



May 2016 (Revised)

GEOTECHNICAL ASSESSMENT

**Proposed Development
Part Lot 6, Concession 14
Geographic Township of Aldborough
Community of Port Glasgow
Municipality of West Elgin, Ontario**

Submitted to:

Mr. Ron Koudys
Ron Koudys Landscape Architect Inc.
368 Oxford Street East
London, Ontario
N6A 1V7

REVISED REPORT

Report Number: 07-1130-188-0-R01

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**GEOTECHNICAL ASSESSMENT
PROPOSED DEVELOPMENT, COMMUNITY OF PORT GLASGOW**

April 5, 2016
Revised May 17, 2016

Project No. 07-1130-188-0-R01

Ron Koudys Landscape Architect Inc.
368 Oxford Street East
London, Ontario
N6A 1V7

Attention: Mr. Ron Koudys

**GEOTECHNICAL ASSESSMENT
PROPOSED DEVELOPMENT
PART LOT 6, CONCESSION 14
GEOGRAPHIC TOWNSHIP OF ALDBOROUGH
COMMUNITY OF PORT GLASGOW
MUNICIPALITY OF WEST ELGIN, ONTARIO**

Dear Mr. Koudys:

This report presents the results of the geotechnical assessment carried out for the proposed development to be constructed in the Community of Port Glasgow on Part Lot 6, Concession 14 in the Geographic Township of Aldborough, Municipality of West Elgin, Ontario. The locations of the subject lands are shown on the attached Key Plan, Figure 1. The current Draft Plan of Subdivision is shown on the Location Plan, Figure 1.

The purpose of the assessment was to assess the stability of the existing lake shore bluff, creek valley wall and gully slopes at the site and provide preliminary geotechnical engineering recommendations for geotechnical setbacks and recommendations for additional site investigation and analyses, where required.

Written authorization to proceed with the assessment was provided by Mr. Ron Koudys on behalf of Seaside Waterfront Inc. (Seaside) on November 13, 2007 and May 16, 2008 and on July 8, 2011 by Mr. Howard Culligan of Seaside.

Important information on limitations of this report is attached.



1.0 PROCEDURE

1.1 Preliminary Assessment

This assessment was carried out by compiling and reviewing the geological, topographical and geotechnical information available from our files together with survey data by NorthWest Consulting Civil Engineers (NorthWest) provided in electronic format on December 6, 2007. Subsequently, updated topographical mapping was provided and incorporated into this report. The assessment also included a review of copies of 1:10,000 Ontario Base Mapping, aerial photographs taken between 1945 and 2006 as well as the Lower Thames Valley Conservation Authority's (LTVCA) document titled "Determination of Regulation Limits, Technical Committee Review", dated November 2005.

Site reconnaissances were carried out by a senior member of our engineering staff on December 7, 2007, May 1 and May 6, 2008. The slope inclinations at the site were measured using an Abney level and observations of vegetation, soil type, seepage and stability conditions were made during the field reconnaissance. The observations were used to evaluate the slopes represented by cross sections A-A to F-F, inclusive and located as shown on Figure 2, using the Ontario Ministry of Natural Resources (MNR) Slope Stability Rating System. These results are provided in Table I. Select site photographs taken during the site visits in 2007 and 2008 are provided in Appendix A and the photograph locations and directions are shown on the Location Plan, Figure 2. Copies of aerial photographs for the area of the site taken in 1945, 1950, 1962, 1973, 1990 and 2006 are provided in Appendix B. The photographs provided in Appendix B have been adjusted to a common scale of approximately 1:10,000.

The above noted information was analyzed to provide a preliminary determination of the stable slope inclinations at the site and to provide preliminary recommendations for setbacks for the proposed buildings. The preliminary building setbacks are shown on Figures 2 to 5.

1.2 Subsurface Investigation

Seven boreholes (boreholes 1 to 7) were drilled on Lot 6 between July 20 and 26, 2011 to evaluate the subsurface conditions at the site of the proposed Town Centre development. The boreholes were drilled using a track mounted power auger supplied and operated by a specialist drilling contractor. The results of the boreholes are provided in a separate draft report pertaining to the Town Centre portion of the development entitled "Geotechnical Investigation, Proposed Town Centre Development, Community of Port Glasgow, Municipality of West Elgin, Ontario" dated August 2011.

2.0 GEOLOGY

The site is located within the physiographic region of southwestern Ontario known as the Bothwell Sand Plain¹ which was the former delta of the Thames River in glacial Lake Warren. The sand plain is generally characterized by a surficial deposit of sand overlying clayey soils with till deposits visible at the Lake Erie bluff slopes. Surface

¹ Chapman, L.J., and Putnam, D.F.

1984: The Physiography of Southern Ontario; Ontario Geological Survey, Special Volume 2, 270p.



water readily infiltrates the sands and collects on the clayey deposits below, resulting in gullies dissecting the sand plain near the Lake Erie shore line. The subcropping bedrock is reported to consist of grey limestone and shale from the Hamilton Group of middle Devonian age. Bedrock mapping for the area of the site indicates that the rock surface is at about elevation 142 metres and some 54 metres below the tablelands or about 32 metres below lake level.

3.0 SITE DESCRIPTION

The proposed development will be located in the cultivated portions of the Lake Erie tablelands on Part Lot 6 of Concession 14 as well as on the flatter portions of the slopes on Part Lot 6, generally east and north of the Port Glasgow marina. The extent of the cultivated lands is shown on the orthophoto based Site Plan on Figure 1. Sixteen Mile Creek flows between Lots 5 and 6 in a southerly direction and reports to Lake Erie immediately west of the marina. A number of gullies have formed at drainage features and at the ends of field drains constructed in the cultivated lands. A narrow beach is located on the shore of Lake Erie adjacent to the bluff slope west of the creek.

The subject slopes were inspected in December 2007, May 2008, July 2008 and August 2011. The locations of select photographs taken during the site visits and the locations of the cross sections developed for the slopes are shown on the Location Plan, Figure 2. Typical cross sections developed using the survey data provided are shown on Figures 3 to 5.

Based on the survey data provided, the creek valley and lake bluff slopes at the site have total heights of about 12 to 18 metres on Part Lot 6. The survey data indicates overall slope inclinations from about 14 degrees to the horizontal on Part Lot 6. The measurements of slope inclinations with an Abney hand level during the site visits indicated typical inclinations of about 16 to 22 degrees on Part Lot 6 and typically about 18 to 24 degrees along the gully slopes on Part Lot 6. Localized inclinations of 24 to 28 degrees were noted on portions of the gully slopes.

The gully slopes and portions of the tablelands at the site are covered with mature trees and shrubs. The remainder of the tablelands are cultivated fields. Shallow streams were noted in the gully inverts and seepage zones were noted in portions of the Lake Erie bluff slope where slope failures were observed near the top portion of the slope.

The Great Lakes shore damage survey data compiled by the Ontario Ministry of Natural Resources in 1975 indicates that the top of Lake Erie bluff slope did not regress at the site between 1955 and 1973. Our review of the aerial photographs, provided in Appendix B, very little erosion at the Lot 5/6 lot line and no erosion on Lot 6. The construction of groynes and harbour works in the 1960's appears to have arrested the erosion immediately east of the marina and accretion is noted west of the marina since 1973.

Based on information available on the Canadian Hydrographic Service web site, the Lake Erie water level is generally at about elevation 174.4 metres (International Great Lakes Datum (IGLD)) or about 0.9 metres above the chart datum elevation of 173.5 metres. The maximum lake level is expected to be 1.35 metres above chart datum or at elevation 174.85 metres. The Lake Erie water level was measured at elevation 174.30 metres (referenced to geodetic datum) at the marina on August 21, 2011. These levels are shown on the relevant cross section on Figure 3 (Section A-A).



4.0 DISCUSSION

The geotechnical conditions in the area of the site were reviewed together with the site observations, measurements, mapping and the subsurface information to develop and refine models for analyzing the stability of the slopes at the site. The cross sections used in the stability modelling are shown on Figures 3 to 5.

4.1 Slope Stability

Based on the MNR Slope Stability Rating System scores provided in Table I, the slopes for the lake shore bluff, gully and creek valley walls on Part Lot 6 received ratings of about 17 and 21 which indicate that they have a low potential for instability. Therefore, this preliminary study and report are considered appropriate to address the site conditions.

Based on the existing site conditions, the subsurface conditions and our measurements, the existing slopes on Part Lot 6 are stable. For planning purposes, and based on the stability analyses, an overall stable slope inclination of 2.5 horizontal to 1 vertical from the toe of the slope may be used for the site. A nominal toe erosion component of 3 metres is recommended for the Lake Erie slope on Part Lot 6 since the shoreline is protected by groynes and there is evidence of accretion of beach material in this area.

A toe erosion component of 3 metres is recommended for the slopes along Havens Lake Road, unless these areas are filled and/or provided with erosion protection. In addition, a 6 metre access allowance from the top of the stable slope line is suggested, consistent with the Ontario Ministry of Natural Resources guidelines.

The recommended inclinations and setbacks are shown on the cross sections on Figures 3 to 5 and the preliminary building setbacks are shown on Figure 2.

4.2 Geotechnical Input

Continued geotechnical input will be required throughout the various stages of site development. Additional site specific detailed geotechnical investigations will be required for any major infrastructure that will be constructed.

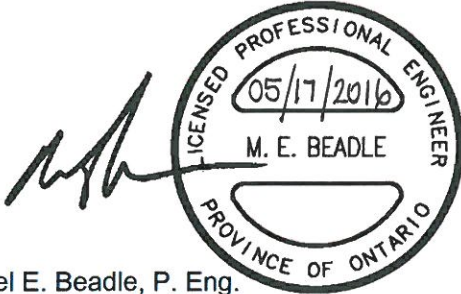
Any construction on the site should be carried out with the full consent of the Municipality of West Elgin, the LTVCA and the local health unit, as applicable.



GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT, COMMUNITY OF PORT GLASGOW

We trust that this report provides sufficient geotechnical information regarding slope stability and the development of the site for your immediate requirements. Should any point require additional clarification, or if we can be of further assistance at this time, please contact our office.

GOLDER ASSOCIATES LTD.



Michael E. Beadle, P. Eng.
Associate

AMH/PRB/MEB/cr

Attachments:

Important Information and Limitations of This Report
Table I
Figures 1 to 5
Appendices A and B

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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.



IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

TABLE I
SLOPE STABILITY RATING CHART
 Page 1 of 2
 Geotechnical Assessment
 Proposed Development
 Part Lot 6, Concession 14
 Geographic Township of Aldbrough
 Community of Port Glasgow
 Municipality of West Elgin, Ontario

Site Location: Port Glasgow, Ontario Inspected By: Azmi M. Hammoud, P.Eng.		Inspection Date: December 7, 2007, May 1 and May 6, 2008 Weather: Sunny, -1 °C, 8 °C and 15 °C		
1. SLOPE INCLINATION <u>Degrees</u> <u>horizontal:vertical</u> a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1		Rating Value (select only one)		
		A-A	B-B	C-C
		>0< 6 16	>0< 6 16	0 >6< 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill		0 6 >9< 12 16	0 6 >9< 12 16	0 6 >9< 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels		>0< 6 12	>0< 6 12	>0< 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m		0 2 4 >8<	0 2 4 >8<	0 2 >4< 8
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare		>0< 4 8	0 >4< 8	>0< 4 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies		>0< 2 4	>0< 2 4	>0< 2 4
7. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes		>0< 6	>0< 6	>0< 6
		Total 17	Total 21	Total 19
SLOPE INSTABILITY RATING	RATING VALUES TOTAL	INVESTIGATION REQUIREMENTS		
1. Low potential	<24	Site Inspection only, confirmation, report letter.		
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.		
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.		
NOTES: <ul style="list-style-type: none"> a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area). b) Choose only one from each category and compare total rating with above requirements. c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required. 				

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

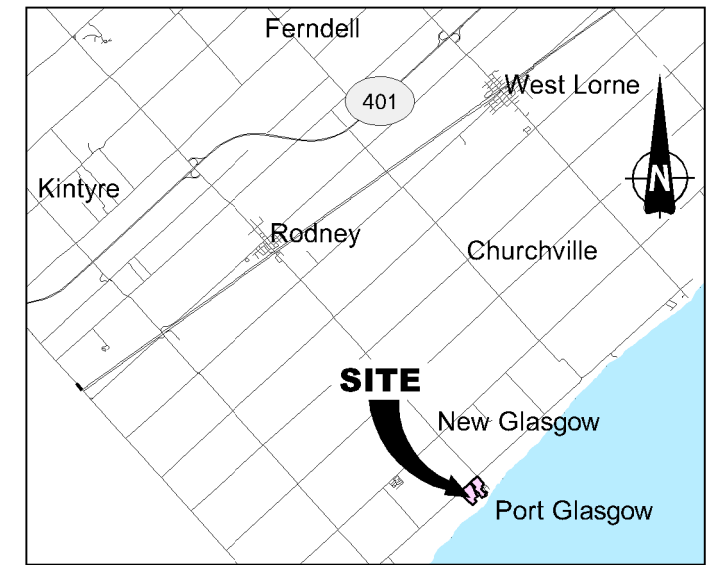
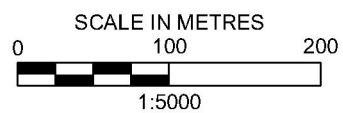
SLOPE STABILITY RATING CHART

Geotechnical Assessment
Proposed Development
Part Lot 6, Concession 14
Geographic Township of Aldbrough
Community of Port Glasgow
Municipality of West Elgin, Ontario

Site Location: Port Glasgow, Ontario		Inspection Date: May 1, 2008		
Inspected By: Azmi M. Hammoud, P.Eng.		Weather: Sunny, 8 °C		
1. SLOPE INCLINATION <u>Degrees</u> <u>horizontal:vertical</u> a) 16 or less 3:1 or flatter b) 16 to 26 2:1 to 3:1 c) 26 or more steeper than 2:1		Rating Value (select only one)		
		D-D	E-E	F-F
Cross Section		>0< 6 16	>0< 6 16	>0< 6 16
2. SOIL STRATIGRAPHY a) Shale, Limestone (bedrock) b) Sand, Gravel c) Till d) Clay, Silt e) Fill		0 6 >9< 12 16	0 6 >9< 12 16	0 6 >9< 12 16
3. SEEPAGE FROM SLOPE FACE a) None or near bottom only b) Near mid-slope only c) Near crest only or from several levels		>0< 6 12	>0< 6 12	>0< 6 12
4. SLOPE HEIGHT a) 2m or less b) 2.1 to 5m c) 5.1 to 10m d) more than 10m		0 2 4 >8<	0 2 4 >8<	0 2 4 >8<
5. VEGETATION COVER ON SLOPE FACE a) Well vegetated: heavy shrubs or forested with mature trees b) Light vegetation: mostly grass, weeds, occasional trees, shrubs c) No vegetation, bare		>0< 4 8	>0< 4 8	>0< 4 8
6. TABLE LAND DRAINAGE a) Table land flat, no apparent drainage over slope b) Minor drainage over slope, no active erosion c) Drainage over slope, active erosion, gullies		>0< 2 4	0 2 >4<	0 2 >4<
7. PREVIOUS LANDSLIDE ACTIVITY a) No b) Yes		>0< 6	>0< 6	>0< 6
		Total 17	Total 21	Total 21
SLOPE INSTABILITY RATING	RATING VALUES TOTAL	INVESTIGATION REQUIREMENTS		
1. Low potential	<24	Site Inspection only, confirmation, report letter.		
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.		
3. Moderate potential	>35	Borehole investigation, piezometers, lab tests, surveying, detailed report.		
NOTES: a) This chart does not apply to rock slopes or to Leda Clay slopes (Ottawa area). b) Choose only one from each category and compare total rating with above requirements. c) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe, the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.				

Reference: Table 4.2, Technical Guide – River & Stream Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources.

Prepared By: AMH
Checked By: MEB




KEY PLAN

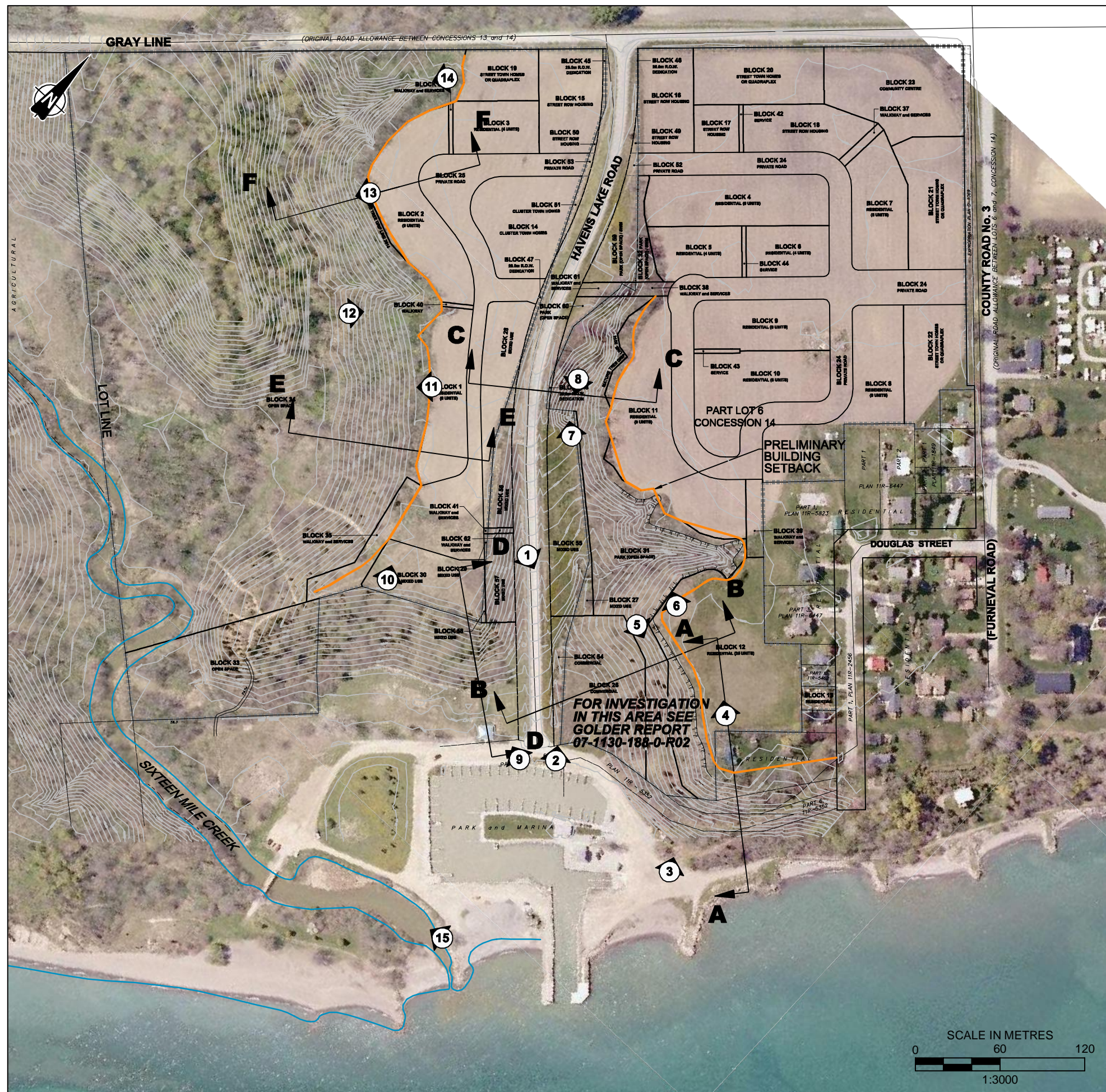
NOTE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

REFERENCES

BASED ON DRAWING SUPPLIED BY McNEIL SURVEYING LIMITED ONTARIO LAND SURVEYORS TOPOGRAPHICAL SKETCH OF PART OF LOT 6 CONCESSION 14 IN THE GEOGRAPHIC TOWNSHIP OF ALDBOROUGH MUNICIPALITY OF WEST ELGIN, COUNTY OF ELGIN AND 2006 ORTHOPHOTO FROM FIRSTBASE SOLUTIONS

PROJECT		GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT COMMUNITY OF PORT GLASGOW MUNICIPALITY OF WEST ELGIN, ONTARIO	
TITLE		SITE PLAN	
PROJECT No.	07-1130-188-0	FILE No.	0711301880-R01001
CADD	WDF/LMK	Apr. 4/16	SCALE AS SHOWN
CHECK			REV. 0
		<p>FIGURE 1</p>	



LEGEND

- PRELIMINARY BUILDING SETBACK
- SITE PHOTOGRAPH LOCATION, DIRECTION AND IDENTIFICATION

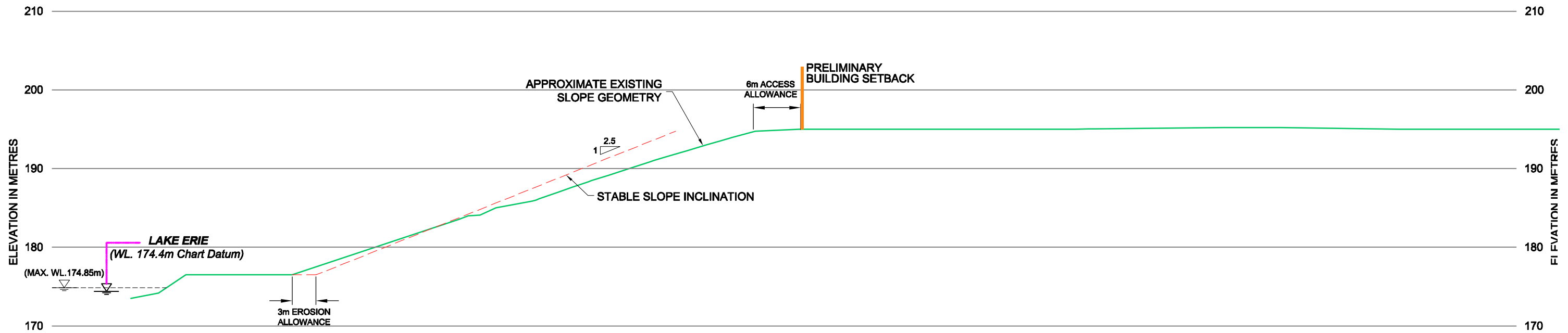
REFERENCES

BASED ON DRAWING SUPPLIED BY McNEIL SURVEYING LIMITED
 ONTARIO LAND SURVEYORS
 TOPOGRAPHICAL SKETCH OF PART OF LOT 6 CONCESSION 14
 IN THE GEOGRAPHIC TOWNSHIP OF ALDBOROUGH
 MUNICIPALITY OF WEST ELGIN, COUNTY OF ELGIN
 AND
 2006 ORTHOPHOTO FROM FIRSTBASE SOLUTIONS

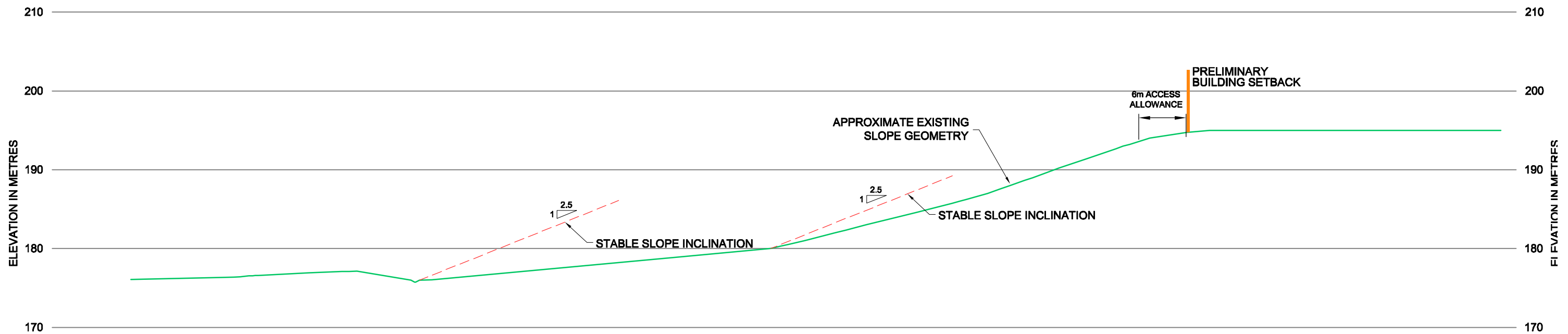
NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.
2. ALL LOCATIONS SHOWN ARE APPROXIMATE ONLY.
3. FOR CROSS SECTIONS, REFER TO FIGURES 3, 4 & 5.

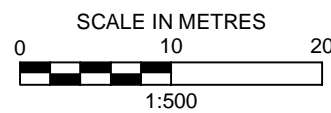
PROJECT	GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT COMMUNITY OF PORT GLASGOW MUNICIPALITY OF WEST ELGIN, ONTARIO			
TITLE	LOCATION PLAN - PART LOT 6			
 Golder Associates LONDON, ONTARIO	PROJECT No.	07-1130-188-0	FILE No.	0711301880-R01002
	CADD	WF/LK/DH	May 5/16	SCALE AS SHOWN
	CHECK			REV. 0
FIGURE 2				



CROSS SECTION A-A



CROSS SECTION B-B




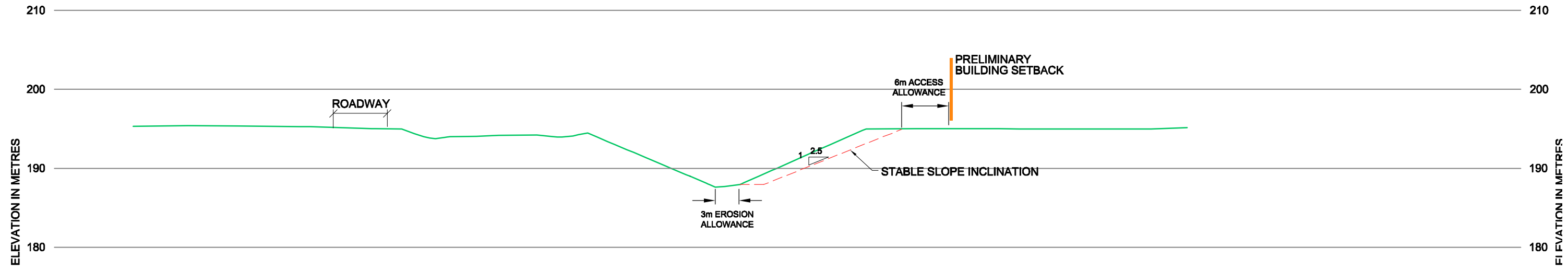
NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.
2. FOR CROSS SECTION LOCATION, REFER TO FIGURE 2.

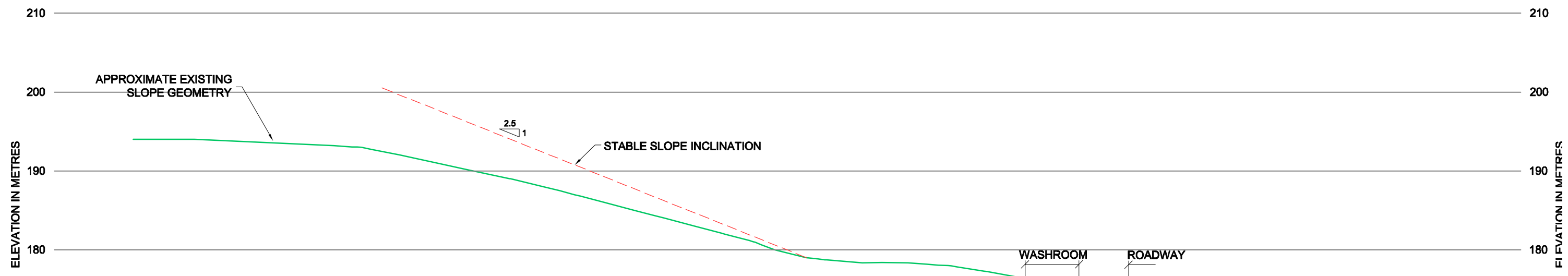
REFERENCE

BASED ON DRAWING SUPPLIED BY
 McNEIL SURVEYING LIMITED
 ONTARIO LAND SURVEYORS
 TOPOGRAPHICAL SKETCH
 OF PART OF LOT 6 CONCESSION 14
 IN THE GEOGRAPHIC TOWNSHIP OF ALDBOROUGH
 MUNICIPALITY OF WEST ELGIN, COUNTY OF ELGIN

PROJECT		GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT COMMUNITY OF PORT GLASGOW MUNICIPALITY OF WEST ELGIN, ONTARIO	
TITLE		CROSS SECTIONS A-A AND B-B	
PROJECT No.	07-1130-188-0	FILE No.	0711301880-R01002
CADD	WDF/DCH May 17/16	SCALE	AS SHOWN REV. 0
CHECK		 FIGURE 3	
Golder Associates LONDON, ONTARIO			



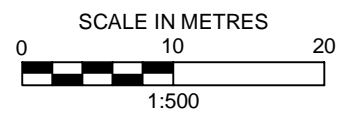
CROSS SECTION C-C




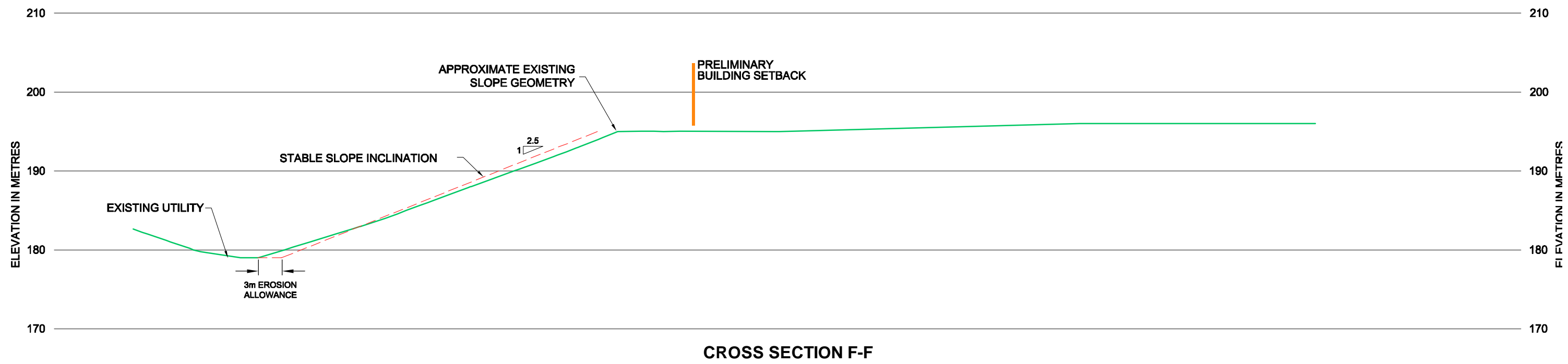
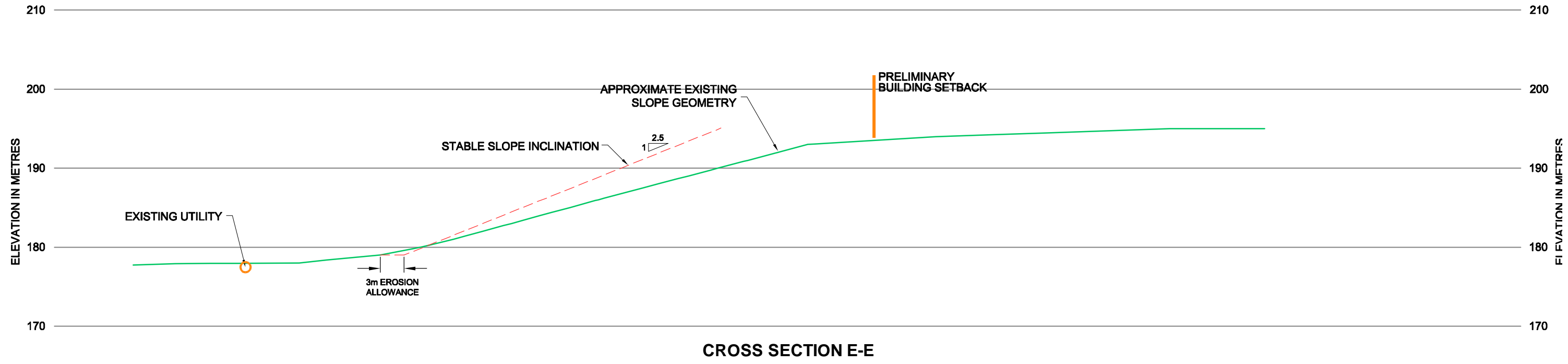
CROSS SECTION D-D

REFERENCE
 BASED ON DRAWING SUPPLIED BY
 McNEIL SURVEYING LIMITED, ONTARIO LAND SURVEYORS,
 TOPOGRAPHICAL SKETCH OF PART OF LOT 6 CONCESSION 14
 IN THE GEOGRAPHIC TOWNSHIP OF ALDBOROUGH
 MUNICIPALITY OF WEST ELGIN, COUNTY OF ELGIN.

NOTES
 1. THIS DRAWING IS TO BE READ IN CONJUNCTION
 WITH ACCOMPANYING TEXT.
 2. FOR CROSS SECTION LOCATION, REER TO FIGURE 2.

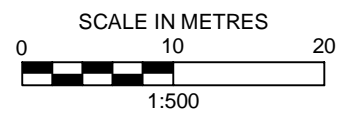



PROJECT		GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT COMMUNITY OF PORT GLASGOW MUNICIPALITY OF WEST ELGIN, ONTARIO	
TITLE		CROSS SECTIONS C-C AND D-D	
PROJECT No.	07-1130-188-0	FILE No.	0711301880-R01002
CADD	WDF/DCH May 17/16	SCALE	AS SHOWN REV. 0
CHECK		 Golder Associates LONDON, ONTARIO	
FIGURE 4			



REFERENCE
 BASED ON DRAWING SUPPLIED BY
 McNEIL SURVEYING LIMITED, ONTARIO LAND SURVEYORS,
 TOPOGRAPHICAL SKETCH OF PART OF LOT 6 CONCESSION 14
 IN THE GEOGRAPHIC TOWNSHIP OF ALDBOROUGH
 MUNICIPALITY OF WEST ELGIN, COUNTY OF ELGIN.

NOTES
 1. THIS DRAWING IS TO BE READ IN CONJUNCTION
 WITH ACCOMPANYING TEXT.
 2. FOR CROSS SECTION LOCATION, REER TO FIGURE 2.



PROJECT		GEOTECHNICAL ASSESSMENT PROPOSED DEVELOPMENT COMMUNITY OF PORT GLASGOW MUNICIPALITY OF WEST ELGIN, ONTARIO	
TITLE		CROSS SECTIONS E-E AND F-F	
PROJECT No.	07-1130-188-0	FILE No.	0711301880-R01002
CADD	WDF/DCH May 17/16	SCALE	AS SHOWN
CHECK		REV.	0
 Golder Associates LONDON, ONTARIO		FIGURE 5	

Drawing file: 0711301880-R01002.dwg May 17, 2016 - 3:43pm



APPENDIX A

Site Photographs

Taken December 2007 and May 2008

SITE PHOTOGRAPHS



Photo 1: General view of slope on east part of Lot 6, Concession 14. Looking east from Havens Lake Road (access road to the marina).



Photo 2: Slope on east part of Lot 6, looking north from marina parking lot.

SITE PHOTOGRAPHS



Photo 3: Slope near east end of marina parking lot.



Photo 4: Table lands at top of slope on east portion of Lot 6, looking northwest.

SITE PHOTOGRAPHS



Photo 5: Upper portion of slope on east part of Lot 6, looking southeast towards location of cross section B-B.



Photo 6: Gully on east part of Lot 6, looking northwest.

SITE PHOTOGRAPHS



Photo 7: Existing gully east of Havens Lake Road and south of Gray Line, looking north.



Photo 8: Culvert pipe at filled portion of gully east of Havens Lake Road and south of Gray Line, looking south.

SITE PHOTOGRAPHS



Photo 9: Public washrooms on north side of marina. Note treed slope in background.



Photo 10: General view of table lands west of Havens Lake Road and north of public washrooms.

SITE PHOTOGRAPHS



Photo 11: Shallow gully forming on slope of table lands west of Havens Lake Road (typical).



Photo 12: Looking up the slope at another gully towards table lands west of Havens Lake Road.

SITE PHOTOGRAPHS



Photo 13: Gully in northern portion of table lands west of Havens Lake Road.



Photo 14: Drain pipe at top of gully forming south of Gray Line.

SITE PHOTOGRAPHS



Photo 15: South end of Sixteen Mile Creek looking northwest towards foot bridge from Lake Erie.



APPENDIX B

Aerial Photographs Taken between 1945 and 2006

AERIAL PHOTOGRAPHS



Photo 1: 1945



Photo 2: 1950

SITE PHOTOGRAPHS



Photo 3: 1962

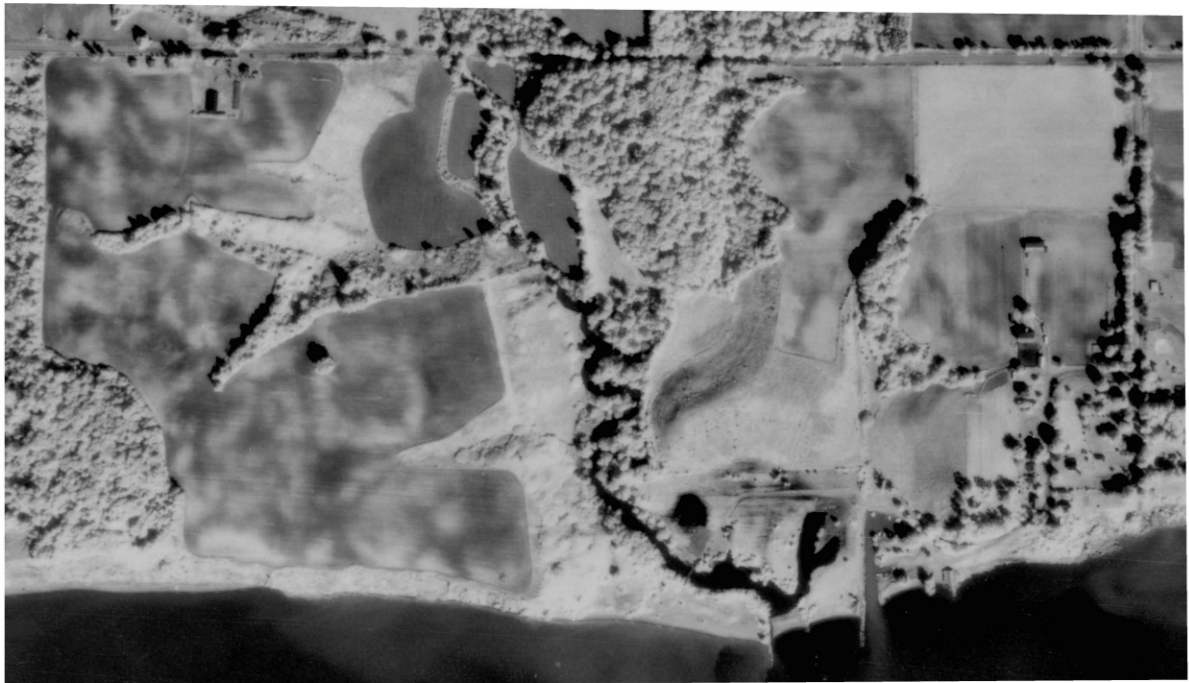


Photo 4: 1973

SITE PHOTOGRAPHS

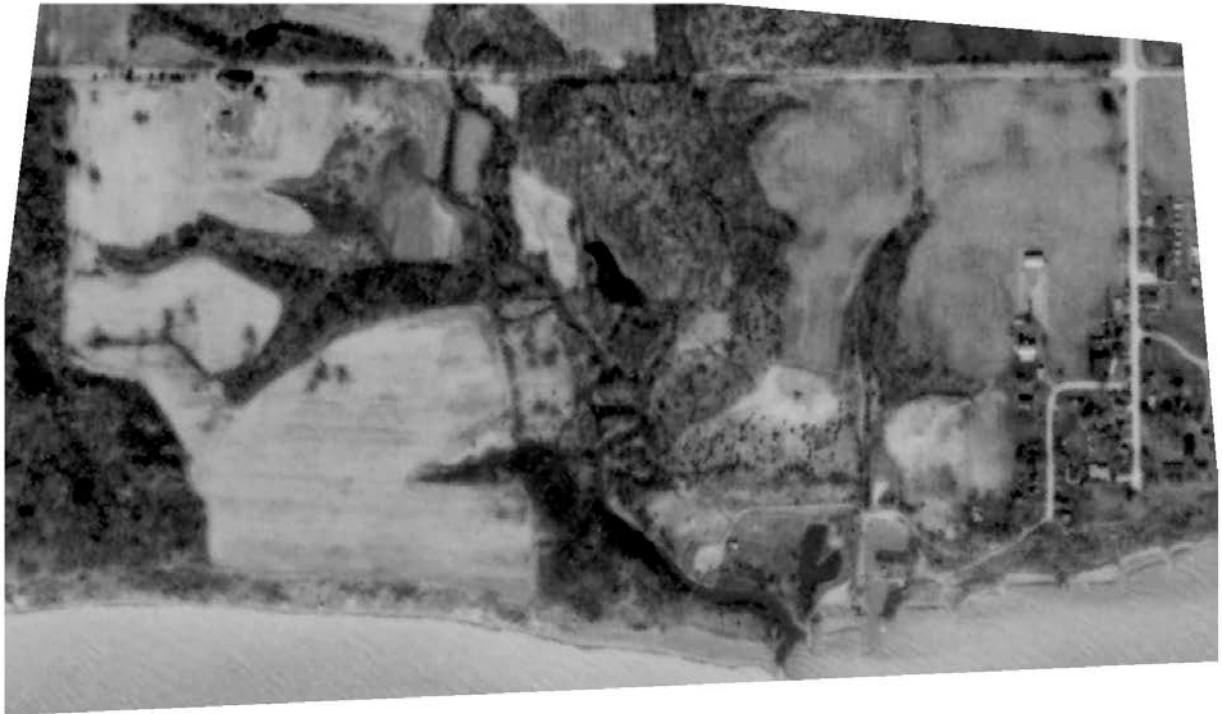


Photo 5: 1990



Photo 6: 2006

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