

Terraprobe

*Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing*

Geocres No:
30M3-191

GEOTECHNICAL INVESTIGATION QEW VINELAND TRUCK INSPECTION STATION

W.P. 2539-98-00
MTO CENTRAL REGION

PREPARED FOR: STANTEC CONSULTING LTD.
1400 Rymal Road East,
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File No. 993005-2

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June 29, 1999

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INTRODUCTION

This report presents the results of a geotechnical investigation which has been undertaken in conjunction with the design of the new QEW Vineland Truck Inspection Station (TIS) to be constructed on the westbound QEW just west of Victoria Avenue (Niagara Regional Road 24) in the Town of Lincoln, Regional Municipality of Niagara. The location of the site is shown on the Key Plan, Figure 1.

The project consists of the design of a new "lay-by" type truck inspection facility which will include new acceleration and deceleration lanes, weigh scale lane, scale by-pass lane, inspection and detainment areas and other associated paved areas. The development will also include the construction of an inspection station building, highway signs and other appurtenances (weigh scale, scale pit).

Boreholes were put down at the proposed sites of the building, weigh scale, retaining wall, and the highway sign. Native clayey silt till strata were encountered beneath layers of earth fill and topsoil in the boreholes.

Foundations for the building, weigh scale and appurtenances, and highway sign may be supported on conventionally design spread footings bearing in the native undisturbed till stratum, or on properly prepared engineered fill, or on bored cast-in-place caissons.



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Logs of Boreholes 201, 313, 314

Figure 1 - Key Plan

Figure 2 - Location Plan



PART A - FOUNDATION INVESTIGATION REPORT

1.0 SITE DESCRIPTION

W.P. 2539-98-00 comprises the design and construction of the new QEW Vineland Truck Inspection Station (TIS) to be constructed on the westbound QEW, just west of Victoria Avenue (Niagara Regional Road 24) in the Town of Lincoln, Regional Municipality of Niagara. The location of the site is shown on the Key Plan, Figure 1. As presently proposed, the truck inspection station will be a "lay-by" type facility which will include new acceleration and deceleration lanes, a weigh scale lane, a scale by-pass lane, inspection and detainment areas, and other associated paved areas. The development will also include the construction of an inspection station building, highway signs and other appurtenances (weigh scale, scale pit).

This report address the geotechnical aspects of the design of foundations for the new inspection station building, highway signs, weigh scale, scale pit, and related earthworks.

The site is located on the lower plateau of the Physiographic Region of Southern Ontario known as Iroquois Plain, below the Niagara Escarpment. The base of the escarpment is located approximately 3 km south of the portion of the QEW under consideration. The subject property ground surface elevation is approximately 80 m above mean sea level, and approximately 5 m above the level of Lake Ontario. Regionally, the ground surface slopes to the north, towards Lake Ontario.

Based on published geological information for the general area, the near surface overburden soil at and in the vicinity of the subject property generally consists of Pleistocene age sediments, Late Wisconsinan stratified sands (predominantly silty fine sand) and silt to clay till (Halton Till). The sequence of overburden deposits is underlain by Upper Ordovician Queenston Formation, the basal rock unit of the Niagara Escarpment. The Queenston Formation is red shale with interlayered green shale and minor interbedded limestone and dolomite. The maps indicated that the depth of overburden in the immediate vicinity of the site property is less than 10 m.



Regional groundwater flow is expected to be in a northerly direction, towards Lake Ontario. However, the near surface groundwater flow may be influenced by topography and/or underground structures (e.g. service trenches and ditches).

It should be noted that the subsurface soil, rock and groundwater conditions described above represent generalized conditions only, and should not be considered site specific.

2.0 INVESTIGATION METHODOLOGY AND RESULTS

The field work for this investigation was carried out in conjunction with a pavement investigation completed at the site between March 30 and April 5, 1999, at which time ninety one boreholes were drilled. The boreholes drilled at the structure sites which have been included in this report are summarized below.

Borehole Number	Location
201	Administration Building
313, 314	Sign

The locations of the boreholes are shown on the attached Location Plan, Figure 2. The boreholes were drilled using both truck mounted and bombardier mounted power auger drill rigs supplied and operated by a specialist drilling contractor. The boreholes were generally advanced to depths of about 5m below the existing ground surface using solid stem augers.

Standard Penetration Testing (SPT) and sampling were carried out at intervals of 0.75 m to 1.5 m depth in each borehole (0.75 m to 3 m depth, 1.5 m deeper) using conventional 50mm outside diameter spoon sampling equipment. After the drilling, sampling, and logging were completed, the boreholes were backfilled with drill cuttings. The borehole samples were sealed in airtight plastic containers and transported to Terraprobe's laboratory where the samples were examined by a Senior Geotechnical Engineer. Samples selected for geotechnical testing.



The field work was supervised throughout by members of our engineering staff who arranged for underground service clearances, directed the drilling and sampling operations, logged the boreholes, and cared for the samples obtained. The boreholes were located in the field with respect to existing topographical features. The ground surface elevations at the deeper borehole locations were determined relative to temporary bench marks provided by Stantec Consulting Ltd.

3.0 SUBSURFACE CONDITIONS

The subsurface soil and groundwater conditions encountered in the boreholes are presented on the attached Log of Borehole sheets. The stratigraphic boundaries indicated on the logs of boreholes typically represent a transition from one soil type to another and should not be interpreted to represent exact planes of geological change. The subsurface conditions are confirmed at the borehole locations only, and may vary between and beyond the borehole locations.

3.1 Soil Conditions

The subsurface conditions encountered in the boreholes generally consisted of clayey silt to silty clay (fill) and a topsoil layer overlying native clayey silt (glacial till).

Earth Fill and Topsoil

Surface topsoil layers were encountered in boreholes 201, 313, and 314. In borehole 201, the topsoil layer was underlain by about 1.5m of clayey silt fill. Fill was also encountered in boreholes 313 and 314 to depths of about 0.6 to 0.7m below the existing ground surface. The fill was typically brown, stiff silty clay to clayey silt (occasional localized areas of brown silty sand fill).

A single 'N value' of 11 blows per 0.3m was determined in the Standard Penetration Testing carried out within the fill in borehole 201. The in-situ water content of the sample of fill recovered from borehole 201 was about 29 percent.



Native Clayey Silt (Glacial Till)

All three boreholes penetrated native strata of silty clay and clayey silt (glacial till) beneath the earth fill. Borehole 313 and 314 encountered layers of silty clay till overlying clayey silt till and borehole 201 encountered clayey silt till to the depth explored. The till was typically brown (with some reddish and grey zones), very stiff to hard, and contained some sand and gravel. It should be noted that glacial till is an inherently variable material. The presence of cobbles and boulders within the till deposits at the site is expected.

'N values' of 20 and 33 blows per 0.3m were measured in the silty clay till, typically near the ground surface within the zone of frost penetration. The deeper 'N values' in the clayey silt till ranged from 40 to greater than 100 blows per 0.3m. The natural water content of the silty clay till and clayey silt till were typically about 18 and 10 percent respectively.

3.2 Ground Water Conditions

During the borehole drilling, ground water was encountered in boreholes 201 and 313 at depths of 1.8 and 4.4m respectively or at about elevations 81.3 and 78.8m (open boreholes). At the time of this investigation, ponded surface water was present in the low areas to the north of the existing QEW lanes.

It should be noted that these conditions should not necessarily be interpreted as representing stabilized ground water conditions. Fluctuations in ground water levels will occur due to seasonal variations and precipitation conditions.



PART B - FOUNDATION DESIGN REPORT

4.0 ENGINEERING DISCUSSION AND RECOMMENDATIONS

This section of the report provides our interpretation of the factual data obtained during this investigation and is intended for design purposes only. Comments made with respect to the construction aspects are only provided in as much as they may impact on design considerations. Contractors bidding on or undertaking these works should review the factual information, satisfy themselves as to the adequacy of the information, and make their own interpretation of the data as it affects their construction techniques, equipment selection, scheduling, and the like.

4.1 Building & Weigh Scale Foundations

It is understood that a single storey, slab on grade, administration building will be required as part of the TIS. As presently proposed, the administration building will have a finished floor slab elevation of 85.0m, which is about 2m above the existing ground surface. The proposed roadway grade across the weigh scale beside the building, is about elevation 84.705 m. The proposed foundation elevation of the weigh scale pit is 82.76 m. The existing grade is at about elevation 83.2 m or about 1.5 m below the design final grade. The results of borehole 201 (area of proposed building) indicate that the site is underlain by about 1.6m of earth fill over native glacial till (fill down to about elevation 81.57 m).

Based on the results of borehole 201, it is considered feasible to support the foundations on conventionally designed spread or strip footings bearing in the native undisturbed till strata. All exterior foundations, or foundations in unheated areas should be provided with a minimum soil cover of 1.2 m or equivalent insulation, for frost protection.

Footings which are founded in the native undisturbed clayey silt till at elevation 81.5m or at a depth of about 1.6m below the existing ground surface, may be designed using the following recommended bearing pressures;



- | | | |
|----|---|----------------|
| A. | Factored bearing capacity
at ultimate limit states (Q_s) | 900 kPa (ULS) |
| B. | Bearing capacity at serviceability
limit states; 25 mm (Q_s) | 350 kPa (SLS). |

The minimum foundation widths to be used in conjunction with these design bearing pressures should be about 0.5 m for continuous footings, and 0.8 m for individual footings or drilled caissons.

The following higher design bearing resistance is recommended for foundations below about elevation 80.6m;

- | | | |
|----|---|-----------------|
| A. | Factored bearing capacity
at ultimate limit states (Q_s) | 1,500 kPa (ULS) |
| B. | Bearing capacity at serviceability
limit states; 25 mm (Q_s) | 650 kPa (SLS). |

Prior to pouring concrete for the footings, the footing areas should be cleaned of all deleterious material such as topsoil, fill, softened, disturbed or caved materials, as well as any standing water. If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided.

The coefficient of friction between the concrete footing and the soil subgrade may be taken as 0.6 (unfactored) for assessment of sliding resistance of the footings.

Conventional lightly loaded concrete floor slabs-on-grade for the building should be placed on at least 150 mm thickness of granular base (19 mm clear crushed stone) which will also act as a vapour barrier. The granular base should be placed on undisturbed native soils or earth fill which has been proof-rolled and compacted to a minimum of 95 percent SPMDD. All backfill beneath settlement sensitive areas



(slabs, pavements) should consist of clean earth fill free of organics and should be compacted in thin layers (max. 150 mm thick) to at least 95 percent SPMDD.

The approach slabs to the weigh scales will also be concrete slabs-on-grade construction. All backfill beneath the approach slabs should consist of clean earth fill free of organics and should be compacted in thin layers (max. 150 mm thick) to at least 95 percent SPMDD. The approach slabs should be placed on a granular base at least 300 mm thick and consisting of MTO Granular 'A' (OPSS 1010). The granular base should be placed on undisturbed native soils or earth fill which has been proof-rolled and compacted to a minimum of 95 percent SPMDD. The granular base should be compacted to at least 100 percent SPMDD in lifts 150 mm thick or less.

Foundation walls of some 3m in height will be required if the footings are to be constructed on undisturbed competent bearing native subgrade soils as outlined above. It is understood that the actual foundation bearing pressure for the structure is relatively low. Consideration could be given to constructing an engineered earth fill to support the building foundations, as an alternative to the above design. Construction of the engineered fill should be carried out as outlined below.

To assist in maintaining any building basement areas and the weigh scale pit dry from seepage, it is recommended that exterior grades around the building and weigh scale, be sloped away at a 2 percent gradient or more, for a distance of at least 2 m.

As well, perimeter foundation drains should be provided, consisting of perforated pipe surrounded by a granular filter (min. 15 cm thick) and freely outletting. The granular filter should consist of O.P.S.S. HL 8 Coarse Aggregate. The drains should outlet to a sewer or to a sump pit for pumping.

The basement wall backfill for a minimum lateral distance of 0.6 m out from the wall should consist of free-draining granular material (O.P.S.S. Granular 'B'), or suitable alternative drainage cellular media and drainage is collected by the perimeter foundation drains. Basement walls should be parged and damp-proofed with bituminous compound on the exterior.



4.2 Building & Weigh Scale Foundations on Engineered Fill

As an alternative to deep foundations at elevations of 81.5 m or lower (on native till), the existing earth fill could be sub-excavated and replaced with well compacted "engineered fill" capable of supporting lightly loaded building foundations at elevations of about 83.2 m (1.2 m deep footings).

In preparation for constructing the engineered fill, all of the existing fill and topsoil, and any loosened soil should be excavated. The limits of the excavation should extend beyond the foundation footprint a distance at least equal to the depth of the fill plus 1m. Based on this requirement and assuming an underside of footing elevation at about 83.2m, the engineered fill should extend about 2.6m beyond the actual foundation footprint. The top of the engineered fill should be over-built (should extend up) at least 150 mm above the design foundation elevation. The adequacy of the subgrade strata exposed in the excavation should be verified by a geotechnical engineer prior to placing any fill.

The engineered fill should consist of MTO Granular 'A' (OPSS Form 1010) and should be placed in maximum 150mm thick lifts, with each lift uniformly compacted to at least 98 percent of Standard Proctor Maximum Dry Density (SPMDD). The engineered fill should be placed under the full time direction of the geotechnical engineer. Sufficient in-situ density testing should be carried out during construction to confirm that an adequate degree of compaction has been achieved in the engineered fill.

Conventionally designed spread or strip footings are considered feasible for the engineered fill alternative. The following design bearing resistance is recommended,

- | | | |
|----|---|-----------------|
| A. | Factored bearing capacity
at ultimate limit states (Q_s) | 900 kPa (ULS) ✓ |
| B. | Bearing capacity at serviceability
limit states; 25 mm (Q_s) | 350 kPa (SLS) ✓ |

Foundations constructed on the engineered fill should be provided with reinforcing designed to minimize the effects of post construction differential settlement.



4.3 Foundations for Highway Signs

Based on the results of boreholes 313 and 314, spread footings for highways signs may be founded in the native undisturbed very stiff to hard silty clay till or in the underlying hard clayey silt till at depths of 1m or greater below the existing ground surface. Footings constructed at the above locations, as outlined, may be designed using a recommended bearing resistance of

- | | | |
|----|---|----------------|
| A. | Factored bearing capacity
at ultimate limit states (Q_s) | 900 kPa (ULS) |
| B. | Bearing capacity at serviceability
limit states; 25 mm (Q_s) | 350 kPa (SLS). |

The minimum foundation widths to be used in conjunction with these design bearing pressures should be about 0.5 m for continuous footings, and 0.8 m for individual footings or drilled caissons.

The coefficient of friction between the concrete footing and the soil subgrade may be taken as 0.6 (unfactored) for assessment of sliding resistance of the footings.

In order to achieve the design bearing resistances given above, and to minimize post construction settlement, it is essential that all material at the founding grade which is loosened, softened, or disturbed during construction be removed from the footing excavations. All foundation excavations should be inspected by experienced geotechnical personnel prior to any concrete placement to confirm the design bearing pressures as well as the adequacy of any preparatory work.

The subgrade soils at the site should be regarded as being frost susceptible. At least 1.2m of soil cover should be provided for all exterior footings or for footings in unheated areas. In addition, footings and slabs with less than 1.2m of cover will require heating or insulation during periods of freezing temperatures including during construction.



4.4 Lateral Earth Pressures

The scale pit walls should be backfilled with free-draining granular fill such as OPSS Granular 'A' or 'B'. The granular backfill should be placed in a wedge-shaped zone extending from 1.2 m behind the base of the walls and up a 60° angle to the horizontal. The backfill should be drained by providing perforated or weep holes or drain pipe behind the base of the walls. The outlets should not be subjected to freezing or flooding.

The granular backfill should extend at least 0.6 m out from the structure, with a frost taper.

Heavy compaction equipment should not be used immediately behind the walls within the lateral distance equal to the height of the backfill being compacted. The use of heavy compaction equipment close to the walls may cause deflection or damage.

Provided the granular backfill is used, the following earth parameters are recommended for design in estimating lateral earth pressures on the scale pit walls:

	Granular 'A'	Granular 'B'
Effective Angle of Internal Friction (Unfactored)	35°	30°
Soil unit weight	22.8 kN/m ³	21.2 kN/m ³
Active Earth Pressure		
Co-efficient, K_a SLS	0.27	0.33
ULS	0.36	0.41
At Rest Earth Pressure		
Co-efficient, K_o SLS	0.43	0.50
ULS	0.53	0.58



All fill materials placed beneath roadway and slab areas should be compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD). The fill should be placed in lift thicknesses not exceeding 150 mm.

For backfill consideration of a box, 'at rest' conditions will exist for design of lateral earth pressures. Additional lateral pressures also develop from the backfilling and compaction process. For a fully restrained structure, the recommended design earth pressure coefficients are as follows;

Granular 'A'	Granular 'B'
0.45	0.57

4.5 Septic Tank System

It is understood that a conventional Class IV septic tank system will be required for the staff assigned to the facility. The Septic tank system should be designed as outlined in *The Ontario Building Code 1997 and Ontario Regulation 403/97, Part 8 - Sewage Systems*. The "T" time for the native subgrade soils at the site should be regarded as being greater than 50 (minutes per cm).


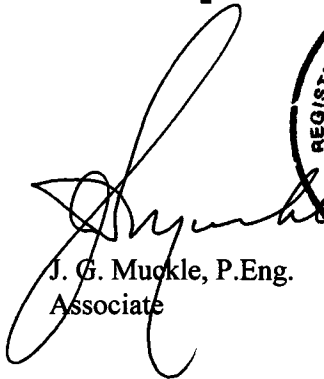


5.0 CLOSURE



We trust that this report is satisfactory for your present requirements. If there is any point requiring further clarification, please do not hesitate to contact our office.

Yours Truly,

Terraprobe Limited



J. G. Muckle, P.Eng.
Associate



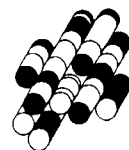
Michael Tanos, P.Eng.
Principal

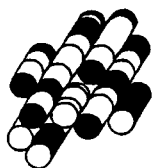
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LOGS OF BOREHOLES

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ABBREVIATIONS, TERMINOLOGY, & GENERAL INFORMATION

Sampling Method

SS - split spoon
ST - shelby tube
AS - auger sample
RC - rock core

Penetration Resistance

Standard Penetration Resistance ('N' values) is defined as the number of blows by a hammer of 63.5kg mass (140lbs) falling freely for a distance of 0.76m (30 inches) required to advance a standard 50mm (2 inch) diameter split spoon sampler for a distance of 0.3m (12 inches).

Dynamic Cone Penetration Resistance is defined as the number of blows by a hammer of 63.5kg mass (140 lbs) falling freely for a distance of 0.76m (30 inches) required to advance a conical steel point of 50mm diameter and with 60 degrees sides of 'A' size drill rods for a distance of 0.3m (12 inches).

Soil Description

Cohesionless Soils

Relative Density	'N' Value
very loose	< 4
loose	4 - 10
compact	10 - 30
dense	30 - 50
very dense	> 50

Cohesive Soils

Consistency	Undrained Shear Strength (kPa)	Soil Composition	% By Weight
very soft	< 12	'trace' (eg. trace silt)	< 10
soft	12 - 25	'some' (eg. some gravel)	10 - 20
firm	25 - 50	'adjective' (eg. sandy)	20 - 35
stiff	50 - 100	'and' (eg. sand and gravel)	35 - 50
very stiff	100 - 200		
hard	> 200		

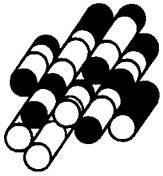
General Information

The recommendations provided in this report are based on the factual information obtained from the boreholes and on the general information provided for the proposed project.

Site investigations by means of boreholes and/or test pit identifies subsurface conditions at the location and time of sampling only. Ground conditions at locations away from the boreholes and test pits may vary.

Recommendations are made by interpretation of this factual data for specific conditions such as size, configuration and location of the proposed project. Changes in project conditions should be reviewed by the Geotechnical consultant as they may affect the recommendations provided.

In order to identify possible changes in ground conditions between the sample locations and their effect on the project, it is recommended that site inspections be carried out during construction by qualified Geotechnical personnel.



Terraprobe

PROJECT No: 993005

CLIENT: Stantec Consulting Ltd.

LOCATION: See Figure 2

LOG OF BOREHOLE 201

BORING DATE: April 5, 1999

ELEVATION DATUM: Geodetic

SAMPLER HAMMER, 63.5kg; DROP, 760mm

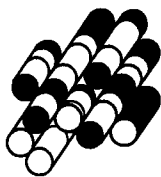
BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES		PENETRATION RESISTANCE PLOT		WATER CONTENT (%)		INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa		WP WL	
							20	40		
0	GROUND SURFACE		83.14							
	FILL Topsoil		0.00 82.92 0.22							
1	FILL Brown, stiff, clayey silt, and topsoil.			1	SS	11				
			81.57 1.57	2	SS	40				
2				3	SS	64				
3	CLAYEY SILT TILL Brown to grey, hard, trace sand, trace gravel, shale fragments.			4	SS	62				
4										
5				5	SS	86				
	END OF BOREHOLE		78.11 5.03							
6										
7										
8										
9										

Bombardier - 125mm Solid Stem Auger

ENC.

NOTES:
Water level upon completion
at elevation 81.31m.

SHEET 1 OF 1



Terraprobe

PROJECT No: 993005

CLIENT: Stantec Consulting Ltd.

LOCATION: See Figure 2

LOG OF BOREHOLE 313

BORING DATE: April 5, 1999

ELEVATION DATUM: Geodetic

SAMPLER HAMMER, 63.5kg; DROP, 760mm

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)				INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WP WL				
							20	40	60	80	10	20	30		
Bombardier - 125mm Solid Stem Auger	0	GROUND SURFACE	83.17												
		FILL Topsoil	0.00												
		FILL	0.10												
		Brown, silty sand.													
			82.57												
			0.60												
	1	SILTY CLAY TILL		1	SS	33									
		Brown, hard, trace sand, trace gravel.	81.82												
			1.35												
				2	SS	50/100									
2															
				3	SS	50/100									
3	CLAYEY SILT TILL														
	Brown to reddish-brown, very dense, trace clay, some sand, occasional cobbles, possible boulders.			4	SS	50/125									
4															
			78.87												
			4.30												
5	SAND & GRAVEL			5	SS	78									
	Brown to grey, very dense, trace shale fragments.		78.14												
	END OF BOREHOLE		5.03												
6															
7															
8															
9															

ENC.

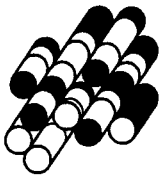
NOTES:

Water level upon completion at elevation 78.75m.

SHEET 1 OF 1

ENC.
▼

NOTES:
Water level upon completion at elevation 78.75m.



Terraprobe

PROJECT No: 993005

CLIENT: Stantec Consulting Ltd.

LOCATION: See Figure 2

LOG OF BOREHOLE 314

BORING DATE: April 5, 1999

ELEVATION DATUM: Geodetic

SAMPLER HAMMER, 63.5kg; DROP, 760mm

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT		WATER CONTENT (%)		INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa		WL		
							20 40 60 80	10 20 30			
0	GROUND SURFACE		83.94								
	FILL Topsoil		0.00								
	FILL		0.15								
	Brown, silty clay, trace gravel.										
1	SILTY CLAY TILL		83.24 0.70	1	SS	20					
	Brown, very stiff, trace gravel.										
2			82.54 1.40	2	SS	58					
3	CLAYEY SILT TILL			3	SS	56/150					
	Brown to red to grey, hard, trace sand, trace gravel.										
4				4	SS	50/125					
5	END OF BOREHOLE		79.22 4.72	5	SS	54/150					
6											
7											
8											
9											

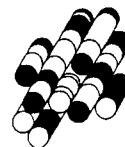
Bombardier - 125mm Solid Stem Auger

NOTES:
Borehole dry upon completion.

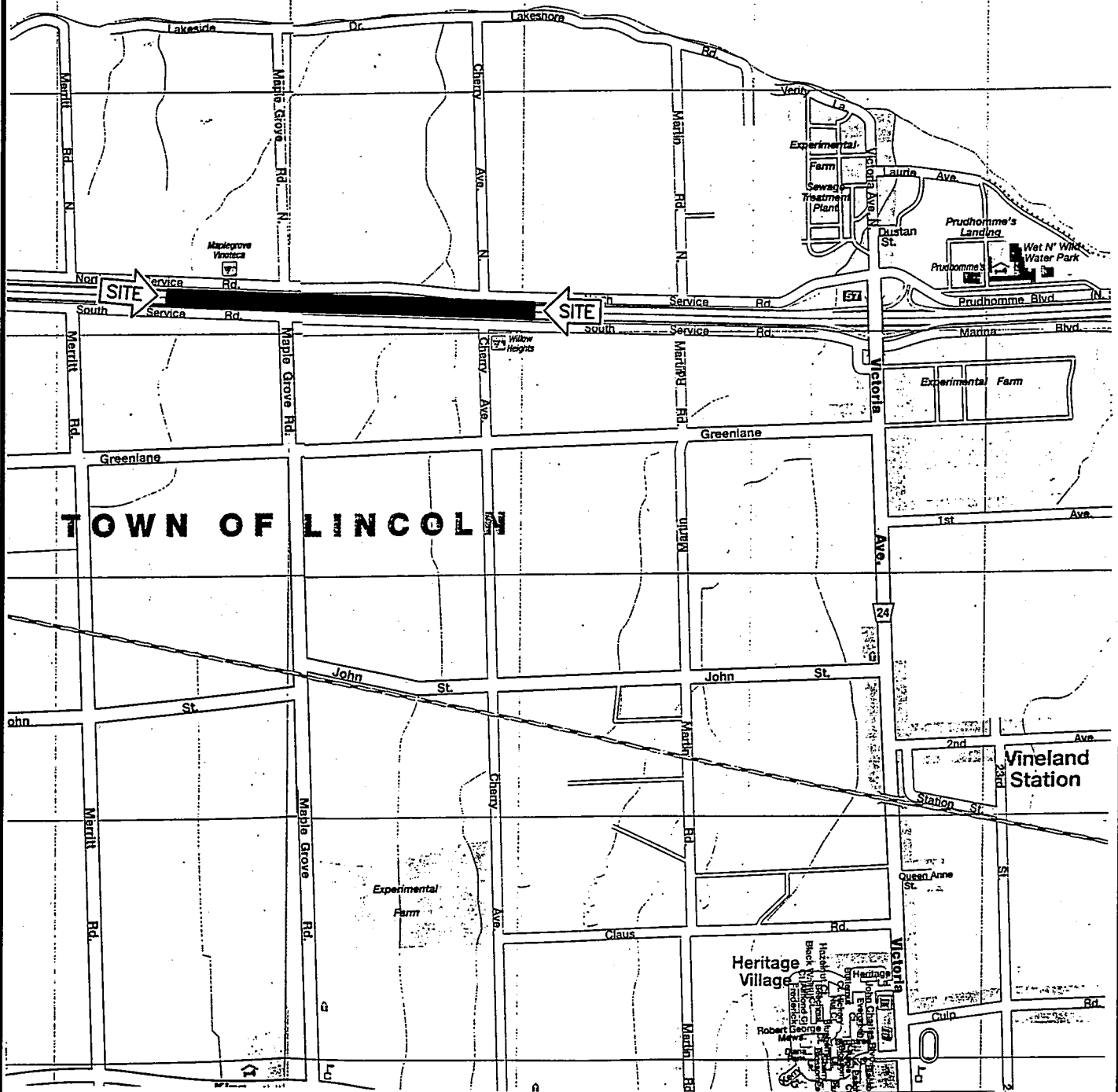
SHEET 1 OF 1

FIGURES

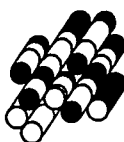
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LAKE ONTARIO



KEY PLAN VINELAND, ONTARIO



Terraprobe

D.M. SERAFIN

Job no.: 993005

Scale: N.T.S.

Date: May, 1999

FIGURE 1

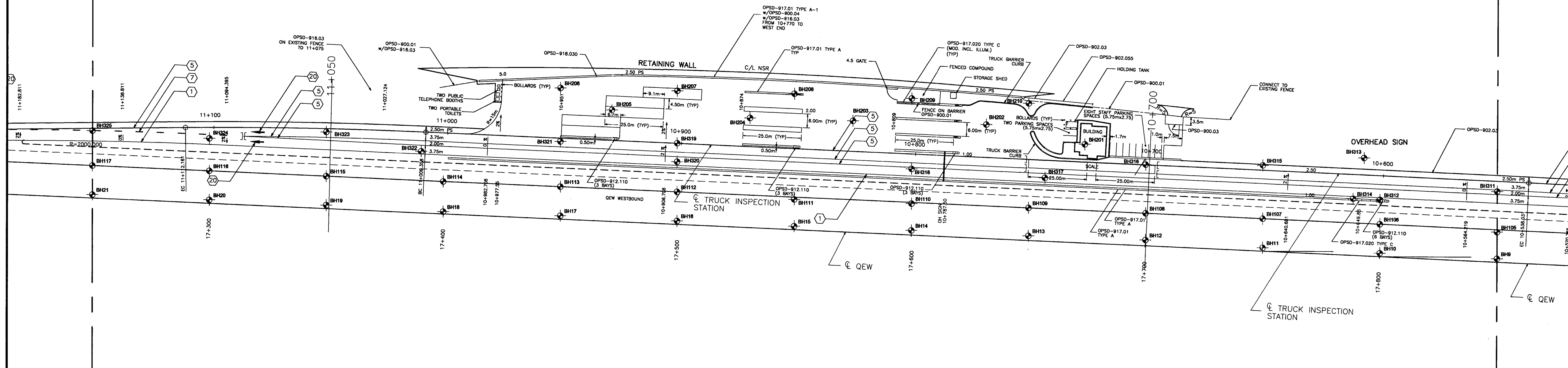
See Figure 2 of 4

Match Line 11+150



Match Line 10+550

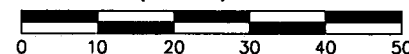
See Figure 4 of 4



LEGEND:

location of borehole

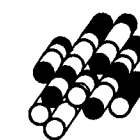
SCALE: (in metres)



NOTES:

All locations and scales are approximate.

**LOCATION PLAN
VINELAND, ONTARIO**



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Job no.: 993005 -2

Scale: as noted

Date: May, 1999

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FIGURE 2