REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK

Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

February 2013

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM USA, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
BBL	Blasland, Bouck & Lee, Inc. (Currently ARCADIS)
bgs	Below Ground Surface
BUD	Beneficial Use Determination
COPC	Constituent of Potential Concern
Drainage District	Bloody Brook Drainage District
Eco-SSL	Ecological Soil Screening Level
EE	Environmental Evaluation
ELAP	Environmental Laboratory Accreditation Program
ESDC	Empire State Development Corporation
FWRIA	Fish and Wildlife Resource Impact Analysis
GE	General Electric Company
HHEA	Human Health Exposure Assessment
IRM	Interim Remedial Measures
LDR	Land Disposal Restriction
Lockheed Martin	Lockheed Martin Corporation
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OCHD	Onondaga County Health Department
OCDWEP	Onondaga County Department of Water Environment Protection
OM&M	Operation, Monitoring and Maintenance
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RI/FS	Remedial Investigation/Feasibility Study
SCG	Standards, Criteria, and Guidance
SCLs	Soil Cleanup Levels
SCOs	Soil Cleanup Objectives
Shaw	Shaw Environmental, Inc.
Thruway	New York State Thruway
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
WBBB	West Branch of Bloody Brook

REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

CERTIFICATION STATEMENT

I, Nickcole M. Evans, P.E., certify that this Remedial Action Work Plan was prepared by a professional engineer in accordance with Paragraph II.B.2 of the Voluntary Cleanup Agreement for Remedial Investigation/Remedial Action between the New York State Department of Environmental Conservation and Lockheed Martin Corporation (Index #: D7-0001-01-09).



Nickcole M. Evans, P.E.
License Number 085978

In accordance with New York State Education Law, it is a violation for any person, unless he is acting under the direction of a licensed professional engineer, to alter this Work Plan in any way.

EXECUTIVE SUMMARY

Lockheed Martin Corporation has prepared this Remedial Action Work Plan for the West Branch of Bloody Brook site in accordance with a Voluntary Cleanup Agreement with the New York State Department of Environmental Conservation effective July 20, 2002. Presented in this document is an overview of past activities and plans for future remediation efforts in response to concentrations of cadmium in the sediment within and soil adjacent to a portion of the West Branch of Bloody Brook. The portion of the West Branch of Bloody Brook addressed in this Plan is approximately 5,000 feet long, located between the New York State Thruway and Onondaga Lake Parkway, in the Town of Salina and Village of Liverpool, Onondaga County, New York.

The brook provides drainage capacity and flood protection to area properties and is maintained by Onondaga County as part of the Bloody Brook Drainage District. Onondaga County has obtained easements from area property owners for access to maintain the brook.

This Remedial Action Work Plan has been prepared based on studies completed by Lockheed Martin Corporation, the New York State Department of Environmental Conservation and Onondaga County between 1994 and 2011. Those studies resulted in identification of cadmium as the contaminant of concern in sediments within and soil adjacent to the West Branch of Bloody Brook. Studies were also conducted in the Middle Branch of Bloody Brook and no environmental impacts were identified.

In addition to the studies of current site conditions, extensive historic document review was conducted to understand land uses in the area since the 1930s. The site and local areas underwent significant development in phases between the 1940s and 1970s changing from agricultural use to residential and commercial/industrial use. During this development, several portions of the West Branch of Bloody Brook channel were moved and in some locations as much as 15 feet of soil were placed over the former channel and floodplain to accommodate residential and commercial/industrial development. The data collected during the site studies confirm that the highest concentrations of cadmium are found along the historic channel of the West Branch of Bloody Brook.

Cadmium is a naturally occurring metallic element that is present throughout the environment in soil, plants and animals. Cadmium is found in small amounts in food. Cadmium has many uses in industry and is found in consumer products such as an ingredient in batteries, paint, metal coatings and plastics.

Lockheed Martin Corporation examined records relating to historic manufacturing processes at the Electronics Park facility positioned upstream from the portion of the West Branch of Bloody

Brook located within the site. These records show that cadmium was historically used at the Electronics Park facility, but no evidence was found of a cadmium release. While a direct connection between site conditions and the Electronics Park facility could not be identified, Lockheed Martin Corporation agreed to investigate and remediate the site under the New York State Voluntary Cleanup Program.

Risk assessments conducted at this site indicate that potential exposures to cadmium at the West Branch of Bloody Brook site are not likely to result in adverse health effects. Ingestion is the primary route of potential exposure to cadmium in soil and sediment. Inhalation is another route of potential exposure. After entering the human body, high levels of cadmium can cause kidney and liver damage. Work place studies suggest that repeated inhalation of high levels of cadmium in an occupational setting may be associated with cancer. Because the cadmium in question is located predominantly in areas that are not easily accessed and are covered by vegetation such as grass and/or by clean soil, potential health risk from exposure to cadmium at the West Branch of Bloody Brook site is unlikely. In the event that exposure would occur, concentrations of cadmium in soil or dust that residents and visitors to the area would be exposed to on a short- or long-term basis are not high enough to cause kidney and liver damage or cancer, based on an analysis of a number of potential exposure scenarios.

Although it has been determined that the cadmium in the sediment within and soil adjacent to the West Branch of Bloody Brook is not currently a threat to human health, Lockheed Martin Corporation is proposing to remove cadmium-impacted sediment and soil to further minimize potential future human and environmental exposure and will work with the community to implement the work plan.

Lockheed Martin Corporation has developed the following remedial action objectives to be met during and after completion of remediation:

- Prevent human and ecological exposure to soil containing cadmium at concentrations in excess of soil cleanup levels and to sediment containing cadmium, to the extent practicable;

- Maintain human and ecological protection by implementing remedial activities that minimize disruption to the surrounding community, to the extent practicable; and

- Ensure Onondaga County can continue routine maintenance of the Drainage District easement by minimizing exposure to soil containing cadmium at concentrations in excess of soil cleanup levels and to sediment containing cadmium, to the extent practicable.

For the West Branch of Bloody Brook site, soil cleanup levels are specified for residential and non-residential properties. Soil cleanup levels are cadmium levels that will ensure the protection

of human health and the environment for all current and anticipated future uses. For residential properties, a soil cleanup level of 10 parts per million (ppm) has been identified as protective of human health and the environment and is being used at the West Branch of Bloody Brook site at the request of the New York State Department of Conservation. For non-residential properties, a soil cleanup level of 70 ppm has been identified as protective of human health and the environment. These values have been incorporated in the design of the remedial alternatives.

Development of the site remedy involved an evaluation of various remedial technologies. Six remedial technologies were evaluated and five technologies were retained to be used as components of the proposed remedial alternatives. Three remedial alternatives were defined and then evaluated for effectiveness in achieving the soil cleanup levels and the remedial action objectives for the West Branch of Bloody Brook site. This evaluation led to the selection of a proposed remedial alternative. Prior to implementation of the proposed remedial alternative, the public will have an opportunity to comment on the proposed remedy during a public comment period, and New York State Department of Environmental Conservation will need to provide approval of the proposed remedy.

The proposed remedial alternative involves the following:

Bloody Brook Channel:

- Lockheed Martin Corporation will remove from the site non-cohesive sediment along the length of the West Branch of Bloody Brook and restore the side banks, with the exception of the section lined with gabions (rock-filled wire cages). Side bank restoration will involve the removal and replacement of approximately the top 2 feet of side bank soils. This will minimize sediment exposure and improve the storm water conveyance capacity of the brook.

Residential Properties:

- Lockheed Martin Corporation will remove and replace soil located in the top 4 feet containing cadmium in excess of 10 ppm. This soil removal will be protective and allow the residential user to conduct routine improvement activities involving soil disturbance such as planting trees and installing fences. In addition, outside of the Drainage District easement, Lockheed Martin will remove soil containing cadmium in excess of 2.5 ppm located in the top 2 feet within single family residential properties and will remove soil containing cadmium in excess of 4.3 ppm located in the top 2 feet within the apartment complex property. This soil removal will reduce the concentration of cadmium in shallow soil, which is the soil most accessible to the public, to levels below New York State residential soil cleanup objective values.

Drainage District Easement adjacent to and within Residential Properties:

- For the portions of the Drainage District easement located adjacent to and within residential properties (including the wooded area), Lockheed Martin Corporation will remove and replace soil located in the top 2 feet containing cadmium in excess of 10 ppm. In addition, from within the former brook channel located in the wooded area, Lockheed Martin Corporation will remove and replace soil containing cadmium at concentrations greater than 100 ppm up to 6 feet deep within the footprint of the previously mentioned 2-foot excavation area. This additional removal will effectively remove a high percentage of cadmium-impacted material greater than 100 ppm from the site.

Non-Residential Properties

- For the commercial/light industrial properties and the Drainage District easement located adjacent to and within these properties, Lockheed Martin Corporation will remove soil located in the top 2 feet containing cadmium in excess of 70 ppm. In addition, Lockheed Martin Corporation will remove soil from the top 2 feet of two areas located outside of the brook channel to facilitate side bank restoration.

Under this proposed remedial alternative, approximately 21,800 cubic yards (3,300 round trip truckloads) of soil and sediment will be excavated and disposed of off site in a permitted landfill. This material will include approximately 14,400 cubic yards of cadmium-impacted soil, 1,700 cubic yards of sediment from the brook channel, and 5,700 cubic yards of channel side bank soils. Following excavation, the soil removed from the site will be replaced with clean soil from an approved off-site location, and the West Branch of Bloody Brook site will be returned to pre-construction grade.

Lockheed Martin Corporation will perform site restoration as part of the cleanup. On residential properties, Lockheed Martin Corporation will restore disturbed vegetation (e.g., grass, shrubs, trees, etc.) and structures (e.g., fences, sheds, etc.). In the wooded area, Lockheed Martin Corporation also will restore disturbed vegetation including the replanting of the wetlands with native species.

The remedy being proposed by Lockheed Martin Corporation will address potential human and wildlife exposure to cadmium by removing the upper-most soils and minimizing potential exposure to deeper soils with cadmium concentrations greater than soil cleanup levels. Lockheed Martin Corporation will provide property owners with documentation of post-cleanup conditions on their properties. The post-cleanup documentation will identify the location of cadmium in deeper soils that remain in place in excess of soil cleanup levels. If future activities

such as the construction of an in-ground pool will disturb residual cadmium in excess of soil cleanup levels, property owners will need to contact Lockheed Martin Corporation prior to construction. Lockheed Martin Corporation will then properly manage soil removal and disposal at a permitted landfill at its expense.

Lockheed Martin Corporation will establish a plan for site monitoring and maintenance that confirms the post-remediation site conditions remain protective of human health and the environment.

1.0 Introduction

Lockheed Martin Corporation (Lockheed Martin) has prepared this Remedial Action Work Plan (RAWP) for a portion of the West Branch of Bloody Brook (WBBB) and surrounding area, pursuant to a Voluntary Cleanup Agreement (VCA) between Lockheed Martin and the New York State Department of Environmental Conservation (NYSDEC) (Index #: D7-0001-01-09, effective July 20, 2002). For the purposes of this RAWP, the site is defined as that portion of the WBBB and the surrounding area commencing on the southern boundary of the New York State Thruway (Thruway) and ending at Onondaga Lake Parkway.[1] Despite not having identified a direct connection between site conditions and the Electronics Park facility, Lockheed Martin has agreed to investigate and remediate the site under the New York State Voluntary Cleanup Program.

This RAWP presents an overview of past activities and plans for future remediation efforts to address cadmium found in the sediments within and soil adjacent to the WBBB. This RAWP has been prepared based on sampling investigations that were conducted at the site by Lockheed Martin, NYSDEC, and Onondaga County between 1994 and 2011. From information and data obtained during the sampling investigations, cadmium at the site is predominantly located in areas that are not easily accessed or that are covered by surface barriers such as grass, pavement and clean soil, which means the potential health risk from exposure to cadmium at the site is unlikely.

The WBBB is located in the Town of Salina and a portion of the site is located in the Village of Liverpool, Onondaga County, New York. A site location map and site area map are included as **Figures 1** and **2**, respectively.

1.1 Remedial Action Work Plan Objective

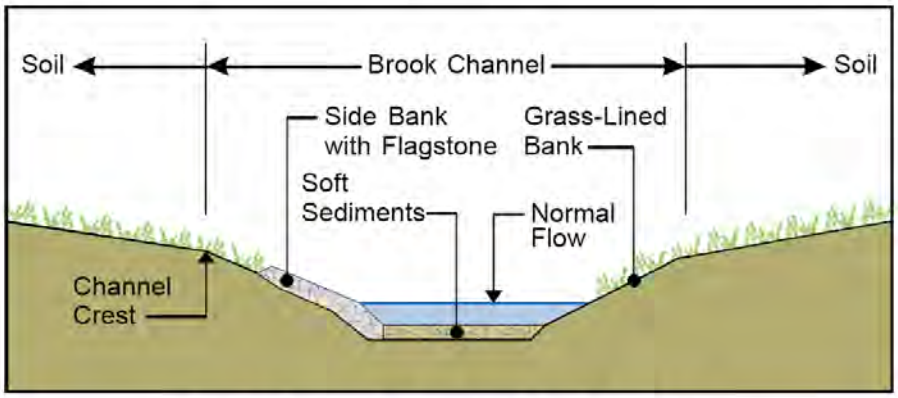
Environmental investigations at the site resulted in identification of cadmium as the contaminant of concern in sediments and soil; cadmium in surface water was not detectable. The objective of this RAWP is to present Lockheed Martin's proposed remedial alternative to address cadmium at

1 The term "site" in the VCA is defined as: a portion of the banks, surface waters and sediments of the West and Middle Branches of Bloody Brook located in the Town of Salina, which commences downstream of Interstate 90, the New York State Thruway, and which extends generally southward past the confluence of the West Branch and the Middle Branch of Bloody Brook, and ends on the upstream side of Onondaga Lake Parkway. After examining data developed during remedial investigation work in the Middle Branch, NYSDEC determined that no further action was required for that branch of Bloody Brook. For this reason, the term "site" in this RAWP relates only to those areas within the VCA Site where the remedial program continues to be implemented and remedial action is proposed.

the site. This RAWP documents the evaluation of alternatives and the basis for selection of the proposed remedial alternative.

Cadmium is an element that occurs naturally in soils and rocks. Human activities release cadmium into the environment through the burning of fossil fuels or municipal wastes, mining activities, industrial processes, and the application of fertilizers. Cadmium has many uses in industry and as an ingredient in consumer products, such as batteries, pigments, metal coatings, and plastics.

This RAWP identifies specific remedial actions for both the brook channel and soil at the site. The following figure illustrates the terms that are used throughout the RAWP.



TYPICAL CHANNEL DETAIL

1.1.1 Soil

The term "soil" means the unconsolidated material surrounding the brook channel. Section 2.0 includes a review of soil sampling at the site. Section 4.0 presents, discusses, and compares a variety of remedial alternatives for addressing soil at the site containing elevated concentrations of cadmium. Remedial alternatives consist of specific combinations of remedial technologies that have the potential to achieve remedial action objectives (RAOs) developed by Lockheed Martin. Consistent with NYSDEC guidance, alternatives are then evaluated in accordance with the following criteria:

- Overall protection of human health and the environment;
- Compliance with applicable Standards, Criteria and Guidance (SCGs);
- Short-term effectiveness;
- Long-term effectiveness;

- Reduction in toxicity, volume and mobility;
- Implementability;
- Cost;
- Land use; and
- Community acceptance.

For this document, SCGs include federal applicable or relevant and appropriate requirements and New York State criteria applicable to the cleanup of contaminated media. Based on the criteria, a recommended remedial alternative for soil is selected as the final remedy for the site.

1.1.2 Brook Channel

The term "brook channel" refers to both the sediments and channel side bank soils of the WBBB as it exists today. The term "sediments" means the unconsolidated sand and silt in the brook channel beneath the water line during normal flow conditions. The term "channel side banks" means areas immediately adjacent to the WBBB from the water line during normal flow conditions to the crest of the channel.

Sediment sampling was conducted at the site by Lockheed Martin, NYSDEC and Onondaga County from 1994 to 2008. Elevated concentrations of cadmium were identified in the samples collected from portions of the brook channel located within the site. In 1997, under NYSDEC oversight, Lockheed Martin completed a project to remove all sediments from within the 200-foot long culvert beneath the Thruway and the adjacent downstream 750-foot segment of the WBBB. This removal addressed elevated concentrations of cadmium and polychlorinated biphenyls (PCBs) in this segment of the WBBB. The removed material was transported off site to Seneca Meadows Landfill located in Waterloo, New York (a New York State permitted landfill). Subsequent sediment sampling and analyses indicated that PCBs were not of concern in the brook channel downstream of this segment.

In 2008, Lockheed Martin conducted sediment removal from within culverts where the WBBB passes beneath the following streets: Brookview Lane, Sunflower Drive, Floradale Road, and Pearl Street. This work was conducted at the request of Onondaga County to increase the hydraulic capacity of the drainage system in the area and pursuant to NYSDEC-approved *Final Interim Remedial Measures Work Plan, Culvert Sediment Removal* (Shaw Environmental, Inc. [Shaw], 2008). The material removed was transported off site to the Waste Management High Acres Landfill in Fairport, New York (a New York State permitted landfill).

As part of this RAWP, Lockheed Martin is planning to remove all the remaining unconsolidated sediment and sediment accumulated since 2008 along the length of the WBBB at the site. In addition, channel side bank soils will be removed to a depth of 2 feet and the channel banks reconstructed to provide increased drainage capacity along the length of the WBBB at the site, with the exception of the existing gabion[2]-lined section. The gabions were installed by Onondaga County to improve drainage capacity, and therefore, this section of the brook will not be included in the side bank reconstruction. This action, in conjunction with the routine maintenance performed by Onondaga County, will minimize potential human and ecological exposure to cadmium in the brook channel. Thus, this RAWP does not contain an evaluation of remedial alternatives for the brook channel. An overview of the proposed sediment removal and channel side bank restoration activities are presented along with the proposed remedial alternatives for soil in Section 4.0 of this RAWP.

Information regarding sediment sampling activities, the 1997 sediment removal project, and the 2008 IRM is found in the following reports:

- *Bloody Brook Sampling and Analysis Work Plan* (Blasland, Bouck & Lee, Inc. [BBL], 1996a);
- *Bloody Brook Sediment Sampling and Analysis Work Plan: Phase II* (BBL, 1996b);
- *West Branch of Bloody Brook Sediment Removal Work Plan* (BBL, 1997a);
- *West Branch of Bloody Brook Sediment Removal Certification Report* (BBL, 1997b);
- *Final Interim Remedial Measures Work Plan, Culvert Sediment Removal* (Shaw, 2008;
- *Interim Remedial Measures Certification Report, Culvert Sediment Removal* (Shaw, 2009a); and
- *Analytical Data Summary* (Shaw, 2012).

1.2 Site Location and Description

The site is located in the Town of Salina and a portion of the site is located in the Village of Liverpool, Onondaga County, New York. Site location and area maps are included as **Figures 1 and 2**, respectively. The site consists of the WBBB and soil surrounding the WBBB downstream of the Thruway and ending at the upstream side of Onondaga Lake Parkway. This

2 Gabions are rock-filled wire cages that are used for constructing banks such as those along the edge of the WBBB.

portion of the WBBB is approximately 5,000 feet long and flows through lands of varied use including residential, commercial, municipal and light industrial.

Upstream of the site, the WBBB originates in a wetland area surrounded by industrial properties. This wetland is located between Vine Street and Crossroads Industrial Park. The WBBB flows southward and is routed through culverts that transmit the WBBB underneath Electronics Business Park and the Thruway. Downstream of the site, the WBBB flows under Onondaga Lake Parkway and discharges into Onondaga Lake. The WBBB obtains a substantial fraction of its flow from storm water runoff from surrounding areas.

1.3 Regulatory Setting

In 1997, with the approval of NYSDEC, Lockheed Martin conducted surface water and sediment investigations and sediment remediation activities within, and in the area surrounding, the site. Lockheed Martin entered into a VCA with NYSDEC in July 2002. In accordance with the VCA, a remedial approach designed to mitigate the potential for human and ecological exposure to cadmium is presented in this RAWP.

In addition to regular communications with state and federal agencies under the VCA, Lockheed Martin communicates with the residents expected to be affected by the proposed remediation activities through various means such as home visits, phone calls, and quarterly letters that provide updates on the status of the project. Lockheed Martin also periodically communicates with the local municipalities (Onondaga County, Town of Salina and Village of Liverpool) regarding site activities.

1.4 Work Plan Organization

This RAWP is organized as follows:

- **Section 1.0, Introduction**—This section includes a brief summary of the project objectives, site location and description, regulatory setting, and work plan organization.

- **Section 2.0, Site Assessment**—This section includes a summary of the site history, environmental and physical setting, and the nature and extent of site-related impacts.

- **Section 3.0, Human Health Exposure Assessment and Environmental Evaluation**—This section includes a human health exposure assessment, a brief environmental evaluation, a summary of the soil cleanup levels (SCLs) and a description of RAOs for the site.

- **Section 4.0, Development and Analysis of Remedial Alternatives**—This section includes a technology evaluation, development of remedial alternatives, and a comparative analysis of remedial alternatives.

- **Section 5.0, Selection of Preferred Remedial Alternative**—This section presents an overview of the selected remedial alternative, an analysis of the rejected remedial alternatives, a description of the public participation program, and a summary of the remedial design basis.

- **Section 6.0, Post-Remediation Property Assessment**—This section presents a summary of the anticipated post-remediation site conditions. The discussion is organized according to the following property types: municipal, residential, and commercial/industrial.

- **Section 7.0, Site Management Plan**—This section presents an overview of a Site Management Plan that will be developed upon completion of the proposed remedial action. Included within this section is an overview of the operations, maintenance and monitoring plan, institutional controls, and annual reporting.

- **Section 8.0, References**—This section lists the documents referenced in this work plan.

- **Figures**—Includes all figures referenced in this work plan.

- **Tables**—Includes all tables referenced in this work plan.

- **Appendices**—Includes all appendices referenced in this work plan.

2.0 Site Assessment

This section provides a discussion of the site history, environmental and physical setting, nature and extent of site-related impacts, the basis for determining cadmium as a contaminant of concern, and the factors affecting mobility and distribution of cadmium.

2.1 Site History

This section contains four subsections for ease of presentation. These subsections are:

- Electronics Park development;
- History of the surrounding area;
- Bloody Brook location history; and
- Bloody Brook Drainage District.

An understanding of the history of the area is necessary to understand the distribution of cadmium at the site.

2.1.1 Electronics Park Development

In August 1944, General Electric Company (GE) began construction of the Electronics Park facility on 180 acres of farm land in Liverpool, New York. Building EP-7 was the first building completed in April 1947. The remaining buildings in the original complex were completed by mid-1948. As previously mentioned in Section 1.2, the WBBB originates north of the Electronics Park facility and flows south through culverts under the facility. In 1993, Martin Marietta Corporation acquired GE's Aerospace business, including the Electronics Park facility. In 1995, Martin Marietta Corporation merged with Lockheed Corporation to form Lockheed Martin. From the construction of the Electronics Park facility to the present, operations at the facility were continuous.

On September 27, 1996, Lockheed Martin transferred ownership of the Electronics Park land and buildings to the Empire State Development Corporation (ESDC). ESDC then established the Electronics Business Park and leased the land and nine of the buildings to the local economic development agency, CEO-Centerstate Corporation for Economic Opportunity (previously named Metropolitan Development Association). At this time, Lockheed Martin is the largest tenant at the Electronics Business Park. The property is currently managed by Electronics Park, LLC.

2.1.2 History of Surrounding Area

The information presented in this section was obtained from the following sources:

- Historical maps;
- Aerial photographs;
- Publicly available government resources;
- Title information; and
- Local historical societies.

The site has been divided into four distinct areas based on land use. The four areas are the wooded area, residential area, apartment complex, and commercial/light industrial area. In addition to these areas, the Thruway borders the northern edge of the site. The Thruway is not part of the site; however, the history of its construction provides insight into the history of the WBBB. The wooded area extends from the Thruway south approximately 1,050 feet. The residential area surrounds the wooded area commencing at the Thruway and extends along the WBBB to the downstream side of Floradale Road. The apartment complex is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road. The commercial/light industrial area extends from Old Liverpool Road to Onondaga Lake Parkway. A map illustrating the location of these areas within the site is included as **Figure 2**.

Aerial photographs are included in **Appendix A** to illustrate the history of site development and are referred to in the following sections.

2.1.2.1 New York State Thruway

The WBBB is directed through culverts that begin north of Electronics Park and convey it beneath Electronics Park and the Thruway. According to the New York State Thruway Authority, construction began on this section of the Thruway on July 11, 1946 and was completed on October 11, 1947. The section of the Thruway from Westmoreland, New York to Rochester, New York, which includes the portion that borders the northern edge of the site, was opened in 1954.

2.1.2.2 Wooded Area

In 1938, the wooded area as well as the Electronics Park facility and the remainder of the site appear to have been farm land. Two agricultural fields were present on either side of the WBBB

where the residential development is currently located. A dirt road can be seen connecting these fields and passing over the WBBB.

In 1951, following the construction of the Thruway and the Electronics Park facility, the agricultural fields and the road connecting them were no longer present. A culvert had been installed, allowing surface water within the WBBB to flow underneath the Thruway. It appears that the culvert was installed slightly west of the former channel location. A drainage swale installed during the construction of the Thruway ran along the southern side of the Thruway, apparently directing flow easterly and connecting with the main channel of the WBBB near the discharge end of the culvert. According to deed records, ownership of the wooded area was transferred to the Town of Salina in 1968.

2.1.2.3 Residential Area

Development of the residential area surrounding the WBBB appears to have been completed between 1951 and 1972. The culverts directing flow underneath Sunflower Drive and Brookview Lane appear to have been installed between 1951 and 1959. The culvert directing flow beneath Floradale Road appears to have been installed between 1959 and 1966. The homes along the WBBB appear to have been constructed as follows:

- Homes on the east side of the WBBB (excluding Floradale Road) were completed between 1951 and 1966;
- Homes on the west side of the WBBB south of the wooded area (excluding Floradale Road) were completed between 1959 and 1967;
- Homes along Floradale Road were completed between 1966 and 1972; and
- Homes on the west side of the wooded area were completed between 1959 and 1978.

Aerial photographs and observations of site conditions indicate that a substantial amount of filling (approximately 3 to 15 feet) and grading was conducted during the construction of these residential areas. Furthermore, the United States Department of Agriculture Soil Survey for Onondaga County references a "Cut and Fill area" (USDA, 1977) in this area. Cut and Fill refers to a construction process used to remove soil from higher elevations and placing it at lower elevations of an area and is used to properly slope or grade an area. This reference to Cut and Fill area refers to development of the residential area as shown on the 1964 aerial photograph (**Figure 3 of Appendix A**).

2.1.2.4 Apartment Complex

In 1938, there are several buildings on either side of Old Liverpool Road in this area. Clearing for the apartment complex occurred between 1959 and 1966. The apartment complex was constructed between 1967 and 1972.

2.1.2.5 Commercial/Light Industrial Area

The commercial/light industrial area mostly consists of three large properties described in this section. The building currently occupied by Young and Franklin (located on Old Liverpool Road) was constructed between 1981 and 1988. Based upon aerial photographs and a newspaper article announcing the start of construction activities, the former Lakeshore Drive-In Theater was constructed between 1956 and 1959. Based upon observations in the field and the newspaper article, a significant amount of fill material (approximately 4 to 9 feet) was imported in order to raise the level of the land for the construction. The source of this fill material is unknown. The drive-in theater operated until it was closed in 1990. Shortly thereafter, the theater was demolished and the strip mall currently present on the property was constructed. The Liverpool Pump Station located between the railroad tracks and Onondaga Lake Parkway was constructed in 1960. The original pump station was expanded by addition of a holding tank between 1984 and 1988 and again in 2005 by the addition of a second, larger holding tank located on the north side of the railroad track across from the former drive-in theater.

2.1.3 Bloody Brook Location History

The approximate original course of the WBBB (1947 brook centerline) is illustrated on **Figure 3**. The original course of the WBBB was derived based upon interpretation of data obtained from historical topographic maps, historical aerial photographs, and site data (soil classification and soil sample analytical data). Five major modifications were made to the path of the brook channel during the development of the surrounding areas.

The first modification is labeled on **Figure 3** as Modification A and was completed to facilitate construction of the Thruway. Prior to the construction of Electronics Park and the Thruway, the brook channel entered the north end of the site east of the current culvert location. This modification was likely made during the time of the construction of Electronics Park and the Thruway. Construction of Electronics Park occurred between August 1944 and mid-1948 and construction of the Thruway was completed between July 1946 and October 1947. Based upon this information, this modification likely occurred between August 1944 and October 1947.

The second modification is labeled on **Figure 3** as Modification B and was completed to facilitate construction of the residential area. The original brook channel in the wooded area followed a wider bend towards the west. The brook channel was moved to the east and the

original channel was allowed to fill naturally becoming a wetland area. Review of aerial photographs indicates that this modification was made between 1959 and 1978 during the development of the residential properties on Sunflower Drive located west of the wooded area.

The third modification is labeled on **Figure 3** as Modification C and was completed to facilitate construction of additional residential areas. Prior to the construction of Brookview Lane and Midwood Drive, the brook channel was located farther east (closer to Midwood Drive) than its current location. The brook channel was moved to the west and the original channel was covered with approximately 3 to 9 feet of fill material. Based on aerial photograph review and property deed research, this modification was likely made between 1955 and 1957.

The fourth modification is labeled on **Figure 3** as Modification D and was completed to facilitate construction of the former Lakeshore Drive-In Theater. Prior to the construction of the Lakeshore Drive-In Theater, the brook channel continued straight across the current shopping center property to the former culverts directing flow beneath the railroad. The brook channel was moved to the east and the original channel was covered with approximately 4 to 6 feet of fill material. Based upon review of aerial photographs and a newspaper article announcing the construction of the Lakeshore Drive-In Theater, this modification to the brook channel was made between 1956 and 1959.

The fifth modification is labeled on **Figure 3** as Modification E and was completed to improve the hydraulics of the brook channel. Following the construction of the Lakeshore Drive-In Theater, new culverts were installed beneath the railroad tracks to the east of the original box culvert. The WBBB was diverted to the east and the original channel located parallel to the railroad tracks was covered with approximately 3 to 4 feet of fill material. The portion of the original channel crossing under the railroad tracks remains an open channel and is part of the current brook. According to Onondaga County records, this modification occurred in 1978.

2.1.4 Bloody Brook Drainage District

Development in the vicinity of the WBBB occurred at an exceptionally fast rate during the 1950s and 1960s. By the late 1960s, the flood capacity of the WBBB had been far exceeded by the amount of new storm water drainage resulting from development in the area. In response to the flooding, Onondaga County commissioned Calocerinos & Spina Consulting Engineers of Syracuse, New York to perform a drainage basin study (*Bloody Brook Drainage Basin Study*, January 1972) for the entire Bloody Brook, including the WBBB. The purpose of the study was to present the current conditions of the drainage basin and to evaluate options and identify a means to improve conditions in the future. The report recommended the formation of the Bloody Brook Drainage District (Drainage District). The Drainage District included all branches of Bloody Brook and formed a funding mechanism under which Onondaga County could complete

various improvements and maintain the drainage capacity of Bloody Brook. Following the establishment of the Drainage District, permanent rights-of-way and easements were obtained by Onondaga County from adjacent land owners. The Drainage District easement was thereby established allowing Onondaga County personnel access to Bloody Brook for various projects. The Drainage District easement along the WBBB is illustrated on **Figure 3**.

Since the formation of the Drainage District, Onondaga County has funded several projects designed to improve and maintain drainage. These projects have ranged from installing erosion controls (flagstone, concrete, gabion baskets, etc.), to minor channel relocations, to reshaping of channel side banks, and installation and replacement of culverts. In addition to these projects, Onondaga County has periodically removed sediment deposits from the WBBB to maintain drainage capacity. These deposits typically accumulate around the culverts at the road crossings. According to discussions with Onondaga County officials, the removed sediments were typically placed within the Drainage District easement. Reportedly, Onondaga County personnel were instructed to discontinue this practice after cadmium was found in the sediments of the WBBB and in the adjacent soils.

As discussed in Section 1.1.2, Lockheed Martin conducted sediment removal from within the Brookview Lane, Sunflower Drive, Floradale Road, and Pearl Street culverts in 2008 as a NYSDEC-approved IRM. This work was completed at the request of the Onondaga County to increase the hydraulic capacity of the drainage system in the area. Approximately 91 tons of sediment were removed from the IRM project area (nine truckloads). The excavated sediment was transported off site to the Waste Management High Acres Landfill in Fairport, New York (a New York State permitted landfill).

2.2 Environmental and Physical Setting

This section presents the environmental and physical setting of the site and the surrounding area. Separate sections are included that discuss topography, climate, physical characteristics and surrounding land use, and geology and hydrogeology.

2.2.1 Topography

The site is located in the Town of Salina and a portion of the site is located in the Village of Liverpool, Onondaga County, New York approximately 5 miles west of Syracuse, New York. Terrain in the surrounding area is roughly characterized by gently rolling hills. Ground elevations at the site range between approximately 360 feet to 385 feet above mean sea level.

2.2.2 Climate

The climate in the area surrounding the site is characterized as continental. Storm systems typically move from the west along the St. Lawrence River valley. As is typical in the northeastern United States, drastic seasonal differences are found in the area. Spring temperatures average around 46 degrees Fahrenheit (°F) with approximately 9 inches of precipitation. Summers are generally humid with temperatures averaging around 69°F. Precipitation in the summer averages around 11 inches. Fall temperatures average around 51°F with approximately 11 inches of precipitation. Winter temperatures average around 26°F. Winter precipitation is dominated by lake effect snow moving off Lake Ontario. Annual snowfall totals average around 124 inches. Climate information has been summarized from the National Oceanic and Atmospheric Administration monthly and daily averages records for the Syracuse, New York area from 1902 to July 2012.

2.2.3 Physical Characteristics and Surrounding Land Use

The site extends along the WBBB from the Thruway to Onondaga Lake Parkway. This section of the WBBB is approximately 5,000 feet long and flows through lands of varied uses including a wooded area, residential area, apartment complex, and commercial/light industrial area as generally described in the subsequent sections and as illustrated on **Figure 2**. **Figures 4A, 4B and 4C** illustrate the site in more detail, showing topography and easement and property boundaries. Since the WBBB channel, adjacent land use, Drainage District easement dimensions, and channel side bank structure vary in each area, a separate description of the physical properties for each area is presented below.

2.2.3.1 West Branch of Bloody Brook

The WBBB is relatively small in the upper section near the Thruway (approximately 4 to 6 feet wide, 1 to 2 feet deep) and increases in size (approximately 10 to 15 feet wide, 2 to 4 feet deep) closer to Onondaga Lake Parkway. The WBBB south of the Thruway is located within segments of property owned by the Town of Salina, various private owners, and Onondaga County. The WBBB is primarily used for storm water management and is included in the Drainage District.

2.2.3.2 Wooded Area

This portion of the site extends approximately 1,050 feet south and downstream of the Thruway and is undeveloped and difficult to access. This area is approximately 6.25 acres, is irregularly shaped and relatively wide (i.e., greater than 150 feet). The presence of fences on residential properties, steep slopes leading to the WBBB, dense vegetation, and wetlands limits access to this area. The area is described in the Fish and Wildlife Resources Impact Analysis (FWRIA) (**Appendix B**) as a deciduous forest cover type which includes wooded and brush-vegetated

areas with mature hardwood trees dominating the canopy and underbrush consisting of various shrub species. The wooded area is entirely within the Drainage District easement and is owned by the Town of Salina. Storm water drainage from the surrounding development enters the WBBB from the west via a drainage channel at the southern end of the wooded area.

The channel side banks in this portion of the WBBB do not have engineered erosion controls. The bottom of the WBBB is a clay substrate which may have some overlying non-cohesive sediments that have accumulated through natural brook flow since the 1997 sediment removal project was completed. The east side of the WBBB has relatively steep slopes along wooded areas leading to residential properties. The west bank has a gentler slope along wooded and brush-vegetated areas leading to residential properties.

2.2.3.3 Residential Area

The residential area surrounds the wooded area commencing at the Thruway and extends along the WBBB to the downstream side of Floradale Road. The portion of the residential area that is directly adjacent to the WBBB (from the southern end of the wooded area to the downstream side of Floradale Road) is approximately 1,300 feet in length. In this area, the WBBB is located within the Drainage District easement on property owned by the Town of Salina and Onondaga County. The Drainage District easement is typically 40 feet wide in this area and is maintained (i.e., mowed) by Onondaga County. This portion of the WBBB has been significantly modified to increase storm water capacity and to reduce erosion. Double barrel culverts transmit the WBBB beneath the road crossing at Brookview Lane, Sunflower Drive, and Floradale Road.

Between the wooded area and Brookview Lane, the vertical channel walls are lined with gabions, and the channel has been straightened to promote drainage. The work to complete the drainage improvements in this portion of the WBBB was completed by Onondaga County as recently as 1996.

From Brookview Lane to the downstream side of Floradale Road, the channel section is trapezoidal with large pieces of flagstone lining the sloped walls and channel bottom. Areas of the channel wall have been subject to slope failure where pieces of flagstone have begun to slide into the WBBB. Multi-barrel culverts are present at road crossings.

In the residential area, residential properties abut the Drainage District easement. Many of these residences have fences installed on their properties which limit access and separate the Drainage District easement from the residential properties.

2.2.3.4 Apartment Complex Area

The apartment complex is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road. The apartment complex borders approximately 1,100 feet along the WBBB. The Drainage District easement is typically 40 feet wide and is maintained (e.g., mowed) by Onondaga County. A double barrel culvert transmits the WBBB under a paved apartment parking area at Pearl Street, and a triple barrel culvert transmits the WBBB beneath the road crossing at Town Gardens Drive.

Upstream of the Pearl Street culverts, commercially-landscaped and paved parking areas abut the Drainage District easement on both sides of the WBBB. This channel section is trapezoidal with large pieces of flagstone lining the sloped walls and channel bottom. Areas of the channel wall have been subject to slope failure. A small unnamed tributary enters the WBBB on the upstream end of the Pearl Street culvert.

Downstream of the Pearl Street culverts, the apartment complex borders the east side of the WBBB. Commercially landscaped areas abut the Drainage District easement. This channel section is trapezoidal with vegetated side slopes. Some of these areas have been undermined by erosion and have collapsed into the WBBB. The confluence of the West and Middle Branches of Bloody Brook occurs approximately 200 feet upstream of Old Liverpool Road.

2.2.3.5 Commercial/Light Industrial Area

The commercial/light industrial area consists of portions of the commercial properties that are adjacent to the WBBB and located on Old Liverpool Road and Onondaga Lake Parkway. The Drainage District easement varies between 40 and 60 feet wide in this area. A combination box and double barrel culvert system transmit the WBBB beneath the road crossing at Old Liverpool Road. A triple barrel culvert transmits the WBBB beneath the railroad bed that lies between Old Liverpool Road and Onondaga Lake Parkway.

Between the Pearl Street and Town Gardens Drive culverts, along the back side of the commercial properties located on Old Liverpool Road, commercially-landscaped and paved parking areas abut the Drainage District easement on the west side of the WBBB. This channel section is trapezoidal with vegetated side slopes. Some portions of this area have been undermined by erosion and have collapsed into the WBBB.

Between the Town Gardens Drive culverts and the confluence with the Middle Branch of Bloody Brook, along the backside of the commercial properties located on Old Liverpool Road, the channel section is trapezoidal with large pieces of flagstone lining the west side of the WBBB.

Areas of the channel wall have been subject to slope failure. Some portions of this area have been undermined by erosion and have collapsed into the WBBB.

Between the confluence with the Middle Branch of Bloody Brook and Old Liverpool Road, commercially-landscaped areas abut the Drainage District easement on both sides of the WBBB. This channel section is trapezoidal with large pieces of flagstone lining the WBBB. Areas of the channel wall have been subject to slope failure. Some portions of this area have been undermined by erosion and have collapsed into the WBBB.

The channel side banks and channel bottom between Old Liverpool Road and the railroad crossing do not have erosion controls installed. Sediment deposition has resulted in blockage of one of the culverts which carries the WBBB under the railroad tracks.

Upstream of the railroad crossing, the abutting land uses include a commercial office building on the east side and a retail strip mall to the west. West of the WBBB upstream of the railroad crossing (the former Lakeshore Drive-In Theater), there is visible evidence of non-site-related filling and disposal activities. Material observed in this area includes construction and demolition debris. The area east of the WBBB and upstream of the railroad crossing is isolated and relatively inaccessible.

Downstream of the railroad crossing, an unnamed tributary joins the WBBB from the west near Onondaga Lake Parkway. Periodic overflows from the Liverpool Pump Station are directed to this tributary. The area east of the WBBB is a mix of wooded and landscaped park areas (near Onondaga Lake Parkway).

2.2.4 Geology and Hydrogeology

General characterization observations of the soil at the site obtained during sampling investigations are included in **Tables 1A, 1B, and 1C**. The general profile from top down consists of a sand and silt mixture, followed by a dense clay and/or glacial till. The elevation of the clay/till appears to generally remain constant with the thickness of the overlying silt/sand varying as surface elevations fluctuate. The location of the former brook channel was typically confirmed by the presence of an organic layer. The composition of the organic layer varied and was generally characterized by the presence of root structures in some locations and highly organic black peat in other locations. This organic layer varied in thickness from less than 1 inch to up to 3 feet. Small scale variations (i.e., thin layers of soil not representative of this generalized profile) could be seen in several locations. The presence of substantial amounts of imported fill material including construction and demolition debris at the former Lakeshore Drive-In Theater and the presence of sand/shell mixtures at the southern end of the site near Onondaga Lake Parkway were noted.

A shallow water bearing zone was noted within the silty sands at the site during the soil sampling investigations. The depth to water in this zone varies depending upon surface elevation. The clay/till layer acts as an aquitard. A wetland delineation was conducted in the wooded area on the northern portion of the site, and approximately 1.4 acres of wetlands were identified. The wetland delineation report is included as **Appendix C**.

2.3 Nature and Extent of Site-Related Impacts

This section presents a discussion of the history and results of the sampling conducted at the site, the quality assurance/quality control program and the factors affecting mobility and distribution of the site related impacts.

2.3.1 Sampling History and Results

Various investigations other than soil sampling have been completed at the site. Those investigations including biota, surface water, and sediment sampling along the WBBB have been performed by NYSDEC, Lockheed Martin and Onondaga County from September 1994 through January 2008. Investigations of water quality and biota within the WBBB were initiated by NYSDEC in September 1994 (NYSDEC, 1996). In April 1996, NYSDEC shared the results of the 1994 investigations with Lockheed Martin. Lockheed Martin conducted sediment and surface water sampling from May 1996 through May 1999 and additional sediment sampling in January 2008 in support of the 2008 IRM. In addition to the biota, surface water, and sediment investigations, Lockheed Martin conducted soil sampling from November 2001 through August 2011. Lockheed Martin undertook these site investigations pursuant to a series of work plans approved by NYSDEC.

As requested by NYSDEC, early studies typically focused on PCBs, cadmium, copper and mercury. In January 1997, NYSDEC concluded that the concentrations of cadmium were elevated in the WBBB sediments, and PCBs, copper and mercury did not pose a concern (NYSDEC, 1997). In 1999, a specific set of sediment samples was collected and analyzed for a more comprehensive list of organic and inorganic constituents. The results of the comprehensive analyses supported NYSDEC focus on cadmium, which became the constituent of potential concern (COPC) for the site.

Below is a summary of the sampling activities that were completed at the site.

2.3.1.1 Biota, Surface Water and Sediment Sampling

Various biota, surface water and sediment sampling activities have been conducted at the site since 1994 as described below:

- In September 1994, crayfish samples were collected by NYSDEC from locations along Bloody Brook and analyzed for inorganic compounds and PCBs.

- From October 1995 to May 2000, Lockheed Martin and NYSDEC collected surface water samples from various locations along Bloody Brook. Analytes included inorganic compounds and PCBs.

- From May 1996 to May 1999, Lockheed Martin and NYSDEC collected sediment samples within Bloody Brook. Samples were collected for various analyses including inorganic compounds, PCBs, total organic carbon, total petroleum hydrocarbons, volatile and semi volatile organic compounds, pesticides and herbicides.

- In January 2008, Lockheed Martin collected five sediment samples from culverts along the WBBB to support the IRM. These samples were analyzed for Resource Conservation and Recovery Act characteristics and PCBs.

A summary of these data is presented in **Appendix D**.

2.3.1.2 Soil Sampling

Soil sampling activities have been conducted at the site since 1996.

In October 1996, Onondaga County collected five soil samples, from 0- to 6-inches in depth, in conjunction with the installation of the gabions north of Brookview Lane (OCDDS-4, OCDDS-5, OCDDS-6, OCDDS-7, and OCDDS-10).

As described in the *West Branch of Bloody Brook Sediment Removal Certification Report* (BBL, 1997b), in April 1997, Lockheed Martin collected two soil samples (Pre-SS-P1 and Post-SS-P1) from the area within the easement which was used to construct a stockpile area for sediment being removed during the 1997 sediment removal project.

In October 2001, NYSDEC collected two soil samples (EPSOIL-2 and EPSOIL-3) between the Thruway and the confluence of the West and Middle Branches: one sample upstream of Electronics Park on the WBBB (EPSOIL-1), and one downstream of the railroad tracks below the confluence of the West and Middle Branches of Bloody Brook (EPSOIL-4). These samples were collected within the 0- to 12-inch depth interval. Additionally, NYSDEC has periodically split samples collected by Lockheed Martin during later sampling events (described below).

In November 2001, Lockheed Martin collected soil samples from 12 locations between the Thruway and the confluence of the West and Middle Branches (SB-01 through SB-12). Additionally, Lockheed Martin collected soil samples at six other locations downstream of the

confluence of the West and Middle Branches (SB-13 through SB-18). These samples were collected from within the 0- to 12-inch depth interval and, where possible, between the 12- and 24-inch depth interval.

In June 2002, Lockheed Martin collected shallow soil samples from 32 locations from 0- to 2-inches in depth between the Thruway and the confluence of the West and Middle Branches (SB-19 through SB-50). These samples were collected in accordance with NYSDEC-approved *Shallow Side Bank Surface Soil Sampling and Analysis Work Plan* (IT Corporation, 2002).

In November 2002, Lockheed Martin collected soil samples from 48 locations (SB-51 through SB-85 and SB-201 through SB-215). Sampling depths ranged from surface samples (0- to 2-inches) to 12 feet below ground surface (bgs). A total of 181 samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase III Side Bank Soil Investigation Work Plan* (Shaw, 2002).

In October and November 2003, Lockheed Martin collected soil samples from 82 locations. Sampling depths ranged from surface samples (0- to 2-inches) to 16 feet bgs. A total of 731 soil samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase IV Side Bank Soil Investigation Work Plan* (Shaw, 2003).

In November 2003, Onondaga County collected 20 soil samples from 10 locations as part of the Liverpool Pump Station Improvement Project. Samples were collected at various depths.

In April 2004, Lockheed Martin collected soil samples from 26 locations (borings SB-435 through SB-459 and SD-31). Sampling depths ranged from surface samples (0- to 2-inches) to 11.5 feet bgs. A total of 124 soil samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase IV-A Side Bank Soil Investigation Work Plan* (Shaw, 2004).

In December 2007, Lockheed Martin collected soil samples from five locations in the area between the existing WBBB channel and the former brook channel (borings SSSWP-1 through SSSWP-5). A single 2-foot core was collected from each of the five locations, and the cores were sampled from the 0- to 6-inch and 6- to 24-inch depth increments. These samples were collected in accordance with NYSDEC-approved *Supplemental Soil Sampling Work Plan* (ARCADIS BBL, 2007).

In August and September 2009, Lockheed Martin collected and analyzed 75 soil samples from 16 locations to support an Onondaga County Department of Water Environment Protection (OCDWEP) storm water drainage improvement project. Sampling depths ranged from 1 foot to 11 feet bgs. After reviewing the analytical results with NYSDEC and New York State Department of Health (NYSDOH), Lockheed Martin removed and disposed of off site at a

permitted landfill approximately 1 cubic yard of soil from locations containing cadmium concentrations above 10 ppm in the top 4 feet in residential areas and in the top 2 feet in the Drainage District easement. The soil removal allowed for the installation of a drainage line needed to complete the storm water upgrades. The sampling and removal activities were completed in accordance with NYSDEC-approved work plans written for individual properties and are summarized in the report titled *OCDWEP Storm Water Drainage Improvement Project Soil Sampling Test Results* (Shaw, 2009b).

In April, May, and August 2011, Lockheed Martin collected soil samples from 164 locations. Sampling depths ranged from 6 inches to 16 feet bgs. A total of 773 soil samples were collected, and 525 soil samples were analyzed. Those samples were collected in accordance with NYSDEC-approved *Design Soil Investigation Work Plan* (Shaw, 2011).

The multiple soil investigation events allowed for effective selection of sampling locations. Each sampling event revealed new details on the history and environmental setting of the area. These details strongly influenced the selection of subsequent sampling locations.

A work plan was prepared detailing the methodologies and protocols used to complete the sampling for each investigation conducted by Lockheed Martin. In general, sampling methods were selected based upon access and the depth of each boring and included grab surface sampling, hand auger sampling, slide hammer sampling, and direct push sampling with the use of several different drilling rigs. Appropriate decontamination protocols were employed for each round of sampling. All soil samples were submitted to a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory for analysis. Soil samples collected for cadmium analysis were analyzed using United States Environmental Protection Agency (USEPA) Method 6010B, and the soil samples collected for PCB analysis were analyzed using USEPA Method 8080.

Concentrations of cadmium detected in soil samples at the site varied from below laboratory detection limits to 5,350 parts per million (ppm). The depth to the observed cadmium ranges from at the surface to 14 feet bgs. Cadmium concentrations are, in general, significantly higher on the northern portion of the site and decrease substantially towards the south end of the site.

Soil analytical results are summarized in **Tables 1A, 1B, and 1C**, and soil sample locations are shown on **Figures 5A**, **5B**, **and 5C**. The "Figure Coordinate" column in the tables corresponds to the grid system shown on the figures. Available laboratory analytical reports are included in **Appendix E** on compact disk.

2.3.2 Quality Assurance/Quality Control

All soil analytical data generated by Lockheed Martin has been validated. Following review, it was concluded that all data met applicable Quality Assurance/Quality Control (QA/QC) guidelines and were useable. Available data validation reports are included in **Appendix F** on compact disk.

2.3.3 Mobility and Distribution of Cadmium

This section presents a discussion on the fate and transport (mobility) of cadmium as well as an overview of the mechanisms affecting the cadmium distribution at the site.

Cadmium within soil buried below the ground surface adjacent to the WBBB is not mobile due to its chemical and physical characteristics. According to the Agency for Toxic Substances and Disease Registry (ATSDR), the general mobility and partitioning of cadmium among media (i.e., movement from soil to groundwater or surface water or the reverse) is dependent on physical and chemical factors within the environment. Two site factors that reduce the mobility of cadmium in soil are pH and organic matter content. Cadmium adsorption in soil generally increases with higher pH, and the presence of organic matter leads cadmium to form insoluble complexes (ATSDR, 1999).

The pH in the vicinity of the WBBB is elevated partly because bedrock at the site is dominated by carbonate minerals. These minerals act to neutralize acidic water and raise the pH of area groundwater and surface water. The measured pH in the surface water of the brook averages around 8.0. In addition, soil in the vicinity of the former brook channel, which has the highest cadmium concentrations, contains a high organic fraction, and in some cases is characterized as peat. The highly organic soil, combined with elevated pH, binds the cadmium to the soil and reduces its mobility in the subsurface.

In the aquatic environment, adsorption of cadmium by humic substances and other organic complexing agents plays a dominant role in transport and partitioning (ATSDR, 1999). As evidenced by sampling data from the WBBB, cadmium precipitation and sorption to mineral surfaces and organic materials account for the lack of dissolved cadmium in the water column, thus water media are not further considered in this RAWP.

Three primary mechanisms appear to have contributed to the distribution of cadmium observed within the soil adjacent to the WBBB. These mechanisms include the natural sediment movement within the stream channel, relocation of portions of the WBBB, and maintenance activities conducted on the brook.

The first mechanism influencing soil adjacent to the WBBB relates to the natural movement of cadmium adsorbed to sediment and soil by erosion and sedimentation. Natural flow within a water body will result in the erosion and deposition of sediments, including areas along and on top of the channel side banks during high flow events. After defining the historical course of the WBBB, the side banks of the original brook channel found in the northern portion of the site appeared to have been shallow allowing the brook to overflow the historical channel and create a wide floodplain where eroded sediment was deposited during periods of high flow. The mechanism of erosion and sedimentation along with the shape and size of the historical brook channel explains why higher cadmium concentrations are found in the northern portion of the site. Along the southern portions of the brook, the erosion control measures implemented to minimize movement of sediment reduced the area of the floodplain and deposition of cadmium.

The second mechanism is a series of stream relocations that were made to the brook channel beginning in the 1940s and proceeding into the 1970s, as described in Section 2.1.3. The distribution of cadmium in soil across the site, as well as the original channel location, is illustrated on **Figures 6A, 6B, and 6C**. The distribution of cadmium follows the location of the former brook channel and its floodplain. These floodplain deposits were covered with soil/fill during the process of development, at depths of up to 15 feet bgs. **Figure 7** depicts two transects showing an example of the location of cadmium and the distribution of fill and floodplain deposits. In this manner, stream relocation had the greatest influence on the areal and vertical extent of cadmium throughout the site.

The third mechanism influencing soil adjacent to the WBBB relates to maintenance activities in the WBBB as described in Section 2.1.4. Reportedly, sediments containing cadmium were periodically removed from the WBBB and placed on the adjacent banks during the installation of erosion controls and maintenance activities conducted to maintain the drainage capacity of the WBBB.

3.0 Human Health Exposure Assessment and Environmental Evaluation

This section presents the human health exposure assessment (HHEA) and environmental evaluation (EE) for soil surrounding the brook channel at the site. Following the summary of the site-specific HHEA and EE, SCLs and RAOs used to develop the remedial strategy for the site are identified.

3.1 Human Health Exposure Assessment

The HHEA provides a framework for the identification of pathways of exposure to compounds of concern at a site. This framework is used by scientists, engineers, and regulators involved in the investigation and remediation of sites to develop protective remedial strategies. The New York State Department of Health (NYSDOH) has established requirements for a qualitative human health exposure assessment that appear in *DER-10 Technical Guidance for Site Investigation and Remediation*, Appendix 3B (NYSDEC, 2010a). This site-specific HHEA includes an evaluation of the current and potential future land use to identify potential pathways by which humans might be exposed to cadmium. If a potential exposure pathway to cadmium exists for humans, that pathway is identified as potentially complete. Human exposure to cadmium via a complete exposure pathway does not in itself indicate that the exposure represents a potential human health impact. Cadmium has been identified within soils and sediments at the site over a range of concentrations. Once a given exposure pathway has been identified as complete, the cadmium concentration at each location at the site is compared to generic cadmium screening values and risk-based SCLs to help identify portions of the site that should be remediated. For areas exceeding SCLs, RAOs are developed, and a remedy is designed to reduce the likelihood of potential exposures above the SCLs. SCLs are presented in Section 3.3 and **Appendix H** of this RAWP.

The focus of the HHEA and EE is soil within the site where elevated concentrations of cadmium have been identified. Regardless of cadmium concentration, Lockheed Martin is proposing to remove from the site non-cohesive sediments along the length of the WBBB and channel side bank soils, with the exception of the existing gabion-lined section, to a depth of 2 feet. After these actions have been completed, potential human and ecological exposure to site-related cadmium in the brook channel will be addressed and screening against SCLs will not be necessary. Thus, sediments and side bank soils are not evaluated in the HHEA or EE. Because cadmium has not been detected in surface water at the site and sediments and side bank soils potentially containing elevated cadmium concentrations will be removed, surface water is also not included in the site-specific HHEA or EE.

The information summarized in previous sections of this RAWP and a description of the factors influencing potential human exposures to cadmium at the site using a Conceptual Site Model will be integrated in the HHEA. As described below, the site-specific Conceptual Site Model presents each of the potential exposure pathways and identifies the potentially complete exposure pathways that have been evaluated on a location- and property-specific basis against SCLs for the purpose of developing a remedial approach for that location.

3.1.1 Conceptual Site Model

As identified in Appendix 3B in *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a), a Conceptual Site Model describes the following: 1) the sources of the impacts, 2) the nature and extent of the impacts, 3) the dominant fate and transport characteristics of the site, 4) potential exposure pathways, and 5) potentially impacted receptors. Below is a Conceptual Site Model for the soils within the site.

3.1.1.1 Sources, Nature and Extent of Contamination

As described in Section 2.3.1, NYSDEC has identified cadmium as the COPC in soil at the site. To define the presence of cadmium, soil investigations were conducted at the site by Onondaga County, NYSDEC, and Lockheed Martin from October 1996 through August 2011. Concentrations of cadmium detected in soil samples collected at the site varied from below laboratory detection limits to 5,350 ppm. Those soil sample collection activities and the analytical results are summarized in Section 2.3.1.2.

3.1.1.2 Fate and Transport Characteristics

As described in Section 2.3.3, cadmium has certain chemical properties that limit its potential to transfer among media. The properties limiting the environmental mobility of cadmium include its low water solubility, increased adsorption to soil with increased pH, high affinity for organic carbon and extremely low vapor pressure. As described below, these characteristics cause cadmium to become bound onto and immobilized in site soil.

Cadmium at the site is expected to be insoluble due to the low water solubility of cadmium and the naturally-elevated pH and high organic content of site soil. The bound cadmium does not readily leach out of soil and is not expected to migrate into the groundwater or surface water.

Due to its extremely low vapor pressure, cadmium in soil does not have the potential to evaporate into air. As such, cadmium cannot be released to the atmosphere or into basements or other subsurface structures with soil vapor. However, wind can erode soil containing cadmium and transport these soil particles by air currents. The presence of vegetation and other surface barriers (e.g., pavement and clean soil) minimizes the potential for cadmium-containing soils to

be eroded and released to the atmosphere. Additionally, vegetation and other surface barriers reduce the potential for residents and visitors to come into direct contact with cadmium-containing soil.

Plants and vegetables can absorb trace levels of cadmium from soil. While cadmium is strongly bound to soils, certain plants demonstrate the ability to take up cadmium. This can result in the incorporation of cadmium into plant tissue. The levels of uptake are influenced by the soil concentration of cadmium, and plant type. Leafy vegetables, such as spinach, take up more cadmium than fruit, root vegetables or grain (Alloway, et al; 1990 and Signh; 1994).

3.1.1.3 Exposure Setting

As described in Section 2.2.3, the site consists of lands of varied uses including a wooded area, residential area, apartment complex area, and commercial/light industrial area. The site is located within segments of property owned by the Town of Salina, various private owners, and Onondaga County. A large portion of the site is designated as a Drainage District easement that is maintained by Onondaga County. As shown on **Figure 3**, the Drainage District easement is located along the length of the WBBB included in the site and consists of the wooded area and lands adjacent to the residential area and apartment complex areas, and commercial/light industrial area. Access to most areas of the site is limited by the presence of fences, steep slopes, dense vegetation, and wetlands.

3.1.1.4 Potential Receptors

Potential receptors are identified below.

<u>Receptors in Residential and Apartment Complex Areas</u>

Potentially exposed receptors in the residential and apartment complex areas include children and adults living in or visiting these areas.

<u>Receptors in the Drainage District Easement</u>

The Drainage District easement, which includes the wooded area, is not physically suitable for commercial, industrial or residential use. The Drainage District easement is vegetated and serves as a storm water buffer and conveys storm water. Receptor groups in the Drainage District easement primarily include maintenance workers involved in routine activities (e.g., mowing) and episodic construction related to flood control structures. As a precautionary measure, Onondaga County Health Department (OCHD) has advised the public to avoid playing in the WBBB or contacting the banks until remediation is complete. This advisory precludes the use of the area for gardening or recreational use. Nevertheless, child and adult trespassers who might

occasionally enter the Drainage District easement for recreational or other purposes are potential receptors.

Receptors in the Commercial/Light Industrial Area

Potential commercial/industrial area receptors include adult workers and visitors to the area.

3.1.1.5 Exposure Pathways

For an exposure pathway to be complete, the following five elements must be present: 1) environmental media (source); 2) transportation route; 3) exposure point; 4) receptor; and 5) route of exposure.

If all five elements exist, then the exposure pathway is complete (NYSDEC, 2010a). Each potential pathway and receptor group is identified and discussed below for each relevant environmental media (source). In addition, a summary of those evaluations and conclusions is found in Section 3.1.2 which includes the identification of exposure scenarios to be compared against SCLs and used for subsequent development of location and property-specific RAOs. A detailed evaluation of each potential pathway is included in **Appendix G**. As previously stated, cadmium has not been detected in surface water, and within the site non-cohesive sediments along the length of the WBBB and side bank soils, with the exception of the existing gabion-lined section, to a depth of 2 feet will be removed from the site. The pathways related to the environmental media (source) of surface water and sediment are evaluated in **Appendix G** for completeness, but these specific media are not discussed below.

Soil

Cadmium has been detected in surface and subsurface soil within portions of the site. Cadmium adsorbed to soil particles can be eroded and suspended in air, and site receptors can be exposed to cadmium if the airborne soil particles are inhaled. For this to occur, the cadmium-containing soil must be directly exposed to air and wind currents. In addition, site receptors can be exposed to cadmium detected in surface and subsurface soil by incidental direct contact and ingestion. Because the cadmium is located predominantly in areas that are not easily accessed or that are covered by surface barriers such as grass, pavement, and clean soil, potential health risk from exposure to cadmium at the WBBB site is unlikely. Invasive activities such as planting trees and installing fences may result in the disturbance of those surface barriers and expose receptors to cadmium-containing soil. Therefore, current and future exposures through inhalation of soil particles and incidental direct contact and ingestion to soil by all identified site receptors within all areas of the site are potentially complete pathways and have been used to establish SCLs for the site.

The residential properties and apartment complex are not currently used for commercial agricultural purposes. However, a homeowner can establish a garden plot for growing vegetables for personal consumption. Cadmium in shallow soils has the potential to be taken up by root processes into plant tissue. Therefore, the ingestion of home-grown crops by residential receptors is a potentially complete pathway under current and future conditions and has been used to establish SCLs for the site.

There are no current or future commercial agricultural uses of the Drainage District easement and wooded area or commercial/light industrial area. Additionally, the OCHD advisory precludes gardening or recreational use of the Drainage District easement and wooded area. The potential current and future exposures to receptors in these areas, including home gardens in the Drainage District easement and wooded area are incomplete and are not carried forward when developing RAOs for these portions of the site.

Groundwater

As described previously, cadmium binds strongly to soil. This limits its ability to leach into or become transported by groundwater. This property and behavior is not expected to change in the future. Additionally, there are no groundwater users in the area. Water for potable and other uses is currently provided by Onondaga County, whose source of water is Lake Ontario and Otisco Lake. Given the availability and quality of Lake Ontario and Otisco Lake as a water supply, future uses of groundwater are not likely. There are no known registered wells located within the site. Based on this information, current and future exposures by potential site receptors to cadmium via the groundwater route are concluded to be incomplete and are not carried forward for development of RAOs for groundwater.

Air

Cadmium at the site is adsorbed to soil particles. Because cadmium does not have an appreciable vapor pressure, cadmium at the site does not have the potential to evaporate from soil surfaces into air or soil vapor. Therefore, potential site receptors cannot be exposed to and inhale cadmium vapors under current or future conditions. This also means that cadmium at the site cannot result in vapor intrusion exposures for indoor air. The inhalation of cadmium vapors is, therefore, concluded to be incomplete under current and/or future exposure scenarios for all potential site receptors. Therefore, development of a RAO for potential exposures via the air route is not necessary.

3.1.2 Conclusions

There is a potential for humans to become exposed to cadmium-containing soil at the site under a limited set of current and future conditions. **Appendix G** provides a detailed summary of the evaluation of each potential pathway and receptor at the site and identifies complete as well as incomplete pathways. The following table lists the potentially complete exposure pathways that have been used when comparing concentrations of cadmium in soils at specific locations and properties of the site against SCLs.

Environmental Media (Source)	Transport Route	Route of Exposure	Current and Future Receptor Group(s)
Soil	Air: release and transport of eroded soil particles	Inhalation	- Child and adult residents and visitors - Maintenance workers and child and adult trespassers - Adult workers and visitors
Soil	Soil	Incidental direct contact and ingestion	- Child and adult residents and visitors - Maintenance workers and child and adult trespassers - Adult workers and visitors
Soil	Plant Uptake	Ingestion of home-grown produce grown in residential area	- Child and adult residents and visitors

3.2 Environmental Evaluation

The environmental evaluation for the soil at the site is presented in a FWRIA. The FWRIA was conducted in accordance with NYSDEC guidance entitled *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC, 1994) and Section 3.10 of *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a). The complete FWRIA is included as **Appendix B**. This section provides a brief overview of the FWRIA activities and results.

The objectives of the FWRIA are to identify the wildlife resources that exist within the site and to evaluate the potential for exposure of these resources to the site-related COPC (i.e., cadmium). Results of the FWRIA are generally used to aid in remedial decision making.

There are no state mapped wetlands at the site. From a site-specific wetland delineation survey of the wooded area (**Appendix C**), three small federal wetland areas were identified. The wetlands ranged in size from 334 square feet to 1.2 acres.

As described in the FWRIA, the ecological cover types in the vicinity of the WBBB are a mixture of residential, commercial/light industrial and wooded. The habitat associated with the site has been impacted by creation of the Drainage District, channelization, channel side bank stabilization, residential and commercial/light industrial development, and routine mowing practices. Therefore, these cover types provide low to moderate value for wildlife. There are no known occurrences of rare, state-listed animals or plants, significant natural communities, or other significant habitats within the site.

Wildlife species expected to use the wooded habitat within the site are mostly limited to species adapted to urban environments (e.g., rabbits, woodchucks, songbirds). Wildlife may be exposed to cadmium in surface soil via direct contact (i.e., dermal contact and ingestion) and possible uptake in food items (e.g., robins eating earthworms). According to Section 3.5.1(b) of NYSDEC (2010a) guidance for ecological assessments, a depth of 0 to 6 inches must be evaluated for potential exposure. However, as a conservative assessment, and based on conversations with NYSDEC, soil with the highest potential for wildlife exposure is defined as 0 to 2 feet.

In accordance with NYSDEC (1994; 2010a) guidance, the FWRIA includes a criteria-specific analysis. Cadmium criteria used in this analysis include the USEPA (2005) generic ecological soil screening levels (Eco-SSLs) for plants (32 ppm), soil invertebrates (140 ppm), birds (0.77 ppm), and mammals (0.36 ppm). The distribution of significant concentrations of cadmium generally follows the location of the former brook channel and its floodplain. At most of these locations, floodplain deposits were covered with soil or other fill during the process of development, at depths of up to 15 feet bgs. Soil cadmium concentrations within the top 2 feet in some areas of the site exceed the Eco-SSLs; the highest frequency of exceedance occurs in areas where the former brook channel is not covered with soil or other fill materials.

The exceedance of the screening values does not necessarily indicate ecological risk. Regional background cadmium concentrations, typically between 1 ppm and 3 ppm for the site, also exceed some of the Eco-SSL values. The Eco-SSL values are generic screening benchmarks that have been developed using conservative assumptions and are not site specific. In accordance

with USEPA (2005) guidance, a cleanup based solely on Eco-SSL values is not scientifically justified due to the uncertainty inherent in the values.

In summary, the habitat within most areas of the site is generally limited due to the surrounding land use and maintenance activities in the Drainage District easement, and there is a significant degree of uncertainty regarding the Eco-SSLs. Therefore, no ecological-based SCLs have been established. Instead, the ecological protectiveness of the remedial alternatives based on potential exposure of ecological receptors to residual cadmium concentrations at the site is included in the developing and screening of the alternatives in Section 4.0.

3.3 Soil Cleanup Levels

SCLs are contaminant concentrations developed for the protection of human health and the environment and can be specific to a site. SCLs may be based on regulation (e.g., 6 NYCRR 375-6.8), modified from the regulatory value based on site-specific differences, or based on other information including risk-based or background levels. SCLs are used in the remedial decision making process to help identify clean-up goals and develop and evaluate remedial alternatives. SCLs are concentrations of contaminants that toxicologists and public health officials consider protective of the health of humans, including lifetime exposures by sensitive subpopulations, such as children and the elderly. SCLs may differ between certain states and regulatory agencies; however, as a whole, they are all protective of human health. A number of SCLs have been compiled for cadmium, and are presented in **Appendix H**. These SCLs include generic cadmium cleanup objectives and screening values that have been developed by NYSDEC, NYSDOH, and USEPA, and risk-based SCLs that have been calculated using standard USEPA risk-based algorithms.

The application of SCLs to a given site is dependent upon factors such as land use, potential receptor groups, and potentially complete exposure pathways. Two broad classifications of land use at the site are residential properties (i.e., residential area and apartment complex) and non-residential properties (i.e., the Drainage District easement [including the wooded area] and the commercial/light industrial area). The distinction between residential and non-residential land use is important because of likely differences in exposure potential. As summarized in Section 3.1.2, potentially complete exposure pathways for residential and non-residential properties have been determined. Based on this information, separate sets of risk-based SCLs have been developed for residential and non-residential land use and are presented in the following sections.

3.3.1 Residential SCLs

Potentially complete exposure pathways to cadmium in soil for residential properties are incidental ingestion of surface soil (and to a lesser extent subsurface soil), inhalation of airborne particles and ingestion of homegrown produce for the current and future residential receptor. Residential risk-based values available in the literature that were developed based on ingestion of homegrown produce are 10 ppm (NYSDOH, 1999) and 24 ppm (USEPA, 1996). Values for incidental ingestion include 70 ppm (USEPA [2002] soil screening level and USEPA [2012] Region 3, 6, and 9 regional screening levels). Additionally, New York State residential soil cleanup objectives (SCOs) for cadmium are 2.5 ppm and 4.3 ppm (6 NYCRR Table 375-6.8(b)) for single family and multifamily land uses, respectively. At the request of NYSDEC and NYSDOH, 10 ppm cadmium will be conservatively applied as a SCL, and the SCOs of 2.5 ppm and 4.3 ppm will be used when developing remedial scenarios for the residential property soil at the site. The SCL of 10 ppm has been applied at other residential sites within New York State (NYSDOH, 1999) and is protective of current and potential future land use.

3.3.2 Non-Residential SCLs

Potentially complete exposure pathways to cadmium in soil for non-residential properties are incidental ingestion of soil and inhalation of particles by the current and future commercial/light industrial receptors, Drainage District easement trespassers (including children and adolescents) and Drainage District easement maintenance workers. Because the potential magnitude and duration of exposure for non-residential receptors is less than the exposure for residential receptors with the potential to consume homegrown produce, non-residential risk-based SCLs are typically higher. For example, generic non-residential SCLs identified in the literature range from 800 ppm (USEPA [2012] Region 3, 6, and 9 regional screening levels for industrial soil) to 3,400 ppm (USEPA [2002] soil screening level for outdoor worker exposure and inhalation of fugitive dust). Risk-based SCLs calculated based on non-residential land use scenarios are 110 ppm (for children); 735 ppm (for adolescents); and 6,317 ppm (for maintenance workers) (see **Appendix H**). The conservative residential-based SCL of 10 ppm (the lowest residential risk-based value for ingestion of homegrown produce identified) will be applied to the Drainage District easement located adjacent to residential properties and within the apartment complex. For the commercial/light industrial area and the Drainage District easement adjacent to and within this area, the SCL will be set at 70 ppm. The SCL of 70 ppm is the lowest residential risk-based value for incidental ingestion identified and is protective of current and potential future land use scenarios.

3.3.3 SCL Application to Soil Depth

The depths for evaluating conformance to SCLs is typically determined by land use and potentially complete exposure pathways. For example, NYSDEC (2004) *Draft Brownfield Cleanup Program Guide* states that soil criteria must be met for the top 1 foot of soil for commercial/industrial land use and for the top 2 feet of soil for residential land use. Additionally, according to Section 3.5.1 (b) of NYSDEC (2010a) guidance, a depth of 0- to 2-inches below the vegetative cover is required for assessing public health exposures. For ecological and garden soil assessments, a depth of 0- to 6-inches represents potential exposure (NYSDEC, 2010a).

To maximize protectiveness of the remedial scenarios, and to adhere to requests made by NYSDEC, exposure to soil with cadmium concentrations exceeding SCLs to a depth of 2 feet is evaluated in all residential areas (including the apartment complex) and non-residential areas (including the Drainage District easement and commercial/light industrial area) of the site. Based upon discussions with NYSDEC and NYSDOH and a review of applicable regulatory requirements, the establishment of a 2-foot surface layer that meets the SCLs will be protective of human health and the environment. For ecological receptors, the establishment of a 2-foot layer of soil with cadmium concentrations less than SCLs is protective of wildlife. For human receptors, the establishment of a 2-foot layer of soil with cadmium concentrations less than SCLs is protective of incidental contact and routine activities that may be performed by a property owner or Onondaga County personnel within the Drainage District easement.

At the request of NYSDEC, soil within certain areas of the commercial/light industrial area that do not contain cadmium concentrations exceeding the SCL will be removed to 2 feet to facilitate side bank restoration. As noted in Section 2.2.3.5, the portion of the light industrial area previously used as a drive-in theater is comprised of construction and demolition debris and other non-site related fill material that are outside the scope of this voluntary cleanup plan. The SCL will not be applied to the non-site related fill material.

3.3.4 Additional Remediation Goal

In accordance with discussions with NYSDEC, Lockheed Martin has completed investigations within residential properties and the apartment complex at the site to characterize soils in the top 2 feet for cadmium concentrations greater than the residential SCOs of 2.5 ppm and 4.3 ppm, respectively. SCOs identified in 6 NYCRR 375-6.8(b) and referenced in *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a), and *CP-51 Soil Cleanup Guidance* (NYSDEC, 2010c) are stringent values that are applicable statewide and do not account for site-specific conditions. As stated in *CP-51 Soil Cleanup Guidance* (NYSDEC, 2010c), an exceedance of the SCO does not necessarily represent a public health concern.

Although, the application of the SCL of 10 ppm in the top 2 feet of soil is protective of human and ecological receptors, Lockheed Martin, in coordination with NYSDEC and NYSDOH, has decided to remove soil within the site and in the top 2 feet of residential properties and the apartment complex outside of the Drainage District easement with cadmium concentrations greater than 2.5 ppm and 4.3 ppm, respectively. The additional soil removal will provide further protection for human receptors from cadmium-impacted soils in areas that are most accessible.

In addition to the removal of soils in the top 2 feet within residential properties and the apartment complex outside of the Drainage District easement with cadmium concentrations greater than residential SCOs, Lockheed Martin, in coordination with NYSDEC and NYSDOH, will remove soil containing cadmium at a concentration of 10 ppm or greater to a depth of 4 feet in these same areas of the site. For human receptors, the establishment of a 2-foot layer of non-impacted soil is protective of incidental contact; however, a depth of up to 4 feet will allow the homeowner to construct routine improvements on residential property such as tree planting and fence and above ground pool installation without being exposed to cadmium at a concentration greater than the SCL.

Because the correlation between the former brook channel location and the distribution of elevated concentrations of cadmium is the strongest within the wooded area of the site, Lockheed Martin, in accordance with discussions with NYSDEC, has evaluated the former brook channel within the wooded area in the 2- to 6-foot depth interval. As stated in Section 3.3.3, the establishment of a 2-foot layer of soil containing cadmium concentrations less than SCLs is protective of wildlife and incidental contact by trespassers; however, within the footprint of the 2-foot excavation resulting from the application of the SCL in the wooded area, Lockheed Martin will remove soil containing cadmium at concentrations greater than 100 ppm up to 6 feet deep. This additional excavation would effectively remove the former brook channel in the area where the correlation between the former brook channel location and the distribution of cadmium is the strongest. This additional soil removal will effectively remove from the site a high percentage of cadmium-impacted material at a concentration greater than 100 ppm.

3.3.5 Summary of Soil Remediation Goals

Soil remediation goals were developed in Section 3.3.3 by applying SCLs to depths within residential and non-residential areas and in Section 3.3.4 by defining additional remediation activities for certain areas of the site. The soil remediation goals for the site are summarized in the following table:

Land Use	Soil Remediation Goal
Drainage District Easement within Wooded Area	10 ppm top 2 feet
	100 ppm 2 to 6 feet within footprint of removal of soil in the top 2 feet
Residential outside of the Drainage District easement	2.5 ppm top 2 feet
	10 ppm 2 to 4 feet
Apartment Complex outside of the Drainage District easement	4.3 ppm top 2 feet
	10 ppm 2 to 4 feet
Drainage District Easement Adjacent to Residential and within Apartment Complex	10 ppm top 2 feet
Non-Residential – Commercial/Light Industrial outside of the Drainage District Easement excluding non-site related fill material	70 ppm top 2 feet
	top 2 feet in defined areas to facilitate side bank restoration
Drainage District Easement adjacent to and within Non-Residential – Commercial/Light Industrial excluding non-site related fill material	70 ppm top 2 feet
	top 2 feet in defined areas to facilitate side bank restoration

3.4 Remedial Action Objectives (RAOs)

This section identifies the RAOs for the site. The RAOs are used to evaluate remedial alternatives in terms of effectiveness in protection of human health and the environment. The RAOs are developed following identification of site-related COPCs and of possible receptors and exposure pathways. RAOs include goals to address COPCs during remediation activities. Additionally, qualitative RAOs have been developed to include impacts construction activities may have on the local community and to recognize Onondaga County's need to improve, access, and maintain the Drainage District easement for storm water management and conveyance.

Cadmium is the site-related COPC, and soil and sediment are identified as the environmental media that create the potentially complete pathways for cadmium exposure at the site. The

potential receptors and potentially complete exposure pathways are summarized in Section 3.1.2. The RAOs for the site are as follows:

1. Prevent human and ecological exposure to soil containing cadmium at concentrations in excess of the SCLs and to sediment containing cadmium, to the extent practicable;

2. Maintain human and ecological protection by implementing remedial activities that minimize disruption to the surrounding community, to the extent practicable; and

3. Ensure Onondaga County can continue routine maintenance of the drainage district easement by minimizing exposure to soil containing cadmium at concentrations in excess of SCLs and to sediment containing cadmium, to the extent practicable.

4.0 Development and Analysis of Remedial Alternatives

This section contains an evaluation of potentially applicable remedial technologies which might be selected for implementation at the site to achieve the RAOs, either as stand-alone technologies, or applied in conjunction with other technologies. Representative process options for those technologies which are retained are identified and grouped into potentially viable remedial alternatives which are carried through a detailed and comparative analysis.

4.1 Technology Evaluation

This section identifies and describes potentially applicable technologies and presents the preliminary screening of each technology and process option. As part of this preliminary screening, certain process options and technologies are eliminated on the basis of technical effectiveness or implementability. Three factors are specified in the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, 1988) to evaluate and screen out technologies or process options. These three factors are:

- Nature of the contaminants;
- Specific media of concern at the site; and
- Physical characteristics of the site, including geology and hydrogeology.

In addition to these three factors, the following information is reviewed when evaluating technologies and their specific application to conditions at the site:

- Availability of technology;
- Current development of technology (e.g., bench/pilot/full scale demonstration of effectiveness);
- Space constraints for full scale implementation;
- Impact to property owners and surrounding community; and
- Future maintenance within the Drainage District.

The following sections describe technologies which are reasonable for consideration in selection and evaluation of remedial alternatives.

4.1.1 Institutional Controls

The *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a) defines an institutional control as follows:

> "Any non-physical means of enforcing a restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or member of the public, or prevents actions that would interfere with the effectiveness of remedial program or with the effectiveness and/or integrity of site management activities at or pertaining to a site."

Institutional controls may also include, but are not limited to, posting of signs regarding the status of the site and/or the mailing of notices and health advisories.

While not expected to be a stand-alone alternative for the site, institutional controls may enhance the effectiveness of other technologies and, therefore, are retained for use in the remedial alternatives for the site.

4.1.2 Containment

Containment is a type of engineering control that creates a physical barrier or passive mechanism to contain or stabilize contamination and/or eliminate potential exposure pathways from contaminated medium. Containment can be accomplished through the use of a covering/capping system that reduces potential exposures by preventing direct contact with impacted media. Covering/capping process options include: asphalt/concrete caps, multi-layered engineered caps, and permeable soil covers.

Asphalt/concrete and multi-layered engineered caps are typically used at sites where a low permeability cap must be constructed in order to prevent infiltration of storm water through a contaminated mass. As described in Section 2.3.3, the mobility of cadmium at the site is not affected (made mobile) by infiltration. Also, an asphalt/concrete cap and/or a multi-layered engineered cap will negatively impact the characteristics of the residential portions of the site. Constructing an asphalt/concrete or multi-layered engineered cap within the Drainage District will negatively impact drainage characteristics and reduce the flood storage capacity of the area if not performed in conjunction with a removal action. Thus asphalt/concrete and multi-layered engineered caps are not retained for use in the remedial alternatives for the site.

A permeable soil cover typically consists of earthen material and a layer of topsoil to support vegetative growth. A permeable soil cover is placed to reduce the potential risk of direct contact with impacted surface soil without interfering with the current use or function of the area by residents or maintenance workers. Because the current land use for much of the site is a

Drainage District, constructing a permeable soil cover on the existing grade across the site will raise the topographic elevation of the site and reduce flood storage capacity. Therefore, a permeable soil cover will only be used in conjunction with surficial soil removal to maintain existing grades.

While not expected to be a stand-alone alternative for the site, a permeable soil cover is a viable containment option and, therefore, is retained to be incorporated in remedial alternatives for the site.

4.1.3 In-Situ Treatment

In-situ treatment encompasses a variety of technologies that could be utilized to treat the soil in place (i.e., without excavation). Below is a brief summary of *in-situ* treatment technologies that were evaluated for use at this site.

- Phytoremediation is an innovative technology that uses plants to remove, transfer, stabilize, or destroy contaminants.

- Electrokinetic separation involves the application of low intensity direct current between electrodes placed in the soil.

- Soil flushing involves the use of water or water containing an additive to enhance contaminant solubility and to flush the contaminants into the groundwater.

- *In-situ* solidification/stabilization and vitrification are both mobility-reducing technologies. Their objective is to immobilize the contaminants through either encapsulation within a stabilized mass and/or addition of chemical binders (solidification/stabilization), or through the application of high temperatures to the soil matrix resulting in a vitreous mass (vitrification).

In-situ treatment technologies are not readily available and/or their effectiveness is only demonstrated at limited scale. The construction and operation of an *in-situ* treatment facility at the site will negatively impact adjacent property owners and the surrounding community, and its implementation is limited due to space constraints. Also, the implementation of an *in-situ* treatment technology may negatively impact the drainage characteristics of the easement and/or preclude Onondaga County from properly maintaining the Drainage District. Therefore, *in-situ* treatment technologies are not retained for use in the remedial alternatives for the site.

4.1.4 Excavation

Under this process, contaminated soil will be excavated and transported to an authorized facility for treatment and/or disposal. On-site treatment (ex-situ solidification/stabilization – see Section 4.1.5 for a description of this process) of some of the soil prior to transport may be necessary to control moisture content. Excavation operations are standard and care would be taken to protect human health and the environment during excavation and transport activities. In this process, contaminated soil will be removed from the site and disposed of at an authorized facility, thereby reducing the on-site contaminant volume and toxicity.

Excavation activities can create increased dust and volatile organic compound emissions at and near the site. A Community Air Monitoring Plan will be implemented to monitor those emissions and address any detection in excess of NYSDOH recommended response levels. To minimize elevated levels, fugitive dust and volatile organic compound emissions will be minimized and controlled during this process by use of water sprays during excavation, by covering stockpiles of material (including excavated material and clean material brought on site for restoration), and by covering the trucks used for transporting material. The use of these controls will minimize the potential for any short-term human and environmental negative impact due to the unearthing and transporting of contaminants off site.

As excavation depth increases, water management and excavation sidewall stability become increased factors. For excavations below the water table and adjacent to the WBBB, water management activities will be a necessary remedial component. Options for water management include the following:

- Use of submersible pumps (either in dewatering wells or in sumps constructed within an excavation) to transfer water to temporary storage tanks prior to either transportation off site for subsequent treatment and disposal, or on-site treatment (treatment may be required to remove suspended solids) prior to discharge. On-site discharge will require obtaining permits and approval from Federal, State, and local agencies or authorities. Submersible pumps could be utilized alone or in combination with other water management techniques.

- Use of temporary diversion dams, pumps, and piping to re-route the WBBB during excavation, as successfully implemented during the 2008 culvert sediment removal IRM.

- Stockpiling of excavated soils and sediments to allow them to dewater naturally. In addition, absorbent material such as sawdust, wood chips, or manufactured liquid absorbing product could be added to the stockpiles to facilitate the dewatering process.

In addition to water management issues, as excavation depth increases, the following factors must be considered:

- Excavation stability—Deeper excavations require shoring of the excavation sidewalls, either through the use of sheet piling and/or sidewall benching; and
- Proximity to structures—Deeper excavations may require the demolition of nearby structures or special methods to avoid damage.

Excavation is retained for use in the remedial alternatives for the site.

4.1.5 Ex-Situ Treatment

Ex-situ treatment encompasses a variety of technologies that can be utilized to treat soil after it has been excavated. Although e*x-situ* treatment has been utilized to treat contaminated materials prior to reuse, it is only being evaluated at the site for preparation of the material for subsequent off-site transportation and disposal. *Ex-situ* treatment technologies that have been evaluated to treat cadmium-impacted soil at the site include soil washing/chemical extraction, separation/soil screening, and solidification/stabilization.

Soil washing/chemical extraction utilizes various extractants (including water, detergents, and acids) to separate contaminants from the contaminated matrix. Waste contaminated soil and extractant are mixed to solubilize the contaminants. The extracted solution is then placed in a separator, where the contaminants and extractant are separated for treatment and further use. Soil washing/chemical extraction is generally not well suited for soils with high organic content similar to those found at the site. Application of this technology will require a significant amount of space, which is not available at the site. Soil washing/chemical extraction is not retained for use in the remedial alternatives for the site.

Separation/soil screening utilizes physical methods to separate soil into various fractions. Typically, contaminants adsorbed to soil particles are concentrated in the fine soil fraction (silt- and clay-sized fractions). Separation of the fine soil fraction results in a concentrated, reduced volume of contaminated soil. Separation/soil screening is typically used as pretreatment for other ex-situ treatment technologies. Due to the homogeneous grain size distribution, the soils found at the site are not well suited for separation/soil screening. Based on the current understanding of site soil characteristics, this technology is not retained for use in the remedial alternatives for the site.

Ex-situ solidification/stabilization is similar to *in-situ* solidification/stabilization, except that the soil being treated has been excavated and placed on a pad and mixed or into a pug mill or rotary drum to be mixed. *Ex-situ* solidification/stabilization is a conventional means of treating

impacted soil. This process may result in a significant increase in the volume of soil to be disposed (typically, up to a 30% increase). *Ex-situ* solidification/stabilization is commonly used in conjunction with excavation and off-site disposal as a means of preparing wet soil for on-highway transportation. *Ex-situ* solidification/stabilization is also used to prepare soil for disposal at a landfill. *Ex-situ* solidification/stabilization is retained for use in the remedial alternatives for the site.

4.1.6 Off-Site Disposal

This process option includes the following:

1. The off-site disposal of impacted soil that has been characterized as non-hazardous waste in a permitted non-hazardous waste landfill; and

2. The off-site disposal of impacted material that has been characterized as a hazardous waste in a permitted hazardous waste landfill. Off-site disposal of hazardous waste may require treatment prior to land disposal to satisfy Land Disposal Restriction (LDR) standards, as defined in 6 NYCRR Part 376.

Prior to off-site disposal, a Beneficial Use Determination (BUD) will be made by NYSDEC for non-hazardous waste. Potential beneficial use of the material off site includes the following: daily cover material at a disposal facility, material used in the construction of temporary roadways at a disposal facility, and material used to condition other soil at a disposal facility prior to its placement within the landfill. Disposal of cadmium-impacted soil at an off-site permitted landfill is retained for use in the remedial alternatives for the site.

4.1.7 Results of Technology Evaluation

Based on the evaluations, the following technologies are retained for use as components of the remedial alternatives to address potential exposure to cadmium-impacted materials at the site and to achieve the RAOs presented in Section 3.4:

- Institutional controls;
- Containment (using permeable soil covers);
- Excavation;
- Ex-situ solidification/stabilization; and
- Off-site disposal.

A summary of the technology evaluation and screening process is included on **Table 2**.

4.2 Development of Remedial Alternatives

The retained technologies summarized in Section 4.1.7 are assembled into remedial alternatives designed to achieve the RAOs identified for the site in Section 3.4. In addition, the selected alternatives are also evaluated for adherence to the soil remediation goals listed in Section 3.3.5. A discussion of the alternatives developed, as well as the rationale behind their development, is presented in the remainder of this section. A comparative analysis of the remedial alternatives is discussed in Section 4.3, and a summary of the comparative analysis is presented in Section 4.4.

4.2.1 Remedial Alternative 1: No Action

The No Action alternative is the baseline or standard against which other alternatives are measured. Aside from the previously implemented 1997 sediment removal project, 2008 IRM, and 2009 soil removal, no further action will be taken to address the presence of cadmium-impacted material at the site. Alternative 1 will not result in any additional removal of the existing cadmium-impacted material.

4.2.2 Remedial Alternative 2: Excavation and Off-Site Disposal of Soil Based on SCLs by Area

For Remedial Alternative 2, the site is divided into the following three areas (**Figure 2**).

1. Wooded Area;

2. Residential/Apartment Complex Area and Drainage District Easement; and

3. Commercial/Light Industrial Area and Drainage District Easement.

Under this remedial alternative, potential exposure to cadmium-impacted sediment and soil will be addressed in all three areas via excavation and off-site disposal at a permitted landfill and the application of institutional controls. SCLs used to develop this remedial alternative were selected based upon the most conservative likely receptor for each land use area. The remedial activities at each area will include those listed below.

Common Remedial Activities

- **Brook Sediment Removal**—In order to address cadmium concentrations in sediments and to improve the storm water conveyance capacity of the WBBB, non-cohesive sediments overlying either the clay layer, an engineered base, or culverts within the WBBB between the Thruway and Onondaga Lake Parkway will be removed. The

volume of sediment requiring removal from the WBBB between the Thruway and Onondaga Lake Parkway is estimated to be 1,700 cubic yards. Surface water will be diverted around each removal area by constructing temporary dams both upstream and downstream of each work area. The flow of the WBBB will be diverted around the work area by pumping from the upstream side of the upstream dam. The diverted water will be discharged a sufficient distance downstream from the work area to allow work in a relatively dry channel section. Pump discharge will be directed against a solid object like straw bales to dissipate energy from the discharge and prevent erosion of the stream bed and/or banks. This sediment removal will be performed concurrently with soil removal and channel side bank restoration activities. Following sediment removal, clean fill material will be added to some areas of the WBBB as needed to maintain the hydraulic grade line of the brook channel.

- **Channel Side Bank Restoration**—As part of the selected alternative, the channel side bank soils, with the exception of the existing gabion-lined section, will be removed to a depth of 2 feet and reconstructed along the length of the WBBB within the site. Removal will involve the excavation and disposal of approximately 5,700 cubic yards of soil. The channel will be engineered with appropriate controls to minimize the potential for channel side bank erosion. This channel reconstruction will create, through excavation, regrading and placement of engineered material, channel side bank surfaces with approximately 2 feet of clean imported backfill. Reconstruction activities are necessary to maintain and restore the dimension of the channel and to allow for installation of the engineering controls consisting of channel upgrades including, but not limited to, flagstone-lined channels, rip rap-lined channels and grass-lined channels. These improvements will be constructed in a manner that is protective of the environment and ensures minimal maintenance in the future. This restoration work will have the dual benefit of achieving the remedial goals and increasing the drainage capacity of the WBBB.

  Lockheed Martin will maintain the channel for a 5-year period following completion of these restoration activities. Following restoration Onondaga County will continue to mow the Drainage District easement. Inspections will be conducted and, if necessary, maintenance performed to assure the integrity of channel side bank restoration. After the expiration of the 5-year maintenance period by Lockheed Martin, all future inspections and potential repair of the channel will be performed by Onondaga County in addition to mowing and regular maintenance of the Drainage District.

- **Transportation**—Transportation of material for off-site disposal at a permitted landfill will be accomplished using conventional on-highway vehicles (i.e., dump

trucks). Loading of transportation vehicles will occur at several locations throughout the site. Specific locations will be determined during the remedial design. Road crossings will be utilized to the maximum extent possible. To minimize dust in the community, truck tires will be cleaned and truck beds will be covered before leaving the site. Local roads will be wet-swept periodically.

- **Disposal**—Off-site disposal at a permitted landfill of cadmium-impacted material is discussed in Section 4.1.6.

- **Site Restoration**—Upon completion of excavation work in the area, backfill will be placed in order to establish the pre-removal grade at the site and to provide a 2-foot or more permeable soil cover. Backfill material will consist of clean imported soil. The landscape (e.g., grass, trees, shrubs, fencing, etc.) will then be reestablished as close to pre-remediation conditions as possible.

- **Excavation Dewatering**—Excavations conducted to depths below the water table will require dewatering. Also, material removed from beneath the water table will require dewatering and stabilization prior to transport off-site. Potential dewatering methods are summarized in Section 4.1.4.

- **Excavation Stabilization**—Depending upon the depth of the planned excavations and their proximity to structures, excavation stabilization will be implemented. For deep excavation near structures, mechanical stabilization methods such as sheeting, shoring, and bracing will likely be necessary. Shallow excavations in open areas located away from structures may utilize sloping or benched sidewalls as a means of stabilization.

- **Institutional Controls**—As described in Section 4.1.1, institutional controls such as posting of signs and mailing of notices will be used to manage impacted material left at a site. Institutional controls will be established after reviewing the post-remediation residual concentrations of cadmium as compared to the SCLs presented in Section 3.3.

- **Green Remediation Practices**—In accordance with *DER-31 Green Remediation* (NYSDEC, 2010b), green remediation and sustainability concepts appropriate for this project will be implemented during the design and completion of the remedial activities. An effort will be made to minimize energy consumption, reduce direct and indirect emission of carbon dioxide and other greenhouse gases, conserve natural resources, reduce waste, and maximize habitat value. Techniques used to implement the green remediation and sustainable concepts will include minimizing truck trips and use of construction equipment, using properly sized equipment, minimizing time that

vehicles and equipment are running and/or idling, limiting construction demolition and habitat disturbance, and reducing waste.

- **Biological Monitoring Program**—A biological monitoring program will be completed to document cadmium concentrations in aquatic biota. As described in **Appendix I**, monitoring will be conducted during three events. The first event will be pre-remedial baseline sampling. Two post-remedial sampling events will also be conducted: 2 and 4 years following remediation. Sampling for each event will be conducted during the same general time frame to avoid possible seasonal fluctuations in cadmium concentrations.

  Three crayfish biological tissue samples will be collected from each of three predetermined locations within the WBBB, including an upper, middle, and lower location (total of nine samples). Crayfish have been observed in the WBBB and were sampled previously by NYSDEC. In addition, crayfish are known to accumulate cadmium and are less mobile than other organisms (e.g., fish). Each of the biota samples will be analyzed for cadmium. Following the 4-year sampling event, the data will be evaluated and a determination will be made regarding whether additional monitoring events are necessary.

In addition to the volume of sediment and channel side bank soils to be removed pursuant to the common elements listed above, approximately 14,400 cubic yards of cadmium-impacted soil will be excavated and disposed of off site under Remedial Alternative 2 in areas outside of the WBBB channel as summarized below.

Wooded Area

Within the wooded area, soil in the top 2 feet having cadmium concentrations greater than 10 ppm will be excavated and disposed of off site. In addition, as discussed in Section 3.3.4, Lockheed Martin will remove soil containing cadmium at concentrations greater than 100 ppm in the 2- to 6-foot depth interval from within the footprint of the 2-foot excavation. This additional excavation will effectively remove the former brook channel in the area where the correlation between the former brook channel location and the distribution of cadmium is the strongest. The excavation targeting the former brook channel will also result in the removal of a significant volume of cadmium-containing soil with the removal boundaries determined using the following:

- Analytical data;

- Historic aerial photographs;

- Topography;
- Field observations;
- Constructability;
- WBBB hydraulics; and
- Stream geomorphology.

The soil remediation goals developed for the wooded area are summarized in the following table:

Land Use	Soil Remediation Goal
Drainage District Easement within Wooded Area	10 ppm top 2 feet
	100 ppm 2 to 6 feet within footprint of removal of soil in the top 2 feet

Residential/Apartment Complex Area and Drainage District Easement

As discussed in Section 3.3.4, soil in the top 2 feet within residential properties and the apartment complex outside of the Drainage District easement at the site with cadmium concentrations greater than the residential SCOs of 2.5 ppm and 4.3 ppm, respectively, will be excavated and disposed of off site at a permitted landfill. Although, the application of 10 ppm in the top 2 feet of soil is protective of human and ecological receptors, this additional removal will provide further protectiveness of human and ecological receptors from cadmium-impacted soils in areas that are most accessible. In addition, as discussed in Section 3.3.4, Lockheed Martin will remove soil containing cadmium at concentrations greater than 10 ppm in the 2- to 4-foot depth interval. Soils within residential/apartment complex properties with cadmium concentrations greater than 10 ppm at depths greater than 4 feet below ground surface will be managed using a Site Management Plan as discussed in Section 7.0.

For the Drainage District easement owned by the town and county located adjacent to residential properties and the Drainage District easement located within the apartment complex properties, excavation and off-site disposal at a permitted landfill of soil with cadmium concentrations greater than 10 ppm in the top 2 feet will be completed. Soils found greater than 2 feet below ground surface with cadmium concentrations greater than 10 ppm will be managed using a Site Management Plan as discussed in Section 7.0.

The soil remediation goals developed for the residential/apartment complex area and the drainage district easement adjacent and within this area of the site are summarized in the following table:

Land Use	Soil Remediation Goal
Residential outside of the Drainage District easement	2.5 ppm top 2 feet
	10 ppm 2 to 4 feet
Apartment Complex outside of the Drainage District easement	4.3 ppm top 2 feet
	10 ppm 2 to 4 feet
Drainage District Easement Adjacent to Residential and within Apartment Complex	10 ppm top 2 feet

Commercial/Light Industrial Areas and Drainage District Easement

For the commercial/light industrial areas and the Drainage District easement within and adjacent to these areas, soils with cadmium concentrations greater than 70 ppm in the top 2 feet will be excavated and disposed of off site.

During the investigative phase, soil samples were collected from throughout the commercial/light industrial areas and the Drainage District easement within and adjacent to these areas. From the information and analytical results collected during the investigations, it was determined that soils in these areas do not exceed the SCL of 70 ppm in the top 2 feet. As noted in Section 2.2.3.5, the portion of the light industrial area previously used as a drive-in theater is comprised of construction and demolition debris and other non-site related fill material that are outside the scope of this voluntary cleanup plan. The SCL will not be applied to the non-site related fill material.

Sampling within the Drainage District easement included a location where sediments appeared to have been placed adjacent to the WBBB during maintenance activities. This is the only location in the easement that contained cadmium in excess of the 70 ppm SCL in the top 2 feet (soil sample SB-420 - 87.1 ppm in the 6- to 12-inch depth interval). The area that SB-420 was collected from was subsequently disturbed by a third party during construction of an access road. Lockheed Martin collected additional samples near the location of SB-420 during the 2011 design soil investigation to determine if any removal was required. The sampling results indicated that current cadmium concentrations in the area of SB-420 are below 70 ppm.

However, at the request of NYSDEC, the soils in the top 2 feet in the area of SB-420 and SB-16 will be excavated to facilitate side bank restoration.

Soil removal in the commercial/light industrial areas and the Drainage District easement within and adjacent to these areas is not required for removal of soils exceeding the SCL. At the request of the NYSDEC, removal of soil in the top 2 feet of two areas will be completed outside the brook channel to facilitate side bank restoration. The soil remediation goals developed for the commercial/light industrial areas and the Drainage District easement adjacent to and within these areas of the site are summarized in the following table:

Land Use	Soil Remediation Goal
Non-Residential – Commercial/Light Industrial outside of the Drainage District Easement excluding non-site related fill material	top 2 feet in defined areas to facilitate side bank restoration
Drainage District Easement within Non-Residential – Commercial/Light Industrial excluding non-site related fill material	top 2 feet in defined areas to facilitate side bank restoration

4.2.3 Remedial Alternative 3: Excavation and Off-Site Disposal of Soil Based on 10 ppm in all Areas

Under Remedial Alternative 3, potential exposure to cadmium-impacted material will be addressed via excavation and off-site disposal at a permitted landfill. This remedial alternative will implement the common remedial activities for each area listed in Section 4.2.2 as part of Remedial Alternative 2, except for institutional controls. To address cadmium-impacted material outside of the WBBB, implementation of Remedial Alternative 3 will result in the excavation and disposal at a permitted landfill of all material, regardless of depth or property usage (i.e., residential and non-residential), with cadmium concentrations greater than 10 ppm. In addition to the soil removal summarized above and in accordance with the evaluation discussed in Section 3.3.4, soil in the top 2 feet within residential properties and the apartment complex outside of the Drainage District easement at the site with cadmium concentrations greater than the residential SCOs of 2.5 ppm and 4.3 ppm, respectively, will be excavated and disposed of off site. Although, the application of 10 ppm in the top 2 feet of soil is protective of human and ecological receptors, this additional removal will provide further protectiveness of human and ecological receptors from cadmium-impacted soils in areas that are most accessible.

Remedial Alternative 3 will not require the use of institutional controls since all soils with cadmium concentrations greater than 10 ppm will be removed. Because Remedial Alternative 3 will require excavation to depths beneath the water table, the use of excavation dewatering and excavation stabilization will be necessary.

Including the volume of sediment and channel side bank soils (i.e., 1,700 cubic yards and 5,700 cubic yards, respectively) to be removed pursuant to the common elements listed above (under Remedial Alternative 2), approximately 40,000 cubic yards of cadmium-impacted material will be excavated and disposed of off site under Remedial Alternative 3.

4.3 Comparative Analysis of Remedial Alternatives

In this section, the three alternatives developed in Section 4.2 are evaluated using the nine criteria described in Section 4.2 of *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a). The three alternatives that are evaluated in this section are:

1. Remedial Alternative 1: No Action;

2. Remedial Alternative 2: Excavation and Off-Site Disposal of Soil Based on SCLs by Area; and

3. Alternative 3: Excavation and Off-Site Disposal of Soil Based on the 10 ppm SCL in all Areas.

The evaluation provides information to facilitate the comparison of the alternatives and the selection of a final remedy (summarized in Section 5.0). The comparative analysis is three-tiered and in accordance with *DER-31 Green Remediation* (NYSDEC, 2010b) includes consideration of green remediation and sustainability concepts to minimize negative environmental impacts.

The first tier is comprised of threshold factors for the overall protection of human health and the environment and compliance with SCGs. Any selected remedy must result in overall protection of human health and the environment. Similarly, the SCGs must be complied with unless site conditions make compliance not possible.

- **Overall Protection of Human Health and the Environment**—The analysis of potential remedies using this criterion involves assessing each alternative for the degree to which potentially completed exposure pathways for human and ecological receptors are eliminated, reduced, or controlled. These factors were considered during the development of RAOs for the site.

- **Compliance with SCGs**—An evaluation to this criterion indicates the compliance of each alternative with SCGs. These regulations are summarized on **Table 3**.

The second tier is comprised of the six criteria listed below. The relative merits and challenges associated with meeting these factors must be balanced in selecting a final remedy.

- **Short-term Effectiveness**—The effectiveness of an alternative in protecting human health and the environment during construction and implementation of the remedial alternative is assessed under short-term effectiveness. This criterion encompasses concerns about short-term impacts, as well as the length of time required to implement the alternative. Factors such as cross-media impacts, the need to transport impacted material through populated areas, usage of fuel and other natural resources, current site operations, and the potential disruption of neighborhoods and ecosystems may be pertinent. Due to the affinity of cadmium to preferentially adsorb to soil, excavation remedies that release dust could create potential short-term risks through the inhalation pathway. The health and safety issues associated with the implementation of any remedial action involving excavation and transport of soil are included under this criterion.

- **Long-term Effectiveness**—The long-term effectiveness of a remedial alternative is evaluated under this criterion with particular focus on the residual contamination remaining in a particular medium after completion of the remedial alternatives and the degree to which a remedial measure provides a permanent remedy for the site. Additionally, an effective remedy will reduce long-term risk without significantly impacting the environment. The long-term integrity of containment options is also evaluated.

- **Reduction in Toxicity, Mobility and Volume**—The focus of this criterion is to evaluate the ability of the remedial alternatives to address the impacted material on site, the irreversibility of the process employed, the nature and movement of the impacted materials, and the mass of material destroyed or treated.

- **Implementability**—The alternatives are evaluated to this criterion with respect to performance, reliability and technical implementability. Performance and reliability focus on the ability of the alternative to meet specific goals or remedial levels. The technical implementability of an alternative addresses construction and operation with regard to site-specific conditions, including the impact on existing on-site activities and habitat, and the ability to safely and practically implement the alternative. Administrative implementability focuses on the time and effort required in obtaining appropriate approvals and addressing other administrative issues.

- **Cost**—Evaluation of costs include design and construction costs, remedial action operation, monitoring and maintenance (OM&M) costs, other capital and short-term costs and costs of field and project management associated with the implementation of the remedial alternatives. Estimates of permitting costs have also been included where appropriate.

- **Land Use**—The alternatives are evaluated to this criterion by reviewing the impact of remedial actions to the current, intended, and reasonably anticipated future use of the properties within and surrounding the site. The evaluation should take into consideration Federal, State, and local laws, plans, zoning, and land use designations; public comments; environmental justice concerns; and natural resources, geography, and geology. The final use determination for the site must be made to complete the remedy selection.

The third tier is comprised of agency and community acceptance. Satisfaction of these criteria will be determined after submittal of this work plan; community acceptance will be addressed following the submittal of this RAWP and the public comment period for the proposed plan. Thus, the third tier criteria are not specifically evaluated in this document.

4.3.1 First Tier of Comparative Analysis

As previously stated, the first tier of the comparative analysis includes a review of the overall protection of human health and the environment and compliance with SCGs. Remedial Alternative 1 will leave the site conditions unchanged and will, therefore, provide no additional protection of human health or the environment. Summarized in the remainder of this section is the first tier comparative analysis for Remedial Alternatives 2 and 3.

4.3.1.1 Overall Protection of Human Health and the Environment

The overall protection of human health and the environment is evaluated for Remedial Alternatives 2 and 3 based the successful achievement of RAOs. The RAOs for the site are as follows:

1. Prevent human and ecological exposure to soil containing cadmium at concentrations in excess of the SCLs and to sediment containing cadmium, to the extent practicable;

2. Maintain human and ecological protection by implementing remedial activities that minimize disruption to the surrounding community, to the extent practicable; and

3. Ensure Onondaga County can continue routine maintenance of the Drainage District easement by minimizing exposure to soil containing cadmium at concentrations in excess of SCLs and to sediment containing cadmium, to the extent practicable.

Remedial Alternatives 2 and 3 will achieve RAOs 1 and 2. Remedial Alternative 2 addresses soil exceeding SCLs to a depth of 2 feet for all areas of the site, including the Drainage District easement, and down to 4 feet within residential areas and the apartment complex outside the Drainage District easement via excavation and off-site disposal at a permitted landfill. Based upon discussions with NYSDEC and NYSDOH and the review of applicable regulatory requirements, the establishment of a 2-foot surface layer that meets the respective SCLs will be protective of human health and the environment, including Onondaga County maintenance employees. In addition to the excavation and disposal activities, exposure to soil containing cadmium in excess of SCLs where left in place at depths greater than 2 and 4 feet will be managed through the use of engineering and institutional controls. Remedial Alternative 3 addresses soil exceeding SCLs for the site regardless of land use and depth via excavation and off-site disposal at a permitted landfill. In addition, Remedial Alternatives 2 and 3 result in the excavation and off-site disposal at a permitted landfill from the site of the non-cohesive brook sediments along the length of the WBBB and side bank soils, with the exception of the existing gabion-lined section, to a depth of 2 feet.

Remedial Alternative 2 achieves RAO 2, while Remedial Alternative 3 does not. Remedial Alternative 2 minimizes disruption to the surrounding community by limiting excavation and disposal activities to the most accessible soils. Compared to Remedial Alternative 2, Remedial Alternative 3 does not minimize disruption to the surrounding community due to the need to complete deeper excavations. The deeper excavations will require additional time and equipment to complete the removal of the increased soil volume, stabilization of excavations to protect workers and homes, demolition of other structures, and management of groundwater infiltration. There would also be an increased risk to the overall safety of the construction workers and the residents. The additional disruption will also result in more impact to ecological receptors by disturbing additional habitat and increasing loss of mature vegetation and ground cover often used for sources of food and shelter. In addition, more soil will need to be transported off site and clean material transported to the site requiring a significant increase in the use of construction equipment and large truck traffic on the community roads resulting in an increase in fuel consumption and greenhouse gas emissions.

4.3.1.2 Compliance with SCGs

With the application of SCLs discussed in Section 3.3 at the site, Remedial Alternatives 2 and 3 will achieve compliance with applicable SCGs. Other potential SCGs and an analysis of their applicability relative to the site are listed on **Table 3**.

4.3.2 Second Tier of Comparative Analysis

As previously stated, the second tier of the comparative analysis includes consideration of the merits and challenges associated with each of the remedial alternatives to satisfy the six criteria required to be considered by *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a). Summarized in the remainder of this section is the second tier comparative analysis of Remedial Alternatives 1, 2, and 3 to the six criteria.

4.3.2.1 Short-Term Effectiveness

The implementation of Remedial Alternative 1 will not have any short-term impacts since no remedial activities are included in that alternative.

The implementation of Remedial Alternative 2 will result in fewer short-term impacts that can be more reasonably managed than Remedial Alternative 3. The scope of work for Remedial Alternative 2 will be less disruptive to individual property owners than Remedial Alternative 3. For example, Remedial Alternative 2 can be implemented without having to demolish any homes or other structures and thereby will not displace occupants or create additional construction waste. Additionally, Remedial Alternative 2 will limit the excavation depth to 4 feet in the residential/apartment complex area, which reduces the quantity of material that will be removed from the site while reducing future potential for exposure. Approximately 3,300 round trip truckloads will be required to transport material to the permitted landfill and for importing backfill material for restoration activities. The time frame for construction activities will be reduced along with the potential for health and safety risks, disturbance of habitat, fuel consumption, and emission of greenhouse gases. It is estimated that approximately three construction seasons will be required to complete Remedial Alternative 2. This will allow for earlier removal of construction equipment from the community and the restoration of impacted areas, permitting the nearby community and the environment to return to pre-construction conditions sooner.

The implementation of Remedial Alternative 3 will result in significantly greater short-term impacts than Remedial Alternative 2 due to the greater depth, area and volume of excavations. Transportation-related risks will also be higher with this alternative. There will be a longer time period of disturbance to individual property owners and the environment. Implementation of Remedial Alternative 3 will require displacement of occupants to allow for the demolition of homes and other structures, which will increase construction waste and material usage. In addition, at many of the deeper excavations, additional time and equipment will be required to stabilize the excavations, manage water and protect homes and other structures. It is estimated that approximately four construction seasons will be required to complete this alternative. Approximately 7,000 round trip truckloads will be required to transport material to the permitted

landfill and for importing backfill material for Remedial Alternative 3 (3,700 more truckloads than Remedial Alternative 2). The additional equipment and truckloads will significantly increase fuel consumption and greenhouse gas emissions.

4.3.2.2 Long-Term Effectiveness

The comparative evaluation of long-term effectiveness focuses on the reduction in residual risk and adequacy and reliability of controls provided by each alternative. Remedial Alternative 1 will not reduce residual risk of contact with cadmium-impacted material. Remedial Alternative 2 will reduce long-term risks associated with exposure to residual cadmium in the soil with reliance on engineering and institutional controls while minimizing negative environmental impacts. Remedial Alternative 3 will reduce long-term risks without the implementation of engineering and/or institutional controls but will significantly increase impacts to the environment with increased natural resource consumption, waste, habitat disturbance, and greenhouse gas emissions.

4.3.2.3 Reduction of Toxicity, Mobility and Volume

The comparative evaluation of reduction of toxicity, mobility and volume focuses on the ability of the alternative to address the impacted material on site, the irreversibility of the process employed, the nature and movement of the residual materials, and the mass of material destroyed or treated.

Remedial Alternative 1 does not include any removal; therefore, it will not reduce the toxicity, mobility or volume of cadmium-impacted material at the site.

Remedial Alternatives 2 and 3 rely on excavation and off-site disposal at a permitted landfill to reduce toxicity, mobility and volume of cadmium-impacted material at the site. Implementation of Remedial Alternative 2 will result in the removal of approximately 21,800 cubic yards of cadmium-impacted material from the site. Implementation of Remedial Alternative 3 will result in the removal of approximately 47,400 cubic yards of cadmium-impacted material from the site. Additional reduction in toxicity, mobility and volume associated with the implementation of Remedial Alternative 3 is due to removal of soils at depths that are not readily accessible and results in a significant increase in negative environmental impacts (e.g., increased energy consumption and greenhouse gas emissions).

4.3.2.4 Implementability

This criterion focuses on the technical implementability of construction and operation of each alternative, the administrative implementability including obtaining the appropriate approvals

and addressing other administrative issues (e.g., property access, applicable permits, and the availability of required disposal facilities).

Remedial Alternative 1 involves no remedial action and is readily implementable.

Remedial Alternative 2 and 3 are both technically implementable, with equipment and labor necessary to implement these remedial alternatives expected to be readily available. However, Remedial Alternative 3 presents greater technical challenges, which will make it more difficult to implement. For example, Remedial Alternative 3 will require deeper and more extensive excavations, requiring shoring, water management and demolition of homes and other structures, all of which will pose greater health and safety risks, greater energy consumption, and increased amounts of waste created and materials used.

With regard to administrative implementability, Remedial Alternatives 2 and 3 will require the cooperation of property owners for access to implement the remedial action and perform post-construction monitoring. Remedial Alternative 3 will require the demolition of a number of homes and other structures and the displacement of occupants. The demolition of homes or other structures and the displacement of occupants will not be required under Remedial Alternative 2. Since residual cadmium will remain at depth within certain portions of the site, under Remedial Alternative 2, a Site Management Plan will be required to manage future disturbance resulting in potential exposure.

4.3.2.5 Cost

The comparative evaluation of the cost of remediation is based on the net present worth of each alternative. The cost of implementing Remedial Alternative 1 was not determined as it is minimal. The total capital, OM&M, and present worth costs of Remedial Alternatives 2 and 3 are presented in **Appendix J**. The net present value of engineering and construction costs associated with Remedial Alternative 2 is approximately $13,000,000. The net present value of engineering and construction costs associated with Remedial Alternative 3 is approximately $34,000,000.

4.3.2.6 Land Use

As described in Section 2.2.3, the site consists of lands of varied uses including a wooded area, residential area, apartment complex area and commercial/light industrial area. The site is located within segments of property owned by the Town of Salina, Onondaga County, and various private owners. A large portion of the site is designated as a Drainage District easement that is maintained by Onondaga County. In addition, the surrounding area is developed with defined zoning laws and use designations. Under all three remedial alternatives the current intended and reasonably anticipated future use of the properties within and surrounding the site would not be

affected. With the implementation of Remedial Alternatives 2 and 3, the potential for future exposure to cadmium-impacted soil is reduced with removal of cadmium-containing soils and, where necessary, the proper management of soils remaining on site with residual cadmium. Remedial Alternative 1 will not reduce any future exposure. Remedial Alternative 2 offers the protection from future exposure to cadmium-impacted soil and is less intrusive and disruptive than Remedial Alternative 3.

4.4 Results of Comparative Analysis

The evaluation criteria and the results of the first and second tier comparative analysis for Remedial Alternatives 1, 2, and 3 are presented in the following table. For the first tier comparative analysis, the table identifies whether each remedial alternative satisfies the evaluation criteria. For the second tier comparative analyses, the table provides a brief description of how each remedial alternative satisfies the evaluation criteria. As previously stated, the third tier comparative analysis was not evaluated in this document but will be addressed following submittal of this RAWP and the public comment period for the proposed plan.

Tier	Evaluation Criteria	Alternative 1 No Action	Alternative 2 Excavation and Disposal of Soil Based on SCLs by Area	Alternative 3 Excavation and Disposal of Soil Based on 10 ppm
1	Protection of Human Health and the Environment			
	RAO 1: Prevent, to the extent practicable, human and ecological exposure to soil containing cadmium at concentrations in excess of the Soil Cleanup Levels and to sediment containing cadmium.	No	Yes, with institutional controls	Yes
	RAO 2: Achieve human and ecological protection by implementing remedial activities that minimize disruption to the surrounding community, to the extent practicable.	Not Applicable	Yes	No

Tier	Evaluation Criteria	Alternative 1 No Action	Alternative 2 Excavation and Disposal of Soil Based on SCLs by Area	Alternative 3 Excavation and Disposal of Soil Based on 10 ppm
	RAO 3: Provide unrestricted access to Onondaga County for routine maintenance of the Drainage District, to the extent practicable.	No	Yes, with institutional controls	Yes
1	Compliance with Standards, Criteria and Guidance (see Table 3)	No	Yes	Yes
2	Short-Term Effectiveness	No impacts.	- 3,300 truck trips. - No building demolition - Three construction seasons	- 7,000 truckloads trips - Building demolition - Four construction seasons
2	Long-Term Effectiveness	No risk reduction	- Reduced risks to cadmium with engineering and institutional controls - Some negative environmental impacts	- Reduced risks to cadmium exposure - Significant negative environmental impacts
2	Reduction in Toxicity, Mobility and Volume	No reduction	Removal of 21,800 cubic yards of sediment and soil containing cadmium.	-Removal of 47,400 cubic yards of sediment and soil containing cadmium
2	Implementability	No action required	- Technically feasible - Requires property access permission from some land owners - Must have a Site Management Plan	- Technically feasible - Requires property access permission from many land owners - Potentially difficult due to demolition of homes and other structures
2	Cost	Minimal	$13M	$34M
2	Land Use	No impact with no	No impact other than Institutional Controls	No impact

Tier	Evaluation Criteria	Alternative 1 No Action	Alternative 2 Excavation and Disposal of Soil Based on SCLs by Area	Alternative 3 Excavation and Disposal of Soil Based on 10 ppm
		reduction future exposure		

5.0 Selection of Preferred Remedial Alternative

Based upon the comparative analysis of the proposed remedial alternatives, Remedial Alternative 2 (Excavation and Off-Site Disposal of Soil Based on SCLs by Area) is recommended as the remedial alternative for the site. Remedial Alternative 2 is the preferred remedial alternative when compared to Remedial Alternatives 1 and 3 as it best satisfies the criteria recommended by NYSDEC in Section 4.2 of *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a), while minimizing the disruption of the surrounding community and environment, and controlling costs and negative environmental impacts. The remainder of this section presents an overview of the selected remedial alternative, the analysis of the rejected remedial alternatives, public participation, and the remedial design basis.

5.1 Overview of Selected Remedial Alternative

Under Remedial Alternative 2, the following actions will be implemented:

Brook Channel

All non-cohesive sediment will be removed from the WBBB between the Thruway and Onondaga Lake Parkway (including the culverts of the WBBB between Brookview Lane and Onondaga Lake Parkway) to remove elevated cadmium concentrations in these sediments and to improve the storm water conveyance capacity of the WBBB. This material will be excavated and disposed of off site at a permitted landfill.

With the exception of the existing gabion-lined section, channel side bank soils will be excavated and channel side banks reconstructed with a minimum of 2 feet of clean material above the limits of excavation along the length of the WBBB within the site. Channel reconstruction will include, but not limited to, armored and grass-lined side banks. These actions will improve storm water conveyance, minimize the potential for future side bank erosion, ensure minimal maintenance in the future and be protective of human health and the environment. Following completion of Lockheed Martin's OM&M activities, future inspections and potential repair of the channel will be performed by Onondaga County as part of its maintenance of the Drainage District.

The remedial activities for the WBBB and the channel side banks will be completed in accordance with a United States Army Corps of Engineers (USACE) permit that will be obtained following RAWP approval.

Wooded Area

Within the wooded area, soils in the top 2 feet having cadmium concentrations greater than 10 ppm will be excavated and disposed of off site. In addition, soil containing cadmium at concentrations greater than 100 ppm will be removed in the 2- to 6-foot depth interval from within the footprint of the 2-foot excavation. The excavation areas will be backfilled with clean imported material, regraded to their original surface elevations and revegetated. Wetlands that are disturbed or excavated will be restored consistent with the requirements of a USACE permit that will be obtained following RAWP approval. In addition, soils with residual cadmium concentrations greater than the SCL of 10 ppm at depths greater than 2 feet will be managed in accordance with a Site Management Plan that is discussed in Section 7.0.

Residential/Apartment Complex Area and Drainage District Easement

Within residential properties and the apartment complex area outside of the Drainage District easement, soil in the top 2 feet having cadmium concentrations greater than 2.5 ppm and 4.3 ppm, respectively, and soil containing cadmium at concentrations greater than 10 ppm in the 2- to 4-foot depth interval will be excavated and disposed of off site. Within the Drainage District easement located adjacent to residential properties and within the apartment complex properties, excavation and off-site disposal at a permitted landfill of soil with cadmium concentrations greater than 10 ppm in the top 2 feet will be completed. The excavation areas will be backfilled with clean imported material, regraded to their original surface elevations, and revegetated. In addition, residential/apartment complex properties and town- and county-owned portions of the Drainage District easement having soils with residual cadmium concentrations greater than the SCL of 10 ppm at depths greater than 4 feet and 2 feet, respectively, will be managed in accordance with a Site Management Plan that is discussed in Section 7.0.

Commercial/Light Industrial Area and Drainage District Easement

Within the commercial/light industrial area of the site and the Drainage District easement adjacent to and within this area, soils with cadmium concentrations greater than 70 ppm in the top 2 feet will be excavated and disposed of off site. Although, analysis of samples recently collected indicate that current cadmium concentrations in the soil located in this area are below the SCL of 70 ppm, soils in the top 2 feet of two areas outside of the brook channel will be excavated to facilitate side bank restoration as shown on **Figure 8C**. The excavation areas will be backfilled with clean imported material, regraded to their original surface elevations, and revegetated. As noted in Section 2.1.2.5, the portion of the light industrial area previously used as a drive-in theater is comprised of construction and demolition debris and

other non-site related fill material. The SCL will not be applied to this non-site related fill material.

Under this remedial alternative, approximately 14,400 cubic yards of cadmium-impacted soil will be excavated and disposed of off site. **Figures 8A, 8B, and 8C** illustrate the approximate limits of excavation in plan view and **Figure 9** illustrates the approximate limits of excavation in cross section. In addition, approximately 1,700 cubic yards of sediment from the brook channel and 5,700 cubic yards of channel side bank soils will be excavated and disposed of off site as part of this remedial alternative. **Figure 10** identifies the portions of the existing brook channel that are either grass-lined or armored with flagstone or gabion baskets and includes "before" and "after" restoration details. The total volume of material that will be excavated and disposed of off site under this remedial alternative is approximately 21,800 cubic yards.

The excavation and off-site disposal at a permitted landfill of cadmium-impacted soils in the top 2 feet in the wooded area, in the top 2 feet in the Drainage District easement (located adjacent to residential and within apartment complex properties), and in the top 4 feet within the residential/apartment complex properties outside of the Drainage District easement will address the potential exposure to cadmium in these upper-most soils. The excavation targeting the former brook channel in the wooded in area in the 2- to 6-foot interval will also result in the removal of a significant volume of cadmium-containing soil from the site. Sediment and channel side bank soil removal and removal of soils in the top 2 feet in two areas outside of the brook channel to facilitate side bank restoration in the commercial/industrial area will mitigate any concerns regarding potential exposure to cadmium in the WBBB and reduce the potential for future migration of any residual cadmium present at depth. A Site Management Plan will be used to manage potential future exposure in areas where the residual cadmium concentrations exceed the respective SCLs.

During implementation of this remedial alternative, surface controls, such as silt fences, will be utilized to prevent migration of impacted material from the excavation areas to other non-impacted areas of the site. Following excavation, the material removed from the site will be replaced with clean imported backfill material and the site will be returned to pre-construction grade or, in the case of the brook channel, restored to the new design configuration. In portions of the wooded area delineated as wetlands where soil removal and wetland restoration is required, a wetland permit will be obtained from the USACE prior to construction activities.

As discussed in Section 4.3 and 4.4, Remedial Alternative 2 was selected for implementation based on a comparison of the strengths and weaknesses of each alternative relative to the evaluation criteria. The following is a summary of those comparison criteria relative to Remedial Alternative 2.

- **Overall Protection of Human Health and the Environment**—Remedial Alternative 2 will be fully protective of human health and the environment. This alternative will mitigate potential exposure to cadmium in surface soil through the excavation and off-site disposal at a permitted landfill of soil exceeding the SCLs located in the top 2 feet of the Drainage District easement and commercial/light industrial areas (excluding non-site related fill material) and soil exceeding residential SCOs in the top 2 feet and SCLs in the 2- to 4-foot interval in residential/apartment complex properties outside of the Drainage District easement. The establishment of a 2-foot surface layer that meets the respective SCLs will be protective of human health and the environment. In addition, removal of soils having cadmium concentrations greater than 100 ppm in the 2- to 6-foot depth interval within the footprint of the 2-foot deep excavation in the wooded area will reduce potential human and ecological exposure and environmental impacts to soils in the former brook channel. A Site Management Plan will be used to manage potential future exposure in areas where the residual cadmium concentrations exceed SCLs.

- **Compliance with SCGs**—Potential SCGs and an analysis of their applicability and status relative to the site are listed on **Table 3**. In accordance with *CP-51 Soil Cleanup Guidance* (NYSDEC, 2010c), Remedial Alternative 2 applies SCLs based upon the most conservative likely receptor for each land use area. .

  For portions of the site that are adjacent to and include residential and apartment complex properties, the conservative SCL of 10 ppm of cadmium based on ingestion of homegrown produce will be used to determine areas of soil removal. Within the wooded area, soils in the top 2 feet with concentrations greater than 10 ppm will be excavated and disposed of off site at a permitted landfill. In addition, to effectively remove the former brook channel and a large quantity of the cadmium-impacted material from the site, soils having cadmium concentrations greater than 100 ppm in the 2- to 6-foot depth interval within the footprint of the 2-foot deep excavation within the wooded area will be excavated and disposed of off site at a permitted landfill. For residential properties and the apartment complex properties outside of the Drainage District easement, soils in the top 2 feet with cadmium concentrations greater than 2.5 ppm and 4.3 ppm, respectively, and in the 2- to 4-foot depth interval with cadmium concentrations greater than 10 ppm will be excavated and disposed of off site at a permitted landfill. For the Drainage District easement adjacent to and within the residential and apartment complex properties, soils in the top 2 feet with concentrations greater than 10 ppm will be excavated and disposed of off site at a permitted landfill.

For the commercial/light industrial areas of the site and the Drainage District easement within and adjacent to these areas, the USEPA generic residential soil screening level for combined ingestion and dermal pathways of 70 ppm was used as the SCL to determine areas of soil removal. Although, analysis of samples recently collected indicate that current cadmium concentrations in the soil located in this area are below the SCL of 70 ppm, soils in the top 2 feet of two areas outside of the brook channel will be removed to facilitate side bank restoration. As noted in Section 2.2.3.5, the portion of the light industrial area previously used as a drive-in theater is comprised of construction and demolition debris and other non-site related fill material that are outside the scope of this voluntary cleanup plan. The SCL will not be applied to this non-site related fill material.

A Site Management Plan will be used to manage potential future exposure in areas where the residual cadmium concentrations exceed the respective SCLs for each area.

With the application of SCLs, this alternative will be implemented in a manner compliant with all SCGs.

- **Short-Term Effectiveness**—Excavating and transporting the volume of impacted material and clean fill described in this remedial alternative will pose some short-term impacts to the communities surrounding the site and along the transportation route(s). Under Remedial Alternative 2, the quantity of material that will be removed from the site for off-site disposal at a permitted landfill will be minimized by removing the most accessible cadmium-impacted material and leaving in place the soils found at depths greater than 2 and 4 feet with cadmium concentrations greater than SCLs and managing the residual cadmium concentrations with a Site Management Plan. This results in less on-site construction time and equipment, including trucks to transport the material off site and backfill on site for restoration, and reduces the short-term impacts to the residents and the surrounding community by expediting the restoration of impacted areas and returning the community to pre-construction condition. By reducing construction time and equipment usage, negative environmental impacts such as energy consumption and greenhouse gas emissions are reduced. Remedial Alternative 2 can be implemented without having to demolish homes and other structures or displacing residents. This alternative limits the need for additional on-site construction equipment and technologies that will be needed for excavations deeper than 6 feet.

- **Long-Term Effectiveness**—The excavation and off-site disposal of cadmium-impacted material in a permitted landfill, combined with the implementation of a Site Management Plan, will provide an effective long-term remedy for the site.

Lockheed Martin's proposal to remove the non-cohesive sediment and side bank soils, establish a 2-foot surface layer that meets the respective SCLs, and remove, in the residential/apartment complex area, soil containing cadmium in excess of SCLs to a depth of 4 feet will effectively avoid long-term adverse impacts to the community and the environment. The long-term effectiveness of the remedy is enhanced by removal to 4 feet because potential contact with any residual cadmium deeper than 4 feet will be infrequent. In addition, a Site Management Plan will be used to address potential future exposure in areas where the residual cadmium concentrations exceed the SCLs. As part of the Site Management Plan, Lockheed Martin will provide property owners with documentation of post-cleanup conditions on their properties to identify the location of cadmium in deeper soils that will remain in place in excess of SCLs, excluding on-site fill material found within the commercial/light industrial areas. If future activities, such as the construction of an in-ground pool, will disturb residual cadmium in excess of SCLs, property owners will need to contact Lockheed Martin prior to construction. Lockheed Martin will properly manage soil removal and disposal at a permitted landfill at its expense.

- **Reduction of Toxicity, Mobility and Volume**—The toxicity, mobility and volume of cadmium-impacted material at the site will be reduced by excavation and disposal in a secure, permitted landfill. Under Remedial Alternative 2, approximately 21,800 cubic yards of cadmium-impacted material will be removed from the site. The residual cadmium with concentrations exceeding SCLs remaining at the site, which is not mobile as discussed in Section 2.3.3, will be managed through the implementation of a Site Management Plan.

- **Implementability**—This remedial alternative is technically implementable. Successful implementation will require the cooperation of the local community, including the municipalities and property owners, for access and implementation of a Site Management Plan. In addition, successful implementation will require obtaining appropriate approvals and permits, and addressing other administrative issues.

- **Cost**—The estimated cost of this remedial alternative is $13,000,000.

- **Land Use**—Remedial Alternative 2 will allow for the current intended and reasonably anticipated future use of the properties within and surrounding the site to remain unchanged. With the implementation of the this alternative, the potential for future exposure to cadmium-impacted soil is reduced with removal of the most accessible soil containing cadmium exceeding residential SCOs and SCLs and proper management of soils remaining on site with residual cadmium exceeding SCLs.

- **Agency and Community Acceptance**— Agency and community acceptance of Remedial Alternative 2 will be determined after submittal of this work plan; community acceptance will be addressed following the submittal of this RAWP and the public comment period for the proposed plan. Thus, these criteria are not specifically evaluated in this document.

Remedial Alternative 2 (Excavation and Off-Site Disposal of Soil Based on SCLs by Area) meets all of the RAOs established in Section 3.4 of this RAWP. Specifically, this remedial alternative achieves these RAOs as follows:

1. **Prevent human and ecological exposure to soil containing cadmium at concentrations in excess of the SCLs and to sediment containing cadmium, to the extent practicable**: At the site, soils containing cadmium in excess of SCLs will be excavated, disposed of off site at a permitted landfill, replaced with clean imported backfill, and the area will be restored to its pre-construction grade. In addition, soils containing cadmium concentrations exceeding SCLs remaining at depth at the site will be managed by implementing a Site Management Plan. Non-cohesive sediment will be removed and disposed of off site at a permitted landfill. With the exception of the gabion-lined section, the channel side banks between the Thruway and Onondaga Lake Parkway will be excavated to a depth of 2 feet and reconstructed to provide adequate drainage and minimize erosion. This channel reconstruction will create, through excavation, regrading, and placement of engineered material, approximately 2 feet of clean imported backfill. The long term integrity of these upgrades will be ensured by the management of the Drainage District by Onondaga County.

2. **Maintain human and ecological protection by implementing remedial activities that minimize disruption to the surrounding community, to the extent practicable:** Remedial Alternative 2 achieves a balance between human and ecological protection, mass removal, and community disruption. Human and ecological protection is provided by creating a 2- or 4-foot barrier of soil and side bank materials with cadmium concentrations less than SCLs. The establishment of a 2-foot surface layer that meets the respective SCLs will be protective of human health and the environment. For purposes of mass removal, deeper excavations are proposed in targeted areas containing high levels of cadmium in areas of the site that are undeveloped and are less accessible to humans. The remedy minimizes disruption to the community by removing surficial material, including non-cohesive sediments, side bank soils, and the top 2 and 4 feet of soils, with the highest likelihood of potential exposure and managing soils containing cadmium concentrations exceeding SCLs left in place at depths greater than 2 and 4 feet with a Site Management Plan.

3. **Ensure Onondaga County can continue routine maintenance of the drainage district easement by minimizing exposure to soil containing cadmium at concentrations in excess of SCLs and to sediment containing cadmium, to the extent practicable:** Within the Drainage District easement located within the site, Remedial Alternative 2 includes the removal of soil above SCLs and side bank soils, excluding the existing gabion-lined section, to a depth of 2 feet. The excavated soils will be replaced with clean imported backfill that will provide a 2-foot layer of soil with cadmium concentrations less than SCLs which will be protective of Onondaga County personnel. In addition, within the site, non-cohesive brook sediment regardless of cadmium concentration along the WBBB will be removed. In this manner, the remedy will provide conditions that support unrestricted access by Onondaga County personnel for the routine and general maintenance of the Drainage District.

5.2 Analysis of Rejected Remedial Alternatives

Remedial Alternative 1: No Action

This remedial alternative was retained to provide a baseline against which other response actions can be compared. Aside from the previously implemented 1997 sediment removal project, 2008 IRMs, and 2009 soil removal, no further action will be taken to address the presence of cadmium-impacted material at the site. There will be no improvements to side banks to prevent erosion and the potential migration of cadmium.

Remedial Alternative 1 was rejected as a final remedy because this alternative will not remove and provide future management of the cadmium-impacted material. If the cadmium-impacted material was not removed from the site and/or properly managed, the material could be disturbed and redistributed to areas that could allow the cadmium-impacted material to become accessible to humans and/or ecological receptors. Additionally, as stated in Section 4.3, Remedial Alternative 1 will leave the site conditions unchanged and will therefore provide no additional protection of human health or the environment; will provide no reduction of toxicity, volume or mobility of cadmium-impacted material; and will not comply with SCLs, RAOs, and chemical-specific SCGs.

Remedial Alternative 3: Excavation and Off-Site Disposal of Soil Based On 10 ppm In All Areas

This remedial alternative will be effective in reducing potential exposure to cadmium-impacted soil at the site. However, application of the 10 ppm SCL to all areas of the site regardless of depth is not justified after evaluating potential exposure pathways and determining the improbability that residents will come into contact with or disturb soils at depths greater than 4

feet bgs. Additionally, the RAO to minimize, to the extent practicable, disruption to the surrounding community will not be met. The application of this SCL to the entire site will result in a significant increase in disruption and potential risk to the communities surrounding the site during implementation of the remedial alternative due to the large volume of material that will be required to be excavated and disposed of off site. The time frame for implementation of this alternative will be extended an additional construction season. In addition, implementation of this remedial alternative will require demolition of homes and other structures and displacement of residents, the use of additional construction equipment to manage deep excavations, and additional truck traffic for transportation of cadmium-impacted material off site and of clean backfill material for restoration. Compared to Remedial Alternative 2, the longer time frame for implementation, larger soil removal volumes, and additional construction activities (e.g., demolition and truck traffic) will result in unnecessary negative environmental impacts from increased energy consumption, greenhouse gas emissions, waste creation, and material usage.

5.3 Public Participation

The goal of the public participation program for the site is to promote public understanding of the remediation process and activities and to encourage the public's meaningful participation in achieving a cleanup that is protective of human health and the environment. Information regarding the site has been communicated to the public using fact sheets, quarterly letters, and meetings. All NYSDEC approved documents regarding the site are kept at repositories located at the following locations:

Liverpool Public Library
310 Tulip Street
Liverpool, NY 13088

NYSDEC
615 Erie Boulevard West
Syracuse, NY 13204

Atlantic States Legal Foundation
658 West Onondaga Street
Syracuse, NY 13204

NYSDEC
625 Broadway
Albany, NY 12233

Also, Lockheed Martin has set up a website for the Bloody Brook Voluntary Cleanup Program. The website contains a description of the program and includes a link to each of the documents contained within the repository, as well as summaries developed by Lockheed Martin. The website address is as follows:

http://www.lockheedmartin.com/us/who-we-are/sustainability/remediation/liverpool.html

In accordance with Section II G. of the VCA and following submission of this RAWP, NYSDEC will publish a notice in the Environmental Notice Bulletin to inform the public of the opportunity

to submit comments on the RAWP. During the 30-day public comment period, a meeting open to the public will be held. Following the close of the public comment period, NYSDEC will notify Lockheed Martin whether the RAWP has been approved or needs to be revised.

5.4 Remedial Design Basis

After reviewing and responding to comments from the public and receiving approval from NYSDEC of this RAWP, the selected remedial alternative will become the basis for the remedial design for the site. As shown on **Figures 8A, 8B, and 8C** and summarized in **Tables 4A, 4B, and 4C**, additional sampling will be performed at the site. The objective of the additional sampling will be to refine the extent of cadmium impacts to soil and collect data necessary to design the brook channel restoration project. A soil sampling work plan has been submitted to NYSDEC for approval of the proposed additional soil sampling activities. Following this sampling, a remedial design will be prepared and submitted to NYSDEC for approval.

6.0 Post-Remediation Property Assessment

A post-remediation site assessment will be conducted following the implementation of remedial activities at the site. The post-remediation site assessment will include a review of all site soil sampling results and will identify the locations and concentrations of residual cadmium greater than SCLs remaining at the site. The results of the post-remediation site assessment will be used to prepare the Site Management Plan and to evaluate the need for and extent of monitoring and maintenance activities and use of institutional controls as described in Section 7.0.

The remainder of this section contains a description of the anticipated locations of residual cadmium with concentrations greater than SCLs in soil that will remain within certain areas of the site following the implementation of remedial activities. These locations have been determined by using information from aerial photographs, analytical data available to date, site topography, soil characterization, and historic and current hydraulic characteristics of the site. The anticipated residual cadmium distribution in soil with concentrations greater than SCLs presented herein is based on preliminary information and is subject to change following additional sampling and the excavation activities. All data available after the remediation is completed will be used to document residual cadmium with concentrations greater than SCLs in soil within the site.

The preliminary estimates of the limits, depths, and concentrations of the anticipated residual cadmium with concentrations greater than SCLs in soil are summarized below by municipal, residential/apartment complex, and commercial/industrial areas.

6.1 Municipal Areas

Areas of the site owned by the Town of Salina or Onondaga County, therefore referred to as municipal, are within the Drainage District easement for the WBBB and are maintained by Onondaga County personnel. The municipal areas consist of three main areas. Summarized in the remainder of this section is a description of each of the main areas and the locations, depths, and concentrations of anticipated cadmium exceeding SCLs that will remain in soil following the completion of remediation activities.

6.1.1 Municipal Area from New York State Thruway to Floradale Road

The municipal area extending from the New York State Thruway along the WBBB to Floradale Road includes the wooded area and all areas within the Drainage District easement adjacent to the brook channel as shown on **Figures 11A and 11B**. The municipal properties in this area are owned by Town of Salina. The SCL for cadmium in this municipal area is 10 ppm. As part of the remediation activities, soils in the top 2 feet containing cadmium concentrations greater than

the SCL will be excavated, disposed of off-site at a permitted landfill, and replaced with clean imported backfill. In addition, Lockheed Martin will remove soil containing cadmium at concentrations greater than 100 ppm up to 6 feet deep from within the footprint of the 2-foot excavation. Following remediation, residual cadmium concentrations in soil exceeding the SCL are anticipated at depths between 2 and 9 feet bgs (**Figures 11A** and **11B**).

6.1.2 Municipal Area from West Side of Floradale Road to Apartment Complex

The municipal area extending from the south side of Floradale Road (downstream side of the culverts) on both sides of the WBBB to the property boundary of the apartment complex includes all areas within the Drainage District easement adjacent to the brook channel as shown on **Figure 11B**. The municipal properties in this area are owned by Onondaga County. The SCL for cadmium in this municipal area is 10 ppm. As part of the remediation activities, soils in the top 2 feet containing cadmium concentrations greater than the SCL will be excavated, disposed of off-site at a permitted landfill, and replaced with clean imported backfill. Following remediation, residual cadmium concentrations in soil exceeding the SCL are anticipated at depths between 2 and 5 feet bgs (**Figure 11B**).

6.1.3 Municipal Area Adjacent to Railroad

The municipal area adjacent to the railroad consists of properties located west of the railroad parcel and on both sides of the WBBB as shown on **Figure 11C**. The municipal properties in this area are owned by Onondaga County. The SCL for cadmium in this municipal area is 70 ppm. Cadmium was not detected above the SCL in this area, and no residual cadmium exceeding the SCL is expected.

6.2 Residential/Apartment Complex Area

The location of the residential/apartment complex area extends along both sides of the brook channel from the south side of the wooded area to the confluence of the Middle Branch of Bloody Brook and WBBB. The residential/apartment complex area consists of single-family residential properties and the apartment complex. A portion of the apartment complex property includes the Drainage District easement. The SCL for cadmium in this area is 10 ppm. As part of the remediation activities, soils in the top 4 feet outside of the Drainage District easement and top 2 feet within the Drainage District easement containing cadmium concentrations greater than the SCL will be excavated, disposed of off-site at a permitted landfill, and replaced with clean imported backfill. Current available information indicates that 25 single-family residential properties and two apartment complex properties (i.e., Pearl Street and Harborside Manor Apartments) are anticipated to contain residual cadmium with concentrations exceeding SCLs at a depth range of 4 to 15 feet bgs following completion of remediation activities.

The locations and depths of anticipated residual cadmium exceeding the SCL in the residential/apartment complex areas are summarized below.

6.2.1 Single-Family Residential Properties

Single-family residential properties are located along both sides of the brook channel, adjacent to the Drainage District easement, from the south side of the Wooded Area to Floradale Road. In single-family residential properties, residual cadmium exceeding the SCL, when present, is found at the shallowest depth of 4 feet bgs along the Drainage District easement and is anticipated to be located at increasing depths moving away from the WBBB. Single-family residential properties that are anticipated to have residual cadmium concentrations that exceed the SCL following remediation are located along Midwood Drive and Brookview Lane and from Brookview Lane to Floradale Road as summarized below.

6.2.1.1 Midwood Drive

The single-family residential properties along Midwood Drive are located along the east side of the brook channel and south of the wooded area. Following completion of remediation activities, the areas anticipated to contain residual cadmium exceeding the SCL at depths greater than 4 feet bgs are located adjacent to the Drainage District easement and extend from the northeast end of the gabion-lined channel to the Brookview Lane culverts (**Figure 11A**). Depths of the residual cadmium exceeding the SCL are anticipated to range from 4 to 11 feet bgs.

6.2.1.2 Brookview Lane

The single-family residential properties along Brookview Lane are located along the west side of the brook channel and south of the wooded area. Following completion of remediation activities, the areas anticipated to contain residual cadmium exceeding the SCL at depths greater than 4 feet bgs along Brookview Lane are located adjacent to the Drainage District easement and extend from approximately the northwest end of the gabion-lined channel to the Brookview Lane culverts (**Figure 11A**). Depths of the residual cadmium exceeding the SCL are anticipated to range from 4 to 16 feet bgs.

6.2.1.3 Brookview Lane to Floradale Road

The single-family residential properties from Brookview Lane to Floradale Road are located along both sides of the brook channel between the Brookview Lane and Floradale Road culverts. Following completion of remediation activities, the areas anticipated to contain residual cadmium exceeding the SCL at depths greater than 4 feet bgs extend around many of the structures (e.g., homes) in this area due to the proximity of the development of those properties to the brook channel (**Figure 11B**). Depths of the residual cadmium exceeding the SCL are anticipated to range from 4 to 6 feet bgs.

6.2.2 Apartment Complex

The apartment complex is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road. The apartment complex consists of the Pearl Street apartments and Harborside Manor apartments. Residual cadmium exceeding the SCL is anticipated to be located on both properties as summarized below.

6.2.2.1 Pearl Street Apartments

The Pearl Street apartments are made up of five apartment buildings located adjacent to the single-family residential properties along the south side of Floradale Road. Two buildings are located along the east side of the brook channel and three buildings are located along the west side of the brook channel. A portion of this property is included in the Drainage District easement. Following completion of remediation activities, residual cadmium exceeding the SCL is anticipated to be located between the apartment building parking lots and the brook channel on the east and west sides of the channel and north of the Pearl Street culvert and within the Drainage District easement on the east side of the channel on the south side of the Pearl Street culvert (**Figure 11B**). Depths of the residual cadmium exceeding the SCL are anticipated to range from 4 to 5 feet bgs.

6.2.2.2 Harborside Manor Apartments

The Harborside Manor apartments are made up of three apartment buildings located adjacent to the Pearl Street apartments on the east side of the brook channel. A portion of this property is included in the Drainage District easement. Current available data indicates that, following completion of remediation activities, the residual cadmium exceeding the SCL is anticipated to be located between the two buildings located on the north side of Town Gardens Drive and within the Drainage District easement located on the south side of Town Gardens Drive (**Figure 11B**). Depths of the residual cadmium exceeding the SCL are anticipated to range from 4 to 6 feet bgs.

6.3 Commercial/Light Industrial Areas

The commercial/light industrial areas consist of portions of the properties located on both sides of Old Liverpool Road and adjacent to the WBBB. This area includes the railroad property located adjacent to the property on the west side of Old Liverpool Road. A portion of these properties is included in the Drainage District easement. Properties that are included in the commercial/light industrial areas are shown on **Figures 11 B and 11C**. The SCL for cadmium in this area is 70 ppm.

According to soil characterization information collected from soil samples, the properties located on the west side of the Old Liverpool Road are mostly comprised of non-site related fill materials that are outside the scope of this voluntary cleanup project. The SCL will not be applied to the non-site related fill material. Following completion of remediation activities, no residual cadmium exceeding the SCL is expected to remain in the commercial/light industrial areas.

7.0 Site Management Plan

A Site Management Plan will be prepared after implementation of the final remedy to guide post-remedial activities at the site. The Site Management Plan will set forth procedures that will be followed during future monitoring and maintenance activities. The Site Management Plan will include the Operations, Monitoring and Maintenance (OM&M) Plan, a description of institutional controls and requirements for an annual report.

7.1 Operation, Monitoring and Maintenance Plan

The purpose of the OM&M Plan is to define the inspection and maintenance that will be performed following remediation by Lockheed Martin. A site-specific OM&M Plan will be prepared in accordance with *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010a) as it applies to site conditions.

Lockheed Martin will perform OM&M for 5 years following completion of the remediation activities to ensure the integrity of the site restoration. Site restoration generally consists of reestablishing the landscape in a manner consistent with a NYSDEC approved design. During the 5-year period following remediation, Lockheed Martin will inspect the restored areas and will address potential problems such as erosion and plant survival. Routine maintenance such as mowing and watering within the residential/apartment complex area will be the responsibility of the property owner. Following remediation, Onondaga County will resume routine maintenance of the Drainage District easement (e.g., mowing and removing culvert obstructions).

After this 5-year period and consistent with pre-construction management of the Drainage District, Onondaga County will resume all maintenance activities of the Drainage District including, addressing erosion, removing accumulated sediments and maintaining the integrity of the channel side banks.

7.2 Institutional Controls

The Site Management Plan will include a description of the institutional controls that will be implemented in compliance with the site remedy. The specific details regarding the form of institutional controls and their implementation will be determined on a property-by-property basis following completion of the remedy. Factors to be considered include property type, location of residual cadmium exceeding SCLs as determined through a review of site information and analytical data following completion of the remedial activities. The institutional control is expected to be the mailing of a periodic notice to property owners that includes the following:

- Identity of property (e.g., street address or tax map number);
- Map showing portions of property affected and depth beneath which cadmium remains above SCLs (i.e., 10 ppm or 70 ppm excluding non-site related fill material);
- A reminder to affected property owner not to disturb or excavate soil containing residual cadmium exceeding SCLs without prior notice to NYSDEC and Lockheed Martin;
- A statement that Lockheed Martin will coordinate removal and off-site disposal at a permitted landfill of any soil that is disturbed during a construction project and contains residual cadmium above SCLs; and
- A statement that no limitations on use apply to areas of the property that do not contain residual cadmium exceeding SCLs.

In the Annual Report described in Section 7.3, Lockheed Martin will state when and to whom the periodic notice was mailed and will identify the property owners who contacted Lockheed Martin and the nature of work performed by Lockheed Martin, if any.

Institutional controls are expected to be applied to municipal and residential/apartment complex properties as described below.

7.2.1 Municipal Property

Lockheed Martin plans to implement an institutional control that will minimize any potential exposure to soil with cadmium concentrations greater than the SCLs while ensuring Onondaga County personnel can continue routine maintenance of the Drainage District easement. The non-cohesive sediments are being removed and the soils of concern would be located at a depth greater than 2 feet which will provide Onondaga County personnel unrestricted access for most maintenance activities (e.g., mowing) and routine improvement activities (e.g., cleaning debris from culverts or replacing damaged side bank armoring).

7.2.2 Residential/Apartment Complex Property

Using currently available information, Lockheed Martin expects that institutional controls will be used at 25 single-family residential properties and two apartment complex properties (i.e., Pearl Street and Harborside Manor Apartments). Periodic notification to the residential/apartment complex property owners will be used to minimize any potential future exposure to residual soil containing cadmium concentrations greater than the SCL of 10 ppm. The soils of concern would be located at depths greater than 4 feet and would not be disturbed during routine home improvement activities such as planting trees and installing fences.

7.3 Annual Report

In accordance with the VCA, Lockheed Martin will submit to NYSDEC an annual report on January 15 of each year following NYSDEC approval of the Site Management Plan. The Site Management Plan will include a summary of the expected contents of the annual report. The annual report is anticipated to document the post-remediation inspection and maintenance activities and to certify that institutional controls are in place, have not been altered, and are still effective. A copy of the annual reports will be kept at the public repositories listed in Section 5.3.

8.0 References

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Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-01-01	G9	0' - 1'	Cadmium	385.50	375.85	384.50	Above	Sandy silt, organics and wood	5/2/2011	0.15 J
		1' - 2'	Cadmium		375.85	383.50	Above	Sandy silt	5/2/2011	0.059 J [0.19 J]
		2' - 3'	Cadmium		375.85	382.50	Above	Sandy silt	5/2/2011	0.11 J
		3' - 4'	Cadmium		375.85	381.50	Above	Sandy silt	5/2/2011	0.047 J
		4' - 5'	Cadmium		375.85	380.50	Above	Sandy silt	5/2/2011	0.11 J
		5' - 6'	Cadmium		375.85	379.50	Above	Sandy silt	5/2/2011	0.060 J
		6' - 7'	Cadmium		375.85	378.50	Above	Silty sand with little clay, Sandy silt with organics at 6'-8"	5/2/2011	0.19 J
		7' - 8'	Cadmium		375.85	377.50	Above	Silt with little clay	5/2/2011	0.079 J
		8' - 9'	Cadmium		375.85	376.50	Above	Grades to fine sand, little silt, silt with organics at 8'-10"	5/2/2011	3.1
		9' - 10'	Cadmium		375.85	375.50	At	Organics with some silt, trace sand, trace clay	5/2/2011	2,450
		10' - 11'	Cadmium		375.85	374.50	Below	Grades to fine sand with white crystals, little silt	5/2/2011	2.6
		11' - 12'	Cadmium		375.85	373.50	Below	Medium to fine sand	5/2/2011	0.49 B
		12' - 13'	Cadmium		375.85	372.50	Below	Medium to fine sand	5/2/2011	13.8
DI-01-02	G9	0' - 1'	Cadmium	386.29	375.82	385.29	Above	Silt with fine sand, trace clay	4/27/2011	NA
		1' - 2'	Cadmium		375.82	384.29	Above	Silt with fine sand, trace clay	4/27/2011	NA
		2' - 3'	Cadmium		375.82	383.29	Above	Silt with fine sand, trace clay	4/27/2011	NA
		3' - 4'	Cadmium		375.82	382.29	Above	Silt with fine sand, some clay	4/27/2011	NA
		4' - 5'	Cadmium		375.82	381.29	Above	Clayey silt	4/27/2011	NA
		5' - 6'	Cadmium		375.82	380.29	Above	Clayey silt	4/27/2011	NA
		6' - 7'	Cadmium		375.82	379.29	Above	Silty clay	4/27/2011	NA
		7' - 8'	Cadmium		375.82	378.29	Above	Silty clay	4/27/2011	NA
		8' - 9'	Cadmium		375.82	377.29	Above	Silty clay	4/27/2011	0.40
		9' - 10'	Cadmium		375.82	376.29	Below	Silty clay	4/27/2011	0.12 J
		10' - 11'	Cadmium		375.82	375.29	At	Sandy silt, little clay at 10'-2"	4/27/2011	0.26
		11' - 12'	Cadmium		375.82	374.29	Below	Sandy silt, little clay, organics	4/27/2011	12.9
		12' - 13'	Cadmium		375.82	373.29	Below	Silty clay	4/27/2011	1.1
		13' - 14'	Cadmium		375.82	372.29	Below	Silty clay	4/27/2011	2.8
		14' - 15'	Cadmium		375.82	371.29	Below	Silty clay, organics	4/27/2011	18.8
DI-01-03	G9	0' - 1'	Cadmium	388.52	375.77	387.52	Above	Sandy, silt, trace clay	4/27/2011	See Note 12
		1' - 2'	Cadmium		375.77	386.52	Above	Sandy, silt, trace clay	4/27/2011	See Note 12
		2' - 3'	Cadmium		375.77	385.52	Above	Sandy, silt, trace clay	4/27/2011	See Note 12
		3' - 4'	Cadmium		375.77	384.52	Above	Sandy, silt, trace clay	4/27/2011	See Note 12
		4' - 5'	Cadmium		375.77	383.52	Above	Sandy, silt, trace clay	4/27/2011	See Note 12
		5' - 6'	Cadmium		375.77	382.52	Above	Sandy Silt to Silty Sand	4/27/2011	See Note 12
		6' - 7'	Cadmium		375.77	381.52	Above	Coarse to fine sand, little gravel, little silt at 6'-7"	4/27/2011	See Note 12
		7' - 8'	Cadmium		375.77	380.52	Above	Organics, fine silty clay	4/27/2011	See Note 12
		8' - 9'	Cadmium		375.77	379.52	Above	Organics, coarse to fine sand	4/27/2011	See Note 12
		9' - 10'	Cadmium		375.77	378.52	Above	Organics, wood	4/27/2011	See Note 12
		10' - 11'	Cadmium		375.77	377.52	Above	Organics, wood	4/27/2011	See Note 12
		11' - 12'	Cadmium		375.77	376.52	Above	Organics, wood	4/27/2011	See Note 12
		12' - 13'	Cadmium		375.77	375.52	At	Sandy, silt, some organics	4/27/2011	See Note 12
		13' - 14'	Cadmium		375.77	374.52	Below	Organics with some sand, trace gravel at 13'-4"	4/27/2011	See Note 12
		14' - 15'	Cadmium		375.77	373.52	Below	Organics with some sand, trace gravel	4/27/2011	See Note 12
		15' - 16'	Cadmium		375.77	372.52	Below	Organics and clay with little sand	4/27/2011	See Note 12
DI-02-01	E9	0' - 1'	Cadmium	378.97	374.00	377.97	Above	Clayey silt, silt, gabion rock	4/27/2011	22
		1' - 2'	Cadmium		374.00	376.97	Above	Clayey silt, silty clay	4/27/2011	1.7
		2' - 3'	Cadmium		374.00	375.97	Above	Clayey silt, silty clay	4/27/2011	0.21 J
		3' - 4'	Cadmium		374.00	374.97	Above	Clayey silt, sandy silt	4/27/2011	0.13 J
		4' - 5'	Cadmium		374.00	373.97	At	Sandy silt, clayey silt	4/27/2011	0.16 J
		5' - 6'	Cadmium		374.00	372.97	Below	Clayey silt, sandy silt, silt	4/27/2011	1.1
		6' - 7'	Cadmium		374.00	371.97	Below	Sandy silt, silt, clayey silt	4/27/2011	2.9
		7' - 8'	Cadmium		374.00	370.97	Below	Silty clay, clay, sandy silt, silty sand, organics	4/27/2011	0.49
		8' - 9'	Cadmium		374.00	369.97	Below	Till	5/2/2011	0.47 B
		9' - 10'	Cadmium		374.00	368.97	Below	Till	5/2/2011	0.27 B
DI-02-02	E9	0' - 1'	Cadmium	379.40	374.00	378.40	Above	Clayey silt, silt	4/27/2011	0.80
		1' - 2'	Cadmium		374.00	377.40	Above	Clayey silt	4/27/2011	0.070 J
		2' - 3'	Cadmium		374.00	376.40	Above	Silty clay, clayey silt	4/27/2011	NA
		3' - 4'	Cadmium		374.00	375.40	Above	Silty clay	4/27/2011	NA

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DI-03-01	D12	0' - 1'	Cadmium	378.75	371.37	377.75	Above	Silt, little fine sand, trace clay	4/27/2011	0.45 B
		1' - 2'	Cadmium		371.37	376.75	Above	Silt, little fine sand, trace clay	4/27/2011	<0.26 U
		2' - 3'	Cadmium		371.37	375.75	Above	Silt, little fine sand, trace clay	4/27/2011	<0.25 U
		3' - 4'	Cadmium		371.37	374.75	Above	Clayey silt	4/27/2011	<0.24 U
		4' - 5'	Cadmium		371.37	373.75	Above	Clayey silt	4/27/2011	<0.23 U
		5' - 6'	Cadmium		371.37	372.75	Above	Clayey silt	4/27/2011	<0.25 U
		6' - 7'	Cadmium		371.37	371.75	At	Clayey silt	4/27/2011	<0.26 U
		7' - 8'	Cadmium		371.37	370.75	Below	Clayey silt	4/27/2011	0.096 J
DI-03-02	C12	0' - 1'	Cadmium	379.68	371.37	378.68	Above	Silt with little fine sand, trace gravel	4/27/2011	0.23 J
		1' - 2'	Cadmium		371.37	377.68	Above	Silt, trace clay	4/27/2011	0.17 J
		2' - 3'	Cadmium		371.37	376.68	Above	Silt, trace clay	4/27/2011	0.15 J
		3' - 4'	Cadmium		371.37	375.68	Above	Silt, some clay	4/27/2011	0.16 J
		4' - 5'	Cadmium		371.37	374.68	Above	Silty clay	4/27/2011	0.25 J
		5' - 6'	Cadmium		371.37	373.68	Above	Silty clay	4/27/2011	<0.25 U
		6' - 7'	Cadmium		371.37	372.68	Above	Silty clay	4/27/2011	<0.23 U
		7' - 8'	Cadmium		371.37	371.68	At	Silty clay	4/27/2011	<0.24 U
		8' - 9'	Cadmium		371.37	370.68	Below	Silt	4/27/2011	<0.22 U
DI-03-03	C12	0' - 1'	Cadmium	380.30	371.37	379.30	Above	Sandy gravel, organics, little silt	4/27/2011	0.18 J
		1' - 2'	Cadmium		371.37	378.30	Above	Medium to fine sand with little silt, trace gravel	4/27/2011	0.067 J
		2' - 3'	Cadmium		371.37	377.30	Above	Silty clay	4/27/2011	0.068 J
		3' - 4'	Cadmium		371.37	376.30	Above	Silty clay	4/27/2011	<0.24
		4' - 5'	Cadmium		371.37	375.30	Above	Medium to fine sand with trace gravel, trace silt	4/27/2011	0.057 J
		5' - 6'	Cadmium		371.37	374.30	Above	Silty clay, trace gravel at 5'-7"	4/27/2011	0.048 J
		6' - 7'	Cadmium		371.37	373.30	Above	Clayey silt	4/27/2011	0.084 J
		7' - 8'	Cadmium		371.37	372.30	Above	Clayey silt	4/27/2011	0.063 J
		8' - 9'	Cadmium		371.37	371.30	At	Clay with some silt	4/27/2011	1.3
		9' - 10'	Cadmium		371.37	370.30	Below	Clay with some silt	4/27/2011	170
DI-03-04	C12	0' - 1'	Cadmium	380.27	371.37	379.27	Above	Sandy gravel, trace silt, organics	4/27/2011	0.28
		1' - 2'	Cadmium		371.37	378.27	Above	Sandy gravel, some silt	4/27/2011	0.23
		2' - 3'	Cadmium		371.37	377.27	Above	Coarse to fine sand, trace gravel, trace silt	4/27/2011	0.31
		3' - 4'	Cadmium		371.37	376.27	Above	Coarse to fine sand, trace gravel, trace silt	4/27/2011	0.25
		4' - 5'	Cadmium		371.37	375.27	Above	Sandy gravel, trace silt	4/27/2011	0.13 J
		5' - 6'	Cadmium		371.37	374.27	Above	Clayey silt and debris at 5'-7"	4/27/2011	0.29
		6' - 7'	Cadmium		371.37	373.27	Above	---	Refusal	Refusal[13]
		7' - 8'	Cadmium		371.37	372.27	Above	---	Refusal	Refusal[13]
		8' - 9'	Cadmium		371.37	371.27	At	---	Refusal	Refusal[13]
		9' - 10'	Cadmium		371.37	370.27	Below	---	Refusal	Refusal[13]
		10' - 11'	Cadmium		371.37	369.27	Below	---	Refusal	Refusal[13]
DI-03-05	C12	0' - 1'	Cadmium	380.56	371.37	379.56	Above	Medium gravel, coarse to fine sand, trace silt	4/27/2011	0.33
		1' - 2'	Cadmium		371.37	378.56	Above	Medium gravel, coarse to fine sand, trace silt	4/27/2011	0.30
		2' - 3'	Cadmium		371.37	377.56	Above	Medium gravel, coarse to fine sand, trace silt	4/27/2011	0.27
		3' - 4'	Cadmium		371.37	376.56	Above	Medium gravel, coarse to fine sand, some silt	4/27/2011	0.31
		4' - 5'	Cadmium		371.37	375.56	Above	Medium gravel, coarse to fine sand, some silt	4/27/2011	0.11 J
		5' - 6'	Cadmium		371.37	374.56	Above	Silt, fine sand, trace clay	4/27/2011	0.12 J
		6' - 7'	Cadmium		371.37	373.56	Above	Silt, fine sand, trace clay	4/27/2011	0.15 J
		7' - 8'	Cadmium		371.37	372.56	Above	Silt, fine sand, trace clay	4/27/2011	0.14 J
		8' - 9'	Cadmium		371.37	371.56	At	Fine to coarse sand, trace silt at 8'-3"	4/27/2011	0.074 J
		9' - 10'	Cadmium		371.37	370.56	Below	Sandy gravel, little silt, Silty sand at 9'-8"	4/27/2011	0.15 J
		10' - 11'	Cadmium		371.37	369.56	Below	Silty clay with organics	4/27/2011	267
		11' - 12'	Cadmium		371.37	368.56	Below	Silty clay with organics, strong odor	4/27/2011	5.9

Table 1A
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West Branch of Bloody Brook
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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-17-01	D13	0' - 1'	Cadmium	378.07	371.28	377.07	Above	Silty sand, sandy silt, roots	5/2/2011	0.43
		1' - 2'	Cadmium		371.28	376.07	Above	Sandy silt, clayey silt	5/2/2011	0.15 J
		2' - 3'	Cadmium		371.28	375.07	Above	Sandy silt	5/2/2011	0.057 J
		3' - 4'	Cadmium		371.28	374.07	Above	Sandy silt, clayey silt	5/2/2011	0.048 J
		4' - 5'	Cadmium		371.28	373.07	Above	Silt, sandy silt	5/2/2011	0.090 J
		5' - 6'	Cadmium		371.28	372.07	Above	Silt, clayey silt, organics	5/2/2011	161
		6' - 7'	Cadmium		371.28	371.07	At	Sandy silt	5/2/2011	0.38 B
		7' - 8'	Cadmium		371.28	370.07	Below	Sandy silt, silt	5/2/2011	<0.31 U
		8' - 9'	Cadmium		371.28	369.07	Below	Sandy silt, clayey silt	5/2/2011	0.46 B
DI-17-02	D13	0' - 1'	Cadmium	378.72	371.28	377.72	Above	Sandy silt, little clay, roots	5/2/2011	NA
		1' - 2'	Cadmium		371.28	376.72	Above	Sandy silt	5/2/2011	NA
		2' - 3'	Cadmium		371.28	375.72	Above	Sandy silt	5/2/2011	NA
		3' - 4'	Cadmium		371.28	374.72	Above	Sandy silt	5/2/2011	NA
		4' - 5'	Cadmium		371.28	373.72	Above	Sandy silt	5/2/2011	0.33
		5' - 6'	Cadmium		371.28	372.72	Above	Sandy silt with little clay	5/2/2011	1.2
		6' - 7'	Cadmium		371.28	371.72	At	Clayey silt with little fine sand	5/2/2011	0.37
		7' - 8'	Cadmium		371.28	370.72	Below	Silty clay with little fine sand	5/2/2011	NA
		8' - 9'	Cadmium		371.28	369.72	Below	Silty clay with little fine sand	5/2/2011	NA
		9' - 10'	Cadmium		371.28	368.72	Below	Clayey silt	5/2/2011	NA
DI-19-01	E4	0' - 1'	Cadmium	386.10	383.00	385.10	Above	Clayey silt, organics, roots	5/3/2011	4.3 B
		1' - 2'	Cadmium		383.00	384.10	Above	Sandy silt, silt, gravel	5/3/2011	5.5 B
		2' - 3'	Cadmium		383.00	383.10	At	Sandy silt, silt, clayey silt, gravel	5/3/2011	14.9 B
		3' - 4'	Cadmium		383.00	382.10	Below	Sandy silt, gravels, clayey silt	5/3/2011	1.0 B
DI-19-02	E4	0' - 1'	Cadmium	387.10	383.00	386.10	Above	Clayey silt, silt, sandy silt, roots	5/3/2011	0.16 J
		1' - 2'	Cadmium		383.00	385.10	Above	Sandy silt, silt, clayey silt, roots	5/3/2011	13.4
		2' - 3'	Cadmium		383.00	384.10	Above	Sandy silt, silt	5/3/2011	2.6
		3' - 4'	Cadmium		383.00	383.10	At	Sandy silt, clayey silt, silt	5/3/2011	2.9
DI-19-03	F4	0' - 1'	Cadmium	387.10	383.00	386.10	Above	Clayey silt, sandy silt, silt, roots	5/3/2011	0.76
		1' - 2'	Cadmium		383.00	385.10	Above	Silt, sandy silt, roots	5/3/2011	0.30
DI-20-01	F5	0' - 1'	Cadmium	386.33	382.82	385.33	Above	Clayey silt, silt	5/3/2011	171 B
		1' - 2'	Cadmium		382.82	384.33	Above	Clayey silt, silt, sandy silt, gravel, roots	5/3/2011	1.2 B
		2' - 3'	Cadmium		382.82	383.33	Above	Sandy silt, silt, roots	5/3/2011	2.6 B
		3' - 4'	Cadmium		382.82	382.33	At	Clayey silt, sandy silt, silt, gravel	5/3/2011	0.52 B
DI-20-02	F5	0' - 1'	Cadmium	387.72	382.82	386.72	Above	Clayey silt, silt, silty clay	5/3/2011	0.29
		1' - 2'	Cadmium		382.82	385.72	Above	Clayey silt, silt, plastic bag (fill)	5/3/2011	0.23 J
		2' - 3'	Cadmium		382.82	384.72	Above	Silt, sandy silt	5/3/2011	NA
		3' - 4'	Cadmium		382.82	383.72	Above	Silt, sandy silt	5/3/2011	NA
DI-21-01	F9	0' - 1'	Cadmium	381.68	375.00	380.68	Above	Silty sand, organics	4/29/2011	0.83
		1' - 2'	Cadmium		375.00	379.68	Above	Silty sand, organics	4/29/2011	0.33
		2' - 3'	Cadmium		375.00	378.68	Above	Silty sand	4/29/2011	0.097 J
		3' - 4'	Cadmium		375.00	377.68	Above	Silty sand	4/29/2011	0.042 J
DI-22-01	F10	0' - 1'	Cadmium	382.43	373.75	381.43	Above	Silty sand, trace clay	4/29/2011	0.73
		1' - 2'	Cadmium		373.75	380.43	Above	Sandy silt, silty sand	4/29/2011	0.19 J
		2' - 3'	Cadmium		373.75	379.43	Above	Sandy silt, silty sand	4/29/2011	0.14 J
		3' - 4'	Cadmium		373.75	378.43	Above	Sandy silt, silty sand	4/29/2011	0.074 J
DI-23-01	D11	0' - 1'	Cadmium	378.00	371.82	377.00	Above	Silty clay, clayey silt	4/27/2011	6.2 B
		1' - 2'	Cadmium		371.82	376.00	Above	Clayey silt, silty clay	4/27/2011	0.65 B [0.61 B]
		2' - 3'	Cadmium		371.82	375.00	Above	Silty clay, clay	4/27/2011	<0.21 U
		3' - 4'	Cadmium		371.82	374.00	Above	Silty clay, clay	4/27/2011	0.64 B
DI-23-02	D11	0' - 1'	Cadmium	378.27	371.82	377.27	Above	Clayey silt, silty clay	4/27/2011	0.30
		1' - 2'	Cadmium		371.82	376.27	Above	Clayey silt, sandy silt	4/27/2011	0.086 J
		2' - 3'	Cadmium		371.82	375.27	Above	Silt, sandy silt, clayey silt	4/27/2011	NA
		3' - 4'	Cadmium		371.82	374.27	Above	Sandy silt, silt, silty sand	4/27/2011	NA
DI-24-01	D11	0' - 1'	Cadmium	378.54	371.68	377.54	Above	Silty sand, trace clay	4/26/2011	0.76
		1' - 2'	Cadmium		371.68	376.54	Above	Silt, little fine sand, trace clay	4/26/2011	0.15 J
		2' - 3'	Cadmium		371.68	375.54	Above	Clayey silt with some fine sand	4/26/2011	0.17 J
		3' - 4'	Cadmium		371.68	374.54	Above	Clayey silt with some fine sand	4/26/2011	0.18 J
DI-25-01	D12	0' - 1'	Cadmium	379.06	371.55	378.06	Above	Sandy silt, trace clay	4/26/2011	0.30
		1' - 2'	Cadmium		371.55	377.06	Above	Sandy silt, trace clay	4/26/2011	0.13 J [0.17 J]
		2' - 3'	Cadmium		371.55	376.06	Above	Clayey silt, some fine sand	4/26/2011	0.052 J
		3' - 4'	Cadmium		371.55	375.06	Above	Clayey silt, some fine sand, decrease in fine sand	4/26/2011	0.11 J

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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-26-01	D12	0' - 1'	Cadmium	377.76	371.51	376.76	Above	Clayey silt, silty clay	4/28/2011	0.91
		1' - 2'	Cadmium		371.51	375.76	Above	Clayey silt, silt with plastic sheeting (fill)	4/28/2011	0.30
		2' - 3'	Cadmium		371.51	374.76	Above	Sandy silt, silty clay, gravel (fill)	4/28/2011	74.2 J [9.2 J]
		3' - 4'	Cadmium		371.51	373.76	Above	Clayey silt, sandy silt, silt	4/28/2011	129
DI-26-02	D12	0' - 1'	Cadmium	378.47	371.51	377.47	Above	Fine sand, little silt	4/28/2011	0.66
		1' - 2'	Cadmium		371.51	376.47	Above	Silty sand	4/28/2011	0.13 J
		2' - 3'	Cadmium		371.51	375.47	Above	Silty sand	4/28/2011	0.098 J
		3' - 4'	Cadmium		371.51	374.47	Above	Sandy silt	4/28/2011	0.13 J
DI-27-01	D13	0' - 1'	Cadmium	375.77	371.10	374.77	Above	Clayey silt, sandy silt, silt	4/28/2011	0.61
		1' - 2'	Cadmium		371.10	373.77	Above	Sandy silt, silty sand	4/28/2011	0.074 J
		2' - 3'	Cadmium		371.10	372.77	Above	Sandy silt, clayey silt	4/28/2011	0.29
		3' - 4'	Cadmium		371.10	371.77	At	Sandy silt, clayey silt, silty clay	4/28/2011	0.12 J
DI-28-01	C13	0' - 1'	Cadmium	378.30	371.17	377.30	Above	Silty clay	4/26/2011	0.16 J
		1' - 2'	Cadmium		371.17	376.30	Above	Clay, silty clay	4/26/2011	0.083 J
		2' - 3'	Cadmium		371.17	375.30	Above	Clay, silty clay	4/26/2011	0.039 J
		3' - 4'	Cadmium		371.17	374.30	Above	Clay	4/26/2011	0.043 J [<0.26]
DI-29-01	C14	0' - 1'	Cadmium	377.73	370.97	376.73	Above	Silt, clayey silt	4/26/2011	0.23 J
		1' - 2'	Cadmium		370.97	375.73	Above	Silty clay, clay	4/26/2011	0.18 J
		2' - 3'	Cadmium		370.97	374.73	Above	Silty clay, clay	4/26/2011	0.24
		3' - 4'	Cadmium		370.97	373.73	Above	Clay, silty clay, trace sandy silt	4/26/2011	0.11 J
DI-30-01	D14	0' - 1'	Cadmium	376.03	370.79	375.03	Above	Clayey silt, sandy silt, silty sand	4/28/2011	1.0
		1' - 2'	Cadmium		370.79	374.03	Above	Sandy silt, silty sand	4/28/2011	0.89
		2' - 3'	Cadmium		370.79	373.03	Above	Sandy silt, silty sand, clayey silt	4/28/2011	0.32
		3' - 4'	Cadmium		370.79	372.03	Above	Sandy silt, silty sand, clayey silt	4/28/2011	0.11 J [0.17 J]
DI-31-01	C15	0' - 1'	Cadmium	373.64	370.63	372.64	Above	Clayey silt, silt	4/28/2011	0.19 J
		1' - 2'	Cadmium		370.63	371.64	Above	Clayey silt, silty clay	4/28/2011	0.22 J
		2' - 3'	Cadmium		370.63	370.64	At	Silty clay, clay	4/28/2011	0.13 J
		3' - 4'	Cadmium		370.63	369.64	Below	Silty clay, clay	4/28/2011	0.15 J
DI-40-01	C3	0' - 1'	Cadmium	392.97	384.00	391.97	Above	Fine sand, little silt, organics to 6" then fine sand, trace silt	8/25/2011	1.3
		1' - 2'	Cadmium		384.00	390.97	Above	Fine sand, trace silt	8/25/2011	0.15 J
		2' - 3'	Cadmium		384.00	389.97	Above	Fine sand, trace silt	8/25/2011	0.12 J [0.21]
		3' - 4'	Cadmium		384.00	388.97	Above	Fine sand, trace silt	8/25/2011	0.13 J
DI-41-01	G5	0' - 1'	Cadmium	382.64	381.76	381.64	At	Clayey silt, silt, sandy silt	5/2/2011	1.1
		1' - 2'	Cadmium		381.76	380.64	Below	Clayey silt, sandy silt, silt	5/2/2011	0.19 J
		2' - 3'	Cadmium		381.76	379.64	Below	Sandy silt, silt, clayey silt	5/2/2011	0.19 J
		3' - 4'	Cadmium		381.76	378.64	Below	Sandy silt, clayey silt, silty clay, gravel	5/2/2011	0.65
DI-42-01	H9	0' - 1'	Cadmium	387.05	376.73	386.05	Above	Fine to medium sand, some silt	8/24/2011	0.31 [0.47]
		1' - 2'	Cadmium		376.73	385.05	Above	Fine to medium sand, some silt	8/24/2011	0.20 J
		2' - 3'	Cadmium		376.73	384.05	Above	Fine to medium sand, some silt	8/24/2011	0.063 J
		3' - 4'	Cadmium		376.73	383.05	Above	Fine to medium sand, some silt, trace clay	8/24/2011	0.075 J
DI-43-01	C16	0' - 1'	Cadmium	375.75	370.42	374.75	Above	Clayey silt, sandy silt	4/28/2011	13.1
		1' - 2'	Cadmium		370.42	373.75	Above	Sandy silt, silt	4/28/2011	0.29 J [0.74 J]
		2' - 3'	Cadmium		370.42	372.75	Above	Silty clay	4/28/2011	0.24 J
		3' - 4'	Cadmium		370.42	371.75	Above	Silty clay	4/28/2011	0.24 J
DI-43-02	C16	0' - 1'	Cadmium	376.96	370.41	375.96	Above	Clayey silt, silty sand	4/28/2011	0.35
		1' - 2'	Cadmium		370.41	374.96	Above	Silty clay	4/28/2011	0.23 J
		2' - 3'	Cadmium		370.41	373.96	Above	Silty clay, clayey silt	4/28/2011	NA
		3' - 4'	Cadmium		370.41	372.96	Above	Silty clay	4/28/2011	NA
DI-44-01	D15	0' - 1'	Cadmium	376.35	370.53	375.35	Above	Silt, fine sand with some silt at 3"	4/28/2011	0.37
		1' - 2'	Cadmium		370.53	374.35	Above	Silty sand	4/28/2011	0.50
		2' - 3'	Cadmium		370.53	373.35	Above	Sandy silt	4/28/2011	0.19 J
		3' - 4'	Cadmium		370.53	372.35	Above	Sandy silt	4/28/2011	0.22 J
DI-51-01	E8	0' - 1'	Cadmium	381.02	376.00	380.02	Above	Clayey silt, silt	4/27/2011	3.8 B
		1' - 2'	Cadmium		376.00	379.02	Above	Clayey silt	4/27/2011	<0.26 U
		2' - 3'	Cadmium		376.00	378.02	Above	Clayey silt, sandy silt, silty clay	4/27/2011	<0.24 U
		3' - 4'	Cadmium		376.00	377.02	Above	Sandy silt	4/27/2011	2.0 B
DI-51-02	E8	0' - 1'	Cadmium	380.77	376.00	379.77	Above	Clayey silt	4/27/2011	0.53
		1' - 2'	Cadmium		376.00	378.77	Above	Clayey silt, silt	4/27/2011	0.13 J
		2' - 3'	Cadmium		376.00	377.77	Above	Sandy silt, silty sand, clayey silt	4/27/2011	NA
		3' - 4'	Cadmium		376.00	376.77	Above	Sandy silt, silty sand	4/27/2011	NA

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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-52-01	H7	0' - 1'	Cadmium	382.99	377.75	381.99	Above	Fine sand, trace silt, wet	8/25/2011	0.042 J
		1' - 2'	Cadmium		377.75	380.99	Above	Fine sand, trace silt, wet	8/25/2011	0.059 J
		2' - 3'	Cadmium		377.75	379.99	Above	Gravelly sand	8/25/2011	0.059 J
		3' - 4'	Cadmium		377.75	378.99	Above	Gravelly sand	8/25/2011	0.054 J
DI-53-01	I7	0' - 1'	Cadmium	381.59	377.49	380.59	Above	Sandy silt, organics, trace clay	4/29/2011	2.5
		1' - 2'	Cadmium		377.49	379.59	Above	Sandy silt, organics, trace clay	4/29/2011	1.3 J [0.39 J]
		2' - 3'	Cadmium		377.49	378.59	Above	Sandy silt, organics, trace clay	4/29/2011	0.39
		3' - 4'	Cadmium		377.49	377.59	At	Sandy silt, organics, trace clay	4/29/2011	0.13 J
DI-53-02	I7	0' - 1'	Cadmium	382.27	377.53	381.27	Above	Clayey silt, sandy silt, silt, organics	4/29/2011	0.83
		1' - 2'	Cadmium		377.53	380.27	Above	Sandy silt, silt, organics	4/29/2011	2.1
		2' - 3'	Cadmium		377.53	379.27	Above	Silt, sandy silt	4/29/2011	NA
		3' - 4'	Cadmium		377.53	378.27	Above	Sandy silt, silt, clayey silt	4/29/2011	NA
DI-54-01	H9	0' - 1'	Cadmium	389.95	385.14	388.95	Above	Fine sand, trace silt & organics	8/25/2011	0.18 J [0.15 J]
		1' - 2'	Cadmium		385.14	387.95	Above	Fine sand, trace silt & organics	8/25/2011	0.11 J
		2' - 3'	Cadmium		385.14	386.95	Above	Fine sand, trace silt & organics	8/25/2011	0.094 J
		3' - 4'	Cadmium		385.14	385.95	Above	Fine sand, trace silt & organics	8/25/2011	0.096 J
DI-60-01	G6	0' - 1'	Cadmium	383.00	380.02	382.00	Above	Clayey silt, silt, roots	5/2/2011	<0.24 U
		1' - 2'	Cadmium		380.02	381.00	Above	Clayey silt, sandy silt	5/2/2011	<0.24 U [<0.25 U]
		2' - 3'	Cadmium		380.02	380.00	At	Sandy silt, fine to coarse gravel	5/2/2011	<0.30 U
		3' - 4'	Cadmium		380.02	379.00	Below	Sandy silt, clay, silt, fine to coarse gravel	5/2/2011	<0.30 U
DI-61-01	H7	0' - 1'	Cadmium	382.96	379.18	381.96	Above	Silty clay, clayey silt, roots	5/2/2011	1.1
		1' - 2'	Cadmium		379.18	380.96	Above	Clayey silt, sandy silt, gravel, roots	5/2/2011	0.20 J
		2' - 3'	Cadmium		379.18	379.96	Above	Sandy silt, clayey silt, silty clay, gravel	5/2/2011	0.099 J
		3' - 4'	Cadmium		379.18	378.96	At	Sandy silt, clayey silt, silty clay, gravel	5/2/2011	<0.24 U
DI-SB-01-05	D10	0' - 1'	Cadmium	382.16	372.41	381.16	Above	Silty sand, organics, trace gravel	5/2/2011	4.0
		1' - 2'	Cadmium		372.41	380.16	Above	Silt, little clay, little fine sand	5/2/2011	0.24
		2' - 3'	Cadmium		372.41	379.16	Above	Silt	5/2/2011	0.23
		3' - 4'	Cadmium		372.41	378.16	Above	Sandy silt, fine sand with trace clay at 3'-10"	5/2/2011	<0.26 U
		4' - 5'	Cadmium		372.41	377.16	Above	Silt with some fine sand, little clay	5/2/2011	0.20 J
		5' - 6'	Cadmium		372.41	376.16	Above	Silty sand	5/2/2011	0.26
		6' - 7'	Cadmium		372.41	375.16	Above	Silty sand	5/2/2011	0.14 J
		7' - 8'	Cadmium		372.41	374.16	Above	Silty sand	5/2/2011	0.16 J
		8' - 9'	Cadmium		372.41	373.16	Above	Silt with little clay, organic silt at 8'-8"	5/2/2011	0.19 J
		9' - 10'	Cadmium		372.41	372.16	At	Organic silt	5/2/2011	0.45
DI-SB-03-05	D14	0' - 1'	Cadmium	380.60	370.90	379.60	Above	Silty sand, organics	5/2/2011	0.091 J
		1' - 2'	Cadmium		370.90	378.60	Above	Silty sand	5/2/2011	<0.25
		2' - 3'	Cadmium		370.90	377.60	Above	Silty sand	5/2/2011	0.058 J
		3' - 4'	Cadmium		370.90	376.60	Above	Silty sand	5/2/2011	0.069 J
		4' - 5'	Cadmium		370.90	375.60	Above	Grades to Clayey silt, little fine sand	5/2/2011	0.077 J [0.12 J]
		5' - 6'	Cadmium		370.90	374.60	Above	Clayey silt	5/2/2011	0.065 J
		6' - 7'	Cadmium		370.90	373.60	Above	Clayey silt	5/2/2011	0.12 J
		7' - 8'	Cadmium		370.90	372.60	Above	Clayey silt, organics	5/2/2011	0.13 J
		8' - 9'	Cadmium		370.90	371.60	Above	Silty clay	5/2/2011	0.25
		9' - 10'	Cadmium		370.90	370.60	At	Silty clay	5/2/2011	<0.26
OCDDS-4	D11	0" - 6"	Cadmium	---	---	---	---	---	10/1996	3.8
		0" - 6"	PCBs		---	---	---	---	10/1996	0.042
OCDDS-5	C15	0" - 6"	Cadmium	---	---	---	---	---	10/1996	26.4
		0" - 6"	PCBs		---	---	---	---	10/1996	0.193
OCDDS-6	D14	0" - 6"	Cadmium	---	---	---	---	---	10/1996	0.14
		0" - 6"	PCBs		---	---	---	---	10/1996	<0.025
OCDDS-7	E9	0" - 6"	Cadmium	---	---	---	---	---	10/1996	80.5
		0" - 6"	PCBs		---	---	---	---	10/1996	0.801
OCDDS-10	E7	0" - 6"	Cadmium	---	---	---	---	---	10/1996	0.4
		0" - 6"	PCBs		---	---	---	---	10/1996	<0.025
Pre-SS-P1	F7	---	Cadmium	---	---	---	---	---	4/17/1997	1.3
		---	PCBs		---	---	---	---	4/17/1997	<0.026
Post-SS-P1	F7	---	Cadmium	---	---	---	---	---	5/15/1997	0.14
		---	PCBs		---	---	---	---	5/15/1997	<0.026

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SA-SB-01-01	D10	0" - 2"	Cadmium	377.74	372.41	377.57	Above	Sand	10/20/2003	6.3
		0' - 1'	Cadmium		372.41	376.74	Above	Sand/Wood	10/20/2003	15.8
		1' - 2'	Cadmium		372.41	375.74	Above	Clayey Sand	10/20/2003	3.4
		2' - 3'	Cadmium		372.41	374.74	Above	Clayey Sand	10/20/2003	<0.59
		3' - 4'	Cadmium		372.41	373.74	Above	Clayey Sand	10/20/2003	<0.58
		4' - 5'	Cadmium		372.41	372.74	At	Organic Silt/Sand	10/20/2003	442
		5' - 6'	Cadmium		372.41	371.74	Below	Organic Silt/Sand to Clayey Sand	10/20/2003	0.86
		6' - 7'	Cadmium		372.41	370.74	Below	Clayey Sand	10/20/2003	4.3
SA-SB-01-02	D10	0" - 2"	Cadmium	378.76	372.41	378.59	Above	Sand	10/20/2003	5.09
		0' - 1'	Cadmium		372.41	377.76	Above	Sand	10/20/2003	1.87
		1' - 2'	Cadmium		372.41	376.76	Above	Sand	10/20/2003	<0.593
		2' - 3'	Cadmium		372.41	375.76	Above	Sand	10/20/2003	<0.581
		3' - 4'	Cadmium		372.41	374.76	Above	Sand	10/20/2003	<0.574
		4' - 5'	Cadmium		372.41	373.76	Above	Sand	10/20/2003	<0.583
		5' - 6'	Cadmium		372.41	372.76	At	Sand to Organic Silt/Sand	10/20/2003	431
		6' - 7'	Cadmium		372.41	371.76	Below	Organic Silt/Sand	10/20/2003	46.1
		7' - 8'	Cadmium		372.41	370.76	Below	Clayey Sand	10/20/2003	<0.670
SA-SB-01-03	D10	0" - 2"	Cadmium	379.72	372.41	379.55	Above	Topsoil	10/20/2003	3.36
		0' - 1'	Cadmium		372.41	378.72	Above	Topsoil	10/20/2003	2.64
		1' - 2'	Cadmium		372.41	377.72	Above	Silty Sand	10/20/2003	6.48 [3.86]
		2' - 3'	Cadmium		372.41	376.72	Above	Silty Sand	10/20/2003	<0.611
		3' - 4'	Cadmium		372.41	375.72	Above	Silty Sand	10/20/2003	<0.58
		4' - 5'	Cadmium		372.41	374.72	Above	Silty Sand	10/20/2003	<0.592
		5' - 6'	Cadmium		372.41	373.72	Above	Silty Sand	10/20/2003	<0.60
		6' - 7'	Cadmium		372.41	372.72	At	Organic Silt/Sand	10/20/2003	401
		7' - 8'	Cadmium		372.41	371.72	Below	Organic Silt/Sand to Silty Clay	10/20/2003	52.1
		8' - 9'	Cadmium		372.41	370.72	Below	Silty Clay	10/20/2003	<0.668
SA-SB-01-04	D10	0" - 2"	Cadmium	381.29	372.41	381.12	Above	Sand	10/20/2003	2.36
		0' - 1'	Cadmium		372.41	380.29	Above	Sand	10/20/2003	1.36
		1' - 2'	Cadmium		372.41	379.29	Above	Silty Sand	10/20/2003	<0.597
		2' - 3'	Cadmium		372.41	378.29	Above	Silty Sand to Silty Clay	10/20/2003	<0.623
		3' - 4'	Cadmium		372.41	377.29	Above	Silty Clay	10/20/2003	<0.590 [<0.593]
		4' - 5'	Cadmium		372.41	376.29	Above	Silty Sand	10/20/2003	<0.589
		5' - 6'	Cadmium		372.41	375.29	Above	Silty Sand	10/20/2003	<0.597
		6' - 7'	Cadmium		372.41	374.29	Above	Silty Sand	10/20/2003	<0.608
		7' - 8'	Cadmium		372.41	373.29	Above	Silty Sand	10/20/2003	<0.608
		8' - 9'	Cadmium		372.41	372.29	At	Silty Sand to Organic Silt/Sand	10/20/2003	79.1
		9' - 10'	Cadmium		372.41	371.29	Below	Organic Silt/Sand to Clay	10/20/2003	0.85
SA-SB-02-01	E11	0" - 2"	Cadmium	378.60	371.90	378.43	Above	Topsoil	10/24/2003	4.4
		0' - 1'	Cadmium		371.90	377.60	Above	Silty Sand	10/24/2003	1.4
		1' - 2'	Cadmium		371.90	376.60	Above	Silty Sand	10/24/2003	<0.55 [1.4]
		2' - 3'	Cadmium		371.90	375.60	Above	Silty Sand	10/24/2003	<0.55
		3' - 4'	Cadmium		371.90	374.60	Above	Silty Sand	10/24/2003	<0.54
		4' - 5'	Cadmium		371.90	373.60	Above	Silty Sand	10/24/2003	1.6
		5' - 6'	Cadmium		371.90	372.60	Above	Organic Silt/Sand	10/24/2003	322
		6' - 7'	Cadmium		371.90	371.60	At	Organic Silt/Sand	10/24/2003	<0.7
		7' - 8'	Cadmium		371.90	370.60	Below	Sandy Clay	10/24/2003	<0.59
		8' - 9'	Cadmium		371.90	369.60	Below	Sand to Silty Clay	10/24/2003	<0.61
		9' - 10'	Cadmium		371.90	368.60	Below	Silty Clay to Organic Silt/Sand	10/24/2003	<0.65
		10' - 11'	Cadmium		371.90	367.60	Below	Organic Silt/Sand/ Gravel	10/24/2003	<0.68
		11' - 12'	Cadmium		371.90	366.60	Below	Silty Clay	10/24/2003	<0.57
SA-SB-02-02	E11	0" - 2"	Cadmium	380.20	371.90	380.03	Above	Topsoil	10/21/2003	1.02
		0' - 1'	Cadmium		371.90	379.20	Above	Silty Sand	10/21/2003	0.761
		1' - 2'	Cadmium		371.90	378.20	Above	Silty Sand	10/21/2003	<0.552
		2' - 3'	Cadmium		371.90	377.20	Above	Silty Sand	10/21/2003	<0.577
		3' - 4'	Cadmium		371.90	376.20	Above	Silty Sand	10/21/2003	<0.559
		4' - 5'	Cadmium		371.90	375.20	Above	Silty Sand	10/21/2003	<0.577
		5' - 6'	Cadmium		371.90	374.20	Above	Silty Sand	10/21/2003	<0.611
		6' - 7'	Cadmium		371.90	373.20	Above	Silty Sand to Organic Silt/Sand	10/21/2003	282
		7' - 8'	Cadmium		371.90	372.20	At	Organic Silt/Sand	10/21/2003	144
		8' - 9'	Cadmium		371.90	371.20	Below	Organic Silt/Sand	10/21/2003	121
		9' - 10'	Cadmium		371.90	370.20	Below	Organic Silt/Sand to Silty Clay	10/21/2003	6.6
		10' - 11'	Cadmium		371.90	369.20	Below	Silty Clay	10/21/2003	<0.62
		11' - 12'	Cadmium		371.90	368.20	Below	Silty Clay	10/21/2003	<0.632

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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SA-SB-02-03	E11	0" - 2"	Cadmium	381.79	371.90	381.62	Above	Topsoil	10/21/2003	<0.652
		0' - 1'	Cadmium		371.90	380.79	Above	Silty Sand	10/21/2003	<0.621
		1' - 2'	Cadmium		371.90	379.79	Above	Silty Sand	10/21/2003	<0.568
		2' - 3'	Cadmium		371.90	378.79	Above	Silty Sand	10/21/2003	<0.571
		3' - 4'	Cadmium		371.90	377.79	Above	Silty Sand	10/21/2003	<0.578
		4' - 5'	Cadmium		371.90	376.79	Above	Silty Sand	10/21/2003	<0.568
		5' - 6'	Cadmium		371.90	375.79	Above	Silty Sand	10/21/2003	<0.590
		6' - 7'	Cadmium		371.90	374.79	Above	Silty Sand	10/21/2003	<0.585
		7' - 8'	Cadmium		371.90	373.79	Above	Organic Silt/Sand	10/21/2003	0.682
		8' - 9'	Cadmium		371.90	372.79	Above	Silty Sand	10/21/2003	39.2
		9' - 10'	Cadmium		371.90	371.79	At	Organic Silt/Sand	10/21/2003	<0.678
		10' - 11'	Cadmium		371.90	370.79	Below	Organic Silt/Sand to Clayey Silt	10/21/2003	13.6
		11' - 12'	Cadmium		371.90	369.79	Below	Clayey Silt to Silty Clay	10/21/2003	<0.668
		12' - 13'	Cadmium		371.90	368.79	Below	Silty Clay	10/21/2003	<0.613
SA-SB-02-04	E11	0" - 2"	Cadmium	385.39	371.90	385.22	Above	Topsoil	10/21/2003	<0.698
		0' - 1'	Cadmium		371.90	384.39	Above	Silty Sand	10/21/2003	<0.659
		1' - 2'	Cadmium		371.90	383.39	Above	Silty Sand	10/21/2003	<0.602
		2' - 3'	Cadmium		371.90	382.39	Above	Silty Sand to Sand	10/21/2003	<0.588
		3' - 4'	Cadmium		371.90	381.39	Above	Sand	10/21/2003	<0.550
		4' - 5'	Cadmium		371.90	380.39	Above	Sand	10/21/2003	<0.590
		5' - 6'	Cadmium		371.90	379.39	Above	Sand	10/21/2003	<0.564
		6' - 7'	Cadmium		371.90	378.39	Above	Sand	10/21/2003	<0.566
		7' - 8'	Cadmium		371.90	377.39	Above	Sand	10/21/2003	<0.578
		8' - 9'	Cadmium		371.90	376.39	Above	Sand	10/21/2003	<0.584
		9' - 10'	Cadmium		371.90	375.39	Above	Organic Silt/Sand	10/21/2003	<0.610
		10' - 11'	Cadmium		371.90	374.39	Above	Silt/Sand	10/21/2003	<0.621
		11' - 12'	Cadmium		371.90	373.39	Above	Silt/Sand	10/21/2003	<0.629 [<0.620]
		12' - 13'	Cadmium		371.90	372.39	At	Silt/Sand	10/21/2003	<0.636
		13' - 14'	Cadmium		371.90	371.39	Below	Silt/Sand to Organic Silt/Sand	10/21/2003	98.4
SA-SB-03-01	D14	0" - 2"	Cadmium	375.50	370.88	375.33	Above	Topsoil	10/21/2003	23.8
		0' - 1'	Cadmium		370.88	374.50	Above	Silty Sand	10/21/2003	31.8
		1' - 2'	Cadmium		370.88	373.50	Above	Silty Sand	10/21/2003	28.2
		2' - 3'	Cadmium		370.88	372.50	Above	Silty Sand	10/21/2003	2.8
		3' - 4'	Cadmium		370.88	371.50	Above	Silty Sand to Organic Silt/Sand	10/21/2003	153
		4' - 5'	Cadmium		370.88	370.50	At	Organic Silt/Sand	10/21/2003	372
		5' - 6'	Cadmium		370.88	369.50	Below	Clayey Sand to Sand	10/21/2003	1.8
SA-SB-03-02	D14	0" - 2"	Cadmium	376.72	370.89	376.55	Above	Silty Sand	10/21/2003	4.22
		0' - 1'	Cadmium		370.89	375.72	Above	Silty Sand	10/21/2003	4.15
		1' - 2'	Cadmium		370.89	374.72	Above	Silty Sand	10/21/2003	<0.566
		2' - 3'	Cadmium		370.89	373.72	Above	Silty Sand	10/21/2003	<0.605
		3' - 4'	Cadmium		370.89	371.72	Above	Silty Sand	10/21/2003	<0.608
		4' - 5'	Cadmium		370.89	370.72	At	Organic Silt/Sand	10/21/2003	142
		5' - 6'	Cadmium		370.89	369.72	Below	Organic Silt/Sand	10/21/2003	36.6
		6' - 7'	Cadmium		370.89	368.72	Below	Organic Silt/Sand	10/21/2003	3.58
		7' - 8'	Cadmium		370.89	367.72	Below	Organic Silt/Sand	10/21/2003	<0.726
SA-SB-03-03	D14	0" - 2"	Cadmium	378.06	370.90	377.89	Above	Topsoil	10/21/2003	<0.713
		0' - 1'	Cadmium		370.90	377.06	Above	Silty Sand	10/21/2003	<0.638
		1' - 2'	Cadmium		370.90	376.06	Above	Silty Sand	10/21/2003	<0.583 [<0.582]
		2' - 3'	Cadmium		370.90	375.06	Above	Silty Sand	10/21/2003	<0.604
		3' - 4'	Cadmium		370.90	374.06	Above	Silty Sand	10/21/2003	<0.633
		4' - 5'	Cadmium		370.90	373.06	Above	Silty Sand	10/21/2003	<0.661
		5' - 6'	Cadmium		370.90	372.06	Above	Silty Sand to Organic Silt/Sand	10/21/2003	34.8
		6' - 7'	Cadmium		370.90	371.06	At	Organic Silt/Sand	10/21/2003	14.1
		7' - 8'	Cadmium		370.90	370.06	Below	Organic Silt/Sand to Organic Silty Clay	10/21/2003	<0.707
		8' - 9'	Cadmium		370.90	369.06	Below	Organic Silty Clay	10/21/2003	<0.677

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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SA-SB-03-04	D14	0" - 2"	Cadmium	379.39	370.90	379.22	Above	Topsoil	10/21/2003	<0.717
		0' - 1'	Cadmium		370.90	378.39	Above	Silty Sand	10/21/2003	<0.629
		1' - 2'	Cadmium		370.90	377.39	Above	Silty Sand	10/21/2003	<0.600
		2' - 3'	Cadmium		370.90	376.39	Above	Silty Sand	10/21/2003	<0.590 [<0.590]
		3' - 4'	Cadmium		370.90	375.39	Above	Silty Sand	10/21/2003	<0.578
		4' - 5'	Cadmium		370.90	374.39	Above	Silty Sand	10/21/2003	<0.605
		5' - 6'	Cadmium		370.90	373.39	Above	Silty Sand	10/21/2003	<0.610
		6' - 7'	Cadmium		370.90	372.39	Above	Silty Sand	10/21/2003	<0.622
		7' - 8'	Cadmium		370.90	371.39	At	Silty Sand to Organic Sandy Silt	10/21/2003	19.0
		8' - 9'	Cadmium		370.90	370.39	Below	Organic Sandy Silt to Silty Clay	10/21/2003	<0.749
		9' - 10'	Cadmium		370.90	369.39	Below	Silty Sand	10/21/2003	1.61
SA-SB-04-01	C15	0" - 2"	Cadmium	379.69	370.68	379.52	Above	Topsoil	10/20/2003	<0.654
		0' - 1'	Cadmium		370.68	378.69	Above	Silty Sand	10/20/2003	<0.613
		1' - 2'	Cadmium		370.68	377.69	Above	Silty Sand	10/20/2003	<0.589
		2' - 3'	Cadmium		370.68	376.69	Above	Silty Sand	10/20/2003	<0.566
		3' - 4'	Cadmium		370.68	375.69	Above	Silty Sand	10/20/2003	<0.572
		4' - 5'	Cadmium		370.68	374.69	Above	Clay/Silt	10/20/2003	<0.573
		5' - 6'	Cadmium		370.68	373.69	Above	Clay/Silt	10/20/2003	<0.610
		6' - 7'	Cadmium		370.68	372.69	Above	Clay/Silt	10/20/2003	<0.583
		7' - 8'	Cadmium		370.68	371.69	Above	Clay/Silt	10/20/2003	<0.629
		8' - 9'	Cadmium		370.68	370.69	At	Clay/Silt	10/20/2003	7.84
		9' - 10'	Cadmium		370.68	369.69	Below	Organic Silt/Sand	10/20/2003	<0.671
		10' - 11'	Cadmium		370.68	368.69	Below	Clay	10/20/2003	3.73
SA-SB-04-02	C15	0" - 2"	Cadmium	377.96	370.69	377.79	Above	Topsoil	10/20/2003	<0.677
		0' - 1'	Cadmium		370.69	376.96	Above	Silty Sand	10/20/2003	<0.597
		1' - 2'	Cadmium		370.69	375.96	Above	Silty Sand	10/20/2003	<0.602
		2' - 3'	Cadmium		370.69	374.96	Above	Silty Sand	10/20/2003	<0.586
		3' - 4'	Cadmium		370.69	737.96	Above	Silty Sand	10/20/2003	<0.602
		4' - 5'	Cadmium		370.69	372.96	Above	Silty Sand to Sand	10/20/2003	<0.573
		5' - 6'	Cadmium		370.69	371.96	Above	Sand to Silty Sand	10/20/2003	<0.613 [<0.595]
		6' - 7'	Cadmium		370.69	370.96	At	Silty Clay to Organic Clayey Silt	10/20/2003	139
		7' - 8'	Cadmium		370.69	369.96	Below	Organic Silt/Sand	10/20/2003	1.73
		8' - 9'	Cadmium		370.69	368.96	Below	Organic Silt/Sand	10/20/2003	11.9
SA-SB-04-03	C15	0" - 2"	Cadmium	377.06	370.70	376.89	Above	Topsoil	10/20/2003	2.7
		0' - 1'	Cadmium		370.70	376.06	Above	Silty Sand	10/20/2003	2.17
		1' - 2'	Cadmium		370.70	375.06	Above	Silty Sand	10/20/2003	<0.588
		2' - 3'	Cadmium		370.70	374.06	Above	Silty Sand	10/20/2003	<0.561
		3' - 4'	Cadmium		370.70	373.06	Above	Silty Sand	10/20/2003	<0.617
		4' - 5'	Cadmium		370.70	372.06	Above	Silty Sand	10/20/2003	<0.603
		5' - 6'	Cadmium		370.70	371.06	At	Silty Sand	10/20/2003	<0.635
		6' - 7'	Cadmium		370.70	370.06	Below	Silty Sand to Organic Silt/Sand	10/20/2003	1,920
		7' - 8'	Cadmium		370.70	369.06	Below	Organic Silt/Sand	10/20/2003	199
SA-SB-04-04	C15	0" - 2"	Cadmium	376.90	370.71	376.73	Above	Topsoil	10/20/2003	7.4
		0' - 1'	Cadmium		370.71	375.90	Above	Silty Sand	10/20/2003	5.3
		1' - 2'	Cadmium		370.71	374.90	Above	Sandy Silt	10/20/2003	<0.62
		2' - 3'	Cadmium		370.71	373.90	Above	Sandy Silt	10/20/2003	<0.56
		3' - 4'	Cadmium		370.71	372.90	Above	Silty Sand	10/20/2003	<0.59
		4' - 5'	Cadmium		370.71	371.90	Above	Silty Sand	10/20/2003	<0.58
		5' - 6'	Cadmium		370.71	370.90	At	Silty Sand to Organic Silt/Sand	10/20/2003	84.7
		6' - 7'	Cadmium		370.71	369.90	Below	Organic Silt/Sand	10/20/2003	112
		7' - 8'	Cadmium		370.71	368.90	Below	Silty Sand	10/20/2003	456
SB-19	E9	0" - 2"	Cadmium	---	---	---	---	---	06/2002	34.7
SB-20	E8	0" - 2"	Cadmium	---	---	---	---	---	06/2002	10.9
SB-21	E10	0" - 2"	Cadmium	---	---	---	---	---	06/2002	82.3
SB-22	E9	0" - 2"	Cadmium	---	---	---	---	---	06/2002	12.2
		0' - 1'	Cadmium		---	---	---	---	06/2002	0.68
SB-23	D12	0" - 2"	Cadmium	---	---	---	---	---	06/2002	27.1
SB-24	D11	0" - 2"	Cadmium	---	---	---	---	---	06/2002	15.8
SB-25	D13	0" - 2"	Cadmium	---	---	---	---	---	06/2002	3.76
SB-26	D13	0" - 2"	Cadmium	---	---		---		06/2002	8.34
SB-27	D15	0" - 2"	Cadmium	---	---	---	---	---	06/2002	11.9
SB-28	C14	0" - 2"	Cadmium	---	---	---	---	---	06/2002	10.9

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-51	E4	0' - 1'	Cadmium	---	---	---	---	Topsoil	11/2002	266
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	146
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	4.9
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	7.2
SB-52	G7	0' - 1'	Cadmium	---	---	---	---	Topsoil	11/2002	14.9
		1' - 2'	Cadmium		---	---	---	Clayey Silt	11/2002	22.1
		2' - 3'	Cadmium		---	---	---	Clayey Silt	11/2002	1.8
		3' - 4'	Cadmium		---	---	---	Clayey Silt	11/2002	<0.67
SB-53	F8	0' - 1'	Cadmium	---	---	---	---	Topsoil	11/2002	<0.61
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.58
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.56
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.55
SB-54	G9	0' - 1'	Cadmium	---	---	---	---	Topsoil	11/2002	1.7
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.58
		2' - 3'	Cadmium		---	---	---	Sandy Silt/Peat	11/2002	438
		3' - 4'	Cadmium		---	---	---	Peat	11/2002	1,800
SB-55	G9	0' - 1'	Cadmium	---	---	---	---	Sandy Silt	11/2002	47.7
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	27.0
		2' - 3'	Cadmium		---	---	---	Clayey Silt	11/2002	35.8
		3' - 4'	Cadmium		---	---	---	Peat	11/2002	440
SB-56	E9	0" - 2"	Cadmium	---	---	---	---	---	11/2002	64.6
SB-57	E10	0' - 1'	Cadmium	---	---	---	---	Top Soil	11/2002	195
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	98.9
		2' - 3'	Cadmium		---	---	---	Sandy Silt/Peat	11/2002	219
		3' - 4'	Cadmium		---	---	---	Peat	11/2002	420
SB-58	E10	0" - 2"	Cadmium	---	---	---	---	---	11/2002	197
SB-59	E10	0' - 1'	Cadmium	---	---	---	---	Sandy Silt	11/2002	42.5
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	310
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	84.5
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	636
SB-60	C15	0' - 1'	Cadmium	---	---	---	---	Silty Sand	11/2002	7.8
		1' - 2'	Cadmium		---	---	---	Clayey Silt	11/2002	10.9
		2' - 3'	Cadmium		---	---	---	Clayey Silt	11/2002	4.5
		3' - 4'	Cadmium		---	---	---	Clayey Silt/Peat	11/2002	139
SB-201	E8	0" - 2"	Cadmium	---	---	---	---	---	11/2002	0.61
		0' - 1'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.61
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.58
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.55
		3' - 4'	Cadmium		---	---	---	Sand	11/2002	<0.56
SB-202	E10	0" - 2"	Cadmium	---	---	---	---	---	11/2002	7.5
		0' - 1'	Cadmium		---	---	---	Sandy Silt	11/2002	20.4
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	18.4
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	8.7
		3' - 4'	Cadmium		---	---	---	Sandy Silt/Peat	11/2002	2,330
SB-203	D12	0" - 2"	Cadmium	---	---	---	---	---	11/2002	8.7
		0' - 1'	Cadmium		---	---	---	Silty Sand	11/2002	6.1
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	<0.58
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	2.0
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	353
SB-204	D12	0' - 1'	Cadmium	---	---	---	---	Silty Sand	11/2002	98.1
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	47.6
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	80.4
		3' - 4'	Cadmium		---	---	---	Silty Sand/Peat	11/2002	219
SB-205	D13	0" - 2"	Cadmium	---	---	---	---	---	11/2002	2.5
		0' - 1'	Cadmium		---	---	---	Topsoil	11/2002	16.4
		1' - 2'	Cadmium		---	---	---	Fill	11/2002	2.6
		2' - 3'	Cadmium		---	---	---	Fill/Sandy Silt	11/2002	148
		3' - 4'	Cadmium		---	---	---	Sandy Silt/Peat	11/2002	291
SB-206	C14	0" - 2"	Cadmium	---	---	---	---	---	11/2002	31.7
		0' - 1'	Cadmium		---	---	---	Topsoil	11/2002	29.4
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	1.2
		2' - 3'	Cadmium		---	---	---	Sandy Silt/Peat	11/2002	79.8
		3' - 4'	Cadmium		---	---	---	Peat	11/2002	82.6

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-207	D15	0' - 1'	Cadmium	---	---	---	---	Topsoil	11/2002	45.8
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	233
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	71.4
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	125
SB-217	C1	0" - 2"	Cadmium	389.18	384.22	389.01	Above	Organic Silt/Sand	10/29/2003	1.5
		0' - 1'	Cadmium		384.22	388.18	Above	Organic Silt/Sand	10/29/2003	6.0
		1' - 2'	Cadmium		384.22	387.18	Above	Organic Silt/Sand	10/29/2003	2.1
		2' - 3'	Cadmium		384.22	386.18	Above	Sandy Silt	10/29/2003	0.68
		3' - 4'	Cadmium		384.22	385.18	Above	Clayey Silt	10/29/2003	<0.65
		4' - 5'	Cadmium		384.22	384.18	At	Till	10/29/2003	<0.53
SB-218	D1	0" - 2"	Cadmium	390.79	384.20	390.62	Above	Topsoil	10/29/2003	1.0
		0' - 1'	Cadmium		384.20	389.79	Above	Silty Sand	10/29/2003	0.76
		1' - 2'	Cadmium		384.20	388.79	Above	Silty Sand	10/29/2003	<0.60
		2' - 3'	Cadmium		384.20	387.79	Above	Fill	10/29/2003	<0.60
		3' - 4'	Cadmium		384.20	386.79	Above	Fill to Organic Silt Sand to Silt/Sand/ Gravel	10/29/2003	<0.67
		4' - 5'	Cadmium		384.20	385.79	Above	Silt/Sand/ Gravel	10/29/2003	<0.63
		5' - 6'	Cadmium		384.20	384.79	Above	Silt/Sand/ Gravel/Peat	10/29/2003	<0.56
		6' - 7'	Cadmium		384.20	383.79	At	Till	10/29/2003	<0.55
		7' - 8'	Lithology		384.20	382.79	Below	Till	10/29/2003	NA
SB-219	D4	0" - 2"	Cadmium	385.96	383.55	385.79	Above	Topsoil	10/30/2003	247
		0' - 1'	Cadmium		383.55	384.96	Above	Topsoil	10/30/2003	466 [29]
		1' - 2'	Cadmium		383.55	383.96	At	Organic Silt/Sand	10/30/2003	40.5
		2' - 3'	Cadmium		383.55	382.96	Below	Organic Silt/Sand	10/30/2003	270
		3' - 4'	Cadmium		383.55	381.96	Below	Organic Silt/Sand	10/30/2003	2,200
		4' - 5'	Cadmium		383.55	380.96	Below	Silt/Sand/ Cobble	10/30/2003	153
		5' - 6'	Cadmium		383.55	379.96	Below	Till	10/30/2003	<0.54
		6' - 7'	Lithology		383.55	378.96	Below	Till	10/30/2003	NA
		7' - 8'	Lithology		383.55	377.96	Below	Till	10/30/2003	NA
SB-220	E4	0" - 2"	Cadmium	388.56	383.76	388.39	Above	Silty Sand	10/30/2003	1.5
		0' - 1'	Cadmium		383.76	387.56	Above	Silty Sand	10/30/2003	<0.60
		1' - 2'	Cadmium		383.76	386.56	Above	Silty Sand	10/30/2003	<0.57
		2' - 3'	Cadmium		383.76	385.56	Above	Silty Sand	10/30/2003	<0.56
		3' - 4'	Cadmium		383.76	384.56	Above	Silty Sand	10/30/2003	<0.58
		4' - 5'	Cadmium		383.76	383.56	At	Silt/Sand/ Gravel/Cobble	10/30/2003	<0.54
		5' - 6'	Cadmium		383.76	382.56	Below	Silt/Sand/ Gravel/Cobble	10/30/2003	<0.56
		6' - 7'	Cadmium		383.76	381.56	Below	Silt/Sand/ Gravel/Cobble	10/30/2003	<0.54
		7' - 8'	Cadmium		383.76	380.56	Below	Silt/Sand/ Gravel/Cobble	10/30/2003	<0.56
SB-221	E5	0" - 2"	Cadmium	384.32	383.00	384.15	Above	Topsoil	10/28/2003	65.1
		0' - 1'	Cadmium		383.00	383.32	At	Silty Sand	10/28/2003	59.1
		1' - 2'	Cadmium		383.00	382.32	Below	Silty Sand to Organic Silt/Sand	10/28/2003	1,430
		2' - 3'	Cadmium		383.00	381.32	Below	Organic Silt/Sand	10/28/2003	2,090
		3' - 4'	Cadmium		383.00	380.32	Below	Sandy Silt to Till	10/28/2003	13.3
		4' - 5'	Cadmium		383.00	379.32	Below	Till	10/28/2003	<0.56
SB-222	E4	0" - 2"	Cadmium	383.87	383.00	383.70	Above	Topsoil	10/28/2003	508
		0' - 1'	Cadmium		383.00	382.87	At	Organic Silt/Sand	10/28/2003	434
		1' - 2'	Cadmium		383.00	381.87	Below	Silty Sand	10/28/2003	36.4
		2' - 3'	Cadmium		383.00	380.87	Below	Silty Sand	10/28/2003	1.3
		3' - 4'	Cadmium		383.00	379.87	Below	Organic Silt/Sand	10/28/2003	0.65
		4' - 5'	Cadmium		383.00	378.87	Below	Organic Silt/Sand	10/28/2003	8.1
		5' - 6'	Cadmium		383.00	377.87	Below	Till	10/28/2003	<0.53
		6' - 7'	Lithology		383.00	376.87	Below	Till	10/28/2003	NA
SB-223	F5	0" - 2"	Cadmium	380.90	382.18	380.73	Below	Organic Silt/Sand	10/28/2003	937
		0' - 1'	Cadmium		382.18	379.90	Below	Organic Silt/Sand	10/28/2003	1,960
		1' - 2'	Cadmium		382.18	378.90	Below	Organic Silt/Sand	10/28/2003	389
		2' - 3'	Cadmium		382.18	377.90	Below	Organic Silt/Sand	10/28/2003	7.5
		3' - 4'	Cadmium		382.18	376.90	Below	Organic Silt/Sand	10/28/2003	2.5 [2.8]
		4' - 5'	Cadmium		382.18	375.90	Below	Till	10/28/2003	26.6
		5' - 6'	Cadmium		382.18	374.90	Below	Till	10/28/2003	<0.55
		6' - 7'	Cadmium		382.18	373.90	Below	Till	10/28/2003	<0.533
		7' - 8'	Cadmium		382.18	372.90	Below	Till	10/28/2003	<0.545

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West Branch of Bloody Brook
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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-224	F5	0" - 2"	Cadmium	382.28	382.18	382.11	At	Silty Sand	10/28/2003	9.6
		0' - 1'	Cadmium		382.18	381.28	Below	Silty Sand	10/28/2003	3.1
		1' - 2'	Cadmium		382.18	380.28	Below	Silty Sand	10/28/2003	897
		2' - 3'	Cadmium		382.18	379.28	Below	Organic Silt/Sand	10/28/2003	1,630
		3' - 4'	Cadmium		382.18	378.28	Below	Organic Silt/Sand to Till	10/28/2003	212
		4' - 5'	Cadmium		382.18	377.28	Below	Till	10/28/2003	17.5
		5' - 6'	Cadmium		382.18	376.28	Below	Till	10/28/2003	<0.54
		6' - 7'	Cadmium		382.18	375.28	Below	Till	10/28/2003	<0.546
SB-225	G7	0" - 2"	Cadmium	381.14	379.18	380.97	Above	Silty Sand	10/28/2003	70.9
		0' - 1'	Cadmium		379.18	380.14	Above	Silty Sand	10/27/2003	28.5
		1' - 2'	Cadmium		379.18	379.14	At	Silty Sand	10/27/2003	5.2
		2' - 3'	Cadmium		379.18	378.14	Below	Organic Silt/Sand	10/27/2003	1,240
		3' - 4'	Cadmium		379.18	377.14	Below	Organic Silt/Sand	10/27/2003	8.6
		4' - 5'	Cadmium		379.18	376.14	Below	Organic Silt/Sand	10/27/2003	1,140
		5' - 6'	Cadmium		379.18	375.14	Below	Silty Sand/Gravel/Cobbles	10/27/2003	<0.50
		6' - 7'	Cadmium		379.18	374.14	Below	Silty Sand/Gravel/Cobbles	10/27/2003	<0.51
		7' - 8'	Cadmium		379.18	373.14	Below	Silty Sand/Gravel/Cobbles	10/27/2003	<0.52
		8' - 9'	Lithology		379.18	372.14	Below	Silty Sand/Gravel/Cobbles	10/27/2003	NA
		9' - 10'	Lithology		379.18	371.14	Below	Silty Sand/Gravel/Cobbles	10/27/2003	NA
SB-226	G7	0" - 2"	Cadmium	380.59	379.30	380.42	Above	Silty Sand	10/28/2003	151
		0' - 1'	Cadmium		379.30	379.59	At	Silty Sand	10/27/2003	15.4
		1' - 2'	Cadmium		379.30	378.59	Below	Organic Silt/Sand	10/27/2003	124
		2' - 3'	Cadmium		379.30	377.59	Below	Organic Silt/Sand	10/27/2003	4.2 [3.9]
		3' - 4'	Cadmium		379.30	376.59	Below	Organic Silt/Sand	10/27/2003	0.80
		4' - 5'	Cadmium		379.30	375.59	Below	Till	10/27/2003	4.3
		5' - 6'	Cadmium		379.30	374.59	Below	Till	10/27/2003	<0.55
		6'-7'	Cadmium		379.30	373.59	Below	Till	10/27/2003	<0.53
		7' - 8'	Cadmium		379.30	372.59	Below	Till	10/27/2003	<0.53
SB-227	D4	0" - 2"	Cadmium	386.29	383.69	386.12	Above	Topsoil	10/28/2003	41.7
		0' - 1'	Cadmium		383.69	385.29	Above	Silty Sand	10/28/2003	63.8
		1' - 2'	Cadmium		383.69	384.29	Above	Silty Sand	10/28/2003	235
		2' - 3'	Cadmium		383.69	383.29	At	Sandy Silt	10/28/2003	86.4
		3' - 4'	Cadmium		383.69	382.29	Below	Organic Silt/Sand to Till	10/28/2003	13.7
SB-228	E6	0" - 2"	Cadmium	384.13	383.00	383.96	Above	Topsoil	10/28/2003	12.6
		0' - 1'	Cadmium		383.00	383.13	At	Silty Sand To Silty Clay	10/28/2003	1.5 [1.1]
		1' - 2'	Cadmium		383.00	382.13	Below	Silty Sand	10/28/2003	<0.59
		2' - 3'	Cadmium		383.00	381.13	Below	Silty Sand/ Gravel	10/28/2003	5.6
SB-400	E3	0" - 2"	Cadmium	391.92	383.63	391.75	Above	Topsoil	10/30/2003	<0.72
		0' - 1'	Cadmium		383.63	390.92	Above	Topsoil	10/30/2003	<0.59
		1' - 2'	Cadmium		383.63	389.92	Above	Silty Sand	10/30/2003	<0.56
		2' - 3'	Cadmium		383.63	388.92	Above	Silty Sand	10/30/2003	<0.54
		3' - 4'	Cadmium		383.63	387.92	Above	Silty Sand	10/30/2003	<0.53
		4' - 5'	Cadmium		383.63	386.92	Above	Silty Sand	10/30/2003	<0.55
		5' - 6'	Cadmium		383.63	385.92	Above	Silty Sand	10/30/2003	<0.55
		6' - 7'	Cadmium		383.63	384.92	Above	Silty Sand/ Gravel	10/30/2003	<0.53
		7' -8 '	Cadmium		383.63	383.92	At	Silty Sand/ Gravel	10/30/2003	<0.54
		8' - 9'	Cadmium		383.63	382.92	Below	Sand	10/30/2003	<0.55
		9' - 10'	Cadmium		383.63	381.92	Below	Sand	10/30/2003	<0.54
		10' - 11'	Cadmium		383.63	380.92	Below	Silty Sand/ Gravel	10/30/2003	<0.56
		11' - 12'	Cadmium		383.63	379.92	Below	Silty Sand/ Gravel	10/30/2003	<0.53
		12' - 13'	Cadmium		383.63	378.92	Below	Silty Sand/ Gravel	10/30/2003	<0.56
		13' - 14'	Cadmium		383.63	377.92	Below	Silty Sand/ Gravel	10/30/2003	<0.54
		14' - 15'	Cadmium		383.63	376.92	Below	Silty Sand/ Gravel	10/30/2003	<0.55
		15' - 16'	Cadmium		383.63	375.92	Below	Silty Sand/ Gravel	10/30/2003	<0.54
SB-401	B1	0" - 2"	Cadmium	387.37	384.28	387.20	Above	Organic Silt/Sand	10/28/2003	489
		0' - 1'	Cadmium		384.28	386.37	Above	Organic Silt/Sand	10/28/2003	771
		1' - 2'	Cadmium		384.28	385.37	Above	Organic Silt/Sand	10/28/2003	61.5
		2' - 3'	Cadmium		384.28	384.37	At	Organic Silt/Sand to Till	10/28/2003	35.6
		3' - 4'	Cadmium		384.28	383.37	Below	Till	10/28/2003	<0.55

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-402	D2	0" - 2"	Cadmium	389.59	384.19	389.42	Above	Organic Silt/Sand	10/29/2003	22.0
		0' - 1'	Cadmium		384.19	388.59	Above	Organic Silt/Sand	10/29/2003	<0.69
		1' - 2'	Cadmium		384.19	387.59	Above	Organic Silt/Sand	10/29/2003	<0.63
		2' - 3'	Cadmium		384.19	386.59	Above	Organic Silt/Sand /Gravel	10/29/2003	<0.68
		3' - 4'	Cadmium		384.19	385.59	Above	Organic Silt/Sand /Gravel	10/29/2003	<0.63
		4' - 5'	Cadmium		384.19	384.59	At	Organic Silt/Sand /Gravel	10/29/2003	<0.64
		5' - 6'	Cadmium		384.19	383.59	Below	Organic Silt/Sand /Gravel to Sand	10/29/2003	<0.61 [<0.61]
		6' - 7'	Cadmium		384.19	382.59	Below	Till	10/29/2003	<0.56
SB-403	D4	0" - 2"	Cadmium	385.52	383.59	385.35	Above	Topsoil	10/30/2003	17.8
		0' - 1'	Cadmium		383.59	384.52	Above	Organic Silt/Sand	10/30/2003	16.3
		1' - 2'	Cadmium		383.59	383.52	At	Organic Silt/Sand	10/30/2003	38.3
		2' - 3'	Cadmium		383.59	382.52	Below	Silt/Sand/ Gravel/Cobble	10/30/2003	89.1
		3' - 4'	Cadmium		383.59	381.52	Below	Silt/Sand/ Gravel/Cobble	10/30/2003	5.3
SB-404	E4	0" - 2"	Cadmium	385.59	383.00	385.42	Above	Topsoil	10/28/2003	11.4
		0' - 1'	Cadmium		383.00	384.59	Above	Silty Sand	10/28/2003	9.8 [10.3]
		1' - 2'	Cadmium		383.00	383.59	Above	Silty Sand	10/28/2003	1.3
		2' - 3'	Cadmium		383.00	382.59	At	Silty Sand	10/28/2003	<0.57
		3' - 4'	Cadmium		383.00	381.59	Below	Silty Sand	10/28/2003	<0.54
		4' - 5'	Cadmium		383.00	380.59	Below	Till	10/28/2003	<0.53
		5' - 6'	Lithology		383.00	379.59	Below	Till	10/28/2003	NA
		6' - 7'	Lithology		383.00	378.59	Below	Till	10/28/2003	NA
SB-405	F6	0" - 2"	Cadmium	384.96	382.18	384.79	Above	Topsoil	10/28/2003	2.0
		0' - 1'	Cadmium		382.18	383.96	Above	Silty Sand	10/28/2003	<0.61
		1' - 2'	Cadmium		382.18	382.96	Above	Silty Sand	10/28/2003	<0.64
		2' - 3'	Cadmium		382.18	381.96	At	Sand/Gravel	10/28/2003	<0.56
		3' - 4'	Cadmium		382.18	380.96	Below	Fill	10/28/2003	<0.60
		4' - 5'	Cadmium		382.18	379.96	Below	Fill	10/28/2003	<0.63
		5' - 6'	Cadmium		382.18	378.96	Below	Silty Sand	10/28/2003	<0.54
		6' - 7'	Cadmium		382.18	377.96	Below	Till	10/28/2003	<0.53
		7' - 8'	Lithology		382.18	376.96	Below	Till	10/28/2003	NA
SB-406	G7	0" - 2"	Cadmium	381.26	378.86	381.09	Above	Gravel	10/28/2003	4.6
		0' - 1'	Cadmium		378.86	380.26	Above	Gravel	10/27/2003	0.92
		1' - 2'	Cadmium		378.86	379.26	At	Silty Sand	10/27/2003	<0.56
		2' - 3'	Cadmium		378.86	378.26	Below	Silty Sand	10/27/2003	<0.52 [<0.55]
		3' - 4'	Cadmium		378.86	377.26	Below	Silty Sand	10/27/2003	<0.55
		4' - 5'	Cadmium		378.86	376.26	Below	Silty Sand	10/27/2003	<0.56
		5' - 6'	Cadmium		378.86	375.26	Below	Silty Sand	10/27/2003	<0.53
		6' - 7'	Cadmium		378.86	374.26	Below	Silty Sand	10/27/2003	<0.53
		7' - 8'	Cadmium		378.86	373.26	Below	Silty Sand	10/27/2003	<0.54
		8' - 9'	Lithology		378.86	372.26	Below	Sand/Gravel/Cobbles	10/27/2003	NA
		9' - 10'	Lithology		378.86	371.26	Below	Sand/Gravel/Cobbles	10/27/2003	NA
SB-407	H7	0" - 2"	Cadmium	380.91	377.49	380.74	Above	Topsoil	10/30/2003	392
		0' - 1'	Cadmium		377.49	379.91	Above	Silty Sand	10/30/2003	170
		1' - 2'	Cadmium		377.49	378.91	Above	Silty Sand	10/30/2003	0.86
		2' - 3'	Cadmium		377.49	377.91	At	Organic Silt/Sand	10/30/2003	<0.59 [<0.58]
		3' - 4'	Cadmium		377.49	376.91	Below	Organic Silt/Sand	10/30/2003	<0.60
		4' - 5'	Cadmium		377.49	375.91	Below	Organic Silt/Sand to Peat	10/30/2003	49.1
		5' - 6'	Cadmium		377.49	374.91	Below	Till	10/30/2003	<0.56
		6' - 7'	Lithology		377.49	373.91	Below	Till	10/30/2003	NA
SB-408	F8	0" - 2"	Cadmium	382.11	377.43	381.94	Above	Topsoil	10/28/2003	4.7
		0' - 1'	Cadmium		377.43	381.11	Above	Silty Sand	10/27/2003	1.1
		1' - 2'	Cadmium		377.43	380.11	Above	Silty Sand	10/27/2003	<0.62
		2' - 3'	Cadmium		377.43	379.11	Above	Silty Sand	10/27/2003	<0.54
		3' - 4'	Cadmium		377.43	378.11	Above	Sand/Gravel/Cobbles	10/27/2003	<0.52
		4' - 5'	Cadmium		377.43	377.11	At	Sand/Gravel/Cobbles	10/27/2003	<0.52
		5' - 6'	Cadmium		377.43	376.11	Below	Sand/Gravel/Cobbles	10/27/2003	<0.52
		6' - 7'	Cadmium		377.43	375.11	Below	Clayey Silt	10/27/2003	<0.56
		7' - 8'	Cadmium		377.43	374.11	Below	Clayey Silt	10/27/2003	<0.54
		8' - 9'	Lithology		377.43	373.11	Below	Clayey Silt	10/27/2003	NA
		9' - 10'	Lithology		377.43	372.11	Below	Clayey Silt	10/27/2003	NA
		10' - 11'	Lithology		377.43	371.11	Below	Silty Sand	10/27/2003	NA
		11' - 12'	Lithology		377.43	370.11	Below	Silty Sand	10/27/2003	NA

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-409	G8	0" - 2"	Cadmium	380.44	376.73	380.27	Above	Topsoil	10/28/2003	153
		0' - 1'	Cadmium		376.73	379.44	Above	Silty Sand	10/28/2003	61.6
		1' - 2'	Cadmium		376.73	378.44	Above	Silty Sand	10/28/2003	0.7
		2' - 3'	Cadmium		376.73	377.44	Above	Silty Sand	10/28/2003	<0.57
		3' - 4'	Cadmium		376.73	376.44	At	Silty Sand	10/28/2003	<0.59
		4' - 5'	Cadmium		376.73	375.44	Below	Silty Sand	10/28/2003	4.4
		5' - 6'	Cadmium		376.73	374.44	Below	Silty Sand to Organic Silt/Sand	10/28/2003	992 [1,360]
		6' - 7'	Cadmium		376.73	373.44	Below	Organic Silt/Sand	10/28/2003	2.4
		7' - 8'	Cadmium		376.73	372.44	Below	Sand/Gravel	10/28/2003	0.96
		8' - 9'	Cadmium		376.73	371.44	Below	Peat to Organic Silt/Sand	10/28/2003	1,540
		9' - 10'	Cadmium		376.73	370.44	Below	Organic Silt/Sand to Sand/Gravel	10/28/2003	1.2
		10' - 11'	Cadmium		376.73	369.44	Below	Sand/Gravel	10/28/2003	<0.56
		11' - 12'	Cadmium		376.73	368.44	Below	Till	10/28/2003	<0.53
SB-410	G9	0" - 2"	Cadmium	378.99	375.85	378.82	Above	Silty Sand	10/28/2003	2.2
		0' - 1'	Cadmium		375.85	377.99	Above	Silty Sand	10/28/2003	1.6
		1' - 2'	Cadmium		375.85	376.99	Above	Silty Sand	10/28/2003	16.3
		2' - 3'	Cadmium		375.85	375.99	At	Silty Sand to Peat	10/28/2003	4,230
		3' - 4'	Cadmium		375.85	374.99	Below	Peat	10/28/2003	7.7
		4' - 5'	Cadmium		375.85	373.99	Below	Peat to Clayey Silt	10/28/2003	463
		5' - 6'	Cadmium		375.85	372.99	Below	Organic Silt/Sand	10/28/2003	1.4
SB-411	H8	0" - 2"	Cadmium	379.09	377.20	378.92	Above	Topsoil	10/28/2003	15.6
		0' - 1'	Cadmium		377.20	378.09	Above	Silty Sand	10/28/2003	3.6
		1' - 2'	Cadmium		377.20	377.09	At	Silty Sand	10/28/2003	4.3
		2' - 3'	Cadmium		377.20	376.09	Below	Organic Silt/Sand	10/28/2003	<1.0
		3' - 4'	Cadmium		377.20	375.09	Below	Organic Silt/Sand	10/28/2003	<0.78
		4' - 5'	Cadmium		377.20	374.09	Below	Organic Silt/Sand	10/28/2003	2.1
		5' - 6'	Cadmium		377.20	373.09	Below	Organic Silt/Sand to Sand/Gravel	10/28/2003	<0.63
		6' - 7'	Cadmium		377.20	372.09	Below	Sand	10/28/2003	<0.60 [<0.63]
		7' - 8'	Cadmium		377.20	371.09	Below	Sand to Till	10/28/2003	<0.56
SB-412	H8	0" - 2"	Cadmium	378.81	377.16	378.64	Above	Topsoil	10/28/2003	29.3
		0' - 1'	Cadmium		377.16	377.81	Above	Silty Sand	10/28/2003	11.4
		1' - 2'	Cadmium		377.16	376.81	At	Silty Sand	10/28/2003	71.8
		2' - 3'	Cadmium		377.16	375.81	Below	Peat	10/28/2003	2,360
		3' - 4'	Cadmium		377.16	374.81	Below	Peat to Organic Silt/Sand	10/28/2003	1,140
		4' - 5'	Cadmium		377.16	373.81	Below	Organic Silt/Sand	10/28/2003	1,730
		5' - 6'	Cadmium		377.16	372.81	Below	Organic Silt/Sand	10/28/2003	13.6
		6' - 7'	Cadmium		377.16	371.81	Below	Till	10/28/2003	16.3
		7' - 8'	Cadmium		377.16	370.81	Below	Till	10/28/2003	1.1
SB-413	E10	0" - 2"	Lithology	377.15	372.46	376.98	Above	Sand	10/20/2003	NA
		0' - 1'	Lithology		372.46	376.15	Above	Sand	10/20/2003	NA
		1' - 2'	Lithology		372.46	375.15	Above	Sand to Silty Sand	10/20/2003	NA
		2' - 3'	Lithology		372.46	374.15	Above	Silty Sand	10/20/2003	NA
		3' - 4'	Lithology		372.46	373.15	Above	Organic Silt/Sand	10/20/2003	NA
		4' - 5'	Cadmium		372.46	372.15	At	Organic Silt/Sand	10/20/2003	2.2
		5' - 6'	Cadmium		372.46	371.15	Below	Organic Clayey Sand	10/20/2003	3.5
		6' - 7'	Cadmium		372.46	370.15	Below	Organic Silt/Sand	10/20/2003	<0.85
SB-414	E10	0" - 2"	Cadmium	379.56	372.62	379.39	Above	Topsoil	10/24/2003	34.9
		0' - 1'	Cadmium		372.62	378.56	Above	Sandy Silt	10/24/2003	96.1
		1' - 2'	Cadmium		372.62	377.56	Above	Sandy Silt	10/24/2003	16.0
		2' - 3'	Cadmium		372.62	376.56	Above	Sandy Silt	10/24/2003	14.7 [13.9]
		3' - 4'	Cadmium		372.62	375.56	Above	Sandy Silt	10/24/2003	5,350
		4' - 5'	Cadmium		372.62	374.56	Above	Organic Silt/Sand	10/24/2003	120
		5' - 6'	Cadmium		372.62	373.56	Above	Organic Silt/Sand to Clayey Silt	10/24/2003	6.9
		6' - 7'	Cadmium		372.62	372.56	At	Organic Clayey Silt	10/24/2003	1.3
		7' - 8'	Cadmium		372.62	371.56	Below	Organic Silt/Sand	10/24/2003	<0.72
SB-435	C1	0" - 2"	Cadmium	389.14	384.27	388.97	Above	Organic Silty Sand	4/28/2004	394
		0' - 1'	Cadmium		384.27	388.14	Above	Silty Sand	4/28/2004	166
		1' - 2'	Cadmium		384.27	387.14	Above	Silty Sand	4/28/2004	24.4
		2' - 3'	Cadmium		384.27	386.14	Above	Till	4/28/2004	4.43 [4.87]
SB-436	B1	0" - 2"	Cadmium	388.91	384.28	388.74	Above	Organic Silt	4/28/2004	42.8
		0' - 1'	Cadmium		384.28	387.91	Above	Organic Silt	4/28/2004	23.4
		1' - 2'	Cadmium		384.28	386.91	Above	Organic Silt	4/28/2004	2.55
		2' - 3'	Cadmium		384.28	385.91	Above	Organic Silt	4/28/2004	<0.736

Table 1A
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-437	B2	0" - 2"	Cadmium	390.63	384.24	390.46	Above	Organic Silt	4/28/2004	1.33
		0' - 1'	Cadmium		384.24	389.63	Above	Organic Silt	4/28/2004	<0.655
		1' - 2'	Cadmium		384.24	388.63	Above	Organic Silt	4/28/2004	<0.644
		2' - 3'	Cadmium		384.24	387.63	Above	Silt	4/28/2004	<0.596
		3' - 4'	Cadmium		384.24	386.63	Above	Silt	4/28/2004	<0.605
SB-438	C4	0" - 2"	Cadmium	387.97	383.63	387.80	Above	Organic Silty Sand	4/28/2004	3.84
		0' - 1'	Cadmium		383.63	386.97	Above	Organic Silty Sand	4/28/2004	1.91
		1' - 2'	Cadmium		383.63	385.97	Above	Organic Silty Sand	4/28/2004	1.03
		2' - 3'	Cadmium		383.63	384.97	Above	Silty Sand	4/28/2004	4.63
		3' - 4'	Cadmium		383.63	383.97	At	Silty Sand	4/28/2004	5.65
SB-439	E4	0" - 2"	Cadmium	387.12	383.00	386.95	Above	Organic Silty Sand	4/28/2004	1.34
		0' - 1'	Cadmium		383.00	386.12	Above	Organic Silty Sand	4/28/2004	<0.641
		1' - 2'	Cadmium		383.00	385.12	Above	Organic Silty Sand	4/28/2004	<0.634 [<0.628]
SB-440	E6	0" - 2"	Cadmium	387.30	383.00	387.13	Above	Silty Sand	4/28/2004	1.45
		0' - 1'	Cadmium		383.00	386.30	Above	Silty Sand	4/28/2004	<0.644
		1' - 2'	Cadmium		383.00	385.30	Above	Sand	4/28/2004	<0.614
		2' - 3'	Cadmium		383.00	384.30	Above	Sand	4/28/2004	<0.576
		3' - 4'	Cadmium		383.00	383.30	At	Sand	4/28/2004	<0.590
		4' - 5'	Cadmium		383.00	382.30	Below	Sand	4/28/2004	<0.610
SB-441	F5	0" - 2"	Cadmium	383.56	382.50	383.39	Above	Organic Silty Sand	4/28/2004	2.37
		0' - 1'	Cadmium		382.50	382.56	At	Organic Silty Sand	4/28/2004	13.4
		1' - 2'	Cadmium		382.50	381.56	Below	Organic Silty Sand	4/28/2004	7.13
		2' - 3'	Cadmium		382.50	380.56	Below	Silty Sand	4/28/2004	2.37
SB-442	G7	0" - 2"	Cadmium	381.80	379.18	381.63	Above	Organic Silt	4/28/2004	4.74
		0' - 1'	Cadmium		379.18	380.80	Above	Organic Silty Sand	4/28/2004	0.685
		1' - 2'	Cadmium		379.18	379.80	Above	Organic Silty Sand	4/28/2004	<0.618
		2' - 3'	Cadmium		379.18	378.80	At	Sandy Silty Clay	4/28/2004	<0.618
SB-443	G7	0" - 2"	Cadmium	381.02	379.18	380.85	Above	Organic Silty Sand	4/28/2004	31.4
		0' - 1'	Cadmium		379.18	380.02	Above	Silty Sand	4/28/2004	0.962
		1' - 2'	Cadmium		379.18	379.02	At	Silty Sand	4/28/2004	<0.663
		2' - 3'	Cadmium		379.18	378.02	Below	Organic Silt	4/28/2004	<0.871
		3' - 4'	Cadmium		379.18	377.02	Below	Silty Sandy Clay	4/28/2004	<0.624
SB-444	H8	0" - 2"	Cadmium	381.08	377.43	380.91	Above	Topsoil	4/28/2004	84.7
		0' - 1'	Cadmium		377.43	380.08	Above	Sandy Silt	4/28/2004	71.3
		1' - 2'	Cadmium		377.43	379.08	Above	Sandy Silt	4/28/2004	6.06
		2' - 3'	Cadmium		377.43	378.08	Above	Sandy Silt	4/28/2004	28.4
		3' - 4'	Cadmium		377.43	377.08	At	Sandy Silt	4/28/2004	1.05
		4' - 5'	Cadmium		377.43	376.08	Below	Sandy Silt	4/28/2004	0.973
SB-445	G7	0" - 2"	Cadmium	380.95	377.57	380.78	Above	Silty Sand	4/28/2004	135
		0' - 1'	Cadmium		377.57	379.95	Above	Silty Sand	4/28/2004	11.3
		1' - 2'	Cadmium		377.57	378.95	Above	Silty Clay	4/28/2004	5.31
		2' - 3'	Cadmium		377.57	377.95	At	Silty Clay	4/28/2004	1.28
		3' - 4'	Cadmium		377.57	376.95	Below	Organic Silt	4/28/2004	1,910 [2,710]
		4' - 5'	Cadmium		377.57	375.95	Below	Silty Sand	4/28/2004	58.4
SB-446	H8	0" - 2"	Cadmium	379.08	377.33	378.91	Above	Topsoil	4/29/2004	10.9
SB-447	I8	0" - 2"	Cadmium	380.24	377.35	380.07	Above	Topsoil	4/29/2004	<0.814
SB-448	H9	0" - 2"	Cadmium	380.65	376.92	380.48	Above	Sandy Silt	4/28/2004	4.15
		0' - 1'	Cadmium		376.92	379.65	Above	Silty Sand	4/28/2004	1.66
		1' - 2'	Cadmium		376.92	378.65	Above	Sandy Silt	4/28/2004	<0.608
		2' - 3'	Cadmium		376.92	377.65	Above	Sandy Silt	4/28/2004	<0.605
		3' - 4'	Cadmium		376.92	376.65	At	Sandy Silt	4/28/2004	3,800
		4' - 5'	Cadmium		376.92	375.65	Below	Sandy Silt	4/28/2004	2,120
		5' - 6'	Cadmium		376.92	374.65	Below	Sand & Silt	4/28/2004	16.9

Table 1A
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West Branch of Bloody Brook
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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-449	G9	0" - 2"	Cadmium	383.38	375.85	383.21	Above	Organic Silt	4/29/2004	0.909
		0' - 1'	Cadmium		375.85	382.38	Above	Organic Silt	4/29/2004	<0.665
		1' - 2'	Cadmium		375.85	381.38	Above	Organic Clayey Silt	4/29/2004	<0.605
		2' - 3'	Cadmium		375.85	380.38	Above	Clayey Silt	4/29/2004	<0.609
		3' - 4'	Cadmium		375.85	379.38	Above	Clayey Silt	4/29/2004	<0.613
		4' - 5'	Cadmium		375.85	378.38	Above	Clayey Silt	4/29/2004	<0.64
		5' - 6'	Cadmium		375.85	377.38	Above	Silty Clay	4/29/2004	<0.619
		6' - 7'	Cadmium		375.85	376.38	Above	Clayey Silt	4/29/2004	84.7
		7' - 8'	Cadmium		375.85	375.38	At	Organic Silt	4/29/2004	2,220
		8' - 9'	Cadmium		375.85	374.38	Below	Silt	4/29/2004	8.27
		9' - 10'	Cadmium		375.85	372.38	Below	Sandy Silt	4/29/2004	14.6
		10' - 11'	Cadmium		375.85	371.38	Below	Organic Silt	4/29/2004	18.3
		11' - 11.5'	Cadmium		375.85	370.88	Below	Sandy Silt	4/29/2004	8.21
SB-450	F9	0" - 2"	Cadmium	377.94	374.64	377.77	Above	Sandy Silt	4/29/2004	33.5
		0' - 1'	Cadmium		374.64	376.94	Above	Sandy Silt	4/29/2004	27.3
		1' - 2'	Cadmium		374.64	375.94	Above	Sand	4/29/2004	26.9
		2' - 3'	Cadmium		374.64	374.94	At	Organic Clayey Silt	4/29/2004	38.0
		3' - 4'	Cadmium		374.64	373.94	Below	Silt	4/29/2004	10.4
		4' - 4.5'	Cadmium		374.64	373.44	Below	Silty Sand	4/29/2004	1.44
SB-451	F9	0" - 2"	Cadmium	377.97	374.64	377.80	Above	Clayey Silt	4/29/2004	10.4
		0' - 1'	Cadmium		374.64	376.97	Above	Organic Sandy Silt	4/29/2004	9.4
		1' - 2'	Cadmium		374.64	375.97	Above	Sandy Silt	4/29/2004	3.53 [0.671]
		2' - 3'	Cadmium		374.64	374.97	At	Sandy Silt	4/29/2004	196
		3' - 4'	Cadmium		374.64	373.97	Below	Silty Sand	4/29/2004	1,390
SB-452	E10	0" - 2"	Cadmium	381.80	372.62	381.63	Above	Topsoil	4/29/2004	1.84
		0' - 1'	Cadmium		372.62	380.80	Above	Topsoil	4/29/2004	<0.654
		1' - 2'	Cadmium		372.62	379.80	Above	Clayey Silt	4/29/2004	<0.623
SB-456	E10	0" - 2"	Cadmium	384.58	373.04	384.41	Above	Topsoil	4/29/2004	<0.658
		0' - 1'	Cadmium		373.04	383.58	Above	Clayey Silt	4/29/2004	<0.607
		1' - 2'	Cadmium		373.04	382.58	Above	Silt	4/29/2004	<0.620
		2' - 3'	Cadmium		373.04	381.58	Above	Sandy Silt	4/29/2004	<0.619
		3' - 4'	Cadmium		373.04	380.58	Above	Clayey Silt	4/29/2004	<0.605
		4' - 5'	Cadmium		373.04	379.58	Above	Clayey Silt	4/29/2004	<0.588
		5' - 6'	Cadmium		373.04	378.58	Above	Sandy Silt	4/29/2004	1.46
SB-457	C2	0" - 2"	Cadmium	387.53	384.10	387.36	Above	Organic Silt	4/29/2004	253
		0' - 1'	Cadmium		384.10	386.53	Above	Organic Silt	4/29/2004	84.5
		1' - 2'	Cadmium		384.10	385.53	Above	Sandy Silt	4/29/2004	12.5
		2' -2.25'	Cadmium		384.10	385.28	Above	Sandy Silt	4/29/2004	3.9
SB-458	C2	0" - 2"	Cadmium	387.06	384.09	386.89	Above	Organic Sandy Silt	4/29/2004	446
		0' - 1'	Cadmium		384.09	386.06	Above	Organic Sandy Silt	4/29/2004	188
		1' - 2'	Cadmium		384.09	385.06	Above	Silt	4/29/2004	15.5
SB-459	C2	0" - 2"	Cadmium	387.63	384.09	387.46	Above	Clayey Silt	4/29/2004	27.0
		0' - 1'	Cadmium		384.09	386.63	Above	Clayey Silt	4/29/2004	21.6
		1' - 2'	Cadmium		384.09	385.63	Above	Organic Clayey Silt	4/29/2004	1.96
		2' - 3'	Cadmium		384.09	384.63	Above	Organic Clayey Silt	4/29/2004	30.3
SSSWP-1	F8	0" - 6"	Cadmium	---	---	---	---	---	12/19/2007	7.0 [10.8]
		6" - 24"	Cadmium		---	---	---	---	12/19/2007	25.8
SSSWP-1E	F8	0" - 6"	Cadmium	379.79	376.73	379.29	Above	Gravelly sand with some silt, organics	4/27/2011	18.4
		6" - 12'	Cadmium		376.73	378.79	Above	Gravelly sand with some silt, organics	4/27/2011	33.9
		1' - 2'	Cadmium		376.73	377.79	Above	Silty sand with trace gravel, organics, clay	4/27/2011	26.3
SSSWP-1N	F8	0" - 6"	Cadmium	380.60	377.16	380.10	Above	Silt and fine sand, organics	4/27/2011	1.8
		6" - 12'	Cadmium		377.16	379.60	Above	Fine sand	4/27/2011	0.045 J
		1' - 2'	Cadmium		377.16	378.60	Above	Fine sand, wet	4/27/2011	0.048 J
SSSWP-1R	F8	0" - 6"	Cadmium	381.25	376.69	380.75	Above	Silt with little fine sand, trace gravel, organics	4/27/2011	8.3
		6" - 12'	Cadmium		376.69	380.25	Above	Fine sand, trace gravel	4/27/2011	0.72
		1' - 2'	Cadmium		376.69	379.25	Above	Fine sand, trace gravel	4/27/2011	2.9
SSSWP-1S	F8	0" - 6"	Cadmium	381.03	376.35	380.53	Above	Sandy silt with organics	4/27/2011	6.8
		6" - 12'	Cadmium		376.35	380.03	Above	Sandy silt with organics	4/27/2011	4.3
		1' - 2'	Cadmium		376.35	379.03	Above	Sandy silt with organics, trace gravel	4/27/2011	3.2
SSSWP-1W	F8	0" - 6"	Cadmium	381.56	376.96	381.06	Above	Sandy silt with organics	4/27/2011	2.6
		6" - 12'	Cadmium		376.96	380.56	Above	Silty sand with organics	4/27/2011	0.40
		1' - 2'	Cadmium		376.96	379.56	Above	Fine sand	4/27/2011	0.58 J

Table 1A

Summary of Soil Classification and Analytical Data[1]

West Branch of Bloody Brook

Bloody Brook Voluntary Cleanup Program

Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SSSWP-2	F7	0" - 6"	Cadmium	---	---	---	---	---	12/19/2007	2.2
		6" - 15"	Cadmium		---	---	---	---	12/19/2007	0.62
SSSWP-3	F7	0" - 6"	Cadmium	---	---	---	---	---	12/19/2007	0.77
		6" - 24"	Cadmium		---	---	---	---	12/19/2007	<0.05
SSSWP-4	F6	0" - 6"	Cadmium	---	---	---	---	---	12/19/2007	4.7
		6" - 24"	Cadmium		---	---	---	---	12/19/2007	<0.04
SSSWP-5	E5	0" - 6"	Cadmium	---	---	---	---	---	12/19/2007	3.2
		6" - 24"	Cadmium		---	---	---	---	12/19/2007	0.28

Notes:

1. Boring locations are shown on Figures 5A, 6A, 8A, and 11A.
2. Figure coordinates correspond to coordinate system shown on Figures 5A, 6A, 8A, and 11A.
3. The soil classification descriptions identified in the table represent the predominant soil type for the respective intervals.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. --- indicates that the information is not available.
6. Duplicate results are presented in brackets.
7. B - Compound was found in the blank and sample.
8. J - The detected concentration is an estimated value.
9. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
10. < - Analyte not detected at the reporting limit shown.
11. NA = Not analyzed.
12. Samples were inadvertently disposed of prior to analysis and no results are available.
13. After three attempts, the sampling personnel were unable to advance the equipment through the sampling depth, and the soil sample was not collected.

Table 1B
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
B-6	E29	0.80' - 1.5'	Cadmium	---	---	---	---	---	11/24/2003	0.97
		1.5' - 7.5'	Cadmium		---	---	---	---	11/24/2003	<0.59
B-7	D29	0' - 1.5'	Cadmium	---	---	---	---	---	11/24/2003	2
		1.5' - 10'	Cadmium		---	---	---	---	11/24/2003	2.5
B-8	E28	0' - 2.5'	Cadmium	---	---	---	---	---	11/24/2003	0.72
		2.5' - 10'	Cadmium		---	---	---	---	11/24/2003	0.93
B-9	F27	0' - 1'	Cadmium	---	---	---	---	---	11/24/2003	<0.62
		1' - 10'	Cadmium		---	---	---	---	11/24/2003	<0.57
B-10	F22	0' - 1.5'	Cadmium	---	---	---	---	---	11/25/2003	7
		1.5' - 10'	Cadmium		---	---	---	---	11/25/2003	0.95
DI-04-01	F17	0' - 1'	Cadmium	377.21	369.96	376.21	Above	Silt with little clay & little sand	4/25/2011	1.7
		1' - 2'	Cadmium		369.96	375.21	Above	Silt with little clay & little sand	4/25/2011	NA
		2' - 3'	Cadmium		369.96	374.21	Above	Silty clay with some fine sand	4/25/2011	NA
		3' - 4'	Cadmium		369.96	373.21	Above	Silty clay with some fine sand	4/25/2011	NA
		4' - 5'	Cadmium		369.96	372.21	Above	Clay with some silt & little fine sand	4/25/2011	NA
		5' - 6'	Cadmium		369.96	371.21	Above	Silty clay with some fine sand	4/25/2011	0.29
		6' - 7'	Cadmium		369.96	370.21	At	Clay with little silt (organics)	4/25/2011	1.4
		7' - 8'	Cadmium		369.96	369.21	Below	Clay with little silt (organics)	4/25/2011	332
		8' - 9'	Cadmium		369.96	368.21	Below	Clay with little silt (organics)	4/25/2011	0.98
DI-06-01	F18	0' - 1'	Cadmium	375.82	369.18	374.82	Above	Fine sand with little silt	4/25/2011	1.4
		1' - 2'	Cadmium		369.18	373.82	Above	Fine sand with little silt	4/25/2011	0.19 J
		2' - 3'	Cadmium		369.18	372.82	Above	Silt with some fine sand & trace clay	4/25/2011	0.24
		3' - 4'	Cadmium		369.18	371.82	Above	Silt with some fine sand & trace clay	4/25/2011	0.25
		4' - 5'	Cadmium		369.18	370.82	Above	Silt with some fine sand & trace clay	4/25/2011	0.47
		5' - 6'	Cadmium		369.18	369.82	Above	Silt with little sand & little clay	4/25/2011	10.5
		6' - 7'	Cadmium		369.18	368.82	At	Silt with little sand & little clay	4/25/2011	0.48
		7' - 8'	Cadmium		369.18	367.82	Below	Gray clay at 7'-6"	4/25/2011	<0.26 U
DI-06-02	F18	0' - 1'	Cadmium	376.21	369.98	375.21	Above	Silty fine sand with organics	4/25/2011	NA
		1' - 2'	Cadmium		369.98	374.21	Above	Silty fine sand with organics	4/25/2011	NA
		2' - 3'	Cadmium		369.98	373.21	Above	Sandy silt with little clay	4/25/2011	NA
		3' - 4'	Cadmium		369.98	372.21	Above	Silt with little clay	4/25/2011	NA
		4' - 5'	Cadmium		369.98	371.21	Above	Silt with little clay	4/25/2011	0.20 J
		5' - 6'	Cadmium		369.98	370.21	At	Silt with little clay	4/25/2011	3.2
		6' - 7'	Cadmium		369.98	369.21	Below	Silt with little clay	4/25/2011	0.26 J
		7' - 8'	Cadmium		369.98	368.21	Below	Clayey silt at 7'-8"	4/25/2011	NA
DI-07-01	F20	0' - 1'	Cadmium	---	---	---	---	Silt & sand/gravel & organics	8/14/2009	28.8 J
		1' - 2'	Cadmium		---	---	---	Silty clay/gravel	8/14/2009	32.2 J [36.1 J]
		2' - 3'	Cadmium		---	---	---	Silt & sand	8/14/2009	20.7 J
		3' - 4'	Cadmium		---	---	---	Silt & clay	8/14/2009	1.16 J
DI-07-02	F20	0' - 1'	Cadmium	---	---	---	---	Silty clay/gravel & organics	8/14/2009	32.4 J
		1' - 2'	Cadmium		---	---	---	Silt & clay/gravel	8/14/2009	5.98 J
		2' - 3'	Cadmium		---	---	---	Silt & clay/gravel	8/14/2009	10.8 J
		3' - 4'	Cadmium		---	---	---	Silt & sand/clay	8/14/2009	12.1 J
		4' - 5'	Cadmium		---	---	---	Silt & sand/clay	8/14/2009	6.11 J
		5' - 6'	Cadmium		---	---	---	Silt & sand/clay	8/14/2009	5.25 J
DI-07-03	F20	0' - 1'	Cadmium	---	---	---	---	Silt & clay/gravel & organics	8/14/2009	0.422
		1' - 2'	Cadmium		---	---	---	Silt & clay	8/14/2009	0.535
		2' - 3'	Cadmium		---	---	---	Silt & clay	8/14/2009	7.38
		3' - 4'	Cadmium		---	---	---	Silty clay	8/14/2009	3.39
		4' - 5'	Cadmium		---	---	---	Silt & sand/clay & gravel	8/14/2009	5.06
		5' - 6'	Cadmium		---	---	---	Silt & clay	8/14/2009	73
		6' - 7'	Cadmium		---	---	---	Silty clay/sand	8/14/2009	<0.267
		7' -8'	Cadmium		---	---	---	Silt & sand	8/14/2009	<0.261
		8' - 9'	Cadmium		---	---	---	Silty clay/sand	8/14/2009	0.277 J
		9' -10'	Cadmium		---	---	---	Silty clay to sand	8/14/2009	1.49
		10' - 11'	Cadmium		---	---	---	Sand/clay to silty clay	8/14/2009	<0.243
DI-08-01	F21	0' - 1'	Cadmium	376.77	367.59	375.77	Above	Clayey silt, sand	4/26/2011	0.25
		1' - 2'	Cadmium		367.59	374.77	Above	Sand, silty clay	4/26/2011	0.24
		2' - 3'	Cadmium		367.59	373.77	Above	Silty clay	4/26/2011	0.38
		3' - 4'	Cadmium		367.59	372.77	Above	Silty clay	4/26/2011	0.10 J
		4' - 5'	Cadmium		367.59	371.77	Above	Clayey silt, silty clay	4/26/2011	5.6
		5' - 6'	Cadmium		367.59	370.77	Above	Silty clay, clayey silt	4/26/2011	1.0

Table 1B
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-09-01	F21	0 - 1'	Cadmium	---	---	---	---	Sand & Silt, trace organics & gravel	9/21/2009	0.601
		1 - 2'	Cadmium		---	---	---	Sand & silt, trace organics & gravel	9/21/2009	0.270
		2 - 3'	Cadmium		---	---	---	Sand & silt, trace organics & gravel	9/21/2009	5.74
		3 - 4'	Cadmium		---	---	---	Silt & sand, trace gravel	9/21/2009	0.246
		4 - 5'	Cadmium		---	---	---	Sand & silt	9/21/2009	0.254
		5 - 6'	Cadmium		---	---	---	Silt & sand, trace gravel	9/21/2009	4.21
		6 - 7'	Cadmium		---	---	---	Silt	9/21/2009	9.12
DI-09-02	F21	0 - 1'	Cadmium	---	---	---	---	Sand & silt, organics	9/21/2009	3.45
		1 - 2'	Cadmium		---	---	---	Sand & silt, organics	9/21/2009	10.7
		2 - 3'	Cadmium		---	---	---	Sand & silt, organics & trace clay	9/21/2009	0.982
		3 - 4'	Cadmium		---	---	---	Silt & sand, trace organics	9/21/2009	0.77
		4 - 5'	Cadmium		---	---	---	Silt & sand, trace organics	9/21/2009	9.40
		5 - 6'	Cadmium		---	---	---	Silty clay & fine sand	9/21/2009	5.76
		6 - 7'	Cadmium		---	---	---	Fine sand & silt	9/21/2009	3.55
DI-09-03	G21	0' - 1'	Cadmium	375.67	367.69	374.67	Above	Silt, silty sand, trace gravel	4/25/2011	0.98
		1' - 2'	Cadmium		367.69	373.67	Above	Silty sand, silt, clay, trace gravel	4/25/2011	6.6
DI-09-04	G21	0' - 1'	Cadmium	376.02	367.29	375.02	Above	Silty clay, clay	4/25/2011	0.72
		1' - 2'	Cadmium		367.29	374.02	Above	Silty clay	4/25/2011	0.72
DI-10-01	G22	0' - 1'	Cadmium	373.62	366.48	372.62	Above	Silty clay, clayey silt	4/25/2011	5.5 B
		1' - 2'	Cadmium		366.48	371.62	Above	Silty clay, clay	4/25/2011	2.4 B
DI-11-01	F22	0' - 1'	Cadmium	---	---	---	---	Silt & sand/ organics & gravel	8/14/2009	7.21
		1' - 2'	Cadmium		---	---	---	Silt with sand/organics & clay	8/14/2009	6.38
		2' - 3'	Cadmium		---	---	---	Silt with sand/clay & gravel	8/14/2009	3.76
		3' - 4'	Cadmium		---	---	---	Silt with sand/clay & gravel	8/14/2009	49
DI-11-02	F22	0' - 1'	Cadmium	---	---	---	---	Silt with gravel/organics	8/14/2009	0.431 [0.276]
		1' - 2'	Cadmium		---	---	---	Silt with clay/gravel & organics	8/14/2009	0.062 J
		2' - 3'	Cadmium		---	---	---	Silt with gravel	8/14/2009	0.266
		3' - 4'	Cadmium		---	---	---	Silt	8/14/2009	0.240
		4' - 5'	Cadmium		---	---	---	Silt with gravel	8/14/2009	0.213 J
		5' - 6'	Cadmium		---	---	---	Silt with gravel	8/14/2009	0.074 J
DI-11-03	F22	0' - 1'	Cadmium	---	---	---	---	Silt & clay/organics & gravel	8/14/2009	<0.261
		1' - 2'	Cadmium		---	---	---	Silt & clay/organics & gravel	8/14/2009	0.523
		2' - 3'	Cadmium		---	---	---	Silt with gravel/organics	8/14/2009	0.154 J
		3' - 4'	Cadmium		---	---	---	Silt with gravel/organics	8/14/2009	0.327
		4' - 5'	Cadmium		---	---	---	Silt with gravel/organics	8/14/2009	<0.253
		5' - 6'	Cadmium		---	---	---	Silt with gravel/organics, some sand	8/14/2009	0.061 J
		6' - 7'	Cadmium		---	---	---	Silt with gravel/organics, some sand	8/14/2009	<0.243
		7' -8'	Cadmium		---	---	---	Silt with gravel/organics, some sand	8/14/2009	<0.250
		8' - 9'	Cadmium		---	---	---	Silt/clay	8/14/2009	<0.265
		9' -10'	Cadmium		---	---	---	Silty clay/sand	8/14/2009	<0.235
		10' - 11'	Cadmium		---	---	---	Silty clay/sand	8/14/2009	<0.267
DI-13-01	F27	0' - 1'	Cadmium	371.26	364.09	370.26	Above	Fine sand, some gravel, organics	8/23/2011	1.4
		1' - 2'	Cadmium		364.09	369.26	Above	Fine sand, some gravel, organics	8/23/2011	2.7
		2' - 3'	Cadmium		364.09	368.26	Above	Fine sand, little silt, trace gravel	8/23/2011	0.30
		3' - 4'	Cadmium		364.09	367.26	Above	Silty fine sand - silt increasing with depth	8/23/2011	0.35
		4' - 5'	Cadmium		364.09	366.26	Above	Sandy silt to 4'-6" then silty clay	8/23/2011	0.19 J [0.14 J]
		5' - 6'	Cadmium		364.09	365.26	Above	Clay, trace silt	8/23/2011	0.22 J
		6' - 7'	Cadmium		364.09	364.26	At	Clay, trace silt	8/23/2011	0.16 J
DI-13-02	F27	0' - 1'	Cadmium	371.67	364.09	370.67	Above	Fine sand, little gravel, trace silt (organics)	8/23/2011	4.6
		1' - 2'	Cadmium		364.09	369.67	Above	Fine sand, some gravel, little silt (organics)	8/23/2011	2.3
		2' - 3'	Cadmium		364.09	368.67	Above	Fine sand, little silt, trace gravel	8/23/2011	0.38
		3' - 4'	Cadmium		364.09	367.67	Above	Silty sand, trace clay (mottling), trace gravel	8/23/2011	0.30
		4' - 5'	Cadmium		364.09	366.67	Above	---	Refusal	Refusal[12]
		5' - 6'	Cadmium		364.09	365.67	Above	---	Refusal	Refusal[12]
		6' - 7'	Cadmium		364.09	364.67	Above	---	Refusal	Refusal[12]
DI-13-03	F27	0' - 1'	Cadmium	372.25	364.09	371.25	Above	Fine sand, some gravel, organics	8/23/2011	0.91
		1' - 2'	Cadmium		364.09	370.25	Above	Fine sand, some gravel	8/23/2011	0.072 J
		2' - 3'	Cadmium		364.09	369.25	Above	Fine sand, some gravel, organics	8/23/2011	0.25
		3' - 4'	Cadmium		364.09	368.25	Above	Fine sand, some gravel, organics	8/23/2011	0.11 J
		4' - 5'	Cadmium		364.09	367.25	Above	Clayey silt, increasing clay with depth	8/23/2011	5.8
		5' - 6'	Cadmium		364.09	366.25	Above	Silty clay to 5'-8" then silt	8/23/2011	1.1
		6' - 7'	Cadmium		364.09	365.25	Above	Clayey silt	8/23/2011	<0.22

Table 1B
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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-14-01	E27	0' - 1'	Cadmium	373.33	364.23	372.33	Above	Sand, some gravel, trace silt	8/23/2011	0.50
		1' - 2'	Cadmium		364.23	371.33	Above	Sand, some gravel, some silt	8/23/2011	0.14 J [0.40]
		2' - 3'	Cadmium		364.23	370.33	Above	Sand, some gravel, some silt, trace clay	8/23/2011	0.15 J
		3' - 4'	Cadmium		364.23	369.33	Above	Sand, some gravel, trace silt	8/23/2011	0.045 J
		4' - 5'	Cadmium		364.23	368.33	Above	Sand, some gravel, trace silt to 4'-6" then silt, trace clay	8/23/2011	5.3
		5' - 6'	Cadmium		364.23	367.33	Above	Silt with organics, trace clay	8/23/2011	78.1
		6' - 7'	Cadmium		364.23	366.33	Above	Silt with less organics, trace clay	8/23/2011	0.42
DI-14-02	E27	0' - 1'	Cadmium	373.82	364.24	372.82	Above	Coarse to fine sand, some gravel, trace silt	8/23/2011	NA
		1' - 2'	Cadmium		364.24	371.82	Above	Coarse to fine sand, some gravel, trace silt	8/23/2011	NA
		2' - 3'	Cadmium		364.24	370.82	Above	Coarse to fine sand, some gravel, trace silt	8/23/2011	NA
		3' - 4'	Cadmium		364.24	369.82	Above	Sandy gravel, trace silt	8/23/2011	NA
		4' - 5'	Cadmium		364.24	368.82	Above	Sand, some gravel, trace silt	8/23/2011	0.058 J
		5' - 6'	Cadmium		364.24	367.82	Above	Sand, some gravel, trace silt to 5'-6" then silt, organics, trace clay	8/23/2011	4.9 J
		6' - 7'	Cadmium		364.24	366.82	Above	Silt, organics, trace clay	8/23/2011	4.6 J
		7' - 8'	Cadmium		364.24	365.82	Above	Clayey silt, trace fine sand	8/23/2011	0.52 J
DI-15-01	C30	0' - 1'	Cadmium	372.6	364.55	371.6	Above	Silty sand, little gravel, trace clay	8/22/2011	0.62
		1' - 2'	Cadmium		364.55	370.6	Above	Silty sand, little gravel, trace clay	8/22/2011	15.2
		2' - 3'	Cadmium		364.55	369.6	Above	Silty sand, little gravel, trace clay	8/22/2011	18
		3' - 4'	Cadmium		364.55	368.6	Above	Silty sand, little gravel, trace clay	8/22/2011	4.9
		4' - 5'	Cadmium		364.55	367.6	Above	Silt, trace clay	8/22/2011	0.27
		5' - 6'	Cadmium		364.55	366.6	Above	Silt, little clay	8/22/2011	0.21 J
		6' - 7'	Cadmium		364.55	365.6	Above	Silt, little clay	8/22/2011	0.19 J
DI-15-02	C30	0' - 1'	Cadmium	372.62	364.55	371.62	Above	Silty sand & gravel, trace clay	8/22/2011	2.5
		1' - 2'	Cadmium		364.55	370.62	Above	Silty sand & gravel, trace clay	8/22/2011	3.7
		2' - 3'	Cadmium		364.55	369.62	Above	Sandy silt with little gravel, trace clay	8/22/2011	2.3
		3' - 4'	Cadmium		364.55	368.62	Above	Sandy silt with little gravel, trace clay	8/22/2011	2.9
		4' - 5'	Cadmium		364.55	367.62	Above	Silt, little clay (green & red mottling)	8/22/2011	1.5
		5' - 6'	Cadmium		364.55	366.62	Above	Silt, little clay	8/22/2011	0.26 [0.20 J]
		6' - 7'	Cadmium		364.55	365.62	Above	Silt, little clay	8/22/2011	0.14 J
DI-32A-01	F20	0 - 1'	Cadmium	---	---	---	---	Silt, organics and gravel	9/21/2009	0.276 [0.215 J]
		1 - 2'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	1.72
		2 - 3'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	4.71
		3 - 4'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	0.591
		4 - 5'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	78.6
		5 - 6'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	6.53
DI-32C-01	F21	0 - 1'	Cadmium	---	---	---	---	Sand & silt, organics	9/21/2009	0.444
		1 - 2'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	1.19
		2 - 3'	Cadmium		---	---	---	Sand & silt, gravel	9/21/2009	0.238 [0.180 J]
		9 - 10'	Cadmium		---	---	---	Silty clay	9/21/2009	<0.255
		10 - 11'	Cadmium		---	---	---	Silty clay	9/21/2009	<0.235
DI-32C-02	F21	0 - 1'	Cadmium	---	---	---	---	Sand & silt, organics	9/21/2009	0.460
		1 - 2'	Cadmium		---	---	---	Sand & silt, organics	9/21/2009	1.32
		2 - 3'	Cadmium		---	---	---	Silt & sand, trace clay	9/21/2009	0.164 J
DI-33-01	G23	0' - 1'	Cadmium	---	---	--	---	Gravel/silt and sand	8/11/2009	2.26
		1' - 2'	Cadmium		---	--	---	Silty clay with gravel	8/11/2009	2.48
		2' - 3'	Cadmium		---	--	---	Silty clay with gravel	8/11/2009	2.05 [2.74]
		3' - 4'	Cadmium		---	--	---	Silty clay with gravel/organics	8/11/2009	3.95
		4' - 5'	Cadmium		---	--	---	Silty clay with gravel/organics	8/11/2009	2.73
DI-34-01	G24	0' - 1'	Cadmium	371.98	365.46	370.98	Above	Fine sandy silt, trace clay & organics	8/24/2011	22.0
		1' - 2'	Cadmium		365.46	369.98	Above	Sandy silt, trace clay	8/24/2011	101
		2' - 3'	Cadmium		365.46	368.98	Above	Sandy silt, trace clay	8/24/2011	5.0
		3' - 4'	Cadmium		365.46	367.98	Above	Silt	8/24/2011	0.51
DI-34-02	G24	0' - 1'	Cadmium	372.31	365.46	371.31	Above	Silt, some fine sand, little clay	8/24/2011	48.2 J
		1' - 2'	Cadmium		365.46	370.31	Above	Silt, little fine sand, little clay	8/24/2011	8.8 J
		2' - 3'	Cadmium		365.46	369.31	Above	Silt, little to trace clay	8/24/2011	23.2 J
		3' - 4'	Cadmium		365.46	368.31	Above	Silt, little fine sand, little clay	8/24/2011	15.6 J

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Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
DI-45-01	F19	0' - 1'	Cadmium	375.04	369.27	374.04	Above	Clay, silty clay	4/25/2011	3.6
		1' - 2'	Cadmium		369.27	373.04	Above	Clay, silty clay, fine sand	4/25/2011	0.33
		2' - 3'	Cadmium		369.27	372.04	Above	Clay, silty clay, silt, trace fine sand	4/25/2011	0.62
		3' - 4'	Cadmium		369.27	371.04	Above	Clay, silty clay, organics	4/25/2011	530
		4' - 5'	Cadmium		369.27	370.04	Above	Clay, silty clay, occasional roots	4/25/2011	4.5
		5' - 6'	Cadmium		369.27	369.04	At	Clay, clayey silt, silt, sandy silt	4/25/2011	2.8
		6' - 7'	Cadmium		369.27	368.04	Below	Clayey silt, clay, sandy silt	4/25/2011	9.5
		7' - 8'	Cadmium		369.27	367.04	Below	Clay	4/25/2011	0.58
DI-45-02	F19	0' - 1'	Cadmium	375.66	369.27	374.66	Above	Clay	4/25/2011	4.1
		1' - 2'	Cadmium		369.27	373.66	Above	Clay, silty clay	4/25/2011	1.9
		2' - 3'	Cadmium		369.27	372.66	Above	Clay, silty clay	4/25/2011	2.5
		3' - 4'	Cadmium		369.27	371.66	Above	Clay, silty clay	4/25/2011	2.6
DI-45-03	F19	0' - 1'	Cadmium	376.01	369.27	375.01	Above	Clay, silty clay	4/25/2011	0.50
		1' - 2'	Cadmium		369.27	374.01	Above	Clay, silty clay	4/25/2011	0.21 J
DI-46-01	F21	0' - 1'	Cadmium	377.47	367.00	376.47	Above	Clayey silt, silty clay, trace gravel	4/27/2011	3.6
		1' - 2'	Cadmium		367.00	375.47	Above	Silty clay, clayey silt, gravel	4/27/2011	0.83
DI-46-02	F21	0' - 1'	Cadmium	377.39	367.00	376.39	Above	Clayey silt, silty clay, fine to coarse gravel	4/27/2011	0.79
		1' - 2'	Cadmium		367.00	375.39	Above	Fine to coarse gravel, silty clay	4/27/2011	0.70
DI-47-01	F21	0' - 1'	Cadmium	377.02	366.91	376.02	Above	Clayey silt with little fine sand	4/26/2011	2.2
		1' - 2'	Cadmium		366.91	375.02	Above	Clayey silt with little fine sand	4/26/2011	2.6
		2' - 3'	Cadmium		366.91	374.02	Above	---	Refusal	Refusal[12]
		3' - 4'	Cadmium		366.91	373.02	Above	---	Refusal	Refusal[12]
DI-47-02	F21	0' - 1'	Cadmium	377.87	366.91	376.87	Above	---	Refusal	Refusal[12]
		1' - 2'	Cadmium		366.91	375.87	Above	---	Refusal	Refusal[12]
		2' - 3'	Cadmium		366.91	374.87	Above	---	Refusal	Refusal[12]
		3' - 4'	Cadmium		366.91	373.87	Above	---	Refusal	Refusal[12]
DI-47-03	F21	0' - 1'	Cadmium	377.58	366.91	376.58	Above	Clayey silt with little fine sand, trace gravel	4/26/2011	0.60
		1' - 2'	Cadmium		366.91	375.58	Above	Clayey silt with little fine sand, trace gravel, less clay	4/26/2011	1.4
DI-48-01	F21	0' - 1'	Cadmium	373.27	366.79	372.27	Above	Silty clay, roots	4/25/2011	52.6 B
		1' - 2'	Cadmium		366.79	371.27	Above	Silty clay with clay	4/25/2011	9.6 B
		2' - 3'	Cadmium		366.79	370.27	Above	Silty clay with clay	4/25/2011	6.5 B
		3' - 4'	Cadmium		366.79	369.27	Above	Clay with silty clay	4/25/2011	9.8 B
DI-48-02	G21	0' - 1'	Cadmium	373.67	366.79	372.67	Above	Clayey silt, sandy silt, silty sand	4/25/2011	0.31
		1' - 2'	Cadmium		366.79	371.67	Above	Clayey silt	4/25/2011	0.095 J
		2' - 3'	Cadmium		366.79	370.67	Above	Clayey silt, clay, wood	4/25/2011	NA
		3' - 4'	Cadmium		366.79	369.67	Above	Clayey silt, clay, wood	4/25/2011	NA
DI-49-01	G23	0' - 1'	Cadmium	372.96	366.19	371.96	Above	Clayey silt, clay, sandy silt	4/25/2011	4.3 B
		1' - 2'	Cadmium		366.19	370.96	Above	Silty clay, clay	4/25/2011	1.7 B
		2' - 3'	Cadmium		366.19	369.96	Above	Clay, silty clay, little gravel	4/25/2011	3.3 BJ [0.84 BJ]
		3' - 4'	Cadmium		366.19	368.96	Above	Clay, silty clay	4/25/2011	1.7 B
DI-49-02	G23	0' - 1'	Cadmium	373.23	366.18	372.23	Above	Silty clay, clay, roots	4/25/2011	6.4
		1' - 2'	Cadmium		366.18	371.23	Above	Silty clay, clay, coarse gravel	4/25/2011	6.8
		2' - 3'	Cadmium		366.18	370.23	Above	Silty clay, clay, gravel, wood & roots	4/25/2011	NA
		3' - 4'	Cadmium		366.18	369.23	Above	Clay, silty clay, trace gravel	4/25/2011	NA
DI-49-03	G23	0' - 1'	Cadmium	373.62	366.18	372.62	Above	Silty clay, clay, trace gravel	4/25/2011	0.78
		1' - 2'	Cadmium		366.18	371.62	Above	Silty clay, clay, cobble	4/25/2011	10.7
DI-55-01	G23	0' - 1'	Cadmium	373.13	366.19	372.13	Above	Silty clay, clay	4/25/2011	2.6 B
		1' - 2'	Cadmium		366.19	371.13	Above	Clay	4/25/2011	1.5 B
		2' - 3'	Cadmium		366.19	370.13	Above	Clay, silty clay, clayey silt	4/25/2011	30.5 B
		3' - 4'	Cadmium		366.19	369.13	Above	Clayey silt, silt	4/25/2011	12.5 B
DI-55-02	F23	0' - 1'	Cadmium	373.56	366.21	372.56	Above	Silty clay, clay, roots	4/25/2011	6.9
		1' - 2'	Cadmium		366.21	371.56	Above	Clay	4/25/2011	1.5
		2' - 3'	Cadmium		366.21	370.56	Above	Clay	4/25/2011	0.77
		3' - 4'	Cadmium		366.21	369.56	Above	Clay	4/25/2011	12.4
DI-55-03	F23	0' - 1'	Cadmium	374.18	366.22	373.18	Above	Clay, silty clay, roots	4/25/2011	0.52
		1' - 2'	Cadmium		366.22	372.18	Above	Silty clay, silt, trace gravel	4/25/2011	1.0
DI-57-01	G25	0' - 1'	Cadmium	371.75	365.18	370.75	Above	Gravelly silt, little sand, trace clay	8/24/2011	15.6
		1' - 2'	Cadmium		365.18	372.18	Above	Clayey silt	8/24/2011	0.30 J [1.4 J]
		2' - 3'	Cadmium		365.18	372.18	Above	Clayey silt, clay increases with depth	8/24/2011	1.8
		3' - 4'	Cadmium		365.18	372.18	Above	Gray clay	8/24/2011	2.8

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DI-57-02	G25	0' - 1'	Cadmium	371.67	365.12	370.67	Above	Sandy silt, some gravel, trace clay & organics	8/24/2011	26.3 J
		1' - 2'	Cadmium		365.12	372.18	Above	Clayey silt, trace fine sand, trace organics	8/24/2011	24.1 J [41.0 J]
		2' - 3'	Cadmium		365.12	372.18	Above	Clayey silt, clay increases with depth	8/24/2011	38.4 J
		3' - 4'	Cadmium		365.12	372.18	Above	Clay, trace silt	8/24/2011	61.3 J
DI-58-01	F27	0' - 1'	Cadmium	372.98	364.31	371.98	Above	Fine sand	8/23/2011	1.8
		1' - 2'	Cadmium		364.23	372.18	Above	Fine sand, little silt	8/23/2011	10.1
DI-58-02	F27	0' - 1'	Cadmium	372	364.31	371	Above	Silty sand	8/23/2011	17.9
		1' - 2'	Cadmium		364.31	372.18	Above	Silty sand	8/23/2011	61.5
		2' - 3'	Cadmium		364.31	372.18	Above	Silty sand, little clay	8/23/2011	23.1
		3' - 4'	Cadmium		364.31	372.18	Above	Silty sand, some clay	8/23/2011	11.3
DI-59-01	G25	0' - 1'	Cadmium	372.12	365.22	371.12	Above	Silt, little sand & clay	8/24/2011	31.7
		1' - 2'	Cadmium		365.22	372.18	Above	Silt, little sand & clay	8/24/2011	3.4
		2' - 3'	Cadmium		365.22	372.18	Above	Silt, little sand & clay	8/24/2011	3.1
		3' - 4'	Cadmium		365.22	372.18	Above	Silt, little clay, trace sand, silt increases with depth	8/24/2011	28.6
DI-59-02	G25	0' - 1'	Cadmium	372.14	365.16	371.14	Above	Silty sand, trace clay	8/24/2011	83.7 J
		1' - 2'	Cadmium		365.16	372.18	Above	Silty sand, little clay	8/24/2011	10.4 J
		2' - 3'	Cadmium		365.16	372.18	Above	Silty sand, little clay	8/24/2011	14.3 J
		3' - 4'	Cadmium		365.16	372.18	Above	Fine sand, silt, trace clay	8/24/2011	11.0 J
DI-SB-05-05	F19	0' - 1'	Cadmium	377.51	368.32	376.51	Above	Silty sand, trace clay	4/25/2011	0.94
		1' - 2'	Cadmium		368.32	375.51	Above	Sandy silt	4/25/2011	0.24 [0.23]
		2' - 3'	Cadmium		368.32	374.51	Above	Silty sand	4/25/2011	<0.26 U
		3' - 4'	Cadmium		368.32	373.51	Above	Fine sand with some gravel, trace silt	4/25/2011	0.52 B
		4' - 5'	Cadmium		368.32	372.51	Above	Grades to Sandy silt with little gravel	4/25/2011	0.33 B
		5' - 6'	Cadmium		368.32	371.51	Above	Sandy silt, trace gravel, trace clay	4/25/2011	0.54 B
		6' - 7'	Cadmium		368.32	370.51	Above	Sandy silt, trace gravel, trace clay	4/25/2011	0.88 B
		7' - 8'	Cadmium		368.32	369.51	Above	Clay, trace gravel at 7'	4/25/2011	1.0 B
DI-SB-07-01	B30	0' - 1'	Cadmium	372.4	364.42	371.4	Above	Course sand, some silt, little gravel, trace clay	8/22/2011	0.93
		1' - 2'	Cadmium		364.42	370.4	Above	Coarse sand, some silt, little gravel & clay	8/22/2011	1.4
		2' - 3'	Cadmium		364.42	369.4	Above	Fine sandy silt, little to trace clay	8/22/2011	0.061 J
		3' - 4'	Cadmium		364.42	368.4	Above	Clayey silt, trace fine sand	8/22/2011	0.12 J
		4' - 5'	Cadmium		364.42	367.4	Above	Silty Clay	8/22/2011	0.060 J
		5' - 6'	Cadmium		364.42	366.4	Above	Silty Clay	8/22/2011	<0.23
		6' - 7'	Cadmium		364.42	365.4	Above	Silty Clay, silt lense 6'-2", clay at 6'-8"	8/22/2011	<0.22
DI-SB-07-02	B30	0' - 1'	Cadmium	372.45	364.42	371.45	Above	Silty Sand, some gravel	8/22/2011	0.32
		1' - 2'	Cadmium		364.42	370.45	Above	Silty fine sand, trace clay & gravel	8/22/2011	0.28
		2' - 3'	Cadmium		364.42	369.45	Above	Silty fine sand, trace clay & gravel	8/22/2011	0.10 J
		3' - 4'	Cadmium		364.42	368.45	Above	Sand, silt, little clay	8/22/2011	0.13 J [0.21 J]
		4' - 5'	Cadmium		364.42	367.45	Above	Clayey silt - increasing clay with depth	8/22/2011	0.064 J
		5' - 6'	Cadmium		364.42	366.45	Above	Silty clay - increasing clay with depth	8/22/2011	0.035 J
		6' - 7'	Cadmium		364.42	365.45	Above	Clay, little to trace silt	8/22/2011	0.059 J
EPSOIL-2	G23	0' - 1'	Cadmium	---	---	---	---	---	10/2001	29.6
EPSOIL-3	B30	0' - 1'	Cadmium	---	---	---	---	---	10/2001	75.6
SA-SB-05-02	F19	0" - 2"	Cadmium	376.93	368.32	376.76	Above	Topsoil	10/22/2003	1.4
		0' - 1'	Cadmium		368.32	375.93	Above	Silty Sand	10/22/2003	1.4
		1' - 2'	Cadmium		368.32	374.93	Above	Silty Sand	10/22/2003	<0.58
		2' - 3'	Cadmium		368.32	373.93	Above	Silty Sand	10/22/2003	1.4
		3' - 4'	Cadmium		368.32	372.93	Above	Silty Sand	10/22/2003	<0.60
		4' - 5'	Cadmium		368.32	371.93	Above	Clayey Silt	10/22/2003	<0.60
		5' - 6'	Cadmium		368.32	370.93	Above	Clayey Silt	10/22/2003	12.5
		6' - 7'	Cadmium		368.32	369.93	Above	Sandy Silt	10/22/2003	<0.58
		7' - 8'	Cadmium		368.32	368.93	Above	Sandy Silt to Organic Clayey Silt	10/22/2003	<0.59
		8' - 9'	Cadmium		368.32	367.93	At	Organic Clayey Silt	10/22/2003	5.1
		9' - 10'	Cadmium		368.32	366.93	Below	Organic Clayey Silt	10/22/2003	5.9
		10' - 11'	Cadmium		368.32	365.93	Below	Organic Clayey Silt	10/22/2003	8.1

Table 1B
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SA-SB-05-03	F19	0" - 2"	Cadmium	376.62	368.31	376.45	Above	Topsoil	10/22/2003	1.51
		0' - 1'	Cadmium		368.31	375.62	Above	Silty Sand	10/22/2003	<0.607
		1' - 2'	Cadmium		368.31	374.62	Above	Silty Sand	10/22/2003	<0.588
		2' - 3'	Cadmium		368.31	373.62	Above	Silty Sand	10/22/2003	<0.581
		3' - 4'	Cadmium		368.31	372.62	Above	Silty Sand	10/22/2003	<0.579
		4' - 5'	Cadmium		368.31	371.62	Above	Clayey Silt	10/22/2003	<0.607
		5' - 6'	Cadmium		368.31	370.62	Above	Organic Clayey Silt	10/22/2003	2.5
		6' - 7'	Cadmium		368.31	369.62	Above	Organic Clayey Silt	10/22/2003	0.587
		7' - 8'	Cadmium		368.31	368.62	At	Organic Clayey Silt	10/22/2003	20.5
		8' - 9'	Cadmium		368.31	367.62	Below	Clayey Silt	10/22/2003	21.8
		9' - 10'	Cadmium		368.31	366.62	Below	Clayey Silt	10/22/2003	<0.661
SA-SB-05-04	F19	0" - 2"	Cadmium	375.98	368.27	375.81	Above	Topsoil	10/22/2003	4.3
		0' - 1'	Cadmium		368.27	374.98	Above	Silty Sand	10/22/2003	3.6
		1' - 2'	Cadmium		368.27	373.98	Above	Silty Sand	10/22/2003	27.9
		2' - 3'	Cadmium		368.27	372.98	Above	Silty Sand	10/22/2003	<0.57
		3' - 4'	Cadmium		368.27	371.98	Above	Organic clayey Silt	10/22/2003	11.8
		4' - 5'	Cadmium		368.27	370.98	Above	Organic Silty Clay	10/22/2003	7.5
		5' - 6'	Cadmium		368.27	369.98	Above	Organic Silty Clay	10/22/2003	2.4
		6' - 7'	Cadmium		368.27	368.98	Above	Organic Silty Clay	10/22/2003	12.0
		7' - 8'	Cadmium		368.27	367.98	At	Organic Clayey Silt	10/22/2003	11.3
		8' - 9'	Cadmium		368.27	366.98	Below	Organic Clayey Silt	10/22/2003	20.9
		9' - 10'	Cadmium		368.27	365.98	Below	Organic Sand/Silt	10/22/2003	<0.72
		10' - 11'	Cadmium		368.27	364.98	Below	Organic Sand/Silt	10/22/2003	<0.85
		11' - 12'	Cadmium		368.27	363.98	Below	Silty Sand	10/22/2003	<0.63
		12' - 13'	Cadmium		368.27	362.98	Below	Organic Silt/Sand	10/22/2003	<0.68
		13' - 14'	Cadmium		368.27	361.98	Below	Organic Silt/Sand	10/22/2003	<0.68
SA-SB-06-01	E28	0" - 2"	Cadmium	371.39	364.30	371.22	Above	Topsoil	10/24/2003	8.5
		0' - 1'	Cadmium		364.30	370.39	Above	Silty Sand	10/24/2003	6.5
		1' - 2'	Cadmium		364.30	369.39	Above	Silty Sand	10/24/2003	<0.54
		2' - 3'	Cadmium		364.30	368.39	Above	Silty Sand	10/24/2003	1.1
		3' - 4'	Cadmium		364.30	367.39	Above	Silty Sand	10/24/2003	41.7
		4' - 5'	Cadmium		364.30	366.39	Above	Silty Sand	10/24/2003	2.6
		5' - 6'	Cadmium		364.30	365.39	Above	Silty Sand	10/24/2003	3.4
		6' - 7'	Cadmium		364.30	364.39	At	Silty Sand to Organic Clayey Silt	10/24/2003	<0.60
		7' - 8'	Cadmium		364.30	363.39	Below	Organic Clayey Silt	10/24/2003	<0.63
		8' - 9'	Cadmium		364.30	362.39	Below	Silty Clay	10/24/2003	<0.65
SA-SB-06-02	E28	0" - 2"	Cadmium	372.31	364.30	372.14	Above	Topsoil	10/24/2003	2.49
		0' - 1'	Cadmium		364.30	371.31	Above	Silty Sand	10/24/2003	1.09 [1.77]
		1' - 2'	Cadmium		364.30	370.31	Above	Silty Sand	10/24/2003	<0.567
		2' - 3'	Cadmium		364.30	369.31	Above	Silty Sand	10/24/2003	<0.522
		3' - 4'	Cadmium		364.30	368.31	Above	Silty Sand	10/24/2003	0.703
		4' - 5'	Cadmium		364.30	367.31	Above	Silty Sand to Organic Clayey Silt	10/24/2003	30.3
		5' - 6'	Cadmium		364.30	366.31	Above	Organic Clayey Silt	10/24/2003	60.1
		6' - 7'	Cadmium		364.30	365.31	Above	Organic Clayey Silt to Silty Clay	10/24/2003	1.44
		7' - 8'	Cadmium		364.30	364.31	At	Organic Clayey Silt	10/24/2003	6.18
		8' - 9'	Cadmium		364.30	363.31	Below	Silty Clay	10/24/2003	7.35
SA-SB-06-03	E28	0" - 2"	Cadmium	372.74	364.30	372.57	Above	Topsoil	10/24/2003	1.22
		0' - 1'	Cadmium		364.30	371.74	Above	Silty Sand	10/24/2003	<0.611
		1' - 2'	Cadmium		364.30	370.74	Above	Organic Silt/Sand	10/24/2003	<0.566
		2' - 3'	Cadmium		364.30	369.74	Above	Silty Sand	10/24/2003	<0.579
		3' - 4'	Cadmium		364.30	368.74	Above	Silty Sand	10/24/2003	<0.585
		4' - 5'	Cadmium		364.30	367.74	Above	Silty Sand	10/24/2003	7.63
		5' - 6'	Cadmium		364.30	366.74	Above	Organic Clayey Silt	10/24/2003	64.4
		6' - 7'	Cadmium		364.30	365.74	Above	Organic Clayey Silt	10/24/2003	<0.668
		7' - 8'	Cadmium		364.30	364.74	At	Clayey Silt to Clay	10/24/2003	<0.625
		8' - 9'	Cadmium		364.30	363.74	Below	Clay	10/24/2003	<0.634

Table 1B
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West Branch of Bloody Brook
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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SA-SB-06-04	E28	0" - 2"	Cadmium	372.98	364.30	372.81	Above	Topsoil	10/24/2003	1.13
		0' - 1'	Cadmium		364.30	371.98	Above	Silty Sand	10/24/2003	<0.605
		1' - 2'	Cadmium		364.30	370.98	Above	Silty Sand	10/24/2003	<0.561
		2' - 3'	Cadmium		364.30	369.98	Above	Silty Sand	10/24/2003	<0.573
		3' - 4'	Cadmium		364.30	368.98	Above	Silty Sand	10/24/2003	<0.554
		4' - 5'	Cadmium		364.30	367.98	Above	Fill	10/24/2003	1.78
		5' - 6'	Cadmium		364.30	366.98	Above	Organic Clayey Silt	10/24/2003	88.1
		6' - 7'	Cadmium		364.30	365.98	Above	Organic Clayey Silt	10/24/2003	<0.693
		7' - 8'	Cadmium		364.30	364.98	Above	Clay to Silty Clay	10/24/2003	<0.678
		8' - 9'	Cadmium		364.30	363.98	At	Clay	10/24/2003	<0.636
SA-SB-07-01	B30	0" - 2"	Cadmium	372.1	364.35	371.93	Above	Topsoil	10/24/2003	4.6
SA-SB-07-02	B30	0" - 2"	Cadmium	371.71	364.35	371.54	Above	Topsoil	10/24/2003	1.0
SA-SB-07-03	B30	0" - 2"	Cadmium	371.04	364.35	370.87	Above	Topsoil	10/24/2003	0.845
SA-SB-07-04	B30	0" - 2"	Cadmium	370.1	364.35	369.93	Above	Topsoil	10/24/2003	0.839
SA-SB-216-01	F19	0" - 2"	Cadmium	375.03	368.96	374.86	Above	Topsoil	10/22/2003	3.3
		0' - 1'	Cadmium		368.96	374.03	Above	Silty Sand	10/22/2003	3.9
		1' - 2'	Cadmium		368.96	373.03	Above	Silty Sand	10/22/2003	<0.59
		2' - 3'	Cadmium		368.96	372.03	Above	Silty Sand	10/22/2003	<0.56
		3' - 4'	Cadmium		368.96	371.03	Above	Clayey Silt	10/22/2003	0.65
		4' - 5'	Cadmium		368.96	370.03	Above	Clayey Silt	10/22/2003	24.9
		5' - 6'	Cadmium		368.96	369.03	At	Clayey Silt	10/22/2003	0.77
		6' - 7'	Cadmium		368.96	368.03	Below	Clayey Silt	10/22/2003	4.7
		7' - 8'	Cadmium		368.96	367.03	Below	Clayey Silt	10/22/2003	<0.65
		8' - 9'	Cadmium		368.96	366.03	Below	Clayey Silt	10/22/2003	20.6
		9' - 10'	Cadmium		368.96	365.03	Below	Organic Clayey Silt	10/22/2003	<0.654
SA-SB-216-02	E19	0" - 2"	Cadmium	376.08	368.88	375.91	Above	Topsoil	10/22/2003	1.26
		0' - 1'	Cadmium		368.88	375.08	Above	Silty Sand	10/22/2003	0.659
		1' - 2'	Cadmium		368.88	374.08	Above	Silty Sand	10/22/2003	<0.588
		2' - 3'	Cadmium		368.88	373.08	Above	Silty Sand	10/22/2003	<0.617
		3' - 4'	Cadmium		368.88	372.08	Above	Silty Sand	10/22/2003	<0.602
		4' - 5'	Cadmium		368.88	371.08	Above	Silty Sand	10/22/2003	5.38
		5' - 6'	Cadmium		368.88	370.08	Above	Organic Clayey Silt	10/22/2003	14.5
		6' - 7'	Cadmium		368.88	369.08	At	Organic Clayey Silt	10/22/2003	1.57 [0.823]
		7' - 8'	Cadmium		368.88	368.08	Below	Silty Clay	10/22/2003	<0.68
		8' - 9'	Cadmium		368.88	367.08	Below	Silty Clay	10/22/2003	0.903
		9' - 10'	Cadmium		368.88	366.08	Below	Organic Clayey Silt	10/22/2003	<0.756
		10' - 11'	Cadmium		368.88	365.08	Below	Organic Clayey Silt	10/22/2003	<0.719
		11' - 12'	Cadmium		368.88	364.08	Below	Silty Clay	10/22/2003	<0.62
		12' - 13'	Cadmium		368.88	363.08	Below	Silty Sand	10/22/2003	<0.616
		13' - 14'	Cadmium		368.88	362.08	Below	Silty Sand	10/22/2003	<0.60
SA-SB-216-03	E19	0" - 2"	Cadmium	376.12	368.90	375.95	Above	Topsoil	10/22/2003	<0.652
		0' - 1'	Cadmium		368.90	375.12	Above	Silty Sand	10/22/2003	<0.60
		1' - 2'	Cadmium		368.90	374.12	Above	Silty Sand	10/22/2003	<0.598
		2' - 3'	Cadmium		368.90	373.12	Above	Silty Sand	10/22/2003	<0.617
		3' - 4'	Cadmium		368.90	372.12	Above	Silty Clay	10/22/2003	<0.624
		4' - 5'	Cadmium		368.90	371.12	Above	Silty Clay	10/22/2003	1.54
		5' - 6'	Cadmium		368.90	370.12	Above	Sandy Silt	10/22/2003	<0.632
		6' - 7'	Cadmium		368.90	369.12	At	Sandy Silt	10/22/2003	<0.641
		7' - 8'	Cadmium		368.90	368.12	Below	Sandy Silt	10/22/2003	<0.713
		8' - 9'	Cadmium		368.90	367.12	Below	Sandy Silt	10/22/2003	<0.635
		9' - 10'	Cadmium		368.90	366.12	Below	Organic Silt/Sand	10/22/2003	<0.635
SA-SB-216-04	E19	0' - 1'	Cadmium	376.23	368.88	375.23	Above	Silty Sand	10/22/2003	<0.59
		1' - 2'	Cadmium		368.88	374.23	Above	Silty Sand	10/22/2003	<0.57
SB-01	F18	0" - 2"	Cadmium	---	---	---	---	---	11/2001	10.5
		0' - 1'	Cadmium		---	---	---	---	11/2001	1.64
SB-02	F19	0' - 1'	Cadmium	---	---	---	---	---	11/2001	203
		1' - 2'	Cadmium		---	---	---	---	11/2001	503
SB-03	F19	0' - 1'	Cadmium	---	---	---	---	---	11/2001	37
		1' - 2'	Cadmium		---	---	---	---	11/2001	30.1
SB-04	F21	0' - 1'	Cadmium	---	---	---	---	---	11/2001	30.4
		1' - 2'	Cadmium		---	---	---	---	11/2001	34.2
SB-05	G22	0' - 1'	Cadmium	---	---	---	---	---	11/2001	41.1
		1' - 2'	Cadmium		---	---	---	---	11/2001	98.2

Table 1B
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West Branch of Bloody Brook
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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-06	F22	0' - 1'	Cadmium	---	---	---	---	---	11/2001	11.3
		1' - 2'	Cadmium		---	---	---	---	11/2001	8.04
SB-07	G24	0' - 1'	Cadmium	---	---	---	---	---	11/2001	42.1
		1' - 2'	Cadmium		---	---	---	---	11/2001	34.3
SB-08	G25	0' - 1'	Cadmium	---	---	---	---	---	11/2001	5.78
SB-09	E28	0' - 1'	Cadmium	---	---	---	---	---	11/2001	81.5
		1' - 2'	Cadmium		---	---	---	---	11/2001	191
SB-10	D29	0' - 1'	Cadmium	---	---	---	---	---	11/2001	108
		1' - 2'	Cadmium		---	---	---	---	11/2001	114
SB-11	B30	0' - 1'	Cadmium	---	---	---	---	---	11/2001	9.82
SB-12	B31	0' - 1'	Cadmium	---	---	---	---	---	11/2001	2.11
SB-29	F19	0" - 2"	Cadmium		---	---	---	---	06/2002	10.5
SB-30	F19	0" - 2"	Cadmium	---	---	---	---	---	06/2002	39.3
SB-31	F19	0" - 2"	Cadmium	---	---	---	---	---	06/2002	22.9
SB-32	F21	0" - 2"	Cadmium	---	---	---	---	---	06/2002	35.2
SB-33	F21	0" - 2"	Cadmium	---	---	---	---	---	06/2002	11.3
SB-34	F21	0" - 2"	Cadmium	---	---	---	---	---	06/2002	3.79
SB-35	F21	0" - 2"	Cadmium	---	---	---	---	---	06/2002	19.0
SB-36	G22	0" - 2"	Cadmium	---	---	---	---	---	06/2002	26.6
SB-37	F22	0" - 2"	Cadmium	---	---	---	---	---	06/2002	11.3
SB-38	G23	0" - 2"	Cadmium	---	---	---	---	---	06/2002	22.4
SB-39	G24	0" - 2"	Cadmium	---	---	---	---	---	06/2002	16.8
SB-40	G24	0" - 2"	Cadmium	---	---	---	---	---	06/2002	6.52
SB-41	G24	0" - 2"	Cadmium	---	---	---	---	---	06/2002	47.3
SB-42	H25	0" - 2"	Cadmium	---	---	---	---	---	06/2002	5.65
SB-43	G25	0" - 2"	Cadmium	---	---	---	---	---	06/2002	7.77
SB-44	G27	0" - 2"	Cadmium	---	---	---	---	---	06/2002	101
SB-45	G27	0" - 2"	Cadmium	---	---	---	---	---	06/2002	17.5
SB-46	E28	0" - 2"	Cadmium	---	---	---	---	---	06/2002	96.1
SB-47	D29	0" - 2"	Cadmium	---	---	---	---	---	06/2002	35.6
SB-48	C30	0" - 2"	Cadmium	---	---	---	---	---	06/2002	29.6
SB-49	B30	0" - 2"	Cadmium	---	---	---	---	---	06/2002	21.6
SB-50	B31	0" - 2"	Cadmium	---	---	---	---	---	06/2002	1.3
SB-61	F19	0' - 1'	Cadmium	---	---	---	---	Sandy Silt	11/2002	134
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	22.9
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	26.2
		3' - 4'	Cadmium		---	---	---	Silty Sand/Peat	11/2002	864
SB-62	F19	2' - 3'	Cadmium	---	---	---	---	Sandy Silt	11/2002	263
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	208
SB-63	F19	0" - 2"	Cadmium	---	---	---	---	---	11/2002	22.6
SB-64	F21	0" - 2"	Cadmium	---	---	---	---	---	11/2002	1.1
SB-65	G22	2' - 3'	Cadmium	---	---	---	---	Sandy Silt	11/2002	6.5
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	23.4
SB-66	G24	0' - 1'	Cadmium	---	---	---	---	Silty Sand	11/2002	29.7
		1' - 2'	Cadmium		---	---	---	Clayey Silt	11/2002	24.2
		2' - 3'	Cadmium		---	---	---	Clayey Silt	11/2002	1.1
		3' - 4'	Cadmium		---	---	---	Clayey Silt	11/2002	<0.60
SB-67	G24	0" - 2"	Cadmium	---	---	---	---	---	11/2002	20.9
SB-68	G27	0' - 1'	Cadmium	---	---	---	---	Silty Sand	11/2002	31.4
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	18.0
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	3.6
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	11.6
SB-69	F27	0" - 2"	Cadmium	---	---	---	---	---	11/2002	10.3
SB-70	E28	2' - 3'	Cadmium	---	---	---	---	Silty Sand	11/2002	12.7
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	4.8
SB-71	E28	0" - 2"	Cadmium	---	---	---	---	---	11/2002	23.2
		0' - 1'	Cadmium		---	---	---	Silty Sand	11/2002	18.6
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	1.7
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	17.0
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	48.4
SB-72	D29	2' - 3'	Cadmium	---	---	---	---	Silty Sand	11/2002	1.7
		3' - 4'	Cadmium		---	---	---	Silty Sand/Clay	11/2002	4.3
SB-73	D29	0" - 2"	Cadmium	---	---	---	---	---	11/2002	37.6

Table 1B
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West Branch of Bloody Brook
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Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-74	B30	0' - 1'	Cadmium	---	---	---	---	Silty Sand	11/2002	25.0
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	3.8
		2' - 3'	Cadmium		---	---	---	Fill	11/2002	1.4
		3' - 4'	Cadmium		---	---	---	Fill/Sandy Silt	11/2002	<0.62
SB-208	F19	0" - 2"	Cadmium	---	---	---	---	---	11/2002	32.7
		0' - 1'	Cadmium		---	---	---	Silty Sand	11/2002	63.7
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	27.3
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	600
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	41.7
SB-209	F21	0" - 2"	Cadmium	---	---	---	---	---	11/2002	14.7
		0' - 1'	Cadmium		---	---	---	Sandy Silt	11/2002	11.8
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	14.3
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	10.0
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	10.7
SB-210	C30	0" - 2"	Cadmium	---	---	---	---	---	11/2002	4.9
		0' - 1'	Cadmium		---	---	---	Silty Sand	11/2002	3.8
		1' - 2'	Cadmium		---	---	---	Silty Sand	11/2002	7.6
		2' - 3'	Cadmium		---	---	---	Silty Sand	11/2002	1.9
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	<0.54
SB-229	F17	0" - 2"	Cadmium	376.82	369.99	376.65	Above	Topsoil	10/21/2003	1.4
		0' - 1'	Cadmium		369.99	375.82	Above	Silty Sand	10/21/2003	1.9
		1' - 2'	Cadmium		369.99	374.82	Above	Silty Sand	10/21/2003	0.67
		2' - 3'	Cadmium		369.99	373.82	Above	Silty Sand	10/21/2003	<0.61 [<0.60]
		3' - 4'	Cadmium		369.99	372.82	Above	Silty Sand	10/21/2003	<0.61
		4' - 5'	Cadmium		369.99	371.82	Above	Silty Sand	10/21/2003	103
		5' - 6'	Cadmium		369.99	370.82	Above	Organic Silt/Sand	10/21/2003	1,390
		6' - 7'	Cadmium		369.99	369.82	At	Organic Silt/Sand to Clayey Silt	10/21/2003	247
		7' - 8'	Cadmium		369.99	368.82	Below	Clayey Silt to Silty Clay	10/21/2003	2.7
SB-230	F21	0" - 2"	Cadmium	376.54	366.99	376.37	Above	Topsoil	10/23/2003	23.5
		0' - 1'	Cadmium		366.99	375.54	Above	Sandy Silt	10/23/2003	10.1
		1' - 2'	Cadmium		366.99	374.54	Above	Fill	10/23/2003	5.2 [1.50]
		2' - 3'	Cadmium		366.99	373.54	Above	Fill	10/23/2003	<0.57
		3' - 4'	Cadmium		366.99	372.54	Above	Silty Sand	10/23/2003	0.81
		4' - 5'	Cadmium		366.99	371.54	Above	Silty Sand	10/23/2003	<0.60
		5' - 6'	Cadmium		366.99	370.54	Above	Silty Sand to Silty Clay	10/23/2003	<0.61
		6' - 7'	Cadmium		366.99	369.54	Above	Organic Silty Clay	10/23/2003	6.0
		7' - 8'	Cadmium		366.99	368.54	Above	Organic Silty Clay	10/23/2003	<0.65 [<0.68]
		8' - 9'	Cadmium		366.99	367.54	Above	Silty Clay	10/23/2003	<0.62
		9' - 10'	Cadmium		366.99	366.54	At	Silty Clay	10/23/2003	<0.59
		10' - 11'	Cadmium		366.99	365.54	Below	Organic Silty Clay	10/23/2003	<0.67
		11' - 12'	Cadmium		366.99	364.54	Below	Silty Clay	10/23/2003	<0.62
		12' - 13'	Lithology		366.99	363.54	Below	Silty Clay	10/23/2003	NA
		13' - 14'	Lithology		366.99	362.54	Below	Silty Clay	10/23/2003	NA
		14' - 15'	Lithology		366.99	361.54	Below	Silty Clay	10/23/2003	NA
SB-415	F24	0" - 2"	Cadmium	373.06	365.92	372.89	Above	Topsoil	10/23/2003	1.6
		0' - 1'	Cadmium		365.92	372.06	Above	Silty Sand	10/23/2003	0.99
		1' - 2'	Cadmium		365.92	371.06	Above	Silty Sand	10/23/2003	2.3
		2' - 3'	Cadmium		365.92	370.06	Above	Silty Sand	10/23/2003	<0.60
		3' - 4'	Cadmium		365.92	369.06	Above	Silty Sand to Clayey Silt	10/23/2003	<0.59
		4' - 5'	Cadmium		365.92	368.06	Above	Silty Sand	10/23/2003	2.1
		5' - 6'	Cadmium		365.92	367.06	Above	Silty Sand	10/23/2003	<0.60
		6' - 7'	Cadmium		365.92	366.06	At	Silty Sand	10/23/2003	<0.55
		7' - 8'	Cadmium		365.92	365.06	Below	Organic Silt/Sand	10/23/2003	<0.61 [<0.59]
		8' - 9'	Cadmium		365.92	364.06	Below	Silty Clay	10/23/2003	<0.64
		9' - 10'	Cadmium		365.92	363.06	Below	Silty Clay to Silty Sand	10/23/2003	<0.57
		10' - 11'	Lithology		365.92	362.06	Below	Silty Sand to Silty Clay	10/23/2003	NA
		11' - 12'	Lithology		365.92	361.06	Below	Silty Clay	10/23/2003	NA
		12' -13'	Lithology		365.92	360.06	Below	Silty Clay	10/23/2003	NA
		13' - 14'	Lithology		365.92	359.06	Below	Silty Clay	10/23/2003	NA
		14' - 15'	Lithology		365.92	358.06	Below	Silty Clay	10/23/2003	NA
		15' -16'	Lithology		365.92	357.06	Below	Silty Clay	10/23/2003	NA

Table 1B
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-416	G23	0" - 2"	Cadmium	372.03	365.87	371.86	Above	Topsoil	10/23/2003	44.4
		0' - 1'	Cadmium		365.87	371.03	Above	Silty Sand	10/23/2003	20.2
		1' - 2'	Cadmium		365.87	370.03	Above	Silty Sand	10/23/2003	6.8
		2' - 3'	Cadmium		365.87	369.03	Above	Silty Sand	10/23/2003	1.1
		3' - 4'	Cadmium		365.87	368.03	Above	Organic Silt/Sand	10/23/2003	123
		4' - 5'	Cadmium		365.87	367.03	Above	Organic Silt/Sand	10/23/2003	16.8
		5' - 6'	Cadmium		365.87	366.03	At	Organic Silt/Sand	10/23/2003	0.79
		6' - 7'	Cadmium		365.87	365.03	Below	Silty Clay	10/23/2003	<0.62
		7' - 8'	Cadmium		365.87	364.03	Below	Silty Clay	10/23/2003	<0.65
SB-417	G24	0" - 2"	Cadmium	371.96	365.42	371.79	Above	Topsoil	10/24/2003	5.9
		0' - 1'	Cadmium		365.42	370.96	Above	Topsoil	10/24/2003	16.2
		1' - 2'	Cadmium		365.42	369.96	Above	Clayey Silt	10/24/2003	3.0
		2' - 3'	Cadmium		365.42	368.96	Above	Clayey Silt	10/24/2003	0.86
		3' - 4'	Cadmium		365.42	367.96	Above	Organic Clayey Silt	10/24/2003	109.0
		4' - 5'	Cadmium		365.42	366.96	Above	Organic Clayey Silt	10/24/2003	18.4
		5' - 6'	Cadmium		365.42	365.96	Above	Organic Clayey Silt	10/24/2003	<0.73
		6' - 7'	Cadmium		365.42	364.96	At	Organic Clayey Silt to Clay	10/24/2003	<0.63
		7' - 8'	Cadmium		365.42	363.96	Below	Silty Sand	10/24/2003	<0.73
SB-453	F17	0" - 2"	Cadmium	376.77	370.01	376.60	Above	Topsoil	4/29/2004	2.26
		0' - 1'	Cadmium		370.01	375.77	Above	Sandy Silt	4/29/2004	4.03
		1' - 2'	Cadmium		370.01	374.77	Above	Sandy Silt	4/29/2004	<0.590
		2' - 3'	Cadmium		370.01	373.77	Above	Sandy Silt	4/29/2004	<0.612
		3' - 4'	Cadmium		370.01	372.77	Above	Clayey Silt	4/29/2004	<0.623
		4' - 5'	Cadmium		370.01	371.77	Above	Clayey Silt	4/29/2004	3.29
		5' - 6'	Cadmium		370.01	370.77	Above	Clayey Silt	4/29/2004	91.9
		6' - 7'	Cadmium		370.01	369.77	At	Clayey Silt	4/29/2004	130
		7' - 8'	Cadmium		370.01	368.77	Below	Clayey Silt	4/29/2004	<0.734
SB-454	F21	0" - 2"	Cadmium	376.79	367.00	376.62	Above	Topsoil	4/29/2004	4.9
		0' - 1'	Cadmium		367.00	375.79	Above	Silty Sand	4/29/2004	7.5
SB-455	G23	0" - 2"	Cadmium	372.43	365.91	372.26	Above	Topsoil	4/29/2004	3.8
		0' - 1'	Cadmium		365.91	371.43	Above	Sandy Silt	4/29/2004	2.31
		1' - 2'	Cadmium		365.91	370.43	Above	Clayey Silt	4/29/2004	<0.615
		2' - 3'	Cadmium		365.91	369.43	Above	Clayey Silt	4/29/2004	<0.602
		3' - 4'	Cadmium		365.91	368.43	Above	Clayey Silt	4/29/2004	7.04
		4' - 5'	Cadmium		365.91	367.43	Above	Clayey Silt	4/29/2004	<0.681

Notes:

1. Boring locations are shown on Figures 5B, 6B, 8B, and 11B.
2. Figure coordinates correspond to coordinate system shown on Figures 5B, 6B, 8B, and 11B.
3. The soil classification descriptions identified in the table represent the predominant soil type for the respective intervals.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. --- indicates that the information is not available.
6. Duplicate results are presented in brackets.
7. B - Compound was found in the blank and sample.
8. J - The detected concentration is an estimated value.
9. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
10. < - Analyte not detected at the reporting limit shown.
11. NA = Not analyzed.
12. After three attempts, the sampling personnel were unable to advance the equipment through the sampling depth, and the soil sample was not collected.

Table 1C
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
B-1	G44	0' - 2.5'	Cadmium	---	---	---	---	---	11/25/2003	1.5
		2.5' - 12'	Cadmium		---	---	---	---	11/25/2003	<0.63
B-2	G44	7' -8'	Cadmium	---	---	---	---	---	11/25/2003	<0.59
B-3	G44	0' - 5'	Cadmium	---	---	---	---	---	11/24/2003	<0.61 [<0.61]
		5' - 14'	Cadmium		---	---	---	---	11/24/2003	<0.64
B-4	E44	0' - 2'	Cadmium	---	---	---	---	---	11/24/2003	<0.63
		2' - 12'	Cadmium		---	---	---	---	11/24/2003	<0.71
B-5	D43	0' - 1.5'	Cadmium	---	---	---	---	---	11/24/2003	<0.54
		1.5' - 12'	Cadmium		---	---	---	---	11/24/2003	7.5
B-11	C43	0' - 4'	Cadmium	---	---	---	---	---	3/5/2004	0.74 [0.63]
		4' - 8'	Cadmium		---	---	---	--	3/5/2004	0.87
		8' - 12'	Cadmium		---	---	---	---	3/5/2004	0.66
B-12	B43	0' - 4'	Cadmium	---	---	---	---	---	3/5/2004	<0.61
		4' - 8'	Cadmium		---	---	---	--	3/5/2004	0.69
		8' - 12'	Cadmium		---	---	---	---	3/5/2004	<0.58
DI-16-01	D35	0' - 1'	Cadmium	371.46	363.58	370.46	Above	Gravelly coarse sand with organics	8/24/2011	3.3
		1' - 2'	Cadmium		363.58	369.46	Above	Gravelly coarse to fine sand with organics	8/24/2011	4.5
		2' - 3'	Cadmium		363.58	368.46	Above	Gravelly coarse to fine sand with organics	8/24/2011	5.1
		3' - 4'	Cadmium		363.58	367.46	Above	Coarse to fine sand with trace silt, gravel & organics	8/24/2011	5.7
		4' - 5'	Cadmium		363.58	366.46	Above	Clayey silt	8/24/2011	0.19 J
		5' - 6'	Cadmium		363.58	365.46	Above	Silty clay to clay at 6'	8/24/2011	0.14 J
DI-16-02	D35	0' - 1'	Cadmium	375.41	363.51	374.41	Above	Fine sand, trace gravel	8/24/2011	45.0
		1' - 2'	Cadmium		363.51	373.41	Above	Fine sand, little silt, some gravel	8/24/2011	59.6
		2' - 3'	Cadmium		363.51	372.41	Above	Fine sand, trace gravel, organics & silt	8/24/2011	3.2
		3' - 4'	Cadmium		363.51	371.41	Above	Coarse to fine gravelly sand	8/24/2011	0.81 J
		4' - 5'	Cadmium		363.51	370.41	Above	Silt, little clay, little gravel & pebbles	8/24/2011	0.31
		5' - 6'	Cadmium		363.51	369.41	Above	Silty clay	8/24/2011	0.17 J
DI-16-03	D36	0' - 1'	Cadmium	369.66	363.56	368.66	Above	Organics, silt with pebbles, some sand	8/24/2011	6.2
		1' - 2'	Cadmium		363.56	367.66	Above	Clayey silt, pebbles, trace fine sand	8/24/2011	0.33
		2' - 3'	Cadmium		363.56	366.66	Above	Silty clay with organics to 2'-3" then silty sand, little gravel, trace clay	8/24/2011	0.44 [0.17 J]
		3' - 4'	Cadmium		363.56	365.66	Above	Gravelly sand (coarse to fine)	8/24/2011	0.040 J
		4' - 5'	Cadmium		363.56	364.66	Above	Silt	8/24/2011	0.24
		5' - 6'	Cadmium		363.56	363.66	At	Clayey silt to silty clay with depth	8/24/2011	0.13 J
EPSOIL-4	F44	0' - 1'	Cadmium	---	---	---	---	---	10/2001	4.5
SB-13	D37	0' - 1'	Cadmium	---	---	---	---	---	11/2001	14.4
		1' - 2'	Cadmium		---	---	---	---	11/2001	<0.666
SB-14	C37	0' - 1'	Cadmium	---	---	---	---	---	11/2001	52.2
		1' - 2'	Cadmium		---	---	---	---	11/2001	26.2 [9.8]
SB-15	D42	0' - 1'	Cadmium	---	---	---	---	---	11/2001	30.2
		1' - 2'	Cadmium		---	---	---	---	11/2001	44.8
SB-16	D43	0' - 1'	Cadmium	---	---	---	---	---	11/2001	28.9
		1' - 2'	Cadmium		---	---	---	---	11/2001	27.7
SB-17	G44	0' - 1'	Cadmium	---	---	---	---	---	11/2001	32.1
SB-18	G44	0' - 1'	Cadmium	---	---	---	---	---	11/2001	6.25
SB-75	D35	0" - 6"	Cadmium	---	---	---	---	---	11/2002	1.3
		6" - 12"	Cadmium		---	---	---	Sand & Gravel	11/2002	0.67
		1' - 2'	Cadmium		---	---	---	Sand, Silt, Clay	11/2002	<0.58
		2' - 3'	Cadmium		---	---	---	Sand, Silt, Clay	11/2002	<0.57
		3' - 4'	Cadmium		---	---	---	Clay	11/2002	<0.61
SB-76	D35	0" - 6"	Cadmium	---	---	---	---	---	11/2002	0.73
		6" - 12"	Cadmium		---	---	---	Clayey Silt	11/2002	<0.58
		1' - 2'	Cadmium		---	---	---	Clayey Silt	11/2002	<0.61
		2' - 3'	Cadmium		---	---	---	Clayey Silt	11/2002	1.2
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	<0.52
SB-77	E36	0" - 6"	Cadmium	---	---	---	---	Gravelly Sand	11/2002	18.9
		6" - 12"	Cadmium		---	---	---	Gravelly Sand	11/2002	1.1
		1' - 2'	Cadmium		---	---	---	Gravelly Sand/Clayey Silt	11/2002	<0.55
		2' - 3'	Cadmium		---	---	---	Clayey Silt/ Sand	11/2002	<0.56
		3' - 4'	Cadmium		---	---	---	Silty Sand	11/2002	<0.57

Table 1C
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-78	C37	3' - 4'	Cadmium	---	---	---	---	Clay	11/2002	<0.58
SB-79	C37	0" - 6"	Cadmium	---	---	---	---	---	11/2002	1.9
		6" - 12"	Cadmium		---	---	---	---	11/2002	0.96
		0' - 1'	Cadmium		---	---	---	Sandy Silt	11/2002	NA
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.57
		3' - 4'	Cadmium		---	---	---	Clay	11/2002	1.2
SB-80	D40	0" - 6"	Cadmium	---	---	---	---	---	11/2002	11.7
		6" - 12"	Cadmium		---	---	---	---	11/2002	7.3
		0' - 4'	Cadmium		---	---	---	Fill	11/2002	18.4
		4' - 8'	Cadmium		---	---	---	Fill/Peat	11/2002	22.6
		8' - 12'	Cadmium		---		---	Peat/Sand and Gravel	11/2002	<0.87
SB-81	D40	0" - 6"	Cadmium	---	---	---	---	---	11/2002	49.9
		6" - 12"	Cadmium		---	---	---	Sandy Silt	11/2002	7.4
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	8.4
		2' - 3'	Cadmium		---	---	---	Sand	11/2002	1.6
		3' - 4'	Cadmium		---	---	---	Clay	11/2002	<0.63
SB-82	D40	0" - 6"	Cadmium	---	---	---	---	---	11/2002	1.7
		6" - 12"	Cadmium		---	---	---	---	11/2002	1.6
		0' - 1'	Lithology		---	---	---	Sandy Silt	11/2002	NA
		1' - 2'	Cadmium		---	---	---	Clayey Silt	11/2002	<0.61
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	1.6
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	1.3
SB-83	C40	0" - 6"	Cadmium	---	---	---	---	---	11/2002	<0.52
		6" - 12"	Cadmium		---	---	---	---	11/2002	<0.51
		0' - 4'	Cadmium		---	---	---	Clay/Fill	11/2002	<0.55
		4' - 8'	Cadmium		---	---	---	Clay/Wood/Peat	11/2002	<0.65
SB-84	D42	2' - 3'	Cadmium	---	---	---	---	Peat	11/2002	11.4
		3' - 4'	Cadmium		---	---	---	Sand	11/2002	<0.79
SB-85	G44	0' - 1'	Cadmium	---	---	---	---	---	11/2002	32.1
SB-211	D43	0" - 6"	Cadmium	---	---	---	---	---	11/2002	3.6
		6" - 12"	Cadmium		---	---	---	---	11/2002	6.8
		0' - 1'	Lithology		---	---	---	Sandy Silt	11/2002	NA
		1' - 2'	Cadmium		---	---	---	Cobbles, Sand	11/2002	<0.60
		2' - 3'	Cadmium		---	---	---	Cobbles, Sand	11/2002	<0.56
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.61
SB-212	G44	0" - 6"	Cadmium	---	---	---	---	---	11/2002	8.0
		6" - 12"	Cadmium		---	---	---	Silty Sand	11/2002	2.6
		1' - 2'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.59
		2' - 3'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.62
		3' - 4'	Cadmium		---	---	---	Sandy Silt	11/2002	<0.75
SB-231	G43	0" - 6"	Cadmium	366.68	361.56	366.18	Above	Silty Sand	11/3/2003	1.0
		6" - 12"	Cadmium		361.56	365.68	Above	Silty Sand	11/3/2003	0.82
		1' - 2'	Cadmium		361.56	364.68	Above	Silty Sand	11/3/2003	0.72
		2' - 3'	Cadmium		361.56	363.68	Above	Silty Sand	11/3/2003	<0.60
		3' - 4'	Cadmium		361.56	362.68	Above	Silty Sand	11/3/2003	<0.64
		4' - 5'	Cadmium		361.56	361.68	At	Silty Sand to Organic Clayey Silt	11/3/2003	<0.63
		5' - 6'	Cadmium		361.56	360.68	Below	Organic Clayey Silt	11/3/2003	<0.68
		6' - 7'	Cadmium		361.56	359.68	Below	Organic Clayey Silt	11/3/2003	<0.59
		7' - 8'	Cadmium		361.56	358.68	Below	Sand/Gravel/ Shells	11/3/2003	<0.74
SB-232	G42	0" - 6"	Cadmium	365.99	361.32	365.49	Above	Silty Sand	11/3/2003	23.9
		6" - 12"	Cadmium		361.32	364.99	Above	Silty Sand	11/3/2003	21.6
		1' - 2'	Cadmium		361.32	363.99	Above	Silty Sand	11/3/2003	40.8
		2' - 3'	Cadmium		361.32	362.99	Above	Silty Sand	11/3/2003	5.3
		3' - 4'	Cadmium		361.32	361.99	Above	Silty Sand to Organic Clayey Silt	11/3/2003	<0.71
		4' - 5'	Cadmium		361.32	360.99	At	Organic Clayey Silt	11/3/2003	<0.70
SB-418	E36	0" - 6"	Cadmium	369.94	363.62	369.44	Above	Fill	11/3/2003	0.96
		6" - 12"	Cadmium		363.62	368.94	Above	Fill	11/3/2003	0.70
		1' - 2'	Cadmium		363.62	367.94	Above	Fill	11/3/2003	0.75
		2' - 3'	Cadmium		363.62	366.94	Above	Silty Sand/ Gravel	11/3/2003	<0.55
		3' - 4'	Cadmium		363.62	365.94	Above	Silty Sand to Organic Clayey Silt	11/3/2003	25.1
		4' - 5'	Cadmium		363.62	364.94	Above	Organic Clayey Silt	11/3/2003	0.65

Table 1C
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-419	D36	0" - 6"	Cadmium	370.41	363.54	369.91	Above	Fill	11/3/2003	1.8
		6" - 12"	Cadmium		363.54	369.41	Above	Fill	11/3/2003	0.8
		1' - 2'	Cadmium		363.54	368.41	Above	Fill	11/3/2003	1.7
		2' - 3'	Cadmium		363.54	367.41	Above	Fill	11/3/2003	0.58
		3' - 4'	Cadmium		363.54	366.41	Above	Fill	11/3/2003	2.5
		4' - 5'	Cadmium		363.54	365.41	Above	Organic Clayey Silt	11/3/2003	1.3
SB-420	D35	0" - 6"	Cadmium	370.42	363.54	369.92	Above	Fill	11/3/2003	64.0
		6" - 12"	Cadmium		363.54	369.42	Above	Fill	11/3/2003	87.1
		1' - 2'	Cadmium		363.54	368.42	Above	Fill	11/3/2003	63.5
		2' - 3'	Cadmium		363.54	367.42	Above	Fill	11/3/2003	1.9
		3' - 4'	Cadmium		363.54	366.42	Above	Fill to Organic Clayey Silt	11/3/2003	2.9
		4' - 5'	Cadmium		363.54	365.42	Above	Organic Clayey Silt	11/3/2003	1.1
SB-421	D36	0" - 6"	Cadmium	371.01	363.46	370.51	Above	Fill	11/3/2003	1.9
		6" - 12"	Cadmium		363.46	370.01	Above	Fill	11/3/2003	0.60
		1' - 2'	Cadmium		363.46	369.01	Above	Fill	11/3/2003	1.3
		2' - 3'	Cadmium		363.46	368.01	Above	Fill	11/3/2003	3.6 [3.1]
		3' - 4'	Cadmium		363.46	367.01	Above	Fill	11/3/2003	<0.54
		4' - 5'	Cadmium		363.46	366.01	Above	Silty Sand	11/3/2003	<0.52
SB-422	D36	0" - 6"	Cadmium	370.64	363.46	370.14	Above	Fill	11/3/2003	53.5
		6" - 12"	Cadmium		363.46	369.64	Above	Fill	11/3/2003	57.7
		1' - 2'	Cadmium		363.46	368.64	Above	Fill	11/3/2003	2.5
		2' - 3'	Cadmium		363.46	367.64	Above	Fill	11/3/2003	0.62
		3' - 4'	Cadmium		363.46	366.64	Above	Fill to Organic Clayey Silt	11/3/2003	1.2
		4' - 5'	Cadmium		363.46	365.64	Above	Organic Clayey Silt	11/3/2003	0.62
SB-423	E36	0" - 6"	Cadmium	371.94	363.79	371.44	Above	Asphalt	10/31/2003	<0.53
		6" - 12"	Cadmium		363.79	370.94	Above	Sand/Gravel	10/31/2003	<0.52
		0' - 2'	Cadmium		363.79	369.94	Above	Asphalt/ Sand/ Gravel/ Fill	10/31/2003	<0.54
		2' - 4'	Cadmium		363.79	367.94	Above	Fill	10/31/2003	<0.56
		4' - 6'	Cadmium		363.79	365.94	Above	Fill to Sand	10/31/2003	<0.56 [<0.28]
		6' - 8'	Cadmium		363.79	363.94	At	Clay	10/31/2003	<0.63
SB-424	F36	0" - 6"	Cadmium	371.98	363.83	371.48	Above	Asphalt	10/31/2003	<0.53
		6" - 12"	Cadmium		363.83	370.98	Above	Fill	10/31/2003	<0.57
		0' - 2'	Cadmium		363.83	369.98	Above	Fill	10/31/2003	<0.59
		2' - 4'	Cadmium		363.83	367.98	Above	Fill to Sand/Gravel/Cobbles	10/31/2003	<0.57
		4' - 6'	Cadmium		363.83	365.98	Above	Sand/Gravel/Cobbles to Silty Sand	10/31/2003	<0.58
		6' - 8'	Cadmium		363.83	363.98	At	Silty Sand to Organic Silty Clay to Organic Clay	10/31/2003	<0.62
		8' - 10'	Cadmium		363.83	361.98	Below	Organic Clay	10/31/2003	<0.61
		10' - 12'	Cadmium		363.83	359.98	Below	Sand to Clay	10/31/2003	<0.61
SB-425	F36	0" - 6"	Cadmium	371.79	363.85	371.29	Above	Asphalt	10/31/2003	<0.53
		6" - 12"	Cadmium		363.85	370.79	Above	Silty Sand/ Gravel/Cobbles	10/31/2003	<0.55
		0' - 2'	Cadmium		363.85	369.79	Above	Asphalt/ Silty Sand/ Gravel/Cobbles	10/31/2003	<0.54
		2' - 4'	Cadmium		363.85	367.79	Above	Silty Sand/ Gravel/Cobbles to Sand	10/31/2003	<0.55
		4' - 6'	Cadmium		363.85	365.79	Above	Sand to Organic Clayey Silt	10/31/2003	22.0
		6' - 8'	Cadmium		363.85	363.79	At	Organic Clayey Silt to Clay	10/31/2003	<0.63
		8' - 10'	Cadmium		363.85	361.79	Below	Silty Clay to Clay to Sand/Gravel to Clay to Sand with Shells	10/31/2003	6.8
		10' - 12'	Cadmium		363.85	359.79	Below	Sand with shells to Clay	10/31/2003	<0.59
SB-426	F38	0" - 6"	Cadmium	371.98	362.55	371.48	Above	Fill	10/31/2003	<0.58
		6" - 12"	Cadmium		362.55	370.98	Above	Fill	10/31/2003	<0.58
		0' - 2'	Cadmium		362.55	369.98	Above	Fill	10/31/2003	<0.56
		2' - 4'	Cadmium		362.55	367.98	Above	Silt/Sand/ Gravel/Cobble	10/31/2003	<0.55 [<0.56]
		4' - 6'	Cadmium		362.55	365.98	Above	Organic Clayey Silt	10/31/2003	28.9
		6' - 8'	Cadmium		362.55	363.98	Above	Organic Clayey Silt	10/31/2003	21.1
		8' - 10'	Cadmium		362.55	361.98	Below	Organic Clayey Silt to Sand with Shells	10/31/2003	11.7
		10' - 12'	Cadmium		362.55	359.98	Below	Clay to Organic Silty Clay to Silty Sand with Shells	10/31/2003	<0.789
SB-427	F38	0" - 6"	Cadmium	371.91	362.57	371.41	Above	Fill	10/31/2003	<0.59
		6" - 12"	Cadmium		362.57	370.91	Above	Fill	10/31/2003	<0.59
		0' - 2'	Cadmium		362.57	369.91	Above	Fill	10/31/2003	<0.58
		2' - 4'	Cadmium		362.57	367.91	Above	Fill	10/31/2003	<0.55
		4' - 6'	Cadmium		362.57	365.91	Above	Fill to Gravel/Sand/ Ceramic	10/31/2003	0.85
		6' - 8'	Cadmium		362.57	363.91	Above	Organic Silty Clay	10/31/2003	4.8
		8' - 10'	Cadmium		362.57	361.91	Below	Sand with shells to Clay	10/31/2003	<0.750
		10' - 12'	Cadmium		362.57	359.91	Below	Silty Clay, Wood at 10'	10/31/2003	<0.832

Table 1C
Summary of Soil Classification and Analytical Data[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sampling Interval	Analyte	Surface Elevation (ft)	Brook Elevation (ft)	Sample Elevation at Bottom of Interval (ft)	Sample Relation to Brook Level	General Soil Classification[3]	Collection Date	Result (mg/kg)
SB-428	F38	0" - 6"	Cadmium	370.79	362.60	370.29	Above	Sand/Gravel/Cobbles	10/31/2003	<0.57
		6" - 12"	Cadmium		362.60	369.79	Above	Sand/Gravel/Cobbles	10/31/2003	<0.55
		0' - 2'	Cadmium		362.60	368.79	Above	Sand/Gravel/Cobbles	10/31/2003	<0.54
		2' - 4'	Cadmium		362.60	366.79	Above	Sand/Gravel/Cobbles	10/31/2003	<0.55
		4' - 6'	Cadmium		362.60	364.79	Above	Sand/Gravel/Cobbles	10/31/2003	<0.56
		6' - 8'	Cadmium		362.60	362.79	At	Organic Silty Clay (ceramics at 6'-6") to Clay	10/31/2003	28.7
		8' - 10'	Cadmium		362.60	360.79	Below	Clay	10/31/2003	<0.693
		10' - 12'	Cadmium		362.60	358.79	Below	Organic Silty Sand to Sand with Shells	10/31/2003	1.02
SB-429	F40	0" - 6"	Cadmium	372.73	361.16	372.23	Above	Fill	10/31/2003	<0.60
		6" - 12"	Cadmium		361.16	371.73	Above	Fill	10/31/2003	0.58
		0' - 2'	Cadmium		361.16	370.73	Above	Fill	10/31/2003	<0.54
		2' - 4'	Cadmium		361.16	368.73	Above	Fill	10/31/2003	<0.55
		4' - 6'	Cadmium		361.16	366.73	Above	Clay	10/31/2003	0.67 [0.62]
		6' - 8'	Cadmium		361.16	364.73	Above	Silty Sand/ Gravel, Organic Clay, Ceramics	10/31/2003	<0.54
		8' - 10'	Cadmium		361.16	362.73	Above	Ceramics to Organic Clayey Silt	10/31/2003	5.7
		10' - 12'	Cadmium		361.16	360.73	At	Organic Clayey Silt	10/31/2003	0.73
		12' - 14'	Cadmium		361.16	358.73	Below	Organic Clayey Silt	10/31/2003	0.99
		14' - 16'	Cadmium		361.16	356.73	Below	Clay to Sand/Gravel/ Shells	10/31/2003	<0.71
SB-430	F40	0" - 6"	Cadmium	373.62	361.16	373.12	Above	Fill	10/31/2003	<0.56
		6" - 12"	Cadmium		361.16	372.62	Above	Fill	10/31/2003	0.59
		0' - 2'	Cadmium		361.16	371.62	Above	Fill	10/31/2003	<0.57
		2' - 4'	Cadmium		361.16	369.62	Above	Fill	10/31/2003	0.57
		4' - 6'	Cadmium		361.16	367.62	Above	Fill	10/31/2003	<0.57
		6' - 8'	Cadmium		361.16	365.62	Above	Concrete to Sand/Gravel to Silty Sand	10/31/2003	<0.55
		8' - 10'	Cadmium		361.16	363.62	Above	Silty Sand	10/31/2003	<0.59
		10' - 12'	Cadmium		361.16	361.62	At	Gravel/Cobbles/Shells to Silty Clay	10/31/2003	2.5
SB-431	G40	0" - 6"	Cadmium	374.38	361.02	373.88	Above	Fill	10/31/2003	<0.54
		6" - 12"	Cadmium		361.02	373.38	Above	Fill	10/31/2003	<0.54
		0' - 2'	Cadmium		361.02	372.38	Above	Fill	10/31/2003	<0.54
		2' - 4'	Cadmium		361.02	370.38	Above	Fill to Sand/Gravel	10/31/2003	3.0
		4' - 6'	Cadmium		361.02	368.38	Above	Silt/Sand/ Gravel to Fill	10/31/2003	0.78
		6' - 8'	Cadmium		361.02	366.38	Above	Fill	10/31/2003	0.71
		8' - 10'	Cadmium		361.02	364.38	Above	Cobbles/Ceramic to Silty Sand to Ceramics	10/31/2003	<0.57
		10' - 12'	Cadmium		361.02	362.38	Above	Organic Silty Clay	10/31/2003	3.3
SB-432	F42	0" - 6"	Cadmium	364.60	361.05	364.10	Above	Organic Silt/Sand	11/3/2003	13.8
		6" - 12"	Cadmium		361.05	363.60	Above	Organic Silt/Sand	11/3/2003	<0.50
		1' - 2'	Cadmium		361.05	362.60	Above	Silty Sand	11/3/2003	3.0
		2' - 3'	Cadmium		361.05	361.6	Above	Silty Sand	11/3/2003	<0.64
		3' - 4'	Cadmium		361.05	360.6	At	Silty Sand to Organic Clayey Silt	11/3/2003	<0.75
		4' - 5'	Cadmium		361.05	359.6	Below	Sand/Gravel/ Shells	11/3/2003	<0.75
SB-433	E40	0" - 6"	Cadmium	371.73	362.02	371.23	Above	Fill	10/31/2003	0.66
		6" - 12"	Cadmium		362.02	370.73	Above	Fill	10/31/2003	1.0
		0' - 2'	Cadmium		362.02	369.73	Above	Fill	10/31/2003	0.99
		2' - 4'	Cadmium		362.02	367.73	Above	Fill	10/31/2003	0.66
		4' - 6'	Cadmium		362.02	365.73	Above	Fill	10/31/2003	1.2
		6' - 8'	Cadmium		362.02	363.73	Above	Fill to Silty Sand/ Ceramics	10/31/2003	<0.57
		8' - 10'	Cadmium		362.02	361.73	At	Organic Clayey Silt	10/31/2003	0.8
		10' - 12'	Cadmium		362.02	359.73	Below	Organic Clayey Silt	10/31/2003	<0.70
SB-434	E41	0" - 6"	Cadmium	371.77	361.89	371.27	Above	Fill	10/31/2003	0.61
		6" - 12"	Cadmium		361.89	370.77	Above	Fill	10/31/2003	0.68
		0' - 2'	Cadmium		361.89	369.77	Above	Fill	10/31/2003	<0.57
		2' - 4'	Cadmium		361.89	367.77	Above	Fill	10/31/2003	1.9
		4' - 6'	Cadmium		361.89	365.77	Above	Fill	10/31/2003	1.3
		6' - 8'	Cadmium		361.89	363.77	Above	Fill to Silty Sand/ Ceramics	10/31/2003	1.3 [<0.54]
		8' - 10'	Cadmium		361.89	361.77	At	Organic Clayey Silt/ Ceramics to Sand/Gravel/ Shells	10/31/2003	<0.78
		10' - 12'	Cadmium		361.89	359.77	Below	Sand/Gravel/ Shells	10/31/2003	<0.79

Table 1C

Summary of Soil Classification and Analytical Data[1]

West Branch of Bloody Brook

Bloody Brook Voluntary Cleanup Program

Onondaga County, New York

Notes:

1. Boring locations are shown on Figures 5C, 6C, 8C, and 11C.
2. Figure coordinates correspond to coordinate system shown on Figures 5C, 6C, 8C, and 11C.
3. The soil classification descriptions identified in the table represent the predominant soil type for the respective intervals.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. --- indicates that the information is not available.
6. Duplicate results are presented in brackets.
7. NA = Not analyzed.
8. J - The detected concentration is an estimated value.
9. < - Analyte not detected at the reporting limit shown.

Table 2
Technology Evaluation Summary
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Remedial Technology	Process Option	Effectiveness	Implementability	Cost
No Action	No Action	Does not achieve remedial action objectives	Implementable	Negligible
Institutional Controls	Notice to Owners	Effective in enhancing the effectiveness of other technologies	Implementable	Negligible
Containment	Surface Controls	Effective in managing erosion and decreasing the potential for exposure to cadmium-impacted material	Implementable	Low capital and maintenance
	Capping	Effective in reducing potential exposure by direct contact with impacted material	Implementable	Low capital and maintenance
In-Situ Treatment	Phytoremediation	Limited by plant root systems and growing seasons	Not readily implementable in Upstate New York	Highly dependent upon plant upkeep and maintenance
	Electrokinetic Separation	Effectiveness dependent upon soil characteristics and presence of buried metallic or insulating materials	Adequate power supply may not be readily available	High capital and maintenance
	Soil Flushing	Effectiveness limited by soil characteristics and distribution of impacted material	Not readily implementable at site considering distribution of impacted material	Moderate
	Solidification/Stabilization	Solidification/stabilization will not change the nature of cadmium impacts at the site	Subsurface obstructions may present difficulties during implementation	High
	Vitrification	Vitrification will not change the nature of cadmium impacts at the site	Adequate power supply may not be readily available	High
Excavation	Excavation	Effective in reducing the on-site contaminant volume and toxicity	Excavation of shallow soil impacts considered readily implementable. Deeper excavation work, especially in proximity to structures, less implementable.	Moderate to high
Ex-Situ Treatment	Solidification/Stabilization	Effective in conditioning material prior to off-site transportation and disposal	Implementable	High
	Vitrification	Vitrification will not change the nature of cadmium impacts at the site	Not implementable	High
	Soil Washing	Not effective in treating soils with high humic content, as present at this site	Not implementable	High
	Separation	Effectiveness dependent upon soil characteristics	Soil characteristics at the site may limit implementability	Moderate
	Chemical Extraction	Effectiveness dependent upon soil characteristics	Soil characteristics at the site may limit implementability	High
Off-Site Disposal	Off-Site Disposal	Effective in reducing the on-site contaminant volume and toxicity	Implementable	Moderate to high depending upon disposal characterization

Note:
Highlighted remedial technologies using the highlighted process options were retained for consideration as a component of remedial alternatives.

Table 3
Evaluation of Potentially Applicable Standards, Criteria and Guidance (SCGs)
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
FEDERAL				
Resource Conservation and Recovery Act (RCRA)	**42 U.S.C. 6901-6992**			
Identification and Listing of Hazardous Wastes (Part 261)	40 CFR Part 260-265	Outlines criteria determining whether solid waste is a hazardous waste after generation and is subject to regulation under 40 CFR Parts 260-265. Does not address cleanup action levels.	Applicable to removed media only	These regulations would apply to media containing hazardous waste that is removed from the site as part of a remedial action.
Clean Air Act (CAA)	**42 U.S.C. 7401-7671**			
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes ambient air quality standards for protection of public health.	Applicable	NAAQS may be applicable in evaluating whether there are air impacts at a site prior to remediation, or during long-term remediation programs. Due to the site conditions, air emissions would not be a significant issue.
Clean Water Act (CWA)	**33 U.S.C. 1251-1387**			
National Primary Drinking Water Regulations	40 CFR Part 141	Establishes maximum contaminant levels (MCLs) for treatment of groundwater for public potable water supplies.	Not Applicable	Groundwater in the vicinity of the site is not utilized as a source of potable water for the public.
USACE Regulatory Program Regulations	33 CFR Part 320-332	U.S. Army Corps of Engineers is involved in regulating certain activities in the Nation's waters, including wetlands.	Applicable	Potentially applicable to activities within the brook, on the side banks, and that affect federal wetlands.
Safe Drinking Water Act (SDWA)	**42 U.S.C. 300f-300j**			
National Primary Drinking Water Regulations	40 CFR Part 141	Establishes MCLs, which are health-based standards for public water systems.	Not Applicable	Water will not be discharged directly to any potable water source. Groundwater in the vicinity of the site is not utilized as a source of potable water for the public.
National Secondary Drinking Water Regulations	40 CFR Part 143	Non-enforceable health goals for public water systems that relate to aesthetic quality.	Not Applicable	Water will not be discharged directly to any potable water source. Groundwater in the vicinity of the site is not utilized as a source of potable water for the public.

Table 3
Evaluation of Potentially Applicable Standards, Criteria and Guidance (SCGs)
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
Occupational Safety and Health Standards (OSHA)	**29 U.S.C. 651-678**			
Hazardous Waste Operations and Emergency Response (HAZWOPER)	29 CFR Part 1910.120	Contains the safety requirements employers and employees must meet in order to conduct hazardous waste operations and emergency response activities.	Applicable	Personnel performing the voluntary clean-up operations at the site will need to meet the requirements of HAZWOPER.
STATE				
Division of Solid and Hazardous Materials				
New York State Environmental Conservation Law	Article 27 - Collection, Treatment and Disposal of Refuse and Other Solid Waste	Governs the management and disposal of solid waste and describes New York remedial program requirements.	Applicable	Remedial activities and wastes generated will be managed in accordance with applicable requirements.
Solid Waste Management Facilities	6 NYCRR Part 360	Includes solid waste disposal requirements.	Applicable	These regulations apply to facilities that will be used for the off-site disposal of non-hazardous waste.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	Outlines criteria determining whether solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 370-376.	Applicable	Applies to material generated from the site for off-site disposal and determined to contain hazardous waste.
Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities	6 NYCRR Part 372	Establishes standards for generators and transporters of hazardous waste and standards for generators, transporters, and treatment, storage or disposal facilities relating to the use of the manifest system and its record keeping requirements.	Applicable	Applies to material generated from the site for off-site disposal and determined to contain hazardous waste.
Land Disposal Restrictions	6 NYCRR Part 376	Establishes constituent-specific standards to which hazardous wastes must be treated prior to land disposal.	Applicable to removed media only	These requirements would be applicable to media removed from the site which are determined to contain hazardous wastes that are land disposed off site as part of a remedial action.

Table 3
Evaluation of Potentially Applicable Standards, Criteria and Guidance (SCGs)
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
Division of Air Resources				
New York State Air Guide 1	DAR-1: Guidelines for the Control of Toxic Ambient Air Contaminants	Provides guidance for permitting emissions for new or existing sources	Not Applicable	No air emissions are being discharged.
Fugitive Dust Suppression and Particulate Monitoring Program	TAGM 4031	Provides guidance for fugitive dust suppression and particulate monitoring at inactive hazardous waste sites.	Applicable	A fugitive dust suppression and particulate monitoring program will be included in the site health and safety plan.
Division of Water				
New York State Environmental Conservation Law - Use and Protection of Waters	Article 15 - Water Resources - 6 NYCRR Part 608	A permit required for temporary or permanent disturbances of the bed or banks of a stream with a classification and standard for C (T) or higher.	Applicable	A portion of the stream at the site is a Class B stream.
New York State Environmental Conservation Law - Pollutant Discharge Elimination System	Article 17 - Water Pollution Control - 6 NYCRR 750	State Pollutant Discharge Elimination System (SPDES) controls wastewater and stormwater discharges including point source discharges to surface water and groundwater; designed to cover liquid discharges greter than 1,000 gallons per day.	Applicable	This statue would be applicable for alternatives that include discharge to waters of the State.
Classification and Standards of Quality and Purity	6 NYCRR 700-706	Establishes quality standards for surface water and groundwater and incorporates federal MCLs and standards from other state regulations.	Applicable	The regulations would be applicable for alternatives that include discharge to surface water and groundwater.
Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations	TOGS 1.1.1	Establishes quality standards for surface water and groundwater in New York State and incorporates federal MCLs.	Applicable	The regulations would be applicable for alternatives that include discharge to surface water and groundwater.

Table 3
Evaluation of Potentially Applicable Standards, Criteria and Guidance (SCGs)
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
New York State Environmental Conservation Law - Article 27	Technical Guidance for Screening Contaminated Sediments	Describes the methodology used by the Division of Fish and Wildlife and the Division of Marine Resources for establishing criteria for the purpose of identifying contaminated sediments.	Applicable	This guidance document presents the criteria used to determine if contaminant concentrations in sediment at the site require remediation.
Groundwater Effluent Standards	6 NYCRR 700-706	Establishes effluent standards and/or limitations for discharges to groundwater.	Not Applicable	Water will not be discharged to groundwater.
Division of Fish and Wildlife and Marine Resources				
Freshwater Wetlands Act	Articles 24 - Freshwater Wetlands	Provides guidance to preserve, protect, and enhance the present and potential values of wetlands; protect the public health and welfare; and be consistent with the reasonable economic and social development of the state.	Not Applicable	This regulation is applicable to activities that would affect state-mapped wetlands, and there are no state-mapped wetlands at the site.
Freshwater Wetlands Permit Requirements	6 NYCRR 663	Policy to preserve, protect, and conserve freshwater wetlands and the benefits derived therefrom; to prevent the despoliation and destruction of freshwater wetlands; and to regulate use and development of such wetlands to secure the natural benefits of freshwater wetlands, consistent with the general welfare and beneficial economic, social and agricultural development of the state.	Not Applicable	There are no state-mapped wetlands at the site.
Division of Environmental Remediation				
Overview of the site investigation and remediation process	DER-10 Technical Guidance for Site Investigation and Remediation	Provides an overview of the site investigation and remediation process for remedial programs administered by the Division of Environmental Remediation (DER).	Applicable	Guidance that governs the remedial process for the site.

Table 3
Evaluation of Potentially Applicable Standards, Criteria and Guidance (SCGs)
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
Improve the overall sustainability of remediation program	CP-31 / Green Remediation	Provides concepts and techniques of green remediation and guidance on how to apply them to remedial programs administered by the DER.	Applicable	Used as a guidance document for incorporating green remediation practices into the remedial action at the site.
Determination of Soil Clean-Up Levels	CP-51 / Soil Cleanup Guidance	Provides the framework and procedures for the selection of soil cleanup levels appropriate for each of the remedial programs administered by the (DER).	Applicable	Used as a guidance document for proposing soil cleanup levels.
State Brownfield Program	6 NYCRR Part 375	Provides for the orderly and efficient administration of the New York Brownfield Program including defining soil cleanup objectives for remedial programs.	Applicable	Soil cleanup objectives defined in this regulation were used when developing remedial alternatives.

TABLE 4A
Proposed Additional Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
Residential Area			
DI-62-01	C15	0' - 1'	Analyze
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-62-02	C15	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]

Notes:

1. Proposed boring locations are shown on Figure 8A.

2. Figure coordinates correspond to coordinate system shown on Figure 8A.

3. All samples will be collected using a stainless steel hand auger. If refusal is encountered, additional attempts will be made in the same general area as the proposed sample location. In the event of refusal, limited sample recovery, or the presence of an obstruction, the sample will not be collected, and the reason for not collecting the sample will be documented.

4. As indicated in the table, certain samples will be collected and held at the laboratory and will be analyzed based on the results of other samples. If analysis of held samples is determined to be necessary, the analysis will be performed within laboratory and analytical procedure holding times. All samples that are analyzed will be analyzed for cadmium using USEPA SW-846 Method 6010B.

5. Analysis is contingent on results from successive samples listed above and from samples at consecutive depth intervals. Samples will not be analyzed if results are less than 2.5 parts per million (ppm) for depth intervals in the top two feet and if results are less than 10 ppm for depth intervals below 2 feet.

TABLE 4B
Proposed Additional Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
Residential/Apartment Complex Area			
DI-55-03	E23	0' - 1'	No Sample
		1' - 2'	No Sample
		2' - 3'	Analyze
		3' - 4'	Analyze
		4' - 5'	Analyze
DI-55-04	E23	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
		4' - 5'	Hold[5]
		5' - 6'	Hold[5]
DI-58-03	E27	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
		4' - 5'	Hold[6]
		5' - 6'	Hold[6]
DI-58-04	E27	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
		4' - 5'	Hold[6]
		5' - 6'	Hold[6]
DI-63-01	E19	0' - 1'	Analyze
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-63-02	E19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-63-03	E19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-64-01	E21	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-64-02	E21	0' - 1'	Analyze
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]

TABLE 4B
Proposed Additional Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
DI-67-01	E27	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-67-02	E27	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
DI-68-01	E28	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-68-02	E28	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
DI-69-01	D28	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-69-02	D28	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
DI-70-01	D28	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
		4' - 5'	Hold[6]
		5' - 6'	Hold[6]
DI-70-02	D28	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]
		4' - 5'	Hold[6]
		5' - 6'	Hold[6]
		6' - 7'	Hold[6]
DI-71-01	D29	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-71-02	D29	0' - 1'	Hold[6]
		1' - 2'	Hold[6]
		2' - 3'	Hold[6]
		3' - 4'	Hold[6]

TABLE 4B
Proposed Additional Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
DI-72-01	F19	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-72-02	F19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-73-01	F19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-73-02	F19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-74-01	F19	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
DI-74-02	F19	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-75-01	F21	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-75-02	F21	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-76-01	G23	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-76-02	G23	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-77-01	G23	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]

TABLE 4B
Proposed Additional Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
DI-79-01	E23	0' - 1'	Analyze
		1' - 2'	Analyze
		2' - 3'	Analyze
		3' - 4'	Analyze
		4' - 5'	Analyze
DI-79-02	E23	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
		4' - 5'	Hold[5]

Notes:

1. Proposed boring locations are shown on Figure 8B.

2. Figure coordinates correspond to coordinate system shown on Figure 8B.

3. All samples will be collected using a stainless steel hand auger. If refusal is encountered, additional attempts will be made in the same general area as the proposed sample location. In the event of refusal, limited sample recovery, or the presence of an obstruction, the sample will not be collected, and the reason for not collecting the sample will be documented.

4. As indicated in the table, certain samples will be collected and held at the laboratory and will be analyzed based on the results of other samples. If analysis of held samples is determined to be necessary, the analysis will be performed within laboratory and analytical procedure holding times. All samples that are analyzed will be analyzed for cadmium using USEPA SW-846 Method 6010B.

5. Analysis is contingent on results from successive samples listed above and from samples at consecutive depth intervals. Samples will not be analyzed if results are less than 2.5 parts per million (ppm) for depth intervals in the top two feet and if results are less than 10 ppm for depth intervals below 2 feet.

6. Analysis is contingent on results from successive samples listed above and from samples at consecutive depth intervals. Samples will not be analyzed if results are less than 4.3 ppm for depth intervals in the top two feet and if results are less than 10 ppm for depth intervals below 2 feet.

TABLE 4C
Proposed Design Soil Investigation Samples[1]
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Boring ID	Figure Coordinates[2]	Sample Depth Interval[3]	Analysis Approach[4]
Commercial/Light Industrial Area			
DI-81-01	D36	0' - 1'	Analyze
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]
DI-81-02	D36	0' - 1'	Hold[5]
		1' - 2'	Hold[5]
		2' - 3'	Hold[5]
		3' - 4'	Hold[5]

Notes:

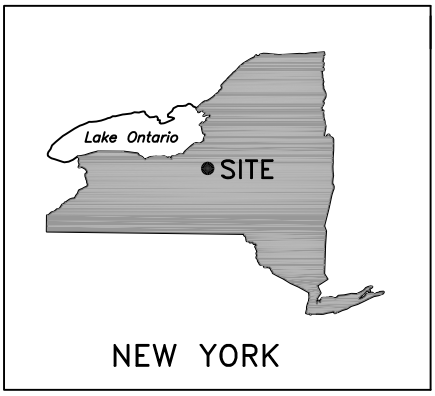
1. Proposed boring locations are shown on Figure 8C.

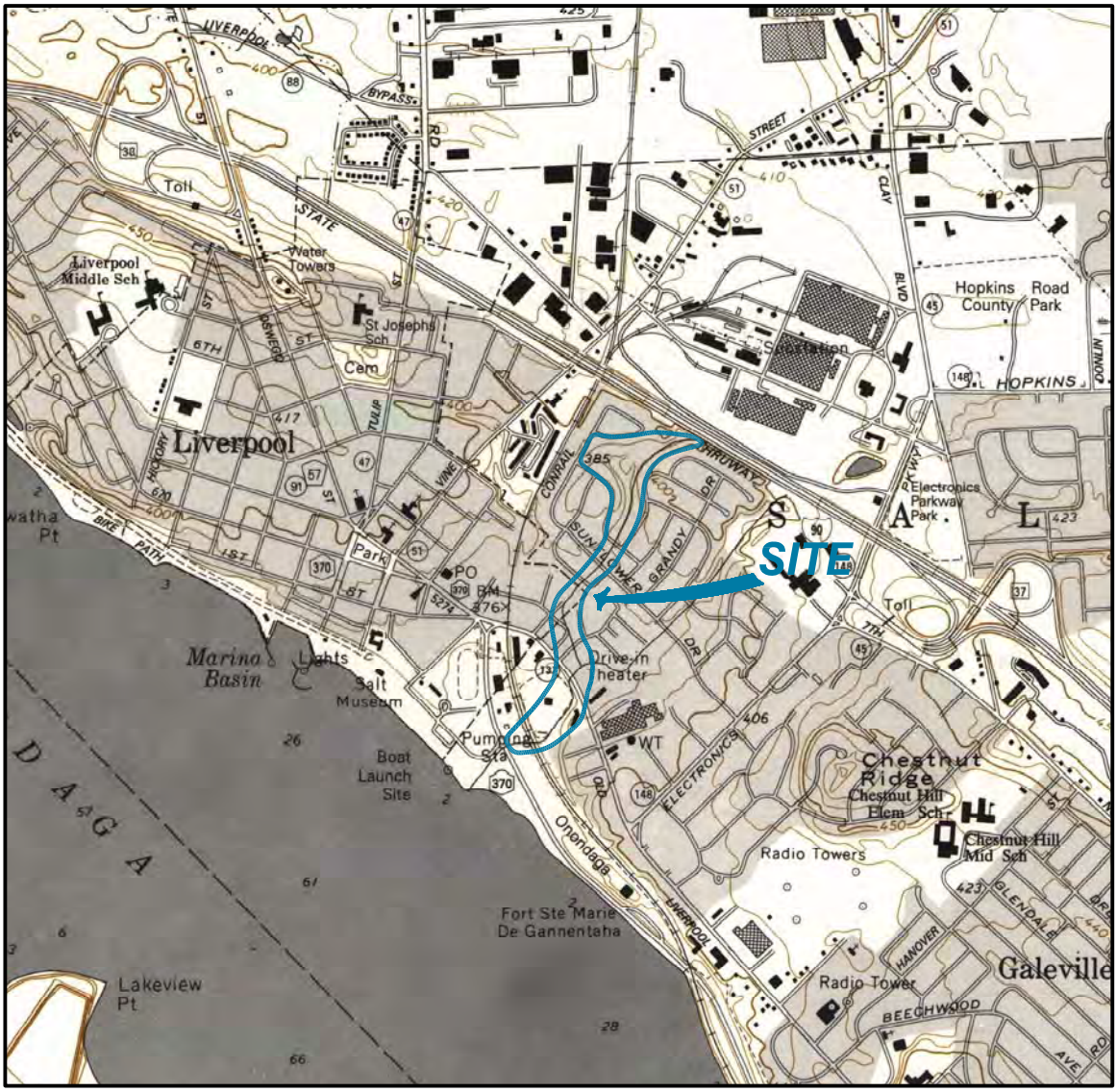
2. Figure coordinates correspond to coordinate system shown on Figure 8C.

3. All samples will be collected using a stainless steel hand auger. If refusal is encountered, additional attempts will be made in the same general area as the proposed sample location. In the event of refusal, limited sample recovery, or the presence of an obstruction, the sample will not be collected and the reason for not collecting the sample will be documented.

4. As indicated in the table, certain samples will be collected and held at the laboratory and will be analyzed based on the results of other samples. If analysis of held samples is determined to be necessary, the analysis will be performed within laboratory and analytical procedure holding times. All samples that are analyzed will be analyzed for cadmium using USEPA SW-846 Method 6010B.

5. Analysis is contingent on results from successive samples listed above and from samples at consecutive depth intervals and based on discussions with Lockheed Martin and NYSDEC.





0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

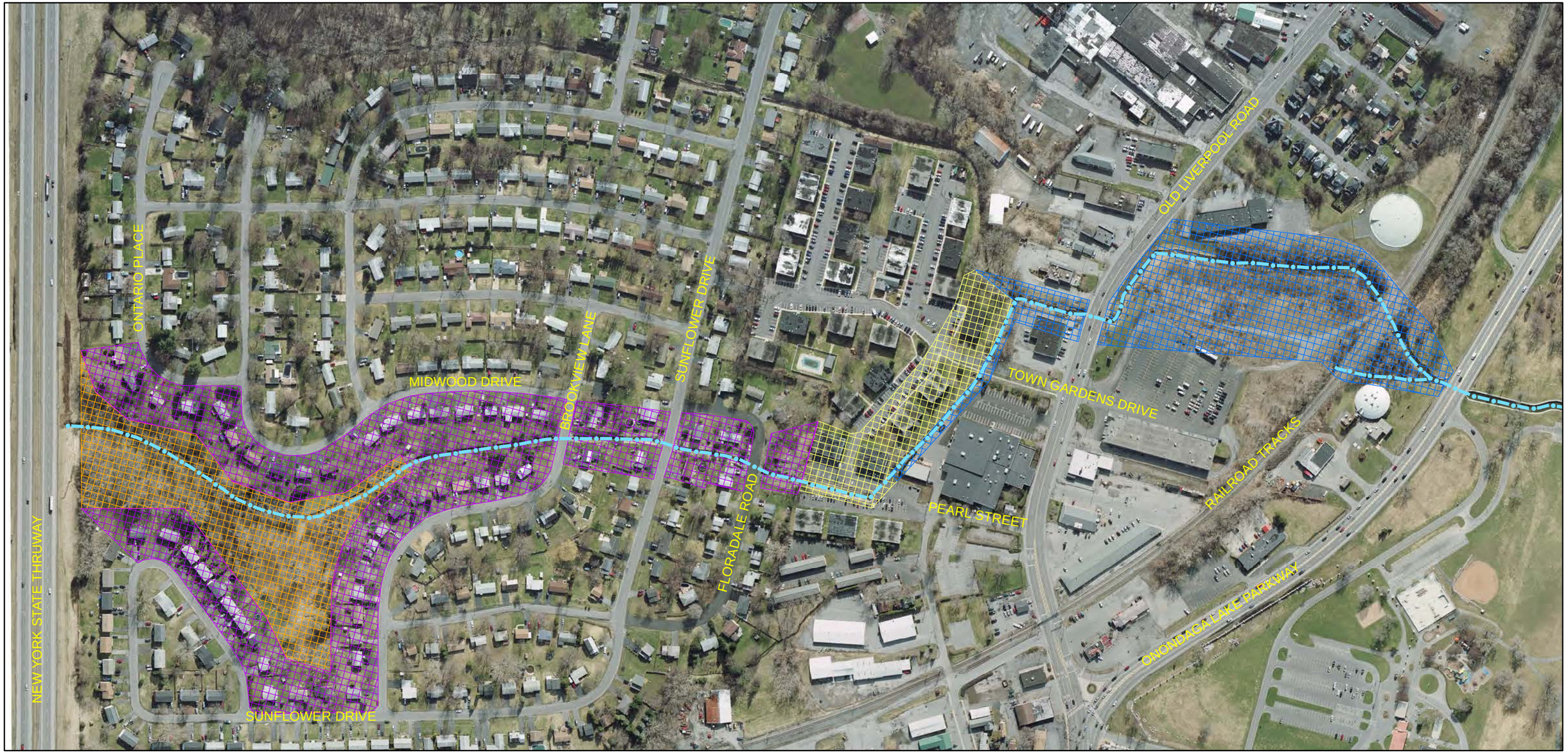
SITE LOCATION MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A1FIG1.dwg	—	60194430	12 / 2012	1

Plotted By: bookasr
Layout-Sheet Name: LAYOUT1
Plot File Date Created: Dec/06/2012 9:43 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\A1FIG1.DWG



Legend

- CURRENT BROOK ALIGNMENT
- WOODED AREA
- RESIDENTIAL AREA
- APARTMENT COMPLEX AREA
- COMMERICAL-LIGHT INDUSTRIAL AREA

N

0 365 730 1,460 2,190 2,920
Feet

AECOM

FIGURE 2
LOCKHEED MARTIN CORPORATION
SITE AREA MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

DECEMBER 2012

60194430



Legend

- CURRENT BROOK ALIGNMENT
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- HISTORIC BROOK ALIGNMENT (PRIOR TO 1947)

N

0 350 700 1,400 2,100 2,800
Feet

AECOM

FIGURE 3
LOCKHEED MARTIN CORPORATION
BLOODY BROOK RELOCATION HISTORY

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

DECEMBER 2012

60194430

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

BROOKVIEW LANE

SUNFLOWER DRIVE

NEW YORK STATE THRUWAY

MATCHLINE TO SHEET 2 OF 3

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

6'x8' WIDE BOX CULVERT INV.=384.4

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.79 DRAINAGE PIPE

30"CMP INV=377.95 DRAINAGE PIPE

GABION LINED CHANNEL

CHANNEL

CHAIN LINK FENCE

SB-437, SB-436, SB-401, SB-459, SB-458, SB-435, SB-457, DI-40-01, SB-217, SB-402, SB-218, SB-438, SB-227, SB-219, SB-403, SB-220, SB-51, SB-221, SB-222, SB-400, SB-404, SB-439, DI-19-01, DI-19-02, DI-19-03, SB-405, SSSWP-4, SSSWP-5, SB-223, SB-224, SB-441, DI-20-01, DI-20-02, DI-41-01, SSSWP-3, SSSWP-2, SB-440, SB-228, SB-406, SB-225, SB-52, SB-226, DI-60-01, SB-443, SB-442, DI-61-01, SB-445, SB-407, SB-444, DI-52-01, SB-446, DI-53-01, DI-53-02, SB-447, DI-51-02, DI-51-01, SB-20, SB-201, OCDDS-10, SB-53, SSSWP-1N, SSSWP-1E, SSSWP-1S, SSSWP-1R, SSSWP-1, SSSWP-1W, SB-408, PRE-SS-P1, POST-SS-P1, SB-409, SB-55, SB-54, SB-449, SB-410, DI-01-01, DI-01-02, DI-01-03, SB-412, SB-448, DI-42-01, SB-411, DI-54-01, DI-02-02, DI-02-01, SB-22, SB-21/SB-58, SB-59, SB-414, SB-452, SB-456, DI-22-01, SB-450, SB-451, DI-21-01, SB-19, SB-56, OCDDS-7, SB-24, OCDDS-4, SB-23/SB-204, DI-26-01, SB-203, DI-25-01, DI-24-01, DI-23-02, DI-23-01, DI-SB-01-05, SA-SB-01-04, SA-SB-01-03, SA-SB-01-02, SA-SB-01-01, SB-202, SA-SB-02-01, SA-SB-02-02, SA-SB-02-03, SA-SB-02-04, DI-03-05, DI-03-04, DI-03-03, DI-03-02, DI-03-01, DI-28-01, SB-26, DI-29-01, SB-28, SB-205, SB-25, DI-27-01, DI-17-01, DI-17-02, DI-26-02, SA-SB-04-01, SA-SB-04-02, SA-SB-04-03, SA-SB-04-04, DI-31-01, SB-60, OCDDS-8, SB-206, SB-27/SB-207, DI-44-01, DI-43-02, DI-43-01, SA-SB-03-01, SA-SB-03-02, SA-SB-03-03, SA-SB-03-04, DI-30-01, DI-SB-03-05, SB-453, SB-229, DI-04-01

LEGEND

- WETLAND/PHRAGMITES
- SB-408 — EXISTING SAMPLING LOCATION
- OCDDS-10 — APPROXIMATE ONONDAGA COUNTY SIDE BANK SAMPLING LOCATION
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- GABIONS (ROCK-FILLED WIRE CAGES)
- ANTICIPATED POST-REMEDIATION CADMIUM CONCENTRATION GREATER THAN 10 ppm BELOW SOIL REMOVAL DEPTH

NOTE

1. SEE FIGURE 11C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

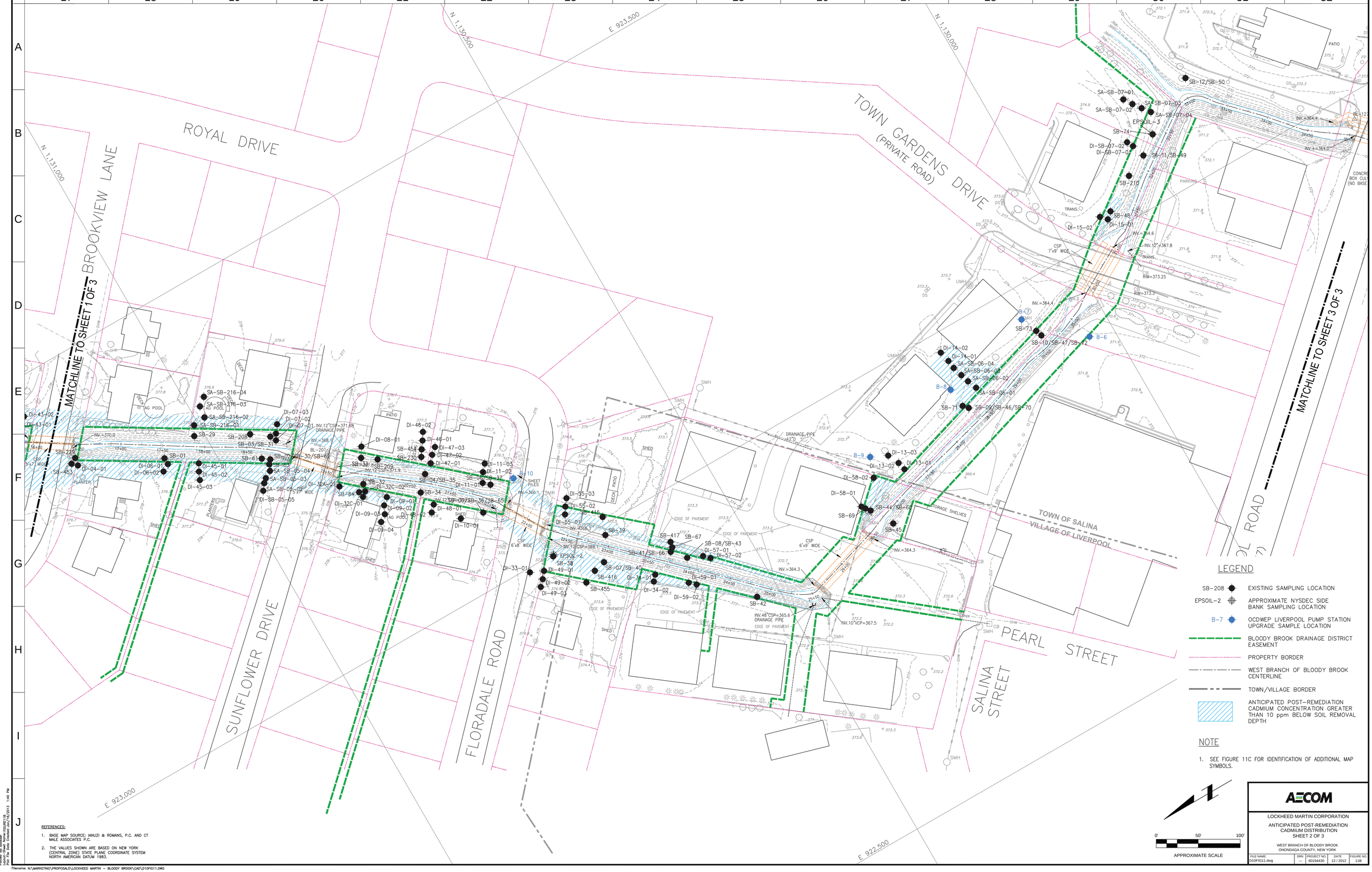
ANTICIPATED POST-REMEDIATION CADMIUM DISTRIBUTION
SHEET 1 OF 3

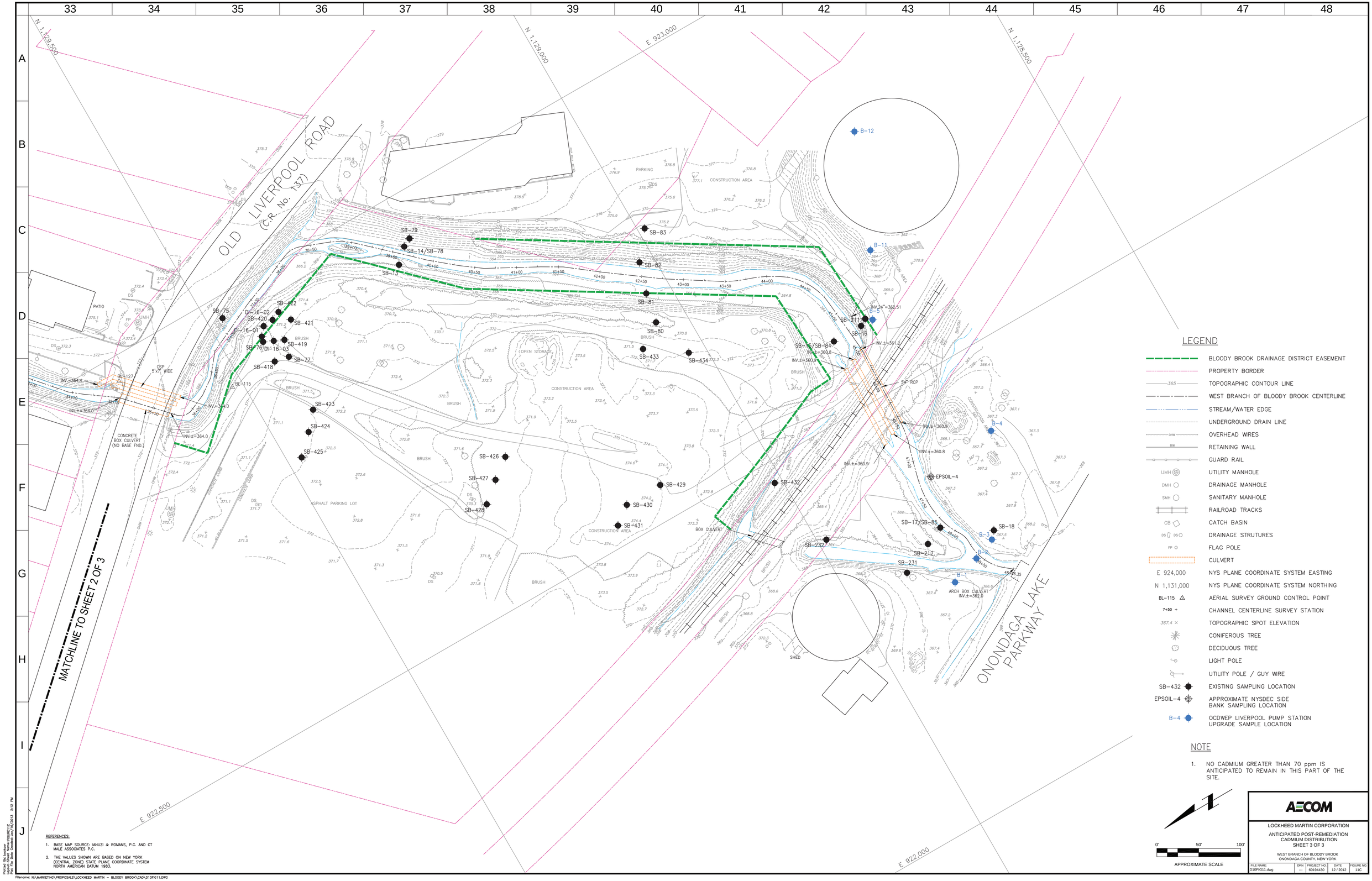
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D10FIG11.dwg	---	60194430	12 / 2012	11A

Plotted By: brooksbar
Plot Scale: 1 = 200.000000
Plot File Date Created: July/16/2013 1:38 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\D10FIG11.DWG


ROYAL DRIVE
BROOKVIEW LANE
TOWN GARDENS DRIVE
(PRIVATE ROAD)
SUNFLOWER DRIVE
FLORADALE ROAD
PEARL STREET
SALINA STREET
TOWN OF SALINA
VILLAGE OF LIVERPOOL
MATCHLINE TO SHEET 1 OF 3
MATCHLINE TO SHEET 3 OF 3
N 1,131,000
N 1,130,500
E 923,500
E 923,000
E 922,500
SB-208
SB-12/SB-50
SB-74
SB-11/SB-49
SB-210
SB-48
SB-73
SB-10/SB-47/SB-72
SB-71
SB-09/SB-46/SB-70
SB-69
SB-44/SB-68
SB-45
SB-42
SB-41/SB-66
SB-67
SB-417
SB-455
SB-416
SB-07/SB-40
SB-39
SB-38
SB-32
SB-64
SB-209
SB-34
SB-08/SB-43
SB-57-01
SB-57-02
SB-59-01
SB-59-02
SB-49-01
SB-49-02
SB-49-03
SB-34-01
SB-34-02
SB-48-01
SB-10-01
SB-33-01
SB-32C-01
SB-32C-02
SB-09/SB-36/SB-65
SB-453
SB-454
SB-230
SB-29
SB-03/SB-31
SB-61
SB-62
SB-30/SB-60
SB-01
SB-223
SB-04-01
SB-06-01
SB-06-02
SB-45-01
SB-45-02
SB-45-03
SB-05-01
SB-05-02
SB-05-03
SB-05-04
SB-05-05
SB-216-01
SB-216-02
SB-216-03
SB-216-04
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SB-06-29
SB-06-30
SB-06-31
SB-06-32
SB-06-33
SB-06-34
SB-06-35
SB-06-36
SB-06-37
SB-06-38
SB-06-39
SB-06-40



LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- SB-432 EXISTING SAMPLING LOCATION
- EPSOIL-4 APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-4 OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION

NOTE

1. NO CADMIUM GREATER THAN 70 ppm IS ANTICIPATED TO REMAIN IN THIS PART OF THE SITE.

REFERENCES:

1. BASE MAP SOURCE: LANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

ANTICIPATED POST-REMEDIATION CADMIUM DISTRIBUTION
SHEET 3 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D10FIG11.dwg	---	60194430	12 / 2012	11C

Plotted By: bcrosser
Last Saved By: bcrosser
Not Fix Xrefs Overlaid: 12/6/2013 2:12 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D10FIG11.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

MATCHLINE TO SHEET 2 OF 3 — BROOKVIEW

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

6'x8' WIDE BOX CULVERT INV.=384.4

S 39°10'35" W 271.55'

S 39°10'35" W 271.55'

S 59°45'45" E 350.00'

204.97'

233.96'

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.78 DRAINAGE PIPE

30"CMP INV=377.90 DRAINAGE PIPE

47"x71" INV=392.95

INV.=370.4

CSP 5'x7' WIDE

CHANNEL

CABION LINED CHANNEL

PROPERTY LINE

CHAIN LINK FENCE

BL-114

SPRUCE TREES

DISTURBED

TREES & BRUSH

SHED

DECK

PATIO

POOL

AG POOL

CONC.

PLANTERS

PLANTER

UMH

DMH

CB

DS

FP

OHW

RW

LEGEND

- WETLAND/PHRAGMITES
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- NYS THRUWAY EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- GABIONS (ROCK-FILLED WIRE CAGES)
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 1 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN.	PROJECT NO.	DATE	FIGURE NO.
D3FIG4.dwg	---	60194430	12 / 2012	4A

Plotted By: bolster
Last Plot Date: Created: Dec/04/2012 8:47 AM
FIGURE 4A

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D3FIG4.DWG

ROYAL DRIVE

BROOKVIEW LANE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

PEARL STREET

SALINA STREET

TOWN OF SALINA
VILLAGE OF LIVERPOOL

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 923,000

E 922,500

MATCHLINE TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

SHEET PILES

CSP 5'x7' WIDE

CSP 5'x8' WIDE

CSP 6'x8' WIDE

CSP 6'x9' WIDE

CSP 7'x9' WIDE

INV.=370.0

INV.=368.1

INV.12"CSP=371.68
DRAINAGE PIPE

INV.12"CSP=371.9

INV.12"CSP=370.2

INV.=367.8

INV.=366.3

INV.12"CSP=368.1

INV.=366.1

INV.=364.3

INV.48"CSP=365.6
DRAINAGE PIPE

INV.10"VCP=367.5

DRAINAGE PIPE
12"D

INV.=364.4

INV.=364.0

INV.12"=367.8

INV.=364.6

RIM=373.25

RIM=373.3

BL-201

BL-115

PATIO

AG POOL

SHED

DECK

PLANTER

PLANTERS

TRANS.

UMH

SMH

DS

CB

CONCRETE BOX CULVERT
(NO BASE)

PARKING

STORAGE SHELVES

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- TOWN/VILLAGE BORDER
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 2 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D3FIG4.dwg	---	60194430	12/2012	4B

Plotted By: bastiaar
Last Plot Date: FIGURE 4B
Plot File Date Created: Dec/04/2013 9:47 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D3FIG4.DWG

N 1,129,500

N 1,129,000

E 923,000

N 1,128,500

E 922,500

OLD LIVERPOOL ROAD (C.R. No. 137)

MATCHLINE TO SHEET 2 OF 3

PATIO

CSP 5'x7' WIDE

CONCRETE BOX CULVERT (NO BASE FND.)

INV.=364.4

INV.±=364.0

BL-127

BL-115

BRUSH

CONSTRUCTION AREA

(OPEN STORAGE)

PARKING

ASPHALT PARKING LOT

BOX CULVERT

SHED

INV.24"=362.51

INV.±=361.2

INV.±=360.8

INV.±=360.9

54" RCP

ARCH BOX CULVERT INV.±=362.0

ONONDAGA LAKE PARKWAY

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- RAILROAD TRACKS
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 3 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.:	DATE	FIGURE NO.
D3FIG4.dwg	—	60194430	12 / 2012	4C

Plotted By: bostonr
Last File Save: Created: Dec/04/2012 9:48 AM
Plot File Name: FIGURE 4C

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D3FIG4.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

MATCHLINE TO SHEET 2 OF 3

BROOKVIEW LANE

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

6'x8' WIDE BOX CULVERT INV.=384.4

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.79 DRAINAGE PIPE

30"CMP INV=377.90 DRAINAGE PIPE

CSP 6'x7' WIDE

CHAIN LINK FENCE

GABION LINED CHANNEL

SPRUCE TREES

DESTROYED

TREES & BRUSH

CHANNEL

SB-437 SB-436 SB-401 SB-458 SB-456 SB-435 SB-457 SB-217 SB-402 SB-218 SB-438 SB-227 SB-219 SB-403 SB-220 SB-221 SB-51 SB-222 SB-400 SB-404 SB-439 SB-440 SB-228 SB-405 SB-223 SB-224 SB-441 SB-406 SB-225 SB-52 SB-226 SB-443 SB-442 SB-445 SB-407 SB-444 SB-446 SB-447 SB-201 SB-53 SB-408 SB-409 SB-54 SB-410 SB-412 SB-448 SB-411 SB-202 SB-22 SB-21/SB-57 SB-58 SB-59 SB-414 SB-452 SB-456 SB-19 SB-56 SB-450 SB-451 SB-55 SB-449 SB-24 SB-23/SB-204 SB-203 SB-205 SB-25 SB-26 SB-206 SB-60 SB-207 SB-453 SB-226

DI-40-01 DI-19-01 DI-19-02 DI-19-03 DI-20-01 DI-20-02 DI-41-01 DI-60-01 DI-61-01 DI-52-01 DI-53-01 DI-53-02 DI-51-02 DI-51-01 DI-02-02 DI-02-01 DI-SB-01-05 DI-23-02 DI-23-01 DI-24-01 DI-25-01 DI-26-01 DI-26-02 DI-03-05 DI-03-04 DI-03-03 DI-03-02 DI-03-01 DI-28-01 DI-29-01 DI-28 DI-17-01 DI-17-02 DI-27-01 DI-SB-03-05 DI-22-01 DI-42-01 DI-54-01 DI-01-02 DI-01-03 DI-01-01 DI-21-01 DI-43-02 DI-43-01 DI-44-01 DI-04-01 DI-30-01

SSSWP-1 SSSWP-1N SSSWP-1E SSSWP-1S SSSWP-1W SSSWP-1R SSSWP-2 SSSWP-3 SSSWP-4

PRE-SS-P1 POST-SS-P1

OCDDS-10 OCDDS-7 OCDDS-4 OCDDS-5 OCDDS-6

SA-SB-01-01 SA-SB-01-02 SA-SB-01-03 SA-SB-01-04 SA-SB-02-01 SA-SB-02-02 SA-SB-02-03 SA-SB-02-04 SA-SB-03-01 SA-SB-03-02 SA-SB-03-03 SA-SB-03-04 SA-SB-04-01 SA-SB-04-02 SA-SB-04-03 SA-SB-04-04

LEGEND

- WETLAND/PHRAGMITES
- SB-408 EXISTING SAMPLING LOCATION
- OCDDS-10 APPROXIMATE ONONDAGA COUNTY SIDE BANK SAMPLING LOCATION
- GABIONS (ROCK-FILLED WIRE CAGES)
- LOCATION HISTORIC BROOK ALIGNMENT

NOTE

1. SEE FIGURE 5C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

EXISTING SOIL SAMPLING LOCATIONS SHEET 1 OF 3

WEST BRANCH OF BLOODY BROOK ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D4FIG5.dwg	---	60194430	12 / 2012	5A

Plotted By: brooker
Plot Style Table: FIGURE_5A
Plot: File Date Created: July 16 2013 11:34 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D4FIG5.DWG

ROYAL DRIVE

BROOKVIEW LANE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

LIVERPOOL ROAD
(C.R. No. 137)

PEARL STREET

SALINA STREET

TOWN OF SALINA
VILLAGE OF LIVERPOOL

MATCHLINE TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 923,000

E 922,500

SB-12/SB-50
SA-SB-07-01
SA-SB-07-02
SA-SB-07-03
SA-SB-07-04
EPSOIL-3
SB-74
DI-SB-07-03
DI-SB-07-04
SB-11/SB-49
SB-210
SB-48
DI-15-01
DI-15-02
SB-73
SB-10/SB-47/SB-72
DI-14-02
DI-14-01
SA-SB-06-04
SA-SB-06-03
SA-SB-06-02
SA-SB-06-01
SB-71
SB-00/SB-46/SB-70
DI-13-03
DI-13-02
DI-13-01
DI-58-02
DI-58-01
SB-69
SB-44/SB-68
SB-45
SB-216-04
SA-SB-216-03
SA-SB-216-02
SA-SB-216-01
SB-29
SB-208
SB-03/SB-31
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SB-220
SB-453
DI-04-01
DI-06-01
DI-06-02
SB-01
DI-45-01
DI-45-02
DI-45-03
SA-SB-05-04
SA-SB-05-03
SA-SB-05-02
SA-SB-05-01
DI-32A-01
DI-SB-05-05
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DI-07-01
DI-08-01
SB-33
SB-209
SB-230
SB-454
DI-46-02
DI-46-01
DI-47-03
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SB-999
SB-1000

B-6
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B-9
B-10

INV.=370.0
INV.12"CSP=371.68
DRAINAGE PIPE
INV.=368.1
INV.=367.8
INV.12"CSP=371.9
INV.=366.1
INV.=365.3
INV.12"CSP=369.1
INV.12"CSP=370.2
INV.=364.4
INV.=364.6
INV.12"=367.8
RIM=373.25
RIM=373.3
INV.=364.3
INV.48"CSP=365.6
DRAINAGE PIPE
INV.10"VCP=367.5
DRAINAGE PIPE
32"D
INV.=364.3
INV.=364.0

CSP 7'x7' WIDE
CSP 5'x7' WIDE
CSP 6'x8' WIDE
CSP 6'x9' WIDE
CSP 7'x9' WIDE

CONCRETE BOX CULVERT (NO BASE FN.)

PATIO
AG POOL
PLANTER
DECK/PATIO
SHED
STORAGE SHELVES
PARKING
TRANS.
SHEET PILES
DS
SMH
UMH
CB
FP

LEGEND

- SB-208 — EXISTING SAMPLING LOCATION
- EPSOIL-2 — APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-7 — OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT

NOTE

1. SEE FIGURE 5C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'
APPROXIMATE SCALE

AECOM

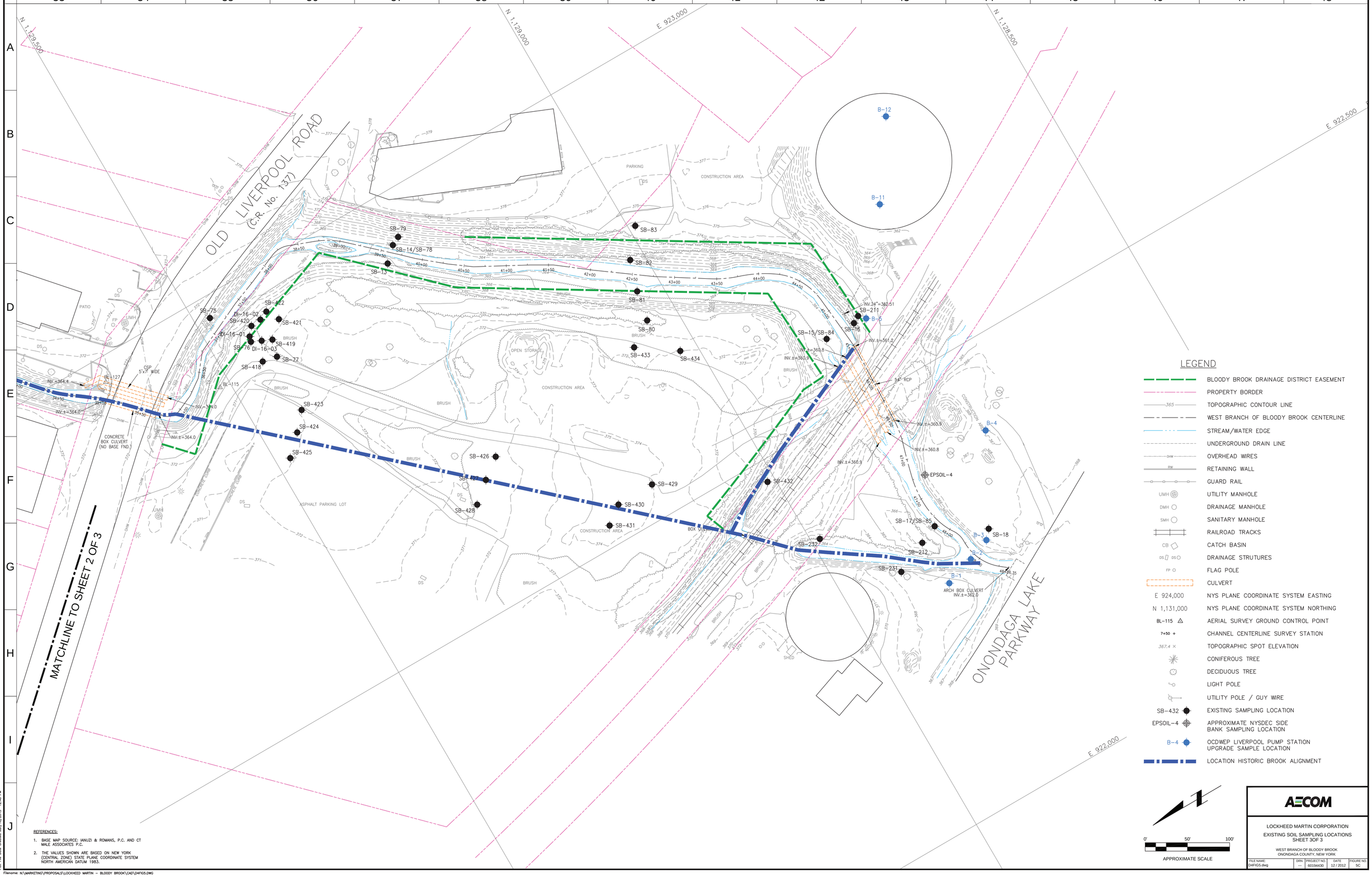
LOCKHEED MARTIN CORPORATION
EXISTING SOIL SAMPLING LOCATIONS
SHEET 2 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D4FIG5.dwg	---	60194430	12 / 2012	5B

Plotted By: bookser
Plotted On: Dec 19, 2012 - 12:47 PM
Xrefs: Base Tones.FIGURE_5B

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D4FIG5.DWG



LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- SB-432 EXISTING SAMPLING LOCATION
- EPSOIL-4 APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-4 OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- LOCATION HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

EXISTING SOIL SAMPLING LOCATIONS SHEET 3OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D4FIG5.dwg	---	60194430	12 / 2012	5C

Plotted By bodaker
Layout: D4Fig5 - Sheet 3 FIGURE 5C
Plot Date: 12/20/2013 12:48 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D4FIG5.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

BROOK

MATCHLINE TO SHEET 2 OF 3

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

6'x8' WIDE BOX CULVERT INV.=384.4

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.78 DRAINAGE PIPE

30"CMP INV=377.90 DRAINAGE PIPE

CABLEN LINED CHANNEL

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

LEGEND

- SB-408 — EXISTING SAMPLING LOCATION
- OCDDS-10 — APPROXIMATE ONONDAGA COUNTY SIDE BANK SAMPLING LOCATION
- GABIONS (ROCK-FILLED WIRE CAGES)
- LOCATION HISTORIC BROOK ALIGNMENT
- CADMIUM CONCENTRATIONS BETWEEN 10 ppm AND 100 ppm AT ANY DEPTH
- CADMIUM CONCENTRATIONS GREATER THAN 100 ppm AT ANY DEPTH
- L 7 — CROSS SECTION (PROFILE SHOWN ON FIGURE 7)

NOTE

1. SEE FIGURE 6C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE WIDE CADMIUM DISTRIBUTION IN SOIL AT ANY DEPTH SHEET 1 OF 3

WEST BRANCH OF BLOODY BROOK ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
DSFIG6.dwg	---	60194430	12 / 2012	6A

Plotted By: bostaser
Layout Name: FIGURE 6A
Plot File Date Created: July 19,2013 1:16 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\DSFIG6.DWG

ROYAL DRIVE

BROOKVIEW LANE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

LIVERPOOL ROAD
(C.R. No. 137)

PEARL
STREET

SALINA

TOWN OF SALINA
VILLAGE OF LIVERPOOL

MATCHLINE TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 923,000

E 922,500

LEGEND

- SB-208 — EXISTING SAMPLING LOCATION
- EPSOIL-2 — APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-7 — OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT
- CADMIUM CONCENTRATIONS BETWEEN 2.5 ppm AND 10 ppm WITHIN RESIDENTIAL PROPERTIES IN TOP 2 FEET
- CADMIUM CONCENTRATIONS BETWEEN 10 ppm AND 100 ppm AT ANY DEPTH
- CADMIUM CONCENTRATIONS GREATER THAN 100 ppm AT ANY DEPTH

NOTE

1. SEE FIGURE 6C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

SITE WIDE CADMIUM DISTRIBUTION IN SOIL AT ANY DEPTH
SHEET 2 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN:	PROJECT NO:	DATE:	FIGURE NO:
DSFIG6.dwg	---	60194430	12 / 2012	6B

Plotted: By: bodziarr
File Name: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\DSFIG6.DWG
Plot Date: Created: Jan 16, 2013 - 1:18 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\DSFIG6.DWG

33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

A B C D E F G H I J

N 1,129,500

N 1,129,000

E 923,000

N 1,128,500

E 922,500

OLD LIVERPOOL ROAD (C.R. No. 137)

MATCHLINE TO SHEET 2 OF 3

ONONDAGA LAKE PARKWAY

E 922,500

E 922,000

SB-75 SB-422 DI-16-02 SB-420 SB-421 DI-16-01 SB-76 DI-16-03 SB-419 SB-77 SB-418

SB-79 SB-14/SB-78 SB-13 SB-83 SB-82 SB-81 SB-80 SB-433 SB-434

SB-15/SB-84 SB-16 SB-211 B-5 INV.24"=362.51 INV.±=361.0 INV.±=360.8 INV.±=360.9

B-12 B-11 B-4 B-3 B-2 B-1 SB-18 SB-17/SB-85 SB-212 SB-231 SB-232 SB-432 EPSOIL-4

ARCH BOX CULVERT INV.±=362.0

5'x7' CSP WIDE

INV.=364.4 INV.=364.0 INV.=364.0

BL-127 BL-115

CONCRETE BOX CULVERT (NO BASE FND.)

5'x7' RCP

SB-423 SB-424 SB-425 SB-426 SB-427 SB-428 SB-429 SB-430 SB-431

BOX CULVERT

PARKING CONSTRUCTION AREA OPEN STORAGE ASPHALT PARKING LOT BRUSH SHED PATIO

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- SB-432 EXISTING SAMPLING LOCATION
- EPSOIL-4 APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- DI-16-02 EXISTING DESIGN SAMPLING
- B-4 OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- LOCATION HISTORIC BROOK ALIGNMENT
- CADMIUM CONCENTRATIONS BETWEEN 10 ppm AND 100 ppm AT ANY DEPTH

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE WIDE CADMIUM DISTRIBUTION IN SOIL AT ANY DEPTH SHEET 3 OF 3

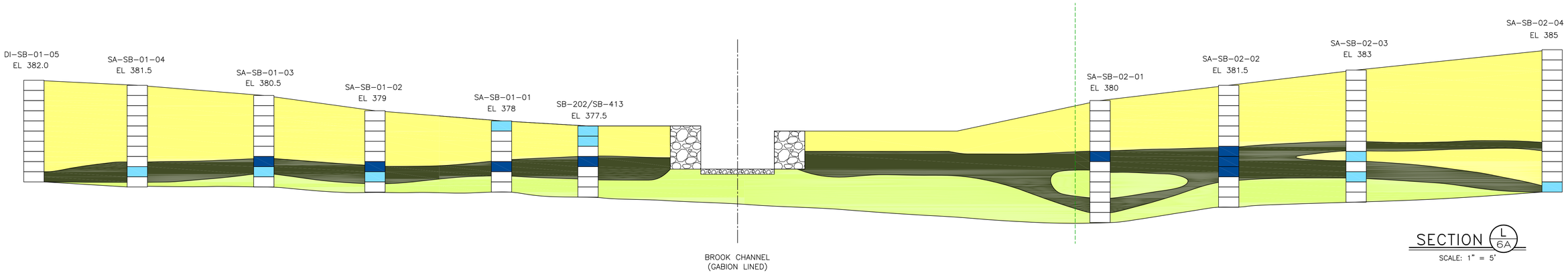
WEST BRANCH OF BLOODY BROOK ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
DSFIG6.dwg	---	60194430	12 / 2012	6C

Plotted By: bostaar
Last Modified By: bostaar
Full Plot Date Created: JAN/16/2013 1:20 PM

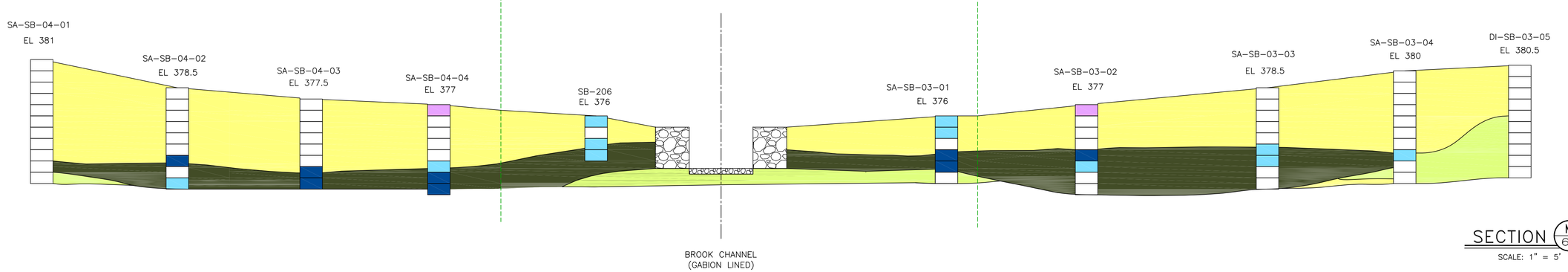
Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\DSFIG6.DWG

CROSS SECTIONS



SECTION L / 6A

SCALE: 1" = 5'



SECTION M / 6A

SCALE: 1" = 5'

LEGEND

- FILL/SILTY SAND
- FLOODPLAIN DEPOSITS
- VARIOUS CLAYS
- CADMIUM DISTRIBUTION WITH CONCENTRATIONS LESS THAN 2.5 ppm IN THE TOP 2 FEET OF RESIDENTIAL PROPERTIES AND LESS THAN 10 ppm AT ANY DEPTH AND IN ALL AREAS OF THE SITE
- CADMIUM DISTRIBUTION WITH CONCENTRATIONS BETWEEN 2.5 ppm AND 10 ppm IN THE TOP 2 FEET OF RESIDENTIAL PROPERTIES
- CADMIUM DISTRIBUTION WITH CONCENTRATIONS BETWEEN 10 ppm AND 100 ppm AT ANY DEPTH AND IN ALL AREAS OF THE SITE
- CADMIUM DISTRIBUTION WITH CONCENTRATIONS OF 100 ppm OR GREATER AT ANY DEPTH AND IN ALL AREAS OF THE SITE
- SB-443 EL. 380.5 — SAMPLING ID WITH GROUND SURFACE ELEVATION
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT

NOTE

1. EACH "DATA BLOCK" REPRESENTS 1FT SAMPLING INTERVALS.
2. SECTION LOCATIONS ARE SHOWN ON FIGURE 6A.

0' 5' 10'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

CROSS SECTION OF CADMIUM DISTRIBUTION

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D6FIG7.dwg	---	60194430	12 / 2012	7

Plotted By: bonner
Layout Name: FIGURE 7
Plot File Date Created: Dec/04/2012 10:17 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\D6FIG7.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

MATCHLINE TO SHEET 2 OF 3

BROOKVIEW LANE

SUNFLOWER DRIVE

NEW YORK STATE THRUWAY

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

6'x8' WIDE BOX CULVERT INV.=384.4

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.79 DRAINAGE PIPE

30"CMP INV=377.90 DRAINAGE PIPE

CHAIN LINK FENCE±

SPRUCE TREES

TREES & BRUSH

OBSTRUCTED

CHANNEL

GABION LINED CHANNEL

CONC. WING WALL

CONC. HEADWALL

PLANTERS

DECK

SHED

PATIO

AC POOL

CONC

UMH

DMH

CB

OHW

BL-114

SB-437, SB-436, SB-401, SB-458, SB-459, SB-435, SB-457, SB-456, SB-217, SB-402, SB-218, SB-438, SB-227, SB-219, SB-403, SB-220, SB-221, SB-222, SB-51, SB-404, SB-400, SB-439, SB-440, SB-228, SB-405, SB-224, SB-223, SB-441, SB-406, SB-225, SB-52, SB-226, SB-443, SB-442, SB-445, SB-407, SB-444, SB-446, SB-411, SB-447, SB-448, SB-412, SB-449, SB-54, SB-409, SB-55, SB-410, SB-408, SB-53, SB-201, SB-20, SB-19, SB-56, SB-450, SB-451, SB-202, SB-22, SB-21/SB-57, SB-58, SB-59, SB-414, SB-452, SB-456, SB-413, SB-24, SB-203, SB-23/SB-204, SB-205, SB-25, SB-26, SB-28, SB-206, SB-27/SB-207, SB-60, SB-229, SB-453

DI-40-01, DI-41-01, DI-60-01, DI-61-01, DI-52-01, DI-53-01, DI-53-02, DI-54-01, DI-42-01, DI-21-01, DI-22-01, DI-51-01, DI-51-02, DI-19-01, DI-19-02, DI-19-03, DI-20-01, DI-20-02, DI-02-01, DI-02-02, DI-01-01, DI-01-02, DI-01-03, DI-23-01, DI-23-02, DI-24-01, DI-25-01, DI-26-01, DI-26-02, DI-17-01, DI-17-02, DI-27-01, DI-28-01, DI-29-01, DI-30-01, DI-31-01, DI-44-01, DI-04-01, DI-43-01, DI-43-02, DI-62-01, DI-62-02, DI-03-01, DI-03-02, DI-03-03, DI-03-04, DI-03-05, DI-SB-01-05, DI-SB-03-05

SSSWP-1, SSSWP-1E, SSSWP-1N, SSSWP-1S, SSSWP-1R, SSSWP-1W, SSSWP-2, SSSWP-3, SSSWP-4, SSSWP-5, SSSWP-6, PRE-SS-P1, POST-SS-P1

OCDDS-4, OCDDS-5, OCDDS-6, OCDDS-7, OCDDS-10

SA-SB-01-01, SA-SB-01-02, SA-SB-01-03, SA-SB-01-04, SA-SB-01-05, SA-SB-02-01, SA-SB-02-02, SA-SB-02-03, SA-SB-02-04, SA-SB-03-01, SA-SB-03-02, SA-SB-03-03, SA-SB-03-04, SA-SB-04-01, SA-SB-04-02, SA-SB-04-03, SA-SB-04-04

LEGEND

- WETLAND/PHRAGMITES
- DI-62-01 — PROPOSED SAMPLING LOCATION
- SB-408 — EXISTING SAMPLING LOCATION
- OCDDS-10 — APPROXIMATE ONONDAGA COUNTY SIDE BANK SAMPLING LOCATION
- GABIONS (ROCK-FILLED WIRE CAGES)
- LOCATION HISTORIC BROOK ALIGNMENT
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT MAX. DEPTH BGS)
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION WITHIN EXISTING BROOK CHANNEL.
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT – 6FT BGS)
- A/9 — CROSS SECTION (PROFILE SHOWN ON FIGURE 9)

NOTE

1. SEE FIGURE 8C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.
2. THE PROPOSED SAMPLE DEPTH INTERVAL, ANALYSIS APPROACH, AND COLLECTION METHOD FOR SOIL SAMPLES TO BE COLLECTED FROM THE PROPOSED SAMPLE LOCATIONS SHOWN ON THIS FIGURE ARE IDENTIFIED IN TABLE 4A OF THE REMEDIAL ACTION WORK PLAN.

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
PROPOSED REMEDIAL ACTION
SHEET 1 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D7FIG8.dwg	---	60194430	12 / 2012	8A

Plotted By: bowdoir
Plot Date: October 10, 2013 1:25 PM
Plot File Name: D7FIG8.dwg

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D7FIG8.DWG

17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

A B C D E F G H I J

N 1,131,000

N 1,130,500

E 923,500

N 1,130,000

E 922,500

E 923,000

ROYAL DRIVE

BROOKVIEW LANE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

OLD LIVERPOOL ROAD
(C.R. No. 137)

PEARL STREET

SALINA STREET

TOWN OF SALINA
VILLAGE OF LIVERPOOL

MATCHLINE TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

SA-SB-216-01 SA-SB-216-02 SA-SB-216-03 SA-SB-216-04 SB-29 SB-208 SB-03/SB-31 SB-61 SB-229 SB-453 SB-01 SB-45-01 SB-45-02 SB-45-03 SB-02/SB-30/SB-62 SB-33 SB-64 SB-32 SB-32C-01 SB-32C-02 SB-209 SB-454 SB-230 SB-34 SB-04/SB-35 SB-06/SB-37 SB-05/SB-36/SB-65 SB-48 SB-10 SB-55-01 SB-55-02 SB-55-03 SB-55-04 SB-95-03 SB-39 SB-41/SB-66 SB-38 SB-07/SB-40 SB-416 SB-455 SB-76-01 SB-76-02 SB-77-01 SB-417 SB-67 SB-08/SB-43 SB-42 SB-415 SB-12/SB-50 SB-74 SB-11/SB-49 SB-210 SB-15-01 SB-15-02 SB-71 SB-09/SB-46/SB-70 SB-73 SB-10/SB-47/SB-72 SB-69 SB-44/SB-68 SB-45

DI-4 DI-04-01 DI-06-01 DI-06-02 DI-63-01 DI-63-02 DI-63-03 DI-72-01 DI-72-02 DI-73-01 DI-73-02 DI-74-01 DI-74-02 DI-05-05 DI-07-01 DI-07-02 DI-07-03 DI-08-01 DI-09-01 DI-09-02 DI-09-03 DI-09-04 DI-32A-01 DI-32C-01 DI-64-01 DI-64-02 DI-75-01 DI-75-02 DI-46-01 DI-46-02 DI-47-01 DI-47-02 DI-47-03 DI-48-01 DI-48-02 DI-10-01 DI-11-01 DI-11-02 DI-11-03 DI-33-01 DI-49-01 DI-49-02 DI-49-03 DI-55-01 DI-55-02 DI-55-03 DI-55-04 DI-79-01 DI-79-02 DI-34-01 DI-34-02 DI-59-01 DI-59-02 DI-57-01 DI-57-02 DI-58-01 DI-58-02 DI-58-03 DI-58-04 DI-13-01 DI-13-02 DI-13-03 DI-14-01 DI-14-02 DI-68-01 DI-68-02 DI-67-01 DI-67-02 DI-70-01 DI-70-02 DI-69-01 DI-69-02 DI-71-01 DI-71-02 DI-74-01 DI-74-02

EPSOIL-2 EPSOIL-3

B-6 B-7 B-8 B-9

SA-SB-05-01 SA-SB-05-02 SA-SB-05-03 SA-SB-05-04 SA-SB-06-01 SA-SB-06-02 SA-SB-06-03 SA-SB-06-04 SA-SB-07-01 SA-SB-07-02 SA-SB-07-03 SA-SB-07-04

DI-07-01 INV.12"CSP=371.68 DRAINAGE PIPE

DI-11-03 INV.12"CSP=371.9

DI-48-01 INV.12"CSP=370.2

DI-11-01 INV.=366.3

DI-55-01 INV.=366.3

DI-55-03 INV.12"CSP=369.1

DI-59-01 INV.48"CSP=365.6 DRAINAGE PIPE

DI-13-01 INV.10"VCP=367.5

DI-58-01 INV.=364.3

DI-15-01 INV.=364.6

DI-15-02 INV.12"=367.8

DI-71-01 INV.=364.4

DI-74-01 INV.=364.4

INV.=364.4

INV.=364.3

INV.12"=367.8

CSP 7'x9' WIDE

CSP 6'x8' WIDE

CSP 6'x9' WIDE

CSP 5'x7' WIDE

RIM=373.25

RIM=373.3

DRAINAGE SHELVES

SHEET PILE WALL

DRAINAGE PIPE 42"D

EDGE OF PAVEMENT

PARKING

PATIO

SHED

DECK PATIO

POOL

PLANTER

TRANS.

CONC. BOX CULVERT (NO BASE)

SMH

UMH

CB

DS

LEGEND

- DI-63-01 — PROPOSED SAMPLING LOCATION
- SB-208 — EXISTING SAMPLING LOCATION
- EPSOIL-2 — APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-7 — OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT MAX. DEPTH BGS)
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION WITHIN EXISTING BROOK CHANNEL
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (4FT MAX. DEPTH BGS)

NOTE

1. SEE FIGURE 8C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.
2. THE PROPOSED SAMPLE DEPTH INTERVAL, ANALYSIS APPROACH, AND COLLECTION METHOD FOR SOIL SAMPLES TO BE COLLECTED FROM THE PROPOSED SAMPLE LOCATIONS SHOWN ON THIS FIGURE ARE IDENTIFIED IN TABLE 4B OF THE REMEDIAL ACTION WORK PLAN.

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

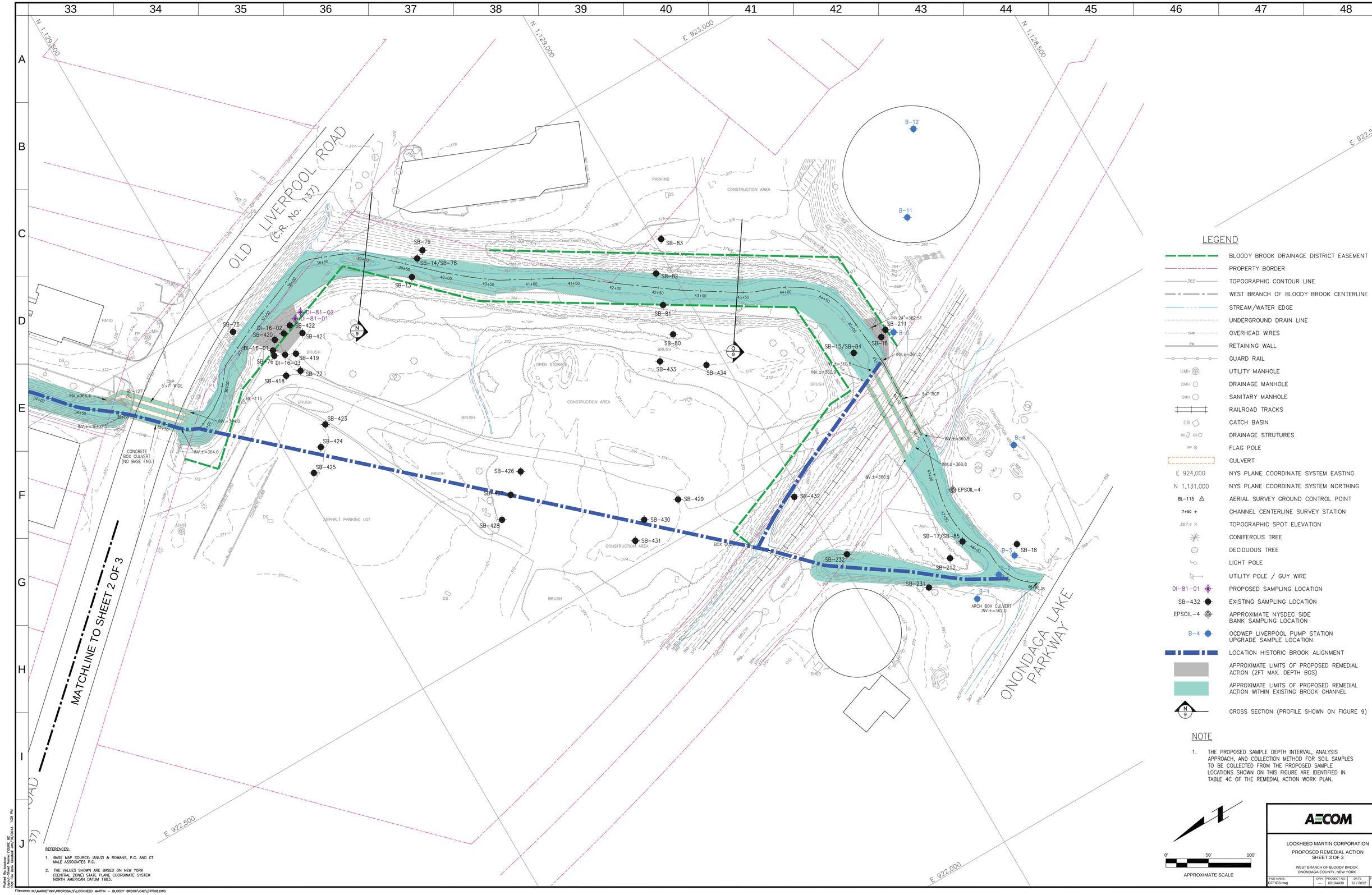
PROPOSED REMEDIAL ACTION
SHEET 2 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME	DRN	PROJECT NO.	DATE	FIGURE NO.
D7FIG8.dwg	---	60194430	12 / 2012	8B

Plotted By: bostaver
Plot Scale: 1 = 1.000000 FIGURE 8B
Plot File Date Created: JAN/16/2013 1:27 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D7FIG8.DWG



LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OVERHEAD WIRES
- RETAINING WALL
- GUARD RAIL
- UMH — UTILITY MANHOLE
- DMH — DRAINAGE MANHOLE
- SMH — SANITARY MANHOLE
- RAILROAD TRACKS
- CB — CATCH BASIN
- DS — DRAINAGE STRUTURES
- FP — FLAG POLE
- CULVERT
- E 924,000 — NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 — NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 — AERIAL SURVEY GROUND CONTROL POINT
- 7+50 — CHANNEL CENTERLINE SURVEY STATION
- 367.4 × — TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- DI-81-01 — PROPOSED SAMPLING LOCATION
- SB-432 — EXISTING SAMPLING LOCATION
- EPSOIL-4 — APPROXIMATE NYSDEC SIDE BANK SAMPLING LOCATION
- B-4 — OCDWEP LIVERPOOL PUMP STATION UPGRADE SAMPLE LOCATION
- LOCATION HISTORIC BROOK ALIGNMENT
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT MAX. DEPTH BGS)
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION WITHIN EXISTING BROOK CHANNEL
- N 9 — CROSS SECTION (PROFILE SHOWN ON FIGURE 9)

NOTE

1. THE PROPOSED SAMPLE DEPTH INTERVAL, ANALYSIS APPROACH, AND COLLECTION METHOD FOR SOIL SAMPLES TO BE COLLECTED FROM THE PROPOSED SAMPLE LOCATIONS SHOWN ON THIS FIGURE ARE IDENTIFIED IN TABLE 4C OF THE REMEDIAL ACTION WORK PLAN.

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

PROPOSED REMEDIAL ACTION
SHEET 3 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D7FIG8.dwg	---	60194430	12 / 2012	8C

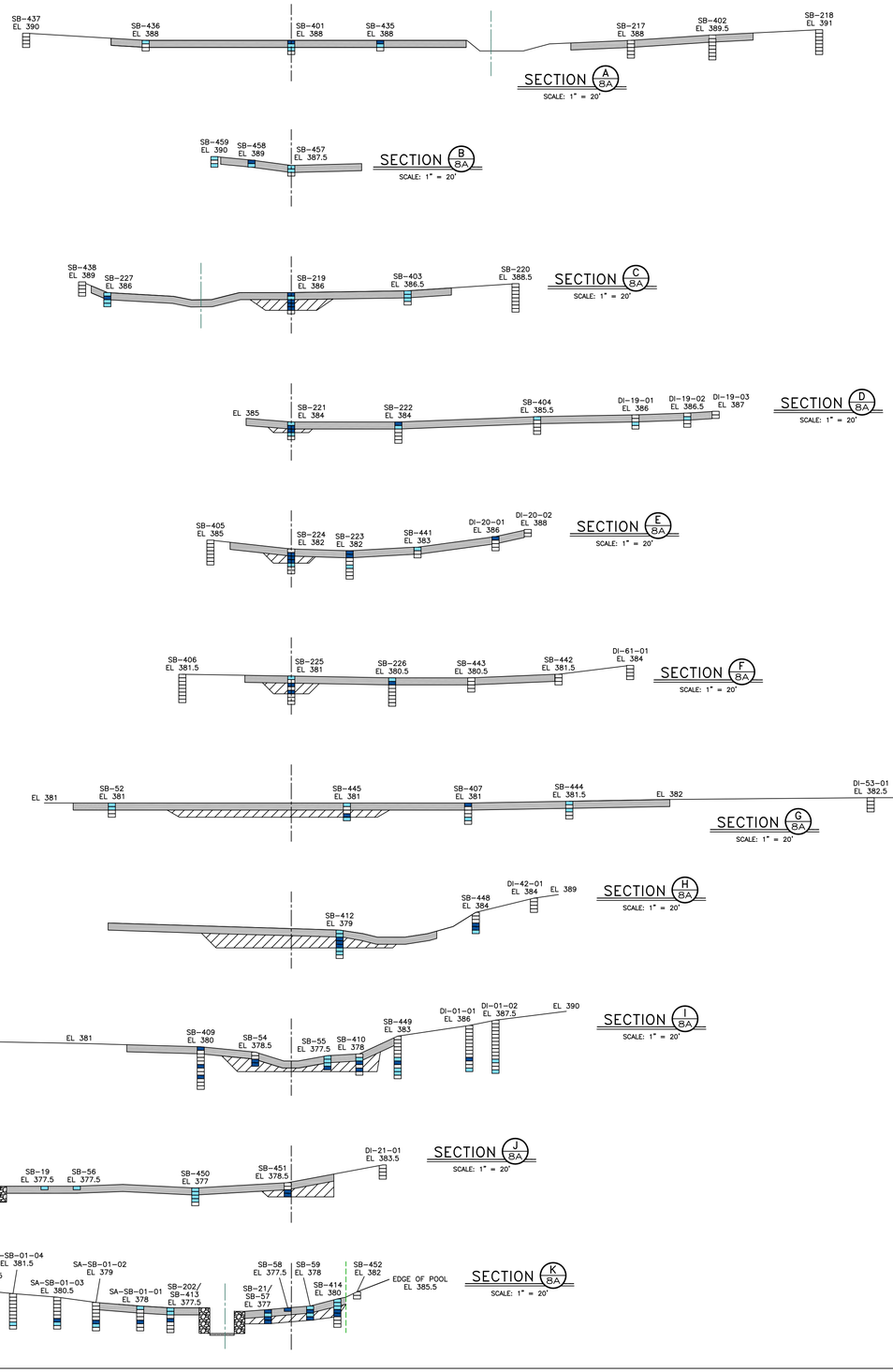
REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

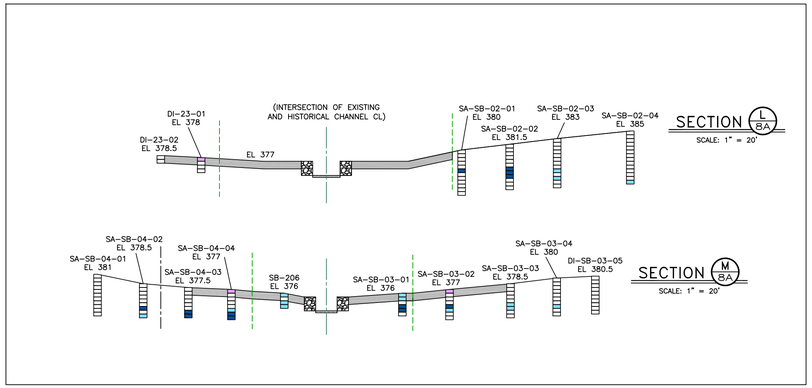
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Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D7FIG8.DWG

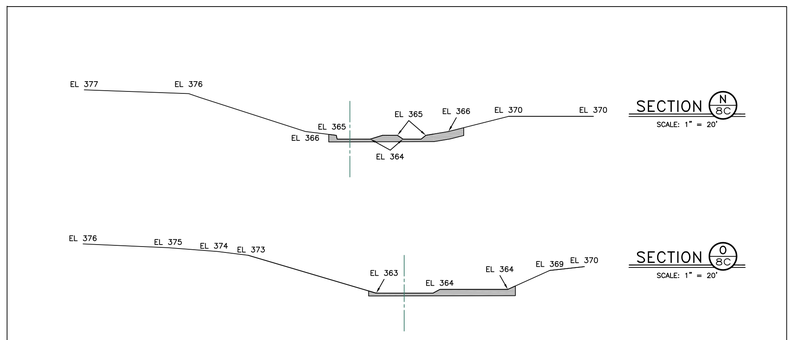
WOODED AREA CROSS SECTIONS LOCATED ON FIGURE 8A



RESIDENTIAL/APARTMENT COMPLEX AREA CROSS SECTIONS LOCATED ON FIGURE 8A



COMMERCIAL/LIGHT INDUSTRIAL AREA CROSS SECTIONS LOCATED ON FIGURE 8C



LEGEND

- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT MAX. DEPTH BGS)
- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION (2FT – 6FT BGS)
- REPRESENTS CADMIUM DISTRIBUTION IN A 1–FT SAMPLING INTERVAL WITH CONCENTRATIONS LESS THAN 2.5 ppm IN THE TOP 2 FEET OF RESIDENTIAL PROPERTIES AND LESS THAN 10 ppm AT ANY DEPTH AND IN ALL AREAS OF THE SITE
- REPRESENTS CADMIUM DISTRIBUTION IN A 1–FT SAMPLING INTERVAL WITH CONCENTRATIONS BETWEEN 2.5 ppm AND 10 ppm IN TOP 2FT OF RESIDENTIAL PROPERTY
- REPRESENTS CADMIUM DISTRIBUTION IN A 1–FT SAMPLING INTERVAL WITH CONCENTRATIONS BETWEEN 10 ppm AND 100 ppm
- REPRESENTS CADMIUM DISTRIBUTION IN A 1–FT SAMPLING INTERVAL WITH CONCENTRATIONS OF 100 ppm OR GREATER
- EXISTING CHANNEL (GABION LINED)
- SB-443 EL. 380.5 — SAMPLING ID WITH GROUND SURFACE ELEVATION
- CENTERLINE OF FORMER BROOK CHANNEL
- CENTERLINE OF EXISTING BROOK CHANNEL
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT

0' 20' 40'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

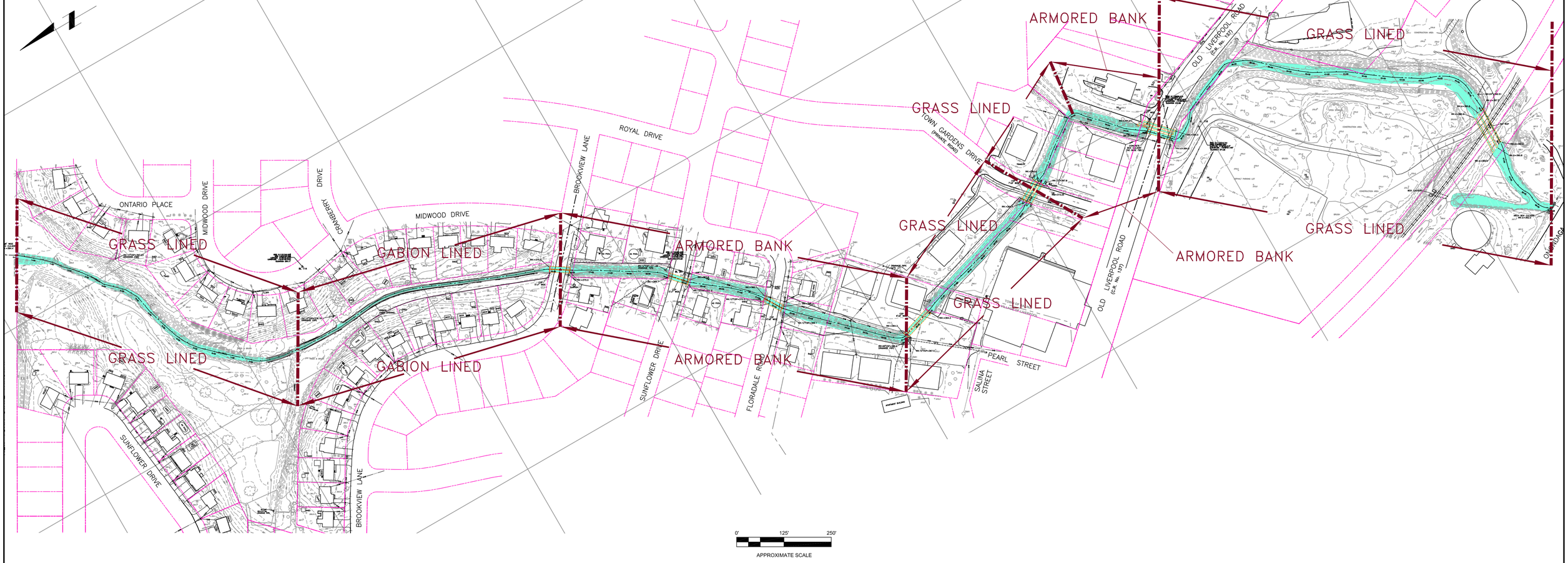
PROPOSED REMEDIAL ACTION
CROSS SECTION DETAILS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

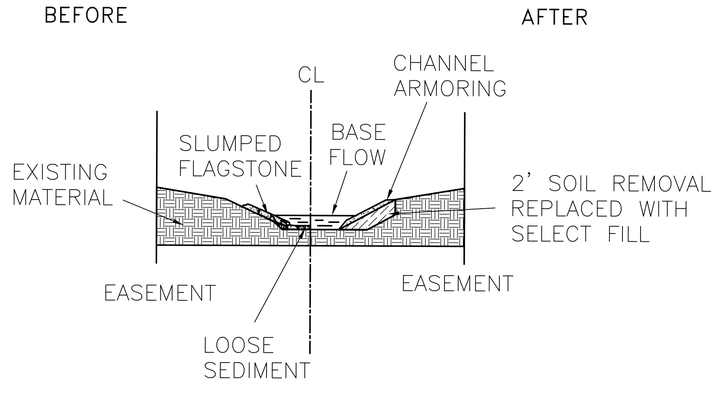
FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
DBFIG9.dwg	---	60194430	12 / 2012	9

Plotted By: bristow
Plot Scale: 1:1 on ANSI full bleed D
Plot File Date Created: Dec/04/2012 - 10:02 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\DBFIG9.DWG

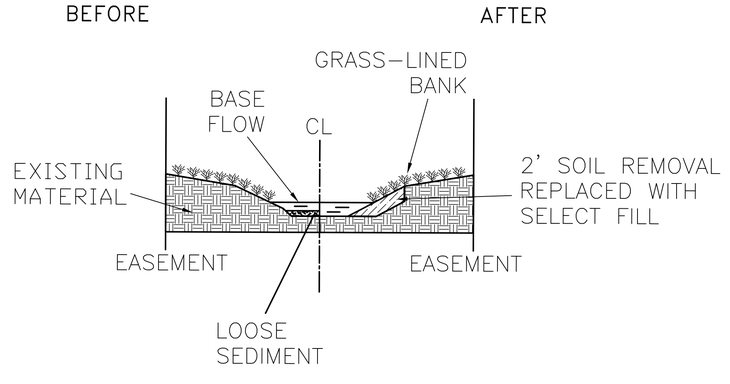


TYPICAL ARMORED BANK DETAIL



NOT TO SCALE

TYPICAL NATURAL GRASS-LINED BANK DETAIL



NOT TO SCALE

LEGEND

- APPROXIMATE LIMITS OF PROPOSED REMEDIAL ACTION WITHIN EXISTING BROOK CHANNEL
- TOWN/VILLAGE BORDER
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- WEST BRANCH OF BLOODY BROOK CENTERLINE

NOTE

1. SEE LEGEND ON FIGURES 4A, 4B AND 4C FOR ADDITIONAL MAP SYMBOLS.

REFERENCES:

1. BASE MAP SOURCE: IANUZZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.

AECOM

LOCKHEED MARTIN CORPORATION

BROOK CHANNEL RESTORATION DETAILS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D9FIG10.dwg	---	60194430	12/2012	10

Plotted By: bossler
Layout: FIGURE10
Plot File Date Created: Dec/04/2012 - 11:03 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\D9FIG10.DWG



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 9-6-38, ID ARX-31-53.

AECOM

LOCKHEED MARTIN CORPORATION

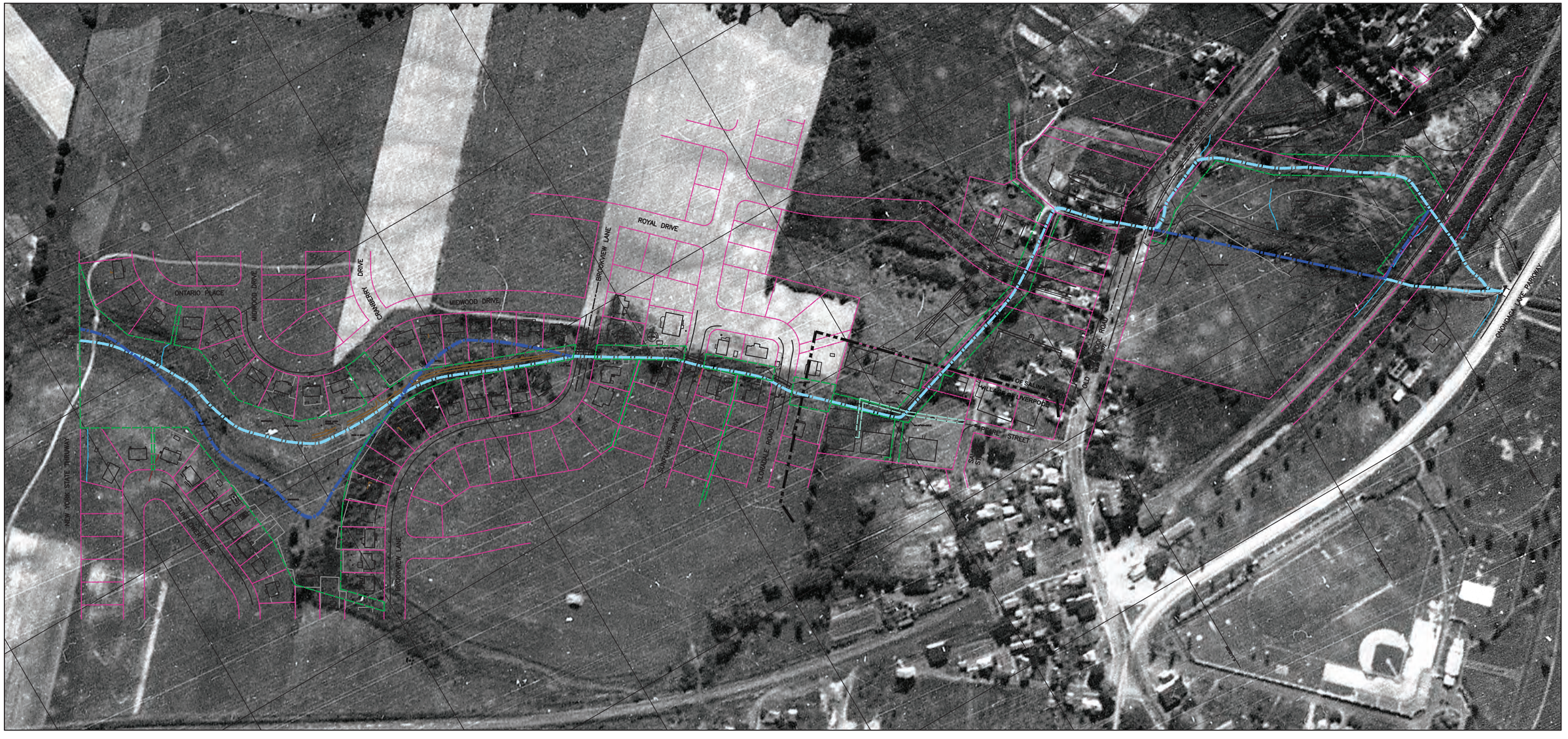
1938 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D11APPXAFIG1A_B.dwg	---	60194430	12 / 2012	1A

Plotted By: bookasr
Layout: Sheet Name: FIGURE 1A
Plot File Date Created: Dec/17/2012 8:21 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D11APPXAFIG1A_B.DWG



NOT TO SCALE

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 9-6-38, ID ARX-31-53.

AECOM

LOCKHEED MARTIN CORPORATION

1938 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D11APPXAFIG1A_B.dwg	---	60194430	12 / 2012	1B

Plotted By: bookasr
Layout: Sheet Name: FIGURE 1B
Plot File Date Created: Dec/17/2012 8:24 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D11APPXAFIG1A_B.DWG



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 5-7-56, ID GS-VKX.

AECOM

LOCKHEED MARTIN CORPORATION

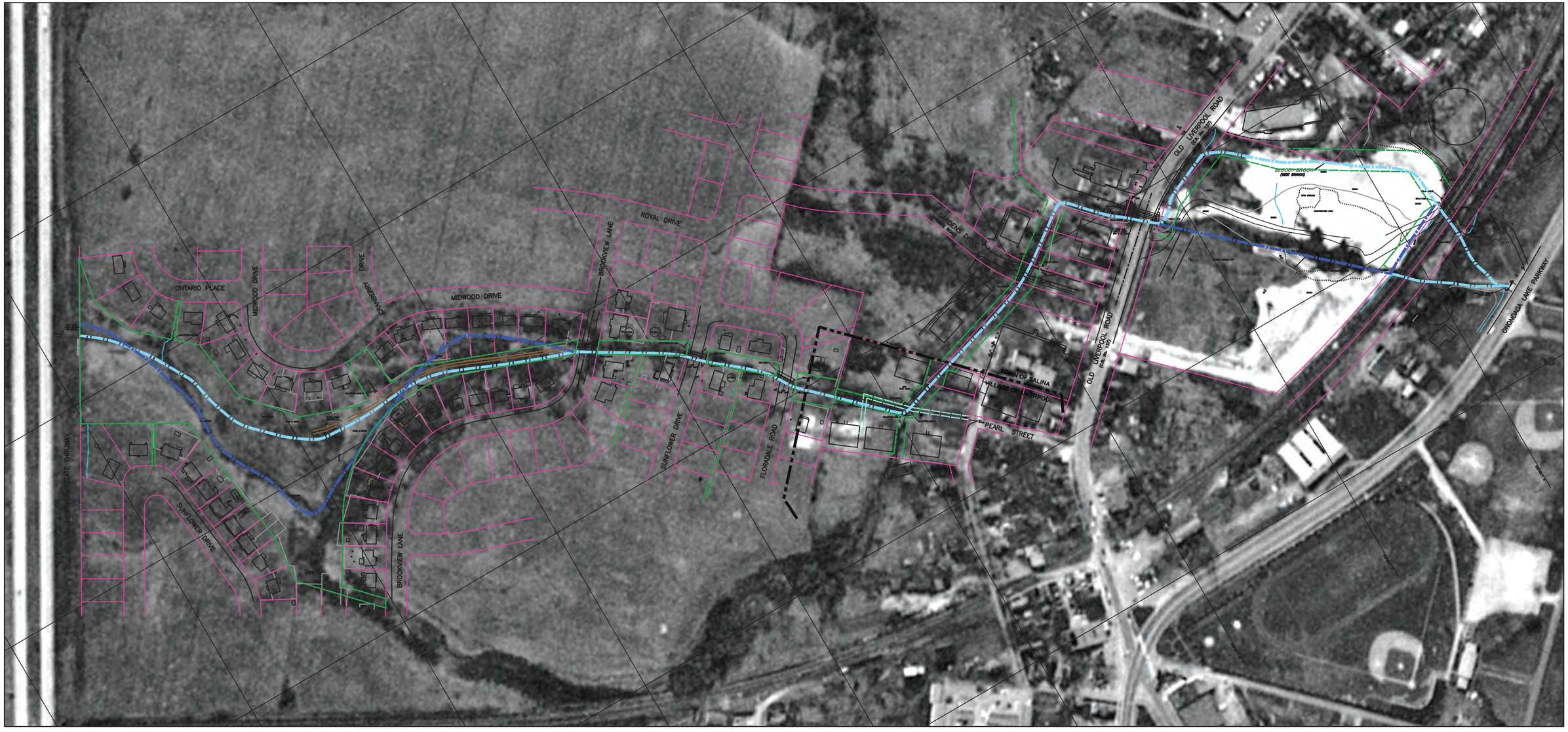
1956 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D12APPXAFIG2A_B.dwg	---	60194430	12 / 2012	2A

Plotted By: bookasr
Layout-Sheet Name: FIGURE 2A
Plot File Date Created: Dec/17/2012 8:27 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D12APPXAFIG2A_B.DWG



NOT TO SCALE

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 5-7-56, ID GS-VKX.

AECOM

LOCKHEED MARTIN CORPORATION

1956 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D12APPXAFIG2A_B.dwg	---	60194430	12 / 2012	2B

Plotted By: bookser
Layout-Sheet Name: FIGURE 2B
Plot File Date Created: Dec/17/2012 8:28 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D12APPXAFIG2A_B.DWG



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 4-26-64, ID 1426 14 82.

AECOM

LOCKHEED MARTIN CORPORATION

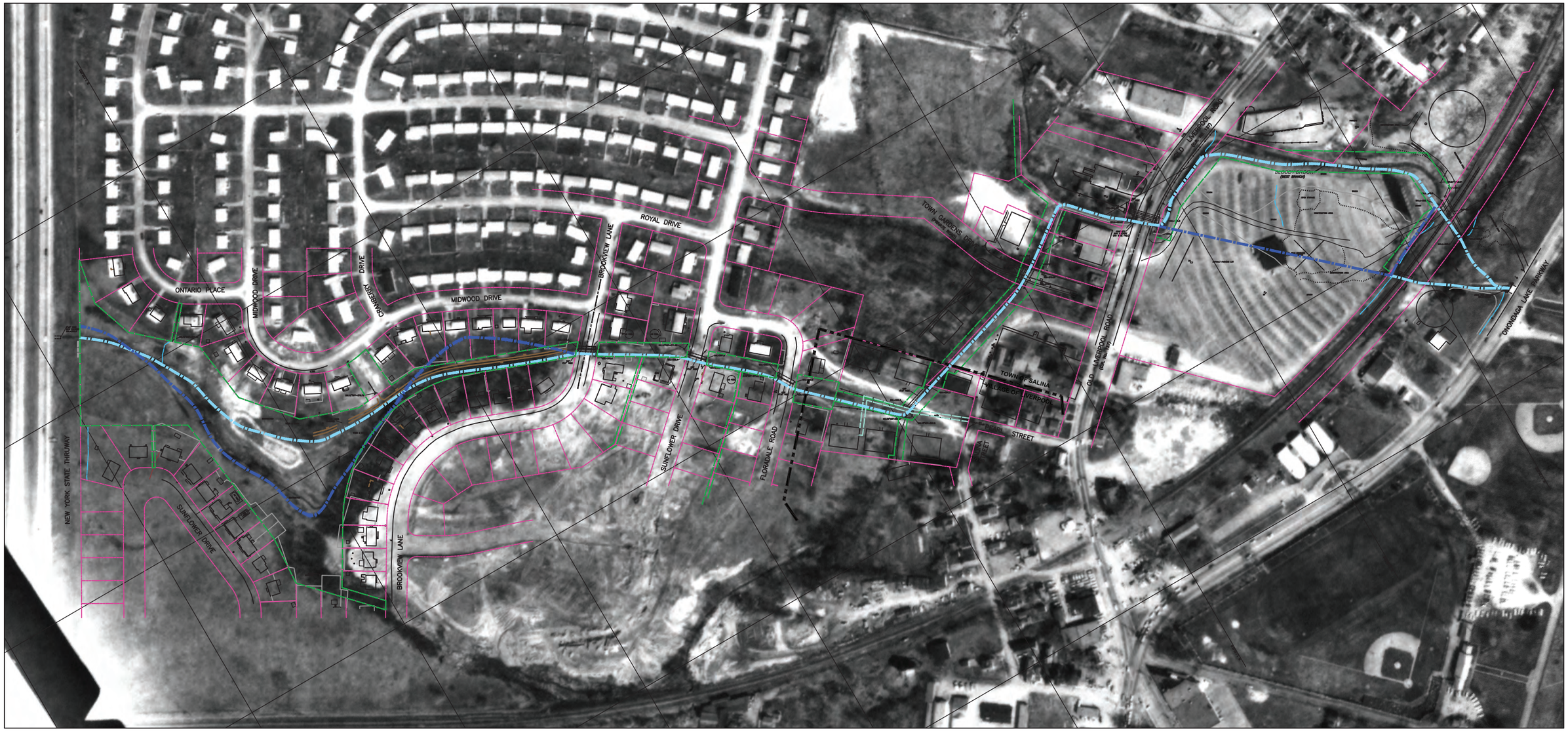
1964 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D13APPXAFIG3A_B.dwg	---	60194430	12 / 2012	3A

Plotted By: bookasr
Layout: Sheet Name: FIGURE_3A
Plot File Date Created: Dec/17/2012 8:32 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D13APPXAFIG3A_B.DWG



NOT TO SCALE

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 4-26-64, ID 1426 14 82.

AECOM

LOCKHEED MARTIN CORPORATION

1964 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D13APPXAFIG3A_B.dwg	---	60194430	12 / 2012	3B

Plotted By: bookasr
Layout: Sheet Name: FIGURE 3B
Plot File Date Created: Dec/17/2012 8:34 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D13APPXAFIG3A_B.DWG



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: LaFAVE, WHITE & McGIVERN, L.S., P.C.; DATED 11–12–05, 1–1 THROUGH 1–6.

AECOM

LOCKHEED MARTIN CORPORATION

2005 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D14APPXAFIG4A_B.dwg	---	60194430	12 / 2012	4A

Plotted By: bookasr
Layout-Sheet Name: FIGURE 4A
Plot File Date Created: Dec/17/2012 8:36 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D14APPXAFIG4A_B.DWG



NOT TO SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: LaFAVE, WHITE & McGIVERN, L.S., P.C.; DATED 11-12-05, 1-1 THROUGH 1-6.

LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

AECOM

LOCKHEED MARTIN CORPORATION

2005 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
D14APPXAFIG4A_B.dwg	---	60194430	12 / 2012	4B

Plotted By: bookasr
Layout-Sheet Name: FIGURE 4B
Plot File Date Created: Dec/17/2012 8:38 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\D14APPXAFIG4A_B.DWG

ARCADIS
Infrastructure, environment, buildings

Imagine the result

Lockheed Martin Corporation

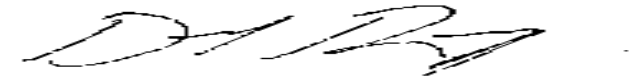
Fish and Wildlife Resources Impact Analysis

West Branch of Bloody Brook

Onondaga County, New York

September 2012

ARCADIS



David Rigg
Principal Scientist

Fish and Wildlife Resources Impact Analysis

West Branch of Bloody Brook
Onondaga County, New York

Prepared for:
Lockheed Martin Corporation

Prepared by:
ARCADIS
6723 Towpath Road
Syracuse
New York 13214
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B0038016

Date:
September 2012

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2 Site Drainage Map

3 Covertype Map

4 New York State Freshwater Wetlands Map

5 National Wetlands Inventory Map

1. Introduction

This report presents the Fish and Wildlife Resources Impact Analysis (FWRIA) that was conducted for the West Branch of Bloody Brook (WBBB) located in Onondaga County, New York. For purposes of this FWRIA, the site is the portion of the WBBB and the surrounding area commencing on the southern boundary of the New York State Thruway (Thruway) and ending at Onondaga Lake Parkway. This FWRIA was conducted in support of a Remedial Action Work Plan (RAWP), in accordance with the New York State Department of Environmental Conservation (NYSDEC) guidance entitled *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC, 1994) and Section 3.10 of the NYSDEC document entitled *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010). The objectives of the FWRIA are to identify the fish and wildlife resources that exist on and in the vicinity of the site and to evaluate the potential for exposure of these resources to site-related constituents. Results of the FWRIA are generally used to aid in remedial decision-making.

As stated in the RAWP, the results of previous WBBB investigations indicated the presence of cadmium in soil and sediment along the WBBB. Surface water samples were non-detect. In 1997, Lockheed Martin Corporation (Lockheed Martin) conducted an Interim Corrective Measure (ICM), which consisted of the removal and off-site disposal of sediments from within the 200-foot long culvert beneath the Thruway and the downstream 750-foot segment of the WBBB. In 2008, Lockheed Martin conducted an Interim Remedial Measure (IRM), which consisted of the removal of sediment from within culverts where the WBBB passes beneath the following streets: Brookview Lane, Sunflow Drive, Floradale Road, and Pearl Street. Lockheed Martin is proposing additional activities, including sediment removal activities which will remove sediment currently deposited in the WBBB from the Thruway downstream to Onondaga Lake Parkway, and side bank soil removal, which will remove cadmium-impacted soil from along the streambanks and provide bank stabilization. The focus of this FWRIA is soils and terrestrial habitats along the WBBB, because historical and proposed sediment removal activities will eliminate ecological exposure to cadmium-containing sediment within the WBBB.

In accordance with the NYSDEC (1994; 2010) guidance, FWRIAs are conducted in a step-wise manner. Specifically, this report includes Steps I, IIA, and IIB. Step I characterizes the terrestrial and aquatic ecology of the site and surrounding areas and develops a list of potential ecological receptors. The specific components of Step I include: Step IA) site description and maps; Step IB) description of fish and wildlife resources; Step IC) description of fish and wildlife resource value; and Step ID) identification of applicable fish and wildlife regulatory criteria. Step IIA consists of a pathway analysis, which utilizes the receptor information generated in Step I to evaluate potential exposure pathways based on site ecology and the location of site-related constituents. Step IIB consists of a criteria-specific analysis, which compares site-specific data to ecological risk-based standards and criteria.

2. Site Description

The site consists of the portion of the WBBB that flows from the Thruway downstream to Onondaga Lake Parkway (Figure 1). The WBBB flows through varied adjacent land uses including: (1) a wooded area with relatively natural channels (from the Thruway downstream approximately 1,050 feet); (2) a single-family residential area with gabion or rip rap channel and maintained (i.e., mowed) drainage easement areas (from the Thruway and adjacent to the wooded area to Floradale Road); (3) apartment complex (from Floradale Road to Old Liverpool Road); and (4) commercial area (from Old Liverpool Road to Onondaga Lake Parkway).

Based on a review of the U.S. Geological Survey (USGS) topographic map for the Syracuse West quadrangle, the area north of the Thruway ranges from approximately 410 to 420 feet above mean sea level (amsl), and the area south of the Thruway is approximately 360 to 385 feet amsl. The flow pattern for localized runoff is towards the WBBB, which is a tributary to Onondaga Lake (Figure 2).

2.1 Ecological Characterization

Topographic maps, aerials, and site photographs were reviewed to identify the general physical and ecological features of the WBBB and surrounding areas. These resources were used to develop a covertype map for the area surrounding the WBBB. The covertype map (Figure 3) classifies these areas into ecological communities based on vegetative assemblages and land use. Information used to develop the covertype map is from the New York State GIS Clearinghouse. As part of the ecological characterization, natural resources (i.e., rivers, lakes, wetlands) located within a 2-mile radius of the WBBB were also identified. This information assisted in the evaluation of wildlife habitat value and human resource value for the site and surrounding areas.

2.1.1 Vegetative Covertypes

Several major covertypes were identified in the vicinity of the site, including: (1) paved; (2) commercial; (3) industrial; (4) park/open space; (5) public service; (6) residential; and (7) vacant. A map depicting the spatial distribution of these covertypes is presented on Figure 3. Individual covertypes are described below.

Paved Covertype - There are paved roads throughout the surrounding areas near the WBBB. These areas generally consist of asphalt covered roadways and drainage ways. Native vegetation (if any) may include grasses and herbaceous species typical of roadway margins.

Commercial Covertype - The commercial covertype is present mainly in areas south of the Thruway. Vegetation within this covertype is generally limited to grasses, ornamental trees, and vegetative species typical of disturbed urban areas.

Industrial Covertype - The industrial covertype is present as a relatively large area north of the Thruway. Additionally, there is a relatively large industrial area south of the Thruway and southeast of the WBBB. Vegetation within this covertype is generally limited to grasses, ornamental trees, and vegetative species typical of disturbed urban areas.

Park/Open Space Covertype - The park/open space covertype includes parks, golf courses, or other recreational areas frequented on a seasonal basis by people. The park/open space covertype is present in several areas north of the Thruway, along both branches of Bloody Brook, and along the northeast shore of Onondaga Lake. For example, the wooded area along the upper portion of the WBBB (immediately south of the Thruway) is also classified as park/open space. Onondaga Lake Park, which is located along the shoreline of Onondaga Lake, contains a mixture of deciduous forest and open fields used for recreation. Dominant vegetation within the deciduous forest generally consists of mature trees and an understory characterized by various herbaceous plants and woody shrubs. The open fields contain primarily maintained grasses.

Public Service Covertype - The public service covertype is present in several areas south of the Thruway within the area surrounding the WBBB. These areas are typically comprised of schools, public utilities, and community properties which contain a mixture of buildings, paved parking areas, and open fields used for recreation. Dominant vegetation within these areas generally consists of mature trees, with an understory characterized by various herbaceous plants and woody shrubs, and open fields and recreational areas. The open fields contain primarily maintained grasses.

Residential Covertype - The residential covertype is the dominant covertype adjacent to the WBBB. Vegetation within this covertype is generally characterized by grasses, ornamental trees, and herbaceous species typical of urban areas.

Vacant Covertype - The vacant covertype includes a variety of residential, commercial, and rural lands. Vacant lands are found to the south of the Thruway in various small areas in the vicinity of the WBBB. Vegetation within the vacant covertype generally consists of grasses, successional fields consisting of various herbaceous and shrub species, and some mature tree species.

2.1.2 Surface Waters

The WBBB is relatively small (approximately 4 to 6 feet wide, 1 to 2 feet deep) in the upper section near the Thruway, and increases in size (approximately 10 to 15 feet wide, 2 to 4 feet deep) closer to Onondaga Lake. The NYSDEC best usage classification for the portion of the WBBB from its mouth to its first tributary is Class B; the portion of Bloody Brook from its first tributary to its source is Class C. The NYSDEC best usage classification for Onondaga Lake near the mouth of Bloody Brook is Class B. According to New York regulations, the best usages for Class B waters are primary and secondary contact recreation and fishing; Class B waters are also suitable for fish propagation and survival. The best usage for Class C waters is fishing; Class C waters are also suitable for fish propagation and survival (6 NYCRR Subparts 701.7 and 701.8).

The primary usage of the WBBB is for stormwater management. Specifically, the Bloody Brook Drainage District (Drainage District) has conducted several projects designed to improve and maintain drainage. These projects have ranged from installing erosion control (flagstone, concrete, gabion baskets, etc.), minor channel relocations, reshaping of channel side banks and installation/replacement of culverts. In addition, the County frequently removed sediment deposits from the WBBB in order to maintain drainage capacity.

2.1.3 Wetlands

Based on the NYS Freshwater Wetlands Map for the Syracuse West and Brewerton quadrangles, there are no state-regulated wetlands present within the site (Figure 4). There are nine state-regulated wetlands within a 2-mile radius of the site (Figure 4).

Based on the National Wetlands Inventory (NWI) map for the Syracuse West and Brewerton quadrangles, there are no mapped federally regulated wetlands on site, but several exist within a 2-mile radius of the site (Figure 5).

A site-specific wetland survey was conducted for the northern wooded portion of the site. The wetland delineation identified three Federal wetland areas in the upper reaches of the WBBB immediately south of the NYS Thruway (AECOM, 2012).

2.2 Fish and Wildlife Resources

The majority of the areas surrounding the site are classified as residential and commercial covertypes with several small pockets of forested habitat (e.g., the wooded area along the upper portion of the WBBB, immediately south of the Thruway, which is classified as park/open space). Due to the surrounding land use, wildlife usage for much of the area is expected to be minimal and likely restricted to common species typical of urbanized and disturbed areas. A list of the wildlife species that may utilize the available habitat is included in Table 1. The following is a description of wildlife usage for each of the primary covertypes present along the WBBB.

Residential and Commercial Covertypes - A significant portion of the land adjacent to the WBBB is classified as commercial or residential covertypes (Figure 3). Wildlife species that utilize these covertypes generally consist of species that are capable of utilizing habitats that are created by urban landscapes. Typical wildlife species that may use this covertype include, but are not limited to, gray squirrel, woodchuck, mice, mourning dove, and English sparrow.

Park/Open Space, Public Service, and Vacant Covertypes - The park/open space, public service, and vacant covertypes consist of several parks, schools and a golf course. These covertypes are present in various areas along Onondaga Lake (Figure 3). The wooded area along the upper portion of the WBBB (immediately south of the Thruway) is also classified as park/open space. Wildlife use of this covertype is most likely restricted to common species that are capable of utilizing habitats that are created by urban landscapes. Typical wildlife species using these covertypes may include, but are not limited to, Canada geese, gray squirrel, mice, rabbits, and passerine birds.

2.2.1 Threatened/Endangered Species and Significant Habitat

Information from the USFWS (2009) identified several Federally-listed endangered (E), threatened (T), proposed (P), candidate (C), or delisted (D) species within Onondaga County. These species are identified as follows:

- American hart's-tongue fern (T);
- Bald eagle (D);
- Bog turtle (T);
- Eastern massasauga (C);
- Eastern prairie fringed orchid (T);
- Indiana bat (E); and
- Small whorled pogonia (T).

Similarly, information from the NYSDEC Natural Heritage Program (NHP) (2009) identified two State-listed species:

- Straight-leaf pondweed (E); and
- Red pigweed (T).

The earlier (2009) threatened/endangered species information was confirmed in August 2012 with review of on-line information from the USFWS and NYSDEC NHP websites.

Information including species profiles for these Federally- and State-listed species indicated that they are not likely to be present in the immediate vicinity of the WBBB. For example, the specific threatened/endangered species of birds (bald eagle), reptiles

(bog turtle, eastern massasauga), and mammals (Indiana bat) are sensitive to human disturbance, and do not occur in areas with the extent of residential and commercial development as the WBBB. Similarly, the level of previous habitat disturbance from development of the area and the ongoing maintenance activities within the drainage easement generally precludes the occurrence of sensitive threatened/endangered plant species. For these reasons, the immediate vicinity of the WBBB is not expected to provide critical habitat for any Federally- or State-listed threatened or endangered species.

2.2.2 Observations of Stress

Observations of stress may include reduced vegetative growth and density, wildlife mortality (e.g., fish kills), or changes in species assemblages and distribution (NYSDEC, 1994). Based on recent and historic visual observations of the site, there is no observable evidence of biological impacts.

2.3 Fish and Wildlife Resources Values

Step IC of the FWRIA consists of an assessment of: (1) the general ability of the area to support fish and wildlife resources; and (2) the value of fish and wildlife resources to humans. The following subsections provide a qualitative evaluation of the value of the identified covertypes to wildlife and the value of these wildlife resources to humans.

2.3.1 Value of Habitat to Associated Fauna

The qualitative determination of habitat value is based on field observations, research, and professional judgment. Habitat values are assigned using the following classification system:

- **No Value –** Paved areas, building, and parking lots;
- **Low Value –** Areas with habitat quality that marginally supports a minimal number and diversity of low quality species;
- **Moderate Value –** Areas that support a variety of quality species with little or no stress related to anthropogenic disturbance; and

- **High Value –** Critical habitat for rare species and/or extensive undeveloped habitat supporting a great diversity and abundance of wildlife without functional restraints imposed by anthropogenic disturbance.

South of the Thruway, the WBBB flows through areas containing deciduous forest, residential, and commercial covertypes. The relative value of the habitat for these areas is described as follows:

Park/Open Space, Public Service, and Vacant Covertypes – This covertype includes the area of deciduous forest covertype that is present along the upper portion of the WBBB, which is characterized by mature trees that form an upper canopy which may be used by passerine birds and arboreal wildlife (e.g., squirrels, raccoons). Shrubs and herbaceous vegetation form an understory that may be used for foraging, nesting, and/or shelter by ground-dwelling birds and small mammals. However, due to the fragmented nature of these forested areas and the surrounding urban land uses, the area is less suitable for large mammals such as fox and white-tailed deer. Therefore, the deciduous forest covertype is considered to have moderate wildlife value.

Residential and Commercial Covertypes - The residential and commercial areas have little natural habitat, and landscapes within these covertypes generally consist of mowed lawns and ornamental trees. These urban areas do not provide adequate food, shelter, and nesting areas for most species. Therefore, the residential and commercial covertypes are considered to have low habitat value. In addition, the WBBB is maintained by the Drainage District for stormwater management. As such, most of the WBBB corridor is mowed periodically, further limiting the habitat potential of the area.

2.3.2 Value of Resources to Humans

The WBBB and adjacent areas have marginal resource value to humans, and current human use of fish and wildlife resources within the site (including the WBBB) is expected to be minimal. The WBBB is a relatively small, shallow stream. A primary function of the WBBB is stormwater conveyance, and habitat along the stream has been altered by stream channelization, bank reinforcement with gabions and riprap, and routine mowing within the Drainage District. The WBBB does not support a sportfish community.

The small wooded area in the upstream portion of the site is relatively inaccessible because it is landlocked by the Thruway and residential properties. Hunting is not allowed because of the urban setting. Activities associated with the site most likely are limited to occasional wildlife observation, and use of the site is likely to remain consistent in the future.

3. Fish and Wildlife Regulatory Criteria

The following New York State laws, rules, regulations, and criteria have been identified for this FWRIA:

- Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR)
  - Part 608, Use and Protection of Waters;
  - Part 663, Freshwater Wetlands Permit Requirements;
  - Part 664, Freshwater Wetlands Maps and Classifications;
  - Part 701, Classifications—Surface Waters and Groundwaters;
  - Part 702, Derivation and Use of Standards and Guidance Values;
  - Part 703, Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards; and
  - Part 800, Classes and Standards of Quality and Purity Assigned to Fresh Surface and Tidal Salt Waters.

- New York Environmental Conservation Law
  - Article 11, Fish and Wildlife:
    - §11-0503, Polluting Streams Prohibited;
    - §11-0535, Endangered and Threatened Species;
  - Article 15, Water Resources: Title 5, Protection of Water; and
  - Article 24, Freshwater Wetlands.

- Criteria and Guidance
  - NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1., "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (June, 1998);
  - NYSDEC "CP-51/Soil Cleanup Guidance" (October 2010); and
  - NYSDEC, 2010, *DER-10 Technical Guidance for Site Investigation and Remediation*, May

4. Impact Assessment

Step II of the FWRIA includes an impact assessment to determine the site-related impacts, if any, on fish and wildlife resources. This impact assessment includes a pathway analysis (Step IIA), and a criteria-specific analysis (Step IIB). The pathway analysis determines if there are complete or potentially complete ecological exposure pathways to site-related constituents. If no fish and wildlife receptors or complete exposure pathways are present, then potential impacts to resources are considered to be minimal (NYSDEC, 1994). The criteria-specific analysis compares site-specific data to ecologically-based screening criteria to determine if chemical concentrations are present at levels that may adversely impact ecological receptors.

4.1 Pathway Analysis

The general objective of the pathway analysis is to identify constituents of interest associated with the site, and to evaluate potential pathways by which fish and wildlife receptors may be exposed to such constituents (NYSDEC, 1994). A complete exposure pathway exists if there is a source, a potential point of exposure, and a viable

route of exposure and receptors at the exposure point. If any one of these elements is missing, then the pathway is not considered to be complete and exposure cannot occur, irrespective of chemical concentrations in environmental media (NYSDEC, 1994).

Soil investigation was conducted for the site by Lockheed Martin, NYSDEC, and Onondaga County from October 1996 through August 2011. These investigations consisted of surface and subsurface soil sampling along the WBBB beginning downstream of the Thruway and ending at Onondaga Lake Parkway. Based on these soil investigations, cadmium has been identified as the constituent of concern for the WBBB (NYSDEC, 2002).

Concentrations of cadmium detected in soil samples at the site varied from below laboratory detection limits to 5,350 parts per million (ppm). The depth to the observed cadmium ranges from at the surface to 14 feet bgs. Cadmium concentrations are, in general, significantly higher on the northern portion of the site and decrease substantially towards the south end of the site.

As stated above, the WBBB flows through wooded, residential, and commercial areas south of the Thruway. Natural habitat along the WBBB is limited to two relatively small patches of forested areas (Figure 3). Potential ecological receptors that may use on-site habitats include common species adapted to living in urban environments (e.g., passerine birds, small mammals). Ecological receptors may be exposed to cadmium in soils along the WBBB through direct contact (via incidental ingestion or dermal contact) during foraging and nesting activities. In addition, uptake of cadmium by soil invertebrates and other wildlife food items may occur (Eisler, 1985). Therefore, possible wildlife exposure may occur via the foodchain (e.g., robins eating earthworms).

4.2 Criteria-Specific Analysis

The pathway analysis identified the potential for a complete exposure pathway for surface soils and to a lesser extent subsurface soils. Generally, the criteria-specific

analysis compares site-specific data to numerical criteria to provide an assessment of potential impact. If concentrations are below criteria, it is assumed that there is a minimal potential for adverse effects to ecological resources; however, the exceedence of numerical criteria does not necessarily indicate an impact, but may imply that additional evaluations are necessary.

As stated previously, cadmium has been identified as the constituent of concern for the site. Although New York State does not have any ecological risk-based soil screening values, benchmarks are available from other sources. Generic ecological soil benchmarks for cadmium include the ecological soil screening levels (Eco-SSLs) from USEPA (2005). This wide range of values includes Eco-SSLs for mammals (0.36 ppm), birds (0.77 ppm), plants (32 ppm), and soil invertebrates (140 ppm) (USEPA, 2005). It is important to note that these numbers are not site-specific ecological risk-based values. According to USEPA (2005), "(i)t is emphasized that the Eco-SSLs are soil screening numbers, and as such are not appropriate for use as cleanup levels. Requiring a cleanup based solely on Eco-SSL values would not be technically defensible."

Soil data collected during the previous investigations indicate that cadmium concentrations exceed the Eco-SSLs. The exceedance of the Eco-SSLs is not unexpected, given that several of the Eco-SSLs are below background concentrations, which are typically between 1 and 3 ppm for the site. In general, the highest frequency of exceedence and highest relative degree of exceedence occurs for those soil samples that were collected along the upper portion of the WBBB, west of the current channel.

4.3 Proposed Remedial Action

As part of the RAWP, Lockheed Martin is proposing to remove all remaining accumulated sediment, and therefore, all cadmium in site sediments, along the entire length of the WBBB. In addition, channel side banks along the length of the WBBB will be reconstructed, with the exception of the existing gabion-lined section. These actions, in conjunction with the routine maintenance performed by Onondaga County

following the remedial action, will eliminate potential ecological exposure to cadmium in the brook channel. In addition, the RAWP presents a proposed remedial action to address cadmium in soils adjacent to the WBBB.

The majority of the habitats onsite provide low value to wildlife, and potential ecological receptors for most of the site are limited to common species adapted to living in urban environments. The proposed remedial activities are not expected to have a significant long-term effect on any fish and/or wildlife resources because the limited habitat that occurs over most of the site is not capable of supporting significant populations of resident wildlife.

5. Summary and Conclusions

The FWRIA for the site was conducted in accordance with NYSDEC (1994; 2010) guidance. The site is described as a mixture of residential, commercial, and forested covertypes that provide low to moderate value to wildlife. In addition, there are three wetland areas that have been identified adjacent to the WBBB immediately south of the Thruway (AECOM 2012). Potentially complete exposure pathways for ecological receptors have been identified for soils via direct contact and possible accumulation in the foodweb.

Although New York State does not have any ecological risk-based soil screening values, benchmarks are available from other sources. Comparison of the cadmium soil concentrations to these generic ecological benchmarks indicates that cadmium concentrations (including background) frequently exceed the lower benchmarks (e.g., 0.36 ppm for small mammals). Cadmium concentrations exceed the higher benchmarks (e.g., 140 ppm for soil invertebrates) much less frequently. However, the screening values used for the evaluation are not site-specific and are derived to avoid underestimating risk. They are not appropriate for use as cleanup levels, and requiring a cleanup based solely on their exceedance is not technically defensible. In general, the highest frequency of exceedence and highest relative degree of exceedence occurs for those soil samples that were collected along the upper portion of the WBBB, west of the current channel.

The presence of cadmium in soils along the WBBB will be addressed through remedial activities to comply with proposed preliminary remediation goals as presented in the RAWP.

6. References

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United States Environmental Protection Agency (USEPA). 2005. Ecological Soil Screening Levels for Cadmium. Interim Final. OSWER Directive 9285.7-65. March 2005.

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Table

Table 1

Lockheed Martin Corporation
Onondaga County, New York

Fish and Wildlife Resources Impact Analysis
Observed and Potentially Present Wildlife Species

Common Name	Scientific Name
Observed Species	
Birds	
Herring Gull	*Laurus argentatus*
Grackle	*Quiscalus quiscula*
Starling	*Sturnus vulgaris*
Song Sparrow	*Melospiza melodia*
American Robin	*Turdus migratorius*
English Sparrow	*Passer domesticus*
Mallard	*Anas platyrynchos*
Northern Flicker	*Colaptes auratus*
Yellow Warbler	*Dendroica petechia*
American Goldfinch	*Corduelis tristis*
Crow	*Corvus brachyrynchos*
Phoebe	*Saynoris pheobe*
White Throated Sparrow	*Zonotrichita albicollis*
Pigeon	*Columba livia*
Mourning Dove	*Zenaida macroura*
Cardinal	*Cardinalis cardinalis*
Merlin	*Falco columbarius*
Great Crested Flycatcher	*Myiarchus crinitus*
Catbird	*Dumetella carolinensis*
Warbling Vireo	*Vireo gilvus*
Belted Kingfisher	*Ceryle alcyon*
Barn Swallow	*Hirundo rustica*
Great Blue Heron	*Ardea herodias*
Little Green Heron	*Butorides rirescens*
Mammals	
Deer	*Odocoileus virginianus*
Muskrat	*Ondatra zibethicus*
Woodchuck	*Marmota monax*
Eastern Gray Squirrel	*Sciurus carolinensis*
Skunk	*Mephitis mephitis*
Raccoon	*Procyon lotor*
Norway Rat	*Rattus norvegicus*
Amphibians	
Green Frog	*Rana clamitans*
Bullfrog	*Rana catesbeiana*
Reptiles	
Snapping Turtle	*Chelydra serpentina*

Table 1

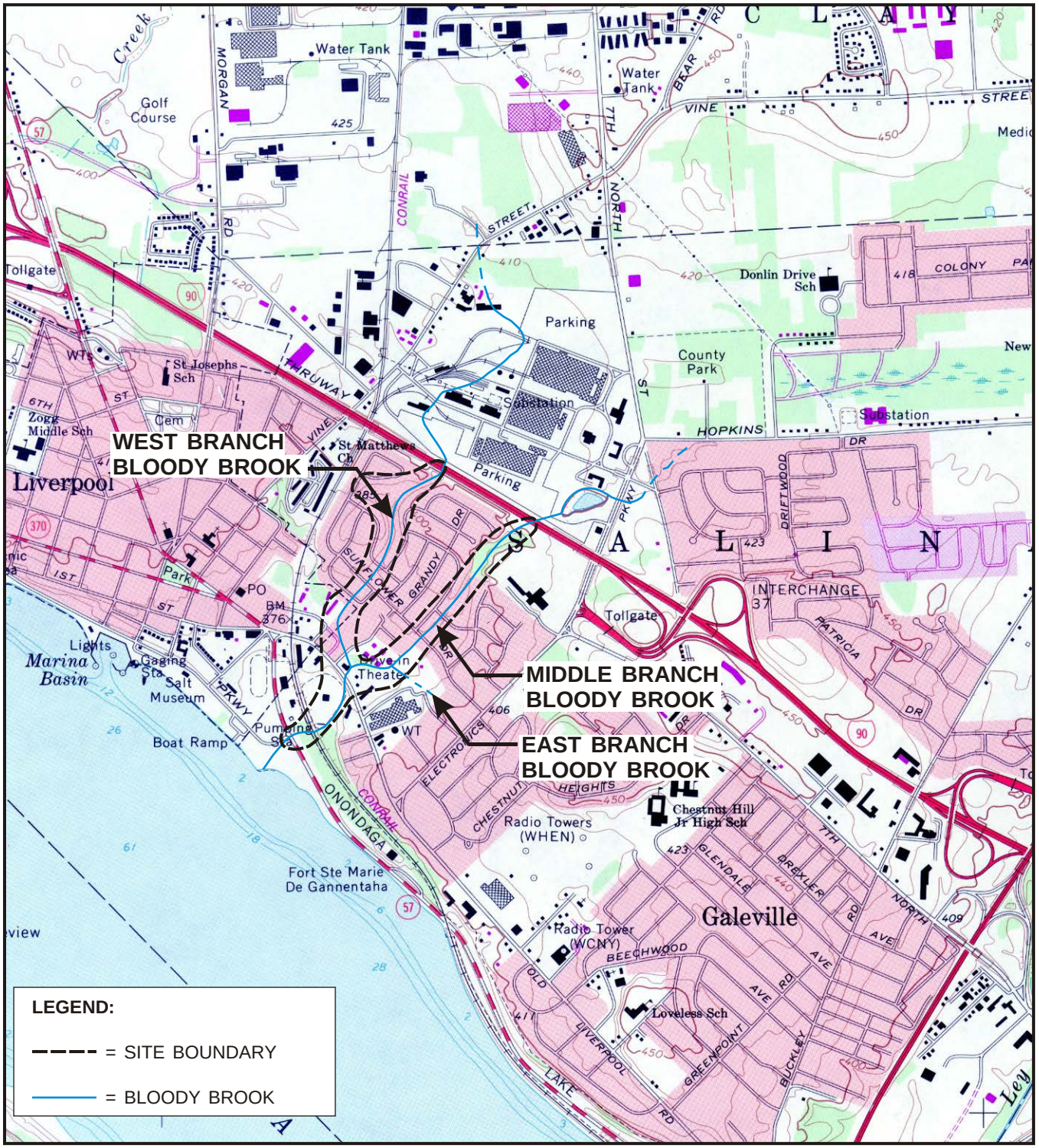
Lockheed Martin Corporation
Onondaga County, New York

Fish and Wildlife Resources Impact Analysis
Observed and Potentially Present Wildlife Species

Common Name	Scientific Name
Species Not Observed, But Likely To Be Present	
Birds	
Brown-headed Cowbird	*Molothrus ater*
Killdeer	*Charardrius vociferus*
Downy Woodpecker	*Picoides pubescens*
Eastern Wood Peewee	*Contopus virens*
Blue Jay	*Cyanocitta cristata*
Black Capped Chickadee	*Parus atricapillus*
Tufted Titmouse	*Parus bicolor*
House Wren	*Troglodytes aedon*
Northern Mockingbird	*Mimus polyglottos*
Rufous-sided Towhee	*Pipilo erythrophthalmus*
Mammals	
Virginia Opossum	*Didelphis virginiana*
Short-tailed Shrew	*Blarina brevicauda*
Little Brown Bat	*Myotis lucifugus*
Big Brown Bat	*Eptesicus fuscus*
Cottontail Rabbit	*Sylvilagus floridanus*
Chipmunk	*Tamias striatus*
Deer Mouse	*Peromyscus maniculatus*
House Mouse	*Mus musculus*
Reptiles	
Garter Snake	*Thamnophis sirtalis*
Eastern painted Turtle	*Chrysemys picta*
Amphibians	
American Toad	*Bufo americanus*
Spring Peeper	*Hyla crucifer*
Red-backed Salamander	*Plethodon cinereus*

ARCADIS

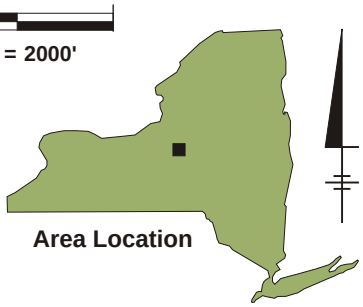
Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., SYRACUSE, WEST, NY, 1973, PHOTOREVISED 1978.

2000' 0 2000'

Approximate Scale: 1" = 2000'



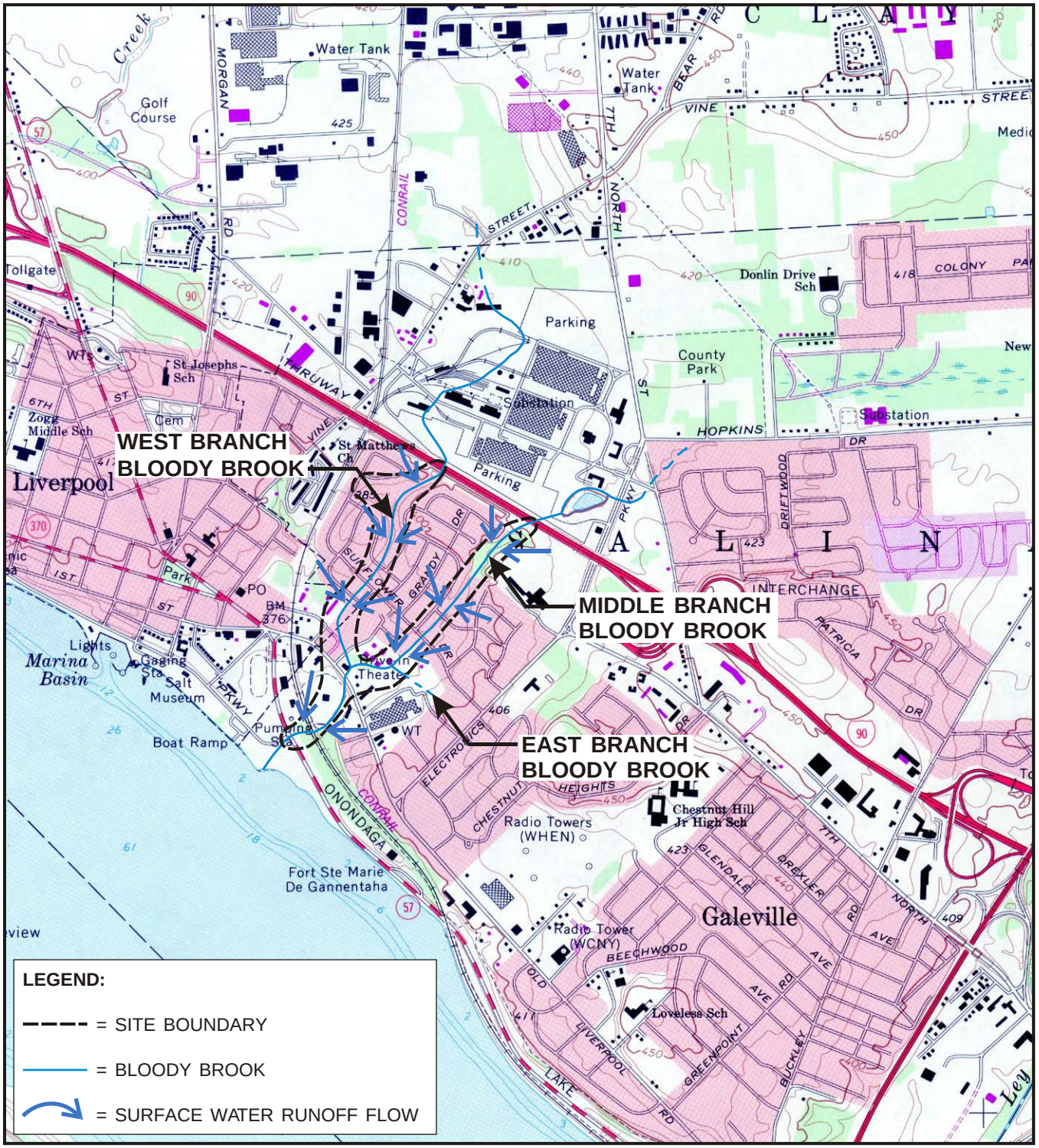
LOCKHEED MARTIN CORPORATION
WEST BRANCH OF THE BLOODY BROOK
ONONDAGA COUNTY, NEW YORK
FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

SITE LOCATION MAP

ARCADIS

FIGURE
1

07/20/09 SYRACUSE, NY-ENV/CAD-DJHOWES
B0038016/0000/00001/CDR/38016N05.CDR



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., SYRACUSE, WEST, NY, 1973, PHOTOREVISED 1978.

2000' 0 2000'

Approximate Scale: 1" = 2000'



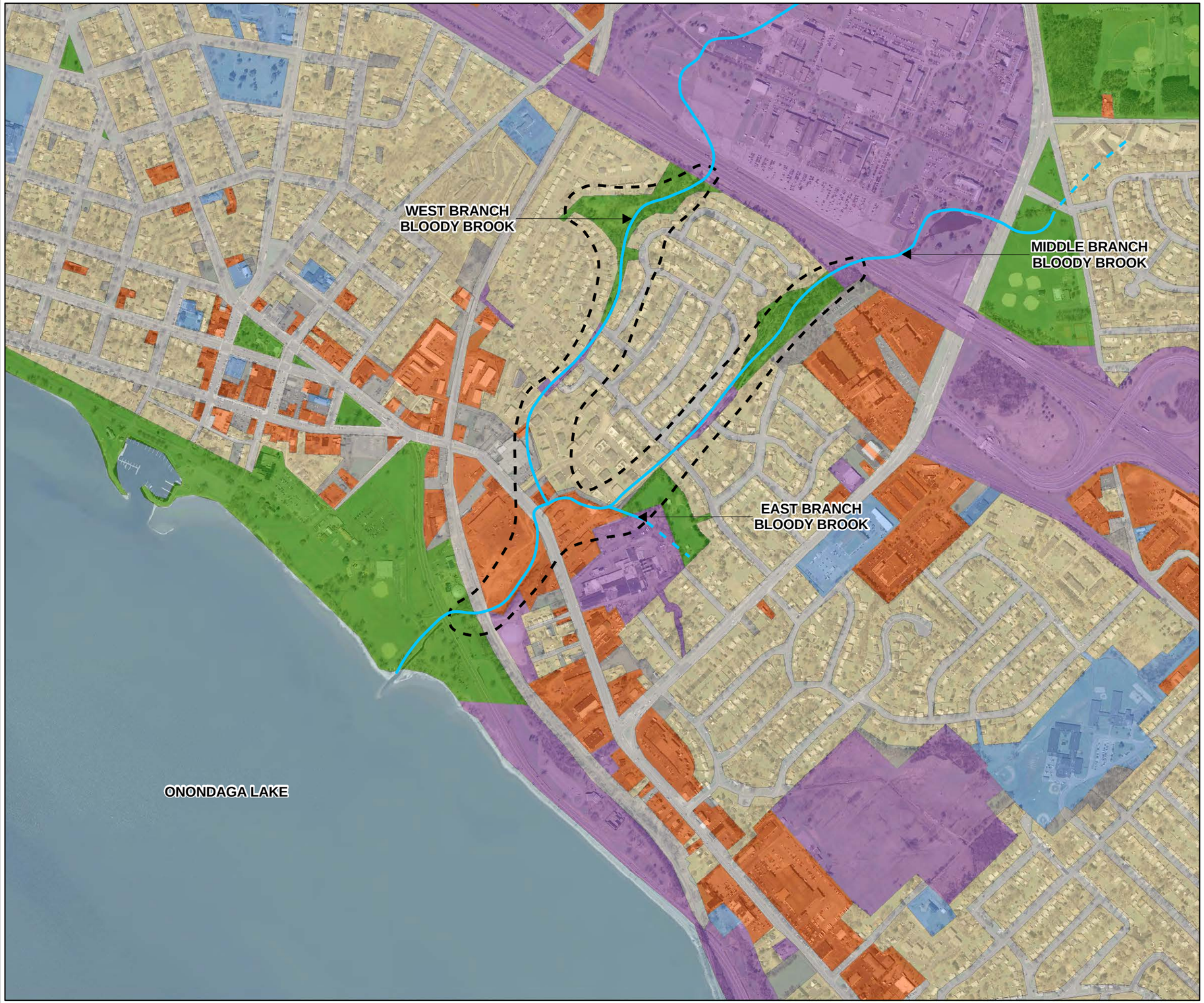
LOCKHEED MARTIN CORPORATION
WEST BRANCH OF THE BLOODY BROOK
ONONDAGA COUNTY, NEW YORK
FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

SITE DRAINAGE MAP

ARCADIS

FIGURE
2

07/20/09 SYRACUSE, NY-ENV/CAD-DJHOWES
B0038016/0000/00001/CDR/38016N06.CDR



LEGEND:

- BLOODY BROOK
- APPROXIMATE SITE BOUNDARY

APPROXIMATE LANDUSE AREAS

- PAVED
- AGRICULTURE
- COMMERCIAL
- INDUSTRIAL
- PARK/OPEN SPACE
- PUBLIC SERVICE
- RESIDENTIAL
- VACANT
- WATER

NOTES:

1. 2006 IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE.
2. LANDUSE POLYGONS DIGITIZED FROM SYRACUSE - ONONDAGA COUNTY GIS ON THE WEB AT http://www.maphost.com/syracuse-onondaga/

0 800 1,600 Feet

GRAPHIC SCALE

LOCKHEED MARTIN CORPORATION
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

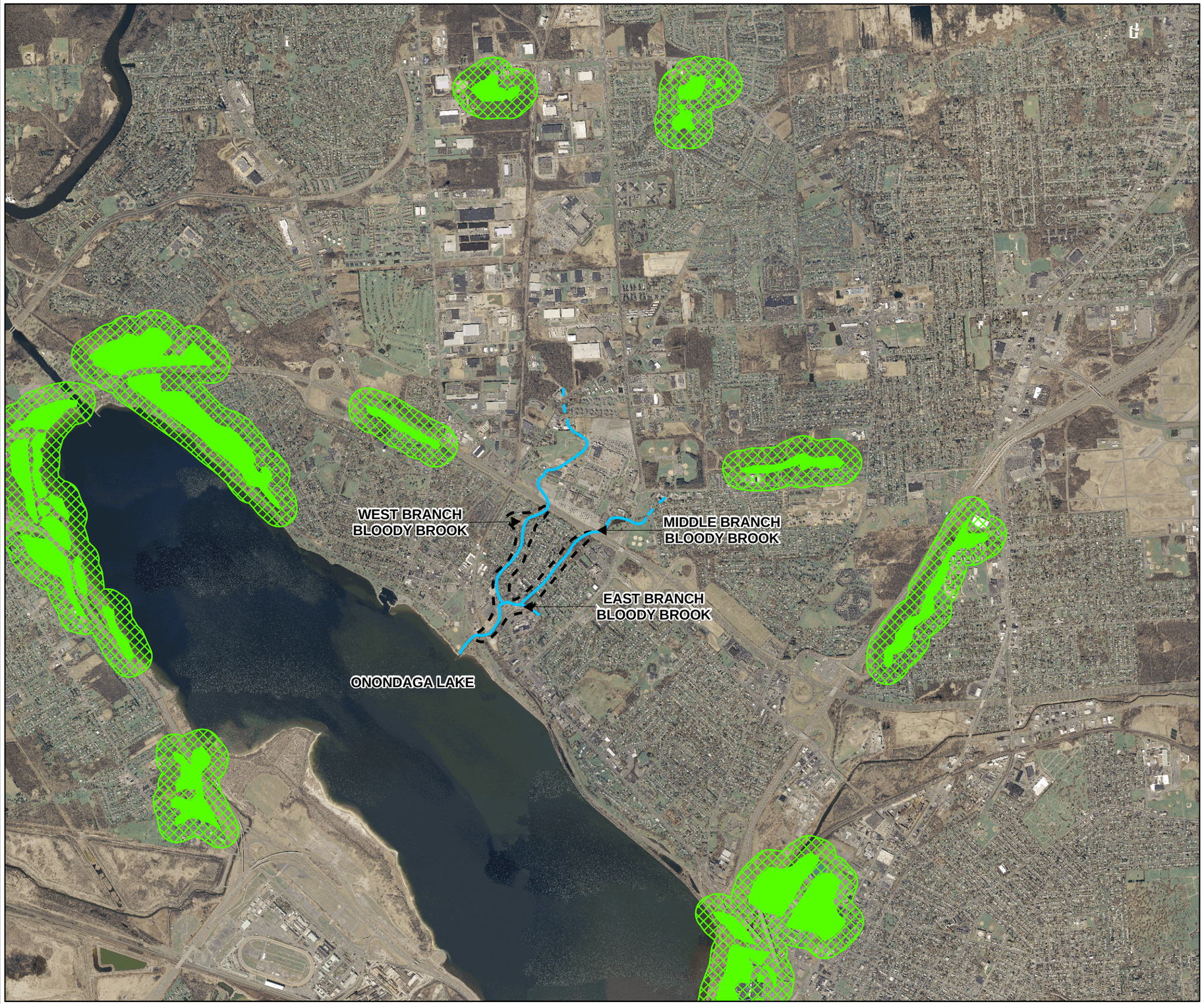
FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

COVERTYPE MAP

ARCADIS

FIGURE
3

CITY: SYR DIV/GROUP: 40 DB: KEW
Lockheed Martin (B0038016.0000.00001)
Q:\LockheedMartin\Syracuse\OnondagaCounty\Fish_and_Wildlife_RI_Analysis\mxd\CovertypeMap.mxd - 7/22/2009 @ 3:04:56 PM



LEGEND:

- BLOODY BROOK
- APPROXIMATE STATE-REGULATED FRESHWATER WETLAND
- APPROXIMATE WETLAND CHECKZONE
- APPROXIMATE SITE BOUNDARY

NOTES:

1. 2006 IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE.
2. STATE-REGULATED FRESHWATER WETLANDS DIGITIZED FROM THE NEW YORK STATE - DEPARTMENT OF ENVIRONMENTAL CONSERVATION ENVIRONMENTAL RESOURCE MAPPER ON THE WEB AT http://www.dec.ny.gov/imsmaps/ERM/viewer.htm

0 2,800 5,600 Feet

GRAPHIC SCALE

LOCKHEED MARTIN CORPORATION
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

NEW YORK STATE FRESHWATER WETLANDS MAP

ARCADIS

FIGURE 4

CITY: SYR DIV/GROUP: 40 DB: KEW
Lockheed Martin (B0038016.0000.00001)
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LEGEND:

- BLOODY BROOK
- APPROXIMATE SITE BOUNDARY

NATIONAL WETLANDS INVENTORY

- L1UBH
- L1UBKHh
- L2UBG
- L2UBH
- L2UBKFhs
- L2USAs
- L2USCs
- PEM1Cs
- PEM1E
- PEM5/UBFh
- PEM5E
- PEM5F
- PFO1/SS1C
- PFO1/SS1E
- PFO1A
- PFO1C
- PFO1Cd
- PFO1E
- PFO5/1E
- PSS1/EM5Cd
- PSS1/EM5E
- PSS1A
- PSS1Cd
- PSS1E
- PUBFx
- PUBHh
- PUBHx
- PUBKHh
- PUBKHhs
- R2UBH
- R2UBHx

NOTES:

1. 2006 IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE.
2. NATIONAL WETLANDS INVENTORY DATA DOWNLOADED FROM THE U.S. FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY WEBSITE AT http://www.fws.gov/wetlands/Data/DataDownload.html

0 2,800 5,600 Feet

GRAPHIC SCALE

LOCKHEED MARTIN CORPORATION
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

NATIONAL WETLANDS INVENTORY MAP

ARCADIS

FIGURE 5

CITY: SYR DIV/GROUP: 40 DB: KEW
Lockheed Martin (B0038016.0000.00001)
Q:\LockheedMartin\Syracuse\OnondagaCounty\Fish_and_Wildlife_RI_Analysis\mxd\NWI_Map.mxd - 7/22/2009 @ 3:00:43 PM

AECOM
40 British American Boulevard
Latham, New York 12110-1405
Phone: 518.951.2200
Fax: 518.951.2300

August 22, 2012

Ms. Jill Fonte
Lockheed Martin Corporation
Electronics Park
497 Electronics Pkwy
Bldg. EP-6, Room 48
Liverpool, NY 13088

RE: Wetland Delineation Update
Lockheed Martin Corporation – West Branch Bloody Brook
Onondaga County, New York

Dear Ms. Fonte:

AECOM Environmental, Inc. (AECOM) has prepared this wetland delineation update in support of remediation activities being completed for a portion of the West Branch of Bloody Brook (WBBB), pursuant to a Voluntary Cleanup Agreement (VCA) between Lockheed Martin Corporation (Lockheed Martin) and the New York State Department of Environmental Conservation (NYSDEC) (Index #: D7-0001-01-09, effective July 20, 2002). Lockheed Martin previously contracted Clough, Harbour & Associates LLP (CHA) to complete a wetland delineation within a portion of the WBBB site. The wetland delineation area is shown on Figure 1 and is referred to in this report as "the Area". The Area is owned by the Town of Salina and located in Liverpool, Onondaga County, New York.

CHA completed its wetland delineation on August 5, 2004 and issued a report dated March 2005. That wetland delineation report is included as Attachment 1 to this letter. A reassessment of the status of the wetlands was conducted by Shaw Environmental, Inc. (Shaw) in July 2009. From the reassessment, Shaw determined the boundaries of the wetlands were unchanged from the August 2004 delineation.

In accordance with the Clean Water Act (33 U.S.C. §1251-1376), Section 404 and the rules related to work conducted within the waters of the United States (WOUS), a wetland delineation is valid for approximately 3 years after the field work is completed for submission to the United States Army Corps of Engineers (USACE). A wetland delineation is considered valid for a period of 5 years after submission to the USACE and upon receipt of a jurisdictional determination letter from the USACE confirming the wetland delineation findings. This delineation update was performed to renew the CHA/Shaw delineation. A summary of the area observations and wetland findings from the recent delineation activities is presented below.

Area Observations

AECOM completed reconnaissance of the Area using a two-person field crew on April 12 and 13, 2012. AECOM was able to locate several of the original wetland flags, which was helpful to compare the previous wetland boundaries with current conditions. AECOM completed the wetland delineation update using methods established in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Department of the Army 1987).

The Area is bordered by the New York State Thruway on the northeast and is surrounded by residential development on the remaining three sides. The WBBB runs through the Area. Historical research and field sampling data have indicated that the WBBB has been relocated during various stages of the surrounding residential development. Portions of the delineated wetlands appear to be located in the former channel of the WBBB.

Hydrologic conditions across the Area appear to be generally influenced by the WBBB and topography. The Area consists of a combination of upland forest, open meadow, and palustrine emergent, scrub-shrub, and forested wetland communities. Some of the dominant species identified in the upland forest consist of box elder (*Acer negundo*), quaking aspen (*Populus tremuloides*), buckthorn (*Rhamnus cathartics*), gray dogwood (*Cornus racemosa*), multi-flora rose (*Rosa multiflora*), fox grape (*Vitis labrusca*), virginia creeper (*Parthenocissus quinquefolia*), violet species (*Viola sp.*), and poison ivy (*Rhus radicans*). Dominant species within the upland meadow consists of Canada goldenrod *(Solidago canadensis),* Queen Anne's lace *(Daucus carota),* grass species *(Poa sp.),* white sweet clover *(Melilotus alba),* violet species, and common plantain *(Plantago major).*

Wetland Findings

The April 2012 wetland delineation generally confirmed the presence of similar hydrophytic vegetation, hydric soils, and wetland hydrology characteristics as described in the previous delineation reports. However, the subsurface hydrology appears to have been altered causing the formerly identified Wetlands A, B, C, and D to contract from the March 2005 and July 2009 surveys. The contraction of the wetland boundaries is observed most prominently in the northeastern portion of the Area closest to the New York State Thruway. The April 2012 surveyed boundaries of the identified wetlands are shown on Figure 2.

In 1997, under NYSDEC oversight, Lockheed Martin completed an interim corrective measure (ICM) to remove all sediments from within the 200-foot long culvert beneath the Thruway and

the downstream 750-foot segment of the WBBB. Following the excavation activities, the stream was restored with steeper cut-banks compared to the banks of the portion of the stream adjacent to but outside of the remediation area. The restored stream was most likely designed to minimize the occurrence of water overtopping the bank. The steeper banks in the northeastern portion of the Area could be attributing to the contraction of the wetland boundaries.

In the lower reach of WBBB, the portion of the stream located downstream of the previous remediation activity and upstream of the gabion-armored section of the stream, the stream channel has a more natural bank configuration. In this portion of the stream, AECOM delineated the ordinary high water mark as outside of the stream banks and reaching into the adjacent floodplain. In addition, AECOM identified the drainage channel located along the southern property edge flowing east within Wetland B and discharging into the WBBB.

Upland/wetland data points were collected in Wetland A (Data points DP-1, DP-2 and DP-3) and Wetland B (DP-4 and DP-5) to document the three Corps of Engineers wetland parameters present in the two wetlands. Data forms for the five data points are attached to this letter as Attachment 2. The vegetation parameter was limited due to the wetland delineation being conducted at the beginning the growing season.

If you have any questions, please contact me or Nickcole Evans.

Sincerely,
AECOM Environmental, Inc.

Jeffrey L. Briggs

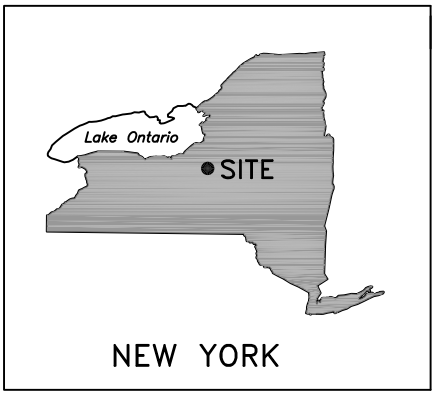
Jeffrey Briggs, Ph.D.
Senior Ecologist

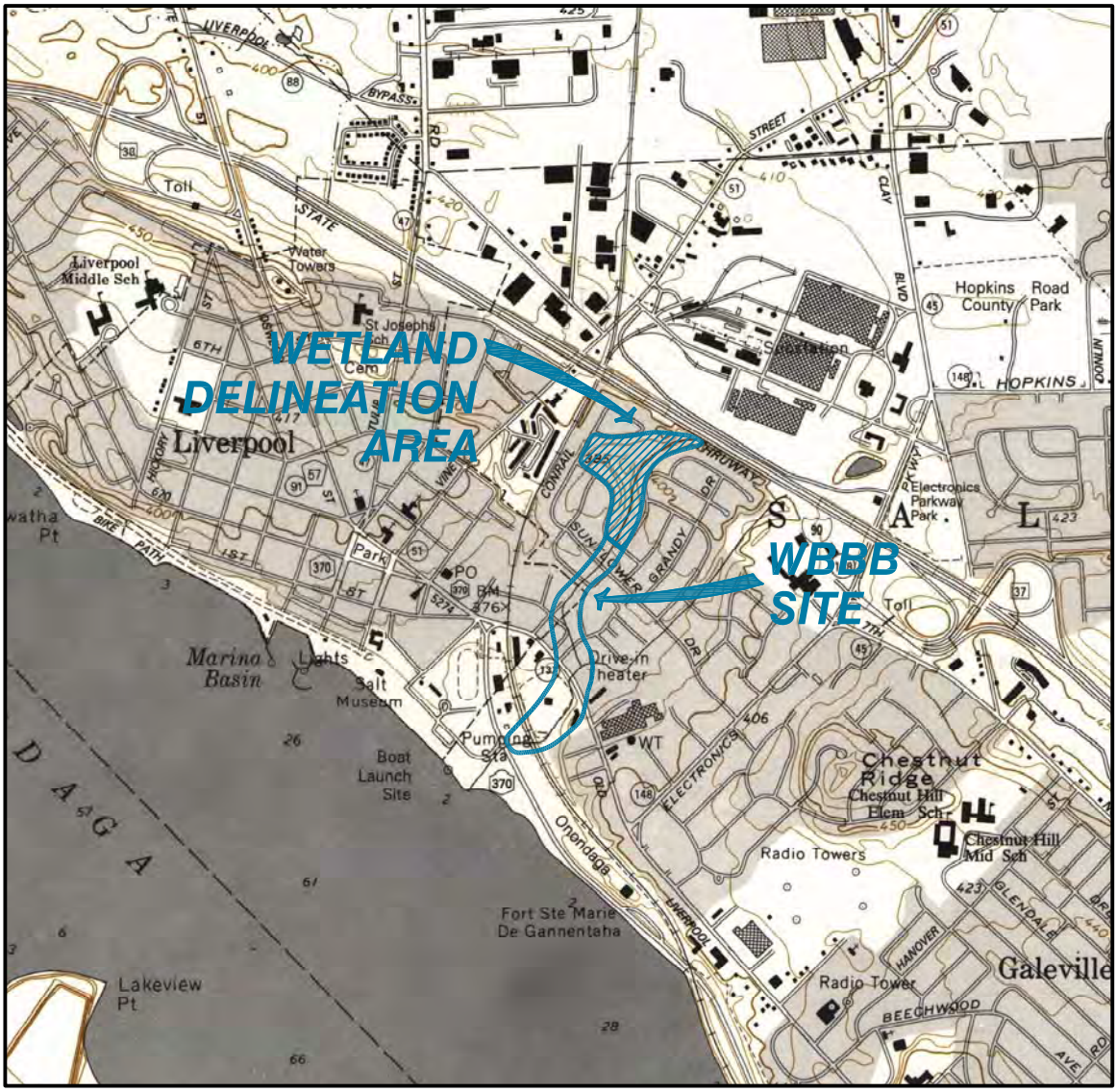
cc: Nickcole Evans, P.E., AECOM

Attachments:

Figure 1 – Area Location Map
Figure 2 – Area Map
Attachment 1 – CHA Wetland Delineation Report March 2005
Attachment 2 - Corps of Engineers Data Forms April 12, 2012

FIGURES





0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

AREA LOCATION MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A2APPXCFIG1.dwg	—	60194430	08 / 2012	1

Plotted By: bookasr
Layout-Sheet Name: FIGURE 1
Plot File Date Created: Dec/12/2012 10:58 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\A2APPXCFIG1.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

BROOKVIEW LANE

SUNFLOWER DRIVE

NEW YORK STATE THRUWAY

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

A

B

C

D

6'x8' WIDE BOX CULVERT INV.=384.4

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.79 DRAINAGE PIPE

30"CMP INV=377.60 DRAINAGE PIPE

47"HC INV=382.93

GRID N:1131748.200
GRID E:923760.469
LATITUDE: 41°50'45.233"
LONGITUDE: -72°54'49.216"
ELEVATION 394.11

BL-114

INV.=370.4

INV.=370.0

CSP 5'x7' WIDE

CHANNEL

GABION LINED CHANNEL

SPRUCE TREES

OBSTRUCTED/ TREES & BRUSH

CHAIN LINK FENCE

DP-1
DP-2
DP-3
DP- 4
DP- 5

SPRING

SHED
DECK
PATIO
POOL
AG POOL
PLANTERS
CONC.
ROCK PATIO

LEGEND

- WETLAND
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- GABIONS (ROCK-FILLED WIRE CAGES)
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- DP-4 WETLAND DATA POINT
- B21 WETLAND SURVEY POINT
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

WETLAND DELINEATION AREA MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN:	PROJECT NO.:	DATE	FIGURE NO.
D15APPXCFIG2.dwg	—	60194430.	08 / 2012	2

Plotted By: bostonr
Plot Scale: APPXC - FIGURE 2
Plot File Date Created: Dec/12/2012 10:09 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\D15APPXCFIG2.DWG

ATTACHMENT 1

CHA Wetland Delineation Report
March 2005

WETLAND DELINEATION REPORT

Prepared For:

Lockheed Martin Corporation
Syracuse, New York

March 2005

CLOUGH HARBOUR & ASSOCIATES LLP

CHA File No. 13410.1001.1106

TABLE OF CONTENTS

Section		Page
I.	INTRODUCTION	1
II.	SITE DESCRIPTION & SITE HISTORY	1
III.	WETLAND CHARACTERISTICS	1
IV.	METHODOLOGY	2
V.	RESULTS AND CONCLUSIONS	3

ATTACHMENTS

Attachment 1: Project Location Map

Attachment 2: Field Data Sheets

Attachment 3: Site Photographs

Attachment 4: Soil Survey Map

Attachment 5: Wetland Mapping

Attachment 6: Wetland Delineation Map

I. INTRODUCTION

Lockheed Martin Corporation requested that Clough, Harbour & Associates LLP complete a wetland delineation as work in support of remedial planning under a Voluntary Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC). A wetland delineation of a portion of property owned by the Town of Salina, south of the New York State Thruway (the "site"), located in Liverpool, Onondaga Co., NY (Attachment 1- Project Location Map/ Site Map) was completed on August 5, 2004.

II. SITE DESCRIPTION & SITE HISTORY

The site consists of a combination of upland forest, upland meadow, palustrine emergent wetland, palustrine scrub-shrub wetland and palustrine forested wetland. The site is bordered by the New York State Thruway on the northeast side and is surrounded by residential development on the other three sides. Additionally, Bloody Brook (west branch) runs through the site. Portions of the brook are currently stone lined channel.

According to Lockheed Martin, historical research and field sampling data have indicated that the West Branch of Bloody Brook has been relocated during various stages of the surrounding residential development. Some of the wetland areas that were field delineated appear to be located in the former channel of the Bloody Brook.

III. WETLAND CHARACTERISTICS

The following provides information on the criteria (vegetation, soils, and hydrology) used to delineate wetland areas on the site. Refer to field data sheets and corresponding photographs (Attachment 2 and 3) for additional information.

A. Vegetation

Vegetative communities identified within the site consist of a combination of upland forest, upland meadow, palustrine emergent wetland, palustrine forested wetland, and palustrine scrub-shrub wetland.

Some of the dominant species identified in the upland forest consist of box elder (*Acer negundo*), quaking aspen (*Populus tremuloides*), buckthorn (*Rhamnus cathartica*), gray dogwood (*Cornus racemosa),* multi-flora rose (*Rosa multiflora*), fox grape (*Vitis labrusca*), virginia creeper (*Parthenocissus quinquefolia*), violet species (*Viola sp.),* and poison ivy (*Rhus radicans*).

Some of the dominant species within the upland meadow consists of Canada goldenrod *Solidago canadensis*), Queen Anne's lace (*Daucus carota*), grass species (*Poa sp.*), white sweet clover (*Melilotus alba*), violet species and common plantain (*Plantago major*).

B. Soils

Soils data for the site was obtained from the Onondaga County Soil Survey (U.S. Department of Agriculture Soil Conservation Service, January 1977) and supplemented with field data. Attachment 4 identifies the soils that have been mapped within the site. Descriptions of these soils are provided below.

Dunkirk silt loam, rolling (DuC) is a deep well drained soil. This soil is mainly on lake plains and has slopes that range from 6 to 12 percent.

Fluvaquents, Frequently Flooded (FL) is a soil that consists of alluvial soils and recent deposits of alluvial soil material. This soil ranges from well drained to very poorly drained. The slopes range from 0 to 8 percent. This soil can be found on narrow flooded plains and alluvial fans of secondary streams.

Cut and Fill land (C.F.L.) is a soil that is a result of previous disturbances.

C. Hydrology

Bloody Brook influences the hydrology of the site. Drainage from the nearby residential development also influences the hydrology of the site.

The water quality of surface waters in New York State are classified by the NYSDEC as either "AA", "A", "B", "C, or "D". A "t" used with the classification indicates that the stream supports, or may support, a trout population. The portion of Bloody Brook that flows through the site has been designated as a Class C stream by NYSDEC. Based on this classification, this portion of Bloody Brook is not a "protected stream," as this term is defined in 6 NYCRR Part 608, NYSDEC's regulations governing the use and protection of waters, and therefore, no permit would be required under 6 NYCRR Sec. 608.2 for any change, modification or disturbance of the stream, its bed or banks, or for any removal from its bed or banks of any material. Also, this portion of Bloody Brook does not appear to be "navigable," as this term is defined in 6 NYCRR Part 608, and therefore, no permit would be required under 6 NYCRR Sec. 608.5 for the excavation from or placement of fill in the stream.

IV. METHODOLOGY

The delineation of wetland boundaries on the site was conducted in accordance with procedures provided in the U.S. Army Corps of Engineers Wetland Delineation Manual (1987). Within the wetland areas, hydrology indicators consisted of the presence of the Bloody Brook, saturation in the upper 12 inches and positive facultative (FAC)-Neutral test. The FAC- Neutral test is used for determining the presence of hydrophytic vegetation.

Prior to visiting the site, various maps and other sources of background information were reviewed. These included: The USGS topographic map (Syracuse West Quadrangle,

Attachment 1); the NYSDEC Freshwater Wetland Map (Syracuse West Quadrangle, Attachment 5); the National Wetland Inventory Map (Syracuse West Quadrangle, Attachment 5) and the Onondaga County Soil Survey (Attachment 4). Based on review of the regional NYSDEC Freshwater Wetland Map, no state wetlands were identified at the site or in the vicinity of the site. Additionally, the National Wetland Inventory Map did not identify any federally mapped wetlands at the site or in the vicinity of the site.

Wetland boundaries were determined in the field based on the three parameter approach, whereby an area is a wetland if it exhibits vegetation adapted to wet conditions (hydrophytes), hydric soils, and the presence or evidence of water at or near the soil surface during the growing season (hydrology).

V. RESULTS AND CONCLUSIONS

Based on the methodology discussed in Section III of this report, three wetland areas were delineated on the site and surveyed by a licensed surveyor (C.T. Male Associates, P.C.) for inclusion on the base map (Attachment 6- Wetland Delineation Map). Their characteristics are discussed below:

Wetland A - This wetland measures approximately 0.09 acres and can be characterized as a combination of both palustrine emergent wetland and palustrine forested wetland that is dominated by common reed, jewelweed and white willow. This wetland continues off the site at the New York State Thruway right-of-way fence. Hydrology and hydric soil indicators included saturation in the upper 12 inches, low chroma soils and positive FAC-Neutral test.

Wetland B/D - This wetland measures approximately 0.39 acres and can be characterized as a combination of palustrine emergent wetland and palustrine forested wetland that is dominated by common reed, jewelweed, purple loosestrife, gray dogwood, and white willow. This wetland also continues off the site at the New York State Thruway right-of-way fence. Additionally, Wetland B/D is transected by a portion of Bloody Brook. Hydrology and hydric soil indicators included saturation in the upper 12 inches, low chroma soils and positive FAC-Neutral test. Wetland B/D appears to be part of the former channel of the Bloody Brook, as discussed in Section II.

Wetland C - This wetland measures approximately 1.27 acres and can be characterized as a palustrine emergent wetland that is dominated by common reed, green bulrush, grass species and mint. Hydrology indicators include saturation in the upper 12 inches, low chroma soils and positive FAC-Neutral test. Wetland C also appears to be part of the former channel of the Bloody Brook.

These are the only wetland areas identified at the site.

ATTACHMENT 1

PROJECT LOCATION MAP



N

CLOUGH, HARBOUR & ASSOCIATES LLP
ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

Project Location Map

Scale 1" = 2000'

CHA File No:
13410.1001.1106

Bloody Brook Wetland Delineation
Liverpool, New York
Syracuse West USGS Quad

ATTACHMENT 2

FIELD DATA SHEETS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 1

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent/ scrub shrub
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Wet A
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Near A-6

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Phragmites australis	Herb	FACW	*Salix alba*	Shrub	FACW
Reed,Common			Willow,White		
Impatiens capensis	Herb	FACW			
Touch-Me-Not,Spotted					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%

FAC Neutral: 3/3 = 100.00%

Numeric Index: 6/3 = 2.00

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	< 1 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner:	Lockheed Martin Corporation		**County:** Onondaga
Investigators:	N. Frazer		**State:** New York
			Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Cut and Fill Land
Map Symbol: C.F.L **Drainage Class:**
Taxonomy (Subgroup):
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	10YR2/1	N/A	N/A	N/A	Silt loam
5+	B	10YR3/2	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 2

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** upland scrub shrub
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Upl A
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Near A-6

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Solidago sp.	Herb	NI	*Acer negundo*	Tree	FAC+
Goldenrod			Box-Elder		
Cirsium vulgare	Herb	FACU-	*Cornus racemosa*	Shrub	NI
Thistle,Bull			Grey dogwood		
Vitis labrusca	Vine	FACU			
Grape,Fox					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/3 = 33.33%

FAC Neutral: 0/2 = 0.00%

Numeric Index: 11/3 = 3.67

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 2

SOILS

Map Unit Name (Series and Phase): Cut and Fill Land

Map Symbol: C.F.L **Drainage Class:** **Mapped Hydric Inclusion?**

Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	10YR2/1	N/A	N/A	N/A	Silt loam
5+	B	10YR3/3	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 3

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Wet C
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Near C-9

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Phragmites australis	Herb	FACW	*Poa sp.*	Herb	NI
Reed,Common			grass sp.		
Scirpus atrovirens	Herb	OBL	*Mentha spicata*	Herb	FACW+
Bulrush,Green			Spearmint		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%

FAC Neutral: 3/3 = 100.00%

Numeric Index: 5/3 = 1.67

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	+/- 6 *(in.)*
Depth to Saturated Soil:	< 1 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Cut and Fill Land
Map Symbol: C.F.L **Drainage Class:**
Taxonomy (Subgroup):
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-14+	A	10YR4/2	10YR4/6	Common	Distinct	Clay loam
			10YR2/1	Few	Distinct	

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 4

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Lawn
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Upl C
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Near C-10

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Plantago major	Herb	FACU	*Viola sp.*	Herb	NI
Plantain,Common			Violet		
Poa sp.	Herb	NI			
grass sp.					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 0/1 = 0.00%

FAC Neutral: 0/1 = 0.00%

Numeric Index: 4/1 = 4.00

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 4

SOILS

Map Unit Name (Series and Phase): Cut and Fill Land
Map Symbol: C.F.L **Drainage Class:** **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-4	A	2.5Y3/2	N/A	N/A	N/A	Silt loam
5+	B	2.5Y4/3	10YR4/6	Common	Distinct	Sandy loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No)		Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present? Yes (No)		
Hydric Soils Present? Yes (No)		

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 5

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Forested
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Upl D
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Near D-2

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Vitis labrusca	Vine	FACU	*Rhamnus cathartica*	Tree	UPL
Grape,Fox			Buckthorn,Common		
Solidago canadensis	Herb	FACU	*Cornus racemosa*	Shrub	NI
Golden-Rod,Canada			Grey dogwood		
Parthenocissus quinquefolia	Vine	FACU	*Acer negundo*	Tree	FAC+
Creeper,Virginia			Box-Elder		
Viola sp.	Herb	NI			
Violet					

Percent of Dominant Species that are OBL, FACW or FAC: 1/5 = 20.00%
(excluding FAC-)

FAC Neutral: 0/4 = 0.00%
Numeric Index: 20/5 = 4.00

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

WetFormtm

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 5

SOILS

Map Unit Name (Series and Phase): Fluvaquents, Frequently Flooded
Map Symbol: FL **Drainage Class:** **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-7	A	10YR3/3	N/A	N/A	N/A	Silt loam
7+	B	10YR5/3	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner:	Lockheed Martin Corporation		**County:** Onondaga
Investigators:	N. Frazer		**State:** New York
			Plot ID: 6

Do Normal Circumstances exist on the site?	(Yes)	No	**Community ID:** Emergent/ Forested
Is the site significantly disturbed (Atypical Situation:)?	Yes	(No)	**Transect ID:** Wet D
Is the area a potential Problem Area?	Yes	(No)	**Field Location:**
(If needed, explain on the reverse side)			Near D-2

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Impatiens capensis	Herb	FACW	*Cornus racemosa*	Shrub	NI
Touch-Me-Not,Spotted			Grey dogwood		
Lythrum salicaria	Herb	FACW+	*Salix alba*	Tree	FACW
Loosestrife,Purple			Willow,White		
Solidago canadensis	Herb	FACU			
Golden-Rod,Canada					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/4 = 75.00%

FAC Neutral: 3/4 = 75.00%

Numeric Index: 10/4 = 2.50

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	+/- 5 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators (2 or more required):
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other (Explain in Remarks)**

Remarks:

WetForm™

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bloody Brook	**Project No:** 13410	**Date:** 5-Aug-2004
Applicant/Owner: Lockheed Martin Corporation		**County:** Onondaga
Investigators: N. Frazer		**State:** New York
		Plot ID: 6

SOILS

Map Unit Name (Series and Phase): Fluvaquents, Frequently Flooded

Map Symbol: FL **Drainage Class:** **Mapped Hydric Inclusion?**

Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-11	A	2.5Y3/2	10YR4/6	Few	Faint	Silt loam
11+	B	10YR3/1	10YR4/6	Common	Distinct	Silt loam
			7.5YR5/6	Few	Distinct	

Hydric Soil Indicators:

- NO **Histosol**
- NO **Histic Epipedon**
- NO **Sulfidic Odor**
- NO **Aquic Moisture Regime**
- NO **Reducing Conditions**
- YES **Gleyed or Low Chroma Colors**
- NO **Concretions**
- NO **High Organic Content in Surface Layer in Sandy Soils**
- NO **Organic Streaking in Sandy Soils**
- NO **Listed on Local Hydric Soils List**
- NO **Listed on National Hydric Soils List**
- NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

ATTACHMENT 3

SITE PHOTOGRAPHS



Photo 1- View of the stone lined channel portion of Bloody Brook at the south end of the site facing south



Photo 2- View of the stone lined channel portion of Bloody Brook at the south end of the site facing north

CLOUGH, HARBOUR & ASSOCIATES LLP
ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

SITE PHOTOGRAPHS

Bloody Brook Wetland Delineation
Liverpool, Onondaga Co., NY



Photo 3 – View of Wetland A near flag A-6



Photo 4 – View of Upland A near flag A-6

CLOUGH, HARBOUR & ASSOCIATES LLP
ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

SITE PHOTOGRAPHS

Bloody Brook Wetland Delineation
Liverpool, Onondaga Co., NY



Photo 5-View of Wetland A near flag A-9



Photo 6-View of Wetland C near flag C-9



Photo 7-View of Upland C and Wetland C near flag C-10



Photo 8-View of Upland D near flag D-2

CLOUGH, HARBOUR & ASSOCIATES LLP
ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

SITE PHOTOGRAPHS

Bloody Brook Wetland Delineation
Liverpool, Onondaga Co., NY



Photo 9 – View of Wetland D near flag D-2



Photo 10 – View of Wetland D near flag D-13

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ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

SITE PHOTOGRAPHS

Bloody Brook Wetland Delineation
Liverpool, Onondaga Co., NY



Photo 11-View of Wetland D near flag D-13 facing north toward the NYS Thruway



Photo 12-Upland meadow near flag C-38 facing southwest

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SITE PHOTOGRAPHS

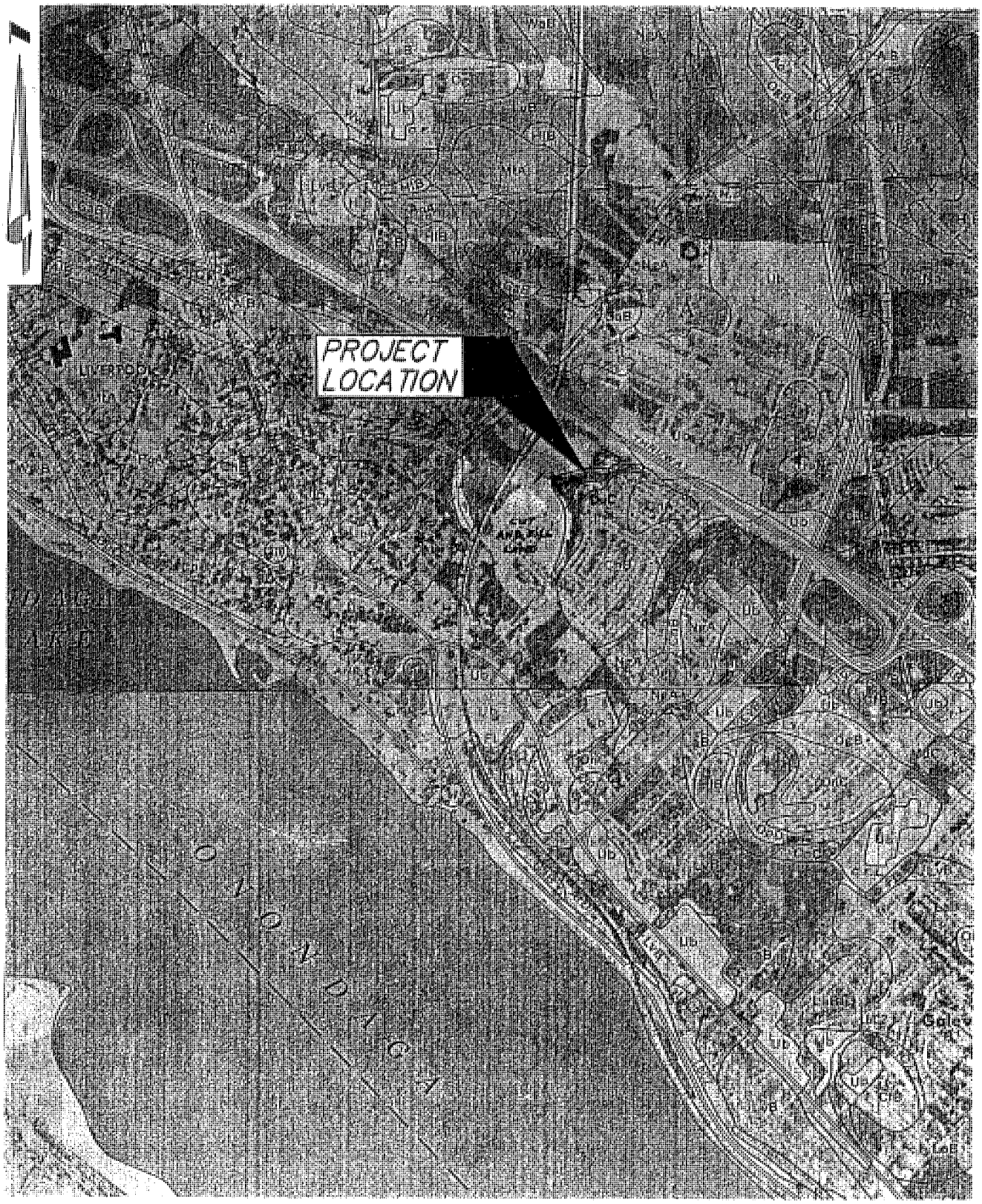
Bloody Brook Wetland Delineation
Liverpool, Onondaga Co., NY



Photo 13-Upland near flag C-38 facing northeast

ATTACHMENT 4

SOIL SURVEY MAP



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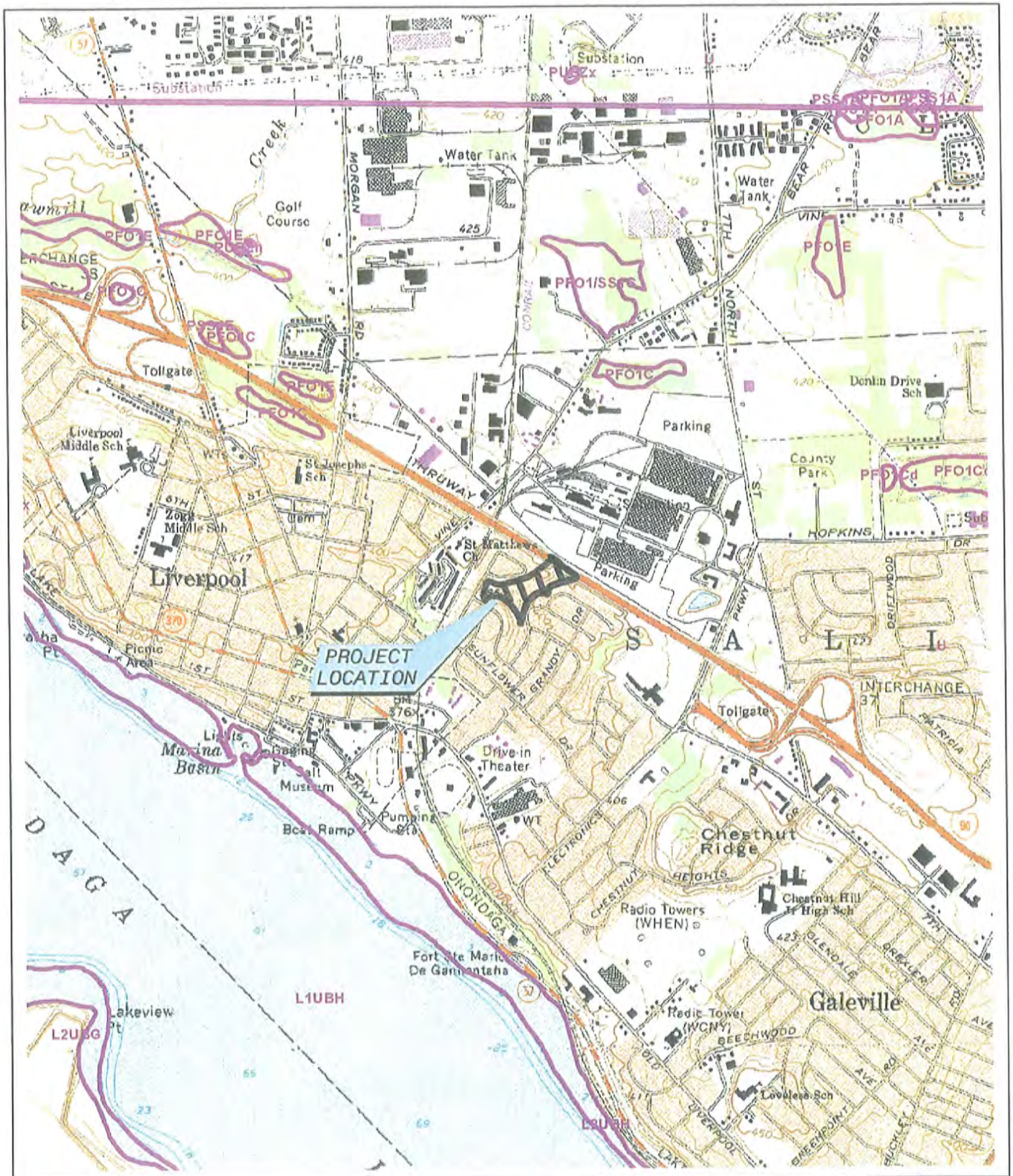
SOIL SURVEY

CHA File No:
13410.1001.1106

Bloody Brook Wetland Delineation
Liverpool, New York
Syracuse West USGS Quadrangle

ATTACHMENT 5

WETLAND MAPPING


PROJECT LOCATION
Liverpool
Galeville
Chestnut Ridge
Tollgate
Parking
Water Tank
Golf Course
Drive-in Theater
Boat Ramp
Pumping Sta
Picnic Area
Radio Towers (WHEN)
Radio Tower (WCNY)
Lakeview
L1UBH
L2UBG
L2UBH
PFO1E
PFO1C
PFO1/SS1C
PFO1A/SS1A
PFO1A
Substation
Liverpool Middle Sch
Zoger Middle Sch
St Joseph's Sch
St Matthews Ch
Donlin Drive Sch
Chestnut Hill Jr High Sch
Loveless Sch
Fort Ste Marie De Gannentaha
THRUWAY
INTERCHANGE
Creek
MORGAN RD
CONRAIL
BEAR
7TH
NORTH
VINE
HOPKINS
SUNFLOWER GRANDY
ONONDAGA
CHESTNUT RIDGE HEIGHTS
GLENDALE
BEECHWOOD
BRIEFWOOD
PATRICIA
OAK
BUCKLEY
ELECTRONICS
ONONDAGA LAKE
Marina Basin
Salt Museum
County Park
Parking
Picnic Area
Water Tank
Substation
Tollgate
Liverpool
Golf Course
Drive-in Theater
Boat Ramp
Pumping Sta
Radio Towers (WHEN)
Radio Tower (WCNY)
Lakeview
Fort Ste Marie De Gannentaha
Chestnut Ridge
Galeville
Parking
Tollgate
Liverpool Middle Sch
Zoger Middle Sch
St Joseph's Sch
St Matthews Ch
Donlin Drive Sch
Chestnut Hill Jr High Sch
Loveless Sch
Picnic Area
Water Tank
Golf Course
Substation
Tollgate
Liverpool
Parking



Key: State Wetland (typ)

N

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NYS Regulated Wetlands Map

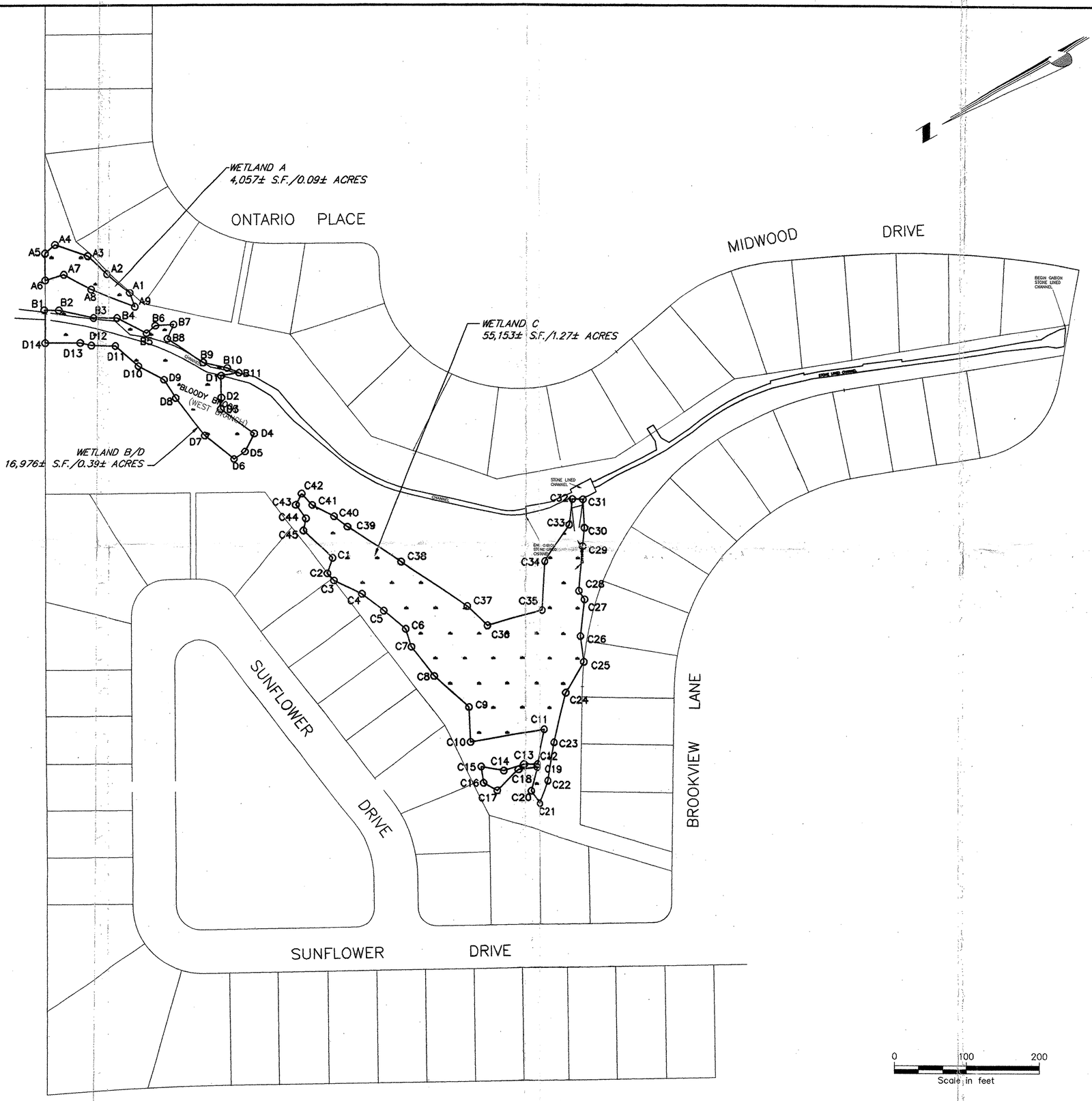
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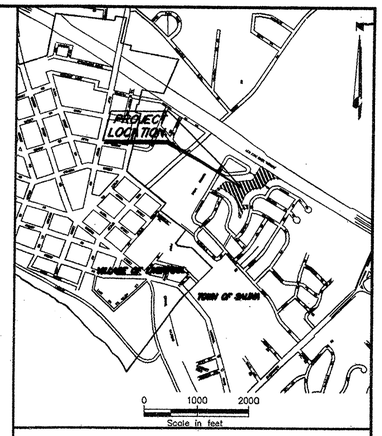
CHA File No: 13410.1001.1106

Bloody Brook Wetland Delineation
Liverpool, New York
Syracuse West USGS Quad

ATTACHMENT 6

WETLAND DELINEATION MAP





LOCKHEED MARTIN
ELECTRONICS PARK
PO BOX 4840
TOWN OF SALINA, NY

BLOODY BROOK PROJECT
TOWN OF SALINA
ONONDAGA COUNTY, NY

CHA
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441 SOUTH SALINA ST. – SYRACUSE, NEW YORK – 13202
315–471–3920

NO.	REVISIONS	BY	DATE

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DATE: AUGUST 2004

CHA PROJECT NO.: 13410

SCALE: AS NOTED

DRAWING TITLE

WETLAND DELINEATION MAP

DRAWING NO.

C-1

SHEET 1 OF 1

File: M:\13410\Acad\Survey\C1_13410.dwg 3/7/2005 07:17 AM

ATTACHMENT 2

Corps of Engineers Data Forms
April 12, 2012

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetland Delineation Manual)

Project/Site: Bloody Brook Remediation Site Applicant/Owner: Lockheed-Martin Investigator: J. Briggs/ E. Gorczyca	Date: 12 Apr 2012 County: Onondaga State: NY
Do Normal Circumstances exist on the site? Yes (early season) Is the site significantly disturbed (Atypical Situation)? Yes Is the area a potential Problem Area? (If needed, explain in the Wetland Determination remarks section.)	Community ID: Transect ID: A Plot ID: DP-1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phragmites communis	Herb	FACW	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC$^-$): 100

Remarks: Brook elevation is approximately 3 feet below sample elevation. DP in swale to brook approximately 15 feet west of the brook bank.

HYDROLOGY

[ ] Recorded Data (Describe in Remarks):
- [ ] Stream, Lake, or Tide Gauge
- [ ] Aerial Photographs
- [ ] Other

[X] No Recorded Data Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Free Water in Pit: [9] inches
- Depth to Saturated Soil: [8] inches

Wetland Hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [X] Saturated in Upper 12 inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [X] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12inches
- [X] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name(Series and Phase): Dunkirk silt loam, rolling	Drainage Class: Well drained		
Soil Taxonomy (Subgroup):	Field Observations: Confirm Mapped Type?	No	

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-14	A	10YR3/2	10YR 3/6	<10%	Silty clay

Hydric Soil Indicators:

- [ ] Histosol
- [ ] Histic Epipedon
- [ ] Sulfidic Odor
- [ ] Aquic Moisture Regime
- [ ] Reducing Conditions
- [X] Gleyed or Low-Chroma Colors
- [ ] Concretions
- [ ] High Organic Content in Surface Layer in Sandy Soils
- [ ] Organic Streaking in Sandy Soils
- [ ] Listed on Local Hydric Soils List
- [ ] Listed on National Hydric Soils List
- [ ] Other (Explain in Remarks)

Remarks: Indications of soil disturbance
Hydric soil coloration

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes Wetland Hydrology Present? Yes Hydric Soils Present? Yes	Is this Sampling Point Within a Wetland? Yes

Remarks: Small emergent herbs in rosettes, too early to identify.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetland Delineation Manual)

Project/Site: Bloody Brook Remediation Site Applicant/Owner: Lockheed-Martin Investigator: J. Briggs/ E. Gorczyca	Date: 12 Apr 2012 County: Onondaga State: NY
Do Normal Circumstances exist on the site? Yes (early season) Is the site significantly disturbed (Atypical Situation)? Yes Is the area a potential Problem Area? (If needed, explain in the Wetland Determination remarks section.)	Community ID: Transect ID: A Plot ID: DP-2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phragmites communis	Herb	FACW	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC$^-$): 100

Remarks: DP in swale to brook approximately 12 feet west of the brook bank.

HYDROLOGY

[ ] Recorded Data (Describe in Remarks):
- [ ] Stream, Lake, or Tide Gauge
- [ ] Aerial Photographs
- [ ] Other

[X] No Recorded Data Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Free Water in Pit: [12] inches
- Depth to Saturated Soil: [ ] inches

Wetland Hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [X] Saturated in Upper 12 inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [X] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12inches
- [ ] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name(Series and Phase): Dunkirk silt loam, rolling	Drainage Class: Well drained		
Soil Taxonomy (Subgroup):	Field Observations: Confirm Mapped Type?	No	

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	A	10YR2/1	organic	none	
2-10	B	10YR3/2	none	none	Silt
10-19	C	10YR4/2	2.5YR3/6	10%	Silty clay

Hydric Soil Indicators:

- [ ] Histosol
- [ ] Histic Epipedon
- [ ] Sulfidic Odor
- [ ] Aquic Moisture Regime
- [ ] Reducing Conditions
- [X] Gleyed or Low-Chroma Colors
- [ ] Concretions
- [ ] High Organic Content in Surface Layer in Sandy Soils
- [ ] Organic Streaking in Sandy Soils
- [ ] Listed on Local Hydric Soils List
- [ ] Listed on National Hydric Soils List
- [ ] Other (Explain in Remarks)

Remarks: Indications of soil disturbance
Hydric soil coloration

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes Wetland Hydrology Present? Yes Hydric Soils Present? Yes	Is this Sampling Point Within a Wetland? Yes

Remarks: Small emergent herbs in rosettes, too early to identify.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetland Delineation Manual)

Project/Site: Bloody Brook Remediation Site Applicant/Owner: Lockheed-Martin Investigator: J. Briggs/ E. Gorczyca	Date: 12 Apr 2012 County: Onondaga State: NY
Do Normal Circumstances exist on the site? Yes (early season) Is the site significantly disturbed (Atypical Situation)? Yes Is the area a potential Problem Area? (If needed, explain in the Wetland Determination remarks section.)	Community ID: Transect ID: A Plot ID: DP-3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phragmites communis	Herb	FACW	9.		
2. Solidago sp.	Herb	FACU	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC$^-$): 50

Remarks: DP in swale to brook approximately 4 feet west of the brook bank.

HYDROLOGY

[ ] Recorded Data (Describe in Remarks):
- [ ] Stream, Lake, or Tide Gauge
- [ ] Aerial Photographs
- [ ] Other

[X] No Recorded Data Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Free Water in Pit: [20] inches
- Depth to Saturated Soil: [ ] inches

Wetland Hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [ ] Saturated in Upper 12 inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [ ] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12inches
- [ ] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name(Series and Phase): Dunkirk silt loam, rolling	Drainage Class: Well drained		
Soil Taxonomy (Subgroup):	Field Observations: Confirm Mapped Type?	No	

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR2/2	organic	none	Silt
4-10	B	10YR3/4	none	none	Sandy Silt
10-24	Buried A	10YR3/3	2.5YR3/6	None	Silt with organic mix and charcoal

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Indications of soil disturbance; buried surface layer
No hydric soil coloration

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes Wetland Hydrology Present? No Hydric Soils Present? No	Is this Sampling Point Within a Wetland? No

Remarks: Groundwater appears to slope deeply to join stream in 3- to 4- foot incised channel with steep banks.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetland Delineation Manual)

Project/Site: Bloody Brook Remediation Site Applicant/Owner: Lockheed-Martin Investigator: J. Briggs/ E. Gorczyca	Date: 13 Apr 2012 County: Onondaga State: NY
Do Normal Circumstances exist on the site? Yes (early season) Is the site significantly disturbed (Atypical Situation)? Yes Is the area a potential Problem Area? (If needed, explain in the Wetland Determination remarks section.)	Community ID: Transect ID: B Plot ID: DP-4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Populus deltoides	Tree	FACW+	9.		
2. Salix alba	Shrub	FACW	10.		
3. Cornus amomum	Shrub	FACW+	11.		
4. Impatiens capensis	Herb	FACW	12.		
5. Phragmites communis	Herb	FACW	13.		
6.Solidago sp.	Herb	SP.	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC$^-$): 100

Remarks:

HYDROLOGY

[ ] Recorded Data (Describe in Remarks):
- [ ] Stream, Lake, or Tide Gauge
- [ ] Aerial Photographs
- [ ] Other

[X] No Recorded Data Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Free Water in Pit: [5] inches
- Depth to Saturated Soil: [0] inches

Wetland Hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [X] Saturated in Upper 12 inches
- [X] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [X] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [X] Oxidized Root Channels in Upper 12inches
- [X] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks: Wetland hydrology; evidence of periodic surface flow

SOILS

Map Unit Name(Series and Phase): Fluvaquent	Drainage Class: Frequently flooded		
Soil Taxonomy (Subgroup):	Field Observations: Confirm Mapped Type?	Yes	

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-7	A	10/YR3/1	None		Organic silt, with ½" duff
7-18+	B	10YR2/2	10YR4/6	20%	Sandy silt

Hydric Soil Indicators:

[ ]	Histosol	[ ]	Concretions
[ ]	Histic Epipedon	[ ]	High Organic Content in Surface Layer in Sandy Soils
[X]	Sulfidic Odor	[ ]	Organic Streaking in Sandy Soils
[ ]	Aquic Moisture Regime	[ ]	Listed on Local Hydric Soils List
[ ]	Reducing Conditions	[ ]	Listed on National Hydric Soils List
[X]	Gleyed or Low-Chroma Colors	[ ]	Other (Explain in Remarks)

Remarks: Low area with flooded patches
hydric soil coloration

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes Wetland Hydrology Present? Yes Hydric Soils Present? Yes	Is this Sampling Point Within a Wetland? Yes

Remarks: Saturated to the surface. Area disturbed by dumping household trash and yard waste

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetland Delineation Manual)

Project/Site: Bloody Brook Remediation Site Applicant/Owner: Lockheed-Martin Investigator: J. Briggs/ E. Gorczyca	Date: 13 Apr 2012 County: Onondaga State: NY
Do Normal Circumstances exist on the site? Yes (early season) Is the site significantly disturbed (Atypical Situation)? Yes Is the area a potential Problem Area? (If needed, explain in the Wetland Determination remarks section.)	Community ID: Transect ID: B Plot ID: DP-5

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Rhus typhina	Tree	NI	9.		
2. Cornus racemosa	Shrub	NI	10.		
3. Vitis labrusca	Vine	FACU	11.		
4. Acer negundo	seedling	FAC+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC$^-$): 25

Remarks:
Signs of household disposal of trash and yard waste.

HYDROLOGY

[ ] Recorded Data (Describe in Remarks):
- [ ] Stream, Lake, or Tide Gauge
- [ ] Aerial Photographs
- [ ] Other

[X] No Recorded Data Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Free Water in Pit: [15] inches
- Depth to Saturated Soil: [0] inches

Wetland Hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [ ] Saturated in Upper 12 inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [ ] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12inches
- [ ] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks: Wetland hydrology; evidence of periodic surface flow

SOILS

Map Unit Name(Series and Phase): Fluvaquent	Drainage Class: Frequently flooded		
Soil Taxonomy (Subgroup):	Field Observations: Confirm Mapped Type?	Yes	

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-9	A	10/YR3/2	None		Silt with roots
9-18	B	10YR2/3	None		Silt
18-20	C	7.5YR4/2	7.5YR4/6	10%	Sandy silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: the 3 horizons transition gradually. Mottle too deep for hydric soil may represent a prior wetland area.
Not hydric soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present? No Wetland Hydrology Present? No Hydric Soils Present? No	Is this Sampling Point Within a Wetland? No

Remarks: Area disturbed by dumping household trash and yard waste

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BIOTA, SURFACE WATER AND SEDIMENT DATA

BLOODY BROOK VOLUNTARY CLEANUP PROGRAM ONONDAGA COUNTY, NEW YORK

August 2012

Prepared for:

Lockheed Martin Corporation
Syracuse, New York

Submitted by:

AECOM USA, Inc.
Latham, New York

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1.0 Biota, Surface Water, and Sediment Data

Environmental investigations (i.e., biota, surface water, and sediment sampling) along Bloody Brook (West Branch of Bloody Brook [WBBB] and the Middle Branch of Bloody Brook [MBBB]) have been performed by the New York State Department of Conservation (NYSDEC), Lockheed Martin Corporation (Lockheed Martin) and Onondaga County from September 1994 through January 2008. Investigations of water quality and biota within the WBBB were initiated by NYSDEC in September 1994. Subsequently, Lockheed Martin voluntarily initiated environmental investigations in May 1996. Below is a summary of biota, surface water, and sediment sampling that has been conducted within the site. For the purposes of this document, the site is defined as that portion of the WBBB and the surrounding area commencing on the southern boundary of the New York State Thruway (Thruway) and ending at Onondaga Lake Parkway.[1] **Figure 1** is included as a site location map, and **Figure 2** presents the environmental investigation sample locations within the site and the MBBB.

1.1 Biota (Crayfish) Sampling

In September 1994, NYSDEC collected biological (crayfish) samples downstream of the Lockheed Martin Electronics Park facility. The analysis was completed without Lockheed Martin's involvement or knowledge. The results of this analysis are documented in a NYSDEC memorandum issued by Mr. Robert Bode on January 25, 1996 (NYSDEC, 1996a). Crayfish were analyzed for inorganics and PCBs from three locations. One location is within the site, and the analytical results for that location are presented in **Table 1** and on **Figure 3**.

1.2 Surface Water Sampling

In October 1995, NYSDEC deployed a passive in situ chemical extraction sampler (PISCES) in Bloody Brook at a location adjacent to Old Liverpool Road as part of an investigation of 11 tributaries to Onondaga Lake. These results are presented in a NYSDEC memorandum prepared by Mr. Simon Litten dated January 26, 1996; however, this memorandum was unable to be located for inclusion for reference in this document.

In May 1996, Lockheed Martin collected surface water samples as part of its Phase I Investigation. Samples were collected in accordance with the NYSDEC-approved *Bloody Brook*

1 The term "Site" in the VCA is defined as: a portion of the banks, surface waters and sediments of the West and Middle Branches of Bloody Brook located in the Town of Salina, which commences downstream of Interstate 90, the New York State Thruway, and which extends generally southward past the confluence of the West Branch and the Middle Branch of Bloody Brook, and ends on the upstream side of Onondaga Lake Parkway. After examining data developed during remedial investigation work in the Middle Branch, NYSDEC determined that no further action was required for that branch of Bloody Brook. For this reason, the term "site" in this document relates only to those areas within the VCA Site where the remedial program continues to be implemented and remedial action is proposed.

Sampling and Analysis Work Plan (BBL, 1996a) from six locations along portions of Bloody Brook and analyzed for cadmium, copper, mercury, and PCBs. Two locations are within the site, and the analytical results for those sample locations are presented in **Table 2** and on **Figure 4**.

1.3 Sediment Sampling

In May 1996, along with the surface water samples mentioned above, Lockheed Martin collected sediment samples from Bloody Brook as part of its Phase I Investigations (BBL, 1996a). Seven sediment samples were collected, six of which were co-located with the surface water samples. Three locations are within the site, and the samples were analyzed for cadmium, copper, mercury, and PCBs.

In July 1996, Lockheed Martin collected 10 sediment samples as part of its Phase II Investigation. Samples were collected from various locations according to the NYSDEC-approved *Bloody Brook Sediment Sampling and Analysis Work Plan: Phase II* (BBL, 1996b). Four locations are within the site, and two locations are within the MBBB. All samples were analyzed for cadmium, copper, mercury, PCBs, and total organic carbon (TOC).

In October 1996, at the request of NYSDEC and the New York State Department of Health (NYSDOH), Lockheed Martin collected three sediment samples within the site to assess the extent of PCBs and cadmium.

In April 1997, Lockheed Martin conducted sediment removal within the site in the upstream portion of the WBBB commencing at the New York State Thruway and ending approximately 750 feet downstream of that point (BBL, 1997b). Prior to this work, on April 18, 1997, and at the request of NYSDEC, Lockheed Martin collected four sediment samples within the site and downstream of the removal area and analyzed them for cadmium only. Subsequent to the sediment removal, on April 25, 1997, Lockheed Martin collected three samples within the site and from the remediated section of the WBBB. These samples were analyzed for cadmium, PCBs, TOC, and total petroleum hydrocarbons (TPH).

As requested by NYSDEC, in May 1999, Lockheed Martin collected 12 sediment samples from seven locations for cadmium and copper, and three samples collected from two locations were analyzed for Target Analyte List (TAL) and Target Compound List (TCL) constituents. Three locations are within the site, and four locations are within the MBBB. At five locations, samples were collected from two separate (and varying) depth intervals.

In July 1999, four sediment samples were collected from two locations within the site and in the vicinity of the pump station near Onondaga Lake Parkway, and analyzed for cadmium**.**

In November 2003, as part of the Liverpool Pump Station Improvement Project, and in accordance with its July 3, 2003 Scope of Work letter to the Onondaga County Department of

Water Environment Protection (OCDWEP) and the permit conditions contained in the *POW's Permit Conditions from the Division of Water for the Onondaga County WEP: Liverpool Pump Station Improvements Including Two Stream Crossings (Application ID #: 7-348-00098/001),* Onondaga County collected one sediment sample within the site and near Onondaga Lake Parkway. This sample was analyzed for cadmium only.

In April 2004, as part of the Phase IV Addendum activities, Lockheed Martin collected one sediment sample within the site and from the unnamed tributary in the wooded area for cadmium analysis.

Most recently, in January 2008, Lockheed Martin collected five composite sediment samples within the site and from the culverts in the WBBB at Brookview Lane, Sunflower Drive, Floradale Road, Pearl Street, and Town Gardens Drive. These samples were analyzed using the Toxicity Characteristic Leaching Procedure. In addition, they were analyzed for PCBs and Resource Conservation and Recovery Act (RCRA) Characteristics**.**

Analytical results for sediment sample locations are summarized in **Table 3**. Analytical results for cadmium, copper, mercury, and total PCBs in sediment are also presented on **Figures 5, 6, 7, and 8**, respectively.

2.0 References

Blasland, Bouck & Lee, Inc. (BBL), 1996a, *Bloody Brook Sampling and Analysis Work Plan*, May.

BBL, 1996b, *Bloody Brook Sediment Sampling and Analysis Work Plan: Phase II*, June.

BBL, 1997a, *West Branch of Bloody Brook Sediment Removal Work Plan*, January.

BBL, 1997b, *West Branch of Bloody Brook Sediment Removal Certification Report*, November.

NYSDEC, 1996, Memorandum from Robert Bode to Distribution regarding Bloody Brook Tissue Analysis Results, January.

Shaw Environmental, Inc. (Shaw), 2004, *Phase IV-A Side Bank Soil Investigation Work Plan*, April.

Shaw, 2008, *Final Interim Remedial Measures Work Plan, Culvert Sediment Removal*, April.

TABLES

Table 1
Summary of Biota (Crayfish) Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	Station 4
Date Collected	**Sep-94**
Inorganics	
Aluminum	<200
Arsenic	<4.0
Cadmium	19
Chromium	<8.0
Copper	197
Iron	488
Lead	6
Manganese	958
Mercury	0.23
Nickel	<8.0
Selenium	<2.0
Titanium	<8.0
Zinc	99
Polychlorinated Biphenyls (PCBs)	
Aroclor-1221	<0.27
Arolclor-1016/1242	<0.27
Aroclor-1248	<0.27
Aroclor-1254	<0.27
Aroclor-1260	2.4
Total PCBs	2.4

Notes:

1. All concentrations are reported in parts per million (ppm).
2. For additional information on these analytical results see NYSDEC Memorandum by Robert Bode dated January 25, 1996.

Table 2
Summary of Surface Water Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SW-05	SW-07
Date Collected	**5/13/1996**	**5/13/1996**
Inorganics		
Cadmium	<1.0	<1.0
Copper	6.6	5.3
Mercury	<0.10	<0.10
Polychlorinated Biphenyls (PCBs)		
Aroclor-1016	<0.064	<0.062
Aroclor-1221	<0.064	<0.062
Aroclor-1232	<0.064	<0.062
Arolclor-1242	<0.064	<0.062
Aroclor-1248	<0.064	<0.062
Aroclor-1254	<0.064	<0.062
Aroclor-1260	<0.064	<0.062
Total PCBs	<0.064	<0.062

Notes:

1. All surface water concentrations are reported in micrograms per liter (µg/L) or parts per billion (ppb).
2. For additional information on these analytical results see *Bloody Brook: Technical Evaluation of Sampling and Analysis Programs (*BBL, October 1996*).*

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-05	SD-06	SD-07	SD-08	SD-09	SD-10	SD-11	SD-12	SD-13	OCDDS-8	OCDDS-9	OCDDS-13
Date Collected	5/31/1996	5/31/1996	5/31/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	10/1/1996	10/1/1996	10/1/1996
Inorganics												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	199 J	104 J	267 J	177	22.4 [18.4]	38.8	21.4	1.1 J	1.6	0.34 [0.33]	11.4	88.6
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	48.8 J	42.9 J	68.9 J	46.2 J	15.6 J [14.4 J]	29.6 J	20.6 J	30.6 J	35.6 J	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	<0.06	<0.06	0.17	<0.06	0.07 J [<0.07]	<0.06	<0.06	<0.06	0.07 J	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)												
Aroclor-1016	NA	NA	NA	NA	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Arolclor-1242	NA	NA	NA	NA	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Aroclor-1254	1.6	2.5	1.9	<0.026	<0.026 [<0.03]	<0.026	<0.028	<0.025	<0.027	NA	NA	NA
Aroclor-1260	0.98	1.9	2.3	0.33	0.3 [0.26]	0.55	0.24	0.11	0.13	NA	NA	NA
Total PCBs	2.58	4.4	4.2	0.33	0.28	0.55	0.24	0.11	0.13	<0.025 [<0.025]	0.44	7.9
Total Organic Carbon												
TOC	NA	NA	NA	15,000	24700 [18,200]	12,000	19,500	6,260	12,700	NA	NA	NA
Total Petroleum Hydrocarbons (TPHs)												
Lube Oil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Oil 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kerosene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unknown Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Carbons (VOCs)												
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropronene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-05	SD-06	SD-07	SD-08	SD-09	SD-10	SD-11	SD-12	SD-13	OCDDS-8	OCDDS-9	OCDDS-13
Date Collected	5/31/1996	5/31/1996	5/31/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	10/1/1996	10/1/1996	10/1/1996
Volatile Organic Carbons (VOCs)(cont'd)												
Dibromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-dichloropronene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Carbons (SVOCs)												
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronapthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnapthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Ntiroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl ether)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachrlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclonentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ideno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-05	SD-06	SD-07	SD-08	SD-09	SD-10	SD-11	SD-12	SD-13	OCDDS-8	OCDDS-9	OCDDS-13
Date Collected	5/31/1996	5/31/1996	5/31/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	7/11/1996	10/1/1996	10/1/1996	10/1/1996
Semivolatile Organic Carbons (SVOCs)(cont'd)												
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total SVOCs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides												
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides												
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RCRA Characteristics												
Corrosivity (pH) (S.U.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flashpoint (°F)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HCN Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
H_2S Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-17	SD-18	SD-19	SD-20	POST-1	POST-2	POST-3	SD-21 (0-6")	SD-21 (6-16")	SD-22	SD-23 (0-6")
Date Collected	4/18/1997	4/18/1997	4/18/1997	4/18/1997	4/25/1997	4/25/1997	4/25/1997	5/27/1999	5/27/1999	5/27/1999	5/27/1999
Inorganics											
Aluminum	NA	NA	NA	NA	NA	NA	NA	3,080	4,550	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	<0.08 J	<1.0 J	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	4.2	5.2	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	23.7 J	39.7	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	0.27 J	0.4 J	NA	NA
Cadmium	30.1	2.6 [2.3]	37.7	5.7	2.7	1.0	1.1	3.9 J	1.1 J	4.4	1.9
Calcium	NA	NA	NA	NA	NA	NA	NA	87,100	66,000	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	17.2 J	11.3 J	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	4.2 J	5.5 J	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	38.6	84.9	18.3	26
Cyanide	NA	NA	NA	NA	NA	NA	NA	<0.65	<0.82	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	11,000	13,900	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	54.2 J	48.3 J	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	10,700 J	10,800 J	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	516 J	367 J	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	0.13	0.15 J	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	10.8	12.7	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	378 J	650 J	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	<0.4 J	0.56 J	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	0.16 J	<0.17	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	257 J	131 J	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	1.1 J	<1.0	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	7.5	11.8	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	105 J	340 J	NA	NA
Polychlorinated Biphenyls (PCBs)											
Aroclor-1016	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Aroclor-1221	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Aroclor-1232	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Arolclor-1242	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Aroclor-1248	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Aroclor-1254	NA	NA	NA	NA	<0.023	<0.024	<0.029	<0.021	<0.027	NA	NA
Aroclor-1260	NA	NA	NA	NA	<0.023	<0.024	<0.029	0.07	0.29	NA	NA
Total PCBs	NA	NA	NA	NA	<0.023	<0.024	<0.029	0.07	0.29	NA	NA
Total Organic Carbon											
TOC	NA	NA	NA	NA	NA	12,700	19,500	13,000	165,000	NA	NA
Total Petroleum Hydrocarbons (TPHs)											
Lube Oil	NA	NA	NA	NA	<110	NA	NA	NA	NA	NA	NA
Fuel Oil 2	NA	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA
Kerosene	NA	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA
Gasoline	NA	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA
Unknown Hydrocarbons	NA	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA
Volatile Organic Carbons (VOCs)											
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	<0.013	0.022	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
cis-1,3-Dichloropronene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-17	SD-18	SD-19	SD-20	POST-1	POST-2	POST-3	SD-21 (0-6")	SD-21 (6-16")	SD-22	SD-23 (0-6")
Date Collected	4/18/1997	4/18/1997	4/18/1997	4/18/1997	4/25/1997	4/25/1997	4/25/1997	5/27/1999	5/27/1999	5/27/1999	5/27/1999
Volatile Organic Carbons (VOCs)(cont'd)											
Dibromodichloromethane	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	<0.013	0.003	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
trans-1,3-dichloropronene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	<0.013	<0.017	NA	NA
Total VOCs	NA	NA	NA	NA	NA	NA	NA	<0.013	0.025	NA	NA
Semivolatile Organic Carbons (SVOCs)											
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2-Chloronapthalene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2-Methylnapthalene	NA	NA	NA	NA	NA	NA	NA	0.41 J	0.13 J	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	<1.0	<0.6	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2-2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	<0.42 J	<0.55	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
4-Chorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
4-Ntiroaniline	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	2.1	0.78	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	3.3	1.7	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	8.1 J	4	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	6.3 J	2.8	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	6.6 J	2.8	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	6.9 J	2.8	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	3.1	1.3	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
bis(2-Chloroethyl ether)	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	0.75	3	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	<0.42 J	<0.55	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	3.9	1.2	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	9.6 J	4.3	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	1.7 J	0.68	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	1.7	0.52 J	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	30	10	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	2.7	1	NA	NA
Hexachrlorobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Hexachlorocyclonentadiene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Ideno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	3.3 J	1.4	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
m-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-17	SD-18	SD-19	SD-20	POST-1	POST-2	POST-3	SD-21 (0-6")	SD-21 (6-16")	SD-22	SD-23 (0-6")
Date Collected	**4/18/1997**	**4/18/1997**	**4/18/1997**	**4/18/1997**	**4/25/1997**	**4/25/1997**	**4/25/1997**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**
Semivolatile Organic Carbons (SVOCs)(cont'd)											
Naphthalene	NA	NA	NA	NA	NA	NA	NA	0.75	0.2 J	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
o-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachorophenol	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.4	NA	NA
p-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	26	9.6	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	<0.42	<0.55	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	20	9	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total SVOCs	NA	NA	NA	NA	NA	NA	NA	136.46	57.21	NA	NA
Pesticides											
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0048	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	0.0126 J	0.0048 J	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0048	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	<0.0043 J	<0.0054 J	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0048	NA	NA
Endosulfan Sulfate	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0048	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0054	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0054	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	<0.043	<0.0054	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.0027	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	<0.0021	<0.027	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	<0.21	<0.27	NA	NA
Herbicides											
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RCRA Characteristics											
Corrosivity (pH) (S.U.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flashpoint (°F)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HCN Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
H_2S Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
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Sample ID	SD-23 (6-12")	SD-24 (0-6")	SD-24 (6-15")	SD-25 (0-6")	SD-26 (0-6")	SD-26 (6-14")	SD-27 (0-6")	SD-27 (6-8")	SD-29 (0-6")	SD-29 (6-18")
Date Collected	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	7/5/1999	7/5/1999
Inorganics										
Aluminum	NA	NA	NA	7,610 [9,570]	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	<0.82 J [<0.94 J]	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	9.3 {14.5}	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	2,450 {1,780}	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	0.39 J [0.52 J]	NA	NA	NA	NA	NA	NA
Cadmium	1.4	1.6	2.7	174 J [117 J]	132	138	44.9	61.9	8.3	12.4
Calcium	NA	NA	NA	133,000 [104,000]	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	16.7 J [23.7 J]	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	5.8 J [6.9 J]	NA	NA	NA	NA	NA	NA
Copper	18.8	20.1	39.6	32.4 [44.3]	67.6	105	42.9	44.6	NA	NA
Cyanide	NA	NA	NA	<0.66 [<0.65]	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	14,800 [20,800]	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	110 J [142 J]	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	15,500 J [14,800J]	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	390 J [377 J]	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	<0.07 J [0.08 J]	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	10.3 [12.2]	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	2,030 J [2,610 J]	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	<0.41 J [<0.47 J]	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	0.45 J [<0.16]	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	248 J [288 J]	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	<0.82 [<0.94]	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	18 [22]	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	577 J [438 J]	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)										
Aroclor-1016	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Arolclor-1242	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	<2.2 [0.025]	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	<2.2 [0.22]	NA	NA	NA	NA	NA	NA
Total PCBs	NA	NA	NA	0.66	NA	NA	NA	NA	NA	NA
Total Organic Carbon										
TOC	NA	NA	NA	20,300	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPHs)										
Lube Oil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Oil 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kerosene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unknown Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Carbons (VOCs)										
1,1-Dichloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	0.028	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	0.12	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropronene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

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Sample ID	SD-23 (6-12")	SD-24 (0-6")	SD-24 (6-15")	SD-25 (0-6")	SD-26 (0-6")	SD-26 (6-14")	SD-27 (0-6")	SD-27 (6-8")	SD-29 (0-6")	SD-29 (6-18")
Date Collected	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	5/27/1999	7/5/1999	7/5/1999
Volatile Organic Carbons (VOCs)(cont'd)										
Dibromodichloromethane	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	0.003	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
trans-1,3-dichloropronene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	<0.014	NA	NA	NA	NA	NA	NA
Total VOCs	NA	NA	NA	0.151	NA	NA	NA	NA	NA	NA
Semivolatile Organic Carbons (SVOCs)										
1,2-Dichlorobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2-Chloronapthalene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2-Methylnapthalene	NA	NA	NA	0.62 [<0.50]	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2-2'-oxybis(1-Chloropropane)	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	<0.44 [<1.0]	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
4-Chorophenyl-phenylether	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
4-Ntiroaniline	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	2.5 [0.18 J]	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	2.5 [0.33 J]	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	5.3 [0.89]	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	4 [0.76]	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	3.7 [0.74]	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	3.9 [0.82]	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	1.8 [0.3 J]	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl ether)	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
bis(2-ethylhexyl)phthalate	NA	NA	NA	0.4 J [0.29 J]	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	1.8 [0.25 J]	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	5.3 [0.96]	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	0.89 [0.06 J]	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	1.2 [0.10 J]	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
di-n-Butylphthalate	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
di-n-Octylphthalate	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	13 [2.0]	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	1.6 [0.16 J]	NA	NA	NA	NA	NA	NA
Hexachrlorobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Hexachlorocyclonentadiene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Ideno(1,2,3-c,d)pyrene	NA	NA	NA	1.8 [0.28 J]	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
m-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-23 (6-12")	SD-24 (0-6")	SD-24 (6-15")	SD-25 (0-6")	SD-26 (0-6")	SD-26 (6-14")	SD-27 (0-6")	SD-27 (6-8")	SD-29 (0-6")	SD-29 (6-18")
Date Collected	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**5/27/1999**	**7/5/1999**	**7/5/1999**
Semivolatile Organic Carbons (SVOCs)(cont'd)										
Naphthalene	NA	NA	NA	0.84 [0.069 J]	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
o-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachorophenol	NA	NA	NA	<1.1 [<1.3]	NA	NA	NA	NA	NA	NA
p-Cresol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	13 [1.60]	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	<0.44 [<0.50]	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	11 [1.9]	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total SVOCs	NA	NA	NA	75.15	NA	NA	NA	NA	NA	NA
Pesticides										
4,4'-DDD	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	<0.022 [<0.003]	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	<0.044 [<0.005 J]	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	<0.044 [<0.005]	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	<0.022 [<0.0025]	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	<0.22 [<0.025]	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	<2.2 [<0.25]	NA	NA	NA	NA	NA	NA
Herbicides										
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RCRA Characteristics										
Corrosivity (pH) (S.U.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flashpoint (°F)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HCN Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
H_2S Released From Waste (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Sample ID	SD-30 (0-6")	SD-30 (6-12")	B-2 (0-6")	SD-31 (0-2")	BROOK-COMP[8]	FLOR-COMP[8]	SUN-COMP[9]	PEARL-COMP[8]	TOWN-COMP[8]
Date Collected	7/5/1999	7/5/1999	11/25/2003	4/28/2004	1/24/2008	1/24/2008	1/24/2008	1/24/2008	1/24/2008
Inorganics									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	<0.010	<0.010	<0.010	<0.010	<0.010
Barium	NA	NA	NA	NA	2.8	2.1	2.2	1.6	1.8
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	10.2	8.2	2.8	<1.1	0.076	0.082	0.021	0.057	0.023
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	<0.0040	<0.0040	<0.0040	0.011	0.0051
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	<0.0050	<0.0050	<0.0050	0.059	0.0175
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	<0.015	<0.015	<0.015	<0.015	<0.015
Silver	NA	NA	NA	NA	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)									
Aroclor-1016	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Aroclor-1221	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Aroclor-1232	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Arolclor-1242	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Aroclor-1248	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Aroclor-1254	NA	NA	NA	NA	<0.018	<0.099	<0.041	<1.3	<0.048
Aroclor-1260	NA	NA	NA	NA	0.27	0.85	0.78	<1.3	0.95
Total PCBs	NA	NA	NA	NA	0.27	0.85	0.78	<1.3	0.95
Total Organic Carbon									
TOC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPHs)									
Lube Oil	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Oil 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kerosene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unknown Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Carbons (VOCs)									
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	<0.05	<0.05	<0.05	<0.05	<0.05
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorobenzene	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
cis-1,3-Dichloropronene	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3
Summary of Sediment Analytical Data

West Branch of Bloody Brook
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Sample ID	SD-30 (0-6")	SD-30 (6-12")	B-2 (0-6")	SD-31 (0-2")	BROOK-COMP[8]	FLOR-COMP[8]	SUN-COMP[9]	PEARL-COMP[8]	TOWN-COMP[8]
Date Collected	7/5/1999	7/5/1999	11/25/2003	4/28/2004	1/24/2008	1/24/2008	1/24/2008	1/24/2008	1/24/2008
Volatile Organic Carbons (VOCs)(cont'd)									
Dibromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Methylene Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
trans-1,3-dichloropronene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs	NA	NA	NA	NA	<0.01	<0.01	<0.01	<0.01	<0.01
Semivolatile Organic Carbons (SVOCs)									
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	<0.040	<0.040	<0.040	<0.040	<0.040
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronapthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnapthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-2'-oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
2,4,5-Trichlorophenol	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
2,4,6-Trichlorophenol	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Ntiroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl ether)	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachrlorobenzene	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
Hexachlorobutadiene	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
Hexachlorocyclonentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
Ideno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Cresol	NA	NA	NA	NA	<0.040	<0.040	<0.040	<0.040	<0.040

Table 3
Summary of Sediment Analytical Data

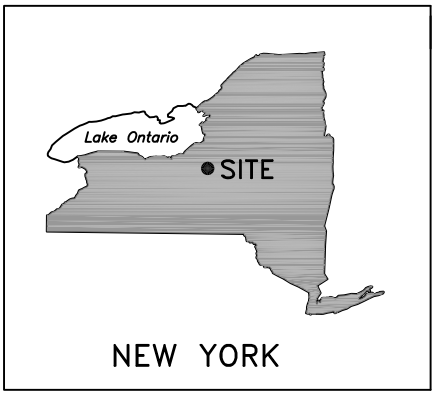
West Branch of Bloody Brook
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Onondaga County, New York

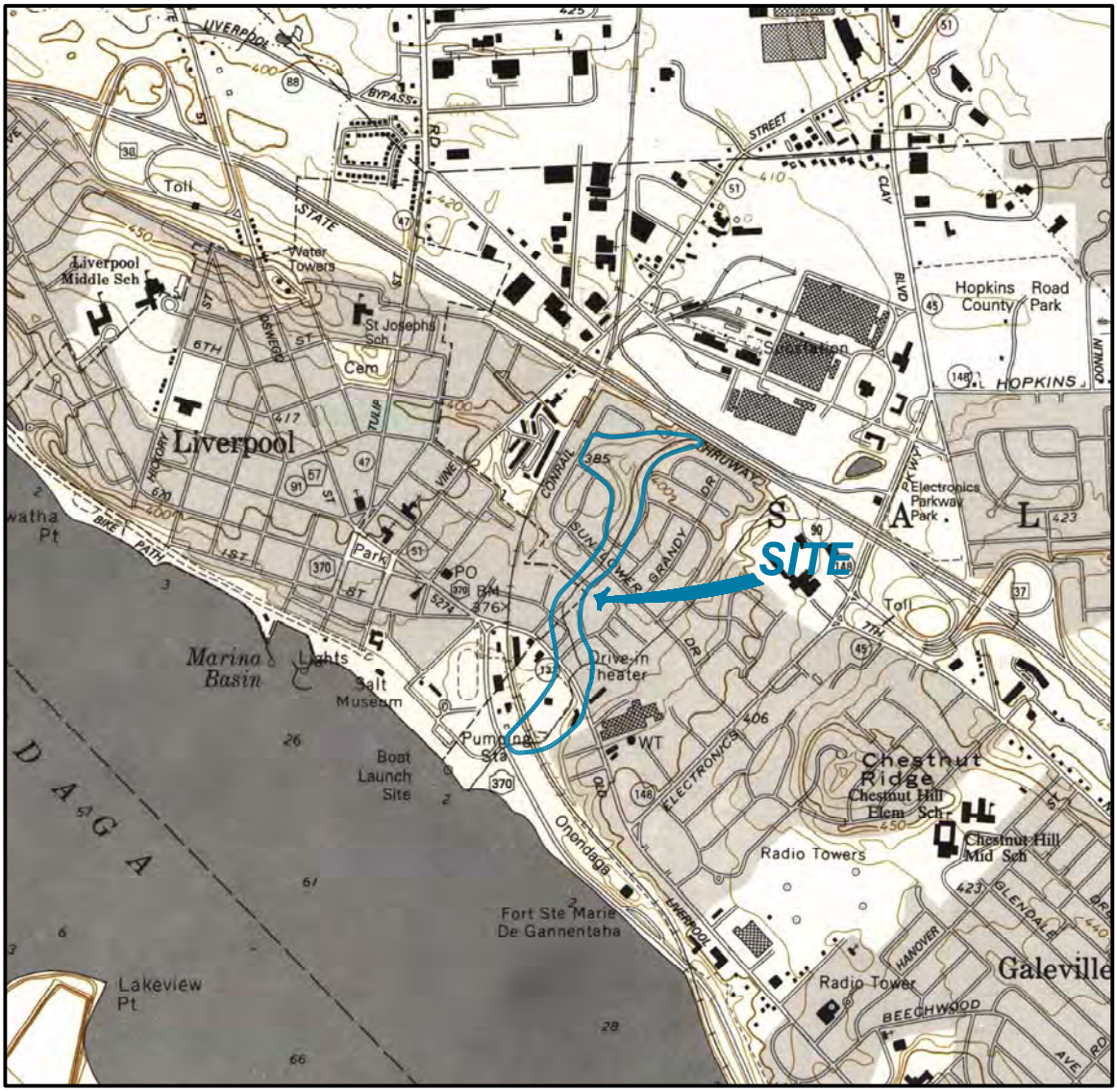
Sample ID	SD-30 (0-6")	SD-30 (6-12")	B-2 (0-6")	SD-31 (0-2")	BROOK-COMP[8]	FLOR-COMP[8]	SUN-COMP[9]	PEARL-COMP[8]	TOWN-COMP[8]
Date Collected	7/5/1999	7/5/1999	11/25/2003	4/28/2004	1/24/2008	1/24/2008	1/24/2008	1/24/2008	1/24/2008
Semivolatile Organic Carbons (SVOCs)(cont'd)									
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Cresol	NA	NA	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
Pentachorophenol	NA	NA	NA	NA	<0.040	<0.040	<0.040	<0.040	<0.040
p-Cresol	NA	NA	NA	NA	<0.020	<0.020	<0.020	0.0016 J	<0.020
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	<0.10	<0.10	<0.10	<0.10	<0.10
Total SVOCs	NA	NA	NA	NA	None Detected	None Detected	None Detected	0.0016	None Detected
Pesticides									
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane	NA	NA	NA	NA	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Heptachlor epoxide	NA	NA	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Methoxychlor	NA	NA	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Toxaphene	NA	NA	NA	NA	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Herbicides									
2,4,5-TP (Silvex)	NA	NA	NA	NA	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
2,4-D	NA	NA	NA	NA	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
RCRA Characteristics									
Corrosivity (pH) (S.U.)	NA	NA	NA	NA	7.74	7.50	7.59	7.28	7.05
Flashpoint (°F)	NA	NA	NA	NA	>176	>176	>176	>176	>176
HCN Released From Waste (ppm)	NA	NA	NA	NA	<10	<10	<10	<10	<10
H_2S Released From Waste (ppm)	NA	NA	NA	NA	<10	<10	<10	<10	<10

Notes:

1. All sediment concentrations are reported in parts per million (ppm).
2. For additional information on analytical data see *Bloody Brook: Technical Evaluation of Sampling and Analysis Programs* (BBL, October 1996); Onondaga County Office of the Environment letter to NYSDEC and NYSDOH (October 29, 1996); *West Branch of Bloody Brook Sediment Removal Certification Report* (BBL, November 1997); *Phase IV Side Bank Soil Investigation Work Plan Bloody Brook, Onondaga County, New York* (Shaw, July 2003); *Liverpool Pump Station Improvements Cadmium-Related Soil/Sediment Investigation* (BBL, January 2004); *and Final Interim Remedial Measure Work Plan, Culvert Sediment Removal, Bloody Brook, Onondaga County, New York* (Shaw, April 2008).
3. Duplicate results are presented in brackets.
4. J - Estimated
5. D - Diluted analysis
6. NA - Not Analyzed
7. RCRA - Resource Conservation and Recovery Act.
8. Sample was collected as part of the 2008 Interim Removal Measure for waste characterization and was analyzed using the Toxicity Characteristic Leaching Procedure. In addition, the sample was analyzed for PCBs and RCRA characteristics.

FIGURES





0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

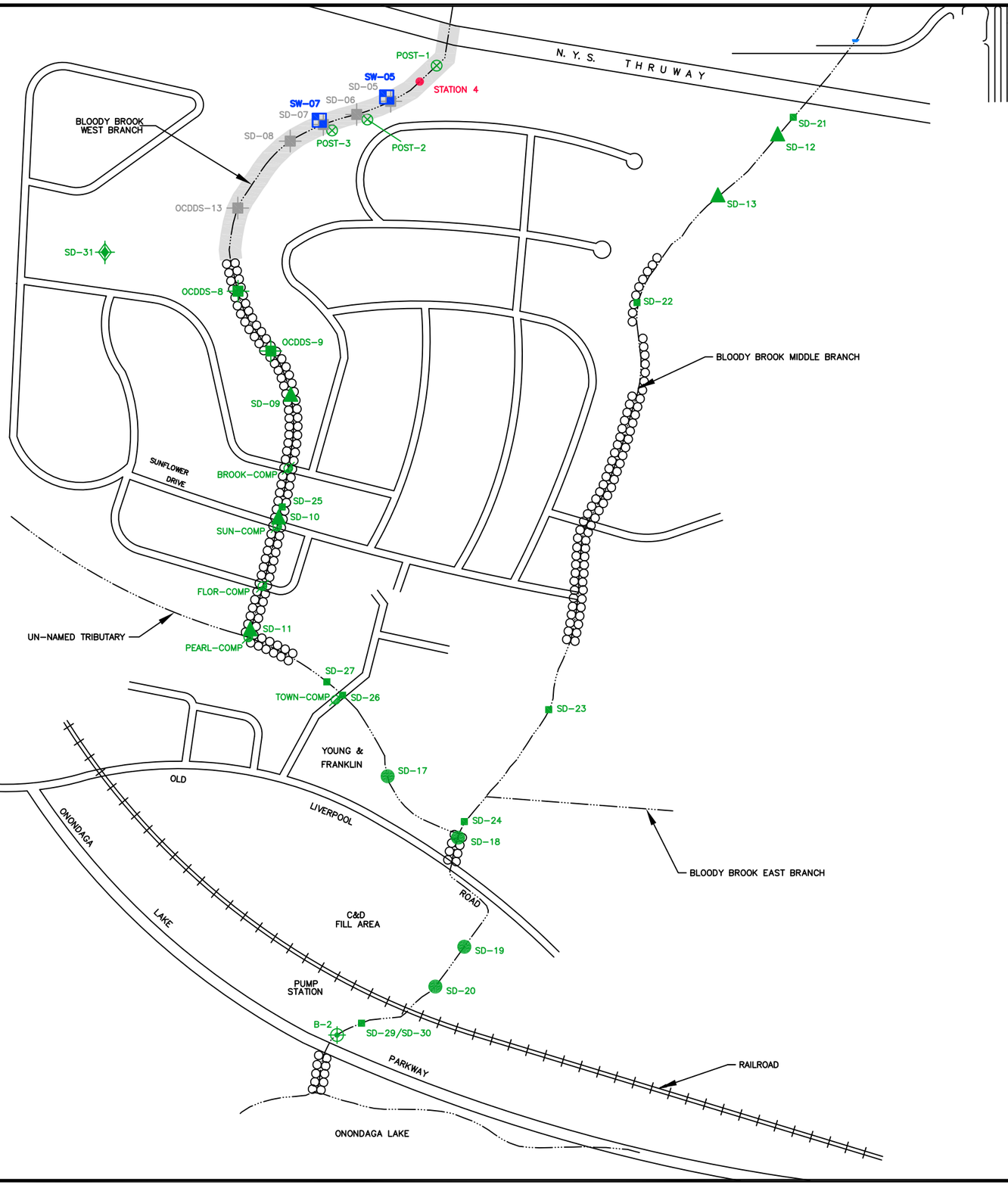
SITE LOCATION MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A3APPENDFIG1.dwg	—	60194430	08 / 2012	1

Plotted By: bookasr
Layout-Sheet Name: LAYOUT1
Plot File Date Created: Dec/07/2012 11:45 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\A3APPENDFIG1.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- NYSDEC BIOLOGICAL SAMPLING LOCATION
- PHASE I SURFACE WATER SAMPLING LOCATION
- LOCATION OF SAMPLE COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL
- MAY/JULY 1999 SEDIMENT SAMPLING LOCATION
- PHASE II SEDIMENT SAMPLING LOCATION
- PHASE III SEDIMENT SAMPLING LOCATION
- 1997 SEDIMENT CONFIRMATION SAMPLING LOCATION
- OCTOBER 1996 SEDIMENT SAMPLING LOCATION
- PHASE IV-A SEDIMENT SAMPLING LOCATION
- OCDWEP LIVERPOOL PUMP STATION UPGRADE SEDIMENT SAMPLING LOCATION
- 2009 IRM CULVERT SEDIMENT SAMPLE

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

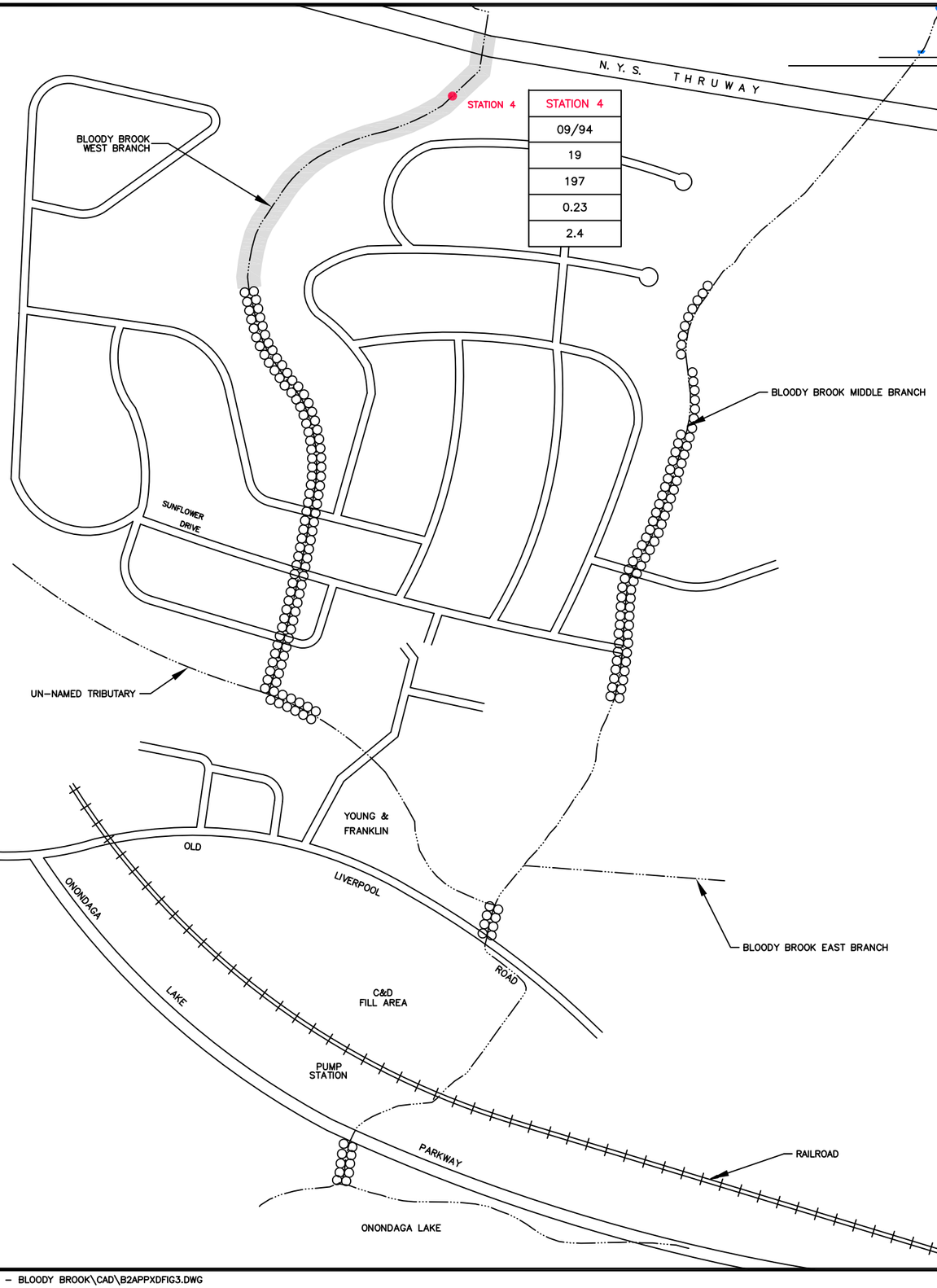
NON-SOIL SAMPLE LOCATION MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B1APPXDFIG2.dwg	---	60194430	08 / 2012	2

Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:46 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B1APPXDFIG2.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- NYSDEC BIOLOGICAL SAMPLING LOCATION

STATION 4	SAMPLE ID
09/94	SAMPLE DATE
19	CADMIUM CONCENTRATION mg/kg OR ppm
197	COPPER CONCENTRATION mg/kg OR ppm
0.23	MERCURY CONCENTRATION mg/kg OR ppm
2.4	TOTAL PCB mg/kg OR ppm

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

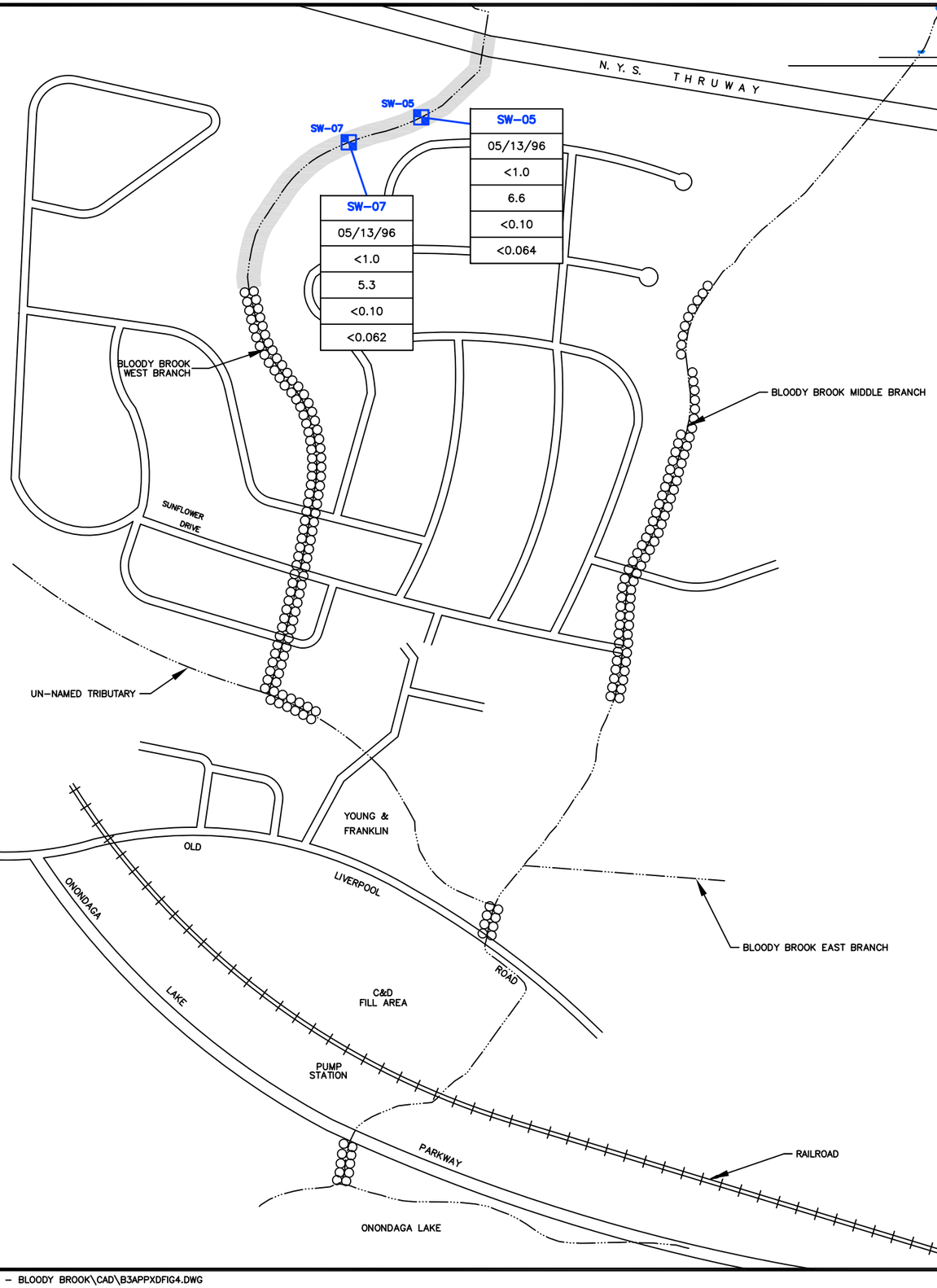
BIOTA SAMPLING LOCATIONS AND ANALYTICAL RESULTS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B2APPXDFIG3.dwg	---	60194430	08 / 2012	3

Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:49 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B2APPXDFIG3.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- PHASE I SURFACE WATER SAMPLING LOCATION

SW-05	SAMPLE ID
05/13/96	SAMPLE DATE
<1.0	CADMIUM CONCENTRATION mg/kg OR ppm
6.6	COPPER CONCENTRATION mg/kg OR ppm
<0.10	MERCURY CONCENTRATION mg/kg OR ppm
<0.064	TOTAL PCB mg/kg OR ppm

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

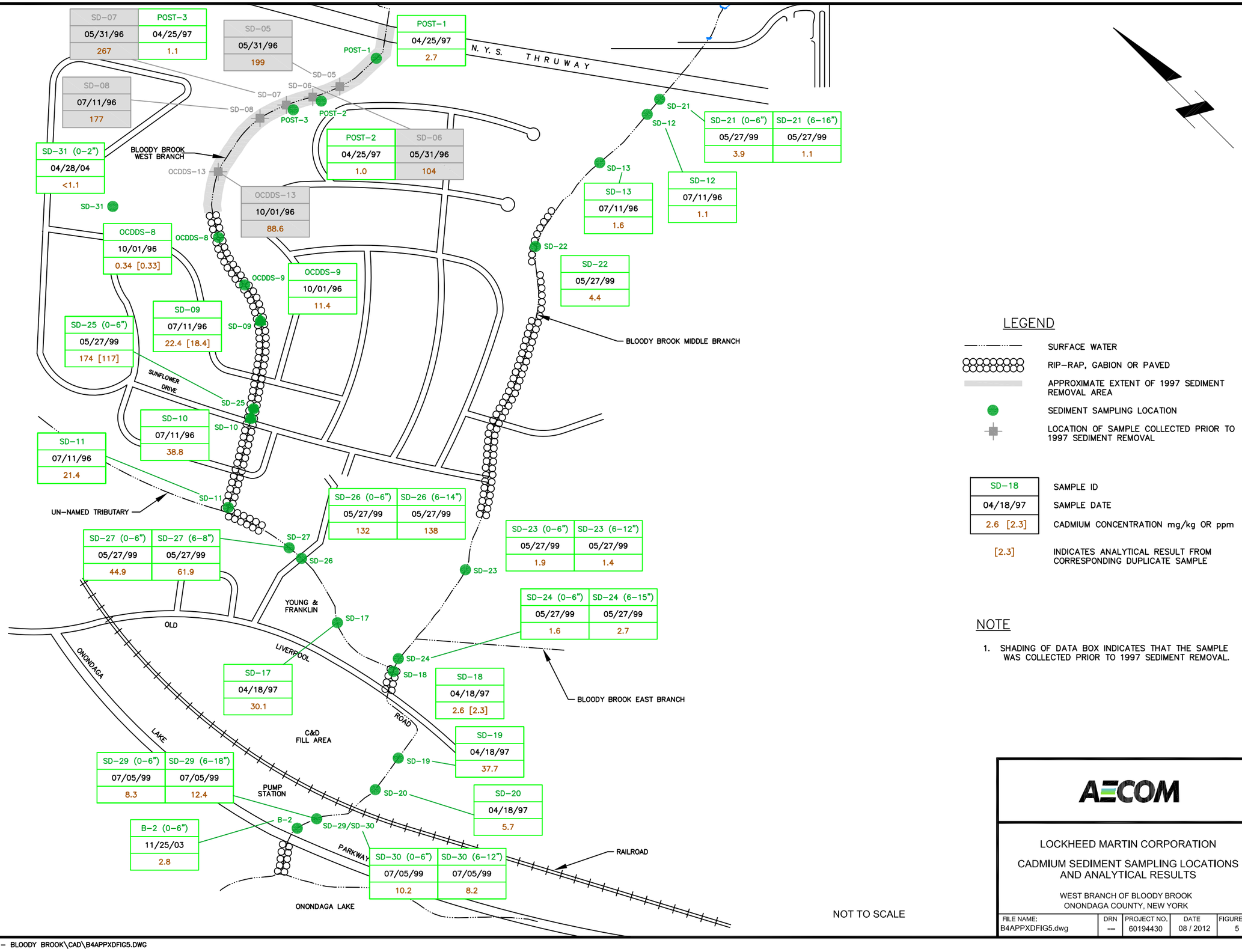
SURFACE WATER SAMPLING LOCATIONS AND ANALYTICAL RESULTS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B3APPXDFIG4.dwg	---	60194430	08 / 2012	4

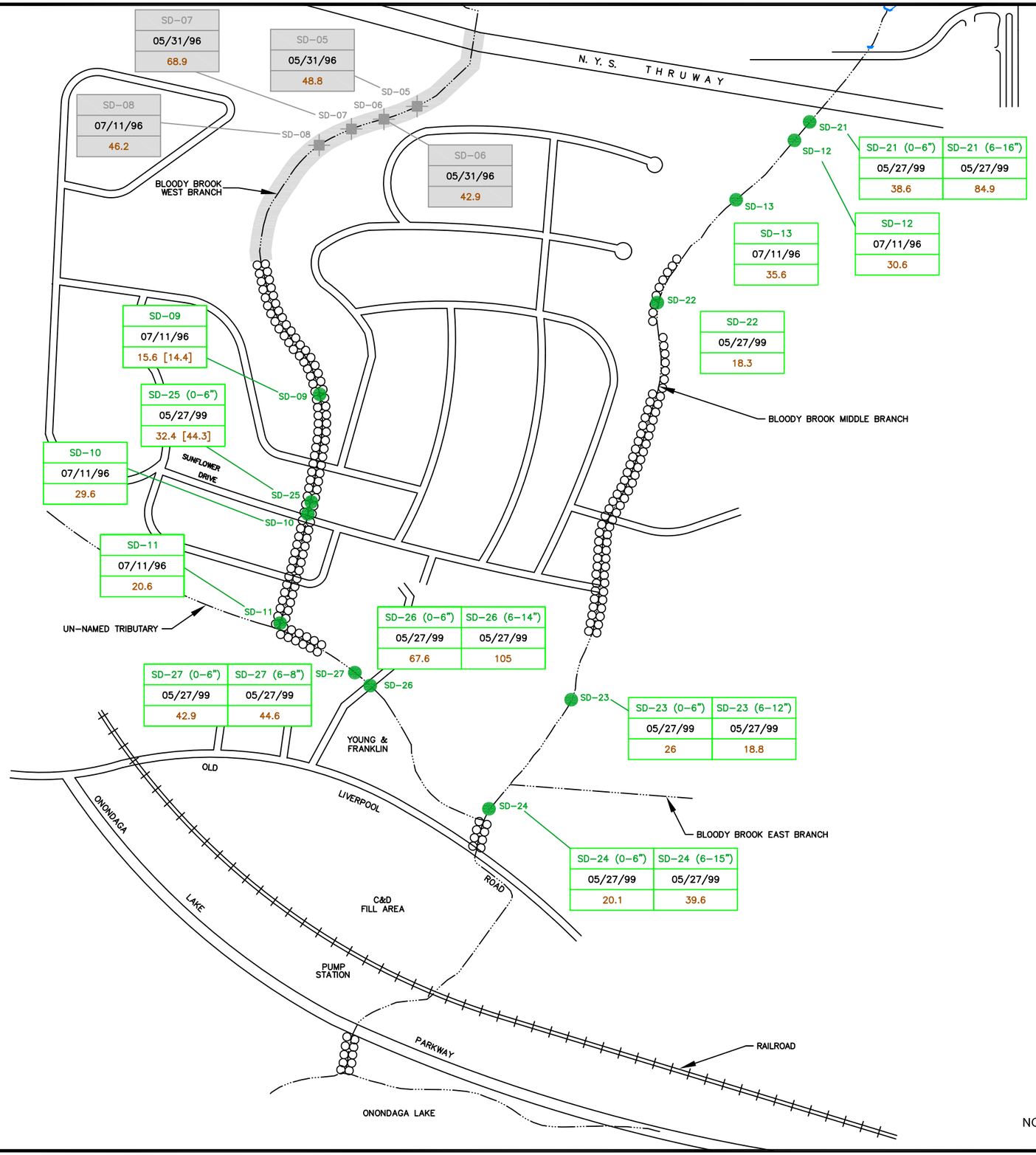
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Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:50 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B3APPXDFIG4.DWG



Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:52 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B4APPXDFIG5.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- SEDIMENT SAMPLING LOCATION
- LOCATION OF SAMPLE COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL

SD-10	SAMPLE ID
07/11/96	SAMPLE DATE
29.6	COPPER CONCENTRATION mg/kg OR ppm
[14.4]	INDICATES ANALYTICAL RESULT FROM CORRESPONDING DUPLICATE SAMPLE

NOTE

1. SHADING OF DATA BOX INDICATES THAT THE SAMPLE WAS COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL.

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

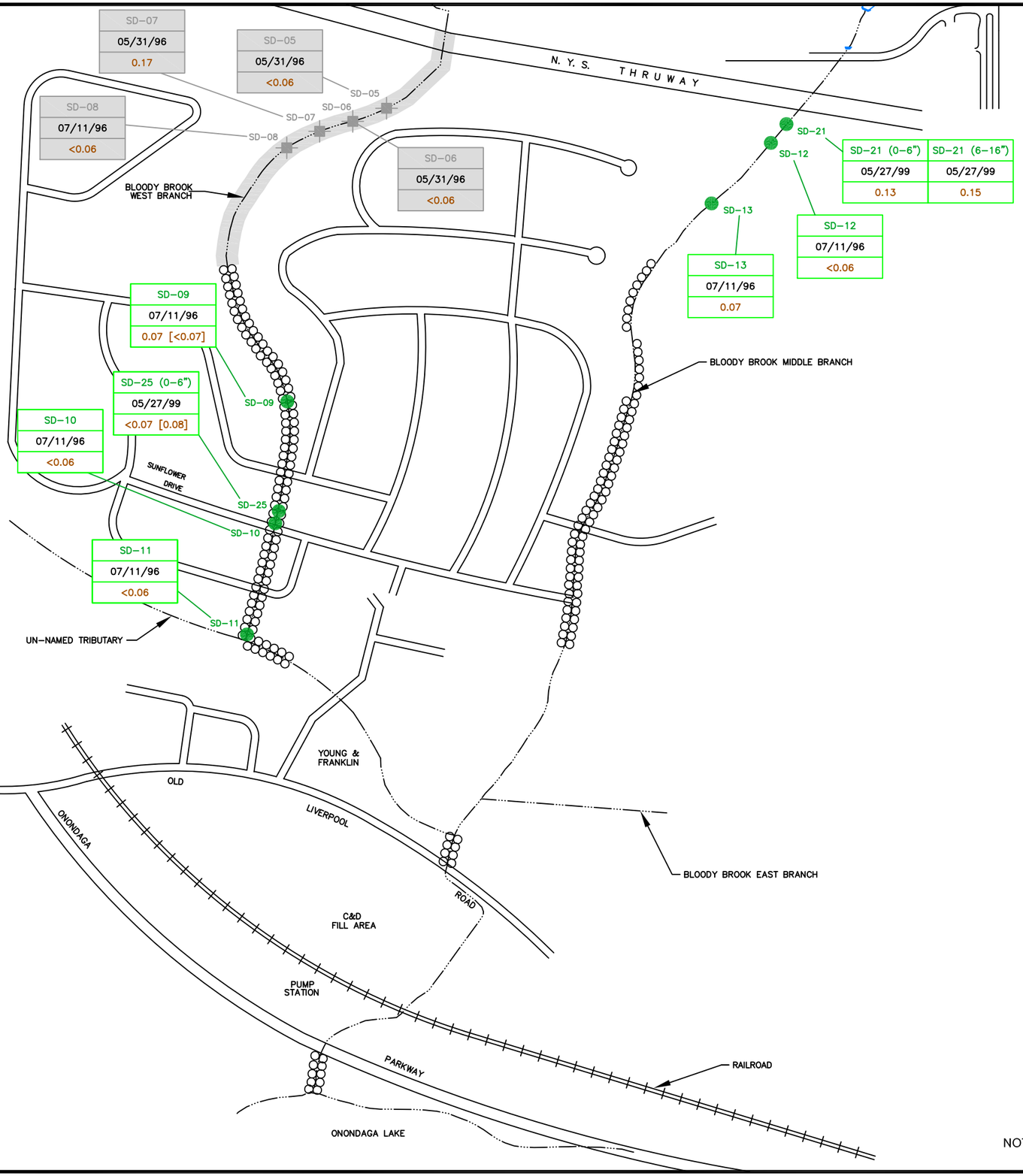
COPPER SEDIMENT SAMPLING LOCATIONS AND ANALYTICAL RESULTS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B5APPXDFIG6.dwg	---	60194430	08 / 2012	6

Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:53 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B5APPXDFIG6.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- SEDIMENT SAMPLING LOCATION
- LOCATION OF SAMPLE COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL

SD-10	SAMPLE ID
07/11/96	SAMPLE DATE
<0.06	MERCURY CONCENTRATION mg/kg OR ppm
[<0.07]	INDICATES ANALYTICAL RESULT FROM CORRESPONDING DUPLICATE SAMPLE

NOTE

1. SHADING OF DATA BOX INDICATES THAT THE SAMPLE WAS COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL.

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

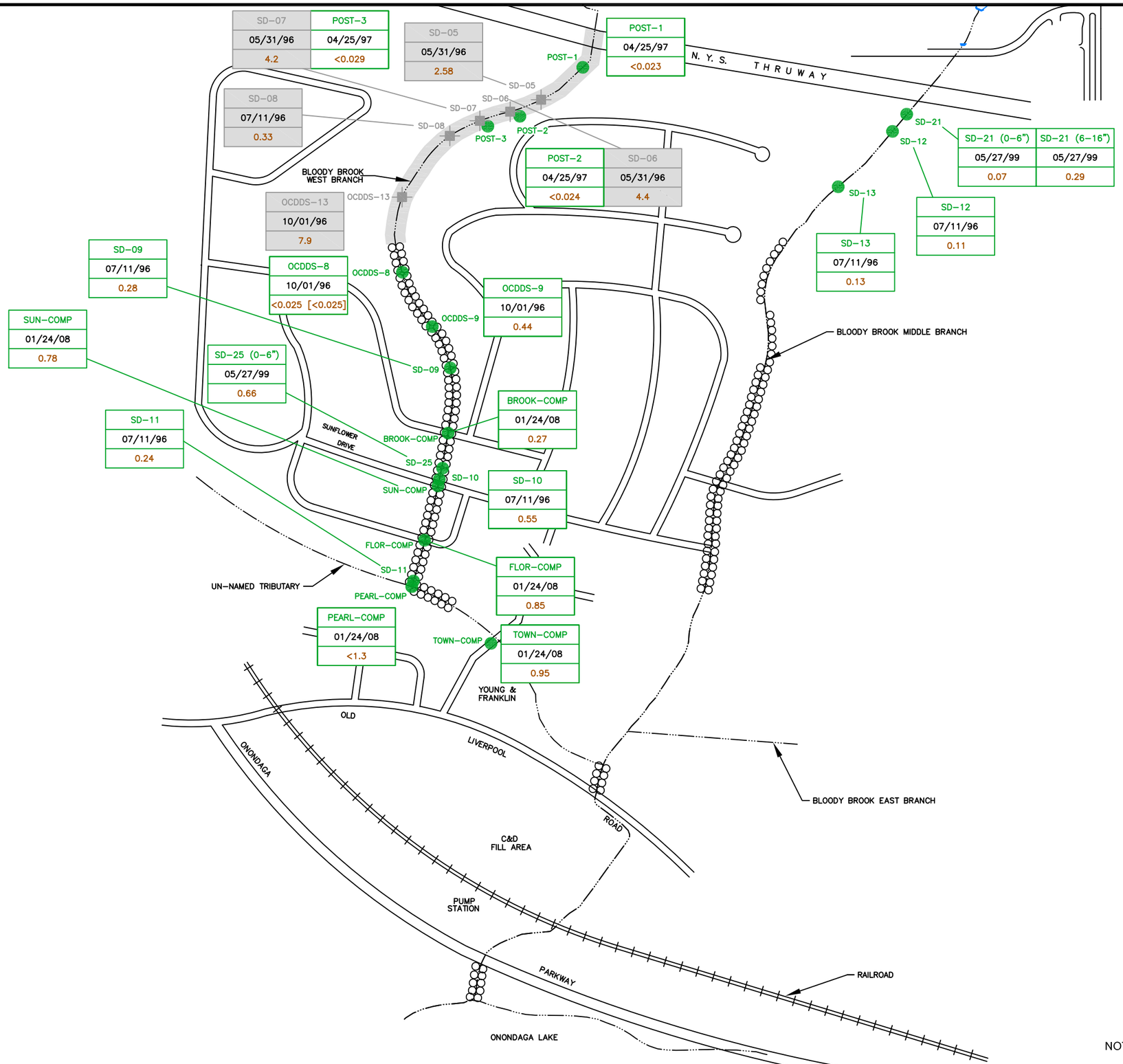
MERCURY SEDIMENT SAMPLING LOCATIONS AND ANALYTICAL RESULTS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B6APPXDFIG7.dwg	---	60194430	08 / 2012	7

Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:56 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\B6APPXDFIG7.DWG



LEGEND

- SURFACE WATER
- RIP-RAP, GABION OR PAVED
- APPROXIMATE EXTENT OF 1997 SEDIMENT REMOVAL AREA
- SEDIMENT SAMPLING LOCATION
- LOCATION OF SAMPLE COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL

SD-10	SAMPLE ID
07/11/96	SAMPLE DATE
0.55	TOTAL PCB CONCENTRATION mg/kg OR ppm
[<0.025]	INDICATES ANALYTICAL RESULT FROM CORRESPONDING DUPLICATE SAMPLE

NOTE

1. SHADING OF DATA BOX INDICATES THAT THE SAMPLE WAS COLLECTED PRIOR TO 1997 SEDIMENT REMOVAL.

NOT TO SCALE

AECOM

LOCKHEED MARTIN CORPORATION

TOTAL PCB SEDIMENT SAMPLING LOCATIONS AND ANALYTICAL RESULTS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
B7APPXDFIG8.dwg	---	60194430	08 / 2012	8

Plotted By: bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Dec/07/2012 11:57 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\B7APPXDFIG8.DWG

Appendix G
Potential Exposure Pathways Evaluation Summary
Remedial Action Work Plan
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Environmental Media (source)	Transport Route	Exposure Point	Receptor	Route of Exposure	Status Current	Status Future	Action
Soil: cadmium adsorbed to surface and subsurface soil	Air: release and transport of eroded soil particulate	Residential Area: indoor and outdoor air	Child and adult residents and visitors	Inhalation	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address inhalation exposures related to future potential erosion of exposed soil
Soil: cadmium adsorbed to surface and subsurface soil	Soil	Residential Area	Child and adult residents and visitors	Incidental direct contact and ingestion of soil	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address potential incidental direct contact and ingestion exposures related to future exposed soil
Soil: cadmium adsorbed to surface and subsurface soil	Air: release and transport of eroded soil particulate	Drainage District Easement and Wooded Area: outdoor Air	Maintenance workers and child and adult trespassers	Inhalation	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address inhalation exposures related to future potential erosion of exposed soil
Soil: cadmium adsorbed to surface and subsurface soil	Soil	Drainage District Easement and Wooded Area	Maintenance workers and child and adult trespassers	Incidental direct contact and ingestion of soil	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address potential incidental direct contact and ingestion exposures related to future exposed soil
Soil: cadmium adsorbed to surface and subsurface soil	Air: release and transport of eroded soil particulate	Commercial/Light Industrial Area: indoor and outdoor air	Adult workers and visitors	Inhalation	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address inhalation exposures related to future potential erosion of exposed soil
Soil: cadmium adsorbed to surface and subsurface soil	Soil	Commercial/Light Industrial Area	Adult workers and visitors	Incidental direct contact and ingestion of soil	**Potentially complete:** Soils may become exposed	**Potentially complete:** Soils may become exposed in the future	Perform location-specific comparison against SCLs. If necessary, develop RAO to address potential incidental direct contact and ingestion exposures related to future exposed soil

Appendix G
Potential Exposure Pathways Evaluation Summary
Remedial Action Work Plan
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Environmental Media (source)	Transport Route	Exposure Point	Receptor	Route of Exposure	Status Current	Status Future	Action
Soil: cadmium adsorbed to surface soil	Uptake of cadmium into plant tissue	Residential Area: vegetable gardens	Child and adult residents	Ingestion of home-grown produce	**Potentially complete:** Homeowners may have vegetable gardens	**Potentially complete:** Homeowners may have vegetable gardens	Perform location-specific comparison against SCLs. If necessary, develop RAO to address potential for ingestion of produce grown in cadmium-containing soil
Groundwater	Groundwater	Residential Area: water taps	Child and adult residence and visitors	Ingestion and direct contact	Incomplete: No groundwater users and cadmium not expected to leach into groundwater	Incomplete: No groundwater users and cadmium not expected to leach into groundwater	No RAO required
Groundwater	Groundwater	Commercial/Light Industrial Area: water taps	Adult workers and visitors	Ingestion and direct contact	Incomplete: No groundwater users and cadmium not expected to leach into groundwater	Incomplete: No groundwater users and cadmium not expected to leach into groundwater	No RAO required
Air: cadmium evaporated from soil into air or soil vapor	Air:	Residential Area: indoor and outdoor air	Child and adult residents and visitors	Inhalation	Incomplete: Cadmium not capable of volatilization	Incomplete: Cadmium not capable of volatilization	No RAO required
Air: cadmium evaporated from soil into air or soil vapor	Air:	Drainage District Easement and Wooded Area: outdoor air	Maintenance workers and child and adult trespassers	Inhalation	Incomplete: Cadmium not capable of volatilization	Incomplete: Cadmium not capable of volatilization	No RAO required
Air: cadmium evaporated from soil into air or soil vapor	Air:	Commercial/Light Industrial Area: indoor and outdoor air	Adult workers and visitors	Inhalation	Incomplete: Cadmium not capable of volatilization	Incomplete: Cadmium not capable of volatilization	No RAO required

Appendix G
Potential Exposure Pathways Evaluation Summary
Remedial Action Work Plan
West Branch of Bloody Brook
Bloody Brook Voluntary Cleanup Program
Onondaga County, New York

Environmental Media (source)	Transport Route	Exposure Point	Receptor	Route of Exposure	Status Current	Status Future	Action
Surface water: solution or suspension of cadmium in Bloody Brook surface water	Surface water	Bloody Brook surface water	Child and adult residents, maintenance workers, child and adult trespassers, adult workers and visitors	Incidental ingestion and direct contact	Incomplete: Cadmium not soluble in surface water and cadmium not detected in Bloody Brook surface water	Incomplete: All Bloody Brook sediments and side bank soils to be removed, which addresses potential for cadmium in surface water	No RAO required: all sediment and side bank soils will be removed as part of planned action
Sediment: Cadmium adsorbed to sediment	Sediment	Bloody Brook Sediment	Child and adult residents, maintenance workers, child and adult trespassers, adult workers and visitors	Incidental ingestion and direct contact	**Potentially Complete:** Cadmium present in sediment	Incomplete: All Bloody Brook sediments to be removed	No RAO required: all sediment will be removed as part of planned action

Appendix H
Summary of Potential Soil Cleanup Levels

1. Introduction

This appendix to the *Remedial Action Work Plan West Branch of Bloody Brook* describes potential soil cleanup levels (SCLs) for the West Branch of Bloody Brook (WBBB) site. SCLs are typically risk-based contaminant levels that are used to identify clean-up goals and develop and evaluate remedial alternatives. Several potential SCLs have been identified for cadmium in WBBB site soil. These potential SCLs include generic cadmium cleanup objectives/screening values that have been developed by New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), and United States Environmental Protection Agency (USEPA), and risk-based SCLs calculated using standard USEPA risk-based algorithms.

2. Generic Cadmium Guidance Values

Generic cadmium cleanup objectives and screening values have been developed by NYSDEC, NYSDOH, and USEPA. Although not all of these values have regulatory basis in New York State, they are presented to identify concentrations that are considered protective of human health. Most of the generic cadmium guidance values are risk-based concentrations developed using conservative exposure assumptions and corresponding to fixed levels of risk [i.e., a hazard quotient of 1, or lifetime cancer risk of one in one million (1×10^{-6})].

NYSDEC 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 Soil Cleanup Objectives (SCOs) – The SCOs of 2.5 milligrams per kilograms (mg/kg) or parts per million (ppm) for single family residences and 4.3 mg/kg for multi-family housing have been calculated by NYSDEC and NYSDOH (2006) and are presented in 6 NYCRR Part 375 6.8(a) and (b) (NYSDEC, 2010a). The 2.5 mg/kg value is based on rural background levels. Because SCOs are guidance values, NYSDEC *CP-51 Soil Cleanup Guidance* (2010b) allows for site-specific SCLs greater than the SCOs that demonstrate protectiveness of human health and the environment to be developed and applied at a site.

Alternate NYSDOH Values - The NYSDOH and NYSDEC requested the consideration of a SCL of 10 mg/kg of cadmium for soil. This value was developed by NYSDOH (1999) and applied as part of the NYSDEC cleanup of the Ciba Geigy site, in Queensbury, NY and according to NYSDOH and NYSDEC is based on consumption of home grown produce.

USEPA Soil Screening Level (SSL) - The USEPA (2002) generic residential SSL is 70 mg/kg for combined ingestion and dermal pathways; and 1,800 mg/kg for inhalation of fugitive particulates. The generic SSL for the plant pathway (i.e., ingestion of home-grown produce) is 24 mg/kg (USEPA, 1996). The generic SSL for outdoor workers are 900 mg/kg (combined ingestion and dermal pathways) and 3,400 mg/kg (inhalation of fugitive particles). The generic SSL for indoor workers is 2,000 mg/kg (combined ingestion and dermal pathways calculated on ingestions data only) (USEPA, 2002). Generic SSLs were calculated by USEPA (1996 and 2002) using conservative default

exposure assumptions. Specifically, the SSLs incorporate exposure assumptions (e.g., incidental soil ingestion rate, exposed skin surface area, frequency and duration of exposure) that represent reasonable maximum exposure, and likely overestimates possible exposure.

USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) - The USEPA (2012b) Region 3, 6, and 9 RSLs are based on ingestion, dermal contact, and inhalation exposure pathways. The generic Region 3, 6, and 9 cadmium RSLs are 70 mg/kg for residential soil and 800 mg/kg for industrial soil.

3. Risk-Based Concentrations

Potential risk-based SCLs for cadmium were developed using the methodology presented in USEPA guidance, including *Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* (USEPA, 2004), *Supplemental Guidance for Developing Soil Screening Levels (SSLs) for Superfund Sites* (USEPA, 2002), and *User's Guide for Regional Screening Levels for Chemical Contaminates of Superfund Sites* (USEPA, 2012a).

The risk-based SCLs represent cadmium concentrations that are protective of humans (including sensitive groups) over a lifetime, and correspond to either a 10^{-6} cancer risk or a noncarcinogenic hazard quotient of 1. The risk-based SCLs that are calculated in this section apply to the non-residential areas of the site (i.e., the Drainage District easement along the WBBB including the wooded area and commercial/light industrial area).

The following hypothetical receptor groups have been identified based on current and future land use of the non-residential areas:

- Near-by Residential Children (1-6 years old) - The residential child may be exposed to surface soils within the Drainage District easement adjacent to the residential properties along the WBBB. Potentially complete exposure pathways could include dermal contact and incidental ingestion. Exposure to cadmium via inhalation is not expected to occur under normal conditions. Including residential children at a young age for non-residential land use is conservative, given that the 1-6 year old child is most likely to be exposed to soils via dermal contact and incidental ingestion, and it is unlikely that a 1-6 year old child would be allowed to play in areas along the WBBB with any regularity or for extended periods of time.

- Adolescent Recreational Users - Adolescents are identified as possible receptors within the Drainage District easement and/or the commercial/light industrial areas along the WBBB. Adolescents may utilize these areas as short-cuts to other residential areas or as areas for bike riding and other outdoor activities. Potentially complete exposure pathways could include dermal contact and incidental ingestion. Exposure to cadmium via inhalation is not expected to occur under normal conditions.

- Seasonal Maintenance Workers - Maintenance workers may be exposed to surface soils within the Drainage District easement along the WBBB during maintenance activities such as mowing and other work (e.g., channel side bank maintenance, utility work, etc.). Workers may also be exposed to subsurface soils in the event of excavation activities. Potentially complete exposure pathways could include dermal contact and incidental ingestion. Exposure to cadmium via inhalation is not expected to occur under normal conditions.

Risk-based SCLs were developed for these receptors using the generic RSL/SSL equation for combined exposures (incidental ingestion and dermal contact) to noncarcinogenic contaminants in soil (USEPA, 2002; 2012a). As stated previously, USEPA (2012a) guidance dictates that for cadmium it is appropriate to use the RfD for food when evaluating potential exposure to cadmium in soils. As such, the cadmium RfD for food was used in the calculation of risk-based SCLs. As a conservative approach, values for selected exposure parameters (e.g., exposure duration, soil ingestion rate) used in these calculations were default values recommended by USEPA (2002; 2012a). To reflect the seasonal nature of potential exposure, site-specific exposure frequencies were used in the SCL calculations. Site-specific exposure frequencies for the residential child, adolescent recreational user, and seasonal maintenance worker receptors were 224, 96, and 32 days per year, respectively. Snow cover/frozen ground was assumed to be present 4 months of the year, and therefore, the potential for exposure to soils would potentially occur 8 months of the year. The residential child receptor was assumed to be potentially exposed to soils 7 days/week, the adolescent 3 days/week, and the maintenance worker 4 days/month.

The risk-based SCL calculations for residential child, adolescent recreational user, and seasonal maintenance worker receptors are shown in Tables H-1, H-2, and H-3, respectively. The risk-based SCLs are 110 mg/kg for the residential child receptor, 735 mg/kg for the adolescent, and 6,317 mg/kg for the maintenance worker.

4. SCL Summary

A summary of the generic and risk-based SCLs identified for cadmium are presented in Table H-4. These SCLs include risk-based values for residential and non-residential land use, and the NYSDEC SCO value for single family residence based on background concentrations. The values range from 2.5 mg/kg and 4.3 mg/kg (NYSDEC SCO values) to 6,317 mg/kg (the risk-based value calculated for maintenance workers). Collectively, these SCLs are evaluated in the *Remedial Action Work Plan West Branch of Bloody Brook* to identify potential clean-up goals and develop and evaluate remedial alternatives.

5. References

NYSDOH. 1999. *Final Statement of Basis,* Ciba Geigy Site, Queensbury, NY. January 1999.

USEPA. 1996. *Soil Screening Guidance: Technical Background Document*. EPA/540/R95/128. May 1996.

USEPA. 2002. S*upplemental Guidance for Developing Soil Screening Levels (SSLs) for Superfund Sites*. OSWER 9355.4-24. December 2002.

USEPA. 2004. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final.* OSWER 9285.7-02EP. July 2004.

NYSDEC and NYSDOH, 2006, *New York State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document*, September 2006.

NYSDEC, 2010a, *DER-10 Technical Guidance for Site Investigation and Remediation*, May 2010.

NYSDEC. 2010b, *CP-51 Soil Cleanup Guidance*, October 2010.

USEPA Regions 3, 6, and 9, 2012a, *User's Guide for Regional Screening Levels for Chemical Contaminates at Superfund Sites.*
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm. May 2012.

USEPA Regions 3, 6, and 9, 2012b, *Regional Screening Levels for Chemical Contaminates at Superfund Sites.*
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/ressoil_sl_table_run_MAY2012.pdf. Accessed July10, 2012.

TABLES

TABLE H-1

CALCULATION OF RISK-BASED SCREENING SOIL CLEANUP LEVEL FOR CADMIUM - RESIDENTIAL CHILD RECEPTOR
REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK
BLOODY BROOK VOLUNTARY CLEANUP PROGRAM
ONONDAGA COUNTY, NEW YORK

EQUATION:

C (mg/kg) = (THQ*BWc*ATn)/EFr*EDc*(((1/RfDo)*(IRSc/10^6))+((1/RfDd)*((SAc*AF*ABS)/10^6)))

Exposure Parameter		**Reference**
THQ (target hazard quotient)	1	USEPA, 1989
BWc (body weight, child) (kg)	15	USEPA, 2002
ATn (averaging time) (year)	2190	USEPA, 1989
RfDo (oral reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
EFr (exposure frequency, residential) (days/year)	224	Site-specific
EDc (exposure duration, child) (year)	6	USEPA, 2002
IRSc (soil ingestion rate, child) (mg/day)	200	USEPA, 2002
RfDd (dermal reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
SAc (exposed surface area, child) (cm^2/day)	2800	USEPA, 2002
AFc (adherence factor, child) (mg/cm^2)	0.2	USEPA, 2002
ABS (skin absorption default) (unit less)	chemical-specific	USEPA, 2004

Constituent	**THQ**	**BW**	**AT**	**EF**	**ED**	**RfD (oral)**	**IRS**	**RfD (dermal)**	**SA**	**AF**	**ABS**	**C**
Cadmium	1	15	2190	224	6	1.00E-03	200	2.50E-05	2800	0.2	0.001	110

References:

1) USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
2) USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December 2002.
3) USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). OSWER 9285.7-02EP. July 2004.
4) USEPA. 2012. Regions 3, 6, and 9 User's Guide for Regional Screening Levels for Chemical Contaminates at Superfund Sites.

TABLE H-2

CALCULATION OF RISK-BASED SCREENING SOIL CLEANUP LEVEL FOR CADMIUM - ADOLESCENT RECREATIONAL USER RECEPTOR
REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK
BLOODY BROOK VOLUNTARY CLEANUP PROGRAM
ONONDAGA COUNTY, NEW YORK

EQUATION:

C (mg/kg) = (THQ*BWc*ATn)/EFr*EDc*(((1/RfDo)*(IRSc/10^6))+((1/RfDd)*((SAc*AF*ABS)/10^6)))

Exposure Parameter		**Reference**
THQ (target hazard quotient)	1	USEPA, 1989
BWc (body weight, adolescent) (kg)	47	USEPA, 1997
ATn (averaging time) (year)	4380	USEPA, 1989
RfDo (oral reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
EFr (exposure frequency, residential) (days/year)	96	Site-specific
EDc (exposure duration, adolescent) (year)	12	USEPA, 1989
IRSc (soil ingestion rate, child) (mg/day)	200	USEPA, 2002
RfDd (dermal reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
SAc (exposed surface area, adolescent) (cm^2/day)	4300	USEPA, 1997
AFc (adherence factor, adolescent) (mg/cm^2)	0.25	USEPA, 2002
ABS (skin absorption default) (unit less)	chemical-specific	USEPA, 2004

Constituent	**THQ**	**BW**	**AT**	**EF**	**ED**	**RfD (oral)**	**IRS**	**RfD (dermal)**	**SA**	**AF**	**ABS**	**C**
Cadmium	1	47	4380	96	12	1.00E-03	200	2.50E-05	4300	0.25	0.001	735

References:

1) USEPA. 1997. Exposure Factors Handbook, Volumes I, II, and III. EPA/600/P-95/002Fa. August 1997.
2) USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
3) USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December 2002.
4) USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). OSWER 9285.7-02EP. July 2004.
5) USEPA. 2012. Regions 3, 6, and 9 User's Guide for Regional Screening Levels for Chemical Contaminates at Superfund Sites. Http://WWW.epa.gov/reg3hwmd/risk/human/rb-concentration table/usersguide.htm. May 2012.

TABLE H-3

CALCULATION OF RISK-BASED SCREENING SOIL CLEANUP LEVELS FOR CADMIUM - SEASONAL MAINTENANCE WORKER RECEPTOR
REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK
BLOODY BROOK VOLUNTARY CLEANUP PROGRAM
ONONDAGA COUNTY, NEW YORK

EQUATION:

C (mg/kg) = (THQ*BWc*ATn)/EFr*EDc*(((1/RfDo)*(IRSc/10^6))+((1/RfDd)*((SAc*AF*ABS)/10^6)))

Exposure Parameter		**Reference**
THQ (target hazard quotient)	1	USEPA, 1989
BWc (body weight, adult) (kg)	70	USEPA, 2002
ATn (averaging time) (year)	9125	USEPA, 1989
RfDo (oral reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
EFr (exposure frequency, residential) (days/year)	32	Site-specific
EDc (exposure duration, adult) (year)	25	USEPA, 2002
IRSc (soil ingestion rate, adult) (mg/day)	100	USEPA, 2002
RfDd (dermal reference dose) (mg/kg-day)	chemical-specific	USEPA, 2012
SAc (exposed surface area, adult) (cm^2/day)	3300	USEPA, 2002
AFc (adherence factor, adult) (mg/cm^2)	0.2	USEPA, 2002
ABS (skin absorption default) (unit less)	chemical-specific	USEPA, 2004

Constituent	**THQ**	**BW**	**AT**	**EF**	**ED**	**RfD (oral)**	**IRS**	**RfD (dermal)**	**SA**	**AF**	**ABS**	**C**
Cadmium	1	70	9125	32	25	1.00E-03	100	2.50E-05	3300	0.2	0.001	6,317

References:

1) USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
2) USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December 2002.
3) USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). OSWER 9285.7-02EP. July 2004.
4) USEPA. 2012. Regions 3, 6, and 9 User's Guide for Regional Screening Levels for Chemical Contaminates at Superfund Sites. Http://WWW.epa.gov/reg3hwmd/risk/human/rb-concentration table/usersguide.htm. May 2012.

TABLE H-4

SUMMARY OF SCREENING SOIL CLEANUP LEVELS
REMEDIAL ACTION WORK PLAN
WEST BRANCH OF BLOODY BROOK
BLOODY BROOK VOLUNTARY CLEANUP PROGRAM
ONONDAGA COUNTY, NEW YORK

Value (mg/kg)	Basis
2.5	NYSDEC (2010) Soil Cleanup Objective (SCO): NYSDEC part 375 SCO for single family residential soils (6 NYCRR Table 375-6.8(b)).
4.3	NYSDEC (2010) Soil Cleanup Objective (SCO): NYSDEC part 375 SCO for multiple family residential soils (6 NYCRR Table 375-6.8(b)).
10	NYSDOH (1999) Value: Based on residential exposure and ingestion of homegrown produce.
24	USEPA (1996) Soil Screening Level: Based on residential exposure and ingestion of homegrown produce.
70	USEPA (2002) Soil Screening Level: Based on residential exposure and direct contact.
70	USEPA (2012) Regions 3, 6, and 9 Regional Screening Level: Based on residential exposure and direct contact (adjusted for a RfD for food).
110	Risk-Based Soil Cleanup Level for residential children: Based on residential exposure and direct contact.
735	Risk-Based Soil Cleanup Level for adolescent trespasser: Based on site-specific exposure assumptions and direct contact.
800	USEPA (2012) Regions 3, 6, and 9 Regional Screening Level: Based on industrial exposure and direct contact.
900	USEPA (2002) Soil Screening Level: Based on outdoor worker exposure and direct contact.
1,800	USEPA (2002) Soil Screening Level: Based on residential exposure and inhalation of fugitive particles.
2,000	USEPA (2002) Soil Screening Level: Based on indoor worker exposure and direct contact.
3,400	USEPA (2002) Soil Screening Level: Based on outdoor worker exposure and inhalation of fugitive particles.
6,317	Risk-Based Soil Cleanup Level for maintenance workers: Based on site-specific exposure assumptions and direct contact.

References:

1) USEPA. 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R95/128. May 1996.
2) NYSDOH. 1999. Final Statement of Basis, Ciba Geigy Site, Queensbury, NY. January 1999.
3) USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December 2002.
4) NYSDEC. 2010, *CP-51 Soil Cleanup Guidance*, October 2010.
5) USEPA. 2012. Regions 3, 6, and 9 User's Guide for Regional Screening Levels for Chemical Contaminates at Superfund Sites. Http://WWW.epa.gov/reg3hwmd/risk/human/rb-concentration table/usersguide.htm. May 2012.

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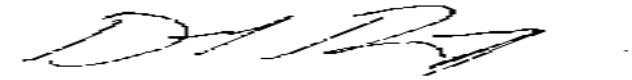
Lockheed Martin Corporation, Inc.

Biological Monitoring Plan

Bloody Brook, Liverpool, New York

September 2012

ARCADIS



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Biological Monitoring Plan

Bloody Brook, Liverpool,
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B0038016.0001

Date:
September 2012

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Figure

1. Proposed Biota Monitoring Sample Location Map

Appendices

1. Standard Operating Procedures - Crayfish Sampling
2. Standard Operating Procedure - Sample Handling, Packing, and Shipping

1. Introduction

This Biological Monitoring Plan (BMP) has been developed by ARCADIS on behalf of Lockheed Martin Corporation (Lockheed Martin). The BMP describes the sampling and analysis program that will be used to monitor cadmium concentrations in biota from the West Branch of Bloody Brook (WBBB). The monitoring program includes the periodic sampling of aquatic biota within WBBB prior to planned remedial action (i.e., baseline sampling), as well as periodic sampling following the completion of the remedial action.

The BMP has been developed to evaluate possible cadmium exposure for aquatic receptors in WBBB before and after remediation. The remedial approach as described in the Remedial Action Work Plan (RAWP) includes complete sediment removal for the length of WBBB from the New York State Thruway (Thruway) downstream to Onondaga Lake Parkway. As part of the remedial program, New York State Department of Environmental Conservation (NYSDEC) has recommended the implementation of a monitoring program. Based on this recommendation, the following BMP has been developed.

2. Background

WBBB is located in the Town of Salina and a portion of the site is located in the Village of Liverpool, Onondaga County, New York. The portion of the WBBB that is addressed in the RAWP extends from downstream of the New York State Thruway (Thruway) and ending at Onondaga Lake Parkway (Figure 1). As described in the RAWP, environmental investigations at the site identified elevated levels of cadmium within portions of the brook channel. As part of the RAWP, Lockheed Martin is proposing to remove all accumulated sediment (and therefore all cadmium in site sediments) along the entire length of WBBB.

3. Objectives

The objective of the biological monitoring is to document cadmium concentrations in aquatic biota following the completion of the remedial activities in WBBB. Pre-remedial data will also be collected to serve as a baseline data set. Collectively, these data will be used in part to support the evaluation of the effectiveness of the site remedial program in mitigating potential cadmium impacts to WBBB.

4. Scope of Work

The scope of work for the biota investigation is the collection of biological tissue samples from WBBB. Crayfish are the target organism for this work because they are known to accumulate cadmium, and they are relatively less mobile than other resident aquatic organisms (e.g., fish). Crayfish have been observed in WBBB and were sampled previously by NYSDEC.

Crayfish will be collected from three general locations or stations within WBBB, including an upper, middle, and lower location (Figure 1). The final sample locations will be selected based on a field reconnaissance. The selection of the sampling locations will be finalized based on habitat availability, access, and the ability to provide spatial coverage of the brook.

Following the identification of the sampling locations (i.e., during the baseline monitoring), the coordinates of each location will be identified using global positional system (GPS), and a description of the locations will be mapped out in the field notes. Each location will also be photographed by the field crew. This information will be useful for sampling the same locations for subsequent events.

Five samples of crayfish will be collected from each of the three sampling locations. In the event that sufficient number of crayfish cannot be collected, alternative or other species will be considered. The crayfish samples will be collected in accordance with the procedures described below, processed, and sent to a laboratory for cadmium analyses.

5. Methodology

This section describes the general methods that will be used to collect, process, and analyze the biological tissue samples. Additional details on collection methods are presented in the standard operating procedures (SOPs) (Appendix 1 and Appendix 2).

5.1 Collection

Five biological tissue samples will be collected from each of the specified three sampling locations. A total of 15 samples will be collected. This biota sampling will target crayfish, although other targets of opportunity may be collected if sufficient numbers of crayfish cannot be collected.

The crayfish (or target of opportunity) that are retained for analyses will be of uniform size to the extent practicable. It is estimated that each crayfish sample will be a composite sample of 3 to 5 like-size individuals, although fewer (or more) organisms per sample may be collected depending on species availability and individual crayfish weights. In order to have sufficient tissue for analysis, each sample will have a minimum sample weight of approximately 20 grams.

Crayfish will be collected using a methodology appropriate for sample conditions, and may include the use of a backpack electrofishing unit, hand netting, or seining. Details on these collection methods are included in the SOP in Appendix 1 of this BMP. As previously stated, if crayfish cannot be collected in sufficient quantities to complete the 15 samples, then additional targets of opportunities may be considered.

Following sample collection, each crayfish will be weighed and measured (carapace length), and samples will be placed in an appropriately-labeled sample jar or Ziploc® bag. Samples will be given a unique laboratory ID that specifies the location and sample number. For example, sample CR-13-1-001 would represent a crayfish sample (CR), collected in 2013 (-13), from location 1 (-1), and the first replicate (-001).

After processing, samples will be placed in coolers with ice and shipped to Pace Laboratories (Green Bay, Wisconsin) for analysis. The sample handling, packing, and shipping procedures are further described in Appendix 2.

5.2 Laboratory Analyses

Each of the biota samples will be analyzed by a laboratory recognized by the National Environmental Lab Accreditation (NELAC) for total cadmium using USEPA Method 6020 (ICP-MS). The contracted laboratory will follow the USEPA method, and the appropriate Quality Assurance/Quality Control (QA/QC) procedures detailed below. The laboratory will achieve a Method Detection Limit (MDL) of 0.006 milligrams per kilogram (mg/kg) and a Reporting Limit (RL) of 0.1 mg/kg.

6. Quality Assurance/Quality Control

QA/QC procedures will be implemented to ensure data needs for completeness, accuracy, and precision. The laboratory will utilize QC samples to assess the validity of the analytical results of field samples. The laboratory QC samples will include a matrix spike/matrix spike duplicate collected once per event.

All laboratory cadmium analyses will follow USEPA Method 6020. The laboratory will ensure that the sample preparation and analyses are performed within the specified holding times for each analysis and perform an internal laboratory quality control report as well as note any QC deficiencies in the final laboratory report. Preservation will involve cooling the samples to 4 degrees Celsius (°C) during transportation, and storage at the laboratory at a temperature of -20 °C until analysis is performed. Holding time will be no more than 180 days to analysis.

7. Health and Safety

All work will be completed in accordance with the applicable health and safety regulations, and the site-specific Health and Safety Plan (HASP).

8. Sample Frequency

Monitoring will be conducted during three events. The first event will be pre-remedial baseline sampling, and will be conducted during the fall or spring prior to remediation. Sampling events will also be conducted two and four years following remediation. Sampling for each event will be conducted during the same general time frame to avoid possible seasonal fluctuations in cadmium concentrations. Following the four-year sampling event the data will be evaluated and a determination will be made regarding the necessity for additional monitoring events.

9. Data Validation and Reporting

The monitoring data will be validated and submitted to NYSDEC for review. The data will be submitted to NYSDEC in a brief letter report within 60 days of the completion of the data validation.

Figure



LEGEND:

- APPROXIMATE BIOTA MONITORING SAMPLE LOCATION
- BLOODY BROOK
- APPROXIMATE SITE BOUNDARY

NOTE:

1. BASE MAP SOURCE: ESRI ARCGIS STREET MAP.

0 800 1,600 Feet

GRAPHIC SCALE

LOCKHEED MARTIN CORPORATION
WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

BIOLOGICAL MONITORING PLAN

SAMPLING LOCATIONS

ARCADIS

FIGURE 1

CITY: SYR DIV/GROUP: 40 DB: JCR
Lockheed Martin (B0038016.0000.00001)
Q:\LockheedMartin\Syracuse\OnondagaCountyFish_and_Wildlife_RI_Analysis\mxd\BioMonitoringPlan.mxd - 8/17/2009 @ 2:21:08 PM

ARCADIS

Appendix 1

Standard Operating Procedures - Crayfish Sampling

Standard Operating Procedure: Crayfish Sampling

I. Introduction

The following procedures describe the general methodologies that will be used in the field to collect crayfish.

II. Pre-Collection

Staff assigned the responsibility of collecting crayfish will be provided with the following information:

- Work documents (Biological Monitoring Plan, Health and Safety Plan);
- Water body name and site maps;
- Number and size of each species to be collected;
- Collecting and processing procedures;
- Special instructions (if any);
- Appropriate fisheries office contact; and
- Sampling permit.

III. Equipment

The following collection equipment and materials will be available, as required, during crayfish sampling:

- Personal protective equipment (as required by the health and safety plan);
- Backpack electrofishing equipment;
- Dip nets with non-conductive handles;
- Chest or hip waders;
- Measuring board or ruler;
- Top-loading electronic and suspended-weight spring balances;
- Insulated coolers with ice;
- Plastic sealable bags and indelible ink markers;
- Camera;
- Global positioning system (GPS); and
- Field notebook.

IV. Field Notes

Field notes will be recorded during sampling activities, and at a minimum, will include the following:

- Names of field crew and oversight personnel;
- General weather conditions;
- Date, time, and general capture location (including GPS location);

- Capture technique;
- Sample duration;
- General observations of crayfish habitat, abundance, and diversity; and
- Photograph number when pictures are taken.

V. Collection Procedures

Crayfish will be collected using approved sampling techniques. State personnel (conservation officers) will be notified of the sampling activities prior to commencing field work. Only those target species identified in the monitoring plan and scientific collectors permit will be retained. Collection of other species may occur when target species are absent. Non-target species will be released back to the system.

The following procedures will be used, as necessary, to collect crayfish:

A. Backpack Electrofishing

The following procedures describe the use of a backpack electrofishing unit to collect crayfish. Electrofishing activities will be temporarily halted when any persons, pets, or livestock are observed in the water or on the shore in close proximity to the electrofishing unit.

1. The field crew will don personal protective equipment (non-conductive waders and gloves, etc.), set up the electrofishing equipment, and test it upon arrival at the site.

2. The backpack operator will be responsible for control of the on-off switch on the anode handle, operation of the control equipment, and for capturing crayfish. The remaining field crew will work alongside the backpack operator and will capture crayfish.

3. Electricity will be applied to the water by actively maintaining the on-off switch in the closed position while the control equipment is operative.

4. The electrical current will be set to stun the crayfish, but should not cause mortality.

5. Target species of appropriate size will be collected using non-conductive dip-nets and will be placed in sealable plastic bags until they can be transferred to a cooler with ice.

6. Backpack electrofishing batteries will be recharged as needed.

B. Hand-Netting

The following procedures describe the use of dip-nets and hand-capture techniques to collect crayfish:

1. The field crew will move along the water's edge to find crayfish. Crayfish will be captured by hand or by dip-net as they are spotted, and will be tracked and captured as they swim.

2. Target species of appropriate size will be placed into sealable plastic bags, and then into a cooler with ice. Non-target species will be noted in the field notebook.

C. Seine-Netting

The following procedures describe the use of seines to collect crayfish:

1. The field crew will ready the appropriate sized seines (length, depth, and mesh size) for site conditions prior to field sampling.

2. One or two crew members will hold the seine in place, while an additional crew member lifts rocks upstream of the seine to dislodge crayfish. Crew members will then lift the net to collect crayfish.

3. Target species of appropriate size will be removed from the seines and will be placed into sealable plastic bags, and then into a cooler with ice. Non-target species will be counted and noted in the field notebook.

VI. Sample Handling

The following identifies the temporary storage procedures that will be used to preserve crayfish in the field prior to sample processing, handling, and shipment to the laboratory:

1. Measure and weigh each crayfish after collection, as necessary. The carapace length (tip of rostrum to posterior edge of carapace) will be measured to the nearest 0.1 M with calipers to ensure that appropriate sized crayfish are taken. Weight will be taken to ensure that minimum sample mass requirements are satisfied.

2. Count the number of crayfish to ensure that the correct amount is taken.

3. Transfer crayfish to sealable plastic bags (if not done previously) and label with sampling date and capture location, and place in coolers with ice until field processing can occur.

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Appendix 2

Standard Operating Procedure – Sample Handling, Packing, and Shipping

Standard Operating Procedure: Sample Handling, Packing, and Shipping

I. Scope and Application

This appendix presents the standard operating procedure (SOP) for sample handling, packing, and shipping. These procedures focus on the delivery of samples that are protected from cross-contamination, tampering, and mis-identification, and the samples are maintained in a controlled environment from the time of collection until receipt by the analytical laboratory.

II. Personnel Qualifications

ARCADIS field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, and site-specific training, as needed. In addition, ARCADIS personnel handling the samples will be versed in the relevant SOPs and possess the skills and experience necessary to successfully complete the desired work.

III. Equipment List

The following materials, as required, will be available during sample handling, packing, and shipping procedures:

- Health and safety equipment, as specified in the Health and Safety Plan;
- Copy of the Biological Monitoring Plan;
- Indelible ink pens;
- Polyethylene bags (resealable-type);
- Clear packing tape, strapping tape, duct tape;
- Appropriate sample containers, labels, and chain-of-custody forms;
- Insulated coolers;
- Ice;
- Thermometer and/or trip blank as required;
- Cushioning and absorbent material (i.e., vermiculite) as required; and
- Field notebook.

IV. Cautions

Possible physical strain may occur from lifting heavy packages.

V. Health and Safety Considerations

Follow health and safety procedures outlined in the site Health and Safety Plan.

VI. Procedure

Chain-of-Custody Procedures

1. Prior to collecting samples, complete the chain-of-custody record header information by filling in the project number, project name, and the name(s) of the sampling technician(s). Please note it is important that chain-of-custody information is printed legibly using indelible ink.

2. After sample collection, enter the individual sample information by filling in the following chain-of-custody fields:

    a. **STA. NO.** Indicates the station number or location that the sample was collected from. Appropriate values for this field include aquatic study area location.

    b. **Date.** Indicates the date the sample was collected. The date format to be followed should be mm/dd/yyyy (e.g., 10/07/2013).

    c. **Time.** Indicates the time the sample was collected. The time value should be presented using military format. For example, 3:15 P.M. should be entered as 15:15.

    d. **Comp.** This field should be marked with an "X" if the sample was collected as a composite.

    e. **Grab.** This field should be marked with an "X" if the sample was collected as an individual grab sample.

    f. **Station Location.** This field should represent the complete sample name. For example, sample CR-13-1-001 would represent a crayfish sample (CR), collected in 2013 (-13), from location 1 (-1), and the first replicate (-001).

    g. **Number of Containers.** This field represents the number of containers collected at the sampling location to be submitted for analysis.

    h. **Analytical Parameters.** The analytical parameters that the samples are being analyzed for should be written legibly on the diagonal lines to the right of the "number of containers" column. As much detail as possible should be presented to allow the analytical laboratory to properly analyze the samples. The target analytes for the crayfish tissue samples will be cadmium. Each sample that requires a particular parameter analysis will be identified by placing an "X" in the appropriate analytical parameter column.

    i. **Remarks.** The remarks field should be used to communicate special analytical requirements to the laboratory. These requirements may be on a per sample basis such as "extract and hold sample until notified," or may be used to inform the laboratory of special reporting requirements for the entire sample delivery group (SDG). Reporting requirements that should be specified in the remarks column include: 1) turnaround time; 2) contact and address where data reports should be sent; 3) name of laboratory project manager; and 4) type of sample preservation used.

    j. **Relinquished By.** This field should contain the signature of the sampling technician who relinquished custody of the samples to the shipping courier or the analytical laboratory.

    k. **Date.** Indicates the date the samples were relinquished. The date format should be mm/dd/yyyy (e.g., 10/07/2009).

l. **Time.** Indicates the time the samples were relinquished. The time value should be presented using military format. For example, 3:15 P.M. should be entered as 15:15.

m. **Received By.** This field should contain the signature of the sample courier or laboratory representative who received the samples from the sampling technician.

3. Complete as many chain-of-custody forms as necessary to properly document the collection and transfer of the samples to the analytical laboratory.

4. Upon completing the chain-of-custody forms, forward two copies to the analytical laboratory and retain one copy for the field records.

Handling Procedures

1. After completing the sample collection procedures, record the following information in the field notebook with indelible ink:

- project number and site name;
- sample identification code and other sample identification information, if appropriate;
- sampling method;
- date;
- name of sampler(s);
- time;
- location (project reference); and
- any comments.

2. Fill in sample label with the following information in indelible ink:

- sample identification code and other sample identification information

3. Cover the label with clear packing tape to secure the label onto the container.

Packing Procedures

1. Using duct tape, secure the outside and inside of the drain plug at the bottom of the cooler being used for sample transport.

2. Place the sample packages in the cooler. If a cooler temperature blank is supplied by the laboratory, it should be packaged following the same procedures as the samples. If the laboratory did not include a temperature blank, do not add one since the sample temperature will be determined by the laboratory using a calibrated infrared thermometer.

3. Package ice or blue ice in small resealable-type plastic bags and place loosely in the cooler. Do not pack ice so tightly that it may prevent the addition of sufficient cushioning material. Samples placed on ice will be cooled to and maintained at a temperature of approximately 4°C.

4. Fill the remaining space in the cooler with cushioning/absorbent material. The cooler must be securely packed and cushioned in an upright position and be surrounded by a sorbent material capable of absorbing spills from leaks or breakage of sample containers. (Note: to comply with 49 CFR 173.4, filled cooler must not exceed 64 pounds).

5. Place the completed chain-of-custody record(s) in a large resealable-type bag and tape the bag to the inside of the cooler lid.

6. Close the lid of the cooler and fasten with packing tape.

7. Wrap strapping tape around both ends of the cooler.

8. Mark the cooler on the outside with the following information: shipping address, return address, "Fragile, Handle with Care" labels on the top and on one side, and arrows indicating "This Side Up" on two adjacent sides.

9. Place custody seal evidence tape over front right and back left of the cooler lid and cover with clear plastic tape.

Shipping Procedures

1. All samples will be delivered by an express carrier within 48 hours of sample collection. Alternatively, the laboratory courier may be used for sample pickup (if available).

2. The following chain-of-custody procedures will apply to sample shipping:

    - Relinquish the sample containers to the laboratory via express carrier or laboratory courier. The signed and dated forms should be included in the cooler. The express carrier will not be required to sign the chain-of-custody forms.

    - When the samples are received by the laboratory, laboratory personnel will complete the chain-of-custody by recording the date and time of receipt of samples, measuring and recording the internal temperature of the shipping container, and checking the sample identification numbers on the containers to ensure they correspond with the chain-of-custody forms.

VII. Waste Management

None

VIII. Data Recording and Management

Copies of chain-of-custody forms will be maintained in the project file.

IX. Quality Assurance

Chain-of-custody forms will be filled out. A copy of the completed chain-of-custody form forwarded with the samples to the laboratory will be sent to the Project Manager for review. Subsequent

chain-of-custody form submissions to the Project Manager will be at the Project Manager's discretion.

X. References

None

COST ESTIMATE SUMMARY REMEDIAL ALTERNATIVE 2

EXCAVATION AND OFF-SITE DISPOSAL OF SEDIMENT, CHANNEL SIDE BANKS, AND SOIL BASED ON CLEAN UP LEVELS BY AREA

Location: Onondaga County

Date: December 2012

Description: Under this remedial alternative, the following will be excavated and properly disposed of: brook sediments and channel side banks, soil with cadmium (Cd) concentrations greater than 10 parts per million (ppm) in the top 2 feet of the Drainage District easement, soil containing cadmium at concentrations greater than 100 ppm in the 2- to 6- foot depth interval from within the footprint of the 2-foot excavation in the wooded area, soil with Cd concentrations greater than 2.5 ppm in the top 2 feet and greater than 10 ppm in the 2 to 4 foot depth interval of residential properties, soil with Cd concentrations greater than 4.3 ppm in the top 2 feet and greater than 10 ppm in the 2 to 4 foot depth interval of the apartment complex outside of the Drainage District easement, soil with Cd concentrations greater than 70 ppm in commercial/industrial areas and the adjacent Drainage District easement, and soil in the top 2 feet of two areas to facilitate side bank restoration in the commercial/industrial area downstream of Old Liverpool Road.

DESCRIPTION	QUANTITY	UNIT	TOTAL COST	NOTES
CONSTRUCTION COSTS				
Mobilization/Demobilization				
Mobilize/Demobilize Labor & Other Direct Costs	1	Lump Sum	$796,137	Miscellaneous equipment and facilities, including access roads, staging areas, etc.
Submittals/Implementation Plans/Bonds	1	Lump Sum	$41,331	Cost for submittals, safety & design plans, performance bond, etc.
Install/Remove Temporary Facilities & Utilities	1	Lump Sum	$120,854	Monthly utilities (sanitary, electric, phone/fax/data, etc.)
Closeout Reporting	1	Lump Sum	$22,211	Final closeout reporting, etc.
Mobilization/Demobilization Subtotal			***$980,533***	
Site Work				
Clearing and Grubbing	4.17	Acre	$54,650	Clear vegetation and cut and chip small trees, up to 6" diameter.
Tree Removal/Wetland Clearing	202	Each	$171,890	Cut and chip trees 6" to 24" diameter with stump removal and disposal.
Fence Removal & Installation	1,075	Linear Feet	$37,757	Remove and replace fence on residential properties.
Rock Removal & Disposal	760	Ton	$116,157	Remove and dispose of riprap located along side banks of brook, rock found in gabion baskets is not included.
Grading and Seeding	13,566	Square Yard	$68,391	Grade and seed to establish grass cover as part of site restoration activities.
Wetland Restoration	1.37	Acre	$168,571	Restore wetlands as part of site restoration activities.
Tree Restoration	202	Each	$148,804	Trees 6" to 24" diameter that will need to be replaced as part of restoration activities.
Brook Restoration	4,630	Linear Feet	$170,753	Includes reconstruction of the brook bottom and side banks.
Site Work Subtotal			***$936,975***	
Excavation and Backfilling				
Erosion and Sediment Controls	13,944	Linear Feet	$104,108	Install and maintain erosion and sediment controls along the site perimeter where excavation activities is proposed.
Install Remove Bypass Pumping/Dewatering/Storm Water Control	1	Lump Sum	$192,196	Installation and removal of bypass pumps during excavation and reconstruction of existing brook channel, includes dewatering and storm water control costs.
Operate Bypass Pumps/Wetland Pumps	1	Lump Sum	$467,377	Operation of the brook channel bypass pumps as well as any dewatering cost during excavation in wetland areas.
Excavation of Overburden	0	Cubic Yard	$0	No overburden soil excavation anticipated under this remedial alternative.
Excavation of Target Soil	14,335	Cubic Yard	$506,978	Excavation cost for soil to be removed outside of the existing brook channel.
Removal of Brook Sediment	1,664	Cubic Yard	$95,108	Excavation cost for sediment to be removed from the bottom of the existing brook channel.
Removal of Channel Side Banks	5,694	Cubic Yard	$266,354	Excavation cost for removal of the existing channel side banks.
Backfilling Purchase/Transportation	15,556	Cubic Yard	$418,887	Purchase and transportation of backfill material to replace excavated target soil and channel side banks.
Backfilling Placement	15,556	Cubic Yard	$322,921	Placement of backfill material to replace excavated target soil and channel side banks.
Topsoil Purchase/Transportation/Placement	2,261	Cubic Yard	$161,067	Purchase, transportation, and placement of 6 inches of topsoil for all areas requiring grading and seeding.
Excavation and Backfilling Subtotal			***$2,534,996***	
Transport & Disposal				
Waste Characterization	44	EA	$36,061	One sample per 500 cubic yards of material to be excavated.
Transport & Disposal (Hazardous Material)	14,389.7	TON	$3,640,983	Assumed presence of hazardous material for cost estimating purposes; actual presence of hazardous material is unknown. Cost estimated for Cd-impacted soil with concentrations greater than 20 mg/kg. Assumed 1 cubic yard of in-place material to weigh approximately 3,400 pounds.
Transport & Disposal (Non-Hazardous Material)	23,572.3	TON	$2,380,066	Cost estimated for Cd-impacted soil with concentrations of 20 mg/kg or less and all sediment and channel side banks. Assumed 1 cubic yard of in-place material to weigh approximately 3,400 pounds.
Transport & Disposal Subtotal			***$6,057,111***	
CONSTRUCTION COSTS SUBTOTAL			***$10,509,614***	
MANAGEMENT COSTS				
Operation & Maintenance	1	LS	$149,995	Operation and maintenance activities during remedial action implementation.
Field Engineering, Management, & Contingency	1	LS	$2,249,925	Engineering oversight, project management, and contingency.
MANAGEMENT COSTS SUBTOTAL			***$2,399,920***	
TOTAL COSTS			**$12,909,534**	

COST ESTIMATE SUMMARY REMEDIAL ALTERNATIVE 3

EXCAVATION AND OFF-SITE DISPOSAL OF SEDIMENT AND SIDE BANK SOIL AND SOIL BASED ON 10 PPM CADMIUM IN ALL AREAS

Location: Onondaga County
Date: December 2012

Description: Under this remedial alternative, the following will be excavated and properly disposed of: brook sediments and channel side banks, soil with cadmium (Cd) concentrations greater than 2.5 part per million (ppm) in the top 2 feet of residential properties and 4.3 ppm in the top 2 feet of the apartment complex outside of the Drainage District easement, and soil with Cd concentrations greater than 10 ppm within the entire site from 0 to 15 feet below ground surface.

DESCRIPTION	QUANTITY	UNIT	TOTAL COST	NOTES
CONSTRUCTION COSTS				
Mobilization/Demobilization				
Mobilize/Demobilize Labor & Other Direct Costs	1	Lump Sum	$1,326,918	Miscellaneous equipment and facilities, including access roads, staging areas, etc.
Submittals/Implementation Plans/Bonds	1	Lump Sum	$68,886	Cost for submittals, safety & design plans, performance bond, etc.
Install/Remove Temporary Facilities & Utilities	1	Lump Sum	$201,427	Monthly utilities (sanitary, electric, phone/fax/data, etc.)
Closeout Reporting	1	Lump Sum	$37,019	Final closeout reporting, etc.
Mobilization/Demobilization Subtotal			***$1,634,251***	
Site Work				
Clearing and Grubbing	5.13	Acre	$66,524	Clear vegetation and cut and chip small trees, up to 6" diameter.
Tree Removal/Wetland Clearing	249	Each	$209,702	Cut and chip trees 6" to 24" diameter with stump removal and disposal.
Fence Removal & Installation	1,774	Linear Feet	$62,310	Remove and replace fence on residential properties.
Rock Removal & Disposal	760	Ton	$116,157	Remove and dispose of riprap located along side banks of brook, rock found in gabion baskets is not included.
Grading and Seeding	18,241	Square Yard	$90,782	Grade and seed to establish grass cover as part of site restoration activities.
Wetland Restoration	1.37	Acre	$168,571	Restore wetlands as part of site restoration activities.
Tree Restoration	249	Each	$183,279	Trees 6" to 24" diameter that will need to be replaced as part of restoration activities.
Brook Restoration	4,630	Linear Feet	$170,753	Includes reconstruction of the brook bottom and side banks.
Site Work Subtotal			***$1,068,078***	
Excavation and Backfilling				
Erosion and Sediment Controls	23,008	Linear Feet	$171,779	Install and maintain erosion and sediment controls along the site perimeter where excavation activities is proposed.
Install Remove Bypass Pumping/Dewatering/Storm Water Control	1	Lump Sum	$317,123	Installation and removal of bypass pumps during excavation and reconstruction of existing brook channel, includes dewatering and storm water control costs.
Operate Bypass Pumps/Wetland Pumps	1	Lump Sum	$1,185,283	Operation of the brook channel bypass pumps as well as any dewatering cost during excavation in wetland areas.
Excavation of Overburden	15,194	Cubic Yard	$691,258	Excavation cost for overburden soil.
Excavation of Target Soil	39,148	Cubic Yard	$1,509,171	Excavation cost for soil to be removed outside of the existing brook channel.
Removal of Brook Sediment	1,664	Cubic Yard	$95,108	Excavation cost for sediment to be removed from the bottom of the existing brook channel.
Removal of Channel Side Banks	5,694	Cubic Yard	$266,354	Excavation cost for removal of the existing channel side banks.
Backfilling Purchase/Transportation	38,559	Cubic Yard	$1,037,140	Purchase and transportation of backfill material to replace excavated target soil and channel side banks.
Backfilling Placement	38,559	Cubic Yard	$794,332	Placement of backfill material to replace excavated target soil and channel side banks.
Topsoil Purchase/Transportation/Placement	4,072	Cubic Yard	$288,662	Purchase, transportation, and placement of 6 inches of topsoil for all areas requiring grading and seeding.
Excavation and Backfilling Subtotal			***$6,356,210***	
Transport & Disposal				
Waste Characterization	93	EA	$77,003	One sample per 500 cubic yards of material to be excavated.
Transport & Disposal (Hazardous Material)	35,951.4	TON	$9,102,998	Assumed presence of hazardous material for cost estimating purposes; actual presence of hazardous material is unknown. Cost estimated for Cd-impacted soil with concentrations greater than 20 mg/kg. Assumed 1 cubic yard of in-place material to weigh approximately 3,400 pounds.
Transport & Disposal (Non-Hazardous Material)	45,433.7	TON	$4,582,799	Cost estimated for Cd-impacted soil with concentrations of 20 mg/kg or less and all sediment and channel side banks. Assumed 1 cubic yard of in-place material to weigh approximately 3,400 pounds.
Transport & Disposal Subtotal			***$13,762,800***	
CONSTRUCTION COSTS SUBTOTAL			***$22,821,340***	
MANAGEMENT COSTS				
Operation & Maintenance	1	LS	$247,496	Operation and maintenance activities during remedial action implementation.
Field Engineering, Management, & Contingency	1	LS	$11,071,640	Engineering oversight, project management, and contingency.
MANAGEMENT COSTS SUBTOTAL			***$11,319,136***	
TOTAL COSTS			**$34,140,475**	