2011 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

LCP BRIDGE STREET SITE (OU-1)
Solvay, New York

Prepared For:

Honeywell

301 Plainfield Road
Suite 330
Syracuse, NY 13212

Prepared By:

PARSONS

301 Plainfield Road
Suite 350
Syracuse, NY 13212

FEBRUARY 2013

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS

CQAPP	Construction Quality Assurance Procedures Plan
CSAP	Construction Sampling and Analysis Plan
LCP	Linden Chemicals and Plastics
METRO	Metropolitan Wastewater Treatment Facility
NYSDEC	New York State Department of Environmental Conservation
OM&M	Operation Maintenance & Monitoring
OU-1	Operating Unit One
TES	Terrestrial Environmental Specialists

2011 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

1.0 INTRODUCTION

This report details the operation, maintenance and monitoring (OM&M) activities conducted in 2011 at the Linden Chemicals and Plastics (LCP) Bridge Street (OU-1) site in Solvay, New York. It has been prepared in conjunction with the LCP OM&M Plan (Parsons, 2009a) and is intended to provide summaries of the collected data and status of OM&M activities.

Under direction of the New York State Department of Environmental Conservation (NYSDEC), the remediation of LCP involved a combination of sewer system closure, mercury removal from soil on the former plant property, excavation of impacted sediments in surrounding areas with relocation to the soil/sediment containment area, construction of an underground cut-off wall and low-permeability soil cover over the soil/sediment containment area, and installation of an onsite groundwater collection system. As part of the project, excavation areas were restored to provide habitats for wading birds, ducks, amphibians, fish, and mammals (Parsons, 2009c).

OM&M operations consist of site and equipment maintenance in addition to monitoring of groundwater, sediment, surface water, wetlands and biota. Upgrades to the site systems are performed as needed, more detail is provided in the respective sections below.

2.0 SYSTEM OPERATION

Groundwater extracted by the 15 pumping wells within the soil/sediment containment area was pumped to two 10,000-gallon tanks in the onsite extraction building (Figure 1). On January 21, 2010, the LCP pre-treatment system began operation. The pre-treatment system consists of a filter feed pump, two 5-micron bag filters, two fiberglass-reinforced plastic granular activated carbon vessels and a flow meter. The design pumping rate is approximately 5 to 25 gpm. Pre-treated groundwater is discharged to the Onondaga County West Side Trunk Sewer from which it flows to the Onondaga County Metropolitan Wastewater Treatment Facility (METRO). In 2011, approximately 2,474,896 gallons were pre-treated on-site and sent to METRO.

In addition to the groundwater pre-treated onsite, approximately 7,710 gallons were hauled to the Willis Avenue Treatment Plant. Monthly summaries are provided in Table 1 of this report.

3.0 MAINTENANCE

The OM&M contractor providing maintenance activities for the specified period was CH2M HILL OMI. Maintenance conducted included system equipment maintenance, cap mowing and snow removal. Specific maintenance activities outside of the normal maintenance activities previously noted included:

- Replacement of collection sump pump in early July.
- Rewiring of all pumping wells on the south side of the landfill in late October.

- Replacement of supply hoses and heat traces for several pumping wells in mid December.
- Periodic replacement of granulated activated carbon for the water collection system throughout the year as necessary.

Maintenance conducted to system equipment was described in the weekly inspection, operation and monitoring reports generated by CH2M HILL OMI and submitted to the NYSDEC and associated distribution list with the monthly reports for the LCP OU-1 site.

4.0 MONITORING

4.1 Groundwater

Containment of impacted sediments in the soil/sediment containment area is monitored both hydraulically and analytically using the piezometer and monitoring well network shown in Figure 1.

Final checks to the piezometer monitoring system are ongoing at the time of this report, in the interim static water levels were measured manually and included in the monthly reports submitted to the NYSDEC (and associated distribution list). The static water level elevations presented in each monthly report have been consolidated and provided in Table 2 of this report.

During the time period covered by this report, water levels measured by the piezometers have remained generally consistent and below the elevation of the top of the cut-off wall. An inward gradient will be achieved when the interior shallow, intermediate, and deep piezometer readings are less than the corresponding exterior shallow, intermediate, and deep piezometer readings. It is anticipated that it will take several years after the final low-permeability cap is constructed to fully achieve an inward and upward gradient at the site.

The piezometers outside of the cut-off wall along the north side of the containment area (PZ 1B: shallow, intermediate and deep through PZ 4B: shallow, intermediate and deep) were sampled quarterly by CH2M HILL OMI and analyzed for total mercury by SW 846 Method 7470. The analytical results are provided in Table 3 of this report.

The analytical results for the exterior piezometer sampling are predominantly non-detect and generally within the same range or lower than the pre-remediation mercury results presented in the RI for the LCP OU-1 site. The results of the exterior shallow piezometer data ranges from non-detect to 3.3 µg/L. The results of the exterior intermediate piezometer data ranges from non-detect to 0.16 µg/L. The results of the exterior deep piezometer data ranges from non-detect to 0.094 µg/L. The piezometer data indicates that the cut-off wall is effectively containing contaminated groundwater.

In addition to the exterior piezometers, monitoring wells 34D, 35D, and 36D located within the containment area were sampled by CH2M HILL OMI quarterly and analyzed for total mercury by SW 846 Method 7470. The monitoring well results are provided in Table 4 of this report. During each sampling event, the monitoring wells were also inspected for elemental mercury by the use of a copper probe. Elemental mercury was not detected during the sample events. The total mercury concentrations in the wells have been stable.

4.2 Surface Water

Nine annual monitoring locations (Figure 2) have been established in the West Flume and Wetland A/B complex for total mercury, methylmercury, and dissolved mercury. Annual surface water samples were collected at the monitoring locations in August 2011. The data range for total mercury from the West Flume (excluding the upstream sample location (LCP1-SW-63)) was 1.8 ng/L to 4.5 ng/L, 16 ng/L to 29 ng/L for Wetland A, and 2.7 ng/L to 18 ng/L for Wetland B. Individual sample results are provided in Table 5 of this report.

4.3 Sediment

Sediment was also sampled at the nine annual monitoring locations and analyzed for total and methylmercury by SW 846 Method 7471 and EPA 1630. Samples were collected in August 2011. The total mercury data ranges for the West Flume (excluding the upstream sample location (LCP1-SW-63)) were 0.24 mg/kg to 0.42 mg/kg, 0.24 to 4.2 mg/kg for Wetland A and 0.075 mg/kg to 0.68 mg/kg for Wetland B. Individual sample results are provided in Table 6 of this report.

4.4 Biota

Biota in and around the West Flume and Wetland A/B complex is sampled annually as part of OM&M. Baseline (or pre-remediation) samples were collected in 2005; four annual sampling events (post remediation) have been conducted following completion of initial remedial activities in 2007. As noted above, remedial activities continued in 2011 in the West Ditch, Wetland A, and the Dredge Spoils Area. The presence of contamination in these areas since 2007 and the remedial activity work in 2011 at both the LCP and Geddes Brook sites may have impacted mercury concentrations in the biota included in the sampling program. In 2011, total mercury concentrations (mg/kg wet weight) ranged from 0.04 to 0.24 in crayfish (n=14), 0.06 to 0.35 in creek chub (n=13), 0.09 to 0.27 in brook stickleback (n=7), 0.2 to 0.71 in earthworm (n=2), and 0.01 ND in deer mouse (n=1). Individual sample results are provided in Table 7 of this report.

In general, field crews target organisms captured during the baseline monitoring event to provide consistent comparisons between organisms. Mercury concentrations in biota that were most consistently sampled from year to year are presented in Figure 3.

4.5 Wetlands Monitoring

Wetland A, Wetland B, and the West Flume were restored following the removal of impacted sediments by placement of 1 ft. of clean imported topsoil. Following placement of topsoil, the areas were restored to a variety of habitat types, including a wet meadow/scrub-shrub fringe, emergent wetland, aquatic bed, open water, and drainage channel. These habitat types were created by developing various water depth zones according to the wetland restoration plan. The restoration plan places an emphasis on the development of aquatic bed and deep emergent marsh habitat types in order to limit invasive species (EPA, 2009).

During the OM&M period, the restored wetland areas are being monitored annually to evaluate the success of the restoration. The monitoring program began in 2008 and consists of

three monitoring events per year during the early, mid and later parts of the growing season (Parsons, 2009a). The parameters monitored include:

- Vegetation (type, percent cover, and frequency)
- Hydrology
- Invasive species (species, location, and approximate size of patch)
- Wildlife usage

Similar to previous years, the wetland assessments in 2011 were made by Terrestrial Environmental Specialists (TES). The number of plant species recorded each year has increased steadily from 77 species in 2008, 97 in 2009, 115 in 2010 and up to 148 observed in 2011. This is substantially more than the *Phragmites*-dominated system that existed prior to remedial efforts. The 2011 wetlands report generated by TES is provided in Appendix A of this report.

5.0 SOIL REMOVALS

In 2011, additional soil/sediment removals were conducted in the West Ditch, Wetland A, and the Dredge Spoils Area to address impacted material identified during previous OM&M sampling events (Figure 4). Removals were completed in accordance with the *LCP OU-1 Proposed Soil Removal – West Ditch, Wetland A and Dredge Spoils Areas* (Parsons, 2011). Impacted soils in these areas were discovered during OM&M sampling and it was determined that additional remedial excavations would be required to remove the contaminated soils. The West Ditch area was not fully remediated during the initial remedial construction activities at the LCP site. Some impacted soils migrated through the West Ditch into Wetland A requiring additional excavation of materials from Wetland A. It is believed that mercury contamination in the dredge spoils area was caused by placement of West Flume sediments in the area during mid-1970's dredging of the West Flume.

Prior to removals, wetland delineation was performed within the Dredge Spoils Area of the site. This delineation was conducted in accordance with the NYSDEC-approved Revised Final Work Plan, Wetlands/ Floodplain Assessment, Onondaga Lake (O'Brien and Gere/Parsons, 2004). Results of this delineation are provided in Appendix B of this report.

Soils/sediment removed during remedial excavation were relocated to the LCP landfill and managed with the Geddes Brook IRM sediment. For the West Ditch, Wetland A, and Dredge Spoils Area 3, removals were completed in 2011 and the areas were restored in accordance with the above referenced work plan. Removals were also completed within Dredge Spoils Area #2 in 2011, excavation in Dredge Spoils Area 1 will be completed in 2012, and both Areas #1 and #2 will be restored during the 2012 construction season.

Following excavation, post-excavation samples were collected in accordance with the remedial work plan indicated above. As agreed upon by Honeywell and NYSDEC, confirmatory sample results are summarized in Table 8 and tag maps are provided as Figures 5 through 8. The samples were collected in accordance with the NYSDEC-approved Construction Sampling and Analysis Plan (CSAP) and the Construction Quality Assurance Procedures Plan (CQAPP) issued in the Final (100%) Design Report For the LCP Bridge Street (OU-1) Site (Parsons, 2004).

Several issues during excavation of the Dredge Spoil Area north of the West Flume resulted in expansion of the remedial activities. The original scope of work called for the removal of approximately 12,000 to 12,500 CY of material from this area. Previous sampling in the area used to delineate remedial areas indicated a clay layer at approximately 2 ft. in depth. During remedial construction, it became evident based upon confirmatory sampling that this was a reworked layer intermingled with mercury-impacted material. Excavation depths increased to remove this impacted material and prevent recontamination of the remediated areas. Excavation depths continued through the reworked material into a native silty clay layer. It was also observed that in areas along the western limits of the excavation the silty clay layer dropped significantly in elevation as it was excavated. Based upon the presence of abandoned utilities, it was believe that this is the result of historic excavation in this area for the installation of these utilities.

In addition, areal limits of excavation were expanded in some areas based upon confirmatory sampling results throughout the site. The majority of the samples that failed clean-up goals were composite samples of the reworked and waste materials that were removed in the Dredge Spoils Area. In the West Ditch and Wetland A portions of the site, elevated sidewall samples occurred mainly in fill type materials.

In areas of the West Ditch and the Dredge Spoils Area, additional excavation to remove impacted materials from sidewalls was not possible due to the presence of existing utilities and infrastructure (water and sewer lines along Gere Lock Road and the sewer force main and railroad tracks along the north side of the Dredge Spoils Area). Additional excavation would have potentially undermined and damaged the existing utilities and railroad tracks. These additional areal removals were mitigated by installing a low-permeability material to be protective of existing utilities and infrastructure that were in close proximity to the excavations as shown on Figures 6 and 8. The installation of the low permeability material over impacted materials will isolate the impacted materials and mitigate any potential for recontamination into the restored wetland. Approximately 10,500 CY of additional material was removed resulting in a total of approximately 25,000 CY of soils/sediments removed during 2011.

The removal of the additional volume resulted in a corresponding increase in schedule causing operations to continue into winter weather conditions. Removal efforts were stopped in early January due to the inability to continue to treat construction water at the Geddes Brook construction water treatment plant and to continue to receive stabilizing cement from our vendor. Approximately 2,000 CY of material will need to be removed and Dredge Spoils Area restoration activities will be completed during the 2012 construction season.

6.0 MAINTENANCE PROGRAM SUCCESS

To date, the maintenance program being implemented at the LCP site has been effective.

Recommendations

- For the year 2012, it is anticipated that the remainder of the removals and restoration in the Dredge Spoils Area will be complete.

- The encroachment of invasive vegetation should be mitigated by spraying areas of phragmite encroachment with appropriate herbicides. The herbicide applicator will be properly licensed and a permit for spraying the phragmite will be obtained prior to herbicide application.

7.0 REFERENCES

EPA. 2009. First Five Year Review Report, LCP Bridge Street Subsite (OU5) Onondaga Lake Site Village of Solvay, Town of Geddes Onondaga County New York. Prepared by the U.S. Environmental Protection Agency Region 2, October 2009.

O'Brien and Gere/Parsons, 2004. Revised Final Work Plan Wetlands/Floodplain Assessment, Onondaga Lake. September 3, 2004.

Parsons, 2004. Final (100%) Design Report For The LCP Bridge Street (OU-1) Site. Prepared for Honeywell, Syracuse, NY. September 2004.

Parsons. 2009a. Operation, Maintenance, and Monitoring Plan for the LCP Bridge Street Site. Prepared for Honeywell, Syracuse, New York. January 2009.

Parsons. 2009b. Operation, Maintenance and Monitoring Sampling Data Report and Supplemental Sampling Plan. Prepared for Honeywell. September 2009.

Parsons, 2009c. Final Remedial Action Report For The Soil Washing, Soil And Sediment Consolidation, Sewers, Slurry Wall, Groundwater Containment/Pretreatment And Interim Soil Cover At The LCP Bridge Street Site (OU 1). Prepared for Honeywell, Syracuse, NY. November 2009.

Parsons. 2011. LCP OU-1 Proposed Soil Removal – West Ditch, Wetland A and Dredge Spoils Areas. Prepared for Honeywell, Syracuse, New York. May, 2011.

TABLES

TABLE 1: MONTHLY PUMPING SUMMARY		
Month	**Pre-Treatment System - METRO**	**Trucked to Willis Avenue Treatment Plant**
January	260,114	
February	264,403	7,710
March	364,754	
April	438,529	
May	291,187	
June	165,908	
July	119,161	
August	97,085	
September	79,862	
October	98,492	
November	123,189	
December	172,212	
Sub-Totals	2,474,896	7,710
Total	**2,482,606**	

Table 2: Piezometer Static Water Elevations

	PZ-1 Wall Top	PZ-1A-Shallow	PZ-1A-Mid	PZ-1A-Deep	PZ-1B-Shallow	PZ-1B-Mid	PZ-1B-Deep	PZ-2 Wall Top	PZ-2A-Shallow	PZ-2A-Mid	PZ-2A-Deep	PZ-2B-Shallow	PZ-2B-Mid	PZ-2B-Deep
1/20/11	393.3	389.4	374.5	374.5	383.9	374.4	374.5	392.5	382.5	374.6	374.2	377.7	374.1	374.3
1/31/11	393.3	389.1	374.2	374.3	383.9	374.1	374.2	392.5	382.3	374.3	374.0	377.5	373.9	374.0
2/25/11	393.3	390.3	374.9	374.9	384.0	374.7	374.8	392.5	383.1	374.9	374.6	378.0	374.5	374.7
3/10/11	393.3	390.8	375.3	375.3	384.2	375.2	375.3	392.5	383.3	375.4	375.1	378.3	375.0	375.2
4/15/11	393.3	390.0	375.0	375.1	384.0	374.9	375.0	392.5	382.8	375.1	374.8	378.1	374.7	374.9
5/20/11	393.3	390.4	375.3	375.3	384.1	375.2	375.3	392.5	383.1	375.4	375.1	378.3	375.0	375.2
5/31/11	393.3	390.0	374.8	374.8	384.0	374.7	374.8	392.5	382.8	374.9	374.6	377.9	374.4	374.7
6/17/11	393.3	389.5	374.4	374.4	384.3	374.2	374.3	392.5	382.6	374.4	374.1	377.3	373.9	374.2
7/1/11	393.3	389.2	374.4	374.4	383.9	374.2	374.2	392.5	382.8	374.5	374.0	377.5	373.8	374.1
7/15/11	393.3	389.0	373.9	373.9	383.7	373.7	373.8	392.5	382.3	374.0	373.6	376.7	373.4	373.7
7/29/11	393.3	388.9	373.8	373.7	383.5	373.6	373.6	392.5	382.3	373.8	373.4	376.4	373.3	373.5
8/12/11	393.3	388.7	374.0	374.0	383.8	373.8	373.9	392.5	382.3	374.1	373.7	377.4	373.5	373.8
8/26/11	393.3	388.7		373.7	383.8	373.8	373.9	392.5	382.5	374.1	373.6	377.5	373.5	373.7
9/9/11	393.3	388.7	374.8	374.7	383.9	374.5	374.6	392.5	382.7	374.9	374.4	378.2	374.2	374.4
9/23/11	393.3	388.8	374.3	374.2	383.8	374.0	374.0	392.5	382.7	374.3	373.8	377.4	373.7	373.9
10/7/11	393.3	388.7	374.5	374.4	383.8	374.2	374.2	392.5	382.7	374.5	374.0	377.9	373.9	374.1
10/21/11	393.3	388.7	374.6	374.6	384.0	374.3	374.3	392.5	383.0	374.7	374.1	378.1	374.0	374.2
11/4/11	393.3	388.8	374.5	374.5	384.2	374.2	374.3	392.5	382.9	374.5	374.0	377.7	373.9	374.1
11/18/11	393.3	388.7	374.4	374.3	383.9	374.2	374.2	392.5	382.8	374.5	374.0	377.7	373.8	374.0
12/1/11	393.3	388.8	374.6	374.5	384.0	374.4	374.4	392.5	383.3	374.7	374.2	378.0	374.0	374.3
12/22/11	393.3	388.8	374.5	374.5	384.1	374.28	374.3	392.5	383.1	374.6	374.1	377.9	374.0	374.2

Table 2: Piezometer Static Water Elevations

	PZ-3 Wall Top	PZ-3A-Shallow	PZ-3A-Mid	PZ-3A-Deep	PZ-3B-Shallow	PZ-3B-Mid	PZ-3B-Deep	PZ-4 Wall Top	PZ-4A-Shallow	PZ-4A-Mid	PZ-4A-Deep	PZ-4B-Shallow	PZ-4B-Mid	PZ-4B-Deep
1/20/11	393.0	388.8	374.5	374.3	386.1	374.1	374.2	393.5	389.1	374.6	376.2	384.2	374.8	376.2
1/31/11	393.0	388.5	374.4	374.1	388.7	373.8	373.9	393.5	388.8	374.3	376.0	384.0	374.5	376.0
2/25/11	393.0	389.8	374.9	374.7	389.2	374.4	374.6	393.5	390.4	375.0	376.5	384.7	375.2	376.6
3/10/11	393.0	390.2	375.4	375.3	389.2	375.0		393.5	390.8	375.4	377.1	385.2	375.7	377.1
4/15/11	393.0	389.4	375.1	374.9	387.8	374.6	374.9	393.5	389.8	375.1	376.7	384.0	375.3	376.7
5/20/11	393.0	390.0	375.3	375.3	388.0	374.9	375.1	393.5	390.5	375.4	377.1	384.8	375.7	377.1
5/31/11	393.0	389.8	374.9	374.7	386.6	374.4	374.6	393.5	390.0	374.9	376.6	384.1	375.1	376.6
6/17/11	393.0	389.2	374.4	374.2	385.9	373.5	374.5	393.5	389.4	374.5	376.1	383.3	374.6	376.1
7/1/11	393.0	389.0	374.6	374.1	386.3	373.8	374.0	393.5	389.1	374.7	375.9	383.5	374.5	376.0
7/15/11	393.0	388.6	373.9	373.6	385.4	373.4	373.6	393.5	388.8	374.0	375.5	382.9	374.1	375.6
7/29/11	393.0	388.7	373.8	373.5	384.9	373.3	373.5	393.5	388.8	373.9	375.4	382.9	373.9	375.4
8/12/11	393.0	388.5	374.1	373.8	387.3	373.5	373.7	393.5	388.6	374.2	375.6	383.9	374.2	375.6
8/26/11	393.0	388.1	374.1	373.8	386.9	373.5	373.7	393.5	388.5	374.2	375.5	383.8	374.2	375.6
9/9/11	393.0	388.6	374.9	374.5	387.8	374.3	374.4	393.5	388.8	375.1	376.1	384.5	374.9	376.1
9/23/11	393.0	388.5	374.4	373.9	385.8	373.7	373.9	393.5	388.6	374.6	375.7	383.9	374.3	375.7
10/7/11	393.0	388.4	374.7	374.1	385.4	373.9	374.0	393.5	388.6	374.8	375.9	384.0	374.5	375.8
10/21/11	393.0	388.4	374.8	374.2	387.8	374.0	374.2	393.5	388.6	374.9	376.0	384.2	374.6	376.0
11/4/11	393.0	388.4	374.5	374.1	385.8	373.9	374.1	393.5	388.5	374.7	376.0	384.1	374.5	376.0
11/18/11	393.0	388.2	374.5	374.1	386.1	373.9	374.0	393.5	388.3	374.7	375.9	384.0	374.4	375.9
12/1/11	393.0	388.4	374.7	374.3	387.8	374.1	374.2	393.5	388.5	374.8	376.1	384.2	374.7	376.1
12/22/11	393.0	388.4	374.5	374.2	388.7	374.0	374.1	393.5	388.6	374.7	376.1	384.3	374.6	376.1

Table 2: Piezometer Static Water Elevations

	PZ-5 Wall Top	PZ-5A-Shallow	PZ-5A-Mid	PZ-5A-Deep	PZ-5B-Shallow	PZ-5B-Mid	PZ-5B-Deep	PZ-6 Wall Top	PZ-6A-Shallow	PZ-6A-Mid	PZ-6A-Deep	PZ-6B-Shallow	PZ-6B-Mid	PZ-6B-Deep
1/20/11	394.8	390.0	374.7	383.6	388.0	378.0	381.6	393.4	390.1	375.2	380.5	390.5	378.0	390.3
1/31/11	394.8	389.6	374.5	383.2	388.0	377.8	381.3	393.4	389.7	375.0	380.3	390.3	377.7	389.8
2/25/11	394.8	390.6	375.1	384.1	388.4	378.3	381.5	393.4	391.1	375.6	381.3	390.6	378.3	391.7
3/10/11	394.8	391.7	375.5	384.5	388.5	378.9	381.9	393.4	391.7	376.0	381.9	391.1	378.9	392.4
4/15/11	394.8	390.3	375.3	384.1	388.3	378.5	382.1	393.4	390.5	375.7	381.4	390.5	378.5	391.4
5/20/11	394.8	388.1	374.5	384.7	388.1	378.8	382.4	393.4	391.0	374.8	382.0	390.6	378.8	392.0
5/31/11	394.8	389.7	375.1	384.2	388.0	378.3	382.2	393.4	390.5	375.5	381.4	390.8	378.3	391.3
6/17/11	394.8	389.1	374.6	383.4	387.5	377.8	381.4	393.4	390.0	375.1	380.7	389.9	377.8	390.1
7/1/11	394.8	388.9	374.8	384.0	387.4	377.8	381.0	393.4	389.5	375.2	380.8	390.3	377.7	390.5
7/15/11	394.8	388.4	374.2	381.6	387.2	377.3	380.3	393.4	389.2	374.6	380.0	389.6	377.2	
7/29/11	394.8	388.1	374.1	382.1	386.8	377.1	380.1	393.4	388.9	374.5	379.8	389.4	377.1	389.1
8/12/11	394.8	389.6	374.4	383.3	387.5	377.5	380.3	393.4	388.7	374.7	380.7	390.3	377.3	391.0
8/26/11	394.8	388.9	374.4	383.0	388.0	377.5	380.7	393.4	388.9	374.8	380.5	390.2	377.3	390.2
9/9/11	394.8	389.6	375.1	383.1	388.3	378.0	380.7	393.4	389.1	375.5	381.5	390.1	378.0	392.3
9/23/11	394.8	388.4	374.7	383.1	388.0	377.6	380.8	393.4	389.0	375.0	380.8	389.6	377.5	390.0
10/7/11	394.8	388.8	374.9	383.3	388.4	377.9	380.9	393.4	388.7	375.1	381.4	389.9	377.7	390.9
10/21/11	394.8	389.2	375.1	383.4	388.4	378.0	381.0	393.4	388.8	375.5	381.6	390.5	377.8	391.2
11/4/11	394.8	388.6	374.8	383.5	388.3	377.9	381.2	393.4	389.0	375.3	381.6	390.4	377.8	390.8
11/18/11	394.8	388.7	374.8	383.1	388.2	376.9	380.9	393.4	388.8	375.3	381.4	390.4	377.7	390.7
12/1/11	394.8	389.1	375.0	383.5	388.5	378.1	381.1	393.4	388.9	375.4	381.8	390.6	377.9	391.2
12/22/11	394.8	389.8	374.9	383.4	388.4	378.0	381.0	393.4	389.1	375.2	381.5	390.7	377.9	390.8

Table 2: Piezometer Static Water Elevations

	PZ-7 Wall Top	PZ-7A-Shallow	PZ-7A-Mid	PZ-7A-Deep	PZ-7B-Shallow	PZ-7B-Mid	PZ-7B-Deep
1/20/11	394.4	389.9	374.7	377.9	385.6	374.8	377.6
1/31/11	394.4	389.4	374.5	377.7	385.7	374.5	377.3
2/25/11	394.4	391.0	375.1	378.3	385.8	375.1	377.9
3/10/11	394.4	391.4	375.6	378.8	386.7	375.6	378.3
4/15/11	394.4	390.3	375.3	378.5	385.9	375.3	378.1
5/20/11	394.4	391.0		379.0	386.0	375.6	378.5
5/31/11	394.4	390.3	375.1	378.5	385.7	375.1	378.0
6/17/11	394.4	389.7	374.6	378.1	385.4	374.6	377.5
7/1/11	394.4	389.3	374.7	377.9	385.6	374.6	377.4
7/15/11	394.4	388.9	374.1	377.5	384.9	374.1	376.9
7/29/11	394.4	389.0	374.0	377.4		373.9	376.8
8/12/11	394.4	389.0	374.3	377.5	385.0	374.2	376.9
8/26/11	394.4	388.6	374.3	377.4	385.5	374.2	376.9
9/9/11	394.4	389.2	375.0	377.9	386.4	374.9	377.4
9/23/11	394.4	389.2	374.6	377.6	384.7	374.3	377.0
10/7/11	394.4	389.0	374.7	377.7	385.6	374.5	377.2
10/21/11	394.4	389.2	374.9	377.9	386.5	374.7	377.3
11/4/11	394.4	389.0	374.9	378.0	386.5	374.6	377.4
11/18/11	394.4	389.1	374.8	377.9	386.6	374.6	377.3
12/1/11	394.4	389.2	375.0	378.1	387.1	374.8	377.6
12/22/11	394.4	389.3	374.8	378.1	387.4	374.7	377.5

TABLE 3: PIEZOMETER ANALYTICAL RESULTS								
	1st Quarter (March) 2011		2nd Quarter (May) 2011		3rd Quarter (August) 2011		4th Quarter (October) 2011	
	Mercury		Mercury		Mercury		Mercury	
	Result ug/L	Qualifier	Result ug/L	Qualifier	Result ug/L	Qualifier	Result ug/L	Qualifier
PZ-1B-S	Not Sampled		ND (0.038)	U	Not Sampled		ND (0.038)	U
PZ-1B-I	ND (0.038)	U	ND (0.038)	U	ND (0.038)	U	0.072	J
PZ-1B-D	ND (0.038)	U	ND (0.038)	U	ND (0.038)	U	0.062/ND (0.038)	J/U
PZ-2B-S	3.3		2.8		2.9		3.2	
PZ-2B-I	0.046	J	0.044	J	ND (0.038)	U	ND (0.038)	U
PZ-2B-D	0.052	J	ND (0.038)	U	ND (0.038)	U	0.041	J
PZ-3B-S	ND (0.038)	U	R		ND (0.038)	U	0.13	J
PZ-3B-I	ND (0.038)	U	R		ND (0.038)	U	0.084	J
PZ-3B-D	0.065	J	ND (0.038)	U	ND (0.038)	U	0.094	J
PZ-4B-S	Not Sampled		R		Not Sampled		Not Sampled	
PZ-4B-I	0.046/0.044	J	R		0.047	J	0.16	J
PZ-4B-D	ND (0.038)	U	R		ND (0.038)	U	0.093	J

Table Notes:
ND: Non-Detect, method detection limit shown in paranthesis.
U: Not detected.
J: Result is considered an estimate.
R: Rejected analytical results. The sampling crew submitted the same chain of custody on 2 consecutive days causing sample ambiguity. These results were considered unusable, because the field notes did not match the chain of custodies.

TABLE 4: MONITORING WELL ANALYTICAL RESULTS

	1st Quarter (March) 2011			2nd Quarter (May) 2011			3rd Quarter (August) 2011			4th Quarter (October) 2011		
	Mercury		elemental mercury	Mercury		elemental mercury	Mercury		elemental mercury	Mercury		elemental mercury
	Result ug/L	Qualifier	detected? (y/n)	Result ug/L	Qualifier	detected? (y/n)	Result ug/L	Qualifier	detected? (y/n)	Result ug/L	Qualifier	detected? (y/n)
MW-34D	1.4		N	1.1/1.1		N	0.97/0.98		N	Not Sampled		N
MW-35D	7.1		N	9.2		N	Not Sampled		N	Not Sampled		N
MW-36D	9.7		N	12		N	5.9		N	6.5		N

Table Notes:
ND: Non-Detect, method detection limit shown in paranthesis.
U: Not detected.
J: Result is considered an estimate.

TABLE 5: SURFACE WATER ANALYTICAL RESULTS

	August 2011					
	Total Mercury		Methyl Mercury		Dissolved Mercury	
	Result ng/L	Qualifier	Result ng/L	Qualifier	Result ng/L	Qualifier
West Flume						
LCP1-SW-60	3.4		0.19		3.4	
LCP1-SW-61	1.8		0.22		1.8	
LCP1-SW-62	4.5		0.17		1.8	
LCP1-SW-63	4.8		0.071		1.4	
Wetland B						
LCP1-SW-64	18.0	J	0.66		18	J
LCP1-SW-65	2.7		0.5	J	1.8	J
LCP1-SW-66	4.9		0.62	J	4.8	J
Wetland A						
LCP1-SW-67	16		0.12	J	11	J
LCP1-SW-68	29		0.18	J	1.9	J

Table Notes:
J: Result is considered an estimate.
U: Not dectected.
ND: Non-Detect, method dectection limit shown in paranthesis.

TABLE 6: SEDIMENT ANALYTICAL RESULTS				
Location ID	August 2011			
	Mercury		Methyl Mercury	
	Result mg/kg	Qualifier	Result ng/g	Qualifier
West Flume				
LCP1-SW-60	0.42		2.6	
LCP1-SW-61	0.24		2.3	
LCP1-SW-62	0.3		2.1	
LCP1-SW-63	0.54		5	
Wetland B				
LCP1-SW-64	0.075	J	1	
LCP1-SW-65	0.68		1.8	
LCP1-SW-66	0.077	J	1.8	
Wetland A				
LCP1-SW-67	0.24		3.7	
LCP1-SW-68	4.2		14	

Table Notes:
J: Result is considered an estimate.

TABLE 7: BIOTA RESULTS					
August 2011					
Location	Mercury		Methyl Mercury		Organism
	Result mg/kg	Qualifier	Result ug/kg	Qualifier	
West Flume Reach A	0.3	J			Creek chub
West Flume Reach A	0.25	J			Creek chub
West Flume Reach A	0.16	J			Creek chub
West Flume Reach A	0.15	J			Brook Stickleback
West Flume Reach A	0.21	J			Brook Stickleback
West Flume Reach A	0.054	J	53	J	Crayfish
West Flume Reach A	0.066	J	80	J	Crayfish
West Flume Reach A	0.075	J			Crayfish
West Flume Reach A	0.1	J			Dragonfly Nymphes
West Flume Reach B	0.32	J			Creek chub
West Flume Reach B	0.23	J			Creek chub
West Flume Reach B	0.3	J			Creek chub
West Flume Reach B	0.29	J			Creek chub
West Flume Reach B	0.092	J			Creek chub
West Flume Reach B	0.04	J	42	J	Crayfish
West Flume Reach B	0.064	J	73	J	Crayfish
West Flume Reach B	0.14	J			Crayfish
West Flume Reach B	0.072	J	71	J	Crayfish
West Flume Reach B	0.062	J	74	J	Crayfish
West Flume Reach C	0.31	J			Creek chub
West Flume Reach C	0.31	J			Creek chub
West Flume Reach C	0.35	J			Creek chub
West Flume Reach C	0.25	J			Brook Stickleback
West Flume Reach C	0.16	J			Brook Stickleback
West Flume Reach C	0.054	J	52	J	Crayfish
West Flume Reach C	0.06	J	52	J	Crayfish
West Flume Reach C	0.04	J	38	J	Crayfish
West Flume Reach C	0.057	J	91	J	Crayfish
West Flume Reach C	0.028	J	42	J	Crayfish
Wetland A	0.22	J			Dragonfly Nymphes
Wetland A	0.24	J			Crayfish
Wetland B	0.06	J			Creek chub
Wetland B	0.06	J			Creek chub
Wetland B	0.09	J			Brook Stickleback
Wetland B	0.27	J			Brook Stickleback
Wetland B	0.14	J			Brook Stickleback
Wetland B	0.075	J	78	J	Dragonfly Nymphes
Wetland B	0.038	J	49	J	Crayfish
Wetland A/B	0.2	J			Earthworms
Wetland A/B	0.71	J			Earthworms
Wetland A/B	0.01	UJ			Deer Mouse
Wetland A/B	0.01	UJ			Meadow Vole
Wetland A/B	0.09	J			Shrew
Wetland A/B	0.11	J			Shrew
Wetland A/B	0.01	UJ			Meadow Vole

TABLE 8: SOIL SAMPLING ANALYTICAL RESULTS					
				Mercury	
		Depth (ft)		Result (mg/kg)	Qualifier
	Number From Figure	Start	End		
West Ditch Area 2					
LCP1-WDA2-SS-01	33	0	0.5	0.045	J
LCP1-WDA2-SS-02	34	0	0.5	0.89	
LCP1-WDA2-SS-03		0	0.5	1.5	
LCP1-WDA2-SS-04		0	0.5	1.3	
LCP1-WDA2-SS-05	37	0	0.5	0.9	
LCP1-WDA2-SS-06	38	0	0.5	0.11	J
LCP1-WDA2-SS-07	39	0	0.5	0.21	
LCP1-WDA2-SS-08		0	0.5	1.2	
LCP1-WDA2-SS-09	41	0	0.5	0.58	
LCP1-WDA2-SS-10		0	0.5	1.9	
LCP1-WDA2-SS-11		0	0.5	3.4	
LCP1-WDA2-SS-12	44	0	0.5	0.49	
LCP1-WDA2-SS-13	45	0	0.5	2.1	
LCP1-WDA2-SS-14		0	0.5	11	
LCP1-WDA2-SS-15		0	0.5	1.2	
LCP1-WDA2-SS-16		0	0.5	2.4	
LCP1-WDA2-SS-17	49	0	0.5	0.16	
LCP1-WDA2-SS-18		0	0.5	1.4	
LCP1-WDA2-SS-19		0	0.5	9.7	
LCP1-WDA2-SS-20	52	0	0.5	0.11	J
LCP1-WDA2-SS-21	53	0	0.5	0.13	
LCP1-WDA2-SS-22	54	0	0.5	0.42	
LCP1-WDA2-SS-23		0	0.5	4	
LCP1-WDA2-SS-24		0	0.5	2.1	
LCP1-WDA2-SS-25		0	0.5	33	
LCP1-WDA2-SS-26	58	0	0.5	3.8	
LCP1-WDA2-SS-27	59	0	0.5	0.63	
LCP1-WDA2-SS-28	60	0	0.5	0.31	
LCP1-WDA2-SS-29		0	0.5	3	
LCP1-WDA2-SS-30	62	0	0.5	0.073	J
LCP1-WDA2-SS-31	63	0	0.5	0.38	
LCP1-WDA2-SS-32	64	0	0.5	0.23	
LCP1-WDA2-SS-33	65	0	0.5	1.4	
LCP1-WDA2-SS-34	66	0	0.5	0.05	J
LCP1-WDA2-SS-35	67	0	0.5	1	
LCP1-WDA2-SS-36	68	0	0.5	0.65	J
LCP1-WDA2-SS-37	FD	0	0.5	0.17	J
LCP1-WDA2-SS-38		0	0.5	18	
LCP1-WDA2-SS-39	71	0	0.5	0.13	
LCP1-WDA2-SS-40	72	0	0.5	0.09	J

TABLE 8: SOIL SAMPLING ANALYTICAL RESULTS

	Number From Figure	Depth (ft)		Mercury Result (mg/kg)	Qualifier
		Start	End		
West Ditch Area 1					
LCP1-WDA1-SS-01	1	0	0.5	0.93	
LCP1-WDA1-SS-02		0	0.5	3.2	
LCP1-WDA1-SS-03	3	0	0.5	0.13	
LCP1-WDA1-SS-04		0	0.5	6.8	
LCP1-WDA1-SS-05	5	0	0.5	0.34	
LCP1-WDA1-SS-06	6	0	0.5	0.034	J
LCP1-WDA1-SS-07	7	0	0.5	0.79	
LCP1-WDA1-SS-08	8	0	0.5	0.036	J
LCP1-WDA1-SS-09	9	0	0.5	0.1	J
LCP1-WDA1-SS-10	10	0	0.5	0.12	
LCP1-WDA1-SS-11		0	0.5	1.4	
LCP1-WDA1-SS-12	12	0	0.5	0.19	
LCP1-WDA1-SS-13		0	0.5	3.3	
LCP1-WDA1-SS-14	14	0	0.5	0.25	
LCP1-WDA1-SS-15	15	0	0.5	0.5	
LCP1-WDA1-SS-16	16	0	0.5	0.073	J
LCP1-WDA1-SS-17	17	0	0.5	0.39	
LCP1-WDA1-SS-18		0	0.5	2.5	
LCP1-WDA1-SS-19	19	0	0.5	0.049	J
LCP1-WDA1-SS-20	20	0	0.5	0.037	J
LCP1-WDA1-SS-21	21	0	0.5	0.05	J
LCP1-WDA1-SS-22	22	0	0.5	0.36	
LCP1-WDA1-SS-23	23	0	0.5	0.064	J
LCP1-WDA1-SS-24	24	0	0.5	0.15	
LCP1-WDA1-SS-25	25	0	0.5	0.11	J
LCP1-WDA1-SS-26	26	0	0.5	0.62	
LCP1-WDA1-SS-27	27	0	0.5	0.43	
LCP1-WDA1-SS-28	28	0	0.5	0.79	
LCP1-WDA1-SS-29		0	0.5	2.4	
LCP1-WDA1-SS-30		0	0.5	4.5	
LCP1-WDA1-SS-30	97	0	0.5	0.19	
Wetland Area 2 - Wetland A					
LCP1-WLA2-SS-01	82	0	0.5	0.039	J
LCP1-WLA2-SS-02	83	0	0.5	0.15	
LCP1-WLA2-SS-03	84	0	0.5	0.19	
LCP1-WLA2-SS-04	85	0	0.5	0.23	
LCP1-WLA2-SS-05	86	0	0.5	0.05	J
LCP1-WLA2-SS-06	87	0	0.5	0.043	J
LCP1-WLA2-SS-07	88	0	0.5	0.081	J
LCP1-WLA2-SS-08	89	0	0.5	0.039	J
LCP1-WLA2-SS-09	FD	0	0.5	0.064	J
LCP1-WLA2-SS-10	91	0	0.5	0.12	
LCP1-WLA2-SS-11	92	0	0.5	0.072	J
LCP1-WLA2-SS-12	93	0	0.5	0.05	J
LCP1-WLA2-SS-13	94	0	0.5	0.068	J
LCP1-WLA2-SS-14		0	0.5	1.1	
LCP1-WLA2-SS-15	FD	0	0.5	0.64	
LCP1-WDA1-SS-32	98	0	0.5	0.12	J

TABLE 8: SOIL SAMPLING ANALYTICAL RESULTS

	Number From Figure	Depth (ft)		Mercury	
		Start	End	Result (mg/kg)	Qualifier
Wetland Area 1 - MW-26 Area					
LCP1-WLA1-SS-01	73	0	0.5	0.66	
LCP1-WLA1-SS-02	74	0	0.5	0.46	
LCP1-WLA1-SS-03	75	0	0.5	1	
LCP1-WLA1-SS-04	76	0	0.5	0.25	
LCP1-WLA1-SS-05	77	0	0.5	0.31	
LCP1-WLA1-SS-06	78	0	0.5	0.28	
LCP1-WLA1-SS-07		0	0.5	2	
LCP1-WLA1-SS-08	80	0	0.5	0.49	
LCP1-WLA1-SS-09	81	0	0.5	0.14	
Dredge Spoils Area					
LCP-DSA1-SS-01	1	0	0.5	0.095	J
LCP-DSA1-SS-02	2	0	0.5	0.046	J
LCP-DSA1-SS-03	3	0	0.5	0.019	J
LCP-DSA1-SS-04	4	0	0.5	0.053	J
LCP-DSA1-SS-05	5	0	0.5	0.031	J
LCP-DSA1-SS-06	6	0	0.5	0.035	J
LCP-DSA1-SS-07	7	0	0.5	0.057	J
LCP-DSA1-SS-08	8	0	0.5	0.071	J
LCP-DSA1-SS-09	9	0	0.5	0.1	J
LCP-DSA1-SS-10	10	0	0.5	0.065	J
LCP-DSA1-SS-11	11	0	0.5	0.095	J
LCP-DSA1-SS-12	12	0	0.5	0.11	J
LCP1-DSA1-SS-33	33	0	0.5	0.1	J
LCP1-DSA2-SS-13	13	0	0.5	0.057	J
LCP1-DSA2-SS-14	14	0	0.5	0.058	J
LCP1-DSA2-SS-15	15	0	0.5	0.057	J
LCP1-DSA2-SS-16	16	0	0.5	0.044	J
LCP1-DSA2-SS-17	17	0	0.5	0.045	J
LCP1-DSA2-SS-18	18	0	0.5	0.051	J
LCP1-DSA2-SS-19	19	0	0.5	0.058	J
LCP1-DSA2-SS-20	20	0	0.5	0.057	J
LCP1-DSA2-SS-21	21	0	0.5	0.031	J
LCP1-DSA2-SS-22	22	0	0.5	0.039	J
LCP1-DSA2-SS-23	23	0	0.5	0.04	J
LCP1-DSA2-SS-24	24	0	0.5	0.043	J
LCP1-DSA2-SS-25	25	0	0.5	0.052	J
LCP1-DSA2-SS-26	26	0	0.5	0.03	J
LCP1-DSA2-SS-27	27	0	0.5	0.043	J
LCP1-DSA2-SS-28	28	0	0.5	0.071	J
LCP1-DSA2-SS-29	29	0	0.5	0.13	J
LCP1-DSA2-SS-30	30	0	0.5	0.088	J
LCP1-DSA2-SS-31	31	0	0.5	0.035	J
LCP1-DSA2-SS-32	32	0	0.5	0.039	J
LCP1-DSA2-SS-34	34	0	0.5	0.091	J
LCP1-DSA2-SS-35	35	0	0.5	0.071	J
LCP1-DSA2-SS-36	36	0	0.5	0.087	J
LCP1-DSA2-SS-37	37	0	0.5	0.12	J
LCP1-DSA2-SS-38	38	0	0.5	0.19	

TABLE 8: SOIL SAMPLING ANALYTICAL RESULTS

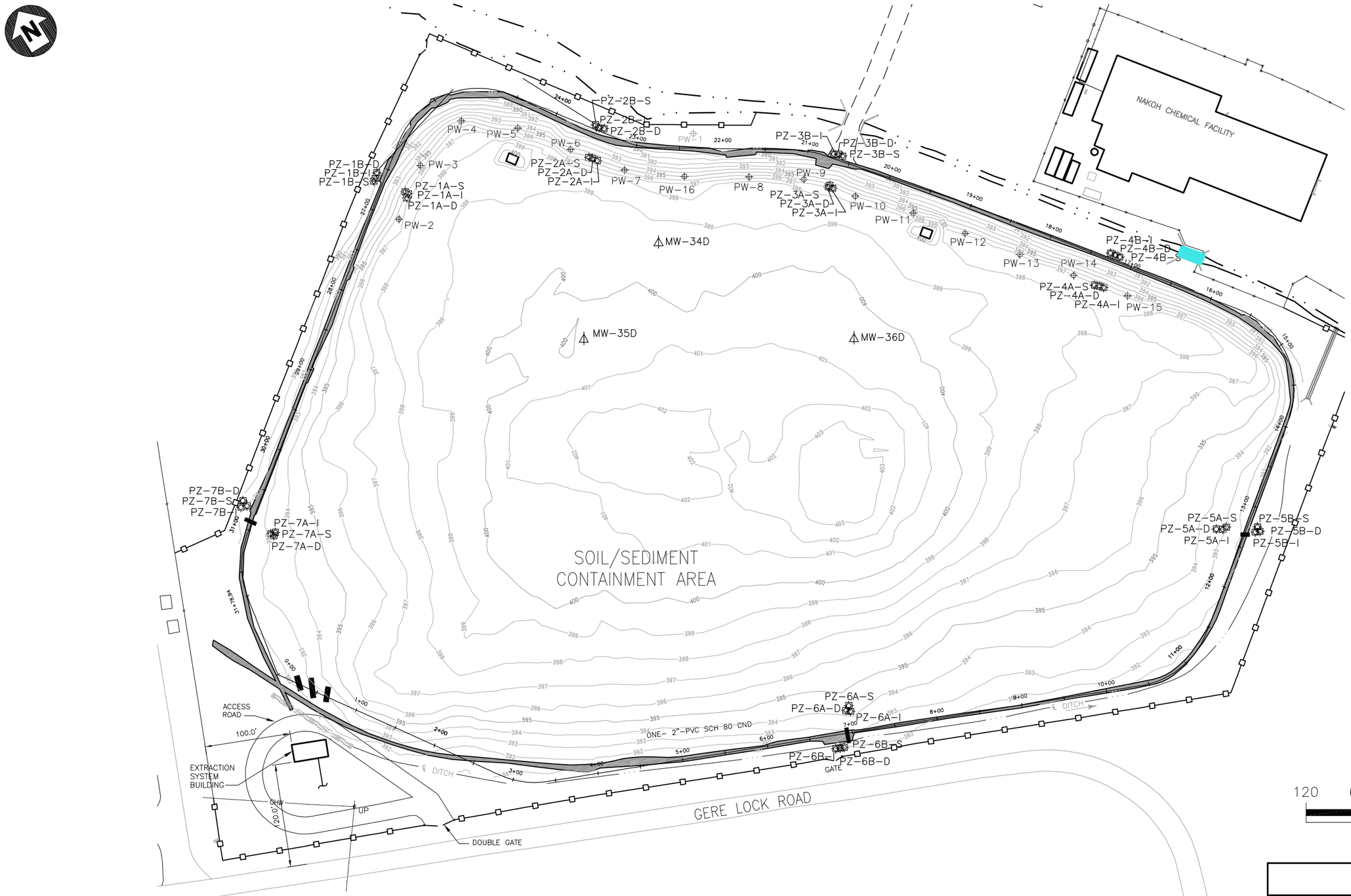
				Mercury	
		Depth (ft)		Result (mg/kg)	Qualifier
	Number From Figure	Start	End		
LCP1-DSA2-SS-39		0	0.5	0.22	
LCP1-DSA2-SS-40	40	0	0.5	0.086	J
LCP1-DSA2-SS-41	41	0	0.5	0.066	J
LCP1-DSA2-SS-42	42	0	0.5	0.096	J
LCP1-DSA2-SS-43	43	0	0.5	0.1	J
LCP1-DSA2-SS-44	44	0	0.5	0.09	J
LCP1-DSA2-SS-45	45	0	0.5	0.16	
LCP1-DSA2-SS-46	46	0	0.5	0.098	J
LCP1-DSA2-SS-47	47	0	0.5	0.11	J
LCP1-DSA2-SS-48	48	0	0.5	0.13	J
LCP1-DSA2-SS-49	49	0	0.5	0.13	J
LCP1-DSA2-SS-50	50	0	0.5	0.076	J
LCP1-DSA2-SS-51	51	0	0.5	0.057	J
LCP1-DSA2-SS-52	52	0	0.5	0.096	J
LCP1-DSA2-SS-53	53	0	0.5	0.084	J
LCP1-DSA2-SS-54	54	0	0.5	0.054	J
LCP1-DSA2-SS-55	55	0	0.5	0.098	J
LCP1-DSA2-SS-56	56	0	0.5	0.11	J
LCP1-DSA2-SS-57		0	0.5	0.1	J
LCP1-DSA2-SS-58	58	0	0.5	0.13	J
LCP1-DSA2-SS-59	59	0	0.5	0.044	J
LCP1-DSA2-SS-60	60	0	0.5	0.058	J
LCP1-DSA2-SS-61	61	0	0.5	0.073	J
LCP1-DSA2-SS-62	62	0	0.5	0.047	J
LCP1-DSA2-SS-63	63	0	0.5	0.14	J
LCP1-DSA2-SS-64	64	0	0.5	0.076	J
LCP1-DSA2-SS-65	65	0	0.5	0.16	
LCP1-DSA2-SS-66	66	0	0.5	0.058	J
LCP1-DSA2-SS-67		0	0.5	0.11	J
LCP1-DSA2-SS-68	68	0	0.5	0.051	J
LCP1-DSA2-SS-69	69	0	0.5	0.054	J
LCP1-DSA2-SS-70	70	0	0.5	0.053	J
LCP1-DSA2-SS-71	71	0	0.5	0.055	J
LCP1-DSA2-SS-72	72	0	0.5	0.046	J
LCP1-DSA2-SS-73	73	0	0.5	0.038	J
LCP1-DSA2-SS-74	74	0	0.5	0.084	J
LCP1-DSA2-SS-75	75	0	0.5	0.043	J
LCP1-DSA2-SS-76	76	0	0.5	0.1	J
LCP1-DSA2-SS-77		0	0.5	0.11	J
LCP1-DSA2-SS-78		0	0.5	6	
LCP1-DSA2-SS-79		0	0.5	23	
LCP1-DSA2-SS-80	80	0	0.5	0.11	J
LCP1-DSA2-SS-81	81	0	0.5	0.11	J
LCP1-DSA2-SS-82	82	0	0.5	0.1	J
LCP1-DSA2-SS-83	83	0	0.5	0.16	
LCP1-DSA2-SS-84	84	0	0.5	0.16	
LCP1-DSA2-SS-85	85	0	0.5	0.16	
LCP1-DSA2-SS-86		0	0.5	90	
LCP1-DSA2-SS-87	87	0	0.5	0.18	

TABLE 8: SOIL SAMPLING ANALYTICAL RESULTS					
				Mercury	
		Depth (ft)		Result (mg/kg)	Qualifier
	Number From Figure	Start	End		
LCP1-DSA2-SS-88		0	0.5	43	
LCP1-DSA2-SS-89		0	0.5	40	
LCP1-DSA2-SS-90	90	0	0.5	0.27	
LCP1-DSA2-SS-91	91	0	0.5	4.7	
LCP1-DSA2-SS-92	92	0	0.5	14	
LCP1-DSA2-SS-93	93	0	0.5	0.25	
LCP1-DSA2-SS-94	94	0	0.5	0.31	
LCP1-DSA2-SS-95	95	0	0.5	0.22	
LCP1-DSA2-SS-96	96	0	0.5	0.12	J
LCP1-DSA2-SS-97	97	0	0.5	0.038	J
LCP1-DSA2-SS-98	98	0	0.5	0.14	J
LCP1-DSA2-SS-99	99	0	0.5	0.12	J
LCP1-DSA2-SS-100	100	0	0.5	0.11	J
LCP1-DSA2-SS-101	101	0	0.5	0.093	J
LCP1-DSA2-SS-102	102	0	0.5	0.041	J
LCP1-DSA2-SS-103	103	0	0.5	0.096	J
LCP1-DSA2-SS-104	104	0	0.5	0.047	J
LCP1-DSA2-SS-105	105	0	0.5	0.054	J
LCP1-DSA2-SS-106	106	0	0.5	0.15	J
LCP1-DSA2-SS-107	107	0	0.5	0.14	J
LCP1-DSA2-SS-108	108	0	0.5	0.1	J
LCP1-DSA2-SS-109	109	0	0.5	0.17	

Table Notes:
J: Result is considered an estimate.

- All highlighted sample concentrations represent final bottom of excavation validated concentrations, non-highlighted concentrations indicate areas where additional excavation was conducted based on agreement between Honeywell and the NYSDEC.

FIGURES



LEGEND:

- PUMPING WELL LOCATIONS
- PIEZOMETER LOCATIONS
- GROUNDWATER MONITORING WELL LOCATIONS

120 60 0 120 240

SCALE: 1"=120'

FIGURE 1

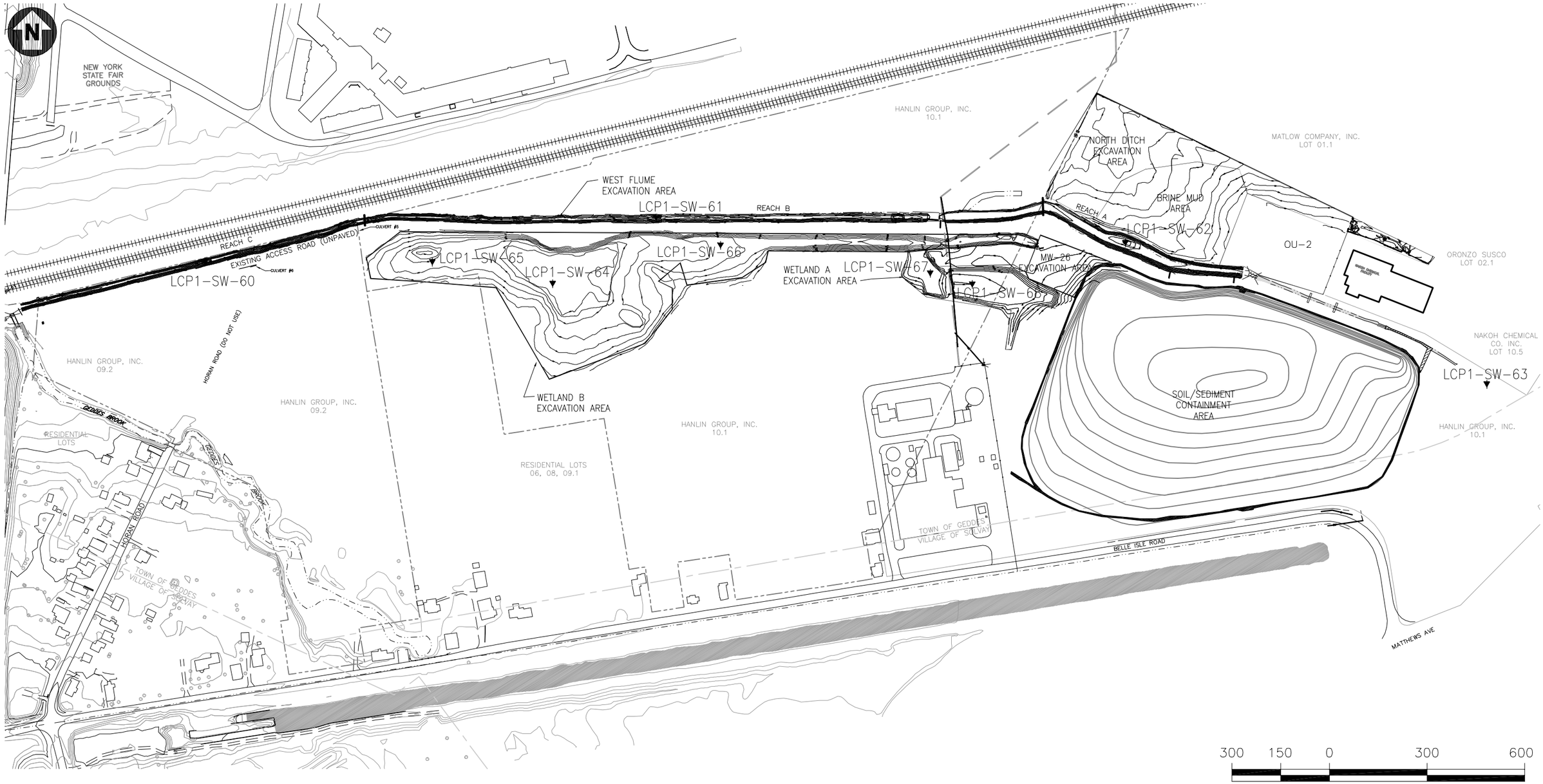
Honeywell

FORMER LINDEN CHEMICAL PLANT
SOLVAY, NEW YORK

PIEZOMETER/MONITORING WELL LOCATIONS

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\HONEYWELL -SYR\444224 LCP OU1 2008\10 TECHNICAL CATEGORIES\10.1 CAD\ANNUAL REPORT-2009\444224-RPT010.DWG
PLOT DATE: 5/29/2012 2:14 PM PLOTTED BY: RUSSO, JILL



300 150 0 300 600

SCALE: 1"=300'

FIGURE 2

Honeywell FORMER LINDEN CHEMICAL PLANT
SOLVAY, NEW YORK

ANNUAL SURFACE WATER/SEDIMENT SAMPLING LOCATION

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\HONEYWELL -SYR\444224 LCP OU1 2008\10 TECHNICAL CATEGORIES\10.1 CAD\ANNUAL REPORT-2009\444224-RPT002.DWG
PLOT DATE: 1/25/2013 12:05 PM PLOTTED BY: MENGES, ALLISON

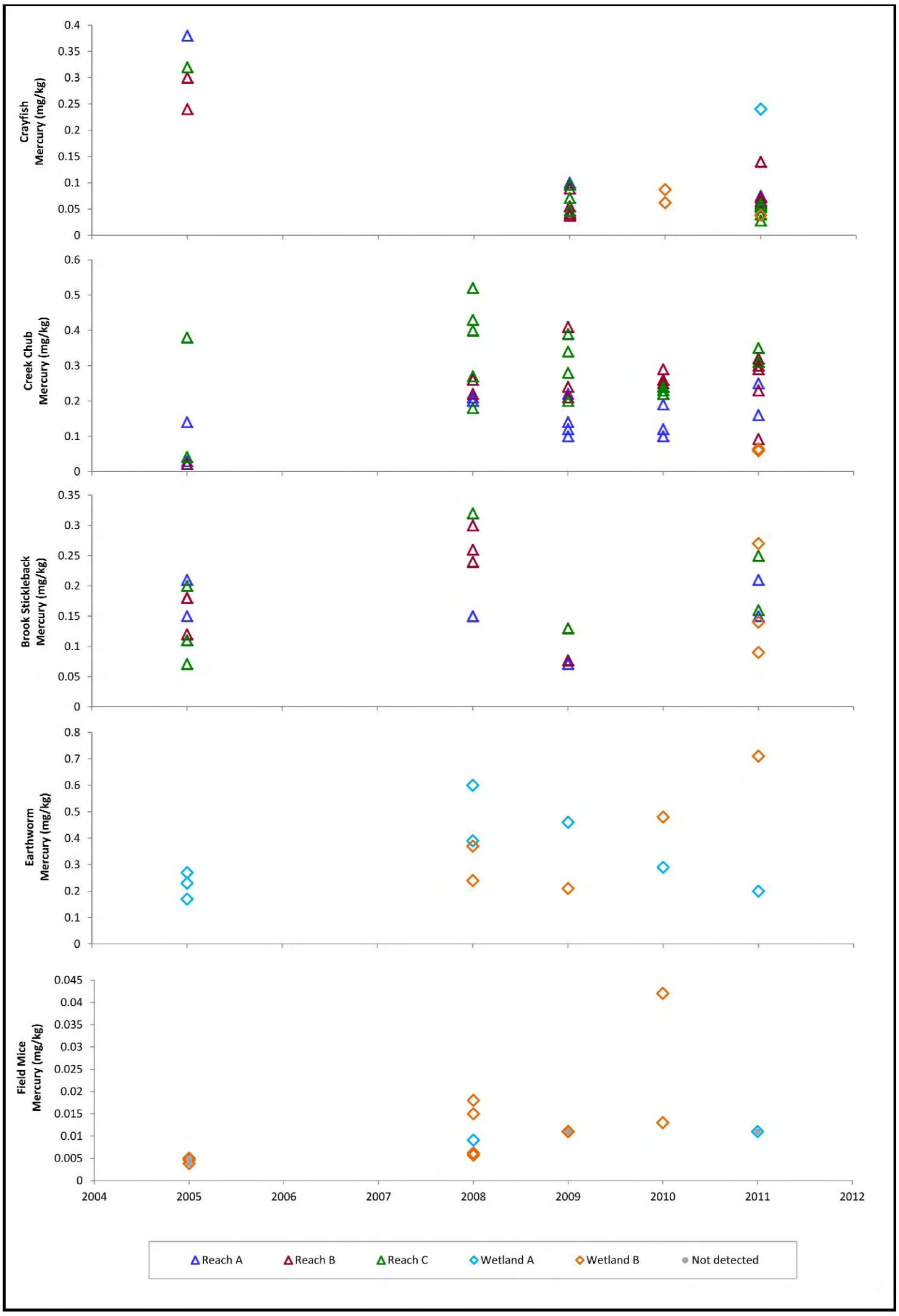


FIGURE 3

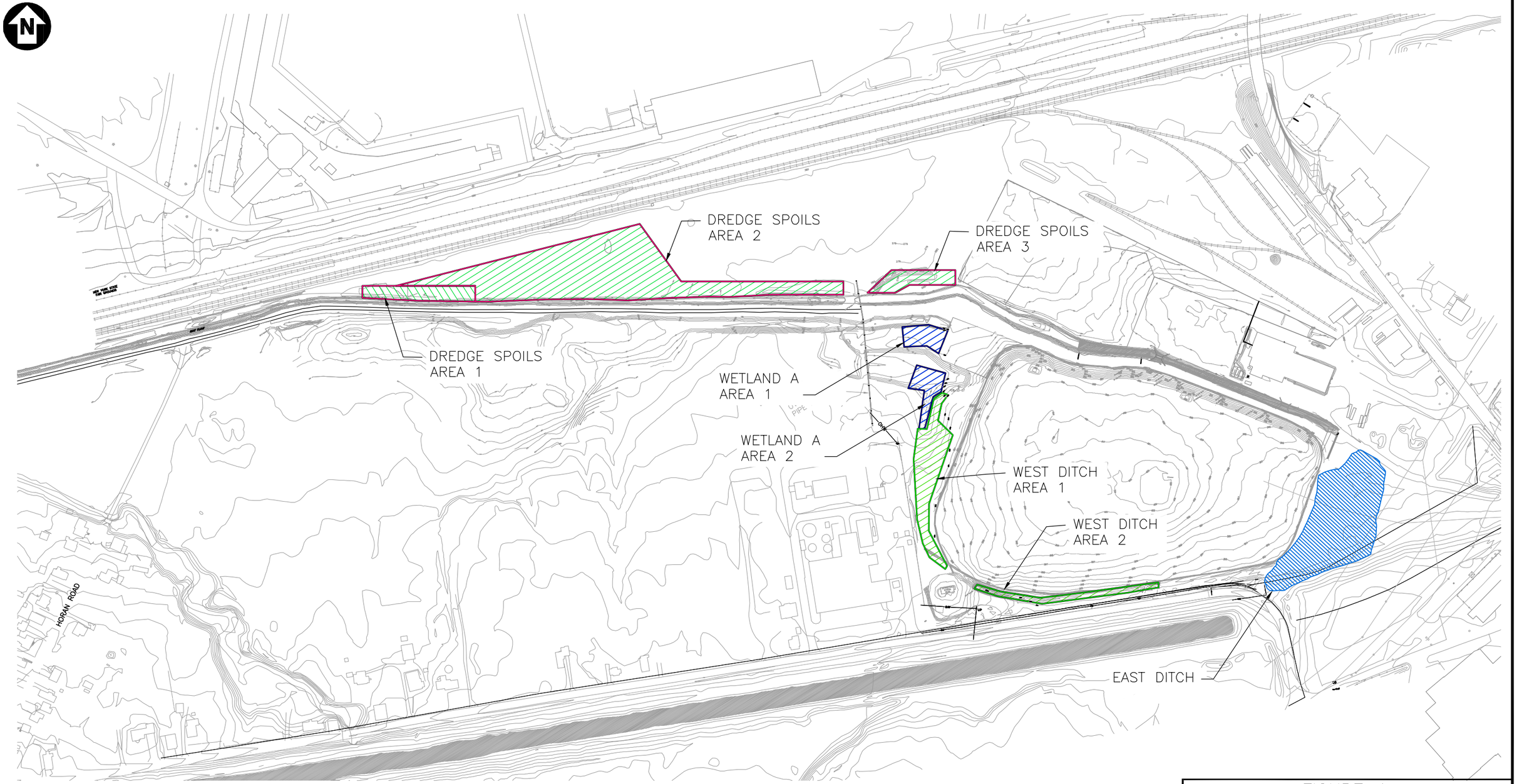
Honeywell

FORMER LINDEN CHEMICAL PLANT
SOLVAY, NEW YORK

MERCURY CONCENTRATIONS IN TISSUE BIOTA SAMPLES

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, N.Y. 13212, PHONE: 315-451-9560

FILE NAME: P:\HONEYWELL -SYR\447459 LCP - OU 1 2012\10.0 -TECHNICAL\CAD\FIGURES\447459-SK001.DWG
PLOT DATE: 1/25/2013 1:49 PM PLOTTED BY: MENGES, ALLISON



300 150 0 300 600

SCALE: 1"=300'

FIGURE 4

Honeywell

LCP OM&M REMOVALS 2011

LCP 2011 OM&M
REMOVAL AREAS

PARSONS
310 PLAINFIELD ROAD * SUITE 350 * SYRACUSE, NY 13212 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\446662 - LCP O&M SUPPORT\10.0 TECHNICAL CATEGORIES\10.3 CAD\FIGURES\SAMPLE AREAS\446662-SK002.DWG
PLOT DATE: 1/25/2013 11:54 AM PLOTTED BY: MENGES, ALLISON

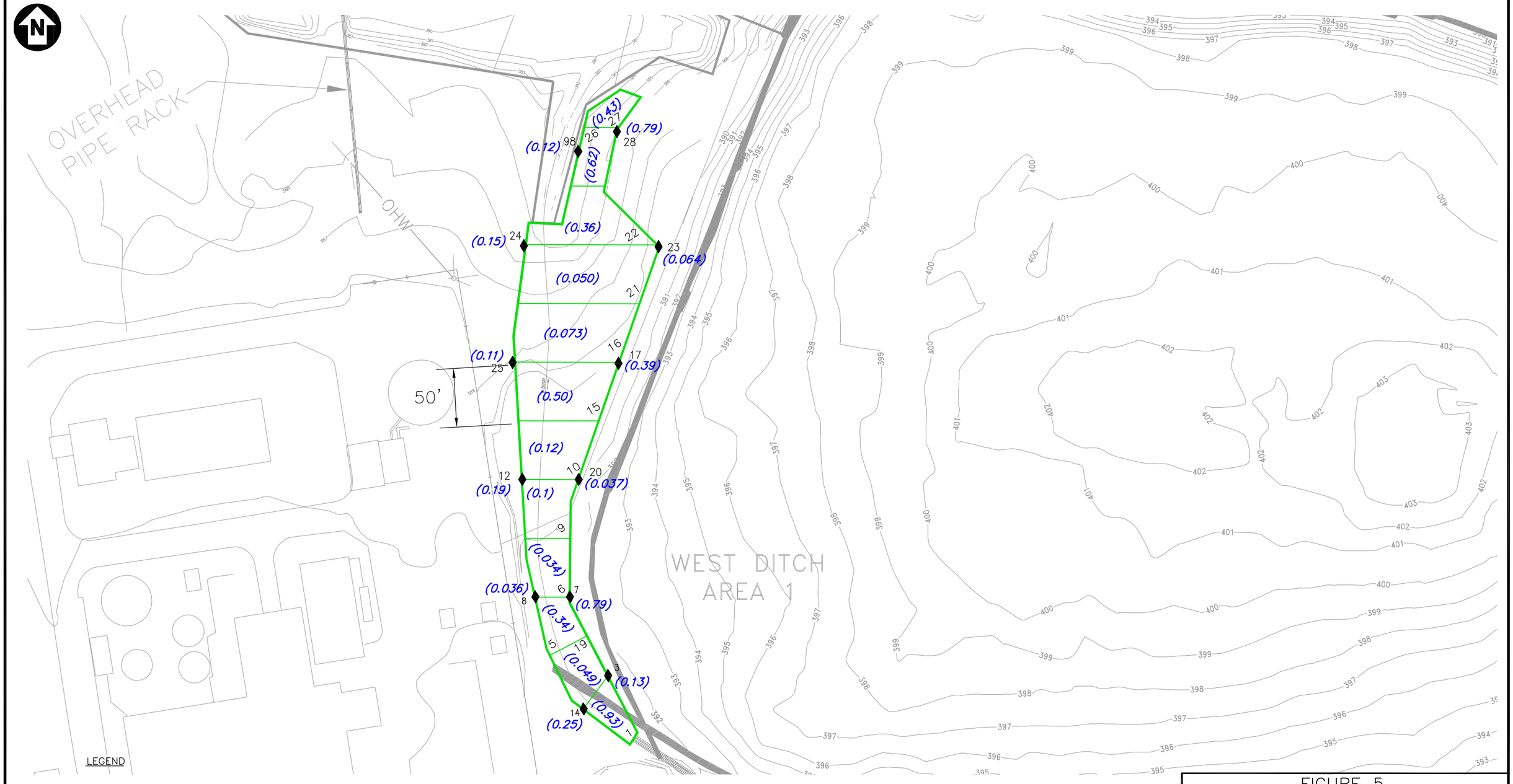


FIGURE 5

Honeywell

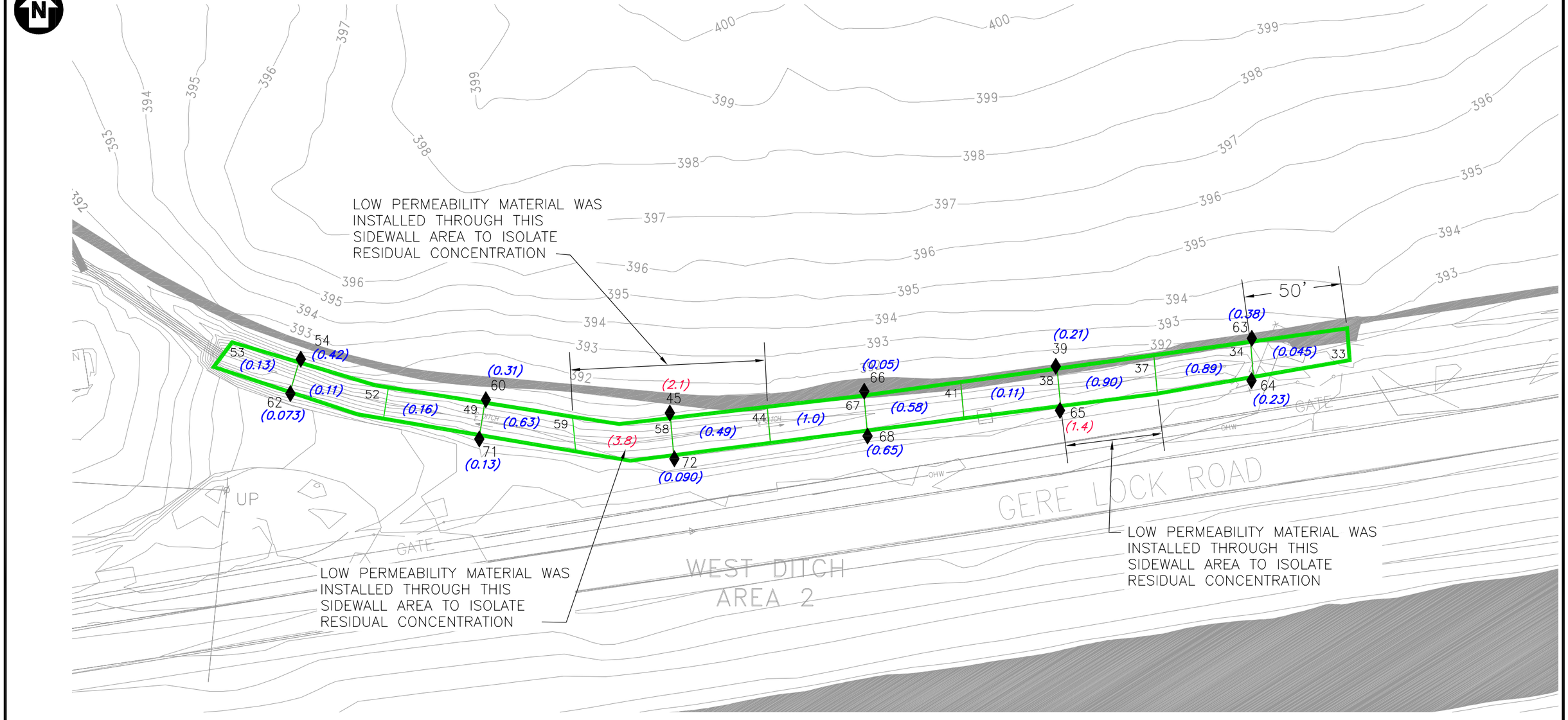
LCP OM&M REMOVALS 2011

WEST DITCH AREA 1 SAMPLE RESULTS AND EXCAVATION PLAN

PARSONS

310 PLAINFIELD ROAD * SUITE 350 * SYRACUSE, NY 13212 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\446662 - LCP O&M SUPPORT\10.0 TECHNICAL CATEGORIES\10.3 CAD\FIGURES\SAMPLE AREAS\446662-SK003.DWG
PLOT DATE: 1/25/2013 12:02 PM PLOTTED BY: MENGES, ALLISON



LEGEND

- REMOVAL BOUNDARY
- CONFIRMATORY SAMPLING AREA
- (0.120) SAMPLE RESULT (mg/kg)
- (0.120) SAMPLE RESULT EXCEEDS CRITERIA (mg/kg)
- SIDEWALL SAMPLE

50 25 0 50 100

SCALE: 1"=50'

FIGURE 6

Honeywell

LCP OM&M REMOVALS 2011

WEST DITCH AREA 2 SAMPLE RESULTS AND EXCAVATION PLAN

PARSONS
310 PLAINFIELD ROAD * SUITE 350 * SYRACUSE, NY 13212 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\446662 - LCP O&M SUPPORT\10.0 TECHNICAL CATEGORIES\10.3 CAD\FIGURES\SAMPLE AREAS\446662-SK003.DWG
PLOT DATE: 1/25/2013 12:02 PM PLOTTED BY: MENGES, ALLISON

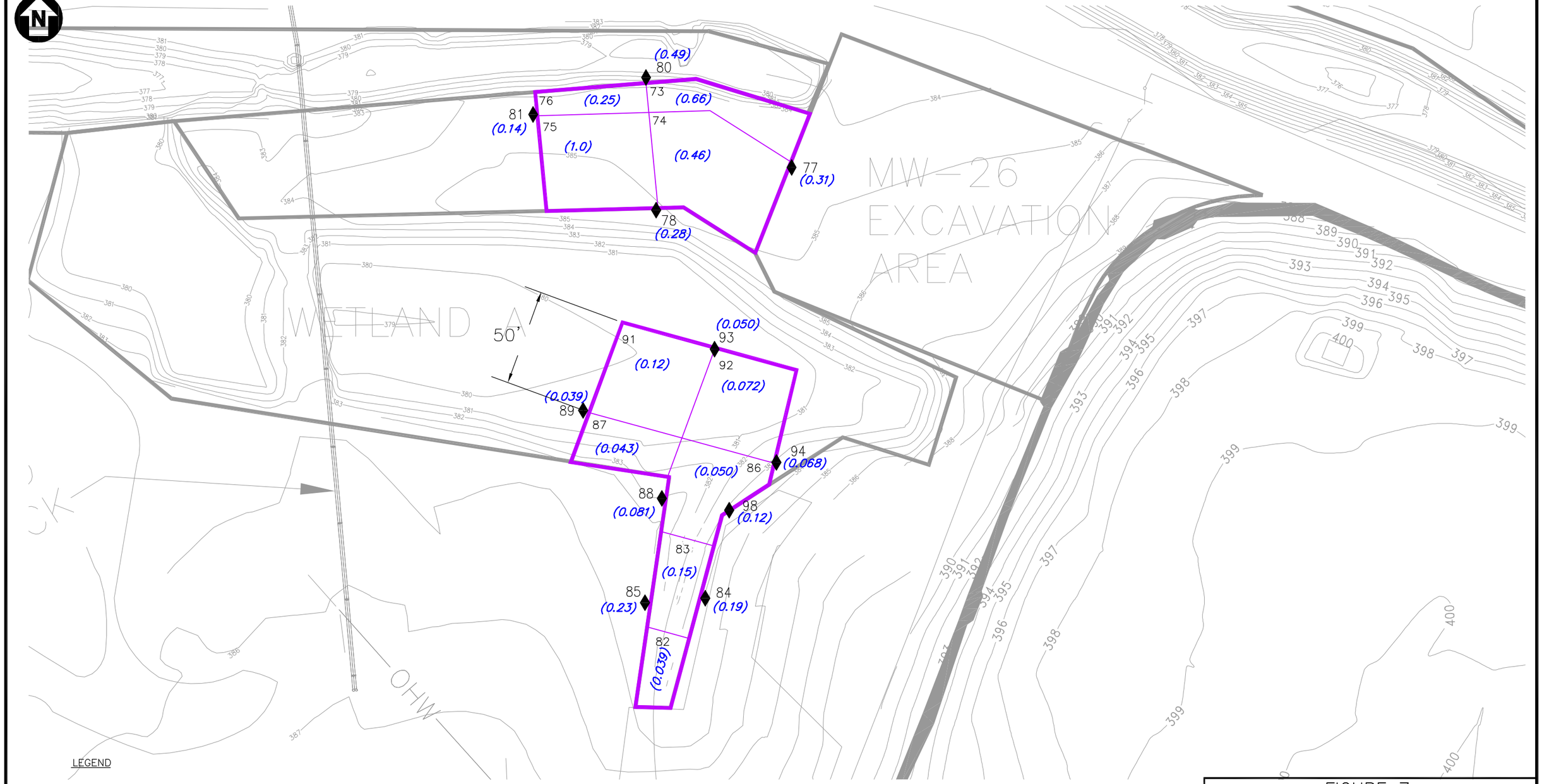


FIGURE 7

Honeywell

LCP OM&M REMOVALS 2011

WETLAND A & MW-26 SAMPLE RESULTS AND EXCAVATION PLAN

PARSONS
310 PLAINFIELD ROAD • SUITE 350 • SYRACUSE, NY 13212 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\446662 - LCP O&M SUPPORT\10.0 TECHNICAL CATEGORIES\10.3 CAD\FIGURES\SAMPLE AREAS\446662-SK003.DWG
PLOT DATE: 1/25/2013 11:58 AM PLOTTED BY: MENGES, ALLISON

LOW PERMEABILITY MATERIAL WAS INSTALLED THROUGH THIS AREA TO ISOLATE RESIDUAL CONCENTRATION

DREDGE SPOIL AREA #1

DREDGE SPOIL AREA #2

DREDGE SPOIL AREA #3

50'

LEGEND

- REMOVAL BOUNDARY
- 50x50 SQUARE USED FOR CONFIRMATORY SAMPLING
- C4 SAMPLE NUMBER
- (0.120) SAMPLE RESULT (mg/kg)
- (0.120) SAMPLE RESULT EXCEEDS CRITERIA (mg/kg)
- SIDEWALL SAMPLE

150 0 150 300

SCALE: 1"=150'

FIGURE 8

Honeywell

LCP OM&M REMOVALS 2011

DREDGE SPOILS AREA SAMPLE RESULTS AND EXCAVATION PLAN

PARSONS
310 PLAINFIELD ROAD * SUITE 350 * SYRACUSE, NY 13212 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\446662 - LCP O&M SUPPORT\10.0 TECHNICAL CATEGORIES\10.3 CAD\FIGURES\SAMPLE AREAS\446662-SK003.DWG
PLOT DATE: 1/25/2013 12:00 PM PLOTTED BY: MENGES, ALLISON

APPENDIX A

WETLANDS MONITORING REPORT YEAR 4 – 2011

WETLAND MONITORING REPORT – YEAR 4 (2011)
LCP BRIDGE STREET SITE

TOWN OF GEDDES
ONONDAGA COUNTY, NEW YORK

Prepared for:

PARSONS
301 Plainfield Road, Suite 350
Syracuse, New York 13212

Prepared by:

TERRESTRIAL ENVIRONMENTAL SPECIALISTS, INC.
23 County Route 6, Suite A
Phoenix, New York 13135

March 2012

TABLE OF CONTENTS

Page

LIST OF TABLES

(all tables follow text)

LIST OF FIGURES

(all figures follow tables)

1.0 INTRODUCTION

Terrestrial Environmental Specialists, Inc. (TES) worked with Parsons and the New York State Department of Environmental Conservation (NYSDEC) to develop a wetland restoration plan to restore wetlands and the West Flume following remediation work at the LCP Bridge Street site. The wetland restoration site is located in the Town of Geddes, Onondaga County, New York (Figure 1).

Remediation work involved the excavation of wetlands in portions of NYSDEC freshwater wetland SYW-14 (Figure 2) and an adjacent drainage feature called the West Flume (Figures 1 and 2). An April 2006 aerial photograph (Figure 3) shows the areas while remediation was underway. An April 2009 aerial photograph (Figure 3a) and a November 2008 oblique aerial photograph (Figure 3b) show the areas after completion of the remediation. The wetland restoration area occurred south of a gravel road that parallels the West Flume. The West Flume drains to the northwest into Geddes Brook, which flows under railroad tracks before discharging into Ninemile Creek, a tributary to Onondaga Lake.

In 2011, additional remediation occurred in the West Ditch and the upper (eastern) portion of Wetland A. Excavation occurred in these areas in September 2011.

The wetland areas and the West Flume were restored under a restoration plan approved by the review agencies. The plan is briefly described in Section 2.0 of *Wetland Monitoring Report – Year 1 (2008) LCP Bridge Street Site* (TES 2009).

Wetland monitoring was part of the restoration plan, with monitoring required for a five-year period specified in the *Operation, Maintenance, and Monitoring Plan for the LCP Bridge Street Site, Solvay, New York* (Parsons 2008). Methods and results for Year 4 (2011) of wetland monitoring are provided in Sections 3.0 and 4.0, respectively, of the following report. Maintenance procedures implemented in the wetland restoration area during the year are provided in Section 5.0.

2.0 WETLAND REMEDIATION/RESTORATION EFFORTS

Remediation at the LCP Bridge Street site required the excavation of portions of NYSDEC wetland SYW-14 and the adjacent West Flume. The remediation design was presented in the *Final (100%) Design Report for the LCP Bridge Street (OU-1) Site* (Parsons 2004). Details about the wetland restoration and reclamation plans can be found in the *Wetland Monitoring Report – Year 1 (2008) LCP Bridge Street Site* (TES 2009). Additional remediation occurred in the West Ditch and the eastern portion of Wetland A in 2011.

Native plant species were selected for the vegetation restoration efforts. Species, quantities, and types of stock planted in the wetland restoration area, West Flume, and adjacent uplands are presented in Table 1. Seeding and mulching details are provided in Table 2. Some supplemental tree and shrub plantings were performed in 2008. These are detailed in Section 5.0 of the Year 1 report (TES 2009), and are also listed in Table 3.

3.0 MONITORING METHODS

Methods proposed to monitor the restored wetland areas and West Flume are provided in Parsons (2008). The proposed parameters to be monitored included: vegetation, hydrology, wildlife usage, and invasive species.

3.1 Vegetation

Vegetation monitoring included field reconnaissance surveys, qualitative assessments, and quantitative sampling. Field reconnaissance surveys occurred at several times from May to September, 2011. More detailed qualitative assessments were performed in July and August, 2011. Quantitative sampling of vegetation occurred in August 2011.

Vegetation sampling was conducted on August 30, 2011 to assess the vegetation in Wetland A, Wetland B, and the West Flume. The vegetation data were collected from 18 permanent circular sample plots. The plots were located in each of the three restored areas and in the different vegetation cover types present in each area; plot locations are shown on Figures 5 and 5a.

Each permanent sample plot was 10 feet in diameter. Wooden stakes were installed to mark the center of each plot, which was also located using GPS equipment. To establish the 10-foot diameter, a cloth tape measure was attached to the stake, extended to 5 feet and walked around the stake.

Vegetation data collected in each sample plot consisted of the following: 1) the vegetation cover type present, 2) total percent areal cover of vegetation, 3) plant species observed, and 4) the percent areal cover of each species. Sample plot data sheets used are presented in Appendix A.

Photographs were taken at various times during the 2011 monitoring. At the time of the quantitative sampling, photographs were taken at each plot and at permanent photograph points shown on Figure 5. The location and direction of the photographs are shown on Figure 5a Sheets 1 and 2, and the photographs are presented in Appendix B.

3.2 Hydrology

The hydrology conditions in the restoration areas were monitored during the growing season using staff gauges. The gauges were installed in Wetland A and Wetland B on June 11, 2008. Staff gauge locations are shown on Figure 5.

Water level monitoring occurred eight times from May through September 2011. Water depths were also recorded at the center of each vegetation sample plot during the quantitative vegetation sampling that occurred on August 30, 2011.

3.3 Wildlife

During field reconnaissance visits to the restoration areas, records were kept of all wildlife species seen in or in the vicinity of the area. Specific efforts occurred during the breeding season for birds and amphibians in 2011.

4.0 MONITORING RESULTS

4.1 Introduction

The restoration area is composed of three areas: Wetland A, Wetland B, and the West Flume. An April 2009 aerial photograph (Figure 3a) and a November 2008 oblique aerial photograph (Figure 3b) show the three areas after restoration. The post-remediation grading plan for these three areas is provided as Figure 4. Figure 6 shows the location and extent of the vegetation cover types found in the restoration areas during the 2011 monitoring effort. Plant species observed in the areas are listed in Table 4. The vegetation, hydrology, and wildlife usage of the restored areas is described in the following sections.

4.2 Vegetation

A total of 148 plant species were recorded in and around Wetlands A and B and the West Flume in 2011 (Table 4). This is an increase of 33 species from the 2010 sampling and an increase of 51 species from the 2009 sampling.

Wetland A

Plant species observed in Wetland A are presented in Table 4. Vegetation plot data for Wetland A are provided in Appendix A, with a summary of the data presented in Table 5.

Wetland A contained one primary vegetation cover type during the August 2011 quantitative vegetation monitoring, which was emergent wetland. Three sampling plots were located in Wetland A, all occurring in emergent wetland (Figure 5).

The dominant plant in Wetland A was broad-leaf cattail (*Typha latifolia*), which was also closely associated with moss (*Chara* sp.), common reed (*Phragmites australis*), and soft-stem bulrush (*Scirpus tabernaemontani*). These four species account for approximately 96% of the total vegetation cover (Table 5). Broad-leaf cattail, moss and soft-stem bulrush have a wetland indicator status of obligate (OBL). Common reed has an indicator status of facultative-wet (FACW). Broad-leaf cattail continues to be the dominant plant in Wetland A, and this is consistent with what was found by the 2009 and 2010 monitoring efforts. Moss cover decreased from 2010 to 2011, while soft-stem bulrush and common reed cover increased.

Wetland B

Plant species observed in Wetland B are listed in Table 4. Vegetation plot data are presented in Appendix A, with summaries of the data presented in Tables 6 and 7.

Wetland B contained two vegetation cover types during the August 2011 quantitative vegetation monitoring. The two cover types were emergent wetland and aquatic bed. A total of twelve sampling plots were located in Wetland B, with seven in the emergent wetland area and five in the aquatic bed area. However, two of the five aquatic bed sample plots have begun to exhibit the characteristics of an emergent wetland cover type.

The emergent wetland portions of Wetland B were dominated by broad-leaf cattail and white cattail *(Typha x glauca*). These two dominants were also closely associated with star duckweed (*Lemna trisulca*), lesser duckweed (*Lemna minor*), and soft-stem bulrush. These five species account for approximately 92% of the total plant vegetation cover in the emergent wetland areas of Wetland B (Table 6). Both the dominant plants and the closely associated species have a wetland indicator status of obligate. As in 2010, the 2011 sampling data show broad-leaf cattail as a dominant plant.

The aquatic bed portion of Wetland B contained five dominant plant species: coontail (*Ceratophyllum demersum*), white water lily (*Nymphaea odorata*), broad-leaf cattail, star duckweed, and common bladder-wort (*Utricularia macrorhiza*). The five dominant plant species account for approximately 89% of the total cover in the Wetland B aquatic bed area (Table 7). All of the plant species have a wetland indicator status of obligate. Dominant plants in the aquatic bed of Wetland B in 2011 were the same as 2010, with the exception of waterweed (*Elodea* sp.). Coontail became the dominant species in 2011. However, the percent cover of each dominant plant species in the aquatic bed changed from 2010 to 2011. Water-weed, white water lily, and common bladder-wort decreased in percent cover, while coontail, broad-leaf cattail, and lesser duckweed increased.

West Flume

Plant species observed in the West Flume in 2011 are presented in Table 4. Vegetation plot data for the West Flume are provided in Appendix A, with a summary of the data presented in Table 8.

The West Flume contained one vegetation cover type (emergent wetland) during the August 2011 vegetation monitoring. Three sampling plots were located in the West Flume.

Common reed and white cattail were the dominant plants in the West Flume in 2011, with associates including rice cutgrass (*Leersia oryzoides*), broad-leaf cattail, and devil's beggar-ticks (*Bidens frondosa*) (Table 8). These species, which all have an indicator status of facultative wet or wetter, account for approximately 90% of the total cover. The relative percent cover of common reed and white cattail increased significantly from 2010 to 2011.

An interesting plant species was found growing in the West Flume during the 2008 monitoring effort. The plant found is seaside bulrush (*Scirpus maritimus* spp. *paludosus*, currently *Bulboschoenus maritimus* spp. *paludosus*). The species has continued to persist in the upper portions of the West Flume through 2011. Seaside bulrush is a state-listed endangered plant. It is listed as endangered in New York under the Protected Plant Act (Section 9-1503 of the Environmental Conservation Law). It has a limited distribution in upstate New York; it is

confirmed extant in Cayuga and Onondaga Counties and also occurs in Nassau and Suffolk Counties (Young 2008).

Seaside bulrush was historically known from several locations in the Onondaga Lake area, including areas near the State Fair Grounds. These historical sitings are summarized in McMullen (1993). Recent records of the species are from near the Onondaga Lake Parkway in the southeastern portion of the lake.

4.3 Hydrology

Water levels in Wetland A were monitored eight times and levels in Wetland B were monitored nine times in 2011. These dates were May 20, June 3, June 16, July 7, July 29, August 17, August 30, September 22, and September 27. Based on the water elevation data collected in 2011 (Table 9), water levels were fairly consistent from May through September.

In Wetland A, the water surface elevation fluctuated between 379.74 feet and 380.30 feet (Table 9). The lowest water elevation was observed on July 29, 2011. The highest water elevation was recorded on August 30, 2011.

In Wetland B, the water surface elevation fluctuated between 375.42 feet and 376.28 feet (Table 9). The lowest water elevation was observed on July 29, 2011. The highest water elevation was observed on May 20, 2011.

4.4 Wildlife

Wildlife observations from the restoration areas are presented in Table 10. These observations were made at various times during the 2011 season. Mammals, fish, and macroinvertebrates collected during the 2011 bioassessment surveys are presented in Table 11.

Fish

Fish were noted in the West Flume and Wetland B during the 2011 monitoring. TES did not sample for fish, but fish collected during the biota assessment were identified by TES and are presented in Table 11. Fish species collected in the West Flume included brook stickleback (*Culaea inconstans*) and creek chub (*Semotilus atromaculatus*). Creek chub was the most abundant species. Both of these fish species were observed in Wetland B in 2011.

Macroinvertebrates

Macroinvertebrates were sampled in the West Flume and Wetlands A and B during the 2011 bioassessment monitoring. Six species of macroinvertebrates were collected (Table 11). These species were crayfish, dragonflies, snails, shrimp, water bugs, and beetles.

Amphibians/Reptiles

Four species of frogs were identified in the restoration area and vicinity during 2011 (Table 10). American bullfrog (*Lithobates catesbeianus*) and gray treefrog (*Hyla versicolor*) were found in Wetland B. Northern green frog (*Lithobates clamitans melanota*) and northern leopard frog (*Lithobates pipiens*) were found in Wetland A, Wetland B, and the West Flume. This was the first record of gray tree frog in the restoration area. It was heard calling near Wetland B.

Painted turtles (*Chrysemys picta*) were observed in Wetland B and the West Flume during the 2011 monitoring effort. As during the 2010 monitoring effort when an eastern snapping turtle (*Chelydra s. serpentina*) was observed in the West Flume, these observations are important because they further indicate the restored site's suitability and success in supporting wildlife.

Birds

Table 10 lists the bird species seen or heard in the vicinity of the restoration areas. Species observed included several wetland species, such as Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), pied-billed grebe (*Podilymbus podiceps*), green heron (*Butorides virescens*), spotted sandpiper (*Actitis macularis*), willow flycatcher (*Empidonax traillii*), and red-winged blackbird (*Agelaius quiscula*). Red-winged blackbird is a common nesting species in the restored wetland areas. Pied-billed grebe is listed as a threatened species by the NYSDEC. Two juveniles were observed in Wetland B in 2011. In June 2010 an adult pied-billed grebe with young were noted in Wetland B. This indicates that the species is continuing to nest in the area, and is another positive indication of the successful restoration of the area.

Mammals

White-tailed deer (*Odocoileus virginianus*) sign was observed in the vicinity of Wetland A. Muskrat (*Ondatra zibeticus*) sign was observed in Wetland A, Wetland B, and the West Flume. In Wetland B under a cover board a meadow vole (*Microtus pennsylvanicus*) was observed. During the bioassessment work, several species of small mammal were collected. These included: meadow vole, deer mouse (*Peromyscus maniculatus)*, and short-tailed shrew (*Blarina brevicauda*).

5.0 WETLAND RESTORATION SUCCESS AND MAINTENANCE

Restoration of the LCP remediation areas, including Wetland A, Wetland B, and the West Flume, has been tremendously successful. Areas that were previously dominated by a monoculture of the invasive common reed with little aquatic habitat component, are now diverse wetlands, supporting a mix of plant and animal species and containing an interspersion of aquatic habitat. The improvement in habitat value of these areas is significant. As previously noted, the nesting of a state-listed bird and the occurrence of a state-listed plant are also indications of restoration success.

While the restoration of the LCP remediation areas is considered very successful based on the four years of monitoring, maintenance of the areas is considered necessary to maintain the habitat value. The two concerns are: 1) the encroachment of common reed into the areas, and 2) the success of the plantings, particularly woody species.

5.1 Invasive Species Control

Common reed occurs in various locations within and around the edges of Wetlands A and B, and the West Flume. Most of the common reed is in upland areas or in wetland fringes but has increased significantly from 2010 to 2011 in portions of Wetland A and especially the West Flume. The more abundant areas are shown on Figure 7. Additional remediation work occurred in the eastern portion of Wetland A where common reed occurred previously.

No measures to control common reed were implemented in 2011. Treatment control measures in 2012 would help to limit the spread of common reed grass. The best time for treatment is late August/early September.

5.2 Woody Species Plantings

Many tree and shrub plantings around Wetland B were originally installed at a lower elevation than specified in the plan. This woody material did not survive when the area was recharged with water. Recommendations were made to replace material. On May 19, 2008, forty-eight additional trees and shrubs were planted at the LCP Restoration site. The species and quantities are presented in Table 3.

Additional tree and shrub plantings would benefit the western edge of Wetland B.

6.0 SUMMARY

Remediation efforts at the LCP Bridge Street site were focused on impacted wetland areas and a drainage feature called the West Flume. The wetland areas (Wetland A and Wetland B) are part of NYSDEC Wetland SYW-14.

Detailed plans were developed by Parsons, TES, and NYSDEC to restore these areas. These plans are presented in Parsons (2004).

The wetlands and the West Flume were originally dominated by a monoculture of the invasive grass common reed and had limited aquatic habitat. Design for the restoration targeted a wetter wetland system to diversify the habitats, provide areas unsuitable for common reed, and increase the aquatic habitat component. Shrub and tree plantings were provided around the restored areas. Remediation efforts occurred from 2005 to 2007. Some additional remediation occurred in the West Ditch and the eastern portion of Wetland A in 2011. Initial restoration of the wetlands and West Flume occurred in the latter portion of this time period, with extensive vegetation planting in the fall of 2007.

Monitoring of the restored areas was required and is described in the Operation, Maintenance and Monitoring Plan (Parsons 2008). Monitoring occurred in 2008, 2009, 2010, and 2011. Results of the fourth year of monitoring (2011) are presented in the current report.

Vegetation, hydrology, and wildlife usage were monitored during 2011 in the restored wetlands and the West Flume. A vegetation cover map of the restored areas is provided. Vegetation in the restored wetlands and West Flume was primarily persistent emergent and aquatic bed. A total of 148 plant species were observed in the area, most of which were wetland species. Interestingly, seaside bulrush, a state-listed endangered plant, was found in the restored West Flume in 2008 and has persisted to 2011.

Hydrology was monitored in Wetlands A and B from May through September 2011 using staff gauges. Water levels were fairly consistent throughout the year.

Wildlife usage of the restored wetlands and the West Flume was extensive. Species of fish were observed in Wetland B and the West Flume in 2011. Leopard frogs were particularly abundant in the restored wetlands, with green frogs and bullfrogs being noted as well. Gray tree frogs were noted in 2011. Painted turtles were observed in Wetland B and the West Flume in 2011. Numerous wetland birds were observed in the area during the year, including the state-listed threatened pied-billed grebe. A few mammals were noted, and muskrat usage continues; many additional species likely utilize the area.

Overall, the restored areas were found to be very successful during the first four years of monitoring. Common reed still occurs in several locations in uplands around the restored areas and has increased in percent cover in certain areas, especially the West Flume. Herbicide treatment or cuttings to control common reed occurred in 2008 and 2009. Mowing and hand cutting to control common reed occurred in 2010. Additional treatment is warranted in certain areas in 2012. Additional tree plantings around the edge of the wetlands were performed in 2008 to replace material that died.

7.0 REFERENCES

American Ornithologists' Union. 1998. *Check-list of North American Birds*. 7th Edition. American Ornithologists' Union. Allen Press, Inc. Lawrence, KS.

Banks, R. C., R. T. Chesser, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, D. F. Stotz, and K. Winker. 2008. Forty-ninth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 125(3):758-768.

Crother, B. I. (ed.) 2008. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, pp. 1-84. SSAR Herpetological Circular 37.

McMullen, J. M. 1993. *Plant Species Recorded in the Botanical Literature from in or Near Onondaga Lake*. Onondaga County, New York. Terrestrial Environmental Specialists, Inc., Phoenix, NY.

Mitchell, R. S. and G. C. Tucker. 1997. *A Revised Checklist of New York State Plants*. The State Education Department, NYS Museum Bulletin No. 490, Albany, NY.

Parsons. 2004. *Final (100%) Design Report for the LCP Bridge Street (OU-1) Site*. Prepared for Honeywell, Inc. Parsons, Liverpool, NY.

Parsons. 2008. *Operation, Maintenance, and Monitoring Plan for the LCP Bridge Street Site, Solvay, New York*. Prepared for Honeywell. Parsons, Liverpool, NY.

Reed, P. B. Jr. 1988. *National List of Plant Species that Occur in Wetlands: Northeast (Region 1)*. U.S. Fish and Wildlife Service, Biological Report 88 (26.1), St. Petersburg, FL.

TES. 2009. *Wetland Monitoring Report – Year 1 (2008) LCP Bridge Street Site*. Terrestrial Environmental Specialists, Inc., Phoenix, NY.

TES. 2010. *Wetland Monitoring Report – Year 2 (2009) LCP Bridge Street Site*. Terrestrial Environmental Specialists, Inc., Phoenix, NY.

Tiner, R., R. Lichvar, R. Franzen, C. Rhodes, and W. Sipple. 1995. *1995 Supplement To The List of Plant Species That Occur In Wetlands: Northeast (Region 1)*, St. Petersburg, FL.

Whitaker, J. O., Jr. and W. J. Hamilton, Jr. 1998. *Mammals of the Eastern United States*. Cornell University Press. Ithaca, NY.

Young, S. M. (ed.). *New York Rare Plant Status List, June 2008*. New York Natural Heritage Program. Albany, NY.

TABLES

Table 1.

Plantings at the LCP Bridge Street Restoration Area

Quantity	Scientific Name[(a)]	Common Name
WETLAND PLANTING ZONE A2 (edge of water to 2 feet above water)		
118	*Populus deltoides*	Eastern cottonwood
118	*Fraxinus pennsylvanica*	Green ash
30	*Populus tremuloides*	Trembling aspen
88	*Quercus bicolor*	Swamp white oak
59	*Sambucus canadensis*	Elderberry
59	*Salix amygdaloides*	Peach-leaf willow
118	*Salix discolor*	Pussy willow
118	*Cornus amomum*	Silky dogwood
WETLAND PLANTING ZONE B1 (water 0 to 1 foot deep)		
348	*Sagittaria latifolia*	Arrowhead
348	*Sparganium americanum*	Burreed
348	*Scirpus tabernaemontani*	Soft-stem bulrush
348	*Leersia oryzoides*	Rice cutgrass
348	*Juncus effusus*	Soft rush
348	*Eleocharis obtusa*	Creeping spikerush
348	*Carex vulpinoidea*	Fox sedge
348	*Scirpus cyperinus*	Woolgrass
348	*Polygonum hydropiperoides*	Swamp smartweed
WETLAND PLANTING SUB-ZONE B2 (water 1 to 2 feet deep)		
3432	*Alisma subcordatum*	Water plantain
500	*Pontederia cordata*	Pickerel weed
280	*Pontederia cordata*	Pickerel weed
624	*Utricularia vulgaris*	Bladderwort
WETLAND PLANTING ZONE C AQUATIC BED (water 2 to 4 feet deep)		
1155	*Elodea canadensis*	Water weed
924	*Coleogeton pectinatum*	Sago pondweed
231	*Nymphaea odorata*	Water lily
231	*Nuphar lutea*	Yellow water lily
WEST FLUME AREA (side slopes to flume)		
90	*Populus deltoides*	Eastern cottonwood
90	*Fraxinus pennsylvanica*	Green ash
30	*Populus tremuloides*	Trembling aspen
60	*Quercus bicolor*	Swamp white oak
45	*Sambucus canadensis*	Elderberry
45	*Salix amygdaloides*	Peach-leaf willow
90	*Salix discolor*	Pussy willow
90	*Cornus amomum*	Silky dogwood

[(a)] Nomenclature follows Mitchell and Tucker (1997).

Table 2.

Seeding and Mulching at the LCP Bridge Street Restoration Area

WETLAND SEED MIX[(b)]	
Scientific Name[(a)]	**Common Name**
Agrostis alba	Redtop
Carex comosa	Cosmos sedge
Carex vulpinoidea	Fox sedge
Carex scoparia	Blunt broomsedge
Scirpus atrovirens	Green bulrush
Typha latifolia	Broad-leaf cattail
Bidens cernua	Beggars-tick
Glyceria striata	Fowl mannagrass
Polygonum pensylvanicum	Pennsylvania smartweed
Polygonum hydropiperoides	Marsh smartweed
Eleocharis obtusa	Spikerush
Juncus effusus	Soft rush
Sparganium americanum	Eastern burreed
Verbena hastata	Blue vervain
Leersia oryzoides	Rice cutgrass

CONSERVATION SEED MIX[(c)]		
Scientific Name[(a)]	**Common Name**	**Lbs./Acre**
Trifolium repens	White clover, Dutch	2.5
Agrostis perennans	Autumn bentgrass, PA Ecotype	5
Lolium perenne	Perennial ryegrass, “Saint” (turf type)	10
Phleum pratense	Timothy	10
Dactylis glomerata	Orchard grass, “Potomac”	10
Bromus inermis	Smooth brome	10
Agrostis scabra	Ticklegrass (rough bentgrass), PA Ecotype	4
	Total	51.5

[(a)] Nomenclature follows Mitchell and Tucker (1997).
[(b)] Seeding rate – 15 bulk lbs./acre.
[(c)] Seeding rate – 51.51 lbs./acre.

Table 3.

Supplemental Tree and Shrub Plantings on May 19, 2008

Quantity	Scientific Name[(a)]	Common Name
9	*Populus deltoides*	Eastern cottonwood
9	*Fraxinus pennsylvanica*	Green ash
10	*Salix purpurea*	Streamco willow
10	*Salix discolor*	Pussy willow
10	*Cornus amomum*	Silky dogwood

[(a)] Nomenclature follows Mitchell and Tucker (1997).

Table 4.

Plant Species Observed in 2011, LCP Wetland Restoration Areas

TREES

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Acer negundo	Box elder	FAC	✓	✓(E)	✓(E)
Fraxinus pennsylvanica	Green ash	FACW	✓	✓	✓
Juglans nigra	Black walnut	FACU			✓(E)
Morus sp.	Mulberry	FACU		✓	
Populus deltoides	Eastern cottonwood	FAC	✓	✓	✓(E)
Populus tremuloides	Quaking aspen	FACU	✓(E)	✓(E)	✓(E)
Quercus bicolor	Swamp white oak	FACW	✓(E)	✓(E)	✓(E)
Robinia pseudoacacia	Black locust	FACU	✓	✓(E)	✓(E)
Salix amygdaloides	Peach-leaf willow	FACW	✓	✓	✓(E)
Salix sp.	Willow	FACW			✓(E)

SHRUBS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Cornus amomum	Silky dogwood	FACW	✓	✓	✓
Cornus sericea	Red-osier dogwood	FACW		✓	
Lonicera morrowii	Morrow's honeysuckle	FACU	✓(E)	✓(E)	✓(E)
Rhamnus cathartica	Common buckthorn	FACU		✓(E)	✓(E)
Rhus hirta	Staghorn sumac	UPL		✓(E)	✓(E)
Salix discolor	Pussy willow	FACW	✓	✓	✓(E)
Salix purpurea	Streamco willow	NI	✓(E)	✓(E)	✓(E)
Sambucus canadensis	Elderberry	FACW	✓(E)	✓(E)	✓(E)

HERBACEOUS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Agrostis gigantea	Redtop	FACW	✓	✓	✓
Agrostis stolonifera	Bentgrass	FACW		✓	
Agrostis sp.	Bentgrass	FACW	✓	✓	
Alisma subcordatum	Water plantain	OBL	✓	✓	✓
Ambrosia artemisiifolia	Ragweed	FACU	✓(E)	✓(E)	✓(E)

[(a)] Nomenclature follows Mitchell and Tucker (1997).

[(b)] Obligate Wetland (OBL): occur almost always (estimated probability >99%) in wetlands. Facultative Wetland (FACW): usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Facultative Upland (FACU): usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%). Obligate Upland (UPL): occur almost always (estimated probability >99%) in non-wetlands.

(E) - Found primarily along the edge of the restoration area.

Table 4. (cont.)

HERBACEOUS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Andropogon gerardii	Big bluestem	FAC	✓(E)		
Apocynum cannabinum	Indian hemp	FACU	✓(E)	✓(E)	✓(E)
Arctium minus	Common burdock	FACU	✓(E)	✓(E)	
Artemisia vulgaris	Felon-herb mugwort	FACU	✓(E)	✓(E)	✓(E)
Asclepias syriaca	Common milkweed	FACU			✓(E)
Aster lanceolatus	Lance-leaved aster	FACW	✓(E)	✓(E)	✓(E)
Aster lateriflorus	Calico aster	FACW	✓	✓(E)	
Aster novae-angliae	New England aster	FACW	✓(E)	✓(E)	✓(E)
Aster pilosum	Old field aster	UPL	✓(E)	✓(E)	✓(E)
Aster puniceus	Purple-stemmed aster	OBL		✓	✓
Aster racemosus	Small white aster	FACW		✓(E)	
Aster sp.	Aster	FAC	✓	✓(E)	✓
Bidens coronata	Large-fruit beggar-ticks	OBL		✓	
Bidens frondosa	Devil's Beggar-ticks	FACW		✓	✓
Bromus inermis	Smooth brome	FACU	✓(E)	✓(E)	✓(E)
Carex comosa	Long-hair sedge	OBL	✓	✓	✓
Carex crinita	Fringed sedge	OBL			✓
Carex granularis	Meadow sedge	FACW			✓
Carex lupulina	Hop sedge	OBL			✓
Carex lurida	Shallow sedge	OBL	✓	✓	✓
Carex scirpoidea	Northern single-spike sedge	FACU	✓(E)	✓(E)	✓(E)
Carex scoparia	Broom sedge	FACW	✓		✓
Carex sp.	Sedge	FACW	✓	✓	
Carex stipata	Awlfruit sedge	OBL		✓	✓
Carex vulpinoidea	Fox sedge	OBL	✓	✓	✓
Centaurea maculosa	Spotted knapweed	FACU	✓(E)	✓(E)	✓(E)
Ceratophyllum demersum	Coontail	OBL		✓	
Chara sp.	Moss	OBL	✓	✓	✓
Cichorium intybus	Chicory	FACU	✓(E)	✓(E)	✓(E)
Cirsium arvense	Canada thistle	FACU	✓(E)	✓(E)	✓(E)
Coleogeton pectinatum	Sago pondweed	OBL	✓	✓	✓
Convolvulus arvensis	Field bindweed	FACU			✓(E)
Cyperus esculentus	Yellow nutsedge	FACW		✓	
Dactylis glomerata	Orchard grass	FACU		✓(E)	✓(E)
Daucus carota	Wild carrot	FACU	✓(E)	✓(E)	✓(E)
Dipsacus fullonum	Teasel	FACU	✓(E)	✓(E)	✓(E)
Echinochloa crusgalli	Barnyard grass	FACU	✓(E)		
Eleocharis sp.	Spikerush	FACW		✓	
Elodea canadensis	Broad water-weed	OBL		✓	✓
Elodea sp.	Water-weed	OBL		✓	
Elymus virginicus	Virginia wild rye	FACW		✓(E)	
Epilobium ciliatum	Hairy willow-herb	FAC	✓	✓	✓

Table 4. (cont.)

HERBACEOUS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Epilobium coloratum	Purple-leaf willow-herb	OBL	✓	✓	✓
Erechtites hieracifolia	Pilewort	FACU			✓
Erigeron annuus	Daisy fleabane	FACU			✓(E)
Eupatorium perfoliatum	Boneset	FACW	✓	✓	✓
Euthamia graminifolia	Flat-top goldenrod	FAC	✓(E)	✓	✓
Galium sp.	Bedstraw	FAC	✓(E)	✓	✓(E)
Galium palustre	Marsh bedstraw	OBL	✓	✓	✓
Geum laciniatum	Rough avens	FAC	✓		
Geum macrophyllum	Large leaf avens	FACW		✓(E)	✓
Glechoma hederacea	Ground ivy	FACU			✓(E)
Glyceria grandis	Reed meadowgrass	OBL		✓	
Glyceria striata	Fowl meadowgrass	OBL	✓	✓	✓
Inula helenium	Elecampane	FACU		✓	✓
Impatiens capensis	Jewelweed	FACW		✓	✓
Juncus brachycephalus	Small-headed rush	OBL	✓	✓	✓
Juncus canadensis	Canada rush	OBL			✓
Juncus effusus	Soft rush	FACW	✓	✓	✓
Juncus sp.	Rush	FAC	✓	✓	✓
Juncus tenuis	Slender rush	FAC	✓(E)	✓(E)	✓(E)
Lactuca sp.	Lettuce	FACU		✓(E)	✓(E)
Lathyrus sylvestris	Flat pea	FAC	✓(E)	✓(E)	✓(E)
Leersia oryzoides	Rice cutgrass	OBL	✓	✓	✓
Lemna minor	Lesser duckweed	OBL	✓	✓	
Lemna trisulca	Star duckweed	OBL		✓	
Leucanthemum vulgare	Ox-eye daisy	FACU	✓(E)		
Lolium arundinaceum	Tall fescue	FACU	✓(E)	✓(E)	✓(E)
Lotus corniculata	Bird’s-foot trefoil	FACU	✓(E)	✓(E)	✓(E)
Ludwigia palustris	Water purslane	OBL			✓
Lythrum salicaria	Purple loosestrife	FACW	✓	✓	✓
Melilotus alba	White sweet clover	FACU	✓(E)	✓(E)	✓(E)
Melilotus officinalis	Yellow sweet clover	FACU	✓(E)	✓(E)	✓(E)
Mimulus ringens	Winged monkeyflower	OBL			✓
Myosotis sp.	Forget-me-not	OBL		✓	
Nymphaea odorata	White water-lily	OBL		✓	
Oenothera biennis	Evening primrose	FACU	✓(E)	✓(E)	✓(E)
Onoclea sensibilis	Sensitive fern	FACW		✓	
Panicum virgatum	Panic grass	FACW	✓	✓(E)	✓
Parthenocissus quinquefolia	Virginia creeper	FACU	✓(E)		
Phalaris arundinacea	Reed canary grass	FACW	✓	✓	✓
Phleum pratense	Timothy	FACU	✓(E)	✓(E)	✓(E)
Phragmites australis	Common reed	FACW	✓	✓	✓

Table 4. (cont.)

HERBACEOUS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Picris hieracoides	Ox-tongue	FACU	✓(E)	✓(E)	✓(E)
Plantago lanceolata	Narrow-leaf plantain	UPL	✓(E)	✓(E)	✓(E)
Plantago major	Common plantain	FACU	✓(E)	✓(E)	✓(E)
Poa compressa	Canada bluegrass	FACU		✓(E)	
Poa palustris	Fowl bluegrass	FACW			✓
Poa pratensis	Kentucky bluegrass	FACU			✓(E)
Polygonum amphibium	Water smartweed	OBL		✓	
Polygonum hydropiperoides	Marsh water pepper	OBL		✓	✓
Polygonum lapathifolium	Willow-weed	FACW			✓
Polygonum pensylvanicum	Pennsylvania smartweed	FACW		✓	
Pontederia cordata	Pickerelweed	OBL		✓	
Potamogeton crispus	Curly pondweed	OBL		✓	✓
Potamogeton sp.	Pondweed	OBL		✓	
Ranunculus acris	Tall Buttercup	FAC		✓	✓
Ranunculus sp.	Buttercup	FAC	✓(E)	✓(E)	✓(E)
Rorippa nasturtium-aquaticum	Watercress	OBL			✓
Rudbeckia hirta	Black-eyed Susan	FACU	✓(E)		
Rumex sp.	Dock	FAC	✓(E)	✓(E)	✓(E)
Scirpus atrovirens	Green bulrush	OBL	✓	✓	✓
Scirpus cyperinus	Woolgrass	FACW		✓	
Scirpus maritimus	Saltmarsh bulrush	OBL			✓
Scirpus tabernaemontani	Soft-stem bulrush	OBL	✓	✓	✓
Solidago canadensis	Canada goldenrod	FACU	✓(E)	✓(E)	✓(E)
Solidago rugosa	Rough goldenrod	FAC	✓(E)	✓(E)	✓
Solanum carolinense	Horse nettle	UPL			✓(E)
Solanum dulcamara	Bittersweet	FAC		✓	✓
Solanum nigrum	Black nightshade	FACU			✓
Sparganim americanum	Burreed	OBL		✓	
Taraxacum officinale	Dandelion	FACU	✓(E)	✓(E)	
Trifolium hybridum	Alsike clover	FACU	✓(E)	✓(E)	✓(E)
Trifolium pratense	Red clover	FACU	✓(E)	✓(E)	✓(E)
Tussilago farfara	Colt's foot	FACU	✓(E)		
Typha angustifolia/glauca	Narrow-leaf/White cattail	OBL	✓	✓	
Typha x glauca	White cattail	OBL	✓	✓	✓
Typha latifolia	Broad-leaf cattail	OBL	✓	✓	✓
Utricularia macrorhiza	Common bladder-wort	OBL		✓	
Verbascum blattaria	Moth-mullein	UPL	✓(E)	✓(E)	✓(E)
Verbena hastata	Blue vervain	FACW		✓	✓
Verbena urticifolia	White vervain	FACU		✓	
Veronica americana	American brooklime	OBL		✓	
Veronica anagallis-aquatica	Water speedwell	OBL		✓	

Table 4. (cont.)

HERBACEOUS

Scientific Name[(a)]	Common Name	Wetland Indicator Status[(b)]	Wetland A	Wetland B	West Flume
Vicia sp.	Vetch	FAC	✓(E)		✓(E)
Vitis sp.	Grape	FAC		✓(E)	✓(E)

Table 5.

Vegetation Data Summary, Wetland A, Emergent Cover Type
LCP Bridge Street Restoration Area (2011)

Scientific Name[(a)]	Common Name	Indicator Status[(b)]	Relative Cover (%)
Typha latifolia	Broad-leaf cattail	OBL	58.17
Chara sp.	Moss	OBL	13.85
Phragmites australis	Common reed	FACW	12.47
Scirpus tabernaemontani	Soft-stem bulrush	OBL	11.08
Lemna minor	Lesser duckweed	OBL	3.60
Lythrum salicaria	Purple loosestrife	FACW	0.83
		Total	100.00

[(a)] Nomenclature follows Mitchell and Tucker (1997).

[(b)] Obligate Wetland (OBL): occur almost always (estimated probability >99%) in wetlands. Facultative Wetland (FACW): usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Facultative Upland (FACU): usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%). Obligate Upland (UPL): occur almost always (estimated probability >99%) in non-wetlands.

Table 6

Vegetation Data Summary, Wetland B, Emergent Cover Type
LCP Bridge Street Restoration Area (2011)

Scientific Name[(a)]	Common Name	Indicator Status[(b)]	Relative Cover (%)
Typha latifolia	Broad-leaf cattail	OBL	35.57
Typha x glauca	White cattail	OBL	21.74
Lemna trisulca	Star duckweed	OBL	20.75
Lemna minor	Lesser duckweed	OBL	8.20
Scirpus tabernaemontani	Soft-stem bulrush	OBL	5.43
Phragmites australis	Common reed	FACW	2.77
Lythrum salicaria	Purple loosestrife	FACW	2.47
Ceratophyllum demersum	Coontail	OBL	1.98
Utricularia macrorhiza	Common bladder-wort	OBL	0.49
Potamogeton sp.	Pondweed	OBL	0.30
Polygonum hydropiperoides	Marsh water pepper	OBL	0.30
		Total	100.00

[(a)] Nomenclature follows Mitchell and Tucker (1997).

[(b)] Obligate Wetland (OBL): occur almost always (estimated probability >99%) in wetlands. Facultative Wetland (FACW): usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Facultative Upland (FACU): usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%). Obligate Upland (UPL): occur almost always (estimated probability >99%) in non-wetlands.

Table 7.

Vegetation Data Summary, Wetland B, Aquatic Bed Cover Type
LCP Bridge Street Restoration Area (2011)

Scientific Name[(a)]	Common Name	Indicator Status[(b)]	Relative Cover (%)
Ceratophyllum demersum	Coontail	OBL	37.91
Nymphaea odorata	White water lily	OBL	16.59
Typha latifolia	Broad-leaf cattail	OBL	13.63
Lemna trisulca	Star duckweed	OBL	11.26
Utricularia macrorhiza	Common bladder-wort	OBL	10.07
Typha x glauca	White cattail	OBL	4.74
Coleogeton pectinatum	Sago pondweed	OBL	3.55
Elodea canadensis	Water-weed	OBL	2.25
		Total	100.00

[(a)] Nomenclature follows Mitchell and Tucker (1997).

[(b)] Obligate Wetland (OBL): occur almost always (estimated probability >99%) in wetlands. Facultative Wetland (FACW): usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Facultative Upland (FACU): usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%). Obligate Upland (UPL): occur almost always (estimated probability >99%) in non-wetlands.

Table 8.

Vegetation Data Summary, West Flume, Emergent Cover Type
LCP Bridge Street Restoration Area (2011)

Scientific Name[(a)]	Common Name	Indicator Status[(b)]	Relative Cover (%)
Phragmites australis	Common reed	FACW	42.86
Typha x glauca	White cattail	OBL	26.19
Leersia oryzoides	Rice cutgrass	OBL	8.33
Typha latifolia	Broad-leaf cattail	OBL	7.14
Bidens frondosa	Devil's beggar-ticks	FACW	5.48
Epilobium ciliatum	Hairy willow-herb	FAC	3.57
Lythrum salicaria	Purple loosestrife	FACW	2.38
Solanum dulcamara	Bittersweet nightshade	FAC	1.19
Erechtites hieracifolia	Pilewort	FACU	1.19
Daucus carota	Wild carrot	FACU	0.71
Scirpus tabernaemontani	Soft-stem bulrush	OBL	0.48
Rumex sp.	Dock	FAC	0.48
		Total	100.00

[(a)] Nomenclature follows Mitchell and Tucker (1997).

[(b)] Obligate Wetland (OBL): occur almost always (estimated probability >99%) in wetlands. Facultative Wetland (FACW): usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). Facultative Upland (FACU): usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%). Obligate Upland (UPL): occur almost always (estimated probability >99%) in non-wetlands.

Table 9.

Staff Gauge Readings, 2011
LCP Wetland Restoration Areas

Wetland A

Date	Reading on Gauge (feet)	0.0 Elevation (feet)	Water Elevation (feet)
5/20/11	1.50	378.84	380.34
6/3/11	1.40	378.84	380.24
6/17/11	1.27	378.84	380.11
7/7/11	1.28	378.84	380.12
7/29/11	0.90	378.84	379.74
8/17/11	1.45	378.84	380.29
8/30/11	1.46	378.84	380.30
9/27/11	1.34	378.84	380.18

Wetland B

Date	Reading on Gauge (feet)	0.0 Elevation (feet)	Water Elevation (feet)
5/20/11	2.12	374.16	376.28
6/3/11	1.94	374.16	376.10
6/17/11	1.78	374.16	375.94
7/7/11	1.68	374.16	375.84
7/29/11	1.26	374.16	375.42
8/17/11	1.68	374.16	375.84
8/30/11	1.76	374.16	375.92
9/22/11	2.00	374.16	376.16
9/27/11	2.00	374.16	376.16.

Table 10.

Wildlife Observed, 2011, LCP Wetland Restoration Areas

BIRDS[a]				
Common Name	**Scientific Name**	**LCP Wetland Restoration Areas**		
		Wetland A	**Wetland B**	**West Flume**
Canada Goose	*Branta canadensis*		X	
Mallard	*Anas platyrhynchos*		X	X
Pied-billed Grebe	*Podilymbus podiceps*		X	
Cedar waxwing	*Bombycilla cedrorum*	X	X	
Green Heron	*Butorides virescens*	X	X	X
Red-tailed Hawk	*Buteo jamaicensis*	f.o.[b]	f.o.	
Turkey vulture	*Cathartes aura*		f.o.	
Yellow warbler	*Dendroica petechiax*	X		
Killdeer	*Charadrius vociferus*	X	X	
Barn swallow	*Hirundo rustica*	X	X	X
Spotted Sandpiper	*Actitis macularius*		X	
Rock Pigeon	*Columba livia*	f.o.		
Mourning Dove	*Zenaida macroura*	X	X	X
Northern Flicker	*Colaptes auratus*	X	X	X
Willow Flycatcher	*Empidonax traillii*	X		
American Crow	*Corvus brachyrhynchos*	f.o.		
Tree Swallow	*Tachycineta bicolor*	X	X	X
American Robin	*Turdus migratorius*	X	X	X
Northern Mockingbird	*Mimus polyglottos*			X
European Starling	*Sturnus vulgaris*	X	X	X
Common Yellowthroat	*Geothlypis trichas*		X	
Song Sparrow	*Melospiza melodia*	X		
Red-winged Blackbird	*Agelaius phoeniceus*	X	X	X
Common Grackle	*Quiscalus quiscula*	X	X	X
American Goldfinch	*Carduelis tristis*	X	X	X

a. Common and scientific names according to AOU (1998) and supplements through 2008.
b. f.o. = fly over.

Table 10. (cont.)

AMPHIBIANS AND REPTILES[c]				
Common Name	**Scientific Name**	**LCP Wetland Restoration Areas**		
		Wetland A	**Wetland B**	**West Flume**
Gray Treefrog	*Hyla versicolor*		X	
American Bullfrog	*Lithobates catesbeianus*		X	
Northern Green Frog	*Lithobates clamitans melanota*	X	X	X
Northern Leopard Frog	*Lithobates pipiens*	X	X	X
Painted Turtle	*Chrysemys picta*		X	X

MAMMALS[d]				
Common Name	**Scientific Name**	**LCP Wetland Restoration Areas**		
		Wetland A	**Wetland B**	**West Flume**
Short-tailed Shrew[e]	*Blarina brevicauda*			
Deer Mouse[e]	*Peromyscus maniculatus*			
Meadow Vole[e]	*Microtus pennsylvanicus*		X	
Common Muskrat	*Ondatra zibethicus*	X	X	X
White-tailed Deer	*Odocoileus virginianus*	X		

c. Common and scientific names according to Crother *et al.* (2008).
d. Common and scientific names according to Whitaker and Hamilton (1998).
e. Collected during Bioassessment

Table 11.

Mammals, Fish, and Macroinvertebrates Collected during 2011 Bioassessment Surveys, LCP Wetland Restoration Area

MAMMALS

Common Name	**Scientific Name**
Short-tailed Shrew	*Blarina brevicauda*
Deer Mouse	*Peromyscus maniculatus*
Meadow Vole	*Microtus pennsylvanicus*

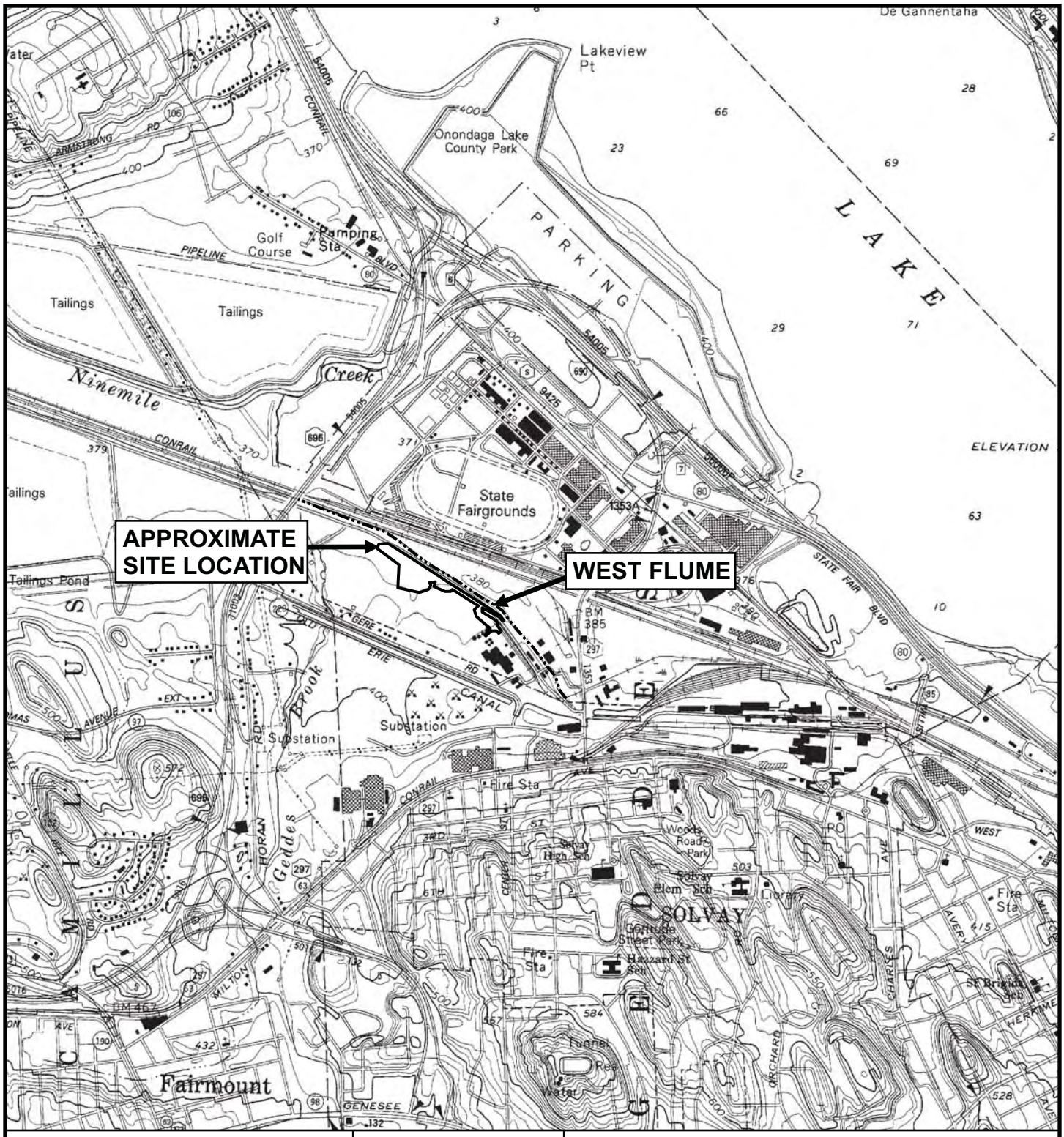
FISH

Common Name	**Scientific Name**
Creek Chub	*Semotilus atromaculatus*
Brook Stickleback	*Culaea inconstans*

MACROINVERTEBRATES

Common Name	**Invertebrate Order**
Crayfish	Decopoda
Dragonflies	Odonata
Snails	Gastropoda
Shrimp	Amphipoda
Giant Water Bug	Hemiptera
Beetles	Coleoptera

FIGURES



QUADRANGLE LOCATION

0 1000' 2000'

SCALE 1" = 2000'

NORTH

Figure 1. Site Location

LCP Bridge Street Restoration Area

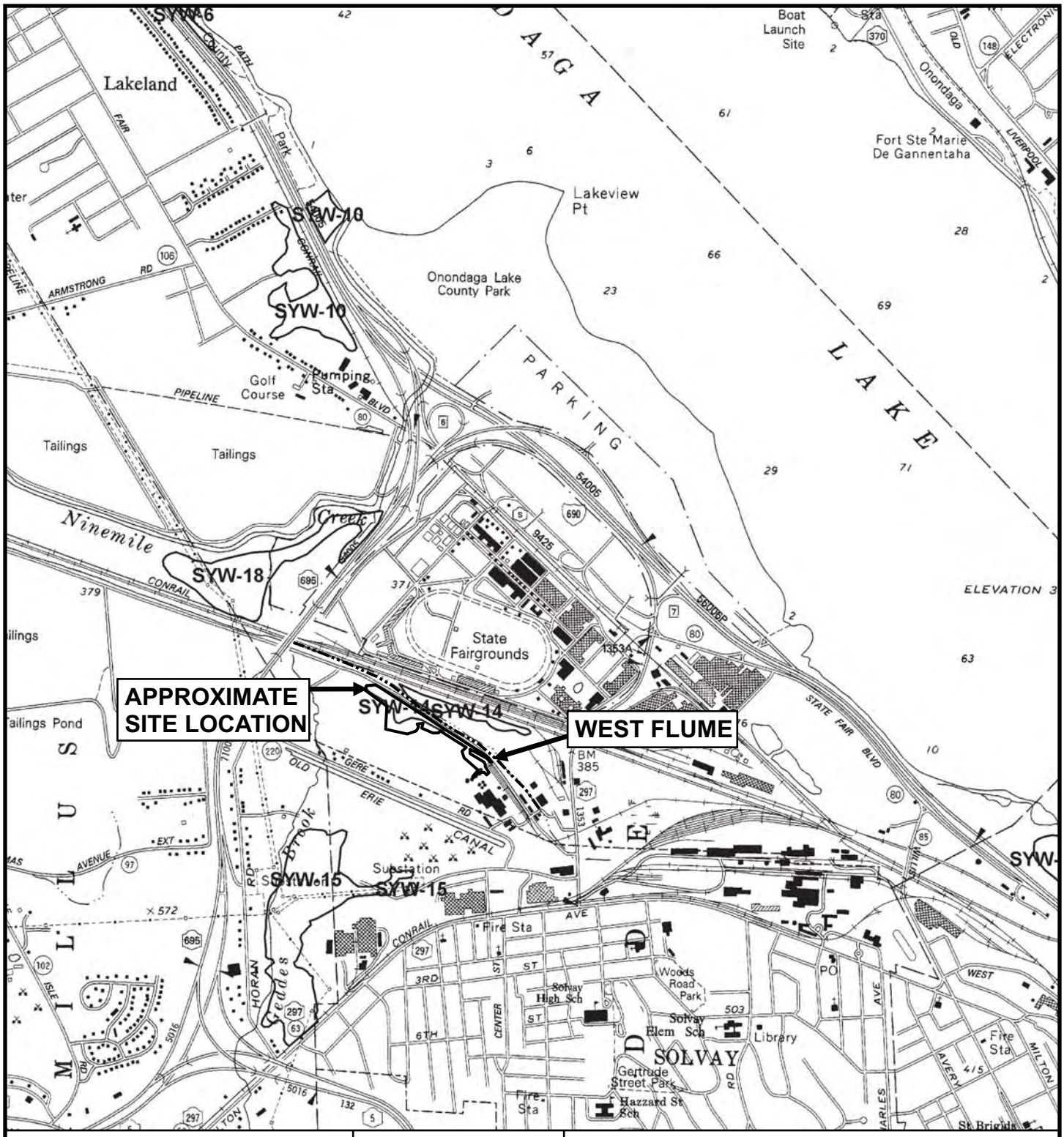
NYS DOT Topographic Map

Syracuse West Quadrangle

1990

Prepared by TERRESTRIAL ENVIRONMENTAL SPECIALISTS, Inc.

TES file: PAR-2682\2682_Monit_Rpt_2011_site_location_1.dsf\10-21-11



QUADRANGLE LOCATION

0 1000' 2000'

SCALE 1" = 2000'

NORTH

Figure 2. NYS Freshwater Wetlands Map

LCP Bridge Street Restoration Area

NYS Dept. of Environmental Conservation
cugir.mannlib.cornell.edu

Syracuse West Quadrangle
2007

Prepared by TERRESTRIAL ENVIRONMENTAL SPECIALISTS, Inc.

TES file: PAR-2682\2682_Monit_Rpt_2011_DEC_wetlands_2.dsf\10-21-11

NORTH

0 100' 200'

APPROXIMATE SCALE IN FEET

Aerial Photograph
obtained from
NYS GIS Clearinghouse

Figure Prepared by
Terrestrial Environmental
Specialists, Inc.

Figure 3.

**April 2006
Aerial Photograph
Showing
Remediation Work
(in progress)**

**LCP Bridge Street
Restoration Area**

TES file: PAR-2682\2682_Monit_Rpt_2011_Aerial_2006_Site_3.dsf\10-21-11

NORTH

0 100' 200'

APPROXIMATE SCALE IN FEET

Aerial Photograph
obtained from
NYS GIS Clearinghouse

Figure Prepared by
Terrestrial Environmental
Specialists, Inc.

Figure 3a.

**April 2009
Aerial Photograph
Showing
Remediation Work
(completed)**

**LCP Bridge Street
Restoration Area**

TES file: PAR-2682\2682_Monit_Rpt_2011_Aerial_2009_Site_3a.dsf\10-21-11

NORTH

Oblique Aerial Photograph provided by Parsons

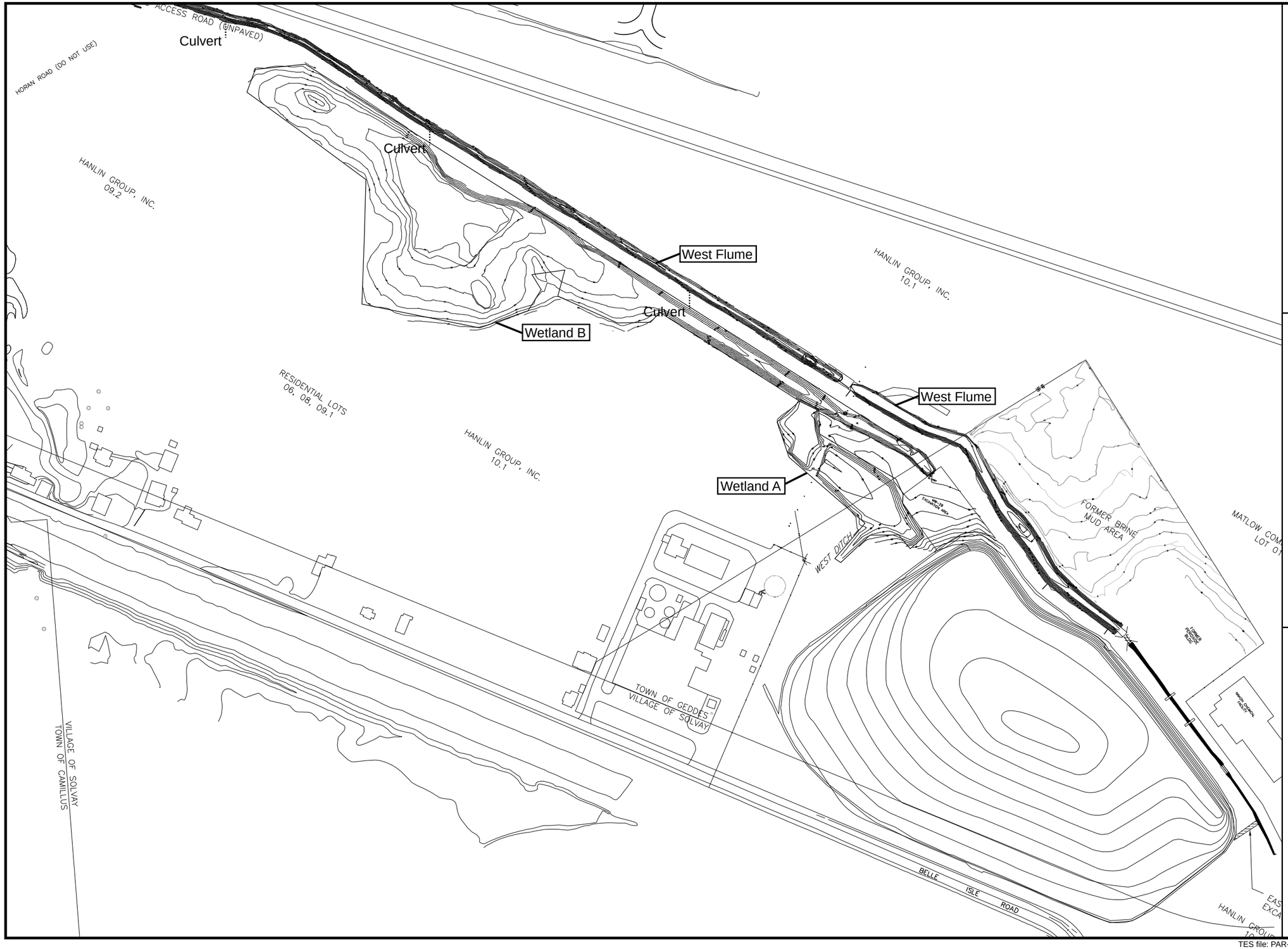
Figure Prepared by Terrestrial Environmental Specialists, Inc.

Figure 3b.

November 2008 Oblique Aerial Photograph

LCP Bridge Street Restoration Area

TES file: PAR-2682\2682_Monit_Rpt_2011_Oblique_Aerial_2008_3b.dsf\10-21-11



NORTH

0 125' 250'

APPROXIMATE SCALE IN FEET

Figure Prepared by Terrestrial Environmental Specialists, Inc.

Base Map Provided by Parsons

Figure 4.

Post Remediation Grading Plan

LCP Bridge Street Restoration Area

TES file: PAR-2682\2682_Monit_Rpt_2011_PostRem_Grading_4.dsf\10-21-11

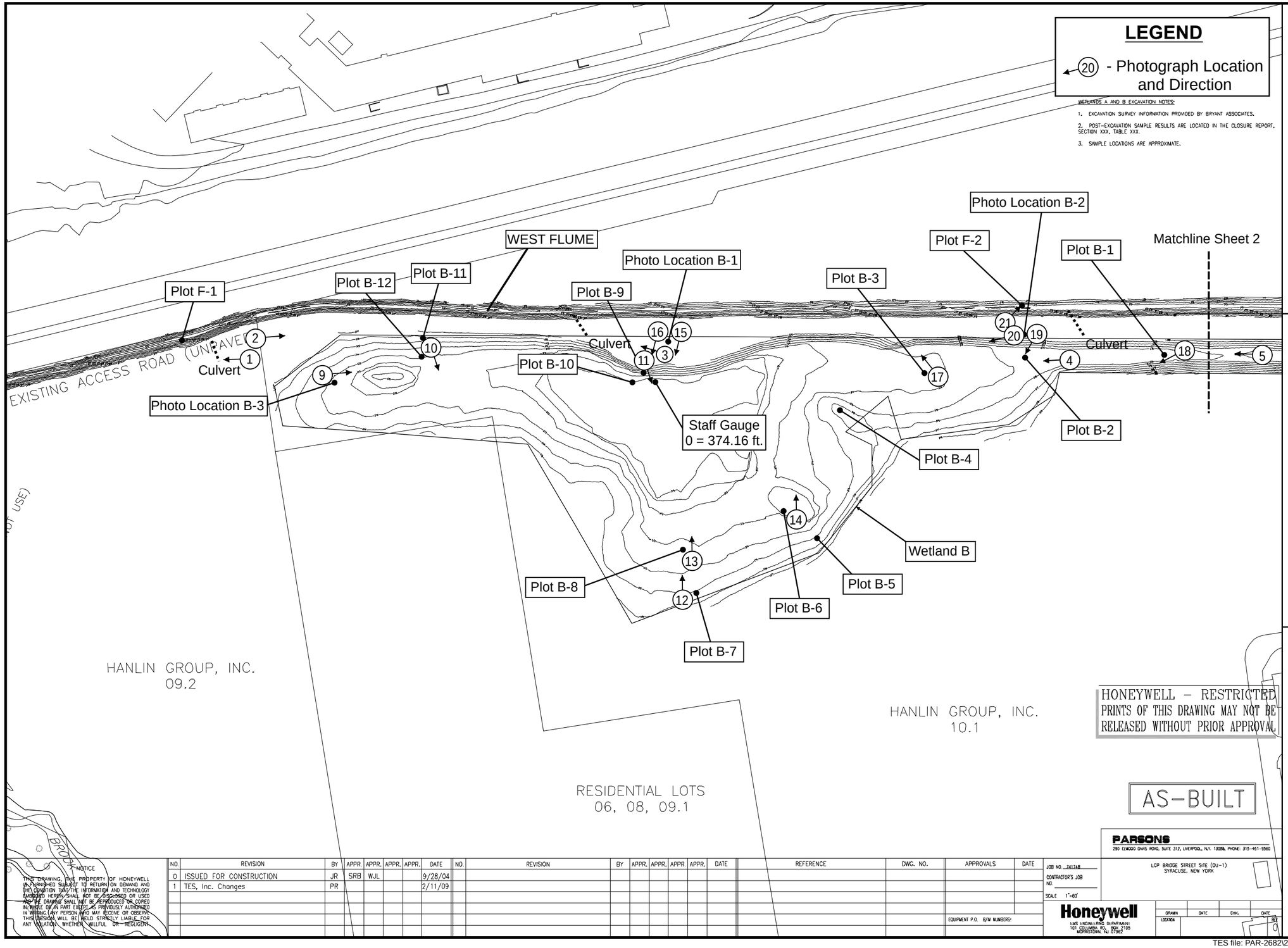


Figure Prepared by Terrestrial Environmental Specialists, Inc.

Base Map Provided by Parsons

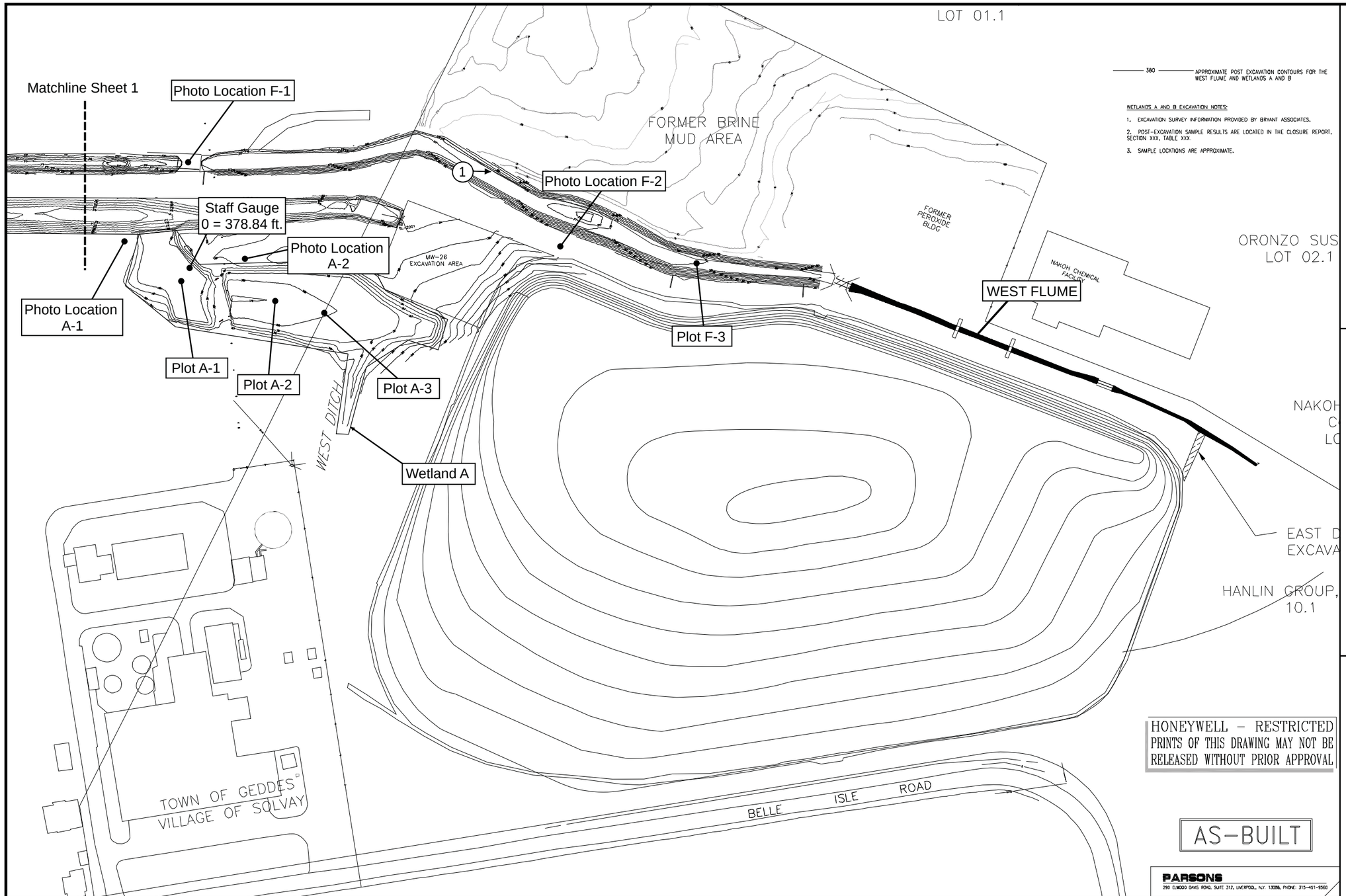
Figure 5.

Post Remediation Grading Plan with Locations of Staff Gauges,Sampling Plots, and Photograph Points

LCP Bridge Street Restoration Area

(Sheet 1 of 2)

TES file: PAR-2682\2682_Monit_Rpt_2011_PostRem_Locations_1of2_5.dsf\10-21-11



NORTH

0 75' 150'

APPROXIMATE SCALE IN FEET

Figure Prepared by Terrestrial Environmental Specialists, Inc.

Base Map Provided by Parsons

Figure 5.

Post Remediation Grading Plan with Locations of Staff Gauges,Sampling Plots, and Photograph Points

LCP Bridge Street Restoration Area

(Sheet 2 of 2)

NO.	REVISION	BY	APPR.	APPR.	APPR.	APPR.	DATE
0	ISSUED FOR CONSTRUCTION	JR	SRB	WJL			9/28/04
1	TES, Inc. Changes	PR					2/11/09

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

REFERENCE | DWG. NO. | APPROVALS | DATE

EQUIPMENT P.O. B/M NUMBERS:

JOB NO. 74374B
CONTRACTOR'S JOB NO.
SCALE 1"=60'

Honeywell
LMS ENGINEERING DEPARTMENT
101 COLUMBIA RD., BOX 2105
MORRISTOWN, NJ 07962

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

LCP BRIDGE STREET SITE (OU-1)
SYRACUSE, NEW YORK

DRAWN	DATE	CHK.	DATE
LOCATION			REV 0

TES file: PAR-2682\2682_Monit_Rpt_2011_PostRem_Locations_2of2_5.dsf\10-21-11