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Subject: **Remedial Action Work Plan Addendum #1**
75-20 Astoria Blvd Site
Jackson Heights, Queens, New York
VCA No.: W2-0854-9906

Dear Mr. Wong,

This submittal is Addendum #1 to the New York State Department of Environmental Conservation (NYSDEC)-approved Remedial Action Work Plan (RAWP) dated April 7, 2008. This addendum has been prepared to address the mobile dense non-aqueous phase liquids (DNAPL) zone in the area of monitoring well MW-35, and summarizes the investigational activities, remedial action selection process, and the planned remedial approach.

INTRODUCTION

On December 17, 2008, during groundwater monitoring well sampling activities, mobile DNAPL was identified within monitoring wells MW-35S and MW-35D.

This mobile DNAPL finding was significant, as the existing bioremediation system was originally intended to address the relatively low levels (i.e., residual) of DNAPL that were found in the source area. The mobile DNAPL found in the area of monitoring well MW-35 is not amenable to the existing biological remedial approach.

To address this, a co-solvent flushing approach is proposed to reduce the DNAPL to residual levels (i.e., elimination of mobile DNAPL) which will then be addressed by the existing bioremediation system.

REMEDIAL INVESTIGATION

As previously stated, on December 17, 2008, during groundwater monitoring activities, mobile DNAPL was identified within wells MW-35S and MW-35D. Based on this finding, the NYSDEC was immediately notified and additional investigational activities and system modifications were undertaken.

Between January 12, 2009 and February 6, 2009 four (4) soil borings (MW-35DD, and B/MW-42 through B/MW-44) were completed to investigate the horizontal and vertical delineation of the mobile DNAPL. The borings were completed using hollow-stem auger (HSA) drilling techniques, and following completion of each boring the borehole was converted into a monitoring well. Determination of the presence of mobile DNAPL was completed primarily through visual inspection of the soil cores and through subsequent well pumping. Other indicators used included laboratory analysis, PID readings and screening of soils under ultraviolet lighting. Results of this investigation identified that separate-phase DNAPL was present at MW-35, which had migrated vertically downward into the underlying sandy zone. Additionally, mobile DNAPL was also present within the silt-zone at boring/monitoring well B/MW-42; however, only residual-phase DNAPL was found to be present in the underlying sandy zone at this location. Boring/monitoring well locations B/MW-43 and B/MW-44 did not contain any indications of mobile DNAPL in either the silt zone or the underlying sandy zone.

As a result of B/MW-42's mobile DNAPL findings, three additional borings/monitoring wells (B/MW-45 through B/MW-47) were completed between March 10, 2009 and March 27, 2009 to further investigate the mobile DNAPL zone. Results of this investigation did not identify any further mobile DNAPL in either the silt-zone or the underlying sandy zone. However, while mobile DNAPL was not visually present at B/MW-45, laboratory analysis of a soil sample collected from the silt-zone identified a trichloroethane (TCA) concentration of 8,100 parts per million (ppm) which is indicative of DNAPL potentially being present.

As a result of B/MW-45's TCA soil concentration, boring B-48 was completed to the northwest of B/MW-45 on April 15, 2009. For this boring a Geoprobe™ was utilized to collect soils from the silt-zone and upper region of the underlying sandy zone. There were no visual indications of DNAPL, and laboratory analysis of the silt-zone soil identified a TCA concentration of only 18 ppm, which is not indicative of DNAPL being present. In addition, laboratory analysis of the soils collected from the upper region of the underlying sandy zone did not contain soil VOC concentrations of any significant concern, as only 1,1-dichloroethane (DCA) marginally exceeded its TAGM 4046 soil guidance value.

On May 28, 2009, a work plan titled DNAPL Well Installation Plan was submitted to the NYSDEC. The first part of this plan called for the installation of three silt-zone monitoring wells (MW-49S through MW-51S), three cluster monitoring wells (MW-55 $D_1D_2D_3$ through MW-57 $D_1D_2D_3$) and two downgradient deep monitoring wells (MW-52DD and MW-53DD) in the underlying sandy zone. The second part of this plan called for the relocation of extraction well EW-16's bladder pump to be moved among the wells located within the mobile DNAPL zone to physically extract the mobile DNAPL from the ground and capture it within DNAPL knockout vessels located within the system enclosure. Between June 22, 2009 and August 4, 2009, following NYSDEC approval of the work plan, well installation and trenching activities occurred. During installation of cluster well MW-56 flowing sands prevented the deepest interval (60'-65' below grade (bg)) from being installed. Following well installation activities, trenching was completed between wells EW-16, MW-35S, MW-42S, and MW-49S through MW-51S for the installation of a sub-grade conduit to provide access for EW-16's pump to these other wells. This conduit served to pass through the water level sensor and bladder pump's air and water lines from well to well. Once DNAPL recovery from a particular well became asymptotic, the pump would be relocated to another well. Monitoring wells installed within the underlying sandy zone were initially used to confirm the physical presence or absence of DNAPL, thereafter monitoring wells MW-35DD, MW-52DD and MW-53DD were added to the routine groundwater monitoring schedule. During development of these underlying sandy-zone wells, no DNAPL was observed in the extracted groundwater.

Between August 2009 and the present time, extraction well EW-16's pump and sensor were installed in each of the silt-zone DNAPL zone wells. Through March 31, 2011, approximately 76.35 gallons of DNAPL had been extracted from the subsurface. Of this, 60.99 gallons were captured via the knockouts and 15.36 gallons recovered via well bailing.

On May 17, 2010 cluster wells MW-55$D_1D_2D_3$, MW-56 D_1D_2, and MW-57 $D_1D_2D_3$, and deep zone monitoring wells MW-52DD and MW-53DD were sampled to further confirm the delineation of the mobile DNAPL within the underlying sandy zone. Groundwater analytical results identified TCA concentrations of 3.0 ppm, 46.3 ppm and 1.78 ppm, respectively for MW-55$D_1D_2D_3$'s three sampling intervals, and 6.06 ppm, 18.5 ppm and 10.7 ppm, respectively for MW-57 $D_1D_2D_3$'s sampling intervals. These TCA concentrations are not indicative of DNAPL being present and thus confirm the delineation of mobile DNAPL to the east and north. Meanwhile, monitoring wells MW-52DD and MW-53DD located to the west (downgradient), were identified to contain a TCA concentration of 5.59 ppm and 3.1 ppm, respectively. Again, these concentrations are not indicative of DNAPL being present and thus delineates to the west. However, cluster well MW-56 D_1D_2, located to the south, contained elevated dissolved-phase TCA concentrations of 1,120 ppm and 888 ppm for the 40'-47' bg sampling interval and the 50'-56' bg sampling interval, respectively. These identified concentrations are potentially indicative of DNAPL present in the area. As a result, the southern mobile DNAPL boundary in the underlying sandy zone was considered undelineated.

Between September 1 and 3, 2010, boring B-54 was completed south of cluster well MW-56 D_1D_2. This boring served a dual purpose: 1) to delineate the southern boundary in the underlying sandy zone, and 2) to tighten up the southern boundary within the silt-zone (currently delineated by EW-47, IW-13, IW-14 and MW-39). Of the three soil samples collected within the silt zone, the maximum TCA soil concentration detected was 7.3 ppm. Of the two soil samples selected from within the underlying sandy-zone, the TCA concentrations were non-detect and 42 parts per billion (ppb), respectively. These soil concentrations detected are not indicative of DNAPL being present in either the silt-zone or the underlying sandy-zone. Thus, this boring completed the delineation.

Boring/monitoring well locations are depicted on Figure 1, and boring/well construction logs have been included as Appendix A. Soil analytical results and groundwater analytical results have been tabulated as Table 1 and Table 2, respectively.

Summary of Remedial Investigation

Silt Zone

Figure 2 depicts the horizontal delineation and Figures 4 and 5 depict the vertical delineation of the mobile DNAPL within the silt-zone. Within the silt-zone, DNAPL was visually identified in borings MW-35DD, B/MW-42S and MW-45S. In addition to those borings, DNAPL was physically extracted from MW-35S and EW-16 via hand bailing or pumping. Other indications of residual DNAPL, which included soil fluorescence, elevated PID readings and olfactory observations, were identified within boring/monitoring well B/MW-46, B/MW-47, B/MW-49S and B/MW-50S.

In all, within a circular shaped area of approximately 30' in diameter, visual DNAPL or indications of residual DNAPL ranging in thickness from 1' to 4' along the perimeter and to approximately 8' thick near the center (MW-42S) have been identified.

Underlying Sandy Zone

Figure 3 depicts the horizontal delineation and Figures 4 and 5 depict the vertical delineation of the mobile DNAPL within the underlying sandy-zone. Within the underlying sandy-zone, DNAPL was visually observed in borings MW-35DD and B/MW-42S. In addition, DNAPL has been physically extracted from MW-35D, and indications of DNAPL (based on groundwater concentrations) are present at MW-56 D_1D_2.

In all, an oval shaped area approximately 16' by 8' was identified to contain DNAPL. Within this zone, visual DNAPL ranged from approximately 34' bg (the silt/underlying sand interface) to approximately 36' bg, with additional indications of residual DNAPL (i.e., fluorescence, PID readings, olfactory observations) ranging to depths of approximately 46' bg.

REMEDIAL ACTION SELECTION

The purpose of a remedial action selection (RAS) is to identify and evaluate the most appropriate remedial strategy for a particular situation. In developing the remedial strategy, the selected remedial alternative needs to satisfy a set of remedial action objectives (RAOs). These RAOs are as follows:

1. **Protection of Public Health and the Environment – Ensure that on-site contaminant levels in soil and groundwater do not pose unacceptable risks to the public health:** The selected remedial approach should not create a exposure pathway. Currently there is no use of groundwater at the Site and no other potential for the building occupants to contact subsurface contaminants. The only potential exposure pathway of concern is vapor intrusion into indoor air. This has been shown not to be a concern, based on indoor air sampling previously conducted at nearby residences and conducted annually on an ongoing basis at the Site.

2. **Standards, Criteria & Guidance (SCGs):** The goal of this remedial action is the elimination of the DNAPL sources to residual levels that can be treated by the existing bioremediation system. For evaluation of the data the following SCGs will be used: Soil: NYSDEC's CP-51, Soil Cleanup Guidance; Groundwater: NYSDEC's Class GA standards; and Vapor: NYSDOH's Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

3. **Short-term Effectiveness:** The selected remedial approach should be able to achieve significant short-term (i.e. within 6 months) reductions.

4. **Long-term Effectiveness and Permanence:** The remedial approach selected must have the ability to achieve permanent results following completion of the remedial action.

5. **Reduction of Toxicity, Mobility or Volume with Treatment:** The remedial approach must have the ability to reduce the toxicity, mobility or volume of the contaminants for each media (i.e., soil, groundwater, etc.).

6. **Implementability:** The remedial approach must be technically and economically feasible for all aspects of the project, including construction, maintenance and monitoring.

Based on these factors, several technologies were evaluated. These technologies include:

1. Chemical Oxidation: Chemical oxidants such as persulfate and Fenton's Reagent are technologies that can remediate volatile organics in a relatively quick timeframe. However, chemical oxidants often require pH changes, high temperature or a second chemical activator to trigger the reaction which can be difficult to obtain in well-buffered soils. In addition, chemical oxidation can be challenging in geology with high soil oxidant demand (SOD), as injected oxidant can be consumed by the soil matrix rather than the target contaminants. As part of the evaluation of this remedial alternative, Shaw conducted a soil buffering test and soil oxidant demand (SOD) tests for peroxide-activated persulfate and Fenton's Reagent. Results of the peroxide-activated persulfate SOD test indicated an SOD value of approximately 100 g/Kg, and the Fenton's Reagent SOD test indicated an SOD value of approximately 60 g/Kg. In addition,

the soil buffering test determined the Site soils had a strong buffering capacity. Based on these factors, chemical oxidation would most likely be ineffective for this Site;

2. Thermal Heating / Soil Vapor Extraction (i.e., electrical resistance heating): Thermal heating is a newer technology in which the subsurface is heated to vaporize the contaminants. The subsequent vapors are then captured via a soil vapor extraction system. While the thermal heating would most likely be very effective in vaporizing the Site contaminants, vapor recovery could be difficult based on Site geology. Sand stringers present within the silt zone could potentially direct vapors to areas outside the vapor extraction zone of influence, thereby increasing the risk of exposure. In addition, installation of the subsurface infrastructure associated with the heating elements and vapor extraction legs could impact the existing bioremediation system. Based on this, thermal heating / SVE has not been selected;

3. Excavation: Excavation is a traditional and effective approach for the removal of source-zone impacts. However, Louis Berger has two main concerns with this approach: 1) Excavation of the silt zone would create a pathway in which surrounding impacts (residual DNAPL and impacted groundwater) could migrate downward into the underlying sandy zone. 2) As the depth of the DNAPL within the silt zone is approximately 35’ bg, the excavation would either have to be exponentially larger to allow for proper sloping, or would require an expensive shoring system. In either case (though especially with an un-shored excavation) the existing bioremediation system would be dramatically impacted. And 3) the digging, loading and transportation of these DNAPL-laden soils could create an exposure risk (e.g., through odors during soil excavation and loading). Thus, excavation was not considered for this Site;

4. Co-Solvent Flushing: Co-solvent flushing is an innovative remedial approach in which a co-solvent is injected into a DNAPL zone. The injected solution interacts with the contaminants by lowering the interfacial tension between the DNAPLs and the soils (mobilization) and enhancing DNAPL solubility (solubilization), as it is flushed through the zone of contamination. As applied to this project, DNAPL solubilization into the dissolved-phase will be the most significant action occurring. The elutriate (i.e., the mixture of injected co-solvent, contaminant and groundwater) is then captured from the subsurface by a network of extraction wells for treatment and/or offsite disposal (for this project, the extracted elutriate will be transported offsite for proper disposal).

   Advantages to co-solvent flushing include: 1) It will rapidly remove a significant portion of the total DNAPL mass trapped in the subsurface; 2) as an in-situ technology, it will eliminate the need to excavate, handle and transport large quantities of contaminated soil and sediment; 3) it is effective on a wide range of contaminants (including TCA); 4) it can be used in conjunction with the existing bioremediation technology; and 5) the residual ethanol remaining in the subsurface after co-solvent flushing is completed has been shown to enhance bioremediation of chlorinated solvents, which is expected to complement the existing bioremediation system. It represents the most cost effective approach to rectify the DNAPL contamination. Implementation of this technology requires a full understanding and delineation of the DNAPL zone, considerable modeling and design with extensive bench-scale testing to determine the appropriate co-solvent and stringent requirements to control and monitor injection and to capture co-solvent to prevent further migration of DNAPL.

In comparison to alternative technologies, co-solvent flushing achieves the RAO's and has the advantage of limiting exposure by remediating the contaminants without the need for excavation. It also removes DNAPL, and the residual concentration of the co-solvent (ethanol) will stimulate the existing biological process. In addition, co-solvent flushing has immediate (short-term) effectiveness as the DNAPL is physically removed from the subsurface, and has long-term effectiveness as the co-solvent provides an additional stimulant to the existing bioremediation system and thereby further reduces the volume of contaminants in both soil and groundwater.

In consideration of these advantages and potential benefits to the existing bioremedial process, co-solvent flushing has been selected as the best option to address the DNAPL source.

REMEDIAL ACTION SCOPE OF WORK

Louis Berger has selected co-solvent flushing as the remedial strategy to address the DNAPL impacts in the area of MW-35. This section describes development of the co-solvent approach and conceptual design, full scale implementation, and the associated monitoring activities and schedule.

Development of Conceptual Design

Implementation of co-solvent flushing requires detailed hydrogeological information, in-situ modeling to determine fluid migration, and bench-scale testing to ensure co-solvency of the DNAPL with the selected alcohol co-solvent. The steps that were completed included the following:

1. Hydraulic Conductivity Field Testing: As the Site has a great deal of heterogeneity, pumping tests were completed at MW-50S in order to determine the hydraulic conductivity within the DNAPL treatment zone. To complete this, the transmissivity (T_i) was first calculated using the Jacobs method over one log cycle (i.e., well drawdown then recovery). For the data to be valid, the hydraulic properties computed from the drawdown and recovery curves should be within 10% of one another. Transmissivity values calculated from the drawdown and recovery curves are 0.0012 and 0.0011 ft^2/min, respectively. These computed values are sufficiently close to be considered valid.

   To compute the hydraulic conductivity (K), the saturated thickness of the transmissive unit must be known. For this calculation, a transmissive unit thickness of 8' (the length of the well screen) was used. Using the mean transmissivity (i.e., 0.00115 ft^2/min) and a thickness of 8 feet, the hydraulic conductivity was calculated to be $1.44x10^{-4}$ ft/min or $2.07x10^{-1}$ ft/day. Hydraulic conductivity field testing data and calculations have been included as Appendix B.

2. Tracer Test Preliminary Modeling: The hydraulic conductivity data, along with other site-specific data (geology, groundwater flow direction, saturated thickness, etc.) were then used to calculate an estimated timeframe for the movement of particles within the saturated zone (in this case, bromide particles).

3. Tracer Test: A simple bromide tracer test was then performed to determine the effective porosity within the target treatment zone. During this test, groundwater was extracted from MW-49S at a

rate of approximately 0.1 gallons per minute (gpm), amended with sodium bromide to achieve a bromide concentration of 400 mg/L and then reinjected into MW-50S. In total, the tracer test lasted 21 days, and determined an effective porosity of approximately 7.7%. This information was used to determine the co-solvent flushing volume. The tracer test results have been included as Appendix C.

4. Well Field Modeling: Using WinFlow, an analytical model that simulates two-dimensional steady-state and transient groundwater flow, the proper well layout and injection/extraction rates were determined.

   Initially, different well field designs were evaluated. For this situation, a five-spot well layout was determined to be the most effective. Using this type of design, a network of four injection wells and nine extraction wells would be necessary to provide adequate coverage and containment. A layout of these wells is presented as Figure 6. However, while the five-spot layout was identified as the most effective, stagnant zones equivalent to 5-10% of the treatment area remained. Thus, a two-stage injection approach was determined to be necessary to provide 100% coverage.

   Stage 1 would involve injecting into EXT-09 (center well) while extracting from INJ-01 through INJ-04. The simulated injection and extraction rates are as follows:

	Number of Wells	Target Pumping Rate (gpm)	Resultant Water Level Change (ft)	Water Level (ft bg)
Extraction Wells EXT-01 through EXT-04	4	0.04	-5.4	20.4
		Total Extraction Rate = 0.16		
Injection Wells EXT-09	1	0.12	+7.5	7.5
		Total Injection Rate = 0.12		

   Based on the well layout and injection rates, the timeframe it takes to complete one pore volume sweep is approximately 21 days. Particle tracking modeling results for time T=4 days, 7.5 days, 15 days and 30 days have been included as Appendix D. Based on the flow rates specified the maximum drawdown is expected to be only 5.4 feet, to a depth of 20.4 feet bg. As the treatment interval is between 26-35 feet bg, this drawdown does not preclude any portion of the treatment area.

   Thereafter, Stage 2 would involve injection into INJ-01 through INJ-04 while extracting from EXT-01 through EXT-09. The simulated injection and extraction rates are as follows:

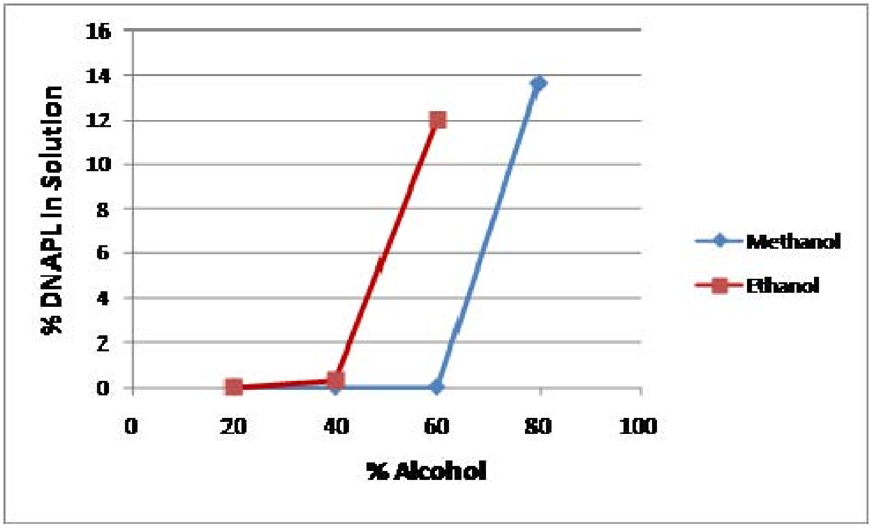
	Number of Wells	**Target Pumping Rate (gpm)**	**Resultant Water Level Change (ft)**	**Water Level (ft bg)**
Extraction Well EXT-9 (center)	1	0.12	-11.5	26.5
Extraction Wells EXT-1 through 4	4	0.07	-4.3	19.3
Extraction Wells EXT-5 through 8	4	0.03	-2.3	17.3
		Total Extraction Rate = 0.52		
Injection Wells INJ-1 through 4	4	0.125	+14	6
		Total Injection Rate = 0.50		

Based on the well layout and injection rates, the timeframe it takes to complete one pore volume sweep is approximately 15 days. Particle tracking modeling results for time T=4 days, 7.5 days, 15 days, 30 days and 45 days have been included as Appendix E. These timeframes are in agreement with the bromide tracer test results, which showed that it took about 14 days for the tracer concentration to reach its maximum achievable concentration at the recovery well.

During this stage, the maximum drawdown at extraction wells EXT-1 through EXT-8 does not extend into the target interval (26'-35' bg). The drawdown at extraction well EXT-9, however, does marginally extend into the treatment interval. The drawdown extends only 0.5 feet into the treatment interval, and has a radius of less than 1 foot from the well. It should be noted though, that as EXT-9 is used as an injection well during Stage 1, this area is included within the scope of the remediation.

5. Co-Solvent Bench-Scale Testing: To determine the most effective co-solvent, a laboratory bench-scale test was completed comparing ethanol and methanol. Initially, solutions of ethanol and deionized water of 20, 40, and 60 % (by volume), and methanol and deionized water of 20, 40, 60 and 80% solution were prepared. The experiment consisted of adding incremental 0.2 mL aliquots of the Site DNAPL to 50 mL alcohol solutions in glass beakers, and visually determining how much DNAPL each alcohol solution could solubilize by observing the phase behavior. The experiment was performed at room temperature (approximately 20 degrees C).

Results are summarized in the following graph:



For methanol, the 0.2 mL aliquots of DNAPL became solubilized only in the 80% methanol solution. A total of 6.8 mLs of the DNAPL (assumed to be primarily TCA) were solubilized in the 80% methanol solution, which equates to approximately 14% DNAPL in solution or 160,000 mg/L. It was noted that some viscous residue began accumulating in the beaker after 2 mLs of DNAPL were added. This residue is likely a contaminant comingled with the primarily TCA DNAPL. The volume of the residue was small compared to the total DNAPL volume, suggesting the volume fraction of this compound within the DNAPL is small.

For ethanol, results indicate that the cosolvency effect was substantially greater than for methanol. At an ethanol volume composition of 40%, nearly all of the 0.2mL aliquot of DNAPL became solubilized. At an ethanol volume composition of 60%, 6 mLs of the DNAPL became solubilized, which equates to approximately 12% DNAPL in solution or 144,000 mg/L. Trace amounts of the viscous residue were observed in the ethanol experiments, but the amount was significantly less than in the methanol experiments, suggesting that the ethanol was more effective at solubilizing a wider range of contaminants than methanol.

Based on the results of this bench scale screening test, ethanol was shown to be a more effective co-solvent than methanol for treating the site DNAPL. A 60% ethanol solution had approximately the same solubilizing effectiveness as an 80% methanol solution. In addition, the accumulation of the insoluble viscous residue was substantially less in the 60% ethanol solution than in the 80% methanol solution, suggesting that the comingled compound was better solubilized by ethanol than by methanol.

Considering that alcohol concentrations in the recovery wells are unlikely to be greater than 60 to 80% (due to mixing), ethanol has been selected as the most appropriate co-solvent for this application.

6. Evaluation of DNAPL Migration: Because co-solvent flushing operates in part by lowering the interfacial tension (at high co-solvent concentrations) between the DNAPL and soil matrix, the potential exists for DNAPL mobilization. As such, as part of the conceptual design, calculations to

determine the potential vertical migration of DNAPL were completed using several conservative assumptions. In summary, during the timeframe in which co-solvent flushing activities are occurring, a worst case vertical migration rate of 1.4 x 10^{-7} m/s, or 0.04 ft/day was calculated. Based on this worst case rate, over the approximately 50 day duration of the co-solvent flushing activities, a total vertical DNAPL migration is expected to be a maximum of only 2 ft. A detailed discussion of the evaluation, the conservative assumptions, and the calculations is presented as Appendix F.

FULL SCALE SCOPE OF WORK

As determined based on the modeling, distribution of the flushing amendments will be performed using an array of four (4) injection wells and nine (9) extraction wells. All extraction/injection wells will be drilled using hollow-stem auger (HSA) drilling techniques and will be screened (including the well sand pack) from a depth of just above the silt/underlying sand interface (approximately 35' bg) upward nine feet (to approximately 26' bg). The injection and extraction wells will be constructed of 4"schedule 40 PVC and will contain 8' of well screen. The actual depth of the wells will be based on the silt/underlying sand interface. For the following well construction description, it is assumed that the silt/underlying sand interface is at 35' bg: Following insertion of the well to a depth of 34.5' bg, a 9-foot well sand pack will be installed (between approximately 25.5' to 34.5'), followed by a 3-foot bentonite seal (between approximately 22.5' and 25.5'). The remaining borehole will be grouted to the surface. The surface will then be finished with a flush-mounted roadbox set within a 2'x2' concrete apron. Finally, the wells will be developed via overpumping to remove fine-grained sediments from the vicinity of the well screen. Well construction for the Injection/ extraction wells has been depicted as Figure7.

Following installation and development of the well network, co-solvent flushing activities will be implemented. A two-stage injection approach has been selected for the treatment area in order to achieve 100% flushing coverage. Based on a circular treatment area with a radius of 16 feet, a 9' depth interval (~26'-35' bg), and a porosity of 7.7%, the two-stage treatment approach will require a total ethanol usage of 11,250 gallons. During the first stage of flushing, Louis Berger will be flushing an equivalent of approximately one pore volume through the treatment area. A total of 3,250 gallons of ethanol will be injected into EXT-09, while groundwater is pumped from extraction wells EXT-01 through EXT-04. During the second stage of flushing, Louis Berger will be flushing an equivalent of approximately two pore volumes through the treatment area for a total of 8,000 gallons of ethanol. During this second flushing stage, ethanol will be injected into injection wells INJ-01 through INJ-04 and groundwater extracted from extraction wells EXT-01 through EXT-09. Detailed injection procedures are as follows:

Pre-Ethanol Injection Activities: Initially, the injection and extraction wells will be operated at the design flow rates for each stage to ensure target rates can be attained. Potable water will be injected, and extracted groundwater will be directed into the onsite waste storage tank for future off-site disposal. During this period, groundwater elevations will be monitored in nearby monitoring wells to confirm adequate containment exists (i.e., water table elevations outside the treatment zone are not increasing). It is anticipated that the pre-ethanol injection activities will occur over a period of six hours (three hours for each stage); thereafter, baseline samples for ethanol and VOCs (EPA Method 8260) will be performed at each extraction well, and at all nearby monitoring wells (Table 3).

Stage 1, Phase 1: During this phase, 500 gallons of ethanol solution will be injected into extraction well EXT-09 (center well) at the specified design rate. Initially, co-solvent solution will be 10 % ethanol and 90 % water by volume; this ratio will be evenly increased to approximately 100% ethanol over the 500 gallon injection volume. The increasing rate of ethanol solution injection will limit buoyancy effects during the ethanol injection[1]. A total of 250 gallons of ethanol will be injected during this phase. Stage 1, Phase 1 is anticipated to take approximately 3 days to complete.

During this phase, monitoring will include daily ethanol and VOC samples from each of the four extraction wells as well as a VOC sample from within the storage tank. In addition, 11 nearby monitoring locations (Table 3) will be sampled for VOCs and ethanol at the end of Phase 1. Groundwater samples will be carefully examined for phase behavior. Free product or emulsions volumes will, to the extent possible, be quantified. Ethanol and VOC analyses will be performed on the aqueous phase only. Ethanol analyses will be performed with a 24-hour turnaround time. If substantial migration of ethanol is observed beyond the influence of the extraction wells (i.e., concentration > 10% by volume (100,000 mg/L)), then the system will be modified (e.g., adjustment of extraction or injection well flow rates, and/or use of existing wells as additional extraction wells to enhance capture). Injection and extraction well flow rates also will be measured on a daily basis.

Stage 1, Phase 2: After completion of the ethanol ramp-up activities (Phase 1) and after confirmation of significant containment based on the monitoring well sampling, 2,750 gallons of 100% ethanol will be injected into extraction well EXT-09 (center well) at the specified design rate. This phase of the injection is expected to take up to 15 days to complete. During this time, injection and extraction well flow rates will be recorded on a daily basis and the total fluid removal (water/ethanol and DNAPL phases) will be measured daily. During this phase, monitoring will include daily ethanol and VOC samples from each of the four extraction wells as well as a VOC sample from within the storage tank. In addition, every 3rd day, VOC and ethanol analyses will be performed at 11 additional monitoring locations (Table 3).

Stage 1, Phase 3: Following the ethanol injection described in Stage 1, Phase 2, 500 gallons of ethanol solution will be injected into extraction well EXT-09 at the specified design rate. Initially, co-solvent solution composition will be 90 % ethanol and 10 % water by volume; this ratio will be evenly increased to 100% water over the 500 gallon injection volume. A total of 250 gallons of ethanol will be injected during this phase. It is anticipated that this phase will take 3 days to complete. During this phase, monitoring will include daily ethanol and VOC samples from each of the four extraction wells as well as a VOC sample from within the storage tank. In addition, 11 nearby monitoring locations (Table 3) will be sampled for VOCs and ethanol at the end of Phase 3.

Stage 1, Phase 4: Water injection will continue into extraction well EXT-09 until ethanol concentrations decrease below 20% at all monitoring locations. Monitoring will be occur from each of the four extraction wells, collection tank and 11 nearby monitoring locations for VOCs and ethanol every 3rd day. While an exact timeframe for this phase is unknown, it is believed that this phase should be complete in approximately 7 days.

Stage 2, Phase 1: During this phase, 500 gallons of ethanol solution will be injected simultaneously into injection wells INJ-01 through INJ-04 at the specified design rates. Initially, co-solvent solution will be 10% ethanol and 90% water by volume; this ratio will be evenly increased to approximately 100% ethanol over the 500 gallon injection volume at each well. As previously stated, the increased rate of

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[1] Jawitz, J.W., Sillan, R.K., Annable, M.D., Rao, P.S.C., Warner, K. 2000. In-situ alcohol flushing of a DNAPL source zone at a dry cleaner site. *Environ. Sci. Technol.*, 34, 3722-3729.

ethanol solution injection will limit buoyancy effects during the ethanol injection. A total of 2,000 gallons of ethanol solution will be injected during this phase, of which approximately 1,000 gallons will be ethanol. Stage 2, Phase 1 is anticipated to take approximately 3 days to complete.

During this phase, monitoring will include daily ethanol and VOC samples from all nine extraction wells as well as a VOC sample from within the storage tank. In addition, 14 nearby monitoring locations will be sampled for VOCs and ethanol at the end of Phase 1. All samples will be carefully examined for phase behavior. Free product or emulsions volumes will, to the extent possible, be quantified. Ethanol and VOC analyses will be performed on the aqueous phase only. Ethanol analyses will be performed with a 24-hour turnaround time. If substantial migration of ethanol (i.e., concentration >10% by volume (100,000 mg/L)) is observed beyond the influence of the extraction wells, then the system will be modified (e.g., adjustment of extraction or injection well flow rates, and/or use of existing wells as additional extraction wells to enhance capture). Injection and extraction well flow rates also will be measured on a daily basis.

Stage 2, Phase2: After completion of the Stage 2, Phase 1 activities and after confirmation of significant containment based on the monitoring well sampling, up to 1,500 gallons of 100% ethanol will be injected simultaneously into each of the four injection wells at the specified design rates (for a total of 6,000 gallons ethanol). This phase of the injection is expected to take up to 9 days to complete. During this time, injection and extraction well flow rates will be recorded on a daily basis as well as the total fluid removal (water/ethanol and DNAPL phases) will be measured. During this phase, monitoring will include daily ethanol and VOC samples from all nine extraction wells as well as a VOC sample from within the storage tank. In addition, 14 nearby monitoring locations (Table 3) will be sampled for VOCs and ethanol every 3rd day.

Stage 2, Phase 3: Following the ethanol injection described in Stage 2, Phase 2, 500 gallons of ethanol/water mixtures will be simultaneously injected into each injection well (for a total of 2,000 gallons injected) at the specified design rates. Initial co-solvent solution composition will be 90 % ethanol and 10 % water by volume; this ratio will be evenly increased to 100% water over the 500 gallon injection volume at each well. A total of 2,000 gallons of ethanol solution will be injected during this phase, of which approximately 1,000 gallons is ethanol. It is anticipated that this phase will take 3 days to complete. During this phase, monitoring will include daily ethanol and VOC samples from all nine extraction wells as well as a VOC sample from within the storage tank. In addition, 14 nearby monitoring locations (Table 3) will be sampled for VOCs and ethanol at the end of Phase 3.

Stage 2, Phase 4: Water injection will continue in each injection well until ethanol concentrations decrease to 3% by volume at all monitoring locations. Monitoring will be performed from each extraction well, as well as 14 other nearby monitoring locations (Table 3) and the collection tank every 3rd day. While an exact timeframe for this phase is unknown, it is believed that this phase should be completed in approximately eight days.

Post-Injection Monitoring: At approximately 1 and 8 weeks after co-solvent and water injection has been completed, all extraction and monitoring locations (Table 3) will be sampled for ethanol, VOC, and anions. Collected groundwater will be carefully examined for the presence of any non-aqueous phases during sampling.

Sub-Slab Soil Vapor Monitoring: At approximately 2 weeks following commencement of injection activities, sub-slab soil vapor will be collected from sub-slab sampling locations 1S and 2S (Figure 8). The purpose of this sampling is to evaluate if co-solvent flushing activities will affect sub-slab soil vapor concentrations beneath the Site building. This data will be evaluated against the historical data collected annually since 2005, and will be used to determine if additional monitoring is required during co-solvent flushing activities.

To collect the sub-slab vapor samples, a 5/8-inch diameter hole will be drilled through the concrete slab using an electric drill. The drill bit will be advanced approximately 3-inches into the sub-slab material to create an open cavity. The vapor probe will consist of a length of 3/8-inch diameter Teflon™ tubing, which will then be inserted no farther than 2-inches into the sub-slab material. The tubing will be sealed to the surface with a non-VOC containing material consisting of permagum grout or beeswax or equivalent.

Prior to collection of the sub-slab soil vapor samples, the tubing will be purged of 1-3 volumes to eliminate air within the tubing. During purging, a tracer gas (helium) will be used to verify the integrity of the seal. Purged air will not be discharged to the indoor air. Following purging, the tubing will be attached to a 6L Summa canister fitted with an in-line filter and a 1-hour flow regulator. Prior to opening the Summa canister, the initial vacuum will be noted. After 1 hour, the Summa canister will be closed and the final vacuum noted. Based on the sample volume of 6L and a sample period of 1 hour, the sub-slab samples will be collected at a flow rate of approximately 0.1 liters per minute. Following collection of the sub-slab vapor samples, the drilled hole in the foundation will be sealed with concrete slurry.

The sub-slab soil vapor samples will then be shipped following proper chain-of-custody procedures to a NYSDOH Environmental Laboratory Approval Program (ELAP)-accredited laboratory, where they will be analyzed for VOCs in accordance with EPA Method TO-15.

CONCEPTUAL SYSTEM DESIGN

As previously stated, the co-solvent flushing system will operate by extracting groundwater while simultaneously injecting ethanol. Since the extracted groundwater will not be reinjected, the system essentially contains two separate operations; an extraction operation, and an injection operation. Details of these are described below and a conceptual process and instrumentation diagram (P&ID) has been included as Figure 9.

Extraction Operations: The extraction operations include the bladder pumps with associated controls and air supply, a manifold, two DNAPL knockouts and a waste storage tank. Groundwater will be extracted via bottom-loading bladder pumps, set approximately 12-inches off the bottom of the extraction wells. The specific bladder pump that will be used is QED's Well Wizard® T1250 bladder pump. These bladder pumps will be controlled using the existing bioremediation system's controls, and supply air will be provided by the existing bioremediation's air compressor. The water return lines from the extraction wells will then be combined into a single water stream and directed through two DNAPL knockout vessels, located in series. The effluent water stream will then be contained within a storage tank for subsequent offsite disposal.

Injection Operations: The injection operations include an ethanol storage tank, ethanol metering pumps with associated controls, flow meters, and a potable water supply. During periods in which potable water is injected to the subsurface, rotameters will be used to control the flow of water to the injection wells. Water will be supplied via the facility's tap or fire hydrant. At the same time, metering pumps will meter ethanol from the ethanol storage tank into the water lines. During Phase 2 of both Stage 1 and 2, the rotameters will be closed as only ethanol will be injected during this period.

SAFETY

Ethanol is flammable material, and as such requires special safety considerations. Currently, Louis Berger is in communications with the New York City Fire Department as part of the system design process; however, at a minimum, the following safety-related tasks are planned:

- Updating of Louis Berger's Health and Safety Plan (HASP) to include co-solvent flushing-related activities. A copy of the updated HASP will be forwarded to the NYSDEC;
- Secure work area via Jersey Barriers and the construction of 6' chain-link fence to prevent unauthorized access or vehicles and pedestrians, respectively. The access gate will be locked at all times when Louis Berger personnel are not within the work area;
- All electronic equipment located within the work zone (i.e., solenoid valves, metering pumps, etc.) will be intrinsically safe (to eliminate ignition sources within the work area);
- All equipment (i.e., tanks, supports, etc.) will be grounded to prevent static discharges;
- Nitrogen will be introduced into the ethanol and waste storage tank headspaces to eliminate the presence of oxygen;
- All equipment used for groundwater monitoring events will be intrinsically safe; and
- No smoking will be allowed in or around the work area.

Prior to commencement of injection activities, permits will be obtained from the USEPA Underground Injection Control (UIC) department, the Alcohol and Tobacco Tax and Trade Bureau (a bureau of the United States Department of Treasury), New York City Fire Department (FDNY) and the New York City Department of Environmental Protection.

SCHEDULE

The anticipated schedule for implementation of the proposed remedy, following NYSDEC approval, is as follows:

Activity	Timeframe
Procurement & Permits	Weeks 1 – 7
Well Installation and Development	Weeks 8 – 9
Treatment System Construction	Weeks 10 – 11
Treatment System Operation	Weeks 12 – 20
Post System Operation Monitoring	Weeks 20 – 28
Total Timeframe	28 Weeks

SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Louis Berger & Associates, P.C. (Louis Berger) in conjunction with Shaw Environmental, Inc. has prepared this addendum to the RAWP for the 75-20 Astoria Blvd Site located at 75-20 Astoria Boulevard, in Jackson Heights, Queens County, New York.

LOUIS BERGER & ASSOCIATES, P.C.

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Principal Environmental Scientist

Ajay Kathuria, P.E.
Principal Engineer

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AJAY KATHURIA
082833-1
LICENSED PROFESSIONAL ENGINEER

SHAW ENVIRONMENTAL, INC.

Charles Schaefer, PhD
Senior Technology Applications Engineer

List of Attachments

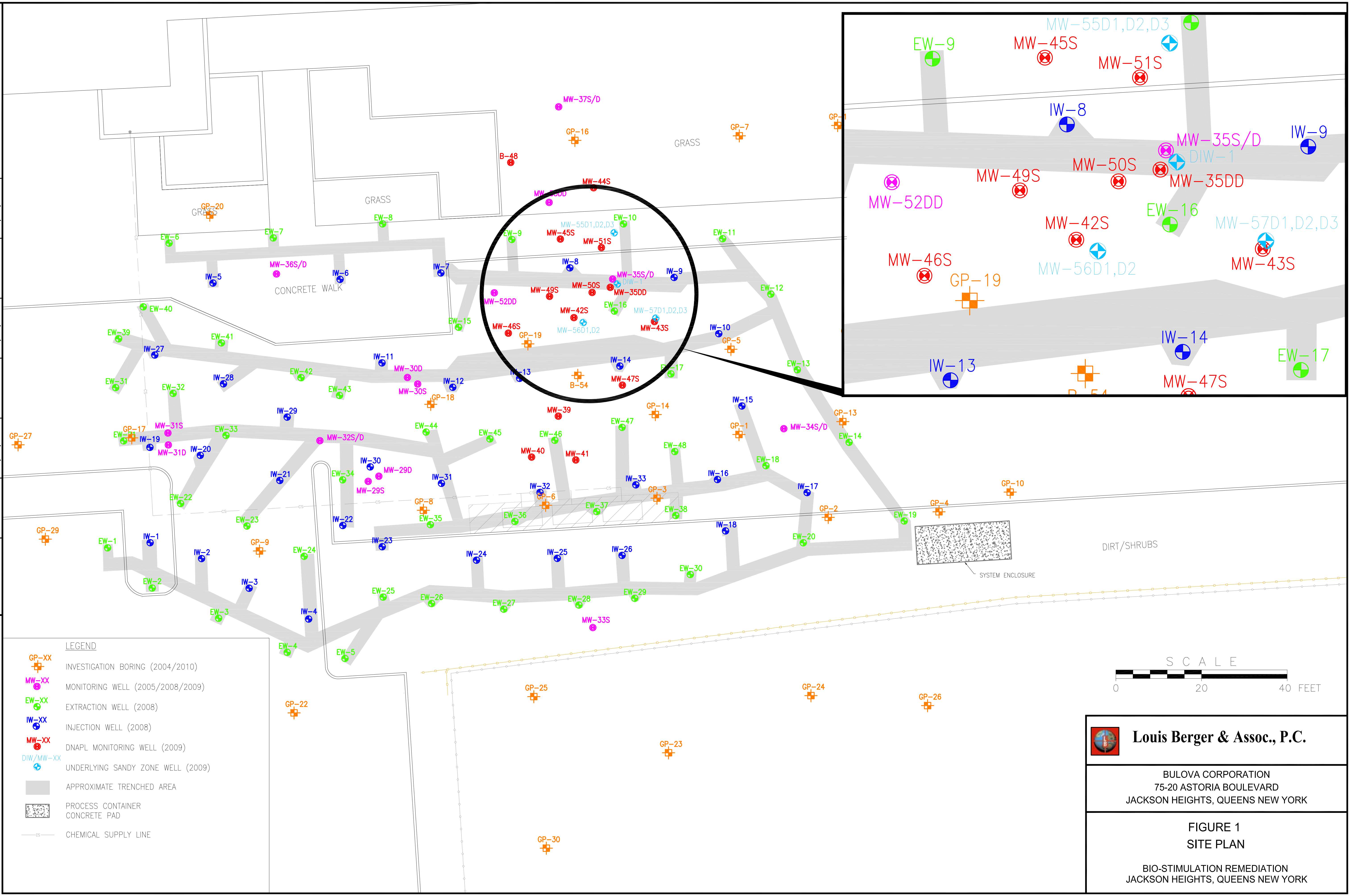
Figures

Tables

Appendices

C: Jane H. O’Connell – NYSDEC
Dawn Hettrick – NYSDOH
Robert Webber – Bulova Corporation
Mitch Bernstein, Esq. – Van Ness Feldman
Brad Blumenfeld – Blumenfeld Development Group
James Rigano – Rigano, LLC
Erik Gustafson – Louis Berger
Ajay Kathuria – Louis Berger
Charles Schaefer – Shaw

FIGURES



LEGEND

GP-XX INVESTIGATION BORING (2004/2010)
MW-XX MONITORING WELL (2005/2008/2009)
EW-XX EXTRACTION WELL (2008)
IW-XX INJECTION WELL (2008)
MW-XX DNAPL MONITORING WELL (2009)
DIW/MW-XX UNDERLYING SANDY ZONE WELL (2009)
APPROXIMATE TRENCHED AREA
PROCESS CONTAINER
CONCRETE PAD
CHEMICAL SUPPLY LINE

Louis Berger & Assoc., P.C.

BULOVA CORPORATION
75-20 ASTORIA BOULEVARD
JACKSON HEIGHTS, QUEENS NEW YORK

FIGURE 1
SITE PLAN

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
NEW YORK,NY	R. STRAUGHAN	7/15/11	E.GUSTAFSON	7/15/11	E.GUSTAFSON	7/15/11	FIGURE 1

File: M:\NYCCAD\CADDTEMP-2011\Bulova Jackson HeightsReportsRAWP\FIG 1 BJH – SITE PLAN.dwg
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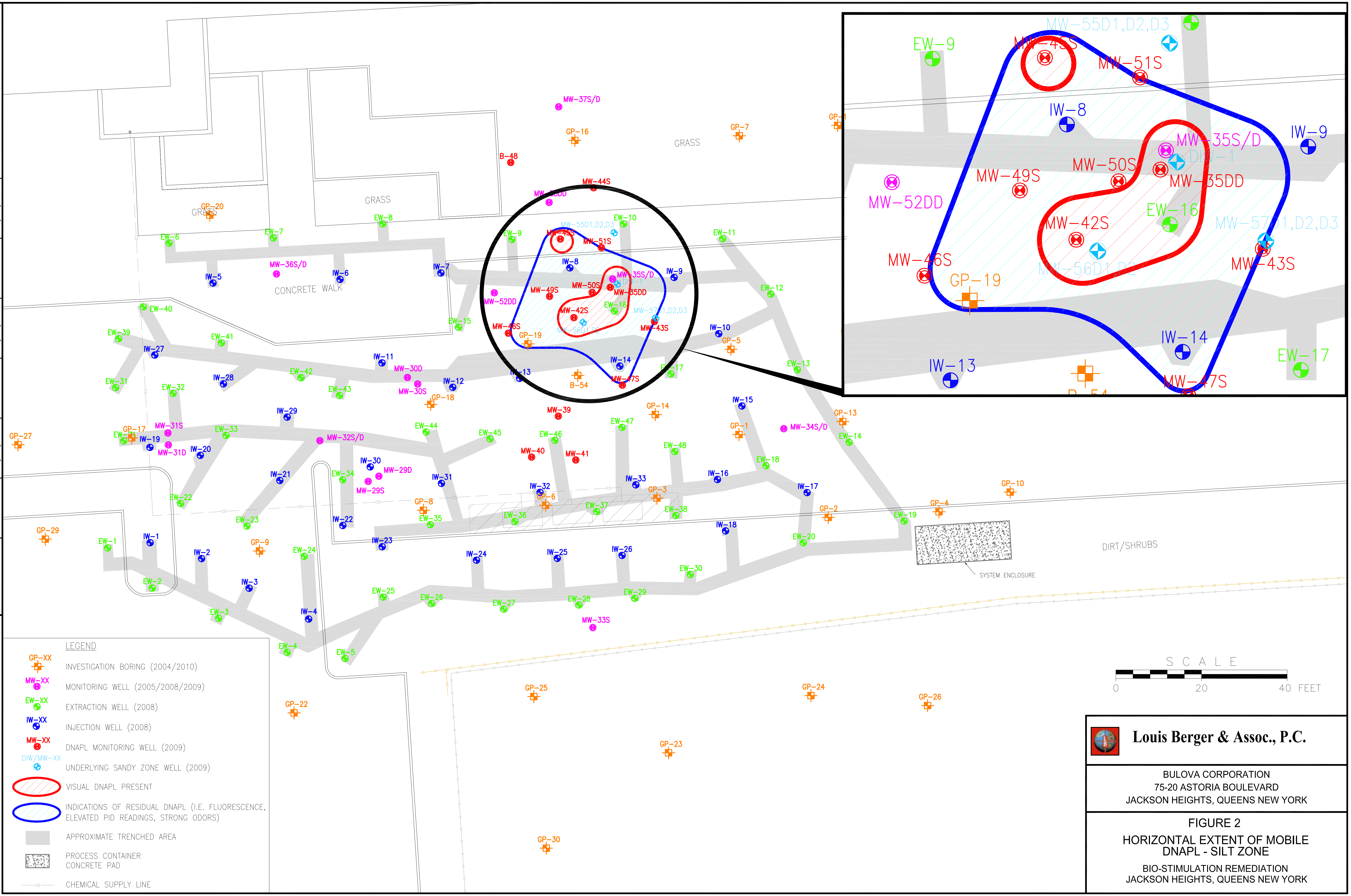

LEGEND

GP-XX	INVESTIGATION BORING (2004/2010)
MW-XX	MONITORING WELL (2005/2008/2009)
EW-XX	EXTRACTION WELL (2008)
IW-XX	INJECTION WELL (2008)
MW-XX	DNAPL MONITORING WELL (2009)
DIW/MW-XX	UNDERLYING SANDY ZONE WELL (2009)
🟥	VISUAL DNAPL PRESENT
🟦	INDICATIONS OF RESIDUAL DNAPL (I.E. FLUORESCENCE, ELEVATED PID READINGS, STRONG ODORS)
▨	APPROXIMATE TRENCHED AREA
▨	PROCESS CONTAINER CONCRETE PAD
---cs---	CHEMICAL SUPPLY LINE

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JACKSON HEIGHTS, QUEENS NEW YORK

FIGURE 2
HORIZONTAL EXTENT OF MOBILE DNAPL - SILT ZONE
BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

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APPROVED BY: E.GUSTAFSON 7/15/11
CHECKED BY: E.GUSTAFSON 7/15/11
DRAWN BY: R. STRAUGHAN 7/15/11
OFFICE: NY,NY

File: M:\NYCCAD\CADDTEMP-2011\Bulova Jackson Heights\Reports\RAWP\FIG 2 BJH - HORIZONTAL EXTENT.dwg
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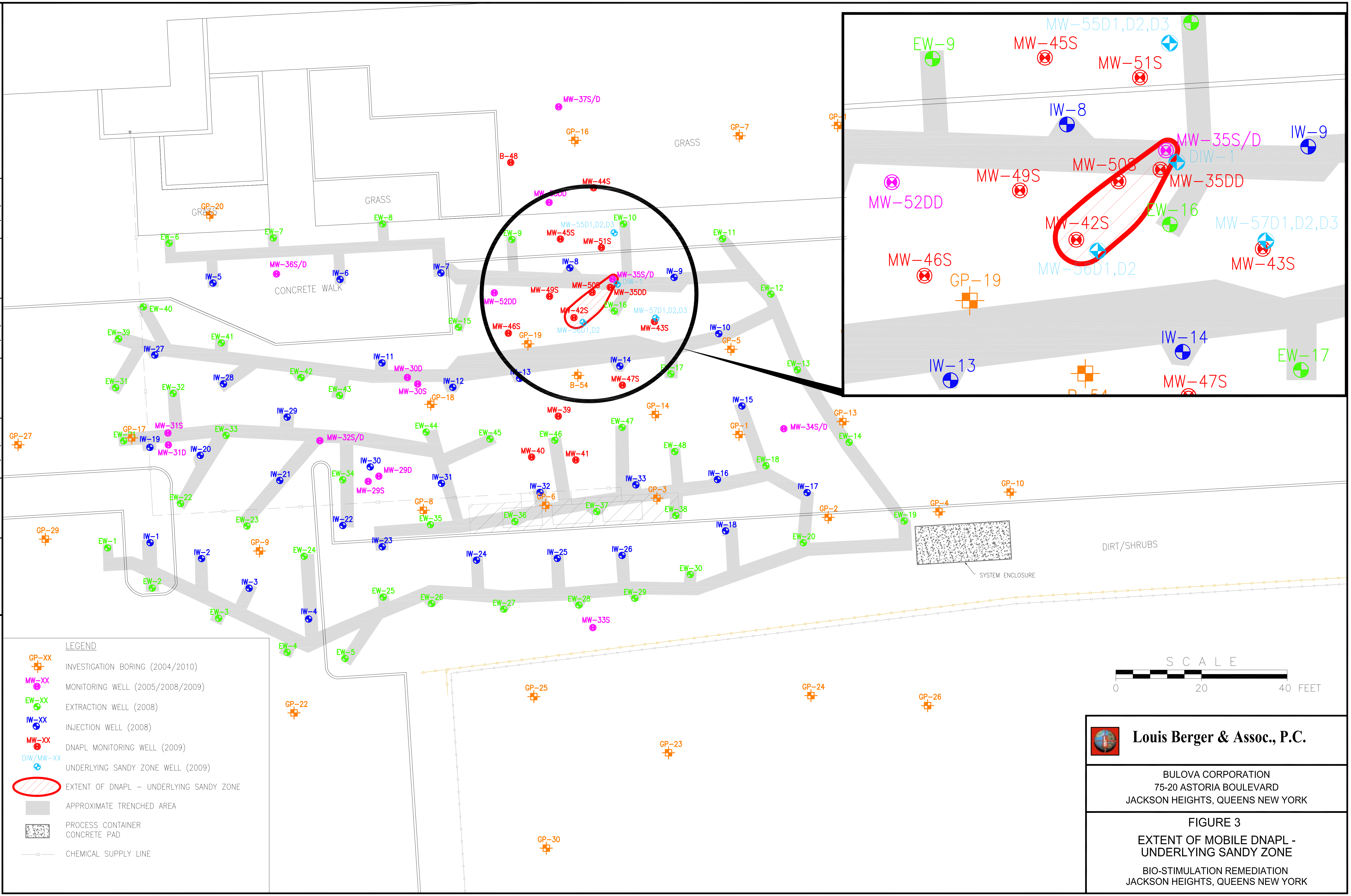

LEGEND

GP-XX	INVESTIGATION BORING (2004/2010)
MW-XX	MONITORING WELL (2005/2008/2009)
EW-XX	EXTRACTION WELL (2008)
IW-XX	INJECTION WELL (2008)
MW-XX	DNAPL MONITORING WELL (2009)
DIW/MW-XX	UNDERLYING SANDY ZONE WELL (2009)
▨	EXTENT OF DNAPL - UNDERLYING SANDY ZONE
▩	APPROXIMATE TRENCHED AREA
▦	PROCESS CONTAINER CONCRETE PAD
--cs--	CHEMICAL SUPPLY LINE

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75-20 ASTORIA BOULEVARD
JACKSON HEIGHTS, QUEENS NEW YORK

FIGURE 3
EXTENT OF MOBILE DNAPL -
UNDERLYING SANDY ZONE

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

DRAWING NUMBER FIGURE 3
APPROVED BY E.GUSTAFSON 7/15/11
CHECKED BY E.GUSTAFSON 7/15/11
DRAWN BY R. STRAUGHAN 7/15/11
OFFICE NY,NY

File: M:\NYCCAD\CADDTEMP-2011\Bulova Jackson HeightsReportsRAWP\FIG 3 BJH - DNAPL SANDY.dwg
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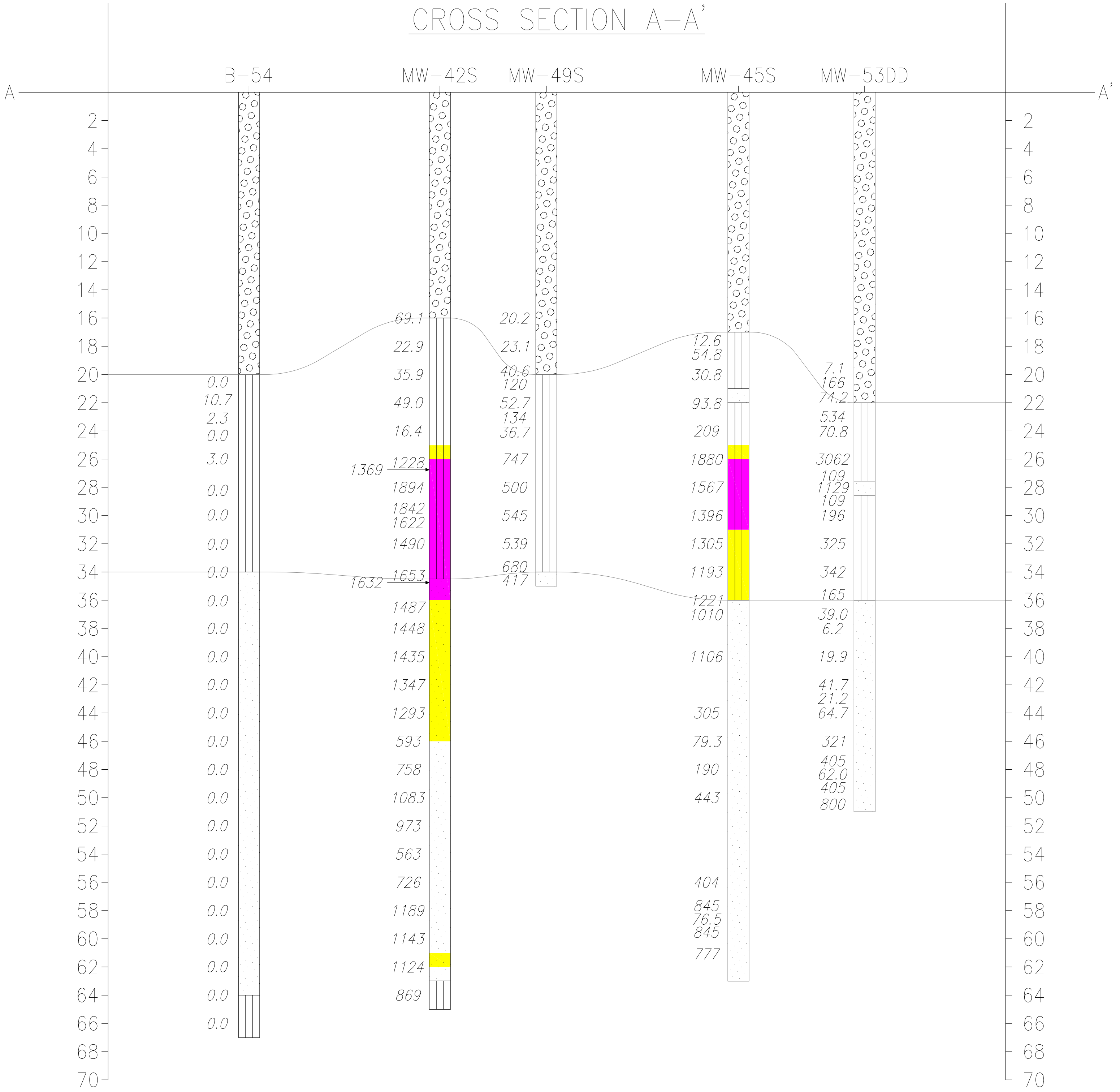
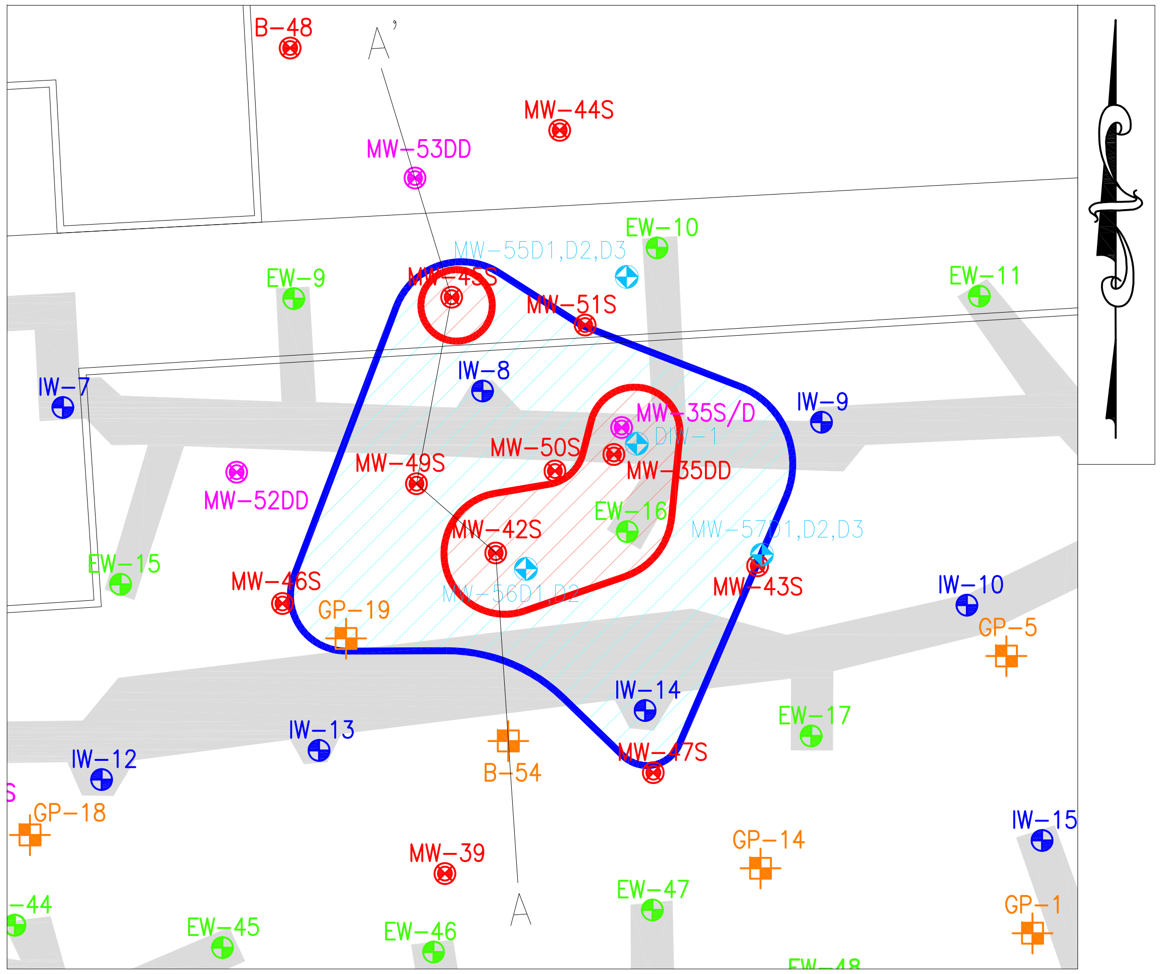
Plotted By: rstraughan





LEGEND

FILL

PID READINGS → 209 SILT

SAND

🟪 VISUAL DNAPL

🟨 INDICATIONS OF RESIDUAL DNAPL

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FIGURE 4
CROSS SECTION A-A'

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

DRAWING NUMBER	FIGURE 4
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OFFICE	NY,NY

File: M:\NYCCAD\CADDTEMP–2011\Bulova Jackson HeightsReportsRAWP\FIG 4 BJH – CROSS SECTION A–A.dwg
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FIGURE 5
DRAWING NUMBER
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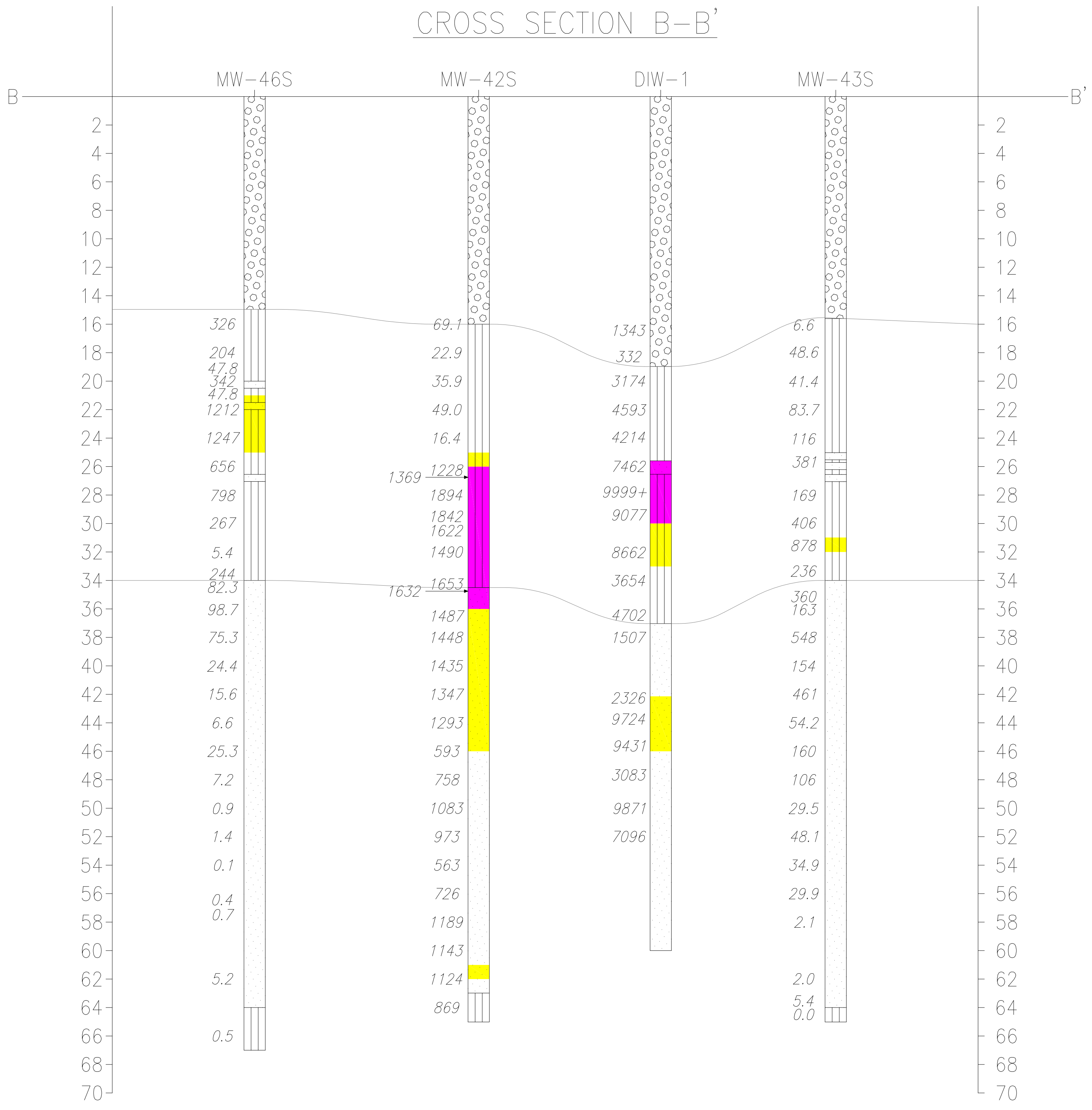
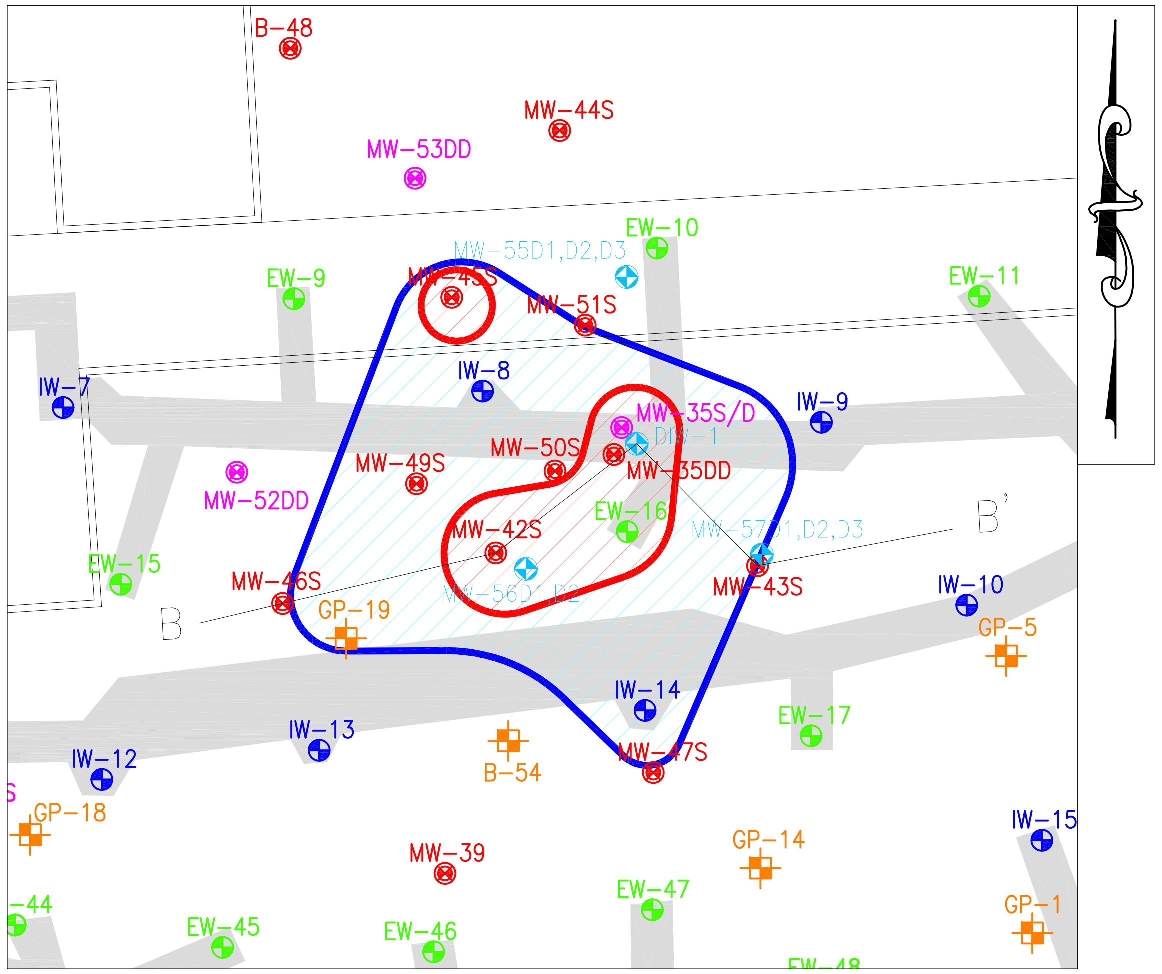
CROSS SECTION B-B'





LEGEND

FILL
SILT
SAND
PID READINGS → 209

🟪 VISUAL DNAPL

🟨 INDICATIONS OF RESIDUAL DNAPL

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FIGURE 5
CROSS SECTION B-B'

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

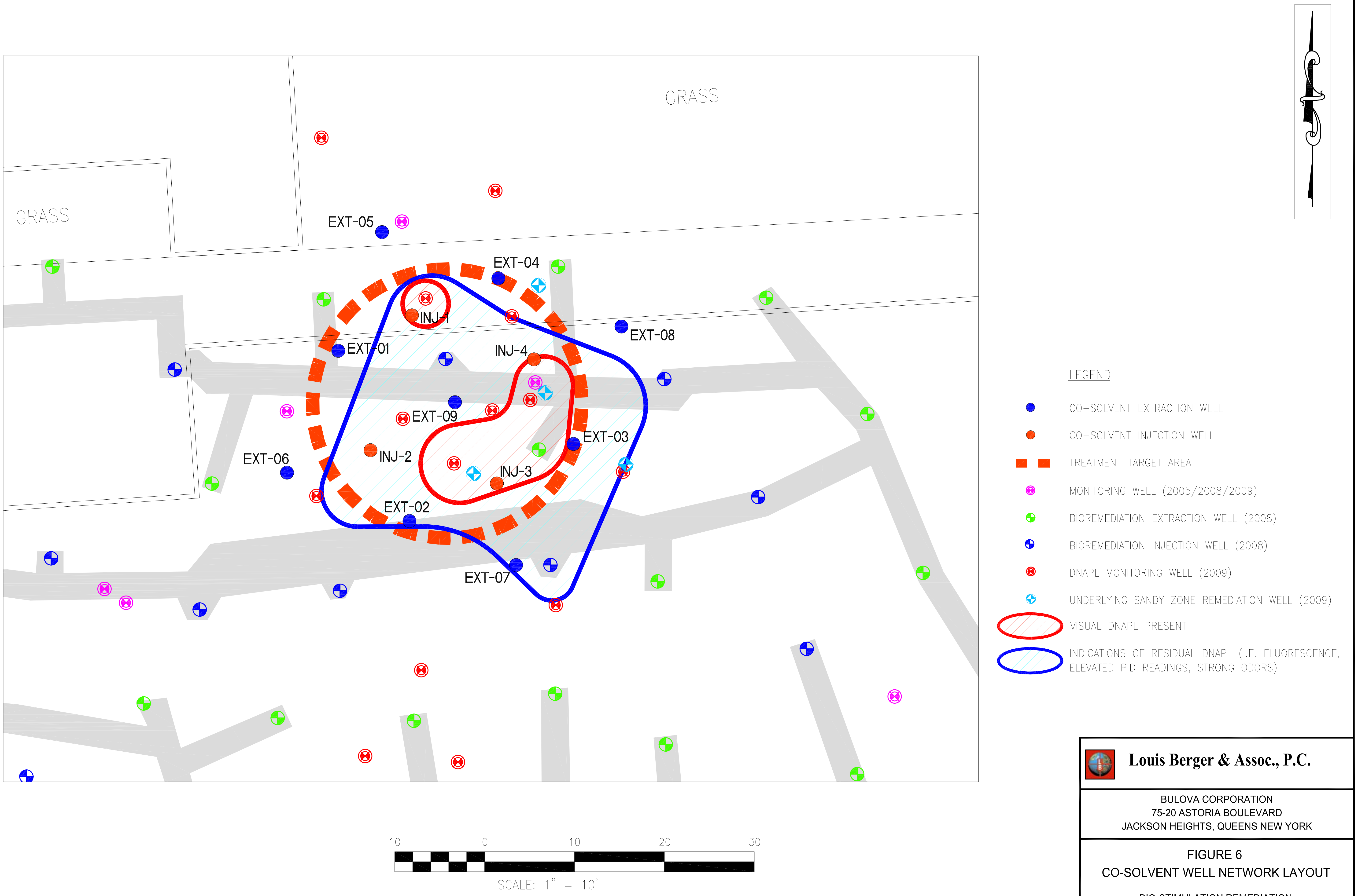

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FIGURE 6
CO-SOLVENT WELL NETWORK LAYOUT

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

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NY,NY	R. STRAUGHAN	7/15/11	E.GUSTAFSON	7/15/11	E.GUSTAFSON	7/15/11	FIGURE 6

File: M:\NYCCAD\CADDTEMP-2011\Bulova Jackson HeightsReportsRAWP\FIG 6 BJH - CO-SOLVENT NETWORK.dwg
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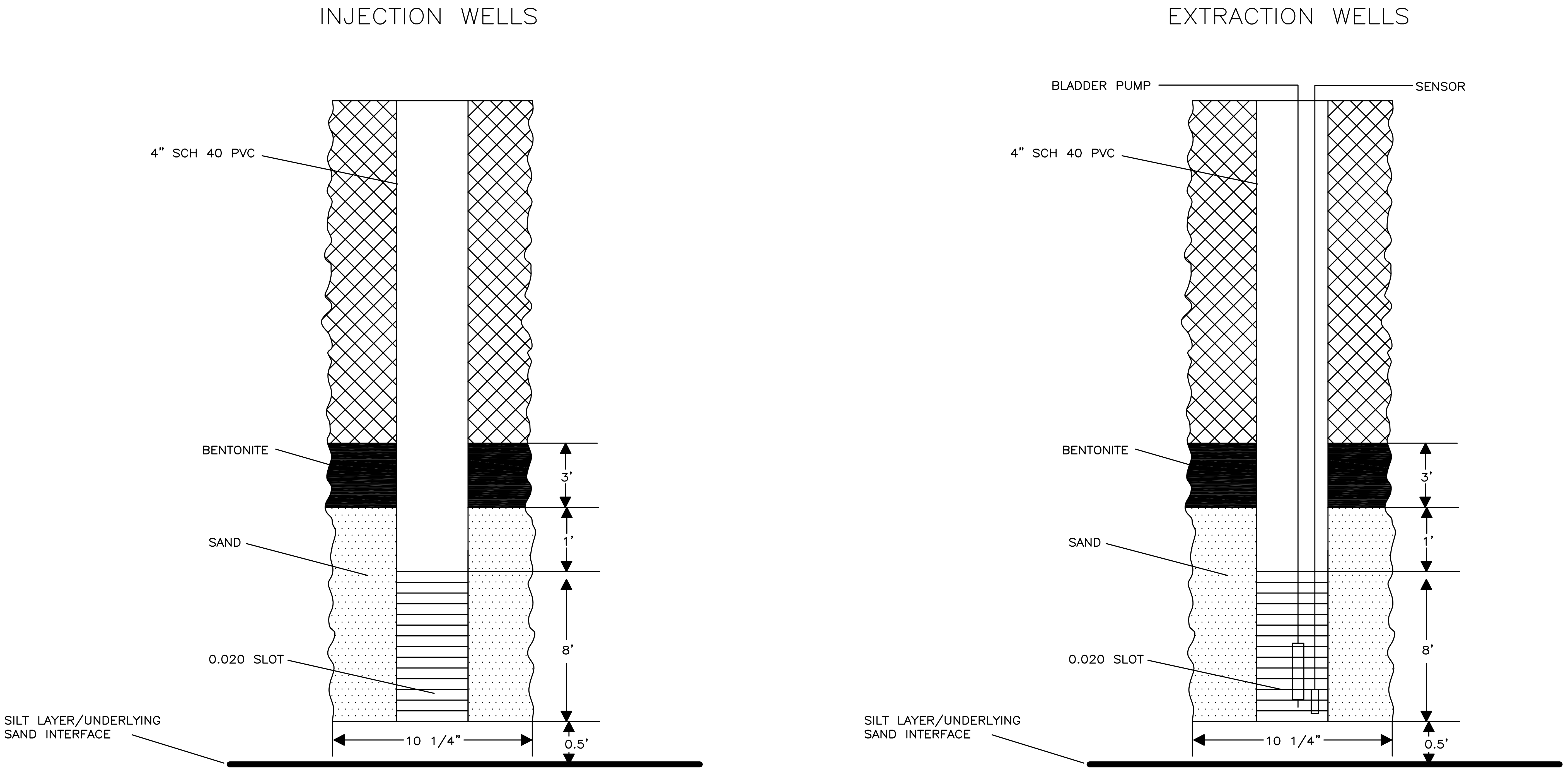

LEGEND

▨ CEMENT/BENTONITE GROUT

■ BENTONITE SEAL

⬚ SAND

Louis Berger & Assoc., P.C.
One Seaport Plaza, 199 Water Street, 23rd Floor,
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FIGURE 7
WELL CONSTRUCTION DETAILS

75–20 ASTORIA BLVD
JACKSON HEIGHTS, NEW YORK

OFFICE	NY
DRAWN BY	R. STRAUGHAN 7/15/11
JOB No.	XXXXX
PM	E. Gustafson
Appvd. By	E. Gustafson
DRAWING NUMBER	FIG – 7

OFFICE
NY

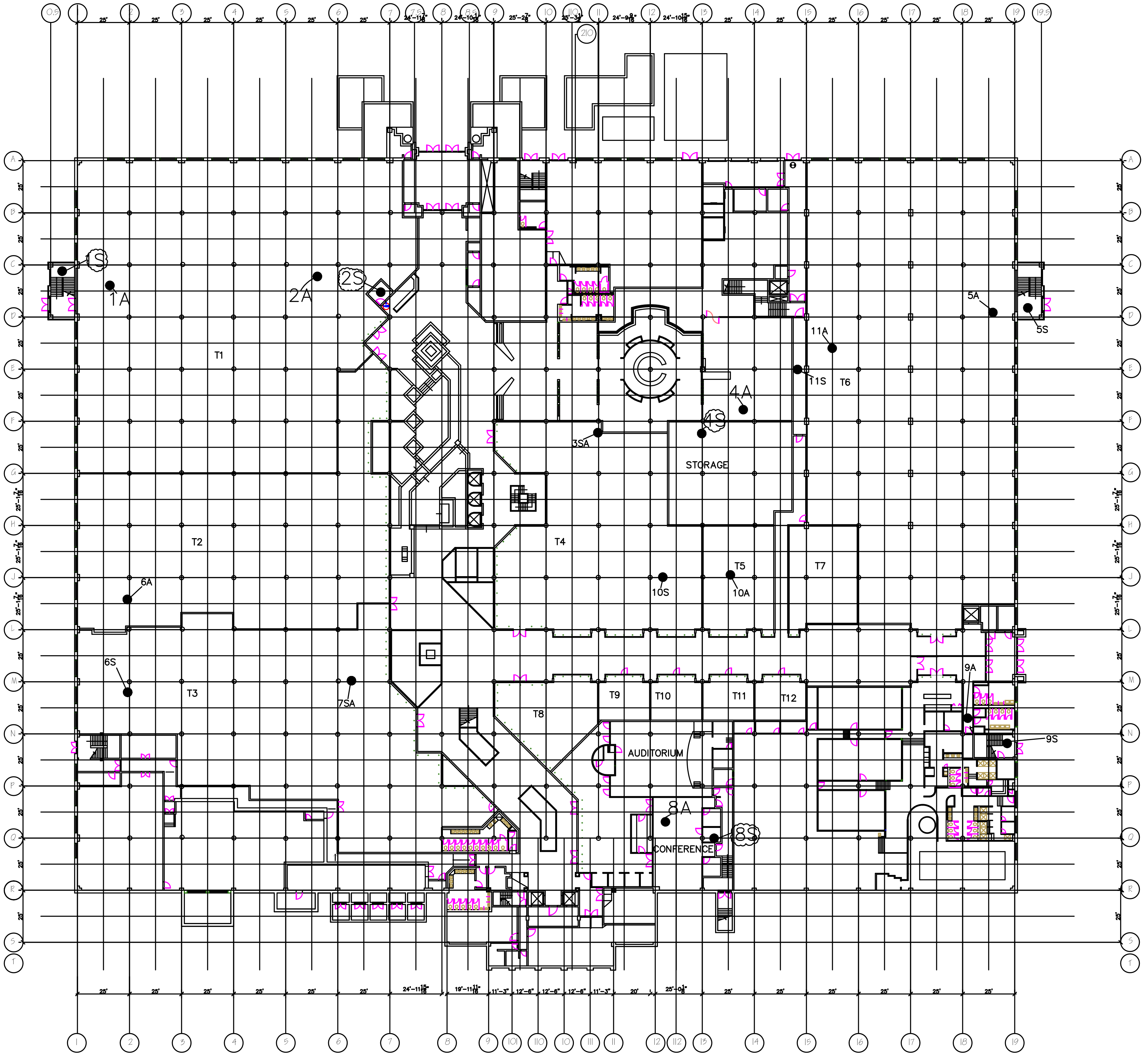
DRAWN BY
R. STRAUGHAN 7/15/11

JOB No.
XXXXXX

PM
E. Gustafson

Appvd. By
E. Gustafson

DRAWING NUMBER
FIG-8



SOURCE: BLUMENFIELD DEVELOPMENT GROUP FLOOR PLAN FOR 75-20 ASTORIA BLVD; DATE 5/10/04

FORMER MONITORING LOCATIONS (MARCH 2005)		
NUMBER	EW COLUMN	NS COLUMN
1-S	0.75	C 1/4
2-S	6 3/4	C 1/2
3-SA	11	F 1/4
4-S	13	F 1/4
5-S	19 1/4	C 3/4
6-S	2	M 1/4
7-SA	6 1/4	M
8-S	13 3/8	Q
9-S	18 3/4	N 1/4
10-S	12 1/4	J
11-S	13 3/4	E

ANNUAL MONITORING LOCATIONS		
NUMBER	EW COLUMN	NS COLUMN
1-S	0.75	C 1/4
2-S	6 3/4	C 1/2
4-S	13	F 1/4
8-S	13 3/8	Q

CO-SOLVENT FLUSHING SAMPLING LOCATIONS		
1-S	0.75	C 1/4
2-S	6 3/4	C 1/2

NOTES:
A = INDOOR AIR
S = SUB SLAB

SCALE
0 50 100 FEET
SCALE: 1"=50'

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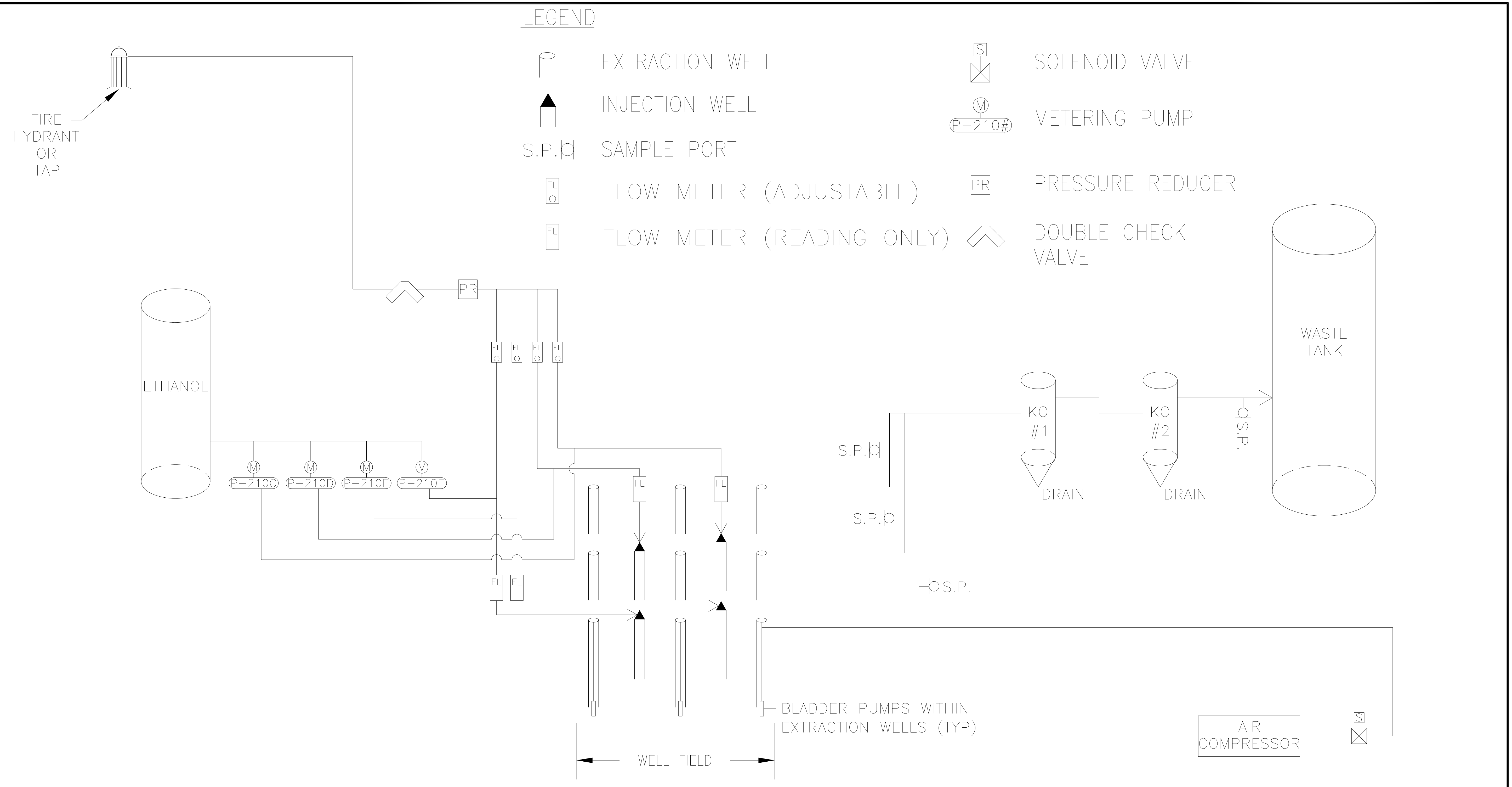
FIGURE 8
SUB-SLAB SAMPLING LOCATIONS

75-20 ASTORIA BLVD
JACKSON HEIGHTS, NEW YORK



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75-20 ASTORIA BOULEVARD
JACKSON HEIGHTS, QUEENS NEW YORK

FIGURE 9

CONCEPTUAL PROCESS & INSTRUMENTATION DIAGRAM

BIO-STIMULATION REMEDIATION
JACKSON HEIGHTS, QUEENS NEW YORK

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
NY,NY	R. STRAUGHAN	7/15/11	E.GUSTAFSON	7/15/11	E.GUSTAFSON	7/15/11	FIGURE 7

File: M:\NYCCAD\CADDTEMP-2011\Bulova Jackson HeightsReportsRAWP\FIG 9 BJH - PROCESS DIAGRAM.dwg
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TABLES

Table 1
Summary of Soil Analytical Data
Volatile Organic Compounds

75-20 Astoria Blvd Site
Jackson Heights, New York

Compound	NYS Soil Guidance Value	MW-35DD			B-42		B-43		B-44		B-45			B-46			B-47		
		33'-35' 01/13/09	59'-61' 01/15/09	65'-67' 01/15/09	37'-39' 01/22/09	57'-59' 01/23/09	31'-33' 01/27/09	63'-65' 01/29/09	27'-29' 01/30/09	63'-64' 02/02/09	29'-31' 03/11/09	35'-37' 03/11/09	57'-59' 03/11/09	23'-25' 03/16/09	34'-35' 03/16/09	65'-69' 03/17/09	21'-23' 03/19/09	37'-39' 03/19/09	61'-64' 03/20/09
Dichlorodifluoromethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Chloromethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Vinyl Chloride	200	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Bromomethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Chloroethane	1900	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Trichlorofluoromethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1,2-Trichlorotrifluoroethane	6000	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1-Dichloroethene	400	**880** D	12	25	28	U	U	U	21	U	**57000** D	U		**1100**	3.3 J	U	13	U	U
Acetone	200	**480**	U	U	U	U	**470**	U	140	U	U	11 J	15 J	U	54	27 J	57	U	U
Carbon Disulfide	2700	U	U	3.0 J	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Methyl tert-butyl Ether	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Methyl Acetate	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Methylene Chloride	100	U	U	6.9	U	U	U	U	U	U	U	U	3.5 J	U	U	U	U	U	U
trans-1,2-Dichloroethene	300	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1-Dichloroethane	200	**720** JD	6.1	160	4.5 J	U	91	U	130 JD	5.8 J	**18000**	U	4.5 J	**4000**	7.2	U	66	U	U
Cyclohexane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
2-Butanone	300	U	U	U	U	U	110 J	U	U	U	U	U		U	U	U	U	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U	U	U	16	U	U	U	U	U	U
cis-1,2-Dichloroethene	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Chloroform	300	18	U	4.1 J	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1,1-Trichloroethane	800	**67000** D	**3000** D	**1400** D	**5500** D	100	**1100** D	U	**1300** D	9.4	**8100000** D	11	220 D	**220000** D	3.5 J	3.4 J	19 D	U	10
Methylcyclohexane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Benzene	60	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,2-Dichloroethane	100	60	U	U	U	U	16 J	U	3.8 J	U	U	U		U	U	U	U	U	U
Trichloroethene	700	**2200** D	43	180 JD	40	U	U	U	24	U	**150000** D	U		**930**	U	U	9.2	U	U
1,2-Dichloropropane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Bromodichloromethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
4-Methyl-2-Pentanone	1000	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Toluene	1500	U	U	U	U	U	U	U	U	U	U	U		U	U	1.4 J	U	U	U
t-1,3-Dichloropropene	300	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
cis-1,3-Dichloropropene	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1,2-Trichloroethane	**	13	3.5 J	4.7 J	U	U	U	U	U	U	U	U		U	U	U	U	U	U
2-Hexanone	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Dibromochloromethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,2-Dibromoethane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Tetrachloroethene	1400	420 JD	15	110	12	U	40	U	14	U	**24000**	U		280 J	U	1.4 J	7.1 JD	U	U
Chlorobenzene	1700	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Ethyl Benzene	5500	U	U	U	U	U	U	U	U	U	U	U		U	U	1.2 J	U	U	U
m/p-Xylenes	1200	U	U	U	U	U	U	U	U	U	U	U		U	U	3.6 J	U	U	U
o-Xylene	1200	U	U	U	U	U	U	U	U	U	U	U		U	U	1.4 J	U	U	U
Styrene	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Bromoform	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
Isopropylbenzene	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,3-Dichlorobenzene	1600	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,4-Dichlorobenzene	8500	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,2-Dichlorobenzene	7900	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,2-Dibromo-3-Chloropropane	**	U	U	U	U	U	U	U	U	U	U	U		U	U	U	U	U	U
1,2,4-Trichlorobenzene	**	U	U	U	U	U	19 J	U	U	U	U	U		U	U	U	U	U	U
TOTAL	10000	71791	3079.6	1893.7	5584.5	100	1846	0	1632.8	15.2	8349000	22	259	226310	68	39.4	171.3	0	10

Notes:
Soil guidance values for NYSDEC TAGM 4046, Table 1, Rec. Soil Cleanup Objective
**: No soil guidance value identified for compound
Results in ug/Kg (ppb)
Bold = Exceeds the applicable NYS groundwater standard/GV.
NS = Not sampled.
ND = Not detected at laboratory detection limit.
J: Estimated Value
B: Analyte Found in Blank Sample

Table 1
Summary of Soil Analytical Data
Volatile Organic Compounds

75-20 Astoria Blvd Site
Jackson Heights, New York

Compound	B-48		B-54				
	30.5'-31' 04/15/09	34.5'-35' 04/15/09	21'-23' 09/03/10	25'-27' 09/03/10	31'-33' 09/03/10	41'-43' 09/04/10	62'-64' 09/04/10
Dichlorodifluoromethane	U	U	U	U		U	U
Chloromethane	U	U	U	U		U	U
Vinyl Chloride	5.7 J	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U
Chloroethane	U	U	85	130	16	U	U
Trichlorofluoromethane	U	U	U	U	U	U	U
1,1,2-Trichlorotrifluoroethane	U	U	U	U	U	U	U
1,1-Dichloroethene	260 JD	21	64	**420** JD	220	U	3.5 J
Acetone	U	U	56	**490**	**440**	U	8.8 J
Carbon Disulfide	U	3.7 J	U	U	U	U	U
Methyl tert-butyl Ether	5 J	U	1.6 J	1.5 J	U	U	U
Methyl Acetate	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U
1,1-Dichloroethane	**1100** D	**310** JD	170 JD	**1600** D	**980** D	U	22
Cyclohexane	U	U	U	U	U	U	U
2-Butanone	U	U	49	180	130	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	9.5	11	U	U	U
Chloroform	U	U	1.3 J	19	2.7 J	U	U
1,1,1-Trichloroethane	**18000** D	250 JD	500 JD	**7300** D	**4300** D	U	42
Methylcyclohexane	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	7.7	61	20	U	U
Trichloroethene	420 JD	8.5	35	66	40	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U
Toluene	U	U	1.2 J	U	U	U	U
t-1,3-Dichloropropene	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	3.6 J	2.3 J	U	U
2-Hexanone	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U
1,2-Dibromoethane	U	U	U	U	U	U	U
Tetrachloroethene	290 JD	3 J	17	22	21	U	U
Chlorobenzene	U	U	U	U	U	U	U
Ethyl Benzene	U	U	1.4 J	U	U	U	U
m/p-Xylenes	U	U	7.7 J	U	U	U	U
o-Xylene	U	U	3.6 J	U	U	U	U
Styrene	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U
Isopropylbenzene	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U
1,2-Dibromo-3-Chloropropane	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U
TOTAL	20080.7	596.2	1010	10304.1	6172	0	76.3

Notes:
Soil guidance values for NYSDEC TAGM 4046, Table 1, Rec. Soil Cleanup Objective
**: No soil guidance value identified for compound
Results in ug/Kg (ppb)
Bold = Exceeds the applicable NYS groundwater standard/GV.
NS = Not sampled.
ND = Not detected at laboratory detection limit.
J: Estimated Value
B: Analyte Found in Blank Sample

Table 2
Summary of Groundwater Analytical Data
Volatile Organic Compounds

75-20 Astoria Blvd Site
Jackson Heights, New York

	B-48	MW-52DD					MW-53DD					MW-55D1		MW-55D2		MW-55D3	
Compound	**4/15/09**	**9/23/09**	**12/1/09**	**2/24/10**	**5/17/10**	**9/27/10**	**9/23/09**	**12/1/09**	**2/24/10**	**5/17/10**	**9/27/10**	**5/17/10**	**9/10/10**	**5/17/10**	**9/10/10**	**5/17/10**	**9/10/10**
Dichlorodifluoromethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U		U	U	85.3 JD	U	U	U	U	U	U	U	U	U
Vinyl Chloride	12	U	U	U		U	U	U	U	32.0	142 D	U	28.1	U	U	U	U
Bromomethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	21	225 JD	U	6.3	199 D	40	1530 D	1420 D	8.9	533 D	1860 D	70.3 D	25.0	U	U	4.2 J	13.5
Trichlorofluoromethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichlorotrifluoroethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2800 D	825 D	483 D	14.9	74.4 D	43	608 D	389 D	12.2	76.1	129 D	89.3 D	190	734 D	279 D	28.9	88.8
Acetone	120	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U		U	U	223 D	U	U	8.4	7.3 JD	2.8 J	U	U	U	U
Methyl tert-butyl Ether	15	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Methyl Acetate	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	21000 D	3480 D	1570 D	50.7	1330 D	251 D	34400 D	67400 D	124	1580 D	7610 D	4250 D	2000 D	3900 D	2410 D	143	305 D
Cyclohexane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U		U	U	471 D	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	18000 D	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	5.5		2.9 J	321 JD	583 D	U	6.3	13.1	38.3 D	29.1	U	U	U	U
Chloroform	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	140000 D	132000 D	43500 D	488 D	5590 D	4120 D	106000 D	14900 D	661 D	3100 D	11400 D	3000 D	10200 D	46300 D	17400 D	1780 D	6630 D
Methylcyclohexane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1100 D	1630 D	605 D	38.5	93.2 D	161	648 D	229 D	9.2	38.6	252 D	51.0 D	261 D	474 D	438 D	80.8	183 D
1,2-Dichloropropane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1.9 J	U	U	U		U	U	U	U	2.3 J	8.2	U	U	U	U	U	U
t-1,3-Dichloropropene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	3.7 J	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	150	101 JD	U	U		8.0	214 JD	U	U	6.2	26.2	3.6 JD	18.4	U	U	2.4 J	10.8
Chlorobenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
m/p-Xylenes	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
Isopropylbenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromo-3-Chloropropane	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U		U	U	U	U	U	U	U	U	U	U	U	U
TOTAL (ug/L)	183223.6	138261	46158	603.9	7286.6	4625.9	143721	85700.3	815.3	5374.5	21448.9	7509.8	12754.4	51408.0	20527.0	2039.3	7231.1

Notes:

Results in ug/L (ppb)

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantification limit but greater than MDL.

D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.

Table 2
Summary of Groundwater Analytical Data
Volatile Organic Compounds

75-20 Astoria Blvd Site
Jackson Heights, New York

	MW-56D1				MW-56D2				MW-57D1				MW-57D2				MW-57D3			
Compound	**5/17/10**		**9/10/10**		**5/17/10**		**9/10/10**		**5/17/10**		**9/10/10**		**5/17/10**		**9/10/10**		**5/17/10**		**9/10/10**	
Dichlorodifluoromethane		U		U		U		U		U		U		U		U		U		U
Chloromethane		U		U		U		D		U		U		U		U		U		U
Vinyl Chloride		U		U	145	JD		U		U	82.9	D		U	37.3			U	3.5	J
Bromomethane		U		U		U		U		U		U		U		U		U		U
Chloroethane	1239	D	2620	D	987	JD	1520	U	7470	D	13400	D	172	D	881	D	82.1	D	36.1	
Trichlorofluoromethane		U		U		U		U		U		U		U		U		U		U
1,1,2-Trichlorotrifluoroethane		U		U		U		U		U		U		U		U		U		U
1,1-Dichloroethene	13400	D	12040	D	17400	D	10600	D	110	D	22.2	D	262	D	64.4		172	D	53.5	
Acetone		U		U		U		U		U		U		U		U		U		U
Carbon Disulfide		U		U		U		U		U	30.8	D		U	98.4			U	2.0	J
Methyl tert-butyl Ether		U		U		U		U		U		U		U		U		U		U
Methyl Acetate		U		U		U		U		U		U		U		U		U		U
Methylene Chloride		U		U		U		U		U		U		U		U		U		U
trans-1,2-Dichloroethene		U		U		U		U		U		U		U		U		U		U
1,1-Dichloroethane	32800	D	45040	D	59400	D	115000	D	4270	D	8620	D	3260	D	3610	D	2010	D	296	D
Cyclohexane		U		U		U		U		U		U		U		U		U		U
2-Butanone		U		U		U	2135	JD		U		U		U		U		U		U
Carbon Tetrachloride		U		U		U		U		U		U		U		U		U		U
cis-1,2-Dichloroethene		U		U		U		U		U		U		U	20.6			U	5.0	
Chloroform		U		U	1082	D		U		U		U		U		U		U		U
1,1,1-Trichloroethane	1120000	D	909000	D	888000	D	844000	D	6060	D	12100	D	18500	D	536	D	10700	D	2110	D
Methylcyclohexane		U		U		U		U		U		U		U		U		U		U
Benzene		U		U		U		U		U		U		U		U		U		U
1,2-Dichloroethane		U		U		U		U		U		U		U		U		U		U
Trichloroethene	13200	D	12800	D	10400	D	9770	D	94.4	D	105	D	249	D	110		128	D	81.9	
1,2-Dichloropropane		U		U		U		U		U		U		U		U		U		U
Bromodichloromethane		U		U		U		U		U		U		U		U		U		U
4-Methyl-2-Pentanone		U		U		U		U		U		U		U		U		U		U
Toluene		U		U		U		U		U		U		U		U		U		U
t-1,3-Dichloropropene		U		U		U		U		U		U		U		U		U		U
cis-1,3-Dichloropropene		U		U		U		U		U		U		U		U		U		U
1,1,2-Trichloroethane		U		U		U		U		U		U		U		U		U		U
2-Hexanone		U		U		U		U		U		U		U		U		U		U
Dibromochloromethane		U		U		U		U		U		U		U		U		U		U
1,2-Dibromoethane		U		U		U		U		U		U		U		U		U		U
Tetrachloroethene		U		U		U	313	JD	11.4	JD		U		U	2.8	J		U	4.4	J
Chlorobenzene		U		U		U		U		U		U		U		U		U		U
Ethyl Benzene		U		U		U		U		U		U		U		U		U		U
m/p-Xylenes		U		U		U		U		U		U		U		U		U		U
o-Xylene		U		U		U		U		U		U		U		U		U		U
Styrene		U		U		U		U		U		U		U		U		U		U
Bromoform		U		U		U		U		U		U		U		U		U		U
Isopropylbenzene		U		U		U		U		U		U		U		U		U		U
1,1,2,2-Tetrachloroethane		U		U		U		U		U		U		U		U		U		U
1,3-Dichlorobenzene		U		U		U		U		U		U		U		U		U		U
1,4-Dichlorobenzene		U		U		U		U		U		U		U		U		U		U
1,2-Dichlorobenzene		U		U		U		U		U		U		U		U		U		U
1,2-Dibromo-3-Chloropropane		U		U		U		U		U		U		U		U		U		U
1,2,4-Trichlorobenzene		U		U		U		U		U		U		U		U		U		U
TOTAL (ug/L)	1180639.0		981500.0		977414.0		983338.0		18015.8		34360.9		22443.0		5360.5		13092.1		2592.4	

Notes:

Results in ug/L (ppb)

U - The compound was not detected at the indicated concentration.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantification limit but greater than MDL.

D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.

Table 3
Process and Monitoring Schedule

75-20 Astoria Blvd Site
Jackson Heights, New York

SYSTEM PROCESS						MONITORING		
Stage	Phase	Injection Wells Utilized	Injection Rate (gpm)	Extraction Wells Utilized	Extraction Rate (gpm)	Locations	Parameters	Frequency
Pre-Ethanol Injection Monitoring	Pre-Injection Monitoring	INJ-01 through INJ-04	0.125 each (water only)	EXT-01 through EXT-04 EXT-05 through EXT-08 EXT-09	0.07 each 0.03 each 0.12	Extraction Wells EXT-01 to EXT-09 Injection Well IW-7, IW-8, IW-9, IW-13 and IW-14 Extraction Wells EW-9, EW-10 and EW-16 Silt-Zone Monitoring Wells MW-35S, 42S to 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, MW-55D1 and MW-56D1	Groundwater Elevations	Through-Out Pre-Ethanol Injection Activities
						Extraction Wells EXT-1 to EXT-9 Injection Well IW-8 and IW-9 Extraction Wells EW-9, 10 and 16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	End of Pre-Ethanol Injection Activities
1	1	EXT-09	0.12 (ethanol ramp up)	EXT-01 through EXT-04	0.04 each	EXT-01 to EXT-04 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Co-solvent Flushing Injection Well INJ-8 Bioremediation Injection Well IW-8 Bioremedation Extraction Well EW-16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S, 49S, and 50S Underlying Sandy-Zone Monitoring Wells MW-35D and 56D1	VOCs, Ethanol	End of Phase 1
	2	EXT-09	0.12 (ethanol only)	EXT-01 through EXT-04	0.04 each	EXT-01 to EXT-04 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Co-solvent Flushing Injection Well INJ-8 Bioremediation Injection Well IW-8 Bioremedation Extraction Well EW-16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S, 49S, and 50S Underlying Sandy-Zone Monitoring Wells MW-35D and 56D1	VOCs, Ethanol	Every 3rd Day
	3	EXT-09	0.12 (ethanol ramp down)	EXT-01 through EXT-04	0.04 each	EXT-01 to EXT-04 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Co-solvent Flushing Injection Well INJ-8 Bioremediation Injection Well IW-8 Bioremedation Extraction Well EW-16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S, 49S, and 50S Underlying Sandy-Zone Monitoring Wells MW-35D and 56D1	VOCs, Ethanol	End of Phase 3
	4	EXT-09	0.12 (water only)	EXT-01 through EXT-04	0.04 each	EXT-01 to EXT-04 Collection Tank (VOCs only) Co-solvent Flushing Injection Well INJ-8 Bioremediation Injection Well IW-8 Bioremedation Extraction Well EW-16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S, 49S, and 50S Underlying Sandy-Zone Monitoring Wells MW-35D and 56D1	VOCs, Ethanol	Every 3rd Day
2	1	INJ-01 through INJ-04	0.125 each (ethanol ramp up)	EXT-01 through EXT-04 EXT-05 through EXT-08 EXT-09	0.07 each 0.03 each 0.12	Extraction Wells EXT-01 to EXT-09 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Injection Well IW-8 and IW-9 Extraction Wells EW-9, EW-10 and EW-16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	End of Phase 1
	2	INJ-01 through INJ-04	0.125 each (ethanol only)	EXT-01 through EXT-04 EXT-05 through EXT-08 EXT-09	0.07 each 0.03 each 0.12	Extraction Wells EXT-01 to EXT-09 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Injection Well IW-8 and IW-9 Extraction Wells EW-9, 10 and 16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	Every 3rd Day
	3	INJ-01 through INJ-04	0.125 each (ethanol ramp down)	EXT-01 through EXT-04 EXT-05 through EXT-08 EXT-09	0.07 each 0.03 each 0.12	Extraction Wells EXT-01 to EXT-09 Collection Tank (VOCs only)	VOCs, Ethanol	Daily
						Injection Well IW-8 and IW-9 Extraction Wells EW-9, 10 and 16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	End of Phase 3
	4	INJ-01 through INJ-04	0.125 each (water only)	EXT-01 through EXT-04 EXT-05 through EXT-08 EXT-09	0.07 each 0.03 each 0.12	Extraction Wells EXT-01 to EXT-09 Collection Tank (VOCs only) Injection Well IW-8 and IW-9 Extraction Wells EW-9, 10 and 16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	Every 3rd Day
Post-Ethanol Injection Monitoring	Post-Injection Monitoring	NA	NA	NA	NA	Extraction Wells EXT-01 to EXT-09 Extraction Wells EW-9, 10 and 16 Silt-Zone Monitoring Wells MW-35S, 42S, 45S, 46S and 49S to 51S Underlying Sandy-Zone Monitoring Wells MW-35D, 55D1 and 56D1	VOCs, Ethanol	Time = 1 week and 8 week post injection activites

APPENDIX A

BORING LOGS

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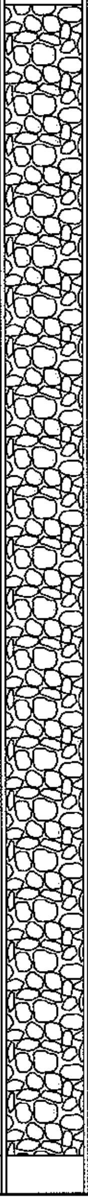
Drilling Log

Soil Boring **B-42**

Page: 1 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date Permit # *NA*
Checked By *E. Gustafson* License No.

COMMENTS
Selected 37'-39' and 57'-59' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Asphalt
0						Air drilled to pre-clear through upper fill material
2						
4						
6						
8						
10						
12						
14						

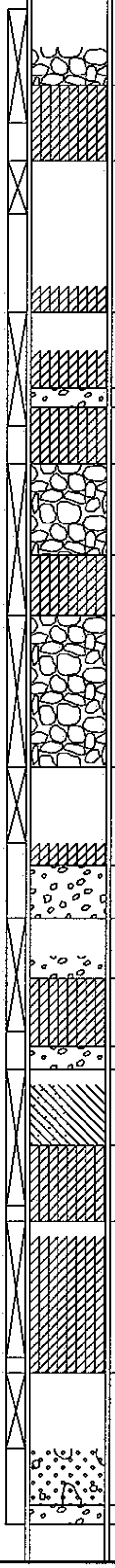
Continued Next Page

Drilling Log

Soil Boring **B-42**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Continued



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
16	69.1	15-17' 75%			Gray brown saturated Silty Clay with brick/fill fragments Grayish brown saturated Silty Clay
18	22.9	17'-19' 35%			Grayish brown saturated Silty Clay
20	35.9	19'-21' 75%			Gray brown saturated Silty Clay Gray saturated fine to medium Sand, some fines (clay/silt) Gray brown saturated Silty Clay Gray brown mushy mix of sand/silt/varoius debris (brick/asphalt)
22	49.0	21'-23' 100%			Grayish brown Silty Clay Gray brown mushy mix of sand/silt/clay with various debris (brick/asphalt)
24	16.4	23'-25' 100%			
26	1228 1369	25'-27' 50%			Gray brown saturated Silty Clay various debris (rocks/wood/brick). Note: Sample partially flouresced under UV light, visible sheen present Tan brown saturated fine to medium Sand. Note: Sample flouresced under UV light, visible sheen present
28	1894	27'-29' 75%			Tan brown saturated fine to medium Sand. Note: Visual DNAPL present, sample flouresced under UV light Gray brown saturated Silty Clay. Note: Visual DNAPL present, sample flouresced under UV light Tan brown saturated fine to medium Sand. Note: Visual DNAPL present, sample flouresced under UV light
30	1842 1622	29'-31' 90%			Mucky mix of sand/silt/clay with debris (rock/brick fragments). Note: Visual DNAPL present, sample flouresced under UV light Gray brown saturated Silty Clay. Note: Visual DNAPL present, sample flouresced under UV light
32	1490	31'-33' 90%			Gray brown saturated Silty Clay. Note: Visual DNAPL present, sample flouresced under UV light
34	1653 1632	33'-35' 50%			Gray brown saturated Silty Clay with debris (rocks/gravel). Note: Visual DNAPL present, sample flouresced under UV light

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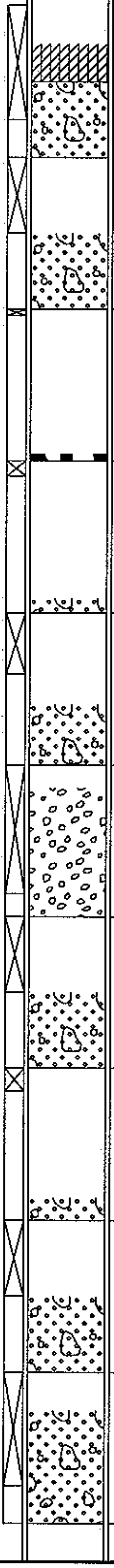
Drilling Log

Soil Boring **B-42**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
	1412	35'-37' 75%				Reddish brown saturated medium to fine Sand. Note: Visual DNAPL present, sample flouresced under UV light. At sand/silt interface soil was black in color
36						Gray brown saturated Silty Clay. Note: Sample flouresced under UV light, sheen on water
	1487					Reddish brown saturated medium to fine Sand, trace pebbles. Note: Sample partially flouresced under UV light
38	1448	37'-39' 50%				Reddish brown saturated medium to fine Sand, trace gravel. Note: Sample flouresced under UV light, sheen on water
40	1435	39'-41' 5%				
						Rock stuck in bottom of split spoon sampler. Note: Sample flouresced under UV light, sheen on water
42	1347	41'-43' 10%				
						Reddish brown saturated well graded Sand. Note: Sample flouresced under UV light, sheen on water
44	1293	43'-45' 40%				Reddish brown saturated medium to fine Sand, some rocks. Note: Sample partially flouresced under UV light, sheen on water
						Reddish brown saturated well graded Sand
46	593	45'-47' 85%				
48	758	47'-49' 50%				Reddish brown saturated medium to fine Sand, trace rocks and pebbles
50	1083	49'-51' 15%				
						Reddish brown saturated well graded Sand, some pebbles
52	973	51'-53' 50%				Reddish brown saturated well graded Sand, some rocks
54	563	53'-55' 75%				Reddish brown saturated medium to fine Sand, some rocks

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Drilling Log

Soil Boring **B-42**
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Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
56	726	55'- 57' 40%				Reddish brown saturated medium to coarse Sand
58	1189	57'- 59' 10%				Reddish brown saturated well graded Sand, some pebbles and rocks
60	1143	59'- 61' 15%				Rock and brick fragments, saturated. Note: Sample partially flouresced under UV light
62	1124	61'- 63' 5%				Rock and pebble fragments mixed with coarse sand, saturated.
64	869	63'- 65' 50%				Gray saturated Silt
66						
68						
70						
72						
74						

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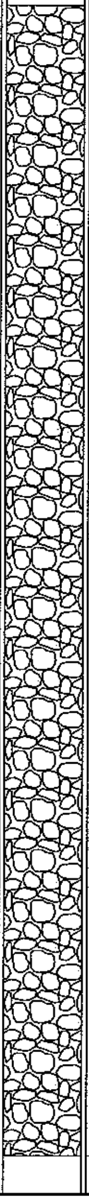
Drilling Log

Soil Boring **B-43**

Page: 1 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date ____ Permit # *NA*
Checked By *E. Gustafson* License No. ____

COMMENTS
Selected 31'-33' and 63'-65' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Asphalt
0						Air drilled to pre-clear through upper fill material
2						
4						
6						
8						
10						
12						
14						

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Drilling Log

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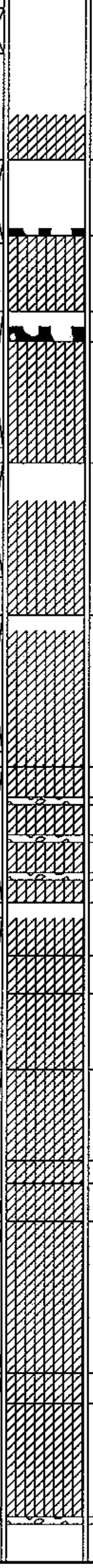
Soil Boring **B-43**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
16	6.6	15-17' 30%				Grayish brown Silty Clay, some tan brown medium sand
18	48.6	17'-19' 55%				Crushed brick and rock fragments Grayish brown saturated Silty Clay
20	41.4	19'-21' 90%				Crushed brick and rock fragments Grayish brown saturated Silty Clay
22	83.7	21'-23' 75%				Gray brown saturated Silty Clay
24	116	23'-25' 90%				Gray brown saturated Silty Clay
26	384	25'-27' 90%				Gray brown saturated Silty Clay Light brown saturated fine Sand Gray brown saturated Silty Clay Light brown saturated fine Sand Gray brown saturated Silty Clay Light brown saturated fine Sand Gray brown saturated Silty Clay
28	169 202 169	27'-29' 100%				Gray brown saturated Silty Clay Gray brown saturated Silty Clay, some fine sand Gray brown saturated Silty Clay
30	406	29'-31' 100%				Gray brown saturated Silty Clay Gray brown saturated Silty Clay, some light brown fine sand Gray brown saturated Silty Clay
32	878	31'-33' 100%				Gray brown saturated Silty Clay. Note: Sample partially flouresced under UV light
34	236	33'-35' 100%				Gray brown saturated Clayey Silt Gray brown saturated Silty Clay

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Drilling Log

Soil Boring **B-43**

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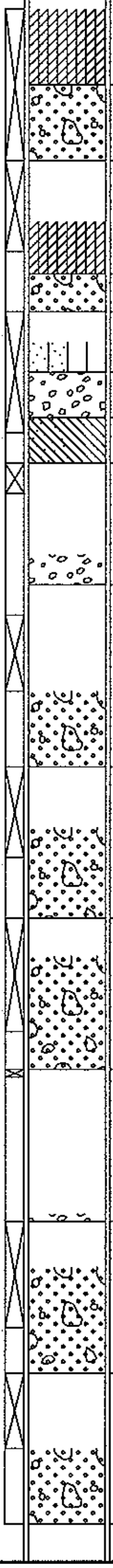
Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
	360					Reddish brown saturated medium Sand Gray brown saturated Silty Clay
36	163	35'- 37' 100%				Reddish brown saturated medium to fine Sand, some rock fragments
38	548	37'- 39' 60%				Gray brown saturated Sily Clay
	53.5					Reddish brown saturated medium to fine Sand, some rock fragments
						Mirky mix of clay, silt and sand
40	154	39'- 41' 80%				Reddish brown saturated medium to fine Sand
						Mirky mix of clay, silt and sand
42	461	41'- 43' 20%				Reddish brown well graded Sand
44	54.2	43'- 45' 50%				Reddish brown medium to fine Sand, some pebbles and rocks
46	160	45'- 47' 60%				Reddish brown medium to fine Sand, some pebbles and rocks
48	106	47'- 49' 75%				Reddish brown medium to fine Sand, some pebbles and rocks
50	29.5	49'- 51' 5%				
						Light brown saturated well graded Sand
52	41.8	51'- 53' 70%				Reddish brown saturated medium to fine Sand, some pebbles and rocks
54	34.9	53'- 55' 50%				Reddish brown saturated medium to fine Sand, some pebbles

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Drilling Log

Soil Boring **B-43**
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Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
						Reddish brown saturated well graded Sand, some pebbles and rocks
56	29.9	55'- 57' 100%				
58	2.1	57'- 59' 60%				Reddish brown saturated medium to fine Sand, some pebbles and rocks
						No Recovery
60	NA	59'- 61' 0%				
62	2.0	61'- 63' 25%				
						Reddish brown saturated medium to fine Sand, some rocks
64		63'- 65' 50%				
	5.4					Reddish brown saturated medium to fine Sand, some pebbles
	0.0					Gray saturated Silt
66						
68						
70						
72						
74						

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Drilling Log

Soil Boring **B-44**

Page: 1 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date Permit # *NA*
Checked By *E. Gustafson* License No.

COMMENTS
Selected 27'-29' and 63'-64' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Grass
0				▨		Air drilled to pre-clear through upper fill material
2				▨		
4				▨		
6				▨		
8				▨		
10				▨		
12				▨		
14				▨		

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Drilling Log

Soil Boring **B-44**

Page: 2 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
16	NA	15-17' 5%				Fill Material - rock, brick and wood fragments
18	4.3	17'-19' 25%				Fill Material - sand and crushed stone, rock and brick fragments Gray brown saturated Silty Clay
	0.0					Gray brown saturated Silty Clay
20		19'-21' 75%				Gray brown saturated medium to fine Sand
	14.1					
22	71.1 206 74.8	21'-23' 80%				Gray brown Silty Clay Gray brown saturated medium to fine Sand, some rocks Gray brown saturated Silty Clay
24	123 72.9	23'-25' 60%				Gray brown Silty Clay mixed with medium to fine sand Gray brown saturated Silty Clay
26	358	25'-27' 75%				Gray brown saturated Silty Clay, some sand Light brown saturated medium to fine Sand Gray brown saturated Silty Clay, some sand
						Gray brown saturated Silty Clay
28	812	27'-29' 100%				
	425					Gray brown saturated medium to fine Sand, some brick fragments Gray brown saturated Silty Clay
30	504	29'-31' 100%				
						Gray brown saturated Silty Clay
32	312	31'-33' 100%				
						Gray brown saturated Silty Clay
34	227	33'-35' 100%				

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Drilling Log

Soil Boring **B-44**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
36	74.9	35'-37' 100%				Gray brown saturated Silty Clay
						Reddish brown saturated medium to fine Sand
	54.9					Gray brown saturated Silty Clay
38	20.6	37'-39' 100%				Reddish brown saturated medium to fine Sand, some pebble and crushed rock
40	7.1	39'-41' 60%				Reddish brown saturated medium to fine Sand, some pebble and crushed rock
42	2.9	41'-43' 5%				
						Reddish brown saturated medium to fine Sand, some rocks
44	0.0	43'-45' 60%				Reddish brown saturated medium to fine Sand, some pebbles
46	4.2	45'-47' 50%				Reddish brown saturated medium to fine Sand, some pebbles
48	8.6	47'-49' 95%				Reddish brown saturated medium to fine Sand, some pebbles and rocks
50	5.9	49'-51' 95%				Reddish brown saturated medium to fine Sand, some pebbles and rocks
						Reddish brown saturated well graded Sand, some rocks
52	11.4	51'-53' 45%				Reddish brown saturated medium to fine Sand, some rocks
54	6.8	53'-55' 100%				Reddish brown saturated medium to fine Sand, some pebbles and rocks

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Drilling Log

Soil Boring **B-44**

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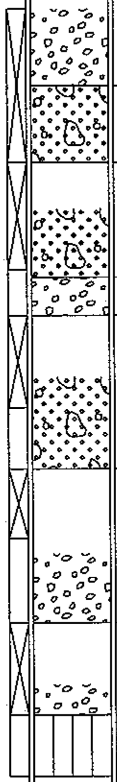
Project 75-20 Astoria Blvd Site Owner Blumenfeld Development Group, Inc.

Location 75-20 Astoria Blvd, Jackson Heights, New York Proj. No. 821687



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
	5.3	55'-57' 100%				Reddish brown saturated coarse Sand
56	0.0					Reddish brown saturated medium to fine Sand, some pebbles and rocks
58	0.0	57'-59' 70%				Reddish brown saturated medium to fine Sand, some pebbles and rocks
	0.0					Tan brown saturated fine Sand
60	0.0	59'-61' 60%				Reddish brown medium to fine Sand, some tan brown fine sand and rocks
62	1.3	61'-63' 45%				Tan brown saturated fine Sand
64	0.0	63'-65' 60%				Tan brown saturated well graded Sand
	0.0					Gray saturated Silt
66						
68						
70						
72						
74						

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Drilling Log

Soil Boring **B-45**

Page: 1 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *61.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *NA* Length *NA* Type/Size *NA*
Casing: Dia *NA* Length *NA* Type *NA*
Fill Material *Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date Permit # *NA*
Checked By *E. Gustafson* License No.

COMMENTS
Selected 29'-31', 35'-37' and 57'-59' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Concrete
0						Air drilled to pre-clear through upper fill material
2						
4						
6						
8						
10						
12						
14						

Continued Next Page

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Drilling Log

Soil Boring **B-45**

Project 75-20 Astoria Blvd Site Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York Proj. No. 821687

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
16	12.6	15'-17' 5%				
						Dark gray saturated Silty Clay
18	54.8	17'-19' 50%				Gray saturated Silty Clay
20	30.8	19'-21' 60%				Gray brown saturated Silty Clay
						Brown saturated medium to fine gray brown Sand
22	93.8	21'-23' 20%				
						Gray brown saturated Silty Clay, some medium sand
24	209	23'-25' 65%				Gray brown saturated Silty Clay
						Gray brown saturated Silty Clay. Note: Visible DNAPL sheen present; Sample flouresced under UV light
26	1888	25'-27' 75%				
						Gray brown saturated Silty Clay. Note: Visible DNAPL sheen present; Sample flouresced under UV light
						Gray brown saturated Silty Clay. Note: Visible DNAPL present; Sample flouresced under UV light
28	1567	27'-29' 100%				
						Gray brown saturated Silty Clay. Note: Visible DNAPL present; Sample flouresced under UV light
30	1396	29'-31' 65%				
						Gray brown saturated Silty Clay. Note: Visible DNAPL present; Sample flouresced under UV light
						Gray brown saturated Clayey Silt. Note: Strong odor preset; Sample flouresced under UV light
32	1305	31'-33' 100%				
						Gray brown saturated Silty Clay. Note: Visible DNAPL sheen present; Stong odor; Sample flouresced under UV light
34	1193	33'-35' 90%				

Continued Next Page

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Drilling Log

Soil Boring **B-45**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Continued

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
	1221	35'- 37' 80%				Gray brown saturated Silty Clay. Note: Stong odor; Sample partially flouresced under UV light
36	1010					Reddish brown saturated medium to fine Sand. Note: Stong odor
	772	37'- 39' 75%				Gray brown saturated Silty Clay
38	108					Reddish brown saturated medium to fine Sand
40	1106	39'- 41' 20%				Reddish brown saturated medium to fine Sand, some rock fragments
42	1066	41'- 43' 5%				Well graded reddish brown saturated Sand
44	305	43'- 45' 60%				Reddish brown saturated medium to fine Sand mixed with pebbles, trace rock fragments
46	79.3	45'- 47' 50%				Reddish brown saturated medium to fine Sand, some pebbles
48	190	47'- 49' 50%				Well graded reddish brown saturated Sand, some pebbles
50	443	49'- 51' 20%				Well graded reddish brown saturated Sand, some pebbles Well graded reddish brown saturated Sand, some pebbles, trace rocks
52	108	51'- 53' 100%				
54	261	53'- 55' 40%				Reddish brown saturated medium to fine Sand, some pebbles and rocks

Continued Next Page

Shaw E & I, Inc.

Drilling Log

Soil Boring **B-45**

Page: 4 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
56	404	55'- 57' 20%				
						Well graded reddish brown saturated Sand, some pebbles and rocks
58	845 76.5 845	57'- 59' 45%				Well graded reddish brown saturated Sand, some pebbles and rocks Well graded tan brown saturated Sand Well graded reddish brown saturated Sand, some pebbles and rocks
60	777	59'- 61' 5%				
						Gray brown saturated fine Sand, some rock fragments. Note: Refusal at 61'
62						
64						
66						
68						
70						
72						
74						

Shaw E & I, Inc.

Drilling Log

Soil Boring **B-46**

Page: 1 of 4

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 67.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia NA
Length NA
Type/Size NA
Casing: Dia NA
Length NA
Type NA
Fill Material Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS
Selected 23'-25', 34'-35' and 65'-67' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Asphalt
0						Air drilled to pre-clear through upper fill material
2						
4						
6						
8						
10						
12						
14						

Continued Next Page

Drilling Log

Soil Boring **B-46**
Page: 2 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Continued

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
16	326	15'-17' 20%				Gray brown saturated Silty Clay, some sand and rock fragments
18	204	17'-19' 30%				Gray brown saturated Silty Clay, some sand and rock fragments
20	47.8 342 47.8	19'-21' 60%				Gray brown saturated Silty clay Yellowish brown saturated medium to fine Sand Gray brown saturated Silty Clay
22	1212	21'-23' 100%				Gray brown saturated Silty Clay, some medium to coarse sand. Note: Sample flouresced under UV light Light gray saturated medium to coarse Sand. Note: Sample floueresced under UV light Gray brown saturated Silty Clay, some medium to coarse sand. Note: Sample floursced under UV light
24	1247	23'-25' 85%				Gray brown saturated Silty Clay. Note: visible sheen present; Sample floursced under UV light Gray brown saturated Silty Clay. Note: visible sheen present; Sample partially floursced under UV light
26	656	25'-27' 95%				Gray brown saturated Silty Clay Light gray saturated medium to coarse Sand Gray brown saturated Silty Clay Gray brown saturated Silty Clay
28	798	27'-29' 100%				
30	267	29'-31' 100%				Gray brown saturated Silty Clay
32	5.4	31'-33' 100%				Gray brown saturated Silty Clay
34	244 82.3	33'-35' 65%				Gray brown saturated Silty Clay Dark gray/black saturated medium Sand

Continued Next Page

Drilling Log

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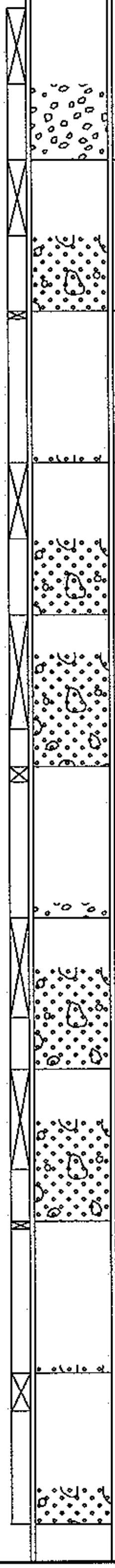
Soil Boring **B-46**
Page: 3 of 4

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
						Reddish brown saturated medium Sand
36	98.7	35'-37' 50%				Well graded reddish brown saturated Sand
38	75.3	37'-39' 50%				Reddish brown saturated medium to fine Sand, some pebbles
40	24.4	39'-41' 5%				
						Well graded reddish saturated brown Sand, some rock and brick fragments
42	15.6	41'-43' 50%				Reddish brown satarated medium to fine Sand, some rock and pebbles
						Reddish brown medium to fine Sand, some pebbles
44	6.6	43'-45' 75%				
46	25.3	45'-47' 10%				
						Reddish brown saturated well graded Sand
48	7.2	47'-49' 65%				Reddish brown medium to fine Sand, some pebbles
50	0.9	49'-51' 65%				Reddish brown saturated medium to fine Sand, trace rock
52	1.4	51'-53' 5%				
						Well graded reddish brown saturated Sand, some pebbles
54	0.1	53'-55' 25%				
						Well graded reddish brown saturated Sand, some rock fragments



Continued Next Page

Shaw E & I, Inc.

Drilling Log

Soil Boring **B-46**
Page: 4 of 4

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
56	0.4	55'-57' 50%				Tan to yellow to brown coarse Sand, some rocks
	0.7					Gray brown Sandy Silt , some pebbles
						Refusal
58	NA	57'-59' 0%				
						Refusal
60	NA	59'-61' 0%				
62	5.2	61'-63' 40%				Light gray saturated Sandy Silt, some pebbles and rocks
						Refusal
64	NA	63'-65' 0%				
66	0.5	65'-67' 60%				Gray saturated Silt
68						
70						
72						
74						

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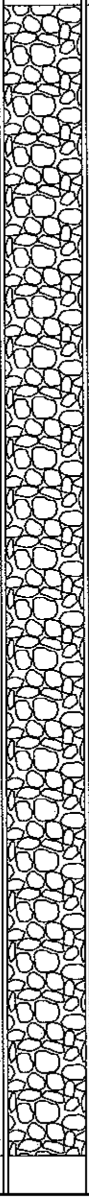
Drilling Log

Soil Boring B-47

Page: 1 of 4

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 67.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia NA
Length NA
Type/Size NA
Casing: Dia NA
Length NA
Type NA
Fill Material Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS
Selected 21'-23', 37'-39' and 61'-64' soil samples for laboratory analysis.

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Asphalt
0						Air drilled to pre-clear through upper fill material
2						
4						
6						
8						
10						
12						
14						

Continued Next Page

Drilling Log

Soil Boring **B-47**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
16	133	15'-17' 15%				
						Fill Material - Gray brown saturated sand, rock, brick and wood
18	1739	17'-19' 15%				
						Gray saturated Silty Clay, some rock fragments
20	1025	19'-21' 65%				Gray brown saturated Clayey Silt
22	6046 >9999 6046 >9999	21'-23' 80%				Gray brown saturated Clayey Silt. Note: Stong odor; Sample partially flouresced under UV light Tan brown saturated medium Sand. Note: Stong odor; Sample flouresced under UV light Gray brown saturated Silty Clay. Note: Stong odor; Sample partially flouresced under UV light Tan brown saturated medium Sand. Note: Stong odor; Sample flouresced under UV light
24	935	23'-25' 5%				
						Gray brown saturated Silty Clay
26	2107	25'-27' 30%				
						Gray brown saturated Silty Clay. Note: Sample partially flouresced under UV light
						Gray brown saturated Silty Clay. Note: Sample partially flouresced under UV light
28	3107	27'-29' 90%				
						Gray brown saturated Silty Clay. Note: Sample partially flouresced under UV light
30	2122	29'-31' 100%				
						Gray brown saturated Silty Clay
32	3316	31'-33' 100%				
						Gray brown saturated Silty Clay
34	1401	33'-35' 85%				
						Gray brown saturated Silty Clay

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Drilling Log

Soil Boring **B-47**
Page: 3 of 4

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
						Reddish brown saturated medium Sand
36	3106	35'-37' 35%				
						Gray brown saturated Silty Clay, some rock
38	173	37'-39' 65%				Reddish brown saturated fine to medium Sand, some pebbles
40	39.3	39'-41' 70%				Reddish brown saturated fine to medium Sand, some pebbles and rocks
42	389	41'-43' 75%				Reddish brown saturated fine to medium Sand, some pebbles and rocks
	0.0	43'-45' 50%				
44						Reddish brown saturated fine to medium Sand, some pebbles and rocks
46	0.0	45'-47' 45%				Reddish brown saturated fine to medium Sand, some pebbles
48	0.0	47'-49' 65%				Reddish brown saturated fine to medium Sand, some pebbles
50	20.1	49'-51' 20%				
						Reddish brown saturated fine to medium Sand, some pebbles
52	9.1	51'-53' 55%				Reddish brown saturated fine to medium Sand, some rocks
54	4.7	53'-55' 50%				Reddish brown saturated fine to medium Sand, some pebbles and rocks

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Drilling Log

Soil Boring **B-47**
Page: 4 of 4

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
56	6.0	55'-57' 10%				
						Reddish brown saturated fine to medium Sand, some rocks
58	11.7	57'-59' 25%				
						Well graded reddish brown saturated Sand, some rocks
	0.6	59'-61' 70%				Well graded reddish brown saturated Sand, some pebbles and rocks
60						
	6.9					Light gray saturated Sandy Silt, some pebbles
62	19.6	61'-63' 40%				Well graded reddish brown saturated Sand, some pebbles
	1.8	63'-65' 50%				
64						Well graded reddish brown saturated Sand, some pebbles and rocks
	3.7					Light gray saturated Sandy Silt, some pebbles
66	4.7	65'-67' 35%				Gray saturated Silt
68						
70						
72						
74						

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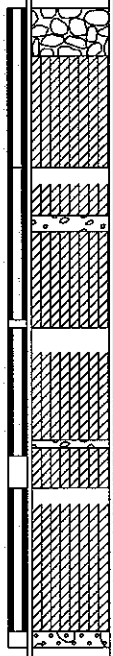
Drilling Log

Soil Boring **B-48**

Page: 1 of 1

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 35.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia NA
Length NA
Type/Size NA
Casing: Dia NA
Length NA
Type NA
Fill Material Grout
Rig/Core Track-Mounted Geoprobe
Drill Co. Fenley & Nicol Enviro, Inc.
Method Direct Push
Driller K. Keyel
Log By G. Passarelli
Date 4/15/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS
Selected 30.5'-31' and 34.5'-35' soil samples for laboratory analysis.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						Grass
5						
10						
15	2.2					Fill Material - Dark gray to black saturated Silty Clay mixed with wood, brick and rock fragments and other debris
		15'-20' 100%				Gray brown saturated Silty Clay
	0.0					
20	0.0					Gray brown saturated Clayey Silt mixed wiht rock and sand
	0.0	20'-25' 95%				Tan brown yellowish saturated medium to fine Sand
	0.0					Gray brown saturated Silty Clay
	0.0					
	0.0					
25	33.9					Gray brown saturated Silty Clay
	70.7	25'-30' 80%				
	20.4					Gray brown saturated fine Sand
	24.6					Gray brown saturated Silty Clay
30	500					Gray brown saturated Silty Clay. Soils flouresced between 30.5'-32' bg, and partially flouresced between 32'-33' bg
	387	30'-35' 90%				
	351					
	62.6					
	32.5					
35	21.4					Reddish brown saturated medium to fine Sand mixed with pebbles and rocks

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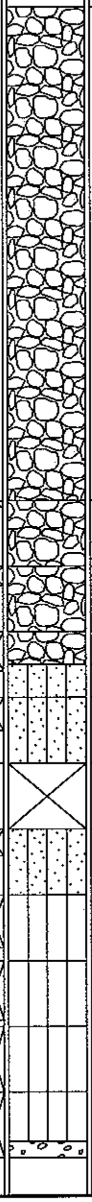
Drilling Log

Soil Boring **B-54**
Page: 1 of 2

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 67.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia NA
Length NA
Type/Size NA
Casing: Dia NA
Length NA
Type NA
Fill Material Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By S. Sharma
Date 9/2/10
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS
Selected 21'-23', 25'-27', 31'-33', 41'-43' and 62'-64' soiil samples for laboratoyr analysis.



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Asphalt
0						Air drilled to pre-clear through upper fill material
5						
10						
15	0.0	15'-17' 10%				Fill Material - Dark brown to black wet medium to course SAND, little fine gravel
	0.0	17'-19' 30%				Fill Material - Wet bricks
20	0.0	19'-21' 60%				Fill Material Gray to dark gray wet SILT SAND
	10.7 2.3	21'-23' 50%				Gray to dark gray wet SILT SAND, little clayey
	0.0	23'-25' 0%				No Recovery
25	3.0	25'-27' 40%				Gray to dark gray saturated SILT SAND, trace clayey
	0.0	27'-29' 80%				Gray to dark gray saturated SILT, trace clayey
30	0.0	29'-31' 90%				Gray to dark gray saturated SILT, trace clayey
	0.0	31'-33' 100%				Gray to dark gray saturated SILT, trace clayey
35	0.0	33'-35' 100%				Gray to dark gray saturated SILT, trace clayey

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Drilling Log

Soil Boring **B-54**
Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
						Continued
35	0.0	35'-37' 50%				Black saturated medium to course SAND Gray to light brown saturated medium to course SAND, few pebbles and gravel
	0.0	37'-39' 0%				No Recovery - Stone stuck in spoon
40	0.0	39'-41' 60%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
	0.0	41'-43' 70%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
	0.0	43'-45' 60%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
45	0.0	45'-47' 50%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
	0.0	47'-49' 40%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
50	0.0	49'-51' 60%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
	0.0	51'-53' 50%				Light tan saturated medium to course SAND, little pebbles, gravel and rock pieces
	0.0	53'-55' 20%				Gray saturated medium to course SAND, little rock pieces/fragments
55	0.0	55'-57' 65%				Gray saturated medium to course SAND, little rock pieces/fragments
	0.0	57'-59' 60%				Light brown saturated medium to course SAND, little rock pieces/fragments Greenish gray fine to medium SAND, little fine gravel
60	0.0	59'-61' 60%				Greenish gray fine to medium SAND, little fine gravel
	0.0	61'-63' 70%				Greenish gray fine to medium SAND, some large pebbles, gravels, little fine sand Greenish gray fine to medium SAND, layers of silty sand with pebbles
	0.0	63'-65' 50%				Greenish gray fine to medium SAND, layers of silty sand with pebbles Dark greenish gray SILT, some mica flakes
65	0.0	65'-67' 50%				Dark greenish gray SILT, some mica flakes
70						
75						
80						

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Drilling Log

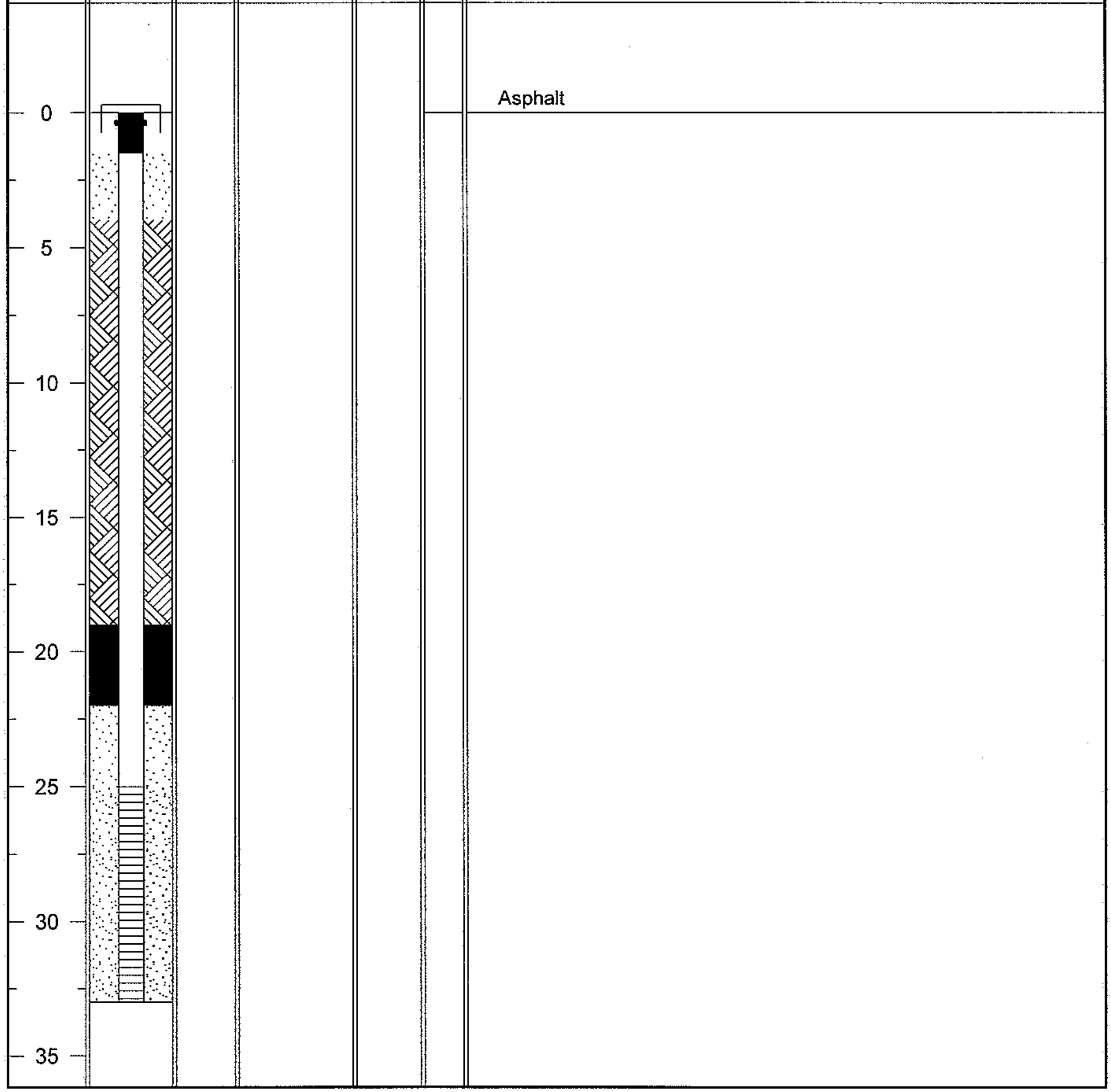
Monitoring Well **MW-42S**

Page: 1 of 1

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *33.0 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ______
Screen: Dia *4 in.* Length *8 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *4 in.* Length *25 ft.* Type *PVC*
Fill Material *Sand/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *S. Sharma* Date *2/5/09* Permit # *NA*
Checked By *E. Gustafson* License No. ______

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Asphalt



Shaw E & I, Inc.

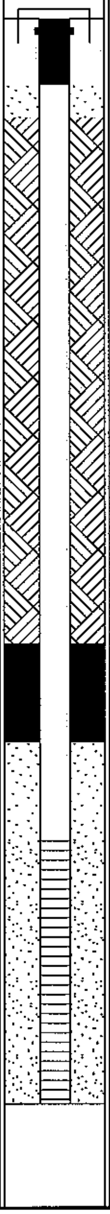
Drilling Log

Monitoring Well **MW-43S**

Page: 1 of 1

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *33.0 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ______
Screen: Dia *4 in.* Length *8 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *4 in.* Length *25 ft.* Type *PVC*
Fill Material *Sand/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *S. Sharma* Date *2/4/09* Permit # *NA*
Checked By *E. Gustafson* License No. ______

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Asphalt
5							
10							
15							
20							
25							
30							
35							

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Drilling Log

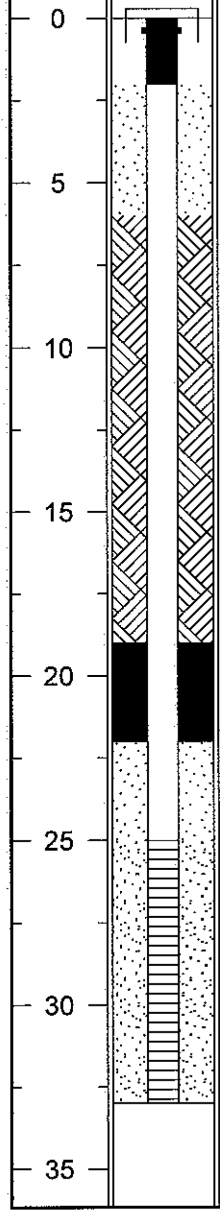
Monitoring Well **MW-44S**

Page: 1 of 1

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 33.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 4 in.
Length 8 ft.
Type/Size PVC/.020 in.
Casing: Dia 4 in.
Length 25 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By S. Sharma
Date 2/4/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Grass



Shaw E & I, Inc.

Drilling Log

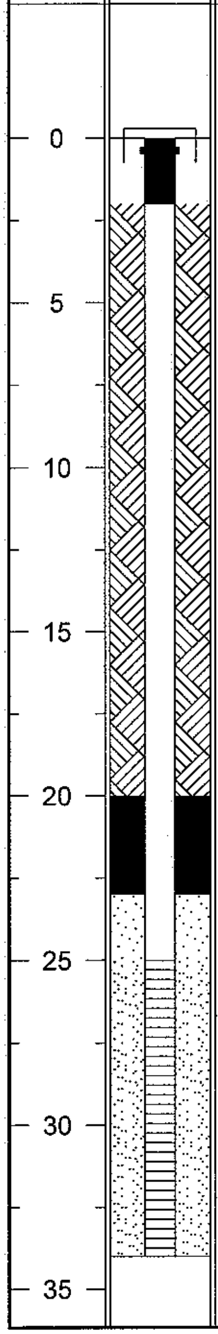
Monitoring Well **MW-45S**

Page: 1 of 1

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 34.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 4 in.
Length 9 ft.
Type/Size PVC/.020 in.
Casing: Dia 4 in.
Length 25 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date 3/23/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Concrete



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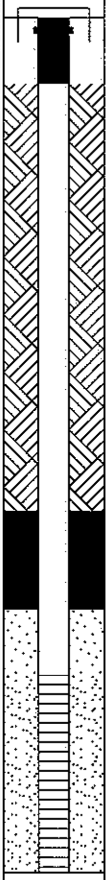
Drilling Log

Monitoring Well **MW-46S**

Page: 1 of 1

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 26.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 4 in.
Length 6 ft.
Type/Size PVC/.020 in.
Casing: Dia 4 in.
Length 20 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date 3/24/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Asphalt
0							
5							
10							
15							
20							
25							
30							
35							

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Drilling Log

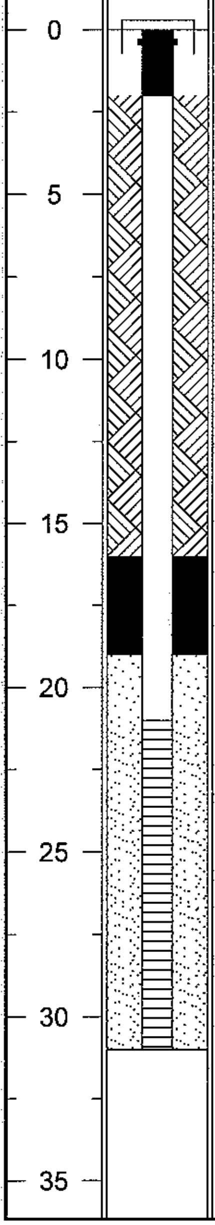
Monitoring Well **MW-47S**

Page: 1 of 1

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 31.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 2 in.
Length 10 ft.
Type/Size PVC/.020 in.
Casing: Dia 2 in.
Length 21 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date 3/25/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Asphalt



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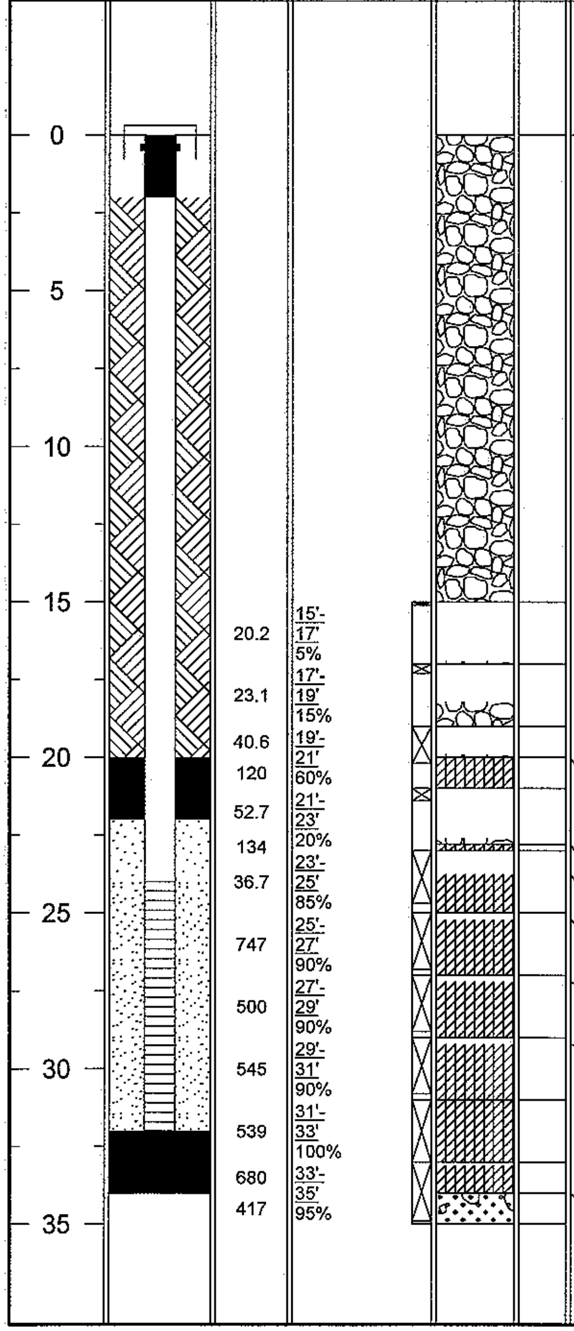
Drilling Log

Monitoring Well **MW-49S**

Page: 1 of 1

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *35.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *4 in.* Length *8 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *4 in.* Length *24 ft.* Type *PVC*
Fill Material *Sandy/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date *6/26/09* Permit # *NA*
Checked By *E. Gustafson* License No. ____

COMMENTS



PID (ppm)	Sample ID % Recovery
20.2	15'-17' 5%
23.1	17'-19' 15%
40.6	19'-21'
120	60%
52.7	21'-23'
134	20%
36.7	23'-25' 85%
747	25'-27' 90%
500	27'-29' 90%
545	29'-31' 90%
539	31'-33' 100%
680	33'-35'
417	95%

Blow Count Recovery

Description

(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Asphalt
Air drilled to pre-clear through upper fill material
Fill Material - Rock fragments in black soupy sand/fill mix
Fill Material - Rock fragments and wood in black soupy sand/fill mix
Fill Material - Rock fragments and wood in black soupy sand/fill mix
Gray brown saturated clayey Silt, trace fine sand
Fill Material - Rock fragments and wood in black soupy sand/fill mix
Gray brown saturated Sily Clay
Gray brown saturated Sily Clay
Gray brown saturated Silty Clay. Note: visible sheen present; sample flouresced under UV light
Gray brown saturated Clayey Silt. Note: sample partially flouresced under UV light
Gray brown saturated Clayey Silt. Note: sample partially flouresced under UV light
Gray brown saturated Clayey Silt. Note: sample partially flouresced under UV light
Gray brown saturated Silty Clay. Note: visible sheen present; sample flouresced under UV light
Reddish brown saturated Sand, some pebbles and rocks

Shaw™
Shaw E & I, Inc.

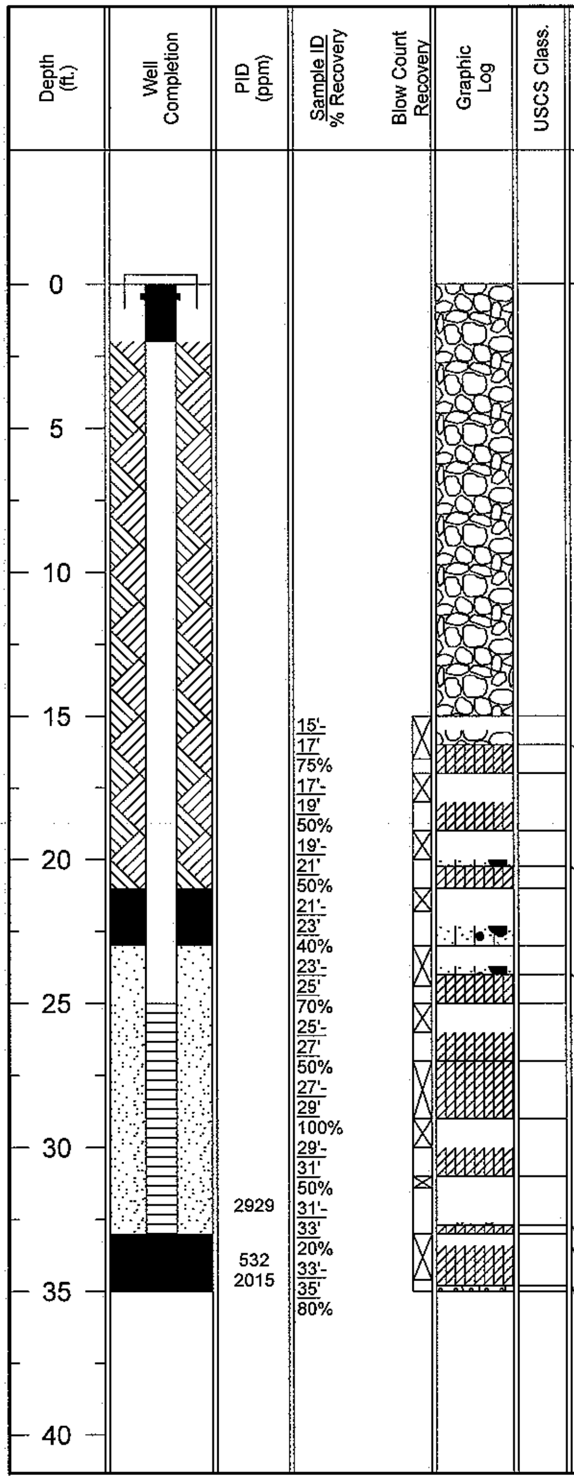
Drilling Log

Monitoring Well **MW-50S**

Page: 1 of 1

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *35.0 ft.* North ______ East ______
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ______
Screen: Dia *4 in.* Length *8 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *4 in.* Length *25 ft.* Type *PVC*
Fill Material *Sand/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date *6/29/09* Permit # *NA*
Checked By *E. Gustafson* License No. ______

COMMENTS



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Asphalt
Air drilled to pre-clear through upper fill material

Fill Material - gray saturated medium to coarse sand.
Greenish gray wet Silty Clay

Greenish gray wet Silty Clay

Soupy mixture of silt, sand and gravel
Gray saturated Silty Clay

Soupy mixture of silt, sand and gravel

Soupy mixture of silt, sand and gravel
Gray brown saturated Silty Clay

Gray brown saturated Silty Clay
Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Gray brown saturated medium to fine Sand. Note: soils partial flourescenced under UV light
Gray brown saturated Silty Clay. Note: soils partial flourescenced under UV light
Gray brown saturated Silty Clay. Note: soils partial flourescenced under UV light
Reddish brown saturated medium Sand, some rock fragments

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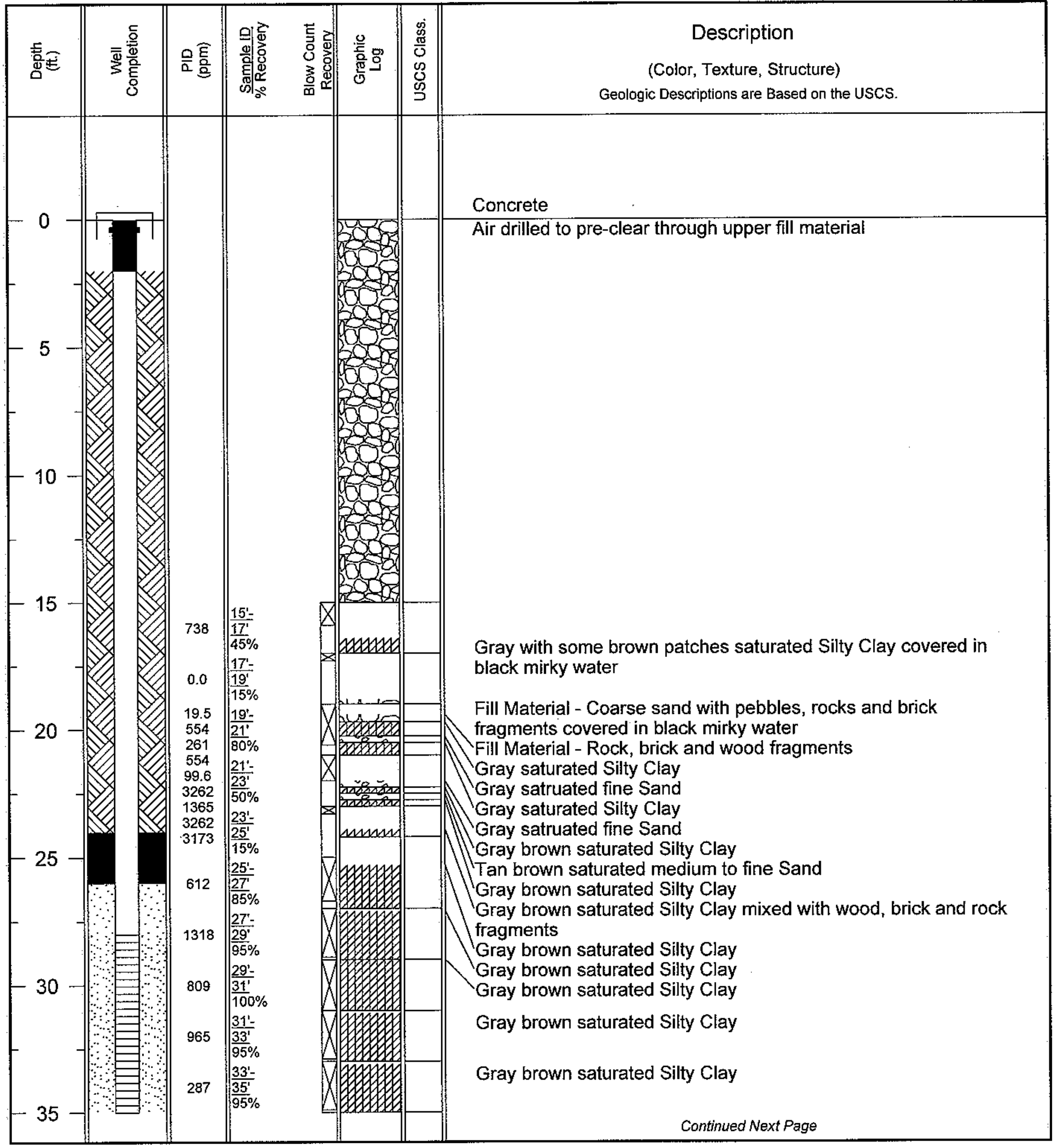
Drilling Log

Monitoring Well **MW-51S**
Page: 1 of 2

Project _75-20 Astoria Blvd Site_ Owner _Blumenfeld Development Group, Inc._
Location _75-20 Astoria Blvd, Jackson Heights, New York_ Proj. No. _821687_
Surface Elev. _NA_ Total Hole Depth _39.0 ft._ North ____ East ____
Top of Casing _NA_ Water Level Initial _NA_ Static _NA_ Diameter ____
Screen: Dia _4 in._ Length _8 ft._ Type/Size _PVC/.020 in._
Casing: Dia _4 in._ Length _28 ft._ Type _PVC_
Fill Material _Sand/Bentonite/Grout_ Rig/Core _Cantera_
Drill Co. _Fenley & Nicol Enviro, Inc._ Method _Air Rotary / Hollow Stem Auger_
Driller _C. Guzzardo_ Log By _G. Passarelli_ Date _7/1/09_ Permit # _NA_
Checked By _E. Gustafson_ License No. ____

COMMENTS



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

Sample ID / % Recovery	PID (ppm)
15'-17' 45%	738
17'-19' 15%	0.0
19'-21' 80%	19.5 554 261
21'-23' 50%	554 99.6 3262 1365
23'-25' 15%	3262 3173
25'-27' 85%	612
27'-29' 95%	1318
29'-31' 100%	809
31'-33' 95%	965
33'-35' 95%	287

Concrete
Air drilled to pre-clear through upper fill material
Gray with some brown patches saturated Silty Clay covered in black mirky water
Fill Material - Coarse sand with pebbles, rocks and brick fragments covered in black mirky water
Fill Material - Rock, brick and wood fragments
Gray saturated Silty Clay
Gray satruated fine Sand
Gray saturated Silty Clay
Gray satruated fine Sand
Gray brown saturated Silty Clay
Tan brown saturated medium to fine Sand
Gray brown saturated Silty Clay
Gray brown saturated Silty Clay mixed with wood, brick and rock fragments
Gray brown saturated Silty Clay
Gray brown saturated Silty Clay
Gray brown saturated Silty Clay
Gray brown saturated Silty Clay
Gray brown saturated Silty Clay

Continued Next Page

Shaw E & I, Inc.

Drilling Log

Monitoring Well **MW-51S**

Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued
35		438	35'-37' 100%	☒	▨		Gray brown saturated Silty Clay
		499	37'-39' 75%	☒	▨		Gray brown saturated Silty Clay
		201					Reddish brown saturated medium to fine Sand mixed with pebbles. Note: black discoloration at sand/silt interface
40							
45							
50							
55							
60							
65							
70							
75							
80							

Shaw E & I, Inc.

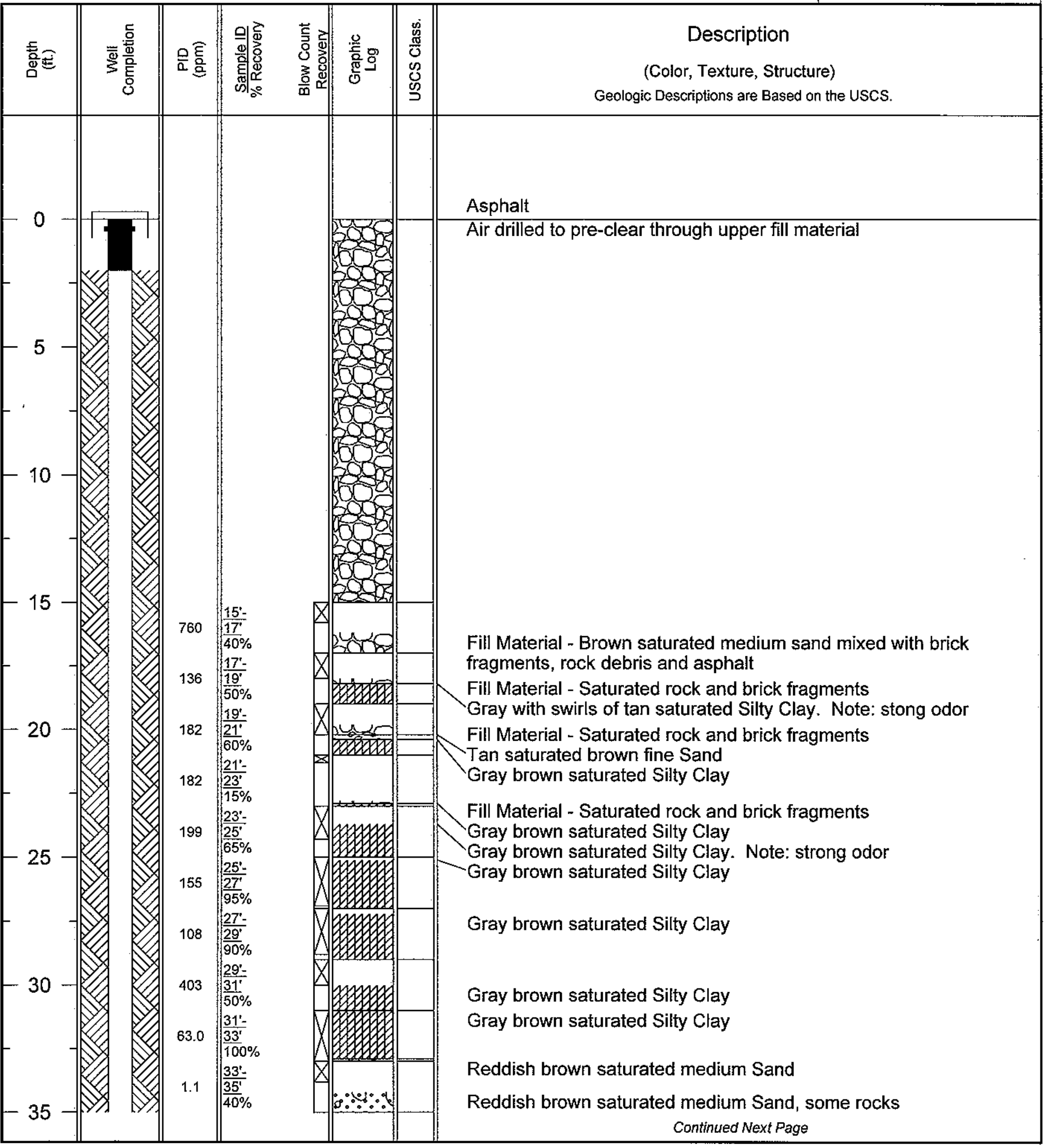
Drilling Log

Monitoring Well **MW-52DD**

Page: 1 of 2

Project: 75-20 Astoria Blvd Site
Owner: Blumenfeld Development Group, Inc.
Location: 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No.: 821687
Surface Elev.: NA
Total Hole Depth: 59.0 ft.
North:
East:
Top of Casing: NA
Water Level Initial: NA
Static: NA
Diameter:
Screen: Dia: 2 in.
Length: 10 ft.
Type/Size: PVC/.020 in.
Casing: Dia: 2 in.
Length: 47 ft.
Type: PVC
Fill Material: Sand/Bentonite/Grout
Rig/Core: Cantera
Drill Co.: Fenley & Nicol Enviro, Inc.
Method: Air Rotary / Hollow Stem Auger
Driller: C. Guzzardo
Log By: G. Passarelli
Date: 6/23/09
Permit #: NA
Checked By: E. Gustafson
License No.:

COMMENTS



Depth (ft.)	PID (ppm)	Sample ID % Recovery	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0			Asphalt Air drilled to pre-clear through upper fill material
15	760	15'-17' 40%	Fill Material - Brown saturated medium sand mixed with brick fragments, rock debris and asphalt
	136	17'-19' 50%	Fill Material - Saturated rock and brick fragments Gray with swirls of tan saturated Silty Clay. Note: stong odor
20	182	19'-21' 60%	Fill Material - Saturated rock and brick fragments Tan saturated brown fine Sand Gray brown saturated Silty Clay
	182	21'-23' 15%	
	199	23'-25' 65%	Fill Material - Saturated rock and brick fragments Gray brown saturated Silty Clay Gray brown saturated Silty Clay. Note: strong odor
25	155	25'-27' 95%	Gray brown saturated Silty Clay
	108	27'-29' 90%	Gray brown saturated Silty Clay
30	403	29'-31' 50%	Gray brown saturated Silty Clay
	63.0	31'-33' 100%	Gray brown saturated Silty Clay
35	1.1	33'-35' 40%	Reddish brown saturated medium Sand Reddish brown saturated medium Sand, some rocks

Continued Next Page

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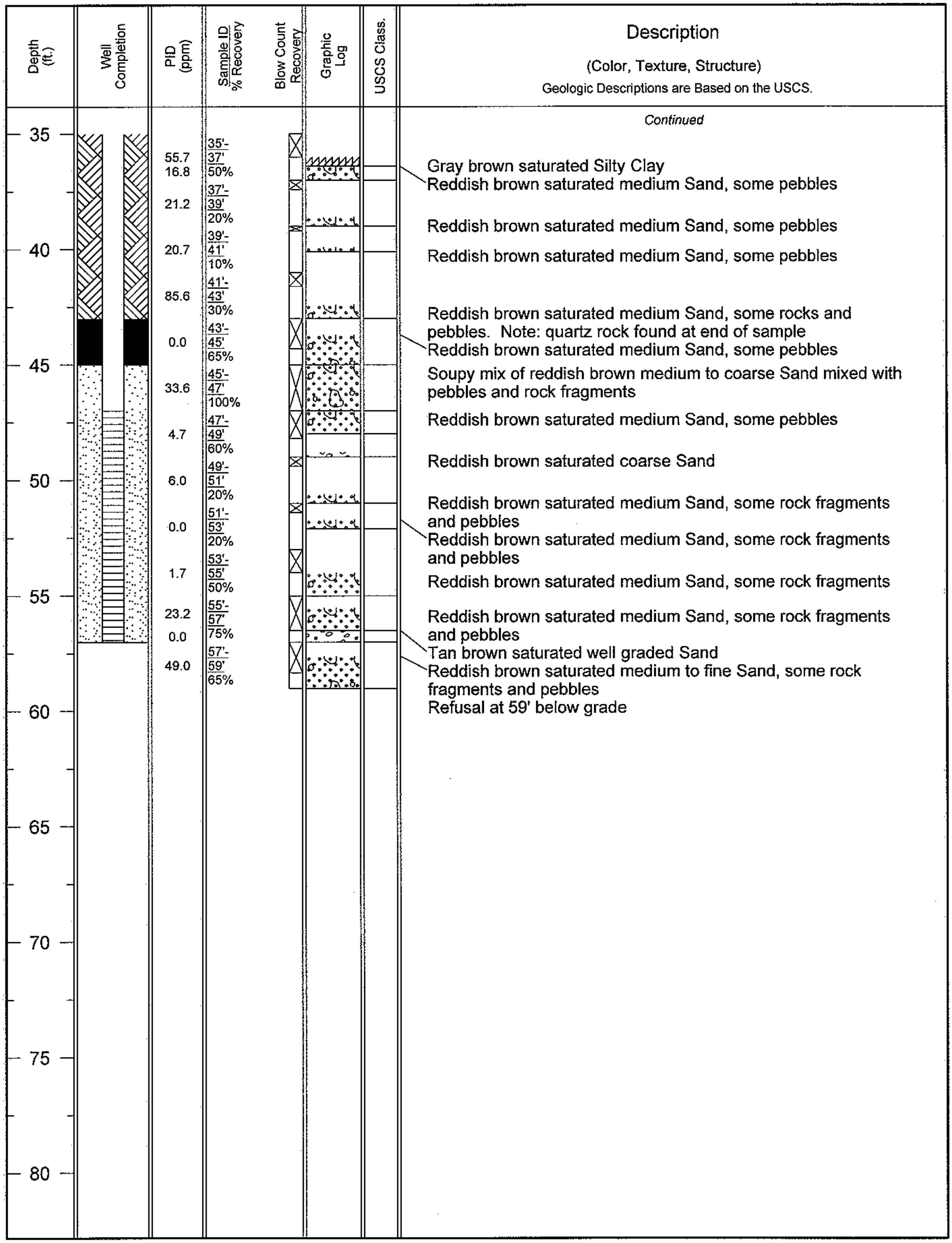
Drilling Log

Monitoring Well **MW-52DD**

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

PID (ppm)	Sample ID % Recovery
55.7 16.8	35'-37' 50%
21.2	37'-39' 20%
20.7	39'-41' 10%
85.6	41'-43' 30%
0.0	43'-45' 65%
33.6	45'-47' 100%
4.7	47'-49' 60%
6.0	49'-51' 20%
0.0	51'-53' 20%
1.7	53'-55' 50%
23.2 0.0	55'-57' 75%
49.0	57'-59' 65%

Gray brown saturated Silty Clay

Reddish brown saturated medium Sand, some pebbles

Reddish brown saturated medium Sand, some pebbles

Reddish brown saturated medium Sand, some pebbles

Reddish brown saturated medium Sand, some rocks and pebbles. Note: quartz rock found at end of sample

Reddish brown saturated medium Sand, some pebbles

Soupy mix of reddish brown medium to coarse Sand mixed with pebbles and rock fragments

Reddish brown saturated medium Sand, some pebbles

Reddish brown saturated coarse Sand

Reddish brown saturated medium Sand, some rock fragments and pebbles

Reddish brown saturated medium Sand, some rock fragments and pebbles

Reddish brown saturated medium Sand, some rock fragments

Reddish brown saturated medium Sand, some rock fragments and pebbles

Tan brown saturated well graded Sand

Reddish brown saturated medium to fine Sand, some rock fragments and pebbles

Refusal at 59' below grade

Shaw™
Shaw E & I, Inc.

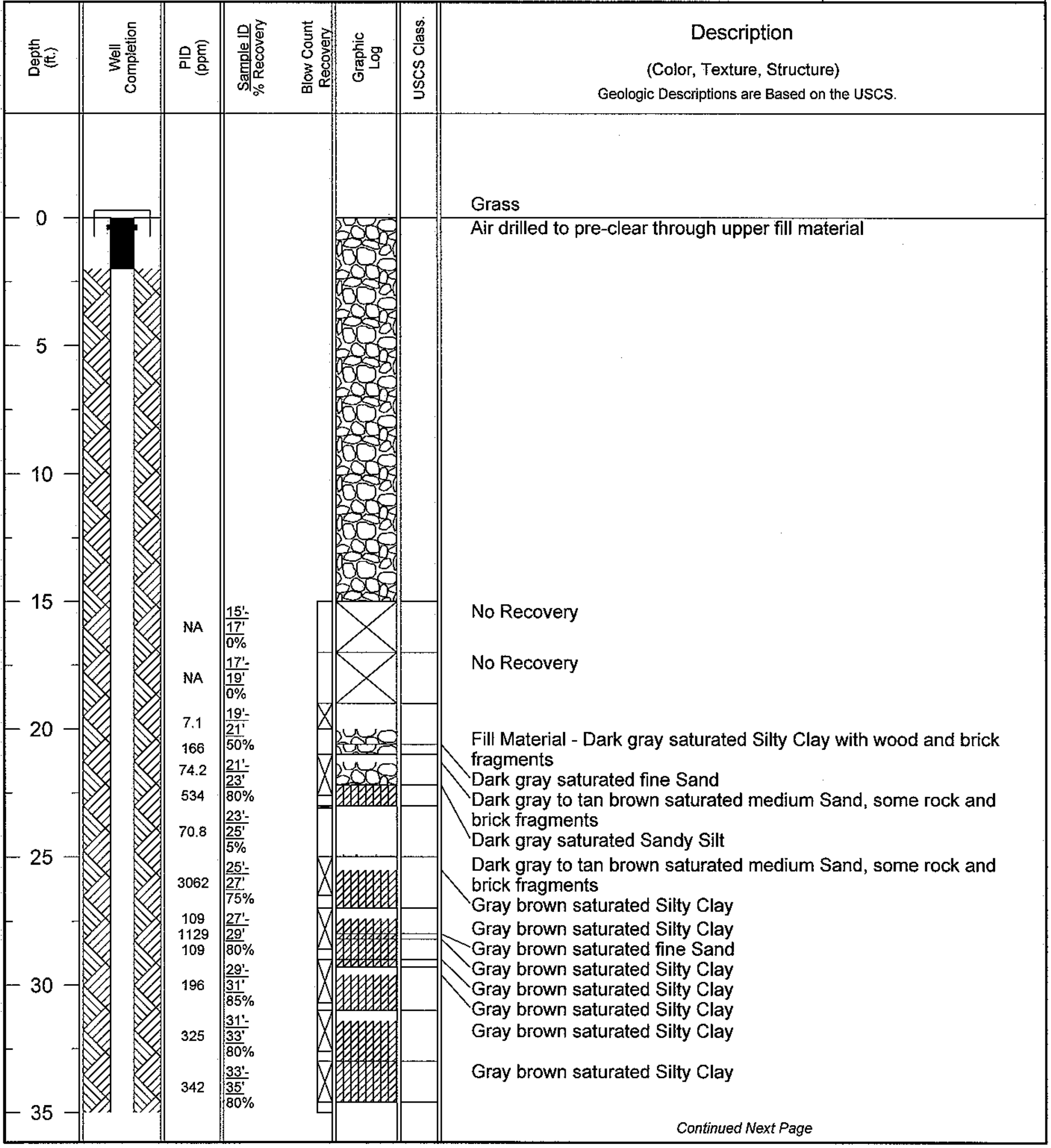
Drilling Log

Monitoring Well **MW-53DD**

Page: 1 of 2

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 51.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 2 in.
Length 8 ft.
Type/Size PVC/.020 in.
Casing: Dia 2 in.
Length 43 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date 7/6/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS



PID (ppm)	Sample ID	% Recovery
NA	15'-17'	0%
NA	17'-19'	0%
7.1 166	19'-21'	50%
74.2 534	21'-23'	80%
70.8	23'-25'	5%
3062	25'-27'	75%
109 1129 109	27'-29'	80%
196	29'-31'	85%
325	31'-33'	80%
342	33'-35'	80%

Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Grass

Air drilled to pre-clear through upper fill material

No Recovery

No Recovery

Fill Material - Dark gray saturated Silty Clay with wood and brick fragments

Dark gray saturated fine Sand

Dark gray to tan brown saturated medium Sand, some rock and brick fragments

Dark gray saturated Sandy Silt

Dark gray to tan brown saturated medium Sand, some rock and brick fragments

Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Gray brown saturated fine Sand

Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Gray brown saturated Silty Clay

Continued Next Page

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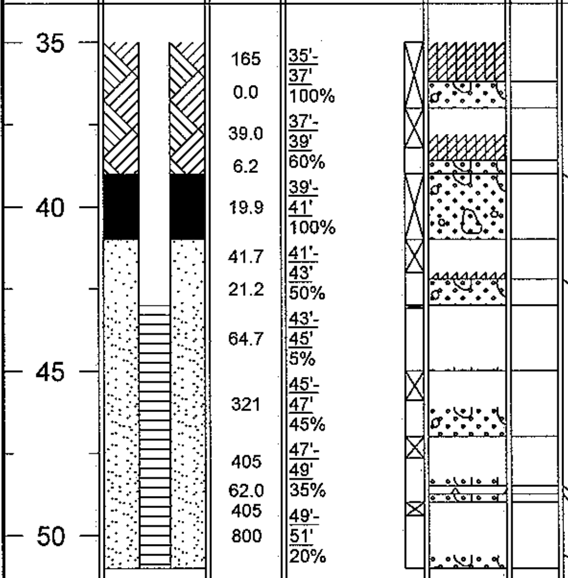
Drilling Log

Monitoring Well **MW-53DD**

Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Sample ID % Recovery	PID (ppm)
35'-37' 100%	165 0.0
37'-39' 60%	39.0 6.2
39'-41' 100%	19.9
41'-43' 50%	41.7 21.2
43'-45' 5%	64.7
45'-47' 45%	321
47'-49' 35%	405 62.0
49'-51' 20%	405 800

Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

Gray brown saturated Silty Clay

Reddish brown saturated medium Sand, some pebbles and rock fragments

Gray brown saturated Silty Clay

Reddish brown saturated medium Sand, some pebbles

Soupy mix of reddish brown medium Sand, rock fragments and pebbles

Gray brown saturated Silty Clay

Reddish brown saturated medium Sand, some pebbles and rock fragments

Reddish brown saturated medium Sand, some rock fragments

Reddish brown saturated medium Sand, some pebbles and rock fragments

Reddish brown saturated medium Sand, some pebbles

Crushed quartz rock, saturated

Reddish brown saturated medium Sand, some pebbles

Reddish brown saturated medium Sand, some pebbles and rock fragments

Refusal at 51' bgs

Shaw E & I, Inc.

Drilling Log

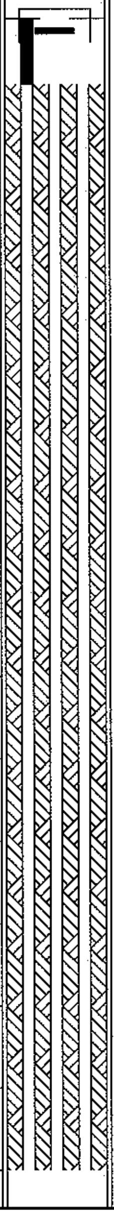
Monitoring Well **MW-55 D1 D2 D3**

Page: 1 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *65.0 ft.* North ____ East ____
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter ____
Screen: Dia *2 in.* Length *7 / 7 / 5 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *2 in.* Length *40 / 50 / 60 ft.* Type *PVC*
Fill Material *Sand/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date *7/28/09* Permit # *NA*
Checked By *E. Gustafson* License No. ____

COMMENTS

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Asphalt
0							
5							
10							
15							
20							
25							
30							
35							



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Drilling Log

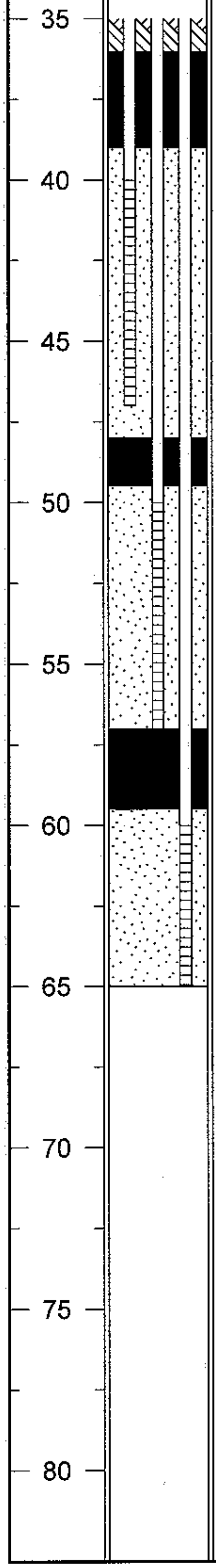
Monitoring Well **MW-55 D1 D2 D3**

Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued



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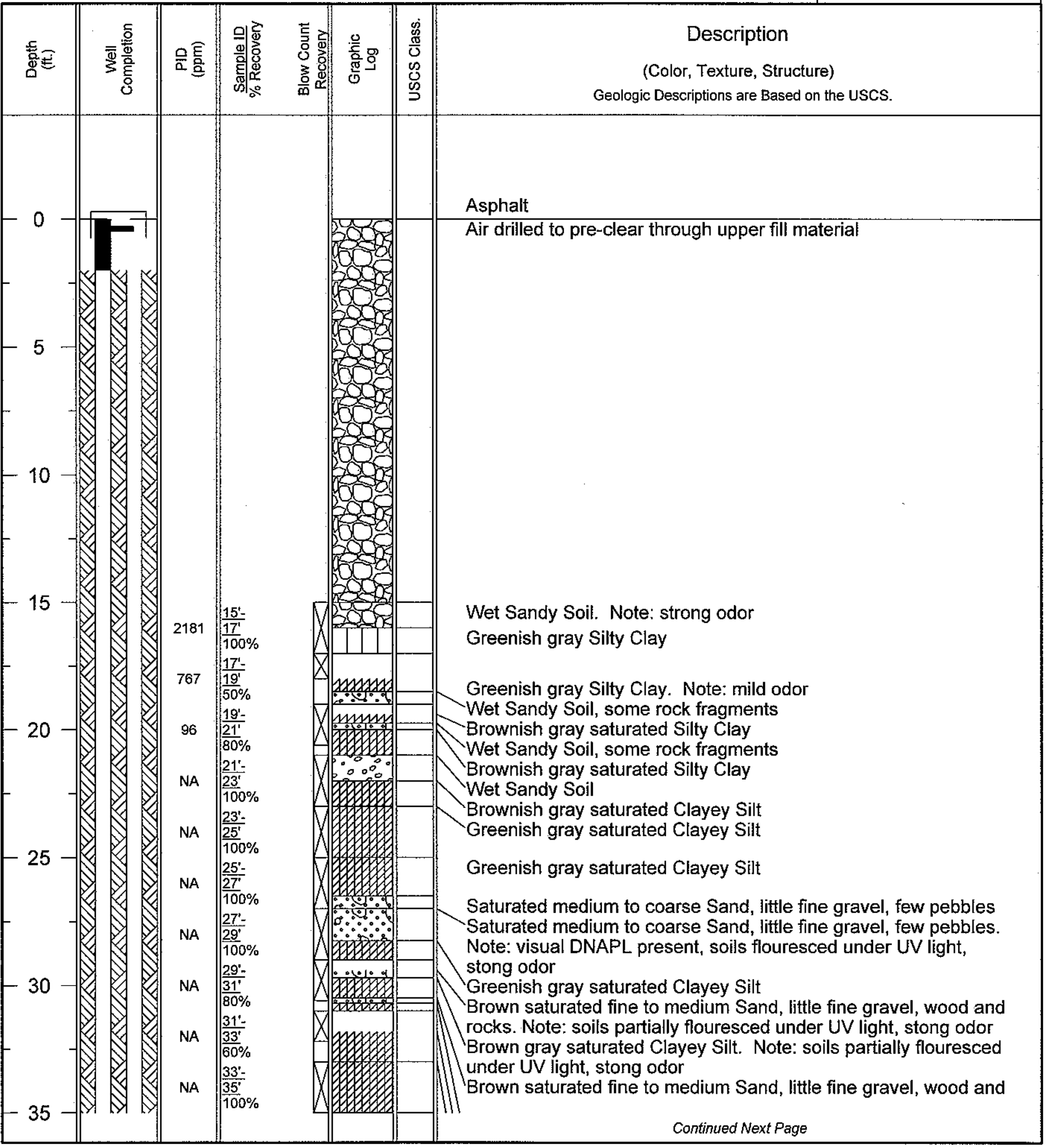
Drilling Log

Monitoring Well **MW-56 D1 D2**

Page: 1 of 2

Project 75-20 Astoria Blvd Site
Owner Blumenfeld Development Group, Inc.
Location 75-20 Astoria Blvd, Jackson Heights, New York
Proj. No. 821687
Surface Elev. NA
Total Hole Depth 56.0 ft.
North
East
Top of Casing NA
Water Level Initial NA
Static NA
Diameter
Screen: Dia 2 in.
Length 7 / 6 ft.
Type/Size PVC/.020 in.
Casing: Dia 2 in.
Length 40 / 50 ft.
Type PVC
Fill Material Sand/Bentonite/Grout
Rig/Core Cantera
Drill Co. Fenley & Nicol Enviro, Inc.
Method Air Rotary / Hollow Stem Auger
Driller C. Guzzardo
Log By G. Passarelli
Date 7/16/09
Permit # NA
Checked By E. Gustafson
License No.

COMMENTS



Description
(Color, Texture, Structure)
Geologic Descriptions are Based on the USCS.

PID (ppm)	Sample ID % Recovery
2181	15'-17' 100%
767	17'-19' 50%
96	19'-21' 80%
NA	21'-23' 100%
NA	23'-25' 100%
NA	25'-27' 100%
NA	27'-29' 100%
NA	29'-31' 80%
NA	31'-33' 60%
NA	33'-35' 100%

Asphalt
Air drilled to pre-clear through upper fill material
Wet Sandy Soil. Note: strong odor
Greenish gray Silty Clay
Greenish gray Silty Clay. Note: mild odor
Wet Sandy Soil, some rock fragments
Brownish gray saturated Silty Clay
Wet Sandy Soil, some rock fragments
Brownish gray saturated Silty Clay
Wet Sandy Soil
Brownish gray saturated Clayey Silt
Greenish gray saturated Clayey Silt
Greenish gray saturated Clayey Silt
Saturated medium to coarse Sand, little fine gravel, few pebbles
Saturated medium to coarse Sand, little fine gravel, few pebbles. Note: visual DNAPL present, soils flouresced under UV light, stong odor
Greenish gray saturated Clayey Silt
Brown saturated fine to medium Sand, little fine gravel, wood and rocks. Note: soils partially flouresced under UV light, stong odor
Brown gray saturated Clayey Silt. Note: soils partially flouresced under UV light, stong odor
Brown saturated fine to medium Sand, little fine gravel, wood and

Continued Next Page

Shaw™
Shaw E & I, Inc.

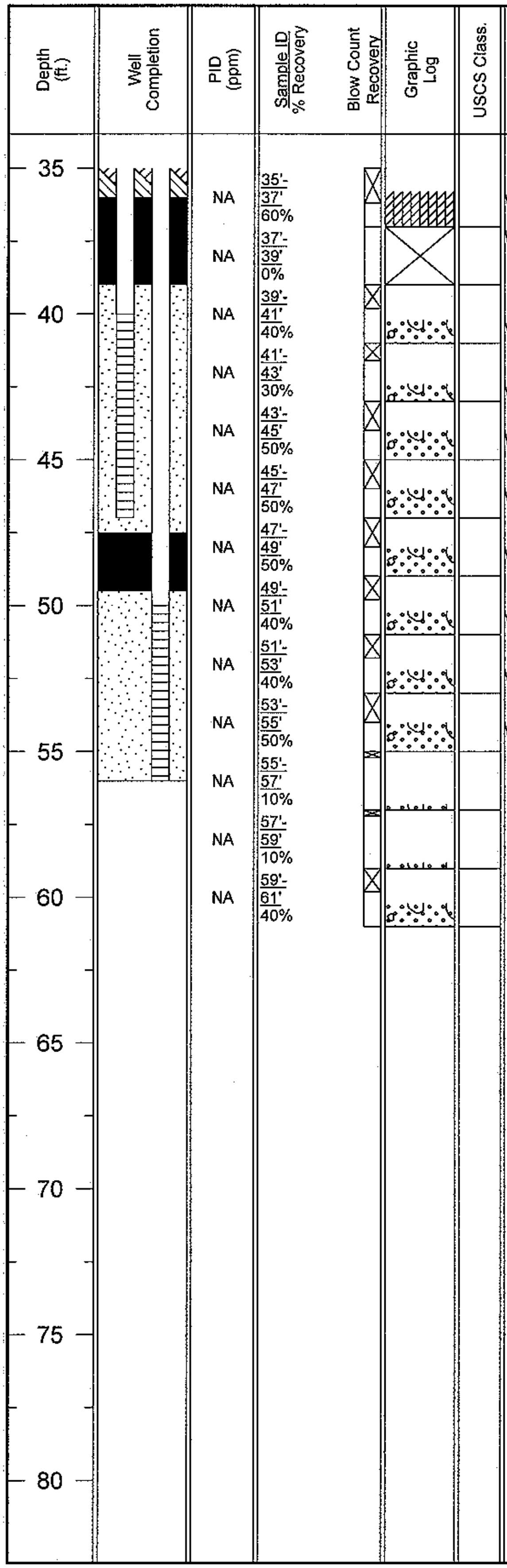
Drilling Log

Monitoring Well **MW-56 D1 D2**

Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*



Depth (ft.)	PID (ppm)	Sample ID	% Recovery
35	NA	35'-37'	60%
37	NA	37'-39'	0%
39	NA	39'-41'	40%
41	NA	41'-43'	30%
43	NA	43'-45'	50%
45	NA	45'-47'	50%
47	NA	47'-49'	50%
49	NA	49'-51'	40%
51	NA	51'-53'	40%
53	NA	53'-55'	50%
55	NA	55'-57'	10%
57	NA	57'-59'	10%
59	NA	59'-61'	40%

Description

(Color, Texture, Structure)

Geologic Descriptions are Based on the USCS.

Continued

rocks. Note: soils partially flouresced under UV light, stong odor

Brown gray saturated Clayey Silt. Note: soils partially flouresced under UV light, stong odor

Brown gray saturated Silt to Clayey Silt. Note: visual DNAPL present, stong odor

Greenish gray saturated Clayey Silt. Note: stong odor

Brownish gray saturated Silty Clay to Clayey Silt. Note: visual DNAPL present, stong odor, soils partially flouresced under UV light

No Recovery, but appears to be medium to coarse sand. Note: water had strong odor.

Brownish gray saturated medium to very coarse Sand, some angular rock fragments, medium gravel and pebbles, little fine sand. Note: mild odor

Brownish gray saturated medium to very coarse Sand, some angular rock fragments, medium gravel and pebbles, little fine sand. Note: mild odor

Light brown saturated medium to very coarse Sand, few pebbles, little fine sand, angular rock fragments. Note: mild odor

Light brown saturated medium to very coarse Sand, few pebbles, little fine sand, angular rock fragments. Note: mild odor

Light brown saturated medium to very coarse Sand, few pebbles, some fine sand, little angular rock fragments. Note: mild odor

Light brown saturated fine to medium Sand, some black very coarse angular rock fragments, few pebbles, little fine sand. Note: mild odor

Light brown saturated fine to medium Sand, some black very coarse angular rock fragments, few pebbles, little fine sand. Note: mild odor, tight soils

Light brown saturated fine to medium Sand, some black very coarse angular rock fragments, few pebbles, little fine sand. Note: mild odor

Light brown saturated fine to medium Sand, some black very coarse angular rock fragments, few pebbles, little fine sand. Note: mild odor, tight soils - split spoon only penetrated 1 foot

Light brown saturated fine to medium Sand, some black very coarse angular rock fragments, few pebbles, little fine sand. Note: mild odor, tight soils - split spoon only penetrated 1 foot

Light brown to red saturated fine to medium Sand, little fine gravel, few pebbles, very little coarse sand. Note: mild odor, geology very tight

Refusal @ 61' below grade

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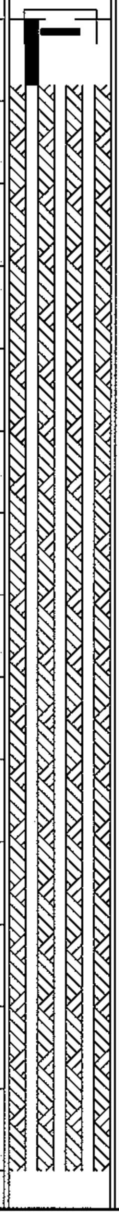
Drilling Log

Monitoring Well MW-57 D1 D2 D3

Page: 1 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*
Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*
Surface Elev. *NA* Total Hole Depth *61.0 ft.* North East
Top of Casing *NA* Water Level Initial *NA* Static *NA* Diameter
Screen: Dia *2 in.* Length *7 / 7 / 5 ft.* Type/Size *PVC/.020 in.*
Casing: Dia *2 in.* Length *40 / 50 / 60 ft.* Type *PVC*
Fill Material *Sand/Bentonite/Grout* Rig/Core *Cantera*
Drill Co. *Fenley & Nicol Enviro, Inc.* Method *Air Rotary / Hollow Stem Auger*
Driller *C. Guzzardo* Log By *G. Passarelli* Date *7/22/09* Permit # *NA*
Checked By *E. Gustafson* License No.

COMMENTS



Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0							Asphalt
5							
10							
15							
20							
25							
30							
35							

Continued Next Page

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Drilling Log

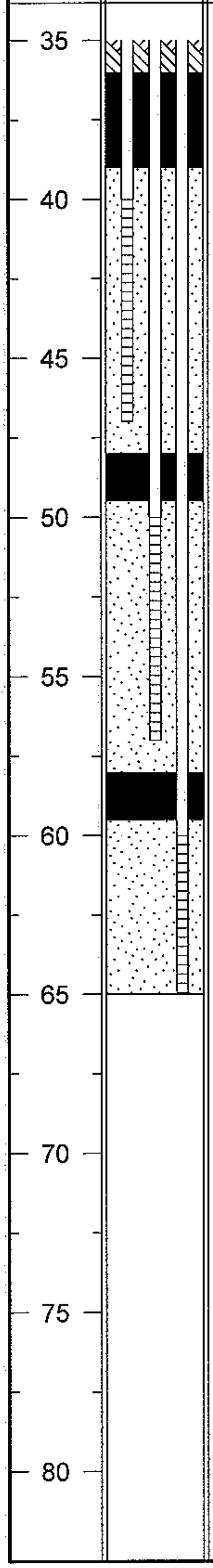
Monitoring Well **MW-57 D1 D2 D3**

Page: 2 of 2

Project *75-20 Astoria Blvd Site* Owner *Blumenfeld Development Group, Inc.*

Location *75-20 Astoria Blvd, Jackson Heights, New York* Proj. No. *821687*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
							Continued



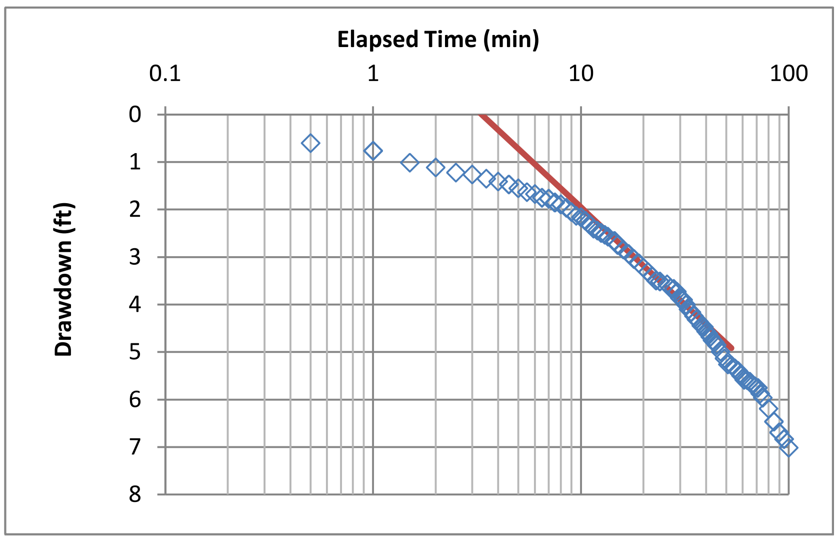
APPENDIX B

HYDRAULIC CONDUCTIVITY FIELD TEST RESULTS

Appendix B
Hydraulic Conductivity Field Test Results

MW-50S Drawdown

Sec	Min	DTW	Log(t) for Regression	Observed Drawdown	Calculated Drawdown
0		13.05			
0.6	0.50	13.65	-0.30103	0.6	-3.369
1.2	1.00	13.81	0.00000	0.76	-2.138
1.86	1.50	14.06	0.17609	1.01	-1.418
2.743	2.00	14.16	0.30103	1.11	-0.906
3.36	2.50	14.27	0.39794	1.22	-0.510
4.14	3.00	14.31	0.47712	1.26	-0.186
4.98	3.50	14.4	0.54407	1.35	0.088
5.88	4.00	14.46	0.60206	1.41	0.325
6.84	4.50	14.52	0.65321	1.47	0.534
7.844	5.00	14.6	0.69897	1.55	0.721
8.88	5.50	14.68	0.74036	1.63	0.891
10.02	6.00	14.72	0.77815	1.67	1.045
11.22	6.50	14.8	0.81291	1.75	1.188
12.48	7.00	14.82	0.84510	1.77	1.319
13.8	7.50	14.9	0.87506	1.85	1.442
15.24	8.00	14.94	0.90309	1.89	1.556
16.74	8.50	15.01	0.92942	1.96	1.664
18.327	9.00	15.1	0.95424	2.05	1.766
19.98	9.50	15.18	0.97772	2.13	1.862
21.78	10.00	15.21	1.00000	2.16	1.953
23.64	10.50	15.28	1.02119	2.23	2.040
25.68	11.00	15.36	1.04139	2.31	2.122
27.875	11.50	15.45	1.06070	2.4	2.201
30	12.00	15.49	1.07918	2.44	2.277
32.4	12.50	15.54	1.09691	2.49	2.349
34.919	13.00	15.58	1.11394	2.53	2.419
37.56	13.50	15.62	1.13033	2.57	2.486
40.38	14.00				2.551
43.383	14.50	15.71	1.16137	2.66	2.613
46.56	15.00	15.79	1.17609	2.74	2.673
49.919	16.00	15.89	1.20412	2.84	2.788
53.52	17.00	15.98	1.23045	2.93	2.896
57.119	18.00	16.09	1.25527	3.04	2.997
61.32	19.00	16.18	1.27875	3.13	3.093
65.52	20.00	16.27	1.30103	3.22	3.184
69.72	21.00	16.36	1.32222	3.31	3.271
74.52	22.00	16.45	1.34242	3.4	3.354
79.919	23.00	16.54	1.36173	3.49	3.433
84.72	24.00	16.56	1.38021	3.51	3.508
90.72	25.00				
96.72	26.00	16.62	1.41497	3.57	3.650
102.72	27.00	16.7	1.43136	3.65	3.717
109.319	28.00	16.72	1.44716	3.67	3.782
116.52	29.00	16.78	1.46240	3.73	3.844
124.319	30.00	16.91	1.47712	3.86	3.905
132.119	31.00	16.95	1.49136	3.9	3.963
140.52	32.00	17.05	1.50515	4	4.019
149.52	33.00	17.15	1.51851	4.1	4.074
159.119	34.00	17.21	1.53148	4.16	4.127
168.72	35.00	17.29	1.54407	4.24	4.179
179.519	36.00	17.36	1.55630	4.31	4.229
190.919	37.00	17.41	1.56820	4.36	4.277
202.919	38.00	17.49	1.57978	4.44	4.325
215.519	39.00	17.52	1.59106	4.47	4.371
228.72	40.00	17.61	1.60206	4.56	4.416
243.119	41.00	17.66	1.61278	4.61	4.460
258.119	42.00	17.73	1.62325	4.68	4.502
273.771	43.00	17.8	1.63347	4.75	4.544
290.519	44.00	17.84	1.64345	4.79	4.585
308.593	45.00	17.9	1.65321	4.85	4.625
327.119	47.00	18.04	1.67210	4.99	4.702
347.519	49.00	18.18	1.69020	5.13	4.776
368.541	51.00	18.31	1.70757	5.26	4.847
390.72	53.00	18.33	1.72428	5.28	4.916
414.72	55.00	18.39	1.74036	5.34	4.982
439.919	57.00	18.44	1.75587	5.39	5.045
466.319	59.00	18.54	1.77085	5.49	5.106
494.519	61.00	18.63	1.78533	5.58	5.166
524.519	63.00	18.64	1.79934	5.59	5.223
556.319	65.00	18.67	1.81291	5.62	5.278
589.919	67.00	18.74	1.82607	5.69	5.332
625.919	69.00	18.77	1.83885	5.72	5.384
661.919	71.00	18.8	1.85126	5.75	5.435
703.919	73.00	18.92	1.86332	5.87	5.485
745.919	75.00	19.01	1.87506	5.96	5.533
787.919	80.00	19.24	1.90309	6.19	5.647
835.919	85.00	19.51	1.92942	6.46	5.755
889.919	90.00	19.74	1.95424	6.69	5.856
937.919	95.00	19.88	1.97772	6.83	5.953
997.919	100.00	20.06	2.00000	7.01	6.044
1057.919	105.00	20.14	2.02119	7.09	6.130
1117.919	110.00	20.23	2.04139	7.18	6.213
1183.919	115.00	20.36	2.06070	7.31	6.292



Δs = *4.09* *ft* *T =* *13* +/- *1* gpd/ft
Transmissivity = 0.0012 +/- 0.0001 ft^2/min
K = 1.5E-04 +/- 1.0E-05 ft/min

K (based on mean Transmissivity) = 1.44E-04 ft/min

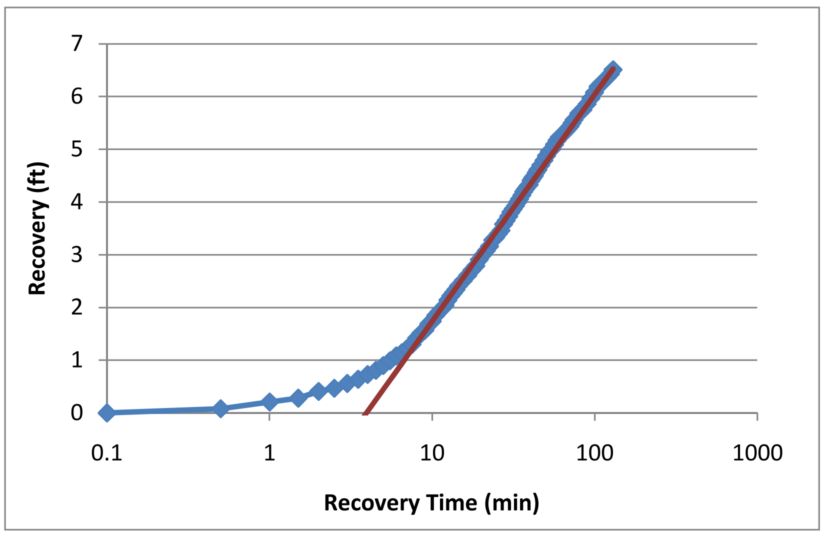
SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.985386
R Square	0.970986
Standard Error	0.066906
Observations	18

	Coefficients
Intercept	-2.137935
X Variable 1	4.090806

Appendix B
Hydraulic Conductivity Field Test Results

MW-50S Recovery

Sec	Min	DTW	Log(t) for Regression	Observed Recovery	Calculated Recovery
	Static	13.05			
0	0.10	20.22	-1.00000	0	-6.871
30	0.50	20.14	-0.30103	0.08	-3.862
60	1.00	20.01	0.00000	0.21	-2.567
90	1.50	19.94	0.17609	0.28	-1.809
120	2.00	19.81	0.30103	0.41	-1.271
150	2.50	19.75	0.39794	0.47	-0.854
180	3.00	19.66	0.47712	0.56	-0.513
210	3.50	19.58	0.54407	0.64	-0.225
240	4.00	19.49	0.60206	0.73	0.025
270	4.50	19.41	0.65321	0.81	0.245
300	5.00	19.32	0.69897	0.9	0.442
330	5.50	19.23	0.74036	0.99	0.620
360	6.00	19.14	0.77815	1.08	0.783
390	6.50	19.08	0.81291	1.14	0.932
420	7.00	19	0.84510	1.22	1.071
450	7.50	18.92	0.87506	1.3	1.200
480	8.00	18.8	0.90309	1.42	1.320
510	8.50	18.71	0.92942	1.51	1.434
540	9.00	18.65	0.95424	1.57	1.540
570	9.50	18.53	0.97772	1.69	1.642
600	10.00	18.48	1.00000	1.74	1.737
630	10.50	18.37	1.02119	1.85	1.829
660	11.00	18.3	1.04139	1.92	1.916
690	11.50	18.24	1.06070	1.98	1.999
720	12.00	18.18	1.07918	2.04	2.078
750	12.50	18.08	1.09691	2.14	2.155
780	13.00	18	1.11394	2.22	2.228
810	13.50	17.94	1.13033	2.28	2.298
840	14.00	17.88	1.14613	2.34	2.366
870	14.50	17.81	1.16137	2.41	2.432
930	15.50	17.71	1.19033	2.51	2.557
990	16.50	17.61	1.21748	2.61	2.673
1050	17.50	17.51	1.24304	2.71	2.783
1110	18.50	17.43	1.26717	2.79	2.887
1170	19.50	17.31	1.29003	2.91	2.986
1230	20.50	17.22	1.31175	3	3.079
1290	21.50	17.14	1.33244	3.08	3.168
1350	22.50	17.06	1.35218	3.16	3.253
1410	23.50	16.94	1.37107	3.28	3.335
1470	24.50	16.89	1.38917	3.33	3.412
1530	25.50	16.82	1.40654	3.4	3.487
1590	26.50	16.76	1.42325	3.46	3.559
1650	27.50	16.64	1.43933	3.58	3.628
1710	28.50	16.57	1.45484	3.65	3.695
1770	29.50	16.49	1.46982	3.73	3.760
1830	30.50	16.41	1.48430	3.81	3.822
1890	31.50	16.35	1.49831	3.87	3.882
1950	32.50	16.29	1.51188	3.93	3.941
2010	33.50	16.22	1.52504	4	3.997
2070	34.50	16.16	1.53782	4.06	4.052
2130	35.50	16.09	1.55023	4.13	4.106
2190	36.50	16.02	1.56229	4.2	4.158
2250	37.50	15.97	1.57403	4.25	4.208
2310	38.50	15.92	1.58546	4.3	4.257
2370	39.50	15.89	1.59660	4.33	4.305
2430	40.50	15.81	1.60746	4.41	4.352
2490	41.50	15.76	1.61805	4.46	4.398
2550	42.50	15.72	1.62839	4.5	4.442
2610	43.50	15.66	1.63849	4.56	4.486
2670	44.50	15.61	1.64836	4.61	4.528
2790	46.50	15.52	1.66745	4.7	4.610
2910	48.50	15.43	1.68574	4.79	4.689
3030	50.50	15.34	1.70329	4.88	4.764
3150	52.50	15.26	1.72016	4.96	4.837
3270	54.50	15.21	1.73640	5.01	4.907
3390	56.50	15.13	1.75205	5.09	4.974
3510	58.50	15.05	1.76716	5.17	5.039
3630	60.50	14.99	1.78176	5.23	5.102
3750	62.50	14.95	1.79588	5.27	5.163
3870	64.50	14.91	1.80956	5.31	5.222
3990	66.50	14.87	1.82282	5.35	5.279
4110	68.50	14.82	1.83569	5.4	5.334
4230	70.50	14.78	1.84819	5.44	5.388
4350	72.50	14.72	1.86034	5.5	5.440
4470	74.50	14.66	1.87216	5.56	5.491
4770	79.50	14.54	1.90037	5.68	5.613
5070	84.50	14.47	1.92686	5.75	5.727
5370	89.50	14.36	1.95182	5.86	5.834
5670	94.50	14.25	1.97543	5.97	5.936
5970	99.50	14.14	1.99782	6.08	6.032
6270	104.50	14.03	2.01912	6.19	6.124
6570	109.50	13.97	2.03941	6.25	6.211
6870	114.50	13.91	2.05881	6.31	6.295
7170	119.50	13.85	2.07737	6.37	6.375
7470	124.50	13.79	2.09517	6.43	6.451
7770	129.50	13.71	2.11227	6.51	6.525



Δs = *4.30* *ft* *T =* *12* +/- *1* gpd/ft
Transmissivity = 0.0011 +/- 0.0001 ft^2/min
K = 1.42E-04 +/- 9.04E-06 ft/min

K (based on mean Transmissivity) = 1.44E-04 ft/min

SUMMARY OUTPUT

0.10 recovery yield (gpm)

Regression Statistics

Multiple R	0.998298
R Square	0.996598
Standard Error	0.063534
Observations	48

	Coefficients
Intercept	-2.56672
X Variable 1	4.304125

Notes:

APPENDIX C

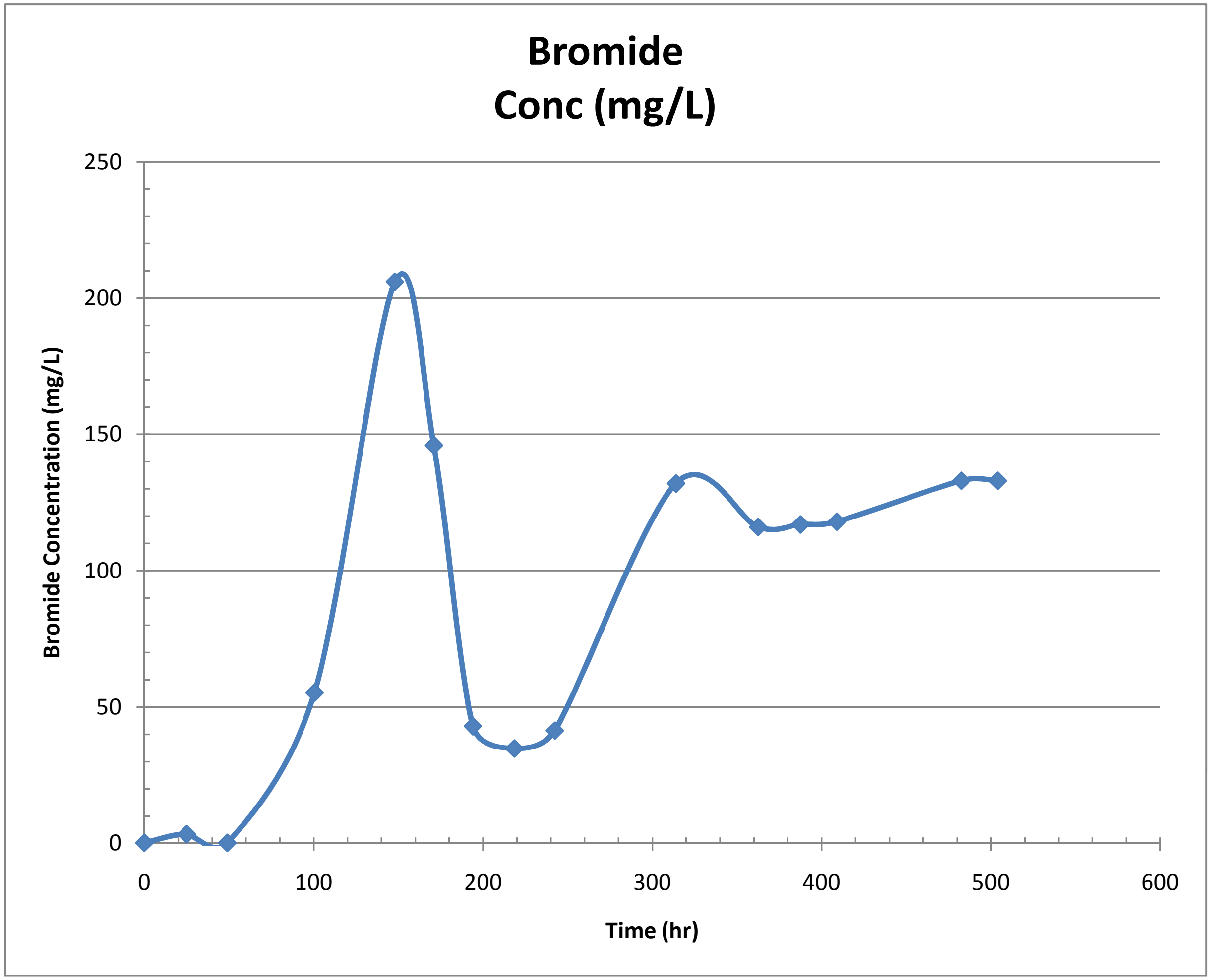
TRACER TEST RESULTS

APPENDIX C
TRACER TEST RESULTS

75-20 Astoria Blvd Site
Jackson Heights, New York

Time (hr)	Bromide Conc (mg/L)
0	0.24
25	3.42
49	0.22
100.5	55.3
148	206
171	146
194	43
218.5	34.8
242.5	41.4
314	132
362.5	116
387.5	117
409	118
482.5	133
504	133

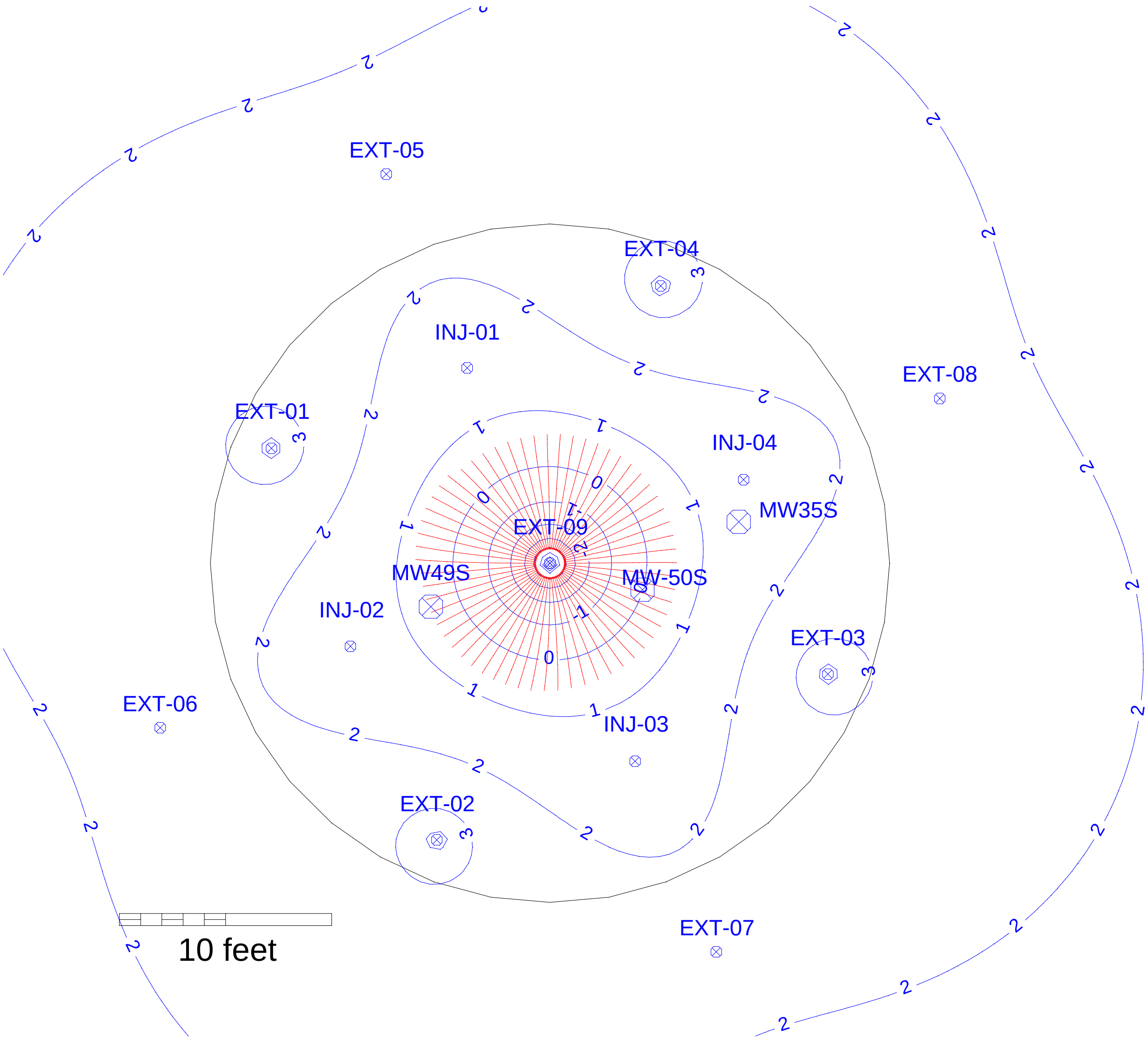
Conc. (mg/L)	15	40
time (hr)	70	90
Thickness (feet)	8	8
Eff. Porosity (range)	6.7%	8.6%
Effective Porisity (average)		**7.7%**



APPENDIX D

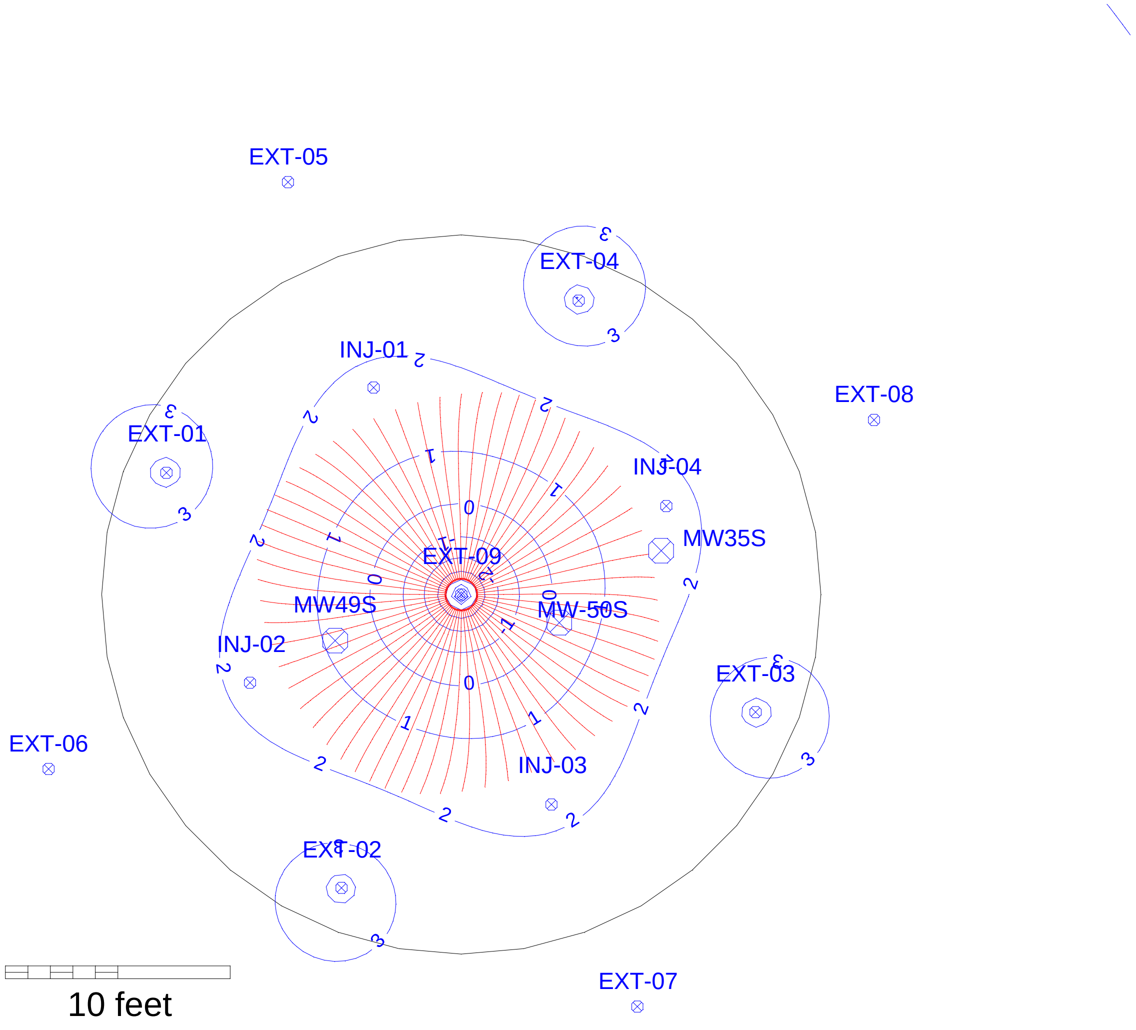
STAGE 1 PARTICLE TRACKING MODELING RESULTS

Appendix D
Stage 1 Particle Tracking Modeling Results



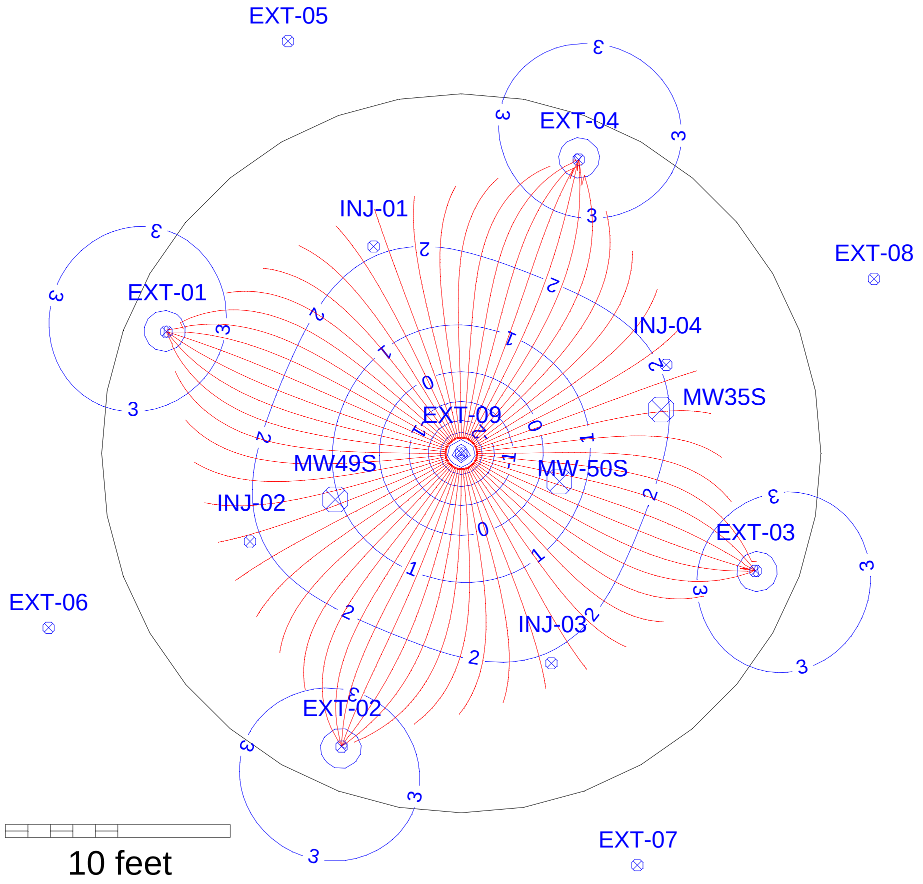
Particle Tracking (red lines) and drawdown (feet, blue contours) at Time = 4 days

Appendix D
Stage 1 Particle Tracking Modeling Results



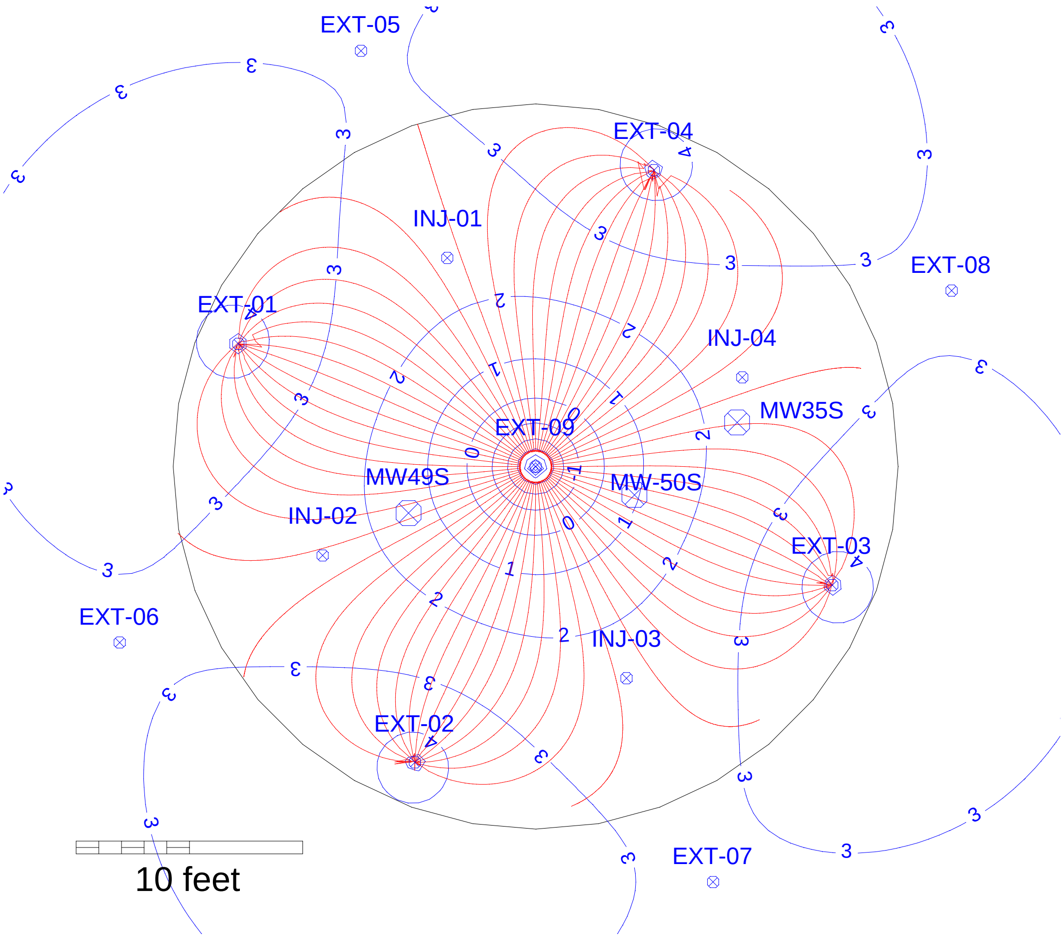
Particle Tracking (red lines) and drawdown (feet, blue contours) at Time = 7.5 days

Appendix D
Stage 1 Particle Tracking Modeling Results



Particle Tracking (red lines) and drawdown (feet, blue contours) at Time = 15 days

Appendix D
Stage 1 Particle Tracking Modeling Results

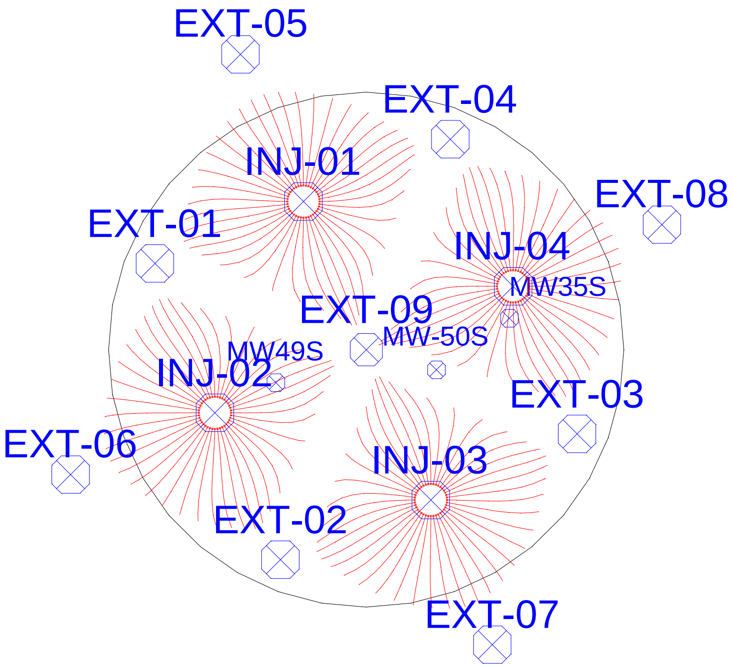


Particle Tracking (red lines) and drawdown (feet, blue contours) at Time = 30 days

APPENDIX E

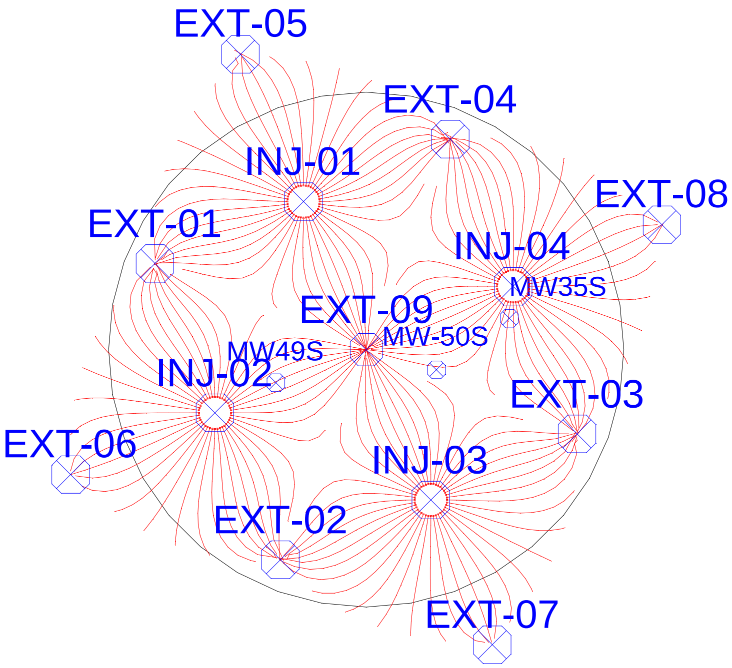
STAGE 2 PARTICLE TRACKING MODELING RESULTS

Appendix E
Stage 2 Particle Tracking Modeling Results



Particle Tracking at Time = 4 days

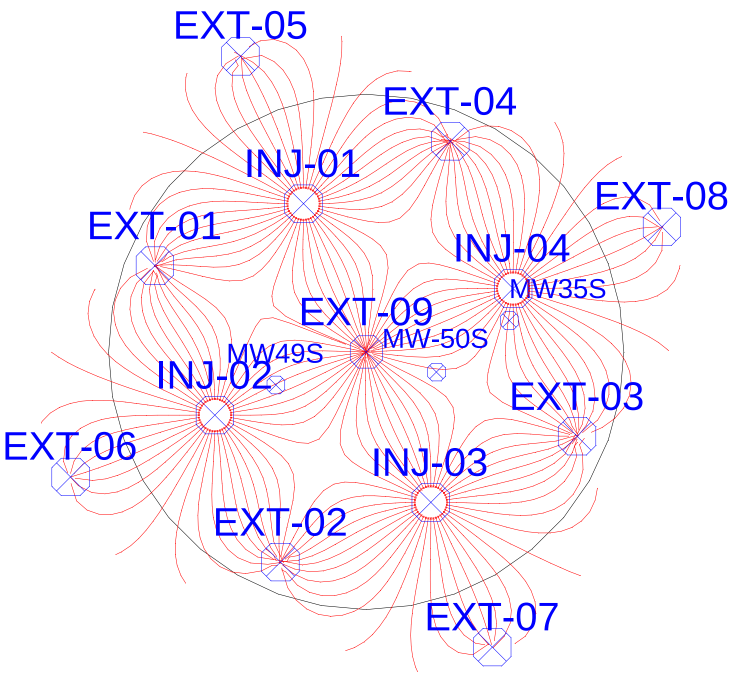
Appendix E
Stage 2 Particle Tracking Modeling Results



Particle Tracking at Time = 7.5 days

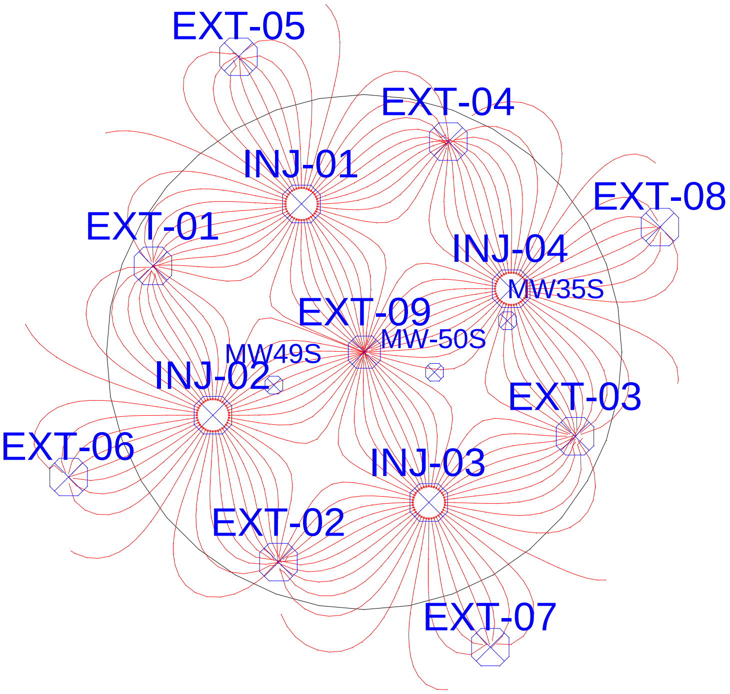
Appendix E

Stage 2 Particle Tracking Modeling Results



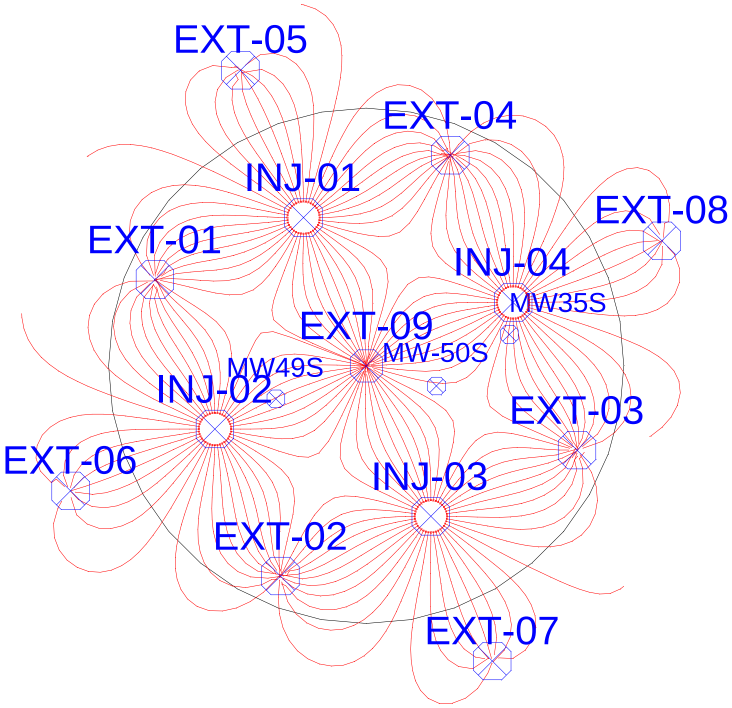
Particle Tracking at Time = 15 days

Appendix E
Stage 2 Particle Tracking Modeling Results



Particle Tracking at Time = 30 days

Appendix E
Stage 2 Particle Tracking Modeling Results



Particle Tracking at Time = 45 days

APPENDIX F

EVALUATION OF VERTICAL DNAPL MIGRATION

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The potential for downwards migration of DNAPL was considered during the conceptual design of the co-solvent flushing system. Exposure of the DNAPL to the co-solvent could result in mobilization of the DNAPL prior to solubilization. Although the time that the DNAPL could be potentially mobilized prior to solubilization would likely be short (days) due to both the volume of co-solvent being delivered, and the viscous nature of the DNAPL, screening level calculations were performed to determine a reasonable "worst-case" scenario for vertical DNAPL migration.

Vertical migration of DNAPL (V, in m/s) due to buoyancy is described by the following expressions:

$$V = \frac{\Delta\rho g K k_r}{\mu\theta S_{DNAPL}} \qquad \text{Eq. 1}$$

$$k_r = S_{DNAPL}^{\ \ 2} \qquad \text{Eq. 2}$$

where $\Delta\rho$ is the density difference between the DNAPL and water (0.34 x 10^3 kg/m^3, assuming a DNAPL density equal to that of TCA, which is 1.34x10^3 kg/m^3), g is the gravitational constant (9.8 m/s^2), K is the permeability determined via pump and slug testing (6 x 10^{-14} m^2), μ is the DNAPL viscosity (assumed equal to that of TCA, 1.2x10^{-3} kg/m/s), θ is the porosity (0.35), and S_{DNAPL} is the DNAPL pore saturation. A DNAPL pore saturation of 0.3 is conservatively estimated, as this value is representative of a DNAPL saturation that is approaching residual (i.e., immobile) saturation, which is consistent with the lack of appreciable product recovery in nearby wells. The relative permeability (k_r) is estimated using Eq. 2 (Charbeneau, 2000), with a resultant value of 0.09.

Incorporating these values into Eqs. 1 and 2, the calculated value of the vertical DNAPL velocity is 1.4 x 10^{-7} m/s, or 0.04 ft/day. Thus, over the duration of the co-solvent flushing, vertical DNAPL migration is expected to be a maximum of 2 ft. This value is considered to be a significant over-prediction of the rate of vertical DNAPL migration due to the conservative assumptions used in the calculations. For example, due to the layered stratigraphy in the DNAPL interbedded sand/silt zone, the vertical hydraulic conductivity is expected to be substantially less than the measured horizontal conductivity that was used in Eq. 1 (in general, vertical permeabilities are typically less than the corresponding horizontal permeabilities). Furthermore, dissolution of the DNAPL into the co-solvent is expected to diminish the DNAPL pore saturation (S_{DNAPL}), thereby lowering the calculated DNAPL migration rate. Finally, vertical DNAPL migration will be retarded and eventually terminated due to retention of residually trapped DNAPL within the soil pores. This trapping phenomenon would limit both the extent and rate of vertical DNAPL migration.