



**CONESTOGA-ROVERS
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August 22, 2008

Reference No. 012618-07

Mr. Stephen M. Johnson
Deputy Regional Director
Massachusetts Department of Environmental Protection
Northeast Regional Office
One Winter Street
Boston, Massachusetts 02108

Dear Mr. Johnson:

Re: Phase IV Remedy Implementation Plan Revision 1
RTN: 3-3940 Former Settling Lagoon and Beaverdam Brook
63 Western Avenue, Framingham, Massachusetts

Conestoga-Rovers & Associates (CRA) has prepared this letter, on behalf of General Motors Corporation (GM), to provide to the Massachusetts Department of Environmental Protection (MADEP) and the Framingham Conservation Commission (FCC), the Phase IV Remedy Implementation Plan (RIP) Revision 1. The Phase IV RIP Revision 1 is being submitted as part of the Comprehensive Response Actions being conducted in accordance with the Massachusetts Contingency Plan (MCP) at the above-referenced Site. The original Phase IV RIP was submitted on December 21 2007 and provided full compliance with Section VII. D 3 of the Administrative Consent Orders With Penalty (ACOPs) NE-05-3A042 and ACOP-NE-05-3A043. This revision incorporates updates to certain remedial action (RA) activities based on discussions with the MADEP and FCC during the permitting process for the 401 Water Quality Certificate W220656 and the Wetlands Order of Conditions (NE 158-1152). The Phase IV RIP Revision 1 includes the following:

- Engineering Design;
- Storm Water Management Plan;
- Construction Quality Assurance Plan;
- Health and Safety Plan;
- Permitting and Approvals;
- Restoration Plan; and
- Public Communication Plan.

By way of background, GM sold the majority of the former Framingham Assembly Plant Property to ADESA Corporation in 1994 as well as a portion of primarily wetlands to CSX, Inc. GM retained ownership of the Former Landfill parcel and a parcel consisting primarily of wetlands. An As-Built Construction and RAO Completion Report was submitted for the





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Former Landfill Site (RTN: 3-3939) in January 2007 to complete actions required by the May 2006 Administrative Consent Order Without Penalty (ACOP) NE-05-3A004.

GM has been conducting MCP response actions for the Site in accordance with ACOP-NE-05-3A042 (Lagoon) and NE-05-3A043 (Brook) requirements. Each of the ACOP requirements have been met to date by completion of the following:

- Final Phase II CSA (Lagoon) (CRA, September 2006);
- Final Phase II CSA (Brook) (CRA, December 2006);
- Phase III Remedial Action Plan (RAP) (Site) (CRA, June 2007); and
- Phase IV RIP (CRA, December 2007).

The two RTNs were linked as part of the Phase II CSA (Lagoon) submittal with the Lagoon designated as the primary disposal site and the Brook linked to the Lagoon site. The required public notifications regarding the Phase submittals and sampling notifications to property owners also have been conducted in accordance with 310 CMR 1403.

The Site RA being implemented consists of dewatering and the removal of impacted sediment from the Lagoon and Brook, on-site stabilization, and transportation and off-site disposal at permitted disposal facilities. Additional related construction activities include the implementation of a Storm Water Management Plan, soil erosion and sediment controls, protection of wetland and Riverfront areas, a Sediment Management Facility, a Wastewater Treatment Facility, health and safety provisions, and temporary facilities and controls.

The majority of the environmental remediation activities involve general civil construction activities that will be conducted in Level D personal protective equipment (PPE) and the Town of Framingham officials have been notified of the specific schedule for Phase IV RIP activities. Certain activities may require Level C, modified Level C, and /or B PPE, such as sediment removal and management activities and sewer plugging. The level of protection will be determined by the remediation contractor's Health and Safety Officer based on the provisions of the Site-Specific Health and Safety Plan (HASP), air monitoring and in consultation with GM and CRA. The Town of Framingham Board of Selectmen and Board of Health have been notified of the start date of the remedial action activities and will be notified of the results of air monitoring and any upgrades of PPE levels to Level C or higher.

The following permits and approvals, have been obtained:

- United States Army Corps of Engineers (Corps) Category 2 Programmatic General Permit (PGP);



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- Massachusetts Environmental Policy Act (MEPA) Environmental Notification Form;
- MADEP 401 WQC;
- Massachusetts Chapter 91 Dredging Permit (Non-applicability determination); and
- FCC Order of Conditions.

The Phase IV RIP includes a copy of the completed BWSC / MCP Comprehensive Response Action Transmittal and Phase IV Revision Completion Statement (BSWC108) submitted to MADEP by eDEP. Copies of the appropriate public notifications completed also are provided.

The schedule is dependent on access from property owners, contractor availability, weather conditions, and other unforeseen conditions that may occur. The current schedule is to mobilize and conduct Site preparation activities such as health and safety, erosion and sediment controls, storm water controls, clearing, equipment set-up, and submittal finalization during the first few weeks (August 25 to September 5, 2008). The detailed schedule will be revised to reflect the actual proposed schedule. GM is committed to meeting the ACOP deadline of achieving a RAO by November 18, 2009.

Please contact the undersigned at (860) 747-1800 or by e-mail (ftaylor@croworld.com), if you have any questions.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Fred K. Taylor, LSP

FKT/ca/28
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Ken Chin, MADEP
Dino Iseppi, Clean Harbors Environmental Services, Inc.
Jim Hartnett, GM
Meg McArdle, Exponent
Randy Moore, CRA

PHASE IV REMEDY IMPLEMENTATION PLAN REVISION No. 1

**RTN: 3-3940 FORMER SETTLING LAGOON
LINKED SITE RTN: 3-4356 BEAVERDAM BROOK**

**FORMER ASSEMBLY PLANT
GENERAL MOTORS CORPORATION
FRAMINGHAM, MASSACHUSETTS**

VOLUME I: TEXT, TABLES AND FIGURES

**Prepared for:
General Motors Corporation**

**AUGUST 2008
REF. NO. 012618 (36)**
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PHASE IV REMEDY IMPLEMENTATION PLAN REVISION No. 1

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LINKED SITE RTN: 3-4356 BEAVERDAM BROOK**

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VOLUME II: APPENDICES A TO J

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1.0 INTRODUCTION

On behalf of General Motors Corporation (GM), Conestoga-Rovers & Associates (CRA) has prepared this Phase IV Remedy Implementation Plan (RIP) Report (Revision No. 1) for the Former Settling Lagoon (Lagoon) and linked Beaverdam Brook (Brook) sites (Site). The Site location is presented on Figure 1.1. The Massachusetts Department of Environmental Protection (MADEP) Site scoring maps are presented on Figures 1.2 and 1.3 for the Lagoon and Brook, respectively. A Site plan showing the Disposal Site boundary is presented on Figure 1.4.

The Phase IV RIP was prepared and submitted to MADEP in December 2007. The engineering design was revised to reflect changes in the design and construction approach to remedy implementation and comments and conditions received during the permitting and approval process. The Phase IV RIP (Revision 1) was prepared to provide the updated detailed implementation plan for the selected response actions to achieve a Remedial Action Outcome (RAO). Copies of the Phase IV Completion Statement and the MADEP Bureau of Waste Site Cleanup (BWSC) Transmittal Form 108 were submitted electronically using eDEP on August 22, 2008. Copies of the forms and the eDEP receipt are provided in Appendix A.

A Phase III Remedial Action Plan (RAP) (CRA, 2007) was prepared based on the results of the Interim and Final Phase II Comprehensive Site Assessments (CSAs). The Phase III RAP (CRA, 2007) provided the selection of the comprehensive response actions (RAs) to be implemented for the Site. The selected response actions included removal of oil and hazardous materials (OHM) impacted materials from the Brook and Lagoon and transportation and off-site disposal at a permitted disposal facility.

Interim Phase II CSAs were submitted to MADEP for the Lagoon (CRA, 2005a and 2005b) and Brook (CRA, 2005a and 2005c) under Release Tracking Number (RTN): 3-3940 and RTN: 3-4356, respectively. The Interim Phase II CSA Reports documented and presented the results of the extensive historical and recent environmental, wetland delineation, and other investigations completed for the Site. The Interim Phase II CSA Reports also included the Tier I Permit Applications based on re-classifications of the Lagoon and Brook as Tier IB sites.

The Final Phase II CSA Reports and Completion Statements were submitted to MADEP separately for the Lagoon (CRA, 2006a) and Brook (CRA, 2006b) under MADEP RTN: 3-3940 and RTN: 3-4356, respectively. The Phase II CSA Reports included updates to the Interim Phase II CSA Reports, and the Human Health Risk Assessment

(HHRA) and the Ecological Risk Assessment (ERA) for the two sites. The Brook site (RTN: 3-4356) was linked to the Former Lagoon site (primary site, RTN: 3-3940) as part of the Final Phase II CSA submittal.

In March 2006 MADEP and GM entered into an Administrative Consent Order with Penalty (ACOP-NE-05-3A0421) for the Lagoon (RTN: 3-3940) and in May 2006 ACOP-NE-05-3A043 for the Brook (RTN: 3-4356). The submittal of the Phase IV RIP in December 2007 addressed and fully complied with paragraphs VII.D.3 of both ACOPs, which required the submittal of Final Phase IV Reports by December 31, 2007.

1.1 GENERAL

The Former GM Assembly Plant operated from the 1940s to 1994 when GM sold the Property to ADESA Auctions, Inc. (ADESA) with the exception of the area of the Former Landfill and adjacent wetlands. As part of the sale, GM retained the responsibility for addressing environmental issues associated with the Brook and Lagoon. Prior to and after the sale, GM conducted environmental investigations and remediation activities at the Site and other areas of the Property, specifically the Former Landfill (RTN: 3-3939).

The Brook portion of the Site was formerly assigned MADEP RTN 3-4356. The Brook was linked to the Lagoon (primary site) under RTN: 3-3940, with the submittal of the Lagoon Final Phase II CSA Report (CRA, 2006c). Therefore, for the purposes of this RIP, and future MADEP submittals, the Site, including both the Lagoon and Brook, has been assigned the primary RTN: 3-3940.

This Phase IV RIP provides the detailed engineering design of the RA alternative selected in the Phase III RAP (CRA, 2007). The RAP identified Alternative 3 (removal and off-site disposal of impacted sediment) as the preferred RA for the Site which complies with 310 Commonwealth of Massachusetts Regulations (CMR) 40, the Massachusetts Contingency Plan (MCP), including Response Action Performance Standards, and includes cleanup criteria determined from the Ecological Impact Delineation Study.

1.2 BACKGROUND

The Property is located at 63 Western Avenue in the Town of Framingham, Middlesex County, Massachusetts (Figure 1.1). In addition to the Brook and Lagoon, the Property includes the following additional disposal sites and RTNs:

- RTN 3-317 Former Assembly Plant; and
- RTN 3-3939 Former Landfill Site.

The Former Assembly Plant is the responsibility of ADESA and the Former Landfill Site is GM's responsibility; both are being addressed separately from the Site.

The Site consists of the Lagoon and associated West Outfall Area (WOA) located on the northwest corner of the Property and a portion of the Brook located along the western Property line as well as the wetland area between the WOA and Brook, south of the Lagoon (Wetland Soil Area) as shown on Figure 1.4.

Currently, ADESA owns the Property in the area of the Lagoon, the Wetland Soil Area, the WOA, and the eastern portion of the Brook. CSX Corporation (CSX) owns the majority of the property to the west of the Site, adjacent to the Property and upstream of the Property. Downstream of the Property along the Brook are various industrial, commercial, private residential and vacant properties on both sides of the Brook.

Historically, the Lagoon received stormwater and wastewater from the Former Assembly Plant, which drained by gravity to the former Pump House and was then pumped to the west end of the Lagoon. The stormwater and wastewater flowed generally from west to east within the Lagoon and drained to the Brook via Outfall No. 3. The Lagoon was constructed in 1964 and its use for wastewater management was discontinued in 1968 when a wastewater treatment plant was constructed. The use of the Lagoon for active stormwater management was discontinued in 1989.

The Lagoon consists of an approximately 1.68-million-gallon capacity (based on an approximately 8 foot (ft) depth of water) former retention pond and the WOA. A former Pump House, and former Valve House were operated with the Lagoon but also are now owned by ADESA. The WOA was designed to contain stormwater overflow from the Lagoon.

The Lagoon is approximately 400 ft in length by 68 ft in width with depths ranging from approximately 5 to 9 ft below ground surface (bgs) (top of lagoon bank) and varying depths of surface water and groundwater. The bottom of the Lagoon slopes slightly from west to east towards the former Valve House and gravity discharge outfall (Outfall No. 3) to the Brook. The valve at the former Valve House has been closed for many years and prevents surface water and sediment discharges from the Lagoon to the Brook.

The WOA at the southwest end of the Lagoon is located in a forested wetland area. This overflow stormwater retention area is contained to the north and northeast by Lagoon sidewalls, to the south and southeast by an earthen berm and to the west and southwest by what was historically described as a topographic rise in the ground surface. The earthen berm and topographic rise are comprised of fill material. The top of the earthen berm and sidewall are approximately 3 to 3.5 ft and 4 to 8.5 ft higher, respectively, than the elevation of the Lagoon discharge outfall pipe. There is a break in the earthen berm located on the south side of the WOA as shown on Figure 1.4.

The Brook flows in a northerly direction and the on-Property portion is approximately 3,250 ft in length, as shown on Figure 1.4. The surface topography in the area of the Brook is relatively flat, and there is an approximate three percent slope from the west side of the Former Assembly Plant towards the Site. The Property is situated in a relatively low-lying area in which some ponding or wetlands are commonly observed during high flow seasons. Historical investigations indicated the Brook to be shallow and range in depth from 0.6 ft to 2.5 ft (2 ft average) and in width from 15 ft to 28 ft (20 ft average). The entire length of the on-Property portion of the Brook is located within the 100-year floodplain. In August 2004, after large rainfall events, the depth of water in the Brook was observed to be at least 5 ft as a result of beavers building dams south of the Lagoon outfall (Outfall No. 3) which discharges directly to the Brook. Following the removal of the beaver dams in November 2004, the Interim Phase II CSA investigation for the Brook indicated the average depth of the Brook to be approximately 1.6 ft, and the average width of the Brook to be approximately 23 ft.

The land to the west of the Brook is generally heavily vegetated and unoccupied, undeveloped wetlands or uplands. At the time of historical investigations, the south (upstream) portion of the Brook on-Property was primarily undeveloped land. To the north (downstream of the Property), there are industrial, commercial, residential, and vacant properties on both sides of the Brook. Approximately 2.2 miles downstream of the Property, the Brook converges with Course Brook and discharges into Fiske Pond

located in the town of Natick, Massachusetts. Fiske Pond empties into Lake Cochituate, which is approximately 2.6 miles northwest of the Property.

Beaverdam Brook is a freshwater perennial surface water body and is not directly used as a water supply. There are no areas of critical environmental concern or parklands or other designated recreational areas in the area of the Site on the Property, however, fishing and other recreational activities may occur at downstream locations.

The existing and former discharge structures located along the reach of the Brook on-Property include four historical surface stormwater outfall structures (Outfall No. 1 to Outfall No. 4) as shown on Figure 1.4.

The wetland outfall (Outfall No. 1) is the farthest upstream on-Property drainage feature which discharges to the Brook. Wetland A is located to the south and west of the Property and is hydraulically connected to the North Pond/Brook through a stormwater sewer located on the southwest portion of the Property as shown on Figure 1.4. The northwest end of the sewer discharges through Outfall No. 1 from the North Pond. The stormwater sewer pipe runs through the Former Landfill (RTN: 3-3939) and was investigated and lined as part of the RA activities for the Former Landfill. The sewer pipe also collects Property drainage from catch basins on ADESA property and discharges to a stormwater retention pond (North Pond) located on ADESA property which overflows and discharges through a 24-inch diameter discharge outfall (Outfall No. 1) to the Brook. The North Pond was substantially enlarged and upgraded as part of the RA activities for RTN 3:3939. Wetland A is considered part of the Brook site since it is hydraulically connected via the storm sewer and North Pond.

The second on-Property outfall (Outfall No. 2) is located approximately 1,000 ft downstream from Outfall No. 1 and consists of a 54-inch diameter outfall. Outfall No. 2 was formerly used between 1947 and 1964 to discharge stormwater from the Former Assembly Plant roof and parking lots to the Brook. In 1964, the stormwater was diverted to a Pump House that directed the discharge to the newly constructed Lagoon. The stormwater was diverted from the roof drain outfall to the Lagoon to provide settling of contaminants in the roof runoff prior to discharge to the Brook. The use of the Lagoon for wastewater management was discontinued in 1968 when a wastewater treatment plant was constructed. The active use of the Lagoon for stormwater management was discontinued in 1989.

The third on-Property outfall (Outfall No. 3) is located approximately 225 ft downstream from the former roof runoff outfall (Outfall No. 2) and it gravity discharged overflow from the Lagoon to the Brook through an 18-inch discharge structure.

Other drainage sources to the Brook are stormwater sheet flow runoff from primarily paved and open areas of the Property. A portion of stormwater runoff from the roof of the Property buildings drains by sheet flow into Wetland A to the south, and into existing ADESA stormwater collection systems to the north and east, including a newly (2005) constructed wetland (ADESA Wetland). The ADESA Wetland receives drainage that was formerly routed to the Brook via Outfall No. 4. During the construction of the ADESA Wetland, Outfall No. 4 was abandoned to direct stormwater to the wetland. The ADESA Wetland discharges overflow to the Brook approximately 100 feet upstream of the downstream Property boundary, as shown in Figure 1.4.

There are no other known current point source stormwater discharges located along the eastern on-Property reaches of the Brook. The wetland and forested areas to the west of the Brook also discharge stormwater runoff to the Brook.

The Phase II CSA activities provided the delineation of approximately 45 acres of wetlands located at and in the vicinity of the approximately 90-acre Property. Nine separate wetlands of various types were delineated in accordance with the United States Army Corps of Engineers (Corps), MADEP, and the Framingham Conservation Commission (FCC) regulations and delineation requirements and practice. Wetlands A, F, G, and H are discussed further below.

Wetland A (30 acres within the Framingham Town Line) is located to the south of the Former Landfill, and is connected hydraulically to the Brook via the North Pond/Outfall No. 1.

The Lagoon is considered Wetland F, and is bordered by Wetland G to the south and Wetland H to the north. Wetland F is 0.76 acres and occurs entirely on the Property. The Lagoon is classified as an open-water area with a narrow fringe of emergent wetland vegetation.

Wetland G (18.5 acres) is a palustrine-emergent/palustrine-scrub/shrub (PEM/PSS) wetland located on the west side of the Brook and south of the Lagoon on CSX property.

Wetland H (15.4 acres) is a PEM/PSS/Palustrine-forested (PFO) wetland located on the west side of the Brook north of the Lagoon on CSX property. Together, Wetlands G and H cover the entire length and both banks of the Brook on the Property.

1.3 NATURE AND EXTENT OF OHM

The primary source of OHM was due to historical impacts to the Site related to stormwater runoff from the roof of the Former Assembly Plant via Outfall No. 2 and from the Lagoon to the Brook via Outfall No. 3. The roof was known to have lead and other metal contamination from air emissions related to former paint shop and welding operations. In addition, these emissions would have contained polycyclic aromatic hydrocarbons (PAHs). The roof was remediated as part of facility decommissioning activities prior to the sale of the property to ADESA in 1994. Prior to 1964, the roof stormwater runoff discharged directly to the Brook via Outfall No. 2. Following the construction of the Lagoon in 1964, the stormwater runoff from the roof discharged to a storm sewer collection system which gravity drained to a Pump House and was pumped to the Lagoon. The Lagoon gravity discharged to the Brook via Outfall #3. Wastewater and stormwater runoff from several sources (e.g., spray booth paint wastes, welding booths, caustic stripping wastes, washing wastes, and some oily wastes) would have contained metals and petroleum hydrocarbons from the use of gasoline, lubricating oils, and fuel oils as part of Former Assembly Plant operations. The heavier fuel oils would also have contained PAHs. In addition, plasticizer coatings applied to new vehicles and the use of plastic materials in assembly operations would have contributed to the presence of phthalates in surface water runoff.

For the Site, the primary impacted media is sediment and secondarily soil and surface water. Shallow overburden groundwater and native subsurface soil adjacent to the Lagoon and the soil and groundwater directly beneath impacted sediment within the Lagoon have minimal to no impact from OHM based on the results of the Phase II CSA and historical investigations. There also is minimal or no impact in native streambed hardpan soils present beneath impacted sediment in the Brook and the Lagoon.

The primary OHM detected at the Site are lead and other metals, PAHs, phthalates, and petroleum hydrocarbons. Metals, PAHs, polychlorinated biphenyls (PCBs), and petroleum hydrocarbons were detected at concentrations in sediment collected from within the Lagoon, which exceeded the sediment freshwater screening benchmark values. For surficial soil in the area of the Lagoon, lead and benzo(a)pyrene were detected at concentrations exceeding S-2/GW-3 and/or S-3/GW-3 soil criteria. For soil

and sediment collected from the Brook, certain metals, PAHs, phthalates, and petroleum hydrocarbons were sporadically detected at concentrations exceeding GW-3/S-2 or GW-3/S-3 soil criteria, Massachusetts Surface Water Quality Standards [adopted United States Environmental Protection Agency (USEPA) Ambient Water Quality Criteria (AWQC)], and freshwater sediment benchmark screening values. The concentrations greater than Method 1 standards were further evaluated by a Method 3 Risk Characterization.

1.4 RESULTS OF THE RISK ASSESSMENTS

The results of the Method 3 HHRA conducted as part of the Phase II CSA concluded that a condition of no significant risk (NSR) of harm to human health exists for the Lagoon, Brook (both on-Property and off-Property), the Wetland Soil Area, and the WOA. Therefore, response actions are not required to address risks to human health due to OHM-impacted media.

As presented in the Phase II CSA, no substantial or imminent hazards exist due to Site conditions and a level of NSR to public welfare and safety exists currently and for the foreseeable future for the Site, except for the potential physical safety hazard associated with the open water Lagoon. Addressing this physical hazard as part of remedial actions, as necessary, is complicated by the interpretation that the Lagoon is a regulated, although inadvertent, wetland and should ideally be maintained as such.

Based on the results of the Method 3 Stage II Ecological Risk Characterization, sediment in the Lagoon, WOA, and Brook, and surface soil associated with the Brook and Wetland Soil Area are impacted primarily by metals, phthalates, and PAHs resulting in the following conditions:

- for the Lagoon and WOA sediment, the weight of evidence indicates that ecological risk cannot be concluded to be negligible and that a condition of NSR of harm cannot be concluded to have been met;
- for Brook sediment, the weight of evidence indicates that ecological risk cannot be concluded to be negligible and a condition of NSR of harm cannot be concluded to have been met for Reaches 3, 4 and 5 (downgrade of Outfall No. 2 to the downstream Property boundary); and
- for some areas along the upper western bank of the Brook, adjacent to Reaches 3 and 4 and in the wetlands adjacent to the Brook and south of the Lagoon, the weight of

evidence indicates that ecological risk cannot be concluded to be negligible for all locations and a condition of NSR of harm cannot be concluded to have been met.

Therefore, response actions are necessary to address ecological impacts of Site-related OHM for the Brook, Lagoon, WOA, and Wetland Soil Area based on the results of the ERAs presented in the Final Phase II CSA Reports. The Ecological Impact Delineation Study presented in Section 2.0 of this Phase IV RIP Report provides further refinement of the extent of these areas that require response actions.

1.5 RESULTS OF THE PHASE III RAP

The following specific remedial action objectives were developed in the Phase III RAP based on the presence of Site-related OHM, and the results of the HHRA and the ERA to achieve a condition of NSR for the current and anticipated future uses of the Site:

1. eliminate any Substantial Hazards for the Site associated with ecological risk;
2. achieve and maintain a level of NSR at the Site for ecological risk posed by exposure to OHM present in sediment and surface soil;
3. ensure that OHM present in sediment and surface soil do not cause future potential releases of OHM to surface waters and/or wetlands, which may cause a condition of substantial release migration and/or significantly affect environmental receptors;
4. the selected remedy should prevent contact with, contain, reduce, and/or detoxify the impacted materials (i.e., Permanent or Temporary Solution) to ensure a condition of NSR is maintained for the Site;
5. address the potential exceedances of the Upper Concentration Limit (UCL) for lead in soils if the OHM-impacted sediments within the Lagoon and Brook are dewatered and left on-Site;
6. address the physical safety hazard of the open Lagoon;
7. minimize damage to the natural environment during remediation activities;
8. remove impacted sediment and soil to restore wetlands and natural resources rather than provide replacement wetlands;
9. minimize potential impacts and exposures to the public during remediation activities;
10. minimize impacts to ADESA operations and potential impacts and exposures to employees; and

11. minimize long-term Operation, Maintenance, and Management (OMM) activities required to maintain the conditions of NSR [e.g., Activity and Use Limitations (AULs) and OMM inspection, monitoring and maintenance activities] and the natural environment.

Following the evaluation of various remedial alternatives, the Phase III RAP concluded that Alternative 3 was the preferred alternative for the Site to address the remedial action objectives. Alternative 3 includes the removal and off-Site disposal of impacted sediment and soil from the Brook, Lagoon, WOA, and Wetland Soil Area, as necessary and determined by further detailed ecological evaluations. An AUL and OMM would not be required for Alternative 3 since a Permanent Solution would be achieved for the Site.

The remedial action that would be conducted for Alternative 3 would result in a Permanent Solution (Class A-2 RAO) for the Site including the Brook, Lagoon, WOA, and Wetland Soil Area.

The Phase III RAP concluded that it was not feasible to achieve or approach background OHM concentrations for the sediment in the Brook, the Lagoon, and the WOA, and soil in the Wetland Soil Area and banks of the Brook. This conclusion was based on the incremental costs being substantial and disproportionate to the incremental benefit of risk reduction and environmental restoration, as well as non-pecuniary values.

The specific extent and volumes of material requiring remediation were determined based on results of a pre-design Ecological Impact Delineation Study (Section 2.0). Section 2.0 provides a detailed description of the purpose, approach, and results of the Ecological Impact Delineation Study and identifies the specific areas requiring remediation.

1.6 PURPOSE OF REPORT

This Phase IV RIP Report Revision 1 has been prepared in accordance with 310 CMR 40.0874 and provides the engineering design, and construction plans and technical specifications for the preferred alternative, Alternative 3, described in the Phase III RAP. The major components of this report include the following:

- final determination of the extent of remediation;
- engineering design objectives and criteria for remedial components;

- stormwater management plan;
- sediment management plan;
- wastewater treatment and discharge;
- remediation access and control measures;
- construction plans and specifications;
- Restoration Plan;
- Construction Quality Assurance (CQA) Program;
- Health and Safety Plan (HASP);
- permits and approvals; and
- public involvement activities.

This report includes analytical data, ecological assessments, calculations, drawings, and related information and documentation in support of the removal, consolidation/stabilization, and off-Site disposal of impacted material from the Lagoon and Brook, decommissioning of the former Pump House and Valve House and related stormwater piping, and Brook/wetland restoration. The engineering design details for construction activities are provided in the technical specifications and design drawings included with this report.

This report is organized as follows:

Section 1.0	Introduction;
Section 2.0	Ecological Impact Delineation Study;
Section 3.0	Proposed Remedial Action;
Section 4.0	Pre-design Activities;
Section 5.0	Stormwater Management Plan;
Section 6.0	Engineering Design;
Section 7.0	Construction Quality Assurance (CQA) Program;
Section 8.0	Health and Safety Plan (HASP);
Section 9.0	Permits and Approvals;
Section 10.0	Public Communication Plan;
Section 11.0	Contacts;

Section 12.0 Schedule; and
Section 13.0 References.

This report includes the following appendices:

Appendix A BWSC Transmittal Forms and Notifications;
Appendix B Restoration Plan;
Appendix C Ecological Impact Delineation Study;
Appendix D Stormwater Management Calculations;
Appendix E Construction Drawings and Specifications;
Appendix F Health and Safety Plan;
Appendix G Remedial Construction Quality Assurance (CQA) Plan;
Appendix I Permits;
Appendix J NOI Supplement; and
Appendix K Public Notification.

2.0 ECOLOGICAL IMPACT DELINEATION STUDY

2.1 PURPOSE

As discussed in the Phase III RAP, an Ecological Impact Delineation Study was necessary to refine previous ecological risk assessment work at the Site to conclusively determine a) if there are any areas where site-related OHM may pose unacceptable ecological risks, and b) for any such areas, determine the appropriate response action that would be protective of ecological receptors. The Ecological Impact Delineation Study was conducted by Exponent from July to December 2007 and is presented in Appendix B.

2.2 BACKGROUND/SUMMARY OF PAST STUDIES

ERAs were conducted for the Lagoon and Brook as part of the Phase II CSA in accordance with the requirements of 310 CMR 40.0995 and applicable MADEP ecological risk assessment guidance.

The ERA for the Lagoon concluded that this area provides some habitat for aquatic life and wildlife and that metals, PAHs, and PCBs in sediments of the Lagoon could not be ruled out as "clearly unlikely to result in environmental harm".

The ERA for the Brook concluded that this area provides habitat for benthic invertebrates, but limited habitat for fish. Results of sediment toxicity tests with Brook sediments suggested some adverse impacts to the benthic macroinvertebrate community on the Property with impacts decreasing with distance downstream.

In addition, the ERA found that soil collected along the upper western bank of the Brook and in the wetlands adjacent to the Brook and south of the Lagoon exceeded screening benchmarks; thus, potential environmental risk in this area also could not be ruled out.

Additional site-specific data were collected as part of the Ecological Impact Delineation Study support development of ecological risk-based cleanup goals to delineate areas and media that provide significant ecological risk.

2.3 CONCEPTUAL ECOLOGICAL SITE MODEL AND STUDY DESIGN

Field sampling to support the Ecological Impact Delineation Study was conducted by Exponent with support from CRA staff during July 23 to 27 and August 6 to 10, 2007. Public notification activities with regards to the off-Property sampling are discussed in Section 10.0. This section summarizes the Conceptual Ecological Site Model and the sampling design for the Lagoon, WOA, Wetland Soil Area, and the Brook.

2.3.1 LAGOON

The Lagoon provides habitat for small fish, amphibians, and invertebrates, all of which serve as a prey base for wildlife. Elevated concentrations of metals, PAHs, phthalates, PCBs, and pesticides were found in Lagoon sediments and surface water during the Phase II CSA and historical investigations. Small mammals and birds, such as raccoons, belted kingfisher, and great blue herons, may be exposed to the OHM associated with the Lagoon while foraging. Exposure routes for these receptors at the Lagoon include ingestion of contaminated prey, surface water, and sediment. The ecological Conceptual Site Model (CSM) for exposure of ecological receptors to potentially site-related OHM in the Lagoon is presented on Figure 3.1 of Appendix B.

The following samples were targeted for collection to evaluate the potential risk posed by OHM associated with the Lagoon to wildlife:

- four composite samples of sediment plus one duplicate sample;
- three surface water grab samples plus one duplicate sample and one field blank sample; and
- nine biota samples plus one duplicate sample.

One composite sediment sample was collected from the top 6 inches at each of the northern, southern, eastern, and western banks of the Lagoon (total of four samples). A duplicate sediment sample was taken at the southern station. Each composite sample consisted of four grab samples from a given station. Sediment samples were analyzed for target analyte list (TAL) metals, target compound list (TCL) semi volatile organic compounds (SVOCs), TCL pesticides, PCB Aroclors®, and total organic carbon (TOC). Three surface water grab samples and one duplicate sample were collected in the shallow edges of the Lagoon and were analyzed for TAL metals (dissolved and total), TAL SVOCs, PCB Aroclors®, TCL pesticides, and pH.

As is typical in most ecological investigations, the proposed sampling design for the aquatic community of the Lagoon was modified in the field based on an improved understanding of community characteristics. For example, early in the field program it became clear the Lagoon supported an abundant population of frogs (*Rana clamitans*) and a fairly diverse fish community, including fairly large individuals of certain species including brown bullhead (*Ameiurus nebulosus*) and bluegill (*Lepomis macrochirus*). By contrast, at the time of the sampling, the benthic community of the Lagoon consisted primarily of corixid invertebrates and only a few crayfish were observed.

Biota sampling in the Lagoon resulted in the collection of seven composite samples of fish consisting of juvenile and adult of *A. nebulosus* and *L. macrochirus*, one individual large adult *A. nebulosus*, four composite samples of frogs, and four composite samples of crayfish. Of these samples, two composite bluegill samples, two composite brown bullhead samples, three composite crayfish samples, and three composite amphibian samples were selected for chemical analysis. Rather than analyze a duplicate tissue sample, another fish composite sample was analyzed so that there were an even number of bluegill and brown bullhead samples in the data set. Biota samples were analyzed for TAL metals, TCL SVOCs, TCL pesticides, PCB Aroclors®, and lipid content.

2.3.2 WETLAND SOIL AREA/WEST OUTFALL AREA

The Wetland Soil Area (east of the WOA between the WOA and the Brook) and the WOA provide habitat for soil invertebrates and wildlife. Elevated concentrations of metals, PAHs, phthalates, PCBs, and pesticides were found in floodplain soils in previous investigations in these areas. Small mammals and birds, such as robins and shrews, may be exposed to these OHM in the wetland while foraging. Exposure routes for these receptors in the wetlands include ingestion of contaminated prey and soil. The ecological CSM for exposure of ecological receptors to potentially site-related OHM in the Wetland Soil Area and WOA is presented on Figure 3.3 of Appendix B.

To evaluate the potential risk posed by chemicals in the Wetland Soil Area and WOA to wildlife, the following samples were collected:

- five composite samples of soil plus one duplicate sample;
- five composite earthworm tissue samples plus one duplicate sample; and
- five composite samples of surficial soil invertebrates (e.g., sow bugs, beetles, and spiders).

Composite soil invertebrate and soil samples were collected from the top 6 inches in areas of the Wetland Soil Area and WOA that are attractive to wildlife. A total of five composite soil samples and one duplicate soil sample were collected. Each composite sample was homogenized in the field and was composed of several individual samples taken at locations where soil invertebrates and earthworms were collected. The size of the sampling areas was dictated by the availability of soil invertebrates for sampling and chemical analysis. Soil samples were analyzed for TAL metals, TCL SVOCs, TCL pesticides, PCB Aroclors®, and TOC.

As discussed in Appendix B, the sampling design for earthworms and soil invertebrates was modified based on field conditions. Earthworms were collected by manually sifting soils excavated by hand with a spade. Very few earthworms were encountered despite considerable effort. The lack of significant earthworm communities at the Property was also confirmed in other wetland areas containing relatively low concentrations of Site-related OHM. Other soil invertebrates were collected via use of pit traps, cover boards, and manually sifting soils by hand. Other soil invertebrates were more abundant than earthworms. However, these organisms were small and yielded little tissue mass so considerable effort was made to collect sufficient mass for chemical analysis. Soil invertebrate collection yielded the following samples: one composite sample of earthworms and five composite samples of other soil invertebrates (primarily slugs, crickets, and sowbugs). Earthworms and other soil invertebrates were analyzed for TAL metals, TCL SVOCs, TCL pesticides, PCB Aroclors®, and lipid content.

2.3.3 BROOK

The Brook has been divided into 5 reaches for the purpose of the ecological studies that have been conducted as shown on Figure 2.1. Previous sediment sampling conducted during the Phase II CSA and historical investigations throughout the 5 reaches indicated that sediments contained concentrations of metals, PAHs, phthalates, PCBs, and pesticides above the sediment screening benchmarks. The ecological CSM for exposure of ecological receptors to potentially site-related OHM in the Brook is presented on Figure 3.2 of Appendix B. The highest concentrations of these OHM were generally found in the Brook in on-Property Reaches 3 and 4. Previous sediment toxicity tests indicated that sediments at certain locations along the Property might pose an unacceptable risk to benthic invertebrates. The sediment toxicity tests conducted in 1998 were short-term tests and MADEP now recommends the use of long-term sediment toxicity tests to support conclusions of NSR.

Therefore, the sampling design for the 2007 study of the Brook focused on long-term sediment toxicity testing to evaluate the potential risk to the benthic invertebrate community. The toxicity testing was supplemented by:

- bulk sediment chemistry analysis to determine whether there is a relationship between sediment toxicity (if any) and the concentration of potential Site-related OHM; and
- solid phase microextraction (SPME) and analysis of PAHs in sediment pore water to aid in the interpretation of toxicity testing results by providing critical information to determine the potential bioavailability of PAHs.

42-Day sediment toxicity tests were conducted with the freshwater amphipod *Hyalella azteca* using surficial (i.e., top 6 inches) sediment composite samples in each of four reaches of the Brook: an upstream off-Property reference reach, two impacted reaches along the Property boundary (Reaches 3 and 4), and one downstream off-Property reach (Reach 5). Toxicity testing was not conducted for the Ecological Impact Delineation Study in Reaches 1 and 2, upstream of the source area, as the results of the Phase II CSA concluded that these reaches did not pose an unacceptable ecological risk based on the concentrations of OHM and toxicity tests. Test endpoints for the 2007 testing were survival and growth on Day 28 and reproduction on Day 42. Toxicity was evaluated by statistical comparisons of survival, growth, and reproduction data in the study area reaches to both the laboratory control and field reference Site sediment. A single toxicity test using *H. azteca* is deemed to be ecologically conservative because this test includes two sublethal endpoints in addition to survival. In addition, *H. azteca* was more sensitive than the midge (*Chironomus tentans*) to the Brook sediments in the previous round of toxicity testing conducted in 1998.

Brook sediment samples were collected from 25 stations as follows:

- 6 stations from the upstream off-Property reference area;
- 8 stations from the reach between Outfall No. 2 and Outfall No. 4 (Reach 3);
- 5 stations from the reach between Outfall No. 4 and the downstream Property boundary (Reach 4); and
- 6 stations downstream of the Property boundary (Reach 5).

These stations were selected to represent the broadest range of concentrations of potentially Site-related OHM over the entire section of the Brook reasonably expected to be influenced by the Site. Sediment samples were initially screened using rapid-turnaround time analyses for metals and SVOCs to aid in the selection of samples to be submitted for toxicity testing. Sediment samples were analyzed for TAL metals, TCL SVOCs, TCL pesticides, PCB Aroclors®, TOC, black carbon, and grain size.

A total of 14 sediment samples were submitted to the laboratory for toxicity testing. These samples were selected to represent a wide range of concentrations of constituents with the goal of bracketing potential upper and lower effects concentrations for potential Site-related OHM. It is important to have a wide distribution of concentrations in test sediments to maximize the ability to establish quantitative relationships between exposure and effects. The samples submitted for toxicity testing were distributed as follows:

- 3 samples from the upstream reference area;
- 6 samples from Reach 3;
- 2 samples from Reach 4; and
- 3 samples from Reach 5.

An aliquot of sediment from five stations was used for SPME and analysis of PAHs in extracted sediment pore water, based on an assessment of the chemical mass analysis results of sediment for PAH, grain size, and TOC, appearance, and observations in the field. The stations were selected based on the following criteria:

- reflect a broad range of PAH concentrations estimated to bracket no-effects to potential severe effects levels based on comparison to available screening values and best professional judgment;
- represent typical physical sediment conditions (e.g., grain size, presence of organic material, texture, and color); and
- not be associated with any anomalous field observations such as presence of a sheen or petroleum odor that might confound data interpretation.

Pore water was analyzed for 34 parent and alkylated PAHs to enable calculation of total Toxic Units for each sample.

2.4 ECOLOGICAL RISK ASSESSMENT RESULTS

The soil and sediment quality observed during the Ecological Impact Delineation Study were generally similar to quality observed during previous Phase II CSA activities, although there were some differences mainly due to composite sampling versus grab sampling, which is more representative for the purposes of overall ecological exposure. Ecological risks to wildlife receptors in the Lagoon, the Wetland Soil Area, and WOA were assessed by estimating exposure to Site-related OHM through consumption of prey items and incidental ingestion of soil and comparing exposure estimates to chemical-specific and receptor-specific toxicity reference values (TRVs) to develop hazard quotients (HQs). Consistent with MADEP and USEPA ecological risk assessment guidance, a HQ less than 1 indicates that risk is negligible for that contaminant. Hazard quotients greater than one do not necessarily indicate unacceptable ecological risk, rather only that additional assessment may be needed.

Ecological risks to receptors in the Brook were evaluated by conducting 42-day toxicity tests on the amphipod *H. azteca* using site-collected sediment and evaluating the toxicity data relative to bulk sediment concentrations and constituents and concentrations of PAH in sediment pore water. The results of the risk assessments for the three study areas are summarized below.

2.4.1 LAGOON

Belted kingfisher (*Ceryle alcyon*) and great blue heron (*Ardea herodias*) were selected as potential receptors because they can be exposed to chemicals of potential concern (CoPCs) through ingestion of aquatic invertebrates and fish from the Lagoon. Raccoon (*Procyon lotor*) was selected as a semi-aquatic mammal receptor because they can be exposed to CoPCs through the ingestion of aquatic invertebrates and fish from the Lagoon.

Results of the exposure modeling for the Lagoon revealed that HQs for non-PAH SVOCs were all below one for the kingfisher, heron, and raccoon that use the Lagoon. Concentrations of these OHM are all low in the food chain and unlikely to pose a significant risk of harm to wildlife that use the Lagoon. Aluminum HQs for the raccoon exceeded one, and ranged from 1.2 to 13. Many of the barium HQs for the kingfisher, heron, and raccoon exceeded one, and ranged from 0.12 to 11. Chromium HQs also exceeded one for the kingfisher and raccoon. Copper and manganese HQs exceeded one, and ranged from 1.1 to 2.0, but only for the kingfisher that consumes all crayfish.

Lead HQs ranged from 1.6 to 2.9 for the kingfisher and great blue heron. Lead HQs were below one for the raccoon. Vanadium HQs for the raccoon ranged from 1.0 to 5.1 but were below one for the kingfisher and heron. PAH HQs ranged from less than one to 14 for the kingfisher, heron, and raccoon and are due to incidental ingestion of PAHs in sediment since concentrations of PAHs in biota were below the limits of detection.

Based on the results of this risk evaluation, a conclusion of NSR of harm cannot be reached for the Lagoon. Although PCBs and pesticides do not pose a significant risk of harm to wildlife that use the Lagoon, metals and PAHs cannot be ruled out as posing a significant risk to wildlife that use the Lagoon. In general, HQs were not very high (e.g., less than 100) and were based on several conservative assumptions (e.g., birds are present year-round and contaminants in prey and sediment are 100 percent bioavailable). In addition, the Lagoon area is not likely to provide sufficient resources (e.g., diverse and abundant prey, shelter and nesting habitat) to support populations of the ecological receptors that were modeled. It is therefore unlikely that exposure to these receptors from OHM in the Lagoon would result in unacceptable effects to regional populations.

2.4.2 WETLAND SOIL AREA/WOA

Songbirds and mammals were selected as receptors in the Wetland Soil Area and WOA because these animals can be exposed to CoPCs through ingestion of contaminated prey, such as invertebrates (e.g., slugs, sowbugs, spiders, crickets, and earthworms). American robin (*Turdus migratorius*) is a representative avian species because it has a high exposure to chemicals in soil through ingestion of worms, and other soil invertebrates, has a small home range, and occurs on-Site. The short-tailed shrew (*Blarina brevicauda*) was selected as the mammalian wetland receptor because it represents small predatory mammal at the Wetland Soil Area and WOA, has a high exposure to chemicals in soil through their ingestion of earthworms, and other soil invertebrates and is likely to occur in the study area.

The results of the wildlife exposure models for the Wetland Soil Area and WOA indicated that HQs for PCBs and pesticides were all below one. HQs for non-PAH SVOCs were all below one for the robin and shrew that use these areas. HQs for PAHs were not calculated because concentrations of PAHs in the 2007 composite soil/sediment samples were all below MADEP background levels for natural soils and concentrations of PAHs in earthworms and soil invertebrates were not detected above analytical detection limits. Antimony, barium, chromium, and lead HQs exceeded one,

and ranged from 1.6 to 2.9, for the shrew that uses the WOA. Copper, lead and zinc HQs ranged from 1.9 to 4.4, for the robin that uses the WOA. However, these HQs were based on a no observed adverse effects (NOAEL) TRV. HQs based on the lowest observed adverse effects (LOAEL) TRVs were all below one. The wildlife exposure models for the robin and shrew were designed to be conservative. These models assumed that the receptors only foraged within the WOA even though other suitable habitats for these receptors exist nearby and off-Site. The models also assumed that these receptors do not migrate substantially or hibernate and are continually exposed to CoPCs at the Site. The models also assumed that the CoPCs in soil were 100 percent bioavailable to the receptors when the CoPCs may be bound to organic material in the wetland soil. It is, therefore, concluded that there is NSR to wildlife associated with the WOA.

Barium, cadmium, lead and selenium NOAEL HQs exceeded one, and ranged between 1.4 and 4.7 for the shrew that uses the Wetland Soil Area. Cadmium, lead, selenium, and zinc NOAEL HQs exceeded one, and ranged from 2.9 to 7.3, for the robin that uses the Wetland Soil Area. If the shrew and robin are assumed to consume a diet of earthworms only, the selenium LOAEL HQs are 1.2 (shrew) and 2.2 (robin). If the shrew and robin are assumed to consume a diet of other soil invertebrates (e.g., slugs, crickets, and spiders), the selenium NOAEL HQs are less than one for both the shrew and robin. No other LOAEL HQs exceed one. The wildlife exposure models for the robin and shrew were designed to be conservative. These models assumed that the receptors only foraged within the Wetland Soil Area even though other suitable habitats for these receptors exist nearby and off-Site. The models also assumed that these receptors do not migrate substantially or hibernate and are continually exposed to CoPCs at the Site. The models also assumed that the CoPCs in soil were 100% bioavailable to the receptors when the CoPCs may be bound to organic material in the wetland soil. It should also be noted that earthworms were difficult to find in comparison to other soil invertebrates at the Site when sampling occurred in the summer of 2007, suggesting the diets of songbirds and carnivorous small mammals would largely consist of soil invertebrates other than earthworms at the Site. It is, therefore, concluded that there is NSR to wildlife associated with the Wetland Soil Area.

Based on the results of this risk evaluation and consideration of the conservative assumptions used in the wildlife exposure models for the wetlands, a conclusion NSR of harm was reached for the Wetland Soil Area and WOA.

2.4.3 BROOK

Benthic invertebrates were selected as the potential receptor community in the Brook because they are relatively immobile and would be exposed to OHM in the sediment of the Brook. No fish were observed in the Brook during the Site visits and sediment sampling activities. In addition, the aquatic habitat characteristics of the Brook are not conducive to the establishment and maintenance of a fish community. In particular, recent removal of beaver dams in the Brook lowered the water level to approximately 0.5 to 2.5 ft, under base flow conditions which likely supports only seasonal populations of fish. Therefore, fish were not selected as receptors in the Brook. Because the Brook does not contain abundant prey items for wildlife, such as freshwater mussels and fish, wildlife were also not selected as receptors for this assessment.

Sediment toxicity was evaluated using the 42-day test for *H. azteca*. Significant toxicity was observed in five of the six sediment samples collected from Reach 3 (BBSDR3-02, BBSDR3-04, BBSDR3-05, BBSDR3-06, and BBSDR3-08) and one of the three sediment samples collected from Reach 5 (BBSDR5-06). The furthest downstream sediment sample in Reach 5 (BBSDR5-01) also exhibited some indication of toxicity for one of the three parameters that were measured. Sediment toxicity was not observed in the two sediment samples (BBSDR4-02 and BBSDR4-04) collected from Reach 4. Two lines of evidence (comparison of concentrations of CoPCs in sediment to benchmarks and the results of chronic sediment toxicity tests) suggest that there is Significant Risk of harm to benthic invertebrates from sediments in some portions of the Brook, primarily in Reach 3 where the highest concentrations of OHM have been reported. PAHs do not appear to be contributing to the observed toxicity to *H. azteca* in the chronic toxicity tests based on the results of the SPME and correlation analysis for toxicity and toxicity units for PAHs.

A correlation analysis found that sediment concentrations of several metals and PAHs are significantly and strongly related to survival and reproduction in the chronic sediment toxicity tests, with lead appearing to be most closely related to the toxicity endpoints. Lead concentrations in sediment also exceeded the sediment effect concentration to a much greater extent than did other OHM, and the severity of the effects on survival and reproduction increased with lead concentration. Therefore, lead was selected as the indicator chemical for the remedial design of response actions to address impacted Brook sediment.

A remediation verification level for lead in Brook sediment was developed using the Apparent Effect Threshold (AET) approach. AET is the concentration of a chemical at or

below which no adverse effects are observed. The AET is defined as the highest concentration that did not exhibit statistically significant effects on survival, growth, or reproduction. The AET for lead is 1,100 mg/kg. The lowest concentration at which significant effects were observed was 1,200 mg/kg. The putative toxicity threshold for lead in sediment is between the AET and the lowest concentration at which significant effects were observed. Therefore, the remediation verification level for lead in sediment was set equal to the geometric mean of the AET (1,100 mg/kg) and the lowest concentration at which significant effects were observed (1,200 mg/kg). The remediation verification value for lead in sediment in the Brook is 1,150 mg/kg.

The results of the toxicity testing clearly indicate the potential for unacceptable risk to the benthic community in areas of the Brook represented by stations with toxicity in Reach 3 and one of the stations with toxicity in Reach 5 (BBSDR5-06). Toxicity was also observed at station BBSDR5-01. However, this station is furthest from the Site boundary, there was no toxicity observed at the nearest upstream station (BBSDR5-04), and it was the only station at which toxicity was limited to a decrease in reproduction (i.e., there was no effect on survival or growth). Reproduction is a highly variable endpoint for the *H. azteca* toxicity study primarily as a function of naturally high variability in first brood fecundity, therefore the observed effect may be attributable to natural variability rather than any sediment contamination. If the effect is attributable to sediment contamination, it may be attributable to non-Site-related OHM since this location is the furthest downstream.

A Principle Components Analysis was performed to evaluate chemistry patterns in sediment samples in an attempt to determine whether sediment chemistry at station BBSDR5-01 may be influenced by non-Site related sources. This analysis revealed that PAHs in sample BBSDR5-01 exhibited significant differences in the relative concentrations of selected PAHs. In addition, considerably higher concentrations of DDT and dieldrin were found at BBSDR5-01 than in other samples, suggesting that sediment quality in this area of the Brook is influenced by sources other than the Site.

2.5 CONCEPTUAL REMEDIAL DESIGN BASED ON ECOLOGICAL RISK

2.5.1 LAGOON

The results of the Ecological Impact Delineation Study for the Lagoon indicates that ecological risk cannot be ruled out for avian and mammalian receptors, although such

risks are deemed to be unlikely to result in population-level impacts (i.e., they are unlikely to be unacceptable). Consistent with MCP Response Action Performance Standards and MADEP and USEPA guidance on ecological risk assessment, GM has the option of either refining the risk assessment to demonstrate that there is a condition of NSR to the environment or completing a response action to eliminate further potential for exposure. The demonstration of NSR will require fairly sophisticated investigations, possibly including population modeling. Additionally, since there are elevated concentrations of Site-related OHM present in Lagoon sediment and surface water (likely due to suspended sediment particles), GM has opted to implement sediment removal in the Lagoon as the preferred remedial option. This action will eliminate the exposure pathway to ecological receptors, thus effectively eliminating potential risk from Site-related OHM to ensure that a condition of NSR exists for the Lagoon.

2.5.2 WETLAND SOIL AREA/WOA

The results of the Ecological Impact Delineation Study for the Wetland Soil Area and WOA indicate that there are no unacceptable ecological risks. Therefore, a condition of NSR exists for the Wetland Soil Area and WOA. Therefore, no further action is required to address impacted soil and sediment in these areas.

2.5.3 BROOK

The Phase III RAP remedial alternative for the Brook is to remove OHM-impacted sediment from the Brook that is associated with significant toxicity. The results of the Ecological Impact Delineation Study for the Brook indicate the areas where sediment exhibited both significant toxicity and contained potentially Site-related OHM (primarily lead and zinc) at sufficiently elevated concentrations to have resulted in the observed toxicity. As indicated above, the areas indicated for sediment removal are primarily in Reach 3 with one location in Reach 5 (designated Reach 5 Hotspot).

As indicated on Figure 5.1 of Appendix B, significant toxicity was observed in five of the six samples from Reach 3: BBSDR3-02, BBSDR3-04, BBSDR3-05, BBSDR3-06, and BBSDR3-08. Although significant toxicity was not observed at BBSDR3-07, this location is bounded by two sample locations that did exhibit significant toxicity in close proximity (upstream location BBSDR3-08 and downstream location BBSDR3-02). Sample location BBSDR3-08 is the furthest upstream location exhibiting significant toxicity in the Brook. For Reach 3, the limit of sediment removal upstream of

BBSDR3-08 is conservatively defined as a point 50 feet upstream of Outfall No. 2. Outfall No. 2 is the furthest upstream discharge point where historical releases occurred to the Brook and historical and recent sampling at all locations upstream of this outfall has indicated concentrations of OHM similar to upstream reference conditions. Additionally, previous toxicity tests performed in 1998 on sediment samples collected from Reach 2 (upstream of Outfall No. 2) exhibited acceptable toxicity. The downstream extent of required remediation in Reach 3 is to the first sample location exhibiting acceptable toxicity for the 2007 study (i.e., sample location BBSDR4-04 in Reach 4). This section of the Brook, from Outfall No. 2 to BBSDR4-04 corresponds to the portion of the Brook exhibiting the highest OHM concentrations, including lead, other metals, and PAHs based on all sampling that has been conducted to-date as indicated by the historical lead results for sediment samples collected along the Brook as shown on Figure 2.2.

Additional delineation for sediment removal upstream and downstream of BBSDR5-06 was completed to determine the extent of removal in this Reach 5 Hotspot. Because lead is the potentially Site-related constituent with the strongest relationship to toxicity, it was used as the "indicator substance" for refining the delineation of areas for sediment removal. Therefore, the actual extent of removal was defined by sampling and lead analysis in comparison to the remediation verification level of 1,150 mg/kg for lead.

Delineation of removal areas in the Reach 5 Hotspot were completed as follows:

- The initial limits of sediment removal were defined as 50 ft upstream and 50 ft downstream of sample location BBSDR5-06.
- Iterative sampling was conducted over approximately 1,000-square foot (ft²) sections of Brook bed, starting with the closest 1,000-ft² sections upstream and downstream of the initial removal area.
- The sediment samples were collected from the sample locations shown on Figure 2.3 and were submitted for lead analysis. Each sample was composited from nine field-collected samples on a randomized basis and submitted for rapid-turnaround lead analysis.
- The analytical data were compared to remediation verification level of 1,150 mg/kg and are presented in Table 2.1.
- Where the concentration of lead is less than 1,150 mg/kg, the limit of remediation is defined as the boundary of the last segment sampled.

The area of approximately 1,000 ft² was selected to further define the limits of remediation around BBSDR5-06 because MADEP recommends averaging sediment concentrations over areas no greater than 1,000 ft² to evaluate benthic invertebrate exposures.

For the Reach 5 Hotspot, the maximum extent of sediment removal is defined as a transect perpendicular to the Brook midway between station BBSDR5-06 and the nearest nontoxic station (downstream location BBSDR5-04 or upstream location BBSDR4-04) as shown on Figure 2.3.

3.0 PROPOSED REMEDIAL ACTION

The Remedial Action for the Site will address the following areas and estimated approximate volumes of in-place sediment that require remediation, as shown in Table 3.1.

3.1 BROOK

The areas of the Brook sediment to be removed are in Reach 3 and the Reach 5 Hotspot. The removal depths are based on the sediment depths determined from the transect field surveys. The depth of sediment overlying native silt hard pan in the Brook ranges from approximately 1 to 3 ft. The estimated volume of Brook sediment to be removed is based on the following:

- 912 linear ft in Reach 3;
- 245 linear ft in the Reach 5;
- average Brook width (remediation area) of 18.3 ft;
- average sediment depth of 2.1 ft (average of maximum thickness at each transect);
- bank sediment width of 10 ft on each side of Brook and average depth of 1 ft; and
- 25 percent contingency for non-impacted material (e.g., sediment, native soil, vegetation, and debris) collected during removal.

Therefore, the total volume of sediment removed from Reach 3 (including banks) is estimated to be 2,400 cubic yards, and from Reach 5 (including banks) is estimated to be 600 cubic yards, as shown in Table 3.1.

The Brook remedial action will include clearing, stormwater management, Brook by-pass/diversion, sediment removal/stabilization/off-site disposal, water treatment and discharge, and restoration activities.

Access to the Brook will be a controlling factor in conducting excavation and/or dredging and removal activities. Access from the banks will be used to the extent practicable to minimize potential damage to wetlands and riverbank areas. Some areas may be accessed by entering the Brook directly from the access road/culvert to the Lagoon.

Extensive vegetation will have to be removed from the Brook and areas which are used to access the Brook as part of the sediment removal activities, however, grubbing will be limited to allow more rapid restoration and prevent longer term damage. Access of heavy equipment along the Brook will require the removal of dense vegetation and brush along the waterway and banks. Prior to clearing, erosion controls will be installed along the perimeter of the disturbed area.

Surface water flow diversions will be required during the removal of the impacted sediment from the Brook. The work area (i.e., a segment of the Brook being remediated) will be isolated allowing the Contractor to work along one side of the Brook bed/bank at a time. Surface water and stormwater diverted from upstream non-contaminated portions of the Brook will be collected and discharged at downstream non-contaminated Brook locations. Due to the short duration of the RA activities and the substantial runoff from the paved parking areas of ADESA to primarily Outfall No. 2, control structures and diversion piping are designed based on a 2-year storm event.

Surface water within the work area (potentially contaminated) will be collected and pumped or transferred to an on-site Wastewater Treatment Facility for treatment and discharge to the Brook or directly to the Lagoon and then treatment as part of Lagoon dewatering. Surface run-on into the work area will be minimized to the extent practicable and feasible.

Site Preparation activities, including extensive soil erosion and sediment controls will be installed prior to conducting remedial activities in the area of the Brook.

Once the erosion and sediment controls are in place as well as the Stormwater Management Plan, Wastewater Treatment Facility and the Sediment Management Facility, sediment removal will be conducted. Based on the sampling and grain size results for the sediment within the Brook, the streambed consists of sediment over a hard-pan native silt soil layer. Brook sediment will be stabilized in situ after dewatering and prior to removal by adding and mixing stabilization agents. Sediment removal from the Brook will be tested using a vacuum truck to minimize damage to the wetlands and riverbank areas by construction equipment. The vacuum nozzle may be fitted with a high-pressure excavating tool to assist in efficient sediment removal. If a vacuum removal field trial demonstrates that adequate sediment removal cannot be conducted, then a conventional bucket excavator will be used to remove sediment by excavating from the banks. The removed stabilized sediment will be loaded into smaller transport container trucks to transport to the on-Site Sediment Management Facility for characterization, prior to transportation and off-Site disposal.

Representative verification sampling of native soil underlying Brook sediment will be conducted to demonstrate that the extent of removal and the procedures and equipment used for removal will provide adequate removal of impacted sediment. This verification sampling will be performed in up to two locations each in Reach 3 and Reach 5 in the Brook after removal activities have been conducted. Up to nine grab samples of native material will be collected in each of the two verification areas, composited, and submitted for lead analysis. The analytical data will be compared to the remediation verification level of 1,150 mg/kg.

3.2 LAGOON

The removal depths of sediment in the Lagoon are based on the depth of sediment determined from soil borings installed through Lagoon water and sediment into underlying native silt soils. The results of soil sampling of the native material beneath the sediment indicated that OHM was not present or concentrations were consistent with MADEP background concentrations for native soil (MADEP, 2001).

The estimated volume of Lagoon sediment to be removed is based on the following:

- Lagoon is approximately 400 ft in width and 70 ft in length;
- Sediment depth of 1.5 ft (average thickness at boring locations); and
- 25 percent contingency for non-impacted material (e.g., sediment, native soil, vegetation, and debris) collected during removal.

Therefore, the total volume of sediment removed from Reach 3 (including banks) is estimated to be 2,500 cubic yards, as shown in Table 3.1.

The approach for removing Lagoon sediment will include the following steps. Erosion and sediment and stormwater management controls will be installed around the work zone including the Lagoon and the equipment access and material handling work areas. The discharge structure beneath the Valve House, which provided gravity discharge to the Brook, will be plugged with a sewer plug and a cement-bentonite grout mixture. The Lagoon will be dewatered to remove existing surface water. The water will be transferred to the on-site Wastewater Treatment Facility for treatment and discharge to the Brook. In situ stabilization of the sediment will be conducted by adding and mixing stabilization agents. An excavator will be used to remove stabilized sediment for

loading into container trucks for transportation to the on-site Sediment Management Facility for characterization prior to transportation and off-site disposal. Representative verification sampling of native soil underlying Lagoon sediment will be conducted to demonstrate that the extent of removal and the procedures and equipment used for removal will provide adequate removal of impacted sediment. This verification sampling will be performed in four locations in the Lagoon after removal activities have been conducted. Up to nine grab samples of native material will be collected at each verification area, composited and submitted for lead analysis. The analytical data will be compared to the MADEP background lead concentrations for native soil (MADEP, 2001).

3.3 WASTEWATER TREATMENT

An on-Site Wastewater Treatment Facility will be constructed and operated to manage potentially contaminated surface water, stormwater, and groundwater generated from remediation areas. The Wastewater Treatment Facility will be used to semi-continuously treat contaminated water and discharge it to the Brook. The discharge criteria and in-stream monitoring requirements are provided in the Technical Specifications and the MADEP 401 Water Quality Certificate (WQC).

3.4 SEDIMENT MANAGEMENT

The stabilized OHM-impacted sediment removed from the Brook and Lagoon will be tested for confirmation of disposition mode prior to transportation and off-Site disposal. Stabilized sediment will be transported to the Sediment Management Facility constructed outside the limits of the work areas and 100-year floodplain. The staging area will be constructed to contain additional water that may drain from the sediment.

The stabilized sediment and debris will be characterized prior to off-Site disposal by representative sampling and chemical analysis. The testing detailed in MADEP Policy COMM-94-007 for dredged sediments will be conducted at a minimum. Additional testing for reactivity, corrosivity, ignitability, and toxicity characteristic leachate procedure (TCLP) also will be conducted to classify material as RCRA characteristically hazardous waste or non-hazardous. Based on the concentrations of certain metals such as lead, a portion of the stabilized sediment may be classified as a characteristically hazardous waste (i.e., D008 for leachable lead) that will require disposal at a RCRA hazardous waste/treatment disposal facility. The majority of the stabilized sediment is

anticipated to be non-hazardous and will be disposed of at a Subtitle D lined landfill and a certain portion may be suitable for use as daily landfill cover material.

3.5 RESTORATION

As part of permit approval activities with the FCC for the Notice of Intent (NOI)/Order of Conditions a more detailed Restoration Plan was prepared and submitted to the FCC on July 8, 2008. The Restoration Plan is provided in Appendix X and is organized into the following sections, tables and appendices:

Table of Contents

- 1.0 Introduction
- 2.0 Existing Site Conditions
- 3.0 Minimization of Impacts to Existing Wetlands
- 4.0 Restoration Plan
- 5.0 General Restoration Chronology and Sequence of Work
- 6.0 Monitoring Plan

List of Tables

- Table 1 Summary of Impacts to Resource Areas

List of Appendices

- Appendix A Drawings C-01 through C-09
- C-01 Resource Area Plan
 - C-02 Site Plan
 - C-03 Reach 3 Restoration Plan and Profile
 - C-04 Reach 5 Restoration Plan and Profile
 - C-05 Lagoon Restoration Plan and Profile
 - C-06 Reach 3 and Reach 5 Planting Plan
 - C-07 Details I
 - C-08 Details II
 - C-09 Details III

3.6 OTHER ACTIVITIES

The RA includes the abandonment of stormwater discharge pipes associated with the former Pump House and Valve House by plugging the pipes. The demolition of the former Pump House and Valve House will also be conducted. Universal waste and asbestos will be removed prior to general demolition. The excavations of the below grade portions of the structures will be dewatered and backfilled. The dewatering water would be transferred and treated at the on-Site Wastewater Treatment Facility.

As requested by the FCC during the NOI/Order of Conditions application process, a historic railway trestle in poor condition downstream of the Reach 5 remediation area also will be removed.

4.0 PREDESIGN ACTIVITIES

4.1 OVERVIEW

Pre-design activities were conducted to obtain sufficient detailed information, as necessary, to complete the engineering design and particularly stormwater management plans and specifications. The pre-design activities included the following tasks:

- Topographic Survey; and
- Beaverdam Brook Flow Study.

4.2 TOPOGRAPHIC SURVEY

CRA retained Schofield Brothers of New England to conduct a detailed topographic survey of the Site. The primary purpose of the topographic survey was to establish and characterize catchment areas that are expected to contribute to the flow of the Brook and to identify key additional features of the Site that were not previously surveyed to assist in the design. The topographic data generated from this survey was combined with previous survey data to establish the base plan for the Site and the design drawings presented in Section 6.0.

Included in the topographic survey were all paved areas north of the Landfill and east of the Brook, the ADESA wetland, the on-Property portion of the Brook, Lagoon, and the wetland areas that are located west of the Brook running parallel to the Site. Topographic surveys of Brook transects and other Site features previously conducted during the Phase II CSA were also incorporated with the new survey information. The four flow monitoring stations as described in Section 4.3 for the Flow Assessment Study and the large culvert that allows access to the Lagoon were also included in the survey.

4.3 BEAVERDAM BROOK FLOW STUDY

CRA retained Flow Assessment Services to conduct flow monitoring at strategic locations along the Brook to assist in the design of stormwater management and Brook restoration components for the RA. During the implementation of the RA, the flow of water through the Brook will need to be temporarily diverted around the sections of the Brook that will require sediment removal and restoration activities. Also, stormwater flow from outfalls to the Brook may need to be controlled. The purpose of the

flow-monitoring program was to generate accurate depth and flow data to characterize the Brook and Property outfalls, in order to design these stormwater management components.

The monitoring program consisted of four flow-monitoring stations (Stations 1 to 4), and one supporting rain gauge station. The surface water monitoring stations included at least one velocity flow meter that also measured a variety of other physical parameters including water velocity, water level, water temperature, and precipitation.

Monitoring Stations 1 and 2 were located inside Outfall No. 1 and Outfall No. 2, respectively. Each station was installed and secured to the outfall concrete structure, approximately 10 ft from the discharge point to the Brook. Each station included one velocity flow meter. The purpose of locating the monitoring equipment inside each outfall was to eliminate any potential backflow disturbances caused by the flow and water level of the Brook. The location of the monitoring equipment also allowed for higher accuracy in determining the stormwater flow input to the Brook from Outfall No. 1 and Outfall No. 2. The outfall structures also presented protection for the monitoring equipment from any large debris potentially flowing through the Brook and shielded all equipment from potential Site workers/trespassers. Outfall No. 1 is hydraulically connected to Wetland A (south of the Property) and also takes stormwater from the former Landfill north stormwater pond. Outfall No. 2 drains a large portion of the west side of the Property and potentially roof drainage from the existing structures.

Monitoring Station 3 was located inside the large metal culvert that allows for access over the Brook to the Lagoon, immediately upstream of Outfall No. 3. There were two area velocity flow meters installed at this location. The meters were mounted on a standard 2-inch by 10-inch plank, which was weighted with cement blocks and secured to the steel floor of the culvert. No natural materials surrounding the banks of the Brook were altered in any manner during the installation of this equipment. Monitoring Station 3 measured total Brook flow through Reach 3, which included water from the upstream watershed and Outfalls No. 1 and No. 2.

Monitoring Station 4 was located in the Brook approximately 100 feet downstream of the ADESA wetland discharge outfall. This location is approximately at the downstream Property boundary. There were two area velocity flow meters installed at this location. The meters were installed on a standard 2-inch by 10-inch plank, which was weighted with cement blocks and placed on the floor of the Brook. No natural materials surrounding the banks of the Brook were altered in any manner during the installation of this equipment. Monitoring Station 4 measured total Brook flow at the Site

downstream boundary just upstream of the Reach 5 Hotspot at sample location BBSDR5-06 and included flow from Monitoring Station 3, the ADESA wetland discharge (which receives stormwater from the north paved areas of the Property), and wetland H runoff.

The rain gauge was mounted on the roof of the Valve House. This location provided a level surface, inaccessible from Site workers and potential trespassers and was clear from debris and vegetation. The rain gauge was connected to the Monitoring Station 3 data logger.

The monitoring program was conducted from October 18, 2007 to December 14th, 2007. Field crews maintained the flow meters on a weekly basis. Each week, flow data was downloaded, batteries were checked and/or changed and the flow equipment was checked for any potential malfunctions or damage. To assure that the meters were operating properly, hand-held depths and velocities were taken to verify the accuracy of the metered depths and velocities. Information from field notes such as silt levels and other field observations were recorded and incorporated in the review of the flow data.

The flow monitoring study collected data from, primarily, four storm events, with the largest event generating 1.24 inches of rainfall. Stations 1 and 2 measured runoff from the Property, which is almost completely paved or impervious, resulting in flow data that demonstrated an almost instantaneous response to rainfall events. Flow data from the upstream watershed was calculated by taking the flow at Station 3 and subtracting the flow from Stations 1 and 2. The upstream watershed is dominated by wetlands and a small reservoir. The flow from similar rainfall events resulted in a much slower response and smaller peak flow when compared to the Property.

The flow monitoring data are discussed in Section 5.2 and the remedial design incorporating the elements of the stormwater management plan is discussed in Section 6.0.

5.0 STORMWATER MANAGEMENT PLAN

5.1 PURPOSE

The design and planning of the remediation work within the Brook are based on calculations of stormwater runoff from the various contributing areas. These calculations were completed by using the stormwater management model, EPASWMM 5.0, for the Site and nearby adjacent catchments, and the hydrological model, HEC-HMS 3.1.0, for the upstream contributing catchments. Both models quantified the runoff for the 1, 2, 5, 10, and 25-year 24-hour duration synthetic rainfall events. Unsteady flow river hydraulic calculations were completed using the Corps River Analysis System (HEC-RAS) model to assess the restoration of the Brook. In addition, a stream flow-monitoring program was implemented at the Site as discussed in Section 4.3 to better understand the flow characteristics within the Brook and runoff characteristics off of the Property.

The design objectives for the development of the Stormwater Management Plan were as follows:

- minimize impacts to surrounding areas during implementation of the work to prevent the migration of OHM-impacted sediment and stormwater; and
- provide adequate Brook diversion and stormwater management capacity to maintain the Brook in dry conditions, up to the 1-year storm event, during sediment removal and restoration activities.

In order to meet these objectives, the following design criteria were established for the Stormwater Management Plan:

- manage and bypass stormwater runoff from the upstream watershed through the Site up to the 1-year storm event;
- manage and bypass stormwater at Outfall No. 1, up to the 1-year storm event, by installing a modified temporary outlet structure at the Facility Stormwater Management Ponds;
- manage and bypass stormwater at Outfall No. 2, up to the 1-year storm event, by installing a modified temporary outlet structure and pump bypass system;
- manage and collect all stormwater within the immediate work area for treatment at the Wastewater Treatment Facility;

- verify no net increase in stormwater peak flow and volume as a result of the proposed works; and
- restore the Brook to a stable channel with stable banks resulting in no increase to the floodplain capacity or storage.

The MADEP Stormwater Management Form and applicable regulations and guidance were considered in the development of the Stormwater Management Plan. The technical and administrative requirements of MADEP requirements will be documented in detail in the permit applications described in Section 9.0.

5.2 STREAM FLOW MONITORING

In an effort to understand the flow regime of the Brook and runoff contributions of the adjacent areas, flow monitoring was conducted as part of the pre-design activities as described in Section 4.3. The flow monitoring data provided insight into the runoff characteristics of the upstream watershed and local area. A summary of runoff peak flows and volumes is presented in Table 5.1. The flow monitoring data was used to further calibrate Site stormwater and watershed models.

The flow monitoring data is summarized in Appendix D.1.

5.3 HYDROLOGIC MODELING

5.3.1 SITE MODELING

Short-term stormwater runoff conditions of the nearby contributing areas to the Brook (i.e., ADESA and adjacent catchments) were quantified using SWMM modeling. The SWMM model used was EPASWMM 5.0. The model calculates how the rainfall events cause runoff, and how that runoff is routed across the Site. For the upstream watershed, the peak flow for the 1-year storm event is calculated as 8.2 cfs, generating a runoff volume of 1.79×10^6 cubic feet. Peak flow and runoff volumes for Outfall No. 1 and Outfall No. 2 are presented in Table 5.1.

The Site is characterized as a series of sub-catchments within the model. The impervious sub-catchments (i.e., parking lots and rooftops) were considered homogeneous in terms of intervening hydrologic characteristics. These contributing areas were delineated for

hydrologic modeling by a visual examination and detailed topographic survey as shown on Figures 5.1 and 5.2.

The pervious sub-catchments (i.e., adjacent wetlands along the Brook) had associated parameters estimated by a visual examination, detailed topographic survey, soil texture data, and respective hydrologic features. These areas are characterized as depressional wetlands with soils of high runoff potential.

5.3.2 BROOK WATERSHED MODELING

The computer model HEC-HMS was selected to calculate the runoff contributions from the watershed that drain to the Brook and to Wetland A. HEC-HMS uses recognized hydrologic and hydraulic methods to calculate and route runoff hydrographs. The model requires input of a hyetograph, topographic features (catchment area, slope, roughness), soil parameters (antecedent moisture condition, infiltration capacity), ground cover conditions, and drainage paths.

Northwest of the gravel lot and Brook there is a depressional wetland situated in a relatively flat area. According to the National Resource Conservation Service (NRCS), there are two main soil types in this area. Both soil types consist mainly of fine sand to silt with smaller amounts of clay. The clay is found as a layer typically at or near the surface. These soil types result in low water infiltration and thus ponding of water. It is noted that the water table in the vicinity of the Brook is comparatively high in the area. These conditions contribute to optimal parameters that create the wetland.

The large portions of depressional wetlands provide regulatory capacity to the hydrological system, mitigating the peak runoffs. Also Waushakum Pond, large in relation to its watershed, plays an important role in the regulation of the peak runoffs.

The catchment boundaries are presented on Figure 5.1 and Figure 5.2.

5.3.3 HYDRAULIC ANALYSIS

A hydraulic analysis of the Brook was completed as part of this study. This analysis included the floodplain area itself and incorporated the existing elevations at surveyed cross sections extending upstream to the railway crossing to downstream of the Site. All hydraulic modeling was conducted using the CorpsRiver Analysis System (HEC-RAS)

Version 3.1.2, released April 2004. CRA used this model to analyze the impact of the pond removal on the floodplain storage volume of the Site for various return interval storm events from the 10-year and the 25-year storm events.

The hydraulic analysis consisted of creating input geometry data files representative of the existing conditions. The geometry data was built upon the most recent topographic survey as described in Section 4.2. The input flow data file was developed using peak discharges calculated for each storm using the results of the hydrologic analysis presented in Table D.2.3 in Appendix D.2. Constructing a variety of cross sections representative of the existing conditions provided additional input data for the Site. A copy of the hydraulic model and all associated geometry and flow files is provided in digital format on the compact disk included in Appendix D.

The cross section properties were developed based on the surveyed cross sections. For the purpose of this model, a Manning's roughness coefficient of 0.035 was used to represent the channel bed, and a value of 0.04 was used on the right and left banks to represent the floodplain areas. The expansion and contraction coefficients used for each of the cross sections were 0.3 and 0.1, respectively.

Results of the HEC-RAS model were used to restore a stable channel. The model output, including depth, velocity and energy slope were used to size channel lining material appropriately.

5.4 SITE CONDITIONS

The surface of the Property consists of relatively level, hard-packed gravel, asphalt or concrete that has been used for at least ten years for the temporary parking of vehicles. This lot was part of a larger former vehicle assembly plant, some of which has been decommissioned and demolished, leaving slabs or other open areas on the north end of the Property.

The Site was delineated for hydrologic modeling by a visual examination and detailed topographic surveying. The drainage sub-catchments and drainage paths and channels were delineated using digital contouring of a detailed topographic survey of the Site. The digital contouring revealed flow patterns across what otherwise appears to be a flat Site and shows the bumps, dips, and swales of the existing surface of the Site, and how the stormwater runoff currently flows across the Site.

An earthen berm was constructed along the south edge of the Property and contoured so the approximate eastern third of the Property, which includes a portion of the area of the Landfill (capped in 2005), would drain to the South Stormwater Pond. The remaining two-thirds of the southern portion of the Property, which includes a large section of the former, Landfill drains to the North Stormwater Management Pond.

Under existing conditions, most of the stormwater drains from the Property to the Brook. Other small amounts of stormwater either evaporate or infiltrates through the railroad track bed to the south. It is likely that nominal stormwater infiltrates through the hard-packed dirt and gravel present on the Property.

5.5 MODELING RESULTS FOR EXISTING AND POST-REMEDIAL SITE CONDITIONS

5.5.1 SITE MODELING

The EPASWMM model outputs for the short-term stormwater runoff conditions are presented in Appendix D.2. Table D.2.1 presents the rainfall depths used for the storm events. The designed storm events are based on published precipitation data. The storm events used were SCS Type III. The sub-catchment parameters used for the modeling are found in Table D.2.2 of Appendix D.2. Table D.2.3 of Appendix D.2 presents the summary of peak flows for the sub-catchments for each storm event under existing conditions and the total off-Site discharge. The runoff volumes for the sub-catchments are presented in Table D.2.4 of Appendix D.2. Graphs depicting the flow at each of the monitoring stations for the 1, 2, 5, 10, and 25-year storm events are found in Appendix D.2 as Figures D.2.2 to D.2.8.

5.5.2 BROOK WATERSHED MODELING

The HEC-HMS model outputs for the Brook Watershed are presented in Appendix D.3. The depths of rainfall used for the design storms events are based on published precipitation data and are listed in Table D.3.1 of Appendix D.3. Model sub-catchment parameters are listed in Table D.3.2 of Appendix D.3.

For Table D.3.3 of Appendix D.3, the Green-Ampe method was used to calculate infiltration, while the SCS Lag Routine method was used to calculate the Lag time for the model.

Peak flows for the existing sub-catchments are presented in Table D.3.4 of Appendix D.3.

Calculated runoff volumes from each of the existing sub-catchments are presented in Table D.3.5 of Appendix D.3.

Calculated runoff hydrograph peak discharges for existing conditions are shown on Figure D.3.3 of Appendix D.3.

5.5.3 MODEL CALIBRATION

An iterative calibration process was completed to refine and adjust the estimated hydrologic parameters of the contributing runoff areas to the Brook. The process was conducted to ensure the models are more accurate in the prediction of the behaviour of the hydrologic system under short-term events.

As part of the calibration process, predicted, modeled hydrographs were simultaneously compared to the measured hydrographs and the parameters of the sub-catchments. Calibrated parameters are presented in Appendix D.4 for the Site modeling and Brook watershed modeling.

5.5.4 HYDRAULIC ANALYSIS

Unsteady flow simulations for the 10- and 25-year events were performed with the HEC-RAS model to assess the planning of the Brook restoration and design of a stable natural channel. The model output, including depth, velocity and energy slope were used to size channel lining material appropriately.

The HEC-RAS model outputs for the Brook are presented in Appendix D.5. The modeling parameters are listed in Table D.5.1 of Appendix D.5. These results refer to peak flow conditions of the Brook for both aforementioned storm events. Based on the modeling results, substrate for the Brook bed has been specified to restore the Brook and prevent sediment transport following the completion of RA activities.

The sizing and design details of the diversion and management features were determined based on the modeling.

6.0 ENGINEERING DESIGN

This section presents the design objectives and criteria for the major elements of the RA activities and is organized as follows:

- Section 6.1 Access;
- Section 6.2 Security;
- Section 6.3 Construction Support Facilities;
- Section 6.4 Clearing
- Section 6.5 Environmental Controls;
- Section 6.6 Health and Safety and Contingency and Emergency Response Plan;
- Section 6.7 Pump House and Valve House Demolition;
- Section 6.8 Sediment Removal and Handling;
- Section 6.9 Sediment Stabilization;
- Section 6.10 Brook and Lagoon Restoration;
- Section 6.11 Transportation and Disposal;
- Section 6.12 Air Quality Monitoring;
- Section 6.13 Water Management; and
- Section 6.14 Closeout.

The following design drawings, provided in Appendix E and Appendix C, were developed to meet the requirements of the engineering design for the RA and have been approved by the MADEP and FCC as part of the WQC/Order of Conditions:

Permit Drawings (Appendix E)

- Drawing C-01 Existing Conditions;
- Drawing C-02 Site Works I – Brook Reach 3 and Reach 5 Hot Spot;
- Drawing C-03 Site Works II – Former Settling Lagoon;
- Drawing C-04 Site Preparation and Erosion And Sediment Control Plan;
- Drawing C-05 Erosion And Sediment Control Details;
- Drawing C-06 Plan and Profile I Reach 3;
- Drawing C-07 Plan and Profile II Reach 5 Hot Spot;

- Drawing C-08 Plan and Profile III Lagoon;
- Drawing C-09 Temporary Sediment Dewatering and Stabilization Facility;
- Drawing C-10 Waste Water Treatment Facility;
- Drawing C-11 Cross Sections;
- Drawing C-12 Demolition and Utility Abandonment;
- Drawing C-13 Restoration Plan;
- Drawing C-14 Miscellaneous Details I; and
- Drawing C-15 Miscellaneous Details II.

Restoration Plan Drawings (Appendix C)

- Drawing C-01 Resource Area Plan;
- Drawing C-02 Site Plan;
- Drawing C-03 Reach 3 Restoration Plan and Profile;
- Drawing C-04 Reach 5 Restoration Plan and Profile;
- Drawing C-05 Lagoon Restoration Plan and Profile;
- Drawing C-06 Reach 3 and Reach 5 Planting Plan;
- Drawing C-07 Details I;
- Drawing C-08 Details II; and
- Drawing C-09 Details III.

In addition to the design drawings, project technical specifications were developed to provide detailed technical and regulatory requirements to construct the remedy in accordance with the MCP and other applicable Federal, State, local regulations, permits and approvals. The technical specifications for the RA, provided in Appendix E.2, are as follows:

- Section 01100 Summary;
- Section 01200 Price And Payment Procedures;
- Section 01300 Administrative Requirements;
- Section 01351 Health And Safety;
- Section 01400 Quality Requirements;
- Section 01500 Temporary Facilities And Controls;

- Section 01571 Temporary Soil Erosion And Sediment Control;
- Section 01600 Product Requirements;
- Section 01700 Execution Requirements;
- Section 02074 Geotextile;
- Section 02117 Material Handling And On-Site Transportation;
- Section 02120 Loading, Off-Site Transportation, And Disposal;
- Section 02145 Wastewater Treatment Facility;
- Section 02196 Sediment Stabilization;
- Section 02200 Site Preparation;
- Section 02223 Demolition and Removals;
- Section 02245 Storm Water and Brook Diversion;
- Section 02316 Fill and Fine Grading;
- Section 02325 Sediment Removal;
- Section 02373 Aggregate Stone;
- Section 02374 Erosion Control;
- Section 02376 Coir Rolls and Habitat Enhancements;
- Section 02921 Seeding; and
- Section 02930 Live Plantings.

CRA will provide engineering oversight of the RA activities on behalf of GM during the implementation of the RA activities, including obtaining permits and approvals, holding regular construction meetings, inspection, testing, and documentation of construction activities, collection and management of information and data, ensuring compliance with permits and approvals, development and preparation of the Final As-Built Construction Report and RAO Statement, and restoration monitoring and reporting. CRA will provide overall project management and coordination between GM, ADESA, property owners, FCC, MADEP, and the Corps. The implementation of the RIP activities will be conducted by an environmental Contractor selected by GM. CRA will also ensure that MCP requirements are complied with such that a RAO will be achieved in the required timeframe.

The necessary permits, access agreements, and Contractors have been procured and the Phase IV RIP activities will be initiated, including the major activities listed below. The work areas are shown on Drawings C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot

Spot) and C-03 (Site Works II – Former Settling Lagoon) provided in Appendix E.1 and the activities include:

- utility locates;
- mobilization of construction facilities, Site trailer(s), material, equipment, and personnel necessary to perform the work;
- provision and maintenance of construction facilities and temporary controls;
- Site preparation, including emergency first aid facility, fire suppression equipment, construction of decontamination facilities, soil erosion and sediment migration controls, temporary utilities, clearing and grubbing, temporary access roads, work zone identification, and staging facilities;
- implementation of environmental controls;
- implementation of a Site-specific Health and Safety Plan;
- implementation of a Stormwater Management Plan;
- construction/operation of a Wastewater Treatment Facility;
- construction/operation of a Sediment Management Facility;
- abandonment of piping/outfalls;
- Valve House and Pump House demolition;
- removal and staging of miscellaneous debris (e.g., tree stumps, rocks, etc.) from the Brook and Lagoon work zones, and on and off-Site disposal;
- removal of Brook sediment from Reach 3 and Reach 5 Hotspot;
- Lagoon dewatering and sediment removal;
- Sediment characterization, transportation and off-site disposal;
- Site restoration;
- closeout activities, including final decontamination, cleanup/restoration of support areas, and demobilization of temporary facilities and equipment; and
- As-Built Construction Report and RAO Statement.

The engineering design for these major items is discussed in detail in the following sections. The remediation process flow diagram for the major RA activities is presented on Figure 6.1.

6.1 ACCESS

Prior to and during RA activities, coordination with ADESA operations and off-Property owners will be conducted as required. GM has entered into an access agreement with CSX. The additional property owners along Reach 5 have been contacted as part of the NOI/Order of Conditions activities and have no objections to the proposed activities on or near their properties. The access locations to the Site are shown on Drawing C-02 (Site Works I – Brook 5 and Reach 5 Hot Spot) and the requirements are specified in Section 01100 (Summary) of the Technical Specifications.

Coordination with ADESA and off-Property owners, as required prior to and during implementation of the RA on their property will include:

- review of work activities to be completed including identification of anticipated work areas, transportation routes, and scope and timing of activities;
- review of vegetation which requires clearing and restoration plans;
- periodic updates of work progress and anticipated completion;
- follow-up visits during re-establishment of vegetation to verify adequate establishment;
- provision of notifications and sampling data as required for any sampling activities; and
- notification of additional truck traffic.

6.2 SECURITY

Existing fencing will be used as appropriate for work areas on the ADESA property. If necessary, a temporary chain link or other type of construction fence will be placed at locations used to access the active work areas and will be used as a security fence during the RA construction period. The Contractor will be responsible for maintaining security and coordinating with ADESA during RA construction activities. The Contractor will inspect, maintain, and repair the fencing, as necessary, to ensure protection of the public and security of the Site. The temporary fence will be removed at the conclusion of the RA activities. The proposed location of existing temporary security fence is shown on Drawings C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and C-03 (Site Works II – Former Settling Lagoon). The security requirements are specified in Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

Access gates into the work areas will be kept closed and locked to prevent uncontrolled and/or unauthorized access to the work areas.

During active sediment management and wastewater handling and treatment, or until sediment materials are removed and wastewater treatment is completed, security will be provided including:

- i) Limit vehicular access to the work areas to authorized vehicles and personnel only.
- ii) Provide initial screening of all Site personnel and visitors. A list of authorized personnel and the name of their employer and documentation of appropriate health and safety training will be available at the access locations.
- iii) Maintain a security log in which documentation is provided of all work area personnel, visitors and deliveries, and any security incidents. This log will include the date, name, address, company, time in and time out for each employee and visitor. If unauthorized personnel are observed near the work areas and refuse to vacate the premises, appropriate ADESA security personnel or law enforcement officials will be contacted.
- iv) Maintain a visitor log at the access locations. Visitors will not be allowed to enter without the knowledge and approval of CRA. All visitors will be required to complete health and safety training in accordance with the HASP as discussed in Section 8.0 prior to gaining access to the secured areas.
- v) Check that all installations are secure and intact on a daily basis. If warning signs are removed, the situation will be brought to the attention of the Contractor and will be rectified at the earliest possible opportunity.

6.3 CONSTRUCTION SUPPORT FACILITIES

The following sections outline the required construction support facilities. The construction facilities layout is presented on Drawings C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and C-03 (Site Works II – Former Settling Lagoon) and the support facility requirements are specified in Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.3.1 SITE OFFICE

Office facilities for CRA/GM and for the Contractor will be installed at the locations shown on Drawing C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and will meet the detailed requirements specified in Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.3.2 EMERGENCY FIRST AID

The Contractor will be required to supply and maintain a first-aid facility, which complies with the requirements of the HASP.

6.3.3 SPILL PREVENTION AND FIRE SUPPRESSION

The Contractor will be required to provide necessary spill prevention and fire suppression equipment and procedures to prevent releases and ensure the safety of Site personnel and protection of the owner's property. Details of the spill prevention and fire suppression equipment and procedures, and contingency planning will provided in the HASP. Coordination will be established with the local Fire and Police Departments to respond to emergencies.

6.3.4 DECONTAMINATION

Prior to commencing work in the Brook and Lagoon work zones, the Contractor will be required to supply and operate equipment and personnel hygiene/decontamination facilities. At the Brook Reach 5 Hotspot support area, smaller equipment and personnel decontamination stations will be established. The requirements for the decontamination facilities and activities are detailed in Section 01351 (Health and Safety) and Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.3.4.1 PERSONNEL HYGIENE/DECONTAMINATION

The Contractor will be required to supply and operate a personnel hygiene/decontamination facility that complies with the requirements of 29 CFR 1910.141 and the MCP.

Wastewater from the personnel hygiene/decontamination facility will be pumped to designated storage tanks. The collected water will be characterized and properly disposed at an appropriate off-Site facility.

6.3.4.2 EQUIPMENT DECONTAMINATION

The Contractor will be required to supply and operate an equipment decontamination facility. The Contractor will have sufficient pumping equipment and piping to pump wastewater from the decontamination pad to Contractor-supplied wastewater storage tank(s) for treatment at the Wastewater Treatment Facility or disposal off-Site.

All equipment leaving the Exclusion Zone (EZ) established for work zone access locations will be decontaminated on the decontamination pad using high-pressure, low-volume hot water and non-phosphate detergent (or equivalent), if necessary, and will be Quality Assurance (QA)/Quality Control (QC) inspected and documented as being decontaminated prior to entering the Clean Zone (CZ).

Sediments collected on the decontamination pad will be managed at the Sediment Management Facility (Section 6.8). Water from the decontamination facility will be managed at the Wastewater Treatment Facility (Section 6.13).

6.3.5 SANITARY FACILITIES

Portable toilet facilities will be provided and maintained by the Contractor. Sanitary wastes will be removed and disposed off-Site on a periodic basis in accordance with applicable laws and regulations. The detailed requirements are specified in Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.3.6 UTILITIES

The Contractor will provide temporary utilities necessary for the completion of the RA either by temporary tie-in to existing utilities (e.g., ADESA), or by provision of temporary facilities (e.g., generators, water tanks, etc.). The detailed requirements are specified in Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.3.7 ACCESS ROADS/PARKING

Temporary access roads will be constructed, as necessary, to allow for access and loading of material onto transportation vehicles and provide a route for transportation vehicles to pass through the decontamination area prior to leaving the Brook and Lagoon work areas. The detailed requirements are specified in Section 01500 (Temporary Facilities and Controls), Section 02117 (Material Handling and On-Site Transportation), and Section 02200 (Site Preparation) of the Technical Specifications. Swamp or crane mats will be used for access roads in low-lying wetland areas to minimize impacts to vegetation and wetland areas.

The Contractor's excavation operations will be managed to minimize the contamination of imported granular material used for the construction of access roads. Imported granular materials used for the construction of access roads, if any, which contacts contaminated sediment will be excavated, tested and recycled or disposed appropriately. A layer of geotextile and surface gravel will protect the base aggregate for the access roads.

Sufficient space for parking will be established and maintained by the Contractor in coordination with ADESA operations.

6.4 CLEARING

The areas required for construction facilities, access, and the excavation area will be cleared to the extent required to implement the RA activities. Certain trees, brush, and vegetation along the Brook work areas in Wetlands G and H will be cleared. Prior to clearing, the extent of clearing and grubbing will be identified to the property owner(s) and the FCC. Cleared above-grade vegetation will be removed or chipped on-Site and used for temporary erosion control and to support Site restoration activities or other uses. Above grade vegetation is defined as vegetation located 1-foot or more above grade. Clearing of potentially contaminated material is addressed as part of sediment removal activities (Section 6.8). Grubbing (i.e., root removal) will not be conducted in any resource areas unless approved by the FCC/Environmental Monitor to minimize impacts to wetlands and increase the timeliness and success of restoration activities.

The detailed requirements are specified in Section 02200 (Site Preparation) of the Technical Specifications.

6.5 ENVIRONMENTAL CONTROLS

The detailed requirements for environmental controls are specified in Section 01351 (Health and Safety) and Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

6.5.1 FUGITIVE PARTICULATE CONTROL

The Contractor will implement fugitive particulate control measures. The particulate control measures will be designed to limit the emissions of total suspended particulates (TSPs) that are likely to remain airborne and be carried out of the work areas (i.e., Brook, Lagoon, and the Sediment/Soil Staging Area). It is expected that the majority of activities will be conducted in relatively low lying wet areas or with materials (e.g., sediment) that is high in moisture content and as such particulate emissions will be minimal. The primary source of particulate emissions will be sediment stabilization agents such as cement kiln dust that will be managed to minimize emissions.

During the performance of the RA, the Contractor will be responsible for the control and monitoring of fugitive particulates generated by the excavation, stabilization, and transportation of sediments/soil and backfilling of soil. This may involve the following:

- Delivering smaller batches of materials to the site and maintaining fugitive air emissions control measures such as a water misting system to prevent the generation of fugitive air emissions;
- use of potable water for fugitive air emissions controls;
- the Contractor will not use any chemical means for dust and particulate control without prior review by the Engineer;
- use of appropriate covers on trucks hauling impacted or un-impacted material; and
- in the event that the Contractor's dust control is not sufficient to control dust from the Site, work will be stopped and changes to the operations made prior to resuming work.

6.5.2 SEDIMENT AND EROSION CONTROL PLAN

A detailed Sediment and Erosion Control Plan will be prepared and implemented by the Contractor. The detailed requirements for sediment and erosion controls are shown on Drawings C-04 (Site Preparation and Erosion and Sediment Control Plan) and Drawing C-05 (Erosion and Sediment Control Details) and specified in Section 01571 (Temporary Soil Erosion and Sediment Control) and Section 01500 (Temporary Facilities and Controls) of the Technical Specifications.

The Sediment and Erosion Control Plan will incorporate the following features:

- i) stabilize disturbed soils as quickly as practical;
- ii) all required in-Brook control structures will be constructed prior to any grading or sediment excavating to mitigate erosion and sediment migration and the potential contamination of surface water and stormwater;
- iii) all temporary erosion control fencing will be installed prior to any area grading or excavating or construction activities to minimize erosion and sediment migration from the Site and to delineate the limits of grading, excavation, and construction areas;
- iv) a sediment staging pad with secondary containment will be constructed prior to any excavation of sediments from the Brook and Lagoon work areas;
- v) straw bale walls will be provided around the base of all clean stockpiles;
- vi) provide erosion protection of embankments;
- vii) the Contractor will be responsible for cleaning of sediments from vehicles, equipment and roadways at the end of each workday;
- viii) additional erosion controls may be required during the course of construction. Measures may include, but are not limited to, erosion control fences and mats, buffer strips, sediment traps, diversion swales and check dams, dikes, required to prevent erosion and migration of silt, mud, sediment, and other debris off-Site or to other areas of the Site where damage might result;
- ix) all erosion controls will be inspected and documented by the Engineer to ensure installation and maintenance to the applicable requirements;
- x) erosion controls will be monitored for damage and sediment depth after each significant (e.g., greater than 0.5 inches) precipitation event and other extreme weather event. Damage will be repaired immediately. Sediment will be removed when accumulations reach one half of the available sediment storage depth or sooner;

- xi) all erosion controls will remain in place and be maintained until disturbed ground surfaces have been stabilized;
- xii) if soil and debris from the Site accumulates in low areas, storm sewers, roadways, gutters, ditches, or other areas in Engineer's determination it is undesirable, the accumulation will be removed and the area restored to its original condition; and
- xiii) provide erosion and sediment control in accordance with applicable permits and approvals, and regulations.

The Contractor's Sediment and Erosion Control Plan will be provided to Engineer for review and approval prior to implementation. Regular inspection and documentation of the soil erosion and sediment controls will be conducted by the Contractor and CRA as part of the CQC/CQA activities.

6.5.3 STORMWATER CONTROL

The Stormwater Management Plan (Section 5.0) provides the design objectives and criteria for stormwater controls. A hydrologic model for the stormwater area flow system was developed by CRA to determine stormwater control requirements and to develop the Stormwater Management Plan. Control structures will be installed in locations to minimize stormwater runoff to the upstream Brook and Lagoon and impacting the work zones.

Construction of stormwater controls prior to initiating excavation will control the potential for off-Site releases and minimize the amount of stormwater that contacts OHM-impacted material as discussed in Section 5.0.

The Contractor will be required to control stormwater runoff in order to meet the following requirements:

- i) prevent Brook water from flowing from OHM-impacted areas to clean areas;
- ii) minimize stormwater entering a work zone either from the Brook upstream of a work area or from adjacent areas and ponding on-Site in excavated areas through the use of temporary and permanent earthen berms/swales/Brook diversions and/or proper grading and by expediting backfilling of excavations; and
- iii) ensure that RA activities do not impact stormwater runoff quality to the Brook.

Stormwater flowing toward the work zones will be redirected, to the extent practical, through the use of dikes/swales/Brook diversions to minimize stormwater contact with potential OHM-impacted materials, surface water and/or stormwater runoff. Stormwater that comes in contact with potential OHM-impacted material will be considered contaminated water that the Contractor must manage with the Wastewater Treatment Facility.

To limit the amount of stormwater entering the Brook from Property outfalls, the following temporary measures will be taken:

- temporary blockage of the inlet to the Brook from the Wetland A headwall, to reduce water entering the Brook from Outfall No. 1. Wetland A will be monitored for accumulation of water. Given the capacity in Wetland A and the limited duration of Brook RA activities, it is unlikely that there would be any adverse effect due to the blockage of the inlet;
- Outfall No. 2 stormwater will be diverted to the extent possible by pumping from the last manhole (MH-2) before Outfall No. 2. The water that can be pumped from the manhole will be discharged to Wetland G west of the Brook or the ADESA wetland while Reach 3 in the Brook is remediated. Any stormwater that is not removed at MH-2 will be contained in a temporary wet well at the outfall. Pumps will remove the water from the wet well during storm events. A forcemain will be routed along the bank of the Brook past the active work area and water will be discharged back into the Brook. Any water from the Outfall No. 2 stormwater sewer that can be contained before it enters the Brook will not require treatment prior to discharge; and
- Precipitation that enters the sediment work zones will be pumped out to the extent possible and transferred to the Wastewater Treatment Facility where it will be treated prior to discharge back to the Brook downstream of the active work zone.

While sediment removal from the Brook is underway, water upstream of the active work area will be diverted so that sediment removal can proceed in the dry. During a large storm event, excess Brook water that cannot be immediately stored in the Wastewater Treatment Facility may be pumped to the Lagoon without treatment to keep water from entering the Brook work zone. This procedure will only be used during larger storm events and before the Lagoon sediment removal has been completed. Details of the control structures that will be used in the Brook are provided in Section 6.8.

The Contractor will be required to contain and collect stormwater from the decontamination pad by providing curbing and positive drainage to a collection sump. This stormwater will be transferred from the sump to the Contractor's temporary storage tank. All wastewater will be managed according to the wastewater management requirements provided in Section 6.13.

The detailed requirements for stormwater controls are shown on Drawings C-02 (Site Works I - Brook Reach 3 and Reach 5 Hot Spot) and C-03 (Site Works II - Former Settling Lagoon) and specified in Section 01500 (Temporary Facilities and Controls) and Section 02245 (Storm Water and Brook Diversion) of the Technical Specifications.

6.6 HEALTH AND SAFETY AND CONTINGENCY AND EMERGENCY RESPONSE PLAN

A Site-specific HASP is required to ensure that all RA construction activities are performed safely and in accordance with applicable regulatory requirements, and that all persons on-Site, the general public, and the environment are protected from exposure to Site-related material during implementation of the RA construction activities at the Site. Each Contractor involved in RA construction activities at the Site will be required to develop, implement, and maintain their own Site-specific HASP for activities they will perform at the Site. At a minimum, each HASP must meet the requirements of the Technical Specification 01351 (Health and Safety).

The basis for the HASP is the Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) and the MCP. The HASP also reflects the USEPA and MADEP's guidance regarding procedures required to ensure safe operations at sites containing hazardous or toxic materials.

The HASP addresses the following:

- i) worker medical surveillance;
- ii) worker training and site orientation;
- iii) Site Safety Officer designation and responsibilities;
- iv) work area designations;

- v) the planned movement of labor, equipment, and materials from and between work areas as work progresses;
- vi) personnel and equipment decontamination facilities including planned disposal of decontamination waters and wastes;
- vii) air monitoring program(s) for the various work areas;
- viii) personal protective equipment to be used;
- ix) personal hygiene and decontamination procedures;
- x) respirator protection program and procedures;
- xi) emergency and first-aid equipment;
- xii) dust and particulate emission controls;
- xiii) monitoring and mitigation of worker heat and cold stress;
- xiv) safety meetings;
- xv) Site communications and posted notices; and
- xvi) Site security.

A confined space entry program will be developed if confined space entry is required to be implemented as part of the RA activities.

The HASP will be maintained at the Site at all times during the performance of the RA activities and will be made available and required to be adhered to by all Site personnel and visitors permitted to enter the work areas.

In addition, the HASP will include emergency response activities and contingency planning, as necessary, to ensure that there are specific sets of standard operating procedures (SOPs) to be followed for different types of emergencies. The emergency response activities have been designed to safeguard on-Site personnel, ADESA personnel, the public, and the environment in the event of an emergency.

The on-Site contingency and emergency response plan includes SOPs for the following potential emergencies:

- i) injury to on-Site personnel;
- ii) release of OHM impacted sediment or wastewater to the environment;
- iii) detecting gases or vapors at stop work levels as defined in the HASP in an excavation area;

- iv) fire at the Site;
- v) the unlikely event of a leak of toxic gases from unknown sources such as rupturing of compressed gas cylinders or gas lines during excavation;
- vi) severe weather events and/or flooding; and
- vii) utility breakage (e.g., gas line).

6.7 PUMP HOUSE AND VALVE HOUSE DEMOLITION

The requirements for the Pump House and Valve House demolition are shown on Drawings C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and C-12 (Demolition and Utility Abandonment), and specified in Section 02223 (Demolition and Removals) of the Technical Specifications.

The existing Pump House and Valve House associated with the use of the Lagoon for stormwater control/sediment management will be demolished. This will include abandonment of the 21-inch diameter stormwater pipe that conveyed stormwater to the Pump House, the forcemains that conveyed stormwater from the Pump House to the Lagoon, and the former Outfall No. 3 piping from the Valve House to the Brook.

6.7.1 STORMWATER PIPING ABANDONMENT

Stormwater piping to be abandoned, and those to remain in service, are identified on Drawings C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and C-03 (Site Works II – Former Settling Lagoon). Piping to be abandoned will be disconnected from the stormwater lines that will remain. The stormwater lines and related structures will be plugged/capped and abandoned in place.

Debris and sediment accumulation in manholes on stormwater lines to be abandoned will be removed, and the manholes will be abandoned by filling them with concrete. Sewers to be cleaned prior to abandonment will be cleaned between manholes prior to abandoning the manholes. Debris and sediment removed from the manholes will be collected, consolidated as appropriate, and disposed off-Site based on characterization results.

Abandonment will proceed as access to the disconnect locations and manholes become available and will be sequenced with the demolition of the Pump House and Valve House.

6.7.2 REMOVAL OF BUILDING MATERIALS

The requirements for the removal of building materials are shown on Drawing No. C-12 (Demolition and Utility Abandonment) and specified in Section 02223 (Demolition and Removals) of the Technical Specifications.

6.7.2.1 ASBESTOS

Asbestos-containing material (ACM) will be removed prior to demolition by a certified asbestos Contractor and in accordance with specified procedures.

6.7.2.2 EQUIPMENT AND LIGHTING

After removal of contaminated debris from each building, miscellaneous electrical equipment, including light ballasts and mercury switches, will be removed, consolidated, characterized, and disposed in accordance with local, state, and federal regulations. Disposal options will be proposed by the selected Contractor, and will be approved by GM.

Any remaining abandoned equipment will be inspected for leaking fluids. All fluids will be drained from the equipment, containerized, consolidated with other compatible fluids, characterized, and disposed at an off-Site facility proposed by the selected Contractor, and approved by GM. The selected Contractor will propose an appropriate disposal facility for each piece of equipment (e.g., landfill, recycle facility, return to manufacturer), and the equipment will be disposed off-Site as approved by GM.

Piping in the buildings will be dismantled, cut into manageable size pieces, cleaned with high-pressure hot water at the decontamination facility, and disposed off-Site in accordance with its characterization. Disposal options will be proposed by the selected Contractor, and will be approved by GM.

6.7.3 DEMOLITION

General demolition activities include the demolition of on-Site structures to approximately 3 feet below grade. At each building, demolition materials will be segregated based on materials suitable for off-Site recycling, and materials not suitable for off-Site recycling. Equipment/lighting removal activities and asbestos abatement activities will be performed to the extent practicable prior to demolition of the structure.

Materials suitable to be segregated for off-Site recycling include equipment, piping/valves, and steel. The balance of the demolition debris, which will consist primarily of wood, concrete, glass, etc. will be segregated and transported to off-Site disposal facilities, as appropriate.

6.7.4 IMPOUNDMENTS/VERIFICATION SAMPLING

Sediment/sludge, if any, found in the Pump House and/or Valve House will be removed by mechanical means, and combined with compatible sediment piles for characterization and off-Site disposal. The Pump House below grade walls and sump pit will be washed with high-pressure hot water. The wash water will be pumped/transferred to the Wastewater Treatment Facility.

6.7.5 BACKFILLING/FINAL GRADING

The below grade structures will be backfilled with clean fill from an off-Site source after the floor slab has been broken to provide drainage. Fill material will be characterized prior to importation to ensure it is acceptable. Fill material will be placed in the below grade structures to below the pre-existing grade and compacted using appropriate compaction equipment as directed by CRA's representative. The remaining thickness will be backfilled with topsoil. The final grading will be constructed during completion of the RA activities to match the surrounding existing grades and promote appropriate surface water drainage. Following completion of backfilling activities, the disturbed areas will be restored with vegetation in accordance with the Restoration Plan. Appropriate erosion controls will be utilized until the vegetation has been established.

6.8 SEDIMENT REMOVAL AND HANDLING

The requirements for sediment removal and handling are shown on Drawing C-01 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and C-02 (Site Works II – Former Settling Lagoon) specified in Section 02117 (Material Handling and on-Site Transportation), Section 02120 (Loading, Off-Site Transportation and Disposal), and Section 02196 (Sediment Stabilization) of the Technical Specifications.

The estimated volumes of sediment to be excavated from the Brook and Lagoon are summarized in Table 3.1 and detailed in Section 3.0. The layout of the initial excavation limits will be established prior to removal activities. The Contractor will be required to perform Site excavation activities according to the following requirements:

- i) perform tasks in an orderly and safe manner such that the movement and double handling of materials is minimized;
- ii) excavation will proceed from upstream to downstream within the Brook to prevent stormwater runoff being directed from an OHM-impacted area to a remediated area;
- iii) stormwater runoff will be directed away from excavations;
- iv) carry out measures necessary for dust emission control from excavation, sediment/soil handling, and transportation activities; and
- v) coordinate in-Brook sediment removal with Brook diversions (Section 6.8).

The scheduling of excavation activities will be coordinated such that activities will be completed promptly following construction of stormwater controls based on weather/seasonal conditions.

Following the excavation of sediment to the specified depths and aerial extent, verification sampling will be conducted for the Brook (i.e., Reach 3 and Reach 5 Hotspot) and the Lagoon (Section 6.8). Based on the results of the verification sampling, additional excavation activities may be required. If additional excavation is conducted, verification sampling will be repeated to ensure that verification levels have been met.

Sediment removal includes removal from the top of the Brook bank down to the depth of sediment removed and from the top elevation of Lagoon sediment as shown on Plan and Profile Drawings C-06, C-07, C-08, and C-011. The final excavation limits will be established by the Engineer based on visual observation and verification sampling. The Brook flow will be temporarily diverted around the work zone. It is anticipated that the

length of the diversions will range from 50 ft up to 500 feet. Once the Brook flow diversion has been implemented, sediments will be removed as discussed below.

6.8.1 SEDIMENT REMOVAL SEQUENCING

Brook sediment will be stabilized in situ and removed from Reach 3. To the extent practicable, Lagoon sediments may be excavated concurrently with Reach 3 sediment removal. Reach 5 in situ sediment stabilization and removal will be completed after Reach 3 removal activities.

6.8.2 SEDIMENT MANAGEMENT FACILITY

Prior to initiating sediment removal activities, a Sediment Management Facility will be constructed as shown on Drawing C-02 (Site Works I – Brook Reach 3 and Reach 5 Hot Spot) and Drawing C-09 (Temporary Sediment Dewatering and Stabilization Facility). Stabilized sediment will be stockpiled on the staging pad and tested for waste characterization, prior to off-Site transportation and disposal.

6.8.3 BROOK DIVERSION

The Brook flow through the remediation areas in Reach 3 and the Reach 5 Hotspot will be temporarily diverted, thereby isolating the work areas and allowing sediment excavation under non-flowing and relatively dry conditions. This will eliminate the potential for re-suspension and downstream transport of potentially impacted sediment and also provides a higher level of quality control, as the removal of the OHM-impacted materials can be determined based on visual examination as well as verification sampling. The diversion of the Brook flow and excavation of the sediment under non-flowing conditions will be most protective of the environment and the most cost-effective means of effecting removal of impacted sediment.

A hydrologic model has been developed for the area of the Site, including the Brook, to provide the basis for the engineering design and support permitting and approval activities. The model was used to determine Brook diversion options for the areas requiring excavation. A summary of the stormwater model results are presented and discussed in Section 5.0.

The stormwater model developed for the Site was utilized to determine peak flows for diversion control structure design parameters including elevations, bypass pipe sizing, and pump sizing.

Reach 3 of the Brook will be divided into manageable sections and the flow diverted around each section, moving in an upstream to downstream direction. In the upper section of Reach 3, diversion will be completed either by bypass pumping, and/or gravity diversion piping. Under either of these methods, the upstream and downstream ends of the area to be cleaned up will be isolated by temporary berms across the Brook. The Brook flow will pond on the upstream side of the upstream dam where an inlet to the diversion pipe or pump intake will be placed. The flow will then be diverted around the active work area and re-introduced to the Brook downstream of the second diversion berm. The second diversion berm will be constructed to prevent backflow into the work area and contain any potential releases from the work area.

Sediment excavation and restoration activities in areas of the Brook diverted by the diversion berms and piping network, would be completed safely while flow conditions equivalent to a 2.6-inch (i.e., 1-year) storm event bypass the work areas. The specific details for the control structures are presented below.

The Brook flow will be temporarily diverted around the work areas and stormwater from Outfall No. 1 and Outfall No. 2 will be controlled to minimize the quantity of water discharging to the Brook. The design storm criteria used for the diversion plan is the 3-inch (2-year) rain event. The diversion plan involves use of up to six temporary control structures (CS) in the following locations as shown on Drawings C-02, C-03, C-04, C-06, C-07 and C-08:

- CS-1 - Installed at the headwall inlet in Wetland A to temporarily block release of Wetland A water to the stormwater pipe that connects Wetland A to Outfall No. 1. This will reduce the amount of water entering the Brook from Outfall No. 1.
- CS-2 - Installed in the Brook upstream of Reach 3 at Station 18+08 to block Brook flow into Reach 3. The top of this control structure will be approximately 150.5 feet AMSL. A 12-inch diversion forcemain pipe will be installed to convey water from CS-2 downstream to Station 27+00. The diversion forcemain pipe will be routed along the west side of the Brook along the bank. In combination with CS-1, a containment wetwell will be attached to Outfall No. 2 to prevent stormwater from entering the Brook between CS-2 and C-2A. A dedicated pumping system will remove water from the wetwell and pump through a second diversion pipe forcemain along the bank of the Brook to a downstream discharge location.

- CS-2A (additional if required) – Installed in the Brook at Station 21+00 at the upstream side of the culvert under the Lagoon access road. This control structure would contain stormwater that enters the Brook from Outfall No. 2 into the upper section of Reach 3 if control measures for the diversion of water from Outfall No. 2 cannot be implemented. The top of the control structure will be approximately 150.5 feet AMSL. During the remedial work in the upper section of Reach 3, water contained behind CS-2A will be pumped to either the Lagoon for treatment at a later time or directly to the Wastewater Treatment Facility for immediate treatment. After the upper section of Reach 3 is remediated, water will be diverted from this control structure to the end of Reach 3 where it will be discharged back into the Brook. If possible, some or all of the stormwater in the Outfall No. 2 pipe will be diverted before it discharges to the Brook. This would reduce the amount of water that has to be treated because it has contacted sediment in the Brook. Excess stormwater would discharge at Outfall No. 2 and be contained in a wetwell and pumped to convey the discharge water downstream past the end of Reach 3. After the work in the upper section of Reach 3 is complete, CS-2A would remain in place to keep the lower section of Reach 3 dry. All diversion forcemains would be routed along the side of the Brook bank.
- CS-3 – Installed in the Brook at Station 27+00 at the downstream end of Reach 3. This control structure will contain stormwater that enters Reach 3 during the remedial work. The top of the control structure will be approximately 150.5 feet AMSL. Water diverted from upstream at CS-2 and CS-2A will be discharged downstream of CS-3. In the event that the Outfall No. 2 discharge cannot be diverted/contained, CS-3 will be designed to contain all the water from Outfall No. 2 for the 1-year design storm. Stormwater that enters the lower section of Reach 3 during the remedial work will be pumped to the Wastewater Treatment Facility for treatment prior to discharge back to the Brook.
- CS-4 – Installed in the Brook at station 33+50 at the upstream end of the Reach 5 Hotspot to prevent Brook water from entering Reach 5. The top of the control structure will be set at approximately 150.5 feet AMSL. Water will not be diverted around CS-4 if the hotspot removal is completed quickly. Upstream control structures will limit the amount of water on the upstream side of CS-4. It will be removed as soon as that sediment removal and restoration work is complete.
- CS-5 – Installed in the Brook at station 33+50 at the end of the Reach 5 Hotspot to contain stormwater entering the Hotspot.

6.8.4 SEDIMENT REMOVAL METHODS

6.8.4.1 BROOK

The Contractor will be required to prepare an Excavation Plan specifying details regarding excavation methods, sequencing, and sediment stabilization methods to be used. The Excavation Plan will be submitted to CRA for review and approval. In general, the following procedure will be implemented and will form the basis for the Excavation Plan:

- excavation will be conducted in a step-wise manner;
- stormwater sewer discharges entering the work area will be temporarily diverted;
- temporary berms and/or ditches will be constructed to prevent surface water runoff from entering the work areas;
- the work area will be allowed to drain by gravity to the maximum degree practicable prior to excavation. Water which remains in a work area following gravity drainage will be pumped utilizing a skimmer pump and pumped to the Wastewater Treatment Facility for treatment and testing prior to discharge to the Brook downstream of the work area;
- water (i.e., precipitation and groundwater seepage or water released as the sediment consolidates) that contacts OHM-impacted materials in the excavation area will be collected in sumps installed by the Contractor and will be pumped to the Wastewater Treatment Facility and treated prior to discharge;
- sediment will be stabilized in situ and then transferred to the Sediment Management Facility for characterization and loading for transportation and off-site disposal;;
- "clean" and "contaminated" work areas will be maintained and all transport vehicles will be restricted from entering the "contaminated" areas;
- stabilized sediment will be transported to an approved off-site disposal facility for disposal in accordance with the procedures presented in the Transportation and Disposal Plan;
- excavation will continue until all sediments and visibly contaminated materials have been removed; and
- verification sampling will be performed in accordance with the protocols presented in Section 6.8 to ensure that cleanup levels have been obtained.

If a large storm event occurs, excavation activities will cease and equipment will be removed from the excavation. The work area will be covered with plastic to minimize the contact between water entering the excavation and sediment. Once the storm event has passed, the collected water in the excavation area will be pumped and treated at the on-site Wastewater Treatment Facility. Resampling of any previously defined clean areas within the active working cell will be conducted to verify that these areas were not re-contaminated.

Additional details regarding the excavation of sediment are presented in Section 02325 (Sediment Removal) of the Project Specifications.

6.8.4.2 LAGOON

Prior to excavation activities, the Lagoon will be dewatered to remove standing water. All water removed from the Lagoon will be pumped to the on-Site Wastewater Treatment Facility to be batch treated and tested prior to discharge to the Brook or other approved area (e.g., ADESA Wetland). Excavation equipment will work from the perimeter of the Lagoon. Due to the size of the Lagoon, it will likely be necessary to construct working platforms in the Lagoon using clean fill to separate the Lagoon into manageable work zones and to prevent potentially OHM-impacted sediments from flowing into a clean area. Dewatering pumps will be used to remove groundwater that seeps back into the Lagoon and stormwater that enters the working areas of the Lagoon. Once in situ stabilization and excavation is complete, any residual clean fill used for working platforms will be graded across the base of the Lagoon. Stabilized sediment excavated from the Lagoon will be transported to the Sediment Management Facility for testing, and subsequent transportation and off-Site disposal.

6.8.5 SEDIMENT CLEANUP VERIFICATION AND SAMPLING

Following the removal of OHM-impacted sediment from the Brook and Lagoon to the specified depths and required aerial extent, verification sampling of the base of the excavation will be conducted to ensure that all OHM-impacted sediment with lead concentrations above remediation verification levels has been removed. The remediation verification concentrations for lead will be 1,150 mg/kg for Brook sediment and 100 mg/kg for the base of the Lagoon. The Brook remediation verification level of 1,150 mg/kg is based on the results of the Ecological Impact Delineation Study as

discussed in Section 2.0. The lead target level for the Lagoon of 100 mg/kg is based on the MADEP background concentration for lead in native soils (MADEP, 2002).

Sampling will be conducted by the Engineer in Reach 3 and the Reach 5 Hotspot of the Brook and in the Lagoon to verify that the procedures and equipment used for sediment removal are adequate. In Reach 3, two (up to 9-point) composite samples will be collected in 1,000 ft² sections in the areas that have exhibited the highest lead concentrations based on the results of the Phase II CSA and the Ecological Impact Delineation Study. The composite samples will include samples up to the top of the bank of the Brook where sediment is present. Similarly, up to two (up to 9-point) composite sample will be collected from 1,000 ft² sections upstream and downstream of the Reach 5 Hotspot. Four up to 9-point composite samples will also be collected from 1,000 ft² sections of the Lagoon. The composite samples will be submitted for rapid turnaround lead analysis.

It is anticipated that the results of the remediation verification sampling will demonstrate that the procedures and equipment and field observations of removed sediment down to native soil have adequately removed impacted sediment.

6.8.6 SEDIMENT HANDLING

Due to the topography and surface conditions along the Brook, it will be necessary to construct temporary access roads and use smaller trucks to transport sediment to the Sediment Management Facility. Care will be taken when transporting sediment from the active work zones to prevent tracking on the temporary access roads.

6.8.7 WETLAND PROTECTION

Wetlands not required for access to the Brook and Lagoon work areas will be protected from construction traffic using temporary fencing.

6.9 SEDIMENT STABILIZATION

The requirements for sediment stabilization are shown on Drawing C-09 (Temporary Sediment Dewatering and Stabilization Facility) and specified in Section 02196

(Sediment Stabilization) of the Technical Specifications. The Contractor will be required to submit a Sediment Stabilization Plan to CRA for review and approval.

The objective of sediment stabilization process will be to reduce the water content in the sediment such that the material will pass a paint filter test (SW-846 Method 9095 and 9096 (Free Liquid) and meet acceptance parameters for disposal at off-Site disposal facilities.

The Brook and Lagoon sediment will undergo physical solidification by adding a pozzolanic material (e.g., cement kiln dust). Solidification will be conducted in place by placing the solidifying reagents on the sediment and uniform mixing with an excavator bucket and/or pneumatically injecting solidifying agents using a specialized backhoe attachment and using a raking motion through the sediment.

6.9.1 BENCH SCALE AND FIELD SCALE STUDIES

Prior to stabilization of the sediment, a bench-scale laboratory treatability study will be performed by the Contractor to determine the optimum percentage of stabilization materials that will produce a suitably stabilized sediment matrix. Representative samples from the Lagoon and Brook will be tested in bench-scale laboratory tests. Samples of stabilized sediment will be tested for landfill disposal parameters, including the paint filter test, Resource Conservation and Recovery Act (RCRA) characteristic waste parameters, and Massachusetts landfill, and other disposal facility parameters.

Upon approval of the results of the laboratory bench-scale treatability study, the Contractor will also be required to perform a pre-construction field pilot treatability test on samples of sediment to finalize stabilization agent or admixture designs. The field pilot test will be conducted on at least 100 CY of sediment. Samples of stabilized sediment will be tested for landfill disposal parameters, including the paint filter test, RCRA characteristic waste parameters, and Massachusetts landfill and other disposal facility disposal parameters, as necessary.

6.9.2 STABILIZATION QA/QC

The stabilization process will be inspected and tested to identify the depth to which stabilization is completed, the degree of mixing, and the volume of solidification material injected into the sediments.

After stabilization, sediment will be sampled and tested to ensure that the material will pass the paint filter test and disposal criteria, as required. One sample will be collected from every 250 cubic yards of stabilized sediments or other disposal facility requirement. CQC/CQA inspections and testing will be conducted in accordance with Section 7.0.

6.10 BROOK AND LAGOON RESTORATION

The requirements for Brook and Lagoon restoration are provided in the Restoration Plan (CRA, July 2008) included in Appendix C.

6.11 TRANSPORTATION AND DISPOSAL

The requirements for off-Site transportation and disposal are specified in Section 02120 (Loading, Off-Site Transportation, and Disposal) of the Technical Specifications.

6.11.1 TRANSPORTATION

This section describes the procedures to be employed during the RA activities to ensure compliance with appropriate federal, state, and local regulations for transporting materials off-Site. This will ensure the following:

- a) materials are transported in accordance with applicable laws and regulations;
- b) potential impacted material is removed from the exterior of vehicles prior to moving from various active areas of the Site onto public rights-of-way or support areas of the Site;
- c) the impact upon local area traffic due to transportation of Site materials is minimized; and
- d) a spill contingency plan is in effect during transportation.

A material tracking form will be used to track the movement of each load of excavated material after it leaves the support facility(s) for off-Site disposal. Transport vehicles appropriately licensed to transport designated materials will be utilized to transport

material over public roads. Records will be kept at both the excavation and the staging area or disposal facility to ensure all loads arrive at the correct destination.

During transportation over public roads, the Contractor will ensure that the transportation is conducted in compliance with federal, state, and local regulations concerning shipping materials, including the following:

- the number for each transport vehicle/container is properly displayed;
- the received box of the transport vehicle/container is clean of loose debris or foreign material prior to loading;
- the receiving box or container will be lined with a minimum of one layer of 6-mil polyethylene sheeting continuous along the bottom and sides. The liner will be placed on the floor, run up the sides, and draped over the sideboards. The liner will be neatly pushed into the corners to prevent tearing during loading and transport. If the Contractor can demonstrate that the receiving box is of leak proof construction, an impermeable cover is placed over the container, and that the receiving box or container is made of materials which can be decontaminated, then the lining requirements may be waived;
- that the materials are loaded in a manner which will not damage the properly placed polyethylene liner; and
- following loading, the liner will be folded over the loaded materials prior to securing with an approved tarpaulin in a manner to prevent loss of materials or fugitive dust emissions.

Flag persons will be employed as necessary to ensure safe entrance to and exit from public roadways.

Prior to leaving the Site, each transport vehicle that has entered the exclusion zone will be decontaminated. The decontamination will be conducted to remove all material on the tires and axles and material on the vehicle resulting from loading operations. Transportation vehicles will also be decontaminated following off-loading at the on-Site staging area.

Material removed from the staging and dewatering facility will be transported directly to the off-Site disposal facility. Transport vehicles will be marked and placarded in accordance with applicable regulations. All material transported off-Site for disposal will be manifested and bills of lading (BOLs) completed, as appropriate, and the signed manifests and BOLs tracked.

6.11.2 OFF-SITE DISPOSAL

Waste streams generated during the RA activities will include:

- cleared and grubbed material from clean areas;
- vegetation and debris removed from the Brook and Lagoon prior to sediment removal;
- demolition debris (concrete, piping, equipment, asbestos, light fixtures);
- stabilized Brook and Lagoon sediment;
- personal protective equipment (PPE); and
- miscellaneous non-impacted refuse and debris.

6.11.2.1 CLEARED AND GRUBBED MATERIAL

Material from clean areas that cannot be chipped into mulch for use in erosion control on-Site will be disposed off-Site.

6.11.2.2 BROOK VEGETATION AND DEBRIS

Vegetation and debris removed from the Brook remediation areas will be managed at the Sediment Management Facility. Based on characterization information and data, the material will be reused on site for erosion control or transported to a permitted off-Site disposal facility.

6.11.2.3 DEMOLITION DEBRIS

Demolition debris will be segregated according to recyclable or waste classification and disposed according to applicable regulations.

6.11.2.4 SEDIMENT

Stabilized Brook and Lagoon sediment will be tested at a frequency of at least each 250 CY for waste characterization prior to transportation for off-Site disposal. Analytical parameters will include RCRA characteristics, PCBs, metals, and pesticides and other parameters required by applicable regulations and disposal facilities.

Contractor selected disposal facilities will be reviewed and approved by GM. It is anticipated that the majority of stabilized sediment will be characterized as non-hazardous and will be transported to Massachusetts-permitted landfills for use as daily cover or direct disposal. Stabilize sediment that is determined to be characteristically hazardous waste (e.g., D008 leachable lead) will be disposed in a RCRA Subtitle C treatment or disposal facility (TSDF).

6.12 AIR QUALITY MONITORING

Throughout the implementation of the RA activities, air monitoring will be conducted by the Contractor to ensure that the workers and public, and ADESA personnel are adequately protected, and applicable OSHA regulations are met. The Contractor's HASP will specify the type, frequency, sampling methods, and analytical protocols to be utilized by the Contractor to provide adequate protection. Ambient air will be field monitored for total dust and volatile organic compounds, using methods and frequencies specified in the Contractor's HASP. Additional monitoring will be conducted during various work activities for lead and other parameters, and confined space monitoring, as appropriate. The results of the air monitoring will be provided to the Town of Framingham Board of Health if they are used to support downgrading of personal protection levels (e.g., respirators to no respirators).

If the concentration of total dust exceeds $150 \mu\text{g}/\text{m}^3$, more stringent dust control measures will be implemented, or Site operations will be temporarily halted to consider alternate work practices.

The Community Response Plan is detailed in the HASP requirements and provides measures to ensure that Site activities are controlled and stopped as needed to prevent potential impact to off-Site areas and the public.

6.13 WATER MANAGEMENT

The requirements for water management are shown on Drawing C-06 (Plan and Profile I – Reach 3), Drawing C-07 (Plan and Profile II – Reach 5 Hotspot), Drawing C-08 (Plan and Profile III – Lagoon) and specified in Section 02145 (Wastewater Treatment Facility) of the Technical Specifications.

6.13.1 WATER HANDLING

6.13.1.1 WASTE WATER SOURCES

Wastewater will be generated from the following activities:

- Brook excavations;
- Lagoon dewatering;
- Sediment dewatering at the Sediment Management Facility;
- Equipment and vehicle decontamination;
- Personal decontamination; and
- Miscellaneous sources that may be impacted.

Wastewater generated will be pumped, collected, and transferred to the on-Site Wastewater Treatment Facility.

6.13.2 WASTEWATER TREATMENT FACILITY

The wastewater treatment requirements are specified on a performance basis (e.g., minimum collection, storage and hydraulic capacities, treatment capacity, and meeting discharge criteria on a batch basis). The performance-based specifications provide the flexibility necessary to allow Contractors to propose the use of their own specialized equipment. At a minimum, treatment will include settling and filtration (e.g., bag filters and sand filters) to remove suspended solids, oil water separators, and activated carbon to provide polishing to remove dissolved OHM.

The Contractor will be required to prepare a Wastewater Management Plan for review and approval by CRA. The plan will specify the components and the design for the treatment system and system operation in accordance with the Drawings and Technical

Specifications. The Technical Specifications specify the treated water monitoring and discharge criteria required to demonstrate compliance with applicable standards, in accordance with the 401 WQC. Treated wastewater will be sampled and tested to confirm that the water meets permitted criteria for discharge into the Brook and potentially other areas (e.g., ADESA Wetland). The discharge criteria include the following as required by the 401 WQC (Section 9.4):

- no discoloration or objectionable odor;
- Turbidity less than 500 NTU;
- Meet USEPA AWQC, including total and dissolved lead, dissolved oxygen, and total suspended solids (TSS); and
- MCP GW-3 Reportable Concentrations (VOCs, Volatile Petroleum Hydrocarbons, Extractable Petroleum Hydrocarbons).

As a contingency, water that cannot be treated on-Site to meet the discharge criteria may be transported off-Site for treatment/disposal.

Additionally, a surface water monitoring plan will be prepared to detail surface water monitoring for turbidity, TSS and dissolved oxygen during remediation activities to demonstrate no unacceptable impacts to occur to surface water in the Brook.

6.14 CLOSEOUT

At the completion of the remedial works, all temporary facilities and equipment will be decontaminated as required and removed and residual waste materials will be disposed off-Site. Disturbed areas will be restored to pre-construction conditions and in accordance with the Restoration Plan.

7.0 CONSTRUCTION QUALITY ASSURANCE (CQA) PROGRAM

The Construction Quality Assurance (CQA) Program forms part of the Phase IV RIP for the RA activities. The technical specifications provide the detailed inspection and testing required for the Construction Quality Control (CQC) program for the remedial construction activities. The CQA Program is designed to provide comprehensive review of all CQC activities as well as independent third party Engineer/LSP inspections and testing to verify that the CQC program is implemented in accordance with the RIP.

7.1 PURPOSE AND ORGANIZATION OF CQA PROGRAM

The CQA Program presents the quality assurance program to be used during implementation of the RA activities. The purpose of the CQA Program is to ensure that the Phase IV RIP activities meet or exceed all design objectives and criteria, plans, and specifications and that the Contractor's Quality Control (QC) program is performed as required by the Phase IV RIP.

7.2 PROJECT DESCRIPTION

The CQA Program applies to all RA construction activities. The major construction components of the RA for the Site include the following:

- i) Site preparation;
- ii) clearing of vegetation;
- iii) clearing debris from the Brook (i.e., Reach 3 and Reach 5 Hotspot);
- iv) demolition of former Pump House and Valve House, if required;
- v) temporary diversion of the Brook around Reach 3 and Reach 5 Hotspot;
- vi) Brook sediment removal;
- vii) dewatering the Lagoon and sediment removal;
- viii) Sediment Stabilization Facility;
- ix) sediment transportation and off-Site disposal;
- x) Water Treatment Facility;
- xi) restoration activities; and
- xii) closeout.

Detailed CQC inspection and testing requirements C are provided throughout the Technical Specifications and are summarized in Table G.1 (Inspections) and Table G.2 (Testing) of Appendix G. The Construction Quality Assurance Plan (CQA Plan) inspection and testing requirements also are summarized in Appendix G.

7.3 QA INSPECTION AND TESTING ACTIVITIES

7.3.1 SCOPE

Throughout the RA, there will be ongoing field inspections and testing requirements for specific work tasks. The field inspection and testing activities will ensure compliance with the RIP as presented in this report, the design specifications and drawings, including ensuring completion of the activities in accordance with the QA/QC requirements.

Field inspections and field testing and off-Site geotechnical and chemical laboratory testing will provide qualitative and quantitative means of monitoring the quality and progress of work performed.

The components of each major work task that will require CQC/CQA field inspection or testing are as follows:

- i) Construction Facilities and Temporary Controls
 - Site support area;
 - personnel and equipment decontamination facilities;
 - Sediment Management Facility; and
 - Wastewater Treatment Facility.
- ii) Brook and Lagoon Sediment Removal
 - sediment and erosion controls;
 - clearing and grubbing;
 - Brook diversions;
 - removal and stabilization of Brook sediment;
 - dewatering Lagoon;
 - removal and stabilization of Lagoon sediment;

- treatment, sampling, and discharge of wastewater;
- stabilized sediment characterization sampling; and
- loading, transportation, and off-Site disposal of sediment.

iii) Other Activities

- Health and Safety;
- Pump House and Valve House demolition, if required;
- surveying; and
- restoration.

7.3.2 FIELD INSPECTIONS

Field inspections will be completed throughout construction by CRA, CQA Officer and/or CQA support personnel.

The CQA Officer has the primary responsibility for performing and documenting all QA inspection activities. The CQA Officer may delegate certain tasks to support personnel, if prior approval from the Engineer is obtained.

The inspections will examine the following:

- quality of workmanship;
- conformance of materials with specifications;
- conformance with specified lines, grades, and elevations;
- conformance with specified material quantities and thicknesses; and
- conformance with required handling procedures.

Documentation of all QA inspection activities will be included in the CQA Officer's logbook. Specific observations and results will be documented and attached to the Daily Construction QA Reports.

Any inspection failures, conformance problems, or other concerns will be reported immediately to the Engineer.

The specific inspection activities, frequencies, conformance standards, and documentation requirements are summarized in Table G.1 in Appendix G.

The LSP of Record will conduct inspections as required to review and verify that RA construction activities are being conducted in accordance with the RIP and applicable provisions of the MCP.

7.3.3 TESTING

In addition to the above mentioned inspections, field and laboratory testing will be performed to ensure compliance with material specifications, performance standards, and design criteria.

The CQA Officer has the primary responsibility for conducting and documenting all QA testing activities. The CQA Officer may delegate certain tasks to support personnel, if prior approval from the Engineer is obtained.

Documentation of all QA testing activities will be included in the CQA Officer's log book. Testing results will be documented and attached to the Daily Construction QA reports.

Any test failures, performance problems, or other concerns will be reported immediately to the Engineer.

The specific testing activities, methods, frequencies, performance standards, and documentation requirements are summarized in Table G.2 in Appendix G.

7.4 CQA DOCUMENTATION

7.4.1 GENERAL

This section describes the documentation requirements for the CQA activities. The proper, thorough, and accurate documentation of all CQA activities is important to verify that the RA was completed according to the plans and specifications.

CQA documentation will consist of daily records, construction problem identification and resolution reports, photographic records, design and specification revisions, weekly construction meeting minutes, construction progress reports, and a final report. The CQA Officer will maintain all records at the Site, and copies submitted to the Engineer.

7.4.2 DAILY RECORDS

At a minimum, daily records will consist of field notes, summaries of daily meetings with the RA Construction Contractor, observation and data sheets, and construction problem and resolution reports.

The CQA Officer will record daily QA activities on observation and data sheets. The observation and data sheets will include the following information:

- date, time, and weather conditions;
- description of ongoing construction and inspection activities;
- a reduced scale Site plan showing work areas, including test locations for each work day;
- a summary of test results identified as passing or failing; or in the event of a failed test, retest results;
- test equipment calibrations, if applicable;
- off-Site materials received and approvals given;
- a summary of decisions regarding acceptance of the work and/or corrective actions taken;
- submittals made by suppliers verifying material quality;
- CQC and CQA quality control test and inspection results;
- construction delays/causes and areas affected;
- QC/QA personnel on Site;
- QA equipment on Site;
- record of instructions given by the Engineer;
- record of changed conditions/conflicts encountered;
- contractor's crew size, equipment, and hours worked; and
- signature of CQA Officer.

7.4.3 CONSTRUCTION PROBLEM/CORRECTIVE ACTION REPORTS

This report will identify and document construction problems such as deficient QC/QA inspections and testing results and other problems and the necessary corrective actions to be taken. The purpose of the Construction Problem/Corrective Action Report is to document problems that will result in rework to meet the limits and criteria defined in the specifications or by the judgment of the CQA Officer, Engineer, Project Manager, or LSP. At a minimum, this report will include the following information:

- detailed description of the problem;
- location and likely cause of the problem;
- how and when the problem was identified;
- estimation of how long the problem has existed;
- plan for corrective action;
- description of the implementation of the corrective action;
- verification and effectiveness of the corrective action;
- suggested methods to prevent similar problems; and
- signature of CQA Officer.

7.4.4 WORK CHANGE PROCEDURE

The Work Change Procedure will be implemented if a significant change in the design is required during construction. The Work Change Procedure will be as follows:

- detailed description of reason for work change;
- detailed description of work change, including specifications, design drawings, and CQA information, as required;
- submission of work change to GM for approval; and
- implement work change after receiving GM approval.

7.4.5 PHOTOGRAPHS

The CQA Officer will maintain a photographic record of construction activities, including significant problems and corrective actions. Photographs will be identified by

location, time, date, and individual photographer. One copy of the photographs will be given to the Engineer on a weekly basis, or more frequently if necessary. The CQA Officer will also keep a complete set of photographs at the Site.

7.4.6 WEEKLY PROGRESS REPORTS

The CQA Officer will prepare weekly progress reports summarizing construction and CQC/CQA activities. The report will be submitted to the Engineer and will be included in progress meeting minutes for distribution. At a minimum, weekly progress reports will include the following information:

- date, project name, and location;
- summary of work and CQC/CQA activities for the week;
- summary of deficiencies and/or defects and resolutions; and
- signature of CQA Officer.

The CQA Weekly Report will be provided and discussed at the weekly Construction Meeting and included as an attachment to the Weekly Construction Meeting minutes.

7.4.7 WEEKLY CONSTRUCTION MEETINGS

Weekly construction meetings will be held to discuss health and safety, construction progress, CQC/CQA activities and results, problems, and corrective actions. CRA will record and distribute the minutes of the meeting. At a minimum, weekly construction meeting minutes will include the following information:

- date, project name, and location;
- health and safety;
- schedule;
- summary of work and progress;
- CQC/CQA activities for the week;
- summary of deficiencies and/or defects and resolutions; and
- other issues and actions.

7.4.7 FINAL REPORT

Upon completion of the Remedial Action construction, the CQC Officer will submit a report to CRA that summarizes the CQC activities performed during the construction. The report will contain, at a minimum, the following information:

- summary of all quality control activities;
- complete set of observation and data sheets and field notes;
- complete set of construction problem/corrective action reports;
- complete set of construction photographs; and
- sampling, inspection, and testing location plans and results.

7.4.8 AS-BUILT CONSTRUCTION REPORT AND RAO STATEMENT

Upon completion of remedial construction activities, an As-Built Construction Report and RAO Statement will be prepared and submitted to MADEP. The As-Built Construction Report and RAO Statement will include detailed documentation of the construction activities, CQC/CQA inspections and testing activities, any significant design modifications, and as-recorded drawings. The Final Inspection Report will include a description of the final inspection activities and findings, and a list of permits and approvals obtained related to the design, construction, and operation of the Remedial Action. The As-Built Construction Report and RAO Statement will be submitted to MADEP with the Phase IV Completion Statement.

7.4.9 STORAGE OF RECORDS

During construction, the Contractor and Engineer will maintain on-Site copies of the plans and specifications and any construction reports and CQC documentation submitted by the Remedial Action Contractor. The CQC/CQA Officers will maintain on-Site copies of the CQC/CQA documentation.

Following construction, GM will maintain the plans and specifications, as-recorded drawings, construction reports, CQA reports, and any other submittals until the As-Built

Construction Report and RAO Statement have been completed and a Phase IV Completion Statement has been submitted to the MADEP.

8.0 HEALTH AND SAFETY PLAN (HASP)

The HASP presented in Appendix F describes the health and safety procedures and emergency response guidelines to be implemented during RA activities for the Site.

8.1 PURPOSE

The purpose of this Site-specific HASP is to provide specific guidelines and establish procedures for the protection of personnel performing RA activities as described in Section 2.0 of the HASP (Appendix F). The information in the HASP has been developed in accordance with applicable standards and is, to the extent possible, based on information available to-date. The HASP is intended to be a living document in that it must continually evolve as Site conditions and knowledge of the Site work activities develop further. Continual updating of the HASP, based upon consistent monitoring and implementation of the HASP adjustments, will provide for the required results.

A vital element of the selected RA Contractor's Health and Safety Program will be the implementation of a Site-specific HASP for their project activities. The selected contractor(s) for this project will provide a HASP based upon the project plans and specifications described in Section 6.0 and that minimally meets the requirements that are identified in the HASP presented in Appendix F. Site personnel and visitors must comply with the Remedial Construction Contractor's HASP during all construction activities. The HASP, as applicable for this project, requires the following measures:

- i) communication of the contents of the HASP to Site personnel;
- ii) elimination of unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an accident and to remove exposure to these conditions;
- iii) reduction of unsafe acts. Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors involved in a task become an integral part of the task; and
- iv) frequent inspections. Regular safety inspections of the work Site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. Safety and health deficiencies shall be corrected as soon as possible, or project activities shall be suspended.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the removal of Site personnel from that area and reevaluation of the hazard and the levels of protection.

Some of the key aspects of the RA activities that will require special attention to prevent health and safety incidents are as follows:

- working in the Brook and Lagoon where wet and slippery conditions are present;
- personnel, equipment, and vehicle access and movement at the Site due to the frequent vehicle traffic from ADESA operations;
- working in exterior open areas exposed to weather;
- Sediment Management Facility operations with wet sediment and mixing dry materials for stabilization;
- Water Treatment Facility where significant volumes of wastewater will be transferred and handled;
- Transportation and on and off-site disposal activities with contaminated materials; and
- Working in off-Property public or private property areas.

8.2 PERSONNEL REQUIREMENTS

All personnel conducting activities at the Site for which a reasonable potential exposure exists must be in compliance with all applicable Occupational Safety and Health Administration (OSHA) regulations, to include but not limited to 29 CFR 1910, 29 CFR 1926, and CRA policies and procedures. Project personnel must also be familiar with the procedures and requirements and comply with the HASP, the Health and Safety specification, and the RA Contractor's HASP (based on the Health and Safety specification). In the event of conflicting safety procedures/requirements, personnel must implement those safety practices, which afford the highest level of safety and protection.

8.3 ELEMENTS OF HASP

The elements of the HASP are as follows:

- i) project management and safety organization;
- ii) training and medical surveillance requirements;
- iii) Site control;
- iv) Site operations;
- v) hazard evaluation;
- vi) personal protective equipment (PPE);
- vii) air monitoring;
- viii) decontamination; and
- ix) emergency response.

The HASP details all the elements required to safely oversee all construction activities. The Contractor's HASP will be developed to meet all construction-related health and safety requirements as detailed in the Health and Safety specification and will be the governing HASP for all Site personnel and visitors.

9.0 PERMITS AND APPROVALS

Certain permits and approvals are required to govern the Phase IV RIP RA activities. The primary governing regulation for the activities is the MCP and the associated ACOPs for the Site. Additionally, a Corps permit, MEPA approval, a 401 WQC permit, and an Order of Conditions from the FCC are required for the activities. In July 2006, a joint agency pre-consultation meeting was held with the Corps, MADEP, FCC, and ADESA to obtain input on the Phase III RAP alternatives evaluation, conceptual Phase IV RIP activities, and the permitting and approval requirements.

The permitting categories and approvals requirements are primarily triggered by the area of resource areas affected and the volume of sediment dredged.

It is important to note that the various permits and approvals require the submittal of much of the same information regarding the Site conditions, engineering design, project activities, and environmental controls provided in the Phase IV RIP, with certain information summarized or specific to the individual permit. Therefore, the overall approach was to submit the Phase IV RIP, the individual permit applications, and supplement the application as necessary with permit-specific information. Therefore, as part of the permit application process, the same information was provided to each agency as is provided in the original Phase IV RIP (CRA, December 2007) and this report.

9.1 MCP

The Phase IV RIP activities will be conducted in accordance with the MCP Response Action Performance Standards and other MCP requirements. In accordance with ACOP NE-05-3A0421 (Lagoon) and ACOP NE-05-3A043 (Brook), the Phase IV RIP activities will be completed and an As-Built Construction Report and RAO Statement for the Site will be submitted by November 18, 2009. The Phase IV RIP Engineering Design, Technical Specifications, and Engineering Design Drawings will govern the Phase IV RIP activities as detailed in the Phase IV RIP. The Phase IV RIP activities will be supervised by the LSP of Record and engineering and technical staff and subcontractors under their supervision to ensure that the MCP provisions are met. Additionally, MCP public notification requirements for project activities have been and will continue to be met and a Public Communication Plan (Section 10.0) will be implemented.

9.2 MEPA

An Environmental Notification Form (ENF) and supporting documentation was provided to MEPA on April 11, 2008. Copies of the ENF were also provided to the appropriate distribution list in accordance with 301 CMR 11.16(2). The Legal Notice/Public Notice of Environmental Review was published in the Metro West Daily News on Wednesday, April 16, 2008.

Based on discussions with MEPA and design changes to minimize impacts to affected resource areas, the ENF was revised and resubmitted to MEPA on April 22, 2008. Copies of the ENF were also provided to the appropriate distribution list in accordance with 301 CMR 11.16(2). The MEPA file was assigned project number 14227.

On May 5, 2008, MEPA coordinated a Site meeting, which included attendances from GM, CRA, ADESA, the FCC and representatives from the Town of Framingham. During this Site meeting it was identified that there was a large beaver dam in Beaverdam Brook, and the FCC requested that this be removed prior to RA activities (see Section 9.6).

The ENF was available on the Environmental Monitor from April 23, 2008 to May 13, 2008. During this time period, on May 13, 2008, the MADEP Northeast Regional Office (NERO) provided comments regarding the proposed wetlands disturbance and the requirement of a 401 WQC for the proposed RA. There were no other comments received during this review period.

The MEPA certification was issued on May 23, 2008. It was determined that the RA activities did not require an Environmental Impact Report (EIR) and did require a Corps Category 2 PGP, 401 WQC, an Order of Conditions from the FCC, potentially a Framingham Land Clearing and Earthworks Permit and that the project was considered a limited project with respect to 310 CMR 10.53(3)(q) the Wetlands Protection Act and therefore would require a wildlife habitat analysis for the wetlands permitting.

Copies of the MEPA ENF, public notification in the Metro West Daily News, May 5, 2008 Site meeting sign-in sheet, May 13, 2008 NERO correspondence and the final May 23, 2008 MEPA certificate are provided in Appendix I.

9.3 CORPS

A Category 2 PGP is required to govern specific dredging/removal activities within State regulated waterbodies and wetlands. On April 17, 2008, the Category 2 PGP permit application and supporting documentation was submitted to the Corps New England District. The file was assigned project number: NAE-2007-1398.

On July 1, 2008, the Corps provided the permit in a cover letter that included specific conditions and the general Category 2 PGP conditions. The Corps indicated that a 401 WQC permit is required for the RA and that certain notification submittals were required prior to and upon completion of the RA activities. The expiration date of the permit is January 20, 2010.

Copies of the application form (ENG 4345), the July 1, 2008 correspondence and the general Category 2 PGP conditions are provided in Appendix I.

Information regarding access approvals, including Corps access, to non-Site properties also is part of the application process.

9.4 WQC

A WQC Permit is required to govern the dredging activities (greater than 100 cubic yards) to be conducted that result in discharges to state waters by the Massachusetts Wetlands and Waterways Regulation Program. The intent of the 401 WQC Permit is to have project activities implemented in a fashion that prevents adverse impacts to water quality and wetlands due to the dredging activities.

On April 14, 2008, CRA/GM submitted the 401 WQC permit application, supporting documentation and applicable fees to the MADEP Bureau of Resource Protection (BRP). Public notification for the application for a 401 WQC permit was published in the Metro West Daily News on April 18, 2008. The WQC file number W220656 was assigned.

Based on discussions with MADEP and revisions to the engineering design to minimize impacts to resource areas, a supplemental package was provided to MADEP BRP on July 10, 2008.

The final WQC permit was issued to GM/CRA on July 24, 2008. GM/CRA discussed with MADEP clarifications to certain conditions in the 401 WQC and the Phase IV RIP (Revision 1) provides these clarifications.

Copies of the MADEP BRP application forms, public notification, and final permit are provided in Appendix I.

9.5 CHAPTER 91 LICENSE

A Chapter 91 License may be required to govern the dredging activities to be conducted in a non-tidal river or stream such as the Brook by the Massachusetts Waterways Regulation Program. The intent of the Chapter 91 License is to protect and promote the public interest by ensuring that project activities do not unreasonably interfere with navigation and the rights of the public or adjacent waterfront property owners; protect water-dependent uses, and serve a proper public purpose.

On July 24, 2008, the MADEP Executive Office of Energy and Environmental Affairs issued a determination that a Chapter 91 License was not applicable or required for the RA activities, and the documentation is provided in Appendix I.

9.6 EMERGENCY BEAVER DAM REMOVAL PERMIT

At the May 5, 2008 MEPA meeting, a large beaver dam was identified in Beaverdam Brook located approximately 50 to 75 feet downstream of the culvert crossing the Lagoon, and the FCC requested that the beaver dam be removed prior to commencement of RA activities. GM/CRA submitted an Application for a 10-Day Emergency Beaver or Muskrat Permit (Emergency Permit) to the Framingham Board of Health (BOH) on June 18, 2008.

The Framingham BOH issued the permit for the duration of June 20, 2008 to July 20, 2008. Beaver dam breaching occurred the week of June 24, 2008. The ratified permit was sent to GM/CRA on July 7, 2008. Since the beaver dam was not entirely removed, a permit extension was granted to August 11, 2008 and a second extension was granted to September 19, 2008. The permit also allows trapping and removal of beavers as required.

Copies of the application form, original permit, and permit extension forms are provided in Appendix I.

9.7 ORDER OF CONDITIONS

A FCC Order of Conditions is required to govern the RA activities in resource areas as defined by 310 CMR 10.00 Wetlands Regulations within the FCC's jurisdiction. The intent of the Order of Conditions is to ensure that measures are in place during project activities to prevent adverse impacts to resource areas and to provide appropriate post-construction restoration.

On April 23, 2008, the original NOI (application for an Order of Conditions) was submitted to the MADEP and the FCC. This submittal contained project descriptions, application information, table of contents, figures and Table 5.1 from the Phase IV RIP (December 2007), and applicable forms.

On May 5, 2008, the FCC/MEPA held the public hearing/Site meeting. Due to the large scope and extent of proposed resource area alteration, the FCC voted to hire an outside consultant to review the NOI. The purpose of the outside consultant was to assist the FCC in ensuring the project complies with the performance standards of the Wetlands Protection Act (310 CMR 10) and to determine if the project as proposed is designed to minimize impacts to the resource areas during and after remediation activities. The FCC voted to hire Mr. Patrick Garner of Patrick C. Garner Company, Inc. Both the FCC and Mr. Garner raised a number of questions and concerns and, as a result, the FCC held continued discussions on June 4, 2008, July 2, 2008 and July 16, 2008.

On May 28, 2008, the NOI Supplement Report was prepared and submitted to provide further detailed information identified at the May 5, 2008 hearing and in the MADEP NERO's May 6, 2008 NOI comments (to MEPA). The NOI Supplement Report included a basis for the remedial action, an analysis of alternatives, a RA implementation plan, a description of resource area calculations, demonstration to the achievement of the Wetland Protection Act (310 CMR 10) performance standards, a restoration plan, and the Town of Framingham bylaw application forms. The NOI Supplement Report also included a habitat evaluation, with detailed drawings and MADEP habitat protection forms.

On June 26, 2008, the Restoration Plan was provided in response to the June 4, 2008 hearing. The Restoration is provided in Appendix X, and includes a description of the

existing Brook channel and instream habitat conditions, resource areas impacted by the project, minimization of impacts to wetlands, a detailed restoration plan, the general restoration chronology and sequence of work, a monitoring plan and detailed restoration drawings.

On July 7 and 8, 2008, the following documents were provided in response to comments received from the FCC/Mr. Garner in a June 2, 2008 letter and additional comments provided in an updated June 28, 2008 letter, and to address comments received from the FCC at the June 4, 2008 and July 2, 2008 hearings: Notice of Intent Supplement Revision No.1; Restoration Plan Revision No.1; and Response to Comments (to Mr. Garner).

On July 15, 2008, the responses to the July 10, 2008 hearing comments were provided.

On July 29, 2008, the NOI Supplement Revision No. 2 was provided to include updates to the calculation of affected resource areas, as agreed upon by the FCC.

It was required that the last page of the NOI form be signed by all property owners, which included GM, ADESA, CSX and the two private property owners adjacent to the Reach 5 hotspot.

Upon completion of the Phase IV RIP, restoration and monitoring activities, including additional FCC inspections, an application to close out the Order of Conditions will be required.

A copy of the final NOI application form including signatures/approvals from adjacent property owners and the final table of the affected resource areas is provided in Appendix I. On August 7, 2008, the FCC issued a signed Order of Conditions contingent upon the submittal of final engineering drawings certified by a Professional Engineer. The certified drawings were submitted on August 11, 2008. A copy of the Order of Conditions is provided in Appendix H.

10.0 PUBLIC COMMUNICATION PLAN

This section summarizes the public communication plan activities that have been completed for the Site sampling activities, permit application process, as well as those activities to be implemented as part of the Phase IV RIP activities. An access agreement between GM and CSX has been established for the duration of the RA activities.

10.1 PUBLIC OFFICIALS NOTIFICATION

In accordance with the MCP, public officials, including the Chief Municipal Officer (CMO) of the Town of Framingham Board of Selectmen and the Town of Framingham BOH, have been notified of the availability of all Phase submittals [i.e., Phase II CSA and CSA Supplements, Phase III RAP, Phase IV RIP (December 2007)] related to the Site.

Throughout the course of RA activities at the Property associated with the Former Landfill site (RTN: 3-3939), GM/CRA worked closely with the FCC. An Order of Conditions was obtained and public hearings were held as part of the design and implementation of remedial action activities for the Former Landfill site.

10.2 PERMITS/APPROVALS PUBLIC NOTIFICATION

As part of the permit applications and approvals process certain public communication activities were completed, including:

- MEPA – publication of ENF in Environmental Monitor, notice in Metro West Daily News, distribution of ENF in accordance with 301 CMR 11.16(2), Site visit/public hearing on May 5, 2008 (Section 9.2);
- WQC – Notice in Metro West Daily News (Section 9.4); and
- NOI/Order of Conditions; Town of Framingham Public Hearings, signatures by adjacent property owners.

10.3 OFF-SITE PROPERTY OWNER NOTIFICATION OF SAMPLING

Supplemental off-Property upstream and downstream sampling of sediment and surface water in the Brook was completed in March 2006 after submission of the Phase II CSA. Initial notification of environmental sampling was provided to affected property

owners on March 3, 2006, and the results of the analytical data and disposal site boundary figure were provided to the appropriate property owners on July 20, 2007. Documentation of this notification was submitted to MADEP on July 25, 2007, as Supplemental Phase II Information pursuant to 310 CMR 40.0836.

As part of the Ecological Delineation Impact Study, additional off-Property upstream and downstream sediment samples were collected from the Brook. Prior to sampling activities, notification was provided to property owners within the vicinity of the proposed sampling locations. The notification of environmental sampling was mailed on July 20, 2007, and included a letter providing Site information, BWSC Form 123 Notice of Environmental Sampling, where the analytical data would be available, how the sampling would be conducted, and a figure showing the proposed sample locations and the corresponding owner's property boundary. Copies of the notification letters are provided in Appendix B.1.

On November 1, 2007, within two weeks of completion of data validation, CRA provided the private property owners with the analytical data from samples collected within the Brook on their respective properties. This analytical data package included Site information, BWSC Form 123 – Notice of Environmental Sampling, a statement that public involvement opportunities are available under 310 CMR 40.1403(9), the sampling procedures used, the name and location of the analytical laboratory, the analysis performed, the tabulated analytical data, and a figure showing the sampling locations and owner's property boundary. Copies of the notification letters are provided in Appendix B.2.

As part of delineation of the length for remediation of the Reach 5 hotspot, additional sampling for lead analysis was required. Prior to sampling activities, notification was provided to property owners within the vicinity of the proposed sampling locations. The notification of environmental sampling was mailed on June 19, 2008, and included a letter providing Site information, BWSC Form 123 Notice of Environmental Sampling, where the analytical data would be available and how the sampling would be conducted. Copies of the notification letters are provided in Appendix B.3.

On August 11, 2008, within two weeks of completion of data validation, CRA provided the private property owners with the analytical data from samples collected within the Brook on their respective properties. This analytical data package included Site information, BWSC Form 123 – Notice of Environmental Sampling, a statement that public involvement opportunities are available under 310 CMR 40.1403(9), the sampling procedures used, the name and location of the analytical laboratory, the analysis

performed, the tabulated analytical data, and a figure showing the sampling locations and owner's property boundary. Copies of the notification letters are provided in Appendix B.4.

10.4 PHASE IV RIP PUBLIC COMMUNICATION/PARTICIPATION ACTIVITIES

The health and safety of the public will be held paramount during the implementation of the Phase IV RIP response action activities and public communication activities will assist in supporting this goal. The identification and selection process for remedial actions in the Phase III RAP considered potential impacts to the public for the various alternatives evaluated. Certain minimum public communication or participation activities are required by applicable regulations to communicate and support the Phase IV RIP RA. The primary public participation activities will include providing notifications of RA activities, obtaining and addressing comments and concerns during the permitting and approvals process and the field activities, and reporting on the results and completion of the RA activities. The primary regulation governing these public participation activities is 310 CMR 40.1400 of the MCP. Additionally, public involvement will occur during other Corps, MEPA, MADEP and Town of Framingham permitting and approval activities.

This public communication plan also provides for communication and liaison during RA field activities. The specific public communication plan activities will ensure that the public, particularly those in close vicinity to the work area, are made aware of the activities, who to contact with concerns, and what measures are being taken to prevent harm to the environment and potential impacts to the health and safety of the public. These additional public participation activities are important since a portion of the Phase IV RIP response actions are being conducted in the Brook off GM and ADESA property.

In accordance with the MCP, the following specific notifications will be provided:

1. planned scope and duration of field activities to CMO and BOH and Fire and Police Departments;
2. availability of any Phase submittals;
3. off-Property sampling or other activities (e.g., restoration) to be performed to property owners and adjacent property owners;

4. sampling results to property owners;
5. RAO Completion Statement; and
6. other public involvement activities as required by the MCP and project permits and approvals.

10.5 RA PUBLIC INVOLVEMENT ACTIVITIES

Written notifications will be provided to each affected property owner and adjacent property owner to inform them of the activities, obtain their input and potential concerns and provide contact information to obtain additional information regarding the project. Property owner approvals will also be obtained where necessary to implement project activities. Follow-up correspondence and communication will be conducted as appropriate to communicate significant changes in activities and ensure any issues are identified and fully addressed.

The following actions will also be implemented in order to provide additional public communication and participation before, during, and after the Phase IV RIP response actions:

1. Project representative visits to residents on Aaron Street, if the street is to be used for truck traffic, to inform them of increased truck traffic during transportation and off-Site disposal of waste materials;
2. Signage at new gate on Aaron Street, if the street is to be used for truck traffic, providing contact information for project representatives;
3. Project representative visits to the local Fire Department and Police Department to inform them regarding the activities, the HASP, and contingency plans in the event of emergency situations; and
4. Public handout sheet available at Security gate and from project representatives providing a summary of project activities and locations and contact information to obtain additional information or express concerns regarding RA activities.

11.0 CONTACTS

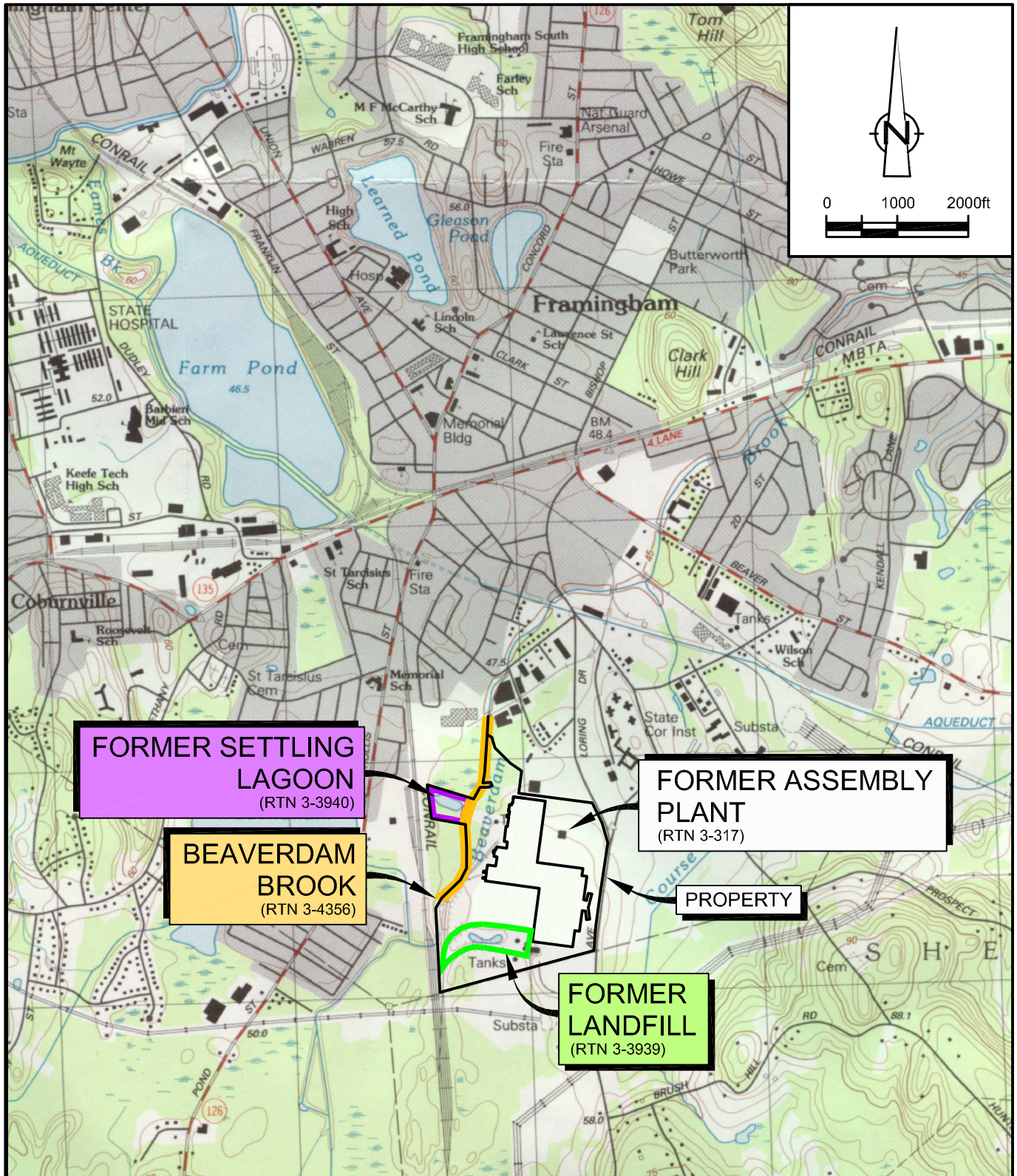
General Motors Contact - Jim Hartnett	315-463-2391
CRA Project Manager - Randy Moore	519-884-0510
CRA Licensed Site Professional - Fred Taylor	519-884-0510
CRA Regional Safety and Health Manager - Craig Gebhardt	716-297-6150
CRA Project Engineer - Aaron Stadnyk	519-884-0510
ADESA Contact - Jack Neshe/Bill Mancini	508-626-7000/508-922-9326
Contractor Project Manager- Dino Iseppi, CHES	781-792-5811
Framingham Conservation Commission - Michele Grzenda	508-532-5460
Environmental Monitor - Patrick Garner	508-393-3200
US Corps of Engineers - Kevin Kotelly/Paul Sneeringer	978-318-8303/978-318-8491
MADEP Water Quality Certification - Ken Chin	617-292-5893
CRA Accident Reporting Number	866-529-4886
National Response Center (NRC)	800-424-8802
Agency for Toxic Substances and Disease Registry	404-488-4100 (24 Hours)
Massachusetts Poison Control Center	800-682-9211
USEPA Emergency Response	800-424-8802
Underground Utilities Location Service - Dig Safe Massachusetts	888-344-7233
Framingham Police Department	508-872-1212
Framingham Fire Department	508-620-4942
Framingham Board of Health	508-532-5470

12.0 SCHEDULE

The preliminary proposed schedule for implementation of the RA activities at the Site is presented on Figure 12.1. This schedule is being updated to reflect the permitting timeframes and resultant revised schedule. The schedule is dependent on access from property owners, contractor availability, weather conditions that may impact flow conditions within the Brook and also cause other unsafe Site conditions, and other unforeseen conditions that may occur. The current schedule is to mobilize and conduct Site preparation activities such as health and safety, erosion and sediment controls, stormwater controls, clearing, equipment set-up, and submittal finalization during the first few weeks (August 25 to September 5, 2008). The detailed schedule will be revised to reflect the actual proposed schedule.

13.0 REFERENCES

- CRA, 2005a. Interim Phase II Comprehensive Site Assessment Report. Former Assembly Plant, Framingham, Massachusetts. Letter Report: Johnson. Report No. 12618 (13). Conestoga-Rovers & Associates, Waterloo, Ontario, Canada. March 31, 2005.
- CRA, 2005b. Interim Phase II Comprehensive Site Assessment Report No. 2. Former Settling Lagoon, Framingham, Massachusetts. Report No. 12618 (14). Conestoga-Rovers & Associates, Waterloo, Ontario, Canada. October 6, 2005.
- CRA, 2005c. Interim Phase II Comprehensive Site Assessment Report No. 2. Beaverdam Brook, Framingham, Massachusetts. Report No. 12618 (16). Conestoga-Rovers & Associates, Waterloo, Ontario, Canada. September 14, 2005.
- CRA, 2006a. Final Phase II Comprehensive Site Assessment Report. Former Settling Lagoon, Framingham, Massachusetts. Report No. 12618 (32). Conestoga-Rovers & Associates, Waterloo, Ontario, Canada. September 7, 2006.
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SOURCE: USGS QUADRANGLE MAP;
FRAMINGHAM, MASSACHUSETTS

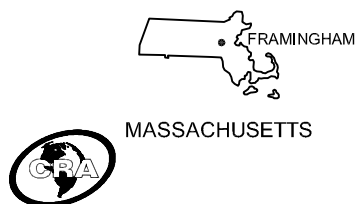
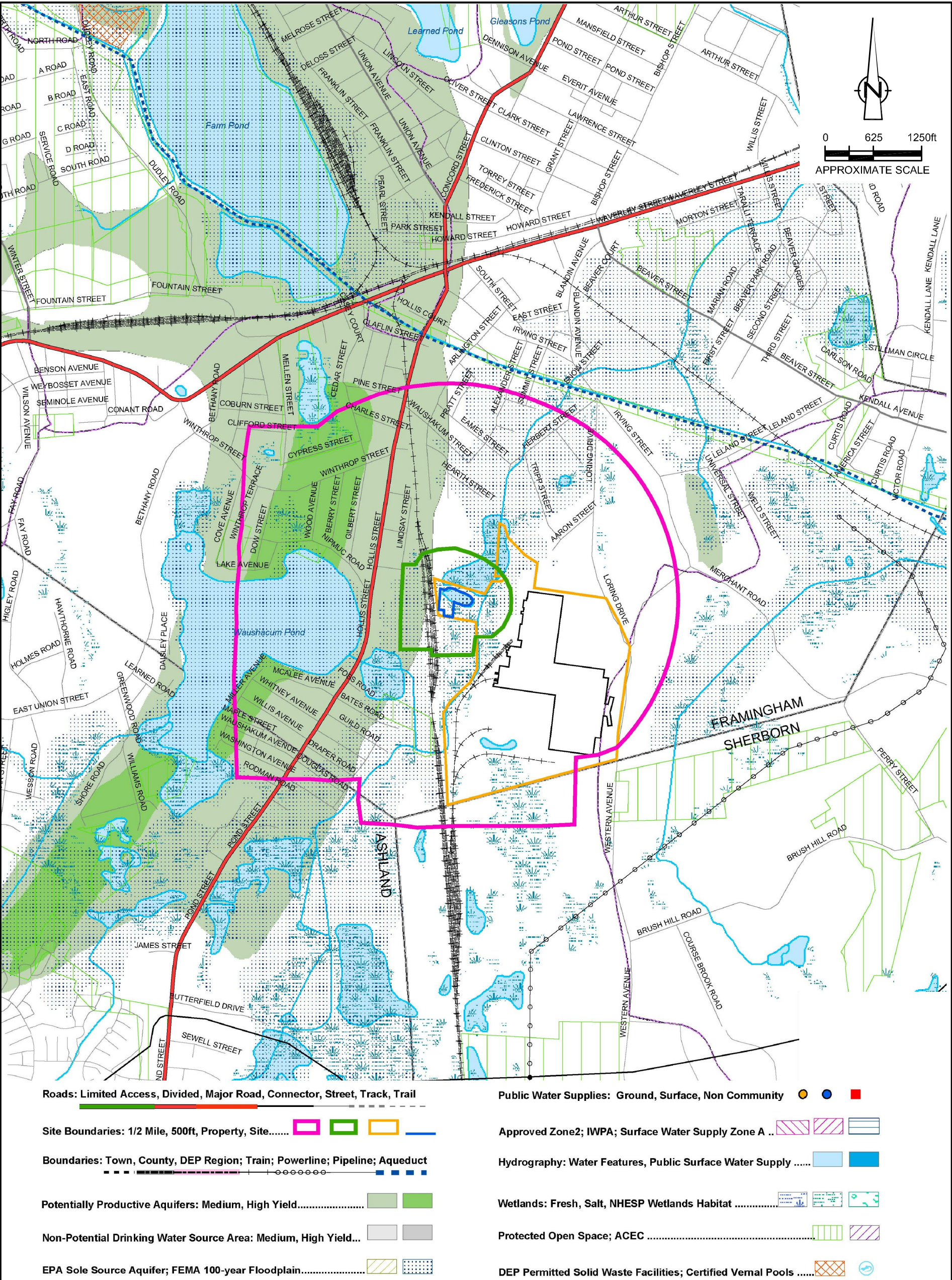


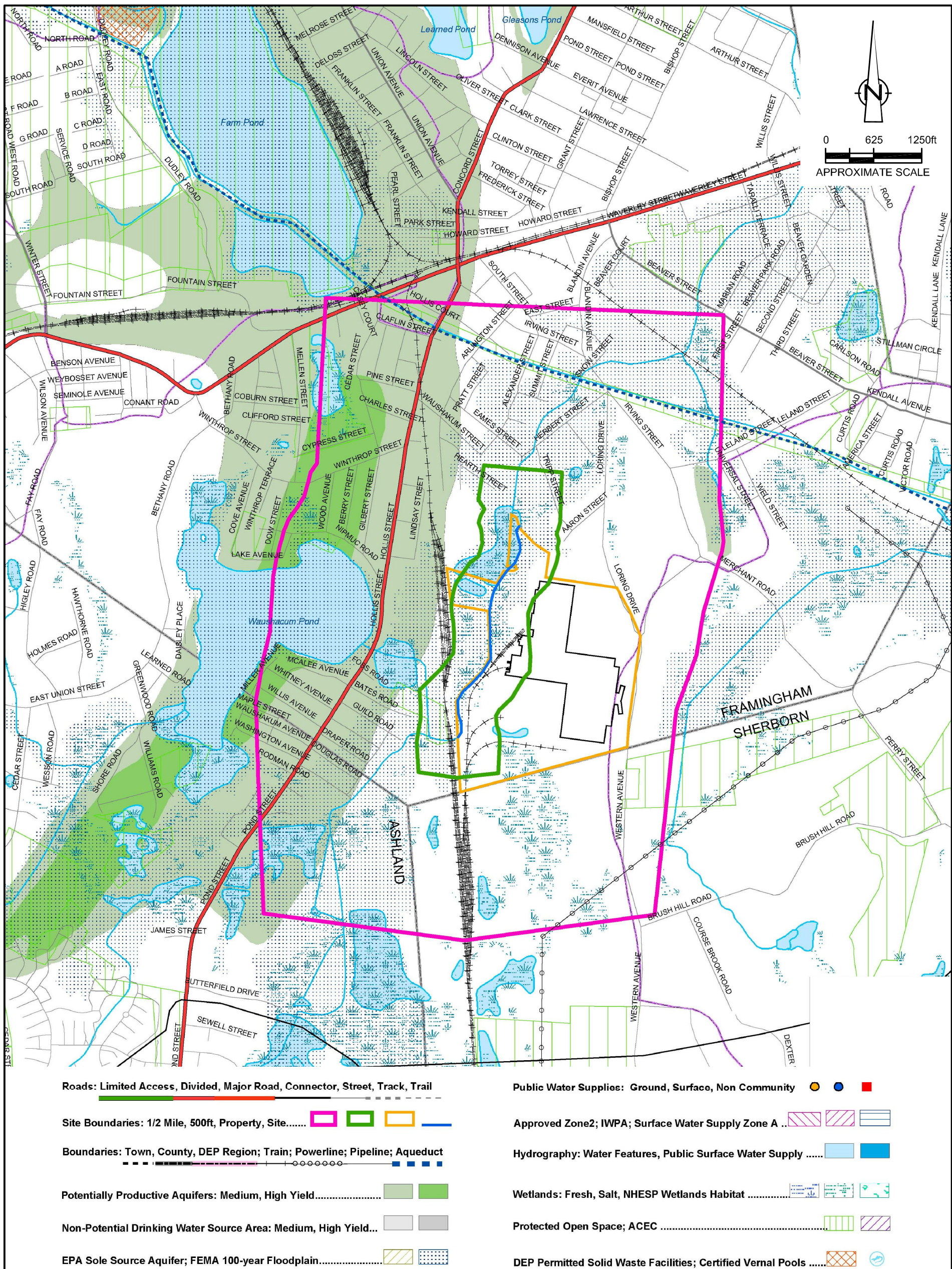
figure 1.1
SITE LOCATION
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER FRAMINGHAM ASSEMBLY PLANT
Framingham, Massachusetts



SOURCE: OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, 2004



figure 1.2
FORMER SETTLING LAGOON
MA DEP SITE SCORING MAP
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER FRAMINGHAM ASSEMBLY PLANT
Framingham, Massachusetts



SOURCE: OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, 2005

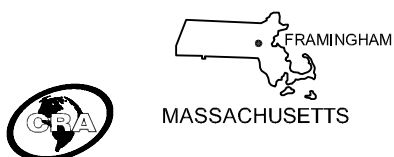
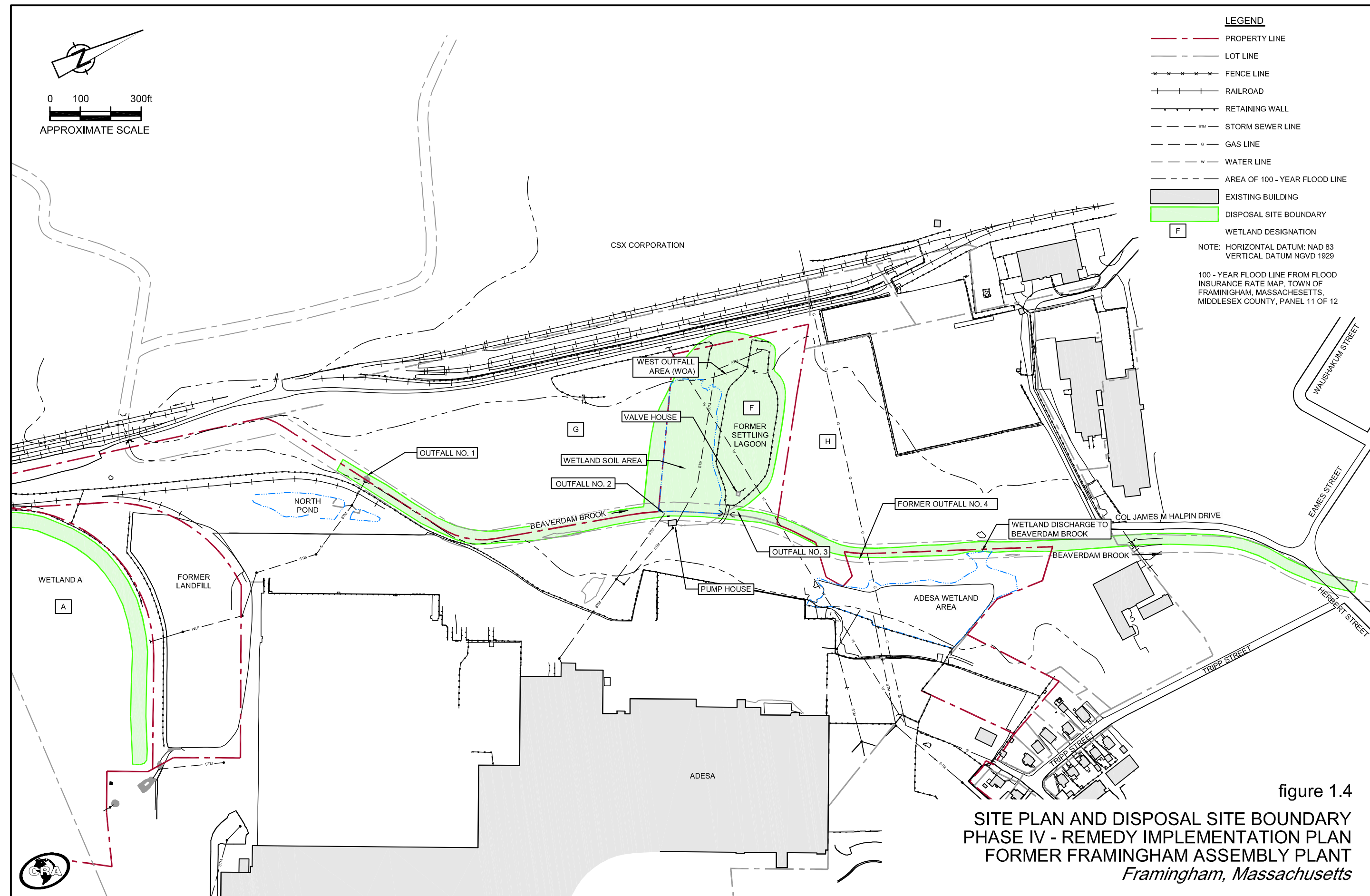


figure 1.3

BEAVERDAM BROOK
MA DEP SITE SCORING MAP
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER FRAMINGHAM ASSEMBLY PLANT
Framingham, Massachusetts



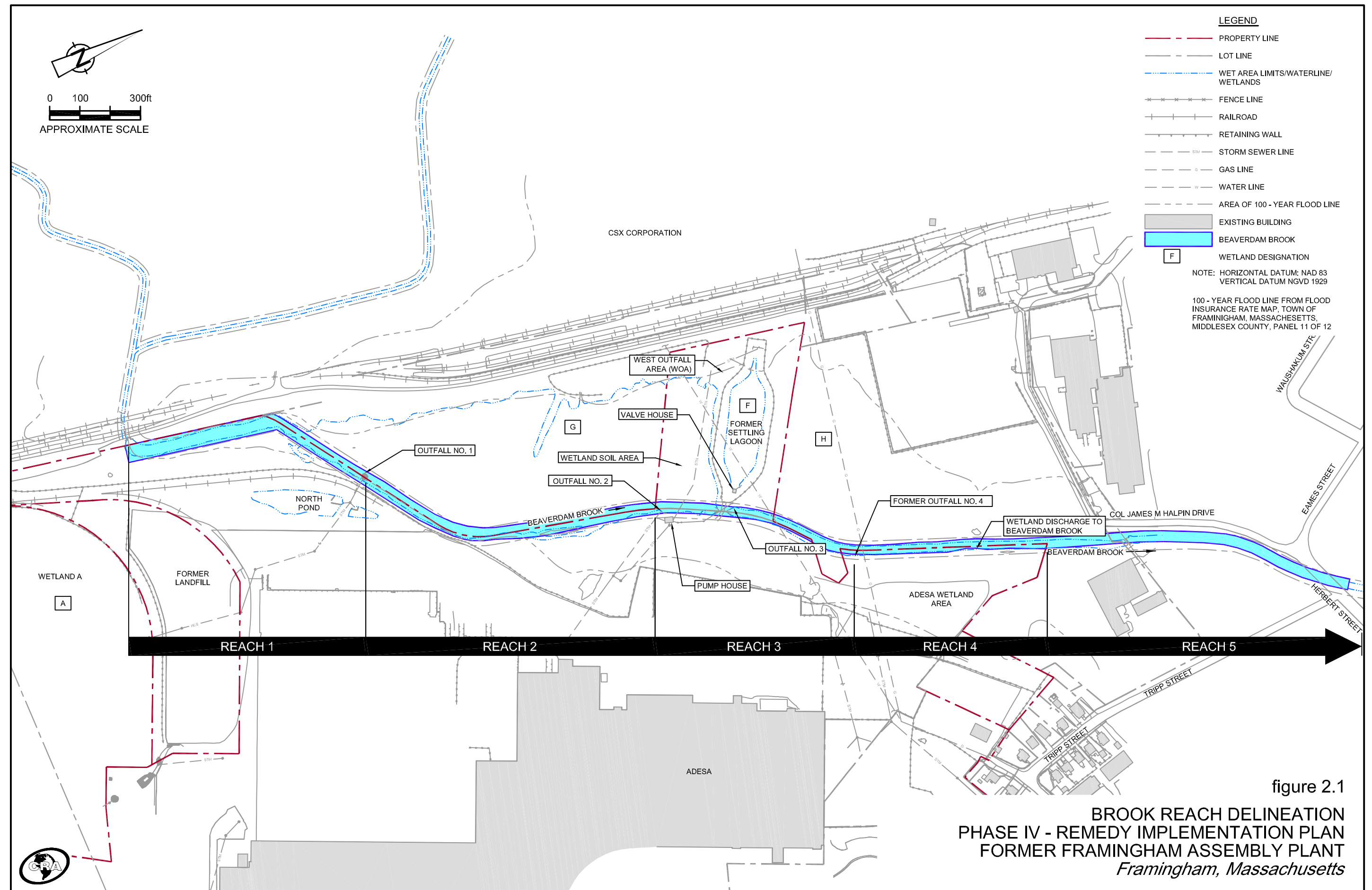
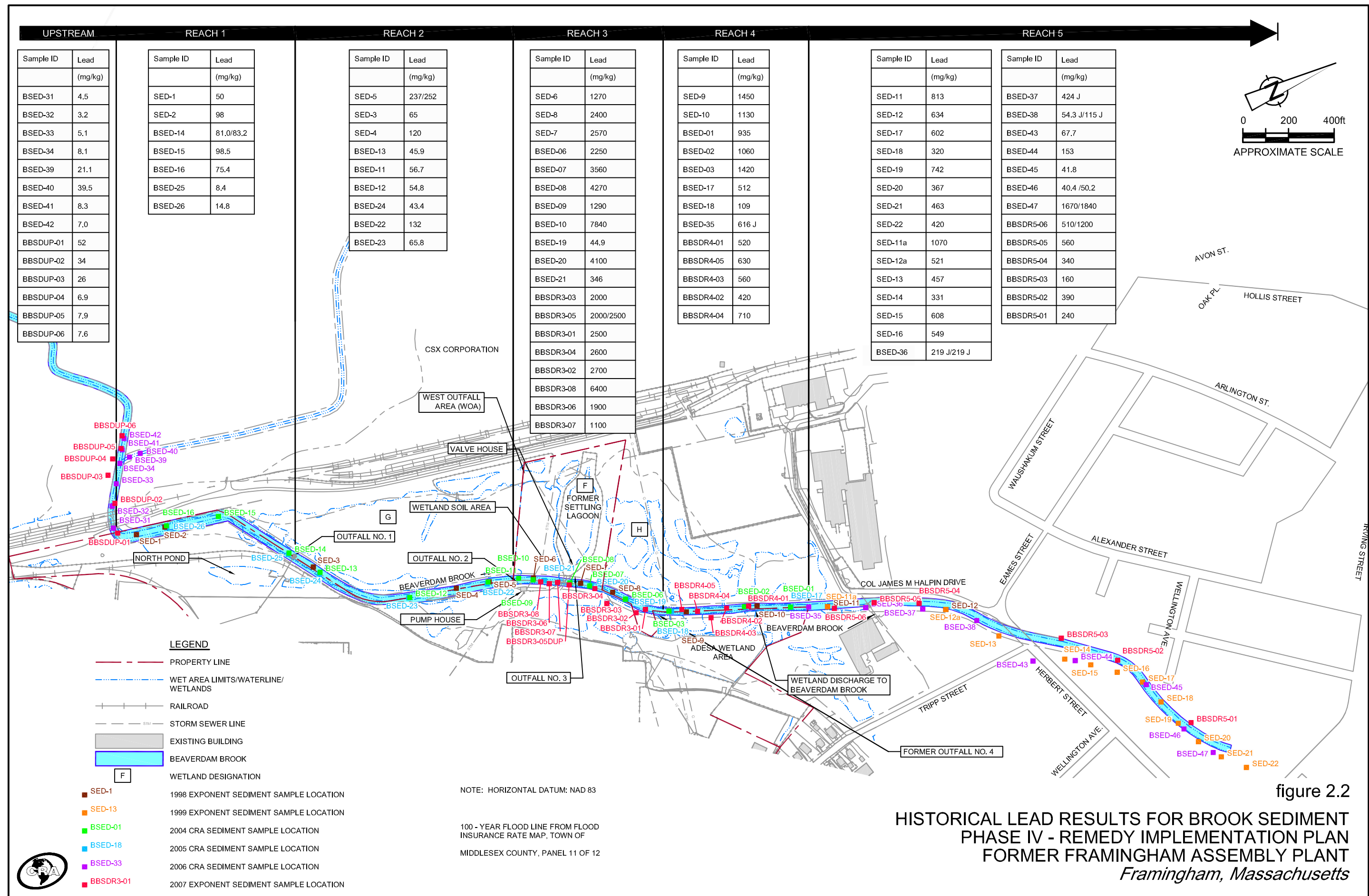


figure 2.1
BROOK REACH DELINEATION
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER FRAMINGHAM ASSEMBLY PLANT
Framingham, Massachusetts





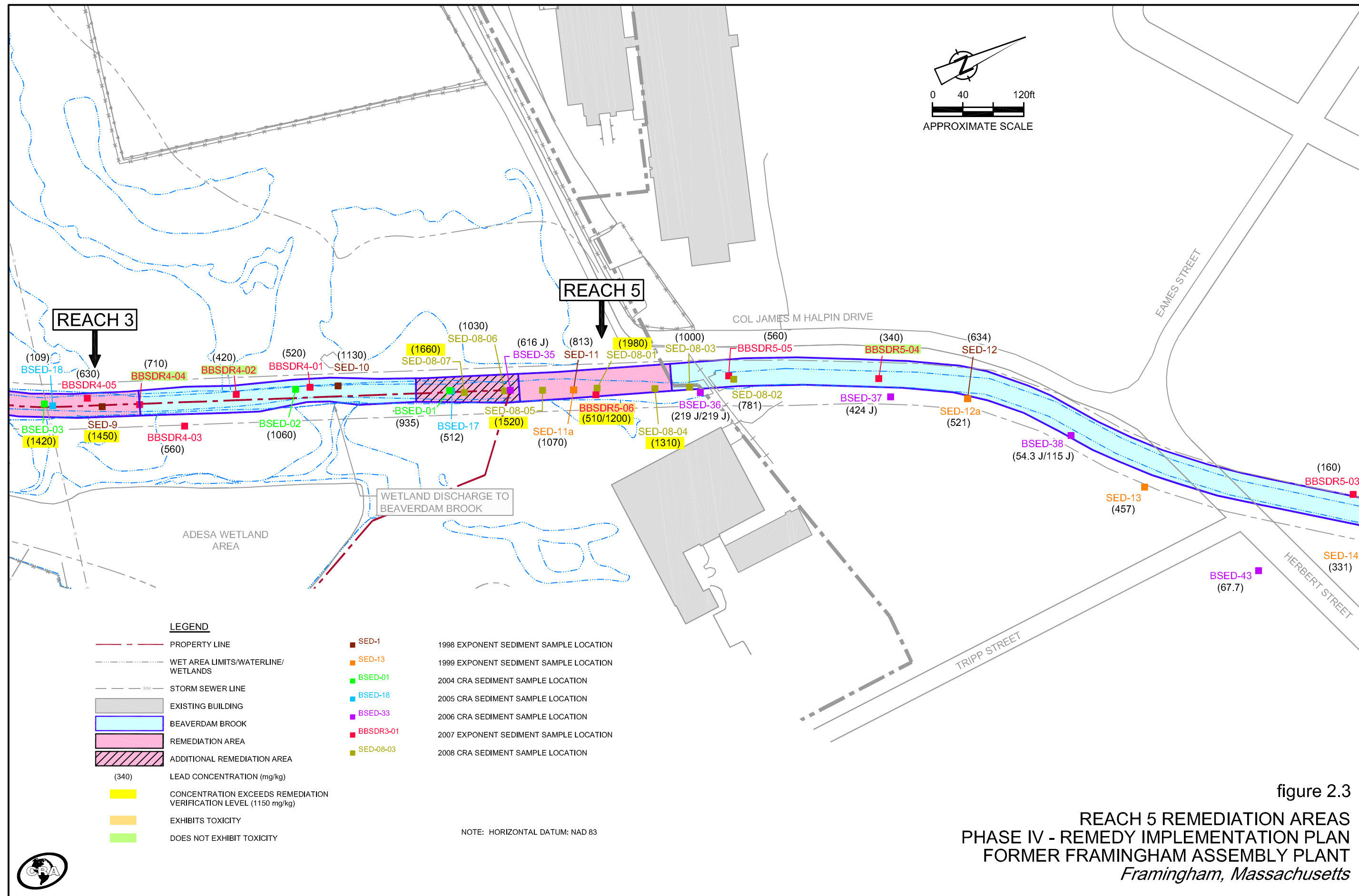
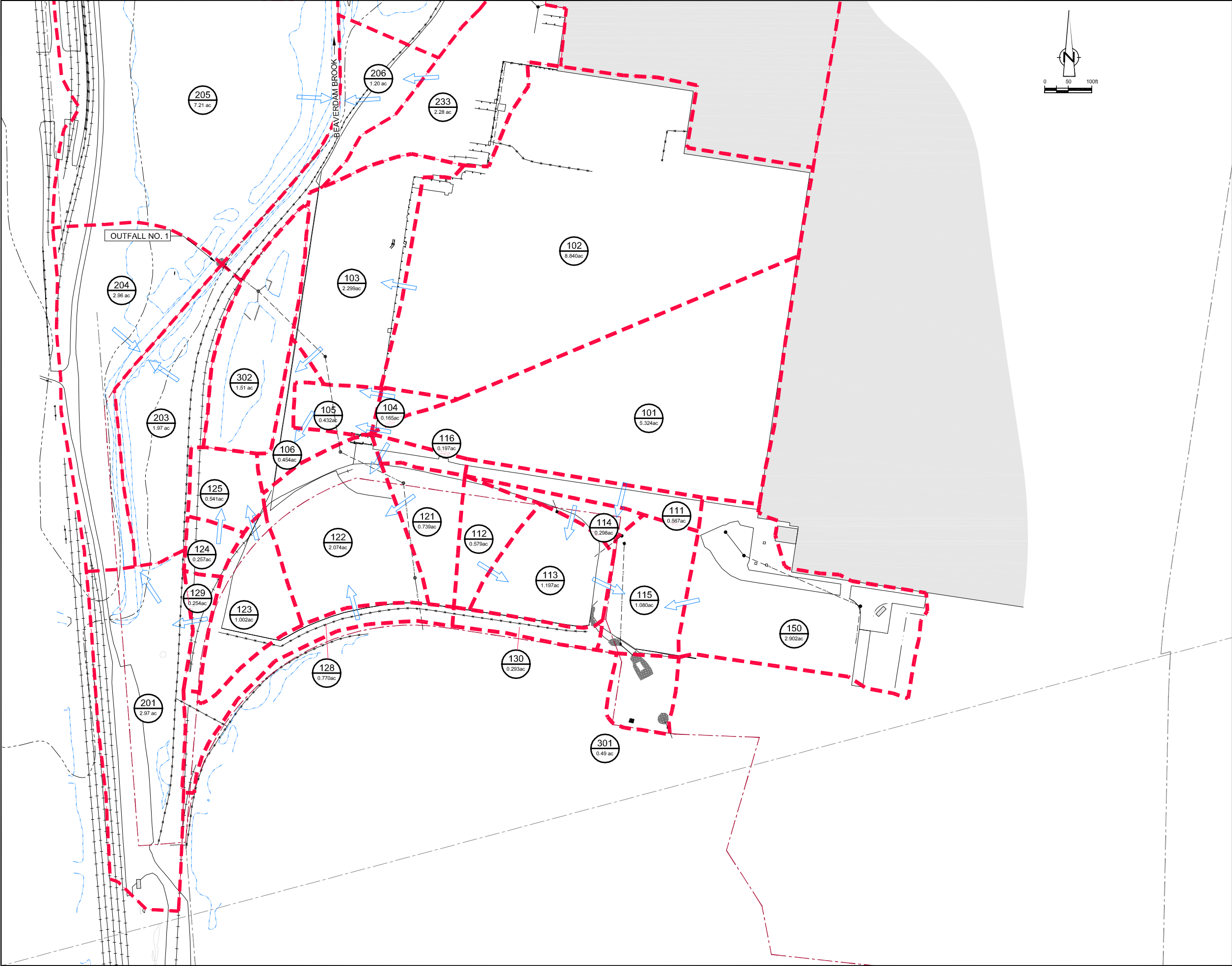


figure 2.3
 REACH 5 REMEDIATION AREAS
 PHASE IV - REMEDY IMPLEMENTATION PLAN
 FORMER FRAMINGHAM ASSEMBLY PLANT
 Framingham, Massachusetts



Nº	Revision	Date	Initial

- LEGEND
- PROPERTY LINE
 - LOT LINE
 - WET AREA LIMITS/WATERLINE/WETLANDS
 - FENCE LINE
 - RAILROAD
 - RETAINING WALL
 - STORM SEWER LINE
 - GAS LINE
 - WATER LINE
 - AREA OF 100 - YEAR FLOOD LINE
 - EXISTING BUILDING
 - CATCHMENT ID
 - CATCHMENT AREA
 - DRAINAGE BOUNDARY
 - DIRECTION OF FLOW

NOTE: HORIZONTAL DATUM: NAD 83
VERTICAL DATUM NGVD 1929

SCALE VERIFICATION
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS		

FORMER FRAMINGHAM ASSEMBLY PLANT
FRAMINGHAM, MASSACHUSETTS

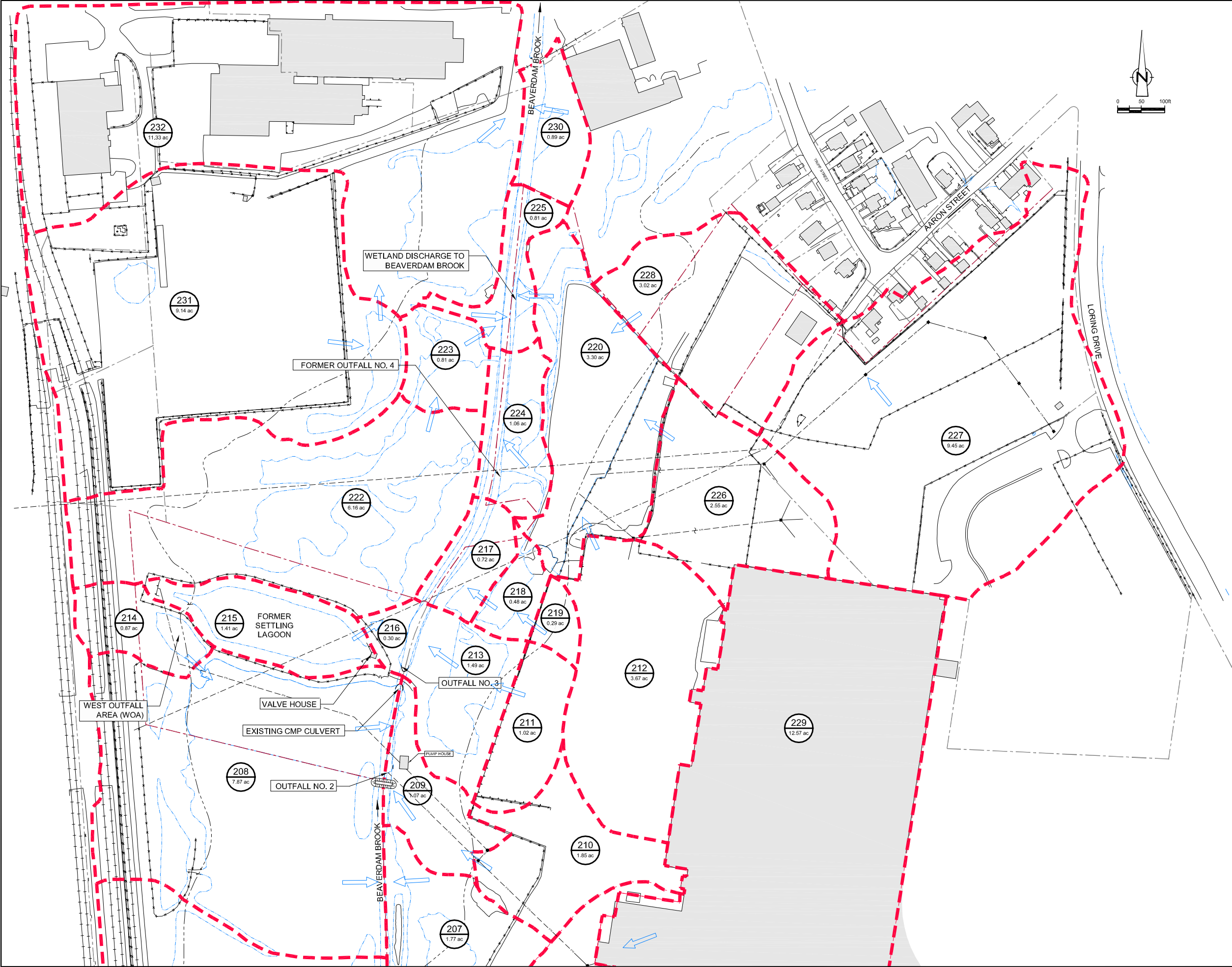
PHASE IV - REMEDY IMPLEMENTATION PLAN

STORMWATER
CATCHMENT AREAS - 1

**CONESTOGA-ROVERS & ASSOCIATES**

Source Reference:

Project Manager: R.M.	Reviewed By: A.S.	Date: DECEMBER 2007
Scale: AS SHOWN	Project Nº: 12618-06	Report Nº: 036
		Drawing Nº: figure 5.1



Nº	Revision	Date	Initial

- LEGEND**
- PROPERTY LINE
 - LOT LINE
 - WET AREA LIMITS/WATERLINE/WETLANDS
 - FENCE LINE
 - RAILROAD
 - RETAINING WALL
 - STORM SEWER LINE
 - GAS LINE
 - WATER LINE
 - AREA OF 100 - YEAR FLOOD LINE
 - EXISTING BUILDING
 - 201 CATCHMENT ID
 - 3.25 ac CATCHMENT AREA
 - DRAINAGE BOUNDARY
 - DIRECTION OF FLOW

NOTE: HORIZONTAL DATUM: NAD 83
VERTICAL DATUM: NGVD 1929

SCALE VERIFICATION
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS		

FORMER FRAMINGHAM ASSEMBLY PLANT
FRAMINGHAM, MASSACHUSETTS
PHASE IV - REMEDY IMPLEMENTATION PLAN
STORMWATER
CATCHMENT AREAS - 2

 CONESTOGA-ROVERS & ASSOCIATES			
Source Reference:			
Project Manager:	Reviewed By:	Date:	
R.M.	A.S.	DECEMBER 2007	
Scale:	Project Nº:	Report Nº:	Drawing Nº:
AS SHOWN	12618-06	036	figure 5.2

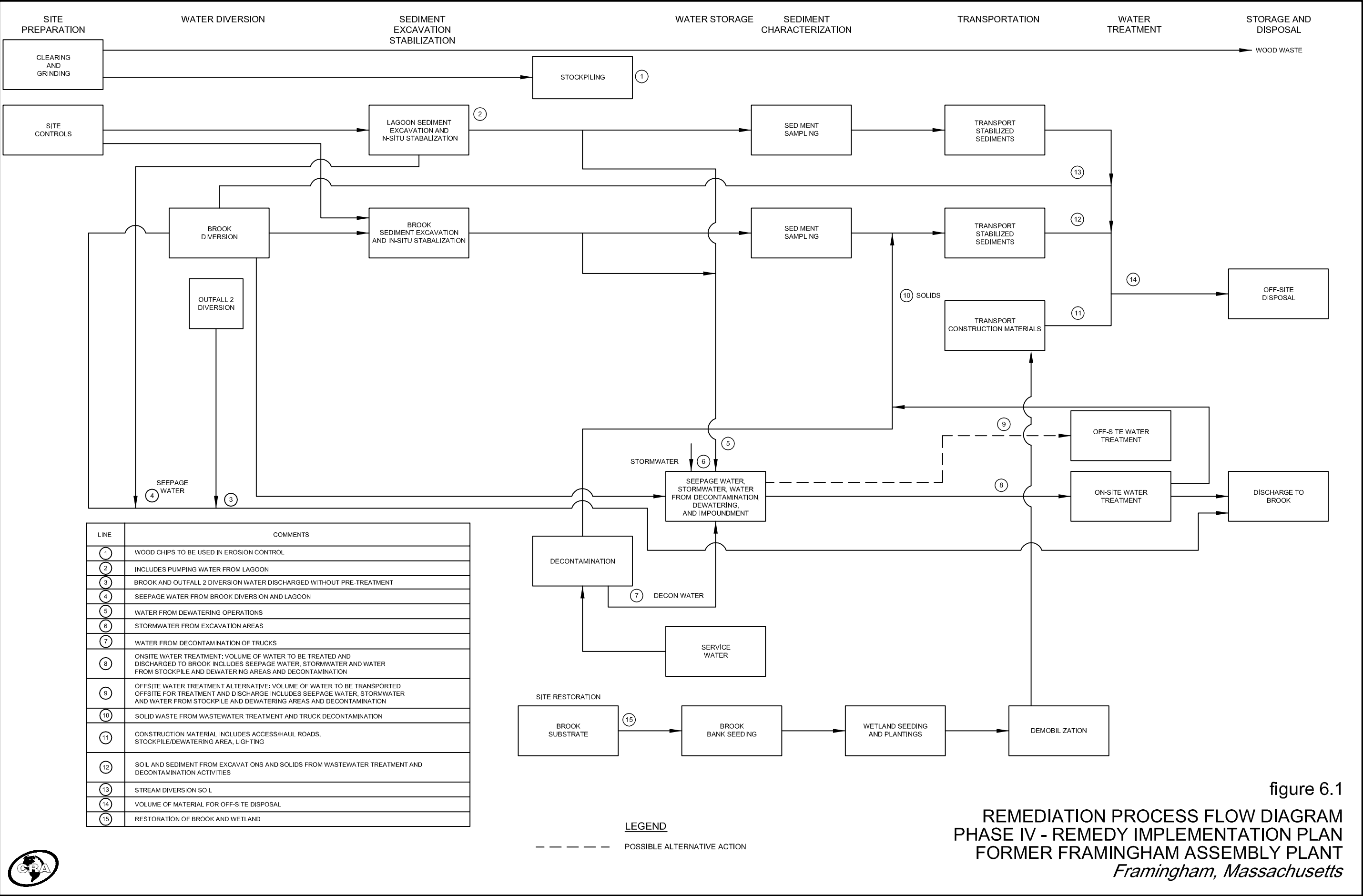
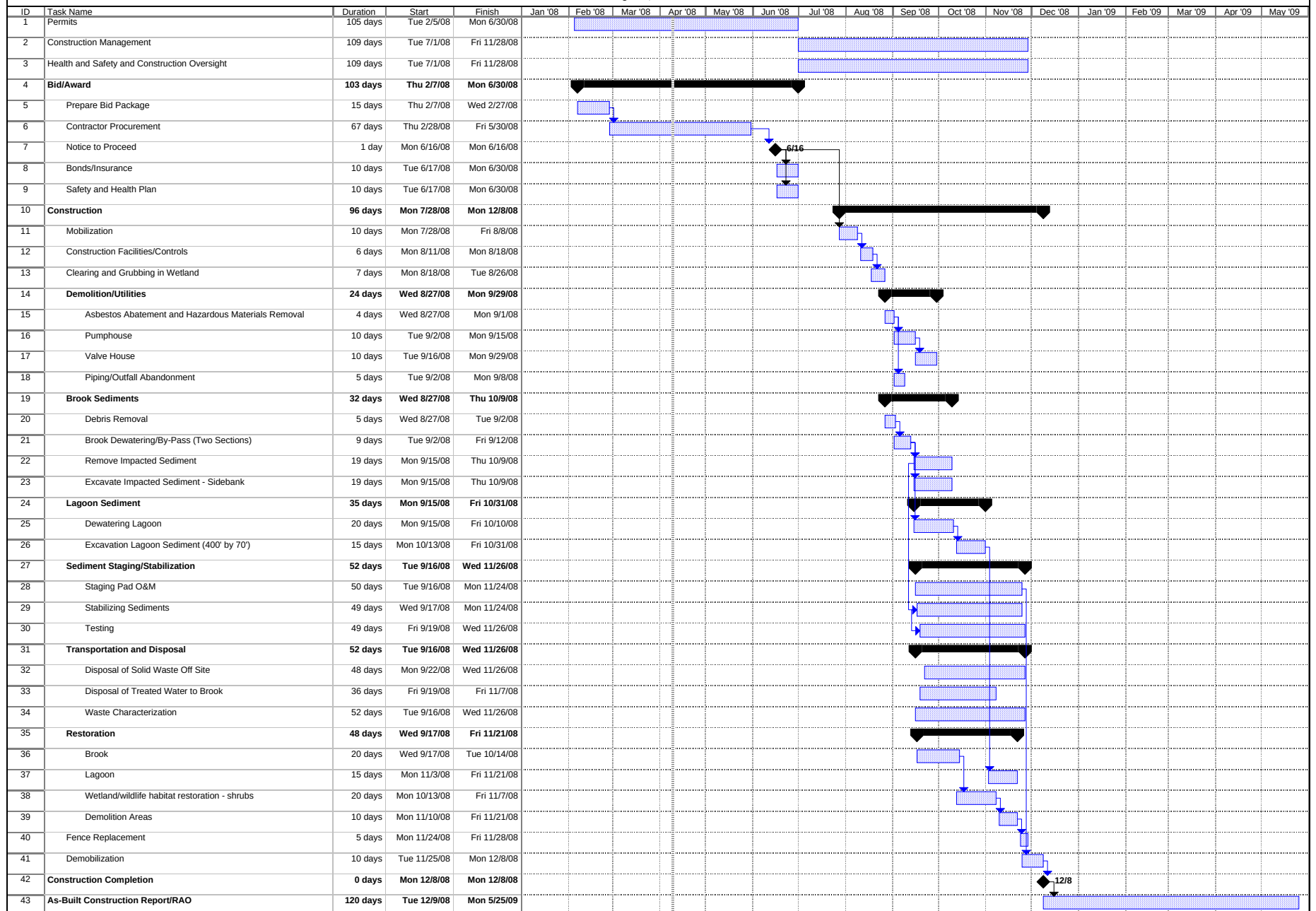


Figure 12.1 - Preliminary Remedy Implementation Schedule
Former Settling Lagoon and Beaverdam Brook
Former GM Assembly Plant
Framingham, Massachusetts

Revision 0
12/05/2007



Project: 012618-RIP Preliminary Schedule-D
Date: Wed 4/9/08

Task  Milestone  Summary 

TABLE 2.1

2008 REACH 5 SEDIMENT ANALYTICAL DATA
 PHASE IV - REMEDY IMPLEMENTATION PLAN
 FORMER GENERAL MOTORS CORPORATION ASSEMBLY PLANT
 FRAMINGHAM, MASSACHUSETTS

Sample ID		SED-08-01	SED-08-02	SED-08-03	SED-08-04	SED-08-05	SED-08-06	SED-08-07	SED-08-08
Location Name		(Reach 5 Center Point)	100 to 150 Downstream of Reach 5	50 to 100 Downstream of Reach 5	0 to 50 Downstream of Reach 5	0 to 50 Upstream of Reach 5	50 to 100 Upstream of Reach 5	100 to 150 Upstream of Reach 5	Equipment Blank
Sample Name		SD-12618-062408-AS-01	SD-12618-062408-AS-02	SD-12618-062408-AS-03	SD-12618-062408-AS-04	SD-12618-062408-AS-05	SD-12618-062408-AS-06	SD-12618-062408-AS-07	SD-12618-062408-AS-08
Sample Date		06/24/2008	06/24/2008	06/24/2008	06/24/2008	06/24/2008	06/24/2008	06/24/2008	06/24/2008
	<i>Units</i>								
<i>Metals</i>									
Lead	mg/kg	1980	781	1000	1310	1520	1030	1660	0.005 U
<i>TCLP Metals</i>									
Lead	mg/L	1.8	--	--	--	--	--	--	--
<i>Wet</i>									
Total Solids	%	46.0	43.5	48.7	37.1	45.0	45.1	50.5	--

TABLE 3.1

**ESTIMATED SEDIMENT REMOVAL VOLUMES
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER GENERAL MOTORS ASSEMBLY PLANT
FRAMINGHAM, MASSACHUSETTS**

<i>Remediation Areas</i>	<i>Length (ft)</i>	<i>Width (ft)</i>	<i>Depth (ft)</i>	<i>Area (sq ft)</i>	<i>Area (acres)</i>	<i>Volume ⁽⁵⁾ (cu.yd.)</i>
Reach 3 - Sediment	912	18.3	2.1	35031	0.80	1622
Reach 3 - Bank Sediment	912	20	1	18231	0.42	844
Reach 5 Hot Spot - Sediments	245	18.3	2.1	9427	0.22	357
Reach 5 Hot Spot - Bank Sediments	245	20	1	4906	0.11	227
Lagoon	400	70	1.5	35890	0.82	2500
Total				103,485	2.38	5,500

Notes:

- (1) Length of Reach 3 includes length of existing CMP Culvert.
- (2) Width of Brook Sediments is based on the average width of Transects 8 through 14 from the Phase II CSA.
- (3) Depth of Brook Sediments is based on the average of the maximum depths of Transects 8 through 14 from the Phase II CSA.
- (4) Width of Side Bank Sediments is based on an average from the edge of water to the top of bank elevation from Transects 8 through 14 of the Phase II CSA.
- (5) Volume includes an additional 25% for over-excavation.
- (6) Lagoon area includes Land Under Water and Bordering Vegetated Wetland Fringe.

TABLE 5.1

**SUMMARY OF RUNOFF PEAK FLOWS AND VOLUMES - EXISTING CONDITIONS
PHASE IV - REMEDY IMPLEMENTATION PLAN
FORMER GENERAL MOTORS ASSEMBLY PLANT
FRAMINGHAM, MASSACHUSETTS**

<i>Storm</i>	<i>Watershed</i>		<i>Site #1</i>		<i>Site #2</i>		<i>Site #3</i>		<i>Site #4</i>	
	<i>Peak Flow (cfs)</i>	<i>Runoff Volume (10⁶ cft)</i>	<i>Peak Flow (cfs)</i>	<i>Runoff Volume (10⁶ cft)</i>	<i>Peak Flow (cfs)</i>	<i>Runoff Volume (10⁶ cft)</i>	<i>Peak Flow (cfs)</i>	<i>Runoff Volume (10⁶ cft)</i>	<i>Peak Flow (cfs)</i>	<i>Runoff Volume (10⁶ cft)</i>
<i>1-year (2.60 in)</i>	8.2	1.79	13.88	0.17	22.55	0.14	30.52	2.29	46.81	2.63
<i>2-year (3.00 in)</i>	10.6	2.11	16.76	0.21	26.15	0.16	37.99	2.71	55.96	3.08
<i>5-year (4.00 in)</i>	17.6	2.9	23.33	0.29	35.14	0.21	55.84	3.74	83.96	4.22
<i>10-year (4.50 in)</i>	21.4	3.3	26.21	0.33	39.64	0.25	65.06	4.25	95.56	4.79
<i>25-year (5.50 in)</i>	32.7	4.36	30.11	0.42	48.63	0.30	84.03	5.56	121.22	6.21

Notes:

- 1) Volumes correspond to a 14 day simulation period.
- 2) Site 1 corresponds to Outfall # 1 - Adesa Plant parking lot and Wetland.
Site 2 corresponds to Outfall # 2 - Adesa Plant parking lot.
Site 3 - Brook, adjacent to Valve House.
Site 4 - Brook, at the downstream end of the Property.
- 3) SCS Type III Storm Event. 24-hour duration.

APPENDIX A

BWSC TRANSMITTAL FORMS AND NOTIFICATIONS

APPENDIX B

RESTORATION PLAN (CRA, JULY 2008)

DRAWING C-01	RESOURCE AREA PLAN
DRAWING C-02	SITE PLAN
DRAWING C-03	REACH 3 RESTORATION PLAN AND PROFILE
DRAWING C-04	REACH 5 RESTORATION PLAN AND PROFILE
DRAWING C-05	LAGOON RESTORATION PLAN AND PROFILE
DRAWING C-06	REACH 3 AND 5 PLANTING PLAN
DRAWING C-07	DETAILS I
DRAWING C-07	DETAILS II
DRAWING C-07	DETAILS III

APPENDIX C

ECOLOGICAL IMPACT DELINEATION STUDY (EXPONENT, DECEMBER 2007)

APPENDIX D

STORMWATER MANAGEMENT CALCULATIONS

APPENDIX D.1

STREAM FLOW MONITORING DATA

APPENDIX D.2

SITE MODEL - EPASWMM

APPENDIX D.3

WATERSHED MODEL - HEC-HMS

APPENDIX D.4

MODEL CALIBRATION

APPENDIX D.5

HYDRAULIC MODEL - HEC-RAS

APPENDIX E

CONSTRUCTION DRAWINGS AND SPECIFICATIONS

APPENDIX E.1

CONSTRUCTION SPECIFICATIONS

SECTION 01100	SUMMARY - ATTACHMENT A - UTILITY CLEARANCE
SECTION 01200	PRICE AND PAYMENT PROCEDURES
	ATTACHMENT B - SAMPLE FORMS
SECTION 01300	ADMINISTRATIVE REQUIREMENTS
SECTION 01351	HEALTH AND SAFETY
SECTION 01400	QUALITY REQUIREMENTS
SECTION 01500	TEMPORARY FACILITIES AND CONTROLS
SECTION 01571	TEMPORARY SOIL EROSION AND SEDIMENT CONTROL
SECTION 01600	PRODUCT REQUIREMENTS
SECTION 01700	EXECUTION REQUIREMENTS
SECTION 02074	GEOTEXTILE
SECTION 02117	MATERIAL HANDLING AND ON-SITE TRANSPORTATION
SECTION 02120	LOADING, OFF-SITE TRANSPORTATION AND DISPOSAL
SECTION 02145	WASTEWATER TREATMENT FACILITY
SECTION 02196	SEDIMENT STABILIZATION
SECTION 02200	SITE PREPARATION
SECTION 02223	DEMOLITION AND REMOVALS
SECTION 02245	STORMWATER AND BROOK DIVERSION
SECTION 02316	FILL
SECTION 02325	SEDIMENT REMOVAL
SECTION 02373	RIP RAP AND ROCK LINING
SECTION 02921	HYDROSEEDING
SECTION 02930	LIVE PLANTINGS

APPENDIX E.2

CONSTRUCTION DRAWINGS

DRAWING C-01	EXISTING CONDITIONS
DRAWING C-02	SITE WORKS I - BROOK REACH 3 AND REACH 5 HOT SPOT
DRAWING C-03	SITE WORKS II - FORMER SETTLING LAGOON
DRAWING C-04	SITE PREPARATION AND EROSION AND SEDIMENT CONTROL PLAN
DRAWING C-05	EROSION AND SEDIMENT CONTROL DETAILS
DRAWING C-06	PLAN AND PROFILE I - REACH 3
DRAWING C-07	PLAN AND PROFILE II - REACH 5 HOT SPOT
DRAWING C-08	PLAN AND PROFILE III - LAGOON
DRAWING C-09	TEMPORARY SEDIMENT DEWATERING AND STABILIZATION FACILITY
DRAWING C-10	WASTEWATER TREATMENT FACILITY
DRAWING C-11	CROSS SECTIONS
DRAWING C-12	DEMOLITION AND UTILITY ABANDONMENT
DRAWING C-13	RESTORATION PLAN
DRAWING C-14	MISCELLANEOUS DETAILS I
DRAWING C-15	MISCELLANEOUS DETAILS II

APPENDIX F

HEALTH AND SAFETY PLAN (HASP)

APPENDIX G

REMEDIAL CONSTRUCTION QUALITY ASSURANCE PLAN (CQA PLAN)

APPENDIX H

PERMITS

APPENDIX H-1

MEPA

APPENDIX H-2

CORPS

APPENDIX H-3

401 WQC

APPENDIX H-4

CHAPTER 91

APPENDIX H-5

BEAVER MANAGEMENT

APPENDIX H-6

ORDER OF CONDITIONS

APPENDIX I

NOI SUPPLEMENT (CRA, JULY 2008)

APPENDIX J

PUBLIC NOTIFICATION

APPENDIX J-1

2007 NOTIFICATIONS OF SAMPLING

APPENDIX J-2

2007 SAMPLING RESULTS

APPENDIX J-3

2008 NOTIFICATIONS OF SAMPLING

APPENDIX J-4

2008 SAMPLING RESULTS