

Strewn Winery Redevelopment
1339 Lakeshore Road, Niagara-on-the-Lake, Ontario

Functional Servicing & Stormwater Management Brief

Initial Submission: May 15, 2026

Revision #1: July 17, 2026

Prepared for: 1724600 Ontario Limited
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**Strewn Winery Redevelopment
1339 Lakeshore Road
Niagara-on-the-Lake, Ontario**

**Functional Servicing & Stormwater
Management Brief**

1724600 Ontario Limited

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RVA 268426

July 17, 2026



STREWN WINERY REDEVELOPMENT
FUNCTIONAL SERVICING & STORMWATER MANAGEMENT BRIEF
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1.0 INTRODUCTION

1724600 Ontario Limited (the Owner) is proposing the redevelopment of a portion of the property located at the southwest corner of Lakeshore Road and Four Mile Creek Road in the Town of Niagara-on-the-Lake (the Town), with a municipal address of 1339 Lakeshore Road. The 3.95-hectare site is currently occupied by Strewn Winery. More than 50% of the property is presently occupied by vineyards, with the remainder consisting of landscaped areas, three (3) building structures, and asphalt/compacted granular parking and driveway areas. Refer to Figure 1.1 below for a site plan of the property dated January 31, 1997.

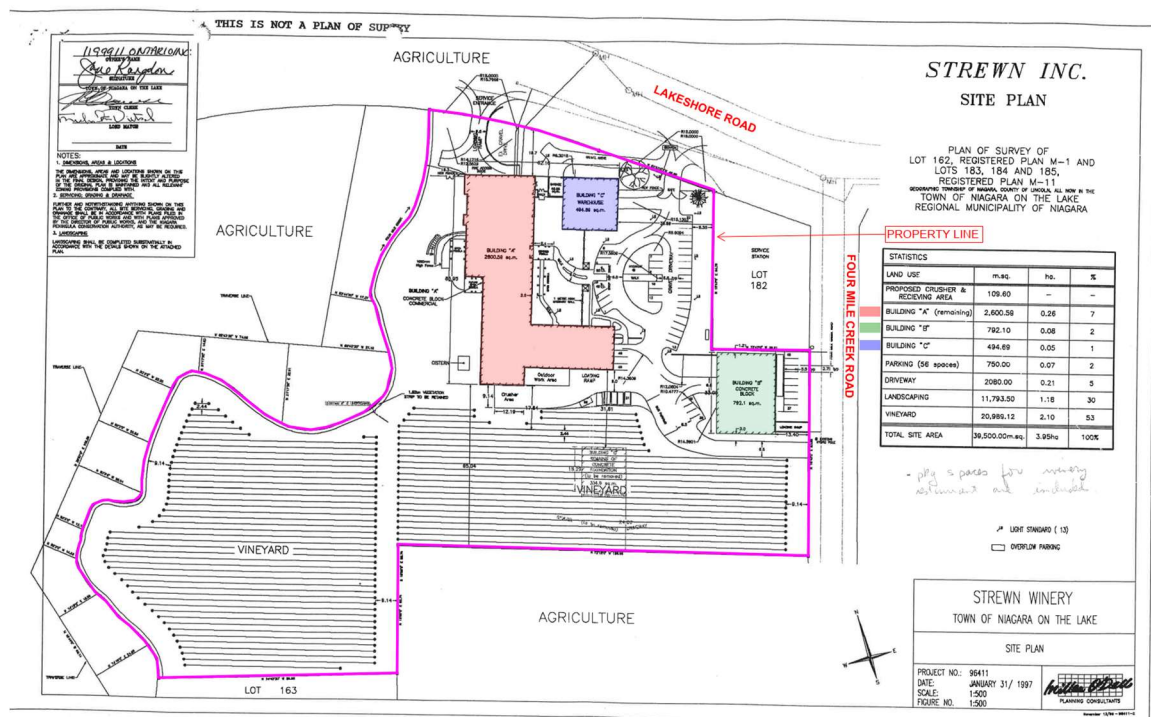


Figure 1.1 - Site Plan, dated January 31, 1997

Based on the site plan prepared by ATA Architects (ATA), the proposed development consists of a three (3)-storey hotel that will be physically connected to the existing main building on the property. Renovations to the existing main building are also proposed to occur concurrently with the new development, as well as additional gravel parking areas to meet planning requirements. The site plan illustrating the proposed redevelopment is provided in Figure 1.2 and Appendix A.

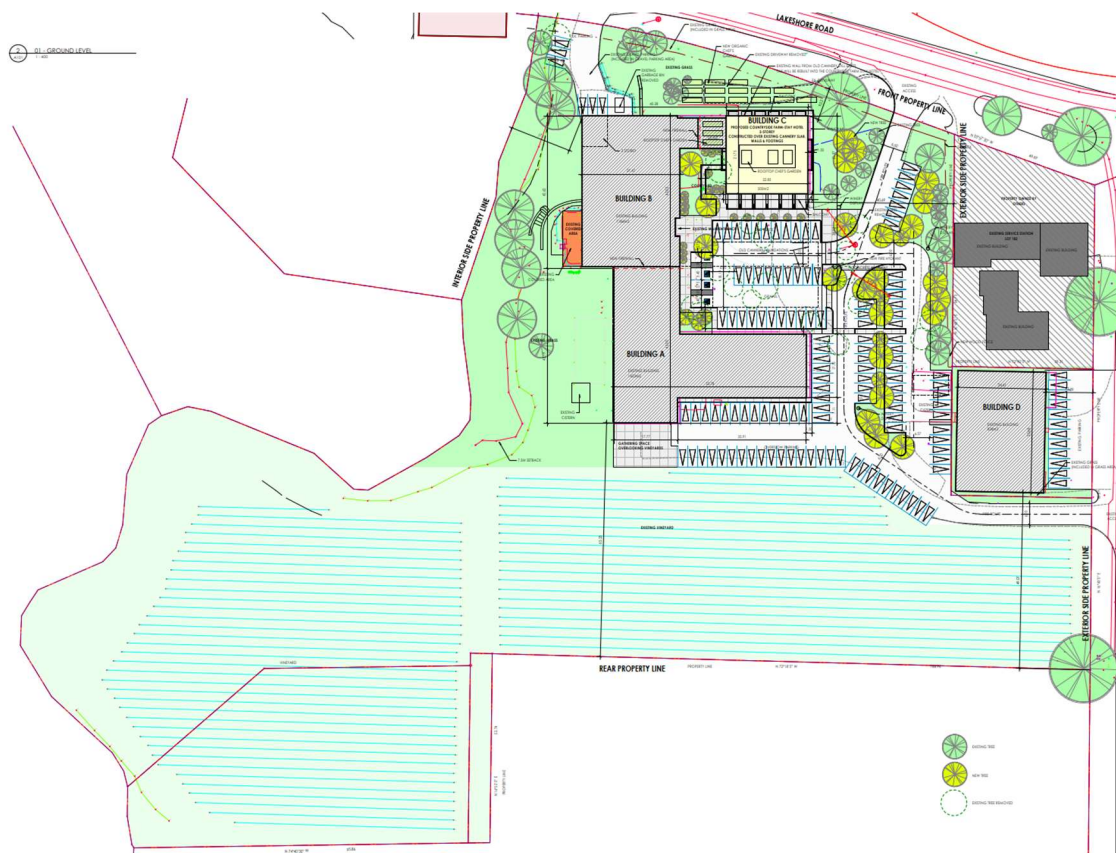


Figure 1.2 – Site Plan

RVA has been retained by the Owner to prepare a Functional Servicing and Stormwater Management Brief (the brief) in support of the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications for the site.

This brief outline the servicing and stormwater management requirements identified during the pre-consultation meeting with the Town held on April 16, 2026, and describes how these requirements, together with applicable Town standards and other regulatory authority criteria, can be addressed from a functional servicing perspective.

2.0 WATER SERVICING

Based on record drawings obtained from the Town (refer to Appendix A), there is a 200mm $\varnothing$ asbestos cement watermain located along Four Mile Creek Road. At the intersection of Lakeshore Road and Four Mile Creek Road, there is an interconnecting 150mm $\varnothing$ PVC watermain which continues west along Lakeshore Road. This watermain terminates at a hydrant located south of the Lakeshore Sanitary Pumping Station (SPS) which is located opposite of the site's municipal frontage. There is a 38mm $\varnothing$ water service to the subject site serviced from the 150mm $\varnothing$ Lakeshore Road watermain located adjacent to this hydrant.

The site currently has a private hydrant located within the landscaped area east of the main building's front entrance. Based on information provided by the Town, the hydrant is understood to be connected to the existing 200mm $\varnothing$ asbestos cement watermain on Four Mile Creek Road.

Furthermore, based on discussions with operational and maintenance staff at Strewn Winery, a 100,000 L cistern is located within the existing landscaped area west of Building 'D' and is equipped with a standpipe for firefighting purposes. The cistern is not interconnected with municipal water infrastructure.

Hydrant testing and inspection reports of three municipal hydrants were obtained from the Town (refer to Appendix B), including:

- The dead-end hydrant connected to the 150mm $\varnothing$ main on Lakeshore Road;
- A hydrant connected to the 200mm $\varnothing$ main located at the south-east corner of the Four Mile Creek Road and Lakeshore Road intersection;
- A hydrant in front of 2289 Four Mile Creek Road residence, approximately 50m south of the subject site.

As per the Town's design criteria, under conditions of simultaneous maximum day and fire flow demands, the water pressure shall not drop below 20psi (140kPa). The theoretical available flow at 20 psi for each hydrant is 123 L/s, 87 L/s, and 105 L/s, respectively.

Preliminary domestic water demand was estimated in accordance with the Town's Municipal Engineering Standards, while fire flow requirements were determined based on the Fire Underwriters Survey (FUS) methodology. Calculations were based on the site plan provided in Appendix A. The architectural plan incorporates two firewalls at the ends of Building 'B'. In accordance with FUS guidelines, each area separated by firewalls was considered a separate building for the purposes of fire flow calculations. The existing wine production and storage

building was treated as an independent structure and analyzed separately. A markup illustrating the delineation of these areas is provided in Appendix B.

Based on the calculations, the site's governing water demand (inclusive of fire and domestic) is estimated to be 202.3 L/s. The results of the governing calculation are included in Table 1.1 below. Refer to Appendix B for detailed calculations.

Table 1.1 – Proposed Water Demand Summary

Peak Hour Demand (PHD) (L/s)	Maximum Day Demand (MDD) (L/s)	Fire Flow Demand (L/s)	Total (L/s)
3.36	2.24	200.00	202.3 (rounded)

Based on Table 1.1 above, the municipal watermain has insufficient pressure and flow to support the estimated peak water demand (MDD + FF) of the proposed development.

It is noted that the fire flow and domestic water demands cited in the above scenarios are considered the highest estimates based on the preliminary site plan and assumed construction methods comparable to developments of similar type and scale within the area. The actual water demand will be further refined and reduced during detailed design through continued coordination with the Architect, Mechanical Engineer, Code Consultant, and the Town's Engineering and Fire Department.

To supplement the available municipal watermain capacity, on-site water storage in the form of a cistern is proposed. Based on the estimated fire-flow deficit of approximately 80 L/s and the applicable fire-flow duration specified in *Table 1 – Required Duration of Fire Flow* of the FUS, the preliminary required cistern storage volume is estimated to be in the order of 505,000 L.

As previously mentioned, an existing cistern with a capacity of approximately 100,000 L is located on the site. It is expected that the existing cistern will continue to contribute toward the required storage volume. On this basis, approximately 405,000 L of additional storage would be required to provide the estimated total storage volume of 505,000 L.

NFPA 1142 – Standard on Water Supplies for Suburban and Rural Fire Fighting will be used as a general design guide and reference for best practices when developing the proposed cistern system.

The proposed site plan will require the existing on-site hydrant to be relocated. In accordance with OBC, the new hydrant location will be within 90m horizontally of the portion of building required to face a street. If the proposed building is sprinklered, the proposed hydrant location

will need to be located within 45m of the building Fire Department Connection (FDC). The final location of the private hydrant and the FDC (if required) will need to be coordinated during detailed design to comply with the OBC and NFPA standards.

As previously noted, the site is currently serviced by an existing 38mmø water service connection. A new metered water service connection to the Lakeshore Road watermain may be required to support the proposed redevelopment. Any necessary branching to serve the proposed fire-protection and domestic water systems will be located within private property, downstream of the water meter. The final service configuration and sizing will be confirmed in consultation with the Project Mechanical Engineer.

3.0 SANITARY SERVICING

Based on record drawings obtained from the Town (refer to Appendix A), there is a 600mmø concrete sanitary sewer owned by the Niagara Region located along Four Mile Creek Road that outlets to the Lakeshore SPS on Lakeshore Road just across the site.

An existing 200mmø concrete sanitary service connection and maintenance hole is located along the Lakeshore Road frontage of the subject property. Existing and proposed peak sanitary flows for the site were calculated using the methodology outlined in Niagara Region’s 2021 Water and Wastewater Master Servicing Plan (WWMSP), updated in 2023. The results of the calculations are included in Table 3.1 below. Refer to Appendix C for detailed calculations.

Table 3.1 – Sanitary Demand Summary

Existing Peak Flow (L/s)	Proposed Peak Flow (L/s)	Proposed Increase in Sanitary Flow (L/s)
2.65	4.40	1.75

Given the relatively low peak sanitary flow rates, the existing 200mmø sanitary service is anticipated to have sufficient hydraulic capacity to accommodate the proposed development. Alternatively, a separate sanitary service connection may be pursued for the proposed hotel building, depending on the preferred plumbing configuration and whether the new building is intended to connect into the existing on-site sanitary system or be serviced independently.

RVA undertook a review of the Niagara Region 2021 WWMSP (updated 2023), which identifies surplus capacity within the downstream 600mmø regional sanitary sewer under the 2051 projected growth conditions. As such, the sewer system is expected to be able to

accommodate the relatively minor increase in proposed peak flows from the development. Refer to Figure 3.1 below for the identified available capacity within the regional sanitary sewer system. A larger version of Figure 3.1 is located in Appendix [C].

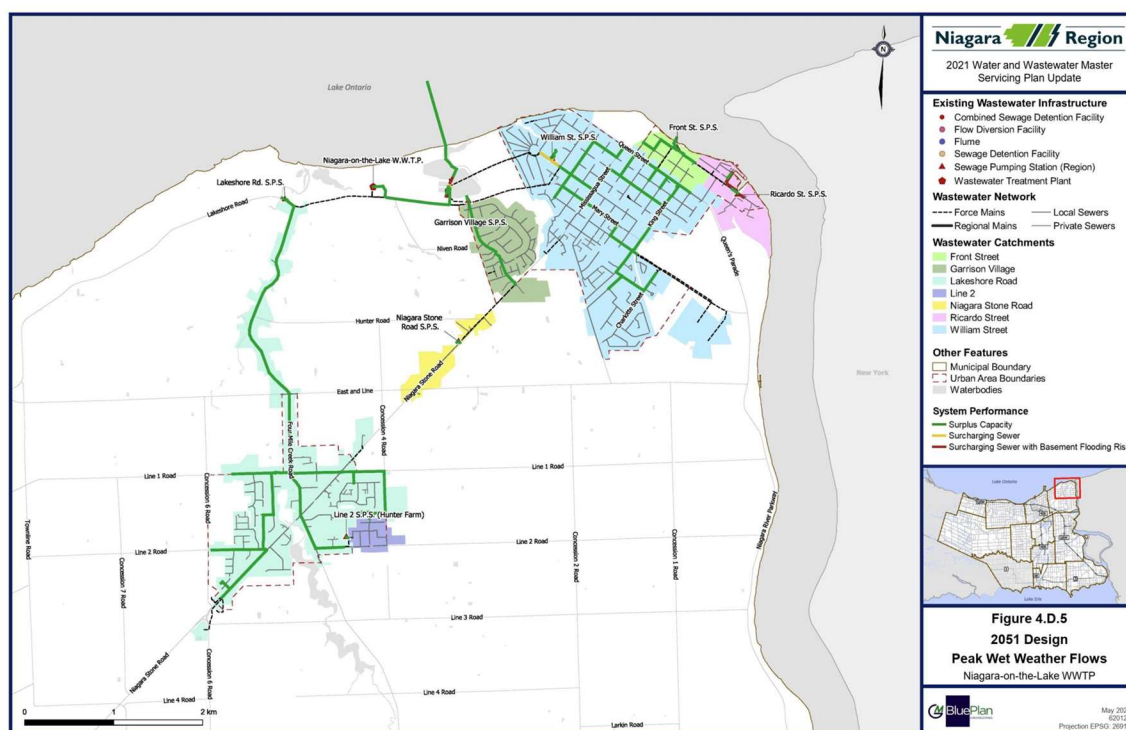


Figure 3.1 – Capacity of sewers based on 2051 Design Peak Wet Weather Flows

Based on the WWMSP, the Lakeshore SPS has an operational firm capacity of approximately 86.0 L/s. The recorded peak dry-weather flow in 2021 was approximately 22.6 L/s, while the forecasted peak dry-weather flow under 2051 conditions is approximately 44.1 L/s. Based on these values, the SPS is projected to operate below its firm capacity under the long-term planning horizon, with residual capacity available to receive the relatively minor increase in flows from the proposed redevelopment. The Region established the wet-weather flow design allowance of Lakeshore SPS (2021) at 133 L/s, where the peak 5-year storm would exceed the limit at 167.7 L/s. It is projected to continue to exceed the design allowance through 2051. However, the WWMSP also indicated that a pump replacement project will increase the station capacity to 168 L/s, as well as Town's planned Pollution Prevention Control Plan (PPCP) update will further identify catchments and strategies for inflow and infiltration reduction and other wet weather management solutions to make allowance for SPS capacity.

At this time, the proposed building is currently assumed to be constructed without a basement and is therefore not anticipated to require a foundation drainage system; however, this assumption should be confirmed during detailed design. Groundwater conditions, and the

specifics of any existing or proposed foundation drainage infrastructure, should be reviewed during detailed design to confirm drainage requirements.

4.0 STORM SERVICING & STORMWATER MANAGEMENT

As discussed in Section 1.0, more than 50% of the property is currently occupied by vineyards, with the remainder consisting of landscaped areas, three (3) building structures, and asphalt or compacted granular parking and driveway areas. A detailed topographic survey of the subject property has been completed. Based on the topographic survey, available aerial imagery, and discussions with maintenance staff at Strewn Winery, the existing site has been divided into four storm drainage catchments, identified as EX. STM-1 through EX. STM-4. Refer to Drawing STM-1 in Appendix E for the catchment breakdown.

Catchment EX. STM-1 comprises the primary entrance and main parking area associated with existing Buildings 'B' and 'A'. This catchment includes approximately half of the existing parking and driveway surfaces, approximately half of the roof area of Buildings 'B' and 'A', and localized landscaped areas. Drainage within EX. STM-1 is captured by a network of interconnected storm inlets. It is anticipated that this system ultimately discharges through an existing headwall near the northwest corner of the property; however, the outlet location, pipe connectivity, and overall configuration of the existing storm network remain subject to confirmation through further investigation.

Catchment EX. STM-2 includes the areas immediately west and south of existing Buildings 'B' and 'A', a portion of the northwest corner of the property, the remaining half of the existing parking lot and driveway surfaces, approximately half of the roof area of Buildings 'B' and 'A', approximately one-quarter of the roof area of Building 'D', a small portion of the vineyard area, and localized landscaped areas. Drainage from this catchment generally appears to be conveyed overland in a westerly direction toward Four Mile Creek.

Catchment EX. STM-3 represents the majority of the subject property and vineyard area. Based on site observations and the agricultural use of this portion of the property, it is currently assumed that the catchment is serviced by a subsurface tile drainage system. The eastern and central portions of the catchment are generally characterized by relatively flat tableland, with grades falling steeply toward Four Mile Creek along the western portion of the property. The catchment also includes three inlets located within landscaped and gravel areas immediately north of the vineyards. Based on discussions with maintenance staff at Strewn Winery, these inlets are suspected to discharge to the tile drainage system. It is anticipated that the tile drainage system ultimately outlets through an existing headwall near the southwest corner of the property; however, the outlet location, pipe connectivity, and

overall configuration of the existing tile drainage network remain subject to confirmation through further investigation.

Catchment EX. STM-4 is located along the eastern portion of the property. Drainage from this area is generally directed overland to the east toward the municipal right-of-way.

As noted above, various inlets are located throughout the site to convey runoff to different outlet locations. Field investigations completed to date have provided a general understanding of the existing drainage patterns and routing; a Subsurface Utility Engineering (SUE) investigation is currently underway to accurately locate and confirm the configuration of the existing storm drainage infrastructure.

It is currently anticipated that the existing storm inlets and pipes within EX. STM-1 will be removed or relocated to suit the new grading design, and with consideration to reusing the existing infrastructure where possible. The existing storm infrastructure within EX. STM-2 to EX. STM-4 will remain as-is, as the proposed development does not impact the current drainage conditions.

Based on the pre-consultation meeting held on April 16, 2026, and relevant Town and NPCA standards and policies, the following stormwater management criteria will apply to the site:

- **Water Quantity:** Post-development peak flow rates during the 2-year through 100-year design storm events must not exceed the corresponding pre-development peak flow rates. The City of St. Catharines intensity-duration-frequency (IDF) curves, as required by Town guidelines, shall be used to calculate peak flow rates. The minor system shall be designed for the 5-year storm event, and the major system shall be designed for the 100-year storm event.
- **Water Quality:** Provide long-term removal of 80% of total suspended solids (TSS), corresponding to an 'Enhanced' level of protection.

4.1 Water Quantity

Recommended relevant runoff coefficients were provided in the Town's Municipal Engineering Guidelines and are listed in Table 4.1.

Table 4.1 – Runoff Coefficient

Surface Type or Recommended Land Use	Coefficient
Parks (Grass/Vegetation)	0.25
Compacted Gravel	0.50

Surface Type or Recommended Land Use	Coefficient
Paved Area	0.90

Weighted runoff coefficients were calculated for both the pre-development and post-development site and are listed in Table 4.2 and Table 4.3, respectively. Refer to Appendix D for detailed calculation sheets.

Table 4.2 – Pre-development Runoff Coefficients

Catchment ID	Catchment Area (m2)	Pervious Area (m2)	Impervious Asphalt/ Concrete/ Paver/Roof (m2)	Impervious Gravel Area (m2)	% Area	C	% IMP
EX. STM-1	6323	2807	3414	102	17%	0.60	54.6%
EX. STM-2	9921	6023	3503	396	27%	0.49	36.8%
EX. STM-3	20495	19769	600	126	55%	0.27	3.2%
EX. STM-4	602	34	282	286	2%	0.67	65.1%
Total	37341	28634	7799	909	100%	0.39	21.8%

Table 4.3 – Post-development Runoff Coefficients

Catchment ID	Catchment Area (m2)	Pervious Area (m2)	Impervious Asphalt/ Concrete/ Paver/Roof (m2)	Impervious Gravel Area (m2)	% Area	C	% IMP
STM-1	6323	2464	1858	2001	17%	0.52	41.6%
STM-2	9921	5596	2131	2193	27%	0.44	30.0%
STM-3	20495	19577	375	543	55%	0.27	2.9%
STM-4	602	35	281	286	2%	0.67	65.0%
Total	37341	27672	4646	5023	100%	0.36	17.6%

Both pre-development and post-development peak flow rates were estimated using the Rational Method.

Rainfall events were selected in accordance with the City of St. Catharines (per Town's guidelines) IDF curve information. A time of concentration of 10 minutes was used per the Town's guidelines. Table 4.4 outlines the IDF curve information used in the analysis.

$$i = \frac{A}{(T_c + B)^C}$$

i = intensity, mm/hr

A, B, C = IDF equation constants

T_c = Time of concentration, minutes

Table 4.4 – IDF Curve Equations

Return Period	A	B	C	i (mm/hr)
2	567	5.2	0.746	74.5
5	664	4.7	0.744	89.9
10	724	4.3	0.739	101.4
25	821	4.0	0.735	118.0
50	900	3.8	0.734	131.1
100	980	3.7	0.732	144.3

A comparison between the pre-development and post-development peak flow rates is demonstrated in Table 4.5. Refer to Appendix D for peak flow calculations.

Table 4.5 – Peak Flow Rates

Return Period	Pre-development Peak Flow (L/s)	Post-development Peak Flow (L/s)	Δ (L/s)
2	302.9	281.7	-21.1
5	365.6	340.1	-25.5
10	412.4	383.6	-28.8
25	480.0	446.5	-33.5
50	533.2	496.0	-37.2
100	586.8	545.8	-40.9

The results presented in Table 4.5 indicate that the proposed development will result in a reduction in post-development peak flow rates relative to pre-development conditions for all design storm events. Although the proposed development increases the overall impervious area, the associated increase in runoff is offset by the lower runoff coefficient resulting from the proposed use of compacted gravel parking surfaces in place of existing asphalt. Based on MTO Hydrotechnical Design Chart 1.07, compacted gravel surfaces typically have a runoff coefficient ranging from 0.40 to 0.60; therefore, a value of 0.50 was assumed for the purposes of this analysis. Existing asphalt/concrete/paver/roof surfaces were assigned a runoff coefficient of 0.90.

As the post-development peak flow rates are less than the corresponding pre-development peak flow rates for all design storm events, stormwater quantity control measure is not proposed.

4.2 Water Quality

Stormwater quality control for the proposed development will be designed to meet an 'Enhanced' level of protection, defined as the long-term removal of 80% of total suspended solids (TSS), in accordance with applicable municipal and conservation authority criteria.

The proposed approach to achieving enhanced water quality protection will be based on a 'treatment train' methodology, which combines multiple stormwater management practices to collectively provide the required level of pollutant removal. Given that a significant portion of the site will remain in its existing, undeveloped condition, existing pervious and vegetated areas inherently provide a high level of water quality treatment through natural filtration, sedimentation, and infiltration processes. In addition, rooftop runoff from the proposed development is considered a clean source and does not typically require water quality treatment. As such, water quality controls will be primarily focused on runoff generated from parking surfaces and localized hardscape features.

Preliminary water quality measures under consideration include the use of compacted gravel or permeable pavement systems in appropriate parking or low-traffic areas, which provide source control by filtering runoff through the pavement structure and underlying aggregate layers. Runoff may then be directed through vegetated grass swales or landscaped conveyance features, which further enhance sediment removal and promote pollutant attenuation. The cumulative pollutant removal provided by these distributed low impact development (LID) measures is expected to achieve or exceed the 80% TSS removal requirement when implemented as part of a treatment train.

Where site constraints or drainage patterns limit the effectiveness of surface-based measures alone, supplemental treatment such as oil-grit separators (OGS) may be incorporated to provide pretreatment for runoff from parking areas.

The ultimate water quality control strategy, including confirmation of applicable treatment credits and long-term maintenance requirements, will be developed and refined during the detailed design stage.

4.3 Environmental Regulatory Features

Based on correspondence received from the NPCA, the subject property is impacted by the following NPCA-regulated features:

- Valleyland Slope
- 1-in-100-Year Floodplain
- Potential Unevaluated Wetlands
- Watercourse

These regulated features may impact the site plan layout and the development application process. An environmental consultant in combination with a planning consultant may provide further guidance on how to navigate these regulatory features. The following is an introductory summary with respect to these issues.

Valleyland Slope:

The NPCA regulates all development and site alterations within 15 metres of a riverine valley (i.e. 15 meters from stable top of slope) for slope stability purposes. In accordance with the NPCA Policy Document, new buildings and structures, accessory buildings and additions to existing buildings and structures must provide a minimum 7.5-metre setback from the stable top of slope to ensure the long-term stability of the valley slope and safety of buildings or structures.

Based on Regulated Feature Mapping provided by the NPCA (refer to Appendix D), a portion of the existing building appears to be located within the minimum 7.5m setback from the stable top of slope. NPCA was invited to attend a site meeting on May 5, 2026 to stake the top of slope, which will be captured in the forthcoming topographical survey. Based on visual observations from the staking, the existing building appears to be outside of the 7.5m setback.

1-in-100-Year Floodplain:

According to NPCA, a portion of this property may be subject to the current Floodplain Management Policies of the NPCA. Based on the Regulated Feature Mapping provided by the NPCA (refer to Appendix D), both the existing and proposed buildings are located outside the approximate floodplain. Per correspondence with the NPCA, *the regulated 1-in-100-Year floodplain elevation on the property fluctuates from 76.28m on the north side of the creek (at Lakeshore Road) to 76.80m (CGVD28:78) on the south side of the creek.* Notwithstanding what is illustrated on the mapping, consultation with NPCA will be undertaken during detailed

design to confirm whether it is required to complete a survey to accurately delineate the limits of the floodplain within the context of the existing site. The results of this survey may confirm that the development is located within the floodplain limits, and as such, the development may be subject to Section 6.2 of the NPCA Policy Document – *Flooding and Erosion*.

Watercourse:

According to NPCA, any works proposed within 15 metres of a regulated watercourse (i.e. 15m from stable top of slope) will require NPCA approval. Reductions to standard watercourse setbacks may require justification through an Environmental Impact Study or similar assessment undertaken by an environmental consultant.

5.0 UTILITIES

Based on the record drawings provided in Appendix A, gas, hydro and communications infrastructure are present within the Lakeshore Road and Four Mile Creek Road ROWs. As part of subsequent stages of detailed design, SUE shall be completed to confirm the location, depth, alignment, and extent of existing underground utilities within the municipal ROWs and on the subject property. Coordination with the applicable utility providers will also be required to identify potential conflicts, confirm servicing constraints, and review that appropriate clearances, protection measures, and relocation requirements, if any, are considered into the final design.

6.0 CONCLUSION

6.1 Water

The subject property is currently serviced by a 38mm $\varnothing$ water service connected to the existing 150mm $\varnothing$ watermain on Lakeshore Road. A private hydrant connected to the 200mm $\varnothing$ watermain on Four Mile Creek Road is also located on the site.

The governing water demand for the proposed development is estimated to be approximately 202.3 L/s, comprising a maximum-day domestic demand of approximately 2.24 L/s and a fire-flow demand of 200 L/s. Available hydrant testing information indicates theoretical flows at 20 psi ranging from approximately 87 L/s to 123 L/s. Accordingly, the municipal water distribution system is not anticipated to provide the full estimated demand while maintaining the Town's minimum residual pressure criterion.

To supplement the available municipal watermain capacity, on-site water storage in the form of a cistern is proposed. Based on an estimated fire-flow deficit of approximately 80 L/s and

the applicable fire-flow duration specified by the FUS, a preliminary total storage volume in the order of 505,000 L is required. The existing cistern, with a reported capacity of approximately 100,000 L, may contribute toward this requirement, subject to confirmation of its condition, usable capacity, and suitability for integration into the proposed fire-supply system. On this basis, approximately 405,000 L of additional storage would be required.

A new metered water service connection to the Lakeshore Road watermain may be required, and the existing private hydrant will require relocation to accommodate the proposed development.

6.2 Sanitary

The subject property is currently serviced by an existing 200mm $\varnothing$ sanitary service connected to the 600mm $\varnothing$ regional sanitary sewer on Four Mile Creek Road, which discharges to the Lakeshore SPS. The proposed peak sanitary flow is estimated to be approximately 4.40 L/s, representing an increase of approximately 1.75 L/s relative to existing conditions.

The Niagara Region's 2021 Water and Wastewater Master Servicing Plan (2023) identifies surplus capacity within the downstream regional sanitary sewer under the 2051 projected growth condition. The Lakeshore SPS has an operational firm capacity of approximately 86.0 L/s, compared with a forecasted 2051 peak dry-weather flow of approximately 44.1 L/s. Based on this information, the downstream sanitary sewer and pumping station are expected to have sufficient residual capacity to accommodate the relatively minor increase in sanitary flow from the proposed development.

6.3 Storm

The existing site drainage system generally consists of localized inlet networks, tile drainage infrastructure, and outfalls toward Four Mile Creek. Investigations completed to date provide a preliminary understanding of the existing drainage patterns; however, the complete configuration, connectivity, condition, and outlet locations of the existing storm infrastructure have not been confirmed. Further investigation, including SUE, should be undertaken during detailed design.

Based on the analysis conducted, the post-development peak flow rates are estimated to be lower than the corresponding pre-development rates for the 2-year through 100-year design storms. The estimated reduction is primarily attributable to the proposed use of compacted gravel parking surfaces in place of existing asphalt surfaces. Accordingly, stormwater quantity-control measures are not proposed.

Stormwater quality controls will be designed to provide an Enhanced level of protection, corresponding to the long-term removal of 80% of total suspended solids. A treatment-train approach incorporating measures such as compacted gravel or permeable pavement systems, vegetated conveyance features, and supplemental OGS treatment.

Based on the assessment completed herein, the proposed redevelopment at 1339 Lakeshore Road, Niagara-on-the-Lake is considered feasible from a functional servicing and stormwater management perspective, provided the identified limitations are addressed during detailed design.

Should you have any questions, please do not hesitate to contact the undersigned.

R. V. ANDERSON ASSOCIATES LIMITED

Arbaz Hasan

Prepared by:

Arbaz Hasan
Project Designer



Reviewed by:

Alex Wong, P.Eng.
Associate, Project Manager

APPENDIX A

BACKGROUND DATA AND INFORMATION



THIS IS NOT A PLAN OF SURVEY

AGRICULTURE

STREWN INC.

SITE PLAN

PLAN OF SURVEY OF
LOT 162, REGISTERED PLAN M-1 AND
LOTS 183, 184 AND 185,
REGISTERED PLAN M-11
GEOGRAPHIC TOWNSHIP OF NIAGARA, COUNTY OF LINCOLN, ALL NOW IN THE
TOWN OF NIAGARA ON THE LAKE
REGIONAL MUNICIPALITY OF NIAGARA

11999/11 ONTARIO INC.
OTHER NAME
John R. Gordon
SIGNATURE
TOWN OF NIAGARA ON THE LAKE
TOWN CLERK
Michael J. D'Amico
LORD MAYOR
DATE

NOTES:

1. DIMENSIONS, AREAS & LOCATIONS

THE DIMENSIONS, AREAS AND LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE AND MAY BE SLIGHTLY ALTERED IN THE FINAL DESIGN, PROVIDING THE INTENT AND PURPOSE OF THE ORIGINAL PLAN IS MAINTAINED AND ALL RELEVANT ZONING PROVISIONS COMPLIED WITH.

2. SERVICES, GRADING & DRAINAGE

FURTHER AND NOTWITHSTANDING ANYTHING SHOWN ON THIS PLAN TO THE CONTRARY, ALL SITE SERVICES, GRADING AND DRAINAGE SHALL BE IN ACCORDANCE WITH PLANS FILED IN THE OFFICE OF PUBLIC WORKS AND WITH PLANS APPROVED BY THE DIRECTOR OF PUBLIC WORKS, AND THE NIAGARA PENINSULA CONSERVATION AUTHORITY, AS MAY BE REQUIRED.

3. LANDSCAPING

LANDSCAPING SHALL BE COMPLETED SUBSTANTIALLY IN ACCORDANCE WITH THE DETAILS SHOWN ON THE ATTACHED PLAN.

AGRICULTURE

PROPERTY LINE

STATISTICS			
LAND USE	m.sq.	ha.	%
PROPOSED CRUSHER & RECEIVING AREA	109.60	—	—
BUILDING "A" (remaining)	2,600.58	0.26	7
BUILDING "B"	792.10	0.08	2
BUILDING "C"	494.68	0.05	1
PARKING (56 spaces)	750.00	0.07	2
DRIVEWAY	2080.00	0.21	5
LANDSCAPING	11,793.50	1.18	30
VINEYARD	20,989.12	2.10	53
TOTAL SITE AREA	39,500.00m.sq.	3.95ha	100%

pkg 5 paces for winery
restaurant and included

13 LIGHT STANDARD (13)

OVERFLOW PARKING

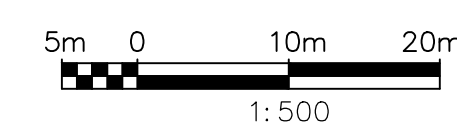
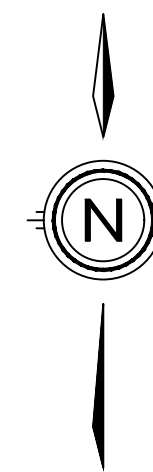


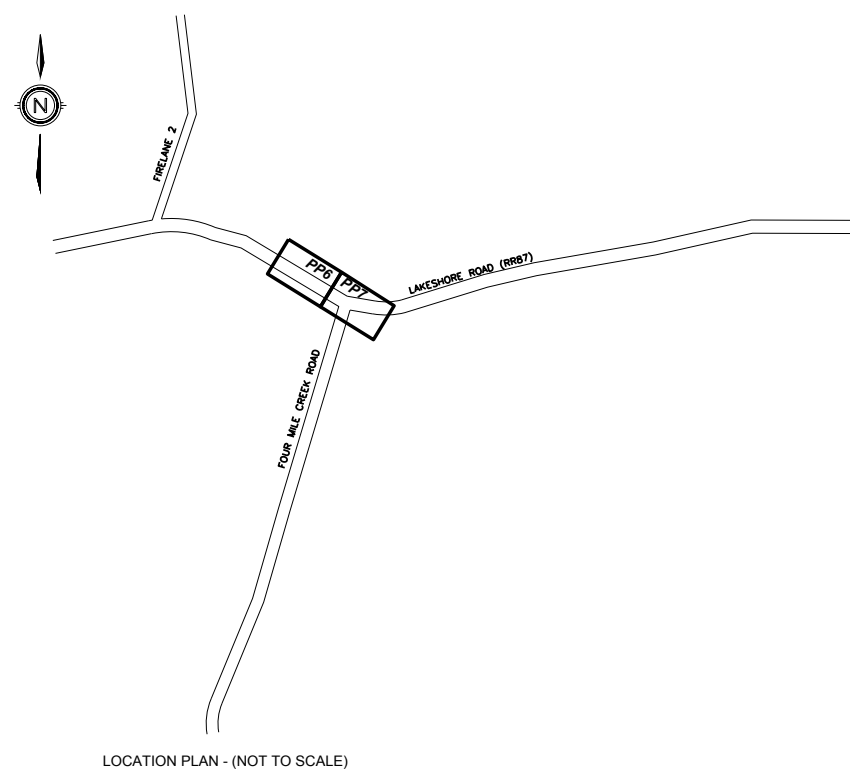
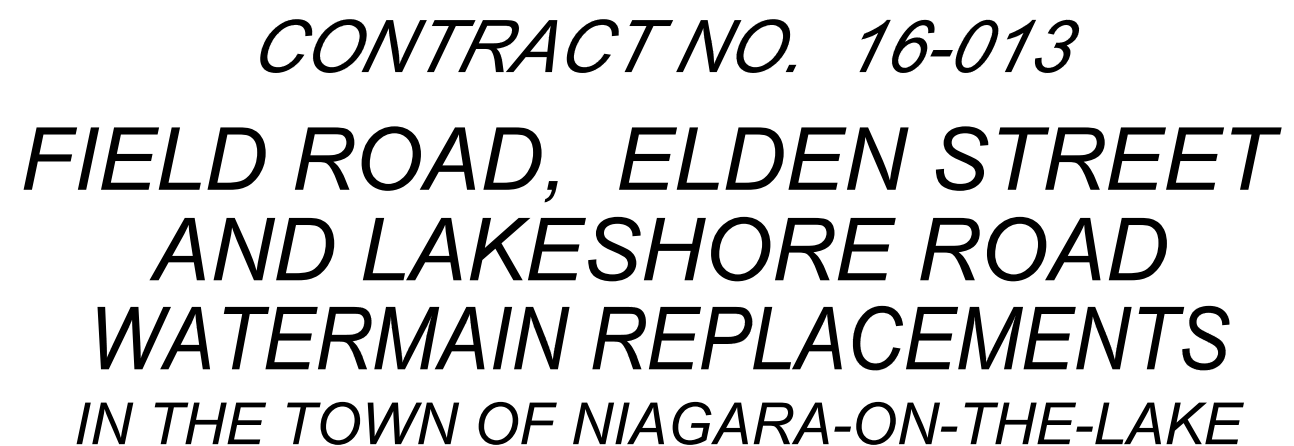
STREWN WINERY
TOWN OF NIAGARA ON THE LAKE

SITE PLAN

PROJECT NO.: 96411
DATE: JANUARY 31/ 1997
SCALE: 1:500
FIGURE NO. 1:500

William O'Dell
PLANNING CONSULTANTS





DRAWING INDEX	
Cover Page	
FIELD ROAD Sta. 0+980 to Sta. 1+100	16-013-PP1
FIELD ROAD Sta. 1+100 to Sta. 1+230	16-013-PP2
FIELD ROAD Sta. 1+230 to Sta. 1+320	16-013-PP3
ELDEN STREET Sta. 2+990 to Sta. 3+110	16-013-PP4
ELDEN STREET Sta. 3+110 to Sta. 3+220	16-013-PP5
LAKESHORE ROAD Sta. 5+100 to Sta. 5+220	16-013-PP6
LAKESHORE ROAD Sta. 5+220 to Sta. 5+350	16-013-PP7

SHELDON RANDALL
DIRECTOR OF OPERATIONS

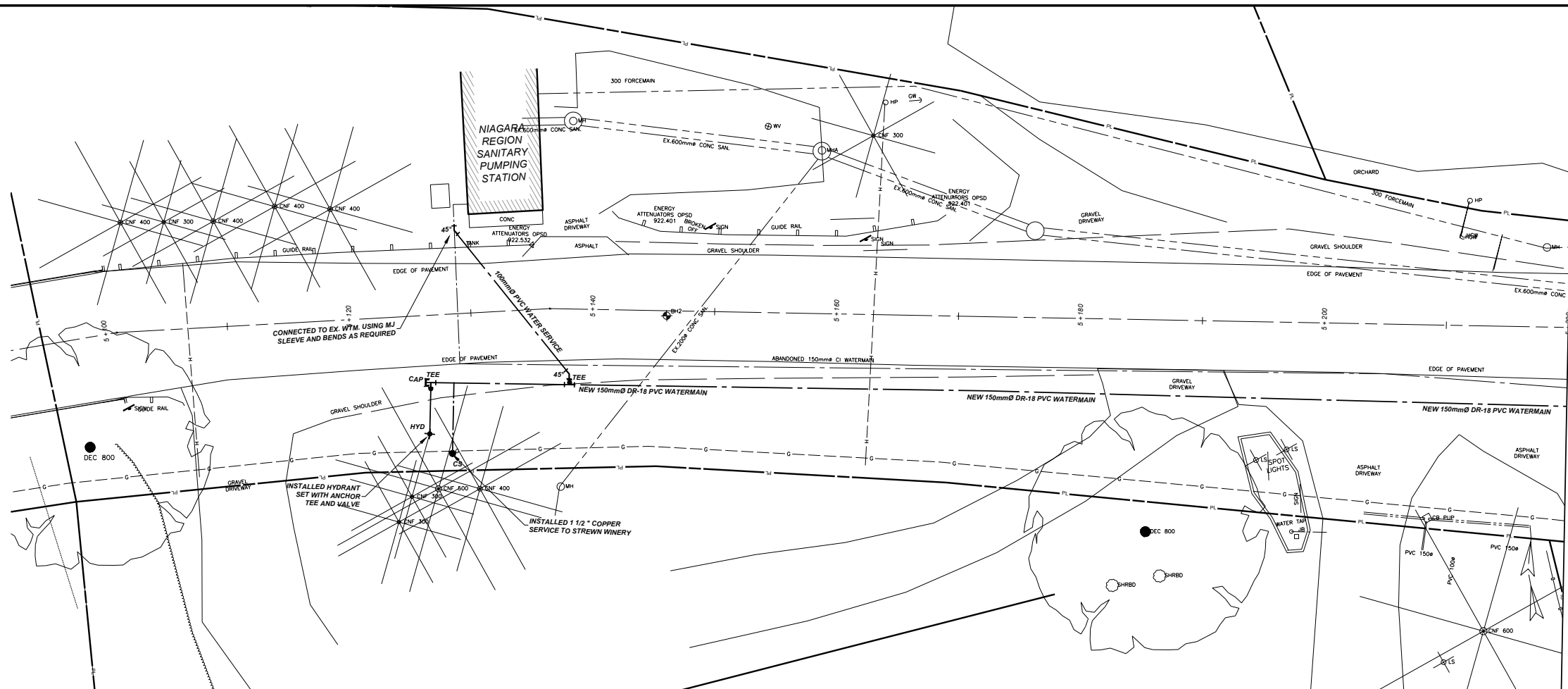
PAT DARTE
LORD MAYOR

KERRY T. HOWE ENGINEERING LTD.
CONSULTING ENGINEERS
98 Church Street
St. Catharines, Ontario
(905) 688-6550

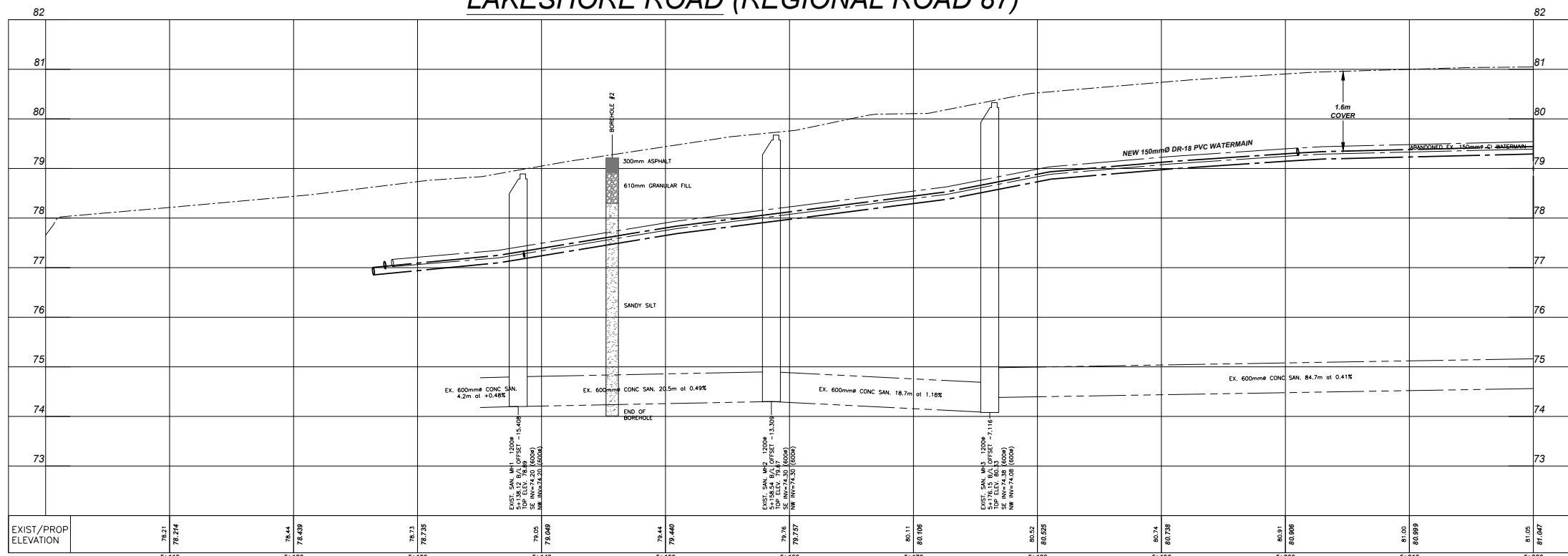


**FIELD ROAD, ELDEN STREET
AND LAKESHORE ROAD
WATERMAIN REPLACEMENTS
IN THE TOWN OF NIAGARA-ON-THE-LAKE**

NO. 16-013



LAKESHORE ROAD (REGIONAL ROAD 87)



NO.	REVISION	DATE	INIT.
3	RECORD OF CONSTRUCTION	JAN/18	LB
2	ISSUED FOR TENDER	NOV/16	TP
1	ISSUED FOR REVIEW	JULY/16	LB

NOTES/LEGEND
1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD TO VERIFY THE ACCURACY OF THESE PROPERTY LINES. A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.
3. BENCHMARK AND CONTROL POINTS
U.T.M. NAD 83 ZONE 17 BM1020020074 MONUMENT IS LOCATED ON THE NORTH SIDE OF LAKESHORE RD APPROXIMATELY 650m EAST OF FIRELANE 6 AND 1.80 kms WEST OF FOUR MILE CREEK ROAD. ELEVATION: 81.392
CP 47 - NL IN SHOULDER OF ROAD NORTH SIDE OF LAKESHORE RD AT FOUR MILE CREEK RD. Northing: 4790562.955 Easting: 652280.386 Elevation: 80.78
CP 49 - NL NORTH SIDE OF LAKESHORE ROAD IN PUMPING STATIONS ASPHALT DRIVEWAY Northing: 4790624.514 Easting: 652170.234 Elevation: 78.92
CP 52 - NL IN GRASS, WEST OF BRIDGE ON SOUTH SIDE OF LAKESHORE RD. Northing: 4790646.607 Easting: 652088.893 Elevation: 78.32

NOTE: THIS DRAWING IS FOR ILLUSTRATIVE PURPOSE ONLY.
KERRY T. HOWE ENGINEERING LTD. ASSUMES NO LIABILITY FOR USE IN ANY OTHER WAY. CAD FILES OF THIS DRAWING ARE NOT CERTIFIED BY THE ENGINEER FOR USE BY OTHERS. USERS OF THESE CAD FILES ASSUME ALL RISK AND RESPONSIBILITY FOR VERIFYING THE CORRECTNESS OF ALL INFORMATION FOR ANY USE.

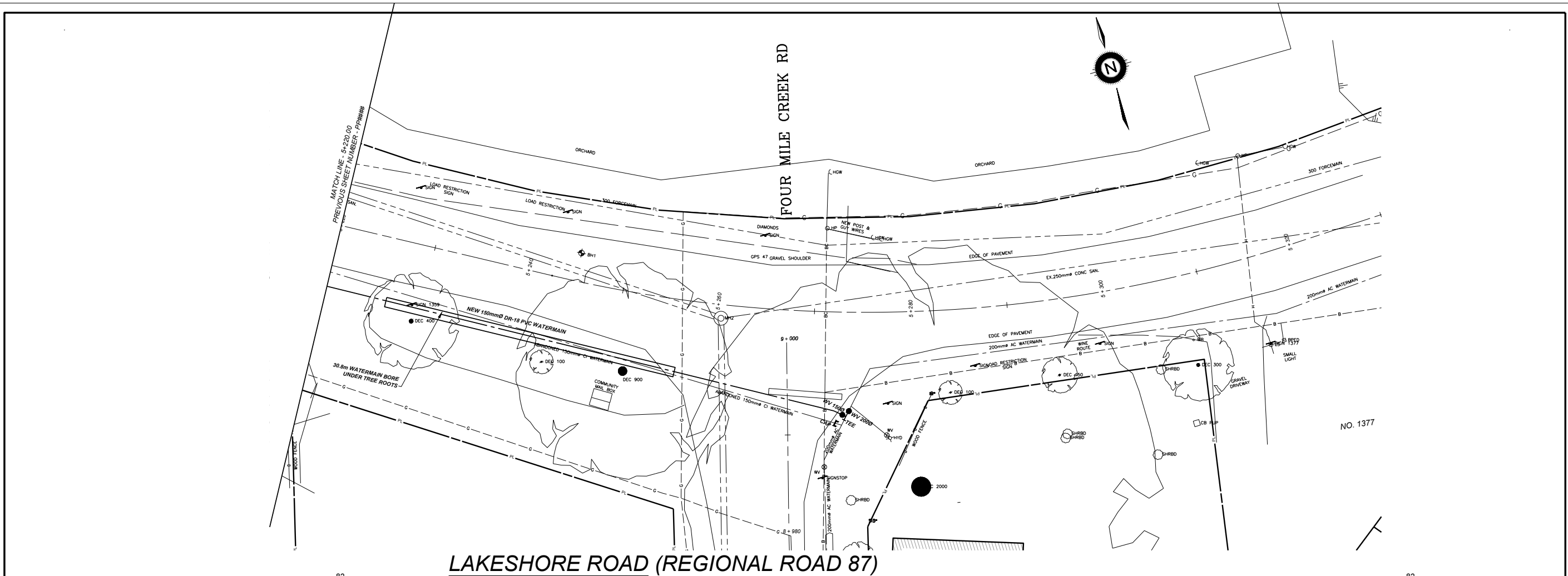
DRAFTING	LB/TP
DESIGN	RB
CHECKED BY	SK
APPROVED BY	

KERRY T. HOWE ENGINEERING LTD.
CONSULTING ENGINEERS
44 Church Street
St. Catharines, Ontario
(905) 688-6860

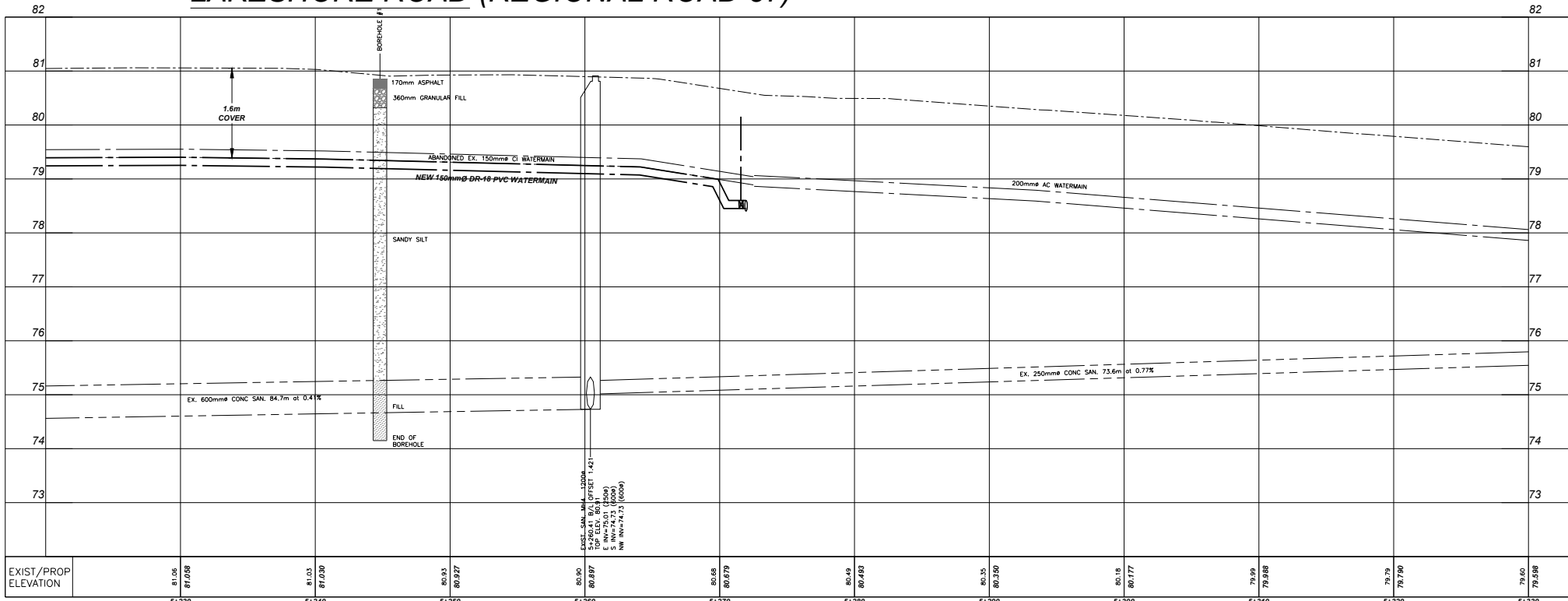


(REGIONAL ROAD 87)
LAKESHORE ROAD
WATERMAIN REPLACEMENT
FROM FOUR MILE CREEK TO FOUR MILE CREEK RD.
TOWN OF NIAGARA-ON-THE-LAKE
Sta. 5+100 to Sta. 5+220

CONSULTANT FILE No. 16-013	DATE JANUARY 9, 2018
SCALE HOR 1:200 VER 1:50	REF. No. REGIONAL ROAD 87
DWG No. 16-013-PP6	REV. 3



LAKESHORE ROAD (REGIONAL ROAD 87)



NO.	REVISION	DATE	INIT.
3	RECORD OF CONSTRUCTION	JAN/18	LB
2	ISSUED FOR TENDER	NOV/16	TP
1	ISSUED FOR REVIEW	JULY/16	LB

NOTES/LEGEND
1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD TO VERIFY THE ACCURACY OF THESE PROPERTY LINES. A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.
BENCHMARK AND CONTROL POINTS
U.T.M. NAD 83 ZONE 17 8W1020020074 MONUMENT IS LOCATED ON THE NORTH SIDE OF LAKESHORE RD APPROXIMATELY 650m EAST OF FIRELANE 6 AND 1.80 kms WEST OF FOUR MILE CREEK ROAD. ELEVATION: 81.392
CP 47 - NL IN SHOULDER OF ROAD NORTH SIDE OF LAKESHORE RD AT FOUR MILE CREEK RD. Northing: 4790562.955 Easting: 652280.386 Elevation: 80.78
CP 49 - NL NORTH SIDE OF LAKESHORE ROAD IN PUMPING STATIONS ASPHALT DRIVEWAY Northing: 4790624.514 Easting: 652170.234 Elevation: 78.92
CP 52 - NL IN GRASS, WEST OF BRIDGE ON SOUTH SIDE OF LAKESHORE RD. Northing: 4790646.607 Easting: 652088.893 Elevation: 78.32

NOTE: THIS DRAWING IS FOR ILLUSTRATIVE PURPOSE ONLY.
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DRAFTING	LB/TP
DESIGN	RB
CHECKED BY	SK
APPROVED BY	

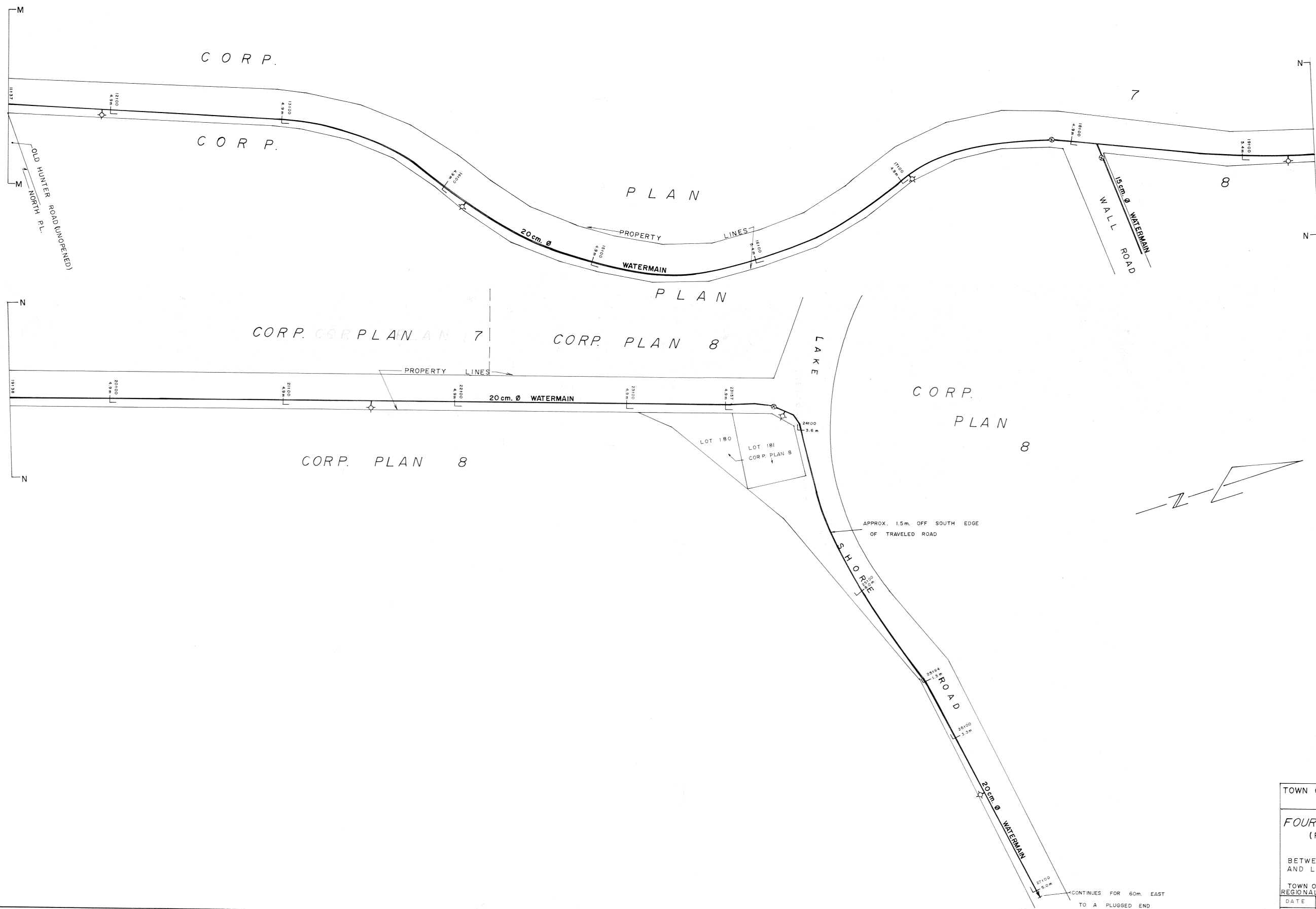
5+230.00
5+240.00
5+250.00
5+260.00
5+270.00
5+280.00
5+290.00
5+300.00
5+310.00
5+320.00
5+330.00

KERRY T. HOWE ENGINEERING LTD.
CONSULTING ENGINEERS
80 Church Street
St. Catharines, Ontario
(905) 688-6560



(REGIONAL ROAD 87) LAKESHORE ROAD WATERMAIN REPLACEMENT FROM FOUR MILE CREEK TO FOUR MILE CREEK RD. TOWN OF NIAGARA-ON-THE-LAKE Sta. 5+220 to Sta. 5+340		CONSULTANT FILE No. 16-013 DATE JANUARY 9, 2018 SCALE HOR 1:200 VER 1:50 REF. No. REGIONAL ROAD 87 DWG No. 16-013-PP7 REV. 3
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WAT-9-2



TOWN OF NIAGARA-ON-THE-LAKE				
WORKS DEPARTMENT				
FOUR MILE CREEK ROAD (REGIONAL ROAD 100) WATERMAINS				
BETWEEN OLD HUNTER ROAD ALLOW. AND LAKE SHORE ROAD (INCL.)				
IN THE TOWN OF NIAGARA-ON-THE-LAKE REGIONAL MUNICIPALITY OF NIAGARA				
DATE	DRWN. BY	SCALE	SHEET N°	FILE N°
1978 03 09	R.B./C.M.	1cm = 10m	2 OF 2	WAT-9

APPENDIX B

WATER SERVICING



TABLE B1 - PROPOSED PEAK-HOUR & MAXIMUM-DAY DEMANDS					
		Building 'C'	Building 'B'	Building 'A'	Building 'D'
Total Units ¹	units	43	15	0	0
% of One Bedroom Units	%	74%	26%	0%	0%
Persons Per Unit ²	persons/unit	2.16	2.16	2.16	2.16
Total Residential Population	persons	95	35	0	0
Combined Residential Population	persons	130			
Gross Floor Area ³	ft2	16788	12545	15263	8921
Employees Per 500 ft2 ⁴	persons/500ft2	1.00	1.00	1.00	1.00
Total Employee Population	persons	35	30	35	20
Combined Employee Population	persons	120			
Total Population Used for Calculation Purposes	persons	250			
Residential Per Capita Demand @ 255 L/person/day ⁵	L/day	33,150			
Employment Per Capita Demand @ 310 L/emp./day ⁵	L/day	37,200			
Total Demand	L/day	70,350			
Equivalent Population Demand	L/s	0.81			
Peak Hour Peaking Factor ⁶		4.13			
Peak Hour Design Demand Rate	L/s	3.36			
Peak Hour Design Demand Rate	m ³ /day	291			
Maximum Day Peaking Factor ⁶		2.75			
Maximum Day Design Demand Rate	L/s	2.24			
Maximum Day Design Demand Rate (m ³ /day)	m ³ /day	193			

*Note: Due to the lack of detailed architectural plans and for ease of calculation at this high-level stage, it was conservatively assumed that the Hotel/Spa Expansion consists of:

¹58 units per Preliminary Site Plan included in Appendix A

²Hotel was assumed as medium density which corresponds to 2.16 persons/unit per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

³Gross floor areas per Option 'X' in the Preliminary Site Plan included in Appendix A
(Note that the west part of the hotel is 2-storey, this extra floor area has been accounted for in this calculation)

⁴Employment density was assumed as 1 person/500sqft per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

⁵Per capita demand based on 2021 Water and Wastewater Master Servicing Plan Volume 4.

⁶Peaking factors per Ministry of Environment Design Guidelines for Drinking-Water Systems, 2016 (Updated 2023).

TABLE B2 - PROPOSED FIRE DEMAND - BUILDING 'C'

			TOTAL
Construction Coefficient (C)			1
Height in Stories			3
Total Effective Area (A)		m ²	1,560
Fire Flow Required		L/min	9,000
Reduction for Occupancy Charge	15%	L/min	-1,350
Fire Flow Required		L/min	7,650
Reduction for Automatic Sprinklers	40%	L/min	-3,060
North: Nearest Building	40	m	0%
East: Nearest Building	41	m	0%
South: Nearest Building	39	m	0%
West: Nearest Building	0	m	25%
Total Change for Building Separation	Max 75	%	25%
Change for Building Separation		L/min	1,913
Fire Flow Required		L/min	7,000
Fire Flow Required		L/s	116.7

*Note: Fire Flow calculations are based on methodology included in Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)

TABLE B3 - PROPOSED FIRE DEMAND - BUILDING 'B'

			TOTAL
Construction Coefficient (C)			1
Height in Stories			1 to 2
Total Effective Area (A)		m ²	1,165
Fire Flow Required		L/min	8,000
Reduction for Occupancy Charge	15%	L/min	-1,200
Fire Flow Required		L/min	6,800
Reduction for Automatic Sprinklers	40%	L/min	-2,720
North: Nearest Building	41	m	0%
East: Nearest Building	0	m	25%
South: Nearest Building	0	m	25%
West: Nearest Building	75	m	0%
Total Change for Building Separation	Max 75	%	50%
Change for Building Separation		L/min	3,400
Fire Flow Required		L/min	8,000
Fire Flow Required		L/s	133.3

*Note: Fire Flow calculations are based on methodology included in Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)

TABLE B4 - PROPOSED FIRE DEMAND - BUILDING 'A'

			TOTAL
Construction Coefficient (C)			1
Height in Stories			1
Total Effective Area (A)		m ²	1,418
Fire Flow Required		L/min	9,000
Reduction for Occupancy Charge	0%	L/min	0
Fire Flow Required		L/min	9,000
Reduction for Automatic Sprinklers	0%	L/min	0
North: Nearest Building	0	m	25%
East: Nearest Building	41	m	0%
South: Nearest Building	225	m	0%
West: Nearest Building	75	m	0%
Total Change for Building Separation	Max 75	%	25%
Change for Building Separation		L/min	2,250
Fire Flow Required		L/min	12,000
Fire Flow Required		L/s	200.0

*Note: Fire Flow calculations are based on methodology included in Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)

TABLE B5 - PROPOSED FIRE DEMAND - BUILDING 'D'

			TOTAL
Construction Coefficient (C)			1
Height in Stories			1
Total Effective Area (A)		m ²	829
Fire Flow Required		L/min	7,000
Reduction for Occupancy Charge	0%	L/min	0
Fire Flow Required		L/min	7,000
Reduction for Automatic Sprinklers	0%	L/min	0
North: Nearest Building	5	m	20%
East: Nearest Building	59	m	0%
South: Nearest Building	250	m	0%
West: Nearest Building	41	m	0%
Total Change for Building Separation	Max 75	%	20%
Change for Building Separation		L/min	1,400
Fire Flow Required		L/min	9,000
Fire Flow Required		L/s	150.0

*Note: Fire Flow calculations are based on methodology included in Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)

APPENDIX C

SANITARY SERVICING



TABLE C1 - EXISTING TOTAL SANITARY FLOW		
		TOTAL
Total Units ¹	units	0
% of One Bedroom Units	%	0%
Persons Per Unit ²	persons/unit	2.16
Total Residential Population	persons	0
Gross Floor Area ³	ft2	53517.00
Employees Per 500 ft2 ⁴	persons/500ft2	1.00
Total Employee Population	persons	110

Total Population Used for Calculation Purposes	persons	110
--	---------	------------

Residential Per Capita Demand @ 255 L/person/day ⁵	L/day	0
Employment Per Capita Demand @ 310 L/emp./day ⁵	L/day	34,100
Total Demand	L/day	34,100
Total Domestic Flow	L/s	0.39
Peaking Factor ⁶		4
Total Residential Peak Flow	L/s	1.58
Site Area	m ²	37341
Site Area	ha	3.73
Infiltration Allowance ⁷	L/s/ha	0.286
Total Infiltration Peak Flow	L/s	1.07

Total Peak Flow	L/s	2.65
------------------------	------------	-------------

¹58 units per email received from MGI on March 24, 2026

²Proposed building was assumed as medium density which corresponds to 2.16 persons/unit per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

³Total building footprint area (existing)

⁴Employment density was assumed as 1 person/500sqft per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

⁵Per capita demand based on 2021 Water and Wastewater Master Servicing Plan Volume 4.

⁶Peaking factors per Harmon's Formula. Use of Harmon's Formula based on Niagara Region's 2021 Water and Wastewater Master Servicing Plan (Updated 2023).

⁷Infiltration Allowance based on Niagara Region's 2021 Water and Wastewater Master Servicing Plan (Updated 2023).

TABLE C2 - PROPOSED TOTAL SANITARY FLOW		
		TOTAL
Total Units ¹	units	58
% of One Bedroom Units	%	100%
Persons Per Unit ²	persons/unit	2.16
Total Residential Population	persons	130
Gross Floor Area ³	ft2	53517.00
Employees Per 500 ft2 ⁴	persons/500ft2	1.00
Total Employee Population	persons	125

Total Population Used for Calculation Purposes	persons	255
--	---------	------------

Residential Per Capita Demand @ 255 L/person/day ⁵	L/day	33,150
Employment Per Capita Demand @ 310 L/emp./day ⁵	L/day	38,750
Total Demand	L/day	71,900
Total Domestic Flow	L/s	0.83
Peaking Factor ⁶		4
Total Residential Peak Flow	L/s	3.33
Site Area	m ²	37341
Site Area	ha	3.73
Infiltration Allowance ⁷	L/s/ha	0.286
Total Infiltration Peak Flow	L/s	1.07

Total Peak Flow	L/s	4.40
------------------------	------------	-------------

¹58 units per email received from MGI on March 24, 2026

²Hotel was assumed as medium density which corresponds to 2.16 persons/unit per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

³Total building footprint area (existing + proposed)

⁴Employment density was assumed as 1 person/500sqft per Town of Niagara-on-the-Lake Development Charges Background Study (2018).

⁵Per capita demand based on 2021 Water and Wastewater Master Servicing Plan Volume 4.

⁶Peaking factors per Harmon's Formula. Use of Harmon's Formula based on Niagara Region's 2021 Water and Wastewater Master Servicing Plan (Updated 2023).

⁷Infiltration Allowance based on Niagara Region's 2021 Water and Wastewater Master Servicing Plan (Updated 2023).

APPENDIX D

STORM SERVICING AND STORMWATER MANAGEMENT



1339 Lakeshore Road - Regulated Features Map

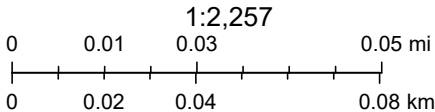


3/30/2026, 4:44:31 PM

SWOOP 2020 NPCA LIO - Wetland DRAFT

- Red: Band_1 Evaluated-Provincial
- Green: Band_2 Roads
- Blue: Band_3 NPCA APPROXIMATE REGULATION LANDS

- Wetland Allowance
- Regulation Wetlands
- Evaluated-Provincial
- Top of Slope Features
 - Stable
 - Unstable



NPCA, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

Web AppBuilder for ArcGIS

TABLE D1 - EXISTING CATCHMENT CHARACTERISTICS & PEAK FLOW RATES

D1.1 - Pre-Development 1339 Lakeshore Road - Site Catchments

ID	Outlet	Catchment Area (m2)	Pervious Area (m2) C=0.25	Impervious Asphalt/Concrete/Paver/Roof Areas (m2) C=0.90	Impervious Gravel Area (m2) C=0.50	C	Area (ha)	% Area	% IMP	Time of Concentration (mins)	Q2 (L/s)	Q5 (L/s)	Q10 (L/s)	Q25 (L/s)	Q50 (L/s)	Q100 (L/s)
EX. STM-1	Four Mile Creek	6323	2807	3414	102	0.60	0.6323	17%	54.6%	10.00	79.2	95.6	107.8	125.5	139.4	153.4
EX. STM-2	Four Mile Creek	9921	6023	3503	396	0.49	0.9921	27%	36.8%	10.00	100.5	121.3	136.9	159.3	177.0	194.7
EX. STM-3	Four Mile Creek	20495	19769	600	126	0.27	2.0495	55%	3.2%	10.00	114.8	138.6	156.3	181.9	202.1	222.4
EX. STM-4	Four Mile Creek	602	34	282	286	0.67	0.0602	2%	65.1%	10.00	8.4	10.1	11.4	13.3	14.8	16.3
Total		37341	28634	7799	909	0.39	3.73	100%	21.8%		302.9	365.6	412.4	480.0	533.2	586.8

NOTL IDF Parameters:

2-YEAR

A = 567
 B = 0.746
 C = 5.2
 T = 10 minutes
 I = 74.5 mm/hour

NOTL IDF Parameters:

5-YEAR

A = 664
 B = 0.744
 C = 4.7
 T = 10 minutes
 I = 89.9 mm/hour

NOTL IDF Parameters:

10-YEAR

A = 724
 B = 0.739
 C = 4.3
 T = 10 minutes
 I = 101.4 mm/hour

NOTL IDF Parameters:

25-YEAR

A = 821
 B = 0.735
 C = 4
 T = 10 minutes
 I = 118.0 mm/hour

NOTL IDF Parameters:

50-YEAR

A = 900
 B = 0.734
 C = 3.8
 T = 10 minutes
 I = 131.1 mm/hour

NOTL IDF Parameters:

100-YEAR

A = 980
 B = 0.732
 C = 3.7
 T = 10 minutes
 I = 144.3 mm/hour

TABLE D2 - PROPOSED CATCHMENT CHARACTERISTICS & PEAK FLOW RATES

D1.2 - Post-Development 1339 Lakeshore Road - Site Catchments

ID	Outlet	Catchment Area (m2)	Pervious Area (m2) C=0.25	Impervious Asphalt/Concrete/Paver/Roof Areas (m2) C=0.90	Impervious Gravel Area (m2) C=0.50	C	Area (ha)	% Area	% IMP	Time of Concentration (mins)	Q2 (L/s)	Q5 (L/s)	Q10 (L/s)	Q25 (L/s)	Q50 (L/s)	Q100 (L/s)
STM-1	Four Mile Creek	6323	2464	1858	2001	0.52	0.6323	17%	41.6%	10.00	68.1	82.2	92.7	107.9	119.9	131.9
STM-2	Four Mile Creek	9921	5596	2131	2193	0.44	0.9921	27%	30.0%	10.00	91.4	110.3	124.4	144.8	160.9	177.0
STM-3	Four Mile Creek	20495	19577	375	543	0.27	2.0495	55%	2.9%	10.00	113.9	137.5	155.1	180.6	200.6	220.7
STM-4	Four Mile Creek	602	35	281	286	0.67	0.0602	2%	65.0%	10.00	8.4	10.1	11.4	13.3	14.7	16.2
Total		37341	27672	4646	5023	0.36	3.73	100%	17.6%		281.7	340.1	383.6	446.5	496.0	545.8

**NOTL IDF Parameters:
2-YEAR**

A = 567
 B = 0.746
 C = 5.2
 T = 10 minutes
 I = 74.5 mm/hour

**NOTL IDF Parameters:
5-YEAR**

A = 664
 B = 0.744
 C = 4.7
 T = 10 minutes
 I = 89.9 mm/hour

**NOTL IDF Parameters:
10-YEAR**

A = 724
 B = 0.739
 C = 4.3
 T = 10 minutes
 I = 101.4 mm/hour

**NOTL IDF Parameters:
25-YEAR**

A = 821
 B = 0.735
 C = 4
 T = 10 minutes
 I = 118.0 mm/hour

**NOTL IDF Parameters:
50-YEAR**

A = 900
 B = 0.734
 C = 3.8
 T = 10 minutes
 I = 131.1 mm/hour

**NOTL IDF Parameters:
100-YEAR**

A = 980
 B = 0.732
 C = 3.7
 T = 10 minutes
 I = 144.3 mm/hour

D3 - Peak Flow Rates			
Return Period	Pre-development Flow (L/s)	Post- development Flow (L/s)	Δ (L/s)
2	302.9	281.7	-21.1
5	365.6	340.1	-25.5
10	412.4	383.6	-28.8
25	480.0	446.5	-33.5
50	533.2	496.0	-37.2
100	586.8	545.8	-40.9

THIS IS NOT A PLAN OF SUPPLY

STREWN INC.

SITE PLAN

PLAN OF SURVEY OF
LOT 162, REGISTERED PLAN M-1 AND
LOTS 183, 184 AND 185,
REGISTERED PLAN M-11,
GEORGIAN TOWNSHIP OF NIAGARA, COUNTY OF LINCOLN, ALL NOW IN THE
TOWN OF NIAGARA ON THE LAKE
REGIONAL MUNICIPALITY OF NIAGARA

STATISTICS			
LAND USE	m.sq.	ha.	%
PROPOSED CRUSHER & RECEIVING AREA	108.60	—	—
BUILDING "A" (remaining)	2,600.58	0.26	7
BUILDING "B"	792.10	0.08	2
BUILDING "C"	494.69	0.05	1
PARKING (55 spaces)	750.00	0.07	2
DRIVEWAY	2080.00	0.21	5
LANDSCAPING	11,793.50	1.18	30
VINEYARD	20,989.12	2.10	53
TOTAL SITE AREA	39,500.00 m.sq.	3.95 ha	100%

- plenty of space for every restaurant and individual

✍ LIGHT STANDARD (13)

 OVERFLOW PARKING

STREWN WINERY
TOWN OF NIAGARA ON THE LAKE

SITE PLAN

PROJECT NO.:	96411
DATE:	JANUARY
SCALE:	1:500
FIGURE NO.	1:500

McLellan O'Dell
PLANNING CONSULTANTS

November 12/11 - 00411

AGRICULTURE

AGRICULTURE

E VINEYARD

AGRICULTURE

Storm Water

- - catch basin - 12
- x - outfall

- - propane storage

SERVICE
STATION

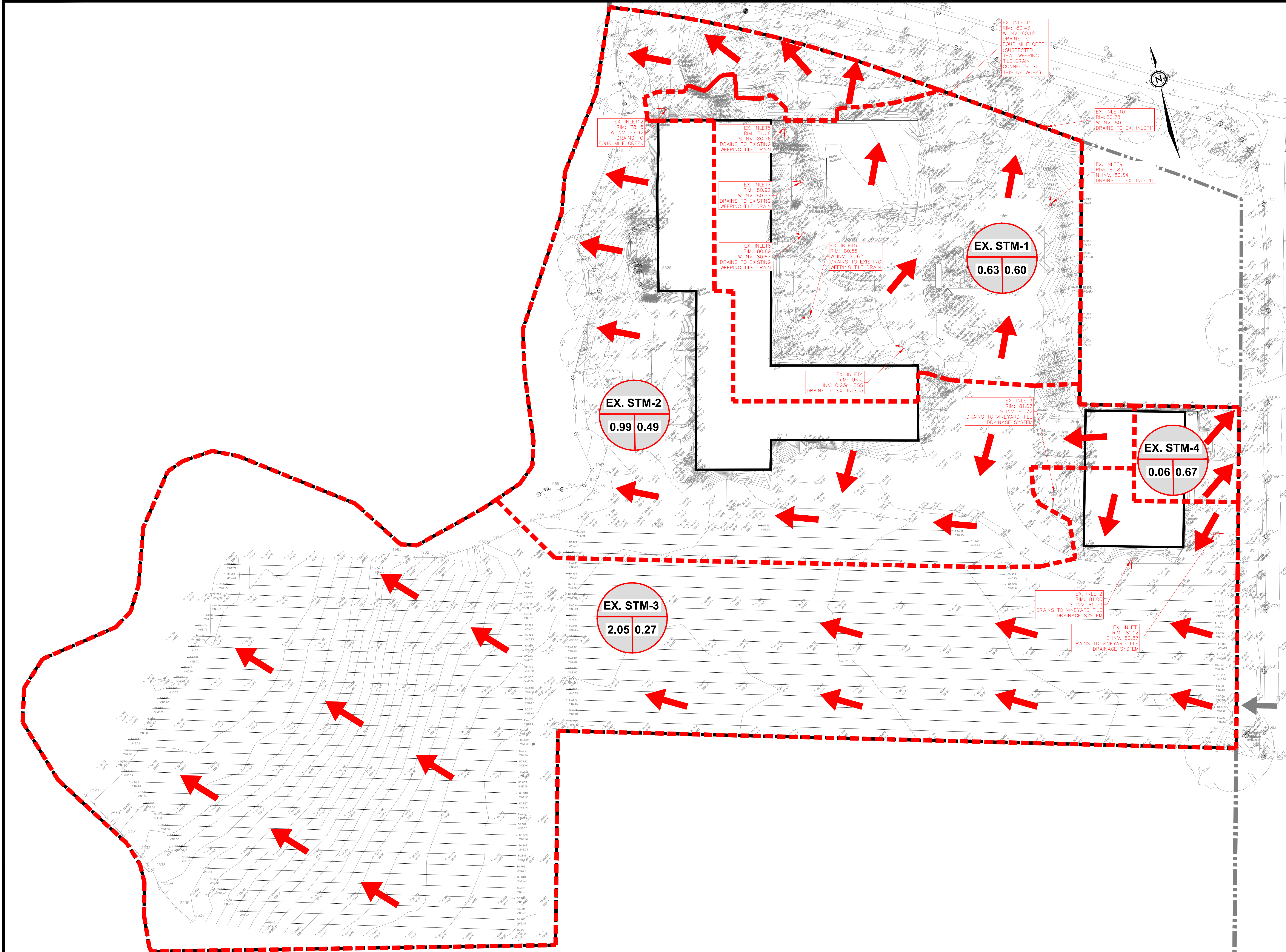
LOT
182

LOT
182

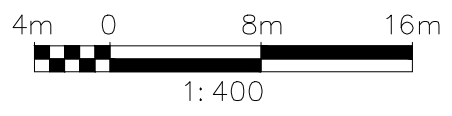
APPENDIX E

CIVIL DRAWINGS





KEY PLAN N.T.S.		
No.	Revision	Comments
1	2026-05-15	ISSUED IN SUPPORT OF OPA/ZBA
2	2026-07-17	ISSUED IN SUPPORT OF OPA/ZBA



Drawing Prepared By:



R.V. Anderson Associates Limited
engineering • environment • infrastructure

Client:

MPI Group Inc.

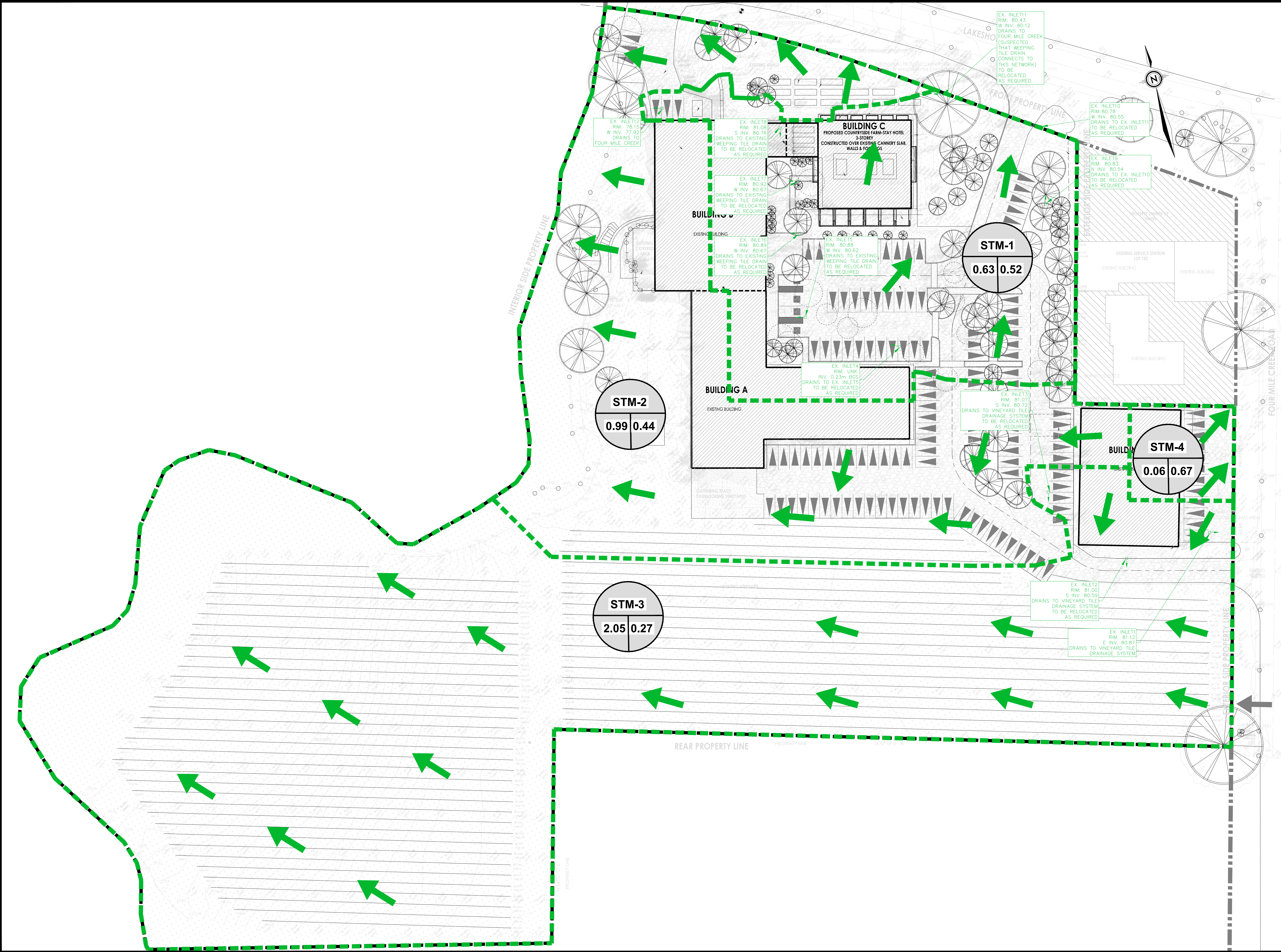
Project Name:

STREW N WINERY REDEVELOPMENT
1339 LAKESHORE ROAD, NOTL

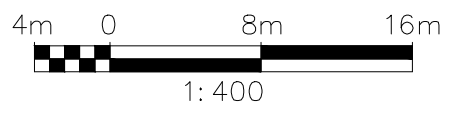
Drawing Title:

PRE-DEVELOPMENT STM

Drawn:	AH	Design:	AH	Date:	MAY 2026
Checked:	AW	Approved:	DAS	Scale:	1:400
CADD File:				Dwg. No.:	C01
Project No.:				268426	



KEY PLAN N.T.S.		
No.	Revision	Comments
1	2026-05-15	ISSUED IN SUPPORT OF OPA/ZBA
2	2026-07-17	ISSUED IN SUPPORT OF OPA/ZBA



Drawing Prepared By:


R.V. Anderson Associates Limited
engineering • environment • infrastructure

Client:

MPI Group Inc.

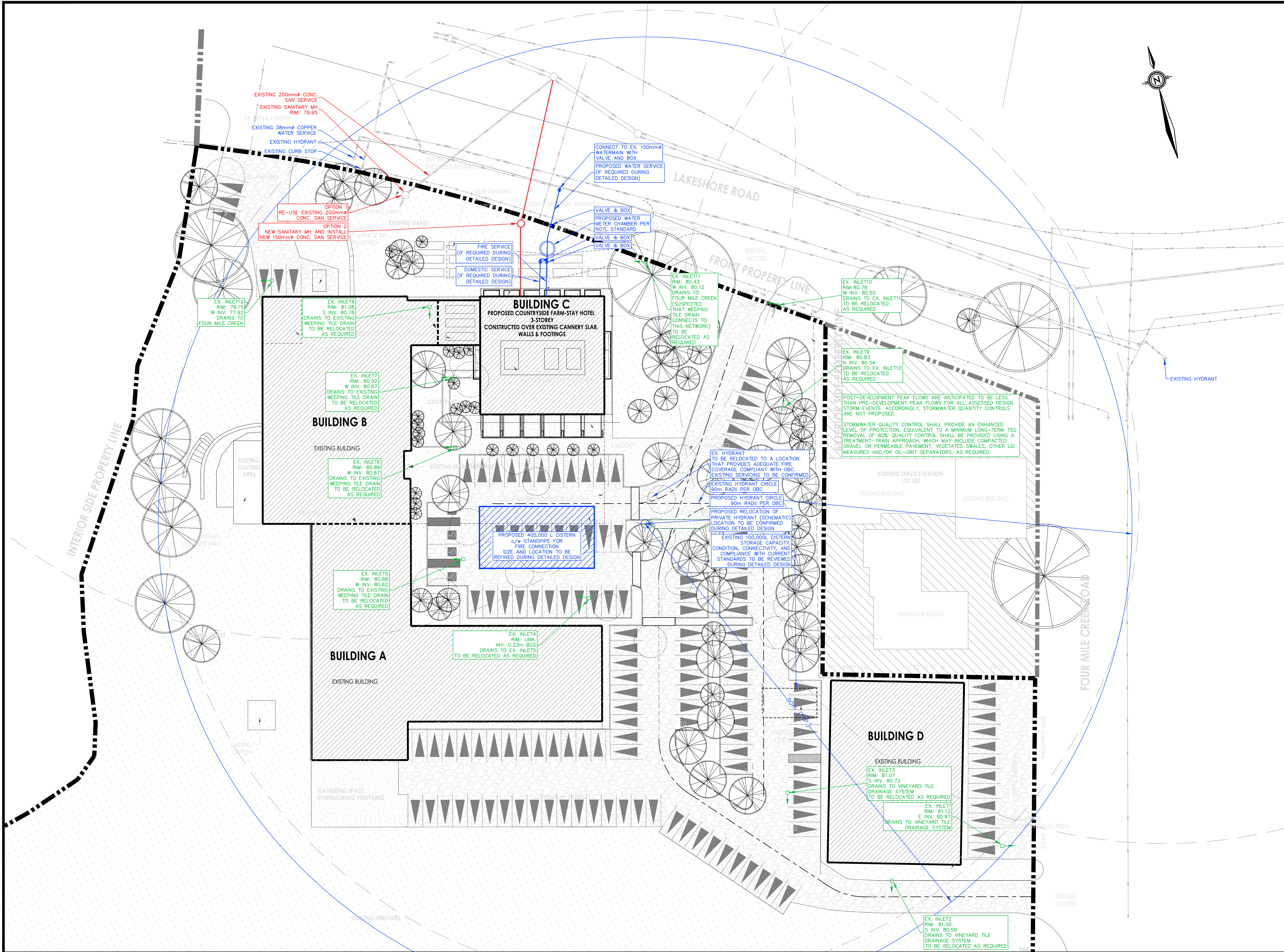
Project Name:

STREWN WINERY REDEVELOPMENT
1339 LAKESHORE ROAD, NOTL

Drawing Title:

POST-DEVELOPMENT STM

Drawn:	Design:	Date:
AH	AH	MAY 2026
Checked:	Approved:	Scale:
AW	DAS	1:400
CADD File:	Dwg. No.:	
268426-S-STM-POST.dwg	C02	
Project No.:	268426	



KEY PLAN N.T.S.		
No.	Revision	Comments
1	2026-05-15	ISSUED IN SUPPORT OF OPA/ZBA
2	2026-07-17	ISSUED IN SUPPORT OF OPA/ZBA



Drawing Prepared By:


R.V. Anderson Associates Limited
engineering • environment • infrastructure

Client:

MPI Group Inc.

Project Name:

STREWN WINERY REDEVELOPMENT
1339 LAKESHORE ROAD, NOTL

Drawing Title:

SERVICING

Drawn:	AH	Design:	AH	Date:	MAY 2026
Checked:	AW	Approved:	DAS	Scale:	1:300
CADD File:	268426-S-SERVICING.dwg				Dwg. No.:
Project No.:	268426				C03