



February 12, 2024

Mr. Ed Lamb
Waterford Sand & Gravel Ltd.
70 Ewart Avenue, R. R. #8
Brantford, ON N3T 5M1

**Re: Supplemental Level 1 and 2 Water Study Report
Proposed Law Quarry Extension
WSP Project No. 111-53023-11**

Dear Mr. Lamb:

We are pleased to provide this Supplemental Level 1 and 2 Water Study Report (Supplemental Report) for the proposed Law Quarry Extension aggregate licence application by Waterford Sand & Gravel Ltd. (Waterford).

The initial Level 1 and 2 Water Study Report (Water Report) prepared by WSP Canada Inc. (March 2022) was submitted as part of the ARA Licence Application package in June 2022. Comments related to the Water Report were provided by the Joint Agency Review Team (JART) in their correspondence dated January 13, 2023 and December 21, 2023.

The purpose of this Supplemental Report is to consolidate comments provided by the JART peer review consultant (Terra-Dynamics Consulting Inc.). Three (3) comments regarding the Water Report (appended) are noted below.

Executive Summary

The wording in the Water Report Executive Summary, page iv, second paragraph, line 1 was revised to clarify the bedrock members of the deep aquifer:

“In general, the results of the hydraulic testing suggest that bedrock of the Salina Formation and Oatka Member of the Bertie Formation (i.e., the deep aquifer), located below the quarry extraction depth, are the most conductive units in the vicinity of the Site, likely as a result of enhanced weathering in these units.”

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Additional Report Figures

Additional cross sections on **Figures 19A, 19B and 19C** have been created to illustrate predicted impacts to private water wells from dewatering the proposed Law Quarry western extension and cumulative impacts from dewatering the future Reeb Quarry (a) along Highway 3 in the east to Ellsworth Road in the west, (b) along Rathfon Road / Graybiel Road from the former railway tracks in the south to the northern limit of Graybiel Road, and (c) along Quarry Road from the former railway tracks in the south to the northern extent of Law Quarry.

Additional Model Report (Appendix H) Figures

Model report (**Appendix H**) **Figure H-9A** and **Figure H-11A** have been created to show the model predicted groundwater contours for the Law Quarry west extension at full development, and the cumulative full development at Law Quarry and phase 1 of the Reeb Quarry. As noted in these figures, there are no drawdown contours within the quarry footprints owing to the sump elevation. On **Figure H-11A**, there are a few contours in the southern portion of the existing quarry because the Reeb Quarry sump is slightly lower in elevation (i.e., the Reeb quarry sump will underdrain the Law quarry sump at full development).

The predicted drawdown shown in **Figures H-9 and H-11** varies within the Law Quarry west extension footprint as the baseline water table is sloped (higher at the southwestern corner than the northeastern corner), as shown in **Figure H-8** contours. In both cases, an upward gradient to the quarry will exist at full development. The baseline and predicted deep aquifer water tables are also shown in section view in **Figure H-9B and H-11B** (appended).

CLOSURE

We trust that this Supplemental Report is sufficient for your needs. Please contact us if there are any further questions.

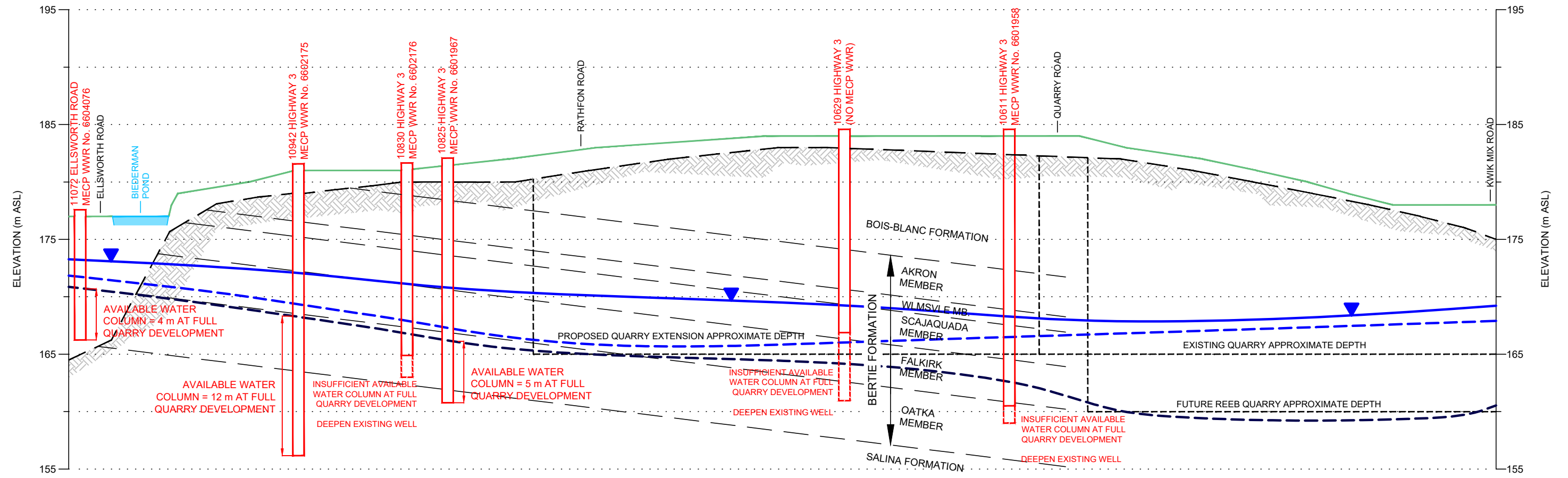
Yours truly,
WSP Canada Inc.

Kevin Fitzpatrick, P.Eng.
Senior Project Engineer, Earth & Environment

Leigh Davis, M.A.Sc., P.Eng.
Project Engineer, Earth & Environment

Attachments: WSP Canada Inc., March 2022. Law Quarry Extension Level 1 and 2 Water Study Report, prepared for Waterford Sand & Gravel Ltd.
Figure 19A – Conceptual Cross Section – Highway 3
Figure 19B – Conceptual Cross Section – Rathfon Road / Graybiel Road
Figure 19C – Conceptual Cross Section – Quarry Road
Figure H-9A – Predicted Groundwater Contours at Full Quarry Development – Deeper Bedrock Units
Figure H-9B – Cross Section A-A'
Figure H-11A – Cumulative Impacts at Full Quarry Development – Deeper Bedrock Units
Figure H-11B – Cross Section C-C'

WEST ← LOOKING NORTH → EAST



LEGEND	
	EXISTING GROUND SURFACE ELEVATION
	TOP OF BEDROCK ELEVATION
	INTERPOLATED STRATIGRAPHIC CONTACT
<u>DEEP AQUIFER POTENTIOMETRIC SURFACE</u>	
	BASELINE CONDITIONS
	PREDICTED LAW QUARRY EXTENSION FULL DEVELOPMENT POTENTIOMETRIC SURFACE
	PREDICTED CUMULATIVE (LAW & REEB) FULL DEVELOPMENT POTENTIOMETRIC SURFACE

HORIZONTAL SCALE:
 0 140 280 m
 NOTE: 20X VERTICAL EXAGGERATION

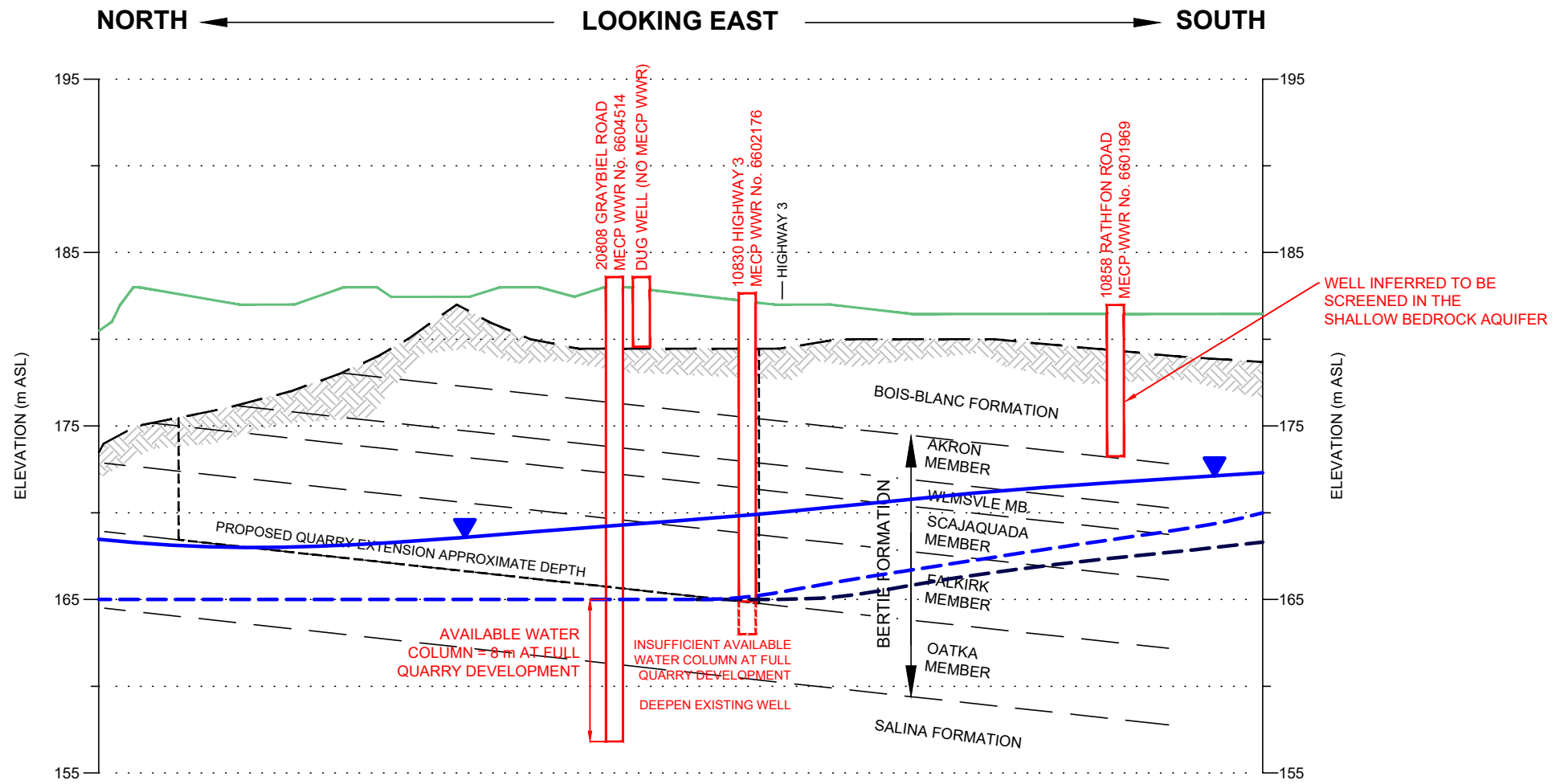
CONCEPTUAL CROSS SECTION - HIGHWAY 3

LEVEL 2 WATER STUDY REPORT
 LAW QUARRY EXTENSION
 WAINFLEET, ON
 For Waterford Sand & Gravel Ltd.

DATE:	SEPTEMBER 2022
PROJECT:	111-53023-06
HORIZONTAL SCALE:	1 : 7,000
DRAWN BY:	JLD

FIGURE No: **19A**

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- LEGEND**
- EXISTING GROUND SURFACE ELEVATION
 - TOP OF BEDROCK ELEVATION
 - INTERPOLATED STRATIGRAPHIC CONTACT
 - DEEP AQUIFER POTENTIOMETRIC SURFACE
 - ▲ BASELINE CONDITIONS
 - - - PREDICTED LAW QUARRY EXTENSION FULL DEVELOPMENT POTENTIOMETRIC SURFACE
 - - - PREDICTED CUMULATIVE (LAW & REEB) FULL DEVELOPMENT POTENTIOMETRIC SURFACE

HORIZONTAL SCALE:
 0 140 280 m
 NOTE: 20X VERTICAL EXAGGERATION

CONCEPTUAL CROSS SECTION - RATHFON RD / GRAYBIEL RD

LEVEL 2 WATER STUDY REPORT
 LAW QUARRY EXTENSION
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 For Waterford Sand & Gravel Ltd.

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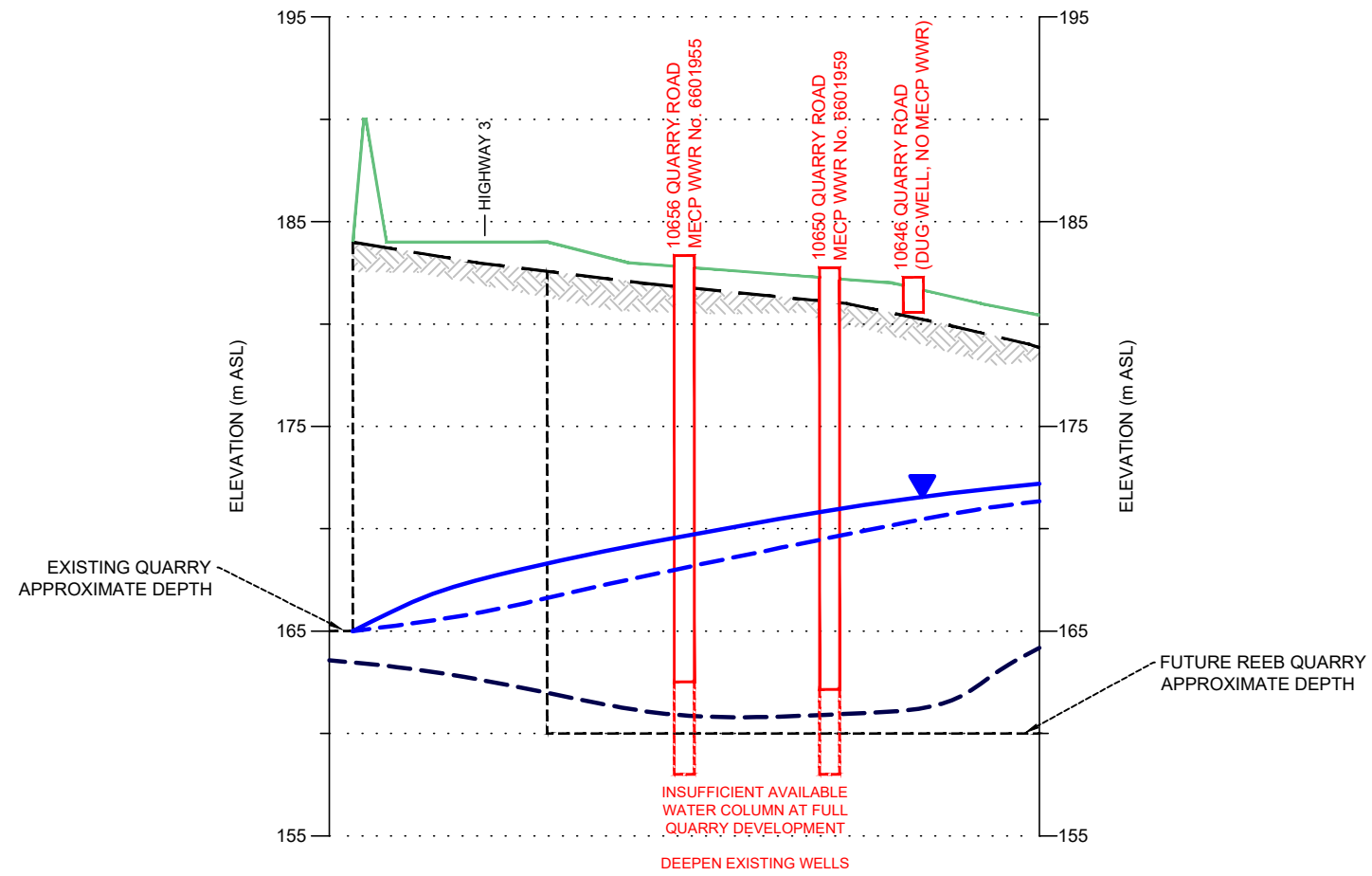
HORIZONTAL SCALE: 1 : 7,000

DRAWN BY: JLD

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FIGURE No: **19B**

NORTH ← LOOKING EAST → SOUTH



LEGEND

- EXISTING GROUND SURFACE ELEVATION
- TOP OF BEDROCK ELEVATION
- INTERPOLATED STRATIGRAPHIC CONTACT
- DEEP AQUIFER POTENTIOMETRIC SURFACE
- BASELINE CONDITIONS
- - - PREDICTED LAW QUARRY EXTENSION FULL DEVELOPMENT POTENTIOMETRIC SURFACE
- - - PREDICTED CUMULATIVE (LAW & REEB) FULL DEVELOPMENT POTENTIOMETRIC SURFACE

HORIZONTAL SCALE:
 0 140 280 m
 NOTE: 20X VERTICAL EXAGGERATION

CONCEPTUAL CROSS SECTION - QUARRY RD

LEVEL 2 WATER STUDY REPORT
 LAW QUARRY EXTENSION
 WAINFLEET, ON
 For Waterford Sand & Gravel Ltd.

DATE: SEPTEMBER 2022

PROJECT: 111-53023-06

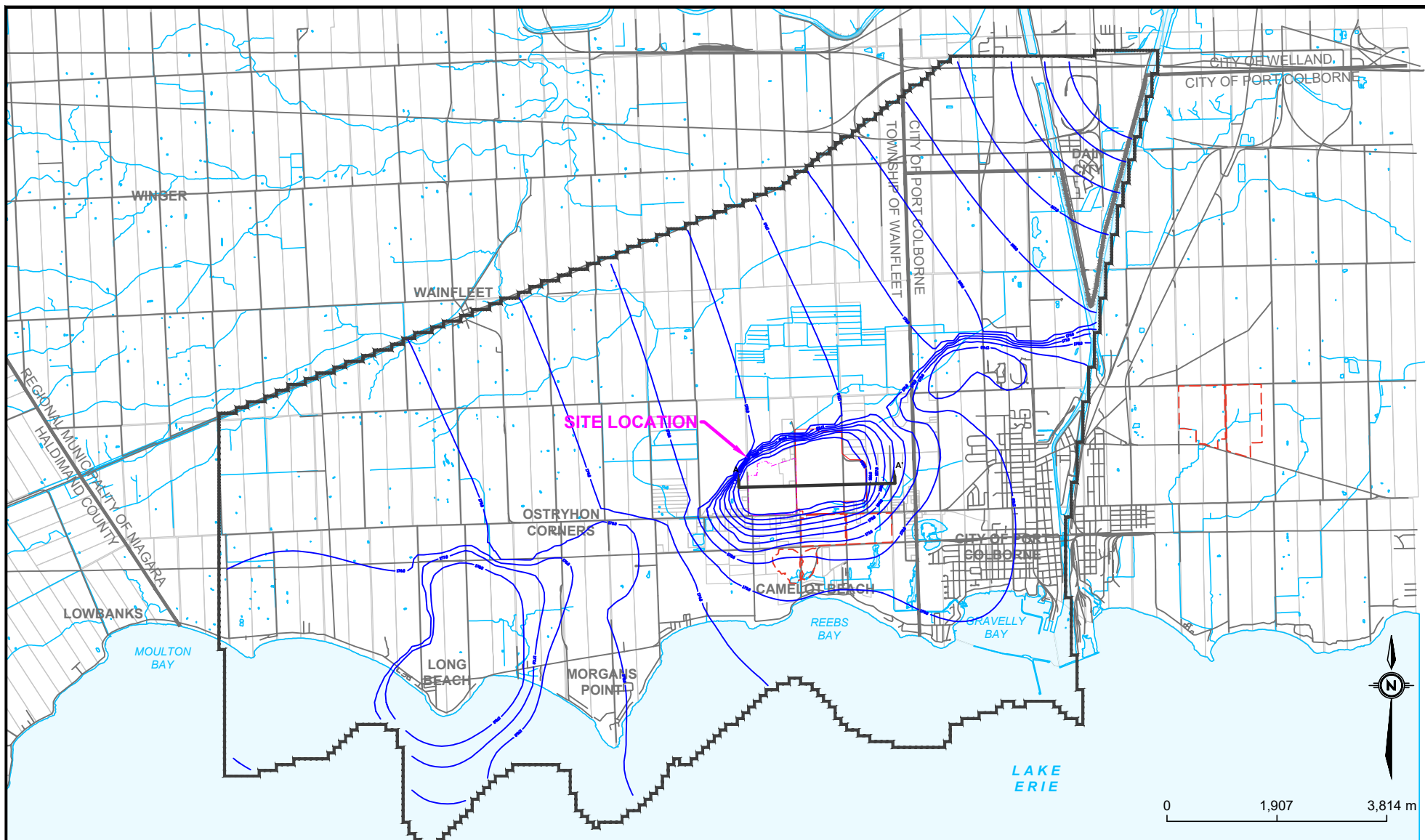
HORIZONTAL SCALE: 1 : 7,000

DRAWN BY: JLD



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FIGURE No: **19C**



LEGEND	
	ACTIVE MODEL DOMAIN
	172.0 SIMULATED GROUNDWATER CONTOURS, 1 m INTERVALS (mASL)
	CROSS SECTION LOCATION

PREDICTED GROUNDWATER CONTOURS AT FULL QUARRY DEVELOPMENT - DEEPER BEDROCK UNITS

NUMERICAL GROUNDWATER MODEL REPORT
LAW QUARRY EXTENSION
WAINFLEET, ON
For Waterford Sand & Gravel Ltd.

DATE:	SEPTEMBER 2022
PROJECT:	111-53023-05
DRAWN BY:	JLD
SCALE:	1 : 95,358


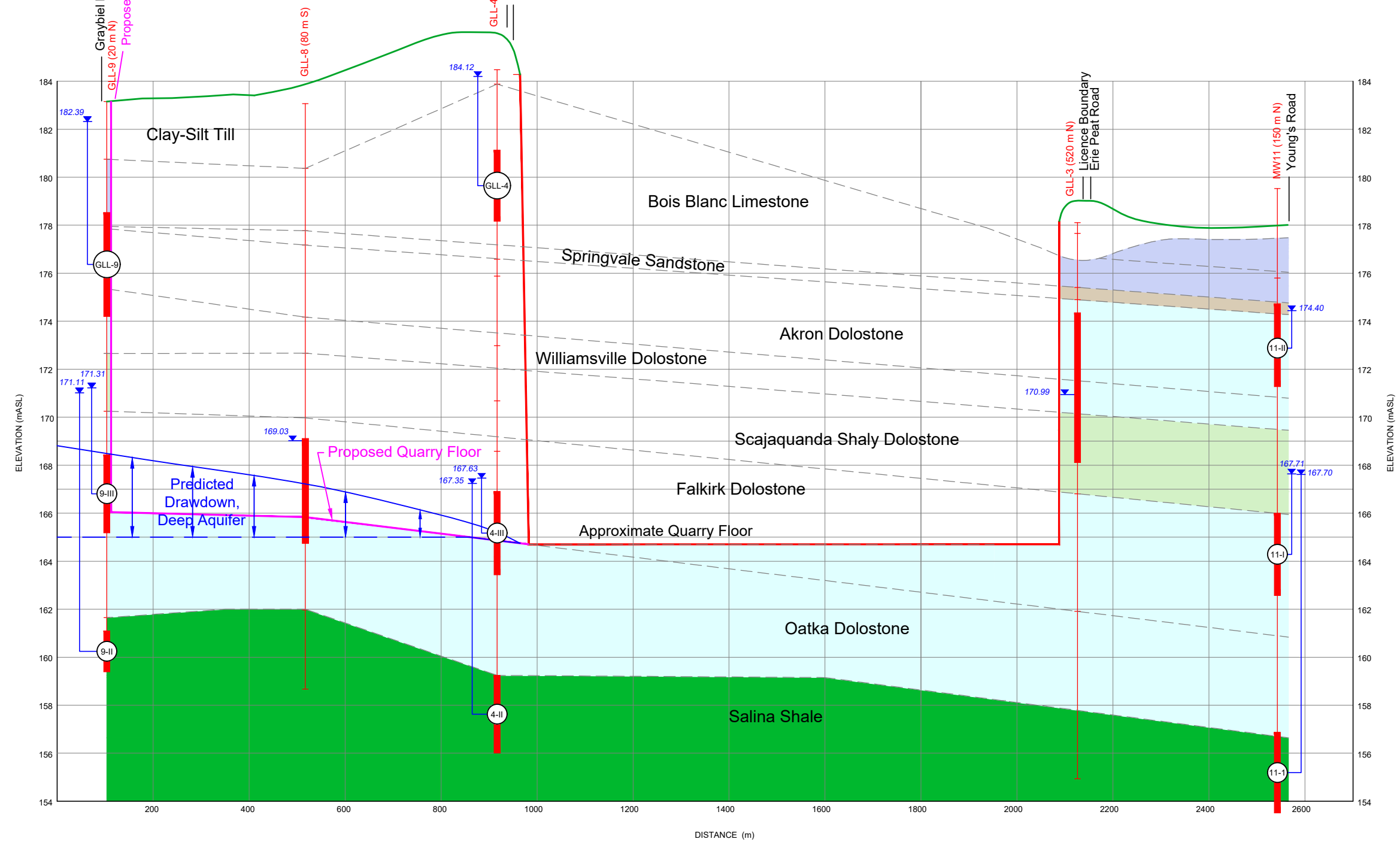


FIGURE No. **H-9A**

A
WEST

A'
EAST

LOOKING NORTH



LEGEND

- BOREHOLE LOCATION AND DESIGNATION
- SURFACE
- ▼ WATER LEVEL (FEBRUARY 4, 2019)
- CHANGE IN STRATIGRAPHY
- SCREENED INTERVAL
- | END OF HOLE
- LIMESTONE
- DOLOSTONE
- SHALY DOLOSTONE
- SHALE
- SANDSTONE
- BASELINE INTERPRETED DEEP WATER TABLE
- - - PREDICTED DEEP WATER TABLE AT FULL QUARRY DEVELOPMENT

REFERENCE: GARTNER LEE LTD. (2005).

CROSS SECTION A-A'

LEVEL 2 WATER STUDY REPORT
LAW QUARRY EXTENSION
WAINFLEET, ON
For Waterford Sand & Gravel Ltd.

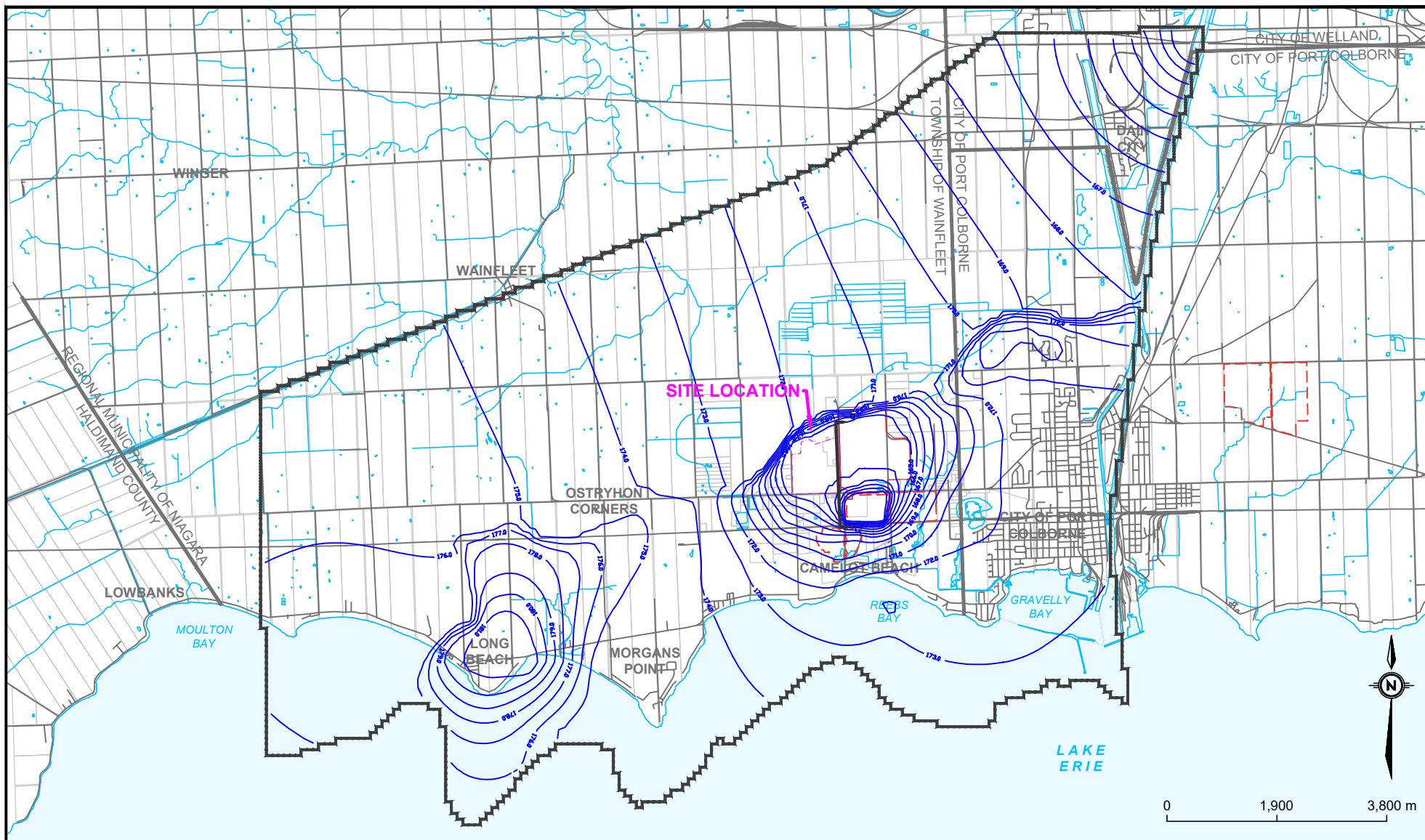
DATE:	SEPTEMBER 2022
PROJECT:	111-53023-06
SCALE:	AS SHOWN
DRAWN BY:	JLD



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FIGURE No: **H-9B**

H:\PROJECTS\201111-53023 LAW QUARRY\05 2018 LEVEL 2 GW MODELLING\GRAPHICS\111-53023-05-FH9B-CS.DWG



LEGEND

- ACTIVE MODEL DOMAIN
- SIMULATED GROUNDWATER CONTOURS, 1 m INTERVALS (mASL)
- CROSS SECTION LOCATION

CUMULATIVE IMPACTS AT FULL QUARRY DEVELOPMENT - DEEPER BEDROCK UNITS

NUMERICAL GROUNDWATER MODEL REPORT
 LAW QUARRY EXTENSION
 WAINFLEET, ON
 For Waterford Sand & Gravel Ltd.

DATE: SEPTEMBER 2022

PROJECT: 111-53023-05

DRAWN BY: JLD

SCALE: 1 : 95,000


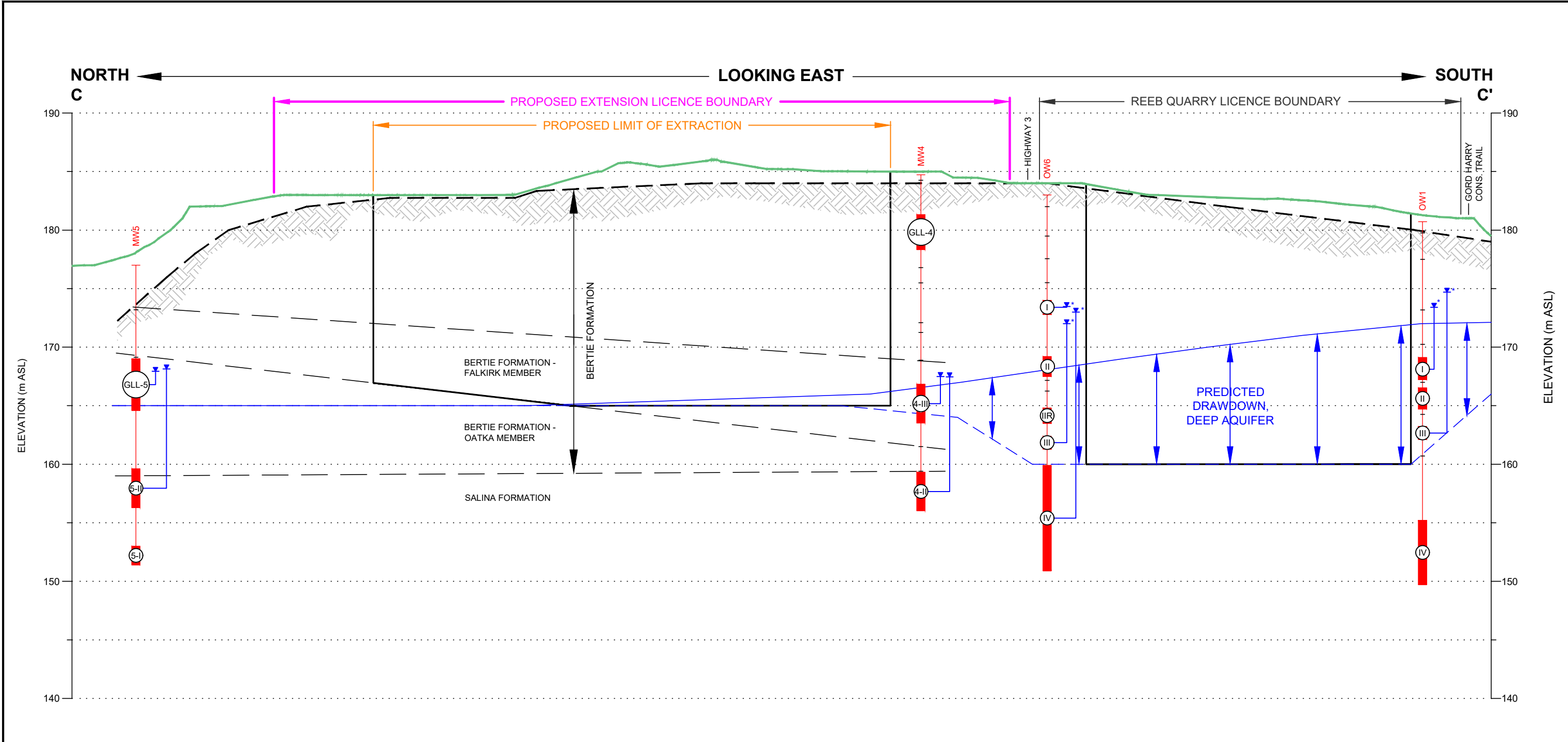


FIGURE No: **H-11A**



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