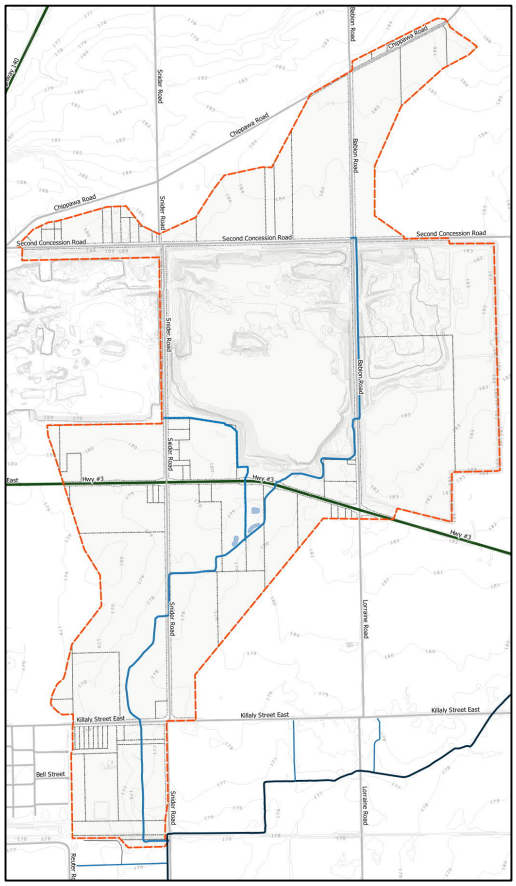
Port Colborne Municipal Drain Report

City of Port Colborne



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1 Executive Summary

The Port Colborne Municipal Drain is located in the eastern portion of the City of Port Colborne. It has an outlet into the Wignell Drain, immediately south of the Friendship Trail and ends at the Second Concession Road and Babion Rd.

The City of Port Colborne retained Paul Marsh, P.Eng of EWA Engineers Inc. to prepare a Drainage Report under the Drainage Act R.S.O. 1990 for the Port Colborne Drain. See appointment resolution of Council included in Appendix D.

This report includes a description of all work, associated plans, cost estimates, and assessment schedules for the proposed work for the Port Colborne Drain, as well as the proposed Branch Drain. The report has been prepared in accordance with the requirements of the Drainage Act, Chapter D.17 of the Revised Statutes of Ontario, Section 4 and 78. The works are described as predominately maintenance with specific improvements identified.

This report includes drain improvements, including drain maintenance, to ensure suitable channel design flows are achieved and extending the drain to the Second Concession to match the original inflow prior to the expansion of the quarry. The drain improvements have been developed through plan and profile drawings. The drawings include As Constructed data for drain improvements already constructed by the City of Port Colborne in 2016 including re-alignment of the drain south of Highway #3.

The following are summary descriptions of the planned improvements:

1. Extension of the drain along the east side of Babion Rd.
2. Re-laying the culverts at the intersection of Babion Rd. and Second Concession Rd.
3. Using the existing outlet (called Wignell Drain in past reports) for the Port Colborne Branch #1 Drain.
4. Maintenance of the Port Colborne Branch Drain #1 to the Snider Rd. ROW.

The following is a summary of the project financial values as prepared in the attached Assessment Schedule included in Appendix C.

Items	Costs
Port Colborne Drain	
Estimated Construction Costs	$54,068.
Previous Works – completed prior to 2018	$52,212.
Eligible Administration Costs	$170,157.
Calculated Allowances	$939.
Sub-Total Port Colborne Drain	**$277,376.**
Port Colborne Branch #1 Drain	
Estimated Construction Costs	$10,340.
Eligible Administration Costs	$8,052.
Calculated Allowances	$277.
Sub-total Port Colborne Branch #1 Drain	**$18,669.**
Total:	**$296,045.**

The Port Colborne Drain is organized into two distinct catchments as follows:

- Port Colborne Drain serving 327.8Ha, with an open channel drain including private crossings and having a Drain length of 3,368m.
- Branch Drain #1 serving 14.8Ha with an open channel drain length of 823m.

The Port Colborne Drain Assessment Summary is as follows:

Benefit Assessment (Section 22)		
Private Lands	$763.50	
Total - Benefit Assessment (Section 22)		**$763.50**
Outlet Liability Assessment (Section 23)		
Private Lands		
Road Right of Way Lands	$225,489.15	
Total - Outlet Liability Assessment (Section 23)		**$225,489.15**
Special Benefit Assessment (Section 24)		
Port Colborne Drain	$5,600.09	
Total - Special Benefit Assessment (Section 24)		**$5,600.09**
Special Assessments (Section 26)		
City of Port Colborne	$40,448.80	
MINISTRY OF TRANSPORTATION ONTARIO	$5,076.19	
Total: Port Colborne Drain	**$45,525.00**	
Total - Special Assessments (Section 26)		**$45,525.00**
Forecasted Total Drain Assessments		**$277,377.74**

The Port Colborne Branch #1 Drain Assessment Summary is as follows:

Outlet Liability Assessment (Section 23)		
Private Lands	$3,096.49	
Road Right of Way Lands	$1,450.25	
Total - Outlet Liability Assessment (Section 23)		$4,546.74
Special Assessments (Section 26)		
City of Port Colborne	$7,008.46	
MINISTRY OF TRANSPORTATION ONTARIO	$7,115.18	
Total - Special Assessments (Section 26)		$14,123.64
		$18,670.38

This report and the proposed improvements are based on instructions from the City of Port Colborne and in consultation with the local landowners. The cost of these improvements is shared across all areas that use the Drain by way of allowances and assessments consistent with the Drainage Act of Ontario.

2 Introduction

The City of Port Colborne retained Paul Marsh, P.Eng of EWA Engineers Inc. to prepare a Drainage Report under the Drainage Act R.S.O. 1990 for the Port Colborne Municipal Drain formerly the Wignell Municipal Drain.

In addition to the Port Colborne Drain Report, there are other Drain Reports being prepared concurrently and they are:

- Wignell Drain, outlets to Lake Erie across Lakeshore Rd. East and proceeds northerly for 7.2km.

- Michener Drain, outlets to Wignell at 0+010 north of the Lakeshore Rd. East and proceeds northerly for 1.7km, ending south of the Friendship Trail.

The Port Colborne Drain originally had an outlet to Lake Erie but was diverted to the Wignell Drain by a previous Engineer's report. The remaining portion has been referred to as a branch of the Wignell Drain, but by the preparation of this Engineer's Report with a revised Assessment Schedule, it will be recognized as the Port Colborne Drain with an outlet to the Wignell Drain south of the Friendship Trail. This report also recognizes the already existing channel as a Branch Drain west to Snider Rd. called Port Colborne Branch Drain #1. The following Figure presents the proposed drain names and drainage boundaries.

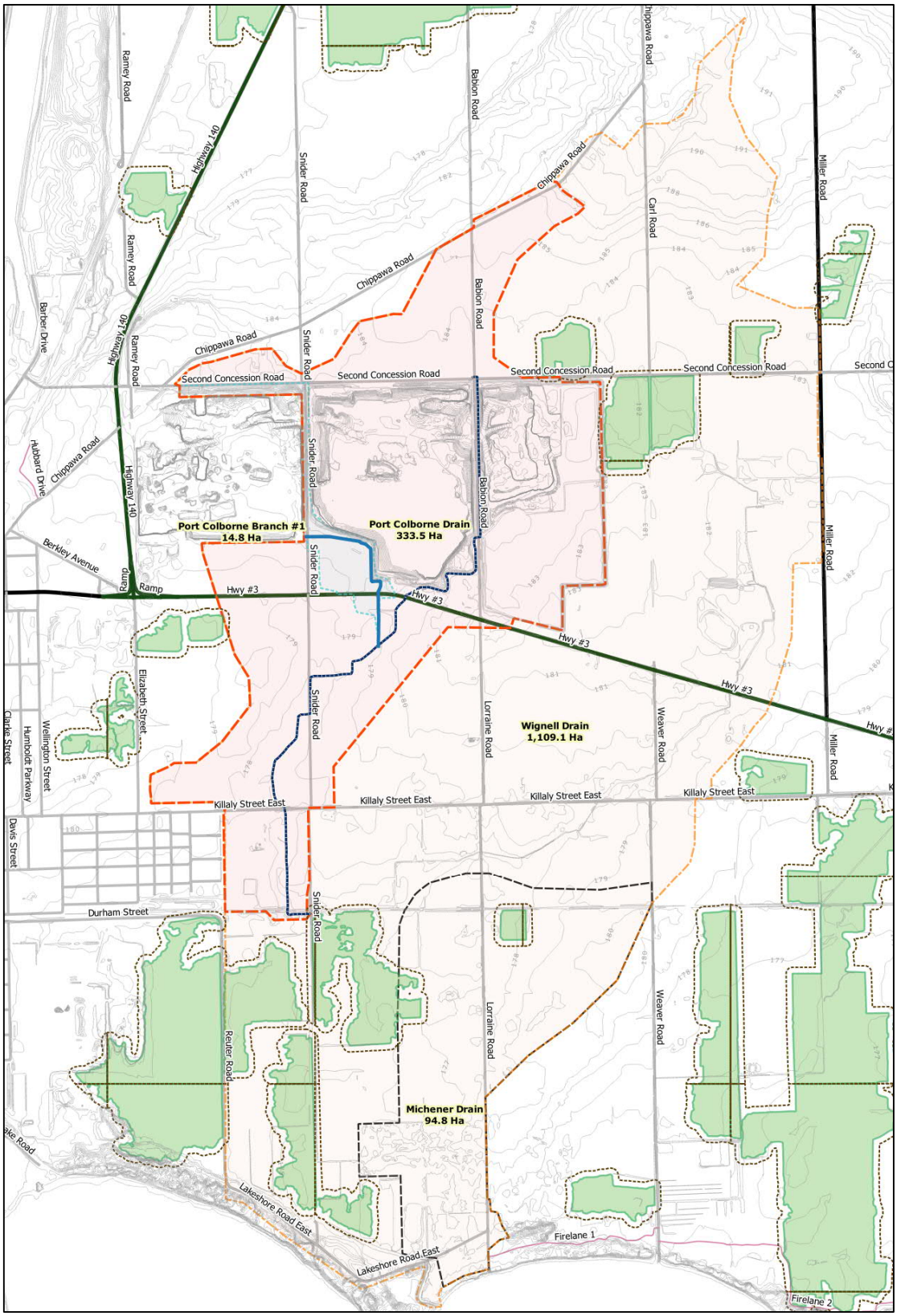

Figure 1 Wignell Watershed; Michener, Port Colborne and Wignell Drains

This report includes a description of all work, associated plans, cost estimates, and assessment schedules for the proposed work on the existing Port Colborne Drain, as

well as for the proposed Branch Drain. The report has been prepared in accordance with the requirements of the Drainage Act, Chapter D.17 of the Revised Statutes of Ontario, Sections 4 and 78.

The proposed improvement work for the Port Colborne Drain is prepared as a Section 78 (1.1) of the Drainage Act. The works are described as maintenance with the exception of re-alignments, which are deemed to be required but not requiring a Section 4 application of the Act. The Port Colborne Branch Drain #1 is prepared as a Section 4 petition by the Road Authority.

2.1 Objective

The Port Colborne Drain already exists and has for many years. Originally known as the Port Colborne Drain, it was renamed and made part of the Wignell/Michener Drain during the 1970s. As of this report, it is being named the Port Colborne Drain again. The objective is to maintain the existing drain in a State of Good Repair (SOGR). The municipal drains have been impacted by changes in land use practices that affect their function. The drain capacity is degraded through growth of vegetation within the banks of the drain.

There are specific new channels proposed to improve drain function recognizing the impacts to the original drain alignments. From Highway #3 to Second Concession is quarry land that has affected the drain alignment with corresponding relocation including quarry boundary and berming.

The Drain channel was relocated to the east side of Babion Road but has not been fully constructed to Second Concession Road. Physical changes to the drain are needed for continued service and proposed improvements have necessitated a new Engineer’s report be prepared under Section 78 of the Drainage Act R.S.O. 1990.

Previous maintenance work conducted in 2016, and other dates, is included in this report and will be assessed as part of the cost of the works.

2.2 Drain History and Past Reports

The Port Colborne Drain Engineer's Report is prepared as follows:

- Baseline Drainage Report; provides an assessment of current drainage problems and identifies the extent of the drainage area to be serviced by the municipal drain. Baseline report includes a history of drainage and presents historical information such as grade lines.

- Wignell Watershed Assessment Report; provides an assessment of existing capacity through the use of hydrologic and hydraulic modelling which identifies the options for resolving problems and recommends a preferred option to improve drainage.

The final Engineer's Report is composed of the two previous reports along with supporting documentation and final drainage cost estimates and assessment schedule or table.

The exact previous alignment of the upper portion of the Port Colborne Drain is not completely clear. With the expansion of the quarry, efforts to abandon portions of the Drain and to re-align the Drain were provided by report to Port Colborne Council, see review in Baseline Report. For this report, based on the information reviewed, the Port Colborne Branch Drain #1 is presumed to have existed previously by drain report. The following figure shows Constructed Drains as presented in the OMAF AgMaps application.

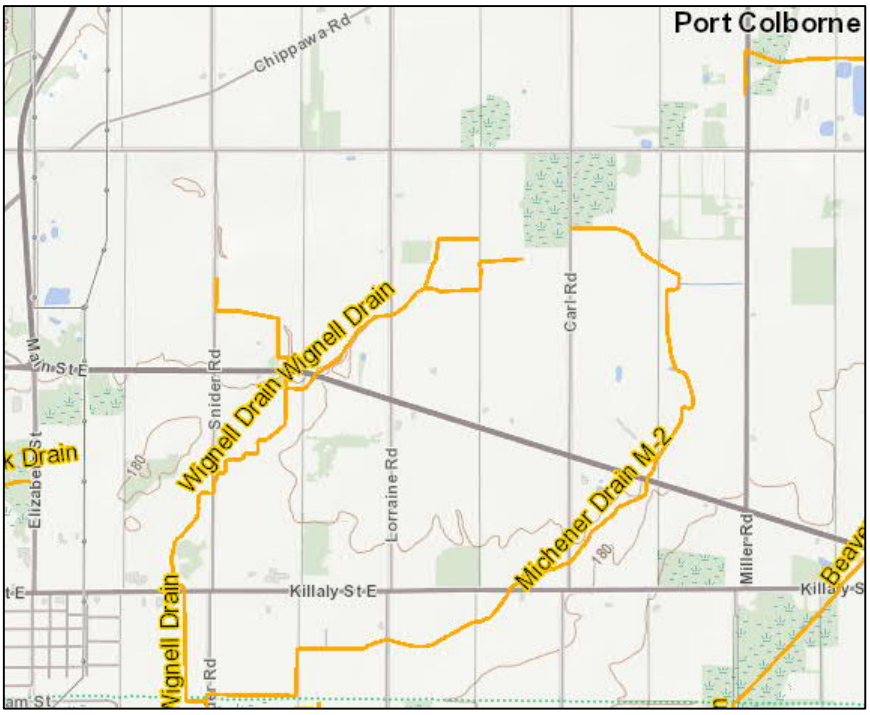

Figure 2 OMAF AgMaps - Constructed Drains

What is clearly shown in the figure are the two (actually three) top branches of the drain. A branch that turns west north of Highway #3 and is shown along the Snider Rd. ROW to a point north along the eastern edge of the roadway. Also a branch that proceeds eastward to Babion Rd (labeled as Lorraine Rd. in the figure) and ending before Carl Rd.

The alignments were substantially changed by report in 1999, in favour of re-alignments to allow the quarry properties to expand rock removal within this area.

2.3 Port Colborne Drain Watershed

The Port Colborne Drain watershed is composed of a single distinct municipal drain that outlets to the Wignell Drain just south of the Friendship Trail.

The Port Colborne Drain serves an area of 327.8 hectares based on the defined drain boundary, refer to Figure 2. The main branch of the drain is 3,368m in length from the drain origin, which is defined as the south end of culvert headwall crossing the Friendship Trail and is 110m to the outlet into Wignell Drain at STA 2+055 for a total main drain length of 3478m.

The watershed boundary is south of Chippawa Rd. with a high point of 190m. The upper portion of the drain is defined to end at the intersection of Babion Rd. and Second Concession Rd. at an approximate elevation of 182m.

- Watershed average fall (slope, height from furthest point in the watershed to lowest point at outlet) is given as 0.32% or 3.17m per 1000m

- Drain average fall (slope) is given as 0.258% or 2.58m per 1000m

It is worth noting that a portion of the upper watershed, the square edge on the west side of the catchment boundary along Snider Road, is removed by a municipal storm sewer that flows west and outlets into the canal.

This slope characterises the Port Colborne Drain as an average sloped watershed, with greater fall than the Wignell Drain at 0.11% average slope. The lower reach of the drain, where it connects to the Wignell Drain, has very little grade and standing water is a common occurrence.

The Port Colborne Drain can be segregated into distinct geographic areas as shown in Figure 3 Drainage Catchment of Port Colborne Drain.

1. The outlet through the Friendship Trail is defined by the low slope and standing water with considerable phragmites growth. This portion of the drain is only 160m in length from the outlet to a point just north of the Friendship Trail.

2. Above the Friendship Trail to Highway #3 Crossing. This section was cleaned and a segment re-aligned by the City of Port Colborne in 2016, as shown in the Baseline Report. The resulting grade line is shown as an “As Constructed” grade line on the Plan & Profile Drawings. There are two constructed wetlands adjacent to the drain. They are located on two properties north of the drain and hydraulically above the drain at STA 1+600 and 1+735 respectively. Two fordings were added to the drain during the 2016 works at STA 1+745 and 1+628, which replaced a culvert in poor condition and with the agreement of the property owner.

3. North of Highway #3, the main channel of the drain follows the edge of the quarry and crosses Babion Rd. to the east side of the ROW. Historically, RV Anderson Drain Report1979, this drain continued east of Babion Rd., but a portion was abandoned by a Drain Report adopted by council in 1999. Since that 1979 report, the channel has been re-routed along Babion Rd. on the west and east side, but not to Second Concession Rd. Currently the channel stops at the Quarry access lanes with an existing culvert underneath the private access road. An existing PVC culvert appears perched and currently blocking the flow path. There’s no defined outlet for the existing culverts located at Second Concession Rd.

4. Two culverts are located at the Second Concession Road; one crossing from east to west of Babion Rd. on the north side of Second Concession (600 HDPE) and a second culvert currently on the west side of Babion Rd. graded to the south but not connecting to the Port Colborne Drain. By this report, the culverts will be reset to provide positive drainage

from west to east and north to south on the north and east sides of the ROW. The Port Colborne Drain will end at the north east corner of the intersection and connect for outlet east of Babion Rd. This change will serve lands to the north of Second Concession Rd. that would otherwise drain south but are blocked by the road and the quarry.

5. The existing channel of the Branch Drain #1 serves west to Snider Rd. at the north edge of the property, ARN = 411000. From the current Highway #3 crossing to a point on Branch Drain #1 roughly at STA 0+480, the drain channel is quite clear and the cross-section well defined. From that point to Snider Rd. ROW, the drain is overgrown with vegetation and the cross-section disappears before the ROW. This section of Branch Drain #1 is to be improved to the edge of the Snider ROW. The portion of the drain shown on Snider Rd. is to be abandoned in favour of municipal roadside swales.

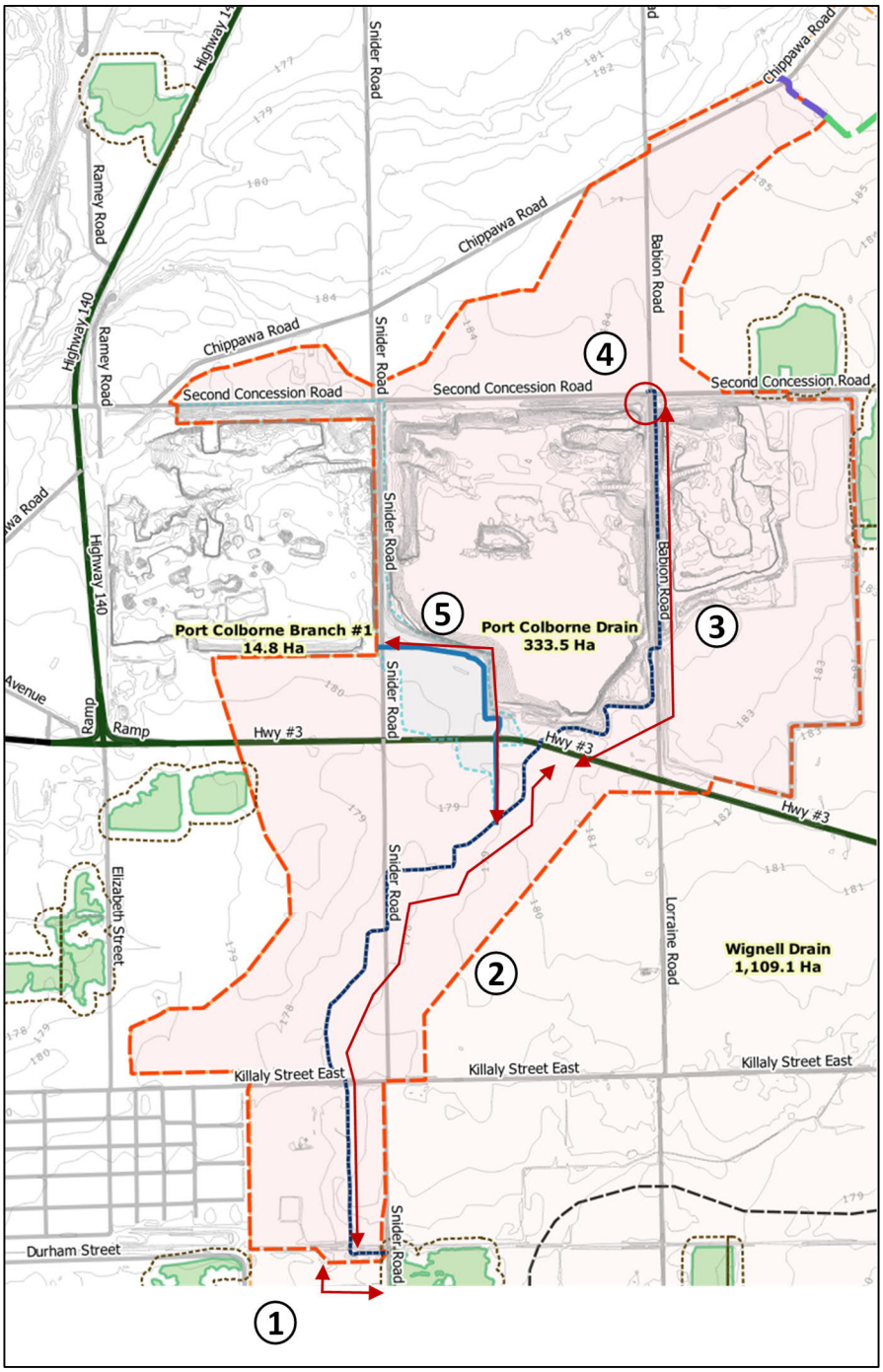

Figure 3 Drainage Catchment of Port Colborne Drain

3 Design Considerations

The analysis of the Port Colborne Drain, part of the Wignell Drain watershed, is based on Hydrologic and Hydraulic analysis to predict runoff flow requirements and to match channel capacity. Water monitoring, gauge measurements, have not been practiced and thus calibration or validation of the computer based model results is limited to historical anecdotal comparisons.

3.1 Watershed Characterization and Use

The Port Colborne Drain watershed is characterized through land use as a design consideration in the following ways:

1. The upper portion of the watershed land use is agricultural with mainly row crops; soya, corn or cereal grains grown. The design service level for agricultural land is flooding with low velocities and drainage of ponding areas over 48 to 72 hours. Drainage is provided to improve working time and an overall goal to reduce the risk of crop drowning.

2. Fringe or rural residential properties are the other major land use with estate sized lots with houses, buildings, wells and septic beds.
   Urban expectations of no ponding on residential lots in rural areas can not be met without extensive costs. Acceptable flooding without damage to property contents is the reasonable design service level similar to agricultural service levels.

3. Gravel and stone quarry operation makes up a significant portion of the drainage area and affects the drain through runoff capture and pumping. The Quarry has several permits to take water granted from the MOE that impact on the function of the drain.

4. Port Colborne Outlet.
   The primary design service level for the outlet is merely to have a positive slope to the Wignell Drain with a clear and clean flow path to outlet.

3.2 Former Drain Changes

The Port Colborne Drain has been in use for a very long time. Over that time, changes have occurred and been abandoned. These changes are described in the Baseline Report. A summary of significant changes are as follows:

- Expansion of the quarry impacting site runoff, changing from stormwater runoff to pumped flow.

- Municipal Drain abandonment:

    - Wignell W1 in 1999 north of Highway #3.

    - Wignell W2a & W2 in 2013 east of Babion Rd.

- Drain Re-alignments:
    - North of Highway #3 and west of Babion Rd. in 1999.
    - South of Highway #3 in 2016
    - Roadside swales along Babion Rd.

3.3 Design

The following describes the design basis for this drain. Descriptions of design criteria are intended to meet the requirements of O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure specifically Table 3.

3.3.1 Criteria

The following section establishes the level of service for the Port Colborne Drain. Channel size is confirmed to be based on a 1 in 5 year return period storm, which is expressed as a design storm as follows:

- 5-year cumulative storm with a total rainfall amount of **68.90 mm** using a Soil Conservation Service (SCS) Type II **24-hr** storm distribution.

The design storm is used to forecast a predicted runoff for identified catchments. Each channel section is designed to convey this runoff.

The existing MTO crossings are to meet the MTO standard criteria of 1:25 year storm. As these are existing crossings with no changes proposed, no analysis of performance is undertaken and available capacity is as it was before this report was prepared. From the original catchments, the quarry lands expansion, previous report abandonments and other watershed changes, the contributory catchments upstream of the MTO crossings are as follows:

- PC1-CS-01; West culvert 1880x1260 (1550x1200) CSPA
    - Original Catchment: 154 Ha
    - Revised Catchment: 14.8 Ha
- PC-CS-04; East culvert, Conc. Box 1200x2400 open bottom
    - Original Catchment: 111Ha
    - Revised Catchment: 61Ha

The Port Colborne Drain outlets to the Wignell Drain and is wholly dependent on the Wignell Drain for sufficient outlet.

3.3.2 Drain Capacity Design

The Wignell Watershed Report describes the modelling used to assess the existing watershed. A revised model was implemented for the design and capacity

determination of the existing channels based on the design drawings attached to this report.

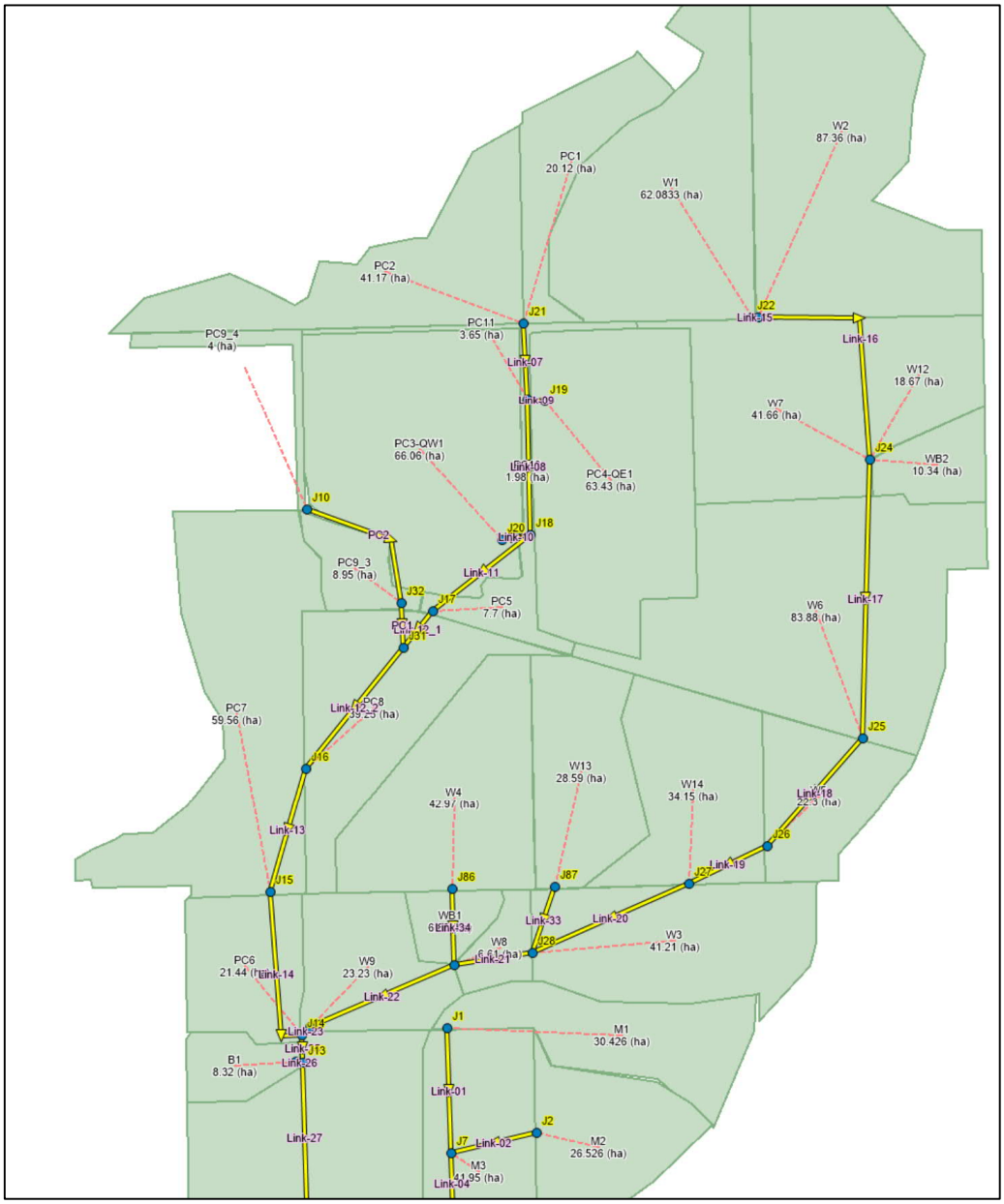

Figure 4: Wignell PC-SWMM Model with Port Colborne

The specific results for the Port Colborne Drain are included in the following table.

The details of the model are included in Appendix D, including the input file.

4 Drain Works Recommendations

The Port Colborne Drain is not a new drain, but an old name for an existing drain. The watershed served has been dramatically altered by the quarry lands and the long term plan for those lands is not referenced in this design. The rest of the watershed is a mixture of rural residential and farm land, which ispredominately row crop.

4.1 Description of the Works

The following presents a program of proposed improvement works for the Port Colborne Drain. As a program, some works are staged at various times and may not proceed in a step-by-step manner, but on an as-and-when available basis that best meets environmental and regulatory requirements.

A significant portion of the works is already complete. The original drain alignment has been compromised by the expansion of the quarry on both sides of Babion Road. A new alignment for the drain extending the open channel to the Second Concession Rd. to provide an outlet for overland flows is required.

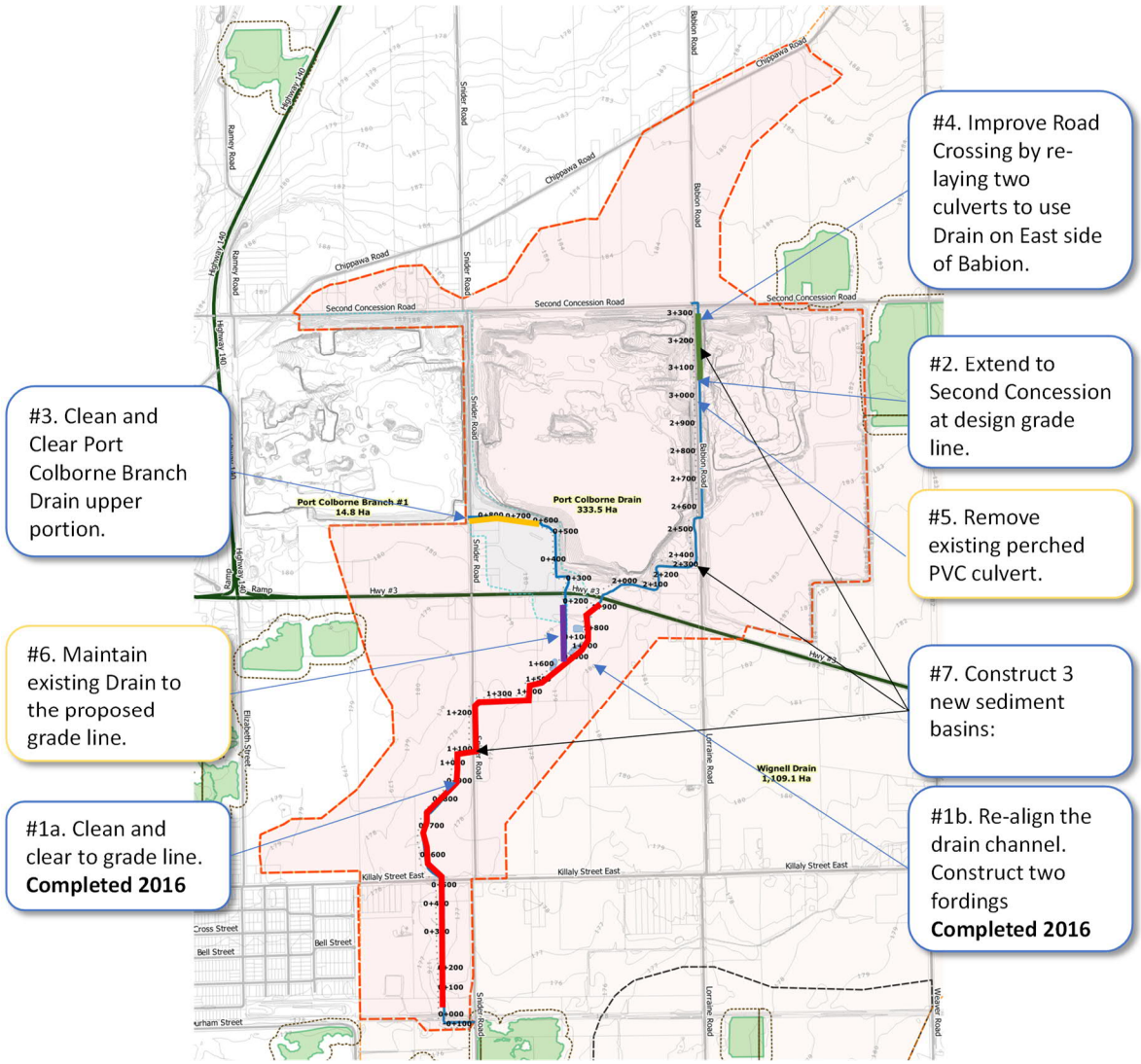

Figure 5 Proposed Port Colborne Drain Improvements

4.1.1 Port Colborne Drain Flow Improvement

The primary function of the proposed works is maintenance of channel section and reduction of flow restrictions. This is for two key restoration efforts as follows:

Restoration works #1 is the removal of vegetation from top-of-bank to top-of-bank. This removal is targeted at tree and shrub growth that limits or could obstruct primary flow paths. Every effort to retain trees, not in the channel, and understory growth will be made to reduce environmental impacts of the maintenance work. A work zone, presumed from previous drain reports, is required for the channel improvements and the maintenance works will seek to minimize the removal of trees and understory growth adjacent to the drain to that required for machine access.

Restoration works #2 is to remove any deposition humps or deviations that are impeding flow. This does not include any changes to grades that were already over deep, past the calculated grade line, but does include channel bank stabilization where slips or excessive erosion is evident during the restoration works. Channel restoration is done from one side with effort to reduce existing stable bank cover damage on the opposite side of the work zone.

Most of the proposed work is to re-establish the original drain capacity and function through the cutting of trees and vegetation that has grown up through the drain. The following figure illustrates a typical cross-section view of the work and work zone required to do the work.

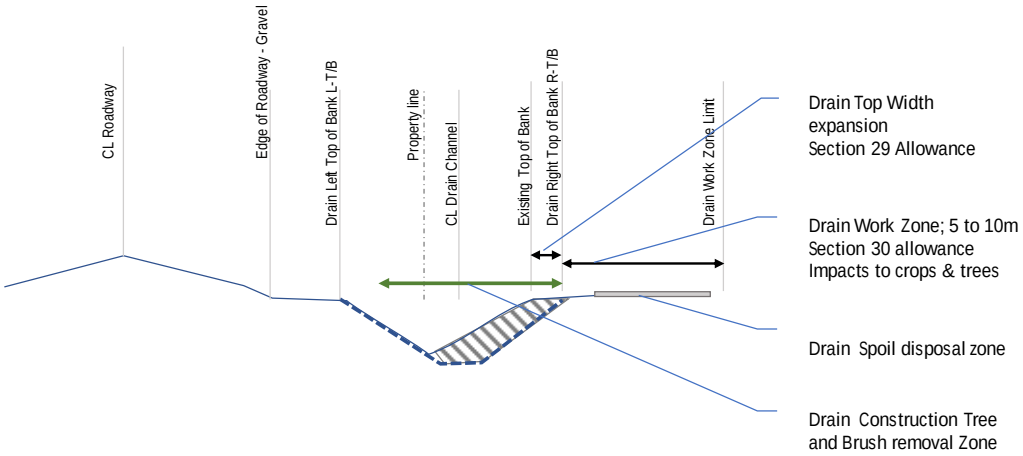

Figure 6 Typical Drain Work and Work Zones

The main work program for the drain is to clean down to the proposed grade line and a design capacity is achieved through removal of bottom and one bank. It is beneficial to only disturb one bank and leave low vegetation in place to reduce risk of erosion. Trees through the drain top of bank (T/B) to top of bank (T/B) are removed leaving stump and roots in place if the removal negatively impacts the grade.

Living trees that are removed from the work zone are eligible for the canopy preservation program, replacement of 2 saplings for each removed tree with a DBH

of 150mm or greater. Trees within the established banks, top of bank to top of bank, are not eligible unless for a new drain or a re-located drain.

4.1.2 Port Colborne Drain Extension to Second Concession Rd.

The original Port Colborne drain alignment to the east has been consumed by the expansion of the quarry. The extension of the drain to the Second Concession was previously identified but not yet completed. This report provides plans and profile drawings for the completion of the extension.

4.1.3 Port Colborne Branch Drain #1

The original Port Colborne Drain alignment is shown in the following figure as circa 1934.

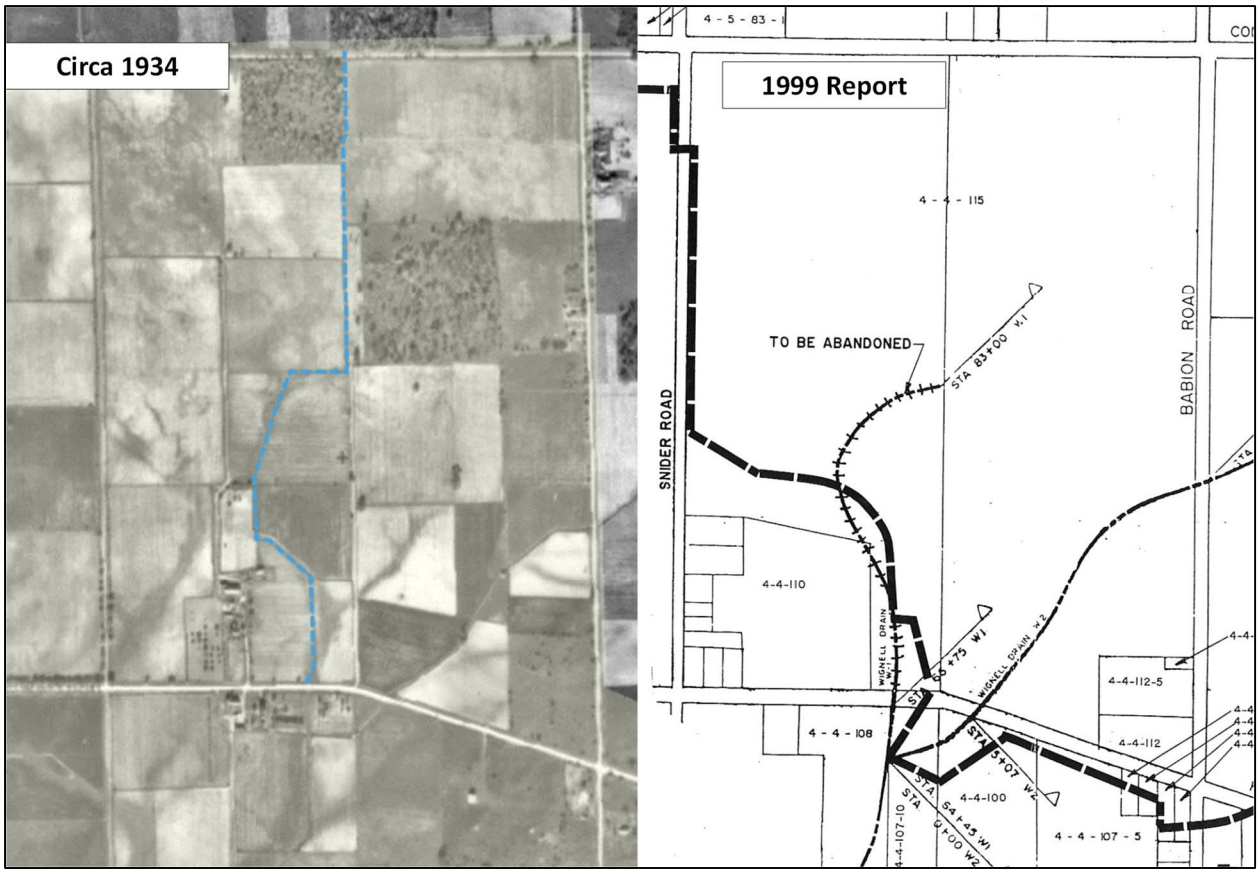

Figure 7 Port Colborne Branch Drain History

Figure 2 OMAF AgMaps - Constructed Drains shows the Port Colborne Branch Drain #1 as existing and proceeding west to Snider. However, there is a bylaw from 1999 showing a portion of the original alignment was abandoned to the north side of Highway #3. This portion is illustrated above in Figure 7 Port Colborne Branch Drain History. By adoption of this report, the City of Port Colborne, recognises that this drain does exist and is formally proposed as a newly named drain, hereafter called the Port Colborne Branch Drain #1. See drawings in Appendix A.

The branch drain is proposed to be 824m in length. The following describes the three proposed sections of work.

1. The existing channel from the outlet at Port Colborne Drain STA 1+654 and proceeding north to Highway #3 requires regrading to design grade line and vegetation clearing with bank re-seeding.

2. The existing CSPA crossing Highway #3 does not require work, nor does the existing channel north of Highway #3. The drainage superintendent may undertake spot maintenance works on as needed basis and where needed basis.

3. Above 0+627 to the end of the drain, requires vegetation clearing and channel excavation to cross-section and grade.

Figure 2 OMAF AgMaps - Constructed Drains shows a final portion or leg of the drain proceeding north along the eastern side of Snider ROW. This Drainage Report proposes for Port Colborne Branch #1 to end on entry to the ROW and any further north or south drainage structures will be municipal roadside swales/channels and not included as part of the Drain Schedule.

4.1.4 Road Crossings

There are 7 road crossings from the outlet of the drain to Second Concession Road. Of those crossings, one is a Provincial highway crossing, (Highway #3) and the others are municipal road crossings (6). There is one crossing for the proposed Port Colborne Branch Drain #1.

There is no additional work proposed for the existing crossings with the exception of the two culverts located at Babion Rd. and Second Concession Rd. which are to have the following changes:

- The west to east culvert crossing Babion Rd. (600mm HDPE) is to be lowered with the grade changed to outlet east.

- The north-south culvert crossing Second Concession Rd. (750mm HDPE) is to be re-located from the west side of Babion Rd. to the east side and connecting to the downstream extension of the drain along the east side of Babion Rd.

All other crossings were surveyed (Amec 2013) and the grade points used to establish the design grade line (see drawings Appendix A).

4.1.5 Private Crossings

Additional survey, CofPC/EWA 2018, showed an existing 30m culvert placed on the east side of Babion Rd. and PVC 6m culvert perched above the grade line. The existing PVC culvert is to be removed and a new channel constructed on the design grade line to the outlet invert of the relocated culvert crossing Second Concession Rd.

Two fordings were constructed in 2016 on two properties south of Highway #3. Amending the fording bottom crossing height using existing concrete slabs (sidewalk removals) is recommended.

4.1.6 Abandonments

A portion of the Port Colborne Drain is to be abandoned through this report. As a part of the drain-re-alignment of the Port Colborne Drain completed in 2016, the proposed outlet for Port Colborne Branch #1 Drain is to be re-aligned north of Highway #3 and outlet to the Port Colborne Main Drain.

Past Abandonments

There were two abandonments adopted by By-Law in 1999 for the Wignell Drain (referred to in this report as the Port Colborne Drain). The part of the Wignell identified as W1, north of Highway #3, was abandoned by adopted By-Law No. 3740/26/99. Additionally, the prepared report also identified that the Wignell, identified as W2a and W2b were abandoned by By-Law No. 5895/02/13.

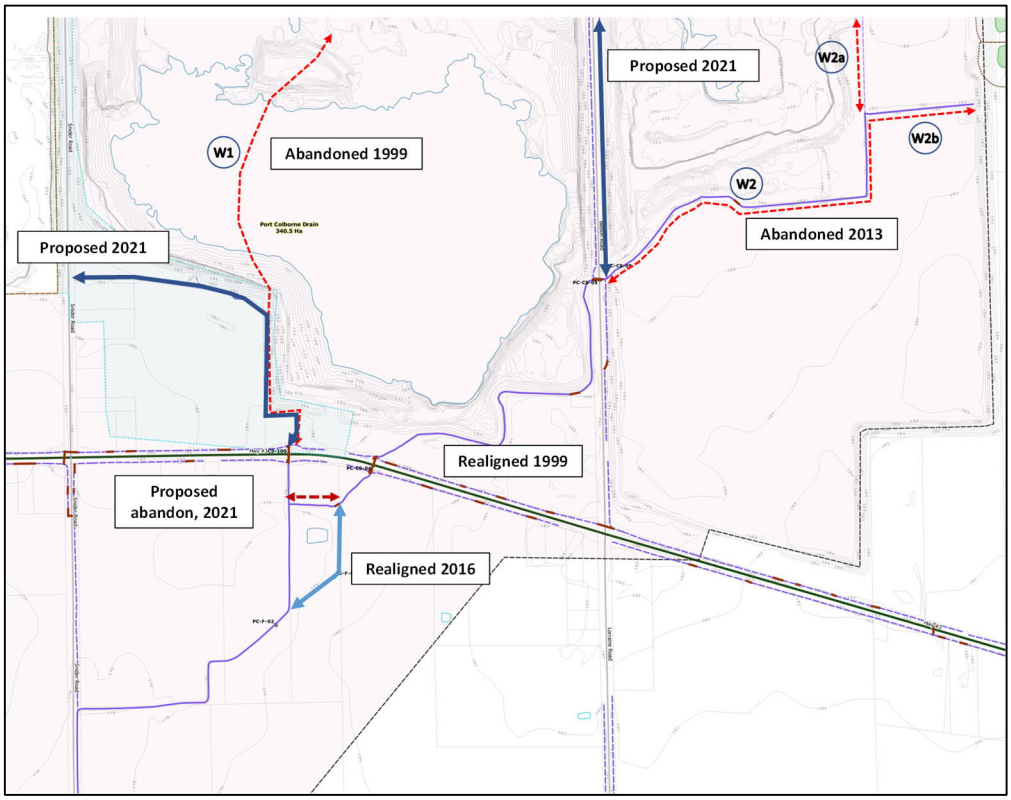

Figure 8 Port Colborne (formerly Wignell) Abandoned Segments

The portion of the original Wignell, W1 drain north of the Highway #3 multiplate culvert (CS-100) was abandoned as a municipal drain by a report in 1999. Since these documents were not included in the Baseline Report, they are included in Appendix D.

4.1.7 Utility Conflicts & Coordination

Utility conflicts may exist with gas lines and telecommunication lines as identified by the exchange of utility information. No direct grade conflicts were identified on the drawings. Where conflicts are identified in the field, relocation of the utilities will be performed following requirements set forth by the utility and charged at cost to each affected utility as per the Drainage Act, R.S.O. 1990.

4.1.8 Plans, Profiles & Specifications

The proposed Port Colborne Drain works are described in the attached Plans, Profile drawings and Specific Design Drawing and Standard Detail Drawings attached as Appendix A.

Project Specifications are included in Appendix E.

4.2 Construction and Constructability

The following describes the specific requirements for drain construction.

4.2.1 Vegetation Removal

Vegetation, specifically trees are to be cut down outside of any bird nesting periods. The remaining stumps are to remain in place unless they obstruct flow or they are Ash trees with re-growth from the lower truck already established. In those cases, the stump will be ground down to match the existing channel section.

Tree removal within the top-of-bank to top-of-bank is to be 100 percent; however, tree removal within the work zone is at the discretion of the drainage superintendent while making every effort to preserve trees where possible. Where live trees are removed in the work zone, they qualify for the tree replacement program as per the tree qualifying criteria. Where a mature live tree is already established and is an individual tree, it can remain on the work zone adjacent to the drain provided there is a working space to provide future maintenance to the drain.

Trees with a DBH greater than 150mm and alive, such trees will be replaced with 2 trees as saplings for future growth in lieu of a damage allowance for the existing tree that is removed. The tree that is removed will be provided to the owner as stacked branches adjacent to the drain and outside of the working zone along with the trunk. The owner shall be wholly responsible for the wood once cut.

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 access for the drain. 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.

- Individual hardwood trees may be allowed every 25m. Trees of any type shall not be planted within 6m of an existing drain (solid tile, wrap joints) or 4.5m 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.

- Replacement trees will be selected from a list of available preferred species at the time of construction for owners eligible for replacements to select their preferred species. Species will be from the identified list of approved Carolinian species typical for the Region. Owners can select any location for the planting of replacement trees excepting within the work zone.

4.2.2 Spoil Material

All spoils and spoil handling practices will comply with applicable legislation including O. Reg. 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT filed December 4, 2019 under Environmental Protection Act, R.S.O. 1990, c. E.19

Where specified, excavated spoil material shall be disposed of and levelled a minimum of 2.5 m from the top of bank to ensure that sediment does not re-enter the drain. Spoil placed next to the drain shall be spread to permit access across the berm area and shall be placed to a maximum height of 0.6m. Spoil excavated along existing travelled road allowances, and on private property where requested, shall be disposed of by the Contractor off site. The cost of spoil trucked from the property shall be borne by the benefiting property owner.

Spoil shall be disposed of as noted in the description of the proposed work. Generally, the spoil will be disposed of adjacent to the drain unless otherwise specified. Should any property owner require that all or a portion of the spoil be trucked away from their property, the cost of trucking spoil shall be assessed totally to the property owner requesting same and will not form part of the total cost of the drainage system. The cost of trucking away spoil from any future maintenance work will be assessed directly to the property owner requesting the same. Vegetation debris from the drain is preferred to be arranged adjacent to the drain to decay but will be removed from the property or disposed of in accordance with agreement of the property owner at the owner’s cost.

With respect to the reaches of drain that are within travelled Municipal road allowances, the spoil will be trucked away during both the initial construction and any future maintenance work where there is no opportunity to dispose of the material on site should the road allowance be the working side.

Access channels shall be provided through the levelled spoil material at every location where existing drainage outlets are visible and/or identified during construction by the Drainage Superintendent. The invert of the access channels shall be consistent with the drain cross-section at that location.

Spoil excavated from the drain shall be levelled in a manner that is suitable for cultivation of crops where crops were previously cultivated. Where the drain is adjacent to a grassed area maintained by the owner, the spoil shall be levelled and re-seeded with grass so that the area is restored to a like or better condition than prior to construction.

4.2.2.1 Contaminated Spoils

Where soils are known to be contaminated but have been assessed to pose no human health risk, on site spreading adjacent to the drain will be the practice and acknowledge that the soils are not be 'moved' off the property.

Where soils are to be removed from the property, then a sample will be collected and analyzed for contamination prior to the commencement of removal. Where that sample is shown to be contaminated and disposal of the soil will require disposal at a registered facility in compliance with O.Reg 406/19, the owner will be responsible for the costs to dispose of the contaminated soil from their property.

Once a contaminated sample is returned, the owner will be given the opportunity to retain the soil on site instead of trucking for disposal.

4.2.3 Sediment Control Basins

The addition of sedimentation basins to the Port Colborne Drain in three locations is to assist with controlling sediment during maintenance and re-grading to the identified design grade line. Post – Construction these basins remain and continue to provide sedimentation control during precipitation events.

Sediment basins are to be constructed at the locations and to the specifications indicated on the drawings. The Contractor will maintain these sediment basins during construction, as directed by the Engineer and/or their designate. The basins are considered to be part of the Municipal Drain and will be maintained in future by the Municipality at the expense of all upstream land and roads owners herein assessed as shown on the attached assessment schedule. Properly maintained sediment basins reduce the incidents of drain maintenance clean out and therefore reduce overall maintenance costs for property owners. The basins will be inspected annually for an assessment of sediment depth and sediment removed where that depth exceeds half the constructed depth of the basin. The inspection schedule may be adjusted after some experience with the sediment basins within the watershed.

4.2.4 Revegetation

Drain banks and exposed soil areas disturbed during the maintenance of the drain are to be seeded as quickly as possible by the Contractor to reduce the risk of soil erosion. The Contractor will seed spoil areas after leveling and shall seed channels at the same time. The Contractor will schedule levelling to reduce the time of bare soil, but where the duration of leveling exceeds 2 weeks, then channels will be seeded immediately after channel maintenance.

Seeding should take place in a manner that optimizes seed germination and establishment of vegetation prior to mid October and after late April.

Seed mixture used shall be applied at a rate of 40 kg/ha in the following proportions:

Creeping red fescue	20 kg	50%
Perennial rye grass	8 kg	20%
Birdsfoot trefoil	12 kg	30%
Total	40 kg/ha	100%

Where working zone adjacent to the drain is grass and this is affected by construction, this area shall be reseeded with a suitable grass mix to restore to a like or better condition.

4.2.5 Private Drain Connections

Where private connections are made to the Municipal Drain, the connections are to be compliant with the City of Port Colborne's standards connection designs. This includes the following connection types:

- Open channel connection – minimal allowance for grade and freeboard.
- Surface water flows – rip rap rock requirements for reducing or amending sites of potential or evident erosion.
- Tile drain connections – use of PE pipe to connect to a receiving channel.
- Berm and Orifice Flow Control - connections designed to control runoff to specified rates of flow.

Private connections are not part of the drain but owned and the responsibility of the landowner for construction and maintenance. Where a deficiency is identified by the Drainage Superintendent or Engineer, the landowner is to make good the connection. Deficiencies can be eroded connections, blocked connections or poor connections and the landowner can accept to have work done by the City on their behalf to make good the connection based on a 50/50 cost sharing basis. Where the City identifies a deficiency and the repairs are not made by the landowner by the next cycle of drain maintenance, the City can make the required repairs and 100% of the cost will be assessed to the landowner.

4.3 Future Maintenance and Repair Provisions

The Drainage Act, Chapter D.17, Sections 74 through 84 governs future maintenance, improvement and repair to any Drainage Works constructed under a By-Law passed under this Act, or any predecessor of this Act.

Upon completion of this report and the works described in the Engineer's Report, the City of Port Colborne will be responsible for future maintenance of the drain with the costs of future maintenance assessed to the upstream lands and roads using the Assessment Schedule in Appendix B, and pro-rating the assessment based on the actual cost using the Outlet Liability Assessment – Section 23. Special Assessment shall not apply to maintenance work. Special Benefit or Special Assessment, Section 24 or Section 26, shall not apply to maintenance work except where maintenance works are related to culvert/bridge replacement or upgrades.

4.4 Construction Summary

The following table provides a list of construction activities by property starting from the outlet and proceeding upstream.

Table 1 Port Colborne Drain Construction Summary

Property / Owner	From STA	To STA	Work Description	Access & Disposal
271104000408700 SCHLENGER USZER	-0-112.7	-0-007.5		Access from Friendship Trail. A 10m Workzone is on the North and east side of the Drain. This Workzone is presumed to already exist from past reports.
271104000699500 PORT COLBORNE CITY	-0-007.5	0+012.5		Work from both sides where required.
271104000408715 PORT COLBORNE CITY	0+012.5	0+053.4		10m Workzone east side
271104000408700 SCHLENGER USZER	0+053.4	0+403.6		10m Workzone east side
271104000408800 SCHLENGER USZER	0+403.6	0+422		10m Workzone east side
271104000409000 HILL KERRY	0+422	0+477		10m Workzone east side
271104000408900 ANNETT SYLVIA	0+477	0+485.7		10m Workzone east side
ROW - Killaly St East City of Port Colborne	0+485.7	0+514.1		
271104000412700 VALE CANADA LIMITED	0+514.1 1+020	1+056.4 1+055	Construct Sediment Basin PC-SB03 at 1+020	10m Workzone east side Excess soil disposal is adjacent to the basin for 10m of Workzone on the south side.
ROW - Snider Rd. City of Port Colborne	1+056.4	1+249.6		10m Workzone
271104000412700 VALE CANADA LIMITED	1+249.6	1+376.8		10m Workzone east side
271104000410900 POWELL BRADLEY KENNETH	1+376.8	1+528.4		10m Workzone east side
271104000410800 VAN RUYVEN JOSEF NICOLAAS	1+528.4	1+657.5		10m Workzone east side
271104000410710 KONC JOHN ANDREW	1+657.5	1+758.3		10m Workzone east side
271104000410000 VALE CANADA LIMITED	1+758.3	1+924.9		10m Workzone east side
Highway#3 ROW MTO	1+924.9	1+958		

Property / Owner	From STA	To STA	Work Description	Access & Disposal
271104000411500 PORT COLBORNE QUARRIES INC	1+958	2+555	commencing at 2+300, clear and re-grade to design grade line and spread spoil on bank. Construct Sediment Basin PC-SB02 at 2+402	10m Workzone north and west side Spread spoil adjacent to drain.
Babion Rd. ROW	2+555	2+575		
271104000315600 PORT COLBORNE QUARRIES INC	2+575	2+923.6		10m Workzone east side
271104000315800 PORT COLBORNE QUARRIES LIMIT	2+923.6	3+330.8	Construct new drain starting at 3+079 to 3+330 Remove existing 500mm PVC culvert. Construct Sediment Basin, PC-SB01 @ 3+300. Spread spoil on adjacent east bank.	10m Workzone east side
ROW-Babion Rd and Second Concession	3+330.8	3+368	Move PC-CS-07 Culvert from West side of Babion Rd. to East side of Babion Rd. at the indicated grade. Excavate PC-CS-06 600mm HDPE culvert and re-lay in the same trench at design grade to drain from West to East.	Work within existing ROW

Port Colborne Branch Drain #1

The following table provides a list of construction activities by property starting from the outlet and proceeding upstream.

Table 2 Port Colborne Branch Drain Construction Summary

Property / Owner	From STA	To STA	Work Description	Access & Disposal
271104000410800 Van Ruyven Josef Nicolaas	0+000	0+224.7	Clear tree vegetation from top of bank to top of bank and re-grade the bottom of the drain to the design grade line. Re-establish the drain bottom width.	Work zone is the east side.
271104000410710 Konc John Andrew	0+000	0+224.7	Clear tree vegetation from top of bank to top of bank and re-grade the bottom of the drain to the design grade line. Re-establish the drain bottom width.	Access from East side and dispose of spoils adjacent to the drain. Spread to match existing field.
MTO Highway #3	0+224.7	0+259.6	No work planned through the MTO Right of Way.	
271104000411500 PORT COLBORNE QUARRIES INC	0+259.6	0+512.7	Spot clean up where required as determined by field inspection.	Work from east side 10m Workzone
271104000411000 HELLINGA JACK SIMON	0+512.7	0+570.6	No work planned.	10m east side workzone
271104000411500 PORT COLBORNE QUARRIES INC	0+570.6	0+818.4	200m - Brush and excavate to extend and re-grade to Snider Rd. ROW	Work from north side 10m Workzone

5 Drainage Works Financing

5.1 Cost of Works

As required by the Drainage Act, Chapter D.17, Section 59(1), Council may call a meeting if the contract price exceeds 133 percent of the estimated construction costs.

5.1.1 Admin & Engineering Costs

Administration costs identified with the Port Colborne Drain are included for the interest payable over the 20 year period of the debenture along with a debenture fee. This total fee is allocated to the Port Colborne Drain on a percentage basis calculated by the total area of each drain. (See Table 3)

There are three engineering costs related to the works for the Port Colborne Drain. These costs are from three separate engineering companies who have worked to prepare the report.

Wiebe Engineering was first hired to prepare the report. Wiebe was paid $92,511.44 for work completed on the Wignell, Michener and Port Colborne Drains and a survey fee of $8,342.93 was paid to a survey firm. A portion of this fee, allocated by area of the drain, is charged to the Port Colborne Drain. (See Table 3 Drain Area Ratios)

Amec Foster Wheeler (formerly Amec and now Wood Plc) was appointed to conclude the report after Wiebe Engineering. They prepared a draft of the report, invoiced and were paid $67,147.23 but they did not finalize the report and ceased to work on the project.

These costs have been allocated to the respective drains using a drain area ratio as per the following table.

Table 3 Drain Area Ratios

Drain	Area, Ha	Area Ratio
Michener Drain Area	135	12%
Port Colborne Drain Area	327.8	30%
Wignell Drain Area	634.4	57%
Total:	**1097.2**	

The result is a cost allocation from past works to Port Colborne Drain for the portion of administration and engineering fees as follows.

Table 4 Past Admin and Engineer Costs

Administration (Debenture) (interest + fees) $35,893.21	Wiebe $92,511.44 + $8,342.93	Amec $67,147.23
$10,723.47	$30,131.30	$20,060.94

The fees for EWA Engineering Inc. are recorded for the fees in the preparation of each individual report. For Port Colborne the EWA Engineering fee is $ 99,812. The total Administration and Engineering fee including estimates for engineering effort remaining for construction oversight is assessed against the Port Colborne Watershed for $178,210.

5.1.2 Capital Construction Cost

The estimated cost of construction is shown in the following table.

Table 5 Port Colborne Estimated Cost of Construction

Estimated Cost of Construction	
Port Colborne Branch #1 – new outlet and grade improvement to Snider Rd.	$10,340.
Port Colborne Drain – Extending to Second Concession Rd. on East Side of Babion, including culverts.	$33,332.
Port Colborne General Construction Costs	$8,279
Port Colborne Contingency	$12,458.
Total - Estimated Cost of Construction	**$74,749**

5.1.3 Previous Works Completed

Additional to this estimate of construction cost is the cost for work already completed.

5.1.3.1 Construction Already Completed

There are two distinct areas of construction that were already completed and they are as follows:

1. Drain adjacent to and downstream of the Babion Rd. Crossing by Rankin Construction. The cost of the cleaning is included in Appendix D as $26,050.

2. Additional to this work was construction of a re-aligned portion and re-grading of the Friendship Trail to MTO Highway #3.

    a. Re-grading and clearing to design grade from STA 0+010 to 1+500

    b. Drain channel re-alignment from STA 1+500 to 1+860 including stone protection on outside channel bends.

    c. Fording # 1 providing private property access.

    d. Fording #2 providing private property access.

Additional work included two constructed wetlands which were externally funded and are not part of the drain.

Table 6 Previous Construction Costs

Previous Construction Costs	
Channel maintenance by Rankin Construction - 2+580 to 3+045	$ 26,050.00
Channel Re-Alignment - 1+660 to 1+860	$ 9,442.50
Channel Re-Grading and Clearing - 0+010 to 1+660	$ 15,300.00
Fording #1; ARN = 410710 - 1+740 to 1+750	$ 710.00
Fording #2; ARN = 410800 - 1+630 to 1+640	$ 710.00
Total Previous Construction:	**$ 52,212.50**

5.2 Maintenance & Program Costs

Included in the estimated cost of construction are allocations for costs related to drain maintenance works including vegetation removal and re-grading.

5.3 Principles of Assessment

The following are general and specific principles used to assess costs according to the Regulations formed under the Drainage Act using our understanding of the Act and seeking the most fair methods to share costs to rate payers within the Port Colborne Drain part of the Wignell Drain Watershed.

1. Assessments are a method to calculate a contributing property's share of drainage works, hereafter referred to as a Drain.

2. The Drain is defined by a fixed point of commencement that traverses to a fixed Outlet, which may be a receiver or another Drain.

3. A property contributes to a drainage work if any portion of the property contributes a runoff flow directly or indirectly to the Drain.

4. A Drain is any constructed or existing natural method of conveyance or stormwater management function that moves or controls water from one point of collection to a discharge point, an Outlet.

5. The use of a property; farming, residential, or vacant does not define benefit of the Drain. The benefit of a Drain is realized among all properties with runoff to the Drain.

6. An excess or additional benefit is realized for any property or group of properties for which a higher standard of drainage service is required for the specific use of a property for which a higher value is realized.

As an example, where a market garden farm requires additional pumping for either irrigation or reducing the water surface in the drain, then the additional costs for those works to provide a higher level of service are borne by the benefitting lands.

7. Similarly, where a property or group of properties is provided with a lower standard of drainage service or where such property or properties provides a stormwater management function within the drainage works of the Drain, the value of the lower service or function is determined at a rate commensurate with the benefit to the drain.

As an example, where a property converts a portion of their lands (or the entire property) to a wetland or other stormwater management feature that reduces the peak flow of the runoff, thereby reducing or enhancing the capacity of the Drain to improve drainage and reduce flooding, then a commensurate benefit is realized to the volume of water removed from the runoff hydrograph.

Where the volume of detained runoff is small relative to the capacity of the drain, this contribution is deemed to be negligible. Where the volume detained is below 1% of the total runoff volume for the Drain, there is no real benefit realized for an individual Stormwater Management Feature.

8. The capacity of the Drain is determined based on a hydrologic model forecast of precipitation event based runoff. Therefore each property realizes a drain benefit based on the proportion of predicted runoff for their property. Predicted runoff is a product of the following attributes, which are determined for each property:

a. Area contributing to runoff;
b. Land use as it relates to runoff;
c. Land topography;
d. Proportion of hard surfaces vs soft surfaces as they relate to infiltration; and
e. Stormwater management features specially built to reduce the rate of runoff.

9. A benefit is realized for a property that causes a physical change in the Drain works to serve a particular use or surface water benefit to the property. An example of this is a culvert, which provides access to a property across a drain.

10. A benefit/assessment is realized for Municipal, Regional or Provincial lands held as Rights of Way that cause or require additional infrastructure, effort or costs related to the Drain. (Section 26)

11. Where a cost to the drain is realized through effort during construction or otherwise for the protection of flora, fauna or quantity or quality of stormwater runoff, this cost is born proportionally amongst all watershed contributing owners at the same proposal rate as established for Drain Maintenance.

12. For the Port Colborne Drainage works being considered, a Drain already exists and the proposed assessment is to recognize a service or benefit that already exists and is being confirmed to exist through the creation of the report and assessment schedule. Section 31 allowances for existing channels are not considered for allowance granted by Assessment schedule in this report.

13. Utilities that require additional works, changes in design or protection during construction, those costs are borne by the owner of the utility.

While efforts within the drain design and assessment have been made to address water quality as well as quantity, there are limits within the Drainage Act to incorporate these features. The assessment tables are proposed for using those regulations within the Drainage Act to address stormwater management features as recognized works as part of the Drain.

Benefit (Section 22)

This Assessment is based on lands, roads, buildings, utilities or other structures that are increased in value or are more easily maintained as a result of the construction, improvement, maintenance or repair of a drainage works may be assessed for benefit. Section 23 benefits specifically require the creation of increased value through the creation of a new or additional drainage systems including natural drainage systems such as wetlands. The Port Colborne Drain work consists of maintenance and drain improvements within existing flow paths.

The Drain improvements are not a new service of additional drainage but maintenance of the existing system. The re-alignments completed do not create new drainage with the possibility of enhanced service level but merely address the current decreased function by restoring a functioning drainage system.

The Drain works has no Benefit Assessment proposed on the main channel of the Port Colborne Drain or for the proposed Branch Drain #1.

Outlet Liability (Section 23)

This is the primary basis for the assessment of the maintenance and drain works. Assessment is based on each individual property's contributing runoff. This is determined from the area flowing to the drain and from the runoff factor C. The runoff factor C is the Rational Method for predicting peak runoff and does not predict volume of runoff (note special benefit used for Site Specific SWM facilities).

The C factor for assessing property runoff is selected based on the property zoning. Where a property is not currently farmed but is zoned for farming, then a C factor is selected based on the potential use of the property. C factors are not adjusted for variations in Residential properties. Residential properties with or without buildings are assigned the same C factor. Thus, the C factor is not a current prediction of runoff for an individual property but a Factor to assess the potential runoff based on the property's potential use in the present and in the future. The attached Table will be used for the determination of C Factor values used in the Runoff Outlet Factor assessment.

Table 7 Land Use and C Factors

PropCode	CATEGORY	DESCRIPTION	C-Factor Low	C-Factor High
100	LAND	Vacant residential land not on water	10	25
105	LAND	Vacant commercial land		
110	LAND	Vacant residential/recreational land on water		
200	FARM	Farm property without any buildings/structures	20	55
201	FARM	Farm with residence - with or without secondary structures; no farm outbuildings		
210	FARM	Farm without residence - with secondary structures; with farm outbuildings		

PropCode	CATEGORY	DESCRIPTION	C-Factor Low	C-Factor High
211	FARM	Farm with residence - with or without secondary structures; with farm outbuildings		
221	FARM	Farm with residence - with commercial/industrial operation		
228	FARM	Farm with gravel pit	12	50
230	FARM	Intensive farm operation - without residence	20	50
231	FARM	Intensive farm operation - with residence		
234	FARM	Large scale poultry operation	20	55
244	FARM	Managed forest property, residence not on water	20	30
260	FARM	Vacant residential/commercial/ industrial land owned by a non-farmer with a portion being farmed	20	55
261	FARM	Land owned by a non-farmer improved with a non-farm residence with a portion being farmed		
301	RESIDENTIAL	Single family detached (not on water)	15	40
302	RESIDENTIAL	More than one structure used for residential purposes with at least one of the structures occupied permanently		
303	RESIDENTIAL	Residence with a commercial unit		
313	RESIDENTIAL	Single family detached on water year round residence		
322	RESIDENTIAL	Semi-detached residence with both units under one ownership two residential homes sharing a common center wall.		
332	RESIDENTIAL	Typically a Duplex residential structure with two self-contained units.		
334	RESIDENTIAL	Residential property with four self-contained units		
383	RESIDENTIAL	Bed and breakfast establishment		
391	RESIDENTIAL	Seasonal/recreational dwelling - first tier on water		
392	RESIDENTIAL	Seasonal/recreational dwelling - second tier to water		
405	COMMERCIAL	Office use converted from house	20	65
410	COMMERCIAL	Retail - one storey, generally under 10,000 s.f.		
421	COMMERCIAL	Specialty automotive shop/auto repair/ collision service/car or truck wash		
441	COMMERCIAL	Tavern/public house/small hotel		
490	COMMERCIAL	Golf course	12	35
510	INDUSTRIAL	Heavy manufacturing (non-automotive)	45	85
518	INDUSTRIAL	Smelter/ore processing		
520	INDUSTRIAL	Standard industrial properties not specifically identified by other industrial Property Codes		
590	INDUSTRIAL	Water treatment/filtration/water towers/pumping station	*	*
593	INDUSTRIAL	Gravel pit, quarry, sand pit	*	*
597	INDUSTRIAL	Railway right-of-way	40	65
598	INDUSTRIAL	Railway buildings and lands described as assessable in the Assessment Act		
605	INSTITUTIONAL	School (elementary or secondary, including private)	35	50
702	SPECIAL PURPOSE	Cemetery	35	65
710	SPECIAL PURPOSE	Recreational sport club - non commercial (excludes golf clubs and ski resorts)	35	85
715	SPECIAL PURPOSE	Racetrack - auto	45	85
735	SPECIAL PURPOSE	Assembly hall, community hall	30	85
	ROW	Single lane Municipal Roadway	75	95
	ROW	unopened road allowance	65	85
	ROW	Regional or MTO	90	98

* C factor values are situationally assigned based on land use.

The following drain features are part of the whole system and are paid for through the outlet assessment:

- Channel Clearing and Re-grading

- Sediment Basins

In addition to assessed costs considered for special benefits, there is also recognition for stormwater management facilities within the watershed that reduce the peak flow used to determine the outlet assessment. These facilities that may already exist in the watershed and are recognized as having a benefit in the reduction of peak flow by determining the available volume is greater than the 24 hour peak flow volume predicted for the 1:100 year design storm.

- Site Specific Stormwater Management (SWM) Facilities
  - Wetlands,
  - Ponds, (natural and stormwater)
- Natural occurring features
  - Kettle lakes, and
  - Bog lands.
- Artificial runoff capture; such as Quarry lands or other features that collect runoff but do not outlet it to the Drain during the peak flow of the event.

Table 8 Section 23 Runoff Factor Determination - QRF Ratio

Area Ha	Soil Type	Gradient	Land Factor	Runoff Factor 'C'	QRF	SWM	SWMF	QRF-SWMF	QRF Ratio
2.176	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	COMMERCIAL	17	2.41	0	0	2.41	**0.1760**
1.201	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	1.18	0	0	1.18	**0.0857**
1.084	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	ROW - paved 2 lane	85	6.01	0	0	6.01	**0.4382**
0.848	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.83	0	0	0.83	**0.0605**
0.729	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.71	0	0	0.71	**0.0521**
0.560	Bookton (BOK2) - 40to100 cm sandy textures over lacustrine silty clay - Well Drained - Brunisolic Gray Brown Luvisol	0.20%	RESIDENTIAL	15	0.55	0	0	0.55	**0.0400**
0.517	NM - Sandy well drained	0.20%	LAND	12	0.41	0	0	0.41	**0.0295**

QRF is a predicted runoff factor based on the following variables:

- Area, Ha – each property's connected area
- Runoff Factor 'C' – Coefficient of Runoff of generally accepted values
  - Soil Type – from Niagara Soil Report
  - Gradient – General Value from NPCA contours
  - Land Factor – reflects the impact of landuse on Runoff

QRF =0.0028* Runoff Factor 'C' * Avg Intensity mm/hr * Area, Ha

QRF-SWMF is the adjusted Runoff Factor used to represent the impact of owner implemented stormwater management facilities.

- SWM is the reduction achieved by the stormwater management facility as determined by the Drainage Engineer / Drainage Superintendent.
- SWMF is the reduction in QRF to be applied.
- QRF-SWMF = QRF - SWMF

QRF Ratio is QRF-SWMF divided by the Sum of all QRF-SWMF for each cost allocated area. The QRF Ratio is the value for each property contribution to the outlet liability cost as a portion of all other contributors.

QRF-SWMF and QRF Ratio is to be used for all future Maintenance assessments.

Special Benefit (Section 24)

The following are assessed costs considered special benefits:
- Culverts,
- Fordings,
- Closed Conduit conveyance (piped flow)
- Channel re-alignment for property use, such as quarry expansion.

The cost of a culvert is assessed against the property owner based on the incremental cost of the drain. A new culvert is paid for by the owner less the cost of drain construction on a per metre basis. The drain per metre construction cost will be estimated for the report but the actual cost will be used to calculate the final value.

Culvert construction costs are shared between the landowner and the rest of the watershed on a 50/50 split basis. Construction costs are based on the City's typical design standard. Additional costs, headwalls, etc. are at the owners cost unless required by the Engineer to meet requirements.

Special Assessment (Section 26)

There are special assessments, as recognized under the Act, for public (not private) roads and utilities that have or require additional costs to the drainage system.

In addition to the projected assessments for Right of Way lands as determined by the outlet assessment, any other costs for road crossings or protection of utilities during construction are assessed to the road owner or utility owner. In the case of Port Colborne Drain, some of the existing Road culverts are to be changed and additional costs are planned or identified. The two new culverts providing road crossings proposed for the Second Concession Rd. are other examples of Section 26 assessments that apply to Port Colborne Drain.

Also included are costs related to impacted utilities such as Enbridge. These costs are additional effort during construction to protect or meet site supervision requirements by the utility. Also included are costs to move infrastructure, if required by site conditions. Actual costs will be assigned to the project as this is merely an estimate of costs during design.

5.3.1 Allowances:

1. Where a drain assessment schedule already exists and a prior maintenance and assessment schedule is known to exist, then a Schedule 29 allowance is accepted and recognized through a past report and schedule unless it can be shown otherwise.

2. Where a drain is re-aligned to a new path, then a Section 29 allowance for land taken is recognized. This can be amended by the restoration of any lands to the same owner by the same re-alignment. Thus, a net allowance can be recognized where that is shown to be the case.

3. Where previously no drain was recognized but already existed as a flow path, then a Section 31 allowance can be realized along with a one time creation of a current and future easement for drain maintenance activities as a Section 29 allowance. This is used in the creation of branch drains.

4. All property valuations are based on the same basic valuation, as per the Schedule of Costs. This single valuation is based on the agricultural land value in the Region of Niagara.

5. Any tree or feature planted within a drainage works right of access for maintenance is not eligible for compensation in any form. Trees within the work zone are eligible for the 2 for 1 tree replacement program.

Section 29 Allowance
(One time payment for land taken)

Where a drain already exists and has had maintenance in the past, then a work zone is assumed to already exist and a one time payment for the work zone easement has been made. No further payment for a work zone or easement is deemed to be required based on the pre-existing work zone regardless of whether that is known to exist or shown to exist in an explicit reference in a previous Engineer's report.

Where a drain re-alignment or a branch drain is proposed, then a Section 29 allowance is determined. The determination is based on a 10m work zone running parallel to one side of the drain commencing at the Top of Bank. The side from which work is done is determined by the Drainage Engineer and shown on the Plans for Construction. In the case of a close conduit the work zone can be reduced to a 5m zone or a 10m zone with 5m on each side. The value is based on a single value of land figure as shown in the Schedule of Costs and because the access is intermittent with the owner retaining ownership and access / use of the land for farming or otherwise, then a factor in the assessment value of land is applied. Since the work zone is likely to be occupied on a 10 year cycle for maintenance a 1/10 factor is to be applied using the land purchase value.

Where a buffer is established that restricts use of the land adjacent to the drain in favour of permanent vegetation, then a full payment for land taken based on the value established is made. For a buffer, a registered easement on title is recommended.

Section 30 Allowance
(Payment for damages during construction)

This allowance is to compensate landowners for economic damages due to construction and recognizes two types of injury. Immediate loss of crop as a result of working corridor for construction and longer-term damage to crops as a result of spoil spreading.

An allowance is made where work on the drain, such as construction or maintenance, damages crops which can not be restored. Compensation in the form of an allowance does not apply to grass or any other ornamental feature that is restored to similar condition as existed pre-construction for the tree canopy program. Compensation is paid for the work zone width multiplied by the length affected at the rate of $4,300 per Hectare.

For any trees removed for construction that have a greater diameter than 150mm at breast height, (DBH) a compensation program of replacement saplings is proposed.

Where a tree is removed and 2 trees of a variety native to the area and available through the canopy program are planted outside the work zone as compensation, then no award for damage is made.

A damage allowance for fences can be paid where the fence is not restored. In any of the planned work for the Drain, fences are to be restored to a like or better condition and no allowance for payment is planned.

Section 31 Allowance
(Incorporate a Private Drain)

This type of allowance is to credit the construction effort of a private drain once the private drain is incorporated into a municipal Drain.

The value of the private drain is dependent on condition and contribution to the function of the Drain. For valuation purposes, the cost to construct a similar channel would be made based on the Schedule of Prices. The cost to maintain it would be subtracted.

This does not apply within the Port Colborne Drain watershed.

Section 32 Allowance
(Insufficient Outlet)

This provides compensation to affect owners for whom lands are not sufficiently drained by the service level provided by the Drain or where lands are discharged into instead of having a sufficient outlet.

There are no known occurrences of this within the Port Colborne Drain.

Section 33 Allowance
(Loss of Access)

Where a re-aligned Drain crosses property and cuts off access, an allowance can be granted. There is one known such occurrence, property 410900 has a portion that is naturally severed by the crossing of the drain. It is assumed that this historical severance would have a loss of access payment made at the time of the severance and is not required to be recognized by this report.

5.3.2 General Instructions to Property Owners, Road Authorities and Public Utilities

The principles of the Drainage Act are:

- Drainage is a collective good that benefits all landowners. However, drainage does not have to benefit all landowners equally.
- All landowners cooperatively fund the drainage works proposed. There is no direct financial government role in the drainage works other than administrative.

- Landowners are assessed a financial share of the cost for the drainage works based on their respective drainage benefit.

- All drainage costs are born by landowners including allowances.

- Drainage is provided on the basis of an identified service level for a specified size of storm. The standard storm, 1 in 5 year frequency, for basic open channel design is 68.9mm over 24 hours. A storm of a larger size or intensity may cause flooding. Tile placed in the bottom of an open channel is provided for drainage and not conveyance capacity.

  For more details, refer to the Wignell Watershed Hydrology and Hydraulics Report.

A best effort has been made to compose a fair and reasonable assessment of costs to each portion of the contributing lands.

5.3.3 Grants

Owners of qualifying agricultural land are presently eligible for a grant of up to one-third of the cost of their assessment from the Ontario Ministry of Agriculture and Food. This grant will be applied for by the City of Port Colborne, and applied to the property owners' assessment at the time of final billing. The Port Colborne Assessment Schedule indicates lands that, based on information provided by the municipality, qualify for the agricultural land use grant. The final determination of eligibility is the decision of the Ontario Ministry of Agriculture and Food. To be eligible for a grant, the property owner must have a Farm Property Class Tax Rate or in combination with the Managed Forest Tax Incentive Program or the Conservation Land Tax Incentive Program for the lands to be drained by the Drain.

For additional information on the Agricultural Drainage Infrastructure Program refer to the OMAFRA website at www.omafra.gov.on.ca.

5.4 Port Colborne Drain Improvements & Maintenance

Added to the cost of maintenance is the full engineering and administration costs less any costs directly assigned to specific Section 22, Section 24 benefit assessments.

With the Runoff Ratio, there is a Stormwater Management Facility reduction in Section 23 that can be applied for those properties that can demonstrate a runoff amendment structure that reduces peak flow contributions to the drain subject to evaluation and confirmation by the Drainage Superintendent and the Engineer.

For the purposes of the submission of the report, no SWMF assessments are recognized and the individual property owners can make a request for assessment and this will be recognized by the Engineer on project completion.

A cycle of review and update of the SWMF assessments is planned to update and address private property runoff improvements made by homeowners. At present this cycle is set to once every 5 years but this will be reviewed and adjusted by the City

of Port Colborne and can be triggered at any point using a Section 76 assessment change process.

5.4.1 Drain Improvement to Second Concession

The re-alignment of the former Wignell W1 and W2 did not appear to be constructed to Second Concession. This report provides the design and report information to complete that work and achieve a full replacement of the original drain pathway around the quarry. The City of Port Colborne had constructed the roadside ditches down the ROW's to help provide some drainage.

As part of this work, a sediment basin is proposed to 'treat' runoff from the farmland upland of the Babion Rd. and Second Concession Rd. intersection culvert crossings.

5.4.2 Drain Crossings

There are no new drain crossing planned; however, the two crossings located at Babion Rd. and Second Concession Rd. are to be changed in grade and/or flow direction. The costs for this work is to be borne by the Municipality.

These re-worked crossings are proposed to pass the former flows crossing Second Concession Rd. and passing into the now quarry lands to the East and crossing Babion Rd. first then Second Concession Rd. and connecting to the extended Drain along the east side of Babion.

5.4.3 Port Colborne Branch #1 Drain Improvement

The majority of the Port Colborne Branch Drain #1 is functioning well but the portion that provides drainage to Snider Rd. is no longer functioning as intended. A removal of the vegetation growth is required along with a re-grading of the channel to connect and serve the roadside swale.

In addition, the outlet is proposed to be re-aligned along the north side of Highway #3 to outlet into the main Drain channel at a connection point north of the existing culvert crossing identified on Plans as PC-CS-004 crossing Highway #3. This new outlet will be the primary channel for Port Colborne Branch Drain #1; however, the original flow path will remain without being a part of the Municipal Drain but as an overflow path should a large runoff event occur. The berm directing runoff to the new outlet is set to overtop prior to the full flow occurring at the PC-CS-004 culvert.

5.4.4 Sediment Basins

There are three sediment basins planned for construction. Each is located adjacent to a road right of way to provide access for future maintenance.

The cost of constructing sediment basins are shared among upstream landowners through a Section 23 assessment including assessed cost for ROW runoff.

5.4.5 2016 Grading and Re-alignment

The City conducted work on the drain to re-grade the channel from station 0+007, North of the Friendship Trail to station 1+928, South of Highway #3. This included some rock removal.

The resulting graded works is shown on the Profile drawings; P1, P2 as an As Constructed drawing record.

A re-alignment of the drain starting at 1+650 to 1+860 was constructed. There were two fordings constructed through this area to provide farm crossings. Each is to be treated in a similar manner to a culvert and the costs shared between the watershed and the landowner on a 50/50 basis.

Two wetlands were constructed on private property using grants. These wetlands are not part of the Municipal Drain and remain with the landowners for future maintenance.

5.5 Allowance and Assessment Schedules

The Assessment calculation Tables are included in Appendix B. The following sections provide a summary reporting of those calculations.

5.5.1 Drain Allowances

5.5.1.1 Port Colborne Drain

The improvement of the Port Colborne Drain using Section 78 is to make specific changes in the drain and assign the cost for the same using an updated schedule and to achieve enhanced stormwater management functions.

The channel is presumed to have an allowance under Section 29 for land taken as well as a work zone allowance for future access. The original land required for the drain is recognized by previous report and an assumed work zone of 30ft (9.14m) already exists. An additional 1m work zone, (0.76m) to be added to the 9.14m existing work zone is declined.

A section 30 allowance is recognized for the damage to crops during construction and is paid at the rate of $4,300 per hectare applied to the 10m work zone.

An allowance paid to the property for the re-alignment is made under Section 29 for land taken on the re-location of the drain path. The other properties are not recognized on the basis of a like for like move of the drain. No other allowances are recognized for the maintenance of this existing drain.

Table 9 Port Colborne Allowances

Drain	Section 29	Section 30	Section 31	Section 32	Section 33
Port Colborne	$939.00	$0.00	$0.00	$0.00	$0.00
				Sub-Total of Allowances:	**$939.00**

Additional to these costs will be Administration and Engineering Costs related to the design.

5.5.1.2 Port Colborne Branch Drain #1

As discussed previously, this drain already existed and is presumed to have been a Municipal Drain previously. All required land is presumed to have been previously assessed for both land taken for the drain and for access for maintenance, which is a 10m work zone.

Table 10 Port Colborne Branch #1 Allowances

Drain	Section 29	Section 30	Section 31	Section 32	Section 33
Port Colborne Branch #1	$0.00	$277.62	$.00	$0.00	$0.00
				Sub-Total of Allowances:	**$277.62**

5.5.2 Port Colborne Assessment Schedules

The assessment tables show the resulting assessment schedules for the past construction works and the proposed construction works based on the calculations performed and included in Appendix B. Past costs are presented by summary reports in Appendix C.

Table 11 Port Colborne Drain Assessment Schedule of Costs

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Section 22: Assessed Benefit
Section 23 Outlet Benefit / Outlet Liability
Section 24 Special Benefit

					Assessment					
	Owner	Legal Text	Roll No	Area, Ha	Benefit	Outlet Liability	Special	Total	Allowance	Net
	City of Port Colborne - Lands Assessed									
	Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642	$0	$1,413.83	$0.00	$1,413.83	$0.00	$1,413.83
	McLean William Richard Samue	CON 1 PT TWP LOT 23	271102001311300	0.095	$0	$45.49	$0.00	$45.49	$0.00	$45.49
	Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191	$0	$91.13	$0.00	$91.13	$0.00	$91.13
	Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190	$0	$91.08	$0.00	$91.08	$0.00	$91.08
	Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534	$0	$306.76	$0.00	$306.76	$0.00	$306.76
	Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868	$0	$20,671.95	$0.00	$20,671.95	$0.00	$20,671.95
	Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089	$0	$42.53	$0.00	$42.53	$0.00	$42.53
	Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112	$0	$23,514.47	$0.00	$23,514.47	$0.00	$23,514.47
	Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583	$0	$334.83	$0.00	$334.83	$0.00	$334.83
	Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726	$0	$4,504.18	$0.00	$4,504.18	$0.00	$4,504.18
	City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431	$0	$1,628.23	$0.00	$1,628.23	$0.00	$1,628.23
	Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373	$0	$228.20	$0.00	$228.20	$0.00	$228.20
	Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631	$0	$301.99	$0.00	$301.99	$0.00	$301.99
	1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463	$0	$310.00	$0.00	$310.00	$0.00	$310.00
	Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201	$0	$96.15	$0.00	$96.15	$0.00	$96.15
	1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779	$0	$521.36	$0.00	$521.36	$0.00	$521.36
	Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202	$0	$96.58	$0.00	$96.58	$0.00	$96.58
	Ed Christensen Roofing Limited	CON 1 PT LOT 23	271104000409400	0.190	$0	$90.98	$0.00	$90.98	$0.00	$90.98
	Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190	$0	$90.98	$0.00	$90.98	$0.00	$90.98
	Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190	$0	$90.98	$0.00	$90.98	$0.00	$90.98
	Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190	$0	$90.98	$0.00	$90.98	$0.00	$90.98
	Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106	$0	$1,963.89	$0.00	$1,963.89	$0.00	$1,963.89
	Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	$256	$3,323.44	$187.50	$3,766.44	$939.00	$2,827.44
	Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071	$0	$33.82	$0.00	$33.82	$0.00	$33.82
	Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107	$0	$51.04	$0.00	$51.04	$0.00	$51.04
	Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159	$0	$76.06	$0.00	$76.06	$0.00	$76.06
	Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168	$0	$80.12	$0.00	$80.12	$0.00	$80.12
	Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936	$0	$926.05	$0.00	$926.05	$0.00	$926.05
	Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	$508	$1,941.39	$5,057.59	$7,506.97	$0.00	$7,506.97
F	Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199	$0	$2,811.99	$355.00	$3,166.99	$0.00	$3,166.99
	Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407	$0	$194.50	$0.00	$194.50	$0.00	$194.50
F	Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711	$0	$5,164.30	$0.00	$5,164.30	$0.00	$5,164.30
	Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411	$0	$2,588.33	$0.00	$2,588.33	$0.00	$2,588.33
	Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202	$0	$574.94	$0.00	$574.94	$0.00	$574.94
	Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208	$0	$578.00	$0.00	$578.00	$0.00	$578.00
	Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067	$0	$31.95	$0.00	$31.95	$0.00	$31.95
	Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170	$0	$51,802.13	$0.00	$51,802.13	$0.00	$51,802.13
	Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418	$0	$199.95	$0.00	$199.95	$0.00	$199.95
	Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209	$0	$100.02	$0.00	$100.02	$0.00	$100.02
	Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	$0	$199.95	$0.00	$199.95	$0.00	$199.95
	Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209	$0	$100.07	$0.00	$100.07	$0.00	$100.07
	Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209	$0	$100.02	$0.00	$100.02	$0.00	$100.02
	Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357	$0	$170.72	$0.00	$170.72	$0.00	$170.72
	Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186	$0	$88.88	$0.00	$88.88	$0.00	$88.88
F	Elite Capital P.C Developments Inc	CON 2 PT LOT 22	271104000412600	4.110	$0	$2,359.42	$0.00	$2,359.42	$0.00	$2,359.42
	Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153	$0	$5,827.80	$0.00	$5,827.80	$0.00	$5,827.80
	Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189	$0	$12,736.89	$0.00	$12,736.89	$0.00	$12,736.89
	Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363	$0	$208.54	$0.00	$208.54	$0.00	$208.54
	NCDSB	CON 2 PT LOT 23	271104000412900	5.947	$0	$3,413.79	$0.00	$3,413.79	$0.00	$3,413.79
	Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176	$0	$84.14	$0.00	$84.14	$0.00	$84.14
	Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182	$0	$104.19	$0.00	$104.19	$0.00	$104.19
	Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186	$0	$88.88	$0.00	$88.88	$0.00	$88.88
	Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085	$0	$40.85	$0.00	$40.85	$0.00	$40.85
	Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828	$0	$396.13	$0.00	$396.13	$0.00	$396.13
	Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409	$0	$3,544.32	$0.00	$3,544.32	$0.00	$3,544.32
	Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115	$0	$6,774.19	$0.00	$6,774.19	$0.00	$6,774.19
	Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631	$0	$422.51	$0.00	$422.51	$0.00	$422.51
	Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326	$0	$1,909.44	$0.00	$1,909.44	$0.00	$1,909.44
	Vale Canada Limited	CON 2 PT LOT 24	271104000414120	0.928	$0	$621.68	$0.00	$621.68	$0.00	$621.68
	2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291	$0	$617.56	$0.00	$617.56	$0.00	$617.56
F	Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222	$0	$106.05	$0.00	$106.05	$0.00	$106.05
	Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079	$0	$37.89	$0.00	$37.89	$0.00	$37.89
F	Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228	$0	$2,426.75	$0.00	$2,426.75	$0.00	$2,426.75
	Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085	$0	$40.80	$0.00	$40.80	$0.00	$40.80
F	Fijavz David	CON 3 PT LOT 20	271104000506703	0.334	$0	$159.58	$0.00	$159.58	$0.00	$159.58
	Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212	$0	$101.17	$0.00	$101.17	$0.00	$101.17
	Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271	$0	$129.44	$0.00	$129.44	$0.00	$129.44
F	Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011	$0	$7,373.83	$0.00	$7,373.83	$0.00	$7,373.83
F	Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252	$0	$10,214.09	$0.00	$10,214.09	$0.00	$10,214.09
	Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050	$0	$2,042.84	$0.00	$2,042.84	$0.00	$2,042.84
	Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238	$0	$592.40	$0.00	$592.40	$0.00	$592.40
F	Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613	$0	$5,098.67	$0.00	$5,098.67	$0.00	$5,098.67
F	Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055	$0	$706.46	$0.00	$706.46	$0.00	$706.46
	Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388	$0	$185.46	$0.00	$185.46	$0.00	$185.46
	Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346	$0	$165.65	$0.00	$165.65	$0.00	$165.65
	Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082	$0	$39.37	$0.00	$39.37	$0.00	$39.37
	Stefan John	CON 3 PT LOT 23	271104000509400	0.016	$0	$7.85	$0.00	$7.85	$0.00	$7.85
	Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208	$0	$103.68	$0.00	$103.68	$0.00	$103.68
	Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417	$0	$199.52	$0.00	$199.52	$0.00	$199.52
	Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605	$0	$289.50	$0.00	$289.50	$0.00	$289.50
	Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597	$0	$285.72	$0.00	$285.72	$0.00	$285.72
F	Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252	$0	$1,077.11	$0.00	$1,077.11	$0.00	$1,077.11
	Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103	$0	$49.17	$0.00	$49.17	$0.00	$49.17
	Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144	$0	$68.98	$0.00	$68.98	$0.00	$68.98
	Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347	$0	$166.13	$0.00	$166.13	$0.00	$166.13
	Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099	$0	$47.21	$0.00	$47.21	$0.00	$47.21
	Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029	$0	$13.78	$0.00	$13.78	$0.00	$13.78
	Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356	$0	$170.06	$0.00	$170.06	$0.00	$170.06
	McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191	$0	$91.41	$0.00	$91.41	$0.00	$91.41
	City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630	$0	$421.71	$0.00	$421.71	$0.00	$421.71
				311.038	$763.50	$199,226.89	$5,600.09	$205,590.48	$939.00	$204,651.48

Owner	Legal Text	Roll No	Area, Ha	Assessment Benefit	Assessment Outlet Liability	Assessment Special	Total	Allowance	Net
Roads									
City of Port Colborne	Snider Rd. N of Second Concession	ROW	0.071		$3,306.62	$0.00	$3,306.62		
City of Port Colborne	Killaly St E east of Snider	ROW	0.176		$1,752.36	$0.00	$1,752.36		
City of Port Colborne	Snider Rd portion south of Killaly St E	ROW	0.353		$2,876.95	$0.00	$2,876.95		
City of Port Colborne	Second Concession Rd. E of Babion	ROW	0.596		$116.22	$0.00	$116.22		
City of Port Colborne	Killaly St East W of Snider Rd	ROW	0.920		$968.19	$0.00	$968.19		
City of Port Colborne	Chippawa Road	ROW	1.016		$3,753.26	$0.00	$3,753.26		
City of Port Colborne	Second Concession W of Snider Rd.	ROW	1.221		$854.95	$0.00	$854.95		
City of Port Colborne	Babion Rd. from 2nd to Chippawa	ROW	1.432		$2,329.34	$0.00	$2,329.34		
City of Port Colborne	Second Concession from Snider to Babion	ROW	1.645		$541.04	$0.00	$541.04		
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	2.005		$1,464.94	$0.00	$1,464.94		
City of Port Colborne	Sndier Rd from Hwy 3 to Killaly St E	ROW	2.033		$286.73	$0.00	$286.73		
City of Port Colborne	Babion Rd. from Hwy 3 to Second Concess	ROW	2.308		$2,675.64	$0.00	$2,675.64		
							$20,926.24		
MTO	Highway #3	ROW	3.281		$5,336.02	$0.00	$5,336.02		
			17.058		$26,262.26	$0.00	$26,262.26		
Section 26 - Special Assessments									
City of Port Colborne	Extend drain along Babion Rd. to Second Concession. Re-lay culverts at Second Concession Rd.						$40,448.80		
MINISTRY OF TRANSPORTATION ONTARIO							$5,076.19		
Utilities - Enbridge	No conflicts assessed during design						$0.00		
Utilities - Other	No conflicts assessed during design						$0.00		
							$45,525.00		
Port Colborne Drain									
	Total Assessed:						$277,377.74		

Notes:
1. The above lands marked "F" are currently classified as agricultural according to the OMAFRA and are therefore entitled to a 1/3 grant.
2. Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown for each parcel of land and road affected. The affected parcels of land are identified using the roll number received from the City. For convenience only, the owners' names are shown by the last revised assessment roll.
3. The value of the assessments identified in this schedule are estimates only, and should not be considered final.

Port Colborne Branch #1 Municipal Drain

City of Port Colborne
Regional Municipality of Niagara

Section 22: Assessed Benefit
Section 23 Outlet Benefit / Outlet Liability
Section 24 Special Benefit

Owner	Legal Text	Roll No	Area, Ha	Assessment Benefit	Assessment Outlet Liability	Assessment Special	Total	Allowance	Net
City of Port Colborne - Lands Assessed									
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	0.107	$0	$27.28	$0.00	$27.28	$277.62	-$250.35
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	1.084	$0	$184.32	$0.00	$184.32	$0.00	$184.32
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.247	$0	$1,338.84	$0.00	$1,338.84	$0.00	$1,338.84
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	2.758	$0	$469.10	$0.00	$469.10	$0.00	$469.10
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.413	$0	$105.40	$0.00	$105.40	$0.00	$105.40
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.098	$0	$16.60	$0.00	$16.60	$0.00	$16.60
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	$0	$106.65	$0.00	$106.65	$0.00	$106.65
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.025	$0	$4.25	$0.00	$4.25	$0.00	$4.25
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.308	$0	$844.05	$0.00	$844.05	$0.00	$844.05
			12.267	$0.00	$3,096.49	$0.00	$3,096.49	$277.62	$2,884.89
Roads									
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	1.612	$0	$616.77	$0.00	$616.77		
City of Port Colborne	Second Concession from Snider to Bab	ROW	0.022	$0	$16.13	$0.00	$16.13		
City of Port Colborne	Second Concession W of Snider Rd.	ROW	0.501	$0	$370.35	$0.00	$370.35		
							$1,003.25		
MTO	Highway #3	ROW	0.547	$0	$446.99	$0.00	$446.99		
			2.682	$0.00	$1,450.25	$0.00	$1,450.25		
			14.948				$4,546.73		
Section 26 - Special Assessments									
City of Port Colborne	Assessed special benefit for improving Snider road outlet.						$7,008.46		
Regional Municipality of Niagara	No works proposed						$0.00		
MINISTRY OF TRANSPORTATION ONTARIO							$7,115.18		
Utilities - Enbridge	No conflicts assessed during design						$0.00		
Utilities - Other	No conflicts assessed during design						$0.00		
							$14,123.64		
Port Colborne Branch #1 Drain									
	Total Assessed:						$18,670.37		

Notes:
1. The above lands marked "F" are currently classified as agricultural according to the OMAFRA and are therefore entitled to a 1/3 grant.
2. Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown for each parcel of land and road affected. The affected parcels of land are identified using the roll number received from the City. For convenience only, the owners' names are shown by the last revised assessment roll.

5.5.3 Port Colborne Drain Maintenance Schedules

The maintenance schedules for use with future maintenance work conducted in each of the Drain catchments.

From the Port Colborne Outlet to the upstream limit of the Drain at the Friendship Trail, STA 0-112.7 to 0+010 basic drain maintenance is required as the Drainage Superintendent determines.

From 0+010 to 1+928, was maintained by the City of Port Colborne in 2016 including work to re-align the channel from 1+650 to 1+860.

Added to the cost of maintenance is the full engineering and administration costs less any costs directly assigned to specific Section 22, and Section 24 benefit assessments.

With the Runoff Ratio, there is a Stormwater Management Facility reduction in Section 23 that can be applied for those properties that can demonstrate a stormwater management facility (SMWF) on property that reduces peak flow contributions to the drain subject to evaluation and confirmation by the Drainage Superintendent and the Engineer.

For the purposes of the submission of the report, no SWMF assessments are recognized and the individual property owners can make a request for assessment and this will be recognized by the Engineer on project completion.

5.5.3.1 Port Colborne Drain Maintenance Schedule

The following is the Maintenance Assessment table for assigning future maintenance costs using Section 23, refer to Appendix B for the calculations.

Table 13 Port Colborne Drain Maintenance Assessment Schedule

Port Colborne Drain

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio
Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642	45	4.82	**0.0063**
McLean William Richard Samue	CON 1 PT TWP LOT 23	271102001311300	0.095	25	0.16	**0.0002**
Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191	25	0.31	**0.0004**
Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190	25	0.31	**0.0004**
Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534	30	1.05	**0.0014**
Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868	35	70.48	**0.0917**
Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089	25	0.14	**0.0002**
Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112	35	80.17	**0.1043**
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583	30	1.14	**0.0015**
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726	35	15.36	**0.0200**
City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431	35	5.55	**0.0072**
Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373	32	0.78	**0.0010**
Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631	25	1.03	**0.0013**
1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463	35	1.06	**0.0014**
Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201	25	0.33	**0.0004**
1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779	35	1.78	**0.0023**
Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202	25	0.33	**0.0004**
Ed Christensen Roofing Limited	CON 1 PT LOT 23	271104000409400	0.190	25	0.31	**0.0004**
Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190	25	0.31	**0.0004**
Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190	25	0.31	**0.0004**
Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190	25	0.31	**0.0004**
Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106	25	6.70	**0.0087**
Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	35	11.33	**0.0147**
Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071	25	0.12	**0.0001**
Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107	25	0.17	**0.0002**
Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159	25	0.26	**0.0003**
Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168	25	0.27	**0.0004**
Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936	25	3.16	**0.0041**

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	35	6.62	**0.0086**
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199	35	9.59	**0.0125**
Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407	25	0.66	**0.0009**
Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711	35	17.61	**0.0229**
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411	25	8.83	**0.0115**
Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202	25	1.96	**0.0025**
Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208	25	1.97	**0.0026**
Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067	25	0.11	**0.0001**
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170	37	176.62	**0.2297**
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418	25	0.68	**0.0009**
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209	25	0.34	**0.0004**
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	25	0.68	**0.0009**
Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209	25	0.34	**0.0004**
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209	25	0.34	**0.0004**
Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357	25	0.58	**0.0008**
Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186	25	0.30	**0.0004**
Elite Capital P.C Developments Inc	CON 2 PT LOT 22	271104000412600	4.110	30	8.04	**0.0105**
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153	30	19.87	**0.0258**
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189	30	43.43	**0.0565**
Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363	30	0.71	**0.0009**
NCDSB	CON 2 PT LOT 23	271104000412900	5.947	30	11.64	**0.0151**
Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176	25	0.29	**0.0004**
Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182	30	0.36	**0.0005**
Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186	25	0.30	**0.0004**
Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085	25	0.14	**0.0002**
Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828	25	1.35	**0.0018**
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409	25	12.08	**0.0157**
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115	35	23.10	**0.0300**
Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631	35	1.44	**0.0019**
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326	30	6.51	**0.0085**
Vale Canada Limited	CON 2 PT LOT 24	271104000414120	0.928	35	2.12	**0.0028**
2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291	25	2.11	**0.0027**

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio
Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222	25	0.36	**0.0005**
Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079	25	0.13	**0.0002**
Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228	30	8.27	**0.0108**
Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085	25	0.14	**0.0002**
Fijavz David	CON 3 PT LOT 20	271104000506703	0.334	25	0.54	**0.0007**
Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212	25	0.34	**0.0004**
Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271	25	0.44	**0.0006**
Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011	35	25.14	**0.0327**
Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252	35	34.83	**0.0453**
Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050	35	6.97	**0.0091**
Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238	25	2.02	**0.0026**
Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613	35	17.38	**0.0226**
Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055	35	2.41	**0.0031**
Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388	25	0.63	**0.0008**
Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346	25	0.56	**0.0007**
Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082	25	0.13	**0.0002**
Stefan John	CON 3 PT LOT 23	271104000509400	0.016	25	0.03	**0.0000**
Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208	26	0.35	**0.0005**
Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417	25	0.68	**0.0009**
Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605	25	0.99	**0.0013**
Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597	25	0.97	**0.0013**
Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252	25	3.67	**0.0048**
Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103	25	0.17	**0.0002**
Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144	25	0.24	**0.0003**
Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347	25	0.57	**0.0007**
Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099	25	0.16	**0.0002**
Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029	25	0.05	**0.0001**
Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356	25	0.58	**0.0008**
McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191	25	0.31	**0.0004**
City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630	35	1.44	**0.0019**
			311.038			
Roads						
City of Port Colborne	**Snider Rd from Hwy 3 to Killaly St E**	ROW	2.033	85	11.27	**0.0147**

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio
City of Port Colborne	**Second Concession W of Snider Rd.**	ROW	1.221	75	5.97	**0.0078**
City of Port Colborne	**Snider Rd. from Hwy 3 to Second Conc**	ROW	2.005	75	9.81	**0.0128**
City of Port Colborne	**Snider Rd. N of Second Concession**	ROW	0.071	85	0.40	**0.0005**
City of Port Colborne	**Second Concession Rd. E of Babion**	ROW	0.595	85	3.30	**0.0043**
City of Port Colborne	**Babion Rd. from Hwy 3 to Second Concess**	ROW	2.308	85	12.80	**0.0166**
City of Port Colborne	**Chippawa Road**	ROW	0.559	80	2.92	**0.0038**
City of Port Colborne	**Babion Rd. from 2nd to Chippawa**	ROW	1.432	85	7.94	**0.0103**
City of Port Colborne	**Snider Rd protion south of Killaly St E**	ROW	0.353	80	1.84	**0.0024**
City of Port Colborne	**Killaly St East W of Snider Rd**	ROW	0.901	85	4.99	**0.0065**
City of Port Colborne	**Killaly St E east of Snider**	ROW	0.176	85	0.98	**0.0013**
City of Port Colborne	**Second Concession from Snider to Babion**	ROW	1.645	85	9.12	**0.0119**
MTO	**Highway #3**	ROW	3.281	85	18.19	**0.0237**
			16.581			
			327.619		**768.83**	**1.00**

5.5.3.2 Port Colborne Branch Drain #1 Maintenance Schedule

The Maintenance Assessment table is for assigning current and future maintenance costs using Section 23, refer to Appendix B for the calculations.

Table 14 Port Colborne Branch Drain #1 Maintenance Schedule

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio
City of Port Colborne - Lands Assessed						
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	0.107	30	0.21	**0.0060**
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	1.084	20	1.41	**0.0405**
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.247	30	10.27	**0.2945**
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	2.758	20	3.60	**0.1032**
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.413	30	0.81	**0.0232**
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.098	20	0.13	**0.0037**
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	30	0.82	**0.0235**
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.025	20	0.03	**0.0009**
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.308	30	6.47	**0.1856**
		Sub-Total (Lands)	**13.457**			
Roads						
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	1.612	45	4.73	**0.1357**
City of Port Colborne	Second Concession from Snider to Babion	ROW	0.022	86	0.12	**0.0035**
City of Port Colborne	Second Concession W of Snider Rd.	ROW	0.501	87	2.84	**0.0815**
MTO	Highway #3	ROW	0.547	96	3.43	**0.0983**
		Sub-Total (Roads)	**2.682**			
		Total:	**16.139**		**34.88**	**1.00**

6 Port Colborne Drain Report Conclusions

This report has identified a series of drain improvements that include drain maintenance to ensure suitable channel design flows are achieved. The drain improvements have been developed through plan and profile drawings, and includes the results of works already undertaken by the City.

The following is a summary description of the planned improvements:

1. Extension of the drain along the East side of Babion Rd. from the Quarry crossing to Second Concession Rd. for 254m.
2. Re-laying the two culverts at the intersection of Babion Rd. and Second Concession Rd.
3. Construction of a new outlet for the Port Colborne Branch #1 Drain to reach the Port Colborne Drain along the North side of Highway #3.
4. Maintenance of the Port Colborne Branch Drain #1 to the Snider Rd. ROW.
5. Construction of 3 sediment basins along the Drain.

Previous Work completed by others is also being assessed.

1. Work already completed for the Port Colborne Drain involving vegetation removal and re-grading to design grade line from 0+010 to 1+928.

Construction of these works is to be recognized as a Section 29 allowance for land access, which has been assumed to already be in place for the Port Colborne Drain and Port Colborne Branch #1. Damages for construction are not expected except as the adjacent lands are to be restored to an equal or better condition.

Assessment for the Drain is based on Section 23 with special benefit assessed for new drain crossings (fordings) and for the cost of channel re-alignment.

Damages for construction, Section 30 allowances, are implemented for economic harm for crop damage from construction work impacts for farming properties only. All other construction impacts are to be restored to an equal or better condition.

The proposed new sediment basins are a Section 23 outlet liability benefit along with the overall construction costs and are shared across the watershed on a pro-rated basis.

This report and the proposed improvements are based on instructions from the City of Port Colborne and the local landowners within the Port Colborne Drain catchment. The cost of these improvements are shared across all areas that contribute runoff to the Drain by way of allowances and assessments consistent with the Drainage Act of Ontario.

Appendix A:
Plans, Profiles

100 0 100 200 300 400 m

Map Scale 1:2811

CofPC-Port Colborne Drain 10-FEB-21
- CofPC-Port Colborne Drain 10-FEB-21 entities

CofPC-Port Colborne Drain 10-FEB-21 entities
- __01_PC_MainDrain
- _dc-chainage for sd ONLY
- PC_catch

- PC_ROW_rev4
- PC_Drain_Xroll_rev4
- PC MapBook_index2500
- Contours

NPCA_ENV
- GR_WetlandAllowance_NPCA
- GR_RegulatedWetlands_NPCA
- AssessmentParcels

DrainC
- Port Colborne Drain
- Port Colborne Branch #1
- Wignell Drain

Road_Segments
- MUN
- ON
- BuildingFootprints

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1

Port Colborne Drain

Assessed Properties by Drainage Area and ARN

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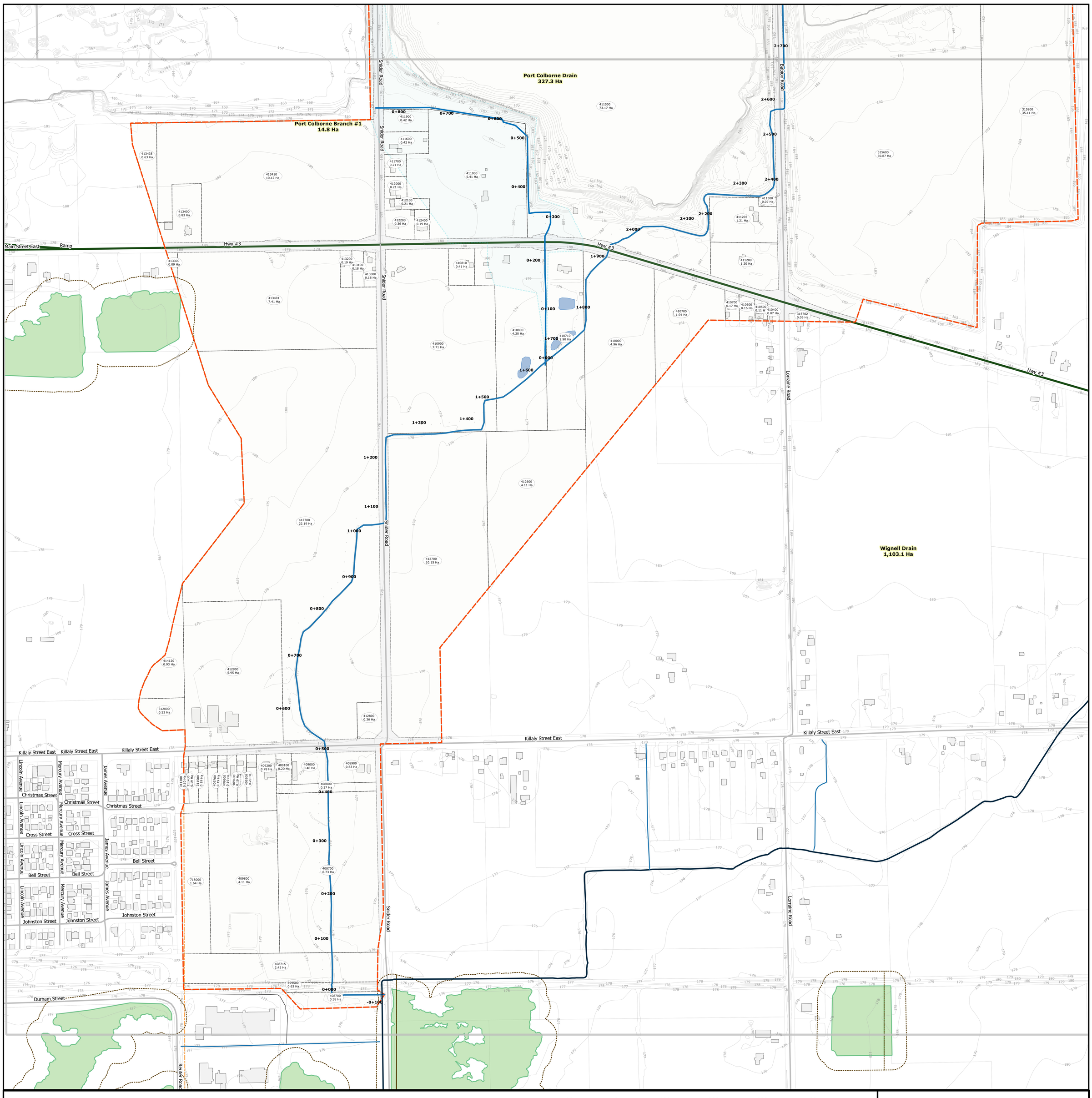
647.400.2824 www.ewaeng.com

Printed on: 2021-04-12



100 0 100 200 300 400 m

Map Scale 1:2783

CofPC-Municipal Drain-Wignell9_2020-09-01
CofPC-Municipal Drain-Wignell9_2020-09-01 entities
__03_W_Branch_Drain2
__04_W_Branch_Drain3
__10_W_PrivateDrain
AET-CL-WIGNELL MAIN BRANCH DRAIN CL
CofPC-Port Colborne Drain 10-FEB-21
CofPC-Port Colborne Drain 10-FEB-21 entities

CofPC-Port Colborne Drain 10-FEB-21 entities
__01_PC_MainDrain
__02_PC_BranchDrain1
_dc-chainage for sd ONLY
AET-CL-PCD Branch 1- N and S-TXT
PC_catch
W_ponds
PC_ROW_rev4

PC_Drain_Xroll_rev4
PC MapBook_index2500
Contours
NPCA_ENV
GR_WetlandAllowance_NPCA
GR_RegulatedWetlands_NPCA
AssessmentParcels
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Port Colborne Drain

Port Colborne Branch #1
Wignell Drain
Road_Segments
MUN
ON
BuildingFootprints

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2

Port Colborne Drain

Assessed Properties by Drainage Area and ARN

EWA Engineering Inc.
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Printed on: 2021-04-12

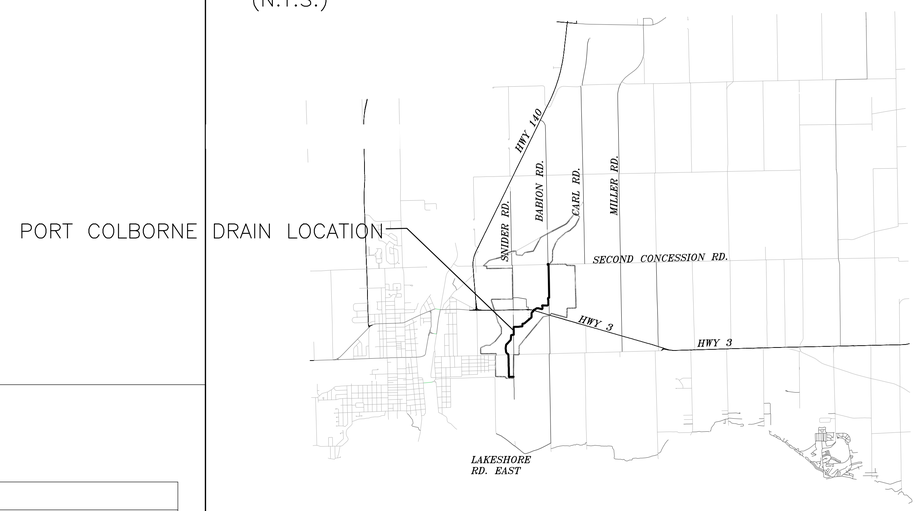
Port Colborne Municipal Drain

City of Port Colborne

APRIL 16, 2021

LOCATION PLAN

(N.T.S.)



LEGEND

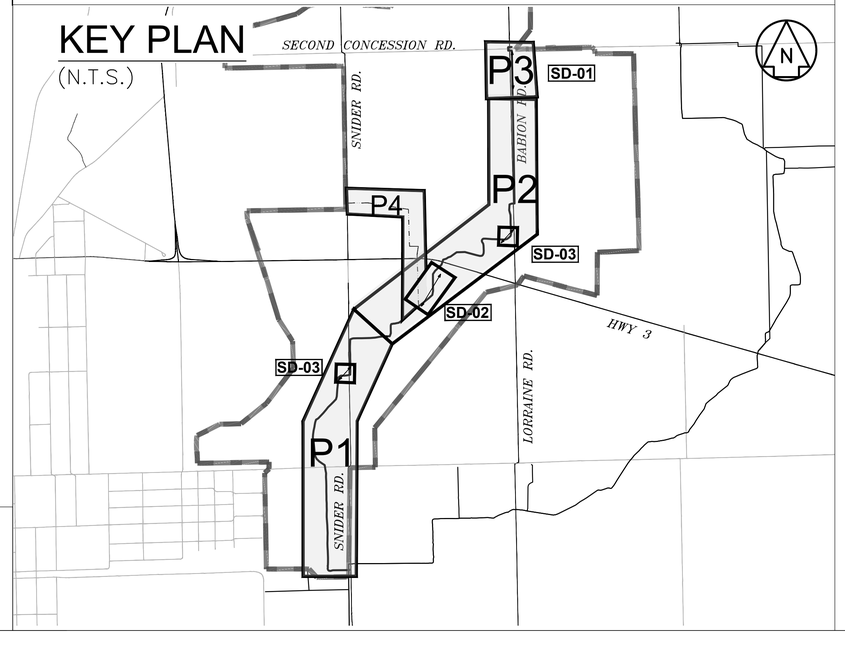
	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2021
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
175.00 PR.	PROPOSED DRAIN CENTERLINE ELEVATION
175.00 EX.	PROPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

DRAWING INDEX

DWG I.D.	DWG TITLE
PC.PLAN	PLAN VIEW
PC.P1	PROFILE STA: –0+120 to 1+400
PC.P2	PROFILE STA: 1+400 to 3+000
PC.P3	PROFILE STA: 2+800 to 3+757 END OF DRAIN
PC.P4	PROFILE BRANCH DRAIN #1: 0+000 to 824
PC.SD–01	PLAN & PROFILE SPECIFIC DETAIL STA 3+040 to 3+368
PC.SD–02	PLAN & PROFILE SPECIFIC DETAIL STA 1+610 to 1+960
PC.SD–03	PLAN & PROFILE SPECIFIC DETAIL– SEDIMENT BASIN 02 & 03
PC.GD	GENERAL DETAILS
PC.CN	CONSTRUCTION NOTES

KEY PLAN

(N.T.S.)



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PORT COLBORNE MUNICIPAL DRAIN - 2021

PORT COLBORNE DRAIN

RE-GRADE FOR 388m TO 600mmØ CULVERT CROSSING SECOND CONCESSION RD. (BY CofPC) SEE PC.P3

RE-LAY 600mmØ CULVERT TO DRAIN TO EAST

PC.SD-01

CONSTRUCT SEDIMENT BASIN AT STA 3+300 SEE PC.SD-01

PC-CS-006 600mmø HDPE-2W

PC-CS-007 750mmø PVCO (TO BE RE-LOCATED)

EXCAVATE TO DESIGN GRADE LINE 3+079 TO 3+340

MOVE EXISTING 750mmØ HDPE CULVERT FROM WEST TO EAST INTERSECTION SEE DRAWING PC.P3 AND PC.SD-01

RE-ALIGNMENT CREATED IN 1999 2+000 TO 2+575

600mmø PVC (TO BE REMOVED)

PC-CS-008 600mmø CSP

EXISTING 600mmØ PVC PIPE TO BE REMOVED

DRAIN MOVED OFF ROW 2+595 TO 2+960

EXTEND DRAIN TO WEST SIDE OF BABION RD. NORTH OF SECOND CONCESSION 2+595 TO 3+371

CLEAR & RE-GRADE 197m TO SNIDER RD. 0+627 TO 0+824

PORT COLBORNE BRANCH DRAIN #1

PC-CS-005 ConcBox 1800x1200

CONSTRUCT PC.SB2 SEDIMENT BASIN AT STA 2+402 & RE-GRADE FOR 250m SEE PC.SD-03

PC-CS-004 ConcBox Open Bottom

WORK ZONE SWITCHES TO NORTH AND WEST SIDES AT 1+952

CSP-100 Pipe Arch Multiplate 1070

CLEAR & RE-GRADE 277m EXISTING CHANNEL TO DESIGN GRADE LINE. MAINTANCE WORK- SECTION 74 0+000 TO 0+277

PC-F-001 Fording#1

PC-F-002 Fording#2

RE-ALIGN CHANNEL & RESTORE (COMPLETED 2016) 1+650 TO 1+860 SEE PC.SD-02

2 CONSTRUCTED WETLANDS (COMPLETED 2016)

2 FORDINGS (COMPLETED 2016)

PC-CS-003 1500mmø ConcPipe

CONSTRUCT PC.SB3 SEDIMENT BASIN AT STA 1+050 SEE PC.SD-03

REMOVE VEGETATION & RE-GRADE CHANNEL (COMPETED 2016) 0+010 TO 1+614

PC-CS-002 ConcBox 2370x1520

WIGNELL DRAIN

PC-CS-001 ConcBox 2570x3130

PORT COLBORNE DRAIN ORIGINAL BENCHMARK at 0+000
N 4749829.167
E 644868.665
E 177.704

OUTLETS TO WIGNELL DRAIN

0 500m 1000m

NOTES:

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   - DRAIN CROSSINGS & SPOT CHANNELS AMEC SURVEY, 2013
   - AS CONSTRUCTED SURVEY BY CofPC, 2016 STATION 0+000–1+940
   - SUPPLEMENTARY SURVEY BY CofPC, 2018
   - WEIBE ENGINEERING SURVEY, 2008

BENCHMARK INFORMATION:

- 0+000 PORT COLBORNE DRAIN LOCATED ON BOX CULVERT (PC–CS–001)
- 0+000 PORT COLBORNE BRANCH DRAIN #1 LOCATED ON NW CORNER OF BOX CULVERT (PC–CS–004)

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

LICENSED PROFESSIONAL ENGINEER PAUL C MARSH 2021-04-16 PROVINCE OF ONTARIO

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1	ISSUED FOR BASELINE REPORT	MAY 2019

PORT COLBORNE DRAIN PLAN

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DESIGNED BY : PCM	DATE : 16–APRIL–21	SCALE : F.T.P.	

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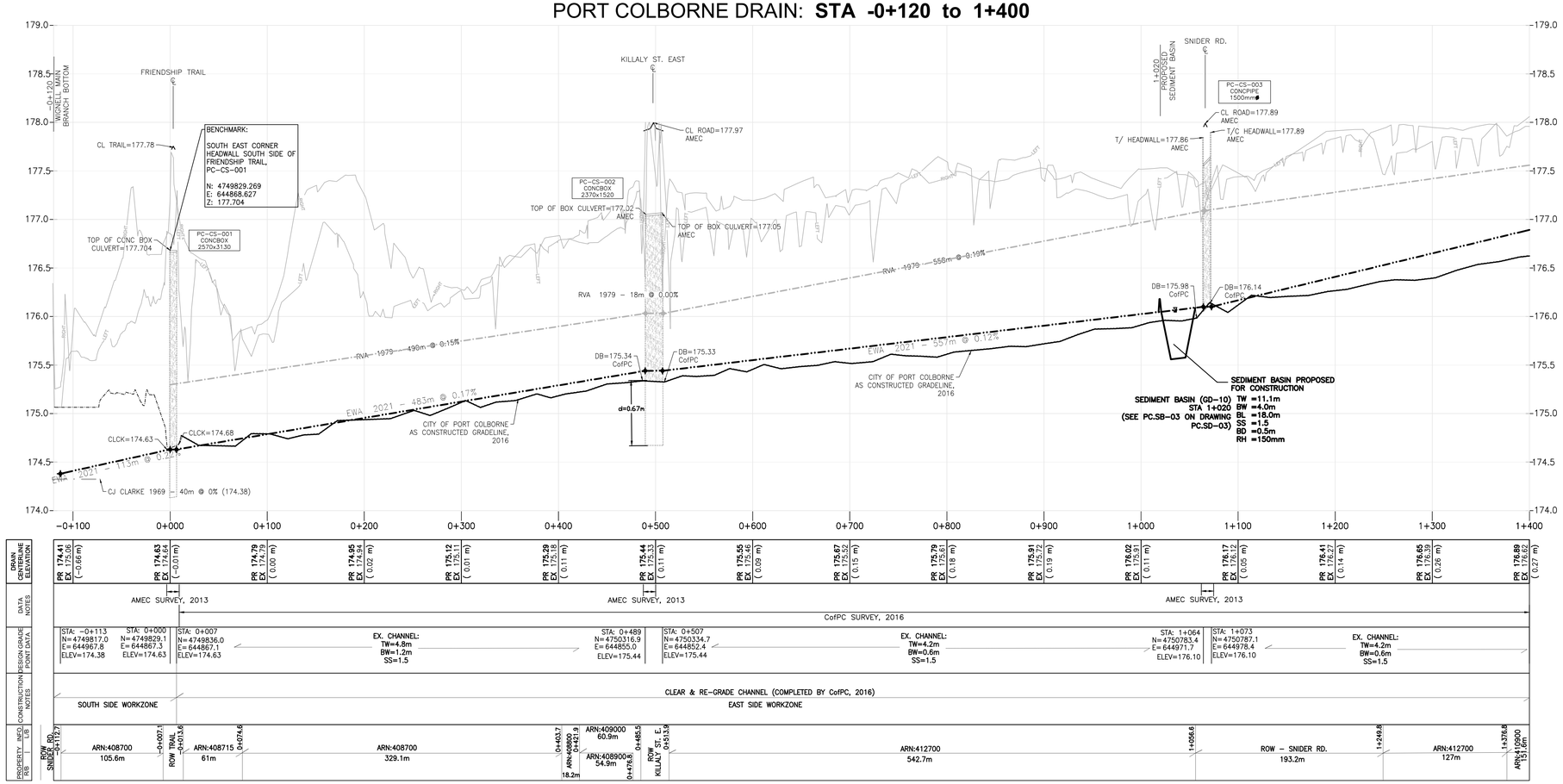
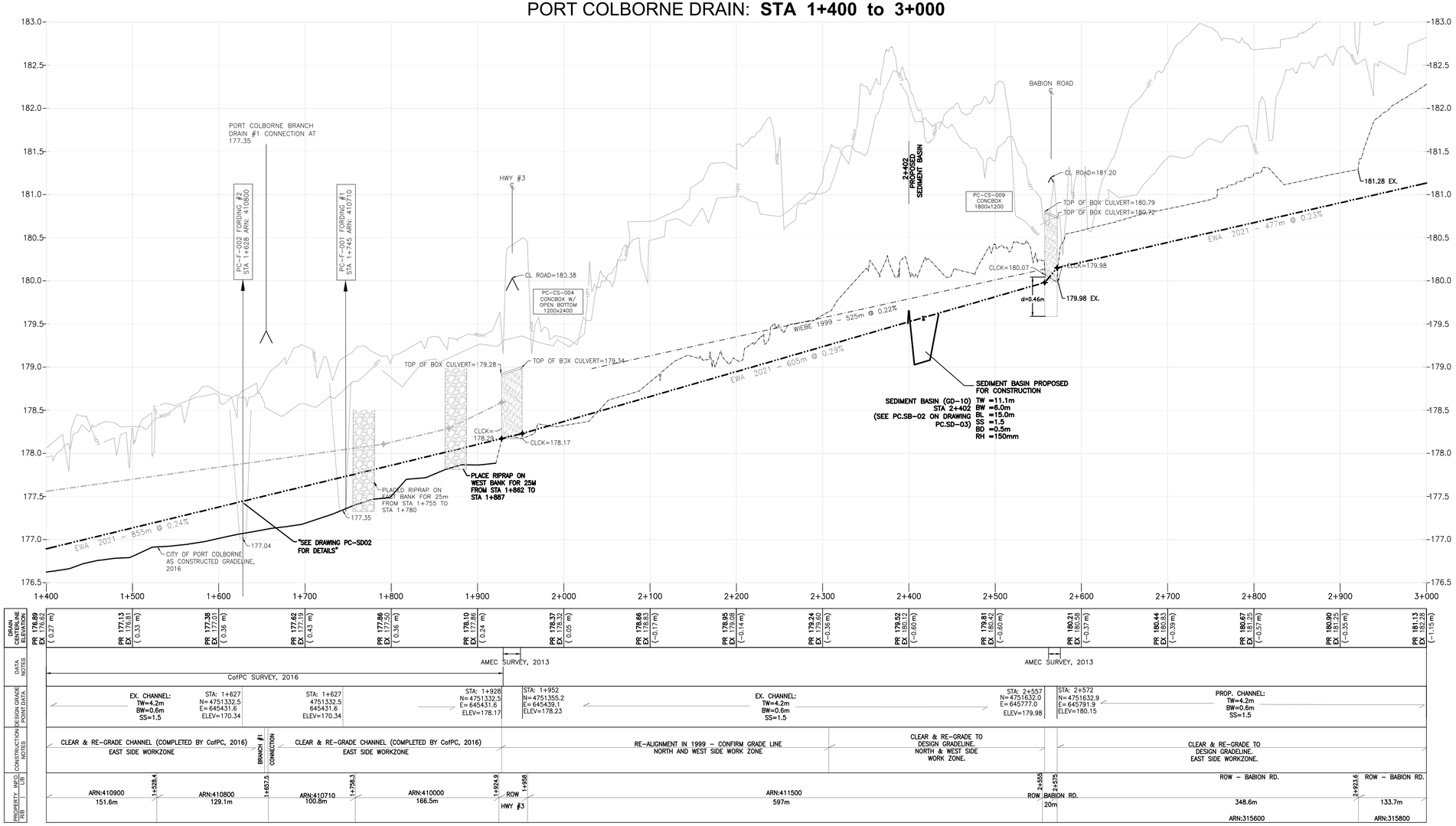


| | | |

PORT COLBORNE DRAIN: **STA 1+400 to 3+000**



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SPATIAL DATA:

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- VERTICAL DATUM: CGVD28-1978
- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.5m

LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE-EWA, 2021
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
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	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

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PORT COLBORNE MUNICIPAL DRAIN DRAIN PROFILE

STA 1+400 to 3+000

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

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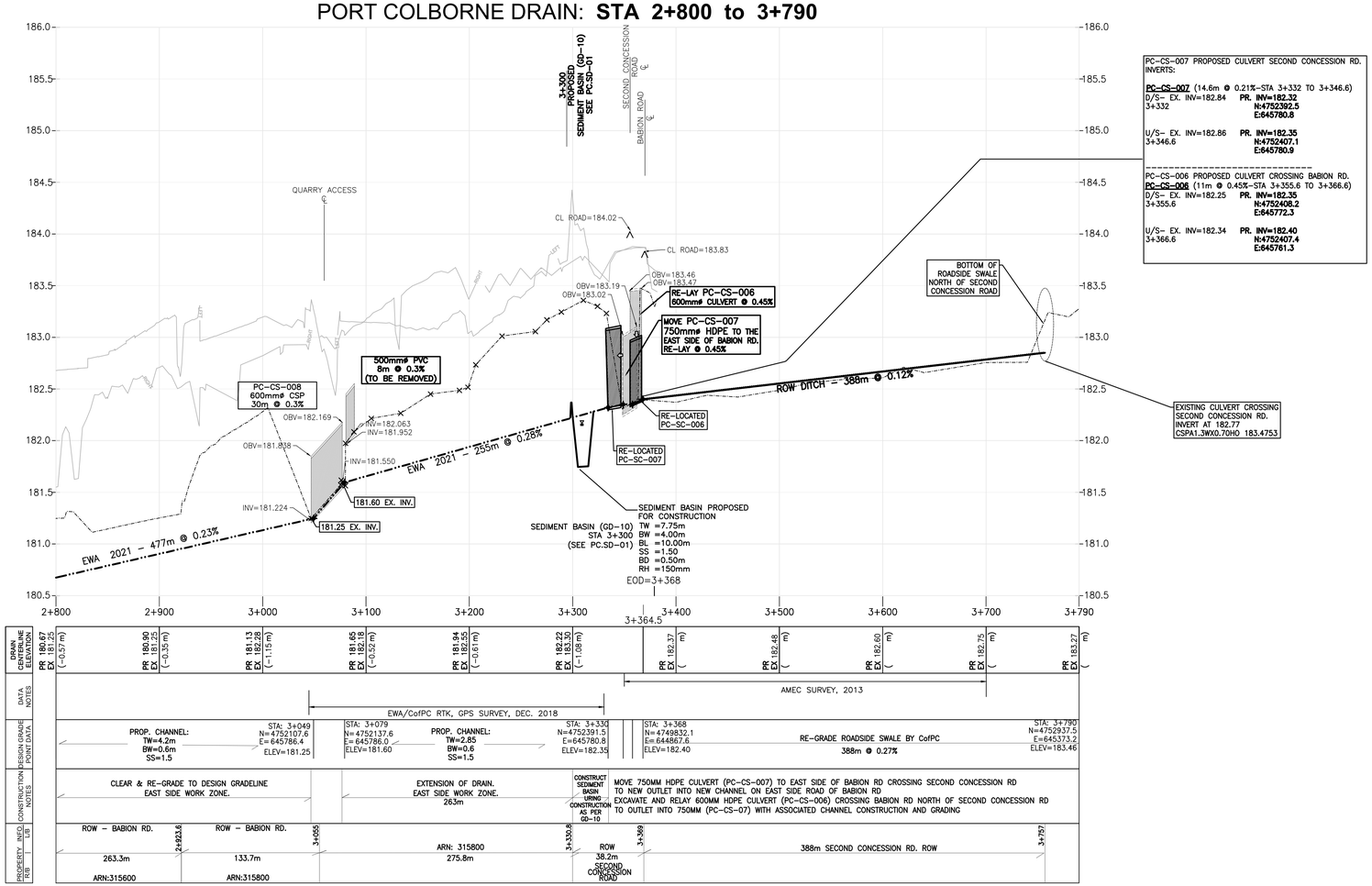
DESIGNED BY :	DATE :	SCALE :	
PCM	16-APRIL-21	1:2500	

PORT COLBORNE DRAIN: **STA 2+800 to 3+790**



PC-CS-007 PROPOSED CULVERT SECOND CONCESSION RD.
INVERTS:

PC-CS-007 (14.6m @ 0.21%–STA 3+332 TO 3+346.6)
D/S– EX. INV=182.84 **PR. INV=182.32**
3+332 **N:4752392.5**
E:645780.8

U/S– EX. INV=182.86 **PR. INV=182.35**
3+346.6 **N:4752407.1**
E:645780.9

PC-CS-006 PROPOSED CULVERT CROSSING BABION RD.
PC-CS-006 (11m @ 0.45%–STA 3+355.6 TO 3+366.6)
D/S– EX. INV=182.25 **PR. INV=182.35**
3+355.6 **N:4752408.2**
E:645772.3

U/S– EX. INV=182.34 **PR. INV=182.40**
3+366.6 **N:4752407.4**
E:645761.3

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LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN DRAIN GRADELINE–EWA, 2021
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
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	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

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PORT COLBORNE MUNICIPAL DRAIN
DRAIN PROFILE
STA 2+800 to 3+790

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

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AN EXPORT OF DESIGN POINTS IN NORTHING, EASTING AND ELEVATIONS IS AVAILABLE ON REQUEST.

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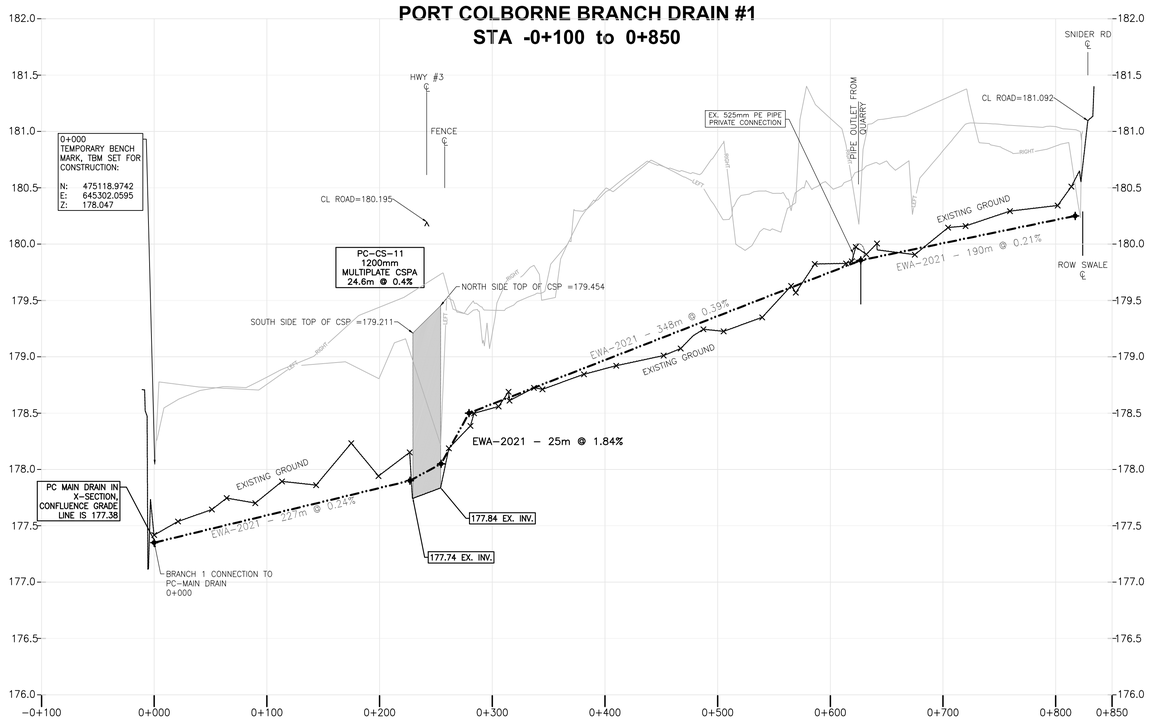
DESIGNED BY :	DATE :	SCALE :	
PCM	16–APRIL–21	1:2500	

PORT COLBORNE BRANCH DRAIN #1
STA -0+100 to 0+850



DRAIN CENTERLINE ELEVATION	PR EX (m)	PR 177.35 EX 177.52 (-0.17 m)	PR 177.59 EX 177.78 (-0.19 m)	PR 177.83 EX 177.95 (-0.12 m)	PR 178.58 EX 178.52 (0.06 m)	PR 178.97 EX 179.02 (-0.05 m)	PR 179.36 EX 179.22 (0.14 m)	PR 179.75 EX 179.96 (-0.21 m)	PR 180.01 EX 180.11 (-0.10 m)	PR 180.21 EX 180.34 (-0.13 m)	PR EX (m)
DATA NOTES	EWA/CofPC RTK-GPS SURVEY, DEC. 2018/ JAN.2021/ AMEC SURVEY, 2013										
DESIGN GRADE POINT DATA	STA: 0+000 N=4751118.5 E=645305.2 ELEV=177.35	EX. CHANNEL: TW=4.1m BW=0.8m SS=1.5	STA: 0+227 N=4751345.4 E=645304.3 ELEV=177.90	STA: 0+279 N=4751374.2 E=645303.2 ELEV=178.50	STA: 0+255 N=4751392.4 E=645313.6 ELEV=178.05	EX. CHANNEL: TW=4.2m BW=0.6m SS=1.5	STA: 0+627 N=4751620.8 E=645163.4 ELEV=179.86	EX. CHANNEL: TW=3.6m BW=0.6m SS=1.5	STA: 0+817 N=4751631.7 E=644971.7 ELEV=180.25		
CONSTRUCTION NOTES	CLEAR AND RE-GRADE TO PROPOSED GRADE LINE EAST SIDE WORK ZONE				EX. CHANNEL TO REMAIN AS-IS NORTH AND EAST SIDE FUTURE WORK ZONE.			CLEAR VEGETATION & RE-GRADE TO DESIGN GRADE LINE. NORTH SIDE WORK ZONE.			
PROPERTY INFO. RIB | LIB	ARN:410800 224.7m ARN:410710	0+224.7	ROW HWY#3	0+259.6	ARN:411500 253.1m	0+512.7	ARN:411000 57.9m	0+570.6	ARN:411500 247.8m	0+818.4	0+823.9 5.5m ROW-SNIDER ROAD

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LEGEND

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	EXISTING DITCH BOTTOM (SURVEYED)
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PORT COLBORNE BRANCH DRAIN #1
PROFILE
STA 0+000 to 0+824

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

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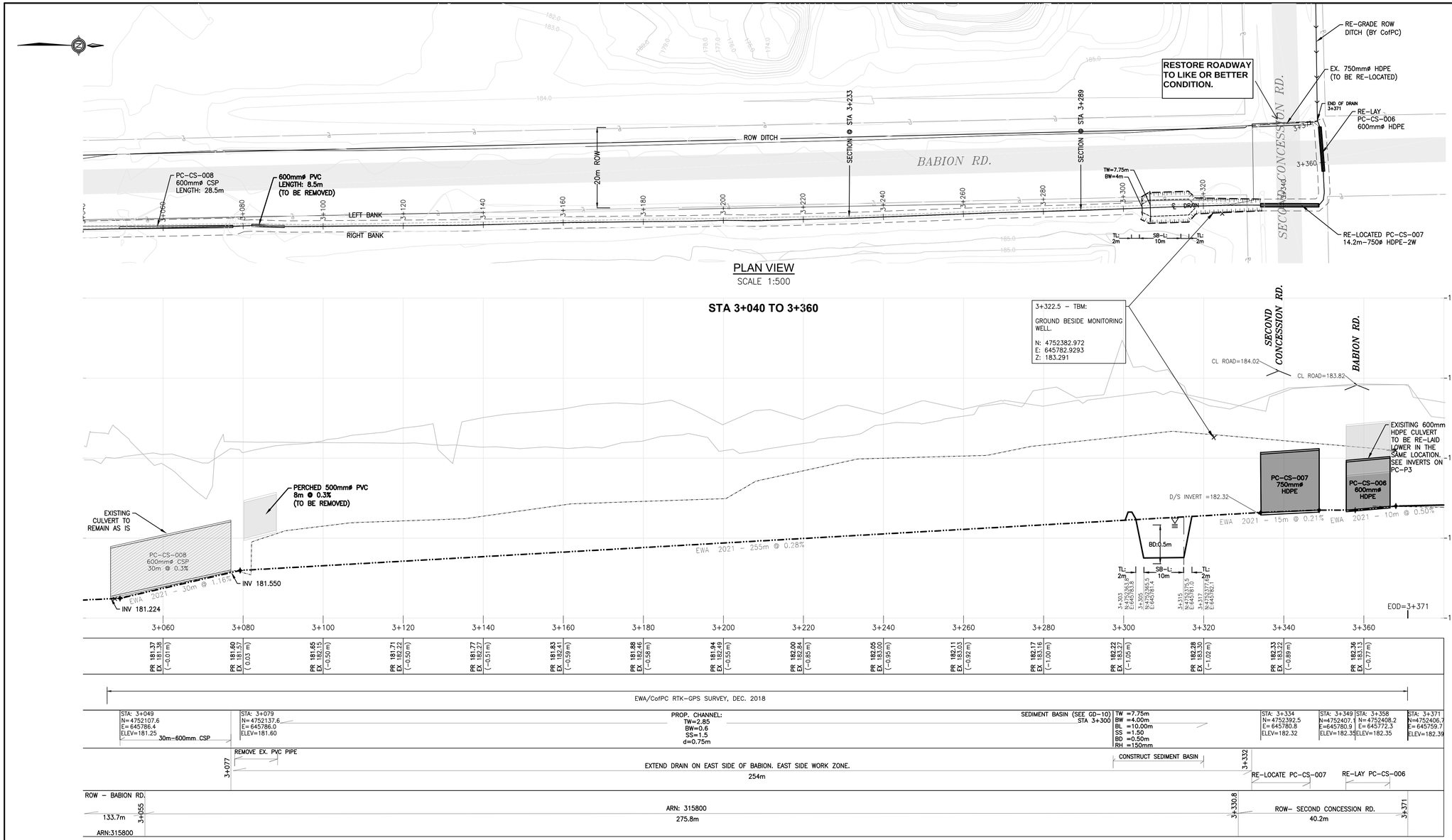
TJF	PCM	189999	PC.P4
DESIGNED BY : PCM	DATE : 16-APRIL-21	SCALE : 1:2500	

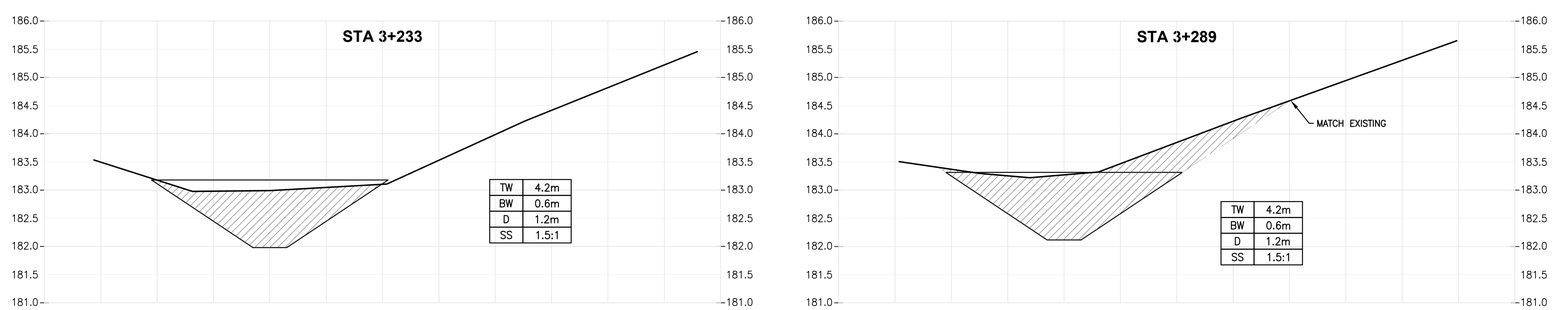


PLAN VIEW

SCALE 1:500

PROFILE VIEW

SCALE H=1:500, V=1:25



SECTION VIEWS

SCALE 1:50

NOTES:

1. DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED
2. CATCHMENT BOUNDARIES ARE BASED ON THE NPCA DIGITAL ELEVATION MODEL (DEM) 2010
3. SPECIFIC POINTS IN THE SURFACE ARE BASED ON THE FOLLOWING SURVEYS:
   - DRAIN CROSSINGS & SPOT CHANNELS AMEC SURVEY, 2013
   - AS CONSTRUCTED SURVEY BY CofPC, 2016 STATION 0+000–1+940
   - SUPPLEMENTARY SURVEY BY CofPC, 2018
   - WIEBE ENGINEERING SURVEY, 2008
   - WETLAND SURVEY BY CofPC RTK GPS, 2020
   - FORDING SURVEY BY CofPC RTK GPS, 2020
   - BRANCH #1 OUTLET SURVEY BY CofPC RTK GPS, 2020

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SPATIAL DATA:

DTM DATA FROM NIAGARA PENINSULA CONSERVATION AUTHORITY

- HORIZONTAL DATUM: UTM NAD83–CSRS ZONE 17N
- VERTICAL DATUM: CGVD28–1978
- ACCURACY: ABSOLUTE HORIZONTAL AND VERTICAL POSITIONAL ACCURACIES OF ±0.5m

LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2021
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

NO.	REVISION DESCRIPTION	DATE
2	ISSUED FOR REPORT	APRIL 16, 2021
1	ISSUED FOR BASELINE REPORT	MAY 2019

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

PORT COLBORNE MUNICIPAL DRAIN

PLAN & PROFILE – SPECIFIC DETAIL

STA 3+040 to 3+371 END OF DRAIN

THIS DRAWING IS PREPARED FOR PRINTING ON 610mm x 914mm PAPER FOR 1:2500 SCALE.
AN EXPORT OF DESIGN POINTS IN NORTHING, EASTING AND ELEVATIONS IS AVAILABLE ON REQUEST.

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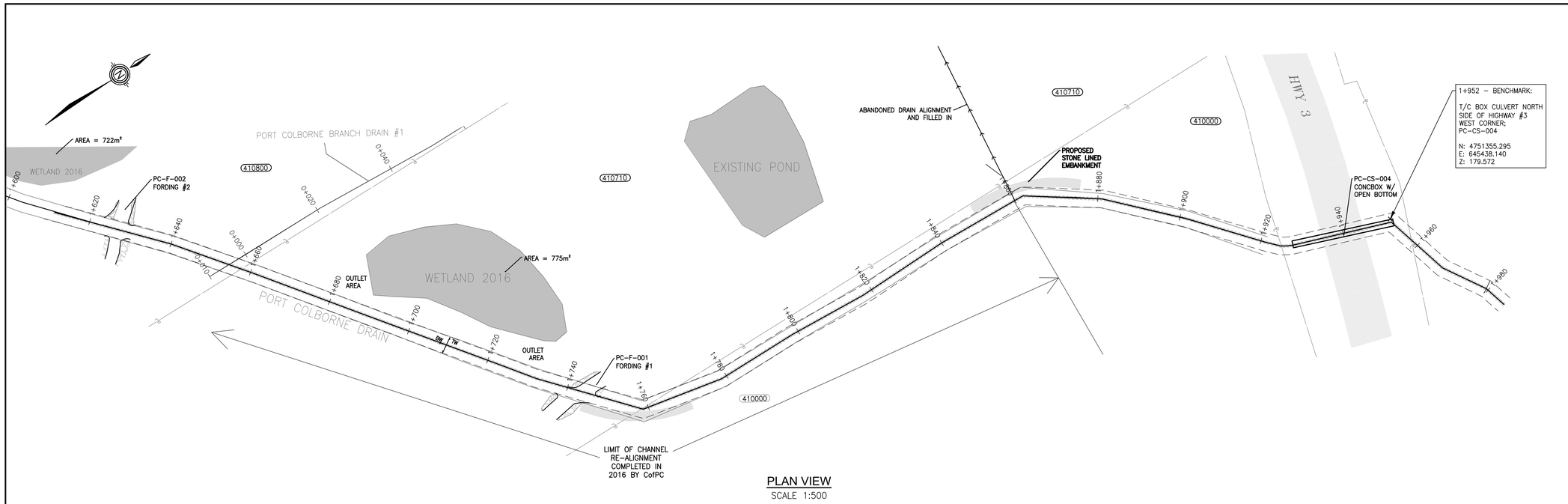
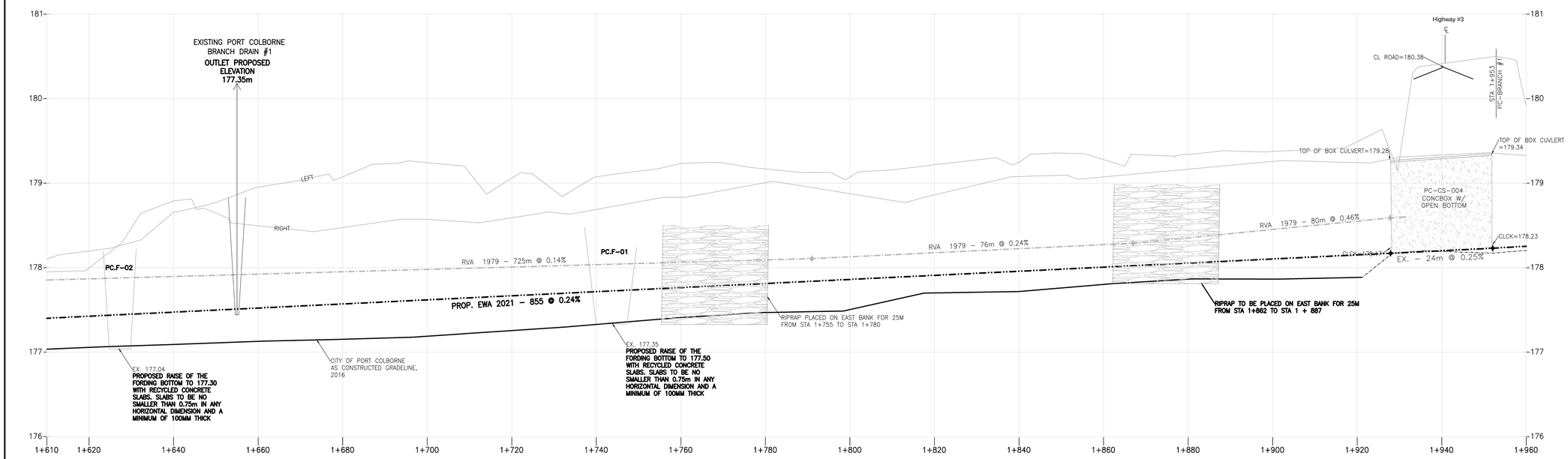
TJF	PCM	189999	PC.SD–01
DESIGNED BY :	DATE :	SCALE :	
PCM	16–APRIL–21	1:2500	



PLAN VIEW

SCALE 1:500



PROFILE VIEW

SCALE H=1:500, V=1:25

DRAIN CENTERLINE ELEVATIONS	DATA NOTES	DESIGN GRADE DESIGN DATA	CONSTRUCTION NOTES	PROPERTY INFO. R/B
PR 177.40 EX 177.03 (-0.37 m)	CofPC SURVEY, 2016	STA: 1+610 N=4751084.2 E=645272.1 ELEV=177.40	CLEAR & RE-GRADE TO DESIGN GRADELINE (COMPLETED IN 2016)	ARN:410710 230m
PR 177.42 EX 177.06 (-0.37 m)				
PR 177.47 EX 177.09 (-0.38 m)		TW=4.2 BW=0.6 SS=1.5	1+650 RE-ALIGN CHANNEL AND RESTORE (COMPLETED 2016) 270m	
PR 177.52 EX 177.13 (-0.39 m)				
PR 177.57 EX 177.15 (-0.42 m)				
PR 177.62 EX 177.19 (-0.43 m)				
PR 177.67 EX 177.26 (-0.41 m)				
PR 177.72 EX 177.33 (-0.39 m)				1+758.4
PR 177.76 EX 177.41 (-0.35 m)				ARN:410000 166.5m
PR 177.81 EX 177.47 (-0.34 m)				
PR 177.86 EX 177.50 (-0.36 m)				
PR 177.91 EX 177.70 (-0.21 m)				
PR 177.96 EX 177.72 (-0.24 m)				
PR 178.01 EX 177.80 (-0.20 m)			1+860 PLACE 25m OF RIPRAP TO THE ⅓ OF BANK HEIGHT ON OUTSIDE BANK OF THE DRAIN CLEAR & RE-GRADE TO DESIGN GRADELINE (COMPLETED IN 2016)	
PR 178.05 EX 177.86 (-0.19 m)				
PR 178.10 EX 177.86 (-0.24 m)				
PR 178.15 EX 177.88 (-0.27 m)	AMEC, 2013	STA: 1+928 N=4751332.5 E=645431.6 ELEV=178.17	1+920	1+924.9 ROW MAIN ST. EAST
PR 178.20 EX 178.19 (-0.01 m)		STA: 1+952 N=4751355.2 E=645439.1 ELEV=178.23		
PR 178.25 EX 178.20 (-0.05 m)				

NOTES:

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SPATIAL DATA:

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LEGEND

	EXISTING DITCH BOTTOM (NPCA DEM DATA)
	EXISTING DITCH BOTTOM (SURVEYED)
	HISTORICAL GRADELINE
	PROPOSED DRAIN GRADELINE–EWA, 2021
LEFT	LEFT BANK
RIGHT	RIGHT BANK
	EXISTING DRAIN SECTION
	EXISTING STRUCTURE DETAILS
	ASSUMED EXISTING STRUCTURE DETAILS
OBV=175.00	EXISTING DRAIN ELEVATION
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175.00 EX.	PROPOSED DRAIN ELEVATION (WHERE MATCHES EXISTING ELEVATION)
	DATA POINT FROM HISTORICAL DESIGN GRADELINE RVA, 1979

NO.	REVISION DESCRIPTION	DATE
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LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

PORT COLBORNE MUNICIPAL DRAIN
PLAN & PROFILE – SPECIFIC DETAIL
STA 1+640 to 1+960

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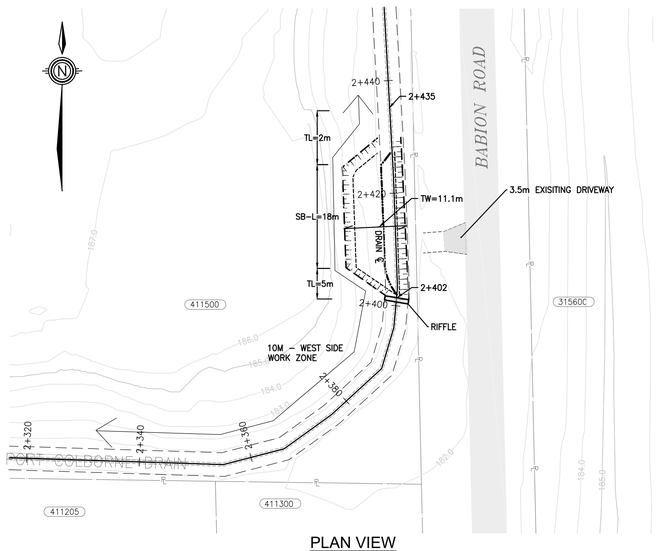
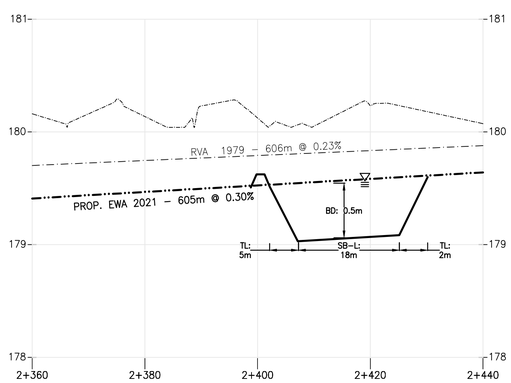
TJF	PCM	189999	PC.SD–02
DESIGNED BY :	DATE :	SCALE :	
PCM	16–APRIL–21		

PC.SB-02



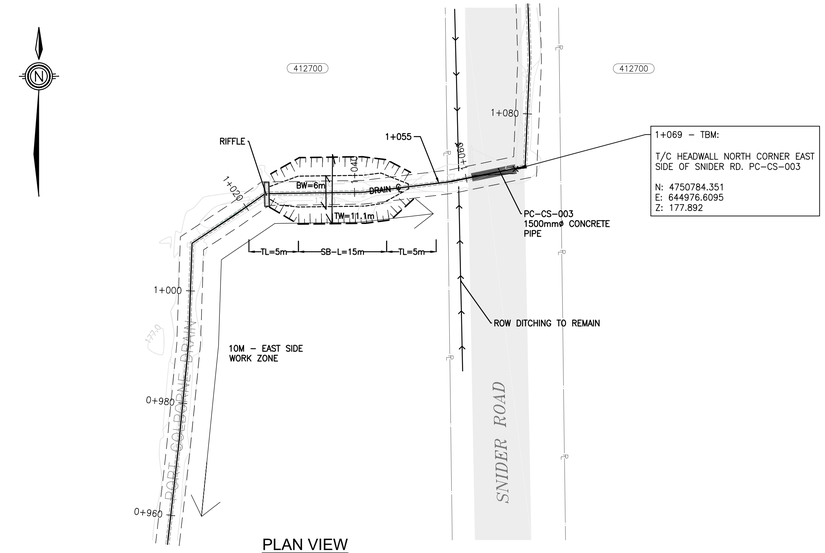
PLAN VIEW
SCALE 1:500



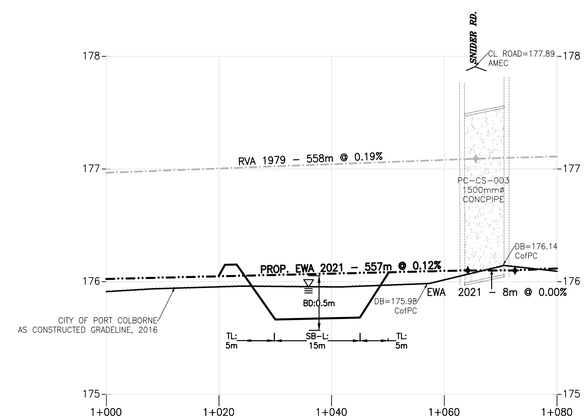
DRAIN CENTERLINE ELEVATION	PR 179.41 EX 180.15 (-0.75 m)	PR 179.47 EX 180.14 (-0.67 m)	PR 179.52 EX 180.12 (-0.60 m)	PR 179.58 EX 180.23 (-0.65 m)	PR 179.64 EX 180.07 (-0.43 m)
DATA NOTES	NPCA DEM DATA				
DESIGN GRADE POINT DATA	STA: 2+360 N=4751455.7 E=645748.9 ELEV=179.41	SEDIMENT BASIN (GD-10) STA 2+402	TW =11.1m BW =6.0m BL =15.0m SS =1.5 BD =0.5m RH =150mm	STA: 2+440 N=4751522.6 E=645773.3 ELEV=179.64	
CONSTRUCTION NOTES	2+402	CONSTRUCT SEDIMENT BASIN SPREAD SPOILS. 33m		2+435	
PROPERTY INFO. RIB / LIB	ARN:411500				

PROFILE VIEW
SCALE H=1:500, V=1:25

PC.SB-03



PLAN VIEW
SCALE 1:500



DRAIN CENTERLINE ELEVATION	PR 176.02 EX 175.91 (0.11 m)	PR 176.05 EX 175.95 (0.09 m)	PR 176.07 EX 175.95 (0.12 m)	PR 176.10 EX 176.02 (0.08 m)	PR 176.12 EX 176.09 (0.03 m)
DATA NOTES	NPCA DEM DATA			CofPC SURVEY, 2016	
DESIGN GRADE POINT DATA	SEDIMENT BASIN (GD-10) STA 1+020	TW =11.1m BW =4.0m BL =18.0m SS =1.5 BD =0.5m RH =150mm		STA: 1+064 N=4750783.4 E=644971.7 ELEV=176.10	STA: 1+073 N=4750787.1 E=644978.4 ELEV=176.10
CONSTRUCTION NOTES	1+020	CONSTRUCT SEDIMENT BASIN AS PER GD-10. SPREAD SPOILS. 35m		1+055	
PROPERTY INFO. RIB / LIB	ARN:412700			1+056.6	BABION RD. ROW

PROFILE VIEW
SCALE H=1:500, V=1:25

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	EXISTING STRUCTURE DETAILS
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LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

PORT COLBORNE MUNICIPAL DRAIN

SEDIMENT BASINS – SPECIFIC DETAIL
PC.SB–02 & PC.SB–03

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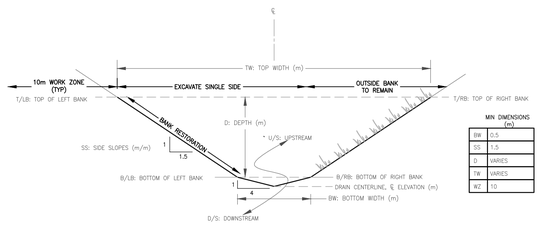
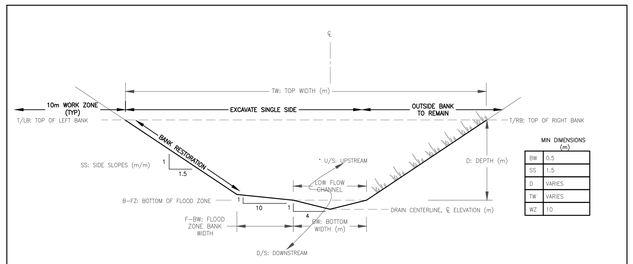
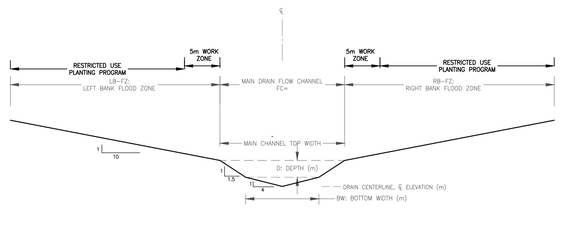
TJF	PCM	189999	PC.SD–03
DESIGNED BY :	DATE :	SCALE :	
PCM	16–APRIL–21		



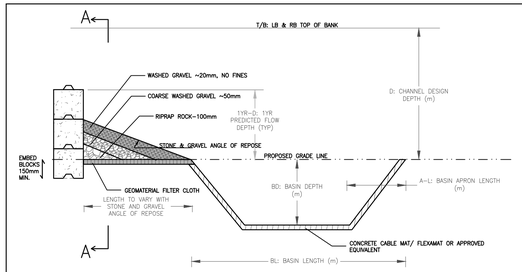
GD-01
DRAIN CHANNEL DIMENSIONS
NOT TO SCALE



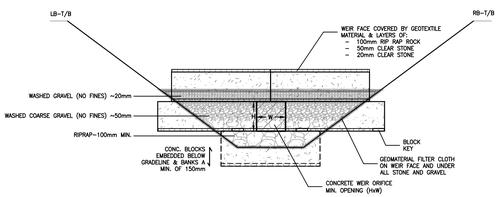
GD-02
FLOOD ZONE DRAIN CHANNEL DIMENSIONS
NOT TO SCALE



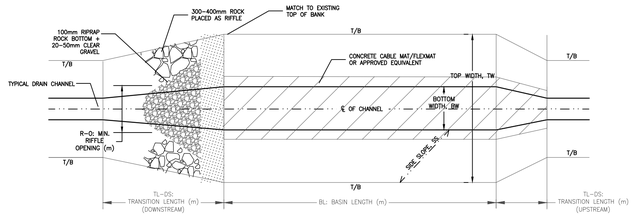
GD-03
NATURAL DRAIN CHANNEL DIMENSIONS
NOT TO SCALE



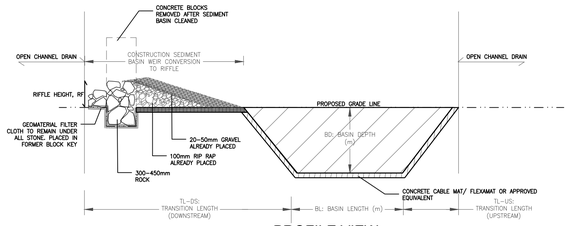
PROFILE VIEW
SEDIMENT BASIN - DURING CONSTRUCTION



SECTION A-A
SEDIMENT BASIN - DURING CONSTRUCTION

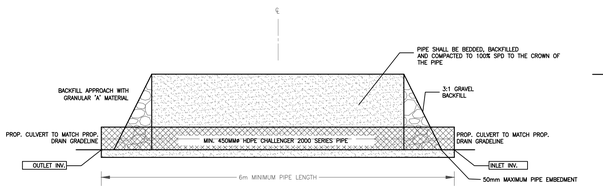


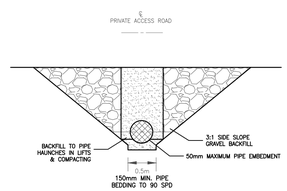
PLAN VIEW
SEDIMENT BASIN - POST-CONSTRUCTION

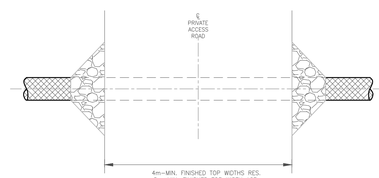


PROFILE VIEW
SEDIMENT BASIN - POST-CONSTRUCTION

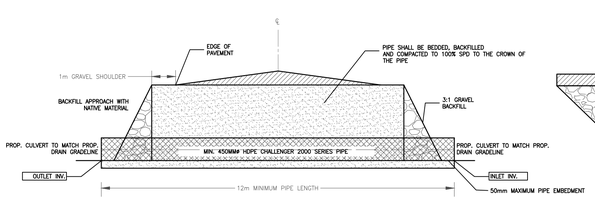
GD-10
SEDIMENT BASIN
NOT TO SCALE

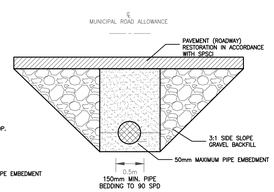


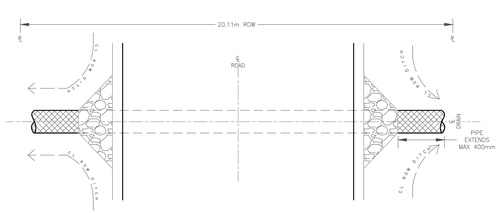




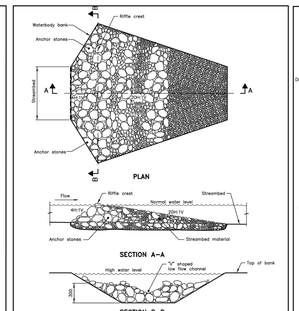
GD-05
TYPICAL PRIVATE ACCESS ROAD CIRCULAR CULVERT INSTALLATION
NOT TO SCALE





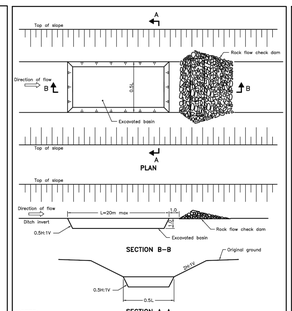


GD-06
TYPICAL MUNICIPAL ROW CULVERT INSTALLATION
NOT TO SCALE



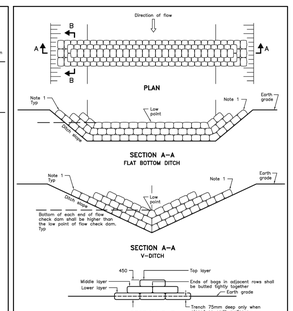
NOTES:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 0
RIFFLES ON STREAMBEDS		OPSD 222.050



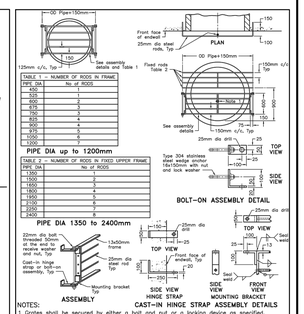
NOTES:
A Ditch cross-section upstream or downstream of sediment trap may be flat bottom or V-shaped. Flat bottom shown.
B This OPSD shall be read in conjuction with OPSD 219.210 or 219.211.
C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
SEDIMENT TRAP IN DITCH		OPSD 219.220



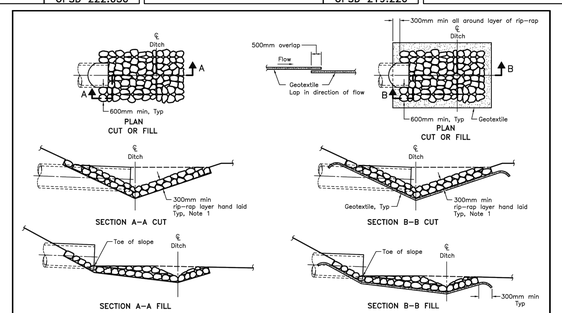
NOTES:
1 Sufficient sandbags shall be placed to prevent end scouring.
2 For sandbag dimensions see OPSD 219.150.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
SANDBAG FLOW CHECK DAM		OPSD 219.200



NOTES:
1 Grates shall be secured by either a bolt and nut or a locking device as specified.
A Metal surfaces shall be either painted with 2 coats of self priming abrasion resistant immersion grade epoxy or hot dip galvanized, as specified.
B Frame, hinge strap, mounting bracket, and steel rods shall be medium grade steel.
C All welding shall be according to CSA W59 and W47.1.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 2
GRATING FOR CONCRETE ENDWALL		OPSD 804.050



NOTES:
1 The thickness of the rip-rap layer shall be at least 1.5 times the rip-rap mean diameter.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
GENERAL RIP-RAP LAYOUT FOR SEWER AND CULVERT OUTLETS		OPSD 810.010

PORT COLBORNE MUNICIPAL DRAIN GENERAL DETAILS

LICENSED PROFESSIONAL ENGINEER
PAUL C MARSH
2021-04-16
PROVINCE OF ONTARIO

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DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	PC.GD
DESIGNED BY :	DATE :	SCALE :	
PCM	16-APRIL-21	N/A	

CITY OF PORT COLBORNE DRAINAGE CONTACTS:

APPOINTED DRAINAGE ENGINEER:
MR. PAUL C. MARSH, P.ENG.
EWA ENGINEERING INC.
84 MAIN STREET, UNIONVILLE, ON L3R 2E7
PCMARSH@EWAENG.COM
647.400.2824

DRAINAGE SUPERINTENDENT:
ALANA VANDER VEEN
DRAINAGE SUPERINTENDENT
1 KILLALY STREET WEST, PORT COLBORNE, ONTARIO L3K 6H1
TEL: 905-835-2901 EXT. 291
ALANA.VANDERVEEN@PORTCOLBORNE.CA

DEPARTMENT OF FISHERIES AND OCEANS:
867 LAKESHORE RD
BURLINGTON ON L7S 1A1
TELEPHONE: 905-336-4999
EMAIL: INFO@DFO-MPO.GC.CA

MINISTRY OF NATURAL RESOURCES AND FORESTRY
ELIZABETH REIMER
ADMINISTRATION BUILDING
4890 VICTORIA AVE N
VINELAND STATION, ON L0R 2E0
905-562-4147

NIAGARA PARKS CONSERVATION AUTHORITY, NPCA
DIRECTOR, WATERSHED MANAGEMENT
NIAGARA PENINSULA CONSERVATION AUTHORITY
250 THOROLD ROAD WEST, 3RD FLOOR
WELLAND, ON, L3C 3W2
P: 905-788-3135 EXT. 229
F: 905-788-1121
WWW.NPCA.CA

GENERAL NOTES:

THE CITY SHALL ARRANGE A PRE-CONSTRUCTION MEETING PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

ALL CONSTRUCTION MATERIALS AND METHODOLOGIES SHALL BE IN ACCORDANCE WITH:

- SPECIAL PROVISIONS – SUPPLEMENTARY GENERAL CONDITIONS (SPSGC)
- SPECIAL PROVISIONS – SUPPLEMENTARY CONTRACT ITEMS (SPSCI)
- NIAGARA PENINSULA STANDARD CONTRACT DOCUMENTS (NPSCD)
- ONTARIO PROVINCIAL STANDARDS FOR ROADS & PUBLIC WORKS (OPSS & OPSD)

AND ANY OTHER APPLICABLE STANDARDS THAT MAY APPLY.

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THESE MATERIALS AND METHODOLOGIES ARE STRICTLY ADHERED TO.

THE CITY OF PORT COLBORNE AND STAFF DISCLAIMS ANY LIABILITY AS TO THE CURRENT ACCURACY OF THE DRAWINGS PROVIDED. IN USING THE INFORMATION SHOWN OR CONTAINED ON THESE DRAWINGS, THE USER AGREES IMPLICITLY AND EXPLICITLY THAT THE CITY OF PORT COLBORNE AND STAFF SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES ARISING FOR THE USE OF SUCH INFORMATION. THE USER SHALL DO AN IN-FIELD VERIFICATION OF THE INFORMATION SHOWN ON OR CONTAINED WITHIN THESE DRAWINGS.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY APPROVALS WHICH MAY BE REQUIRED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE CONTRACT ADMINISTRATOR.

DIMENSIONING SHALL GOVERN OVER SCALED DIMENSIONS.

ANY WORKS COMPLETED IN SET-BACK AREAS, AND DISCHARGE TO CREEKS, STREAMS AND WATERCOURSES MAY BE SUBJECT TO FEDERAL AND PROVINCIAL APPROVALS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN SUCH APPROVALS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION IF REQUIRED FOR THE PROJECT.

PUBLIC UTILITIES:

THE CONTRACTOR SHALL NOTE THAT PUBLIC UTILITIES SHALL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING, HYDRO, GAS, BELL, CABLE AND FIBRE OPTIC.

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE NECESSARY CLEARANCES FROM SAID PUBLIC UTILITIES WHICH MAY BE IN DIRECT CONFLICT WITH THIS PROJECT.

ANY WORK REQUIRING EITHER RELOCATION/LOWERING OF SAID PUBLIC UTILITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE UTILITY, AND ANY WORKS WILL BE REQUIRED TO BE COMPLETE PRIOR TO THE INSTALLATION OF THE WORK.

ENVIRONMENTAL COMPLIANCE:

THE CONTRACTOR SHALL PREPARE AN ENVIRONMENTAL MANAGEMENT PLAN (EMP) PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. THE EMP WILL ADDRESS THE FOLLOWING MAJOR SUBJECT AREAS:

- EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION
- TREE PROTECTION & REMOVAL (SAR – BUTTERNUT)
- MINIMIZE AND/OR MITIGATION MEASURES FOR CONSTRUCTION IMPACTS ON SPECIES AND SPECIES HABITAT INCLUDING STOPPING CONSTRUCTION PROCEDURES.
- AGENCY CONTACTS – IDENTIFY RESOURCES & CONTACT INFO.

THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH SPECIES AT RISK (SAR) LEGISLATION. BY LAW, YOU MUST IMMEDIATELY:

- AVOID DRAINAGE WORK DURING REPRODUCTION AND REARING SEASONS
- PREVENT A SPECIES FROM ENTERING THE WORK AREA (E.G. PUTTING UP A FENCE)
- GIVE THE SPECIES ADEQUATE TIME TO LEAVE THE AREA, BEFORE STARTING WORK
- GET ADVICE/HELP BEFORE YOU MOVE IT
- PROTECT AREAS THAT ARE IMPORTANT TO THE SPECIES (E.G. SPAWNING AREAS)
- CONTROL EROSION AND SEDIMENT
- STABILIZE WATER BANKS IN AFFECTED AREAS

TURTLES:

- YOU CANNOT REDUCE THE AMOUNT OF WATER IN A DRAIN OR DITCH WHERE A TURTLE IS HIBERNATING.

ABREVATIONS USED:

- BD – SEDIMENT BASIN BOTTOM DEPTH (FROM GRADE LINE)
- BL – SEDIMENT BASIN LENGTH
- BOD – BEGINNING OF DRAIN
- BW – BOTTOM WIDTH OF CHANNEL
- CL – CENTRELINE OF ROAD, CHANNEL
- CLCK – CENTRELINE OF CREEK OR CHANNEL
- D – DEPTH
- D/S – DOWNSTREAM
- E – EASTING
- ELEV – ELEVATION
- EOD – END OF DRAIN
- EX. – EXISTING
- INV – INVERT
- LB – LEFT BANK, LOOKING UPSTREAM
- N – NORTHING
- PL – PROPERTY LINE
- PR. – PROPOSED
- RB – RIGHT BANK, LOOKING UPSTREAM
- RH – RIFFLE HEIGHT
- ROW – RIGHT OF WAY
- SB – SEDIMENT BASIN
- SS – SIDE SLOPE; RUN(m)/RISE, WHERE RISE=1m
- T/B – TOP OF BANK
- T/C – TOP OF CONCRETE
- TL – TRANSITION LENGTH
- TW – TOP WIDTH OF CHANNEL
- TYP – TYPICAL
- U/S – UPSTREAM
- WZ – WORK ZONE

OPSD REFERENCED DETAILS:

- OPSD 219.200
- OPSD 219.220
- OPSD 222.050
- OPSD 400.020
- OPSD 403.010
- OPSD 705.040
- OPSD 803.010

PORT COLBORNE
MUNICIPAL DRAIN
CONSTRUCTION NOTES

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DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
TJF	PCM	–	PC.CN
DESIGNED BY :	DATE :	SCALE :	
PCM	10-FEB-21	N/A	

Appendix B:

Cost Estimates & Assessment Tables

Port Colborne Municipal Drain

City of Port Colborne
Regional Municipality of Niagara

Section 78 Works under the Municipal Drainage Act.

Drainage Assessment	Costs	
Cover page		

Port Colborne Drain

Estimated Cost of Construction				
Port Colborne Drain	$33,332.00			
Port Colborne General Construction Costs	$8,278.52			
Port Colborne Contingency	$12,458.10			
Total - Estimated Cost of Construction		$54,068.62		
Previous Construction				
Port Colborne Channel Re-alignment by Rankin Construction - 2+580 to 3+045	$26,050.00			
Port Colborne Channel Re-Alignment - 1+660 to 1+860	$9,442.50			
Port Colborne Channel Re-Grading and Clearing - 0+010 to 1+500	$15,300.00			
Fording #1; ARN = 410710 - 1+740 to 1+750	$710.00			
Fording #2; ARN = 410800 - 1+630 to 1+640	$710.00			
Total - Previous Construction		$52,212.50		
Administration				
Engineering	$167,486.89			
Administration Cost Allocations	$10,723.47			
	$178,210.37			
Administration Costs allocated per Drain area				
Port Colborne Branch Drain #1	$8,052.75		4.5%	14.812
Port Colborne Drain	$170,157.61		95.5%	327.795
Total - Administration Port Colborne Drain		$170,157.61		
Drain Allowances				
Port Colborne Drain	$939.00			
		$939.00		
Forecasted Total Drain Costs		$277,377.74		

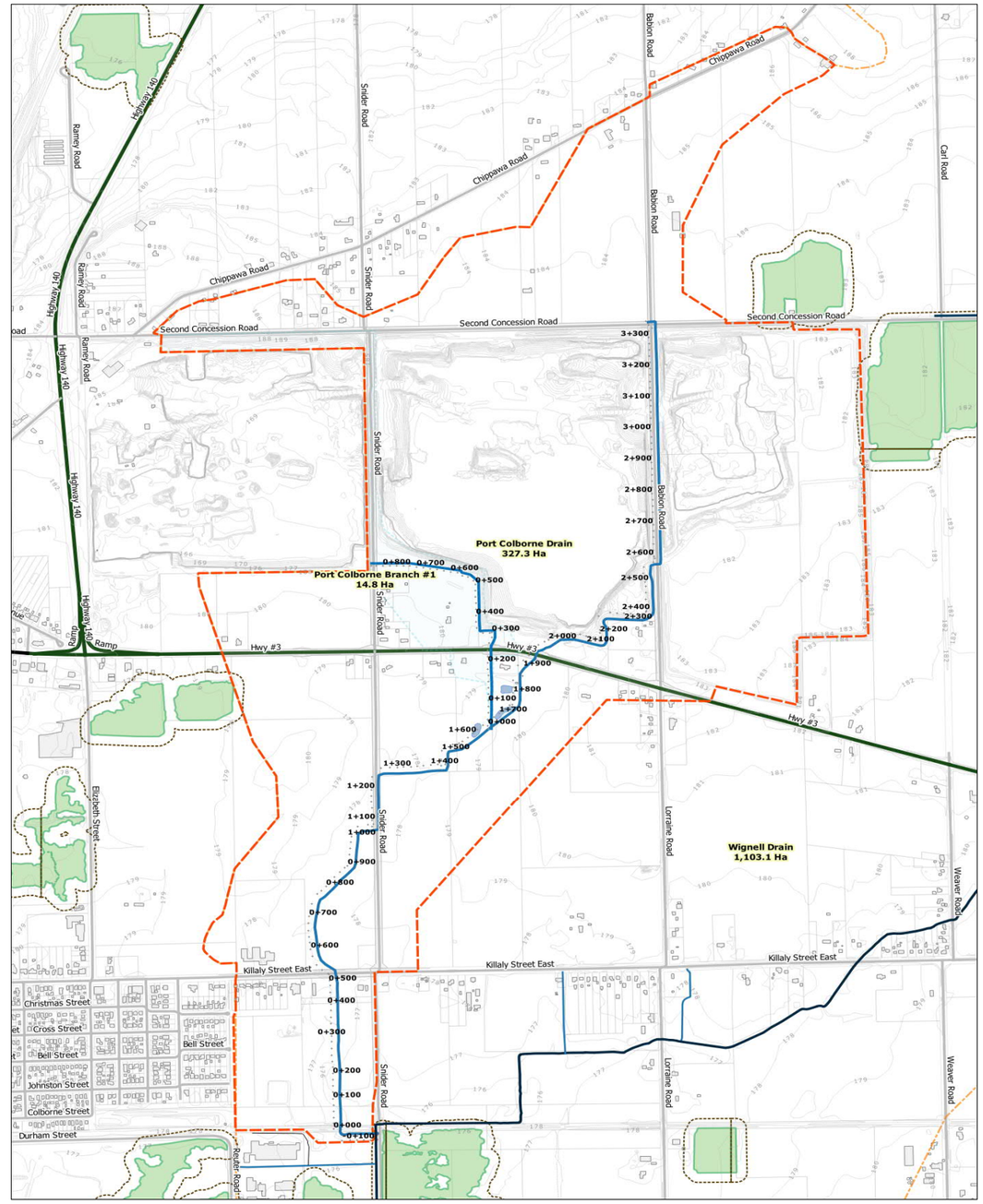
Assessment Schedule		
Benefit Assessment (Section 22)		
Private Lands	$763.50	
Total - Benefit Assessment (Section 22)		$763.50
Outlet Liability Assessment (Section 23)		
Private Lands		
Road Right of Way Lands	$225,489.15	
Total - Outlet Liability Assessment (Section 23)		$225,489.15
Special Benefit Assessment (Section 24)		
Port Colborne Drain	$5,600.09	
Total - Special Benefit Assessment (Section 24)		$5,600.09
Special Assessments (Section 26)		
City of Port Colborne	$40,448.80	
MINISTRY OF TRANSPORTATION ONTARIO	$5,076.19	
Total: Port Colborne Drain	$45,525.00	
Total - Special Assessments (Section 26)		$45,525.00
Forecasted Total Drain Assessments		$277,377.74

Port Colborne Branch Drain #1

Estimated Cost of Construction	$10,340.00	
Previous Construction	$0.00	
Administration	$8,052.75	
Drain Allowances	$277.62	
		$18,670.37
Benefit Assessment (Section 22)	$0.00	
Outlet Liability Assessment (Section 23)		
Private Lands	$3,096.49	
Road Right of Way Lands	$1,450.25	
		$4,546.73
Special Benefit Assessment (Section 24)	$0.00	
Special Assessments (Section 26)		
City of Port Colborne	$7,008.46	
MINISTRY OF TRANSPORTATION ONTARIO	$7,115.18	
Total: Section 26		$14,123.64
		$18,670.37

Prepared by: Paul C. Marsh, P.Eng. $296,048.11

Dated:



Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Proposed Construction - Cost Estimate

Port Colborne Branch #1

Cost ID:	Drain	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
PC1-01	Port Colborne Branch Drain #1.	0+000	0+227	Clear and re-grade to design grade to outlet from MTO culvert crossing	Work from West Side. Spread spoil material adjacent to bank.	linear	227	$20.00			$4,540.00	
PC1-00	MTO	0+227	0+255	Existing Drain Crossing CS-100 CSPA 1070 crossing Highway #3	No work required.						$0.00	
PC1-02	Port Colborne Branch Drain #1.	0+255	0+627	Spot maintenance as required		linear	372	$5.00			$1,860.00	
PC1-03	Port Colborne Branch Drain #1.	0+627	0+824	Clear and re-grade to design grade from culvert quarry outlet to Snider Road ROW.		linear	197	$20.00			$3,940.00	
PC1-04	Port Colborne Branch Drain #1.			ROW North South Grading by others, (CofPC)							$0.00	Excluded from Drain. Work to be completed for ROW by CofPC.

SubTotal for: Port Colborne Branch #1 $10,340.00

Port Colborne Drain

Cost ID:	Drain	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
PC-00	Port Colborne Drain		3364.5	Regrade the North Side of Second Concession Rd. Ditch to drain to the East into the re-laid culvert crossing Babion Rd.	This work is not part of the drain and excluded from the cost estimate. Work is the responsibility of the City of Port Colborne as part of the road funding program.		388				$0.00	Excluded from Drain. Work to be completed for ROW by CofPC.
PC-01	Port Colborne Drain	3+364.5	3+350	Re-lay existing 600mm HDPE double wall culvert lower and to drain to the East.		Each	14.5		1	$ 2,500.00	$2,500.00	
PC-02	Port Colborne Drain	3+350	3+331	Re-locate existing 750mm HDPE double wall culvert to the East side of Babion Road, crossing Second Concession Rd. and outletting to East Side Drain Channel.	Road is to be closed to re-lay culvert in both directions. Restore road to original condition or better. Includes re-grading of open channel between culverts.	linear & each	5	$ 25.00	1	$ 2,500.00	$2,625.00	
PC-03	Port Colborne Drain	3+303	3+318	Construct Sediment Basin PC-SB01 at STA 3+300 as per Design and GD-10.	Remove material and dispose by spreading on existing berm. Sediment Basin constructed prior to commencing work upstream.	Area, m2	10	$ 75.00	77.5	$ 40.00	$3,850.00	
PC-04	Port Colborne Drain	3+080	3+331	Construct Open Channel as per Design.	Spoil removed and spread on berm.		254	$ 35.00			$8,890.00	
PC-05	Port Colborne Drain	2+595	2+960	Existing PVC Pipe to be removed.	Remove and dispose.				1	$ 500.00	$500.00	

PC-08	Port Colborne Drain			Construct Sediment Basin PC-SB02 at STA 2+400 as per Design and GD-10.	Remove material and dispose by spreading adjacent to the drain. Sediment Basin constructed prior to commencing work upstream.	Area, m2	15	$ 75.00	199.8	$ 40.00	$9,117.00	
PC-09	Port Colborne Drain			Additional Erosion Protection	Protect bank from erosion south of Highway 3 crossing				1	$ 1,500.00	$1,500.00	
PC-10	Port Colborne Drain			Construct Sediment Basin PC-SB03 at STA 1+020 as per Design and GD-10.	Remove material and dispose by spreading adjacent to the drain. Sediment Basin constructed prior to commencing work upstream.	Area, m2	18	$ 75.00	FALSE	$ 40.00	$1,350.00	
PC-11	Port Colborne Drain	2+300	2+500	Clear vegetation from Drain Channel & Construct Channel as per Design			200	$ 15.00			$3,000.00	

SubTotal for: Cost ID: $33,332.00

Construction Mgmt Port Colborne Drain

Cost ID:	Drain	From STA	To STA	Work	Description	Linear, Each or Lump Sum Cost Type	Length	$/m	Qnty	/each	$	Notes
	Port Colborne Drain			Bonding							$1,310.16	
	Port Colborne Drain			Environmental Management - Compliance with legislative requirements	Preparation of Environmental Management Plan - Exclusions for SAR incidents that require on site expertise.	Lump Sum					$2,500.00	Program budget - actual cost will vary
	Port Colborne Drain			Erosion Control During construction - including conversion of sediment ponds to permanent drain features		Lump Sum					$3,500.00	Program budget - actual cost will vary
	Port Colborne Drain			Construction Management	Traffic Control, Layout, and all compliance items for submission on construction startup.						$1,528.52	Budget
	Port Colborne Drain			Tree Replacement Program	Where private trees are removed for the drain and in lieu of compensation a 3 for 1 tree planting program is available for owners.				15	50	$750.00	Program budget - actual cost will vary

SubTotal for: Construction Mgmt Port Colborne Drain $8,278.52

SubTotal for: Port Colborne Drain $51,950.52
Contigency Allowance, (20%) $12,458.10
Cost of Construction: $74,748.62

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Previous Costs - Works Already Completed

Port Colborne Branch #1	Status	From STA	To STA	Work	Description	$	Notes	Date Completed	Length	$/m	Qnty	/each
Channel Construction by appointment - Section XX		2+580	3+045	Port Colborne Channel Re-alignment by Rankin Construction		$26,050.00		27-Mar-17	465	$ 56.02		
	Completed	1+660	1+860	Port Colborne Channel Re-Alignment	Construct new alignment based on existing topography	$9,442.50	filling in Drain - $ 3,995.00 Erosion protection - $1,555.00 Misc. trucking & levelling - $3,892.50	2016	202	$ 46.75		
	Completed	0+010	1+500	Port Colborne Channel Re-Grading and Clearing	establish lower grade line	$15,300.00		2016	1490	$ 10.27		
	Completed	1+740	1+750	Fording #1; ARN = 410710	provides access to back of farm crossing new alignment	$710.00	Two crossings - $1,410.00	2016				
	Completed	1+630	1+640	Fording #2; ARN = 410800	provides access to back of farm crossing new alignment	$710.00	Two crossings - $1,410.00	2016				
						$52,212.50						

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Administration Costs

	Area, Ha	Area Ratio
Michener Drain Area	135	12%
Port Colborne Drain Area	327.8	30%
Wignell Drain Area	634.4	58%
	1097.2	100.0%

Port Colborne Drain	Costs	Cost Items	Sub-totals, $	Totals, $
ADMINISTRATION				
	Interim Financing Allowance	Debenture Interest - 20007 to 2017	$8,911.40	
		Total Amount: $29,827.92		$8,911.40
		Debenture Administrative Fee	$1,812.07	
		Total Fee Amount: $6,065.29		$1,812.07
	Legal and Permitting Fees			$0.00
	Expenses, where applicable			$0.00
	Applicable Taxes			$0.00
	Total - ADMINISTRATION			$10,723.47
ENGINEERING				
	Preliminary Design and Report			$0.00
	Survey, Design, Plans, Engineer's Report and Assessment Schedule (Wiebe)*1			
		Survey; ($8,342.93) portion allocated by area	$2,492.54	
		Report Preparation; ($92,511.44) portion allocated by area	$27,638.76	
	Survey, Design, Plans, Engineer's Report (AMEC)*2	3-561-33229; 2012 to 2014; $67,147.23 portion allocated by area	$20,060.94	
	Survey, Design, Plans, Engineer's Report and Assessment Schedule (EWA Engineering)			
		Design Services	$99,811.50	
		CofPC CAD Work - 2020	$11,483.16	
		CofPC CAD Work - 2021	$2,500.00	
	Sub-total: ENGINEERING			$163,986.89
	Tribunal Costs (not estimated and assumed to be zero)			$0.00
	Tendering, Contract Administration and Construction Inspection (estimated)			$3,500.00
	Total - ENGINEERING			$167,486.89
TOTAL ADMINISTRATION AND ENGINEERING				$178,210.37

*1 Wiebe Engineering was appointed as the Drainage Engineer by Council with an approved budget. The firm declared bankruptcy after having been paid for a portion of the work. This is the amount originaly paid and not allocated.

*2 AMEC was appointed as the Drainage Engineer by Council in 2013, assuming work already completd by Wiebe and with an approved budget. After having been paid for 70% of the work, the company refused to complete the project without additional funds being allocated. The contract was cancelled.
This is the fee for service paid for partially completed work on the drain.

Allowances

Port Colborne Branch #1

Owner	Legal Text		Roll No	Area, Ha	Land and Rights of Way: Length m	Top Width	Section 29 Area, Ha	$	Work Zone $	Damages: Length m	Section 30 Area, Ha	$	For Existing Private Drain converted: From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet: Section 32 Allowance $	Loss of Access: Section 33 Allowance $	Total of Allowances $
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801		271104000410710	0.107			0.0000	$0.00		224.7	0.225	$277.62				$0.00			$277.62
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801		271104000410800	1.084			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
Hellinga Jack Simon	CON 2 PT LOT 22		271104000411000	5.247			0.0000	$0.00			0.000	$0.00			0	$0.00			$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP		271104000411500	2.758			0.0000	$0.00			0.000	$0.00			0	$0.00			$0.00
Parsons David Scott	CON 2 PT LOT 22		271104000411600	0.413			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22		271104000411700	0.098			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
Yanni Bill	CON 2 PT LOT 22		271104000411900	0.418			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884		271104000412100	0.025			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23		271104000414000	3.308			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
				13.457															
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW		1.612			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
City of Port Colborne	Second Concession from Snider to Babion	ROW		0.022			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
City of Port Colborne	Second Concession W of Snider Rd.	ROW		0.501			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
MTO	Highway #3	ROW		0.547			0.0000	$0.00			0.000	$0.00				$0.00			$0.00
				2.682															
				16.139				$0.00	$0.00			$277.62				$0.00	$0.00	$0.00	$277.62

Port Colborne Drain

Owner	Legal Text	Roll No	Area, Ha	Land and Rights of Way: Length m	Top Width	Section 29 Allowance Area, Ha	$	$	Damages: Length m	Section 30 Allowance Area, Ha	$	For Existing Private Drain converted: From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet: Section 32 Allowance $	Loss of Access: Section 33 Allowance $	Total of Allowances $
Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642															$0.00
McLean William Richard Samue	CON 1 PT TWP LOT 23	271102001311300	0.095															$0.00
Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191															$0.00
Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190															$0.00
Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534															$0.00
Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868															$0.00
Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089															$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112	255.0	3.800	0.0969	$	-										$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583															$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726	0.0	0.000	0.0000	$	-										$0.00
City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431															$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373															$0.00
Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631															$0.00
1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463															$0.00
Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201															$0.00
1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779															$0.00
Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202															$0.00
Ed Christensen Roofing Limited	CON 1 PT LOT 23	271104000409400	0.190															$0.00
Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190															$0.00
Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190															$0.00
Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190															$0.00
Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106															$0.00
Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	100.000	3.800	0.0380	$	939.00	164.4	0.000	$0.00							$939.00
Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071															$0.00
Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107															$0.00
Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159															$0.00
Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168															$0.00
Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936															$0.00
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	202.000	0.000	0.0000	$	-	202	0.000	$0.00							$0.00
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199															$0.00
Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407															$0.00
Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711															$0.00
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411															$0.00
Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202															$0.00
Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208															$0.00
Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067															$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170															$0.00
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418															$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209															$0.00
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418															$0.00
Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209															$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209															$0.00

Owner	Legal Text	Roll No	Area, Ha	Land and Rights of Way: Length m	Top Width	Section 29 Allowance: Area, Ha	$	$	Damages: Length m	Section 30 Allowance: Area, Ha	$	For Existing Private Drain converted: From STN	To STN	Length, m	Section 31 Allowance $	Insufficient Outlet: Section 32 Allowance $	Loss of Access: Section 33 Allowance $	Total of Allowances $
Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357															$0.00
Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186															$0.00
Elite Capital P.C Developments Inc	CON 2 PT LOT 22	271104000412600	4.110															$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153															$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189															$0.00
Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363															$0.00
NCDSB	CON 2 PT LOT 23	271104000412900	5.947															$0.00
Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176															$0.00
Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182															$0.00
Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186															$0.00
Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085															$0.00
Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828			0.0000	$	-										$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409															$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115															$0.00
Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631															$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326															$0.00
Vale Canada Limited	CON 2 PT LOT 24	271104000414120	0.928															$0.00
2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291															$0.00
Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222															$0.00
Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079															$0.00
Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228															$0.00
Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085															$0.00
Fijavz David	CON 3 PT LOT 20	271104000506703	0.334															$0.00
Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212															$0.00
Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271															$0.00
Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011															$0.00
Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252															$0.00
Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050															$0.00
Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238															$0.00
Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613															$0.00
Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055															$0.00
Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388															$0.00
Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346															$0.00
Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082															$0.00
Stefan John	CON 3 PT LOT 23	271104000509400	0.016															$0.00
Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208															$0.00
Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417															$0.00
Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605															$0.00
Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597															$0.00
Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252															$0.00
Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103															$0.00
Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144															$0.00
Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347															$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099															$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029															$0.00
Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356															$0.00
McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191															$0.00
City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630															$0.00
			311.038				$	939.00	$ -		$ -				$ -	$ -	$ -	$ 939.00

City of Port Colborne	Sndier Rd from Hwy 3 to Killaly St E	ROW	2.033
City of Port Colborne	Second Concession W of Snider Rd.	ROW	1.221
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	2.005
City of Port Colborne	Snider Rd. N of Second Concession	ROW	0.071
City of Port Colborne	Second Concession Rd. E of Babion	ROW	0.595
City of Port Colborne	Babion Rd. from Hwy 3 to Second Concess	ROW	2.308
City of Port Colborne	Chippawa Road	ROW	0.559
City of Port Colborne	Babion Rd. from 2nd to Chippawa	ROW	1.432
City of Port Colborne	Snider Rd protion south of Killaly St E	ROW	0.353
City of Port Colborne	Killaly St East W of Snider Rd	ROW	0.901
City of Port Colborne	Killaly St E east of Snider	ROW	0.176
City of Port Colborne	Second Concession from Snider to Babion	ROW	1.645
MTO	Highway #3	ROW	3.281
			16.581
			327.619

Drain Allowance To $ 1,216.62

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Section 22: Assessed Benefit

Benefit assessments are based on the benefit value to each property and are not proportional to

Owner	Legal Text	ARN	Area Ha	Abutting Length m	BENEFIT ASSESSMENT DIRECT	BENEFIT ASSESSMENT ABUT	TOTAL BENEFIT
City of Port Colborne - Lands Assessed							
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	0.107	224.7			$0.00
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	1.084	224.7			$0.00
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.247	57.9			$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	2.758	500.9			$0.00
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.413				$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.098				$0.00
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418				$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.025				$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.308				$0.00
Sub-Total (Lands)			13.457				
Roads							
City of Port Colborne	Snider Rd. from Hwy 3 to Second Con	ROW	1.612				$0.00
City of Port Colborne	Second Concession from Snider to Bal	ROW	0.022				$0.00
City of Port Colborne	Second Concession W of Snider Rd.	ROW	0.501				$0.00
MTO	Highway #3	ROW	0.547	34.9			$0.00
Sub-Total (Roads)			2.682				
			16.139				

Owner	Legal Text	Roll No	Area, Ha	Abutting Length m	BENEFIT ASSESSMENT DIRECT	BENEFIT ASSESSMENT ABUT	TOTAL BENEFIT
City of Port Colborne - Lands Assessed							
Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642			$0	$0.00
McLean William Richard Samue	CON 1 PT TWP LOT 23	271102001311300	0.095			$0	$0.00
Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191			$0	$0.00
Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190			$0	$0.00
Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534			$0	$0.00
Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868			$0	$0.00
Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089			$0	$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112			$0	$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583			$0	$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726			$0	$0.00
City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431			$0	$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373			$0	$0.00
Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631			$0	$0.00
1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463			$0	$0.00
Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201			$0	$0.00
1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779			$0	$0.00
Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202			$0	$0.00
Ed Christensen Roofing Limited	CON 1 PT LOT 23	271104000409400	0.190			$0	$0.00
Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190			$0	$0.00
Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190			$0	$0.00
Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190			$0	$0.00
Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106			$0	$0.00
Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	102.2		$256	$255.50
Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071			$0	$0.00
Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107			$0	$0.00
Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159			$0	$0.00
Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168			$0	$0.00
Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936			$0	$0.00
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	203.2		$508	$508.00
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199			$0	$0.00
Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407			$0	$0.00
Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711			$0	$0.00
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411			$0	$0.00
Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202			$0	$0.00
Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208			$0	$0.00
Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067			$0	$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170			$0	$0.00

Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418				$0	$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209				$0	$0.00
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418				$0	$0.00
Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209				$0	$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209				$0	$0.00
Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357				$0	$0.00
Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186				$0	$0.00
Elite Capital P.C Developments Inc	CON 2 PT LOT 22	271104000412600	4.110				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363				$0	$0.00
NCDSB	CON 2 PT LOT 23	271104000412900	5.947				$0	$0.00
Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176				$0	$0.00
Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182				$0	$0.00
Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186				$0	$0.00
Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085				$0	$0.00
Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631				$0	$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326				$0	$0.00
Vale Canada Limited	CON 2 PT LOT 24	271104000414120	0.928				$0	$0.00
2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291				$0	$0.00
Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222				$0	$0.00
Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079				$0	$0.00
Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228				$0	$0.00
Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085				$0	$0.00
Fijavz David	CON 3 PT LOT 20	271104000506703	0.334				$0	$0.00
Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212				$0	$0.00
Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271				$0	$0.00
Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011				$0	$0.00
Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252				$0	$0.00
Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050				$0	$0.00
Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238				$0	$0.00
Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613				$0	$0.00
Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055				$0	$0.00
Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388				$0	$0.00
Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346				$0	$0.00
Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082				$0	$0.00
Stefan John	CON 3 PT LOT 23	271104000509400	0.016				$0	$0.00
Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208				$0	$0.00
Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417				$0	$0.00
Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605				$0	$0.00
Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597				$0	$0.00
Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252				$0	$0.00
Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103				$0	$0.00
Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144				$0	$0.00
Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347				$0	$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099				$0	$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029				$0	$0.00
Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356				$0	$0.00
McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191				$0	$0.00
City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630				$0	$0.00
			311.038					
City of Port Colborne	Sndier Rd from Hwy 3 to Killaly St E	ROW	2.033				$0	$0.00
City of Port Colborne	Second Concession W of Snider Rd.	ROW	1.221				$0	$0.00
City of Port Colborne	Snider Rd. from Hwy 3 to Second Con	ROW	2.005				$0	$0.00
City of Port Colborne	Snider Rd. N of Second Concession	ROW	0.071				$0	$0.00
City of Port Colborne	Second Concession Rd. E of Babion	ROW	0.595				$0	$0.00
City of Port Colborne	Babion Rd. from Hwy 3 to Second Con	ROW	2.308				$0	$0.00
City of Port Colborne	Chippawa Road	ROW	0.559				$0	$0.00
City of Port Colborne	Babion Rd. from 2nd to Chippawa	ROW	1.432				$0	$0.00
City of Port Colborne	Snider Rd protion south of Killaly St E	ROW	0.353				$0	$0.00
City of Port Colborne	Killaly St East W of Snider Rd	ROW	0.901				$0	$0.00
City of Port Colborne	Killaly St E east of Snider	ROW	0.176				$0	$0.00
City of Port Colborne	Second Concession from Snider to Bal	ROW	1.645				$0	$0.00
MTO	Highway #3	ROW	3.281				$0	$0.00
			16.581					
							$	763.50

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Section 23 Outlet Benefit / Outlet Liability
Port Colborne Branch #1

$4,546.73

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio	
City of Port Colborne - Lands Assessed							
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	0.107	30	0.21	0.0060	$27.28
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	1.084	20	1.41	0.0405	$184.32
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.247	30	10.27	0.2945	$1,338.84
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	2.758	20	3.60	0.1032	$469.10
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.413	30	0.81	0.0232	$105.40
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.098	20	0.13	0.0037	$16.60
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	30	0.82	0.0235	$106.65
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.025	20	0.03	0.0009	$4.25
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.308	30	6.47	0.1856	$844.05
		Sub-Total (Lands)	13.457				
Roads							
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	1.612	45	4.73	0.1357	$616.77
City of Port Colborne	Second Concession from Snider to Babion	ROW	0.022	86	0.12	0.0035	$16.13
City of Port Colborne	Second Concession W of Snider Rd.	ROW	0.501	87	2.84	0.0815	$370.35
MTO	Highway #3	ROW	0.547	96	3.43	0.0983	$446.99
		Sub-Total (Roads)	2.682				
	Total Assessments for City of Port Colborne:		16.139		34.88	1.00	$4,546.73

Port Colborne Drain

$225,489.15

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio	
Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642	45	4.82	0.0063	$1,413.83
McLean William Richard Samue	CON 1 PT TWP LOT 23	271102001311300	0.095	25	0.16	0.0002	$45.49
Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191	25	0.31	0.0004	$91.13
Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190	25	0.31	0.0004	$91.08
Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534	30	1.05	0.0014	$306.76
Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868	35	70.48	0.0917	$20,671.95
Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089	25	0.14	0.0002	$42.53
Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112	35	80.17	0.1043	$23,514.47
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583	30	1.14	0.0015	$334.83
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726	35	15.36	0.0200	$4,504.18
City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431	35	5.55	0.0072	$1,628.23

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio	
Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373	32	0.78	0.0010	$228.20
Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631	25	1.03	0.0013	$301.99
1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463	35	1.06	0.0014	$310.00
Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201	25	0.33	0.0004	$96.15
1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779	35	1.78	0.0023	$521.36
Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202	25	0.33	0.0004	$96.58
Ed Christensen Roofing Limited	CON 1 PT LOT 23	271104000409400	0.190	25	0.31	0.0004	$90.98
Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190	25	0.31	0.0004	$90.98
Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190	25	0.31	0.0004	$90.98
Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190	25	0.31	0.0004	$90.98
Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106	25	6.70	0.0087	$1,963.89
Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	35	11.33	0.0147	$3,323.44
Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071	25	0.12	0.0001	$33.82
Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107	25	0.17	0.0002	$51.04
Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159	25	0.26	0.0003	$76.06
Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168	25	0.27	0.0004	$80.12
Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936	25	3.16	0.0041	$926.05
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	35	6.62	0.0086	$1,941.39
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199	35	9.59	0.0125	$2,811.99
Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407	25	0.66	0.0009	$194.50
Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711	35	17.61	0.0229	$5,164.30
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411	25	8.83	0.0115	$2,588.33
Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202	25	1.96	0.0025	$574.94
Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208	25	1.97	0.0026	$578.00
Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067	25	0.11	0.0001	$31.95
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170	37	176.62	0.2297	$51,802.13
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418	25	0.68	0.0009	$199.95
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209	25	0.34	0.0004	$100.02
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418	25	0.68	0.0009	$199.95
Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209	25	0.34	0.0004	$100.07
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209	25	0.34	0.0004	$100.02
Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357	25	0.58	0.0008	$170.72
Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186	25	0.30	0.0004	$88.88
Elite Capital P.C Developments Inc	CON 2 PT LOT 22	271104000412600	4.110	30	8.04	0.0105	$2,359.42
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153	30	19.87	0.0258	$5,827.80
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189	30	43.43	0.0565	$12,736.89
Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363	30	0.71	0.0009	$208.54
NCDSB	CON 2 PT LOT 23	271104000412900	5.947	30	11.64	0.0151	$3,413.79
Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176	25	0.29	0.0004	$84.14
Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182	30	0.36	0.0005	$104.19
Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186	25	0.30	0.0004	$88.88
Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085	25	0.14	0.0002	$40.85
Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828	25	1.35	0.0018	$396.13
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409	25	12.08	0.0157	$3,544.32

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio	
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115	35	23.10	0.0300	$6,774.19
Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631	35	1.44	0.0019	$422.51
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326	30	6.51	0.0085	$1,909.44
Vale Canada Limited	CON 2 PT LOT 24	271104000414120	0.928	35	2.12	0.0028	$621.68
2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291	25	2.11	0.0027	$617.56
Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222	25	0.36	0.0005	$106.05
Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079	25	0.13	0.0002	$37.89
Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228	30	8.27	0.0108	$2,426.75
Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085	25	0.14	0.0002	$40.80
Fijavz David	CON 3 PT LOT 20	271104000506703	0.334	25	0.54	0.0007	$159.58
Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212	25	0.34	0.0004	$101.17
Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271	25	0.44	0.0006	$129.44
Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011	35	25.14	0.0327	$7,373.83
Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252	35	34.83	0.0453	$10,214.09
Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050	35	6.97	0.0091	$2,042.84
Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238	25	2.02	0.0026	$592.40
Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613	35	17.38	0.0226	$5,098.67
Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055	35	2.41	0.0031	$706.46
Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388	25	0.63	0.0008	$185.46
Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346	25	0.56	0.0007	$165.65
Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082	25	0.13	0.0002	$39.37
Stefan John	CON 3 PT LOT 23	271104000509400	0.016	25	0.03	0.0000	$7.85
Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208	26	0.35	0.0005	$103.68
Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417	25	0.68	0.0009	$199.52
Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605	25	0.99	0.0013	$289.50
Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597	25	0.97	0.0013	$285.72
Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252	25	3.67	0.0048	$1,077.11
Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103	25	0.17	0.0002	$49.17
Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144	25	0.24	0.0003	$68.98
Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347	25	0.57	0.0007	$166.13
Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099	25	0.16	0.0002	$47.21
Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029	25	0.05	0.0001	$13.78
Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356	25	0.58	0.0008	$170.06
McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191	25	0.31	0.0004	$91.41
City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630	35	1.44	0.0019	$421.71
			311.038				
Roads							
City of Port Colborne	Sndier Rd from Hwy 3 to Killaly St E	ROW	2.033	85	11.27	0.0147	$3,306.62
City of Port Colborne	Second Concession W of Snider Rd.	ROW	1.221	75	5.97	0.0078	$1,752.36
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	2.005	75	9.81	0.0128	$2,876.95
City of Port Colborne	Snider Rd. N of Second Concession	ROW	0.071	85	0.40	0.0005	$116.22
City of Port Colborne	Second Concession Rd. E of Babion	ROW	0.595	85	3.30	0.0043	$968.19
City of Port Colborne	Babion Rd. from Hwy 3 to Second Concess	ROW	2.308	85	12.80	0.0166	$3,753.26
City of Port Colborne	Chippawa Road	ROW	0.559	80	2.92	0.0038	$854.95

Owner	Legal Text	Roll No	Area, Ha	Runoff Factor 'C'	QRF	QRF Ratio	
City of Port Colborne	Babion Rd. from 2nd to Chippawa	ROW	1.432	85	7.94	0.0103	$2,329.34
City of Port Colborne	Snider Rd protion south of Killaly St E	ROW	0.353	80	1.84	0.0024	$541.04
City of Port Colborne	Killaly St East W of Snider Rd	ROW	0.901	85	4.99	0.0065	$1,464.94
City of Port Colborne	Killaly St E east of Snider	ROW	0.176	85	0.98	0.0013	$286.73
City of Port Colborne	Second Concession from Snider to Babion	ROW	1.645	85	9.12	0.0119	$2,675.64
MTO	Highway #3	ROW	3.281	85	18.19	0.0237	$5,336.02
			16.581				
			327.619		768.83	1.00	$225,489.15

Port Colborne Municipal Drain
City of Port Colborne
Regional Municipality of Niagara

Section 24 Special Benefit
Port Colborne Branch #1

Owner	Legal Text	Roll No	Area, Ha	Length	Crossings $/each	Channel Works	Culvert Works	Erosion Control	Other Works	Construction Sub-Total	Construction Total	Portion of Eng & Admin	TOTAL Special Benefit
							Assessments						
City of Port Colborne - Lands Assessed										$0.00	$0.00		$0.00
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	0.107							$0.00	$0.00		$0.00
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	1.084							$0.00	$0.00		$0.00
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.247							$0.00	$0.00		$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	2.758							$0.00	$0.00		$0.00
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.413							$0.00	$0.00		$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.098							$0.00	$0.00		$0.00
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418							$0.00	$0.00		$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.025							$0.00	$0.00		$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.308							$0.00	$0.00		$0.00
		Sub-Total (Lands)	13.457										$0.00
Roads													
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	1.612							$0.00	$0.00		$0.00
City of Port Colborne	Second Concession from Snider to Babion	ROW	0.022							$0.00	$0.00		$0.00
City of Port Colborne	Second Concession W of Snider Rd.	ROW	0.501							$0.00	$0.00		$0.00
MTO	Highway #3	ROW	0.547							$0.00	$0.00		$0.00
		Sub-Total (Roads)	2.682										$0.00
	Total Assessments for City of Port Colborne:		16.139										$0.00

Port Colborne Drain

Owner	Legal Text	Roll No	Area, Ha	Length	Crossings $/each	Channel Works	Culvert Works	Erosion Control	Other Works	Construction Sub-Total		Construction Total	Portion of Eng & Admin	TOTAL Special Benefit
							Assessments							
Vale Canada Limited	HUMBERSTONE CON 1 PT LOTS 24	271102000718000	1.642							$0.00		$0.00		$0.00
McLean William Richard Sam	CON 1 PT TWP LOT 23	271102001311300	0.095							$0.00		$0.00		$0.00
Tomiuck Jonas	CON 1 PT TWP LOT 23	271102001311400	0.191							$0.00		$0.00		$0.00
Scott Gregory George	CON 1 PT TWP LOT 23	271102001311500	0.190							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 24	271102001312000	0.534							$0.00		$0.00		$0.00
Port Colborne Quarries Inc	CON 2 PT LOTS 19 AND 20 RP	271104000315600	30.868							$0.00		$0.00		$0.00
Phillips Richard Gordon	CON 2 PT LOT 20 RP 59R-1546	271104000315702	0.089							$0.00		$0.00		$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 19 PT LOT 20	271104000315800	35.112							$0.00		$0.00		$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	0.583	105.6						$0.00		$0.00		$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408700	6.726	329.1						$0.00		$0.00		$0.00
City of Port Colborne	CON 1 PT LOTS 23, 24 RP	271104000408715	2.431	61						$0.00		$0.00		$0.00
Schlenger Uszer	CON 1 PT LOT 23	271104000408800	0.373	18.2						$0.00		$0.00		$0.00
Coccagna Anthony	CON 1 PT LOT 23	271104000408900	0.631	60.9						$0.00		$0.00		$0.00
1346618 Ontario Ltd	CON 1 PT LOT 23	271104000409000	0.463	54.9						$0.00		$0.00		$0.00
Ostric Milan	CON 1 PT LOT 23 RP 59R5797	271104000409100	0.201							$0.00		$0.00		$0.00
1108904 Ontario Limited	CON 1 PT LOT 23 PT LOT 24	271104000409200	0.779							$0.00		$0.00		$0.00
Favero Lidia	CON 1 PT LOT 23	271104000409300	0.202							$0.00		$0.00		$0.00
Ed Christensen Roofing Limit	CON 1 PT LOT 23	271104000409400	0.190							$0.00		$0.00		$0.00
Sauder William Edward	HUMBERSTONE CON 1 PT LOT 23	271104000409500	0.190							$0.00		$0.00		$0.00
Stenson Ian John	CON 1 PT LOT 23	271104000409600	0.190							$0.00		$0.00		$0.00
Polverari Giuseppe	CON 1 PT LOT 23	271104000409700	0.190							$0.00		$0.00		$0.00
Vale Canada Limited	CON 1 PT LOT 23	271104000409800	4.106							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 21 RP59R3588	271104000410000	4.963	166.5				$ 187.50		$187.50		$187.50		$187.50
Huffman John Wayne	CON 2 PT LOT 21	271104000410400	0.071							$0.00		$0.00		$0.00
Young Tammy Lynn	CON 2 PT LOT 21	271104000410500	0.107							$0.00		$0.00		$0.00

Port Colborne Drain

Owner	Legal Text	Roll No	Area, Ha	Length	Crossings $/each	Channel Works	Culvert Works	Erosion Control	Other Works	Construction Sub-Total		Construction Total	Portion of Eng & Admin	TOTAL Special Benefit
							Assessments							
Vollick Ronald Christopher	CON 2 PT LOT 21	271104000410600	0.159							$0.00		$0.00		$0.00
Citrigno Angela	CON 2 PT LOT 21	271104000410700	0.168							$0.00		$0.00		$0.00
Stark Raymond	CON 2 PT LOT 21 RP 59R4333	271104000410705	1.936							$0.00		$0.00		$0.00
Konc John Andrew	CON 2 PT LOT 22 RP 59R4801	271104000410710	2.899	100.8	$ 710.00	$ 4,702.59	$ 355.00			$5,057.59		$5,057.59		$5,057.59
Van Ruyven Josef Nicolaas	CON 2 PT LOT 22 RP 59R4801	271104000410800	4.199	129.1	$ 710.00		$ 355.00			$355.00		$355.00		$355.00
Stewart Scott James	CON 2 PT LOT 22 RP 59R 5732	271104000410810	0.407							$0.00		$0.00		$0.00
Powell Bradley Kenneth	CON 2 PT LOT 22 RP59R4801	271104000410900	7.711	151.6						$0.00		$0.00		$0.00
Hellinga Jack Simon	CON 2 PT LOT 22	271104000411000	5.411							$0.00		$0.00		$0.00
Kinzie Patricia Helen	CON 2 PT LOT 21 RP 59R6766	271104000411200	1.202							$0.00		$0.00		$0.00
Pipher Lynn Mae	CON 2 PT LOT 21 RP 59R6766	271104000411205	1.208							$0.00		$0.00		$0.00
Scace Wesley	CON 2 PT LOT 21	271104000411300	0.067							$0.00		$0.00		$0.00
Port Colborne Quarries Inc	CON 2 PT LOT 21 PT LOT 22 RP	271104000411500	73.170	597						$0.00		$0.00		$0.00
Parsons David Scott	CON 2 PT LOT 22	271104000411600	0.418							$0.00		$0.00		$0.00
Leavere Larry Allan Thomas	CON 2 PT LOT 22	271104000411700	0.209							$0.00		$0.00		$0.00
Yanni Bill	CON 2 PT LOT 22	271104000411900	0.418							$0.00		$0.00		$0.00
Fitzgerald Shawn Patrick	HUMBERSTONE CON 2 PT LOT 22	271104000412000	0.209							$0.00		$0.00		$0.00
Orlowski Jeffrey	CON 2 PT LOT 22 RP 59R4884	271104000412100	0.209							$0.00		$0.00		$0.00
Moes Frank Allan	HUMBERSTONE CON 2 PT LOT 22	271104000412200	0.357							$0.00		$0.00		$0.00
Boda Terry Joseph	CON 2 PT LOT 22	271104000412400	0.186							$0.00		$0.00		$0.00
Elite Capital P.C Developmen	CON 2 PT LOT 22	271104000412600	4.110							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	10.153	127						$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 22 PT LOT 23	271104000412700	22.189	542.7						$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 23	271104000412800	0.363							$0.00		$0.00		$0.00
NCDSB	CON 2 PT LOT 23	271104000412900	5.947							$0.00		$0.00		$0.00
Dyson Patrick James	CON 2 PT LOT 23	271104000413000	0.176							$0.00		$0.00		$0.00
Dyson Mary Lynn	CON 2 PT LOT 23	271104000413100	0.182							$0.00		$0.00		$0.00
Hortobagyi Zoltan	CON 2 PT LOT 23	271104000413200	0.186							$0.00		$0.00		$0.00
Wakunick Deborah Ivy	CON 2 PT LOT 24	271104000413300	0.085							$0.00		$0.00		$0.00
Wells Donna Louise	CON 2 PT LOT 23 PT LOT 24	271104000413400	0.828							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413401	7.409							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 23 PT LOT 24 RP	271104000413410	10.115							$0.00		$0.00		$0.00
Vale Canada Limited	CON 2 PT LOT 24 RP 59R10047	271104000413435	0.631							$0.00		$0.00		$0.00
Port Colborne Quarries Inc	HUMBERSTONE CON 2 PT LOTS 23	271104000414000	3.326							$0.00		$0.00		$0.00
2023165 Ontario Inc	CON 3 PT LOT 19 PT LOT 20	271104000506400	1.291							$0.00		$0.00		$0.00
Koch Olga	CON 3 LOT 19CPT	271104000506500	0.222							$0.00		$0.00		$0.00
Kozelj Stif	CON 3 PT LOT 20	271104000506600	0.079							$0.00		$0.00		$0.00
Orsetto Aldo	CON 3 PT LOT 20	271104000506700	4.228							$0.00		$0.00		$0.00
Currie Michael Bruce	CON 3 PT LOT 20	271104000506702	0.085							$0.00		$0.00		$0.00
Fijavz David	CON 3 PT LOT 20	271104000506703	0.334							$0.00		$0.00		$0.00
Levitt Corie	CON 3 PT LOT 20 PLAN 59R	271104000506710	0.212							$0.00		$0.00		$0.00
Michaud Antonio Abel	CON 3 PT LOT 20 RP 59R8240	271104000506800	0.271							$0.00		$0.00		$0.00
Henderson David Marshall	CON 3 PT LOT 20	271104000506801	11.011							$0.00		$0.00		$0.00
Babion Gail J	HUMBERSTONE CON 3 PT LOT 21	271104000506900	15.252							$0.00		$0.00		$0.00
Wagner Dan Patrick	CON 3 PT LOT 21	271104000507400	3.050							$0.00		$0.00		$0.00
Stovell David Alan	CON 3 PT LOT 21 59R8535	271104000507500	1.238							$0.00		$0.00		$0.00
Cooper Collin James Lee	CON 3 S PT LOT 21 S PT LOT	271104000508100	7.613							$0.00		$0.00		$0.00
Henderson Drew David	CON 3 PT LOT 22	271104000508301	1.055							$0.00		$0.00		$0.00
Beaulieu George E	CON 3 E PT LOT 23	271104000508900	0.388							$0.00		$0.00		$0.00
Garner Mark Edward	CON 3 PT LOT 23	271104000509100	0.346							$0.00		$0.00		$0.00
Joseph Grandilli	CON 3 PT LOT 23	271104000509300	0.082							$0.00		$0.00		$0.00
Stefan John	CON 3 PT LOT 23	271104000509400	0.016							$0.00		$0.00		$0.00
Johnson Raymond Francis Jr	CON 3 PT LOT 23 RP 59R10549	271104000510200	0.208							$0.00		$0.00		$0.00
Vance Gregory Thomas	CON 3 PT LOT 23 RP 59R10549	271104000510202	0.417							$0.00		$0.00		$0.00
Saxon Ronald Joseph	CON 3 PT LOT 23 PLAN	271104000510204	0.605							$0.00		$0.00		$0.00
Pilkey Dean Lloyd	CON 3 PT LOT 23 PLAN	271104000510206	0.597							$0.00		$0.00		$0.00
Schneider Darryl Frederick	CON 3 PT LOT 23	271104000510801	2.252							$0.00		$0.00		$0.00
Zonneveld Bastian	CON 3 PT LOT 24	271104000510900	0.103							$0.00		$0.00		$0.00

Port Colborne Drain

Owner	Legal Text	Roll No	Area, Ha	Length	Crossings $/each	Channel Works	Culvert Works	Erosion Control	Other Works	Construction Sub-Total		Construction Total	Portion of Eng & Admin	TOTAL Special Benefit
						Assessments								
Terreberry Jack	CON 3 PT LOT 24	271104000511000	0.144							$0.00		$0.00		$0.00
Jacak Dominik	CON 3 PT LOT 24	271104000511300	0.347							$0.00		$0.00		$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511400	0.099							$0.00		$0.00		$0.00
Moore Linda Ann	CON 3 PT LOT 24	271104000511500	0.029							$0.00		$0.00		$0.00
Medvic Peter James	CON 3 PT LOT 24	271104000511600	0.356							$0.00		$0.00		$0.00
McIntyre Shelly	CON 3 PT LOT 24	271104000511700	0.191							$0.00		$0.00		$0.00
City of Port Colborne	59R11175 PART 1 59R11176	271104000699500	0.630		20.7					$0.00		$0.00		$0.00
			310.110											
Roads														
City of Port Colborne	Sndier Rd from Hwy 3 to Killaly St E	ROW	2.033							$0.00		$0.00		$0.00
City of Port Colborne	Second Concession W of Snider Rd.	ROW	1.221							$0.00		$0.00		$0.00
City of Port Colborne	Snider Rd. from Hwy 3 to Second Conc	ROW	2.005							$0.00		$0.00		$0.00
City of Port Colborne	Snider Rd. N of Second Concession	ROW	0.071		28.4					$0.00		$0.00		$0.00
City of Port Colborne	Second Concession Rd. E of Babion	ROW	0.595							$0.00		$0.00		$0.00
City of Port Colborne	Babion Rd. from Hwy 3 to Second Concess	ROW	2.308							$0.00		$0.00		$0.00
City of Port Colborne	Chippawa Road	ROW	0.559							$0.00		$0.00		$0.00
City of Port Colborne	Babion Rd. from 2nd to Chippawa	ROW	1.432							$0.00		$0.00		$0.00
City of Port Colborne	Snider Rd protion south of Killaly St E	ROW	0.353							$0.00		$0.00		$0.00
City of Port Colborne	Killaly St East W of Snider Rd	ROW	0.901							$0.00		$0.00		$0.00
City of Port Colborne	Killaly St E east of Snider	ROW	0.176							$0.00		$0.00		$0.00
City of Port Colborne	Second Concession from Snider to Babion	ROW	1.645							$0.00		$0.00		$0.00
MTO	Highway #3	ROW	3.281							$0.00		$0.00		$0.00
			16.581											
													$	5,600.09

Section 26 - Special Assessments

As per Section 26 of the Drainage Act, the following costs are to be charged directly to the Road Authorities listed as SPECIAL ASSESSMENTS.

Agency	Items	A. Portion of General Construction Costs	B. Channel Improvement Works	C. Culvert Improvement Works	D. Erosion and Sediment Control Works	E. Other Improvement Works	Total Construction Costs	Portion of Administration Costs	TOTAL Special Assessment
Port Colborne Branch #1									
City of Port Colborne	Assessed special benefit for improving Snider road outlet.		$ 3,940				$ 3,940	$ 3,068	$7,008.46
Regional Municipality of Niagara	No works proposed						$ -	$ -	$0.00
MINISTRY OF TRANSPORTATION ONTARIO		$ 4,000					$ 4,000	$ 3,115	$7,115.18
Utilities - Enbridge	No conflicts assessed during design						$ -	$ -	$0.00
Utilities - Other	No conflicts assessed during design						$ -	$ -	$0.00
									$14,123.64
Port Colborne Drain									
City of Port Colborne	Extend drain along Babion Rd. to Second Concession. Re-lay culverts at Second Concession Rd.		$ 8,890	$ 2,563		$ 500	$ 11,953	$ 28,496	$40,448.80
Regional Municipality of Niagara	No works proposed						$ -		$0.00
MINISTRY OF TRANSPORTATION ONTARIO					$1,500.00		$ 1,500	$ 3,576	$5,076.19
Utilities - Enbridge	No conflicts assessed during design						$ -		$0.00
Utilities - Other	No conflicts assessed during design						$ -		$0.00
									$45,525.00

Appendix C:

Past Financing and Cost Reports

Fw: invoicing

1 message

alanavanderveen@portcolborne.ca <alanavanderveen@portcolborne.ca> Tue, Dec 17, 2019 at 4:02 PM
To: "Paul Marsh (pcmarsh" <pcmarsh@ewaeng.com>

Paul, as per our discussions on the Port Colborne drain wetland and fordings.

Thank you,

Alana Vander Veen
Drainage Superintendent
City of Port Colborne
alanavanderveen@portcolborne.ca
905-835-2900 x 291

"Serving You to Create an Even Better Community"

Working Smoke and Carbon Monoxide Alarms Save Lives

This message, including any attachments, is privileged and intended only for the person (s) named above. This material may contain confidential or personal information which may be subject to the provisions of the Municipal Freedom of Information and Protection of Privacy Act. Any other distribution, copying or disclosure is strictly prohibited. If you are not the intended recipient or have received this message in error, please notify us immediately by telephone, fax or email and permanently delete the original transmission from us, including any attachments, without making a copy.

----- Forwarded by Alana Vander Veen/Port_Notes on 2019-12-17 04:02 PM -----

From: Deanna Lindblad <dlindblad@npca.ca>
To: "henribennemeer@portcolborne.ca" <henribennemeer@portcolborne.ca>, "alanavanderveen@portcolborne.ca" <alanavanderveen@portcolborne.ca>
Date: 2016-01-07 09:14 AM
Subject: RE: invoicing

Hello,
Below are the reworked numbers for the invoices.
Thank you Henri for catching my mistake about the low level crossings.
deanna

KONC:
Excavation of wetland $7,571.00 (incl HST)
Low level crossing $ 1,243.00 (incl HST)
TOTAL: $8,814.00
Total will need to be in access of $ 11,800 in order for this amount to be paid by NPCA. *See details below.

VANRUYVEN:
Excavation of wetland $2,721.00 (incl HST)
Low level crossing $1,243.00 (inlc HST)
TOTAL: $3,964.00
Total will need to be in access of $5300 in order for this amount to be paid by NPCA. *See details below.

*Now because our program can only pay 75% of the cost of the project and it is our understanding that the City through your funding is covering the 25% on behalf of the landowner through your additional funding source, I will need the invoice to show that the totals above are no more than 75% of the cost. I know that the trucking of the soil off site will be more than that 25% so be sure that the invoice you send me shows that amount please.

**I will need that invoice by the end of the year in order to process by our drop dead date in the first week of January.

Deanna L. Lindblad
Restoration Project Lead
Niagara Peninsula Conservation Authority
250 Thorold Road, West, 3rd floor,
Welland, ON L3C 3W2
905-788-3135 x237
dlindblad@npca.ca

CERTIFICATE

TO: Borden Ladner Gervais LLP

IN THE MATTER OF By-law Number 71-2007 (the "**Debenture By-law**") authorizing an issue of instalment debentures of The Regional Municipality of Niagara (the "**Upper-tier Municipality**") in the aggregate principal amount of $22,809,804.00 - $845,000.00 of which relates to The Corporation of the City of Port Colborne (the "**Lower-tier Municipality**");

AND IN THE MATTER OF certain authorizing by-laws of the Lower-tier Municipality.

I, Janet Beckett, refer to my declaration declared July 5th, 2007. I hereby certify that all statements contained in such declaration are true and correct as at the date hereof.

DATED at the City of Port Colborne as at the 10th day of July, 2007.

Janet Beckett

Janet Beckett,
Clerk

City of Port Colborne

DATE: APRIL 23RD, 2007

MOVED BY COUNCILLOR G. BRUNO

SECONDED BY COUNCILLOR B. Butters

WHEREAS the Council of the Corporation of the City of Port Colborne passed By-law No. 4988/44/07 Being a By-law to Authorize the Borrowing of the Sum of Seven Hundred and Forty-Five Thousand Dollars ($745,000) Upon the Issuance of Debentures for Such Purposes, for the construction of Wignell and Michener Municipal Drains;

WHEREAS the estimated cost of construction of the Wignell and Michener Municipal Drains amount to $745,000;

WHEREAS it is deemed desirable to issue debentures in the amount of $745,000 in accordance with the terms of the various authorizing by-laws applicable to such expenditures;

NOW THEREFORE be it resolved by the Council of the Corporation of the City of Port Colborne as follows:

THAT the City Clerk be and is hereby directed to request the Council of the Regional Municipality of Niagara to issue debentures, on behalf of the said City of Port Colborne in the amount of $745,000 to finance the construction of the Wignell and Michener Municipal Drains and to be a 10 year debenture;

AND THAT the City Clerk and the Treasurer be and they are hereby directed to make available to the said Regional Municipality of Niagara certified copies of all By-laws and Orders of the Ontario Municipal Board applicable and all other information required in this connection, to ensure the issue of the said debentures in the amount of $745,000. for the construction of the Wignell and Michener Municipal Drains as described in the attached schedule.

Vance Badawey (sgd.)
MAYOR

No.....

CITY OF PORT COLBORNE
CERTIFIED TRUE AND CORRECT COPY
City Clerk Janet Beckett
05/01/07

THE CORPORATION OF THE CITY OF PORT COLBORNE

BY-LAW NO. 4988/44/07

BEING A BY-LAW TO AUTHORIZE THE BORROWING OF THE SUM OF SEVEN HUNDRED AND FORTY-FIVE THOUSAND DOLLARS ($745,000) UPON THE ISSUANCE OF DEBENTURES FOR SUCH PURPOSES

WHEREAS Section 401(1) of the Municipal Act, 2001, S.O. 2001, c.25, as amended, authorizes the municipality to borrow money or incur a debt for municipal purposes and may issue debentures for the money borrowed or for the debt.

WHEREAS the Council of the Corporation of the City of Port Colborne deemed it desirable to undertake the following Capital Project in 2007 by issuance of debentures:

The construction of the Wignell and Michener Municipal Drains, as approved by Council in the Department of Operational, Planning & Development Services Report No. 2007-25, for the amount of $745,000.

WHEREAS the Treasurer of the Corporation of the City of Port Colborne has confirmed that the debt repayment limit for the City of Port Colborne has been updated and this project will not cause the Corporation to exceed its limit.

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE CITY OF PORT COLBORNE ENACTS AS FOLLOWS:

1. In this By-law:

   "Council" means the Council of the Corporation of the City of Port Colborne.

   "Corporation" means the Corporation of the City of Port Colborne.

2. The Council authorizes and approves the Capital Project, being the construction of the Wignell and Michener Municipal Drains in 2007 for the amount of $745,000.

3. That the cost of the project, namely $745,000, to be borne by the ratepayers within the Wignell and Michener Municipal Drain Watershed, shall be paid for by the issue and sale of debentures for the amount of $745,000 over a period of ten (10) years.

4. Any debentures to be issued by the Council of the Regional Municipality of Niagara, with respect to the said project or part thereof, shall bear interest at such rate or rates as shall be determined by the Regional Council.

5. The Mayor and Treasurer are hereby authorized on behalf of the Corporation to borrow from any bank, person, firm or corporation from time to time, pending the issue and sale of debentures, any money necessary to meet the expenditures incurred up to the amount of the estimated cost thereof, and the Mayor and Treasurer are hereby authorized to execute a promissory note or notes thereof and the Clerk is hereby authorized to affix the corporate seal thereto.

6. The City Clerk of the Corporation is hereby authorized and directed to request the Council of the Regional Municipality of Niagara to borrow money for the purposes hereinbefor set out to a maximum amount of $745,000 and to issue debentures therefore to the credit of the Regional Corporation and to suggest to the Regional Municipality of Niagara that such debentures shall be payable within ten (10) years.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 23rd DAY OF APRIL, 2007.

Vance Badawey
MAYOR

Janet Beckett

Janet Beckett
CITY CLERK

CITY OF PORT COLBORNE
CERTIFIED TRUE AND CORRECT COPY
City Clerk Janet Beckett
05/01/07

PORT COLBORNE

APPROVED BY COUNCIL APR 23 2007 J. BECKETT CITY CLERK CITY OF PORT COLBORNE

DEPARTMENT OF OPERATIONAL PLANNING & DEVELOPMENT SERVICES

Report No. **2007-25** **Agenda Date: April 23, 2007**

Division: **Engineering Division**

Subject: **FINANCING OF THE WIGNELL-MICHENER MUNICIPAL DRAINS**

RECOMMENDATION:

That the Council of the City of Port Colborne approve the works contained in this report for the construction of the Wignell and Michener Municipal Drains.

That the Council of the City of Port Colborne approve the attached resolution to authorize the Regional Municipality of Niagara to issue the debenture in the amount of $745,000.00 over a period of 10 years for the works related to construction for the Wignell and Michener Drains.

That the Council of the City of Port Colborne authorize the City Clerk and Mayor to sign the appropriate by-law to authorize the issuance of debentures by the Region.

Purpose of the Report

The City of Port Colborne has appointed Wiebe Engineering Group to prepare a report for the repair and improvement of the Wignell, Michener M - 1 and the Michener M - 2 Municipal Drains. The estimated cost of the work is $780,000.00 and Council should consider debenturing the cost of this project as the City cannot finance this amount on behalf of the benefiting landowners within the watershed.

Analysis

Council appointed Wiebe Engineering Group on December 21, 2001 to prepare a drainage report for the Wignell and Michener Municipal Drains, under the appropriate sections of *The Drainage Act, R.S.O 1990*. The primary reason for the Report was to amalgamate 5 different by-laws for various portions of the Wignell Municipal Drain into one by-law, to confer municipal drain status on a short section connecting two portions of the Wignell Drain, to update the assessment schedules to reflect current land use and watershed boundaries, and to provide for needed repairs and improvements.

The "on-site" meeting for this project was held the evening of January 9, 2002 and was attended by about 90 landowners as well as Councillors Butters and Bodner. Many issues were raised and discussed at the meeting, including a storm water management system to control discharge of sediment and nutrients into Lorraine Bay, the ongoing erosion problem in the muck type soils in the portion of the Wignell Drain located south of the Friendship Trail, and others.

A treatment wetlands / storm water management system was designed, however, the cost was so high that it was decided not to proceed with that as part of the Report. The concept has not been abandoned, we are trying to receive funding for the wetlands through Water Smart Niagara. Concerns were raised about contaminants in the sediment in the bottom of the drain, so soil samples of the drain bottom were taken and tested and the test results indicate that the sediment is within provincial guidelines so the excavated material is safe to spread along the side of the drain.

The existing building housing the pump at Lakeshore Road East must be replaced, the starter on the pump inside the building must be replaced, the controller for the Grindex pump on the north side of the floodgates must be moved to inside the building, "bubblers" must be installed inside the pump wetwell to prevent freezing, the existing transformer must be upgraded to provide more power, the power supply cables must be moved underground, the floodgates require remedial work, and various

electrical components and installations for the pumps and floodgates must be upgraded to meet current Hydro regulations.

Erosion continues to worsen, to the extent that we had to install a concrete block wall along the Smith property between Snider Road and the Cemetery at a cost of $226,000. Repairs and improvements are required all along the Wignell and Michener Drains to improve flows and reduce erosion.
The work has escalated beyond what was originally considered when the engineer was appointed in late 2001. The cost of the required works is now estimated at $780,000, as follows:

- Construction: Main Drain = $400,000 (includes the $226,000 for the concrete wall)
  Wignell W-1 = $38,000
  Wignell W-2 = $23,000
  Michener M-1 = $15,000
  Michener M-2 = $56,000
  Total construction & Contingency = $532,000
- Allowances = $53,000
- Engineering & Administration = $151,000
- GST = $44,000
- **TOTAL COST = $780,000**

Resource Implications

The estimated $780,000 cost will have to be borne upfront by the municipality. It is estimated that approximately 15% of that cost will be assessed to City owned lands and road allowances and the remainder will be invoiced to affected landowners within the watershed. The actual cost to be debentured, net of GST and commission/legal fees, amounts to $745,000.00.

Policies Affecting The Proposal

The attached resolution provides the authority for the Region to issue a 10 year debenture for the construction of the Wignell and Michener Drains . This confirms that the Treasurer has updated the municipalities 2006 annual repayment limit respecting long term debt and financial obligations and determined that the estimated annual amount payable in respect of the drain construction, the additional cost amount and additional debenture authority, would not cause the municipality to reach or to exceed the updated 2006 limit.

Comments From Relevant Departments, Agencies & Corporate Partners

None.

Alternatives

None

Conclusions

That the construction of the Wignell and Michener Drains be approved with financing from the issuance of debentures from the Region in the amount of $745,000.00. Costs will be recovered from the affected landowners following completion of the works.

Attachments

The attached by-law and resolution is required to authorize the borrowing of $745,000.00 upon the issuance of debentures by the Region in June, 2007.

Prepared by:

René Landry, C.E.T., CST
Drainage Superintendent
Engineering Assistant

Reviewed and Approved by:

Tim Stuart, P.Eng.
Director of Operational, Planning
and Development Services

Approved and Respectfully
Submitted by:

Robert Cotterill, P. Eng.
Chief Administrative Officer

Financing strategy reviewed and
Approved by:

Peter Senese
Director of Community & Corporate
Services

Wignell/Michener Debenture

		Debenture Fee	December 31, 2007.	**2008 TOTAL**	December 31, 2008.	**2009 TOTAL**	December 31, 2009.	**2010 TOTAL**	December 31, 2010.	**2011 TOTAL**	December 31, 2011.	**2012 TOTAL**	December 31, 2012.	**2013 TOTAL**	December 31, 2013.	**2014 TOTAL**	December 31, 2014.	**2015 TOTAL**	December 31, 2015.	**2016 TOTAL**	December 31, 2016.	**2017 TOTAL**	December 31, 2017.	**Total Interest Paid**
Total			$ 745,000.00		$ 685,773.55		$ 623,570.98		$ 558,277.98		$ 489,704.23		$ 417,715.44		$ 342,126.42		$ 262,748.73		$ 179,397.98		$ 91,889.76		$ -	
		$ 6,065.29		$ 96,388.48		$ 96,422.90		$ 96,485.90		$ 96,556.81		$ 96,577.48		$ 96,614.26		$ 96,661.28		$ 96,665.48		$ 96,613.74		$ 96,576.12		
PRINC.				$ 59,226.45		$ 62,192.57		$ 65,303.00		$ 68,573.75		$ 71,988.79		$ 75,589.02		$ 79,377.69		$ 83,350.75		$ 87,508.22		$ 91,889.76		
INT.				$ 37,162.03		$ 34,230.33		$ 31,182.90		$ 27,983.06		$ 24,588.69		$ 21,025.24		$ 17,283.59		$ 13,314.73		$ 9,105.52		$ 4,686.36		**$ 220,562.45**
2007-2009 Contract cost for Rankin Construction Retaining Wall	$241,254.45																							
Erosion Protection Wall Engineering Fee	$27,894.59	$2,191.23		$13,425.67		$12,366.52		$11,265.57		$10,109.55		$8,883.25		$7,595.87		$6,244.11		$4,810.26		$3,289.59		$1,693.06		**$79,683.45**
2001-2007 Weibe Engineering Fees	$100,750.62	$820.24		$5,025.63		$4,629.16		$4,217.04		$3,784.31		$3,325.27		$2,843.36		$2,337.36		$1,800.63		$1,231.39		$633.76		**$29,827.92**
	$369,899.66	$3,011.47		$18,451.31		$16,995.69		$15,482.61		$13,893.86		$12,208.52		$10,439.23		$8,581.47		$6,610.89		$4,520.98		$2,326.82		**$ 109,511.38**
				4.99%		4.59%		4.19%		3.76%		3.30%		2.82%		2.32%		1.79%		1.22%		0.63%		**29.61%**

Appendix D:

Supplementary Information

City of Port Colborne
Regular Committee of the Whole Meeting 16-18
Minutes

Date:	July 23, 2018
Time:	6:30 p.m.
Place:	Council Chambers, Municipal Offices, 66 Charlotte Street, Port Colborne
Members Present:	R. Bodner, Councillor B. Butters, Councillor F. Danch, Councillor A. Desmarais, Councillor D. Elliott, Councillor B. Kenny, Councillor J. Maloney, Mayor (presiding officer) Absent: Y. Doucet, Councillor (due to vacation) J. Mayne, Councillor (leave of absence)
Staff Present:	D. Aquilina, Director of Planning and Development T. Cartwright, Fire Chief A. Grigg, Director of Community and Economic Development N. Halasz, Manager of Parks and Recreation A. LaPointe, Manager of Legislative Services/City Clerk (minutes) C. Lee, Director of Engineering and Operations S. Luey, Chief Administrative Officer P. Senese, Director of Corporate Services

Also in attendance were interested citizens, members of the news media and WeeStreem.

1. Call to Order:

Mayor Maloney called the meeting to order.

2. Introduction of Addendum Items:

Nil.

3. Confirmation of Agenda:

Moved by Councillor B. Kenny
Seconded by Councillor A. Desmarais

That the agenda dated July 23, 2018 be confirmed, as circulated or as amended.

CARRIED.

2. Engineering and Operations Department, Engineering Division, Report 2018-103, Subject: Wignell, Michener, Port Colborne and Beaverdam Municipal Drains Engineer Appointment

Moved by Councillor R. Bodner
Seconded by Councillor B. Butters

That the appointment of Paul Smeltzer P. Eng. of AMEC(FW) be rescinded as per Section 39(2) Chapter D.17 of *the Drainage Act R.S.O. 1990*; and

That Paul Marsh P. Eng. of EWA Engineers Inc. be appointed under Section 78(1) Chapter D.17 of the *Drainage Act R.S.O. 1990*, and that this appointment become effective once the conditions of Section 78(2) have been met; and

That staff be authorized to execute a petition under Section 4 Chapter D.17 of the *Drainage Act R.S.O. 1990* to initiate/incorporate any new works related to municipal roads and/or property; and

That Paul Marsh P. Eng. of EWA Engineers Inc., be appointed under Section 8 Chapter D.17 of the *Drainage Act R.S.O. 1990* for the new works contemplated and any additional petitions under Section 4, related to the Wignell, Michener Port Colborne and Beaver Dam Drains, that may come forward during the Drainage Act process; and

That the Mayor and Clerk be authorized to sign the requisite Engineering Services Agreement for the preparation of new engineer(s) reports for the Wignell, Michener, Port Colborne and Beaverdam Municipal Drains.

CARRIED.

14. Notice of Motion:

Nil.

15. Adjournment:

Moved by Councillor F. Danch
Seconded by Councillor D. Elliott

That the Committee of the Whole meeting be adjourned at approximately 7:31p.m.

CARRIED.

AL/cm

WIGNELL MUNICIPAL DRAIN
W2 RELOCATION
W1 ABANDONMENT

ENGINEER'S REPORT

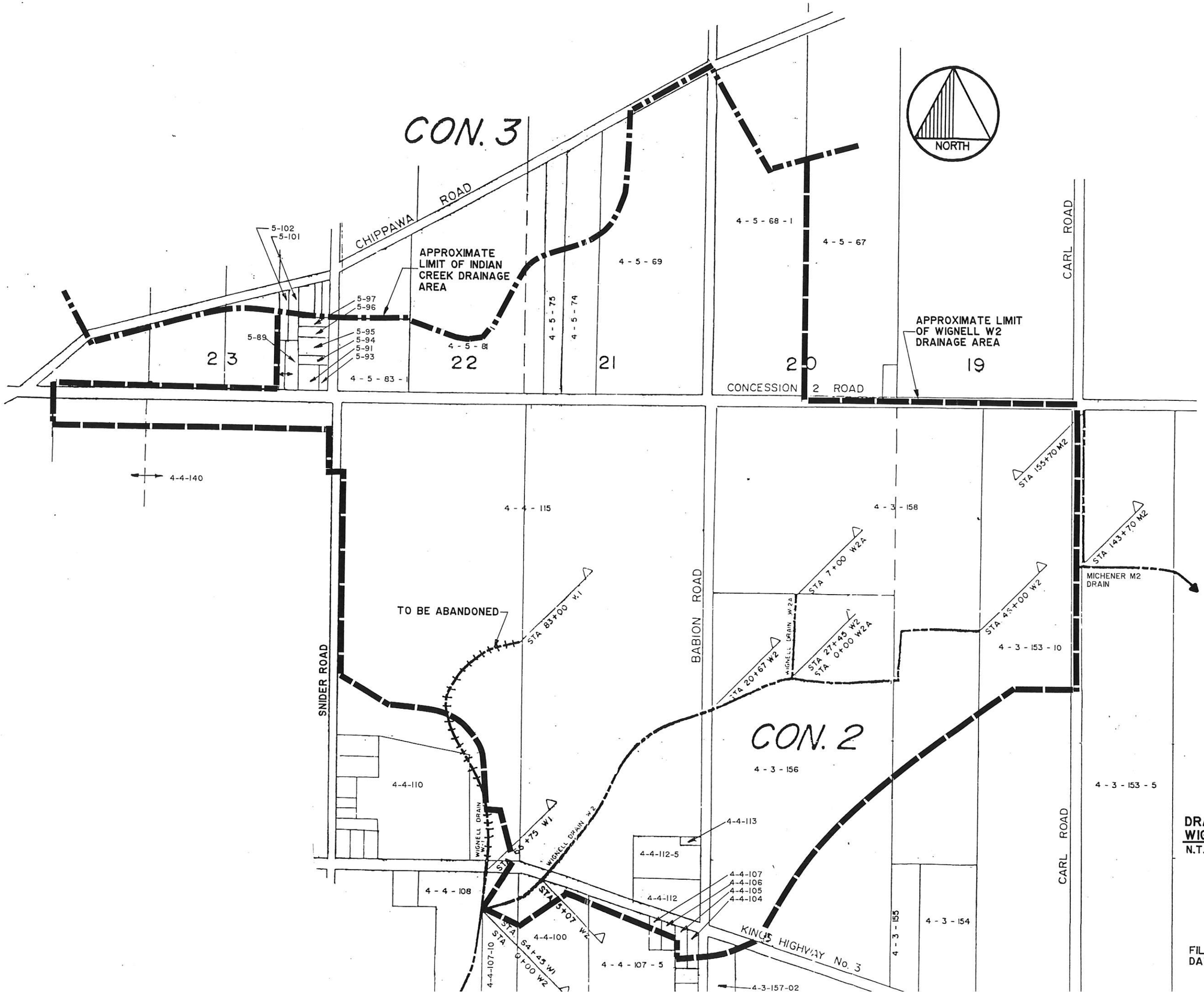
CITY OF PORT COLBORNE
Regional Municipality of Niagara

DATED: FEBRUARY 19, 1999

Copyright 1999

WIEBE ENGINEERING GROUP INC.
CONSULTING ENGINEERS & PROJECT MANAGERS

826 East Main Street
WELLAND, Ontario
L3B 3Y9
Ph. (905) 735-4522
Fax (905) 735-5355
E-mail: wiebe@vaxxine.com



DRAINAGE PLAN
WIGNELL W2 DRAIN
N.T.S

FILE: 9758
DATE: FEBRUARY 19, 1999

ENGINEERING AND OPERATIONS DEPARTMENT
ENGINEERING DIVISION

Report Number: 2013- 1 **Date: January 14, 2013**

SUBJECT: Wignell/Michener & Beaverdam Drains – Abandonments & Subsequent Connections

1. PURPOSE:

This report prepared by Henri Bennemeer, Drainage Superintendent has been authorized by Chris Lee, Manager of Projects & Design in response to a request from Port Colborne Quarries to have the Wignell 2A (W-2A) and a portion of the Wignell 2 (W-2) east of Babion Road abandoned and to have a remnant portion of the Wignell 2 watershed redirected to the Michener 2 (M2). The purpose of this report is to provide Council with background information and requisite actions.

2) HISTORY, BACKGROUND, COUNCIL POLICY, PRACTICES

Some years previous, circa 1998 the former owners of Port Colborne Quarries had requested that certain portions of the Wignell Municipal Drain system (W-1, W-2 & W-2A) be abandoned (see attached plan). An engineer's report was prepared by Wiebe Engineering Group dated February 19, 1999 dealing with an initial request to have a portion of the W-2 drain west of Babion Road, within the quarry lands, relocated as part of their rehabilitation plan, as well as the abandonment of a portion of the W-1 drain. The request to have the W-2 & W-2A drains abandoned was postponed until sometime in the future, when needed.

As Council may be aware the Wignell/Michener Municipal Drain Report has been under review for a number of years through a former appointment of Wiebe Engineering Group Inc. and more recently, combined with the Beaverdam Municipal Drain, through the appointment of AMEC Environment & Infrastructure. Throughout the review process, in discussions between AMEC and the current owner of Port Colborne Quarries (who now wish to move the abandonments forward), it was anticipated that the report, including the abandonments, would be finalized by the time quarry operations necessitated the removal of the aforementioned drains and ancillary works related to the redirection of the remnant portion of the W-2 watershed. A number of factors have affected this timing, namely the scope of the project and increased activity at the quarry that has moved the timelines forward, requiring that interim or alternate measures under the Drainage Act be taken.

3) STAFF COMMENTS AND DISCUSSIONS

Under Section 84 Chapter D.17 of the Drainage Act R.S.O. the Council of the initiating municipality may give notice on its own initiative, to the property owners affected, of its intention to abandon a drainage works or part thereof as specified in the notice, without any written request of the landowners assessed for benefit, in respect of the drainage

works. If within ten days of the mailing of the notice, no landowners receiving the notice request that an engineer's report be prepared on the proposed abandonment, then Council may by by-law abandon the drainage works or part thereof and thereafter the municipality will have no further obligation with respect to the drainage works.

In the case of the abandonment of the W-2 and W-2A east of Babion Road there are only two properties affected, that of Port Colborne Quarries, through which the drains pass and that of Mr. Paul Fehrman, who's lands drain into the W-2 at their west property line with Port Colborne Quarries. In discussions with both property owners, neither require the report of an engineer for the abandonment, provided that the drainage of the Fehrman lands can be redirected to the east into the M-2 drain.

In regard to redirecting or subsequently connecting lands to a drainage works to which the lands are not assessed, Section 65(3) & 65(5) Subsequent Connections to a Drainage Works, Chapter D.17 of the Drainage Act R.S.O. 1990, respectively provides for the clerk to instruct an engineer to inspect the subject lands and to assess it for a just proportion of the drainage works and to provide for Council authority to allow the connection. Again, similar to the abandonment, there will be no appeals as all construction costs and engineering related to the subsequent connection process are to be borne by Port Colborne Quarries. Staff is in receipt of the appropriate documentation from both parties in regard to the aforementioned requests/releases/commitments.

As a further assurance the new report by AMEC will address any oversights and or inequities that may develop as a result of this alternative measure.

4) OPTIONS AND FINANCIAL CONSIDERATIONS:

a) Do nothing.

This is an option. However, it would cause serious hardship and additional costs to Port Colborne Quarries if they were delayed until the outcome of the Engineer's Report on the Wignell/Michener Municipal Drain.

b) Other Options

None.

5) COMPLIANCE WITH STRATEGIC PLAN INITIATIVES

Municipal Drain Maintenance Strategic Planning is currently under review. This project is in compliance with all City legislative requirements.

6) ATTACHMENTS

Aerial plan of the subject area.

7) RECOMMENDATION

A. That Council receives this report as information.

B. That Council hereby authorizes the subsequent connection of the Fehrman lands identified as Roll # 2711-040-003-15310 to the Michener M-2 Municipal Drain.

C. That the City Clerk be authorized to send notice to the affected parties as defined in Section 84(2) Chapter D.17 of the Drainage Act R.S.O. 1990 and to prepare the appropriate by-law for the abandonment of those portions of the Wignell W-2 and W-2A Municipal Drains east of Babion Road, which by-law will come into effect once the conditions of Section 84(5) Chapter D.17 of the Drainage Act R.S.O. 1990 are met.

8) SIGNATURES

Prepared on January 2, 2013

Henri Bennemeer
Drainage Superintendent

Reviewed by:

Chris Lee
Manager of Projects & Design

Reviewed by:

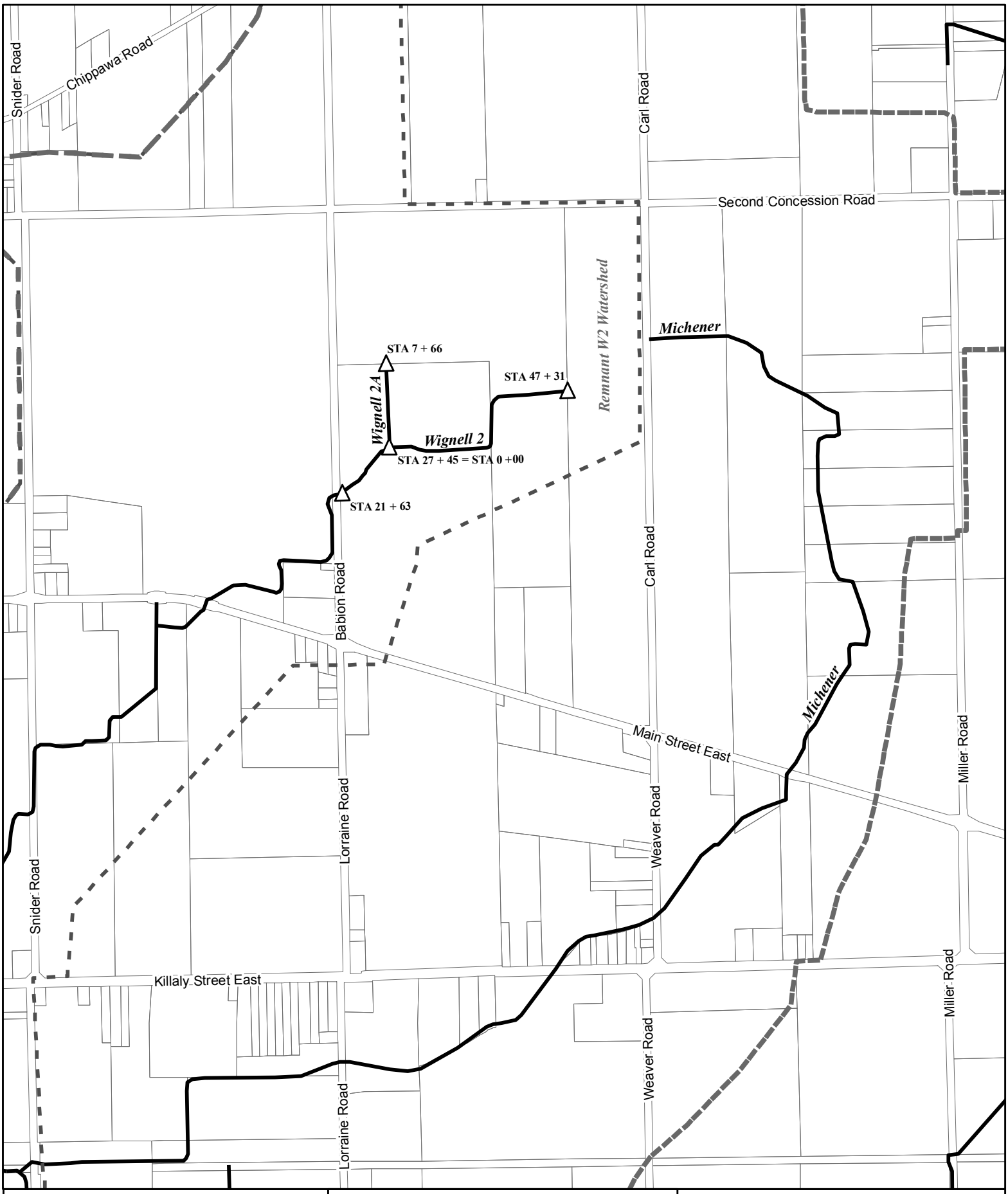
Ron Hanson, C.E.T.
Director, Engineering & Operations

Reviewed by:

Peter Senese
Director of Corporate and Community Services

Reviewed and Respectfully Submitted:

Robert J. Heil
Chief Administrative Officer



Municipal Drain

Wignell - Sub Watershed

Watershed

Wignell 2 & Wignell 2A Abandonment

N
W E
S

PORT COLBORNE

January 02, 2013

```
[TITLE]
Wignell Drain

[OPTIONS]
;;Options            Value
;;------------------ ------------
FLOW_UNITS           CMS
INFILTRATION         CURVE_NUMBER
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           11/20/2018
START_TIME           00:00:00
REPORT_START_DATE    11/20/2018
REPORT_START_TIME    00:00:00
END_DATE             11/23/2018
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:10:00
DRY_STEP             01:00:00
ROUTING_STEP         30

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              4

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;               Rain      Time     Snow     Data
;;Name           Type      Intrvl   Catch    Source
;;-------------- --------- -------- -------- ----------
Rain Gage-01     CUMULATIVE 0:10     1.0      TIMESERIES TS-SCS24_5

[SUBCATCHMENTS]
;;                                                Total    Pcnt.             Pcnt.    Curb     S
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   P
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- -
;Bower
B1               Rain Gage-01     J6               8.32     5        201      0.25     0
;Michener
M1               Rain Gage-01     J1               30.426   4.5      288      0.17     0
;Michener
M2               Rain Gage-01     J2               26.526   4.5      420      0.43     0
;Michener
```

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M3              Rain Gage-01     J7              41.950000 4.5     411      .01      0
;Michener
M4              Rain Gage-01     J4              18.790000 4.5     469.75   .001     0
;Michener
M5              Rain Gage-01     J5              15.520000 4.5     597      .001     0
;Port Colborne
PC1             Rain Gage-01     J21             20.1163  4.5      198      0.53     0
;Port Colborne
PC10            Rain Gage-01     J18             1.98     55       40       0.4      0
;Port Colborne
PC11            Rain Gage-01     J88             3.65     45       36.5     0.4      0
;Port Colborne
PC2             Rain Gage-01     J21             41.1751  4.73     374      0.24     0
;Port Colborne
PC3-QW1         Rain Gage-01     J20             66.06    0        660      0.01     0
;Port Colborne
PC4-QE1         Rain Gage-01     J19             63.430000 0       906      0.01     0
;Port Colborne
PC5             Rain Gage-01     J17             7.7      4.5      153      0.4      0
;Port Colborne
PC6             Rain Gage-01     J14             21.44    4.5      447      0.2      0
;Port Colborne
PC7             Rain Gage-01     J15             59.555   4.5      455      0.2      0
;Port Colborne
PC8             Rain Gage-01     J16             39.25    4.5      441      0.56     0
;Port Colborne
PC9_3           Rain Gage-01     J32             8.952833 4.5      239      0.75     0
;Port Colborne
PC9_4           Rain Gage-01     J10             4.005947 85       60       0.75     0
;Wignell
W1              Rain Gage-01     J22             62.0833  4.5      511      0.77     0
;Wignell
W10             Rain Gage-01     J12             100.600000 4.5    680      .01      0
;Wignell
W11             Rain Gage-01     J8              26.230000 4.5     1380     3        0
;Wignell
W12             Rain Gage-01     J24             18.67    4.5      275      0.15     0
;Wignell
W13             Rain Gage-01     J87             28.59    4.5      342      0.36     0
;Wignell
W14             Rain Gage-01     J27             34.15    4.5      491      0.29     0
;Wignell
W2              Rain Gage-01     J23             87.36    4.5      488      0.5      0
;Wignell
W3              Rain Gage-01     J28             41.21    4.5      330      0.16     0
;Wignell
W4              Rain Gage-01     J86             42.97    4.5      511      0.6      0
;Wignell
W5              Rain Gage-01     J26             22.3     4.5      354      0.16     0
;Wignell
W6              Rain Gage-01     J25             83.88    4.5      986      0.12     0
;Wignell
W7              Rain Gage-01     J24             41.66    4.5      495      0.12     0
;Wignell
W8              Rain Gage-01     J29             6.61     4.5      220      0.33     0
;Wignell
W9              Rain Gage-01     J30             23.23    4.5      502.06   0.81     0
;Wignell
WB1             Rain Gage-01     J29             6.88     4.5      260      0.38     0
;Wignell
WB2             Rain Gage-01     J24             10.34    4.5      250      0.24     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
```

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;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
B1               0.015      0.1        10         5          25         OUTLET
M1               0.015      0.1        10         5          25         OUTLET
M2               0.015      0.1        10         5          25         OUTLET
M3               0.0150     0.1000     10         5.00       25         OUTLET
M4               0.0150     0.1000     10         5.00       25         OUTLET
M5               0.0150     0.1000     10         5.00       25         OUTLET
PC1              0.015      0.1        10         5          25         OUTLET
PC10             0.015      0.1        10         5          25         OUTLET
PC11             0.015      0.1        10         5          25         OUTLET
PC2              0.015      0.1        10         5          25         OUTLET
PC3-QW1          0.015      0.1        10         200        25         OUTLET
PC4-QE1          0.0150     0.1000     10         200        25         OUTLET
PC5              0.015      0.1        10         5          25         OUTLET
PC6              0.015      0.1        10         5          25         OUTLET
PC7              0.015      0.1        10         5          25         OUTLET
PC8              0.015      0.1        10         5          25         OUTLET
PC9_3            0.015      0.1        10         5          25         OUTLET
PC9_4            0.015      0.1        10         5          25         OUTLET
W1               0.015      0.1        10         5          25         OUTLET
W10              0.0150     0.1000     10         5.00       25         OUTLET
W11              0.0150     0.1000     10         5.00       25         OUTLET
W12              0.015      0.1        10         5          25         OUTLET
W13              0.015      0.1        10         5          25         OUTLET
W14              0.015      0.1        10         5          25         OUTLET
W2               0.015      0.1        10         5          25         OUTLET
W3               0.015      0.1        10         5          25         OUTLET
W4               0.015      0.1        10         5          25         OUTLET
W5               0.015      0.1        10         5          25         OUTLET
W6               0.015      0.1        10         5          25         OUTLET
W7               0.015      0.1        10         5          25         OUTLET
W8               0.015      0.1        10         5          25         OUTLET
W9               0.015      0.1        10         5          25         OUTLET
WB1              0.015      0.1        10         5          25         OUTLET
WB2              0.015      0.1        10         5          25         OUTLET

[INFILTRATION]
;;Subcatchment   CurveNum   HydCon     DryTime
;;-------------- ---------- ---------- ----------
B1               83         0.5        4
M1               73         0.5        4
M2               83         0.5        4
M3               73.00      0.5        4
M4               73.00      0.5        4
M5               73.00      0.5        4
PC1              83         0.5        4
PC10             93         0.5        4
PC11             93         0.5        4
PC2              83         0.5        4
PC3-QW1          73         0.5        4
PC4-QE1          73.00      0.5        4
PC5              83         0.5        4
PC6              83         0.5        4
PC7              83         0.5        4
PC8              83         0.5        4
PC9_3            83         0.5        4
PC9_4            95         0.5        4
W1               83         0.5        4
W10              73.00      0.5        4
W11              73.00      0.5        4
W12              83         0.5        4
W13              83         0.5        4
W14              83         0.5        4
W2               83         0.5        4
```

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W3                 83          0.5         4
W4                 83          0.5         4
W5                 83          0.5         4
W6                 83          0.5         4
W7                 83          0.5         4
W8                 83          0.5         4
W9                 83          0.5         4
WB1                83          0.5         4
WB2                83          0.5         4

[JUNCTIONS]
;;                 Invert      Max.        Init.       Surcharge   Ponded
;;Name              Elev.       Depth       Depth       Depth       Area
;;--------------- ---------- ---------- ---------- ---------- ----------
;Michener
J1                 176.34      1.87        0           0           0
J10                180.25      0.75        0           0           0
;Wignell
J11                173.85      3.5         0           0           0
;Wignell
J12                174.134     2           0           0           0
;Wignell
J13                174.345     2           0           0           0
;Wignell
J14                174.36      3.34        0           0           0
;Port Colborne
J15                175.33      2           0           0           0.00
;Port Colborne
J16                175.98      2           0           0           0.00
;Port Colborne
J17                178.43      1.74        0           0           0
;Port Colborne
J18                179.98      2.08        0           0           0
;Port Colborne
J19                181.76      2           0           0           0.00
;Michener
J2                 176.377     1.2         0           0           0
;Port Colborne
J20                181.78      2           0           0           0.00
;Port Colborne
J21                182.40      2           0           0           0.00
;Wignell
J22                181.38      2           0           0           0.00
;Wignell
J23                181.36      2           0           0           0.00
;Wignell
J24                180.75      2           0           0           0.00
;Wignell
J25                178.32      2           0           0           0.00
;Wignell
J26                177.25      2           0           0           0.00
;Wignell
J27                176.5       2           0           0           0.00
;Wignell
J28                175.52      2           0           0           0.00
;Wignell
J29                175.15      2           0           0           0.00
;Michener
J3                 175.26      1           0           0           0
;Wignell
J30                174.48      2           0           0           0.00
J31                177.35      2.314       0           0           0
J32                178.05      2.3         0           0           0
;Michener
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J4                174.6      1.2        0          0          0
;Michener
J5                174.1      2.96       0          0          0
;Bower
J6                174.5      2          0          0          0.00
;Michener
J7                175.85     0.9        0          0          0
;Wignell
J8                174.07     3          0          0          0
;Wignell
J86               176        2          0          0          0.00
;Wignell
J87               176        2          0          0          0.00
;Wignell
J88               181.6      2.14       0          0          0
;Wignell
J9                173.888    3.512      0          0          0

[OUTFALLS]
;;                Invert     Outfall    Stage/Table      Tide
;;Name            Elev.      Type       Time Series      Gate     Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Wignell
J10 Outlet        173.75     FREE                        NO

[CONDUITS]
;;                Inlet            Outlet                        Manning    Inlet      Outlet     In
;;Name            Node             Node             Length       N          Offset     Offset     Fl
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- --
;MitchnerChannel
Link-01           J1               J7               455        0.04       0          0          0
;MitchnerChannel
Link-02           J2               J7               352        0.04       0          0          0
;MitchnerChannel
Link-04           J7               J3               533        0.04       0          0          0
;MitchnerChannel
Link-05           J3               J4               510        0.04       0          0          0
;MitchnerChannel
Link-06           J4               J5               230        0.04       0          0          0
;PortColborneChannel
Link-07           J21              J88              302        0.04       0          0          0
;PortColborneChannel
Link-08           J88              J18              500        0.04       0          0          0
;PortColborneChannel-QE1
Link-09           J19              J88              70         0.032      0          0          0
;PortColborneChannel-QW1
Link-10           J20              J18              110        0.04       0          0          0
;PortColborneChannel
Link-11           J18              J17              640        0.04       0          0          0
;PortColborneChannel
Link-12_1         J17              J31              198.542    0.04       0          0          0
;PortColborneChannel
Link-12_2         J31              J16              661.458    0.04       0          0          0
;PortColborneChannel
Link-13           J16              J15              580        0.04       0          0          0
;PortColborneChannel
Link-14           J15              J14              600        0.04       0          0          0
;WignelChannel
Link-15           J22              J23              21.42      0.04       0          0          0
;WignelChannel
Link-16           J23              J24              883.618    0.04       0          0          0
;WignelChannel
Link-17           J24              J25              1250       0.04       0          0          0
;WignelChannel
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Link-18          J25              J26              522.47     0.04       0          0          0
;WignelChannel
Link-19          J26              J27              313.77     0.04       0          0          0
;WignelChannel
Link-20          J27              J28              618.63     0.04       0          0          0
;WignelChannel
Link-21          J28              J29              289.09     0.04       0          0          0
;WignelChannel
Link-22          J29              J30              567        0.04       0          0          0
;WignelChannel
Link-23          J30              J14              40.77      0.04       0          0          0
;WignelChannel
Link-25          J14              J13              98.5       0.04       0          0          0
;BowerDrain
Link-26          J6               J13              25         0.04       0          0          0
;WignelChannel
Link-27          J13              J12              1364.61    0.04       0          0          0
;WignelChannel
Link-28          J12              J8               566.25     0.04       0          0          0
;WignelChannel
Link-29          J5               J8               12         0.04       0          0          0
;WignelChannel
Link-30          J8               J9               13.58      0.04       0          0          0
;WignelChannel
Link-31          J9               J11              29.42      0.04       0          0          0
;WignelChannel
Link-32          J11              J10 Outlet       231.24     0.04       0          0          0
;WignelChannel
Link-33          J87              J28              254.29     0.04       0          0          0
;WignelChannel
Link-34          J86              J29              278.16     0.04       0          0          0
PC1              J32              J31              256        0.036      0          0          0
PC2              J10              J32              680        0.036      0          0          0

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
Link-01          TRAPEZOIDAL  0.9              0.6        1.5        1.5        1
Link-02          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-04          TRAPEZOIDAL  1                1          1.5        1.5        1
Link-05          TRAPEZOIDAL  1.2              1          1.5        1.5        1
Link-06          TRAPEZOIDAL  1                0.6        1.5        1.5        1
Link-07          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-08          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-09          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-10          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-11          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-12_1        TRAPEZOIDAL  2                0.6        2          2          1
Link-12_2        TRAPEZOIDAL  2                0.6        2          2          1
Link-13          TRAPEZOIDAL  2.000            0.600      1.5        1.5        1
Link-14          TRAPEZOIDAL  2                0.6        1.5        1.5        1
Link-15          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-16          TRAPEZOIDAL  2                0.6        1.5        1.5        1
Link-17          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-18          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-19          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-20          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-21          TRAPEZOIDAL  2.0000000000     1.000      1.5        1.5        1
Link-22          TRAPEZOIDAL  2                1.65       2          2          1
Link-23          RECT_OPEN    2.57             3.13       0          0          1
Link-25          TRAPEZOIDAL  2.5              5          1.5        1.5        1
Link-26          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-27          TRAPEZOIDAL  2                15         1.5        1.5        1
Link-28          TRAPEZOIDAL  2                15         1.5        1.5        1
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Link-29          TRAPEZOIDAL  1                1.6        1.5        1.5        1
Link-30          RECT_OPEN    2.73             5.2        0          0          1
Link-31          TRAPEZOIDAL  3.5              5          1.5        1.5        1
Link-32          TRAPEZOIDAL  2.000            5.000      1.5        1.5        1
Link-33          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
Link-34          TRAPEZOIDAL  2.0000000000     0.600      1.5        1.5        1
PC1              TRAPEZOIDAL  1.2              0.8        1.5        1.5        1
PC2              TRAPEZOIDAL  1.5              0.6        1.5        1.5        1

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate  SeepageRate
;;-------------- ---------- ---------- ---------- ---------- ----------

[INFLOWS]
;;                                                Param    Units    Scale    Baseline Baseline
;;Node           Parameter        Time Series      Type     Factor   Factor   Value    Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
J19              FLOW             ""               FLOW     1.0      1.0      .118     Sanitary T
J20              FLOW             ""               FLOW     1.0      1.0      .057     Sanitary T

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;10-year cumulative storm with a total rainfall amount of 81.50 mm using a SCS Type II 24-hr stor
TS-SCS24_10                 0:00       0.00000
TS-SCS24_10                 0:10       0.13697
TS-SCS24_10                 0:20       0.27620
TS-SCS24_10                 0:30       0.41769
TS-SCS24_10                 0:40       0.56145
TS-SCS24_10                 0:50       0.70747
TS-SCS24_10                 1:00       0.85575
TS-SCS24_10                 1:10       1.00631
TS-SCS24_10                 1:20       1.15912
TS-SCS24_10                 1:30       1.31419
TS-SCS24_10                 1:40       1.47154
TS-SCS24_10                 1:50       1.63114
TS-SCS24_10                 2:00       1.79300
TS-SCS24_10                 2:10       1.95714
TS-SCS24_10                 2:20       2.12354
TS-SCS24_10                 2:30       2.29219
TS-SCS24_10                 2:40       2.46312
TS-SCS24_10                 2:50       2.63631
TS-SCS24_10                 3:00       2.81175
TS-SCS24_10                 3:10       2.98947
TS-SCS24_10                 3:20       3.16945
TS-SCS24_10                 3:30       3.35169
TS-SCS24_10                 3:40       3.53620
TS-SCS24_10                 3:50       3.72297
TS-SCS24_10                 4:00       3.91200
TS-SCS24_10                 4:10       4.10450
TS-SCS24_10                 4:20       4.30146
TS-SCS24_10                 4:30       4.50288
TS-SCS24_10                 4:40       4.70896
TS-SCS24_10                 4:50       4.91950
TS-SCS24_10                 5:00       5.13450
TS-SCS24_10                 5:10       5.35412
TS-SCS24_10                 5:20       5.57829
TS-SCS24_10                 5:30       5.80688
TS-SCS24_10                 5:40       6.04007
TS-SCS24_10                 5:50       6.27784
TS-SCS24_10                 6:00       6.52000
TS-SCS24_10                 6:10       6.76684
TS-SCS24_10                 6:20       7.01807
TS-SCS24_10                 6:30       7.27388
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TS-SCS24_10	6:40	7.53424
TS-SCS24_10	6:50	7.79912
TS-SCS24_10	7:00	8.06850
TS-SCS24_10	7:10	8.34250
TS-SCS24_10	7:20	8.62096
TS-SCS24_10	7:30	8.90387
TS-SCS24_10	7:40	9.19146
TS-SCS24_10	7:50	9.48350
TS-SCS24_10	8:00	9.78000
TS-SCS24_10	8:10	10.09035
TS-SCS24_10	8:20	10.42314
TS-SCS24_10	8:30	10.77838
TS-SCS24_10	8:40	11.15664
TS-SCS24_10	8:50	11.55735
TS-SCS24_10	9:00	11.98050
TS-SCS24_10	9:10	12.41517
TS-SCS24_10	9:20	12.84983
TS-SCS24_10	9:30	13.28450
TS-SCS24_10	9:40	13.73764
TS-SCS24_10	9:50	14.22664
TS-SCS24_10	10:00	14.75150
TS-SCS24_10	10:10	15.32254
TS-SCS24_10	10:20	15.94738
TS-SCS24_10	10:30	16.62600
TS-SCS24_10	10:40	17.37852
TS-SCS24_10	10:50	18.22068
TS-SCS24_10	11:00	19.15250
TS-SCS24_10	11:10	20.24134
TS-SCS24_10	11:20	21.54534
TS-SCS24_10	11:30	23.06450
TS-SCS24_10	11:40	27.42855
TS-SCS24_10	11:50	38.38593
TS-SCS24_10	12:00	54.03450
TS-SCS24_10	12:10	56.50151
TS-SCS24_10	12:20	58.45751
TS-SCS24_10	12:30	59.90250
TS-SCS24_10	12:40	61.02421
TS-SCS24_10	12:50	62.02938
TS-SCS24_10	13:00	62.91800
TS-SCS24_10	13:10	63.71426
TS-SCS24_10	13:20	64.44776
TS-SCS24_10	13:30	65.11850
TS-SCS24_10	13:40	65.73383
TS-SCS24_10	13:50	66.30433
TS-SCS24_10	14:00	66.83000
TS-SCS24_10	14:10	67.32449
TS-SCS24_10	14:20	67.80330
TS-SCS24_10	14:30	68.26644
TS-SCS24_10	14:40	68.71338
TS-SCS24_10	14:50	69.14465
TS-SCS24_10	15:00	69.56025
TS-SCS24_10	15:10	69.95965
TS-SCS24_10	15:20	70.34338
TS-SCS24_10	15:30	70.71144
TS-SCS24_10	15:40	71.06330
TS-SCS24_10	15:50	71.39949
TS-SCS24_10	16:00	71.72000
TS-SCS24_10	16:10	72.02954
TS-SCS24_10	16:20	72.33345
TS-SCS24_10	16:30	72.63182
TS-SCS24_10	16:40	72.92433
TS-SCS24_10	16:50	73.21129
TS-SCS24_10	17:00	73.49263
TS-SCS24_10	17:10	73.76820

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TS-SCS24_10                 17:20      74.03816
TS-SCS24_10                 17:30      74.30249
TS-SCS24_10                 17:40      74.56114
TS-SCS24_10                 17:50      74.81412
TS-SCS24_10                 18:00      75.06150
TS-SCS24_10                 18:10      75.30312
TS-SCS24_10                 18:20      75.53914
TS-SCS24_10                 18:30      75.76957
TS-SCS24_10                 18:40      75.99416
TS-SCS24_10                 18:50      76.21320
TS-SCS24_10                 19:00      76.42663
TS-SCS24_10                 19:10      76.63429
TS-SCS24_10                 19:20      76.83635
TS-SCS24_10                 19:30      77.03274
TS-SCS24_10                 19:40      77.22345
TS-SCS24_10                 19:50      77.40854
TS-SCS24_10                 20:00      77.58800
TS-SCS24_10                 20:10      77.76399
TS-SCS24_10                 20:20      77.93886
TS-SCS24_10                 20:30      78.11262
TS-SCS24_10                 20:40      78.28523
TS-SCS24_10                 20:50      78.45674
TS-SCS24_10                 21:00      78.62713
TS-SCS24_10                 21:10      78.79632
TS-SCS24_10                 21:20      78.96440
TS-SCS24_10                 21:30      79.13145
TS-SCS24_10                 21:40      79.29722
TS-SCS24_10                 21:50      79.46190
TS-SCS24_10                 22:00      79.62550
TS-SCS24_10                 22:10      79.78790
TS-SCS24_10                 22:20      79.94919
TS-SCS24_10                 22:30      80.10937
TS-SCS24_10                 22:40      80.26840
TS-SCS24_10                 22:50      80.42632
TS-SCS24_10                 23:00      80.58313
TS-SCS24_10                 23:10      80.73874
TS-SCS24_10                 23:20      80.89323
TS-SCS24_10                 23:30      81.04662
TS-SCS24_10                 23:40      81.19886
TS-SCS24_10                 23:50      81.34999
TS-SCS24_10                 24:00      81.50000

;100-year cumulative storm with a total rainfall amount of 121.1 mm using a SCS Type II 24-hr sto
TS-SCS24_100                0:00       0.00000
TS-SCS24_100                0:10       0.20353
TS-SCS24_100                0:20       0.41041
TS-SCS24_100                0:30       0.62064
TS-SCS24_100                0:40       0.83426
TS-SCS24_100                0:50       1.05123
TS-SCS24_100                1:00       1.27155
TS-SCS24_100                1:10       1.49526
TS-SCS24_100                1:20       1.72232
TS-SCS24_100                1:30       1.95274
TS-SCS24_100                1:40       2.18654
TS-SCS24_100                1:50       2.42370
TS-SCS24_100                2:00       2.66420
TS-SCS24_100                2:10       2.90810
TS-SCS24_100                2:20       3.15534
TS-SCS24_100                2:30       3.40594
TS-SCS24_100                2:40       3.65992
TS-SCS24_100                2:50       3.91726
TS-SCS24_100                3:00       4.17795
TS-SCS24_100                3:10       4.44203
TS-SCS24_100                3:20       4.70946
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TS-SCS24_100	3:30	4.98024
TS-SCS24_100	3:40	5.25441
TS-SCS24_100	3:50	5.53193
TS-SCS24_100	4:00	5.81280
TS-SCS24_100	4:10	6.09884
TS-SCS24_100	4:20	6.39150
TS-SCS24_100	4:30	6.69078
TS-SCS24_100	4:40	6.99700
TS-SCS24_100	4:50	7.30984
TS-SCS24_100	5:00	7.62930
TS-SCS24_100	5:10	7.95562
TS-SCS24_100	5:20	8.28873
TS-SCS24_100	5:30	8.62838
TS-SCS24_100	5:40	8.97488
TS-SCS24_100	5:50	9.32817
TS-SCS24_100	6:00	9.68800
TS-SCS24_100	6:10	10.05477
TS-SCS24_100	6:20	10.42808
TS-SCS24_100	6:30	10.80818
TS-SCS24_100	6:40	11.19505
TS-SCS24_100	6:50	11.58862
TS-SCS24_100	7:00	11.98890
TS-SCS24_100	7:10	12.39604
TS-SCS24_100	7:20	12.80980
TS-SCS24_100	7:30	13.23018
TS-SCS24_100	7:40	13.65750
TS-SCS24_100	7:50	14.09144
TS-SCS24_100	8:00	14.53200
TS-SCS24_100	8:10	14.99315
TS-SCS24_100	8:20	15.48764
TS-SCS24_100	8:30	16.01548
TS-SCS24_100	8:40	16.57754
TS-SCS24_100	8:50	17.17295
TS-SCS24_100	9:00	17.80170
TS-SCS24_100	9:10	18.44757
TS-SCS24_100	9:20	19.09343
TS-SCS24_100	9:30	19.73930
TS-SCS24_100	9:40	20.41262
TS-SCS24_100	9:50	21.13922
TS-SCS24_100	10:00	21.91910
TS-SCS24_100	10:10	22.76761
TS-SCS24_100	10:20	23.69604
TS-SCS24_100	10:30	24.70440
TS-SCS24_100	10:40	25.82256
TS-SCS24_100	10:50	27.07392
TS-SCS24_100	11:00	28.45850
TS-SCS24_100	11:10	30.07640
TS-SCS24_100	11:20	32.01400
TS-SCS24_100	11:30	34.27130
TS-SCS24_100	11:40	40.75580
TS-SCS24_100	11:50	57.03725
TS-SCS24_100	12:00	80.28930
TS-SCS24_100	12:10	83.95500
TS-SCS24_100	12:20	86.86140
TS-SCS24_100	12:30	89.00850
TS-SCS24_100	12:40	90.67524
TS-SCS24_100	12:50	92.16881
TS-SCS24_100	13:00	93.48920
TS-SCS24_100	13:10	94.67235
TS-SCS24_100	13:20	95.76225
TS-SCS24_100	13:30	96.75890
TS-SCS24_100	13:40	97.67321
TS-SCS24_100	13:50	98.52091
TS-SCS24_100	14:00	99.30200

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TS-SCS24_100                14:10      100.03675
TS-SCS24_100                14:20      100.74822
TS-SCS24_100                14:30      101.43639
TS-SCS24_100                14:40      102.10050
TS-SCS24_100                14:50      102.74132
TS-SCS24_100                15:00      103.35885
TS-SCS24_100                15:10      103.95232
TS-SCS24_100                15:20      104.52250
TS-SCS24_100                15:30      105.06939
TS-SCS24_100                15:40      105.59222
TS-SCS24_100                15:50      106.09175
TS-SCS24_100                16:00      106.56800
TS-SCS24_100                16:10      107.02794
TS-SCS24_100                16:20      107.47952
TS-SCS24_100                16:30      107.92287
TS-SCS24_100                16:40      108.35749
TS-SCS24_100                16:50      108.78389
TS-SCS24_100                17:00      109.20193
TS-SCS24_100                17:10      109.61140
TS-SCS24_100                17:20      110.01253
TS-SCS24_100                17:30      110.40530
TS-SCS24_100                17:40      110.78963
TS-SCS24_100                17:50      111.16552
TS-SCS24_100                18:00      111.53310
TS-SCS24_100                18:10      111.89212
TS-SCS24_100                18:20      112.24283
TS-SCS24_100                18:30      112.58522
TS-SCS24_100                18:40      112.91893
TS-SCS24_100                18:50      113.24440
TS-SCS24_100                19:00      113.56153
TS-SCS24_100                19:10      113.87009
TS-SCS24_100                19:20      114.17034
TS-SCS24_100                19:30      114.46215
TS-SCS24_100                19:40      114.74552
TS-SCS24_100                19:50      115.02054
TS-SCS24_100                20:00      115.28720
TS-SCS24_100                20:10      115.54870
TS-SCS24_100                20:20      115.80854
TS-SCS24_100                20:30      116.06672
TS-SCS24_100                20:40      116.32321
TS-SCS24_100                20:50      116.57805
TS-SCS24_100                21:00      116.83123
TS-SCS24_100                21:10      117.08263
TS-SCS24_100                21:20      117.33238
TS-SCS24_100                21:30      117.58059
TS-SCS24_100                21:40      117.82691
TS-SCS24_100                21:50      118.07161
TS-SCS24_100                22:00      118.31470
TS-SCS24_100                22:10      118.55601
TS-SCS24_100                22:20      118.79567
TS-SCS24_100                22:30      119.03367
TS-SCS24_100                22:40      119.26998
TS-SCS24_100                22:50      119.50463
TS-SCS24_100                23:00      119.73763
TS-SCS24_100                23:10      119.96885
TS-SCS24_100                23:20      120.19841
TS-SCS24_100                23:30      120.42632
TS-SCS24_100                23:40      120.65254
TS-SCS24_100                23:50      120.87710
TS-SCS24_100                24:00      121.10000

;2-year cumulative storm with a total rainfall amount of 49.8 mm using a SCS Type II 24-hr storm
TS-SCS24_2                  0:00       0.00000
TS-SCS24_2                  0:10       0.08370
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TS-SCS24_2	0:20	0.16877
TS-SCS24_2	0:30	0.25523
TS-SCS24_2	0:40	0.34307
TS-SCS24_2	0:50	0.43230
TS-SCS24_2	1:00	0.52290
TS-SCS24_2	1:10	0.61490
TS-SCS24_2	1:20	0.70827
TS-SCS24_2	1:30	0.80303
TS-SCS24_2	1:40	0.89917
TS-SCS24_2	1:50	0.99670
TS-SCS24_2	2:00	1.09560
TS-SCS24_2	2:10	1.19590
TS-SCS24_2	2:20	1.29757
TS-SCS24_2	2:30	1.40063
TS-SCS24_2	2:40	1.50507
TS-SCS24_2	2:50	1.61090
TS-SCS24_2	3:00	1.71810
TS-SCS24_2	3:10	1.82670
TS-SCS24_2	3:20	1.93667
TS-SCS24_2	3:30	2.04803
TS-SCS24_2	3:40	2.16077
TS-SCS24_2	3:50	2.27490
TS-SCS24_2	4:00	2.39040
TS-SCS24_2	4:10	2.50803
TS-SCS24_2	4:20	2.62838
TS-SCS24_2	4:30	2.75145
TS-SCS24_2	4:40	2.87738
TS-SCS24_2	4:50	3.00603
TS-SCS24_2	5:00	3.13740
TS-SCS24_2	5:10	3.27159
TS-SCS24_2	5:20	3.40858
TS-SCS24_2	5:30	3.54825
TS-SCS24_2	5:40	3.69074
TS-SCS24_2	5:50	3.83603
TS-SCS24_2	6:00	3.98400
TS-SCS24_2	6:10	4.13483
TS-SCS24_2	6:20	4.28834
TS-SCS24_2	6:30	4.44465
TS-SCS24_2	6:40	4.60374
TS-SCS24_2	6:50	4.76559
TS-SCS24_2	7:00	4.93020
TS-SCS24_2	7:10	5.09763
TS-SCS24_2	7:20	5.26778
TS-SCS24_2	7:30	5.44065
TS-SCS24_2	7:40	5.61638
TS-SCS24_2	7:50	5.79483
TS-SCS24_2	8:00	5.97600
TS-SCS24_2	8:10	6.16564
TS-SCS24_2	8:20	6.36899
TS-SCS24_2	8:30	6.58605
TS-SCS24_2	8:40	6.81719
TS-SCS24_2	8:50	7.06204
TS-SCS24_2	9:00	7.32060
TS-SCS24_2	9:10	7.58620
TS-SCS24_2	9:20	7.85180
TS-SCS24_2	9:30	8.11740
TS-SCS24_2	9:40	8.39429
TS-SCS24_2	9:50	8.69309
TS-SCS24_2	10:00	9.01380
TS-SCS24_2	10:10	9.36273
TS-SCS24_2	10:20	9.74453
TS-SCS24_2	10:30	10.15920
TS-SCS24_2	10:40	10.61902
TS-SCS24_2	10:50	11.13362

TS-SCS24_2	11:00	11.70300
TS-SCS24_2	11:10	12.36833
TS-SCS24_2	11:20	13.16513
TS-SCS24_2	11:30	14.09340
TS-SCS24_2	11:40	16.76002
TS-SCS24_2	11:50	23.45545
TS-SCS24_2	12:00	33.01740
TS-SCS24_2	12:10	34.52485
TS-SCS24_2	12:20	35.72005
TS-SCS24_2	12:30	36.60300
TS-SCS24_2	12:40	37.28841
TS-SCS24_2	12:50	37.90261
TS-SCS24_2	13:00	38.44560
TS-SCS24_2	13:10	38.93215
TS-SCS24_2	13:20	39.38035
TS-SCS24_2	13:30	39.79020
TS-SCS24_2	13:40	40.16619
TS-SCS24_2	13:50	40.51479
TS-SCS24_2	14:00	40.83600
TS-SCS24_2	14:10	41.13815
TS-SCS24_2	14:20	41.43073
TS-SCS24_2	14:30	41.71372
TS-SCS24_2	14:40	41.98683
TS-SCS24_2	14:50	42.25035
TS-SCS24_2	15:00	42.50430
TS-SCS24_2	15:10	42.74835
TS-SCS24_2	15:20	42.98283
TS-SCS24_2	15:30	43.20772
TS-SCS24_2	15:40	43.42273
TS-SCS24_2	15:50	43.62815
TS-SCS24_2	16:00	43.82400
TS-SCS24_2	16:10	44.01314
TS-SCS24_2	16:20	44.19884
TS-SCS24_2	16:30	44.38116
TS-SCS24_2	16:40	44.55989
TS-SCS24_2	16:50	44.73524
TS-SCS24_2	17:00	44.90715
TS-SCS24_2	17:10	45.07554
TS-SCS24_2	17:20	45.24049
TS-SCS24_2	17:30	45.40201
TS-SCS24_2	17:40	45.56006
TS-SCS24_2	17:50	45.71464
TS-SCS24_2	18:00	45.86580
TS-SCS24_2	18:10	46.01344
TS-SCS24_2	18:20	46.15766
TS-SCS24_2	18:30	46.29846
TS-SCS24_2	18:40	46.43569
TS-SCS24_2	18:50	46.56954
TS-SCS24_2	19:00	46.69995
TS-SCS24_2	19:10	46.82684
TS-SCS24_2	19:20	46.95031
TS-SCS24_2	19:30	47.07031
TS-SCS24_2	19:40	47.18684
TS-SCS24_2	19:50	47.29994
TS-SCS24_2	20:00	47.40960
TS-SCS24_2	20:10	47.51713
TS-SCS24_2	20:20	47.62399
TS-SCS24_2	20:30	47.73016
TS-SCS24_2	20:40	47.83564
TS-SCS24_2	20:50	47.94043
TS-SCS24_2	21:00	48.04455
TS-SCS24_2	21:10	48.14793
TS-SCS24_2	21:20	48.25064
TS-SCS24_2	21:30	48.35271

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TS-SCS24_2                  21:40      48.45401
TS-SCS24_2                  21:50      48.55463
TS-SCS24_2                  22:00      48.65460
TS-SCS24_2                  22:10      48.75383
TS-SCS24_2                  22:20      48.85239
TS-SCS24_2                  22:30      48.95026
TS-SCS24_2                  22:40      49.04744
TS-SCS24_2                  22:50      49.14393
TS-SCS24_2                  23:00      49.23975
TS-SCS24_2                  23:10      49.33483
TS-SCS24_2                  23:20      49.42924
TS-SCS24_2                  23:30      49.52296
TS-SCS24_2                  23:40      49.61599
TS-SCS24_2                  23:50      49.70833
TS-SCS24_2                  24:00      49.80000

;25-year cumulative storm with a total rainfall amount of 97.5 mm using a SCS Type II 24-hr storm
TS-SCS24_25                 0:00       0.00000
TS-SCS24_25                 0:10       0.16387
TS-SCS24_25                 0:20       0.33043
TS-SCS24_25                 0:30       0.49969
TS-SCS24_25                 0:40       0.67168
TS-SCS24_25                 0:50       0.84636
TS-SCS24_25                 1:00       1.02375
TS-SCS24_25                 1:10       1.20387
TS-SCS24_25                 1:20       1.38668
TS-SCS24_25                 1:30       1.57219
TS-SCS24_25                 1:40       1.76043
TS-SCS24_25                 1:50       1.95137
TS-SCS24_25                 2:00       2.14500
TS-SCS24_25                 2:10       2.34137
TS-SCS24_25                 2:20       2.54043
TS-SCS24_25                 2:30       2.74219
TS-SCS24_25                 2:40       2.94668
TS-SCS24_25                 2:50       3.15387
TS-SCS24_25                 3:00       3.36375
TS-SCS24_25                 3:10       3.57637
TS-SCS24_25                 3:20       3.79168
TS-SCS24_25                 3:30       4.00969
TS-SCS24_25                 3:40       4.23043
TS-SCS24_25                 3:50       4.45387
TS-SCS24_25                 4:00       4.68000
TS-SCS24_25                 4:10       4.91029
TS-SCS24_25                 4:20       5.14592
TS-SCS24_25                 4:30       5.38688
TS-SCS24_25                 4:40       5.63342
TS-SCS24_25                 4:50       5.88530
TS-SCS24_25                 5:00       6.14250
TS-SCS24_25                 5:10       6.40523
TS-SCS24_25                 5:20       6.67342
TS-SCS24_25                 5:30       6.94688
TS-SCS24_25                 5:40       7.22586
TS-SCS24_25                 5:50       7.51029
TS-SCS24_25                 6:00       7.80000
TS-SCS24_25                 6:10       8.09530
TS-SCS24_25                 6:20       8.39585
TS-SCS24_25                 6:30       8.70188
TS-SCS24_25                 6:40       9.01335
TS-SCS24_25                 6:50       9.33023
TS-SCS24_25                 7:00       9.65250
TS-SCS24_25                 7:10       9.98030
TS-SCS24_25                 7:20       10.31342
TS-SCS24_25                 7:30       10.65188
TS-SCS24_25                 7:40       10.99592
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TS-SCS24_25	7:50	11.34530
TS-SCS24_25	8:00	11.70000
TS-SCS24_25	8:10	12.07128
TS-SCS24_25	8:20	12.46941
TS-SCS24_25	8:30	12.89438
TS-SCS24_25	8:40	13.34691
TS-SCS24_25	8:50	13.82628
TS-SCS24_25	9:00	14.33250
TS-SCS24_25	9:10	14.85250
TS-SCS24_25	9:20	15.37250
TS-SCS24_25	9:30	15.89250
TS-SCS24_25	9:40	16.43460
TS-SCS24_25	9:50	17.01960
TS-SCS24_25	10:00	17.64750
TS-SCS24_25	10:10	18.33065
TS-SCS24_25	10:20	19.07815
TS-SCS24_25	10:30	19.89000
TS-SCS24_25	10:40	20.79025
TS-SCS24_25	10:50	21.79775
TS-SCS24_25	11:00	22.91250
TS-SCS24_25	11:10	24.21510
TS-SCS24_25	11:20	25.77510
TS-SCS24_25	11:30	27.59250
TS-SCS24_25	11:40	32.81330
TS-SCS24_25	11:50	45.92182
TS-SCS24_25	12:00	64.64250
TS-SCS24_25	12:10	67.59383
TS-SCS24_25	12:20	69.93383
TS-SCS24_25	12:30	71.66250
TS-SCS24_25	12:40	73.00443
TS-SCS24_25	12:50	74.20693
TS-SCS24_25	13:00	75.27000
TS-SCS24_25	13:10	76.22257
TS-SCS24_25	13:20	77.10008
TS-SCS24_25	13:30	77.90250
TS-SCS24_25	13:40	78.63863
TS-SCS24_25	13:50	79.32113
TS-SCS24_25	14:00	79.95000
TS-SCS24_25	14:10	80.54157
TS-SCS24_25	14:20	81.11438
TS-SCS24_25	14:30	81.66844
TS-SCS24_25	14:40	82.20313
TS-SCS24_25	14:50	82.71907
TS-SCS24_25	15:00	83.21625
TS-SCS24_25	15:10	83.69407
TS-SCS24_25	15:20	84.15313
TS-SCS24_25	15:30	84.59344
TS-SCS24_25	15:40	85.01438
TS-SCS24_25	15:50	85.41656
TS-SCS24_25	16:00	85.80000
TS-SCS24_25	16:10	86.17031
TS-SCS24_25	16:20	86.53388
TS-SCS24_25	16:30	86.89083
TS-SCS24_25	16:40	87.24076
TS-SCS24_25	16:50	87.58406
TS-SCS24_25	17:00	87.92063
TS-SCS24_25	17:10	88.25031
TS-SCS24_25	17:20	88.57326
TS-SCS24_25	17:30	88.88948
TS-SCS24_25	17:40	89.19892
TS-SCS24_25	17:50	89.50156
TS-SCS24_25	18:00	89.79750
TS-SCS24_25	18:10	90.08656
TS-SCS24_25	18:20	90.36892

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TS-SCS24_25                 18:30      90.64458
TS-SCS24_25                 18:40      90.91326
TS-SCS24_25                 18:50      91.17531
TS-SCS24_25                 19:00      91.43062
TS-SCS24_25                 19:10      91.67905
TS-SCS24_25                 19:20      91.92079
TS-SCS24_25                 19:30      92.15573
TS-SCS24_25                 19:40      92.38388
TS-SCS24_25                 19:50      92.60531
TS-SCS24_25                 20:00      92.82000
TS-SCS24_25                 20:10      93.03054
TS-SCS24_25                 20:20      93.23974
TS-SCS24_25                 20:30      93.44761
TS-SCS24_25                 20:40      93.65411
TS-SCS24_25                 20:50      93.85929
TS-SCS24_25                 21:00      94.06313
TS-SCS24_25                 21:10      94.26554
TS-SCS24_25                 21:20      94.46661
TS-SCS24_25                 21:30      94.66646
TS-SCS24_25                 21:40      94.86477
TS-SCS24_25                 21:50      95.06179
TS-SCS24_25                 22:00      95.25750
TS-SCS24_25                 22:10      95.45179
TS-SCS24_25                 22:20      95.64474
TS-SCS24_25                 22:30      95.83636
TS-SCS24_25                 22:40      96.02661
TS-SCS24_25                 22:50      96.21554
TS-SCS24_25                 23:00      96.40313
TS-SCS24_25                 23:10      96.58929
TS-SCS24_25                 23:20      96.77411
TS-SCS24_25                 23:30      96.95761
TS-SCS24_25                 23:40      97.13974
TS-SCS24_25                 23:50      97.32053
TS-SCS24_25                 24:00      97.50000

;5-year cumulative storm with a total rainfall amount of 68.90 mm using a SCS Type II 24-hr storm
TS-SCS24_5                  0:00       0.00000
TS-SCS24_5                  0:10       0.11580
TS-SCS24_5                  0:20       0.23350
TS-SCS24_5                  0:30       0.35311
TS-SCS24_5                  0:40       0.47465
TS-SCS24_5                  0:50       0.59810
TS-SCS24_5                  1:00       0.72345
TS-SCS24_5                  1:10       0.85073
TS-SCS24_5                  1:20       0.97992
TS-SCS24_5                  1:30       1.11101
TS-SCS24_5                  1:40       1.24404
TS-SCS24_5                  1:50       1.37896
TS-SCS24_5                  2:00       1.51580
TS-SCS24_5                  2:10       1.65456
TS-SCS24_5                  2:20       1.79524
TS-SCS24_5                  2:30       1.93781
TS-SCS24_5                  2:40       2.08232
TS-SCS24_5                  2:50       2.22873
TS-SCS24_5                  3:00       2.37705
TS-SCS24_5                  3:10       2.52730
TS-SCS24_5                  3:20       2.67945
TS-SCS24_5                  3:30       2.83351
TS-SCS24_5                  3:40       2.98950
TS-SCS24_5                  3:50       3.14740
TS-SCS24_5                  4:00       3.30720
TS-SCS24_5                  4:10       3.46994
TS-SCS24_5                  4:20       3.63645
TS-SCS24_5                  4:30       3.80673
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TS-SCS24_5	4:40	3.98095
TS-SCS24_5	4:50	4.15894
TS-SCS24_5	5:00	4.34070
TS-SCS24_5	5:10	4.52636
TS-SCS24_5	5:20	4.71588
TS-SCS24_5	5:30	4.90912
TS-SCS24_5	5:40	5.10627
TS-SCS24_5	5:50	5.30728
TS-SCS24_5	6:00	5.51200
TS-SCS24_5	6:10	5.72068
TS-SCS24_5	6:20	5.93307
TS-SCS24_5	6:30	6.14933
TS-SCS24_5	6:40	6.36944
TS-SCS24_5	6:50	6.59336
TS-SCS24_5	7:00	6.82110
TS-SCS24_5	7:10	7.05274
TS-SCS24_5	7:20	7.28815
TS-SCS24_5	7:30	7.52733
TS-SCS24_5	7:40	7.77045
TS-SCS24_5	7:50	8.01734
TS-SCS24_5	8:00	8.26800
TS-SCS24_5	8:10	8.53037
TS-SCS24_5	8:20	8.81171
TS-SCS24_5	8:30	9.11203
TS-SCS24_5	8:40	9.43181
TS-SCS24_5	8:50	9.77057
TS-SCS24_5	9:00	10.12830
TS-SCS24_5	9:10	10.49577
TS-SCS24_5	9:20	10.86323
TS-SCS24_5	9:30	11.23070
TS-SCS24_5	9:40	11.61378
TS-SCS24_5	9:50	12.02718
TS-SCS24_5	10:00	12.47090
TS-SCS24_5	10:10	12.95366
TS-SCS24_5	10:20	13.48189
TS-SCS24_5	10:30	14.05560
TS-SCS24_5	10:40	14.69178
TS-SCS24_5	10:50	15.40374
TS-SCS24_5	11:00	16.19150
TS-SCS24_5	11:10	17.11200
TS-SCS24_5	11:20	18.21440
TS-SCS24_5	11:30	19.49870
TS-SCS24_5	11:40	23.18807
TS-SCS24_5	11:50	32.45142
TS-SCS24_5	12:00	45.68070
TS-SCS24_5	12:10	47.76630
TS-SCS24_5	12:20	49.41990
TS-SCS24_5	12:30	50.64150
TS-SCS24_5	12:40	51.58979
TS-SCS24_5	12:50	52.43956
TS-SCS24_5	13:00	53.19080
TS-SCS24_5	13:10	53.86395
TS-SCS24_5	13:20	54.48405
TS-SCS24_5	13:30	55.05110
TS-SCS24_5	13:40	55.57130
TS-SCS24_5	13:50	56.05360
TS-SCS24_5	14:00	56.49800
TS-SCS24_5	14:10	56.91604
TS-SCS24_5	14:20	57.32083
TS-SCS24_5	14:30	57.71236
TS-SCS24_5	14:40	58.09021
TS-SCS24_5	14:50	58.45481
TS-SCS24_5	15:00	58.80615
TS-SCS24_5	15:10	59.14381

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TS-SCS24_5                  15:20      59.46821
TS-SCS24_5                  15:30      59.77936
TS-SCS24_5                  15:40      60.07683
TS-SCS24_5                  15:50      60.36104
TS-SCS24_5                  16:00      60.63200
TS-SCS24_5                  16:10      60.89368
TS-SCS24_5                  16:20      61.15061
TS-SCS24_5                  16:30      61.40285
TS-SCS24_5                  16:40      61.65014
TS-SCS24_5                  16:50      61.89273
TS-SCS24_5                  17:00      62.13058
TS-SCS24_5                  17:10      62.36355
TS-SCS24_5                  17:20      62.59177
TS-SCS24_5                  17:30      62.81523
TS-SCS24_5                  17:40      63.03390
TS-SCS24_5                  17:50      63.24777
TS-SCS24_5                  18:00      63.45690
TS-SCS24_5                  18:10      63.66117
TS-SCS24_5                  18:20      63.86070
TS-SCS24_5                  18:30      64.05550
TS-SCS24_5                  18:40      64.24537
TS-SCS24_5                  18:50      64.43055
TS-SCS24_5                  19:00      64.61098
TS-SCS24_5                  19:10      64.78653
TS-SCS24_5                  19:20      64.95736
TS-SCS24_5                  19:30      65.12338
TS-SCS24_5                  19:40      65.28461
TS-SCS24_5                  19:50      65.44108
TS-SCS24_5                  20:00      65.59280
TS-SCS24_5                  20:10      65.74158
TS-SCS24_5                  20:20      65.88941
TS-SCS24_5                  20:30      66.03631
TS-SCS24_5                  20:40      66.18224
TS-SCS24_5                  20:50      66.32723
TS-SCS24_5                  21:00      66.47128
TS-SCS24_5                  21:10      66.61431
TS-SCS24_5                  21:20      66.75641
TS-SCS24_5                  21:30      66.89763
TS-SCS24_5                  21:40      67.03777
TS-SCS24_5                  21:50      67.17699
TS-SCS24_5                  22:00      67.31530
TS-SCS24_5                  22:10      67.45259
TS-SCS24_5                  22:20      67.58895
TS-SCS24_5                  22:30      67.72436
TS-SCS24_5                  22:40      67.85881
TS-SCS24_5                  22:50      67.99231
TS-SCS24_5                  23:00      68.12488
TS-SCS24_5                  23:10      68.25643
TS-SCS24_5                  23:20      68.38704
TS-SCS24_5                  23:30      68.51671
TS-SCS24_5                  23:40      68.64541
TS-SCS24_5                  23:50      68.77318
TS-SCS24_5                  24:00      68.90000

;50-year cumulative storm with a total rainfall amount of 109.3 mm using a SCS Type II 24-hr stor
TS-SCS24_50                 0:00       0.00000
TS-SCS24_50                 0:10       0.18370
TS-SCS24_50                 0:20       0.37042
TS-SCS24_50                 0:30       0.56016
TS-SCS24_50                 0:40       0.75297
TS-SCS24_50                 0:50       0.94880
TS-SCS24_50                 1:00       1.14765
TS-SCS24_50                 1:10       1.34956
TS-SCS24_50                 1:20       1.55450
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TS-SCS24_50	1:30	1.76246
TS-SCS24_50	1:40	1.97348
TS-SCS24_50	1:50	2.18753
TS-SCS24_50	2:00	2.40460
TS-SCS24_50	2:10	2.62473
TS-SCS24_50	2:20	2.84788
TS-SCS24_50	2:30	3.07406
TS-SCS24_50	2:40	3.30330
TS-SCS24_50	2:50	3.53556
TS-SCS24_50	3:00	3.77085
TS-SCS24_50	3:10	4.00920
TS-SCS24_50	3:20	4.25057
TS-SCS24_50	3:30	4.49496
TS-SCS24_50	3:40	4.74242
TS-SCS24_50	3:50	4.99290
TS-SCS24_50	4:00	5.24640
TS-SCS24_50	4:10	5.50457
TS-SCS24_50	4:20	5.76871
TS-SCS24_50	4:30	6.03883
TS-SCS24_50	4:40	6.31521
TS-SCS24_50	4:50	6.59757
TS-SCS24_50	5:00	6.88590
TS-SCS24_50	5:10	7.18043
TS-SCS24_50	5:20	7.48107
TS-SCS24_50	5:30	7.78762
TS-SCS24_50	5:40	8.10037
TS-SCS24_50	5:50	8.41923
TS-SCS24_50	6:00	8.74400
TS-SCS24_50	6:10	9.07503
TS-SCS24_50	6:20	9.41197
TS-SCS24_50	6:30	9.75503
TS-SCS24_50	6:40	10.10420
TS-SCS24_50	6:50	10.45943
TS-SCS24_50	7:00	10.82070
TS-SCS24_50	7:10	11.18817
TS-SCS24_50	7:20	11.56161
TS-SCS24_50	7:30	11.94103
TS-SCS24_50	7:40	12.32671
TS-SCS24_50	7:50	12.71837
TS-SCS24_50	8:00	13.11600
TS-SCS24_50	8:10	13.53221
TS-SCS24_50	8:20	13.97852
TS-SCS24_50	8:30	14.45493
TS-SCS24_50	8:40	14.96222
TS-SCS24_50	8:50	15.49961
TS-SCS24_50	9:00	16.06710
TS-SCS24_50	9:10	16.65003
TS-SCS24_50	9:20	17.23297
TS-SCS24_50	9:30	17.81590
TS-SCS24_50	9:40	18.42361
TS-SCS24_50	9:50	19.07941
TS-SCS24_50	10:00	19.78330
TS-SCS24_50	10:10	20.54913
TS-SCS24_50	10:20	21.38710
TS-SCS24_50	10:30	22.29720
TS-SCS24_50	10:40	23.30640
TS-SCS24_50	10:50	24.43584
TS-SCS24_50	11:00	25.68550
TS-SCS24_50	11:10	27.14575
TS-SCS24_50	11:20	28.89455
TS-SCS24_50	11:30	30.93190
TS-SCS24_50	11:40	36.78455
TS-SCS24_50	11:50	51.47953
TS-SCS24_50	12:00	72.46590

TS-SCS24_50	12:10	75.77441
TS-SCS24_50	12:20	78.39761
TS-SCS24_50	12:30	80.33550
TS-SCS24_50	12:40	81.83983
TS-SCS24_50	12:50	83.18787
TS-SCS24_50	13:00	84.37960
TS-SCS24_50	13:10	85.44746
TS-SCS24_50	13:20	86.43116
TS-SCS24_50	13:30	87.33070
TS-SCS24_50	13:40	88.15591
TS-SCS24_50	13:50	88.92102
TS-SCS24_50	14:00	89.62600
TS-SCS24_50	14:10	90.28916
TS-SCS24_50	14:20	90.93130
TS-SCS24_50	14:30	91.55241
TS-SCS24_50	14:40	92.15181
TS-SCS24_50	14:50	92.73019
TS-SCS24_50	15:00	93.28755
TS-SCS24_50	15:10	93.82319
TS-SCS24_50	15:20	94.33781
TS-SCS24_50	15:30	94.83141
TS-SCS24_50	15:40	95.30330
TS-SCS24_50	15:50	95.75416
TS-SCS24_50	16:00	96.18400
TS-SCS24_50	16:10	96.59912
TS-SCS24_50	16:20	97.00670
TS-SCS24_50	16:30	97.40685
TS-SCS24_50	16:40	97.79913
TS-SCS24_50	16:50	98.18397
TS-SCS24_50	17:00	98.56128
TS-SCS24_50	17:10	98.93085
TS-SCS24_50	17:20	99.29289
TS-SCS24_50	17:30	99.64739
TS-SCS24_50	17:40	99.99427
TS-SCS24_50	17:50	100.33354
TS-SCS24_50	18:00	100.66530
TS-SCS24_50	18:10	100.98934
TS-SCS24_50	18:20	101.30587
TS-SCS24_50	18:30	101.61490
TS-SCS24_50	18:40	101.91609
TS-SCS24_50	18:50	102.20985
TS-SCS24_50	19:00	102.49607
TS-SCS24_50	19:10	102.77457
TS-SCS24_50	19:20	103.04556
TS-SCS24_50	19:30	103.30894
TS-SCS24_50	19:40	103.56470
TS-SCS24_50	19:50	103.81292
TS-SCS24_50	20:00	104.05360
TS-SCS24_50	20:10	104.28962
TS-SCS24_50	20:20	104.52414
TS-SCS24_50	20:30	104.75716
TS-SCS24_50	20:40	104.98866
TS-SCS24_50	20:50	105.21867
TS-SCS24_50	21:00	105.44718
TS-SCS24_50	21:10	105.67408
TS-SCS24_50	21:20	105.89949
TS-SCS24_50	21:30	106.12352
TS-SCS24_50	21:40	106.34584
TS-SCS24_50	21:50	106.56670
TS-SCS24_50	22:00	106.78610
TS-SCS24_50	22:10	107.00390
TS-SCS24_50	22:20	107.22020
TS-SCS24_50	22:30	107.43501
TS-SCS24_50	22:40	107.64829

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TS-SCS24_50                 22:50      107.86008
TS-SCS24_50                 23:00      108.07038
TS-SCS24_50                 23:10      108.27907
TS-SCS24_50                 23:20      108.48626
TS-SCS24_50                 23:30      108.69196
TS-SCS24_50                 23:40      108.89614
TS-SCS24_50                 23:50      109.09882
TS-SCS24_50                 24:00      109.30000

[PATTERNS]
;;Name           Type       Multipliers
;;-------------- ---------- -----------
Sanitary TP-03   MONTHLY    1.0   1.0   1.0   1.0   1.0   1.0
Sanitary TP-03              1.0   1.0   1.0   1.0   1.0   1.0

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   YES
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       643980.4075      4747589.535      647613.9825      4754619.085
UNITS            Meters

[COORDINATES]
;;Node           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
J1               645495.04        4749843.42
J10              644984.427       4751723.074
J11              645549.88        4748115.22
J12              645009.32        4748356.47
J13              644971.1         4749720.54
J14              644968.9         4749819.02
J15              644853.51        4750336.06
J16              644981.39        4750788.06
J17              645440           4751355.44
J18              645793.52        4751633.26
J19              645847.07        4752117.18
J2               645817.33        4749465.97
J20              645691.36        4751614.15
J21              645768.04        4752399.45
J22              646596.45        4752421.17
J23              646617.85        4752422.15
J24              647023.16        4751905.96
J25              646996.81        4750894.91
J26              646650.71        4750503.52
J27              646367.33        4750368.8
J28              645802.88        4750115.61
J29              645517.18        4750071.48
J3               645525.2         4748818.72
J30              644995.13        4749850.23
J31              645334.124       4751224.453
J32              645328.117       4751385.992
J4               645535.25        4748420.78
J5               645543.35        4748168.19
J6               644945.37        4749722.83
J7               645507.17        4749392.75
J8               645539.77        4748156.74
J86              645511.4         4750349.58
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J87              645881.27        4750357.52
J88              645783.96        4752124.13
J9               645545.1         4748144.25
J10 Outlet       645654.61        4747909.06

[VERTICES]
;;Link           X-Coord          Y-Coord
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Link-16          646985.327       4752420.587
PC2              645290.524       4751615.308

[POLYGONS]
;;Subcatchment   X-Coord          Y-Coord
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B1               644763.85        4749829.73
B1               644802.33        4749787.63
B1               644958.56        4749791.87
B1               644961.89        4749701.17
B1               644765.39        4749581.9
B1               644551.47        4749578.28
M1               645435.43        4749839.87
M1               645452.18        4749862.21
M1               645450.79        4749860.82
M1               645481.5         4749911.08
M1               645508.03        4749934.82
M1               645551.32        4749966.93
M1               645725.85        4750015.8
M1               645838.95        4750015.8
M1               646048.4         4749941.8
M1               646372.33        4749933.42
M1               646611.1         4749966.93
M1               646602.636       4749833.774
M1               646455.359       4749484.959
M1               646253.821       4749659.367
M1               645872.083       4749708.458
M1               645811.988       4749833.774
M1               645435.43        4749839.87
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M2               645804.39        4749845.46
M2               645870.124       4749709.751
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M2               645971.6         4749080.99
M2               645819.4         4748934.38
M3               645405.89        4748812.41
M3               645402.43        4748991.91
M3               645396.67        4749321.65
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M3               645819.41        4748934.41
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M4               645411.51        4748558.43
M4               645212.62        4748553.12
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WB2	647032.13	4751816.84
WB2	647029.91	4751893.6
WB2	647025.08	4751904.32

[SYMBOLS]

;;Gage	X-Coord	Y-Coord
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Appendix E:

Specifications

SPECIAL PROVISIONS - MUNICIPAL DRAIN

I N D E X

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B2 CONSTRUCTION 5
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f) Excavation Through Woodlots 7
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A1 ROLES

The Contractor is responsible for the construction site including all approvals required for compliance with applicable legislation not already completed by the City of Port Colborne.

The City of Port Colborne, who is further recognized as The Owner, shall be responsible party for allocation of resources in support of construction where required, such as road occupancy permits during construction.

The Drainage Engineer or the Drainage Superintendent shall supervise construction and the Drainage Engineer, Drainage Superintendent or their representative shall respond to any requests by the Contractor and identify any deficiencies between the Contractor's work and the Design documents.

The Drainage Engineer is the responsible designer and will provide technical direction to the Contractor on an as needed and as requested basis from the Drainage Superintendent or their representative.

A2 ENVIRONMENTAL CONDITONS AND COMPLIANCE

The Contractor is wholly responsible for the site environmental conditions, compliance with applicable approvals and existing legislation. The Owner will facilitate environmental approvals, but the Contractor shall control the site and be the responsible party for all construction activities.

General requirements to be fulfilled by Contractor:

a) Department of Fisheries and Oceans, DFO.
Requirements to protect Fish and Fish habitat.
b) Endangered Species Act, 2007 ONTARIO REGULATION 230/08
https://www.ontario.ca/page/species-risk
c) Ontario Water Resources Act, R.S.O. 1990, c. O.40
d) On-Site and Excess Soil Management, 2019 ONTARIO REGULATION 406/19 Environmental Protection Act
e) O. Reg. 675/98: Classification and Exemption of Spills and Reporting of Discharges, Environmental Protection Act, R.S.O. 1990

Any other legislation applicable to the jurisdiction of the works.

A3 CONSTRUCTION LAYOUT

Conditions stipulated in the Niagara Peninsula Standard Contract Document also apply. Failure to comply with these conditions will result in a reduction in payment to this item.

a) Stakes

Contractor is responsible for setting any layout, alignment or grade control stakes required for construction. A Stake shall be placed to mark every cross-section grade and a second stake shall be placed to mark the limits of the Working Zone. Work Zone Stake shall be 4' wooden stake painted red at the top of the stake. Grade stake shall be placed at the Work Zone Top of Bank. X-Section stakes shall be placed at a maximum spacing of 25m. A recommended spacing shall coincide with the Profile drawings. Prior to the start of Construction, the Contractor will stake and identify the difference between the existing grade and the design grade. The Drainage Engineer shall review the stakes and the measurement of the soil to be removed. Post Construction, the Contractor shall remove all stakes.

b) Project Signage

The Contractor is responsible for the installation and removal of all construction signage and is responsible for daily maintenance of all signage throughout the contract.

A5 INSTALL AND MAINTAIN SEDIMENT CONTROL DEVICES

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document and OPSS 577, the following shall also apply:

a) SILT FENCE

Silt fence is to be placed prior to disturbing soil adjacent to the drain that could be carried by runoff into the drain. This excludes the area of the drain where The Contractor is working to re-establish Drain grade and cross-section. It includes areas adjacent to the drain impacted by clearing and grubbing for work access.(missing is a description of where a silt fence is to be placed. How frequently across the drain.)

Silt fence shall be installed in accordance with OPSD 219.190 except that the minimum height above the invert of the drain shall be 500 mm. Silt fence materials shall be in accordance with OPSS 577.05.02.02 for geotextile and OPSS 577.05.03 for stakes. Stakes shall be 1.5 m minimum height.

The silt fence shall remain in place for the duration of the section that the Contractor is working and the Contractor shall make every effort to maintain it throughout the project. The Contractor shall request Approval from the Engineer or the Drainage Superintendent for the removal of the silt fence once each section of the drain is complete. Prior to the removal of the silt fence, the accumulated silt shall be removed and leveled adjacent to the drain in accordance with the disposal of excavated material section.

b) SEDIMENT BASINS

Sediment basins have been provided along the length of the drain in an effort to minimize the transport of sediment. The Contractor shall construct the sediment basins in accordance with the construction drawings in the locations indicated. Relocation of sediment basins can only be undertaken upon approval of the Engineer.

The Sediment basin is to be constructed prior to the upstream work and shall be monitored during construction for sediment accumulation and sediment removed if the basin has more than 50% of the 0.5m depth occupied with sediment. Once the upstream work is complete, the Sediment basin shall be converted from Construction to Final as per the Design Detail Drawings. Sediment accumulated during construction shall be removed and disposed of in the manner directed by the Contract.

A5 PAYMENT; For progress payment, fifty (50) percent of the lump sum price will be paid upon installation with the balance to be paid with the final payment.

A6 ACCESS & NOTICE

The City of Port Colborne's Drainage Superintendent or designate shall provide affected landowners with notice of the commencement of construction.

It will be the Contractor's responsibility to inform the various businesses and residences of daily construction impacts in order to reduce/eliminate any problems with parked vehicles that may interfere with their operations. Ingress & egress to the abutting businesses and residences must be maintained at all times.

The Contractor shall advise the Police Department, Fire Department and Niagara Emergency Medical Service on a daily basis, with current status of the construction as it pertains to the passage of traffic within the contract limits.

The Contractor will co-ordinate with local transit to ensure minimum interruption to bus schedules. Transit, school buses and garbage and recycling service vehicles will be given priority to maintain their schedule.

The Contractor shall also maintain/provide existing pedestrian access at all times to the businesses and residents during all phases of construction in an acceptable manner.

A6 PAYMENT; Payment as a lump sum bid for this item shall be full compensation for all labour, equipment and materials necessary to meet the above requirements. Fifty (50) percent of the lump sum price will be paid on the first payment certificate. The balance will be prorated over the remainder of the working period.

B1 EARTH EXCAVATION

Work under this item shall include the supply of all labour, equipment and materials required for ditch excavation or any other type of excavation or earth work as outlined on the Contract Drawings. Ditch work involves clearing, excavation, leveling, and seeding as required. Specifications and information on the Contract Drawings shall take precedence over the standard specifications outlined below. The specifications below shall take precedence over the Niagara Peninsula Standard Contract Document Special Provisions B2.

B2 CONSTRUCTION

a) Vegetation Removal

All trees, brush, fallen timber and debris shall be moved from the ditch cross-section and to such a distance on each side to eliminate any interference with the spreading of the spoil. The roots shall be left in the banks if no bank excavation is required as part of the new channel excavation. In wooded or heavily overgrown areas all cleared material may be pushed into piles or rows along the edge of the cleared path and away from leveled spoil. All dead trees along either side of the drain that may impede the performance of the drain if allowed to remain and fall into the ditch, shall be removed prior to excavation and put in piles, unless directed otherwise by the Engineer.

Any tree removed will be offered as wood to the property owner in the form of logs from the trunk where they lay and to be moved from the site by the owner at their expense. Tree tops shall be cut and limbs stacked as piles adjacent to the drain and within the work zone.

b) Excavation

The bottom width and the side slopes of the ditch shall be as shown on the profile(s) and/or cross-sections on the Contract Drawings. Side slopes are normally one and one-half metre horizontal to one metre vertical (1.5:1) unless otherwise noted on the Contract Drawings. If a bottom width is not specified then any excavation required shall be from the bottom of the ditch without disturbing the bank slopes subject to the clearing of brush required as described in a).

c) Profile

The profile(s) on the Contract Drawings show the depth and grade for the drain improvements. The description and elevation of benchmarks that were established during the survey are shown on the profile(s) in the location for each benchmark.

d) Line

The drain shall follow the course of the existing channel and/or shall be constructed in a straight line as outlined on the Contract Drawings. A uniform grade shall be maintained in accordance with the profile(s). A variation of one hundred millimeters (100mm) above

the required grade will require the Contractor to remedy the grade to that given on the profile. The Contractor may be required to backfill any portion of the ditch that is excavated more than two hundred millimeters (200mm) below the required grade. All curves shall be made with a minimum radius of fifteen metres (15m).

e) Excavated Material

Excavated material (spoil) shall be deposited on either or both sides of the drain as directed on the Contract Drawings. Spoil upon excavation shall be placed a minimum one (1) metre back from the top of the bank, either existing or new. No excavated material shall be placed in tributary drains, depressions, or low areas, which direct or channel water into the ditch so that no water will be trapped behind the spoil bank. The excavated material shall be placed and leveled to a maximum depth of three hundred millimeters (300mm); unless otherwise instructed. The edge of the spoil bank away from the ditch shall be feathered down to existing ground. The edge of the spoil bank nearest the ditch shall have a maximum slope of 2:1. The material shall be leveled such that it may be cultivated with ordinary equipment without causing undue hardship on farm machinery and farm personnel. Wherever clearing is necessary prior to leveling, the Contractor shall remove all stumps unless the Contract Drawings specify that stumps can be covered with the leveled spoil. No excavated material shall cover any logs, brush or rubbish of any kind. Large stones or boulders in the leveled spoil that are heavier than fifteen kilograms (15kg or approximately 300mm in size roughly referred to as man stone or the size of a stone that a single person can carry.) shall be moved to the edge of the leveled spoil nearest to the ditch but in general no closer than one metre (1) to the top of bank.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion of an existing ditch, the excavation from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and old ditch, no extra compensation will be allowed for this work. If the Contractor obtains written permission from an affected landowner stating that the owner does not wish the spoil to be leveled and such is approved by the Engineer, the Engineer may release the Contractor from the obligation to level the spoil. If spoil is not leveled that was to be leveled as part of the Contract, the Engineer shall determine the credit to be applied to the Contractor's payment. No additional compensation is provided to the owner if the spoil is not leveled.

If the affected landowner requests that the spoil be removed from the site instead of being spread adjacent to the drain within the work zone or that the grading requirement is to a higher standard than suitable for agricultural cultivation, then the Contractor shall provide trucking of the spoil including disposal at a suitable site or additional grading and shall provide the Drainage Superintendent with the specific costs for each landowner who requests such work. The Engineer shall assess the cost of the trucking of spoil to the landowner making such request.

The Engineer may require the Contractor to obtain written statements from any or all of the landowners affected by the leveling of the spoil. A written statement from the owners indicating their complete satisfaction with the leveling of the spoil is sufficient to comply

with this specification. The final decision, with respect to leveling of the spoil, shall be made by the Engineer.

f) Excavation Through Woodlots

The Contractor shall minimize disturbance through woodlots by reducing the limit of excavation to the bottom width of the drain and a minimum side slopes. The drain shall be routed around existing trees at the direction of the Drainage Superintendent or where requested by the Engineer.

Prior to performing work through a woodlot, the Contractor in coordination with the Drainage Superintendent shall mark all trees for preservation or removal within the Drain or Workzone. This mark will consist of a physical identification that will be easily understood by the landowner and consist of either colour ribbons or specific paint markings (green to keep, red mark of an ‘X’ for removal).

g) Excavation at Bridge and Culvert Sites

The Contractor shall excavate or clean through all bridges and culverts to match the grade line and the downstream channel cross-section. Bridges that span from bank to bank may be carefully removed to permit excavation below the bridge and then replaced to original condition. Permanent bridges must be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the Engineer before completing excavation in the area of a bridge or culvert if the excavation will expose the footings or otherwise cause bridge instability.

Where the invert of any pipe culvert is above the grade line, the Contractor will be required to remove the culvert, clean and relay it, so that the invert of the culvert is one hundred and fifty millimetres (150mm) below the grade for the ditch bottom at this location.

h) Obstructions

In all cases, the Contractor shall ensure that the finished drain is clear of obstructions to flow. The contractor will ensure that trunks are cut flush and that any debris or snags are removed as part of the bid price.

i) Fences and private furniture or equipment

The contractor will use the identified work zone for access and shall restore any fences to an equivalent or better condition than before construction. Where possible the Contractor shall perverse existing fences, private equipment and furniture in place but where it must be moved, the Contractor shall in all cases restore to a like or better condition than existed before construction.

j) Tile Outlets

The location of all existing tile outlets may not be shown on the profile for the drain. The Contractor shall contact each owner and ensure that all tile outlets are marked prior to commencing excavation on the owner's property. If a marked tile outlet is damaged during, or altered due to construction, the Contractor shall repair or replace the damaged or altered outlet as part of the Contract. If an existing outlet pipe does require replacement the Contractor shall confirm the replacement outlet pipe with the Engineer. All tile outlets identified are considered part of the bid work.

Additional payment will be allowed for the repair or replacement of any unmarked tile outlets encountered during excavation. Where stone or concrete riprap protection exists at any existing tile outlet such protection shall be removed and replaced as necessary to protect the outlet after reconstruction of the channel.

If any outlet becomes plugged as a result of construction, the Contractor shall be obligated to free such outlet of any impediments. Where any damage results to tile leading to and upstream of the outlet, as a consequence of such construction, the Engineer may direct the Contractor to repair such tile and shall determine a fair compensation to be paid to the Contractor for performing the work.

B3 INSTALLATION OF NEW CULVERT

Work under this item shall include the supply of all labour, equipment and materials required for supply and installation of culverts as outlined on the Contract Drawings. The Niagara Peninsula Standard Contract Document Special Provision B7 shall apply but the specifications and information on the Contract Drawings shall take precedence over Special Provision B7.

Payment shall be as per Plan Quantity.
The size and material for any new ditch crossings shall be as specified on the Contract Drawings. Any crossings assembled on-site shall be assembled in accordance with the manufacturer's specifications for on-site assembly.

Where a new crossing replaces an existing crossing the following shall apply:

If directed on the drawings that the existing crossing is to be salvaged for the owner the Contractor shall carefully remove the existing crossing and leave along the ditch or haul to a location as specified on the Drawings.

If the existing crossing is not to be saved then the Contractor shall remove and dispose of the existing crossing. Disposal by burying on-site is not permitted.

All new pipe crossings shall be installed a minimum of 100mm below design grade (not as-constructed grade) or at the invert elevations as specified on the Drawings. If the ditch is over excavated greater than 200mm the Contractor shall confirm with the Engineer the elevations for installation of the new pipe crossing.

When an existing crossing is being replaced the contractor shall save all granular and riprap. New crossings can be backfilled with compacted on-site native material that is

free of large rocks or stones. Contractor responsible for any damage to a culvert pipe as a result of rocks or stones in the backfill.

All new crossings shall have a minimum 6m laneway width and end slopes shall be at 1:1 slope or flatter. Finished crossing elevation shall provide a minimum of 300mm cover. Finished crossing surface shall be a minimum 150mm depth of Granular A for the minimum 6m width and extending from top of bank to top of bank using salvaged granular or imported granular as required.

Installation of private crossings during construction must be approved by the Engineer before the culvert is installed.

Where riprap protection is called for at either or both ends of a new culvert, such riprap shall be in accordance with Special Provision B4.
Payment will be based on plan quantity.

Riprap to be adequately keyed in along the bottom of the slope. Riprap to extend to top of pipe or as directed on the Drawings. No riprap is required in the ditch bottom on the upstream side of a crossing. If riprap is required in the ditch bottom on the downstream side of a crossing it shall be specified on the Drawings. Any new end face slope not protected by riprap shall be seeded as per specifications for ditch bank seeding.

B4 HAND LAND RIP RAP WITH FILTER CLOTH

Rip rap complete with filter fabric underlay (geotextile) shall be placed by the Contractor at the locations shown on the drawing or as requested by the Drainage Superintendent. Rip rap shall consist of 200 – 250 mm dia. stones (min.) and shall be placed at 300 mm minimum thickness. Along upstream edges, where surface water will enter the drain, the underlay shall extend a minimum of 300 mm upstream from the rip rap and be keyed into the soil a minimum of 300 mm. The finished elevation of the rip rap shall be at design elevation or flush with the ground.

Work under this item shall include the supply of all labour, equipment and materials required for placing riprap as outlined on the Contract Drawings. The Niagara Peninsula Standard Contract Document Special Provision B20 shall apply but the specifications and information on the Contract Drawings shall take precedence over Special Provision B20.

Payment shall be as per Plan Quantity.

C1 COMPLETION

At the time of final inspection, all work in the contract shall have the full dimensions and cross-sections specified.

PAYMENT; Payment is for all work complete on the basis of a measured linear distance inclusion of all items identified above. Where a culvert is removed and reinstalled, compensation shall be in the form of a per each payment. Where a tile is discovered and constructed as an outlet, compensation will be in the form of a per each payment for tile outlets repaired.

C2 AS-CONSTRUCTED DOCUMENTATION

For the 'as-constructed' works, the Contractor must provide the City of Port Colborne with an electronic version of the final drainage works as surveyed post construction, to be imported into AutoCAD or GIS. This copy must confirm that the design grade and cross-section details for all drainage work and the invert elevations and lengths for all culverts complies with the Engineer's Report. Survey spacing shall be to a minimum of 25m.

All work must be in an acceptable electronic format that the City of Port Colborne can use and all work must be completed using the verified geodetic benchmarks. The submission of the As-Constructed works will be in a common delimited format having the form as follows:

> Numeric key, Northing, Easting, Elevation, Coded identifier & optional description
> For the coded identifiers, the City of Port Colborne will provide a table for reference along with an example file from a past project for comparison. The City will certify the as-constructed files with respect to their completeness.

Failure to provide a certified as-built file will result in the delay of substantial completion and/or contract completion. In the event that the contractor asks the City to perform the AS CONSTRUCTED SURVEY, then payment for the lump sum item is negated.
A4 PAYMENT; Payment in full at the lump sum bid price for this item shall be made only upon completion and approval by the Contract Administrator.