GEOSYNTEC CONSULTANTS

COMPUTATION COVER SHEET

Client: Honeywell **Project:** Onondaga Lake ILWD Stability **Project/Proposal #:** GD4014 **Task #:** 02

TITLE OF COMPUTATIONS **LIQUEFACTION POTENTIAL ANALYSES AND THE ADDENDUM**

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Client:	**Honeywell**	Project:	**Onondaga Lake ILWD Stability**	Project/ Proposal No.:	**GJ4204**	Task No.:	**01**

SUMMARY OF SUBSURFACE STRATIGRAPHY AND MATERIAL PROPERTIES

1. INTRODUCTION

This "*Summary of Subsurface Stratigraphy and Material Properties*" package (referred to as the Data Package) was prepared in support of the stability evaluation of the In-Lake Waste Deposit (ILWD). Specifically, the purpose of the package is to provide:

- a summary of the site investigation activities conducted in the ILWD area to date;
- interpretation of subsurface stratigraphy in the ILWD area;
- interpretation of material properties (i.e., index properties, shear strength, and compressibility); and
- recommendation on material properties to be used for the stability evaluation of the ILWD area.

2. SITE INVESTIGATIONS

The ILWD area, which is adjacent to Wastebed B (WB-B), consists mainly of the area identified as Sediment Management Unit 1 (SMU 1) with limited portions of SMU 2, SMU 7, and SMU 8 (Figure 1). Extensive pre-design investigations (PDIs) were conducted in the ILWD area to characterize the subsurface conditions. These investigations included the Phase I PDI in 2005, the Phase II PDI in 2006, the Phase III PDI in 2007, and the DNAPL investigation in 2006 and 2007. Figure 2 shows the locations of soil borings drilled during the investigations. Details of the investigations were presented in the data summary reports prepared by Parsons [Parsons, 2007a, 2007b, 2009a, and 2009b].

3. SUBSURFACE STRATIGRAPHY

The subsurface stratigraphy in the ILWD area was developed based on the geotechnical information interpreted from the boring logs. Subsurface profiles at eight selected cross sections (Figure 2) are shown in Figures 3 through 10. Sections 1 through 5 represent the overall general cross sections with average slopes of about 3 to 5 degrees (i.e., 19 horizontal to 1 vertical [19H:1V] to 11H:1V) and Sections 6 through 8 represent the steeper localized cross sections with average slopes of about 20 to 27 degrees (i.e., 2.7H:1V to 2H:1V). Attachment 1 of this package provides a detailed description of how the subsurface profiles were developed.

As shown in the above cross sections, the subsurface soil in the ILWD area consists primarily of seven strata:

- Stratum I – Solvay Waste (SOLW): SOLW encountered in the ILWD area was described in the boring logs as wet, very soft, gray to dark gray, silt-like grains with mothball odor. The reported standard penetration test (SPT) N value of SOLW in the ILWD area ranges mainly from 0 to 7 (with most of the values being 0). The thickness of SOLW ranges between approximately 15 ft and 55 ft in the ILWD area.
- Stratum II – Marl: Marl encountered in the ILWD area was described in the boring logs as wet, very soft, dark gray or brown silt with shells. The reported SPT N value of Marl in the ILWD area ranges mainly from 0 to 4 (with most of the values being 0). The thickness of Marl varies from 0 ft to approximately 50 ft in the ILWD area.
- Stratum III – Silt and Clay: Silt and Clay encountered in the ILWD area was described in the boring logs as wet, very soft, dark gray or brown mixture of silt and clay. The reported SPT N value of Silt and Clay in the ILWD area is mainly 0. Only a limited number of deep borings in the ILWD area penetrated the bottom of Silt and Clay layer and the thickness of Silt and Clay was reported to be about 20 ft to 80 ft. Based on available information from the deep borings and the other relatively shallow borings, it was estimated that the thickness of Silt and Clay in the ILWD area is at least 15 ft.
- Stratum IV – Silt and Sand: Silt and Sand were encountered in several deep borings in the ILWD area. The SPT N value of Silt and Sand ranges typically from approximately 20 to 80 as reported in the boring logs.
- Stratum V – Sand and Gravel: Sand and Gravel were encountered in several deep borings in the ILWD area. The typical SPT N value for Sand and Gravel ranges from approximately 20 to greater than 100 as reported in the boring logs.
- Stratum VI – Till: Till was encountered in several deep borings in the ILWD area. The SPT N value for Till is typically greater than 100.
- Stratum VII – Shale: Shale was encountered in several deep borings in the ILWD area. The SPT N value for Shale is typically greater than 100.

In addition to the above seven strata, isolated pockets of thin layers of silt were also noticed on top of SOLW in the ILWD area.

Figure 11 shows the historic lake water level. The lake water level was estimated to be at Elevation 363 ft above mean sea level for the purpose of the ILWD stability evaluation.

4. MATERIAL PROPERTIES

Properties of the subsurface soils were selected based on laboratory data or empirical correlations using in-situ test data when laboratory data were not available. Samples of SOLW, Marl, and Silt and Clay were collected during the investigations for laboratory testing, which included:

- Index property tests (i.e., water content, grain size, organic content, carbonate content, Atterberg limits, specific gravity, and density); and
- Performance tests (i.e., unconsolidated undrained (UU) triaxial compression tests, consolidated undrained (CU) triaxial compression tests with porewater pressure measurement, and one-dimensional consolidation tests).

Summary tables of the laboratory test results for Phase I, Phase II, Phase III, and DNAPL investigations were provided to Geosyntec by Parsons and are presented in Attachment 2 of this package. It is noted that the summary tables include data from SMU 1, SMU 2, and SMU 8. However, only the data from SMU 1 (unless specified otherwise) were considered for the ILWD stability evaluation because: (i) the ILWD area consists of only a small portion of SMU 2; and (ii) the stability evaluation is mainly focused on SMU 1 where the lake bottom slope is steeper than in SMU 8.

4.1 INDEX PROPERTIES

The fines (including clay and silt) content was measured in the laboratory index property tests during all four investigations. The carbonate and organic contents were also measured in the laboratory index property tests except during the Phase II investigation. The fines, carbonate, and organic contents were plotted together as a function of depth in Figure 12. Hydrometer tests were performed during the Phase I, Phase II, Phase III, and DNAPL investigations to further measure the clay content (particle size less than 0.002 mm). Based on the lab results, the clay content typically ranges from 5% to 30% for SOLW, from 20% to 43% for Marl, and from 14% to 50% for Silt and Clay. The average clay content was calculated to be 14%, 30%, and 30% for SOLW, Marl, and Silt and Clay, respectively.

The water content and Atterberg limits (i.e., plastic limit and liquid limit) were measured in the laboratory index property tests and were plotted together as a function of depth in Figure 13. Based on the measured water content and Atterberg limits, the plasticity index and liquidity index were calculated and plotted with respect to depth in Figures 14 and 15, respectively. The laboratory data were also plotted in Casagrande's plasticity chart shown in Figure 16.

The unit weights of SOLW, Marl, and Silt and Clay were measured in the laboratory index property tests except during the Phase II investigation when only disturbed sampling was performed. The results are summarized in Table 1 and also plotted in Figure 17 as a function of depth. The calculated average total unit weights recommended for the ILWD stability analysis are 81 pcf, 98 pcf, and 108 pcf for SOLW, Marl, and Silt and Clay, respectively. The unit weight of the isolated silt pockets was assumed to be the same as Marl. The unit weights of the other subsurface soils (i.e., Silt and Sand, Sand and Gravel, Till, and Shale) were assumed to be 120 pcf.

4.2 CONSOLIDATION PARAMETERS

One-dimensional consolidation tests were performed during Phase I and Phase II investigations. The results of the preconsolidation pressures ($p_c^{'}$) of SOLW, Marl, and Silt and Clay were plotted with respect to depth in Figure 18. As a comparison, data from adjacent SMU 2 were also plotted in the figure. The profile of the in-situ vertical effective stress was calculated and plotted in the same figure. The assumed representative subsurface profile in the ILWD area shown in Figure 19 was used in the calculation of the in-situ vertical effective stress. It was assumed in the representative subsurface profile that the thickness of SOLW, Marl, and Silt and Clay is 30 ft, 10 ft, and 30 ft, respectively.

The overconsolidation ratio (*OCR*), which is the ratio of $p_c^{'}$ to the in-situ vertical effective stress, was calculated and plotted in Figure 20 as a function of depth. Figure 20 includes both SMU 1 and SMU 2 data. Based on the plot, material above 30 ft, which consists mainly of SOLW, was considered to be overconsolidated and material below 30 ft, which consists mainly of Marl and Silt and Clay, was considered to be normally consolidated. The *OCR* of SOLW was observed to vary from 1.6 to 8.2, with an average of about 4.7. An OCR value of 2.0 was selected, which is slightly higher than the lower bound of 1.6 but well below the average value of 4.7, to conservatively estimate undrained shear strengths from CU test results, as presented in the next section.

4.3 UNDRAINED SHEAR STRENGTH

Undrained shear strength (S_u) properties of SOLW, Marl, and Silt and Clay were interpreted from UU and CU tests performed as part of the Phase I, Phase III, and DNAPL investigations.

4.3.1 Interpretation of Undrained Shear Strength from UU Tests

The S_u values of SOLW, Marl, and Silt and Clay measured from the UU tests were plotted with respect to depth in Figure 21. The mean and standard deviation of the S_u were calculated and summarized in Table 2 for SOLW, Marl, and Silt and Clay. As presented in the table, the calculated average S_u of SOLW, Marl, and Silt and Clay is 247 psf, 354 psf, and 350 psf, respectively.

4.3.2 Interpretation of Undrained Shear Strength from CU Tests

During CU tests, a soil sample is usually trimmed into three specimens, and each specimen is tested under a different initial confining stress. The initial effective confining stress applied in each test should be greater than the effective overburden stress in the ground where the sample was collected to compensate for the effect of any disturbance. The S_u measured in each CU test corresponds to the initial effective confining stress applied to the specimens rather than the in-situ effective overburden stress the specimens were subjected to in the field. Therefore, the measured S_u from each CU test can not be used directly in analysis. However, a relationship between the S_u in the field and the S_u established from the CU test results can be used to calculate the "in-situ" S_u as explained below:

- Approach 1 – The undrained shear strength ratio defined as s_u / σ'_{ci} can be calculated from CU test results, where S_u is the undrained shear strength measured in the laboratory and is equal to one half of the peak deviator stress, and σ'_{ci} is the initial effective confining stress applied in the CU test. The calculated s_u / σ'_{ci} is then corrected for the overconsolidation effect by multiplying by a factor of $OCR^{0.8}$, if the sample is overconsolidated [Kulhawy and Mayne, 1990]. The s_u / σ'_{ci}, or the corrected s_u / σ'_{ci} if soil is overconsolidated, can be applied directly to a slope stability analysis program. The program will calculate the effective stress for each slice and then assign appropriate S_u based on the undrained shear strength ratio.
- Approach 2 – A best-fit straight line that passes through the origin can be developed to represent the relationship between S_u and σ'_{ci} for each specimen based on the CU tests, as illustrated in Figure 22. In this example using this best-fit line, the "in-situ" S_u for the sample can be established as the strength that corresponds to the in-situ overburden effective stress, $\sigma'_{v,in-situ}$ (see Figure 22), which is calculated according to the subsurface profile where the sample was collected. The calculated S_u is then corrected for the overconsolidation effect by multiplying by a factor of $OCR^{0.8}$, if the sample is overconsolidated [Kulhawy and Mayne, 1990].

The undrained shear strengths were interpreted from the CU test results using both approaches:

Approach 1 -- Undrained Shear Strength Ratio

The undrained shear strength ratio was calculated for each test based on the summary tables of the CU test results provided by Parsons. Figures 23, 24, and 25 present the plots of the undrained shear strength ratio versus the effective confining stress for SOLW, Marl, and Silt and Clay, respectively. The undrained shear strength ratios of SOLW presented in Figure 23 were not corrected for the overconsolidation effect (i.e., the factor of $OCR^{0.8}$ was not applied). The undrained shear strength ratio ranges mainly from 0.2 to 1.2 for SOLW, 0.25 to 0.65 for Marl, and 0.25 to 0.6 for Silt and Clay.

It should be noted that specimens that were tested in an overconsolidated stress state (i.e., the initial effective confining stress in the laboratory is less than the in-situ effective overburden stress) and specimens with abnormal results (i.e., laboratory test report shows abnormal behavior of the stress-strain relation) were removed from the plots for SOLW, Marl, and Silt and Clay. The intent of removing data for specimens that were tested in an overconsolidated stress state is to remove data for which overconsolidation was artificially created in the lab, rather than limiting the data to normally consolidated samples. An example of this situation is shown in Figure 26 for the Silt and Clay samples, where the test results removed from the data set are circled. The in-situ effective overburden stresses were calculated based on the assumed representative subsurface profiles in the ILWD area illustrated in Figure 19. The calculated in-situ effective stress was compared to the initial effective confining stress in the laboratory to identify the overconsolidated samples.

Approach 2 -- Undrained Shear Strength as a Function of Depth

Using Approach 2 described before and illustrated in Figure 22, the in-situ effective overburden stress calculated using the assumed representative subsurface profile in Figure 19 was used to establish the "in-situ" S_u for each sample. The resulting S_u is plotted with respect to the sample depth in Figure 27. The mean and standard deviation of the interpreted S_u from the CU tests are summarized in Table 2. As presented in the table, the calculated average S_u is 140 psf, 492 psf, and 612 psf for SOLW, Marl, and Silt and Clay, respectively. Because SOLW is overconsolidated, the average S_u of SOLW was adjusted by a factor of $OCR^{0.8}$ with OCR being 2.0 as discussed before. The adjusted S_u for SOLW was calculated to be approximately 240 psf. It is noticed that the S_u of Marl and Silt and Clay increases with depth. A line with $s_u / \sigma_v' = 0.35$ was found to fit the S_u data well for Marl and Silt and Clay.

4.3.3 Recommended Undrained Shear Strength for Design

Comparison of S_u interpreted from UU and CU test results is shown in Figure 28. In general, S_u from CU tests are close to S_u from UU tests for SOLW and Marl at shallow depths, and S_u from CU tests are greater than S_u from UU tests for Marl and Silt and Clay at deep depths. This observation is consistent with the evidence found in literature [e.g., Sabatini et al., 2002], where UU tests tend to underestimate the actual shear strength for samples collected at depths greater than 6 m (or 18 ft) for normally consolidated samples and greater than 12 m (or 36 ft) for overconsolidated soils.

Based on the interpretation results, it is recommended that the adjusted average S_u of SOLW from the CU tests, which was calculated to be 240 psf, be used for the ILWD stability analysis. It is also recommended that the undrained shear strength ratio of 0.35 be used for Marl and Silt and Clay because their S_u appears to increase with depth. For the liquefaction analysis, an undrained shear strength ratio of 0.35 is recommended for the SOLW. This value is considered conservative because it is not adjusted to account for overconsolidation.

4.4 DRAINED SHEAR STRENGTH

The effective stress friction angles (ϕ') of SOLW, Marl, and Silt and Clay were estimated based on the CU test results. The ϕ' was calculated using the effective stress Mohr circle at failure for each CU test as illustrated in Figure 29. The calculated ϕ' is plotted in Figure 30 as a function of the effective normal stress for SOLW, Marl, and Silt and Clay. The mean value and the standard deviation of the ϕ' for SOLW, Marl, and Silt and Clay are summarized in Table 3. As shown in Figure 30, there is considerable scatter in the data for the near surface material (i.e., at low effective normal stress). It is unknown if the scatter is due to material variability or difficulty in testing at low normal stresses. For this reason, it is recommended that the "Mean minus one standard deviation or slightly lower" values of the ϕ' be used at low effective normal stresses for SOLW in the ILWD stability analysis, which was calculated to be 37 degrees. It is noted that the standard deviation for the deeper materials, primarily Marl and Silt and Clay layers, indicates less scatter than for the near surface materials. While it may be appropriate to use the mean value, the mean minus standard deviation was used for consistency, which was calculated to be 32 degrees and 30 degrees for Marl and Silt and Clay, respectively.

Initial slope stability analyses were performed using mean and standard deviation values calculated from the initial data that was available. When more data (i.e., Phase III data) became available, the values were recalculated. Since the recalculated mean values were greater than or equal to the initial values and the standard deviations were less than or equal to the initial values, the slope stability analyses were not updated because the original strength values were considered to be conservative. This is the rationale behind the term *"Mean minus one standard deviation or slightly lower"*.

An empirical relation between ϕ' and SPT N value, as shown in Table 4 [Kulhawy and Mayne, 1990], was used to estimate ϕ' of Silt and Sand, Sand and Gravel, Till, and Shale. Using an estimated average SPT N value of 30 for Silt and Sand and Sand and Gravel, their ϕ' was conservatively estimated to be 32 degrees. The ϕ' of Till and Shale was estimated to be 40 degrees as their SPT N values are typically greater than 100.

4.5 SUMMARY OF RECOMMENDED MATERIAL PROPERTIES

The material properties (i.e., unit weight and undrained and drained shear strengths) recommended for the ILWD stability analysis are summarized in Table 5.

5. REFERENCES

Kulhawy, F.H. and Mayne, P.W. (1990). "Manual on Estimating Soil Properties for Foundation Design", EPRI EL-6800, Project 1493-6, August 1990.

Parsons (2007a). "Onondaga Lake Pre-Design Investigation Phase I Data Summary Report", March 2007.

Parsons (2007b). "Draft Willis-Semet Interim Remedial Measure Causeway DNAPL Investigation", December 2007.

Parsons (2009a). "Draft Onondaga Lake Pre-Design Investigation Phase II Data Summary Report", 2009.

Parsons (2009b). "Draft Onondaga Lake Pre-Design Investigation Phase III Data Summary Report", 2009.

Sabatini P.J., Bachus, R.C., Mayne, P.W., Schneider, J.A., and Zettler, T.E. (2002). " Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties", FHWA-IF-02-034, Federal Highway Administration, Washington, DC, April 2002.

TABLES

Table 1. Summary of measured total unit weight

Material	Average value (pcf)	Standard Deviation (pcf)
SOLW	81	6
Marl	98	9
Silt and Clay	108	9

Note:
See Table 5 for the final recommended material properties to be used for the ILWD stability analysis.

Table 2. Summary of measured/interpreted undrained shear strength

Material	Based on UU tests		Based on CU tests		
	Mean	Standard Deviation	Mean	Standard Deviation	Mean adjusted for overconsolidation
SOLW	247	149	140	44	244
Marl	354	127	492	166	$S_u/\sigma_v' = 0.35$
Silt and Clay	350	136	612	183	$S_u/\sigma_v' = 0.35$

Note:
See Table 5 for the final recommended material properties to be used for the ILWD stability analysis.

Table 3. Summary of interpreted effective friction angle from CU tests

Material	Mean (degrees)	Standard deviation (degrees)	Mean – Standard deviation (degrees)
SOLW	48	8	40
Marl	39	6	33
Silt & Clay	36	6	30

Note:
See Table 5 for the final recommended material properties to be used for the ILWD stability analysis.

Table 4. Empirical relation between friction angle and SPT N value

N Value (blows/ft or 305 mm)	Relative Density	Approximate $\bar{\phi}_{tc}$ (degrees) (a)	(b)
0 to 4	very loose	< 28	< 30
4 to 10	loose	28 to 30	30 to 35
10 to 30	medium	30 to 36	35 to 40
30 to 50	dense	36 to 41	40 to 45
> 50	very dense	> 41	> 45

a - Source: Peck, Hanson, and Thornburn (12), p. 310.
b - Source: Meyerhof (13), p. 17.

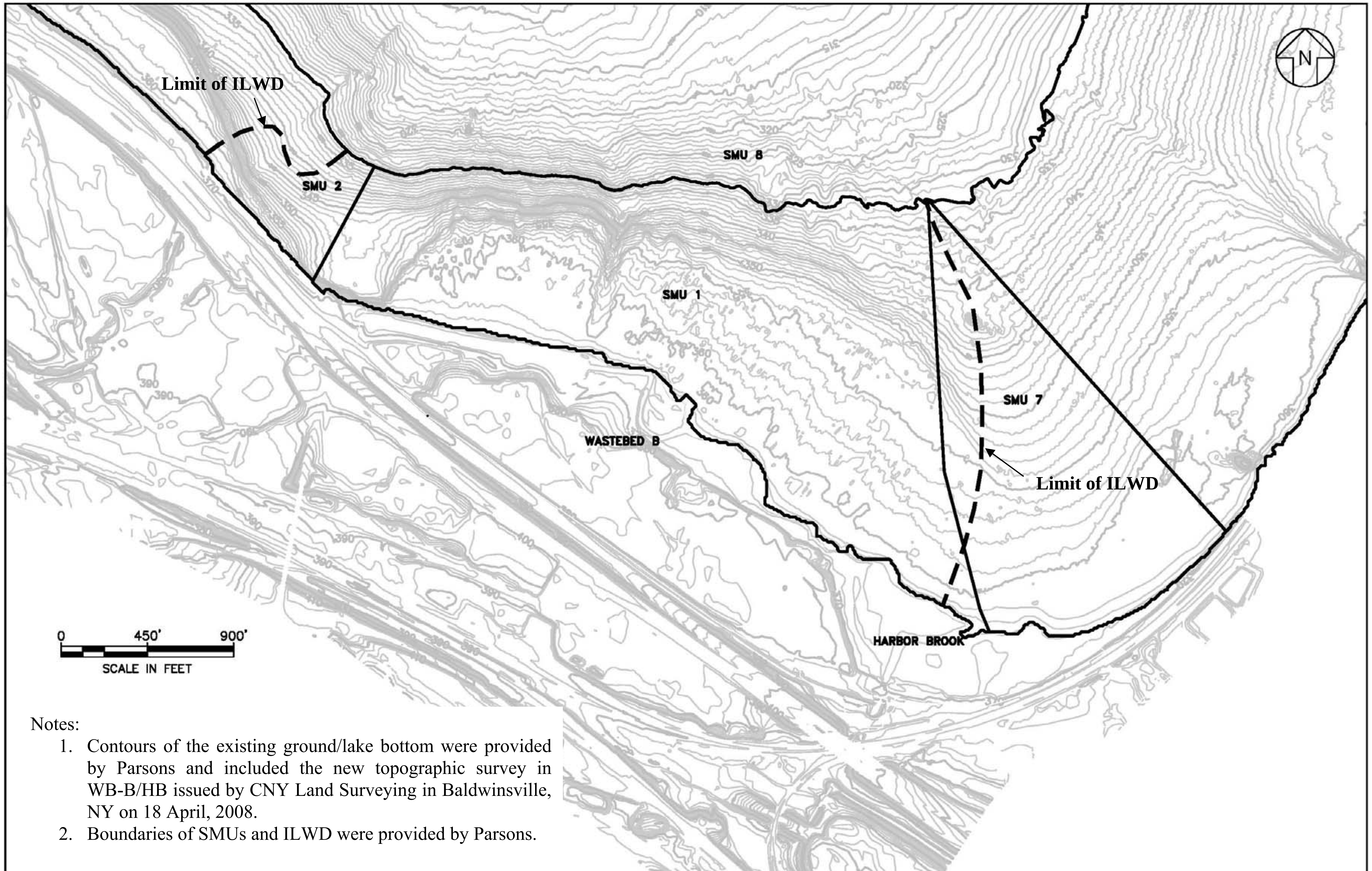
Table 5. Material properties recommended for the ILWD slope stability analysis

Material	Total Unit Weight (pcf)	Drained Shear Strength		Undrained Shear Strength[1] (psf)	
		c’	ϕ’	From UU	From CU
Silt[2]	98	0	32	N/A[3]	N/A
SOLW	81	0	37[4]	245	240[5]
Marl	98	0	32[6]	350	$S_u/\sigma'_v = 0.35$[7]
Silt and Clay	108	0	30	350	$S_u/\sigma'_v = 0.35$[7]
Silt and Sand	120	0	32	N/A	N/A
Sand and Gravel	120	0	32	N/A	N/A
Till	120	0	40	N/A	N/A
Shale	120	0	40	N/A	N/A

Notes:

1. Undrained shear strength obtained from CU tests is recommended to be used for the ILWD stability analysis for undrained loading conditions. Values of the undrained shear strength were rounded down to the nearest 5 or 10.
2. Properties of Marl were used for the isolated Silt on top of SOLW.
3. N/A = Not Applicable
4. As presented in Table 3, the “mean minus one standard deviation” value for SOLW is 40 degrees. However, based on initially available data, a value of 37 degrees was calculated and used in slope stability analyses. Because it is conservative, the recommended shear strength value was not changed to 40 degrees after the new data became available.
5. Undrained shear strength of SOLW from CU tests has been adjusted by multiplying a factor of $OCR^{0.8}$ (with OCR being 2.0) to account for the overconsolidation effect.
6. As presented in Table 3, the “mean minus one standard deviation” value for Marl is 33 degrees. However, based on initially available data, a value of 32 degrees was calculated and used in slope stability analyses. Because it is conservative, the recommended shear strength value was not changed to 33 degrees after the new data became available.
7. The laboratory undrained shear strength data of Marl and Silt and Clay shows a trend of increase with depth. An undrained shear strength ratio of 0.35 was found to fit the data well.

FIGURES



Notes:
1. Contours of the existing ground/lake bottom were provided by Parsons and included the new topographic survey in WB-B/HB issued by CNY Land Surveying in Baldwinsville, NY on 18 April, 2008.
2. Boundaries of SMUs and ILWD were provided by Parsons.

Figure 1. ILWD site layout

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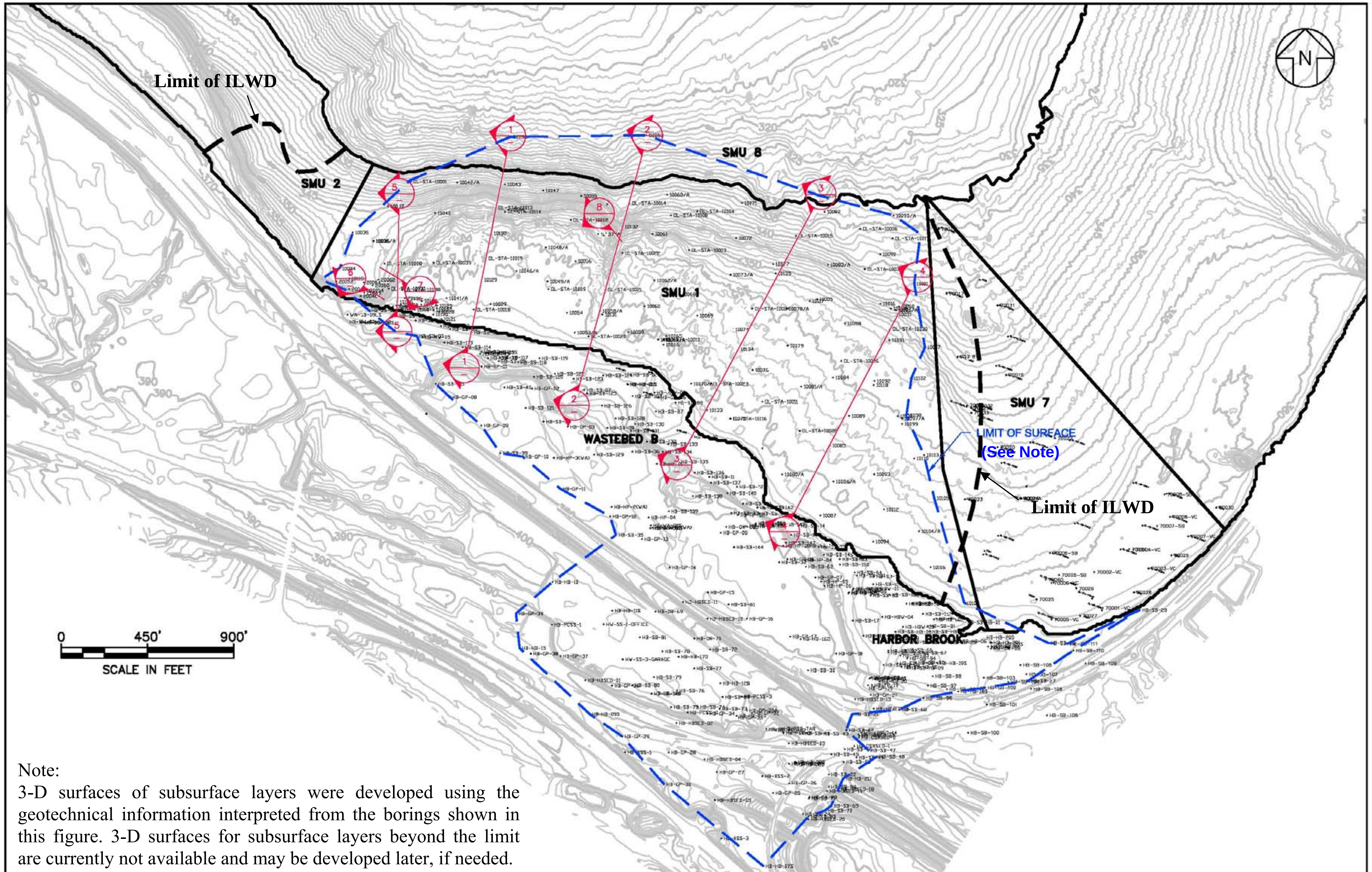

Figure 2. Locations of borings and selected cross sections

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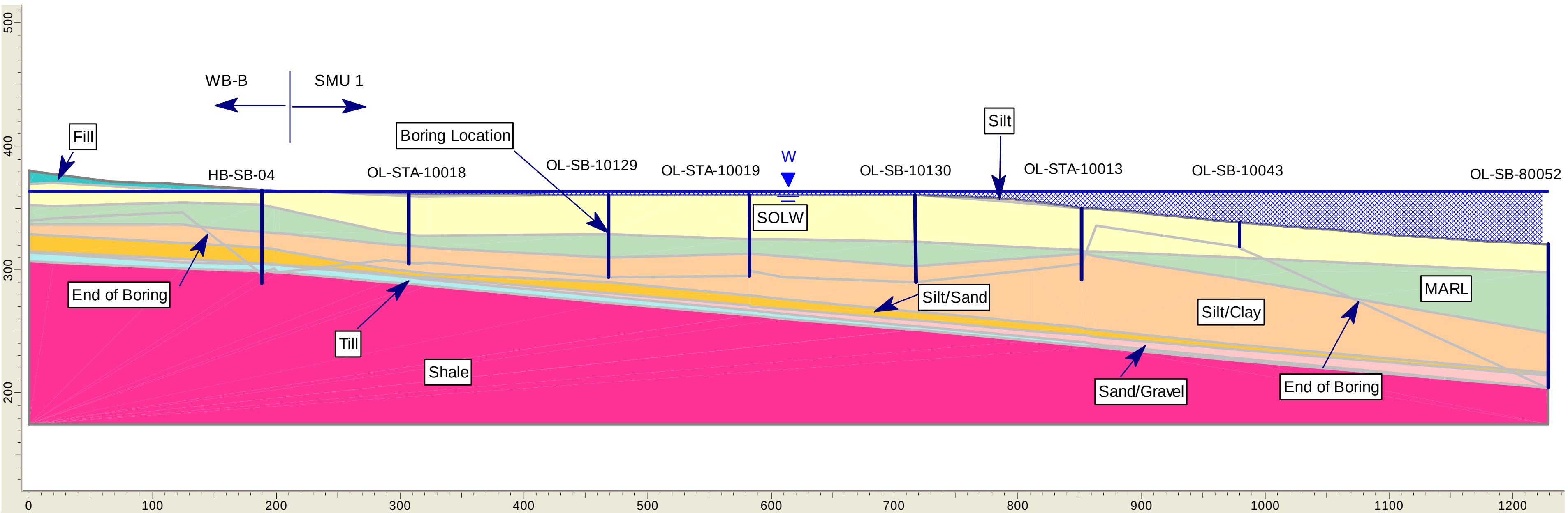

Figure 3. Geometry of cross section 1

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. Borings HB-SB-04 and OL-STA-10013 are offset from the cross section line. Therefore, the end of the boring shown in the figure does not match the line of end of boring for these two borings.
3. Subsurface layer elevations above the end of boring at the boring locations shown in the figure were checked and found to match well with the available elevations reported in the boring logs.

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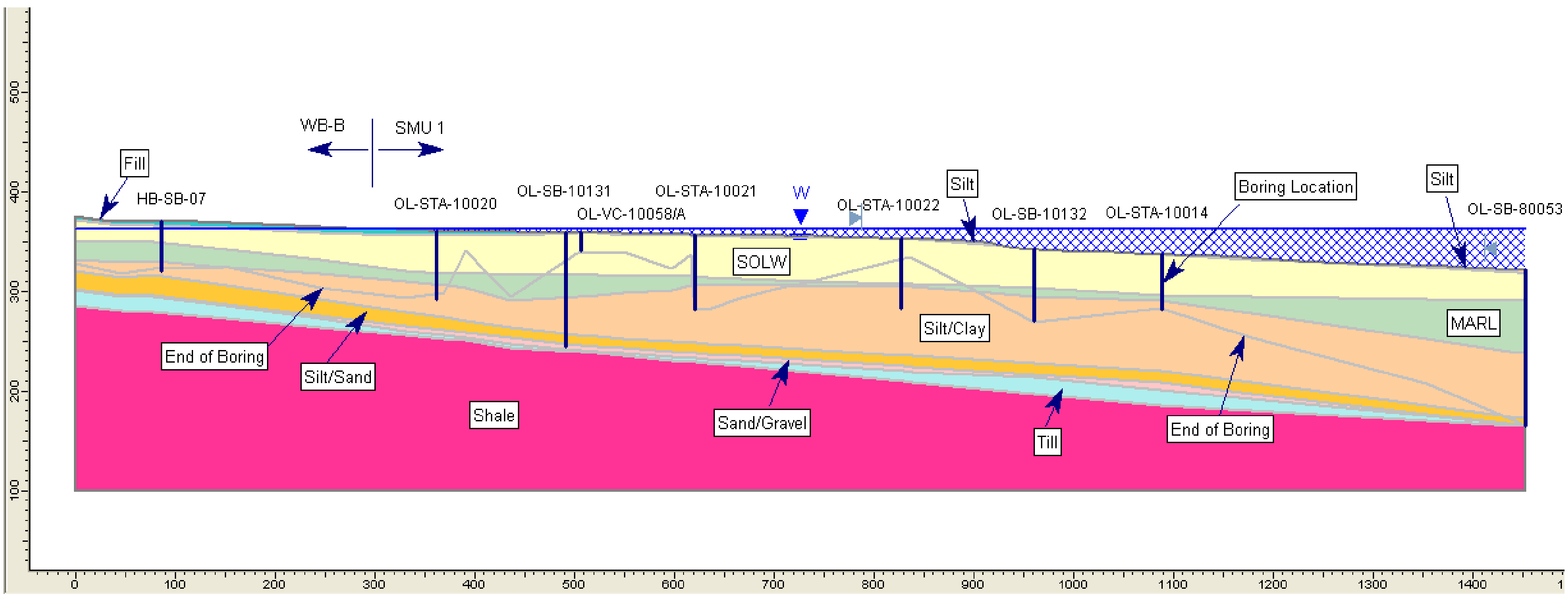

Figure 4. Geometry of cross section 2

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. Borings OL-SB-10131 and OL-STA-10022 are offset from the cross section line. Therefore, the end of the boring shown in the figure does not match the line of end of boring for these two borings.
3. Subsurface layer elevations above the end of boring at the boring locations shown in the figure were checked and found to match well with the available elevations reported in the boring logs.

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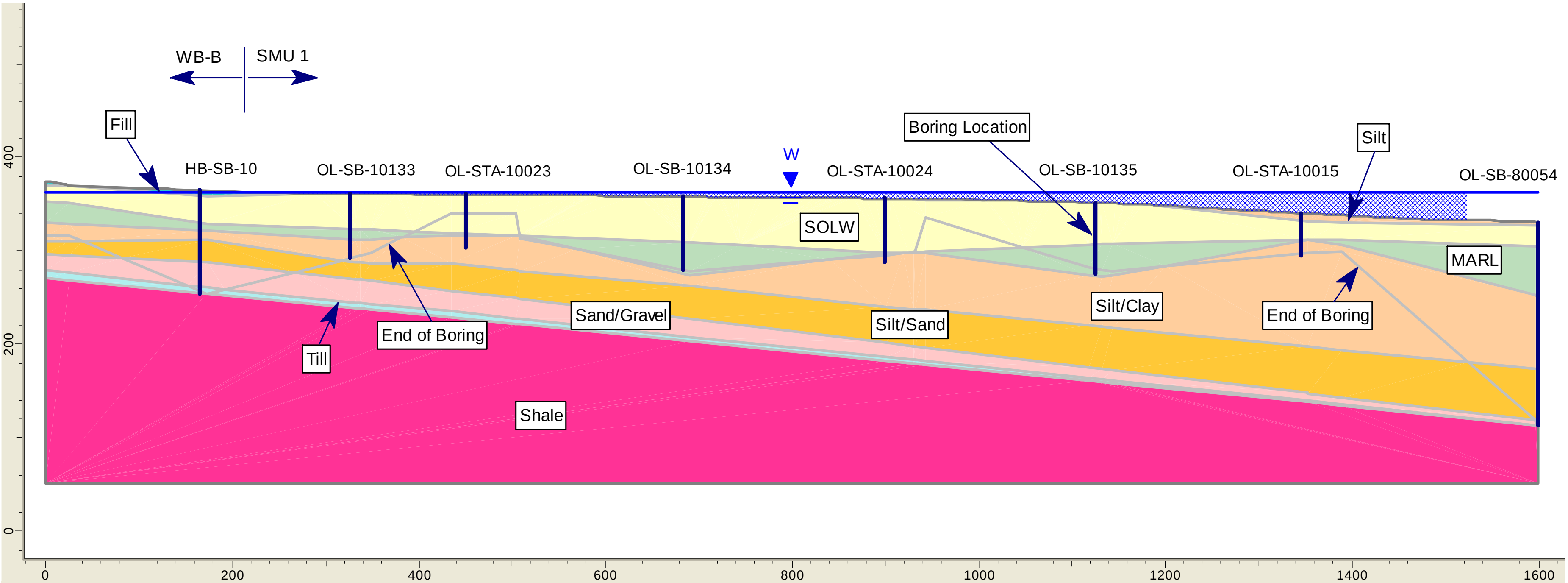

Figure 5. Geometry of cross section 3

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. Boring OL-STA-10023 is offset from the cross section line. Therefore, the end of the boring shown in the figure does not match the line of end of boring for this boring.
3. Subsurface layer elevations above the end of boring at the boring locations shown in the figure were checked and found to match well with the available elevations reported in the boring logs.

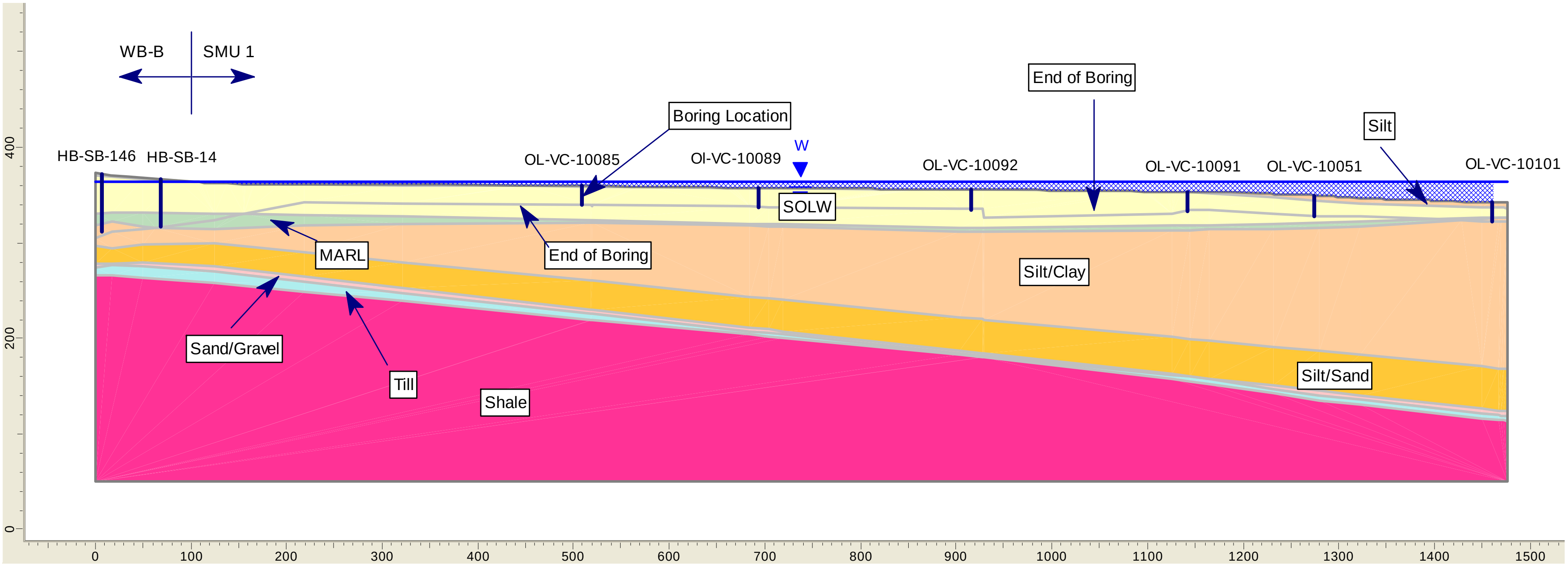

Figure 6. Geometry of cross section 4

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. Subsurface layer elevations above the end of boring at the boring locations shown in the figure were checked and found to match well with the available elevations reported in the boring logs.

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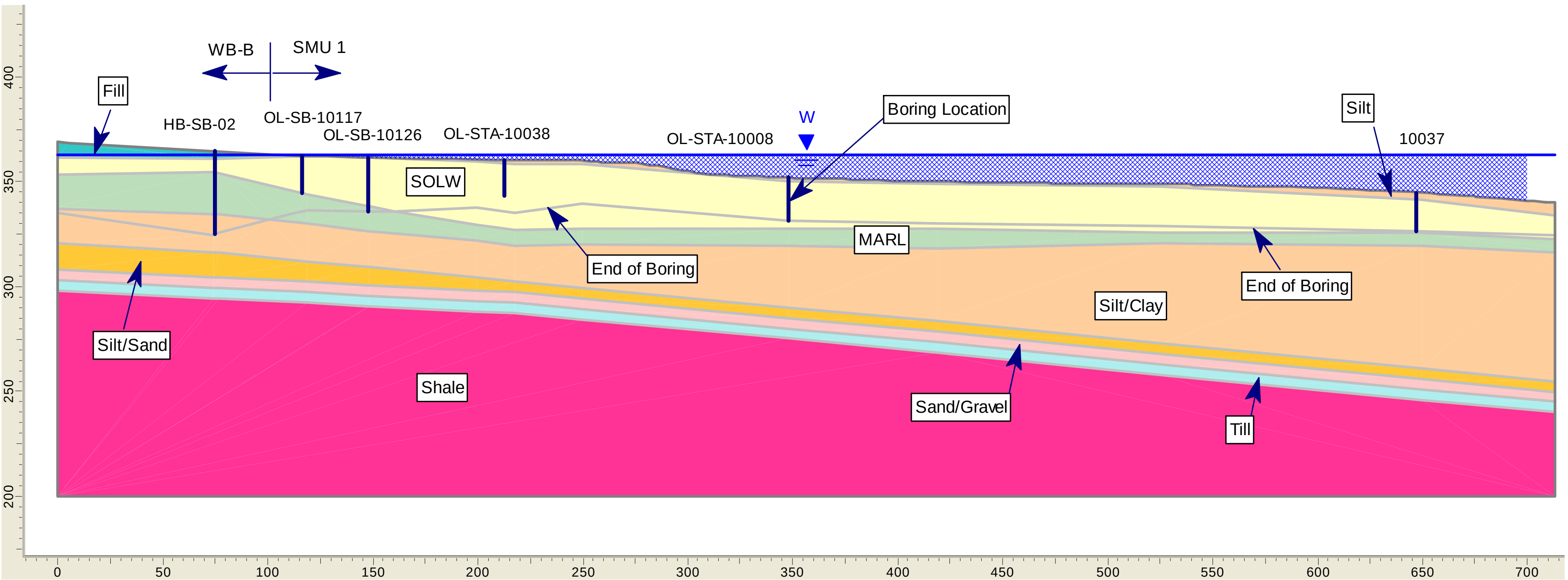

Figure 7. Geometry of cross section 5

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. Borings OL-SB-10117 and OL-STA-10038 are offset from the cross section line. Therefore, the end of the boring shown in the figure does not match the line of end of boring for these two borings.
3. Subsurface layer elevations above the end of boring at the boring locations shown in the figure were checked and found to match well with the available elevations reported in the boring logs.

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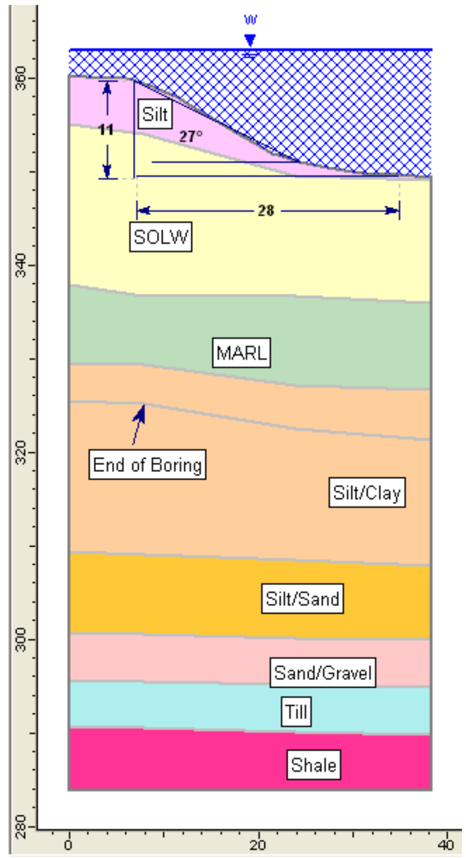

Figure 8. Geometry of cross section 6

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. The average slope is about 27 degrees and the maximum slope is about 32 degrees.

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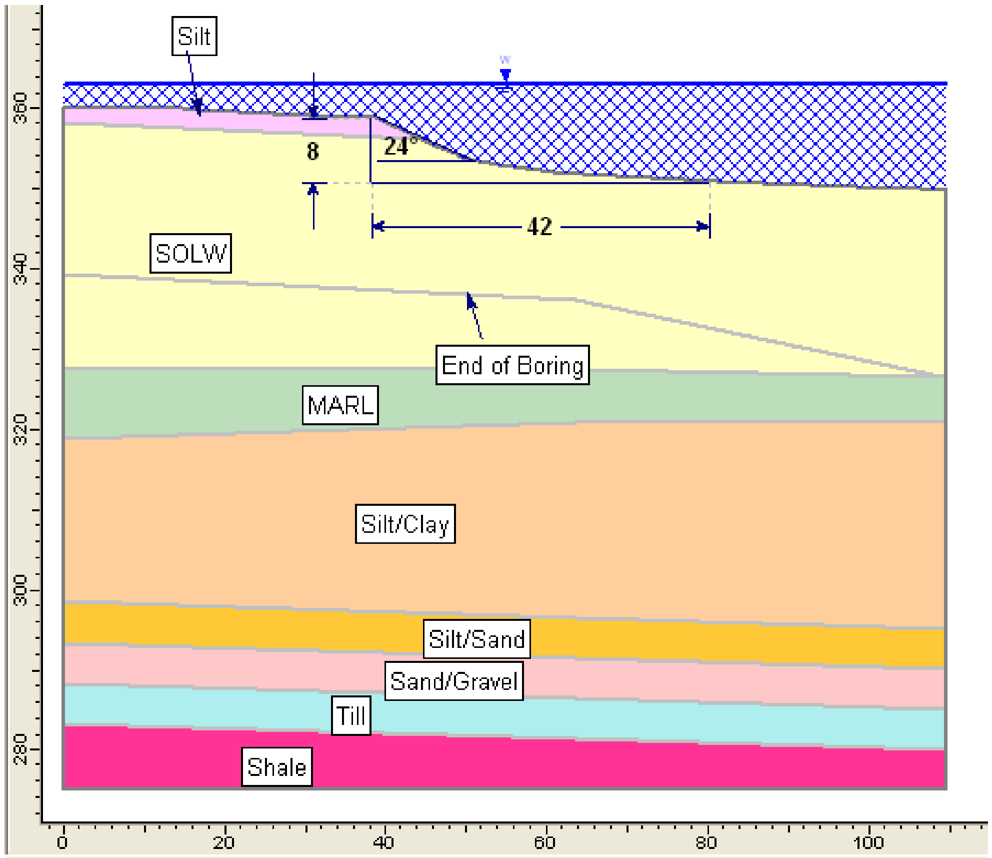

Figure 9. Geometry of cross section 7

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. The average slope is about 24 degrees and the maximum slope is about 28 degrees.

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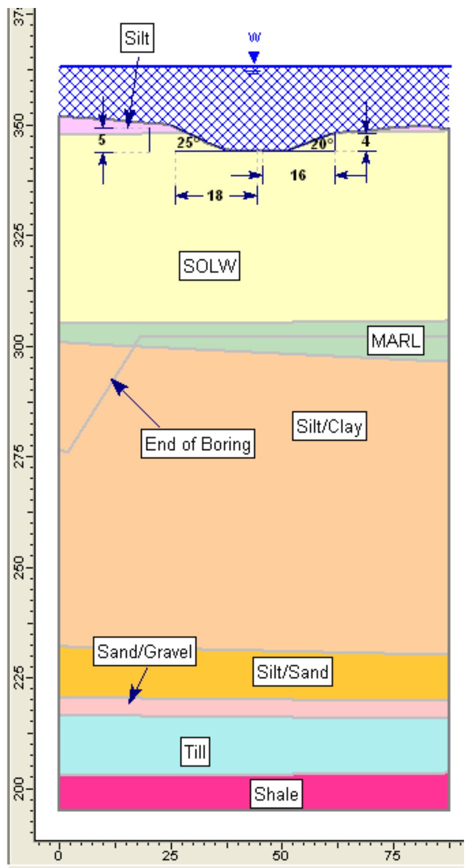

Figure 10. Geometry of cross section 8

Notes:

1. Subsurface profiles below the line of end of boring were estimated based on information from deeper borings and may not represent the true field stratigraphy. See Attachment 1 for details.
2. The average slope is about 25 degrees and the maximum slope is about 28 degrees for the steeper left-side slope.

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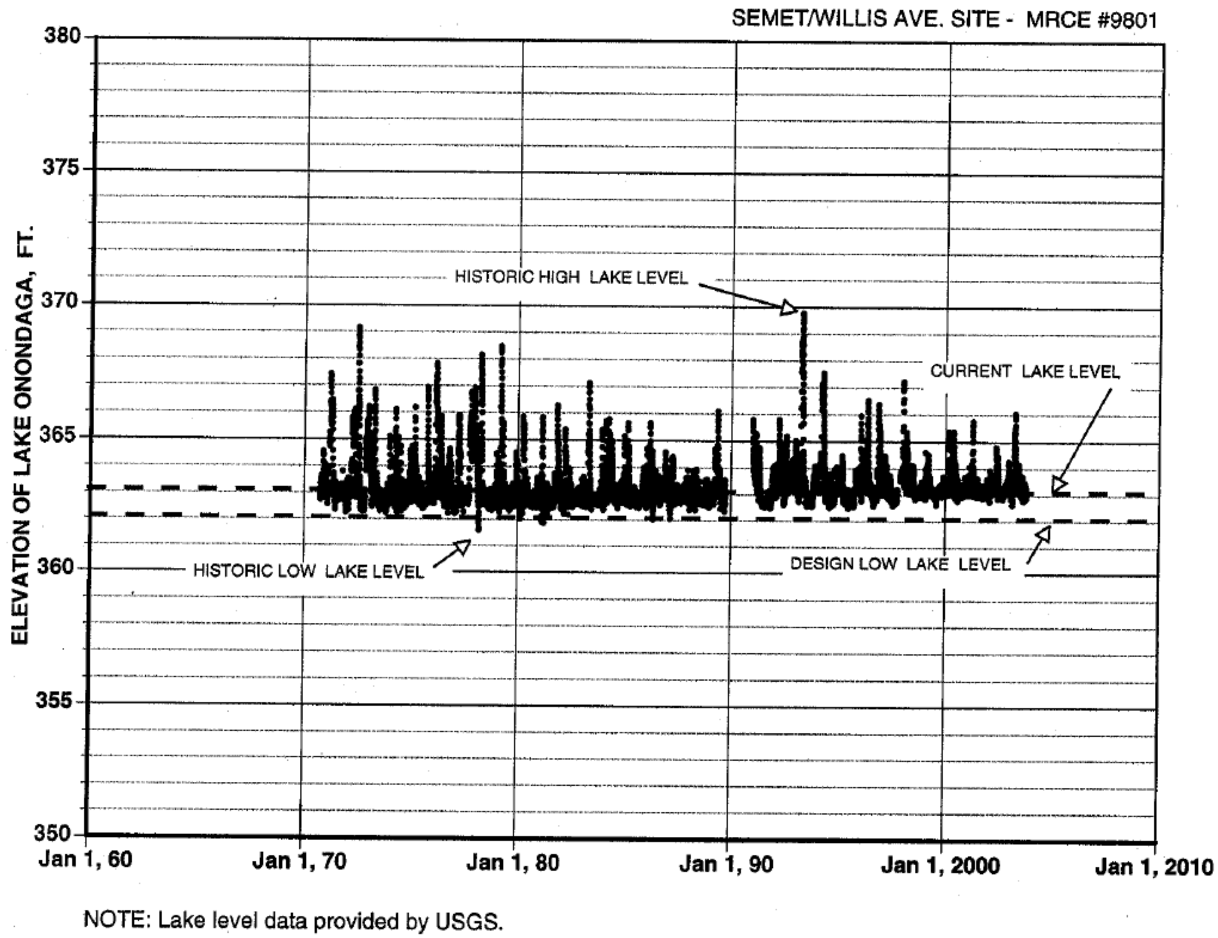

Figure 11. Onondaga Lake water level
(Figure provided to Geosyntec by Parsons)

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

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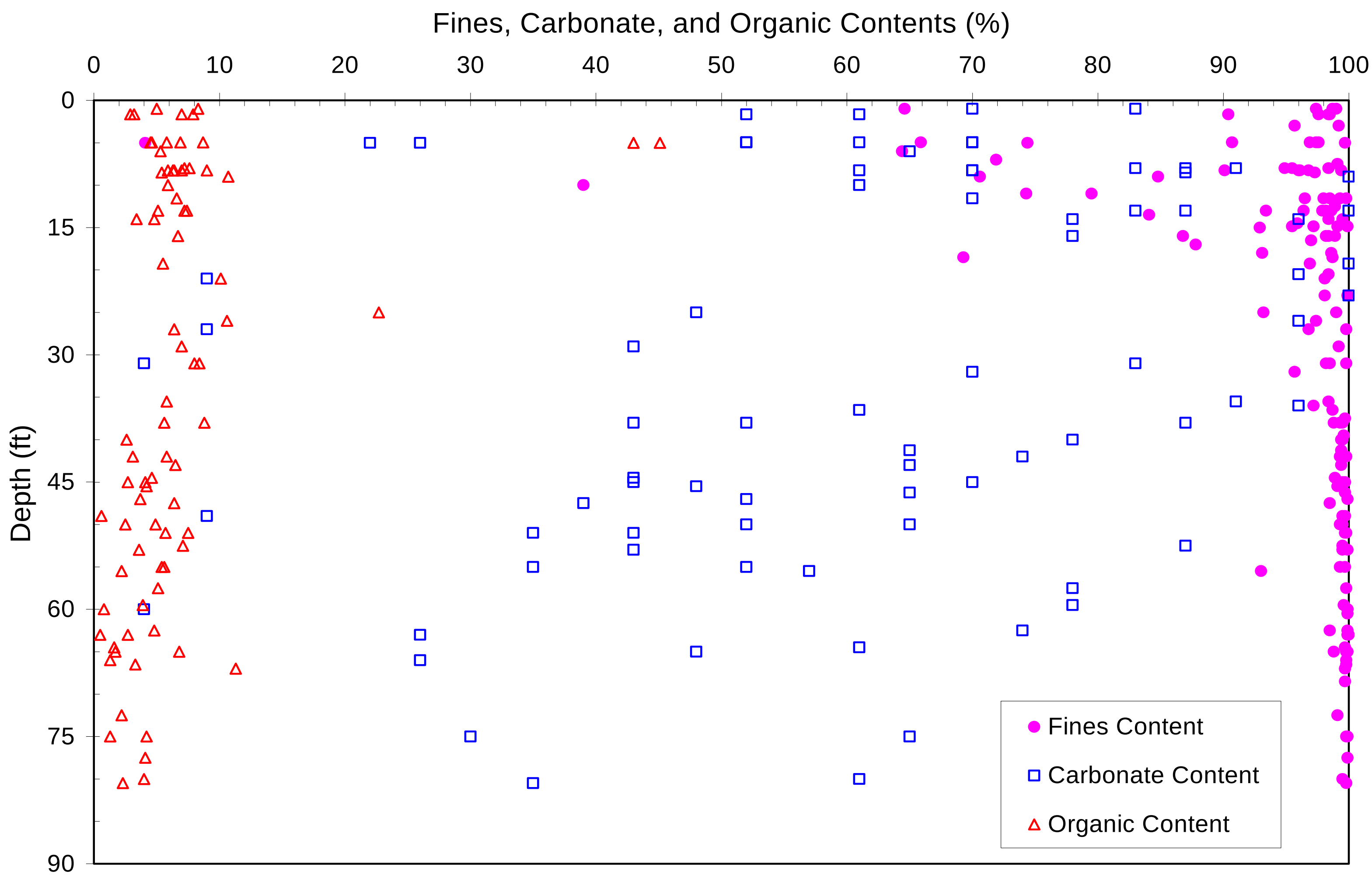

Figure 12. Plot of fines, carbonate, and organic contents versus depth

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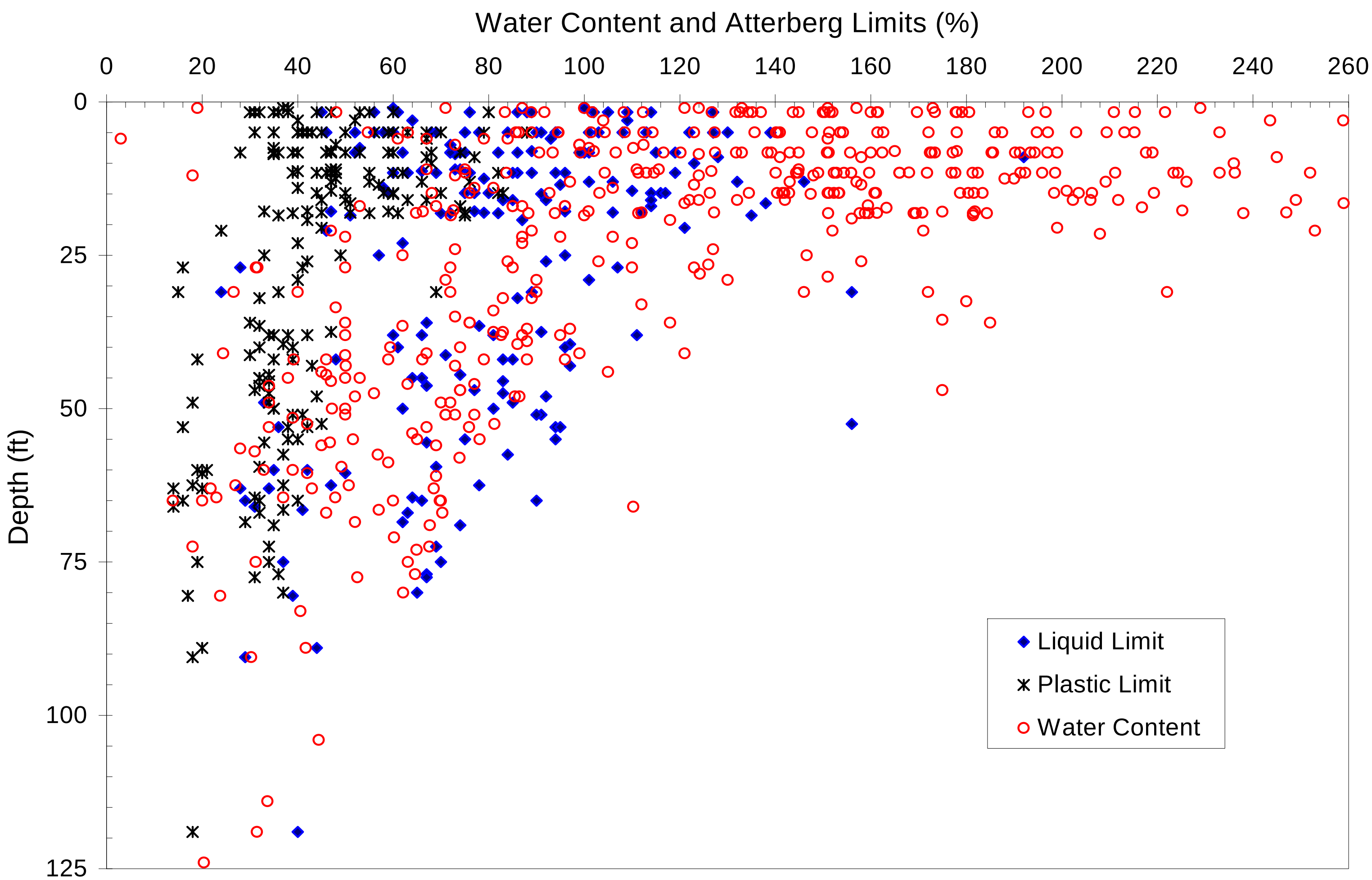

Figure 13. Plot of water content and Atterberg limits versus depth

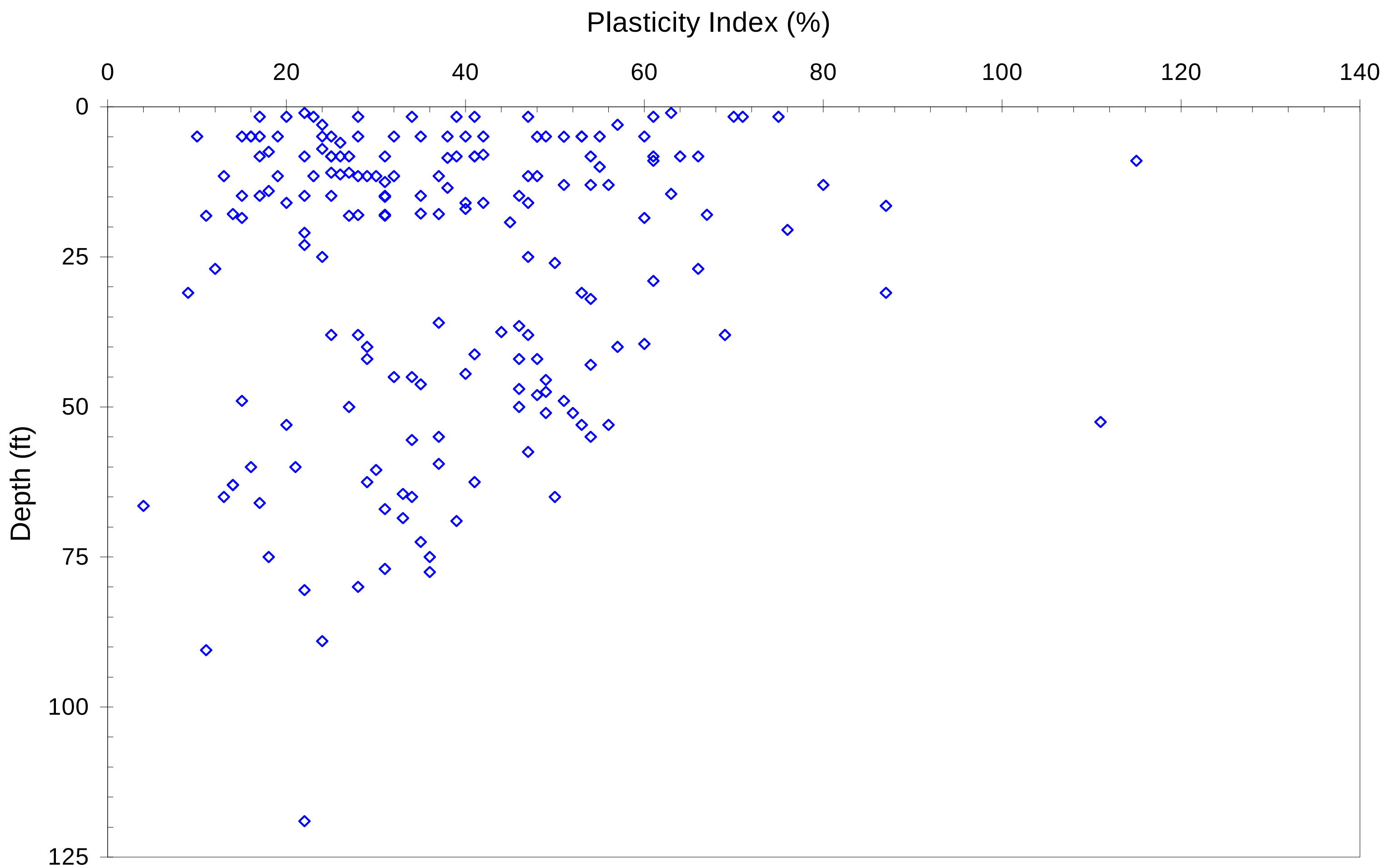

Figure 14. Plot of plasticity index versus depth

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

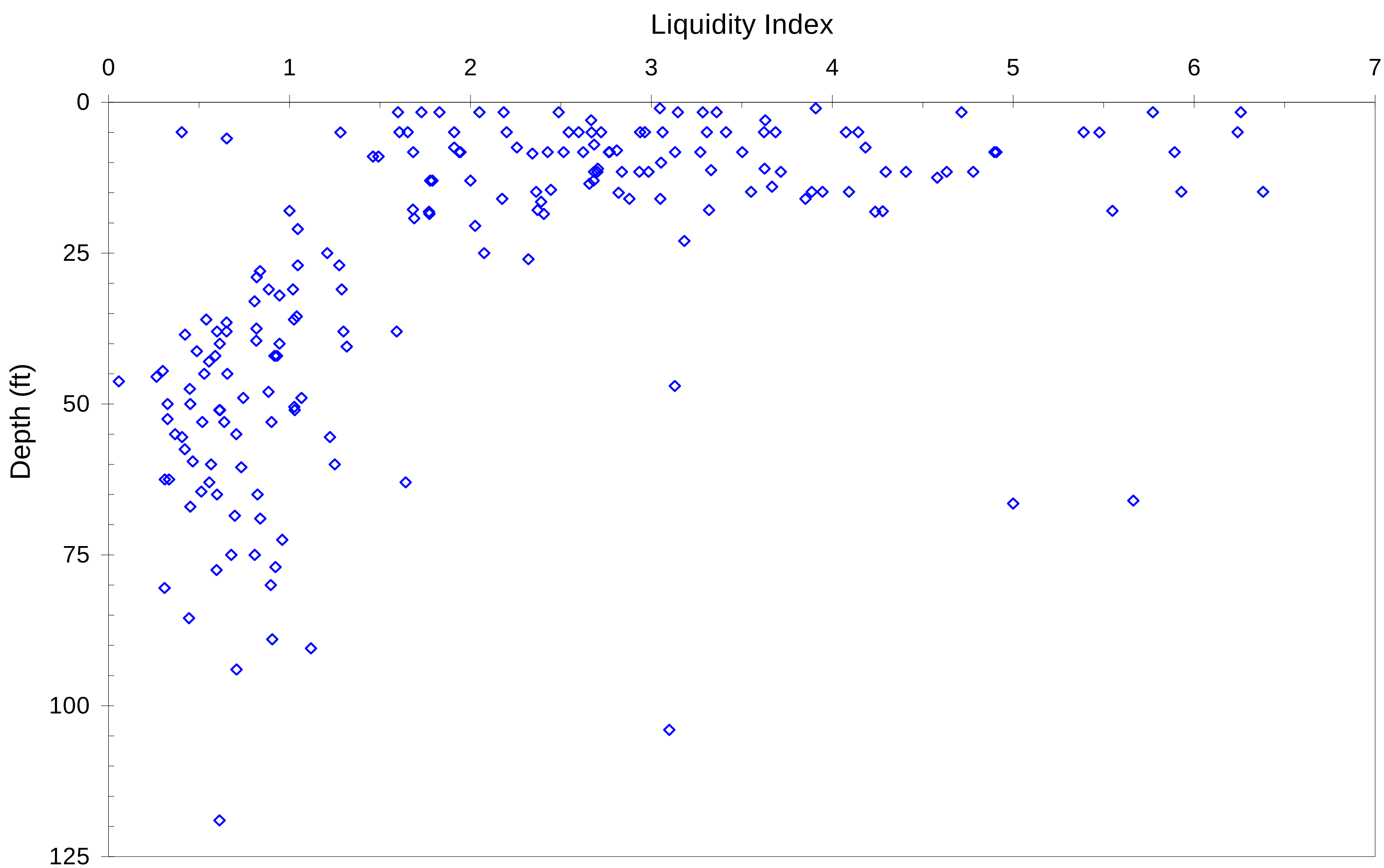

Figure 15. Plot of liquidity index versus depth

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

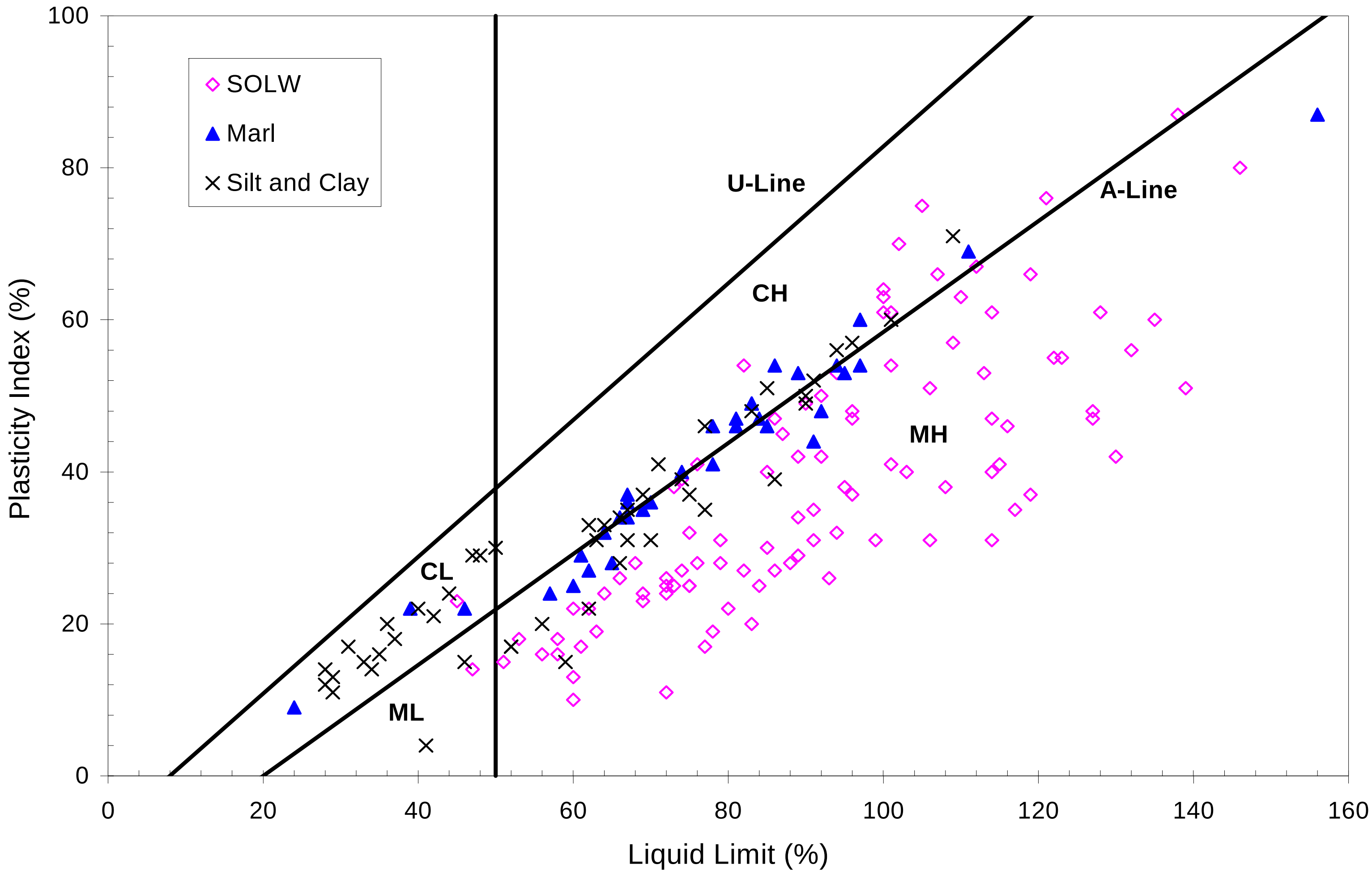

Figure 16. Casagrande's plasticity chart

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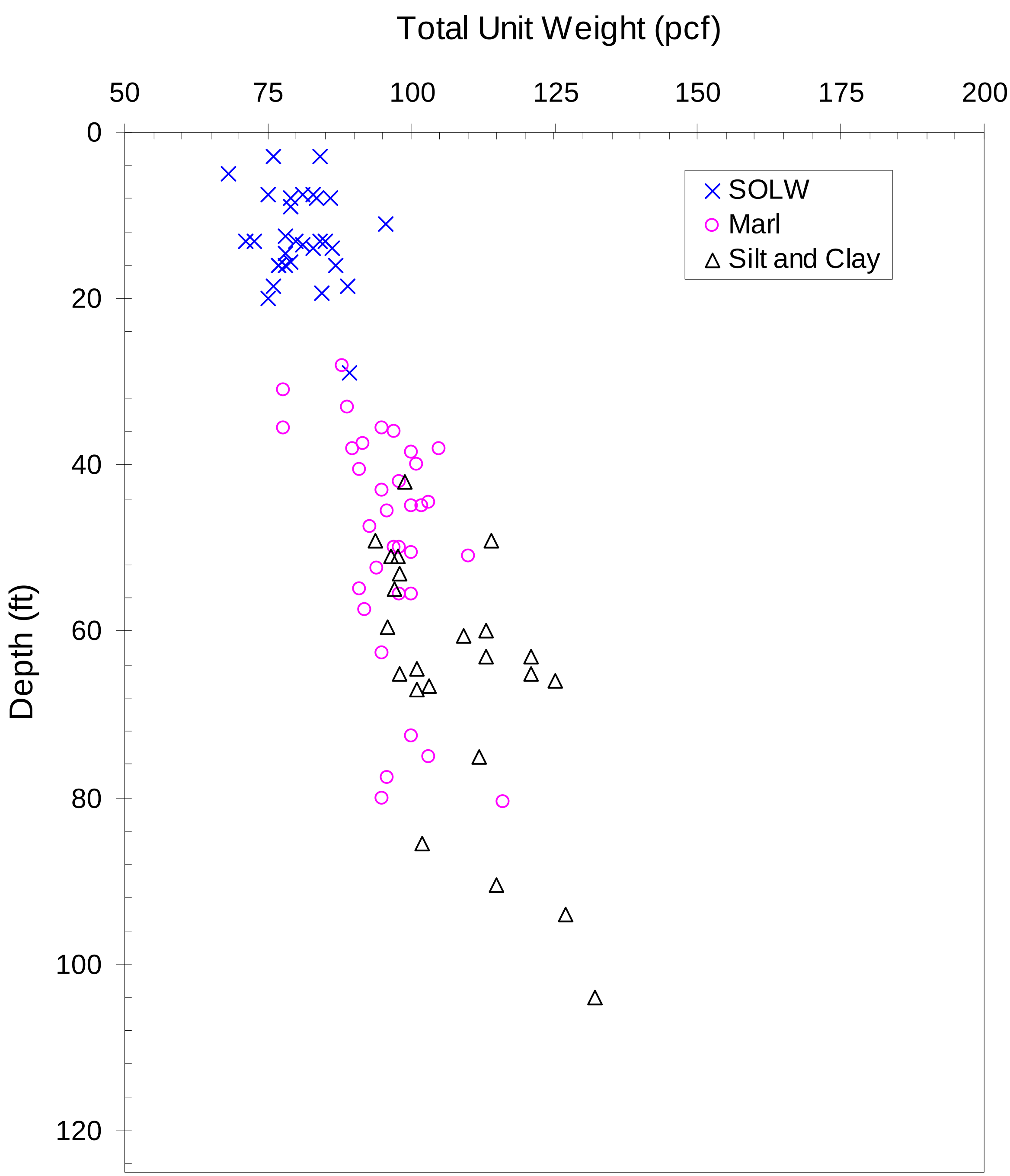

Figure 17. Plot of total unit weight versus depth

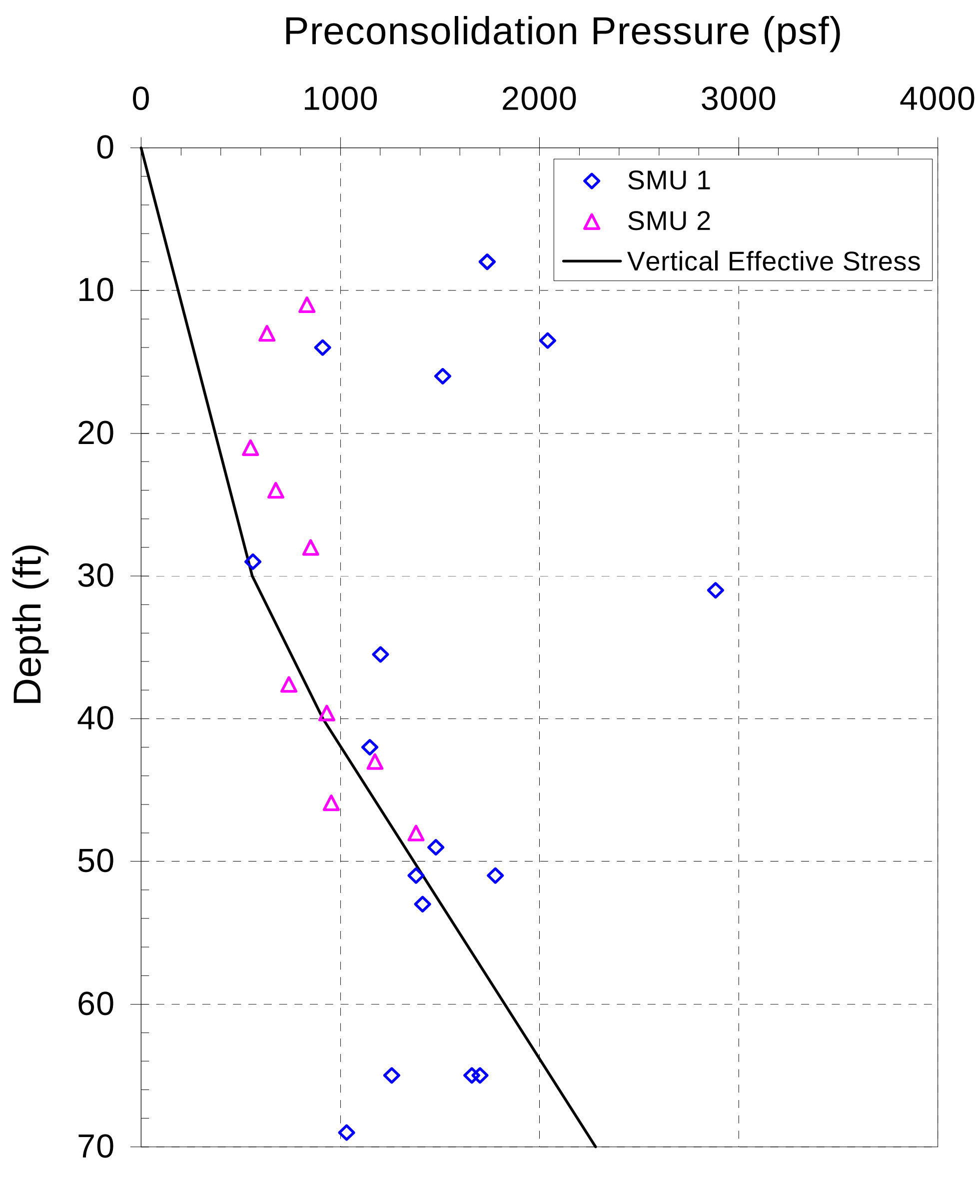

Figure 18. Profile of preconsolidation pressure
(Note: data from SMU 2 were included for comparison)

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

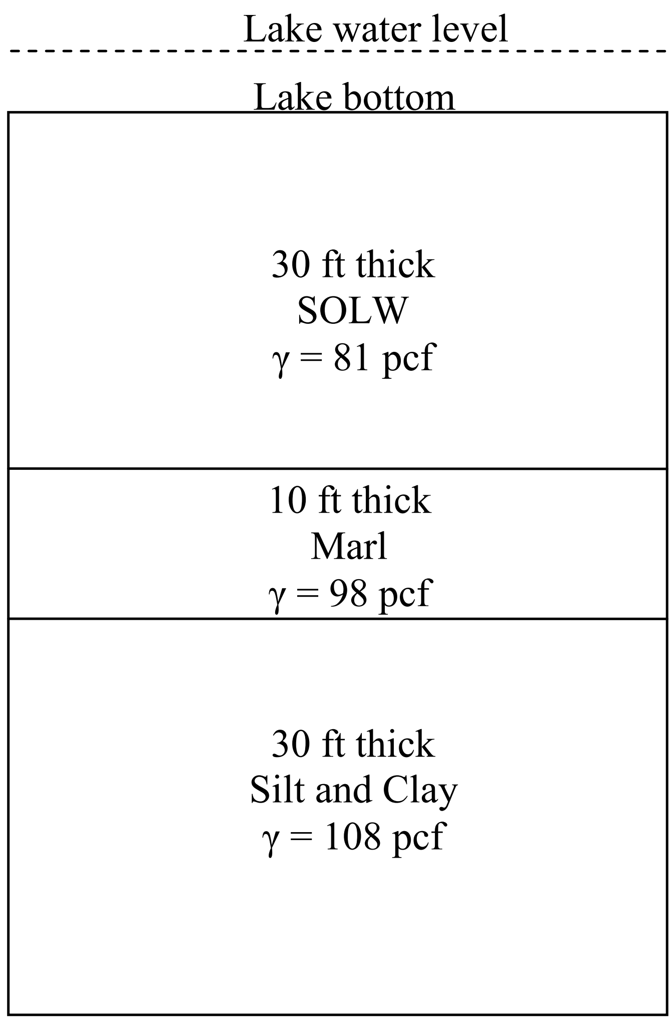

Figure 19. Assumed representative subsurface profile in the ILWD area for in-situ effective overburden stress calculation

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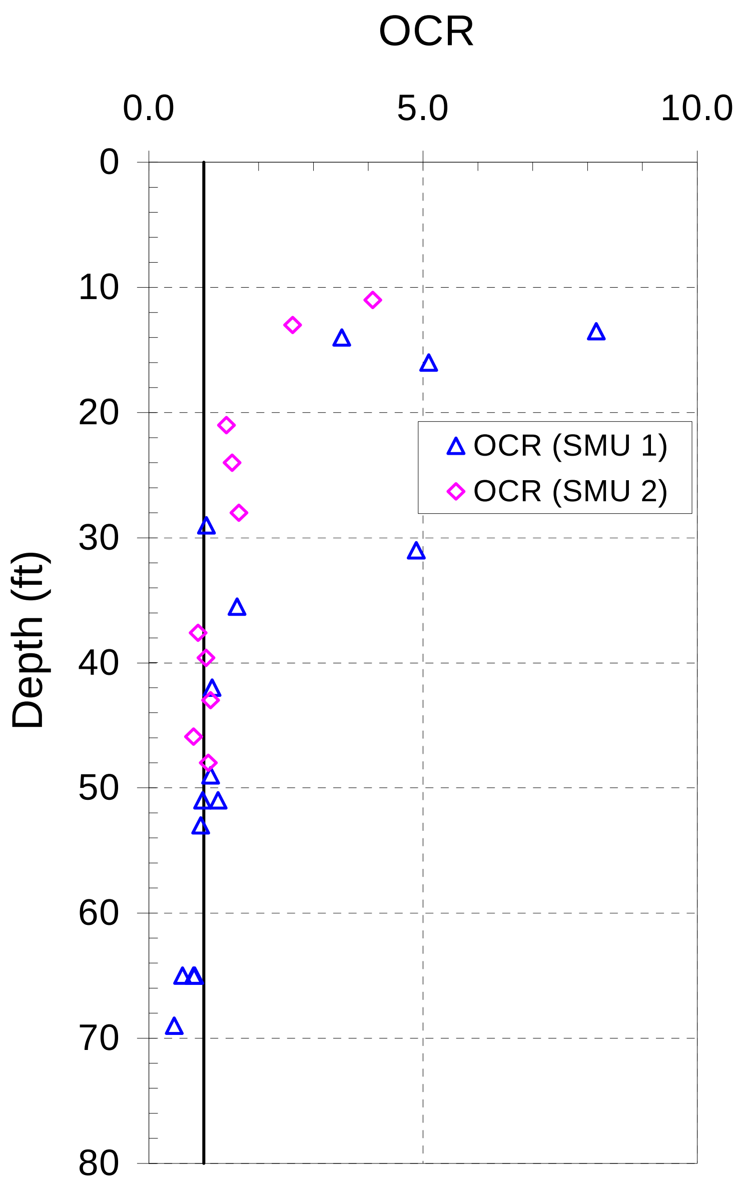

Figure 20. Profile of overconsolidation ratio
(Note: data from SMU 2 were included for comparison)

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

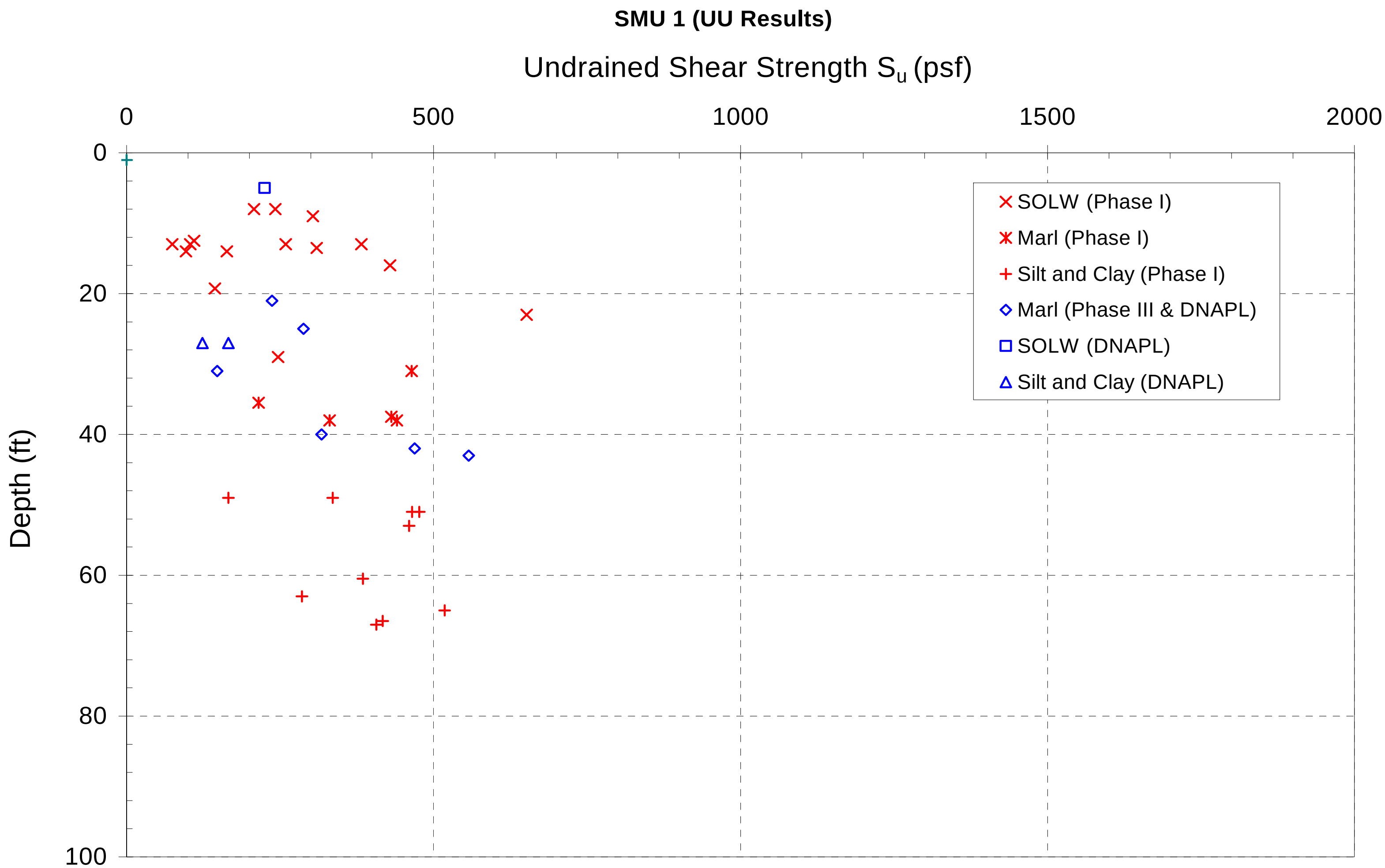

Figure 21. Undrained shear strength from UU tests

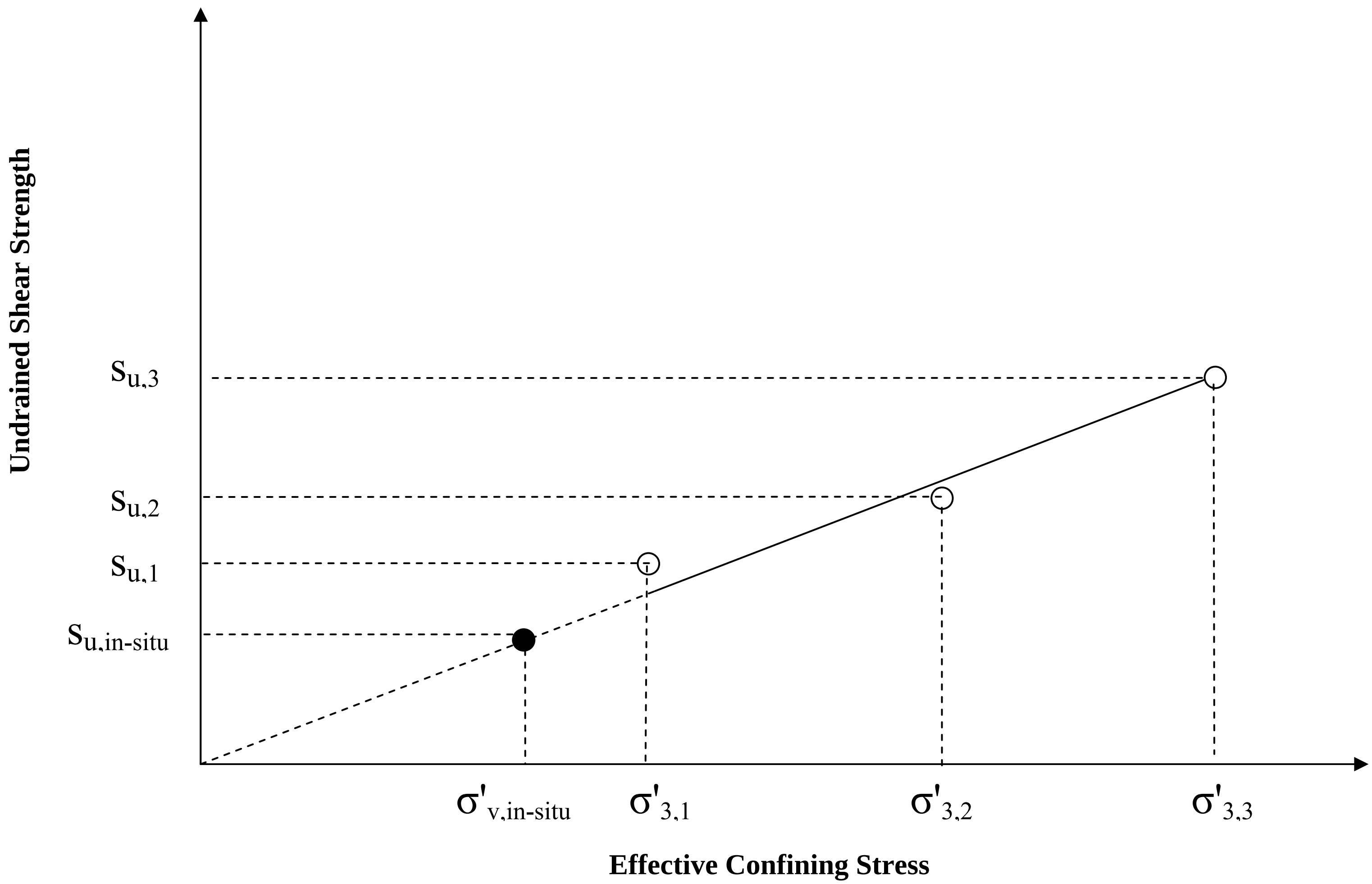

Figure 22. Obtaining S_u corresponding to the in-situ vertical stress from CU tests (Approach 2).

Written by: **Ming Zhu** Date: **08/20/2008** Reviewed by: **R. Kulasingam/J. Beech** Date: **08/20/2008**

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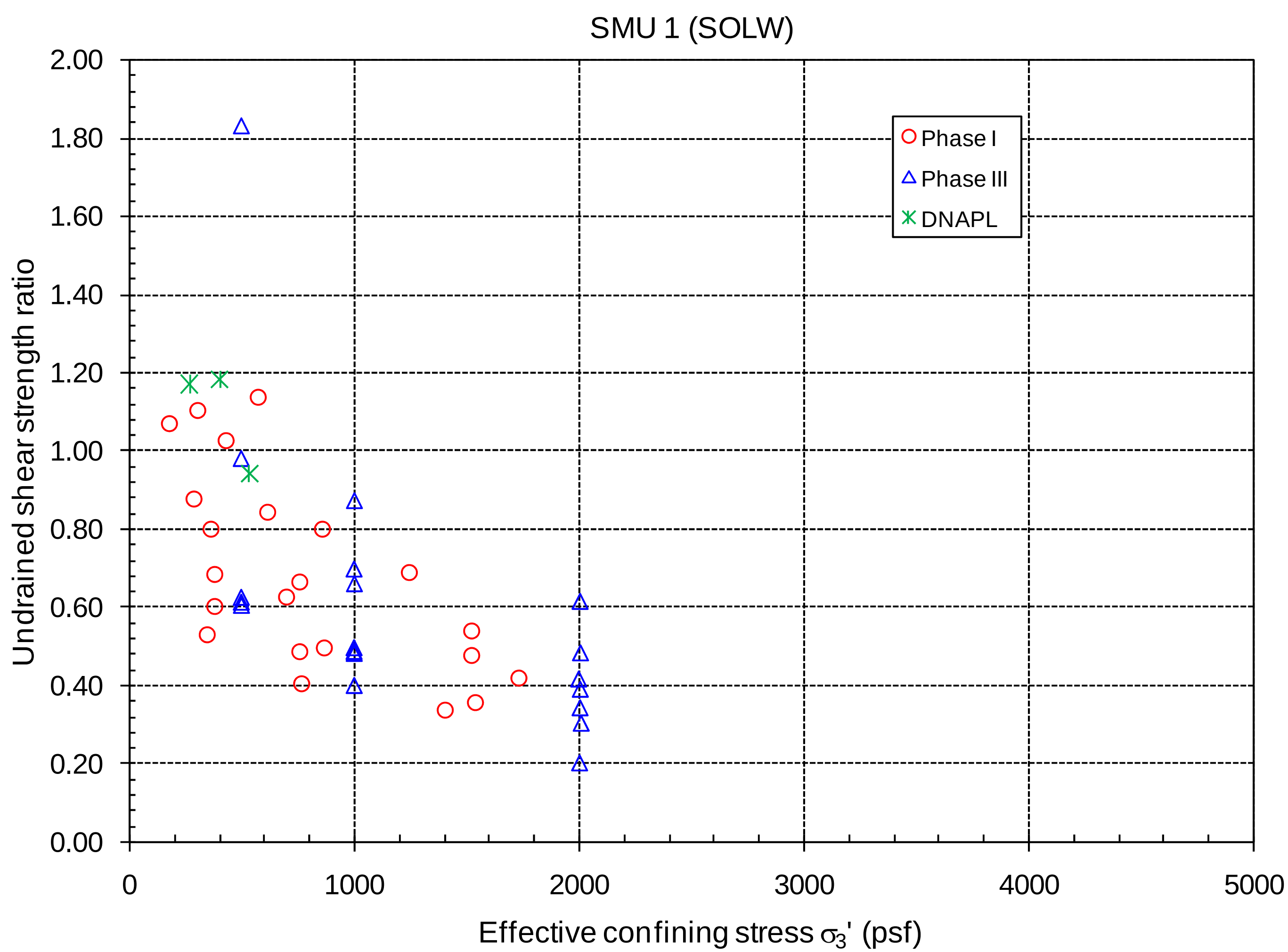

Figure 23. Undrained shear strength ratio for SOLW from CU tests

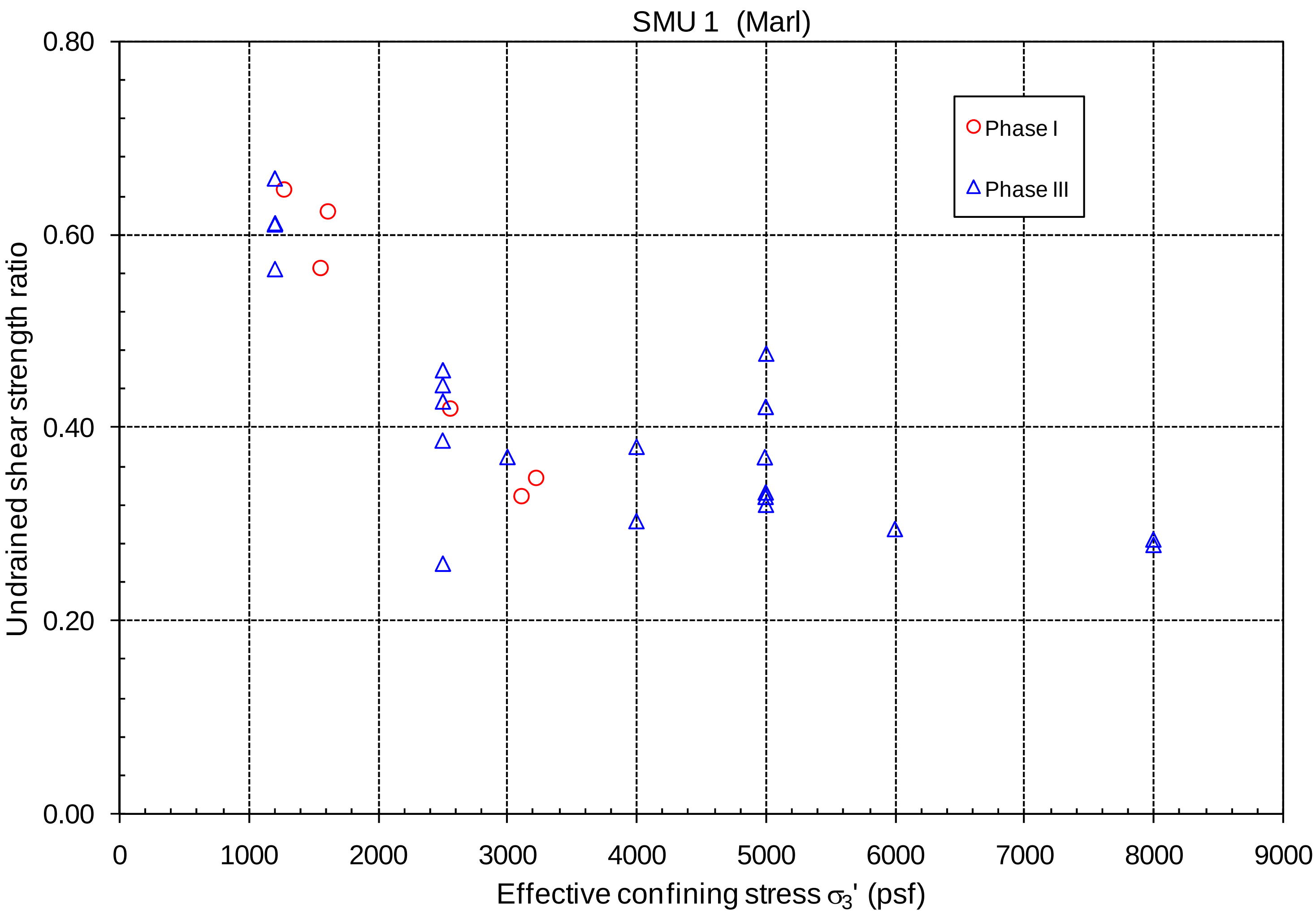

Figure 24. Undrained shear strength ratio for Marl from CU tests

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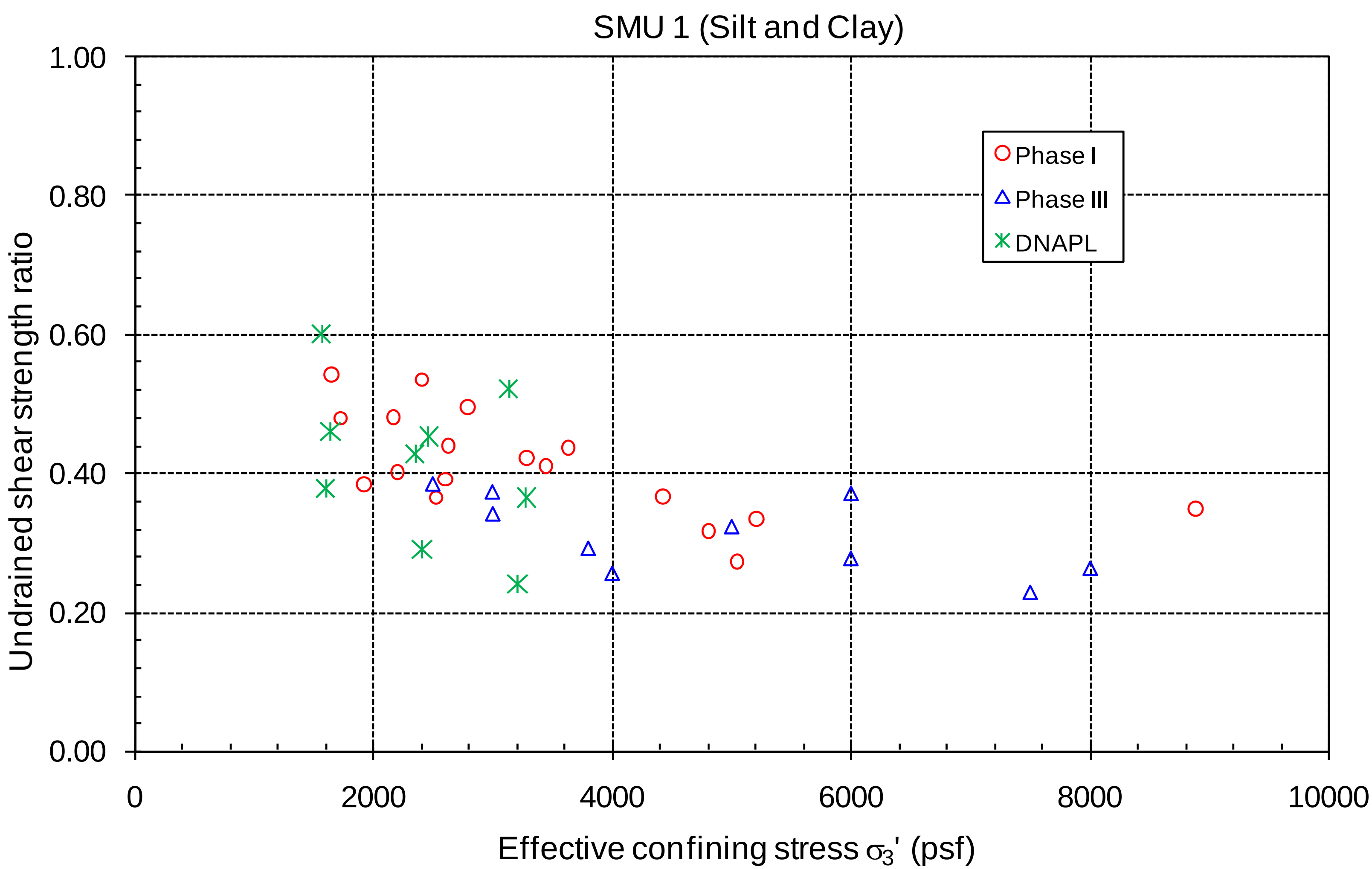

Figure 25. Undrained shear strength ratio for Silt and Clay from CU tests

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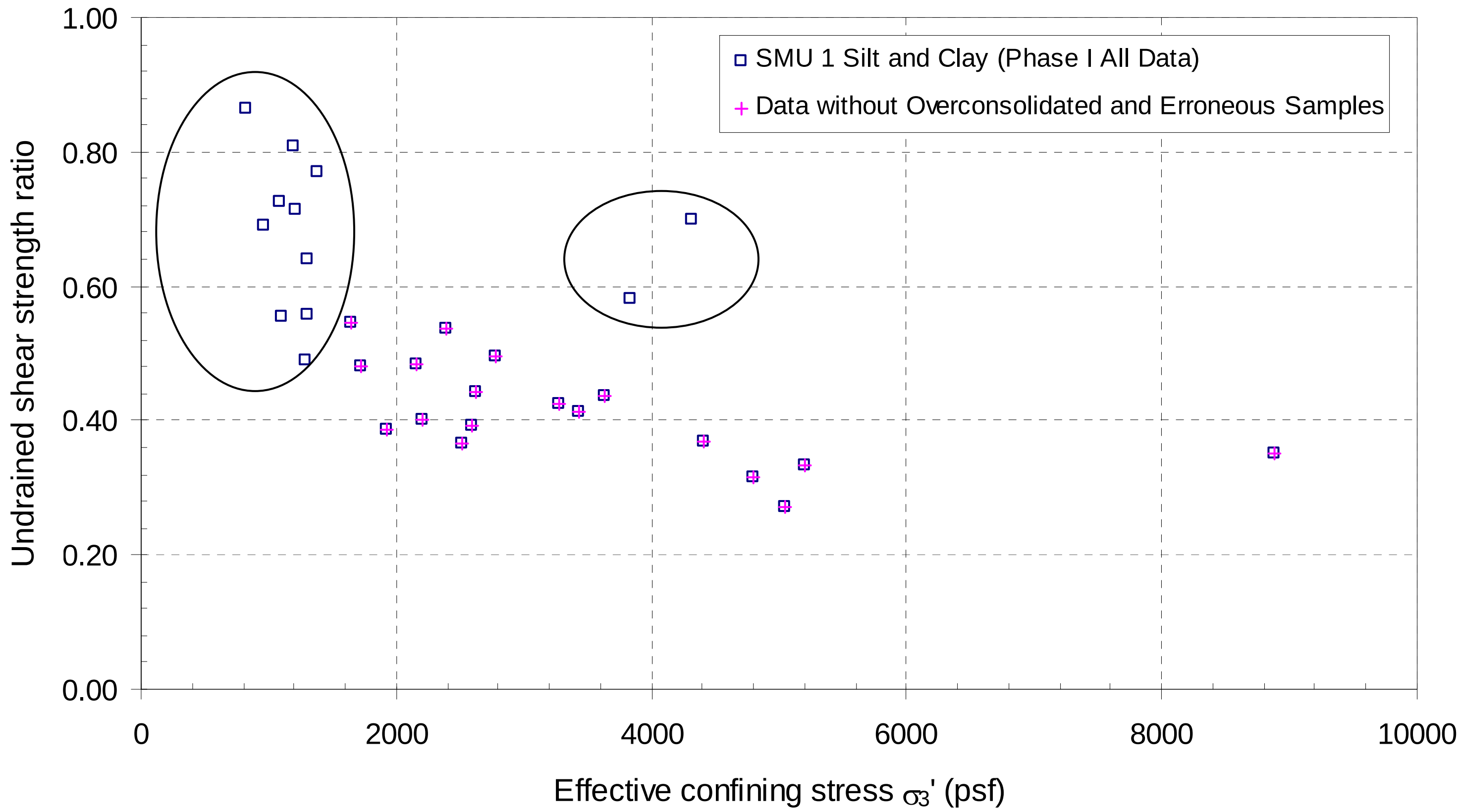

Figure 26. Example of removed samples from CU tests

Notes:

1. Data obtained from a confining stress lower than the in-situ vertical stress were removed.
2. Two data points showing erroneous behavior were removed based on the observation of stress-strain curves.

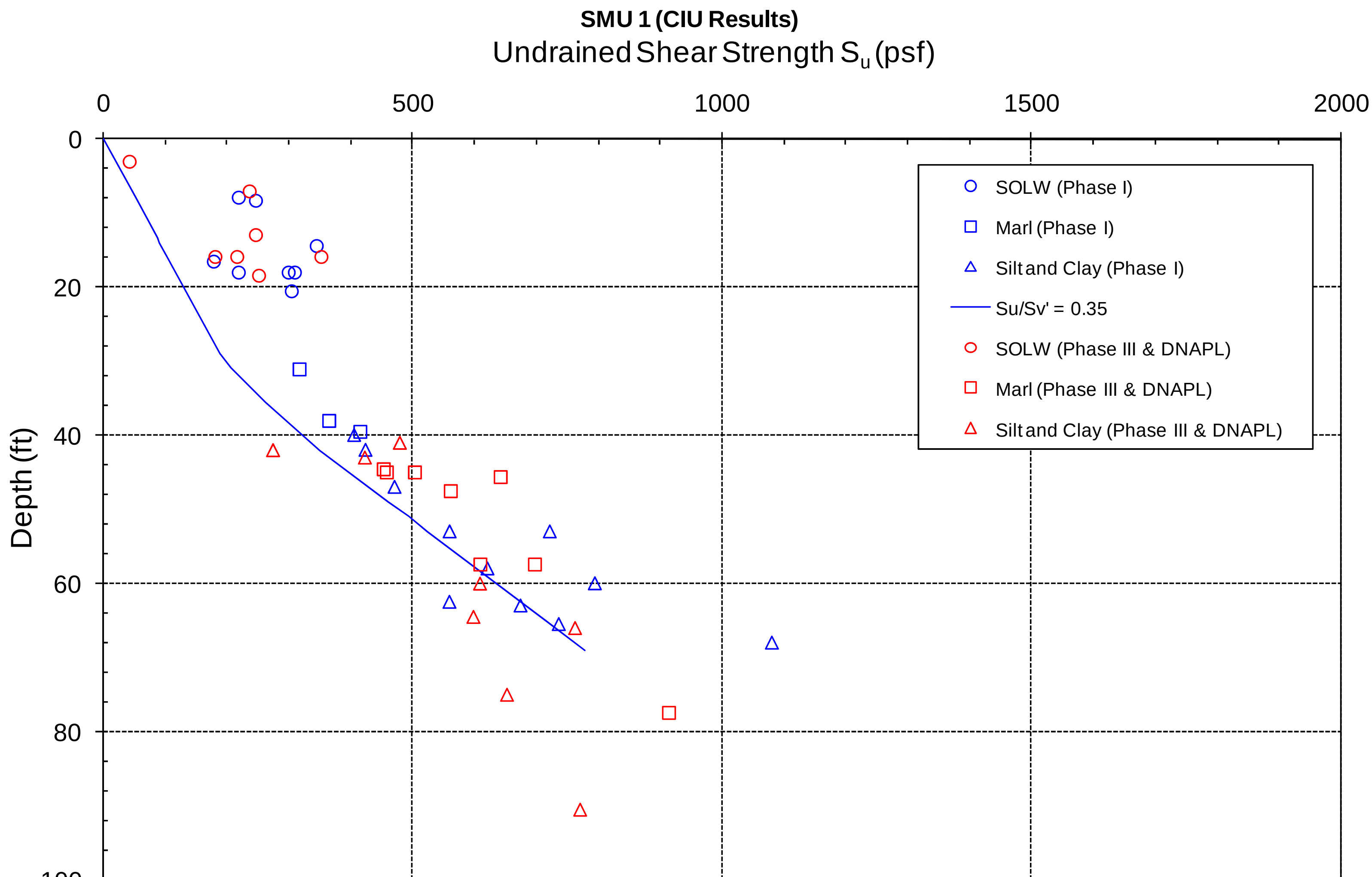

Figure 27. Interpreted undrained shear strength from CU tests

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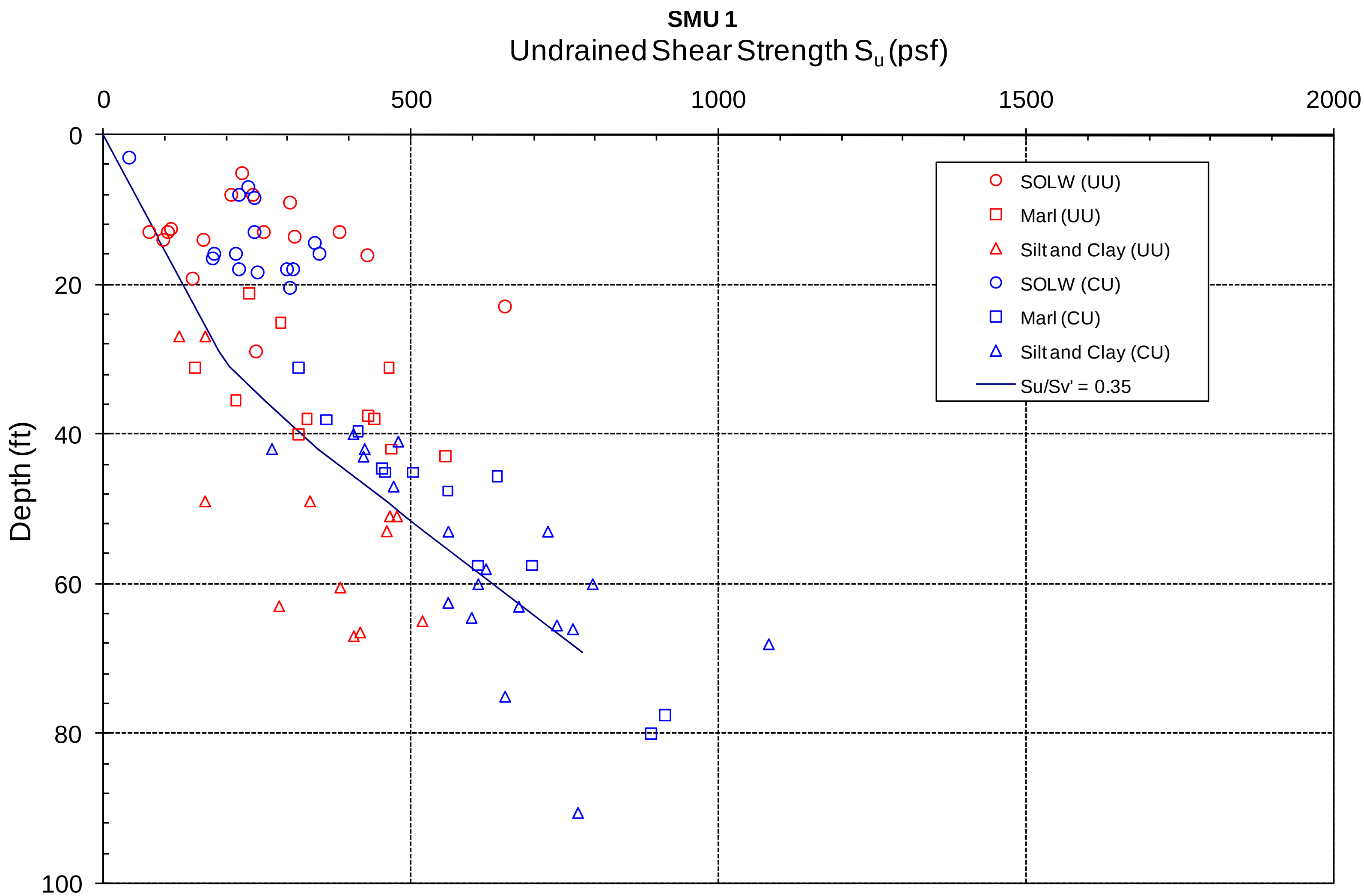

Figure 28. Comparison of undrained shear strength from UU and CU tests

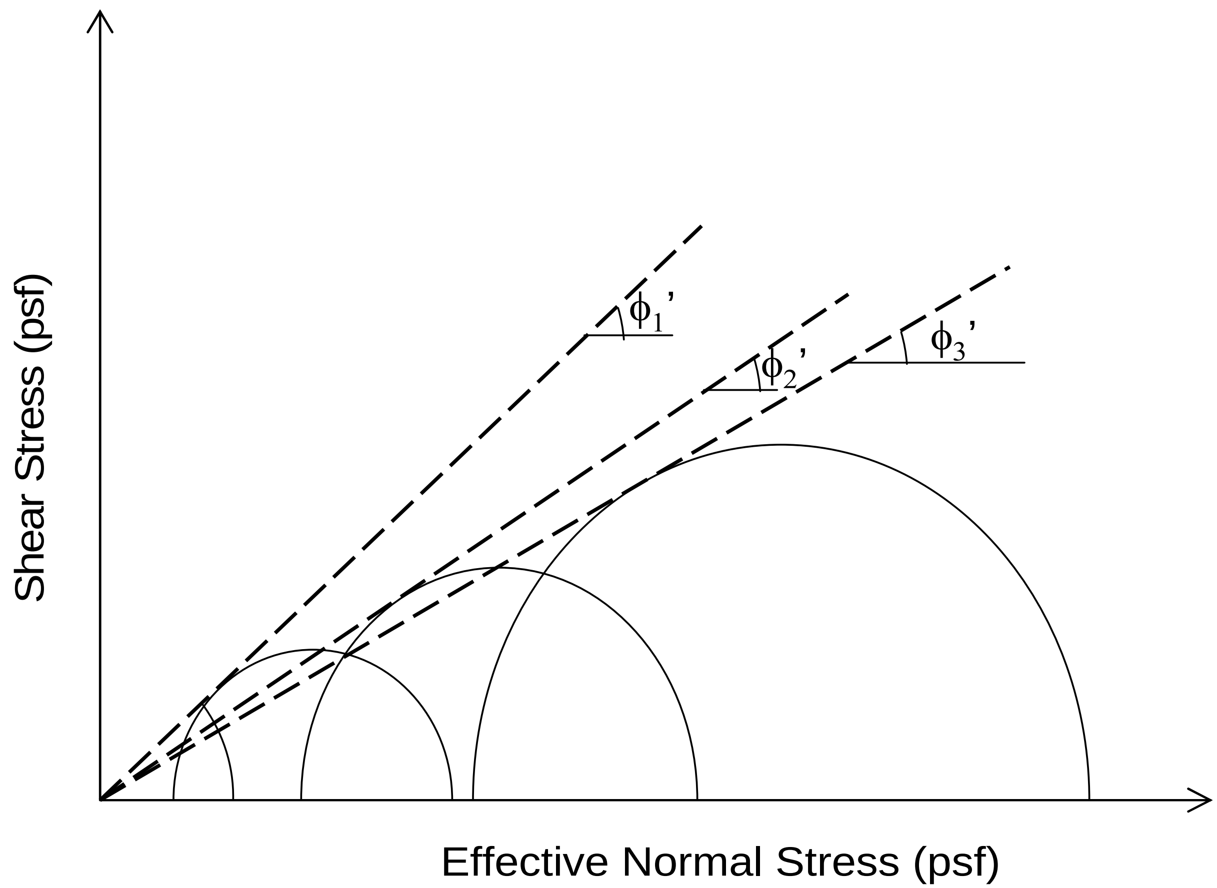

Figure 29. Obtaining effective stress friction angle using effective stress Mohr circles from CU tests

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Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

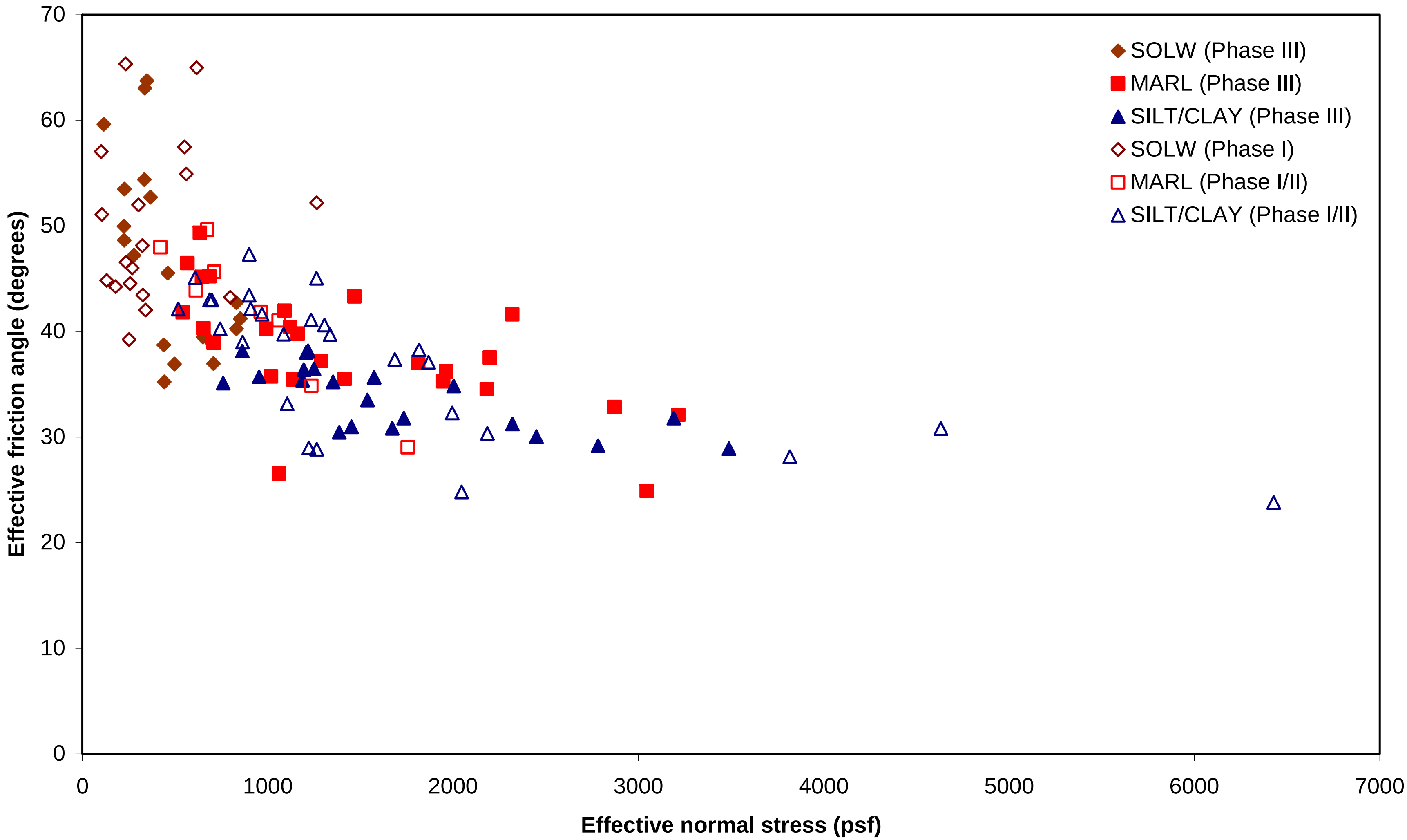


Figure 30. Effective stress friction angle versus effective normal stress for SOLW, Marl, and Silt and Clay

ATTACHMENT 1

Development of Subsurface Profiles in the ILWD area

Subsurface profiles were developed for the ILWD area and the Wastebed B (WB-B) and Harbor Brook (HB) areas using the geotechnical information interpreted from borings conducted during the site investigations. Table 1-1 summarizes the coordinates (i.e., northing and easting), the elevation of existing ground or lake bottom, and the elevations of the bottoms of subsurface layers at each boring location. A 3-D surface was created for each subsurface soil layer using the information provided in the table.

The procedure of creating the surfaces included the following steps (using the surface of bottom of Silt and Clay as an example):

- Step 1: divide the borings into two groups: one group included the relatively deep borings where the elevations of the bottom of Silt and Clay are known; the other group included the relatively shallow borings where the borings ended above the bottom of Silt and Clay and therefore, the elevations were unknown but were expected to be lower than or equal to the end of boring.
- Step 2: create the 3-D surface of bottom of Silt and Clay using the known elevations: a 3-D surface (i.e., Triangular Irregular Network (TIN) surface) was created using the Kriging method imbedded in the program Autodesk Land Desktop 2007. The input data were the known elevations of bottom of Silt and Clay and corresponding coordinates of the borings.
- Step 3: extract the elevations from the 3-D surface at locations where the elevations were originally unknown: The extracted elevations must meet two criteria: first, they can not be higher than the end of boring; second, they can not be higher than the bottom of the overlying layer, which is Marl for this example. If both of the criteria were satisfied, the extracted elevation was considered acceptable, although the true elevation was unknown at this location. However, if either of the two criteria was not satisfied, the extracted elevation was then manually adjusted to be 5 ft below the end of boring or the bottom of Marl, whichever was lower. The 5 ft was selected arbitrarily to provide an estimate of the elevation, since the true elevation is unknown.
- Step 4: re-create the 3-D surface in Step 2 using the known elevations and the adjusted elevations at locations where the elevations were originally unknown.
- Step 5: repeat Steps 1 to 4 for other subsurface layers.

The contours of the existing ground/lake bottom and the bottoms of seven subsurface layers (i.e., Fill (in land)/Silt (in lake), SOLW, Marl, Silt and Clay, Silt and Sand, Sand and Gravel, and Till) are shown in Figures 1-1 through 1-8. The surface of bottom of Shale was not created because of insufficient data. The limit of the 3-D surfaces is shown in Figure 1-1. 3-D surfaces for subsurface layers beyond this limit are currently not available and may be developed later, if needed. In addition, the contours of the surface of the end of boring were also created and are shown in Figure 1-9. The surface of the end of the borings was used to identify the areas where the created 3-D surfaces for subsurface layers were below the surface of the end of boring, which are shown in Figures 1-3 through 1-8 as the shaded areas.

It is noted that: (i) the Kriging method used the known elevations from boring logs to interpolate or extrapolate the surface elevations between or outside the boring locations; and (ii) because of the uncertainty associated with the shallow borings, Step 3 in the above-mentioned procedure only provides an estimated elevation. As a result, surfaces that are below the end of boring may not represent the true in-situ stratigraphy.

Based on the created 3-D surfaces, subsurface profiles of eight selected cross sections in the ILWD area were developed and are shown in Figures 3 through 10 in the main text of this package. It is recommended that engineering judgment be applied in the ILWD stability analysis if the most critical slip surface goes below the line of the end of boring shown in these cross sections.

Table 1-1. Summary of subsurface layer elevations from boring logs

Boring ID	Northing	Easting	Mudline Elevation (ft)	Bottom of Silt Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Silt (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
PHASE I																					
OL-STA-10001-VC	1118517.76	923452.28	336.22	326.22	<323.02	<323.02	<323.02	<323.02	<323.02	<323.02	<323.02	323.02	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10002-VC	1118311.97	924291.63	353.54	353.54	<340.34	<340.34	<340.34	<340.34	<340.34	<340.34	<340.34	340.34	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10003-VC	1118153.61	924907.56	351.23	351.23	<338.03	<338.03	<338.03	<338.03	<338.03	<338.03	<338.03	338.03	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10004-VC	1118356.41	924950.90	340.87	340.87	<327.67	<327.67	<327.67	<327.67	<327.67	<327.67	<327.67	327.67	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10005-VC	1117898.15	925576.04	352.85	352.85	<339.65	<339.65	<339.65	<339.65	<339.65	<339.65	<339.65	339.65	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10006-VC	1118267.11	925796.04	336.89	324.39	<323.69	<323.69	<323.69	<323.69	<323.69	<323.69	<323.69	323.69	12.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10007-VC	1117646.82	926138.49	349.12	349.12	<335.92	<335.92	<335.92	<335.92	<335.92	<335.92	<335.92	335.92	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10008-VC	1118082.96	923319.57	349.76	349.76	<330.36	<330.36	<330.36	<330.36	<330.36	<330.36	<330.36	330.36	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.4
OL-STA-10009-VC	1117950.72	924174.44	361.40	361.40	<342.7	<342.7	<342.7	<342.7	<342.7	<342.7	<342.7	342.70	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.7
OL-STA-10010-VC	1117686.08	924773.69	359.70	359.70	<340.2	<340.2	<340.2	<340.2	<340.2	<340.2	<340.2	340.20	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.5
OL-STA-10011-VC	1117369.90	925301.95	359.41	359.41	<340.11	<340.11	<340.11	<340.11	<340.11	<340.11	<340.11	340.11	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.3
OL-STA-10012-VC	1116800.55	925924.34	359.24	359.24	342.74	<339.54	<339.54	<339.54	<339.54	<339.54	<339.54	339.54	0	16.5	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-STA-10013-SB	1118375.53	923900.19	349.52	349.52	315.02	312.52	<304.52	<304.52	<304.52	<304.52	<304.52	304.52	0	34.5	37	N/A	N/A	N/A	N/A	N/A	45
OL-STA-10013-VC	1118383.60	923909.42	349.19	349.19	<335.99	<335.99	<335.99	<335.99	<335.99	<335.99	<335.99	335.99	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10014-SB	1118398.91	924596.38	336.85	336.85	295.35	290.85	<282.85	<282.85	<282.85	<282.85	<282.85	282.85	0	41.5	46	N/A	N/A	N/A	N/A	N/A	54
OL-STA-10014-VC	1118398.61	924609.04	337.62	337.62	<324.42	<324.42	<324.42	<324.42	<324.42	<324.42	<324.42	324.42	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10015-SB	1118228.76	925464.84	337.90	329.90	311.90	311.90	<295.4	<295.4	<295.4	<295.4	<295.4	295.40	8	26	26	N/A	N/A	N/A	N/A	N/A	42.5
OL-STA-10015-VC	1118225.72	925443.60	340.11	335.11	<326.91	<326.91	<326.91	<326.91	<326.91	<326.91	<326.91	326.91	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10016-SB	1117874.32	925905.77	344.22	342.22	314.22	314.22	<303.22	<303.22	<303.22	<303.22	<303.22	303.22	2	30	30	N/A	N/A	N/A	N/A	N/A	41
OL-STA-10016-VC	1117871.97	925898.56	346.58	337.58	<333.38	<333.38	<333.38	<333.38	<333.38	<333.38	<333.38	333.38	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.2
OL-STA-10017-SB	1118233.61	926113.93	335.91	323.91	314.91	314.91	<299.91	<299.91	<299.91	<299.91	<299.91	299.91	12	21	21	N/A	N/A	N/A	N/A	N/A	36
OL-STA-10017-VC	1118245.60	926104.00	336.78	330.28	<324.18	<324.18	<324.18	<324.18	<324.18	<324.18	<324.18	324.18	6.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12.6
OL-STA-10018-SB	1117844.21	923783.99	359.30	359.30	327.80	318.30	<303.3	<303.3	<303.3	<303.3	<303.3	303.30	0	31.5	41	N/A	N/A	N/A	N/A	N/A	56
OL-STA-10018-VC	1117842.07	923779.99	360.82	360.82	<341.62	<341.62	<341.62	<341.62	<341.62	<341.62	<341.62	341.62	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2
OL-STA-10019-SB	1118111.61	923847.96	360.16	360.16	324.66	312.66	<294.66	<294.66	<294.66	<294.66	<294.66	294.66	0	35.5	47.5	N/A	N/A	N/A	N/A	N/A	65.5
OL-STA-10019-VC	1118120.13	923856.72	360.58	360.58	<341.48	<341.48	<341.48	<341.48	<341.48	<341.48	<341.48	341.48	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.1
OL-STA-10020-SB	1117703.29	924383.28	358.44	355.44	318.44	308.44	<292.44	<292.44	<292.44	<292.44	<292.44	292.44	3	40	50	N/A	N/A	N/A	N/A	N/A	66
OL-STA-10020-VC	1117726.18	924394.20	359.89	355.89	<340.09	<340.09	<340.09	<340.09	<340.09	<340.09	<340.09	340.09	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-STA-10021-SB	1117948.41	924469.86	355.65	355.15	314.65	305.65	<282.15	<282.15	<282.15	<282.15	<282.15	282.15	0.5	41	50	N/A	N/A	N/A	N/A	N/A	73.5
OL-STA-10021-VC	1117945.12	924467.87	356.41	356.41	<337.11	<337.11	<337.11	<337.11	<337.11	<337.11	<337.11	337.11	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.3
OL-STA-10022-SB	1118138.66	924560.00	351.72	351.22	306.22	306.22	<281.72	<281.72	<281.72	<281.72	<281.72	281.72	0.5	45.5	45.5	N/A	N/A	N/A	N/A	N/A	70
OL-STA-10022-VC	1118152.34	924536.07	352.49	352.49	<332.79	<332.79	<332.79	<332.79	<332.79	<332.79	<332.79	332.79	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-STA-10023-SB	1117456.65	925020.02	359.62	359.62	317.62	317.62	<303.62	<303.62	<303.62	<303.62	<303.62	303.62	0	42	42	N/A	N/A	N/A	N/A	N/A	56
OL-STA-10023-VC	1117452.38	925019.68	359.78	359.78	<340.08	<340.08	<340.08	<340.08	<340.08	<340.08	<340.08	340.08	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-STA-10024-SB	1117848.61	925237.17	356.19	356.19	296.19	296.19	<288.19	<288.19	<288.19	<288.19	<288.19	288.19	0	60	60	N/A	N/A	N/A	N/A	N/A	68
OL-STA-10024-VC	1117861.90	925237.66	355.70	355.70	<335.9	<335.9	<335.9	<335.9	<335.9	<335.9	<335.9	335.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-STA-10025-SB	1117210.54	925484.56	358.33	358.33	315.33	315.33	<286.33	<286.33	<286.33	<286.33	<286.33	286.33	0	43	43	N/A	N/A	N/A	N/A	N/A	72
OL-STA-10025-VC	1117211.28	925488.14	359.05	359.05	<340.55	<340.55	<340.55	<340.55	<340.55	<340.55	<340.55	340.55	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.5
OL-STA-10026-SB	1117575.40	925701.69	354.85	354.85	307.85	307.85	<296.85	<296.85	<296.85	<296.85	<296.85	296.85	0	47	47	N/A	N/A	N/A	N/A	N/A	58
OL-STA-10026-VC	1117571.58	925702.21	355.08	355.08	<335.38	<335.38	<335.38	<335.38	<335.38	<335.38	<335.38	335.38	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7

Note: Depths are measured from mudline elevation (NAVD 88).

Geosyntec consultants

Written by: Ming Zhu Date: 06/18/2008 Reviewed by: Raja Madhyannapu Date: 06/19/2008

Client: Honeywell Project: Onondaga Lake ILWD Stability Project/ Proposal No.: GJ4204 Task No.: 01

Boring ID	Northing	Easting	Mudline Elevation (ft)	Bottom of Silt Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Silt (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
PHASE II																					
OL-VC-10034	1118059.79	923085.68	347.90	347.90	329.90	<328.2	<328.2	<328.2	<328.2	<328.2	<328.2	328.20	0	18	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10035	1118249.10	923155.90	347.00	347.00	327.50	<327.2	<327.2	<327.2	<327.2	<327.2	<327.2	327.20	0	19.5	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10036	1118201.60	923262.90	347.40	347.40	327.90	<327.6	<327.6	<327.6	<327.6	<327.6	<327.6	327.60	0	19.5	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10036A	1118202.50	923260.40	347.40	347.40	327.90	<327.6	<327.6	<327.6	<327.6	<327.6	<327.6	327.60	0	19.5	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10037	1118398.60	923321.20	344.30	338.80	326.30	<324.5	<324.5	<324.5	<324.5	<324.5	<324.5	324.50	5.5	18	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10038	1117947.64	923415.06	361.90	361.90	<343	<343	<343	<343	<343	<343	<343	343.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.9
OL-VC-10039	1118088.40	923575.40	351.00	351.00	<333	<333	<333	<333	<333	<333	<333	333.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-VC-10040	1118351.90	923587.30	349.70	347.70	<329.9	<329.9	<329.9	<329.9	<329.9	<329.9	<329.9	329.90	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10041	1117900.70	923642.10	361.30	361.30	<341.6	<341.6	<341.6	<341.6	<341.6	<341.6	<341.6	341.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10041A	1117900.00	923643.90	361.30	361.30	<341.5	<341.5	<341.5	<341.5	<341.5	<341.5	<341.5	341.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10042	1118505.00	923697.10	338.70	338.70	<318.9	<318.9	<318.9	<318.9	<318.9	<318.9	<318.9	318.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10042A	1118507.20	923698.10	338.20	335.20	<318.4	<318.4	<318.4	<318.4	<318.4	<318.4	<318.4	318.40	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10043	1118496.60	923946.70	338.60	338.60	<318.8	<318.8	<318.8	<318.8	<318.8	<318.8	<318.8	318.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10044	1118365.50	923964.80	349.80	349.80	<330.8	<330.8	<330.8	<330.8	<330.8	<330.8	<330.8	330.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19
OL-VC-10046	1118047.30	924008.60	359.60	359.60	<340.4	<340.4	<340.4	<340.4	<340.4	<340.4	<340.4	340.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2
OL-VC-10046A	1118045.00	924010.70	360.00	360.00	<341.9	<341.9	<341.9	<341.9	<341.9	<341.9	<341.9	341.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.1
OL-VC-10047	1118465.20	924146.40	339.70	339.70	<319.9	<319.9	<319.9	<319.9	<319.9	<319.9	<319.9	319.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10048	1118168.80	924158.40	360.00	360.00	<340.3	<340.3	<340.3	<340.3	<340.3	<340.3	<340.3	340.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10048A	1118168.30	924160.50	360.00	360.00	<342.1	<342.1	<342.1	<342.1	<342.1	<342.1	<342.1	342.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.9
OL-VC-10049	1117989.70	924167.40	360.70	360.70	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	340.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10049A	1117991.00	924167.80	360.70	360.70	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	340.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10050	1117816.40	925985.10	346.60	343.60	<327.2	<327.2	<327.2	<327.2	<327.2	<327.2	<327.2	327.20	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.4
OL-VC-10051	1117854.70	926006.90	346.20	339.70	<326.4	<326.4	<326.4	<326.4	<326.4	<326.4	<326.4	326.40	6.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10052	1117852.60	925963.80	346.60	341.60	<326.8	<326.8	<326.8	<326.8	<326.8	<326.8	<326.8	326.80	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10053	1117722.00	924313.00	361.00	361.00	<341.8	<341.8	<341.8	<341.8	<341.8	<341.8	<341.8	341.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2
OL-VC-10053A	1117723.80	924313.30	361.00	361.00	<341.2	<341.2	<341.2	<341.2	<341.2	<341.2	<341.2	341.20	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10054	1117823.80	924273.20	361.20	361.20	<342.4	<342.4	<342.4	<342.4	<342.4	<342.4	<342.4	342.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.8
OL-VC-10055	1118435.40	924347.90	341.40	341.40	<322.5	<322.5	<322.5	<322.5	<322.5	<322.5	<322.5	322.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.9
OL-VC-10056	1118096.50	924315.80	359.60	359.60	<340.4	<340.4	<340.4	<340.4	<340.4	<340.4	<340.4	340.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2
OL-VC-10057	1118236.30	924432.40	353.90	353.90	<334.4	<334.4	<334.4	<334.4	<334.4	<334.4	<334.4	334.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.5
OL-VC-10057A	1118237.80	924433.90	353.90	353.90	<334.2	<334.2	<334.2	<334.2	<334.2	<334.2	<334.2	334.20	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10058	1117838.00	924442.80	358.30	358.30	<338.5	<338.5	<338.5	<338.5	<338.5	<338.5	<338.5	338.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10058A	1117839.50	924444.60	358.30	356.30	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	<340.9	340.90	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.4
OL-VC-10059	1117726.60	924590.40	359.80	359.80	<340.5	<340.5	<340.5	<340.5	<340.5	<340.5	<340.5	340.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.3
OL-VC-10060	1117861.40	924676.30	359.90	358.90	<341.9	<341.9	<341.9	<341.9	<341.9	<341.9	<341.9	341.90	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-VC-10061	1118238.80	924717.30	350.70	350.70	<331	<331	<331	<331	<331	<331	<331	331.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10062	1117993.70	924727.10	358.00	358.00	<338.8	<338.8	<338.8	<338.8	<338.8	<338.8	<338.8	338.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2
OL-VC-10062A	1117996.10	924727.20	358.10	358.10	<339.1	<339.1	<339.1	<339.1	<339.1	<339.1	<339.1	339.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19
OL-VC-10063	1118434.80	924795.40	338.00	338.00	<318.2	<318.2	<318.2	<318.2	<318.2	<318.2	<318.2	318.20	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10063A	1118435.40	924793.40	338.00	338.00	<320.5	<320.5	<320.5	<320.5	<320.5	<320.5	<320.5	320.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.5
OL-VC-10064	1117684.30	924771.70	359.80	359.80	<340	<340	<340	<340	<340	<340	<340	340.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10064A	1117684.70	924774.20	359.80	359.80	<340	<340	<340	<340	<340	<340	<340	340.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10065	1117697.10	924792.20	360.40	360.40	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	340.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10066	1117659.00	924773.40	360.80	360.80	<341	<341	<341	<341	<341	<341	<341	341.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10067	1117697.50	924750.20	360.90	360.90	<341.8	<341.8	<341.8	<341.8	<341.8	<341.8	<341.8	341.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.1
OL-VC-10068	1117921.70	924860.70	356.90	356.90	<337.3	<337.3	<337.3	<337.3	<337.3	<337.3	<337.3	337.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.6
OL-VC-10069	1117812.20	924950.90	357.70	353.70	<337.9	<337.9	<337.9	<337.9	<337.9	<337.9	<337.9	337.90	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10070	1117455.20	924919.90	360.30	360.30	<341.2	<341.2	<341.2	<341.2	<341.2	<341.2	<341.2	341.20	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.1
OL-VC-10070A	1117457.00	924918.50	360.30	360.30	<341.1	<341.1	<341.1	<341.1	<341.1	<341.1	<341.1	341.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.2

Note: Depths are measured from mudline elevation (NAVD 88).

Geosyntec consultants

Written by: Ming Zhu Date: 06/18/2008 Reviewed by: Raja Madhyannapu Date: 06/19/2008

Client: Honeywell Project: Onondaga Lake ILWD Stability Project/ Proposal No.: GJ4204 Task No.: 01

Boring ID	Northing	Easting	Mudline Elevation (ft)	Bottom of Silt Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Silt (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
OL-VC-10071	1118398.90	925183.70	335.20	332.20	<315.4	<315.4	<315.4	<315.4	<315.4	<315.4	<315.4	315.40	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10072	1118217.60	925154.10	344.10	344.10	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	324.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10073	1118025.10	925124.40	353.20	353.20	<333.4	<333.4	<333.4	<333.4	<333.4	<333.4	<333.4	333.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10073A	1118024.80	925112.80	353.20	353.20	<333.4	<333.4	<333.4	<333.4	<333.4	<333.4	<333.4	333.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10074	1117740.60	925137.10	356.90	356.90	<337.1	<337.1	<337.1	<337.1	<337.1	<337.1	<337.1	337.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10075	1117274.00	925124.10	360.30	360.30	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	341.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.9
OL-VC-10076	1117526.40	925240.30	357.80	357.80	<338	<338	<338	<338	<338	<338	<338	338.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10077	1118080.00	925345.50	349.50	349.50	<331.6	<331.6	<331.6	<331.6	<331.6	<331.6	<331.6	331.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.9
OL-VC-10078	1117846.00	925415.90	354.20	351.20	<334.4	<334.4	<334.4	<334.4	<334.4	<334.4	<334.4	334.40	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10078A	1117845.20	925416.60	354.30	353.30	<334.5	<334.5	<334.5	<334.5	<334.5	<334.5	<334.5	334.50	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10079	1117654.20	925420.70	355.90	355.90	<337	<337	<337	<337	<337	<337	<337	337.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.9
OL-VC-10080	1116980.60	925396.30	360.60	360.60	<341.3	<341.3	<341.3	<341.3	<341.3	<341.3	<341.3	341.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.3
OL-VC-10080A	1116982.20	925394.20	360.60	354.60	<341.3	<341.3	<341.3	<341.3	<341.3	<341.3	<341.3	341.30	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.3
OL-VC-10081	1117441.00	925496.00	357.60	357.60	<337.8	<337.8	<337.8	<337.8	<337.8	<337.8	<337.8	337.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10081A	1117443.50	925496.80	357.70	357.70	<338.1	<338.1	<338.1	<338.1	<338.1	<338.1	<338.1	338.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.6
OL-VC-10082	1118354.30	925614.90	333.60	326.60	<313.8	<313.8	<313.8	<313.8	<313.8	<313.8	<313.8	313.80	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10083	1118077.40	925633.80	344.10	344.10	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	324.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10083A	1118076.40	925631.90	344.10	342.10	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	<324.3	324.30	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10084	1117489.50	925660.70	355.40	355.40	<335.6	<335.6	<335.6	<335.6	<335.6	<335.6	<335.6	335.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10085	1117135.00	925641.90	358.50	358.50	<338.7	<338.7	<338.7	<338.7	<338.7	<338.7	<338.7	338.70	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10086	1116945.80	925660.60	359.40	359.40	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	341.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-VC-10086A	1116944.40	925659.40	359.40	359.40	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	340.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.8
OL-VC-10087	1116769.10	925592.60	360.40	360.40	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	<341.4	341.40	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19
OL-VC-10088	1117764.50	925722.10	353.10	353.10	<333.3	<333.3	<333.3	<333.3	<333.3	<333.3	<333.3	333.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10089	1117288.40	925742.90	356.60	356.60	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	336.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7
OL-VC-10090	1118132.30	925905.20	338.80	332.30	<319	<319	<319	<319	<319	<319	<319	319.00	6.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10091	1117683.10	925945.20	352.90	352.90	<333.3	<333.3	<333.3	<333.3	<333.3	<333.3	<333.3	333.30	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.6
OL-VC-10092	1117470.80	925874.70	354.60	354.60	<335.6	<335.6	<335.6	<335.6	<335.6	<335.6	<335.6	335.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19
OL-VC-10093	1116983.50	925873.50	358.50	358.50	<338.7	<338.7	<338.7	<338.7	<338.7	<338.7	<338.7	338.70	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10094	1116632.30	925868.40	360.40	360.40	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	<340.6	340.60	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10095	1118333.90	925972.70	334.10	325.10	317.60	317.60	<314.5	<314.5	<314.5	<314.5	<314.5	314.50	9	16.5	16.5	N/A	N/A	N/A	N/A	N/A	19.6
OL-VC-10095A	1118335.50	925974.70	334.10	325.60	321.10	321.10	<315	<315	<315	<315	<315	315.00	8.5	13	13	N/A	N/A	N/A	N/A	N/A	19.1
OL-VC-10096	1117842.40	925984.70	347.00	344.00	<327.2	<327.2	<327.2	<327.2	<327.2	<327.2	<327.2	327.20	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10096A	1117840.70	925983.80	347.00	344.00	<329.6	<329.6	<329.6	<329.6	<329.6	<329.6	<329.6	329.60	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.4
OL-VC-10097	1117273.40	926020.40	355.20	355.20	<336.8	<336.8	<336.8	<336.8	<336.8	<336.8	<336.8	336.80	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.4
OL-VC-10097A	1117275.10	926019.50	355.20	355.20	<336.7	<336.7	<336.7	<336.7	<336.7	<336.7	<336.7	336.70	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.5
OL-VC-10098	1117287.00	926041.70	354.90	354.90	<335.1	<335.1	<335.1	<335.1	<335.1	<335.1	<335.1	335.10	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10099	1117250.50	926020.20	355.30	355.30	<335.5	<335.5	<335.5	<335.5	<335.5	<335.5	<335.5	335.50	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10100	1117287.30	925996.80	355.10	355.10	<336	<336	<336	<336	<336	<336	<336	336.00	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.1
OL-VC-10101	1117979.00	926082.60	341.40	335.90	325.90	325.90	<321.6	<321.6	<321.6	<321.6	<321.6	321.60	5.5	15.5	15.5	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10102	1117485.00	926067.60	353.90	353.90	<336.7	<336.7	<336.7	<336.7	<336.7	<336.7	<336.7	336.70	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.2
OL-VC-10103	1117084.30	926131.80	354.90	354.90	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	336.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-VC-10103A	1117084.40	926133.50	354.90	354.90	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	<336.9	336.90	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-VC-10104	1116687.10	926107.60	359.10	359.10	346.10	346.10	<339.3	<339.3	<339.3	<339.3	<339.3	339.30	0	13	13	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10104A	1116685.60	926107.10	359.10	359.10	347.60	347.60	<340.9	<340.9	<340.9	<340.9	<340.9	340.90	0	11.5	11.5	N/A	N/A	N/A	N/A	N/A	18.2
OL-VC-10105	1116859.40	926187.20	356.80	356.80	338.80	338.80	<337	<337	<337	<337	<337	337.00	0	18	18	N/A	N/A	N/A	N/A	N/A	19.8
OL-VC-10106	1116498.40	926169.90	359.80	357.80	354.80	354.80	<342.3	<342.3	<342.3	<342.3	<342.3	342.30	2	5	5	N/A	N/A	N/A	N/A	N/A	17.5
OL-VC-10107	1116313.70	926342.70	360.70	360.70	360.70	360.70	<343.2	<343.2	<343.2	<343.2	<343.2	343.20	0	0	0	N/A	N/A	N/A	N/A	N/A	17.5
OL-STA-10108	1118335.70	924813.40	342.81	342.81	295.81	280.81	218.31	202.81	194.31	173.81	<163.81	163.81	0	47	62	124.5	140	148.5	169	N/A	179

Note: Depths are measured from mudline elevation (NAVD 88).

Geosyntec consultants

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Boring ID	Northing	Easting	Mudline Elevation (ft)	Bottom of Silt Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Silt (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
2007 DNAPL Addendum (Mudline elevations in pink not presented in boroing logs; estimated from the boring plan)																					
OL-SB-10115	1118004.96	923135.01	347.24	347.24	336.54	324.94	<321.24	<321.24	<321.24	<321.24	<321.24	321.24	0	10.7	22.3	N/A	N/A	N/A	N/A	N/A	26
OL-SB-10116	1117858.77	923362.77	362.41	362.41	348.41	330.41	<328.41	<328.41	<328.41	<328.41	<328.41	328.41	0	14	32	N/A	N/A	N/A	N/A	N/A	34
OL-SB-10117	1117851.31	923409.20	362.44	362.44	<344.44	<344.44	<344.44	<344.44	<344.44	<344.44	<344.44	344.44	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
OL-SB-10117A	1117868.78	923403.94	361.91	Incomplete boring logs									Incomplete boring logs								
OL-SB-10117B	1117852.93	923384.42	362.4																		
OL-SB-10118	1117843.24	923476.58	362.26	362.26	348.26	<334.26	<334.26	<334.26	<334.26	<334.26	<334.26	334.26	0	14	N/A	N/A	N/A	N/A	N/A	N/A	28
OL-SB-10119	1117847.79	923504.34	361.99	361.99	341.99	<331.99	<331.99	<331.99	<331.99	<331.99	<331.99	331.99	0	20	N/A	N/A	N/A	N/A	N/A	N/A	30
OL-SB-10120	1117818.00	923573.00	362.32	362.32	342.32	328.32	<326.32	<326.32	<326.32	<326.32	<326.32	326.32	0	20	34	N/A	N/A	N/A	N/A	N/A	36
OL-SB-10121	1117794.13	923614.32	362.58	362.58	344.08	328.58	<320.58	<320.58	<320.58	<320.58	<320.58	320.58	0	18.5	34	N/A	N/A	N/A	N/A	N/A	42
OL-SB-10122	1117840.64	923574.97	361.97	361.97	342.97	<333.97	<333.97	<333.97	<333.97	<333.97	<333.97	333.97	0	19	N/A	N/A	N/A	N/A	N/A	N/A	28
OL-SB-10123	1117890.13	923515.16	361.06	361.06	331.56	321.06	<319.06	<319.06	<319.06	<319.06	<319.06	319.06	0	29.5	40	N/A	N/A	N/A	N/A	N/A	42
OL-SB-10124	1117850.92	923591.26	361.69	361.69	332.49	321.69	<319.69	<319.69	<319.69	<319.69	<319.69	319.69	0	29.2	40	N/A	N/A	N/A	N/A	N/A	42
OL-SB-10125	1117864.09	923592.56	361.45	361.45	331.45	323.15	<321.45	<321.45	<321.45	<321.45	<321.45	321.45	0	30	38.3	N/A	N/A	N/A	N/A	N/A	40
OL-SB-10126	1117884.17	923386.19	361.52	361.52	338.02	<335.52	<335.52	<335.52	<335.52	<335.52	<335.52	335.52	0	23.5	N/A	N/A	N/A	N/A	N/A	N/A	26
OL-SB-10127	1117868.23	923510.67	361.49	361.49	332.79	323.79	<321.49	<321.49	<321.49	<321.49	<321.49	321.49	0	28.7	37.7	N/A	N/A	N/A	N/A	N/A	40
OL-SB-10128	1117832.55	923602.76	361.99	361.99	338.09	327.29	<323.99	<323.99	<323.99	<323.99	<323.99	323.99	0	23.9	34.7	N/A	N/A	N/A	N/A	N/A	38
Phase III SMU 1 and 8																					
OL-SB-10129	1117999.55	923826.20	360.95	360.95	327.95	309.45	<293.95	<293.95	<293.95	<293.95	<293.95	293.95	0	33	51.5	N/A	N/A	N/A	N/A	N/A	67
OL-SB-10130	1118242.42	923877.19	360.1	360.10	322.10	302.60	<289.1	<289.1	<289.1	<289.1	<289.1	289.10	0	38	57.5	N/A	N/A	N/A	N/A	N/A	71
OL-SB-10131	1117817.76	924455.93	357.39	357.39	315.39	273.39	255.89	245.89	<243.89	<243.89	<243.89	243.89	0	42	84	101.5	111.5	N/A	N/A	N/A	113.5
OL-SB-10132	1118276.19	924561.43	345.24	343.24	303.74	294.24	<269.24	<269.24	<269.24	<269.24	<269.24	269.24	2	41.5	51	N/A	N/A	N/A	N/A	N/A	76
OL-SB-10133	1117318.06	925001.70	362.49	362.49	322.99	311.49	<291.99	<291.99	<291.99	<291.99	<291.99	291.99	0	39.5	51	N/A	N/A	N/A	N/A	N/A	70.5
OL-SB-10134	1117635.90	925164.52	359.29	359.29	309.29	<278.29	<278.29	<278.29	<278.29	<278.29	<278.29	278.29	0	50	N/A	N/A	N/A	N/A	N/A	N/A	81
OL-SB-10135	1118032.66	925359.40	353.57	353.57	306.57	<275.07	<275.07	<275.07	<275.07	<275.07	<275.07	275.07	0	47	N/A	N/A	N/A	N/A	N/A	N/A	78.5
OL-SB-80052	1118745.12	923974.90	323.85	322.25	297.85	248.85	215.85	213.85	204.45	204.45	<203.85	203.85	1.6	26	75	108	110	119.4	119.4	N/A	120
OL-SB-80053	1118753.14	924685.38	322.03	318.03	290.03	237.53	172.03	165.03	165.03	165.03	<164.03	164.03	4	32	84.5	150	157	157	157	N/A	158
OL-SB-80054	1118437.57	925589.90	330.44	326.94	304.44	250.94	173.44	117.44	112.74	112.74	<112.44	112.44	3.5	26	79.5	157	213	217.7	217.7	N/A	218
2006 DNAPL (In the overlapping area of SMU 1 and SMU 2)																					
OL-VC-20024	1117946.41	923116.47	351.3	346.90	335.30	324.80	<317.3	<317.3	<317.3	<317.3	<317.3	317.30	4.4	16	26.5	N/A	N/A	N/A	N/A	N/A	34
OL-VC-20039	1117999.12	922986.03	356.4	352.10	332.40	322.40	<321.4	<321.4	<321.4	<321.4	<321.4	321.40	4.3	24	34	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20043	1118001.70	923003.90	350.5	339.80	328.30	321.30	<317.9	<317.9	<317.9	<317.9	<317.9	317.90	10.7	22.2	29.2	N/A	N/A	N/A	N/A	N/A	32.6
OL-VC-20044	1117950.40	923134.10	349.3	347.00	329.70	323.20	<314.3	<314.3	<314.3	<314.3	<314.3	314.30	2.3	19.6	26.1	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20045	1118013.70	923017.50	348.8	346.50	329.10	324.20	<313.8	<313.8	<313.8	<313.8	<313.8	313.80	2.3	19.7	24.6	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20046	1117914.10	923194.50	348.8	344.80	329.00	323.80	<314	<314	<314	<314	<314	314.00	4	19.8	25	N/A	N/A	N/A	N/A	N/A	34.8
OL-VC-20047	1118026.20	923030.30	348.3	344.10	327.00	320.00	<313.3	<313.3	<313.3	<313.3	<313.3	313.30	4.2	21.3	28.3	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20048	1117880.20	923290.40	356.8	351.80	344.10	332.20	<327.9	<327.9	<327.9	<327.9	<327.9	327.90	5	12.7	24.6	N/A	N/A	N/A	N/A	N/A	28.9
OL-VC-20049	1117931.70	923213.50	348.6	347.10	329.40	324.10	<313.6	<313.6	<313.6	<313.6	<313.6	313.60	1.5	19.2	24.5	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20050	1118038.50	923044.30	348	344.20	327.00	321.00	<313	<313	<313	<313	<313	313.00	3.8	21	27	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20052	1117989.90	923067.30	348.1	346.00	328.00	319.80	<313.1	<313.1	<313.1	<313.1	<313.1	313.10	2.1	20.1	28.3	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20054	1117943.40	923227.40	348.1	342.30	329.90	324.40	<313.1	<313.1	<313.1	<313.1	<313.1	313.10	5.8	18.2	23.7	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20055	1117906.80	923320.20	356.3	354.80	334.20	328.50	<324.3	<324.3	<324.3	<324.3	<324.3	324.30	1.5	22.1	27.8	N/A	N/A	N/A	N/A	N/A	32
OL-STA-20056	1117902.85	923425.95		This boring seems to be a continuation to OL-VC-20056 based on coordiantes; Soil profile here is combined into OL-VC-200056																	
OL-VC-20056	1117905.90	923418.40	361.5	360.00	326.50	322.50	<316.5	<316.5	<316.5	<316.5	<316.5	316.50	1.5	35	39	N/A	N/A	N/A	N/A	N/A	45
OL-VC-20060	1117970.30	923256.90	347.8	345.50	326.80	320.80	<312.8	<312.8	<312.8	<312.8	<312.8	312.80	2.3	21	27	N/A	N/A	N/A	N/A	N/A	35
OL-STA-20061				Boring log N/A									Boring log N/A								
OL-VC-20062	1117999.20	923286.50	348.9	345.90	324.10	316.90	<313.9	<313.9	<313.9	<313.9	<313.9	313.90	3	24.8	32	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20063	1117950.50	923312.30	350	346.30	326.30	320.00	<315	<315	<315	<315	<315	315.00	3.7	23.7	30	N/A	N/A	N/A	N/A	N/A	35
OL-VC-20064	1117985.30	923211.00	347.9	345.80	327.10	320.00	<316.7	<316.7	<316.7	<316.7	<316.7	316.70	2.1	20.8	27.9	N/A	N/A	N/A	N/A	N/A	31.2
OL-VC-20065	1117968.50	923322.80	351.2	349.50	325.30	318.80	<317.3	<317.3	<317.3	<317.3	<317.3	317.30	1.7	25.9	32.4	N/A	N/A	N/A	N/A	N/A	33.9

Note: Depths are measured from mudline elevation (NAVD 88).

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
HB-SB-01	1117840.27	923237.44	368.14	357.14	351.94	326.34	<320.14	<320.14	<320.14	<320.14	<320.14	320.14	11	16.2	41.8	N/A	N/A	N/A	N/A	N/A	48
HB-SB-02	1117811.12	923383.93	368.48	360.98	354.48	334.68	<324.48	<324.48	<324.48	<324.48	<324.48	324.48	7.5	14	33.8	N/A	N/A	N/A	N/A	N/A	44
HB-SB-03	1117705.90	923488.10	369.7	362.70	355.70	340.20	<333.7	<333.7	<333.7	<333.7	<333.7	333.70	7	14	29.5	N/A	N/A	N/A	N/A	N/A	36
HB-SB-04	1117723.70	923772.70	368.5	364.50	352.50	330.50	317.50	304.90	304.90	298.50	<296.3	296.30	4	16	38	51	63.6	63.6	70	N/A	72.2
HB-SB-05	1117574.23	923914.63	370.04	364.54	356.04	342.54	<332.04	<332.04	<332.04	<332.04	<332.04	332.04	5.5	14	27.5	N/A	N/A	N/A	N/A	N/A	38
HB-SB-07	1117424.12	924360.13	369.17	364.17	349.17	328.67	<319.17	<319.17	<319.17	<319.17	<319.17	319.17	5	20	40.5	N/A	N/A	N/A	N/A	N/A	50
HB-SB-08	1117503.70	924603.38	366.14	361.14	321.14	311.64	<308.14	<308.14	<308.14	<308.14	<308.14	308.14	5	45	54.5	N/A	N/A	N/A	N/A	N/A	58
HB-SB-09	1117225.96	924481.57	376.47	369.47	353.77	342.97	<332.47	<332.47	<332.47	<332.47	<332.47	332.47	7	22.7	33.5	N/A	N/A	N/A	N/A	N/A	44
HB-SB-10	1117179.20	924921.40	363.7	357.70	328.20	321.70	311.90	288.20	260.20	253.70	<253.5	253.50	6	35.5	42	51.8	75.5	103.5	110	N/A	110.2
HB-SB-11	1116969.99	925013.38	365.49	364.49	349.49	327.49	<317.49	<317.49	<317.49	<317.49	<317.49	317.49	1	16	38	N/A	N/A	N/A	N/A	N/A	48
HB-SB-12	1116918.09	925157.85	363.51	363.51	333.51	317.51	<315.51	<315.51	<315.51	<315.51	<315.51	315.51	0	30	46	N/A	N/A	N/A	N/A	N/A	48
HB-SB-13	1116810.14	925264.09	364.94	364.94	332.94	318.94	<314.94	<314.94	<314.94	<314.94	<314.94	314.94	0	32	46	N/A	N/A	N/A	N/A	N/A	50
HB-SB-14	1116715.05	925479.87	365	363.00	331.10	<317	<317	<317	<317	<317	<317	317.00	2	33.9	N/A	N/A	N/A	N/A	N/A	N/A	48
HB-SB-15	1116604.07	925584.66	365.41	363.41	347.41	316.41	302.41	279.91	279.91	266.01	<265.71	265.71	2	18	49	63	85.5	85.5	99.4	N/A	99.7
HB-SB-16	1116450.95	925872.47	363.6	357.60	346.60	<317.6	<317.6	<317.6	<317.6	<317.6	<317.6	317.60	6	17	N/A	N/A	N/A	N/A	N/A	N/A	46
HB-SB-17	1116219.81	925761.67	364.88	363.18	354.88	<320.88	<320.88	<320.88	<320.88	<320.88	<320.88	320.88	1.7	10	N/A	N/A	N/A	N/A	N/A	N/A	44
HB-SB-18	1116307.90	926076.11	363.4	361.40	348.40	313.40	280.20	271.90	270.00	267.90	<265.4	265.40	2	15	50	83.2	91.5	93.4	95.5	N/A	98
HB-SB-19	1116127.48	925969.59	363.61	357.01	353.81	<317.61	<317.61	<317.61	<317.61	<317.61	<317.61	317.61	6.6	9.8	N/A	N/A	N/A	N/A	N/A	N/A	46
HB-SB-20	1115903.03	925902.66	368.12	351.12	351.12	334.37	<324.12	<324.12	<324.12	<324.12	<324.12	324.12	17	17	33.75	N/A	N/A	N/A	N/A	N/A	44
HB-SB-21	1115732.02	925758.87	373.38	363.38	356.88	331.38	300.38	284.58	284.58	282.68	<282.48	282.48	10	16.5	42	73	88.8	88.8	90.7	N/A	90.9
HB-SB-22	1115416.91	925636.34	374.83	370.03	359.73	339.03	<328.83	<328.83	<328.83	<328.83	<328.83	328.83	4.8	15.1	35.8	N/A	N/A	N/A	N/A	N/A	46
HB-SB-23	1115297.76	925536.59	370.03	361.23	361.23	342.03	<334.03	<334.03	<334.03	<334.03	<334.03	334.03	8.8	8.8	28	N/A	N/A	N/A	N/A	N/A	36
HB-SB-24	1115210.68	925502.23	371.03	360.53	360.53	347.63	335.03	335.03	335.03	331.53	<331.23	331.23	10.5	10.5	23.4	36	36	36	39.5	N/A	39.8
HB-SB-25	1116106.10	926261.77	363.78	357.08	357.08	310.28	<299.78	<299.78	<299.78	<299.78	<299.78	299.78	6.7	6.7	53.5	N/A	N/A	N/A	N/A	N/A	64
HB-SB-26	1116103.01	926781.14	363.64	355.94	355.94	312.44	<301.64	<301.64	<301.64	<301.64	<301.64	301.64	7.7	7.7	51.2	N/A	N/A	N/A	N/A	N/A	62
HB-SB-27	1115906.21	926677.66	363.42	353.92	353.92	<299.42	<299.42	<299.42	<299.42	<299.42	<299.42	299.42	9.5	9.5	N/A	N/A	N/A	N/A	N/A	N/A	64
HB-SB-28	1116276.11	927258.43	365.29	347.09	347.09	<303.29	<303.29	<303.29	<303.29	<303.29	<303.29	303.29	18.2	18.2	N/A	N/A	N/A	N/A	N/A	N/A	62
HB-SB-30	1115961.00	925528.80	379.19	377.19	356.19	339.19	<337.188	<337.188	<337.188	<337.188	<337.188	337.19	2	23	40	N/A	N/A	N/A	N/A	N/A	42
HB-SB-32	1116524.40	925378.40	380.07	378.07	348.67	326.07	300.07	269.57	<264.268	<264.268	<264.268	264.27	2	31.4	54	80	110.5	N/A	N/A	N/A	115.8
HB-SB-32A	1115751.05	925209.52	389.54	375.54	359.54	337.54	310.54	310.54	310.54	<305.54	<305.54	305.54	14	30	52	79	79	79	N/A	N/A	84
HB-SB-33	1116781.30	925128.50	379.98	377.98	346.28	<325.984	<325.984	<325.984	<325.984	<325.984	<325.984	325.98	2	33.7	N/A	N/A	N/A	N/A	N/A	N/A	54
HB-SB-35	1116667.00	924526.50	380.10	378.10	356.10	343.60	343.60	<340.097	<340.097	<340.097	<340.097	340.10	2	24	36.5	36.5	N/A	N/A	N/A	N/A	40
HB-SB-36	1117102.80	924612.20	380.17	378.17	352.17	338.17	<334.165	<334.165	<334.165	<334.165	<334.165	334.17	2	28	42	N/A	N/A	N/A	N/A	N/A	46
HB-SB-38	1117259.00	924148.50	380.53	378.53	349.53	334.53	<313.526	<313.526	<313.526	<313.526	<313.526	313.53	2	31	46	N/A	N/A	N/A	N/A	N/A	67
HB-SB-39	1117094.20	923923.20	380.79	378.79	352.79	340.79	<338.789	<338.789	<338.789	<338.789	<338.789	338.79	2	28	40	N/A	N/A	N/A	N/A	N/A	42
HB-SB-40	1117438.10	923944.30	383.25	381.25	351.25	344.25	<341.249	<341.249	<341.249	<341.249	<341.249	341.25	2	32	39	N/A	N/A	N/A	N/A	N/A	42
HB-SB-42	1115649.20	925728.20	379.99	373.29	363.29	340.99	<337.991	<337.991	<337.991	<337.991	<337.991	337.99	6.7	16.7	39	N/A	N/A	N/A	N/A	N/A	42
HB-SB-43	1115629.50	925596.80	394.72	374.02	370.92	<356.716	<356.716	<356.716	<356.716	<356.716	<356.716	356.72	20.7	23.8	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-SB-44	1115632.10	925499.50	386.00	375.80	364.80	351.40	351.40	351.40	<346.004	<346.004	<346.004	346.00	10.2	21.2	34.6	34.6	34.6	N/A	N/A	N/A	40
HB-SB-45	1115522.30	925650.20	376.65	372.75	363.85	353.85	353.85	<348.651	<348.651	<348.651	<348.651	348.65	3.9	12.8	22.8	22.8	N/A	N/A	N/A	N/A	28
HB-SB-46	1115548.60	925720.70	379.49	374.49	365.49	354.49	354.49	<351.492	<351.492	<351.492	<351.492	351.49	5	14	25	25	N/A	N/A	N/A	N/A	28
HB-SB-47	1115544.10	925842.50	375.58	364.78	357.88	348.58	348.58	<345.576	<345.576	<345.576	<345.576	345.58	10.8	17.7	27	27	N/A	N/A	N/A	N/A	30
HB-SB-48	1115511.10	925889.20	378.51	373.71	360.31	349.81	349.81	<346.507	<346.507	<346.507	<346.507	346.51	4.8	18.2	28.7	28.7	N/A	N/A	N/A	N/A	32
HB-SB-49	1115506.00	925780.60	381.50	375.60	366.70	353.50	353.50	<349.497	<349.497	<349.497	<349.497	349.50	5.9	14.8	28	28	N/A	N/A	N/A	N/A	32
HB-SB-50	1115482.20	925714.10	379.38	358.98	358.98	348.58	348.58	<345.381	<345.381	<345.381	<345.381	345.38	20.4	20.4	30.8	30.8	N/A	N/A	N/A	N/A	34

Note: Depths are measured from mudline elevation (NAVD 88).

Written by: Ming Zhu Date: 06/18/2008 Reviewed by: Raja Madhyannapu Date: 06/19/2008

Client: Honeywell Project: Onondaga Lake ILWD Stability Project/ Proposal No.: GJ4204 Task No.: 01

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
HB-SB-61	1116304.87	925113.83	380.58	376.58	356.58	334.58	<328.58	<328.58	<328.58	<328.58	<328.58	328.58	4	24	46	N/A	N/A	N/A	N/A	N/A	52
HB-SB-62	1116501.67	925517.11	380.05	379.05	351.30	322.55	<318.05	<318.05	<318.05	<318.05	<318.05	318.05	1	28.75	57.5	N/A	N/A	N/A	N/A	N/A	62
HB-SB-63	1116540.82	925693.98	366.21	361.71	355.21	322.21	<318.212	<318.212	<318.212	<318.212	<318.212	318.21	4.5	11	44	N/A	N/A	N/A	N/A	N/A	48
HB-SB-64	1116471.45	925771.95	365.61	363.61	352.61	326.61	<319.608	<319.608	<319.608	<319.608	<319.608	319.61	2	13	39	N/A	N/A	N/A	N/A	N/A	46
HB-SB-65	1116351.48	925855.65	364.91	363.91	353.91	319.91	<316.909	<316.909	<316.909	<316.909	<316.909	316.91	1	11	45	N/A	N/A	N/A	N/A	N/A	48
HB-SB-66	1116066.72	926035.35	367.11	362.61	362.61	324.11	<321.108	<321.108	<321.108	<321.108	<321.108	321.11	4.5	4.5	43	N/A	N/A	N/A	N/A	N/A	46
HB-SB-67	1116052.25	926108.94	366.40	360.40	360.40	321.40	<318.395	<318.395	<318.395	<318.395	<318.395	318.40	6	6	45	N/A	N/A	N/A	N/A	N/A	48
HB-SB-68	1115755.21	926004.30	371.05	364.05	356.05	322.05	273.05	273.05	273.05	<272.448	<272.448	272.45	7	15	49	98	98	98	N/A	N/A	98.6
HB-SB-69	1115253.82	925648.84	382.00	360.00	360.00	348.00	<344	<344	<344	<344	<344	344.00	22	22	34	N/A	N/A	N/A	N/A	N/A	38
HB-SB-70	1115228.86	925618.42	381.43	357.43	357.43	343.43	<339.425	<339.425	<339.425	<339.425	<339.425	339.43	24	24	38	N/A	N/A	N/A	N/A	N/A	42
HB-SB-71	1115291.27	925532.57	373.06	365.06	365.06	353.06	353.06	<347.06	<347.06	<347.06	<347.06	347.06	8	8	20	20	N/A	N/A	N/A	N/A	26
HB-SB-72	1115653.88	925310.27	381.90	381.90	364.90	354.90	314.90	314.90	314.90	<309.901	<309.901	309.90	0	17	27	67	67	67	N/A	N/A	72
HB-SB-73	1115759.44	925067.40	390.35	377.35	361.35	351.35	317.35	317.35	317.35	<314.345	<314.345	314.35	13	29	39	73	73	73	N/A	N/A	76
HB-SB-74	1115769.22	924952.42	390.17	353.17	353.17	346.17	346.17	346.17	346.17	<339.365	<339.365	339.37	37	37	44	44	44	44	N/A	N/A	50.8
HB-SB-75	1115768.21	924814.40	390.23	370.23	358.23	353.23	353.23	353.23	353.23	<350.029	<350.029	350.03	20	32	37	37	37	37	N/A	N/A	40.2
HB-SB-76	1115854.33	924845.17	391.89	358.89	358.89	350.89	350.89	350.89	350.89	<345.786	<345.786	345.79	33	33	41	41	41	41	N/A	N/A	46.1
HB-SB-77	1115970.97	924934.51	390.88	384.88	357.88	343.88	313.88	313.88	313.88	<307.982	<307.982	307.98	6	33	47	77	77	77	N/A	N/A	82.9
HB-SB-78	1116058.98	924769.02	393.27	387.27	360.27	346.27	324.27	324.27	324.27	<321.267	<321.267	321.27	6	33	47	69	69	69	N/A	N/A	72
HB-SB-79	1115924.80	924724.58	393.52	359.52	359.52	351.52	<346.219	<346.219	<346.219	<346.219	<346.219	346.22	34	34	42	N/A	N/A	N/A	N/A	N/A	47.3
HB-SB-80	1115883.00	924613.65	390.90	371.90	360.90	352.90	352.90	352.90	352.90	<348.097	<348.097	348.10	19	30	38	38	38	38	N/A	N/A	42.8
HB-SB-81	1116132.67	924651.71	394.87	387.87	359.87	330.87	326.87	326.87	326.87	<319.668	<319.668	319.67	7	35	64	68	68	68	N/A	N/A	75.2
HB-SB-82	1115351.77	925637.20	369.97	362.97	362.97	355.97	<352.971	<352.971	<352.971	<352.971	<352.971	352.97	7	7	14	N/A	N/A	N/A	N/A	N/A	17
HB-SB-83	1115197.03	925530.50	370.32	364.32	364.32	356.32	<353.322	<353.322	<353.322	<353.322	<353.322	353.32	6	6	14	N/A	N/A	N/A	N/A	N/A	17
HB-SB-84	1117787.26	923482.10	364.75	362.75	352.75	<330.751	<330.751	<330.751	<330.751	<330.751	<330.751	330.75	2	12	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-SB-85	1117741.78	923661.10	364.27	360.27	352.27	334.27	<330.272	<330.272	<330.272	<330.272	<330.272	330.27	4	12	30	N/A	N/A	N/A	N/A	N/A	34
HB-SB-86	1117385.76	924748.55	364.93	364.93	323.43	<320.931	<320.931	<320.931	<320.931	<320.931	<320.931	320.93	0	41.5	N/A	N/A	N/A	N/A	N/A	N/A	44
HB-SB-87	1117311.43	924734.59	365.21	365.21	329.71	<327.209	<327.209	<327.209	<327.209	<327.209	<327.209	327.21	0	35.5	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-SB-88	1117357.89	924837.61	363.14	363.14	322.14	<318.144	<318.144	<318.144	<318.144	<318.144	<318.144	318.14	0	41	N/A	N/A	N/A	N/A	N/A	N/A	45
HB-SB-89	1115820.44	925082.35	390.42	382.42	358.42	337.22	312.42	312.42	312.42	<302.418	<302.418	302.42	8	32	53.2	78	78	78	N/A	N/A	88
HB-SB-90	1115197.10	925530.50											4	4	15	N/A	N/A	N/A	N/A	N/A	17
HB-SB-91	1116191.13	926151.56	363.80	362.80	351.80	321.80	<299.8	<299.8	<299.8	<299.8	<299.8	299.80	1	12	42	N/A	N/A	N/A	N/A	N/A	64
HB-SB-92	1116061.891	925947.596	363.174	356.17	356.17	325.17	<303.174	<303.174	<303.174	<303.174	<303.174	303.17	7	7	38	N/A	N/A	N/A	N/A	N/A	60
HB-SB-93	1116038.491	926009.791	363.624	349.62	349.62	321.62	<301.624	<301.624	<301.624	<301.624	<301.624	301.62	14	14	42	N/A	N/A	N/A	N/A	N/A	62
HB-SB-94	1116023.418	926045.208	363.447	347.45	347.45	317.95	<293.447	<293.447	<293.447	<293.447	<293.447	293.45	16	16	45.5	N/A	N/A	N/A	N/A	N/A	70
HB-SB-95	1116002.604	926091.248	363.213	351.21	351.21	324.21	<297.213	<297.213	<297.213	<297.213	<297.213	297.21	12	12	39	N/A	N/A	N/A	N/A	N/A	66
HB-SB-96	1115815.69	926130.29	369.24	350.74	344.24	317.24	<285.24	<285.24	<285.24	<285.24	<285.24	285.24	18.5	25	52	N/A	N/A	N/A	N/A	N/A	84
HB-SB-97	1115881.17	926153.24	364.79	355.79	355.79	320.79	<278.79	<278.79	<278.79	<278.79	<278.79	278.79	9	9	44	N/A	N/A	N/A	N/A	N/A	86
HB-SB-98	1115929.83	926178.56	363.96	355.96	355.96	317.96	<297.96	<297.96	<297.96	<297.96	<297.96	297.96	8	8	46	N/A	N/A	N/A	N/A	N/A	66
HB-SB-99	1115862.329	926252.789	363.442	337.44	337.44	315.44	<287.442	<287.442	<287.442	<287.442	<287.442	287.44	26	26	48	N/A	N/A	N/A	N/A	N/A	76
HB-SB-100	1115634.97	926363.29	373.62																		
HB-SB-101	1115781.84	926461.01	370.43																		
HB-SB-102	1115870.171	926452.403	362.891	337.89	337.89	309.89	<288.891	<288.891	<288.891	<288.891	<288.891	288.89	25	25	53	N/A	N/A	N/A	N/A	N/A	74
HB-SB-103	1115922.201	926445.291	363.215	336.72	336.72	311.22	<291.215	<291.215	<291.215	<291.215	<291.215	291.22	26.5	26.5	52	N/A	N/A	N/A	N/A	N/A	72
HB-SB-104	1115900.44	926572.74	364.00	357.00	357.00	308.00	<264	<264	<264	<264	<264	264.00	7	7	56	N/A	N/A	N/A	N/A	N/A	100
HB-SB-105	1115725.41	926774.37	372.00																		
HB-SB-106	1115863.94	926692.41	370.62																		
HB-SB-107	1115940.23	926668.13	364.00	352.00	352.00	304.00	<249	<249	<249	<249	<249	249.00	12	12	60	N/A	N/A	N/A	N/A	N/A	115
HB-SB-108	1115988.571	926637.101	362.816	356.82	356.82	287.82	<268.816	<268.816	<268.816	<268.816	<268.816	268.82	6	6	75	N/A	N/A	N/A	N/A	N/A	94

Note: Depths are measured from mudline elevation (NAVD 88).

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
HB-SB-109	1115996.13	926976.00	371.29																		
HB-SB-110	1116064.121	926912.382	364.613	355.11	355.11	314.61	<294.613	<294.613	<294.613	<294.613	<294.613	294.61	9.5	9.5	50	N/A	N/A	N/A	N/A	N/A	70
HB-SB-111	1116099.924	926883.08	364.083	350.08	350.08	314.08	<294.083	<294.083	<294.083	<294.083	<294.083	294.08	14	14	50	N/A	N/A	N/A	N/A	N/A	70
HB-SB-112	1117756.71	923614.03	364.28	358.28	340.28	326.28	317.28	<312.278	<312.278	<312.278	<312.278	312.28	6	24	38	47	N/A	N/A	N/A	N/A	52
HB-SB-113	1117671.01	923630.99	369.99																		
HB-SB-114	1117646.40	923727.04	370.17																		
HB-SB-115	1117456.02	923586.02	380.06	378.06	346.06	334.06	334.06	319.56	319.56	<314.055	<314.055	314.06	2	34	46	46	60.5	60.5	N/A	N/A	66
HB-SB-116	1117621.96	923824.64	370.06																		
HB-SB-117	1117593.85	923920.16	370.00																		
HB-SB-118	1117567.69	924016.40	369.00																		
HB-SB-119	1117589.64	924127.64	367.32																		
HB-SB-120	1117492.80	924099.45	379.53																		
HB-SB-121	1117330.23	924055.77	383.33	382.33	345.83	341.33	341.33	321.33	319.33	<317.333	<317.333	317.33	1	37.5	42	42	62	64	N/A	N/A	66
HB-SB-122	1117508.37	924207.80	369.02																		
HB-SB-123	1117482.28	924305.80	369.32																		
HB-SB-124	1117500.43	924459.74	366.72	360.72	326.72	314.72	300.72	<294.724	<294.724	<294.724	<294.724	294.72	6	40	52	66	N/A	N/A	N/A	N/A	72
HB-SB-125	1117406.64	924375.62	369.95	359.95	347.95	327.95	316.95	<313.95	<313.95	<313.95	<313.95	313.95	10	22	42	53	N/A	N/A	N/A	N/A	56
HB-SB-126	1117341.67	924453.60	374.15	373.65	348.15	327.65	320.15	<306.145	<306.145	<306.145	<306.145	306.15	0.5	26	46.5	54	N/A	N/A	N/A	N/A	68
HB-SB-127	1117391.78	924613.12	368.34	366.84	329.34	320.34	<298.34	<298.34	<298.34	<298.34	<298.34	298.34	1.5	39	48	N/A	N/A	N/A	N/A	N/A	70
HB-SB-128	1117276.18	924524.86	373.65	371.65	346.65	337.65	<327.653	<327.653	<327.653	<327.653	<327.653	327.65	2	27	36	N/A	N/A	N/A	N/A	N/A	46
HB-SB-129	1117086.68	924413.11	384.51	382.51	358.51	342.51	336.51	329.51	326.51	<324.509	<324.509	324.51	2	26	42	48	55	58	N/A	N/A	60
HB-SB-130	1117245.71	924625.51	367.98																		
HB-SB-131	1117211.16	924604.00	370.12	368.62	354.62	341.12	<330.119	<330.119	<330.119	<330.119	<330.119	330.12	1.5	15.5	29	N/A	N/A	N/A	N/A	N/A	40
HB-SB-132	1117154.70	924688.15	372.03																		
HB-SB-133	1117141.46	924799.17	368.33																		
HB-SB-134	1117101.12	924770.27	371.14	368.64	351.14	329.14	<317.137	<317.137	<317.137	<317.137	<317.137	317.14	2.5	20	42	N/A	N/A	N/A	N/A	N/A	54
HB-SB-135	1117049.96	924854.26	369.93																		
HB-SB-136	1116992.14	924937.68	369.67	369.17	351.67	326.67	<315.67	<315.67	<315.67	<315.67	<315.67	315.67	0.5	18	43	N/A	N/A	N/A	N/A	N/A	54
HB-SB-137	1116939.76	925022.82	369.77																		
HB-SB-138	1116869.90	924927.53	375.69	375.19	355.69	328.69	<305.687	<305.687	<305.687	<305.687	<305.687	305.69	0.5	20	47	N/A	N/A	N/A	N/A	N/A	70
HB-SB-139	1116790.85	924801.87	380.04	378.04	355.54	340.04	<310.037	<310.037	<310.037	<310.037	<310.037	310.04	2	24.5	40	N/A	N/A	N/A	N/A	N/A	70
HB-SB-140	1116884.92	925107.07	370.01	369.51	344.01	324.01	<314.005	<314.005	<314.005	<314.005	<314.005	314.01	0.5	26	46	N/A	N/A	N/A	N/A	N/A	56
HB-SB-141	1116830.68	925189.67	369.46	367.96	329.46	319.46	<309.46	<309.46	<309.46	<309.46	<309.46	309.46	1.5	40	50	N/A	N/A	N/A	N/A	N/A	60
HB-SB-142	1116809.91	925297.84	365.38																		
HB-SB-143	1116778.49	925274.31	369.96																		
HB-SB-144	1116603.18	925142.66	380.96	379.96	353.96	320.96	306.96	<288.961	<288.961	<288.961	<288.961	288.96	1	27	60	74	N/A	N/A	N/A	N/A	92
HB-SB-145	1116723.16	925359.88	370.61	369.61	330.61	320.61	<310.606	<310.606	<310.606	<310.606	<310.606	310.61	1	40	50	N/A	N/A	N/A	N/A	N/A	60
HB-SB-146	1116667.87	925440.24	369.60	367.10	330.60	321.60	<311.6	<311.6	<311.6	<311.6	<311.6	311.60	2.5	39	48	N/A	N/A	N/A	N/A	N/A	58
HB-SB-147	1116626.54	925413.21	374.72	373.72	326.72	312.72	302.72	<290.721	<290.721	<290.721	<290.721	290.72	1	48	62	72	N/A	N/A	N/A	N/A	84
HB-SB-148	1116612.43	925526.13	371.86	370.36	350.86	325.86	<315.863	<315.863	<315.863	<315.863	<315.863	315.86	1.5	21	46	N/A	N/A	N/A	N/A	N/A	56
HB-SB-149	1116563.94	925610.82	369.34																		
HB-SB-150	1116512.68	925695.44	367.41	367.41	349.41	326.41	<315.409	<315.409	<315.409	<315.409	<315.409	315.41	0	18	41	N/A	N/A	N/A	N/A	N/A	52
HB-SB-151	1116455.45	925782.99	365.91																		
HB-SB-152	1116409.78	925868.27	364.83																		
HB-SB-153	1116355.56	925954.03	364.04																		
HB-SB-154	1116308.54	926041.69	363.91																		
HB-SB-155	1116254.74	926128.18	364.10																		

Note: Depths are measured from mudline elevation (NAVD 88).

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
GP series borings in WB-B (coordinates and ground elevations were obtained from the topo shown on the boring location plan)																					
HB-GP-01	1117546.60	923825.10	371.94	361.94	355.94	<349.94	<349.94	<349.94	<349.94	<349.94	<349.94	349.94	10	16	N/A	N/A	N/A	N/A	N/A	N/A	22
HB-GP-02	1117431.50	924089.30	384.07	382.07	350.07	<348.07	<348.07	<348.07	<348.07	<348.07	<348.07	348.07	2	34	N/A	N/A	N/A	N/A	N/A	N/A	36
HB-GP-03	1117231.90	924275.20	385.27	383.27	357.27	<351.27	<351.27	<351.27	<351.27	<351.27	<351.27	351.27	2	28	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-GP-04	1117154.80	924481.70	378.00	376.00	354.00	<350	<350	<350	<350	<350	<350	350.00	2	24	N/A	N/A	N/A	N/A	N/A	N/A	28
HB-GP-05	1116678.80	925073.00	379.97	377.97	352.17	<349.97	<349.97	<349.97	<349.97	<349.97	<349.97	349.97	2	27.8	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-GP-06	1116540.30	925420.70	378.99	376.99	347.29	<344.99	<344.99	<344.99	<344.99	<344.99	<344.99	344.99	2	31.7	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-GP-07	1116445.00	925566.60	378.00	376.00	350.00	<346	<346	<346	<346	<346	<346	346.00	2	28	N/A	N/A	N/A	N/A	N/A	N/A	32
HB-GP-08	1117386.40	923660.00	387.46	385.46	353.66	<349.46	<349.46	<349.46	<349.46	<349.46	<349.46	349.46	2	33.8	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-GP-09	1117238.48	923824.48	387.53	387.53	357.53	<353.53	<353.53	<353.53	<353.53	<353.53	<353.53	353.53	0	30	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-GP-10	1117076.40	924040.00	384.78	382.78	356.78	<350.78	<350.78	<350.78	<350.78	<350.78	<350.78	350.78	2	28	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-GP-11	1116908.10	924236.30	382.64	380.64	356.64	<352.64	<352.64	<352.64	<352.64	<352.64	<352.64	352.64	2	26	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-GP-11B	1116908.08	924236.28			Boring log not available																
HB-GP-12	1116763.90	924496.10	382.00	378.00	358.00	<356	<356	<356	<356	<356	<356	356.00	4	24	N/A	N/A	N/A	N/A	N/A	N/A	26
HB-GP-13	1116646.00	924662.40	380.37	378.37	360.37	<342.37	<342.37	<342.37	<342.37	<342.37	<342.37	342.37	2	20	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-GP-14	1116497.70	924806.30	380.54	378.54	358.54	<352.54	<352.54	<352.54	<352.54	<352.54	<352.54	352.54	2	22	N/A	N/A	N/A	N/A	N/A	N/A	28
HB-GP-15	1116367.40	925005.80	380.00	376.00	356.00	<350	<350	<350	<350	<350	<350	350.00	4	24	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-GP-16	1116230.20	925209.50	380.00	378.00	356.00	<352	<352	<352	<352	<352	<352	352.00	2	24	N/A	N/A	N/A	N/A	N/A	N/A	28
HB-GP-17	1116136.40	925435.30	379.11	377.11	351.11	<349.11	<349.11	<349.11	<349.11	<349.11	<349.11	349.11	2	28	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-GP-18	1116047.90	925675.10	378.19	376.19	350.19	<346.19	<346.19	<346.19	<346.19	<346.19	<346.19	346.19	2	28	N/A	N/A	N/A	N/A	N/A	N/A	32
HB-GP-19	1115882.90	925841.30	369.91	361.91	357.91	<353.41	<353.41	<353.41	<353.41	<353.41	<353.41	353.41	8	12	N/A	N/A	N/A	N/A	N/A	N/A	16.5
HB-GP-20	1115832.20	925855.20	372.00	362.00	358.00	<342	<342	<342	<342	<342	<342	342.00	10	14	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-GP-25	1115320.40	925345.70	372.00	362.50	362.50	357.00	<352	<352	<352	<352	<352	352.00	9.5	9.5	15	N/A	N/A	N/A	N/A	N/A	20
HB-GP-26	1115371.72	925430.32	372.20	363.20	363.20	344.70	<338.2	<338.2	<338.2	<338.2	<338.2	338.20	9	9	27.5	N/A	N/A	N/A	N/A	N/A	34
HB-GP-27	1115428.90	925052.50	376.96	374.96	365.06	362.96	362.96	362.96	362.96	<362.56	<362.56	362.56	2	11.9	14	14	14	14	N/A	N/A	14.4
HB-GP-28	1115531.88	924801.30	380.00	378.00	364.30	364.30	364.30	364.30	364.30	<363.7	<363.7	363.70	2	15.7	15.7	15.7	15.7	15.7	N/A	N/A	16.3
HB-GP-29	1115615.60	924558.80	378.94	373.34	364.44	364.44	364.44	364.44	364.44	<361.44	<361.44	361.44	5.6	14.5	14.5	14.5	14.5	14.5	N/A	N/A	17.5
HB-GP-30	1115365.70	924777.60	380.00	380.00	380.00	380.00	380.00	370.60	367.00	<365.6	<365.6	365.60	0	0	0	0	9.4	13	N/A	N/A	14.4
HB-GP-32	1115738.40	925235.80	390.00	372.00	363.00	344.00	<340	<340	<340	<340	<340	340.00	18	27	46	N/A	N/A	N/A	N/A	N/A	50
HB-GP-32A	1115751.05	925209.52	390.00	376.00	360.00	344.00	311.00	311.00	311.00	<306	<306	306.00	14	30	46	79	79	79	N/A	N/A	84
HB-GP-33	1115721.90	925156.00	390.00	371.40	362.10	347.00	306.90	306.90	304.90	<304	<304	304.00	18.6	27.9	43	83.1	83.1	85.1	N/A	N/A	86
HB-GP-34	1115734.10	925002.70	390.00	372.00	372.00	346.10	<344	<344	<344	<344	<344	344.00	18	18	43.9	N/A	N/A	N/A	N/A	N/A	46
HB-GP-35	1115838.32	924712.28	391.14	373.54	365.54	356.04	356.04	352.14	352.14	<351.14	<351.14	351.14	17.6	25.6	35.1	35.1	39	39	N/A	N/A	40
HB-GP-36	1115880.70	924505.80	392.23	374.63	360.63	<354.23	<354.23	<354.23	<354.23	<354.23	<354.23	354.23	17.6	31.6	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-GP-37	1116034.70	924237.80	391.85	367.85	361.85	<351.85	<351.85	<351.85	<351.85	<351.85	<351.85	351.85	24	30	N/A	N/A	N/A	N/A	N/A	N/A	40
HB-GP-38	1116047.18	924082.70	390.00	382.40	380.50	380.50	379.50	379.50	379.50	<378	<378	378.00	7.6	9.5	9.5	10.5	10.5	10.5	N/A	N/A	12
HB-GP-39	1116256.93	924005.15	390.00	388.00	366.10	366.10	366.10	366.10	366.10	<366	<366	366.00	2	23.9	23.9	23.9	23.9	23.9	N/A	N/A	24

Note: Depths are measured from mudline elevation (NAVD 88).

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
HB-RISB-1	Coordinates NA																				
HB-RISB-2																					
HB-RISB-4																					
HB-RISB-5																					
HB-RISB-6																					
HB-RISB-7																					
HB-RISB-11																					
HB-RISB-16																					
(coordinates and ground elevations for OW series were provided by Parsons)																					
HB-OW-1S	1117590.143	923859.617	369.9	365.90	<355.9	<355.9	<355.9	<355.9	<355.9	<355.9	<355.9	355.90	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-OW-2S	1116387.435	925765.841	364.1	364.10	352.60	<350.1	<350.1	<350.1	<350.1	<350.1	<350.1	350.10	0	11.5	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-OW-3S	1115918.426	925849.318	369.2	359.70	<355.2	<355.2	<355.2	<355.2	<355.2	<355.2	<355.2	355.20	9.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-OW-4S	1117612.594	923818.011	370	366.00	<356	<356	<356	<356	<356	<356	<356	356.00	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-OW-5S	1116372.665	925784.796	363.9	361.90	352.20	<349.9	<349.9	<349.9	<349.9	<349.9	<349.9	349.90	2	11.7	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-OW-6S	1116074.1	926482.9	363.1	348.20	<347.1	<347.1	<347.1	<347.1	<347.1	<347.1	<347.1	347.10	14.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16
HB-OW-7S	1116083.8	926467.8	362.8	<346.8	<346.8	<346.8	<346.8	<346.8	<346.8	<346.8	<346.8	346.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16
HB-OW-8D	1116709.3	925101.4	378.4	374.60	348.60	322.40	289.40	279.20	278.70	<274.4	<274.4	274.40	3.8	29.8	56	89	99.2	99.7	N/A	N/A	104
(coordinates and ground elevations for TW series were provided by Parsons)																					
HB-TW-1	1117618.28	923847.26	369.8	364.30	<355.8	<355.8	<355.8	<355.8	<355.8	<355.8	<355.8	355.80	5.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-TW-2	1116379.93	925761.80	364.3	364.30	352.50	<350.3	<350.3	<350.3	<350.3	<350.3	<350.3	350.30	0	11.8	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-TW-3	1115922.90	925858.25	369	361.00	357.00	<355	<355	<355	<355	<355	<355	355.00	8	12	N/A	N/A	N/A	N/A	N/A	N/A	14
HB-TW-4	1116712.70	925208.53	378.6	Incomplete Boring, data missing for top 80 ft. This boring location is close to HB-OW-08D																	
HB-TW-5	1116083.20	926486.80	363	349.30	<347	<347	<347	<347	<347	<347	<347	347.00	13.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16
BFMW-01S	Coordinates NA/Borings are on OBG's Fig. 1																				
BFMW-01I																					
BFMW-01D																					
BFMW-02B																					
BFMW-03S																					
BFMW-03I																					
BFMW-03D																					
BFMW-04S																					
BFMW-04I																					
BFMW-04D																					
BFMW-05S																					
BFMW-05I																					
BFMW-05D																					
BFMW-06S																					
BFMW-06I																					
BFMW-06D																					
BFMW-07																					
(coordinates and ground elevations in blue were obtained from the topo shown on the boring location plan)																					
HB-HB-01D	1117455.00	924585.12	368.00	356.00	320.00	316.00	282.00	277.00	277.00	<276.5	<276.5	276.50	12	48	52	86	91	91	N/A	N/A	91.5
HB-HB-01S	1117453.46	924589.21	368.00										Boring information is included in HB-HB-01D (a deep boring at approximately the same location)								
HB-HB-02D	1116367.30	925743.10	365.77	364.77	351.77	327.77	<293.77	<293.77	<293.77	<293.77	<293.77	293.77	1	14	38	N/A	N/A	N/A	N/A	N/A	72

Note: Depths are measured from mudline elevation (NAVD 88).

Written by: Ming Zhu Date: 06/18/2008 Reviewed by: Raja Madhyannapu Date: 06/19/2008

Client: Honeywell Project: Onondaga Lake ILWD Stability Project/ Proposal No.: GJ4204 Task No.: 01

Boring ID	Northing	Easting	Ground Elevation (ft)	Bottom of Fill Elevation (ft)	Bottom of SOLW Elevation (ft)	Bottom of Marl Elevation (ft)	Bottom of Silt and Clay Elevation (ft)	Bottom of Silt and Sand Elevation (ft)	Bottom of Sand and Gravel Elevation (ft)	Bottom of Till Elevatioin (ft)	Bottom of Shale Elevation (ft)	End of Boring Elevation (ft)	Depth to Bottom of Fill (ft)	Depth to Bottom of SOLW (ft)	Depth to Bottom of Marl (ft)	Depth to Bottom of Silt and Clay (ft)	Depth to Bottom of Silt and Sand (ft)	Depth to Bottom of Sand and Gravel (ft)	Depth to Bottom of Till (ft)	Depth to Bottom of Shale (ft)	Depth to End of Boring (ft)
HB-HB-02I	1116367.30	925743.10	365.77										Boring information is included in HB-HB-02D (a deep boring at approximately the same location)								
HB-HB-02S	1116363.20	925739.20	365.91										Boring information is included in HB-HB-02D (a deep boring at approximately the same location)								
HB-HB-03S	1117620.07	923856.38	370.00	366.00	354.00	<352	<352	<352	<352	<352	<352	352.00	4	16	N/A	N/A	N/A	N/A	N/A	N/A	18
HB-HB-04D	1115915.01	925879.18	368.36	352.36	352.36	328.36	280.36	272.06	<270.86	<270.86	<270.86	270.86	16	16	40	88	96.3	N/A	N/A	N/A	97.5
HB-HB-04S	1115920.24	925886.19	368.09							Boring N/A											
HB-HB-05D	1116715.20	925256.30	378.00	378.00	327.00	314.00	278.00	274.00	274.00	<268	<268	268.00	0	51	64	100	104	104	N/A	N/A	110
HB-HB-05I	1116728.20	925256.10	378.00										Boring information is included in HB-HB-05D (a deep boring at approximately the same location)								
HB-HB-05S	1116724.20	925255.20	378.00										Boring information is included in HB-HB-05D (a deep boring at approximately the same location)								
HB-HB-06S	1116225.60	926185.00	363.90	351.90	337.90	<329.9	<329.9	<329.9	<329.9	<329.9	<329.9	329.90	12	26	N/A	N/A	N/A	N/A	N/A	N/A	34
HB-HB-07S	1114938.87	925295.14	377.66	377.66	377.66	377.66	377.66	372.76	372.76	<369.66	<369.66	369.66	0	0	0	0	4.9	4.9	N/A	N/A	8
HB-HB-08D	1115476.36	925459.35	373.23	367.33	359.73	351.63	309.23	308.63	308.63	306.23	<305.73	305.73	5.9	13.5	21.6	64	64.6	64.6	67	N/A	67.5
HB-HB-08I	1115476.52	925464.86	373.17										Boring information is included in HB-HB-08D (a deep boring at approximately the same location)								
HB-HB-08S	1115482.95	925460.32	373.28										Boring information is included in HB-HB-08D (a deep boring at approximately the same location)								
HB-HB-09S	1115732.37	924388.96	382.92	373.92	369.42	369.42	369.42	364.92	363.42	<361.12	<361.12	361.12	9	13.5	13.5	13.5	18	19.5	N/A	N/A	21.8
HB-HB-10	1116421.43	924195.32	394.74	388.24	359.74	<348.74	<348.74	<348.74	<348.74	<348.74	<348.74	348.74	6.5	35	N/A	N/A	N/A	N/A	N/A	N/A	46
HB-HB-11I										Boring N/A											
HB-HB-11D	1116271.90	924507.40	392.12	386.12	356.52	347.12	331.02	331.02	328.12	<326.12	<326.12	326.12	6	35.6	45	61.1	61.1	64	N/A	N/A	66
HB-HB-11S										Boring N/A											
HB-HB-12D	1115893.40	925070.80	390.00	384.90	354.40	339.40	302.00	302.00	302.00	<300.2	<300.2	300.20	5.1	35.6	50.6	88	88	88	N/A	N/A	89.8
HB-HB-12I	1115893.40	925070.80	390.00										Boring information is included in HB-HB-12D (a deep boring at approximately the same location)								
HB-HB-12S	1115893.40	925070.80	390.00										Boring information is included in HB-HB-12D (a deep boring at approximately the same location)								
HB-HB-13D	1115722.90	925156.00	390.00	371.40	362.10	347.00	306.90	306.90	304.90	<304	<304	304.00	18.6	27.9	43	83.1	83.1	85.1	N/A	N/A	86
HB-HB-14D	1115838.59	924711.95	391.15													This boring is same as HB-GP-35.					
HB-HB-14S	1115839.37	924712.73	391.18										Boring information is included in HB-HB-14D (a deep boring at approximately the same location)								
HB-HB-15	1116076.70	924023.90	390.00	385.00	378.00	378.00	378.00	378.00	378.00	<376.6	<376.6	376.60	5	12	12	12	12	12	N/A	N/A	13.4
HB-HB-16D	1116123.40	925489.60	379.05	377.05	351.05	337.25	288.05	275.05	272.45	<271.05	<271.05	271.05	2	28	41.8	91	104	106.6	N/A	N/A	108
HB-HB-17D	1116031.40	924853.10	391.83	389.83	354.03	336.33	316.13	316.13	316.13	<314.33	<314.33	314.33	2	37.8	55.5	75.7	75.7	75.7	N/A	N/A	77.5
HB-HB-18S	1115851.02	926311.70	363.99	354.99	354.99	<325.99	<325.99	<325.99	<325.99	<325.99	<325.99	325.99	9	9	N/A	N/A	N/A	N/A	N/A	N/A	38
HB-HB-19S	1115997.80	926203.30	363.82	352.32	347.82	328.02	<327.82	<327.82	<327.82	<327.82	<327.82	327.82	11.5	16	35.8	N/A	N/A	N/A	N/A	N/A	36
HB-HB-20D	1116106.00	926478.30	363.28	347.78	347.78	317.28	241.28	237.78	229.78	<227.78	<227.78	227.78	15.5	15.5	46	122	125.5	133.5	N/A	N/A	135.5
HB-HB-20I	1116105.10	926483.40	363.33										Boring information is included in HB-HB-20D (a deep boring at approximately the same location)								
HB-HB-20S	1116104.20	926488.40	363.37										Boring information is included in HB-HB-20D (a deep boring at approximately the same location)								
HB-HB-21I	1115395.66	925711.82	376.61	357.61	357.61	341.11	<340.61	<340.61	<340.61	<340.61	<340.61	340.61	19	19	35.5	N/A	N/A	N/A	N/A	N/A	36
HB-WA-08S	1116716.90	924708.10	381.28										Boring information is included in HB-WA-08D (a deep boring at approximately the same location)								
HB-WA-08D	1116702.90	924706.30	381.06	381.06	355.26	337.06	321.06	307.06	303.56	<301.06	<301.06	301.06	0	25.8	44	60	74	77.5	N/A	N/A	80
HB-WA-08I	1116705.10	924717.30	381.03										Boring information is included in HB-WA-08D (a deep boring at approximately the same location)								
HB-WA-1D	Coordinates NA/Borings are on OBG's Fig. 1																				
HB-WA-3S																					
HB-WA-3D																					
HB-WA-3I																					
HB-HBW-01	1116387.01	925845.23	364.00	360.00	354.00	<334	<334	<334	<334	<334	<334	334.00	4	10	N/A	N/A	N/A	N/A	N/A	N/A	30
HB-HBW-02	1116140.61	925817.26	365.12	361.12	349.12	<333.12	<333.12	<333.12	<333.12	<333.12	<333.12	333.12	4	16	N/A	N/A	N/A	N/A	N/A	N/A	32
HB-HBW-03	1116186.50	926023.60	363.65	359.65	353.65	<331.65	<331.65	<331.65	<331.65	<331.65	<331.65	331.65	4	10	N/A	N/A	N/A	N/A	N/A	N/A	32
HB-HBW-04	1116238.97	925915.78	363.88	357.88	350.88	<331.88	<331.88	<331.88	<331.88	<331.88	<331.88	331.88	6	13	N/A	N/A	N/A	N/A	N/A	N/A	32
HB-HBW-06	1117410.13	924727.74	365.50	363.50	323.50	<319.5	<319.5	<319.5	<319.5	<319.5	<319.5	319.50	2	42	N/A	N/A	N/A	N/A	N/A	N/A	46
WA-SB-29	1117727.41	923377.10	369.3	361.30	353.30	338.30	<336.3	<336.3	<336.3	<336.3	<336.3	336.30	8	16	31	N/A	N/A	N/A	N/A	N/A	33

Note: Depths are measured from mudline elevation (NAVD 88).

Figure 1-1. Existing topography and limit of 3-D surfaces

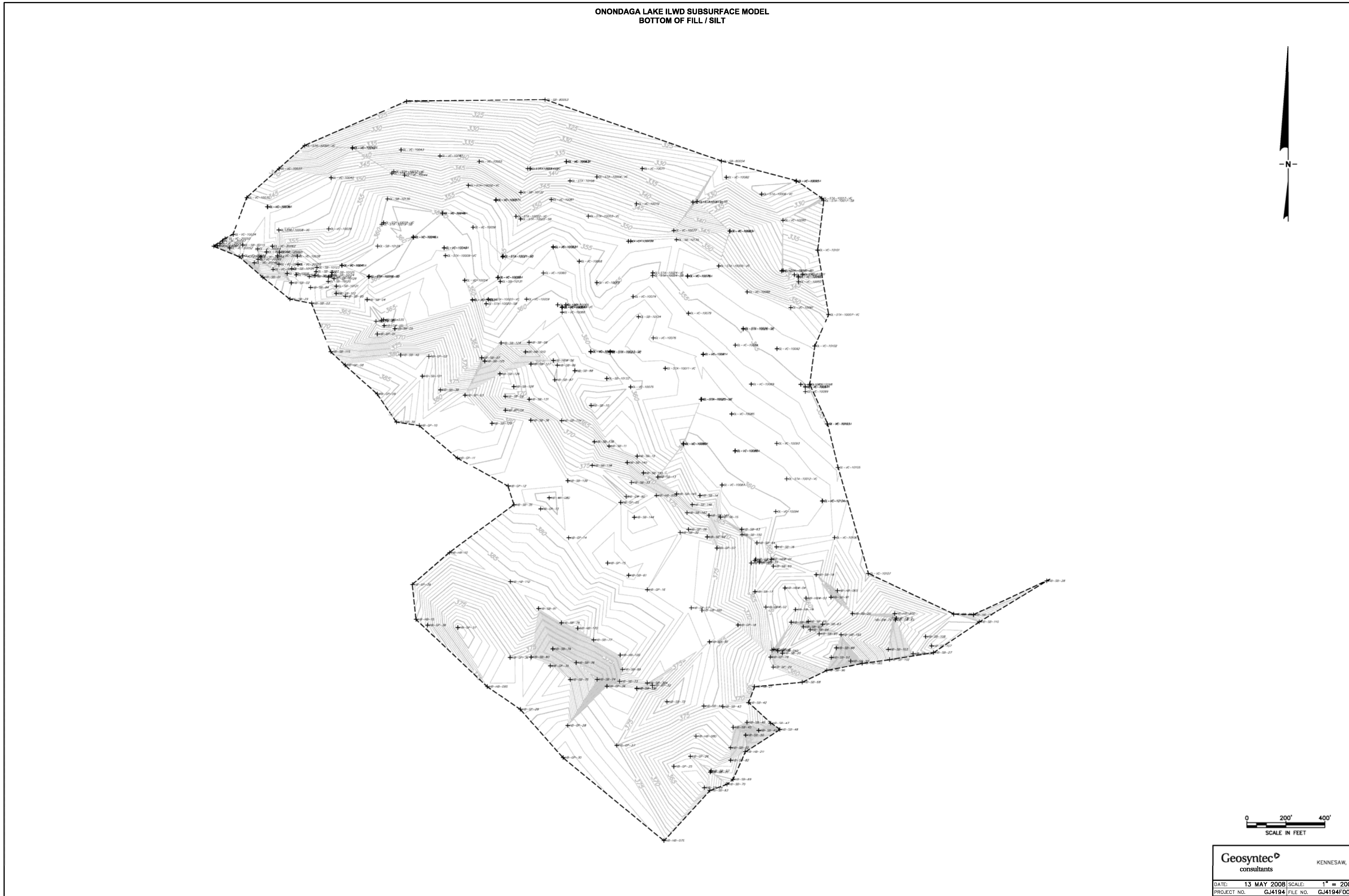


Figure 1-2. Contours of bottom of Fill (in WB-B) and Silt (in lake)

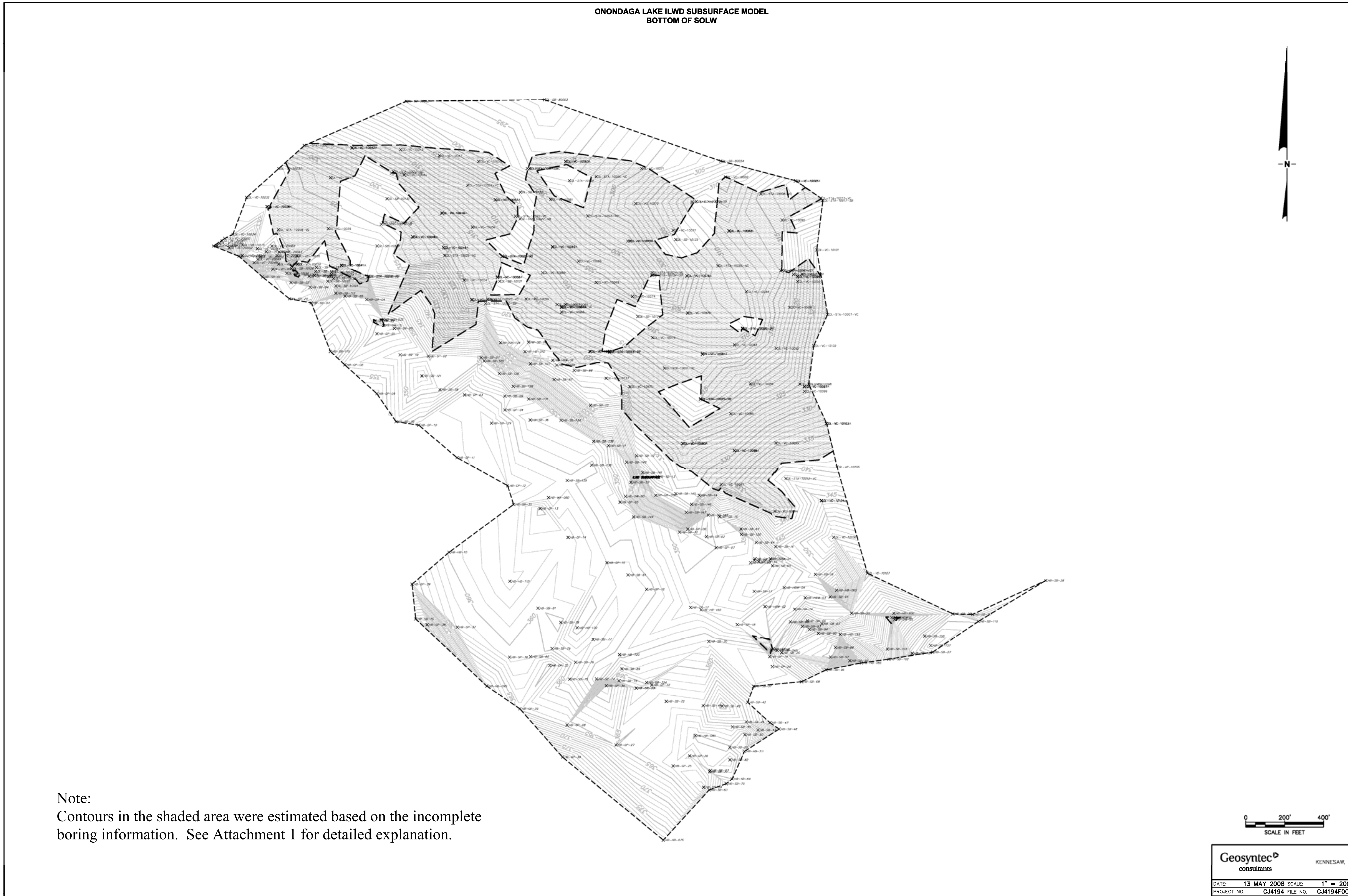
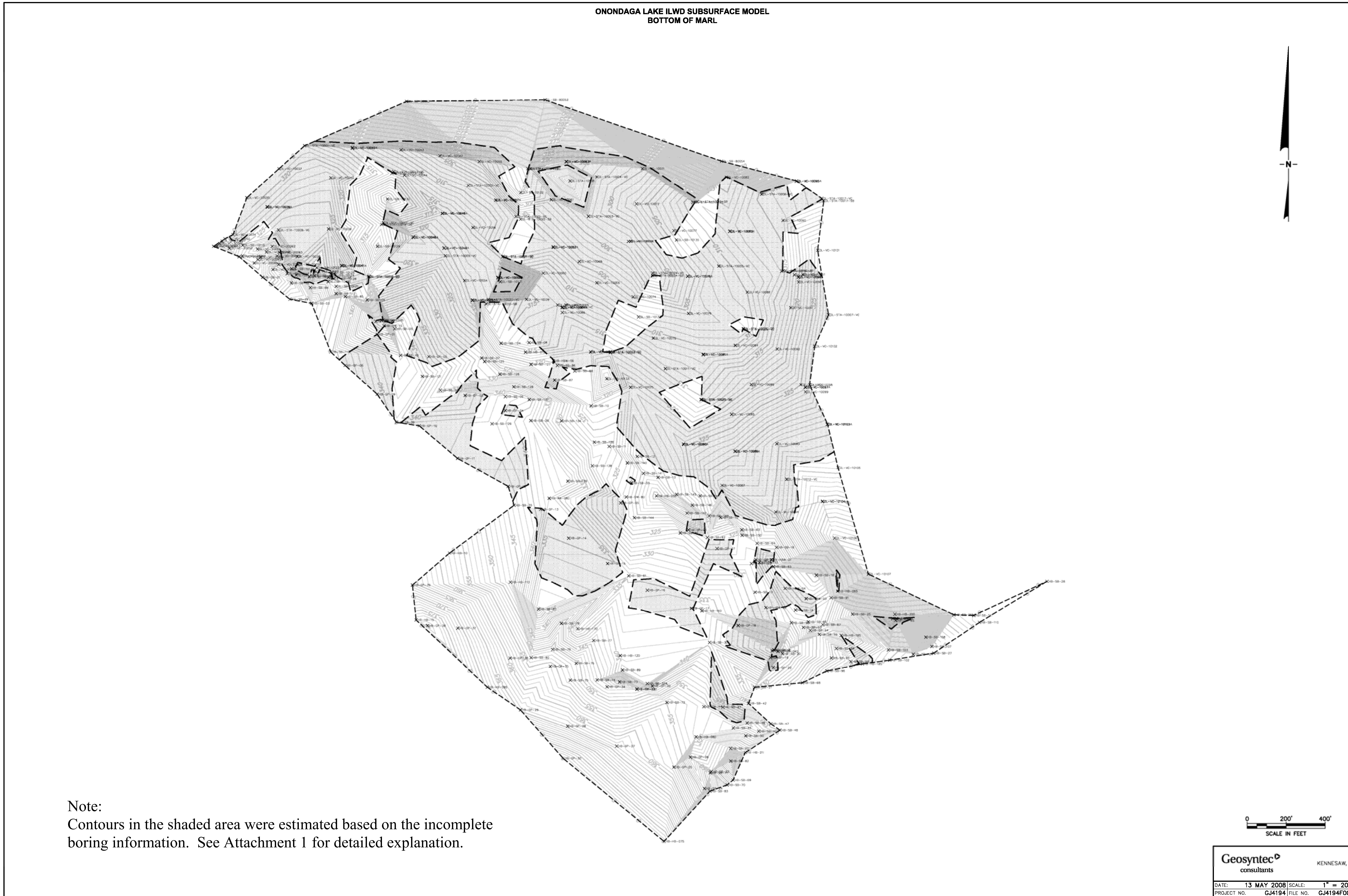
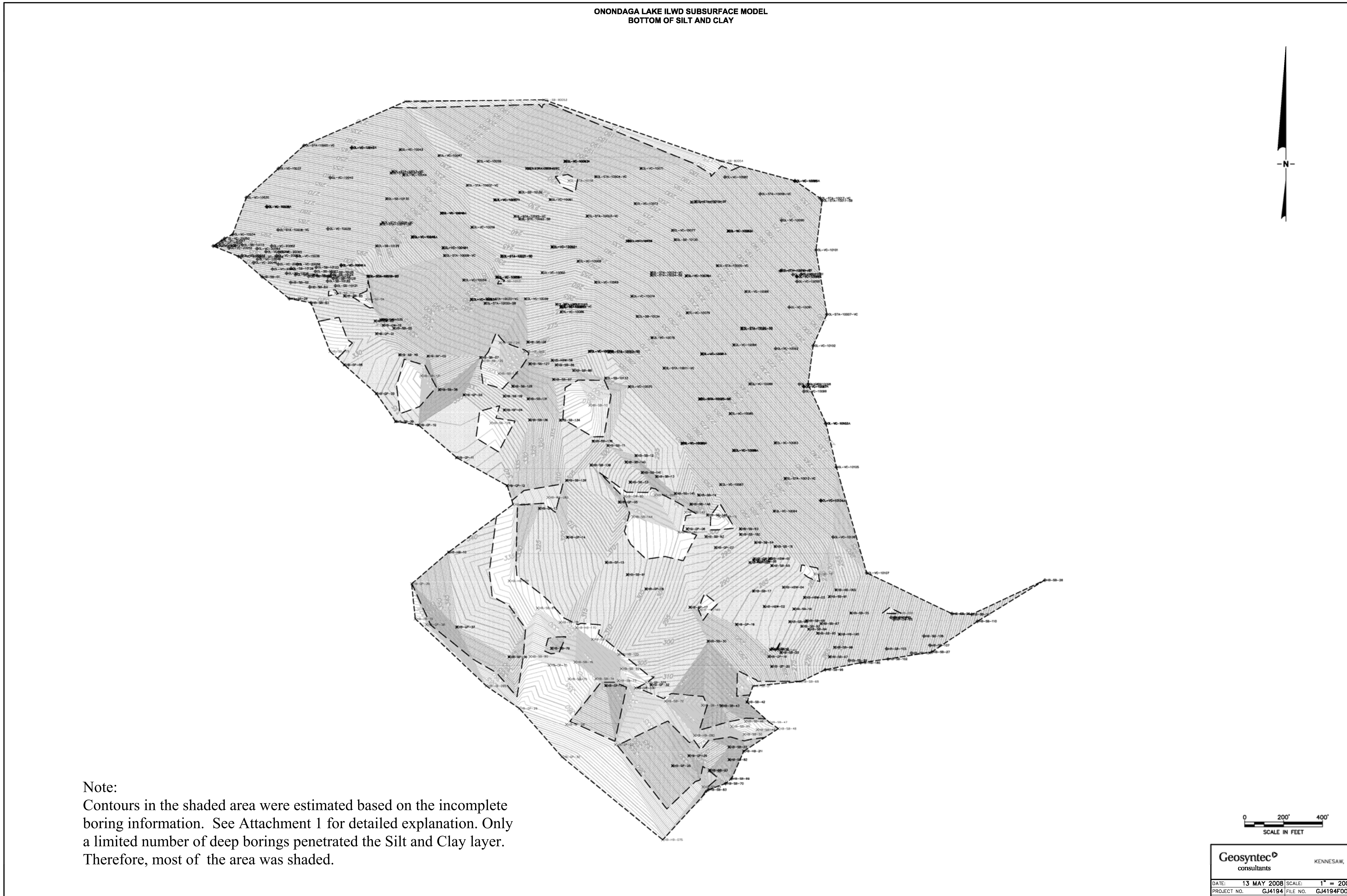


Figure 1-3. Contours of bottom of SOLW



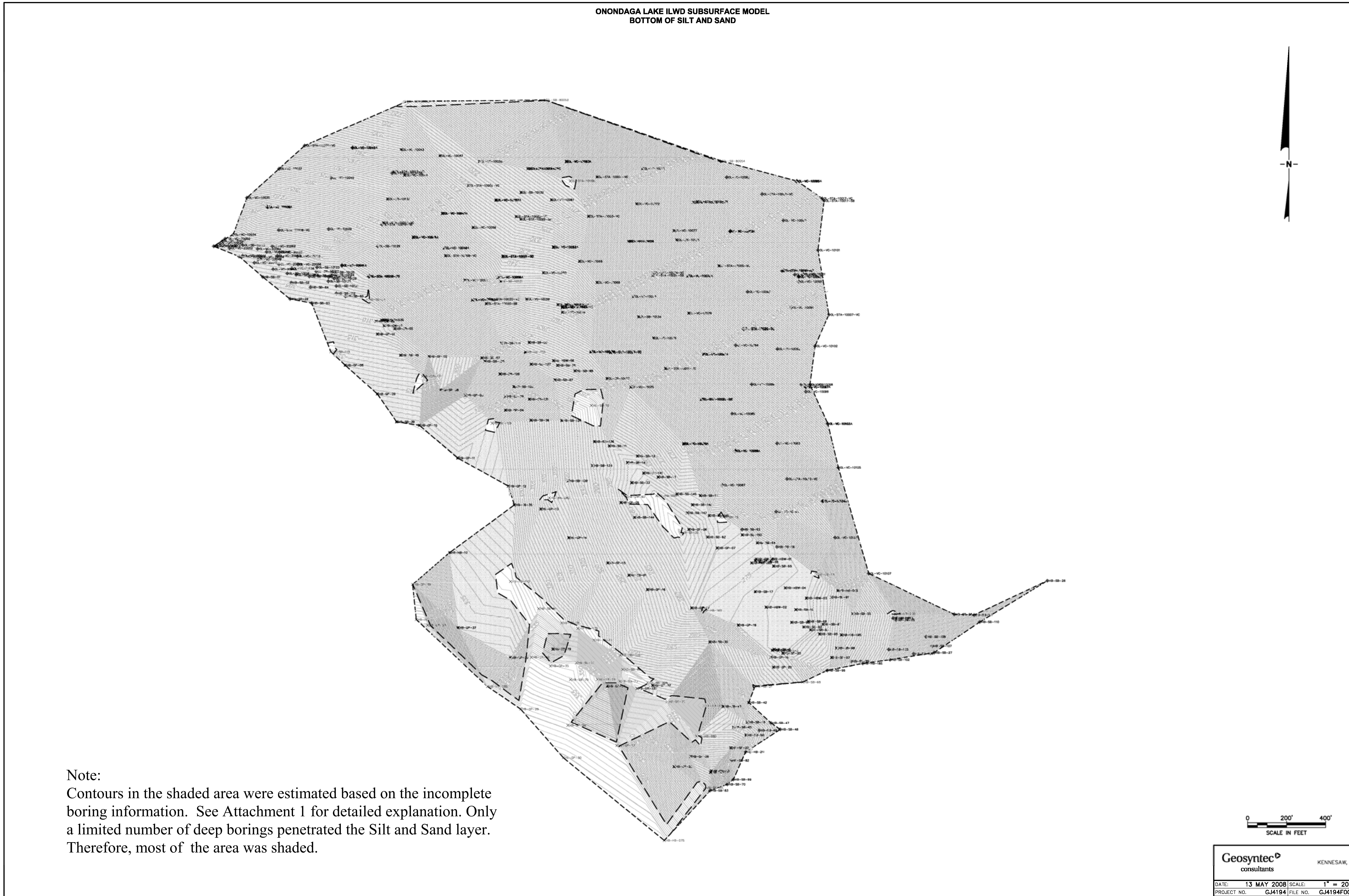
Note:
Contours in the shaded area were estimated based on the incomplete boring information. See Attachment 1 for detailed explanation.

Figure 1-4. Contours of bottom of Marl



Note:
Contours in the shaded area were estimated based on the incomplete boring information. See Attachment 1 for detailed explanation. Only a limited number of deep borings penetrated the Silt and Clay layer. Therefore, most of the area was shaded.

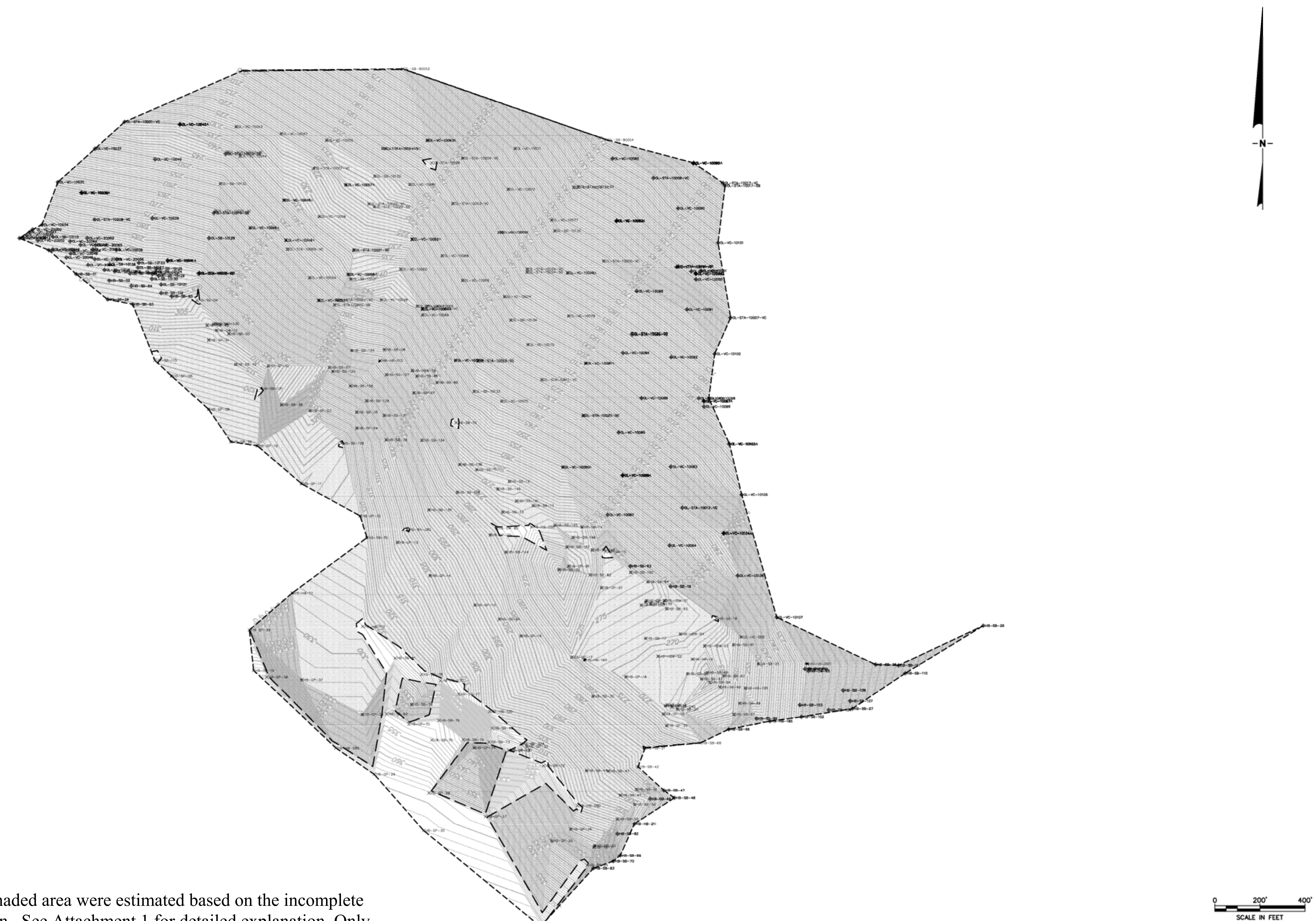
Figure 1-5. Contours of bottom of Silt and Clay



Note:
Contours in the shaded area were estimated based on the incomplete boring information. See Attachment 1 for detailed explanation. Only a limited number of deep borings penetrated the Silt and Sand layer. Therefore, most of the area was shaded.

Figure 1-6. Contours of bottom of Silt and Sand

ONONDAGA LAKE ILWD SUBSURFACE MODEL
BOTTOM OF SAND AND GRAVEL



Note:
Contours in the shaded area were estimated based on the incomplete boring information. See Attachment 1 for detailed explanation. Only a limited number of deep borings penetrated the Sand and Gravel layer. Therefore, most of the area was shaded.

Geosyntec consultants KENNESAW, GA

DATE:	13 MAY 2008	SCALE:	1" = 200'
PROJECT NO.	GJ4194	FILE NO.	GJ4194F0007
DOCUMENT NO.		FIGURE NO.	6

Figure 1-7. Contours of bottom of Sand and Gravel

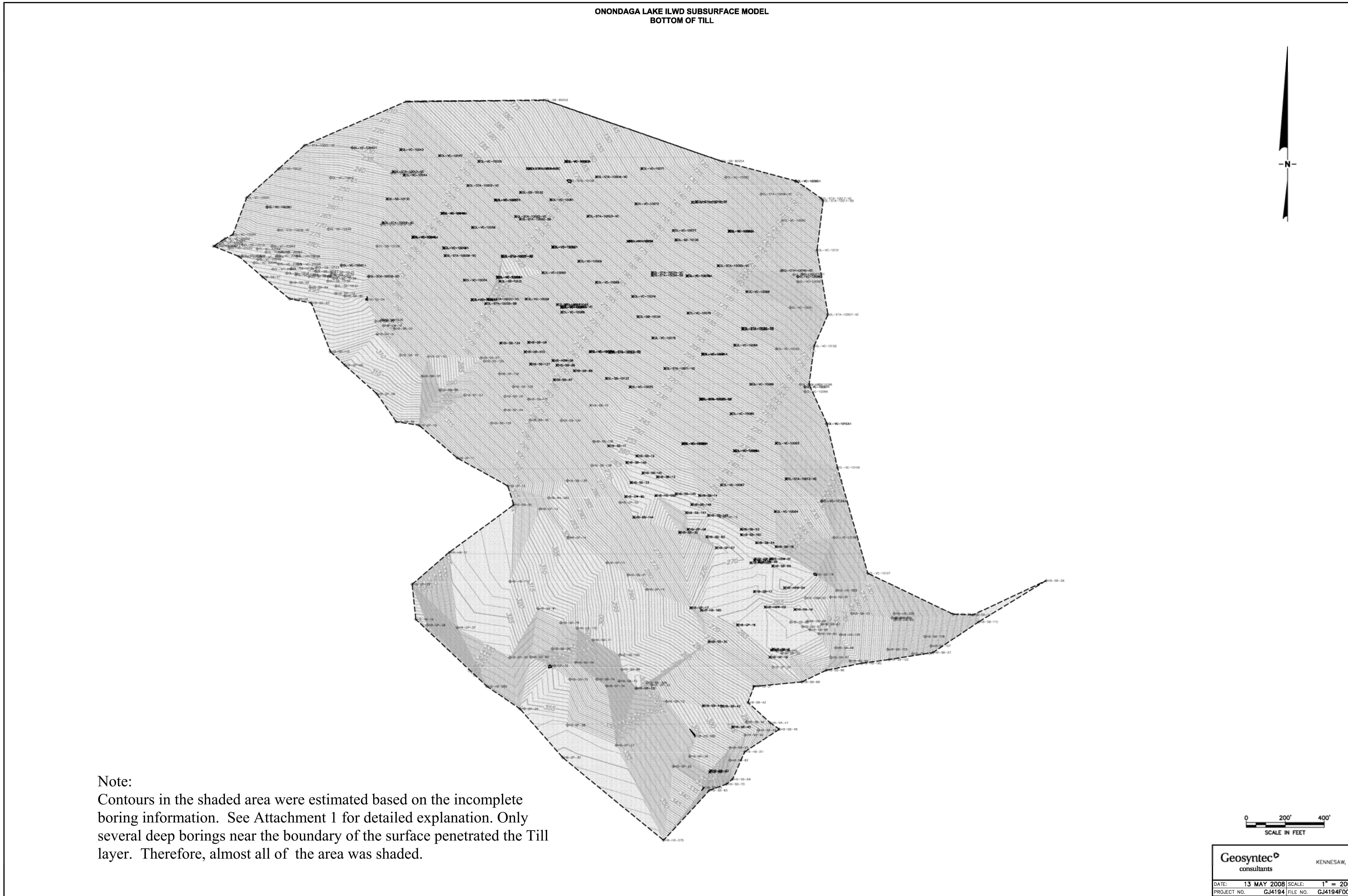
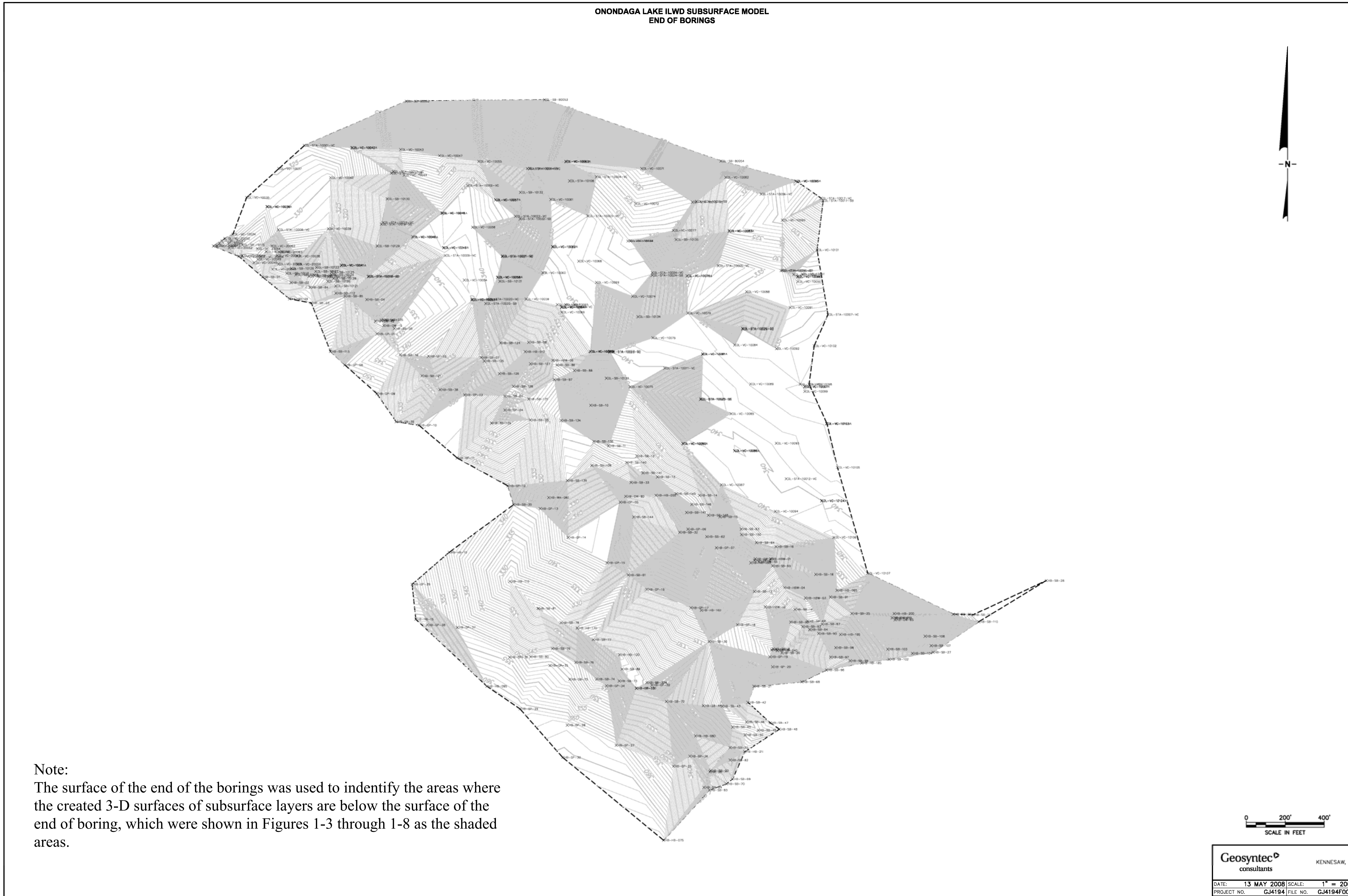


Figure 1-8. Contours of bottom of Till



Note:
The surface of the end of the borings was used to indentify the areas where the created 3-D surfaces of subsurface layers are below the surface of the end of boring, which were shown in Figures 1-3 through 1-8 as the shaded areas.

Figure 1-9. Contours of End of Boring

ATTACHMENT 2

Summary Tables of Lab Testing Results for ILWD

(Provided to Geosyntec by Parsons)

Phase I Investigation

Written by:	Ming Zhu	Date:	06/18/2008	Reviewed by:	Raja Madhyannapu	Date:	06/19/2008
Client:	Honeywell	Project:	Onondaga Lake ILWD Stability	Project/ Proposal No.:	GJ4204	Task No.:	01

Onondaga Lake Pre-Design Investigation
Phase I Geotechnical Data Summary - Table Index
Syracuse, New York

Table Number	Content
Table 1	Index Test Results
Table 2	Bulk Density Results
Table 3	Consolidation Test Results
Table 4	Unconsolidated Undrained Test Results
Table 5	Consolidated Undrained Test Results

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Table 1

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Water Content (ASTM D 2216) (%)	Grain Size (ASTM D 422) Percent Gravel (%)	Percent Sand (%)	Percent Fines (clay & silt) (%)	Clay-sized Particle Content (0.005 mm) (%)	Clay-sized Particle Content (0.002 mm) (%)	Atterberg Limits (ASTM D 4318) Liquid Limit	Plastic Limit	Plasticity Index	Organic Content (ASTM D 2974) (%)	Specific Gravity (ASTM D 854)	Carbonate Content (ASTM D 4373) (%)
OL-STA-10001-VC	OL-0118-14	0-3.3 Ft	1.65	160	0.1	1.4	98.5	14	9	102	32	70	7	2.37	
OL-STA-10001-VC	OL-0118-15	6.6-9.9 Ft	8.25	133	0	3.9	96.1	24	17	82	28	54	9	2.72	
OL-STA-10002-VC	OL-0118-09	3.3-6.6 Ft	4.95	203	0	3.1	96.9	39	16	90	41	49	8.7	2.5	52
OL-STA-10003-VC	OL-0118-16	0-3.3 Ft	1.65	137	0	1.6	98.4	25	11	76	35	41	3.2	2.75	61
OL-STA-10003-VC	OL-0118-17	9.9-13.2 Ft	11.55	166	0	2	98	29	10	86	39	47	6.6	2.59	70
OL-STA-10004-VC	OL-0118-18	3.3-6.6 Ft	4.95	233	0.1	2.3	97.6	12	9	94	41	53	4.5	2.53	70
OL-STA-10004-VC	OL-0118-19	9.9-13.2 Ft	11.55		0.1	1.4	98.5	9	6						
OL-STA-10005-VC	OL-0118-20	0-3.3 Ft	1.65	178	0	2.4	97.6	17	11	114	53	61	2.9	2.38	52
OL-STA-10005-VC	OL-0118-21	9.9-13.2 Ft	11.55		0	0.2	99.8	38	16						
OL-STA-10006-VC	OL-0118-22	0-3.3 Ft	1.65	150	0	9.6	90.4	25	17	105	30	75	7.9	2.59	
OL-STA-10006-VC	OL-0118-23	6.6-9.9 Ft	8.25	160	0	3.2	96.8	19	10	100	36	64	7	2.71	
OL-STA-10007-VC	OL-0118-07	3.3-6.6 Ft	4.95	141	0	2.6	97.4	13	7	75	43	32	5.8	2.62	70
OL-STA-10007-VC	OL-0118-08	9.9-13.2 Ft	11.55		0	0.7	99.3	18	7						
OL-STA-10008-VC	OL-0118-01	6.6-9.9 Ft	8.25	219	0.1	0.5	99.4	43	21	119	53	66	6.4	2.52	70
OL-STA-10008-VC	OL-0118-02	13.2-16.5 Ft	14.85		0	0.1	99.9	48	24						
OL-STA-10009-VC	OL-0118-10	6.6-9.9 Ft	8.25	143	0	9.9	90.1	24	8	74	35	39	5.9	2.47	70
OL-STA-10009-VC	OL-0118-11	13.2-16.5 Ft	14.85		0	2.8	97.2	36	13						
OL-STA-10010-VC	OL-0118-12	3.3-6.6 Ft	4.95	89	0.2	33.9	65.9	16	8	58	42	16	6.9	2.41	61
OL-STA-10010-VC	OL-0118-13	9.9-13.2 Ft	11.55		0.1	3.4	96.5	24	10						
OL-STA-10011-VC	OL-0118-03	6.6-9.9 Ft	8.25	199	0	4	96	21	9	100	39	61	6.3	2.39	61
OL-STA-10011-VC	OL-0118-04	13.2-16.5 Ft	14.85		0	4.5	95.5	37	15						
OL-STA-10012-VC	OL-0118-05	3.3-6.6 Ft	4.95	123	0	9.3	90.7	13	6	68	40	28	4.6	2.43	52
OL-STA-10012-VC	OL-0118-06	13.2-16.5 Ft	14.85		0.1	0.8	99.1	17	7						
OL-STA-10013-SB	OL-0111-01	5-7 Ft	6	79											
OL-STA-10013-SB	OL-0110-01	7-9 Ft	8	165	0	1.6	98.4	36	17	89	47	42			91
OL-STA-10013-SB	OL-0111-02	10-12 Ft	11	67											
OL-STA-10013-SB	OL-0110-02	12-14 Ft	13	278	0	2.1	97.9	51	22		NP		7.2	2.58	83
OL-STA-10013-SB	OL-0111-03	15-17 Ft	16	142											
OL-STA-10013-SB	OL-0111-04	20-22 Ft	21	89											
OL-STA-10013-SB	OL-0111-05	25-27 Ft	26	158	0	2.6	97.4	21	12	92	42	50	10.6	2.57	96
OL-STA-10013-SB	OL-0111-06	30-32 Ft	31	40											
OL-STA-10013-SB	OL-0111-07	35-37 Ft	36	76											
OL-STA-10013-SB	OL-0110-04	37-39 Ft	38	95	0	0.5	99.5	60	41	81	34	47			52
OL-STA-10013-SB	OL-0110-05	41-43 Ft	42	79	0	0.3	99.7	55	35	83	35	48	3.1	2.61	
OL-STA-10013-SB	OL-0111-08	43-45 Ft	44	45											
OL-STA-10014-SB	OL-0111-09	0-2 Ft	1	87											
OL-STA-10014-SB	OL-0111-10	8-10 Ft	9	141											
OL-STA-10014-SB	OL-0111-11	12.5-14.5 Ft	13.5	123											
OL-STA-10014-SB	OL-0111-12	17.5-19.5 Ft	18.5	100											
OL-STA-10014-SB	OL-0110-07	19.5-21.5 Ft	20.5	199	0	1.6	98.4	30	15	121	45	76			96
OL-STA-10014-SB	OL-0111-13	23-25 Ft	24	73											
OL-STA-10014-SB	OL-0111-14	28-30 Ft	29	71											
OL-STA-10014-SB	OL-0111-15	32.5-34.5 Ft	33.5	48											
OL-STA-10014-SB	OL-0110-08	34.5-36.5 Ft	35.5	175	0	1.6	98.4	40	22		NP		5.8	2.65	91
OL-STA-10014-SB	OL-0111-16	40-42 Ft	41	99											
OL-STA-10014-SB	OL-0111-17	44-46 Ft	45	38											

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OL-STA-10014-SB	OL-0110-09	46-48 Ft	47	175	0	0.1	99.9	48	30	77	31	46	3.7	2.7	52
OL-STA-10014-SB	OL-0110-10	48-50 Ft	49	72	0	0.3	99.7	53	40	85	34	51		2.73	
OL-STA-10014-SB	OL-0111-18	50-52 Ft	51	73											
OL-STA-10015-SB	OL-0110-64	11.5-13.5 Ft	12.5	190	0.1	1	98.9	11	5	79	48	31		2.54	
OL-STA-10015-SB	OL-0110-65	15.5-17.5 Ft	16.5	259	0	3	97	28	15	138	51	87			
OL-STA-10015-SB	OL-0110-68	36.5-38.5 Ft	37.5	83	0	0.3	99.7	41	23	91	47	44		2.6	
OL-STA-10015-SB	OL-0110-69	38.5-40.5 Ft	39.5	86	0	0.4	99.6	47	30	97	37	60			
OL-STA-10016-SB	OL-0111-20	0-2 Ft	1	124	0	1	99	27	10	60	38	22		2.34	
OL-STA-10016-SB	OL-0111-21	5-7 Ft	6	61											
OL-STA-10016-SB	OL-0111-22	10-12 Ft	11	75											
OL-STA-10016-SB	OL-0110-12	12-14 Ft	13	143	0	1.4	98.6	19	11	101	47	54		2.56	100
OL-STA-10016-SB	OL-0111-23	15-17 Ft	16	122											
OL-STA-10016-SB	OL-0111-24	20-22 Ft	21	171											
OL-STA-10016-SB	OL-0110-14	22-24 Ft	23	110	0	1.9	98.1	15	6	62	40	22			100
OL-STA-10016-SB	OL-0111-25	25-27 Ft	26	84											
OL-STA-10016-SB	OL-0111-26	30-32 Ft	31	72											
OL-STA-10016-SB	OL-0111-27	35-37 Ft	36	76											
OL-STA-10016-SB	OL-0110-15	37-39 Ft	38	87	0	1.2	98.8	47	31	111	42	69	8.8	2.6	43
OL-STA-10016-SB	OL-0110-16	39-41 Ft	40	74	0	0.6	99.4	53	33	96	39	57			
OL-STA-10017-SB	OL-0111-28	0-2 Ft	1	229	0	1.3	98.7	30	23	100	37	63		2.38	
OL-STA-10017-SB	OL-0111-29	6-8 Ft	7	99											
OL-STA-10017-SB	OL-0111-30	11-13 Ft	12	148											
OL-STA-10017-SB	OL-0110-17	13-15 Ft	14	106	0	1.6	98.4	32	12	58	40	18	3.4	2.54	96
OL-STA-10017-SB	OL-0111-31	16-18 Ft	17	69											
OL-STA-10017-SB	OL-0111-32	21-23 Ft	22	87											
OL-STA-10017-SB	OL-0111-33	26-28 Ft	27	110	0.4	2.8	96.8	45	29	107	41	66		2.64	
OL-STA-10017-SB	OL-0110-20	28-30 Ft	29	90	0	0.8	99.2	44	29	101	40	61	7	2.63	43
OL-STA-10017-SB	OL-0110-21	30-32 Ft	31	90	0	1.5	98.5	51	32	89	36	53			
OL-STA-10017-SB	OL-0111-34	34-36 Ft	35	73											
OL-STA-10018-SB	OL-0111-35	0-2 Ft	1	121											
OL-STA-10018-SB	OL-0111-36	6-8 Ft	7	73											
OL-STA-10018-SB	OL-0110-23	8-10 Ft	9	158	0	15.2	84.8	32	16	128	67	61	10.7		100
OL-STA-10018-SB	OL-0111-37	11-13 Ft	12	124											
OL-STA-10018-SB	OL-0111-38	16-18 Ft	17	87											
OL-STA-10018-SB	OL-0111-39	21-23 Ft	22	50											
OL-STA-10018-SB	OL-0111-40	26-28 Ft	27	50											
OL-STA-10018-SB	OL-0111-41	31-33 Ft	32	83	0	4.3	95.7	35	24	86	32	54			70
OL-STA-10018-SB	OL-0111-42	35-37 Ft	36	50	0	2.8	97.2	64	43	67	30	37			96
OL-STA-10018-SB	OL-0110-26	37-39 Ft	38	50	0	0.7	99.3	67	40	60	35	25	5.6	2.68	87
OL-STA-10018-SB	OL-0118-26	41-43 Ft	42	46	0	0.2	99.8	59	39	48	19	29			
OL-STA-10018-SB	OL-0110-27	48-50 Ft	49	34	0	0.5	99.5	51	32	33	18	15	0.6	2.79	9
OL-STA-10018-SB	OL-0110-28	52-54 Ft	53	34	0	0.1	99.9	66	48	36	16	20			
OL-STA-10019-SB	OL-0111-45	0-2 Ft	1	71											
OL-STA-10019-SB	OL-0111-46	5-7 Ft	6	151											
OL-STA-10019-SB	OL-0110-29	7.5-9.5 Ft	8.5	124	0	2.7	97.3	31	14	73	35	38	5.4	2.42	87
OL-STA-10019-SB	OL-0111-47	10.5-12.5 Ft	11.5	168											

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OL-STA-10019-SB	OL-0110-30	12.5-14.5 Ft	13.5	158	0.2	15.7	84.1	31	10	95	57	38			
OL-STA-10019-SB	OL-0111-48	15.5-17.5 Ft	16.5	121											
OL-STA-10019-SB	OL-0111-49	20.5-22.5 Ft	21.5	208											
OL-STA-10019-SB	OL-0111-50	25.5-27.5 Ft	26.5	126											
OL-STA-10019-SB	OL-0111-98	27.5-29.5 Ft	28.5	151											
OL-STA-10019-SB	OL-0111-51	35.5-37.5 Ft	36.5	62	0	1.3	98.7	52	33	78	32	46			61
OL-STA-10019-SB	OL-0111-52	40.5-42 Ft	41.25	50	0	0.6	99.4	64	42	71	30	41			65
OL-STA-10019-SB	OL-0111-53	45.5-47 Ft	46.25	34	0	0.3	99.7	56	26	67	32	35			65
OL-STA-10019-SB	OL-0111-54	50.5-52.5 Ft	51.5	39											
OL-STA-10019-SB	OL-0111-55	55.5-57.5 Ft	56.5	28											
OL-STA-10019-SB	OL-0110-32	59.5-61.5 Ft	60.5	42	0	0.1	99.9	62	43	50	20	30		2.78	
OL-STA-10019-SB	OL-0110-33	61.5-63.5 Ft	62.5	27	0	0.1	99.9	54	40	47	18	29			
OL-STA-10019-SB	OL-0111-56	63.5-65.5 Ft	64.5	23											
OL-STA-10020-SB	OL-0111-57	0-2 Ft	1	19											
OL-STA-10020-SB	OL-0111-58	5-7 Ft	6	3											
OL-STA-10020-SB	OL-0111-59	10-12 Ft	11	111											
OL-STA-10020-SB	OL-0110-34	12-14 Ft	13	330	0	6.6	93.4	16	9		NP		7.4	2.64	
OL-STA-10020-SB	OL-0111-60	15-17 Ft	16	249											
OL-STA-10020-SB	OL-0110-35	17-19 Ft	18	247	0	1.4	98.6	36	13	106	75	31			
OL-STA-10020-SB	OL-0111-61	20-22 Ft	21	253											
OL-STA-10020-SB	OL-0110-36	22-24 Ft	23	441	0	0.1	99.9	74	41		NP				
OL-STA-10020-SB	OL-0111-62	25-27 Ft	26	452											
OL-STA-10020-SB	OL-0111-63	30-32 Ft	31	172											
OL-STA-10020-SB	OL-0111-64	35-37 Ft	36	118											
OL-STA-10020-SB	OL-0111-65	40-42 Ft	41	67											
OL-STA-10020-SB	OL-0111-66	45-47 Ft	46	63											
OL-STA-10020-SB	OL-0111-67	50-52 Ft	51	50											
OL-STA-10020-SB	OL-0111-68	55-57 Ft	56	45											
OL-STA-10020-SB	OL-0110-38	59-61 Ft	60	39	0	0.1	99.9	59	38	35	19	16			
OL-STA-10020-SB	OL-0110-39	62-64 Ft	63	43	0	0.1	99.9	69	50	34	20	14	2.7	2.76	
OL-STA-10020-SB	OL-0111-69	64-66 Ft	65	20											
OL-STA-10021-SB	OL-0111-70	0-2 Ft	1	133											
OL-STA-10021-SB	OL-0111-71	6.5-8.5 Ft	7.5	101											
OL-STA-10021-SB	OL-0111-72	11.5-13.5 Ft	12.5	188											
OL-STA-10021-SB	OL-0110-40	13.5-15.5 Ft	14.5	201	0	4.1	95.9	38	20	110	47	63			
OL-STA-10021-SB	OL-0111-73	16-18 Ft	17	96											
OL-STA-10021-SB	OL-0110-41	18-20.5 Ft	19.25	118	0	3.1	96.9	29	9	87	42	45	5.5	2.53	100
OL-STA-10021-SB	OL-0111-74	22-24 Ft	23	87											
OL-STA-10021-SB	OL-0111-75	26-28 Ft	27	85											
OL-STA-10021-SB	OL-0111-76	31.5-33.5 Ft	32.5	180											
OL-STA-10021-SB	OL-0111-77	36.5-38.5 Ft	37.5	81											
OL-STA-10021-SB	OL-0111-78	41-43 Ft	42	59											
OL-STA-10021-SB	OL-0111-79	47-49 Ft	48	52											
OL-STA-10021-SB	OL-0111-80	51.5-53.5 Ft	52.5	42											
OL-STA-10021-SB	OL-0111-81	56-58 Ft	57	31											
OL-STA-10021-SB	OL-0111-82	63.5-65.5 Ft	64.5	37											
OL-STA-10021-SB	OL-0110-43	65.5-67.5 Ft	66.5	57	0	0.2	99.8	59	43	41	37	4	3.3	2.73	
OL-STA-10021-SB	OL-0110-44	67.5-69.5 Ft	68.5	52	0	0.3	99.7	70	50	62	29	33			
OL-STA-10021-SB	OL-0111-83	71.5-73.5 Ft	72.5	18											
OL-STA-10022-SB	OL-0111-84	0-2 Ft	1	151											
OL-STA-10022-SB	OL-0110-45	12-14 Ft	13	157	0.1	1.7	98.2	36	15	106	55	51	5.1	2.58	87
OL-STA-10022-SB	OL-0110-46	17-19 Ft	18	112	0	6.9	93.1	33	13	112	45	67			
OL-STA-10022-SB	OL-0110-49	64-66 Ft	65	60	0	0.1	99.9	62	42	66	32	34			

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OL-STA-10022-SB	OL-0110-50	66-68 Ft	67	46	0	0.3	99.7	55	33	63	32	31	11.3	2.67	
OL-STA-10023-SB	OL-0071-54	0-2 Ft	1	173	0	35.4	64.6	17	7		NP		8.3	2.61	70
OL-STA-10023-SB	OL-0071-55	6-8 Ft	7	99											
OL-STA-10023-SB	OL-0071-56	11-13 Ft	12	73											
OL-STA-10023-SB	OL-0052-06	13-15 Ft	14	81	0	0.5	99.5	17	6		NP		4.8	2.34	78
OL-STA-10023-SB	OL-0071-57	16-18 Ft	17	85											
OL-STA-10023-SB	OL-0071-58	21-23 Ft	22	106											
OL-STA-10023-SB	OL-0071-59	26-28 Ft	27	72											
OL-STA-10023-SB	OL-0071-60	36-38 Ft	37	88											
OL-STA-10023-SB	OL-0071-61	41-43 Ft	42	88											
OL-STA-10023-SB	OL-0071-62	46-48 Ft	47	74											
OL-STA-10023-SB	OL-0052-04	50-52 Ft	51	71	0	0.2	99.8	31	21	91	39	52	7.5	2.65	35
OL-STA-10023-SB	OL-0071-65	54-56 Ft	55	65											
OL-STA-10024-SB	OL-0071-66	0-2 Ft	1	100											
OL-STA-10024-SB	OL-0071-67	5-7 Ft	6	67											
OL-STA-10024-SB	OL-0071-68	9-11 Ft	10	236	0	61	39	12	7	123	68	55	5.9	2.54	61
OL-STA-10024-SB	OL-0071-69	13-15 Ft	14	77											
OL-STA-10024-SB	OL-0052-07	15-17 Ft	16	124	0	13.2	86.8	24	11	83	63	20	6.7	2.48	78
OL-STA-10024-SB	OL-0071-70	18-20 Ft	19	156											
OL-STA-10024-SB	OL-0071-71	23-25 Ft	24	127											
OL-STA-10024-SB	OL-0071-72	28-30 Ft	29	130											
OL-STA-10024-SB	OL-0052-09	30-32 Ft	31	146	0	0.2	99.8	30	8	156	69	87	8	2.52	83
OL-STA-10024-SB	OL-0071-73	33-35 Ft	34	81											
OL-STA-10024-SB	OL-0071-74	38-40 Ft	39	88											
OL-STA-10024-SB	OL-0071-75	43-45 Ft	44	105											
OL-STA-10024-SB	OL-0071-76	48-50 Ft	49	70											
OL-STA-10024-SB	OL-0071-77	53-55 Ft	54	64											
OL-STA-10024-SB	OL-0071-78	58-59.5 Ft	58.75	59											
OL-STA-10024-SB	OL-0052-12	64-66 Ft	65	70	0	1.2	98.8	39	26	90	40	50	6.8	2.66	48
OL-STA-10025-SB	OL-0071-31	0-2 Ft	1	157	0	2.6	97.4	21	10		NP		5	2.39	83
OL-STA-10025-SB	OL-0052-13	7-9 Ft	8	178	0	4.5	95.5	26	8		NP		7.6	2.43	87
OL-STA-10025-SB	OL-0071-32	15-17 Ft	16	206											
OL-STA-10025-SB	OL-0071-33	20-22 Ft	21	152											
OL-STA-10025-SB	OL-0071-34	25-27 Ft	26	103											
OL-STA-10025-SB	OL-0071-35	30-32 Ft	31	222											
OL-STA-10025-SB	OL-0071-36	35-37 Ft	36	185											
OL-STA-10025-SB	OL-0071-37	40-42 Ft	41	121											
OL-STA-10025-SB	OL-0071-38	45-47 Ft	46	77											
OL-STA-10025-SB	OL-0071-39	50-52 Ft	51	77											
OL-STA-10025-SB	OL-0052-16	52-54 Ft	53	67	0	0.5	99.5	36	24	94	38	56	3.6	2.61	43
OL-STA-10025-SB	OL-0071-40	55-57 Ft	56	69											
OL-STA-10025-SB	OL-0071-41	60-62 Ft	61	69											
OL-STA-10026-SB	OL-0071-79	5-7 Ft	6	84	21.7	13.9	64.4	15	7	93	67	26	5.3	2.42	65
OL-STA-10026-SB	OL-0052-19	7-9 Ft	8	102	0	5.1	94.9	19	6		NP		7.2	2.64	83
OL-STA-10026-SB	OL-0071-80	11-13 Ft	12	18											
OL-STA-10026-SB	OL-0071-81	16-18 Ft	17	85											
OL-STA-10026-SB	OL-0071-82	21-23 Ft	22	95											
OL-STA-10026-SB	OL-0071-83	26-28 Ft	27	123											
OL-STA-10026-SB	OL-0071-84	31-33 Ft	32	89											
OL-STA-10026-SB	OL-0071-85	36-38 Ft	37	97											
OL-STA-10026-SB	OL-0071-86	41-43 Ft	42	96											
OL-STA-10026-SB	OL-0071-87	46-48 Ft	47	74											
OL-STA-10026-SB	OL-0052-22	50-52 Ft	51	71	0	0.3	99.7	40	25	90	41	49	5.7	2.59	43

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OL-STA-20001-SB	OL-0072-07	20-22 Ft	21	68	0	34.5	65.5	28	20	60	37	23	2.3		9
OL-STA-20001-SB	OL-0072-09	44.9-46.9 Ft	45.9	29	0	0.1	99.9	50	35	27	16	11	1		78
OL-STA-20001-VC	OL-0071-01	0-3.3 Ft	1.65	62	0	35.3	64.7	20	12				2	2.65	
OL-STA-20001-VC	OL-0071-02	13.2-16.5 Ft	14.85	65	0	19.1	80.9	26	17				1.5		
OL-STA-20002-VC	OL-0071-03	3.3-6.6 Ft	4.95	89	0	12.8	87.2	10	5	65	41	24	4.4	2.36	
OL-STA-20002-VC	OL-0071-04	13.2-16.5 Ft	14.85	104	0	11.3	88.7	18	12	88	39	49	14.6	2.36	
OL-STA-20002-VC	OL-0095-01	20.3-23.6 Ft	21.95	61	0	3	97	52	33	53	41	12	7.2		96
OL-STA-20002-VC	OL-0095-02	33.5-36.8 Ft	35.15	26	0	2.9	97.1	23	19		NP		1.2		13
OL-STA-20003-VC	OL-0071-05	6.6-9.9 Ft	8.25	107	0	5.5	94.5	18	8	88	39	49	9.2	2.34	
OL-STA-20003-VC	OL-0071-06	13.2-16.5 Ft	14.85	78	0	28.6	71.4	17	9		NP		3.6	2.62	30
OL-STA-20003-VC	OL-0071-07	16.5-17.5 Ft	17	96	0	3.4	96.6	12	10	83	34	39	1.4		78
OL-STA-20003-VC	OL-0095-03	26.9-30.2 Ft	28.55	52	0	1.4	98.6	63	39	56	42	14	6.4		
OL-STA-20003-VC	OL-0095-04	36.8-40.2 Ft	38.5	16	0	0.5	99.5	27	20	24	15	9	1		
OL-STA-20004-SB	OL-0072-01	12-14 Ft	13	108	0	2.6	97.4	43	30	77	51	26	4.8		87
OL-STA-20004-SB	OL-0072-02	36.6-38.6 Ft	37.6	27	0	0.6	99.4	46	34	26	14	12	1.3		78
OL-STA-20004-VC	OL-0071-08	0-3.3 Ft	1.65	136	0	27	73	22	13	85	44	41	13.9		
OL-STA-20004-VC	OL-0071-09	23.5-26.7 Ft	25.1	64	0.6	10.6	88.8	30	19	76	35	41	4.7		78
OL-STA-20004-VC	OL-0071-10	33.3-36.6 Ft	34.95	61	0.7	1.5	97.8	60	32	63	34	29	1.8	2.69	70
OL-STA-20004-VC	OL-0118-25	0-3.3 Ft	1.65											2.69	
OL-STA-20005-VC	OL-0071-11	6.6-9.9 Ft	8.25	127	0	1.6	98.4	17	12	98	43	55	9.5		
OL-STA-20005-VC	OL-0071-12	23.2-26.6 Ft	24.9	68	0	0.9	99.1	60	31	72	37	35	3.3	2.66	70
OL-STA-20005-VC	OL-0071-13	33.3-36.6 Ft	34.95	40	0	0.3	99.7	59	38	52	23	29	2.1		17
OL-STA-20006-VC	OL-0071-14	6.6-9.9 Ft	8.25	253	0	2.5	97.5	36	20	0	0	0	6		
OL-STA-20006-VC	OL-0071-15	23.6-27 Ft	25.3	61	0	1.1	98.9	53	31	72	28	44	1.6		61
OL-STA-20006-VC	OL-0071-16	36.9-40.2 Ft	38.55	27	0	0.1	99.9	44	31	25	14	11	1.3		9
OL-STA-20007-SB	OL-0072-04	23-25 Ft	24	67	0	1.4	98.6	64	33	67	38	29	2.5		9
OL-STA-20007-SB	OL-0072-05	38.6-40.6 Ft	39.6	43	0	0.2	99.8	58	39	45	19	26	1.8		61
OL-STA-20007-VC	OL-0071-17	3.3-6.6 Ft	4.95	113	0	7.5	92.5	13	11	110	39	71	15.7		
OL-STA-20007-VC	OL-0071-18	9.9-13.2 Ft	11.55	185	0	0.8	99.2	32	25		NP		5.2		
OL-STA-20008-VC	OL-0071-19	9.9-13.2 Ft	11.55	173	0	0.2	99.8	43	20		NP		3.8		
OL-STA-20009-VC	OL-0071-20	6.6-9.9 Ft	8.25	90	0	72.3	27.7	7	4				2.1	2.59	
OL-STA-20009-VC	OL-0071-21	16.5-19.8 Ft	18.15	73	0	23.5	76.5	15	6	73	43	30	2.7	2.61	100
OL-STA-20009-VC	OL-0095-06	23.6-26.9 Ft	25.25	79	0	66.3	33.7	10	7		NP		2.2		
OL-STA-20009-VC	OL-0095-07	36.8-40.1 Ft	38.45	21	0	0.9	99.1	19	14	45	25	20	0.6		
OL-STA-20010-VC	OL-0071-22	3.3-6.6 Ft	4.95	78	0	73.9	26.1	9	7				1.2	2.65	
OL-STA-20010-VC	OL-0071-23	13.2-16.5 Ft	14.85	73	0	46.1	53.9	15	12				3.7	2.63	87
OL-STA-20010-VC	OL-0095-08	26.9-30.2 Ft	28.55	58	0	8	92	42	27	64	48	16	3.3		96
OL-STA-20010-VC	OL-0095-09	36.8-40.1 Ft	38.45	38	0	0.9	99.1	51	34	32	20	12	0.6		26
OL-STA-20011-VC	OL-0071-24	16.5-19.8 Ft	18.15	64	0	1.9	98.1	44	27	83	35	48	5.7	2.63	78
OL-STA-20011-VC	OL-0101-01	33.5-36.8 Ft	35.15	47	0	0.2	99.8	68	49	46	20	26	9.8	2.74	26
OL-STA-20012-VC	OL-0071-25	3.3-6.6 Ft	4.95	128	0	10.9	89.1	7	3	109	46	63	13.4		
OL-STA-20012-VC	OL-0071-26	33.3-36.6 Ft	34.95	36	0	0.1	99.9	67	43	48	24	24	23.3	2.47	17
OL-STA-20012-VC	OL-0118-24	26.6-30 Ft	28.3	66	0	1.1	98.9	63	34	65	30	35	3		70
OL-STA-20013-VC	OL-0071-27	13.2-16.5 Ft	14.85	138	0.1	0.7	99.2	32	16		NP		6.3		
OL-STA-20013-VC	OL-0095-10	33-36 Ft	34.5	48	0	5.7	94.3	33	21	65	40	25	7.4		87
OL-STA-20013-VC	OL-0095-11	39-42.2 Ft	40.6	30	0	0.6	99.4	46	30	31	15	16	7.5		17
OL-STA-20014-VC	OL-0071-28	0-3.3 Ft	1.65	132	0	1.6	98.4	15	6	71	46	25	7		
OL-STA-20014-VC	OL-0071-29	13.2-16.5 Ft	14.85	116	0	3.9	96.1	33	16	84	56	28	4.8		

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OL-STA-20014-VC	OL-0101-02	23.3-26.9 Ft	25.1	62	0	0.7	99.3	69	50	64	31	33	3.1	2.69	91
OL-STA-20014-VC	OL-0101-03	30.1-33.4 Ft	31.75	38	0	0.5	99.5	46	23	66	31	35	4.7	2.68	96
OL-STA-20015-VC	OL-0071-30	3.3-6.6 Ft	4.95	178	0	0.5	99.5	39	18	127	63	64	6.5		
OL-STA-20015-VC	OL-0095-12	23.6-26.9 Ft	25.25	35	0	0.8	99.2	60	28	61	42	19	3.3		
OL-STA-20015-VC	OL-0095-13	30.2-33.5 Ft	31.85	24	0	0.3	99.7	44	30	32	22	10	5.3		
OL-STA-20016-SB	OL-0110-51	14-16 Ft	15	28	0	8.9	91.1	35	24	25	15	10	0.9	2.7	9
OL-STA-20016-SB	OL-0110-52	27-29 Ft	28	29	0.1	0.2	99.7	11	8		NP			2.75	
OL-STA-20016-SB	OL-0110-53	57-59 Ft	58		0	9.3	90.7	7	6		NP			2.71	
OL-STA-20017-SB	OL-0110-57	10-12 Ft	11	79	0	15.7	84.3	14	10		NP		3	2.67	
OL-STA-20017-SB	OL-0110-58	37-39 Ft	38	79	0	0.2	99.8	66	53	40	16	24	9	2.57	
OL-STA-20017-SB	OL-0110-59	42-44 Ft	43	28	0	0.1	99.9	50	35	23	13	10			
OL-STA-20018-SB	OL-0110-54	10-12 Ft	11	68	0	19.5	80.5	18	11	41	29	12	2	2.68	61
OL-STA-20018-SB	OL-0110-55	47-49 Ft	48	33	0.1	0.3	99.6	53	36	35	16	19			
OL-STA-20018-SB	OL-0110-56	51-53 Ft	52	27	0	0	100	65	46	32	18	14			
OL-STA-20019-VC	OL-0101-04	23.6-26.9 Ft	25.25	71	0.1	14.7	85.2	32	20	64	33	31	2.4	2.68	96
OL-STA-20019-VC	OL-0101-05	33.5-36.8 Ft	35.15	44	0.1	0.9	99	66	45	46	22	24	1.1	2.78	35
OL-STA-20020-VC	OL-0101-06	20.3-23.6 Ft	21.95	65	0.4	10.3	89.3	35	23	74	36	38	4.7	2.62	87
OL-STA-20020-VC	OL-0101-07	36.8-40.1 Ft	38.45	29	0	1.2	98.8	41	29	31	14	17	1.8	2.7	17
OL-STA-20021-VC	OL-0101-08	17-20.3 Ft	18.65	226	0.3	1.8	97.9	39	30	138	89	49	8.9	2.7	57
OL-STA-20021-VC	OL-0101-09	26.9-30.2 Ft	28.55	56	0.2	2.4	97.4	63	40	63	29	34	8.4	2.7	87
OL-STA-20021-VC	OL-0101-10	33.5-36.8 Ft	35.15	53	0.1	0.6	99.3	63	44	48	20	28	3.3	2.75	26
OL-STA-20022-VC	OL-0101-11	17-20.3 Ft	18.65	248	0	1	99	39	28	129	79	50	8	2.54	65
OL-STA-20022-VC	OL-0101-12	23.6-26.9 Ft	25.25	51	0	2.8	97.2	51	36	74	30	44	13.3	2.68	78
OL-STA-20022-VC	OL-0101-13	33.5-36.8 Ft	35.15	41	0	0.4	99.6	61	41	48	19	29	6.6	2.45	13
OL-STA-20023-VC	OL-0101-14	17-20.3 Ft	18.65	204	0	2.3	97.7	4	4	112	69	43	2.6	2.7	57
OL-STA-20023-VC	OL-0101-15	20.3-21.3 Ft	20.8	72	0	4.6	95.4	48	38	80	34	46	5	2.6	87
OL-STA-20023-VC	OL-0101-16	30.2-33.5 Ft	31.85	47	0	0.7	99.3	53	36	35	17	18	5	2.77	30

Note:
NP indicates non-plastic.

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Table 2

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Bulk Density (pcf)	Water Content (%)	Dry Density (pcf)
OL-STA-10013-SB	OL-0110-01	7-9	8	83.4	123	37.4
OL-STA-10013-SB	OL-0110-02	12-14	13	72.6	245	21.0
OL-STA-10013-SB	OL-0110-05	41-43	42	99	58	62.8
OL-STA-10014-SB	OL-0110-06	14.5-16.5	15.5	79	259	22.0
OL-STA-10014-SB	OL-0110-08	34.5-36.5	35.5	77.7	173	28.4
OL-STA-10014-SB	OL-0110-10	48-50	49	93.9	39	67.8
OL-STA-10015-SB	OL-0110-64	11.5-13.5	12.5	78.2	180	27.9
OL-STA-10015-SB	OL-0110-68	36.5-38.5	37.5	91.8	81	50.6
OL-STA-10016-SB	OL-0110-12	12-14	13	84.2	136	35.8
OL-STA-10016-SB	OL-0110-15	37-39	38	89.9	86	48.3
OL-STA-10017-SB	OL-0110-17	13-15	14	83	112	39.1
OL-STA-10017-SB	OL-0110-20	28-30	29	89.1	91	46.6
OL-STA-10018-SB	OL-0110-23	8-10	9	79	153	31.3
OL-STA-10018-SB	OL-0110-26	37-39	38	105	56	67.2
OL-STA-10018-SB	OL-0110-27	48-50	49	114	29	88.7
OL-STA-10019-SB	OL-0110-30	12.5-14.5	13.5	81.1	155	31.8
OL-STA-10019-SB	OL-0110-32	59.5-61.5	60.5	109.2	46	74.9
OL-STA-10020-SB	OL-0110-34	12-14	13	71	334	16.4
OL-STA-10020-SB	OL-0110-39	62-64	63	113	42	79.7
OL-STA-10021-SB	OL-0110-40	13.5-15.5	14.5	78.2	154	30.8
OL-STA-10021-SB	OL-0110-41	18-20.5	19.25	84.3	113	39.5
OL-STA-10021-SB	OL-0110-43	65.5-67.5	66.5	103	59	65.0
OL-STA-10022-SB	OL-0110-45	12-14	13	80	165	30.2
OL-STA-10022-SB	OL-0110-50	66-68	67	101	64	62.0
OL-STA-10023-SB	OL-0052-06	13-15	14	86.2	107	41.6
OL-STA-10023-SB	OL-0052-04	50-52	51	97.7	71	57.1
OL-STA-10024-SB	OL-0052-07	15-17	16	86.9	99	43.6
OL-STA-10024-SB	OL-0052-09	30-32	31	77.8	177	28.1
OL-STA-10024-SB	OL-0052-12	64-66	65	97.9	69	57.9
OL-STA-10025-SB	OL-0052-13	7-9	8	78.9	140	32.9
OL-STA-10025-SB	OL-0052-16	52-54	53	98	69	58.0
OL-STA-10026-SB	OL-0052-19	7-9	8	85.9	125	38.3
OL-STA-10026-SB	OL-0052-22	50-52	51	96.4	72	56.1
OL-STA-20001-SB	OL-0072-07	20-22	21	98.2	70	57.7
OL-STA-20001-SB	OL-0072-09	45-47	46	122	29	93.9
OL-STA-20004-SB	OL-0072-01	12-14	13	89.4	102	44.3
OL-STA-20004-SB	OL-0072-02	36.6-38.6	37.6	121	30	93.6
OL-STA-20007-SB	OL-0072-04	23-25	24	102	50	68.3
OL-STA-20007-SB	OL-0072-05	38.6-40.6	39.6	106	48	71.2
OL-STA-20016-SB	OL-0110-51	14-16	15	131	16	113.0
OL-STA-20017-SB	OL-0110-59	42-44	43	127	23	104.0
OL-STA-20018-SB	OL-0110-54	10-12	11	95.7	69	56.6
OL-STA-20018-SB	OL-0110-56	51-53	52	115	36	84.6

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Table 3

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Compression Index (Cc)	Recompression Index (Cr)	Initial Void Ratio (e_o)	Initial Water Content (%)	Preconsolidation Pressure (tsf)
OL-STA-10013	OL-0110-05	41-43	42	0.51	0.06	1.60	57.6	0.6
OL-STA-10014	OL-0110-08	34.5-36.5	35.5	0.94	0.01	3.05	113.1	0.6
OL-STA-10017	OL-0110-20	28-30	29	0.94	0.13	2.74	103.7	0.3
OL-STA-10018	OL-0110-27	48-50	49	0.36	0.03	1.06	36.5	0.7
OL-STA-10019	OL-0110-30	12.5-14.5	13.5	0.08	0.01	4.24	148.7	1.0
OL-STA-10022	OL-0110-49	64-66	65	0.70	0.06	1.85	67.2	0.8
OL-STA-10023	OL-0052-06	13-15	14	1.59	0.02	3.38	142.2	0.5
OL-STA-10023	OL-0052-04	50-52	51	0.73	0.07	1.94	72.5	0.9
OL-STA-10024	OL-0052-07	15-17	16	1.18	0.02	3.08	120.9	0.8
OL-STA-10024	OL-0052-09	30-32	31	2.84	0.03	4.93	180.0	1.4
OL-STA-10024	OL-0052-12	64-66	65	0.57	0.09	1.81	63.4	0.6
OL-STA-10025	OL-0052-13	7-9	8	2.04	0.02	4.53	183.6	0.9
OL-STA-10025	OL-0052-16	52-54	53	0.65	0.08	1.88	70.3	0.7
OL-STA-10026	OL-0052-19	7-9	8	1.22	0.03	3.17	105.7	0.9
OL-STA-10026	OL-0052-22	50-52	51	0.69	0.09	1.99	76.5	0.7
OL-STA-20001	OL-0072-07	20-22	21	0.37	0.02	1.87	64.2	0.3
OL-STA-20001	OL-0072-09	44.9-46.9	45.9	0.26	0.04	0.95	32.7	0.5
OL-STA-20004	OL-0072-01	12-14	13	0.72	0.01	2.91	102.3	0.3
OL-STA-20004	OL-0072-02	36.6-38.6	37.6	0.16	0.02	0.90	31.4	0.4
OL-STA-20007	OL-0072-04	23-25	24	0.41	0.03	1.89	65.8	0.3
OL-STA-20007	OL-0072-05	38.6-40.6	39.6	0.49	0.05	1.33	48.6	0.5
OL-STA-20016	OL-0110-52	27-29	28	0.19	0.04	0.89	30.9	0.4
OL-STA-20017	OL-0110-57	10-12	11	0.51	0.01	1.42	37.2	0.4
OL-STA-20017	OL-0110-59	42-44	43	0.22	0.03	0.87	31.1	0.6
OL-STA-20018	OL-0110-55	47-49	48	0.23	0.02	0.91	32.7	0.7

Note:
These parameters are provided to show general material behavior for informational purposes only, additional interpretation will be required for design.

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Table 4

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Water Content (%)	Dry Density (pcf)	Undrained Strength (psf)	Strain at Failure (%)
OL-STA-10013	OL-0110-02	12.0-14.0	13	245.2	21.0	382.3	2.6
OL-STA-10014	OL-0110-08	34.5-36.5	35.5	173.1	28.4	215.2	9.4
OL-STA-10014	OL-0110-10	48.0-50.0	49	38.5	67.8	165.6	14.3
OL-STA-10015	OL-0110-64	11.5-13.5	12.5	179.9	27.9	109.9	4.0
OL-STA-10015	OL-0110-68	36.5-38.5	37.5	81.3	50.6	431.3	6.6
OL-STA-10016	OL-0110-12	12.0-14.0	13	135.5	35.8	103.6	12.6
OL-STA-10016	OL-0110-15	37.0-39.0	38	86.2	48.3	330.9	10.8
OL-STA-10017	OL-0110-17	13.0-15.0	14	112.3	39.1	96.7	5.8
OL-STA-10017	OL-0110-20	28.0-30.0	29	91.2	46.6	247.0	9.0
OL-STA-10018	OL-0110-26	37.0-39.0	38	55.6	67.2	440.3	9.5
OL-STA-10018	OL-0110-27	48.0-50.0	49	28.7	88.7	335.8	7.8
OL-STA-10018	OL-0110-23	8.0-10.0	9	152.5	31.3	303.5	12.1
OL-STA-10019	OL-0110-30	12.5-14.5	13.5	154.6	31.8	309.8	15.0
OL-STA-10019	OL-0110-32	59.5-61.5	60.5	45.8	74.9	384.9	5.7
OL-STA-10020	OL-0110-34	12.0-14.0	13	333.8	16.4	74.4	6.0
OL-STA-10020	OL-0110-36	22.0-24.0	23	440.2	13.0	651.6	6.7
OL-STA-10020	OL-0110-39	62.0-64.0	63	41.6	79.7	285.7	13.9
OL-STA-10021	OL-0110-41	18-20.5	19.25	113.1	39.5	144.0	15.0
OL-STA-10021	OL-0110-43	65.5-67.5	66.5	59.0	65.0	417.1	9.8
OL-STA-10022	OL-0110-45	12.0-14.0	13	164.7	30.2	259.3	15.0
OL-STA-10022	OL-0110-50	66.0-68.0	67	63.6	62.0	406.8	8.7
OL-STA-10023	OL-0052-06	13.0-15.0	14	107.1	41.6	163.3	8.9
OL-STA-10023	OL-0052-04	50.0-52.0	51	71.2	57.1	465.2	6.4
OL-STA-10024	OL-0052-07	15.0-17.0	16	99.3	43.6	429.2	18.3
OL-STA-10024	OL-0052-09	30.0-32.0	31	176.9	28.1	464.5	11.7
OL-STA-10024	OL-0052-12	64.0-66.0	65	69.2	57.9	518.1	9.5
OL-STA-10025	OL-0052-16	52.0-54.0	53	68.8	58.0	460.3	8.2
OL-STA-10025	OL-0052-13	7.0-9.0	8	139.6	32.9	242.4	15.0
OL-STA-10026	OL-0052-22	50.0-52.0	51	71.7	56.1	476.7	9.6
OL-STA-10026	OL-0052-19	7.0-9.0	8	124.5	38.3	207.7	8.1
OL-STA-20001	OL-0072-07	20.0-22.0	21	70.2	57.7	99.8	11.7
OL-STA-20001	OL-0072-09	44.9-46.9	45.9	29.4	93.9	200.5	12.5
OL-STA-20004	OL-0072-01	12.0-14.0	13	101.9	44.3	63.2	10.8
OL-STA-20004	OL-0072-02	36.6-38.6	37.6	29.7	93.6	203.4	15.0
OL-STA-20007	OL-0072-04	23.0-25.0	24	49.9	68.3	247.6	10.5
OL-STA-20007	OL-0072-05	38.6-40.6	39.6	48.3	71.2	316.5	5.9
OL-STA-20016	OL-0110-51	14.0-16.0	15	15.6	113.4	3051.0	1.8
OL-STA-20016	OL-0110-52	27.0-29.0	28	26.8	98.1	229.5	4.0
OL-STA-20016	OL-0110-53	57.0-59.0	58	16.8	115.8	2240.0	9.8
OL-STA-20017	OL-0110-57	10.0-12.0	11	82.4	51.2	312.6	6.1
OL-STA-20017	OL-0110-58	37.0-39.0	38	29.2	95.7	576.4	5.5
OL-STA-20017	OL-0110-59	42.0-44.0	43	22.7	103.8	402.0	15.0
OL-STA-20018	OL-0110-54	10.0-12.0	11	62.7	58.8	222.5	12.5
OL-STA-20018	OL-0110-55	47.0-49.0	48	35.3	85.2	391.4	9.9
OL-STA-20018	OL-0110-56	51.0-53.0	52	35.9	84.6	357.7	9.8

Note:
These parameters are provided to show general material behavior for informational purposes only, additional interpretation will be required for design.

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Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Table 5

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Initial Water Content (%)	Dry Density (pcf)	Initial Confining Stress (psf)	Peak Deviator Stress (psf)	Strain at Failure (%)	CU Total Stress Cohesion (psf)	CU Total Stress Friction Angle (degrees)	CU Effective Stress Cohesion (psf)	CU Effective Stress Friction Angle (degrees)
OL-STA-10013	OL-0110-01	7.0-9.0	8	123.4	37.4	180.4	385.6	7.5	67.6	20.4	54.5	37.3
				100.6	41.8	360.2	574.4	10.4				
OL-STA-10013	OL-0110-04	37.0-39.0	38	70.4	58.1	780.7	1120.2	15.0	436	9	349	20.4
				72.2	57.2	1561	1765.4	13.2				
				86.8	50.4	3121	2050	15.0				
OL-STA-10013	OL-0110-05	41.0-43.0	42	65.9	59.2	1720	1654.4	14.0	178	14.9	0	40.5
				60	60.0	3438	2830	15.0				
OL-STA-10014	OL-0110-07	19.5-21.5	20.5	156.3	30.7	432.6	887.6	8.8	298	7.8	201	30.3
				127.1	36.2	864.9	854.4	15.0				
				117.5	39.4	1727	1440.4	10.0				
OL-STA-10014	OL-0110-09	46.0-48.0	47	67.1	59.9	959.3	1324	15.0	280	12.2	227	24.3
				69.5	58.1	1921	1479.2	15.0				
				67.6	59.7	3836	4468	15.0				
OL-STA-10015	OL-0110-69	38.5-40.5	39.5	75.8	55.3	807.1	1197	12.5	446	9.8	152	39.9
				85.2	51.1	1614	2010	15.0				
				81.6	52.6	3227	2246	11.4				
OL-STA-10015	OL-0110-65	44.0-46.0	45	206.5	24.2	348.9	368.0	9.5	121	12	30.3	44.3
				224.4	22.6	699.9	875.6	6.5				
				171.4	27.8	1400	939.8	12.9				
OL-STA-10016	OL-0110-13	170.-19.0	18	134.1	32.7	379.2	454.8	15.0	21.8	19.8	16.4	44.8
				133.8	34.5	759.7	737.4	15.0				
				135	33.7	1519	1635.6	11.9				
OL-STA-10016	OL-0110-16	39.0-41.0	40	75.2	52.9	819	1415	13.0	374	12.7	230	37.8
				80	52.7	1640	1786.4	15.0				
				79.3	53.4	3283	2782	15.0				
OL-STA-10017	OL-0110-21	30.0-32.0	31	88.5	49.7	1279	1652.2	11.3	387	10.9	258	32.5
				95.6	47.1	2562	2150	15.0				
OL-STA-10018	OL-0110-28	52.0-54.0	53	30.3	90.2	1081.3	1568.2	15.0	0	21.6	273.6	24.8
				25.6	96.4	2161.4	2085.1	15.0				
				21.5	97.5	4318.6	6042.2	15.0				
OL-STA-10019	OL-0110-29	7.5-9.5	8.5	110.9	41.0	288.3	504.8	15.0	33.4	27.5	96.2	44.2
				115.8	39.7	575.4	1307.6	15.0				
				104.4	42.5	860.9	1377.4	15.0				
OL-STA-10019	OL-0110-33	61.5-63.5	62.5	46.9	73.4	1296.0	1269.2	15.0	355	9.2	358	22.6
				49	72.6	2519.0	1839.0	10.7				
				52.9	68.8	5041.0	2742.0	11.6				
OL-STA-10020	OL-0110-35	17.0-19.0	18	388.2	14.7	760.0	1008.6	13.6	61	20.7	NA	
				307.9	17.6	1514.9	1446.6	15.0				
OL-STA-10020	OL-0110-38	59.0-61.0	60	24.9	94.0	1208.0	1725.2	15.0	419	13.2	100	36
				21.4	98.1	3630.0	3180.0	15.0				

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OL-STA-10021	OL-0110-40	13.5-15.5	14.5	154.3	30.8	309.0	680.4	15.0	137	20.2	NA	
				199.9	26.1	618.7	1041.2	4.7				
				160	30.2	1239.0	1701.2	12.9				
OL-STA-10021	OL-0110-44	67.5-68.5	68	43.8	70.0	1389.0	2136.0	15.0	627	10.6	110	36.7
				50.1	71.6	2781.0	2760.0	15.0				
OL-STA-10022	OL-0110-46	17.0-19.0	18	116.5	39.9	383.3	523.6	10.5	119	11.6	70.1	34.2
				118.9	39.5	766.7	619.2	12.1				
				118.1	39.8	1531.0	1080.8	2.5				
OL-STA-10022	OL-0110-49	65.0-66.0	65.5	65.7	60.8	1311	1676.8	9.4	441	10.8	428	24
				66	60.6	2620	2312	15.0				
				63.4	62.2	8885	6212	6.4				
OL-STA-10023	OL-0052-05	52.0-54.0	53	61.8	62.3	1099	1218.4	11.5	159	16.1	58.4	39.9
				64.4	59.3	2198	1768.8	13.5				
				63.8	59.6	4414	3244	15.0				
OL-STA-10024	OL-0052-11	62.0-64.0	63	68.2	57.7	1298	1448	12.8	294	12	187	34.8
				68.8	58.6	2597	2038	12.3				
				67.9	58.9	5203	3480	14.7				
OL-STA-10025	OL-0052-17	57.0-59.0	58	56.9	63.6	1199	1936	12.1	749	7.3	504	25.5
				66.5	60.3	2398	2572	14.9				
				67.4	59.8	4801	3042	15.3				
OL-STA-20001	OL-0072-08	38.9-40.9	39.9	22.4	101.6	788.4	2652	15.0	158	18.6	0.86	37.9
				23.3	101.3	1601	4546	15.0				
OL-STA-20004	OL-0072-03	38.6-40.6	39.6	26.5	86.8	1600	1528.8	15.0	13	19.7	75.8	32.5
				23.8	101.7	3200	3180	15.0				
OL-STA-20007	OL-0072-06	36.6-38.6	37.6	25.4	93.3	746.4	770.4	8.8	0	25.1	123	29.3
				25.7	99.1	3001	4356	15.0				
OL-STA-20016	OL-0110-54	10.0-12.0	11	69.3	56.6	241.2	613.2	1.5	172	17.4	0	38
						479.1	972.3	1.3				
						945.4	1240.4	1.1				
OL-STA-20016	OL-0110-51	14.0-16.0	15	40.6	80.0	639.9	1738.4	15.0	159	27.8	46.9	34.5
				15.2	111.3	1281	8642	15.0				
OL-STA-20017	OL-0110-58	37.0-39.0	38	25.4	97.0	780.2	1089.8	4.5	280	8.7	0	36.5
				36.2	83.1	1559	997.6	2.1				
				31.4	88.8	3123	1827.8	2.3				

Note:
1. These parameters are provided to show general material behavior for informational purposes only, additional interpretation will be required for design.
2. NA indicates not applicable. Additional interpretation is required to use these test results.

Phase II Investigation

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SMU 1 Index Test Results Summary

Location ID	Field Sample ID	Depth	Average Depth	Water Content	Atterberg Limits (ASTM D4318)			Grain Size (ASTM D422)					Specific Gravity
		(ft)	(ft)	(ASTM D2216) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Percent Gravel (%)	Percent Sand (%)	Percent Fines (clay & silt) (%)	Clay-sized Particle Content (0.005 mm) (%)	Clay-sized Particle Content (0.002 mm) (%)	(ASTM D854)
SICT Index Tests													
OL-STA-10015-VC	OL-0119-05	9.9-13.2	11.55	233									
OL-STA-10016-VC	OL-0119-02	0-3.3	1.65	108.3	45	31	23	0	1.5	98.5	32	12	
OL-STA-10017-VC	OL-0119-06	0-3.3	1.65	152									
OL-STA-10017-VC	OL-0119-07	9.9-12.6	11.25	126.6	66	40	26	0.5	4.7	94.8	35	14	
OL-STA-10018-VC	OL-0119-04	6.6-9.9	8.25	217.6	115	74	41	0.4	8.6	91	33	11	2.54
OL-STA-10022-VC	OL-0119-01	9.9-13.2	11.55	171.8									
OL-STA-10024-VC	OL-0119-08	6.6-9.9	8.25	120.2	99	68	31	0	25.3	74.7	32	17	
OL-STA-10026-VC	OL-0119-03	3.3-6.6	4.95	54.7	69	45	24	0	55.3	44.7	18	11	
Phase II Index Tests													
OL-VC-10034	OL-0236-08	0-3.3	1.65	180.6									
OL-VC-10034	OL-0236-07	3.3-6.6	4.95	213.1									
OL-VC-10034	OL-0236-09	6.6-9.9	8.25	277.7									
OL-VC-10034	OL-0236-10	9.9-13.2	11.55	263.5									
OL-VC-10034	OL-0236-11	13.2-16.5	14.85	260.9									
OL-VC-10034	OL-0236-12	16.5-19.7	18.1	64.8									
OL-VC-10037	OL-0236-13	0-3.3	1.65	112.3									
OL-VC-10037	OL-0256-01	3.3-6.6	4.95	161.4	78	59	19	0	1.6	98.4	44	18	2.45
OL-VC-10037	OL-0256-02	6.6-9.9	8.25	191.2	86	59	27	0	3.2	96.8	53	27	
OL-VC-10037	OL-0236-14	9.9-13.2	11.55	166									
OL-VC-10037	OL-0296-01	9.9-13.2	11.55	191.3	96	48	48	0	4.8	95.2	55	28	2.52
OL-VC-10037	OL-0236-15	13.2-16.5	14.85	219.3									
OL-VC-10037	OL-0236-16	16.5-19.8	18.15	88.3									
OL-VC-10038	OL-0250-19	0-3.3	1.65	161.3	127	80	47	3	35.6	61.4	34	17	
OL-VC-10038	OL-0236-17	3.3-6.6	4.95	215.2									
OL-VC-10038	OL-0236-18	6.6-9.9	8.25	144.9									
OL-VC-10038	OL-0236-19	9.9-13.2	11.55	236.2									
OL-VC-10038	OL-0296-02	9.9-13.2	11.55	223.4									
OL-VC-10038	OL-0250-20	13.2-16.5	14.85	160.8	77	60	17	0	3.4	96.6	48	18	
OL-VC-10038	OL-0236-20	16.5-18.9	17.7	225.2									
OL-VC-10040	OL-0237-01	0-3.3	1.65	88.9									
OL-VC-10040	OL-0237-02	3.3-6.6	4.95	114.3									
OL-VC-10040	OL-0250-17	6.6-9.9	8.25	127.4	72	46	26	0	2.2	97.8	28	9	
OL-VC-10040	OL-0250-18	9.9-13.2	11.55	155.9	94	62	32	0	4.4	95.6	30	10	
OL-VC-10046	OL-0237-03	0-3.3	1.65	173.4									
OL-VC-10046	OL-0250-15	3.3-6.6	4.95	153.6	108	70	38	0	4.2	95.8	29	6	2.67
OL-VC-10046	OL-0237-04	6.6-9.9	8.25	131.8									
OL-VC-10046	OL-0237-05	9.9-13.2	11.55	111.3									
OL-VC-10046	OL-0237-06	13.2-16.5	14.85	68.1									

Geosyntec consultants

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OL-VC-10046	OL-0250-16	16.5-19.2	17.85	66.2	47	33	14	0	0.8	99.2	29	13	
OL-VC-10047	OL-0237-07	0-3.3	1.65	144.9									
OL-VC-10047	OL-0250-13	3.3-6.6	4.95	151.3	91	56	35	0	4	96	32	16	2.63
OL-VC-10047	OL-0250-14	6.6-9.9	8.25	173.4	101	60	41	0.3	4.9	94.8	35	13	
OL-VC-10047	OL-0237-08	9.9-13.2	11.55	113									
OL-VC-10047	OL-0237-09	13.2-16.5	14.85	92.7									
OL-VC-10047	OL-0237-10	16.5-19.8	18.15	111.3									
OL-VC-10054	OL-0237-15	0-3.3	1.65	134.3									
OL-VC-10054	OL-0250-11	6.6-9.9	8.25	93.4	62	40	22	0	14.7	85.3	33	12	
OL-VC-10054	OL-0250-12	9.9-13.2	11.55	114.6	63	44	19	0	1.5	98.5	36	11	
OL-VC-10054	OL-0237-17	13.2-16.5	14.85	76									
OL-VC-10054	OL-0237-18	16.5-18.8	17.65	72.6									
OL-VC-10057	OL-0237-11	0-3.3	1.65	143.7									
OL-VC-10057	OL-0250-09	3.3-6.6	4.95	197.1	130	88	42	0	27.6	72.4	27	13	
OL-VC-10057	OL-0237-12	6.6-9.9	8.25	193.4									
OL-VC-10057	OL-0250-10	9.9-13.2	11.55	140.1	85	55	30	0	1.3	98.7	28	12	
OL-VC-10057	OL-0237-14	13.2-16.5	14.85	141.9									
OL-VC-10057	OL-0237-13	16.5-19.5	18	127.2									
OL-VC-10062	OL-0237-19	0-3.3	1.65	177.8									
OL-VC-10062	OL-0250-07	3.3-6.6	4.95	127.3	103	63	40	0	7.6	92.4	33	11	
OL-VC-10062	OL-0237-20	6.6-9.9	8.25	185.3									
OL-VC-10062	OL-0238-01	9.9-13.2	11.55	144.4									
OL-VC-10062	OL-0238-02	13.2-16.5	14.85	181.6									
OL-VC-10062	OL-0250-08	16.5-19.2	17.85	181.8	96	59	37	0	3	97	36	14	2.7
OL-VC-10062A	OL-0296-03	3.3- 6.6	4.95	194.8	113	60	53	0	4.3	95.7	43	22	2.54
OL-VC-10063	OL-0250-05	0-3.3	1.65	221.6	88	60	28	0	1.2	98.8	30	12	
OL-VC-10063	OL-0238-03	3.3-6.6	4.95	209.4									
OL-VC-10063	OL-0238-04	6.6-9.9	8.25	172.4									
OL-VC-10063	OL-0238-05	9.9-13.2	11.55	154.4									
OL-VC-10063	OL-0238-06	13.2-16.5	14.85	180.4									
OL-VC-10063	OL-0250-06	16.5-19.8	18.15	169.4	82	55	27	0	2.2	97.8	30	13	
OL-VC-10066	OL-0238-07	0-3.3	1.65	131.7									
OL-VC-10066	OL-0249-12	3.3-6.6	4.95	112.4	60	50	10	0	30.3	69.7	17	7	
OL-VC-10066	OL-0238-08	6.6-9.9	8.25	99.2									
OL-VC-10066	OL-0249-13	9.9-13.2	11.55	104.3	60	47	13	0	23.5	76.5	20	9	
OL-VC-10066	OL-0238-09	13.2-16.5	14.85	134.5									
OL-VC-10066	OL-0238-10	16.5-19.8	18.15	238									
OL-VC-10071	OL-0249-14	0-3.3	1.65	169.7	86	47	39	0	1.1	98.9	42	32	
OL-VC-10071	OL-0238-11	3.3-6.6	4.95	186									
OL-VC-10071	OL-0238-12	6.6-9.9	8.25	155.7									
OL-VC-10071	OL-0249-15	9.9-13.2	11.55	198.6	89	60	29	0	1.4	98.6	29	13	
OL-VC-10071	OL-0238-13	13.2-16.5	14.85	153.3									
OL-VC-10071	OL-0238-14	16.5-19.8	18.15	157.7									
OL-VC-10073	OL-0245-01	0-3.3	1.65	196.6									
OL-VC-10073	OL-0245-02	3.3-6.6	4.95	147.7									

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OL-VC-10073	OL-0249-16	6.6-9.9	8.25	194.3	72	47	25	0	1.7	98.3	30	11	
OL-VC-10073	OL-0245-03	9.9-13.2	11.55	152.3									
OL-VC-10073	OL-0245-05	13.2-16.5	14.85	151									
OL-VC-10073	OL-0245-04	16.5-19.8	18.15	159.5									
OL-VC-10076	OL-0245-06	0-3.3	1.65	151.4									
OL-VC-10076	OL-0245-07	3.3-6.6	4.95	154.2									
OL-VC-10076	OL-0245-08	9.9-13.2	11.55	192.3									
OL-VC-10076	OL-0249-17	13.2-16.5	14.85	178.7	116	70	46	0.1	7.2	92.7	38	17	
OL-VC-10076	OL-0245-09	16.5-19.8	18.15	169									
OL-VC-10077	OL-0249-18	0-3.3	1.65	150.4	61	44	17	0	0.4	99.6	31	15	
OL-VC-10077	OL-0245-10	3.3-6.6	4.95	187.5									
OL-VC-10077	OL-0245-11	6.6-9.9	8.25	138.4									
OL-VC-10077	OL-0249-19	9.9-13.2	11.55	177.7	76	48	28	0	1.4	98.6	38	18	
OL-VC-10077	OL-0245-12	13.2-16.5	14.85	151.1									
OL-VC-10077	OL-0245-13	16.5-17.9	17.2	216.8									
OL-VC-10078	OL-0248-05	0-3.3	1.65	48.1									
OL-VC-10078	OL-0248-06	3.3-6.6	4.95	108.5									
OL-VC-10078	OL-0248-07	6.6-9.9	8.25	150.8									
OL-VC-10078	OL-0249-20	9.9-13.2	11.55	181.3	119	82	37	0	10.3	89.7	14	11	
OL-VC-10078	OL-0248-08	13.2-16.5	14.85	153.4									
OL-VC-10078	OL-0248-09	16.5-19.8	18.15	181.4									
OL-VC-10080	OL-0245-14	0-3.3	1.65	135.2									
OL-VC-10080	OL-0250-01	3.3-6.6	4.95	94.6	56	40	16	0	9.2	90.8	26	10	
OL-VC-10080	OL-0245-15	6.6-9.9	8.25	185.6									
OL-VC-10080	OL-0245-16	9.9-13.2	11.55	252									
OL-VC-10080	OL-0296-04	9.9-13.2	11.55	224.3									
OL-VC-10080	OL-0250-02	13.2-16.5	14.85	203.5	114	83	31	0	2.5	97.5	8	2	
OL-VC-10080	OL-0245-17	16.5-19.3	17.9	175									
OL-VC-10081A	OL-0248-01	0-3.3	1.65	132.6									
OL-VC-10081A	OL-0250-03	3.3-6.6	4.95	172.1	122	67	55	0	3	97	38	19	2.69
OL-VC-10081A	OL-0248-02	6.6-9.9	8.25	197									
OL-VC-10081A	OL-0248-03	9.9-13.2	11.55	149									
OL-VC-10081A	OL-0248-04	13.2-16.5	14.85	183.4									
OL-VC-10081A	OL-0296-05	13.2-16.5	14.85	206.3	117	82	35	4.8	7.1	88.1	40	22	2.58
OL-VC-10081A	OL-0250-04	16.5-19.6	18.05	170.8	79	51	28	0	1.1	98.9	39	17	
OL-VC-10089	OL-0248-10	0-3.3	1.65	91.7									
OL-VC-10089	OL-0248-11	3.3-6.6	4.95	135.7									
OL-VC-10089	OL-0248-12	6.6-9.9	8.25	162.4									
OL-VC-10089	OL-0248-13	9.9-13.2	11.55	176.9									
OL-VC-10089	OL-0256-08	13.2-16.5	14.85	198.4	80	58	22	0	0.9	99.1	36	17	2.43
OL-VC-10089	OL-0248-14	16.5-19.7	18.1	161.3									
OL-VC-10090	OL-0248-15	0-3.3	1.65	179.1									
OL-VC-10090	OL-0256-09	3.3-6.6	4.95	104.3	52	35	17	0	1.7	98.3	20	8	
OL-VC-10090	OL-0248-16	6.6-9.9	8.25	116.6									
OL-VC-10090	OL-0248-17	9.9-13.2	11.55	83.7									

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OL-VC-10090	OL-0248-18	13.2-16.5	14.85	141.5									
OL-VC-10090	OL-0248-19	16.5-19.8	18.15	151.1									
OL-VC-10094	OL-0248-20	0-3.3	1.65	126.7									
OL-VC-10094	OL-0249-11	3.3-6.6	4.95	86.3	46	31	15	0	11	89	16	8	2.58
OL-VC-10094	OL-0249-01	6.6-9.9	8.25	106.6									
OL-VC-10094	OL-0249-02	9.9-13.2	11.55	195.9									
OL-VC-10094	OL-0249-03	13.2-16.5	14.85	161.1									
OL-VC-10094	OL-0249-04	16.5-19.8	18.15	184.3	72	61	11	0	1	99	13	8	
OL-VC-10095A	OL-0256-05	0-3.3	1.65	193	109	38	71	0	2.7	97.3	24	16	
OL-VC-10095A	OL-0256-06	3.3-6.6	4.95	140.2	101	41	60	0	1.9	98.1	19	12	
OL-VC-10095A	OL-0244-05	6.6-9.9	8.25	139.2									
OL-VC-10095A	OL-0244-06	9.9-13.2	11.55	211.2									
OL-VC-10095A	OL-0244-07	13.2-16.5	14.85	126.3									
OL-VC-10095A	OL-0256-07	16.5-19.1	17.8	100.9	77	42	35	0	1.5	98.5	12	8	
OL-VC-10096	OL-0256-03	0-3.3	1.65	101.7	56	36	20	0	3.2	96.8	23	8	
OL-VC-10096	OL-0244-08	3.3-6.6	4.95	94.5									
OL-VC-10096	OL-0244-09	6.6-9.9	8.25	177.2									
OL-VC-10096	OL-0244-10	9.9-13.2	11.55	159.7									
OL-VC-10096	OL-0256-04	13.2-16.5	14.85	152.3	75	50	25	0	1	99	31	11	
OL-VC-10096	OL-0244-11	16.5-19.8	18.15	158.8									
OL-VC-10102	OL-0244-12	3.3-6.6	4.95	101.4									
OL-VC-10102	OL-0244-13	6.6-9.9	8.25	190.2									
OL-VC-10102	OL-0256-11	9.9-13.2	11.55	144.8	69	46	23	0	0.8	99.2	27	8	2.63
OL-VC-10102	OL-0244-14	13.2-16.5	14.85	140.4									
OL-VC-10102	OL-0244-15	16.5-17.2	16.85	159.4									
OL-VC-10103	OL-0244-16	0-3.3	1.65	161.5									
OL-VC-10103	OL-0244-17	3.3-6.6	4.95	178									
OL-VC-10103	OL-0256-10	6.6-9.9	8.25	172.7	75	50	25	0	0.9	99.1	30	13	
OL-VC-10103	OL-0244-18	9.9-13.2	11.55	152.8									
OL-VC-10103	OL-0244-19	13.2-16.5	14.85	142.9									
OL-VC-10103	OL-0244-20	16.5-18	17.25	163.3									
OL-VC-10105	OL-0244-01	0-3.3	1.65	210.9									
OL-VC-10105	OL-0296-06	0-3.3	1.65	215.3	89	55	34	0	11.7	88.3	35	20	2.6
OL-VC-10105	OL-0256-12	3.3-6.6	4.95	162.6	84	59	25	0	27	73	26	13	
OL-VC-10105	OL-0244-02	6.6-9.9	8.25	151.2									
OL-VC-10105	OL-0244-03	9.9-13.2	11.55	182.4									
OL-VC-10105	OL-0244-04	13.2-16.5	14.85	151.3									
OL-VC-10105	OL-0256-13	16.5-19.8	18.15	93.9	70	39	31	0	2.3	97.7	19	11	
OL-VC-10107	OL-0249-06	0-3.3	1.65	83.4									
OL-VC-10107	OL-0249-07	3.3-6.6	4.95	85.7									
OL-VC-10107	OL-0249-10	6.6-9.9	8.25	90.6	52	35	17	0	5.9	94.1	17	9	2.65
OL-VC-10107	OL-0249-08	9.9-13.2	11.55	75.1									
OL-VC-10107	OL-0249-05	13.2-16.5	14.85	103.2	59	44	15	0	5.5	94.5	17	8	2.71
OL-VC-10107	OL-0249-09	16.5-17.5	17	96									
OL-STA-10108	OL-0299-01	2-4	3	243.6									

OL-STA-10108	OL-0299-02	12-14	13	226.1	132	76	56	0	4.1	95.9	42	20	2.59
OL-STA-10108	OL-0299-03	27-29	28	124.2									
OL-STA-10108	OL-0299-04	32-34	33	112									
OL-STA-10108	OL-0299-08	37-39	38	82.6	66	38	28	0.1	3.7	96.2	39	19	2.52
OL-STA-10108	OL-0299-05	42-44	43	270.5									
OL-STA-10108	OL-0299-06	47-49	48	85.5									
OL-STA-10108	OL-0298-05	47-49	48	86.43	92	44	48	0	3.6	96.4	34	27	2.57
OL-STA-10108	OL-0299-09	52-54	53	75.9	95	42	53	0.2	2.3	97.5	26	19	2.69
OL-STA-10108	OL-0299-07	57-59	58	73.9									
OL-STA-10108	OL-0299-10	62-64	63	68.5									
OL-STA-10108	OL-0267-01	64-66	65	69.8									
OL-STA-10108	OL-0299-11	66-68	67	70.3									
OL-STA-10108	OL-0267-02	68-70	69	67.7	74	35	39	0	0.1	99.9	23	17	2.77
OL-STA-10108	OL-0299-12	70-72	71	60.2									
OL-STA-10108	OL-0299-13	72-74	73	64.9									
OL-STA-10108	OL-0301-10	76-78	77	64.6	67	36	31	0	0.4	99.6	47	29	
OL-STA-10108	OL-0299-14	82-84	83	40.6									
OL-STA-10108	OL-0301-11	88-90	89	41.7	44	20	24	0	0	100	33	27	
OL-STA-10108	OL-0299-15	103-105	104	44.4									
OL-STA-10108	OL-0301-13	113-115	114	33.7									
OL-STA-10108	OL-0301-12	118-120	119	31.5	40	18	22	0	0	100	55	41	
OL-STA-10108	OL-0299-16	123-125	124	20.4									
OL-STA-10108	OL-0299-17	128-130	129	18.6									
OL-STA-10108	OL-0301-14	134-136	135	17.2	17	15	2	0	8.1	91.9	17	13	2.79
OL-STA-10108	OL-0299-18	141-143	142	17.2									
OL-STA-10108	OL-0301-15	147-149	148	10	26	15	11	63.3	24	12.7	6	5	
OL-STA-10108	OL-0299-19	149-151	150	7.9									
OL-STA-10108	OL-0301-16	153-155	154	7.6	14	10	4	5.9	53.7	40.4	13	10	
OL-STA-10108	OL-0301-17	155-157	156	9.3	20	10	10	9.6	38	52.4	29	20	2.8
OL-STA-10108	OL-0299-20	165-167	166	11.2									

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SMU 8 Index Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Water Content (ASTM D2216) (%)	Atterberg Limits (ASTM D 4318)			Grain Size (ASTM D 422)					Specific Gravity (ASTM D 854)
					Liquid Limit	Plastic Limit	Plasticity Index	Percent Gravel (%)	Percent Sand (%)	Percent Fines (clay & silt) (%)	Clay-sized Particle Content (0.005 mm) (%)	Clay-sized Particle Content (0.002 mm) (%)	
OL-VC-80028	OL-0281-07	0.5-3.3	1.9	206.4	105	48	57	0	0.5	99.5	31	20	2.65
OL-VC-80028	OL-0271-15	3.3-6.6	4.95	143.1									
OL-VC-80028	OL-0303-06	3.3-6.6	4.95	109	64	37	27	0	0.8	99.2	17	11	
OL-VC-80028	OL-0304-04	6.6-9.9	8.25	161.1									
OL-VC-80028	OL-0271-16	9.9-13.2	11.55	93.4									
OL-VC-80028	OL-0271-17	13.2-16.5	14.85	85.2									
OL-VC-80028	OL-0271-18	16.5-17.2	16.85	80.1									
OL-VC-80029	OL-0281-08	3.3-6.6	4.95	123.3	79	55	24	0	6	94	27	10	2.57
OL-VC-80029	OL-0271-11	6.6-9.9	8.25	227.9									
OL-VC-80029	OL-0271-12	9.9-13.2	11.55	103.4									
OL-VC-80029	OL-0271-13	13.2-16.5	14.85	134									
OL-VC-80029	OL-0271-14	16.5-20	18.25	171.3									
OL-VC-80030	OL-0281-17	3.3-6.6	4.95	232	99	61	38	0	1.5	98.5	29	11	
OL-VC-80030	OL-0272-03	6.6-9.9	8.25	172									
OL-VC-80030	OL-0272-04	9.9-13.2	11.55	176.8									
OL-VC-80030	OL-0303-04	9.9-13.2	11.55	176	95	61	34	0.1	1.3	98.6	41	17	2.6
OL-VC-80030	OL-0272-05	13.2-16.5	14.85	159.3									
OL-VC-80030	OL-0272-06	16.5-20	18.25	150.1									
OL-VC-80031	OL-0272-07	0-0.5	0.25	161.3									
OL-VC-80031	OL-0272-08	0.5-3.3	1.9	238.1									
OL-VC-80031	OL-0272-09	3.3-6.6	4.95	185.6									
OL-VC-80031	OL-0303-05	3.3-6.6	4.95	179.4	80	45	35	0.4	1.3	98.3	34	13	2.55
OL-VC-80031	OL-0272-10	6.6-9.9	8.25	141.2									
OL-VC-80031	OL-0272-11	9.9-13.2	11.55	168.4									
OL-VC-80031	OL-0272-12	13.2-16.5	14.85	140.1									
OL-VC-80031	OL-0272-13	16.5-20	18.25	148.5									
OL-VC-80032	OL-0281-04	0.5-3.3	1.9	186.2	120	45	75	0	1.2	98.8	20	13	2.5
OL-VC-80032	OL-0272-14	6.6-9.9	8.25	163.4									
OL-VC-80032	OL-0272-15	9.9-13.2	11.55	143.4									
OL-VC-80032	OL-0272-16	13.2-16.5	14.85	99.3									
OL-VC-80032	OL-0272-17	16.5-18.4	17.45	106									
OL-VC-80033	OL-0281-09	0-0.5	0.25	211.2	115	47	68	0	0.8	99.2	33	22	2.62
OL-VC-80033	OL-0271-01	3.3-6.6	4.95	147.9									
OL-VC-80033	OL-0271-02	6.6-9.9	8.25	49.1									
OL-VC-80033	OL-0271-03	9.9-13.2	11.55	199.2									
OL-VC-80033	OL-0271-04	13.2-16.5	14.85	115.4									
OL-VC-80033	OL-0271-05	16.5-19.7	18.1	139.1									
OL-VC-80034	OL-0281-10	0-0.5	0.25	215.6	113	49	64	0	0.7	99.3	25	17	
OL-VC-80034	OL-0304-08	0.5-3.3	1.9	232.5	161	49	112	0	1.4	98.6	8	7	

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OL-VC-80034	OL-0271-06	3.3-6.6	4.95	181.4									
OL-VC-80034	OL-0271-07	6.6-9.9	8.25	174.4									
OL-VC-80034	OL-0271-08	9.9-13.2	11.55	113.1									
OL-VC-80034	OL-0271-09	13.2-16.5	14.85	198.4									
OL-VC-80034	OL-0271-10	16.5-19.6	18.05	9.1									
OL-VC-80035	OL-0281-18	0-0.5	0.25	219.2	103	48	55	0	2.1	97.9	25	19	2.73
OL-VC-80035	OL-0273-11	3.3-6.6	4.95	186.6									
OL-VC-80035	OL-0273-12	6.6-9.9	8.25	179.7									
OL-VC-80035	OL-0273-13	9.9-13.2	11.55	122.5									
OL-VC-80035	OL-0273-14	13.2-16.5	14.85	102.4									
OL-VC-80035	OL-0273-15	16.5-19	17.75	88.5									
OL-VC-80036	OL-0281-19	0-0.5	0.25	269.4	113	52	61	0	0.8	99.2	13	10	
OL-VC-80036	OL-0273-07	3.3-6.6	4.95	140.7									
OL-VC-80036	OL-0281-20	6.6-9.9	8.25	137	69	44	25	0	1.1	98.9	16	9	
OL-VC-80036	OL-0273-08	9.9-13.2	11.55	101.8									
OL-VC-80036	OL-0273-09	13.2-16.5	14.85	89.4									
OL-VC-80036	OL-0304-09	13.2-16.5	14.85		78	37	41	0.1	0.7	99.2	7	6	
OL-VC-80036	OL-0273-10	16.5-18.5	17.5	104.4									
OL-VC-80041	OL-0271-20	0.5-3.3	1.9	210									
OL-VC-80041	OL-0303-03	0-3.3	1.65	219.6	143	45	98	0	0.9	99.1	12	9	2.49
OL-VC-80049	OL-0272-01	0-0.5	0.25	248.1									
OL-VC-80049	OL-0272-02	0.5-3.3	1.9	234.5									
OL-VC-80050	OL-0273-04	0-0.5	0.25	176.9									
OL-VC-80050	OL-0273-05	0.5-3.3	1.9	167.8									
OL-VC-80050	OL-0282-01	3.3-6.6	4.95	56.7	84	48	36	0	0.6	99.4	10	5	
OL-VC-80050	OL-0273-06	6.6-9.9	8.25	131.4									
OL-VC-80050	OL-0282-02	13.2-16.5	14.85	119.9	117	51	66	0	1.1	98.9	31	22	
OL-VC-80050	OL-0304-02	16.5-17	16.75	91.4									
OL-VC-80051	OL-0304-01	0.5-3.3	1.9	189.1	126	44	82	0	0.8	99.2	13	10	
OL-VC-80051	OL-0304-03	3.3-6.6	4.95	169.3									

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Consolidation Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Compression Index (C_c)	Recompression Index (C_r)	Modified Compression Index ($C_{c\varepsilon}$)	Modified Recompression Index ($C_{r\varepsilon}$)	Initial Void Ratio (e_o)	Initial Water Content (%)	Preconsolidation Pressure (psf)
OL-STA-10108	OL-0267-01	64-66	65	0.74	0.06	0.25	0.02	1.91	70.8	1702
OL-STA-10108	OL-0267-02	68-70	69	0.58	0.05	0.20	0.02	1.86	65.3	1032 (disturbed sample)

DNAPL Investigation

Geosyntec
consultants

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Index Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Atterberg Limits (ASTM D4318)			Bulk Density (EM-1110-2-1906)		Carbonate Content ASTM D4373	Organic Content ASTM D2974	Water Content ASTM D2216	Specific Gravity ASTM D854	Grain Size (ASTM D422)				
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Bulk Density (pcf)	Dry Density (pcf)					Percent Gravel (%)	Percent Sand (%)	Percent Fines (clay & silt) (%)	Clay-sized Particle Content (0.005 mm) (%)	Clay-sized Particle Content (0.002 mm) (%)
OL-SB-10115	OL-0317-01	26-28	27				116	88			31.6	2.7					
OL-SB-10121	OL-0317-02	40-42	41				118	92			24.4	2.73					
OL-SB-10124	OL-0317-03	42-44	43				109	72			50.1	2.7					
OL-STA-20056	OL-0317-04	41-43	42				110	79			39.2	2.72					
OL-STA-20056	OL-0317-05	43-45	44														
OL-STA-20052	OL-0318-06	4-6	5	139	88	51	74	16	26	45.1	367.3	2.76	0	0.3	99.7	82	72
OL-STA-20052	OL-0318-07	6-8	7														
OL-STA-20052	OL-0318-08	22-24	23														
OL-STA-20052	OL-0318-09	24-26	25	57	33	24	101	62	48	22.7	62	2.68	0	1	99	52	24
OL-STA-20052	OL-0318-10	30-32	31	24	15	9	124	97	4	8.4	26.6	2.7	0	1.8	98.2	40	27
OL-STA-20052	OL-0318-11	32-34	33														
OL-STA-20054	OL-0318-12	2-4	3														
OL-STA-20054	OL-0318-13	4-6	5	127	79	48	77	23	22	43	140.5	2.58	0	25.6	74.4	28	15
OL-STA-20054	OL-0318-14	20-22	21	46	24	22	103	70	9	10.1	47	2.82	0.3	1.6	98.1	70	48
OL-STA-20054	OL-0318-15	26-28	27	28	16	12	114	86	9	6.4	31.3	2.77	0	0.2	99.8	46	28
OL-SB-10118	OL-0333-01	10-12	11	73	48	25					115.6	2.62	0	25.7	74.3	22	10
OL-SB-10120	OL-0333-02	6-8	7	72	48	24					112.4	2.7	0.7	27.4	71.9	29	14
OL-SB-10126	OL-0333-03	12-14	13	146	66	80					209.2	2.43	0	3.6	96.4	1	0
OL-SB-10121	OL-0333-04	8-10	9	192	77	115					245	2.33	0	29.4	70.6	15	9
OL-SB-10121	OL-0333-05	14-16	15	91	60	31					147.4	2.53	0	7.1	92.9	24	8
OL-SB-10121	OL-0333-06	16-18	17	114	74	40					53	2.52	0.5	11.7	87.8	18	9
OL-SB-10124	OL-0333-07	4-6	5	Non-Plastic							63.1	2.7	0	95.9	4.1		
OL-SB-10124	OL-0333-08	10-12	11	74	47	27					144.9	2.52	0	20.5	79.5	22	4
OL-SB-10124	OL-0333-09	24-26	25	96	49	47					146.6	2.51	0	6.8	93.2	4	2

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

CIU Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Initial Water Content (%)	Initial Confining Stress (psf)	Peak Deviator Stress (psf)	Undrained Strength (psf)	Strain at Failure (%)	CIU Total Stress		CIU Effective Stress	
									Cohesion (psf)	Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)
OL-SB-10121	OL-0317-02	40-42	41	29.2	1561	1872.6	936.3	15	57.8	18.7	41.7	29.5
				25	2343	2002	1001	14.4				
				28.4	3123	3256	1628	15				
OL-SB-10124	OL-0317-03	42-44	43	49.4	1636	1502.8	751.4	11.5	319	10.7	195	26.4
				47.6	2455	2220	1110	15				
				31.6	3271	2388	1194	14.2				
OL-STA-20056	OL-0317-04	41-43	42	34.1	1597	1205.4	602.7	13.4	401	5	335	15.1
				29.9	2399	1390	695	10.2				
				39.2	3198	1540.8	770.4	8.46				
OL-STA-20052	OL-0318-07	6-8	7	297.3	267.2	624.2	312.1	3.4	79.1	25.5	200	46
				194.3	400	943.8	471.9	6.66				
				231.8	532.4	1002.8	501.4	7.92				
OL-STA-20054	OL-0318-13	4-6	5	230.6	295.5	744.6	372.3	8.1				

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UU Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Water Content (%)	Dry Density (pcf)	Confining Stress (psf)	Undrained Strength (psf)	Strain at Failure (%)
OL-SB-10115	OL-0317-01	26-28	27	32.7	87.4	1028	165.9	8.1
OL-STA-20052	OL-0318-06	4-6	5	211.1	23.82	190	225.1	23.1
OL-STA-20052	OL-0318-09	24-26	25	53.5	65.59	952	288.1	10.3
OL-STA-20052	OL-0318-10	30-32	31	27.8	95.6	1180	147.7	12.7
OL-STA-20054	OL-0318-14	20-22	21	62.9	63.21	800	236.9	10
OL-STA-20054	OL-0318-15	26-28	27	32	86.1	1028	123.6	11.9

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Phase III investigation

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Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

Index Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Sediment Type	Water Content (ASTM D2216) (%)	Atterberg Limits (ASTM D4318) Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Grain Size (ASTM D422) Percent Gravel (%)	Percent Sand (%)	Percent Fines (clay & silt) (%)	Clay-sized Particle Content (0.005 mm) (%)	Clay-sized Particle Content (0.002 mm) (%)	Organic Content (ASTM D2974)	Specific Gravity (ASTM D854)	Carbonate Content (ASTM D4373)	Bulk Density (ASTM D2937)
OL-SB-10129	OL-0414-02	6.5-8.5	7.5	SOLW	110.3	53	35	18	0	0.9	99.1	36	12		2.53		83
OL-SB-10129	OL-0414-03	12-14	13	SOLW	97												85
OL-SB-10129	OL-0414-06	39-41	40	Marl	59.4	61	32	29	0	0.5	99.5	65	36	2.6		78	101
OL-SB-10129	OL-0414-08	44-46	45	Marl	53	64	32	32	0	0.3	99.7	32	14	2.7	2.69	70	100
OL-SB-10129	OL-0414-11	62-64	63	Silt/Clay	21.8	28	14	14	0	0	100	63	43	0.5		26	121
OL-SB-10129	OL-0414-12	65-67	66	Silt/Clay	110.3	31	14	17	0	0.2	99.8	45	33	1.3	2.76	26	125
OL-SB-10130	OL-0414-13	15-17	16	SOLW	202.3	114	67	47	0	1.8	98.2	45	18		2.57		78
OL-SB-10130	OL-0414-16	44-46	45	Marl	50	66	32	34	0	0.5	99.5	30	15	4.1	2.74	43	102
OL-SB-10130	OL-0414-18	49-51	50	Marl	47.2	62	35	27	0	0.5	99.5	74	48	2.5		52	98
OL-SB-10130	OL-0414-20	59-61	60	Silt/Clay	32.9	42	21	21	0	0.1	99.9	72	47	0.8	2.75	4	113
OL-SB-10130	OL-0414-21	64-66	65	Silt/Clay	13.9	29	16	13	0	0.2	99.8	54	36	1.7		0	121
OL-SB-10131	OL-0414-23	2-4	3	SOLW	104	64	40	24	0	4.3	95.7	32	13		2.58		84
OL-SB-10131	OL-0414-27	17.5-19.5	18.5	SOLW	72.1	51	36	15	0	1.3	98.7	34	13		2.51		89
OL-SB-10131	OL-0414-28	42-44	43	Marl	73	97	43	54	0	0.6	99.4	43	29	6.5		65	95
OL-SB-10131	OL-0414-29	44.5-46.5	45.5	Marl	47	83	34	49	0	0.9	99.1	45	34	4.2	2.68	48	96
OL-SB-10131	OL-0414-32	54.5-56.5	55.5	Marl	46.8	67	33	34	0	7	93	52	35	2.2	2.67	57	98
OL-SB-10131	OL-0414-36	79.5-81.5	80.5	Marl?	23.8	39	17	22	0	0.2	99.8	40	27	2.3		35	116
OL-SB-10131	OL-0414-37	89.5-91.5	90.5	Silt/Clay	30.3	29	18	11	0	0.3	99.7	72	50	0.8	2.76	9	115
OL-SB-10132	OL-0414-38	15-17	16	SOLW	132	85	45	40	0	1.6	98.4	27	12		2.5		77
OL-SB-10132	OL-0414-40	46.5-48.5	47.5	Marl	56	83	34	49	0	1.5	98.5	41	26	6.4	2.67	39	93
OL-SB-10132	OL-0414-41	49-51	50	Marl	50	81	35	46	0	0.7	99.3	48	31	4.9		65	97
OL-SB-10132	OL-0414-43	54-56	55	Silt/Clay	51.6	75	38	37	0	0.3	99.7	30	20	5.6		52	97
OL-SB-10132	OL-0414-47	74-76	75	Silt/Clay	31.2	37	19	18	0	0.1	99.9	61	39	1.3	2.68	30	112
OL-SB-10133	OL-0414-48	2-4	3	SOLW	258.9	109	52	57	0	0.8	99.2	33	13		2.58		76
OL-SB-10133	OL-0414-51	19-21	20	SOLW	299.1												75
OL-SB-10133	OL-0414-52	41-43	42	Marl	66.1	85	39	46	0	0.7	99.3	43	29	5.8		74	98
OL-SB-10133	OL-0414-53	43.5-45.5	44.5	Marl	46	74	34	40	0	1.1	98.9	47	29	4.6	2.58	43	103
OL-SB-10133	OL-0414-57	58.5-60.5	59.5	Silt/Clay	49.2	69	32	37	0	0.4	99.6	26	20	3.9		78	96
OL-SB-10133	OL-0414-58	63.5-65.5	64.5	Silt/Clay	47.9	64	31	33	0	0.3	99.7	39	24	1.6	2.77	61	101
OL-SB-10134	OL-0414-61	17.5-19.5	18.5	SOLW	181.4	135	75	60	0	30.7	69.3	32	15		2.52		76
OL-SB-10134	OL-0414-62	51.5-53.5	52.5	Marl	81.2	156	45	111	0	0.5	99.5	53	33	7.1	2.64	87	94
OL-SB-10134	OL-0414-63	54-56	55	Marl	78.1	94	40	54	0	0.7	99.3	32	24	5.4		35	91
OL-SB-10134	OL-0414-68	74-76	75	Marl	63.1	70	34	36	0	0.2	99.8	32	24	4.2		65	103
OL-SB-10134	OL-0414-69	79-81	80	Marl	62.1	65	37	28	0	0.5	99.5	43	30	4	2.73	61	95
OL-SB-10135	OL-0414-70	15-17	16	SOLW	211.8	92	50	42	0	1.1	98.9	40	20		2.57		77
OL-SB-10135	OL-0414-75	56.5-58.5	57.5	Marl	56.8	84	37	47	0	0.2	99.8	46	27	5.1	2.68	78	92
OL-SB-10135	OL-0414-76	61.5-63.5	62.5	Marl	50.7	78	37	41	0	1.5	98.5	19	15	4.8		74	95
OL-SB-10135	OL-0414-78	71.5-73.5	72.5	Marl	67.6	69	34	35	0	0.9	99.1	34	23	2.2		74	100
OL-SB-10135	OL-0414-79	76.5-78.5	77.5	Marl	52.5	67	31	36	0	0.1	99.9	28	20	4.1	2.66	74	96
OL-SB-80052	OL-0414-81	6.5-8.5	7.5	SOLW	128.4	92	52	40	0.1	0.7	99.2	45	20		2.54		75
OL-SB-80052	OL-0414-83	35-37	36	Marl	66.8	66	34	32	0	0.3	99.7	50	32	3.3		61	97
OL-SB-80052	OL-0414-84	37.5-39.5	38.5	Marl	48.2	69	33	36	0	0.5	99.5	35	23	2	2.46	91	100
OL-SB-80052	OL-0414-87	50-52	51	Marl	40.6	40	19	21	0	0	100	69	48	0.8	2.74	9	110
OL-SB-80052	OL-0414-92	93-95	94	Silt/Clay	23.2	27	14	13	0	0	100	59	41	0.8		9	127
OL-SB-80052	OL-0414-93	103-105	104	Silt/Clay	19.1	17	16	1	0	12.6	87.4	13	11	0.4	2.79	9	132
OL-SB-80053	OL-0414-94	4-6	5	SOLW	148.8	87	50	37	0	0.8	99.2	39	22		2.58		68
OL-SB-80053	OL-0414-96	32-34	33	Marl	86.6	98	39	59	0	1	99	54	31	3.7		48	89
OL-SB-80053	OL-0414-97	34.5-36.5	35.5	Marl	84.7	83	40	43	0	0.4	99.6	37	27	4.5	2.58	61	95
OL-SB-80053	OL-0414-101	54.5-56.5	55.5	Marl	68.7	62	32	30	0	0.2	99.8	55	36	2.9	2.71	74	100
OL-SB-80053	OL-0414-108	129-131	130	Silt/Clay	29.7	41	17	24	0	0	100	84	63	1.9		26	121
OL-SB-80053	OL-0414-109	139-141	140	Silt/Clay	25.2	32	15	17	0	0.1	99.9	63	43	1.2	2.79	30	127
OL-SB-80054	OL-0414-111	6.5-8.5	7.5	SOLW	100.2	65	37	28	0	1.5	98.5	33	16		2.59		81
OL-SB-80054	OL-0414-112	27-29	28	Marl	90.1	100	39	61	0	1	99	35	25	6.8	2.65	61	88
OL-SB-80054	OL-0414-117	39.5-41.5	40.5	Marl	78.8	69	38	31	0	0.6	99.4	52	35	5.1		78	91
OL-SB-80054	OL-0414-119	49.5-51.5	50.5	Marl	64.7	64	37	27	0	0.2	99.8	35	19	1.5	2.56	96	100
OL-SB-80054	OL-0414-123	84.5-86.5	85.5	Silt/Clay	35.8	53	22	31	0	0.1	99.9	70	53	2.9		9	102
OL-SB-80054	OL-0414-128	134.5-136.5	135.5	Silt/Clay	32.7	46	18	28	0	0	100	73	56	1.4	2.72	30	125

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UU Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Sediment Type	Water Content (%)	Dry Density (pcf)	Confining Stress (psf)	Undrained Strength (psf)	Strain at Failure (%)
OL-SB-10129	OL-0414-06	39-41	40	Marl	59.9	63.1	3442	318	11.4
OL-SB-10131	OL-0414-28	42-44	43	Marl	71.4	55.7	3701	557	9.41
OL-SB-10133	OL-0414-52	41-43	42	Marl	67.7	58.2	3572	469	9.43
OL-SB-80052	OL-0414-83	35-37	36	Marl	51.9	64.0	5528	312	8.65
OL-SB-80053	OL-0414-96	32-34	33	Marl	89.5	46.9	4959	125	15
OL-SB-80054	OL-0414-112	27-29	28	Marl	89.7	46.5	4247	150	15
OL-SB-80054	OL-0414-117	39.5-41.5	40.5	Marl	74.4	52.0	5372	216	12.5

Note:

1. These parameters are provided to show general material behavior for informational purposes only. Additional interpretation will be required for design.

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CIU Test Results Summary

Location ID	Field Sample ID	Depth (ft)	Average Depth (ft)	Sediment Type	Initial Water Content (%)	Initial Confining Stress (psf)	Peak Deviator Stress (psf)	Undrained Strength (psf)	Strain at Failure (%)	CIU Total Stress [1] Cohesion (psf)	CIU Total Stress [1] Friction Angle (degrees)	CIU Effective Stress [1] Cohesion (psf)	CIU Effective Stress [1] Friction Angle (degrees)	Test Type
OL-SB-10129	OL-0414-02	6.5-8.5	7.5	SOLW	150.1	1999	1144	572	9.18	0	12.2	0	34	1-Point CIU
OL-SB-10129	OL-0414-03	12-14	13	SOLW	73.9	500.3	1829.8	914.9	12.9	682	5.1	54.8	39.7	3-Point CIU
					88.4	999.3	1394.8	697.4	12.8					
					97.3	2002	1938	969	15					
OL-SB-10129	OL-0414-08	44-46	45	Marl	60	1199	1576.4	788.2	12.9	365	12.5	97.9	41.3	3-Point CIU [2]
					60.5	4993	3682	1841	14.2					
OL-SB-10129	OL-0414-11	62-64	63	Silt/Clay	27.7	6001	3870	1935	14.8					1-Point CIU
OL-SB-10129	OL-0414-12	65-67	66	Silt/Clay	24	2000	2518	1259	15	347	13	292	27.7	3-Point CIU
					19.3	3001	2052	1026	15					
					21.8	5999	4456	2228	12.8					
OL-SB-10130	OL-0414-13	15-17	16	SOLW	173.3	499.8	979.6	489.8	9.46	217	19	0	58	3-Point CIU
					247.2	1001	1746.8	873.4	5.72					
					205.6	2000	2462	1231	15					
OL-SB-10130	OL-0414-16	44-46	45	Marl	62.6	1200	1352.6	676.3	14.4	287	11.7	101	32.9	3-Point CIU
					57	2498	1928.4	964.2	9.68					
					57.4	4999	3276	1638	14.5					
OL-SB-10130	OL-0414-18	49-51	50	Marl	54.8	5000	3178	1589	14.7					1-Point CIU
OL-SB-10130	OL-0414-20	59-61	60	Silt/Clay	34.8	1200	1218.4	609.2	12.4	239	12.1	130	29.5	3-Point CIU
					38.5	2499	1925	962.5	13.3					
					31.1	5000	3232	1616	15					
OL-SB-10130	OL-0414-21	64-66	65	Silt/Clay	29	6000	4652	2326	15					1-Point CIU
OL-SB-10131	OL-0414-23	2-4	3	SOLW	127.8	999.3	993.8	496.9	8.51	124	14.6	191	28.3	3-Point CIU [2]
					106.3	1994	1664.4	832.2	3.8					
OL-SB-10131	OL-0414-27	17.5-19.5	18.5	SOLW	87.7	2000	1148	574	11.6					1-Point CIU
OL-SB-10131	OL-0414-29	44.5-46.5	45.5	Marl	63.4	1201	1467.8	733.9	15	210	16	261	32.1	3-Point CIU
					69.4	2500	2294	1147	12.2					
					70.1	5004	4764	2382	15					
OL-SB-10131	OL-0414-32	54.5-56.5	55.5	Marl	62.4	5000	3776	1888	15					1-Point CIU
OL-SB-10131	OL-0414-36	79.5-81.5	80.5	Marl?	36.7	6001	3486	1743	10					1-Point CIU
OL-SB-10131	OL-0414-37	89.5-91.5	90.5	Silt/Clay	41.3	2499	1893.6	946.8	9.72	474	7.7	292	25.1	3-Point CIU
					38.7	3800	2218	1109	13.9					
					31.9	7498	3420	1710	8.13					
OL-SB-10132	OL-0414-38	15-17	16	SOLW	152.4	499.8	613	306.5	3.78	170	9.7	118	30.3	3-Point CIU
					143.5	1000	801.6	400.8	5.61					
					189.9	2005	1221	610.5	9.56					

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OL-SB-10132	OL-0414-40	46.5-48.5	47.5	Marl	81.4	1200	1200.4	600.2	15	0	16	46.3	36.6	3-Point CIU
					81.7	2500	1292.4	646.2	14.4					
					72.2	5000	4208	2104	15					
OL-SB-10132	OL-0414-41	49-51	50	Marl	70.6	4999	3150	1575	11.9					1-Point CIU
OL-SB-10132	OL-0414-43	54-56	55	Silt/Clay	65.5	5001	3180	1590	9.31					1-Point CIU
OL-SB-10132	OL-0414-47	74-76	75	Silt/Clay	32.4	1999	2018	1009	12.6	383	9.5	341	24.3	3-Point CIU
					35.1	4000	2046	1023	12					
					24.5	8000	4208	2104	15					
OL-SB-10133	OL-0414-48	2-4	3	SOLW	122	999.2	974.8	487.4	4.95	NA [3]		0	40.2	3-Point CIU [2]
					85	1998	812.6	406.3	9.82					
OL-SB-10133	OL-0414-51	19-21	20	SOLW	282.3	1999	1533.6	766.8	5.59					1-Point CIU
OL-SB-10133	OL-0414-53	43.5-45.5	44.5	Marl	68.6	1199	1462.4	731.2	13.1	267	13.6	290	28.2	3-Point CIU
					63.1	2500	2132	1066	10					
					56.1	5002	3196	1598	5.49					
OL-SB-10133	OL-0414-57	58.5-60.5	59.5	Silt/Clay	64.8	4999	3244	1622	15					1-Point CIU
OL-SB-10133	OL-0414-58	63.5-65.5	64.5	Silt/Clay	59.3	1997	1605.8	802.9	10.7	366	9.9	129	33	3-Point CIU
					60.4	2998	2240	1120	11.9					
					58.1	5997	3324	1662	12.6					
OL-SB-10134	OL-0414-61	17.5-19.5	18.5	SOLW	196.2	499.8	625.6	312.8	4.06	128	13.7	0.362	52	3-Point CIU
					125.3	1000	965.6	482.8	5.91					
					201.2	2001	1565.4	782.7	8.56					
OL-SB-10134	OL-0414-63	54-56	55	Marl	76.2	4999	3742	1871	13.6					1-Point CIU
OL-SB-10134	OL-0414-64	56.5-58.5	57.5		72.8	1200	1571.8	785.9	11.2	432	10.7	295	30.7	3-Point CIU
					73	2499	2216	1108	13.9					
					74	5000	3322	1661	9.71					
OL-SB-10134	OL-0414-68	74-76	75	Marl	60.4	6006	7554	3777	15					1-Point CIU
OL-SB-10134	OL-0414-69	79-81	80	Marl	67.7	2001	1757	878.5	12.2	306	10.7	78.9	33.6	3-Point CIU
					60.1	3999	2420	1210	13.1					
					54.9	8003	4448	2224	15					
OL-SB-10135	OL-0414-70	15-17	16	SOLW	216.8	500.7	606	303	2.96	214	11.5	150	36.1	3-Point CIU
					227.3	1001	1322.2	661.1	4.28					
					188.4	2000	1375.8	687.9	9.58					
OL-SB-10135	OL-0414-75	56.5-58.5	57.5	Marl	77.9	1501	1285.4	642.7	10.6	255	11.4	188	31.9	3-Point CIU
					76.8	3000	2214	1107	15					
					69.6	6000	3532	1766	15					
OL-SB-10135	OL-0414-76	61.5-63.5	62.5	Marl	72.9	5998	3984	1992	14.6					1-Point CIU
OL-SB-10135	OL-0414-78	71.5-73.5	72.5	Marl	65.1	6000	3542	1771	7.5					1-Point CIU

Written by: **Ming Zhu** Date: **06/18/2008** Reviewed by: **Raja Madhyannapu** Date: **06/19/2008**

Client: **Honeywell** Project: **Onondaga Lake ILWD Stability** Project/ Proposal No.: **GJ4204** Task No.: **01**

OL-SB-10135	OL-0414-79	76.5-78.5	77.5	Marl	65.9	2002	1832.2	916.1	12.8	448	10.4	331	27.7	3-Point CIU
					66.1	4000	3036	1518	14.6					
					66.8	8002	4538	2269	9.49					
OL-SB-80052	OL-0414-81	6.5-8.5	7.5	SOLW	192	500	370.2	185.1	5.35	44.5	11.8	53.3	31.8	3-Point CIU
					222.7	999.4	616.4	308.2	10.7					
					217.7	2001	1137.2	568.6	8.92					
OL-SB-80052	OL-0414-84	37.5-39.5	38.5	Marl	60.1	999.2	941.2	470.6	13.3	17.5	15.9	7.79	37.5	3-Point CIU
					66.7	2000	1356.6	678.3	11.9					
					58.7	4000	3124	1562	15					
OL-SB-80052	OL-0414-87	50-52	51	Marl	36.5	4999	6654	3327	15					1-Point CIU
OL-SB-80052	OL-0414-92	93-95	94	Silt/Clay	21.5	6000	5620	2810	15					1-Point CIU
OL-SB-80052	OL-0414-93	103-105	104	Silt/Clay	19.4	2999	9822	4911	15	0	50	0.192	36.6	3-Point CIU
					19.3	4503	49700	24850	11.8					
					18.8	8998	47160	23580	15					
OL-SB-80053	OL-0414-94	4-6	5	SOLW	257.9	499.8	396.8	198.4	5.95	86.5	9.5	41.1	33.1	3-Point CIU
					306.4	1009	604.8	302.4	7.18					
					196.1	1999	990.4	495.2	10.2					
OL-SB-80053	OL-0414-97	34.5-36.5	35.5	Marl	79.6	1000	1380.4	690.2	15	320	13.2	262	30.1	3-Point CIU
					82.9	2002	2020	1010	14.9					
					85.5	3997	3164	1582	15					
OL-SB-80053	OL-0414-101	54.5-56.5	55.5	Marl	66.5	4997	2888	1444	5.47					1-Point CIU
OL-SB-80053	OL-0414-108	129-131	130	Silt/Clay	30.6	5999	2784	1392	14					1-Point CIU
OL-SB-80053	OL-0414-109	139-141	140	Silt/Clay	25.3	4005	4462	2231	14.2	1530	8.5	236	30.1	3-Point CIU
					24.9	6002	6370	3185	15					
					25.4	12000	7522	3761	33.3					
OL-SB-80054	OL-0414-111	6.5-8.5	7.5	SOLW	125.6	998.6	660.4	330.2	12.4	0	15	0	45	3-Point CIU [2]
					122.6	1998	1373.4	686.7	15					
OL-SB-80054	OL-0414-119	49.5-51.5	50.5	Marl	64.6	1503	1564.2	782.1	13.4	389	10.1	192	30.7	3-Point CIU
					61.8	2999	2210	1105	15					
					64.9	6000	3486	1743	15					
OL-SB-80054	OL-0414-123	84.5-86.5	85.5	Silt/Clay	56.6	5999	2276	1138	4.63					1-Point CIU
OL-SB-80054	OL-0414-128	134.5-136.5	135.5	Silt/Clay	26.8	4001	2424	1212	15	686	6.7	36	31.6	3-Point CIU
					15.3	6000	3348	1674	4.09					
					25.2	12000	4630	2315	3.56					

Notes:
1. Cohesion and friction angle are not determined for the 1-point CIU tests.
2. Only a 2-point CIU test could be performed at this interval.
3. NA indicates not applicable. Additional interpretation is required to use these test results.
4. These parameters are provided to show general material behavior for informational purposes only. Additional interpretation will be required for design.