ENGINEERING REPORT

For

OSPRINGE DRAIN

Town of Erin

County of Wellington

Date: August 23, 2019

File No. 18-074

K. SMART ASSOCIATES LIMITED

Kitchener Sudbury

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Definitions:

"Act" means The Drainage Act RSO 1990
"DFO" means Fisheries and Oceans Canada
"Drain" means Ospringe Drain
"Grant" means grant paid by Grants Ontario under OMAFRA's Agricultural Drainage Infrastructure Program (ADIP) Policy
"GRCA" means Grand River Conservation Authority
"KSAL" means K. Smart Associates Limited
"MNRF" means Ministry of Natural Resources and Forestry
"MOECP" means Ministry of Environment, Conservation and Parks
"Municipality" means Town of Erin
"OMAFRA" means the Ontario Ministry of Agriculture, Food and Rural Affairs
"Tribunal" or "Drainage Tribunal" means Agriculture, Food and Rural Affairs Appeal Tribunal
"Twp" means Township

Tables:

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
85 McIntyre Drive
Kitchener ON N2R 1H6
Tel: (519) 748-1199
Fax: (519) 748-6100
www.ksmart.ca

August 23, 2019 File No. 18-074

OSPRINGE DRAIN

TOWN OF ERIN

1 EXECUTIVE SUMMARY

This report is prepared pursuant to Section 4 of the Drainage Act RSO 1990 (the Act).

On December 12, 2017 the Municipality received a petition from Tom Krizsan (Thomasfield Homes Ltd.) for drainage for a proposed subdivision for the lands in Pt E½ and SW½ Lot 13, Concession 2 (Erin Twp). Pursuant to Section 8 of the Act, on July 19, 2018, Neal Morris, P. Eng., K. Smart Associates Limited was appointed by resolution of Council to prepare a report on the petition received.

To address the petition received, this report recommends the following:

- Improvement of 1,821m of open ditch and swale (1,241m ditch improvement on Main Drain, 122m swale incorporation on North Branch, 458m swale incorporation on South Branch)
- Incorporation of 241m of closed drain (24m in SWM Pond, 114m North Branch, 103m South Branch)
- Incorporation of a SWM Pond
- The estimated cost of this project is $481,980.
- The watershed served is approximately 416 hectares (1,028 acres).

Assessment schedules are provided for construction and future maintenance of the Drain.

- Schedule A shows the assessment of the total estimated cost
- Schedule B will be used for prorating future maintenance cost
- Schedule C will be used for levying the final cost of the Drain
- Appendix A illustrates the calculation of the assessments outlined in Schedule A.
- Appendix B illustrates the calculation of the assessments outlined in Schedule B.

2 BACKGROUND

In October 2017 GM BluePlan Engineering Limited had prepared Drawings for a proposed subdivision (Ospringe Subdivision) in N½ Lot 13, Concession 2. The Subdivision would consist of 60 residential lots (Lots 1 to 60), 11 blocks (Blocks 61 to 71) (including a block for parklands and a block for an SWM area (pond)) and 3 streets (Broughton Street, Charles Currie Crescent and McKinnon Street).

The landowner/developer Thomasfield Homes Ltd. submitted a petition to the Town on December 12, 2017. The petition was for part of E1/2 and SW1/2 Lot 13, Concession 2 in the Town of Erin that requires a sufficient outlet for a Draft Plan of Subdivision as approved by the County of Wellington. The owner of part E1/2 and SW1/2 Lot 13, Concession 2 in the Town of Erin requested that a municipal drain be created to provide adequate capacity to convey the storm drainage from the Draft Plan of Subdivision and Wellington Road 125 to a sufficient outlet.

Downstream of Wellington Road 125 the existing ditch runs along the property line to the north before turning to the west and entering an old 18”CSP culvert under an existing barn.

On July 19, 2018, K. Smart Associates Limited (Neal Morris, P.Eng.) was appointed by resolution of Council to prepare a report.

3 INVESTIGATION

3.1 On-Site Meeting

On October 2, 2018, an on-site meeting was held in accordance with S. 9(1) and 9(2) of the Act. Notice of the meeting was sent to the landowners most affected by the drain and the affected agencies.

The meeting was attended by the representatives of the petitioner, the petitioner’s engineers for the subdivision, several landowners, Town staff, Wellington County staff, representatives from the agencies/utilities (Bell, Enbridge Gas and Hydro One) and Neal Morris, P. Eng. (K. Smart Associates Limited).

The following input was provided by those in attendance:

W. Kline (005-06712)

When this landowner bought the property, there was an 18” CSP culvert under the barn that takes existing water from the road. He asked KSAL to investigate taking water along the road to outlet into the Eramosa River. He could put in a pipe along the barn. He did not want an open ditch through their property. The lower part of the property can be very wet. He said his neighbour to the west, John Deere dealer, has tiled land to the northeast corner of his property using 6” tile. There is

an existing swale along the west property line. The watershed divide is between two properties to the east.

M. Schotsch (005-09001)

Installed culvert – services under culvert by the previous landowner. Flows typically are contained in the existing ditch.

GRCA owns the land on both sides of the property. The existing culvert has not been overtopped. Wanted ditch to be cleaned out.

Has one railway tie footbridge, a ditch is very small and water floods the east of the property.

He would like a new culvert.

There is no ditch to the Eramosa River from his property. He would like work to be on the west side of the drain.

T. McLaughlin (Thomasfield Homes Ltd.) (005-05900)

They would like the proposed SWM Pond, and several storm sewers and swales on private property to be made a part of the drain.

3.2 Site Examination and Survey

The route of the proposed Main Drain was examined after the on-site meeting on October 13, 2018, and a topographic (GPS) survey was completed in October 2018, from the outlet in the Eramosa River to the upstream (south) side of Wellington Road 125 (Hwy 125). Several option routes were also surveyed. The information for the subdivision lots, blocks, streets, SWM Pond, North Branch and South Branch were taken from the subdivision drawings provided by GM BluePlan.

3.3 Watershed Description

The perimeter watershed of the Drain has been established based on-site investigation, available topographic information and the proposed subdivision plans. There are no municipal drains that have common watershed with the proposed drain.

The watershed area currently is approximately 265.5 ha agricultural lands, 90.9 ha forested lands, 41.3 ha residential lands and 18.3 ha roads.

The watershed area will be approximately 247.6 ha agricultural lands, 90.9 ha forested lands, 55.8 ha residential lands and 21.7 ha roads. The subdivision will convert 17.9 ha of agricultural lands to 14.5 ha residential lands and 3.4 ha of roads.

4 AUTHORITY FOR REPORT

Section 4 of the Drainage Act provides for the construction of new drainage works for an area requiring drainage. As a result of the analysis of the petition and of discussions at the on-site meeting and on-site examination, the area requiring drainage was determined to be the proposed subdivision lands owned by Thomasfield Homes Ltd. in the N½ Lot 13, Concession 2 (Erin Twp). The petition was signed by Tom Krizsan, President of Thomasfield Homes Ltd., who has the "authority to bind the Corporation". The signature on the petition represents all of the area requiring drainage thus the petition is valid in accordance with Sections 4(1)(a) and 4(1)(b) of the Drainage Act.

5 DESIGN CONSIDERATIONS

5.1 Sufficient Outlet

Section 15 of the Act requires that proposed work be continued downstream to a sufficient outlet. Section 1 of the Act defines sufficient outlet as "a point at which water can be discharged safely so that it will do no damage to lands or roads." For this project, it was determined that the Eramosa River provides sufficient outlet and will allow the proposed works to function as intended.

5.2 Drain Capacity

The lower portion of the Main Drain from Eramosa River upstream for approximately 940m has been sized, due to the steeper grades, to convey the 2-year storm within the channel cross-section. It is customary for open municipal drains serving agricultural or rural lands to be sized for a 2-year storm. The upper portion of the Main Drain open ditch has been sized to provide adequate capacity for a 100-year storm from the proposed subdivision in the NPt Lot 13, Concession 2. This system is designed to flood undeveloped and unoccupied lands for short periods while protecting permanent structures.

Low flow culvert crossings are designed for the 2-year storm as to allow the free flow of low water levels through them. In the event of a flood, the water will flow over the top of the crossing as well as through them, thereby not providing a major blockage in the ditch at any time.

Laneway culverts are designed for the 5-year storm.

The County road crossing satisfies the 100-year storm.

This approach is in accordance with the "Guide for Engineers Working Under the Drainage Act in Ontario" OMAFRA Publication 852 and is in accordance with the Drainage Act.

Based on discussions with the Developer's engineer, the proposed closed (storm) drains and swales on this project to be incorporated have been designed, using the Rational Method, for a 5-year storm.

The proposed SWM Pond area was designed for the 100-year storm. This SWM area has been designed for both quantity and quality control.

5.3 Soil Conditions

The Wellington County soils mapping for this area indicates that the soils adjacent to this drain are Guelph loam (loam till, good drainage, smooth moderately sloping, slightly stony), London loam (loam till, imperfect drainage, smooth very gently sloping and slightly stony) and Muck (very poor drainage, smooth basin, stone-free).

The Guelph loam soils are located in the N Pt Lot 13, Concession 2 and S Pt Lot 13, Concession 3, the London loam soils are located in the middle part of Lot 13, Concession 3 and the Muck soils are located in the N Pt Lot 13 along and for 270m± upstream of the Eramosa River.

The work in the Muck soils may require the use of mats. A portion of the Guelph loam soils in the S Pt Lot 13, Concession 3 may have possible underground springs. It is anticipated that flowing sands may be encountered in some portions.

If pockets of poor soils conditions are encountered, the contingency price from the form of the tender will be paid by the linear meter upon the engineer's approval. This contingency price is based on increased costs relating to the contractors time and materials.

5.4 Alternatives Investigated

The option to put a pipe along the barn and on the east side of the Roll No. 005-06712 property would involve 189m of ditch excavation and 75m of 600mm dia. HDPE pipe, remove and re-erect 240m of fence and excavation of 68m of swale. This option is not being pursued due to much higher costs to the project and a highly restricted working corridor.

Another option that landowners wished to be investigated was for the drain to be along the north side of Wellington Road 125 to outlet into the Eramosa River. This would involve 1,430m± road ditch excavation with a deep section involving installing guard rails and replacement of 5 laneway culverts. This option is not being pursued due to much higher costs to the project and the road/public safety issues.

6 MEETING

On February 28, 2019, a second meeting with landowners was held. Notice for the meeting was sent to all landowners in the watershed, affected agencies and the Municipality. 24 landowners had attended the meeting as well as the developer and his engineers and representatives from the Town. At the meeting, the Engineer explained the Drainage Act process and the results of the investigation to-date were presented along with a summary of the proposed work/design alternatives and preliminary cost estimates and assessments.

The following input was provided by those in attendance:

- One landowner had a question about taking the water east along Highway 125. The Engineer explained that the construction would be higher and may require guide rails due to a 3m deep ditch.
- One landowner questioned if this would cause increased flooding. The Engineer and developer's Engineer explained the pond on the developer's property would reduce the peak flow off the site. The ditch is designed for the 100-year at the top end and 2-year at the lower end. This system is designed to flood undeveloped and occupied lands for a small amount of time while protective permanent structures by draining into the Eramosa River more efficiently.
- Landowners were concerned about the cost of future maintenance. The Engineer explained that the proposal is designed to be low maintenance and only if work is done are costs assessed out. The Town has one drain which has not been maintained in the last 5 years.
- Landowners were concerned about the existing pond in the subdivision to the west of the drain. The proposed drain does account for water from this area. The proposed drain should have little negative effect on this system.
- The outlet from the 005-09001 property to Eramosa River there is approximately 1m of fall.

7 ENVIRONMENTAL CONSIDERATIONS

7.1 Agency Notification

Contact was made with the Grand River Conservation Authority, the Ministry of Natural Resources and Forestry (MNRF) and Fisheries and Oceans Canada (DFO) during the process of preparing this report. It is to be noted that MNRF is now part of the Ministry of Environment, Conservation and Parks (MOECP).

7.2 Agency Responses

7.2.1 Grand River Conservation Authority (GRCA)

The GRCA did not request an environmental appraisal under Section 6 of the Act. The GRCA received notice of public meetings conducted during the course of this project. In the fall of 2018, the engineer met GRCA at their office. GRCA approved the use of the rock riffle. They requested that a wide bottom swale into the Eramosa River be used as well as native seed. A project description and drawing package were provided to the Conservation Authority for their review on March 13, 2019. A response from the GRCA has not been received yet. The GRCA will receive a copy of this report for their review.

7.2.2 MOECP/MNRF

A screening request for species at risk was submitted to MOECP/MNRF on March 13, 2019. There has been no response from the ministry to date. It is noted however that there are no known endangered or threatened species or their habitat along the proposed ditch.

7.2.3 DFO

The Ospringe Drain is not rated under DFO's drain classification system.

A Request for Review was submitted to DFO along with a project description and drawing package on March 13, 2019. The response from DFO dated June 27, 2019, indicated the proposed works will not result in serious harm to fish or prohibited effected on listed aquatic species at risk. As such, an authorization under the Fisheries Act or a permit under the Species at Risk Act is not required. The work is to be done in the summer months in dry conditions and erosion and sediment control measures as shown in this report are to be undertaken.

8 RECOMMENDED WORK

A description of the Drain for construction and future maintenance can be found in the Special Provisions and Drawings.

8.1 Culverts

Table 8.1-1 - Summary of Culverts identifies culverts that are part of the Drain and specifies minimum sizes for future culverts, subject to the approval of the municipality as required by the maintenance section of this report.

Table 8.1-1 - Summary of Culverts

Roll Number or Road	Station	Existing Length, Size and Type	Proposed / Recommended	Responsibility
i) Main Drain				
005-09001	0+975 to 0+970	Timber/railway ties/footbridge	Twin (2) 5m lengths of 600mm dia. HDPE pipe low flow crossing	Drain
005-06716	0+800	14m of 1600mm dia. CSP laneway culvert	14m of 1600mm dia. CSP	Drain
005-06714	0+470 to 0+464	6m of 200mm dia. plastic pipe culvert	6m of 750mm dia. HDPE pipe	Drain
005-06712/ Wellington Road 125	0+062 to 0+037	20m of 450mm dia. CSP laneway culvert along N/S of road	Existing to remain and to be incorporated. 25m of 600mm dia .HDPE beside existing	Drain
Wellington Road 125	0+029 to 0+000	29m of 750mm dia. CSP	750mm dia. CSP	Road
ii) North Branch				
Access to Subd. Lot 54	0+138	None	12m of 400mm dia. CSP	Drain
Access to Subd. Lot 53	0+166	None	12m of 400mm dia. CSP	Drain
Minimum Capacity for future culverts subject to municipality approval				
005-09100	1+241 to 1+017	None	1200mm dia. HDPE	Drain
005-09100	0+903 to 0+875	None	1200mm dia. HDPE	Drain
005-06715	0+706 to 0+589	None	750mm dia. HDPE	Drain
005-06716	0+800	14m of 1600mm dia. CSP laneway culvert	1200mm dia. HDPE	Drain

Based on the responsibility noted above, culverts constructed under this report are assessed as follows:

- Drain – 50% to the listed roll number/subdivision lot number and 50% to the upstream watershed
- Road – special assessment to the road authority per Section 26
- Road/Utility – 50% to the affected utility and 50% to the road authority
- Owner – 100% to the listed roll number

Refer to the Maintenance section of this report for instructions regarding assessing future culvert maintenance costs and further instructions.

8.2 Changes to the Drain After the Bylaw is Passed

If a substantial addition, deletion, or change is made to the drain proposed in this report, a revised report can be prepared and processed through the Act, or an application can be made under the Act to the Drainage Tribunal to recognize the substantial addition, deletion or change. The application to the Tribunal must occur before final costs are levied.

9 CONSTRUCTION CONSIDERATIONS

9.1 Pre-Construction Approvals

Before starting work, the Contractor shall ensure all public utilities are located and shall contact all landowners along the proposed drain route to determine the location of any private utilities. The contractor is responsible for determining there are no utility conflicts for the proposed drainage works. No permits are required for the proposed work.

Utilities exist along Wellington Road 125 (Hwy 125). There are overhead hydro lines along both sides of the road. Work at this road allowance is subject to approval and coordination with the County of Wellington roads department.

9.2 Construction Scheduling

Construction cannot commence until 10 days after a bylaw to adopt this report is given third reading in accordance with the Act.

9.3 Minor Adjustments During Construction

Minor changes to the drain may be made during construction if the changes are approved by the Engineer and the Municipality in accordance with the Specifications in this report. Such changes must occur before final costs are levied.

Additional work desired by the landowner/s which is not part of the drainage works may be arranged with the Contractor provided the cost of the work is paid by the landowner(s) and the additional work is reviewed by the Engineer in advance. Such additional work is not part of the drainage works for future maintenance.

9.4 Substantial Alterations to the Drain

Any alterations that would affect the function of the drain which are requested by landowners, agencies or other authorities after the bylaw is passed cannot be undertaken unless the report is amended.

9.5 Alignment of Drains

All drains shall be constructed and maintained generally to the alignment as noted on the plans and specified by the Special Provisions. In the absence of survey bars, existing fences and similar boundary features are assumed to represent property lines.

Should landowners desire a more precise location for the drains in relation to their property line or if there is a dispute about the location of any property line, it is recommended that landowners obtain a legal survey at their own cost prior to construction.

10 DRAWINGS AND SPECIFICATIONS

10.1 Drawings

The location of the drain, watershed boundary and the affected properties are shown on Drawings 1 to 3 included with this report. The numbers adjacent to the drain are station numbers which indicate in metres the distance along the drain from the outlet.

The profiles for the Drain are on Drawings 4 to 7. The profiles show the depth and grade for proposed/incorporated work and future maintenance.

Drawings No. 8 to 15 contain the details and cross-sections. Drawings 16 & 17 contain the Special Provisions. The information for the profiles and details for the SWM Pond, North Branch and South Branch were taken from the proposed subdivision drawings supplied by the Developer's engineer, GM BluePlan Limited, dated November 19, 2018.

10.2 Specifications

This report incorporates the General Conditions, Standard Specifications and Special Provisions listed in the Table of Contents which govern the construction and maintenance of the drain.

11 COST ESTIMATE

The estimated cost of this project includes allowances to owners, the construction cost, the engineering cost and other costs associated with the project.

11.1 Allowances

Sections 29 to 33 of the Drainage Act provides for allowances (compensation) to owners affected by proposed drain construction. On this project, there are allowances for Section 29 (R-O-W), Section 30 (Damages) and Section 31 (Existing Drains).

11.1.1 Section 29 – Right of Way

Section 29 provides for payment of an allowance to landowners for the right of way required for construction and maintenance of the new drain. This allowance compensates the owners for land to accommodate the drain, access routes to the drain and for a corridor along the drain for construction and maintenance purposes. Right of way corridors of 5m width exist along both sides of the drain for maintenance. Current municipal assessment rolls were reviewed to establish land values for computing right of way allowances. Section 29 allowances are based on the rates in the following Table.

Table 11.1-1 - Section 29 Allowance Rates

Land Use	Area Land Value
Cultivated Lands	$ 7.55/m²
Bush Lands and Flood Plain	$ 3.78/m²

There is a minimum Section 29 allowance of $100.

11.1.2 Section 30 - Damages

Section 30 provides for payment of an allowance to landowners along the drain for damages caused by the construction of the drain. Where separate access routes to the working area are specified in this report, Section 30 allowances also account for access route damage. In agricultural areas, crop damages are computed based on published crop values and declining productivity loss in the years following construction. For this project, Section 30 allowances are based on the following rates:

Table 11.1-2 - Section 30 Allowance Rates

Land Use	Area Land Value
Cultivated Lands	$ 0.44/m²
Bush Lands and Flood Plain	$ 0.22/m²

There is a minimum Section 30 allowance of $100.

11.1.3 Section 31 – Existing Drains

Section 31 provides for payment of an allowance to the owner of an existing drain that is to be incorporated as part of the new drain. On this project the Section 31

allowances are for the SWM Pond, North Branch and South Branch to be constructed by the developer on the Thomasfield Homes Ltd. (Roll No. 005-05900) in the proposed subdivision in Pt Lot 13, Concession 2. The items to be incorporated and their costs are as shown in Table 11.1-3 – Section 31 Allowance Calculations. These items and costs were supplied by GM BluePlan Limited and are estimated costs.

Table 11.1-3 - Section 31 Allowance Calculations

Stations	Description	Unit	Quantity	Unit Price	Cost
i) SWM Pond					
0+000	1200mm dia. precast concrete manhole (MH 5.3) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000
0+000 to -0+018	17.5m of 600mm dia. concrete CL-3 storm sewer	m	18	215	3,900
-0+018	1500mm dia. concrete double ditch inlet catchbasin manhole (DDICBMH 5.2) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000
-0+018 to -0+024	7m of 300mm dia. PVC SDR 35 pipe storm sewer	m	7	100	700
-0+024	1200 x 600mm concrete double ditch inlet catchbasin (DDICB 5.1) complete with 2:1 sloped top, benching, frame and grate and connections	L.S.	1	2,500	2,500
-0+024	Construction of pond with 150mm dia. orifice plate, seeding on 450mm of topsoil, riprap, asphalt overflow weir, grading and security fence	L.S.	1	53,300	53,300
Sub Total:					**68,400**
ii) North Branch					
0+000	Precast concrete headwall for 525mm pipe with rodent gate	each	1	2,500	2,500
0+000 to 0+025	25m of 525mm dia. concrete CL-3 storm sewer	m	25	200	5,000
0+025	1500mm dia. precast concrete manhole (MH 1.1) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000
0+025 to 0+096	71m of 525mm dia. concrete CL-3 storm sewer	m	71	200	14,200
0+096	1500mm dia. precast concrete double ditch inlet catchbasin manhole (DDICBMH 1.2) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000
0+096 to 0+114	18m of 450mm dia. concrete CL-3 storm sewer	m	18	150	2,700
0+114	1500mm dia. precast concrete double ditch inlet catchbasin manhole (DDICBMH 1.3) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000

Stations	Description	Unit	Quantity	Unit Price	Cost
0+114 to 0+178	64m of swale (road ditch) ("V" ditch with 3:1 side slopes)	m	64	6	400
0+138 & 0+166	12m of 400mm dia. CSP (2.0mm wall, 68 x 13mm corrugations) driveway/laneway crossing	each	2	3,000	6,000
0+178 to 0+228	50m of swale ("V" ditch with 3:1 side slopes)	m	50	6	300
0+228 to 0+236	8m of 300mm dia. CSP (2.0mm wall, 68 x 13mm corrugation) with 20m of 0.9m high earth berm	L.S.	1	3,000	3,000
Sub Total:					**46,100**
iii) South Branch					
0+000	Rodent gate at outlet	each	1	500	500
0+000	Precast concrete headwall for 825mm pipe with rodent gate	each	1	3,500	3,500
0+000 to 0+085	85m of 825mm dia. concrete CL-3 storm sewer	m	85	250	21,300
0+085	1500mm dia. precast concrete double ditch inlet catchbasin manhole (DDICBMH 2.1) complete with benching, frame and grate and connections	L.S.	1	4,000	4,000
0+085 to 0+103	18m of 675mm dia. concrete CL-3 storm sewer	m	18	230	4,100
0+103	1200 x 600mm concrete double ditch inlet catchbasin (DDICB 2.2) complete with benching, frame and grate and connections	L.S.	1	2,500	2,500
0+103 to 0+111	8m of swale (road ditch) ("V" ditch with 3:1 side slopes)	m	8	6	100
0+111 to 0+561	450m of swale ("V" ditch with 3:1 side slopes)	m	450	6	2,700
Sub Total:					**38,200**
TOTAL VALUE OF ITEMS TO BE INCORPORATED:					**$152,700**

11.1.4 Summary of Allowances

The table below summarizes the dimensions and amounts of the allowances to be provided under this report.

Table 11.1-4 - Summary of Allowances

Roll Number	R.O.W. Width (m)	(Sec 29) ($)	Damages Width (m)	(Sec 30) ($)	Existing Drain (Sec 31)	Total ($)
i) MAIN DRAIN						
005-06712	5	16,100	10	1,800	0	17,900
005-06713	10	16,000	15	1,400	0	17,400
005-06714	10	21,900	20	2,400	0	24,300
005-06715	10	5,700	20	700	0	6,400
005-06716	10	3,500	20	400	0	3,900

Roll Number	R.O.W. Width (m)	(Sec 29) ($)	Damages Width (m)	(Sec 30) ($)	Existing Drain (Sec 31)	Total ($)
005-09001	10	4,300	20	500	0	4,800
005-09100	15	15,400	25	1,500	0	16,900
SUB TOTAL:		82,900		8,700	0	91,600
ii) SWM POND (005-05900 (SUBDIV.)						
SWM Block 62		0		0	68,400	68,400
iii) NORTH BRANCH (005-05900) (SUBDIV.)						
005-05900 (Subdiv.)	0	0	0	0	46,100	46,100
Lot 55	9	3,300	0	0		3,300
Lot 52	6	2,400	0	0		2,400
Lot 53	3	1,200	0	0		1,200
SUB TOTAL:		6,900		0	46,100	53,000
iv) SOUTH BRANCH (005-05900) (subdiv.)						
005-05900 (Subdiv.)	0	0	0	0	38,200	38,200
Lot 59	6	2,900	0	0		2,900
Lot 60	3	1,400	0	0		1,400
Lot 1	9	6,200	0	0		6,200
Lot 2	9	2,300	0	0		2,300
Lot 3	9	2,300	0	0		2,300
Lot 4	9	2,300	0	0		2,300
Lot 5	9	2,300	0	0		2,300
Lot 6	9	2,300	0	0		2,300
Lot 7	9	2,400	0	0		2,400
Lot 8	9	2,400	0	0		2,400
Lot 9	9	2,500	0	0		2,500
Lot 10	9	4,400	0	0		4,400
Lot 11	9	1,300	0	0		1,300
SUB TOTAL:		35,000		0	38,200	73,200
TOTAL:		124,800		8,700	152,700	**286,200**

In accordance with Section 62(3) of the Act, the allowances shown may be deducted from the final assessment levied. Payment to the owner would only be made when the allowance is greater than the final assessment. The allowances are a fixed amount and are not adjusted at the conclusion of construction.

11.2 Construction Cost Estimate

The estimated cost for Labour, Equipment and Materials to construct the proposed drain is outlined in detail in Estimated Costs Summary in Table 11.6-1 Estimated Cost Summary. The construction cost estimate is based on recent costs for

comparable work. A contingency amount is included to cover additional work that may be required due to field conditions or minor alterations to the project.

The contract for the drain will be awarded by public tender. If the contract price is more than 33% over the Engineer's estimate, Section 59 of the Act requires a Council meeting with the assessed landowners to determine if the project should proceed.

11.3 Engineering Cost Estimate

Engineering costs include report preparation and attending the Council meeting to consider the report and the Court of Revision

Construction Phase Services may include: preparing tender documents and tender call, review of tenders, attending pre-construction meeting, periodic construction inspection, payments, final inspection, post-construction follow-up, final cost analysis and prepare and sign the grant application.

The cost for report preparation is usually not altered at the conclusion of a project unless the report is referred back or the report is appealed to the Drainage Tribunal which would result in additional costs. The amount shown for meetings is an estimate. The final cost will be based on the actual time required for meetings. The estimate shown for construction phase services is based on past experience and assumes good construction conditions and a Contractor who completes the construction in an efficient manner. The final cost for the construction phase will vary as per the actual time spent during and following drain construction.

Engineering costs are summarized in Table 11.6-1 Estimated Cost Summary.

11.4 Estimate of Section 73 Costs

Section 73(2) and 73(3) of the Act direct that the cost of services provided by municipal staff and Council to carry out the Act process shall not form part of the final cost of the drain. However, Section 73(1) outlines that the following costs incurred by the municipality can be included in the cost of the drain: "*cost of any application, reference or appeal and the cost of temporary financing."*

The estimate of Section 73 costs is included to cover the above-referenced items from Section 73(1) and primarily provides for interest charges on financing the project until it is completed. This cost estimate may not be adequate to cover legal or engineering costs incurred by or assessed to the municipality should the project be appealed beyond the Court of Revision though such costs will form part of the final drain cost.

Grant policy indicates that municipal cost for photo-copying and mailing required to carry out the required procedures under the Act can be included in the final drain cost. This cost estimate includes an allowance for these costs.

Section 73 costs are summarized in Table 11.6-1 Estimated Cost Summary.

11.5 Harmonized Sales Tax

The Harmonized Sales Tax (HST) will apply to most costs on this project. The Municipality is eligible for a partial refund on HST paid, the net 1.76% HST is included in the cost estimates in this report.

11.6 Estimated Cost Summary

Table 11.6-1 Estimated Cost Summary

DESCRIPTION						TOTAL COST
ALLOWANCES:						**$286,200**
CONSTRUCTION COST ESTIMATE						
Item	Stations	Description	Unit	Quantity	Unit Price	Cost
i) Main Drain						
1	1+200±	Construct temporary straw bale sediment trap	each	1	800	$ 800
2	1+241 to 1+017	Power brushing 15m width	m²	3,360	2	6,700
3	1+200 to 0+975	225m of ditch clean-out (10m bottom, 2:1 side slopes). Level on east side.	m	225	15	3,400
4	1+200 to 0+975	Seeding (10m width) with native wetland seed	m²	2,250	3	6,800
5	1+017 to 0+903	Power brushing 15m width	m²	1,710	2	3,400
6	0+903 to 0+832	Power brushing 10m width	m²	710	2	1,400
7	0+975 to 0+875	100m of ditch clean-out (2m bottom, 2:1 side slopes). Level on east side.	m	100	15	1,500
8	0+975 to 0+875	Seeding (3m sides)	m²	300	1	300
9	0+975± to 0+970	Construct low flow crossing with twin (2) 5m lengths of 600mm dia. HDPE pipes and 45m² of riprap	L.S.	1	4,500	4,500
10	0+800	Existing 14m of 1600mm CSP laneway culvert to be incorporated. No work required.	m²	0	0	0
11	0+875 to 0+706	169m of debris removal and disposal	m	169	5	900
12	0+706 to 0+300	406m of ditch excavation (1m bottom, 2:1 side slopes). Level on west side.	m	406	15	6,100
13	0+706 to 0+300	Seeding (3m sides)	m²	1,218	1	1,300
14	0+600 to 0+475	Power brushing (10m width)	m²	1,250	2	2,500
15	0+470 to 0+464	Remove and dispose of existing culvert and construct new 6m of 750mm HDPE	L.S.	1	3,000	3,000

		DESCRIPTION					TOTAL COST
		laneway crossing with 6m² riprap and laneway restoration					
16	0+300 to 0+088	212m of ditch excavation, 1m bottom, 2:1 side slopes. Level spoil on west side from Sta. 0+300 to 0+175	m	212	42	8,900	
17	0+175 to 0+088	Spoil to be hauled away to use for berm at Sta. 0+125 to 0+100	m	87	6	600	
18	0+300 to 0+088	Seeding (6m sides)	m²	1,272	1	1,300	
19	0+125 to 0+100	Construct 25m long x 0.6m wide x 0.8m high earth berm on east bank using spoil from 0+175 to 0+088	L.S.	1	500	500	
20	0+102 to 0+092	Construct rock riffle 10m³ rocks (riprap)	L.S.	1	3,000	3,000	
21	0+088 to 0+062	26m of ditch excavation (1m bottom, 2:1 side slopes). Spoil to be hauled away	m	26	50	1,300	
22	0+088 to 0+062	Seeding (9m sides)	m²	234	1	300	
23	0+062 to 0+037	Construct 25m of 600mm dia. HDPE laneway crossing including 5m² of riprap at each end (10m² riprap total) and laneway restoration	L.S.	1	8,500	8,500	
24	0+037 to 0+029	8m of ditch excavation (1m bottom, 2:1 side slopes). Spoil to be hauled away.	m	8	50	400	
25	0+037 to 0+029	Seeding (9m sides)	m²	72	1	100	
26	0+029	Regrade 31m of ditch to the east along north side of road	m	31	20	600	
27	0+029	Construct 0.4m high earth berm 35m long along north bank	m	35	30	1,100	
28	0+029	Seed disturbed area (10m width)	m²	310	1	300	
29	0+029	Riprap on bends and berm	m²	25	50	1,300	
30	0+029 to 0+000	No work required. Existing 29m of 750mm dia. CSP road culvert to be incorporated.	L.S.	0	0	0	
		Sub Total Part i)				**70,800**	
v) Contingencies							
31		Lump sum contingency allowance	L.S.	1	7,100	7,100	
		Net HST (1.76%)				1,370	
		TOTAL CONSTRUCTION COST ESTIMATE:					**$79,270**

ENGINEERING COST ESTIMATE	
Report Preparation	75,000
Consideration of Report Meeting	1,200
Court of Revision	1,200
Construction Phase Services	22,300
Net HST (1.76%)	1,750
TOTAL ENGINEERING COST ESTIMATE:	**101,450**

SECTION 73 COSTS ESTIMATE	
Printing (reports)	1,200
Printing (tender)	200

DESCRIPTION			TOTAL COST
	Agencies Fees (GRCA/MOECP/DFO)	1,000	
	Interest estimate	6,700	
	Unforeseen costs	5,700	
	Net HST (1.76%)	260	
TOTAL SECTION 73 COSTS ESTIMATE:			**15,060**
TOTAL ESTIMATED COST:			**$481,980**

12 ASSESSMENTS

The Drainage Act requires that the total estimated cost be assessed to the affected lands and roads under the categories of Benefit (Section 22), Outlet Liability (Section 23), Injuring Liability (Section 23), Special Benefit (Section 24) and Increased Cost (Section 26). On this project assessment for Benefit, Special Benefit and Outlet Liability are involved.

12.1 Calculation of Assessments

The method of calculating the assessments for the Drain is illustrated in Appendix A which has been included with this report. Appendix A divides the drain into intervals. The estimated cost for each interval is then determined. For each interval the first step in the assessment calculation is to determine the benefit assessment to the affected lands and roads, then special assessments to roads and utilities are determined, where applicable. After deducting the total benefit and special assessments from the interval cost the balance of the cost is then assessed as outlet liability on a per hectare basis to all lands and roads in the watershed.

12.2 Benefit Assessments (Section 22 and 24)

Section 22 benefits were determined based on the estimated value the drain provides to the property and are not proportional to watershed area.

Section 24 special benefit is assessed to lands where additional work or features are requested that have no effect on the function of the drain. Special benefit examples include hauling spoil offsite, aesthetic features and installing lateral drains. Non-grantable benefits relate to work that is not eligible for Grant according to the current OMAFRA policy. Non-proratable benefits are not used to determine the actual cost factor for the final cost levy. Some examples would be lateral drains, culverts or hauling of spoil. Columns with non-grantable and non-proratable are used to complete the final assessment. Table 12.2-1 - Benefit Assessments provides a summary of the benefit assessments. The Special Benefit to Roll No. 005-09001 is for ½ of the cost of the new low flow crossing at Stn. 0+975±. The Special Benefit to Roll No. 005-09100 is for wetland native seed mix and other required environmental features and the Special Benefit to Roll No. 005-06714 is for ½ of the cost of the new culvert at Stn. 0+465±.

Table 12.2-1 - Benefit Assessments

Roll Number	Location	Section 22	Section 24	Total Benefit	Non-grantable	Non-proratable
005-06715	Main Dr, Int. 1	2,900		2,900		
005-06716	Main Dr, Int. 1	7,300		7,300		
005-09001	Main Dr, Int. 1	7,300	2,250	9,550		2,250
005-09100	Main Dr, Int. 1	25,200	11,800	37,000		
005-06712	Main Dr, Int. 2	19,100		19,100		
005-06713	Main Dr, Int. 2	25,100		25,100		
005-06714	Main Dr, Int. 2	24,800	1,500	26,300		1,500
005-06715	Main Dr, Int. 2	5,800		5,800		
Wellington Road 125 (Hwy 25) (County of Wellington)	Main Dr, Int. 2	12,600		12,600		
005-05900	Main Dr, Int. 2	20,600		20,600		
Wellington Road 125 (Hwy 25) (County of Wellington)	Main Dr, Int. 3	2,000		2,000		
005-05900	Main Dr, Int. 3	2,000		2,000		
005-06712	Main Dr, Int. 3	2,100		2,100		
005-05900 (subdiv.)	SWM Pond	84,200		84,200		
005-05900 (subdiv.)	North Br	50,900		50,900		
005-05900(subdiv.)	South Br	66,400		66,400		
TOTALS:		358,300	15,550	373,850		3,750

12.3 Outlet Liability Assessments (Section 23)

Section 23(3) of the Drainage Act states that outlet liability assessment is to be based on the volume and rate of flow of the water artificially caused to flow. To satisfy this requirement, the lands and roads in the watershed are assessed on a per hectare basis, with adjustments made to recognize the different amount of runoff generated by different land uses. The basis for the adjustments is 1 hectare of cleared agricultural land contributing both surface and subsurface water to the drain. Land uses with a different runoff rate are adjusted by the factors given in Table 12.3-1 - Runoff Factors Table.

Table 12.3-1 - Runoff Factors Table

Land Use	Runoff factor
Agricultural	1.0
Forest	0.5
Built-up	1.5
Gravel Road	2.0
Paved Road	3.0
Unopened Road	1.0

12.4 Assessment Schedules

12.4.1 Schedule A- Schedule of Assessments

The estimated cost for the drainage works in this report is distributed among lands, roads and utilities as shown in Schedule A, the Schedule of Assessments. In Schedule A each parcel of land assessed has been identified by the municipal assessment roll number at the time of the preparation of this report. The size of each parcel was established using the assessment roll information. For convenience only, each parcel is also identified by the owner name(s) from the last revised assessment roll.

12.4.2 Schedule B -Schedule of Assessments for Maintenance

In accordance with Section 74 of the Act, the Drain shall be maintained by the municipality and the cost of maintenance shall be assessed to lands and roads upstream of the maintenance location, prorata with the amounts in Schedule B. The amounts in Schedule B are derived from the cost distribution shown in Appendix B, and will not be levied with the final cost of the drainage works.

Roll numbers are per the Municipality's last revised assessment roll, names included for convenience. Amounts are not payable at this time, they determine the share of future maintenance cost. Eligibility for grant will be confirmed by the municipality at the time the maintenance cost is levied.

Schedule B is divided into columns to reflect the different drain intervals where maintenance work may be undertaken. These column intervals assist in identifying upstream lands and roads to be assessed for future maintenance. The percentages shown in Schedule B determine the share of future maintenance to be levied to a property or road. For example, a $1,000 beaver dam removal or tile repair will result in a $50 assessment to a property with a 5% maintenance assessment.

A minimum assessment of 0.01% is to be applied to all future small lots in the watershed per interval.

12.4.3 Schedule C – Schedule for Actual Cost Bylaw

After the construction of the drain is certified complete by the Engineer the municipality will determine the actual cost of the drain. Actual assessments will be determined by prorating the actual cost of the drain using Schedule C. Schedule C illustrates the estimated net assessments after deducting allowances and grants from the total assessments shown in Schedule A. Eligibility for grant will be confirmed by the municipality at the time the actual cost is levied. Actual assessments in Schedule C will be levied to the owner of the identified parcel at the time the Actual Cost Bylaw is passed.

13 GRANT

In accordance with the provisions of Section 85 of the Act, a grant not exceeding 1/3 (33-1/3%) may be available on the assessments against lands used for agricultural purposes. Current OMAFRA grant policy defines agricultural lands as privately owned parcels of land which have the Farm Property Class Tax Rate. Based on Municipal assessment roll information, parcels that have the Farm Property Tax Class are identified with an 'F' in the first column of the assessment schedules.

Section 88 of the Act provides for the Municipality to apply for this grant after the construction of the drain is certified complete by the Engineer. The municipality must confirm the Farm Property Tax Class on the assessed parcels at the time the grant application is completed and submitted to OMAFRA. OMAFRA has the authority to determine grant eligibility regardless of the designation herein.

If any portion of the drainage works is not eligible for grant, those ineligible costs have been separately identified in this report.

14 PRIVACY OF LANDS

Although a municipal drain is situated on the property of various landowners, one landowner may not enter another landowner's property by means of the drain. Persons authorized to enter private lands to carry out duties authorized under the Act include: Engineers (or their assistants), Contractors (or their assistants) and the appointed Drainage Superintendents (or their assistants).

15 MAINTENANCE

15.1 General

Section 74 of the Act requires the Drain, as outlined in this report, to be maintained by the Municipality, and the cost of maintenance to be assessed to the upstream lands and roads prorata with the assessments in Schedule B.

All parties affected by the Drain, are encouraged to periodically inspect the drain and report any visible or suspected problems to the Municipality.

A right-of-way along the drain and access routes to the drain exist for the Municipality to maintain the drain. The right-of-way for the drain as described in the Allowances section of this report shall remain free of obstructions. The cost of removing obstructions is the responsibility of the owner.

Any landowner making a new connection to the Drain shall notify the Drainage Superintendent before making the connection. If the Drainage Superintendent is not notified, the cost to remedy new connections that obstruct or otherwise damage the drain will be the responsibility of the owner.

The discharge of anything but clean, unpolluted water into a drain is regulated by other provincial legislation. Any non-compliance will be reported to the appropriate environmental agency.

It is recommended that each abutting owner work no closer than 1.2m (4 ft) to any ditch bank. Such area does not have to be grassed but it should not be cultivated.

15.2 Updating Future Maintenance Schedules

To ensure future maintenance assessments are equitable, the assessments provided in this report should be reapportioned under Section 65 when severances or amalgamations occur, when new lands are connected to the Drain or when a land-use change occurs that can be accommodated by the existing Drain. If a future land-use change will cause the drain capacity to be exceeded, a report under Section 4 or 78 may be required to provide increased capacity.

15.3 Culvert Maintenance

- The costs of cleaning through all culverts shall be assessed as drain maintenance to upstream lands and roads.
- The cost for future structural repair, extension or replacement of road culverts will be assessed fully to the road authority.
- When the responsibility for an access culvert is designated in Table 8.1-1 - Summary of Culverts as “Drain,” the cost for repair or replacement shall be assessed 50% to the abutting landowner and the remainder to the upstream watershed. The cost of an additional culvert length is assessed to the owner.
- When the responsibility for an access culvert is designated as “Owner,” the cost for installation, repair, replacement and removal are the responsibility of the roll number listed in Table 8.1-1 - Summary of Culverts.
- Culverts installed to service public utilities shall be assessed 50% to the utility and 50% to the affected land or road.
- Prior approval of the Municipality is required before a landowner installs a culvert not constructed under this report. The culvert shall be installed per sizing listed in Table 9.1-1 and design grade specified in this report. If culverts smaller than the minimum recommended size are installed, such culverts will be deemed an obstruction to the drain and removed at the landowner’s expense.

16 BYLAW

This report including the drawings and specifications, assessment schedules and appendices, when adopted by bylaw in accordance with the Act, provides the basis for construction and maintenance of the Drain.

All of which is respectfully submitted,

K. SMART ASSOCIATES LTD.

N. Morris, P. Eng.

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