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REMEDIAL ACTION COMPLETION REPORT

Buffalo Outer Harbor/Radio Tower Area
Buffalo, New York

Prepared for:

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1.0 INTRODUCTION

Remedial Engineering, P.C. (Remedial Engineering) and Roux Associates, Inc. (Roux Associates), have prepared this "Remedial Action Completion Report" (RACR) to document remediation activities performed at the Buffalo Outer Harbor/Radio Tower Area (Site) in the City of Buffalo, Erie County, New York, on behalf of Honeywell International, Inc. (Honeywell). The remediation activities were conducted pursuant to an Order on Consent (Index No. B9-0233-88-07) (NYSDEC, 2003b) entered into by Honeywell with the New York State Department of Environmental Conservation (NYSDEC), the Record of Decision (ROD) (NYSDEC, 1999), and the Explanation of Significant Difference (ESD) dated January 2003 (NYSDEC, 2003a). The work was performed in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan dated March 21, 2003 (Remedial Engineering, 2003), as amended. This RACR has been prepared in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

The RD/RA Work Plan was intended to be flexible and dynamic to respond to field conditions as they were encountered. Therefore, during the course of the work, several field decisions were made (in consultation with the NYSDEC), that modified the details by which the RD/RA Work Plan was implemented. All proposed field changes were communicated to the NYSDEC (verbally in the field, by telephone, etc.) for their approval prior to implementation, and properly documented.

The remedial activities, including two rounds of *in situ* chemical oxidation followed by *in situ* stabilization of nitrobenzene impacted soil, were performed from June 23, 2003 through December 10, 2003 by Remedial Construction (RECON). Approximately 1,680 cubic yards of treated, stabilized soil was taken to the Alltift landfill site to stabilize material as part of closure action for that site. A soil cover system was installed from August 31, 2004 to September 3, 2004. Roux Associates provided field oversight of all of the remedial activities under the direction of Remedial Engineering, P.C. This RACR summarizes the work performed, the methodologies used, and any NYSDEC-approved modifications with respect to the scope of

work. This report certifies compliance with the requirements of the approved RD/RA Work Plan (as modified). The remainder of the RACR is organized as follows:

- Section 2.0 presents site background information;
- Section 3.0 presents a summary of selected remedy;
- Section 4.0 presents a description of the remediation activities;
- Section 5.0 presents the operation, maintenance and monitoring program; and
- Section 6.0 presents the engineer's certification.

2.0 SITE BACKGROUND INFORMATION

The following sections provide background information regarding the Site.

2.1 Site Location and Description

The Site is located in the southeast corner of a larger parcel of land known as the Buffalo Outer Harbor property (Figure 1). The Site is located in the vicinity of the Niagara Frontier Transportation Authority (NFTA) communications radio tower. The NFTA owned property is bordered to the east by Fuhrmann Boulevard and to the west by Lake Erie (Figure 2). The Site is currently vacant and consists of weeds, grasses and trees.

2.2 Site History and Background

In the early 1800s, the Lake Erie shoreline was located east of Fuhrmann Boulevard and the present day Route 5. In about 1840, a sea wall was constructed along the shoreline approximately at the location of Route 5. From approximately 1865 to 1890, an outer harbor break wall was constructed approximately 2,000 feet offshore. During this period, the area near the foot of Michigan Avenue was occupied by numerous railroad facilities and storage yards. The Buffalo Outer Harbor property is the result of filling activities that occurred over the past 100 years. Fill material, including incinerator ash, casting sands, blast furnace slag, dredged lake spoils and miscellaneous construction and demolition debris comprising concrete, brick, wood, glass, plastic, etc. were disposed in the area, forming the land mass which is known as the Buffalo Outer Harbor property.

2.3 Remedial Investigation and Feasibility Study

The entire Buffalo Outer Harbor property was listed by the NYSDEC as a Class 2 Inactive Hazardous Waste Disposal Site on the Registry of Inactive Hazardous Waste Disposal Sites (Registry) in the early 1990s. To characterize environmental conditions at the Buffalo Outer Harbor property, a Remedial Investigation and Feasibility Study (RI/FS) was completed by the NYSDEC in two phases, May through November 1994 and June 1995 (Dvirka and Bartilucci Engineers, 1995).

The key results are summarized below:

- The RI/FS found soil (fill) and groundwater contamination in the Radio Tower area Site that exceeded applicable Standards, Criteria and Guidelines (SCGs) for the Site.

- With respect to soil (fill), the RI/FS found elevated concentrations of VOCs and SVOCs, as well as metals. The soil contamination was associated with a zone of stained subsurface soils (*"stained with a shoe polish like sludge"* [ROD; pg. 8]) that were encountered at an approximate depth from 8 to 20 feet below grade.

- The most prominent contaminant (from a concentration standpoint) encountered in these soils was nitrobenzene, which was detected at concentration levels as high as 13,000 milligrams per kilogram (mg/kg), or parts per million (ppm). Toxicity Characteristic Leaching Procedure (TCLP) testing results indicated that these soils would be a characteristic hazardous waste, based upon the leachable concentrations of nitrobenzene measured.

- The RI/FS also found elevated levels of select VOCs and SVOCs in groundwater. However, the NYSDEC concluded that *"the contamination is localized and groundwater flow is limited by the minimal hydraulic gradients present in this area of lake bottom and generally low permeability of fill material. Sample results from downgradient monitoring wells verify that groundwater contamination is not readily migrating at this time"*(ROD; pg. 9).

Based upon the results of the RI/FS, in1997 the NYSDEC delisted over 100 acres of the property from the Registry. The Radio Tower Area Site was found by the NYSDEC *"to contain a significant and consequential amount of hazardous waste that requires further action"* (ROD; pg. 7), and therefore remained on the Registry.

2.4 Record of Decision

Following the RI/FS, a Record of Decision (ROD) for the Site was issued by the NYSDEC in March 1999 to select the remedial action. The remedy selected in the ROD consisted of the excavation and aerobic/anoxic treatment of the nitrobenzene-contaminated soils on Site.

According to the ROD, the selected remedial goals for the Site were as follows:

- Prevent or reduce, to the extent possible, the potential for direct contact, exposure (dermal absorption, inhalation and incidental ingestion) with contaminated surface soils and subsurface soils in the Radio Tower Area.

- Reduce, to the extent practicable, adverse impacts to groundwater from contaminated soils.

- Prevent or reduce, to the extent practicable, the migration of contaminants through groundwater to surface water.

- Allow for the productive reuse of the property, remove impediments to access the Lake Erie waterfront, and provide for delisting from or reclassifying the Site within the Registry of Inactive Hazardous Disposal Sites.

The ROD specified a Site-specific cleanup goal of 14 parts per million (ppm); milligram per kilogram (mg/kg) for nitrobenzene.

The ROD estimated that approximately 3,500 cubic yards of soil at the Site contained nitrobenzene concentrations above the 14 ppm goal. These soils were located in a zone that extended from approximately 8 to 20 feet below land surface (bls) within a 100 foot by 100 foot area of concern (ROD AOC). This area is shown in Figure 3. To access these soils, the ROD envisioned the excavation of approximately 8,000 cubic yards of soil, including the 3,500 yards of nitrobenzene-contaminated soil, plus 4,500 cubic yards of overlying soil ("ROD Remedy"). The water table is approximately 8 to 12 feet below grade; therefore, dewatering and treatment of water would be necessary.

Under the ROD Remedy, the estimated 3,500 cubic yards of soil exhibiting nitrobenzene concentrations exceeding the 14 ppm (mg/kg) goal would be treated on-site utilizing a proprietary bioremediation technique known as aerobic/anoxic cycling. Following treatment, treated soils would be returned to the excavation and covered with two feet of clean backfill. The additional 4,500 cubic yards of soils would be tested, stockpiled and ultimately re-deposited back into the excavation as well.

The aerobic/anoxic treatment process was selected based upon a limited laboratory treatability study only, which showed that soils containing 433-ppm nitrobenzene were reduced to 3 ppm after 56 days of treatment. In the event the aerobic/anoxic technology was determined to be unavailable or otherwise ineffective, the ROD specified that *"a proven alternative, low temperature thermal desorption, will be utilized to meet the remedial objectives"* (ROD; pg. 9).

The NYSDEC determined that groundwater remediation was not necessary to meet the remedial objectives for the Site.

2.5 Interim Order on Consent

Due to the implementation difficulties and related costs that Honeywell determined would be associated with implementation of the ROD Remedy of excavation and ex-situ treatment, Honeywell began investigating alternative technologies capable of achieving the soil cleanup goal of 14 mg/kg for nitrobenzene. In August 2000, Honeywell signed an Interim Order on Consent with the NYSDEC to conduct a pre-design pilot study using *in situ* chemical oxidation. From November 2000 to February 2001, Honeywell implemented a pilot study using *in situ* chemical oxidation to assess the effectiveness of this alternative remedy. During this pilot study, a proprietary, Fentons-type reagent was injected into the contaminated soil in three phases using a Geoprobe™ unit. The results of the pilot study indicated some reduction in nitrobenzene mass in soil but consistent, adequate destruction was not achieved. A parameter that apparently limited the effectiveness of this technology was the heterogeneous permeability of the Site soils, which prevented the injected reagent mix from fully permeating the impacted zone. It was determined that *in situ* chemical oxidation with soil mixing and (as necessary) soil stabilization would be more effective in meeting the objectives of the ROD.

2.6 Explanation of Significant Difference (ESD)

Based on the *in situ* chemical oxidation pilot study (as described in Section 2.5), Honeywell further explored the possibility of *in situ* chemical oxidation as an alternative to the ROD Remedy. Honeywell prepared several remedial alternative documents, had several discussions with the NYSDEC and subsequently proposed an alternative remedy (to the ROD Remedy) of *in situ* chemical oxidation using potassium permanganate, soil mixing, and, if necessary, *in situ* soil stabilization to meet the objectives of the ROD (See Section 3.0) ("Remedy").

The proposed alternative remedy identified the following differences:

- The ROD remedy required excavation and on-site ex-situ treatment. This would involve sheeting/shoring and dewatering. The dewatering activities would involve handling and treating large volumes of groundwater. In-situ chemical oxidation does not require excavation and therefore does not require dewatering.

- The excavation would expose remediation workers and the general public to nitrobenzene-impacted soil. The *in situ* chemical oxidation will treat the nitrobenzene soil in place.

- The proposed alternative remedy would treat the nitrobenzene-impacted soil utilizing widely accepted *in situ* chemical oxidation techniques to destroy organic contaminants. Any residual nitrobenzene concentrations (above the 14 mg/kg goal) remaining after two treatment rounds would be immobilized with *in situ* stabilization.

- The proposed alternative remedy did not require any excavation or redeposition of treated soil. Therefore, a 24-inch cap was not necessary. Instead the proposed remedy would include placement of a twelve-inch layer of clean soil followed by hydroseeding.

The NYSDEC determined that the proposed alternative remedy was effective, easier to implement, and provided a greater degree of protection of human health than the ROD remedy. In addition, the alternative remedy was more cost effective (less cost) than the ROD remedy. Consequently, the NYSDEC issued an ESD in January 2003 (NYSDEC, 2003a) to modify the ROD Remedy.

2.7 Pre-Remediation Delineation Investigation

The pre-remediation delineation investigation was performed to delineate the area of soil requiring treatment (i.e., containing nitrobenzene concentration above the site-specific cleanup goal of 14 mg/kg) and to collect data necessary to support the design and implementation of the Remedy (a more detailed description of this investigation is provided in the RD/RA Work Plan). The pre-remediation delineation soil sampling utilizing Geoprobe™ unit was performed by Roux Associates during two separate visits to the Site on November 20 through 22, 2002 and on December 17 and 18, 2002. Roux Associates collected soil samples from 19 locations in the 100 foot by 100 foot area of concern, as defined in the ROD (ROD AOC) (See Section 2.3). Locations of the borings are provided in Figure 3. One soil sample was selected for nitrobenzene analysis at each borehole location from the depth interval exhibiting the highest level of contamination, based upon field screening results (photoionization detector [PID] readings, visual, etc.). In addition, one composite sample for total organic carbon (TOC) analysis was collected from boreholes SB-1A to SB-14A from 10 to 20 feet bls. All 19 soil boring locations were surveyed by TVGA Consultants of Elma, New York, a New York State-licensed surveyor.

The soil samples selected for laboratory analysis were sent to Columbia Analytical Services, Inc. (CAS) (New York State Certification No. 10145) located in Rochester, New York, for

nitrobenzene analysis using the United States Environmental Protection Agency (USEPA) Method 8270 and TOC analysis using the Lloyd Kahn Method.

The pre-remediation delineation effort refined the ROD AOC (hereinafter referred to as AOC) to reflect those areas containing nitrobenzene concentrations exceeding 14 mg/kg. The AOC is shown in Figure 3, and is approximately 6,600 square feet.

2.8 May 2003 Remedial Order on Consent

Based on the ESD (NYSDEC, 2003a), the NYSDEC and Honeywell entered into an Order on Consent (Index No. B9-0233-88-07) on May 12, 2003 to implement the NYSDEC approved RD/RA Work Plan (Remedial Engineering, 2003).

3.0 SUMMARY OF SELECTED REMEDY

The selected remedy for the AOC consisted of two rounds of *in situ* chemical oxidation injection using $KMnO_4$ to treat the nitrobenzene-impacted soil approximately 8 to 20 feet bls. Due to the low permeability of the soil and its heterogeneous nature, (i.e., silt and clay with rubble, etc.), the first *in situ* chemical oxidation injection round was performed using a crane-mounted vertical blade mixing system designed to mix the subsurface soil using 8 foot diameter augers.

Two weeks following completion of the first *in situ* chemical oxidation round, post-treatment soil samples were collected to determine if the cleanup goal for nitrobenzene of 14 mg/kg had been met. If the clean up goal was not met, a second round of *in situ* chemical oxidation was required. As with the first *in situ* chemical oxidation, post-treatment soil samples were to be collected two weeks following the second round of *in situ* chemical oxidation.

The selected remedy also provided a contingency of *in situ* stabilization to immobilize any residual soil that contained nitrobenzene concentrations above the 14 ppm (mg/kg) goal, following the two rounds of *in situ* chemical oxidation.

Final remedial activities consisted of the excavation of approximately 1,680 cubic yards of stabilized soil from the Site (for use in stabilizing soils at the Alltift Landfill Site), and the installation of a soil cover system. The soil cover system is 24 inches thick and consists of 20 inches of imported clean fill overlain by 4 inches of topsoil. The topsoil was hydro-seeded to minimize erosion of the soil cover.

4.0 REMEDIAL ACTION

The remedial action (RA) was conducted from June 23, 2003 to September 3, 2004. The major components of the RA are identified below, and are detailed in the following sections. These tasks include:

- construction project management (CPM) meeting], initial mobilization and Site preparation;
- two *in situ* chemical oxidation injections using $KMnO_4$;
- *in situ* stabilization;
- offsite transportation and disposal of debris;
- excavation of 1,680 cubic yards of material to stabilize material at the Alltift site;
- installation of soil cover system;
- demobilization; and
- institution controls/operation, maintenance and monitoring (OM&M).

4.1 CPM Meeting, Initial Mobilization and Site Preparation

Once the selected contractor received the Notice to Proceed and prior to mobilizing to the Site, a CPM Meeting was held to discuss key project issues. After these key project issues were discussed, the contractor mobilized to the Site and completed Site preparation activities prior to performing major remedial action tasks. The CPM meeting, mobilization, and Site preparation are discussed in the following sections.

4.1.1 CPM Meeting

Prior to mobilizing to the Site, a CPM Meeting was conducted on May 22, 2003 at the Honeywell offices located in Morristown, New Jersey. The purpose of this meeting was to identify the roles and responsibilities of key project personnel, discuss health and safety issues, provide an overview of the remedial action, and review the remedial action schedule. Following the CPM meeting, the selected remedial contractor, Remedial Construction Services, LP (RECON), mobilized to the Site on June 23, 2003.

4.1.2 Initial Mobilization

Initial mobilization activities began the week of June 23, 2003 and included the set-up of the system components ($KMnO_4$ mixing tank, holding tank, pumps, piping, etc.). The 8 foot diameter auger drill rig and a support excavator, along with miscellaneous equipment (i.e., portable generator) were also brought to the Site. RECON's mobilization efforts also included the provision of health and safety monitoring equipment, and decontamination equipment. In addition, 236 drums of $KMnO_4$ (each drum weighs approximately 330 pounds) were delivered to the Site for the first injection round of *in situ* chemical oxidation. The $KMnO_4$ drums were stored in the NFTA Terminal A Building. The Material Data Sheets and Bills of Lading for the delivered KMnO4 can be found in Appendix A.

Roux Associates mobilized to the Site on June 23, 2003 and provided full-time oversight for the duration of the RA under the direction of Remedial Engineering. One of the purposes for oversight activities was to document that the RA was conducted in accordance with the RD/RA Work Plan. In addition, the oversight activities included groundwater sample collection, post-treatment soil sample collection, and reviewing/approving (with NYSDEC-concurrence) all modifications to the RD/RA Work Plan. Roux Associates' Daily Construction Activity reports are included in Appendix B.

4.1.3 Site Preparation

Prior to initiation of the major remedial action activities, RECON also performed Site preparation activities. These activities included:

- preparation of a soil mixing work plan and health and safety plan (HASP);
- utility line mark-outs;
- temporary chain link fence section removal;
- survey of the AOC for the first *in situ* chemical oxidation round;
- installation of temporary erosion control measures (silt fence and hay bales), decontamination area, and temporary site security fence;
- clearing and grubbing; and
- installation of temporary potable water service connection to provide the necessary water for the *in situ* chemical oxidation injections.

During the utility markouts, a buried electrical line intersected the southeastern portion of the AOC. The buried electrical line was owned by Niagara Mohawk. For safety reasons, RECON located the buried electrical line by hand digging to a depth of approximately 3 feet bls to determine its exact location and depth.

In addition to the activities listed above, per the RD/RA Work Plan three new monitoring wells were installed to monitor groundwater during and after completion of the RA. SJB Services, Inc. (SJB) of Hamburg, NY installed the new monitoring wells (GW-18R, GW-22 and GW-23) on May 19, 2003 (Figure 3). These new monitoring wells along with two existing monitoring wells (GW-19 and GW-21), located down gradient of the Site, were incorporated into the groundwater monitoring network (see Section 3.5).

RECON removed all existing monitoring and injection wells with total depths of approximately 10 to 20 feet bls (the *in situ* treatment depth was approximately 20 feet bls) within the AOC on June 23, 2003. The monitoring wells removed were GW-18 and the observation and injection wells OW-1, OW-2, OW-3, OW-4, OW-5, OW-6, IW-1, IW-2 and IW-3 installed as part of the *in situ* chemical oxidation pilot study conducted from November 2000 to February 2001 (Figure 3). In addition, monitoring well GW-18B (total depth of approximately 25 feet bls) was properly abandoned by sealing the borehole with cement/bentonite grout down from approximately 17 feet bls to 25 feet bls by SJB on May 20, 2003.

4.2 *In Situ* Chemical Oxidation – First Round

Based on the results of the pre-remediation delineation investigation (See Section 2.7), the AOC encompassed an area of approximately 6,600 square feet. In order to provide complete treatment of the AOC, 164 eight-foot diameter soil mixing columns (approximately 475 pounds of $KMnO_4$ per auger location), overlapping each other by 10%, were installed in the AOC (Refer to Appendix C for column layout).

A buried electrical line, marked out by Niagara Mohawk on May 19, 2003, intersected the southeastern portion of the AOC. Therefore, the treatment of the area surrounding the electrical utility line (column number 151 through 163, which is approximately 750 square feet) could not be treated with the 8 foot diameter soil mixing rig. With the results of the pre-remediation

delineation investigation indicating low nitrobenzene concentrations along the southeastern portion of the AOC, the NYSDEC agreed to the collection of one additional post-treatment soil sample in the area (total of three) between the buried electrical line and the perimeter of the AOC (Figure 3 and 4). The post-treatment soil samples in the area between the buried electrical line and the perimeter of the AOC were less than 14 mg/kg goal for nitrobenzene, therefore no treatment of that area was required. As a result, the AOC was reduced to approximately 5,900 square feet.

Beginning the week of July 16, 2003, the first *in situ* oxidation round injections were conducted. Crystalline $KMnO_4$ powder was mixed with water in order to create a 4% solution (by weight) and temporarily stored in the transfer holding unit in order to provide a continuous supply of the oxidant for the injection operations. In order to minimize the amount of water used to reach the treatment depth of 20 feet bls and minimize possible ponding, the top four feet of uncontaminated soil was initially excavated and temporarily stockpiled adjacent to the AOC. It was expected that the stockpiled material would be placed over the AOC once the treatment had been completed. The 8 foot diameter auger was set at the required depth of 20 feet bls by first drilling with potable water only in order to prevent clogging of the injection ports. Once the treatment depth was reached, the 4% $KMnO_4$ solution was injected into the soil while simultaneously retracting the 8 foot diameter auger. In order to provide proper mixing of the 4% $KMnO_4$ solution within the soil, the auger was pulled back up to the top of the treatment column and pushed back down to 20 feet bls several times, following the injection of the 4% $KMnO_4$ solution. The amount of 4% $KMnO_4$ solution being injected per column was prepared in batches. Each batch consisted of approximately 1,500 gallons of water and 500 pounds of $KMnO_4$ (approximately 1.5 drums).

As the auger was being pushed to 20 feet bls, numerous subsurface obstructions were encountered throughout the AOC from 2 feet bls to 16 feet bls. The subsurface obstructions consisted of concrete debris, wood, etc. A support excavator was used to remove the obstructions. The removed obstructions were placed on plastic sheeting and stockpiled on-site. Due to the reduced area of the AOC a total of 76,000 pounds of $KMnO_4$ were injected during the first round of *in situ* chemical oxidation, with 151 eight foot diameter mixing columns each

injected with 500 pounds of $KMnO_4$. Six drums of the original inventory of $KMnO_4$ were not used.

The presence of the numerous subsurface obstructions encountered throughout the AOC caused significant delays in advancing many of the borings. Significant quantities of potable water were used to prevent clogging of the injection ports to allow the 8 foot diameter auger to reach the required depth. This lead to significant ponding of water on the ground surface. In order to prevent the soil/water mixture from draining outside the AOC, the previously stockpiled top four feet of the overlying clean soil was utilized to construct a temporary berm around the AOC.

The sequence of first round of *in situ* chemical oxidation injection began in the northwestern portion of the AOC and proceeded generally in an easterly direction. Initially, two to four columns were completed per day. Once full-scale daily mixing was initiated and technical problems with the auger rig were resolved, an average of 11 columns were completed per day. The first round of *in situ* chemical oxidation injection was completed on August 2, 2003. The 8 foot diameter rig was demobilized from the site. The mixing tank, holding tanks, pumps, etc. remained on-site pending results of the post-treatment sampling (see section 3.2.2).

4.2.1 Air Monitoring

Air monitoring was conducted by RECON during the first round of *in situ* chemical oxidation injection in accordance with RECON's site-specific Health and Safety Plan. Monitoring devices consisted of a photo-ionization detector (PID) (equipped with a nitrobenzene specific 9.92 electron volt [eV] ultraviolet [UV] lamp), a dust meter and four air samplers. Nitrobenzene concentrations were sampled along the downwind and upwind edge of the AOC and within the breathing zone of both, the drill-rig operator and excavator operator, who operated within the treatment area, on a continuous basis. The air samples were taken during intrusive work activities (e.g., *in situ* chemical oxidation injection and excavation activities). The four composite air samples were sent to Data Chem Laboratories, located in Salt Lake City, Utah, on a daily basis. Nitrobenzene concentrations were observed within the AOC and breathing area of workers in the treatment area with the PID on a periodic basis (as indicated by the readings on the PID). Nitrobenzene and dust measurements were taken (three times per day) upwind and downwind of the AOC. The results of the air monitoring are provided in Appendix D.

Based upon the air sample results from the first round of *in situ* chemical injection indicating that nitrobenzene concentrations were below action levels, and with the approval of NYSDEC, the air monitoring was not conducted during the second round of *in situ* chemical oxidation and *in situ* stabilization.

4.2.2 First Post-Treatment Soil Sampling Round

Post-treatment soil samples of the first round of *in situ* chemical oxidation injection were collected between August 23, 2003 and August 27, 2003. Due to the ponding of water on the surface of the Site, the soil samples were collected using hand sampling equipment (i.e., hand augers) and a rowboat. As shown in Figure 4, soil samples were collected from 21 locations (PTSB-1 through PTSB-21) and were sent to CAS for nitrobenzene analysis using USEPA Method 8270 and TOC analysis using the Lloyd Khan method. The analytical results are provided in Table 1. Additionally, at the request of the NYSDEC, five select sample locations (PTSB-6, PTSB-7, PTSB-10, PTSB-11, and PTSB-16) were also sampled from 4 to 8 feet bls in order to determine if cross contamination occurred as a result of the obstructions (i.e. construction debris) removed during mixing activities. In addition, soil samples were also collected for the *in situ* stabilization treatability studies (see Section 3.4.1).

The analytical results indicated that nitrobenzene was detected at or below 14 mg/kg goal in 8 of the 26 samples. In 18 samples, nitrobenzene concentrations exceeded 14 mg/kg, with the highest concentration (1,500 mg/kg) being detected in PTSB-16 at a sample depth of 4 to 8 feet bls. The analytical results for TOC indicate concentrations ranging from 1,960 mg/kg to 33,900 mg/kg in PTSB-14. Based on the results at PTSB-3, PTSB-4, PTSB-9 and PTSB-21, the portion of the AOC on the eastern side of the buried electrical line did not require further treatment. The analytical lab results are provided in Appendix E.

4.3 *In Situ* Chemical Oxidation – Second Round

Based upon the post-treatment soil sampling results of the first round of *in situ* chemical oxidation, approximately 73 percent of the AOC required treatment in the second round of *in situ* chemical oxidation injection. Due to nitrobenzene concentrations exceeding 14 mg/kg on the southeastern portion of the Site, the treatment was also extended in that area. The second round

of *in situ* chemical oxidation injection therefore, encompassed the treatment area from 0 to 20 feet bls in an approximate 4,800 square foot area (Figure 5).

Based on water accumulation during the first round of *in situ* chemical oxidation, the amount of $KMnO_4$ for the second round of *in situ* oxidation was based upon how much of the $KMnO_4$ solution could be injected into the unsaturated soil. Using a mean groundwater table elevation of 6 feet bls and a pore space of 20%, it was estimated that approximately 13,700 pounds of $KMnO_4$ could be injected while preventing additional water accumulation. Originally, the second round of *in situ* chemical oxidation was to be completed using a Geoprobe™ unit. However, due to the accumulated water and unstable soil conditions in the AOC, a jet grout rig was mobilized to the Site. An additional 47 drums of $KMnO_4$ (approximately 15,500 pounds) were delivered to the Site. The second round of *in situ* chemical injection began the week of September 22, 2003. Crystalline $KMnO_4$ powder was mixed with water in order to create a 4% solution (by weight) in the mixing tank and temporarily stored in the transfer holding unit in order to provide a continuous supply of the oxidant for the injection operations. A total of approximately 15,500 pounds of $KMnO_4$ were injected during the second round of *in situ* oxidation.

The radius of influence of the jet grout rig was determined to be approximately six feet during a preliminary field test. Therefore, the second *in situ* chemical oxidation area was comprised of ten injection lines each with a width of ten feet. In order to achieve complete coverage, the jet grout rig was set-up along the southeastern perimeter of the AOC and each injection line was treated with multiple injection points, at various lengths, depths and angles ranging from 10° to 90° (Appendix F). A total of 54 injection points were needed in order to provide the complete application of the 4% $KMnO_4$ solution over the 4,800 square foot area to 20 feet bls. The amount of 4% $KMnO_4$ solution being injected per injection line was prepared in batches. Each batch consisted of approximately 1,500 gallons of water and 500 pounds of $KMnO_4$ (approximately 1.5 drums).

The sequence of chemical oxidation injection began in the northeastern portion of the second injection round area and proceeded generally in a southeasterly direction. Initially, two to three injection points were completed per day. As the work progressed, as many as seven injection

points were completed per day. Once full-scale daily mixing was initiated, an average of 6 injection points were completed per day. The second round of *in situ* chemical oxidation injection was completed on October 8, 2003. The jet grout rig, $KMnO_4$ mixing tank and pumps were removed from the Site. The holding tank and temporary water connection remained onsite. The Material Data Sheets and Bills of Lading for the delivered KMnO4 can be found in Appendix A.

4.3.1 Second Post-Treatment Soil Sampling Round

Post-treatment soil samples of the second round of *in situ* chemical oxidation injection were collected from October 20, 2003 to October 21, 2003 and on November 12, 2003. As shown in Figure 5, soil samples were collected from 10 locations (PTSB-22 through PTSB-31) and were sent to CAS for nitrobenzene analysis using USEPA Method 8270. The analytical results are provided in Table 2. Additionally, at the request of the NYSDEC, three composite samples at three locations (PTSB-24, PTSB-29, and PTSB-31) were also sampled from 0 to 8 feet bls.

The analytical results indicated that nitrobenzene concentrations were above the 14 mg/kg goal in all 13 samples, with the highest concentration (1,600 mg/kg) being detected in PTSB-26 at a sample depth of 10 to 12 feet bls. The analytical lab results are provided in Appendix E.

4.4 *In Situ* Stabilization

Based upon the post-treatment soil sampling results, *in situ* stabilization activities were performed. Prior to mobilization, treatability studies were performed, which are discussed below.

4.4.1 Treatability Studies

In order to determine the appropriate stabilization/fixation agents and to provide an additional degree of quality assurance, two independent treatability studies (each consisting of two phases) were performed by two subcontractors, RECON and Kemron Environmental Services, Inc. (KEMRON). The initial treatability study was performed with various mixtures of Portland cement, hydrated lime, fly ash, cement kiln dust, and lime kiln dust. Based on the initial treatability results, the stabilizing agents tested did not meet the applicable regulatory criteria.

A second treatability study was performed by both subcontractors. This second test used various mixtures of Portland cement, activated carbon, organophilic clay, and water. Based on the second treatability study, 4% 40X200 mesh regenerated activated carbon and 10% Portland cement achieved TCLP levels of nitrobenzene below the 2 mg/L regulatory level. The treatability study tables and reports of the first and second study are attached in Appendices G (RECON) and H (KEMRON).

The treatability study reports were submitted to the NYSDEC, and based upon their review, the mixture of 10% Portland cement and 6% activated carbon was requested by the NYSDEC for the *in situ* stabilization of the soil. Based on subsequent discussions with the NYSDEC and Honeywell, the NYSDEC approved the 10% Portland cement and 6% (40x200 mesh) regenerated activated carbon in a letter dated November 5, 2003 (Appendix I).

In a letter dated December 3, 2003 (Appendix J), the NYSDEC expressed concern that the type and quality of the activated carbon used in the field application was not the same as the type and quality used in the treatability studies. The NYSDEC also requested, in the December 3, 2003 letter, that a New York State licensed professional engineer certify that the Portland cement and activated carbon mixture used in the field is expected to satisfy the remedial goals and adequately protect the public health and environment. As a result, Remedial Engineering submitted a certification letter to the NYSDEC dated December 8, 2003 (Appendix K), signed and stamped by Charles J. McGuckin, P.E. (PE No. 069509).

4.4.2 Mobilization

Prior to *in situ* stabilization activities, mobilization of RECON's work force and equipment commenced. Mobilization activities were initiated the week of November 3, 2003. The equipment delivered to the Site included the 8-foot auger diameter drill rig, an excavator, forklift, pumps, batch mixer, transfer holding unit, cement silo, equipment container with tools, hoses, and fittings. The water holding tank and water piping were kept onsite from the previous *in situ* chemical oxidation rounds. The activated carbon and Portland cement were delivered continuously during *in situ* stabilization, as needed.

4.4.3 *In Situ* Stabilization

Soil stabilization activities were conducted from November 17, 2003 to December 10, 2003. Portland cement, water and activated carbon were mixed in the mixing tank and temporarily stored in the transfer holding unit in order to provide a continuous supply of material for the stabilization operations. For quality control purposes, each cement/activated carbon batch was tested for the required density of 1,560 kilograms per cubic meter (kg/m^3) using a "Mud Balance." This density value was determined based on the results of the RECON treatability study using 10% Portland cement and 6% activated carbon. A discrete volume (1 pint) of a composite sample of each batch was sampled and weighed with the Mud Balance in order to determine its density using the density conversions table (Appendix L). If the required density was not achieved, more Portland cement or water was then added to the batch. The activated carbon was added to the batch on a 6% by weight basis.

A stabilization column layout, including 124 eight foot diameter columns was established in the 4,800 square foot treatment area (Appendix M). The sequence of stabilization began in the northeastern portion of the second injection round area and proceeded generally in a southwesterly direction. Initially, two to four columns were completed per day. As the work progressed, as many as 12 columns were completed per day. Once full-scale daily mixing was initiated, an average of eight columns were completed per day. A total quantity of 669.59 tons of Portland cement and 302.5 tons of activated carbon were delivered and used in the *in situ* stabilization round. The full scale *in situ* stabilization work was completed on December 10, 2003. The Material Data Sheets and Bills of Lading for the activated carbon and cement can be found in Appendix A.

During the course of the stabilization work, it was determined that the subsurface obstructions (i.e., concrete debris), which were not excavated during previous remediation rounds made stabilization activities to 20 feet bls in portions of stabilization target area difficult to achieve. It was agreed upon with the NYSDEC that in the event large debris was encountered in a zone less than ten feet bls, inhibiting stabilization activities, it would be removed with the excavator. It was further agreed that if large debris was encountered at a depth greater than ten feet and it was not practical to remove the debris, every effort was made to stabilize above and around the object and that the object would be forced down as far as possible using the stabilizing equipment. This

procedure was followed during the stabilization work and any debris that was encountered at depths greater than 10 feet bls were moved around in the subsurface during the stabilization activities such that there were no "dead spots" or areas that were not stabilized.

Due to the ponding of excess water from the two *in situ* chemical oxidation injection rounds and the low permeability of the soil, the addition of the cement and activated carbon during the *in situ* stabilization activities created a mounded area approximately 7 feet above the surrounding ground surface.

4.5 Groundwater Monitoring

In accordance with the approved RD/RA work plan, groundwater samples were collected on a monthly basis during the RA, including baseline samples prior to the beginning of the first round of *in situ* chemical oxidation. Groundwater samples were collected from 5 monitoring wells (GW-18R, GW-19, GW-21, GW-22 and GW-23) (Figure 6). Groundwater was analyzed for nitrobenzene using USEPA Method 8270 (base neutral extractable hydrocarbons) and target analyte list (TAL) using USEPA Method 6000-7000 Series. The analytical results are provided in Tables 3 and 4. As shown in Table 3, the laboratory detection limit was changed following the second groundwater sampling round from five micrograms per liter (µg/L) to 0.2 µg/L for nitrobenzene. It was lowered because the Ambient Water Quality Standards and Guidance Value (AWQSGV) for nitrobenzene is 0.4 µg/L.

4.6 Construction and Demolition Debris

As a result of clearing and grubbing and obstruction removal (i.e., concrete debris), approximately 100 cubic yards of construction and demolition (C&D) debris were generated during the RA. The C&D debris was characterized as non-hazardous waste and was transported offsite to an approved disposal facility. An approved hauler, Price Trucking Corporation, transported the excavated material to CWM Chemical Service, L.L.C., Model City, New York, an approved disposal facility. Non-Hazardous Waste Manifest and certified weight scale tickets for the C&D debris are provided in Appendix N.

4.7 Site Restoration

As a final phase of the RA, final Site restoration activities were completed from August 31, 2004 to September 3, 2004. Preliminary Site restoration activities completed in December 2003 primarily involved grading of the stabilized material and reestablishment of the silt fence surrounding the remediation area in order to prevent silt runoff until the final site restoration activities were completed.

In order to address the mound of excess treated/stabilized material, Roux Associates prepared a material management and soil cover system plan in a July 22,2004 letter to the NYSDEC (See Appendix O). As described in the NYSDEC approved (Refer to Appendix P for NYSDEC approval letter dated August 13, 2004) management and soil cover system plan, the final Site restoration activities consisted of the excavation of the treated/stabilized material to ground surface and transporting the excavated material to the nearby Alltift Landfill Site in Buffalo, New York, to be used to stabilize sediments and soils in conjunction with the ongoing NYSDEC-approved closure of the Alltift Landfill. Tug Hill Construction, Inc. (Tug Hill) of Lockport, New York, excavated approximately 1,680 cubic yards of treated/stabilized material and transported it to the Alltift Landfill where it was utilized as a stabilizing agent.

4.7.1 Soil Cover System

Following the excavation of the excess material, a 2-foot soil cover was placed over the remediated area by Tug Hill. The clean imported fill was provided from the Birdsong Subdivision, Transit and Jewell Holmwood Roads, Orchard Park, New York. The clean imported fill was sampled by GZA GeoEnvironmental Laboratories, Inc. (GZA) of Buffalo, New York, with analyses for: volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260; semi-volatile organic compounds (SVOCs) by USEPA Method 8270; metals-target analyte list by USEPA Method 6010; mercury by USEPA Method 7470 and cyanide by USEPA Method 9010. The imported fill characterization analytical results are included in Appendix Q. The same source of fill was used at the Honeywell Alltift Landfill project.

A 12-ounce non-woven geotextile fabric was placed over the remediated area by Tug Hill. A trenching machine was utilized by Tug Hill personnel to dig a 3-inch wide anchor trench,

approximately two feet below grade at the perimeter of the remediated area. Edges of the geotextile fabric were buried in the anchor trench providing a stable fabric surface to accept the placement of common fill.

The fill was imported to the Site and unloaded directly onto the geotextile fabric. Beyond the boundaries of the geotextile fabric, common fill at the edges of the soil cover systems were "feathered" into the existing landscape. As part of the stormwater management controls, the soil cover system was gently sloped. In addition, at the request of the NYSDEC, the eastern edge of the soil cover system was extended over the buried electrical line.

The soil cover system consisted of 20 inches of common fill compacted at 85% of the Standard Proctor Density. Compaction tests of the common fill were performed by GZA, and following confirmation of compaction, topsoil was imported and placed over the compacted common fill. The compaction test results are provided in Appendix R. The topsoil was imported from the North American Park, Commerce Drive, West Seneca, New York, and spread to a thickness of approximately four inches. The topsoil was sampled by GZA with analyses for VOCs by USEPA Method 8260, SVOCs by USEPA Method 8270, metal-target analyte list by USEPA Method 6010, mercury by USEPA Method 7470, and cyanide by USEPA Method 9101. The gradation, organic content and laboratory analytical results of the topsoil are provided in Appendix S. The topsoil was not compacted. The same topsoil source was used at the Honeywell Alltift Landfill project.

A total of an estimated 767 cubic yards of common fill and an estimated 141 cubic yards of topsoil were utilized as soil cover for the Site.

The soil cover system was seeded with a hydro-seed mix of local grasses. The hydro-seed included a tack coat with mulch and fertilizer. An as-built of the soil cover system is provided in Appendix T.

Other site restoration activities were performed following completion of soil cover system, including repair of previously removed chain link fencing and restoration of staging and access areas.

5.0 OPERATION, MAINTENANCE AND MONITORING

This section of the report details the proposed operation, maintenance and monitoring (OM&M) program for the Site. On an annual basis, documentation of these activities will be submitted to NYSDEC. The elements of the OM&M program are listed below and further discussed in the following subsections:

- Groundwater Monitoring; and
- Vegetation Inspection and Maintenance.

5.1 Groundwater Monitoring

One objective of the remedial action is to prevent leaching of contamination from the treated material into the surrounding groundwater. Institution of a groundwater monitoring program is proposed to verify the performance of the remedial action. In order to evaluate long-term groundwater quality, a network of suitably located groundwater wells will be gauged and sampled. Monitoring is proposed at the monitoring wells GW-18R, GW-19, GW-21, GW-22, and GW-23. During each sampling round, one sample will be taken from each of the five wells listed above. The results of the groundwater sampling will be provided to the NYSDEC in an annual report. Groundwater monitoring will be performed on a quarterly basis for the first year and on a semiannual basis for the second consecutive year. A Closure Evaluation Report will be submitted to the NYSDEC once Honeywell has shown that Site groundwater concentrations do not increase significantly above Site background levels for six consecutive rounds of monitoring following the last round of groundwater sampling conducted on December 16, 2003.

As part of the OM&M program, water level measurements will be collected for each well using an electronic sounding device (M-Scope). In addition, each monitoring well will be sampled in accordance with the following sampling methods and requirements.

5.1.1 Sampling Methods

Well sampling will be conducted in accordance with NYSDEC guidelines and as described below. Groundwater samples will be analyzed for nitrobenzene using USEPA Method 8270 (base neutral extractable hydrocarbons) and TAL metals using USEPA Method 6000-7000 Series. In addition to the samples detailed above, a duplicate (D), matrix spike (MS), and matrix spike duplicate (MSD) sample will be collected during each monitoring round. Each of these

quality assurance/quality control (QA/QC) samples will be analyzed for the same parameters as its corresponding sample. Three purge volumes will be removed from each monitoring well prior to sampling.

5.1.2 Sampling Requirements

Sample containers will be pre-labeled before sample collection. The labels will include the sample number, parameter sampled, date, time, sampler's initials and the Site name. A Chain of Custody (COC) form will be maintained as the record of possession for the sample.

After the analytical samples are collected, the sample bottles will be packed in coolers for shipment to the laboratory.

5.2 Vegetation Inspection And Maintenance

The soil cover system will be inspected and maintained to ensure that the soil cover system remains in good condition. Any areas of concern will be noted and restored with topsoil and seed. The grass cover will be mowed annually and cut to a height not less than 4 inches and not more than 8 inches. If observed, bare soil or eroded areas in excess of 100 square feet will be re-seeded as required. A detailed description of the inspection and maintenance activities is provided in a Site Management Plan (SMP) (Remedial Engineering, 2005). The SMP also discusses procedures for any activities that may disturb the soil cover system.

5.3 Institutional Controls

Honeywell will work with the Niagara Frontier Transportation Authority (NFTA), owner of the Site, to place appropriate institutional controls in place which will (i) restrict disturbance of the capped area without NYSDEC consent; (ii) prohibit the use of groundwater from beneath the capped area without NYSDEC consent; and (iii) provide for yearly Vegetation Inspection and Maintenance of the capped area as set forth in Section 5.2 above, and as discussed in the SMP.

6.0 ENGINEER'S CERTIFICATION

The implementation of the remedy at the Buffalo Outer Harbor/Radio Tower (Site Number 9-15-026) located at Fuhrman Boulevard, Buffalo, New York, has been completed. Remedial Engineering, P.C. certifies that the Remedial Action was implemented, and construction activities were performed in accordance with the requirements of the March 1999 ROD (as appropriate), the January 2003 ESD, the May 2003 Order on Consent, and the NYSDEC approved RD/RA Work Plan dated March 21, 2003 (as modified with NYSDEC concurrence), and as described in this RACR dated August 17, 2005, and that the remedy, as implemented, is protective of human health and the environment.

REMEDIAL ENGINEERING, P.C.

Charles J. McGuckin, P.E.
Principal Engineer

7.0 REFERENCES

Dvirka and Bartilucci Engineers, Phase 1/ Phase 2 Remedial Investigation Report – Buffalo Outer Harbor Site, December 1995.

NYSDEC, 1999. Record of Decision, Buffalo Outer Harbor/Radio Tower Area Site, City of Buffalo, Erie County, Site No. 9-15-026, Buffalo, New York. March 1999.

NYSDEC, 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

NYSDEC, 2003a. Explanation of Significant Difference (ESD), Buffalo Outer Harbor/Radio Tower Area Site, City of Buffalo, Erie County, Site No. 9-15-026, Buffalo, New York. January 2003.

NYSDEC, 2003b. Record of Decision, Buffalo Outer Harbor/Radio Tower Area Site, City of Buffalo, Erie County, Site No.B9-0233-88-07, Buffalo, New York. May 2003.

Remedial Engineering, P.C., March 2003. Remedial Design/Remedial Action Work Plan, Buffalo, New York.

Remedial Engineering, P.C., August 2005. Site Management Plan, Buffalo, New York.

Table 1. Summary of Soil Sampling Analytical Results Following the First In-Situ Chemical Oxidation Round, Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-1	PTSB-2	PTSB-3	PTSB-4	PTSB-5	PTSB-6	PTSB-6
Sample Depth (feet bls):	14'-16'	12'-14'	16'-18'	16'-20'	14'-16'	12'-14'	6'-8'
Sample Date:	8/23/2003	8/24/2003	8/25/2003	8/25/2003	8/23/2003	8/24/2003	8/24/2003
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Notes:							
Parameter (Concentrations in mg/kg)							
Nitrobenzene	7.5	**23**	1.2	1.4	**27**	**760**	**110**
Total Organic Carbon	12,800	13,900	11,800	7,920	10,300	19,400	1,960

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but not detected
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg/kg

3.17.05

Table 1. Summary of Soil Sampling Analytical Results Following the First In-Situ Chemical Oxidation Round, Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-7	PTSB-7	PTSB-8	PTSB-9	PTSB-10	PTSB-10	PTSB-11
Sample Depth (feet bls):	14'-16'	4'-8'	16'-20'	16'-20'	14'-16'	4'-6'	18'-20'
Sample Date:	8/25/2003	8/25/2003	8/25/2003	8/25/2003	8/23/2003	8/23/2003	8/23/2003
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Notes:							
Parameter (Concentrations in mg/kg)							
Nitrobenzene	**590**	**150**	**120**	0.046J	9.1	12	**43**
Total Organic Carbon	20,200	16,000	18,900	4,960	12,800	16,100	14,800

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but not detected
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg/kg

8.17.05

Table 1. Summary of Soil Sampling Analytical Results Following the First In-Situ Chemical Oxidation Round, Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-11	PTSB-12	PTSB-13	PTSB-14	PTSB-15	PTSB-16	PTSB-16
Sample Depth (feet bls):	4'-6'	16'-18'	16'-18'	18'-20'	18'-20'	16'-18'	4'-8'
Sample Date:	8/23/2003	8/24/2003	8/24/2003	8/24/2003	8/24/2003	8/25/2003	8/25/2003
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Notes:							
Parameter (Concentrations in mg/kg)							
Nitrobenzene	**100**	**760**	**1200**	**590**	**220**	**920**	**1500**
Total Organic Carbon	24,100	19,500	21,300	33,900	14000	18200	24700

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but not detected
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg/kg

8.17.05

Table 1. Summary of Soil Sampling Analytical Results Following the First In-Situ Chemical Oxidation Round, Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-17	PTSB-18	PTSB-19	PTSB-20	PTSB-21
Sample Depth (feet bls):	16'-20'	16'-20'	18'-20'	14'-16'	14'-16'
Sample Date:	8/25/2003	8/25/2003	8/24/2003	8/23/2003	8/27/2003
Matrix:	Soil	Soil	Soil	Soil	Soil
Notes:					
Parameter (Concentrations in mg/kg)					
Nitrobenzene	**650**	**1000**	**230**	14	10
Total Organic Carbon	NS	22800	15800	16600	NS

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but not detected
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg/kg

8.17.05

Table 2. Summary of Soil Sampling Analytical Results Following the Second In-Situ Chemical Oxidation Round
Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-22	PTSB-23	PTSB-24	PTSB-24	PTSB-25	PTSB-26	PTSB-27	PTSB-28
Sample Depth (feet bls):	16'-20'	14'-16'	0'-8'	12'-14'	12'-14'	10'-12'	16'-18'	12'-14'
Sample Date:	11/12/2003	11/12/2003	10/21/2003	10/21/2003	10/21/2003	10/21/2003	10/21/2003	10/21/2003
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Notes:								
Parameter (Concentrations in mg/kg)								
Nitrobenzene	**420**	**590**	**500**	**63**	**1,000**	**1,600**	**520**	**410**

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but not detected
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg/kg

8.1.05

Table 2. Summary of Soil Sampling Analytical Results Following the Second In-Situ Chemical Oxidation Round
Buffalo OuterHarbor/Radio Tower Area, Buffalo, New York

Field Identification:	PTSB-29	PTSB-29	PTSB-30	PTSB-31	PTSB-31
Sample Depth (feet bls):	0'-8'	14'-16'	14'-16'	0'-8'	8'-10'
Sample Date:	10/21/2003	10/21/2003	10/20/2003	10/21/2003	10/21/2003
Matrix:	Soil	Soil	Soil	Soil	Soil
Notes:					
Parameter (Concentrations in mg/kg)					
Nitrobenzene	**1,600**	**120**	**430**	**500**	**64**

NOTES:
mg/kg - Milligrams per kilogram
U - Indicates compound was analyzed for but nc
J - Estimated concentration
ft bls - Feet below land surface
NS- Not sampled
Bold numbers represent detections above 14 mg

8.17.05

Table 3. Summary of Nitrobenzene Data Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

					Sample Date						
					6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
Sample Designation	PARAMETER	NYSDEC AWQSGVs	PQL	UNITS							
GW-18R	Nitrobenzene	0.4	5	ug/l	4.7U	5.1U					
			0.2	ug/L			0.22	0.20U	0.20U	0.21U	0.19U
GW-19	Nitrobenzene	0.4	5	ug/l	5U	5.1U					
			0.2	ug/L			0.21	0.20U	0.20U	0.21U	0.23U
GW-21	Nitrobenzene	0.4	5	ug/l	5U	4.9U					
			0.2	ug/L			0.19U	0.21U	0.20U	0.20U	0.19U
GW-22	Nitrobenzene	0.4	5	ug/l	5U	5U					
			0.2	ug/L			0.33	0.23U	0.21U	0.21U	0.20U
GW-23	Nitrobenzene	0.4	5	ug/l	5U	4.9U					
			0.2	ug/L			**0.73**	0.19U	0.19U	0.11J	0.20U

Notes:
ug/l - micrograms per liter
U-Not detected; detection limits shown
NA-Not analyzed
NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998
PQL-Practical Quantitation Limit
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

8.17.05

Table 4. Summary of Target Analyte List Metals Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

			Sample Designation:	GW-18R						
			Sample Date:	6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
PARAMETERS	NYSDEC AWQSGVs	PQL	UNITS							
Aluminum	--	100	ug/l	3,710	15,100	38,700	14,300	15,100	20,100	11,300
Antimony	3	60	ug/l	60U	60U	60U	60U	60U	3.1U	**3.2**
Arsenic	25	10	ug/l	**84.8**	**34.1**	**84**	21.6	**34.9**	**52.4U**	**33.1**
Barium	1,000	20	ug/l	109	247	479	242	284	350	235
Beryllium	3	5	ug/l	5U	5U	5U	5U	5U	0.13U	0.130U
Cadmium	5	5	ug/l	5U	5U	5U	5U	5U	0.3	0.56
Calcium	--	500	ug/l	286,000	433,000	478,000	384,000	482,000	426,000	445,000
Chromium	50	10	ug/l	10U	25.9	**59.3**	17.9	26.4	33.4	20.2
Cobalt	--	50	ug/l	50U	50U	50U	50U	50U	13.2	7.8
Copper	200	20	ug/l	20U	46.3	69.1	23.1	23	37.4	15.6
Iron	300	100	ug/l	**11,800**	**28,600**	**53,900**	**26,100**	**29,200**	**35,300**	**23,300**
Lead	25	5	ug/l	**26.9**	**150**	**246**	**87**	**101**	**121**	**91.7**
Magnesium	35,000	500	ug/l	**50,500**	**80,000**	**92,800**	**71,700**	**95,800**	**85,800**	**91,100**
Manganese	300	10	ug/l	**1,710**	**1,800**	**2,820**	**1,670**	**2,240**	**1,890**	**2,420**
Mercury	0.7	0.2	ug/l	0.2U	0.21	0.5	0.51	0.2U	0.22	0.14
Nickel	100	40	ug/l	40U	40U	48.4	40U	40U	35.1	22.5
Potassium	--	2,000	ug/l	15,200	19,300	28,700	25,300	40,500	30,300	26000
Selenium	10	5	ug/l	5U	5U	5U	5U	5U	3.5U	3.46U
Silver	50	10	ug/l	10U	10U	10U	10U	10U	0.53U	0.53U
Sodium	20,000	500	ug/l	**24,700**	**26,300**	**32,700**	**30,700**	**45,500**	**37,700**	**37,500**
Thallium	0.5	10	ug/l	10U	20U	30U	10U	20U	4U	7.94U
Vanadium	--	50	ug/l	50U	50U	80.6	50U	50U	50.4	27.1
Zinc	2,000	20	ug/l	44.4	272	390	149	162	323	203

Notes:

ug/l - micrograms per liter

U-Not detected; detection limits shown

NA-Not analyzed

NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998

PQL-Practical Quantitation Limit

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

-- Not available

8.17.05

Table 4. Summary of Target Analyte List Metals Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

			Sample Designation:	GW-19						
			Sample Date:	6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
PARAMETERS	NYSDEC AWQSGVs	PQL	UNITS							
Aluminum	--	100	ug/l	2,960	860	3,310	1190	1,460	1,390	1,960
Antimony	3	60	ug/l	60U	60U	60U	60U	60U	3.1U	3.07U
Arsenic	25	10	ug/l	10U	**68.8**	10U	**34**	**54.6**	4.6	3.2
Barium	1,000	20	ug/l	29.1	24.5	32.2	20U	21.2	34.6	30
Beryllium	3	5	ug/l	5U	5U	5U	5U	5U	0.13U	0.130U
Cadmium	5	5	ug/l	5U	5U	5U	5U	5U	0.15U	0.17
Calcium	--	500	ug/l	52,900	25,900	63,500	23600	24,200	104,000	81,900
Chromium	50	10	ug/l	**56.1**	**16.4**	**59.6**	10U	**62**	47.2	**59.9**
Cobalt	--	50	ug/l	50U	50U	50U	50U	50U	1.2	0.640U
Copper	200	20	ug/l	20U	135	20U	59.9	46.1	5.6	2.28U
Iron	300	100	ug/l	100U	**407**	122	**427**	**608**	136	**312**
Lead	25	5	ug/l	5U	**26.1**	5U	13.2	16.6	1.5	1.5
Magnesium	35,000	500	ug/l	500U	500U	500U	500U	500U	157	383
Manganese	300	10	ug/l	10U	12.4	10U	11	17.9	3.3	8.3
Mercury	0.7	0.2	ug/l	0.2U	1.3	0.2U	0.68	0.95	0.03U	0.06
Nickel	100	40	ug/l	40U	40U	40U	40U	40U	1.1	2
Potassium	--	2,000	ug/l	540,000	1,110,000	427,000	825000	938,000	191,000	328,000
Selenium	10	5	ug/l	**19.2**	**32.6**	**16.8**	**27**	**28.8**	**15.3**	**13.6**
Silver	50	10	ug/l	10U	10U	10U	10U	10U	0.53U	0.530U
Sodium	20,000	500	ug/l	**37,100**	**84,100**	**29,500**	**60,900**	**73,700**	12,600	21,700
Thallium	0.5	10	ug/l	10U	10U	10U	10U	20U	4.0U	3.97U
Vanadium	--	50	ug/l	50U	103	50U	70.9	67.5	14.1	18.4
Zinc	2,000	20	ug/l	20U	77.1	20U	20U	20U	3.7	7

Notes:

ug/l - micrograms per liter

U-Not detected; detection limits shown

NA-Not analyzed

NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998

PQL-Practical Quantitation Limit

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

-- Not available

8.17.05

Table 4. Summary of Target Analyte List Metals Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

			Sample Designation:	GW-21						
			Sample Date:	6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
PARAMETERS	NYSDEC AWQSGVs	PQL	UNITS							
Aluminum	--	100	ug/l	100U	100U	100U	100U	100U	48	43.1
Antimony	3	60	ug/l	60U	60U	60U	60U	60U	3.1U	3.07U
Arsenic	25	10	ug/l	10U	10U	10U	10U	10U	5.8	2.49U
Barium	1,000	20	ug/l	51.8	55.4	51.9	51.2	53.4	49.8	55.5
Beryllium	3	5	ug/l	5U	5U	5U	5U	5U	0.13U	0.13U
Cadmium	5	5	ug/l	5U	5U	5U	5U	5U	0.15U	0.15U
Calcium	--	500	ug/l	43,600	4,720	47,100	48,000	53,500	50,600	49,900
Chromium	50	10	ug/l	10U	10U	10U	10U	10U	0.21U	1.1
Cobalt	--	50	ug/l	50U	50U	50U	50U	50U	0.83	0.64U
Copper	200	20	ug/l	20U	20U	20U	20U	20U	4	2.28U
Iron	300	100	ug/l	100U	149	135	100U	127	44	28.4
Lead	25	5	ug/l	5U	5U	5U	5U	5U	1.3U	1.8
Magnesium	35,000	500	ug/l	7,740	4,190	3,320	3,630	2,110	2,740	5,650
Manganese	300	10	ug/l	10U	10U	10U	10U	10U	2	2.8
Mercury	0.7	0.2	ug/l	0.2U	0.2U	0.2U	0.2U	0.2U	0.03U	0.04
Nickel	100	40	ug/l	40U	40U	40U	40U	40U	1.1U	1.15U
Potassium	--	2,000	ug/l	20,700	27,400	22,000	23,900	21,800	19,400	21,100
Selenium	10	5	ug/l	5U	5U	5U	5U	5U	3.5U	3.46U
Silver	50	10	ug/l	10U	10U	10U	10U	10U	0.53U	0.53U
Sodium	20,000	500	ug/l	13,100	15,200	14,300	15,700	14,300	12,700	14,000
Thallium	0.5	10	ug/l	10U	10U	10U	10U	20U	4.0U	3.97U
Vanadium	--	50	ug/l	50U	50U	50U	50U	50U	2.8	2.7
Zinc	2,000	20	ug/l	20U	83.1	20U	20U	20U	3.5	3.2

Notes:

ug/l - micrograms per liter

U-Not detected; detection limits shown

NA-Not analyzed

NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998

PQL-Practical Quantitation Limit

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

-- Not available

Table 4. Summary of Target Analyte List Metals Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

			Sample Designation:	GW-22						
			Sample Date:	6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
PARAMETERS	NYSDEC AWQSGVs	PQL	UNITS							
Aluminum	--	100	ug/l	550	18000	86,500	467	2,040	1,380	1,420
Antimony	3	60	ug/l	60U	60U	**79.4**	60U	60U	4.2	7.7
Arsenic	25	10	ug/l	10U	13.3	**44.3**	10U	10U	4.6	2.49U
Barium	1,000	20	ug/l	50.5	254	878	85.1	90.9	86.4	94.2
Beryllium	3	5	ug/l	5U	5U	5U	5U	5U	0.13U	0.130U
Cadmium	5	5	ug/l	5U	5U	5U	5U	5U	1.7	2.1
Calcium	--	500	ug/l	269,000	312,000	658,000	307,000	379,000	364,000	370,000
Chromium	50	10	ug/l	10U	36.4	**165**	10U	10U	3.9	5.7
Cobalt	--	50	ug/l	50U	50U	50U	50U	50U	4	2.3
Copper	200	20	ug/l	20.2	114	**411**	20U	32.2	26.6	17.3
Iron	300	100	ug/l	**4,010**	**28,900**	**120,000**	**5,920**	**16,000**	**16,200**	**17,300**
Lead	25	5	ug/l	9.6	**325**	**1260**	13.9	**37.2**	**26.2**	**27.9**
Magnesium	35,000	500	ug/l	**81,900**	**109,000**	**201,000**	**90,400**	**126,000**	**111,000**	**111,000**
Manganese	300	10	ug/l	**1,150**	**1,660**	**4,270**	**1,210**	**1,270**	**1,220**	**1,240**
Mercury	0.7	0.2	ug/l	0.2U	0.68	2.1	0.2U	0.2U	0.03	0.07
Nickel	100	40	ug/l	40U	40U	**115**	**40U**	40U	17.9	17.7
Potassium	--	2,000	ug/l	16,500	21,400	42,200	21,300	21,800	23,400	28,100
Selenium	10	5	ug/l	5U	5U	5U	5U	5U	3.5U	3.46U
Silver	50	10	ug/l	10U	10U	10U	10U	10U	0.53U	0.53U
Sodium	20,000	500	ug/l	**30,700**	**37,000**	**49,200**	**33,200**	**66,000**	**53,700**	**51,200**
Thallium	0.5	10	ug/l	10U	20U	50U	10U	20U	4.0U	3.97U
Vanadium	--	50	ug/l	50U	50U	169	50U	50U	4.2	4.1
Zinc	2,000	20	ug/l	20U	358	1170	20U	35.7	28.3	32

Notes:

ug/l - micrograms per liter

U-Not detected; detection limits shown

NA-Not analyzed

NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998

PQL-Practical Quantitation Limit

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

-- Not available

Table 4. Summary of Target Analyte List Metals Detected in Groundwater, Buffalo Outer Harbor/Radio Tower Area, Buffalo, New York

			Sample Designation:	GW-23						
			Sample Date:	6/26/2003	7/29/2003	8/23/2003	9/25/2003	11/14/2003	12/3/2003	12/16/2003
PARAMETERS	NYSDEC AWQSGVs	PQL	UNITS							
Aluminum	--	100	ug/l	100U	197	532	661	178	55	312
Antimony	3	60	ug/l	60U	60U	60U	60U	**78.9**	**14.7**	**25.4**
Arsenic	25	10	ug/l	10U	10U	10.5	10U	10.4	8.2	4.9
Barium	1,000	20	ug/l	93	120	343	370	345	260	220
Beryllium	3	5	ug/l	5U	5U	5U	5U	5U	0.13U	0.130U
Cadmium	5	5	ug/l	5U	5U	5U	5U	5U	1.4	0.75
Calcium	--	500	ug/l	266,000	301,000	254,000	187000	272,000	325,000	284,000
Chromium	50	10	ug/l	10U	10U	10U	10U	10U	0.92	3.6
Cobalt	--	50	ug/l	50U	50U	50U	50U	50U	5.3	1.9
Copper	200	20	ug/l	20U	20U	21.5	20U	20U	11.3	2.28
Iron	300	100	ug/l	**897**	**3,940**	**7,900**	**6270**	**3,470**	**11,900**	**5,600**
Lead	25	5	ug/l	5U	6.1	15.9	17.1	10	19	11.2
Magnesium	35,000	500	ug/l	**49,800**	**65,400**	**82,500**	**102,000**	**97,300**	**64,600**	**75,800**
Manganese	300	10	ug/l	**706**	**1,200**	**720**	**451**	**864**	**1,500**	**918**
Mercury	0.7	0.2	ug/l	0.2U	0.2U	0.2U	0.2U	0.2U	0.03U	0.04
Nickel	100	40	ug/l	40U	40U	40U	40U	40U	16.5	10.2
Potassium	--	2,000	ug/l	9,810	15,100	32,500	20700	49,300	69,200	45,600
Selenium	10	5	ug/l	5U	5U	5U	5U	5U	3.5U	3.46U
Silver	50	10	ug/l	10U	10U	10U	10U	10U	0.53U	0.53U
Sodium	20,000	500	ug/l	17,100	**24,900**	**58,000**	**83900**	**80,600**	**49,700**	**48,100**
Thallium	0.5	10	ug/l	10U	10U	10U	10U	20U	4.0U	3.97U
Vanadium	--	50	ug/l	50U	50U	50U	50U	50U	1.7	1.9
Zinc	2,000	20	ug/l	20U	28.8	23.7	20U	20U	11.2	6.7

Notes:

ug/l - micrograms per liter

U-Not detected; detection limits shown

NA-Not analyzed

NYSDEC AWQSGVs-New York State Department of Environmental Conservation Ambient Water-Quality Standards and Guidance Values, June 1998

PQL-Practical Quantitation Limit

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

-- Not available

8.17.05

QUADRANGLE LOCATION

SOURCE:
USGS; 1965. Buffalo, NY
7.5 Minute Topographic Quadrangle

N

0 2000'

Title:

SITE LOCATION MAP

BUFFALO OUTER HARBOR/RADIO TOWER AREA

Prepared for:

HONEYWELL

ROUX ASSOCIATES, INC. *Environmental Consulting & Management*	Compiled by: W.S.	Date: 11FEB03	FIGURE 1
	Prepared by: R.K.	Scale: 1:25000	
	Project Mgr.: G.N.	Office: NY	
	File No.: AI0310903.CDR	Project No.: 25203Y02	

8.1.05

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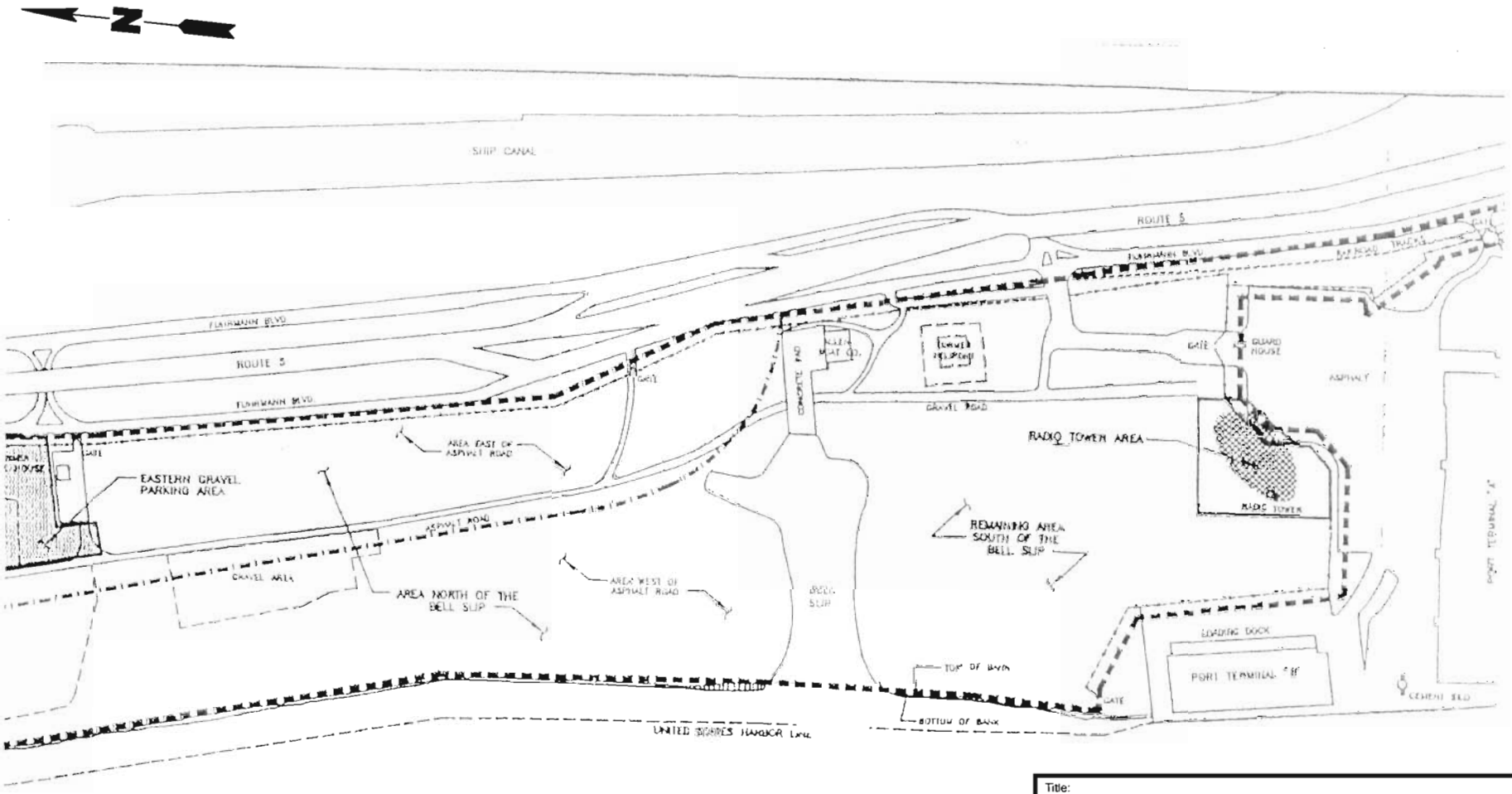


LEGEND

- INVESTIGATION AREA BOUNDARY
- FENCE LINES
- SITE BOUNDARY/RTA
- APPROXIMATE DELINEATION OF FUHRMANN BLVD. LANDFILL
- GRAVEL PARKING AREA

Title:

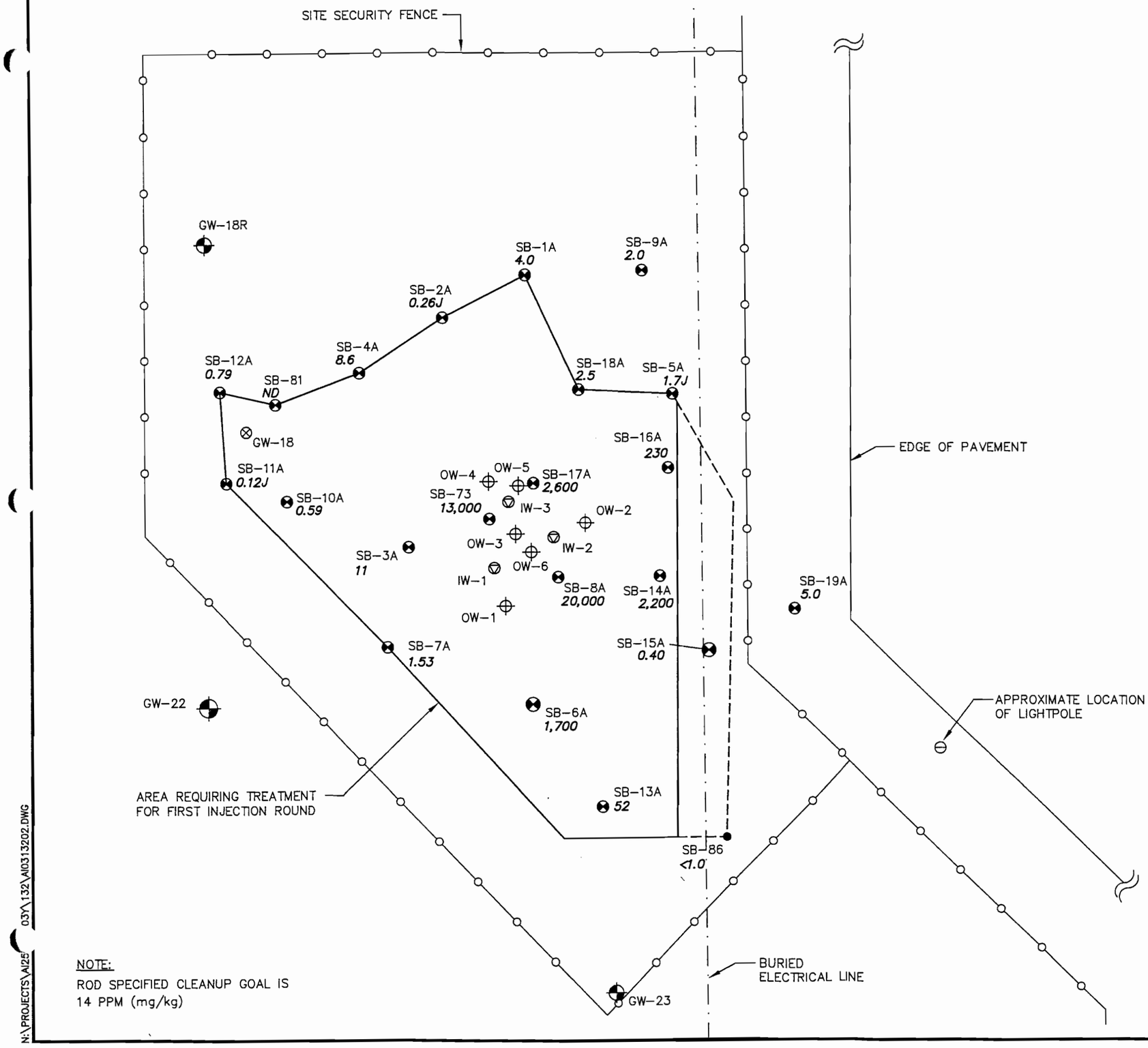
SITE MAP

Prepared for:

HONEYWELL INTERNATIONAL, INC.

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: W.S.	Date: 11FEB03	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	2
Project Mgr.: G.N.	Office: NY	
File No.: AI0313205.CDR	Project No.: 25203Y02	



NOTE:
ROD SPECIFIED CLEANUP GOAL IS 14 PPM (mg/kg)

LEGEND

- SB-86 ● FORMER SOIL BORING LOCATION FROM PHASE I/II RI
- OW-1 ⊕ FORMER PILOT TEST OBSERVATION WELL LOCATION
- IW-1 ⊽ FORMER PILOT TEST INJECTION WELL LOCATION
- GW-18 ⊗ FORMER MONITORING WELL LOCATION
- SB-15A ⊗ PRE-REMEDIATION SOIL BORING LOCATION
- GW-22 ⊕ EXISTING MONITORING WELL LOCATION
- ⊖ LIGHT POLE
- *0.59* NITROBENZENE CONCENTRATIONS (mg/kg)
- *J* ESTIMATED CONCENTRATION
- *ND* NOT DETECTED

20' 0 20'

Title:
PRE-TREATMENT SOIL BORING LOCATIONS AND RESULTS

Prepared For:
HONEYWELL INTERNATIONAL, INC.

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.H.	Date: 07JAN04	FIGURE 3
Prepared by: G.M.	Scale: AS SHOWN	
Project Mgr: G.N.	Office: NY	
File No: AI0313202	Project: 25203Y04	

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SITE SECURITY FENCE

GW–18R

PTSB–1 7.5

PTSB–5 27.0

PTSB–2 23

PTSB–10 9.1

PTSB–20 14

PTSB–21 10

PTSB–7 590

PTSB–6 76

PTSB–3 1.2U

PTSB–18 1,000

PTSB–11 43

PTSB–17 650

PTSB–19 230

PTSB–8 120

PTSB–12 760

PTSB–16 920

PTSB–4 1.4

PTSB–15 220

GW–22

PTSB–13 1,200

PTSB–9 0.046J

PTSB–14 590

AREA REQUIRING TREATMENT FOR FIRST INJECTION ROUND

EDGE OF PAVEMENT

APPROXIMATE LOCATION OF LIGHTPOLE

BURIED ELECTRICAL LINE

GW–23

NOTE:

ROD SPECIFIED CLEANUP GOAL IS 14 PPM (mg/kg)

CROSS CONTAMINATION

SOIL BORING	SAMPLE DEPTH (ft)	NITROBENZENE CONCENTRATION (mg/kg)
PTSB–6	6–8	110
PTSB–7	4–8	150
PTSB–10	4–6	12
PTSB–11	4–6	100
PTSB–16	4–8	1,500

N

LEGEND

GW–22 ⊕	EXISTING MONITORING WELL LOCATION
⊖	LIGHT POLE
PTSB–18 ⊕	POST–TREATMENT SOIL BORING LOCATION
0.59	NITROBENZENE CONCENTRATIONS (mg/kg)
J	ESTIMATED CONCENTRATION
ND	NOT DETECTED

20' 0 20'

Title:

POST-TREATMENT SOIL BORING LOCATIONS AND RESULTS FIRST ROUND

Prepared For: HONEYWELL INTERNATIONAL, INC.

ROUX ASSOCIATES, INC. Environmental Consulting & Management

Compiled by: J.H.	Date: 07JAN04	FIGURE 4
Prepared by: G.M.	Scale: AS SHOWN	
Project Mgr: G.N.	Office: NY	
File No: AI0313203	Project: 25203Y04	

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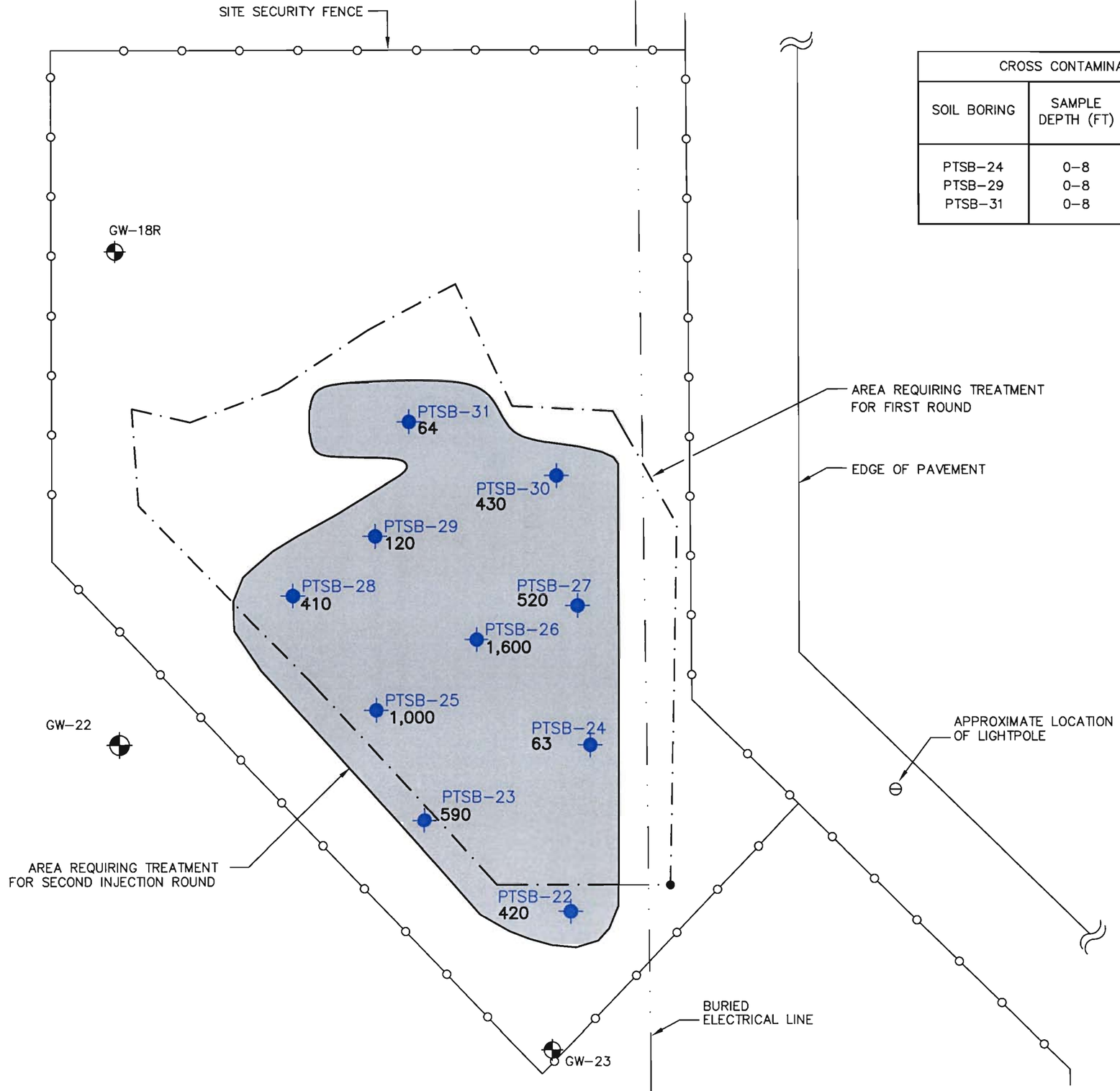
CROSS CONTAMINATION		
SOIL BORING	SAMPLE DEPTH (FT)	NITROBENZENE CONCENTRATION (mg/kg)
PTSB-24	0-8	1,600
PTSB-29	0-8	500
PTSB-31	0-8	500



LEGEND

- GW-22 — EXISTING MONITORING WELL LOCATION
- ⊖ — LIGHT POLE
- PTSB-22 — SECOND ROUND POST-TREATMENT SOIL BORING LOCATION
- *0.59* — NITROBENZENE CONCENTRATIONS (mg/kg)
- *J* — ESTIMATED CONCENTRATION
- *ND* — NOT DETECTED
- ——— REMEDIATION AREA (SECOND ROUND)
- — · — · — REMEDIATION AREA (FIRST ROUND)

20' 0 20'

Title:
POST-TREATMENT SOIL SAMPLE LOCATIONS FOR THE SECOND INJECTION ROUND

Prepared For: HONEYWELL INTERNATIONAL, INC.

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.H.	Date: 07JAN04	FIGURE
Prepared by: R.K.	Scale: AS SHOWN	
Project Mgr: G.N.	Office: NY	5
File No: AI0313204	Project: 25203Y04	

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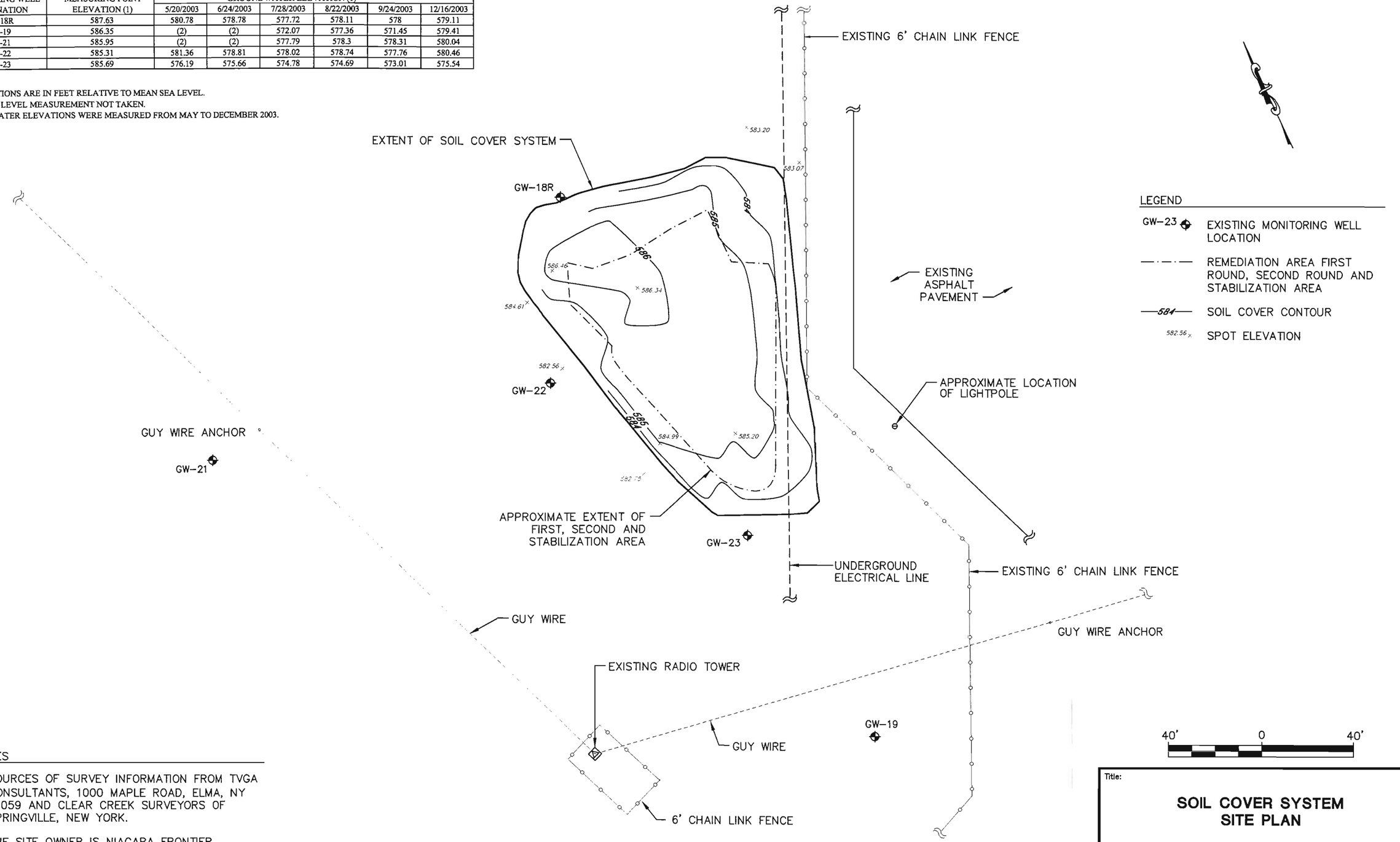
MONITORING WELL DESIGNATION	MEASURING POINT ELEVATION (1)	GROUNDWATER ELEVATION (1)					
		5/20/2003	6/24/2003	7/28/2003	8/22/2003	9/24/2003	12/16/2003
GW-18R	587.63	580.78	578.78	577.72	578.11	578	579.11
GW-19	586.35	(2)	(2)	572.07	577.36	571.45	579.41
GW-21	585.95	(2)	(2)	577.79	578.3	578.31	580.04
GW-22	585.31	581.36	578.81	578.02	578.74	577.76	580.46
GW-23	585.69	576.19	575.66	574.78	574.69	573.01	575.54

NOTES:
(1) ELEVATIONS ARE IN FEET RELATIVE TO MEAN SEA LEVEL.
(2) WATER LEVEL MEASUREMENT NOT TAKEN.
GROUNDWATER ELEVATIONS WERE MEASURED FROM MAY TO DECEMBER 2003.



NOTES

1. SOURCES OF SURVEY INFORMATION FROM TVGA CONSULTANTS, 1000 MAPLE ROAD, ELMA, NY 17059 AND CLEAR CREEK SURVEYORS OF SPRINGVILLE, NEW YORK.
2. THE SITE OWNER IS NIAGARA FRONTIER TRANSPORTATION AUTHORITY (NFTA).
3. THE ELEVATIONS OF THE SOIL COVER SYSTEM CONTOURS AND SPOT ELEVATIONS ARE BASED ON NAD 83 HORIZONTAL AND NAD 88 VERTICAL DATUMS.

Title:

SOIL COVER SYSTEM SITE PLAN

Prepared For:
HONEYWELL INTERNATIONAL, INC.

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: G.N.	Date: 15AUG05	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	6
Project Mgr: G.N.	Office: NY	
File No: AI0313210v2	Project: 25203Y04	