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FINAL DRAFT
PSA WORK PLAN
MATHEWS AVENUE SITE
GEDDES, NEW YORK

Prepared for

Honeywell International, Inc.

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Suite 700

East Syracuse, New York 13057

MWH Project No. 4060312

By

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1.0 INTRODUCTION

This Preliminary Site Assessment (PSA) Work Plan has been prepared by Montgomery Watson Harza (MWH) on behalf of Honeywell International, Inc. (Honeywell) (formerly AlliedSignal) for the Mathews Avenue Landfill located in the Village of Solvay, Town of Geddes, Onondaga County, New York ("the Site"). The New York State Department of Environmental Conservation (NYSDEC) has identified the Site as a potential source of mercury, chlorinated benzenes, lead and possibly other contaminants, to ground water, sediments and surface water and to Onondaga Lake via Geddes Brook. According to the NYSDEC, "(t)he Mathews Avenue Landfill was a Part 360 construction/demolition debris disposal site used by AlliedSignal. AlliedSignal applied for closure of the landfill in 1988, under Part 360 (NYSDEC Solid Waste Regulations). Soil samples were requested, prior to closure, and a limited investigation involving test pits was completed in 1990. Mercury and chlorinated benzene compounds were detected in site soil samples. Mercury and other contaminants (including chlorinated benzenes, several other volatile organic compounds, PCBs, and lead) were also detected in a sediment sample collected by NYSDEC at a location (adjacent to the site) which is drained by a tributary to Geddes Brook. In addition, structures which are allegedly diaphragm cells associated with the Chlor-Alkali process (which was employed at the LCP/Bridge Street and Willis Avenue Plants) have been noted at the site."

While the source(s) of these compounds may include the Site, this has not been conclusively demonstrated. Regardless of the ultimate source, the potential migration pathways for these compounds include surface water and accompanying sediment run-off as well as ground water. The objectives of this PSA are to determine whether the Site meets the NYSDEC definition of a hazardous waste site by confirming the presence (or absence) of hazardous waste and determining if the Site poses a significant threat to public health or the environment. This Work Plan presents the methods by which sediment, surface water, soil, and groundwater samples are to be collected from suspected areas of environmental concern

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and analyzed for target contaminants. A Site Location Map has been included as Figure 1 and a Site Map has been included as Figure 2.

The Sampling and Analysis Plan (SAP) for the Site, presented in Section 3 of this Work Plan, incorporates by reference the SAP previously approved for Honeywell's Willis Avenue Site presented in the document entitled *O'Brien & Gere, Inc. October 1990, Work Plan, Remedial Investigation/Feasibility Study: Willis Avenue Plant, Petroleum Storage Facility and Associated "Hot Spots," Geddes, New York.*

The SAP includes the Quality Assurance Project Plan (QAPP), presented in Appendix A, describing the quality assurance and quality control protocols necessary to achieve the initial data quality objectives. The QAPP incorporates by reference the QAPP previously approved for Willis Avenue and entitled *O'Brien & Gere, Inc., November 1990, QAPP, Remedial Investigation/Feasibility Study: Willis Avenue Plant, Petroleum Storage Facility and Associated "Hot Spots," Geddes, New York.* This updated QAPP has been prepared in accordance with *EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5), Final, March 2001.*

A site-specific Health and Safety Plan (HASP) to protect persons at and in the vicinity of the Site during the performance of the PSA and consisting of a modification of the Willis Avenue Chlorobenzene Site HASP will be prepared prior to the initiation of field work at the Site. This HASP will include additional material safety data sheet (MSDS) information for the constituents of concern currently identified at the Site.

2.0 PROJECT PERSONNEL

MWH believes the qualifications of the assigned personnel are the single largest factor in the successful completion of any project. MWH has assembled a select group of individuals who have extensive experience conducting Preliminary Site Assessments in New York State and Remedial Investigations and Feasibility Studies, and Figure 3 presents an organizational chart of project personnel. The MWH Project Manager will be Mr. Anthony M. Noce, who will manage and be supported by a team of MWH personnel, including a Technical Advisory Committee of experts in site investigation and remediation.

MWH Project Manager - Anthony M. Noce, CHMM

As Project Manager, Mr. Noce will coordinate the interaction with technical advisory committee members and ensure the technical requirements of the project are met. He will be directly responsible for the contractual requirements and assuring that the necessary resources are dedicated to this project. As Project Manager, he will be the day-to-day point of contact for Honeywell. In addition, Mr. Noce will serve as the Project Chemist and Data Validator. He is an approved NYSDEC data validator and will be responsible for reviewing and validating the analytical data, as well as coordinating the selected analytical laboratory.

MWH Principal-In-Charge - Richard Hixon, P.G.

As the Principal-In-Charge for this project, Mr. Hixon will provide strategic and regulatory guidance as well as overall direction for the project team. He will also serve as the Quality Assurance Officer for the project.

MWH Technical Advisory Committee Member - Gus Mergenthaler, P.E.

Mr. Mergenthaler will serve as a member of the Technical Advisory Committee, assisting the project team by being the internal client advocate and interjecting the client's viewpoint into the project.

MWH Technical Advisory Committee Member - Jim Rouse, R.G.

Mr. Rouse will serve as a member of the Technical Advisory Committee specializing in heavy metal migration and remediation.

MWH Technical Advisory Committee Member - Kenneth Quinn, P.G.

Mr. Quinn will serve as a member of the Technical Advisory Committee specializing in the investigation and remediation of chlorinated VOCs. His responsibility as a Principal Hydrogeologist is to provide expert support on complex or sensitive projects and contribute to QA and peer review of projects.

MWH PSA/RI Task Manager, Project Geologist - David Broach, P.G.

Mr. Broach will serve as the PSA/RI Task Manager and Project Geologist, reporting directly to the Project Manager. He will be responsible for the day-to-day quality assurance project activities related to the sampling and associated drilling and test pitting activities at the Site.

MWH FS Task Manager, Project Engineer - Paul Romano, P.E.

Mr. Romano will serve as the FS Task Manager and Project Geologist, reporting directly to the Project Manager. He will be responsible for the day-to-day quality assurance project activities related to the sampling and associated drilling and test pitting activities at the Site.

MWH Risk Assessment Task Manager - Michael Kierski, Ph.D.

Dr. Kierski is the project lead for risk assessment activities conducted for Honeywell at the Site, including the Human Health Risk Assessment (HHRA) and Integrated Ecological Risk Assessment (ERA).

3.0 SCOPE OF WORK

The objective of the PSA is to screen the Site for the presence of industrial contaminants through the review of historical documents and the analysis of environmental samples, which will be evaluated to determine if hazardous waste was disposed of at this Site. Environmental samples will be collected through the installation of soil borings, groundwater monitoring wells, the excavation of test pits, and the collection of surface water and sediment samples. Selected environmental samples will be submitted for laboratory analysis.

Given the assumption that NYSDEC will direct Honeywell to perform a Remedial Investigation/Feasibility Study (RI/FS) upon completion of the PSA, all three steps of a typical NYSDEC PSA (i.e., records search, sampling/surveys, and ground water monitoring) will be combined into a single phase. Rather than preparing a PSA report, it is Honeywell's intention to provide a figure showing each of the sampling locations along with a series of summary tables presenting the results of the sampling. At this time, MWH will either recommend that Honeywell proceed with an RI/FS, in which case the PSA data will be summarized within the RI work plan, or, if the data indicates that the Site does not, in fact, meet the State's definition of a hazardous waste site, MWH will document its findings and conclusions in a PSA report. The following table details the PSA Tasks to be performed.

PSA Task	Purpose	Study Area	Number of Samples
Historical Records Assessment	Review information to refine PSA and RI Scopes and provide additional information	Property and surrounding area	*Not Applicable*
Test Pit Installation	Perform a visual assessment and collect samples of the waste material	Locations within the known landfill boundary not previously excavated	Estimated as approximately six (6) 8-foot test pits to be performed during one (1) working day

PSA Task	Purpose	Study Area	Number of Samples
Soil Boring Installation	Perform an assessment of nature and extent of landfill materials and site geology, and identification of constituents in and below the landfill	Locations within and on the boundary of known landfill to a depth of 30 feet	Nine (9) 30-foot soil borings are proposed with three (3) soil samples per boring
Monitoring Well Installation and Groundwater Sampling	Perform an assessment of the site geology and hydrogeology, and ground water quality	Locations in the presumed upgradient and downgradient groundwater flow direction of the landfill	Two (2) upgradient well clusters, three downgradient well clusters and three (3) additional wells placed to assess surface water ground water interaction
Surface Water and Sediment Sampling	Perform an assessment of potential migration of landfill constituents to surface water/sediment from run off and/or groundwater discharge to surface water bodies	Drainage/wetland areas near landfill, Old Erie Canal and Geddes Brook in upgradient and downgradient locations from the landfill where possible	Ten (10) locations, four (4) of which are in drainage/wetland areas, and three (3) in the Old Erie Canal and Geddes Brook each

3.1 HISTORICAL RECORDS ASSESSMENT

A Historical Records Assessment (HRA) will be conducted to assess the nature of the local geology and surface and groundwater hydrogeology, as well as evaluate past activities on or near the Mathews Avenue Site that may have resulted in adverse impacts to the environment. A review of this information will aid in the identification of areas of potential environmental concern, and the placement of sampling points that will positively bias the investigation to identify potential environmental impacts. Some sources of information that will be evaluated for the historical records assessment include the available geologic literature, past scientific

and environmental studies, historical aerial photographs and maps, as well as available government environmental records databases. Available historic aerial photographs will be obtained and reviewed to assess the extent of disturbed and filled areas over the decades. In addition, a standard Phase I ESA database review will be obtained from a commercial search firm and reviewed by MWH environmental professionals.

3.2 FIELD INVESTIGATION

A field investigation will be conducted to evaluate the Site for the presence of industrial contaminants resulting from past waste disposal activities on the property. The assessment will be conducted through the excavation and sampling of test pits, advancement and sampling of soil borings, installation and sampling of both shallow and deep groundwater monitoring wells, and the collection and analysis of sediment and surface water samples. The following section is a description of those tasks to be conducted during the execution of the PSA.

3.2.1 Mobilization/Demobilization

Mobilization will begin upon approval of the project Work Plan and will include all normal activities necessary to begin the field investigations. These activities can include acquisition and inspection of equipment and materials, scheduling subcontractors, establishing communication and transportation arrangements, personnel scheduling and assignment, delineation of work zones, utility clearance, and sampling point locations. Demobilization will consist of all normal activities associated with securing documentation, shipping samples, cleaning and storing equipment, and follow-up communication with both subcontractors and Honeywell.

3.2.2 Test Pit Excavations

A series of test pits will be excavated at specific locations in the filled area to assess shallow subsurface fill conditions and evaluate specific areas of potential environmental concern that may have been identified in the HRA. For the purpose of this Work Plan, it has been estimated that a total of six test pits will be excavated to a depth of eight feet below grade or until groundwater is first encountered utilizing a rubber tire mounted excavator. The proposed test pit excavation locations have been included on Figure 5. Actual locations and sizes of the test pits may vary as a result of the location of subsurface/overhead utilities, field observations and/or areas of concern that may be identified in the HRA.

The on-site MWH environmental professional will screen the excavated material utilizing a photoionization detector (PID) and mercury vapor analyzer. A minimum of one grab fill sample will be collected for laboratory analysis from each test pit location. The analytical sample will be collected from that area of the test pit exhibiting the highest PID and/or mercury vapor reading. In the event that no PID or mercury vapor readings are observed, the sample will be collected from the bottom of the test pit.

The test pit excavations will be photographed and logged, and then the test pit will be backfilled and compacted with the excavated material. Field observations and a sketch of each pit will be recorded in the project notebook, photographs will be taken, and a formal test pit log will be prepared from the field notes.

The selected fill sample will be placed in a laboratory supplied container, preserved on ice, and transported accompanied by proper chain-of-custody documentation to Severn Trent Laboratories (STL) located in Edison, New Jersey for analysis. Each selected soil sample will be submitted to the laboratory for the full Target Compound List (TCL), Target Analyte List metals (TAL metals) and polychlorinated dibenzo-dioxin/furan (PCDD/PCDF) analysis.

3.2.3 Soil Borings

In order to assess the nature of the fill material and to evaluate the overburden geology and the potential impact on soil beneath the fill, a total of nine soil borings will be advanced and soil samples will be recovered from within or near the suspected fill area. The proposed locations of these soil borings are indicated on Figure 6.

Each boring will be advanced to the first aquitard layer encountered utilizing 4¼-inch inside diameter (I.D.) hollow stem augers (HSA). Soil samples will be recovered continuously using a 2-inch and/or 3-inch outside diameter (O.D.) split-barrel sampler following ASTM Method D1586-98 protocols. Each recovered soil sample will be inspected by an on-site MWH environmental professional, and observations of the sample's physical characteristics (color, moisture, grain size distribution, etc.), as well as the drilling methodologies and observations will be noted in a project specific notebook. A representative portion of each recovered sample will be placed in a sealed jar and the headspace will be subsequently screened for the presence of field-detectable contamination utilizing a PID and mercury vapor analyzer.

Each soil boring will be abandoned using a neat cement/bentonite grout mixture upon termination of the boring. Soil cuttings generated at each boring location will be containerized individually in 55-gallon drums and transported to a temporary on-site waste staging area pending receipt of the analytical results. Each drum will be labeled with the boring location, date generated, and the type of material contained. Upon receipt of the analytical data and characterization of the waste, the soil cuttings will be disposed of appropriately by Honeywell. Electronic soil boring logs will be prepared for each boring using the field notes.

It is estimated that a total of three soil samples from each boring will be submitted for laboratory analysis. The soil samples to be submitted for analysis from each boring will be a

surface soil sample collected from 0-6 inches below grade, the sample collected at the groundwater table, and the sample that displays the highest PID or mercury vapor analyzer reading. Each selected soil sample will be placed in a laboratory supplied container, preserved on ice, and submitted to STL accompanied by proper chain-of-custody documentation for full TCL, TAL metals and PCDD/PCDF analysis.

3.2.4 Monitoring Well Placement

To assess soil and groundwater quality both upgradient and downgradient of the fill area, fourteen (14) groundwater-monitoring wells will be installed around the perimeter of the landfill. The well installations will consist of five (5) well clusters composed of a shallow and deep monitoring well and four isolated shallow wells. The proposed monitoring well locations are depicted on Figure 6.

Past environmental studies conducted in the area suggest that the overburden geology be composed of glacio-lacustrine deposits. This material consists of approximately 0-10 feet of silty sand underlain by 2-10 feet of clayey silt, which in turn is underlain, by 10-30 feet of sandy silt. Glacial till underlies the sandy silt at approximately 50 feet below ground surface (bgs) and bedrock is encountered at approximately 80 feet bgs. The past studies also indicate that the groundwater flow direction is from south to north across the Site, and that groundwater can be expected to be encountered at a depth of between 5-10 feet bgs.

The glacio-lacustrine clayey silt unit is most likely acting as an aquitard between the shallow silty sand and deeper sandy silt aquifer units. The aquitard is inhibiting the vertical migration of groundwater between the aquifer units. Five (5) well clusters will be installed to assess the soil and groundwater quality, as well as the aquifer hydraulic characteristics of both the shallow and deep overburden aquifer units. Each well cluster will consist of one (1) well installed into the shallow silty sand unit, and one (1) well installed into the deeper sandy silt unit.

The five (5) monitoring well clusters have also been placed to aid in the assessment of groundwater quality in both the upgradient and downgradient areas of the landfill. Two (2) of the well clusters will be installed upgradient (south) of the fill area. One (1) of these clusters will be installed between the fill area and the Pass & Seymour/Legrand property located on the south side of Mathews Avenue, while the other upgradient cluster well will be installed opposite the end of Boyd Avenue.

Two (2) monitoring well clusters will be installed downgradient (north) of the fill area between the filled area and the old Erie Canal. Past environmental studies conducted at the LCP facility, located north of the Site and the old Erie Canal, have identified a shallow groundwater chlorinated VOC plume, consisting of predominantly 1,1-dichlorethane, migrating onto their property from the south. These two (2) well clusters will be installed to assess soil, as well as shallow and deep groundwater quality, downgradient of the fill area and south of the old Erie Canal.

One (1) monitoring well cluster will be installed downgradient and one shallow well will be installed upgradient of the Village of Solvay (Village) landfill. These wells will be installed to evaluate soil and groundwater quality both upgradient and downgradient of the Village's landfill.

Two (2) shallow wells will be installed on the north side of the old Erie Canal immediately across the canal from the two well clusters installed on the north side of the filled area. These wells will be installed to assess soil and groundwater quality north of the canal and to aid in the evaluation of the hydraulic nature of the surface water impounded in the canal.

To further aid in the hydraulic assessment of the canal, a measuring gauge will be installed into impounded surface water. The elevation of the gauge will be established during the site

survey to allow the recovery of surface water elevations for correlation with groundwater elevations.

One (1) shallow monitoring well will be installed on the western portion of the Site in an area that is suspected to have not been filled in the past. This location was selected to gather background soil and groundwater data for comparison to those samples gathered in the suspected impacted areas.

3.2.5 Monitoring Well Installation

At the five (5) monitoring well cluster locations, the deep well will be advanced first. Each deep monitoring well will be advanced and sampled to 4 feet into the first confining unit utilizing 6¼-inch I.D. HSAs. Soil samples will be recovered continuously with a 2-inch or 3-inch diameter split barrel sampler following ASTM Method D1586-98. Each recovered soil sample will be inspected by an on-site MWH field professional, and observations of the sample's physical characteristics (grain size distribution, moisture, color, etc.), as well as the drilling methodologies and observations will be noted in a project specific notebook. A representative portion of each recovered sample will be placed in a sealed jar and the headspace will be subsequently screened for the presence of field detectable contamination utilizing a PID and mercury vapor analyzer.

Upon encountering the first aquitard layer, a 4-inch diameter steel surface casing will then be installed through the HSAs and hydraulically pressed approximately 2 feet into the confining unit. The boring annulus will then be tremie grouted from the bottom of the borehole to the surface with a neat cement/bentonite grout as the auger string is removed. The grout will be allowed to set for a minimum of 12 hours before resuming drilling. For the purpose of this Work Plan, it has been estimated that the bottom of the surface casing will be set at a depth of 20 feet bgs. The steel surface casing will be installed into the first aquitard layer to reduce

the risk of the cross contamination of the deep overburden aquifer from potential shallow groundwater and/or surficial contamination.

The deep monitoring wells will then be advanced to depth utilizing fluid rotary methodology and a 3-inch diameter roller bit. Potable water will be circulated through the borehole to remove soil cuttings and stabilize the borehole sides during drilling. The borehole will be advanced to the top of the till unit which is estimated at a depth of 50 feet bgs. Soil samples will again be recovered continually to the terminal depth with a 2-inch or 3-inch diameter split barrel sampler following ASTM Method D1586-98.

The nine (9) shallow wells will be installed so as the well screen intersects the shallow groundwater table. Each shallow well will be advanced to depth, estimated at 20 feet bgs, utilizing 4¼-inch I.D. HSAs. The deep well at the cluster well locations will have been advanced first; consequently, soil samples need only be recovered and field screened continuously from the screened interval of the shallow wells. Soil samples will be recovered and field screened continuously for the entire depth of the isolated shallow wells.

Soil cuttings generated at each boring location will be containerized individually in labeled 55-gallon drums and transported to a temporary on-site waste staging area pending receipt of the analytical results. Final soil boring logs will be completed for each boring using the field notes.

Each monitoring well will be constructed of a 10-foot length of 2-inch O.D., 0.010-inch slot size, Schedule 40 PVC well screen and an appropriate length of 2-inch I.D., Schedule 40, PVC riser. The annulus between the well screen and the borehole side of the deep wells will be filled with an appropriately sized, inert, washed silica sand filter pack utilizing the tremie method. If possible, the sand pack of the shallow wells will be pored down the annulus. The filter pack will extend from the bottom of the borehole to a minimum of 2 feet above the top

of the well screen. A minimum 2-foot thick bentonite seal will then be placed above the sand filter pack to inhibit vertical contaminant migration through the borehole into the well's screened interval. The remainder of the annulus will then be grouted to the surface with a cement/bentonite grout. At the surface, each well will be completed with a lockable, 4-inch diameter, stick-up protective casing and a 2-foot square concrete pad. The wellhead within the protective casing will be sealed with a lockable pressure cap. Each wellhead will be permanently labeled with the well location.

3.2.6 Monitoring Well Development

Each monitoring well will be developed following completion in an attempt to remove suspended sediments from the sand filter pack and maximize the hydraulic connection between the overburden aquifer and the monitoring well. Well development will be performed using the surge and/or over-pumping methods. Field parameters (pH, conductivity, temperature and turbidity) will be monitored during development and development will continue until the extracted water is relatively free of sediments (<50 NTU), the field parameters stabilize for three (3) readings, or a total of ten (10) well volumes have been removed. Wastewater generated during the purging activities will be contained in labeled 55-gallon drums that will be transported and stored at the on-site staging area pending the result of the laboratory analysis.

3.2.7 Hydraulic Conductivity Testing

Following well development, a hydraulic conductivity test (slug test) will be conducted on each newly installed groundwater monitoring well. These tests will be conducted to aid in the assessment the hydraulic characteristics of the overburden aquifers. Both rising and falling head hydraulic conductivity tests will be conducted by inserting and removing a PVC slug; groundwater measurements will be recorded during these tests utilizing an electronic datalogger.

3.2.8 Groundwater Analytical Testing

Following development and the equilibration period, groundwater samples will be collected for analysis from each of the fourteen (14) newly installed monitoring wells. Prior to the recovery of analytical samples, the monitoring wells will be gauged for depth to water and total depth using an electronic water level probe. Additionally, a disposable bailer and/or an electronic oil/water interface probe will be used to assess the possible accumulation of NAPL and DNAPL in the well. The wells will then be purged utilizing using low flow purging techniques. The wells will be purged to remove stagnant water from the well casing and sand pack to facilitate the acquisition of a groundwater sample representative of local overburden aquifer. Field parameters (temperature, pH, conductivity, dissolved oxygen, turbidity, and oxidation/reduction potential) will also be monitored and recorded during purging activities. Purging will continue until a minimum of one (1) well volume of groundwater has been removed from the well and that the field parameter readings have stabilized, indicating that representative formation water is being produced. Final monitoring well sampling logs will be completed from the field notes.

Groundwater samples recovered from each monitoring well will be placed in laboratory supplied and preserved containers, preserved on ice, and transported accompanied by Chain-of-Custody documentation to STL for analysis. Each submitted groundwater sample will be analyzed for full TCL, TAL metals, chloride, sulfate, and carbonate/bicarbonate analysis.

Wastewater generated during well purging and sampling activities will be containerized and stored on-site in labeled 55-gallon drums pending characterization and proper disposal.

3.2.9 Surface Water and Sediment Sampling

Surface water and sediment samples will be collected from the surface water and wetland areas bordering and on the Site. These samples will be collected to evaluate potential impacts to the surface water and sediment quality, which will aid in the assessment of potential effects to aquatic life and human health, if any.

It has been estimated that ten surface water and sediment samples will be collected from three (3) areas. Where possible, both a sediment and surface water sample will be collected at the same point. Three (3) sets of samples will be collected from the length of Geddes Brook: one (1) at the point were Geddes Brook enters the Site from the south, one (1) from near the mid-point of the stream as it passes through the property, and the last were Geddes Brook leaves the property at the northern boundary. Three (3) sets of samples will be collected at various locations in the impounded area of the old Erie Canal. The remaining four (4) sets of samples will be collected from the wetlands areas in the central portion of the Site. The proposed surface water and sediment sampling locations are indicated on Figure 5. The actual numbers of samples, sampling procedures, and sampling locations may vary based on field conditions and observations.

Surface water samples will be collected by either directly filling laboratory-supplied glassware or using a decontaminated dipper to collect the surface water sample and transfer it into the glassware. Sample bottles not containing preservative will be direct filled while those bottles containing preservative will be filled using a dipper. As the surface water bodies being sampled are shallow, no profiling with respect to depth will be performed.

Surface water samples will be collected prior to any sediment sampling and care will be taken not to disturb stream sediment, thus increasing turbidity, before the surface water sample is collected. When sampling a stream, the downstream sample will be collected first with sampling progressing upstream to avoid increases in turbidity. Surface water samples will be

placed in laboratory supplied and preserved containers and submitted full TCL and TAL metals analysis.

Sediment sample locations will be targeted at stream depositional areas as opposed to areas of eroded streambed. At each sediment sampling location, a sediment sample will be collected with a decontaminated spoon or spatula sampler from the top 1 foot of sediment. Depending on the depth of the water body, sediment sampling may require the use of a dredge, split barrel sampler, and/or hand coring devices.

Sediment samples for laboratory analysis will be transferred directly into laboratory supplied glassware using disposable spoons or spatulas. The sample jars will be labeled and immediately placed on ice. The sample collection will be documented in the field notebook and on the Chain-of Custody. A description of the sediment (grain size, color, evidence of contaminant impacts) will be included in the field notebook. Each sediment sample selected for analysis will be placed in a laboratory supplied container, preserved on ice, and submitted to STL accompanied by proper chain-of-custody documentation for full TCL, TAL metals, total organic carbon (TOC), grain size and PCDD/PCDF analysis.

Sample collection will be documented in the field notebook and recorded on the Chain-of-Custody. Final sediment/surface water sampling logs will be prepared from the field notes. Sampling locations will be located with a stake or flag and by the use of a hand held Global Positioning System (GPS) unit.

5.0 SCREENING LEVEL RISK ASSESSMENT

As part of the PSA, a screening level human health risk assessment and ecological risk assessment will be performed to determine if there are potential risks to human health or the environment. These assessments will help to determine if any areas on the Site could pose a potential health concern to human or ecological receptors, and will help to formulate the scope of the remedial investigation if it is required. If a remedial investigation is required, then a Baseline Risk Assessment (BlRA) will be performed.

5.1 SCREENING LEVEL HUMAN HEALTH EVALUATION

The human health risk assessment will be performed in accordance with USEPA's Risk Assessment Guidance for Superfund (USEPA 1989). Elements of the human health risk assessment are data evaluation (including selection of chemicals of potential concern), exposure assessment (including land uses in the vicinity of Site, a conceptual model of the receptors and exposure pathways, and exposure dose estimation), toxicity assessment, and risk characterization. For purposes of the *screening level* human health evaluation conducted as part of the PSA, the assessment will be limited to the data evaluation phase to determine if there are any chemicals of potential concern (COPCs) considering the complete exposure pathways identified as part of the exposure assessment. These elements are described in the following subsections.

5.1.1 Data Evaluation

Chemical data that pass the validation process will be included in the risk assessment. The validation process will determine that the requirements of the QAPP were met, and if an analyte is not considered present due to field or blank contamination. Maximum concentrations of analytes in each medium (soil, sediment, surface water, sediment, and groundwater) will be compared to applicable human health-based screening levels to determine if the medium represents a potential human health concern. In addition,

background data (e.g., upstream surface water and sediment data, previously published results) for a medium will be used to determine if concentrations of analytes above human-health based standards are site-related or not.

Chemicals of potential concern (COPCs) in soil and sediment will be identified based on a comparison of analytical data to the Recommended Soil Cleanup Objectives (RSCOs) listed in the NYSDEC Technical Administrative Guidance Memorandum (TAGM) #4046 (January 24, 1994) and NYSDEC Sediment Screening Criteria. Groundwater and surface water data will be compared to applicable NYSDEC groundwater and surface water standards.

If any analytes fail the screen (i.e., are greater than the health-based screening levels) and are found to be potentially site related, then a BlRA would be performed as part of the RI for those particular media and the identified COPCs.

5.1.2 Exposure Assessment

The exposure assessment is an evaluation of who may be exposed to constituents from the Site, how they would be exposed, and how much exposure could occur. In particular, the exposure assessment involves identifying populations who are (or may in the future be) potentially exposed to constituents released from the Site. As part of this phase of the project, an MWH toxicologist will make a one-day trip to the Site to collect information on land use and demographics for the human health risk assessment. Based on this information, a conceptual model will be prepared as part of the screening assessment to describe the pathways by which exposure could occur. An exposure pathway includes a source and mechanism of chemical release, a transport medium, a point of contact with the affected medium, and an exposure route (e.g., ingestion). If any one of these components of a pathway is not present, the pathway is incomplete and no exposure can occur. For purposes of this work plan, a preliminary exposure assessment was performed so that the screening

that was performed under the data evaluation made sense for current and potential future site conditions. The exposure pathways considered under this screening evaluation are listed below. Depending upon the results of the PSA and information gathered during the Site visit, this preliminary list of exposure pathways will be modified as appropriate.

- Surface Soil – Incidental ingestion of and dermal contact with soil or inhalation of soil particles or chemical vapors by on-site industrial/commercial workers and occasional trespassers.

- Subsurface Soil – Incidental ingestion of and dermal contact with soil or inhalation of soil particles or chemical vapors by on-site construction workers.

- Sediments – Incidental ingestion of and dermal contact with sediment or inhalation of sediment particles or chemical vapors by on-site industrial/commercial workers, adolescent trespassers and occasional adult trespassers.

- Surface Water - Incidental ingestion of surface water by on-site industrial/commercial workers and occasional adolescent or adult trespassers.

- Groundwater – Ingestion of groundwater from the shallow aquifer at the Site by on-site industrial/commercial workers and off-site residents (only if contaminated groundwater migration to residential areas is predicted).

The selection of these exposure pathways were based on the consideration that the Site is in an industrial/commercial area, and the likely future use of the Site will be consistent with commercial/industrial land use.

The screens discussed under the data evaluation section (5.1.1) will be used to determine if there are any potential human health risks that would require further evaluation as part of an RI. As discussed previously, if concentrations of chemicals are identified above the NYSDEC RSCOs or Sediment Screening Criteria and are considered site-related, further

evaluation for those exposure pathways will be performed as part of the BlRA unless the screening assessment is considered sufficient to make management decisions. This decision will need to be made jointly between Honeywell and NYSDEC risk managers.

5.2 SCREENING LEVEL ECOLOGICAL RISK

Consistent with USEPA guidance (USEPA 1997, 1998), the ERA will initially be performed as a screening level assessment as part of the PSA. The screening level ecological assessment (SLERA) will conform to the NYSDEC Generic Ecological Risk Assessment Guidance for Onondaga Lake Sites (April 1998). This would include Step 1 of the Fish and Wildlife Impact Analysis (NYSDEC October 1994), and Steps 1 through 3 of Ecological Risk Assessment Guidance for Superfund (ERAGS) (EPA 1997). Step 1 of the Fish and Wildlife Impact Analysis consists of development of a *Site Description*, which includes:

- Site maps,
- Description of fish and wildlife resources,
- Description of fish and wildlife resource values, and
- Identification of applicable fish and wildlife regulatory criteria.

Steps 1 through 3 of ERAGs include:

1. Screening Level Problem Formulation and Ecological Effects Evaluation
2. Screening Level Exposure Estimate and Risk Calculation
3. Baseline Risk Assessment Problem Formulation

Scientific Management Decision Points (SMDPs) occur after Steps 2 and 3 of ERAGS where agreement between Honeywell and NYSDEC is required. Steps 1 and 2 of the process are completed first to determine if Step 3 is required.

As part of ERAGS Steps 1 and 2, the analytical data will be screened against readily available ecological toxicity benchmarks (e.g., ORNL values). These will include criteria identified as part of Step 1 of the Fish and Wildlife Impact Analysis. The list of criteria/ecological benchmarks will be provided to NYSDEC for review and concurrence before ERAGS Step 2 is completed. A request to state and federal agencies will be made to determine if any threatened and endangered (T&E) species are known to exist at or near the Site. In addition, an MWH environmental toxicologist will make a one-day visit to the Site to perform a qualitative habitat assessment required for the screening level ecological assessment, and gather information for Step 1 of the Fish and Wildlife Impact Analysis.

The screening ecological risk assessment (ERA) evaluates whether releases of constituents have the potential to cause a significant adverse impact on the Site or surrounding valued ecological resources. At this time, the terrestrial environment on the landfill is not being considered a valued ecological resource due to management considerations associated with a landfill (cover maintenance). Rather, the surface water bodies and wetlands adjacent to the landfill are considered potentially valuable ecological resources. These known ecological resources at the Site include Geddes Brook, old Erie Canal and wetlands adjacent to the landfill. As part of Step 1 of the Fish Wildlife Impact Analysis, a qualitative discussion of the function and values of these ecological resources will be made. In addition, as part of Step 1 it will be re-evaluated whether other valued aquatic or terrestrial ecological resources exist at the Site or directly downstream from the Site. An MWH environmental toxicologist and biologist will make this evaluation in the presence of a NYSDEC environmental biologist. The screening level ERA will focus on whether there appears to have been a release of contaminants from the landfill to valued ecological resources on the Site or downstream of the Site.

Two (2) mechanisms of chemical transport to the surface water bodies will be evaluated as part of the PSA. These include direct discharge of storm water runoff to the surface water

bodies and discharge of contaminated groundwater to the surface water bodies. If it is determined as part of the PSA that a release of contaminants to the surface water bodies has likely occurred, then the surface water data collected as part of the PSA will be compared to ecological benchmarks.

If there appears to have been a release of contamination to surface water bodies, based on the surface water and sediment data, or based on the hydrogeological investigation, then the maximum sediment and surface water analyte concentrations (both measured and modeled) will be compared to ecological benchmarks. These evaluations will be performed to determine if contaminated sediment or surface water may pose a potential ecological concern to these surface water bodies, or downstream surface water bodies. As with the human health evaluation, a determination will be made of whether analytes that exceed the ecological benchmarks are site related or associated with background conditions in the area of the Site. The results of this assessment would be shared with NYSDEC as SDMP No. 1 to determine if ERAGS Step 3 is required.

If maximum sediment and surface water analyte concentrations exceed ecological benchmarks values (and are considered site related), then further ecological evaluation may be necessary. It should be noted that exceedance of an ecological benchmark does not necessarily indicate there is a risk to the ecology of the area, and any exceedances of ecological benchmarks will be discussed in light of their location and magnitude within the SLERA. If, based on the results of the SLERA, Honeywell and NYSDEC determine that a Baseline Ecological Risk Assessment (BERA) would be required, then ERAGS Step 3 would be performed, which provides the problem formulation step for the BERA. The baseline problem formulation will be highly dependent upon the results of ERAGS Steps 1 and 2 and Step 1 of the Fish and Wildlife Impact Analysis. The results of the baseline problem formulation will be provided to NYSDEC for comment and review as SMDP No. 2. The

results of the baseline problem formulation will be used to determine an applicable scope of work for the RI for purposes of the BERA.

6.0 SITE SURVEY

All sampling and data points will be located, both horizontally and vertically, through a site survey conducted by a surveyor licensed by the State of New York. Each point will be geographically referenced to either the New York Transverse Mercator or New York State Plane Coordinate System. All vertical data will be referenced to the National Geodetic Vertical Datum, 1929 adjustment.

This looks correct (NAD83 Horizontal datum)

7.0 WASTE MANAGEMENT

All Investigation Derived Waste (IDW), including drill cuttings and decontamination/development/purge water, will be placed in sealed and labeled 55-gallon steel drums and transported to a central temporary staging area designated by Honeywell. Each drum will be labeled with the location that the waste was created, the type of waste (PPE, soil, wastewater, etc.), and the date. Final waste classification and disposal of PPE will be the responsibility of MWH, while disposal of all other IDW will be the responsibility of Honeywell.

8.0 EQUIPMENT DECONTAMINATION

8.1 HEAVY EQUIPMENT DECONTAMINATION

All heavy equipment used during the field investigation, including backhoes, bull dozers, and drill rigs, will be decontaminated to reduce the risk of importing or exporting contaminants to or from the Site. Each piece of equipment will be decontaminated before entering the Site, as necessary after completing each sampling location, and before leaving the Site. Decontamination will be accomplished utilizing high-pressure hot water at a designated central decontamination area. The decontamination area will consist of a bermed and lined decontamination pad sloped to a wastewater collection sump located in one corner. All wastewater and solids generated during the decontamination activities will be collected and containerized in labeled 55-gallon steel drums from later characterization and disposal.

8.2 SAMPLING EQUIPMENT

Where practical, non-reusable or dedicated sampling equipment and utensils will be used to reduce the risk of cross-contamination and minimize decontamination requirements. Environmental monitoring instruments will be covered with plastic, if necessary, to avoid direct contamination of these instruments. Where necessary, reusable sampling equipment will be thoroughly decontaminated prior to each use and before removal from the Site.

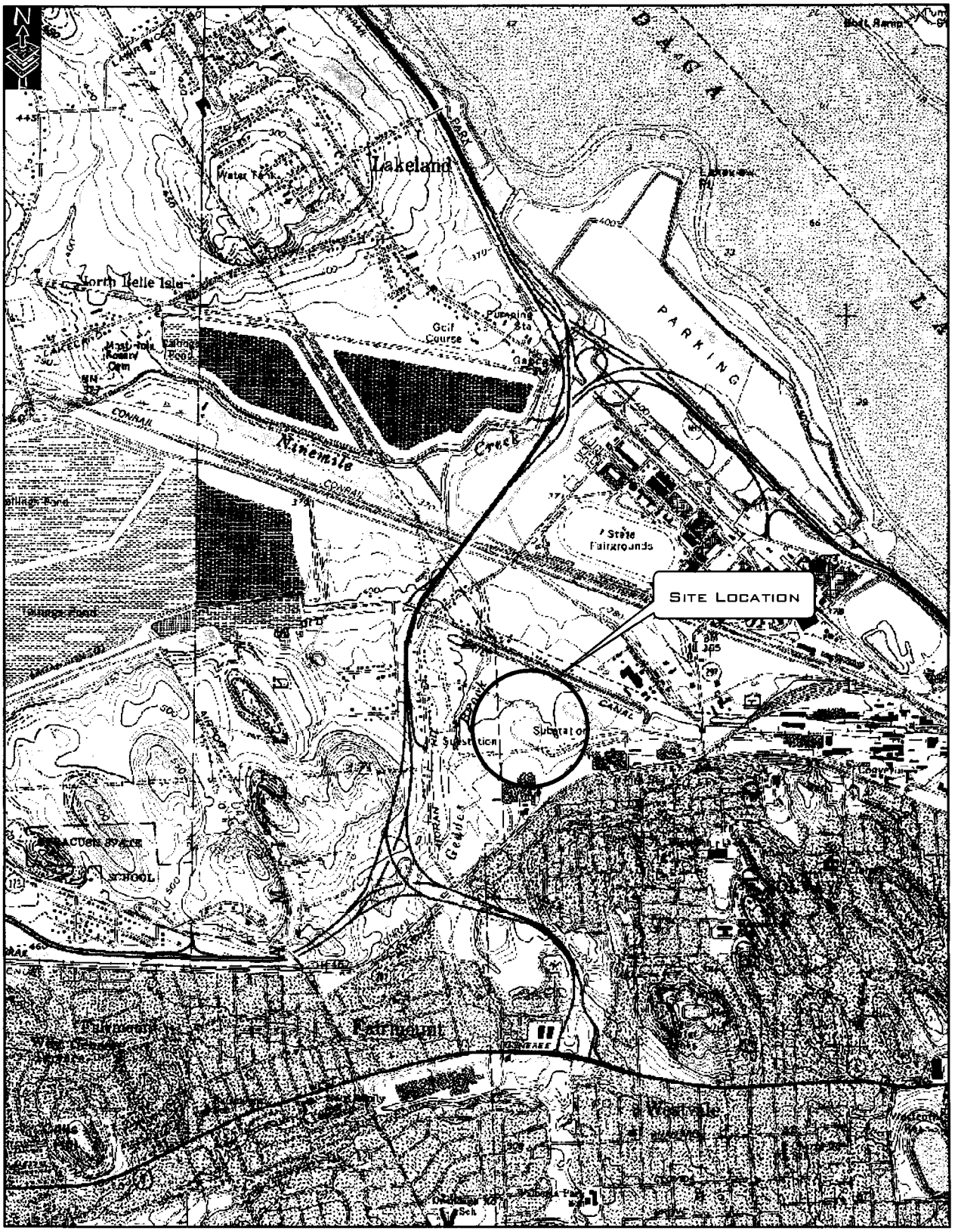
All non-dedicated equipment and tools used to collect samples for chemical analyses (including trowels, spatulas, spoons, scoops, hand augers, and split-spoons) will be decontaminated using the following procedures:

- Non-phosphate detergent wash,
- Tap water rinse, and
- Distilled/deionized water rinse.

If equipment is to be stored for future use, allow it to air dry, and then wrap it in aluminum foil (reflective side out) or seal in plastic bags. Decontamination fluid will be discharged directly to the ground away from any surface water or containerized on site if necessary.

Table 1
Analytical Summary Table
Mathews Avenue Site
Geddes, New York

Types of Analysis	Method Required	Parameters	Estimated Number of Samples
Soil Samples			
VOCs	Method 8260B	TCL plus 10	31
SVOCs	Method 8270C	TCL plus 20	31
Pesticides/PCBs	Methods 8081 and 8082	TCL plus Aroclor 1268	31
TAL Metals	Methods 6010B, 7470A, 7471 and 9010B	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc	31
PCDD/Fs	Method 8290	polychlorinated dibenzo(p)dioxins and dibenzofurans	31
Ground Water Sampling			
Note: At the request of the DEC, samples collected for organic analyses will not be preserved or adjusted for pH.			
VOCs	Method 8260B	TCL plus 10	14
SVOCs	Method 8270C	TCL plus 20	14
Pesticides/PCBs	Methods 8081 and 8082	TCL plus Aroclor 1268	14
TAL Metals	Methods 6010B, 7470A and 7471	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc	14
Wet Chemistry	EPA300	chloride	14
		sulfate	14
		carbonate	14
		bicarbonate	14
Surface Water Sampling			
Note: At the request of the DEC, samples collected for organic analyses will not be preserved or adjusted for pH.			
VOCs	Method 8260B	TCL plus 10	12
SVOCs	Method 8270C	TCL plus 20	12
Pesticides/PCBs	Methods 8081 and 8082	TCL plus Aroclor 1268	12
TAL Metals	Methods 6010B, 7470A, 7471 and 9010B	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc	12
Sediment Sampling			
VOCs	Method 8260B	TCL plus 10	12
SVOCs	Method 8270C	TCL plus 20	12
Pesticides/PCBs	Methods 8081 and 8082	TCL plus Aroclor 1268	12
TAL Metals	Methods 6010B, 7470A and 7471	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc	12
PCDD/Fs	Method 8290	polychlorinated dibenzo(p)dioxins and dibenzofurans	12
TOC		total organic carbon	12
Geotechnical	ASTM D422	grain size	10



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SITE LOCATION MAP
MATHEWS AVENUE LANDFILL
HONEYWELL INTERNATIONAL
SOLVAY, N.Y.

FIGURE
1

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared as part of this PSA Work Plan, but it applies to future sampling events as well and therefore will be included in the RI Work Plan for the Site. The overall objective is to identify procedures for sampling, chain-of-custody, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective action. It presents the field and laboratory quality assurance/quality control (QA/QC) policies and procedures that will be followed during the implementation of the project.

1.1 SAMPLE LABELING, HANDLING, AND SHIPPING

1.1.1 Sample Identification/Labeling

All samples will be assigned a unique identification code consisting of two to four parts. These parts generally consist of the project, sample type, boring number or location, and additional identification codes (as needed). Examples of the codes used for each sample type are identified below.

Environmental Samples

Soil Samples

Location ID:	SS01
Location Type:	SS *(Soil Sample)*
Field Sample ID:	SS01-01
Matrix:	SO *(Soil)*
Beginning Depth:	0.5 ft

Ending Depth: 2 ft
Sample Type: N *(Normal)*

Monitoring Well Installation Soil Boring Samples
Location ID: MWSB01
Location Type: MWSB *(Monitoring Well Soil Boring Sample)*
Field Sample ID: MWSB01
Matrix: SO *(Soil)*
Beginning Depth: 6 ft
Ending Depth: 8 ft
Sample Type: N *(Normal)*

Groundwater Monitoring Well Samples
Location ID: MW01
Location Type: MW *(Monitoring Well)*
Field Sample ID: MW01
Matrix: WG *(Water)*
Beginning Depth: 0 ft
Ending Depth: 0 ft
Sample Type: N *(Normal)*

Quality Assurance/Quality Control Samples

Matrix Spike/Matrix Spike Duplicate Samples: QA/QC samples will include a matrix spike (MS) and matrix spike duplicate (MSD) sample at a frequency of not less than 5% (one MS/MSD pair per every 20 samples collected) for each matrix type (aqueous and soil). They will receive the following code:

Location ID: SS01
Location Type: SS *(Soil Sample)*
Field Sample ID: SS01-01
Matrix: SO *(Soil)*
Beginning Depth: 6 ft
Ending Depth: 8 ft
Sample Type: MS *(Matrix Spike)* and
Sample Type: SD *(Matrix Spike Duplicate)*

Blind Field Duplicate Samples: Field duplicate samples are sent blind to the laboratory. They will receive the following code:

Location ID:	SS99
Location Type:	SS *(Soil Sample)*
Field Sample ID:	SS99-01, 02, 03, …
	(Use consecutive numbers for all duplicates collected for soil samples)
Matrix:	SO *(Soil)*
Beginning Depth:	0.5 ft
Ending Depth:	2 ft
Sample Type:	N *(Normal)*

The sample location where a blind field duplicate is collected will be marked both in the field notebook and on the copy of the chain-of-custody record retained by the sampling team. A blind field duplicate sample will be collected at a frequency of one per every 20 samples for each matrix (aqueous and soil).

Equipment Blanks: Equipment blanks are not required when dedicated sampling equipment is used. If non-dedicated sampling equipment is used in the soil sampling program, equipment blanks will be analyzed at a frequency of not less than 5% (one equipment blank per every 20 samples collected). In either case, they receive the following code:

Location ID:	FIELDQC
Location Type:	QC *(Quality Control Sample)*
Field Sample ID:	EB-01-01-2001-01, 02, 03, ...
	(Use consecutive numbers for all Equipment Blanks collected on that day)
Matrix:	WQ *(Water Quality Sample)*
Beginning Depth:	0 ft
Ending Depth:	0 ft
Sample Type:	EB *(Equipment Blank)*

Trip Blanks: Trip blanks are used to monitor potential aqueous sample volatile organic contamination during shipment to and from the laboratory. It also provides information on laboratory water quality since the laboratory provides the trip blank water. One trip blank will

submitted for analysis for each day aqueous matrix volatile organic samples are collected. A trip blank will be included in each cooler that contains aqueous matrix volatile organic samples; therefore, all volatile organic samples and containers will be shipped to and from the laboratory in the smallest number of coolers possible in order to minimize the number of trip blanks required.

Location ID:	FIELDQC
Location Type:	QC *(Quality Control Sample)*
Field Sample ID:	TB-01-01-2001-01, 02, 03, ...
	(Use consecutive numbers for all Trip Blanks collected on that day)
Matrix:	WQ *(Water Quality Sample)*
Beginning Depth:	0 ft
Ending Depth:	0 ft
Sample Type:	TB *(Trip Blank)*

All sample containers will be labeled prior to sample collection. A non-removable label on which the following information is recorded with a permanent waterproof marker (pen for volatile samples) will be affixed to each sample container for shipment to the laboratory:

- project name/location;
- sample identification code;
- date and time the sample was collected (except for blind field duplicates, where the time will be omitted);
- sample type (soil or aqueous); and
- analysis requested.

1.1.2 Containers, Preservation, and Holding Times

All sample containers used will be of traceable quality purchased and supplied by the laboratory. The selection of sample containers used to collect the samples is based on the following considerations:

- sample matrix;
- analytical methods;
- potential contaminants of concern;
- reactivity of container material with sample; and
- QA/QC requirements.

The required containers, preservatives and holding times will conform to the NYSDEC Analytical Services Protocol (10/95). No chemical preservative is required for soil samples, although the samples will be kept on ice in a cooler at a temperature of 4°C (±2°C).

1.1.3 Chain-of-Custody Protocol and Shipping Requirements

A chain-of-custody record will be initiated by MWH personnel upon sample collection and by the laboratory providing the sample containers. The laboratory record traces the path of the initial sample bottles and preservation at the laboratory to the field for sample collection. The MWH chain of custody is initiated at the point of sample collection and documents their return to the laboratory for analysis.

The MWH Project Manager or designated representative will notify the laboratory of the anticipated schedule of upcoming field sampling activities. This notification will include information concerning the number and type of samples, as well as the anticipated date(s) of shipment of samples to the laboratory. The laboratory will be responsible for supplying insulated containers (typically coolers) for storing and shipping the samples. Field samplers receiving the sample containers check each cooler and inspect the contents for breakage upon receipt. All sample bottles within each shipping container are individually labeled with an adhesive identification label provided by the laboratory.

Once the sample containers are filled, they are immediately placed in the cooler with sealed bags of ice ("wet ice") or synthetic ice packs ("blue ice") to maintain the samples at 4°C

(±2°C). To the extent possible, the chain of custody is filled out prior going in the field. Following sample collection, the field sampler properly completes the chain of custody for each sample. The chain-of-custody forms are then signed and placed in a sealed plastic Ziploc bag in the cooler. The shipping containers are then closed and properly sealed and the cooler is shipped to the laboratory via an overnight courier or hand delivered under appropriate chain-of-custody procedures. Whenever possible, the samples will be shipped within 24 hours of collection. Samples will not be shipped later than 48 hours following collection. Upon receipt of the coolers at the laboratory, the cooler's contents are inspected and the chain of custody signed, thus accepting custody of the samples.

1.1.4 Cleaning of Field Sampling Equipment

All non-dedicated equipment and tools used to collect samples for chemical analyses (including trowels, spatulas, spoons, scoops, hand augers, and split-spoons) will be decontaminated using the following procedures:

- Non-phosphate detergent wash;
- Tap water rinse; and
- Distilled/deionized water rinse.

If equipment is to be stored for future use, allow it to air dry, and then wrap it in aluminum foil (reflective-side out) or seal in plastic bags. Decontamination fluid will be discharged directly to the ground away from any surface water or containerized on-site if necessary.

1.1.5 Cleaning of Pumps and Pumping Equipment

In general, all suction-lift pumps and pumping equipment that have come in contact with the water column during well development and/or purging will use dedicated and pre-cleaned tubing. If submersible pumps are used, the following cleaning procedure will be employed:

- Wash the exteriors of the pump, wiring, and cables with non-phosphate detergent;
- Rinse with potable water;
- Pump a minimum of 25 gallons of potable water through the pump housing and through the pump tubing if a dedicated pre-cleaned discharge hose is not used for each well;
- Perform a final rinse by pumping 5 gallons of distilled/deionized water through the pump and pump tubing.

1.2 ANALYTICAL LABORATORY/ANALYTICAL METHODS

The analytical laboratory contracted to perform the sample analyses is Severn Trent Laboratories (STL) of Edison, New Jersey, a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory holding the Analytical Services Protocol (ASP) certification. Samples will be analyzed in accordance with NYSDEC ASP (10/95) quality control criteria and the methods outlined in Table 1. The Quality Assurance Plan (QAP) for the laboratory is available upon request.

1.3 DATA QUALITY REQUIREMENTS

1.3.1 Data Quality Objectives

Data quality objectives (DQO) for data measurement are generally defined in terms of six parameters: precision, accuracy, representativeness, comparability and completeness (PARCC). The following DQO have been established to ensure that the data collected as part of this program are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP are used to assess the uncertainty associated with decisions related to the Site.

1.3.2 Precision

Precision measures the reproducibility of measurements under a given set of conditions. To maximize precision, established sampling and analytical procedures are consistently followed. Analytical precision is monitored through analysis of matrix spike duplicates and field duplicates. Matrix spike duplicates for organic compounds are analyzed at a frequency of once for every 20 samples as specified by the ASP. Precision is expressed as the relative percent difference (%RPD):

$$\%RPD = 100 \times 2[(X1 - X2)/(X1 + X2)]$$

where X1 and X2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values. The equation is taken from "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003, March 1987).

1.3.3 Accuracy

Accuracy measures the bias in a measurement system. Laboratory accuracy is assessed through use of laboratory internal QC samples, matrix spikes, and surrogate recovery. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on similar samples. A matrix spike and matrix spike blank are analyzed once for every twenty samples, as specified in the ASP.

Accuracy values can be presented in a variety of ways. Average error is one way of presenting this information; however, more commonly, accuracy is presented as percent bias or percent recovery. Percent bias is a standardized average error (the average error divided by the actual or spiked concentration and converted to a percentage). Percent bias is unit-less and allows accuracy of analytical procedures to be compared easily. Percent recovery

provides the same information as percent bias. Routine organic analytical protocols require a surrogate spike in each sample. Percent recovery is defined as:

$$\% \text{ Recovery} = (R/S) \times 100$$

Where

S = spike surrogate concentration

R = reported surrogate concentration

and % Bias = % Recovery - 100

This equation is taken from "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003, March 1987). Percent recovery criteria published by the NYSDEC as part of the NYSDEC ASP (10/95) and those determined from laboratory performance data are used to evaluate accuracy in matrix spike and blank spike quality control samples.

1.3.4 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent actual conditions. In the field, the representativeness of the data depends on selection of appropriate sampling locations, collection of an adequate number of samples, and use of consistent sampling procedures. The sampling procedures, as described in the FSP, are designed with the goal of obtaining representative samples for each of the different matrices.

In the analytical laboratory, the representativeness of the analytical data is a function of the procedures used in processing the samples. The objective for representativeness is to provide data of the same high quality as other analyses of similar samples using the same methods during the same time period within the laboratory. Representativeness is determined by

comparing the quality control data for these samples against other data for similar samples analyzed at the same time.

1.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Analytical results are comparable to results of other laboratories with the use of the following procedures/programs: Instrument standards traceable to National Institute of Standards and Testing (NIST), Environmental Protection Agency (EPA) or NYSDEC sources; the use of standard methodology; reporting results from similar matrices in consistent units; applying appropriate levels of quality control within the context of the laboratory quality assurance program; and participation in inter-laboratory studies to document laboratory performance. By using traceable standards and standard methods, the analytical results can be compared to other laboratories operating similarly. The QA program documents internal performance, and the inter-laboratory studies document performance compared to other laboratories. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

1.3.6 Completeness

Completeness is the percentage of measurements made that are judged to be valid measurements. The completeness goal is to generate the maximum amount possible of useable data (i.e., 100% usable data). Data is considered usable unless qualified during validation as "R," rejected.

1.3.7 Reporting Limits

The estimated reporting limits or practical quantification limits that are desired for each analysis are the Contract Required Detection Limits specified in the NYSDEC ASP (10/95). All such limits are dependent upon matrix interferences and reporting limits may vary as a result of dilution.

1.4 FIELD QUALITY ASSURANCE SAMPLES

1.4.1 Blind Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Field duplicate samples are defined as a second sample collected from the same location, at the same time, in the exact same manner as the first and placed into a separate container with no prior mixing. Field duplicate samples are collected at a frequency of one per every twenty (20) samples per matrix. Each duplicate sample is analyzed for the same parameters as the samples collected that day. Thus, both field and laboratory variability are evaluated. Acceptance and control limits for the laboratory follow NYSDEC ASP guidelines for organic analyses. However, any deviations in the data with respect to the limits will be discussed in the report. Although there are no established QC limits for field duplicate RPD data, MWH considers RPD values of 50% or less for aqueous samples and 100% or less for soil samples an indication of acceptable sampling and analytical precision.

1.4.2 Split Samples

Split samples are usually used for performance audits or inter-laboratory comparability of data. The collection of split samples is not anticipated during the course of this project.

However, if the NYSDEC or other appropriate agency requests split samples to be collected, then the following applies: A split sample is defined as two separate samples taken from a single aliquot that has been thoroughly mixed or homogenized prior to the formation of the two separate samples.

1.4.3 Equipment Blanks

Equipment blanks are not required when dedicated sampling equipment is used. If non-dedicated sampling equipment is used for the soil sampling program, equipment blanks will be analyzed at a frequency of not less than 5% (i.e., one equipment blank per every 20 samples collected).

1.4.4 Trip Blanks

Trip blanks are used to monitor potential sample volatile organic contamination during shipment to and from the laboratory. It also provides information on laboratory water quality since the laboratory provides the trip blank water. One trip blank will be submitted for analysis for each day that aqueous volatile organic samples are collected. A trip blank will be included in each cooler that contains aqueous volatile organic samples, therefore all aqueous volatile organic samples and containers will be shipped to and from the laboratory in the smallest possible number of coolers in order to minimize the number of trip blanks required.

1.5 LABORATORY QUALITY ASSURANCE SAMPLES

1.5.1 Method Blanks

Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instrument as the

turbidity, temperature, salinity and redox potential will be obtained in duplicate once for every 20 aqueous samples collected.

pH: If the pH QC sample (pH 7.0 or pH 10.0 buffer after initial automatic calibration with pH 4.0 buffer) exceeds ±0.5 pH units from the true value, the source of the error is determined and the instrument re-calibrated. If a continuing calibration check with pH 7.0 buffer is off by ±0.5 pH units, the instrument is re-calibrated.

Conductivity: QC samples must be within ±10% of the true values. The true value for conductivity in the automatic calibration solution is 4,490 micromhos per centimeter (umhos/cm).

Turbidity: QC samples must be within ±10% of the true values. Turbidity QC samples are commercially prepared polymer standards such as those available from Advanced Polymer System, Inc. or equivalent. The initial automatic calibration solution has a turbidity value of 0 NTU.

The PID and mercury analyzer are each calibrated according to the manufacturer's instructions at the beginning of the day, whenever the instrument is turned off for more than two hours and at the discretion of the Site Safety Officer (SSO).

1.6.1.2 Maintenance

Prior to field sampling events, each piece of field equipment is inspected to ensure it is operational. If necessary, the equipment is serviced. Meters that require charged batteries are fully charged or have fresh batteries. Due to MWH's relationship with a number of firms which rent instrumentation, safety and sampling equipment, significant downtime should not

occur. In addition to this, field personnel carry key spare parts and equipment into the field to prevent downtime.

1.6.2 Laboratory Equipment

All laboratory equipment is calibrated according to the requirements of the respective NYSDEC ASP (10/95) method for each analysis and/or in accordance with the manufacturer's specifications. In general, preventative maintenance of laboratory equipment follows the guidelines recommended by the manufacturer. Generally speaking, a malfunctioning instrument which cannot be repaired directly by laboratory personnel is repaired following a service call to the manufacturer.

1.7 DATA DOCUMENTATION

1.7.1 Field Notebook

Field notes will be initiated at the start of on-site work. All original forms and notebooks used during field activities become part of the permanent project file. Field notes will include the following daily information, where applicable:

- date;
- meteorological conditions;
- crew members;
- brief description of proposed field activities for that day;
- locations where work is performed;
- problems and corrective actions taken;
- records of all field measurements;
- a description of all modifications to the work plan;
- a record of all field data sampling point locations;

- pertinent sample collection information;
- chain-of-custody information; and
- documentation of the calibration of field instrumentation used.

1.8 CORRECTIVE ACTIONS

Corrective actions are required when a problem arises that impedes the progress of the investigation as detailed in the project plans, or when field or analytical data are not within the objectives specified in the Work Plan or QAPP. Corrective actions include those actions implemented to promptly identify, document, and evaluate the problem and its source, as well as those actions taken to correct the problem. These corrective actions are documented in the project file. Prior to implementing any deviations from the approved procedures contained in the QAPP, the Project Manager must be notified.

1.8.1 Field Procedures

Project personnel continuously monitor ongoing work performance as part of their daily responsibilities. If a condition is noted that would have an adverse impact on data quality, corrective actions are taken. Situations that require corrective action include the following:

- standard operating procedures and or protocols identified in the project-specific work plan or QAPjP have not been followed;
- equipment is not calibrated properly or in proper working order;
- QC requirements have not been met; and
- performance or system audits identify issues of concern.

The problem, its cause, and the corrective action implemented are documented. The PM is responsible for initiating and approving corrective actions.

1.8.2 Laboratory Procedures

During all investigations/studies, instrument and method performance and data validity are monitored by the analytical laboratory performing the analyses. The laboratory calibrates its instruments and documents the calibration data. Laboratory personnel continuously monitor the performance of its instruments to ensure that performance data fall within acceptable limits. If instrument performance or data fall outside acceptable limits, or when any condition is noted that has an adverse effect on data quality, then the laboratory implements appropriate corrective actions. Situations that require corrective action include the following:

- protocols defined by the project-specific QAPP have not been followed;
- identified data acceptance standards are not obtained;
- equipment is not calibrated properly or in proper working order;
- sample and test results are not completely traceable;
- QC requirements have not been met; and
- performance or system audits identify issues of concern.

The laboratory QA Officer is responsible for initiating and approving corrective actions. The corrective actions may include one or more of the following:

- re-calibration or standardization of instruments;
- acquiring new standards;
- repairing equipment; and
- reanalyzing samples or repeating portions of work.

System audits and calibration procedures with data review are conducted by the laboratory at a frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work. MWH provides independent data validation and/or data review and summary, and the laboratory is notified as soon as possible of any situation which

requires corrective action so that the corrective action may be implemented in a timely manner.

1.9 DATA REDUCTION, REVIEW AND REPORTING

1.9.1 Laboratory Data

The laboratory is required to meet all applicable documentation, data reduction, and reporting protocols as specified in the NYSDEC ASP (10/95) CLP deliverable format. Calculations of sample concentrations are performed using the appropriate regression analysis program, response factors, and dilution factors, where applicable. The laboratory, through its assigned QAO, conducts its own internal review of the analytical data generated for a specific project prior to sending the data to MWH. Deficiencies discovered during the laboratory internal data validation, as well as the corrective actions used to correct the deficiency, are documented in the laboratory Case Narrative submitted with each data package.

The laboratory reports the data in tabular form by method and sample. The laboratory is required to submit analytical results that are supported by a complete NYSDEC ASP Category B data package to enable the quality of the data to be determined. This standard backup data includes supporting documentation (chromatograms, raw data, etc.), sample preparation information, and sample handling information (i.e., chain-of-custody documentation).

1.9.2 Data Review

In addition to the laboratory's in-house review of the data, MWH chemists will review the laboratory standard quality control summary forms prior to its incorporation into a final report and complete a Data Usability Summary Report (DUSR). This data review will follow

the NYSDEC Guidance for Development of Data Usability Reports; complete validation of the data in accordance with the National Functional Guidelines will not be performed. Upon receipt of the laboratory data analytical package, the data reviewer:

1. Reviews the data package to determine completeness. It must contain all sample chain-of-custody forms, case narratives including sample/analysis summary forms, QA/QC summaries with supporting documentation, relevant calibration data, instrument and method performance data, documentation of the laboratories ability to attain the method detection limits for target analytes in required matrices, data report forms with examples of calculations, and raw data. The laboratory is promptly notified of any deficiencies, and must produce the documentation necessary to correct the deficiencies within 10 calendar days.

2. Reviews the data package to determine compliance with the applicable portions of the work plan. The data reviewer confirms that the data is produced and reported consistent with the QAPJP and laboratory quality control program, protocol-required QA/QC criteria are met, instrument performance and calibration requirements were met, protocol required calibration data are present and documented, data reporting forms are complete, and problems encountered during the analytical process and actions taken to correct the problems are reported. Field duplicate data are evaluated to determine field variability.

3. Prepares a tabular summary of the reported data. The data reviewer summarizes the data in a tabular format to provide the data in more accessible format.

In addition to the laboratory's in-house review of the data, the MWH Project Chemist will review and validate all analytical data prior to its incorporation into a final report. Data validation is performed to define and document analytical data quality to determine if the data

quality is sufficient for the intended use(s). The data validator will conduct a systematic review of the data with respect to the data quality criteria defined in the project-specific QAPP, the laboratory quality assurance plan and quality control programs, and the analytical methods.

Upon receipt of the laboratory data analytical package, the data validator:

1. Reviews the data package to determine completeness. It must contain all sample chain-of-custody forms, case narratives including sample/analysis summary forms, QA/QC summaries with supporting documentation, relevant calibration data, instrument and method performance data, documentation of the laboratories ability to attain the method detection limits for target analytes in required matrices, data report forms with examples of calculations, and raw data. The laboratory is promptly notified of any deficiencies, and must produce the documentation necessary to correct the deficiencies within 10 calendar days.

2. Reviews the data package to determine compliance with the applicable portions of the work plan. The data validator confirms that the data is produced and reported consistent with the QAPP and laboratory quality control program, protocol-required QA/QC criteria are met, instrument tune and calibration requirements were met, protocol required calibration data are present and documented, data reporting forms are complete, and problems encountered during the analytical process and actions taken to correct the problems are reported.

3. Validates the data by comparing the reported data with raw data. The data validator determines that the reported data can be completely substantiated by applying protocol-defined procedures for identifying and qualifying individual analytes.

Data validation is performed in accordance with a program developed by MWH that incorporates guidelines established in the USEPA Region 2 SOP No. HW-6, Revision #8, 1992, *"CLP Organics Data Review"*, and SOP No. HW-2, Revision #11, 1992, *"CLP Inorganics Review and Preliminary Review"*. These documents are checklists designed to investigate the degree of accuracy and completeness exhibited by a package of CLP data.

MWH reviews the appropriate data and reporting forms, and, once the entire data package has been reviewed, a narrative report and deliverables summary is prepared. This report indicates the quality of the data and identifies any specific problem areas. The data validator submits a final report documenting the results of the data review. Validation reports include a general assessment of the data package, a description of any protocol deviations, failures to reconcile the reported data with raw data, assessment of compromised data, the laboratory case narrative, an overall appraisal of the analytical data, and a data usability assessment. They also include the tabular summaries of QC variances for the various QC requirements of the analytical methods (e.g., method blank data, spike and surrogate recoveries, etc.). For work performed under NYSDEC ASP protocols, any necessary additions or changes to the general EPA validation procedures are incorporated and data is assessed according to the State-specific requirements.

1.9.3 Field/Engineering Data

Field data (i.e., information collected in the field through observation, manual measurement, and/or field instrumentation) is recorded in a dedicated project field notebook, on the appropriate field data sheets, and/or on the appropriate field data forms. This data is reviewed by the Project Geologist and the Project Manager for adherence to the work plan and QAPP requirements. The final reporting of the data is reviewed by the project field personnel, who also participate in data reduction and evaluation.

Field documentation, data calculations, transfers, and interpretations are conducted by field personnel, and reviewed for accuracy by the project manager and/or his designee for:

- general completeness;
- readability;
- usage of appropriate procedures;
- appropriate instrument calibration and maintenance;

- reasonableness in comparison to present and past data collected;
- correct sample locations; and
- correct calculation and interpretations.

Approximately 5% of all calculations are checked through recalculation. If appropriate, field data forms and/or calculations are included in project report appendices. All of the original field notebooks, logs, forms and documents are kept in the project file.

1.10 QUALITY ASSURANCE CONTROLS

The Project Manager and the Principal-In-Charge are responsible for ensuring that quality QA/QC records such as chain-of-custody forms, field notebooks, and data summaries are being properly prepared. The Project Manager is responsible for ensuring that all records are properly filed. Information received from outside sources, such as laboratory analytical reports, is retained at MWH, and access to working project files is restricted to project personnel.

1.10.1 Field Audits

The Project Manager is responsible for ensuring that all field investigations are performed in accordance with the requirements and specifications outlined in this QAPP. As part of MWH's field QA/QC program, a field audit is performed by MWH's Principal-In-Charge or a designated representative on projects where sampling activities extend for more than two weeks. The primary purpose of the field audit is to monitor project sampling practices. The QA/QC field audit is performed during sampling to evaluate the performance of work during the collection of samples for laboratory analysis.

For projects of relatively short duration (i.e., continuous field work of less than two week), a formal audit of field activities is not performed. The field team leader or appropriate task

manager monitor field performance and document all work performed in field notes, a narrative, and/or a checklist of tasks, as appropriate. The Project Manager and/or Principal-In-Charge review this documentation to ensure the necessary information has been recorded and conduct discussions with field team members to verify that field activities were performed according to the project Work Plan, QAPP and HASP. The PM communicates any concerns to the field team as appropriate. A formal field audit may not be performed in conjunction with this project.

1.10.2 Meetings

Periodic meetings between the Project Manager and Principal-In-Charge will be held to review quality assurance procedures, field work, laboratory performance and data documentation and review. Any potential problems identified during the review are documented and addressed. If necessary, they are reported to management for review and appropriate corrective action.

MONTGOMERY WATSON HARZA

CHAIN OF CUSTODY RECORD

MWH CONTACT PERSON: David Broach (315) 793-5000

FED EX #: _____ COOLER #: _____ COC ID: MAL-_ _ _ _ LOGCODE: MWHUTI LAB: STL-Edison, NJ

SAMPLER(S) PRINTED NAME AND SIGNATURE

PROJECT NAME: PSA at Mathews Avenue Landfill Site

PROJECT NUMBER: 4060312

SAMPLE ID	LOCATION ID	SBD	SED	DATE	TIME	SA	MC	BC	CT	PR			VOCs (Methd 8260B-TCL plus 10)	SVOCs (Method 8270C-TCL plus 20)	Pest/PCBs (Methods 8081&8082-TCL plus Aroclor 1268)	TAL Metals (Methods 6010B,7470A,7471,9010B)	PCDD/Fs (Method 8290)	Wet Chemistry (EPA300)	Total Organic Carbon	Geotechnical (ASTM D422)								REMARKS:

Comments/Instructions:

Turn-around time is 15 business days.

Consult Subcontract Agreement for project-specific requirements.

	Signature:	Print Name:	Company Name/Title:	Date:	Time:
RELINQUISHED BY:					
RECEIVED BY:					
RELINQUISHED BY:					
RECEIVED BY:					

For Lab Use Only: Sample Condition Upon Receipt:

Legend

SBD: Sample Beginning Depth

SED: Sample Ending Depth

Sample Type Code (SA): N=Normal TB=Trip Blank EB=Equipment Blank MS=matrix Spike SD=Spike Duplicate

Sampling Matrix Code (MC): SO=Soil WG=Water

Bottle Count (BC): 1,2,3, etc.

Container Type (CT): S = Sleeve, A= Amber Glass, G = Clear Glass, P = Plastic, E = Encore sample container

Preservative (PR): NA = None, A = HNO3, B = H2SO4, C = HCl, D = NaOH

ORIGINAL: Send with sample (sign only in blue or black ink)

COPIES: Retained by Sampler, Sent to Office

Figure 3 - PSA / RI / FS Project Schedule
Mathews Ave. Site - Honeywell International, Inc.

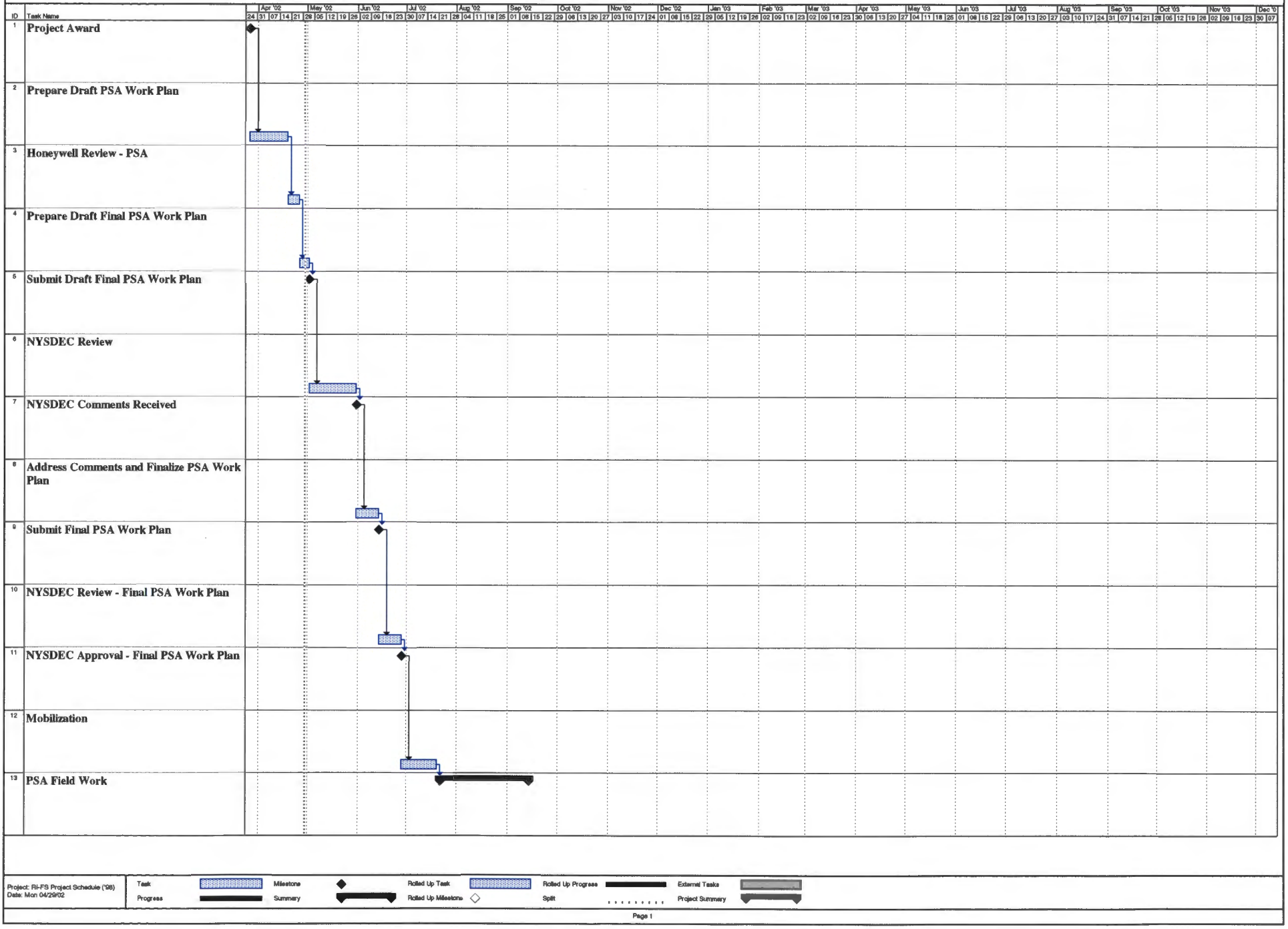
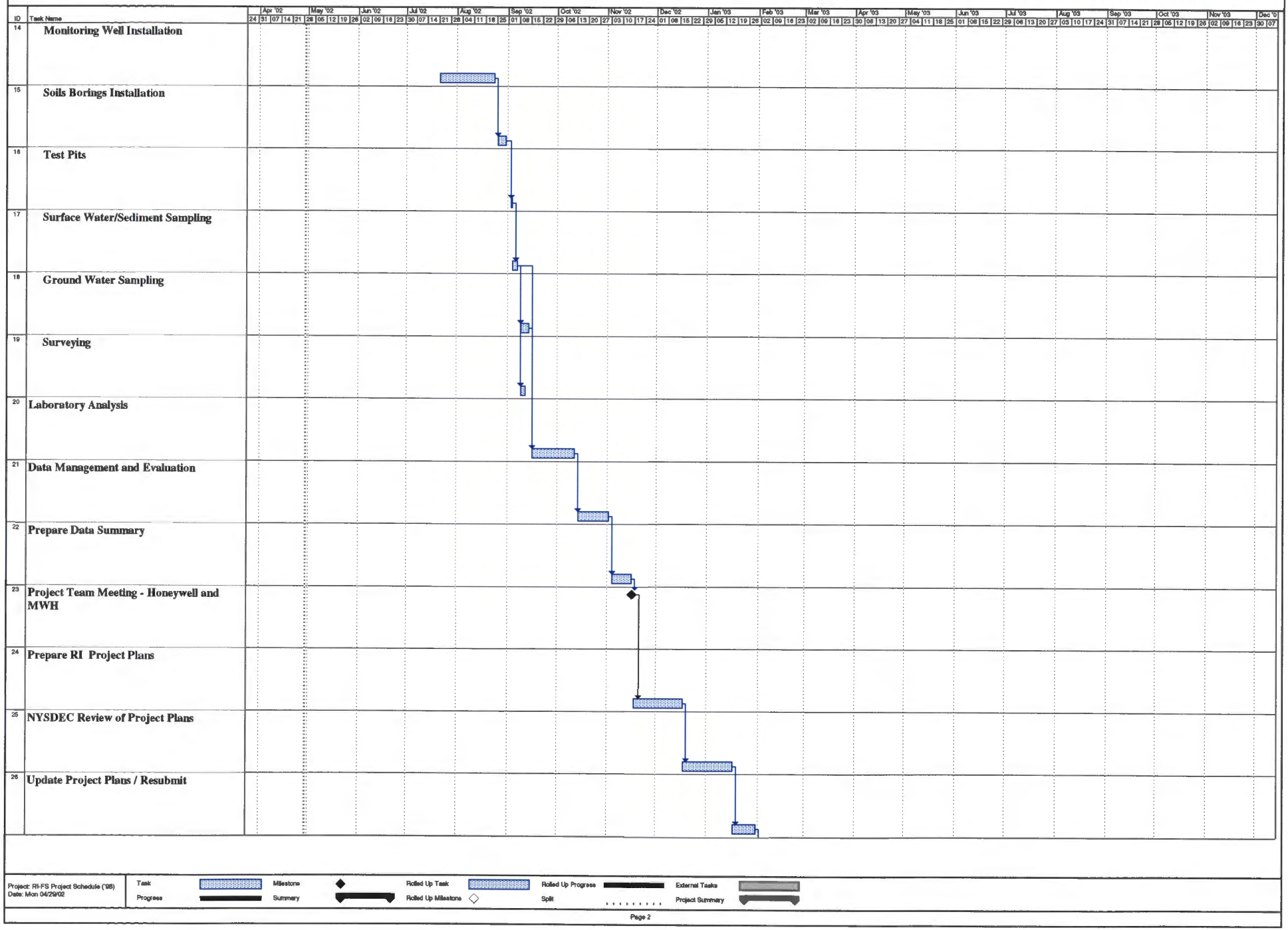


Figure 3 - PSA / RI / FS Project Schedule
Mathews Ave. Site - Honeywell International, Inc.



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Mathews Ave. Site - Honeywell International, Inc.

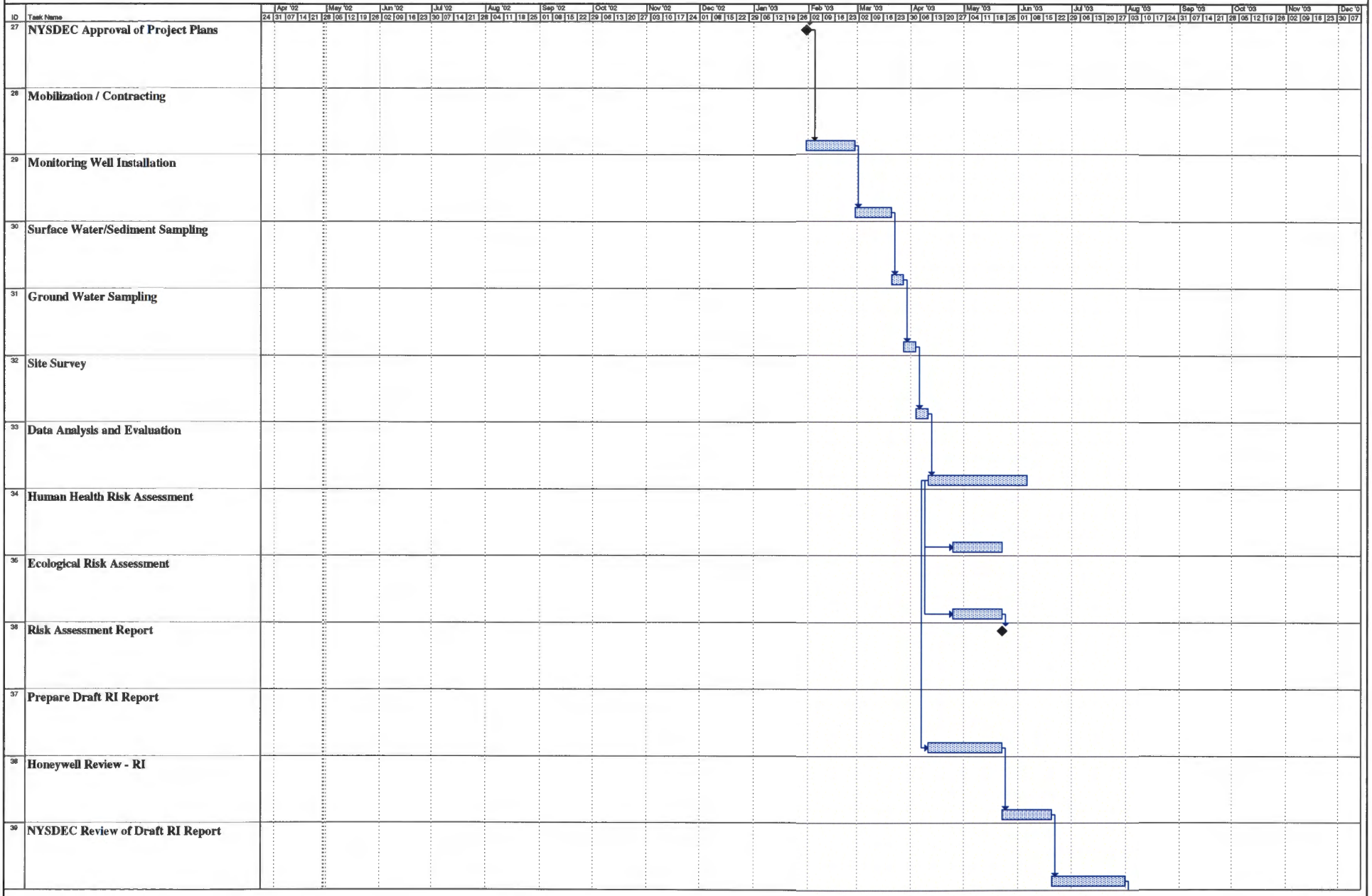


Figure 3 - PSA / RI / FS Project Schedule
Mathews Ave. Site - Honeywell International, Inc.

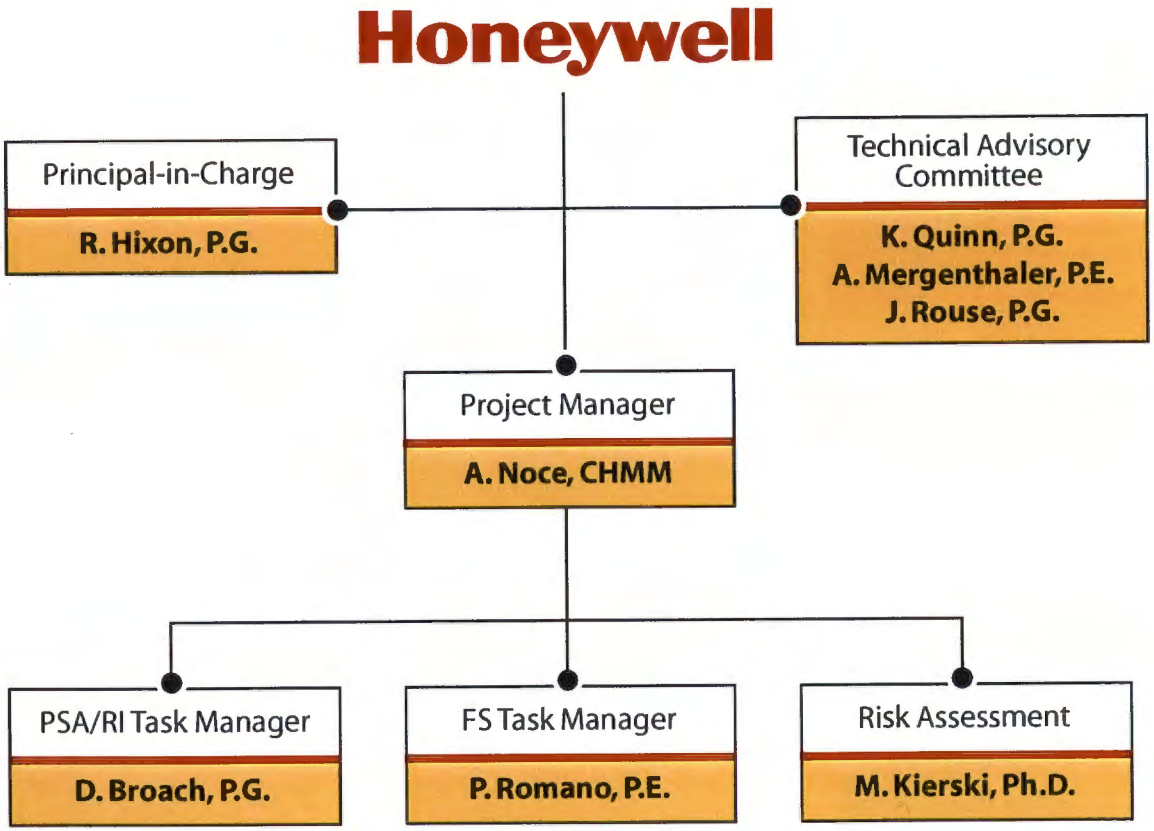
Project: RI-FS Project Schedule ('98)
Date: Mon 04/29/02

Task | Milestone | Rolled Up Task | Rolled Up Progress | External Tasks
Progress | Summary | Rolled Up Milestone | Split | Project Summary


FORMER LCP FACILITY
GERE LOCK ROAD
OLD ERIE CANAL
GEDDES BROOK
VILLAGE OF SOLVAY LANDFILL
SOLVAY ELECTRIC
HASS &

Figure 3

Mathews Avenue Site - PSA/RI
PROJECT ORGANIZATION

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