115 FRONT STREET
(MITCHELL PROPERTY)

Village of Greenport, Suffolk County, New York
Site No. B00027-1

Environmental Restoration

PROPOSED REMEDIAL ACTION PLAN

February 2000

Prepared by:
Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act Project

Environmental Restoration
PROPOSED REMEDIAL ACTION PLAN

115 FRONT STREET (MITCHELL PROPERTY)
Village of Greenport, Suffolk County
Site No. B00027-1
February 2000

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health is proposing a remedy to address the threat to human health and/or the environment created by the presence of hazardous substances at the 115 Front Street brownfield project.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration (Brownfields) Program, the State provides grants to municipalities to reimburse up to 75 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

The 115 Front Street site, also known as Mitchell's Property, is a public park for the Village of Greenport. As more fully described in Sections 3 and 4 of this document, leaking underground storage tanks and other previous site activities have resulted in the disposal of a number of hazardous substances, including gasoline, diesel fuel, and fuel oil which threatened the adjacent harbor area. The removal of nine abandoned underground storage tanks (USTs) and most of the heavily contaminated soils in the vicinity of these tanks during the site investigation has, to a large extent, mitigated the threat to the adjacent water body. However, the residual contamination still presents the following threat to the public health:

- a threat to human health associated with potential direct contact with soils and groundwater contaminated by petroleum related volatile and semi-volatile organic compounds and elevated concentrations of heavy metals, including arsenic and lead.
- a threat to human health associated with potential inhalation of vapors from those soils which are highly impacted by petroleum related volatile organic compounds.

In order to eliminate or mitigate the threats to the public health that the hazardous substances disposed at the 115 Front Street brownfield site have caused, the following remedy is proposed to allow for continued use of the site as a public park:

- Off-site disposal of the top one foot of surface soils in those areas with elevated concentrations of arsenic above background.
- Off-site disposal of petroleum contaminated subsurface soils in the area immediately south of the former USTs in southeastern portion of the site.
- Off-site disposal of surface soils which are contaminated with petroleum related compounds around the light pole area in the eastern portion of the site.
- Placement of a surface cover of one foot of clean fill over all affected areas. Unpaved areas will be vegetated.
- Periodic monitoring of the groundwater for a minimum of two years.
- Institution of a deed restriction to prevent future direct contact with contaminated subsurface soils and the underlying groundwater.

The proposed remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Proposed Remedial Action Plan (PRAP) in conformity with applicable standards, criteria, and guidance (SCGs).

This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in greater detail in the Site Investigation (SI) and Remedial Alternatives Report (RAR) available at the document repositories.

To better understand the site and the investigations conducted, the public is encouraged to review the project documents at the following repositories:

1. Floyd Memorial Library
   539 First Street
   Greenport, NY 11944
   (631) 477-0660
   10:00 AM to 8:00 PM - Mon-Thurs
   10:00 AM to 5:00 PM - Fri & Sat
   Closed - Sunday

2. Village of Greenport
   236 Third Street
   Greenport, NY 11944
   (631) 477-2385
   8:30 AM to 4:30 PM - Mon-Fri

3. NYSDEC - Region 1
   Hazardous Waste Remediation
   SUNY Campus, Bldg. 40
   Stony Brook, NY 11790-2356

Robert Stewart, Project Manager
(631) 444-0244
8:30 AM to 4:45 PM - Mon-Fri

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 10, 2000 to March 26, 2000 to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for March 8, 2000 at the Floyd Memorial Library beginning at 7:00 PM.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which you can submit verbal or written comments on the PRAP.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision. The Record of Decision is the NYSDEC's final selection of the remedy for this site. Written comments may be sent to Mr. Stewart, NYSDEC Project Manager, at the above address through March 26, 2000.

SECTION 2: SITE LOCATION AND DESCRIPTION

The 115 Front Street site is located in the downtown portion of the Village of Greenport. This 3.19 acre site is bounded on the north by Front Street and on the south by Greenport Harbor (See Figure 2). The south side of the site is characterized by bulkheading and piers used to dock boats. Currently, the majority of the site is being utilized by the Village as a public park. The park is being renovated. The Village is constructing an amphitheater and a building to house a carousel ride.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The 115 Front Street site was acquired by the Village on September 5, 1996. Prior to this date, the property was known as Mohring's Marina and was also the location of Kokomos Restaurant. Even further back, parts of the site were used by a car dealer with auto repair capabilities, a gasoline station, various marine boat and engine repairing facilities, and an oyster company which reportedly painted boats at the site.

More than nine feet of fill has been brought to the site over the years to raise the original grade. This fill may contain low levels of heavy metal contamination.

Portions of the site have been used for bulk storage of gasoline, diesel fuel, and fuel oil in aboveground and underground storage tanks. The former aboveground storage tanks (ASTs) were located in the southeastern portion of the site in an area known as "Texaco Alley". USTs believed to be associated with the former marina were located in the central portion of the site and in Texaco Alley. A fuel oil tank, possibly used by a former restaurant, was located in the north central portion of the site. All these petroleum storage tanks were removed during the Site Investigation. Further discussion of these activities will be described in Sections 3.2 and 4.1.3.

3.2: Environmental Restoration History

During August 1991, flooding by a hurricane resulted in the discharge of "oil" from a 3,000 gallon UST. Records indicate that the spill was satisfactorily cleaned up.

One 3,000 gallon UST was reportedly removed around this time period. Minor soil contamination was noted in the area of the fill pipe. This spill was cleaned up to the satisfaction of the Department.

Nine other USTs were removed during the Brownfields Site Investigation. These removals will be discussed further in Section 4.1.3.

SECTION 4: SITE CONTAMINATION

To determine the nature and extent of any contamination by hazardous substances of this environmental restoration site, the Village of Greenport has recently completed a Site Investigation and a Remedial Alternatives Report (SI/RAR) at the 115 Front Street site.

4.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The field work for the SI was performed between August 1998 and March 1999. A report entitled Site Investigation Report, July, 1999 has been prepared which describes the field activities and findings of the SI in detail.
The SI included the following activities:

- Geophysical survey to identify the presence of subsurface utilities and to locate previously unidentified USTs.
- USTs in three separate areas were removed to visually determine whether they had leaked petroleum into the subsurface.
- Ten surface soil samples were collected and analyzed based upon the reported potential disposal of contaminants directly onto the surface soils.
- Eighteen soil borings were conducted to evaluate potential impacts to subsurface soils due to leakage from USTs and other potential historic subsurface discharges based on site usage.
- Ten monitoring wells were installed and sampled to evaluate impacts to the underlying groundwater.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the SI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the 115 Front Street site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. The NYSDEC Spill Technology and Remediation Series (STARS) Memo #1 Petroleum-Contaminated Soil Guidance Policy, dated August 1992, has been used to provide direction on the handling, disposal and/or reuse of petroleum-contaminated soils. For non-petroleum issues in soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions and health-based exposure scenarios. In addition,

for soils, background concentration levels can be considered for certain categories of contaminants.

The list of volatile and semi-volatile organic compounds (VOCs and SVOCs) which were analyzed for this investigation are in accordance with guidance in the STARS Memorandum. For short, this list of chemicals is known as STARS VOCs and SVOCs. All the STARS SVOCs are common polynuclear aromatic hydrocarbons (PAHs) associated with fuels and lubricating oils.

Based on the Site Investigation results in comparison to the SCGs and potential public health and environmental exposure routes, certain soil and areas of the site require remediation. These are summarized below. More complete information can be found in the SI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The subsurface soils at the site are dominated by fill material to between 9.5 to 12 feet below grade where a fine-grained clay unit was encountered. The fill material is primarily sand, gravel, and silt with assorted pieces of wood, metal, brick, concrete, glass, coal fragments, and clam, oyster, and scallop shells. The underlying clay consists of a black, dark brown, or green stiff clay with a low estimated hydraulic conductivity. The clay was not penetrated during the investigation since this unit is believed to be retarding downward migration of contaminants in the groundwater.

The underlying groundwater was found between 2.85 feet and 5.38 feet below grade. Slight tidal effects were seen in all of the monitoring wells constructed for the investigation. The maximum rise detected in the water table was 0.35 feet. The groundwater flow direction was to the south to south southwest. There appears to be little or no variation in the groundwater flow direction in response to tidal changes in Greenport Harbor.

4.1.2: Nature of Contamination

As described in the SI report, many soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. Many different areas were studied.

Three separate areas at the site were used for the storage of petroleum related compounds in underground storage tanks. Each area was investigated by excavating the tanks. A total of 9 underground tanks were located. None of these tanks were in use. Gasoline, diesel fuel, and fuel oil were formerly stored in these abandoned tanks. The bottoms of all these tanks were sitting in the underlying groundwater. This condition apparently accelerated corrosion of the bottoms of the tanks. Additionally, some of the tanks exhibited evidence of leakage around the fill and pump areas. Significant leakage was evident in each of the three storage areas. The surrounding soils and underlying groundwater were impacted. These impacts have been significantly reduced by the removal of all known USTs and most of the highly contaminated soils in the vicinity of these tanks. See Section 4.1.3 for further discussion on the UST removal actions.

Low concentrations of petroleum related compounds, slightly above SCGs, were also detected in other areas of the site. These detections are attributed to the discharges of relatively small amounts of fuels and/or lubricating oils in these areas.

Some elevated concentrations of heavy metals, such as arsenic, lead, and zinc, were detected above typical background concentrations. It is suspected that some of these metals may have been brought to the site in the nine to ten feet of fill used to raise the original elevation of the site. Previous site usage such as boat and engine repairs, including the painting of boats, may be partially responsible for some of the metals that were detected.

No hazardous wastes as defined by New York State Law under 6 NYCRR Part 371 have been discovered at this site.

4.1.3: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR.

Besides serving as an investigative tool, the removals of underground tanks in three separate areas of the site also qualify as Interim Remedial Measures (IRMs). For this site, these IRM tank removals have, to a large extent, mitigated the threat of potential discharges of contaminated groundwater to the adjacent saltwater body.

The underground storage tanks at this site were used to hold either gasoline, diesel fuel, or fuel oil. Each of these areas were investigated for leakage by actually removing the tanks and any associated piping. All the liquids in the tanks were pumped out and disposed of at an approved facility. Similarly, all sludges were removed from inside of each of the tanks and disposed of at an approved off-site location. The highly contaminated soils surrounding the tanks in each of the three underground tank locations were acting as a continuing source for the groundwater contamination at the site. As part of these IRMs, most of the highly impacted soils were removed and disposed of at an approved off-site location. These three areas are discussed below and shown on Figure 2.

South UST Area - Five 4,000 gallon tanks in the south central portion of the site were removed in August 1998. All the tanks were pitted. Each of the five tanks had at least one pinhole. Significant leakage was evident, and based on visual observation, approximately 135 cubic yards of petroleum impacted soils were excavated and disposed of at an approved off-site location. The excavation extended to approximately two feet below the water table. A thin layer of petroleum which was floating on top of the exposed groundwater was removed by skimming off the floating petroleum and by using absorbent pads specifically designed for this purpose. The bulk of the soil contamination was removed, however, some residual soil contamination was visible around the edges of the excavation at the water table.

Four test pits outside of each wall of the excavation were dug to expose the underlying groundwater. These test pits were used to investigate the potential migration of the fuels which had leaked from the USTs. No floating product was evident in any of these test pits. However, a slight fuel odor was detected near the water table in the north and east test pits.

North UST Area - In December 1998, one 1,000 gallon fuel oil tank was removed from the north central portion of the site. The tank was pitted and several holes were observed in the bottom of the tank. Leakage from this tank was evident, and based on visual screening, approximately 40 cubic yards of petroleum contaminated soils were removed to a depth of 10 feet to 12 feet below grade. All of the contaminated soils were removed except for a thin band of contaminated soils seen at the water table around the edges of the excavation. A thin layer of petroleum floating on top of the exposed groundwater was removed with absorbent pads.

Southeast UST Area - The southeast UST area is also known as the Texaco Alley area. Three 4,000 gallon USTs near the eastern property border were removed in January 1999. Approximately 350 gallons of product were recovered from the tanks. All the tanks were severely pitted. Two of them had small holes. Significant leakage was visually evident and approximately 130 cubic yards of petroleum impacted soils beneath the tanks were removed. The soil removal extended to 1.5 feet below the water table. Some contaminated soils are still present in the sidewalls of the excavation, particularly along the south wall. A thin layer of petroleum floating on top of the exposed groundwater was removed by skimming off the floating petroleum and by using absorbent pads.

4.1.4: Extent of Contamination

Most of the soil and groundwater sampling for the Site Investigation was performed after the UST removals. The only exception was most of the soil borings, around the Southeast UST area, were performed before this removal. The extent of contamination identified is the residual soil and groundwater contamination remaining after the completion of the IRM UST removals discussed in Section 4.1.3. It should be emphasized that a total of approximately 315 cubic yards of petroleum impacted soils were removed as part of all the IRM UST removals.

The following sections will discuss the extent of contamination by media. Only the significant detections will be discussed.

Surface Soils

Arsenic has been detected in the surface soils throughout the site at concentrations above typical background. In a background sample, arsenic was detected at 8.7 ppm. Arsenic was detected at the site at concentrations above background in 9 out of 10 surface soil samples collected from the surface to three inches deep at concentrations as high as 67.8 ppm. Supplemental shallow soil samples were collected at four of these nine surface soil sample locations to ensure that the results were representative and to collect additional samples slightly deeper at 3 to 6 inches and at one location at 6 to 9 inches below grade. Arsenic was detected above site background in 3 out of 4 of the 3 to 6 inches samples indicating that the arsenic is not restricted to the top three inches of the surface soils. Table 1 summarizes the significant detections in the surface soil samples. Figure 3 shows all the surface and subsurface soil samples which detected arsenic above the site background of 8.7 ppm. The only significant detections were in the shallow soils up to one foot below grade.

Due to the concentrations of arsenic detected in some of the surface soil samples, potential prolonged direct contact/accidental ingestion is a concern.

Subsurface Soils

The following potential areas of concern were investigated:

- South UST Area
- North UST Area
- Southeast UST Area
- Suspected East UST Area
- Light Pole Area
- Dredge Spoils Area
- Water-Line Area
- Boat-Bottom Scraping Area

Table 1 also summarizes the significant detections from the soil samples collected from the subsurface soils. Figure 2 shows the location of these areas of concern. Each of these areas will be discussed separately.

South UST Area - Eight soil borings were performed around the South UST area where 5 USTs were removed to determine the extent of the residual soil contamination due to tank leakage. Four out of the eight soil samples detected petroleum related semi-volatile organic compounds (SVOCs) slightly above their respective NYSDEC guidance values. Of these four samples, sample SB-16 collected at 14 inches to 29 inches below grade from a boring northwest of the UST excavation detected the highest concentrations. Twelve different STARS SVOCs were detected at a combined total of 8.4 ppm in this sample. This sample was collected from an area where a citizen alleged that waste oils were discharged in the past. None of the exceedences in these four samples were significant enough to require additional cleanup evaluation.

Of the eight samples collected, six were subsurface soil samples collected near the water table at various locations outside of the tank excavation. These six samples detected only trace concentrations of STARS VOCs, well below their respective NYSDEC guidance values. Only two of these samples detected any appreciable concentrations of STARS SVOCs. This data indicates that there has not been significant migration from the former source area of the petroleum related contaminants which would float on top of the groundwater.

North UST Area - No soil borings were performed in the vicinity of the former fuel oil tank. However, a post-excavation bottom soil sample and a composite soil sample of the four sidewalls of the excavation were collected. The sidewall composite sample was collected from the "smear zone" created by the rise and fall of petroleum related compounds floating on top of the constantly changing water table. The highest concentrations would be expected in the smear zone. These two samples are adequate to indicate the extent of the residual soil contamination in this area. The bottom soil sample was within STARS guidance values. The following petroleum related volatile organic compounds (VOCs) were detected in the sidewall sample above their respective NYSDEC guidance values as stated in the STARS guidance document: 0.25 ppm of total xylenes, 0.48 ppm of n-propylbenzene, 2.1 ppm of p-isopropyltoluene, 1.1 ppm of 1,2,4-trimethylbenzene, 0.24 ppm of 1,3,5-trimethylbenzene, 1.4 ppm of n-butylbenzene, and 0.24 ppm of sec-butylbenzene. Since natural attenuation is expected to remediate this residual contamination now that the source has been removed, none of these exceedences were significant enough to require additional cleanup evaluation. Natural attenuation of petroleum related compounds includes volatilization, dispersion, dilution, and biodegradation. The petroleum related VOCs are particularly susceptible to

biodegradation as long as adequate oxygen is available for the growth of the natural occurring microbes which consume the contaminants as a food source and ultimately produce non-toxic end products such as carbon dioxide and water.

Southeast UST Area - Three soil borings were performed in this area prior to the tank removal. However, since all these borings are outside of the excavation for the tank removal, the results of this soil sampling are being used as a conservative estimate of the residual soil contamination in this area. Additionally, two more soil borings were performed after the tank removal to assist in determining the extent of the residual soil contamination. It should also be noted that the two borings immediately south of the tank excavation are also being used to evaluate potential spills from old above ground storage tanks which were formerly located in the southeastern corner of the property. Soil samples were collected from all 5 soil borings near the water table, where floating product in the "smear zone" would be located.

The soil sample from Boring #7, just outside what would later be the southern edge of the excavation, had strong visual and olfactory evidence of petroleum related contamination. The soil sample (SB-7) from boring #7 and the one from boring #8 (SB-8), further south of the excavation, contained petroleum related VOCs above STARS guidance values. As expected, the sample closer to the tank excavation (SB-7) had much higher concentrations. Sample SB-7 detected a total of 780 ppm of 8 different STARS VOCs. Seven of these compounds have STARS Alternative Guidance Values (AGV) of 0.1 ppm. The actual detections for these seven compounds were: 29 ppm ethylbenzene, 160 ppm total xylenes, 30 ppm n-propylbenzene, 210 ppm 1,2,4-trimethylbenzene, 24 ppm isopropylbenzene, 150 ppm n-butylbenzene, and 89 ppm 1,3,5-trimethylbenzene. The eighth compound, naphthalene (AGV 0.2 ppm), was detected at 88 ppm. In comparison, sample SB-8 detected a total of 11.47 ppm of STARS VOCs.

Additionally, a total of almost 24 ppm of STARS SVOCs were detected in sample SB-7. The following compounds were detected above their respective contract required detection limits (CRDL) and STARS AGVs: 4.2 ppm acenaphthene (AGV 0.4 ppm), 6.9 ppm fluorene (AGV 1 ppm), and 10 ppm phenanthrene (AGV 1 ppm). Seven other STARS SVOCs, each with a low STARS AGV of only 0.04 ppb, were detected at low estimated concentrations, below their respective CRDLs. The three other soil samples located east (SB-19), west (SB-20), and southwest (SB-9) of the tank excavation contained low estimated concentrations of STARS SVOCs, some slightly above STARS guidance values.

Soil sample SB-9, collected at 4 feet to 4 feet, 8 inches below grade, also contained an elevated concentration of lead at 613 ppm, above the typical range for lead of 200 to 500 ppm in suburban areas. This exceedence was not significant enough to require additional cleanup evaluation for the following reasons: 1) the surface soils are not impacted by lead, therefore, direct contact with surface soils is not a concern, and 2) the deed restriction to prevent uncontrolled excavations which would be necessary for other reasons, as discussed later, would serve to prevent direct contact with these subsurface soils.

Suspected East UST Area - Based on the geophysical survey results, it was suspected that another UST was located to the east of the

North UST area. A backhoe was used to expose the potential UST. Instead, it was discovered that the anomaly was an abandoned storm drain that had been filled in. No further investigation was deemed necessary.

Light Pole Area - A citizen reported seeing soil contamination around two light poles in the eastern portion of the site. Soil boring SB-6 was performed next to the eastern light pole in a slight depression next to the pole. A sample was collected from the surface to 18 inches below grade. Chrysene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene, each with a STARS AGV of only 0.04 ppb, were detected at a combined total of 11.8 ppm. These concentrations are of concern, especially since they are present in the surface soils where direct contact is possible. Three other STARS SVOCs were detected slightly above their respective AGVs.

It is suspected that waste oils may have been discharged to the surface soils in the depression. Consequently, the affected area may be limited in size.

Dredge Spoils Area - It is alleged that dredge spoils resulting from the dredging of the adjacent saltwater body were placed in the northwestern corner of the property. Low estimated concentrations of 7 STARS SVOCs, detected at a combined total of 1.3 ppm, were slightly above their respective STARS guidance values. None of these exceedences were significant enough to require additional cleanup evaluation.

Water-Line Area - A citizen reported seeing petroleum related contamination during the installation of a water line in the northern portion of the site. Soil borings SB-4, SB-5, and SB-18 were drilled in this area. The highest concentrations were detected in the soil sample from SB-4, collected at one foot, ten inches to two feet, ten inches below grade. Nine STARS SVOCs were detected above their respective AGVs in this sample at a combined total of 5.4 ppm. Based on the depth of the sample and the concentrations detected, none of these exceedences were judged to be significant enough to require additional cleanup evaluation.

Lead was detected in sample SB-5, collected at three feet, five inches below grade, at 969 ppm. This concentration is above the typical range for lead of 200 ppm to 500 ppm in suburban areas. This exceedence was not significant enough to require additional cleanup evaluation for the following reasons: 1) the surface soils are not impacted by lead, therefore, direct contact with surface soils is not a concern, and 2) the deed restriction to prevent uncontrolled excavations which would be necessary for other reasons, as discussed later, would serve to prevent direct contact with these subsurface soils. To a lesser extent, copper, zinc, and mercury concentrations were slightly elevated.

Groundwater

Groundwater sampling was designed to evaluate groundwater quality in the vicinity of the South UST, North UST, and Southeast UST areas. The excavations for these tank removals, as discussed in Section 4.1.3, extended into the underlying groundwater. The exposed groundwater at the bottoms of each of these excavations was visually contaminated. Measures were implemented to recover a thin layer of floating petroleum from each of the excavations before each excavation was backfilled with clean fill. The

groundwater quality in each of these three areas will be discussed separately. Table 2 summarizes the significant groundwater detections. All groundwater samples were collected after the UST removals. Each well was checked for the potential presence of floating product utilizing an interface probe. No floating product was detected in any of the wells.

South UST Area Groundwater - Three monitoring wells were installed to a depth of 12 feet below grade in this area. A groundwater sample from MW-4, located near the southern edge of the backfilled tank excavation, detected the highest concentrations of petroleum related compounds for this area. Nine different petroleum related volatile organic compounds totaling less than 6,000 ppb were detected in this sample. All 9 compounds were detected in excess of their Class GA groundwater standard. The three highest detections were: 2,800 ppb of total xylenes, 1,200 ppb of 1,2,4-trimethylbenzene, and 740 ppb of ethylbenzene. Each of these compounds have a GA groundwater standard of 5 ppb.

Groundwater samples from MW-5 and MW-6, located further south and southeast of the tank excavation, respectively, detected much lower concentrations. MW-5 detected only 36 ppb of total STARS VOCs while MW-6 detected 328 ppb of total STARS VOCs. These wells are located between 20 feet and 25 feet from the edge of the UST excavation. The most significant detection in the groundwater sample from MW-6 was 94 ppb of benzene which has a GA groundwater standard of 1 ppb.

It has been concluded that the bulk of the residual VOC groundwater contamination is limited to a very localized area near to the South UST excavation for the following reasons:

1. MW-5 and MW-6, located at relatively short distances downgradient of the UST excavation, have much lower concentrations of petroleum related contaminants than MW-4 which was constructed near the south wall of the UST excavation. Consequently, there is essentially no groundwater plume attributable to this area.

2. The visual appearance of the remaining soils at the sides and bottom of the UST excavation suggest that the bulk of the contaminated soils has been removed.

3. The four test pits used to visually inspect the underlying groundwater outside of the four walls of the UST excavation did not indicate any significant migration of the fuels which leaked from the USTs.

4. Six of the eight soil samples used to evaluate the residual soil contamination in this area were collected from the smear zone near to the water table where the highest concentrations would be expected. Three of these samples were collected a short distance from the south side of the excavation in the direction of groundwater flow. One sample each was collected a short distance from the east, west, and north sides of the excavation. All of these samples contained only trace levels of STARS VOCs, well below their applicable STARS AGVs. Only the samples collected west and southeast of the UST excavation had any appreciable concentrations of STARS SVOCs. These samples detected 4.6 ppm and 2.4 ppm of total STARS SVOCs, respectively.

5. Most of the residual soil contamination attributable to the former USTs is apparently

very limited in extent and consists of a small volume of soils at the water table near the sidewalls of the UST excavation. The significant detections in the groundwater sample from MW-4 are probably caused by this well being located along the southern edge of the excavation where most of the residual soil contamination is located.

Although the groundwater contamination by MW-4 is considerable, it is believed that this groundwater contamination will naturally attenuate quickly because the source area has essentially been eliminated and the groundwater contamination is localized to the immediate area around MW-4. However, periodic groundwater monitoring will be necessary to verify this.

Lead was detected above its GA groundwater standard of 25 ppb in MW-4 and MW-5 at 279 ppb and 193 ppb, respectively. It is possible that some of this lead may be attributable to the lead formerly used in leaded gasoline. These exceedences were not significant enough to require additional cleanup evaluation since the underlying groundwater will not be consumed due to saltwater intrusion and lead has limited migration potential in groundwater.

North UST Area Groundwater - Three monitoring wells were constructed by the North UST Area. MW-1, constructed in the backfilled excavation, detected relatively low concentrations of STARS VOCs. A total of 218 ppb of total STARS VOCs were detected. GA groundwater standards were exceeded by several of the compounds.

The groundwater sample from MW-2, located slightly south of the excavation, detected 9 different STARS VOCs at concentrations above their respective GA groundwater standard or guidance value. The sum of the detections of these 9 compounds was 899 ppb. The most significant detections were: 210 ppb of 1,2,4-trimethylbenzene, 140 ppb of total xylenes, 85 ppb of ethylbenzene, 84 ppb of 1,3,5-trimethylbenzene and 220 ppb naphthalene. The GA groundwater standard for the first four of these compounds is 5 ppb while the last compound, naphthalene, has a GA guidance value of 10 ppb.

The groundwater sample from MW-3, located southeast of the excavation, did not have any detections above GA groundwater standards.

The groundwater sampling results for this area, supported by the results from the closure samples, indicate that the former source area by MW-1 has been successfully removed by the soil removal which was performed concurrently with the tank removal. There has been some slight migration of the contaminants from the former source area as indicated by the results from MW-2. However, now that the source area has been removed, it is expected that this groundwater contamination will naturally attenuate relatively quickly.

Lead was detected at 226 ppb in MW-3, above its applicable groundwater standard of 25 ppb. This groundwater sample contained excessive silt. The suspended particles in this sample may have resulted in an unrepresentative sample result for the metals analysis. The 226 ppb may be greater than the actual concentration of lead present in the groundwater at this location. This potential exceedence was not significant enough to require additional cleanup evaluation since the underlying groundwater will not be consumed due to saltwater intrusion and lead has limited migration potential in groundwater.

Southeast UST Area Groundwater - Four monitoring wells were sampled in the Southeast UST area, also known as the Texaco Alley area. MW-7 was constructed in the center of the backfilled tank excavation. MW-8 and MW-9 were both constructed just south of the tank excavation and were located on the western and eastern sides of the excavation, respectively. MW-10 was located further downgradient (south) of the tank excavation. The highest concentration of both volatile and semi-volatile organic compounds were detected in MW-8. Ten different STARS VOCs were detected at a combined total of 2,764 ppb. Most of these VOCs were detected above their respective groundwater standards. The three highest VOC detections were: 1,200 ppb of total xylenes, 870 ppb of 1,2,4-trimethylbenzene, and 320 ppb of ethylbenzene. The GA groundwater standard for these three compounds is 5 ppb.

The groundwater sample from MW-9 also detected significant concentrations of STARS VOCs. Nine different VOCs were detected at a combined total of 2,490 ppb. The most significant detections were: 1,100 ppb of total xylenes, 790 ppb of 1,2,4-trimethylbenzene, and 88 ppb of benzene. The GA groundwater standards for these three compounds are 5 ppb, 5 ppb, and 1 ppb, respectively.

The groundwater sample from MW-7, located by the former source area, detected lower concentrations of STARS VOCs with 10 different compounds being detected at a total concentration of 335 ppb. MW-10 detected 11 different STARS VOCs at a combined concentration of 122 ppb.

Since the groundwater sample from MW-7, constructed in the backfilled tank excavation, detected much lower concentrations of contaminants than the samples from MW-8 and MW-9, which are both located just outside the southern limit of the UST excavation, it has been concluded that the soil removal performed in conjunction with the tank removal has been effective in removing the primary source area beneath the tanks. However, the results from MW-8 and MW-9 indicate that the petroleum related contaminants have migrated in groundwater to the area immediately downgradient of the tank excavation or there is some residual soil contamination in this area which continues to impact the groundwater. Based on the much lower concentrations in MW-10, which is further downgradient of the source area, this residual contamination is localized to the area around MW-8 and MW-9.

Considering both the groundwater results from MW-8 and MW-9 and the soil sampling results from SB-7, the Department has concluded that there is a residual source area of petroleum related VOCs and SVOCs which would act as a continuing source of groundwater contamination. This source area is located immediately south of the Texaco Alley tank excavation.

This source area could also present an inhalation threat should these highly impacted subsurface soils be excavated without adequate controls.

4.2: Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 7.0 of the SI Report.

An exposure pathway is the manner by which an individual may come in contact with a

contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- Ingestion of contaminated soil
- Inhalation of vapors
- Dermal adsorption of contaminants via direct contact with contaminated soil
- Dermal adsorption of contaminants via direct contact with contaminated groundwater

These potential human exposure pathways at the 115 Front Street site would be addressed through the remedial actions to be implemented at the Site.

4.3: Summary of Environmental Exposure Pathways

No pathways for environmental exposure have been identified for this site. The IRM underground tank removals have, to a large extent, mitigated the potential impact which might have resulted from the discharge of contaminated groundwater to the adjacent saltwater body. The residual groundwater contamination should not result in any environmental impacts to the surface water especially when one considers the constant flushing resulting from tidal changes. NYSDEC personnel have visually inspected the adjacent surface water body for any signs of discharge on four separate occasions. No sheen was visible during any of these inspections.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the State to recover State response costs should PRPs be identified. The Village of Greenport will assist the State in its' efforts by providing all information to the State which identifies PRPs. The Village will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND FUTURE USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria, and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous substance disposed at the site through the proper application of scientific and engineering principles.

The 115 Front Street site will continue to be used as a public park. The goals selected for this site are:

- *Reduce, control, or eliminate to the extent practicable the contamination present within the surface soils on site.*
- *Eliminate the potential for direct human or animal contact with the contaminated soils or groundwater on site.*
- *Eliminate to the extent practible the source areas for groundwater contamination.*
- *Eliminate to the extent practible source areas of VOCs which could present a threat due to potential inhalation of vapors.*
- *Provide for attainment of SCGs for contaminated surface soils at the limits of the area of concern (AOC), to the extent practicable.*
- *Mitigate the impacts of contaminated groundwater to the environment.*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the 115 Front Street site were identified, screened and evaluated in a Remedial Alternatives Report. This evaluation is presented in the report entitled Remedial Alternatives Report, **{date}** for 115 Front Street.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy or procure contracts for design and construction.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site.

Alternative #1 - No Further Action

Present Worth:	*$ 104,964*
Capital Cost:	*$ 2,800*
Annual O&M:	*$ 23,600*
Time to Implement:	0 months

This alternative recognizes remediation of the site conducted under previously completed IRM UST removals. No further remedial actions would be performed.

This alternative would include the following:

1. Continued monitoring would be necessary to evaluate the effectiveness of the remediation completed under the IRMs. Five years of monitoring is proposed since it is expected that groundwater would take longer to recover without further source removal in the Texaco Alley area.

2. A deed restriction would be necessary to prevent future site activities which would result in direct contact with contaminated subsurface soils and groundwater. Uncontrolled excavations which would expose contaminated soils would be prohibited.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. Under this alternative, the potential for direct contact with the

contaminated surface soils would not be mitigated. The residual source of petroleum related groundwater contamination in the Texaco Alley area would not be eliminated.

Alternative #2 - Off-Site Disposal of Contaminated Surface Soils

Present Worth:	*$ 643,586*
Capital Cost:	*$ 541,422*
Annual O&M:	*$ 23,600*
Time to Implement:	1 month

This alternative would include the following remedial actions:

1. Excavation and off-site disposal of the upper one foot of the surface soils impacted by arsenic.

All surface soils above the site background concentration for arsenic would be removed. Additional sampling would be performed during the remedial phase of this project to better establish the background concentration of arsenic and the affected areas of the site. If all of the surface soils are impacted, approximately 3,040 cu. yds. of soils would be excavated.

2. Excavation and off-site disposal of the SVOC impacted soils in the Light Pole area from the surface to approximately two feet below grade.

Additional sampling during the remedial phase of this project would be performed to better define the affected area. If the depth and area of the excavation allows, some of the soils under Item #1, which are unsuitable solely due to their arsenic content, would be used to backfill this area up to one foot below grade.

3. A surface cover of at least one foot of clean soils would be placed over all the impacted areas to prevent direct contact with any residual subsurface soil contamination. Some arsenic impacted soils would be placed under the carousel building. However, these soils would be covered by a concrete slab.

4. Groundwater monitoring for at least five years. Five years of monitoring is proposed since it is expected that groundwater would take longer to recover without further source removal in the Texaco Alley area.

5. Deed restriction to prevent future site activities which would result in direct contact with contaminated subsurface soils and groundwater. Uncontrolled excavations which would expose contaminated subsurface soils would be prohibited.

Under this alternative, the potential for direct contact with contaminated surface soils would be eliminated. The potential for direct contact with contaminated subsurface soils would be mitigated. The remaining source area for the groundwater contamination by petroleum related compounds in the Texaco Alley area would not be eliminated.

Alternative #3 - Off-Site Disposal of Impacted Surface Soils and Selected Subsurface Soils.

Present Worth:	*$ 689,092.*
Capital Cost:	*$ 645,219*
Annual O&M:	*$ 23,600*
Time to Implement:	2 months

This alternative would include the following remedial actions:

1. Excavation and off-site disposal of the upper one foot of the surface soils impacted by arsenic.

All surface soils above the site background concentration for arsenic would be removed. Additional sampling would be performed during the remedial phase of this project to better establish the background concentration of arsenic and the affected areas of the site.

If all of the surface soils are impacted, approximately 3,040 cu. yds. of soils would be excavated.

2. Excavation and off-site disposal of the SVOC impacted soils in the Light Pole area from the surface to approximately two feet below grade.

Additional sampling during the remedial phase of this project would be performed to better define the affected area. If the depth and area of the excavation allows, some of the soils under Item #1, which are unsuitable solely due to their arsenic content, would be used to backfill this area up to one foot below grade.

3. Excavation and off-site disposal of the subsurface soils in the area immediate south of the former underground tanks in the Texaco Alley area which are acting as a continuing source of groundwater contamination by petroleum related volatile and semi-volatile organic compounds.

This soil removal would be intended as a source removal only. At the completion of the soil removal, some low concentrations of petroleum related contaminants would be expected in some of the sidewalls of the excavation. At a minimum, none of the residual soil contamination would exceed 10 ppm of total STARS VOCs and 50 ppm of total STARS SVOCs. Much better results would be anticipated. Any residual petroleum related soil contamination left in this area would be expected to naturally attenuate within a reasonable period of time.

Some of the soils in Item #1, which would be unsuitable solely due to their arsenic content, would be used to backfill this excavation up to one foot below grade.

Based on the available data, the residual source area is estimated to encompass a 55 feet by 55 feet area to a depth of 7 feet below grade, located directly south of the Southeast UST excavation. Figure 4 illustrates the proposed area. The actual dimensions of the area to be remediated would be determined by visual and olfactory evidence of soil contamination. It is expected that some of the shallow soils above the smear zone would not be impacted and would be reused as fill. The tie backs for the nearby bulkhead present a physical restraint regarding the potential eastern and southern extent of the excavation. These tie backs would not be removed since they support the bulkhead. However, it is not anticipated that the residual source area would extend to the tie backs. For cost estimating purposes, the 55' x 55' x 6' volume of soils (the top one foot of soils would be accounted for under Item #1) is equivalent to 672 cu. yds. of soils.

4. A surface cover of at least one foot of clean soils would be placed over all the impacted areas to prevent direct contact with any residual subsurface soil contamination. Some arsenic impacted soils would be placed under the carousel building. However, these soils would be covered by a concrete slab.

5. Groundwater monitoring for at least 2 years. As opposed to Alternatives #1 and #2, less monitoring would be needed since groundwater is expected to return to

acceptable levels quicker after the removal of the Texaco Alley source area.

6. Deed restriction to prevent future site activities which would result in direct contact with contaminated subsurface soils and groundwater. Uncontrolled excavations which would expose contaminated subsurface soils would be prohibited.

Under this alternative, the potential for direct contact with surface soils would be eliminated. The potential for direct contact with subsurface soils would be mitigated. Additionally, the remaining source of petroleum related groundwater contamination in the Texaco Alley area would be eliminated.

Alternative #4 - Off-Site Disposal of Impacted Surface Soils and In-Situ Treatment of Selected Subsurface Soils and Groundwater

Present Worth:	*$ 842,578*
Capital Cost:	*$ 737,359*
Annual O&M:	*$ 56,600*
Time to Implement:	3 months

This alternative would include the following remedial actions:

1. Excavation and off-site disposal of the upper one foot of the surface soils impacted by arsenic. All surface soils above the site background concentration for arsenic would be removed. Additional sampling would be performed during the remedial phase of this project to better establish the background concentration of arsenic and the affected areas of the site. If all of the surface soils are impacted, approximately 3,040 cu. yds. of soils would be excavated.

2. Excavation and off-site disposal of the SVOC impacted soils in the Light Pole area from the surface to approximately two feet below grade.

Additional sampling during the remedial phase of this project would be performed to better define the affected area. If the depth and area of the excavation allows, some of the soils under Item #1, which are unsuitable solely due to their arsenic content, would be used to backfill this area up to one foot below grade.

3. A surface cover of at least one foot of clean soils would be placed over all the impacted areas to prevent direct contact with any residual subsurface soil contamination. Some arsenic impacted soils would be placed under the carousel building. However, these soils would be covered by a concrete slab.

4. In-situ treatment of petroleum contaminated soils and groundwater using Air Sparging/Soil Vapor Extraction (SVE) in the portion of the Texaco Alley area which is acting as a source area for groundwater contamination by petroleum related compounds.

5. Groundwater monitoring for at least 2 years. In the Texaco Alley area, a minimum of one year of groundwater monitoring would take place after the closure of the Air Sparging/SVE system. As opposed to Alternatives #1 and #2, less monitoring would be expected since this remedy would actively remediate the groundwater in the Texaco Alley area where there is a residual source of contamination.

6. Deed restriction to prevent future site activities which would result in direct contact with contaminated subsurface soils and groundwater. Uncontrolled excavations which would expose contaminated subsurface soils would be prohibited.

Under this alternative, the potential for direct contact with surface soils would be eliminated. The potential for direct contact with subsurface soils would be mitigated. Additionally, the remaining source of petroleum related VOC groundwater contamination in the Texaco Alley area would be eliminated. However, the In-situ treatment in this area would have little effect on the heavier petroleum related SVOCs in the subsurface soils and groundwater.

Alternative #5 - Off-Site Disposal of all Impacted Soils and Groundwater Treatment

Present Worth:	*$ 1,807,290*
Capital Cost:	*$ 993,517*
Annual O&M:	*$104,520 - $ 108,120*
Time to Implement:	4 months

This alternative would include the following remedial actions:

1. Excavation and off-site disposal of all impacted soils from the site. The contaminated soils in the surface soils, Light Pole area, Texaco Alley area, Dredge Spoils area, Water Line area, South UST area, and Boat Bottom Scraping area would total more than 5,000 cu. yds.

2. Groundwater treatment via extraction wells using liquid phase granular activated carbon to remove organic compounds from the extracted groundwater. This portion of the alternative is commonly referred to as "pump and treat".

3. Periodic groundwater monitoring to observe the progress made by the groundwater treatment system.

The intent of this remedial alternative is to evaluate the feasibility of bringing this site back to pre-release conditions. A deed restriction would not be needed since the site would be completely restored.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of environmental restoration project sites in New York State (6 NYCCR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Remedial Alternatives Report.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs).

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. The relevant soil SCGs for this site are found in NYSDEC Spill Technology and Remediation Series (STARS) Memo #1 for petroleum related contamination and in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels" for other environmental contamination. The relevant groundwater SCGs are found in NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS 1.1.1), "Ambient Water Quality Standards and Guidance Values".

The GA groundwater standards listed in TOGS 1.1.1, which assumes that the underlying groundwater at the site may be used as a source of drinking water, have been used at this site as SCGs. However, the groundwater at the site is influenced by the adjacent saltwater body. Saltwater intrusion would severely limit the possible future use of this groundwater for drinking water purposes. Also, the bulk of the petroleum related groundwater contamination will naturally attenuate with time and will eventually meet most of the GA groundwater standards. Additionally, the groundwater at this site flows directly into the saltwater body thereby preventing migration of the contaminants to nearby groundwater which might be usable for drinking water purposes.

All alternatives except for Alternative #5 require a waiver of the groundwater SCGs. This waiver would be granted for Alternatives #1, #2, #3, and #4 due to the saltwater intrusion which makes the underlying groundwater unsuitable for use as a drinking water source. The waiver includes both petroleum and lead contamination in groundwater.

Alternative #4 would treat the portion of the contaminated groundwater by VOCs in the Texaco Alley area which is considered to be a source area but would not effectively treat SVOCs. Alternative #3 would result in an improvement in groundwater quality near Texaco Alley since the primary residual source of the existing groundwater contamination by petroleum related VOC and SVOC compounds in this area would be removed. Alternatives #1 and #2, which would not address the Texaco Alley source area, would take a longer time for the groundwater quality in this area to improve by natural attenuation. Consequently, Alternatives #3 and #4 are preferred over Alternatives #1 and #2.

STARS Memo #1 and TAGM 4046 provide guidance values for soils. Both these documents consider health related concerns such as direct contact or accidental ingestion of impacted soils and potential leaching of the contaminants to the underlying groundwater. However, since a waiver would be granted for groundwater SCGs at this site as noted previously, the potential leaching of the contaminants in the soils to the underlying groundwater is not considered further. By applying engineering judgement as allowed under 6 NYCRR Part 375-1.10(c)(1)(ii), the Department has determined that, in this site-specific instance, soil guidance values would not be applied directly. However, the Department would consider the health risks that the contaminated soils might present. Consequently, the ability of an alternative to meet soil SCGs would be evaluated solely on its ability to prevent health related exposures. If all potential exposures would be prevented by an alternative, it will be concluded that this alternative would satisfy the soil SCGs.

Alternative #1, no further action, does not comply with soil SCGs due to the surface soil contamination by arsenic and SVOCs. Direct contact and/or accidental ingestion of the surface soils is not prevented. This alternative does not satisfy the remedial goals.

Alternatives #2, #3, and #4 would use a deed restriction and placement of a surface cover of one foot of clean fill to prevent contact with the impacted subsurface soils. These alternatives would prevent all potential health related exposures. Consequently, soil SCGs would be satisfied under the limits discussed above.

Alternatives #3 and #4 would include the remediation of the only remaining source area at the site. The remediation of the highly contaminated soils in this source area is preferred since there would be less risk of exposure to the public as compared to Alternatives #1 and #2.

Since Alternative #5 will satisfy both soil and groundwater SCGs without a waiver for groundwater SCGs, this alternative is preferred over the other alternatives based on this criteria.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The no further action alternative would not be protective of human health as the potential to be exposed to contamination would remain. This alternative would not provide for removal or control of contaminated soils.

Alternatives #2, #3, and #4 would be protective of public health since exposure to residual contamination would be prevented by a deed restriction.

At the concentrations remaining in groundwater for all alternatives, no environmental impacts to the adjacent surface water body are expected especially when one considers the constant flushing resulting from tidal changes. However, Alternatives #3, #4, and #5 would be preferred over Alternatives #1 and #2 since the recovery of the contaminated groundwater would take less time than for Alternatives #1 and #2.

The relatively high concentrations of VOCs in the Texaco Alley source area are viewed as a potential source for the release of vapors should an uncontrolled excavation of these soils occur in the future. Alternatives #3, #4, and #5 would also be preferred over Alternatives #1 and #2 since this potential source of vapors would be eliminated. The deed restriction under Alternative #2 would mitigate the potential release of vapors from this area for this alternative.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Since there are no further actions proposed for Alternative #1, there would be no short-term effects associated with this alternative.

Alternatives #2, #3, #4, and #5 would include varying degrees of excavation and offsite disposal of contaminated soils. Implementation of these alternatives would pose short-term effects during excavation and transportation to an offsite landfill or treatment facility. Based on the quantities of contaminated soils being removed, Alternative #5 would have the most potential short-term effects, including potential exposure to the community and the environment during transportation of contaminated soils. Alternatives #3, which would include excavation of the highly impacted soil in the remaining source area in Texaco Alley, would have more potential short-term effects than Alternatives #2 and #4.

Alternative #5, which would utilize "pump and treat" technology to treat the groundwater, would take a relatively long time to achieve remedial objectives. To a lesser extent, the air sparge/SVE system under Alternative #4 would take a considerable time period to remediate the Texaco Alley source area.

Alternatives #2 and #3 would be completed in a much shorter time period than Alternatives #4 and #5 since these alternatives primarily would involve excavation and backfilling of soils.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

The no further action alternative would not be effective in the long term. This alternative would not provide for removal or control of contaminated soils, and therefore, would not reduce any existing or future potential risks from the residual onsite contamination.

Alternatives #2, #3, and #4 would all require a deed restriction to prevent direct contact with the residual soil and groundwater contamination which would be left at the site under these alternatives. Alternative #2 would provide less long term effectiveness than Alternatives #3 and #4 since the highly impacted soils judged to be the source of continuing groundwater contamination in the Texaco Alley area would not be remediated under this alternative. The groundwater would take much longer to recover via natural attenuation for Alternative #2.

Alternative #4 would not effectively remove the petroleum related SVOCs in the Texaco Alley source area. The heavier molecular weight SVOC compounds in this source area would not significantly reduce in concentration by natural attenuation.

Alternative #5 would provide the best long term effectiveness since all the contamination would be remediated.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the substances at the site.

The no further action alternative would not reduce the toxicity, mobility, or volume of the residual waste.

Alternative #2 would leave highly contaminated soils in the Texaco Alley area and consequently, would be less effective than Alternatives #3 and #4 which would address these highly impacted soils.

Alternative #4 would only removed the residual source of petroleum related VOCs in the Texaco Alley area. This alternative would not be effective on the residual source of SVOCs. Alternatives #3 and #5 would address both petroleum related VOCs and SVOCs in this area.

Alternatives #2, #3, and #4 would leave some relatively low concentrations of organic and inorganic contamination at other areas of the site. However, the most mobile portion of these contaminants, the petroleum related VOCs are expected to naturally attenuate

within a reasonable period of time. The relatively immobile inorganic contaminants and heavier molecular weight petroleum related SVOCs are not expected to naturally attenuate to any significant degree. A deed restriction would have to be maintained to prevent future direct contact with these contaminants.

Alternative #5 would provide for the return of the site to pre-release conditions and would result in the best reduction of toxicity, mobility, and volume.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

All of the alternatives would be implementable. Alternative #1 would be the easiest to implement since it involves no further action other than monitoring.

Alternatives #4 and #5 would involve air sparge/SVE and groundwater pump and treat systems, respectively. These systems would probably be impacted by the elevated concentrations of salt in the underlying groundwater due to saltwater intrusion. The expected corrosion of the system components under both of these alternatives would make it more difficult to implement them.

Potential vandalism of the treatment systems at the park where public access would not be controlled would make it more difficult to implement Alternatives #4 and #5.

Alternatives #2 and #3, which would primarily involve excavation and backfilling of soils, would be implemented much easier than Alternatives #4 and #5.

The material and personnel for each alternative should be readily available in this region.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Section 7.1.

The no further action alternative would be the least costly alternative, having no associated costs other than monitoring and the cost to implement the deed restriction.

Alternative #2 would have the next lowest costs since only the surface soil contamination would be addressed. However, both Alternatives #1 and #2 would not satisfy the remedial goals discussed under Section 6.

The cost of Alternative #3 would be slightly less than for Alternative #4, but both remedies would cost more than Alternatives #1 and #2. However, since the remaining source of groundwater contamination in the Texaco Alley would be eliminated, it would be expected that the groundwater quality would recover to acceptable levels much more quickly. This would result in reduced monitoring costs for Alternatives #3 and #4

since it would be necessary to monitor for less time than for Alternatives #1 and #2.

Alternative #5 would be much more expensive than the other alternatives.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - Concerns of the community regarding the SI/RAR reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

Based on the results of the SI/RAR, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative #3 as the remedy for this site.

Alternative #3 is being proposed for the following reasons:

1) It would be a cost effective remedial action which would address the remedial objectives for this site.

2) It would be implemented in a much shorter time than Alternatives #4 and #5 and would take only slightly more time than Alternative #2.

3) Alternative #3 would not require periodic maintenance of a treatment system as required for Alternatives #4 and #5. Due to conditions under which these treatment systems would operate, significant maintenance costs would be expected for Alternatives #4 and #5.

4) Alternative #3, in comparison to Alternative #4, would remove the remaining source area for both petroleum related VOCs and SVOCs while Alternative #4 would only remediate the source of VOCs.

5) Alternative #2, which does not remediate the remaining source area in the Texaco Alley area, is less desirable than Alternative #3 since it would take a much longer time for the groundwater to recover by natural attenuation. This means that there would be a much longer time needed to monitor the groundwater. Consequently, much of the cost savings for Alternative #2 over Alternative #3, would instead be spent on increased monitoring costs. The remediation of the highly impacted soils in this source area would also result in less potential risk of exposure to subsurface soils.

6) The much higher costs that would be associated with Alternative #5 cannot justify the removal of the relatively low concentrations of the residual contamination which would be left at the site under Alternative #3, especially when one considers that much of the residual petroleum related contamination would naturally attenuate and any residual groundwater contamination would not result in any noticeable health or environmental impacts.

This selection is based upon the fewer negative aspects for Alternative #3 as compared to Alternatives #4 and #5, the only

other alternatives which satisfy the remedial goals in Section 6.

The estimated present worth cost to implement the remedy is $689,092. The cost to construct the remedy is estimated to be $645,219 and the estimated average annual operation and maintenance cost for 2 years is $23,600 per year.

The elements of the proposed remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the SI/RAR would be resolved.

2. Excavation and off-site disposal of the top one foot of the surface soils in all areas above the site background concentration for arsenic. A background sample detected 8.7 ppm of arsenic. Additional background sampling would be performed during the remedial phase to better define the background concentration of arsenic. Additionally, grid sampling would be performed prior to the removal to better define the area which contains arsenic above background concentrations. Some of these soils which are judged to be unsuitable due to direct contact concerns resulting solely from their arsenic content, may be used as part of the fill in the excavations described below under Items #3 and #4 where direct contact would not be an issue.

3. Excavation and off-site disposal of soils from the surface to approximately 2 feet below grade in the Light Pole area. Further sampling would be performed to better delineate the impacted area.

4. Excavation and off-site disposal of the subsurface soils in a 55 feet x 55 feet area to a depth of 7 feet below grade located immediate south of the former underground tanks in the Texaco Alley area. These soils are judged to be acting as a continuing source of groundwater contamination by petroleum related volatile and semi-volatile organic compounds in this area. The actual area to be remediated would be adjusted during implementation based on visual and olfactory evidence of contamination.

5. A surface cover of at least one foot of clean soils would be placed over all the impacted areas to prevent direct contact with any residual subsurface soil contamination. Some arsenic impacted soils would be placed under the carousel building. However, these soils would be covered by a concrete slab.

6. A deed restriction would be instituted to prevent future site activities which would result in direct contact with contaminated subsurface soils and groundwater. Uncontrolled excavations which would expose contaminated subsurface soils would be prohibited.

7. Since the remedy results in untreated hazardous substances remaining at the site, a long term monitoring program

would be instituted. This program would allow the effectiveness of the selected remedy to be monitored and would be a component of the operation and maintenance for the site. Groundwater monitoring would be implemented for a minimum of 2 years.

TABLE 1 - RANGE OF DETECTIONS IN SOIL SAMPLES (PPM) - Page 1 of 2
SIGNIFICANT DETECTIONS ONLY

AREA OF CONCERN	SURFACE SOILS	BOAT SCRAPING AREA	DREDGE SPOILS AREA	WATER LINE AREA	STARS TCLP ALTERNATIVE GUIDANCE VALUE	TAGM-4046
STARS VOCs (ppm)						
Benzene	NO SIGNIFICANT DETECTIONS	NO SIGNIFICANT DETECTIONS	NO SIGNIFICANT DETECTIONS	NO SIGNIFICANT DETECTIONS	.014	.06
Ethylbenzene					0.1	5.5
MTBE					1.0	Not Available
Toluene					0.1	1.5
Xylenes (total)					0.1	1.2
Isopropylbenzene					0.1	Not Available
n-Propylbenzene					0.1	Not Available
p-Isopropyltoluene					0.1	Not Available
1,2,4-Trimethylbenzene					0.1	Not Available
1,3,5-Trimethylbenzene					0.1	Not Available
n-Butylbenzene					0.1	Not Available
sec-Butylbenzene					0.1	Not Available
Naphthalene					0.2	13
STARS SVOCs (ppm)						
Acenaphthene	NO SIGNIFICANT DETECTIONS				0.4	50
Fluorene					1.0	50
Phenanthrene					1.0	50
Anthracene					1.0	50
Fluoranthene					1.0	50
Pyrene					1.0	50
Benzo(a)anthracene		0.27J - 0.32J		0.17J - 0.39	0.00004	0.224 or MDL
Chrysene		0.42 - 0.47		0.18J - 0.93	0.00004	0.4
Benzo(b)fluoranthene		0.41J - 0.48	0.31J	0.2J - 0.58	0.00004	0.224 or MDL
Benzo(k)fluoranthene		0.21J - 0.23J		0.13J - 0.28J	0.00004	0.224 or MDL
Benzo(a)pyrene		0.32J - .35J	0.19J	0.17J - 0.3J	0.00004	0.061 or MDL
Indeno(1,2,3-cd)pyrene					0.00004	3.2
Dibenzo(a,h)anthracene					1.0	0.014 or MDL
Benzo(g,h,i)perylene					0.00004	50
METALS (ppm)					**BACKGROUND CONCENTRATION**	**TAGM-4046**
Arsenic	1.9 - 67.8		NO SIGNIFICANT DETECTIONS		8.7	7.5 or SB
Copper		37.2 - 167		28.5 - 208	10.9	25 or SB
Lead		118 - 421		117 - 969	24.6	★
Zinc				146 - 479	43.6	20 or SB

★ Background levels vary widely. Average background levels in metropolitan or suburban areas near highways typically range from 200-500 ppm.

J = Estimated Value; Detection is Below the Contract Required Detection Limit ppm = parts per million ND = Not Detected

TAGM = Technical and Administrative Guidance Memorandum MDL = Method Detection Limit SB = Site Background

TABLE 1 - RANGE OF DETECTIONS IN SOIL SAMPLES (PPM) - Page 2 of 2
SIGNIFICANT DETECTIONS ONLY

AREA OF CONCERN	SOUTHEAST UST AREA TEXACO ALLEY	SOUTH UST AREA	NORTH UST AREA	LIGHT POLE AREA	STARS TCLP ALTERNATIVE GUIDANCE VALUE	TAGM-4046
STARS VOCs (ppm)						
Benzene	ND - 1.9				.014	.06
Ethylbenzene	ND - 29				0.1	5.5
MTBE	ND - 0.001				1.0	not available
Toluene	ND				0.1	1.5
Xylenes (total)	0.003 - 160		ND - 2.5		0.1	1.2
Isopropylbenzene	ND - 24	NO		NO	0.1	not available
n-Propylbenzene	ND - 30	SIGNIFICANT	ND - 0.48	SIGNIFICANT	0.1	not available
p-Isopropyltoluene	ND - 0.7	DETECTIONS	0.042 - 2.1	DETECTIONS	0.1	not available
1,2,4-Trimethylbenzene	0.001 - 210		0.022 - 1.1		0.1	not available
1,3,5-Trimethylbenzene	ND - 89		ND - 0.24		0.1	not available
n-Butylbenzene	0.006 - 150		0.045 - 1.4		0.1	not available
sec-Butylbenzene	ND - 2.4		0.007 - 0.24		0.1	not available
Naphthalene	0.006 - 88				0.2	13
STARS SVOCs (ppm)						
Acenaphthene	ND - 4.2				0.4	50
Fluorene	ND - 6.9				1.0	50
Phenanthrene	ND - 10				1.0	50
Anthracene					1.0	50
Flupranthene		ND - 1.1			1.0	50
Pyrene		ND - 1.3	NO		1.0	50
Benzo(a)anthracene	ND - 0.35J	ND - 0.64J	SIGNIFICANT	1.8	0.00004	0.224 or MDL
Chrysene	ND - 0.54J	ND - 0.78	DETECTIONS	2.1	0.00004	0.4
Benzo(b)fluoranthene	ND - 0.66J	ND - 0.97		2.4	0.00004	0.224 or MDL
Benzo(k)fluoranthene	ND - 0.39J	ND - 0.43J		1.3	0.00004	0.224 or MDL
Benzo(a)pyrene	ND - 0.47J	ND - 0.73J		1.6	0.00004	0.061 or MDL
Indeno(1,2,3-cd)pyrene	ND - 0.38J	ND - 0.63J		1.2	0.00004	3.2
Dibenzo(a,h)anthracene	ND - 1.0J			0.44	1.0	0.014 or MDL
Benzo(g,h,i)perylene	ND - 0.47J	ND - 0.79		1.4	0.00004	50
METALS (ppm)					**BACKGROUND CONCENTRATION**	**TAGM-4046**
Arsenic		LIMITED	NO	NO	8.7	7.5 or SB
Copper		METALS	METALS	SIGNIFICANT	10.9	25 or SB
Lead	21.4 - 613	DATA	DATA	DETECTIONS	24.6	★
Zinc					43.6	20 or SB

★ Background levels vary widely. Average background levels in metropolitan or suburban areas near highways typically range from 200-500 ppm.

J = Estimated Value; Detection is Below the Contract Required Detection Limit ppm = parts per million ND = Not Detected

TAGM = Technical and Administrative Guidance Memorandum MDL = Method Detection Limit SB = Site Background

TABLE 2 - RANGE OF DETECTIONS IN GROUNDWATER SAMPLES (PPB)

SIGNIFICANT DETECTIONS ONLY

AREA OF CONCERN	SOUTHEAST UST AREA TEXACO ALLEY	SOUTH UST AREA	NORTH UST AREA	CLASS GA GROUNDWATER STANDARDS
STARS VOCs (ppb)				
Benzene	4 - 88	2 - 94	ND - 5	1
Ethylbenzene	11 - 320	2 - 740	ND - 85	5
MTBE				50**
Toluene	3 - 130	3 - 250		5
Xylenes (total)	51 - 1,200	10 - 2,800	ND - 140	5
Isopropylbenzene	4 - 40	ND - 65	ND - 37	5
n-Propylbenzene				5
p-Isopropylbenzene		ND - 22		5
1,2,4-Trimethylbenzene	25 - 870	5 - 1,200	ND - 210	5
1,3,5-Trimethylbenzene	1 - 85	1 - 180	ND - 84	5
n-Butylbenzene	5 - 100	2 - 190	ND - 65	5
sec-Butylbenzene	ND - 14		ND - 53	5
Naphthalene*	11 - 140	3 - 480	ND - 220	GA Guidance Value = 10
STARS SVOCs (ppb)				
Naphthalene*	ND - 57	1 - 90	ND - 64	GA Guidance Value = 10
Acenaphthene				GA Guidance Value = 20
Fluorene				GA Guidance Value = 50
Phenanthrene				GA Guidance value = 50
Anthracene				GA Guidance Value = 50
Fluoranthene				GA Guidance Value = 50
Pyrene				GA Guidance Value = 50
Benzo(a)anthracene		ND - 2J		GA Guidance Value = 0.002
Chrysene		ND - 2J		GA Guidance Value = 0.002
Benzo(b)fluoranthene		ND - 2J		GA Guidance Value = 0.002
Benzo(k)fluoranthene				GA Guidance Value = 0.002
Benzo(a)pyrene		ND - 2J		Not detectable
Indeno(1,2,3-cd)pyrene				GA Guidance Value = 0.002
Dibenzo(a,h)anthracene				50**
Benzo(g,h,i)perylene				50**
METALS (ppb)				
Lead		ND - 279	ND - 226	25

* Naphthalene was analyzed using two different analytical methods

** Regulated as an Unspecified Organic Contaminant (UOC) at 50 ppb under Part 5 Public Water Systems (NYSDOH Part 5)

ND = Not Detected

J = Estimated Value Below the Contract Required Detection Limit

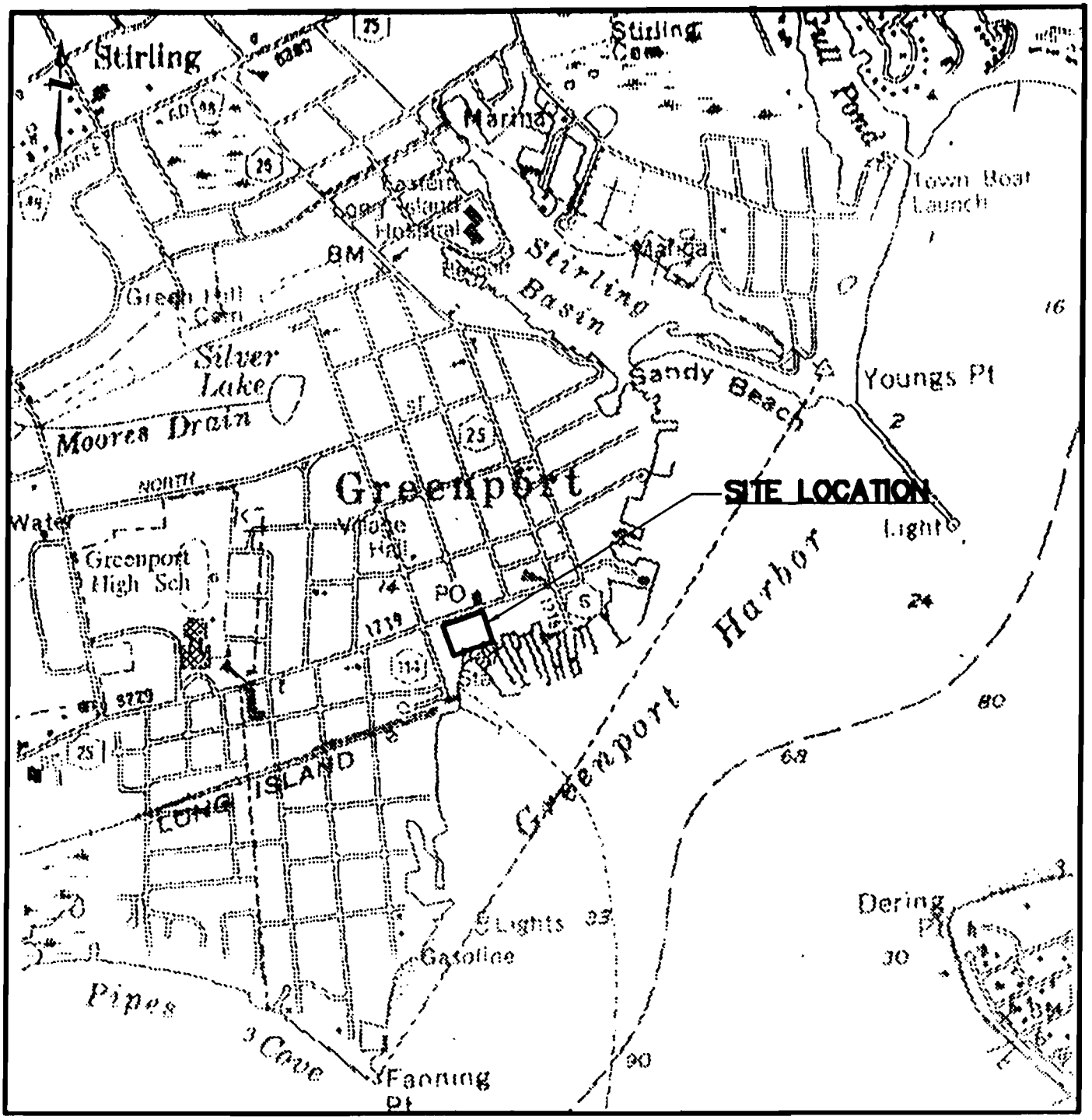


FIGURE 1

SITE LOCATION MAP
115 FRONT STREET PROPERTY
SITE LOCATION MAP

SCALE: 1" = 2000'

SOURCE: U.S.G.S. AMITYVILLE QUADRANGLE 1969

H2MGROUP
ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y.
TOTOWA, N.J.

Source: Site Investigation Report, July 1999

FRONT STREET

115 FRONT STREET
SITE MAP WITH AREAS OF CONCERN

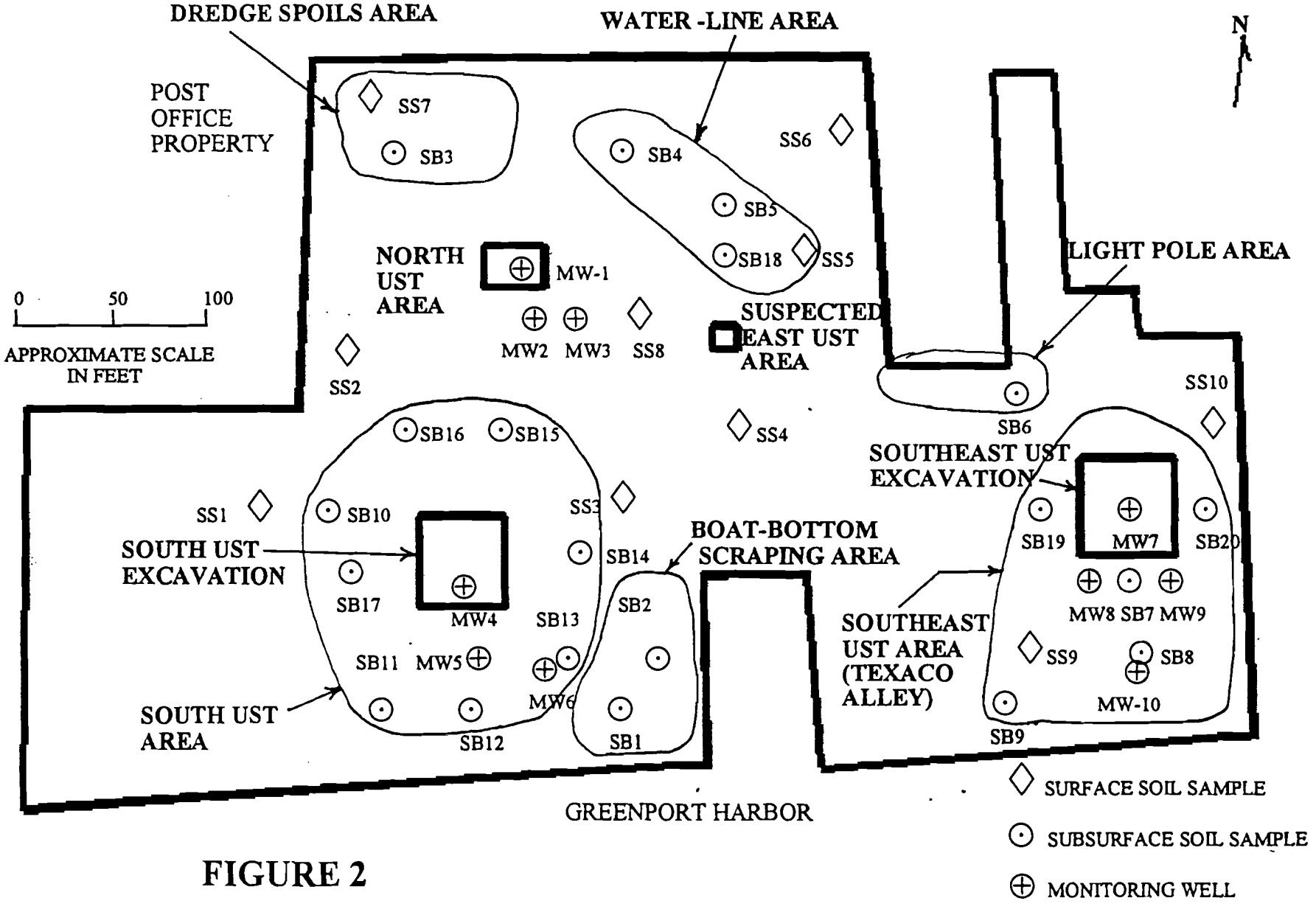
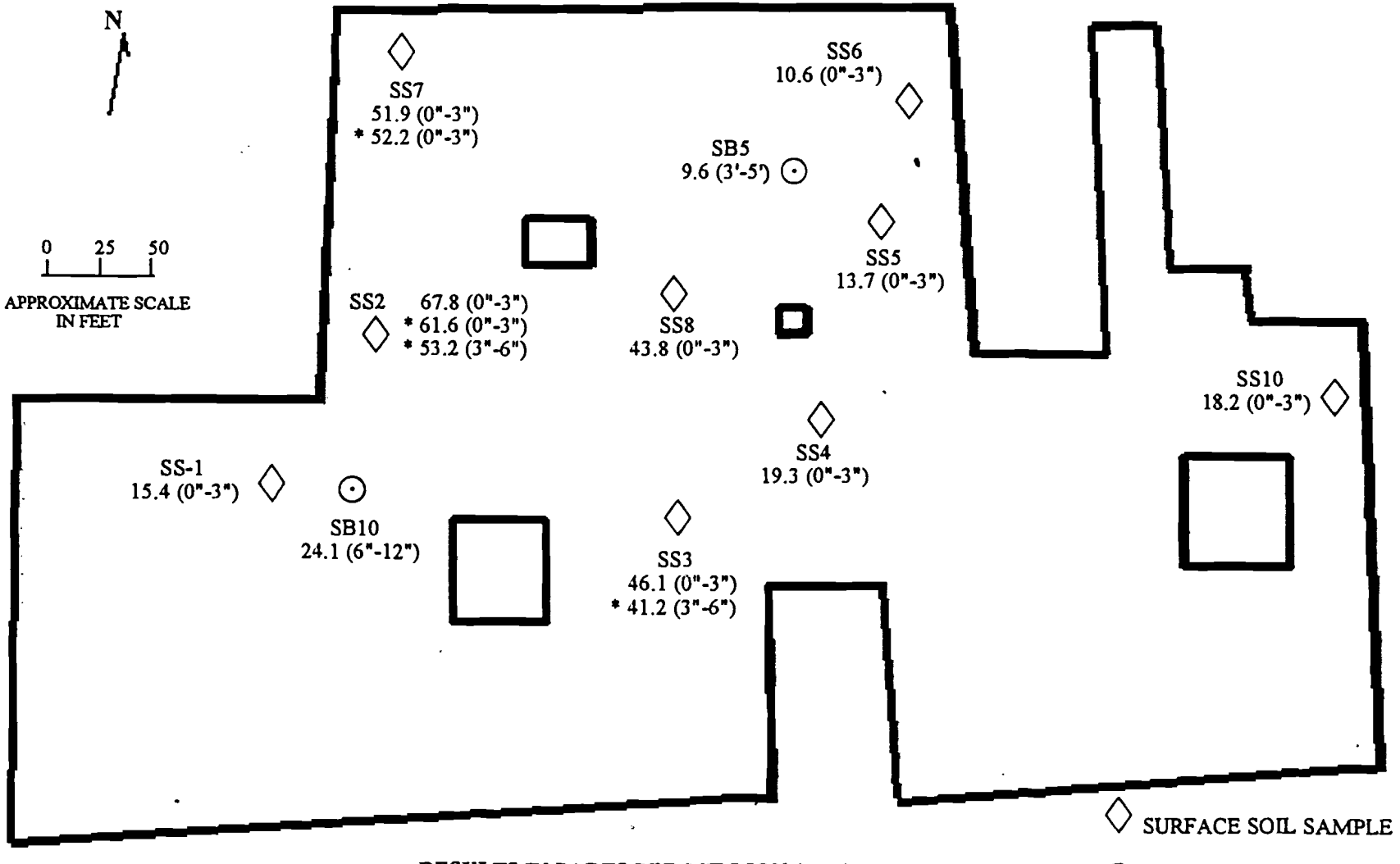


FIGURE 2

115 FRONT STREET

ARSENIC CONCENTRATIONS DETECTED ABOVE SITE BACKGROUND



RESULTS IN PARTS PER MILLION (ppm)

FIGURE 3

115 FRONT STREET
PROPOSED TEXACO ALLEY EXCAVATION FOR ALTERNATIVE #3

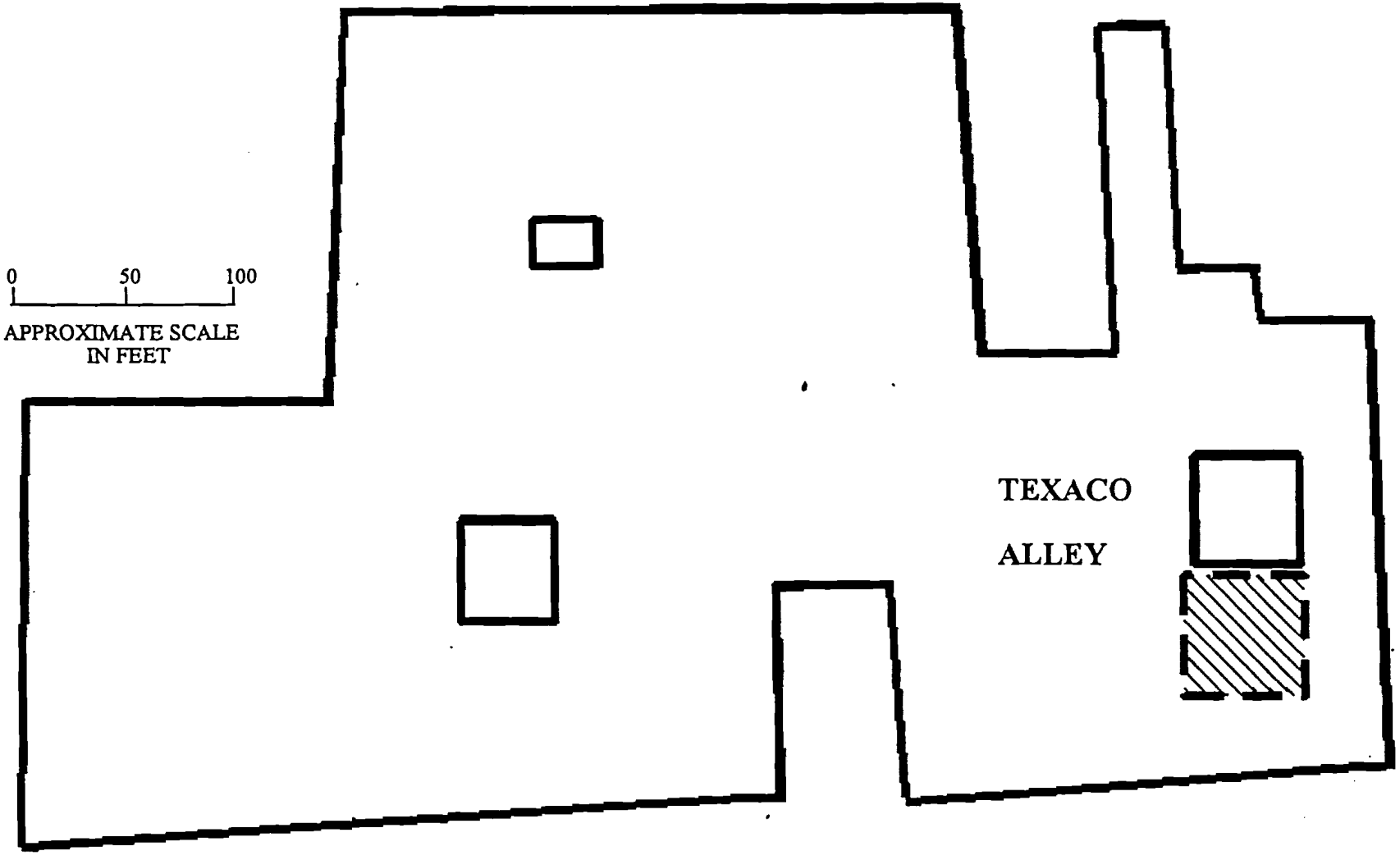


FIGURE 4

PROPOSED EXCAVATION