



City Of New London

Department of Finance-Purchasing Agent
13 Masonic Street • New London, CT 06320 • Phone (860) 447-5215 • Fax (860) 447-5297

Request for Proposals

ADDENDUM 2

Proposal No.:2023-13 CONL

Addendum No.: 2

Date Issued: May 15, 2023

Environmental Services for 43 Hempstead Street

Opening Date and Time: May 19, 2023 at 2:00 P.M.

Bidders Notes: This addendum is issued to provide all potential bidders with answers to questions submitted.

All other terms and conditions remain the same.

This Addendum cover page must be signed and returned with your bid.

Authorized Signature of Bidder

Company Name

Return Bid To:

Joshua Montague, Accounting Purchasing Agent
City of New London
13 Masonic Street
New London, CT 06320

Bids cannot be accepted after the Bid Opening Date and Time indicated above.

ADDENDUM 2

Environmental Services for 43 Hempstead Street

FROM: Joshua Montague, Accounting Purchasing Agent
TO: Prospective bidders

This Addendum shall be part of the Contract Documents and modifies the original bidding documents. This Addendum is to be acknowledged by the bidders on the Bid Form. Failure to do so may subject the bidder to disqualification.

Changes to prior Addenda:

- No prior addenda have been issued

Q&A:

Q1. The statement of bidder's qualifications requires information regarding our major equipment, credit information, and bank references. Can you please confirm that these are all required as part of this submittal?

A1. Questions #12, 15, 16, 17, and 18 are not necessary to be completed for this project. Please just leave blank or write "N/A per addendum #1".

Q2. Is a bid bond required?

A2. No.

Q3. Related to the proposal submission requirements of one hard copy and one digital USB copy, please advise if the hard copy requires wet signatures.

A3. Wet signatures are not necessary.

Q4. We understand that the Site will require entry into Connecticut's Voluntary Remediation Program under Section 22a-133x as a condition of the EPA cleanup grant. For this RFP, does Item 7) Provide required permits, EPA and DEEP reporting include completion of CTDEEP forms and technical reports required for formal LEP verification including an Environmental Condition Assessment (ECAAF) form, a Completion of Investigation transmittal form, a Final Site Investigation Report, LEP verification forms, Additional Polluting Substance (APS) requests and a Final Site Verification Report as required under Section 22a-133x?

A4. Yes, all required reporting should be included in bid.

Q5. Are there any existing redevelopment plans with details regarding future landscaped areas, paved areas, potential buildings, etc. that have been drafted for the site/project?

A5. No

Q6. Are copies of the historic Delta Environmental Services, Inc. reports available for review?

A6. Yes, attached

Q7. Should bidders include costs to complete an A2/T2 property survey, which will be needed to support bid documents and the planned environmental use restrictions for the property, or will said survey mapping be provided outside of this scope of work?

A7. Yes, please include the A2/T2 survey in the bid

Q8. Please confirm if this site has or will be required to enter one of CT DEEP's formal remediation programs. Also, if it is entering one of the Voluntary Remediation Programs, please confirm which one (e.g., the "x" program or the "y" program).

A8. This site has not been entered into the voluntary remediation program. Please include the work and any associated costs with entering the "X" remediation program as part of the bid.

Q9. Will a Quality Assurance Project Plan (QAPP) be required for this project?

A9. Yes, a QAPP is required.

2023-13

Q10. Should bidders include a cost for assisting with the public notice of remediation?

A10. Yes, please include any costs associated with the public notice requirements.

Q11. Will there be any local/municipal reviews/approvals that should be considered in the proposal?

A11. No additional local or municipal reviews or approvals will be necessary.

Q12. Should bidders include longer-term environmental tasks that may be needed for the project such as seasonal compliance groundwater monitoring, annual EUR inspections, abandonment of groundwater monitoring wells, LEP verification?

A12. Since the contracted LEP will enter the "X" voluntary remediation program please include four quarters of seasonal groundwater compliance monitoring in the base bid. Annual EUR inspections shall be the city/ owner responsibility and the 5th year state required LEP inspection will be contracted out separately by the city as needed. Please include LEP verification at appropriate time after clean up and any included monitoring/ inspections.

Q13. Is the City open to the use of any engineered controls (ECs) to render materials environmentally isolated or inaccessible?

A13. Yes, the city is open to the use of engineered controls

Q14. The scope includes remediation oversight, which would typically include collection of soil samples to confirm the limits of the remedial excavations. Will the City select and retain the services of the analytical laboratory, or should the environmental consultants incorporate the laboratory analytical costs in this proposal?

A14. The contracted LEP should include all costs associated with soil samples and any lab fees in the bid.

Q15. Does the City intend to have the selected firm submit a Final LEP Verification report to DEEP upon completion of all remedial activities and favorable results?

A15. Yes, please include the LEP verification after completion of remedial activities and monitoring inspections required in "X" voluntary remediation program.

Q16. Should the cost for fees associated with any permit applications or other forms be included in the proposal, or would the City pay those fees directly to the appropriate entity?

A16. All associated fees should be included in bid.

General Items:

- N/A

2.1 Occupancy History of Site

The following occupancy history of the Site was prepared through review of City of New London Directories, Sanborn Fire Insurance Maps and municipal records:

<u>Occupant</u>	<u>Period of Occupation (approximate)</u>
Pequot Preserving Company (canning factory)	1884
Vacant	1891 - 1901
Contractor's stable and yard	1907
New London Wash Silk Company	1910 - 1917
HKH Silk Company of New York	1918 - 1922
Troy Laundry	1926 - 1962
Kaybrook Manufacturing Company (pajama manufacturers)	1930 - 1933
Model Laundry	1935 - 1946
CTM Laundries	1935 - 1946
Carroll Quality Laundry	1935 - 1946
Gottesdiener Dress Manufacturers	1937 - 1943
Talent Toy and Woodworking Company	1946 - 1947
Smalley Products Company (storm and screen windows)	1946
New London Insulation Company	1946
Lord's Laundry	1947 - 1951
Paramount Robes, Inc. (clothing manufacturers)	1948 - 1956
Crescent Communications	1957 - 1988
Alpha Instrument Company	1983 - 1988
New London Instrument Company	1977 - 1988
Vacant	1988 - present



PHASE II
ENVIRONMENTAL SITE ASSESSMENT

**43 Hempstead Street
New London, Connecticut**

PREPARED FOR:

**Rev. Dr. Benjamin K. Watts
Shiloh Baptist Church
One Garvin Street
New London, CT 06320**

DELTA NUMBER: D97-275-12

REPORT DATE: October 10, 2000



**DELTA
ENVIRONMENTAL
SERVICES[®], INC.**

**81 Schoolground Road
P.O. Box 564, Branford, CT
(203) 481-7668**

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- APPENDIX B - Geoprobe Soil Sampling Logs
- APPENDIX C - Analytical Results/Chain of Custody Forms
- APPENDIX D - Site Plan



EXECUTIVE SUMMARY

DELTA Environmental Services, Inc.'s (DELTA's) Phase II Environmental Site Assessment of the property located at 43 Hempstead Street in the City of New London, Connecticut (the Site) was designed to gather the information required to develop an informed opinion of environmental conditions at the Site. DELTA's investigation consisted of Geoprobe soil sampling. Soil samples were analyzed for petroleum constituents, volatile organic compounds and heavy metals. DELTA's findings are summarized below.

Low to moderate levels of lead were detected in soil samples, though the levels did not exceed criteria in the Connecticut Remediation Standard Regulations. The concentrations of lead were 490 ppm in a 0-4 foot depth sample from B-3 and 200 ppm in a 0-4 foot depth sample from B-5. The results were below the 500 ppm residential direct exposure criterion and the 1000 ppm industrial/commercial direct exposure criterion.

The concentrations of arsenic were 11 ppm in a 0-4 foot depth sample from B-3 and 6.6 ppm in a 0-4 foot depth sample from B-5. The residential and industrial/commercial direct exposure criteria have both been established at 10 ppm, so that the level in B-3 slightly exceeds the standard. If the property is paved as proposed, the soil at B-3 would not require remediation if it meets the definition of "inaccessible soil" in DEP's Remediation Standard Regulations. The definition of inaccessible soil includes soil "more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement".

Soil sample analysis did not find detectable concentrations of volatile organic compounds or extractable total petroleum hydrocarbons. Analysis for leachable metals did not find levels requiring remediation under the Remediation Standard Regulations.

Based on available information, the Site is not defined as an "establishment" pursuant to Connecticut Public Act 97-218, the "Transfer Act". A filing with the State is therefore not required in conjunction with sale or transfer of the property.



INTRODUCTION

This report summarizes the findings of a Phase II environmental assessment of the property located at 43 Hempstead Street in the City of New London, New London County, Connecticut (the Site) conducted by DELTA Environmental Services, Inc. in August and September 2000. This work was conducted pursuant to Connecticut Public Act 95-183 regulating the transfer of a hazardous waste establishment, and Sections 22a-133k-1 through 22a-133k-3, the Remediation Standard Regulations. The investigation is in conformance with the recommended evaluation criteria outlined in the Connecticut Department of Environmental Protection (DEP) "Transfer Act Site Assessment Guidance Document," dated November 1991.

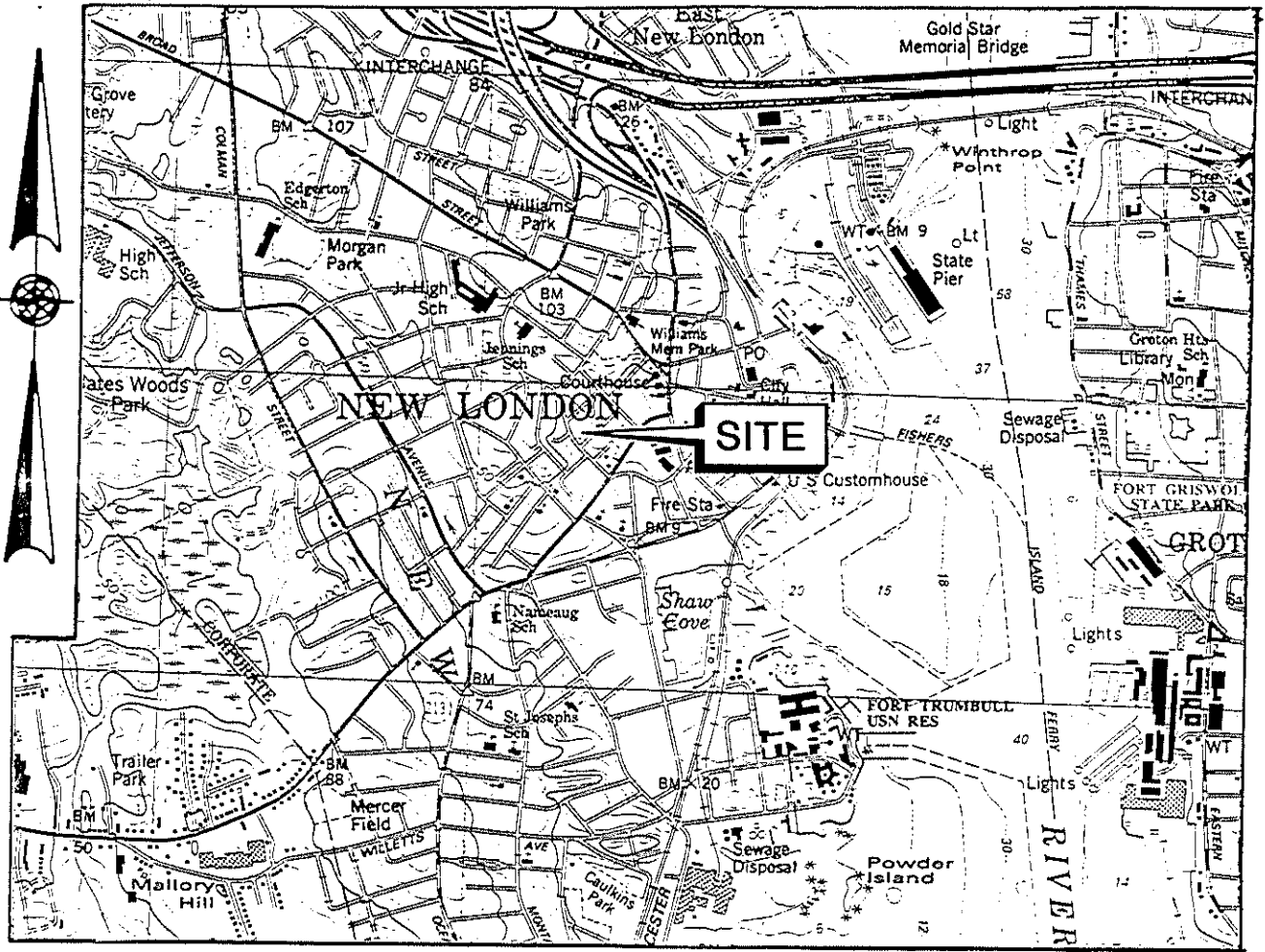
DELTA's findings are based on completion of a soil and groundwater sampling program. Select soil and groundwater samples were laboratory analyzed to screen for environmental contamination. The investigation was conducted on behalf of Shiloh Baptist Church solely for the purposes of an environmental evaluation of the Site.

The objective of Phase II was to determine if a hazardous materials release has occurred, through on-site environmental sampling and laboratory analysis. Generally, if contamination requiring further investigation and/or remedial action is identified in Phase II, a Phase III investigation designed to define the degree, extent, and rate of migration of any on-site release should be executed.

SITE DESCRIPTION/SUMMARY OF PREVIOUS INVESTIGATION

The Site consists of 0.6± acres (according to Tax Assessor's records) and is currently a vacant lot. Based on DELTA's August 2000 site visit, there is no direct visual evidence of storage of hazardous materials or sources of soil or groundwater contamination at the Site. The municipal water supply and public sanitary sewers are available to the Site.





U.S. Geological Survey
 SCALE 1:24000
 CONTOUR INTERVAL 10 FEET
 NATIONAL GEODETIC VERTICAL
 DATUM OF 1929

NEW LONDON QUADRANGLE
 CONNECTICUT-NEW YORK
 7.5 MINUTE SERIES (TOPOGRAPHIC)



FIGURE 1: LOCATION MAP
 43 Hempstead Street
 New London, Connecticut
 DELTA #D94-275-10



DELTA Environmental Services, Inc.

DELTA previously performed an inspection of the property in November 1997. At the time of the 1997 inspection, two vacant industrial buildings were present on-site. Based on City Directory review, the buildings were last occupied by Crescent Communications Corporation (until 1988). New London Wash Silk Company and HKH Silk Company of New York occupied the Site from 1910-1922. Commercial laundries under various owners occupied the Site from 1926 to 1962.

During the 1997 inspection, DELTA noted storage of containers of paints, lacquer thinner, oil, metal cleaning chemicals, and welding compound in the former site buildings. These materials have all been removed and disposed of.

SUBSURFACE INVESTIGATION

On August 8, 2000, Glacier Drilling, of Meriden, Connecticut, used a Geoprobe sampling rig to investigate eight locations at the Site. The sampling was performed under the supervision of DELTA. Geoprobe soil sampling logs are included in Appendix B. The sampling locations are depicted on the Site Plan in Appendix D.

Sampling was performed using a hydraulic "direct push" method. Soil samples were collected in dedicated four foot plastic sleeves. Samples were collected continuously from the test borings, at 0-4 foot and 4-8 foot intervals.

Stratigraphic zones encountered at the Site generally consisted of: fine to coarse sandy fill including cinders and brick fragments to 4-6 feet; and native soils consisting of organic silt and fine sand to 8 feet. Groundwater was encountered at depths ranging from 4 to 6 feet.

DELTA performed headspace screening of soil samples at room temperature using a Thermo Electron Model 580B photoionization detector (PID), capable of detecting both organic and inorganic vapors. The PID used has a vapor detection limit of 0.1 parts per million (ppm) based on a benzene standard. None of the soil samples yielded detectable levels of organic vapors.



CONCLUSIONS AND RECOMMENDATIONS

DELTA Environmental Services, Inc.'s (DELTA's) Phase II Environmental Site Assessment of the property located at 43 Hempstead Street in the City of New London, Connecticut (the Site) was designed to gather the information required to develop an informed opinion of environmental conditions at the Site. DELTA's investigation consisted of Geoprobe soil sampling. Soil samples were analyzed for petroleum constituents, volatile organic compounds and heavy metals. DELTA's findings are summarized below.

Low to moderate levels of lead were detected in soil samples, though the levels did not exceed criteria in the Connecticut Remediation Standard Regulations. The concentrations of lead were 490 ppm in a 0-4 foot depth sample from B-3 and 200 ppm in a 0-4 foot depth sample from B-5. The results were below the 500 ppm residential direct exposure criterion and the 1000 ppm industrial/commercial direct exposure criterion.

The concentrations of arsenic were 11 ppm in a 0-4 foot depth sample from B-3 and 6.6 ppm in a 0-4 foot depth sample from B-5. The residential and industrial/commercial direct exposure criteria have both been established at 10 ppm, so that the level in B-3 slightly exceeds the standard. If the property is paved as proposed, the soil at B-3 would not require remediation if it meets the definition of "inaccessible soil" in DEP's Remediation Standard Regulations. The definition of inaccessible soil includes soil "more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement".

Soil sample analysis did not find detectable concentrations of volatile organic compounds or extractable total petroleum hydrocarbons. Analysis for leachable metals did not find levels requiring remediation under the Remediation Standard Regulations.

Based on available information, the Site is not defined as an "establishment" pursuant to Connecticut Public Act 97-218, the "Transfer Act". A filing with the State is therefore not required in conjunction with sale or transfer of the property.



SUPPLEMENTAL SUBSURFACE INVESTIGATION

**43 Hempstead Street
New London, Connecticut**

PREPARED FOR:

**Shiloh Development Corporation
Three Garvin Street
New London, CT 06320**

DELTA NUMBER: D97-275-13

REPORT DATE: June 22, 2001



**DELTA
ENVIRONMENTAL
SERVICES[®], INC.**

**81 Schoolground Road
P.O. Box 564, Branford, CT
(203) 481-7668**

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- APPENDIX A - Limitations
- APPENDIX B - Test Boring Logs/Monitoring Well Detail Sheets
- APPENDIX C - Analytical Results/Chain of Custody Forms
- APPENDIX D - Site Plan



1.0 INTRODUCTION

This report summarizes the findings of a supplemental subsurface investigation of the property located at 43 Hempstead Street in the City of New London, New London County, Connecticut (the Site) conducted by DELTA Environmental Services, Inc. in May and June 2001. This work was conducted pursuant to Connecticut Public Act 97-218 regulating the transfer of a hazardous waste establishment, and Connecticut General Statutes Sections 22a-133k-1 through 22a-133k-3, the Remediation Standard Regulations. The investigation is in conformance with the recommended evaluation criteria outlined in the Connecticut Department of Environmental Protection (DEP) "Transfer Act Site Assessment Guidance Document," dated November 1991.

DELTA's findings are based on completion of a soil and groundwater sampling program. Select soil and groundwater samples were laboratory analyzed to screen for environmental contamination. The investigation was conducted on behalf of Shiloh Development Corporation solely for the purposes of an environmental evaluation of the Site.

The objective of Phase II was to determine if a hazardous materials release has occurred, through on-site environmental sampling and laboratory analysis. Generally, if contamination requiring further investigation and/or remedial action is identified in Phase II, a Phase III investigation designed to define the degree, extent, and rate of migration of any on-site release should be executed.

2.0 SITE DESCRIPTION/SUMMARY OF PREVIOUS INVESTIGATION

The Site consists of 0.6± acres (according to Tax Assessor's records) and is currently a vacant lot. Based on DELTA's May 2001 site visits, there is no direct visual evidence of storage of hazardous materials or ongoing sources of soil or groundwater contamination at the Site. The municipal water supply and public sanitary sewers are available to the Site.

DELTA previously performed an inspection of the property in November 1997. At the time of the 1997 inspection, two vacant industrial buildings were present on-site. Based on City Directory review, the buildings were last occupied by Crescent Communications Corporation (until 1988). New London Wash Silk Company and HKH Silk Company of New York occupied the Site from 1910-1922. Commercial laundries under various owners occupied the Site from 1926 to 1962.

During the 1997 inspection, DELTA noted storage of containers of paints, lacquer thinner, oil, metal cleaning chemicals, and welding compound in the former site buildings. These materials have all been removed and disposed of.



3.0 SUBSURFACE INVESTIGATION

On May 9, 2001, Glacier Drilling, of Meriden, Connecticut, drilled five test borings and installed three groundwater monitoring wells at the Site under the supervision of DELTA. Test boring logs and well installation details are included in Appendix B. The test borings were drilled in order to supplement data from a geoprobe soil sampling investigation conducted by DELTA in August 2000. The geoprobe locations are identified as B-1 through B-8 on the Site Plan in Appendix D. The recent test boring locations are identified as B-9 through B-13. The monitoring wells are identified as MW-1 through MW-3.

The test borings were drilled using 4.25 inch outside diameter hollow stem augers. A split spoon was used to obtain soil samples either continuously or at five foot intervals during drilling.

Wells were constructed in accordance with DEP protocol outlined in the document Monitoring Well Guidelines (1990). Wells were constructed using polyvinyl chloride (PVC) screen sections. A silica sand pack was placed around the screen to limit the entry of fine sediments into the wells. An impermeable bentonite clay seal was placed above the screen section to prevent surface water from entering the wells. Wells were completed at grade with curb boxes cemented in place. The well pipes were sealed with locking expansion caps.

Stratigraphic zones encountered at the Site generally consisted of: fine to coarse sandy fill including coal ash, iron slag, cinders and brick fragments to 3-6 feet; and native soils consisting of organic silt and fine to medium sand to the maximum drilling depth of 12 feet. Groundwater was encountered at depths ranging from 5 to 7 feet below grade.

In order to screen the soil samples for volatile organic compounds, DELTA performed headspace screening at room temperature using a Thermo Electron Model 580B photoionization detector (PID), capable of detecting both organic and inorganic vapors. The PID used has a vapor detection limit of 0.1 parts per million (ppm) based on a benzene standard. None of the soil samples yielded detectable levels of organic vapors above a background concentration.

4.0 SOIL AND GROUNDWATER SAMPLE COLLECTION

Soil samples for laboratory analysis were collected in general accordance with approved DEP sampling protocol. During drilling operations, soil samples were collected directly from the split spoon using a stainless steel spatula.

Between samples the split spoon was washed with a laboratory detergent solution and the spatula with distilled water to prevent cross-contamination of the soil samples. A clean spatula was used to pack the soils into 40 milliliter glass vials and 100 milliliter glass jars.



Each filled container was immediately sealed and placed in a chilled cooler to maintain sample integrity.

The monitoring wells were sampled by DELTA on May 18, 2001. Wells were sampled using dedicated, disposable polyethylene bailers. Prior to sampling, wells were purged by removing three times the volume of standing water in accordance with DEP protocol.

Sample containers were handled under strict chain of custody procedures, maintained in a cool environment, and promptly delivered to the analytical laboratory.

5.0 LABORATORY ANALYSIS

In developing an analytical program to evaluate the condition of soil and groundwater at the Site, the contaminants of concern were volatile organics, petroleum hydrocarbons and metals. Samples were analyzed in accordance with the test procedures discussed below.

- **Volatile Organics, Method 8021B:** As described in EPA Manual SW-846, this gas chromatography analysis is specific for over fifty constituents and will provide general indications of petroleum products and industrial solvents.
- **Total Metals (Arsenic and Lead):** The total concentrations of the metals arsenic and lead regulated by the Resource Conservation and Recovery Act (RCRA) are determined by atomic absorption spectrophotometry.
- **Arsenic by SPLP:** This analytical method provides the leachable concentration of arsenic. The Synthetic Precipitation Leaching Procedure (SPLP) used in the analysis is designed to simulate acid rainfall conditions.

Soil samples were analyzed by Complete Environmental Testing, Inc., Stratford, Connecticut, an independent state-certified analytical laboratory. Results of the laboratory analyses are contained in Appendix C.

6.0 INTERPRETATION OF DATA

In evaluating the analytical results, three factors must be considered: (1) DEP policy regarding the removal and disposal of contaminated soils; (2) DEP policy regarding groundwater remediation; and (3) the classification of groundwater at the Site.

Because contaminants present in the soil can migrate into groundwater, contaminated soil is considered to be a source of potential groundwater contamination. The DEP's purpose in requiring soil removal is to safeguard human health and the environment by removing and thereby eliminating potential sources of pollution.



**TABLE 1: SOIL SAMPLING RESULTS
TOTAL ARSENIC
43 HEMPSTEAD STREET
NEW LONDON, CONNECTICUT**

BORING No.	SAMPLING DEPTH (Feet)	TOTAL ARSENIC (ppm)	REGULATORY STANDARD (ppm)
MW-1	0 - 2	4.4	10*
MW-1	4 - 6	Not Detected (< 2.0)	
MW-2	0 - 2	7.7	
MW-2	4 - 6	3.9	
B-3	0 - 4	11	
B-5	0 - 4	6.6	
B-9	0 - 2	24	
B-9	2 - 4	3.2	
B-10	0 - 2	18	
B-10	2 - 4	12	
B-11	2 - 4	3.7	
B-12	0 - 2	38	
B-13	0 - 2	8.4	

* DEP "Direct Exposure Criterion" for Residential and Industrial/Commercial Zones. Results exceeding the standard are shown in bold type.



**TABLE 2 : SOIL SAMPLING RESULTS
TOTAL LEAD
43 HEMPSTEAD STREET
NEW LONDON, CONNECTICUT**

BORING No.	SAMPLING DEPTH (Feet)	TOTAL LEAD (ppm)	REGULATORY STANDARD (ppm)
MW-1	0 - 2	230	500*
MW-1	4 - 6	57	
MW-2	0 - 2	93	
MW-2	4 - 6	100	
B-3	0 - 4	490	
B-5	0 - 4	200	
B-9	0 - 2	89	
B-9	2 - 4	51	
B-10	0 - 2	87	
B-10	2 - 4	390	
B-11	2 - 4	150	
B-12	0 - 2	59	
B-13	0 - 2	150	

* DEP "Direct Exposure Criterion" for Residential Zones.



Groundwater in the vicinity of the Site is classified GB by the DEP, which signifies groundwater in "a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts" (Water Quality Standards, DEP, April 1996). Given the GB groundwater classification, DEP criteria for remediation of contamination is less stringent than in a drinking water (GAA or GA) zone.

DEP's policy regarding remediation of contaminated sites is outlined in the Remediation Standard Regulations (C.G.S. Section 22a-133K-1 through 22a-133k-3). The DEP regulations establish two sets of standards for soil remediation: (1) standards designed to protect humans against the incidental ingestion of and dermal exposure to pollutants in soil ("direct exposure criteria"); and 2) standards designed to prevent degradation of groundwater quality due to migration of pollutants from soil to groundwater ("pollutant mobility criteria"). DELTA's findings for the previous and supplemental investigation are summarized below.

6.1 Results of August 2000 Investigation

During DELTA's August 2000 investigation, analysis of soil samples for volatile organic compounds and extractable total petroleum hydrocarbons (ETPH) did not detect those constituents.

Analysis of soil samples for SPLP metals found leachable lead in samples collected at a 0-4 foot depth from locations B-4 and B-5. The results (0.072 and 0.018 ppm at locations B-4 and B-5 respectively) are well below the pollutant mobility criterion of 0.15 ppm for GB groundwater classification zones. Leachable barium was detected in samples collected at a 0-4 foot depth from B-3, B-4, B-5 and B-8. The results (ranging from 0.38 to 0.70 ppm) are well below the DEP's pollutant mobility criterion of 10.0 ppm for GB groundwater classification zones.

Analysis of soil samples for total RCRA metals detected lead, selenium, cadmium, chromium, arsenic and barium. Detected concentrations of selenium, cadmium, chromium and barium are well below DEP's direct exposure criteria for both residential and industrial/commercial areas. The concentrations of lead were 490 ppm in a 0-4 foot depth sample from B-3 and 200 ppm in a 0-4 foot depth sample from B-5. The results were below the 500 ppm residential direct exposure criterion and the 1000 ppm industrial/commercial direct exposure criterion. The concentrations of arsenic were 11 ppm in a 0-4 foot depth sample from B-3 and 6.6 ppm in a 0-4 foot depth sample from B-5. The residential and industrial/commercial direct exposure criteria have both been established at 10 ppm, so that the level in B-3 slightly exceeded the standard.



6.2 Results of May 2001 Investigation

The recent investigation included analysis of additional soil samples to supplement the data obtained during the August 2000 investigation. Given the previous results, the specific concerns were total lead and arsenic in soil.

During the recent investigation, a total of eleven soil samples were analyzed for lead and arsenic. The results are provided in Tables 1 and 2. Lead was found at levels ranging from 51 to 390 parts per million (ppm) below the direct exposure criterion of 500 ppm. Over the two investigations, a total of 13 soil samples have been analyzed for lead. All sample results are below the direct exposure standard. Based on the data and the DEP standards, the lead levels present do not appear to be of concern.

Four of eleven soil samples analyzed for arsenic during the recent investigation were found to exceed the 10 ppm direct exposure criterion. Results ranged from non detectable (less than 2.0 ppm) to 38 ppm. Including the results from the August 2000 investigation, five of thirteen samples contained more than 10 ppm of arsenic. The results exceeding the standard were: boring B-3, 0-4 foot sample (11 ppm); boring B-9, 0-2 foot sample (24 ppm); boring B-10, 0-2 and 2-4 foot samples (18 and 12 ppm, respectively); and boring B-12, 0-2 foot sample (38 ppm). As can be seen from the Site Plan in Appendix D, the affected area appears to be localized in the northeast portion of the property.

During the recent and previous investigations, soil samples were also analyzed for SPLP arsenic, to determine the likelihood of arsenic leaching from soil into groundwater. The following samples were analyzed for SPLP arsenic: B-3, 0-4 foot sample; B-4, 0-4 foot sample; B-5, 0-4 foot sample; B-8, 0-4 foot sample; and B-9, 0-2 foot sample. None of the samples contained detectable levels of SPLP arsenic (using a detection limit of 0.05 ppm). The results indicate that the elevated levels of arsenic detected in site soils are not likely to leach into groundwater. The SPLP tests indicate that the DEP pollutant mobility criteria are not exceeded for arsenic (or other metals) at the Site.

Sampling of three groundwater monitoring wells installed at the Site did not find detectable concentrations of volatile organic compounds (VOC's). The VOC's tested for include constituents of typical petroleum products such as gasoline and fuel oil, as well as common chlorinated industrial solvents.



6.3 Remedial Options

Analysis of soil samples collected at the Site identified elevated levels of arsenic. The levels detected exceed the "direct exposure" standard established by DEP at 10 ppm of arsenic. The DEP standard is designed to protect human health against potential exposure to arsenic (e.g. via skin contact with the soil, or by incidental ingestion by children, etc.). The data clearly indicate that the property is not acceptable for the proposed use (recreation area including basketball court and playground) in its current condition.

As discussed in Section 2 of this report, the property has a long history of industrial use, including textile manufacturers and commercial laundries. However, it does not appear likely that the arsenic detected in soil at the Site resulted from releases by the former industrial occupants. The most likely source of the arsenic appears to be the fill material present at the Site. A layer of fine to coarse sandy fill including coal ash, iron slag, cinders and brick fragments is present at a depth of 3-6 feet, above the native soils consisting of organic silt and fine to medium sand. It appears that the Site was once a low lying wet area which was likely filled in the late 1800's so that it could be developed. The fill material present at the Site contains a significant quantity of coal and coal ash. Arsenic is known to be a trace impurity in coal, and this appears to be the most likely source of the arsenic detected at the Site.

The two main methods of addressing contaminated soil are: (1) remediation, typically through excavation and disposal of the soil; or (2) "capping" the soil (covering it with a clean material such as pavement or uncontaminated fill).

Preliminary calculations indicate that the quantity of affected soil at the Site is at least 270 cubic yards. This estimate is based on excavation of an area approximately bounded by borings B-12 (north), B-9 (south), B-10 (east) and B-3 (west). The boring locations are shown on the Site Plan in Appendix D.

At a minimum, the dimensions of excavation would be approximately 60 feet (north-south) by 30 feet (east-west). Based on the soil sampling data, the minimum depth of excavation would be 4 feet, in order to remove all of the affected soil. The minimum volume of affected soil is then 7,200 cubic feet (60 X 30 X 4) or 270 cubic yards. This quantity is equivalent to approximately 350 tons of soil. Based on a typical unit price of \$200 per ton for soil excavation and disposal as non-hazardous waste, the minimum cost of remediation through soil excavation at the Site is estimated as \$70,000. It is emphasized that the actual quantity of affected soil may be significantly greater (the elevated arsenic levels may extend beyond the sampling locations noted above, soil excavation and disposal costs may be greater, etc.)



As outlined in the Remediation Standard Regulations (RSR's), an alternative to soil excavation is rendering the soil inaccessible by covering it with clean fill and/or pavement. The RSR's do not require remediation of inaccessible soil defined in Section 22a-133k-1 as soil "(1) more than four feet below the ground surface; (2) more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement; or (3) (A) beneath an existing building or (B) beneath another existing permanent structure provided written notice that such structure will be used to prevent human contact with such soil has been provided to the Commissioner." Section 22a-133k-2 (b) (3) of the RSR's states that remediation of soil exceeding the pollutant mobility criteria is not required if the soil is inaccessible as defined above and an environmental land use restriction is recorded for the property. The term "environmental land use restriction (ELUR)" is defined in Section 22a-133q-1 of the RSR's.

An ELUR is a statement recorded on the City Land Records which "ensures that . . . soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition (CGS Section 22a-133k-2 (b) (3))." Prior to recording an ELUR, it must be submitted to the DEP Commissioner for review and approval, along with supporting documentation.

The most likely application of an ELUR at the Site would involve the placement of clean fill material and pavement over the soil area containing elevated arsenic levels in order to isolate the soil as required by the DEP RSR's. Given the sensitive nature of the proposed use of the Site, it is DELTA's recommendation that the remedial options be discussed with DEP officials prior taking any specific course of action.

7.0 CONCLUSIONS AND RECOMMENDATIONS

DELTA Environmental Services, Inc.'s (DELTA's) supplemental subsurface investigation of the property located at 43 Hempstead Street in the City of New London, Connecticut (the Site) was designed to gather the information required to develop an informed opinion of environmental conditions at the Site. DELTA's investigation consisted of the drilling of test borings and installation of groundwater monitoring wells. Soil and groundwater samples were collected and submitted for laboratory analysis. The purpose of the investigation was to supplement the available data obtained through a geoprobe soil sampling program performed in August 2000. DELTA's findings are summarized below.



DEP's policy regarding remediation of contaminated sites is outlined in the Remediation Standard Regulations (C.G.S. Section 22a-133K-1 through 22a-133k-3). The DEP regulations establish two sets of standards for soil remediation: (1) standards designed to protect humans against the incidental ingestion of and dermal exposure to pollutants in soil ("direct exposure criteria"); and 2) standards designed to prevent degradation of groundwater quality due to migration of pollutants from soil to groundwater ("pollutant mobility criteria").

Four of eleven soil samples analyzed for arsenic during the recent investigation were found to exceed the 10 ppm direct exposure criterion. Results ranged from non detectable (less than 2.0 ppm) to 38 ppm. Including the results from the August 2000 investigation, five of thirteen samples contained more than 10 ppm of arsenic. Based on the data, the affected area appears to be localized in the northeast portion of the property.

The data clearly indicate that the property is not acceptable for the proposed use (recreation area including basketball court and playground) in its current condition.

The property has a long history of industrial use, including textile manufacturers and commercial laundries. However, it does not appear likely that the arsenic detected in soil at the Site resulted from releases by the former industrial occupants. The most likely source of the arsenic appears to be the fill material present at the Site. A layer of fine to coarse sandy fill including coal ash, iron slag, cinders and brick fragments is present at a depth of 3-6 feet, above the native soils consisting of organic silt and fine to medium sand. It appears that the Site was once a low lying wet area which was likely filled in the late 1800's so that it could be developed. The fill material present at the Site contains a significant quantity of coal and coal ash. Arsenic is known to be a trace impurity in coal, and this appears to be the most likely source of the elevated levels of arsenic detected at the Site.

The two main methods of addressing contaminated soil are: (1) remediation, typically through excavation and disposal of the soil; or (2) "capping" the soil (covering it with a clean material such as pavement or uncontaminated fill).

As discussed in the report, it is estimated that the minimum volume of arsenic contaminated soil at the Site is 270 cubic yards or approximately 350 tons. The minimum cost of remediation through soil excavation at the Site is estimated as \$70,000. It is emphasized that the actual quantity of affected soil may be significantly greater.



An alternative to soil excavation outlined in the Connecticut Remediation Standard Regulations (RSR's) is rendering the soil inaccessible by covering it with clean fill and/or pavement. The RSR's do not require remediation of inaccessible soil defined in Section 22a-133k-1 as soil "(1) more than four feet below the ground surface; (2) more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement; or (3) (A) beneath an existing building or (B) beneath another existing permanent structure provided written notice that such structure will be used to prevent human contact with such soil has been provided to the Commissioner." Section 22a-133k-2 (b) (3) of the RSR's states that remediation of soil exceeding the pollutant mobility criteria is not required if the soil is inaccessible as defined above and an environmental land use restriction is recorded for the property. The term "environmental land use restriction (ELUR)" is defined in Section 22a-133q-1 of the RSR's.

An ELUR is a statement recorded on the City Land Records which "ensures that . . . soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition (CGS Section 22a-133k-2 (b) (3))." Prior to recording an ELUR, it must be submitted to the DEP Commissioner for review and approval, along with supporting documentation.

The most likely application of an ELUR at the Site would involve the placement of clean fill material and pavement over the soil area containing elevated arsenic levels in order to isolate the soil as required by the DEP RSR's. Given the sensitive nature of the proposed use of the Site, it is DELTA's recommendation that the remedial options be discussed with DEP officials prior taking any specific course of action.



- DRAFT -

REMEDIAL ACTION PLAN

**43 Hempstead Street
New London, Connecticut**

PREPARED FOR:

**Ms. Sylvia Hemphill
Executive Director
Shiloh Development Corporation
Three Garvin Street
New London, CT 06320**

DELTA NUMBER: D97-275-12

REPORT DATE: January 25, 2002



DELTA Environmental Services,® Inc.

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1.0 INTRODUCTION

This report outlines a remedial action plan for the property located at 43 Hempstead Street in the City of New London, New London County, Connecticut (the Site). This work was conducted pursuant to Connecticut General Statutes Section 22a-133y, the "Voluntary Remediation Program". The remedial action plan prepared by DELTA includes the following: summary of soil and groundwater sampling data from previous site investigations; discussion of proposed site uses; summary of the regulatory process; explanation of the options for achieving remediation of the site in compliance with the Remediation Standard Regulations; a detailed plan describing the necessary steps for implementation of each remedial option; and comparison of the feasibility and cost of the various options.

2.0 SITE DESCRIPTION/SUMMARY OF PREVIOUS INVESTIGATION

The Site consists of 0.6± acres (according to Tax Assessor's records) and is currently a vacant lot. The site is located in the eastern portion of New London, approximately 1,000 feet from the Thames River, as depicted in Figure 1. The municipal water supply and public sanitary sewers are available to the Site. Groundwater in the vicinity of the Site is classified GB by the DEP, which signifies groundwater in "a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts" (Water Quality Standards, DEP, April 1996). Given the GB groundwater classification, DEP criteria for remediation of contamination is less stringent than in a drinking water (GAA or GA) zone.

DEP's policy regarding remediation of contaminated sites is outlined in the Remediation Standard Regulations (C.G.S. Section 22a-133K-1 through 22a-133k-3). The DEP regulations establish two sets of standards for soil remediation: (1) standards designed to protect humans against the incidental ingestion of and dermal exposure to pollutants in soil ("direct exposure criteria"); and 2) standards designed to prevent degradation of groundwater quality due to migration of pollutants from soil to groundwater ("pollutant mobility criteria").

A discussion of the findings of previous environmental investigations performed at the Site follows.



November 1997 Investigation

DELTA performed an inspection of the property in November 1997. At that time, two vacant industrial buildings were present on-site. Based on City Directory review, the buildings were last occupied by Crescent Communications Corporation (until 1988). New London Wash Silk Company and HKH Silk Company of New York occupied the Site from 1910-1922. Commercial laundries under various owners occupied the Site from 1926 to 1962.

During the 1997 inspection, DELTA noted storage of containers of paints, lacquer thinner, oil, metal cleaning chemicals, and welding compound in the former site buildings. These materials have all been removed.

City Fire Marshal's records indicate that an 8000 gallon underground fuel oil tank was installed at the Site in 1957. During the 1997 investigation, a fill and vent pipe for the tank were noted adjacent to the boiler room in the northeast portion of the property. Soil sampling in the area performed during DELTA's 2000 and 2001 investigations indicate that the tank was removed, and found no indication of petroleum contamination in the area of the former tank. DELTA was unable to locate any record or documentation concerning removal of the tank.

August 2000 Investigation

On August 8, 2000, Glacier Drilling, of Meriden, Connecticut, used a Geoprobe sampling rig to investigate eight locations at the Site, designated as B-1 through B-8. The sampling was performed under the supervision of DELTA. Geoprobe soil sampling logs are included in Appendix B. The sampling locations are depicted on the Site Plan in Appendix D. Sampling was performed using a hydraulic "direct push" method. Soil samples were collected in dedicated four foot plastic sleeves. Samples were collected continuously from the test borings, at 0-4 foot and 4-8 foot intervals.

Analysis of soil samples for volatile organic compounds and extractable total petroleum hydrocarbons (ETPH) during DELTA's August 2000 investigation did not detect those constituents.

Analysis of soil samples for SPLP metals found leachable lead in samples collected at a 0-4 foot depth from locations B-4 and B-5. The results (0.072 and 0.018 ppm at locations B-4 and B-5 respectively) are well below the applicable cleanup criterion in the Remediation Standard Regulations (the pollutant mobility criterion of 0.15 ppm for GB groundwater classification zones). Leachable barium was detected in samples collected at a 0-4 foot depth from B-3, B-4, B-5 and B-8. The results (ranging from 0.38 to 0.70 ppm) are well below the DEP's pollutant mobility criterion of 10.0 ppm for GB groundwater classification zones.



Analysis of soil samples for total RCRA metals detected lead, selenium, cadmium, chromium, arsenic and barium. Detected concentrations of selenium, cadmium, chromium and barium are well below DEP's direct exposure criteria for both residential and industrial/commercial areas. The concentrations of lead were 490 ppm in a 0-4 foot depth sample from B-3 and 200 ppm in a 0-4 foot depth sample from B-5. The results were below the 500 ppm residential direct exposure criterion and the 1000 ppm industrial/commercial direct exposure criterion. The concentrations of arsenic were 11 ppm in a 0-4 foot depth sample from B-3 and 6.6 ppm in a 0-4 foot depth sample from B-5. The residential and industrial/commercial direct exposure criteria have both been established at 10 ppm, so that the level in B-3 slightly exceeded the standard.

May - June 2001 Investigation

On May 9, 2001, Glacier Drilling drilled five test borings and installed three groundwater monitoring wells at the Site under the supervision of DELTA. Test boring logs and well installation details are included in Appendix B. The test borings were drilled using 4.25 inch outside diameter hollow stem augers. A split spoon was used to obtain soil samples either continuously or at five foot intervals during drilling.

Wells were constructed in accordance with DEP protocol outlined in the document Monitoring Well Guidelines (1990). Wells were constructed using polyvinyl chloride (PVC) screen sections. A silica sand pack was placed around the screen to limit the entry of fine sediments into the wells. An impermeable bentonite clay seal was placed above the screen section to prevent surface water from entering the wells. Wells were completed at grade with curb boxes cemented in place. The well pipes were sealed with locking expansion caps.

The test boring locations are identified as B-9 through B-13 on the Site Plan in Appendix D. The monitoring wells are identified as MW-1 through MW-3.

During the 2001 investigation, a total of eleven soil samples were analyzed for total lead and total arsenic. Lead was found at levels ranging from 51 to 390 parts per million (ppm), below the direct exposure criterion of 500 ppm. Over the two investigations, a total of 13 soil samples were analyzed for lead. All sample results are below the direct exposure standard. Based on the data and the DEP standards, the lead levels present do not appear to be of concern.



Four of eleven soil samples analyzed for arsenic during the 2001 investigation were found to exceed the 10 ppm direct exposure criterion. Results ranged from non detectable (less than 2.0 ppm) to 38 ppm. Including the results from the August 2000 investigation, five of thirteen samples contained more than 10 ppm of arsenic. The results exceeding the standard were: boring B-3, 0-4 foot sample (11 ppm); boring B-9, 0-2 foot sample (24 ppm); boring B-10, 0-2 and 2-4 foot samples (18 and 12 ppm, respectively); and boring B-12, 0-2 foot sample (38 ppm). As can be seen from the Site Plan in Appendix D, the affected area appears to be localized in the northeast portion of the property.

During the 2000 and 2001 investigations, soil samples were also analyzed for SPLP arsenic, to determine the likelihood of arsenic leaching from soil into groundwater. The following samples were analyzed for SPLP arsenic: B-3, 0-4 foot sample; B-4, 0-4 foot sample; B-5, 0-4 foot sample; B-8, 0-4 foot sample; and B-9, 0-2 foot sample. None of the samples contained detectable levels of SPLP arsenic (using a detection limit of 0.05 ppm). The results indicate that the elevated levels of arsenic detected in site soils are not likely to leach into groundwater. The SPLP tests indicate that the DEP pollutant mobility criteria are not exceeded for arsenic (or other metals) at the Site.

Sampling of three groundwater monitoring wells installed at the Site did not find detectable concentrations of volatile organic compounds (VOC's). The VOC's tested for include constituents of typical petroleum products such as gasoline and fuel oil, as well as common chlorinated industrial solvents.

Soil sample analysis did not find detectable concentrations of volatile organic compounds or extractable total petroleum hydrocarbons. Analysis for leachable metals did not find levels requiring remediation under the Remediation Standard Regulations.

3.0 ENVIRONMENTAL SETTING

3.1 Groundwater Quality Classification

All surface water and groundwater in Connecticut has been evaluated and classified according to a system developed by the DEP. The classification system is used to evaluate water quality at specific locations, as well as to set goals for maintaining various levels of water quality.

Groundwater in the vicinity of the Site is classified GB by the DEP, which signifies groundwater in "a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts" (Water Quality Standards, DEP, April 1996). Given the GB groundwater classification, DEP criteria for remediation of contamination is less stringent than in a drinking water (GAA or GA) zone.



During groundwater sampling performed in May 2001, groundwater was encountered at depths ranging from 7.4 to 9.5 feet below grade.

3.2 Public Water Supply Sources

Public water is available to the Site and surrounding area. Based on a review of the Atlas of the Public Water Supply Sources and Drainage Basins of Connecticut (DEP, June 1982) and other available information, there are no public water supply sources within one mile of the Site.

3.3 Surface Water Quality Classification

The closest surface water body to the Site is Shaw Cove, 1,000± feet southeast. Shaw Cove has surface water classification SC/SB indicating that it is a marine surface water body with degraded quality due to regional sources of pollution.

3.4 Soil Classification

Native soil at the Site is classified as the Charlton-Hollis fine sandy loam, very rocky, 3-15% slopes (Soil Survey of New London County, Connecticut, USDA, 1983).

Stratigraphic zones encountered during subsurface investigation at the Site generally consisted of: fine to coarse sandy fill including coal ash, iron slag, cinders and brick fragments to 3-6 feet; and native soils consisting of organic silt and fine to medium sand to the maximum drilling depth of 12 feet.

3.5 Site Geology

The surficial geology of the Site is characterized as glacial till, or nonsorted sediment varying widely in grain size (Surficial Geology of the New London Quadrangle, GQ-176, USGS, 1962).

The bedrock geology of the Site is characterized as the New London Gneiss (Bedrock Geology of the New London Quadrangle, GQ-574, USGS, 1967).

4.0 REMEDIAL OPTIONS

The three most common methods of addressing contaminated soil are: (1) remediation by excavation and disposal of the soil; (2) installation of an "in-situ" treatment system to treat the soil in place; or (3) "capping" the soil (covering it with a clean material such as pavement or uncontaminated fill). The contaminants of concern and remediation alternatives are discussed below.



4.1 Contaminants of Concern

Analysis of soil samples collected at the Site identified elevated levels of arsenic. The levels detected exceed the "direct exposure" standard established by DEP at 10 ppm of arsenic. The DEP standard is designed to protect human health against potential exposure to arsenic (e.g. via skin contact with the soil, or by incidental ingestion by children, etc.). The data clearly indicate that the property is not acceptable for the proposed use (recreation area including basketball court and playground) in its current condition.

The property has a long history of industrial use, including textile manufacturers and commercial laundries. However, it does not appear likely that the arsenic detected in soil at the Site resulted from releases by the former industrial occupants. The most likely source of the arsenic appears to be the fill material present at the Site. A layer of fine to coarse sandy fill including coal ash, iron slag, cinders and brick fragments is present at a depth of 3-6 feet, above the native soils consisting of organic silt and fine to medium sand. It appears that the Site was once a low lying wet area which was likely filled so that it could be developed. The fill material present at the Site contains a significant quantity of coal and coal ash. Arsenic is known to be a trace impurity in coal, and this appears to be the most likely source of the arsenic detected at the Site.

4.2 Remediation Through Soil Excavation

Preliminary calculations indicate that the quantity of affected soil at the Site is at a **minimum**, 270 cubic yards. This estimate is based on excavation of an area approximately bounded by borings B-12 (north), B-9 (south), B-10 (east) and B-3 (west). The boring locations are shown on the Site Plan in Appendix D.

At a minimum, the dimensions of excavation would be approximately 60 feet (north-south) by 30 feet (east-west). Based on the soil sampling data, the minimum depth of excavation would be 4 feet, in order to remove all of the affected soil. The minimum volume of affected soil is then 7,200 cubic feet (60 X 30 X 4) or 270 cubic yards. This quantity is equivalent to approximately 350 tons of soil. Based on a typical unit price of \$200 per ton for soil excavation and disposal as non-hazardous waste, the minimum cost of remediation through soil excavation at the Site is estimated as \$70,000. It is emphasized that the actual quantity of affected soil may be significantly greater (the elevated arsenic levels may extend beyond the sampling locations noted above, soil excavation and disposal costs may be greater, etc.).



Based on the available data, arsenic levels exceed the 10 ppm remediation standard in the northeast portion of the site. Sampling outside of this area did not find results exceeding 10 ppm of arsenic, though the fill material occurs over virtually the entire site. The fill is a heterogeneous mixture of industrial wastes and the level of arsenic in the fill material varies significantly from location to location (ranging from 3.2 to 38 parts per million). It is therefore not feasible to ensure that all of the affected soil could be addressed through excavation of only the northeast portion of the property.

The only feasible way to ensure that the remediation standards are satisfied through excavation would be to remove all of the contaminated fill material. Though possible from a technical standpoint, the cost of this option appears to be prohibitive. The total volume of fill material is estimated to be some 4,000 tons, resulting in an approximate cost of \$800,000 for excavation and disposal using the previously quoted unit price of \$200 per ton.

4.3 Remediation Through In-Situ Treatment

Common on-site treatment methodologies include soil vapor extraction, soil venting, and microbial degradation. These methods work effectively with specific types of contaminants, particularly volatile organic compounds and petroleum products. However, there does not appear to be any feasible on-site treatment which would effectively address the existing arsenic contamination.

4.4 Remediation Through Capping of Soil

As outlined in the Remediation Standard Regulations (RSR's), an alternative to soil remediation is rendering the soil inaccessible by covering it with clean fill and/or pavement. The RSR's do not require remediation of "inaccessible soil", defined in Section 22a-133k-1 as soil "(1) more than four feet below the ground surface; (2) more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement; or (3) (A) beneath an existing building or (B) beneath another existing permanent structure provided written notice that such structure will be used to prevent human contact with such soil has been provided to the Commissioner." Section 22a-133k-2 (b) (3) of the RSR's states that remediation of soil exceeding the direct exposure criteria is not required if the soil is inaccessible as defined above and an environmental land use restriction is recorded for the property. The term "environmental land use restriction (ELUR)" is defined in Section 22a-133q-1 of the RSR's.



An ELUR is a statement recorded on the City Land Records which "ensures that . . . soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition (CGS Section 22a-133k-2 (b) (3))." Prior to recording an ELUR, it must be submitted to the DEP Commissioner for review and approval, along with supporting documentation.

In order to determine the feasibility of "capping" the site contamination by covering it with clean fill, DELTA reviewed a plan entitled "Hempstead Neighborhood Park, Landscape Plan", by CLA Engineers, Inc., Norwich, Connecticut, dated October 1999.

The plan calls for a basketball court at the southwestern portion of the property, surrounded by paved areas and a concrete sidewalk around the perimeter. The total area of the pavement and concrete surfaces is approximately 10,000 square feet. Typically, the pavement would be underlain by approximately six inches of sub-base material such as process stone. Consequently, adding another 1.5 feet of clean fill material on top of the existing grade (with 6" of sub-base and then pavement or concrete) would achieve the specification for inaccessible soil under Section 22a-133k-1.

Based on the CLA plan, the remainder of the Site is intended for use as park and playground space, planted with turf and trees. In order to render the arsenic contaminated fill at the Site "inaccessible" as defined in the RSR's, four (4) feet of clean fill would have to be placed over the existing soil in these areas.

The quantity of clean fill required for the basketball court area is 1.5 feet over a surface area of 10,000 square feet, or approximately 550 cubic yards. The quantity of clean fill required for the remainder of the Site is 4 feet over a surface area of 15,000 square feet, or approximately 2200 cubic yards. The total quantity of fill required is then approximately 2,750 cubic yards. A cost estimate for performing this work is included in Table 1.

If this plan was implemented, the deposition of clean fill or "capping" process would be supervised by an environmental engineer, in order to ensure: quality of the fill used; placement of the necessary quantity of fill to comply with the regulations; and compaction and grading requirements.



**TABLE 1: COST ESTIMATE FOR CAPPING OF SITE WITH CLEAN FILL
HEMPSTEAD NEIGHBORHOOD PARK
43 HEMPSTEAD STREET
NEW LONDON, CONNECTICUT**

ITEM	QUANTITY	UNIT COST	SUBTOTAL
1. Delivery and Placement of 1.5 feet of Clean Fill over Proposed Paved/Concrete Area of Basketball Court and Sidewalks at Southwest Portion of Site*	550 cubic yd.	\$25/cubic yd.	\$13,750
2. Delivery and Placement of 4 feet of Clean Fill over Remainder of Site (Unpaved Landscaped Areas)	2,200 cubic yd.	\$25/cubic yd.	\$55,000
3. Additional Earthwork Requirements			\$10,000
3. Environmental Engineer's Supervision of Site Work			\$3,500
4. Final Remedial Action Report by LEP with Confirmatory Groundwater Sampling Data	N/A		\$7,000
5. Preparation of Environ. Land Use Restriction, Filing Fees, and Supporting Documentation	N/A		\$8,000
SUBTOTAL:			\$97,250
6. Contingency	Add 20%		\$19,450
TOTAL ESTIMATE:			\$116,700

* This item is contingent upon DELTA's understanding that this area will be developed as described in the plan prepared by CLA Engineers, Inc. dated October 1999. It is assumed that the site development will include placement of a minimum of 6" of sub-base material below the paved and concrete covered areas. PLEASE NOTE THAT THE ESTIMATE DOES NOT INCLUDE PLACEMENT OF PAVEMENT OR CONCRETE WHICH WOULD BE INCLUDED IN THE SCOPE OF TYPICAL SITE WORK PREPARED BY THE SITE CIVIL DESIGN ENGINEER.



The plan must be fully coordinated with the site civil design engineers, to ensure that it does not conflict with site development plans (or that the development plans can be appropriately modified to incorporate the placement of fill in the areas required). For example, implementation of the plan would require gradual "sloping" of the property from street grade to the park area (4 feet above street grade). In order to achieve a suitable slope and still satisfy the environmental capping requirements, it may be necessary to move some of the contaminated fill material at the perimeter of the site to the center of the site, in order to ensure that it will be covered by at least 4 feet of clean fill. This matter must be coordinated with the site design engineers.

The Site Plan in Appendix D includes notes depicting the areas to be filled to implement the capping plan.

In conjunction with the capping described, additional sampling of the on-site groundwater monitoring wells would be performed in order to confirm that the existing arsenic contamination does not impact groundwater quality.

5.0 SUMMARY OF REGULATORY PROCESS

This section summarizes the regulatory process for implementation of a remedial action under Connecticut General Statutes Section 22a-133y, the "Voluntary Remediation Program" for GB and GC areas.

Connecticut General Statutes Section 22a-133y covers voluntary site remediation in areas of groundwater classification GB and GC. These classifications include urban areas where groundwater has been degraded to some extent by releases of contaminants. The Site is in an area of groundwater classification GB.

Section 22a-133y establishes a process by which property owners can conduct remediation of contaminated sites and obtain formal approval when the completion of remediation is verified. DEP has determined that remediation projects in GB and GC areas can be designed and directed by a Licensed Environmental Professional (LEP), without direct DEP oversight. In these cases, the LEP may verify that the remediation has been performed in accordance with Connecticut General Statutes Sections 22a-133k-1 through 22a-133k-3, the "Remediation Standard Regulations" (RSR's).

Prior to implementation of remediation, DEP requires submittal of a Remedial Action Plan which summarizes the environmental conditions at the site and the remedial action proposed. Upon review of the Remedial Action Plan, the "(DEP) commissioner may review such plan and may advise such owner as to the adequacy of such plan (C.G.S. Section 22a-133y-b)".



Prior to the start of remediation, the property owner is required to meet public notice standards by one of the following methods: 1) Publish notice in a local newspaper; 2) maintain a sign on the property for at least thirty (30) days; or 3) mail notice to all abutting property owners.

Following completion of the remediation, the LEP submits a final Remedial Action Report to DEP documenting the work performed. In conjunction with the final report, an environmental land use restriction would have to be submitted to the DEP Commissioner for review and approval, along with supporting documentation.

The term "environmental land use restriction (ELUR)" is defined in Section 22a-133q-1 of the RSR's. An ELUR is a statement recorded on the City Land Records which "ensures that . . . soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition (CGS Section 22a-133k-2 (b) (3))."

The Statute allows DEP 60 days to either accept the final report (the remediation is then deemed complete under the Statute) or start an "audit" of the remedial work performed. If required, such an audit must be completed by DEP within eight months following initial receipt of the final remedial action report. The audit may find that additional remediation or investigation is required at the Site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

DELTA's evaluation of the alternatives indicates that the best way of addressing the existing arsenic contamination at the 43 Hempstead Street project site is by covering or "capping" the contaminated material with clean fill.

The Remediation Standard Regulations (RSR's) do not require remediation of "inaccessible soil", defined in Section 22a-133k-1 as contaminated soil "(1) more than four feet below the ground surface; (2) more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement; or (3) (A) beneath an existing building or (B) beneath another existing permanent structure provided written notice that such structure will be used to prevent human contact with such soil has been provided to the Commissioner."



Section 22a-133k-2 (b) (3) of the RSR's states that remediation of soil exceeding the direct exposure criteria is not required if the soil is inaccessible as defined above and an environmental land use restriction is recorded for the property. The term "environmental land use restriction (ELUR)" is defined in Section 22a-133q-1 of the RSR's. An ELUR is a statement recorded on the City Land Records which "ensures that . . . soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition (CGS Section 22a-133k-2 (b) (3))."

Based on DELTA's review of the site development plans prepared by CLA Engineers, we estimate the cost as approximately \$117,000.

Prior to implementation of the environmental capping plan as described, the plan must be fully coordinated with the site civil design engineers, to ensure that it does not conflict with site development plans. Specifically, the site design professionals must review DELTA's plan for capping of the Site in order to ensure that the changes to the site topography can be feasibly incorporated into the existing engineering plans and do not conflict with the intended uses for the Site.

If this plan was implemented, the deposition of clean fill or "capping" process would be supervised by an environmental engineer, in order to ensure: quality of the fill used; placement of the necessary quantity of fill to comply with the regulations; and compaction and grading requirements.

This remedial action plan has been submitted for review. When a decision is made as to how to proceed, the plan will be finalized and forwarded to DEP as required under Section 22a-133y (b) of the Connecticut General Statutes. DELTA will revise the plan as warranted based on comments from DEP and the interested parties.

