ONONDAGA LAKE PRE-DESIGN INVESTIGATION:

PHASE III WORK PLAN - ADDENDUM 2
Syracuse, New York

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (CONT.)

LIST OF TABLES

LIST OF FIGURES

PHASE III PDI WORK PLAN
ADDENDUM 2

1.0 INTRODUCTION

This addendum describes the additional data to be collected as part of the Phase III Pre-Design Investigation (PDI) for Onondaga Lake. Since this scope was not identified in the Phase III PDI Work Plan, the sample locations and details of the additional analyses are described in this document. Unless otherwise stated, the activities described in this addendum will be collected in accordance with the procedures outlined in the Phase I PDI Work Plan (Parsons, 2005).

2.0 OBJECTIVES

The purpose of the Phase III PDI is to collect information required to conduct remedial design activities. Since many of the details around the design have not been finalized, this addendum is intended to address several gaps within the existing data set. Additional PDI will be required to complete the design beyond the scope of this addendum. The additional scope will be submitted to the New York State Department of Environmental Conservation (NYSDEC) as future addenda to the Phase III PDI work plan.

3.0 MOBILIZATION AND LOGISTICS

3.1 Health and Safety

Parsons ranks health and safety as the highest priority. Parsons Project Safety Plan (PSP) and our Subcontractor's Safety Plans (SSP) prepared for previous PDI activities will be used for this investigation and will be strictly followed by all personnel. Any task outside of the current scope defined in the PSP will have a new Job Safety Analysis (JSA) completed before the task begins. Copies of the PSP and SSPs will be maintained at the support zone and on each vessel.

3.2 Site Facilities, Decon and Waste Handling

The support zone and facilities established during the Phase I/II PDI will be used for the Phase III investigation. All decontamination and waste management activities will be conducted in accordance with Phase I PDI Work Plan (Parsons, 2005).

4.0 IN-LAKE WASTE DEPOSIT STABILITY INVESTIGATION

During the Phase I and II PDIs, borehole drilling and sample collection was performed in and below the In-Lake Waste Deposit (ILWD). In general, the borings were located at the most representative and/or critical cross sections for slope stability. The Phase III PDI scope includes additional borings along three transects in this area. Based on the results of this investigation, NYSDEC and Honeywell will evaluate whether slope stability analyses will be needed for design at additional transects. In addition, the various design evaluations will utilize shear

strength data as appropriate based on the available data set, potentially including appropriate data throughout the ILWD area.

The current approach for evaluating stability of the ILWD is focused on three cross sections shown on Figures 1 through 4: HB-SB-04 to OL-STA-10013-SB (Transect B); HB-SB-07 to OL-STA-10014-SB (Transect D); and HB-SB-10 to OL-STA-10015-SB (Transect F). Transects B and F include a deep, on-land boring that was drilled as part of the Wastebed B/Harbor Brook Pre-Design Investigation (i.e., the HB-SB series). Upon review of the existing data, the following additional data needs were identified:

- Data Need #1: During the Phase I and II PDIs, it was determined that the ILWD extends into areas of the Lake where the water depth is greater than 30 ft (i.e., into SMU 8); therefore, additional borings are required in SMU 8 to identify the Solvay Waste (SOLW) thickness along these cross sections. In addition, samples for laboratory testing of the SOLW and native materials in this area are required to establish geotechnical properties of these materials.
- Data Need #2: The majority of the Phase I PDI borings only extended into the top of the silt/clay unit; therefore, additional borings are required to establish the silt/clay thickness below the SOLW in the ILWD. In addition, laboratory testing is required to establish the strength properties of the deeper silt/clay material.
- Data Need #3: Borings from the Phase I and II PDIs are approximately 300 to 500 ft apart along each cross section. As a result, limited data are available. Therefore, additional borings are needed to achieve better coverage of the area in terms of strata thicknesses and strength testing for the SOLW, marl, and silt/clay units.

To obtain the required data for future ILWD stability evaluations, ten borings are proposed within the ILWD. The borings have been placed along the three cross sections discussed above, as shown on Figure 1. Six of the ten borings will be shallow borings advanced 30 ft below the SOLW/native material interface or to the top of the silt and fine sand unit, whichever is encountered first. The other four borings (i.e., OL-SB-10131, 80052, 80053, and 80054) will be deep borings advanced into the sand and gravel unit. Boring OL-SB-10131 is a proposed deep boring location because the Wastebed B boring along Transect D (i.e., HB-SB-07) is not considered a deep boring. Details of the sampling and testing program are summarized in Table 1 and shown on Figures 2 through 4. The types of strength tests are discussed in Section 4.3.

4.1 Drilling and Sampling Activities at Shallow Boring Locations

For all boring locations (i.e., both shallow and deep), continuous split spoon samples will be collected through the organic silt until the SOLW unit is reached. Two undisturbed samples will be collected once the SOLW unit is identified at OL-SB-10129, 10131 and 10133, as well as at deep locations OL-SB-80052 through 80054. Two additional undisturbed SOLW samples will be collected approximately 10 ft and 12.5 ft (or 15 and 17.5 ft below the mudline) into the SOLW unit at OL-10129, 10131, and 10133. At locations OL-SB-10130, 10132, 10134, and

10135 undisturbed samples will be collected from 10 ft and 12 ft into the SOLW unit. Sample intervals and geotechnical analyses are as described in Table 1 and data needs are shown on Figures 2 through 4. This boring and SOLW sampling strategy is proposed to address Data Needs #1 and 3 listed above.

It is estimated that the surficial organic silt unit is 0 to 5-ft thick, and the SOLW/native material interface is 15 to 45 ft below the mudline at each of the proposed boring locations. If the thickness of the surficial organic silt unit or the SOLW affects the SOLW sampling intervals defined in Table 1, the intervals will be adjusted accordingly in the field. Following completion of the SOLW samples, 2-inch diameter split spoon samples will be collected on 5-ft intervals to identify the approximate SOLW/ native material interface. The inferred interface will be within 3 ft of the actual interface, which will be sufficient for design purposes.

Once the SOLW/native material interface has been reached, eight undisturbed samples will be collected from the first 30 ft of the marl and silt/clay units at each boring. Undisturbed 2-ft samples will be collected from the following depth intervals using the approximate SOLW/native material interface as the starting point: 0 (i.e. just below the interface), 2.5, 5, 7.5, 12.5, 17.5, 22.5, and 27.5 ft below the interface or until the silt and fine sand unit is encountered. This sampling strategy will allow for at least a 6-inch cleanout between undisturbed samples. This proposed sampling strategy addresses Data Needs #2 and 3 noted above.

Once sampling has extended 5 ft into the silt/clay, a casing will be set to protect the deep zone from any potential impacts from the shallow zone. The casing will be installed and sealed with bentonite prior to commencement of drilling through the casing. Following casing installation, mud-rotary drilling techniques will be used to advance the boreholes to the terminal depth approximately 30 ft below the top of the native sediments (Table 1). Drill cuttings that are carried to the surface will be initially contained in the re-circulation tub and transferred to 55-gallon drums as needed. Each borehole will be grouted with cement-bentonite grout and all casing will be removed at the completion of drilling and sampling activities.

As indicated in Table 1 and shown on Figures 2 through 4, significantly more samples of SOLW, marl, and silt/clay are proposed for collection than testing. Since there can be field and or laboratory issues associated with sample recovery, extrusion, or testing, this additional sample collection is proposed in an attempt to ensure that sufficient sample quantity is available to perform each test. Based on field observations during sampling (e.g., recovery), the samples will be selected for testing.

4.2 Drilling and Sampling Activities at Deep Boring Locations

The upper portion of the four deep borings (i.e., OL-SB-80052, 80053, 80054, and 10131) will be completed as noted above. At the deep boring locations where the marl and silt/clay thickness is greater than 30 ft, undisturbed sample collection will continue at 10-ft intervals. Split-spoon samples will also be collected at 5-ft intervals between the undisturbed samples. This combination of alternating split-spoon and undisturbed sampling will continue until the

approximate interface of the silt and fine sand unit has been reached. The approximate interface of the silt and clay/silt and fine sand will be sufficient for design purposes.

Once the silt and fine sand unit is identified, sediment samples will be collected and archived at 5-ft intervals using a 2-inch diameter split spoon until the sand and gravel unit is identified. One archive sample from the silt and fine sand unit at each deep boring location will be sent for moisture content and grain size with hydrometer analysis (Table 1). Borings will be advanced into the sand and gravel unit to collect sufficient disturbed samples for one set of moisture content and grain size with hydrometer tests at each location (Table 1). This sample collection and testing strategy is proposed to address Data Need #1. Each borehole will be grouted with cement-bentonite grout and all casing will be removed at the completion of drilling and sampling activities.

4.3 Geotechnical Laboratory Testing

Geotechnical index and performance tests are proposed for the disturbed and undisturbed samples, as summarized in Table 1 and shown on Figures 2 through 4. The laboratory tests will be performed by GeoTesting Express in Boxborough, MA, which is the same laboratory that performed the Phase I and II geotechnical laboratory tests.

Slope stability will be evaluated for both short-term conditions (using undrained shear strength parameters) and for long-term conditions (using drained shear strength parameters). Unconsolidated undrained (UU) triaxial tests provide undrained strength values. The isotropically consolidated undrained (CIU) tests provide both drained and undrained strength values. The CIU tests will consist of a mixture of 1 pt. and 3 pt. tests depending on sample recovery and data needs at each location. A 3 pt test will be conducted at each location if there is sufficient sample volume unless otherwise discussed with NYSDEC prior to sample analysis. The combination of UU and CIU tests proposed in this Work Plan along with the data from previous investigations is expected to provide sufficient data to evaluate slope stability.

5.0 POREWATER INVESTIGATION

5.1 Sampling

A total of 25 cores in SMU 1, 1 core in SMU 2, and 3 cores in SMU 7 will be advanced 20 ft into the sediment using Vibracore sampling techniques to collect porewater and sediment data for cap design (Figure 5). Following extraction, each core will be cut into 2-ft sections, capped, sealed, and shipped to the lab for processing. These cores are intended to focus on the area in front of the Willis/Semet Barrier Wall and the central portion of the ILWD where the calcite crust prohibits the installation of the extended peepers. Since the dredge cut has not been defined for this area, samples will be collected from the 0 to 20 ft interval to allow acquisition of data at and below potential dredge cuts for cap design (Table 2).

Seven porewater samples will be collected in SMU 8 for cap design evaluation. The porewater samples will be co-located with surface sediment samples shown on Figure 7 and

described in Section 6.4. Vibracores will be advanced approximately 3.3 ft (1 m) into the sediment to collect samples and ensure sample retention. Any lake water in the top of the core will be siphoned or drained out. The top 2 ft of the core will then be capped and sealed for shipment to the lab for centrifugation and sampling. Samples will be analyzed for parameters described in Table 2.

Porewater vibracores will also be advanced at two locations where peepers were unsuccessfully installed. In SMU 7, a 20 ft porewater vibracore (OL-VC-70084) will be advanced adjacent to the OL-PP-70048 location. The peeper at OL-PP-70048 could not be installed to full depth due to sediment conditions. In SMU 4, OL-PP-40061 could not be installed due to water depth and was moved approximately 690 ft to the east. The original peeper location will be replaced by a 20 ft porewater vibracore (OL-VC-40142).

5.2 Processing and Analysis

Unless otherwise stated, the cores collected during this portion of the Phase III PDI will be processed and analyzed by Test America (formerly Severn Trent Labs) in Pittsburgh, PA. Raw sediment samples and dissolved porewater will be analyzed for mercury, VOCs (CPOIs plus benzene and toluene), pH, and organic carbon. The raw sediment will also be analyzed for moisture content and specific gravity (Table 2). Raw sediment samples will not be analyzed for SVOCs, PCBs, total sulfides, or ammonia, as these parameters are not analyzed as part of the porewater investigation. Sediment will be sampled and analyzed in accordance with the initial Phase III PDI Work Plan (Parsons, 2007), which includes modifications to procedures used during the Phase I and II PDIs (Parsons, 2005 and 2006).

6.0 ADDITIONAL VIBRACORES AND SHALLOW BORINGS

6.1 Groundwater Discharge Evaluation

During the initial portion of the Phase III PDI, multiple samples were collected at five clusters to evaluate various methods for measuring groundwater discharge. As part of this addendum, one additional core will be collected to a depth of 20 ft in each cluster (Figures 5 and 6) to allow the onsite geologist to describe the lithology in that area. All field procedures will be conducted in accordance with the Phase I and II PDI work plans (Parsons, 2005 and 2006).

6.2 SMU 3, SMU 4 and SMU 5

A total of five Vibracores in SMU 3, eight in SMU 4, and five in SMU 5 (Figure 6) will be collected to a depth of 10 ft (3 m) to better determine the lateral and vertical extent of mean PECQ and/or Mercury PEC exceedances in these areas.

The eight cores in SMU 4 will be sectioned into 1-ft intervals for the top 3.3 ft (1 m) and into 3.3 ft (1 m) sections to 10 ft to further evaluate shallow sediment concentrations. The five cores in SMU 5 and SMU 3 will be sectioned from 0 to 1 ft, from 1 to 3.3 ft (1 m), and into 3.3 ft (1 m) intervals from 3.3 ft to 10 ft. All samples will be processed for chemical analyses as specified in Table 2. Results from these cores will be used to define the vertical extent of

contamination along the SMU 4 shoreline and to identify the extent of Mean PECQ and/or Mercury PEC exceedences along the eastern and western boundaries of SMU 4.

Two shallow borings (OL-SB 40140 and 40141) will also be advanced in front of the former Ninemile Creek channel (Figure 3) to determine if the former channel is a potential conduit for wastebed leachate from the wastebeds to enter the Lake. A vibracore will be used to collect the top 20 ft of sediment at each location for lithology. A barge mounted drill rig will be used to collect the samples below the top 20 ft to the silt/clay interface. Continuous samples will be collected using a 3-inch diameter split spoon until the silt/clay layer is identified. If coarse grained material from the former channel is identified, samples of the coarse grained material will be collected and sent to the lab for centrifugation. The porewater generated will be analyzed for groundwater parameters, VOCs, naphthalene, and phenol (Table 2). If one or both attempts are unsuccessful at locating the former channel, two additional attempts will be made to locate the former channel. The location of the additional borings will be discussed with NYSDEC prior to implementation.

6.3 SMU 6

A total of six vibracores will be advanced to 10 ft along the northeastern portion of SMU 6 (Figure 8) to better define the extent of exceedances in this area. The six cores will be sectioned into 3.3 ft (1 m) intervals and analyzed for the chemical parameters specified in Table 2.

6.4 SMU 8

Seventeen surface samples will be collected using a vibracore in SMU 8 near the edge of the ILWD (Figure 7) and processed for chemical analyses identified in Table 2. One meter cores will be advanced at these locations to ensure sufficient sample volume is retained within the core. The top 6 inches (15 cm) will be processed onshore and sent to the lab for chemical analyses. Results of this investigation will be used to evaluate the need for thin layer or isolation capping in this area. If isolation capping is warranted, additional data may be required to design the cap in this area. As described in Section 5.1, surficial porewater samples will also be co-located at seven locations with surface samples (Figure 7).

7.0 DATA MANAGEMENT AND REPORTING

Field Database

An electronic database will be developed for the Phase III PDI to ensure consistency in field sample ID assignment and compatibility with the Locus Focus data management system. The data collection program prepared for the Phase III field program will be similar to the one used during the Phase I and II PDI.

Quality Assurance/Quality Control (QA/QC)

Field QA/QC will consist of the collection and analysis of field duplicates, and matrix spike/matrix spike duplicate samples in accordance with the Phase I PDI Work Plan (Parsons,

2005). All field QA/QC samples will be identified using standard sample identifiers and collected in accordance with the Phase I PDI Work Plan (Parsons, 2005).

Sample Holding, Collection, and Recordkeeping

Samples will be collected and handled according to the procedures outlined in the Phase I PDI Work Plan and associated appendices (Parsons, 2005). Samples will be managed by the field database as described above. All sample recordkeeping and database entry for Locus Focus will be conducted in accordance with the Phase I PDI Work Plan (Parsons, 2005).

Data Validation and Reporting

Analytical data generated during this investigation will be reviewed and validated in accordance with the Phase I PDI Work Plan (Parsons, 2005). Upon completion of the Phase III PDI field activities and laboratory analyses, Parsons will submit unvalidated and validated data to NYSDEC in accordance with the Consent Decree for Onondaga Lake (2006, United States District Court, Northern District of New York). Once the Phase III investigation and evaluation has been completed, a data summary report will be prepared and submitted to NYSDEC.

8.0 REFERENCES

Parsons, 2004, *Onondaga Lake Feasibility Study Report, Onondaga County, New York.* Prepared for Honeywell, Morristown, New Jersey. Syracuse, New York.

Parsons, 2005, *Onondaga Lake Pre-Design Investigation: Phase I Work Plan.* Prepared for Honeywell, Morristown, New Jersey. Syracuse, New York.

Parsons, 2006, *Onondaga lake Pre-Design Investigation: Phase II Work Plan.* Prepared for Honeywell, Morristown, New Jersey. Syracuse, New York.

United States District Court, Northern District of New York. 2006. State of New York and Denise M. Sheehan against Honeywell International, Inc. Consent Decree Between the State of New York and Honeywell International, Inc. Senior Judge Scullin. Dated October 11, 2006. Filed January 4, 2007.

Parsons, 2007, *Onondaga Lake Pre-Design Investigation: Phase III Work Plan.* Prepared for Honeywell, Morristown, New Jersey. Syracuse, New York.

TABLES

TABLE 1
ILWD Stability - Proposed Sampling and Geotechnical Laboratory Testing

					Sampling Intervals				
					SOLW Sampling Depths[2]	Native Material Sampling Depths [3]			
Description	Map Symbol	Station ID	Estimated Boring Depth (ft)[1]	Estimated SOLW Thickness (ft)		Top 30 ft of Native Material (i.e., Marl and Silt/Clay Units)[4]	Deep Silt/Clay Unit (i.e., greater than 30 ft into native materials)	Silt and Fine Sand Unit	Sand and Gravel Unit
Shallow Borings		OL-SB-10129	~ 65	~ 0-35	Collect undisturbed samples at 5 ft, 7.5 ft, 15 ft, and 17.5 ft below the mudline	Collect an undisturbed sample just below the SOLW/native material interface, and at approximately 2.5 ft, 5 ft, 7.5 ft, 12.5 ft, 17.5 ft, 22.5 ft, and 27.5 ft below the first native material sample	NA [5]	NA [5]	NA [5]
		OL-SB-10133	~ 70	~ 0-40					
		OL-SB-10130	~ 65	~ 0-35	Collect undisturbed samples at 15 ft and 17.5 ft below the mudline				
		OL-SB-10132	~ 70	~ 0-40					
		OL-SB-10134	~ 75	~ 0-45					
		OL-SB-10135	~ 70	~ 5-40					
Deep Borings		OL-SB-10131	> 65	~ 2-35	Collect undisturbed samples at 5 ft, 7.5 ft, 15 ft, and 17.5 ft below the mudline		Collect undisturbed samples at 10 ft intervals starting at approximately 37.5 ft below the SOLW/native material interface until the silt and fine sand unit is reached [6]	Collect and archive split spoon samples every 5 ft. until the sand and gravel unit is reached. Submit one archive sample at each location for index testing (water content and grain size only).	Collect sufficient disturbed sample for index testing (water content and grain size only)
		OL-SB-80052	~ 160	~ 0-20	Collect undisturbed samples at 5 ft and 7.5 ft below the mudline				
		OL-SB-80053		~ 2-15					
		OL-SB-80054		~ 5-15					

Notes:

1. Shallow borings will be advanced 30 ft into the native material (i.e., marl and silt/clay units) or to the top of the silt and fine sand unit, whichever is encountered first. Deep borings will extend at least 2 ft into the sand and gravel unit.
2. These sampling intervals assume that the surficial organic silt is less than 5-ft thick. If this is not the case, SOLW sampling intervals will be adjusted in the field according to the actual surficial silt thickness. These intervals will allow for at least a 6 inch cleanout between undisturbed samples.
3. The number of proposed tests is less than the number of samples collected in an attempt to ensure that sufficient sample quantity is available to perform quality testing. The samples to be tested will be determined based on field observations (e.g., recovery). The extra samples will be used as necessary if there are laboratory issues related to sample extrusion and/or testing.
4. Sampling intervals will be adjusted in the field as necessary depending on the actual combined thickness of the marl and silt/clay units at each location. These intervals will allow for at least a 6 inch cleanout between undisturbed samples.
5. NA indicates not applicable.
6. These sampling intervals only apply if the combined thickness of the marl and silt/clay units is greater than 30 ft.

TABLE 1
ILWD Stability - Proposed Sampling and Geotechnical Laboratory Testing

			Geotechnical Tests															
			CIU Tests (ASTM D4767)		UU Tests (ASTM D2850)		Water Content (ASTM D2216)		Atterberg Limits (ASTM D4318)		Grain Size with Hydrometer (ASTM D422)		Organic Content (ASTM D2974)		Specific Gravity (ASTM D854)		Carbonate Content (ASTM D4373)	
Description	Map Symbol	Station ID	SOLW	Native	SOLW	Native	SOLW	Native	SOLW	Native	SOLW	Native	SOLW	Native	SOLW	Native	SOLW	Native
Shallow Borings		OL-SB-10129	2	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
		OL-SB-10133	2	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
		OL-SB-10130	1	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
		OL-SB-10132	1	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
		OL-SB-10134	1	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
		OL-SB-10135	1	2	0	2	1	4	1	4	1	4	0	4	1	2	0	4
Deep Borings		OL-SB-10131	2	2	0	2	2	7	2	5	2	7	0	5	2	3	0	4
		OL-SB-80052	1	2	0	2	1	7	1	5	1	7	0	5	1	3	0	4
		OL-SB-80053	1	2	0	2	1	7	1	5	1	7	0	5	1	3	0	4
		OL-SB-80054	1	2	0	2	1	7	1	5	1	7	0	5	1	3	0	4

Notes:

1. Shallow borings will be advanced 30 ft into the native material (i.e., marl and silt/clay units) or to the top of the silt and fine sand unit, whichever is encountered first. Deep borings will extend at least 2 ft into the sand and gravel unit.
2. These sampling intervals assume that the surficial organic silt is less than 5-ft thick. If this is not the case, SOLW sampling intervals will be adjusted in the field according to the actual surficial silt thickness. These intervals will allow for at least a 6 inch cleanout between undisturbed samples.
3. The number of proposed tests is less than the number of samples collected in an attempt to ensure that sufficient sample quantity is available to perform quality testing. The samples to be tested will be determined based on field observations (e.g., recovery). The extra samples will be used as necessary if there are laboratory issues related to sample extrusion and/or testing.
4. Sampling intervals will be adjusted in the field as necessary depending on the actual combined thickness of the marl and silt/clay units at each location. These intervals will allow for at least a 6 inch cleanout between undisturbed samples.
5. NA indicates not applicable.
6. These sampling intervals only apply if the combined thickness of the marl and silt/clay units is greater than 30 ft.

TABLE 2
Onondaga Lake Phase III PDI
Proposed Sediment and Porewater Vibracore Sample Locations and Analyses

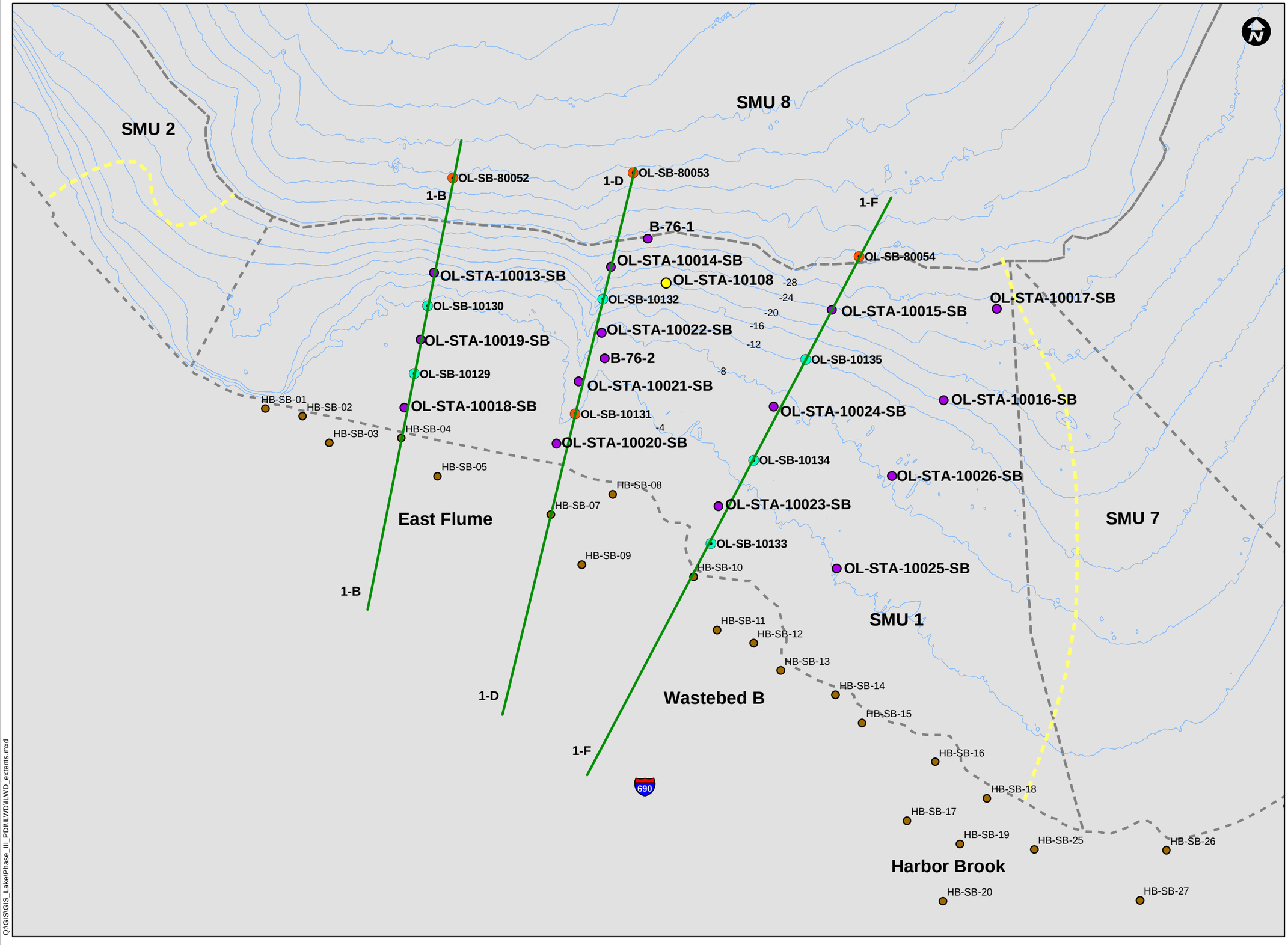
	Description	Map Symbol	Number of Locations	Number of Intervals	Sampling Intervals (ft)	Location	Total Depth (ft)	Chemical Analyses: Sediment: Mercury	VOCs (CPOIs) + Benzene & Toluene[1]	SVOCs (CPOIs) + Phenol[1]	Total PCBs	pH	Total Sulfides	Total Ammonia	Organic Carbon	Phenol	Percent Moisture	Specfic Gravity	Porewater: Mercury	VOCs (CPOIs)	pH	Specific Conductence	Cations/Anions	Napthalene	Phenol	Organic Carbon
SMU 1	Shallow Vibracores		25	10	2 ft intervals	OL-VC-10136-10160	20	250	250			250			250		250	250	250	250	250					250
SMU 2	Shallow Vibracores		1	10	2 ft intervals	OL-VC-20108	20	10	10			10			10		10	10	10	10	10					10
SMU 3	Shallow Vibracores		5	4	0 to 1 ft, 1ft to 3.3 ft (1 m), 3.3 ft intervals from 3.3 ft to 10 ft	OL-VC-30054 - 30058	10	20	20	20	20	20	20	20												
SMU 4	Shallow Vibracores		8	5	1 ft intervals to 3.3 ft (1 m), 3.3 ft (1 m) intervals to 10 ft	OL-VC-40132-40139	10	40	40	40	40	40	40	40	40											
			3	6	3.3 ft (1m) intervals	OL-VC-40086, 40090, and 40094[2]	20																			
			1	10	2 ft intervals	OL-VC-40142	20	10	10			10			10		10	10	10	10	10					10
	Former Ninemile Creek Channel Vibracores/ Shallow Borings[3]		2	~10	3.3 (1 m) intervals from 0 to 20 ft; 2 ft intervals from 20 ft to 40 ft	OL-SB-40140-40141	~40										20	20		20		20	20	20	20	

TABLE 2
Onondaga Lake Phase III PDI
Proposed Sediment and Porewater Vibracore Sample Locations and Analyses

	Description	Map Symbol	Number of Locations	Number of Intervals	Sampling Intervals (ft)	Location	Total Depth (ft)	Chemical Analyses: Sediment: Mercury	VOCs (CPOIs) + Benzene & Toluene[1]	SVOCs (CPOIs) + Phenol[1]	Total PCBs	pH	Total Sulfides	Total Ammonia	Organic Carbon	Phenol	Percent Moisture	Specfic Gravity	Porewater: Mercury	VOCs (CPOIs)	pH	Specific Conductence	Cations/Anions	Napthalene	Phenol	Organic Carbon
SMU 5	Shallow Vibracores		5	4	0 to 1 ft, 1ft to 3.3 ft (1 m), 3.3 ft intervals from 3.3 ft to 10 ft	OL-VC-50023 - 50027	10	20	20	20	20	20	20	20	20												
SMU 6	Shallow Vibracores		6	3	3.3 ft (1m) intervals	OL-VC-60113 - 60118	10	18	18	18	18	18	18	18	18												
SMU 7	Shallow Vibracores		4	10	2 ft intervals	OL-VC-70084-70087	20	40	40			40			40		40	40	40	40	40					
			2	6	3.3 ft (1m) intervals	OL-VC-70060 and 70064[2]	20																			
SMU 8	Shallow Vibracores		17	1	0.5 ft (15 cm) intervals	OL-VC-80055 - 80071	0.5	17	17	17	17	17	17	17	17											
	Co-locted Shallow Vibracores		7	1	2 ft intervals	OL-VC-80065-80071	2	7	7	7	7				7		7	7	7	7	7					7

Notes:
General: Number of samples listed on table do not include QA/QC samples
1. CPOI list for VOCs and SVOCs are the same compounds as the Phase I PDI (Parsons, 2005)
2. 20-ft. cores for lithology description only
3. Top 20 ft to be collected with vibracore. Drill rig will be used to collect samples below 20 ft

FIGURES



NOTES

1. Bathymetry elevations are in 4 foot intervals.
2. Water depth based on average lake elevation of 362.82 feet.
3. Only soil borings are shown.

FIGURE 1

Honeywell

Onondaga Lake
Syracuse, New York

Proposed Phase III PDI
Addendum 2
ILWD Stability Sample Locations

PARSONS
290 ELWOOD DAVIS RD, SUITE 312, LIVERPOOL, NY 13088 Phone:(315)451-9560

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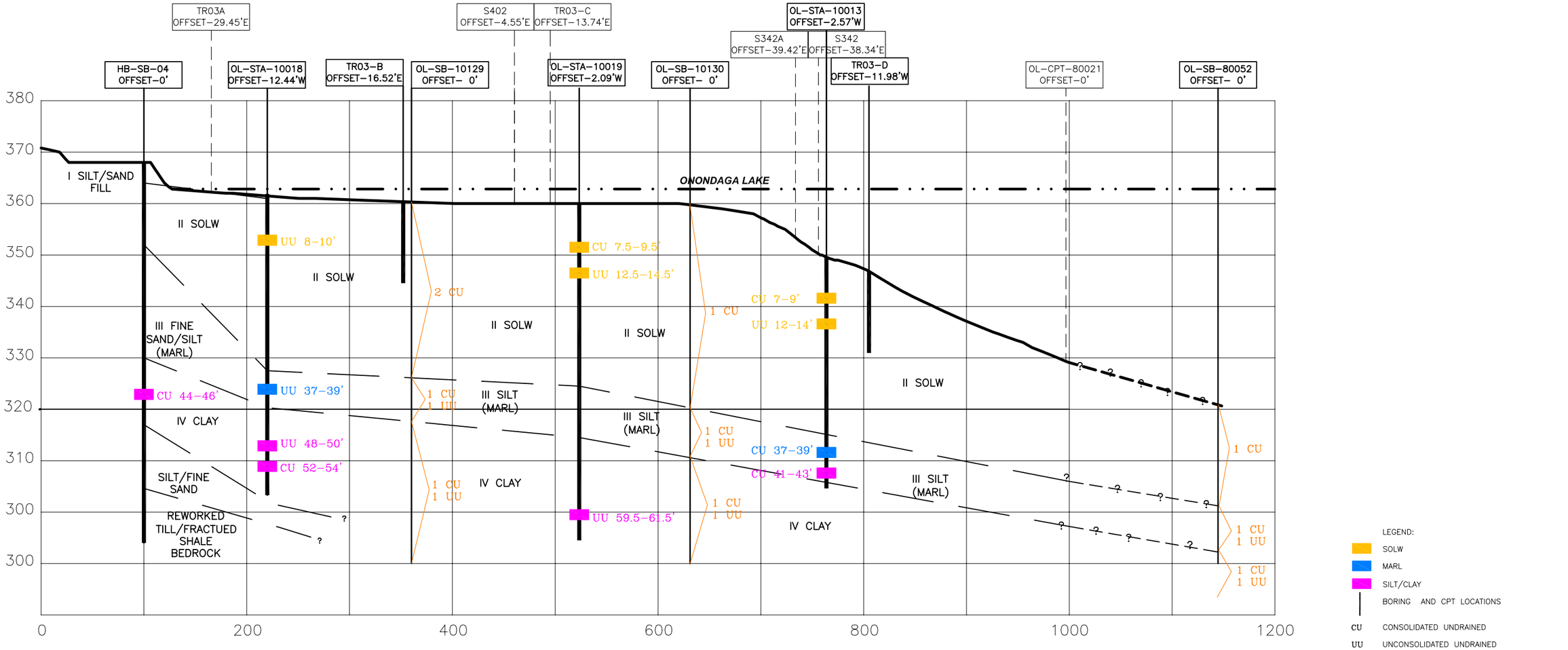

B / –

CROSS SECTION LOCATION B–B'

HORIZONTAL 1"=100'–0"

PRELIMINARY
NOT FOR CONSTRUCTION
OR BIDDING

FILE NAME: P:\HONEYWELL –SYR\443665 PHASE III PDI\10 TECHNICAL CATEGORIES\10.1 CAD\443665–SK006.DWG
PLOT DATE: 8/10/2007 10:07 AM PLOTTED BY: RUSSO, JILL

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE
A	ISSUED FOR REVIEW	JR	–	–			–

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE

REFERENCE	DWG. NO.	APPROVALS	DATE

EQUIPMENT P.O. B/M NUMBERS:

PARSONS
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ONONDAGA LAKE Phase III PDI
SYRACUSE, NEW YORK
PHASE III PDI ADDENDUM 2
ILWD CROSS SECTION B–B'
PROPOSED SAMPLE INTERVALS

JOB NO. 443665
CONTRACTOR'S JOB NO.
SCALE AS SHOWN

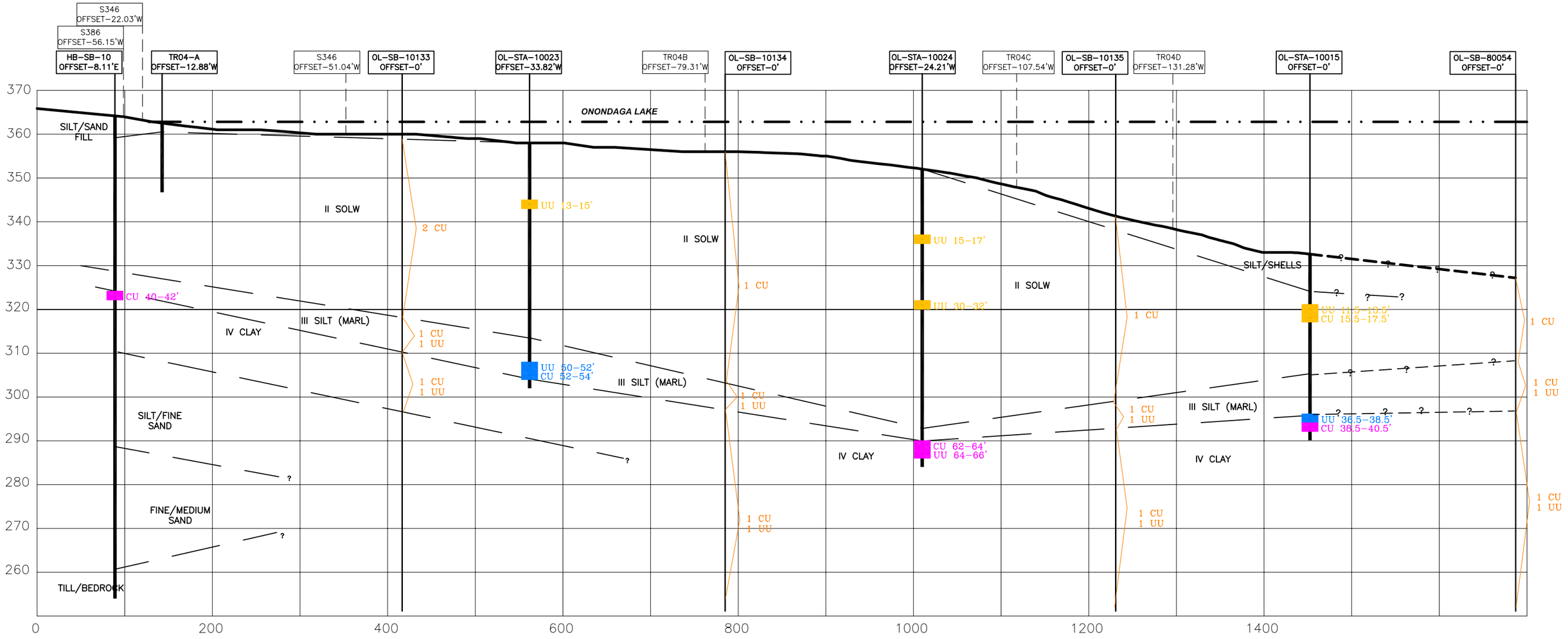
Honeywell
ESR ENVIRONMENTAL DEPARTMENT
101 COLUMBIA RD., P.O. BOX 2104
MORRISTOWN, NJ 07962

DRAWN	DATE	CHK.	DATE
JR	01/18/06	–	–

LOCATION

Figure 2

REV A



LEGEND:

- SOLW
- MARL
- SILT/CLAY
- BORING AND CPT LOCATIONS
- CU CONSOLIDATED UNDRAINED
- UU UNCONSOLIDATED UNDRAINED

F / –

CROSS SECTION LOCATION F–F'

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION
OR BIDDING

FILE NAME: P:\HONEYWELL –SYR\443665 PHASE III PDI\10 TECHNICAL CATEGORIES\10.1 CAD\443665–SK006.DWG
PLOT DATE: 8/10/2007 10:08 AM PLOTTED BY: RUSSO, JILL

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE
A	ISSUED FOR REVIEW	JR	–	–			–

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE

REFERENCE	DWG. NO.	APPROVALS	DATE

EQUIPMENT P.O. B/M NUMBERS:

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315–451–9560

JOB NO. 443665
CONTRACTOR'S JOB NO.
SCALE AS SHOWN

ONONDAGA LAKE Phase III PDI
SYRACUSE, NEW YORK
PHASE III PDI ADDENDUM 2
ILWD CROSS SECTION F–F'
PROPOSED SAMPLE INTERVALS

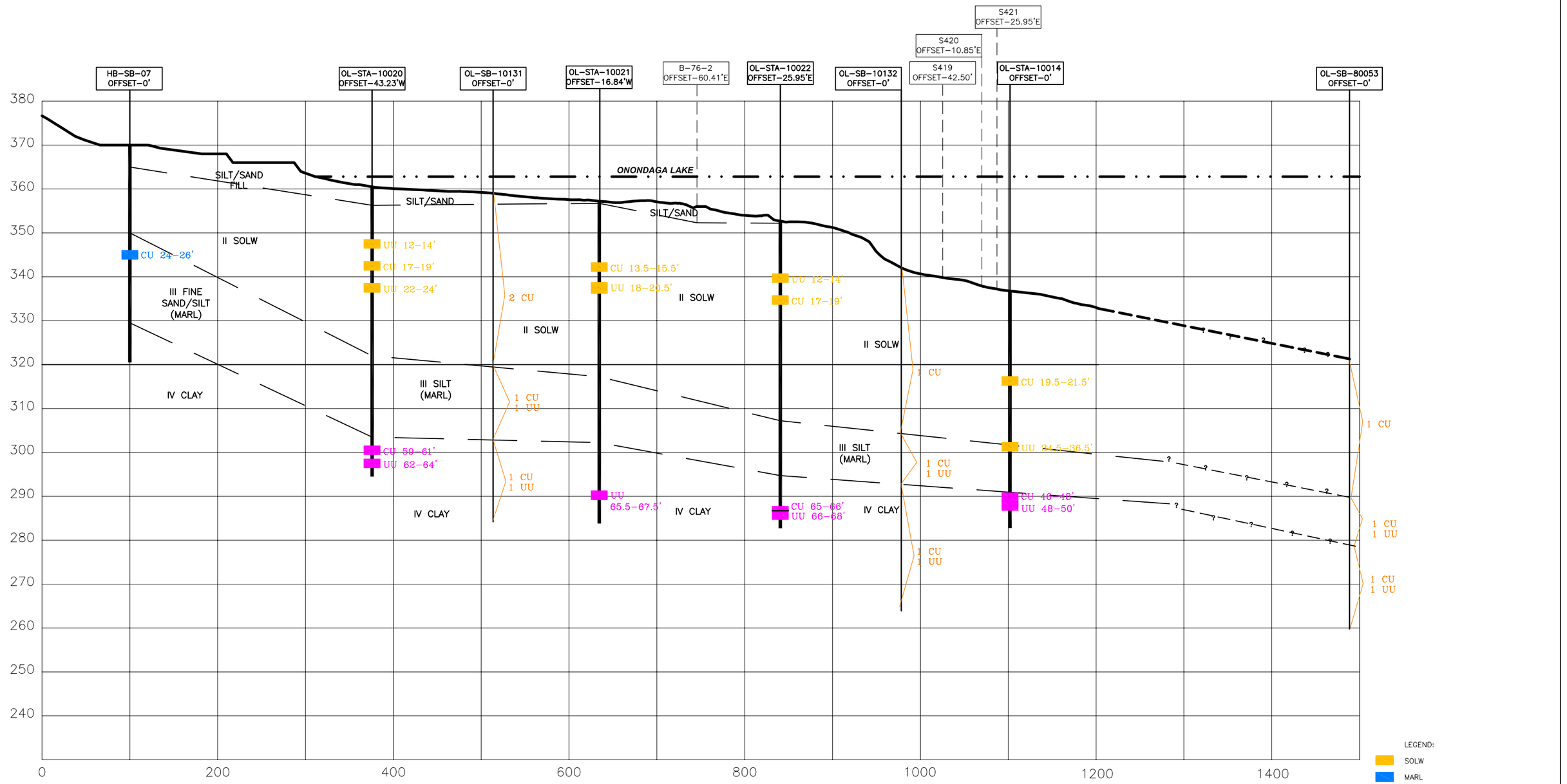
Honeywell
EMS ENVIRONMENTAL DEPARTMENT
101 COLUMBIA RD., P.O. BOX 2105
MORRISTOWN, NJ 07962

DRAWN	DATE	CHK.	DATE
JR	01/18/06	–	–

LOCATION

Figure 4

REV A



D
–

CROSS SECTION LOCATION D–D'

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION OR BIDDING

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NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE
A	ISSUED FOR REVIEW	JR	–	–			–

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE

REFERENCE

DWG. NO.

APPROVALS | DATE

EQUIPMENT P.O. B/M NUMBERS:

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

JOB NO. 443665
CONTRACTOR'S JOB NO.
SCALE AS SHOWN

ONONDAGA LAKE Phase III PDI
SYRACUSE, NEW YORK
PHASE III PDI ADDENDUM 2
ILWD CROSS SECTION D–D'
PROPOSED SAMPLE INTERVALS

Honeywell
SMS ENVIRONMENTAL DEPARTMENT
101 COLUMBIA RD., P.O. BOX 2105
MORRISTOWN, NJ 07962

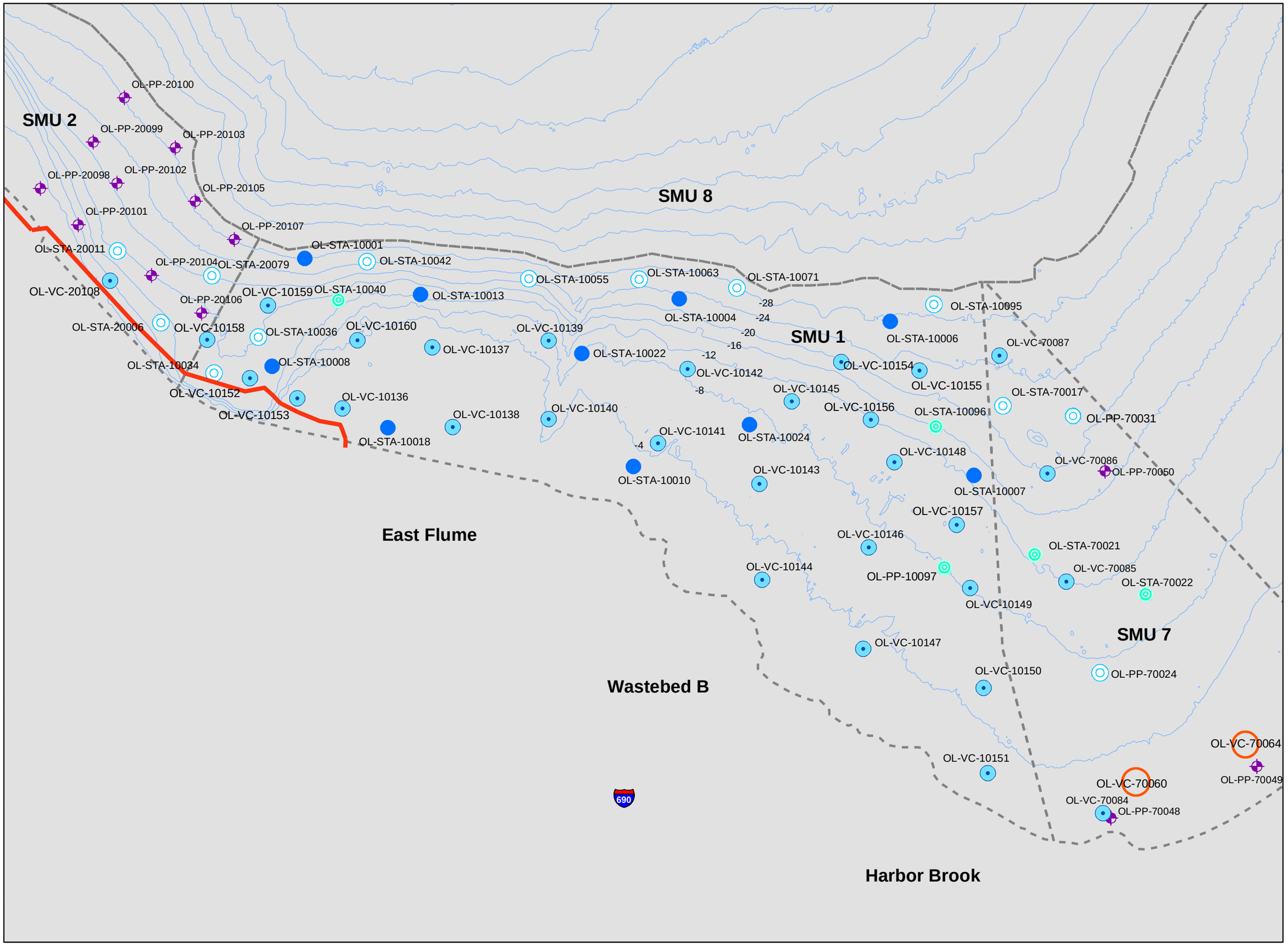
DRAWN	DATE	CHK.	DATE
JR	01/18/06	–	–

LOCATION

Figure 3

REV A

p:\h\well-syr\443665\10\10.1\443665-skoo1.dwg ** JILL ** 6/06/07



Proposed Phase III PDI Addendum 2 Sample Locations

- 20 Ft Vibracore
- 20' Lithology Core in Groundwater Cluster

Initial Phase III PDI Sample Locations

- Extended Peeper

Phase II PDI Sample Locations

- Colocated Extended Peeper Sample
- Extended Peeper Sample

Phase I PDI Sample Locations

- Phase I Centrifuge / Peeper Sample

- Proposed Willis-Semet Barrier Wall Alignment
- Extent of ILWD

NOTES

1. Bathymetry contours are in 4 foot intervals.
2. Water depth based on average lake elevation of 362.82 feet.
3. Colocated cores will be less than 1 meter apart.

0 75 150 300 450 600 750
Feet

FIGURE 5

Honeywell

Onondaga Lake
Syracuse, New York

Proposed Phase III PDI
Addendum 2
SMUs 1, 2, & 7 Sample Locations

PARSONS
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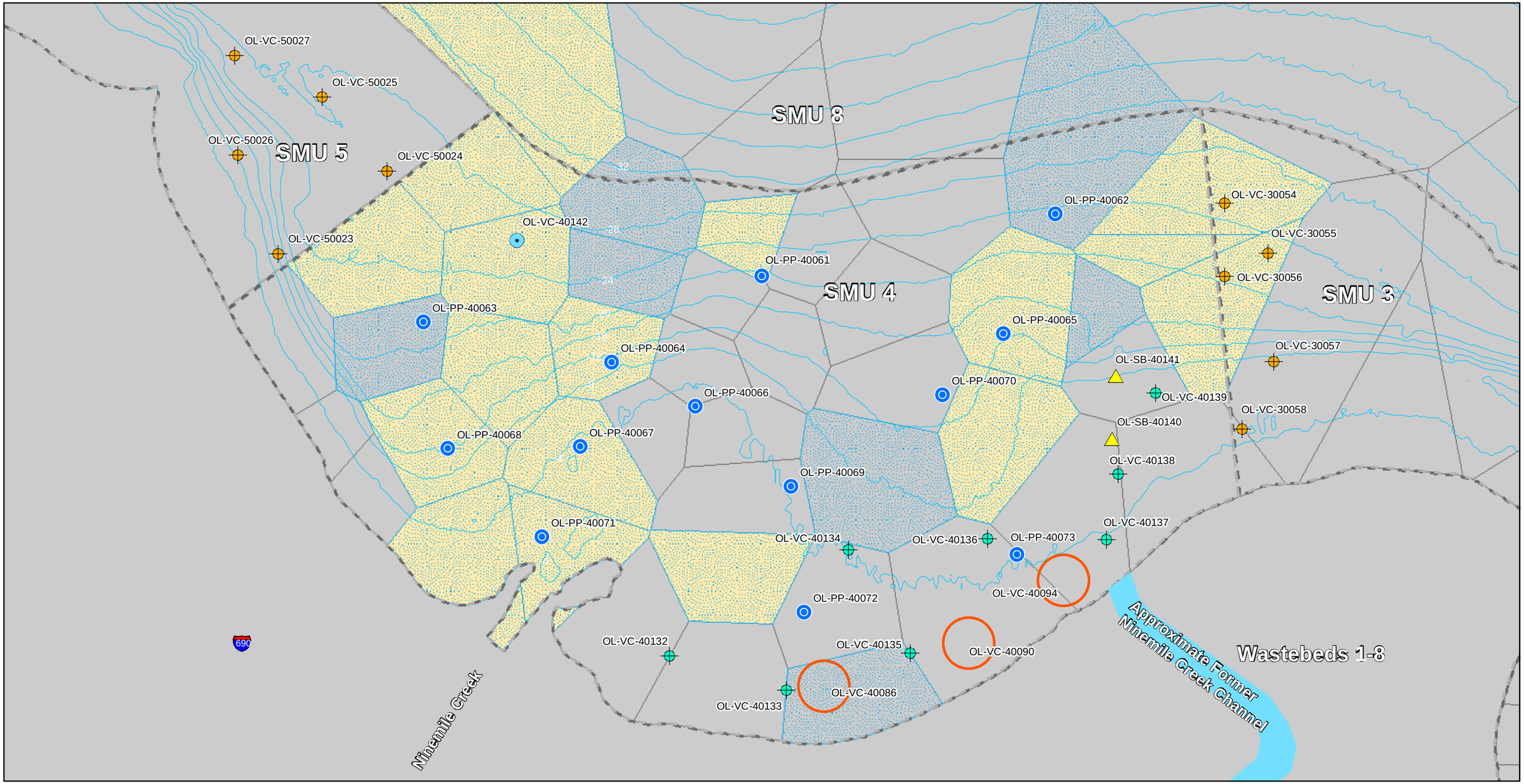

Proposed Phase III PDI Addendum 2 Sample Locations

- 20' Lithology Core in Groundwater Cluster
- 20' Porewater Vibracore
- 10' Vibracore- Sample on 1 ft. intervals to 3.3 ft. Sample remaining depth on 3.3 ft. intervals to 10 ft.
- 10' Vibracore- Sample 0-1 ft., 1-3.3 ft; Sample remaining depth on 3.3 ft intervals.
- 40' Shallow Boring

Initial Phase III PDI Sample Locations

- Extended Peeper

- Mean PECQ >1
- Hg > 2.2 mg/kg (PEC)
- Thiessen Polygon Boundary

RI, Phase I, and Phase II data are included.

NOTES

1. Bathymetry contours are in 4 foot intervals.
2. Water depth based on average lake elevation of 362.82 feet.
3. Exceedances shown are in the 0-1 meter interval.

0 50 100 200 300 400 500
Feet

FIGURE 6

Honeywell

Onondaga Lake
Syracuse, New York

Proposed Phase III PDI Addendum 2
SMUs 3, 4 & 5 Sample Locations

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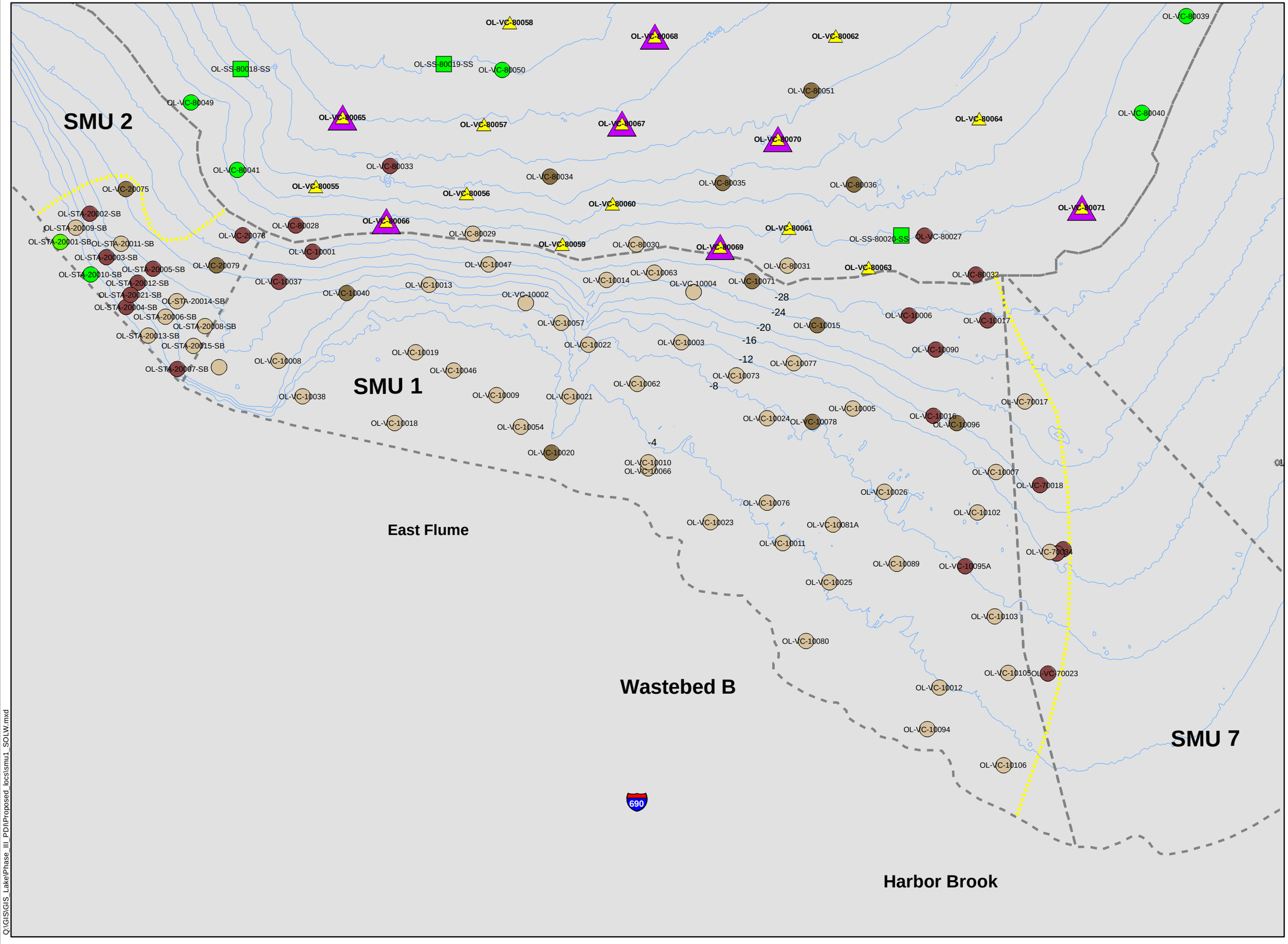

Proposed Phase III PDI Addendum 2 Sampling Locations

- 0-0.5 ft Sediment Sample Location
- Co-located 0-2 ft Sediment and Porewater Sample Location

Depth to SOLW (in feet)

- 0 - 3.2
- 3.3 - 6.5
- 6.5 - 10 +
- No SOLW
- Surface Sample (0-6") No SOLW

NOTES

1. Bathymetry contours are in 4 foot intervals.
2. Water depth based on average lake elevation of 362.82 feet.
3. DNAPL Cores not included in figure.

0 75 150 300 450 600 750
Feet

FIGURE 7

Honeywell — Onondaga Lake, Syracuse, New York

Proposed Phase III PDI Addendum 2
SMU 8 Sample Locations

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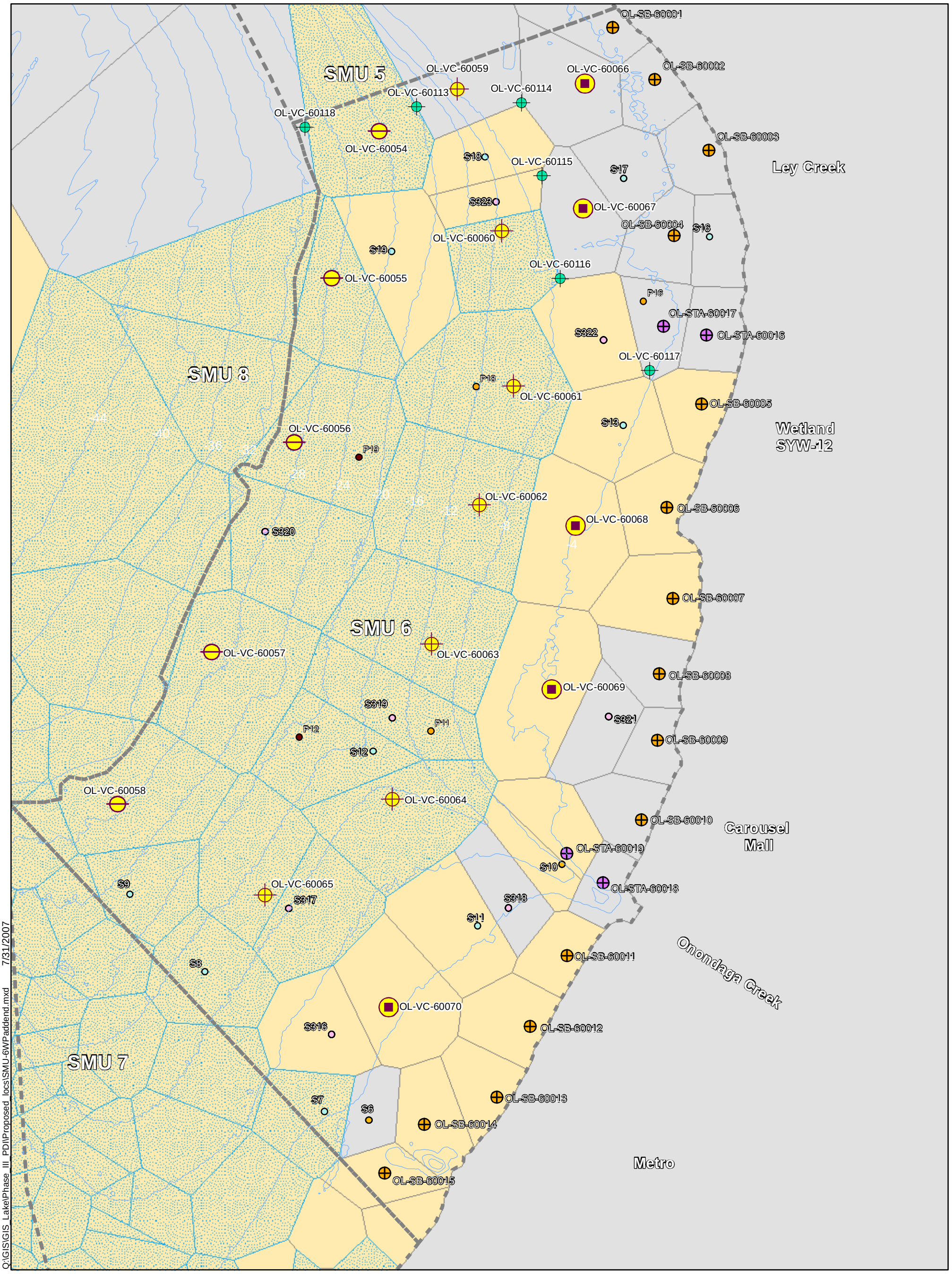

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RI/FS Locations

- 0.07 - 0.16 Ft (0 - 5 cm)
- 0.17 - 0.50 Ft (5 - 15 cm)
- 0.5 - 1.0 Ft (15 - 30 cm)
- 1.0 - 3.3 Ft (30 - 100 cm)
- 3.3 - 7.0 Ft (1 - 2 m)
- 7 - 13 Ft (2 - 4 m)
- 13 - 17 Ft (4 - 5 m)
- 17 - 26 Ft (5 - 8 m)

Phase I PDI Sample Locations

- 13 Ft (4 m) Core
- 33 Ft (10 m) Boring, 13 Ft (4 m) Core, and Porewater Samples (Groundwater Model)

Phase II PDI Sample Locations

- 20 Ft (6 m) Core (Sample 0-0.5 Ft and 0.5-3.3 Ft)
- 20 Ft (6 m) Core (Sample on 3.3 Ft intervals to 10 Ft)
- 20 Ft (6 m) Core (Sample on 3.3 Ft intervals to 20 Ft)

0 120 240 480 720 960
Feet

Proposed Phase III PDI Addendum 2 Sample Locations

- 10' Vibracore
- Mean PECQ >1
- Hg > 2.2 mg/kg (PEC)
- Thiessen Polygon Boundary

RI, Phase I, and Phase II data are included.

NOTES

1. Bathymetry contours are in 4 foot intervals.
2. Water depth based on average lake elevation of 362.82 feet.
3. Exceedances shown are in the 0-1 meter interval.

FIGURE 8

Honeywell

Onondaga Lake
Syracuse, New York

Proposed Phase III PDI Addendum 2
SMU 6 Sampling Locations

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