REMEDIAL DESIGN WORK PLAN
FOR THE ONONDAGA LAKE BOTTOM SUBSITE

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ACRONYMS AND ABBREVIATIONS

AMP	Ambient Monitoring Program
ARAR	Applicable or Relevant and Appropriate Requirements
BSQV	Bioaccumulation-Based Sediment Quality Value
CPOI	Chemical Parameters of Interest
FS	Feasibility Study
IDS	Initial Design Submittal
ILWD	In-Lake Waste Deposit
IRM	Interim Remedial Measure
MNR	Monitored Natural Recovery
NPL	National Priorities List
NAPL	Non-Aqueous Phase Liquids
NYSDEC	New York State Department of Environmental Conservation
OLP	Onondaga Lake Partnership
OM&M	Operation, Maintenance, and Monitoring
PDI	Pre-Design Investigation
PRG	Preliminary Remediation Goal
PSA	Preliminary Site Assessment
RA	Remedial Action
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
RD	Remedial Design
ROD	Record of Decision
SCA	Sediment Consolidation Area
SMU	Sediment Management Unit
SUNY ESF	State University of New York College of Environmental Science and Forestry
TBC	To Be Considered
USEPA	Environmental Protection Agency

EXECUTIVE SUMMARY

This Remedial Design Work Plan has been prepared on behalf of Honeywell International Inc. (Honeywell) and presents the activities and sequencing necessary to complete remedial design of the remedy selected in the Record of Decision (ROD) issued by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) Region 2 in 2005 for the Onondaga Lake Bottom subsite. The NYSDEC and Honeywell have agreed to conditions under which Honeywell will design and implement the selected remedy, as set forth in the Consent Decree (United States District Court, Northern District of New York, 2007) (89-CV-815). The selected remedy provides for:

- dredging and proper management of as much as approximately 2,653,000 cubic yards of contaminated sediments and wastes;
- construction of an isolation cap over an estimated 425 acres in shallower areas (the littoral zone);
- construction of a thin-layer cap over an estimated 154 acres in the deeper areas (the profundal zone);
- performance of a pilot study that evaluates methods to prevent the formation of methylmercury in the deeper areas;
- re-establishment of habitat impacted by implementation of the remedy and enhancement of habitat in certain near-shore areas;
- monitored natural recovery (MNR) in portions of the deeper areas (the profundal zone);
- implementation of institutional controls; and
- long-term operation, maintenance and monitoring.

Given the central role played by the lake in the surrounding community, Honeywell is strongly committed to the implementation of the selected remedy that will help restore this important resource and enhance the overall quality of life within the community. The overall goal for remedial design and construction is to achieve the remedial action objectives (RAOs) and preliminary remediation goals (PRGs) developed as part of the Onondaga Lake Feasibility Study (Parsons, 2004) and set forth in the ROD. RAOs are identifiable goals to protect human health and the environment. PRGs are specific goals to achieve the RAOs and address the three primary affected media within the lake: sediment, biological tissues, and surface water.

The selected remedy relies upon the control of upland areas that contribute or have contributed contamination to Onondaga Lake. Remediation of contaminant sources is underway at multiple upland sites. Honeywell, under supervision from the NYSDEC, is nearing completion of remediation at the former Linden Chemical and Plastics (LCP) Bridge Street site

which was once one of the primary sources of mercury to Onondaga Lake. In 2005, Honeywell also began the Willis/Semet interim remedial measure (IRM) which includes the construction and operation of a groundwater treatment plant and underground barrier wall along the southwest shoreline of Onondaga Lake to control ongoing releases of contaminated groundwater from upland sites/sources.

Honeywell has conducted extensive pre-design activities to support design of the selected remedy and to supplement data collected by Honeywell and by others for the Remedial Investigation (TAMS Consultants, 2002) from 1992 to 2002. Pre-design activities have included Feasibility Study (Parsons, 2004) analyses, design-related investigation activities, bench-scale tests, siting of the Sediment Consolidation Area (SCA), nitrate addition/oxygenation evaluations, cultural resource assessment, wetlands and floodplain assessment, IRM design and construction, and coordination with other lake programs/projects. Design-related investigation activities have been conducted since 2005 to accelerate the design process and include: geotechnical testing and a settlement pilot study at the SCA; geophysical surveys; sediment sampling for chemical and geotechnical analyses; in-situ geotechnical testing of sediments; surface water and porewater sampling and analysis; seepage meter and Geoprobe™ measurements; sediment cores and borehole drilling to evaluate groundwater discharge and delineate contaminant extent; and installation and monitoring of two meteorological stations. These activities have provided more than 400 sediment cores, 60 borings, 7,300 environmental samples, and 120,000 chemical and geotechnical analyses through 2007 to support design of the selected remedy. Additional pre-design activities will be conducted as necessary to support the remedial design.

Honeywell will design and construct the lake bottom remedy on an accelerated basis, to the extent possible, using expedited pre-design, design, and construction of critical path components. The remedial design will include the preparation of four initial design submittals (IDSs):

- SCA Civil and Geotechnical;
- Dredging, SCA, and Water Treatment Operations;
- Sediment Cap and Dredge Area and Depth; and
- Thin-layer Capping, Nitrate Addition/Oxygenation, and MNR in Sediment Management Unit (SMU)-8.

Following completion of each IDS, Honeywell will prepare subsequent design submittals (e.g., intermediate and final designs) and specifications to construct the remedial design for the lake bottom. Subsequent design submittals will include supporting plans to the remedial design, such as a Health and Safety Plan. The remedial design process and sequencing of submittals allows for the acceleration of critical path activities including construction of the water (supernatant) treatment facility and the SCA and initiation of dredging within five years from entry of the Consent Decree.

Several organizations will be directly involved in the performance and review of the remedial design. Honeywell has retained professional consultants and subject matter experts to

perform the technical, engineering, and analytical aspects of the remedial design, including preparation of the design submittals. The NYSDEC and USEPA will review and approve plans, drawings, reports, and schedules submitted for the pre-design, remedial design, and remedial action. The NYSDEC will be assisted by retained professional consultants to assist in the oversight of pre-design investigation activities and remedial design review. Honeywell will distribute documents approved or accepted by NYSDEC within 14 days to the six public document repositories located in Syracuse, New York and vicinity.

Honeywell is committed to informing and involving the public during the Onondaga Lake remediation program. Honeywell has prepared a Citizen Participation Plan that provides a formal yet flexible plan for communication with the public during the Onondaga Lake remediation program.

SECTION 1

INTRODUCTION

This Remedial Design Work Plan has been prepared on behalf of Honeywell International Inc. (Honeywell) and presents the process to design the remedy for the Onondaga Lake Bottom subsite. The lake bottom is on the New York State Registry of Inactive Hazardous Waste Sites and is part of the Onondaga Lake National Priorities List (NPL) Site. Honeywell entered into a Consent Decree (United States District Court, Northern District of New York, 2007) (89-CV-815) with the New York State Department of Environmental Conservation (NYSDEC) to implement the selected remedy for Onondaga Lake as outlined in the Record of Decision (ROD) issued on July 1, 2005. The Consent Decree is the result of 12 years and 90,000 hours of intensive effort by world-class scientists, engineers and technicians working in cooperation with NYSDEC and the United States Environmental Protection Agency (USEPA). The following documents are appended to the Consent Decree: ROD, Explanation of Significant Differences, Statement of Work, and Environmental Easement.

The primary objective of this work plan is to provide the framework for implementing remedial design activities for the Lake Bottom subsite that is consistent with the Consent Decree. The Consent Decree requires this Remedial Design Work Plan to include the elements listed below.

- Description of remedial design activities with a schedule for performing these activities.
- Summary of pre-design investigation (PDI) field activities.
- Discussion of the need for further design-related investigation activities and need for a PDI work plan (including a quality assurance project plan and field sampling plan) and schedule for such activities.
- Plan for physical security and posting of the site.
- Health and Safety Plan to protect persons at and in the vicinity of the site during the remedial design program and during and after completion of remedial construction.
- Description of the remedial design, including remedial goals, and the means for implementing each element of the remedy to achieve those goals.
- Schedule for submitting remedial design documents.

Additionally, this Remedial Design Work Plan was developed consistent with applicable federal and state guidance documents for remedial design for a hazardous waste site (NYSDEC, 2002; USEPA, 1995a and b; and USEPA, 2005).

1.1 ONONDAGA LAKE SUBSITE DESCRIPTION

Onondaga Lake is a 4.6 square mile (3,000 acre) lake located in Central New York State immediately northwest of the City of Syracuse. The lake is approximately 4.5 miles long and 1 mile wide, with an average water depth of 36 ft. The lake has two deep basins, a northern basin and a southern basin, that have maximum water depths of approximately 61 and 65 ft, respectively. The basins are separated by a saddle region at a water depth of approximately 56 ft. Most of the lake has a broad nearshore shelf with water depths less than 12 ft. This nearshore shelf is bordered by a steep offshore slope in water depths of 12 to 24 ft (TAMS Consultants, 2002).

Ninemile Creek and Onondaga Creek are the two largest tributaries to Onondaga Lake. Other tributaries in a clockwise direction from the southeast section of the lake include Ley Creek, Harbor Brook, the East Flume, Tributary 5A, Sawmill Creek, and Bloody Brook (see Figure 1.1). In addition to the tributary streams, the treated effluent from the Onondaga County Metropolitan Wastewater Treatment Plant (Metro), located between Onondaga Creek and Harbor Brook, provides a significant portion of the water entering the lake.

Central New York State has experienced significant growth in the twentieth century. As a result, the area around Onondaga Lake is mostly urban. The City of Syracuse is located at the southern end of Onondaga Lake, and numerous towns, villages, and major roadways surround the lake (see Figure 1.1). The eastern shore of Onondaga Lake is urban and residential, while the northern shore is dominated by parkland, wooded acres, and wetlands. The northwest upland areas in Liverpool and Lakeland are mainly residential, with interspersed urban structures and several undeveloped areas. Much of the western and southern lakeshore is covered by wastebeds that received wastes generated from Honeywell's former Allied Signal, Solvay operations. Urban centers and industrial zones in Syracuse and Solvay dominate the landscape surrounding the southern and eastern shores of Onondaga Lake from approximately the New York State Fairgrounds south to Ley Creek.

For investigation and remediation purposes, the sediments in the lake are divided into two regions: the littoral zone (shallower area) and profundal zone (deeper area). The littoral zone includes sediments along the shoreline in less than 30 ft (9 m) of water that are in contact with the epilimnion – the uppermost warm-water layer. The profundal zone includes sediments in the deep basins in more than 30 ft (9 m) of water that are in contact with the hypolimnion – the deeper, colder, and denser water layer. Additionally, the site has been divided into eight Sediment Management Units (SMUs) based on water depth, source of water entering the lake, and physical, ecological, and chemical characteristics (NYSDEC and USEPA, 2005). SMUs 1 through 7 are located in the littoral zone of the lake where most aquatic vegetation and aquatic life reside, while SMU 8 consists of sediment in the profundal zone (see Figure 1.2).

1.2 REMEDIATION OBJECTIVES AND GOALS

Remedial action objectives (RAOs) are identifiable goals to protect human health and the environment. RAOs for Onondaga Lake, as per the ROD, are listed below.

- "RAO 1: To eliminate or reduce, to the extent practicable, methylation of mercury in the hypolimnion."
- "RAO 2: To eliminate or reduce, to the extent practicable, releases of contaminants from the in-lake waste deposit (ILWD) and other littoral areas around the lake."
- "RAO 3: To eliminate or reduce, to the extent practicable, releases of mercury from profundal (SMU 8) sediments."
- "RAO 4: To be protective of fish and wildlife by eliminating or reducing, to the extent practicable, existing and potential future adverse ecological effects on fish and wildlife resources, and to be protective of human health by eliminating or reducing, to the extent practicable, potential risks to humans."
- "RAO 5: To achieve surface water quality standards, to the extent practicable, associated with chemical parameters of interest (CPOIs)" (NYSDEC and USEPA, 2005, p. 35).

To achieve the RAOs, preliminary remediation goals (PRGs) were developed to provide specific goals to address the three primary affected media within the lake: sediment, biological tissue, and surface water. PRGs for Onondaga Lake, as per the ROD, are listed below.

- "PRG 1: Achieve applicable and appropriate sediment effects concentrations (SECs) for CPOIs and the bioaccumulation-based sediment quality value (BSQV) of 0.8 mg/kg for mercury, to the extent practicable, by reducing, containing, or controlling CPOIs in profundal and littoral sediments."
- "PRG 2: Achieve CPOI concentrations in fish tissue that are protective of humans and wildlife that consume fish. This includes a mercury concentration of 0.2 mg/kg in fish tissue (fillets) for protection of human health based on the reasonable maximum exposure scenario and USEPA's methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms of 0.3 mg/kg in fish tissue. This also includes a mercury concentration of 0.14 mg/kg in fish (whole body) for protection of ecological receptors. These values represent the range of fish tissue PRGs."
- "PRG 3: Achieve surface water quality standards, to the extent practicable, associated with CPOIs" (NYSDEC and USEPA, 2005, p. 35).

PRG 1 addresses RAOs 1 through 4. PRG 2 primarily addresses RAO 4. PRG 3 addresses RAO 5.

1.3 REMEDY OF RECORD

The ROD for the lake bottom presents the remedy selected by NYSDEC and USEPA for addressing the RAOs and PRGs presented in Section 1.2 above. The Statement of Work, presented as Appendix C of the Consent Decree, further describes design-related elements for the implementation of the remedy, such as the development of dredging areas and volume; isolation cap areas, models and components; profundal zone (SMU 8); management of dredged sediments; water treatment system; and design and construction schedule.

Major components of the selected remedy, set forth in the ROD and Statement of Work, are summarized as follows (United States District Court, 2007 – appendices to the Consent Decree):

- "Dredging of as much as an estimated 2,653,000 cubic yards (cy) of contaminated sediment/waste from the littoral zone in Sediment Management Units (SMUs) 1 through 7 to a depth that will prevent the loss of lake surface area, ensure cap effectiveness, remove non-aqueous-phase liquids (NAPLs), reduce contaminant mass, allow for erosion protection, and re-establish the littoral zone habitat. Most of the dredging will be performed in the ILWD (which largely exists in SMU 1) and in SMU 2."
- Dredging, as needed, of an additional 3.3 ft in the ILWD to remove materials within areas of hot spots (to improve cap effectiveness) and additional dredging, as needed, to ensure stability of the cap.
- "Placement of an isolation cap over an estimated 425 acres of SMUs 1 through 7."
- "Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. In addition, the remedy for SMUs 1 and 2 will rely upon the proper operation of the hydraulic control system, which is being designed under interim remedial measures (IRMs) presently underway at the Semet Residue Ponds, Willis Avenue, and Wastebed B/Harbor Brook subsites to control migration of contamination to the lake via groundwater from the adjacent upland areas."
- "Placement of a thin-layer cap over an estimated 154 acres of the profundal zone."
- The majority of the "dredged sediment will be placed in one or more Sediment Consolidation Areas (SCAs), which will be constructed on one or more of Honeywell's Solvay wastebeds that historically received process wastes from Honeywell's former operations. The containment area will include, at a minimum, the installation of a liner, a cap, and a leachate collection and treatment system."
- "Treatment of water generated by dredging and sediment handling processes to meet NYSDEC discharge limits."
- "Completion of a comprehensive lake-wide habitat restoration plan."
- "Habitat reestablishment will be performed consistent with the lakewide habitat restoration plan in areas of dredging/capping."

- "A pilot study will be performed to evaluate the potential effectiveness of oxygenation at reducing the formation of methylmercury in the water column, while preserving the normal cycle of stratification within the lake. An additional factor which will be considered during the design of the pilot study will be the effectiveness of oxygenation at reducing fish tissue methylmercury concentrations. If supported by the pilot study results, the pilot study will be followed by full-scale implementation of oxygenation in SMU 8. Furthermore, potential impacts of oxygenation on the lake system will be evaluated during the pilot study and/or the remedial design of the full-scale oxygenation system." In addition, as discussed in the Statement of Work, a study will be performed to determine if nitrification can effectively reduce formation of methyl mercury in the water column while preserving the normal cycle of lake stratification. If NYSDEC determines from this study that nitrification is effective and appropriate, a nitrification program will be implemented in lieu of oxygenation."
- Monitored natural recovery (MNR) in SMU 8 to achieve the mercury PEC (probable effect concentration) of 2.2 milligrams per kilogram (mg/kg or part per million) in the lake's profundal zone (where water depths exceed 9 meters or 30 feet) and to achieve the bioaccumulation-based sediment quality value (BSQV) for mercury of 0.8 mg/kg on an area-wide basis, within 10 years following the remediation of upland sources, dredging and/or isolation capping of littoral sediment, and initial thin-layer capping in the profundal zone. "An investigation will be conducted during the remedial design to refine the application of an MNR model and determine any additional remedial measures (e.g., additional thin-layer capping) needed in the profundal zone."
- "Investigation during the remedial design to determine the appropriate area-wide basis for the application of the BSQV of 0.8 mg/kg. During remedy implementation, additional remedial measures may be needed (e.g., thin-layer capping) to meet the BSQV on an area-wide basis."
- "Implementation of institutional controls including the notification of appropriate governmental agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy."
- "Implementation of a long-term operation, maintenance, and monitoring (OM&M) program to monitor and maintain the effectiveness of the remedy".

Annually, it will be certified that the institutional controls are in place and that Honeywell is performing remedy-related OM&M.

A draft Phase 1A Cultural Resource Assessment for various areas including Onondaga Lake was prepared for the selected remedy. "If, based upon the results of this Cultural Resource Assessment, a Phase 1B Cultural Resource Assessment (to locate culturally sensitive areas) is determined necessary, it would be performed during the remedial design phase" (NYSDEC and USEPA, 2005, p. iii).

"The selected remedy also includes habitat enhancement, which is an improvement of habitat conditions in areas where CERCLA contaminants do not occur at levels that warrant active remediation, but where habitat impairment due to stressors has been identified as a concern. Habitat enhancement will be performed along an estimated 1.5 mi (2.4 km) of shoreline (SMU 3) and over approximately 23 acres (SMU 5). Habitat enhancement will be performed consistent with the lakewide habitat restoration plan" (NYSDEC and USEPA, 2005, p. iii-iv). The lakewide habitat restoration plan is hereafter referred to as Remedial Design Elements for Habitat Restoration, which is described in Sections 2 and 3 of this Work Plan.

The selected remedy addresses all areas of the lake where the surface sediments exceed a mean probable effect concentration quotient of 1 or the mercury probable effect concentration of 2.2 milligrams per kilogram (mg/kg). "The selected remedy will also attain a 0.8 mg/kg BSQV for mercury on an area-wide basis for the lake and other applicable areas of the lake to be determined during the remedial design. The selected remedy is also intended to achieve lakewide fish tissue mercury concentrations ranging from 0.14 mg/kg, which is for protection of ecological receptors, to 0.3 mg/kg, which is based on EPA's methylmercury National Recommended Water Quality criterion for the protection of human health for the consumption of organisms." (NYSDEC and USEPA, 2005, p. 73). The depth of surface sediments will be defined as part of upcoming design efforts. If the selected remedy does not at least achieve the range of fish tissue PRGs specified in the ROD, the remedy will be reevaluated at a minimum as part of the five-year review under CERCLA, and could be addressed through a modification of the ROD.

An evaluation was performed to assess potential locations for building and operating an SCA to contain sediment removed from Onondaga Lake during the remedial action, as documented in *Onondaga Lake SCA Siting Evaluation* (Parsons, 2006a). Each of Honeywell's Solvay wastebeds was evaluated as a potential location for an SCA based on accessibility, estimated capacity, current and future site use, geotechnical considerations, and potential community impacts. Based on evaluation results, Wastebed 13 was selected for building and operating an SCA (Figure 1.2). The SCA will be designed, constructed, operated and maintained in accordance with the substantive requirements of NYSDEC Regulations Part 360, Section 2.14(a) (industrial monofills).

The NYSDEC and USEPA issued an Explanation of Significant Differences as Appendix B of the Consent Decree to specify a modification to the selected remedy documented in the ROD. Based on PDI data and a stability evaluation, there was significantly less NAPL-impacted material beneath the lake in SMU 2 than was assumed during the FS and ROD, and removing this material could result in instability of the adjacent shoreline. Therefore, the alignment of the Willis/Semet IRM barrier wall (Willis portion) was moved off-shore immediately beyond the farthest extent of pooled NAPLs within the lake. In addition, recovery wells will be installed landward of the new barrier wall, between the barrier wall and the causeway. Existing upland areas adjacent to Onondaga Lake will be converted to new aquatic habitat to mitigate the loss of habitat resulting from placement of the barrier wall off-shore.

1.4 DESCRIPTION OF UPLAND SITES/SOURCES

Onondaga Lake and several areas upland that contribute or have contributed contamination to the lake system are part of USEPA's National Priorities List (NPL) Onondaga Lake site. The NYSDEC and USEPA have, to date, organized the work for the Onondaga Lake NPL site into eight NPL subsites, five of which are Honeywell's responsibility (see Figure 1.1). In accordance with various agreements, Honeywell has assumed responsibility for the following four NPL subsites in addition to the lake bottom NPL subsite. Whether a site is subject to a Remedial Investigation/Feasibility Study (RI/FS), Preliminary Site Assessment (PSA), Remedial Design/Remedial Action (RD/RA), or closure is also indicated below:

- Linden Chemical and Plastics (LCP) Bridge Street Operable Unit No. 1 (remediated and now subject to closure),
- Semet Residue Ponds (subject to a RI/FS and RD/RA),
- Willis Avenue (subject to a RI/FS), and
- Wastebed B/Harbor Brook (subject to a RI/FS).

The Geddes Brook/Ninemile Creek site, which is an operable unit of the lake bottom subsite, is subject to a RI/FS.

In addition to the Onondaga Lake NPL subsites, there are state-lead sites for which Honeywell has assumed responsibility in accordance with agreements:

- Ballfield (subject to a RI/FS),
- LCP Bridge Street OU-2 (subject to a RI/FS),
- Mathews Avenue (subject to a PSA),
- Wastebeds 1 through 8 (subject to a RI/FS),
- Wastebeds 9 through 15 (subject to closure), and the
- Dredge Spoils Area (subject to a PSA).

Interim remedial measures (IRMs) are at present or are anticipated to be elements of remedies for the following sites: Willis/Semet (shoreline barrier wall and groundwater treatment plant), Wastebed B/Harbor Brook (shoreline barrier wall extension and remediation of the East Flume), and Geddes Brook/Ninemile Creek (removal of sediment and floodplain soils from the lowermost section of Geddes Brook).

The ROD describes the importance of controlling upland sources of contamination to the lake system. The ROD states "The remediation of the Onondaga Lake subsite will need to be coordinated with upland remedial activities. The control of contamination migrating to the lake from various upland sites (e.g., Willis Avenue, Semet Residue Ponds, Wastebed B/Harbor Brook, LCP Bridge Street, and Geddes Brook/Ninemile Creek) is an integral part of the overall cleanup of Onondaga Lake. To prevent the recontamination of lake sediments, active sources of

contamination to a given portion of the lake will need to be shut off prior to performing cleanup activities in that area of the lake. For example, the hydraulic control systems which are being installed/operated as part of the Wastebed B/Harbor Brook and Willis/Semet Barrier IRMs will address the ongoing releases of contaminants from these upland areas to SMUs 1 and 2, respectively. These systems will need to be constructed and in operation prior to cleanup activities commencing in this part of the lake" (NYSDEC and USEPA, 2005, p. 80).

Given that these active upland sources of contamination will need to be shut off prior to dredging in a respective area of the lake, Honeywell is drafting a schedule for remedial activities for various upland sites, as well as the lake. As the remedial design proceeds, NYSDEC and Honeywell will provide the public with projected milestone dates for performing remedial activities in the lake, as well as at the various upland sites.

Honeywell has made significant progress with the remediation of upland sites. Honeywell has completed construction of the remedy at the LCP site (Operable Unit No. 1) in the Town of Geddes, a former Allied Chemical property that was one of the primary sources of mercury contamination to Onondaga Lake. Under direction of the NYSDEC, the cleanup program at the LCP site involved a combination of mercury removal from soil on the former plant property; excavation of contaminated sediments in surrounding areas; installation of an on-site groundwater collection system; and the construction of a five-story deep, underground cut off wall to prevent any future contaminant migration from the site. As part of the remediation, Honeywell has removed 15,300 pounds (nearly eight tons) of mercury from plant property through "soil washing." The mercury was recycled and the remaining soil was consolidated and capped at the LCP site. Remediation and restoration activities at the LCP site, with the exception of the permanent cover/cap, were completed in 2007. Groundwater collection at the LCP site is ongoing. The permanent cover/cap will be placed in the future as part of the site closure effort.

Honeywell has also made significant progress with installing a hydraulic barrier wall and groundwater treatment plant, as part of the Willis/Semet Barrier IRM, to prevent contaminated groundwater from entering the lake. Approximately 1,200 feet of an underground barrier wall (the Semet portion), constructed of interlocking steel panels, and was installed along the southwest shoreline of Onondaga Lake in 2006 as part of an IRM. Additionally, Honeywell completed construction of a groundwater treatment plant in 2006, one year ahead of schedule, to collect, process, and treat contaminated groundwater that will accumulate behind the underground barrier wall. Installation of an additional 1,600 feet of nearshore underground barrier wall (the Willis portion of the IRM) began during the summer of 2008.

1.5 OVERVIEW OF REMEDIAL DESIGN REQUIREMENTS

The primary objective of the remedial design is to develop plans and specifications for implementing the selected remedy consistent with the Consent Decree. Remedial design requirements presented in Consent Decree are quoted below.

- "A detailed description of remedial goals for the site, as set forth in the ROD";

- "A detailed description of each element of the remedy and the means by which each element will be implemented to achieve the remedial goals for the site…";
- " 'Biddable Quality' documents for the remedial design including, but not limited to, documents and specifications prepared, signed, and sealed by a professional engineer. These plans shall be consistent with all applicable local, state, and federal laws, rules, and regulations";
- "A detailed time schedule to implement the remedial design";
- "The parameters, conditions, procedures, and protocols to determine the effectiveness of the remedial design, including a schedule for periodic sampling of all relevant environmental media, on-site and off-site";
- "A description of operation, maintenance, and monitoring ('OM&M') activities to be undertaken at and in the vicinity of the Site, which details the operation and maintenance procedures to be employed during system startup as well as on a long-term basis, and which describes the long-term OM&M strategy and schedule";
- "A contingency plan to be implemented if any element of the remedial design, when implemented, fails to achieve any of its objectives or otherwise fails to protect human health or the environment, to ensure that such objectives and protections are achieved ('Remedial Program Contingency Plans')"; and
- "A citizen participation plan which incorporates appropriate activities outlined in the NYSDEC's publication, *Citizen Participation in New York's Hazardous Waste Site Remediation Program- A Guidebook*, dated June 1998, and any subsequent revisions thereto, and 6 NYCRR Part 375" (United States District Court, Northern District of New York, 2007, paragraph 29).

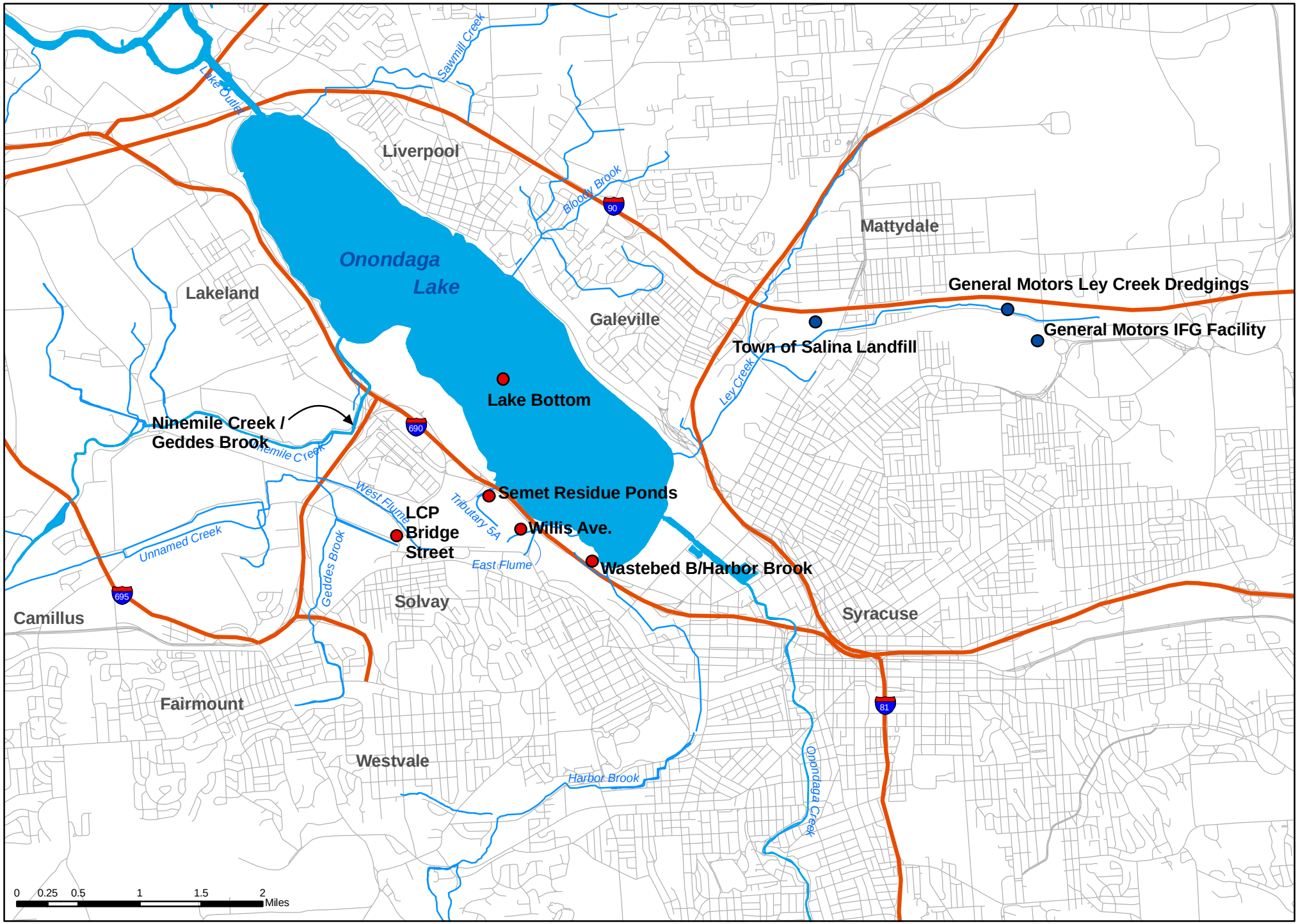
Specific activities to accomplish the remedial design requirements, thus achieving the primary remedial design objective, are described within this Work Plan.

1.6 WORK PLAN ORGANIZATION

This Remedial Design Work Plan is organized into six sections and two appendices.

- Section 1: Introduction – presents background information, project objectives, and remedial goals for the site.
- Section 2: Pre-Design Activities to Date – describes pre-design activities conducted to date by Honeywell as well as other monitoring efforts that may be of value during the remedial design.
- Section 3: Future Design Related Activities - presents available information about objectives and plans for further PDI work.
- Section 4: Remedial Design Process – describes the engineering design processes and deliverables to be produced to address each element of the selected remedy as well as major milestones and dates of the remedial program.

- Section 5: Remedial Design Management – describes the project management approach, including remedial design organization, project communication, document management, quality assurance, health and safety, physical security, regulatory requirements, and citizen participation as part of the remedial design process.
- Section 6: References – lists the references used to prepare this work plan and provides a glossary of terms.
- Appendix A: Regulatory Requirements – provides a preliminary guide for involvement of each local, state, federal, and regulatory agency with jurisdiction over implementing at least a portion of the selected remedy.
- Appendix B: Outline for Remedial Design Elements for Habitat Restoration Plan – based on work initiated between Honeywell and NYSDEC to describe habitat restoration and enhancement measures to be included as part of the lake remediation effort.



Honeywell NPL Site

Non-Honeywell NPL Site

Onondaga Lake Area and NPL Subsites

Figure 1.1

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