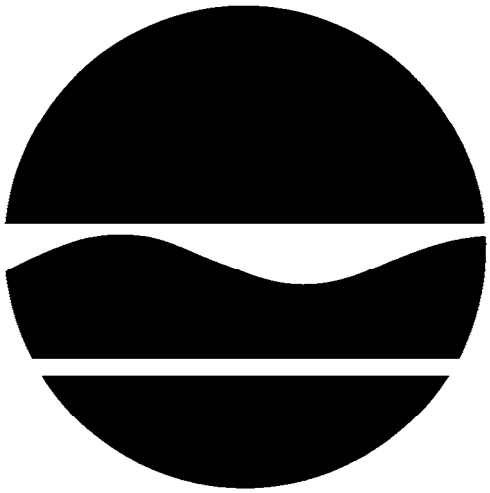
PROPOSED REMEDIAL ACTION PLAN

EIGHTEENMILE CREEK CORRIDOR SITE
Operable Unit Nos. 1, 3, 4, 5 and 6
Lockport, Niagara County, New York
Site No. 932121

January 2010



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC or Department), in consultation with the New York State Department of Health (NYSDOH), is proposing remedies for Operable Units 1, 3, 4, 5 and 6 of the Eighteenmile Creek Corridor Site. The presence of hazardous waste has created significant threats to human health and the environment that are addressed by the proposed remedies. As more fully described in Sections 3 and 5 of this document, on-site disposal and direct discharge to Eighteenmile Creek have resulted in the disposal of hazardous wastes, including polychlorinated biphenyls and metals. These wastes have contaminated the soil and sediment at the site, and have resulted in:

- A significant threat to human health associated with current and potential exposure to soils and sediment; and

- A significant environmental threat associated with current and potential impacts of contaminants to Eighteenmile Creek, and potentially to groundwater.

To eliminate or mitigate these threats, the Department proposes sediment and creek bank excavation with restoration and long-term monitoring for Operable Unit 1, hazardous waste removal with bank stabilization and long-term monitoring for Operable Units 3, 4 and 5, and limited excavation with bank stabilization and long-term monitoring for Operable Unit 6.

The proposed remedies, discussed in detail in Section 8, are intended to attain the remediation goals identified for this site in Section 6. The remedies must conform to officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy for each operable unit, summarizes the other alternatives considered, and discusses the reasons for these preferences. The Department will select final remedies for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the September 2006 "Remedial Investigation (RI) Report", the July 2009 "Supplemental Remedial Investigation (SRI) Report", the July 2009 "Additional Investigation

Addendum to the Supplemental Remedial Investigation Report", and the September 2009 "Feasibility Study (FS) Report", and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Lockport Public Library
23 East Avenue
Lockport, N.Y.
(716) 433-5935
Hours: Monday - Thursday, 10 AM - 9 PM;
Fri. & Sat., 10 AM - 5 PM

or,

NYSDEC Region 9 Buffalo Office
270 Michigan Avenue
Buffalo, N.Y. 14203
(716) 851-7220
Hours: Mon.- Fri. 8:30 AM - 4:45 PM
Attention Mr. Glenn May
8:30 am - 4:30 pm by appointment only

The Department seeks input from the community on all PRAPs. A public comment period has been set from January 13, 2010 to February 11, 2010 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for Wednesday, January 27, 2010 at the Lockport Public Library beginning at 7:00 pm.

At the meeting, the results of the RI/SRI/FS will be presented along with a summary of the proposed remedies. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. May at the above address through February 11, 2010.

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

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedies for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Eighteenmile Creek Corridor Site consists of approximately 10.6 acres between Clinton and Harwood Streets in the City of Lockport, Niagara County, New York (Figure 1). The site is bounded by Water Street, Eighteenmile Creek, residential properties and vacant land to the west, Clinton Street to the south, Mill Street to the east and commercial property to the north (Figures 1 and 2). The topography of the site is relatively flat-lying with a steep downward slope toward Eighteenmile Creek and the millrace, which bisects the former Flintkote property (Figure 2).

Eighteenmile Creek north of the New York State Barge Canal originates from two branches (East and West; Figure 2). Water from the East Branch originates at the spillway in the Barge Canal near the Mill Street Bridge where canal water joins with water from the culverted section of Eighteenmile Creek south of the canal. This water flows north under the Barge Canal toward Clinton Street. Water from the West Branch originates from the dry dock on the north side of the Barge Canal (Figure 2) and also flows north toward Clinton Street. Water from the East and West Branches converges south of Clinton Street and flows under the street to a mill pond (Figure 2). The mill pond is the result of the Clinton Street Dam on the former United Paperboard Company property (Figure 2). Water from Eighteenmile Creek eventually discharges to Lake Ontario in Olcott, New York, which is approximately 13 miles north of the site.

Eighteenmile Creek, located in the heart of Niagara County, is surrounded by six residential townships, and many citizens own creek-front property. The creek is used extensively for fishing, boating, and recreation. During operation, the Barge Canal discharges approximately 50 cubic feet per second (cfs) of water into the East and West Branches of the creek. During dry periods, the Barge Canal provides a significant portion of the creek's flow.

At the Eighteenmile Creek Corridor Site four distinct geologic units exist. These units, in order of increasing depth, are summarized as follows:

- Topsoil described as a brown to dark brown silty soil with varying amounts of natural organic matter (e.g., leaves and rootlets). This unit was often encountered above fill material, but was absent in some areas of the site. Where encountered, the thickness of the topsoil layer was usually less than 0.2 feet;

- Fill material consisting primarily of various colored ash and cinder material containing glass, coal, coke, slag, buttons, metal, ceramic, rubber and brick. Where encountered, the thickness of the fill material ranged from 0.9 to 24.9 feet;

- A glaciolacustrine deposit consisting primarily of mottled, brown to reddish brown, silty clay and clayey silt containing traces of fine grained sand and fine gravel. This deposit directly overlies bedrock, and where encountered, ranged in thickness from 0.1 to more than 28 feet; and

- Light to dark gray dolostone bedrock with interbedded gray clay underlying the southern portion of the site, and marbleized red and white sandstone underlying the northern portion of the site. Depth to bedrock at the site ranged from 1.6 to more than 28 feet, with the greater depths generally associated with the thicker fill areas.

Groundwater underlying the site occurs in both the overburden and upper fractured bedrock, and flows toward Eighteenmile Creek. Saturated conditions were not encountered in the overburden soils at the northern portion of the site east of Eighteenmile Creek and at the southern portion of the site west of the creek. Groundwater in these areas is confined to the upper bedrock. As groundwater flows toward Eighteenmile Creek, it discharges from the bedrock into the overburden along the creek. Groundwater continues to flow within the overburden and discharges to Eighteenmile Creek and the millrace. Groundwater elevations at the site ranged between 464.54 feet above mean sea level (amsl) to 502.72 feet amsl.

The Eighteenmile Creek Corridor Site has been subdivided into six Operable Units (OUs) as shown on Figure 2. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The Operable Units at the Eighteenmile Creek Corridor Site are defined as follows:

OU1: Eighteenmile Creek and Millrace: This operable unit consists of approximately 4,000 linear feet of contaminated creek and millrace sediment from the New York State Barge Canal to Harwood Street.

OU2: Former Flintkote Property: This operable unit consists of the former Flintkote property located at 198 and 300 Mill Street. The majority of the property is situated along the eastern bank of Eighteenmile Creek, and is bisected by William Street (Figure 2), which divides the operable unit into north (300 Parcel) and south (198 Parcel) sections. The section of 300 Mill Street between Eighteenmile Creek and the millrace is referred to as the Island, while a small portion of the property is located between the creek and the residential properties (OU6) on Water Street. This portion of the 300 Mill Street Parcel is referred to as the Water Street Section. This operable unit is approximately 6.0 acres in size

OU3: Former United Paperboard Property: This operable unit consists of the former United Paperboard Company property located at 62 and 70 Mill Street. The property is bounded to the north by the Former Flintkote Plant Site, to the east by Mill Street, to the south by Clinton Street and to the west by Water Street and residential properties. This operable unit is approximately 4.8 acres in size, and consists of two adjoining parcels separated by Olcott Street.

OU4: Upson Park: This operable unit consists of the Upson Park property located on Clinton Street. The property is bounded to the north by Clinton Street, to the east by the White Transportation Property and property owned by New York State, to the south by the New York State Barge Canal and property owned by New York State, and to the west by wooded, vacant land. This operable unit is approximately 5.9 acres in size and consists of one parcel.

OU5: White Transportation Property: This operable unit consists of the former White Transportation property located at 30 thru 40 Mill Street. The property is bounded to the north by Clinton Street, to the east by Mill Street, to the south by the New York State Barge Canal and property owned by New York State, and to the west by Upson Park and property owned by New York State. This operable unit is approximately 2.6 acres in size and consists of four adjoining parcels.

OU6: Water Street Residential Properties: This operable unit consists of residential and vacant property located at 97 thru 143 Water Street. The properties are bounded to the north by the Water Street Section of the Former Flintkote Plant Site, to the east by Eighteenmile Creek, to the south by Olcott Street, and to the west by Water Street. This operable unit is approximately 2.25 acres in size and consists of nine adjoining parcels.

Operable Units 1, 3, 4, 5 and 6, are the subject of this document. A Remedy for Operable Unit 2 is contained in a Record of Decision that was issued by the Department in March 2006.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The operational and disposal history of the Eighteenmile Creek Corridor Site is described by operable unit as follows:

OU1: Eighteenmile Creek and Millrace: This operable unit has been impacted by fill material eroding into the creek from Operable Units 2 thru 5, and by direct discharges to the creek from the various facilities that operated at these operable units.

OU2: Former Flintkote Property: The Flintkote Company began operations as a manufacturer of felt and felt products in 1928 when the property was purchased from the Beckman Dawson Roofing Company. In 1935 Flintkote began production of sound-deadening and tufting felt for installation and use in automobiles. Manufacturing of this product line was continued at Flintkote until December, 1971, when operations ceased and the plant closed. The disposal history of the Flintkote Company is largely unknown, although aerial photographs suggest that disposal of fill on the island was taking place by 1938. It has also been reported that ash resulting from the burning of municipal garbage was dumped on the Flintkote property. The fill material on the 198 Mill Street Parcel and Island is consistent with such a source.

OU3: Former United Paperboard Property: The United Paperboard Company property operated in the late 1880's and early 1890's as a lumber company, and as a paper company from the late 1890's until at least 1948. The history of the property after that time is unknown. The portion of the property near the Clinton Street/Mill Street intersection is currently occupied by Duraline Abrasives. The disposal history of the United Paperboard Company property is unknown, although ash similar to that at the Former Flintkote Property is observed directly at the surface in many locations. Coal ash from the power plant located east of Mill Street and operated by the United Paperboard Company may also have been disposed of on the United Paperboard Company property along Eighteenmile Creek.

OU4: Upson Park: The Upson Park property operated in the mid 1880's as a canal boat building company. By 1892 the canal boat company was no longer in operation, but a pulp mill and pulp company were operating on the property. The pulp mill operated until sometime between 1919 and 1928, while the pulp company operated until at least 1928. The pulp company was in ruins by 1948. The history of the property after that time is unknown. The disposal history of the Upson Park property is also unknown, although ash similar to that at other properties within the Eighteenmile Creek Corridor Site is observed directly at the surface along the creek.

OU5: White Transportation Property: The White Transportation property was used to store tractor-trailer trucks and other equipment associated with trucking operations from 1948 until the late 1990's when operations ceased. Prior to 1948 the property operated as the New York Cotton Batting Company, the James O Ring Company, the Niagara Paper Mills, the D.C. Graham box factory, the L. Huston cold storage facility, the Lockport Leather Board Company, and the Simon William Brewery. The disposal history of the White Transportation property is unknown, although slag material is observed directly at the surface. When White Transportation closed, tractor-trailers were located throughout the property, many of which contained drums and other miscellaneous debris. An open drum containing a petroleum product was observed along Eighteenmile Creek during the site reconnaissance conducted as part of the Supplemental

RI. The trailers and related drums have been removed from the property. Miscellaneous debris remains scattered throughout the property.

OU6: Water Street Residential Properties: This operable unit has been impacted by fill material eroding onto the properties from the Water Street Section of Operable Unit 2, and by the deposition of contaminated creek sediments during flooding events.

3.2: Remedial History

In 2008, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York State (Registry). A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

The remedial history of the Eighteenmile Creek Corridor Site is described by operable unit as follows:

OU1: Eighteenmile Creek and Millrace: Analytical results of two sediment samples from the millrace were included in an April 1996 NYSDEC study entitled "Trackdown of Chemical Contaminants to Lake Ontario from New York State Tributaries". Six sediment samples were also collected by the NYSDEC Division of Environmental Remediation (DER) in August 1996. The concentrations of polychlorinated biphenyls (PCBs) and lead exceeded the NYSDEC sediment criteria.

On July 23, 2002 the NYSDEC collected one sediment sample from Eighteenmile Creek. Three additional sediment samples were collected by the NYSDEC on November 26, 2002 near the Clinton Street Dam from an area identified as a potential source of PCBs to Eighteenmile Creek. The concentrations of PCBs, copper, mercury and zinc exceeded the NYSDEC sediment criteria. The results of these sampling events were presented in a March 2003 NYSDEC report entitled "Sampling Report, Water Street Properties, City of Lockport, Niagara County, New York".

OU2: Former Flintkote Property: A portion of the former Flintkote property consisting of a building near William Street and the millrace was formerly listed as Site No. 932072 in the Registry and assigned a Classification Code of 3. This classification is given to sites that do not present a significant threat to public health or the environment and that further action can be deferred. The basis for listing the former Flintkote property in the Registry was the presence of seven drums containing sweepings, solid materials and PCB transformer oil stored in the basement of the building. During an inspection of the site on May 12, 1983 as part of a Phase I Investigation, the drums were observed to be stored in accordance with federal regulations. Analyses of the waste oil (March 1983) indicated that none of the oil contained more than 2 parts per million (ppm) of PCBs. In January 1984 the owner of the property had these drums removed from the property by a waste oil processor. As a result of this action the Former Flintkote Property was removed from the Registry in 1985.

In 1989, the City of Lockport Building Inspection Department reported to the NYSDEC that a number of drums containing chemicals were found in various locations throughout the buildings at the 300 Mill Street property. Subsequent investigation revealed that 28 of these drums contained hazardous wastes. These drums were disposed off site in May, 1991 by a NYSDEC Drum Removal Action.

Analytical results of two ash samples from the Island were included in an April 1996 NYSDEC study entitled "Trackdown of Chemical Contaminants to Lake Ontario from New York State Tributaries". These

samples contained mercury, dioxins and furans. Two ash samples from the island were also collected by the NYSDEC Division of Environmental Remediation in August 1996. Both samples failed the Toxicity Characteristic Leaching Procedure (TCLP) Regulatory Limit for lead, making the ash a characteristic hazardous waste (D008).

In late 1999 the NYSDEC conducted an investigation of the entire Flintkote property, with the results of that investigation presented in a September 2000 report entitled "Site Investigation Report, Former Flintkote Plant Site". This investigation revealed that the Flintkote property received various fill, refuse and debris over the years, with fill being visible at the surface and along the embankments of Eighteenmile Creek and the millrace. The subsurface investigation revealed that most of the fill at this operable unit is ash containing glass, coal, coke, slag, ceramic, bottles, brick, buttons and wood. This fill covers an area of approximately 3.6 acres, with ash fill on the Island and the 198 Mill Street Parcel being a characteristic hazardous waste for lead (D008).

The former Flintkote property was also the subject of a United States Environmental Protection Agency (USEPA) removal action in 2002, which focused on the removal of friable asbestos containing materials within the Flintkote buildings and on-site debris. A total of 170 cubic yards of asbestos containing debris and 180 cubic yards of debris that did not contain asbestos were disposed off-site at approved facilities.

In late 2003 Niagara County conducted a Site Investigation of the former Flintkote property under the NYSDEC's Environmental Restoration Program to further define the nature and extent of contamination at the site by filling in data gaps in the NYSDEC's 1999 investigation. The results of the County's investigation are presented in a July 2005 report entitled "Site Investigation Report, Former Flintkote Site", and are consistent with the results obtained by the NYSDEC. The combined investigations suggest that approximately 46,500 cubic yards of ash fill exist at this operable unit.

In March 2006 the NYSDEC issued a Record of Decision for the Former Flintkote Property.

OU3: Former United Paperboard Property: Prior to the NYSDEC Remedial Investigation, no subsurface investigations or remedial actions have been completed at this operable unit.

OU4: Upson Park: Prior to the NYSDEC Remedial Investigation, no subsurface investigations or remedial actions have been completed at this operable unit.

OU5: White Transportation Property: In 2002 TVGA Engineering, Surveying, P.C. (TVGA) was retained by the Niagara County Department of Planning, Development and Tourism to complete a Phase I Environmental Site Assessment (ESA) of the White Transportation property. This Phase I ESA was completed in connection with the County's efforts to redevelop the historic mill district along Eighteenmile Creek, and was funded through a USEPA Brownfields Assessment Demonstration Pilot grant. The results of the Phase I ESA were presented in an August 2002 report entitled "Phase I Environmental Site Assessment Report for White Transportation", and revealed a number of potential environmental concerns at the property. Prior to the NYSDEC Remedial Investigation, however, no subsurface investigations or remedial actions have been completed at this operable unit.

OU6: Water Street Residential Properties: In early April 2002, the Niagara County Health Department (NCHD) received a request from the owners of 143 Water Street to evaluate soils from their property. This request was made due to concerns over elevated PCB concentrations in creek sediment, and the potential for

this sediment to impact their property during flooding events. NCHD personnel identified a portion of the yard that would flood during high water events, and concluded that the flood complaint was plausible. In addition, a small vegetable garden was observed within the reported flood area. As a result of this inspection, the NYSDEC collected three surface soil samples from the property on April 16, 2002 and analyzed them for PCBs and lead. The concentrations of lead in all three samples exceeded the NYSDEC residential soil cleanup objective of 400 parts per million (ppm), while the concentration of PCBs in one sample exceeded the NYSDEC residential soil cleanup objective of 1 ppm. The results from this sampling event were presented in a June 2002 NYSDEC report entitled "Sampling Report, Former Flintkote Plant Site, 143 Water Street, City of Lockport, Niagara County, New York".

Based upon the results of the April 2002 sampling event, the NYSDOH determined that it was necessary to sample additional Water Street properties. As a result, on July 23, 2002 the NYSDEC, in consultation with the NYSDOH and NCHD, collected thirteen surface soil samples from nine properties along Water Street. The concentrations of lead in nine samples, and PCBs in two samples, exceeded the NYSDEC residential soil cleanup objectives. The results from this sampling event were presented in a March 2003 NYSDEC report entitled "Sampling Report, Water Street Properties, City of Lockport, Niagara County, New York".

SECTION 4: ENFORCEMENT STATUS

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

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, should PRPs be identified in the future, they would be subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 5: SITE CONTAMINATION

A Remedial Investigation/Supplemental Remedial Investigation/Feasibility Study (RI/SRI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI/SRI was to define the nature and extent of contamination resulting from previous activities at the site. The RI was conducted between April 2005 and November 2005, while the SRI was conducted in two phases between October 2006 and February 2009. The field activities and findings of the investigations are described in reports entitled "Remedial Investigation Report", dated March 2006; "Supplemental Remedial Investigation Report" dated July 2009; and "Additional Investigation Addendum to the Supplemental Remedial Investigation Report", dated July 2009.

The following activities were completed during the RI:

- Research of historical documentation to identify potential sources of contamination to Eighteenmile Creek;

- Completion of 27 soil borings and 3 test pits to evaluate the geology of the site and to facilitate sample collection for chemical analysis;

- Collection of 61 sediment samples from 32 locations in Eighteenmile Creek and the millrace (OU1) for chemical analysis;

- Collection of 5 surface and 7 subsurface soil/fill samples from the Former United Paperboard Property (OU3) for chemical analysis;

- Collection of 2 surface and 2 subsurface fill samples from Upson Park (OU4) for chemical analysis;

- Collection of 2 surface and 2 subsurface fill samples from the White Transportation Property (OU5) for chemical analysis;

- Collection of 39 surface and 19 subsurface soil/fill samples from residential properties along Water Street (OU6) for chemical analysis; and

- Completion of a base map for all 6 operable units.

During the Supplemental RI the following activities were completed:

- Completion of a Phase I Environmental Site Assessment for the Former United Paperboard Property (OU3), Upson Park (OU4), and the White Transportation Property (OU5) to identify potential sources of contamination to Eighteenmile Creek;

- Completion of 30 soil borings to evaluate the geology of the site and to facilitate sample collection for chemical analysis;

- Installation of 15 monitoring wells to evaluate the hydrogeology of the site and to facilitate sample collection for chemical analysis;

- Collection of 14 groundwater samples for chemical analysis (1 well was dry);

- Completion of sediment thickness measurements along 18 transects in Eighteenmile Creek and the millrace (OU1);

- Collection of 86 sediment samples from 67 locations in Eighteenmile Creek (OU1) for chemical analysis;

- Collection of 21 surface and 37 subsurface soil/fill samples from the Former United Paperboard Property (OU3) for chemical analysis;

- Collection of 16 surface and 28 subsurface fill samples from Upson Park (OU4) for chemical analysis;

- Collection of 8 surface and 21 subsurface fill samples from the White Transportation Property (OU5) for chemical analysis;

- Collection of 1 surface and 1 subsurface soil/fill samples from residential properties along Water Street (OU6) for chemical analysis; and

- Completion of a topographic survey and updated base map for all 6 operable units.

During the Additional Investigation Addendum to the Supplemental RI the following activities were completed:

- Collection of 8 surface water samples from 2 locations in Eighteenmile Creek (OU1) for chemical analysis;

- Collection of 3 Passive In-Situ Chemical Extraction Sampler (PISCES) samples from Eighteenmile Creek for chemical analysis;

- Collection of flow measurements in the New York State Barge Canal and Eighteenmile Creek;

- Delineation of the bankfull width of Eighteenmile Creek to identify the boundaries of Operable Unit 1 from the upland operable units (OUs 2 thru 6); and

- Collection of 4 groundwater samples for chemical analysis to verify the presence of volatile organic compounds (VOCs) detected during the Supplemental RI.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, fill, sediment, surface water and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code;

- Soil SCGs are based on the Department's Regulation "6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives" for unrestricted, residential and commercial use. When a Part 375 soil cleanup objective was not available, the soil cleanup objectives in the Department's "Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels" were utilized. These SCGs were also utilized to evaluate fill at the site; and

- Sediment SCGs are based on the Department's "Technical Guidance for Screening Contaminated Sediments".

Based upon the RI and SRI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI and SRI reports.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI and SRI reports, many soil, fill, groundwater and sediment samples were collected to characterize the nature and extent of contamination. As shown in Figures 3 thru 10, and summarized in Table 1, the main categories of contaminants that exceed their SCGs are semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganics (metals). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for fill, soil, and sediment.

Figures 3 thru 10, and Table 1 summarize the degree of contamination for the contaminants of concern in surface soil/fill, subsurface soil/fill, groundwater, surface water and sediment, and compare the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation by operable unit.

Surface Soil/Fill

OU3: Former United Paperboard Property: Twenty-six surface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 3). All 26 samples were analyzed for PCBs and lead, while 15 samples were analyzed for SVOCs (Table 1). The majority of the samples were also analyzed for arsenic, chromium, copper, mercury and zinc (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds, and to a lesser degree SVOCs (Table 1). The SVOCs detected consisted primarily of polycyclic aromatic hydrocarbons (PAHs). Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1). PAHs are a group of over 100 different chemicals that are common in the environment. Sources of PAHs include incomplete combustion of coal, oil, gasoline, garbage, wood, automobiles and incinerators.

PCBs were detected in 16 of the 26 surface soil/fill samples collected from this operable unit with the concentration in 9 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 3). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objective for PCBs are shown on Figure 4.

Inorganic compounds were also detected in the surface soil/fill samples collected from OU3. Of these compounds, arsenic, chromium, copper, lead, mercury and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 3). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for these inorganic compounds are shown on Figure 4. Two of the surface soil/fill samples were also analyzed for the characteristics of hazardous waste using the Toxicity Characteristic Leaching Procedure (TCLP). A summary of the TCLP data for lead is given in Table 1, and reveals that some of the surface soil/fill at Operable Unit 3 is a characteristic hazardous waste (D008).

Surface soil contamination identified during the RI/SRI/FS at Operable Unit 3 will be addressed in the remedy selection process.

OU4: Upson Park: Eighteen surface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 5). All 18 samples were analyzed for PCBs and inorganic compounds, while 11 samples were analyzed for SVOCs (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds, and to a lesser degree SVOCs (Table 1). The SVOCs detected consisted primarily of PAHs. Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1).

PCBs were detected in 12 of the 18 surface soil/fill samples collected from this operable unit with the concentration in 8 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objective for PCBs are shown on Figure 6.

Inorganic compounds were also detected in the surface soil/fill samples collected from OU4. Of these compounds, arsenic, barium, cadmium, chromium, copper, lead, mercury, silver and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for inorganic compounds are shown on Figure 6. One of the surface soil/fill samples was also analyzed for the characteristics of hazardous waste using TCLP. A summary of the TCLP data for lead is given in Table 1, and reveals that the surface soil/fill at Operable Unit 4 is not a characteristic hazardous waste.

Surface soil contamination identified during the RI/SRI/FS at Operable Unit 4 will be addressed in the remedy selection process.

OU5: White Transportation Property: Ten surface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 5). All 10 samples were analyzed for PCBs and inorganic compounds, while 8 samples were analyzed for SVOCs (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds, and to a lesser degree SVOCs (Table 1). The SVOCs detected consisted primarily of PAHs. Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)-fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1).

PCBs were detected in 7 of the 10 surface soil/fill samples collected from this operable unit with the concentration in 3 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 5). None of these concentrations, however, exceeded the NYSDEC Part 375 commercial soil cleanup objective for PCBs (Figure 6).

Inorganic compounds were also detected in the surface soil/fill samples collected from OU5. Of these compounds, arsenic, cadmium, chromium, copper, lead, nickel and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for inorganic compounds are shown on Figure 6. One of the surface soil/fill samples was also analyzed for the characteristics of hazardous waste using TCLP. A summary of the TCLP data for lead is given in Table 1, and reveals that the surface soil/fill at Operable Unit 5 is not a characteristic hazardous waste.

Surface soil contamination identified during the RI/SRI/FS at Operable Unit 5 will be addressed in the remedy selection process.

OU6: Water Street Residential Properties: Forty surface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 7). All 40 samples were analyzed for lead, while 28 samples were analyzed for PCBs (Table 1). Twenty-two samples were also analyzed for arsenic, chromium, copper and zinc (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds (Table 1). PCBs were detected in 21 of the 28 surface soil/fill samples analyzed for PCBs with the concentration in 14 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 7). Four of these samples also exceeded the NYSDEC Part 375 residential soil cleanup objectives (Figure 8). All of these samples were collected along the shore of Eighteenmile Creek.

Inorganic compounds were also detected in the surface soil/fill samples collected from OU6. Of these compounds, arsenic, chromium, copper, lead and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 7). Concentrations of these compounds also exceeded the NYSDEC Part 375 residential (Figure 8) soil cleanup objectives. All of the samples are located within, or close to, the 100 year floodplain, suggesting that this contamination resulted from historical flooding of Eighteenmile Creek.

Surface soil contamination identified during the RI/SRI/FS at Operable Unit 6 will be addressed in the remedy selection process.

Subsurface Soil/Fill

OU3: Former United Paperboard Property: Forty-four subsurface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 3). All 44 samples were analyzed for PCBs, arsenic, chromium, copper, lead and zinc, while 16 samples were analyzed for SVOCs (Table 1). Forty samples were also analyzed for mercury (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds, and to a lesser degree SVOCs (Table 1). The SVOCs detected consisted primarily of PAHs. Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)-fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1).

PCBs were detected in 14 of the 44 subsurface soil/fill samples collected from this operable unit with the concentration in 6 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 3). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objective for PCBs are shown on Figure 4. PCBs were detected in one sample at a concentration that exceeded the hazardous waste criterion of 50 ppm.

Inorganic compounds were also detected in the subsurface soil/fill samples collected from OU3. Of these compounds, arsenic, chromium, copper, lead, mercury and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 3). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for inorganic compounds are shown on Figure 4. Four of the subsurface soil/fill samples were also analyzed for the characteristics of hazardous waste using TCLP. A summary of the TCLP data for lead is given in Table 1, and reveals that some of the subsurface soil/fill at Operable Unit 3 is a characteristic hazardous waste

Subsurface soil contamination identified during the RI/SRI/FS at Operable Unit 3 (approximately 39,300 cubic yards) will be addressed in the remedy selection process.

OU4: Upson Park: Thirty subsurface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 5). All 30 samples were analyzed for PCBs and inorganic compounds (Table 1), which are the primary contaminants of concern at this operable unit (Table 1). PCBs were detected in 16 of the 30 subsurface soil/fill samples collected from this operable unit with the concentration in 6 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objective for PCBs are shown on Figure 6. PCBs were detected in one sample at a concentration that exceeded the hazardous waste criterion.

Inorganic compounds were also detected in the subsurface soil/fill samples collected from OU4. Of these compounds, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for inorganic compounds are shown on Figure 6. Six of the subsurface soil/fill samples were also analyzed for the characteristics of hazardous waste using TCLP. A summary of the TCLP data for lead is given in Table 1, and reveals that some of the subsurface soil/fill at Operable Unit 4 is a characteristic hazardous waste.

Subsurface soil contamination identified during the RI/SRI/FS at Operable Unit 4 (approximately 39,400 cubic yards) will be addressed in the remedy selection process.

OU5: White Transportation Property: Twenty-three subsurface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 5). All 23 samples were analyzed for PCBs and inorganic compounds, while 8 samples were analyzed for SVOCs (Table 1). The primary contaminants of concern in these samples include inorganic compounds, and to a lesser degree PCBs and SVOCs (Table 1). Of the SVOCs, 4-methylphenol and phenol were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1).

PCBs were detected in 6 of the 23 subsurface soil/fill samples collected from this operable unit with the concentration in 2 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 5). Neither concentration, however, exceeded the NYSDEC Part 375 commercial soil cleanup objective for PCBs (Figure 6).

Inorganic compounds were also detected in the subsurface soil/fill samples collected from OU5. Of these compounds, arsenic, copper, lead, mercury and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 5). Samples exceeding the NYSDEC Part 375 commercial soil cleanup objectives for inorganic compounds are shown on Figure 6. Two of the subsurface soil/fill samples were also analyzed for the characteristics of hazardous waste using TCLP. A summary of the TCLP data for lead is given in Table 1, and reveals that the subsurface soil/fill at Operable Unit 5 is not a characteristic hazardous waste.

Subsurface soil contamination identified during the RI/SRI/FS at Operable Unit 5 (approximately 20,700 cubic yards) will be addressed in the remedy selection process.

OU6: Water Street Residential Properties: Twenty subsurface soil/fill samples were collected from this operable unit during the RI and SRI (Figure 7). All 20 samples were analyzed for PCBs and inorganic compounds, while 8 samples were analyzed for SVOCs (Table 1). The primary contaminants of concern in these samples include inorganic compounds, and to a lesser degree PCBs and SVOCs (Table 1). The SVOCs detected consisted primarily of PAHs. Of these compounds, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1).

PCBs were detected in 7 of the 20 subsurface soil/fill samples analyzed for PCBs with the concentration in 3 samples exceeding the NYSDEC Part 375 unrestricted soil cleanup objective (Table 1; Figure 7). One of these samples also exceeded the NYSDEC Part 375 residential soil cleanup objectives (Figure 8). This sample was collected along the shore of Eighteenmile Creek.

Inorganic compounds were also detected in the subsurface soil/fill samples collected from OU6. Of these compounds, arsenic, chromium, copper, lead and zinc were detected at concentrations that most frequently exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 1; Figure 7). Concentrations of these compounds also exceeded the NYSDEC Part 375 residential soil cleanup objectives (Figure 8). All of the samples are located within, or close to, the 100 year floodplain.

Subsurface soil contamination identified during the RI/SRI/FS at Operable Unit 6 (approximately 5,800 cubic yards) will be addressed in the remedy selection process.

Groundwater

OU3: Former United Paperboard Property: Seven groundwater samples from six monitoring wells installed at this operable unit (Figure 9) were collected during the Supplemental RI and Additional Investigation. All 7 samples were analyzed for VOCs, while 6 samples were analyzed for SVOCs, PCBs, pesticides and inorganic compounds (Table 1). A summary of the detected compounds is given in Table 1. The contaminants of concern in these samples include VOCs, SVOCs and inorganic compounds. Of these compounds, only the concentrations of cis-1,2-dichloroethene, phenol, antimony, iron and manganese exceeded the NYSDEC groundwater standards (Table 1).

It is important to note that the well (MW-5; Figure 9) containing elevated concentrations of cis-1,2-dichloroethene is located upgradient to the Eighteenmile Creek Corridor Site, suggesting a source in the residential neighborhood to the west (Figure 9). Iron and manganese are naturally occurring, and do not appear to be site related. Concentrations of likely represent background concentrations in this area of Lockport.

The extent of groundwater contamination at Operable Unit 3 is shown on Figure 9. Because no site-related groundwater contamination of significant concern was identified at this operable unit during the RI/SRI/FS, remedial alternatives do not need to be evaluated for groundwater.

OU4: Upson Park: Seven groundwater samples from four monitoring wells installed at this operable unit (Figure 9) were collected during the Supplemental RI and Additional Investigation. All 7 samples were analyzed for VOCs, while 4 samples were analyzed for SVOCs, PCBs, pesticides and inorganic compounds (Table 1). A summary of the detected compounds is given in Table 1. The contaminants of concern in these

samples include VOCs and inorganic compounds. Of these compounds, only the concentrations of cis-1,2-dichloroethene, trichloroethene, antimony and iron exceeded the NYSDEC groundwater standards (Table 1).

It is important to note that the well (MW-14) containing elevated concentrations of cis-1,2-dichloroethene and trichloroethene is located upgradient to the Eighteenmile Creek Corridor Site, suggesting a source in the residential neighborhood to the west (Figure 9). Iron is naturally occurring, and does not appear to be site related. Concentrations of antimony likely represent background concentrations in this area of Lockport.

The extent of groundwater contamination at Operable Unit 4 is shown on Figure 9. Because no site-related groundwater contamination of significant concern was identified at this operable unit during the RI/SRI/FS, remedial alternatives do not need to be evaluated for groundwater.

OU5: White Transportation Property: Four groundwater samples from four monitoring wells installed at this operable unit (Figure 9) were collected during the Supplemental RI. All 4 samples were analyzed for VOCs, SVOCs, PCBs, pesticides and inorganic compounds (Table 1). A summary of the detected compounds is given in Table 1. The contaminants of concern in these samples include inorganic compounds. Of these compounds, only the concentrations of antimony, iron and manganese exceeded the NYSDEC groundwater standards (Table 1).

Iron and manganese are naturally occurring, and do not appear to be site related. Concentrations of antimony likely represent background concentrations in this area of Lockport.

The extent of groundwater contamination at Operable Unit 5 is shown on Figure 9. Because no site-related groundwater contamination of significant concern was identified at this operable unit during the RI/SRI/FS, remedial alternatives do not need to be evaluated for groundwater.

Surface Water/Passive In-Situ Concentration Extraction Sampler (PISCES)

OU1: Eighteenmile Creek and Millrace: Eight surface water samples from two locations in Eighteenmile Creek were collected during the Additional Investigation and analyzed for total solids and total suspended solids. The results from this sampling are summarized in Table 1. There are no surface water standards or guidance values for these compounds.

In addition to surface water, 3 PISCES samples from Eighteenmile Creek upstream of Olcott Street were also collected during the Additional Investigation to evaluate the potential exposure of fish to PCBs in the water column. These passive samplers are an innovative sampling technique that is used to collect samples of hydrophobic organic compounds for analysis. They provide time-integrated samples and often allow lower analytical detection limits. PCBs were not detected in any of these samples.

Sediments

OU1: Eighteenmile Creek and Millrace: 147 sediment samples were collected from this operable unit during the RI and SRI (Figure 10). All 147 samples were analyzed for PCBs and lead, while 143 samples were analyzed for arsenic, chromium, copper and zinc (Table 1). Thirty-one samples were also analyzed for SVOCs (Table 1). The primary contaminants of concern in these samples include PCBs and inorganic compounds, and to a lesser degree SVOCs (Table 1). The SVOCs detected consisted primarily of PAHs.

Of these compounds, anthracene, benzo(a)anthracene, fluorene and phenanthrene were detected at concentrations that most frequently exceeded the NYSDEC sediment criteria (Table 1).
PCBs were also detected in the sediment samples collected from Eighteenmile Creek and the millrace with the concentration in 66 samples exceeding the NYSDEC sediment criterion (Table 1). PCBs were detected in 11 samples at concentrations that exceeded the hazardous waste criterion.

Inorganic compounds were also detected in the sediment samples collected from OU1. Of these compounds, arsenic, chromium, copper, lead and zinc were detected at concentrations that most frequently exceeded the NYSDEC sediment criteria (Table 1). The high frequency of exceedances for the Severe Effect Level for copper, lead and zinc (Table 1) indicates that the sediment in this operable unit is severely impacted.

The extent of sediment contamination at Operable Unit 1 by PCBs and inorganic compounds is shown on Figure 10. Sediment contamination identified during the RI/SRI/FS at this operable unit (approximately 14,500 cubic yards) will be addressed in the remedy selection process.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. There were no IRMs performed at this site during the RI/SRI/FS.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7 of the SRI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source; [2] contaminant release and transport mechanisms; [3] a point of exposure; [4] a route of exposure; and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Completed pathways of exposure to site-related contaminants exist on-site at this time. These pathways include:

- Dermal contact and incidental ingestion of contaminated surface soil/fill, subsurface soil/fill and creek sediment by residents living on Water Street with back yards abutting the creek, recreational

users of Upson Park and the creek (e.g., anglers), trespassers on the White Transportation property, and workers at the active manufacturing facility on the Former United Paperboard Property; and

- Ingestion of contaminated fish by anglers.

Potential pathways of exposure to site-related contaminants that could occur in the future include:

- Public water serves the area so ingestion of contaminated groundwater is unlikely. Future site use is anticipated to be a combination of residential, recreational, and/or commercial; therefore, remediation and/or institutional controls (e.g., environmental easements) would be required to mitigate known and potential future exposure pathways.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the SRI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified:

- Dermal contact of contaminated surface soil/fill, subsurface soil/fill and sediment by terrestrial and aquatic organisms inhabiting the site and stream corridor;

- Inhalation of contaminated surface soil/fill and subsurface soil/fill by terrestrial organisms inhabiting the site; and

- Ingestion of contaminated surface soil/fill, subsurface soil/fill and sediment by terrestrial and aquatic organisms inhabiting the site and stream corridor.

Fish advisories ("all species – eat none") have been listed for all of Eighteenmile Creek due to the high level of PCBs in fish.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedies selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- Exposures of residents, anglers and workers at or around the site to SVOCs, PCBs and inorganic compounds in surface soil/fill, subsurface soil/fill and sediment;

- Environmental exposures of flora or fauna to SVOCs, PCBs and inorganic compounds in surface soil/fill, subsurface soil/fill and sediment;

- The release of contaminants from subsurface soil/fill into groundwater that may create exceedances of groundwater quality standards; and

- The release of contaminants from surface soil/fill and subsurface soil/fill into Eighteenmile Creek and the millrace through erosion and the discharge of contaminated storm water runoff.

Further, the remediation goals for the site include attaining to the extent practicable:

- 6 NYCRR Part 375 soil cleanup objectives;

- TAGM 4046 soil cleanup objectives when Part 375 soil cleanup objectives are not available; and

- Sediment SCGs derived from the Department's Technical Guidance for Screening Contaminated Sediments.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedies must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Eighteenmile Creek Corridor Site, Operable Units 1, 3, 4, 5 and 6, were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated surface soil/fill, subsurface soil/fill and sediment at the site. ***Because some of these alternatives are applicable to more than one operable unit, a range of values for present worth and capital cost is given. These ranges represent the minimum and maximum costs associated with the given remedial alternative for the operable units in which the alternative was evaluated. Therefore, to directly compare the costs of each remedial alternative for a given operable unit, the reader is referred to Table 2, where the detailed costs are broken down by operable unit.***

Alternative 1: No Action

Present Worth: *$0*
Capital Cost: *$0*
Annual Costs (years 1-30): *$0*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. This alternative is applicable to all five operable units.

Alternative 2: Institutional Controls with Long-Term Monitoring

Present Worth: ..... *$224,000 (OU5) - $290,000 (OU3)*
Capital Cost: ..... *$59,000 (OU5) - $117,000 (OU3)*
Annual Costs (years 1-30): ..... *$5,500 (all OUs)*
Periodic Costs (every 5 years): ..... *$11,500 (OU5) - $13,500 (OU3)*

This alternative, applicable to Operable Units 3 thru 6, would include institutional controls and long term monitoring. Institutional controls would include access and use restrictions, and physical barriers such as fencing with warning signs would be installed around soil and fill that is considered hazardous or exceeds the commercial soil cleanup objectives to limit human exposure to contaminated soil and fill. The locations of the areas that would be fenced are shown on Figure 11. Environmental easements would be filed to control future use of the properties.

Long-term monitoring activities would include annual inspections of the fencing and signage. Periodic costs associated with this alternative include periodic review and maintenance of the fencing and signage when required.

Installation of the fencing and signage, and the filing of the environment easements, could be completed in 2 months. Long-term monitoring would continue for 30 years.

Alternative 3: Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring

Present Worth: ..... *$681,000 (OU5) - $3,438,000 (OU4)*
Capital Cost: ..... *$447,000 (OU5) - $3,166,000 (OU4)*
Annual Costs (years 1-30): ..... *$8,300 (all OUs)*
Periodic Costs (every 5 years): ..... *$14,000 (OU5) - $24,700 (OU3)*

This alternative, applicable to Operable Units 3 thru 5, would consist of the excavation of soil and fill that is considered hazardous with the placement of a soil cover over contaminated soil and fill along the embankment of Eighteenmile Creek to prevent erosion of these materials into the creek. The locations of the areas to be excavated and covered are shown on Figure 12. Excavation would not be required at OU5 as hazardous waste is not present at this operable unit. All excavated material would be transported to approved off-site disposal facilities. Verification samples would be collected following excavation to confirm that all hazardous waste has been removed from each operable unit. All excavations would be

backfilled to grade with clean soil, with the top 6 inches consisting of topsoil that would be planted with native grasses, shrubs, and/or trees.

Under this alternative contaminated soil and fill along the creek beyond the bankfull width would be excavated to facilitate the construction of gravel access roads that would be utilized during the remediation of creek sediment as described for OU1. The layout of these roads would be determined during the design phase of this project. The access roads would remain in place following creek remediation and form part of the bank stabilization cover system.

Contaminated soil and fill between the access roads and the top of the embankment adjacent to the creek would be covered in place with a demarcation layer and a 2-foot thick clean soil cover. This cover would extend approximately ten feet beyond the top of the embankment to reduce the potential for exposed contaminated soil and fill on the relatively flat-lying upland portion of each operable unit from eroding into the creek, and also extend over contaminated soil and fill that exceeds the commercial soil cleanup objectives. The soil cover beyond the top of the embankment would be constructed flush with the surrounding topography to promote precipitation runoff. Any contaminated soil and fill excavated during soil cover construction would be transported to approved off-site disposal facilities. The top 6 inches of the soil cover would consist of topsoil that would be planted with native grasses, shrubs and/or trees.

Since contaminated soil and fill would remain on-site following remediation, institutional controls in the form of an environmental easement would be required to restrict site use to limit future risk to property owners, workers, and visitors to the site. Long-term monitoring would be conducted annually to visually inspect the soil cover. Periodic costs associated with this alternative include periodic review and bank stabilization repair when required.

The installation of the soil cover and excavation of hazardous soils is estimated to take 3 to 4 months per operable unit. Long-term monitoring would continue for 30 years.

Alternative 4: Limited Excavation with Bank Stabilization and Long-Term Monitoring

Present Worth: ..... *$702,000 (OU5) - $3,626,000 (OU4)*
Capital Cost: ..... *$472,000 (OU5) - $3,389,000 (OU4)*
Annual Costs (years 1-30): ..... *$0 (OU6) - $8,300 (OUs 3 thru 5)*
Periodic Costs (every 5 years): ..... *$0 (OU6) - $18,400 (OU3)*

This alternative, applicable to Operable Units 3 thru 6, would consist of the excavation of soil and fill that is considered hazardous, and/or exceeds the residential (OU6) or commercial (OUs 3 thru 5) soil cleanup objectives. The locations of the areas to be excavated and covered are shown on Figure 13. Bank stabilization would not be required at OU6 because all contaminated soil and fill would be removed and there are no steep slopes at this operable unit. All excavated material would be transported to approved off-site disposal facilities. Verification samples would be collected following excavation to confirm that all hazardous waste and contaminated soil and fill that exceeds the residential (OU6) or commercial (OUs 3 thru 5) soil cleanup objectives have been removed from each operable unit. All excavations would be backfilled to grade with clean soil, with the top 6 inches consisting of topsoil that would be planted with native grasses, shrubs, and/or trees.

Like Alternative 3, additional soil and fill along the creek beyond the bankfull width would be excavated to facilitate the construction of gravel access roads that would be utilized during the remediation of creek sediment. The access roads would remain in place following creek remediation and form part of the bank stabilization cover system.

Contaminated soil and fill between the access roads and the top of the embankment adjacent to the creek would be covered in place with a demarcation layer and a 2-foot thick clean soil cover. This cover would extend approximately ten feet beyond the top of the embankment, and would be constructed flush with the surrounding topography to promote precipitation runoff. Any contaminated soil and fill excavated during soil cover construction would be transported to approved off-site disposal facilities. The top 6 inches of the soil cover would consist of topsoil that would be planted with native grasses, shrubs and/or trees.

Since contaminated soil and fill would remain on-site following remediation, institutional controls in the form of an environmental easement would be required to restrict site use to limit future risk to property owners, workers, and visitors to the site. Long-term monitoring would be conducted annually to visually inspect the soil cover. Periodic costs associated with this alternative include periodic review and bank stabilization repair when required. Long-term monitoring and environmental easements would not be required at OU6 as contaminated soil and fill would be removed to residential soil cleanup objectives.

The installation of the soil cover and excavation of contaminated and hazardous soils is estimated to take 3 to 6 months per operable unit. Long-term monitoring would continue for 30 years.

Alternative 5: Complete Containment with Long-Term Monitoring

Present Worth: ..... *$1,095,000 (OU5) - $2,267,000 (OU4)*
Capital Cost: ..... *$793,000 (OU5) - $1,829,000 (OU4)*
Annual Costs (years 1-30): ..... *$8,300 (all OUs)*
Periodic Costs (every 5 years): ..... *$19,200 (OU6) - $62,500 (OU4)*

This alternative, applicable to Operable Units 3 thru 6, would consist of a soil cover over soil and fill that is considered hazardous, and/or exceeds the residential (OU6) or unrestricted (OUs 3 thru 5) soil cleanup objectives to reduce direct contact exposures and to prevent erosion of contaminated materials into Eighteenmile Creek. Some soil and fill along the creek would be excavated under this alternative to facilitate the construction of gravel access roads that would be utilized during the remediation of creek sediment. Any material excavated during road construction that is considered hazardous waste, or exceeds the residential (OU6) or commercial (OUs 3 thru 5) soil cleanup objectives, would be transported to approved off-site disposal facilities. The areas to be covered are shown on Figure 14.

Contaminated soil and fill would be covered in place with a demarcation layer and either a 1-foot thick (OUs 3 and 5) or a 2-foot thick (OUs 4 and 6) clean soil cover. The soil cover over the embankments near the creek would be 2 feet thick for added bank stability. The top 6 inches of the soil cover would consist of topsoil that would be planted with native grasses, shrubs and/or trees. The access roads would remain in place following sediment remediation, except at OU6, and form part of the cover system. Current on-site roadways, parking lots and the access roads would be asphalt paved following the construction of the soil cover.

Since contaminated soil and fill would remain on-site following remediation, institutional controls in the form of an environmental easement would be required to restrict site use to limit future risk to property owners, workers, and visitors to the site. Long-term monitoring would be conducted annually to visually inspect the soil cover. Periodic costs associated with this alternative include periodic review and cover system repair when required.

The installation of the cover system is estimated to take 4 to 6 months per operable unit. Long-term monitoring would continue for 30 years.

Alternative 6: Complete Excavation

Present Worth: ..... *$1,766,000 (OU6) - $10,532,000 (OU4)*
Capital Cost: ..... *$1,766,000 (OU6) - $10,532,000 (OU4)*
Annual Costs (years 1-30): ..... *$0 (all OUs)*
Periodic Costs (every 5 years): ..... *$0 (all OUs)*

This alternative, applicable to Operable Units 3 thru 6, would consist of the excavation of all soil and fill that exceeds the unrestricted soil cleanup objectives. The areas to be excavated are shown on Figure 15. All excavated material would be transported to approved off-site disposal facilities. Verification samples would be collected following excavation to confirm that all soil and fill exceeding the unrestricted soil cleanup objectives have been removed from each operable unit. All excavations would be backfilled to grade with clean soil, with the top 6 inches consisting of topsoil that would be planted with native grasses, shrubs, and/or trees. Current on-site roadways and parking lots that would be destroyed during excavation activities would be replaced with asphalt paving. Since all soil and fill exceeding the unrestricted soil cleanup objectives would be removed from each operable unit, institutional controls and long-term monitoring would not be required.

The time required to complete this alternative is estimated to be 4 to 7 months per operable unit.

Alternative 7: Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring

Present Worth per Removal Technology: ..... *$7,662,000 - $8,818,000*
Capital Cost per Removal Technology: ..... *$7,410,000 - $8,566,000*
Annual Costs (years 1-30): *$8,300*
Periodic Costs (every 5 years): *$18,200*

This alternative, applicable only to Operable Unit 1, would consist of the complete removal of contaminated sediment in Eighteenmile Creek and the millrace, followed by restoration with appropriate substrate(s). The areas to be excavated are shown on Figure 10, and would include Eighteenmile Creek from the New York State Barge Canal to Harwood Street. Creek bank soils between the creek and bankfull width that exceed sediment SCGs would also be excavated as part of the OU1 remediation, and coordinated with remediation of the upland properties (OUs 3 thru 6). To facilitate the removal of contaminated sediment, the Clinton and William Street dams would be removed. Both dams are dilapidated and unpermitted.

Due to the continuous flow of water to the creek from the canal based upon downstream needs (i.e., to supply a hydroelectric plant), flows in the creek would need to be managed during sediment removal.

Although the best method will be determined during the design phase of this project, the following two methods were evaluated in the FS Report for cost comparison purposes:

- Installation of sand-filled dam bags within the creek to divert flow away from the working area while keeping the creek within the creek channel; and

- Construction of temporary dam structures with diversion of creek water around the dammed sections.

Verification samples would be collected following sediment removal to confirm that all contaminated sediment has been removed from the operable unit. All excavated sediment would be dewatered at a facility constructed at the site before being transported to approved off-site disposal facilities.

Following sediment removal, the creek bank would be restored utilizing natural stream restoration principles including, but not limited to, the placement of topsoil, biodegradeable erosion control fabric and live plantings along the length of the creek and millrace. A series of rock riffle grade control structures would be installed in the creek to control flow, reduce the potential for erosion and scour of the banks, and reduce the potential for downstream flooding. During the design phase of this project a floodplain and hydraulic study would be conducted to determine the types and locations of these grade control structures, and to determine if reconstruction of the creek banks would impact the floodplain and floodway at, and downstream of, the site.
Long-term monitoring would be conducted to assess the effectiveness of the remediation. As part of this monitoring, biota would be monitored and sediment accumulation would be evaluated behind the control structures with samples collected periodically to assess the recontamination potential from upstream sources. Periodic costs associated with this alternative include creek bank repair when required.

The time required to complete this alternative is estimated to be 2 years, and would be completed over two construction seasons. Long-term monitoring would continue for 30 years.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

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

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

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

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

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

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

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

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

7. Cost-Effectivness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

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

8. Community Acceptance. Concerns of the community regarding the RI/SRI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing the following alternatives as the remedies for this site. The elements of these remedies are described at the end of this section.

- Operable Unit 1: Eighteenmile Creek and Millrace: Alternative 7 - Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring;

- Operable Unit 3: Former United Paperboard Property: Alternative 3 – Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring;

- Operable Unit 4: Upson Park: Alternative 3 - Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring;

- Operable Unit 5: White Transportation Property: Alternative 3 - Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring; and

- Operable Unit 6: Water Street Residential Properties: Alternative 4 - Limited Excavation with Bank Stabilization and Long-Term Monitoring.

The proposed remedies are based on the results of the RI and SRI, and the evaluation of alternatives presented in the FS.

OU1: Eighteenmile Creek and Millrace

Alternative 7 (Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring) is being proposed for OU1 because, as described below, it satisfies both the threshold criteria and primary balancing criteria described in Section 7.2. This alternative would achieve the remediation goals for the site by removing contaminated sediment from the creek, and contaminated creek bank soil and fill between the creek and bankfull width that create a significant threat to public health and the environment. Following remediation, OU1 would no longer be a source of contamination to downstream sections of the creek.

Under Alternative 1 (No Action) this operable unit would remain in its current state. There would be no access controls (e.g., chain-link fencing) to prevent trespassing on the site, which could result in direct contact exposures to contaminated sediment. Contaminated sediment would also continue to adversely impact fish and wildlife resources at the site. Because this alternative does not satisfy the "threshold criteria" (it would not be protective of public health and the environment, and would not achieve compliance with SCGs), it will not be considered for implementation at Operable Unit 1 of the Eighteenmile Creek Corridor Site.

Alternative 7 satisfies the five balancing criteria discussed in Section 7.2 above. This alternative would be effective in the long-term because all contaminated sediment, and creek bank soil and fill would be removed from this operable unit. Alternative 7 would also reduce the toxicity and mobility of contaminated sediment through the relocation of this material to approved off-site disposal facilities.

Alternative 7 has potential short-term exposure risks to construction workers and the surrounding community (e.g., dust generation, noise, etc.) that could result during the implementation of this alternative. These impacts, however, could be mitigated through standard construction practices. The application of common health and safety measures would also minimize potential health risks to remedial contractors and the surrounding community during the implementation of this alternative.

The creek bank restoration measures of Alternative 7 would be subject to weathering, erosion, and degradation from wildlife intrusion (e.g., woodchucks burrowing into the creek bank). The potential for erosion of the creek bank restoration measures, however, would be reduced through the implementation of a semiannual monitoring program. Repairs to the creek bank restoration measures would be completed as required.

Alternative 7 would be readily implementable, although there would be some challenges due to limited site access, steep slopes along the creek, the rocky nature of the creek bed and on-site dewatering methods. In addition, both methods for managing creek flows are readily implementable using standard construction equipment and materials. Each method, however, would also have challenges associated with implementation. For example, the placement and configuration of dam bags for in-channel diversion would be complicated by narrow creek widths in several locations, while diversion by damming and pumping would require continuous operation of several large capacity pumps to accommodate creek flows at the site. The cost of Alternative 7 varies between $7,662,000 and $8,818,000, depending upon the method used to manage flows within the creek (see Table 2). During the design phase of this project a floodplain and hydraulic study would be conducted to determine if reconstruction of the creek banks would impact the floodplain and floodway, to determine the types and locations of the grade control structures, and to determine the best method for diverting the creek based upon the implementation issues discussed above.

The estimated present worth cost to implement Alternative 7 at Operable Unit 1 is $8,818,000 (Table 2). The cost to construct the remedy is estimated to be $8,566,000 and the estimated average annual costs for 30 years is $8,300 (Table 2). Periodic costs to monitor biota and collect sediment samples upstream of the grade control structures, and to complete creek bank restoration repair when required is estimated to be $18,200 (Table 2). The higher present worth cost has been used for costing purposes only, and does not imply that "dam and pump around" is the proposed creek diversion method. As stated above, the best method for diverting the creek would be determined during the design phase of this project.

OU3: Former United Paperboard Property; OU4: Upson Park; and OU5: White Transportation Property

Alternative 3 (Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring) is being proposed for OUs 3, 4 and 5 because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. This alternative would achieve the remediation goals for the site by removing hazardous waste that creates the most significant threat to public health and the environment (OUs 3 and 4; there is no hazardous waste at OU5) and by covering contaminated soil and fill that exceeds the commercial soil cleanup objectives with a clean soil cover (OUs 3, 4 and 5). The bank stabilization soil cover would limit the potential for contaminated soil and fill not removed under this alternative from eroding into the creek and recontaminating sediment.

Under Alternative 1 (No Action) these operable units would remain in their current state. Soils exceeding regulatory limits would remain on-site and could result in direct contact exposures to wildlife and the public. Furthermore, the No Action Alternative does not address transport mechanisms, such as erosion, that would allow contaminated soil and fill from OUs 3, 4 and 5 to remain a potential source of contamination to Eighteenmile Creek. Under Alternative 2 (Institutional Controls with Long-Term Monitoring) these operable units would also remain in their current state, although the presence of access controls (e.g., environmental easement, fencing and signage) would provide some long-term protection to public health by restricting access to the most contaminated materials. Also, Alternative 2 does not address transport mechanisms that would allow contaminated soil and fill from these operable units to remain a potential source of contamination to Eighteenmile Creek. As these alternatives do not satisfy the "threshold criteria" (they would not be protective of public health and the environment, and would not achieve compliance with SCGs), they will not be considered for implementation at Operable Units 3, 4 and 5 of the Eighteenmile Creek Corridor Site.

Because Alternatives 3 (Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring), 4 (Limited Excavation with Bank Stabilization and Long-Term Monitoring), 5 (Complete Containment with Long-Term Monitoring) and 6 (Complete Excavation) satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for this operable unit.

Alternatives 3 thru 6 would involve the excavation of contaminated soil and fill to varying degrees. As a result, these alternatives have potential short-term exposure risks to construction workers and the surrounding community (e.g., dust generation, noise, etc.) that could result during the implementation of these alternatives. These impacts, however, could be mitigated through standard construction practices. The application of common health and safety measures would also minimize potential health risks to remedial contractors and the surrounding community during the implementation of these alternatives. Caution when excavating near Eighteenmile Creek and during the construction of the soil cover or bank stabilization measures would be required to prevent impacts to this surface water body.

The bank stabilization measures of Alternatives 3 and 4, and the soil cover of Alternative 5, would be subject to weathering, erosion, and degradation from wildlife intrusion. The potential for erosion of the soil cover or bank stabilization measures, however, would be reduced through the implementation of a monitoring program. Repairs to the cover or bank stabilization measures would be completed as required. Additionally, exposure risks to construction workers and the surrounding community associated with future intrusive activities at these operable units could be effectively minimized through the use of a site management plan and standard construction and health and safety precautions. Long-term effectiveness is best achieved by Alternative 6 as all contaminated soil and fill would be removed from each operable unit.

Under Alternatives 3, 4 and 6 the volume of contaminants would be reduced through the excavation and off-site disposal of contaminated soil and fill. The volume would be reduced the least under Alternative 3 as only hazardous waste would be removed from OUs 3 and 4 (there is no hazardous waste at OU5), and would be reduced the most under Alternative 6 as all contaminated soil and fill would be removed from these operable units. The volume reduction would be slightly more for Alternative 4 than for Alternative 3. The volume of contaminants would not be reduced significantly under Alternative 5 as only contaminated soil and fill excavated during access road construction would be transported to approved off-site disposal facilities.

Under Alternatives 3 thru 6 the mobility of contaminants would be reduced through the excavation and off-site disposal of contaminated soil and fill, and by the soil cover or bank stabilization measures. The mobility would be reduced the least under Alternatives 3 and 4, and the most under Alternatives 5 and 6. The toxicity of the contaminants would be completely reduced under Alternative 6 as all contaminated soil and fill would be removed from these operable units.

Alternatives 3 thru 6 are readily implementable. There would be ample availability and capacity of remedial contractors and equipment to construct the bank stabilization measures of Alternatives 3 and 4, the soil cover of Alternative 5, and the excavation activities of Alternatives 3 thru 6. In addition, the earthwork and transportation technologies necessary for the implementation of these alternatives are proven and reliable.

Table 2 shows the estimated present worth cost to implement the proposed remedies at OUs 3, 4 and 5. The costs of these alternatives vary significantly. For OUs 3 and 4, Alternative 5 is less expensive than Alternatives 3, 4 or 6, while Alternative 3 is less expensive than Alternative 4. For OU5, Alternative 3 is the least expensive alternative, followed closely by Alternative 4. Alternative 5 costs substantially more than

either Alternative 3 or 4. Alternative 6 has the greatest cost for OUs 3, 4 and 5 because all contaminated soil and fill would be removed from these operable units. The additional cost of this alternative compared to Alternatives 3, 4 and 5 makes this alternative much less favorable.

Alternative 3 (Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring) is being proposed for OUs 3, 4 and 5 because this alternative offers protection to public health and the environment while allowing for the future commercial redevelopment of OUs 3 and 5, and future improvements to the park (OU4). Under Alternative 3, all hazardous waste would be removed from operable units 3 and 4 (there is no hazardous waste at OU5), while the bank stabilization soil cover would limit the potential for remaining contaminated soil and fill from eroding into the creek. The soil cover would protect public health by also covering contaminated soil and fill that exceeds the commercial soil cleanup objectives. Although Alternative 5 (Complete Containment with Long-Term Monitoring) is less expensive than Alternatives 3 and 4 at OUs 3 and 4, the presence of a soil cover over large portions of ~~this~~ these operable units could limit future redevelopment of these properties. For OU5, Alternative 5 costs substantially more than Alternative 3. In addition, the presence of a soil cover over large portions of this operable unit could limit future use of the property.

The estimated present worth cost to implement Alternative 3 at Operable Unit 3 is $1,985,000 (Table 2). The cost to construct the remedy is estimated to be $1,706,000 and the estimated average annual costs for 30 years is $8,300 (Table 2). Periodic costs to complete bank stabilization repairs when required are estimated to be $24,700 (Table 2).

At Operable Unit 4, the estimated present worth cost to implement Alternative 3 is $3,438,000 (Table 2). The cost to construct the remedy is estimated to be $3,166,000 and the estimated average annual costs for 30 years is $8,300 (Table 2). Periodic costs to complete bank stabilization repairs when required are estimated to be $22,900 (Table 2).

The estimated present worth cost to implement Alternative 3 at Operable Unit 5 is $681,000 (Table 2). The cost to construct the remedy is estimated to be $447,000 and the estimated average annual costs for 30 years is $8,300 (Table 2). Periodic costs to complete bank stabilization repairs when required are estimated to be $14,000 (Table 2).

OU6: Water Street Residential Properties

Alternative 4 (Limited Excavation with Bank Stabilization and Long-Term Monitoring) is being proposed for OU6 because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. This alternative would achieve the remediation goals for the site by removing contaminated soil and fill that exceeds residential soil cleanup objectives. Bank stabilization would not be required at OU6 because all contaminated soil and fill would be removed and there are no steep slopes at this operable unit.

Under Alternative 1 (No Action) this operable unit would remain in its current state. Soils exceeding regulatory limits would remain on-site and could result in direct contact exposures to wildlife and the public. Under Alternative 2 (Institutional Controls with Long-Term Monitoring) OU6 would also remain in its current state, although the presence of access controls (e.g., environmental easement, fencing and signage) would provide some long-term protection to public health by restricting access to the most contaminated materials. The presence of fencing, however, would partially limit the use of the residential properties in

this operable unit. In addition, environmental easements would be difficult to implement and enforce. As these alternatives do not satisfy the "threshold criteria" (they would not be protective of public health and the environment, and would not achieve compliance with SCGs), they will not be considered for implementation at Operable Unit 6 of the Eighteenmile Creek Corridor Site.

Because Alternatives 4 (Limited Excavation with Bank Stabilization and Long-Term Monitoring), 5 (Complete Containment with Long-Term Monitoring) and 6 (Complete Excavation) satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for this operable unit.

Alternatives 4 thru 6 would involve the excavation of contaminated soil and fill to varying degrees. As a result, these alternatives have potential short-term exposure risks to construction workers and the surrounding community (e.g., dust generation, noise, etc.) that could result during the implementation of these alternatives. These impacts, however, could be mitigated through standard construction practices. The application of common health and safety measures would also minimize potential health risks to remedial contractors and the surrounding community during the implementation of these alternatives. In addition, there would be potential short-term impacts when excavating or constructing the soil cover around old building foundations. These impacts would be greatest under Alternative 6 as excavation would take place around all buildings in this operable unit.

The soil cover of Alternative 5 (bank stabilization would not be required at OU6 as there are no steep slopes at this operable unit) would be subject to weathering, erosion, and degradation from wildlife intrusion. The potential for erosion of the soil cover, however, would be reduced through the implementation of a semiannual monitoring program. Repairs to the cover would be completed as required. Long-term effectiveness is best achieved by Alternative 6 as all contaminated soil and fill would be removed from this operable unit.

Under Alternatives 4 and 6 the volume of contaminants would be reduced through the excavation and off-site disposal of contaminated soil and fill. The volume reduction would be greatest for Alternative 6. The volume of contaminants would not be reduced significantly under Alternative 5 as only contaminated soil and fill excavated during access road construction would be transported to approved off-site disposal facilities.

Under Alternatives 4 thru 6 the mobility of contaminants would be reduced through the excavation and off-site disposal of contaminated soil and fill, and by the construction of a soil cover. The mobility would be reduced the most under Alternatives 5 and 6. The toxicity of the contaminants would be completely reduced under Alternative 6 as all contaminated soil and fill would be removed from this operable unit.

Alternatives 4 thru 6 are readily implementable. There would be ample availability and capacity of remedial contractors and equipment to construct the soil cover of Alternative 5, and the excavation activities of Alternatives 4 thru 6. In addition, the earthwork and transportation technologies necessary for the implementation of these alternatives are proven and reliable.

Table 2 shows the estimated present worth cost to implement the proposed remedies for OU6. The costs of these alternatives vary only slightly. Alternative 4 is the least expensive alternative for this operable unit while Alternative 6 has the greatest cost. Alternative 5 is slightly more expensive than Alternative 4.

Alternative 4 (Limited Excavation with Bank Stabilization and Long-Term Monitoring) is being proposed for OU6 because this alternative offers protection to public health and the environment without requiring restrictions on the individual properties. Under this alternative all contaminated soil and fill that exceeds the residential soil cleanup objectives would be removed from this operable unit. Under Alternative 5 (Complete Containment with Long-Term Monitoring) long-term monitoring of the soil cover along with environmental easements on each property would be required. Such easements, however, would be difficult to implement and enforce on residential properties. Under Alternatives 5 and 6 (Complete Excavation) there is an increased potential for damage to on-site buildings as excavation and soil cover construction would take place around old building foundations.

The estimated present worth cost to implement Alternative 4 at Operable Unit 6 is $1,256,000, which is the cost to construct this remedy (Table 2). Long-term monitoring and environmental easements would not be required at this operable unit as contaminated soil and fill would be removed to residential soil cleanup objectives.

The total estimated present worth cost to implement the proposed remedies at all five operable units is $16,178,000. The cost to construct the remedies is estimated to be $15,141,000, while the estimated average annual costs for 30 years is $33,200. Periodic costs (every 5 years) to monitor biota, collect sediment samples upstream of the grade control structures, and to complete creek bank restoration and bank stabilization repair when required are estimated to be $79,800.

The elements of the proposed remedy for each operable unit are as follows:

OU1: Eighteenmile Creek and Millrace - Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring

- A remedial design program consisting of a floodplain and hydraulic study to determine if reconstruction of the creek banks would impact the floodplain and floodway, to determine the types and locations of the grade control structures, and to determine the best method for diverting the creek during construction;

- Excavation of contaminated sediment from Eighteenmile Creek and the millrace followed by on-site dewatering and subsequent transport to approved off-site disposal facilities;

- Removal of the Clinton and William Street dams following sediment removal. Both dams are dilapidated and unpermitted;

- Excavation of contaminated creek bank soils between the creek and bankfull width followed by creek bank restoration utilizing natural stream restoration principles including, but not limited to, the placement of topsoil, biodegradeable erosion control fabric and live plantings along the length of the creek and millrace;

- Construction of a series of rock riffles to control flow within the creek, reduce the potential for erosion and scour of the banks, and reduce the potential for downstream flooding; and

- Long-term monitoring to assess the effectiveness of the remediation. As part of this monitoring, biota would be monitored and sediment accumulation would be evaluated behind the control

structures with samples collected periodically to assess the recontamination potential from upstream sources. The creek bank stabilization measures would be repaired when required.

OU3: Former United Paperboard Property; OU4: Upson Park; and OU5: White Transportation Property - Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring

- A remedial design program to (1) further delineate the extent of contaminated soil and fill requiring removal, (2) further delineate the extent of contaminated soil and fill along the embankment to determine the extent of the soil cover, and (3) determine the layout of the gravel access roads;

- Construction of gravel access roads along Eighteenmile Creek to be utilized in the remediation of creek sediment. The access roads would remain in place following sediment remediation and form part of the bank stabilization cover system;

- Excavation of soil and fill from OUs 3 and 4 that is considered hazardous as shown in Figure 12 (there is no hazardous waste at OU5) with the excavated materials transported to approved off-site disposal facilities;

- Backfilling of all excavations to grade with clean soil, with the top 6 inches consisting of topsoil that would be planted with native grasses, shrubs, and/or trees; and

- Construction of a 2-foot thick clean soil cover with demarcation layer between the access roads and the top of the embankment adjacent to the creek. This cover would extend approximately ten feet beyond the top of the embankment, and also extend over contaminated soil and fill that exceeds the commercial soil cleanup objectives. The top 6 inches of the soil cover would consist of topsoil that would be planted with native grasses, shrubs and/or trees.

OU6: Water Street Residential Properties - Limited Excavation with Bank Stabilization and Long-Term Monitoring

- A remedial design program to further delineate the extent of contaminated soil and fill requiring removal and to determine the layout of the gravel access roads;

- Construction of gravel access roads along Eighteenmile Creek to be utilized in the remediation of creek sediment. The access roads would be removed following sediment remediation;

- Excavation of soil and fill that exceeds the residential soil cleanup objectives, with the excavated materials transported to approved off-site disposal facilities; and

- Backfilling of all excavations to grade with clean soil, with the top 6 inches consisting of topsoil that would be planted with native grasses, shrubs, and/or trees.

In addition to the above, the following elements are applicable to Operable Units 3, 4 and 5:

- Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property to commercial use, which would also permit industrial use; (b) compliance with the approved site management plan; (c) restricting the use of

groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls;

- Development of a site management plan that would include the following institutional and engineering controls: (a) management of the final bank stabilization measures to restrict excavation below the demarcation layers. Excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) identification of any use restrictions at each operable unit; and (c) provisions for the continued maintenance of the components of the remedy;

- The property owners would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owners in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department; and

- Since the remedies result in contaminated soil and fill remaining at the site, a long-term monitoring program would be instituted. This monitoring program would consist of annual, visual inspections of the soil covers with repairs made as necessary.

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 3 – Former United Paperboard Property				
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND[c] – 26.0	1	4 of 15
	Benzo(a)pyrene	ND – 20.0	1	4 of 15
	Benzo(b)fluoranthene	ND – 26.0	1	7 of 15
	Benzo(k)fluoranthene	ND – 7.3	0.8	3 of 15
	Chrysene	ND – 23.0	1	4 to 15
	Indeno(1,2,3-cd)pyrene	ND – 11.0	0.5	5 of 15
PCBs	PCBs - Total	ND – 4.3	0.1	9 of 26
Inorganic Compounds	Arsenic	3.6 – 66.0	13	6 of 22
	Chromium	7.7 – 73.7	30	3 of 22
	Copper	20.9 – 1,410	50	16 of 22
	Lead	4.5 – 3,600	63	21 of 26
	Mercury	0.026 – 0.727	0.18	9 of 21
	Zinc	57.2 – 1,640	109	16 of 22
Inorganic Compounds - TCLP[d]	Lead	ND – 59.0	5	1 of 2

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SUBSURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 3 – Former United Paperboard Property				
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND – 14.0	1	2 of 16
	Benzo(a)pyrene	ND – 12.0	1	2 of 16
	Benzo(b)fluoranthene	ND – 15.0	1	2 of 16
	Benzo(k)fluoranthene	ND – 3.9	0.8	2 of 16
	Chrysene	ND – 13.0	1	2 of 16
	Indeno(1,2,3-cd)pyrene	ND – 7.4	0.5	2 of 16
PCBs	PCBs - Total	ND – 630	0.1	6 of 44
Inorganic Compounds	Arsenic	1.9 – 123	13	16 of 44
	Chromium	2.6 – 71.9	30	5 of 44
	Copper	6.5 – 1,600	50	19 of 44
	Lead	1.7 – 7,430	63	25 of 44
	Mercury	ND – 9.6	0.18	19 of 40
	Zinc	2.9 – 1,890	109	18 of 44
Inorganic Compounds - TCLP	Lead	ND – 27.9	5	2 of 4

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Operable Unit 3 – Former United Paperboard Property				
Volatile Organic Compounds (VOCs)	cis-1,2-Dichloroethene	ND – 9.4	5	2 of 7
Semivolatile Organic Compounds (SVOCs)	Phenol	ND – 3.2	1	1 of 6
Inorganic Compounds	Antimony	5.3 – 7.6	3	6 of 6
	Iron	868 – 44,900	300	6 of 6
	Manganese	52.8 – 2,030	300	2 of 6

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 4 – Upson Park				
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND – 4.4	1	1 of 11
	Benzo(a)pyrene	ND – 2.3	1	1 of 11
	Benzo(b)fluoranthene	ND – 3.5	1	3 of 11
	Benzo(k)fluoranthene	ND – 1.0	0.8	1 of 11
	Chrysene	ND – 3.6	1	1 to 11
	Indeno(1,2,3-cd)pyrene	ND – 1.3	0.5	2 of 11
PCBs	PCBs - Total	ND – 23.0	0.1	8 of 18
Inorganic Compounds	Arsenic	4.7 – 63.2	13	7 of 18
	Barium	10.6 – 2,360	350	5 of 18
	Cadmium	0.14 – 27.4	2.5	5 of 18
	Chromium	6.2 – 162	30	6 of 18
	Copper	10.6 – 1,640	50	7 of 18
	Lead	18.8 – 3,480	63	14 of 18
	Mercury	0.04 – 10.8	0.18	9 of 18
	Silver	ND – 80.6	2	5 of 18
	Zinc	36.3 – 6,540	109	13 of 18
Inorganic Compounds - TCLP	Lead	0.019	5	0 of 1

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SUBSURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 4 – Upson Park				
PCBs	PCBs - Total	ND – 80.0	0.1	6 of 30
Inorganic Compounds	Arsenic	3.0 – 81.2	13	10 of 30
	Barium	8.7 – 3,900	350	8 of 30
	Cadmium	ND – 24.9	2.5	7 of 30
	Chromium	4.6 – 918	30	10 of 30
	Copper	6.6 – 20,100	50	14 of 30
	Lead	7.9 – 77,300	63	17 of 30
	Mercury	ND – 21.5	0.18	12 of 30
	Nickel	5.3 – 1,090	30	7 of 30
	Silver	ND – 79.5	2	9 of 30
	Zinc	12.7 – 7,870	109	15 of 30
Inorganic Compounds - TCLP	Lead	ND – 322	5	1 of 6

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Operable Unit 4 – Upson Park				
Volatile Organic Compounds (VOCs)	cis-1,2-Dichloroethene	ND – 33.0	5	2 of 7
	Trichloroethene	ND – 20.0	5	2 of 7
Inorganic Compounds	Antimony	2.9 – 7.2	3	3 of 4
	Iron	928 – 1,350	300	4 of 4

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 5 – White Transportation Property				
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND – 1.2	1	1 of 8
	Benzo(a)pyrene	ND – 1.1	1	1 of 8
	Benzo(b)fluoranthene	ND – 2.0	1	1 of 8
	Chrysene	ND – 1.2	1	1 to 8
	Indeno(1,2,3-cd)pyrene	ND – 0.51	0.5	1 of 8
PCBs	PCBs - Total	ND – 0.67	0.1	3 of 10
Inorganic Compounds	Arsenic	5.5 – 30.3	13	5 of 10
	Cadmium	0.17 – 8.3	2.5	3 of 10
	Chromium	6.4 – 411	30	4 of 10
	Copper	12.9 – 222	50	6 of 10
	Lead	9.7 – 3,750	63	8 of 10
	Nickel	8.1 – 133	30	5 of 10
	Zinc	18.0 – 713	109	4 of 10
Inorganic Compounds - TCLP	Lead	0.89	5	0 of 1

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SUBSURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 5 – White Transportation Property				
Semivolatile Organic Compounds (SVOCs)	4-Methylphenol	ND – 1.0	0.33	2 of 8
	Phenol	ND – 10.0	0.33	3 of 8
PCBs	PCBs - Total	ND – 0.48	0.1	2 of 23
Inorganic Compounds	Arsenic	1.1 – 18.7	13	2 of 23
	Copper	4.2 – 244	50	4 of 23
	Lead	1.7 – 2,590	63	9 of 23
	Mercury	ND – 0.486	0.18	5 of 23
	Zinc	5.2 – 722	109	6 of 23
Inorganic Compounds - TCLP	Lead	0.36 – 1.45	5	0 of 2

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Operable Unit 5 – White Transportation Property				
Inorganic Compounds	Antimony	1.9 – 5.4	3	3 of 4
	Iron	561 – 793	300	4 of 4
	Manganese	33.5 – 5,730	300	1 of 4

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 6 – Water Street Residential Properties				
PCBs	PCBs - Total	ND – 27.0	0.1	14 of 28
Inorganic Compounds	Arsenic	5.3 – 66.5	13	9 of 22
	Chromium	10.7 – 164	30	4 of 22
	Copper	32.2 – 2,620	50	20 of 22
	Lead	29.8 – 4,630	63	35 of 40
	Zinc	146 – 2,390	109	22 of 22

SUBSURFACE SOIL/FILL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 6 – Water Street Residential Properties				
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND – 6.8	1	3 of 8
	Benzo(a)pyrene	ND – 7.7	1	3 of 8
	Benzo(b)fluoranthene	ND – 8.4	1	3 of 8
	Chrysene	ND – 6.1	1	3 of 8
	Indeno(1,2,3-cd)pyrene	ND – 6.1	0.5	4 of 8
PCBs	PCBs - Total	ND – 4.16	0.1	3 of 20
Inorganic Compounds	Arsenic	3.8 – 24.0	13	10 of 20
	Chromium	5.1 – 262	30	3 of 20
	Copper	20.7 – 2,240	50	12 of 20
	Lead	5.4 – 1,030	63	16 of 20
	Zinc	19.6 – 2,560	109	14 of 20

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 1 – Eighteenmile Creek and Millrace				
Miscellaneous Compounds	Total Solids	305 – 446	NS[e]	NA[f]
	Total Suspended Solids	ND – 21.2	NS	NA

SEDIMENT	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Operable Unit 1 – Eighteenmile Creek and Millrace				
Semivolatile Organic Compounds (SVOCs)	Anthracene	ND – 23.0	3.08[g]	2 of 31
	Benzo(a)anthracene	0.013 – 43.0	0.35[g]	15 of 31
	Fluorene	ND – 13.0	0.23[g]	4 of 31
	Phenanthrene	0.011 – 120	3.46[g]	4 of 31
PCBs	PCBs - Total	ND – 1,400	0.56[g]	66 of 147
Inorganic Compounds	Arsenic	1.2 – 50.5	LEL[h] – 6	66 of 143
			SEL[h] – 33	1 of 143
	Chromium	2.8 – 1,200	LEL – 26	60 of 143
			SEL – 110	8 of 143
	Copper	12.5 – 54,900	LEL – 16	142 of 143
			SEL – 110	81 of 143
	Lead	11.3 – 15,000	LEL – 31	143 of 147
			SEL – 110	123 of 147
	Zinc	37.1 – 23,600	LEL – 120	117 of 143
			SEL - 270	83 of 143

TABLE 1
Nature and Extent of Contamination
April 2005 – February 2009

a ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b SCG = standards, criteria, and guidance values;
c ND = contaminant analyzed but not detected;
d TCLP = Toxicity Characteristic Leaching Procedure;
e NS = no standard or guidance value available;
f NA = not applicable;
g chronic toxicity to benthic aquatic life; and
h LEL = Lowest Effect Level and SEL = Severe Effect Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.

TABLE 2
Remedial Alternative Costs

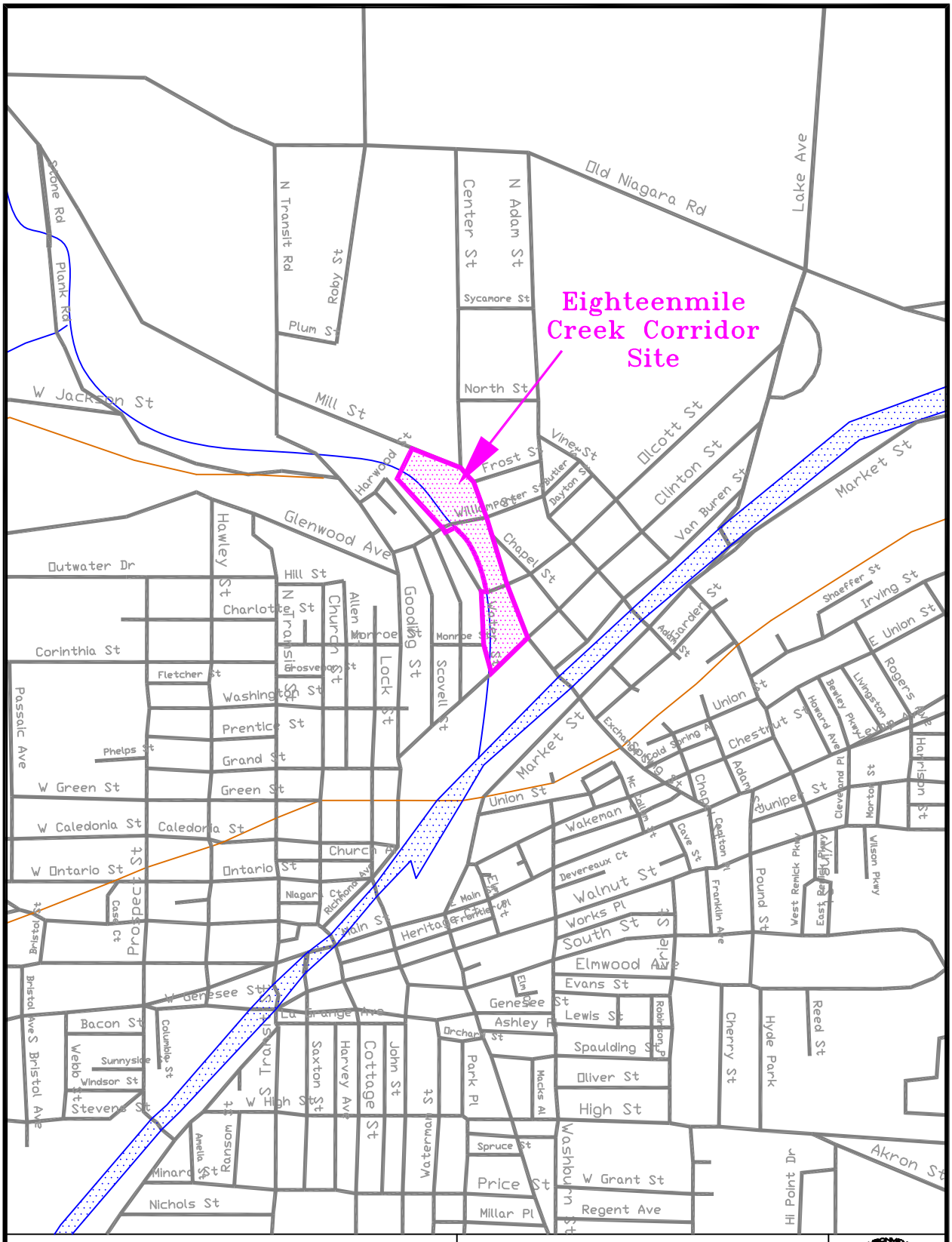
Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Operable Unit 1 – Eighteenmile Creek and Millrace			
Alternative 1: No Action	$0	$0	$0
Alternative 7: Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring: In-Channel Diversion	$7,410,000	$8,300 (annual) $18,200 (periodic)	$7,662,000
Alternative 7: Sediment and Creek Bank Excavation with Restoration and Long-Term Monitoring: Dam and Pump Around *	$8,566,000	$8,300 (annual) $18,200 (periodic)	$8,818,000
Operable Unit 3 – Former United Paperboard Property			
Alternative 1: No Action	$0	$0	$0
Alternative 2: Institutional Controls with Long-Term Monitoring	$117,000	$5,500 (annual) $13,500 (periodic)	$290,000
Alternative 3: Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring *	$1,706,000	$8,300 (annual) $24,700 (periodic)	$1,985,000
Alternative 4: Limited Excavation with Bank Stabilization and Long-Term Monitoring	$1,948,000	$8,300 (annual) $18,400 (periodic)	$2,201,000
Alternative 5: Complete Containment with Long-Term Monitoring	$1,206,000	$8,300 (annual) $39,000 (periodic)	$1,545,000
Alternative 6: Complete Excavation	$9,238,000	$0	$9,238,000
Operable Unit 4 – Upson Park			
Alternative 1: No Action	$0	$0	$0
Alternative 2: Institutional Controls with Long-Term Monitoring	$88,000	$5,500 (annual) $12,700 (periodic)	$258,000
Alternative 3: Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring *	$3,166,000	$8,300 (annual) $22,900 (periodic)	$3,438,000

TABLE 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Operable Unit 4 – (continued)			
Alternative 4: Limited Excavation with Bank Stabilization and Long-Term Monitoring	$3,389,000	$8,300 (annual) $14,700 (periodic)	$3,626,000
Alternative 5: Complete Containment with Long-Term Monitoring	$1,829,000	$8,300 (annual) $62,500 (periodic)	$2,267,000
Alternative 6: Complete Excavation	$10,532,000	$0	$10,532,000
Operable Unit 5 – White Transportation Property			
Alternative 1: No Action	$0	$0	$0
Alternative 2: Institutional Controls with Long-Term Monitoring	$59,000	$5,500 (annual) $11,500 (periodic)	$224,000
Alternative 3: Hazardous Waste Removal with Bank Stabilization and Long-Term Monitoring *	$447,000	$8,300 (annual) $14,000 (periodic)	$681,000
Alternative 4: Limited Excavation with Bank Stabilization and Long-Term Monitoring	$472,000	$8,300 (annual) $12,000 (periodic)	$702,000
Alternative 5: Complete Containment with Long-Term Monitoring	$793,000	$8,300 (annual) $30,200 (periodic)	$1,095,000
Alternative 6: Complete Excavation	$4,847,000	$0	$4,847,000
Operable Unit 6 – Water Street Residential Properties			
Alternative 1: No Action	$0	$0	$0
Alternative 2: Institutional Controls with Long-Term Monitoring	$107,000	$5,500 (annual) $13,300 (periodic)	$279,000
Alternative 4: Limited Excavation with Bank Stabilization and Long-Term Monitoring *	$1,256,000	$0	$1,256,000

TABLE 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Operable Unit 6 – (continued)			
Alternative 5: Complete Containment with Long-Term Monitoring	$1,046,000	$8,300 (annual) $19,200 (periodic)	$1,302,000
Alternative 6: Complete Excavation	$1,766,000	$0	$1,766,000
Total Estimated Cost for Operable Units 1, 3, 4, 5 & 6			
See proposed alternatives for each OU above	$15,141,000	$33,200 (annual) $79,800 (periodic)	$16,178,000
*** Proposed alternative.**			



Lockport Quadrangle

Scale Depends on Final Plotted Size

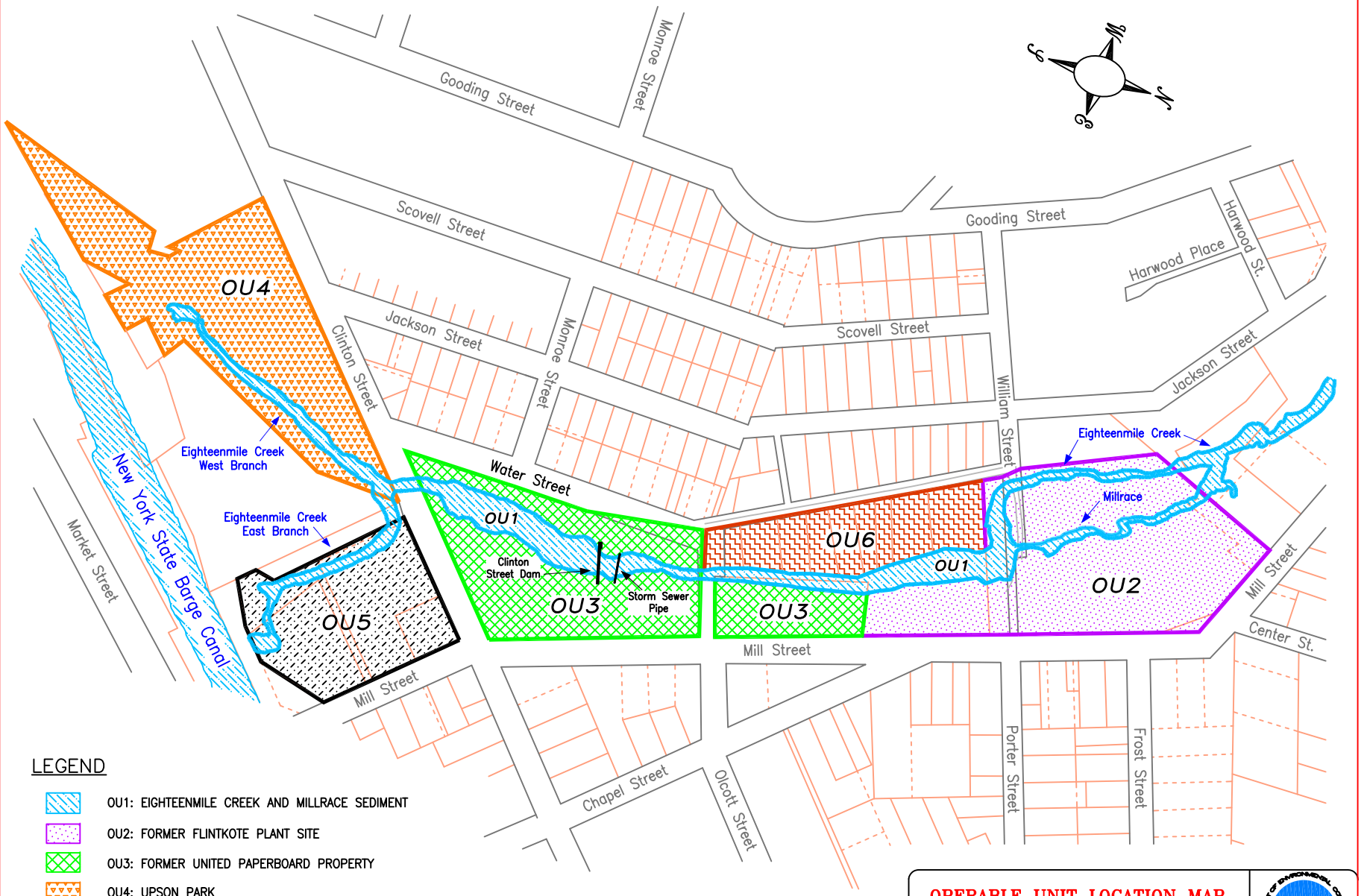
SITE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 02/20/03 DRAWING: Location Map.dwg

SITE: EIGHTEENMILE CREEK CORRIDOR

FIGURE 1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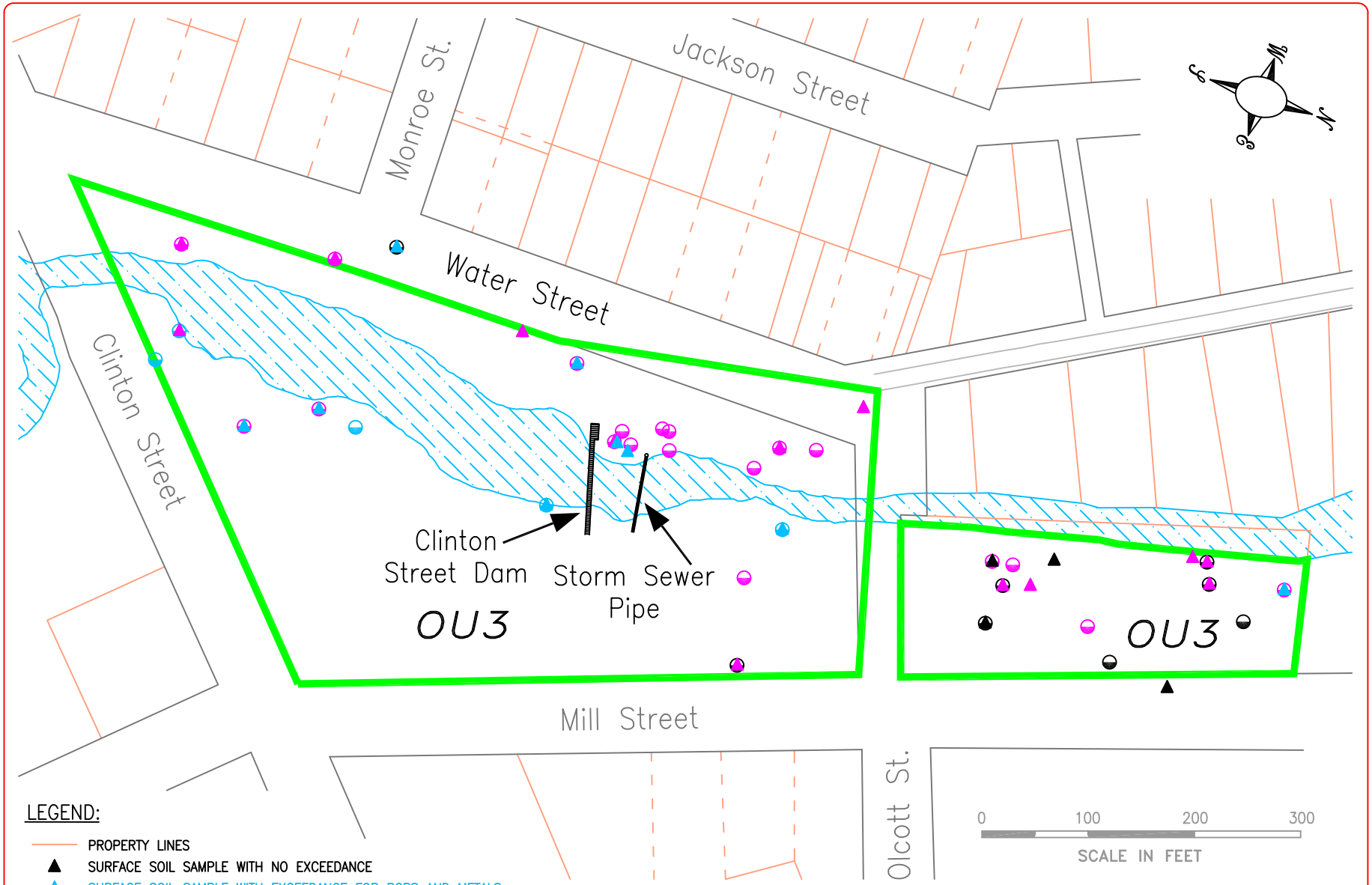
Scovell Street
Jackson Street
Clinton Street
Monroe Street
Gooding Street
Harwood Place
Harwood St.
Scovell Street
William Street
Jackson Street
OU4
Eighteenmile Creek
West Branch
Eighteenmile Creek
East Branch
New York State Barge Canal
Market Street
Water Street
OU1
Clinton
Street Dam
Storm Sewer
Pipe
OU3
OU5
OU6
OU1
OU2
OU3
Eighteenmile Creek
Millrace
Mill Street
Center St.
Mill Street
Mill Street
Chapel Street
Olcott Street
Porter Street
Frost Street
LEGEND
OU1: EIGHTEENMILE CREEK AND MILLRACE SEDIMENT
OU2: FORMER FLINTKOTE PLANT SITE
OU3: FORMER UNITED PAPERBOARD PROPERTY
OU4: UPSON PARK
OU5: WHITE TRANSPORTATION PROPERTY
OU6: WATER STREET RESIDENTIAL PROPERTIES
0
200
400
600
SCALE IN FEET
OPERABLE UNIT LOCATION MAP
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 08/12/09
DRAWING: Site Wide Map.dwg
SITE NAME: EIGHTEENMILE CREEK CORRIDOR
FIGURE 2



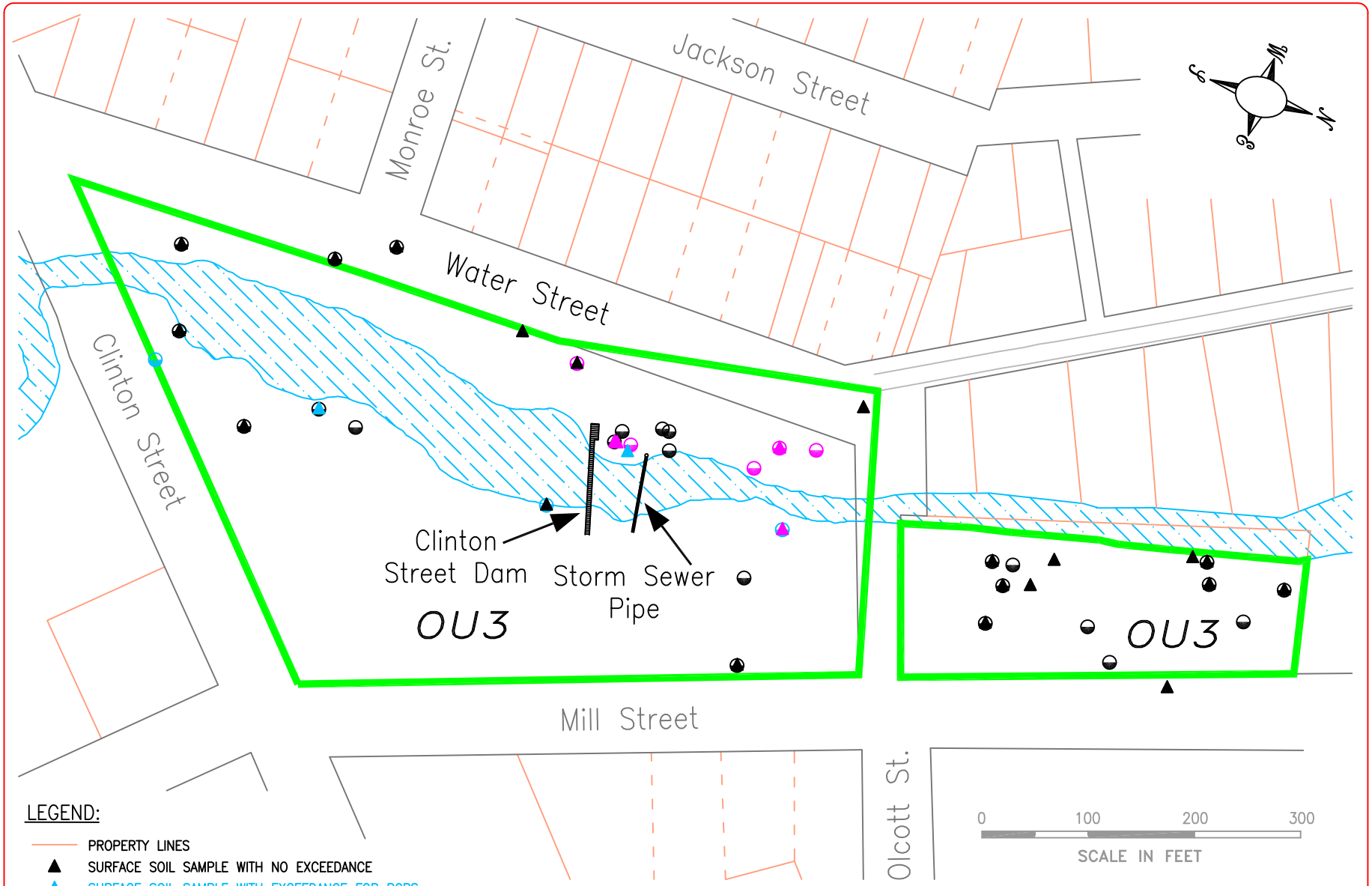
UNRESTRICTED SCG EXCEEDANCE MAP FOR OU3

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/13/09 DRAWING: Exceedance Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 3



LEGEND:

- PROPERTY LINES
- SURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS
- SUBSURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS

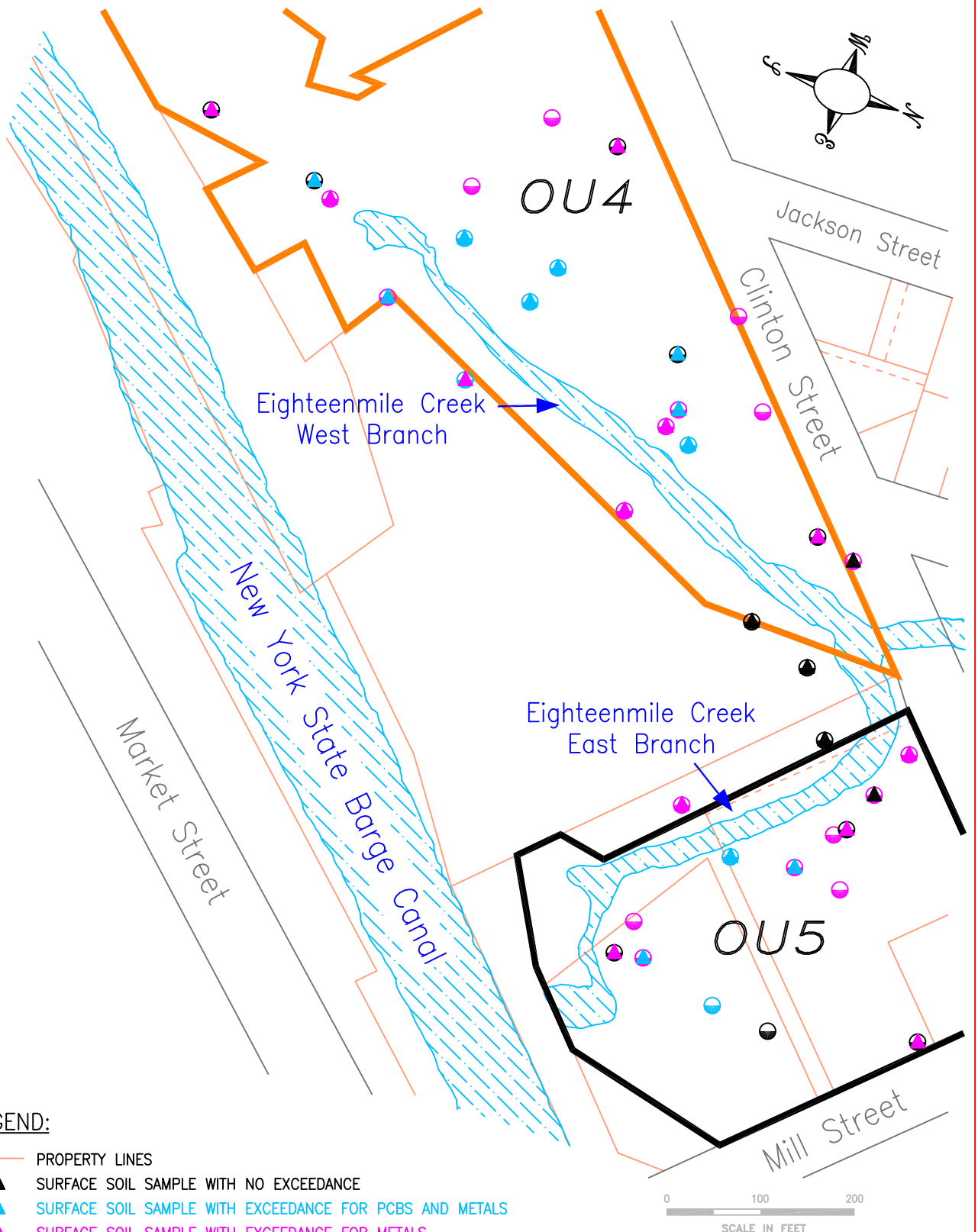
COMMERCIAL SCG EXCEEDANCE MAP FOR OU3

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/13/09 DRAWING: Exceedance Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 4



LEGEND:

- PROPERTY LINES
- SURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS
- SUBSURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS

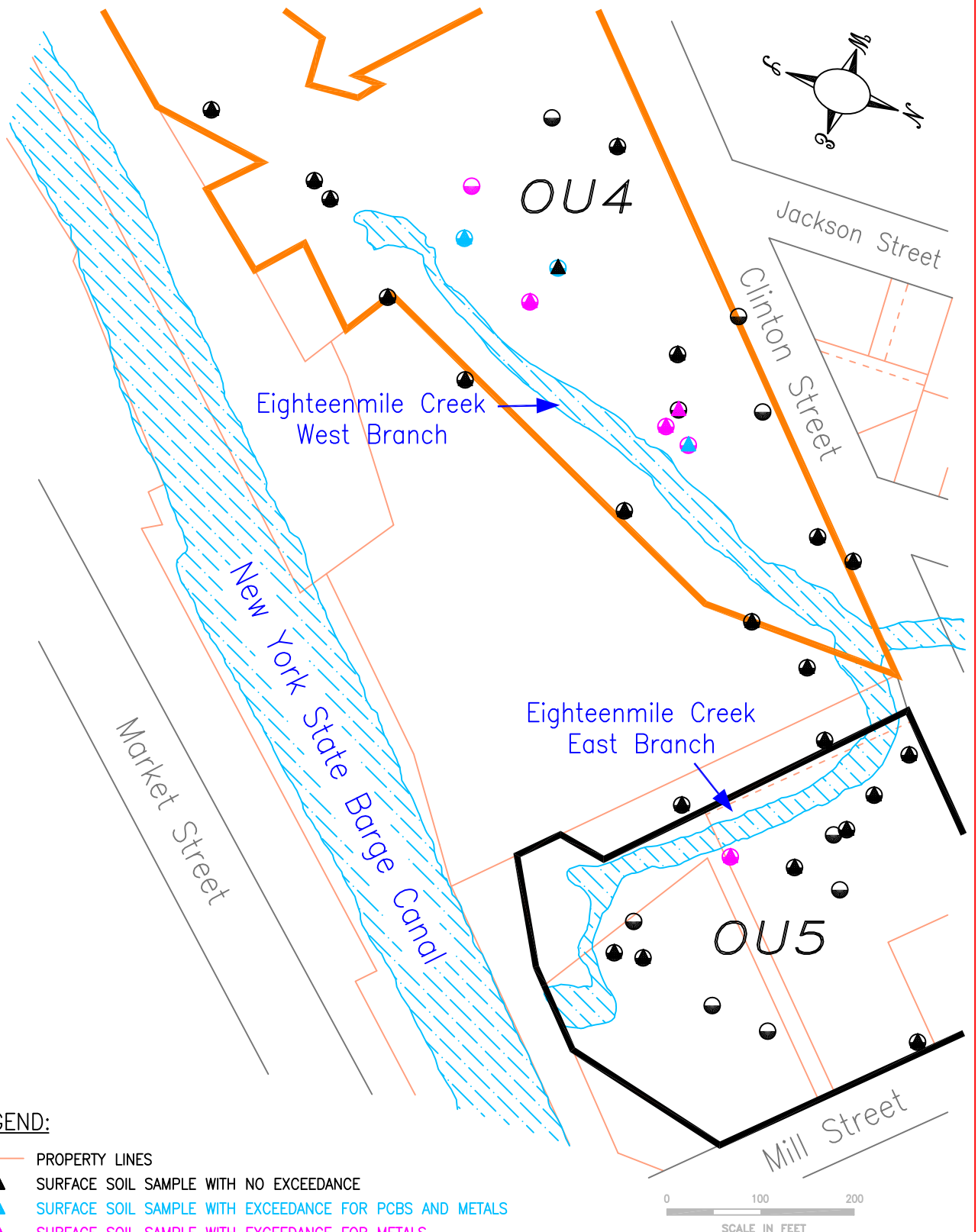
UNRESTRICTED SCG EXCEEDANCE MAP FOR OUs 4 & 5

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/17/09 | DRAWING: Exceedance Map.dwg

SITE: EIGHTEENMILE CREEK CORRIDOR

FIGURE 5



LEGEND:

- PROPERTY LINES
- SURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS
- SUBSURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS

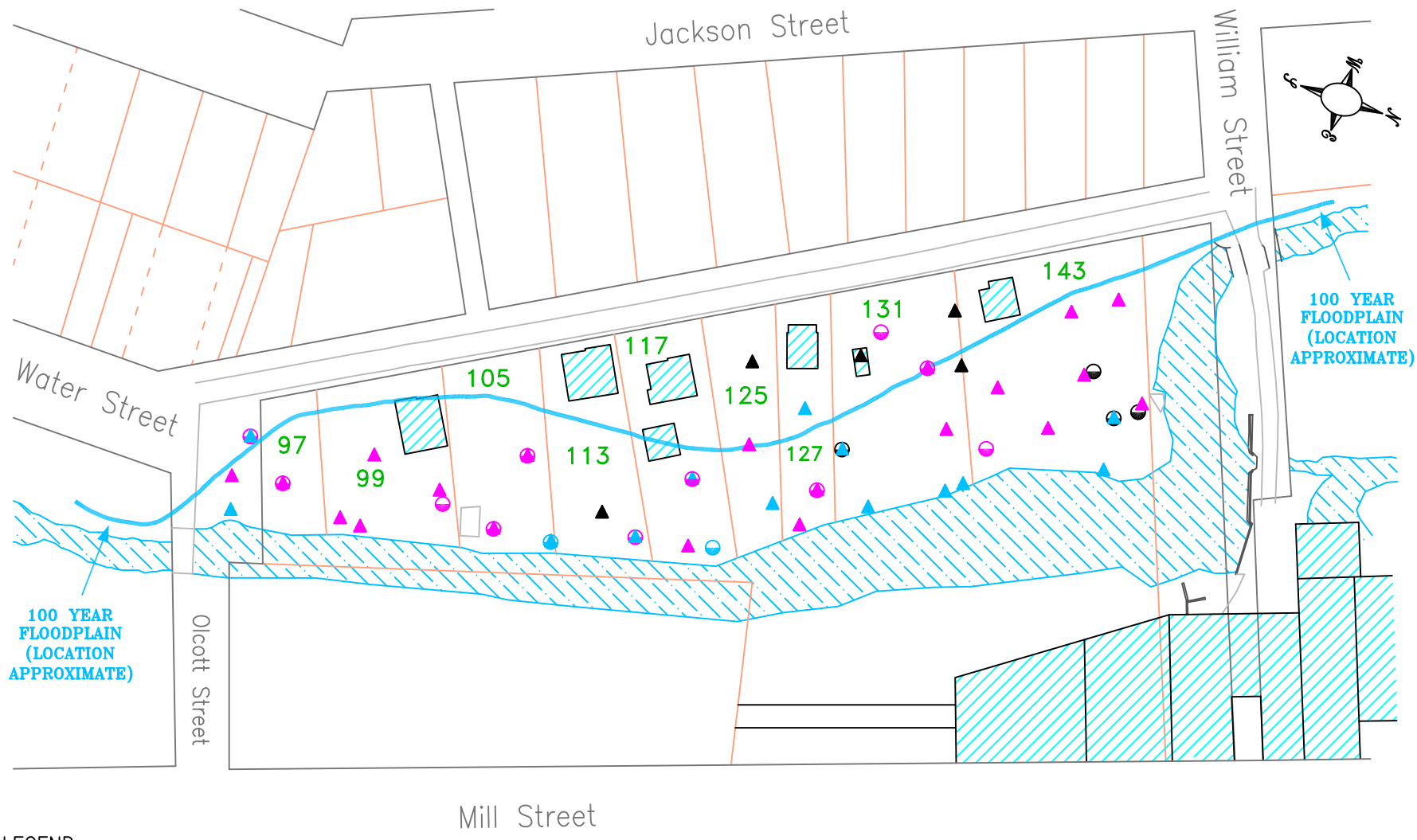
COMMERCIAL SCG EXCEEDANCE MAP FOR OUs 4 & 5

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/17/09 | DRAWING: Exceedance Map.dwg

SITE: EIGHTEENMILE CREEK CORRIDOR

FIGURE 6



LEGEND:

- PROPERTY LINES
- SURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS
- SUBSURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS

0 50 100 150
SCALE IN FEET

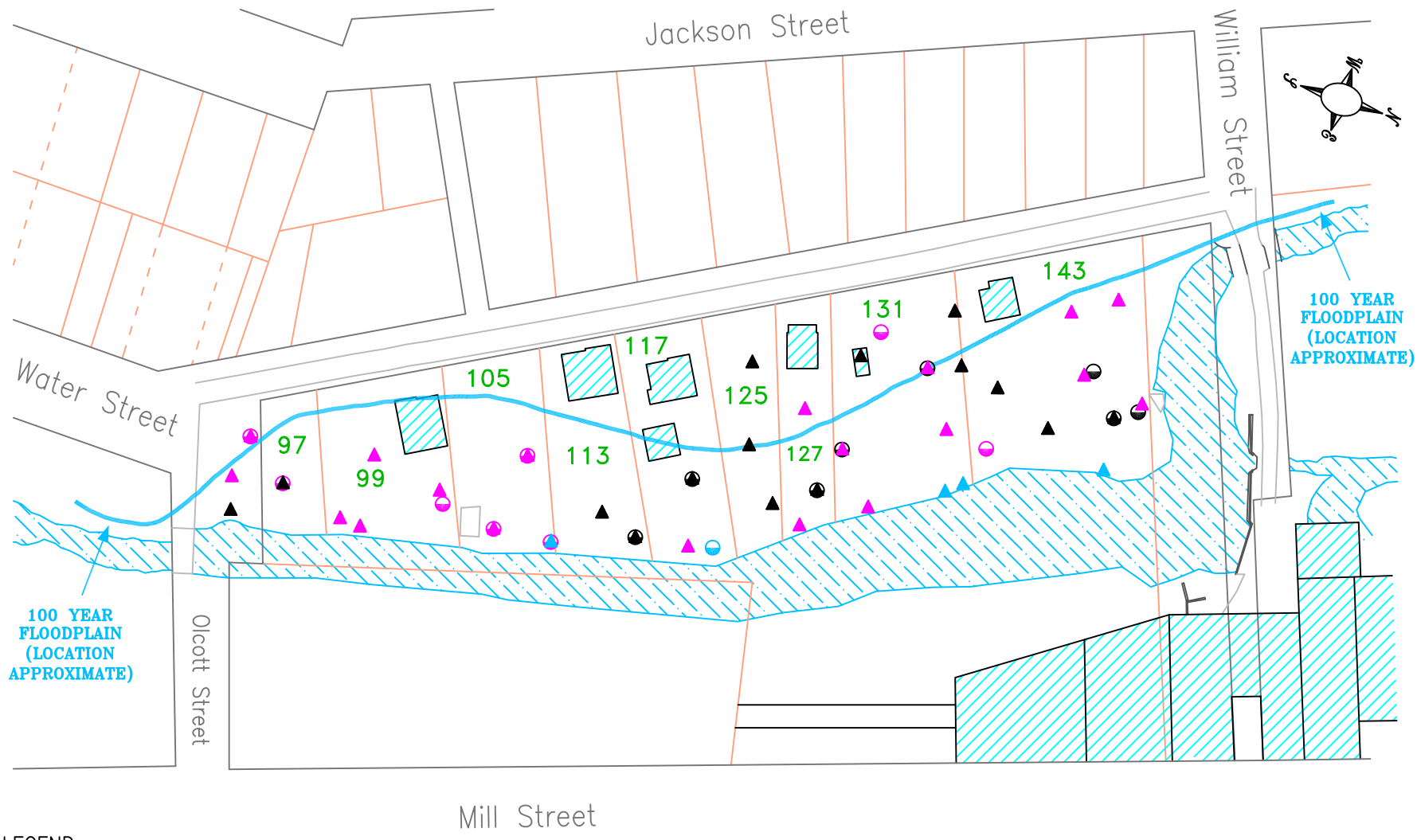
UNRESTRICTED SCG EXCEEDANCE MAP FOR OU6

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/13/09 DRAWING: Exceedance Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 7



LEGEND:

- PROPERTY LINES
- SURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS
- SUBSURFACE SOIL SAMPLE WITH NO EXCEEDANCE
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR PCBS AND METALS
- SUBSURFACE SOIL SAMPLE WITH EXCEEDANCE FOR METALS

0 50 100 150
SCALE IN FEET

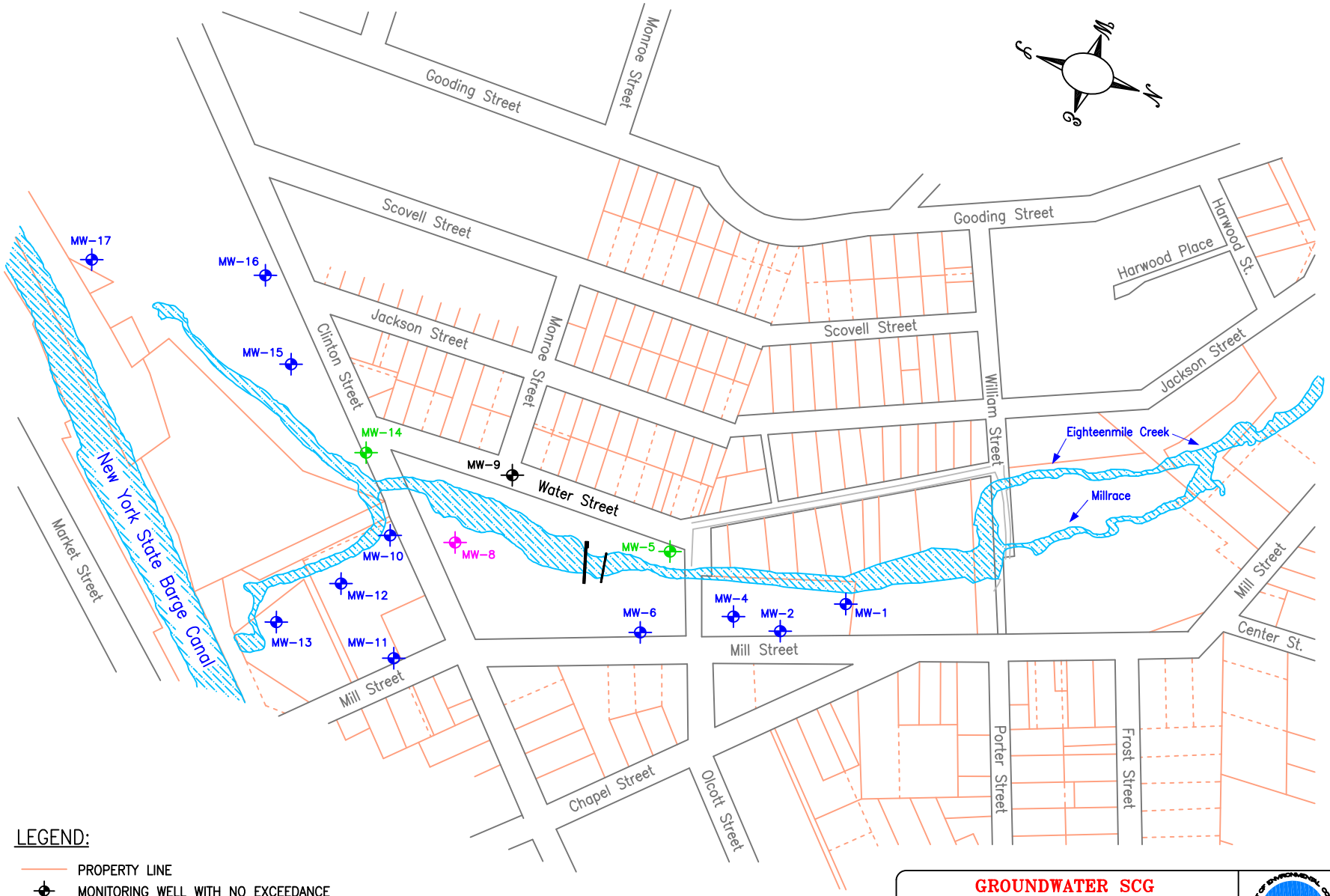
RESIDENTIAL SCG EXCEEDANCE MAP FOR OU6

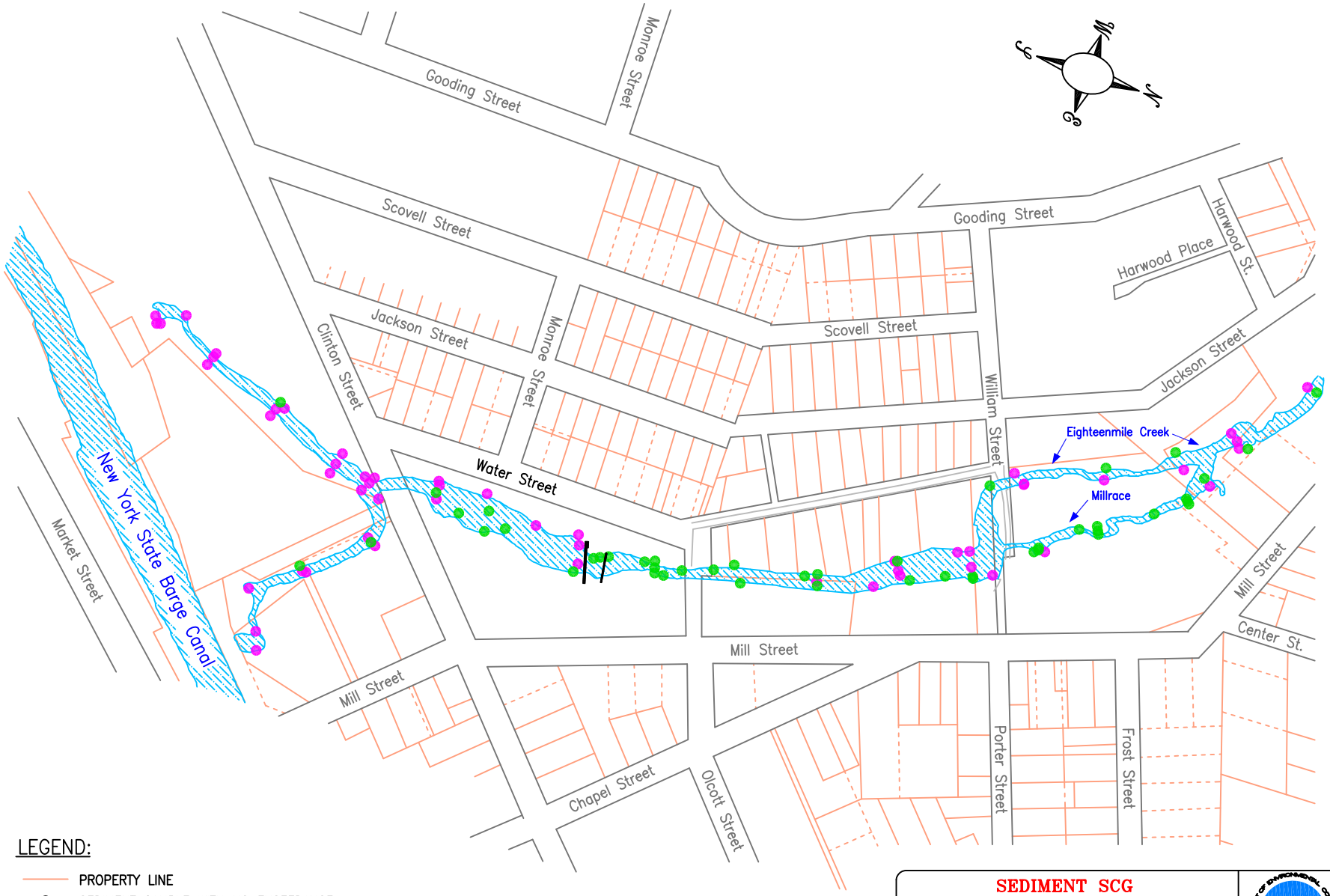
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/13/09 DRAWING: Exceedance Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 8


Gooding Street
Monroe Street
Scovell Street
Gooding Street
Harwood Place
Harwood St.
Scovell Street
Jackson Street
Monroe Street
Clinton Street
William Street
Jackson Street
MW-17
MW-16
MW-15
MW-14
MW-9
Water Street
Eighteenmile Creek
Millrace
New York State Barge Canal
Market Street
MW-10
MW-8
MW-5
MW-12
MW-13
MW-11
MW-6
MW-4
MW-2
MW-1
Mill Street
Mill Street
Center St.
Mill Street
Chapel Street
Olcott Street
Porter Street
Frost Street
LEGEND:
PROPERTY LINE
MONITORING WELL WITH NO EXCEEDANCE
MONITORING WELL WITH VOC AND METALS EXCEEDANCE
MONITORING WELL WITH SVOC AND METALS EXCEEDANCE
MONITORING WELL WITH METALS EXCEEDANCE
0
200
400
600
SCALE IN FEET
GROUNDWATER SCG
EXCEEDANCE MAP
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 08/12/09
DRAWING: Site Wide Map.dwg
SITE NAME: EIGHTEENMILE CREEK CORRIDOR
FIGURE 9



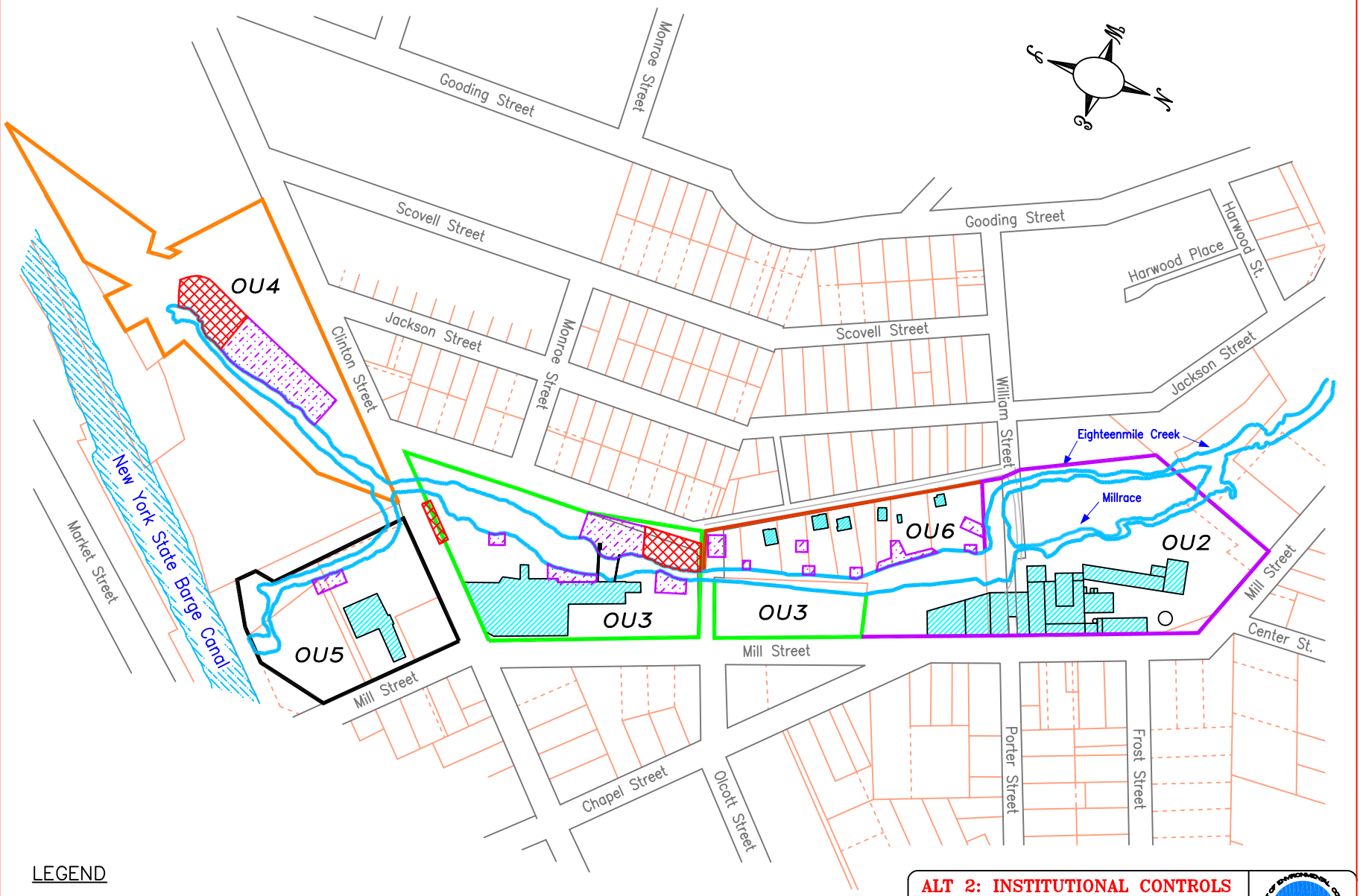
SEDIMENT SCG EXCEEDANCE MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/12/09 DRAWING: Site Wide Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 10



LEGEND

- HAZARDOUS WASTE AREAS TO BE FENCED
- COMMERCIAL SOIL SCG EXCEEDANCE AREAS TO BE FENCED

0 200 400 600

SCALE IN FEET

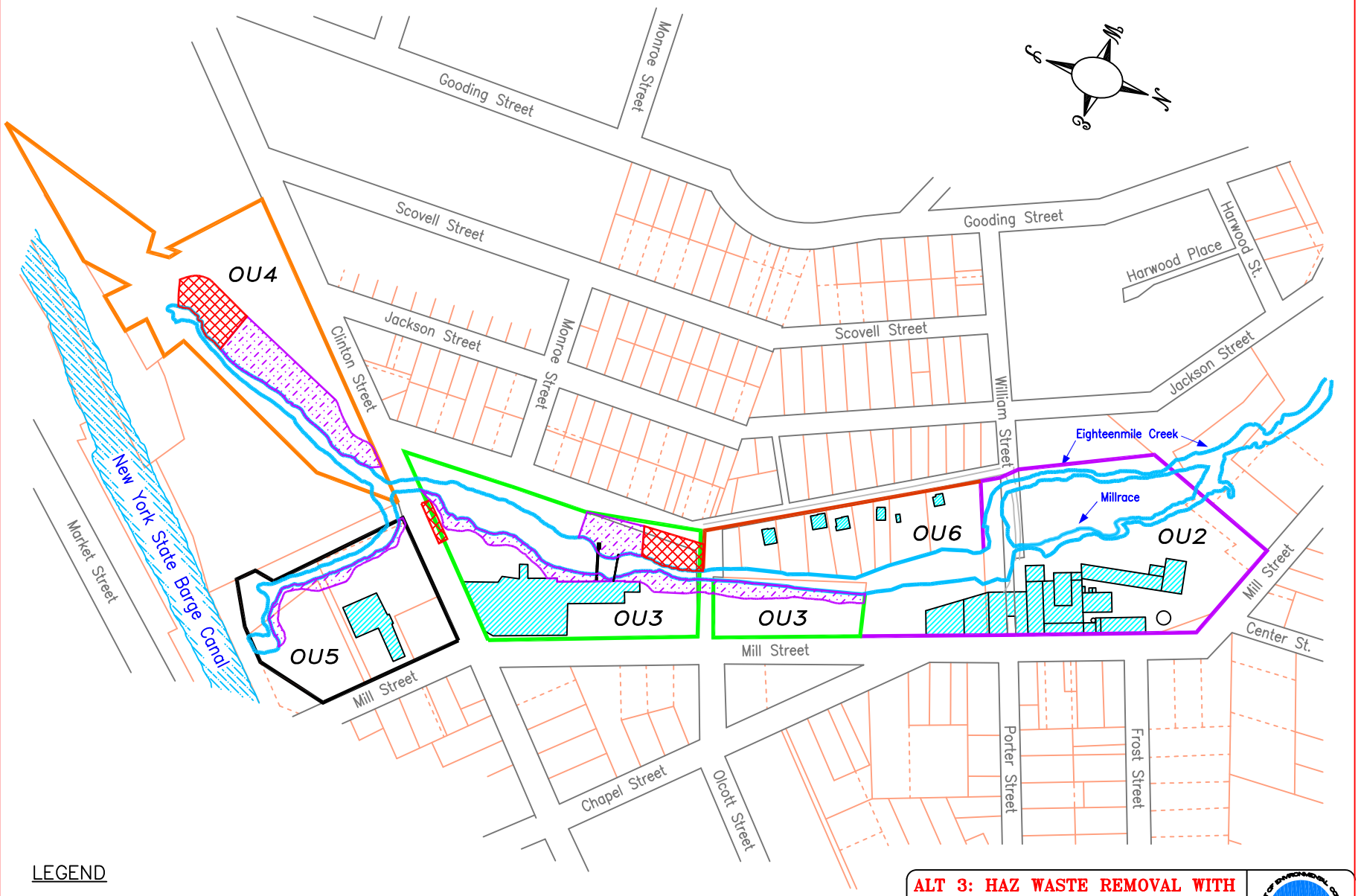
ALT 2: INSTITUTIONAL CONTROLS WITH LONG-TERM MONITORING

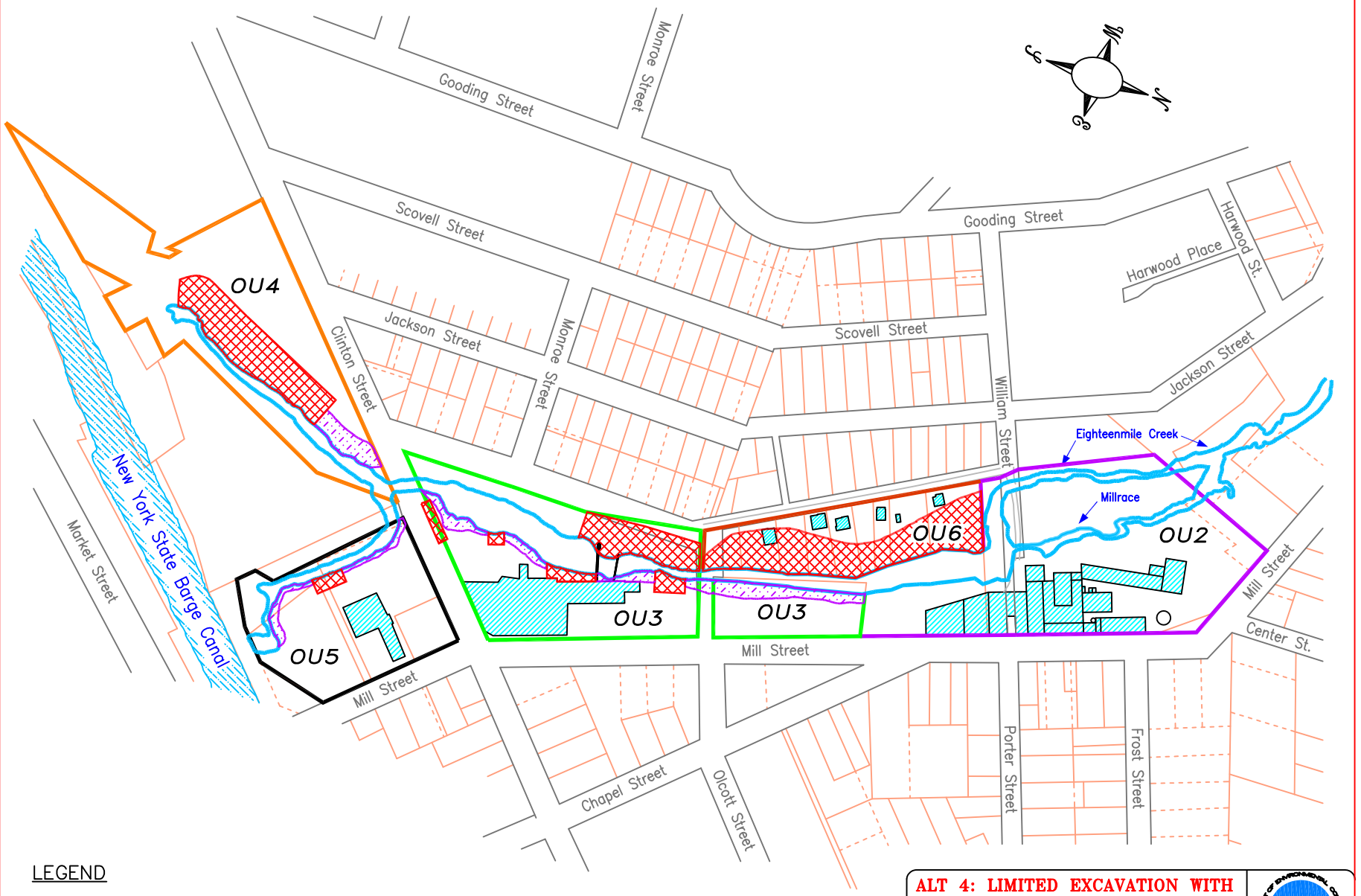
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/12/09 DRAWING: Site Wide Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 11


Gooding Street
Monroe Street
Scovell Street
Jackson Street
Clinton Street
Monroe Street
Gooding Street
Harwood Place
Harwood St.
Scovell Street
William Street
Jackson Street
Eighteenmile Creek
Millrace
OU4
OU6
OU2
OU3
OU3
OU5
New York State Barge Canal
Market Street
Mill Street
Mill Street
Center St.
Chapel Street
Olcott Street
Porter Street
Frost Street
N
LEGEND
EXCAVATION AREAS
SOIL COVER AREAS
0
200
400
600
SCALE IN FEET
ALT 3: HAZ WASTE REMOVAL WITH BANK STABILIZATION AND LTM
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 08/12/09
DRAWING: Site Wide Map.dwg
SITE NAME: EIGHTEENMILE CREEK CORRIDOR
FIGURE 12



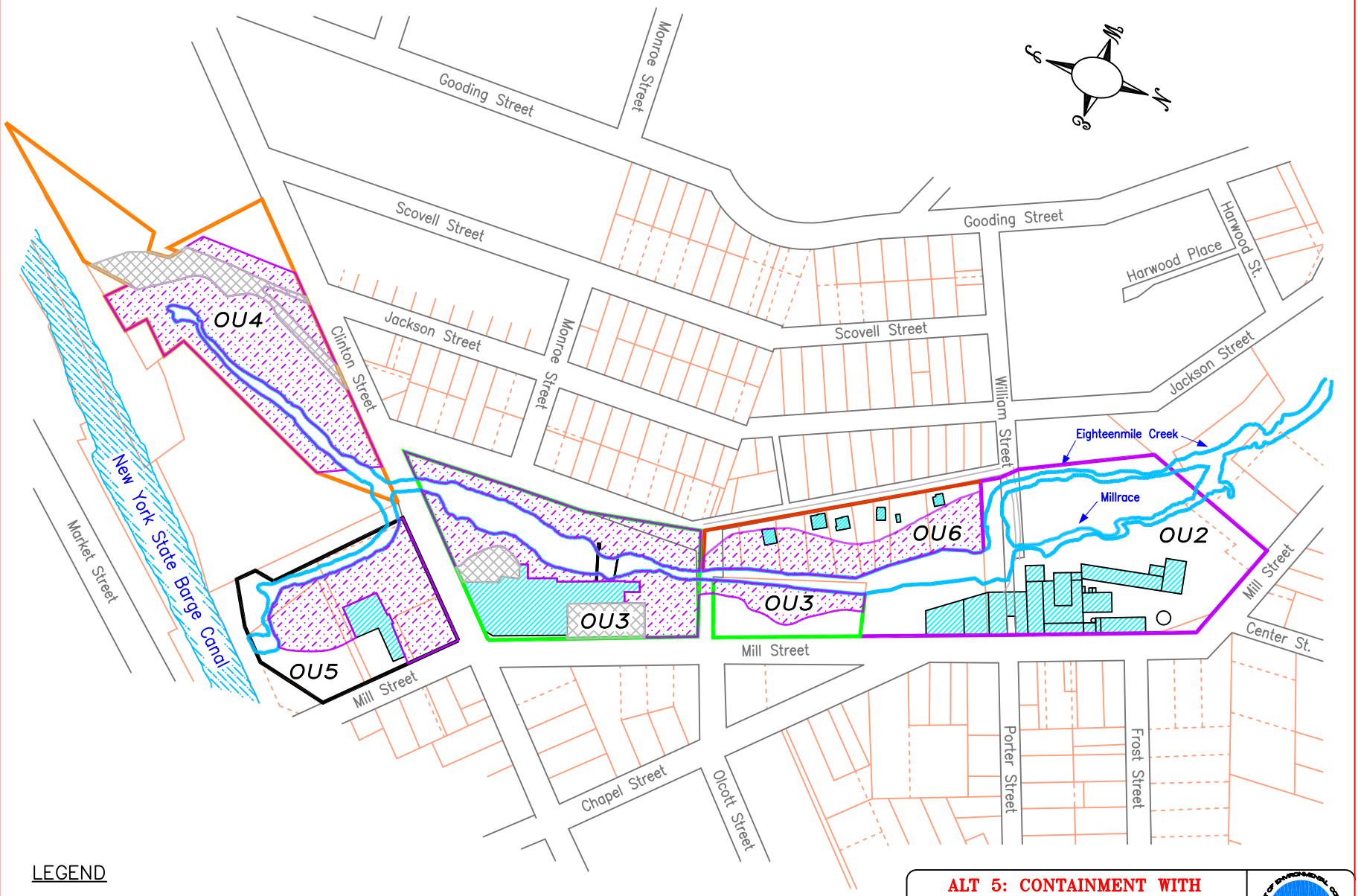
ALT 4: LIMITED EXCAVATION WITH BANK STABILIZATION AND LTM

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/12/09 DRAWING: Site Wide Map.dwg

SITE NAME: EIGHTEENMILE CREEK CORRIDOR

FIGURE 13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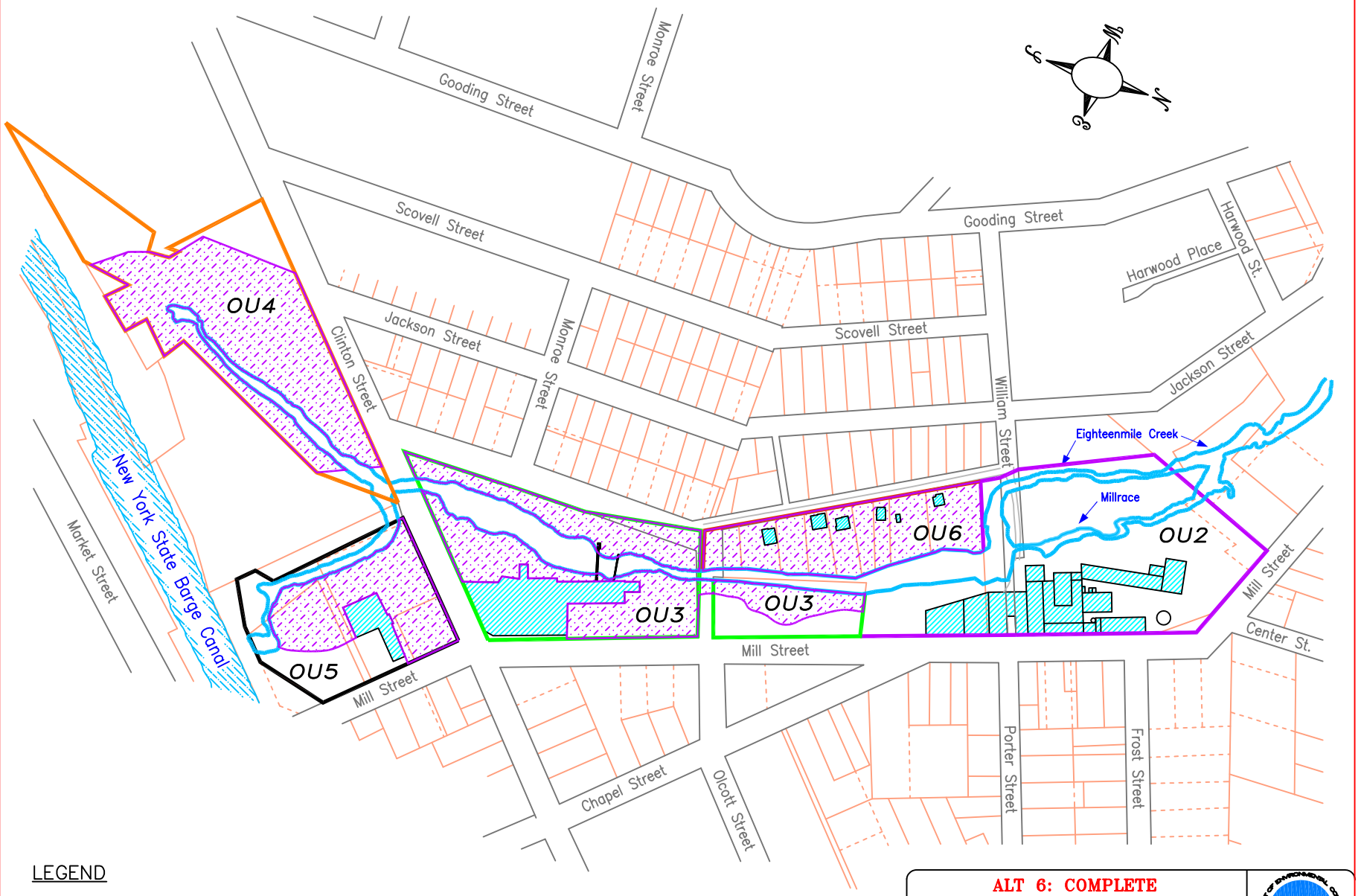
Monroe Street
Scovell Street
Jackson Street
Clinton Street
Harwood Place
Harwood St.
William Street
Eighteenmile Creek
Millrace
OU4
OU5
OU6
OU3
OU2
New York State Barge Canal
Market Street
Mill Street
Center St.
Chapel Street
Olcott Street
Porter Street
Frost Street
LEGEND
EXISTING GRAVEL OR ASPHALT PARKING LOTS AND ROADWAYS
SOIL COVER AREAS
0
200
400
600
SCALE IN FEET
ALT 5: CONTAINMENT WITH LONG-TERM MONITORING
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 08/12/09
DRAWING: Site Wide Map.dwg
SITE NAME: EIGHTEENMILE CREEK CORRIDOR
FIGURE 14


Gooding Street
Monroe Street
Scovell Street
Jackson Street
Clinton Street
Monroe Street
Gooding Street
Harwood Place
Harwood St.
Scovell Street
William Street
Jackson Street
Eighteenmile Creek
Millrace
OU4
OU6
OU2
OU3
OU3
OU5
New York State Barge Canal
Market Street
Mill Street
Mill Street
Center St.
Chapel Street
Olcott Street
Porter Street
Frost Street
LEGEND
EXCAVATION AREAS
0
200
400
600
SCALE IN FEET
ALT 6: COMPLETE EXCAVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 08/12/09
DRAWING: Site Wide Map.dwg
SITE NAME: EIGHTEENMILE CREEK CORRIDOR
FIGURE 15