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**SEMI-ANNUAL PROGRESS REPORT
BRIGHT HOUR TRUST PROPERTY
340 ARMOUR DRIVE
ATLANTA, FULTON COUNTY, GEORGIA**

**SEA JOB #152-079
HSI#10894**

**SUBMITTED:
NOVEMBER 19, 2018**



SEA
SAILORS ENGINEERING ASSOCIATES, INC.

1675 SPECTRUM DRIVE • LAWRENCEVILLE, GEORGIA 30043 • TEL (770) 962-5922 • FAX 962-7964

November 19, 2018

Mr. David Hayes
Georgia Department of Natural Resources
Environmental Protection Division
205 Butler Street, S.E.
Floyd Towers East, Suite 1054
Atlanta, GA 30334

RE: Semi-Annual Progress Report
Bright Hour Trust Property
340 Armour Drive
Atlanta, Fulton County, Georgia
HSI #10894
SEA Job No. 152-079

Dear Mr. Hayes:

Sailors Engineering Associates, Inc. (SEA) appreciates this opportunity to submit this Semi-Annual Progress Report for the Bright Hour Trust Property located at 340 Armour Drive, Atlanta, Fulton County Georgia (the “Property”). The purpose of this report is to provide an update of the activities and findings since our July 2, 2018 Second Semi-Annual Progress Report.

I certify, under penalty of law, that the enclosed electronic copy is complete, identical to the paper copy, and virus free.

If you have any questions or need additional information, please contact us at (770) 962-5922. We look forward to working with you on this project.

Respectfully submitted,

SAILORS ENGINEERING ASSOCIATES, INC.



Michael J Haller, P.G.
Manager, Environmental Engineering

w/enclosures

cc: Mr. James Sochovka, Key Investments, Inc and Bright Hour Trust w/enclosures

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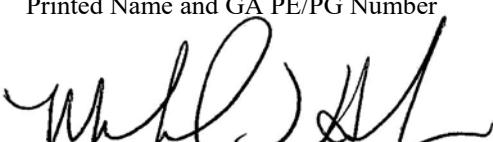
VOLUNTARY INVESTIGATION AND REMEDIATION PLAN CERTIFICATION

"I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/ Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances.

Furthermore, to document my oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division.

The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Michael J. Haller, P.G #1062
Printed Name and GA PE/PG Number


Signature and Stamp

November 19, 2018
Date



TABLE OF CONTENTS

1.0 Site Description

2.0 Risk Reduction Standards

- 2.1 Bright Hour Trust Property
 - 2.1.1 Type 3 and Type 4 Non-Residential Risk Reduction Standards
- 2.2 Restricted Area Exposure Domain
 - 2.2.1 Type 3 and Type 4 Non-Residential Risk Reduction Standards
 - 2.2.2 Type 5 Risk Reduction Standards
 - 2.2.2.1 Direct Exposure Calculations
 - 2.2.2.2 Protection of Groundwater

3.0 Delineation Standards

4.0 Remediation Plan

- 4.1 Corrective Action Completed or in Process
- 4.2 Additional Correction Action Measures

Appendix 1 Figures

- Sample Location Plan
- Delineation Plan Arsenic <2.0'
- Delineation Plan Barium <2.0'
- Delineation Plan Lead <2.0'
- Delineation Plan Mercury <2.0'
- Delineation Plan Selenium <2.0'
- SVOC Delineation Summary
- Proposed Remediation Plan

Appendix 2 - Tables

- Table 1 – Soil Analytical Data Summary – RCRA Metals
- Table 2 – Summary of Soil Analyses – SVOCs

Appendix 3 – Lab Data

Appendix 4 – GI Lab Data

Appendix 5 – Risk Reduction Standards Calculations

Appendix 6 – Summary of Activities and Professional Hours

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RE: Semi-Annual Progress Report
Bright Hour Trust HSI Site
Armour Drive
Atlanta, Fulton County, Georgia
HSI #10894
SEA Job No. 152-079

Dear Mr. Hayes:

The purpose of this report is to present our proposed Risk Reduction Standards (RRS) for the remaining soil impacts on the Bright Hour Trust property and the Restricted Area located on the Conservation Property north of Armour Drive in Atlanta, Fulton County, Georgia and to present our plan for a Type 5 remedy for the Bright Hour Trust HSI Site.

1.0 Site Description

The subject property is located at 340 Armour Drive in Atlanta, Fulton County, Georgia and is currently owned by Bright Hour Trust. The property is currently operating as a USA Ready Mix (also known as Allied Concrete and Cemex) concrete batch plant. The subject property is bordered to the north by a CSX rail line, followed by Peachtree Creek and residential property beyond, to the east by a LaFarge concrete plant, beyond which is a MARTA Rail Line and a MARTA rail repair facility and on the west and south by an undeveloped 9.4-acre tract of land beyond which is commercial/light industrial properties south and residential properties to the west. The subject property is approximately 5.989 acres in size and the geographical center of the subject property is at an approximate latitude of 33.813903° and approximate longitude of -84.377519°.

The Conservation Property, neighboring the Bright Hour Trust Property to the west, is currently undeveloped and subject to a City of Atlanta nature conservation easement. The Conservation Property consists of 9.4 acres and includes the 2.2-acre Restricted Areas discussed below. Based on SEA's extensive historical research, the Conservation Property has never been developed or used for commercial or industrial purposes. During SEA's site reconnaissance, areas of scattered slag were observed near the surface on the eastern edge of the Conservation Property and within the Restricted Area. As previously reported, this slag contains elevated levels of certain constituents, primarily lead and arsenic. The source and timing of the slag within the Restricted

Area is unknown, although it may have been transported by mechanical means or may have been placed in conjunction with the construction of the adjacent rail line. The lateral extent of the slag material on the Conservation Property is confined to a narrow area along the common boundary of the Conservation Property and the Bright Hour Trust Property. This area has been designated as the Restricted Area Exposure Domain for the purpose of calculating site specific risk reduction standards.

2.0 Risk Reduction Standards

The Risk Reduction Standards for soil selected for the Subject Property are the Type 3 or Type 4 RRS for all site potential contaminants of concern (COCs), with the exception of arsenic, barium, lead, mercury, selenium and silver. Type 5 RRSs have been chosen for arsenic, barium, lead, mercury, selenium and silver impacts and includes the existing and planned additional area of concrete cover over the affected area on the Subject Property.

The Risk Reduction Standards for soil selected for the Restricted Area Exposure Domain are the Type 3 or Type 4 RRS for all site potential contaminants of concern (COCs), with the exception of arsenic, barium and lead. A Type 5 remedy has been chosen for arsenic, barium and lead and includes the installation of a fence around the area that does not meet the Type 3 or Type 4 RRS. Since the Property was not listed on the Hazardous Site Inventory for a release to groundwater, certification to RRS for groundwater is not required. However, demonstration that any remaining soil impacts will not impact groundwater that results in an exceedance of the appropriate standard at the downgradient point of compliance is necessary.

2.1 Bright Hour Trust Property

2.1.1 Type 3 and Type 4 Non-Residential Risk Reduction Standards

The Risk Reduction Standards for soil selected for the Subject Property are the Type 3 or Type 4 RRS for all site potential contaminants of concern (COCs), with the exception of arsenic, barium, lead, mercury, selenium and silver. Type 5 RRSs have been chosen for arsenic, barium, lead, mercury, selenium and silver impacts as discussed above.

Copies of the Type 3 and Type 4 RRS calculations for the regulated substances detected on the Bright Hour Trust Property and the Restricted Area Exposure Domain are attached.

2.2 Restricted Area Exposure Domain

2.2.1 Type 3 and Type 4 Non-Residential Risk Reduction Standards

The concentrations of regulated substances detected on the Restricted Area Exposure Domain were compared to the Type 3 and Type 4 RRS calculated for the Bright Hour Trust Property. All substances detected in soil on the Restricted Area Exposure Domain were in compliance with the higher of either the Type 3 or Type 4 RRS with the exception of arsenic, barium and lead. A Type 5 remedy has been chosen for this area as discussed above.

Copies of the Type 3 and Type 4 RRS calculations for the regulated substances detected on the Restricted Area Exposure Domain are attached.

2.2.2 Type 5 Risk Reduction Standards

Since materials with concentrations above the Type 3 and Type 4 RRS will be present near the surface and not covered with a cap, SEA calculated a Type 5 RRS for the Restricted Area Exposure Domain.

2.2.2.1 Direct Exposure Calculations

Two direct exposure scenarios were considered in the calculations. One scenario involved a maintenance worker who will be walking the fence perimeter occasionally for the purpose of certifying that the Type 5 remedy is properly implemented. The second scenario included a youth trespasser.

Area averaging was used within the proposed fence area to determine an average concentration of arsenic, barium and lead for that exposure domain. The area average was calculated based on a 95-percentile upper confidence level (95%UCL). This 95%UCL was calculated using the XRF and laboratory results for soil samples collected in the Restricted Area within 2 feet of the surface. The value calculated for arsenic was 150.56 milligrams per kilogram (mg/Kg), 935.04 mg/Kg for barium and 691.84 for lead.

The worker scenario calculation is based on both chronic and acute exposure values for a maintenance worker who may inspect the fence area. The maintenance worker exposure calculation was based on a determination of the number of days per year of exposure that would not exceed the 95%UCL. The Georgia Adult Lead Model was used to calculate an exposure for lead and it was determined that the average concentration for lead within the restricted area was below the target soil concentration of 929.77 mg/Kg calculated using the default model input values. The average concentration for barium is below the calculated Type 4 RRS of 1,648 mg/Kg. No further access restriction is necessary for barium or lead.

The calculated 95%UCL average concentration for arsenic within the Restricted Area is above the Type 3 RRS for arsenic and additional exposure restrictions are necessary. SEA used the default input parameters for RAGs Equations 6 and 7 to calculate a worker exposure value except for the exposure frequency which was adjusted until the value did not cause the resulting soil concentration to exceed the 95%UCL concentration. The exposure frequency value of 63 days per year does not result in an exposure risk above the target number of 10E-5 for carcinogenic effects and the default exposure frequency of 250 days per year does not result in a hazard quotient of 1 to be exceeded for non-carcinogenic effects. To determine if an acute exposure risk to a worker exists for arsenic, RAGs equations 6 and 7 were used with a carcinogenic risk of 10E-4 and a Hazard Quotient of 3, and an exposure frequency set to 63 days per year. The lower of the two calculated values at 1,510 mg/Kg based on carcinogenic risk was compared to the highest detected concentration of arsenic on the Conservation Property at 881 mg/Kg indicating that an acute risk is not present. Single worker access will be restricted to 63 days per year or less as part of the proposed institutional control portion of the Type 5 remedy for the Restricted Area.

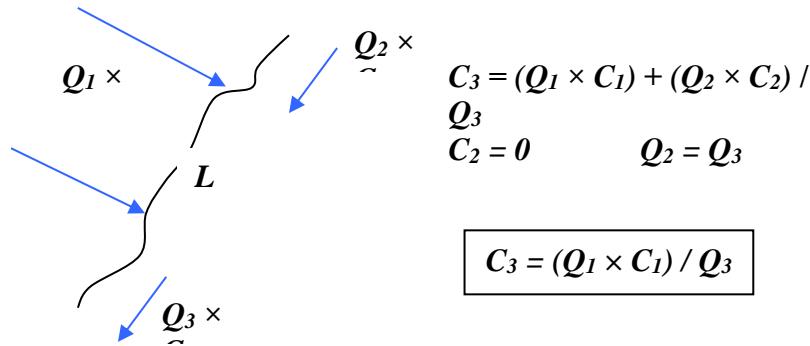
To calculate the potential risk for a youth trespasser, SEA utilized the USEPA input values for a trespasser scenario. The default input parameters for a typical trespasser are a 7 to 16-year-old adolescent (10-year exposure duration) with a body weight of 45 kilograms. The EPA Region 4 Human Health Risk Assessment Guidance (March 2018 Update) states that the exposure frequency should consider site-specific factors such as the distance to residences and the attractiveness of the site to trespassers. The site-specific factors considered for the Restricted Area Exposure Domain included the EPA recommended factors in addition to the presence of a covenant-maintained fence. The Restricted Area Exposure Domain is nearly 1,000-feet from the nearest residence and is located at the far end of a heavily wooded Conservation Property in an area that includes many industrial properties. There are no unique features at the Restricted Area that would attract a youth trespasser and local topography and surrounding property use make access to the Restricted Area difficult. Although the guidance states that the presence of a fence should not be used in considering access to an area, in this case the fence will be maintained pursuant to a Uniform Environmental Covenant that will be enforced by EPD and will require that a certification be filed annually with EPD to confirm that the fence remains in place. Under these circumstances, SEA believes that the consideration of the fence in the exposure assumptions is appropriate and that, in light of the fence and the other site-specific factors, the default youth trespasser exposure frequency of 90-days per year recommended in the EPD August 27, 2018 letter is not appropriate. It is SEA's opinion that a conservative estimate for a youth trespasser to access the Restricted Area Exposure Domain given site-specific factors would be once a month for 5-years (11-16 years old). However, to be consistent with EPA guidance for a trespasser scenario and provide a very conservative trespasser scenario, SEA has used the USEPA recommended 10-year exposure duration and a site-specific exposure frequency of 45-days per year for arsenic, barium and lead for both chronic and acute exposure calculations. RAGs equations 6 and 7 were used with a carcinogenic risk of 10E-5 and a Hazard Quotient of 1 for chronic exposure and a carcinogenic risk of 10E-4 and a Hazard Quotient of 3 for acute exposure. The results of the calculations indicate that the average concentrations present within the proposed fence area based on the 95% UCL for arsenic, barium and lead do not exceed the calculated values for chronic exposure and the highest reported concentrations do not exceed the calculated value for acute exposure.

2.2.2.2 Protection of Groundwater

Although the site was not listed for groundwater based on the distance to the nearest drinking water well, SEA calculated the potential for the remaining soil impacts within the Restricted Area Exposure Domain to result in a groundwater concentration that would cause the point of compliance to exceed the appropriate standard. For the purposes of our calculations, Peachtree Creek was identified as the compliance point and the in-stream water quality standards (ISWQS) where chosen as the compliance standard.

Soil Screening Guidance Equation 10 was used to calculate a site-specific protection of groundwater standard. SEA utilized chemical specific and default values for the input parameters except for the Dilution Attenuation Factor (DAF). To calculate a site-specific DAF, SEA used the groundwater stream mixing calculation with the In-Stream Water Quality Standard as the final stream concentration.

The following schematic shows the key elements of the groundwater-surface water mixing calculations. A spreadsheet is attached with the calculations and results.



Where:

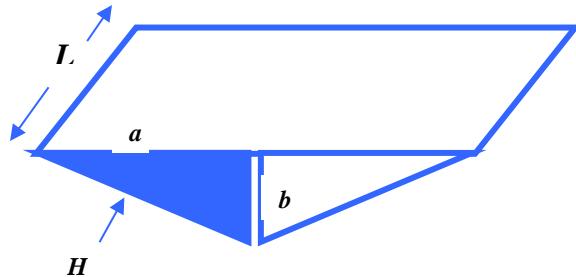
- Q_1 is the flow rate of impacted groundwater entering the stream segment (in cfs).
- Q_2 is the average annual daily streamflow immediately upgradient of the site (in cfs).
- Q_3 is the average annual daily streamflow immediately downgradient of the site (in cfs).
- C_1 is the dissolved contaminant concentration in groundwater (in mg/L).
- C_2 is the upgradient concentration in the stream (assumed 0).
- C_3 is the resulting contaminant concentration in the stream after mixing (in mg/L).
- L is the length of the stream segment receiving impacted groundwater (in feet).

The length (L) used in the mixing calculation was the length of the restricted area exposure domain parallel to Peachtree Creek.

The flux of impacted groundwater discharging into Peachtree Creek (Q_1) is calculated using the following equations (see calculations below):

$$Q_1 = A \times v_d$$

$$A = L \times H \times i$$



- v_d is the groundwater (Darcy) velocity ($v_d = K^*i$).
- K is the hydraulic conductivity
- i is the hydraulic gradient
- A is the cross-sectional area of discharge.
- a is the half-width of the surface water.
- b is the depth of water in the stream (average daily mean gage height).

H is the side-face of groundwater discharge calculated from **a** and **b**.

The regulations for ISWQS state that concentrations are to be measured “under annual average or higher stream flow conditions”, Rule 391-3-6-.03(5)(d). SEA used USGS stream gage data for the calculations. The main stem of Peachtree Creek forms at the confluence of North Fork Peachtree Creek and South Fork Peachtree Creek which is located approximately 1,500 feet upstream from the subject property. As a conservative input value, SEA added the daily-mean discharge from USGS Gaging Station 02336120 (North Fork Peachtree Creek at Buford Highway) and USGS Gaging Station 02336240 (South Fork Peachtree Creek at Johnson Road) to perform simple mixing calculations to develop a site-specific DAF. Both gaging stations are located approximately 2.5 miles upstream of the confluence. The annual average streamflow conditions were calculated by using the most recent 15-years of stream flow data for both gaging stations and determining the 95th-percentile Lower Confidence Level (95%LCL) value for the stream flow at each station.

The hydraulic conductivity was determined based on grainsize analysis of representative soil samples collected from three locations within the Restricted Area Exposure Domain. Samples were collected from 0-2 feet and 2-6 feet at each location. ASTM methods for sieve and hydrometer were used to determine the grain size distribution. Based on the grain size analysis the soils were classified using the USDA Soil Conservation Service Soil Texture Calculator. The soil types encountered included a silty clay loam in the shallow soils at HA-8 and HA-11, a silty clay in the shallow soils in HA-7 and clay in each of the deep samples. The soil textures were then used to estimate the hydraulic conductivity using Table A-2 from the USEPA Soil Screening Guidance Users Guide. Since the deeper soils would control the rate at which infiltration occurred, using the clay soil type would be appropriate for use in the mixing calculations. However, to determine if a more permeable soil would result in impact to Peachtree Creek, the soil with the highest estimated hydraulic conductivity (silty clay loam at 4.5E-5 cm/sec) was chosen as the input value in the stream mixing calculation. A copy of the grain size analysis worksheets and soil Texture Calculator worksheets are attached.

The hydraulic gradient was based on groundwater elevation data collected from site wells on the Bright Hour Trust Property in December 2015.

The average of the annual daily-mean gage height for USGS stream gage 02336300 was used in the calculations. This station is the nearest gaging station on Peachtree Creek and is located approximately 2.4 miles downstream (west-northwest) of the subject property at Northside Drive. The width of the creek was estimated at 50 feet from Google Earth.

Based on the input parameters as outlined above, the site-specific DAF calculated for the restricted area exposure domain is 1470. Entering the calculated DAF into Equation 10 of the Soil Screening Guidance, the site-specific soil concentrations that would result in an exceedance of the ISWQ for arsenic is 2,146.2 mg/Kg, for barium 121,128 mg/Kg and for lead 1,588.0 mg/Kg which are higher than the area average based on the 95% UCL for each of those constituents in this exposure domain.

Based on the calculations as outlined above, the Restricted Area Exposure Domain Type 5 RRS for arsenic is 151.28 mg/Kg based on carcinogenic direct exposure risk, the Type 5 RRS for barium is 121,128 mg/Kg based on the protection of groundwater standard and the Type 5 RRS for lead is 929.77 mg/Kg based on Georgia Adult Lead model. Copies of the RRS calculations are presented in the Appendix to this report.

3.0 Delineation Standards

The delineation standards for the Property have been tabulated and are presented in Table 1 attached to this report. The Delineation Standards are based on either the Type 1 or Type 2 Risk Reduction Standards as indicated on the table. The concentrations of regulated substances detected on the Bright Hour Trust HSI Site were compared to the Delineation Standards and it was determined that no VOCs exceeded the Type 1 RRS. The Delineation Standards for metals was exceeded on both the Bright Hour Trust Property and the Restricted Area Exposure Domain. The metals arsenic and lead were the most widespread and were detected on both the Bright Hour Trust Property and the Restricted Area Exposure Domain.

Additional samples were collected on the Conservation Property to horizontally delineate the metals impacts. Four additional hand auger samples were collected southwest of the Restricted Area Exposure Domain to complete the horizontal delineation of lead and arsenic. Hand auger sampling methods were used to collect a sample from the top two feet at each location which was screened with an XRF instrument. Three of those samples were selected for laboratory analysis of arsenic based on the XRF readings. The results of the XRF screening indicated that both arsenic and lead were below the delineation standards. The laboratory results confirmed that arsenic was below the Delineation Standard. Since the XRF readings for lead were well below the Delineation Standard, no laboratory analysis for lead was warranted.

Soil samples were collected in general accordance with published protocols including USEPA Region 4 Science and Ecosystem Support Division Field Branches Quality System and Technical Procedures, and Standard Operating Procedures, Soil Sampling ((SESPROC-300-R3, August 21, 2014). All soil samples were placed in laboratory supplied sample containers and immediately placed on ice for delivery to the laboratory under written chain-of-custody procedures. All downhole and/or reusable field equipment was properly decontaminated between soil borings and temporary wells in general accordance with published protocols including USEPA Region 4 Science and Ecosystem Support Division “Field Equipment Cleaning and Decontamination” Operating Procedure (SESDPROC-205-R3, December 18, 2015).

Figures are included in the Appendix which depict the horizontal extent of metals impacts above the Delineation Standards. Additional vertical delineation of metals impacts will be necessary. Also provided in the appendix, are figures depicting the horizontal and vertical extent of SVOC impacts above the Delineation Standards.

4.0 Remediation Plan

4.1 Corrective Action Completed or in Process

Although no direct corrective action measures have been taken to date, the operation of a concrete batch plant on the Bright Hour Trust Property has resulted in a substantial and impervious concrete cover across the majority of the Bright Hour Trust Property. This concrete cap prevents direct exposure to impacted soil and reduces the potential for leaching to the underlying groundwater. Based on SEA's multiple subsurface investigations of the Bright Hour Trust Property, the concrete thickness across the paved portions of the Bright Hour Trust Property ranges from eight inches to over 14 inches.

4.2 Additional Corrective Action Measures

Additional corrective action measures necessary to meet the appropriate risk reduction standards will include engineering and institutional controls to minimize the potential for exposure. Specifically, the proposed corrective action measures will include the following engineering and institutional controls:

- a) Engineering controls will include the placement of at least 6-inches of concrete in those areas of the Bright Hour Trust Property that exceed the Type 3 or 4 RRS which currently are not covered by concrete.
- b) In addition, a fence will be erected around the perimeter of the Restricted Area. The proposed fence will be constructed of a heavy gauge wire fence approximately six feet tall supported by treated wooden posts, similar in appearance to the fencing commonly used along highways to prevent wildlife from entering the roadway. The use of the fence limits the potential for long term, continuous access to the area and results in a diminished potential for any adverse health effects from exposure to the remaining slag.
- c) An institutional control in the form of a Uniform Environmental Covenant will be recorded on the Bright Hour Trust Property and the Restricted Property. The covenant for the Bright Trust Property will restrict groundwater and residential use (without EPD's prior approval) and will require that the concrete cover on the Bright Hour Trust Property be inspected annually and an annual certification form be submitted to EPD documenting any changes or repairs to the concrete cap. Similarly, the covenant for the Restricted Area will restrict groundwater and residential use (without EPD's prior approval) and will require that the fence surrounding the Restricted Area be maintained and inspected annually and an annual certification be submitted to EPD documenting any changes or repairs made. Finally, the covenants will require that all subsurface work on the Bright Hour Trust Property and the Restricted Area be performed in accordance with the soil management plan approved by EPD.

The areas to receive the additional concrete cover and the fenced area are shown on the attached Proposed Remediation Plan.

SEA is prepared to implement the proposed corrective action measures upon your approval and respectfully requests written approval of our plan that we may forward to the owner of the Conservation Property as a condition of our access agreement with them.

November 2018
Bright Hour Trust Property
Atlanta, Fulton County, Georgia

Following implementation of the corrective action described in this submittal and the completion of the horizontal and vertical delineation, a VRP Compliance Status Report will be completed and submitted for your review.

If you have any questions, please contact us at your convenience.



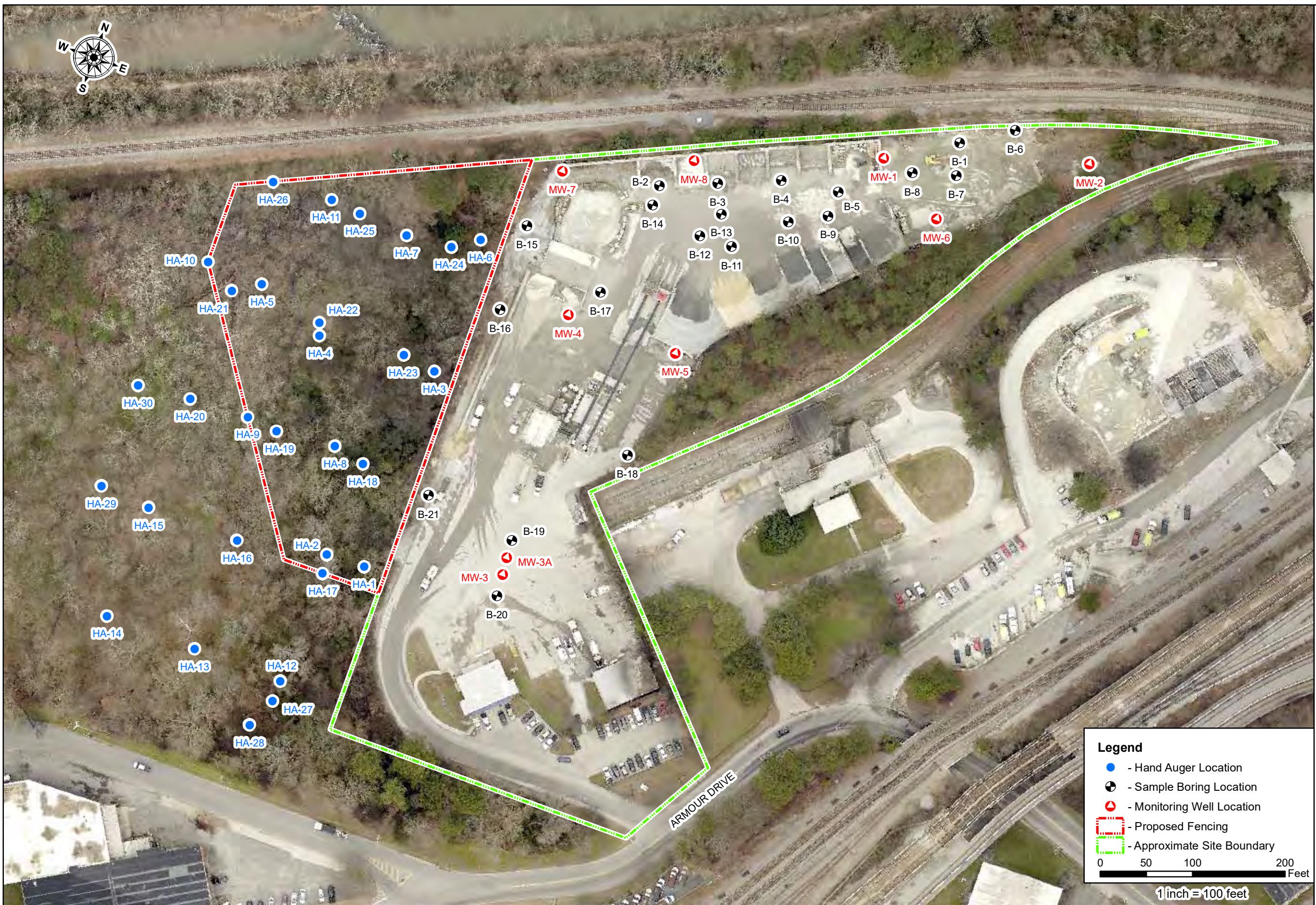
Respectfully submitted,

SAILORS ENGINEERING ASSOCIATES, INC.

A handwritten signature in black ink that appears to read "Michael J. Haller".

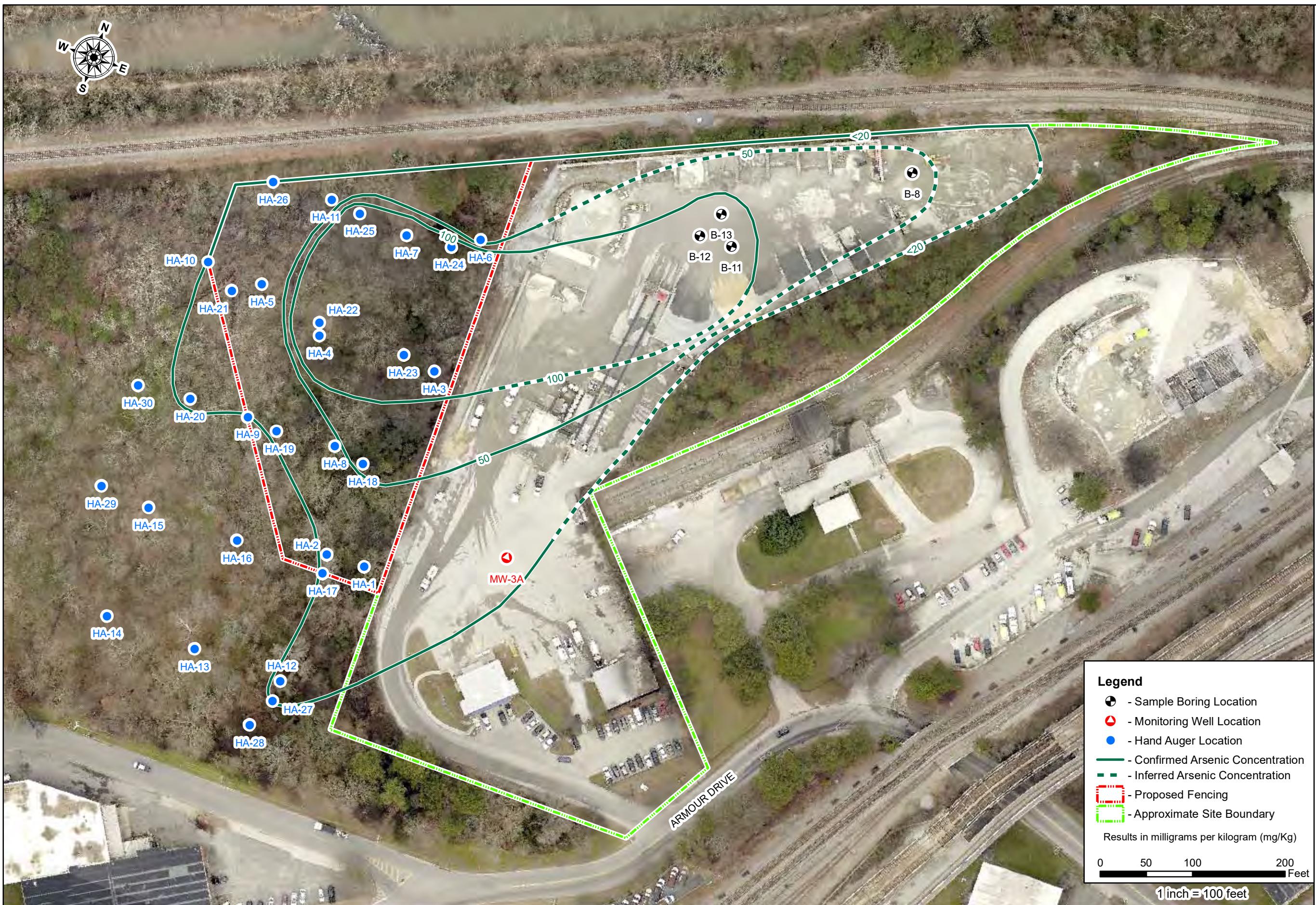
Michael J. Haller, P.G.
Principal Geologist

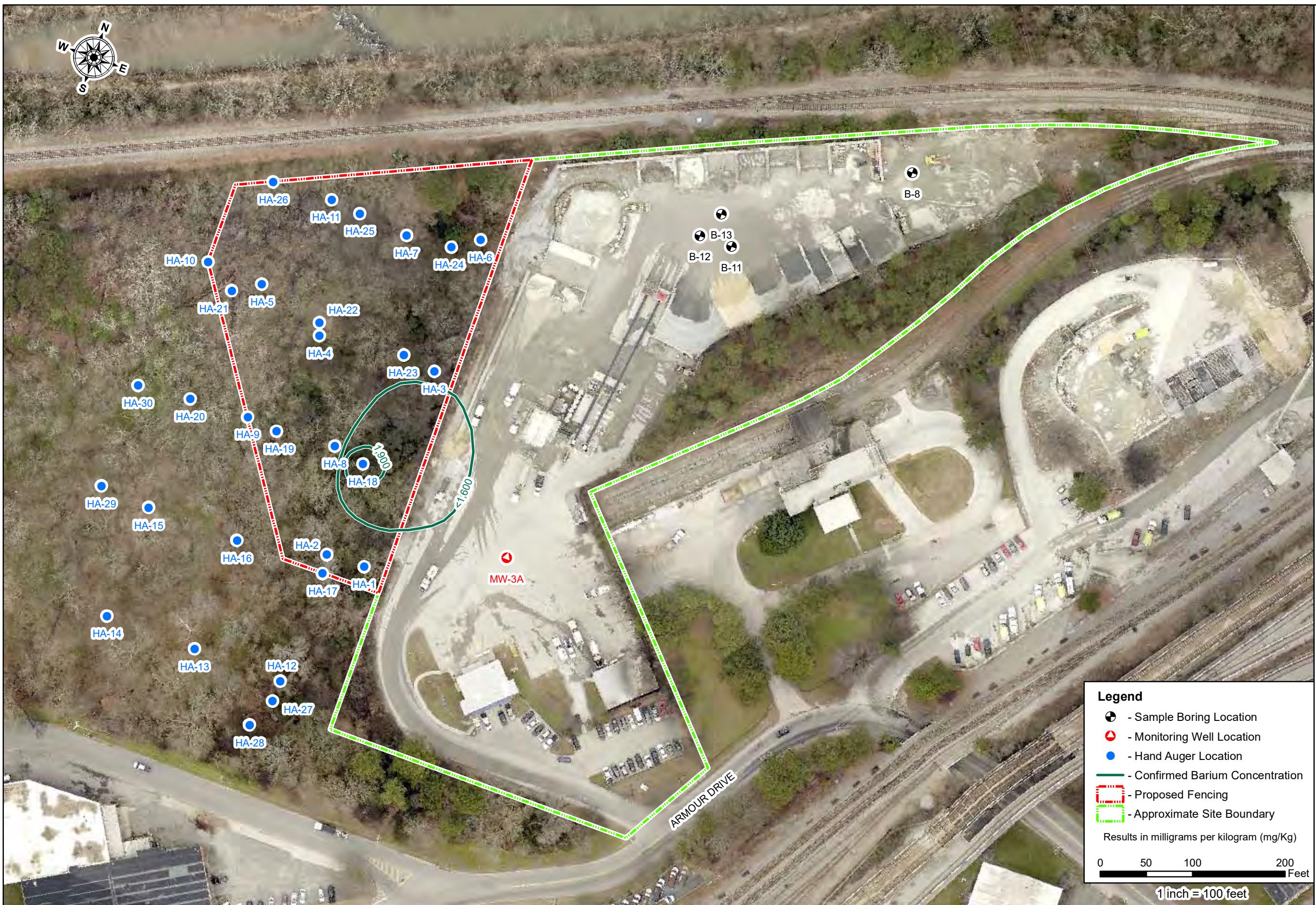
APPENDIX 1
FIGURES

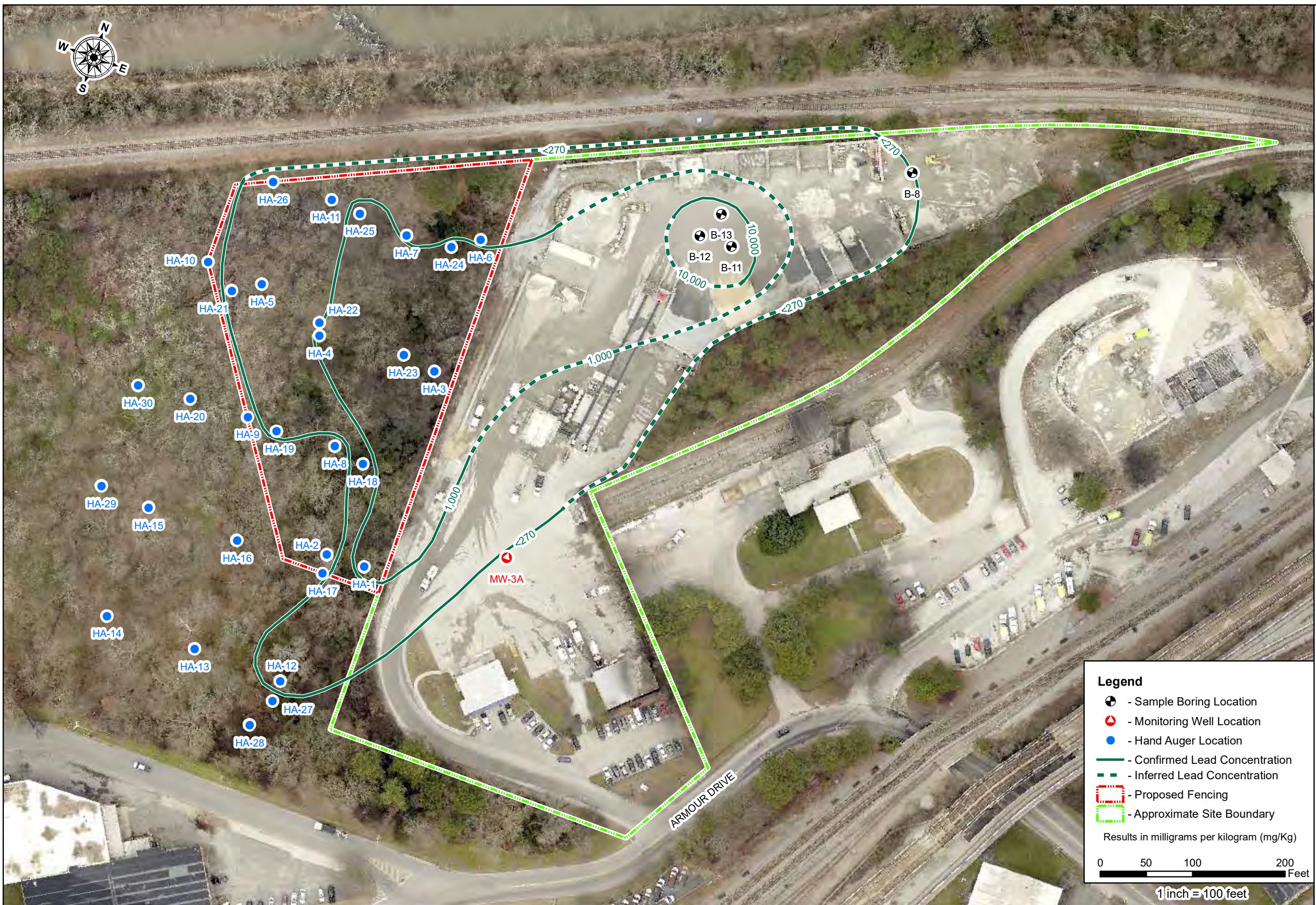


SEA SAMPLE LOCATION PLAN

BRIGHT HOUR TRUST PROPERTY
340 Armour Drive
Atlanta, Fulton County, Georgia
Job No. 152-079









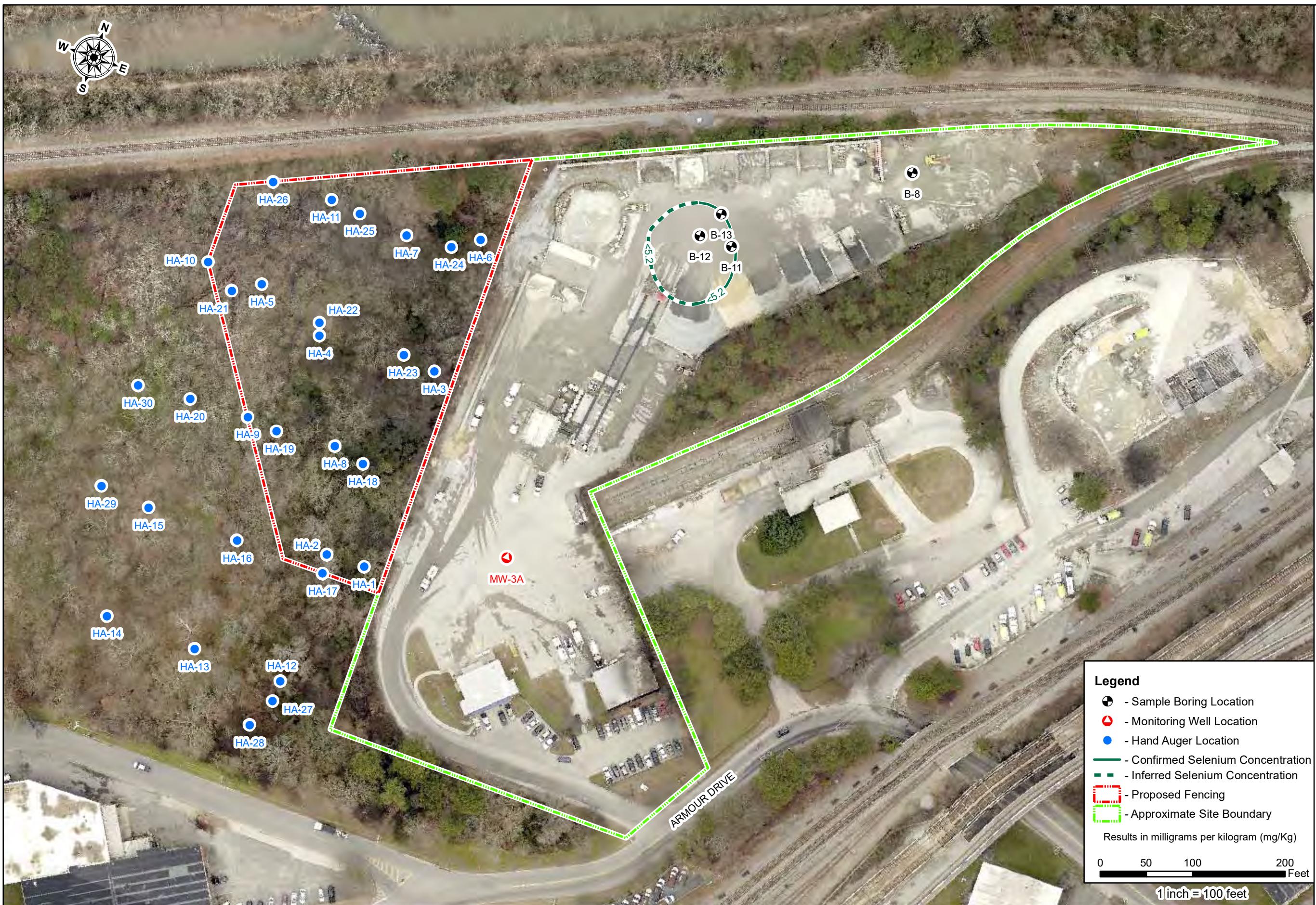
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Job No. 152-079

11/5/2018

**DELINNEATION PLAN
MERCURY <2.0'**

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DELINERATION PLAN SELENIUM <2.0'

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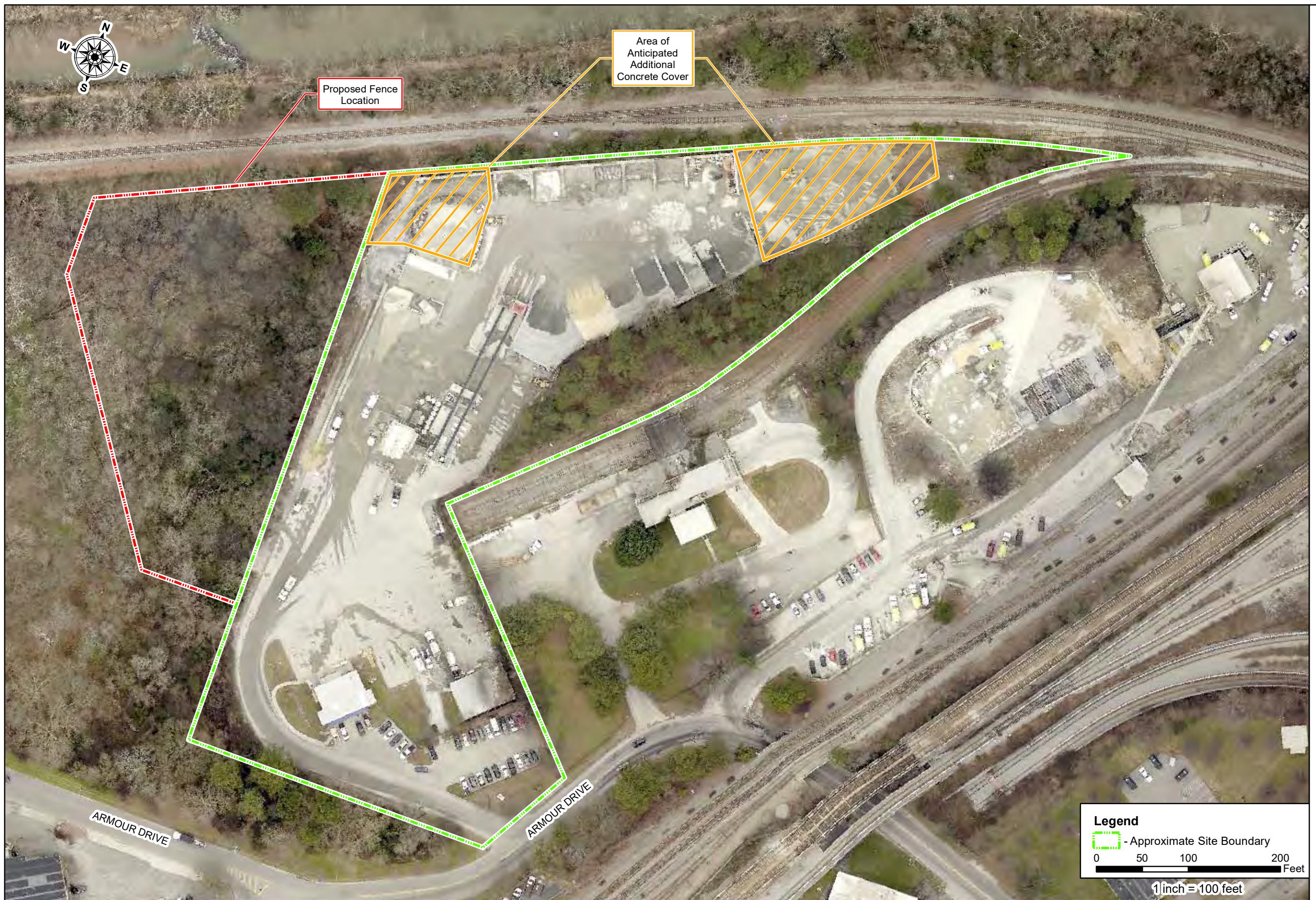
BRIGHT HOUR TRUST PROPERTY

SVOC DELINEATION SUMMARY

SEA ENGINEERING ASSOCIATES, INC.
ENVIRONMENTAL/GEOTECHNICAL
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BRIGHT HOUR DRIVE
Atlanta, Fulton County, Georgia

Job No. 152-079
11/5/2015



SEA **PROPOSED**
ENGINEERING
ASSOCIATES, INC.
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Job No. 152-079

APPENDIX 2
TABLES

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	B-1	B-1	B-1	B-2	B-2	B-2	B-3	B-3	B-4	B-4	B-5	B-5	B-6	B-6	B-7	B-8	B-8	B-8	B-9	B-10
Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Depth (ft)	3-5	13-15	23-25	3-5	8-10	13-15	3-5	8-10	3-5	8-10	3-5	8-10	3-5	8-10	3-5	1-2	3-5	8-10	3-5	3-5
Date	11/20/15	11/20/15	11/20/15	11/23/15	11/23/15	11/23/15	11/23/15	11/23/15	11/24/15	11/24/15	11/24/15	11/24/15	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016
Arsenic	519	< 6.21	< 4.88	1330	636	206	499	191	907	139	76.6	< 5.91	125	396	43.3	74.5	57.9	14.1	33.3	12.7
Barium	274	135	41.0	83.8	50.7	73.0	136	751	178	201	37.3	70.8	108	118	114	132	166	124	27.4	110
Cadmium	4.91	< 3.1	< 2.44	8.07	5.68	< 2.94	30.6	3.30	4.98	< 2.54	< 3.08	< 2.95	< 2.84	< 2.90	< 2.36	< 2.84	< 3.20	< 3.02	< 2.77	< 3.01
Chromium	< 2.76	53.0	4.58	< 2.93	< 2.74	6.56	< 2.64	< 2.83	23.3	97.9	5.49	19.5	40.8	54.4	9.12	5.64	7.29	36.3	16.6	4.58
Lead	22.2	12.4	< 4.88	39400	5020	9.06	33800	805	860	43.8	187	12.9	8.54	16.4	98.7	263	137	10.7	< 5.53	277
Mercury	< 0.119	< 0.115	< 0.104	172	1.01	0.251	< 0.113	0.202	0.697	0.149	< 0.120	< 0.119	< 0.106	0.127	< 0.112	0.747	< 0.118	< 0.121	0.242	< 0.110
Selenium	< 5.52	< 6.21	< 4.88	76.7	< 5.47	< 5.88	< 5.27	< 5.66	< 5.72	< 5.08	< 6.15	< 5.91	< 5.67	< 5.79	< 4.73	< 5.68	< 6.40	< 6.05	< 5.53	< 6.02
Silver	2.86	< 3.1	< 2.44	27.8	32.3	< 2.94	58.3	15.9	< 2.86	< 2.54	< 3.08	< 2.95	< 2.84	< 2.90	< 2.36	< 2.84	< 3.20	< 3.02	< 2.77	< 3.01

Concentrations in mg/Kg

NA=Not Analyzed

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	B-11	B-12	B-12	B-13	B-13	B-14	B-14	B-15	B-16	B-17	B-17	B-18	B-19	B-19	B-20	B-20	B-21	MW-1	MW-1
Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Depth (ft)	1-3	1-3	8-10	1-3	8-10	3-5	8-10	5-10	3-5	3-5	8-10	3-5	2-4	8-10	2-4	8-10	3-5	3-5	13-15
Date	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	11/20/15	11/20/15
Arsenic	147	128	86.6	171	21.7	197	441	341	1490	156	<4.99	<4.53	NA	NA	NA	< 5.73	888	195	14.5
Barium	524	502	316	368	89.4	969	415	1150	159	240	239	146	NA	NA	NA	172	483	108	96.9
Cadmium	< 2.75	4.47	< 2.68	<2.61	<2.78	3.19	8.08	5.39	12.4	<2.91	<2.50	< 2.27	NA	NA	NA	< 2.86	4.73	< 2.9	< 2.9
Chromium	9.46	10.3	4.29	13	19.6	25.4	2.35	8.5	< 2.83	48.6	35.4	31.1	NA	NA	NA	23.6	17.4	23.4	25.7
Lead	9620	53200	2410	4440	93	4230	13900	2710	12500	20.9	13.5	< 4.53	NA	NA	NA	12.7	654	17.7	14.2
Mercury	3.03	10.5	6.89	6.34	<0.115	3.36	2.58	1.31	2.22	<0.119	<0.119	< 0.0984	NA	NA	NA	< 0.121	8.32	< 0.114	< 0.122
Selenium	< 5.50	66.1	7.27	<5.21	<5.55	< 5.69	< 4.29	< 5.00	< 5.67	<5.82	<4.99	< 4.53	NA	NA	NA	< 5.73	< 5.67	< 5.79	< 5.8
Silver	14.8	7.81	< 2.68	6.1	<5.55	6.68	37.4	17.4	32	<2.91	<2.50	< 2.27	NA	NA	NA	< 2.86	< 2.83	< 2.9	< 2.9

Concentrations in mg/Kg

NA=Not Analyzed

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	MW-1	MW-2	MW-2	MW-3	MW-3A	MW-3A	MW-4	MW-4	MW-4	MW-5	MW-5	MW-6	MW-6	MW-7	MW-7	MW-8	MW-8	MW-8	
Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Depth (ft)	18-20	3-5	18-20	3-5	0-3	3-5	8-10	3-5	8-10	13-15	3-5	8-10	3-5	8-10	5-7	8-10	3-5	5-10	8-10
Date	11/20/15	11/20/15	11/20/15	11/21/15	11/25/15	11/25/15	11/25/15	11/21/15	11/21/15	11/23/15	11/23/15	11/24/15	11/24/15	11/25/15	11/25/15	1/25/2016	1/25/2016	1/25/2016	
Arsenic	< 6.57	< 5.12	< 5.28	66.8	29.1	< 5.78	< 5.65	28.8	< 5.76	< 5.82	101	< 5.35	10.5	16.6	233	289	16.3	316	1260
Barium	210	73.9	329	433	196	79.1	71.7	262	220	134	78.1	144	32.1	35.4	1890	1870	484	1300	30.5
Cadmium	5.82	< 2.56	< 2.64	< 3.29	< 2.9	< 2.89	< 2.83	< 2.85	< 2.88	< 2.91	< 2.80	< 2.67	< 2.67	< 2.67	3.14	9.25	< 2.58	4.79	15.4
Chromium	58.1	10.8	56.1	26.9	28.7	31.0	21.7	48.5	31.2	21.6	39.1	16.8	6.50	< 2.67	12.1	< 2.89	8.72	3.71	< 2.98
Lead	26.4	9.98	< 5.28	789	217	10.6	10.2	17.7	12.6	11.0	49.1	10.1	10.5	7.77	2050	3530	383	7560	4860
Mercury	< 0.121	< 0.102	< 0.099	1.03	0.545	< 0.116	< 0.103	< 0.114	< 0.118	< 0.123	< 0.119	< 0.105	< 0.111	< 0.0973	0.463	< 0.106	0.377	2.19	1.06
Selenium	< 6.57	< 5.12	< 5.28	< 6.57	< 5.79	< 5.78	< 5.65	< 5.7	< 5.76	< 5.82	< 5.59	< 5.35	< 5.34	< 5.34	< 5.73	< 5.78	< 5.16	< 5.40	< 5.95
Silver	< 3.28	< 2.56	< 2.64	< 3.29	< 2.9	< 2.89	< 2.83	< 2.85	< 2.88	< 2.91	< 2.8	< 2.67	< 2.67	< 2.67	13.0	33.7	< 2.58	25.7	24.9

Concentrations in mg/Kg

NA=Not Analyzed

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	HA-1		HA-1	HA-2		HA-2		HA-3	HA-3		HA-4		HA-4	HA-5		HA-5	
Type	XRF		soil	XRF		XRF	soil	XRF	XRF	soil	XRF	soil	XRF	XRF	soil	XRF	soil
Depth (ft)	0-0.5		1'-2'	0-0.5		1'-2'		1'-2'	0-0.5		0-0.5		1'-2'	0-0.5		1'-2'	
Date	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018
Arsenic	97	98.5	55	11	8	19	12.4	141	95	94.4	209	170	160	15	13.2	35	41.5
Barium	NA	827	NA	NA	172	NA	213	NA	NA	1040	NA	1210	NA	NA	241	NA	393
Cadmium	NA	1.95	NA	NA	<2.24	NA	<2.37	NA	NA	7.11	NA	4.11	NA	NA	<2.38	NA	<2.01
Chromium	NA	27.5	NA	NA	30.7	NA	28.3	NA	NA	68.9	NA	41.7	NA	NA	42.2	NA	65.3
Lead	1139	961	392	89	61.1	116	78.1	1332	832	699	1421	1080	458	118	84.2	492	378
Mercury	NA	4.67	NA	NA	0.154	NA	0.213	NA	NA	1.59	NA	6.04	NA	NA	0.208	NA	1.68
Selenium	NA	<3.12	NA	NA	<4.49	NA	<4.73	NA	NA	<5.44	NA	<3.88	NA	NA	<4.77	NA	<4.02
Silver	NA	2.1	NA	NA	4.85	NA	<2.37	NA	NA	<2.72	NA	3.93	NA	NA	2.97	NA	<2.01

Concentrations in mg/Kg

NA=Not Analyzed

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	HA-6	HA-6		HA-7	HA-7	HA-8		HA-9	HA-10		HA-11		HA-12	HA-13	HA-14	HA-15	HA-16	HA-17
Type	XRF	XRF		soil	XRF	XRF	XRF	soil	XRF	XRF	soil	XRF	soil	soil	soil	soil	soil	soil
Depth (ft)	3'-4'	0-0.5		0-0.5		0-0.5		0-0.5	0-0.5		0-0.5		0-2	0-2	0-2	0-2	0-2	0-2
Date	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/28/2018	1/29/2018	1/29/2018	1/29/2018	1/29/2018	1/29/2018	1/29/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	
Arsenic	181	18	26.8	31	417	<LOD	<4.05	<LOD	17	9.76	21	21.4	23.4	7.26	12.1	20.9	<5.82	7.85
Barium	NA	NA	1130	NA	NA	NA	126	NA	NA	243	NA	721	385	187	153	213	230	202
Cadmium	NA	NA	<2.53	NA	NA	NA	<2.03	NA	NA	<2.39	NA	2.63	<1.95	<2.21	<2.80	<3.09	<2.91	<2.40
Chromium	NA	NA	39.2	NA	NA	NA	19.1	NA	NA	48.1	NA	73.9	19.8	38.5	71.1	34.5	53.5	25
Lead	2528	441	418	819	934	37	23.1	48	95	67.4	383	274	321	84.1	131	108	24.8	121
Mercury	NA	NA	0.31	NA	NA	NA	<0.101	NA	NA	0.161	NA	0.47	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	<5.07	NA	NA	NA	<4.05	NA	NA	<4.79	NA	<4.14	<3.89	<4.41	<5.61	<6.18	<5.82	<4.80
Silver	NA	NA	<2.53	NA	NA	NA	<2.03	NA	NA	2.93	NA	4.99	<1.95	<2.21	<2.80	<3.09	<2.91	<2.40

Concentrations in mg/Kg

NA=Not Analyzed

Table 1 - Soil Analytical Data Summary - RCRA Metals**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI #10894**

Location	HA-18	HA-19	HA-21	HA-22	HA-23	HA-24	HA-25	HA-26	HA-27		HA-28		HA-29		HA-30	
Type	soil	XRF	soil	XRF	soil	XRF	soil	XRF	soil							
Depth (ft)	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2
Date	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	3/7/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Arsenic	54.3	60.7	46.2	382	811	100	372	95.1	8	7.87	<LOD	NA	<LOD	9.1	19	17.1
Barium	1990	818	461	1000	1060	908	1170	878	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	3.17	<2.71	<3.08	4.68	6.60	3.66	5.81	<3.41	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	58.8	49.3	71.7	79.3	67.7	54.5	80.8	71.4	NA	NA	NA	NA	NA	NA	NA	NA
Lead	393	470	387	640	1000	1790	1490	862	78	NA	60	NA	127	NA	189	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA							
Selenium	<4.15	<5.42	<6.16	<6.23	<4.77	<3.96	<6.32	<6.83	NA	NA	NA	NA	NA	NA	NA	NA
Silver	<2.08	<2.71	<3.08	<3.11	2.59	<1.98	4.12	4.81	NA	NA	NA	NA	NA	NA	NA	NA

Concentrations in mg/Kg

NA=Not Analyzed

Bright Hour Trust Property
 340 Armour Drive, Atlanta, GA 30324
 HSI # 10894
 SEA Job #152-079

Table 2 - Summary of Soil Analyses - SVOCs

Location	HA-2	HA-5	HA-5	HA-8	HA-10
Type	Soil	Soil	Soil	Soil	Soil
Depth	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Date	1/3/2018	1/3/2018	1/3/2018	1/3/2018	1/3/2018
Acenaphthene	<0.70	<0.72	<0.49	<0.53	<0.48
Acenaphthylene	<0.70	<0.72	<0.49	<0.53	<0.48
Anthracene	<0.70	<0.72	<0.49	<0.53	<0.48
Benz(a)anthracene	<0.70	<0.72	<0.49	0.57	<0.48
Benzo(a)pyrene	<0.70	<0.72	<0.49	0.66	<0.48
Benzo(b)fluoranthene	<0.70	<0.72	<0.49	1.4	<0.48
Benzo(g,h,i)perylene	<0.70	<0.72	<0.49	0.63	<0.48
Benzo(k)fluoranthene	<0.70	<0.72	<0.49	<0.53	<0.48
Bis(2-ethylhexyl)phthalate	<0.70	<0.72	<0.49	0.55	<0.48
Carbazole	<0.70	<0.72	<0.49	<0.53	<0.48
Chrysene	<0.70	<0.72	<0.49	0.79	<0.48
Dibenzofuran	<0.70	<0.72	<0.49	<0.53	<0.48
Dibenz(a,h)anthracene	<0.70	<0.72	<0.49	<0.53	<0.48
Fluoranthene	<0.70	<0.72	<0.49	1.2	<0.48
Flourene	<0.70	<0.72	<0.49	<0.53	<0.48
Indeno(1,2,3-cd)pyrene	<0.70	<0.72	<0.49	0.56	<0.48
2-Methylnaphthalene	<0.70	<0.72	<0.49	<0.53	<0.48
Naphthalene	<0.70	<0.72	<0.49	<0.53	<0.48
Phenanthrene	<0.70	<0.72	<0.49	<0.53	<0.48
Pyrene	<0.70	<0.72	<0.49	<0.53	<0.48

APPENDIX 3
LAB DATA



ANALYTICAL ENVIRONMENTAL SERVICES, INC.

September 21, 2018

Michael Haller
Sailors Engineering Associates
1675 Spectrum Drive
Lawrenceville GA 30043

RE: Key Investments

Dear Michael Haller: Order No: 1809D63

Analytical Environmental Services, Inc. received 3 samples on 9/17/2018 2:23:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES's accreditations are as follows:

-NELAP/State of Florida Laboratory ID E87582 for analysis of Non-Potable Water, Solid & Chemical Materials, Air & Emissions Volatile Organics, and Drinking Water Microbiology & Metals, effective 07/01/18-06/30/19.
State of Georgia, Department of Natural Resources ID #800 for analysis of Drinking Water Metals, effective 07/01/18-06/30/19 and Total Coliforms/ E. coli, effective 04/25/17-04/24/20.
-AIHA-LAP, LLC Laboratory ID: 100671 for Industrial Hygiene samples (Organics, Metals, PCM Asbestos, Gravimetric), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) Direct Examination, effective until 11/01/19.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

A handwritten signature in black ink that reads "Paris Masoudi".

Paris Masoudi
Project Manager



ANALYTICAL ENVIRONMENTAL SERVICES, INC.

3080 Presidential Drive Atlanta, GA 30340-3704

Phone: (770) 457-8177 / Toll-Free: (800) 972-4889 / Fax: (770) 457-8188

Work Order: 1809D63

CHAIN OF CUSTODY

Date: 9/17/18 Page 1 of 1

COMPANY: <i>Sailors Engg. Assoc</i>		ADDRESS: 1675 Spectrum Dr Lawrenceville, GA 30043		ANALYSIS REQUESTED								Visit our website www.aesatlanta.com for downloadable COCs and to log in to your AESAccess account.	Number of Containers						
PHONE: 770-962-5952		EMAIL: <i>[Signature]</i>		Assurance Only															
SAMPLED BY: <i>Michael Shurtliff</i>		SIGNATURE: <i>Michael Shurtliff</i>		PRESERVATION (see codes)								REMARKS							
#	SAMPLE ID	SAMPLED:		GRAB	COMPOSITE	MATRIX (see codes)													
1	HA-27 0-2'	9/17/18	14:37	/	/	So	/										1		
2	HA-28 0-2'	9/17/18	14:51	/	/	So	/										1		
3	HA-29 0-2'	9/17/18	16:02	/	/	So	/										1		
4	HA-30 0-2'	9/17/18	16:27	/	/	So	/										1		
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
RELEASER/PICKUP BY:		DATE/TIME:	RECEIVED BY:	PROJECT INFORMATION								RECEIPT							
<i>Michael Shurtliff</i>		9/17/18 14:23	Monique E. Albritton	PROJECT NAME: <i>Key Investments</i>								Total # of Containers 4							
				PROJECT #: 152-079								Turnaround Time (TAT) Request							
				SITE ADDRESS: <i>Armenus Dr Atlanta GA</i>								<input checked="" type="checkbox"/> Standard 5 Business Days							
				SEND REPORT TO: Mike Shurtliff								<input type="checkbox"/> 2 Business Day Rush							
												<input type="checkbox"/> Next Business Day Rush							
												<input type="checkbox"/> Same-Day Rush (auth req.)							
												<input type="checkbox"/> Other _____							
SPECIAL INSTRUCTIONS/COMMENTS:		SHIPMENT METHOD								INVOICE TO: (IF DIFFERENT FROM ABOVE)									
		OUT: / /	VIA:																
		IN: / /	VIA:																
		client FedEx UPS US mail courier Greyhound other: _____										QUOTE #: _____ PO#: _____							
												STATE PROGRAM (if any): _____							
												E-mail? <input type="checkbox"/> Fax? <input type="checkbox"/>							
												DATA PACKAGE: I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/>							

Submission of samples to the laboratory constitutes acceptance of AES's Terms & Conditions. Samples received after 3PM or on Saturday are considered as received the following business day. If no TAT is marked on COC, AES will proceed with standard TAT.
 Samples are disposed of 30 days after completion of report unless other arrangements are made.

Matrix Codes: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water WW = Waste Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify)

Preservative Codes: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client
Page 2 of 7

Analytical Environmental Services, Inc**Date:** 21-Sep-18

Client:	Sailors Engineering Associates	Client Sample ID:	HA-27 0-2'					
Project Name	Key Investments	Collection Date:	9/12/2018 2:37:00 PM					
Lab ID:	1809D63-001	Matrix:	Soil					
Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution	Date Analyzed	Analyst
METALS, TOTAL SW6010D				(SW3050B)				
Arsenic	7.84	4.09		mg/Kg-dry	267338	1	09/19/2018 14:42	NS
PERCENT MOISTURE D2216								
Percent Moisture	0.586	0		wt%	R380403	1	09/19/2018 15:00	NN

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc**Date:** 21-Sep-18

Client:	Sailors Engineering Associates	Client Sample ID:	HA-29 0-2'
Project Name	Key Investments	Collection Date:	9/12/2018 4:02:00 PM
Lab ID:	1809D63-003	Matrix:	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution	Date Analyzed	Analyst
METALS, TOTAL SW6010D								
(SW3050B)								
Arsenic	9.10	4.13		mg/Kg-dry	267338	1	09/19/2018 14:49	NS
PERCENT MOISTURE D2216								
Percent Moisture	0.642	0		wt%	R380403	1	09/19/2018 15:00	NN

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc**Date:** 21-Sep-18

Client:	Sailors Engineering Associates	Client Sample ID:	HA-30 0-2'
Project Name	Key Investments	Collection Date:	9/12/2018 4:27:00 PM
Lab ID:	1809D63-004	Matrix:	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution	Date Analyzed	Analyst
METALS, TOTAL SW6010D (SW3050B)								
Arsenic								
	17.1	4.45		mg/Kg-dry	267338	1	09/19/2018 14:59	NS
PERCENT MOISTURE D2216								
Percent Moisture								
	3.51	0		wt%	R380403	1	09/19/2018 15:00	NN

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

SAMPLE/COOLER RECEIPT CHECKLIST

1. Client Name: **SAILORS ENGINEERING**

AES Work Order Number: **1809D63**

2. Carrier: FedEx UPS USPS Client Courier Other _____

	Yes	No	N/A	Details	Comments
3. Shipping container/cooler received in good condition?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	damaged <input type="checkbox"/> leaking <input type="checkbox"/> other <input type="checkbox"/>	
4. Custody seals present on shipping container?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
5. Custody seals intact on shipping container?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
6. Temperature blanks present?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
7. Cooler temperature(s) within limits of 0-6°C? [See item 13 and 14 for temperature recordings.]	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Cooling initiated for recently collected samples / ice present <input type="checkbox"/>	
8. Chain of Custody (COC) present?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
9. Chain of Custody signed, dated, and timed when relinquished and received?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
10. Sampler name and/or signature on COC?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
11. Were all samples received within holding time?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
12. TAT marked on the COC?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	If no TAT indicated, proceeded with standard TAT per Terms & Conditions. <input type="checkbox"/>	

13. Cooler 1 Temperature 2.0 °C Cooler 2 Temperature _____ °C Cooler 3 Temperature _____ °C Cooler 4 Temperature _____ °C

14. Cooler 5 Temperature _____ °C Cooler 6 Temperature _____ °C Cooler 7 Temperature _____ °C Cooler 8 Temperature _____ °C

15. Comments: _____

I certify that I have completed sections 1-15 (dated initials).

AP 9/17/18

	Yes	No	N/A	Details	Comments
16. Were sample containers intact upon receipt?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
17. Custody seals present on sample containers?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
18. Custody seals intact on sample containers?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
19. Do sample container labels match the COC?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	incomplete info <input type="checkbox"/> illegible <input type="checkbox"/> no label <input type="checkbox"/> other <input type="checkbox"/>	
20. Are analyses requested indicated on the COC?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
21. Were all of the samples listed on the COC received?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	samples received but not listed on COC <input type="checkbox"/> samples listed on COC not received <input type="checkbox"/>	
22. Was the sample collection date/time noted?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
23. Did we receive sufficient sample volume for indicated analyses?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
24. Were samples received in appropriate containers?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
25. Were VOA samples received without headspace (< 1/4" bubble)?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		
26. Were trip blanks submitted?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	listed on COC <input type="checkbox"/> not listed on COC <input type="checkbox"/>	

27. Comments: _____

This section only applies to samples where pH can be checked at Sample Receipt.

I certify that I have completed sections 16-27 (dated initials).

AP 9/17/18

	Yes	No	N/A	Details	Comments
28. Have containers needing chemical preservation been checked? *	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
29. Containers meet preservation guidelines?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
30. Was pH adjusted at Sample Receipt?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		

* Note: Certain analyses require chemical preservation but must be checked in the laboratory and not upon Sample Receipt such as Coliforms, VOCs and Oil & Grease/TPH.

I certify that I have completed sections 28-30 (dated initials).

AP 9/17/18

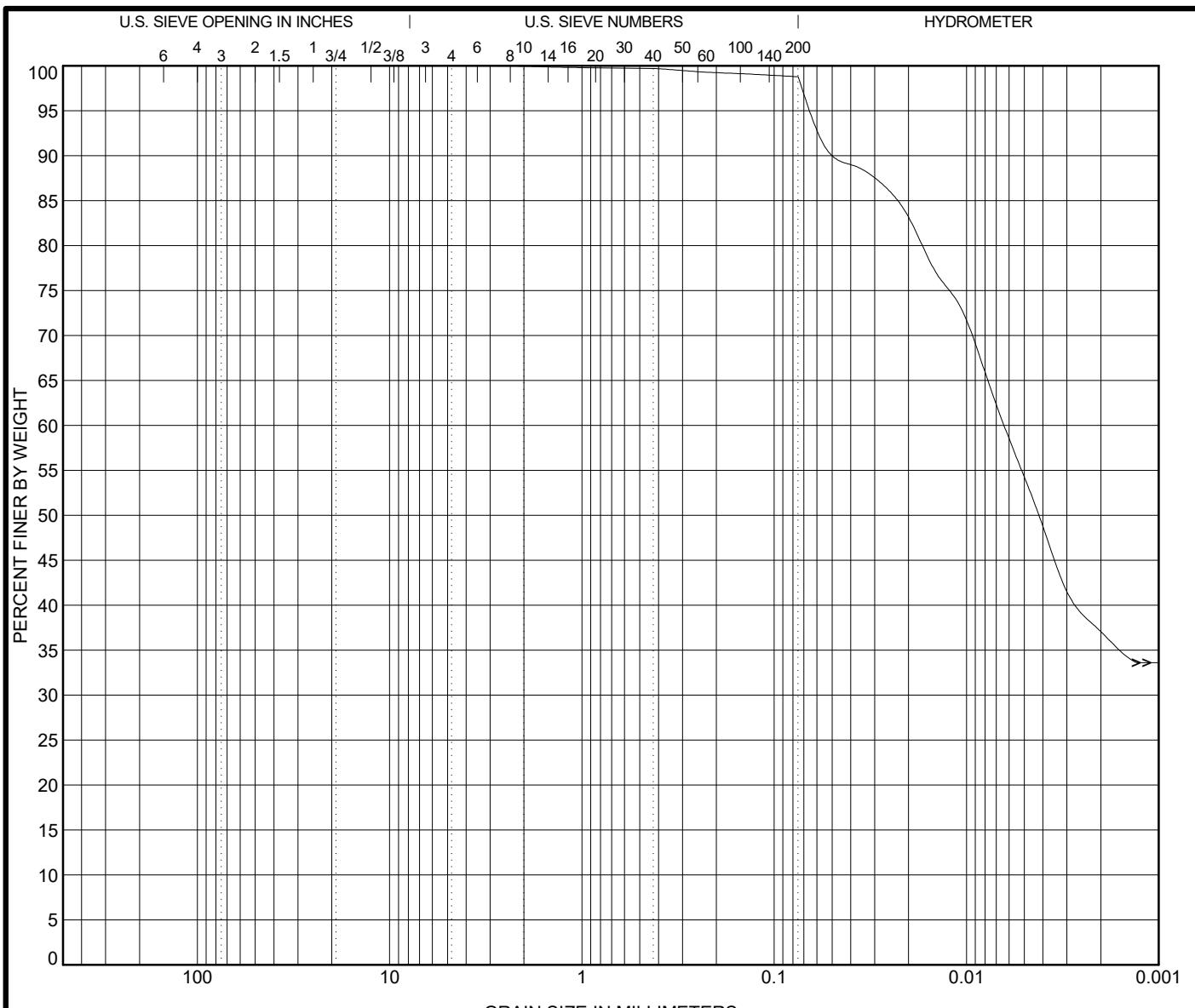
Client: Sailors Engineering Associates
Project Name: Key Investments
Workorder: 1809D63

ANALYTICAL QC SUMMARY REPORT**BatchID: 267338**

Sample ID: MB-267338		Client ID: METALS, TOTAL SW6010D			Units: mg/Kg		Prep Date: 09/19/2018		Run No: 380334		
SampleType: MBLK		TestCode: METALS, TOTAL SW6010D			BatchID: 267338		Analysis Date: 09/19/2018		Seq No: 8476309		
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	5.00									
Sample ID: LCS-267338		Client ID: METALS, TOTAL SW6010D			Units: mg/Kg		Prep Date: 09/19/2018		Run No: 380334		
SampleType: LCS		TestCode: METALS, TOTAL SW6010D			BatchID: 267338		Analysis Date: 09/19/2018		Seq No: 8476310		
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	46.95	5.00	50.00		93.9	80	120				
Sample ID: 1809C44-003AMS		Client ID: METALS, TOTAL SW6010D			Units: mg/Kg-dry		Prep Date: 09/19/2018		Run No: 380334		
SampleType: MS		TestCode: METALS, TOTAL SW6010D			BatchID: 267338		Analysis Date: 09/19/2018		Seq No: 8476314		
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	39.01	4.39	43.87	2.696	82.8	75	125				
Sample ID: 1809C44-003AMSD		Client ID: METALS, TOTAL SW6010D			Units: mg/Kg-dry		Prep Date: 09/19/2018		Run No: 380334		
SampleType: MSD		TestCode: METALS, TOTAL SW6010D			BatchID: 267338		Analysis Date: 09/19/2018		Seq No: 8476315		
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	41.46	4.39	43.90	2.696	88.3	75	125	39.01	6.11	20	

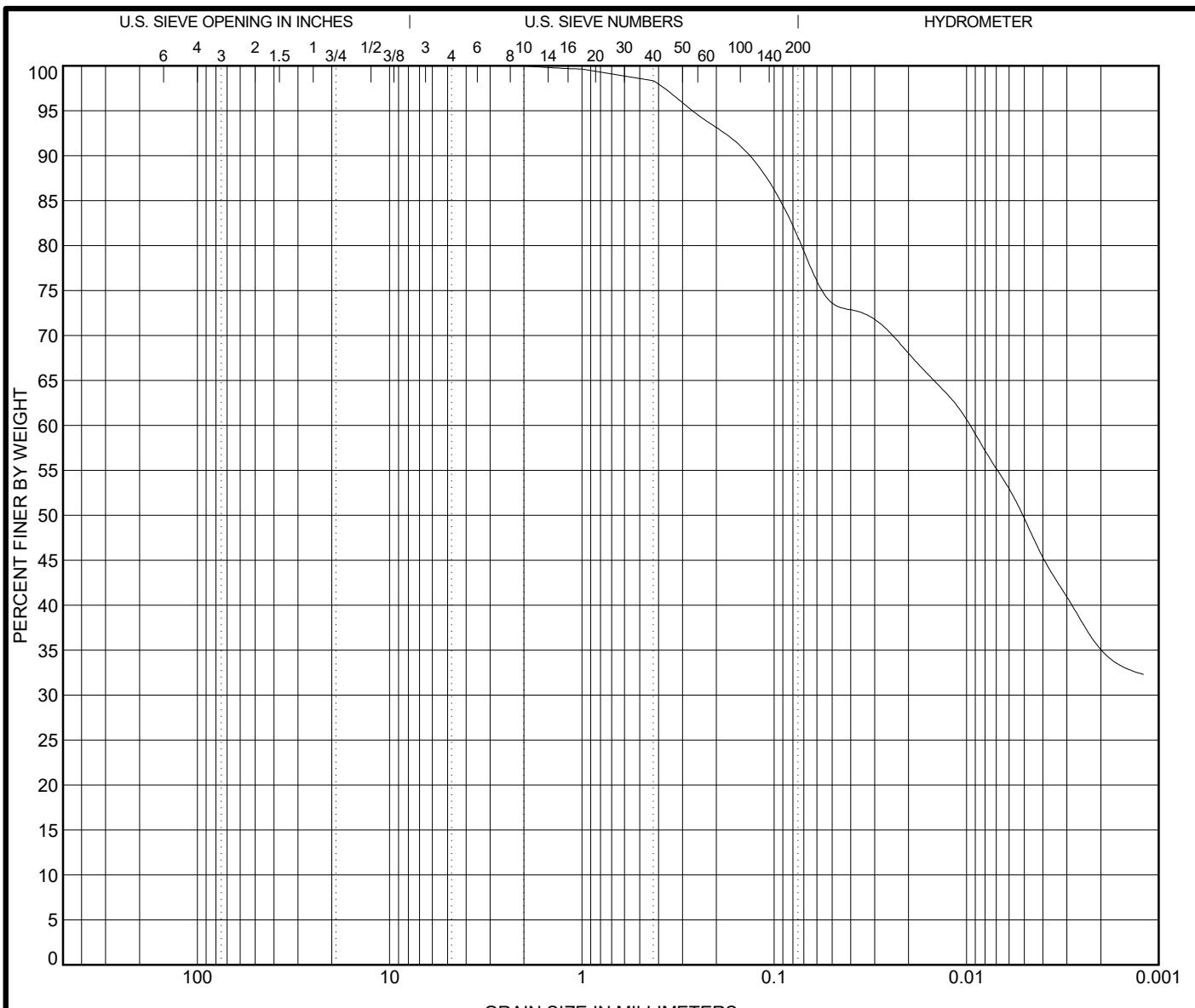
Qualifiers:	>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
	BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
	J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
	Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

APPENDIX 4
GI LAB DATA



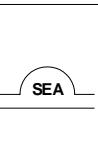
Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-7;0ft-2ft	0.0	Brn-Grey Silty Clay with trace of Sand									
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
HA-7;0ft-2ft	4.75	0.006			0.0	1.2	44.6	54.2			

 Sailors Engineering Associates 1675 spectrum drive Lawrenceville, GA 30043 Telephone: 770-962-5922 Fax:	GRAIN SIZE DISTRIBUTION	
	Project: Key Investments-Allied Ready	
	Client:	
	Number: 152-079	



COBBLES	GRAVEL		SAND			SILT OR CLAY			
	coarse	fine	coarse	medium	fine				

Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-7;2ft-6ft 0.0	Brn-Grey Clay with some Silt and little Sand										
	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
HA-7;2ft-6ft 0.0	4.75	0.01			0.0	19.1	31.3	49.6			

 Sailors Engineering Associates 1675 spectrum drive Lawrenceville, GA 30043 Telephone: 770-962-5922 Fax:	GRAIN SIZE DISTRIBUTION	
	Project:	Key Investments-Allied Ready
	Client:	
	Number:	152-079

152-079 Key Investments - HA-7

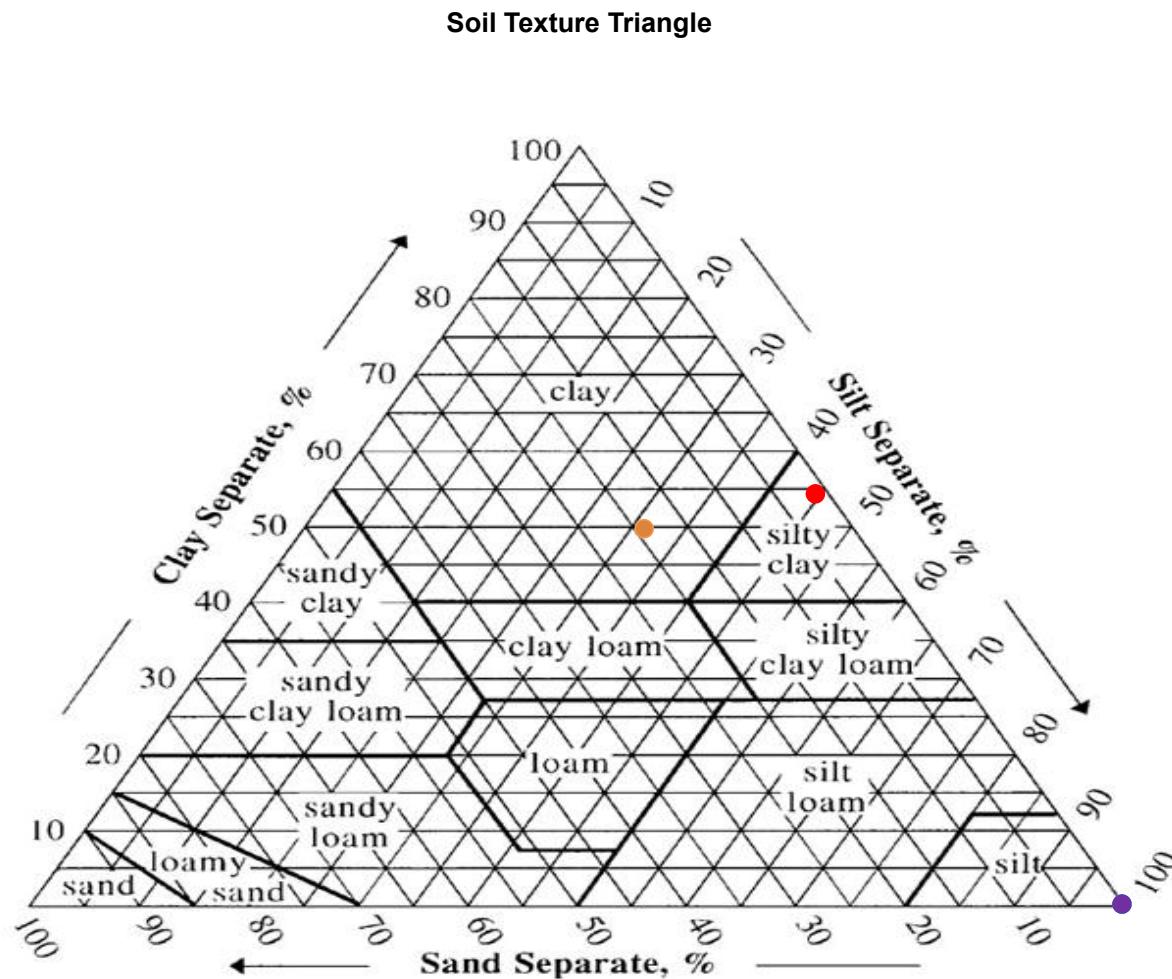
Sand	Clay	Silt	USDA Texture	
% Sand 0-2' 1.20%	% Clay 0-2' 54.20%	% Silt 0-2' 44.60%	SILTY CLAY	
% Sand 2-6' 19.10%	% Clay 2-6' 49.60%	% Silt 2-6' 31.30%	CLAY	

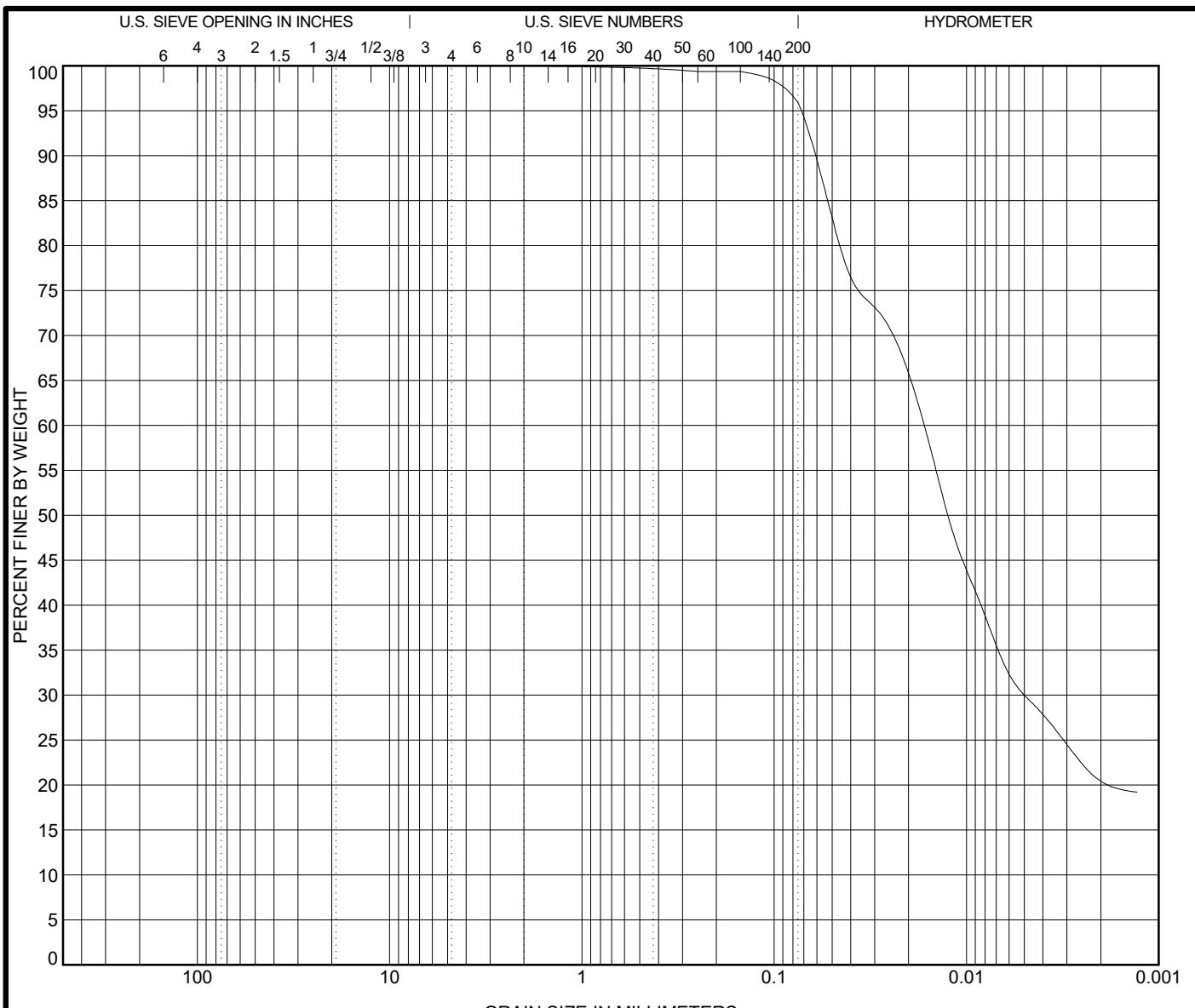
Optional Sand 1	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 2	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 3	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

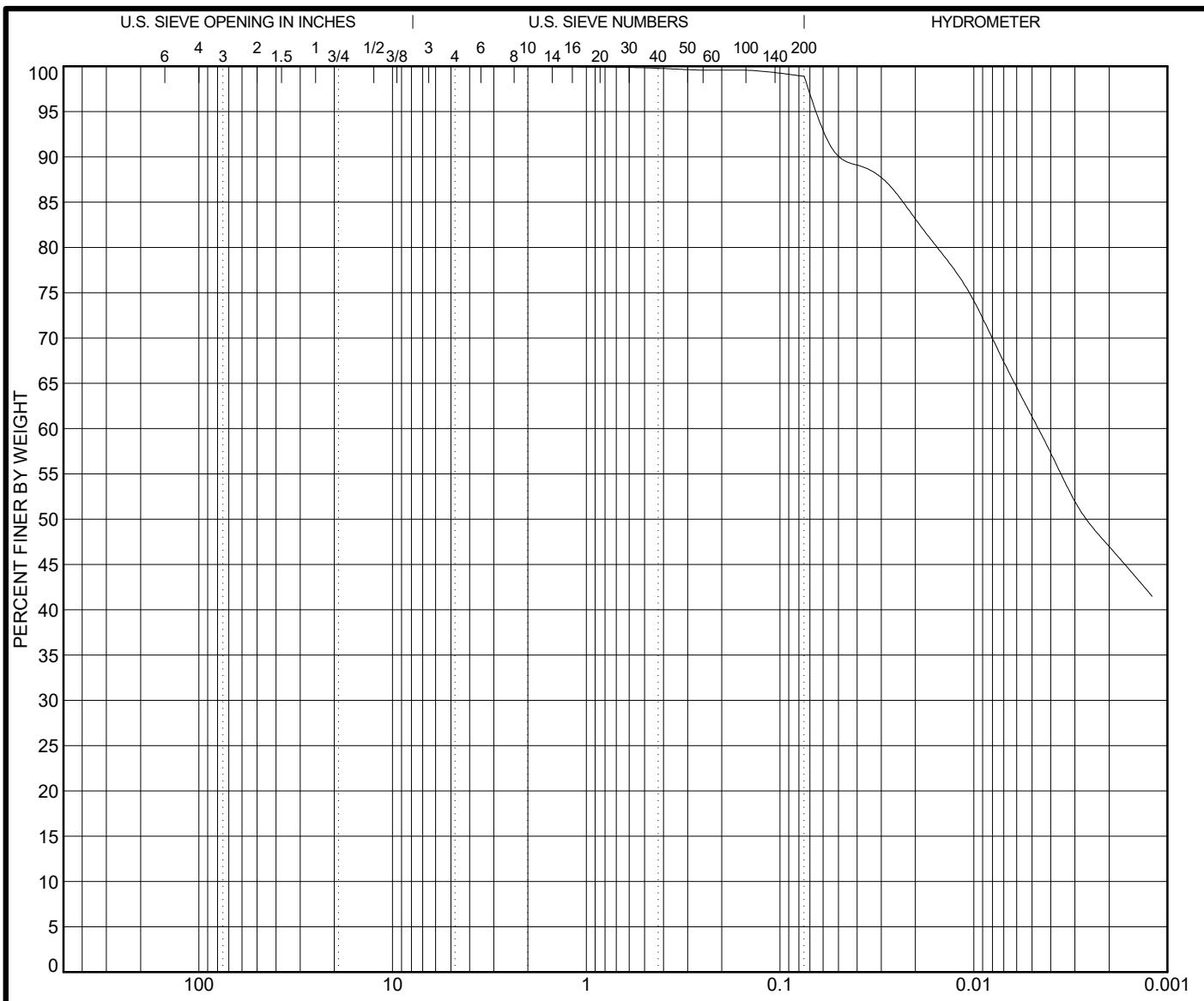
Optional Sand 4	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%





Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-8;0ft-2ft	0.0	Brn-Grey Silt with some Clay and trace Sand									
		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
HA-8;0ft-2ft	0.0	4.75	0.017	0.005		0.0	4.1	65.6	30.3		

 Sailors Engineering Associates	GRAIN SIZE DISTRIBUTION	
	Project: Key Investments-Allied Ready	
	Client:	
	Number: 152-079	



Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-8;2ft-6ft	0.0	Brn-Grey Clay with some Silt and trace Sand									
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
HA-8;2ft-6ft	4.75	0.005			0.0	1.1	37.6	61.3			

 Sailors Engineering Associates	GRAIN SIZE DISTRIBUTION	
	Project: Key Investments-Allied Ready	
	Client:	
	Number: 152-079	

152-079 Key Investments - HA-8

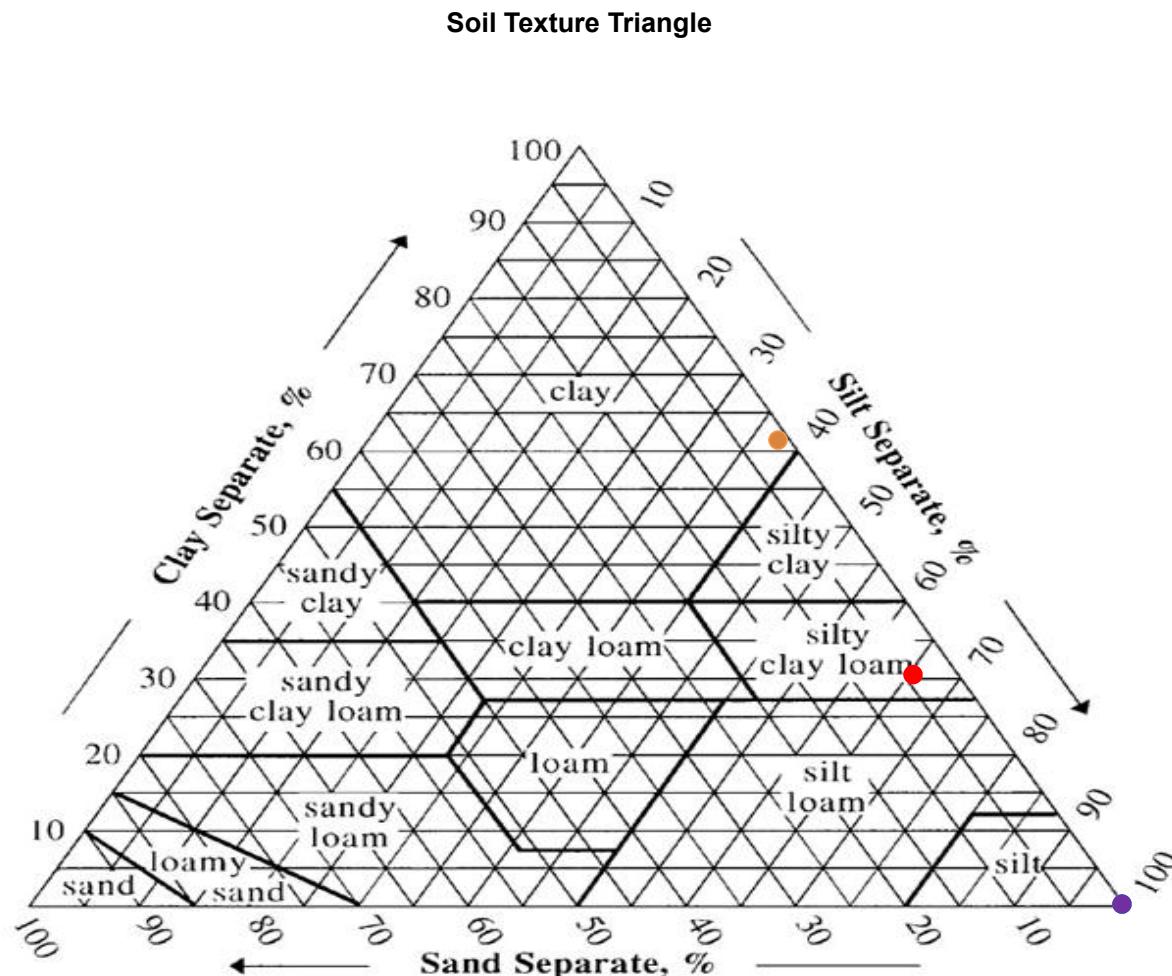
Sand	Clay	Silt	USDA Texture	
% Sand 0-2'	4.10%	% Clay 0-2'	30.30%	% Silt 0-2' 65.60%
% Sand 2-6'	1.10%	% Clay 2-6'	61.30%	% Silt 2-6' 37.60%

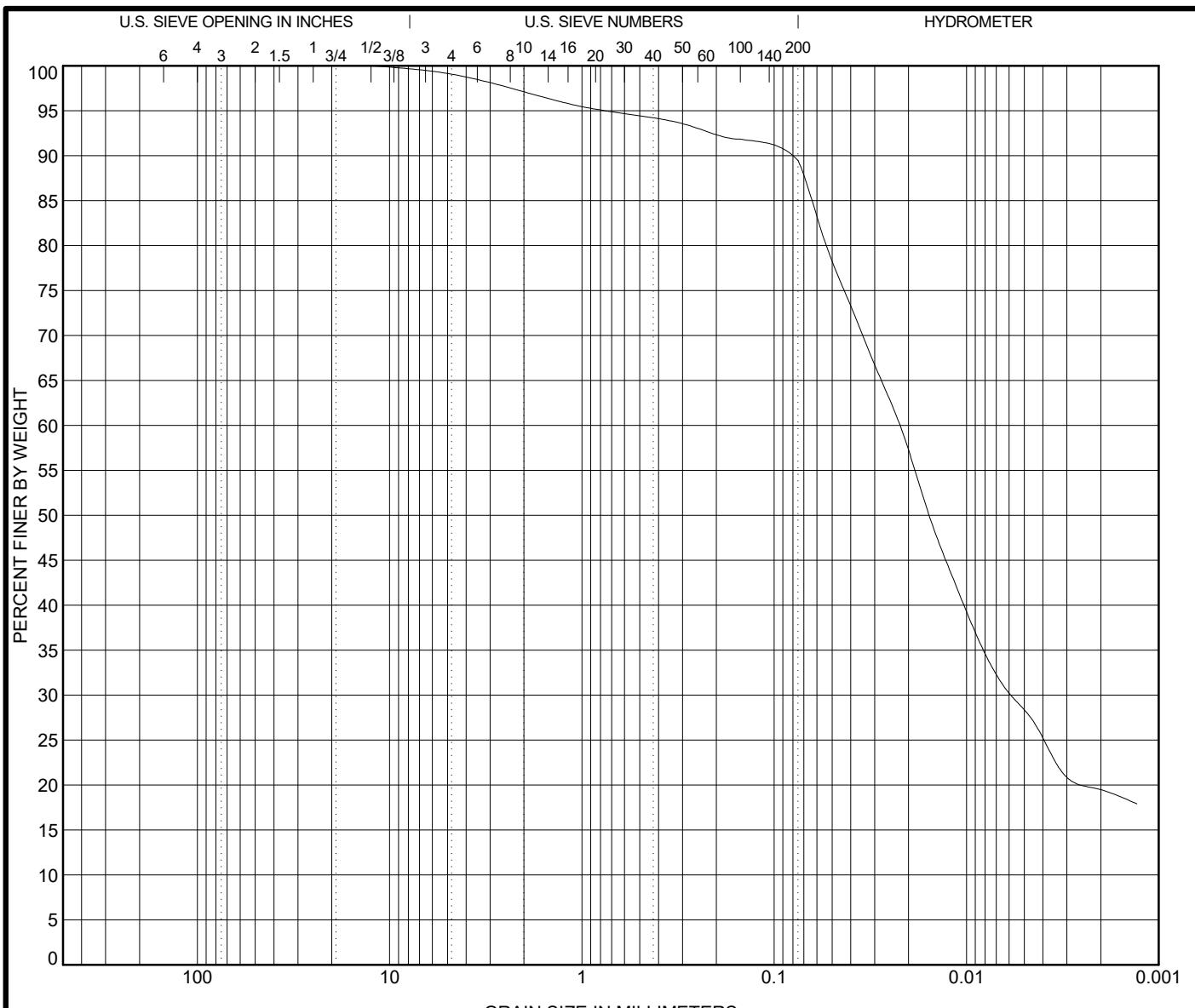
Optional Sand 1	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 2	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 3	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

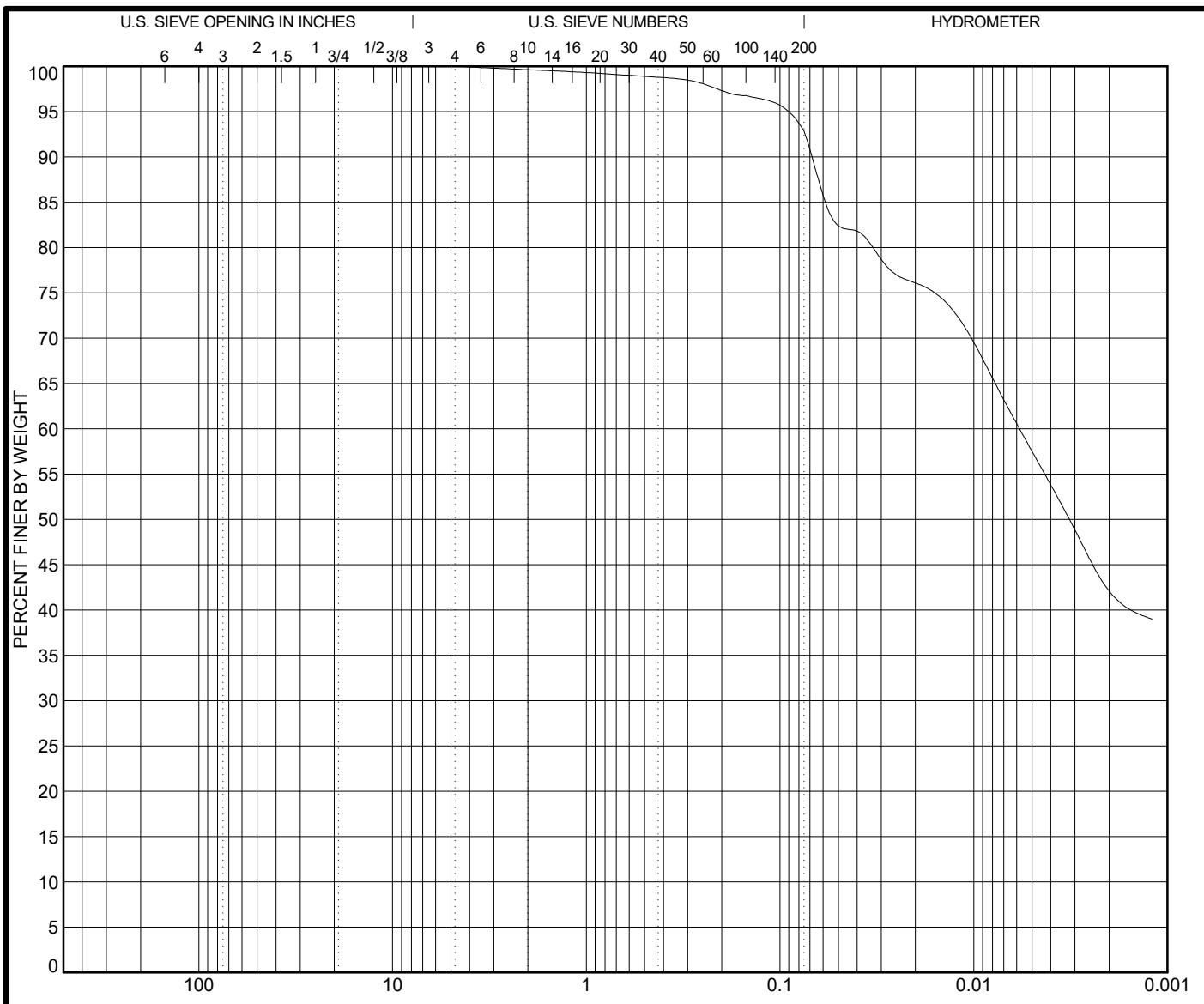
Optional Sand 4	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%





Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-11;0ft-2ft 0.0	Brn-Grey Silt with some Clay and trace Sand										
HA-11;0ft-2ft 0.0	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
	12.7	0.022	0.006		0.9	9.6	61.3	28.2			

 Sailors Engineering Associates	GRAIN SIZE DISTRIBUTION	
	Project: Key Investments-Allied Ready	
	Client:	
	Number: 152-079	



Specimen Identification	Classification						LL	PL	PI	Cc	Cu
HA-11;2ft-6ft	0.0	Brn-Grey Clay with some Silt and trace Sand									
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
HA-11;2ft-6ft	4.75	0.006			0.0	7.2	35.3	57.5			

 Sailors Engineering Associates 1675 spectrum drive Lawrenceville, GA 30043 Telephone: 770-962-5922 Fax:	GRAIN SIZE DISTRIBUTION	
	Project: Key Investments-Allied Ready	
	Client:	
	Number: 152-079	

152-079 Key Investments - HA-11

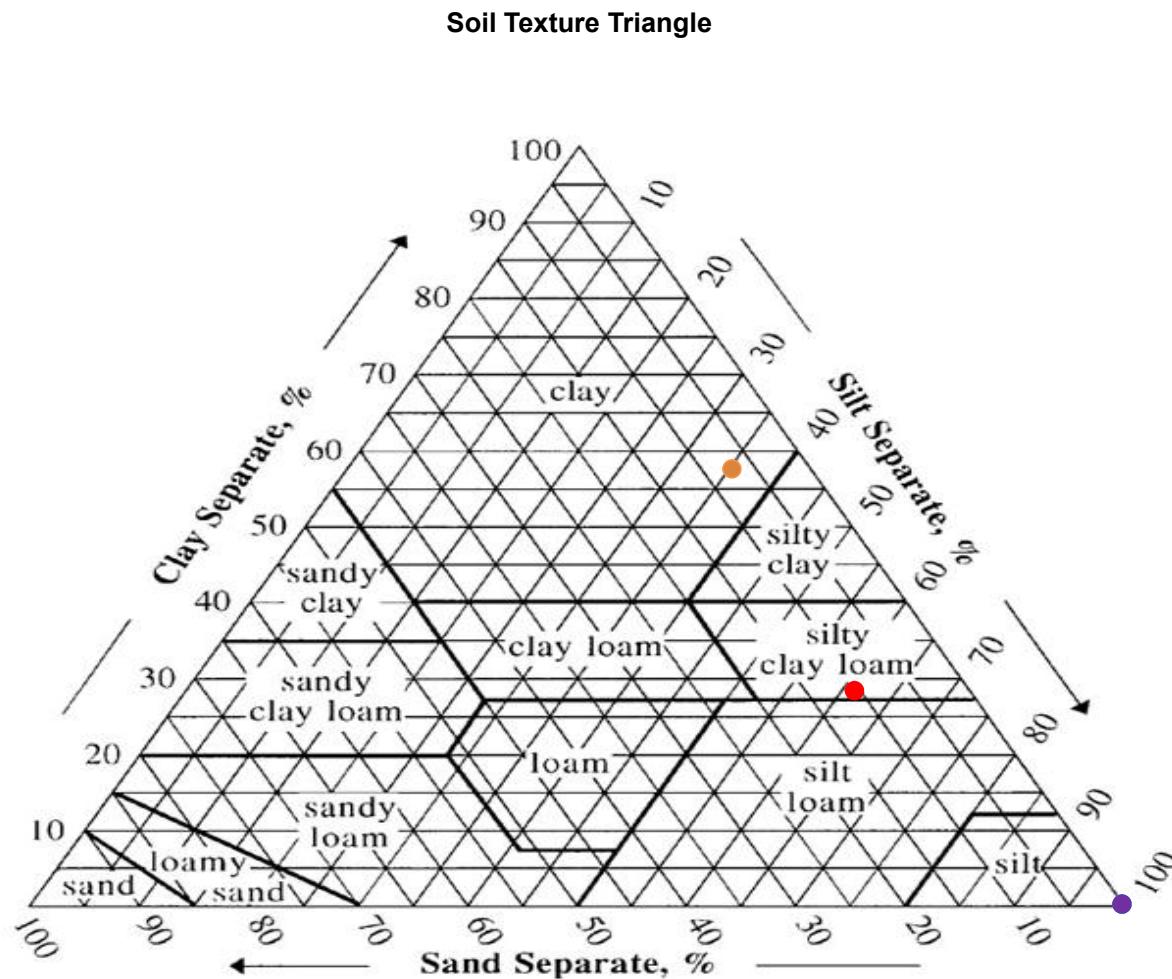
Sand	Clay	Silt	USDA Texture	
% Sand 0-2'	10.50%	% Clay 0-2'	28.20%	% Silt 0-2' 61.30% SILTY CLAY LOAM
% Sand 2-6'	7.20%	% Clay 2-6'	57.50%	% Silt 2-6' 35.30% CLAY

Optional Sand 1	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 2	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 3	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%

Optional Sand 4	
% Very Coarse	0.00%
% Coarse	0.00%
% Medium	0.00%
% Fine	0.00%
% Very Fine	0.00%



APPENDIX 5
RISK REDUCTION STANDARDS CALCULATIONS

RRS Table 1
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RRS Calculations Summary

CAS	Chemical	Delineation							Restricted Area RRS (mg/Kg)	Highest Detected (mg/Kg)	95% UCL (mg/Kg)
		Type 1 RRS (mg/Kg)	Type 2 RRS (mg/Kg)	Standard (mg/Kg)	Type 3 RRS >2' (mg/Kg)	Type 3 RRS <2' (mg/Kg)	Type 4 RRS >2' (mg/Kg)	Type 4 RRS <2' (mg/Kg)	Non-Res <2' RRS (mg/Kg)		
75-34-3	1,1-Dichloroethane	2.800		2.8000	400.0000	400.0000	22.7327	22.7327	400.0000	400.0000	0
75-35-4	1,1-Dichloroethene	0.700		0.7000	0.7000	0.7000	3.7624	3.7624	3.7624	3.7624	0
95-50-1	1,2-Dichlorobenzene	60.000		60.0000	60.0000	60.0000	11.6737	11.6737	60.0000	60.0000	0
91-57-6	2-Methylnaphthalene	NR		NR	0.0000	0.0000	40.5490	40.5490	40.5490	40.5490	13
83-32-9	Acenaphthene	300.000		300.0000	300.0000	300.0000	786.0206	786.0206	786.0206	786.0206	13
208-96-8	Acenaphthylene	130.000		130.0000	130.0000	130.0000	NA	BG/DL	130.0000	130.0000	0.65
67-64-1	Acetone	1400.000		1400.0000	400.0000	400.0000	186.9189	186.9189	400.0000	400.0000	0.16
120-12-7	Anthracene	500.000		500.0000	500.0000	500.0000	5046.6671	5046.6671	5046.6671	5046.6671	1.1
7440-38-2	Arsenic, Inorganic	20.000		20.0000	41.0000	38.1216	5.8400	5.8400	38.1216	41.0000	151.28
7440-39-3	Barium	1600.000		1600.0000	500.0000	500.0000	1648.0000	1648.0000	1648.0000	1648.0000	121128.00
56-55-3	Benz(a)anthracene	5.000		5.0000	5.0000	5.0000	76.7429	76.7429	76.7429	76.7429	4.4
71-43-2	Benzene	0.500		0.5000	0.5000	0.5000	0.7385	0.7385	0.7385	0.7385	0
50-32-8	Benzo(a)pyrene	1.640	4.7000	4.7000	1.6400	1.6400	4.7000	4.7000	4.7000	4.7000	3.9
205-99-2	Benzo(b)fluoranthene	5.000	91.2470	91.2470	5.0000	5.0000	259.9287	259.9287	259.9287	259.9287	5.1
191-24-2	Benzo(g,h,i)perylene	5.000		5.0000	5.0000	5.0000	2547.2576	2547.2576	2547.2576	2547.2576	3.3
207-08-9	Benzo(k)fluoranthene	500.000		500.0000	500.0000	500.0000	NA	BG/DL	500.0000	500.0000	1.9
117-81-7	Bis(2-ethylhexyl)phthalate	50.000		50.0000	50.0000	50.0000	1165.0800	1165.0800	1165.0800	1165.0800	0.55
7440-43-9	Cadmium	7.500		7.5000	39.0000	39.0000	7.5200	7.5200	39.0000	39.0000	30.6
75-15-0	Carbon disulfide	81.000		81.0000	400.0000	400.0000	23.6829	23.6829	400.0000	400.0000	0.015
67-66-3	Chloroform	3.871		3.8713	10.0000	4.9042	0.5541	0.5541	4.9042	10.0000	0
7440-47-3	Chromium (total)	100.000		100.0000	1200.0000	1200.0000	3600000.4000	675980.0000	675980.0000	3600000.4000	97.9
218-01-9	Chrysene	5.000		5.0000	5.0000	5.0000	7830.3786	7830.3786	7830.3786	7830.3786	4.8
156-59-2	cis-1,2-Dichloroethylene	7.000		7.0000	7.0000	7.0000	1.1787	1.1787	7.0000	7.0000	0.044
53-70-3	Dibenz(a,h)anthracene	5.000		5.0000	5.0000	5.0000	82.9040	57.2216	57.2216	82.9040	0.62
132-64-9	Dibenzofuran	NR		NR	0.0000	0.0000	37.4857	37.4857	37.4857	37.4857	13
100-41-4	Ethylbenzene	70.000		70.0000	70.0000	70.0000	50.9170	50.9170	70.0000	70.0000	0.11
206-44-0	Fluoranthene	500.000		500.0000	500.0000	500.0000	6488.2419	6488.2419	6488.2419	6488.2419	11
86-73-7	Fluorene	360.000		360.0000	360.0000	360.0000	1081.5885	1081.5885	1081.5885	1081.5885	6.3
193-39-5	Indeno(1,2,3-cd)pyrene	5.000		5.0000	5.0000	5.0000	845.9497	572.2162	572.2162	845.9497	2.5
98-82-8	Isopropylbenzene	45.000		45.0000	21.8800	21.8800	34.3306	34.3306	34.3306	34.3306	0.18
7439-92-1	Lead	270.000		270.0000	400.0000	400.0000	270.0600	270.0600	400.0000	400.0000	1050.0000
7439-97-6	Mercury (elemental)	2.100		2.1000	17.0000	11.5797	0.9151	0.9151	11.5797	17.0000	172
	Mercury (inorganic)	2.100		2.1000	17.0000	17.0000	0.0080	0.0080	17.0000	17.0000	172
91-20-3	Naphthalene	100.000		100.0000	100.0000	100.0000	1.3158	1.3158	100.0000	100.0000	2.6
85-01-8	Phenanthrene	110.000		110.0000	110.0000	110.0000	NA	BG/DL	110.0000	110.0000	31
129-00-0	Pyrene	500.000		500.0000	500.0000	500.0000	5135.7879	5135.7879	5135.7879	5135.7879	14
7782-49-2	Selenium	5.200		5.2000	36.0000	36.0000	5.4507	5.4507	36.0000	36.0000	76.7
7440-22-4	Silver	16.000		16.0000	10.0000	10.0000	82.7333	82.7333	82.7333	82.7333	58.3
127-18-4	Tetrachloroethylene	0.500		0.5000	0.5000	0.5000	0.8918	0.8918	0.8918	0.8918	0.032
108-88-3	Toluene	100.000		100.0000	100.0000	100.0000	72.5404	72.5404	100.0000	100.0000	0
79-01-6	Trichloroethylene	0.500		0.5000	0.5000	0.5000	0.0375	0.0375	0.5000	0.5000	0.19
1330-20-7	Xylene	1000.000		1000.0000	1000.0000	1000.0000	198.0014	198.0014	1000.0000	1000.0000	0.14

RRS Table 2

Bright Hour Trust

340 Armour Drive

Atlanta, Fulton County, Georgia

SEA Job #152-079

HSI# 10894

Delineation Standards

CAS	Chemical	Delineation Standard (mg/Kg)	Basis	Highest Detected (mg/Kg)
75-34-3	1,1-Dichloroethane	2.8000	Type 1 RRS	0
75-35-4	1,1-Dichloroethylene	0.7000	Type 1 RRS	0
95-50-1	1,2-Dichlorobenzene	60.0000	Type 1 RRS	0
91-57-6	2-Methylnaphthalene	NR	Not Regulated	13
83-32-9	Acenaphthene	300.0000	Type 1 RRS	13
208-96-8	Acenaphthylene	130.0000	Type 1 RRS	0.65
67-64-1	Acetone	1400.0000	Type 1 RRS	0.16
120-12-7	Anthracene	500.0000	Type 1 RRS	1.1
7440-38-2	Arsenic, Inorganic	20.0000	Type 1 RRS	1490
7440-39-3	Barium	1600.0000	Type 1 RRS	2200
56-55-3	Benz(a)anthracene	5.0000	Type 1 RRS	4.4
71-43-2	Benzene	0.5000	Type 1 RRS	0
50-32-8	Benzo(a)pyrene	4.7000	Type 2 RRS	3.9
205-99-2	Benzo(b)fluoranthene	91.2470	Type 2 RRS	5.1
191-24-2	Benzo(g,h,i)perylene	5.0000	Type 1 RRS	3.3
207-08-9	Benzo(k)fluoranthene	500.0000	Type 1 RRS	1.9
117-81-7	Bis(2-ethylhexyl)phthalate	50.0000	Type 1 RRS	0.55
7440-43-9	Cadmium	7.5000	Type 1 RRS	30.6
75-15-0	Carbon disulfide	81.0000	Type 1 RRS	0.015
67-66-3	Chloroform	3.8713	Type 1 RRS	0
7440-47-3	Chromium (total)	100.0000	Type 1 RRS	97.9
218-01-9	Chrysene	5.0000	Type 1 RRS	4.8
156-59-2	cis-1,2-Dichloroethylene	7.0000	Type 1 RRS	0.044
53-70-3	Dibenz(a,h)anthracene	5.0000	Type 1 RRS	0.62
132-64-9	Dibenzofuran	NR	Not Regulated	13
100-41-4	Ethylbenzene	70.0000	Type 1 RRS	0.11
206-44-0	Fluoranthene	500.0000	Type 1 RRS	11
86-73-7	Fluorene	360.0000	Type 1 RRS	6.3
193-39-5	Indeno(1,2,3-cd)pyrene	5.0000	Type 1 RRS	2.5
98-82-8	Isopropylbenzene	45.0000	Type 1 RRS	0.18
7439-92-1	Lead	270.0000	Type 1 RRS	53200
7439-97-6	Mercury (elemental)	2.1000	Type 1 RRS	172
	Mercury (inorganic)	2.1000	Type 1 RRS	172
91-20-3	Naphthalene	100.0000	Type 1 RRS	2.6
85-01-8	Phenanthrene	110.0000	Type 1 RRS	31
129-00-0	Pyrene	500.0000	Type 1 RRS	14
7782-49-2	Selenium	5.2000	Type 1 RRS	76.7
7440-22-4	Silver	16.0000	Type 1 RRS	58.3
127-18-4	Tetrachloroethylene	0.5000	Type 1 RRS	0.032
108-88-3	Toluene	100.0000	Type 1 RRS	0
79-01-6	Trichloroethylene	0.5000	Type 1 RRS	0.19
1330-20-7	Xylene	1000.0000	Type 1 RRS	0.14

RRS Table 3
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894
Chemical Specific Factors

CAS	Compound	MW	H'	H=H'/41	VP	Density (g/cm³)	Di,a	Di,w	Koc	Kd	S	VOC	VF	RfDi=RfCi*20/70		Oral RfD - Chronic (mg/kg-day)	IUR (ug/m³)⁻¹	Sfi=IUR*70/20*1000		Carcinogen Class	Target Cancer Risk	
														Inhalation RfC (mg/m³)	Inhalation RfD - Chronic (mg/kg-day)	Inhalation Slope Factor [1/(mg/kg-day)]	Oral Slope Factor [1/(mg/kg-day)]					
75-34-3	1,1-Dichloroethane	98.96	2.30E-01	5.60E-03	2.27E+02	1.1757	8.36E-02	1.06E-05	3.18E+01		5.04E+03	1	2.12E+03	0.00E+00	2.00E-01	1.60E-06	5.60E-03	5.70E-03	C	1.00E-04		
75-35-4	1,1-Dichloroethene	96.94	1.07E+00	2.60E-02	6.00E+02	1.213	8.63E-02	1.10E-05	3.18E+01		2.42E+03	1	8.66E+02	2.00E-01	5.71E-02	5.00E-02	0.00E+00	0.00E+00	NA	NA		
95-50-1	1,2-Dichlorobenzene	147.00	7.85E-02	1.91E-03	1.36E+00	1.3059	5.62E-02	8.92E-06	3.83E+02		1.56E+02	1	1.59E+04	2.00E-01	5.71E-02	9.00E-02	0.00E+00	0.00E+00	NA	NA		
91-57-6	2-Methylnaphthalene	142.2	2.12E-02	5.17E-04	5.50E-02	1.01E+00	5.24E-02	7.78E-06	2.48E+03		2.46E+01	1	8.06E+04	0.00E+00	4.00E-03	0.00E+00	0.00E+00	0.00E+00	NA	NA		
83-32-9	Acenaphthene	154.21	7.52E-03	1.83E-04	2.15E-03	1.22E+00	5.06E-02	8.33E-06	5.03E+03		3.90E+00	1	1.96E+05	0.00E+00	6.00E-02	0.00E+00	0.00E+00	0.00E+00	NA	NA		
208-96-8	Acenaphthylene	152.2	5.11E-03	1.25E-04			4.39E-02	7.53E-06	6.12E+03		1.61E+01	1	2.82E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA		
67-64-1	Acetone	58.08	1.43E-03	3.49E-05	2.32E+02	0.7845	1.06E-01	1.15E-05	2.36E+00		1.00E+06	1	6.72E+03	3.10E+01	8.86E+00	9.00E-01	0.00E+00	0.00E+00	NA	NA		
120-12-7	Anthracene	178.24	2.27E-03	5.54E-05	6.53E-06	1.28E+00	3.90E-02	7.85E-06	1.64E+04		4.34E-02	1	7.33E+05	0.00E+00	3.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA		
7440-38-2	Arsenic, Inorganic	74.922		0.00E+00			4.9				2.90E+01	2.00E+05	0	NA	1.50E-05	4.29E-06	3.00E-04	4.30E-03	1.51E+01	1.50E+00	A	1.00E-05
7440-39-3	Barium	137.33		0.00E+00			3.62				4.10E+01	0.00E+00	0	NA	5.00E-04	1.43E-04	2.00E-01	0.00E+00	0.00E+00	NA	NA	
56-55-3	Benz(a)anthracene	228.3	4.91E-04	1.20E-05	2.10E-07	1.27E+00	2.61E-02	6.75E-06	1.77E+05		9.40E-03	1	6.34E+06	0.00E+00	6.00E-05	2.10E-01	1.00E-01	2.10E-01	1.00E-05	B	1.00E-05	
71-43-2	Benzene	78.12	2.27E-01	5.53E-03	9.48E+01	0.8765	8.95E-02	1.03E-05	1.46E+02		1.79E+03	1	4.53E+03	3.00E-02	8.57E-03	4.00E-03	7.80E-06	2.73E-02	5.50E-02	B	1.00E-05	
50-32-8	Benzo(a)pyrene	252.32	1.87E-05	4.56E-07	5.49E-09		4.76E-02	5.56E-06	5.87E+05		1.62E-03	0	NA	2.00E-06	5.71E-07	3.00E-04	6.00E-04	2.10E+00	1.00E+00	B	1.00E-05	
205-99-2	Benzo(b)fluoranthene	252.32	2.69E-05	6.55E-07	5.00E-07		4.76E-02	5.56E-06	5.99E+05		1.50E-03	0	NA	0.00E+00	6.00E-05	2.10E-01	1.00E-01	2.10E-01	1.00E-05	B	1.00E-05	
207-08-9	Benzo(k)fluoranthene	252.32	2.39E-05	5.82E-07	9.65E-10		4.76E-02	5.56E-06	5.87E+05		8.00E-04	0	NA	0.00E+00	6.00E-06	2.10E-02	1.00E-02	2.10E-02	1.00E-05	B	1.00E-05	
191-24-2	Benz[g,h,i]perylene	276.34	1.35E-05	3.30E-07	1.00E-10		4.48E-02	5.23E-06	1.90E-06		2.60E-04	0	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA		
117-81-7	Bis(2-ethylhexyl)phthalate	390.57	1.10E-05	2.70E-07	1.42E-07	9.81E-01	1.73E-02	4.18E-06	1.20E+05		2.70E-01	0	NA	0.00E+00	2.00E-02	2.40E-06	8.40E-03	1.40E-02	B	1.00E-05		
7440-43-9	Cadmium	112.4		0.00E+00			8.69E+00				7.50E+01	0.00E+00	0	NA	1.00E-05	2.86E-06	5.00E-04	1.80E-03	6.30E+00	1.00E-05	B	1.00E-05
75-15-0	Carbon disulfide	76.14	5.89E-01	1.44E-02	3.59E+02	1.2632	1.06E-01	1.30E-05	2.17E+01		2.16E+03	1	8.89E+02	7.00E-01	2.00E-01	1.00E-01	0.00E+00	0.00E+00	NA	NA		
67-66-3	Chloroform	119.38	1.50E-01	3.66E-03	1.97E+02	1.48E+00	7.69E-02	1.09E-05	3.18E+01		7.95E+03	1	2.77E+03	9.80E-02	2.80E-02	1.00E-02	2.30E-05	8.05E-02	3.10E-02	B	1.00E-05	
7440-47-3	Chromium (total)	51.996		0.00E+00			7.15				1.80E+06	0.00E+00	0	NA	1.00E-04	2.86E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	
218-01-9	Chrysene	228.3	2.14E-04	5.22E-06	6.23E-09	1.27E+00	2.61E-02	6.75E-06	1.81E+05		2.00E-03	0	NA	0.00E+00	6.00E-07	2.10E-03	1.00E-03	2.10E-03	1.00E-05	B	1.00E-05	
156-59-2	cis-1,2-Dichloroethylene	96.94	1.67E-01	4.07E-03	2.00E+02	1.2837	8.84E-02	1.13E-05	3.96E+01		6.41E+03	1	2.74E+03	0.00E+00	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	
53-70-3	Dibenzo(a,h)anthracene	278.36	5.76E-06	1.41E-07	9.55E-10		4.46E-02	5.21E-06	1.91E+06		2.49E-03	0	NA	0.00E+00	6.00E-04	2.10E+00	1.00E+00	2.10E+00	1.00E+05	B	1.00E-05	
132-64-9	Dibenzofuran	168.2	8.71E-03	2.12E-04	2.48E-03	1.09E+00	6.51E-02	7.377E-06	9.16E+03		3.10E+00	1	2.17E+05	0.00E+00	2.00E-03	0.00E+00	0.00E+00	0.00E+00	NA	NA		
100-41-4	Ethylbenzene	106.17	3.22E-01	7.86E-03	9.60E+00	0.8626	6.85E-02	8.46E-06	4.46E+02		1.69E+02	1	7.64E+03	1.00E+00	2.86E-01	1.00E-01	2.50E-06	8.75E-03	1.10E-02	C	1.00E-04	
206-44-0	Fluoranthene	202.26	3.62E-04	8.83																		

RRS Table 4
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 8 Soil-to-air Volatilization Factor

VF	volatilization factor (m^3/kg)		calculated
LS	length of side of contaminated area (m)	45	default
V	wind speed in mixing zone (m/s)	2.25	default
DH	diffusion height (m)	2	default
A	area of contamination (cm^2)	20,250,000.00	default
D_{ei}	effective diffusivity (cm^2/s)	$D_i \times E^{0.33}$	calculated
E	true soil porosity	0.35	default
K_{as}	soil/air partition coefficient (g soil/ cm^3 air)	$(H/K_d) \times 41$	calculated
p_s	true soil density or particulate density (g/cm^3)	2.65	default
T	exposure interval (s)	7.90E+08	default
D_i	molecular diffusivity (cm^2/s)		chemical specific
H'	Henry's law constant (dimensionless)		chemical specific
H	Henry's law constant (atm- m^3/mol)	$H/41$	calculated
K_d	soil-water partition coefficient (cm^3/g)	$K_{oc} \times OC$	calculated
K_{oc}	organic carbon partition coefficient (cm^3/g)		chemical specific
OC	organic carbon content of soil (fraction)	0.02	default
α			calculated

$$VF = \frac{(LS \times V \times DH)}{A} \times \frac{(3.14 \times \alpha \times T)^{1/2}}{(2 \times D_{ei} \times E \times K_{as} \times 10^{-3} \text{ kg/g})}$$

where:

$$\alpha (\text{cm}^2/\text{s}) = \frac{(D_{ei} \times E)}{E + (p_s)(1-E)/K_{as}}$$

Chemical	VF	D_{ei}	K_{as}	D_i	H'	H	K_d	K_{oc}	α
Anthracene	7.33E+05	2.76E-02	6.95E-06	3.90E-02	2.27E-03	5.54E-05	3.27E+02	1.64E+04	3.89E-08
Arsenic, Inorganic	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E+01	0.00E+00	#DIV/0!
Barium	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E+01	0.00E+00	#DIV/0!
Benz(a)anthracene	6.34E+06	1.85E-02	1.39E-07	2.61E-02	4.91E-04	1.20E-05	3.54E+03	1.77E+05	5.20E-10
Benzene	4.53E+03	6.33E-02	7.78E-02	8.95E-02	2.27E-01	5.53E-03	2.92E+00	1.46E+02	9.86E-04
Benzo(a)pyrene	NA	3.37E-02	1.59E-09	4.76E-02	1.87E-05	4.56E-07	1.17E+04	5.87E+05	1.09E-11
Benzo(b)fluoranthene	NA	3.37E-02	2.24E-09	4.76E-02	2.69E-05	6.55E-07	1.20E+04	5.99E+05	1.53E-11
Benzo(k)fluoranthene	NA	3.37E-02	2.03E-09	4.76E-02	2.39E-05	5.82E-07	1.17E+04	5.87E+05	1.39E-11
Benzol[g,h]perylene	NA	3.17E-02	3.56E+02	4.48E-02	1.35E-05	3.30E-07	3.80E-08	1.90E-06	3.13E-02
Bis(2-ethylhexyl)phthalate	NA	1.23E-02	4.63E-09	1.73E-02	1.10E-05	2.70E-07	2.39E+03	1.20E+05	1.15E-11
Cadmium	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.50E+01	0.00E+00	#DIV/0!
Carbon disulfide	8.89E+02	7.53E-02	1.35E+00	1.06E-01	5.89E-01	1.44E-02	4.35E-01	2.17E+01	1.62E-02
Chromium (total)	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E+06	0.00E+00	#DIV/0!
Chrysene	NA	1.85E-02	5.92E-08	2.61E-02	2.14E-04	5.22E-06	3.61E+03	1.81E+05	2.22E-10
cis-1,2-Dichloroethylene	2.74E+03	6.25E-02	2.11E-01	8.84E-02	1.67E-01	4.07E-03	7.92E-01	3.96E+01	2.57E-03
Dibenz(a,h)anthracene	NA	3.15E-02	1.51E-10	4.46E-02	5.76E-06	1.41E-07	3.82E+04	1.91E+06	9.65E-13
Dibenzofuran	2.17E+05	4.60E-02	4.75E-05	6.51E-02	8.71E-03	2.12E-04	1.83E+02	9.16E+03	4.44E-07
Ethylbenzene	7.64E+03	4.84E-02	3.61E-02	6.85E-02	3.22E-01	7.86E-03	8.92E+00	4.46E+02	3.53E-04
Fluoranthene	NA	1.95E-02	3.27E-07	2.76E-02	3.62E-04	8.83E-06	1.11E+03	5.55E+04	1.30E-09
Fluorene	3.93E+05	3.11E-02	2.15E-05	4.40E-02	3.93E-03	9.59E-05	1.83E+02	9.16E+03	1.36E-07
Indeno(1,2,3-cd)pyrene	NA	3.17E-02	3.65E-10	4.48E-02	1.42E-05	3.47E-07	3.90E+04	1.95E+06	2.35E-12
Isopropylbenzene	8.43E+03	4.26E-02	3.37E-02	6.03E-02	4.70E-01	1.15E-02	1.40E+01	6.98E+02	2.90E-04
Lead	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E+02	0.00E+00	#DIV/0!
Mercury (elemental)	2.64E+04	2.17E-02	6.77E-03	3.07E-02	3.52E-01	8.59E-03	5.20E+01	0.00E+00	2.98E-05
Mercury (inorganic)	NA	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Naphthalene	6.42E+04	4.28E-02	5.83E-04	6.05E-02	1.80E-02	4.39E-04	3.09E+01	1.54E+03	5.06E-06
Phenanthrene	NA	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	3.42E+06	1.97E-02	4.48E-07	2.78E-02	4.87E-04	1.19E-05	1.09E+03	5.43E+04	1.79E-09
Selenium	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	#DIV/0!
Silver	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.30E+00	0.00E+00	#DIV/0!
Tetrachloroethylene	2.65E+03	3.57E-02	3.81E-01	5.05E-02	7.24E-01	1.76E-02	1.90E+00	9.49E+01	2.57E-03
Toluene	5.64E+03	5.50E-02	5.80E-02	7.78E-02	2.71E-01	6.62E-03	4.68E+00	2.34E+02	6.41E-04
Trichloroethylene	2.45E+03	4.86E-02	3.32E-01	6.87E-02	4.03E-01	9.82E-03	1.21E+00	6.07E+01	3.07E-03

RRS Table 5
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Risk Reduction Standards Evaluation - Type 1

CAS	Chemical	NC (mg/Kg)	Type 1/3			Max NC/ GWx100	Carcinogenic Equ 6	Carcinogenic Equ 7	Non- Default Type 1 RRS	
			Type 1/3 GW	GWx100	App3 Table 2					
75-34-3	1,1-Dichloroethane	0.03	0.028	2.8		2.8	422.6278	9541.2393	2.800	
75-35-4	1,1-Dichloroethene	0.36	0.007	0.7		0.7	NA	238.9897	0.700	
95-50-1	1,2-Dichlorobenzene	25	0.6	60		60	NA	4101.3263	60.000	
91-57-6	2-Methylnaphthalene	NL	NL	NA		0	NA	2544.7798	NR	
83-32-9	Acenaphthene	300	0.54	54		300	NA	36933.1975	300.000	
208-96-8	Acenaphthylene	130	NL	NA		130	NA	NA	130.000	
67-64-1	Acetone	2.74	14	1400		1400	NA	192685.8189	1400.000	
120-12-7	Anthracene	500	NL	NA		500	NA	182286.5794	500.000	
7440-38-2	Arsenic, Inorganic	41	0.01	1	20	41	9.9582	191.7239	20.000	
7440-39-3	Barium	500	2	200	1600	500	NA	123169.7096	1600.000	
56-55-3	Benz(a)anthracene	5	0.0003	0.03		5	143.1650	NA	5.000	
71-43-2	Benzene	0.02	0.005	0.5		0.5	17.6335	176.1110	0.500	
50-32-8	Benzo(a)pyrene	1.64	0.0002	0.02		1.64	14.9406	189.2812	1.640	
205-99-2	Benzo(b)fluoranthene	5	0.0025	0.25		5	149.4063	NA	5.000	
207-08-9	Benzo(k)fluoranthene	5	0.025	NA		5	1494.0629	NA	5.000	
191-24-2	Benzo[g,h,i]perylene	500	NL	NA		500	NA	NA	500.000	
117-81-7	Bis(2-ethylhexyl)phthalate	50	0.006	0.6		50	1067.2333	12807.0103	50.000	
7440-43-9	Cadmium	39	0.005	0.5	7.5	39	83454.3210	318.5910	7.500	
75-15-0	Carbon disulfide	DL	0.81	81		81	NA	854.1624	81.000	
67-66-3	Chloroform	0.68	0.08	8		8	3.8713	356.0324	3.871	
7440-47-3	Chromium	1200	0.1	10	100	1200	NA	643790.4762	100.000	
218-01-9	Chrysene	5	0.25	0.02		5	14940.6288	NA	5.000	
156-59-2	cis-1,2-Dichloroethylene	0.53	0.07	7		7	NA	1168.3677	7.000	
53-70-3	Dibenz(a,h)anthracene	5	0.0003	0.03		5	14.9406	NA	5.000	
132-64-9	Dibenzo furan	NL	NL	NA		0	NA	1279.1495	NR	
100-41-4	Ethylbenzene	20	0.7	70		70	924.3356	9114.2220	70.000	
206-44-0	Fluoranthene	500	0.8	80		500	NA	25614.0060	500.000	
86-73-7	Fluorene	360	0.29	29		360	NA	25275.1054	360.000	
193-39-5	Indeno(1,2,3-cd)pyrene	5	0.0025	0.25		5	149.4063	NA	5.000	
98-82-8	Isopropylbenzene	21.88	0.45	45		45	NA	4370.1017	45.000	
7439-92-1	Lead	400	0.015	1.5	270	400	NA	NA	270.000	
7439-97-6	Mercury (elemental)	17	NL	NA	2.1	17	NA	11.0283	2.100	
	Mercury (inorganic)	17	0.002	0.2	2.1	17	NA	192.0862	2.100	
91-20-3	Naphthalene	100	0.0061	0.61		100	612.9968	262.4753	100.000	
85-01-8	Phenanthrene	110	NL	NA		110	NA	NA	110.000	
129-00-0	Pyrene	500	0.12	12		500	NA	19188.3599	500.000	
7782-49-2	Selenium	36	0.05	5	5.2	36	NA	3201.6748	5.200	
7440-22-4	Silver	10	0.1	10	16	10	NA	3201.7539	16.000	
127-18-4	Tetrachloroethylene	0.18	0.005	0.5		0.5	315.9288	141.9142	0.500	
108-88-3	Toluene	14.4	1	100		100	NA	22216.8581	100.000	
79-01-6	Trichloroethylene	0.13	0.005	0.5		0.5	18.2675	6.6608	0.500	
1330-20-7	Xylene	20	10	1000		1000	NA	1064.1030	1000.000	

RRS Table 6
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Risk Reduction Standards Evaluation - Type 1

RAGS Equation 6 Residential Soil - Carcinogenic Effects

Adult	
C	chemical concentration in soil (mg/kg)
TR	target cancer risk
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)
AT	averaging time (yr)
EF	exposure frequency (days/year)
BW	body weight (Kg)
ED	exposure duration (yr)
IR _s	daily soil ingestion rate (L/day)
IR _a	daily inhalation rate (m ³ /day)
PEF	Particulate emision factor (m ³ /kg)
VF	soil to air volatilization factor (m ³ /kg)

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	SF _o	SF _i	VF	TR
Anthracene	NA			7.33E+05	NA
Arsenic, Inorganic	9.96E+00	1.50E+00	1.51E+01	NA	1.00E-05
Barium	NA			NA	NA
Benz(a)anthracene	1.43E+02	1.00E-01	2.10E-01	6.34E+06	1.00E-05
Benzene	1.76E+01	5.50E-02	2.73E-02	4.53E+03	1.00E-05
Benzo(a)pyrene	1.49E+01	1.00E+00	2.10E+00	NA	1.00E-05
Benzo(b)fluoranthene	1.49E+02	1.00E-01	2.10E-01	NA	1.00E-05
Benzo(k)fluoranthene	1.49E+03	1.00E-02	2.10E-02	NA	1.00E-05
Benzo[g,h,i]perylene	NA			NA	NA
Bis(2-ethylhexyl)phthalate	1.07E+03	1.40E-02	8.40E-03	NA	1.00E-05
Cadmium	8.35E+04		6.30E+00	NA	1.00E-05
Carbon disulfide	NA			8.89E+02	NA
Chromium (total)	NA			NA	NA
Chrysene	1.49E+04	1.00E-03	2.10E-03	NA	1.00E-05
cis-1,2-Dichloroethylene	NA			2.74E+03	NA
Dibenz(a,h)anthracene	1.49E+01	1.00E+00	2.10E+00	NA	1.00E-05
Dibenzofuran	NA			2.17E+05	NA
Ethylbenzene	9.24E+02	1.10E-02	8.75E-03	7.64E+03	1.00E-04
Fluoranthene	NA			NA	NA
Fluorene	NA			3.93E+05	NA
Indeno(1,2,3-cd)pyrene	1.49E+02	1.00E-01	2.10E-01	NA	1.00E-05
Isopropylbenzene	NA			8.43E+03	NA
Lead	NA			NA	NA
Mercury (elemental)	NA			2.64E+04	NA
Mercury (inorganic)	NA			NA	NA
Naphthalene	6.13E+02		1.19E-01	6.42E+04	1.00E-04
Phenanthrene	NA			NA	NA
Pyrene	NA			3.42E+06	NA
Selenium	NA			NA	NA
Silver	NA			NA	NA
Tetrachloroethylene	3.16E+02	2.10E-03	9.10E-04	2.65E+03	1.00E-05
Toluene	NA			5.64E+03	NA
Trichloroethylene	1.83E+01	4.60E-02	1.44E-02	2.45E+03	1.00E-05

RRS Table 7
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894
Risk Reduction Standards Evaluation - Type 1
RAGS Equation 7 Residential Soil - Non-Carcinogenic Effects

Adult

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	70	default	
AT	averaging time (yr)	30	equal to ED	
EF	exposure frequency (days/year)	350	default	
ED	exposure duration (yr)	30	default	
IR _s	soil ingestion rate (mg/day)	114	default	
IR _a	daily inhalation rate (m ³ /day)	15	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	RfD _o	RfD _i	VF
Anthracene	1.82E+05	3.00E-01		7.33E+05
Arsenic, Inorganic	1.92E+02	3.00E-04	4.29E-06	NA
Barium	1.23E+05	2.00E-01	1.43E-04	NA
Benz(a)anthracene	NA			6.34E+06
Benzene	1.76E+02	4.00E-03	8.57E-03	4.53E+03
Benzo(a)pyrene	1.89E+02	3.00E-04	5.71E-07	NA
Benzo(b)fluoranthene	NA			NA
Benzo(k)fluoranthene	NA			NA
Benzo[g,h,i]perylene	NA			NA
Bis(2-ethylhexyl)phthalate	1.28E+04	2.00E-02		NA
Cadmium	3.19E+02	5.00E-04	2.86E-06	NA
Carbon disulfide	8.54E+02	1.00E-01	2.00E-01	8.89E+02
Chromium (total)	6.44E+05		2.86E-05	NA
Chrysene	NA			NA
cis-1,2-Dichloroethylene	1.17E+03	2.00E-03		2.74E+03
Dibenz(a,h)anthracene	NA			NA
Dibenzofuran	1.28E+03	2.00E-03		2.17E+05
Ethylbenzene	9.11E+03	1.00E-01	2.86E-01	7.64E+03
Fluoranthene	2.56E+04	4.00E-02		NA
Fluorene	2.53E+04	4.00E-02		3.93E+05
Indeno(1,2,3-cd)pyrene	NA			NA
Isopropylbenzene	4.37E+03	1.00E-01	1.14E-01	8.43E+03
Lead	NA			NA
Mercury (elemental)	1.10E+01		8.57E-05	2.64E+04
Mercury (inorganic)	1.92E+02	3.00E-04	8.57E-05	NA
Naphthalene	2.62E+02	2.00E-02	8.57E-04	6.42E+04
Phenanthrene	NA			NA
Pyrene	1.92E+04	3.00E-02		3.42E+06
Selenium	3.20E+03	5.00E-03	5.71E-03	NA
Silver	3.20E+03	5.00E-03		NA
Tetrachloroethylene	1.42E+02	6.00E-03	1.14E-02	2.65E+03
Toluene	2.22E+04	8.00E-02	1.43E+00	5.64E+03
Trichloroethylene	6.66E+00	5.00E-04	5.71E-04	2.45E+03

RRS Table 8
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Residential Risk Reduction Standards Evaluation - Type 2

CAS	Chemical	NC (mg/Kg)	Type1/3 GW	Type 1/3	Type 1 RRS	Adult	Adult Non-Carcinogenic	Child	Child	Child	Default	
				GWx100	(App3 Table 2)	Equ 6	Equ 7	Equ 6	Equ 7	Type 2 GW (mg/L)	Type 2 SSL	Type 2 RRS Soil (mg/Kg)
50-32-8	Benzo(a)pyrene	1.64	0.0002	0.02		17.0322	214.1436	9.1247	23.2664	1.1915E-06	4.1698E-06	1.1915E-06
205-99-2	Benzo(b)fluoranthene	5	0.0025	0.25		170.3217	NA	91.2469	NA	0.0109	0.0074	0.0074

RRS Table 9
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Residential Risk Reduction Standards Evaluation - Type 2

RAGS Equation 6

Residential Soil - Carcinogenic Effects

Child			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	350	default
BW	body weight (Kg)	15	default
ED	exposure duration (yr)	6	default
IR _s	daily soil ingestion rate (L/day)	200	default
IR _a	daily inhalation rate (m ³ /day)	15	default
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{child}	SF _o	SF _i	VF	TR
Benzo(a)pyrene	9.12E+00	1.00E+00	2.10E+00	NA	1.00E-05
Benzo(b)fluoranthene	9.12E+01	1.00E-01	2.10E-01	NA	1.00E-05

RRS Table 10
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Residential Risk Reduction Standards Evaluation - Type 2

RAGS Equation 6 Residential Soil - Carcinogenic Effects

Adult

C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	350	default
BW	body weight (Kg)	70	default
ED	exposure duration (yr)	30	default
IR _s	daily soil ingestion rate (L/day)	100	default
IR _a	daily inhalation rate (m ³ /day)	15	default
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	SF _o	SF _i	VF	TR
Benzo(a)pyrene	1.70E+01	1.00E+00	2.10E+00	NA	1.00E-05
Benzo(b)fluoranthene	1.70E+02	1.00E-01	2.10E-01	NA	1.00E-05

RRS Table 11
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Residential Risk Reduction Standards Evaluation - Type 2

RAGS Equation 7

Residential Soil - Non-Carcinogenic Effects
 Child

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	15	default	
AT	averaging time (yr)	6	equal to ED	
EF	exposure frequency (days/year)	350	default	
ED	exposure duration (yr)	6	default	
IR _s	soil ingestion rate (mg/day)	200	default	
IR _a	daily inhalation rate (m ³ /day)	15	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{child}	RfD _o	RfD _i	VF
Benzo(a)pyrene	2.33E+01	3.00E-04	5.71E-07	NA
Benzo(b)fluoranthene	NA			NA

RRS Table 12
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Residential Risk Reduction Standards Evaluation - Type 2

RAGS Equation 7

Residential Soil - Non-Carcinogenic Effects
 Adult

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	70	default	
AT	averaging time (yr)	30	equal to ED	
EF	exposure frequency (days/year)	350	default	
ED	exposure duration (yr)	30	default	
IR _s	soil ingestion rate (mg/day)	100	default	
IR _a	daily inhalation rate (m ³ /day)	20	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	RfD _o	RfD _i	VF
Benzo(a)pyrene	2.14E+02	3.00E-04	5.71E-07	NA
Benzo(b)fluoranthene	NA			NA

RRS Table 13
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 1

Residential Water - Carcinogenic Effects

Child			
C	chemical concentration in water (mg/L)		calculated
TR	target cancer risk	1×10^{-5}	default
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
BW	child body weight (Kg)	15	default
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	350	default
ED	exposure duration (yr)	6	site specific
IR _a	daily indoor inhalation rate (m ³ /day)	15	default
IR _w	daily water ingestion rate (L/day)	1	default
K	Volatilization factor	0.5	default

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_i \times K \times IR_a) + (SF_o \times IR_w)]}$$

Chemical	Cw	SF _i	SF _o	TR
Benzo(a)pyrene	1.09E-03	2.10E+00	1.00E+00	1.00E-05
Benzo(b)fluoranthene	1.09E-02	2.10E-01	1.00E-01	1.00E-05

RRS Table 14
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 1

Residential Water - Carcinogenic Effects

Adult			
C	chemical concentration in water (mg/L)		calculated
TR	target cancer risk	1×10^{-5}	default
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
BW	body weight (Kg)	70	default
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	350	default
ED	exposure duration (yr)	30	default
IR _a	daily indoor inhalation rate (m ³ /day)	20	default
IR _w	daily water ingestion rate (L/day)	2	default
K	Volatilization factor	0.5	default

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_i \times K \times IR_a) + (SF_o \times IR_w)]}$$

Chemical	Cw	SF _i	SF _o	TR
Benzo(a)pyrene	7.41E-04	2.10E+00	1.00E+00	1.00E-05
Benzo(b)fluoranthene	7.41E-03	2.10E-01	1.00E-01	1.00E-05

RRS Table 15
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 2

Residential Water - Non-carcinogenic Effects

		Child
C	chemical concentration in water (mg/L)	calculated
THI	Target Health Index	1 default
RfD _i	inhalation chronic reference dose ((mg/kg-day) ⁻¹)	chemical specific
RfD _o	oral chronic reference dose ((mg/kg-day) ⁻¹)	chemical specific
BW	child body weight (Kg)	15 default
AT	averaging time (yr)	6 site specific
EF	exposure frequency (days/year)	350 default
ED	exposure duration (yr)	6 default
IR _a	daily indoor inhalation rate (m ³ /day)	15 default
IR _w	daily water ingestion rate (L/day)	1 default
K	Volatilization factor	0.5 default

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(1/RfD_i \times K \times IR_a) + (1/RfD_o \times IR_w)]}$$

Chemical	Cw	RfDi	RfDo
Benzo(a)pyrene	1.19E-06	5.71E-07	3.00E-04
Benzo(b)fluoranthene	NA	1.00E+00	1.00E+00

RRS Table 16
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 2

Residential Water - Non-carcinogenic Effects

		Adult
C	chemical concentration in water (mg/L)	calculated
THI	Target Health Index	1 default
RfD _i	inhalation chronic reference dose ((mg/kg-day) ⁻¹)	chemical specific
RfD _o	oral chronic reference dose ((mg/kg-day) ⁻¹)	chemical specific
BW	body weight (Kg)	70 default
AT	averaging time (yr)	30 default
EF	exposure frequency (days/year)	350 default
ED	exposure duration (yr)	30 default
IR _a	daily indoor inhalation rate (m ³ /day)	20 default
IR _w	daily water ingestion rate (L/day)	2 default
K	Volatilization factor	0.5 default

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(1/RfD_i \times K \times IR_a) + (1/RfD_o \times IR_w)]}$$

Chemical	Cw	RfDi	RfDo
Benzo(a)pyrene	4.17E-06	5.71E-07	3.00E-04
Benzo(b)fluoranthene	NA	1.00E+00	1.00E+00

RRS Table 17**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI# 10894**

Default Type 2
 Soil Screening Level

$$SSL = C_w * Daf * [K_d + (Q_w + Q_a * H') / R_b]$$

Where:

Soil screening level	mg/Kg	SSL	Calculated
Dilution Factor	dimensionless	Daf	20 Default for <0.5 acre source
Target soil lechate concentration	mg/L	Cw	Chemical specific
soil water partition coefficient	L/Kg	Kd	Calculated (Koc x foc)
Fraction of organic carbon	g/g	foc	0.002 Default
organic carbon partition coefficient	L/Kg	Koc	Chemical specific
Water filled soil porosity	Lw/Ls	Qw	0.3 Default
Air filled soil porosity	La/Ls	Qa	0.13396 Default
Henry's Law constant	dimensionless	H'	Chemical specific
soil bulk density	Kg/L	Rb	1.5 Default

CAS	Compound	SSL	Cw	Kd	Koc	H'
50-32-8	Benzo(a)pyrene	4.70E+00	0.0002	1.17E+03	5.87E+05	1.87E-05
205-99-2	Benzo(b)fluoranthene	1.78E+02	0.0074	1.20E+03	5.99E+05	2.69E-05

RRS Table 18
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Risk Reduction Standards Evaluation - Type 3 and 4

CAS	Chemical	NC (mg/Kg)	Type1/3 GW	Type 1/3 GWx100	Carcinogenic Equ 6	Non- Carcinogenic Equ 7	Type 3 RRS >2' (mg/Kg)	Type 3 RRS <2' (mg/Kg)	Type 4 SSL	Type 4 SSL (mg/Kg)	Type 4 RRS >2' (mg/Kg)	Type 4 RRS <2' (mg/Kg)
									Cw term (mg/L)			
75-34-3	1,1-Dichloroethane	0.03	4	400	538.3354	10545.5079	400.0000	400.0000	4.0000	22.7327	22.7327	22.7327
75-35-4	1,1-Dichloroethene	0.36	0.007	0.7	NA	252.2025	0.7000	0.7000	0.5241	3.7624	3.7624	3.7624
95-50-1	1,2-Dichlorobenzene	25	0.6	60	NA	4522.3586	60.0000	60.0000	0.6000	11.6737	11.6737	11.6737
91-57-6	2-Methylnaphthalene	NL	NL	NA	NA	8016.7966	0.0000	0.0000	0.3931	40.5490	40.5490	40.5490
83-32-9	Acenaphthene	300	2	200	NA	109259.3847	300.0000	300.0000	3.8325	786.0206	786.0206	786.0206
208-96-8	Acenaphthylene	130	nl	NA	NA	NA	130.0000	130.0000	NA	NA	NA	BG/DL
67-64-1	Acetone	2.74	4	400	NA	260842.8678	400.0000	400.0000	45.6221	186.9189	186.9189	186.9189
120-12-7	Anthracene	500	nl	NA	NA	526918.8550	500.0000	500.0000	7.6650	5046.6671	5046.6671	5046.6671
7440-38-2	Arsenic, Inorganic	41	0.01	1	38.1216	609.5140	41.0000	38.1216	0.0100	5.8400	5.8400	5.8400
7440-39-3	Barium	500	2	200	NA	364690.5588	500.0000	500.0000	2.0000	1648.0000	1648.0000	1648.0000
56-55-3	Benz(a)anthracene	5	0.0001	0.01	505.2628	NA	5.0000	5.0000	0.0108	76.7429	76.7429	76.7429
71-43-2	Benzene	0.02	0.005	0.5	23.2300	193.8610	0.5000	0.5000	0.0721	0.7385	0.7385	0.7385
50-32-8	Benzo(a)pyrene	1.64	0.0002	0.02	57.2216	586.5942	1.6400	1.6400	0.0002	4.7000	4.7000	4.7000
205-99-2	Benzo(b)fluoranthene	5	0.0002	0.02	572.2162	NA	5.0000	5.0000	0.0108	259.9287	259.9287	259.9287
207-08-9	Benzo(k)fluoranthene	5	nl	NA	5722.1619	NA	5.0000	5.0000	0.1084	2547.2576	2547.2576	2547.2576
191-24-2	Benzo(g,h,i)perylene	500	nl	NA	NA	NA	500.0000	500.0000	NA	NA	NA	BG/DL
117-81-7	Bis(2-ethylhexyl)phthalate	50	0.006	0.6	4087.7881	40879.9294	50.0000	50.0000	0.2433	1165.0800	1165.0800	1165.0800
7440-43-9	Cadmium	39	0.005	0.5	105152.4444	1006.7787	39.0000	39.0000	0.0050	7.5200	7.5200	7.5200
75-15-0	Carbon disulfide	DL	4	400	NA	904.9710	400.0000	400.0000	4.0000	23.6829	23.6829	23.6829
67-66-3	Chloroform	0.68	0.1	10	4.9042	388.3224	10.0000	4.9042	0.1000	0.5541	0.5541	0.5541
7440-47-3	Chromium (total)	1200	0.1	10	NA	675980.0000	1200.0000	1200.0000	0.1000	3600000.4000	3600000.4000	675980.0000
218-01-9	Chrysene	5	0.0002	0.02	57221.6185	NA	5.0000	5.0000	1.0839	7830.3786	7830.3786	7830.3786
156-59-2	cis-1,2-Dichloroethylene	0.53	0.07	7	NA	3163.3908	7.0000	7.0000	0.2004	1.1787	1.1787	1.1787
53-70-3	Dibenz(a,h)anthracene	5	0.0003	0.03	57.2216	NA	5.0000	5.0000	0.0011	82.9040	82.9040	57.2216
132-64-9	Dibenzofuran		nl	NA	NA	2040.2368	0.0000	0.0000	0.1012	37.4857	37.4857	37.4857
100-41-4	Ethylbenzene	0.7	0.7	70	1220.3921	10580.4981	70.0000	70.0000	2.2711	50.9170	50.9170	50.9170
206-44-0	Fluoranthene	500	1	100	NA	81759.7175	500.0000	500.0000	2.9200	6488.2419	6488.2419	6488.2419
86-73-7	Fluorene	360	1	100	NA	78557.5800	360.0000	360.0000	2.9200	1081.5885	1081.5885	1081.5885
193-39-5	Indeno(1,2,3-cd)pyrene	5	0.0004	0.04	572.2162	NA	5.0000	5.0000	0.0108	845.9497	845.9497	572.2162
98-82-8	Isopropylbenzene	21.88	NL	NA	NA	4808.8334	21.8800	21.8800	1.0482	34.3306	34.3306	34.3306
7439-92-1	Lead	400	0.015	1.5	NA	NA	400.0000	400.0000	0.0150	270.0600	270.0600	270.0600
7439-97-6	Mercury (elemental)	17	nl	NA	NA	11.5797	17.0000	11.5797	0.0009	0.9151	0.9151	0.9151
	Mercury (inorganic)	17	0.002	0.2	NA	613.0146	17.0000	17.0000	0.0020	0.0080	0.0080	0.0080
91-20-3	Naphthalene	100	0.02	2	772.3760	279.4422	100.0000	100.0000	0.0200	1.3158	1.3158	1.3158
85-01-8	Phenanthrene	110	nl	NA	NA	NA	110.0000	110.0000	NA	NA	NA	BG/DL
129-00-0	Pyrene	500	1	100	NA	61105.4090	500.0000	500.0000	2.3585	5135.7879	5135.7879	5135.7879
7782-49-2	Selenium	36	0.05	5	NA	10219.2275	36.0000	36.0000	0.0524	5.4507	5.4507	5.4507
7440-22-4	Silver	10	0.1	10	NA	10219.9956	10.0000	10.0000	0.4867	82.7333	82.7333	82.7333
127-18-4	Tetrachloroethylene	0.18	0.005	0.5	410.2958	152.7972	0.5000	0.5000	0.0981	0.8918	0.8918	0.8918
108-88-3	Toluene	14.4	1	100	NA	32903.4474	100.0000	100.0000	5.2410	72.5404	72.5404	72.5404
79-01-6	Trichloroethylene	0.13	0.005	0.5	23.9198	7.0928	0.5000	0.5000	0.0052	0.0375	0.0375	0.0375
1330-20-7	Xylene	20	10	1000	NA	1123.5728	1000.0000	1000.0000	10.0000	198.0014	198.0014	198.0014

RRS Table 19
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 6

Non-Residential Soil - Carcinogenic Effects

Adult			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	250	default
BW	body weight (Kg)	70	default
ED	exposure duration (yr)	25	default
IR _s	daily soil ingestion rate (L/day)	50	default
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63e9	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	SF _o	SF _i	VF	TR
Anthracene	NA			7.33E+05	NA
Arsenic, Inorganic	3.81E+01	1.50E+00	1.51E+01	NA	1.00E-05
Barium	NA			NA	NA
Benz(a)anthracene	5.05E+02	1.00E-01	2.10E-01	6.34E+06	1.00E-05
Benzene	2.32E+01	5.50E-02	2.73E-02	4.53E+03	1.00E-05
Benzo(a)pyrene	5.72E+01	1.00E+00	2.10E+00	NA	1.00E-05
Benzo(b)fluoranthene	5.72E+02	1.00E-01	2.10E-01	NA	1.00E-05
Benzo(k)fluoranthene	5.72E+03	1.00E-02	2.10E-02	NA	1.00E-05
Benzo[g,h,i]perylene	NA			NA	NA
Bis(2-ethylhexyl)phthalate	4.09E+03	1.40E-02	8.40E-03	NA	1.00E-05
Cadmium	1.05E+05		6.30E+00	NA	1.00E-05
Carbon disulfide	NA			8.89E+02	NA
Chloroform	4.90E+00	3.10E-02	8.05E-02	2.77E+03	1.00E-05
Chromium (total)	NA			NA	NA
Chrysene	5.72E+04	1.00E-03	2.10E-03	NA	1.00E-05
cis-1,2-Dichloroethylene	NA			2.74E+03	NA
Dibenz(a,h)anthracene	5.72E+01	1.00E+00	2.10E+00	NA	1.00E-05
Dibenzofuran	NA			2.17E+05	NA
Ethylbenzene	1.22E+03	1.10E-02	8.75E-03	7.64E+03	1.00E-04
Fluoranthene	NA			NA	NA
Fluorene	NA			3.93E+05	NA
Indeno(1,2,3-cd)pyrene	5.72E+02	1.00E-01	2.10E-01	NA	1.00E-05
Isopropylbenzene	NA			8.43E+03	NA
Lead	NA			NA	NA
Mercury (elemental)	NA			2.64E+04	NA
Mercury (inorganic)	NA			NA	NA
Naphthalene	7.72E+02		1.19E-01	6.42E+04	1.00E-04
Phenanthrene	NA			NA	NA
Pyrene	NA			3.42E+06	NA
Selenium	NA			NA	NA
Silver	NA			NA	NA

RRS Table 20
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 7

Non-Residential Soil - Non-Carcinogenic Effects
 Adult

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	70	default	
AT	averaging time (yr)	25	equal to ED	
EF	exposure frequency (days/year)	250	default	
ED	exposure duration (yr)	25	default	
IR _s	soil ingestion rate (mg/day)	50	default	
IR _a	daily inhalation rate (m ³ /day)	20	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{adult}	RfD _o	RfD _i	VF
Anthracene	5.27E+05	3.00E-01		7.33E+05
Arsenic, Inorganic	6.10E+02	3.00E-04	4.29E-06	NA
Barium	3.65E+05	2.00E-01	1.43E-04	NA
Benz(a)anthracene	NA			6.34E+06
Benzene	1.94E+02	4.00E-03	8.57E-03	4.53E+03
Benzo(a)pyrene	5.87E+02	3.00E-04	5.71E-07	NA
Benzo(b)fluoranthene	NA			NA
Benzo(k)fluoranthene	NA			NA
Benzo[g,h,i]perylene	NA			NA
Bis(2-ethylhexyl)phthalate	4.09E+04	2.00E-02		NA
Cadmium	1.01E+03	5.00E-04	2.86E-06	NA
Carbon disulfide	9.05E+02	1.00E-01	2.00E-01	8.89E+02
Chloroform	3.88E+02	1.00E-02	2.80E-02	2.77E+03
Chromium (total)	6.76E+05		2.86E-05	NA
Chrysene	NA			NA
cis-1,2-Dichloroethylene	3.16E+03	2.00E-03		2.74E+03
Dibenz(a,h)anthracene	NA			NA
Dibenzofuran	2.04E+03	1.00E-03		2.17E+05
Ethylbenzene	1.06E+04	1.00E-01	2.86E-01	7.64E+03
Fluoranthene	8.18E+04	4.00E-02		NA
Fluorene	7.86E+04	4.00E-02		3.93E+05
Indeno(1,2,3-cd)pyrene	NA			NA
Isopropylbenzene	4.81E+03	1.00E-01	1.14E-01	8.43E+03
Lead	NA			NA
Mercury (elemental)	1.16E+01		8.57E-05	2.64E+04
Mercury (inorganic)	6.13E+02	3.00E-04	8.57E-05	NA
Naphthalene	2.79E+02	2.00E-02	8.57E-04	6.42E+04
Phenanthrene	NA			NA
Pyrene	6.11E+04	3.00E-02		3.42E+06
Selenium	1.02E+04	5.00E-03	5.71E-03	NA
Silver	1.02E+04	5.00E-03		NA

RRS Table 21
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 1

Comercial/Industrial Water - Carcinogenic Effects

C	chemical concentration in water (mg/L)		calculated
TR	target cancer risk	1×10^{-5}	default
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
BW	adult body weight (Kg)	70	default
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	250	default
ED	exposure duration (yr)	30	default
IR _a	daily indoor inhalation rate (m ³ /day)	20	default
IR _w	daily water ingestion rate (L/day)	1	default
K	Volatilization factor	0.5	default

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_i \times K \times IR_a) + (SF_o \times IR_w)]}$$

Chemical	Cw	SF _i	SF _o	TR
Anthracene	NA	1.00E+00	1.00E+00	NA
Arsenic, Inorganic	1.57E-04	1.51E+01	1.50E+00	1.00E-05
Barium	NA	1.00E+00	1.00E+00	NA
Benz(a)anthracene	1.08E-02	2.10E-01	1.00E-01	1.00E-05
Benzene	7.27E-02	2.73E-02	5.50E-02	1.00E-05
Benzo(a)pyrene	1.08E-03	2.10E+00	1.00E+00	1.00E-05
Benzo(b)fluoranthene	1.08E-02	2.10E-01	1.00E-01	1.00E-05
Benzo(k)fluoranthene	1.08E-01	2.10E-02	1.00E-02	1.00E-05
Benzo[g,h,i]perylene	NA	1.00E+00	1.00E+00	NA
Bis(2-ethylhexyl)phthalate	2.43E-01	8.40E-03	1.40E-02	1.00E-05
Cadmium	3.73E-04	6.30E+00	1.00E+00	1.00E-05
Carbon disulfide	NA	1.00E+00	1.00E+00	NA
Chloroform	2.85E-02	8.05E-02	3.10E-02	1.00E-05
Chromium (total)	NA	1.00E+00	1.00E+00	NA
Chrysene	1.08E+00	2.10E-03	1.00E-03	1.00E-05
cis-1,2-Dichloroethylene	NA	1.00E+00	1.00E+00	NA
Dibenz(a,h)anthracene	1.08E-03	2.10E+00	1.00E+00	1.00E-05
Dibenzofuran	NA	1.00E+00	1.00E+00	NA
Ethylbenzene	2.42E+00	8.75E-03	1.10E-02	1.00E-04
Fluoranthene	NA	1.00E+00	1.00E+00	NA
Fluorene	NA	1.00E+00	1.00E+00	NA
Indeno(1,2,3-cd)pyrene	1.08E-02	2.10E-01	1.00E-01	1.00E-05
Isopropylbenzene	NA	1.00E+00	1.00E+00	NA
Lead	NA	1.00E+00	1.00E+00	NA
Mercury (elemental)	NA	1.00E+00	1.00E+00	NA
Mercury (inorganic)	NA	1.00E+00	1.00E+00	NA
Naphthalene	1.09E-01	1.19E-01	1.00E+00	1.00E-04
Phenanthrene	NA	1.00E+00	1.00E+00	NA
Pyrene	NA	1.00E+00	1.00E+00	NA
Selenium	NA	1.00E+00	1.00E+00	NA
Silver	NA	1.00E+00	1.00E+00	NA
Tetrachloroethylene	2.13E+00	9.10E-04	2.10E-03	1.00E-05
Toluene	NA	1.00E+00	1.00E+00	NA
Trichloroethylene	1.26E-01	1.44E-02	4.60E-02	1.00E-05
Xylene	NA	1.00E+00	1.00E+00	NA

RRS Table 22**Bright Hour Trust****340 Armour Drive****Atlanta, Fulton County, Georgia****SEA Job #152-079****HSI# 10894**

RAGS Equation 2

Comercial/Industrial - Non-carcinogenic Effects

C	chemical concentration in water (mg/L)		calculated
THI	Target Health Index	1	default
RfD _i	inhalation chronic reference dose ((mg/kg-day) ⁻¹)		chemical specific
RfD _o	oral chronic reference dose ((mg/kg-day) ⁻¹)		chemical specific
BW	adult body weight (Kg)	70	default
AT	averaging time (yr)	30	default
EF	exposure frequency (days/year)	250	default
ED	exposure duration (yr)	30	default
IR _a	daily indoor inhalation rate (m ³ /day)	20	default
IR _w	daily water ingestion rate (L/day)	1	default
K	Volatilization factor	0.5	default

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(1/RfD_i \times K \times IR_a) + (1/RfD_o \times IR_w)]}$$

Chemical	Cw	RfDi	RfDo
Anthracene	7.67E+00	1.00E+00	3.00E-01
Arsenic, Inorganic	4.37E-05	4.29E-06	3.00E-04
Barium	1.46E-03	1.43E-04	2.00E-01
Benz(a)anthracene	NA	1.00E+00	1.00E+00
Benzene	7.21E-02	8.57E-03	4.00E-03
Benzo(a)pyrene	5.84E-06	5.71E-07	3.00E-04
Benzo(b)fluoranthene	NA	1.00E+00	1.00E+00
Benzo(k)fluoranthene	NA	1.00E+00	1.00E+00
Benzo[g,h,i]perylene	NA	1.00E+00	1.00E+00
Bis(2-ethylhexyl)phthalate	1.70E+00	1.00E+00	2.00E-02
Cadmium	2.92E-05	2.86E-06	5.00E-04
Carbon disulfide	1.70E+00	2.00E-01	1.00E-01
Chloroform	2.24E-01	2.80E-02	1.00E-02
Chromium (total)	2.92E-04	2.86E-05	1.00E+00
Chrysene	NA	1.00E+00	1.00E+00
cis-1,2-Dichloroethylene	2.00E-01	1.00E+00	2.00E-03
Dibenz(a,h)anthracene	NA	1.00E+00	1.00E+00
Dibenzofuran	1.01E-01	1.00E+00	1.00E-03
Ethylbenzene	2.27E+00	2.86E-01	1.00E-01
Fluoranthene	2.92E+00	1.00E+00	4.00E-02
Fluorene	2.92E+00	1.00E+00	4.00E-02
Indeno(1,2,3-cd)pyrene	NA	1.00E+00	1.00E+00
Isopropylbenzene	1.05E+00	1.14E-01	1.00E-01
Lead	NA	1.00E+00	1.00E+00
Mercury (elemental)	8.76E-04	8.57E-05	1.00E+00
Mercury (inorganic)	8.52E-04	8.57E-05	3.00E-04
Naphthalene	8.72E-03	8.57E-04	2.00E-02
Phenanthrene	NA	1.00E+00	1.00E+00
Pyrene	2.36E+00	1.00E+00	3.00E-02
Selenium	5.24E-02	5.71E-03	5.00E-03
Silver	4.87E-01	1.00E+00	5.00E-03
Tetrachloroethylene	9.81E-02	1.14E-02	6.00E-03
Toluene	5.24E+00	1.43E+00	8.00E-02
Trichloroethylene	5.24E-03	5.71E-04	5.00E-04
Xylene	2.88E-01	2.86E-02	2.00E-01

RRS Table 23

Bright Hour Trust

340 Armour Drive

Atlanta, Fulton County, Georgia

SEA Job #152-079

HSI# 10894

Default Type 4
Soil Screening Level

$$SSL = C_w * Daf * [K_d + (Q_w + Q_a * H') / R_b]$$

Where:

Soil screening level	mg/Kg	SSL	Calculated
Dilution Factor	dimensionless	Daf	20 Default for <1 acre source
Target soil leachate concentration	mg/L	Cw	Chemical specific
soil water partition coefficient	L/Kg	Kd	Calculated (Koc x foc)
Fraction of organic carbon	g/g	foc	0.002 Default
organic carbon partition coefficient	L/Kg	Koc	Chemical specific
Water filled soil porosity	Lw/Ls	Qw	0.3 Default
Air filled soil porosity	La/Ls	Qa	0.13396 Default
Henry's Law constant	dimensionless	H'	Chemical specific
soil bulk density	Kg/L	Rb	1.5 Default

CAS	Compound	SSL	Cw	Kd	Koc	H'
120-12-7	Anthracene	5.05E+03	7.6650	3.27E+01	1.64E+04	2.27E-03
7440-38-2	Arsenic, Inorganic	5.84E+00	0.0100	2.90E+01	0.00E+00	0.00E+00
7440-39-3	Barium	1.65E+03	2.0000	4.10E+01	0.00E+00	0.00E+00
56-55-3	Benz(a)anthracene	7.67E+01	0.0108	3.54E+02	1.77E+05	4.91E-04
71-43-2	Benzene	7.39E-01	0.0721	2.92E-01	1.46E+02	2.27E-01
50-32-8	Benzo(a)pyrene	4.70E+00	0.0002	1.17E+03	5.87E+05	1.87E-05
205-99-2	Benzo(b)fluoranthene	2.60E+02	0.0108	1.20E+03	5.99E+05	2.69E-05
207-08-9	Benzo(k)fluoranthene	2.55E+03	0.1084	1.17E+03	5.87E+05	2.39E-05
191-24-2	Benzo[g,h,i]perylene	NA	NA	3.80E-09	1.90E-06	1.35E-05
117-81-7	Bis(2-ethylhexyl)phthalate	1.17E+03	0.2433	2.39E+02	1.20E+05	1.10E-05
7440-43-9	Cadmium	7.52E+00	0.0050	7.50E+01	0.00E+00	0.00E+00
75-15-0	Carbon disulfide	2.37E+01	4.0000	4.35E-02	2.17E+01	5.89E-01
67-66-3	Chloroform	5.54E-01	0.1000	6.36E-02	3.18E+01	1.50E-01
7440-47-3	Chromium (total)	3.60E+06	0.1000	1.80E+06	0.00E+00	0.00E+00
218-01-9	Chrysene	7.83E+03	1.0839	3.61E+02	1.81E+05	2.14E-04
156-59-2	cis-1,2-Dichloroethylene	1.18E+00	0.2004	7.92E-02	3.96E+01	1.67E-01
53-70-3	Dibenz(a,h)anthracene	8.29E+01	0.0011	3.82E+03	1.91E+06	5.76E-06
132-64-9	Dibenzofuran	3.75E+01	0.1012	1.83E+01	9.16E+03	8.71E-03
100-41-4	Ethylbenzene	5.09E+01	2.2711	8.92E-01	4.46E+02	3.22E-01
206-44-0	Fluoranthene	6.49E+03	2.9200	1.11E+02	5.55E+04	3.62E-04
86-73-7	Fluorene	1.08E+03	2.9200	1.83E+01	9.16E+03	3.93E-03
193-39-5	Indeno(1,2,3-cd)pyrene	8.46E+02	0.0108	3.90E+03	1.95E+06	1.42E-05
98-82-8	Isopropylbenzene	3.43E+01	1.0482	1.40E+00	6.98E+02	4.70E-01
7439-92-1	Lead	2.70E+02	0.0150	9.00E+02	0.00E+00	0.00E+00
7439-97-6	Mercury (elemental)	9.15E-01	0.0009	5.20E+01	0.00E+00	3.52E-01
7487-94-7	Mercury (inorganic)	8.00E-03	0.0020	0.00E+00	0.00E+00	0.00E+00
91-20-3	Naphthalene	1.32E+00	0.0200	3.09E+00	1.54E+03	1.80E-02
85-01-8	Phenanthrene	NA	NA	0.00E+00	0.00E+00	0.00E+00
129-00-0	Pyrene	5.14E+03	2.3585	1.09E+02	5.43E+04	4.87E-04
7782-49-2	Selenium	5.45E+00	0.0524	5.00E+00	0.00E+00	0.00E+00
7440-22-4	Silver	8.27E+01	0.4867	8.30E+00	0.00E+00	0.00E+00
127-18-4	Tetrachloroethylene	8.92E-01	0.0981	1.90E-01	9.49E+01	7.24E-01
108-88-3	Toluene	7.25E+01	5.2410	4.68E-01	2.34E+02	2.71E-01
79-01-6	Trichloroethylene	3.75E-02	0.0052	1.21E-01	6.07E+01	4.03E-01

RRS Table 24
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Type 5 Risk Reduction Standards Evaluation

CAS	Chemical	Teen Tresspasser				Maintenance Worker				Georgia Adult Lead Model	Type 5 SSL 10	Equ 10 (mg/Kg)	Type 5 RRS <2'	95% UCL Value
		Carcinogenic Equ 6	Non-Carcinogenic Equ 7	Carcinogenic Equ 6 Acute Exposure	Non-Carcinogenic Equ 7 Acute Exposure	Carcinogenic Equ 6	Non-Carcinogenic Equ 7	Carcinogenic Equ 6 Acute Exposure	Non-Carcinogenic Equ 7 Acute Exposure					
7440-38-2	Arsenic, Inorganic	170.26	1091.70	1702.60	3275.10	151.28	609.51	1512.76	1828.54		2146.20	151.28	150.56	
7440-39-3	Barium	NA	688370.67	NA	2065112.02	NA	364690.56	NA	1094071.68		121128.00	121128.00	935.04	
7439-92-1	Lead	NA	NA	NA	NA	NA	NA	NA	NA	1050.00	1587.95	1050.00	691.83	

All concentrations in mg/Kg

RRS Table 25
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 6

Non-Residential Soil - Carcinogenic Effects

Trespasser			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	45	Site Specific
BW	body weight (Kg)	45	EPA Recommended Value
ED	exposure duration (yr)	10	EPA Recommended Value
IR _s	daily soil ingestion rate (L/day)	100	EPA Recommended Value
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63e9	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{trespasser}	SF _o	SF _i	VF	TR
Arsenic, Inorganic	1.70E+02	1.50E+00	1.51E+01	NA	1.00E-05
Barium	NA			NA	NA
Lead	NA			NA	NA

RRS Table 26
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 6

Non-Residential Soil - Carcinogenic Effects

Trespasser			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	45	Site Specific
BW	body weight (Kg)	45	EPA Recommended Value
ED	exposure duration (yr)	10	EPA Recommended Value
IR _s	daily soil ingestion rate (L/day)	100	EPA Recommended Value
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63e9	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{trespasser}	SF _o	SF _i	VF	TR (Acute)
Arsenic, Inorganic	1.70E+03	1.50E+00	1.51E+01	NA	1.00E-04
Barium	NA			NA	NA
Lead	NA			NA	NA

RRS Table 27
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 6 Non-Residential Soil - Carcinogenic Effects Acute Exposure

Worker			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	63	Site Specific
BW	body weight (Kg)	70	default
ED	exposure duration (yr)	25	default
IR _s	daily soil ingestion rate (L/day)	50	default
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63e9	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$\begin{aligned}
 C = & TR \times BW \times AT \times 365 \text{ days/year} \\
 & EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]
 \end{aligned}$$

Chemical	C _{worker}	SF _o	SF _i	VF	TR
Arsenic, Inorganic	1.51E+02	1.50E+00	1.51E+01	NA	1.00E-05
Barium	NA			NA	NA
Lead	NA			NA	NA

RRS Table 28
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 6 Non-Residential Soil - Carcinogenic Effects Acute Exposure

Worker			
C	chemical concentration in soil (mg/kg)		calculated
TR	target cancer risk		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	63	Site Specific
BW	body weight (Kg)	70	default
ED	exposure duration (yr)	25	default
IR _s	daily soil ingestion rate (L/day)	50	default
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63e9	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_o \times 10^{-6} \text{ kg/mg} \times IR_s) + (SF_i \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{worker}	SF _o	SF _i	VF	TR (Acute)
Arsenic, Inorganic	1.51E+03	1.50E+00	1.51E+01	NA	1.00E-04
Barium	NA			NA	NA
Lead	NA			NA	NA

RRS Table 29
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 7

Non-Residential Soil - Non-Carcinogenic Effects
 Trespasser

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	Default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	45	EPA Recommended Value	
AT	averaging time (yr)	10	equal to ED	
EF	exposure frequency (days/year)	45	Site Specific	
ED	exposure duration (yr)	10	EPA Recommended Value	
IR _s	soil ingestion rate (mg/day)	100	EPA Recommended Value	
IR _a	daily inhalation rate (m ³ /day)	20	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{trespass}	RfD _o	RfD _i	VF
Arsenic, Inorganic	1.09E+03	3.00E-04	4.29E-06	NA
Barium	6.88E+05	2.00E-01	1.43E-04	NA
Lead	NA			NA

RRS Table 30
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 7

Non-Residential Soil - Non-Carcinogenic Effects

		Trespasser	Acute Exposure	
C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	3	Acute Exposure	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	45	EPA Recommended Value	
AT	averaging time (yr)	10	equal to ED	
EF	exposure frequency (days/year)	45	Site Specific	
ED	exposure duration (yr)	10	EPA Recommended Value	
IR _s	soil ingestion rate (mg/day)	100	EPA Recommended Value	
IR _a	daily inhalation rate (m ³ /day)	20	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{trespass}	RfD _o	RfD _i	VF
Arsenic, Inorganic	3.28E+03	3.00E-04	4.29E-06	NA
Barium	2.07E+06	2.00E-01	1.43E-04	NA
Lead	NA			NA

RRS Table 31
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 7

Non-Residential Soil - Non-Carcinogenic Effects
 Maintenance
 Worker

C	chemical concentration in soil (mg/L)		calculated	
THI	target hazard index	1	Default	
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific	
BW	body weight (Kg)	70	Worker Default	
AT	averaging time (yr)	25	equal to ED	
EF	exposure frequency (days/year)	250	Worker Default	
ED	exposure duration (yr)	25	Worker Default	
IR _s	soil ingestion rate (mg/day)	50	default	
IR _a	daily inhalation rate (m ³ /day)	20	default	
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default	
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8	

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [((1/RfD_o) \times 10^{-6} \text{ kg/mg} \times IR_s) + ((1/RfD_i) \times IR_a \times [1/VF + 1/PEF])]}$$

Chemical	C _{trespass}	RfD _o	RfD _i	VF
Arsenic, Inorganic	6.10E+02	3.00E-04	4.29E-06	NA
Barium	3.65E+05	2.00E-01	1.43E-04	NA
Lead	NA			NA

RRS Table 32
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 7

Non-Residential Soil - Non-Carcinogenic Effects

		Maintenance Worker	Acute Exposure
C	chemical concentration in soil (mg/L)		calculated
THI	target hazard index	3	Acute Exposure
RfD _o	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
RfD _i	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
BW	body weight (Kg)	70	Worker Default
AT	averaging time (yr)	25	equal to ED
EF	exposure frequency (days/year)	250	Worker Default
ED	exposure duration (yr)	25	Worker Default
IR _s	soil ingestion rate (mg/day)	50	default
IR _a	daily inhalation rate (m ³ /day)	20	default
PEF	Particulate emision factor (m ³ /kg)	4.63E+09	default
VF	soil to air volatilization factor (m ³ /kg)		from RAGS eq. 8

C=

$$\frac{\text{THI} \times \text{BW} \times \text{AT} \times 365 \text{ days/year}}{\text{EF} \times \text{ED} \times [((1/\text{RfD}_o) \times 10^{-6} \text{ kg/mg} \times \text{IR}_s) + ((1/\text{RfD}_i) \times \text{IR}_a \times [1/\text{VF} + 1/\text{PEF}])]} \quad \text{Eq. 7}$$

Chemical	C _{worker}	RfD _o	RfD _i	VF
Arsenic, Inorganic	1.83E+03	3.00E-04	4.29E-06	NA
Barium	1.09E+06	2.00E-01	1.43E-04	NA
Lead	NA			NA

RRS Table 33
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 1

Comercial/Industriall Water - Carcinogenic Effects

C	chemical concentration in water (mg/L)		calculated
TR	target cancer risk		chemical specific
SF _i	inhalation cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
SF _o	oral cancer slope factor((mg/kg-day) ⁻¹)		chemical specific
BW	adult body weight (Kg)	70	default
AT	averaging time (yr)	70	default
EF	exposure frequency (days/year)	250	default
ED	exposure duration (yr)	30	default
IR _a	daily indoor inhalation rate (m ³ /day)	20	default
IR _w	daily water ingestion rate (L/day)	1	default
K	Volatilization factor	0.5	default

$$C = \frac{TR \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(SF_i \times K \times IR_a) + (SF_o \times IR_w)]}$$

Chemical	Cw	SF _i	SF _o	TR
Arsenic, Inorganic	1.57E-04	1.51E+01	1.50E+00	1.00E-05
Barium	NA	1.00E+00	1.00E+00	NA
Lead	NA	1.00E+00	1.00E+00	NA

RRS Table 34
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

RAGS Equation 2

Comercial/Industrial - Non-carcinogenic Effects

C	chemical concentration in water (mg/L)		calculated
THI	Target Health Index	1	default
RfD _i	inhalation chronic reference dose ((mg/kg-day) ⁻¹)		chemical specific
RfD _o	oral chronic reference dose ((mg/kg-day) ⁻¹)		chemical specific
BW	adult body weight (Kg)	70	default
AT	averaging time (yr)	30	default
EF	exposure frequency (days/year)	250	default
ED	exposure duration (yr)	30	default
IR _a	daily indoor inhalation rate (m ³ /day)	20	default
IR _w	daily water ingestion rate (L/day)	1	default
K	Volatilization factor	0.5	default

$$C = \frac{THI \times BW \times AT \times 365 \text{ days/year}}{EF \times ED \times [(1/RfD_i \times K \times IR_a) + (1/RfD_o \times IR_w)]}$$

Chemical	Cw	RfDi	RfDo
Arsenic, Inorganic	4.37E-05	4.29E-06	3.00E-04
Barium	1.46E-03	1.43E-04	2.00E-01
Lead	NA	1.00E+00	1.00E+00

RRS Table 35
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Default Type 4
Soil Screening Level

$$SSL=Cw * Daf * [Kd + (Qw + Qa * H')/Rb]$$

Where:

Soil screening level	mg/Kg	SSL	Calculated
Dilution Factor	dimensionless	Daf	1470 Site Specific
Target soil lechate concentration	mg/L	Cw	Chemical specific
soil water partition coefficient	L/Kg	Kd	Calculated (Koc x foc)
Fraction of organic carbon	g/g	foc	0.002 Default
organic carbon partition coefficient	L/Kg	Koc	Chemical specific
Water filled soil porosity	Lw/Ls	Qw	0.3 Default
Air filled soil porosity	La/Ls	Qa	0.13396 Default
Henry's Law constant	dimensionless	H'	Chemical specific
soil bulk density	Kg/L	Rb	1.5 Default

CAS	Compound	SSL	Cw	Kd	Koc	H'
7440-38-2	Arsenic, Inorganic	2.15E+03	0.0500	2.90E+01	0.00E+00	0.00E+00
7440-39-3	Barium	1.21E+05	2.0000	4.10E+01	0.00E+00	0.00E+00
7439-92-1	Lead	1.59E+03	0.0012	9.00E+02	0.00E+00	0.00E+00

RRS Table 36
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

Adult Lead Model

Equation 1

$$PbB = PbB_{fetal,0.95} / R^*GSD^{1.645}$$

Equation 2

$$Cs = (PbB - PbB_0) * AT_{S,D} / (BKSF * (IR_S * AF_{S,D} * EF_{S,D}))$$

Where:

PbB _{fetal, 0.95}	95 th percentile PbB in fetus	µg/dL	5
R _{fetal/maternal}	Fetal/maternal PbB ratio		0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD _i	Geometric standard deviation PbB		1.8
PbB ₀	Baseline PbB	µg/dL	0.6
IR _S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.05
AF _{S, D}	Absorption fraction (same for soil and dust)		0.12
EF _{S, D}	Exposure frequency (same for soil and dust)	days/year	219
AT _{S, D}	Averaging time (same for soil and dust)	days/year	365
C _s	Soil Lead Target Concentration where PbB _t = 5 µg/dL	mg/kg	1050.373

RRS Table 37
Bright Hour Trust
340 Armour Drive
Atlanta, Fulton County, Georgia
SEA Job #152-079
HSI# 10894

95% UCL Calculations

Location	Type	Depth (ft)	Arsenic	Barium	Lead
HA-1	XRF	0-0.5	97		1139
	soil		98.5	827	961
HA-1	XRF	1'-2'	55		392
HA-2	XRF	0-0.5	11		89
	soil		8	172	61.1
HA-2	XRF	1'-2'	19		116
	soil		12.4	213	78.1
HA-3	XRF	1'-2'	141		1332
HA-3	XRF	0-0.5	95		832
	soil		94.4	1040	699
HA-4	XRF	0-0.5	209		1421
	soil		170	1210	1080
HA-4	XRF	1'-2'	160		458
HA-5	XRF	0-0.5	15		118
	soil		13.2	241	84.2
HA-5	XRF	1'-2'	35		492
	soil		41.5	393	378
HA-6	XRF	0-0.5	18		441
	soil		26.8	1130	418
HA-7	XRF	0-0.5	31		819
HA-7	XRF		417		934
HA-8	XRF	0-0.5	<7		37
	soil		<4.05	126	23.1
HA-9	XRF	0-0.5	<7		48
HA-10	XRF	0-0.5	17		95
	soil		9.76	243	67.4
HA-11	XRF	0-0.5	21		383
	soil		21.4	721	274
HA-17	soil	0-2	7.85	202	121
HA-18	soil	0-2	54.3	1990	393
HA-19	soil	0-2	60.7	818	470
HA-20	soil	0-2	23.1	288	135
HA-21	soil	0-2	46.2	461	387
HA-22	soil	0-2	382	1000	640
HA-23	soil	0-2	811	1060	1000
HA-24	soil	0-2	100	908	1790
HA-25	soil	0-2	372	1170	1490
HA-26	soil	0-2	95.1	878	862
Average			100.1911	718.619	540.9974
Std. Dev			158.4087	506.0015	474.4001
Sample Size			38	21	38
Confidence Coeff.			1.96	1.96	1.96
Margin of Error			50.36669	216.4204	150.8374
95% UCL			150.5577	935.0395	691.8348

Note: The reporting limit value was used in the calculation of the average for results below the reporting limit
Only samples within the top 2 feet were used in the calculations

APPENDIX 6
SUMMARY OF ACTIVITIES AND PROFESSIONAL HOURS

**Bright Hour Trust Property
340 Armour Drive
Atlanta, Fulton County, Georgia 30324
SEA Job #152-079
HSI# 10894**

**Summary of Activities and Professional Hours
Semi-Annual Progress Report - November 2018**

Activity	Professional Hours
Site Visits	5
RRS Calculations	42
Semi-Annual Report Preparation	10