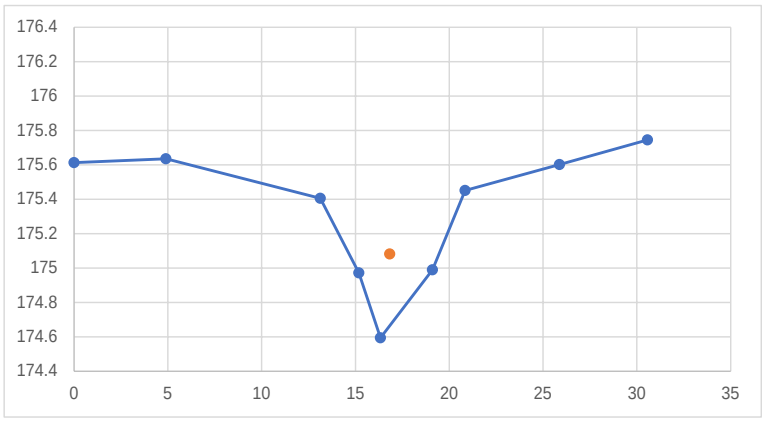
0+175

		field_1	E	N	E	txt	Distance	section
Design Slope	0.0006	1	3701	4748568	648853.1	176.149 OG	0	0
Depth	0.75	2	3700	4748571	648854.6	175.408 OG	3.518	3.518
BW	4.81	3	3699	4748574	648858.5	175.215 TS	4.694	8.211
TW	8.03	4	3698	4748575	648859.6	174.821 BS	1.424	9.635
SS1	3.6	5	3696	4748577	648861.9	174.504 D	2.891	12.526
SS2	3.8	7	3695	4748577	648863.7	174.785 BS	1.921	14.447
		8	3694	4748578	648865.4	175.257 TS	1.799	16.246
		9	3693	4748578	648869.7	175.371 OG	4.394	20.640
		10	3709	4748578	648872.7	175.429 01-Dec	2.939	23.579
		11	3710	4748578	648873.3	175.57 10-Dec	0.598	24.177
		12	3711	4748578	648875.2	175.458 05-Dec	1.948	26.126
		13	3712	4748581	648883.6	175.828 03-Dec	8.929	35.055
		6	3697	4748577	648862	174.838 WL	0.137	12.663



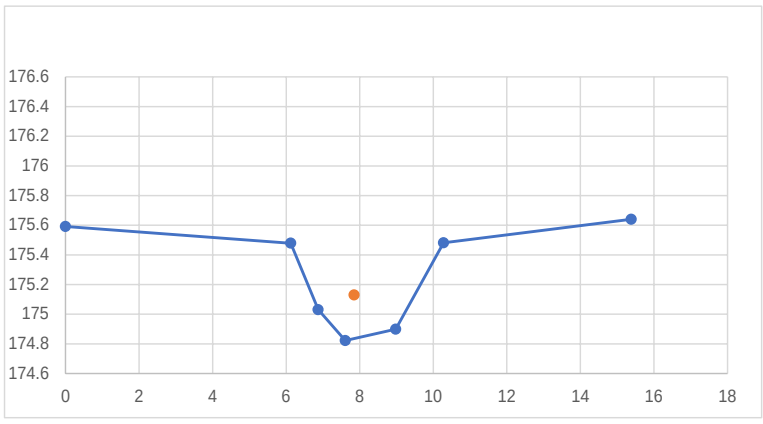
0+500

		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.0006		3457	4748660	648686.8	175.613 OG	0	0
Depth	0.86		3458	4748665	648688.4	175.636 OG	4.901	4.901
BW	3.92		3459	4748657	648684.7	175.406 TS	8.224	13.125
TW	7.72		3460	4748656	648683.3	174.972 BS	2.062	15.187
SS1	4.8		3461	4748655	648682.7	174.595 D	1.147	16.334
SS2	3.8		3463	4748653	648680.5	174.99 BS	2.773	19.106
			3464	4748652	648679	175.451 TS	1.742	20.848
			3465	4748649	648675.4	175.602 OG	5.029	25.877
			3466	4748646	648671.8	175.745 OG	4.693	30.570
			3462	4748655	648683	175.082 WL	0.496	16.830



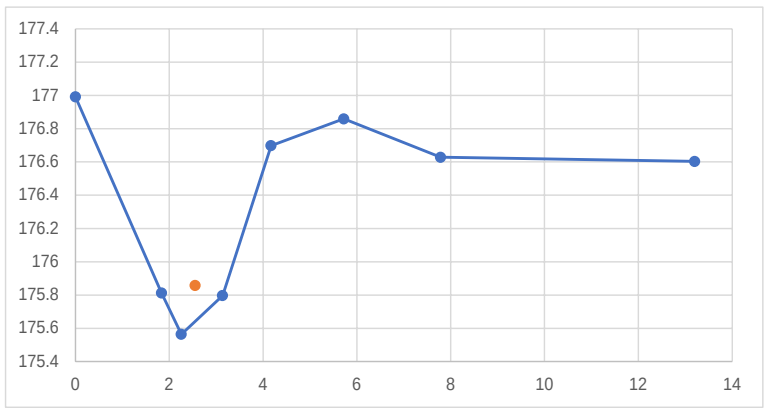
0+990

		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.0011		3252	4748880	648321.3	175.592 OG	0	0
Depth	0.66		3253	4748886	648321.9	175.479 TS	6.124	6.124
BW	2.11		3254	4748887	648321.9	175.031 BS	0.745	6.870
TW	4.15		3255	4748888	648321.9	174.822 D	0.737	7.607
SS1	1.7		3257	4748889	648321.7	174.899 BS	1.372	8.979
SS2	2.2		3258	4748891	648321.7	175.482 TS	1.298	10.277
			3259	4748896	648320.6	175.64 OG	5.106	15.383
			3256	4748888	648322	175.13 WL	0.238	7.846



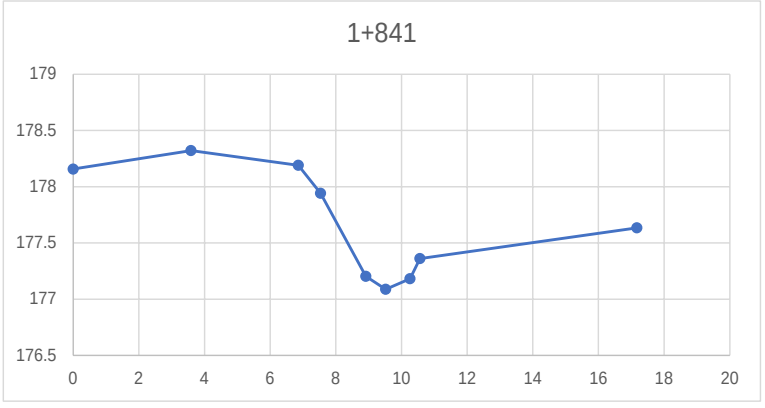
1+350

		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.0041		1156	4749207	648264.7	176.991 TS	0	0
Depth	1.13		1157	4749207	648266.5	175.812 BS	1.836	1.836
BW	1.30		1158	4749207	648266.9	175.564 D	0.421	2.257
TW	4.17		1160	4749207	648267.8	175.797 BS	0.880	3.137
SS1	1.6		1161	4749207	648268.8	176.698 TS	1.033	4.170
SS2	1.1		1162	4749208	648270.2	176.859 OG	1.549	5.719
			1163	4749208	648272.3	176.628 EF	2.066	7.785
			1164	4749208	648277.7	176.603 OG	5.416	13.202
			1159	4749208	648266.7	175.857 WL	0.294	2.551



1+841

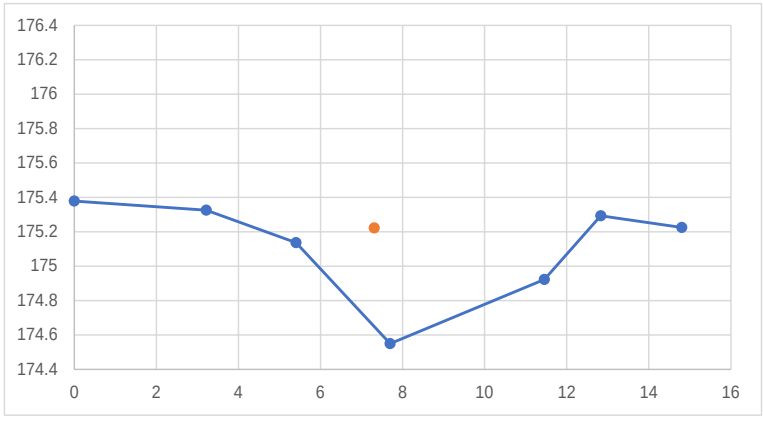
		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.001		2072	4749799	648240.8	178.157 EP	0	0
Depth	0.27		2073	4749799	648244.4	178.322 CL	3.590	3.590
BW	1.35		2074	4749799	648247.6	178.19 EP	3.269	6.859
TW	3.03		2075	4749799	648248.3	177.941 TS	0.679	7.538
SS1	1.9		2076	4749798	648249.7	177.203 BS	1.376	8.913
SS2	1.7		2077	4749799	648250.3	177.088 D	0.607	9.520
			2078	4749798	648251	177.182 BS	0.741	10.261
			2079	4749799	648251.3	177.361 TS	0.304	10.565
			2080	4749799	648257.9	177.634 OG	6.607	17.172



WB Branch Drain

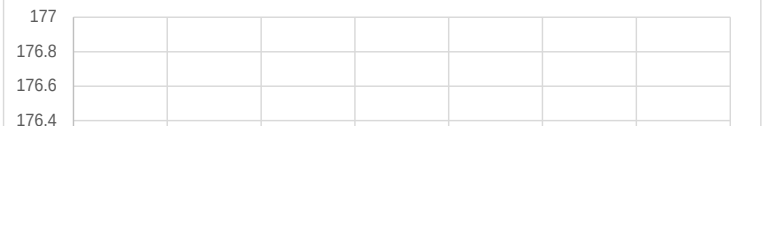
0+097

		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.001							
Depth	0.74	1	3203	4748634	648568.9	175.379 OG	0	0
BW	6.05	2	3199	4748635	648565.9	175.326 TS	3.217	3.217
TW	9.61	3	3238	4748637	648564.2	175.137 BS	2.188	5.405
SS1	11.6	5	3268	4748637	648562	174.55 D	2.291	7.696
SS2	3.7	6	3485	4748641	648562.3	174.923 BS	3.761	11.457
		7	3484	4748642	648561.1	175.293 TS	1.374	12.831
		8	3468	4748643	648559.4	175.225 OG	1.975	14.806
		4	3310	4748637	648562.3	175.223 WL	1.907	7.311

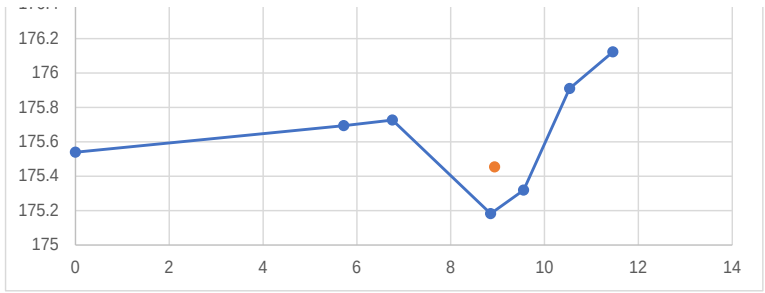


0+500

		field_1	field_2	field_3	field_4	field_5	Distance	section
Design Slope	0.0017							
Depth	0.73	1	1482	4748393	648267.4	175.54 OG	0	0

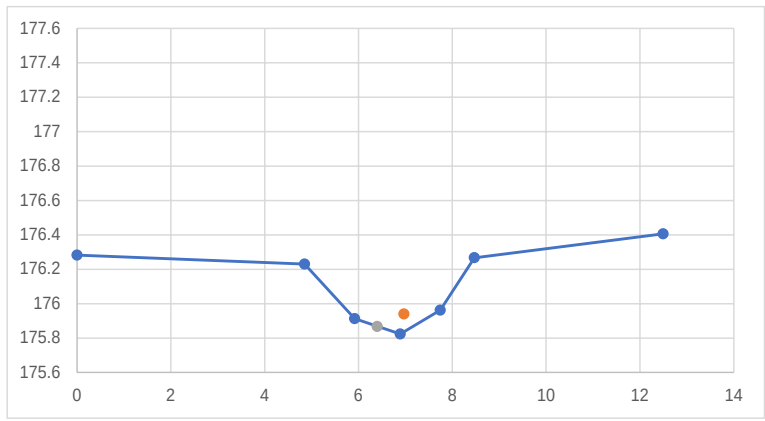


BW	0.70	2	1481	4748393	648273.1	175.694	HGUY	5.720	5.720
TW	3.78	3	1480	4748394	648274	175.727	TS	1.038	6.759
SS1	3.8	4	1478	4748394	648276	175.183	D	2.094	8.853
SS2	1.7	6	1477	4748394	648276.7	175.319	BS	0.703	9.555
		7	1476	4748394	648277.7	175.91	TS	0.980	10.535
		8	1475	4748394	648278.6	176.123	EP	0.922	11.458
		5	1479	4748394	648276.1	175.454	WL	0.086	8.938



1+105

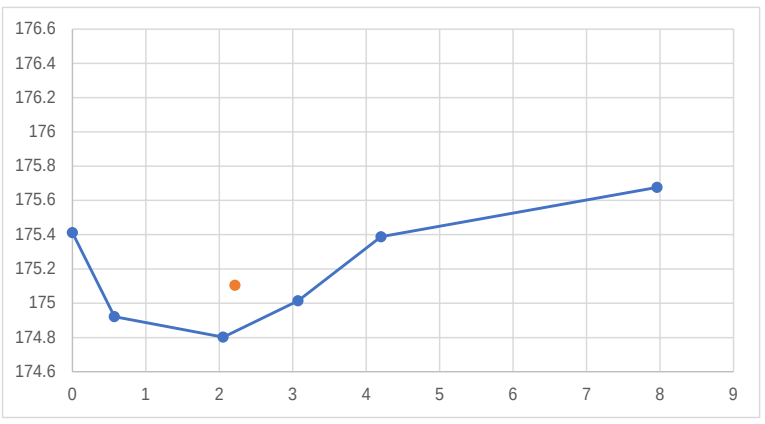
Design Slope	0.0008		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.44	1	4816	4747993	647982.6	176.282	OG	0	0
BW	1.83	2	4815	4747998	647981.1	176.23	TS	4.852	4.852
TW	3.62	3	4814	4747999	647980.6	175.913	BS	1.067	5.919
SS1	3.4	5	4811	4748000	647980.4	175.824	D	0.491	6.890
SS2	2.4	7	4810	4748000	647979.5	175.962	BS	0.775	7.745
		8	4809	4748000	647979.2	176.267	TS	0.724	8.469
		9	4808	4748004	647976.6	176.406	OG	4.026	12.495
		4	4813	4747999	647980.3	175.867	BEDROCK	0.480	6.399
		6	4812	4748000	647980.3	175.94	WL	0.079	6.969



OMC E1 Branch

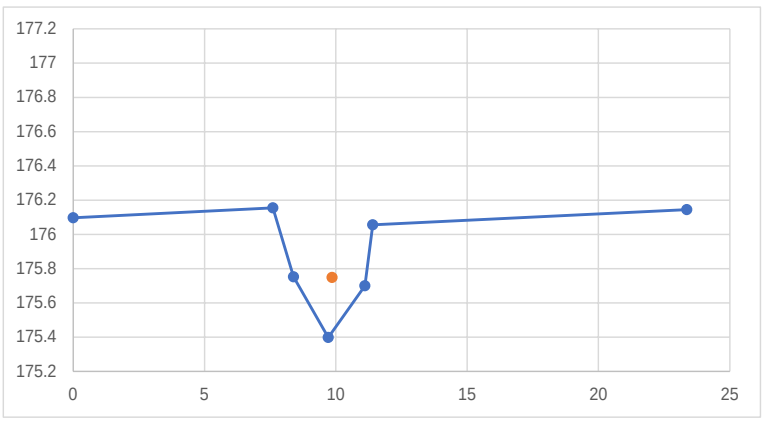
0+050

Design Slope	0.001		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.59	1	3350	4748838	648424.3	175.412	TS	0	0
BW	2.50	2	3349	4748838	648424.9	174.922	BS	0.572	0.572
TW	4.20	3	3347	4748839	648426.4	174.802	D	1.481	2.053
SS1	1.2	5	3346	4748839	648427.4	175.014	BS	0.859	3.073
SS2	3.0	6	3345	4748839	648428.5	175.388	TS	1.130	4.203
		7	3344	4748839	648432.2	175.676	OG	3.756	7.959
		4	3348	4748839	648426.5	175.105	WL	0.160	2.214



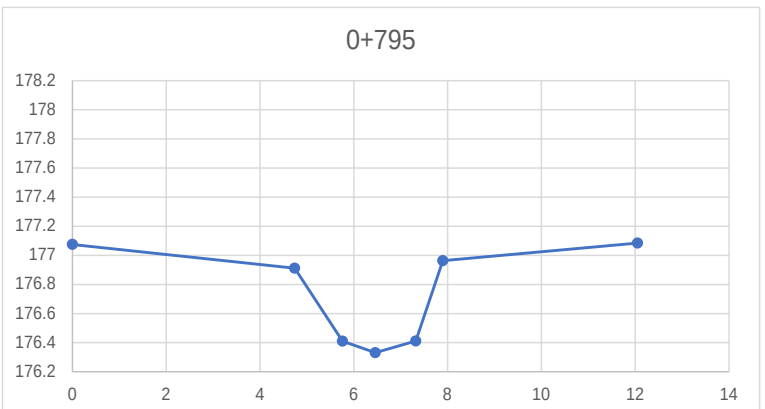
0+460

Design Slope	0.0025		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.66		2229	4749185	648471.6	176.097	OG	0	0
BW	2.72		2230	4749185	648479.2	176.155	TS	7.605	7.605
TW	3.80		2231	4749185	648480	175.752	BS	0.787	8.392
SS1	2.0		2232	4749185	648481.3	175.398	D	1.320	9.712
SS2	0.8		2234	4749185	648482.7	175.7	BS	1.397	11.109
			2235	4749185	648483	176.056	TS	0.296	11.404
			2679	4749185	648495	176.145	OG	11.958	23.362
			2233	4749185	648481.5	175.749	WL	0.146	9.858



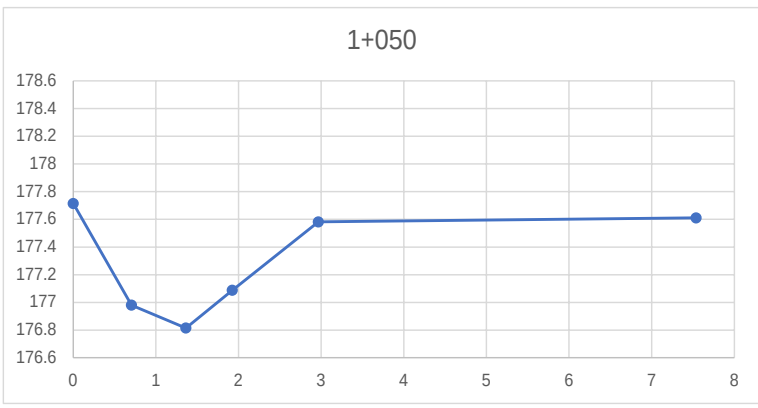
0+795

Design Slope	0.0021		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.63		3063	4749351	648648.9	177.075	OG	0	0
BW	1.56		3064	4749352	648653.7	176.912	TS	4.741	4.741
TW	3.16		3065	4749352	648654.7	176.41	BS	1.019	5.759
SS1	2.0		3066	4749352	648655.3	176.331	D	0.699	6.458
SS2	1.0		3067	4749352	648656.2	176.411	BS	0.862	7.321
			3068	4749352	648656.8	176.963	TS	0.578	7.899
			3069	4749353	648660.9	177.084	OG	4.152	12.051



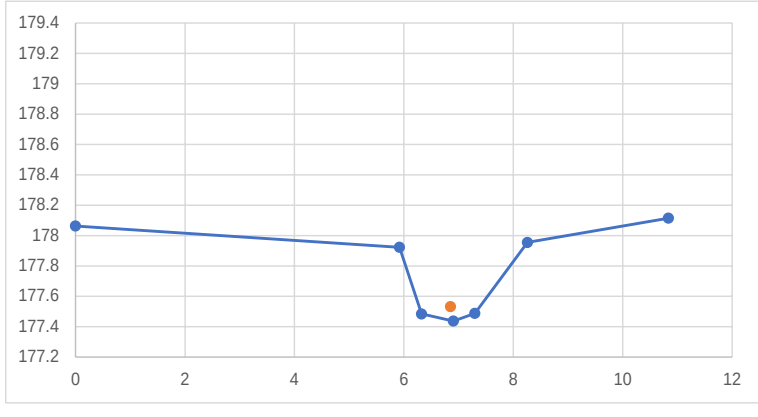
1+050

Design Slope	0.0019		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.77	1	2661	4749434	648803.8	177.714	TS	0	0
BW	1.22	2	2660	4749434	648804.1	176.98	BS	0.705	0.705
TW	2.97	3	2659	4749433	648803.9	176.814	D	0.659	1.363
SS1	1.0	4	2658	4749433	648804.2	177.087	BS	0.562	1.926
SS2	2.1	5	2657	4749432	648804.1	177.581	TS	1.042	2.967
		6	2656	4749427	648804.9	177.61	OG	4.571	7.539



1+224

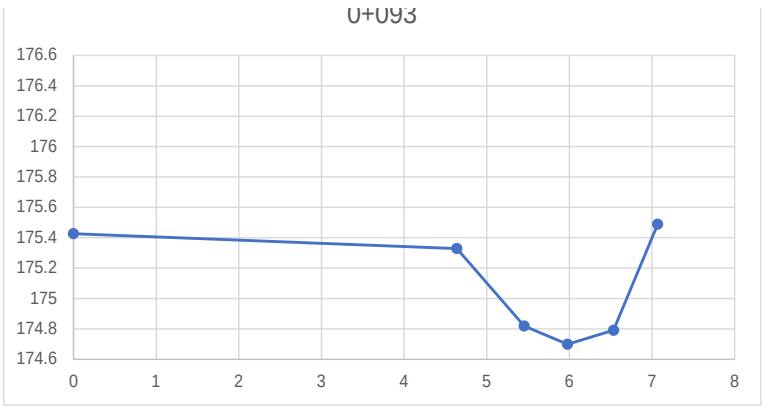
Design Slope	0.0019		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.52	1	4773	4749445	649007.4	178.063	OG	0	0
BW	0.97	2	4772	4749439	649007.6	177.923	TS	5.920	5.920
TW	2.34	3	4771	4749439	649007.6	177.484	BS	0.405	6.325
SS1	0.9	5	4769	4749438	649007.6	177.437	D	0.055	6.907
SS2	2.1	6	4768	4749438	649007.6	177.488	BS	0.390	7.297
		7	4767	4749437	649008.1	177.955	TS	0.962	8.260
		8	4766	4749435	649008	178.115	OG	2.577	10.836
		4	4770	4749439	649007.6	177.532	WL	0.527	6.852



OMC E2 Branch

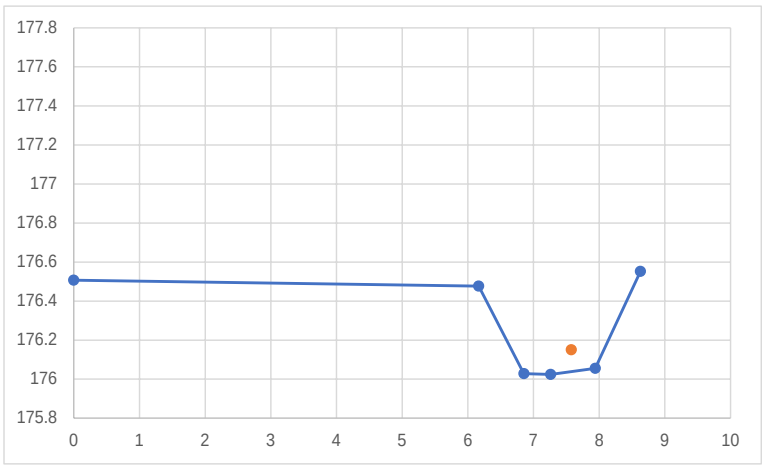
0+093

Design Slope	0.002		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.79		2400	4748704	648870.7	175.427	OG	0	0
BW	1.08		2401	4748705	648875.3	175.329	TS	4.639	4.639
TW	2.43		2402	4748705	648876.1	174.819	BS	0.814	5.453
SS1	1.6		2403	4748705	648876.6	174.699	D	0.525	5.978
SS2	0.8		2404	4748705	648877.2	174.791	BS	0.556	6.535
			2405	4748705	648877.7	175.489	TS	0.533	7.068



0+277

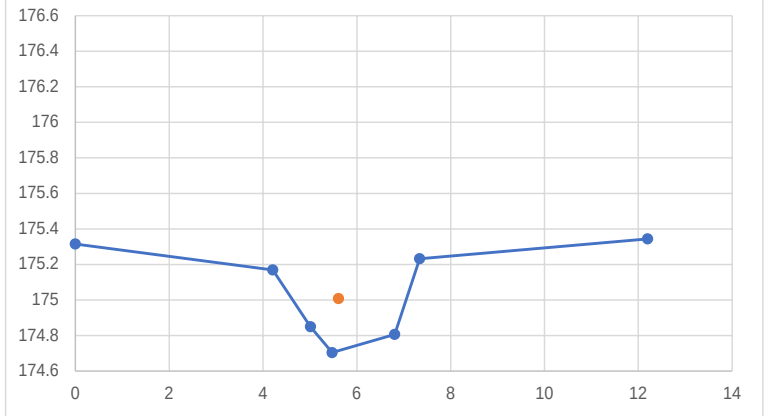
Design Slope	0.0044		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.53		2496	4748889	648864.3	176.507	OG	0	0
BW	1.09		2497	4748889	648870.4	176.477	TS	6.165	6.165
TW	2.46		2498	4748889	648871.1	176.028	BS	0.689	6.854
SS1	1.5		2499	4748889	648871.5	176.024	D	0.407	7.261
SS2	1.4		2501	4748890	648872	176.055	BS	0.364	7.940
			2502	4748890	648872.6	176.552	TS	0.689	8.629
			2500	4748890	648871.6	176.15	WL	0.314	7.575



OMC E3 Branch

0+104

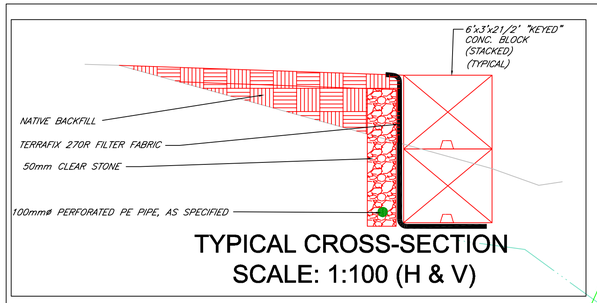
Design Slope	0.002		field_1	field_2	field_3	field_4	field_5	Distance	section
Depth	0.53		4648	4748639	648964.7	175.315	OG	0	0
BW	1.79		4649	4748635	648965.6	175.169	TS	4.208	4.208
TW	3.13		4650	4748635	648965.5	174.849	BS	0.804	5.012
SS1	2.5		4651	4748634	648965.5	174.704	D	0.460	5.472
SS2	1.3		4653	4748633	648966	174.806	BS	1.334	6.806
			4654	4748632	648966.1	175.232	TS	0.533	7.339
			4655	4748628	648967.1	175.344	OG	4.860	12.200
			4652	4748634	648965.5	175.008	WL	0.139	5.611



Main Branch					E3				E2				E1				West Branch			
segment Length	Station	Elevation	RVA	Length	Station	Elevation	RVA	Length	Station	Elevation	RVA	Length	Station	Elevation	RVA	Length	Station	Elevation	RVA
	-122.3	174.35	174.35		178.5				198.5				722.5				488.4		
27.1	-95.2	174.4	174.4																
95.2	0	174.496	174.5																
178.5	178.5	174.552	174.6		178.5	174.55	174.6												
20	198.5	174.38	174.61	18.3	196.8	174.491	175.02		198.5	174.38	174.6								
488.4	488.4	174.525	174.98	204.7	401.5	175.03	175.44	10	208.5	174.45	174.95						488.4	175.05	175.05
234	722.4	174.648	175.26			0.22%		58	256.5	174.593	174.593		722.5	174.671	175.26	469.8	958.2	175.123	175.51
429	917.4	174.806	175.41					65.5	322	176.276	176.26	260	982.5	175.07	175.53	216	1174.2	175.43	175.87
160.7	1078.1	175.341	175.75							1.54%		5.3	987.8	175.096	175.56	796	1754.2	175.686	176.28
331.5	1409.6	176.375	177.12									65	1052.8	175.241	175.73			0.05%	
277.4	1687	177.026	177.42									185.8	1238.6	175.597	176.19				
208.5	1895.5	177.224	177.64									176.7	1415.3	176.165	176.57				
705	2600.5	182										179.2	1594.5	176.461	176.94				
		0.14%										405	1999.5	177.556	177.73				
														0.23%					

Appendix C:

Relevant Reports



TYPICAL CROSS-SECTION
SCALE: 1:100 (H & V)

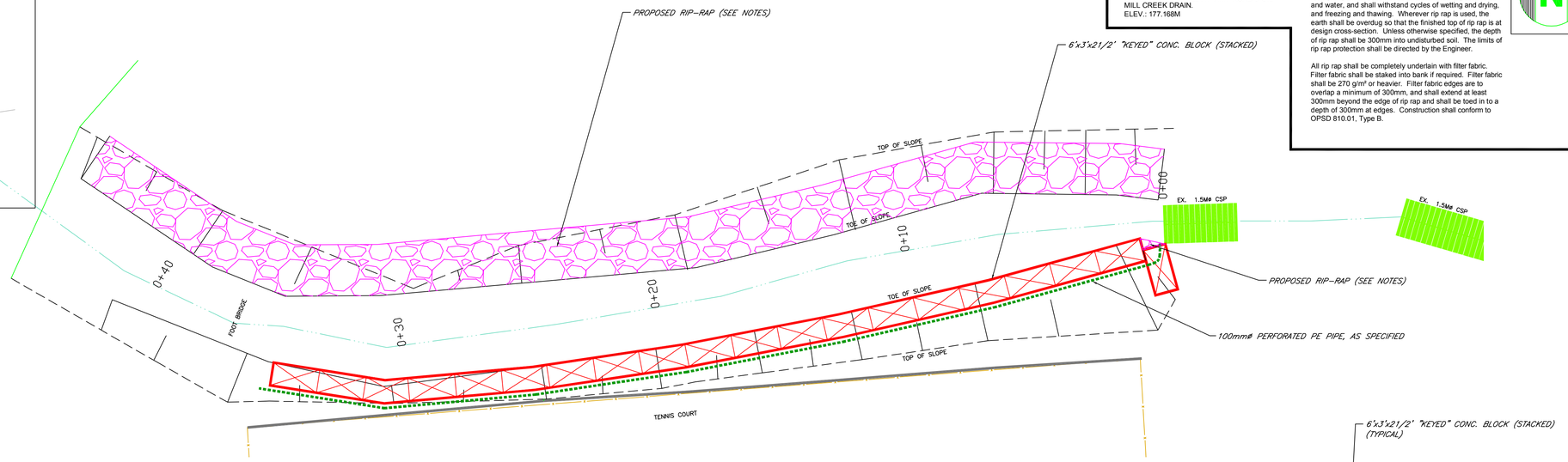
BENCHMARK:

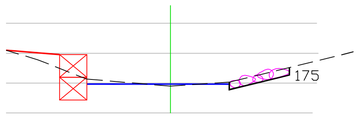
SOUTHWEST CORNER OF CONCRETE CULVERT HEADWALL AT VIMY ROAD & OIL MILL CREEK DRAIN.
ELEV.: 177.168M

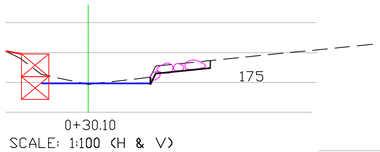
NOTES:

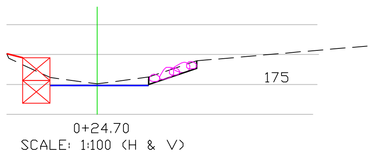
Rip rap shall consist of clean, hard 200 - 250mm dia. broken rock (min.) which does not deteriorate when exposed to air and water, and shall withstand cycles of wetting and drying, and freezing and thawing. Wherever rip rap is used, the earth shall be overdug so that the finished top of rip rap is at design cross-section. Unless otherwise specified, the depth of rip rap shall be 300mm into undisturbed soil. The limits of rip rap protection shall be directed by the Engineer.

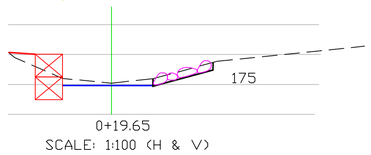
All rip rap shall be completely underlain with filter fabric. Filter fabric shall be staked into bank if required. Filter fabric shall be 270 g/m² or heavier. Filter fabric edges are to overlap a minimum of 300mm, and shall extend at least 300mm beyond the edge of rip rap and shall be toed in to a depth of 300mm at edges. Construction shall conform to OPSD 810.01, Type B.

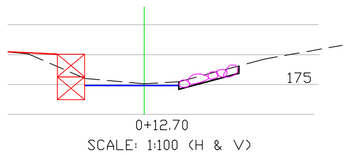


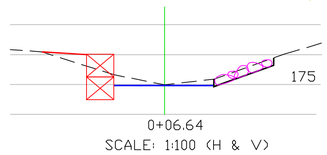


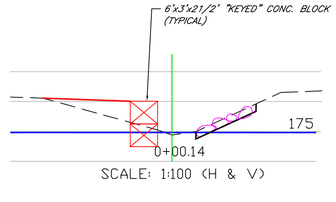


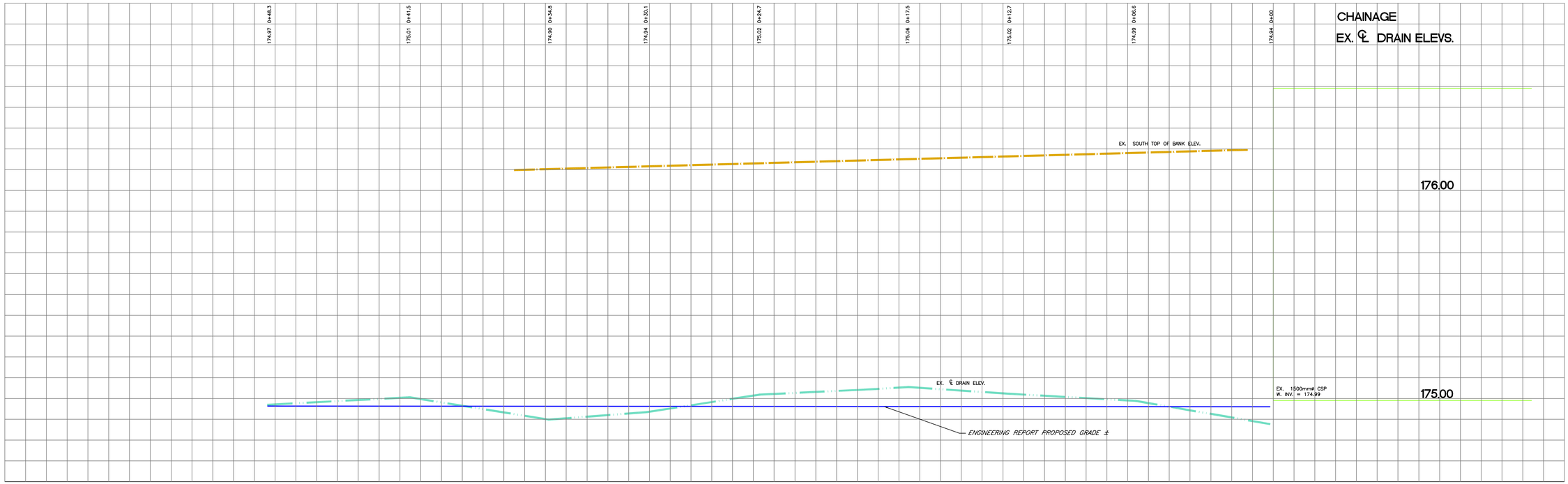












No.	REVISION	DATE	INIT.

NOTES

1) THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY ON THE CONSTRUCTION DRAWINGS AND WHERE SHOWN THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

2) BEFORE STARTING THE WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

3) HYDRO AND BELL POLES ARE TO BE ANCHORED TO THE GROUND WHERE REQUIRED SO AS TO ENSURE THE STABILITY OF THE POLE LINES.

4) THE CONTRACTOR IS TO CHECK WITH ALL THE UTILITIES INVOLVED.

5) ALL MANHOLE FRAMES , CATCH BASIN FRAMES, WATER VALVES AND GAS VALVES TO BE ADJUSTED TO FINISH GRADE.

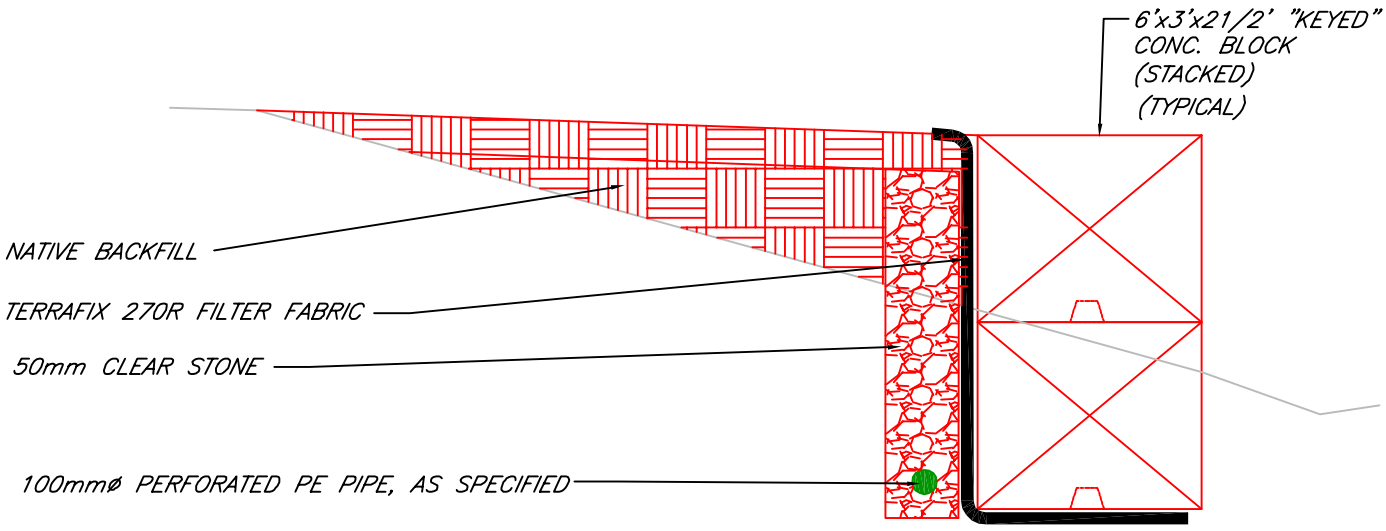
DRAFTING	J.W
DESIGN	
CHECKED	

CITY OF PORT COLBORNE

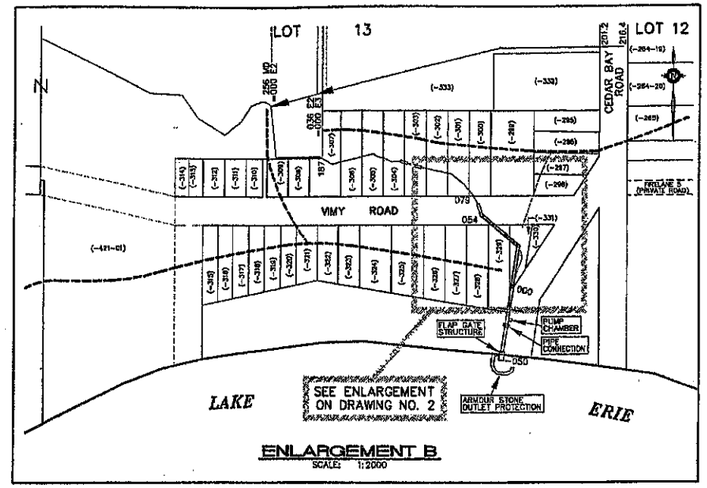
OIL MILL CREEK MUNICIPAL DRAIN

EROSION CONTROL WORKS AT VIMY ROAD TENNIS COURTS

FIELD NOTES	
DATE	FEB./06
SCALE	Horiz. 1:100 Vert. 1:10
DWG No	120-145
CONTRACT/QUOTE No	CONTRACT NO.



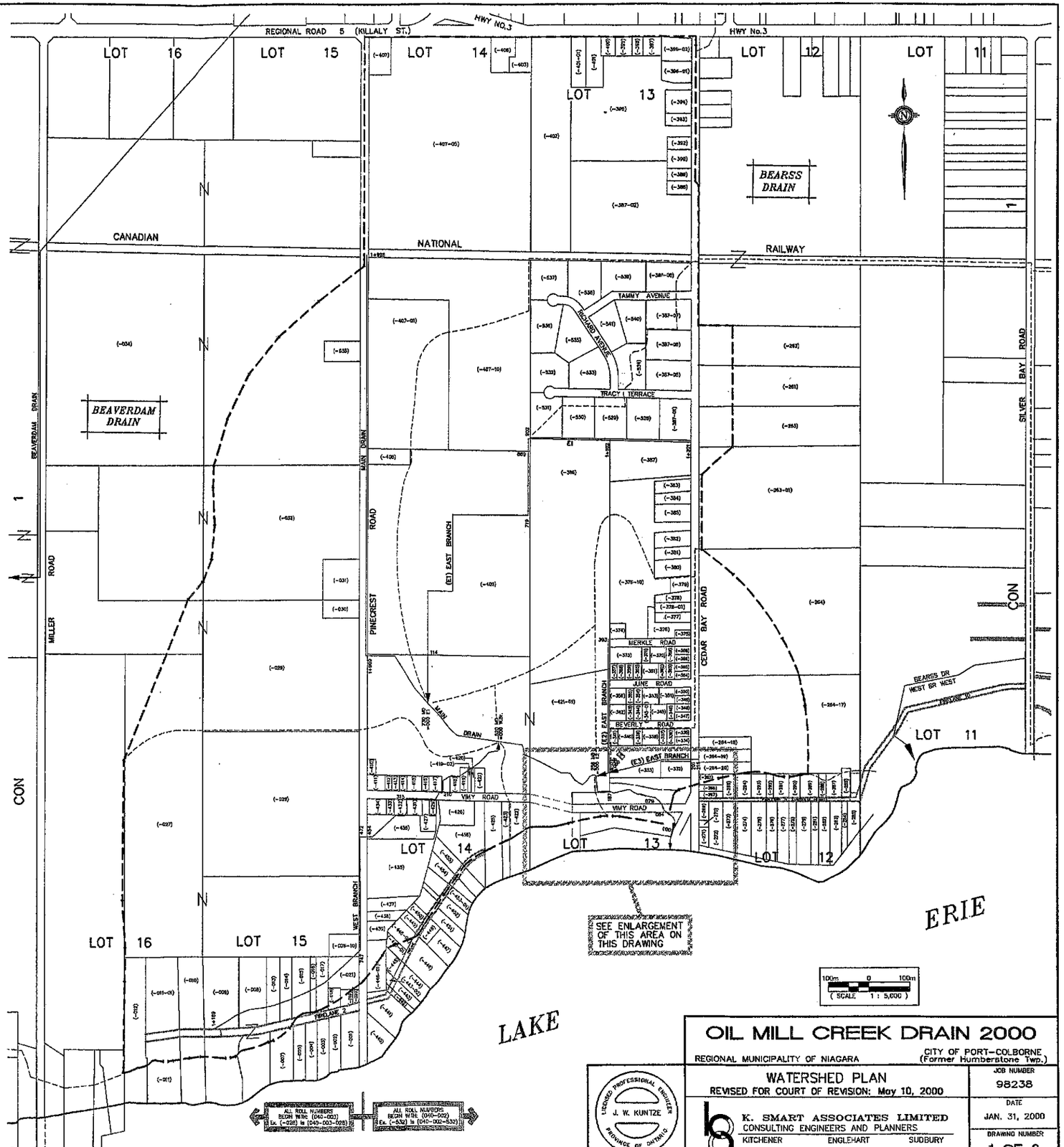
		CITY OF PORT COLBORNE OPERATIONAL SERVICES	SCALE: 1:100 (H & V)	CONTRACT. No.
DRAWN BY:	DATE:	CONCRETE BLOCK TYPICAL CROSS-SECTION		DWG. No.



ENLARGEMENT B
SCALE: 1:2000

PLAN LEGEND

- MAJOR WATERSHED
- INTERMEDIATE WATERSHED
- PROPOSED DRAIN WORK
- OTHER DRAIN
- BUSH
- DENOTES PROPERTY OWNERSHIP ON BOTH SIDES OF LOT LINE
- (2.8) APPROXIMATE HECTARES IN WATERSHED
- (040-002-421) ASSESSMENT ROLL NUMBER
- ACCESS



OIL MILL CREEK DRAIN 2000

REGIONAL MUNICIPALITY OF NIAGARA

CITY OF PORT-COLBORNE (Former Humberstone Twp.)

WATERSHED PLAN

REVISED FOR COURT OF REVISION: May 10, 2000

LICENSED PROFESSIONAL ENGINEER J. W. KUNTZE PROVINCE OF ONTARIO

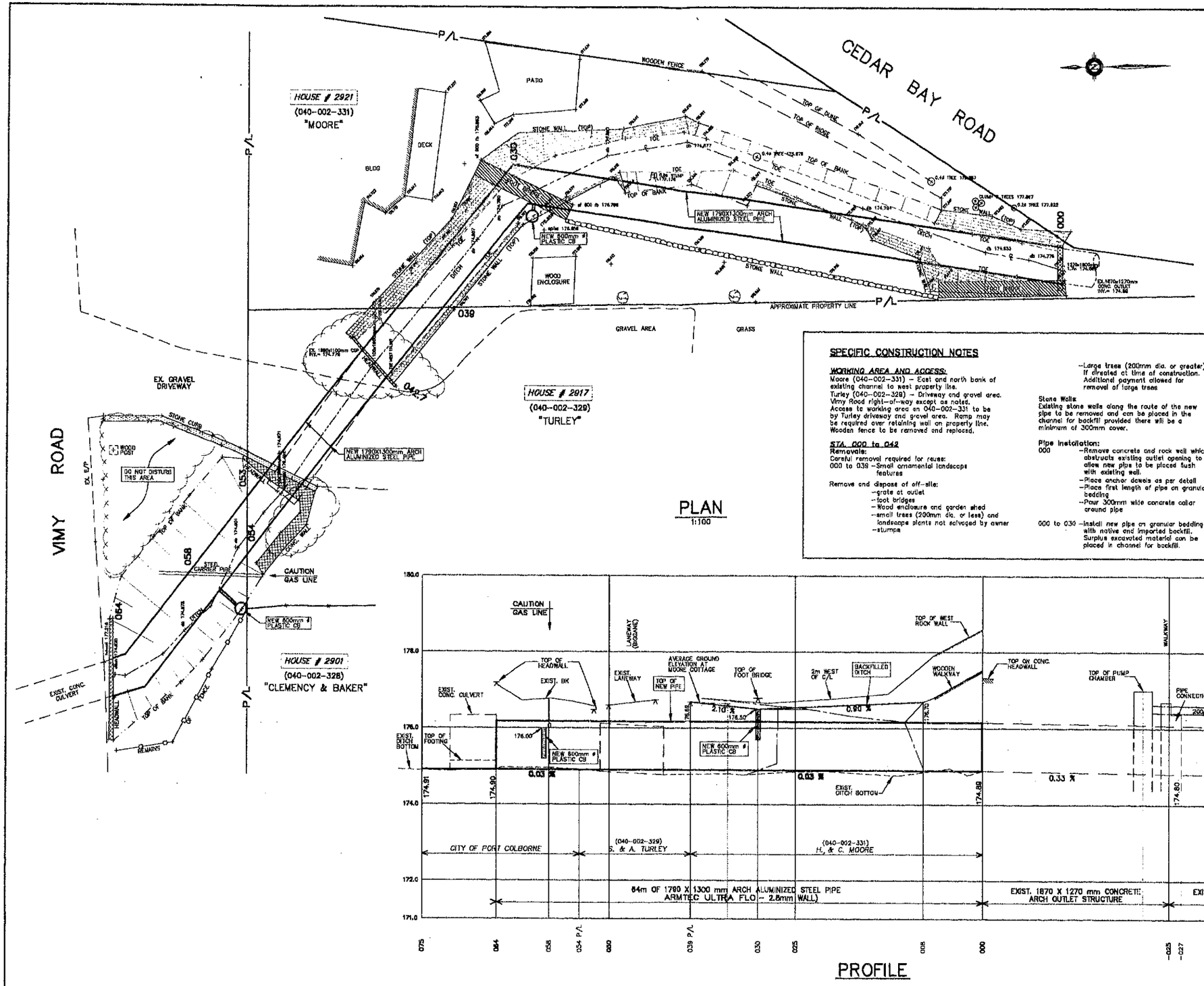
K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER ENGLEHART SUDBURY

JOB NUMBER 98238

DATE JAN. 31, 2000

DRAWING NUMBER 1 OF 3

G:\98238\W-PLAN.DWG



PROFILE

PROFILE SCALE
HORZ. 1:250
VERT. 1:50

SPECIFIC CONSTRUCTION NOTES

WORKING AREA AND ACCESS:
Moore (040-002-331) – East and north bank of existing channel to west property line.
Turley (040-002-329) – Driveway and gravel area.
Vimy Road right-of-way except as noted.
Access to working area on 040-002-331 to be by Turley driveway and gravel area. Ramp may be required over retaining wall on property line.
Wooden fence to be removed and replaced.

STA. 000 to 042
Removals:
Careful removal required for reuse:
000 to 039 –Small ornamental landscape features

Remove and dispose of off-site:
–grate at outlet
–foot bridges
–Wood enclosure and garden shed
–small trees (200mm dia. or less) and landscape plants not salvaged by owner
–stumps
–Large trees (200mm dia. or greater) if directed at time of construction. Additional payment allowed for removal of large trees

Stone Walls:
Existing stone walls along the route of the new pipe to be removed and can be placed in the channel for backfill provided there will be a minimum of 300mm cover.

Pipe installation:
000 –Remove concrete and rock wall which obstructs existing outlet opening to allow new pipe to be placed flush with existing wall.
–Place anchor dowels as per detail
–Place first length of pipe on granular bedding
–Pour 300mm wide concrete collar around pipe

000 to 030 –Install new pipe on granular bedding with native and imported backfill. Surplus excavated material can be placed in channel for backfill.

030 –Manufactured elbow for bend.

030 to 042 –Install new pipe on granular bedding in existing channel with imported backfill.
–Remove stone walls as required to permit installation.

Restoration:
After pipe is installed existing channel to be backfilled with imported fill to elevation on profile minus allowance for topsoil
Install 600mm dia. plastic catchbasin with grate near Station 030. Exact location to be determined at time of construction. Top to be flushed with finished ground.
Connect to new pipe using 3m of 200mm dia. corrugated plastic tubing.
Place 100mm (minimum) imported topsoil on all disturbed areas in working area, fine grade and seed.
Replace fence on property line.

042 to 052
Removals:
Remove and dispose of off site the existing lane culvert and headwalls plus landscape shrubs.
Disruption of driveway access to be co-ordinated with owner

Pipe installation:
Install new pipe on granular bedding with granular backfill.

Restoration:
150mm depth (minimum) Granular A on new trench for driveway.
Remaining driveway and gravel area to have all non-granular contamination removed and surface to be restored to pre-construction condition using imported Granular A.
Topsoil and seed either side of driveway.

STA. 052 to 064
Removals:
Steel carrier pipe for gasline to be removed and gasline raised or lowered to permit pipe installation.
–Fence remains on west bank.

Pipe installation:
052 to 063 –Install new pipe on granular bedding in existing ditch with imported backfill.
063 to 064 –Manufactured elbow for connection
064 –Concrete collar around pipe as per Sta. 000.

Restoration:
Backfill channel with imported fill to provide minimum 300mm cover on pipe and grade down to new catchbasin location.
Install 600mm dia. plastic catchbasin with grate near Station 058. Exact location to be determined at time of construction. Top to be flushed with finished ground.
Connect to new pipe using 3m of 200mm dia. corrugated plastic tubing.
Place 100mm (minimum) imported topsoil on all disturbed areas in working area, fine grade and seed.

REVISION	DATE

DESIGNED BY:	J.K.
CHECKED BY:	J.K.
DRAWN BY:	J.R.M.
CHECKED BY:	J.K.
FIELD BOOK:	

SCALE: AS SHOWN

LICENSED PROFESSIONAL ENGINEER J. W. HUNTZE PROVINCE OF ONTARIO

OIL MILL CREEK DRAIN 2000

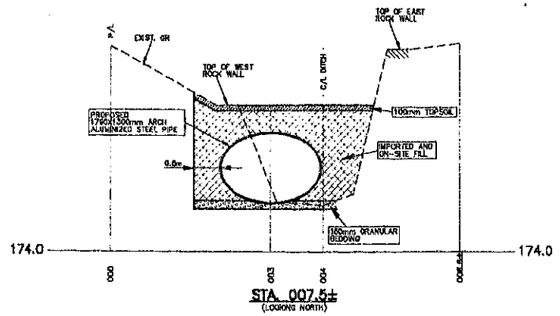
REGIONAL MUNICIPALITY OF NIAGARA
CITY OF PORT COLBORNE (Former Humberstone Twp.)

PLAN AND PROFILE

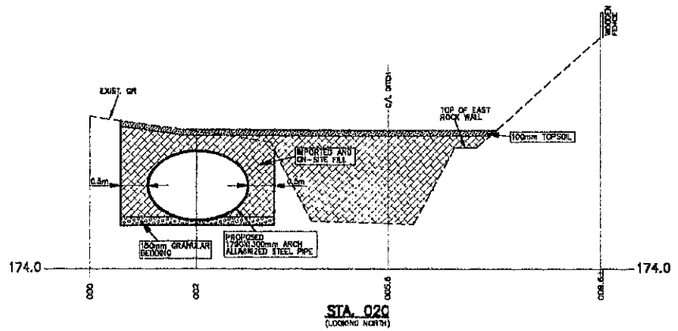
K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER ENGLEHART SUDBURY

JOB NUMBER 98238
DATE JAN. 31, 2000
DRAWING NUMBER 2 OF 3

G:\98238\PROFILE.DWG



STA. 007.5±
(LOOKING NORTH)



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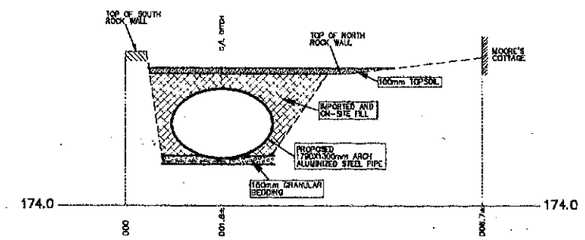
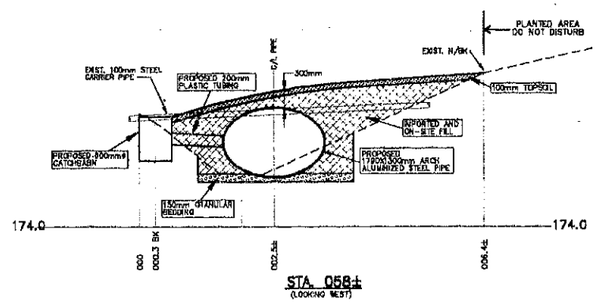


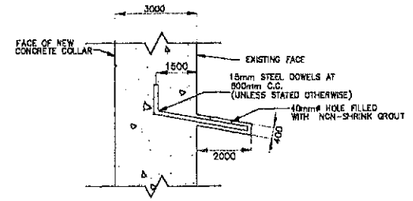
STA. 036.5±
(LOOKING NORTH)



STA. 058±
(LOOKING WEST)

CROSS-SECTIONS

SCALE
HORZ. 1:50
VERT. 1:50



DOWEL DETAIL
1:100

NOTES:

1 – CONCRETE SHALL HAVE A STRENGTH OF 30 MPa AT 28 DAYS.

2 – ALL CONCRETE SHALL INCLUDE AN APPROVED AIR ENTRAINING AGENT.

3 – ALL CONCRETE SHALL BE PLACED IN THE DRY. WORKING AREA SHALL BE DEWATERED BY THE USE OF PUMPS.

4 – NO CONCRETE TO BE POURED BEFORE MATERIALS, FORMWORK, AND REINFORCING HAVE BEEN CHECKED BY THE ENGINEER.

GENERAL NOTES:

NEW PIPE
Pipe material to be 1790 x 1300mm arch Aluminized steel pipe (ARMTEC ULTRA–FLO or approved equal) with 2.8m wall.
All coupler joints to be fully wrapped with a 1m width of filter fabric (Mirafi P250 or equal).
Pipe installation to be as per specific notes and manufacturer's recommendation.
Care required during channel backfilling and site restoration due to minimal cover on pipe.
Contractor responsible for repairing or replacing pipe damaged during construction.

IMPORTED FILL
Imported fill to be approved by Engineer. Material to be free of asphalt, concrete, organic material and any other form of garbage or debris.

TOPSOIL AND SEEDING
Imported topsoil to be approved by Engineer. Seeding materials shall be an approved residential lawn seed mixture and fertilizer applied with a mechanical spreader at supplier's recommended rate of application. Contractor responsible for watering for first three weeks. Contractor responsible for uniform seed catch. Reseeding required on barren areas.

REVISION	DATE				
		DESIGNED BY: J.K.	SCALE	LICENSED PROFESSIONAL ENGINEER J. W. KUNTZE PROVINCE OF ONTARIO	OIL MILL CREEK DRAIN 2000
		CHECKED BY: J.K.			REGIONAL MUNICIPALITY OF NIAGARA — CITY OF PORT COLBORNE (Former Humberstone Twp.)
		DRAWN BY: J.R.M.	AS SHOWN		GENERAL NOTES, SECTIONS AND DETAIL
		CHECKED BY: J.K.			K. SMART ASSOCIATES LIMITED CONSULTING ENGINEERS AND PLANNERS — KITCHENER ENGLEHART SUDBURY
		FIELD BOOK: ?			JOB NUMBER 98238 — DATE JAN. 31, 2000 — DRAWING NUMBER 3 OF 3

G:\98238\SECTIONS.DWG

REVISED JUNE 1982 TO SHOW AS CONSTRUCTED PROFILE
REVISED BY J.R.L., CITY OF PORT COLBORNE ENGINEERING DEPT.

120-51 ~~MD-S~~

NO	DESCRIPTION	BY	DATE	APP'D
B	REISSUED FOR TENDER	J.J.C.	JULY 1980	
A	ISSUED FOR TENDER	J.J.C.	JUNE 1980	D.R.I.

REGISTERED PROFESSIONAL ENGINEER — D. R. INGRAM — PROVINCE OF ONTARIO

ANDERSON ASSOCIATES LTD
CONSULTING ENGINEERS AND TOWN PLANNERS
76 DIVISION STREET WELLAND 735-3659

SCALE HORIZ 1"=200' VERT 1"=2'	DESIGNED BY J.J.C.	DRAWING NO. 1053-01
DATE JANUARY, 1978	DRAWN BY K.G.C.	REVISION NO. 1

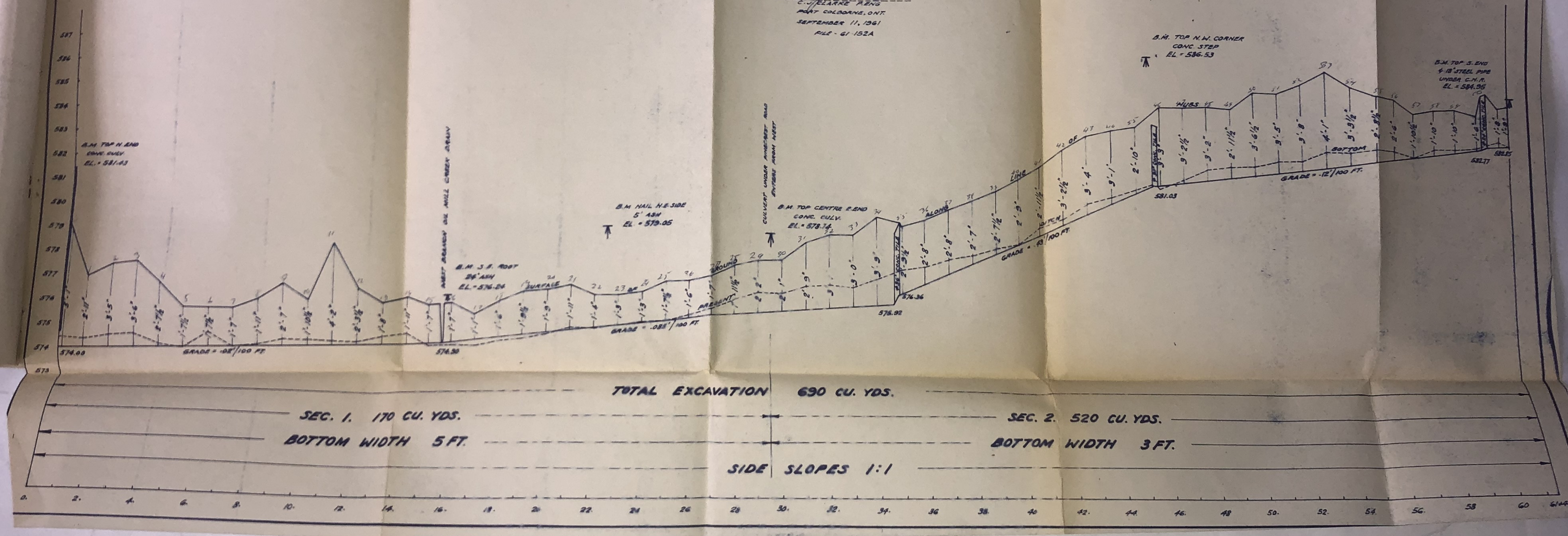
CITY OF PORT COLBORNE
ENGINEERING DEPARTMENT CONTRACT # CE 80-19

OIL MILL CREEK DRAIN
STA 0+00 TO STA 65+42

PROFILE FOR OIL MILL CREEK DRAIN
TOWNSHIP OF HUMBERSTONE

SCALES: HOR. 1" = 200'
VERT. 1" = 2'

C. J. CLARKE P.ENG
PORT COLBORNE, ONT.
SEPTEMBER 11, 1961
FILE - G/ 152A

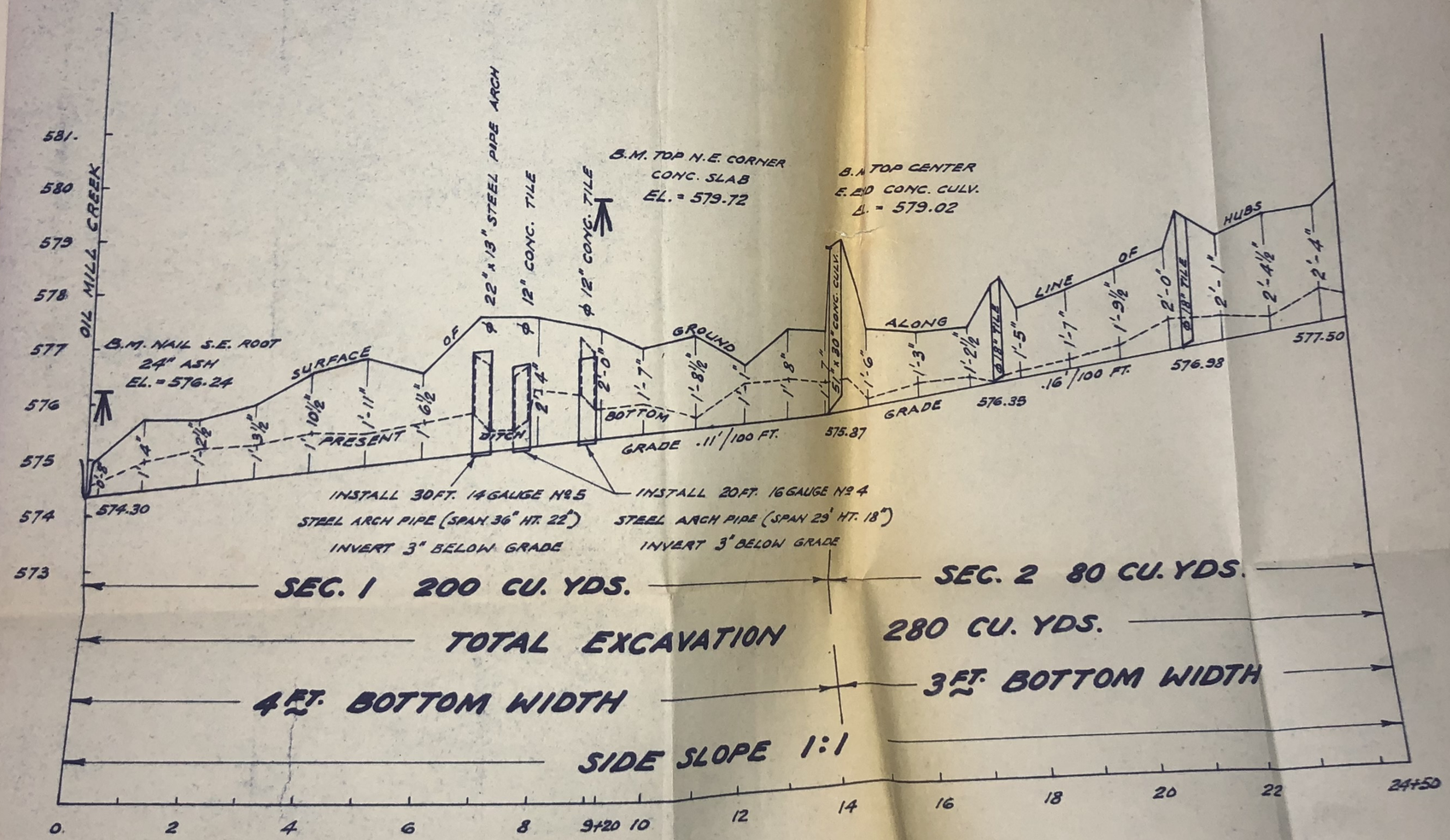


PROFILE FOR WEST BRANCH OIL MILL CREEK DRAIN

TOWNSHIP OF HUMBERSTONE

SCALES: HOR. 1" = 200'
VERT. 1" = 2'

C. J. CLARKE P.ENG.
PORT COLBORNE, ONT.
SEPT. 5, 1961. FILE: 61-152.

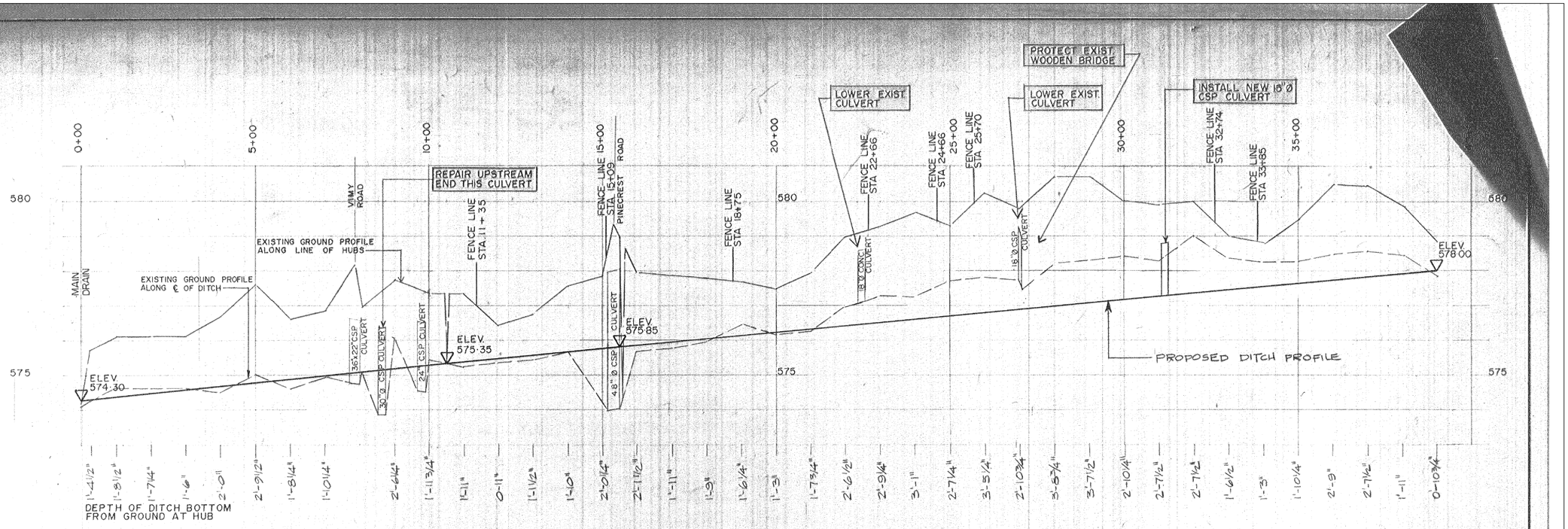


PLAN OF
LANDS DRAINED BY
OIL MILL CREEK DRAIN
TOWNSHIP OF HUMBERSTONE

SCALE: 1" = 20 ch.

C. J. Clarke

C. J. CLARKE P. ENG.
PORT COLBORNE, ONT.
SEPTEMBER 11, 1961.
FILE: 61-152A.



1550 L.F. @ 0·10%

2350 L.F 0·091%

TOTAL EXCAVATION = 473 CU. YDS.

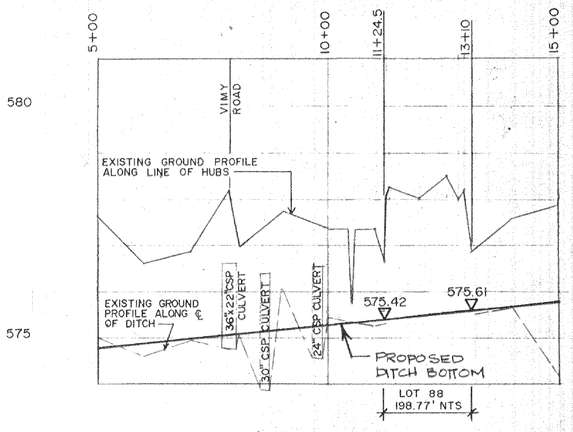
EXCAVATION SEC. 3 = 228 CU. YDS

BOTTOM WIDTH = 4'-0"

EXCAVATION SEC. 4 = 245 CU. YDS.

BOTTOM WIDTH = 3'-0"

SIDE SLOPES 1:1



LOT 88 198.77' at 0.10 %

LOT 88 EXCAVATION - 123 CU.YD.

LOT 88 BOTTOM WIDTH 4'-0" AV. DEPTH 2'-9"

LOT 88 SIDE SLOPES 1:1

LOT 88
ALTERNATE DITCH PROFILE

D. R. INGRAM — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

120-49 MD-89-91

NO.	DESCRIPTION	BY	DATE	APP'D	DATE
B	REISSUED FOR TENDER	J.J.C.	JULY 1980		
A	ISSUED FOR TENDER	J.J.C.	JUNE 1980	D.R.I.	JUNE 1980

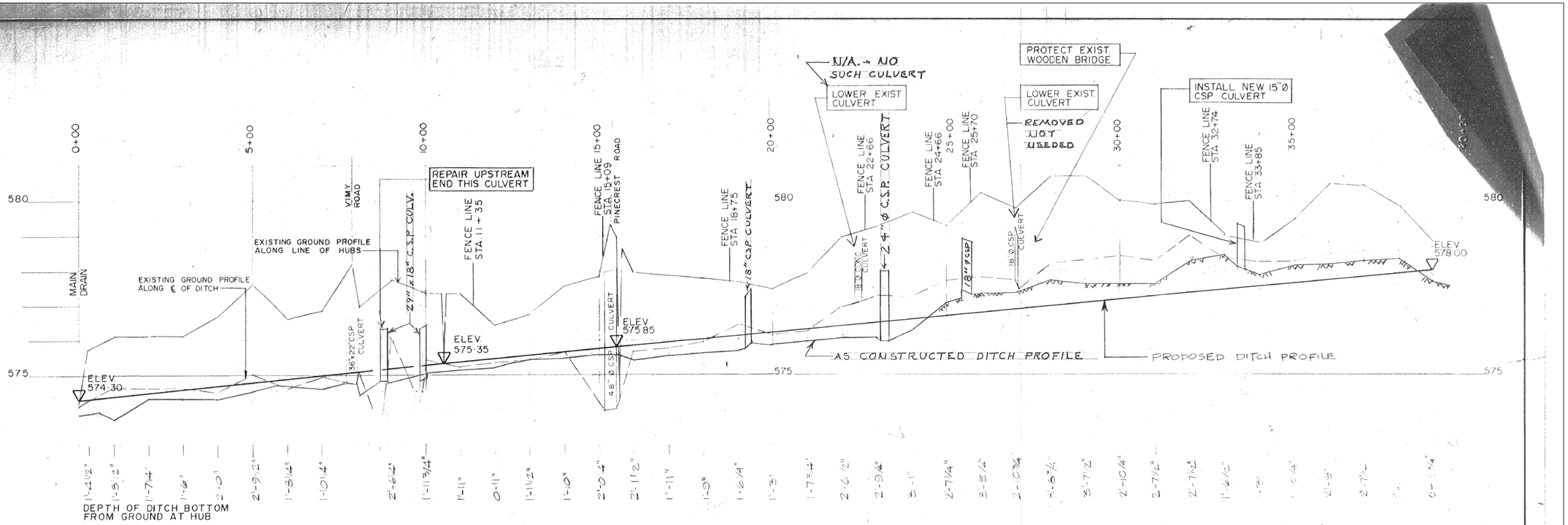
R V ANDERSON ASSOCIATES LTD
CONSULTING ENGINEERS AND TOWN PLANNERS
76 DIVISION STREET WELLAND 735-3659

SCALE HORIZ. 1"=200', VERT. 1"=2'	DESIGNED BY J.S.H.	DRAWING NO. 1053-02
DATE JANUARY, 1978	DRAWN BY K.G.C	REVISION NO. 1

CITY OF PORT COLBORNE
ENGINEERING DEPARTMENT CONTRACT # CE 80-19

OIL MILL CREEK DRAIN (WEST BRANCH)
STA. 0+00 TO STA. 40+00

02



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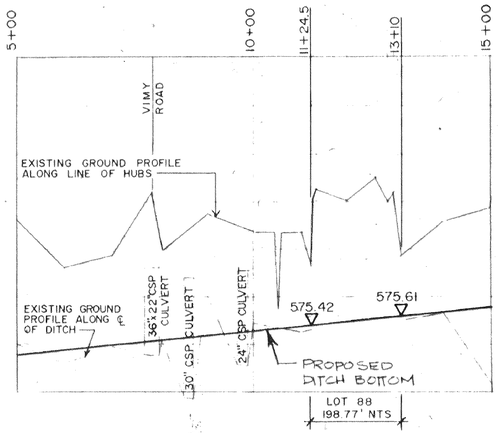
SIDE SLOPES 1:1



LOT 88 198.77' at 0.10 %

LOT 88 EXCAVATION - 123 CU.YD.

LOT 88 BOTTOM WIDTH 4'-0" AV. DEPTH 2'-9"

LOT 88 SIDE SLOPES 1:1

N.B. → DETAIL NOT REVISED TO SHOW AS-BUILT

LOT 88 ALTERNATE DITCH PROFILE

=ROCK EXCAVATION ONLY

=ROCK EXCAVATION & CLAY SEAL

=CLAY SEAL ONLY

a DITCH PROFILE GRADE: 0.064%

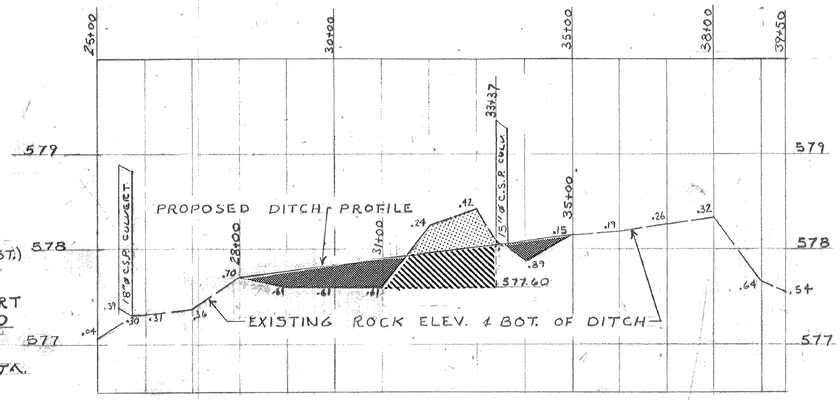
28+00 →	577.70 (EXIST.)	32+00 →	577.96
29+00 →	577.76	33+00 →	578.02
30+00 →	577.83	34+00 →	578.09
31+00 →	577.89	35+00 →	578.15 (EXIST.)

b EXCAVATE ROCK FROM STA 31+00± TO STA. 33+37± (EAST END OF 15"ø C.S.P. CULVERT UNDER NELSON DRIVEWAY) TO ELEV. 577.60 EXCAVATION WIDTH = 4'-0"

c SEAL DITCH WITH CLAY FROM STA. 28+00 TO STA. 35+00. FINISHED DITCH BOTTOM WIDTH = 3'-0" SIDE SLOPES 1:1

d ADJUST CULVERTS ON NELSON PROPERTY AS NECESSARY. DRIVEWAY CULVERT TO REMAIN AS IS. DITCH ELEV AT WEST END TO BE SET AT 578.06. MATCH DITCH TO EAST INVERT.

e ROCK EXCAVATION = 19.2± C.Y.



ROCK EXCAVATION DETAIL

SCALE: HORIZ.: 1" = 200'
VERT.: 1" = 1'

* DETAIL DRAWN BY J.R.L.; CITY OF PORT COLBORNE ENGINEERING DEPT. REVISED JUNE 1982 TO SHOW AS CONSTRUCTED PROFILE

NO.	DESCRIPTION	BY	DATE	APP'D	DATE
B	REISSUED FOR TENDER	J.J.C	JULY 1980		
A	ISSUED FOR TENDER	J.J.C	JUNE 1980	D.R.I.	JUNE 1980

D. R. INGRAM — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

R V ANDERSON ASSOCIATES LTD
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76 DIVISION STREET WELLAND 735-3659

SCALE HORIZ. 1" = 200', VERT. 1" = 2'	DESIGNED BY J.S.H	DRAWING NO. 1053-02
DATE JANUARY, 1978	DRAWN BY K.G.C	REVISION NO. 1

CITY OF PORT COLBORNE 120-48
ENGINEERING DEPARTMENT CONTRACT # CE 80-19

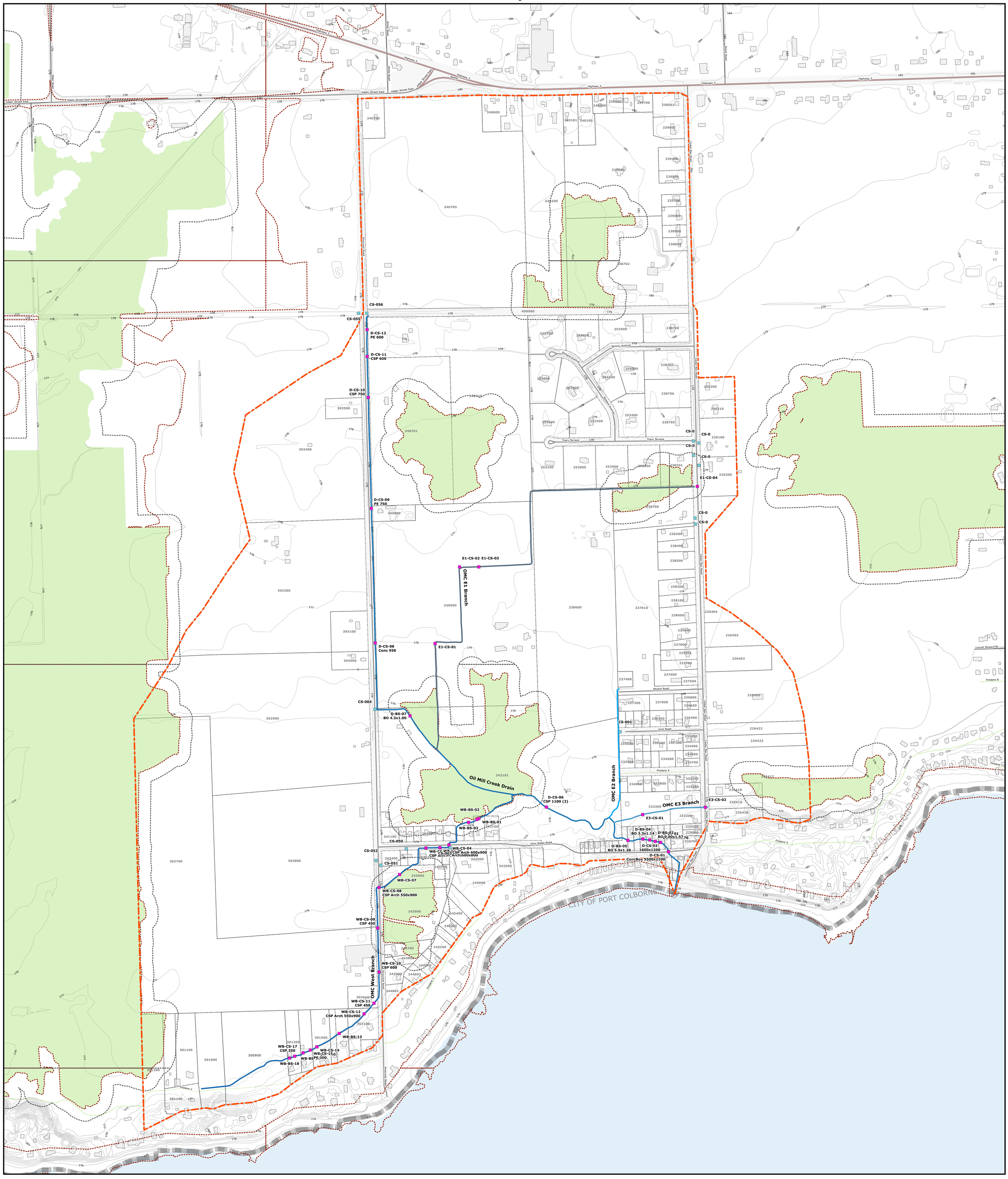
OIL MILL CREEK DRAIN (WEST BRANCH)
STA 0+00 TO STA 40+00

02

Appendix D:

Environmental Mapping

Oil Mill Creek Municipal Drain



200 0 200 400 m

OldMill_catchment
BuildingFootprints
crossings
OMC
ROW
oldmill_cl
Oil Mill Creek Drain
OMC E1 Branch
OMC E2 Branch
OMC E3 Branch
OMC West Branch
GR_WetlandAllowance_NPCA
GR_RegulationAreaLimit_NPCA
GR_RegulatedWetlands_NPCA
MUNICIPAL_BOUNDARY_LOWER_AND_SINGLE_TIER
ROW
OMC_parcels
Contours
Road_Segments
MUN
ON
PRIV
Lake_&_Canal

Figure 1 Oil Mill Creek Municipal Drain

Map Scale: 1:3000

EWA Engineering Inc.
647.400.2824
www.ewaeng.com

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