Remedial Investigation/ Feasibility Study Work Plan

Astro Electroplating Site - 170 Central Avenue, Farmingdale, NY 11735
Order on Consent: W1-1147-10-01
Site: 1-52-036

Client:
Astro Electroplating, Inc.
171 Fourth Ave
Bay Shore, NY 11706

August 30, 2015

Revised 8/30/2015

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File: ASTRO RI FS WORK PLAN August 30 2015

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1.1 INTRODUCTION

On behalf of 170-176 Associates, LLC, (Respondent), CPR, Inc. Environmental, Inc. (CPR, Inc.) prepared this Remedial Investigation/Feasibility Study (RI/FS) Work Plan as required by the Order on Consent and Administrative Settlement (Order on Consent) between the New York State Department of Environmental Conservation (NYSDEC) and the Respondent. The Order on Consent is identified as W1-1147-10-01 for Site Number 1-52-036. The Site is located at 170 Central Avenue, Farmingdale, NY and is listed as the Astro Electroplating, Inc. Site on the Registry of Inactive Hazardous Waste Disposal Sites in New York State (the State Registry). Hereinafter, it will be referred to as the Site. The Respondent is the current owner of the Site.

The Site is currently listed on the State Registry as a Classification "2" site pursuant to ECL 27-1305. Astro Electroplating, Inc. (Astro), was a long-term tenant and operator of the Site, and executed two orders on consent for the Site, one to conduct a Remedial Program (Index No. W1-0759-01-04, dated January 7, 2002) and the other to conduct a RI/FS of the Site (Index 4W1-0759-96-06, dated November 12, 1997). Astro has not completed the work required by either of these two orders on consent. In addition, when Astro ceased operations at the Site, it was required to close its facility in accordance with the NYSDEC Hazardous Waste Part 373 Regulations, which closure activities are overseen by the NYSDEC. However, Astro has not completed this required closure work.

The Order on Consent requires the Respondent to submit a Work Plan for a RI/FS for Operable Unit 2 (OU-2). OU-2 addresses the groundwater contamination at and emanating from the Site and the delineation and remediation of one or more Underground Injection Control structures which may be contaminated by the past operations of Astro. This Work Plan presents the scope of work to address the Order on Consent. The Work Plan was prepared in accordance NYSDEC DER-10 Guidance.

Based on the review of the existing documents and the requirements of the current Order on Consent for OU-2, the following scope of work is proposed.

<u>On-site Underground Injection Control (UIC) Investigation</u>

Based on prior knowledge of site by CPR, Inc., the suspect UIC structure was cleaned out during Astro's remediation work completed in the late 1980s but the UIC structure was left in place due to its location adjacent to the building and concerns with undermining the building if it was removed. CPR, Inc. had prepared hand-sketches depicting the location of the structures are included in Appendix A. The purpose of the current investigation will be to identify the location of the UIC structure(s) and ascertain if they had been properly remediated, addressing the Order on Consent's requirement to delineate and remediate the UIC features. The scope will include:

- Ground penetrating radar (GPR) to identify the location of the UIC structure(s).
- Drill soil borings in and around the identified UIC structure(s), collect soil samples and analyze the samples for the metals of concern.

OU-2 Groundwater Investigation

To address the Order on Consent's requirement to address the *groundwater contamination at and emanating from the site*, the following preliminary scope of work is proposed:

- Measure groundwater table elevations at the seven existing on-site monitoring wells (or as many as available) and the one extraction well under static conditions. Survey the top of well casing elevations. The groundwater table elevations and survey data will be used to prepare a groundwater level contour map and confirm groundwater flow direction.[1]

- Collect groundwater samples from the existing on-site monitoring wells and the extraction well and analyze the samples for the metals of concern (chromium, copper, nickel, zinc, and arsenic) to determine the current groundwater water quality.[2]

- Profile the aquifer water quality downgradient of the Site. Collect groundwater samples at various depths for the laboratory analyses of metals of concern at five GeoProbe-driven temporary well sampling points located along a transect on the south side of Central Avenue in the vicinity of the existing extraction well and downstream the groundwater flow direction near the Site. Drill and sample temporary wells to profile aquifer water quality at additional locations, if needed, based on the results of the five sampling locations on the south side of Central Avenue.

  The information will be used to determine the quality of the groundwater downgradient of the Site boundary. The aquifer profile data will be used to determine if a groundwater contamination plume exists that is emanating from the Site and if so, to estimate the vertical and areal extent of such a plume and to determine whether there is a need for one or more permanent off-Site monitoring wells. The information will also be used to determine the scope of groundwater remedial alternatives if a groundwater contamination plume emanating from the Site is detected.

[1] During a recent site reconnaissance, MW-2 and MW-3 could not be found and MW-1 may have been covered with debris inside the fenced area and/or destroyed. Because of the number and locations of the other wells, if one or more of these 3 wells are not available to be gauged, the water table elevations of the other four wells will be used to determine groundwater flow.

[2] If MW-1, MW-2 or MW-3 are not able to be sampled, the other existing wells should be sufficient to determine the on-site groundwater quality.

2.0 SITE DESCRIPTION AND HISTORY

The 2.9 acre Site is located at 170 Central Avenue in the Town of Babylon, Suffolk County, New York. It is located on the north side of Central Avenue in a commercial/industrial area. The Site contains one multi-tenant industrial building. A paved parking lot surrounds the building. See the Location Map and Site Plan on following page.

The Site is generally flat and is covered with asphalt and concrete. The Site is situated approximately 94 feet above mean sea level. The upper glacial deposits are located directly below the surface and extend to a depth of 144 feet bgs. The soil consists primarily of coarse grained sand and is characteristic of outwash plain deposits. The depth to water is approximately 37 feet bgs, and flows south-southeast. The Magothy aquifer lies below the upper glacial aquifer. This aquifer is 600 feet thick and consists of moderately to highly permeable sediments. The Magothy formation is a primary source of drinking water for this portion of Long Island. The Lloyd aquifer lies below the Magothy aquifer and is 350 feet thick. Below the Lloyd aquifer is bedrock.

The Astro facility occupied 9,700 square feet of space at the north end of the industrial building. Astro electroplated nickel, chromium and copper on premolded plastic components. Astro's use and occupation of the Site extended over the course of several decades. Until 1986, Astro discharged approximately 400,000 gallons per year of wastewater into a leaching pool at the Site. Although Astro had a State Pollution Discharge Elimination System (SPDES) permit for this leaching pool during that period, Astro was found to have discharged wastewater into the leaching pool that contained heavy metals in concentrations exceeding the allowable limits in Astro's SPDES permit. As a result, the Site was listed on the State Registry in 1983 as a Class 2a site, a temporary classification that is used by the NYSDEC until further information is collected.

Pursuant to the Order on Consent, a Records Search Report was prepared by the Respondent and was submitted to NYSDEC on October 15, 2010. The report was subsequently reviewed and approved by the NYSDEC.

Figure 1 Location Map

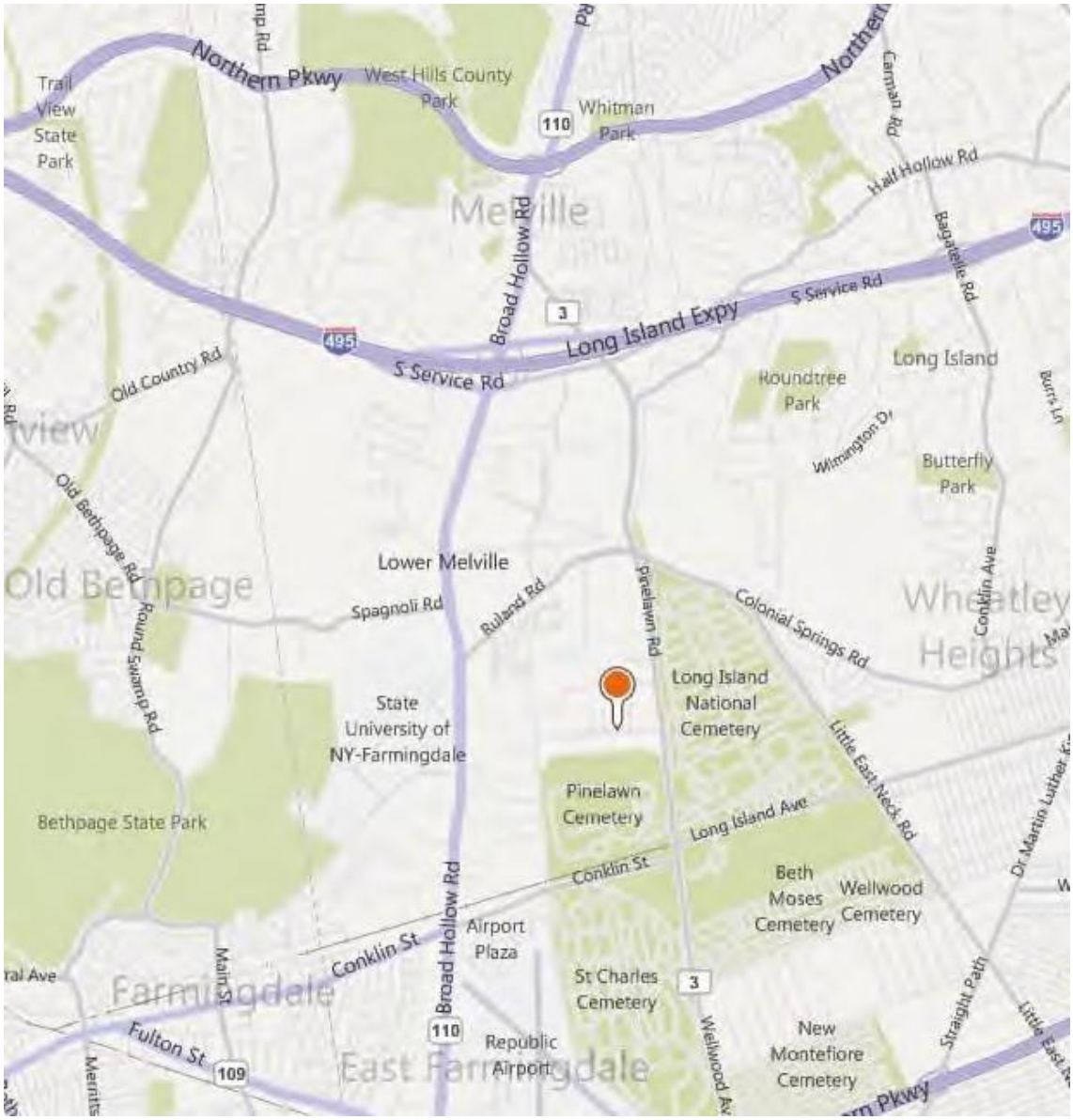
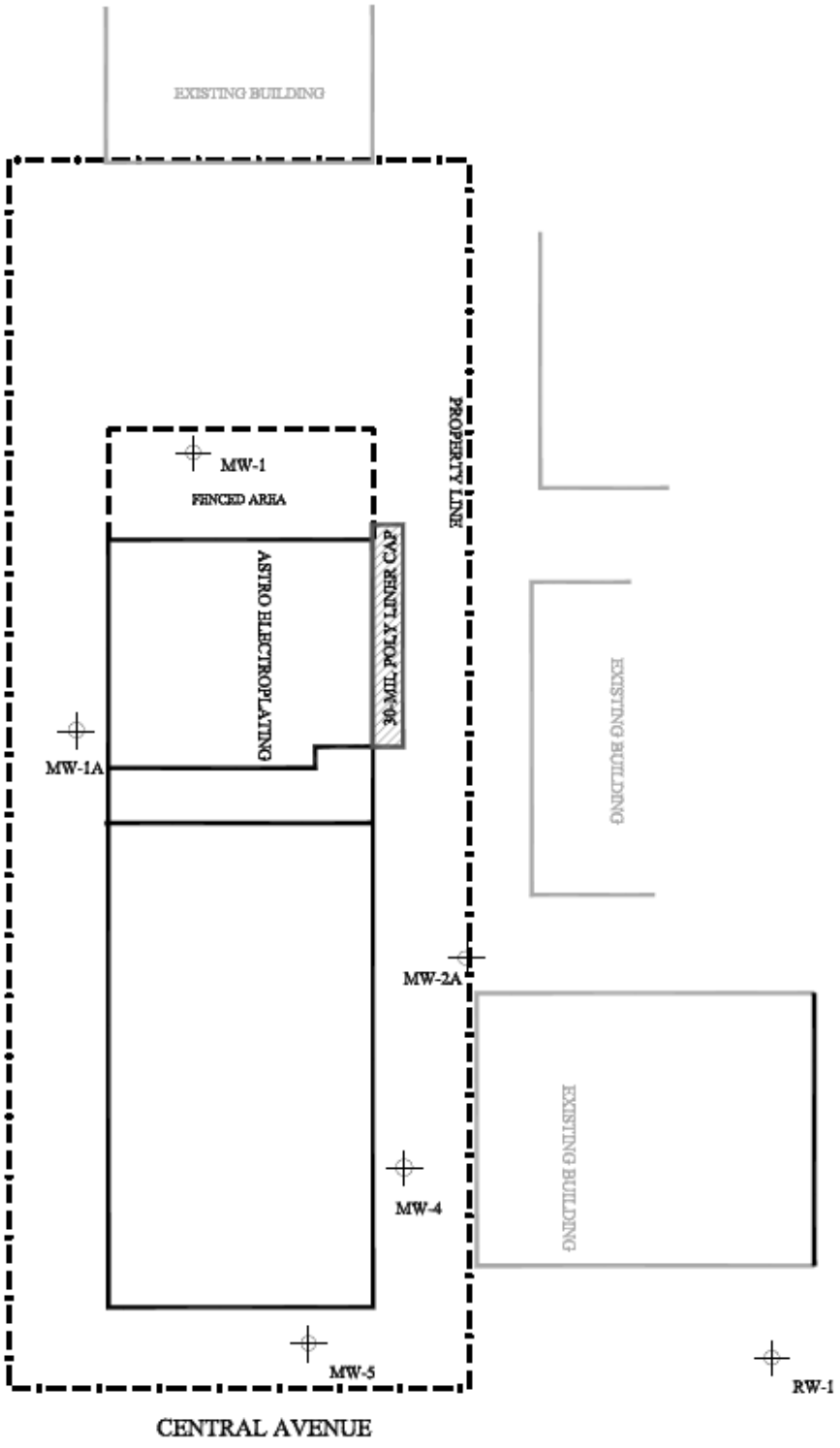


Figure 2 Site Plan



3.1 PRIOR INVESTIGATION AND REMEDIATION SUMMARY

The Record Search Report (October 15, 2010) prepared by Edgewater, Inc, the owner's environmental consultant for the Site provides a summary of the prior investigations and remediation conducted on the Site. The following is an abbreviated summary of the prior investigation and remedial work. The scope of the current investigation is based on the findings of these earlier actions.

Initial Investigations - 1986 through the 1990s

In 1986, four leaching pools which lacked permits were discovered on the east side of the site. These four leaching pools, along with the one leaching pool, mentioned above that had a SPDES permit, had been receiving Astro's plating waste discharges. Astro subsequently removed the liquids and sludge from all five leaching pools in October 1986 under the supervision of the Suffolk County Department of Health Services (SCDHS). Although the depth of this excavation is not known, typical leaching pools on Long Island are 10-12 feet below ground surface (bgs), with a typical leaching pool remediation removing 2 to 3 feet of soil from below the bottom of a drywell, bringing the total depth to 15 feet bgs. This estimated depth is corroborated by the data contained in Astro's Remedial Investigation report which reported finding native soil at 15 to 17 feet bgs. According to SCDHS records, unpermitted leaching pools #1 and #2 had the precast rings completely removed. Unpermitted leaching pools #3 and #4 were power washed and the precast rings were left in place. The permitted leaching pool was also cleaned out. The four unpermitted pools and one permitted pool were then backfilled with clean soil and closed. However, no action was taken at the time to evaluate the groundwater beneath these leaching pools. Once these five leaching pools were cleaned out and closed, wastewater from Astro's plating process was treated by an on-site wastewater treatment system which discharged into the municipal sanitary sewer system.[3]

Pursuant to the first order on consent that Astro signed with the NYSDEC, Astro conducted a preliminary investigation in 1989, which included subsurface soil and groundwater sampling. Chromium was detected in soil samples at concentrations above 2,000 parts per million (ppm), exceeding the guidance value of 50 ppm. Concentrations of chromium in groundwater samples were greater than 2,000 parts per billion (ppb), exceeding the groundwater standard of 50 ppb.

In 1991, SCDHS discovered two illegally installed collection pits that Astro had installed in the floor of its facility. It is unknown when Astro installed these pits. The pits were not sealed and collected plating chemicals that spilled on the plating room floor. The volume of wastewater that Astro spilled into these collection pits is unknown.

In January 2001, the NYSDEC divided the Site investigation and remediation into two operable units, soil contamination (0U1) and groundwater contamination (0U2). NYSDEC took this action after the soil investigation was complete and a permanent remedy for the soil contamination had been selected by the NYSDEC. Although the NYSDEC requested that Astro undertake the work required to investigate and remediate OU-2, Astro refused to do so.

[3] The Site was reclassified as a Class 2 Site in 1986.

Remedial Investigation (RI) - 1997 and 2000

Astro conducted the Remedial Investigation (RI) of the on-site conditions in two phases, with the first phase conducted between November 1997 and July 2000 and the second phase conducted between August and November 2000. A report entitled "Remedial Investigation/Feasibility Study Report" was prepared on behalf of Astro to describe the field activities and findings of the RI in detail. The RI included the following activities:

- Conducting a ground penetrating radar survey to locate underground drainage structures;
- Collecting soil samples from eleven GeoProbe borings to determine the extent of contamination in the former leaching pool area;
- Obtaining sediment samples from the ten on-site storm water dry wells to determine the extent of contamination in these drainage structures;
- Collecting three soil samples from beneath the factory building;
- Collecting groundwater samples from eleven GeoProbe boring locations to determine the on-site groundwater quality;
- Installing two new monitoring wells on-site; and
- Sampling two new monitoring wells and five existing monitoring wells to determine on-site groundwater quality.

To determine which media (soil, groundwater, etc.) were contaminated at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater and drinking water SCGs identified for the Site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of New York State Sanitary Code. The NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 was used for soil cleanup guidelines based on the protection of groundwater, background conditions, and health-based exposure scenarios.

The soil samples collected during the RI were from the former leaching pool area and from beneath the floor slab. Several soil samples in the area of the former leaching pools exceeded SCGs. The depths of soil samples exceeding SCGs ranged from 15 to 38 feet bgs. The RI reported that since the water table was found at 37 feet bgs, no soil samples were collected below 38 feet bgs. A sample collected inside the former permitted leaching pool contained a chromium concentration of 498 ppm, exceeding the SCG of 50 ppm. The highest chromium concentrations in the four former unpermitted leaching pools ranged from 90 ppm to 281 ppm. SCGs for copper (25 ppm) were also exceeded in the former permitted leaching pool (43 ppm) and in the unpermitted leaching pool LP-4 (111 ppm).

Inside the Astro facility, four samples were collected from below the two former collection pits and one sample was collected beneath the process floor. Both pits had chromium (4.5 to 1,020 ppm), copper (4 to 50 ppm), and nickel (22 to 26 ppm) levels that exceeded SCGs. The sample beneath the process floor exceeded SCGs for copper (131 ppm) and nickel (29.4 ppm). The SCG for nickel was 13 ppm. During the RI, sediment samples were collected from the bottom of the ten on-site storm water dry wells. Chromium and copper concentrations exceeding the SCGs were found in the samples from all ten dry

wells, with chromium concentrations ranging from 84 to 1,550 ppm and copper levels from 143 to 2,490 ppm. Mercury [non-detect (ND) to 2.5 ppm] and nickel (66 to 677 ppm) also exceeded the SCGs in several of the dry wells. The SCG for mercury in soil was 0.1 ppm.

In response to the high metals concentrations in the dry wells, Astro was ordered to conduct an Interim Remedial Measure (IRM) to remove contaminated sediments from the dry wells. Following this remedial work, confirmatory samples were collected from each dry well. These post-remedial samples still exhibited exceedances of the SCGs.

Two rounds of groundwater sampling were conducted during the RI. During the first round (November 1998), both GeoProbe and monitoring well samples were obtained. GeoProbe samples were obtained beneath and downgradient of the five former leaching pools. SCGs were exceeded for antimony, arsenic, chromium and copper in groundwater samples taken below all five former leaching pools. Lead, nickel and mercury also exceeded groundwater standards beneath the majority of the pools. Thallium exceeded the groundwater SCG of 0.5 ppb in LP-1 (maximum 10.4 ppb), LP-3 (maximum 7.2 ppb), and LP-4 (maximum 29.5 ppb). Groundwater SCGs for antimony, arsenic, chromium, copper, lead, mercury, and nickel were 3 ppb, 25 ppb, 50 ppb, 200 ppb, 25 ppb, 0.7 ppb, and 100 ppb, collectively. The metals concentrations were less than the SCGs in the upgradient samples.

In addition to the leaching pool samples, four GeoProbe borings were installed in the eastern parking lot of the Site. All four samples exceeded SCGs for antimony, chromium, copper, and lead. Three samples exceeded groundwater standards for nickel.

The seven on-site monitoring wells were sampled during both phases of the RI. The first round of well sampling was performed in November 1998 using a conventional sampling pump. All samples were unfiltered. The four monitoring wells located in the east parking lot (MW-2, 2A, 3, and 4) exceeded groundwater standards for antimony (6.3-72.6 ppb), arsenic (ND to 175 ppb), chromium (751-16,400 ppb), copper (1,130-10,600 ppb), lead (113-736 ppb), mercury (0.1-1.5 ppb), and nickel (413-5,650 ppb). Chromium, copper, lead and nickel were found in well MW-1 at the upgradient edge of the Site at 267 ppb, 586 ppb, 167 ppb and 187 ppb, collectively. MW-5, located at the south end of the building, exceeded the groundwater SCG for lead (98.5 ppb). However, no additional exceedances of SCGs were detected in MW-5.

The second round of sampling was conducted in September 2000 using low flow sampling techniques to minimize the turbidity of the samples. All samples were unfiltered. Metals concentrations did not exceed SCGs in the upgradient wells. In three of the four wells in the east parking lot (MW-2, 2A, and 3), all of the metals except chromium (86.7-926 ppb) were less than the SCGs. The decreasing concentrations were partially attributed to the lower sample turbidities. However, MW-4, the furthest downgradient monitoring well, exhibited chromium, copper and nickel increases that were nine, two, and three times their Round 1 values, collectively. Based upon the metals concentrations in MW-2, MW- 2A and MW-3 decreasing from the first round to the second round, and the concentration increases observed in MW-4, Astro concluded that groundwater contamination was migrating downgradient.

Interim Remedial Measures (IRM)

Drywell IRM (OU-1):
In May and June 2000, Astro, as the responsible party, conducted an IRM at the site to remediate the ten dry wells that were found to be contaminated in the RI.

The IRM remediation was accomplished using a vacuum truck. First, the standing water was removed from each dry well and was placed into drums. Next, the sludge in each dry well was vacuumed and placed into drums. Finally, the contaminated sediment was removed from the bottom of the dry well and was placed in roll-off dumpsters. An end point sample was obtained from each dry well after sediment removal was completed. The dry wells were then backfilled with clean sand. Material removed from the dry wells was disposed of as non-hazardous waste. The endpoint samples in three of the ten drywells marginally exceeded SCGs and the difference in depth between the bottom of the drywells (approximately 15 feet bgs) and the water table (37 feet bgs) is approximately 22 feet. It was believed that the possibility of the residual contaminants leaching and impacting the groundwater would be unlikely. The locations of the remediated dry wells are shown on the site plan.

Groundwater IRM (OU-2A):
The groundwater IRM involved the installation of an extraction well to pump contaminated groundwater to the surface. This installation operated until its closure in 2012.

Land Air and Water (LAWS) under the supervision of CPR, Inc. on behalf of Astro installed a one 4-inch recovery well to a depth of 60 feet bgs. The recovery well was constructed of 30 linear feet of schedule 40 PVC screen and approximately 30 linear feet of schedule 40 PVC riser. A concrete service box with a cast iron manhole and access cover was used to house the recovery well and the necessary piping. Astro pumped the extracted groundwater into the treatment system at the facility and discharged it into the municipal sewer. The pump operated at less than 10 gallons per minute for 8 to 10 hours a day.

The groundwater IRM was intended to treat the most contaminated portion of the plume until a comprehensive groundwater investigation was to be completed under OU 2.

Soils in Former Leaching Pool Area
To prevent future storm water infiltration through any residual soil contamination in and around the former leaching pools area, Astro installed a cap over this area with a 30-mil PVC membrane overlaid with six inches of asphalt cover.

The NYSDEC selected remedial alternative for OU-2A at the Site included the pump and treat system described above. The detailed analysis of the remedy included the assumption that additional groundwater investigation work would be done to define the downgradient extent of the plume and that a monitoring well network would be installed as part of the OU-2 remedy. In addition to monitoring the wells presently on-site, additional monitoring wells were contemplated to be installed downgradient to assess the progress of groundwater remediation system installed under OU-2A.

Astro's RI report states that there are other sources of groundwater contamination in the vicinity of the Astro Site. Given the south-southeast groundwater flow direction as determined in the RI report, the Tronic Plating site impacts groundwater quality in the area of the Astro site. The RI report states that Tronic Plating was a former metal electroplating and anodizing facility which operated from July of 1968 to March of 1984 and was located at 168 Central Avenue directly west of the Astro Site. The Tronic facility was served by four industrial leaching pools, one sanitary septic leaching pool, one drywell and several on-site storm drains which may have received discharges from Tronic Plating's activities. The total amount of wastewater discharged during Tronic's operation was estimated at 20 million gallons. Samples collected from the leaching pools at the Tronic site by the New York State Department of Health (NYSDOH) in 1985 detected heavy metals including copper, silver, iron, zinc, lead and cadmium. An RI/FS investigation was conducted at the Tronic facility beginning in 1988 and detected significant concentrations of cadmium, cyanide, chromium and lead in sediments sampled from the storm drains as high as 1,130 ppm, 92 ppm, 1,580 ppm and 2,290 ppm respectively. A removal action consisting of soil removal from the on-site leaching pits and storm drains at the Tronic site was completed in August of 1993 and all known disposal areas have been remediated to NYSDEC approval levels. The remediated areas were backfilled and subsequently paved. A groundwater monitoring program for the Tronic site was instituted to assure that the site-related contaminants were adequately controlled by the remedial action. The Tronic RI states that groundwater sampling has yielded inconsistent results, indicating the need for further monitoring. A Record of Decision for the Tronic site was issued in September of 1993.

Astro Facility Hazardous Waste Closure Records

The NYSDEC files confirm that Astro, the facility operator, was required to comply with the New York State Part 373: Hazardous Waste Management Facilities Closure regulations. Astro submitted a September 5, 2007 Partial Closure Plan to the NYSDEC. Astro's Plan, however, did not address all of the requirements of the NYS Hazardous Waste Closure Regulations. The records review indicates that Astro has not met the Closure requirements and has not yet completed the closure tasks in its partial closure plan. The Closure regulations require decommissioning of the facility including all hazardous waste container and tank storage areas, hazardous waste residues at the facility to soil groundwater, building structures, equipment structures and facility process areas. Astro's Partial Closure Plan does not address the hazardous waste residues in the facility and the methods to decontaminate the building where residues are present.

A Closure plan which addresses the above-stated shortfalls will be prepared and submitted to NYSDEC at the end of 2015.

4.0 WORK PLAN

4.1 Areas and Compounds of Concern

The Order on Consent requires that the Respondent investigate the on-site UIC structures and the groundwater at and emanating from the Site. These two items are collectively covered in OU-2. The Areas of Concern (AOC) are the area south of the impervious cap installed as part of the IRM, and the groundwater quality in the area of the site boundary along the east property line and along Central Avenue in the area of the existing recovery well, and offsite.

The compounds of concern (COC) that have been identified in the NYSDEC-previously approved RI study are chromium, copper, nickel, zinc, and arsenic.

4.2 Scope of Investigation

Based on the review of the existing documents and the requirements of the current Order on Consent, the following scope of work is proposed.

OU-2 On-site Underground Injection Control (UIC) Investigation

The purpose of the current investigation will be to identify the location of the UIC structure(s) and ascertain if the UIC structure(s) were previously remediated. The work will include:

- Ground penetrating radar (GPR) survey to identify the location of the UIC structure(s). The extent of the structures will be marked out on the asphalt.
- After the locations of the UIC structures are identified, a GeoProbe rig will be used to drill soil borings and collect soil samples in and around the UIC structure(s), and samples will be analyzed for the COCs.
- One boring will be driven through the inside of the structure with four borings immediately outside the structure. Two soil samples from each boring will be collected based on field observations. The samples to be analyzed from each boring will be based on visual characteristics of the soil with one sample collected in the affected soil (if present) and a second sample from the visually unaffected soil to determine the vertical extent of the impacted soil. Since there is reportedly one structure, ten soil samples are anticipated (exclusive of QA/QC samples).
- To assess the potential for exposure should the asphalt parking lot deteriorates or is replaced, two soil samples will be collected from immediately beneath the sub-base. The samples will be analyzed for the COCs.

OU-2 Groundwater Investigation

To address the Consent Order's requirement to address the *groundwater contamination at and emanating from the site*, the following scope of work is proposed:

Task 1

- Obtain water level measurements at the existing on-site wells and the extraction well under static conditions. Survey the top of well casing elevations. The water level and survey data will be used to prepare a water level contour map and confirm groundwater flow direction.

- Collect groundwater samples from the monitoring wells and the extraction well and analyze the samples for the COC (chromium, copper, nickel, zinc, and arsenic) to determine the current on-site groundwater water quality. Both unfiltered and filtered water samples will be collected for analysis.

Task 2

- Based on the groundwater flow direction, a transect of five downgradient aquifer vertical profiling locations will be proposed to the NYSDEC before proceeding.

- The groundwater quality downgradient of the Site will be profiled to determine the location and width of the plume (if any) and the vertical extent of a groundwater contaminant plume (if any) emanating from the Site. Groundwater samples will be collected at various depths for the laboratory analyses of the COC using five GeoProbe-driven temporary well sampling points located along a transect on the south side of Central Avenue in the vicinity of the existing extraction well and downgradient the Site. Additional temporary wells will be drilled and sampled to profile aquifer water quality, if needed, based on the results of the five sampling locations on the south side of Central Avenue.

The information will be used to determine the quality of the groundwater downgradient of the Site boundary. The aquifer profile data will be used to determine if a groundwater contamination plume exists that is emanating from the Site and if so, to estimate the vertical and areal extent of such a plume and to determine whether there is a need for one or more permanent off-site monitoring wells. Such as, if indications of a plume containing the COCs are detected in the either the eastern-most or western-most temporary wells, additional wells will be proposed to further delineate the extent of the plume.

The information will also be used to determine the scope of groundwater remedial alternatives if a groundwater contamination plume emanating from the Site is detected.

4.2.1 On-Site Drainage Structures

The approximate extent of the geophysical survey is shown on the following site plan. The extent was estimated based on the hand sketches from previous reports of the UIC structures, included in Appendix A. The site plan delineating the area to be surveyed is included in Appendix B. The geophysical survey and the sampling in and around the drainage structure will be performed in accordance with the QAPP (Appendix D).

4.2.2 Groundwater

The existing on-site groundwater monitoring wells will be surveyed and gauged. The locations are shown on the On-Site Drainage Structures site plan included in Appendix B.[4] Based on the water table elevation information collected, the depth to groundwater will be determined and the flow direction will be estimated.

Based on the presumed groundwater flow direction reported to NYSDEC in the OU-1 RI and for presentation purposes the locations of the aquifer profile sampling points are shown on Figure 2 in Appendix B. These locations are based on previous work plans submitted by others. The five aquifer profiling points will be installed along the south side of Central Avenue. Additional profiling points may be needed to delineate the horizontal extent of the plume, however, the locations will be based on the findings of the initial five locations.

The locations of the groundwater profiling points will be determined based on the current contour maps and flow direction estimation. Preliminary locations will be spaced approximately 40 feet apart to provide a 160 foot wide transect.

The anticipated maximum depth of the profile will be approximately 70 to 75 feet below grade with groundwater samples collected at 10-foot intervals moving upwards to the water table (assumed to be approximately 35 ft bgs). Based on the groundwater depth assumptions, discrete profile samples will be collected at the 60-70 foot interval, the 50-60 foot interval and the 40-50 foot interval. Additional temporary wells will be drilled and sampled to profile aquifer water quality, if needed, based on the results of the five sampling locations on the south side of Central Avenue.

The aquifer profiling and the sampling will be performed in accord with the QAPP (Appendix D). Filtered and un-filtered samples will be analyzed for the Compounds of Concern, which is consistent with earlier investigations.

[4] If MW-1, MW-2 and MW-3 are found, these wells will be surveyed and gauged.

4.3 Analytical Methods/QA Summary Matrix

The actual number of samples will be based on field conditions, and the numbers provided in the following tables are estimated. The holding times listed are technical holding times from time of collection and not ASP holding times which are calculated from time of sample receipt at the laboratory. The holding time for hexavalent chromium is 30 days for extraction and 7 days to analyze for soils using Methods 3060B/7196A.

MATRIX: Soil	Frequency / Number of Samples	Sample Preservation	Sample Container	Holding Time
Metals (Cr, Cu, Ni, Zn, and As) by USEPA Method 6010B	Will Be Determined Based on Geophysical Survey. Anticipate approximately 12 samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	6 Months
Hexavalent Chromium (Cr^{+6}) by USEPA Method 7196A/3060B	Will Be Determined Based on Geophysical Survey. Anticipate approximately 12 samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	30 Days
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods by USEPA Method SW-846	Will Be Determined Based on Geophysical Survey	Cool, 4 ^{o}C	--	--
Matrix Spike (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	6 Months
Matrix Spike Duplicate (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	6 Months
Blind Duplicate Sample (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	6 Months

MATRIX: Aqueous	Frequency / Number of Samples	Sample Preservation	Sample Container	Holding Time
Hexavalent Chromium (Cr^{+6}) by USEPA Method 7196A	12 samples estimated (10 samples - UIC 2 samples below asphalt cap)	Cool, 4 ^{o}C	Plastic Sample Jar with Cap. 100ml	24 Hours
Metals (Cr, Cu, Ni, Zn, and As) by USEPA Method 6010B	12 samples estimated (10 samples - UIC 2 samples below asphalt cap)	HNO_3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr^{+6})
Matrix Spike (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr^{+6})
Matrix Spike Duplicate (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr+6)
Blind Duplicate Sample (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr^{+6})
Field Blank (METALS)	1 per Day	HNO_3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr^{+6})
Equipment Rinse Blank (METALS)	1 Per Day	HNO3, pH<2	Plastic Sample Jar with Cap. 100ml	6 Months (Except Hg, Cr^{+6})

4.4 Project Schedule

The anticipated project schedule will be included in Appendix C after approval of the work plan. The schedule will be updated after approval of the RI/FS work plan. The schedule is subject to change based on NYSDEC and NYSDOH reviews, site conditions, weather, required Town permits and sampling results. It is anticipated that the Town of Babylon will take at least a month to grant well drilling permits for the work in the Central Avenue ROW. The project schedule will be updated periodically to reflect changing conditions and project durations.

4.5 Reporting Requirements

The samples will be delivered to and analyzed by *American Analytical Laboratory* a New York State Department of Health ELAP certified environmental laboratory. A Category B deliverables package will accompany the submitted analytical data, in accordance with the New York Department of Environmental Conservation (NYSDEC) Analytical Services Protocol. All analytical data will be validated and a DUSR prepared by *EDV, Inc* an independent data validation professional.

The project documents and laboratory deliverables will be provided in electronic format. The environmental data will be provided to the NYSDEC using an EQuis Electronic Data Deliverable (EDD). The laboratory will provide the data in EQuis format and EDV, Inc. will provide the data management services related to the electronic data.

In accord with DER-10, the Remedial Investigation Report (RIR) will incorporate the information collected during the RI, a technical overview and findings of the work completed, summary of compounds that exceed the unrestricted soil clean-up objectives for the on-site soil sampling and the groundwater standards for the off-site groundwater sampling work. The RIR will also address the environmental fate and transport, qualitative human exposure assessment, potential adverse impacts to wildlife, as outlines in DER-10 Section 3.14.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The sampling and analytical methods and procedures are outlined in Quality Assurance Project Plan (Appendix D).

Appropriate Quality Assurance/Quality Control (QA/QC) Procedures have been prepared to ensure that suitable and verifiable results from sampling and analysis are collected. The sample preservation requirements, holding times, and frequency for field blanks, field duplicates, matrix spike and matrix spike duplicates and equipment rinse blanks will be consistent with the NYSDEC Analytical Services Protocol (ASP).

The quality assurance (QA) objective is to develop and implement standard procedures to record field measurements, collection of samples, laboratory analyses, and report laboratory results to provide consistent quality data.

All data generated will be submitted in an electronic data deliverable (EDD) that complies with the DEC's Electronic Data Warehouse Standards (EDWS). The laboratory will provide the analytical data in EqUIS format consistent with the NYSDEC Format template files. Reports will be provided in pdf-format.

6.0 HEALTH AND SAFETY AND COMMUNITY AIR MONITORING PLAN

A site-specific Health and Safety Plan has been developed for the project and is attached as Appendix E. The plan will be followed by the field personnel involved in the investigation and/or remedial work. Included in the plan is a section on community air monitoring (CAMP) with measures to ensure that the public working near the site are protected from exposure to site contaminants during intrusive site activities.

7.1 FEASIBILITY STUDY

A feasibility study will be prepared to document the development and evaluation of remedial alternatives to address the contamination identified by the OU-2 RI of the Astro site. The FS will develop and evaluate options for a remedial action in accordance with CERCLA (40 CFR 300.430(e)). The FS will use the data gathered during the RI to determine the following:

- the goal of the remedial program;
- the nature and extent of contamination to be addressed by the alternatives developed;
- the RAOs for the site, in accordance;
- develop remedial action alternatives; and
- initial screening and detailed analysis of the alternatives.

The FS will identify and evaluate alternatives that can achieve the goal to cleanup to the pre-disposal or unrestricted condition. The FS may also evaluate alternatives to achieve a cleanup necessary to meet an identified use of the site. The FS will develop a range of alternatives, as follows:

1. a no action or, where the IRM has addressed the disposal, no further action alternative;
2. one or more alternatives capable of achieving unrestricted use;
3. one or more alternatives capable of achieving the most feasible and least restrictive use of the site as follows:
    a. either a residential or restricted-residential alternative is to be developed;
    b. followed by a commercial use alternative if this is within the intended and allowable use of the site; and
    c. an industrial use alternative, if it is the intended and allowable use of the

site. The FS process will include the following steps in accordance with DER-10.

Step 1. Identify the remedial goals for the site.

Step 2. Establish Remedial Action Objectives.

Step 3. Identify general response actions based on the RAOs, which:

- include an estimate of the areas and volumes of contaminated soil and groundwater to be addressed;

- treatment, containment, excavation, extraction, disposal, institutional controls;

- medium specific (soil and groundwater) similar to the development of RAOs, and will identify the volumes or areas to be remediated for that alternative, for each medium

addressed, characterized with respect to the requirements for the identified use of the site.

This step will consider the use of innovative technologies, where available and applicable to site and will identify and discuss technologies which are not appropriate for the site based on site-specific factors or constraints and eliminate technologies that are not applicable.

Step 4. Identify and screen technologies based on effectiveness and implementability. Technologies and process options that are appropriate to the site-specific conditions and contamination will be identified for each of the general response actions.

Pilot tests may be conducted or more data may be collected to support the feasibility of a technology, if applicable. Technologies that are not technically implementable will be dropped from further consideration; and technologies that remain will be used in the development of alternatives.

Step 5. Assemble the technologies selected for further evaluation in Step 4 into remedial alternative(s). The identified alternatives will be developed such that each alternative is clearly defined with respect to the following factors:

(1) size and configuration of process options;
(2) time for remediation;
(3) spatial requirements;
(4) options for disposal;
(5) substantive technical permit requirements;
(6) limitations or other factors necessary to evaluate the alternatives; and
(7) beneficial and/or adverse impacts on fish and wildlife resources.

The Astro RI identified groundwater contamination and the OU-2 remedial program will consider measures to address groundwater quality restoration by evaluating the feasibility of measures to restore groundwater quality to meet applicable SCGs and plume containment/stabilization to prevent, to the extent feasible, the further migration of groundwater plume by developing and evaluating the feasibility of remedial alternatives.

The cost estimate for each alternative will be prepared in Step 5 and it will include the following:

- all direct and indirect capital costs and engineering costs for the construction of all facilities and process equipment, labor, materials, construction equipment and services, land purchase and land preparation/ development and relocation expenses;

- costs associated with the institutional controls;

- costs for system start up and testing, facility operation, maintenance and repair, continuous performance and effectiveness monitoring, periodic site condition reviews; and

- costs for legal, administrative and capital costs associated with the placement of institutional controls on a property and other site management activities and/or certifications;

The net present worth of all remedial action costs over time will be calculated by discounting all future costs to the current calendar year. The present worth cost analyses will use a current discount rate as specified by DER at the time of remedial action selection. Step 5 will eliminate alternatives that are not technically implementable or cost effective relative to the other alternatives.

Step 6. The remedial alternatives will be analyzed in accordance with the eight evaluation criteria.

- Overall protectiveness of the public health and the environment.
- Standards, criteria and guidance (SCGs)
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume of contamination through treatment
- Short-term impact and effectiveness
- Implementability
- Cost effectiveness
- Land use

Step 7. Recommend a remedy for the site. The remedy for the site will be recommended in the FS report based on the demonstration that it meets the threshold criteria for selection:

- Overall protectiveness of the public health and the environment.
- Standards, criteria and guidance (SCGs)
-

The remedy will be recommended based and on a comparison between alternatives of the remaining evaluation criteria.

The FS report will include the following sections:

i. introduction;

ii. site description and history;

iii. summary of RI and exposure assessment;

iv. remedial goals and remedial action objectives;

v. general response actions;

vi. identification and screening of technologies;

vii. development and analysis of alternatives, which

(1) assembles technologies into alternatives;
(2) evaluates alternatives with respect to the criteria in section 4.2; and
(3) evaluates the institutional/engineering controls for the selected remedy; and

viii. recommended remedy, with a discussion supporting documentation.

8.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The overall purpose of the Qualitative Human Health Exposure Assessment is to evaluate and document potential human exposure to site-related contaminants, and to identify and characterize the potentially exposed population(s) presently and under the reasonably anticipated future use of the site.

The qualitative exposure assessment will consider the nature of populations currently exposed or that have the potential to be exposed to site related contaminants identified by the off-site OU-2 RI, and will describe the reasonably anticipated future land use of the site and affected off-site areas.

The exposure assessment will evaluate the five elements associated with exposure pathways, and describe how each of these elements pertains to the Astro Electroplating site. The exposure pathway elements will include the following:

(1) a description of the contaminant source(s) including the location of the contaminant release to the environment, the contaminated environmental medium at the point of exposure;

(2) an explanation of the contaminant release and transport mechanisms to the exposed population;

(3) identification of all potential exposure point(s) where actual or potential human contact with a contaminated medium may occur;

(4) description(s) of the route(s) of exposure (i.e., ingestion, inhalation, dermal absorption); and

(5) a characterization of the receptor populations who may be exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not known. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and can reasonably be anticipated to never exist in the future.

The table below provides an overview of the current and potential exposures for the Astro Electroplating site.

Astro Electroplating Farmingdale, New York Exposure Assessment Summary Table	
Environmental Media & Exposure Route	**Human Exposure Assessment**
Direct contact with surface soils (and incidental ingestion)	
Direct contact with subsurface soils (including incidental ingestion)	
Ingestion of groundwater	
Direct contact with groundwater	

9.0 CERTIFICATIONS

9.1: Certification by QEP

This Work Plan was prepared in accordance with DER-10 guidance and the certification is provided below:

I, Patrick Enochs certify that I am a qualified environmental professional and that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).;

The Feasibility Study and Remedial Design Plans will also be prepared in accordance with DER-10 guidance and the documents will include the professional engineer's certification as follows:

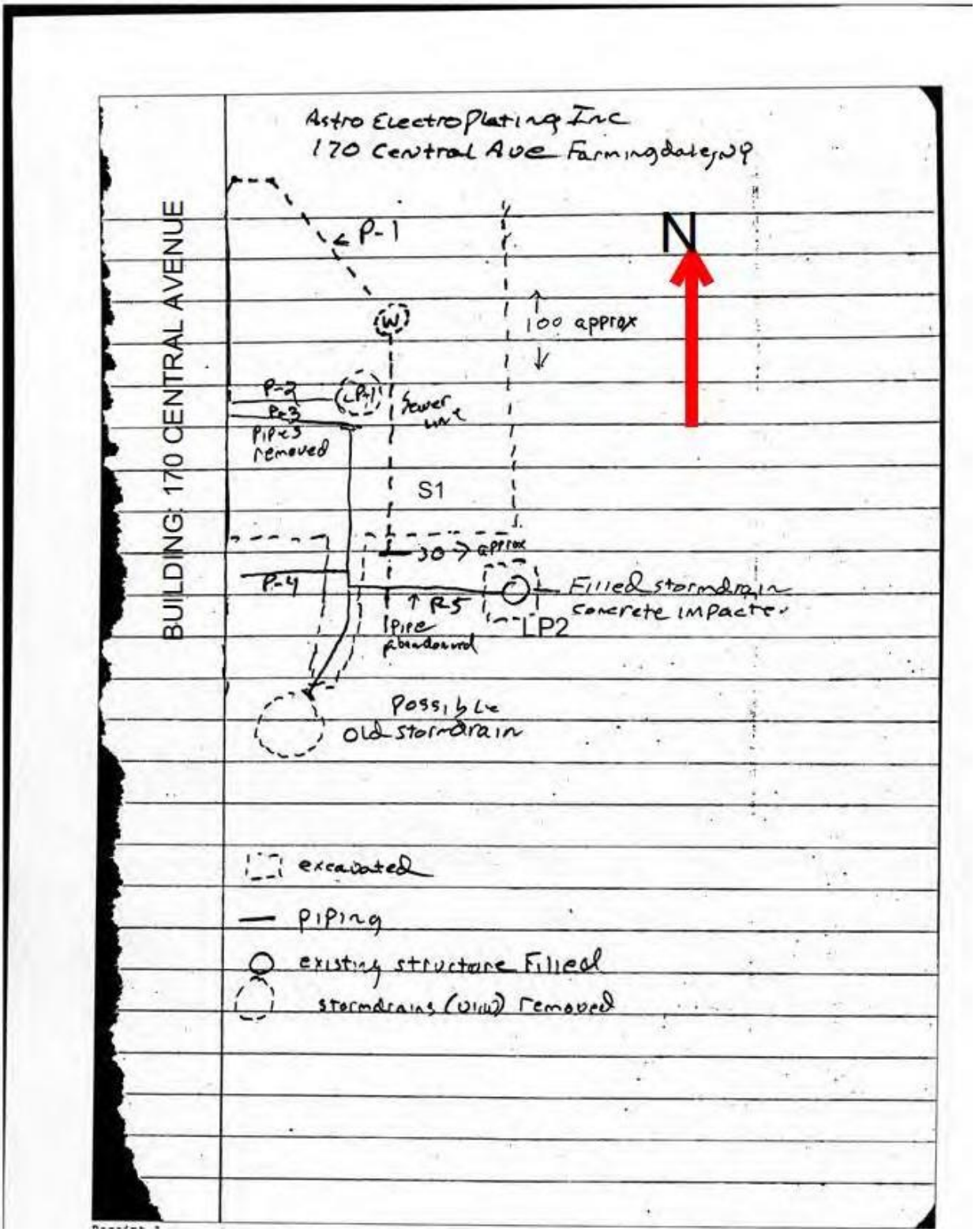
9.2: Certification by PE

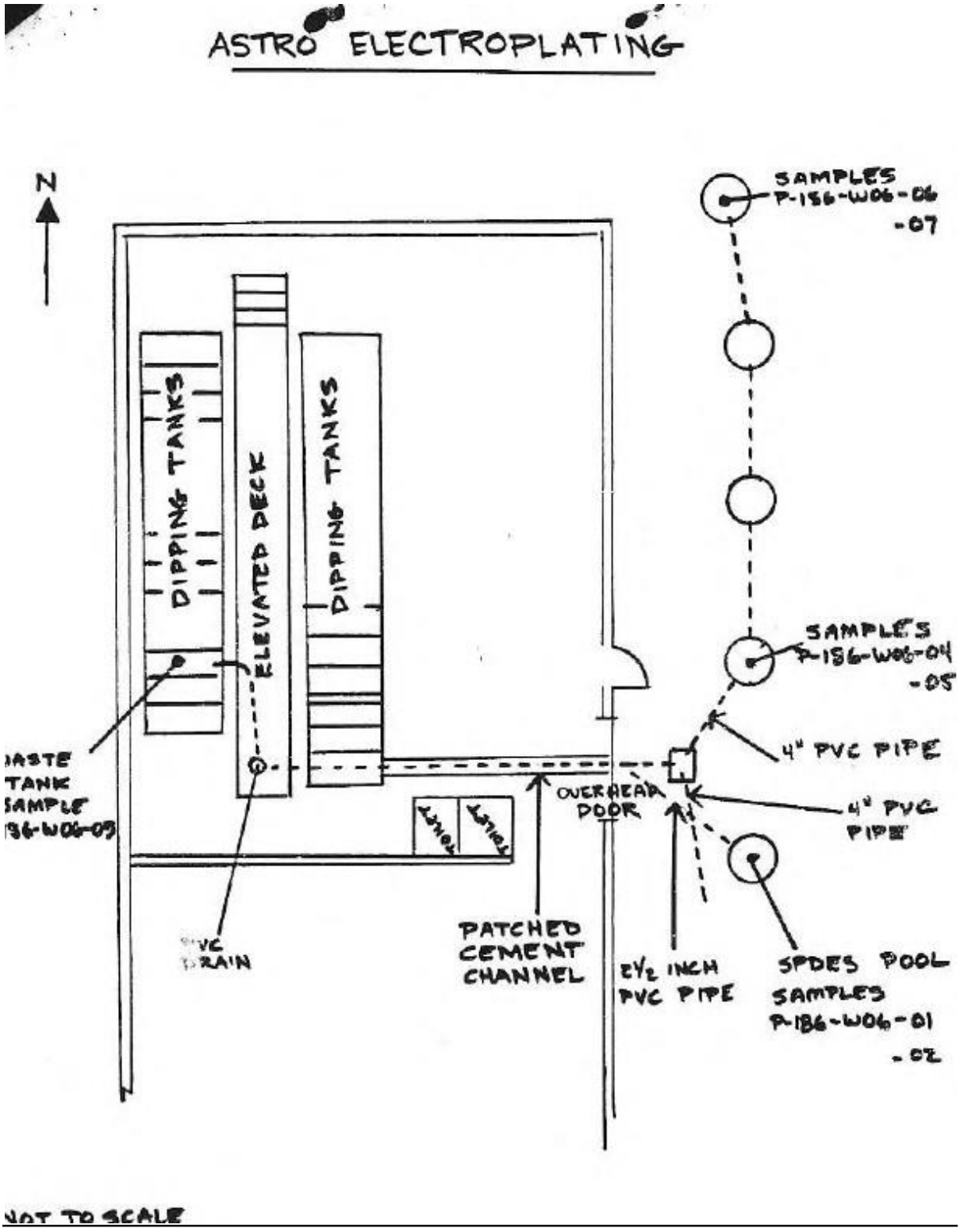
I, Ariel Czemerinski, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Date: 8/30/2015

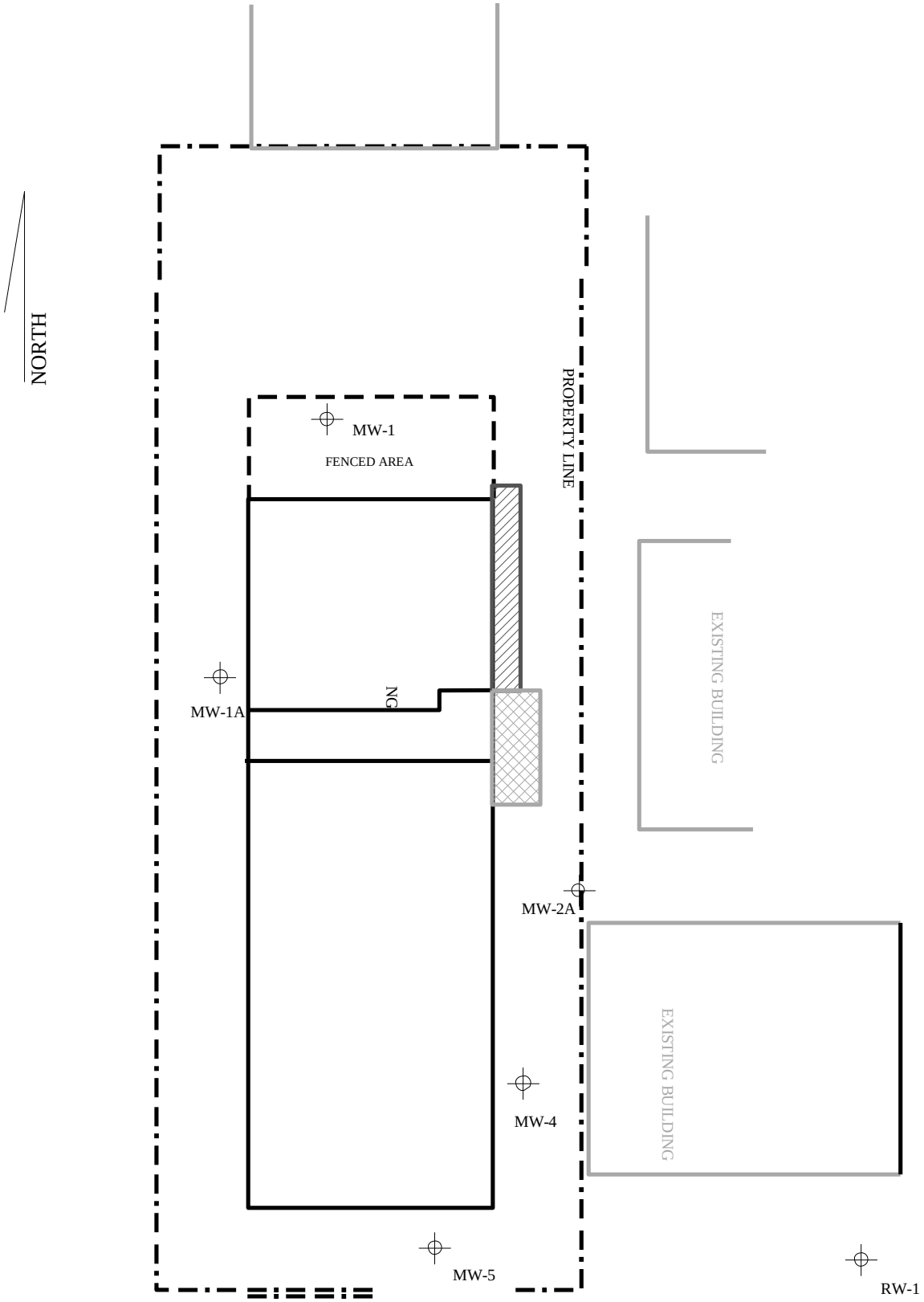
APPENDIX A - SKETCHES OF UIC STRUCTURES FROM PREVIOUS REPORTS

Astro Electroplating - Closure Report OU1

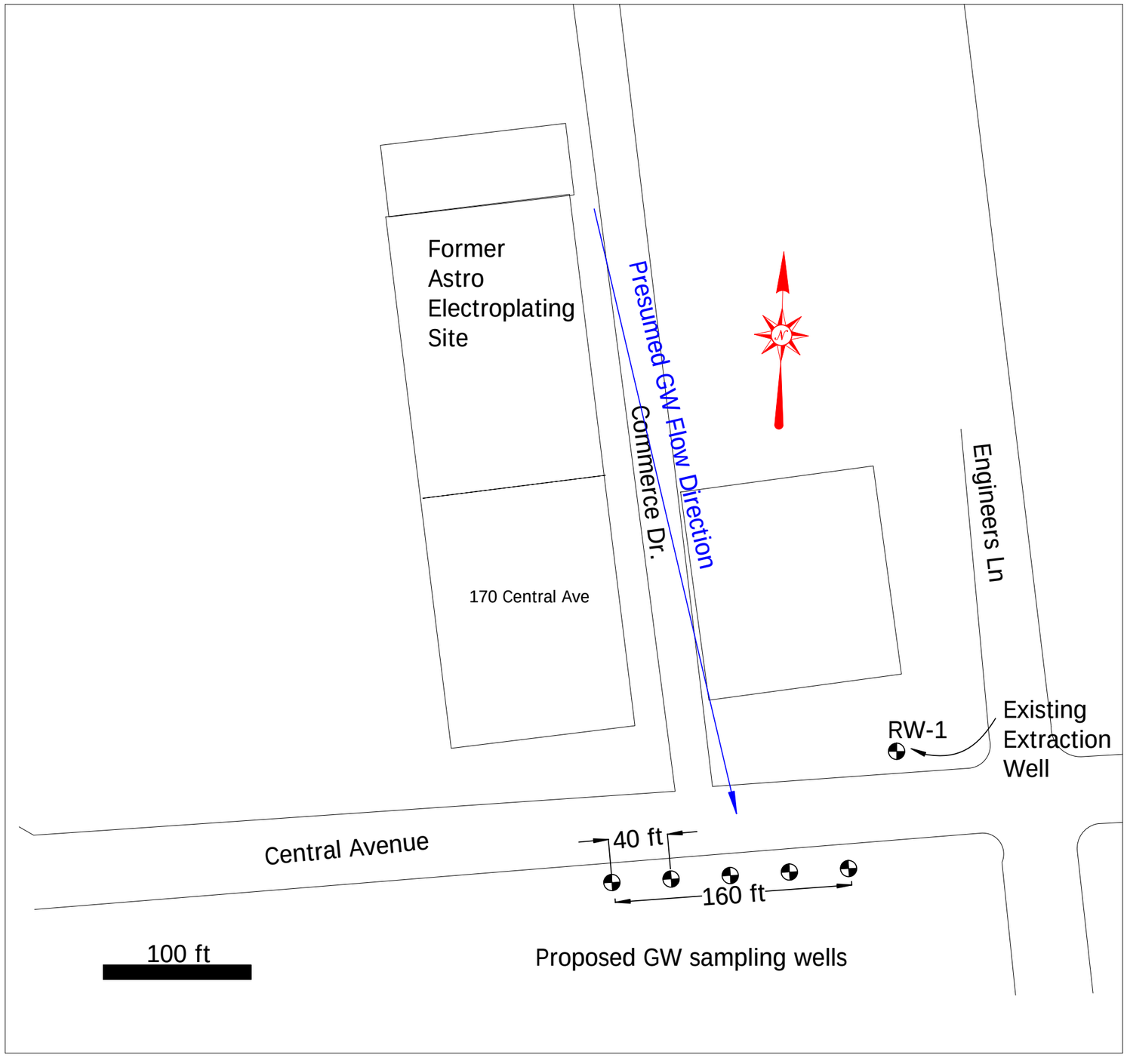


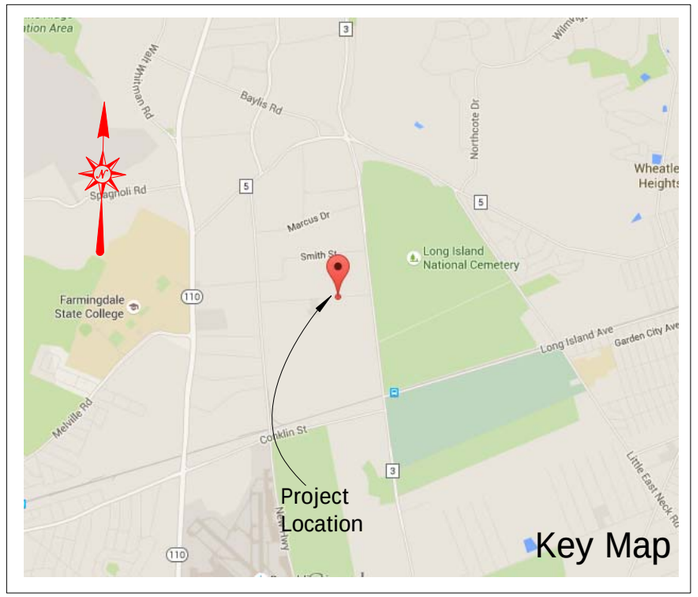

ASTRO ELECTROPLATING
N
SAMPLES
P-156-W06-06
-07
DIPPING TANKS
ELEVATED DECK
DIPPING TANKS
SAMPLES
P-156-W06-04
-05
4" PVC PIPE
OVERHEAD DOOR
4" PVC PIPE
TOILET
SINK
PATCHED CEMENT CHANNEL
2½ INCH PVC PIPE
SPDES POOL SAMPLES
P-186-W06-01
-02
NOT TO SCALE

APPENDIX B - SITE PLANS



ASTRO ELECTROPLATING SITE - 170/176 ASSOCIATES, LLC
ON-SITE GROUNDWATER WELLS
AND GEOPHYSICAL SURVEY AREA - FIGURE 1





AMC ENGINEERING PLLC
99 Jericho Turnpike, Ste. 300J
Jericho, NY 11753
516 417-8588

PROJECT
170 Central Ave
Farmingdale, NY 11735

TITLE:
Astro Electroplating
Remedial Investigation
Feasibility Study
Remedial Action Work Plan

SEAL & SIGNATURE:

DATE: AUG 30, 15
PROJECT No:
DRAWING BY: AC
CHK BY:
DWG No:

Figure 2

APPENDIX C - PROJECT SCHEDULE

ASTRO ELECTROPLATING RI/FS PROJECT SCHEDULE

PRELIMINARY SCHEDULE - TO BE UPDATED

Activity	Days	Approximate Dates
DEC Review/Approval	45	September 2015
Mobilization	30	Oct-2015
Geophysical Survey and On-site MW Survey/Gauging	15	Oct-2015
Prepare Interim Findings Report	45	Nov-2015
DEC Review	45	Feb-2016
Groundwater Profiling along Central Avenue	30	Mar-2016
Prepare Aquifer Profiling Interim Report	60	May-2016
DEC review	45	Jun-2016
Obtain well drilling permit from TOB	20	Jul-2016
Drill and sample wells	15	Aug-2016
Prepare RI Report	60	Oct-2016
DEC review - RI	45	Nov-2016
Prepare FS Report	45	Dec-2016
Conduct Bench-Scale Pilot Studies	20	Jan-2017
DEC Review and Approval	45	Mar-2017
Proposed Remedial Action Plan (DEC Task)	45	Apr-2017
Public Comment (DEC Task)	45	Jun-2017

APPENDIX D - QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

Astro Electroplating Site - 170 Central Avenue, Farmingdale, NY 11735
Order on Consent: W1-1147-10-01
Site: 1-52-036

INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared to outline the appropriate Quality Assurance/Quality Control (QA/QC) procedures that will be followed to ensure that suitable and verifiable results from sampling and analysis are collected for the Remedial Investigation at the Astro Electroplating Site.

The sample preservation requirements, holding times, and frequency for field blanks, field duplicates, matrix spike and matrix spike duplicates, and equipment rinse blanks will be consistent with the New York State Department of Environmental Conservation (NYSDEC) July 2005 Analytical Services Protocol (ASP), and NYSDEC DER-10 guidance.

The quality assurance (QA) objective is to develop and implement standard procedures for recording field measurements, collecting soil samples, laboratory analyses, and reporting laboratory results to provide consistent quality data. The Site's Project Manager and the Project's Quality Assurance Officer is Patrick Enochs of **Chemical Pollution Resources, Inc.**. The remedial Engineer is Ariel Czemerinski, P.E. of **AMC Engineering PLLC.**

Maxine Walters of **EDV-Inc.** will provide data validation services and preparation of the DUSR. The resumes of these individuals are included in Attachment A.

GEOPHYSICAL SURVEY

Based upon the site conditions and surfaces of the survey locations, the geophysical survey will be performed using ground penetrating radar (GPR) equipment. The GPR equipment will consist of a mobile GSSI SIR system with a 400 MHZ antenna, equipped with a dedicated laptop computer with data processing software or equivalent. The GPR survey equipment is designed to identify underground structures, conduit, piping, etc. to a depth of 10 feet below grade. This depth penetration range is sufficient to identify potential underground structures such as buried storage tanks and drywells. In addition, a magnetometer will be used to identify any metallic structures underground and trace any underground piping.

Each area will be surveyed by scanning horizontal and vertical transect paths, approximately five to seven feet apart, within the survey area. The GPR survey equipment will visually identify potential underground structures on the laptop screen upon completion of the scanned path. If potential underground structures are identified along a path, the transect path will be re-scanned. The approximate locations of the underground structures will be delineated at the surface using spray paint and the transect path will be recorded as an electronic data file.

SOIL SAMPLE COLLECTION FROM DRAINAGE STRUCTURE

Field Measurements

Measurement data will be generated during field activities that are incidental to collection of samples for analytical testing or unrelated to sampling. The activities include:

- Documenting the condition of the floor slab, asphalt or other ground surface conditions (ex. stains, etc.) prior to boring and sample collection;

- Measuring and documenting the distance from the sample location to known, fixed measuring points; and.

- Determining the collected depth for each soil sample.

The general QA objective for this measurement data is to use standard procedures to obtain reproducible and comparable measurements at a degree of accuracy consistent with the intended use of the data. Field measurements will be recorded in bound field logbook and sample documentation will conform to the standard sampling handling requirements.

GeoProbe Equipment

The soil to be sampled will be obtained by the use of GeoProbe drilling equipment. The methodology for soil collection using GeoProbe equipment is as follows;

- At each sampling location, the concrete slab will be penetrated by a GeoProbe drill rig equipped with a GeoProbe model GH-40 hammer or equivalent.

- The demolished concrete will be discarded and the hammer attachment will be washed with Alconox detergent, triple-rinsed with distilled water, and followed by a reagent grade 10% nitric acid rinse. The wash waters will be containerized.

- A clean, disposable 2-foot long macro-core liner will be placed into a 2-foot long by 2-inch outside diameter macro-core sample tube. A macro-core core-catcher and cutting shoe will be installed at the bottom of the sample tube.

- The top of the macro-core sample tube assembly will be connected to the GeoProbe sampler drive head.

- The sampler will be advanced from grade to a designated depth. The sample tube assembly will be withdrawn after advancement to the desired sample depth, disassembled and the undisturbed soil sample and macro-core liner will be provided to the field personnel.

- The sampler tube and cutting shoe will be washed with Alconox detergent, triple-rinsed with distilled water, and then followed by a reagent grade 10% nitric acid rinse. The wash waters will be containerized.

Sample Collection

The following sampling procedures will be followed to ensure that all soil samples will be uniformly collected and prepared for laboratory analyses:

- Enter the designated sample identification along with the collection date and time and the name of the sample collector into a bound field logbook. Record the equipment used to collect the sample;

- Place new plastic sheeting over and around the borehole so that a 5-foot by 5-foot clean surface is created for the sampling equipment. Ensure that all materials, tools and equipment are clean prior to placement on the plastic;

- Prepare the sample bottles to receive samples. Write the sample identification and the collection date & time on each sample bottle;

- Collect and immediately place the sample into the sample bottles. Soil samples will be collected with either a stainless steel hand (bucket) auger or with a stainless steel trowel. A GeoProbe unit may be used to collect soil at designated areas as directed by NYSDEC. Soil samples will be collected using two-foot long, pre-cleaned disposable plastic macro cores. The use of chromium, cadmium or galvanized plated or coated equipment for soil sampling will not be permitted.

- Place the samples on ice immediately after collection and enter the sample information on the laboratory chain of custody document. The soil samples will be delivered to the laboratory no later than 48 hours after sample collection.

- The maximum allowable holding time for soil samples: 1 month for hexavalent chromium analyses and 6 months for other metals analyses.

- Place excess sample material back into the excavation/borehole; and

- After equipment decontamination, discard the plastic sheeting and other expendable materials.

Equipment Decontamination

The boring and sample collection equipment will be decontaminated prior to collection of each individual soil sample. The decontamination procedure will consist of washing the equipment in an Alconox detergent solution, followed by a triple rinse of distilled water. The decontamination wash water and rinse water will be containerized, sampled and analyzed for RCRA characteristics; ignitability, reactivity, corrosivity and toxicity. The sample will be taken from the drum used to contain the wash water using a pre-cleaned disposable plastic drum thief or similar container. The contents of the drum will be mixed to homogenize the material prior to sampling.

GROUNDWATER SAMPLE COLLECTION

Aquifer Profiling Procedures

A temporary well point will be installed to screen a 4 foot interval using the GeoProbe groundwater sampling system. A decontaminated screen point sampler will be threaded onto the leading end of a probe rod and was driven to the determined depth below grade. While the sampler is driven to the desired depth, O-ring seals at the drive head and an expendable drive point will be used to provide a watertight system. When the sampling probe reaches the desired depth below grade, chase rods will be sent down the inside of the probe rods to deploy the four foot temporary well screen.

The well point will then be retracted to the next four foot interval above the pervious interval. A screen point sampler with a 0.1 mm slot size will be used to collect the groundwater samples. The groundwater samples will be retrieved by using dedicated polyethylene tubing fitted with a decontaminated stainless steel check valve. The check valve will be attached to the bottom end of the tubing and inserted down the probe rods until it is immersed in groundwater. Water will pumped through the tubing by using the ground water sampling procedures provided below.

Groundwater samples will be delivered to American Analytical Laboratories, no later than 24 hours after sampling date of the investigation to be analyzed for metals.

Temporary Well Point Installation

Temporary well points may be installed during the soil boring investigation to collect groundwater samples. The temporary well points will consist of a GeoProbe model SP16 groundwater sampling assembly or equivalent. The sampling assembly will be driven to the depth of the water table. The sampling assembly will be inserted inside the drive rods, followed by the removal of the expendable point, allowing the sampling assembly screen to be exposed to the saturated substratum beneath the bottom of the drive rods.

Groundwater Sampling

Groundwater will be purged from the temporary points prior to sample collection. Either a submersible pump or a peristaltic pump will be used to mechanically purge groundwater from the temporary points. Groundwater may be purged manually if sufficient flow cannot be produced by mechanical means. A check valve will be connected to 1/4" polyethylene tubing, inserted inside the sampling assembly and then purged by hand.

Purged groundwater will be conveyed directly to a Horiba U-22 water quality meter, equipped with a flow-

thru cell, and containerized in a 55-gallon drum. Dissolved oxygen, turbidity, pH, conductivity and total dissolved solids of the purged groundwater will be measured with the water quality meter and recorded. Purging will proceed until turbidity measurements are at or below 50 NTUs.

Groundwater samples will be collected in laboratory-prepared sample bottles.

The sample bottles will be placed in an iced-cooler and delivered to American Analytical Laboratories, an ELAP- accredited environmental laboratory. The samples will be analyzed for metals.

Equipment Decontamination

The sampling assembly equipment will be decontaminated prior to collection of each individual groundwater sample. The decontamination procedure will consist of washing the equipment in an Alconox detergent solution, followed by a triple rinse of distilled water.

Monitoring Well Installation

(1) The monitoring wells will be installed using GeoProbe machinery and hollow stem auger methods.

(2) The monitoring well assemblies will be 2-inch diameter flush joined, internally threaded PVC riser pipe attached to 10 feet of machine perforated flush joined PVC well screen with a slot size of 0.01 inches (10 slot). The well screens will be installed at the determined depth below grade.

(3) A clean silica sand filter pack, consisting of W.G. #2 sand will be installed around the well screen by gravity placement, and extend 3 feet above the well screen.

(4) A bentonite/cement grout will be installed to seal the borehole annulus, and will terminate 12 inches from grade.

(5) An 8-inch steel well box with a steel well skirt will be installed flush at grade and finished in a concrete pad.

Monitoring Well Development

(1) The monitoring wells will be allowed to cure for at least three days after construction is completed.

(2) The wells will be developed by pumping to remove traces of drilling fluid and formation “fines”.

(3) The wells will be purged of a minimum of three well casing volumes of standing water and will continue to be purged until the measured effluent turbidity is less than 50 Nephelometric Turbidity Units (NTUs).

(4) The purged groundwater will be containerized in 55-gallon drums for characterization and off-site disposal.

Groundwater Sample Collection

Field quality control procedures will be followed according to this Quality Assurance Project Plan and documented in bound ledgers as described below.

Field Measurements

Measurement data will be generated during field activities that are incidental to collection of samples for analytical testing or unrelated to sampling. The activities include:

- Documenting the condition of the floor slab or ground surface (ex. stains, etc.) prior to boring and sample collection;

- Measuring and documenting the distance from the sample location to known, fixed measuring points; and.

- Determining the collected depth for each groundwater sample.

The general QA objective for this measurement data is to use standard procedures to obtain reproducible and comparable measurements at a degree of accuracy consistent with the intended use of the data. Field measurements will be recorded in bound field logbook and sample documentation will conform to the standard sampling handling requirements.

Sampling Procedures

Groundwater will be purged from the monitoring wells prior to sample collection. Either a submersible pump or a peristaltic pump will be used to mechanically purge groundwater from the wells. Groundwater may be purged manually if sufficient flow cannot be produced by mechanical means. A check valve will be

connected to 1/4" polyethylene tubing, inserted inside the sampling assembly and then purged by hand.

Purged groundwater will be conveyed directly to a Horiba U-22 water quality meter, equipped with a flow-thru cell, and containerized in a 55-gallon drum. Dissolved oxygen, turbidity, pH, conductivity and total dissolved solids of the purged groundwater will be measured with the water quality meter and recorded. Purging will proceed until turbidity measurements are at or below 50 NTUs.

Groundwater samples will be collected in laboratory-prepared sample bottles. The sample bottles will be placed in an iced-cooler and delivered to American Analytical Laboratories, an ELAP-accredited environmental laboratory. The Metals of Concern will be analyzed by USEPA Methods 6010B and 7196A/3060A.

Equipment Decontamination

The sampling assembly equipment will be decontaminated prior to collection of each individual groundwater sample. The decontamination procedure will consist of washing the equipment in an Alconox detergent solution, followed by a triple rinse of distilled water.

LABORATORY REQUIREMENTS

Laboratory Qualifications

The samples will be delivered to and analyzed by American Analytical Laboratories, a New York State Department of Health ELAP certified environmental laboratory. A Category B deliverables package will accompany the submitted analytical data, in accordance with the New York Department of Environmental Conservation (NYSDEC) Analytical Services Protocol. Soil samples will be analyzed for Metals of Concern by USEPA Methods 6010 (chromium, copper, nickel, zinc and arsenic) and 7196A (hexavalent chromium). Groundwater samples will also be analyzed for Metals of Concern by USEPA Methods 6010 and 7196A.

An Analytical Methods/QA Summary for the RI Work Plan is provided.

All data generated will be submitted in an electronic data deliverable (EDD) that complies with the DEC's Electronic Data Warehouse Standards (EDWS). The laboratory will provide the analytical data in EqUIS format consistent with the NYSDEC Format template files. Reports will be provided in pdf-format.

Parameters and Reporting Limits

The soil and water samples will be analyzed for Metals of Concern. Additional samples collected may be analyzed for Metals of Concern.

All quality objectives and acceptance criteria shall be consistent with the NYSDEC Analytical Services Protocol (ASP). The detection limits for target Metals analytes will reflect the contract required quantification limits (CRQLs) cited in Exhibit C of the NYSDEC ASP.

The soil sampling data will be compared to the NYSDEC Part 375 cleanup guidelines. The water sampling data will be compared to the NYSDEC Part 703.5, class GA groundwater quality standards. Non-detects will be reported at the sample specific CRQL and flagged “U”. Values detected above the sample specific MDL but below the CRQL will be reported and flagged “J”.

Field Blank Samples

A field blank will be taken on a representative GeoProbe macro-core sample liner to determine if interferences in the soil sample laboratory analyses occur. The following field blank sample collection method will be followed prior to soil sampling:

- Place a vinyl end cap on one end of the liner.
- Pour 100 milliliters of distilled water into the liner and cap the open end of the liner.

- Repeatedly invert the liner so that the distilled water contacts the entire inner surface. Repeat this step for one minute.
- Remove one cap from the inner liner and empty contents into an appropriate sample container.
- Perform analyses on the extract water for the analytes of interest to the investigation.

Field Duplicates

Field duplicates will be collected and submitted to the analytical laboratory to provide a means to assess the quality of the data resulting from the field sampling program. Field duplicate samples will be analyzed for sampling and analytical reproducibility. All duplicate samples will be collected using the same procedures, the same equipment, and in the same types of containers as the required samples. The duplicate samples will be preserved in the same manner and submitted for the same analyses as the samples. One duplicate sample will be obtained for every 20 soil samples collected and one duplicate sample will be obtained for every 20 groundwater samples collected. At least one soil and/or groundwater duplicate sample will be collected per day.

Matrix Spike / Matrix Spike Duplicates

In addition to field duplicate samples, a matrix spike sample and matrix spike duplicate sample will be obtained at a frequency of one sample for every 20 soil samples collected and one sample for every 20 groundwater samples collected.

Equipment Rinse Blank

An equipment rinse blank will be collected once per day. The equipment rinse blank will be analyzed for the identical target parameters (Metals) as the soil samples, to determine if interferences exist from the sampling equipment. The equipment rinse blank will be placed on ice upon collection. The holding times for the equipment rinse will be 6 months for Metals, and 24 hours for Hexavalent Chromium. The following Equipment Rinse Blank collection method will be followed after equipment decontamination:

- Deionized water will be poured over the decontaminated sampling equipment.
- Water runoff will be collected in laboratory prepared sampling bottles.
- Analysis will be performed on the extract water.

Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared by EDV-Inc. in accordance with NYSDEC DER-10 guidance. The DUSR will be developed by reviewing and evaluating the Category B deliverables package from the laboratory. The DUSR and Category B deliverables package will be submitted under a separate cover.

TABLES -

ANALYTICAL METHODS/QA SUMMARY TABLE

ANALYTICAL PARAMETERS AND REPORTING LIMITS

Analytical Methods/Quality Assurance Summary Table

REMEDIAL INVESTIGATION
ASTRO ELECTROPLATING SITE

MATRIX: Soil	Frequency / Number of	Sample Preservation	Sample Container	Holding Time
Metals (Cr,Cu, Ni, Zn, and As) by USEPA Method 6010B	Will Be Determined Based on Geophysical Survey	Cool, 4 ^{o}C	Wide Mouth Glass Sample	6 Months
Hexavalent Chromium (Cr^{+6}) by USEPA Method 7196A/3060B	Will Be Determined Based on Geophysical Survey	Cool, 4 ^{o}C	Wide Mouth Glass Sample	30 Days
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods by USEPA Method SW-846	Will Be Determined Based on Geophysical Survey	Cool, 4 ^{o}C		
Matrix Spike (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample	6 Months
Matrix Spike Duplicate (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample	6 Months
Blind Duplicate Sample (METALS)	1 per 20 Samples	Cool, 4 ^{o}C	Wide Mouth Glass Sample Jar. 8oz.	6 Months

MATRIX: Aqueous	Frequency / Number of	Sample Preservation	Sample Container	Holding Time
Hexavalent Chromium (Cr^{+6}) by USEPA Method 7196A	15 samples estimated	Cool, 4 ^{o}C	Plastic Sample Jar with Cap.	24 Hours
Metals (Cr,Cu, Ni, Zn, and As) by USEPA Method 6010B	15 samples estimated	HNO_3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg,
Matrix Spike (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg,
Matrix Spike Duplicate (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg,
Blind Duplicate Sample (METALS)	1 per 20 Samples	HNO_3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg,
Field Blank (METALS)	1 per Day	HNO_3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg,
Equipment Rinse Blank (METALS)	1 Per Day	HNO3, pH<2	Plastic Sample Jar with Cap.	6 Months (Except Hg, Cr^{+6})

Note:

The holding times listed are technical holding times from time of collection and not ASP holding times which are calculated from time of sample receipt at the laboratory.

Holding time for Hex Cr is 30 days for extraction -7 days to analyze for soils using 3060/7196

Actual number of samples will be based on field conditions.

Astro Electroplating, Inc.
Site Order on Consent: W1-1147-10-01
Site: 1-52-036

APPENDIX E -
HASP/CAMP

Health And Safety Plan

and

Community Air Monitoring Plan

Astro Electroplating Site

170 Central Avenue

Farmingdale, New York

Contents

ATTACHMENTS

1. Site Visitors Log
2. Tailgate Safety Meeting Form
3. Accident Reporting Form, OSHA 101
4. Utilities and Structures Checklist
5. Air Monitoring Log

INTRODUCTION

Chemical Pollution Resources, Inc and AMC Engineering will collect soil and groundwater samples as part of a New York State Department of Environmental Conservation (NYSDEC) required Remedial Investigation at the Astro Electroplating Site in Farmingdale Deer Park, New York. This Health and Safety Plan (HASP) has been developed to address the potential physical and chemical hazards that employees may face while performing the planned field activities. This HASP establishes procedures to minimize worker's exposures through personal protective equipment and safe work practices. This HASP has been developed to meet the requirements of the Occupational Safety and Health Administration (OSHA) regulation, Title 29, Code of Federal Regulations, Part 1910.120 (20 CFR 1910.120), "Hazardous Waste Operations and Emergency Response" (OSHA 1989). It is intended for the protection of Consultant's employees. Anyone else, such as subcontractors, client, and visitors may review this HASP and follow its procedures if they so decide. Subcontractors and others working on the site must provide their own HASP to be followed by their personnel.

RESPONSIBILITIES

Pat Enochs (CPR) has been designated as the Site Safety Officer (SSO). He will be responsible for implementing the procedures and safe work practices established in this HASP. In the event that the SSO must leave the site while the work is in progress, an alternate SSO will be designated to ensure that the HASP will continue to be followed. The SSO will report all health and safety matters to Ariel Czemerinski, P.E. (AMC), who has responsibility for overseeing the planned field activities. Pat Enochs, a Chemical Pollution Resources, Inc principal, will also be available. Subcontractors and others that may be involved in the work must designate a SSO for their firm and the SSO shall enforce compliance with the subcontractors HASP.

SITE DESCRIPTION

The Astro Electroplating site is located at 170 Central Avenue, Farmingdale, New York. The property is commercial/industrial and is privately owned. Additional site information is available in the RI/FS Work Plan.

PLANNED FIELD ACTIVITIES

The following is a brief description of the planned field activities:

- Drill shallow soil borings and collect soil samples in the area of the former leaching pools on the east side of the building.
- Gauge the existing on-site wells.
- Drill temporary well points as part of the aquifer profiling task.
- Collect soil and groundwater samples as part of the above work.

Additional details of each of locations and planned field activity are provided in the work plan.

HAZARD EVALUATION

The potential physical and chemical hazards associated with the planned field activities for this site are evaluated in this document.

The physical hazards associated with the planned field activities include the following: potential for being struck by flying and falling objects while working near the Geoprobe rig; slips and falls due to wet or uneven surfaces, pressurized gasses / pipes, electrical shock, lock-out tag-out, noise, and stored energy.

The known chemical hazards associated with this site are based on the soil and groundwater sampling results obtained from previous site investigations. A limited number of metals were detected in the soil and groundwater. Based on this information, the following exposure pathways have been identified in order to minimize potential worker's exposure:

- Accidental inhalation of contaminants.
- Direct skin contact with and absorption of soil and/or groundwater.

COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Real-time air monitoring for particulate levels at the perimeter of the exclusion zone or work area will be necessary. Particulate monitoring will be performed during well installation and during groundwater and soil sampling.

Continuous monitoring will be performed for all ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Even though VOC exposure is not anticipated, periodic monitoring for VOCs may be performed during non-intrusive activities such as the collection of soil and groundwater samples, based on field conditions. “Periodic” monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil,

monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOCs may be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

If the organic vapor level is above 25 ppm over background at the perimeter of the work area, activities must be shutdown.

All 15-minute readings will be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

LEVELS OF PROTECTION

Based upon the hazard evaluation results, drilling the soil borings will be performed in Level D protection. In the event that the established action level is exceeded, the level of protection will be upgraded to Level C. The following is a description of the personal protective equipment required for each level:

Level D

- Disposable coveralls (optional).
- Hard hat (optional for all tasks except well drilling)
- Safety glasses, goggles, or face shield (optional).
- Steel-toe and shank, chemical-resistant boots.
- Chemical-resistant gloves (optional except when handling soil, sediment or surface water).
- Hearing protection, NRR of 85 decibels (optional).

Level C

- Hard hat (optional for all tasks except well drilling).
- Disposable coveralls (optional).
- Safety glasses, goggles, or face shield.
- Steel-toe and shank, chemical-resistant boots.
- Chemical-resistant gloves (optional except when handling soil, sediment or

ground water).

- Hearing protection, NRR of 85 decibels (optional).
- Full face air purifying respirator equipped with organic vapor cartridges.

To evaluate whether actual field conditions will require an upgrade in the level of protection, the following action level procedure based upon the existing data has been established for all planned field activities. Air monitoring will be conducted using an PID instrument during each task. A 5 part per million (ppm) reading for a sustained period of 5 minutes in the worker's breathing zone has been selected as an action level. If the action level is exceeded, work will be discontinued, the work area will be permitted to vent while the workers move to an area upwind. Work will not resume until the concentrations fall below 5 ppm. If after 30 minutes, the concentration does not fall below the action level, then the work will resume with the level of protection upgraded to Level C using a full-face air purifying respirator equipped with an organic vapor canister. Once in Level C, detection tubes will be drawn every 30 minutes to monitor its presence. When this monitoring indicates that the concentration is below the action level, then downgrading to Level D is possible. If the monitoring indicates that the concentration exceeds 10 ppm, all work will be discontinued, and workers will move to an area upwind. Work will not be resumed until air monitoring results confirm that the levels are less than 10 ppm.

SITE CONTROL

Prior to the start of the field activities, the SSO will be responsible for the designation of the work zone, support zone, and clean zone. The work zone will be an area surrounding the immediate work being performed, where the greatest potential hazards exist. Only the necessary workers required to perform the work will be permitted in this zone. A support zone will be established for the storage of equipment.

EQUIPMENT DECONTAMINATION

The Geoprobe rods, tools, rig and any piece of equipment that comes in contact (directly or indirectly) with the formation, will be decontaminated on-site prior to drilling. Equipment will be cleaned at a specific decontamination area, between each borehole, and prior to leaving the site. All on-site cleaning activities will be monitored by the field hydrogeologist. In addition to the drilling and sampling equipment, the following equipment will be used during the drilling and sampling of boreholes.

- Alconox Laboratory Grade Detergent
- Brushes
- Plastic Buckets
- Distilled Water
- Potable Water
- Photo-ionization detector (PID)
- Health & Safety Equipment (As discussed in the Health & Safety Plan)
- Sample Containers

The drive rods and/or push rods will be decontaminated after completion of each boring installation. Disposable gloves will be worn while equipment is cleaned to avoid contamination, and the gloves will be changed frequently. The procedure for cleaning sampling equipment is as follows:

- A solution of Alconox and potable water will be prepared in a bucket
- The rods will be scrubbed and washed with the Alconox solution.
- All equipment will be scrubbed with a brush to remove any adhering particles.
- All equipment will be rinsed with potable water.
- The clean rods will be placed on clean plastic sheeting until it is needed. The rods will be handled only when clean gloves are being worn.

SAFE WORK PRACTICES

A pre-entry, tailgate safety meeting will be conducted prior to the start of each task to discuss the associated hazards. Attendees will be recorded on the Tailgate Safety Meeting Form (Attachment 2).

All utilities and structures will be cleared and marked out prior to the start of any ground intrusive work. Attachment 4 will be used to record this information.

The SSO will inform all subcontractors of the potential hazards associated with the site and the planned field activities. A copy of the HASP will be made available for their review.

No eating, drinking, or smoking will be permitted in the work and support zones.

No sources of ignition, such as matches or lighters will be permitted in the work and support zones.

Calls for help will be made via the cellular phone.

During hazardous weather conditions, such as lightning and thunder storms, work will cease immediately.

EMERGENCY PLAN

On-site verbal communications should not be a problem since all tasks will be performed in Level D protection. In the event that the action level is exceeded and personnel are upgraded to Level C protection, verbal communications may become difficult. A universal set of hand signals will then be used. They are as follows:

Hand gripping throat:	Can't breathe.
Grip partner's wrist or place hands around waist:	Leave work area immediately.
Hand on top of head:	Need assistance.
Thumbs up:	OK, I'm all right.
Thumbs down:	No, negative.

Communications from the site will be though a cellular telephone which will be brought to the site.

All job-related injuries and illnesses will be reported to the SSO. If medical attention is needed, the injured worker will be decontaminated, if possible, prior to leaving the site. The SSO will investigate the cause of the accident and corrective measures will be taken before the work can resume. It will be the responsibility of the SSO to complete the accident reporting form, OSHA

101, included in this report for all injuries. The completed OSHA 101 (Attachment 3) should be forwarded to the office health and safety manager within six days for recording into the OSHA 200 log. If there is a fatality, or if 5 or more workers are hospitalized as a result of a single incident, the SSO will contact the office health and safety manager immediately for OSHA reporting purposes.

EMERGENCY TELEPHONE NUMBERS

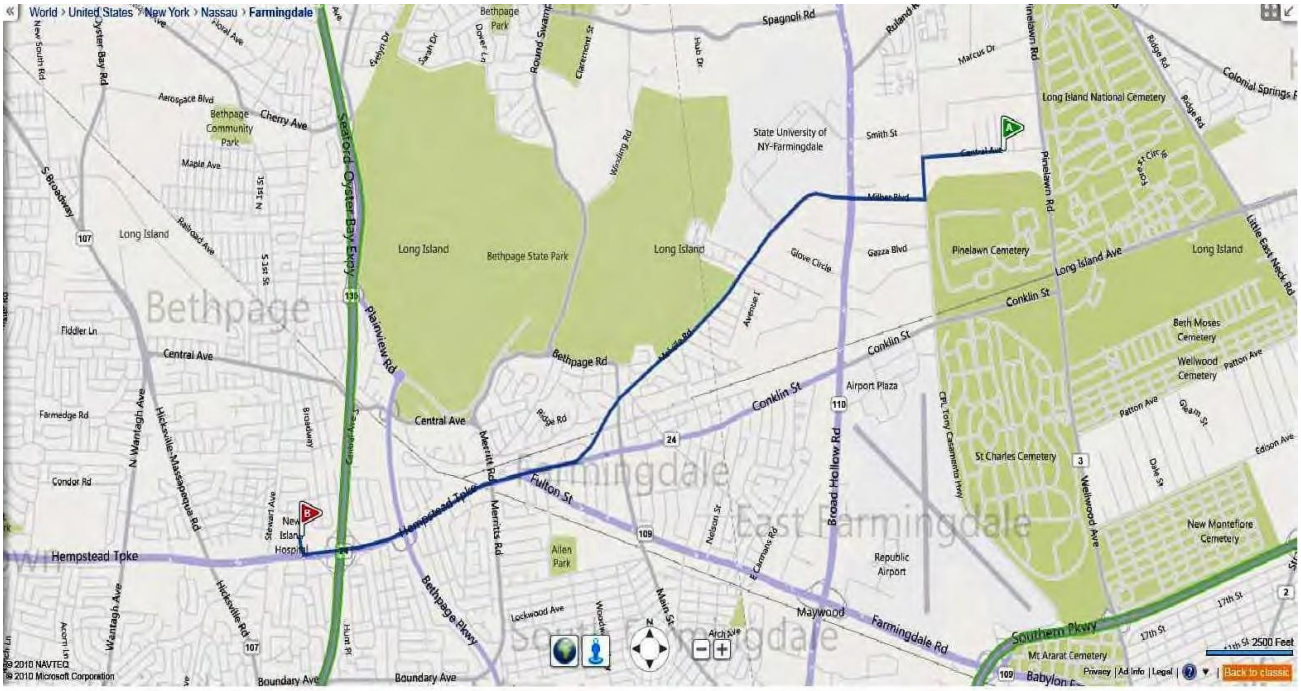
Police	911
Fire	911
New Island Hospital	(516) 579-6000
Chemtrec	(800) 424-9300
NYSDEC Spills	(800) 457-7362

HOSPITAL LOCATION

The closest hospital to the site is New Island Hospital Bethpage, New York. The shortest distance to the hospital:

- Head west on Central Avenue.
- Turn Left onto New Highway.
- Make a right onto Milbar Blvd. Continue straight onto Melville Rd (name change to Clinton St.) Bear right onto SR-24/Conklin Street.
- The Hospital entrance is at 4295 Hempstead Turnpike on the right side.

See map indicating the route.



ATTACHMENT 1

SITE VISITORS LOG

SITE VISITORS LOG

THE UNDERSIGNED VISITORS REQUIRE ENTRANCE TO THE EXCLUSION ZONE AND HAVE THOROUGHLY READ THE HEALTH AND SAFETY PLANS. I UNDERSTAND THE POTENTIAL HAZARDS AT THE SITE AND THE PROCEDURES TO MINIMIZE EXPOSURE TO THE HAZARDS, WILL FOLLOW THE DIRECTION OF THE SITE HEALTH AND SAFETY MANAGER, AND WILL ABIDE BY THE HEALTH AND SAFETY PLAN.

NAME	COMPANY	DATE	SIGNATURE

NAME	COMPANY	DATE	SIGNATURE

ATTACHMENT 2

TAILGATE SAFETY MEETING FORM

TAILGATE SAFETY MEETING

Prepared by _____

Client _____

Project_____

Date _____

Project Number_____

Work Location_____

Type of Work to be Done _____

SAFETY TOPICS PRESENTED _____

Chemical Hazards _____

Physical Hazards/Underground Utilities _____

Protective Clothing/Equipment _____

Special Equipment _____

Emergency Procedures _____

Hospital/Clinic Phone ( )_____

Paramedic Phone ( )_____

Hospital Address _____

Other _____

ATTENDEES

NAME PRINTED SIGNATURE

ATTACHMENT 3

ACCIDENT REPORTING FORM, OSHA 101

OSHA FORM 101

SUPPLEMENTARY RECORD OF OCCUPATIONAL INJURIES AND ILLNESSES

EMPLOYER

1. Name _____
2. Mail Address _____
   (No. and street) (City or town) (State)
3. Location, if different from mail address _____

INJURED OR ILL EMPLOYEE

4. Name _____ Social Security No. _____
   (First name) (Middle name) (Last name)
5. Home Address _____
   (No. and street) (City or town) (State)
6. Age _____ 7. Sex: Male_____ Female_____ (Check one)
8. Occupation _____
   (Enter regular job title, not the specific activity he was performing at time of injury.)
9. Department _____
   (Enter name of department or division in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure _____
    (No. and street) (City or town) (State)
    If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.
11. Was place of accident or exposure on employer's premises? _____ (Yes or No)
12. What was the employee doing when injured? _____
    (Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them.)
13. How did the accident occur? _____
    (Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident. Use separate sheet for additional space.)

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

14. Describe the injury or illness in detail and indicate the part of body affected _____
    (e.g: amputation of right index finger at second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)
15. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)
16. Date of injury or initial diagnosis of occupational illness _____
    (Date)
17. Did employee die? _____ (Yes or No)

OTHER

18. Name and address of physician _____
19. If hospitalized, name and address of hospital _____

Date of report _____ Prepared by _____

Official position _____

ATTACHMENT 4

UTILITIES AND STRUCTURES CHECKLIST

UTILITIES AND STRUCTURES CHECKLIST

Project: _____ **Prepared by:** _____

Location: _____ **Date:** _____

Instructions. This checklist has to be completed by a staff member as a safety measure to insure that all undergrounc utility lines, other underground structures as well as above-ground power lines are clearly marked out in the area selectec for boring or excavation. **DRILLING OR EXCAVATION WORK MAY NOT PROCEED UNTIL LINES ARE MARKED ANC THIS CHECKLIST HAS BEEN COMPLETED.** Arrangements for underground utility markouts are best made at the time o the preliminary site visit to allow client and/or utility company sufficient time. Keep completed checklist and maps onsite send copy to Project Manager.

Assignment of Responsibility. Client is responsible for having underground utilities and structures located and marked Preferably, the utilities themselves should mark out the lines.

Drilling or Excavation Sites. Attach a map of the property showing the proposed drilling or excavation site (or if sites are widely separated, several maps) clearly indicating the area(s) checked for underground utilities or underground structures and the location of above-ground power lines.

Utilities and Structures

Type	Not Present	Present	How Marked?[1]
Petroleum products line			
Natural gas line			
Steam line			
Water line			
Sewer line			
Storm drain			
Telephone cable			
Electric power line			
Product tank			
Septic tank/drain field			
Overhead power line			

1) Flags, paint on pavement, wooden stakes, etc.

Name and affiliation of person who marked out underground lines or structures.

_____ NAME _____ ORGANIZATION _____ PHONE

Emergency Procedures

Persons at site or facility to contact in case of emergency

1. _____ Phone _____

2. _____ Phone _____

Fire Dept.: Phone _____ Ambulance: Phone _____

Utility: Phone _____ Utility: Phone _____

Utility: Phone _____ Utility: Phone _____

Directions to nearest hospital (describe or attach map).

ATTACHMENT 5 AIR MONITORING LOG

Air Monitoring Log

DATE: _______________

Time	PID Readings (ppm)	Particulate Readings (mg/m^3)