

Blast Proposal (Plan) - Parkbridge Craigleith

Town of The Blue Mountains

Rock Breakers (2007) Inc.
Final Report
Contract No. 1046-4031-C22

November 3, 2022
02210331



eNGLOBE

Rock Breakers (2007) Inc.
Contract No. 1046-4031-C22

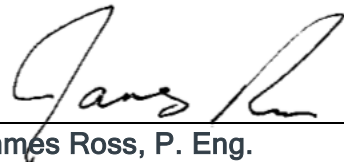
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Revisions and publications log

REVISION No.	DATE	DESCRIPTION
00	November 3, 2022	Final Report

Distribution

1 PDF copy	Rock Breakers (2007) Inc.
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Introduction

Further to our correspondence with Rock Breakers (2007) Inc. (Rock Breakers), review of pertinent contract drawings prepared by Crozier Consulting Engineers (CCE) (Appendix A), Geotechnical Reports prepared by Peto MacCallum Ltd. Consulting Engineers (PML) and the blasting parameters proposed by Rock Breakers, it is the understanding of Englobe Corp. (Englobe) that blasting for rock removal will be required as part of the above noted project at various locations within the project limits for the installation of underground services such as watermain, storm sewers, sanitary sewers and catch basins. The proposed project involves the site preparation for a new residential subdivision on approximately 25 Ha in Craigleith, in the Town of The Blue Mountains. The site is bordered by Lakeshore Road East and residential properties to the north and east, residential properties along Grey Road 19 to the west and undeveloped land to the south. The site is divided by the Niagara Escarpment, creating an elevated southern section and low-lying north section. Based on the geotechnical data provided by PML and plan and profile drawings prepared by CCE, limestone bedrock is present near the surface in the northern section of the proposed site. No blasting will be required for foundation installation of the houses as the proposed undersides of the footings are all above rock elevations, however blasting will be required to achieve the required depths and grades of the proposed sewers and mains. An overview of the site showing approximate blast areas, surrounding structures and utilities is attached in Appendix B. An Enbridge Gas Distribution and Storage (GDS) main is located along the south side of Lakeshore Road East. The closest blasting within the site will be a parallel trench along the proposed Daylily Crescent at a distance of 11 m or more, however the west services connection will require undercrossing of the gas line. Therefore, blasting operations must be carried out in accordance with GDS Third Party Requirements in the Vicinity of Natural Gas Facilities (TPR) when blasting is conducted within 30 m of the gas main.

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Englobe Corp.’s subcontractors who have carried out on-site or laboratory work are duly assessed according to the purchase procedure of our quality system. For further information, please contact your project manager.”

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1 Proposed Blasting Procedure

1.1 Trench Rock

Rock removal including drilling and blasting will be required to achieve the proposed trenching profiles for the installation of the watermains, sanitary and storm sewers. The rock face should be dug out to the toe after each blast to ensure proper depth is achieved and eliminate any “choke blasting” which can contribute to high vibration levels and undesired overbreak. The following drilling and blasting parameters have been proposed by Rock Breakers for trench rock removal blasting requirements for this project:

1.1.1 Drill-hole Diameter

Maximum drill-hole diameter will be 76 mm for initial blasting. The drill-hole diameter may be reduced, if necessary, in shallower cuts. Drill-hole diameter will not exceed 76 mm due to proximity of existing buildings, type of blasting being conducted and required depths.

1.1.2 Drill-hole Depth

Based on plan and profile drawings, maximum rock removal depth is estimated to be approximately 3 m, including subdrill, around the intersection of Thistle Trail, Hawthorn Way and Daylily Crescent. In all cases, drill-hole depth will not exceed allowable tolerances in accordance with contract drawings and specifications. Minimum drill-hole depth will not be less than 1.2 m. Drill-holes for trench blasting will be drilled true vertical. At no time will drill-hole depth be less than effective burden.

1.1.3 Drilling Pattern

The drilling pattern for initial blasting will be a standard square pattern of 1.5 m by 1.5 m burden and spacing respectively with a dice hole for trench blasting.

1.1.4 Number of Holes Per Blast

Number of holes per blast will be at the discretion of the blaster-in-charge and will vary from blast to blast due to rock geometry, distance to sensitive receptors, and available number of rubber blasting mats.

1.1.5 Explosive Column Charge

The column charge will vary with depth of holes. For initial blasting, maximum column charge will be 0.4 m. Once initial blasting is complete and a free face established, explosive column may be increased to accommodate any increase in rock depth, provided vibration levels monitored at sensitive receptors are maintained below acceptable levels. Vibration records obtained during the initial blasting will determine if any increase or decrease in the length of explosive column for subsequent blasts is necessary. Rock Breakers is prepared to reduce hole diameter, drilling pattern, or use controlled blasting techniques including multiple decking of explosive charges (in a single column) in order to maintain the vibration peak particle velocity (PPV) monitored at the closest sensitive receptor below required levels.

1.1.6 Collar

Collar is the uncharged portion of the blast-hole, generally the top section. Minimum collar of 0.9 m for a 76 mm blast-hole covered with rubber blasting mats will be maintained for minimum drill-hole depth of 1.2 m. The collar will be increased with increased hole depth, if any, as vibration levels dictate.

1.1.7 Explosive Quantity Per Delay Period

Quantity of explosive charge per delay period for initial blasting will be 1.1 kg. Vibration records obtained during the initial blasting will determine if any increase or decrease in the quantity of explosives per delay period for subsequent blasts is required. Once initial blasting is complete, and a free-face established, the quantity of explosives per delay period may be increased to accommodate increase depth of drill-holes, if any. Total explosives per blast will vary from blast to blast based on hole depth/rock profile and geometry.

1.1.8 Initiation System

Use of dual delay 25/500 ms non-electric blasting detonators for priming explosive charges will be used for blasting operations on this project. An electric detonator will be used to initiate the blast after it is covered with blasting mats. If, in the opinion of the blasting consultant, an initiation continuity check is necessary based on rock topography and loading logistics, electric detonators may be used.

1.2 Trench Blasting - Utility Undercrossing

As indicated above, undercrossing of the gas main will be required to connect the new mains and sewers to the existing infrastructure within Lakeshore Road East. Rock elevations are currently unknown outside of the proposed site limits, however based on profile drawings, the rock appears to be sloping towards the street, and where rock elevation is known, required depth will be minimum. If/when blasting is required within 5 m of the gas main, or when vibration levels dictate, it will be necessary to implement a combination of line-drilling and “modified cushion/trim blasting” techniques. Modified cushion/trim blasting is defined as a single row of boreholes with reduced burden and spacing, loaded with a decoupled explosives column where each borehole is primed with a different delay period, fired in a

single blast into a mucked out free-face. This technique will help minimize vibration level and limit over break. The number of holes in each blast will be based on achieving acceptable vibration levels.

1.2.1 Drill Hole Diameter

Maximum drill-hole diameter will be 76 mm for initial blasting. The drill-hole diameter may be reduced, if necessary, in shallower cuts.

1.2.2 Drilling Pattern

When blasting a trench perpendicular to the existing gas main within 5 m, three holes will be drilled in rows with 0.75 m spacing to achieve the desired 1.5 m trench width, with 0.9 m of burden. Numbers of rows per blast will be determined by vibration levels monitored on the existing utility line. Prior to each blast the face must be dug to the grade elevation to provide greater relief. Once blasting has reached the point where vibration levels cannot be kept below desired levels, typically 1-3 m from the existing line, the process is repeated on the other side of the utility (if necessary). **Blasting for undercrossings will be limited to a minimum of 1 m from GDS gas mains.** Once blasting is completed on both sides of the utility line, the rock underneath the gas pipeline is generally fractured enough to dig or can be fragmented with a hydraulic hammer.

1.2.3 Explosive Column Charge

The column charge will vary with the depth of holes. Maximum column charge for blasting within 5 m of the gas main shall not exceed 0.4 m. Vibration records obtained during the initial blasting will determine if any increase or decrease in length of column charge for subsequent blasts is required. Rock Breakers will be prepared to use controlled blasting measures, such as multiple decking, in order to maintain the vibration peak particle velocity (PPV) monitored on the existing gas main and closest residence.

1.2.4 Explosive Quantity per Delay Period

Quantity of explosive charge per delay period shall be limited to a maximum of 1.1 kg for blasting within 5 m of the gas main. Total explosives per blast will vary from blast to blast based on hole depth/rock profile and geometry.

1.3 Stemming

Stemming is the material used to fill the collar (uncharged section) region of all blast-holes. Stemming will have multiple functions. It will confine the explosive charge in the blast-hole, reduce the noise and overpressure produced upon detonation, minimize potential fly-rock and protect the rubber blast mats. A well stemmed blast will also produce better fragmentation since it will confine the explosion energy in the ground. Use of crushed stone as stemming material will be employed on this project.

1.4 Explosive Type

The use of commercially available explosives approved for use in Canada will be employed on this project. Such products included nitroglycerin based, cap sensitive emulsion or water-gel cartridge explosives designed for use in construction projects. Use of Ammonium Nitrate Fuel Oil (ANFO) with appropriate primer is not permitted for utility undercrossings due to the excessive heave and over-break produced by such explosives.



2

2 Third Party Requirements in the Vicinity of Natural Gas Facilities Standard Considerations

As mentioned above, majority of the blasting will take place within the site at distances greater than 30 m from the GDS gas main located on the south side of Lakeshore Road East. Trench blasting will be required parallel to the gas main along the proposed Daylily Crescent at distances greater than 10 m from the gas main.

The west utilities connections will require undercrossing of the gas main and may require blasting within 10 m of the gas main, up to 1 m at the very worst case. Based on current data, the blasting required within 10 m of the gas main will be at depths of 1.2 - 1.5 m, with the top of the rock above the main, and bottom of the hole below. The above noted undercrossing procedure is designed specifically for close in blasting, minimizing vibrations and possibility of overbreak. In all cases each blast should be mucked to the toe to ensure necessary depths are achieved, and to prevent any “choke blasting”, which can cause overbreak and higher vibration levels.



3 Blasting Specialist

Englobe Corp. (Englobe) is in general agreement with the blasting methods proposed by Rock Breakers outlined in Section 1.0, provided the blasting operations are carried out in accordance with regulations governing construction blasting operations in the province of Ontario. The above noted procedures are in compliance with project specifications, *Ontario Provincial Standard Specification (OPSS) 120*, and EGD's TPR and are intended for initial blasting operations and are subject to change if acceptable vibration levels, fragmentation requirements, and desirable results are not achieved. Rock Breakers must be prepared to adjust drilling patterns, change explosive types, and implement controlled blasting techniques such as multiple decking of explosive charges in blast-holes in order to meet fragmentation and vibration limit requirements. Engineering services will be provided by Englobe on a required basis for suggesting changes in drilling pattern, blasting procedures and techniques.



4 Initial Blasting

Initial blasting is to be conducted at a location of the blasting site where a free-face already exists or where depth of rock is at its minimum, and where the distance to existing buildings and structures is the maximum. This will allow the blaster to become familiar with the local rock characteristics and the geology. The vibration data obtained during the initial blasting period will also assist the blaster-in-charge to adjust the required maximum quantity of explosive per delay period for subsequent blasts. This is also in compliance with requirements of OPSS 120 for blasting on construction projects in the province of Ontario. A minimum of three blasts will be conducted at the start of the operations and results will be analyzed. If the results meet all the requirements of the contract's special provisions, the blasting will continue. In the event that all the requirements of the contract governing the blasting operations are not met, the blasting procedure will be revised and resubmitted.



5 Acceptable Vibration Levels

Many blasting consultants recommend, as a general guideline, that blasting vibrations monitored at the closest structure to the blast site be kept below 50 mm/s PPV. The maximum “zero to peak” particle velocity of 50 mm/s at frequencies above 40 Hz is in our opinion, and that of most other blasting consultants, including experts such as the United States Bureau of Mines (USBM), the American Insurance Association (AIA), and the National Research Council of Canada (NRC), the threshold of the possibility of cosmetic cracking in drywall and plaster for construction vibrations. Concrete and masonry will tolerate higher levels. For this project, blasting operations will be controlled such that vibration levels at the closest structure, and when required, EGD gas main, will be maintained in accordance with OPSS 120 guidelines shown in Table 1.

Table 1: Maximum Allowable Peak Particle Velocities

Element	Frequency (Hz)	Maximum PPV (mm/s)
Structures and Pipelines	≤40	20
Structures and Pipelines	>40	50
Concrete and Grout <72 hours from placement	N/A	10

The vibration limits shown in Table 1 are also in compliance with EGD’s TPR which state that “**Peak particle velocity (PPV) must be limited to 50 mm/s (2in/s) and maximum amplitude must be limited to 0.15 mm (0.006 in).**”

Blasting shall not be carried out within 30 m of concrete placed less than 72 hours when ambient temperature falls below 20°C or for 36 hours when ambient temperature is continuously greater than

20°C, unless otherwise authorized by the contract administrator. At no time shall vibration levels exceed 10 mm/s on concrete or grout in place less than 72 hours.

Should any two consecutive blasts exceed these levels, or any reading exceed these levels by more than 30 mm/s, blasting operations at that location shall cease until a revised blasting design has been submitted to the contract administrator.

Peak Sound Pressure Levels (PSPL) will be kept to a minimum with the use of stemming and blasting mats. PSPL varies greatly with changes in atmospheric conditions such as temperature inversions, humidity and cloud cover/ceiling, as well as the number and type of holes being blasted. Presently there are no threshold limits for PSPL produced by blasting on constructions projects in the province of Ontario, however, as a due-diligence, PSPL must be recorded during all blasting operations.



6 Vibration Monitoring

In accordance with OPSS.MUNI 120 and contract specifications, blasting induced vibrations will be monitored by Englobe at the closest buildings/structures to blasting operations, as well as above the EGD pipeline when blasting operations are located within 30 m of the pipeline. Seismographs will be calibrated as per manufacturer recommendation. When necessary, seismographs will be repositioned accordingly as blasting progresses. Vibration data will be submitted by Englobe's on-site technician or via email at a pre-determined time of day, or when vibrations exceed a pre-determined trigger level. It will be the responsibility of Rock Breakers to notify Englobe in advance of the blasting operations with sufficient notice to mobilize a technician to site to install the required seismographs. Proposed vibration monitoring locations are shown in the Site Overview in Appendix B. An additional seismograph will be added above the GDS gas main when blasting operations are within 30 m of the main.



7 Pre-blast/Pre-construction Survey

Based on information extracted from the project drawings, and due to the nature, quantity and depth of the rock to be blasted on this site, we recommend that when the maximum depth of rock excavation is less than 5 m, existing third party properties located within 75 m of the areas where explosives are used for the purpose of fragmenting rock be surveyed for existing conditions. This is also in accordance with OPSS.MUNI 120 (November 2019) for construction project in the province of Ontario. Additionally, a pre-construction survey of all structures adjacent to the work zone, will be carried out by Englobe's qualified staff prior to the commencement of construction operations. It must be noted that this area is surrounded by residential properties to the north, west and east, and thus due diligence must be exercised, and good public relations be implemented. A completion letter confirming the surveys have been completed, a list of the properties surveyed, the refusals received, and an evaluation of any evident or potential hazards that may exist will be submitted at the completion of the survey program.

Generally, pre-blast/pre-construction surveys are conducted as a measure to alleviate concerns expressed by property owners in the vicinity of the blasting or construction operations. The surveys will also provide a baseline for assessment and evaluation of any claims arising during and after completion of the blasting and construction operations. Pre-blast/pre-construction surveys are also intended to provide a representative sampling of pre-existing deficiencies that are present in every building, but not an exhaustive exercise of recording all minute cracks and deformities in every building component.

It is Englobe's general policy to visit every third-party property in person and hand deliver notices advising the property owners of the upcoming blasting and construction operations, and provide a contact name, phone number and email address where the building owner can contact surveying staff and arrange for appointments to carry out the survey. An example notification letter is attached in Appendix C. The surveying staff shall conduct at least three visits to each property in order to make contact with the owner and complete the survey. In the event the property owner cannot be reached during these visits, or the property owner makes no attempts to contact surveying staff, it is reasonable to assume that the property owner is not granting permission to conduct the survey, and thus it is counted

as a refusal. The surrounding buildings recommended for the pre-blast and pre-construction survey program are identified in the Site Overview in Appendix B.



8 Blasting Safety and Control

In addition to federal, provincial and municipal laws and regulations governing the use of commercial explosives and blasting safety, we recommend implementation of the following measures for safer blasting operations on this project.

8.1 Designated Blast Area

Designated blast area will be determined on a blast-by-blast basis by the blaster-in-charge as number of holes, depth of holes and quantity of explosive per delay will change due to changes in rock geometry and type of blasting being performed. Maximum blast area shall not exceed the project site limits unless approved by the contract administrator.

8.2 Matting

All blasts will be matted with standard rubber blasting mats in good condition to prevent the possibility of fly rock, and to protect the public, workers, surrounding properties, structures and utilities. Determining the sufficient number of blasting mats will be the responsibility of the blaster-in-charge, since blasting geometry will vary from blast to blast. Due to the nature of the area and presence of the adjacent buildings and roadway, there will be ZERO tolerance for fly rock at this site.

8.3 Blasting Warning Signs

Blasting warning signs will be posted at all entrances to the blasting area in order to warn the public and workers of the blasting operations in progress, and to prevent unauthorized persons from entering the blast site.

8.4 Guarding

Guards will be placed at all points of entry to the blast site. The blaster-in-charge and the guards shall be in constant communication using communication devices or be in direct line of site after guards are positioned.

8.5 Blasting Siren

Standard blasting siren, including an all-clear siren, will be sounded prior to initiation and following the completion of each blast, respectively. The audible blast warning device shall be capable of alerting workers and the public up to a radius of 1,000 m in accordance with OPSS.MUNI 120 guidelines. The following procedure is common and accepted in the blasting industry:

- Following the completion of loading explosives and covering the blast with rubber blasting mats, blasting area clearance, and positioning of the guards, 3 short sirens are sounded,
- One-minute wait and a long siren is sounded,
- Blast imminent,
- Following the blast, the blaster-in-charge will inspect the blast site to ensure all blast-holes are detonated as per design and sequence,
- If a misfire or cut-off is suspected, all personnel except the blaster-in-charge and necessary employees needed to handle the situation shall be kept out of the danger area until it is deemed safe by the blaster-in-charge, and
- All clear siren is sounded.

8.6 Time of Blasting

Blasting shall be carried out only during daylight hours and at a time when atmospheric conditions provide clear observation of the blast site from a minimum distance of 1,000 m. Blasting shall not be conducted on Sundays, statutory holidays, or during electrical storms in accordance with OPSS.MUNI 120.



9 Damage Claims and Complaints

Damage claims and complaints arising from the blasting/construction operations shall be handled by the GC and/or Rock Breakers in a timely and professional manner. In general, upon receiving a complaint, a representative from the GC or Rock Breakers will visit the complainant to document the issue including the name and address of the complainant, time received, date and time of the blast or issue complained, description of the circumstances which led to the complaint and try to resolve the matter. If the complaint is not resolved, the GC and/or Rock Breakers will advise Englobe and Englobe will mobilize an engineer to site to address the complaint. A post-blast assessment will be conducted by Englobe which will include review of the pre-blast survey and vibration monitoring records to assess the validity of the claim followed by an engineering report.



10 Blasting Notification

In accordance with OPSS.MUNI 120, blasting notifications shall be distributed to Utilities and all owners and tenants of properties located within a 250 m radius of the proposed blast locations by the GC, Rock Breakers, or their representatives. Notifications shall include detailed description of what the building occupants can expect during the blasting operations. It is prudent to provide building owners and occupants with the blasting siren sequence and its meaning, and information about what to do when blasting is taking place. The notification shall include the contact information including name and phone number of a competent person who is available to receive, document, and deal with public inquiries regarding the project. All reported complaints shall be documented by the GC and Rock Breakers. An example notification letter is provided in Appendix E.

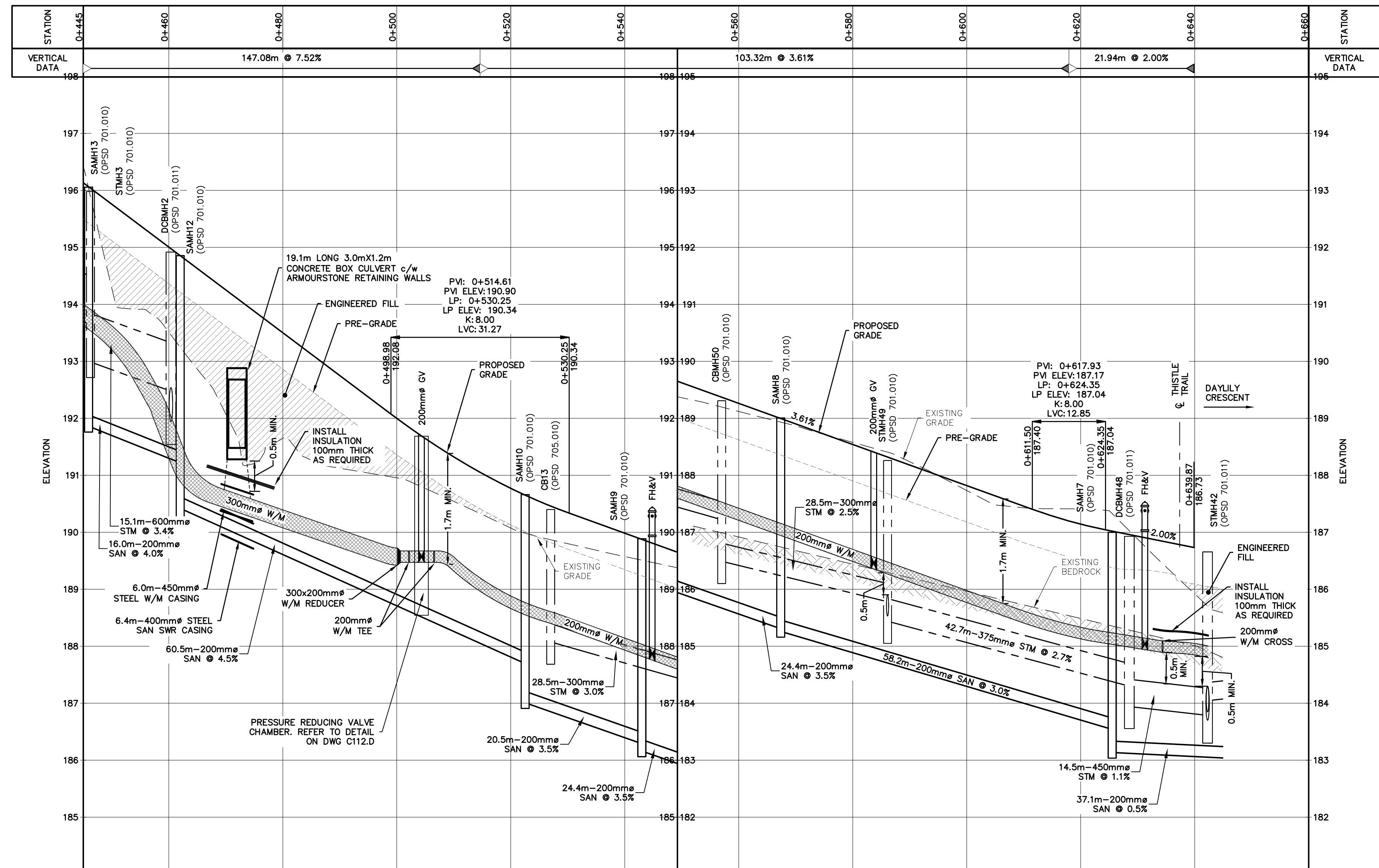
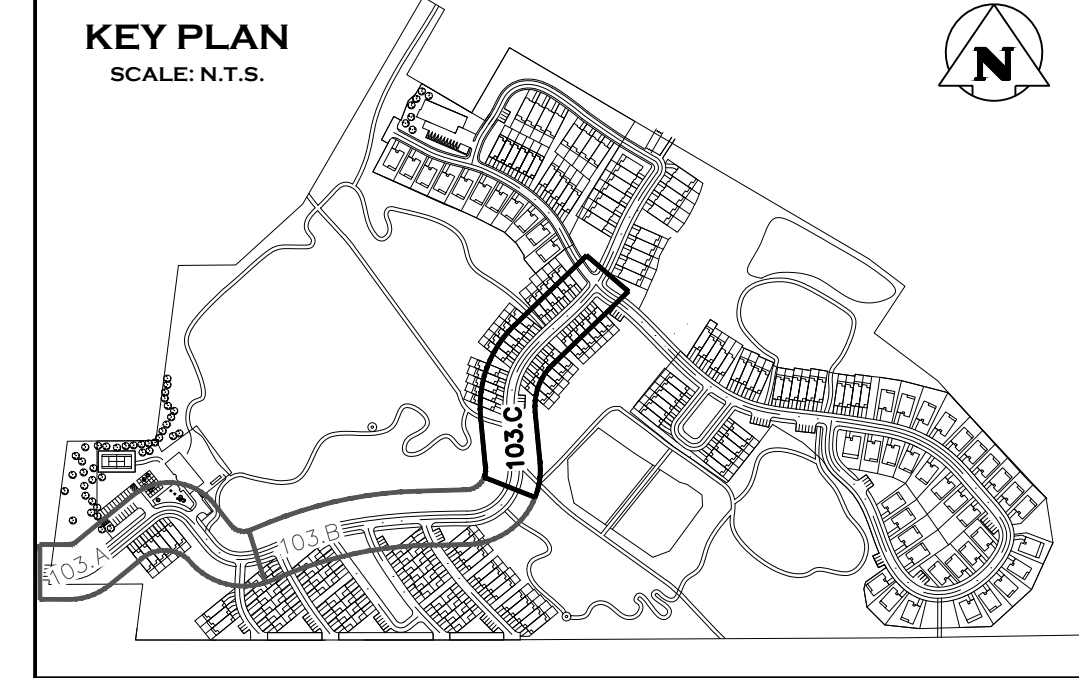
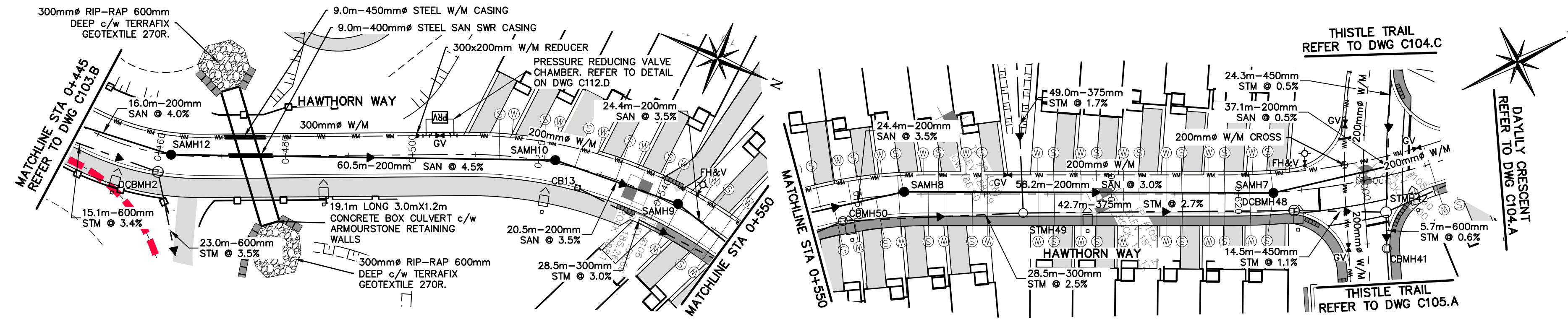
Appendix A

Pertinent Project Drawings

Prepared by Crozier Consulting Engineers



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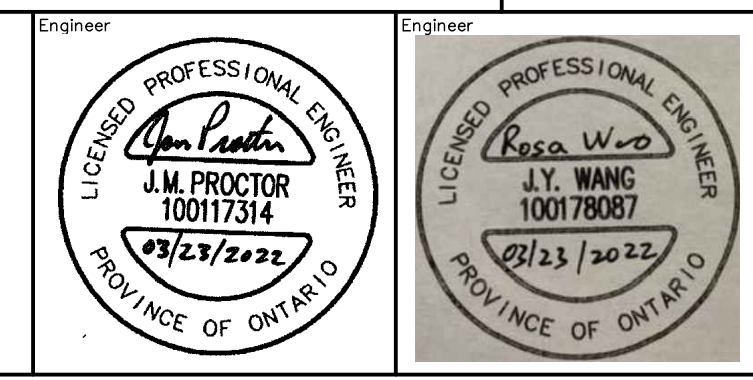
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0+445	193.41 193.13	STMH3 T/G 195.98 S 192.66 N 191.86	SAMH3 T/G 195.06 S 192.66 N 191.86
0+460	193.51 193.22	DCBMH2 T/G 194.92 S 192.60 N 191.22	SAMH12 T/G 194.85 S 192.22 N 190.42
0+480	191.65 193.50		
0+500	190.96 192.00		
0+520	190.07 190.77	CB13 T/G 189.40 S 188.08 N 187.01	SAMH10 T/G 189.66 S 187.01 N 187.01
0+540	189.57 189.98		SAMH9 T/G 189.89 S 188.18 N 186.18
0+560	189.12 188.26	CBM450 T/G 189.31 S 187.23 N 185.26	SAMH8 T/G 189.00 S 185.54 N 185.26
0+580	188.58 188.54	STMH49 T/G 188.26 S 185.45 N 185.53	
0+600	187.73 187.82		
0+620	187.41 187.14	DCBMH48 T/G 187.00 S 183.54 N 183.14	SAMH7 T/G 187.00 S 183.54 N 183.14
0+640	185.92 185.92	STMH42 T/G 185.66 S 183.70 N 184.05	STMH42 T/G 185.66 S 183.70 N 184.05
0+660			

NOTE:
REFER TO DWG C114.D FOR DETAIL ON
STEEL LINER AND CASING SPACERS.

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- THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
- DO NOT SCALE THE DRAWINGS.
- ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS
TBM#1 - ELEVATIONS HEREON ARE GEODETIC AND ARE REFERRED TO A SPIKE IN HYDRO POLE ON GREY ROAD 19 SOUTH OF CRAIGLEITH ROAD HAVING AN ELEVATION OF 222.88 METRES.
TOPOGRAPHIC SURVEY COMPLETED BY ZUBEK, EMO, PATTEN AND THOMSEN LTD. O.L.S., DATED MARCH 2006.

No.	ISSUE	DATE: MM/DD/YYYY
0	ISSUED FOR 1st SUBMISSION	10/05/2018
1	ISSUED FOR 2nd SUBMISSION	09/17/2020
2	ISSUED FOR 3rd SUBMISSION	05/14/2021
3	ISSUED FOR 4th SUBMISSION	03/23/2022

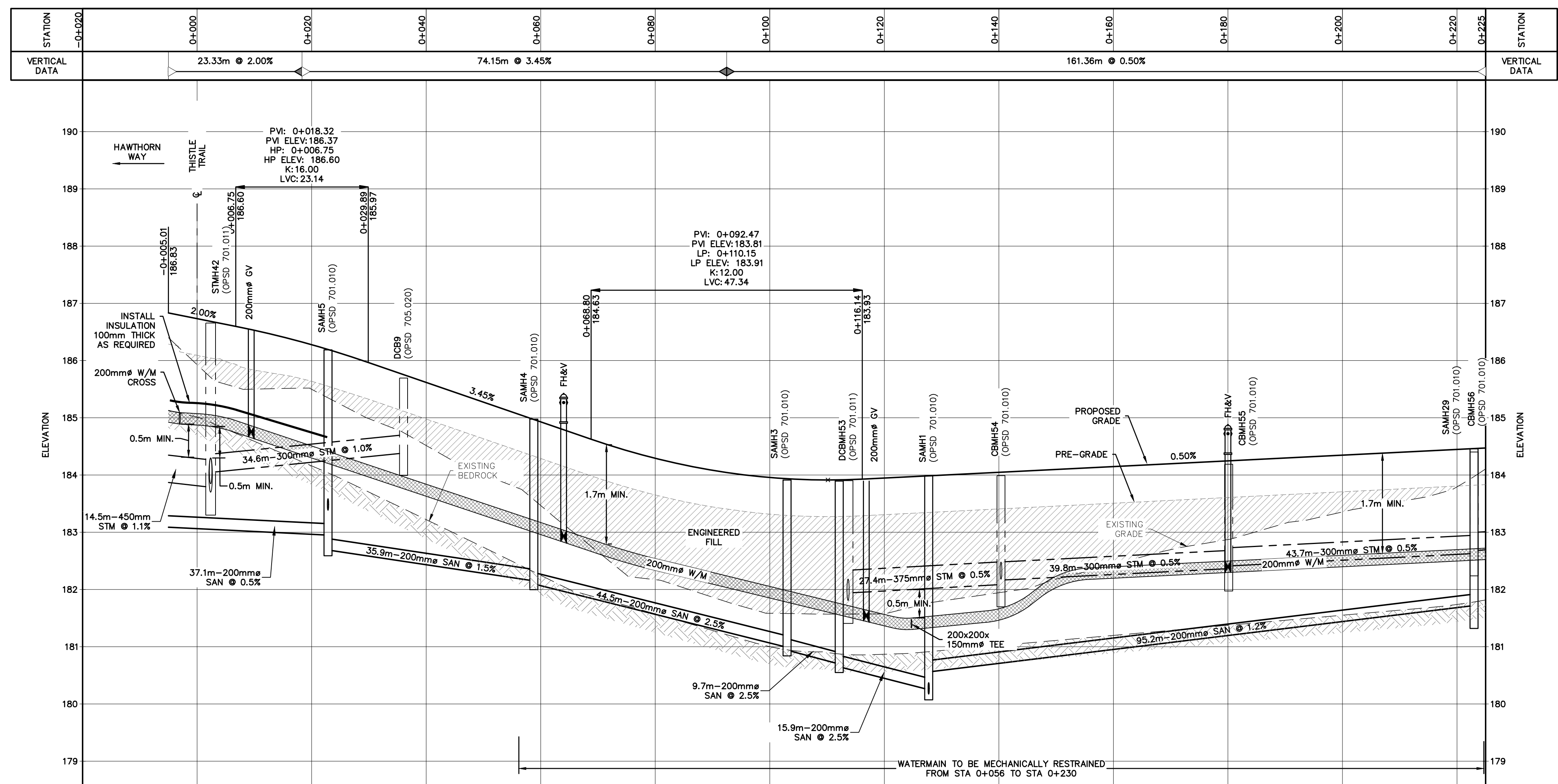
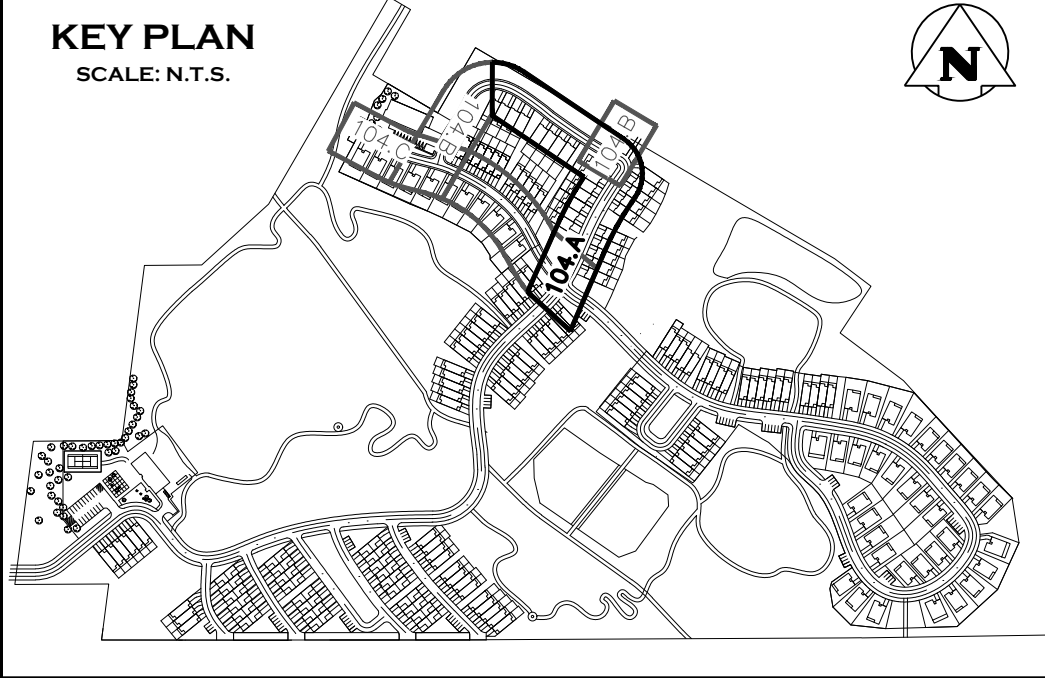
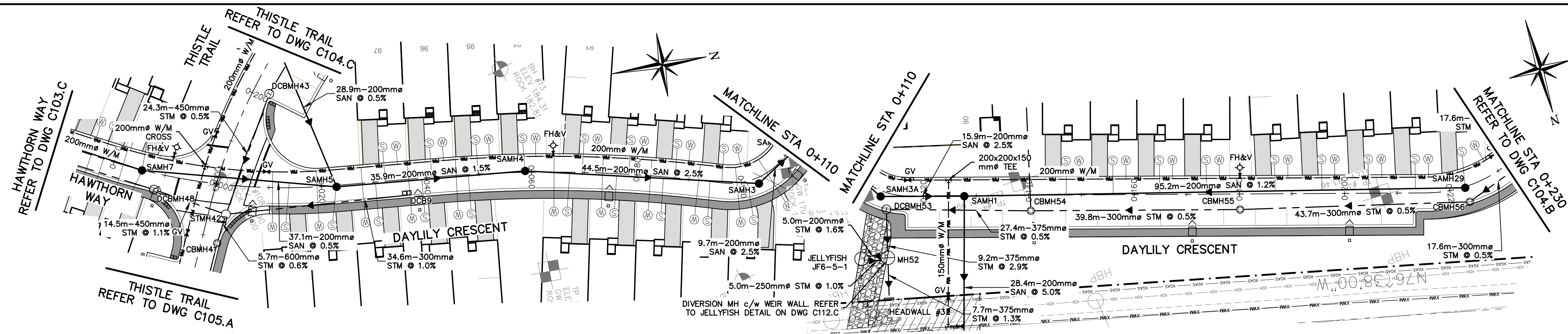


Project
**PARKBRIDGE CRAIGLEITH
THE TOWN OF THE BLUE MOUNTAINS**

Drawing
**PLAN & PROFILE
HAWTHORN WAY
STA (0+445 - 0+639.87)**

ADAMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON. L9Y 1A1
705-446-3510 T
705-446-3520 F
WWW.CROZIER.CA
INFO@CROZIER.CA

Drawn By	L.W.	Design By	L.W.	Project	1046-4031
Check By	R.W.	Check By	J.P.	Scale	V 1:50 H 1:500
				Drawing	C103.C



STATION	EXISTING PROPOSED CENTERLINE	STORM INVERT	SANITARY INVERT
0+000	186.93 186.73	STM42 T/G 186.66 S/E 183.70 S/W 183.80 N 184.00	
0+020	185.50 186.28	SAMH5 T/G 183.39 S/E 182.69 S/W 182.95	
0+040	184.52 185.02	OPB9 T/G 185.69 S/E 184.35	
0+060	183.47 184.93	SAMH4 T/G 181.98 S/E 182.10	
0+080	182.17 184.29		
0+100	181.58 183.96	SAMH3 T/G 183.91 S/E 180.99 S/W 180.94	
0+120	181.57 183.95	DCBMH53 T/G 183.90 S/E 181.81 S/W 180.65	
0+140	181.54 184.05	SAMH1 T/G 180.99 S/E 180.25 S/W 180.17	
0+160	182.44 184.15	CBMH54 T/G 183.99 S/E 182.10 S/W 182.17	
0+180	181.57 184.25	CBMH55 T/G 184.19 S/E 182.37 S/W 182.42	
0+200	181.35 184.35		
0+220	181.71 184.45	SAMH29 T/G 184.46 S/E 182.69 S/W 182.64	
0+225	184.47		
STATION	EXISTING PROPOSED CENTERLINE	STORM INVERT	SANITARY INVERT

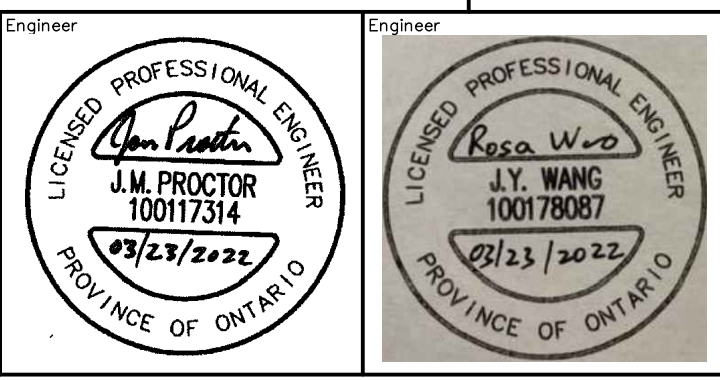
NOTE: REFER TO DWG C114.D FOR DETAIL ON STEEL LINER AND CASING SPACERS.

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TEMPORARY BENCHMARKS
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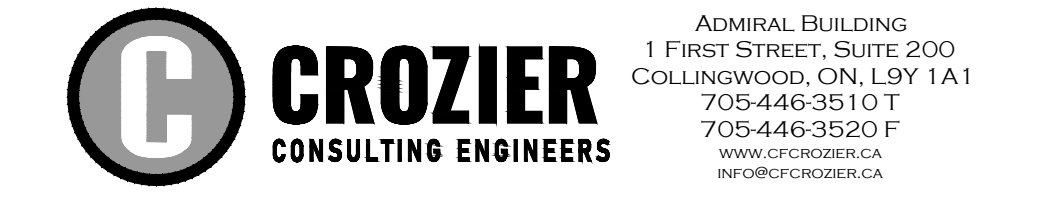
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No	ISSUE	DATE: MM/DD/YYYY
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1	ISSUED FOR 2nd SUBMISSION	09/17/2020
2	ISSUED FOR 3rd SUBMISSION	05/14/2021
3	ISSUED FOR 4th SUBMISSION	03/23/2022

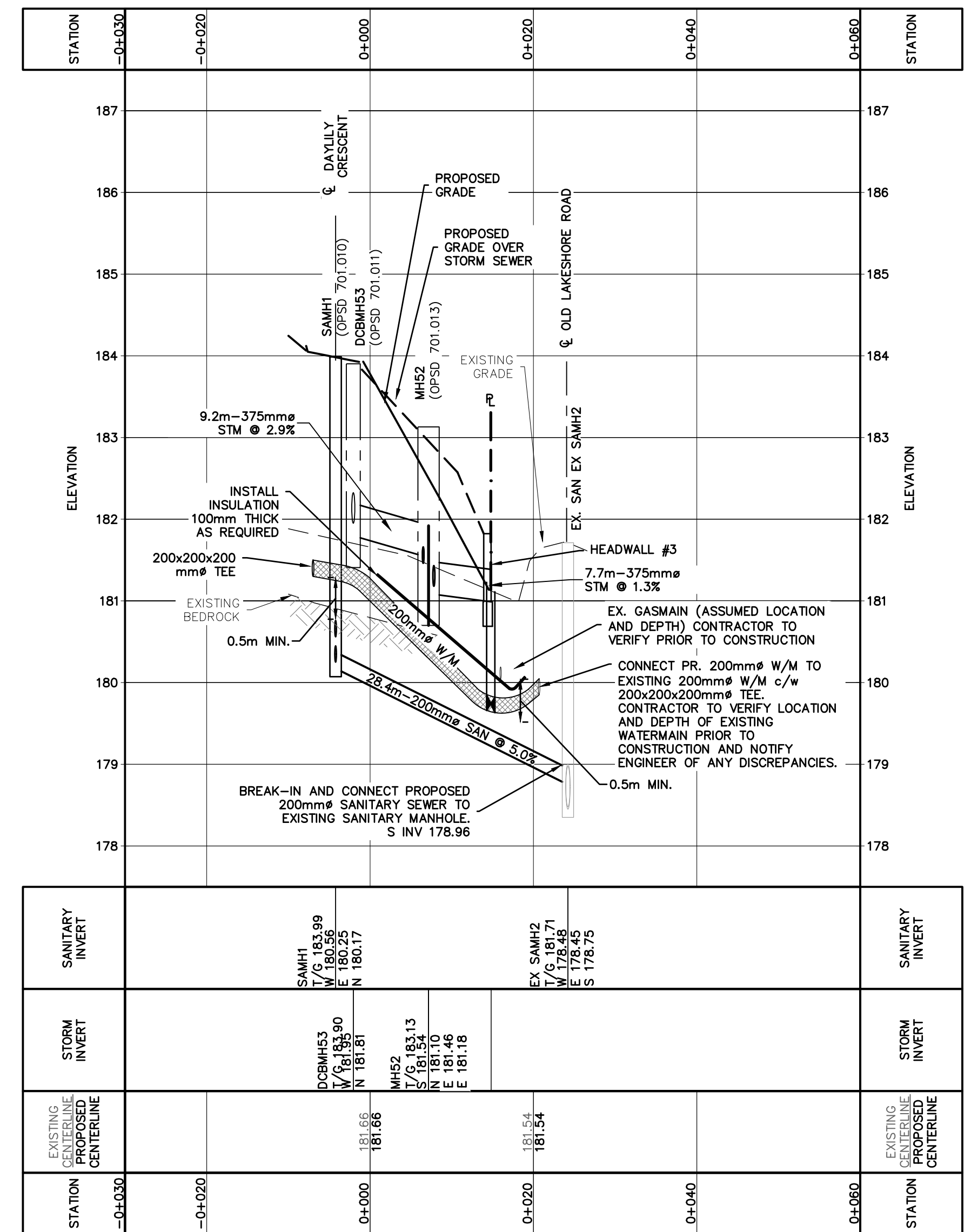
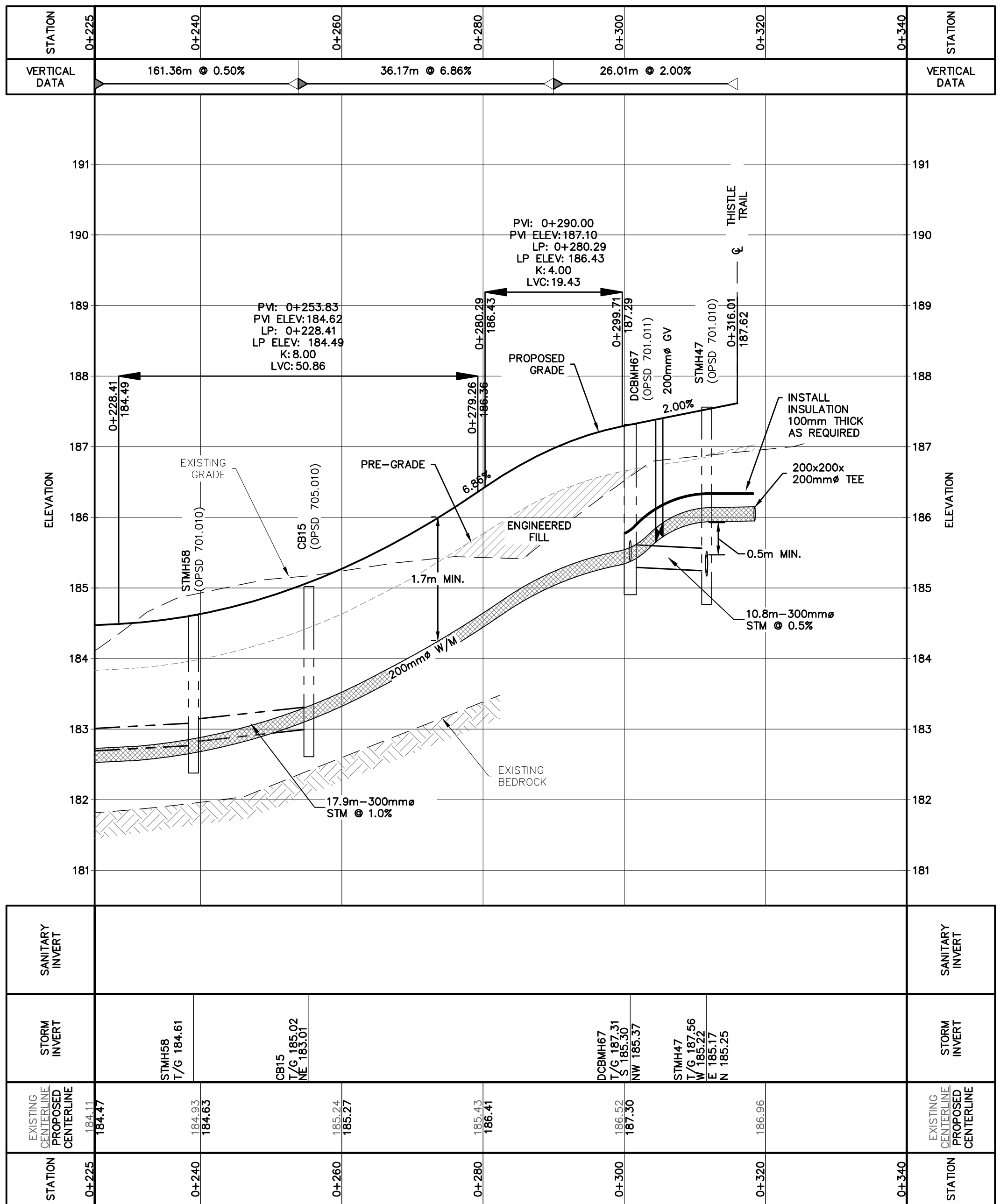
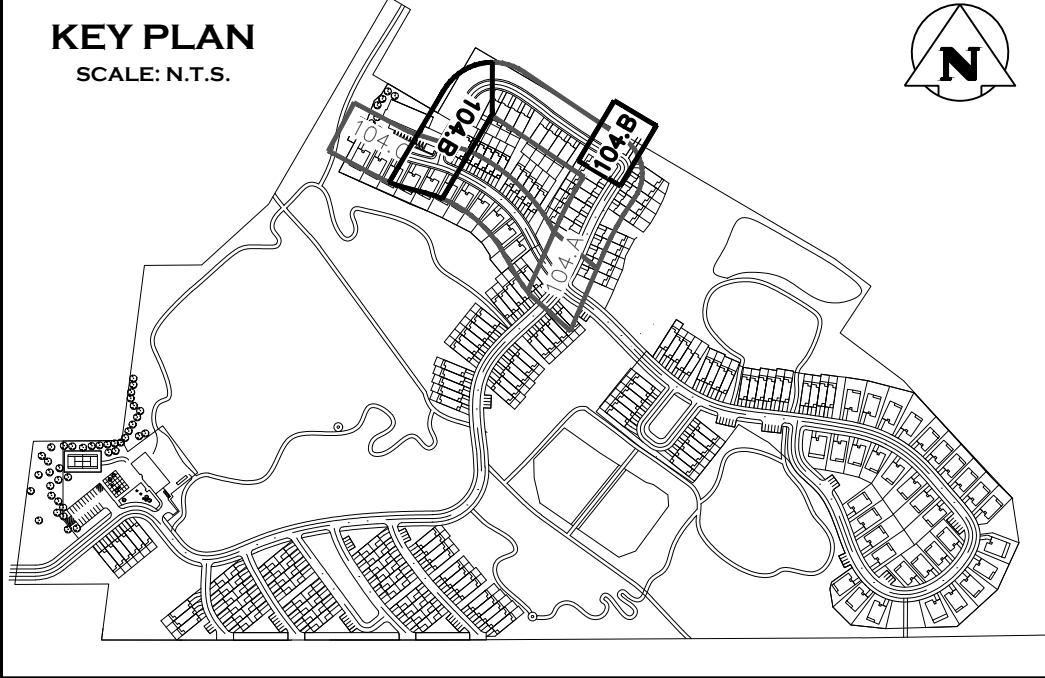
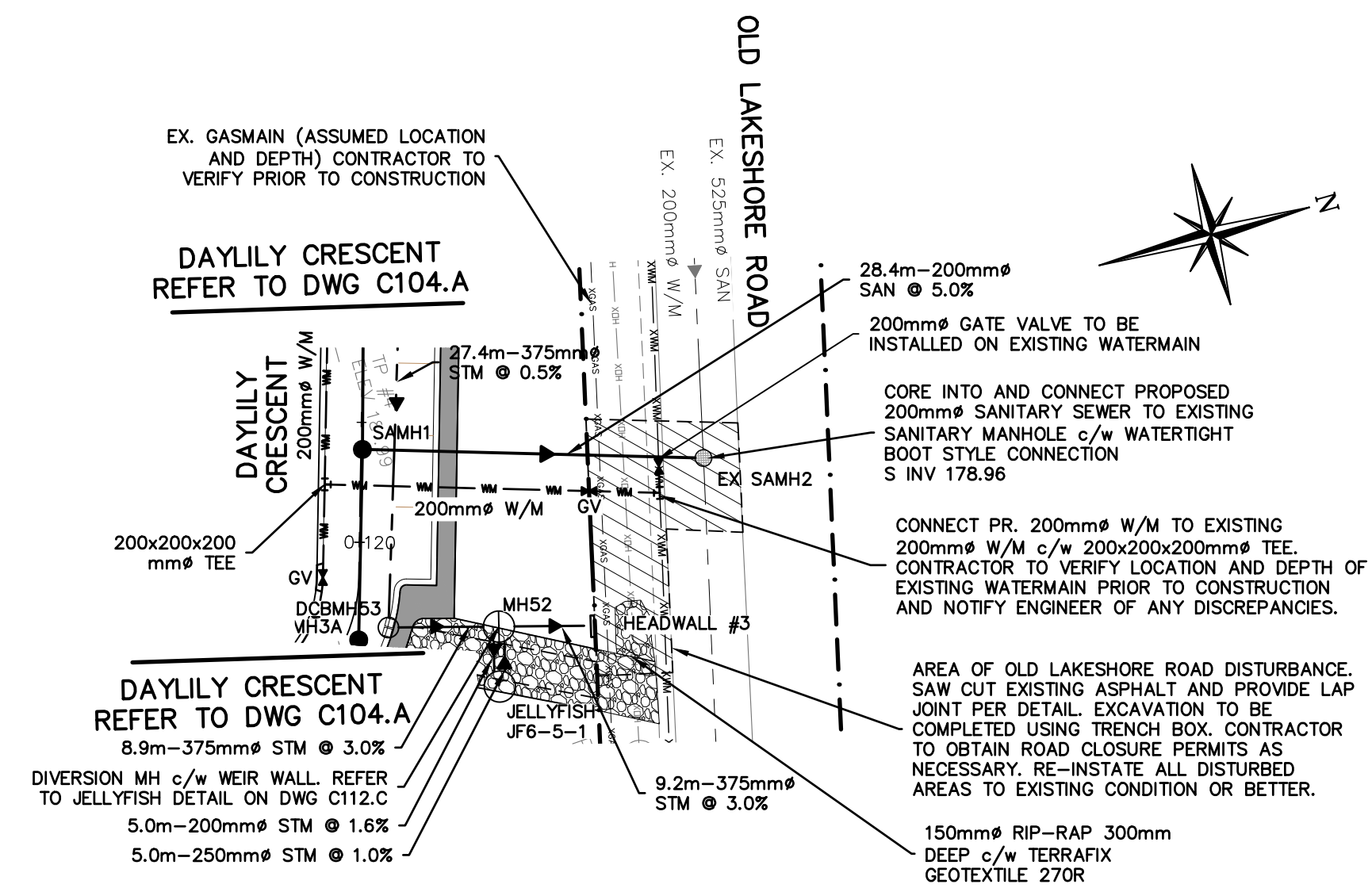
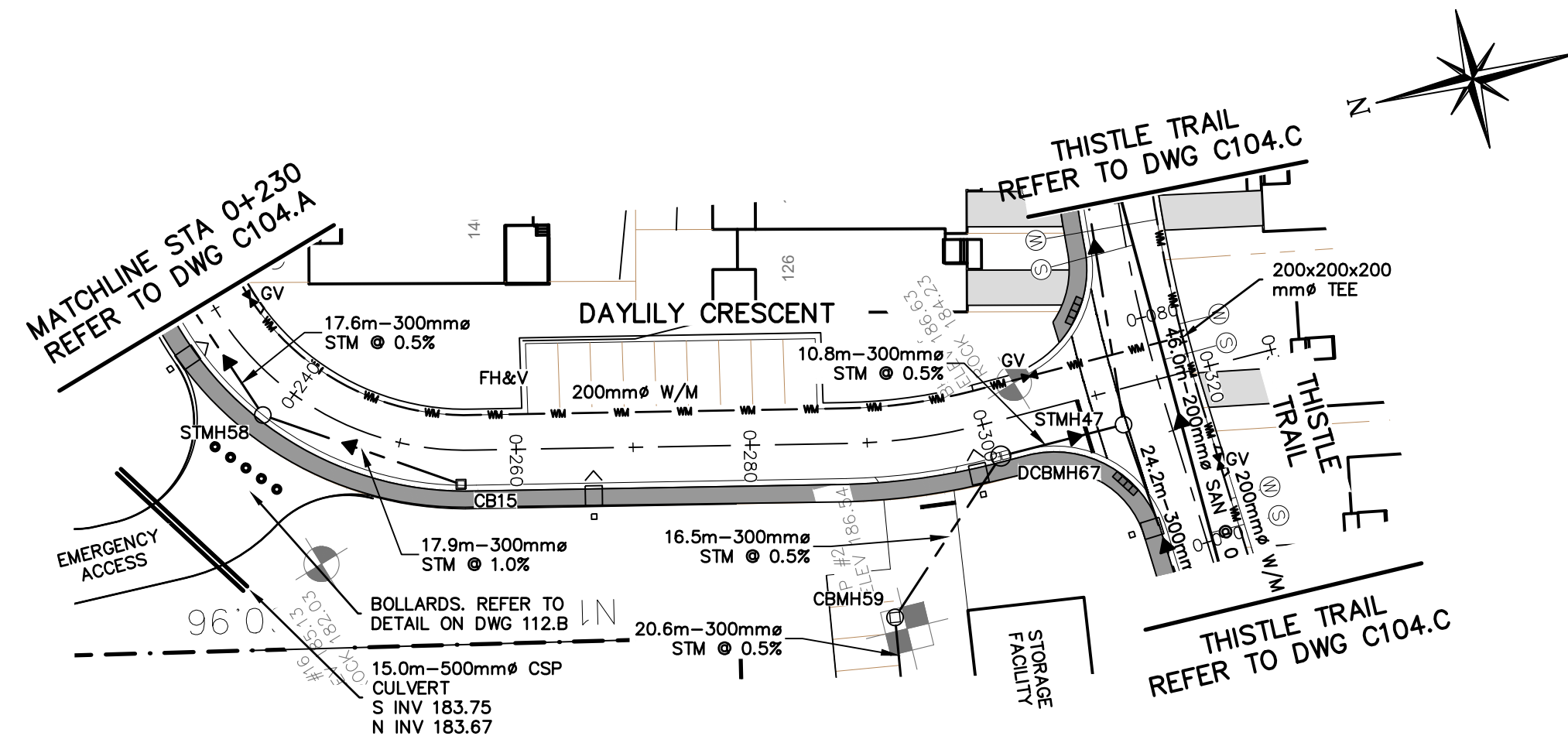


Project
PARKBRIDGE CRAIGLEITH
THE TOWN OF THE BLUE MOUNTAINS

Drawing
PLAN & PROFILE
DAYLILY CRESCENT
(STA 0+000 - 0+225)



Drawn By: L.W. Design By: L.W. Project: **1046-4031**
 Check By: R.W. Check By: J.P. Scale: V 1:500 Drawing: **C104.A**
 H 1:500



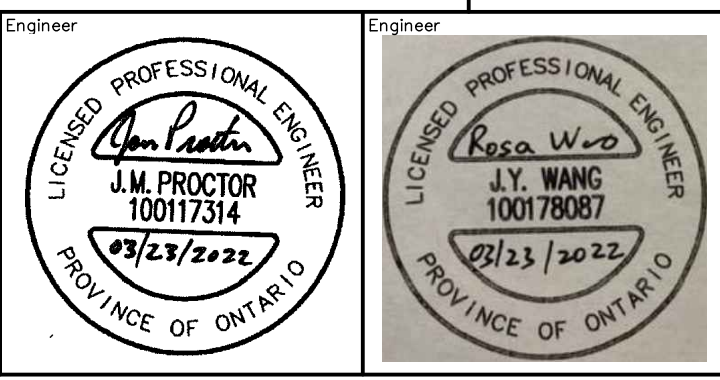
NOTE: REFER TO DWG C114.D FOR DETAIL ON STEEL LINER AND CASING SPACERS.

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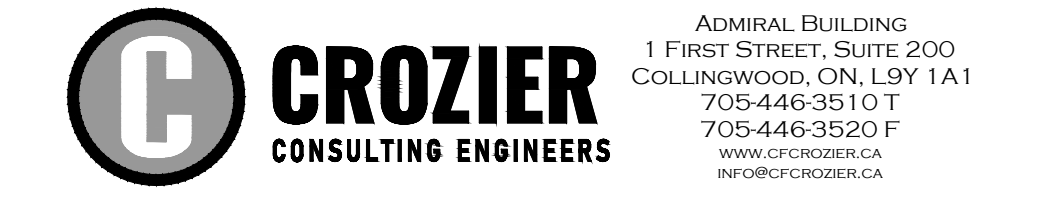
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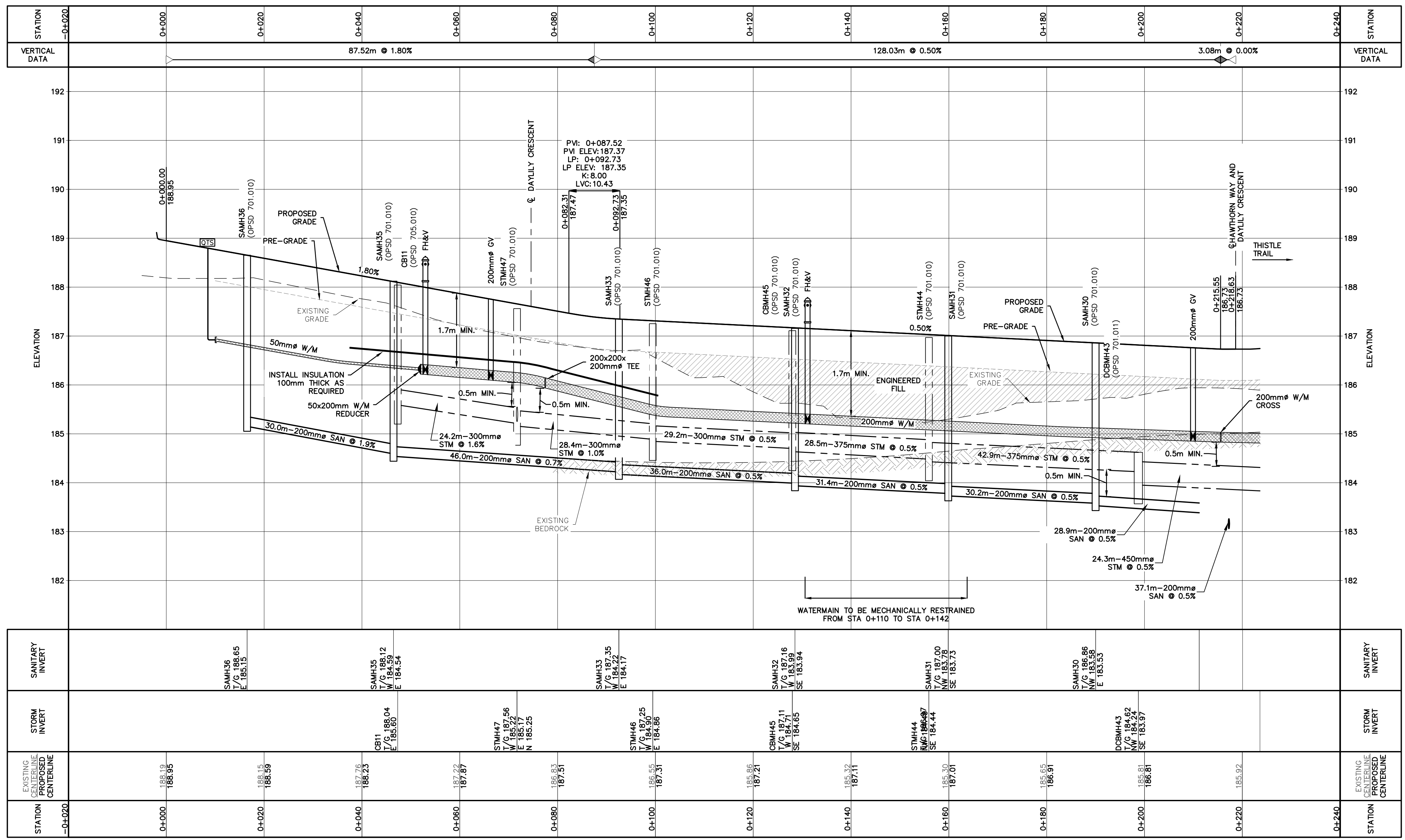
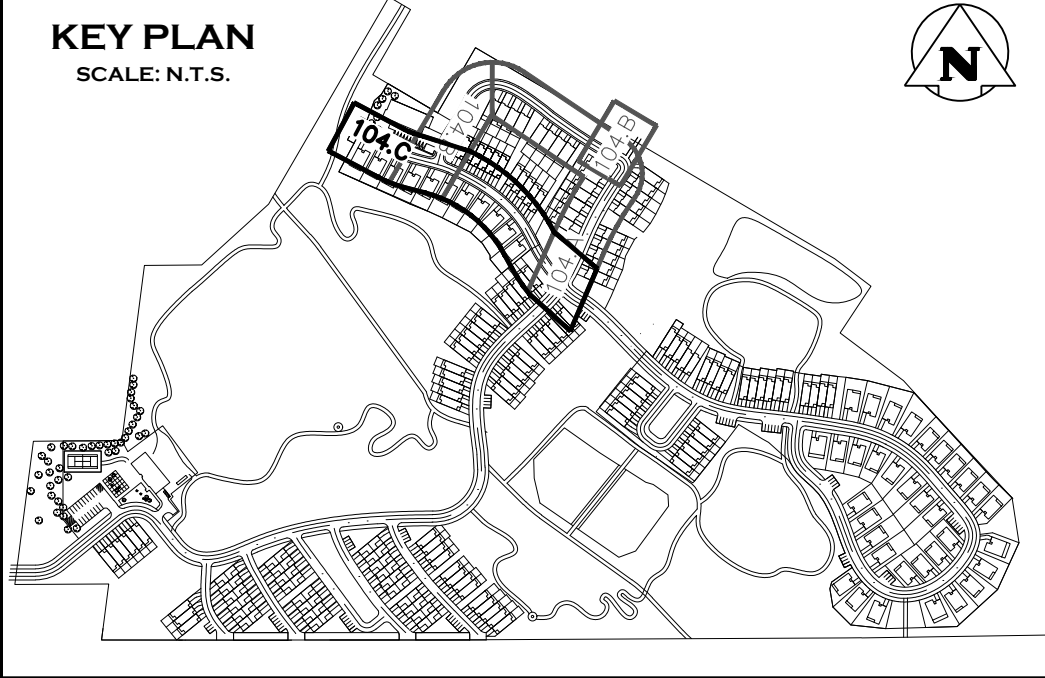
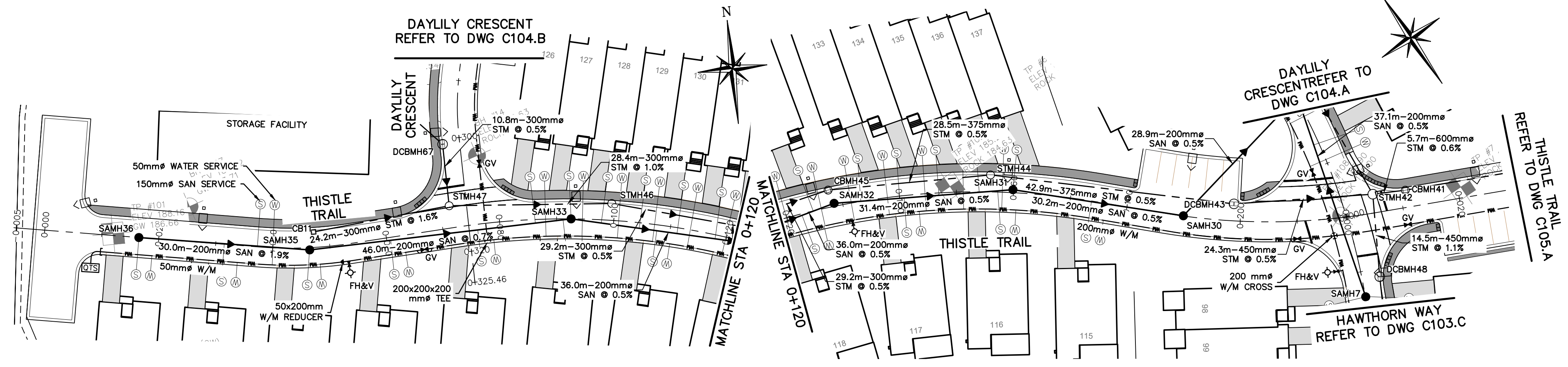


Project
PARKBRIDGE CRAIGLEITH
THE TOWN OF THE BLUE MOUNTAINS

Drawing
PLAN & PROFILE DAYLILY CRESCENT
STA 0+225 TO 0+316.01
WEST SANITARY CONNECTION
STA 0+000 TO 0+025.20



Drawn By: L.W. Design By: L.W. Project: **1046-4031**
Check By: R.W. Check By: J.P. Scale: V 1:50 Drawing: **C104.B**
H 1:500



STATION	EXISTING CENTERLINE PROPOSED CENTERLINE	STORM INVERT	SANITARY INVERT
0+000	185.19 186.95		SAMH36 T/G 186.65 E 185.15
0+020	185.15 186.59		
0+040	187.75 186.23	CB11 T/G 188.04 E 185.50	SAMH35 T/G 186.12 W 184.79 E 184.54
0+060	187.82 187.87	STMH47 T/G 187.56 W 185.22 N 185.25	
0+080	185.63 187.51		SAMH33 T/G 184.23 W 184.23 E 184.17
0+100	185.55 187.31	STMH46 T/G 187.05 W 184.71 E 184.86	
0+120	185.66 187.21	CBM45 T/G 187.11 W 184.65 SE 183.94	SAMH32 T/G 187.01 W 184.65 SE 183.94
0+140	185.32 187.11		SAMH31 T/G 187.00 W 184.44 SE 183.73
0+160	185.30 187.01		SAMH30 T/G 186.86 W 183.98 E 183.53
0+180	185.65 186.91		DCBM43 T/G 184.92 W 184.24 SE 183.97
0+200	185.81 186.81		
0+220	185.92		
0+240			

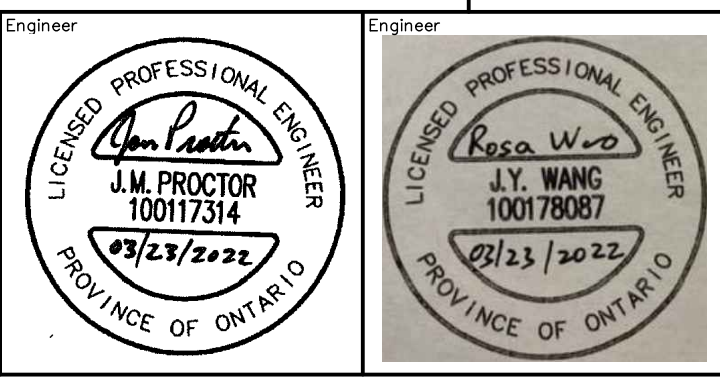
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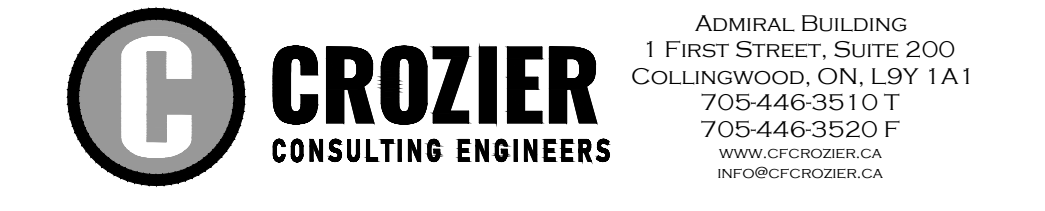
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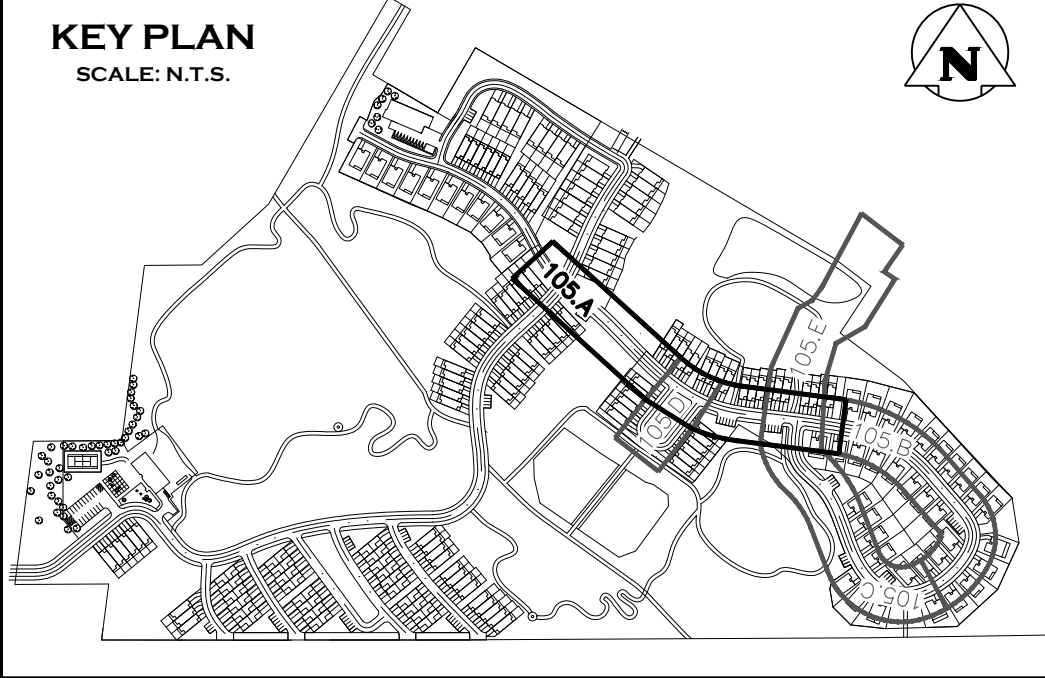
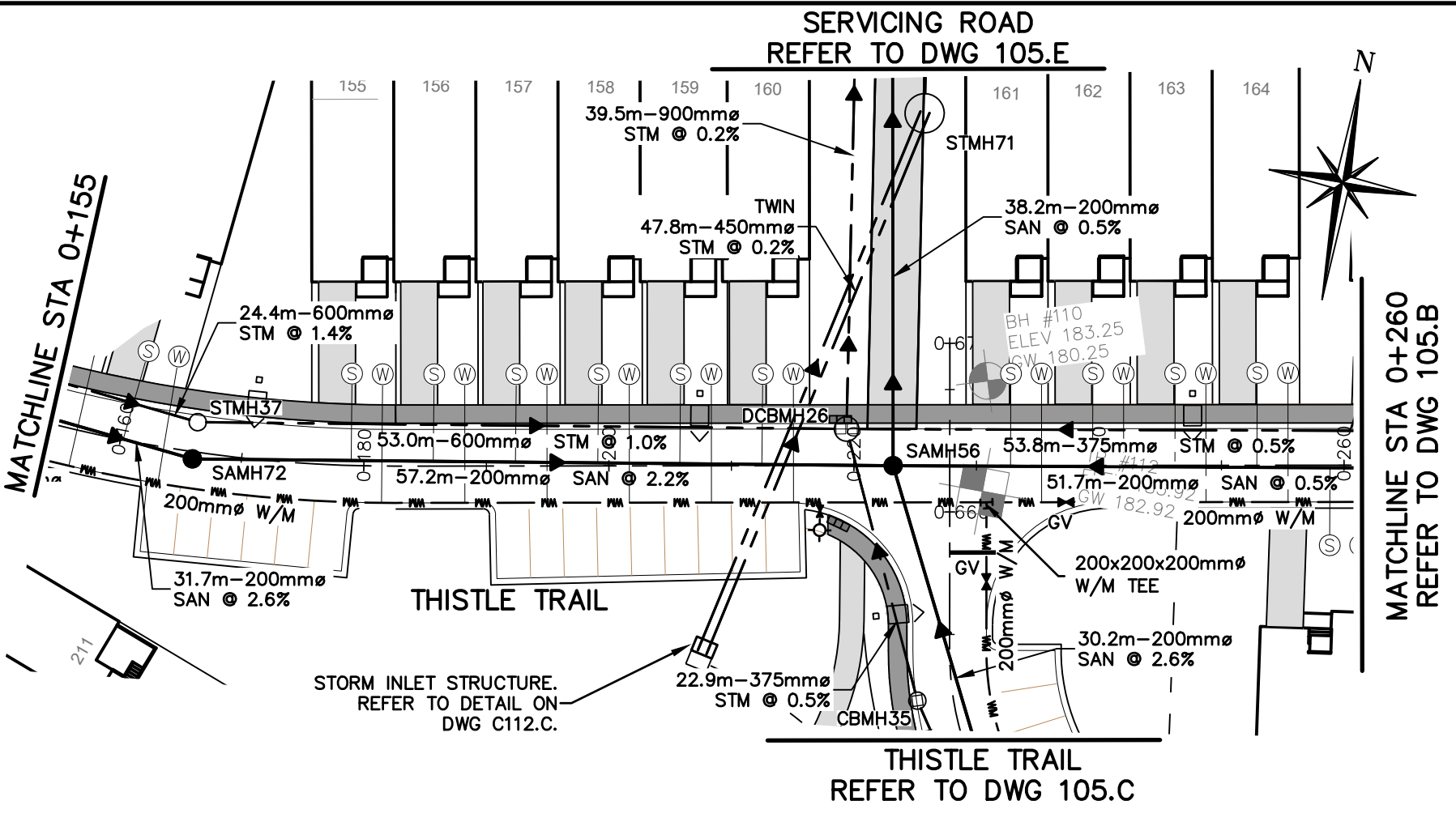
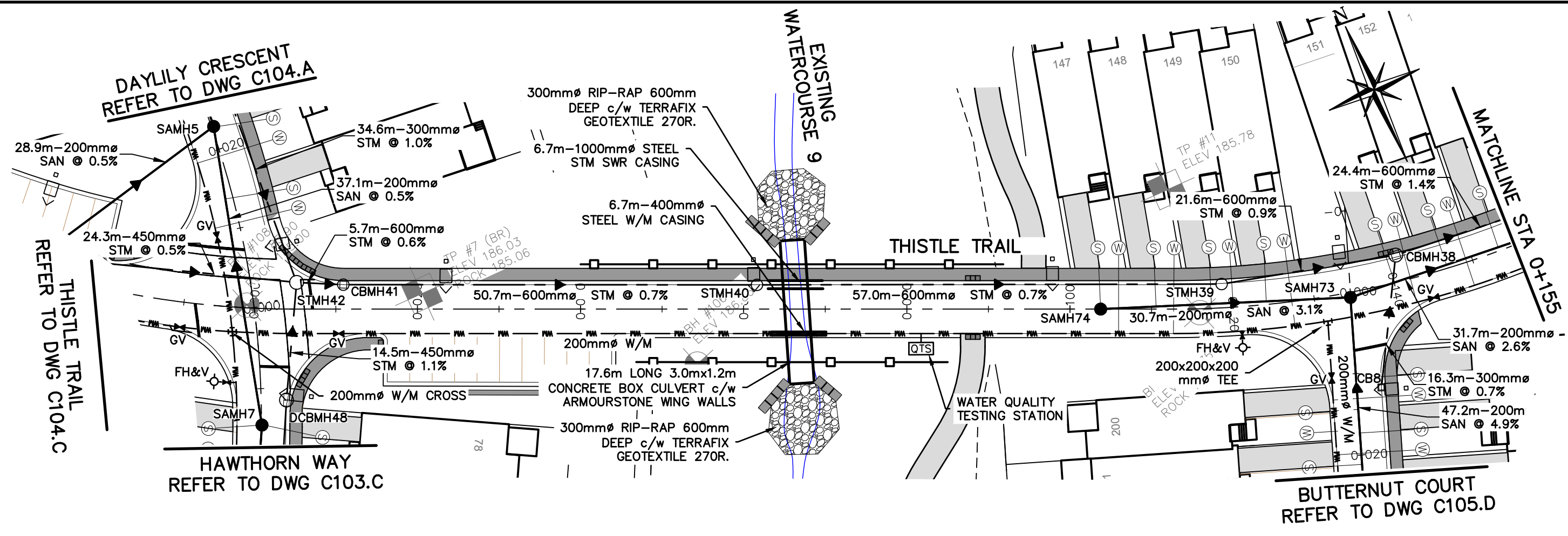


Project
PARKBRIDGE CRAIGLEITH
 THE TOWN OF THE BLUE MOUNTAINS

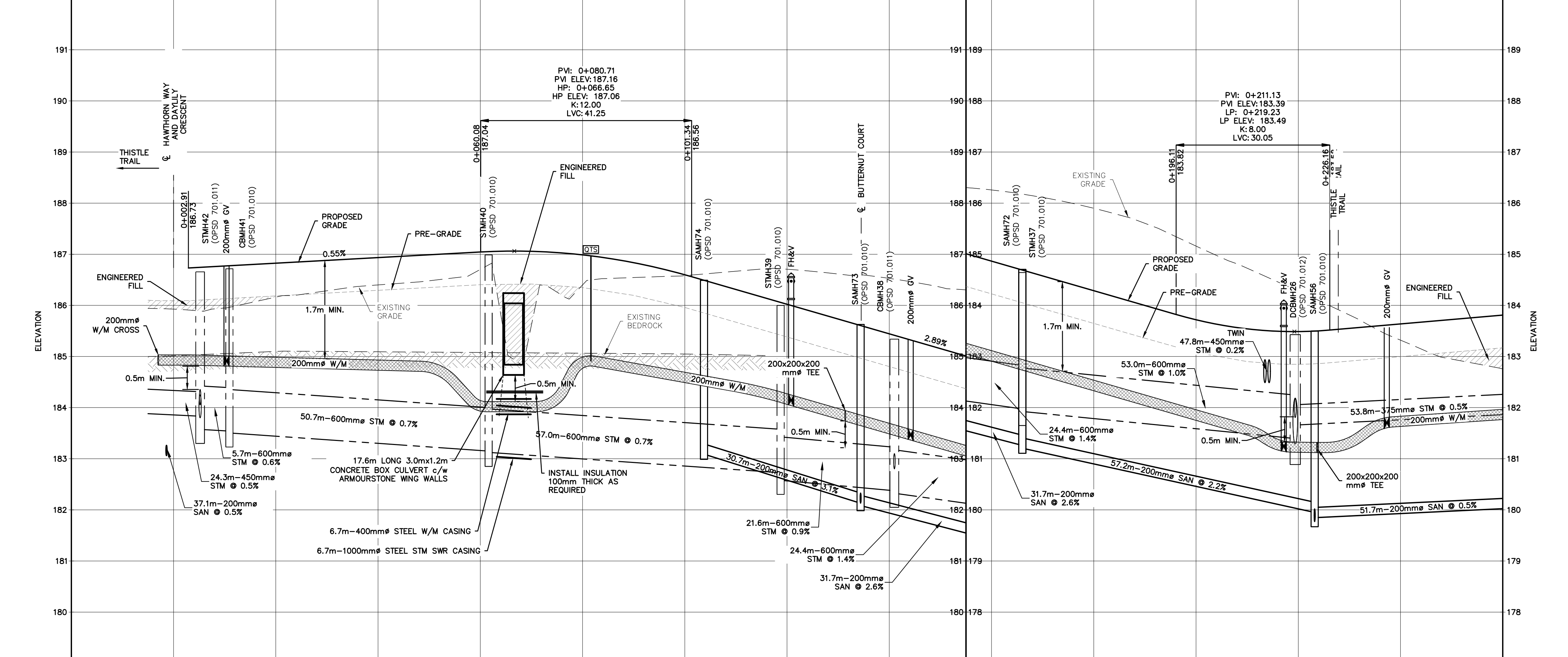
Drawing
PLAN & PROFILE
THISTLE TRAIL
 STA (0+000 - 0+218.70)



Drawn By	L.W.	Design By	L.W.	Project	1046-4031
Check By	R.W.	Check By	J.P.	Scale	V 1:50 H 1:500
				Drawing	C104.C



STATION	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	STATION																									
VERTICAL DATA	77.80m @ 0.55%													130.43m @ 2.89%													209.37m @ 0.87%													VERTICAL DATA



NOTE:
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STEEL LINER AND CASING SPACERS.

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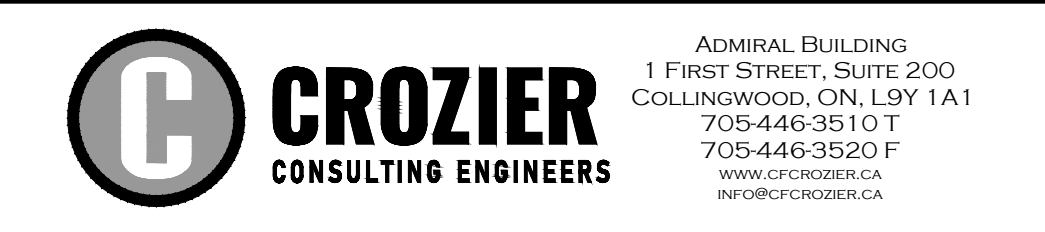
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3	ISSUED FOR 4th SUBMISSION	03/23/2022



STATION	EXISTING CENTERLINE	PROPOSED CENTERLINE	STORM INVERT	SANITARY INVERT
0+000	185.93	185.93	183.80 183.85 183.97 183.85	186.72
0+020	186.85	186.85		
0+040	186.93	186.93		
0+060	187.04	187.04		
0+080	186.99	186.99		
0+100	186.60	186.60		
0+120	186.02	186.02		
0+140	185.44	185.44		
0+160	184.75	184.75		
0+180	184.29	184.29		
0+200	183.72	183.72		
0+220	183.25	183.25		
0+240	182.64	182.64		
0+260	182.06	182.06		

Project
PARKBRIDGE CRAIGLEITH
THE TOWN OF THE BLUE MOUNTAINS

Drawing
PLAN & PROFILE
THISTLE TRAIL
(STA 0+000 - 0+260)



Drawn By	L.W.	Design By	L.W.	Project	1046-4031
Check By	R.W.	Check By	J.P.	Scale	V 1:50 H 1:500
				Drawing	C105.A

Appendix B

Site Overview





Legend

- Approximate Blast Locations
- Recommended Pre-construction Survey Area
- Seismograph Location



885 REGENT STREET, SUITE 2-1B
 SUDBURY, ONTARIO. P3E 5M4
 TELL (877) 300-4800 FAX (705) 523-6690
www.englbecorp.com

NOTES:
 1 GOOGLE MAPS 2022

REV	DATE	ISSUE	APPROVAL
1	2022-11-03	Final Report	JH

PROJECT NAME:
 Parkbridge Craigeith

DRAWING TITLE:
 Site Overview

DESIGNED BY: JH SCALE: AS SHOWN

DRAWN BY: JH DATE: 3-Nov-22

APPROVED BY: JH PROJECT NO: 2210331

AREIAL VIEW 1

Appendix C

Example Pre-construction Survey Notification Letter



eNGLOBE



November 3, 2022

Subject: Notice of Pre-construction Survey

Project Location: 161 Lakeshore Road East, Craigeith, ON

General Contractor: B&J Contracting
Contact No.: (705) XXX-XXXX

Blasting Contractor: Rock Breakers (2007) Inc.
Contact: (705) 789-5666

Englobe Reference: 02210331

Dear Resident/Owner:

Englobe Corp. is retained by B&J Contracting to carry out a pre-construction survey of the buildings in the vicinity of the project noted above. Construction activities including rock blasting operations will be carried out for the site preparation for the construction of a new subdivision. The building survey is completely voluntary and at no cost to you. This is the First of Three notifications about this free service.

Generally, pre-construction surveys are conducted as a measure to alleviate concerns expressed by the property owners in the vicinity of the construction operations. The surveys will also provide a baseline for assessment and evaluation of any issues arising during and/or after completion of the construction operations. Pre-construction surveys are also intended to provide a representative sampling of pre-existing deficiencies that are present in every building, but not an exhaustive exercise of recording all minute cracks and deformities in every building component.

The survey will take approximately *one hour* to complete, depending on the size of your building. This will entail recording the existing conditions of the interior/exterior of your building and yard using video cameras. Please note that the exterior survey of publicly viewable/accessible areas of your property will be carried out if we are unsuccessful in reaching you.

In order to remain impartial and in compliance with the Privacy Act and PIPED, these records will remain in our office, and will be released if there is a claim filed in writing, and with your authorization only.

Please contact **Englobe Representative** at **877-300-4800** or at **info@englobecorp.com** at to book an appointment before this **date**. If you do not wish to have the survey done, please notify us. We apologize for any inconvenience this process may cause you.



Blasting operations will occur during daylight hours. Rest assured that seismic monitoring equipment will be installed at the closest structures to blasting locations to measure vibration levels and ensure they are maintained within guidelines and project specifications.

During blasting operations, a warning siren will be sounded prior to initiation, and following the completion of each blast. The warning siren procedure for this project will be as follows:

- Following completion of loading, matting, blasting area clearance, and positioning of guards, 3 short sirens will be sounded;
- One-minute wait, blaster-in-charge completes final check with guards, and a long siren is sounded;
- Blast imminent;
- Following the blast, the blaster-in-charge will inspect the blast site to ensure complete detonation of charges has taken place;
- All clear siren is sounded.

If you have any question regarding the project, please do not hesitate to contact the General Contractor at the phone number noted above.

Appendix D

Example Contractor Notification Letter



NOTICE OF CONSTRUCTION ACTIVITIES

November 3, 2022

Project location: 161 Lakeshore Road East, Craigeleith, ON

General Contractor: B&J Contracting
Contact No. (705) XXX-XXXX

Dear Employees/Visitors or Resident/Owner,

Please be advised that construction activities including BLASTING operations will commence on the above noticed project as of **THIS DATE**, until the completion of the site preparation for the development of the above noted project.

Blasting will occur during daylight hours. Rest assure that seismic monitoring equipment has been installed at locations on either side of the blast site to measure the vibrations and maintain the vibration levels within the guidelines.

For each blast a standard blasting siren will be sounded prior to initiation and following the completion each blast, following the procedure below:

- Following the completion of loading, matting, blasting area clearance, and positioning of guards, 3 short sirens are sounded;
- One-minute wait and a short siren is sounded;
- Blast imminent;
- Following the blast, the blaster-in-charge will inspect the blast site to ensure complete detonation of charges has taken place;
- All Clear siren is sounded.

If you have any questions regarding this project, please contact the general contractor noted above.

Appendix E

Blasting Consultant Curriculum Vitae



eNGLOBE



James Hicks P.Eng. Director of Operations Engineering Group - Northeast/Northwest

Mr. James Hicks is the Director of Operations for Engineering services for Northern Ontario. He is a seasoned Project Manager who has managed blasting and construction projects from start to finish with responsibilities such as project bidding, project team coordination, client liaison and technical input. Mr. Hicks is also responsible for the overall project management and delivery of blasting services to the construction, demolition, mining, pipeline, energy and public service sectors, including blast design, control and monitoring, vibration and overpressure monitoring, locally and remotely; pre-condition and post-condition inspections; blast damage claim investigations.

Professional experience

FIELD OF ACTIVITY

Proposed Highway 400 Four Lane Project - Castonguay Blasting Limited. 2008 - 2010

Project Manager, Responsibilities: Blast consulting engineer responsible for vibration monitoring, pre-blast survey requirements, and damage claim investigations.

Oak Street E. Reconstruction - Bruman Construction and Leasing Ltd. North Bay, ON. 2008

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, vibration monitoring of existing structures and Union Gas line, and damage claim investigations.

Red Lake Mining Division - Goldcorp Incorporated. Balmertown, ON. 2010

Project Manager, Responsibilities: Blast consulting engineers responsible for pre and post-blast survey requirements and for the implementation of third-party blast induced surface vibration monitoring program for underground distress blast.

Reconstruction of Cascade Street - Rock Breakers 2007 Inc. Parry Sound, ON. 2010

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, and for vibration monitoring.

Years of experience

14

Profession

Director of Operations, Engineering - Northeast/Northwest

Education

2008 – Bachelor of Engineering, Civil Engineering, McMaster University, Hamilton, Ontario

Professional associations

Professional Engineers of Ontario (PEO)
Licence #10013490

Association of Professional Engineers and Geoscientists Manitoba - License #46496

Languages

English

Princess Anne Public School Expansion - Trow and Associates Inc. Sudbury 2010

Project Manager, Responsibilities: Consulting engineers responsible for pre-construction survey requirements, and vibration monitoring of pile driving activities.

Proposed Highway 11 Four Lane Project - Rock Breakers 2007 Inc. Burks Falls, ON. 2010 - 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for vibration monitoring, pre-blast survey requirements, damage claim investigations.

Hespeler Wastewater Treatment Plant New Raw Sewage Pumping Station - Region of Waterloo. Cambridge, ON. 2010

Project Manager, Responsibilities: Blast consulting engineer responsible for vibration monitoring, pre and post-blast survey requirements.

Site Specific Study of Impact of Vibrations Induced by Vibratory Compactors on Homes - Pedersen Construction. Town of Iroquois Falls, ON. 2010

Project Manager, Responsibilities: Consulting engineer responsible for monitoring, recording and reporting on vibration levels induced by the operation of vibratory compactors and mechanical shovels in close vicinity of homes during reconstruction of Union St project.

Mamainse Harbour Dredging - J.I. Enterprises. 2010 - 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, vibration monitoring and underwater hydrophone monitoring.

Vale Clarabelle Mill CORE Project New Dry - Rhude Drilling and Blasting. Sudbury, ON. 2010 - 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, vibration monitoring, Union Gas high pressure gas line monitoring.

Vale Clarabelle Mill CORE Project Mill Expansion - Rhude Drilling and Blasting. Sudbury, ON. 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, vibration monitoring of existing structures and underground rock tunnels.

Cochrane Lift Station - Pedersen Construction. Cochrane, ON. 2011

Project Manager, Responsibilities: Vibration consulting engineer responsible for pre-construction survey requirements, vibration monitoring of sheet pile driving activities in close proximity to Bell Canada fiber optic line station.

Algonquin Green Townhome Development - Dalron Construction. Sudbury, ON. 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, remote vibration monitoring program.

Highway 11-17 - Various Highway Twining Projects - Consbec Inc. Thunder Bay, ON. 2010 - Present

Project Manager, Responsibilities: Blast consulting engineer responsible for vibration monitoring, pre-blast survey requirements, and damage claim investigations.

Various MTO Contracts along Highway 11 North Corridor - Pedersen Construction. 2008 - Present

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure, vibration monitoring, pre-blast survey requirements, and damage claim investigations.

Cargill's Ogden Federal Elevator Implosion - Rakowski Cartage and Wrecking Ltd. Calgary, Alberta. 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for completing pre-blast survey requirements, vibration monitoring and assisting in the preparation and loading of explosives.

Vale Big Eddie Dam Spillway Reconstruction - Laari Construction. Worthington, ON. 2011

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements and vibration monitoring.

Pearson Plaza Site Preparation - Consbec Inc. Elliot Lake, ON. 2012

Project Manager, Responsibilities: Blast consulting engineer responsible for pre-blast survey requirements, vibration monitoring of existing structures and Union Gas line, and damage claim investigations.

Ferguson Street Reconstruction, Phases 1, 2, 3 - Bruman Construction Inc. North Bay, ON. 2013-2015

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure development, pre-blast survey requirements, vibration monitoring of existing structures and Union Gas line, and damage claim investigations.

Vale Creighton Mine Wastewater Booster Station - Lacroix Construction. Creighton, ON. 2014

Project Manager, Responsibilities: Blast engineer responsible for blasting procedure, pre-blast survey requirements and vibration monitoring of existing station and tailing pond dams.

Vale Wabageshik Power Station - Cecchetto and Sons Limited. Nairn Centre, ON. 2014

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure development, pre-blast survey requirements, vibration monitoring of existing structures and hydrophone monitoring of nearby waterbodies.

Health Sciences North Parking Lot Expansion - Rock Breakers 2007 Inc. Sudbury, ON. 2014-2015

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure development, pre-blast survey requirements and vibration monitoring of sensitive hospital equipment as well as third party structures.

Vale Filter Plant Sump Hole - Rhude Drilling and Blasting Inc. Copper Cliff, ON. 2015

Project Manager, Responsibilities: Blast consulting engineer responsible for developing blasting plan for blasting inside of a building, pre-blast survey requirements and blast vibration and crack monitoring of steel and concrete columns adjacent to blasting.

Saskatoon Traffic Bridge Demolition - Rakowski Cartage and Wrecking Limited. Saskatoon, Saskatchewan. 2016

Project Manager, Responsibilities: Blast consulting engineer responsible for completing pre-blast survey requirements, vibration monitoring and assisting in the preparation and loading of explosives.

Vale Clarabelle Lake Pump House - Rhude Drilling and Blasting Inc. Sudbury, ON. 2016

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure, including final in-water blast next to building to open in-take channel once building was complete, vibration monitoring, and pre-blast survey requirements.

Laurentian University Cliff Fielding RIE Building - Sullivan & Sons Limited. Sudbury, ON. 2017

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure incorporating final blasted walls to be part of basement construction, completing pre-blast survey requirements, vibration monitoring and damage claim investigation.

Spruce Street Reconstruction - Teranorth Construction and Engineering Ltd. Sudbury, ON. 2017

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure for blasting within 5m of Union Gas hot line and undercrossing of hot line, pre-blast survey requirements, vibration monitoring and damage claim investigation.

Sudbury Lateral Section 2 and 3 Replacement Project - Union Gas Ltd. Sudbury, ON. 2017-2018

Project Manager, Responsibilities: Blast consulting engineer responsible for blasting procedure for trench blasting for new 12-inch mainline parallel to working 10-inch mainline from Walden