

PRELIMINARY REPORT

IRVINE ROAD DRAIN

Town of Niagara-on-the-Lake

(Geographic Township of Grantham)

Region of Niagara

March 20, 2020

File No. 19-047



K. SMART ASSOCIATES LIMITED
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Definitions:

“Act” means The Drainage Act RSO 1990

“CSP” means corrugated steel pipe

“Drain” means Irvine Road Drain

“Grant” means grant paid by Grants Ontario under OMAFRA’s Agricultural Drainage Infrastructure Program (ADIP) Policy

“HDPE” means high density polyethylene

“Municipality” means Town of Niagara-on-the-Lake

“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



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PRELIMINARY REPORT IRVINE ROAD DRAIN

Town of Niagara-on-the-Lake

1.0 EXECUTIVE SUMMARY

This is a Preliminary Report for Irvine Road Drain, prepared pursuant to Section 10 of the Drainage Act, RSO 1990 (the Act) as a result of a petition under Section 4 of the Act.

The Town received a *Petition* under Section 4 from the owners of:

- 1499 Irvine Road (Roll No. 020-016-05100), filed November 23, 2018,
- 1513 Irvine Road (Roll No. 020-016-05200), filed November 30, 2018,
- 1521 Irvine Road (Roll No. 020-016-06805), filed November 21, 2018,
- 1527 Irvine Road (Roll No. 020-016-06800), filed November 24, 2018,
- 1481 Irvine Road (Roll No. 020-016-05000), filed November 21, 2018,
- WS Irvine Road (Roll No. 020-016-10150), filed November 23, 2018,
- 10 Firelane 12B (Roll No. 020-016-09800), filed November 16, 2018,
- 8 Firelane 12A (Roll No. 020-016-05800), filed November 18, 2018,
- 1496 Irvine Road (Roll No. 020-016-10200), filed November 16, 2018,
- 1439 Irvine Road (Roll No. 020-016-04700), filed November 16, 2018,
- 1482 Irvine Road (Roll No. 020-016-10201), filed November 16, 2018,
- 600 Lakeshore Road (Roll No. 020-016-04300), filed November 16, 2018,
- ES Irvine Road (Roll No. 020-016-04900), filed November 16, 2018
- 620 Lakeshore Road (Roll No. 020-016-04200), filed November 15, 2018
- NS Lakeshore Road (Roll No. 020-016-04600), filed November 16, 2018
- 1464 Irvine Road (Roll No. 020-016-10301), filed November 20, 2018
- 1283-1301 Irvine Road (Roll No. 020-016-07800), filed November 17, 2018
- 12A Firelane Road (Roll No. 020-016-04900), filed November 20, 2018

K. Smart Associates Limited was appointed by by-law of Council (By-Law 5123-19) on January 14, 2019 to prepare a Preliminary Report on the Section 4 petition.

The objective for this Preliminary Report is to review existing conditions, summarize input received from stakeholders, present options considered, estimate costs and provide recommendations for Irvine Road Drain.

Due to the urban setting along Irvine Road, landowner engagement for this project included public meetings, site investigation, surveying and preparation of drawings.

The location of the existing private drain, and preferred alternatives considered are shown on the Drawings 1 and 2 included with this report.

Irvine Road Drain highlights:

- Alternative A
 - Watershed area is approximately 116.0 hectares (286.6 acres)
 - Proposed work includes 312m of 750mm (30") dia. HDPE storm pipe and 3 offset connections to the existing private drain, each 300mm (12") dia. HDPE pipe (1 – 16m length, 1 – 36m length and 1 – 48m length)
- Alternative B
 - Watershed area is approximately 110.7 hectares (273.5 acres)
 - Proposed work includes 399m of 450mm to 750mm (21" to 30") dia. HDPE storm pipe and 3 offset connections as in Alternative A. Also 24m of existing ditch cleanout incorporating 260m of existing ditch and twin (2) 12m lengths of 750mm dia. HDPE laneway crossing
- Main Drain Upstream (This is in addition to Alternatives A or B) (General Work)
 - Watershed area is approximately 110.7 hectares (273.5 acres)
 - Proposed work involves incorporating 214m of existing ditch/swale, 246m of new ditch excavation, 286m of existing ditch bottom cleanout and removing and replacing existing Lakeshore Road crossing with 22m of 600mm dia. HDPE pipe

At the Council meeting to consider the Preliminary Report, Council may direct the Engineer to proceed with preparation of a final report under Section 4 of the Drainage Act to provide for construction of the Irvine Road Drain.

2.0 INVESTIGATION

2.1 Project Scoping Meeting

On November 1, 2018 a “scoping meeting” was held at which time the affected residents/landowners were informed that the existing system is a private system and that the Town could not expend public funds on a private system.

The residents were also informed of the findings of the in-pipe CCTV camera inspection and advised that a storm sewer pipe could be installed on Irvine Road. The residents were further advised that filing a petition to have the system become a municipal drain should resolve the issues regarding drainage and future maintenance. Otherwise it will remain a private system and will continue to be the responsibility of the individual landowners.

2.2 On-Site Meeting

The first public meeting (on-site meeting) was held on March 7, 2019 at the Centennial Arena in Virgil. Nine landowners attended the meeting along with the Drainage Superintendent and other staff from the Town and Neal Morris, P.Eng. K. Smart Associates Limited.

Items Discussed:

John Van Der Zalm (1499 Irvine Road)

John stated that his property floods in the spring and there is not enough capacity in the existing drain.

Robert Enns (1301 Irvine Road)

Robert indicated that he has no problem with flooding on his property and has a 24" tile. His land is tiled and has catchbasin to the tile.

Judith Benezra (10 Firelane 12B)

Judith said that she has water sitting from the existing tile drain across her property and has a big manhole in the yard. She also said that there usually is not any problem with the drain, except during heavy events when water comes out of the top of the manhole.

John Thwaites (600 Lakeshore Road)

John said that his land is all tiled to the Airport Drain with 8" pipe.

Jim Meyers (552 Lakeshore Road)

Jim said that his property has no problems with flooding.

Simon Haecker (1513 Irvine Road)

Simon said that he has flooding in the spring. He said to just remove blockage downstream of the Firelane and to fix the culvert across it.

Stephanie Reis (1527 Irvine Road)

Stephanie stated that her property has flooding in the spring.

Robert Stewart (1439 Irvine Road)

Robert said that he does not have flooding but has seen some of it in the spring.

Arnold Lepp (1481 Irvine Road)

Arnold stated that the existing system is fine on his property and he does not want more water in the tile.

Brett Ruck/Rene Landry (Drainage Superintendent and Assistant)

Rene said that the system had an in-pipe camera (video) inspection and part of it is in poor condition, and there are problems on the Irvine Road crossing.

They also said that the existing tile drain system is private.

Rene said that the Region is planning to work on Lakeshore Road.

Brett indicated that the new system could go along Irvine Road to the lake.

2.3 Existing Drainage

There is an existing private drain consisting mostly of pipe varying in size from 525mm at the downstream end of the drain at the outlet into Lake Ontario, to 675mm (21" to 27") pipe at the upper end with a short section of ditch on one property. This private drain commences at an outlet into Lake Ontario in the west part of Lot 3, Concession 1, west of Irvine Road, crosses the road approximately 30m south of the Lake, then continues southerly across private lands to the property line between Roll No's 016-05000 and 016-05100.

In August 2018, in-pipe (CCTV) camera inspection was completed by the Town to evaluate the private drain condition. These videos were reviewed. All videos show the existing tile drain is in poor structural condition throughout with most tiles showing multiple cracks. Roots, sediment buildup and protruding private drainage connections were also encountered in multiple locations.

The existing 525mm to 675mm diameter pipe drain and ditch is undersized based on current land-use in the watershed, is in poor structural condition and has reached the end of its expected life-cycle.

Upstream of the pipe drain southerly across Lot 2, Concession 1 to the north side of Lakeshore Road, there is an existing ditch/swale with a 600mm CSP across Lakeshore Road.

In Lot 3, Concession 1 there is an existing ditch that outlets in Lake Ontario approximately 300m west of Irvine Road, then continues southeasterly in Lot 3 and ends approximately 153m west of Irvine Road.

3.0 AUTHORITY FOR REPORT

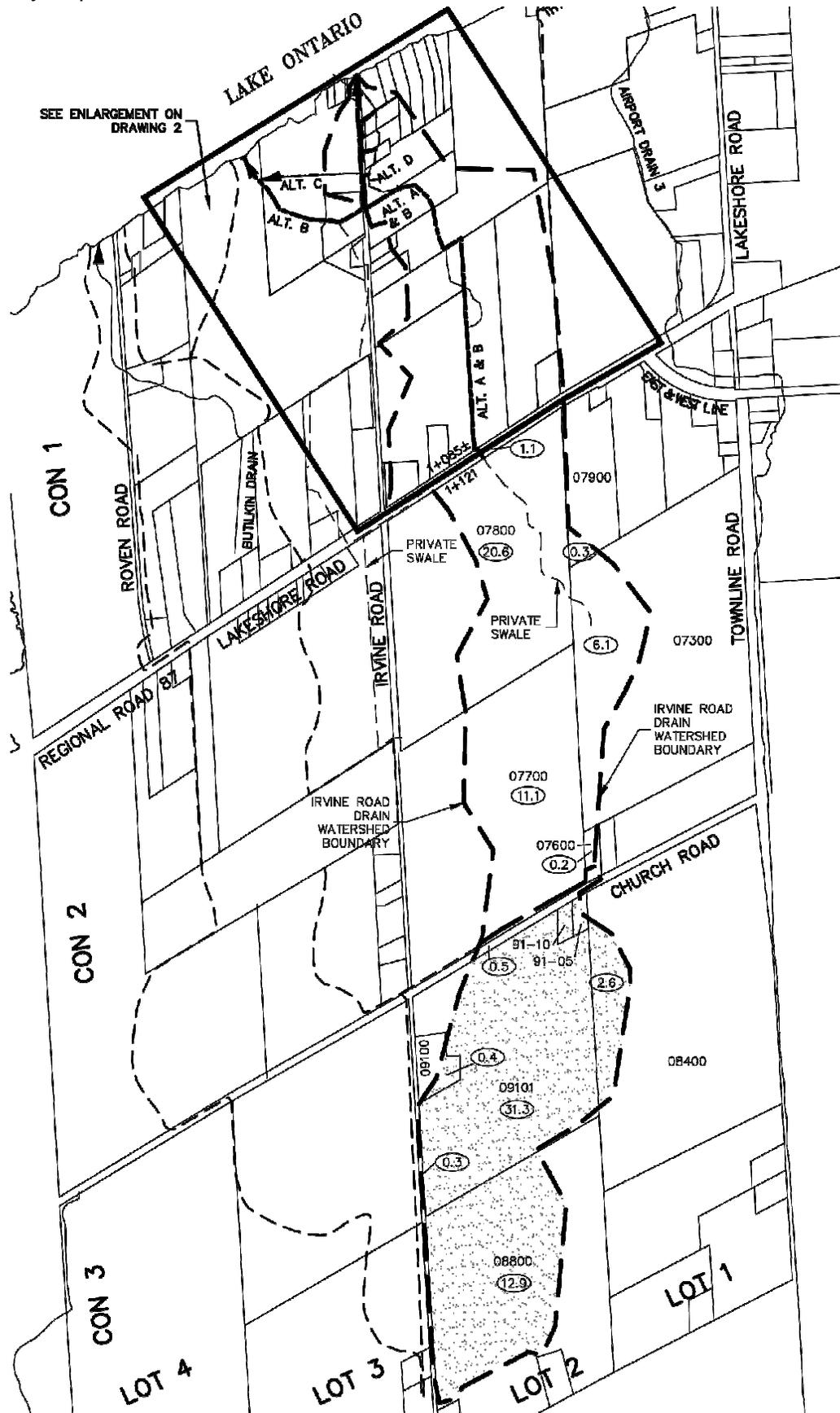
3.1 Section 4 Petition and Area Requiring Drainage

Section 4 of the Act provides for the construction of new drainage works for an area requiring drainage. As a result of on-site examination and discussions, the area requiring drainage was determined to be the lands along the existing private pipe drain and the existing ditch in Lots 2 and 3, Concession 1 and the north part of Lot 2, Concession 2. This area consists of 22 properties. Seventeen (17) properties have signed the petition, and therefore, the petition is valid in accordance with Section 4(1)(b) of the Act.

4.0 DESIGN CONSIDERATIONS

4.1 Watershed Description

The watershed for the Drain was confirmed by reviewing the historic watershed boundary, drawings for adjacent drainage systems, topographic data and field inspection. See Sketch 1 for details of the watershed. To the east, the Drain shares a common watershed boundary with Airport Drain 3, and to the west, the watershed boundary is shared with the Butilkin Drain.



Sketch 1. Watershed Sketch

4.2 Sufficient Outlet

Section 15 of the Drainage Act requires that every drainage works be continued to a sufficient outlet. Sufficient outlet is defined as “the location where the flow from a drain can be discharged without causing additional damage to downstream lands or roads”.

The outlet is Lake Ontario for both alternatives. Due to the size of the outlet, no additional damage downstream is anticipated. Therefore, a sufficient outlet is achieved.

4.3 Drain Capacity

The existing private drain pipe and ditches and options for improvement were evaluated using a 2-D PCSWMM, a computer model that incorporates both hydrologic and hydraulic computations. Updated watershed boundaries, conveyance system information, and rainfall events from the 2-year to 100-year storm return period were included in the modeling work. Hydrographs were based on the 12-hour, SCS Type 2 storm distribution. The model calculated the stormwater runoff resulting from rainfall events and computed the hydraulic grade line for various scenarios.

4.3.1 Ditch Portion

Abutting landowners indicated the existing ditch has sufficient capacity in its current form, provided the ditch is maintained and free of obstructions. Survey of key locations along the ditch uses existing grade of an average bottom width of 1m.

Initial modelling suggests minor improvements in the channel cross-section and grade line will provide conveyance up to the 2-year storm, provided the ditch is clean. However, more detailed review of channel capacity and design considerations will be required if a final report on the Drain is prepared. At that time, any significant updates affecting runoff in the watershed should be considered, along with available floodplain modelling data.

4.3.2 Tile Portion

The piped portion of the drain were sized using the a PC-SWMM model.

The pipe portions of the Drain were sized to convey the 100-year storm event, resulting in diameters from 450mm to 750mm. Compared to the capacity of the existing drain, the proposed system provides three to five times more capacity on private lands.

The model predicts the duration of surface ponding in low areas will be less than twelve hours for the 100-year storm event.

4.4 Utilities

Available drawings were reviewed for the general location of existing utilities. The drain alternative routes and associated costing in this report minimizes utility conflicts.

There may be existing underground Bell and gas lines along Irvine Road that would have to be pre-located and confirmed prior to any work along the road. There are also overhead hydro lines along and crossing the road.

5.0 ENVIRONMENTAL CONSIDERATIONS

5.1 Niagara Peninsula Conservation Authority (NPCA)

A meeting was held with NPCA to review various options, and they had one major concern at this point. A shoreline engineer report would be required for the pipe outlet into Lake Ontario

5.2 Fisheries and Oceans Canada (DFO)

The existing drain is a covered system, so no fish habitat is anticipated for the drain. An environmental analysis has been completed at the outlet into Lake Ontario no Critical species were identified at this time.

5.3 Ministry of Environment, Conservation and Parks (MECP)

To ensure compliance with the Endangered Species Act, during the preparation of the final report, MECP's *Guide to Preliminary Screening for Species at Risk* was done, and only a Bird's Foot Violet was located in this area. The proposed drainage works submitted to MECP, if necessary, will be done for the final report.

5.4 Archaeological Assessment

An archaeological assessment will be completed, by a third party, as part of the final report.

6.0 ADDITIONAL MEETINGS

6.1 Public Information Meeting

On October 29, 2019, a public meeting was held at the Town Administrative Offices in Virgil. Notice for the meeting was sent to all landowners in the updated watershed. Fourteen landowners attended the meeting along with the Drainage Superintendent and staff from the Town, and K. Smart Associates.

At the information meeting, a summary of progress to-date was provided, including:

- Overview of landowner input obtained during site-specific discussions
- Description of the options (Alternatives A to D) evaluated and the various constraints and advantages of each
- The estimated cost of various option combinations
- Explanation of assessment principles that apply to Drainage Act projects
- Estimated assessment ranges for affected lands in the watershed

7.0 ALTERNATIVES

As summarized in Section 2.3, the existing private pipe/ditch drain clearly requires improvement, thus the “do nothing” approach was not given serious consideration. In the absence of an imminent, alternative process to install storm drainage infrastructure in the existing service area for the Drain, it is necessary to provide recommendations/alternatives to improve the Drain and address the Section 4 petition.

In order to review and evaluate alternatives for improvements, there are five (5) alternatives: Alternatives A, B, C and D, and Main Drain upstream. Alternatives A to D were presented at the second meeting on October 29, 2019. The location of each alternative is shown on Drawings 1 and 2 included with this report. A sketch for each alternative is also included in the report for reference.

7.1 Alternative A

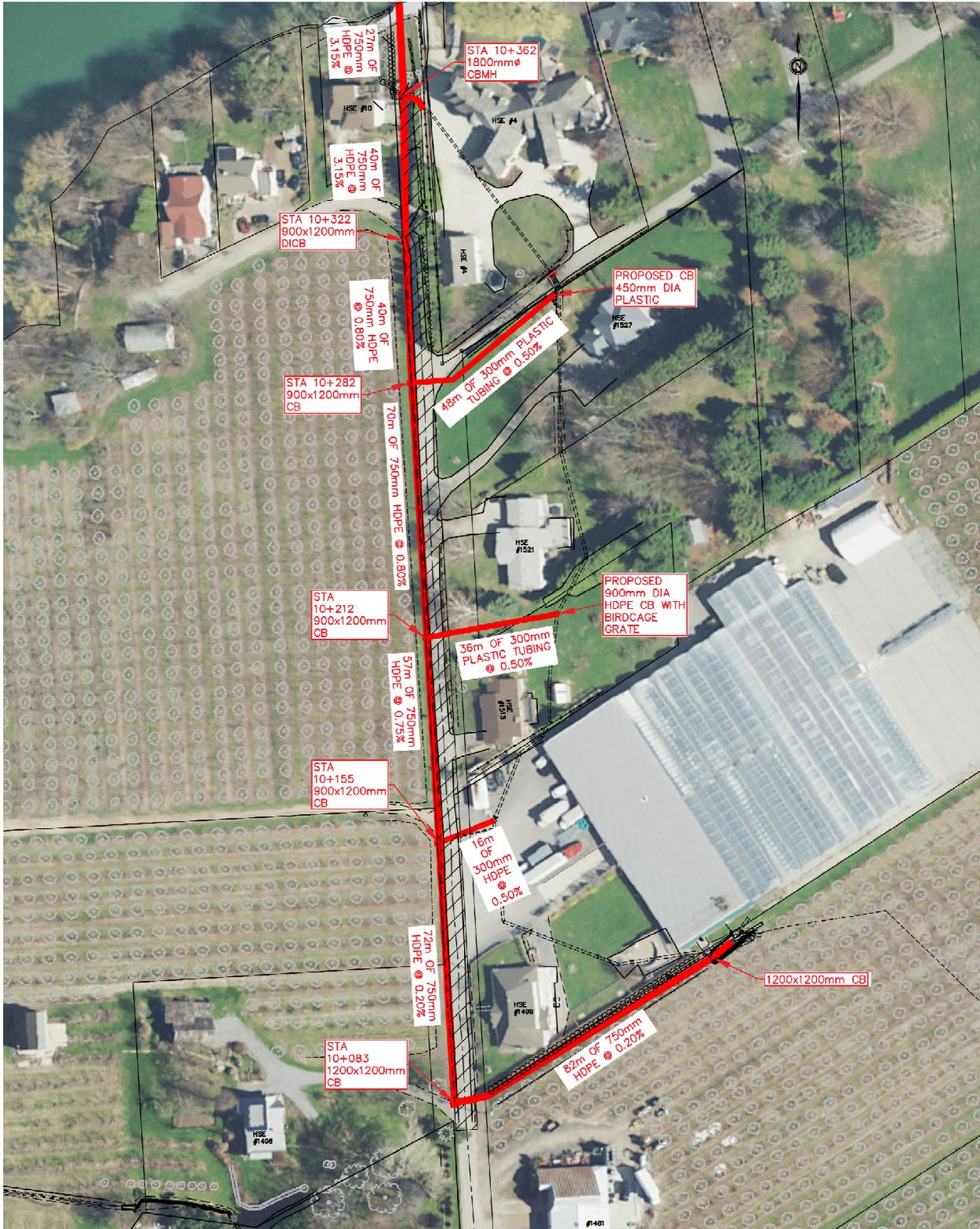
7.1.1 Description

Alternative A would commence at a proposed outlet into the Lake and would be along the west side of Irvine Road south for 306m, then east crossing Irvine Road and continuing east for 74m along the Roll No. 05000/05100 property line. It would consist of 388m of 750mm dia. HDPE pipe with rodent gate at outlet, 1 – 900 x 1200mm DICB, 3 – 900 x 1200mm CB's, 2 – 1200 x 1200mm CB's, 1 – 1800mm dia. CBMH and 45m of berm work. This alternative also includes 3 offset connections to the existing private drain with 300mm dia. plastic tubing.

7.1.2 Discussion

This alternative is one of the preferred options that were presented at the October 2019 meeting and is costed in detail herein. This is one of the preferred options and is the best solution from a future maintenance perspective.

The following Sketch 2 illustrates the location of Alternative A.



Sketch 2. Alternative A Sketch

7.2 Alternative B

7.2.1 Description

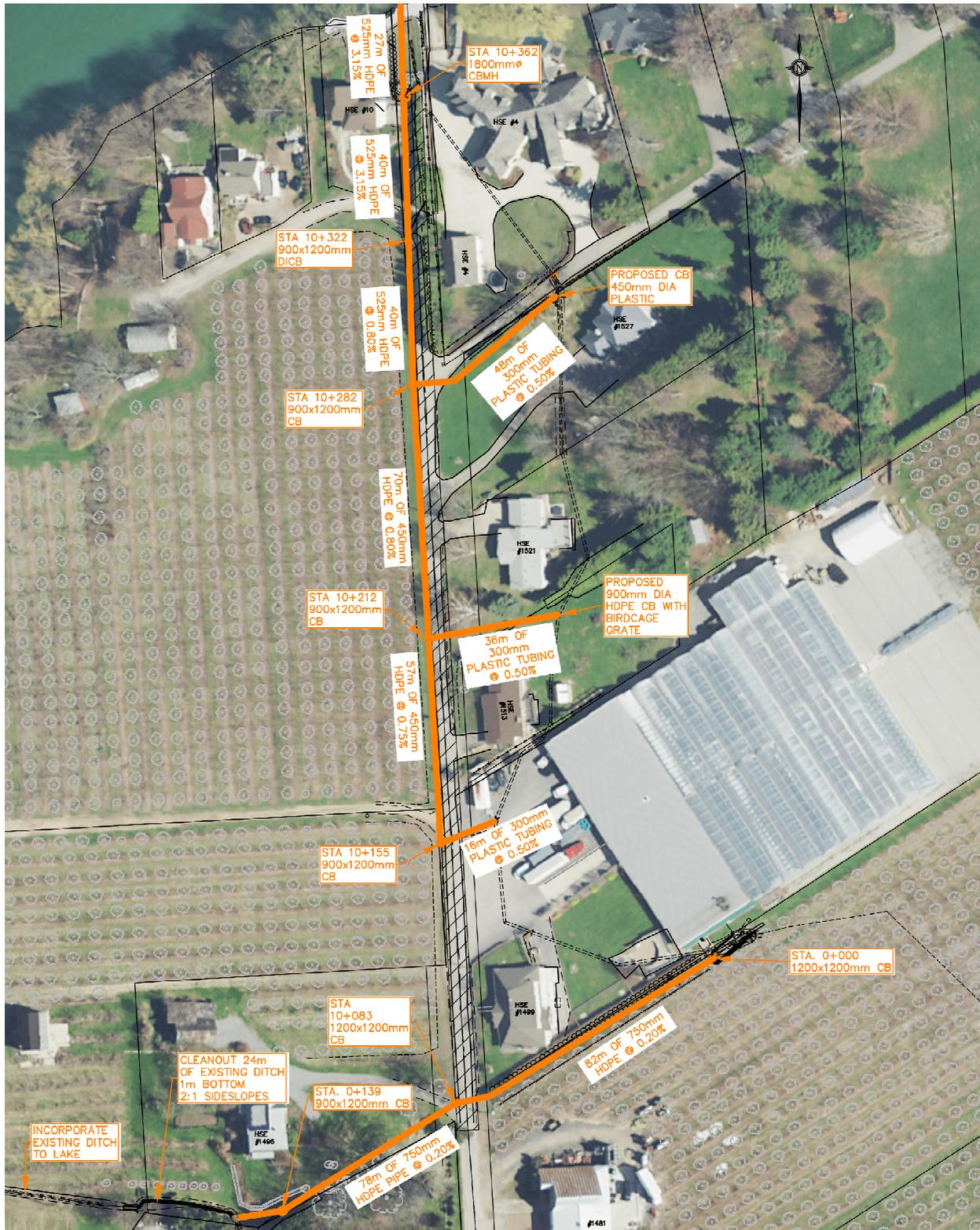
The western portion of Alternative B would commence in Lake Ontario approximately 300m west of Irvine Road and continue 355m southeasterly up to and crossing Irvine Road, and then for 74m along the Roll No. 05000/05100 property line. It would consist of incorporating 260m of existing open ditch, 24m of existing ditch cleanout, twin (2) 750mm dia. HDPE pipe lane crossing, 160m of 750mm dia. HDPE pipe with rodent gate at outlet, 45m of berm work, 1 – 900 x 1200mm CB, and 2 – 1200 x 1200mm CB's.

The northern portion of Alternative B would commence in Lake Ontario on the west side of Irvine Road, then south along the west side for 234m. It would consist of 107m of 525mm dia. HDPE pipe with rodent gate at outlet, 127m of 450mm dia. HDPE pipe, 1 – 900 x 1200mm DICB, 2 - 900 x 1200mm CB's, 1 – 1800mm dia. CBMH, 2 offset connections to the existing private drain with 300mm dia. plastic tubing (1 – 900mm dia. HDPE CB, 1 – 36m length and 1 – 48m length) and connection to the existing private drain with 16m of 300mm dia. HDPE.

7.2.2 Discussion

This alternative is also one of the preferred options that were presented at the October 2019 meeting and is costed in detail herein.

The following Sketch 3 illustrates the location of Alternative B.



Sketch 3. Alternative B Sketch

7.3 Alternative C

7.3.1 Description

The western portion of Alternative C would commence in Lake Ontario approximately 300m west of Irvine Road and continues southeasterly for 70m±, then east for 250m to the west side of the road, then south along the west side of the road for 175m, then continues east crossing the road, then east for 74m along the Roll No. 05000/05100 property line. It would consist of incorporating 77m of existing open ditch, 500m of 750mm dia. HDPE pipe with rodent gate at the outlet, 2 – 900 x 1200mm CB, and one connection to the existing private drain with 300mm dia. HDPE pipe.

The northern portion of Alternative C would commence in Lake Ontario on the west side of Irvine Road, then south along the west side for 177m. It would consist of 107m of 525mm dia. HDPE pipe with rodent gate at outlet, 70m of 450mm dia. HDPE pipe, 1 – 900 x 1200mm DICB, 2 - 900 x 1200mm CB's, 2 offset connections to the existing private drain with 300mm dia. plastic tubing (1 – 900mm dia. HDPE CB, 1 – 36m length and 1 – 48m length) and 1 – 1800mm dia. CBMH.

7.3.2 Discussion

This alternative was not deemed to be a preferred option as it would be too costly. It is not costed in this Preliminary Report. At the October 2019 meeting the landowners did not want this alternative pursued.

The following Sketch 3 illustrates the location of Alternative B.



Sketch 4. Alternative C Sketch

7.4 Alternative D

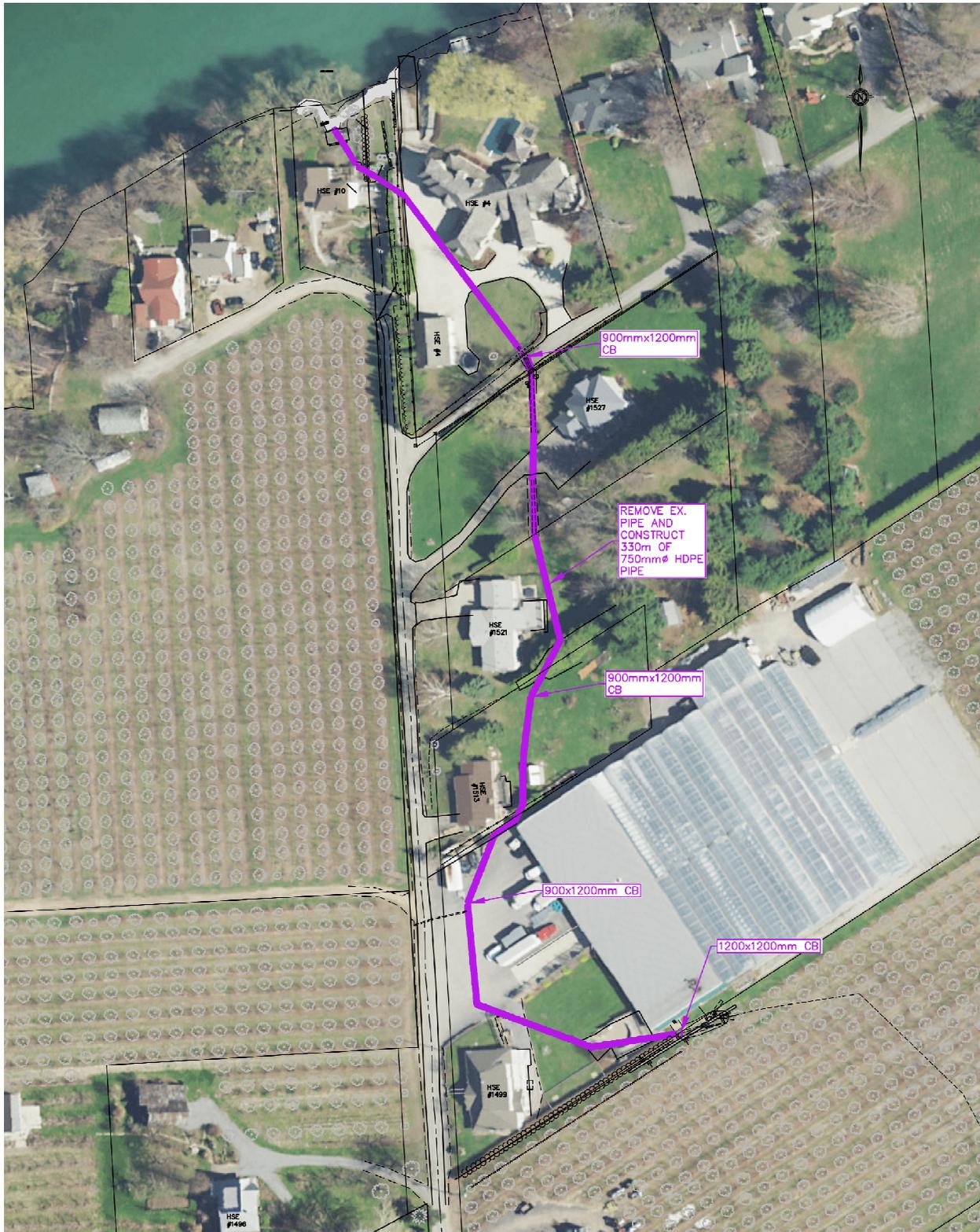
7.4.1 Descriptions

Alternative D would be a replacement of the existing private drain north of Roll No. 05000. It would consist of approximately 330m of 750mm dia. HDPE pipe with rodent grate at the outlet, 3 – 900 x 1200mm CB's, 1 - 1200 x 1200mm CB, restoration of numerous concrete pads, gravel areas and paved areas on private lands.

7.4.2 Discussion

This alternative was not deemed to be a preferred option as it would also be too costly. It is not costed in this Preliminary Report. At the October 2019 meeting the landowners did not want this alternative pursued.

The following Sketch 5 illustrates the location of Alternative D.



Sketch 5. Alternative D Sketch

7.5 Main Drain Upstream

This would be part of the general work that should be done and would be additional to Alternatives A or B. It was not presented at the October 2019 meeting. Discussions with the landowners affected by this work took place after the October 2019 meeting.

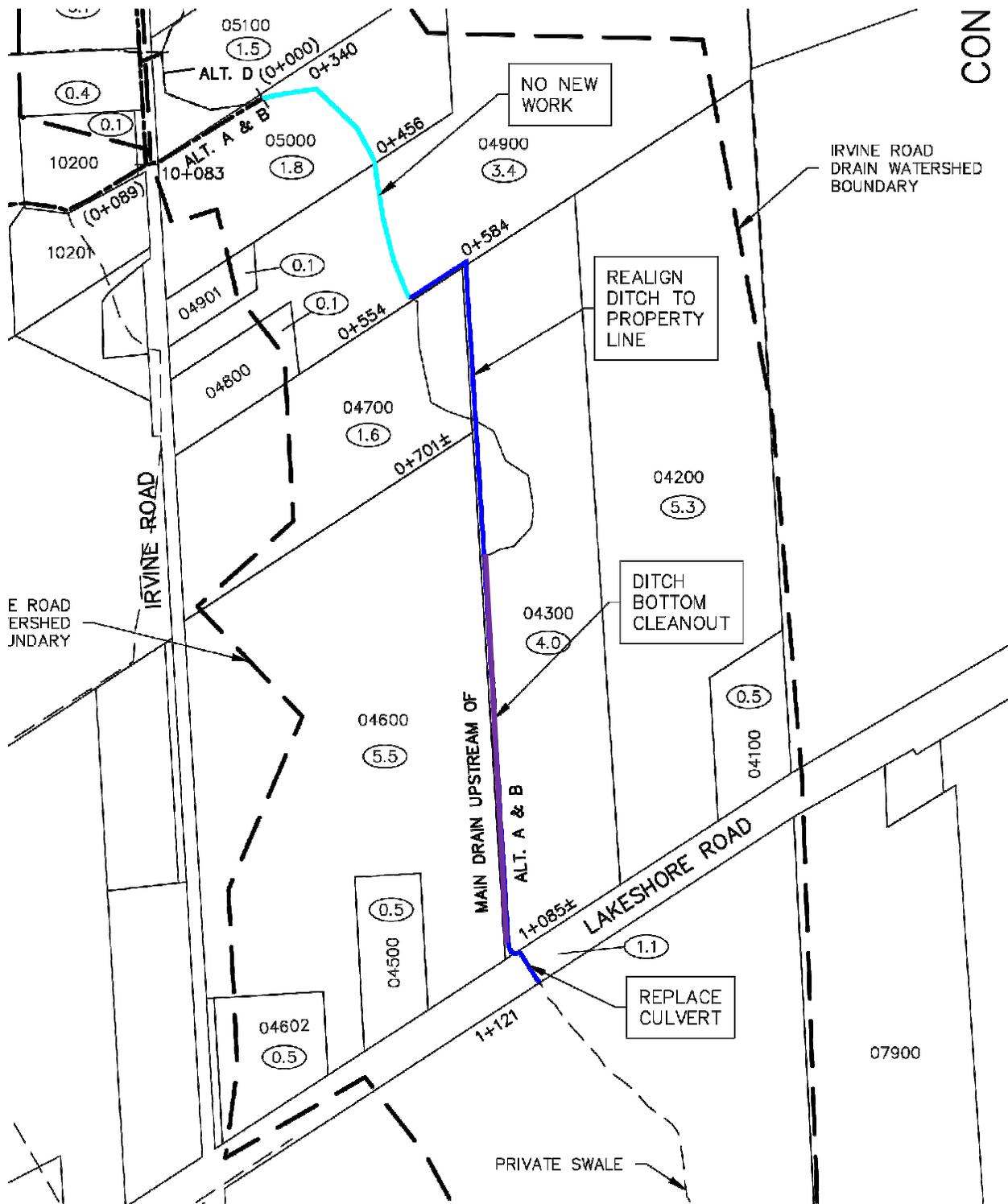
7.5.1 Description

This general work would commence at the end of the Alternative A or B work and would continue south in Lot 2, Concession 1 up to and across Lakeshore Road. It would consist of incorporating 214m of existing ditch/swale, 246m of new ditch excavation (1.0m bottom, 2:1 side slopes) on a new alignment along the property lines, then 286m of ditch bottom cleanout and removing and replacing the Lakeshore Road crossing with 22m of 600mm dia. HDPE pipe.

7.5.2 Discussion

This would be additional to Alternatives A or B and is costed herein.

The following Sketch 6 illustrates the location of the upstream main drain works.



Sketch 6. Upstream Drain Main Work

7.6 Estimating Costs

The total estimated cost of the project alternatives cost herein includes allowances, construction, engineering and those administrative costs which are eligible under Section 73 of the Act.

7.6.1 Allowances

Sections 29 to 33 of the Drainage Act provide for allowances (compensation) to owners affected by proposed drain construction.

Section 29 – Right of Way

Section 29 provides for payment of an allowance to landowners for right of way required for construction and maintenance of the 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. Section 29 allowance rates are based on assessed property MPAC values. In addition, land used for the drain still belongs to and may be used by the owner, provided such use does not impede the function or maintenance of the drain.

Section 29 allowances are computed using the rates in table below and the following standard right-of-way widths: 5 to 10m for open ditch portions along the drain and 3 to 5m for piped portions of the drain on private land. Standard widths may be modified where additional (or reduced) width is necessary for construction and maintenance. Such allowance calculation details are typically provided in the Final Report.

Table 7-1 Section 29 Allowance Rates

Land Use	Rate
Cultivated (farm)	\$ 11.00/m ²
Residential	\$ 80.00/m 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. Section 30 allowances were computed using the rates in the following table and widths varying from 5 to 10m for open ditch or piped options along the drain. In lieu of Section 30 allowances to residential properties, this report has assumed residential property restoration will be completed as part of construction.

Table 7-2 Section 30 Allowance Rates

Land Use	Rate
Cultivated (farm)	\$ 0.44/m ²
Residential	\$ 0.44/m ²

There are no allowances under Section 31 (existing drains), Section 32 (insufficient outlet) or Section 33 (loss of access) for this project.

In accordance with Section 62(3) of the Act, allowances are 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.

7.6.2 Construction Costs

The estimated cost for Labour, Equipment and Materials for Drain construction is outlined in detail herein. The construction cost estimate is based on recent costs for comparable work. In this report, a contingency factor of 30% was added to estimated construction costs, since there may be additional work items, necessary for the Drain, which are identified by the Final Report or during construction.

7.6.3 Engineering

The estimate for Engineering includes the following items: preparation of the Preliminary Report; preparation of a Final Report - including public meetings required by the Act, shoreline engineer report, test holes to locate subsurface utilities, field surveys, detailed design and modelling and report preparation; Construction Phase Services – including the tender process, contract administration, inspection and final cost levy.

7.6.4 Section 73 Costs

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.” This cost estimate is included for environmental permits and approvals, interim financing and costs to print and distribute reports as required by the Act.

7.7 Total Cost Estimates of the Preferred Alternatives

The following table provides an estimate of the cost for the preferred alternatives.

Table 7-3 Cost Estimate for the Preferred Alternatives

Work Description	Estimated Cost
General Works (in Addition to Alternatives A or B)	
Allowances	\$ 103,400
Construction (Main Drain ditch u/s & Alt.'s A & B)	
<i>214m of existing ditch /swale to be incorporated. No work required.</i>	0
<i>246m of new ditch excavation (1.0m bottom, 2:1 side slopes)</i>	12,300
<i>Seeding of banks (6m sides)</i>	1,500
<i>286m of ditch bottom cleanout (1.0m bottom, 2:1 side slopes)</i>	8,600
<i>Seeding of banks (3m sides)</i>	900
<i>Remove existing 600mm CSP Lakeshore Road crossing and replace it with 22m of 600mm dia. HDPE pipe across the road with full granular backfill and road restoration and with 5m² riprap at each end (10m² riprap total)</i>	18,800
<i>Construction Contingency</i>	12,600
<i>Net HST</i>	965
<i>Sub Total Construction:</i>	55,665
Engineering	
<i>Preliminary Report</i>	65,000
<i>Consideration of the Report Meeting</i>	1,200
<i>Final Report</i>	30,800
<i>Shoreline Engineer Report</i>	20,000

<i>Consideration of the Final Report Meeting</i>	1,200
<i>Court of Revision</i>	1,200
<i>Tender</i>	8,000
<i>Construction and final paperwork</i>	30,800
<i>Sub Total Engineering:</i>	158,200
Section 73 Costs (including Net HST on Engineering and eligible Administration)	35,755
TOTAL GENERAL WORK:	\$ 353,020
Alternative A	
Allowances	\$63,200
Construction	
<i>1800mm dia. CBMH including 6m of 750mm dia. HDPE pipe, 12m of 250mm plastic tubing, 2 - 12m lengths of 100mm dia. plastic tubing for connections</i>	10,000
<i>306m of 750mm dia. HDPE pipe with rodent gate at outlet</i>	122,400
<i>45m of earth berm and hickenbottom</i>	2,000
<i>2 - 1200 x 1200mm CB</i>	7,000
<i>Clearing and grubbing (5m width)</i>	500
<i>3 - 900 x 1200mm CB's</i>	8,400
<i>900 x 1200mm DICB</i>	3,000
<i>Connect existing 525mm concrete private drain to new CB with 8m of 525mm HDPE pipe</i>	2,400
<i>Remove existing 300mm dia. CSP's (1 - 6m length and 1 - 11m length)</i>	500
<i>16m of 300mm dia. HDPE plus connection to existing private drain MH (Offset 1)</i>	4,000
<i>36m of 300mm dia. dual wall plastic tubing to existing private drain (Offset 2)</i>	5,800
<i>900mm dia. HDPE CB (Offset 2)</i>	1,500
<i>48m of 300mm dia. dual wall plastic tubing (Offset 3) to existing private drain</i>	7,700
<i>450mm dia. HDPE CB (Offset 3)</i>	1,000
<i>Construction contingencies</i>	52,900
<i>Net HST</i>	4,030
<i>Subtotal Construction</i>	<i>\$ 233,130</i>
TOTAL ALTERNATIVE A:	\$296,330
Alternative B	
Allowances	\$155,100
Construction	
<i>1800mm dia. CBMH including 6m of 750mm dia. HDPE pipe, 12m of 250mm plastic tubing, 2 - 12m lengths of 100mm dia. plastic tubing for connections</i>	10,000
<i>160m of 750mm HDPE pipe with rodent gate at outlet</i>	64,000
<i>45m of earth berm and offset hickenbottom</i>	2,000
<i>Clearing and grubbing (5m width)</i>	500
<i>2 - 1200 x 1200mm CB's</i>	7,000
<i>900 x 1200mm CB</i>	2,800
<i>10m² riprap at outlet</i>	600
<i>24m of existing ditch cleanout</i>	1,200
<i>260m of existing ditch to be incorporated. No work required.</i>	0

<i>Twin 12m lengths of 750mm dia. HDPE laneway culverts with 10m² riprap</i>	5,000
<i>16m of 300mm HDPE plus connection to existing private drain MH (Offset 1)</i>	4,000
<i>3 - 900 x 1200mm CB's</i>	8,400
<i>127m of 450mm dia. HDPE pipe</i>	34,900
<i>107m of 525mm dia. HDPE pipe with rodent gate at outlet</i>	31,800
<i>900 x 1200mm DICB</i>	3,000
<i>Connect existing 525mm concrete to new CB with 8m of 525mm HDPE pipe</i>	2,400
<i>Remove existing 300mm dia. CSP's (1 - 6m length and 1 - 11m length)</i>	500
<i>36m of 300mm dia. dual wall plastic tubing (Offset 2) to existing private drain</i>	5,800
<i>900mm dia. HDPE CB (Offset 2)</i>	1,500
<i>48m of 300mm dia. dual wall plastic tubing to existing private drain (Offset 3)</i>	7,700
<i>450mm dia. HDPE CB (Offset 3)</i>	1,000
<i>Construction contingency</i>	58,200
<i>Net HST</i>	4,440
<i>Subtotal Construction (Alternative B)</i>	<i>256,740</i>
<i>TOTAL ALTERNATIVE B:</i>	<i>\$411,840</i>

SUMMARY	
<i>Alternative A and General Work</i>	
<i>Total Cost Estimate</i>	<i>\$649,350</i>
<i>Alternative B and General Work</i>	
<i>Total Cost Estimate</i>	<i>\$ 764,860</i>

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

8.0 ASSESSING DRAIN COST

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, it is expected that assessment for Benefit, Special Benefit, Outlet Liability and Increased Cost (Special) Assessment will be involved. Assessment methodology considers a number of factors including: parcel size, land use, benefit derived from the work, and the length of the Drain used by a particularly property.

Should this project proceed to a Final Report, the Final Report will include assessment calculation details and schedules with estimated assessments for each property. Following construction, the actual cost of the Drain project is prorated using the assessment schedules in the Final Report.

8.1 Estimated Assessments

Based on the provisions of the Drainage Act an assessment schedule is not to be included in a Preliminary Report. However, estimated ranges for assessment were determined to inform affected landowners of their anticipated share of the project cost.

Table 8-1 Estimated Distribution of Assessments

	Upstream Works Cost \$353,020		Alternative A Cost \$296,330			Alternative B Cost \$411,840		
		Interval Costs		Interval Costs	Total Project		Interval Costs	Total Project
Outlet	30%	93,700	40%	111,200	204,900	40%	157,400	251,100
Adjacent Landowner Benefits	60%	187,300	3%	8,300	195,600	3%	11,800	199,100
Regional Road Benefit	10%	31,200	0%	0	31,200	0%	0	31,200
Residential Benefits	0%	-	36%	100,100	100,100	36%	141,600	141,600
NOTL Roads	0%	-	21%	58,400	58,400	21%	82,600	82,600
Special Assessment		40,775 (Region)		18,400 (NOTL)	59,175		18,400 (NOTL)	59,175

The Outlet assessment will be based on a factored area in the watershed.

The Adjacent Benefit will be based on a per metre of length of drain along or on the property and would apply to roll numbers, 04600, 04300, 04700, 04900, 05000, 10200 and 10300. Depending on the route that has been chosen.

The Regional Benefit will be a lump sum amount plus any Section 26 costs.

The Residential Benefit will be split evenly between 09800, 05500, 06800, 06805, 05200, 05100.

NOTL benefit will be a lump sum amount plus any Section 26 costs.

The cost of the Irvine Road restoration was not included in this report because it will be an assessment to the town as Section 26 costs.

9.0 LIMITATIONS OF THIS PRELIMINARY REPORT

This Preliminary Report outlines the relevant background, summarizes existing conditions, describes options for improvement, presents high-level cost estimates and principles to assess costs in a Final Report. The Drainage Act stipulates a Preliminary Report is not to include detailed profiles, cost estimates, or schedules of assessment.

10.0 PROCEEDINGS ON THIS PRELIMINARY REPORT

10.1 Consideration by Council

This report should be sent to the owners of parcels in the watershed identified by roll number or street address on the drawings and to others as required under the Act along with a notice of when the report will be considered at a meeting of the Town of Niagara-on-the-Lake Council.

In accordance with Section 10(3) of the Act, the meeting to consider this report will include an opportunity for names to be withdrawn or added to the Section 4 petition.

The meeting will conclude with a decision by Council to either direct the Engineer to prepare a Final Report or to not proceed with a Final Report.

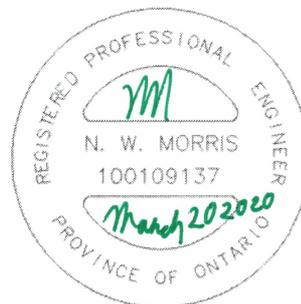
- If the Section 4 petition remains valid, but Council does not proceed to a Final Report, the petitioner(s) may appeal Council's decision to the Ontario Drainage Tribunal per Section 10(6) of the Act.
- If at the end of the meeting, the petition is no longer valid and Council does not proceed to a Final Report, the Drainage Act process stops, and the cost of this Preliminary Report is assessed equally to each petitioner approximately \$2550 after grant.

10.2 Final Report

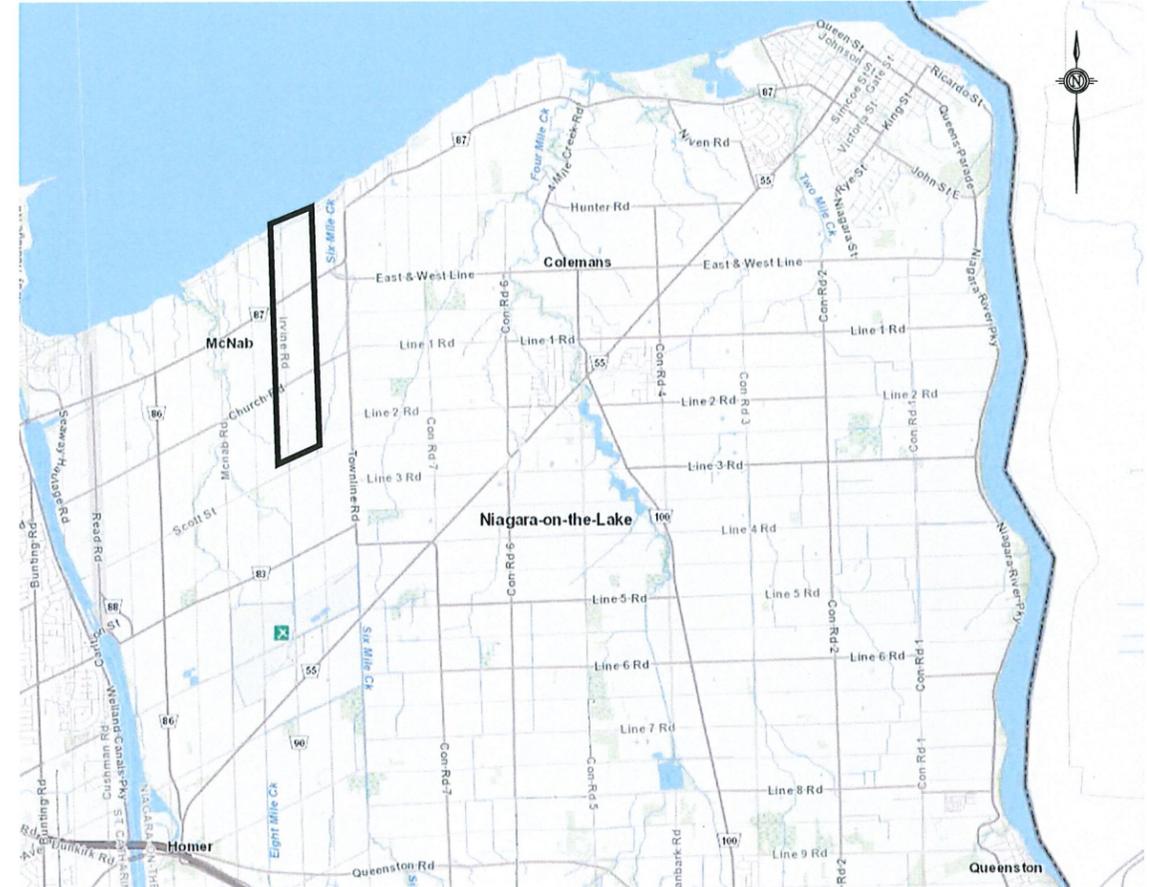
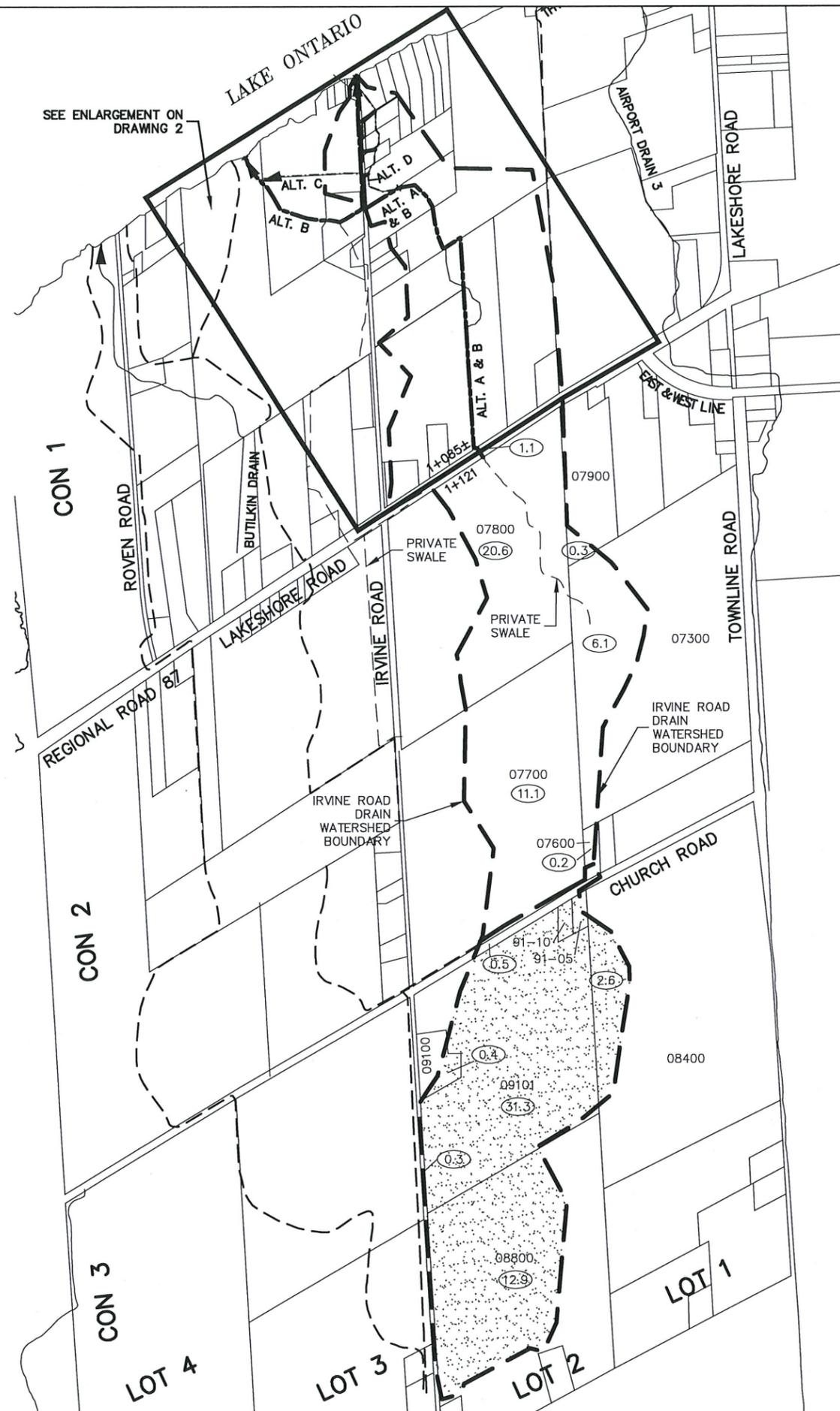
If the Engineer is directed to prepare a Final Report, further meetings will be held with landowners, road authorities and agencies before filing the Final Report with the Town. It should be noted that the Final Report may modify the General Work and preferred alternatives costed in this Preliminary Report if new information arises from concurrent studies, further agency and landowner input or geotechnical investigations. Such modifications would be presented to the Town and affected landowners at public meetings during the preparation of the Final Report.

All of which is respectfully submitted,

K. SMART ASSOCIATES LIMITED



Neal Morris, P. Eng.



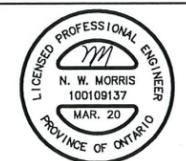
KEY MAP
N.T.S.

PLAN LEGEND	
	MAJOR WATERSHED
	INTERMEDIATE/EXTERNAL WATERSHED
	PROPOSED WORK OR INCORPORATION
	EXISTING DRAIN
	APPROXIMATE HECTARES IN WATERSHED
	ASSESSMENT ROLL NUMBER
	AREA TO BE ASSESSED AT HALF RATE

ALL ROLL NUMBERS BEGIN WITH 2627-020-016-
ie. 04100 IN FULL IS
2627-020-016-04100

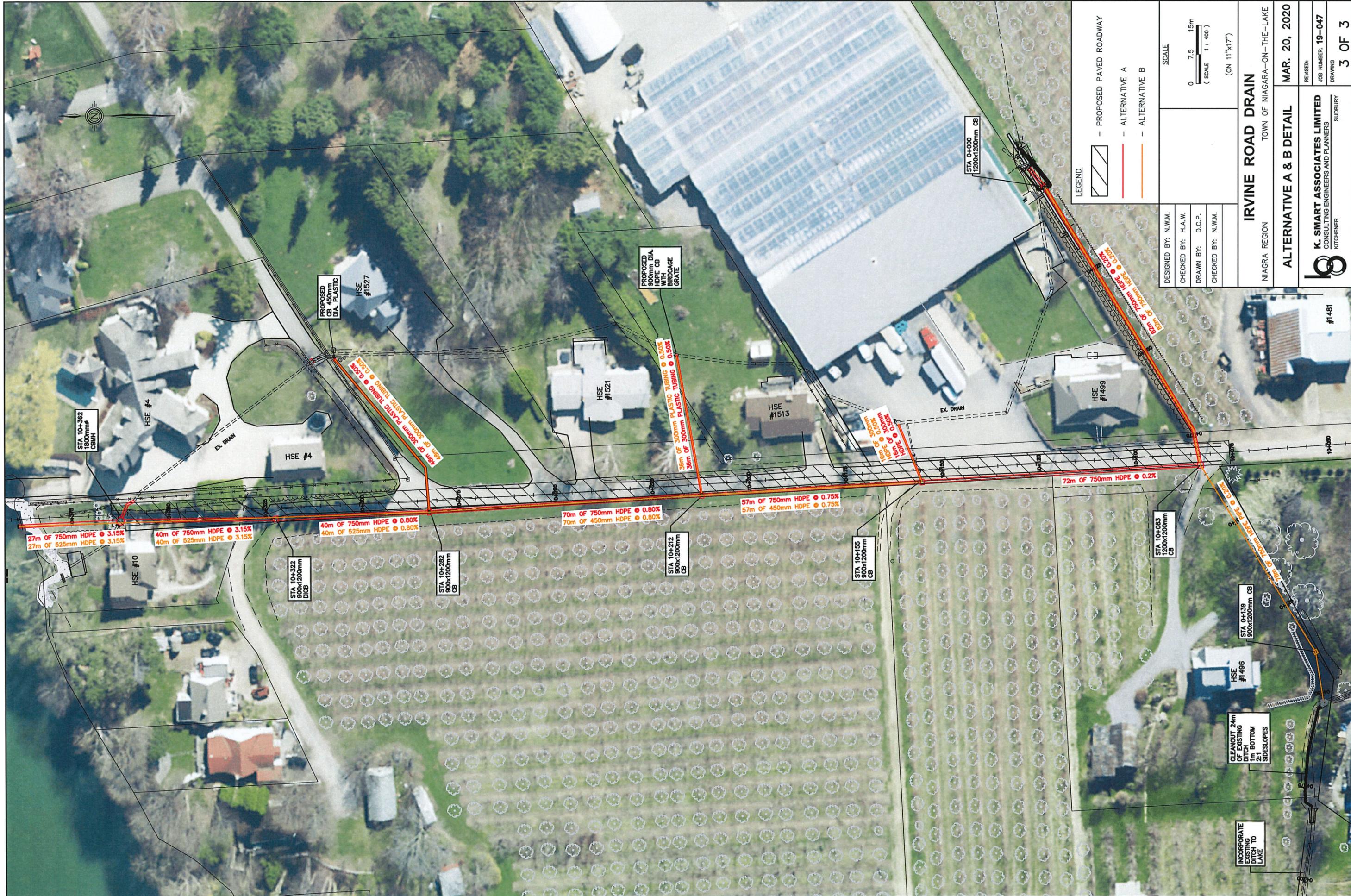
GEOGRAPHIC TOWNSHIP OF GRANTHAM

DESIGNED BY: N.W.M.
CHECKED BY: N.W.M.
DRAWN BY: D.C.P.
CHECKED BY: N.W.M.



SCALE
0 125 250m
(1:12,500 ON 11"x17")

IRVINE ROAD DRAIN	
NIAGARA REGION	TOWN OF NIAGARA-ON-THE-LAKE
WATERSHED PLAN	MAR. 20, 2020
K. SMART ASSOCIATES LIMITED CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 19-047
	DRAWING 1 OF 3



LEGEND

- PROPOSED PAVED ROADWAY
- ALTERNATIVE A
- ALTERNATIVE B

SCALE

0 7.5 15m
(SCALE 1 : 400)

(ON 11" x 17")

DESIGNED BY:	N.W.M.
CHECKED BY:	H.A.W.
DRAWN BY:	D.C.F.
CHECKED BY:	N.W.M.

IRVINE ROAD DRAIN
TOWN OF NIAGARA-ON-THE-LAKE

ALTERNATIVE A & B DETAIL

NIAGRA REGION

MAR. 20, 2020

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUBURBY

REVISED: _____
JOB NUMBER: 19-047
DRAWING: _____
3 OF 3