November 2003

Remedial Alternatives Report

Environmental Restoration Project
Clean Water/Clean Air Bond Act of 1996
Independent Leather
321-333 South Main Street
City of Gloversville
Fulton County, New York

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ENVIRONMENTAL RESTORATION PROJECT
REMEDIAL ALTERNATIVES REPORT
INDEPENDENT LEATHER
321-333 SOUTH MAIN STREET
GLOVERSVILLE, NEW YORK

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APPENDICES

1.0 INTRODUCTION

1.1 Purpose and Organization

The intent of this Remedial Alternatives Report (RAR) is to present site specific remediation alternatives based on the findings and conclusions of the Site Investigation (SI) Report for the Independent Leather Environmental Restoration Project prepared by C.T. Male Associates, P.C., dated November 2003. The overall goal of the RAR is to develop and present feasible remedial action(s) to either achieve compliance with established regulatory clean up guidance levels and/or to protect human health and the environment from contaminated media which may remain at the subject site. Ultimately, a Record of Decision (ROD) will be issued by the NYSDEC on the basis of this RAR.

This RAR is organized and prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) Revised Technical and Administrative Guidance Memorandum (TAGM) issued December 22, 1997, entitled Municipal Assistance Environmental Restoration Projects, "Brownfields Program" (the "Procedures Handbook"). The RAR consists of three (3) main sections. Section 1 is an introduction which presents the purpose of the project and background information such as a site description, site history, and extent and nature of site contamination. Human and ecological exposure pathways are also discussed in this section. Section 2 identifies remedial alternatives currently available for addressing the on-site contamination and their objectives. Section 3 presents an individual and comparative analysis of each of the alternatives discussed within the report.

1.2 Site History

1.2.1 Project Background

In 2001, the City of Gloversville applied for and was approved for funding by the NYSDEC under the Clean Water/Clean Air Bond Act of 1996 for performing an Environmental Restoration "Site Investigation" Project of the Independent Leather Tannery in the City of Gloversville, Fulton County, New York. Independent Leather is one of several defunct tannery complexes that have been abandoned in the City of Gloversville. Independent Leather was in an advanced state of decay and dilapidation,

and was suspected to be contaminated by industrial wastes that potentially contain hazardous wastes and substances from the tannery processes.

C.T. Male Associates, P.C. (C.T. Male) was retained by the City of Gloversville to perform the site investigation activities. The majority of the investigation work was completed between April 2002 and May 2002. The work was performed in accordance with the Final Site Investigation/Remedial Alternatives Report Work Plan as approved by the NYSDEC on December 17, 2001, which included input from the New York State Department of Health (NYSDOH).

It should also be noted that from mid 2001 until mid 2002, the United States Environmental Protection Agency (EPA) was on-site performing a CERCLA Emergency Removal Action. EPA was aggressively packaging and removing hundreds of drums of chemicals from April 2001 until December of 2001, including corrosives, metallic pigments, resins, acids, lab chemicals, water reactive solids, chromium solutions, and biowaste consisting of animal hair, skin fleshing, and small animal parts. Once the wastes were properly disposed off-site or relocated on-site for subsequent disposal, EPA demolished three buildings, the main tannery building and smaller maintenance building on the west side of the creek, and the storage shed located on the east side of the creek. EPA also cleaned the interior of the secondary tannery building on the east side of the creek. All of the building demolition debris was transported to the Fulton County Landfill. Due to inclement weather, EPA demobilized for the winter months and remobilized to the site on May 13, 2002 to finish the removal action.

1.2.2 Operational and Disposal History

The Independent Leather Tannery site has been used to tan, dye and finish pickled animal skins since the beginning of the 20th Century. It was reported that beaming of skins, the process of de-hairing the skins, was not part of the process at Independent Leather. However, based on the observation of piles of waste hair and deer tails within the secondary tannery building, beaming may have also been performed. For the years of operation, it is inferred that the liquid wastes generated in the various tanning and finishing processes were discharged directly to the Cayadutta Creek, which flows through the center portions of the site. In the early 1980's, at the time waste water treatment facilities were established in the Cities of Gloversville and Johnstown, the area tanneries were mandated to construct and maintain waste water pretreatment

plants and monitoring stations. The waste water pretreatment plant at Independent Leather was reportedly in operation in 1984. Liquid waste water from the on-site plant was discharged to the municipal sewer system. Sludges from the plant were reportedly removed and disposed of at the local landfill. There is some limited information that leather shavings were periodically stockpiled on the ground surface within the southern sections of the site on the west side of the creek.

1.3 Site Description

The project site is located at 321-333 South Main Street in the City of Gloversville, County of Fulton, New York. The site boundaries lie within the northeast quadrant of the intersection of South Main Street and Hill Street. The site is identified on City of Gloversville tax maps as being within the parcel with section 149.13, block 2 and parcel 9. The parcel is approximately 3.7 acres in size. The subject site can be accessed by South Main Street and Hill Street. The approximate latitude and longitude for the site is 43° 02′ 22″N and 73° 21′ 10″ W. A Site Location Map is included as Figure 1 of the SI Report. A Boundary Survey depicting the locations of its features is presented as Figure 2 of the SI Report.

The site is situated in the middle of a commercial/retail area in the City of Gloversville. The site is bound to the west by South Main Street; to the east by former railroad tracks that are now a bike path with wooded areas and Callanan Gravel Pit on the opposite side of the bike path; to the north by a car washp; and to the south by commercial/retail businesses and Hill Street.

The site's property boundaries create an irregularly shaped parcel. The site is currently a defunct tannery complex. The Cayadutta Creek flows onto the site from the north and continues in a southerly direction through the middle of the parcel. At its peak, the site contained four separate buildings which were associated with the tannery process, and a sewage pre-treatment plant. These buildings were located on both sides of the stream. Steel/wooden bridges over the stream allowed access to each side of the site as shown in the black and white aerial photograph presented in the Figure 3 of the SI Report.

The main building complex (two buildings) was located in the western section of the parcel, which was razed as part of EPA's Emergency Response Action. For the purpose

of this report, these buildings are referred to as the "main tannery building" and the "maintenance shop". The main tannery building was a multi-story building with a basement approximately 30,000 square feet in plan size. EPA designated the main tannery building as Building #1 for the purpose of their work. The maintenance shop was a single-story slab on grade building approximately 3,200 square feet in plan size.

The main tannery building was constructed on a stone and concrete foundation with a basement. The remainder of the building was predominantly of wood post and beam construction. The basement floor of the main tannery building contained the majority of the tanning wheels, chemical tanks, drums and other tanning products, and the pretreatment sewer plant. A small room extending off of the northern side of the building and basement was used as the color room. This room, prior to being cleaned out, contained numerous drums and containers of various chemicals used to dye the leather. A small laboratory was also located on the basement level. The upper floors were used in the tanning process including drying, finishing, buffing and shaving, shipping and receiving, offices, a small retail store and warehousing.

The one-story machine shop was constructed on a slab on grade concrete foundation and was stick framed. The shop contained various milling machines and lathes, and was in part used as a parts stockroom.

On the eastern portion of the parcel, two additional buildings were located for supplemental tanning activities. The two buildings, for the purpose of this report, are referred to as the "secondary tannery building" and the "storage shed". The storage shed was demolished as part of EPA's Emergency Response Action, but the secondary tannery building remains. The secondary tannery building is approximately 12,700 square feet in plan size. EPA designated the secondary tannery building as Building #2 for the purpose of their work. The storage shed was a single story wood frame building approximately 1,600 square feet in plan size. The concrete slab for the storage shed was left in-place. The storage shed was apparently used for equipment storage.

The main and older portion of the secondary tannery building is in part two stories constructed of concrete and masonry block and brick. A wood frame addition appears to have been added to the southern end of the building. The building appears to have been used primarily for warehousing purposes; however, at some point it appears it

was used in the tanning process as several tanning wheels, chemical storage tanks, floor drains and piping systems were present in the building.

1.4 Summary of the Site Investigation

The goal of the site investigation was to identify and assess known and potential sources of contamination, and to develop a comprehensive strategy to address and/or remediate the identified contamination, as necessary to protect the environment and human health. A report entitled "Site Investigation Report, Independent Leather, 321-333 South Main Street, Gloversville, New York", dated November 2003 was prepared and summarizes all of the investigation activities. The site investigation included the following investigative activities:

- site survey;
- geophysical investigation (ground penetrating radar survey);
- evaluation of creek sediments and surface water;
- fish and wildlife impact analysis;
- site wide subsurface/hydrogeologic evaluation;
- monitoring well installation and sampling; and
- surface soil sampling and analysis.

The analytical data collected from completion of these site investigation work tasks were compared to environmental Standards, Criteria, and Guidance (SCGs) to determine which media (soil, groundwater, etc.) contains contamination at levels of concern. Soil and sediment SCGs for the site were based on NYSDEC TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels, and in part on NYSDEC Technical Guidance for Screening Contaminated Sediments. Groundwater and surface water SCGs for the site were based on NYSDEC Ambient Water Quality Standards and Guidance Values (6 NYCRR Part 703.5).

Additional analytical data generated by EPA was provided to C.T. Male for additional site characterization under the Brownfields program. The EPA samples were analyzed by a New York State Environmental Laboratory Approval Program certified laboratory, however, the analytical results were not subjected to third party independent data validation.

1.5 Nature and Extent of Contamination

1.5.1 General

Media and sampling locations used for determining the extent of contamination at the subject site, as presented in the SI report included the following:

Collected by C.T. Male:

- Three surface water samples from the creek.
- Three sediment samples from the creek.
- Eight surface soil samples site wide.
- Ten subsurface soil samples from test borings.
- Thirteen groundwater samples from new and existing monitoring wells.
- Two additional groundwater samples were collected in September 2003 from MW-8 (total arsenic) and MW-10 (total chromium) to verify contaminant concentrations.

Collected by EPA:

- Three sediment samples from the creek for total chromium only.
- Forty-nine individual surficial soil samples for total chromium analysis only.
- Six additional surficial soil samples for expanded analysis.
- Six subsurface soil samples from about five feet below grade for total chromium analysis only.
- Numerous waste characterization samples for disposal purposes.

Table 1.5.1-1 within Appendix A summarizes the contaminants of concern within the related media identified at the Independent Leather Site on the basis of the site investigation. The table presents the detected contaminant concentration range, frequency of contaminant exceeding standard, applicable standards, criteria, and guidance values (SCGs) and other background or sediment criteria for comparison purposes.

Based on the findings of the Brownfields site investigation and analysis of the various media samples, contamination at the subject site was determined to consist primarily of

a few VOCs and SVOCs, and several metals. No pesticides or PCBs were identified as contaminants of concern based on the investigations performed. The VOCs and SVOCs likely relate to petroleum grade fuels, defatting agents and coal for the reasons provided in the SI Report. These compounds were documented to exist within the site's surface and subsurface soil and to a lesser extent in groundwater and are likely related to the former tannery processes. Metals were detected in site's surface and subsurface soil and groundwater. With the exception of arsenic, chromium, iron, mercury and sodium, the concentrations of metals within soil were less than the regulatory clean-up standards and/or within normal background ranges for Eastern USA soils, or are not expected to been used in the tannery process. The concentrations of metals in groundwater were all within regulatory groundwater standards except for antimony, arsenic, chromium, iron, magnesium, manganese and sodium. Antimony and manganese are not considered contaminants of concern due to their non-use in the tannery process.

Evidence of free-phase petroleum product was identified within the excavation of the bottom-half of a 20,000-gallon former fuel oil tank. EPA removed the tank and contaminated soils within the tank, but sampling of the underlying soil did not identify contaminants and was placed back in the excavation. Based on a visual observations made while the excavation was open, a small amount of black oil appeared to be leaking through the cracks in the below grade block foundation wall of the former tank. Therefore, this oil, in the absence of supporting analytical data, is considered to be a contaminant of concern.

1.5.2 Extent of Contamination for Each Media

Surface Water

Aluminum and iron were the only parameters included in the project analyses that were detected at concentrations above applicable SCGs. Both of these metals were elevated within the upstream sample only. Considering this information, a remedial action relative to the surface water is not considered warranted.

Creek Sediments

The analytical results did not reveal VOCs, pesticides or PCBs above applicable SCGs. Six SVOCs and three metals were the only parameters included in the project analyses

that were detected in the creek sediments at concentrations above applicable SCGs. The SVOCs were detected in all three sediment samples (upstream, midstream and downstream), and in most instances, exceeding the SCGs within the upstream and downstream samples (not the sample from the middle of the site). The concentrations of the SVOCs were highest within the upstream sample. Copper, iron and zinc were the only metals detected above applicable SCGs in the creek sediments. Based on a comparison of the detected concentrations to typical background concentrations in Eastern USA soils and the relationship of concentrations from upstream to downstream, it does not appear that these metals are either at levels that warrant remedial action or are the result of past tanning activities performed at the site. The Cayadutta Creek flows through a large percentage of the City of Gloversville and is the discharge point for the stormwater system. Therefore, the creek receives road runoff which contains, in part, oily sediments and debris, some of which is likely to have settled out along the stream bed. Historically, the creek has also been impacted by petroleum spills as recorded in the NYSDEC spills database. These spill incidents had occurred both upstream and downstream of the Independent Leather Site, as well as two specifically in connection with the site. One of the two relating to the Independent Leather site related to a sheen in the stream that was traced back to a local car dealership upstream and was closed by NYSDEC. The second spill was noted during a comprehensive survey (completed by others) of the creek sediments upstream of the Hill Street bridge to Merkt Oil which is the area of and upstream of Independent Leather. This spill was closed by NYSDEC on November 18, 2002. In conclusion, it appears that the SVOC contamination within the creek sediments is related primarily to stormwater runoff entering the creek at various locations throughout the City, and possibly to a lesser extent from spills that have occurred upgradient from the site in the creek. Since others have investigated the creek sediments and spills in the area of the site, and they have been closed by NYSDEC based on their investigative data, remedial actions are not considered warranted relative to the creek sediments.

Soil

Former 20,000-gallon Fuel Oil Tank

The EPA, as part of an Emergency Response Action, encountered the bottom half of a 20,000-gallon steel tank believed to be formerly used for fuel oil storage. This tank was discovered on the east side of the site, just southwest of the secondary tannery building.

The tank existed below grade within a masonry block foundation and concrete floor slab. EPA removed the tank and the contaminated soil contents within the foundation. Analysis of the soil beneath the tank reportedly showed no contamination and was replaced in the excavation. While the excavation was open, C.T. Male observed a small amount of thick black material (possible No. 6 fuel oil) seeping through the cracks in the below grade foundation wall. The source of the fuel oil remains unknown as it was discovered on the back side of the foundation wall. The oil appeared to be viscous suggesting it is not highly mobile. As such, it is proposed to perform a remedial measure to resolve this issue.

Western Side of the Site

The wastewater treatment plant (WWTP) is located on the west side of the creek, just off the southeast corner of the main tannery building. The WWTP was emptied, cleaned, and demolished by EPA. The use of this area prior to construction of the WWTP may have potentially been as a discharge point for the tannery's wastewater. Soil sampling locations in the immediate area of the WWTP were surface soil sampling locations SS-3 and SS-8, and monitoring well MW-8. Other sampling locations in the area of the WWTP are monitoring well MW-10 and surface soil samples SS-1 and SS-2. At surface soil sample SS-3, one SVOC was detected above SCGS, and at SS-8 five SVOCs were detected above SCGs. Similar SVOCs to those detected at SS-8 were detected above SCGs at surface soil samples SS-1 and SS-2. The subsurface soil samples collected from borings MW-8 and MW-10 revealed similar SVOCs above SCGs, whereas no other boring location on the west side of the creek identified these SVOCs at concentrations which exceed SCGs. The metals analysis identified elevated arsenic and chromium concentrations above the SCGs within the surface soil at SS-8 (west of the WWTP) and SS-3 (immediately south of the WWTP). Arsenic and chromium were also elevated above SCGs within subsurface soil at boring MW-8 and to a lesser degree at soil boring MW-10. EPA analytical data also identified elevated concentrations of chromium within the surface soils at many sampling locations on the western side of the site. This information suggests that surface soil and subsurface soil in the western side of the site, inclusive of the area of the WWTP are impacted at concentrations above SCGs and a remedial action is warranted.

Secondary Tannery Building

Surface soil sampling performed beneath the secondary tannery building identified two VOCs (ethylbenzene and xylenes) and five SVOCs (benzo(a)anthracene, benzo(a)pyrene, chrysene, 2-methylnaphthalene and naphthalene) above applicable SCGs. Analytical data provided by EPA also identified several VOCs in a soil sample collected from beneath the building, although none of which were above SCGs. Soil vapor screening also preformed by EPA at numerous locations beneath the floor slab of the building strongly suggests that these compounds may be widespread beneath the secondary tannery building. The compounds detected in surface soil were also detected in groundwater at concentrations above applicable SCGs. Of the metals detected within the surface soil samples, arsenic, chromium, copper, iron, mercury, nickel and zinc were at relatively higher concentrations (significantly higher in some instances) at surface soil sample location SS-6, beneath the secondary tannery building, as compared to other surface soil sampling locations. Arsenic concentrations were also elevated in subsurface soil samples collected from MW-12 (immediately downgradient of the secondary tannery building) and MW-13 (beneath the secondary tannery building). Considering these findings, remedial action, or at a minimum additional investigation, is warranted for this area of the site.

Lands South of Secondary Tannery Building

EPA collected a multitude of surface soil samples from across the site for chromium analysis. Chromium concentrations varied across the site, both on the west and east side of the site. However, chromium was more prevalent on the west side of the site with the highest chromium concentrations in the area just southwest of the WWTP. Based on the remaining EPA analytical data, chromium concentrations on the east side of the site were mostly non-detect or only slightly above non-detect except in the area south of the secondary tannery building (SSE-8, SSE-13, SSE-14 and SSE-15). In addition, based on C.T. Male's analytical data for the east side of the site, chromium concentrations were elevated in soil above SCGs and at abnormally high concentrations when compared to other locations at MW-11 (soil only) and to a lesser degree at surface soil sample SS-6. Chromium concentrations in groundwater were only elevated above SCGs at one monitoring well location MW-10, which is on the west side of the site. Considering these findings, remedial action is warranted on the eastern side of the site,

but not required on the western side of the site as EPA has placed a soil barrier cover on the western side of the site as part of their past work.

Groundwater

Wastewater Treatment Plant

The groundwater quality within the west side of the site was evaluated with monitoring wells MW-5 through MW-10. The analytical results for groundwater samples collected from these wells identified three VOCs and two SVOCs above applicable SCGs at two well locations (MW-7 and MW-10). Xylenes were detected above SCGs at monitoring well MW-7. Benzene, ethylbenzene and xylenes were detected in groundwater above SCGs at monitoring well MW-10. Naphthalene and pentachlorophenol were also detected in groundwater above SCGs at monitoring well MW-10. Of the metals detected in groundwater, arsenic was detected above SCGs at MW-8 and chromium was detected above SCGs at MW-10, which are located in the general area of the WWTP. Iron, magnesium and sodium were also generally elevated on the west side of the side and notably higher at monitoring wells MW-7 and MW-10.

In September 2003, additional groundwater samples were collected from monitoring wells MW-8 and MW-10 to verify contaminant concentrations at these locations. Analysis of groundwater samples yielded similar results as those detected during the initial sampling event. Due to the elevated concentration of arsenic and chromium, remedial action is warranted.

Eastern Side of the Site

Since the Cayadutta Creek hydraulically separates the project site, the groundwater quality for the east and west side of the creek are discussed separately. The groundwater quality within the west side of the site is discussed above. Groundwater monitoring wells on the east side of the site include MW-11 through MW-15, and existing monitoring wells B-2 and B-3. The analytical results for groundwater samples collected from these wells identified three VOCs and two SVOCs above applicable SCGs; benzene at MW-13; ethylbenzene and xylenes at MW-13 and MW-15; naphthalene at MW-12; MW-13 and MW-15; and phenol at MW-13. The metals detected above applicable SCGs consist of arsenic at MW-11, MW-12, MW-13, MW-15, B-2 and B-3, iron at all well locations, manganese at MW-11, MW-12 and MW-15, and

sodium at MW-12, MW-13, MW-15 and B-3. Based on analytical data, VOCs and SVOCs are present in groundwater beneath the secondary tannery building (MW-13 and MW-15) and immediately downgradient (MW-12). A similar finding exists with respect to arsenic as it was detected above SCGs within all locations on the east side of the creek except for monitoring well MW-14, which is inferred to be the upgradient well location based on the groundwater flow direction. Furthermore, the highest concentrations of arsenic were detected within the two monitoring wells immediately downgradient of the secondary tannery building (MW-12 and B-3). Iron, manganese and sodium were similarly detected, generally at their highest concentrations within these same wells within and immediately downgradient of the secondary tannery building. In summary, the analytical data suggests that a plume of VOCs (benzene, ethylbenzene, and xylenes), naphthalene and arsenic (and to a lesser extent iron, manganese and sodium) may exist in the east side of the site, in part, beneath the secondary tannery building. Considering these findings, remedial action is warranted for the groundwater on the eastern side of the site.

1.6 Human Exposure Pathways

Exposure pathways are means by which contaminants move through the environment from a source to a point of contact with humans. A complete exposure pathway must have four parts: a source of contamination; a mechanism for transport of a substance from the source to the air, surface water, groundwater and/or soil; a point where people come in contact with contaminated air, surface water, groundwater or soil; and a route of entry into the body. Routes of entry include ingesting contaminated materials, breathing contaminated air, or absorbing contaminants through the skin. If any part of an exposure pathway is absent, the pathway is said to be incomplete and no exposure or risk is possible. In some cases, although a pathway is complete, the likelihood that significant exposure will occur is small.

The potential site related contaminants were identified as those contaminants detected in various media at the site above NYSDEC regulatory levels including the NYSDEC TAGM 4046 recommended soil cleanup objective values with consideration to the normal background range of metals found in soil in this area, the NYSDEC sediment criteria, and the NYSDEC groundwater standards and/or guidance values. The potential site related contaminants that have been identified in various media at the site are presented in Table 1.6-1.

Table 1.6-1 - Potential Site Related Contaminants					
Parameter	Surface Soil	Sediment	Subsurface Soil	Surface Water	Groundwater
Acetone	No	No	Yes	No	No
Benzene	No	No	No	No	Yes
Ethylbenzene	Yes	No	No	No	Yes
Total Xylenes	Yes	No	No	No	Yes
Benzo(a)anthracene	Yes	Yes (1)	Yes	No	No
Benzo(a)pyrene	Yes	Yes (1)	Yes	No	No
Benzo(b)fluoranthene	Yes	Yes (1)	Yes	No	No
Benzo(k)fluoranthene	Yes	Yes (1)	Yes	No	No
Chrysene	Yes	Yes (1)	Yes	No	No
Dibenzo(a,h)anthracene	Yes	Yes	Yes	No	No
Indeno(1,2,3-cd)pyrene	Yes	No	No	No	No
2-Methylnaphthalene	Yes	No	No	No	No
Naphthalene	Yes	No	No	No	Yes
Pentachlorophenol	No	No	No	No	Yes
Phenol	No	No	No	No	Yes
2,4,5-Trichlorophenol	Yes	No	No	No	No
Aluminum	No	No	No	Yes	No
Antimony	No	No	No	No	Yes
Arsenic	Yes	No	Yes	No	Yes
Barium	No	No	Yes	No	No
Beryllium	Yes	No	Yes	No	No
Cadmium	No	No	Yes	No	No
Chromium	Yes	No	Yes	No	Yes
Copper	Yes	Yes	Yes	No	No
Iron	Yes	Yes	Yes	Yes	Yes
Lead	No	No	No	No	No
Magensium	No	No	No	No	Yes
Manganese	No	No	No	No	Yes
Mercury	Yes	No	Yes	No	No
Nickel	No	No	Yes	No	No
Selenium	No	No	Yes	No	No
Sodium	No	No	No	No	Yes
Vanadium	Yes	No	No	No	No
Zinc	Yes	Yes	Yes	No	No

(1) The exceedance occurred also for the NYSDEC wildlife bioaccumulation sediment criteria.

Potential exposure pathways for site contaminants are a function of the contaminant, the affected media, contaminant location and the potentially impacted population. The

potential exposure routes and pathways for the site include dermal contact and/or ingestion of potentially contaminated soil on-site; inhalation potentially contaminated dust or vapors emanating from soils; dermal contact and/or ingestion of potentially contaminated groundwater. At the Independent Leather site, potential impacted populations include residents in the neighboring community, site visitors, trespassers on the site, and workers engaged in excavation work at the site.

It is the intent of the City to demolish the remaining site building. Therefore, the potential for vapor migration from the soils beneath the building into the building will no longer exist. The majority of the contaminants of concern were detected in surface soil and to a lesser extent subsurface soil. With the subsurface soil, dermal contact and/or ingestion of potentially contaminated soil is low. However, the surface soil at the site is exposed with a high probability dermal contact, inhalation and/or ingestion of potentially contaminated soil and/or dust is high to those populations entering the site. Therefore, remedial action relative to the surface soil at the subject site is warranted.

Since the depth to groundwater is approximately 1 to 3 feet beneath the secondary tannery building and greater than 3 feet below grade across the site, the potential for dermal contact with/exposure to contaminated groundwater and the associated impact is anticipated to be minimal. Ingestion of the contaminated groundwater is unlikely since the area surrounding and downgradient of the site is serviced by public water and no private water supply wells used for drinking water are known to exist. The creek, that traverses the site, may be a discharge point for groundwater based on groundwater contouring data, however, the analytical data does not identify similar compounds in surface water and sediment as in the groundwater. This suggests little or no transport of contaminants in this manner.

Based on site characteristics and the nature of the existing contamination groundwater treatment is not considered to be warranted for protection of human health. Institutional controls to restrict groundwater use will be required as a remedial action for groundwater. Containment, in the form of a barrier to contact and institution controls is warranted to minimize storm water/precipitation infiltration into the areas where elevated contaminants exist, and deter the potential leaching of contaminants into groundwater, and to cover and protect existing surface soils from erosion, dust generation and contact.

1.7 Ecological Exposure Pathways

The wildlife inhabiting the study area is limited. Access to the Independent Leather site is, in part, restricted by signage, fencing and other features, and no hunting allowed within the City of Gloversville. For these reasons the exposure pathways from wildlife in the study area to humans are limited.

The fish and wildlife impact assessment demonstrates that under present conditions there is only minimal impact to fish and wildlife resources. There are no pathways for wildlife contamination associated with either groundwater or surface water. For sediments and surface soil, based on the lack of any significant fish or wildlife resources at the subject site, only minimal impacts to either fish and/or wildlife have been identified. For subsurface soil, there are no pathways for wildlife impacts.

2.0 IDENTIFICATION AND DEVELOPMENT OF ALTERNATIVES

2.1 Introduction

The site investigation included intrusive and non-intrusive investigations to determine the quality of the surface soil, subsurface soil, surface water, sediment, groundwater and building materials at the site. The results of the site investigation, as discussed in the Site Investigation Report (November 2003), were used for the identification and development of the remedial alternatives described within this report.

Feasible remedial action(s) were identified to either achieve compliance with established regulatory cleanup guidance levels and/or to protect human health and the environment. The remedial alternatives for the site were developed based on published literature and current knowledge of the technologies commonly employed in similar situations and circumstances.

2.1.1 Areas & Media of Concern

Table 2.1.1-1 summarizes the contaminants of interest for various media and the generalized remediation goals anticipated. The contaminants of interest were selected based on exceedance of their applicable SCGs. Consideration was also given to those metals that are above their numeric SCGs, but within typical EPA background levels in Eastern USA soils.

Table 2.1.1-1
Contaminants of Interest for Various Media and Remediation Goals

Area of Concern (AOC)	Media	Contaminants of Interest	Anticipated Remediation Goal
Creek	Surface Water	Aluminum and iron.	No remediation recommended since the contaminants of interest were detected at their highest concentrations at up-stream sampling locations.

Table 2.1.1-1
Contaminants of Interest for Various Media and Remediation Goals

Area of Concern (AOC)	Media	Contaminants of Interest	Anticipated Remediation Goal
Creek	Sediment	Five SVOCs and Copper.	No remediation recommended since the contaminants of interest were detected at their highest concentrations at up-stream sampling locations within the creek.
Former 20,000-gallon Fuel Oil Tank (Figure 1)	Soil	Free-phase oil. Not sampled otherwise.	Remove free-phase oil. Reduce, eliminate, or control residual impacts, if any, from entering groundwater and/or surface water.
Western Side of the Site (Figure 2)	Soil	Chromium in surface soil where soil barrier was not placed by EPA. Eight SVOCs and ten metals (primarily arsenic and chromium) in subsurface soil.	Reduce, eliminate, or control SVOCs & metals from entering ground water, and/or surface water and prevent direct contact and exposure to human health and the environment.
Waste Water Treatment Plant (Figure 3)	Ground-water	Three VOCs, two SVOCs, and five metals.	Reduce, eliminate, or control further migration of VOCs, SVOCs, metals in groundwater and/or surface water and prevent direct contact and exposure to human health and the environment..
Secondary Tannery Building (Figure 4)	Soil	Two VOCs, seven SVOCs, and six metals in surface soil. Similar compounds in subsurface soil down-gradient of building.	Reduce, eliminate, or control VOCs, SVOCs and metals from entering ground water and/or surface water and prevent direct contact and exposure to human health and the environment.

Table 2.1.1-1
Contaminants of Interest for Various Media and Remediation Goals

Area of Concern (AOC)	Media	Contaminants of Interest	Anticipated Remediation Goal
Eastern Side of the Site (Figure 5)	Ground-water	Three VOCs, two SVOCs, and four metals	Reduce, eliminate, or control further migration of VOCs, SVOCs, metals in groundwater and/or surface water and prevent direct contact and exposure to human health and the environment.
Lands South of Secondary Tannery Building (Figure 6)	Surface Soil	Chromium	Reduce, eliminate, or control chromium from entering groundwater and/or surface water, and prevent direct contact and exposure to human health and the environment.

Based on the findings of the site investigation, metals are the primary contaminants of interest, and VOCs/SVOCs are secondary. The specific remediation goals considered for this project are presented in subsequent sections herein. As the VOC and SVOC contaminated soils are not being disturbed and/or are below grade or below the building floor slab, there are no contaminants of interest within the atmosphere (air) within the site.

In review of the data collected from the site investigation, five distinct areas of the site for which various remedial action alternatives are evaluated. These target areas or area of concern (AOC) and the associated media are as follows:

- Soil - Former 20,000-gallon Fuel Oil Tank (AOC #1)
- Soil – Western Side of the Site (AOC #2a)
- Groundwater - Wastewater Treatment Plant (AOC #2b)
- Soil - Secondary Tannery Building (AOC #3)
- Groundwater - Eastern Side of the Site (AOC #4)

- Soil – Lands South of Secondary Tannery Building (AOC #5)

These portions of the site are depicted in Figures 1 to 6, respectively.

2.2 Remedial Action Objectives

As part of EPA's CERCLA Emergency Response Action, all of the petroleum and chemical storage tanks on-site were permanently closed and waste materials and raw product drums and containers were gathered and disposed off-site. Therefore the potential for future contamination from these items has been eliminated, leaving only the areas of remaining media contamination to be addressed. The objectives of the proposed remedial action(s) are to control and possibly eliminate the metal contamination present in the various areas and media within the site, and at the same time address residual and isolated VOC and SVOC contamination. The ultimate goal of the remedial action(s) is to protect human health and the environment, and meet regulatory standard and guidance values set forth NYSDEC TAGM HWR 4046 and NYSDEC Part 703 Groundwater Quality Standards.

2.3 General Response Actions

Based on the site investigation, six areas of the site were identified as being impacted by metals used in the tanning process, and/or to a lesser extent by petroleum constituents (VOCs and SVOCs). As such, general response actions were developed for addressing one or more of the areas of concern through site specific remedial alternatives. The intent of the general response actions is to address contamination and mitigate potential off-site impacts from the subject site.

In developing remediation goals for the subject site, the following design considerations were evaluated relative to economical and feasible solutions for addressing the residual metals and organic contamination remaining on-site:

- The secondary tannery building is currently dilapidated and potentially unsafe. Some level of VOC, SVOCs and metals contamination is present beneath the secondary tannery building. It will be necessary to demolish the site buildings as part of the remedial action for the purpose of making the areas of contamination accessible to the work.

- It is the intent of the City of Gloversville to use the subject site for commercial/retail business use, either restricted or unrestricted. Therefore, the remedial action needs to reduce and possibly eliminate potential exposure to the contaminants of concern.

2.3.1 Alternative No. 1 - No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison to other remedial alternatives. This alternative requires continued groundwater monitoring, allowing the site to remain in an unremediated state. Under this remedial alternative the site would be left in its current condition and would not provide any additional protection to human health or the environment.

2.3.2 Alternative No. 2 - Soil Barrier to Contact for Contaminated Areas with Institutional Controls

This alternative would place a protective soil barrier over all areas of contamination (metals, VOCs, SVOCs) at the site. The contaminated soils west of the Cayadutta Creek, consisting predominantly of metals contamination, were previously covered by EPA with one to eight feet of soil barrier with vegetative cover.. Remaining areas of contaminated soil east of the Cayadutta Creek, excluding what may be present beneath the secondary tannery building which will be left in place, would be covered with at least a one to two foot barrier to contact. Topsoil and grass would also be placed on top of the soil cover. The soil cover would require periodic maintenance (O&M) to monitoring the vegetative growth and potential erosion. Annual groundwater sampling of select monitoring wells would be performed to monitor the groundwater conditions over time. Since this alternative would leave contaminated soil on site, institutional controls in the form of deed restrictions would be required to notify future owners and/or developers of the restricted use of the property.

Other acceptable forms of protective cover would include concrete sidewalks, asphalt/concrete parking lots, building footprints, or other acceptable strategies that provide a barrier to contact with the contaminated soils. Any excavated contaminated soil needed to implement an acceptable alternative protective cover would be properly managed according to Department approvals and regulations. Figure 7 depicts the areas of the site influenced by the implementation of this alternative.

2.3.3 Alternative No. 3 - Limited Excavation of Fuel Oil Contaminated Soil and Soil Barrier to Contact for Remaining Areas with Institutional Controls

This alternative is identical to Alternative No. 2, as described in Section 2.3.2, except that additional remedial action is included with respect to the former 20,000 gallon fuel oil tank, and the footprint of the to be demolished secondary tannery building. In the absence of analytical data, it has been assumed based on subjective observations that the free-phase oil within the former fuel oil tank grave warrants remedial action. The assumed horizontal limits of AOC #1 which includes the location of the former fuel oil tank grave are shown in Figure 1. It is further assumed that the depth of fuel oil contamination is no more than eight feet below grade. This remedial action includes limited excavation and proper disposal of any free-phase fuel oil and associated contaminated soils (assumed to be non-hazardous) in the area of the former 20,000-gallon fuel oil tank prior to placement of the soil barrier to contact over the remaining portions of the site on the east side of the creek, including the foot print of the secondary tannery building after it is demolished.

The intent of this option would be to deter surface water infiltration into those contaminated soils being left in-place, specifically those beneath the secondary tannery building. Currently, the secondary tannery building is an accumulation point for rainwater due to the dilapidated condition of the building. Stormwater ponding within the building infiltrates through the incompetent floor slab and various floor slab perforations. As such, this option must include, at a minimum, demolition of the building for placement of an adequate soil barrier to contact. The floor slab could be left in-place and the barrier placed over it. Portions of the floor slab may have to be ripped up if contaminated soils in the area of the fuel oil tank continue beneath the floor slab. Figure 8 depicts the areas of the site influenced by the implementation of this alternative.

2.3.4 Alternative No. 4 - Expanded Soil Excavation and Disposal of Select Contamination Areas and Soil Cover with Institutional Controls for Remaining Contaminated Areas

This alternative would further investigate and remediate the areas where soil contamination levels (VOCs and SVOCs) are elevated, in particular, the fuel oil contaminated soils in the former 20,000 fuel tank area (AOC #1), contaminated soils

underneath the secondary tannery building (AOC #3) and the surface soils south of the secondary tannery building (AOC#5). Razing and proper disposal of the secondary tannery building and floor slab are included in this alternative. Contaminated soils west of the Cayadutta Creek have been previously covered by EPA with a protective soil barrier, and consist predominantly of metals contamination. Remaining metals contaminated soil east of the Cayadutta Creek and south of the secondary tannery building would be further investigated and if necessary, excavated and then covered with at least one to two feet of soil cover. Topsoil and grass would be placed on top of the soil cover. The soil cover would require periodic maintenance (O&M) to monitoring the vegetative growth and potential erosion. Since this alternative would leave contaminated soil on site, institutional controls in the form of deed restrictions and groundwater use would be required to notify future owners and/or developers of the restricted use of the property. Long term groundwater monitoring would also be completed as a function of this alternative.

Other acceptable forms of protective cover would include concrete sidewalks, asphalt/concrete parking lots, building footprints, or other acceptable strategies that provide a barrier to contact with the contaminated soils. Any contaminated soil required to be excavated in order to construct the protective cover(s) would need to be properly managed according to Department approvals and regulations. Figure 9 depicts the areas of the site influenced by the implementation of this alternative.

2.3.5 Alternative No. 5 - Excavation and Disposal of All Contaminated Soil Areas In Excess of SCGs

This alternative would remediate all contamination areas (VOCs, SVOCs, and metals) to meet NYSDEC TAGM 4046 recommended soil cleanup objectives. Soils would be excavated and properly disposed of according to Department regulations. Confirmatory samples would be collected and analyzed to ensure NYSDEC TAGM 4046 objectives are met. Institutional controls and restrictions for groundwater usage would be required. Figure 10 depicts the areas of the site influenced by the implementation of this alternative.

2.3.6 Alternative No. 6 - On Site Soil Stabilization, Groundwater Treatment and Barrier to Contact

This alternative would involve the active pumping and treating of VOCs and SVOCs contaminated groundwater and the injection of chemicals to bind metal contaminants (stabilization) to deter migration of the contaminants, via ex-situ and/or in-situ methods. Petroleum contaminated soils in the area of the former 20,000 gallon fuel oil tank would be removed for proper disposal. A soil barrier to contact would also be required on the eastern side of the site, and the western side of the site would require re-installation of the soil barrier previously constructed by EPA. The VOC-SVOC contaminated groundwater plume is primarily located within the area of the secondary tannery building. The stabilization of the soil impacted by metals would be in the area south of the secondary tannery building (AOC #5), and in select portions of the western side of the site (AOC #2a). Groundwater treatment would occur over a period of years, and is maintenance and sampling intensive. Institutional controls and use restrictions for groundwater would be required. Figure 11 depicts the areas of the site influenced by the implementation of this alternative.

3.0 DETAILED ANALYSIS OF ALTERNATIVES

3.1 Introduction

Each remedial alternative was evaluated based on specific criteria set forth in 6NYCRR Part 375-1.10(c)(1-7, inclusive). The evaluation criteria will be used by the NYSDEC in the selection process for the most appropriate remedy considering the site conditions, level of implementation, and cost-effectiveness. From this RAR and the SI Report, the Department will prepare a Proposed Remedial Action Plan (PRAP) to be submitted to the public with the SI Report and the RAR. The Department will address any issues raised by the public in a Responsiveness Summary. The final remedy for the site will be documented in the Record of Decision (ROD) prepared by NYSDEC after a 45 day public comment period.

The first six (6) of the following seven (7) topics form the basic components of the detailed analysis of each alternative whereby each topic is compared to others to determine the most cost effective, protective remedy. The Department will use topic #7 in their evaluation once the public comment period has ended.

1. Overall protection of human health and the environmental;
2. Compliance with Standards, Criteria, and Guidance (SCG);
3. Short-term effectiveness;
4. Long-term effectiveness;
5. Reduction of toxicity, mobility, and volume;
6. Feasibility; and
7. Community acceptance.

The remedial alternative approach of no action with institutional controls could be applied to most sites where low level contamination is present and fully delineated, and does not pose a significant threat to human health or the environment. This alternative is best suited for low level contamination, but could also be applied if higher levels of contamination are present and there is no significant threat to the human health or the environment.

Institutional controls are means of attaching restrictions to the property to limit site activities and future use of the property, and to assure due diligence in notification of prospective purchasers and the public. These restrictions could also include installation of fencing or other means to limit access to the site or a particular area of the site. The site's current and future land use plays a significant role in selecting the most effective institutional controls. Examples of institutional controls typically include land use and drinking water use restrictions, deed restrictions, and notification in public registries of excavation and construction work activity, and appropriate posting of informational signs at the site. Depending on the severity of contamination, institutional controls could be required along with other feasible remedial alternatives. For the purpose of analyzing the alternatives below, specific examples of institutional controls (as discussed above) are not referenced, but would ultimately be selected based on the results of remedial action performed.

3.1.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment would not be improved in the short term by implementing the No Action alternative (Alternative No. 1). The level of protection to human health and the environment could be evaluated over time by periodically assessing the contaminant concentrations through groundwater monitoring over an extended period of time (30 years). Impacts to the environment may be slightly mitigated with respect to VOC and SVOC contamination as the contaminants within the soils would slowly degrade by natural processes, but the free-phase oil may not degrade easily. Residual public health risks in the form of potential exposure to the contaminants in the soil will remain, but given sufficient time they would be with respect to VOCs and SVOCs, however, not the metals. Residual environmental risks will remain until the soil has been sufficiently mitigated by natural processes with respect to VOCs and SVOCs, but will remain indefinitely for metals.

Exposure to human health and the environment would be minimized upon completion of the Barrier to Contact alternative (Alternative No. 2) because a barrier to contact to the contaminated soils would be created. There would be some residual public health risks remaining after the remediation, mainly if the barrier to contact was breached or the soils were exposed or disturbed by invasive activities such as construction. There would also be some residual environmental risks for the same reason.

Alternative No. 3 is the same as Alternative No. 2 except there would be excavation and disposal of the free-phase oil and associated contaminated soils in the area of the former 20,000-gallon fuel oil tank and the demolition of the secondary tannery building. This alternative would reduce if not eliminate exposure to human health and the environment in the area of the 20,000-gallon fuel oil tank, and minimize exposure to human health and the environment in the remaining portions of the site with the placement of the soil barrier to contact.

Alternative No. 4 is the same as Alternative No. 3 except there would be additional excavation and disposal of the VOC and SVOC contaminated soils beneath the secondary tannery building, and investigation and removal of surface soils south of the secondary tannery building. This alternative would reduce if not eliminate exposure to human health and the environment in the east side of the site (specifically beneath the building and in the area of the 20,000-gallon fuel oil tank), and would minimize exposure to human health and the environment in the remaining eastern portions of the site due to the placement of the soil barrier to contact. Residual environmental risks will remain until the soil has been sufficiently mitigated by natural processes with respect to VOCs and SVOCs, but will remain indefinitely for metals.

There would be no exposure to human health and the environment following the implementation of Alternative No. 5 as all of the contaminated soil in excess of SCGs would be excavated and removed from the site. There may be residual public health and environment risks if groundwater contamination remains after completion of this alternative.

Alternative No. 6 consists of stabilization of metals in soil, groundwater treatment for VOCs and SVOCs and soil barrier to contact components. Protection of human health and the environment varies for each aspect of this remedial alternative. By implementing the stabilization and barrier to contact component, overall protection of human health and the environment would be realized upon completion of this activity. For the groundwater treatment aspect of this alternative, overall protection of human health and the environment would be slowly reduced over time and ultimately realized upon reduction of the groundwater contamination below SCGs. There would be public health risks associated with the implementation of this alternative as it includes some form of in-situ or ex-situ soil mixing and/or chemical reagent injection, and operation of the groundwater treatment system (mainly if the system fails to operate properly).

There would be some residual environmental risks present depending on the effectiveness of the stabilization, barrier to contact or groundwater treatment system.

3.1.2 Compliance with Standards, Criteria and Guidance (SCGs)

The SCGs applicable to remediation of the contaminated soils at the subject site are NYSDEC TAGM 4046. There are five areas of concern within the site where contaminated soils exist that do not comply with the recommended soil cleanup objective values. The No Action alternative (Alternative No. 1) will not directly reduce contaminant concentrations, but it is likely that VOC and SVOC contaminant concentrations will be reduced over an extended period of time by natural processes. The metal contaminant concentrations will not likely be reduced by natural degradation processes.

The Barrier to Contact alternative (Alternative No. 2) would involve leaving contaminated soils and free-phase oil in-place and therefore compliance with SCGs will not be initially achieved. Over a period of time the VOC and SVOC contaminants within the soils will naturally degrade and will at some point be in compliance with SCGs. Metal contaminants will not naturally degrade over time.

As Alternative No. 3 and Alternative No. 4 are similar to Alternative No. 2, compliance with SCGs will not be achieved except in those areas where excavation of contaminated media are planned. Under Alternative No. 3, the free-phase oil and associated contaminated soils in the area of the former 20,000-gallon fuel oil tank would be removed, therefore, compliance with applicable SCGs would be achieved unless groundwater impacts remained. Under Alternative No. 4, the contaminated soils beneath the secondary tannery building would also be removed as well as surficial soils south of the secondary tannery building. Compliance would also be achieved in these areas unless groundwater impacts remain. Compliance with SCGs would be determined through sampling and analysis of soil and groundwater left in-place after completion of this remedial action.

Completion of Alternative No. 5 would involve removal of all contaminated soil in excess of SCGs, therefore, compliance with SCGs would be achieved. Compliance with SCGs would be determined through sampling and analysis of soil and groundwater left in-place after completion of this remedial action.

Alternative No. 6 consists of stabilization of metals in soil, groundwater treatment and soil barrier to contact components. The stabilization component of this alternative would achieve some level of compliance with SCGs in that the contaminants would be physically and chemically bound within a solidified matrix (solidification) or converted into a more immobile form usually by a chemical reaction (stabilization). These methods would inhibit the contaminants from leaching from the soil into groundwater thereby eliminating the source of these contaminants. The groundwater treatment part of this alternative would involve treating groundwater being extracted from the area, therefore compliance with SCGs will not be initially achieved. However, over a period of time the contaminants within groundwater (and to some degree soils) will decline and will at some point be in compliance with SCGs. Residual impacts to the groundwater may remain depending on the effectiveness of the treatment system and the stabilization efforts.

3.1.3 Short-term Effectiveness

The effectiveness of the No Action alternative (Alternative No. 1) will be realized in the short term and could be implemented in less than two months. There would be no short term reduction in the potential for impacts to human health. There will be no impact to the community or the environment during implementation of the No Action alternative.

The effectiveness of the Barrier to Contact alternative (Alternative No. 2) will be realized upon placement of the barrier to contact. The community will be protected during the remedial action by establishing a work zone that excludes unauthorized individuals, and by performing the earthwork activity in accordance with a site specific soil management plan. There will be no significant environmental impacts as a result of implementing this alternative. This alternative could be implemented within a few months following authorization to proceed.

The effectiveness of Alternative No. 3, Alternative No. 4 and Alternative No. 5 will be realized upon removal of contaminated soils in those designated areas and placement of the barrier to contact. The community will be protected during the remedial action by establishing a work zone that excludes unauthorized individuals, and by performing the earthwork activity in accordance with a site specific soil management plan. There will be no significant environmental impacts as a result of implementing these

alternatives. These alternatives could be implemented within a few months following authorization to proceed.

Alternative No. 6 consists of stabilization of metals in soil, groundwater treatment and soil barrier to contact components. The effectiveness of the stabilization portion of this alternative will be realized immediately after completion of the remedial action, with the effectiveness being moderate to high. The effectiveness of the groundwater treatment part of this alternative will be moderate and incremental over time. The effectiveness of the barrier to contact is discussed in Alternative No. 2 above. The community will be protected during the stabilization and barrier to contact by establishing a work zone that excludes unauthorized individuals and by performing stabilization or immobilization work in a manner that does not result in the generation of contaminated airborne particulates. The community will be protected during the groundwater treatment activity as the system components will be installed below grade or housed within a protective enclosure and will discharge clean effluent. With a clean effluent to the environment, no significant environmental impacts are expected as a result of implementing this alternative.

3.1.4 Long-term Effectiveness and Permanence

Implementing the No Action alternative (Alternative No. 1) will have little long term effectiveness. A reduction in the potential for impacts to human health may be realized if the contaminants are naturally reduced to values below the regulatory thresholds over time. This should occur with respect to the VOC and SVOC contaminants, but it is not likely for the metals contaminants. There will be no impact to the environment by implementing this alternative. Residual risks will remain after implementing this alternative because contaminated soils will remain in place. This alternative is not considered to be an adequate or reliable means of mitigating the potential for impacts to human health or the environment due to the presence of free-phase oil in subsurface soils and metals contaminants in the surficial soils on the eastern side of the site.

Implementation of the Alternative No. 2, Alternative No. 3 or Alternative No. 4 will provide long term and permanent means of remediating contamination. There will be some residual risks remaining upon completion of these alternatives. These alternatives are considered to be adequate, reliable and effective means for reducing potential impacts to human health and the environment. The reduction is dependent on the

quantity of contaminated media removed from the site, and any on-going natural degradation processes.

Implementing the excavation of all contaminated soils in excess of SCGs at the site (Alternative No. 5) is a long term and permanently effective means of remediating contamination at the site. There should be no residual risks remaining upon completion of this alternative unless groundwater contamination remains. This alternative is considered to be a reliable means of reducing the potential impacts to human health and the environment.

Implementing Alternative No. 6 is a long-term and permanently effective site remedy. A reduction in the potential for impacts to human health and the environment will be realized as long as the contaminants remain stabilized and the groundwater contaminants have been reduced to values below the SCGs. This alternative is considered to be an adequate and reliable means of eliminating the potential for impacts to human health and the environment.

3.1.5 Reduction of Toxicity, Mobility and Volume

Implementing the No Action alternative (Alternative No. 1) will not actively reduce the toxicity, mobility or volume of the contamination present in the soils and groundwater. Some passive reduction of VOC and SVOC contamination will occur over time, but this is not expected for metals. Implementation of institutional controls is a reversible action.

Implementing the barrier to contact alternative (Alternative No. 2) will not initially reduce the toxicity or volume of the contaminated soil. The mobility will be reduced assuming the infiltration of water (precipitation) through the barrier to contact and contaminated soils is reduced. With time, natural degradation processes should reduce the toxicity and volume of the VOC and SVOC contaminants within the soil and groundwater, but not the metal contaminants. This remediation alternative is reversible, in that the soils could be excavated and made subject to other remedial actions such as off site disposal or on-site treatment, and active groundwater treatment could be established.

Implementing Alternative No. 3 or Alternative No. 4 will effectively eliminate the toxicity and mobility of the contaminates in soil in those designated areas of the site as

the contaminated soils would be removed and properly disposal off-site. The removal action and placement of the barrier to contact would assist in reducing the toxicity and mobility of contaminants in groundwater as the source area will have been reduced in concentration and the infiltration of precipitation will be restricted. The excavation portion of these alternatives is irreversible. The balance of the contaminated soil at the site will remain (primarily metals contaminated) under a soil barrier to contact as described in Alternative No. 2.

The toxicity and mobility of the contaminated soil being removed by Alternative No. 5 will be effectively eliminated. In addition, the entire volume of contaminated soils at the site would be removed and properly disposed off-site. This remedial alternative is irreversible.

Alternative No. 6 consists of the solidification or stabilization of metals in soil, groundwater treatment and soil barrier to contact components. Implementing the solidification or stabilization portion of this alternative will reduce the mobility and toxicity of contaminates in soil. Stabilization is dependent on the effectiveness and amount of reagent used to immobilize contaminants. This remediation alternative is reversible as the soil could be excavated and made subject to other remedial actions such as off-site disposal or other on-site treatment methods. Implementing the groundwater treatment portion of this alternative will quickly reduce the mobility of contaminates in groundwater assuming the groundwater flow direction is altered and contained by this alternative. With time, the groundwater treatment aspect will also continue to reduce the toxicity, mobility and volume of the contaminants. The groundwater remediation aspect is reversible, in that the components of the groundwater treatment system can be removed, and made subject to other remedial actions.

3.1.6 Feasibility

The No Action alternative (Alternative No. 1) can be implemented at any site since there is no significant work involved in the completion of this alternative. It is reasonable to assume that continued groundwater monitoring, regardless of the frequency, could be implemented by the City. This alternative is considered cost effective, as monitoring of the site would track the contaminant concentrations through

time. There would be little reduction in potential impacts to human health and environment under this alternative.

Site conditions are suitable for implementation of the Barrier to Contact alternative (Alternative No. 2). Affected soils are readily accessible. This alternative could be easily implemented by retaining a remediation contractor to perform the work. Remediation contractors available to implement this alternative routinely provide this service and have the materials necessary to complete the work. This alternative is considered to be a moderately cost effective means in controlling the potential impacts to human health and environment.

Site conditions are suitable for implementation Alternative No. 3 or Alternative No. 4. Affected soils are accessible. The secondary tannery building is ready for demolition as the interior surfaces have been cleaned by EPA and the asbestos containing materials have also been removed (excluding roofing materials). These alternatives could be easily implemented by retaining a remediation and/or demolition contractor to perform the work. Contractors of this type are locally available to implement these alternatives and have the materials necessary to complete the work. This alternatives are considered to be a highly cost effective means of eliminating the potential impacts to human health and environment relative to the excavated areas of the site and moderately cost effective with respect to the balance of the site (soil barrier).

Site conditions are not suitable for implementing Alternative No. 5. Although the contaminated soils on the eastern side of the site are somewhat accessible, the soils on the west side are not. The contaminated soils on the west side of the site constitute more than 50% of the total volume of contaminated media identified by the site investigation activities. The contaminated soil on the west side of the site is beneath a 1 to 8 foot established soil barrier to contact previously placed by EPA and the main tannery building floor slab.

Site conditions are poorly suitable for implementation of Alternative No. 6. Affected soils are not readily accessible due to the presence of a one to five foot thick barrier to contact, the main tannery building floor slab, the remains of the wastewater treatment plant. This alternative could be implemented as services are commercially available and are established technologies. This alternative is not considered a cost effective means in controlling the potential impacts to human health.

3.2 Comparative Analysis

Utilizing the evaluation criteria, each remedial alternative for each area of remediation identified in this RA Report is compared to each other on the basis of cost and effectiveness to identify the most cost effective, protective remedy. The evaluation of the various remedies is summarized in Tables 1 through 6. For comparative purposes the criteria is based on a high, moderate and low basis.

3.2.1 Alternative No. 1 – No Action

This remedial alternative is the least expensive remedial alternative for the site. The effectiveness of this remedy is low as the site will remain unremediated. Groundwater sampling and analysis will allow for continued monitoring of the site to observe changes in the environmental quality of the groundwater at the site. Protection of human health and the environment would not be increased. The estimated cost associated with implementing this remedial alternative is presented in Table 1.

TABLE 1
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 1
NO ACTION

Work Task	Units	Unit Cost	Quantity	Total Cost
Capital Costs (Includes Labor):	None	None	None	$0
Total Capital Costs				$0
Present Worth - O&M such as Annual Groundwater Monitoring ($6,000 Each Year for Years 1 to 5 at 5%)				$25,977
Present Worth - O&M such as Annual Groundwater Monitoring ($6,000 Each Year for Years 5 to 30 at 5%)				$66,258

3.2.2 Alternative No. 2 - Soil Barrier to Contact for Contaminated Areas with Institutional Controls

This remedial alternative is considered low in terms of cost. The effectiveness of this remedy is considered moderate as SCGs would not be achieved, but protection of human health and the environment would be increased. The institutional controls would further enhance the protection of human health and the environment. The estimated cost associated with implementing this remedial alternative is presented in Table 2.

TABLE 2
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 2
SOIL BARRIER TO CONTACT FOR CONTAMINATED AREAS WITH INSTITUTIONAL CONTROLS

Work Task	Units	Unit Cost	Quantity	Total Cost
Capital Costs (Includes Labor):				
Institutional Controls:				
Legal and Filing Fees	LS	$2,000	1	$2,000
Soil Barrier to Contact (1 to 2 Feet Thick):				
Mobilization	LS	$500	1	$500
Clean Backfill w/Compaction	CY	$20	2,358	$47,160
Site Grading & Seeding	SY	$5	3,536	$17,680
Subtotal				$67,340
Contingency (20%)				$13,468
Engineering (15%)				$10,101
Total Capital Costs				$90,909
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 1 to 5 at 5%)				$34,636
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 5 to 30 at 5%)				$88,344

3.2.3 Alternative No. 3 – Limited Excavation of Fuel Oil Contaminated Soil and Soil Barrier to Contact for Remaining Areas with Institutional Controls

This remedial alternative is considered moderate in terms of cost. The effectiveness of this alternative is high as compliance with SCGs would likely be reached immediately upon completion of work in the area of the former 20,000-gallon fuel oil tank. This alternative is more protective of human health and the environment in comparison to Alternative No. 2 as one of the two areas of the site with VOC and SVOC contamination would be removed and a barrier to contact would be established over the footprint of the secondary tannery building. The estimated cost associated with implementing this remedial alternative is presented in Table 3.

TABLE 3
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 3
LIMITED EXCAVATION OF FUEL OIL CONTAMINATED SOIL AND SOIL BARRIER TO CONTACT FOR REMAINING CONTAMINATED AREAS WITH INSTITUTIONAL CONTROLS

Work Task	Units	Unit Cost	Quantity	Total Cost
Capital Costs (Includes Labor):				
Institutional Controls:				
Legal and Filing Fees	LS	$2,000	1	$2,000
Limited Excavation of Fuel Oil Contaminated Soil:				
Mobilization	LS	$7,000	1	$7,000
Demolition of Building	LS	$60,000	1	$60,000
Concrete Removal & Disposal	CY	$100	100	$10,000
Excavate Contaminated Soils	DAY	$1,200	2	$2,400
Soil Dewatering & Treatment	DAY	$5,000	2	$10,000
Clean Backfill w/Compaction	CY	$20	335	$6,700
Confirmatory Soil Sampling	EACH	$300	10	$3,000
Transportation and Off-site Disposal (Assume Non-Hazardous)	TON	$60	503	$30,180
Soil Barrier to Contact (1 to 2 Feet Thick):				
Mobilization	LS	$500	1	$500
Clean Backfill w/Compaction	CY	$20	3,300	$66,000
Site Grading & Seeding	SY	$5	4,950	$24,750
Subtotal				$210,130

TABLE 3
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 3
LIMITED EXCAVATION OF FUEL OIL CONTAMINATED SOIL AND SOIL BARRIER TO CONTACT FOR REMAINING CONTAMINATED AREAS WITH INSTITUTIONAL CONTROLS

Work Task	Units	Unit Cost	Quantity	Total Cost
Contingency (20%)				$42,026
Engineering (15%)				$31,520
Total Capital Costs				$283,676
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 1 to 5 at 5%)				$34,636
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 5 to 30 at 5%)				$88,344

3.2.4 Alternative No. 4 - Expanded Soil Excavation and Disposal of Select Contamination Areas and Soil Cover with Institutional Controls for Remaining Contaminated Areas

This remedial alternative is considered moderately high in terms of cost. The effectiveness of this alternative is high as compliance with SCGs would likely be reached immediately upon completion in the area of the former 20,000-gallon fuel oil tank and the secondary tannery building as a potential source of contamination/free-phase oil would be eliminated. Elevated arsenic contaminated soils would also be removed on the east side of the site as part of this alternative. This alternative would be more protective of human health and the environment in comparison to Alternative No. 3 as areas of the site with VOC, SVOC and elevated arsenic contaminated soils would be removed. The estimated cost associated with implementing this remedial alternative is presented in Table 4.

TABLE 4
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 4
EXPANDED SOIL EXCAVATION AND DISPOSAL OF SELECT CONTAMINATED AREAS AND SOIL BARRIER TO CONTACT WITH INSTITUTIONAL CONTROLS FOR REMAINING CONTAMINATED AREAS

Work Task	Units	Unit Cost	Quantity	Total Cost
Capital Costs (Includes Labor):				
Institutional Controls:				
Legal and Filing Fees	LS	$2,000	1	$2,000
Soil Barrier to Contact (1 to 2 Feet Thick):				
Mobilization	LS	$500	1	$500
Clean Backfill w/Compaction	CY	$20	3,300	$66,000
Site Grading & Seeding	SY	$5	4,950	$24,750
Limited Excavation and Disposal of Fuel Oil Tank & Soil Beneath the Secondary Tannery Building:				
Mobilization	LS	$7,000	1	$7,000
Demolition of Building	LS	$60,000	1	$60,000
Concrete Removal & Disposal	CY	$100	380	$38,000
Excavate Contaminated Soils	DAY	$1,200	12	$14,400
Soil Dewatering & Treatment	DAY	$5,000	12	$60,000
Clean Backfill w/Compaction	CY	$20	2,150	$43,000
Confirmatory Soil Sampling	EACH	$300	30	$9,000
Transportation and Off-site Disposal (Assume Non-Haz)	TON	$60	3,225	$193,500
Limited Excavation and Disposal of Arsenic Impacted Soil (One Foot Layer) on the East Side of the Site				
Excavate Contaminated Soils	DAY	$1,200	7	$8,400
Clean Backfill w/Compaction	CY	$20	1,180	$23,600
Confirmatory Soil Sampling	EACH	$30	30	$900
Transportation and Off-site Disposal (Assume Non-Haz)	TON	$60	1,770	106,200
Subtotal				$657,250
Contingency (20%)				$131,450
Engineering (15%)				$98,588
Total Capital Costs				$887,288
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 1 to 5 at 5%)				$34,636
Present Worth - O&M such as Barrier Maintenance and Groundwater Sampling ($8,000 Each Year for Years 5 to 30 at 5%)				$88,341

3.2.5 Alternative No. 5 - Excavation and Disposal of All Contaminated Soil Areas In Excess of SCGs

This remedial alternative is the second most expensive alternative evaluated. The effectiveness of this alternative is high as compliance with SCGs would likely be achieved immediately upon completion. This alternative would also be protective of human health and the environment. There would be no on-going costs associated with this alternative. The estimated cost associated with implementing this remedial alternative is presented in Table 5.

TABLE 5
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO.5
EXCAVATION AND DISPOSAL OF ALL CONTAMINATED SOIL IN EXCESS OF SCGS

Work Task	Units	Unit Cost	Quantity	Total Cost
Capital Costs (Includes Labor):				
Institutional Controls:				
Legal and Filing Fees	LS	$2,000	1	$2,000
Soil Excavation And Disposal:				
Mobilization	LS	$20,000	1	$20,000
Demolition of Building	LS	$60,000	1	$60,000
Concrete Removal & Disposal	CY	$100	1,190	$119,000
Excavate Contaminated Soils	DAY	$1,200	30	$36,000
Soil Dewatering & Treatment	DAY	$5,000	20	$100,000
Clean Backfill w/Compaction	CY	$20	9,060	$181,200
Site Grading & Seeding	SY	$5	8,700	$43,500
Confirmatory Soil Sampling	EACH	$300	200	$60,000
Transportation and Off-site Disposal (Assume Non-Hazardous)	TON	$60	2,142	$128,520
Transportation and Off-site Disposal (Assume Hazardous)	TON	$120	11,448	$1,373,760
Subtotal				2,123,980
Contingency (20%)				424,796
Engineering (15%)				318,597
Total Capital Costs				2,867,373
Present Worth - O&M such as Annual Groundwater Monitoring ($6,000 Each Year for Years 1 to 5 at 5%)				$25,977

TABLE 5 SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS ALTERNATIVE NO.5 EXCAVATION AND DISPOSAL OF ALL CONTAMINATED SOIL IN EXCESS OF SCGS	
Present Worth - O&M such as Annual Groundwater Monitoring ($6,000 Each Year for Years 5 to 30 at 5%)	$66,258

3.2.6 Alternative No. 6 - On Site Soil Stabilization, Groundwater Treatment and Barrier to Contact

This remedial alternative is the most expensive alternative evaluated. The effectiveness of this alternative is high, however, the work tasks are more complex which are more labor and engineering intensive in comparison to other alternatives. This alternative would be protective of human health and the environment. The estimated cost associated with implementing this remedial alternative is presented in Table 6.

TABLE 6
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 6
ON-SITE STABILIZATION, GROUNDWATER TREATMENT AND BARRIER TO CONTACT

Work Task	Units	Unit Cost	Quantity	Total Cost
Institutional Controls:				
Legal and Filing Fees	LS	$2,000	1	$2,000
Groundwater Treatment:				
Treatment Shed	SF	$100	800	$8,000
Treatment System For Arsenic	LS	$150,000	1	$150,000
Carbon Treatment Canisters For VOCs/SVOCs	EACH	$600	6	$3,600
Well Installation	LS	$2,400	4	$9,600
Well Pumps	EACH	$1,500	3	$4,500
Misc. Plumbing & Labor	LS	$50,000	1	$50,000
SPDES Permitting & Trenching for Discharge	LS	$6,000	1	$6,000
On-site Stabilization:				
Mobilization	LS	$20,000	1	$20,000
Excavate Contaminated Soils	DAY	$1,200	30	$36,000
Treatment of Impacted Soils	TON	$200	13,661	$2,732,200

TABLE 6
SUMMARY OF REMEDIAL ALTERNATIVE ESTIMATED COSTS
ALTERNATIVE NO. 6
ON-SITE STABILIZATION, GROUNDWATER TREATMENT AND BARRIER TO CONTACT

Work Task	Units	Unit Cost	Quantity	Total Cost
Various Analytical Services	LS	$40,000	1	$40,000
Site Grading & Seeding (i.e., reinstall soil barrier placed by EPA on the west side of the site)	SY	$5	11,600	$58,000
Barrier to Contact (1 to 2 feet thick):				
Mobilization	LS	$500	1	$500
Clean Backfill w/Compaction	CY	$20	2,358	$47,160
Site Grading & Seeding	SY	$5	3,536	$17,680
Subtotal				3,185,240
Contingency (20%)				637,048
Engineering (15%)				477,786
Total Capital Costs				4,300,074
Present Worth - O&M such as utilities, carbon disposal, etc. ($30,000 Each Year for 10 Years @ 5%)				$231,651

FIGURES 1 TO 6

AREAS OF CONCERN

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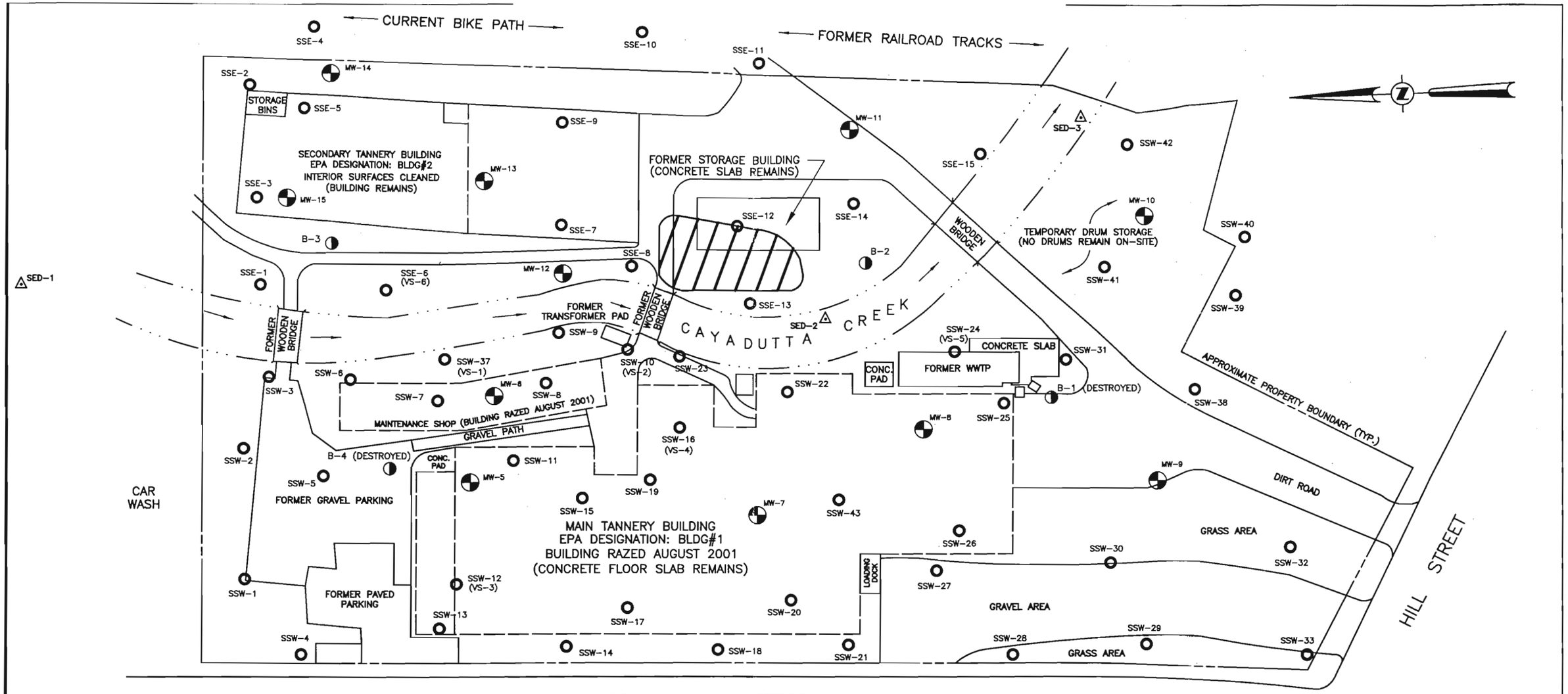

BAR SCALE

50 0 25 50 100

1 inch = 50 ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
- SED-1 — EPA SEDIMENT SAMPLING LOCATION
- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
- MW-5 — C.T. MALE TEST BORING & MONITORING WELL LOCATIONS

GENERAL NOTES:
THE LOCATIONS AND FEATURES DEPICTED ON THIS MAP ARE APPOXIMATE AND DO NOT REPRESENT AN ACTUAL FIELD SURVEY.

2.) THE LOCATIONS OF EPA SAMPLING POINTS WERE ELECTRONICALLY PROVIDED BY EPA AND ARE APPROXIMATE.

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FIGURE 1
AREA OF CONCERN #1
SOIL - FORMER 20,000-GALLON FUEL OIL TANK

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RAR FIG.1
SHEET 1 OF 1
DWG. NO: 03-194

CAD DWG. FILE NAME: FINAL AOCs.DWG

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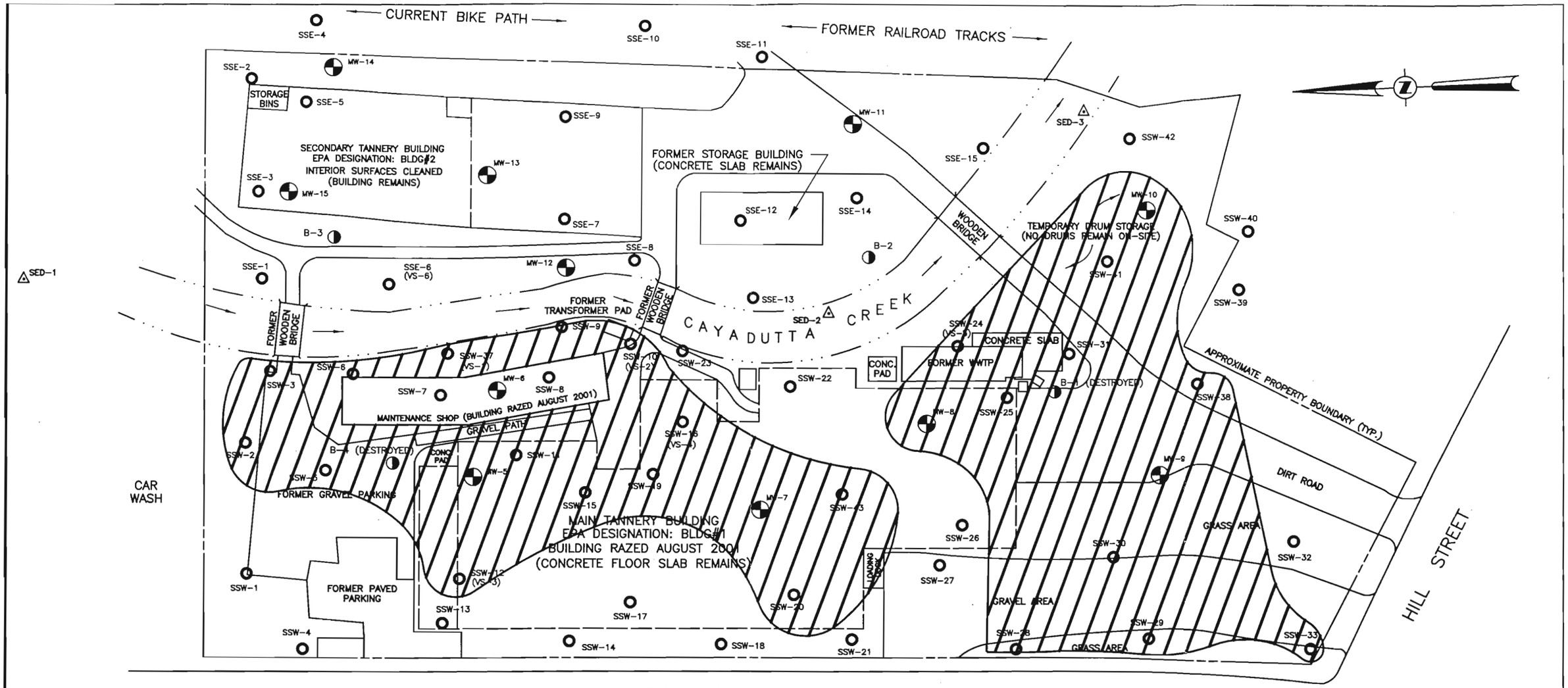

BAR SCALE
50 0 25 50 100
1 inch = 50 ft.

LEGEND:

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FIGURE 2
AREA OF CONCERN #2a
SOIL - WESTERN SIDE OF THE SITE

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RAR FIG.2
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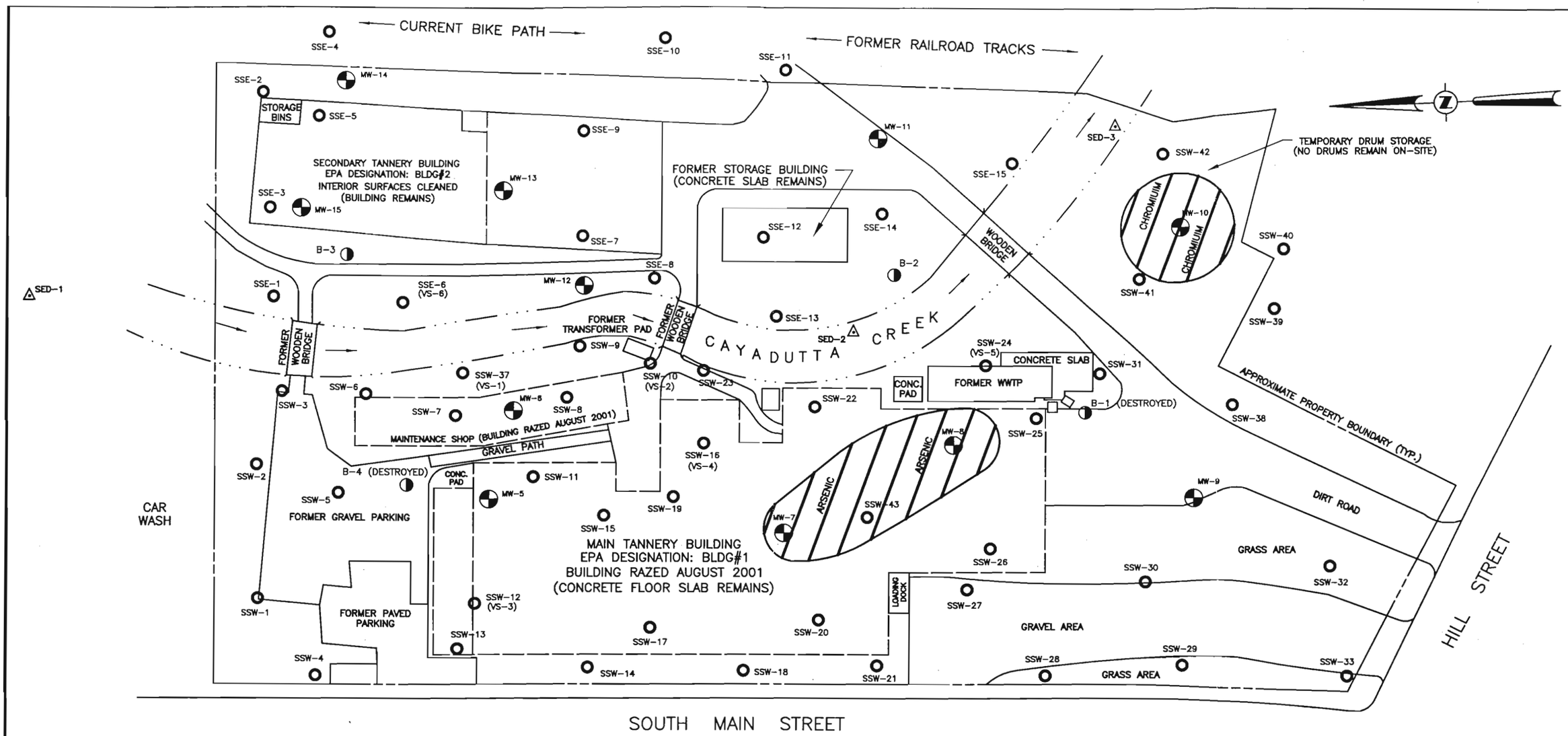

BAR SCALE

50 0 25 50 100

1 inch = 50 ft.

LEGEND:

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FIGURE 3
AREA OF CONCERN #2b
GROUNDWATER - WASTEWATER TREATMENT PLANT

INDEPENDENT LEATHER TANNERY

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RAR FIG.3
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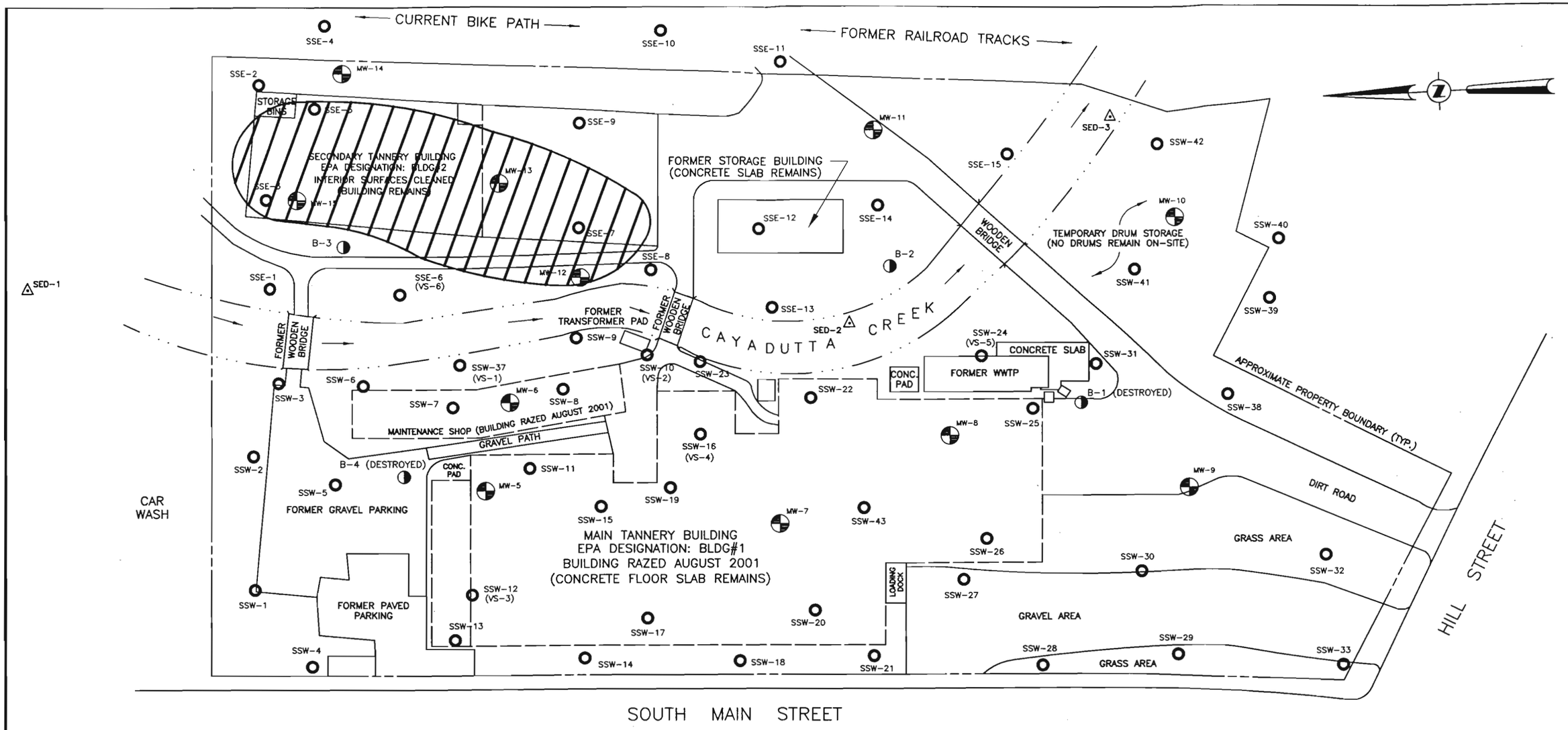

BAR SCALE
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1 inch = 50 ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
- SED-1 — EPA SEDIMENT SAMPLING LOCATION
- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
- MW-5 — C.T. MALE TEST BORING & MONITORING WELL LOCATIONS

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FIGURE 4
AREA OF CONCERN #3
SOIL - SECONDARY TANNERY BUILDING

INDEPENDENT LEATHER TANNERY

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RAR FIG. 4
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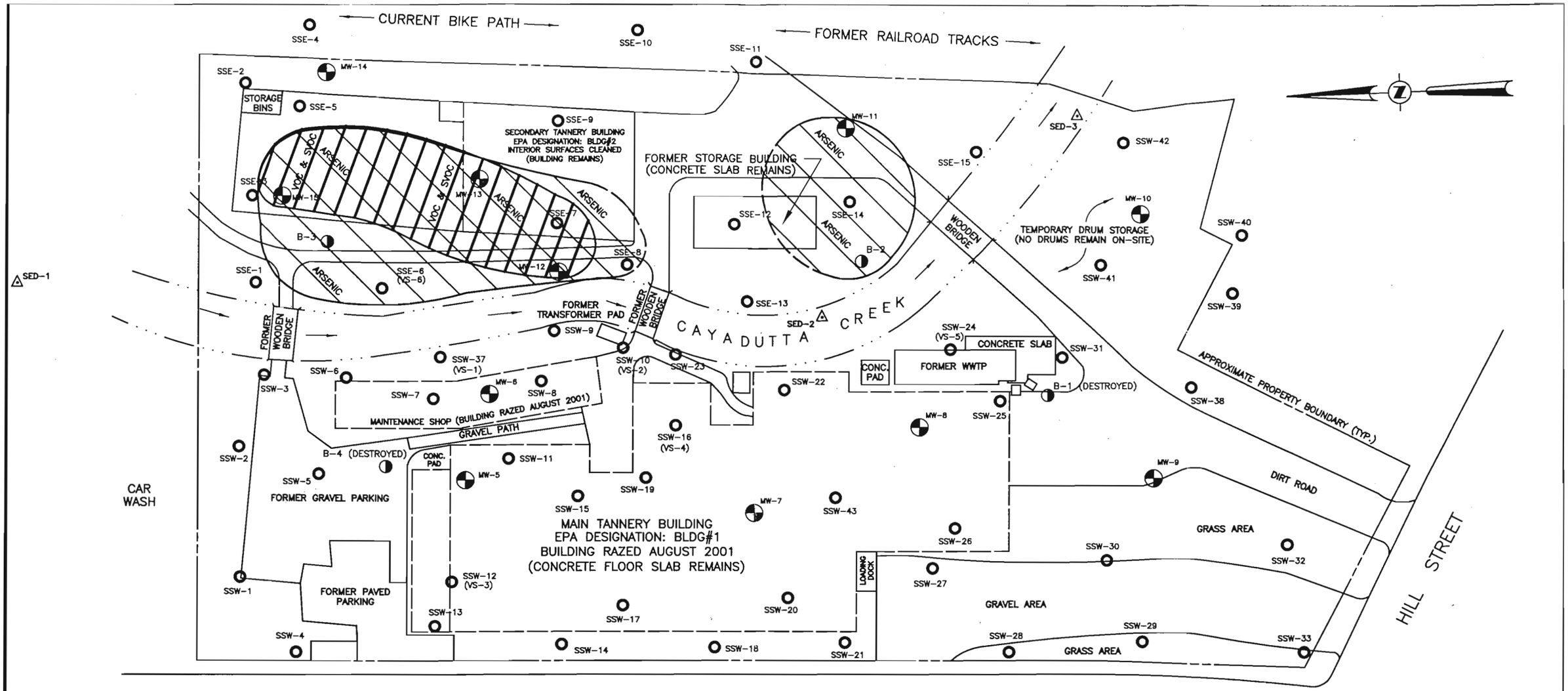

BAR SCALE
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1 inch = 50 ft.

LEGEND:

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FIGURE 5
AREA OF CONCERN #4
GROUNDWATER - EASTERN SIDE OF THE SITE

INDEPENDENT LEATHER TANNERY

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RAR FIG. 5
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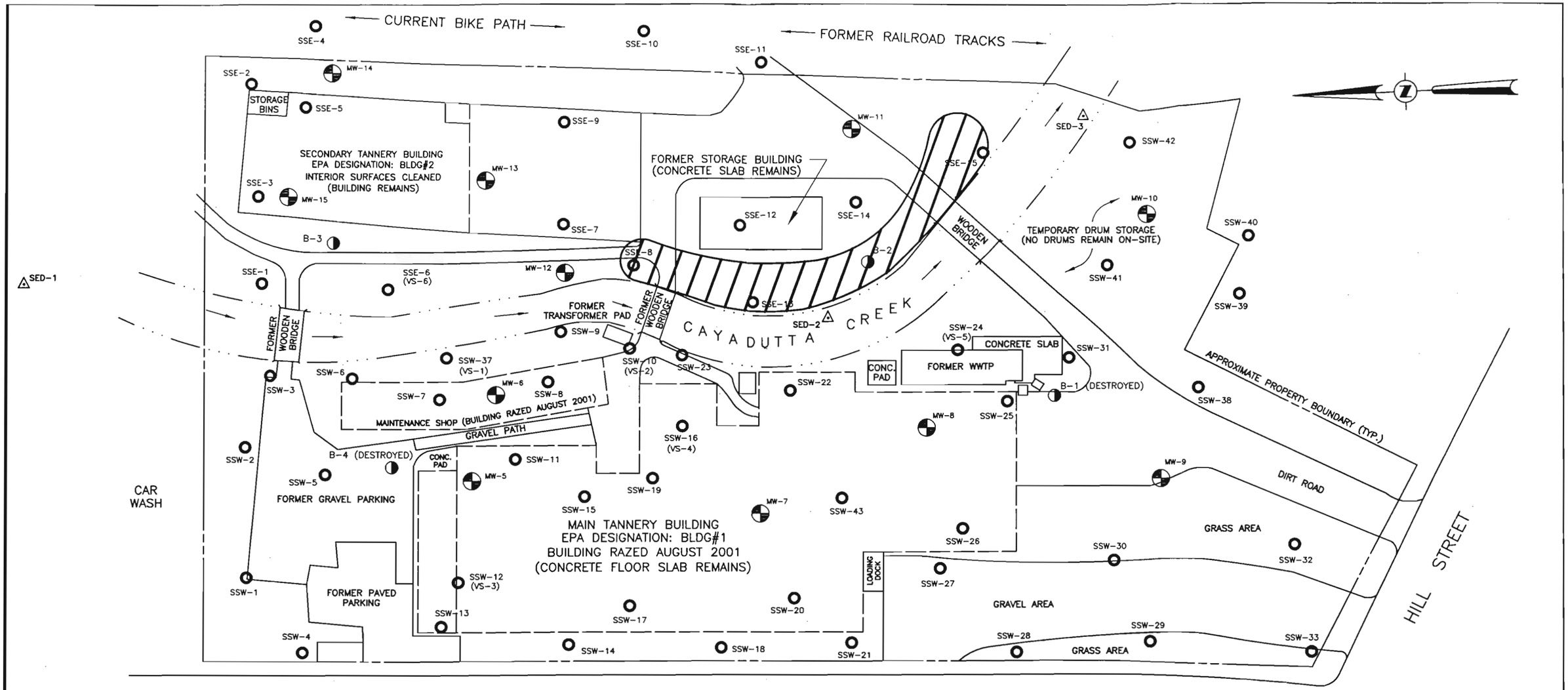

BAR SCALE
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1 inch = 50 ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
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- MW-5 — C.T. MALE TEST BORING & MONITORING WELL LOCATIONS

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FIGURE 6
AREA OF CONCERN #5 - SOIL
LANDS SOUTH OF THE SECONDARY TANNERY BLDG.

INDEPENDENT LEATHER TANNERY

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RAR FIG.6
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FIGURES 7 TO 11

REMEDIAL ALTERNATIVES

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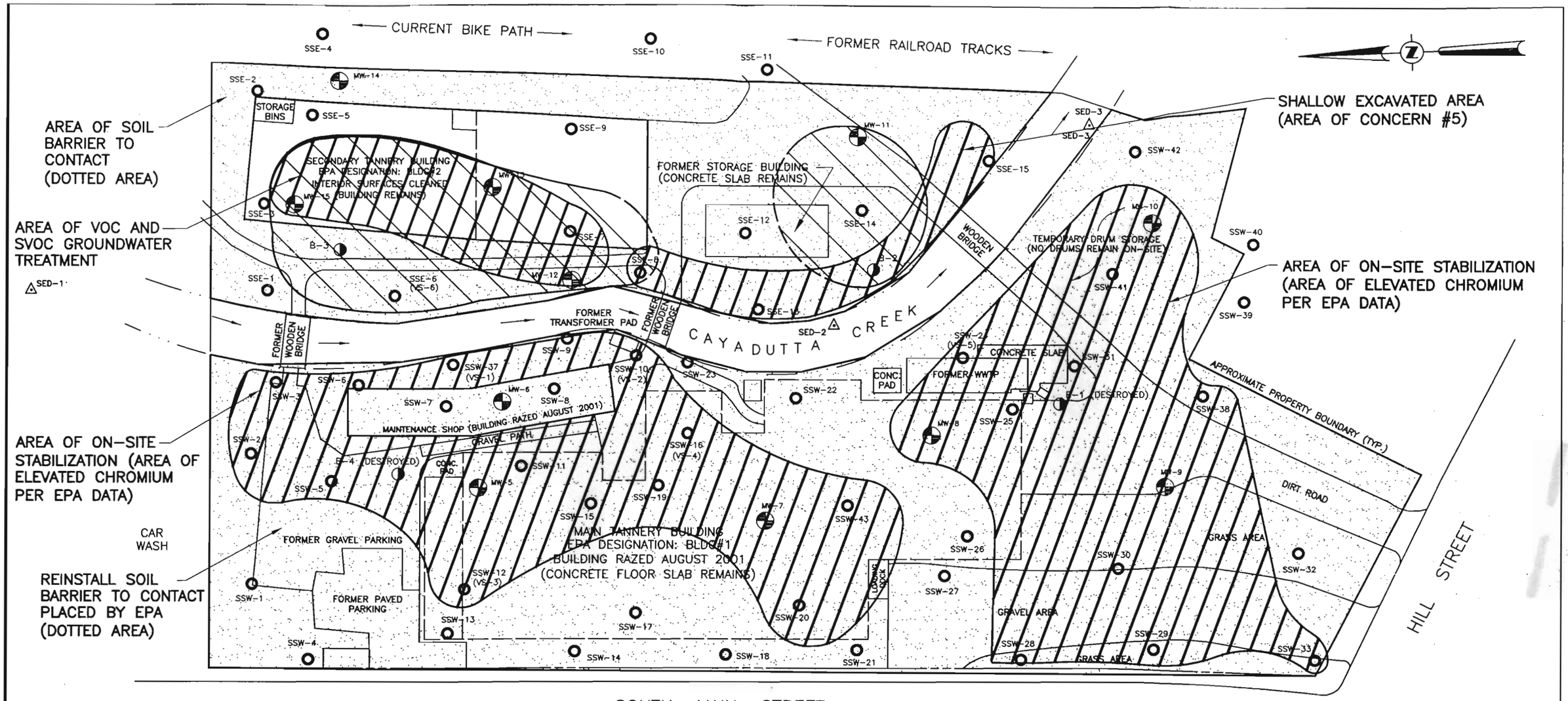

BAR SCALE

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1 inch = 50 ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
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FIGURE 11 - ALTERNATIVE NO. 6 ON-SITE STABILIZATION, GROUNDWATER TREATMENT AND SOIL BARRIER TO CONTACT

INDEPENDENT LEATHER TANNERY

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RAR FIG. 11
SHEET 1 OF 1
DWG. NO: 03-194

CAD DWG. FILE NAME: FINAL ALTs.DWG

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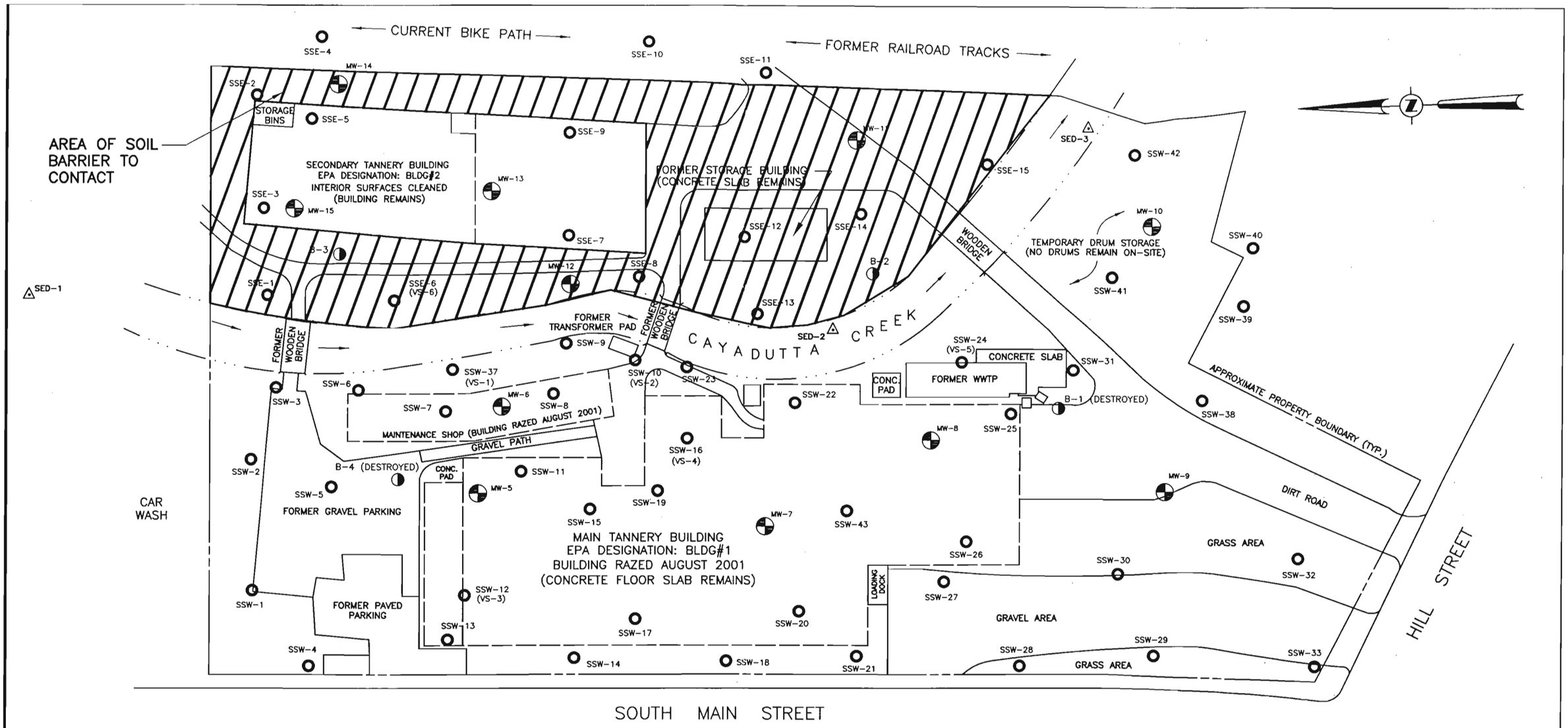

BAR SCALE

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1 inch = 50 ft.

LEGEND:

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- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
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GENERAL NOTES:
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2.) THE LOCATIONS OF EPA SAMPLING POINTS WERE ELECTRONICALLY PROVIDED BY EPA AND ARE APPROXIMATE.

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FIGURE 7 - ALTERNATIVE NO. 2
SOIL BARRIER TO CONTACT FOR CONTAMINATED AREAS WITH INSTITUTIONAL CONTROLS

INDEPENDENT LEATHER TANNERY

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RAR FIG. 7
SHEET 1 OF 1
DWG. NO: 03-194

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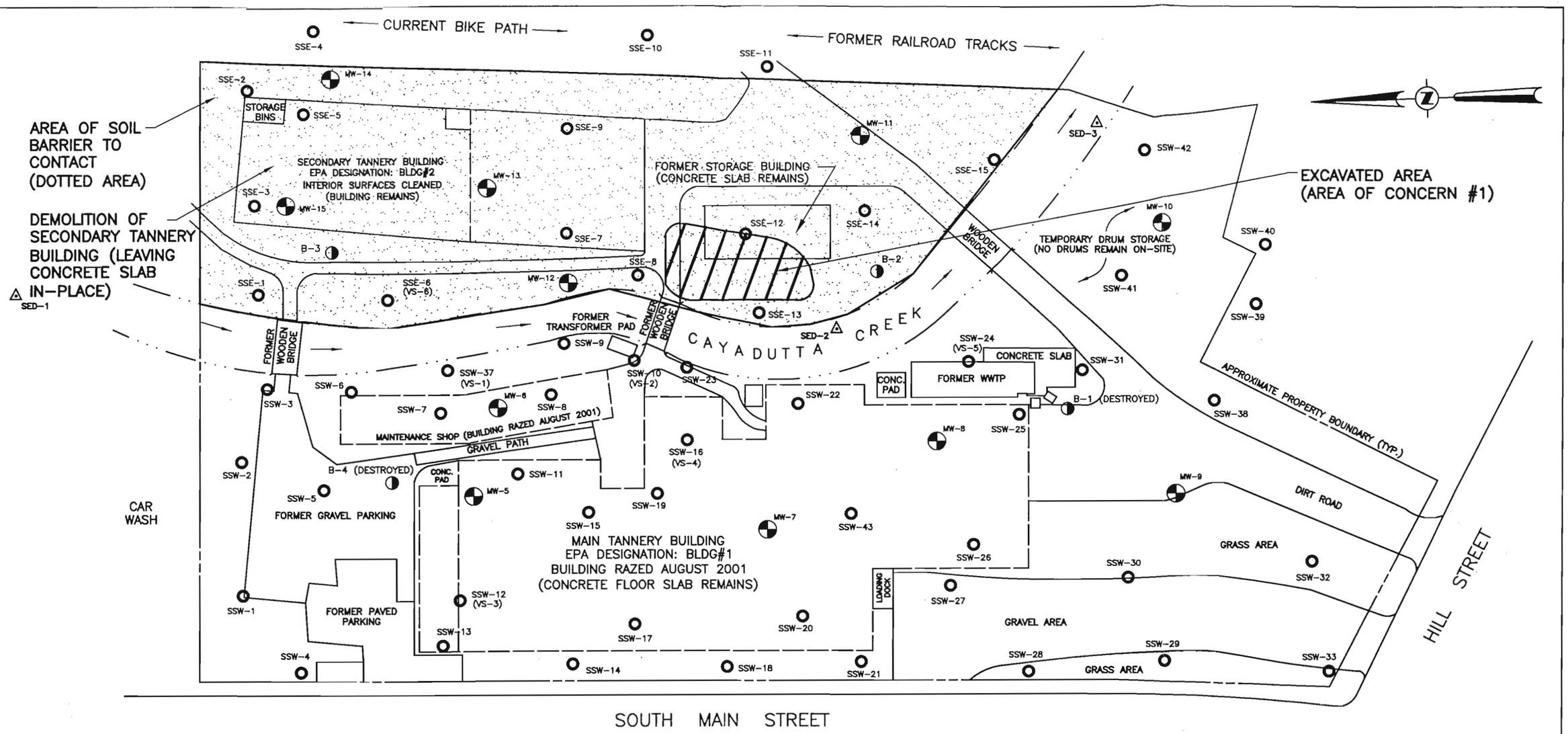

BAR SCALE
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DESIGNED:
DRAFTED : JAM
CHECKED : KM
PROJ. NO : 01.7293
SCALE : ±1"=50'
DATE : NOVEMBER 2003

FIGURE 8 - ALTERNATIVE NO. 3
LTD. EXCAVATION OF FUEL OIL CONTAMINATED SOIL AND SOIL BARRIER TO CONTACT ON REMAINING

INDEPENDENT LEATHER TANNERY

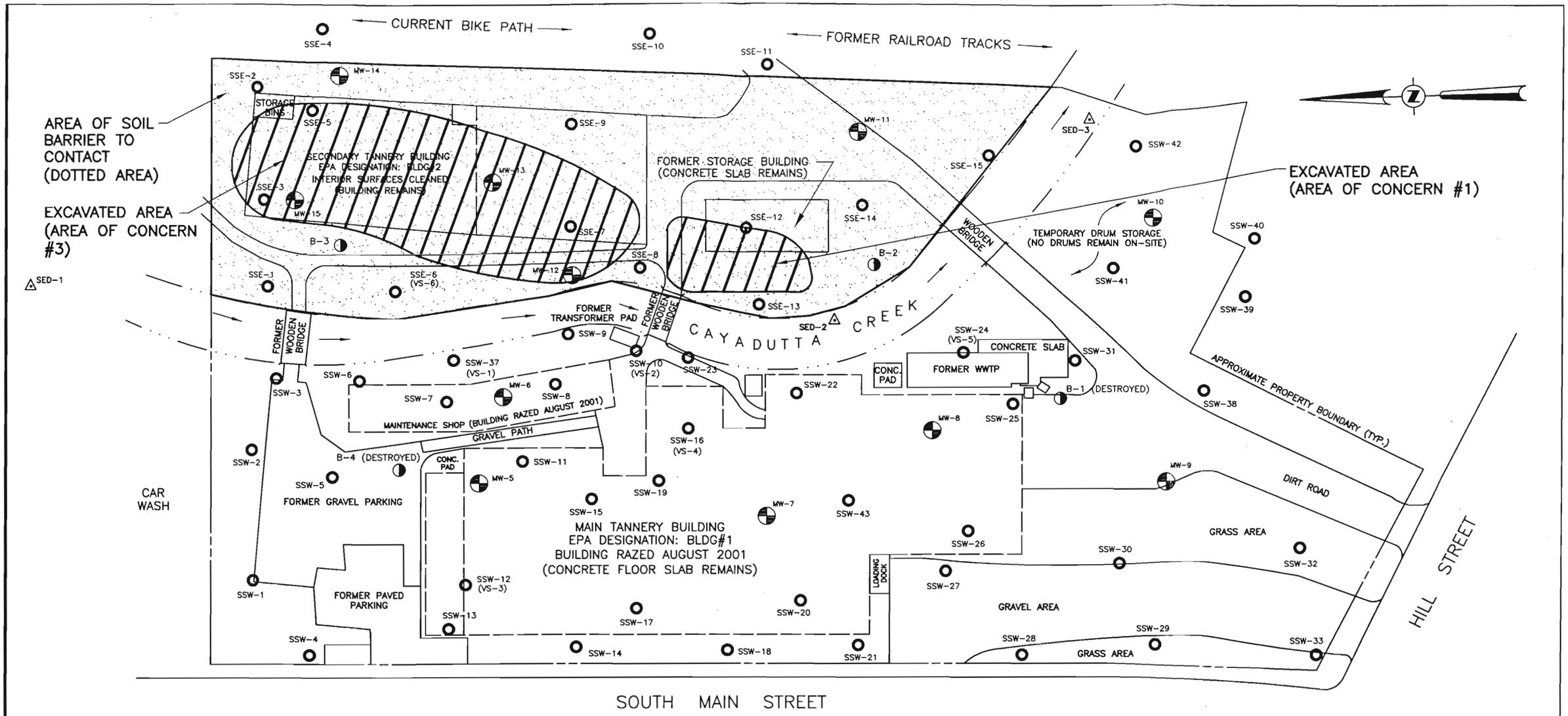
CITY OF GLOVERSVILLE — FULTON COUNTY, NEW YORK

C.T. MALE ASSOCIATES, P.C.
50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
518.786.7400 • FAX 518.786.7299
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING • CIVIL ENGINEERING
ENVIRONMENTAL SERVICES • SURVEY & LAND INFORMATION SERVICES

RAR FIG.8
SHEET 1 OF 1
DWG. NO: 03-194

CAD DWG. FILE NAME: FINAL ALTs.DWG

NO XREFS



BAR SCALE
50 0 25 50 100
1 inch = 50 ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
- SED-1 — EPA SEDIMENT SAMPLING LOCATION
- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
- MW-5 — C.T. MALE TEST BORING & MONITORING WELL LOCATIONS

GENERAL NOTES:
THE LOCATIONS AND FEATURES DEPICTED ON THIS MAP ARE APPOXIMATE AND DO NOT REPRESENT AN ACTUAL FIELD SURVEY.

2.) THE LOCATIONS OF EPA SAMPLING POINTS WERE ELECTRONICALLY PROVIDED BY EPA AND ARE APPROXIMATE.

DATE		REVISIONS RECORD/DESCRIPTION	DRAFTED	CHECK	APPR.
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DESIGNED:
DRAFTED : JAM
CHECKED : KM
PROJ. NO : 01.7293
SCALE : ±1"=50'
DATE : NOVEMBER 2003

FIGURE 9 - ALTERNATIVE NO. 4 - EXPANDED SOIL EXCAVATION OF CONTAMINATED AREAS AND SOIL BARRIER TO CONTACT ON REMAINING

INDEPENDENT LEATHER TANNERY

CITY OF GLOVERSVILLE — FULTON COUNTY, NEW YORK

C.T. MALE ASSOCIATES, P.C.
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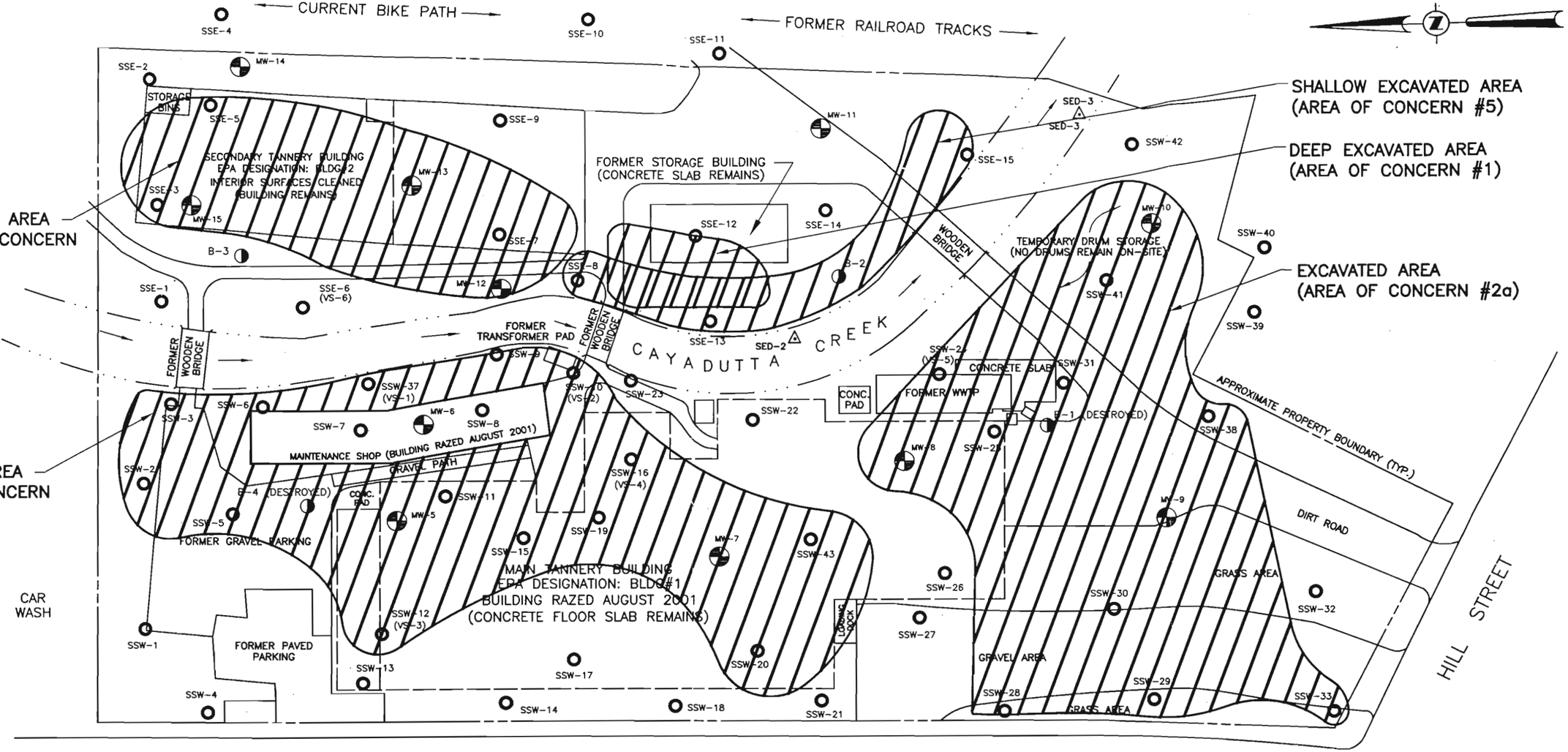
RAR FIG.9
SHEET 1 OF 1
DWG. NO: 03-194

CAD DWG. FILE NAME: FINAL ALTs.DWG



BAR SCALE

50 0 25 50 100

1 inch = 50. ft.

LEGEND:

- B-1 — EXISTING MONITORING WELLS B-1 THROUGH B-4
- SSW-33 — EPA SURFICIAL AND/OR DEEP SAMPLING LOCATION
- SED-1 — EPA SEDIMENT SAMPLING LOCATION
- MW-5 — C.T. MALE TEST BORING & MONITORING WELL LOCATIONS

GENERAL NOTES:
THE LOCATIONS AND FEATURES DEPICTED ON THIS MAP ARE APPOXIMATE AND DO NOT REPRESENT AN ACTUAL FIELD SURVEY.

2.) THE LOCATIONS OF EPA SAMPLING POINTS WERE ELECTRONICALLY PROVIDED BY EPA AND ARE APPROXIMATE.

DATE		REVISIONS RECORD/DESCRIPTION	DRAFTED	CHECK	APPR.
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DESIGNED:
DRAFTED : JAM
CHECKED : KM
PROJ. NO : 01.7293
SCALE : ±1"=50'
DATE : NOVEMBER 2003

FIGURE 10
ALTERNATIVE NO. 5 - EXCAVATION AND DISPOSAL OF ALL CONTAMINATED SOIL IN EXCESS OF SCGS

INDEPENDENT LEATHER TANNERY

CITY OF GLOVERSVILLE — FULTON COUNTY, NEW YORK

C.T. MALE ASSOCIATES, P.C.
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RAR FIG.10
SHEET 1 OF 1
DWG. NO: 03-194

NO XREFS

CAD DWG. FILE NAME: FINAL ALTs.DWG

APPENDIX A

TABLE 1.5.1-1

SUMMARY OF CONTAMINANTS OF CONCERN FOR EACH MEDIA

TABLE 1.5.1-1 SUMMARY OF CONTAMINANTS OF CONCERN FOR EACH MEDIA						
Media	Class	Contaminant of Concern	Detected Concentration Range	Frequency of Exceeding Standard	Applicable SCG (1)	Eastern USA Background (2) Or Sediment Criteria (3)
Surface Soil (mg/kg or ppm)	VOCs	Ethylbenzene	0.037 and40	1 of 2	5.5	NA (2)
		Total Xylenes	0.44 and 33	1 of 2	1.2	NA (2)
	SVOCs	Benzo(a)anthracene	2	1 of 1	0.224 or MDL	NA (2)
		Benzo(a)anthracene by EPA (4)	3.5	1 of 1	0.224 or MDL	NA (2)
		Benzo(a)pyrene	1.6	1 of 1	0.061 or MDL	NA (2)
		Benzo(a)pyrene by EPA (4)	4.2	1 of 1	0.061 or MDL	NA (2)
		Benzo(b)fluoranthene by EPA (2)	5.2	1 of 1	0.224 or MDL	NA (2)
		Benzo(k)fluoranthene by EPA (2)	5.0	1 of 1	0.224 or MDL	NA (2)
		Chrysene	2	1 of 1	0.4	NA (2)
		Chrysene by EPA (4)	4.5	1 of 1	0.4	NA (2)
		2-Methylnaphthalene	37	1 of 1	36.4	NA (2)
		Naphthalene	110	1 of 1	13	NA (2)
	Pesticides	NONE	NA	NA	NA	NA
	PCBS	NONE	NA	NA	NA	NA
	Metals	Arsenic (As)	3,510	1 of 1	7.5 of SB	3 to 12 (2)
		Arsenic (As) by EPA (4)	2.1 and 42	1 of 2	7.5 of SB	3 to 12 (2)
		Chromium (Cr)	605	1 of 1	50	1.5 to 40 (2)
		Chromium (Cr) by EPA (4)	177 to 605	7 of 14	50	1.5 to 40 (2)
		Copper (Cu)	123	1 of 1	25 or SB	1 to 50 (2)
		Iron (Fe)	30,400	1 of 1	2,000 or SB	2,000 to 550,000 (2)
		Iron (Fe) by EPA (4)	7,000 and 10,000	2 of 2	2,000 or SB	2,000 to 550,000 (2)
		Mercury (Hg)	3.1	1 of 1	0.1	0.001 to 0.2 (2)
Surface Soil	Metals	Nickel (Ni)	34.8	1 of 1	13 or SB	0.5 to 25 (2)
		Zinc (Zn)	255	1 of 1	20 or SB	9 to 50 (2)
		Zinc (Zn) by EPA (4)	21 and 45	2 of 2	20 or SB	9 to 50 (2)
Stream Surface Water (ug/l or ppb)	VOCs	NONE	NA	NA	NA	NA
	SVOCs	NONE	NA	NA	NA	NA
	Pesticides	NONE	NA	NA	NA	NA
	PCBs	NONE	NA	NA	NA	NA
	Metals	Aluminum (Al)	ND to 202	1 of 3	100	NA
		Iron (Fe)	195 to 393	1 of 3	300	NA

TABLE 1.5.1-1 SUMMARY OF CONTAMINANTS OF CONCERN FOR EACH MEDIA						
Media	**Class**	**Contaminant of Concern**	**Detected Concentration Range**	**Frequency of Exceeding Standard**	**Applicable SCG (1)**	**Eastern USA Background (2) Or Sediment Criteria (3)**
Stream Sediment (mg/kg or ppm)	VOCs	NONE	NA	NA	NA	NA
	SVOCs	Benzo(a)anthracene	0.14 to 2.7	2 of 3	0.224 or MDL	1.3 (3)
		Benzo(a)pyrene	0.14 to 2.6	3 of 3	0.061 or MDL	1.3 (3)
		Benzo(b)fluoranthene	0.15 to 2.4	2 of 3	0.224 or MDL	1.3 (3)
		Benzo(k)fluoranthene	0.14 to 2.2	2 of 3	0.224 or MDL	1.3 (3)
		Chrysene	0.2 to 3.5	1 of 3	0.4	1.3 (3)
		Dibenzo(a,h)anthracene	0.056 to 0.93	3 of 3	0.014 or MDL	NA (3)
	Pesticides	NONE	NA	NA	NA	NA
	PCBS	NONE	NA	NA	NA	NA
	Metals	Copper	7.9 to 33.8	3 of 3	25 or SB	16/110 (3)
		Iron (Fe)	8,770 to 11,800	3 of 3	2,000 or SB	20,000/40,000 (3)
		Zinc (Zn)	47.5 to 99.5	3 of 3	20 or SB	120/270 (3)
Subsurface Soil (mg/kg or ppm)	VOCs	Acetone	ND to 0.75	3 of 10	0.2	NA (2)
	SVOCs	Benzo(a)anthracene	ND to 2.6	3 of 10	0.224 or MDL	NA (2)
		Benzo(a)anthracene	ND to 7.6	3 of 3	0.224 or MDL	NA (2)
		Benzo(a)pyrene	ND to 1.9	3 of 10	0.061 or MDL	NA (2)
		Benzo(a)pyrene	ND to 8.3	3 of 3	0.061 or MDL	NA (2)
		Benzo(b)fluoranthene	ND to 1.3	3 of 10	0.224 or MDL	NA (2)
		Benzo(b)fluoranthene	ND to 8.3	3 of 3	0.224 or MDL	NA (2)
		Benzo(k)fluoranthene	ND to 1.8	3 of 10	0.224 or MDL	NA (2)
		Benzo(k)fluoranthene	ND to 8.2	3 of 3	0.224 or MDL	NA (2)
		Chrysene	ND to 2.4	3 of 10	0.4	NA (2)
		Chrysene	ND to 8.2	2 of 3	0.4	NA (2)
		Dibenzo(a,h)anthracene	ND to 0.48	2 of 10	0.014 or MDL	NA (2)
		2,4,5-Trichlorophenol	ND to 0.54	1 of 3	0.1	NA (2)
	Pesticides	NONE	NA	NA	NA	NA
	PCBs	NONE	NA	NA	NA	NA
	Metals	Arsenic (As)	1.2 to 700	5 of 10	7.5 or SB	3 to 12** (2)
		Barium (Ba)	6.3 to 1,390	1 of 10	300 or SB	15 to 600 (2)
		Beryllium (Be)	0.24 to 0.68	10 of 10	0.16 or SB	0 to 1.75 (2)
		Cadmium (Cd)	ND to 23.4	1 of 10	10	0.1 to 1 (2)
	Metals	Chromium (Cr)	ND to 9,870	4 of 10	50	1.5 to 40** (2)
		Copper (Cu)	1.6 to 459	3 of 10	25 or SB	1 to 50 (2)
		Iron (Fe)	5,610 to 107,000	10 of 10	2,000 or SB	2,000 to 550,000 (2)

TABLE 1.5.1-1 SUMMARY OF CONTAMINANTS OF CONCERN FOR EACH MEDIA						
Media	**Class**	**Contaminant of Concern**	**Detected Concentration Range**	**Frequency of Exceeding Standard**	**Applicable SCG (1)**	**Eastern USA Background (2) Or Sediment Criteria (3)**
Subsurface Soil		Mercury (Hg)	ND to 27.3	4 of 10	0.1	0.001 to 0.2 (2)
		Nickel (Ni)	3.2 to 71.6	2 of 10	13 or SB	0.5 to 25 (2)
		Selenium (Se)	ND to 4.1	1 of 10	2 or SB	0. to 3.9 (2)
		Zinc (Zn)	12.5 to 990	6 of 10	20 or SB	9 to 50 (2)
Ground-water (Wells) (ug/l or ppb)	VOCs	Benzene	ND to 3	1 of 13	1	NA
		Ethylbenzene	ND to 10	3 of 13	5	NA
		Total Xylenes	ND to 75	4 of 13	5	NA
	SVOCs	Naphthalene	ND to 130	4 of 13	10	NA
		Pentachlorophenol	ND to 3	1 of 13	1	NA
		Phenol	ND to 22	1 of 13	1	NA
	Pesticides	NONE	NA	NA	NA	NA
	PCBs	NONE	NA	NA	NA	NA
	Metals	Antimony (Sb)	ND to 54.9	1 of 13	3	NA
		Arsenic (As)	ND to 4,780	7 of 13	25	NA
		Chromium (Cr)	ND to 148	1 of 13	50	NA
		Iron (Fe)	332 to 33,900	13 of 13	300	NA
		Magnesium (Mg)	4,170 to 72,800	2 of 13	35,000 (GV)	NA
		Manganese (Mn)	33.8 to 7,420	6 of 13	300	NA
		Sodium (Na)	6,600 to 3,910,000	10 to 13	20,000	NA

Table Notes:

(1) Technical and Administrative Guidance Memorandum #4046, Determination of Soil Cleanup Objectives and Cleanup Levels, NYSDEC, January 24, 1994, Revised April 1995 for soil. NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Effluent Limitations, June 1998 for groundwater and surface water.

(2) Eastern USA background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

(3) NYSDEC Technical Guidance for screening Contaminated Sediments, Human Health Bioaccumulation

(4) EPA provided analytical data (exceedances only). No data validation was been performed.

GV Guidance Value

** New York State Background

*** Background levels for lead varies widely. Average background levels in metropolitan areas near highways are much higher and typically range from 200 to 500 mg/kg or ppm. The EPA's Interim Lead Hazard Guidance (7/14/94) establishes a residential screening level of 400 kg/kg or ppm.

This table does not present those compounds detected below applicable SCGs.