REPORT

REMEDIAL INVESTIGATION WORK PLAN

Legacy LaSalle, LLC– 89 LaSalle Avenue Site
Buffalo, New York
Brownfield Cleanup Program

Submitted To: Chief, Site Control Section
New York State Department of Environmental Conservation
Division of Environmental Conservation
625 Broadway
Albany, NY 12233-7020

Submitted By: Golder Associates Inc.
2430 North Forest Road, Suite 100
Getzville, NY 14068 USA

Distribution:

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1.0 INTRODUCTION

Legacy LaSalle LLC (Legacy) has prepared this Remedial Investigation (RI) Work Plan in support of the submittal of a Brownfield Cleanup Program (BCP) application in accordance with the provisions of the New York State Department of Environmental Conservation's (NYSDEC) Subpart 375-3. The BCP application is requesting entry into the BCP for Legacy's property or parcels located at 67 and 89 LaSalle Avenue and portions of the City of Buffalo parcel (71 NY L&W RR, also referred to as 71 Cordova Ave.) for which Legacy has received designated developer status. All parcels are located in the City of Buffalo, New York (Site). The Site consists of three parcels comprising a total of approximately 10.6 acres located in the Main-LaSalle neighborhood just to the north of McCarthy Park (refer to Figure 1-1). Portions of the site encompass the former Buffalo Crushed Stone quarry Legacy is proposing to construct a high density, multifamily student housing community primarily for rent to the State University at Buffalo students. The project will consist of 4 - 6 separate residential buildings, a community building, parking facilities, a maintenance building and common area. Buildings will range in height from 3 to 5 stories and will contain approximately 300,000 square feet of space.

The Site development uses will encompass residential housing, support facilities, parking and vehicle access infrastructure. Golder Associates Inc. (Golder) was retained by Legacy to prepare this RI Work Plan to address the NYSDEC BCP requirements.

1.1 Site History

Based on the results of a recently conducted Phase I Environmental Site Assessment, the southern portions of the 89 LaSalle parcel and associated unaddressed parcels to the south including the City of Buffalo parcel were used as a stone quarry from approximately 1915 through 1950 by the Buffalo Crushed Stone company. Subsequently the quarried areas were used by the City of Buffalo as a landfill in the 1950s and 1960s for the disposal of a variety of demolition debris, ash, railroad ballast and reportedly some municipal waste. A building located on the northern portion of 89 LaSalle (proximate to LaSalle Ave.) was apparently constructed in the 1950's and at various times has housed a residential heating contractor, catering service and most recently, a local radio station. Several towers and antennas associated with the radio station are located to the south and southwest of the building on the 89 LaSalle Avenue parcel.

According to a recently performed Phase I ESA, the 67 LaSalle parcel has a history of use as a lumber yard since the early 1900s, more recently some of the structures on the parcel have been used for automotive storage after lumber yard operations ceased. The buildings remain on the parcel but are now vacant. There were no other noted uses of this property.

The parcel at 71 Cordova Avenue is generally vacant with the exception of a parking lot and tennis courts that are in need of repairs and upgrades. The portions of the 71 Cordova parcel associated with the parking lot and tennis courts have been excluded from BCP Site metes and bounds definition (i.e., they

are ineligible under the BCP program) as shown on Figure 3-1 and are therefore not part of the proposed RI.

1.2 Purpose and Scope

The Site has not been comprehensively characterized, therefore Legacy intends to investigate soil/fill and groundwater, if feasible, within the Site for the purpose of more fully characterizing the Site and identifying/evaluating remedial alternatives under the New York State BCP. Data collected during the RI will be used to identify potential health risks and to evaluate remedial alternatives.

The Work Plan proposes the following activities to identify and delineate, if present, soil/fill and groundwater impacts on the Site:

- Advancement of fifteen (15) subsurface soil borings to a depth of approximately 15-20 feet below ground surface (bgs) and collection/analysis of representative soil/fill samples to establish concentrations of specified Target Compound List contaminants of concern parameters.
- Manual collection of three (3) shallow soil/fill samples from test pits excavated to bedrock. Based on previous investigations the assumed depth of proposed test pits will be 3 to 4 feet below grade surface (bgs) on the 67 LaSalle parcel and at the northern border of the 89 LaSalle parcel. Analysis of representative soil/fill samples at each test pit location to establish concentrations of specified Target Compound List contaminants of concern parameters.
- Installation of up to three (3) on-site monitoring wells and collection/analysis for Target Compound List parameters of on-site groundwater samples to assess Site groundwater quality. Collection of groundwater potentiometric data will also be performed in conjunction with the sampling activities.

The data obtained from this RI, with the results of previous investigations (presented in Section 1.3) will be used to:

- Describe the amount, concentration, persistence, mobility, state (e.g., solid, liquid), and other relevant characteristics of the contaminants present.
- Define hydrogeological factors (i.e., depth to saturated zone, groundwater gradients, proximity to wetlands, etc).
- Define the potential human and environmental exposure pathways from the Site and the extent to which contaminants of concern from these pathways have the potential to pose a threat to human health or the environment.
- Determine the extent to which contaminant levels on the Site, if applicable, pose an unacceptable risk to human health or the environment.
- Develop Remedial Action Objectives (RAOs for the Site based on the contaminant characterization results, exposure pathways and risk valuation data.
- Provide sufficient information to allow for the identification of potentially feasible remedial alternatives.

Based on the current knowledge of potential Site impacts, the RAOs for the Site may require implementation of remedial actions designed to remove or cover impacted soil/fill material. It is Legacy's intent to propose a remedy that will meet the BCP's Track 4 clean up approach for achieving Restricted

Residential use. Depending on the results of the RI, this remedy is anticipated to consist of a combination of soil/fill excavation of identified "hot-spot" shallow soils, if any, that exceed Part 375 restricted residential Soil Cleanup Objectives (SCOs) combined with a soil cover system over exposed residual soil contamination that complies with the use-based SCOs in 6NYCRR Table 375-6.8(b0 levels for the top two feet.

1.3 Summary of Previous Investigations

Several investigations encompassing portions of the proposed BCP Site were previously performed for other proposed development activities on or adjacent to the BCP Site and are briefly summarized below.

1.3.1 Phase I ESAs

1985 RECRA Environmental Phase I Engineering Investigation

In 1985 RECRA Environmental completed a Phase I Engineering Investigation for the NYSDEC of the so-called LaSalle Reservoir site that encompassed approximately 50 acres and a substantial portion of the BCP Site. No environmental sampling was conducted as part of this study and the resulting conclusions were based on a US EPA hazard ranking system that is no longer in use and therefore of limited informational value. The report did reiterate the site history of the use of the northern portion of the quarry as a landfill area by the City of Buffalo from approximately 1951 through 1972.

2013 Phase I Environmental Site Assessment

A Phase I ESA was completed by LCS Inc.in September 2013 in conjunction with preparation of the BCP Application. The known or suspect Recognized Environmental Conditions (RECs) and de minimis conditions found during the conduct of the ESA are listed below as presented in the LCS Phase I ESA summary if findings:

- The subject property and adjacent properties were initially identified as being part of a quarry from at least 1916 until at least 1950. Sanborn maps indicate a gasoline tank on-site from at least 1935 until 1950.
- The subject property and/or its immediate adjacent properties were identified as a Historic VCP site, two State Sites, a Federal Brownfield site and a CERCLIS NFRAP site. The LaSalle Reservoir site includes two State sites and a CERCLIS NFRAP site. The narrative in the third party database states that this site was an approximately 50 acre limestone quarry. The limestone quarry was later utilized by the City of Buffalo as a landfill for municipal refuse, incinerator ash, household appliances, tree parts and construction and demolition debris, and may have also received suspected paint wastes mixed with sawdust, floor sweepings. The prior investigations completed at this LaSalle Reservoir site identified several potential concerns associated with typical solid waste landfill operations. It should be noted that within the third party database there is limited information regarding the geographical limits the 50-acre site, including the extent of the investigation, if any, completed on the subject property.
- LaSalle Reservoir, addressed at East Amherst Street, was identified in the Orphan Summary of the EDR report as a CERCLIS-NFRAP site; this listing may in part be

associated with portions of the subject property historically utilized as a quarry and municipal landfill.

- A railroad track extended onto a portion of the property from at least 1935 through at least 1950.
- Railroad tracks have been historically located south adjacent from at least 1935 through at least 1950 and west adjacent to the subject property from at least 1916 until at least 1990.
- South and east adjacent properties were identified as being a portion of a quarry from at least 1916 until at least 1950.
- A west adjacent property was utilized as an iron/steel works facility from at least 1957 until at least 2005.
- A filling station with automotive repair was located north adjacent to the subject property in at least 1935 until at least 1950.
- An automotive repair facility is located north of the subject property.
- A north adjacent property was identified in the RCRA Non-Generator, FINDS database and Manifest databases.

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The following de minimis conditions in connection with the Site were identified in the Phase I ESA:

- Partially hydric soils are located on portions of the subject property.

A complete copy of the September 2013 Phase I ESA is provided on a CD in Appendix A.

1.3.2 Previous Soil/Fill Investigations

1.3.2.1 1989 Phase II Investigation – LaSalle Reservoir Site

In 1989, the NYSDEC contracted Ecology and Environment to conduct a Phase II environmental site investigation of the LaSalle Reservoir Site that included portions of the BCP Site. The investigation included an electromagnetic terrain conductivity survey, a magnetometer survey, completion of 3 bedrock monitoring wells and collection and analysis of soil, fill and groundwater samples. The results of the investigation indicated that:

- The depth of the quarry is approximately 45 feet below the adjacent ground surface;
- The depth to groundwater in the bedrock wells ranged from 33 to 45 feet below grade surface, with flow to the northwest;
- Soil samples had concentrations of polycyclic aromatic hydrocarbons (PAHs) at concentrations which, at that time, exceeded NYSDEC's recommended Soil Cleanup Objectives presented in NYSDEC Technical and Administrative Guidance Memorandum;
- Groundwater samples had exceedences of Class GA Ambient Water Quality Standards for iron and magnesium only; and
- "Waste:" samples exhibited concentrations of lead which exceeded the typical background levels for soils in the eastern United States.

1.3.2.2 September 1995 Environmental Site Assessment / Cordova Street Extension Area

In September 1995, Frontier Technical Associates conducted an ESA of 5 acre parcel (referred to as Parcel 16) located in the northern portion of the LaSalle Reservoir Site that encompasses a portion of the proposed BCP Site. This assessment included a review of historical records, completion of 7 soil borings and analysis of 4 composite samples.

The results of the investigations indicated that the area had been backfilled with up to 44 feet of fill materials including gravel, sand, clay, bricks, glass, ash, wood, metal and miscellaneous debris. There appeared to be between zero and two feet of water above the top of bedrock (at the bottom of the fill). Contaminants identified in the fill materials included total petroleum hydrocarbons, elevated concentrations of lead, zinc and mercury and PAHs (in one sample). These findings were consistent with the 1989 LaSalle Reservoir Site investigation findings.

1.3.2.3 April 1997 Main-LaSalle Revitalization Project- Site Investigation Report

Investigations were conducted in August, November and December of 1996 by URS under contract to the Buffalo Urban Renewal Agency to further investigate the general 50 acre area known as the LaSalle Reservoir Site. It appears that approximately 25 test pits were completed within the limits of the proposed BCP Site and at nine of these test pits shallow (i.e., 2- 4 inches below grade surface) soil samples were collected for the analysis of TCL VOCs, SVOCs, pesticides and PCBs as well as TAL metals and cyanide. The contamination identified consisted primarily of PAHs and metals which were described as "widespread across the site at concentrations which exceed both recommended cleanup levels and RBCs" (Main-LaSalle Revitalization Project, Site Investigation Report, Rev. April 1997, URS Greiner, Inc.).

The report also provided the results of an extensive depth to bedrock assessment in portions of the proposed BCP Site which delineated the former quarry high wall location o differentiate between shallow bedrock and the deeper quarried areas where more extensive landfilling occurred. This delineation is included on the survey plans submitted as part of the BCP application.

1.3.2.4 April 2013 Limited Phase II Environmental Site Assessment

Legacy retained EnSol Inc. to conduct a limited environmental investigation of the 89 LaSalle properties and the City of Buffalo property (i.e., 71 Cordova Ave.) to assess the potential eligibility of these parcels for the New York Brownfield Cleanup Program.

The investigation of these properties consisted of:

- Advancement of 10 test pits to a maximum depth of 15 feet below ground surface with a minimum of two test pits in the area of a suspected Underground Storage Tank (UST) (no tank was found in the field);

- Visual and olfactory inspection of soil samples as well as headspace screening with a photoionization detector; and,
- Analysis of six soil samples for target compounds list (TCL) volatile organic compounds (VOCs), TCL semi volatile organic compounds (SVOCs), target analyte list (TAL) metals, cyanide, polychlorinated biphenyls (PCBs), herbicides, and pesticides via United States Environmental Protection Agency (USEPA) SW-846 Test Methods 8260, 8270, 6010/7470, 9012, 8082, 8151, and 8081, respectively.

The results of the test pit soil sampling investigation indicated that concentrations of certain SVOC, metals and pesticide compounds were detected at concentrations exceeding the 6 NYCRR Part 375 soil cleanup objectives for residential or restricted uses at several locations on the properties. No definitive pattern of impact was found and concentrations in excess of SCOs in soil/fill were found to be widespread across the six sample locations.

A summary of the soil sampling results for the test pit locations is presented in Table 1 of the Limited Phase II ESA (a full electronic file of the report is included on the CD attached in Appendix A) and a site map illustrating sample locations on the property is presented on Figure 2 – Test Pit Location Map in the report.

1.3.2.5 Supplemental Phase II Investigation – 67 LaSalle Ave. Parcel

A supplemental Phase II investigation of the 67 LaSalle Avenue parcel was conducted by Golder Associates on August 6, 2013. This investigation consisted of collecting two composite soil samples from the sidewalls and bottom of shallow test pits located on the parcel. Each test pit was excavated to bedrock refusal approximately 3 to 3.5 feet below grade surface. The lithology of the test pits indicated a predominant layer of dark fill (possibly consisting of cinders or ash-like material) mixed with gravel in the upper 1 to 1.5 feet of both test pits with the remaining depth consisting of soils with large quantities of stone or gravel. A representative composite sample was collected from each test pit for the analysis of TCL SVOCs, TAL metals, PCBs, and TCL herbicides and pesticides. The location of these test pits are shown on Figure 4-1 included as a separate electronic file on the CD in Appendix A.

In one of the test pits (TP67-1), a total of seven (7) semi-volatile organic compounds (SVOCs) and one metal were detected at concentrations exceeding the 6NYCRR Part 375 Restricted Residential Soil Cleanup Objectives (SCOs). No other compounds analyzed were detected above Part 375 SCOs. Table 4-1 included as a separate electronic file on the CD in Appendix A presents a summary of the sample results for all detected constituents in both test pits.

1.4 Project Organization and Responsibilities

Legacy has submitted the 89 LaSalle Avenue Site for entrance into the BCP as a volunteer per ECL§27-1405. Golder Associates Inc. (Golder) will manage the brownfield cleanup on behalf of Legacy. The proposed responsibilities of the key staff are summarized below:

Partick T. Martin, P.E., will be the Project Manager for the BCP program. In this capacity Mr. Martin will be responsible for overall coordination of all phases of the project from implementation of the Work Plan and subsequent reporting and documentation of the work performed.

Russell Marchese, will be the Project Geologist, responsible for the implementing the remedial investigation tasks. Responsibilities will include sample collection, well development and directing drilling subcontractors' activities.

Brian C. Senefelder, CHMM, will serve as Project Director and be responsible for the overall quality assurance and review of all project deliverables. He will interface with the Project Manager to address any technical issues and provide quality control for the entire project.

2.0 DATA OBJECTIVES

2.1 Acceptance or Performance Criteria

Acceptance or performance criteria specify the quality of data required to support decisions regarding remedial response activities and are based on the data quality objectives. The data quality and level of analytical documentation necessary for a given set of samples will vary depending on the intended use of the data.

Site-specific remedial action objectives will be developed during the RI process. Sampling data will be used to evaluate whether or not remedial alternatives can meet the objectives. Two data confidence levels will be employed in the RI: screening level data and definitive level data. In general, screening level confidence will apply to field measurements, including photo-ionization detector (PID) measurements, groundwater elevation measurements, and field analyses (i.e., pH, temperature, specific conductivity, and turbidity). Definitive level confidence will apply to samples submitted to an independent laboratory for chemical analysis.

Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, will be defined in the QAPP (refer to Appendix B).

2.2 Data Evaluation Procedures

The RI scope of work is focused on providing reliable data to identify areas of the Site potentially requiring remediation, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks, and performing the remedial alternatives evaluation. The investigation will include the collection and analysis of soil/fill and groundwater samples to support remedial action objectives. Definitive level data quality will be required for chemical analysis of groundwater and soil/fill samples.

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the QAPP. United States Environmental Protection Agency (USEPA) and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed, in accordance with USEPA SW-846 methodology to meet the definitive-level data requirements, by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) Contract Laboratory Protocol (CLP)-certified laboratory. A full (Category B) deliverables package will be provided for all site characterization samples. Analytical results for site characterization samples will be evaluated by a third-party data validation expert for evaluation of the accuracy and precision of the analytical results. A Data Usability Summary Report (DUSR) will be prepared to describe the compliance of the analyses with the analytical method protocols detailed in the NYSDEC Analytical Services Protocol (ASP). The DUSR will provide a determination of whether the

data meets the project-specific criteria for data quality and data use. The validation effort will be completed in accordance with NYSDEC Division of Environmental Remediation DUSR guidelines.

3.0 INVESTIGATION SCOPE

The proposed RI will focus on investigating the Site for potential contaminants in soil/fill and groundwater that have not previously been characterized through the previous limited Phase II investigations.

The proposed RI investigation of the approximately 10.6-acre Site will supplement the soil/fill data across the entire Site were data gaps from previous investigations exist. A total of three (3) shallow soil locations, seventeen (15) subsurface soil borings, and three (3) groundwater monitoring locations are proposed for collection of representative soil/fill and groundwater samples for the RI.

Subsequent to receiving NYSDEC approval for the RI Work Plan, NTC will conduct the RI and prepare a report on the findings. The major components of the proposed RI tasks are described in detail below. Proposed RI sample and groundwater monitoring well locations are illustrated on Figure 3-1. Table 3-1 provides a summary of the proposed samples and analyses to be collected/performed as part of the RI.

3.1 Soil/Fill Investigation

3.1.1 Supplemental Subsurface Investigation Program

As previously noted the historical LaSalle Reservoir Site investigations performed for NYSDEC or BURA and the limited Phase II soil sampling program performed by Legacy on the Site in 2013 provided characterization of residual contaminant concentrations primarily in the upper 10 feet (or less depending on the depth to bedrock) of soil/fill across portions of the site. The results of these investigations indicate that consistently the primary contaminants of concern detected at relevant concentrations at a majority sampling locations are RCRA metals and SVOCs (specifically PAHs). PCBs and VOCs were not detected at concentrations exceeding Part 375 SCOs, with the exception of two VOCs, methylene chloride and acetone that are common laboratory contaminants and are believed to be anomalous detections. Two low level detections of pesticides/herbicides were found at one location, TP-15 as part of the 2013 limited Phase II investigation.

The LaSalle Reservoir and limited Phase II samples were not collected uniformly across the entire BCP site. In addition, groundwater was not encountered in the test pits performed as part of the limited Phase II investigations and very limited groundwater monitoring data was collected from a few wells installed as part of the scope of these investigations. Therefore, a soil boring program will be implemented to thoroughly characterize the subsurface soil/fill and groundwater media to better characterize the overall Site soil/fill overburden material and shallow groundwater, if present, for potential contaminants of concern. The subsurface soil sampling program proposes a total of fifteen (15) soil samples (B-1 through B-15) at evenly spaced intervals drilled to refusal depth (assumed to be top of bedrock) across the Site (except where grid locations overlap with limited Phase II test pits). Proposed borehole locations as depicted in Figure 3-1 may be adjusted in the field based on Site conditions, accessibility, NYSDEC preferences or other logistical concerns. If saturated soils or water is detected during soil boring

activities, three of the proposed borehole locations are proposed to be completed as temporary monitoring wells (MW-1 through MW-3) for characterization of Site groundwater.

3.1.1.1 Soil/Fill Sampling

A drilling rig capable of advancing a borehole using direct push drilling methods via a Geoprobe® drill rig equipped with a concrete core barrel will be used to advance the twelve subsurface soil borings that will not be completed as monitoring wells (i.e., all borings except B-1, B-11, and B-15) through the soil/fill to a maximum of twenty feet . The planned drilling method uses a 1.5-inch diameter, 4-foot core sampler with a dedicated PVC sleeve to advance and retrieve soil core samples at four foot intervals. The total depth of the borings is anticipated to be a maximum of twenty (20) feet or refusal, whichever occurs first. However, if the fill characteristics, contaminant impacts or saturated conditions warrant, select borings may be advanced deeper to better characterize subsurface conditions.

Three soil/fill boring locations (B-1, B-11 and B-15) will be advanced to a maximum depth of 45 feet bgs or refusal and completed as monitoring wells if saturated soils and or groundwater are encountered during drilling. The borings will be advanced and sampled using standard drill-rig mounted hollow stem auger methods. The drilling and sampling approach for these locations is described in detail in Section 3.1.1.2.2 below. The sample selection criteria however will be identical to the approach discussed below for the direct push soil/fill sampling locations.

Upon retrieval of each soil/fill core, the soil/fill samples will be screened for total organic vapors using a photo-ionization detector (PID). The organic vapor measurements will be recorded and the soil/fill material described on boring logs by a Golder field representative. The recovered soils will be characterized/classified by visual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Subsurface soil samples will be collected for chemical analysis at the boring locations shown on Figure 3-1. The depth from which samples are collected will be determined based on screening results of visual and olfactory observations and PID measurements. Samples will be collected from the discrete depth interval that displays the greatest evidence of contamination, if present. If there is no discernable difference across the entire boring depth based on the visual, olfactory or PID screening methods, the default sample collection approach will consist of collecting a composite from the 0 to 12 feet bgs strata. Subsurface soil/fill samples will be analyzed for, semi-volatile organic compounds (SVOCs), target compound list (TCL) pesticides, PCBs, target analyte list (TAL) metals, and cyanide. Based on the results of the previous investigations, VOCs, pesticides/herbicides and PCBs will not be analyzed in the samples to be collected during the RI, as these compounds were not detected or consistently detected at in concentrations exceeding Part 375 SCOs. A summary of proposed samples and analyses is provided in Table 3 -1.

All non-dedicated, downhole sampling equipment will be decontaminated between soil boring locations in accordance with accepted drilling practices using a high-pressure hotwater “steam” cleaner or scrubbed

using Alconox® and a hot water wash followed by clean potable water rinse. Subsequent to borehole advancement and soil/fill sampling at boring locations B-1, B-11 and B-15, a temporary monitoring well will be installed if saturated conditions are identified within the planned maximum 45-foot boring depth or if refusal is reached. If saturated conditions are not encountered within the maximum 45 foot boring depth the boring will be grouted from total depth to ground level with a grout mixture of 95% cement and 5% bentonite. All other boring locations advanced only for soil/fill sampling purposes will also be grouted in the same manner.

3.1.1.2 Groundwater Monitoring Well Installation and Sampling

3.1.1.2.1 Site Hydrogeology

Test pits advanced on the Site during the March and August 2013 soil/fill investigations were typically completed to the top of bedrock which varied across the site depending on extent of historical quarrying in a particular area. The maximum depth encountered was 10-12 feet bgs at TP-1, TP-3 and TP-14. Groundwater or saturated soils were not encountered in any of the test pit locations. Historical groundwater information is very limited within the footprint of the proposed BCP Site and not generally available based on a lack of historical monitoring well data with the exception of three bedrock wells installed in 1989 as part of the Phase II environmental site investigation performed by Ecology and Environment. Based on the location map provided in the April 1991 report, the monitoring well locations appear to all be outside the boundary of the quarried area and with the exception of MW-2 were located outside the proposed BCP Site boundary. The groundwater samples collected from these wells were analyzed for VOCs and metals and only exceedences of iron and magnesium were noted. Therefore no definitive interpretation with respect to saturated soil/fill conditions and depth to groundwater can be made within the proposed BCP Site boundary. Reliable information on the Site hydrogeology is complicated by the significant man-made bedrock elevation differential that exists across the site resulting from the historical rock quarrying activities.

Based strictly on the historical quarrying activities and the presence of a small surface water body located south/southeast of McCarthy Park in what was a portion of the former quarry, the general direction of localized groundwater flow in the vicinity of the Site is inferred to be to the south and south east. The proposed location of the three monitoring wells is intended to provide sufficient data to assess groundwater flow and elevations, if present.

3.1.1.2.2 Monitoring Well Installation

As noted in Section 3.1.2.1, three soil borings will be advanced using a standard drilling rig employing hollow-stem auger and completed as 2-inch wells to be used for measuring water levels and collecting groundwater samples. The proposed locations (B-1, B-14 and B-16) are illustrated on Figure 3-1. The final well installations will also depend on the presence of saturated soils in the soil/fill unit at the proposed monitoring well locations. The wells will be installed after the soil borings have established the

presence of saturated conditions (and any soil samples have been collected from the selected borings). If the borings are determined to be dry holes, completion of these borings as monitoring wells will not be performed and the Department will be consulted to assess the feasibility of installing well(s) at a different location or abandoning the well installation.

Shallow overburden well borings will be advanced using 4.25-inch I.D. hollow stem augers (HSA). A 2-inch diameter, 2-foot long split spoon sampler will be advanced ahead of the auger string with a standard 140-pound hammer. Recovered samples will be examined by qualified Golder personnel and characterized in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), scanned for total volatile organic vapors with a calibrated PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

Soil/fill samples from each boring will be collected from the discrete depth interval that displays the greatest evidence of contamination, if present. Subsurface soil/fill samples will be analyzed for TCL SVOCs, TAL metals, and cyanide. A summary of proposed samples and analyses is provided in Table 3 -1.

Subsequent to boring completion, each monitoring well will be constructed of 2-inch I.D. flush-joint Schedule 40 PVC solid riser and machine slotted screen (0.010-inch slot size). The monitoring well screen will be approximately 10 feet in length. Approximately 6 inches of silica sand will be placed at the bottom of each boring as a base for the well screen and as part of the sand pack. The well screen and attached riser will be placed within the borehole on top of the 6-inch sand layer and the remainder of the sand pack will be installed within the borehole annulus to a level of about 3 feet above the top of the well screen. A bentonite seal (2 feet thick) will be installed immediately above the sand layer. The bentonite seal will be constructed with 3/8-inch bentonite pellets or medium bentonite chips and allowed to hydrate sufficiently to mitigate the potential for down-hole grout contamination. The top of the well riser pipe will extend approximately 3 feet above grade and will be fitted with a lockable J-plug.

Provided that each of the wells yields sufficient water, groundwater samples will be collected from each of the wells using low flow sampling methods. The total depth of the wells is expected to be within 45 feet of ground surface.

3.1.1.2.3 Well Development

The newly installed monitoring wells will be developed no sooner than 24 hours after construction has been completed. The development procedure will require purging of the groundwater and periodically surging the water in the well to loosen and remove suspended fines from the well screen and sandpack.

Measurements of the water volume removed and water quality parameters including temperature, pH, conductivity, and turbidity will be recorded at regular intervals throughout the development process.

Development will continue until water quality measurements stabilize to within 10 percent of the previous measurement.

3.1.1.2.4 Groundwater Sample Collection

Groundwater will be collected from each well using low flow sampling techniques (typically less than 0.1 L/min) via dedicated plastic flex tubing and a peristaltic pump. If low-flow sampling is not feasible due to insufficient groundwater recharge rate, new and dedicated disposable bailers may be used to collect the groundwater samples. If sufficient groundwater volume is available, each well will be sampled for VOCs, SVOCs, TCL Pesticides, PCBs, TAL metals, and cyanide.

Field measurements for pH, specific conductivity, temperature, turbidity and water level as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization during well purging prior to sampling. Purging will be considered complete when pH, specific conductivity and temperature stabilize and when turbidity measurements fall below 50 NTU or become stable above 50 NTU. Stability is defined as variation of between field measurements of 10 percent or less and no overall upward or downward trend in the measurements.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductivity, temperature, turbidity and water level as well as visual and olfactory field observations will be recorded. All groundwater samples will be collected in the pre-cleaned and pre-preserved laboratory sample bottles in accordance with protocols for analyses shown on Table 3-1. Quality Assurance/Quality Control (QA/QC) samples will be collected for the groundwater sampling event in accordance with the QAPP (Appendix B) including one trip blank (accompanying VOC samples only), one matrix spike (MS), one matrix spike duplicate (MSD), and one field duplicate sample. Subsequent to sample collection all groundwater samples will be placed on ice and shipped under chain of custody to the selected analytical laboratory.

The laboratory will be required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation and preparation of a DUSR by a third party validation expert. Accordingly, the samples will be analyzed by an NYSDOH ELAP-approved laboratory certified to perform CLP work.

3.2 Site Mapping and Survey

The existing topographic base map of the Site (revised March 2013, McIntosh and McIntosh) will be revised to locate RI monitoring well and sample locations. Soil/fill surface and boring locations will be field located based on measurements from known benchmarks (e.g., rebar, pins, etc.) established during

the 2013 boundary survey of the Site. Final monitoring well locations and elevations will be surveyed after installation.

The Site map was prepared by a New York State licensed surveyor and all modifications and additions will be performed by a licensed surveyor. The surveyor has established the horizontal and vertical elevations using the New York State Plane Coordinate System and most recent vertical datum. Elevations of the ground surface and top of PVC riser will be measured and recorded for each monitoring well.

4.0 REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT

Upon completion of the RI fieldwork, a comprehensive RI/AA Report will be completed summarizing the tasks completed as described below.

4.1 Remedial Investigation Report

The RI section of the RIAA Report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 3).

- Introduction and background.
- A description of the site and the overall scope of the investigation activities.
- A description of the field procedures, methods performed during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this Work Plan.
- The data obtained during the RI and historical data considered to be of useable quality.
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP.
- Comparative criteria that may be used to calculate cleanup levels during the alternatives analysis report (AAR) process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative exposure assessment and fish and wildlife impact analysis, if applicable.
- Conclusions regarding the effectiveness of the Interim Remedial Measures conducted with respect to the comparative criteria and remedial action objectives (RAOs) established for the Site.
- Supporting RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, etc.

In addition, Golder will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

4.2 Alternative Analysis Report

The Alternative Analysis Report (AAR) will include a remedial alternatives evaluation for on-site groundwater and soil/fill on portions of the Site if determined, based on the results of the Remedial

Investigation and reasonably anticipated future Site use, to exhibit elevated concentrations of constituents of concern.

The AAR will meet the requirements identified in NYSDEC Standards, Criteria, and Guidance (SCGs) (e.g., Part 375 SCO's and GA Groundwater Quality Standards).

Based on the remedial action objectives (RAOs) and cleanup goals established for the Site, volumes and areas of media potentially requiring remediation, if required, will be calculated/estimated. General Response Actions will then be delineated to address each of the Site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.8(f):

- Protection of Human Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Short-term Effectiveness & Impacts
- Long-term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume
- Implementability
- Cost
- Land Use

In addition, the criteria of Community Acceptance will be considered based on public comments on the RI/AAR Report and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate recommendation of further remedial action, if required.

5.0 INVESTIGATION SUPPORT DOCUMENTS

5.1 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) will be prepared as a stand-alone document (refer to Appendix B) for the RI activities described herein. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as Section 4.0 of the QAPP. The RI project management methods, organizational structure, and schedule are also included in the QAPP.

The QAPP will assure the accuracy and precision of data collection during the site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to assure compliance with USEPA SW-846 methodology. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5); the EPA Region IICERCLA Quality Assurance Manual, and NYSDEC's May 2010 DER-10 Technical Guidance for Site Investigation and Remediation.

5.2 Health and Safety Plan (HASP)

A Site Health and Safety Plan (HASP) has been prepared in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 for the proposed BCP RI activities. A copy of the HASP is included as Appendix C of this Work Plan. The HASP will be enforced by Golder and any Golder subcontractors engaged in RI/IRM field activities in accordance with the requirements of 29 CFR 1910.120. The HASP covers on-site investigation and interim remedial activities. Golder's HASP is provided for informational purposes in Appendix C. Subcontractors will be required to develop and implement a HASP as or more stringent than Golder's HASP. Health and safety activities will be monitored throughout the Remedial Investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation activities. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic Community Air Monitoring Plan (dated December 2002) and NYSDEC Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

5.3 Community Participation Plan (CPP)

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan (CPP) is required for the 89 LaSalle Avenue Site RI activities. The CPP, included as Appendix D, meets the requirements of Attachment 2 of the NYSDEC Technical Administrative Guidance Memorandum (TAGM) DER-97-4058 and NYSDEC's DER-10 guidance. Golder will coordinate and assist Legacy with community relations throughout the course of the project.

6.0 PROJECT SCHEDULE AND SEQUENCE OF THE WORK

Figure 6-1 presents the tentative schedule for planned remedial investigation, interim remedial measures and assessment of remedial alternatives. As noted, the start of field activities is dependent on NYSDEC approval of the RI/IRM Work Plan.

7.0 REFERENCES

1. New York State Department of Environmental Conservation, *DER-10; Technical Guidance for Site Investigation and Remediation*, May 2010.

TABLES

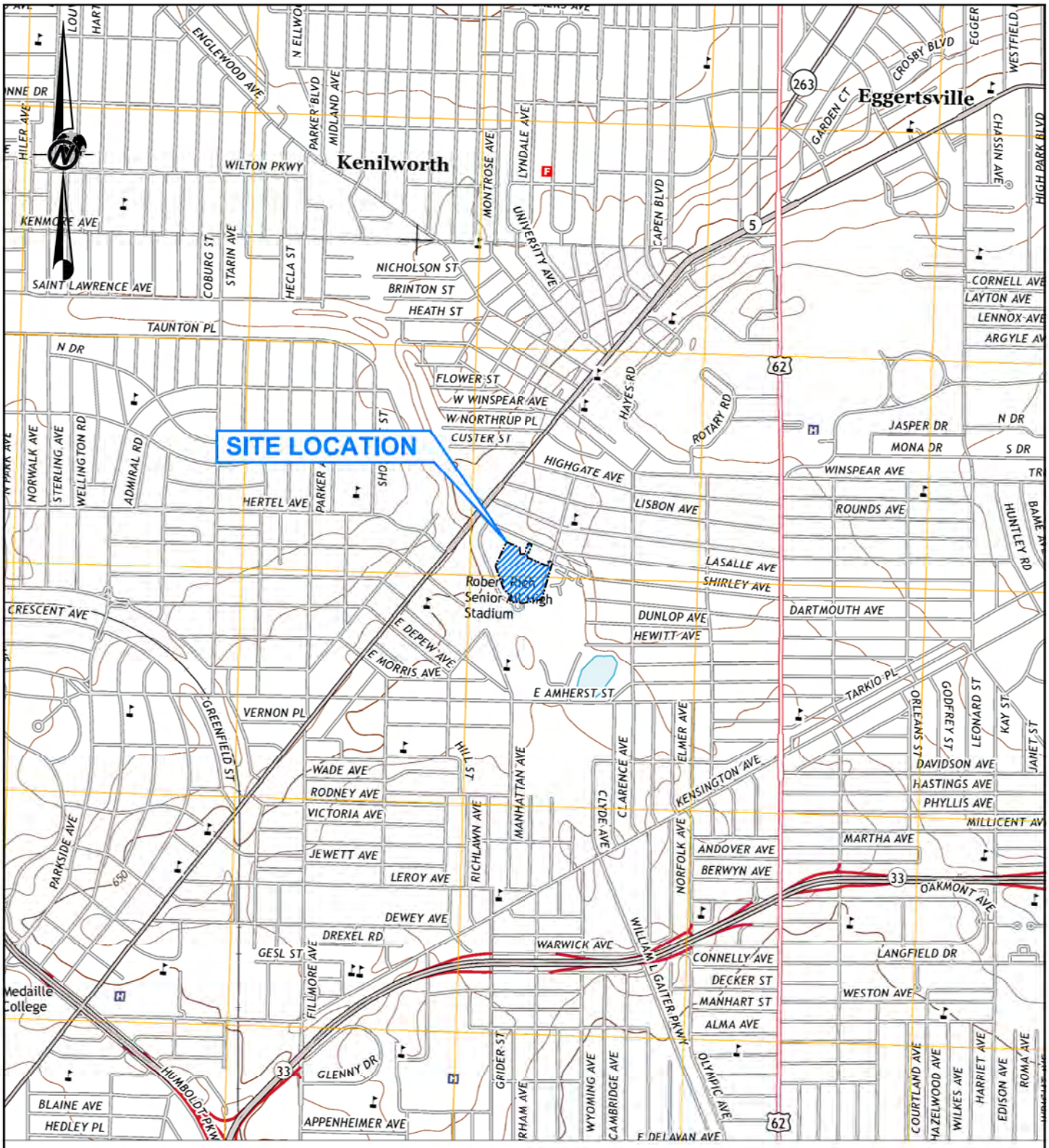
TABLE 3-1

Analytical Program Summary
Remedial Investigation
Legacy LaSalle - 89 LaSalle Avenue BCP Site

Sample Media	Number of Samples				Analyses
	Field Samples	Duplicates	MS/MSD Samples	Trip Blanks	
Test Pit Shallow Soil Samples	3	1	1/1	0	TCL SVOCs TAL Metals and Cyanide
Subsurface Soil/Fill	15	1	1/1	0	TCL SVOCs TAL Metals and cyanide
Groundwater (3 temporary monitoring wells)	3	1	1/1	1	TCL VOCs TCL SVOCs TCL Pesticides, Total PCBs TAL Total Metals and cyanide

Notes:
MS = Matrix Spike
MSD = Matrix Spike Duplicate
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
TAL = Target Analyte List
TCL = Target Compound List

FIGURES



REFERENCE

1.) BASE FROM 7.5 MINUTE QUADRANGLE OF BUFFALO NORTHEAST, NEW YORK DATED 2013.

2000 0 2000
SCALE FEET

Golder Associates
Mt. Laurel, New Jersey

SCALE	AS SHOWN
DATE	08/08/13
DESIGN	AML
CADD	AM
CHECK	
REVIEW	

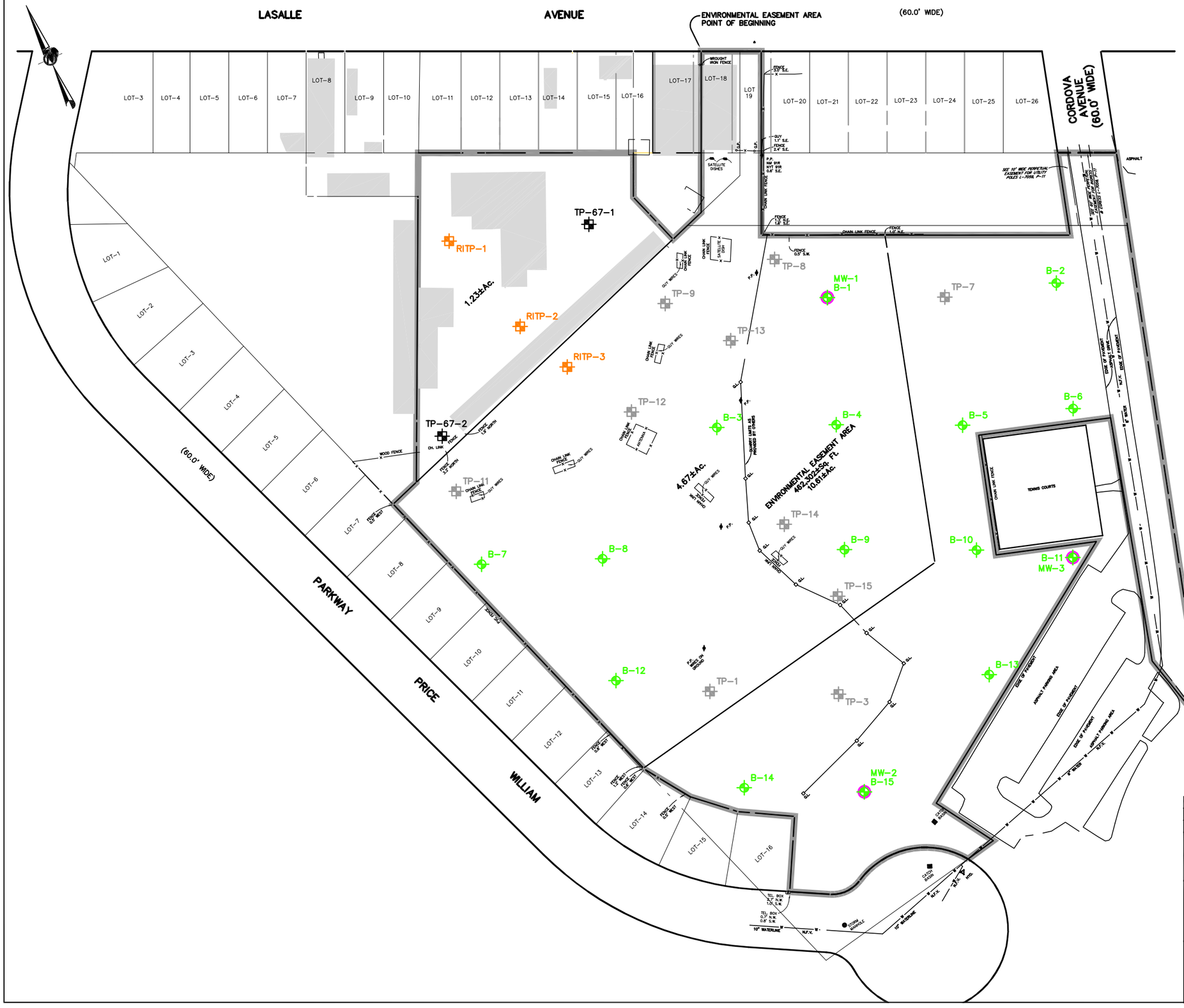
FILE No. 1300732A001
PROJECT No. 1300732 REV. 0

TITLE

SITE VICINITY MAP

LEGACY LASALLE LLC

FIGURE 1-1



LEGEND

- TP-9 — 3/7/13 TEST PIT LOCATION
- TP-67-1 — 8/6/13 TEST PIT LOCATION
- RITP-2 — PROPOSED TEST PIT LOCATION
- B-2 — PROPOSED BORING SAMPLE LOCATION
- MW-1 — PROPOSED MONITORING WELL LOCATION
- QUARRY LIMIT

NOTES

1.) ALL TEST PIT AND BORING LOCATIONS ARE APPROXIMATE.

REFERENCE

1.) BASE MAP FROM DIGITAL FILE PROVIDED BY McINTOSH & McINTOSH, P.C., LOCKPORT, NEW YORK, ENTITLED "SURVEY OF PART OF LOT-46, TWP.-11, R.-8, HOLLAND PURCHASE," DATED MARCH 20, 2012.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

REMEDIAL INVESTIGATION WORK PLAN
LEGACY LASALLE, LLC
BUFFALO, NEW YORK

TITLE

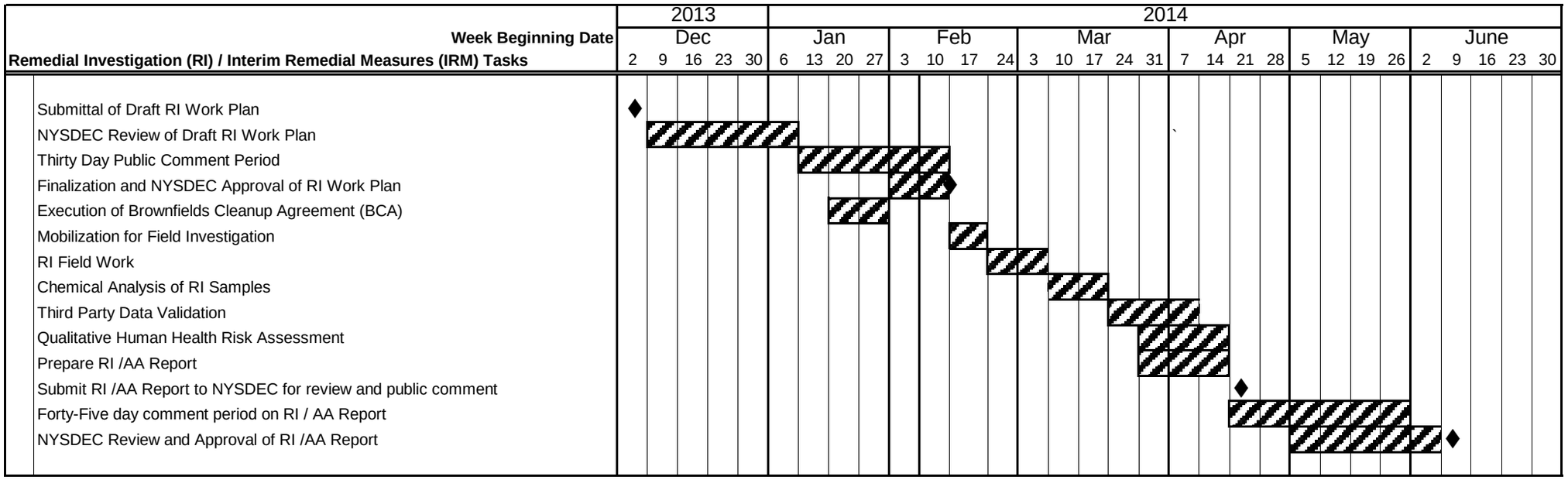
PROPOSED SAMPLE LOCATIONS
89 LASALLE AVENUE SITE

Golder Associates
Buffalo, New York

PROJECT No.		130-0732	FILE No.		1300732A005
DESIGN	AML	10/30/13	SCALE	AS SHOWN	REV. 0
CADD	MJS	10/30/13			
CHECK	AML	11/21/13			
REVIEW	PTM	11/21/13			

FIGURE 3-1

FIGURE 6-1
SCHEDULE OF PLANNED REMEDIAL INVESTIGATION ACTIVITIES
RI WORK PLAN
89 LASALLE AVENUE BCP SITE
LEGACY LASALLE LLC



APPENDIX A

CD ENCLOSED CONTAINING ELECTRONIC FILES:

- **PHASE I ESA REPORT (LCS, SEPT. 2013)**
- **LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT (ENSOL, APRIL 2013)**
- **TABLE 4-1: 67 LASALLE SOIL SAMPLE RESULTS**
- **FIGURE 4-1: 67 LASALLE SUPPLEMENTAL INVESTIGATION TEST PIT LOCATIONS**

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

1.0 INTRODUCTION

This Quality Assurance/Quality Control Plan is designed to provide an overview of QA/QC procedures. It will give specific methods and QA/QC procedures for chemical testing of environmental samples obtained from the site. In addition, it will ensure the quality of the data produced.

The organizational structure with the names of key project personnel for this project is presented in Section 1.4 of the RI Work Plan. The Project Manager will be responsible for verifying that QA procedures are followed in the field. This will provide for the valid collection of representative samples. The Project Manager will be in direct contact with the analytical laboratory to monitor laboratory activities to help ensure that holding times and other QA/QC requirements are met. The number of proposed RI soil/fill and groundwater samples and corresponding analytical parameters/methods are provided in Table B-1.

In addition to overall project coordination, the Project Manager will be responsible for overseeing both the analytical and field QA/QC activities. The ultimate responsibility for maintaining quality throughout the project rests with the Project Manager.

TABLE B-1
ANALYTICAL SUMMARY TABLE – SOIL/GROUNDWATER

PARAMETER	EPA METHOD	SOIL SAMPLES (1)	WATER SAMPLES (2)
TCL Volatiles	8260		6
TCL Semi-Volatiles	8270	22	5
TCL Pesticides	8081		5
Total PCBs	8082		5
TAL Metals	6010	22	5

(1) – Includes 2 MS/MSD and 2 duplicate samples
(2) – Includes 1 MS/MSD, 1 Duplicate sample and 1 Trip Blank (Volatiles Only)

The analytical laboratory proposed for use for the analysis of samples will be a certified NYSDOH ELAP laboratory for the appropriate categories. The QA Manager of the laboratory will be responsible for performing project-specific audits and for overseeing the quality control data generated.

2.0 DATA QUALITY OBJECTIVES

2.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements, which specify the quality of data required to support the investigation of the Site. DQOs focus on the identification of the end use of

the data to be collected. The project DQOs will be achieved utilizing the definitive data category, as outlined in *Guidance for the Data Quality Objectives Process*, EPA QA/G-4 (September 1994). All sample analyses will provide definitive data, which are generated using rigorous analytical methods, such as the reference methods approved by the United States Environmental Protection Agency (USEPA). The purpose of this investigation is to determine the nature and extent of contamination at the site.

Within the context of the purpose stated above, the project DQOs for data collected during this investigation are:

- To assess the nature/extent of contamination in surface and subsurface soil/fill and groundwater.
- To maintain the highest possible scientific/professional standards for each procedure.
- To develop enough information to assess if the levels of contaminates identified in the media sampled are hazardous or non-hazardous.

2.2 QA Objectives for Chemical Data Measurement

Sample analytical methodology for the media sampled and data deliverables will meet the requirements in the most recent NYSDEC Analytical Services Protocol (ASP). Laboratories will be instructed that completed **Sample Preparation and Analysis Summary forms** are to be submitted with the analytical data packages. The laboratory also will be instructed that matrix interferences must be cleaned up, to the extent practicable. Data usability summary reports (DUSRs) will be generated. In order to achieve the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, and completeness will be measured during offsite chemical analysis.

2.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in field and/or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate (for organics) and matrix duplicates (for inorganics), which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision. RPD criteria must meet the method requirements identified in Table B-1.

2.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. These data help to assess the potential concentration contribution from various outside

sources. The laboratory objective for accuracy is to equal or exceeds the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the matrix spike/matrix spike duplicate and matrix spike blank samples. The spike and spike duplicate, which will give an indication of matrix effects that may be affecting target compounds is also a good gauge of method efficiency.

2.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or sub-sampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures, have been selected with the goal of obtaining representative samples for the media of concern.

2.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. A DQO for this program is to produce data with the greatest possible degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Complete field documentation will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representative-ness, completeness, comparability), because only when precision and accuracy are known can data sets be compared with confidence. In order for data sets may be comparable, it is imperative that contract-required methods and procedures be explicitly followed.

2.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to verify that valid data are obtained in order to meet project needs. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, then NYSDEC and GOLDER project personnel will determine whether the deviations might cause the data to be rejected.

3.0 SAMPLING LOCATIONS, CUSTODY, HOLDING TIMES, & ANALYSIS

Sampling locations and procedures are discussed in Section 3.1.2 of the RI Work Plan. Procedures for chain of custody, holding times, and laboratory analyses shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. All holding times begin with validated time of sample receipt (VTSR)

at the laboratory. The laboratory must meet the method required detection limits which are referenced within the methods.

4.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections describe the analytical support areas and laboratory instrument calibration procedures.

4.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered; these are detailed in the following paragraphs.

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished according to the methods referenced. All standards and standard solutions are to be formally documented (i.e., in a logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparers name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with manufacturer specifications. Calibration is conducted with two Class AS" weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and they must be properly documented in permanently bound logbooks.

Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (2 to 6°C for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for

organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

4.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet established quantitation limits. Each instrument for organic and inorganic analyses shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to specified methods.

In addition to the requirements stated within the analytical methods, the contract laboratory will be required to analyze an additional low level standard at or near the detection limits. In general, standards will be used that bracket the expected concentration of the samples. This will require the use of different concentration levels, which are used to demonstrate the instrument's linear range of calibration.

Calibration of an instrument must be performed prior to the analysis of any samples and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still calibrated. If the contract laboratory cannot meet the method required calibration requirements, corrective action shall be taken as discussed in Section 7.0. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

5.0 INTERNAL QUALITY CONTROL CHECKS

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed and are described as batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the contract laboratory will be according to the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the referenced analytical methods.

QC results which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

5.1 Batch QC

Method Blanks - A method blank is defined as laboratory-distilled or deionized water that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - A matrix spike blank (MSB) sample is an aliquot of water spiked (fortified) with all the elements being analyzed for calculation of precision and accuracy to verify that the analysis that is being performed is in control. A MSB will be performed for each matrix and organic parameter only.

5.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) and matrix spike duplicate (MSD) are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent difference of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per 20 samples per matrix.

Matrix Duplicates - The matrix duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Collection of duplicate samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Obtaining duplicate samples from a soil matrix requires homogenization (except for volatile organic compounds) of the sample aliquot prior to filling sample containers, in order to best achieve representative samples. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible.

Rinsate (Equipment) Blanks - A rinsate blank is a sample of laboratory demonstrated analyte free water passed through and over the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from ambient air and from sample instruments used to collect and transfer samples. This water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks for nonaqueous matrices should be performed at a rate of 10 percent of the total number of samples collected throughout the sampling event. Rinse blanks will not be performed on samples (i.e., groundwater) where dedicated disposable equipment is used.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte free water. These samples then accompany the bottles that are prepared at the lab into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the lab with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organic parameters. Trip blanks must be included at a rate of one per volatile sample shipment.

6.0 CALCULATION OF DATA QUALITY INDICATORS

6.1 Precision

Precision is evaluated using analyses of a field duplicate and/or a laboratory MS/MSD which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

$$RPD = \frac{(X_1 - X_2)}{[(X_1 + X_2)/2]} \times 100\%$$

where:

X_1 = Measured value of sample or matrix spike
X_2 = Measured value of duplicate or matrix spike duplicate

Precision will be determined through the use of MS/MSD (for organics) and matrix duplicates (for inorganics) analyses.

6.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. It is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to organic fractions (i.e., volatiles, semivolatiles, PCB), and is calculated as follows:

$$Accuracy\ (\%R) = \frac{(X_s - X_u)}{K} \times 100\%$$

where:

X_s - Measured value of the spike sample
X_u - Measured value of the unspiked sample
K - Known amount of spike in the sample

6.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$Completeness\ (\%C) = \frac{(X_v - X_n)}{N} \times 100\%$$

where:

X_v - Number of valid measurements
X_n - Number of invalid measurements
N - Number of valid measurements expected to be obtained

7.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

7.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The Golder Associates (Golder) Project Manager shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

7.2 Sample Holding Times

If any sample extraction and/or analyses exceed method holding time requirements, the Golder Project Manager shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

7.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed and, if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

7.4 Reporting Limits

The laboratory must meet the method required detection limits listed in NYSDEC ASP , 10/95 criteria. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify Golder project personnel for problem resolution. In order to achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt to retain the project required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to

bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, the Golder Project Manager will be immediately notified so that appropriate corrective actions can be initiated.

7.5 Method QC

All QC method-specified QC samples, shall meet the method requirements referenced in the analytical methods. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed and/or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/redigested, then reanalyzed at no cost. Golder shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

7.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

8.0 DATA REDUCTION, VALIDATION, AND USABILITY

8.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either in a graphic or printed tabular format. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Individuals experienced with a particular analysis and knowledgeable of requirements will perform data reduction.

8.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use. All analytical samples collected will receive a limited data review. The data validation will be limited to a review of holding times, completeness of all required deliverables, review of QC results (surrogates, spikes, duplicates) and a 10% check of all samples analyzed to ensure they were analyzed properly. The methods as well as the general guidelines presented in the following documents will be used during the data review USEPA *Contract Laboratory Program (CLP) Organic Data Review, SOP Nos. HW-6, Revision #11 and USEPA*

Evaluation of Metals Data for the Contract Laboratory Program based on 3/90, SOW, Revision XI. These documents will be used with the following exceptions:

- Technical holding times will be in accordance with NYSDEC ASP, 10/95 edition.
- Organic calibration and QC criteria will be in accordance with NYSDEC ASP, 10/95 edition. Data will be qualified if it does not meet NYSDEC ASP, 10/95 criteria.

Where possible, discrepancies will be resolved by the project manager (i.e., no letters will be written to laboratories). A complete analytical data validation is not anticipated. However, if the initial limited data audit reveals significant deviations and problems with the analytical data, project personnel may recommend a complete variation of the data.

9.0 REFERENCES

Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy , Revision I, October 1989.

National Enforcement Investigations Center of USEPA Office of Enforcement. *NEIC Policies and Procedures*. Washington: USEPA.

New York State Department of Environmental Conservation (NYSDEC).2005. *Analytical Services Protocol*, (ASP) 07/2005 Edition. Albany: NYSDEC.

APPENDIX C

HEALTH AND SAFETY PLAN

Health Safety And Environment Plan

A world of capabilities delivered locally

LEGACY LASALLE BCP

Site Address: 89 LaSalle Ave BCP Site
89 LaSalle Ave., Buffalo, NY

Submitted By: Aaron Lange

Revision #0

Date: November 11, 2013 **Project No.1300732**

1.0 CONTACTS LIST SUMMARY

1.1 Emergency Contacts

Contact	Number
Ambulance	911
Fire	911
Police	911
Golder National Health and Safety Leader (Jane Mills)	206-295-7002
WorkCare	888-449-7787

Hospital name	Address	Phone	Level of Care Available
ECMC	462 Grider Street, Buffalo, NY 14215	716-898-3000	ER

1.2 Golder contacts

Contacts	Name	Office	Cell	Home
Project Manager	Patrick Martin	(716) 204-5880	(716) 867-2860	
Project Director	Dave Wehn	(716) 204-5880	716 713-6394	
Client	Legacy LaSalle			

1.3 Missed Check-in Contacts

Contacts	Name	Phone	Cell
Project Manager	Patrick Martin	(716) 204-5880	(716) 867-2860
Project Director	Dave Wehn	(716) 204-5880	716 713-6394
Other	Aaron Lange	(716) 204-5880	(716) 316-8146

1.4 Client and Site Contacts

Contacts	Number
Site field cell phone	716-316-8146

Contacts	Name	Number
Contact person on site	Roger Rusch	(716) 570-8775
Client safety contact	Frank Chinnici	(716) 689-3300
Company Golder reports to	Legacy LaSalle	(716) 689-3300
Golder overall site supervisor and alternate:	Patrick Martin	Office: (716) 204-5880 Cell: (716) 867-2860
	Aaron Lange	Office: (716) 204-5880 Cell: (716) 316-8146

It is company policy to complete a HaSEP form including a task-based Health, Safety and Environment (HSE) risk assessment for every project that includes site work, working alone or international travel.

To get an updated table of contents, please right-click the table of contents below and choose 'Update Field'

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You have the right to refuse any work you feel is unsafe, or that you are not trained to do. No job is so urgent that we cannot do it without meeting our HSE obligations

2.0 PROJECT PROPOSAL DETAILS

Project/Proposal Number	1300732	**Start Date**	TBD	**End Date**	TBD
Project Title	Legacy LaSalle BCP				
Project Manager (PM)	Patrick Martin				
PM's phone - Office	(716) 204-5880	**Home**		**Cell**	(716) 867-2860
Project Director	Dave Wehn				
PD's phone - Office	(716) 204-5880	**Home**		**Cell**	716 713-6394
Client name	Legacy LaSalle				

Brief description of project and scope of works (include any hazardous activities, if known)

Remedial Investigation activities on an approx. 10.5 acre Site that requires oversight of direct push and/or drill rig for completion of 17 soil boring locations and 3 shallow test pits and possible completion of three of the borings as groundwater monitoring wells and associated groundwater sampling. The site includes land and a former lumber yard that has been vacant for several years and a former city landfill. Previous soil investigations indicate minor soil contamination (RCRA Metals and PAHs) on the properties.

3.0 GOLDER TEAM

Name	Office	Contact number (cell phone)	Role
Patrick Martin	Buffalo	(716) 867-2860	PM
Aaron Lange	Buffalo	(716) 316-8146	Field Staff
Russell Marchese	Buffalo	+1 585 281-9366	Site Supervisor/ Geologist

Project Manager (PM)

- Appoint a competent site supervisor and alternate. For sites with multiple Golder projects/disciplines at work, coordinate with the overall site supervisor
- Oversee/develop hazard controls including work instructions and
- Assign only adequately trained and competent employees to the project

Site Supervisor

- The site supervisor is responsible for the safety of all Golder employees, subcontractors, visitors and public on the parts of the site under Golder control.
- Communicate all site hazards to affected parties, in real time, as hazards, conditions and employees change.
- Ensure that work is undertaken in accordance with the hazard controls included in this HaSEP.

Contractor

- All plant and equipment is maintained in a safe working condition
- All plant and equipment are to be registered/licensed and electrical equipment tagged and tested
- Potential hazards are to be controlled (e.g., cage over rotating parts)
- You will report any identified hazards to the Golder Associates field staff member

Field Staff

- Inspect your worksite and equipment before starting work
- Apply the controls outlined in this HaSEP
- Look out for the safety of yourself and others
- Report unsafe acts, conditions and incidents to the site supervisor

4.0 CLIENT/SITE DETAILS

4.1 Client/Site Details

Project location map (paste URL here)	**http://goo.gl/maps/emd5p**

4.1.1 Site Hierarchy

Role	Name	Phone
Contact person on site	Roger Rusch	(716) 570-8775
Client safety contact	Frank Chinnici	(716) 689-3300
Company Golder reports to	Legacy LaSalle	(716) 689-3300
Golder overall site supervisor and alternate:	Patrick Martin	Office: (716) 204-5880 Cell: (716) 867-2860
	Aaron Lange	Office: (716) 204-5880 Cell: (716) 316-8146

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4.1.2 Site description

If the project is near another Golder Office, has the local Office been notified of the work? ☒Yes ☐No

Site Name	89 LaSalle Ave BCP Site		**Address**		89 LaSalle Ave., Buffalo, NY	
Coordinates	Lat: 42.9462 Long: -78.8277					
Description	3 adjacent parcels containing a vacant lumber yard, misc. buildings and vacant land					
Access info	Enter from LaSalle Ave.					
Previous land uses	Lumber Yard, radio station and landfill					
HSE Induction / orientation provider	☒Golder		☐Client		☐Contractor	
Site Contact Numbers	**Field cell phone**	716-316-8146	**Satellite phone**		**Other**	
Nearest Golder office	USA - Buffalo	**Address**	2430 North Forest Road, Suite 100, Getzville, New York, USA 14068		**Phone**	+1 (716) 204-5880

4.2 Underground Services

Investigation involves ground penetration or intrusive works (e.g. drilling, auguring and excavation).
The following controls will be implemented prior to commencing work:

Underground Services	**Yes**	**No**	**If yes, provide details:**
Service locator engaged?	☒	☐	811 will be called prior to any ground penetration.
Plans detailing location of services obtained?	☒	☐	Survey drawing provided by client. Overhead lines are onsite.
Client provided service locator?	☐	☒	

5.0 CHECK-IN SYSTEM

5.1 Check-in contacts

	Name	**Phone/Email**	**Check-in frequency***	**By phone**	**By email**	**By SMS**	**On site**
Primary	Patrick Martin	Office: (716) 204-5880 Cell: +1 (716) 867-2860	On departure from the Site each day	☒	☐	☒	☐
Secondary	Aaron Lange	Office: (716) 204-5880 Cell: +1 (716) 316-8146	If Patrick cannot be reached	☒	☐	☒	☐

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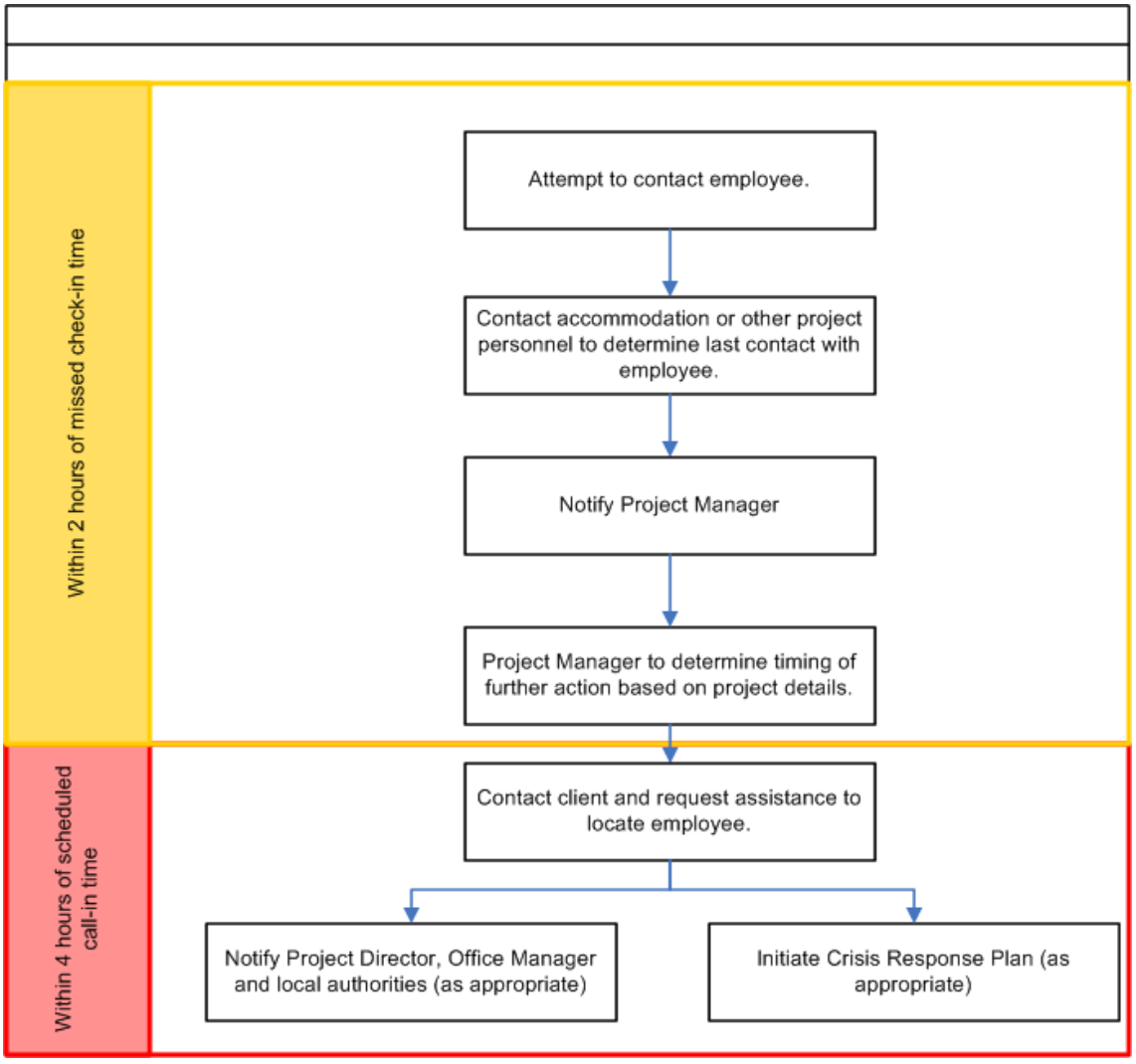
5.2 Missed Check-in Procedure

Missed check-in procedure flowchart:



☐Does missed check-in procedure for this project deviate from the flowchart?

Missed check-in contact information:

	Name	Phone	Cell/Mobile
Project Manager	Patrick Martin	(716) 204-5880	(716) 867-2860
Project Director	Dave Wehn	(716) 204-5880	716 713-6394
Other	Aaron Lange	(716) 204-5880	(716) 316-8146
Other			

6.0 CHEMICALS AND CONTAMINANTS

6.1 Possible Contaminants or Chemical Exposures

☒Are any contaminants likely to be encountered during this project (consider previous land uses)

Contaminant Name	Arsenic, Cadmium
Exposure routes	Dermal, Inhalation
Risk controls	Nitrile Gloves when handling soils, groundwater
Additional Info	Previous investigations indicate relatively low (Restricted Residential SCO) concentrations.

Contaminant Name	PAHs
Exposure routes	Dermal, Inhalation
Risk controls	Nitrile Gloves when handling soils, groundwater
Additional Info	Previous investigations indicate relatively low (Restricted Residential SCO) concentrations.

7.0 RISK REGISTER

7.1 Risk Definition

Health & Safety Consequence or Impact Description:

Catastrophic	5	Death, toxic release off-site with detrimental effect, very high financial loss
Major	4	Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss
Moderate	3	Medical treatment required, on-site release contained with outside assistance, high financial loss
Minor	2	First aid treatment, on-site release immediately contained, limited financial loss
Insignificant	1	No injuries, low financial loss

Environmental Consequence or Impact Description:

Catastrophic	5	Release to air, water or land with life threatening impacts on or off site. e.g.: human death(s); destruction of endangered species; habitat destruction; human water supply or food destruction; localized extinction of a species; Protracted or extensive clean up requiring external resources.
Major	4	Release to air, water or land with destructive impacts on or off site. e.g.: destruction of animal / fish life; habitat damage; making air, water or land unfit for use by living things; destruction of known or unknown indigenous people's / heritage sites ; irreversible alteration of the natural environment or its aesthetics; dust or noise affecting a region; large volumes of contaminated or hazardous waste. Requires clean up using external resources.
Significant	3	Release to air, water or land with impacts requiring long term recovery. e.g.: habitat disturbance; damage to indigenous people's/heritage sites; alteration of the natural environment or its aesthetics; generation of contaminated or hazardous waste, or large volumes of solid waste; dust or noise affecting the immediate area. Clean-up can be managed by internal resources.
Minor	2	Release to air, water or land with resulting in localised damage to worksite requiring short term recovery. e.g.: readily repairable impacts (physical or aesthetic) to the natural environment, indigenous people's/heritage items, property, or business operations; public nuisance (noise, dust, odours); generation of small quantities of waste. Clean up can be completed by internal resources.
Insignificant	1	Release to or disturbance of air, water or land resulting in no impact or localised (i.e. isolated to worksite) impacts within authorized limits. Short term impact with complete recovery. Clean up can be completed by person(s) involved.

Likelihood Description:

Almost certain	5	Incident will occur in every circumstance (e.g. every time).
Likely	4	Incident will probably occur (e.g. 1 in 10 times).
Possible	3	Incident may occur at sometime (e.g. 1 in 100 times).
Unlikely	2	Incident not expected to occur, but conceivable (e.g. 1 in 1, 000 times).
Rare	1	Incident would only occur in exceptional circumstances (e.g. 1 in 10,000 times).

Risk Analysis Matrix:

Likelihood:		**Consequence:**				
		Catastrophic	Major	Moderate	Minor	Insignificant
		5	4	3	2	1
Almost certain	5	25 (VH)	20	15	10	5
Likely	4	20	16 (H)	12	8	4
Possible	3	15	12	9 (M)	6	3
Unlikely	2	10	8	6	4 (L)	2
Rare	1	5	4	3	2	1 (VL)

0-3 (VL) Very Low Risk	No additional controls necessary. Continue to monitor risk.
4-6 (L) Low Risk	Consider additional controls to further reduce risk.
8-12 (M) Moderate Risk	Controls must be implemented to reduce risk.
15-16 (H) High Risk	Risk Unacceptable, do not proceed without controls, minimum of 'engineering controls'.
20-25 (VH) Very High Risk	Risk Unacceptable, do not proceed without controls, elimination or substitution controls required.

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7.2 Risk Register

Header Key:

- PA: Persons Affected
- IC: Initial Consequence
- IL: Initial Likelihood
- IR: Initial Risk
- RC: Residual Consequence
- RL: Residual Likelihood
- RR: Residual Risk
- AC: Additional controls

Initial Risk	Hazard	PA	IC	IL	IR	Controls	RC	RL	RR	AC
Driving vehicle (Personal)	Driving vehicle (Personal)	Golder employee	4	2	8	Drivers will have a current driving license. Maintain vehicle in a roadworthy condition. The driver should be fit to drive. Adhere to highway regulations and follow speed limits. Do not drive in adverse weather or when excessively tired. Check weather and routes before departure. In poor weather delay departure. When arranging transport request suitable vehicle that is equipped with seatbelts, spare tire, winter tires & ice scraper (if needed), and bring along a first aid kit & fire extinguisher if applicable. Conduct a pre-use inspection of the vehicle including fluid levels.	2	2	4	
Ground penetrating work	Contaminants - Ground penetrating work	Golder employee	3	4	12	Create an exclusion zone to ensure non-essential staff and members of the public do not enter the area. Avoid excessive vehicle movements as this can disperse and spread potential contamination. Where water restrictions permit, dampen the soil during earthworks to reduce dust and odor generation. Where possible, stand and work upwind from earthworks.	3	2	6	

Initial Risk	Hazard	PA	IC	IL	IR	Controls	RC	RL	RR	AC
High Noise Environments	Noise	Golder employee	4	4	16	Follow the Hearing Protection SWP 21. Evaluate the noise level. If it is difficult to maintain a normal conversation at a distance of 3 feet, institute controls to manage the hazard. Install insulation or other noise damping techniques where possible. Establish task rotation to decrease exposure times to hazardous noise. Wear hearing protection with a sufficient protection factor to mitigate the noise hazard. This could be properly fitted ear plugs or a combination of both ear plugs and ear muffs.	2	2	4	
Positioning the Rig	Stability of the drill rig	Golder Employee	3	2	6	Choose a site that allows for safe access of the drill rig. **LOOK UP FOR OVERHEAD LINES THAT MAY LIMIT ACCESS AND OPERATIONS**. Ask the drill rig operator to stabilize the rig using the stabilizing arms. Slope stability and soil conditions should be considered.	2	2	4	
Working Near the Rig	Entanglement and falling objects	Golder Employee	5	2	10	Golder employees will stand clear of the drill rig when in operation. No loose clothing will be worn when working near a rig. Long hair will be tied back. Consider wearing break-away safety vests.	3	2	6	

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Initial Risk	Hazard	PA	IC	IL	IR	Controls	RC	RL	RR	AC
Managing the excavated area	Managing the excavated area	Golder Employee	4	4	16	Any excavation greater than 4 ft deep must comply with regulatory requirements. **NO ONE SHOULD ENTER THE EXCAVATION.** Monitor the excavation for signs of instability such as slumping of side walls, tension cracks, and water ingress. Keep traffic, equipment, and the edge of temporary spoil piles at least 2 feet from the edge of the excavation. Permanent spoil piles should be placed further from the excavation. People working in an excavation should not work in isolation. Another person should be present in the immediate area to manage nearby hazards and provide assistance if needed.	3	2	6	
Groundwater - General (SWP 15)	General Procedure	Golder Employee	3	3	9	Follow the Groundwater Sampling SWP 15. When using a bailer to sample groundwater or conducting a slug test, position yourself to minimize back strain. When sampling groundwater with a bailer, take care when handling the bailer cord, as it can cause a tripping hazard. Before sampling, become familiar with the contaminants of concern and establish the appropriate action levels and response action for each potential contaminant.	3	2	6	

Initial Risk	Hazard	PA	IC	IL	IR	Controls	RC	RL	RR	AC
Sampling - Contaminated Media	Sampling - Contaminated Media	Golder Employee	3	4	12	Review available data about chemical of concerns (SDS) and potential concentrations to be encountered. Understand the exposure routes. Select necessary PPE for the potential chemical hazards. Avoid direct contact between contaminated media and skin surface and eyes. When handling containers of sample preservatives, appropriate gloves and eye protection are required. When sampling groundwater with a bailer, keep bailed water away from yourself and avoid splashing onto equipment.	2	2	4	
Soil- General (SWP 20)	General Procedure	Golder Employee	3	3	9	Follow the Soil Sampling SWP 20. Before sampling, become familiar with the contaminants of concern and establish the appropriate action levels and response action for each potential contaminant. Prior to breaking ground, make sure an underground utilities clearance has been conducted. If collecting a sample from a split-spoon sampler with an acetate liner, exercise caution as the edges of the acetate liner are extremely sharp. Wear gloves and use a tool to scoop out the sample, if possible. Do not leave boreholes unattended. Be cautious around heavy equipment such as drill rigs and excavators.	3	2	6	

8.0 PERSONAL PROTECTIVE EQUIPMENT

Item	Required	Provided by Golder	Provided by Client	Specific Requirement
Cold Weather Gear	☒	☒	☐	As needed
Wet Weather Gear	☒	☒	☐	As needed
Gloves				
Disposable	☒	☒	☐	When Sampling Soils and groundwater
Head Protection				
Hard Hat	☒	☒	☐	At all times
Hearing Protection				
Disposable foam ear plugs	☒	☒	☐	When near drilling rig
High Visibility Clothing				
Orange	☒	☒	☐	At all times
Safety Footwear				
Safety boots	☒	☒	☐	At all times
Eye Protection				
Impact resistant safety goggles or glasses	☒	☒	☐	When sampling and near drill rig

9.0 INCIDENT AND EMERGENCY MANAGEMENT

9.1 Emergency contacts

Contact	Number
Ambulance	911
Fire	911
Police	911
Golder National Health and Safety Leader (Jane Mills)	206-295-7002
WorkCare	888-449-7787

9.2 Hospital

Hospital name	Address	Phone	Level of Care Available
ECMC	462 Grider Street, Buffalo, NY 14215	716-898-3000	ER

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9.3 Site emergency

☒Site emergency procedures available

☐Site owner will provide emergency procedures induction/site induction

☐Medivac procedures in place (medivac arrangements must be confirmed on site)

10.0 HSE PLAN CONTROL

It is the responsibility of the Project Manager to ensure that this HaSEP is prepared and the contents communicated at the pre-start / toolbox meeting to all project staff, Golder or subcontractor, with a copy held on site. The HaSEP has been reviewed or prepared by the Project Manager.

If the project site is remote from the home office, this HaSEP is to be reviewed and approved by the local Golder office whether in another country, province or city.

Role	Name (printed)	Date	Signature
Prepared by	Aaron Lange	11-7-13	
Reviewed by	Patrick Martin		
Approved by	Dave Wehn		
Other			

10.1 Golder sign-off

Signing below indicates you have read and agree to comply with the information contained in this document.

Date	Name	Company	Signature

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11.0 ONSITE CHANGES AND REVIEW

Date	Change or modification	How was it communicated?

12.0 INSPECTIONS AND SITE VISITS

12.1 Inspections

Nature	Frequency	Person Responsible
On-site HaSEP verification with call to PM	Before work begins	Site Supervisor

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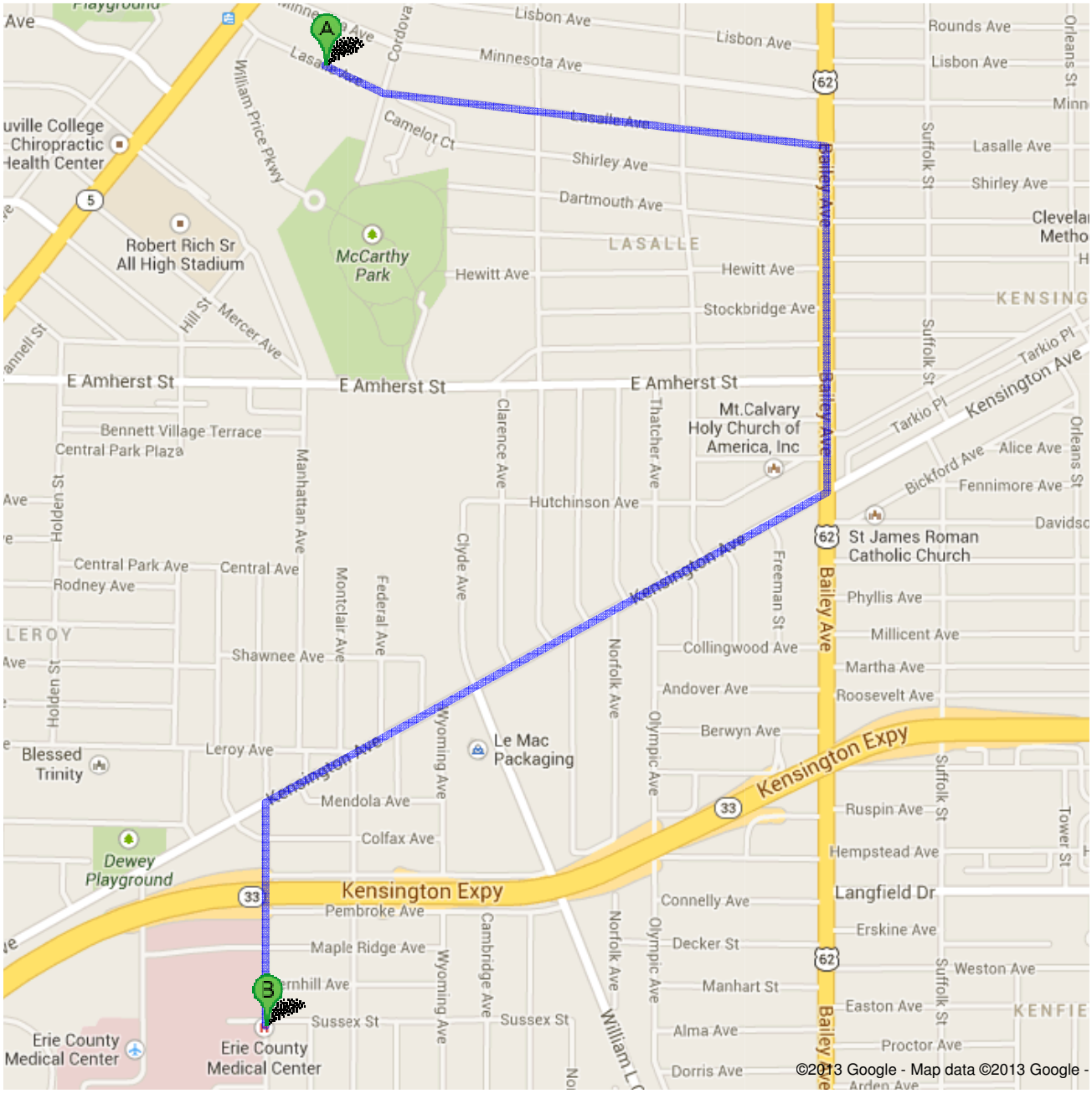
12.2 Inspections and Site Visits

Date	Area	Name

13.0 REVISION HISTORY

Version	Author	Date	Amendments, hazards associated with amendments & controls	Reviewed and communicated to all parties	Approved by
V1					

Directions to Erie County Medical Center
462 Grider St, Buffalo, NY 14215
2.4 mi – about **8 mins**



73 Lasalle Ave, Buffalo, NY 14214

1.	Head **southeast** on **Lasalle Ave** toward **Cordova Ave** About 2 mins	go 0.7 mi total 0.7 mi
2.	Turn right onto **Bailey Ave** About 2 mins	go 0.5 mi total 1.2 mi
3.	Turn right onto **Kensington Ave** About 2 mins	go 0.9 mi total 2.1 mi
4.	Turn left onto **Grider St** Destination will be on the right About 2 mins	go 0.3 mi total 2.4 mi

Erie County Medical Center
462 Grider St, Buffalo, NY 14215

APPENDIX A

Community Air Monitoring Plan (CAMP)

You have the right to refuse any work you feel is unsafe, or that you are not trained to do. No job is so urgent that we cannot do it without meeting our HSE obligations

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and 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.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. 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.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/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.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must 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, particularly if wind direction changes. 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. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. 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.

2. 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.

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

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

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX B

Standard Work Procedures (SWPs)

- HSE_200.014_SWP_Slips_Trips_and_Falls.pdf
- HSE_200.015_SWP_Groundwater_Sampling.pdf
- HSE_200.017_SWP_Underground_Utilities.pdf
- HSE_200.024_SWP_Motor_Vehicles_and_Driving_on_Company_Business.pdf
- HSE_200.039_SWP_Cadmium_Exposure.pdf
- HSE_200.001_SWP_Drilling.pdf
- HSE_200.005_SWP_Cold_Environment_Cold_Stress.pdf
- HSE_200.010_SWP_Soil_Sampling.pdf

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Approved by	Jane Mills	Issue Date	August 2012
Revision by	Brian Tuccillo	Revision Date	August 2013

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) staff. The majority of falls occur on slippery, uneven, defective, cluttered or obstructed walking surfaces. A significant number of debilitating falls are the result of a person falling out of his or her own chair, typically while in the process of sitting down, or leaning back. Falls from elevations while reaching for an overhead object are also common, and frequently cause severe injuries.

2.0 SLIPS, TRIPS, AND FALLS

Slips are primarily caused by a slippery surface and compounded by wearing the wrong footwear.

Providing dry walking and working surfaces and slip-resistant footwear can minimize slips and their resultant falls and injuries. Shoes with rubber-cleated, soft soles and heels are recommended for most field work.

In work areas where the walking and working surface is likely to be slippery, non-skid strips, mats, or floor coatings should be used.

As little as a 3/8" rise in a walkway can cause a “stubbed” toe resulting in a trip and fall. The same thing can happen when going up a flight of stairs: Only a slight difference in the height of subsequent steps could cause a person can trip and fall. Be aware of uneven surfaces.

3.0 TYPES OF FALLS

Falls are of two basic types: elevated falls and same-level falls. Same-level falls are most frequent, but elevated falls are more severe.

- Same-Level Falls: high frequency--low severity.
- Elevated Falls: lower frequency--high severity.

Same-level falls are generally slips or trips. Injury results when the individual hits a walking or working surface or strikes some other object during the fall. Over 60 percent of elevated falls are from less than 10 feet.

4.0 CONTRIBUTING FACTORS

Proper housekeeping in work and walking areas can contribute to safety and the prevention of falls. It is important to maintain a safe working environment and walking surface. Work areas must remain free of obstacles that might cause slips and trips. One action which promotes good housekeeping in work

environments is the painting of yellow lines to identify working and walking areas. Working and walking areas should never be obstructed by objects of any kind.

Adequate lighting can improve visibility in an area and is an important factor in the prevention of slips and falls. Moving from light to dark areas, or vice versa, can cause temporary vision problems, that might be just enough to cause a person to slip on an oil spill or trip over a misplaced object.

Carrying an oversized object can also obstruct one's vision and result in a slip or a trip. This is a particularly serious problem on stairs.

If a material spills on the floor, promptly clean it up and post the necessary precautionary signs until it is dry and free of slip hazards.

In addition to wearing the wrong footwear, there are specific behaviors which can lead to slips, trips, and falls. Walking too fast or running can cause major problems. Rapid changes in direction or walking backwards can create a similar problem.

Other problems that can lead to slips, trips and falls are: distractions; not watching where one is going; carrying materials which obstruct view; wearing sunglasses in low-light areas; and failure to use handrails. These and other behaviors, caused by lack of knowledge, impatience, or bad habits developed from past experiences, can lead to falls, injuries, or even death.

5.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.022 SWP Housekeeping.

Approved by	Jane Mills	Issue Date	August 2012
Revision by	Amanda Cote	Revision Date	August 2013

1.0 SCOPE

This Standard Work Procedure (SWP) applies to Golder Associates Inc. (Golder) staff working on a project where groundwater sampling is conducted.

2.0 DEFINITIONS

FID Flame ionizing air monitoring instrument. A direct reading air monitoring instrument equipped with a hydrogen flame that ionizes (through combustion) all combustible organic vapors.

GFCI Ground Fault Circuit Interrupter

HASEP Health, Safety, and Environment Plan

IDW Investigation Derived Waste

MSDS Material Safety Data Sheets

PID Photo ionizing air monitoring instrument. A direct reading air monitoring instrument equipped with an ultraviolet light source that ionizes organic vapors with ionization potentials less than that of the lamp.

PPM Parts Per Million

SDS Safety Data Sheets

SWP Standard Work Procedure

3.0 KEY HAZARDS

- Potential skin, inhalation or eye exposure to contaminated sampling water
- Potential exposure to chemicals including sample preservatives
- Ergonomic hazards including lifting heavy objects such as sample coolers or buckets of purge water

- Ergonomic hazards including repetitive motions such as opening drum bungs or manual bailing
- Insect or snake stings or bites from creatures nesting in wells, well houses or well casings
- Electrical hazards associated with groundwater sampling pumps

If any of these hazards are anticipated on the project site, the corresponding SWP must be included in the Health, Safety and Environment Plan (HASEP).

4.0 PREPARING FOR THE WORK

The site-specific HASEP addressing both known and reasonably anticipated hazards should be prepared prior to the commencement of work. Chemical hazards and their means of detection and control should be reviewed prior to field mobilization. Employees should understand how to use all monitoring equipment including calibration and field check procedures.

5.0 CHEMICAL HAZARD CONTROL

Before sampling any groundwater well, employees must become familiar with the contaminants of concern and review previous sampling data (if available) to understand potential site contaminants and exposure levels. If the groundwater is not expected to contain contaminants, air monitoring, as described below, is not necessary.

5.1 Potential Volatile Chemical Exposure

When initially opening the well, position yourself upwind if possible and keep your face as far from the opening to avoid inhaling volatile contaminants. Avoid any direct contact with a skin surface or eyes with groundwater. Continuous air monitoring should be performed utilizing a photo ionizing or flame ionizing instrument that can measure a minimum of 0.5 parts per million (PPM) organic vapor. Calibrate the air monitoring instrument daily as described by the manufacturer. In general, total organic vapor readings of less than 1 PPM are safe. Steady breathing zone measurements at 1 PPM or above warrant an exposure assessment and re-evaluation of control measures. It may be necessary to implement engineering controls (ventilation) or upgrade personal protective equipment (respiratory protection) to reduce exposure.

5.2 Dry Ice Exposure

Occasionally samples are kept cool with dry ice instead of regular ice, and this presents a special hazard to employees.

5.2.1 Handling

Dry Ice temperature is extremely cold at -109.3°F or -78.5°C. Always handle dry ice with care and wear protective cloth or leather gloves whenever touching it. An oven mitt or towel will work. If touched briefly it is harmless, but prolonged contact with the skin will freeze cells and cause injury similar to a burn.

5.2.2 Storage

Store dry ice in an insulated container. The thicker the insulation, the slower it will sublimate. Do not store dry ice in a completely airtight container. The sublimation of dry ice to carbon dioxide gas will cause any airtight container to expand or possibly explode. Keep proper air ventilation wherever dry ice is stored. The sublimated carbon dioxide gas will sink to low areas and replace oxygenated air. This could cause suffocation if breathed exclusively. Do not store dry ice in a refrigerator freezer.

5.2.3 Ventilation

If dry ice has been in a closed cooler for more than 10 minutes, open the lid and allow adequate ventilation before putting things into or taking things out of the cooler. Leave the area containing dry ice if you start to pant and breath quickly develop a headache or your fingernails or lips start to turn blue. This is the sign that you have breathed in too much CO2 and not enough oxygen. Dry ice CO2 is heavier than air and will accumulate in low spaces.

5.3 Air Monitoring

Action levels for each potential contaminant of concern should be established in the site-specific HASEP. Employees should understand how to respond when action levels are detected. Some organic compounds at high concentrations pose significant flammability or explosive risks. If these concentrations may be encountered at the project site, controls must be established which could include sampling with a minimum of ferrous tools or other sources of ignition.

5.4 Sample Preservative Hazards

Sample preservatives are usually acidic, and handling these preservatives and the containers they are stored in must be done carefully. At all times, when handling containers with preservatives, you must be wearing appropriate disposal gloves and eye protection to protect yourself from splashes and spills.

5.5 Hazard Communication

Maintain material safety data sheets (MSDS) or Safety Data Sheets (SDS) or equivalent for all chemicals of concern at the site including any chemicals required as part of the sampling program (i.e. calibration gas, sample preservatives, etc.).

5.6 Wastewater Disposal

Collect development or purge water in containers as required for proper disposal. Use secure areas for waste storage to protect the public and client staff from investigation derived waste (IDW). All containers containing IDW must be properly labeled and dated.

6.0 ERGONOMIC HAZARD CONTROL

Many of the activities associated with groundwater sampling represent potential ergonomic hazards. The list below represents a few of the activities that may be associated with this type of sampling.

- Carrying coolers with empty sample containers
- Carrying coolers with full sample containers and/or dry ice
- Lifting and carrying buckets with purge water
- Pouring liquids into a larger drum for storage
- Opening bungs on drums
- Manually bailing water from a well

For any of the activities listed above, consider proper body positioning, scheduling rest breaks, and alternative methods for lifting any object that you cannot lift safely.

7.0 BIOLOGIC HAZARD CONTROL

Well houses, well casings and wells are favorite places for snakes, bees, wasps and similar animals to rest or build homes. Use great care when opening any of these locations to access a well head for sampling. Remember that snakes and insects can relocate overnight, so check before you open them every time.

When first approaching the sampling location, listen for sounds such as the hum of a hive or the rattle of a snake. Look for signs of habitation. Slowly opening doors or covers, and be prepared to close it again quickly, or to run in the event that an insect, snake or other animal is present. Sampling should not proceed until the insect, snake or other animal has been removed from the sampling location.

If you are injured by an insect, snake or other animal, follow the recommendations of HSE 200.003 Biological Hazards.

8.0 ELECTRICAL HAZARD CONTROL

Groundwater sampling often involves using line-operated pumps to extract water from the subsurface. Pumps can be powered by battery, electric generator or compressed gases.

If using an electric generator, employees shall check that it is equipped with ground fault circuit interrupter (GFCI) to prevent possible shock hazards. Batteries and compressed gas cylinders should be safely transported to the sampling location and properly stored, with secondary containment where appropriate.

The process to connect the power supply (battery) to the sampling pump must be strictly followed:

1. Use the correct battery for your particular sampling pump. Check the pump operator's manual for information
2. Check that the pump is **not** plugged in to an electric outlet and that the power switch is off.
3. Connect the positive (usually red) charger cable to the positive (+) battery terminal and the negative (usually black) cable to the negative (-) battery terminal.
4. When use of the pump is complete, disconnect the cables, starting with the negative cable, and then moving on to the positive cable.

Do not allow the battery cable or battery to lie in water.

If internal combustion engines (generators) are used, they must be in an area with adequate ventilation, and free of combustible materials (i.e., dry grass, gasoline, etc.).

9.0 PERSONAL PROTECTIVE EQUIPMENT

- Hard hat, where overhead hazards are present
- Safety glasses (splash goggles should be made available depending on the known hazards that may be present in the groundwater)
- Respirator with appropriate cartridges, as required by potential site conditions
- High visibility clothing (reflective vest)
- Steel-toed safety boots
- Nitrile gloves (or appropriate gloves depending on the known hazards that may be present in the groundwater)

10.0 TRAINING

- 40-hour HAZWOPER (8-hour annual refresher required) if groundwater is known or suspected to be contaminated
- OSHA 10-hour Construction Safety

11.0 APPLICABLE REGULATORY REFERENCES

- 29 CFR 1926.59: Hazard Communication
- 29 CFR 1926 Subpart E: Personal Protective and Life Saving Equipment

12.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200-026 SWP Compressed Gas Cylinders

- GAI HSE 204 Electrical Safety Program
- GAI HSE 200.003 Biological Exposure

Approved by	Jane Mills	Issue Date	August 31, 2012
Revision by	Jane Mills	Revision Date	None

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. staff working on projects where underground (buried) utilities may be contacted.

2.0 INTRODUCTION

Prior to beginning any subsurface work, the Project Manager must identify the risks associated with working around subsurface utilities. Subsurface work includes, but is not limited to: digging, planting trees or shrubs; hand auguring; drilling; excavating; trenching; concrete coring; pile driving; or any activity that penetrates the ground surface. If a buried utility line is contacted while digging, personal injury (including fatal injuries), disruption of service to businesses or neighborhoods, and potential fines and repair costs may be incurred. The following sections provide a summary of the recommended minimum requirements to perform subsurface work.

3.0 PROCEDURE

3.1 Client Communication and Site Plan Review

Golder personnel should contact the client and/or site owner to discuss any known or suspected utilities on site. Golder should review previous maps and drawings of the site that may contain the locations of subsurface utilities. Be sure you know what the drawing includes. For example, a water/sewer drawing will likely not identify the locations of subsurface communication lines.

3.2 Call Before You Dig – One-Call – DigSafe Communication

State law requires any person or company involved in subsurface work to call the local utility locating services (e.g., Call Before You Dig, One-Call, Dig Safe) prior to commencing subsurface activities. The Project Manager and/or his or her designee should be familiar with their state's utility locating requirements (e.g., states have different utility reporting response times - 72 hours vs. 48 hours, generally excluding weekends and holidays). Note that most public utility locating services will not mark utilities on private property. If utilities are not marked on your site (i.e., private property), consider commissioning a private locating company to locate private property utilities. At a minimum, the Project Manager and/or his or her designee should perform the following utility clearance procedures:

- To contact the utility locating service, dial 811 and identify the project area to be connected to a customer service representative in that area. At least 72 business hours prior to starting the work, the Project Manager or designee should complete a public utility clearance request (Dig Safe, One-Call, etc.) and record the information listed on

Section 6 of the SWP. If our client or subcontractor has responsibility for. If the dig area is complex or involves several locations, a meet can be requested during the initial locate call. This will allow the locator and the person making the request the opportunity to meet and cover all of the needs without having to recall locates if something is missed or unclear. If our client or subcontractor has responsibility of completing the public utility clearance request, prior to starting work, the Project Manager or designee should request the information from Section 6 of this SWP. More information on the 811 service is available at www.call811.com.

- Check State-specific laws governing utility locates. Some jurisdictions require the subcontractor (e.g., driller, excavator, etc.) to take responsibility for locating the utilities.
- If a specific utility is not present within the project area, ask the utility company or utility locating service to provide a written statement stating that their utility is not in the project area.
- All proposed earth penetration locations should be staked or marked using white paint and stakes/flags and have the following information on it:
  - Excavators name (e.g., Golder).
  - Contact information.
  - The radius or size of the proposed excavation.

  Consider clearing alternative excavation/boring locations in case of refusal or difficult excavating areas. If you are trying to clear a larger area, make sure the proposed excavating/drilling area is clearly marked (e.g., marking the side of a road with white arrows pointing towards one another if completing borings along right-of-way).
- The utility locating contractors use the American Public Works Association (APWA) Uniform Color Codes for temporary marking of underground utilities (see Section 5). Markings should be 18 to 24 inches in length and 2 inches in width. The markings should indicate the type of utility, the utility owner, and utility size if known.
  - If a specific project site deviates from this standard, the Project Manager and HSO should make sure all site personnel and all parties involved, including the client and subcontractors are aware of the deviation.
- Utility markings should include an indication of the tolerance zone on either side of the utility. The tolerance zone is the width of the utility line plus at least 18 inches on each side. Utility locating contractors may not be able to pinpoint the exact location of the underground utilities (e.g., non-metallic lines) and may be using outdated maps. DO NOT perform any earth penetration activities within **five feet** of the tolerance zone.

  If you must perform work within the tolerance zone, most states require that you contact the utility company and use investigative procedures to pinpoint the utilities prior to drilling/excavating (e.g., hand excavation and vacuum excavation).
- The Project Manager and/or designee should have the ticket number with them on the project site at all times and be aware of the expiration date of the ticket number, if any.
- The Project Manager and/or designee should verify that the utilities contacted on the ticket have responded. If a utility has not yet responded, DO NOT dig and contact the utility locator to verify the status.
- The Project Manager and/or their designee and subcontractor should walk through the project area and familiarize themselves with the utility clearance markings. During the walk through, the Project Manager and/or their designee and subcontractor should

visually assess the site for any signs of subsurface utilities (e.g., manholes, grates, vents, etc.) and verify the utilities have been clearly marked.

- If any signs of subsurface utilities suggest utilities are unmarked or if the markings are unclear, STOP and contact the utility locator to clarify.

- Avoid disturbing markings and DO NOT use markings from a previous project. If the markings have faded or are disturbed, request that they be re-marked before proceeding.
- NEVER move a proposed earth penetration location to a location beyond the utility-cleared area.
- DO NOT assume buried utilities are at a certain depth.
- DO NOT assume a utility runs straight or is centered between the tolerance zone offset marks.
- Flags alone are not sufficient for excavation activities.
- If the markings are destroyed, the locate is no longer valid and locates must be recalled.

4.0 STEPS TO TAKE IF YOU CONTACT A UTILITY

If a utility is encountered or damaged during excavation, follow the steps provided below:

4.1 A Natural Gas, Petroleum, or Propane Line

1. Stop work and evacuate the site.
2. Call 911 or the emergency services number in your area.
3. Call the appropriate facility operator.
4. Eliminate all sources of ignition (e.g., no open flames, running engine, etc.).
5. Alert everyone on the premises.
6. Keep the public and traffic away.
7. Tape, rope or place cones around the area.
8. Stay upwind of blowing gas.
9. Do not try to fix a gas pipe.
10. Do not try to extinguish a gas-fueled fire.

4.2 Electric Line

1. Stop work immediately and warn all persons in the vicinity, that the ground and objects near the point of contact (e.g., excavator and drill rig), may be energized.
2. Contact the electrical utility operator and fire department.
3. The operator should remain on the energized excavator to prevent an electrical shock (i.e., not cause a pathway to ground while stepping out of the excavator).
4. Personnel on the ground near the excavator or point of contact should remain still with both feet together. Don't touch the excavator, nearby equipment, structures or material.
5. Evacuate the excavator and the area near the point of contact only after an official of the electric utility deems it is safe to do.

6. If immediate evacuation is required due to threat of serious injury from fire, explosion or other hazard:
    a. Jump – not step – clear of the equipment and land with both feet together.
    b. Move a safe distance away (at least 25 to 30 feet) using short hops or shuffling steps to keep both feet together at all times.
    c. Do not take normal, walking steps (see above).
7. Do not resume work until an electric utility official confirms the site is safe.

4.3 Telephone of Fiber-optic Line

1. Stop excavation and secure the area for public safety.
2. Notify facility owner of the potential damage to copper/fiber cable.
3. Do not examine or stare into broken/severed/disconnected fibers/fiber cable (laser signal can damage your eyes).
4. Move a safe distance away from a damaged fiber system (always assume that a laser signal is present).
5. Place warning or barricades around the fiber damage location to protect the public and other workers from exposure.

4.4 Potable Water, Reclaimed Water, and Sewer Line

1. Stop excavation and secure the area for public safety.
2. Contact utility company and local fire department.
3. Notify facility owner of the potential damage to water/sewer line.
4. Move equipment and vehicles away from flowing water if safe to do so.

5.0 UTILITY UNIFORM COLOR CODE

The American Public Works Association (APWA) Uniform Color Codes for temporary marking of underground utilities are listed below:

RED	Electric power lines, cables or conduits, and lighting cables.
YELLOW	Gas, oil, steam, petroleum or other hazardous liquid or gaseous materials.
ORANGE	Communications, cable TV, alarm or signal lines, cables, or conduits.
BLUE	Water, irrigation, and slurry lines.
GREEN	Sewers, storm sewer facilities, or other drain lines.
WHITE	Proposed excavation.
PINK	Temporary survey markings.
PURPLE	Reclaimed water, irrigation and slurry lines.

6.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.001 SWP Drilling.
- GAI HSE 200.018 SWP Working Around Heavy Equipment.
- GAI HSE 200.016 SWP Trenching Shoring and Excavation.

Appendix A - Utility Locating Service Form

FILL OUT ALL AVAILABLE INFORMATION PRIOR TO CALLING IN A UTILITY LOCATE REQUEST.

CALL AT LEAST 72 HOURS (3 BUSINESS DAYS) PRIOR TO BEGINNING FIELD WORK.

NOTIFICATION LEAD TIME SUBJECT TO LOCAL LAWS AND REGULATIONS

CALL BEFORE YOU DIG!

PROJECT INFORMATION:

Project:	**Project No:**

GENERAL INFORMATION:

Golder Contract Number:	**Time/Date:**
Ticket Number:	**Person:**
Primary Contact (Field):	**Phone/Pager:**
Secondary Contact (PM):	**Phone/Pager:**

LOCATE INFORMATION:

State:	**City:**
County:	**Other:**
Township/Range/Section/1/4 Section/*1/4-1/4 Section:	
Address or Nearest Intersection:	
Type of Work:	**Overhead Power Conflicts? YES NO**

LOCATE INSTRUCTIONS: (BE AS SPECIFIC AS POSSIBLE)

IMPORTANT: IF FEASIBLE FLAG OR MARK AREAS OF THE PROPOSED EXPLORATION. MAKE SURE TO REQUEST A MINIMUM 50 FT RADIUS AROUND EACH PROPOSED EXPLORATION LOCATION SUCH THEY CAN ME MOVED IN THE EVENT OF A UTILITY CONFLICT.

UTILITIES THAT WILL BE CONTACTED:

Utility	Utility

DISTRIBUTION: FILE

(PROJECT MANAGER)

(FIELD REPRESENTATIVE)

BY:_____

SWP Motor Vehicles and Driving on Company Business – GAI HSE 200.024

Approved by	Jane Mills	Issue Date	August 2012
Revision by	Brian Tuccillo	Revision Date	August 2013

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) company drivers who operate motor vehicles (company owned, private, or hired) on company business. All employees must comply with Golder's Motor Vehicle Policy. Definitions of the terms in this SWP are the same as the terms in that Policy. In the event of conflict, Golder's Motor Vehicle Policy takes precedence over this SWP.

2.0 MOTOR VEHICLES AND DRIVING ON COMPANY-RELATED BUSINESS

Preventing work-related roadway crashes requires strategies that combine traffic safety principles and sound safety management practices. Although Golder cannot control roadway conditions, the company can provide safety information to employees and set and enforce driver safety policies to promote safe driving behavior.

3.0 GENERAL GUIDELINES

- Company drivers are authorized to operate a motor vehicle (company owned, private, or hired) while on company business.
- Seat belts shall be worn by all drivers and passengers in vehicles on company business.
- Employees must carry appropriate insurance if using private vehicles for work purposes.
- Consider the risks driving while fatigued presents on all projects. Employees should not drive irregular hours or far beyond their normal working hours.
- Develop work schedules that allow employees to obey speed limits and to follow applicable hours-of-service regulations.
- Observe all the rules and regulations pertaining to the use of public land. Always ask permission before crossing pastoral land. Leave gates in the same position as they were found. Keep to constructed vehicle tracks. Avoid areas that are easily damaged, such as swamps, alpine snow plains and vegetated sand dunes.
- Do not operate any vehicle while under the influence of alcohol, illegal drugs, or medications (prescription or over the counter) that might impair the ability to safely operate the vehicle.
- Consider fire safety when parking vehicles in areas with dried grasses, leaves, or other plant material. Hot engine fluids, catalytic converters or other vehicle equipment could ignite dry plant material, and cause a fire. Observe all fire restrictions.
- For portable electronic devices reference Golder's Motor Vehicle Policy and the HSE 200.023 SWP Cellular Telephone for additional information. Additional safe driving behaviors include:
  - The employee operating a vehicle while conducting company related business shall not talk (including hand free units), text, email, surf the internet, etc. If the employee needs to perform any of these tasks then they shall park the vehicle in a designated and safe parking location.

- Employees are strongly discouraged from performing other activities that result in taking away meaningful attention to operating a vehicle safely (e.g. playing with the radio, eating, reading, applying makeup, shaving, etc.).

- Only operate vehicles for the designed intended purpose.

4.0 VEHICLE MAINTENANCE AND FLEET MANAGEMENT

- To keep the vehicle in a safe working order, follow the maintenance requirements prescribed in Golder's fleet management program for company owned vehicles.
- Maintain a Vehicle Condition Check-out/Check-in list for company owned vehicles.
- Test the brakes, wipers, tires, lights, and turn signals, and verify that the vehicle has an inflated spare tire and jack prior to use (in company, private, or rented vehicles). Address any notes or oral warnings concerning vehicle deficiencies. If any safety concerns are identified, the vehicle must not be used.
- Report vehicle deficiencies to the Office Manager as soon as they are noticed. The Office Manager, or his/her delegate, will arrange for maintenance of the vehicle.
- Equip company owned, rented, or private vehicles used for on-site work with fire extinguishers and first aid kits, when required.
- Make sure rented or client-provided vehicles are in a roadworthy condition.

5.0 SAFETY TRAINING PROGRAMS

- Teach employees strategies for recognizing and managing driver fatigue and in-vehicle distractions.
- Provide appropriate training to employees operating specialized motor vehicles or equipment.
- Emphasize the need to follow safe driving practices on and off the job.

6.0 DRIVER PERFORMANCE EVALUATION

- Employees must report any traffic violations and/or vehicle accidents or damage that occurred when driving on company related business to the Project Manager or the Human Resource Representative.
- Human Resources Representatives are responsible to make sure each driver of a vehicle being used on company business (company owned, private, or hired) possesses a valid driver's license. The Project Manager is required to verify that the license is appropriate for the type of vehicle to be driven.
- Human Resources will check driving records of prospective employees, and perform periodic rechecks after hiring.
- Human Resources will maintain complete and accurate records of employees' driving performance.

7.0 SECURING LOADS

Unsecured and poorly secured items inside or outside of a vehicle can be extremely dangerous if they are loose or become airborne. They can harm the vehicle driver and passenger, and/or occupants in following vehicles. The following recommendations should be followed:

- Use tie-down straps that are in good condition and rated for the load that the vehicle will carry. Ratcheting tie downs are better than bungee cords or tie downs that just pull tight.
- Install mounts to secure loads that are hauled frequently in the same vehicle or trailer.
- Secure tarps covering loads so they are snug and do not flap.
- Check all loads after driving for 30 minutes to make sure that they have not shifted and remain properly secured.
- Loads shall not exceed the manufactures specifications and legal limits for the vehicle.

8.0 VEHICLE SAFETY EQUIPMENT AND EMERGENCY PREPARATION

Be prepared for a driving emergency by ensuring that the vehicle is equipped with roadside emergency supplies. Consider carrying items such as the following, and know how to use them properly:

- Flashlight
- Reflective safety vest
- Light sticks
- Fire extinguisher
- Tire inflator or sealant
- Reflective triangles or flares

9.0 SAFE DRIVING TECHNIQUES FOR 4-WHEEL DRIVING

9.1 Driving In Heavy Vegetation

- Check road conditions before proceeding if the ground conditions are unknown or if there is mud or water.
- Do not change transmission gears in the middle of a hazardous area. If in doubt always choose the lower gear.
- Setting the correct tire pressure when driving off-road is important. Lowering tire pressures helps in getting through. For soft tracks, 140-180 kPa or 20-26 pounds per square inch (psi) is a good tire pressure. The vehicle must be operated at a lower speed when the tires are at lower pressure. Remember to re-inflate the tires as soon as the vehicle is back on hard ground.
- Cross small ridges 'square on' and cross ditches at a slight angle.
- Turn the steering wheel from side to side to maintain traction and move forward if the vehicle begins to lose traction going uphill, along a rutted track, or in mud.

9.2 Driving On Steep Hills

- Use low second or third gear for going uphill and low first gear for going downhill.
- Use the footbrake sparingly and with caution.
- Avoid turning the vehicle sideways on a hill. If the vehicle begins to slide sideways, very slightly accelerating and steering into the slide will normally straighten the vehicle's descent.
- Allow sufficient stopping distance between vehicles.

- Do not touch the clutch or accelerator if the vehicle stalls going uphill.

9.3 Sand Driving

- Speed and flotation are the keys to success. High transmission gear ratio is best, if possible.
- Lower the tire pressure to 20 psi. When a lower tire pressure is used, the vehicle must be operated at a lower speed. Remember to re-inflate the vehicle tires as soon as the vehicle is back on hard ground.
- Drive in existing wheel tracks if they are present.
- Avoid sudden changes in direction or acceleration. Coast to a stop if possible.
- Approach dunes head on.
- Avoid braking when descending a dune. Point the front of the vehicle downhill. Do not go fast, but also do not go so slow that the wheels stop rolling, or the vehicle begins to slide sideways. A touch on the throttle will keep the wheels moving and the vehicle pointing in the right direction.
- Try to rock the vehicle backwards or forwards, building up a small stretch of hardpack sand from which the vehicle can accelerate if it gets stuck. Do not spin the wheels.
- Be sure that recovery gear is always in the vehicle in these driving conditions.
- Wash the vehicle after use.

9.4 Snow, Rain, and Ice Driving

- Carry chains and install them on the tires when required.
- Prepare the vehicle and carry safety gear.
- Travel only on roads and tracks that are open to traffic.
- Drive with low beam lights on. Do not travel when visibility is poor.
- Vehicles travelling uphill in snow and ice conditions have right of way.
- Park only where directed and as close to the bank as possible. When parking, leave the vehicle in gear. Do not use the handbrake - it could freeze in the “on” position.
- Lift the wiper blades off the wind shield when leaving the vehicle parked.
- Watch for other travelers and animals and drive slowly in areas where they may be present. In the event that an animal is encountered on a road where driving conditions are poor due to the presence of snow, ice, or rain, do not over steer to avoid hitting the animal. The act of over steering may cause the vehicle to slide or roll. Most of the time the animal will move out of the road before the vehicle reaches it.
- Consider increasing the load or weight on the rear axle of front-wheel drive vehicles to improve traction when driving in snow, ice, or rain.

9.5 Driving in Mud

- Good tires with deep tread are helpful when driving in muddy conditions.
- Low second or third gears are probably the best gears for vehicle operation.
- Move the steering wheel rapidly from side to side to improve traction.

- Keep a steady pace.
- Stay out of ruts if possible.
- Rock the vehicle backwards or forwards by alternating between first and reverse if it becomes stuck.

9.6 Driving in Fog/Limited Visibility

- Drive with low beam lights on. Do not travel when visibility is poor.
- Drive slowly and carefully.
- Pull over to a safe location until weather improves if the vehicles in front or behind cannot be seen.

10.0 RELATED GOLDER DOCUMENTS

- Golder Motor Vehicle Policy
- HSE 200.023 SWP Cellular Telephone
- HSE 200.028 SWP All-Terrain Vehicles
- HSE 200.042 SWP Aerial Lifts
- HSE 200.043 SWP Snowmobile Safety
- Golder Associates Inc. DOT Driver and Vehicle Program

Approved by	Jane Mills	Issue Date	August 31, 2012
Revision by	Jane Mills	Revision Date	None

1.0 SCOPE

This Standard Work Practice (SWP) applies to all Golder Associates Inc. and Golder Construction Services (Golder) staff working in areas where the presence of cadmium is known or suspected to exist, including sampling activities, abatement or remediation activities, site restoration, cleanup activities and similar situations.

2.0 DEFINITION

Cadmium (Chemical Services Registry Number 7740-43-9) is a soft, blue-white malleable, lustrous metal or a grayish-white powder that is insoluble in water and reacts readily with dilute nitric acid. A primary use for cadmium metal is as an anticorrosive, electroplated onto steel. Cadmium may serve as an electrode component in alkaline batteries and may be used in alloys, silver solders, and welding.

3.0 KEY HAZARDS

Golder provides respiratory protection, Personal Protective Equipment (PPE) and medical monitoring for all employees who work with cadmium, at no cost to the employee, in accordance with regulatory requirements. Typical projects that Golder may undertake where there is a potential for employee exposure to cadmium include building demolition sites, Brownfield redevelopments, industrial facilities, landfills, mining operations, chemical processing, etc. Health effects of cadmium include:

- **Acute** — Metal fume fever may result from acute exposure with flu-like symptoms of weakness, fever, headache, chills, sweating and muscular pain. Acute pulmonary edema usually develops within 24 hours and reaches a maximum by three days. If death from asphyxia does not occur, symptoms may resolve within a week.
- **Chronic** — The most serious consequence of chronic cadmium poisoning is cancer (lung and prostate). The first observed chronic effect is generally kidney damage, manifested by excretion of excessive (low molecular weight) protein in the urine. Cadmium also is believed to cause pulmonary emphysema and bone disease (osteomalcia and osteoporosis). The latter has been observed in Japan ("itai-itai" disease) where residents were exposed to cadmium in rice crops irrigated with cadmium-contaminated water. Cadmium may also cause anemia, teeth discoloration (Cd forms CdS) and loss of smell (anosmia).

Because of these risks, the Occupational Safety and Health Administration (OSHA) has developed regulations to protect workers from exposure (29 Code of Federal Regulations (CFR) 1910.1027 and 29 CFR 1926.1127). The Permissible Exposure Limit (PEL) is 5 ug/m^3 averaged over an 8 hour period. The action level is 2.5 ug/m^3 and minimum actions under the cadmium standard are required if this concentration is exceeded as described below.

4.0 TRAINING

All Golder employees whose work requires them to encounter or potentially encounter cadmium exposures above the action level in the workplace will be included in a Cadmium Exposure Program. Training is a critical part of Golder's cadmium program. Initial training will be conducted prior to the employee beginning any cadmium-related work and will be pertinent to the planned work in accordance with 29 CFR 1910.1027(m) (4), 1910.1027 Appendices A and B and 1910.134. Training will present specific hazards associated with their work environment, protective measures which can be taken, the danger of cadmium to their bodies (including their reproductive systems), and their rights under the OSHA cadmium standard. Refresher training will be provided as needed as conditions change, or at least on an annual basis for employees covered by OSHA or State regulations. Records of training will be maintained along with employee health and safety training records in their file. The record will include the name of the employee, the signature of the trainer and the date of the training.

5.0 MEDICAL MONITORING

Golder technical employees participate in the company's medical monitoring program. The medical monitoring program consists of regular, periodic physical examinations including respiratory testing in accordance with regulatory requirements. All new employees complete a pre-employment (prior to beginning employment with Golder) physical examination (at no cost to the prospective employee). Employees who have exposure or potential exposure to cadmium above the airborne Action Level (2.5 ug/m^3) for 30 days or more a year will be included in the cadmium program medical monitoring program in conformance with 29 CFR 1910.1027(l)(1)(i) (a). Biological monitoring that includes the following tests:

- Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr).
- Beta-2 microglobulin in urine (B(2)-M), standardized to g/Cr, with pH specified, as described in Appendix F.
- Cadmium in blood (CdB), standardized to liters of whole blood (lwb).

If the results of the initial biological monitoring tests show the employee's CdU level to be at or below 3 ug/g Cr, B(2)-M level to be at or below 300 ug/g Cr, and CdB level to be at or below 5 ug/lwb, then employees will be subject to annual biological monitoring. If exceedences are noted, the project situations impacting the employee will be studied and additional engineering controls implemented. Additional biological monitoring will be completed in accordance with 29 CFR 1910.1027 (l) (3) (i), including medical removal as directed by a physician.

Medical monitoring results are provided to the employee after completion of the physical examination and evaluation of the data by Golder's occupational medical physician or other licensed physician. Records

are retained by Golder for the period of time in accordance with the provisions of 29 CFR 1910.1027 and 1910.1020 (d) (1) (i).

6.0 EXPOSURE MONITORING

Air monitoring for cadmium will be conducted to determine if employees are exposed to cadmium at levels in excess of the regulatory action level at sites where cadmium is known or suspected to be present. Exposure monitoring will be conducted within employee breathing zones for work conducted within areas where cadmium is known or suspected to be present. Exposure monitoring will include the collection of full shift (at least 7 hours) personal samples representative of employees' regular, daily exposure to cadmium. Monitoring frequency will be in accordance with the provisions of 29 CFR 1910.1027(d) (1) (iii). Results of exposure monitoring will be reported in writing to the employee within 15 days of receipt of results and maintained with the employee health and safety records in accordance with applicable regulatory standards including 29 CFR 1910.1027 and 1910 (d) (1) (ii). Corrective actions as required will be instituted through controls in the following section of this document.

7.0 CONTROL MEASURES AND PPE

Where reasonably practicable, Golder will reduce the workers exposure to cadmium through the use of engineering, and administrative controls. Each project site will be evaluated for best application of engineering and administrative controls. Should these controls not be applicable, PPE will be used to protect the worker.

- Site specific Health, Safety and Environment Plan (HASEP) is required at all Golder work sites. At sites where there is known or potential cadmium exposure risk above the Action Level, the HASEP will contain detailed information regarding respiratory protection, PPE, worksite housekeeping, hygiene facilities, as well as emergency action plans, etc. Lunch rooms, shower and changing areas will be specifically addressed as necessary in the HASEP. The plan will provide a site specific compliance program to reduce exposures to or below regulatory limits. This plan will address respirator and PPE requirements. In conformance with Golder policy, respiratory protection will be required when airborne cadmium concentrations reach ½ the PEL as described in the Key Hazards section in this document. If desired by employees and also provides sufficient protection, a powered air-purifying respirator will be provided.
- In areas where the potential for exposure to cadmium exceeds the PEL, warning signs will be posted within and around the perimeter of the area. The sign shall comply with 29 CFR 1910.1027(m)(2)(ii) and will include the following information:

DANGER
CADMIUM
CANCER HAZARD
CAN CAUSE LUNG AND KIDNEY

DISEASE

AUTHORIZED PERSONNEL ONLY

RESPIRATORS REQUIRED IN THIS AREA

- Employees shall complete a hazard assessment prior to starting work in an area to make sure all hazards are being accounted for, and the appropriate PPE is being utilized properly. Employees shall comply with all PPE manufacturer's guidelines, and government standards regarding personal protection.
- In work areas where the exposure to cadmium cannot be controlled below the PEL by other means, respiratory protection will be required and will be provided by Golder at no cost to the employee. Only National Institute for Occupational Safety and Health (NIOSH) approved respirators will be used by Golder personnel. Respirators selected will comply with the requirements set forth in 1910.134 (d) (3) (i) (A) and 42 CFR part 84.
- The need for additional PPE (hard hat, gloves, coveralls, vented goggles, footwear, etc.) should be determined during the hazard assessment and made available before beginning the work begins. Golder will provide this PPE at no cost to the employee. All PPE will be issued to employees in a clean, dry serviceable condition. Contaminated work clothing and PPE must be removed in change rooms at the jobsite and not worn home. Contaminated clothing & PPE which is to be cleaned, laundered or disposed of must be placed in closed containers in the change room.
- In the event that planned PPE will not provide sufficient exposure protection, the site safety contact will consult with the HSC to develop an alternative approach to protect workers.
- PPE will be inspected prior to the start of work each day to make sure proper maintenance is being completed, and if the PPE is not up to standard that it is being replaced. PPE necessary for conducting cadmium-related work will be provided by Golder at no cost to the employee.
- Respirators will be provided by Golder at no cost to employees to make sure they are used in the following circumstances: work practice controls, work operations, exposure reduction, and for emergency use.
- At sites where exposure to cadmium is likely, change rooms, showers, and filtered air lunchrooms will be made available to workers exposed to cadmium above the PEL. Food, beverages, and tobacco use will not be permitted within the exclusion zones. Only in filtered air lunchrooms will food and beverage be permitted.
- During maintenance of ventilation systems and/or changing of filters, the employer will develop a written plan to minimize employee exposure. This plan shall include work practice controls, work operations, and PPE.

8.0 EVALUATING PROGRAM EFFECTIVENESS

Golder's cadmium exposure program will be periodically evaluated (at least annually) for program effectiveness and compliance with recent regulatory updates and interpretations. Employee acceptance of this program is integral to the program's success. Employee comments will be solicited regarding the

program and the program amended, as needed. According to 29 CFR 1910.1027 (f)(2), the program will be provided for examination and copying upon request of affected employees, their representatives, the Assistant Secretary and the Director.

9.0 APPLICABLE REGULATORY REFERENCES

- American Conference of Governmental Industrial Hygienists (ACGIH), 2009, Threshold Limit Value (TLV) and Biological Exposure Indices (BEI), Threshold Limit Values for Chemical Substances and Physical Agents, Biological Exposure Indices" published by the ACGIH, 2009.
- Bollinger, N., 2004, National Institute for Occupational Safety and Health (NIOSH) Respirator Selection Logic, National Institute for Occupational Safety and Health, Cincinnati, Ohio, October 2004, Department of Health and Human Services (DHHS), NIOSH Publication No. 2005-100.
- 29 CFR 1910.1027 “Cadmium”.
- 29 CFR 1926.1127 “Cadmium”.
- 29 CFR 1910.134 “Respiratory Protection”.
- 29 CFR 1926.21 “Safety Training and Education”.
- 42 CFR 84 “Approval of Respiratory Protective Devices”.

1.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.013 SWP Respiratory Protection.
- GAI HSE 200.035 SWP Hot Work.

Approved by	Jane Mills	Issue Date	August 31, 2012
Revision by	Jane Mills	Revision Date	None

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) staff that work on projects that include drilling activities.

2.0 DRILLING

Drilling techniques include auger, rotary, percussion, and sonic which all have high-speed rotating and moving components which require caution to avoid injury when working.

Drilling can be safely undertaken in all types of terrain and in all types of conditions, if proper precautions are taken. Because of the variety of situations staff may experience, it is important to recognize and be aware of potential hazards associated with this operation.

3.0 KEY HAZARDS

- Impact by moving equipment.
- Encountering subsurface utilities.
- Mast contact with overhead wires.
- Traversing uneven ground to drill, document and/or sample.
- Clothing, fingers or other body parts caught in high speed and high torque rotating equipment.
- Noise generated by the equipment or surroundings.
- Dust generated by equipment.

4.0 PRECAUTIONS

4.1 Before Drilling:

- Inform staff of the emergency shut-off switch on the rig and have the driller test it daily.
- Get as much site-specific information as possible concerning ground conditions and surface obstructions. Ask the Project Manager and, if possible, the Client or Client Contact.
- Use available soils information (i.e., previous reports, US Geological Survey Surficial Geology Maps, colleagues who have had experience in the area) to ascertain potential subsurface conditions.
- Each drilling location should be inspected by the field team leader or site safety officer, and subcontractor supervisor and approved as safe for drilling. Consider access requirements, and look for evidence of underground services (i.e., buried utility lines, wire, conduits, tanks, service boxes, plugs, exposed pipe, trenches, etc.), and locate the boreholes accordingly.

- Always utilize state, local, or 811 utility location services to get clearance to proceed at each drilling location. Plan at least 48 hours in advance prior to scheduled work, see Golder's Underground Utilities SWP.
- Look for surface and overhead features that may represent a hazard. Overhead power lines are a major concern and must be avoided or de-energized. Even without direct contact, electricity can arc from the power lines to another object.
- Do not pile drill spoil such that it could endanger workers.
- Drill rigs should not be operated within 12 feet of lines less than 132 KV; within 20 feet of lines 132 to 330 KV; or within 26 feet of lines greater than 330 KV. See Golder's Overhead Hazards SWP.
- Drill rig should not be moved from one location to the next with the mast raised.
- Drill rig equipment should be safety inspected by the subcontractor on a daily basis dependent on specific use, field conditions, and manufacturer's recommendations.

4.2 During Drilling

- Identify a safe viewing area where you can observe the drilling operations, but not so close that you are either in danger of being struck by the equipment swinging from wirelines or winch cables.
- Always make sure you have a route of escape, should things go wrong. Be aware of wind direction and consider escaping upwind if subsurface contaminants are involved.
- Make sure the drill crew knows where you are **at all times**.
- Approach the drill rig during times when it is safest to do so. If necessary, signal the operator first and make sure the equipment is stopped before you approach.
- Avoid the temptation to act as the driller's helper. Do not handle heavy rods or equipment. Remember that the drilling contractor is responsible for providing the necessary drilling equipment and personnel who are trained in its safe use. This also includes traffic control needs, unless otherwise specifically indicated by GAI project manager (i.e. for road drilling where GAI provided the necessary traffic control.)
- Know where everyone is at all times.
- Never use gasoline or any other combustible solvent as a cleaning agent. It is a fire and explosion hazard.
- Use a personal fall arrest system while working at any height above 5 feet on the mast or on top of the rig.
- Do not perform maintenance while the rig is running.
- Do not remove any blocking or jacks from under rig while the rig is drilling.
- Stand clear of cables as much as possible while pulling pipe or while the rig is under a heavy strain.
- When racking drill rods for rotary drilling/sampling, the total length of rods racked shall not be more than 1.5 times the height of the mast.
- Do not wear loose clothing or jewelry around moving machinery.
- Be on guard for pinch and shear hazards for fingers and toes--especially around the drill string.

- Practice good housekeeping--keep excess spoil material and unnecessary equipment well out of the way.
- When jumping batteries during cold weather starting, be sure of terminal connections. Connect the positive terminal first, then the negative terminal. Batteries can explode, spraying acid to eyes and skin; wear protective goggles and clothing.
- Communicate effectively; if using hand signals, make sure everyone knows what they are.
- Know where fire extinguisher(s) are and how to use them. Check the charge condition before the start of project activities, and periodically thereafter.
- All hoses carrying high pressure air or fluids should have safety chains or cables at connectors.
- Lighting on the site or rig shall be properly installed and sufficient in quantity to provide adequate illumination for night work. All receptacles shall be protected with a ground fault circuit interrupter (GFCI).
- Weight indicators should be standard equipment.
- All hooks shall have safety latches and be checked between borings.
- Do not ride on hook ropes or other traveling lines on rig.
- Keep walkways clear.
- Using a properly calibrated real-time air quality instrumentation, monitor for suspected airborne gas hazards (combustible and/or toxic as applicable).
- Ear protection must be worn by employees working in close proximity to equipment that generates noise (85 dB(A) or greater).
- Wear required respiratory protective equipment when hazards from toxic chemicals are suspected (See Respiratory Protection).
- Observe proper lifting techniques.
- Fuel tanks should be properly installed according to local fire codes with appropriate secondary contaminant.
- Wastewater and drilling fluids must be properly diverted or contained.
- Containerize drilling spoils and fluids suspected to be contaminated as required by environmental regulatory requirements.
- Protect the public by use of proper barricades, ramps over pipes, warning signs and guard rails.
- Use caution during welding activities, remain at a safe distance and do not look directly at the welding arc. The drillers will need to wear welding goggles and gloves; properly ground arc-welding equipment; properly vent PVC solvent glue vapors from installed well casings before cutting or welding the casings.
- Have a first-aid safety kit handy.

4.3 After Drilling

- Properly decontaminate all drilling equipment, as required, before leaving. This includes drilling tools, pipe, pumping equipment, and mud-pits, in addition to the drill rig and drill string.
- Never leave a borehole open for an extended period. Always backfill and compact the near surface soil after you have completed sampling, any instrumentation installation(s) and documentation activities. Open drill holes represent a potential hazard to yourself and others.
- Clean up waste materials from drilling operations, such as discarded containers, hoses, damaged tools or blocking, and wasted pipe and casing, etc. Dispose of properly.

5.0 MINIMUM PERSONAL PROTECTIVE EQUIPMENT REQUIRED

- Hard Hat
- Steel Toe Safety Boots
- High Visibility Vest
- Hearing Protection
- Safety Glasses
- Close fitting clothing
- Dust Mask (Respirator if required)
- Gloves

6.0 TRAINING

- OSHA 10 hour Construction Safety course
- First Aid and CPR courses

7.0 APPLICABLE REGULATORY REFERENCES

The following are the major OSHA standards impacted by this work (based on drilling location and type): 29 CFR 1926.

- .21 “Safety Training”
- .23 “First Aid”.
- .52 “Noise Exposure”.
- .59 “Hazard Communication”.
- .96 “Foot Protection”.
- .100 “Head Protection”.
- .101 “Hearing Protection”.
- .102 “Eye and Face Protection”.
- .103 “Respiratory Protection”.
- .351 “Arc Welding”.

- .403 “General Electrical”.
- .404 “Wiring”.
- .500-503 “Fall Protection”.
- .601 “Motor Vehicles”.
- Subpart Z – “Toxic and Hazardous Substances”.

8.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.017 SWP Underground Utilities.
- GAI HSE 200.011 SWP Overhead Hazards.

Approved by	Jane Mills	Issue Date	August 31, 2012
Revision by	Brian Tuccillo	Revision Date	October, 10 2013

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) staff that work in the field in locations where there is potential for cold stress conditions to develop.

2.0 COLD ENVIRONMENT – COLD STRESS

Employees who are exposed to extreme cold or work in cold environments may be at risk of cold stress. Extreme cold weather is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter, outdoor workers, and those who work in an area that is poorly insulated or without heat. What constitutes cold stress and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered factors for "cold stress." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can more rapidly leave your body. These weather-related conditions may lead to serious health problems.

In a cold environment, body heat must be conserved to maintain the core temperature at normal levels and to maintain an adequate blood flow to the brain and extremities. Feelings of cold and discomfort should not be ignored, since these may be early warning signals. The effects of cold are such that problems can occur before the employee is aware of them, and furthermore, over-exposure to cold may affect judgment.

3.0 MANAGING THE CAUSES OF COLD STRESS

Work environments that may expose employees to cold stress conditions must be carefully evaluated as part of development of the site-specific health safety and environment plan (HASEP). Project sites with potential for the development of cold stress include:

- Work in winter months in areas with rain or snow weather conditions and/or
- Work in high altitude locations and/or
- Work in or over water

The following controls may be appropriate to protect employees from cold stress:

- Schedule maintenance and repair work in cold areas for warmer months.
- Schedule cold work for the warmer part of the day.

- Reduce the physical demands of employees.
- Use relief employees or assign extra employees for long duration, demanding jobs.
- Provide warm liquids to employees.
- Provide warm areas for use during break periods.
- Monitor employees who are at risk of cold stress.

Prior to work in an environment where cold stress is an identified hazard (and annually thereafter) provide cold stress training that includes information about:

- Employee risk
- Prevention
- Symptoms
- The importance of monitoring yourself and coworkers for symptoms
- Treatment
- Personal protective equipment

4.0 TYPES OF COLD STRESS

4.1 Frostbite

Frostbite is a condition in which the skin and underlying tissues freeze. Usually affects fingers, hands, toes, feet, ears, cheeks and face – especially the nose. The following specific steps should be taken [adapted from the Centers for Disease Control and Prevention National Institute for Occupational Safety and Health (NIOSH) workplace safety and health topics].

4.1.1 Symptoms

Symptoms of frostbite include:

- Reduced blood flow to hands and feet (fingers or toes can freeze)
- Numbness
- Tingling or stinging
- Aching
- Bluish or pail, waxy skin

4.1.2 First Aid

Employees suffering from frostbite should:

- Get into a warm location as soon as possible.
- Unless absolutely necessary, do not walk on frostbitten feet or toes-this increases the damage.

- Immerse the affected area in warm-not hot-water (the temperature should be comfortable to the touch for unaffected parts of the body).
- Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers. Rewarming should not be attempted if there is a chance of refreezing; the damage is significantly worse on refreeze and thaw.
- Do not rub or massage the frostbitten area; doing so may cause more damage.
- Do not use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned.

4.1.3 Temperatures 40 °F or Below

If ambient temperatures are 40 °F or below, site training should include prevention of cold injury, cold-injury symptoms, and cold-injury first-aid.

- If ambient temperatures are 40 °F or below, and there is a potential for employees to become significantly wet (splashed or soaked), the Site Safety Officer or Field Team Leader should perform at least one of the following controls:
  - Obtain a supply of dry, warm clothing that can be made available immediately.
  - Check to see if the employees are wearing the clothing appropriate for water contact (e.g., immersion-survival suits, neoprene chest waders, wet suit,).
  - Secure an area that will allow employees to take heated break(s) that can be made available immediately.
- A heated break area should be provided if ambient temperatures are below 32 °F.
- At a minimum, breaks should be taken in a warm area every 120 minutes if ambient temperatures are below 32 °F.
- Employees should be allowed to take unscheduled breaks, if needed, in a warm area.

4.2 Hypothermia

When exposed to cold temperatures, the human body begins to lose heat faster than it can be produced. Prolonged exposure to cold will eventually use up the body's stored energy. The result is hypothermia, or abnormally low body temperature. A body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and will not be able to do anything about it.

When a person has hypothermia, simply applying dry clothes or blankets alone will not help raise a person’s core body temperature. In these situations, an external heat source is necessary. Do not raise a person’s core body temperature rapidly.

4.2.1 Symptoms

Signs and symptoms of hypothermia include:

- Early Symptoms
  - Shivering
  - Fatigue
  - Loss of coordination
  - Confusion and disorientation
- Late Symptoms
  - No shivering
  - Blue skin
  - Dilated pupils
  - Slowed pulse and breathing
  - Loss of consciousness

4.2.2 First Aid

Take the following steps to treat an employee with hypothermia:

- Alert the supervisor and request medical assistance.
- Move the victim into a warm room or shelter.
- Remove their wet clothing.
- Warm the center of their body first-chest, neck, head, and groin-using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets.
- Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not give beverages to an unconscious person.
- After the body temperature has increased, keep the victim dry and wrapped in a warm blanket, including the head and neck.
- If victim has no pulse, begin cardiopulmonary resuscitation (CPR).

4.2.3 What should be done (land):

- Move the person to a warm, dry area. Don't leave the person alone. Remove any wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if they are alert. Avoid drinks with caffeine (coffee, tea or hot chocolate) or alcohol.
- Have the person move their arms and legs to create muscle heat. If they are unable to do this, place warm bottles or hot packs in the arm pits, groin, neck and head areas. Do not warm a person too quickly (shower, warm baths, massaging limbs, etc.), the rapid warming will dilate blood vessels causing a rapid drop in blood pressure, which may induce cardiac arrest.

4.2.4 What should be done (water):

- DO NOT remove any clothing. Button, buckle, zip and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. DO NOT attempt to swim unless a floating object ban be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

Remove any wet or tight clothing that may cut off blood flow to the affected area.

4.3 Trench foot

Trench foot, also known as immersion foot, is an injury of the feet resulting from prolonged exposure to wet and cold conditions. Trench foot can occur at temperatures as high as 60 degrees F if the feet are constantly wet. Injury occurs because wet feet lose heat 25-times faster than dry feet. Therefore, to prevent heat loss, the body constricts blood vessels to shut down circulation in the feet. Skin tissue begins to die because of lack of oxygen, nutrients, and the buildup of toxic products.

4.3.1 Symptoms

Symptoms of trench foot include:

- Reddening of the skin
- Numbness
- Leg cramps
- Swelling
- Tingling pain
- Blisters or ulcers
- Bleeding under the skin
- Gangrene (the foot may turn dark purple, blue, or gray)

4.3.2 First Aid

Employees suffering from trench foot should:

- Remove shoes/boots and wet socks.
- Dry their feet.
- Avoid walking on feet, as this may cause tissue damage.

5.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Employees should avoid exposure to extremely cold temperatures when possible. When cold environments or temperatures cannot be avoided, employees should follow these recommendations to protect themselves from cold stress:

- Wear appropriate clothing.
  - Dress appropriately for expected weather conditions. Dress in a minimum of three layers (a skin layer to absorb moisture and keep the skin dry, an insulating layer, and an outer protective layer), wear a hat and gloves, in addition to underwear that will keep water away from the skin.
  - Wear several layers of loose clothing. Layering provides better insulation.
  - Tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities.
  - When choosing clothing, be aware that some clothing may restrict movement resulting in a hazardous situation.
- Make sure to protect the ears, face, hands and feet in extremely cold weather.
  - Boots should be waterproof and insulated.
  - Wear a hat; it will keep your whole body warmer. (Hats reduce the amount of body heat that escapes from your head.)
- Move into warm locations during work breaks; limit the amount of time outside on extremely cold days.
- Carry cold weather gear, such as extra socks, gloves, hats, jacket, blankets, a change of clothes and a thermos of hot liquid.
- Include a thermometer and chemical hot packs in your first aid kit.
- Avoid touching cold metal surfaces with bare skin.

6.0 OTHER CONTROL MEASURES FOR COLD EXPOSURE

6.1 Use the buddy system

Employees must not work alone on any project location where there is potential for cold stress. Monitor your physical condition and that of your coworkers. Recognize the environment and workplace conditions that lead to potential cold-induced illnesses and injuries. Through training and on-going conversations, learn the signs and symptoms of cold induced illnesses/injuries and what to do to help your coworkers.

6.2 Work/Rest Regimen

When working in cold environments it is best to keep active. Take frequent short breaks in warm dry shelters to allow the body to warm up. When resting in a warm location, remove or at least open the outer

layer of clothing to warm the body core. Make every effort to perform work during the warmest part of the day.

6.3 Consumption of Food and Drink

When working in or around a cold environment, eat warm, high calorie foods like hot pasta dishes. Avoid vasodilators, which allow the body to lose heat faster, which can accelerate hypothermia. These include alcohol and drugs. Avoid vasoconstrictors, including tobacco products, which constrict blood vessels and can accelerate the onset of frostbite.

7.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.027 SWP Fatigue Management.
- GAI HSE 200.031 SWP Cold Water Operations.

Approved by	Jane Mills	Issue Date	August 2012
Revision by	Jane Mills	Revision Date	August 2013

1.0 SCOPE

This Standard Work Procedure (SWP) applies to Golder Associates Inc. (Golder) staff working on a project where soil sampling is conducted.

2.0 DEFINITIONS

Photo ionizing air monitoring instrument (PID) — A direct reading air monitoring instrument equipped with an ultraviolet light source that ionizes organic vapors with ionization potentials less than that of the lamp.

Flame ionizing air monitoring instrument (FID) — A direct reading air monitoring instrument equipped with a hydrogen flame that ionizes (through combustion) all combustible organic vapors.

3.0 KEY POTENTIAL HAZARDS

- Lifting heavy objects
- Ergonomic stress and strain
- Chemical exposure via inhalation, skin contact or ingestion
- Compressed gas hazards (see Compressed Gas Cylinders)

4.0 PRECAUTIONS

There are many general precautions associated with soil sampling.

- Prior to the project start, determine if the soil to be sampled is expected to contain a constituent in a concentration that may present a health or safety risk to our employees.
- Prior to breaking any ground surface to collect a soil sample, make sure the appropriate underground utilities clearance has been conducted.
- If sampling soil by hand, using a shovel, a crusher/rock bar, or other tool, pay close attention to the potential for awkward body position and the development of muscle fatigue. Consider stretching and healthy movement prior to the start of work.
- If soil sampling from the ground surface, pay close attention to awkward body position and the potential for back strain or injury. Establish a work area that minimizes as much bending as possible.
- Repetitive motion can be part of soil sampling. Be alert to repetitive motion activities and introduce rest breaks, or alternate tasks to minimize adverse impact to hands, arms and legs.
- Do not leave open boreholes unattended.
- Soil samples are often collected in 5-gallon buckets for laboratory testing. Samples in glass jars are often gathered in coolers prior to transfer to the laboratory. Buckets and coolers are heavy, and you must be sure that you are fit to lift these heavy objects prior to any lifting activity. If the objects are too heavy, remove some of the contents to lighten the load, or have a stronger employee lift the object.

- Pending the laboratory analysis, soil jars may be preserved with caustic chemicals. Exercise caution when handling these jars and where the appropriate protective gloves (the type of glove may vary based on type of preservative).
- Soil sampling is often conducted around heavy equipment such as drill rigs or excavators. Please refer to SWP 18 titled Working Around Heavy Equipment for further direction.
- Prior to the project start, acquire the appropriate training on any air monitoring instruments.
- If compressed gas will be used for calibration of any monitoring instruments, safely transport the cylinder to and around the site in a secure and upright position.
- Any Investigation-derived wastes produced during sampling or decontamination will be managed in accordance with best management practices and applicable environmental regulations (i.e., securely store and label the materials until disposal, inventory, inspect, utilize generator knowledge or analytical data to accurately characterize the materials for disposal)

5.0 SAMPLING CONTAMINATED SOILS

Prior to initiating work, every effort should be made to determine if the soil to be sampled is expected to contain a constituent in a concentration that may present a health or safety risk to our employees through exposure. For the purpose of this SWP, such soils will be referred to as “contaminated.”

Sampling contaminated soils often occurs at sites that are known hazardous waste sites or adjacent to such sites. Follow all local regulations in regards to working at such properties.

Avoid direct contact between contaminated soils and any skin surface or eyes.

If collecting a sample from a split-spoon sampler with an acetate liner, exercise caution as the edges of the acetate liner are extremely sharp. Wear gloves and use a tool to scoop out the sample, if possible.

When sampling contaminated soils with organic constituents, air monitoring should be performed utilizing equipment appropriate for the conditions, such as an intrinsically safe photo ionizing (PID), flame ionizing (FID) instrument, or Draeger tubes. Action levels for exposure measurements should be determined based on the anticipated contaminants present.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The level of personal protective equipment (PPE) required will be determined based on the anticipated concentration of contaminants present and the potential for exposure. Regardless of the presence or absence of contaminants, the following minimum PPE is required:

- Safety glasses – if flying objects are an anticipated hazard and/or compressed gases are used.

The following PPE may be required, depending on specific project conditions:

- Respirator with appropriate cartridges
- High visibility clothing
- Steel-toed safety boots
- Nitrile gloves (or appropriate gloves depending on the known hazards that may be present)

7.0 TRAINING

- OSHA 10-hour Construction Safety
- Emergency first aid/CPR
- Golder and/or site-specific training (including HASEP review)

8.0 RELATED GOLDER DOCUMENTS

- GAI HSE 200.001 SWP Drilling.
- GAI HSE 200.016 SWP Trenching Shoring and Excavation.
- GAI HSE 200.017 SWP Underground Utilities.
- GAI HSE 200.018 SWP Working Around Heavy Equipment.
- GAI HSE_200.026_SWP_Compressed_Gas_Cylinders

APPENDIX D

COMMUNITY PARTICIPATION PLAN

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
89 LaSalle Avenue BCP Site

89 LaSalle Ave.
Buffalo, New York

December 2013

Contents

*** * * * ***

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: **Legacy LaSalle LLC ("Applicant")**
Site Name: **89 LaSalle Ave ("Site")**
Site Address: **89 LaSalle Avenue**
Site County: **Erie**
Site Number: **C915283**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: **www.dec.ny.gov/chemical/8450.html.**

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

Project Contacts

[1] "Remedial activities", "remedial action", and "remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Appendix B identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's remedial program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list includes, at a minimum:

> chief executive officer and official(s) principally involved with relevant zoning and planning matters of each county, city, town and village in which the site is located;
> residents, owners, and occupants of the site and properties adjacent to the site;
> the public water supplier which services the area in which the site is located;
> any person who has requested to be placed on the site contact list;
> the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
> document repositories.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with NYSDEC to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the brownfield site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the site's remedial process.

> Notices and fact sheets help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.
>
> Public forums, comment periods and contact with project managers provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation.

The public is encouraged to contact project staff at any time during the site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 6 or in the nature and scope of remedial activities. Modifications may include additions to the brownfield site contact list and changes in planned citizen participation activities.

3. Site Information

Site Description

Location –
Setting – Commercial/Residential
Site size – 10.6 acres
Adjacent properties –

- North – Commercial properties and residences on the south side of LaSalle Avenue immediately border the site.
- East – Residential properties are located to the east of Cordova Ave. which forms the eastern birder of the site the vacant parcel.
- South –McCarthy Park and some residences on William Price Parkway border the property to the south.
- West – Residential properties on William Price Parkway and a commercial property, border the Site to the west.

Site History

Prior and current use(s) – The site consists of three parcels and two of the parcels, 67 and 89 LaSalle have been utilized in the recent past as a lumber yard and a radio station, respectively. The parcels are currently vacant, although the buildings and structures associated with these businesses remain. The southern portion of the 89 LaSalle Ave parcel which is landlocked has been essentially vacant, with the exception of radio transmitting towers and equipment, since the 1950s. The 71 Cordova parcel is owned by the City of Buffalo and the southeast portion of this parcel contains tennis courts and parking areas associated with McCarthy Park. The remainder of the city owned parcel is vacant and undeveloped.

Known or suspected contaminants – The site was found to have low levels of heavy metals and semi-volatile organic compounds (SVOCs) contamination in the subsurface soils from previous limited soil investigations conducted in 2013.

Environmental History

Based on historical documentation obtained during the performance of a Phase I Environmental Site Assessment in September 2013, it was confirmed that significant portions of the 89 LaSalle Avenue and 71 Cordova Avenue parcels had been part of the Buffalo Crushed Stone quarrying operation that operated in the early 20th century. Records further indicate that in the 1940s and 1950s, the former quarry pits were utilized for landfilling of demolition and similar debris by the City of Buffalo.

In March/April 2013 Legacy LaSalle performed a limited Phase II Environmental Site Assessment that encompassed the 89 LaSalle Ave. and 71 Cordova Ave parcels.. The results of the test pit soil sampling investigation indicated that concentrations of certain SVOC, metals and pesticide compounds were detected at concentrations exceeding the 6 NYCRR Part 375 soil cleanup objectives for residential or restricted uses at several locations on the properties. No definitive pattern of impact was found and concentrations in excess of SCOs in soil/fill were found to be widespread across the six sample locations.

A supplemental Phase II investigation of the 67 LaSalle parcel was conducted in August 2013. This investigation consisted of collecting two composite soil samples from the sidewalls and bottom of shallow test pits located on the parcel. Each test pit was excavated to bedrock refusal approximately 3 to 3.5 feet below grade surface.

In one of the test pits (TP67-1), a total of seven (7) semi-volatile organic compounds (SVOCs) and one metal were detected at concentrations exceeding the 6NYCRR Part 375 Restricted Residential Soil Cleanup Objectives (SCOs). No other compounds analyzed were detected above Part 375 SCOs.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Applicant has applied for acceptance into New York's Brownfield Cleanup Program as a Participant. This means that the Applicant was the owner of the site at the time of the disposal or discharges of contaminants or was otherwise liable for the disposal or discharge of the contaminants. The Participant must fully characterize the nature and extent of contamination onsite, as well as the nature and extent of contamination that has migrated from the site. The Participant also must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted industrial purposes related directly to expansion of its current manufacturing operations.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant will set forth the responsibilities of each party in conducting a remedial program at the site.

Investigation

The remedial investigation (RI) of the site will be performed with NYSDEC oversight. The Applicant has developed a remedial investigation work plan, which is subject to public comment as noted in Appendix D. The goals of the investigation are as follows:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;

2) Identify the source(s) of the contamination;

3) Assess the impact of the contamination on public health and/or the environment; and

4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant will prepare an RI Report after it completes the RI. This report will summarize the results of the RI and will include the Applicant's recommendation of whether remediation is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. Before the RI Report is approved, a fact sheet that describes the RI Report will be sent to the site's contact list.

NYSDEC will determine if the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the eligible site.

For more information about the TAG Program and the availability of TAGs, go online at: **www.dec.ny.gov/regulations/2590.html.**

Remedy Selection

After NYSDEC approves the RI Report, the Applicant will be able to develop a Remedial Work Plan if remediation is required. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.
The public will have the opportunity to review and comment on the draft Remedial Work Plan. The site contact list will be sent a fact sheet that describes the draft Remedial Work Plan and announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that, in order to request a public meeting, the health, economic well-being or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the site. The site contact list will receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a final engineering report that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the final engineering report.

Certificate of Completion and Site Management

Once NYSDEC approves the final engineering report, it will issue the Applicant a Certificate of Completion. This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the remedial action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the brownfield site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Remedial Work Plan.

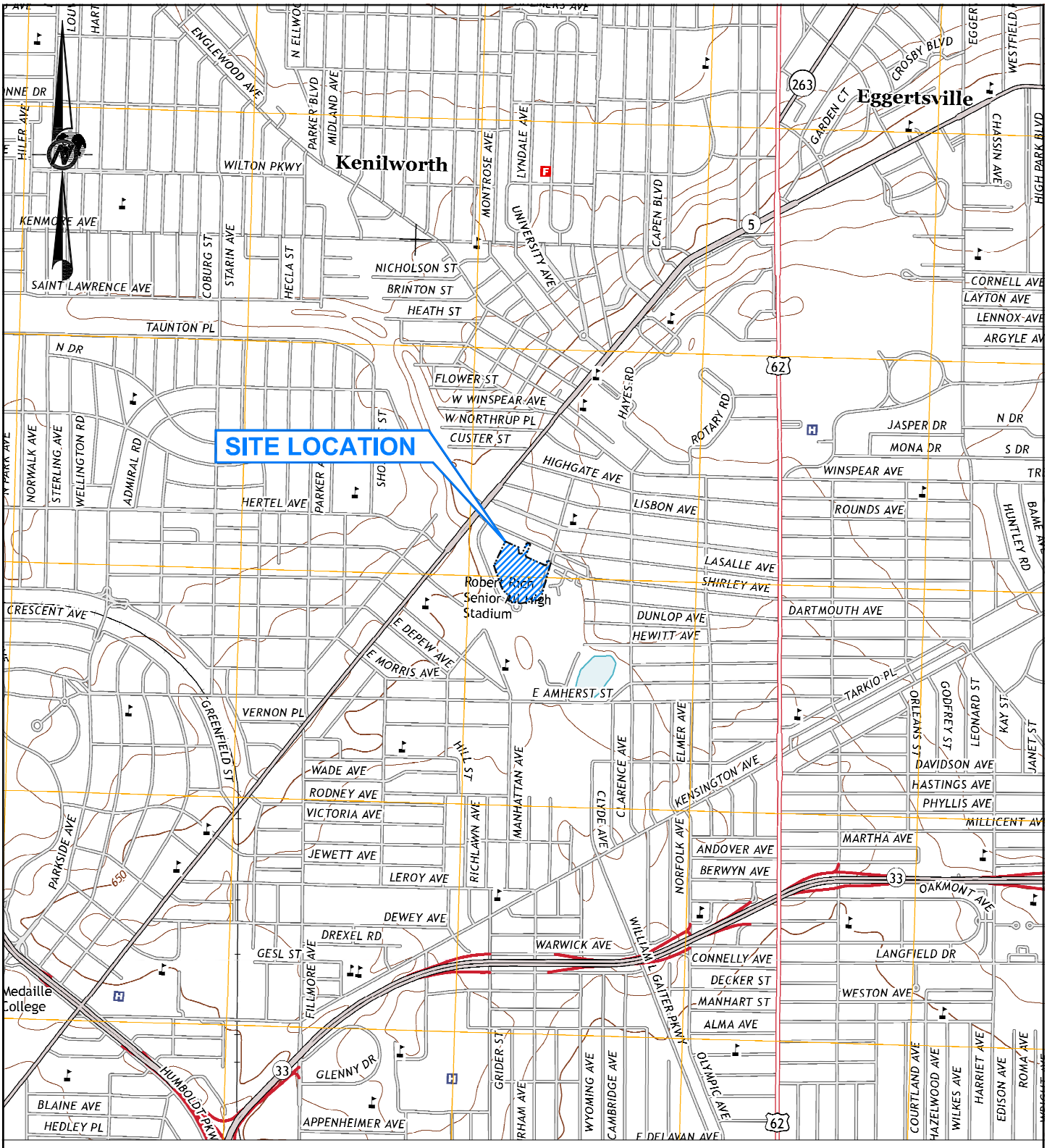
All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval of, NYSDEC.

6. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

The site is located in an area currently zoned for residential and commercial uses, and current land uses adjacent to and nearby the site are predominantly commercial/residentiall. Based on recent investigation data, the levels of known soil/fill contamination do not pose a significant threat for exposure. The site remediation will be carried out by professionals experienced in performing cleanup activities. All site work will be conducted under a site-wide Health and Safety Plan and a Community Air Monitoring Program approved by the NYSDEC and the New York State Department of Health (NYSDOH). The site remediation will be conducted over limited time duration and during normal business hours. NYSDEC anticipates excavating and transporting a small quantity of contaminated soil and importation of larger quantities of clean cover soils. Traffic is not expected to be significantly impacted. Soil excavations, if any, associated with the planned remediation will be shallow in nature and secured to reduce the risk of injury and the potential exposures.

Appendix A – Site Location Map



REFERENCE

1.) BASE FROM 7.5 MINUTE QUADRANGLE OF BUFFALO NORTHEAST, NEW YORK DATED 2013.

2000 0 2000
SCALE FEET

Golder Associates
Mt. Laurel, New Jersey

SCALE	AS SHOWN
DATE	11/07/13
DESIGN	AML
CADD	AML
CHECK	
REVIEW	

FILE No. 1300732A006
PROJECT No. 1300732 REV. 0

TITLE

APPENDIX A - SITE LOCATION MAP
89 LSALLE AVENUE BCP SITE
BUFFALO, NY

LEGACY LASALLE LLC

FIGURE A-1

Appendix B – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (DEC):

David Locey
Project Manager
NYS DEC Region 9
Division of Environmental Remediation
270 Michigan Ave.
Buffalo, NY 14203
716-851-7220

Kristen Davidson
Citizen Participation Specialist
NYS DEC Region 9
270 Michigan Ave.
Buffalo, NY 14203
716-851-7220

New York State Department of Health (DOH):

Albert DeMarco
NYS DOH
Public Health Specialist II
Bureau of Environmental Exposure
Investigation
Empire State Plaza
Corning Tower, Rm 1787
Albany, NY 12237
518-402-7860

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Buffalo & Erie County Public Library
East Delavan Branch
1187 E. Delavan Ave.
Buffalo, NY 14225
Phone: 716-892-8089
Hours: Mon/Weds–12:00 – 8:00 PM
Thurs/Fri – 10:00 AM – 6:00 PM
Sat – 9:00 AM – 5:00 PM
Tues/Sun – Closed

NYS DEC Region 9
270 Michigan Ave.
Buffalo, NY 14203
Attn: David P. Locey
Phone: 716-851-7220
Hours: 8:30 am – 4:45 pm
(Call for appointment)

Select and/or abbreviated documents will also be available on DEC's website.

Visit http://www.dec.ny.gov/chemical/37554.html and look for the Legacy LaSalle entry under the Erie County heading.

Appendix C – Brownfield Site Contact List

Mr. Martin Doster
NYSDEC Region 9
270 Michigan Avenue
Buffalo NY 14203

Ms. Megan Gollwitzer
NYSDEC Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. David P. Locey
NYSDEC Region 9
270 Michigan Avenue
Buffalo, NY 14203

Senator Timothy Kennedy
NYS Senate Dist. 63
2239 South Park Avenue
Buffalo, NY 14220

Assemblywoman Crystal Peoples-Stokes
NYS Assembly District 141
792 E. Delavan Avenue
Buffalo, NY 14215

Representative Brian Higgins
District 26, U.S. Congress
726 Exchange Street, Suite 601
Buffalo, NY 14210

Senator Charles Schumer
United States Senate
130 S. Elmwood Avenue, #660
Buffalo, NY 14202

Mr. Mark Poloncarz
Erie County Executive
95 Franklin Street
Buffalo, NY 14202

Senator Kirsten Gillibrand
United States Senate
726 Exchange Street, Suite 511
Buffalo, NY 14210

Mr. Dennis Sutton
Erie County EMC
95 Franklin Street, 10th Floor
Buffalo, NY 14202

Ms. Maria Whyte, Commissioner
Erie Co. Dept. of Env. & Planning
95 Franklin Street, 10th Floor
Buffalo, NY 14202

Legislator Betty Jean Grant, Chair
Erie County Legislature
92 Franklin Street, 4th Floor
Buffalo, NY 14202

Mr. Alfred Culliton
Erie County I.D.A.
143 Genesee Street
Buffalo, NY 14203

Mr Daniel Neaverth, Jr., Commissioner
Erie Co. Emergency Services
45 Elm Street
Buffalo, NY 14203

Mr. Robert Graber
Erie County Legislature Clerk
92 Franklin Street, 4th Floor
Buffalo, NY 14202

Ms. Gale Berstein, Commissioner
Erie Co. Health Dept.
95 Franklin Street
Buffalo, NY 14202

Buffalo Water Authority
281 Exchange Street
Buffalo, NY 14204

Mayor Byron Brown
201 City Hall
Buffalo, NY 14202

Ms. Bonnie Russell
City of Buffalo Common Council
1508 City Hall
Buffalo, NY 14202

Ms. Teena Jackson, Principal
Bennett High School
2885 Main Street
Buffalo, NY 14214

Mark Scott, News Director
WBFO 88.7/WOLN 91.3
3435 Main St.
Buffalo, NY 14214

WGRZ TV - Channel 2
ATTN: Ms. Maria Sisti
259 Delaware Avenue
Buffalo, NY 14202

WKBW News - Channel 7
ATTN: Ms. Melanie Pritchard
7 Broadcast Plaza
Buffalo, NY 14202

Buffalo News
Environmental News Desk
1 News Plaza
Buffalo, NY 14240

WBEN Radio 930 & WMJQ
ATTN: Environmental News Desk
500 Corporate Parkway
Buffalo, NY 14226

WIVB - Channel 4
ATTN: Ms. Lisa Fullone
2077 Elmwood Avenue
Buffalo, NY 14207

WNED, Environmental News Desk
ATTN: Mr. Michael Desmond
P.O. Box 1263, Horizons Plaza
Buffalo, NY 14240

Business First
ATTN: James Fink
465 Main Street
Buffalo, NY 14203-1793

Buffalo & Erie Co. Public Library
East Delevan Branch
1187 E. Delavan Ave.
Buffalo , NY 14215

Ms. Carol Ann Batt
Buffalo & Erie Co. Public Library
1 Lafayette Square
Buffalo, New York 14203

Current Resident
66 William Price Pkwy
Buffalo, NY 14214

Current Resident
72 William Price Pkwy
Buffalo, NY 14214

Current Resident
78 William Price Pkwy
Buffalo, NY 14214

Current Resident
84 William Price Pkwy
Buffalo, NY 14214

Current Resident
90 William Price Pkwy
Buffalo, NY 14214

Current Resident
96 William Price Pkwy
Buffalo, NY 14214

Current Resident
102 William Price Pkwy
Buffalo, NY 14214

Current Resident
108 William Price Pkwy
Buffalo, NY 14214

Current Resident
118 William Price Pkwy
Buffalo, NY 14214

Current Resident
126 William Price Pkwy
Buffalo, NY 14214

Current Resident
57 LaSalle Ave.
Buffalo, NY 14214

Current Resident
83 LaSalle Ave.
Buffalo, NY 14214

Current Resident
91 LaSalle Ave.
Buffalo, NY 14214

Current Resident
2 LaSalle Ave.
Buffalo, NY 14214

Current Resident
101 LaSalle Ave.
Buffalo, NY 14214

Current Resident
115 LaSalle Ave.
Buffalo, NY 14214

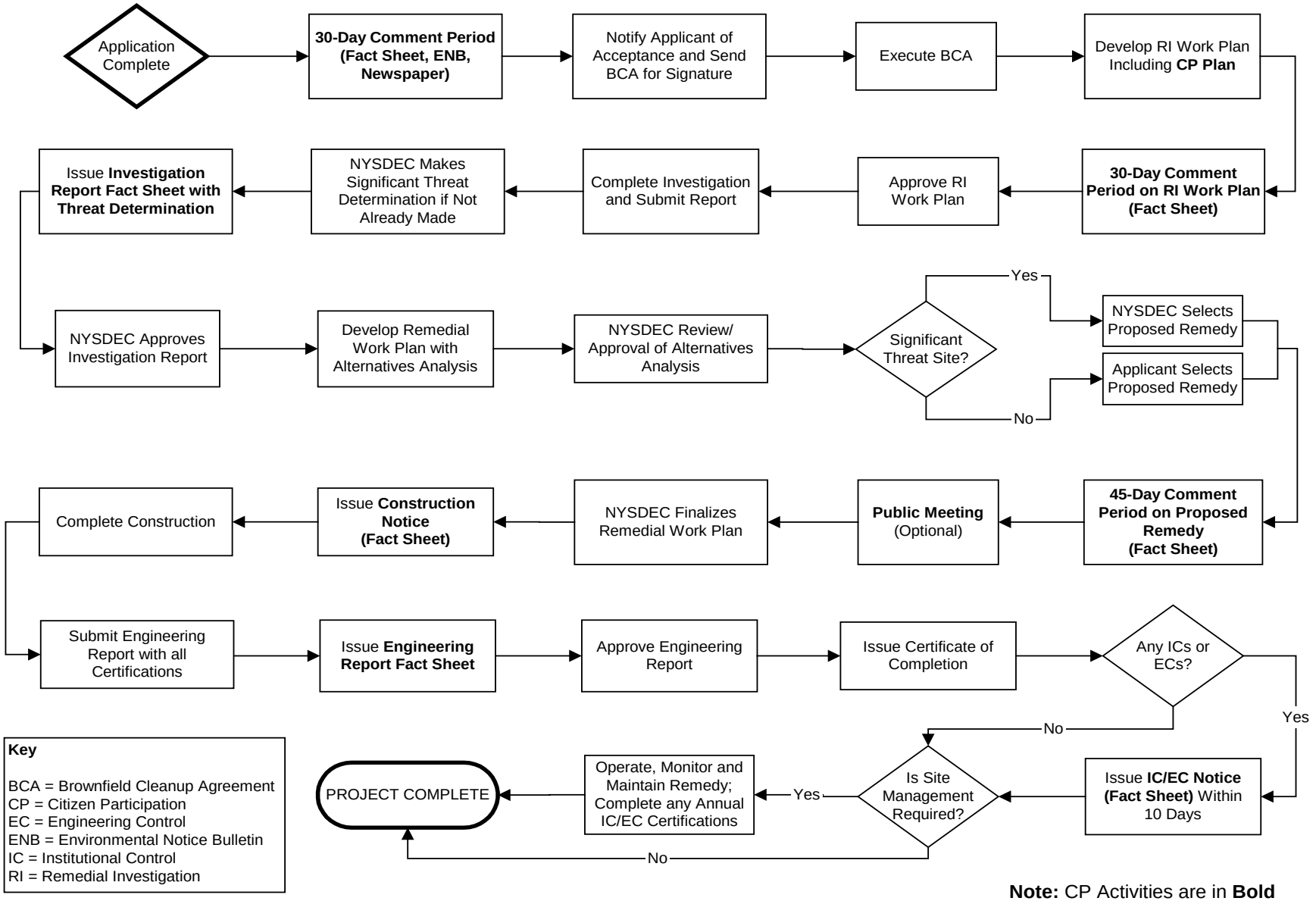
Clover Management Inc.
Camelot Court Apartments
348 Harris Hill Road
Williamsville, NY 14221

Current Owner
21 LaSalle Ave.
Buffalo, NY 14214

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories	At time of preparation of application to participate in BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare citizen participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution.
After Remedial Investigation (RI) Work Plan Received:	
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.
After RI Completion:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report.
After Remedial Work Plan (RWP) Received:	
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
After Approval of RWP:	
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction.
After Remedial Action Completed:	
• Mail fact sheet to BSCL announcing that remedial construction has been completed • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of the COC.

Appendix E – Brownfield Cleanup Program Process



Note: CP Activities are in **Bold**