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General Electric Company
Pittsfield, Massachusetts

2008 Annual Monitoring Report

1½-Mile Reach of the Housatonic River

January 2009

ARCADIS

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1½-Mile Reach of the Housatonic River

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Our Ref.:
B0031044

Date:
January 2009

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1. Introduction

The U.S. Environmental Protection Agency (EPA) performed sediment and riverbank soil remediation activities in the 1½-Mile Reach of the Housatonic River (1½-Mile) from 2002 through 2006. This reach extends from the Lyman Street Bridge downstream to the confluence of the East and West Branches of the River in Pittsfield, Massachusetts (Figure 1-1). EPA performed these activities, known as the 1½-Mile Reach Removal Action, under the terms of the Consent Decree (CD) for the GE-Pittsfield/Housatonic River Site. Following completion of remediation and associated restoration activities associated with the first portion of the 1½-Mile Reach Removal Action in 2004, EPA performed a number of post-remediation monitoring activities through 2007. In 2008, pursuant to the CD, General Electric Company (GE) assumed responsibility for performance of the post-remediation monitoring and maintenance activities, known as Post-Removal Site Control activities, associated with the 1½-Mile. These activities have been and will continue to be performed in accordance with the *Interim Post-Removal Site Control Plan: 1½-Mile Removal Reach* (PRSC Plan; Weston, 2008), prepared on EPA's behalf.

1.1 Description of 1½-Mile Reach

For the purpose of restoration activities and post-restoration monitoring, the 1½-Mile was divided into four sub-reaches delimited by the four bridge crossings within the 1½-Mile, as shown on Figure 1-1 and listed below:

- Phase 1 – Lyman Street Bridge to Elm Street Bridge
- Phase 2 – Elm Street Bridge to Dawes Avenue Bridge
- Phase 3 – Dawes Avenue Bridge to Pomeroy Avenue Bridge
- Phase 4 – Pomeroy Avenue Bridge to the Confluence of the East and West Branches of the River

Though the sub-reach names listed above reference the construction sequencing, the same nomenclature has been maintained through the monitoring program for consistency.

1.2 Purpose and Scope

This *2008 Annual Monitoring Report* has been prepared on GE's behalf by ARCADIS, and summarizes the results of the monitoring and maintenance activities associated with the 1½-Mile that were performed by GE in 2008. This report describes the 2008 monitoring activities and associated response actions, where conducted, for the following components of the program:

- Restored bank and non-bank vegetation
- Riverbank soil restoration
- Aquatic habitat enhancement structures
- Riprap and articulated concrete block (ACB) installation
- Ancillary items
- Surface water sampling

A number of trip reports on the specific monitoring and maintenance activities conducted by GE in 2008 were previously submitted to EPA in July and August 2008, and were conditionally approved by EPA in a letter dated October 8, 2008. Consistent with the PRSC Plan, that letter stated that, following completion of the corrective actions specified in those trip reports, GE should submit a report describing the corrective actions taken. However, EPA subsequently advised GE that GE could forgo submission of such a corrective action report, provided that GE described those corrective actions in the 2008 Annual Report. This report summarizes the 2008 inspection/monitoring activities previously described in the trip reports, with modifications stemming from EPA's October 8, 2008 conditional approval letter; and it reports on the corrective actions taken in response to conditions noted during the inspections.

1.3 Report Organization

Following this introductory section, this report is organized into the following sections.

- **Section 2 – Restored Bank and Non-bank Vegetation Monitoring**. This section summarizes the vegetation inspections and associated response actions conducted during 2008. As detailed in the PRSC Plan, these activities were performed in those bank areas that were excavated and restored as part of the 1½-Mile Reach Removal Action and in certain bank and non-bank areas that were cleared or otherwise affected during removal activities.

- **Section 3 – Riverbank Soil Restoration Monitoring**. This section summarizes the restored bank erosion inspections performed during 2008, as well as the evaluation of the need for response actions and the performance of response actions.

- **Section 4 – Aquatic Habitat Enhancement Structures Monitoring**. This section summarizes the inspections conducted in 2008 for the aquatic habitat enhancement structures and presents the results of these activities.

- **Section 5 – Riprap and ACB Monitoring**. This section summarizes the inspections conducted in 2008 for the riprap and ACB and presents the results of these activities.

- **Section 6 – Ancillary Item Monitoring**. This section summarizes the inspections conducted in 2008 for the Critical and Non-Critical Ancillary Items described in the PRSC Plan and presents the results of these activities and associated response actions.

- **Section 7 – Surface Water Sampling**. This section summarizes surface water sampling activities (performed under the Housatonic River Monthly Water Column Sampling Program) conducted in 2008 associated with locations within the 1½-Mile and presents relevant field parameters and related analytical results.

- **Section 8 – Summary and Future Activities**. This section summarizes the overall activities completed as part of the 2008 monitoring program and describes future monitoring activities.

- **Section 9 – References**. This section presents references cited throughout this report.

2. Restored Riverbank and Non-Riverbank Vegetation Monitoring

2.1 General

Vegetative restoration activities were implemented in those areas where soils were excavated as part of the 1½-Mile Reach Removal Action and in bank and non-bank areas that were cleared or otherwise affected during the removal activities (see Figures 2-1 through 2-4). Restoration activities were intended to restore the vegetative community in such disturbed riparian areas to a functional value consistent with the riparian habitat present prior to the removal action. As discussed above, starting in 2008, GE assumed responsibility for performance of the post-remediation monitoring and maintenance program outlined in the PRSC Plan. As such, in conjunction with the Natural Resource Trustees (Trustees), GE now monitors those areas that were restored to verify the success and biological integrity of the intended vegetative community.

2.2 Monitoring Program

An annual summary monitoring report is required to document the results of each year's monitoring visits and the conditions of the vegetative communities installed in restored areas within the 1½-Mile. This section fulfills the annual summary monitoring report requirement for the calendar year 2008.

For each planting area, the PRSC Plan requires that the vegetative monitoring program consist of two visits per year for five years – one in May (spring monitoring visit) and the other in July (summer monitoring visit). The spring monitoring visit is qualitative, and is intended to survey general planting area conditions and plant survivorship, and identify segments of the planting areas where potential corrective actions or maintenance may be required. The summer monitoring visit quantitatively assesses the achievement of various Maintenance Standards (e.g., standards for plant survivorship, extent of herbaceous vegetative cover, invasive species control) as defined in the PRSC Plan and described below.

In accordance with the PRSC Plan, a certified arborist (selected in consultation with the Trustees) assists in the performance of both the spring and summer monitoring visits. The arborist, Chris Frank of C.L. Frank & Company of Northampton, Massachusetts, uses best professional judgment to assess the apparent vigor of the planted specimens. To the extent practicable, Mr. Frank observes any supplemental plantings and is present for the restored bank vegetation monitoring visits.

For the purpose of the vegetation monitoring activities, the 1½-Mile is divided into the four sub-reaches designated as Phases 1 through 4, as described in Section 1.1. For the riverbanks, the PRSC Plan designates each side of the River within each of these sub-reaches as an overall monitoring area, and it designates specific representative monitoring plots within each such area for more intensive, quantitative monitoring. These designations result in a total of eight monitoring areas and 24 permanent monitoring plots (3 plots in each monitoring area) that are used for the quantitative assessment of the restored area vegetation monitoring. The designated monitoring plots within the monitoring areas are shown, by sub-reach, on Figures 2-1 through 2-4. Those figures also show the planting areas (designated by number) within the monitoring areas. It should be noted that the riverbank monitoring area for the west side of the River in Phase 1 includes the plantings along the top of the riverbank on Parcels I9-4-14 and I9-4-19 (Planting Area #2 on Figure 2-1).

In addition, Table 3-2 of the PRSC Plan lists the properties where non-riverbank plantings are subject to monitoring as part of the 1½-Mile. That table is repeated as Table 2-1 in this report. As shown in that table, at many of these properties, only limited monitoring was required and was previously completed by EPA. The properties where continued monitoring by GE was required are Parcels I8-24-1 and I9-5-13 (in Phase 1), and Parcels I7-1-101 (Fred Garner Park), I6-1-67, and I6-1-66 (in Parcel 4), as shown on Figures 2-1 and 2-4.

Spring Qualitative Inspection

The purpose of the spring visit is to assess plant conditions and plant survivorship, and to identify segments of planting areas where potential corrective actions or maintenance may be required. The assessment of the re-vegetation areas is conducted using pedestrian meander surveys in each overall monitoring area, with special attention given to the specific monitoring plots.

During these surveys, the general characteristics of each riverbank monitoring area and non-riverbank planting area and any exceptional characteristics, such as concentrations of dead or stressed plants or significant areas of bare soil, are noted. The spring survey also includes an assessment of whether the monitoring plots within each overall monitoring area are representative of the entire monitoring area, and includes monitoring the red-osier dogwood (*Cornus sericea*) band at the bottom of the re-vegetated slope, along the entire length of the areas from Elm Street Bridge to the Confluence. In addition, a qualitative assessment of invasive plant species is included as part of the spring assessment to evaluate whether any areas require immediate attention.

Summer Quantitative Survey

During the summer inspection, each monitoring plot is quantitatively assessed with respect to the following Maintenance Standards:

1. All planted trees and shrubs in riverbank planting areas must meet an 80% survival rate of the amount originally planted.

2. All planted trees and shrubs in non-riverbank planting areas, excluding Fred Garner Park, must meet a 100% survival rate of the amount originally planted.

3. All planted trees and shrubs in Fred Garner Park planting areas must meet an 80% survival rate of the amount originally planted, except for the following trees in Fred Garner Park, for which a 100% survival rate is required: the eight red maples and the six river birches adjacent to the soccer field at Fred Garner Park, and the sixteen hemlocks along the walking path.

4. Herbaceous coverage of 95% must be maintained outside the foliar extent of the trees. There is no Maintenance Standard for individual species of the herbaceous seed mix.

5. No greater than 5% of the restoration area of either bank may be allowed to be covered by invasive plant species, as listed in Appendix A of the PRSC Plan. Any invasive species in excess of the 5% coverage limit must be removed by appropriate means.

Each summer quantitative monitoring visit consists of a pedestrian meander survey in each overall monitoring area, with special attention given to the specific monitoring plots. Personnel conducting the inspection, supported by the certified arborist, perform a stem count of planted trees and shrubs in the monitoring plots and non-riverbank planting areas to determine survival rates. Plants are counted as either alive or dead, with the live category including stressed plants. Best professional judgment is used to assess the apparent stress and/or vigor of the planted specimens. Where natural regeneration of the plant species occurs, these plants are included in the overall plant count if such plants are a minimum of two feet tall.

As with the spring inspection, the general characteristics of each riverbank monitoring area and non-riverbank planting area are noted, including any exceptional characteristics, such as concentrations of dead or stressed plants, and the presence of any areas with significant bare soil. The extent of areal cover of the herbaceous layer and an estimate of the relative percent of invasive species are also noted during the survey. Based on the results of each

visit, the inspection team recommends response actions, such as replanting, watering, fertilization.

2.3 2008 Monitoring Activities

Vegetation monitoring activities performed in 2008 comprised the first year of the scheduled five-year program detailed in the PRSC Plan. Representatives of GE, EPA, and the Trustees, as well as the certified arborist, jointly conducted each of the vegetation monitoring visits.

2.3.1 Spring 2008 Monitoring Activities

The spring 2008 qualitative monitoring visit was conducted on June 3, 2008, and the trip report on that visit was submitted to EPA on July 3, 2008. EPA conditionally approved that trip report in its letter dated October 8, 2008. The results of the spring 2008 monitoring visit suggested that the riverbank plantings in all the sub-reaches, as well as the non-riverbank plantings in Phases 1 and 4, generally were exhibiting very good initial growth and that the designated monitoring plots were representative of the overall monitoring areas that they were designated to represent. The spring monitoring visit also indicated that there were no obvious gaps in the red-osier dogwood band at the bottom of the re-vegetated slope, and no significant areas of bare soil were observed. The need for some tree cage maintenance was noted in Phase 2, and invasive plant species were observed near the downstream end of Planting Area #4. These issues were addressed through GE's ongoing program of invasive species control and tree cage maintenance, which had been initiated in May 2008. In addition, Canada thistle (*Cirsium arvense*), which was noted in Phase 1, was added to the invasive plant species control list. Although this species is not on the official state invasive species list as documented in the PRSC Plan, GE considered it prudent and appropriate to control this species.

2.3.2 Summer 2008 Monitoring Activities

The summer vegetation monitoring was conducted on July 22 and 23, 2008, and the trip report on that visit was submitted to EPA on August 21, 2008. EPA conditionally approved the trip report in a letter dated October 8, 2008. The specific methods used to calculate percent survivorship of trees and shrubs and extent of herbaceous vegetation cover and invasive species cover, and the results of the quantitative surveys for the riverbank monitoring plots and the non-riverbank planting areas in each phase, were presented in detail in the August 21, 2008 trip report. The results of the 2008 summer re-vegetation inspection are summarized in Tables 2-2 through 2-5 and are described briefly below.

Specific monitoring plots and non-riverbank planting areas are illustrated on Figures 2-1 through 2-4.

Trees and Shrubs

As shown in Table 2-3, all of the riverbank monitoring plots with the exception of trees in Plot 2-E-1 (in Phase 2) showed a minimum of 80% survival of trees and shrubs, and most showed densities exceeding their target densities. Although the trees in Plot 2-E-1 showed a percent-of-target survival of 77%, the Maintenance Standards apply to overall monitoring areas, not individual monitoring plots, and the trees in the Phase 2 monitoring areas met the Maintenance Standard of 80% survival. Thus, all trees and shrubs in the riverbank areas met the applicable Maintenance Standard.

For the non-riverbank planting areas, as shown in Table 2-4, each of the properties examined met the applicable Maintenance Standard for survival of trees and shrubs with the exception of trees in Parcel I8-24-1, which showed 82% survival due to the loss of two sugar maples.

Herbaceous Cover and Invasive Species

As shown in Table 2-5, the herbaceous vegetation cover for all of the riverbank monitoring plots and non-riverbank planting areas met the Maintenance Standard of 95% areal cover except for Plot 3-W-3, which had coverage of 92.5%. As also shown in Table 2-5, all of the riverbank monitoring plots and non-riverbank planting areas met the Maintenance Standard for invasive plant species by exhibiting less than 5% areal cover by invasive species.

The survey also indicated that the designated riverbank monitoring plots are representative of the overall monitoring areas that they were designated to represent. Further, there were no obvious gaps in the red-osier dogwood band at the bottom of the re-vegetated slope, and no significant areas of bare soil were observed.

2.4 Response Actions

Following receipt of EPA's conditional approval letter of October 8, 2008, GE implemented the following corrective repair or maintenance actions as proposed in the summer 2008 trip report or identified in EPA's conditional approval letter:

- Two sugar maples were installed in open spaces within Parcel I8-24-1 on November 17, 2008. Tree tags were attached to facilitate future re-inspection of these specific trees for the next two years.

- Replacement or repair of leaning and knocked-down tree cages in Planting Areas #4, #13, #13A, #14, and Plot 1-W-3 was completed on November 17 through 20, 2008.

- A portion of a community of Canada thistle, bittersweet nightshade, and field binder weed near Planting Area #21 was removed in November 2008.

- At the request of EPA, GE attached tree tags to two stressed oaks on Parcel I8-24-1 on November 17, 2008.

- The oriental bittersweet specimens observed on Parcel I7-1-101 were removed as part of GE's ongoing invasive species control plan.

Although a single silver maple specimen in Plot 1-W-1 appeared to be suffering from water stress, no action was recommended for that specimen as the percent of target density for the trees in this plot was well above the Maintenance Standard. Additionally, no action was recommended for the bare soil area within Plot 3-W-3 as this condition was minor and the result of land use by the property owner, and would not be expected to cause a major adverse effect on the remainder of the vegetation within that plot. Similarly, no action was recommended for minor herbivory damage found on some of the white pines on Parcels I6-6-66 and I6-6-67, given the expectation that these trees would survive and continue to grow. All these recommendations were approved by EPA through its October 8, 2008 conditional approval letter.

3. Riverbank Soil Restoration Monitoring

3.1 General

In 2008, riverbank soil restoration monitoring activities were performed for those bank areas disturbed and restored as part of the 1½-Mile Reach Removal Action. Specifically, the cleared and restored bank areas of the 1½-Mile are required to be inspected for significant areas of soil erosion or bank failure. In areas where a significant amount of erosion (e.g., ruts, gullies, washouts, or sloughing) is observed within the cleared and restored or riprap-protected areas, GE is required to implement measures to replace or restore the eroded soil or riprap to the original restoration design conditions.

3.2 Monitoring Program

The PRSC Plan requires that the post-restoration riverbank soil monitoring program be performed annually for 5 years. This annual monitoring program is to consist of a visual inspection of the riverbanks, which involves walking the length of the banks, to assess general characteristics of the riverbanks and to identify potential bank erosion issues. The Maintenance Standard for the riverbank soil restoration is "no significant erosion (e.g., ruts, gullies, washouts, or sloughing)" (PRSC Plan, p. 2-1).

3.3 2008 Monitoring Activities

The riverbank soil restoration monitoring visit was conducted on July 31, 2008, and constituted the first year of the scheduled five-year monitoring program detailed in the PRSC Plan. Representatives of GE and EPA jointly conducted the inspection, and the results were presented in a trip report submitted to EPA on August 29, 2008. EPA conditionally approved the trip report in its October 8, 2008 letter.

During the 2008 bank inspection, flow in the River was approximately 85 cubic feet per second (cfs), as measured at U.S. Geological Survey (USGS) River Gauge Station No. 01197000 on the East Branch of the Housatonic River in Coltsville, MA. It should be noted that there were multiple high-flow events (i.e., estimated flow greater than 440 cfs) in 2008 prior to this inspection, including flows greater than 440 cfs recorded on July 24 and 28, 2008.

The four phases of the 1½-Mile, which were monitored during the 2008 riverbank soil restoration monitoring inspection, are illustrated on Figures 3-1 through 3-4. During the 2008 monitoring inspection, five areas were noted with visually observable erosion of bank materials. Descriptions of these areas, as revised based on EPA's October 8, 2008

conditional approval letter, are presented below and summarized in Table 3-1, and their locations are shown on Figures 3-1, 3-2, and 3-4.

Area 1 – This area consists of an area of minor erosion located near the top of the bank on the west side of the River adjacent to Parcel I9-4-203 (Figure 3-1; Appendix A, Photos 1 and 2). This erosion was likely caused by concentrated surface runoff from the parking lot located at the top of the bank. Less than 0.5 cubic yards (cy) of material loss was observed, and there was no evidence of eroded materials in the River.

Area 2 – This area consists of an area of minor erosion located near the top of bank on the east side of the River adjacent to Parcel I7-20-1 (Figure 3-2; Appendix A, Photos 3 and 4). This erosion was likely caused by concentrated surface runoff from the road located at the top of the bank. Less than 0.5 cy of material loss was observed, and there was no evidence of eroded materials in the River.

Area 3 – Area 3 consists of minor erosion of surface bank soils at several locations near Parcels I8-23-6, I8-23-4, and I8-23-1 (Figure 3-1). Surface soil losses in these areas have resulted in the exposure of segments of the Geoweb that was installed to promote slope stability (Appendix A, Photos 5 through 7). This erosion appears to have been caused by concentrated surface runoff from certain adjacent areas located at the top of the bank, and/or may be related to poorly compacted materials within the Geoweb at the time of installation. At these locations, a total of less than 0.5 cy of material loss was observed, and there were no indications of eroded materials in the River. Although some material loss was observed, these areas appear to be generally stable.

Area 4 – Area 4 consists of an area of minor erosion of surface bank soils near Parcels I8-23-2/3 (Figure 3-1). Surface soil losses in this area have resulted in the exposure of segments of the Geoweb that was installed to promote slope stability (Appendix A, Photo 8). This erosion appears to have been caused by stormwater generated by a recently installed drainage pipe associated with a recently renovated parking lot, and/or may be related to poorly compacted materials within the Geoweb at the time of installation. At this location, a total of less than 0.5 cy of material loss was observed, and there was no indication of eroded materials in the River. Although some material loss was observed, this area appears to be generally stable.

Area 5 – Area 5 consists of an area of minor erosion of surface bank soils on Parcel I6-1-68 at the approximate property line with Parcels I6-1-68 and I6-1-67 (Figure 3-4). Surface soil losses in this area have resulted in the exposure of segments of the Geoweb that was installed to promote slope stability (Appendix A, Photos 9 and 10). This erosion appears to have been caused by concentrated surface runoff from certain adjacent areas located at the

top of the bank, and/or may be related to poorly compacted materials within the Geoweb at the time of installation. At this location, a total of less than 0.5 cy of material loss was observed, and there was no indication of eroded materials in the River. Although some material loss was observed, this area appears to be generally stable.

3.4 Response Actions

Following discussions with EPA related to the response actions proposed in the August 29, 2008 trip report and receipt of the October 8, 2008 EPA conditional approval letter, the following response actions were identified and, where appropriate, conducted in the fall of 2008 to address the above-described areas of erosion, as summarized in Table 3-1:

Area 1 – To reduce the potential for future erosion in this area, riprap was placed in the eroded area in the fall of 2008 to restore the area to surrounding grades and protect it from future potential material loss.

Area 2 – This area will be evaluated again during the 2009 annual inspection; and based on observations made during that inspection, corrective actions may be initiated if it appears that there is continuing erosion of bank soils in this area.

Area 3 – These areas will be evaluated again during the 2009 annual inspection; and based on observations made during that inspection, corrective actions may be initiated if it appears that there is continuing erosion of the bank soils in this area.

Area 4 – To prevent continued erosion, GE placed additional riprap in the eroded area of Parcel I8-23-2/3 in the fall of 2008. This area will be evaluated again during the 2009 annual inspection; and based on observations made during that inspection, additional corrective actions may be initiated if it appears that there is continuing erosion of the bank soils in this area.

Area 5 – In order to further stabilize the area of the eroded riverbank and prevent continued erosion, GE planted two red-osier dogwoods along the base of the eroded area to protect the area from future potential material loss.

Additionally, during a bank inspection conducted by EPA after the annual monitoring event, an additional area of erosion was noted upstream of Area 1 on Parcel I9-4-203. This area is labeled Area 6, and is shown on Figure 3-1. At the request of EPA, GE placed riprap in this area in the fall of 2008 to restore the area to surrounding grades and protect it from future material loss.

4. Aquatic Habitat Enhancement Structures Monitoring

4.1 General

Periodic monitoring of the aquatic habitat enhancement structures is required to evaluate structural stability, the effect of the structures on aquatic habitat, and the potential for increased bank-side erosion.

4.2 Monitoring Program

The PRSC Plan requires that the post-restoration monitoring program for the aquatic habitat enhancement structures be performed annually for five years. The purpose of the annual monitoring program is to observe and document characteristics of the structures, such as shape and location, and qualitatively assess the function of the installations (e.g., flow speed and depth variability, sediment deposition and scour). The Maintenance Standards for these structures are that there be "no significant movement of any riprap adjacent to the structures and no significant riverbank erosion caused by the presence of the structures" (PRSC Plan, p. 2-2).

4.3 2008 Monitoring Activities

During 2008, monitoring activities for the aquatic habitat enhancement structures were performed concurrently with the Riverbank Soil Restoration Monitoring on July 31, 2008 by representatives of GE and EPA. The 2008 monitoring visit was the first year of the five-year monitoring program detailed in the PRSC Plan. The results of this monitoring event were included the August 29, 2008 trip report to EPA, which was conditionally approved by EPA in its October 8, 2008 letter.

The inspection consisted of visual observation of the condition of the aquatic habitat structures. As noted in Section 3, at the time of inspection, flow in the 1½-Mile was approximately 85 cfs. The aquatic habitat enhancement structures that were monitored during the 2008 survey included the following:

- Wing wall deflectors
- Riprap swales
- Weirs
- Rock spurs

- Habitat enhancement boulders and boulder clusters

The July 31, 2008 inspection indicated that the aquatic habitat enhancement structures that were visible appeared to be providing good cover and habitat. These structures appeared to be structurally stable and were creating variations in water velocity and flow, as evidenced by the presence of scour zones and depositional areas in the sediment surrounding the structures. The development of these variations in sediment elevation and the creation of flow changes in the water column appeared to be providing good habitat for fish and aquatic invertebrates. Further, the habitat enhancement structures also appeared to be recreating riffle/pool structural variability in the in-stream habitat and providing in-stream and bank-side cover for aquatic organisms.

In addition, no significant movement of any riprap adjacent to the structures and no significant riverbank erosion caused by the presence of the structures was observed. Thus, the aquatic habitat enhancement structures met the Maintenance Standards defined in the PRSC Plan.

Photographs of the aquatic habitat enhancement structures were included in the trip report submitted to EPA on August 29, 2008.

4.4 Response Actions

No response actions were required in 2008, as the aquatic habitat enhancement structures met the Maintenance Standards set forth in the PRSC Plan.

5. Riprap and ACB Monitoring

5.1 General

Periodic monitoring of riprap placed in the channel, on the banks, or in adjacent drainage swales, as well as any areas where ACB was installed, is required to confirm that these measures effectively prevent erosion of the underlying materials.

5.2 Monitoring Program

The PRSC Plan requires that the post-restoration monitoring program for the riprap and ACB be performed annually for five years. The monitoring program is to consist of visual inspections of all riprap located within the 1½-Mile to observe the general condition of the riprap and underlying banks, including noting any indications of sloughing, erosion and/or movement of associated riprap. The Maintenance Standards for riprap within the channel are that there be "no significant movement of the riprap or reduction in riprap thickness that threatens the stability of the riverbanks or river channel or results in the erosion of underlying soils or sediment," and for riprap placed in swales, that there be "no movement of riprap that results in the exposure of the underlying geotextile fabric" (PRSC Plan, p. 2-2).

Visual observations of the riverbed ACB located immediately downstream of the Elm Street Bridge are made to assess the general condition of the ACB (and surrounding transition areas) and to monitor for any cracked or loose blocks and/or any other potential structural deficiencies that may adversely impact the long-term performance of the ACB. For ACB areas in the river channel, the Maintenance Standard is that there be "no significant damage to (i) the ACB, (ii) the shotcrete that is tying in the ACB to the base of the adjacent retaining wall on Parcel I8-10-5, and (iii) the shotcrete at the transition between the ACB and the adjacent riprap at the downstream end of the ACB" (PRSC Plan, p. 2-2).

5.3 2008 Monitoring Activities

During 2008, monitoring activities for the riprap installed in the 1½-Mile and the ACB areas were performed concurrently with the Riverbank Soil Restoration Monitoring on July 31, 2008, by representatives of GE and EPA. The 2008 monitoring visit was the first of five scheduled annual visits. The results of this monitoring event were included in the August 29, 2008 trip report, which was conditionally approved by EPA on October 8, 2008.

The inspection consisted of visual observation of the condition of the riprap installed in the 1½-Mile and of the ACB areas. As noted in Section 3, at the time of inspection, flow in the 1½-Mile was approximately 85 cfs.

5.3.1 Riprap Layer

In general, based on this inspection, the riprap appeared to have met the Maintenance Standards set forth in the PRSC Plan. There were no observed indications of significant movement of the riprap or reductions in riprap thickness affecting the stability of the riverbanks or river channel, nor were there any observations of erosion of the underlying soils or sediment. In many areas within the channel, the riprap has been covered with sediment deposits, an indication of natural sedimentation processes within the 1½-Mile. Similarly, there did not appear to be any movement of riprap placed in drainage swales that resulted in the exposure of the underlying geotextile fabric.

5.3.2 ACB

Due to flow conditions in the 1½-Mile at the time of the 2008 inspection, portions of the transition between the ACB and the adjacent riverbed riprap near the Elm Street Bridge could not be observed. However, the ACB installations that were visible met the Maintenance Standards set forth in the PRSC Plan. There was no observed damage to the ACB or the associated visible shotcrete that transitions the ACB to the neighboring structures (e.g., retaining walls, abutments).

5.4 Response Actions

No response actions were required in 2008, as the riprap layer and ACB met the Maintenance Standards set forth in the PRSC Plan.

6. Ancillary Item Monitoring

6.1 General

Periodic visual monitoring of various ancillary items, either critical or non-critical (as designated in the PRSC Plan), is required to evaluate the general condition of each of these items with respect to the "as-built" condition.

6.2 Monitoring Program

The annual monitoring is to consist of visual observation of various items/structures implemented as part of the 1½-Mile Reach Removal Action. Each such installation is assessed for general condition and compliance with the appropriate Maintenance Standards and to determine the need, if any, for corrective actions. The items to be included in the annual monitoring program are summarized below.

6.2.1 Critical Items

Critical items are required to be inspected annually for five years, at which time GE will propose a long-term monitoring program. The critical restoration items identified in the PRSC Plan are: (1) the retaining walls adjacent to Parcels I8-23-6, I8-24-1, I8-10-5, and I8-10-4, and the City Layout for High Street-abutting High Street (formerly lot I8-10-1); (2) fencing along the retaining walls at Parcels I8-10-5 and I8-10-4, and the City Layout for High Street-abutting High Street; (3) handrails on the Silver Lake outfall structure; (4) guardrails along High Street and Deming Street; and (5) fencing along Caledonia Street. The critical restoration items listed above are visually observed to confirm the presence and general condition of each item. Additionally, the above-mentioned retaining walls are visually inspected and reviewed for stability and functionality. The Maintenance Standard for all the critical restoration items is "no substantial variation from as-built conditions" (PRSC Plan, p. 2-3)

6.2.2 Non-Critical Items

Non-critical items were required to be inspected annually for two years following installation. The non-critical restoration items, as identified in the PRSC Plan, include certain fencing, pavement, guardrails, gates, and other restored areas, as well as the backflow prevention valves at Fred Garner Park. The non-critical items were installed in 2006 and EPA conducted the first year of the required two-year monitoring program in 2007. The Maintenance Standard for these items is "no substantial variation from as-built conditions" (PRSC Plan, p. 2-3).

6.3 2008 Monitoring Activities

Inspection of the ancillary items listed above was performed on July 31, 2008 by representatives of GE and EPA in conjunction with the Riverbank Soil Restoration Monitoring. The results of this monitoring event were included in the August 29, 2008 trip report, which EPA conditionally approved on October 8, 2008.

6.3.1 Critical Items

The 2008 monitoring visit was the first year of the required five-year monitoring program for the critical items listed above. All five retaining walls monitored during this inspection met the Maintenance Standard defined in the PRSC Plan. The physical features of the five walls and the top-of-bank features behind the walls were observed to be in good condition, as described further in the August 29, 2008 trip report. The approximate locations of the retaining walls included in the inspection are illustrated on Figures 3-1 and 3-2. Each of the other critical items listed above was also observed to be in good condition and structurally sound with no obvious damage.

6.3.2 Non-Critical Items

The 2008 inspection of the non-critical restoration items was the final scheduled inspection of these items as set forth in the PRSC Plan. During the 2008 monitoring inspection, two ancillary items were observed to have variations from the as-built conditions (as established in the PRSC Plan), and therefore did not meet the Maintenance Standard. These items were as follows:

- A portion of the fencing adjacent to the parking lot on Parcel I8-24-1 was observed to be damaged (Area 7 on Figure 3-1; Appendix A, Photos 11 and 12), an apparent result of snow removal or plowing activities at the adjacent parking lot.

- The backflow prevention valves at Fred Garner Park (Area 8 on Figure 3-4) had observable natural woody debris and leaf litter located within the valves.

All other non-critical ancillary items met the Maintenance Standard defined in the PRSC Plan.

6.4 Response Actions

No response actions were required for the critical ancillary items, as the Maintenance Standard set forth in the PRSC Plan was met.

For the non-critical ancillary items, the area of damaged fencing identified as Area 7 was repaired in the fall of 2008, and the backflow prevention valves at Fred Garner Park (Area 8) were cleaned out and/or flushed on November 6, 2008, to maintain proper operation and minimize the potential for future flooding events. Further maintenance of these backflow valves, if necessary, will be performed by the City of Pittsfield. As a result of the above-described inspection and repairs, GE believes that the Maintenance Standard for non-critical ancillary items has been satisfied and that no further inspections are required for these items.

7. Surface Water Sampling

7.1 General

Surface water sampling continues to be performed under the Housatonic River Monthly Water Column Sampling Program, and as specified in the PRSC Plan, results from that program related to the 1½-Mile are included herein.

7.2 Monitoring Program

Specific to the 1½-Mile Reach, under the Housatonic River Monthly Water Column Sampling Program, monthly water quality samples are collected at the Lyman Street and Pomeroy Avenue Bridge locations and analyzed for polychlorinated biphenyls (PCBs) and for total suspended solids (TSS). Field data such as temperature, conductivity, and pH are also collected for each event.

7.3 2008 Monitoring Activities

During 2008, water column samples, and associated water quality parameters, were collected 12 times at both the Lyman Street and Pomeroy Avenue locations.

For each monitoring event, the flow in the River was reported from data collected at the USGS flow gauge located in Coltsville, MA. Precipitation data were also compiled from daily National Oceanic and Atmospheric Administration's National Weather Service data reported for the Pittsfield, MA airport.

Complete analytical results and recorded field parameters associated with the 2008 water column monitoring at the Lyman Street and Pomeroy Avenue locations are summarized in Table 7-1. As shown there, PCBs were detected in one sample collected on June 25, 2008 at the Lyman Street Bridge at 0.000084 parts per million (ppm) (0.084 micrograms per liter [µg/L]). PCBs were also detected in three samples collected on July 31, August 26, and September 24, 2008 at the Pomeroy Avenue Bridge at 0.0000065 ppm, 0.0000069 ppm, and 0.0000069 ppm (0.0065, 0.0069, and 0.0069 µg/L), respectively. Additionally, while PCBs were initially reported as detected in a sample collected at the Pomeroy Avenue Bridge on December 16, 2008, those data were rejected during data validation due to excessive PCB contamination in the associated method blank. All other samples collected showed no detected PCBs. TSS results across the entire water column data set ranged from not detected to 8.0 ppm.

8. Summary and Future Activities

In general, 2008 represented the first year of the various monitoring programs discussed herein. Within the exception of non-critical ancillary items, all of these programs will be continued in 2009, as described below. A summary of the scheduled future monitoring events for these programs is provided in Table 8-1. GE will coordinate scheduling of these inspection visits with EPA and/or the Trustees' representative, as appropriate, to avoid potential high-water events in the 1½-Mile (where relevant) or other scheduling conflicts.

8.1 Restored Bank and Non-Bank Vegetation Monitoring

GE will perform vegetation inspections twice in 2009. As prescribed in the PRSC Plan, the spring monitoring visit will be performed in May 2009 and will examine the 1½-Mile qualitatively. The summer monitoring visit will be performed in July 2009 and will examine the 1½-Mile quantitatively. These monitoring events will evaluate the riverbank plantings and the plantings at Fred Garner Park (Parcel I7-1-101), as well as the replanted and stressed trees (which have been tagged) at Parcel I8-24-1. (The monitoring for other vegetation at Parcel I8-24-1 and the vegetation monitoring at Parcels I9-5-13, I6-1-67, and I6-1-66 have been completed.) Semi-annual monitoring events for the riverbank plantings will continue through 2012; semi-annual monitoring events for the plantings at Fred Garner Park will continue through 2011, and semi-annual monitoring events for the replanted and stressed trees at Parcel I8-24-1 will continue through 2010. However, if any additional trees are replanted, they will be monitored semi-annually for two years after planting.

8.2 Riverbank Soil Restoration Monitoring

GE will perform the 2009 riverbank soil restoration inspection in late summer (i.e., July or August). These monitoring events will continue annually (as well as after flow events exceeding 3,500 cfs) through 2012, at which time GE will make a proposal regarding further long-term monitoring.

8.3 Aquatic Habitat Enhancement Structures Monitoring

GE will perform the 2009 inspection of the aquatic habitat enhancement structures in late summer (i.e., July or August). This monitoring visit will likely coincide with the riverbank soil restoration monitoring event. These monitoring events will continue annually (as well as after flow events exceeding 3,500 cfs) through 2012.

8.4 Riprap Layer and ACB Monitoring

GE will perform the 2009 inspection of the riprap layer and ACB in late summer (i.e., July or August). This monitoring visit will also likely coincide with the riverbank soil restoration monitoring event. Note that due to elevated water levels in the 1½-Mile at the time of the 2008 inspection, the transition between certain ACB areas and the adjacent riverbed riprap could not be inspected. GE will make every effort to inspect these areas in 2009. These monitoring events will continue annually (as well as after flow events exceeding 3,500 cfs) through 2012, at which time GE will make a proposal regarding further long-term monitoring.

8.5 Ancillary Items Monitoring

The 2008 monitoring event was the final inspection for the non-critical ancillary items; any future monitoring and maintenance of these items will be conducted by the City of Pittsfield. GE will perform the 2009 inspection of the critical ancillary items in late summer (i.e., July or August). This monitoring visit will also likely coincide with the riverbank soil restoration monitoring event. These monitoring events will continue on an annual basis through 2012, at which time GE will make a proposal regarding further long-term monitoring.

8.6 Surface Water Sampling

Surface water sampling associated with the 1½-Mile will continue to be performed as part of the ongoing water column sampling efforts being performed under the Housatonic River Monthly Water Column Sampling Program.

8.7 Sediment Sampling

A sediment sampling event is scheduled to occur every five years for 15 years to document PCB concentrations in sediment in the 1½-Mile over time. The first sampling event of this program was conducted by EPA in 2007. The next sampling event (second round) will be conducted by GE and is scheduled for performance in 2012.

8.8 Macroinvertabrate Sampling

The macroinvertabrate sampling program is scheduled to occur every five years for 15 years to document PCB concentrations in the composition of the aquatic invertebrate communities that have re-established themselves in the 1½-Mile since the completion of remediation activities. The first sampling event of this program was performed by EPA in

2007. The next sampling event (second round) will be conducted by GE and is scheduled for performance in 2012.

8.9 Environmental Restrictions & Easements and Conditional Solution Inspection

For non-residential properties in the 1½-Mile that are owned by parties other than GE or the Commonwealth of Massachusetts and at which Grants of Environmental Restrictions and Easements (EREs) have been recorded, annual inspections, including document reviews and visual site inspections, will be conducted regarding compliance with the EREs, as provided in the PRSC Plan. It is anticipated that EREs will be executed by the City of Pittsfield and one private property owner in 2009 for their properties located in the 1½-Mile. If that occurs, it is anticipated that the annual ERE inspections of these properties will begin in November 2009 and will be conducted annually thereafter in the same month.

In addition, for non-residential properties at which Conditional Solutions have been implemented, annual inspections (again consisting of document reviews and visual site inspections) will be conducted in accordance with the PRSC Plan. For properties where the Conditional Solution applies only to the riverbank portion of the property, the inspections will be conducted only of that portion. For properties where a Conditional Solution applies to both the riverbank and non-riverbank portions of the properties, the inspections of the riverbanks within the 1½-Mile will be conducted in conjunction with the Conditional Solution inspections of the non-riverbank portions as required under Post-Removal Site Control Plans for other Removal Action Areas under the CD. It is anticipated that these inspections will be conducted in November 2009 and thereafter annually in November.

8.10 Future Reporting

In accordance with the PRSC Plan, GE will submit interim reports on the monitoring events described above within 30 days of completion of the inspection(s) in question, and will submit an annual monitoring report on all monitoring activities during a given year by the end of January of the following year.

9. References

Weston. 2008. *Interim Post-Removal Site Control Plan, 1½-Mile Removal Reach, General Electric (GE)-Pittsfield/Housatonic River Site*. Prepared by Weston Solutions for the U.S. Army Corps of Engineers and the U.S. EPA. May 2008.

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Tables

TABLE 2-1
SUMMARY OF NON-RIVERBANK RE-VEGETATION AREAS

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Parcel ID	Quantity of Plants Planted	Plant Type and Species	Common Name	Size/Stock	Comments	Monitoring Requirements
1	I8-24-1	6	*Betula nigra*	River Birch Clump	8-10 ft.		2008
		12	*Acer rubrum*	Red Maple	1.75"-2" cal		2008
		6	*Quercus alba*	White Oak	1.75"-2" cal		2008
		11	*Acer saccharum*	Sugar Maple	1.75"-2" cal		2008
		8	*Fraxinus americana*	White Ash	1.75"-2" cal		2008
		6	*Fraxinus pennsylvanica*	Green Ash	1.75"-2" cal		2008
		6	*Quercus palustris*	Pin Oak	1.75"-2" cal		2008
		7	*Pinus strobus*	White Pine	5-6 ft.		2008
		7	*Abies fraseri*	Frasier Fir	5-6 ft.		2008
		6	*Tsuga canadensis*	Eastern Canadian Hemlock	5-6 ft.		2008
	I8-23-6	80	*Thula occidentalis*	Dark American Arborvitae	12-15 ft.		Complete
		2	*Acer rubrum*	Red Maple	2" cal		Complete
	I9-5-13	13	*Thula occidentalis*	Dark American Arborvitae	12ft.		2008
		12	*Thula occidentalis*	Dark American Arborvitae	4ft.		2008
2	I8-4-6	3	*Pinus strobus*	White Pine	6 ft.		Complete
	I8-4-101	1	*Acer saccharum*	Silver Maple	n/a		Complete
	I8-4-7	1	*Salix nigra*	Black Willow	n/a		Complete
		1	*Pruns serotina*	Black Cherry	n/a		Complete
		5	*Abies balsamea*	Balsam Fir	n/a		Complete
		2	*Syringa vulgaris*	Lilacs	n/a		Complete
	I7-21-6	5	*Tsuga canadensis*	Eastern Canadian Hemlock	5 ft.		Complete
	and I7-21-	1	*Acer platanoides*	Crimson King Maple	n/a		Complete
	I8-10-4	37	*Thula occidentalis*	Dark American Arborvitae	4-5 ft.		Complete
	I7-20-1	3	*Fraxinus pennsylvanica*	Green Ash	1.5"-2" cal		Complete
		2	*Acer rubrum 'red sunset'*	Sunset Maple	n/a		Complete
3	I7-3-12	3	*Picea pungens*	Blue Spruce	10 ft.		Complete
		22	*Acer saccharum*	Sugar Maple	2" cal		Complete
		1	*Acer saccharum*	Silver Maple	2" cal		Complete
	I7-3-4	1	*Betula papyrifera*	White Birch	n/a		Complete
		1	*Forsythia sp.*	Forsythia	n/a		Complete
		1	*Rosa sp.*	Knockout Rose	n/a		Complete
	I7-2-21	3	*Syringa vulgaris*	Lilacs	n/a		Complete
	I7-2-22	5	*Thula occidentalis*	Dark American Arborvitae	n/a		Complete
		1	*Rhododendron sp.*	Rhododendron	n/a		Complete
	I7-2-24	2	*Acer rubrum*	Red Maple	10-12 ft.		Complete
	I7-2-25	2	*Acer rubrum*	Red Maple	10-12 ft.		Complete
		1	*Picea pungens*	Blue Spruce	6 ft.		Complete
		9	*Funkiaceae*	Hostas	n/a		Complete
		1	*Rhododendron sp.*	Rhododendron	n/a		Complete
4	I7-1-5	8	*Thula occidentalis*	Dark American Arborvitae	6-8 ft.	WMECO	Complete
	I7-1-101	8	*Acer rubrum*	Red Maple	2" cal	Soccer Field Area	2008 to 2011
		6	*Betula nigra*	River Birch Clump	8-10 ft.	Soccer Field Area	2008 to 2011
		16	*Tsuga canadensis*	Eastern Canadian Hemlock	8-10 ft.	Top of bank along walk path	2008 to 2011
		5	*Pinus strobus*	White Pine	8-10 ft.	Area A	2008 to 2011
		10	*Acer saccharum*	Sugar Maple	1.5"-2" cal	Area A	2008 to 2011
		10	*Quercus rubra*	Red Oak	1.5"-2" cal	Area A	2008 to 2011
		5	*Betula papyrifera*	Paper Birch	8-10 ft.	Area A	2008 to 2011
		4	*Acer saccharum*	Silver Maple	1.5"-2" cal	Area A	2008 to 2011
	I7-1-101	13	*Pinus strobus*	White Pine	8-10 ft.	Area B	2008 to 2011
		16	*Acer saccharum*	Sugar Maple	1.5"-2" cal	Area B	2008 to 2011
		15	*Quercus rubra*	Red Oak	1.5"-2" cal	Area B	2008 to 2011
		10	*Betula papyrifera*	Paper Birch	8-10 ft.	Area B	2008 to 2011
		23	*Cornus amomum*	Silky Dogwood	1-gal	Area B	2008 to 2011
		23	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area B	2008 to 2011
		23	*Ilex verticillata*	Winterberry Holly	1-gal	Area B	2008 to 2011
		23	*Prunus virginiana*	Chokecherry	1-gal	Area B	2008 to 2011
	I7-1-101	14	*Cornus amomum*	Silky Dogwood	1-gal	Area C *	2008 to 2011
		13	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area C *	2008 to 2011
		13	*Ilex verticillata*	Winterberry Holly	1-gal	Area C *	2008 to 2011
		13	*Prunus virginiana*	Chokecherry	1-gal	Area C *	2008 to 2011

TABLE 2-1
SUMMARY OF NON-RIVERBANK RE-VEGETATION AREAS

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Parcel ID	Quantity of Plants Planted	Plant Type and Species	Common Name	Size/Stock	Comments	Monitoring Requirements
4	I7-1-101	2	*Pinus strobus*	White Pine	8-10 ft.	Area D	2008 to 2011
		2	*Acer saccharum*	Sugar Maple	1.5"-2" cal.	Area D	2008 to 2011
		2	*Betula papyrifera*	Paper Birch	8-10 ft.	Area D	2008 to 2011
		3	*Cornus amomum*	Silky Dogwood	1-gal	Area D	2008 to 2011
		3	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area D	2008 to 2011
		3	*Ilex verticillata*	Winterberry Holly	1-gal	Area D	2008 to 2011
		3	*Prunus virginiana*	Chokecherry	1-gal	Area D	2008 to 2011
	I7-1-101	5	*Pinus strobus*	White Pine	8-10 ft.	Area E	2008 to 2011
		3	*Betula papyrifera*	Paper Birch	8-10 ft.	Area E	2008 to 2011
		40	*Acer saccharum*	Silver Maple	1.5"-2" cal.	Area E	2008 to 2011
		30	*Acer rubrum*	Red Maple	1.5"-2" cal.	Area E	2008 to 2011
		7	*Salix nigra*	Black Willow	1-gal	Area E	2008 to 2011
		16	*Populus deltoides*	Eastern Cottonwood	1-gal	Area E	2008 to 2011
		8	*Acer negundo*	Box Elder	1-gal	Area E	2008 to 2011
		37	*Cornus amomum*	Silky Dogwood	1-gal	Area E	2008 to 2011
		38	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area E	2008 to 2011
		38	*Ilex verticillata*	Winterberry Holly	1-gal	Area E	2008 to 2011
		38	*Prunus virginiana*	Chokecherry	1-gal	Area E	2008 to 2011
	I6-1-69	5	*Tsuga canadensis*	Eastern Canadian Hemlock	4-5 ft.		Complete
		4		Varios Shrubs	3-gal		Complete
	I6-1-68	16	*Tsuga canadensis*	Eastern Canadian Hemlock	4-5 ft.		Complete
		14	*Sorbaria sorbifolia*	Spirea	3-gal		Complete
	I6-1-67	3	*Amelanchier sp.*	Serviceberry (shadbush)	6-8 ft.		2008
		2	*Fraxinus pennsylvanica*	Green Ash	6-8 ft.		2008
		3	*Betula papyrifera*	White Birch	6-8 ft.		2008
		7	*Pinus strobus*	White Pine	5-6 ft.		2008
		2	*Quercus rubra*	Red Oak	6-8 ft.		2008
		2	*Abies balsamea*	Balsam Fir	5-6 ft.		2008
		2	*Acer rubrum*	Red Maple	6-8 ft.		2008
		13	*Vaccinium macrocarpon*	American Cranberry	3-4 ft.		2008
		14	*Viburnum dentatum*	Northern Arrowwood	3-4 ft.		2008
		2	*Cornus sericea*	Red Osier Dogwood	1-gal		2008
		2	*Cornus amomum*	Silky Dogwood	1-gal		2008
		4	*Ilex verticillata*	Winterberry Holly	1-gal		2008
		4	*Prunus virginiana*	Chokecherry	1-gal		2008
		5	*Viburnum dentatum*	Northern Arrowwood	1-gal		2008
	I6-1-66	7	*Amelanchier sp.*	Serviceberry (shadbush)	6-8 ft.		2008
		6	*Fraxinus pensylvanica*	Green Ash	6-8 ft.		2008
		4	*Betula papyrifera*	White Birch	6-8 ft.		2008
		8	*Pinus strobus*	White Pine	5-6 ft.		2008
		9	*Quercus rubra*	Red Oak	6-8 ft.		2008
		4	*Abies balsamea*	Balsam Fir	5-6 ft.		2008
		12	*Acer rubrum*	Red Maple	6-8 ft.		2008
		8	*Vaccinium macrocarpon*	American Cranberry	3-4 ft.		2008
		7	*Viburnum dentatum*	Northern Arrowwood	3-4 ft.		2008
		6	*Cornus amomum*	Silky Dogwood	1-gal		2008
		5	*Ilex verticillata*	Winterberry Holly	1-gal		2008
		5	*Prunus virginiana*	Chokecherry	1-gal		2008
		6	*Viburnum dentatum*	Northern Arrowwood	1-gal		2008

Notes:
1. * Planting area located on Western Mass Electric Company (WMECO) Right of Way (ROW). WMECO requirements do not allow tree planting in ROW areas; therefore only shrubs were planted.
2. ft. = feet
3. gal = gallon
4. " = inches
5. n/a - Not Available

TABLE 2-2
SUMMER 2008 RIVERBANK PLANT COUNT SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Upper & Lower Boundaries	Bank	Plot No.	Dimensions			Trees					Shrubs						Total Plants
				L (ft)	W (ft)	Area (ft^2)	BW	SM	EC	BE	Total Trees	ROD	SD	WH	CC	NA	Total Shrubs	
1	Lyman - Elm	West	1-W-1	61	10	580	3	10	7	6	26	0	0	0	0	0	0	26
			1-W-2	32	31	982	1	10	7	4	22	0	0	0	0	0	0	22
			1-W-3	67	21	1,434	5	3	9	5	22	8	4	4	4	4	24	46
		East	1-E-1	139	12	1,640	7	3	8	5	23	16	13	4	2	5	40	63
			1-E-2	45	34	1,548	8	6	8	12	34	0	0	0	0	0	0	34
			1-E-3	70	18	1,239	1			6	7	12	4	0	4	0	20	27
2	Elm - Dawes	West	2-W-1	63	17	1,058	3	5	7	5	20	0	0	0	0	0	0	20
			2-W-2	17	54	913	3	1	6	8	18	0	0	0	0	0	0	18
			2-W-3	66	9	574		1	1	17	19	0	10	0	5	3	18	37
		East	2-E-1	33	27	894	1		7	3	11	6	4	5	4	3	22	33
			2-E-2	27	34	913		4	12	3	19	0	0	0	0	0	0	19
			2-E-3	141	10	1,382	2	6	10	10	28	0	0	0	0	0	0	28
3	Dawes - Pomeroy	West	3-W-1	212	6	1,272	2	4	1	8	15	7	21	0	4	2	34	49
			3-W-2	67	14	938	2	3	1	2	8	6	4	2	0	3	15	23
			3-W-3	105	13	1,365	5	4	1	2	12	11	0	4	4	2	21	33
		East	3-E-1	145	10	1,450	1	5	4	7	17	0	23	1	6	3	33	50
			3-E-2	38	10	369			7	1	8	0	0	0	0	0	0	8
			3-E-3	77	10	770	5	5	1	3	14	10	0	2	3	3	18	32
4	Pomeroy - Confluence	West	4-W-1	50	18	900	5	5	2	6	18	0	0	0	0	0	0	18
			4-W-2	50	25	1,250	1	4	10	6	21	0	0	0	0	0	0	21
			4-W-3	74	12	888	2	3	11	2	18	5	8	2	3	4	22	40
		East	4-E-1	50	8	400	2	1	2	2	7	0	0	0	0	0	0	7
			4-E-2	50	10	500	3	2	4	9	18	0	5	2	4	3	14	32
			4-E-3	50	10	500	5	4	3	6	18	5	4	0	4	4	17	35

Species Legend:

Trees:
BW = black willow
SM = silver maple
EC = eastern cottonwood
BE = box elder

Shrubs:
ROD = red-osier dogwood
SD = silky dogwood
WH = winterberry holly
CC = choke cherry
NA = northern arrowwood

TABLE 2-3
SUMMER 2008 RIVERBANK RE-VEGETATION PLOT SURVIVORSHIP MONITORING SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Plot No.	Type	Shrub Clumps						Trees				Meets Maintenance Standard (≥ 80% Survival)	
			L (ft)	W (ft)	Area (ft^2)	Target Density (per acre)	2008 Density (per acre)	% of Target Density	Area (ft^2)	Target Density (per acre)	2008 Density (per acre)	% of Target Density	Shrubs	Trees
	1-W-1	Regular							580	700	1954	279	Yes	Yes
	1-W-2	Regular							982	700	975	139	Yes	Yes
	1-W-3	Regular			264*	2723	3960	145	1434	700	668	95	Yes	Yes
	Average (west side)							NA				171	Yes	Yes
1	1-E-1	Regular			484*	2723	3600	132	1640	700	611	87	Yes	Yes
	1-E-2	Regular							1548	700	957	137	Yes	Yes
	1-E-3	Geoweb	70	17.7	1239	730	703	96	1239	210**	246	117	Yes	Yes
	Average (east side)							114				114	Yes	Yes
	Average (Phase 1)							125				143	Yes	Yes
	2-W-1	Regular							1058	700	823	118	Yes	Yes
	2-W-2	Regular							913	700	859	123	Yes	Yes
	2-W-3	Geoweb	66	8.7	574	730	1366	187	574	500	1441	288	Yes	Yes
	Average (west side)							NA				176	Yes	Yes
2	2-E-1	Regular			316*	2723	3033	111	894	700	536	77	Yes	No
	2-E-2	Regular							913	700	907	130	Yes	Yes
	2-E-3	Regular							1382	700	883	126	Yes	Yes
	Average (east side)							NA				111	Yes	Yes
	Average (Phase 2)							149				143	Yes	Yes
	3-W-1	Geoweb	212	6	1272	730	1164	159	1272	411**	514	125	Yes	Yes
	3-W-2	Regular	66	14	924	730	707	97	938	418**	372	89	Yes	Yes
	3-W-3	Regular	105	13	1365	730	670	92	1365	383**	383	100	Yes	Yes
	Average (west side)							116				105	Yes	Yes
3	3-E-1	Regular	145	10	1450	730	991	136	1450	391**	511	131	Yes	Yes
	3-E-2	Geoweb							369	500	945	189	Yes	Yes
	3-E-3	Regular	77	10	770	730	1018	139	770	679**	792	117	Yes	Yes
	Average (east side)							138				145	Yes	Yes
	Average (Phase 3)							125				125	Yes	Yes
	4-W-1	Regular							900	700	871	124	Yes	Yes
	4-W-2	Regular							1250	700	732	105	Yes	Yes
	4-W-3	Regular	40	10	400	2723	2396	88	888	700	883	126	Yes	Yes
	Average (west side)							NA				118	Yes	Yes
4	4-E-1	Geoweb							400	500	762	152	Yes	Yes
	4-E-2	Regular	50	10	500	730	1220	167	500	700	1568	224	Yes	Yes
	4-E-3	Regular	50	10	500	730	1481	203	500	700	1568	224	Yes	Yes
	Average (east side)							185				200	Yes	Yes
	Average (Phase 4)							153				159	Yes	Yes

Notes:
1. * Irregularly-shaped shrub clump.
2. ** Denotes plots where survivorship criterion is based on actual number of trees planted, as shown below
   - 1-E-3: 6 trees originally planted within plot
   - 3-W-1: 13 trees originally planted within plot
   - 3-W-2: 9 trees originally planted within plot
   - 3-W-3: 12 trees originally planted within plot
   - 3-E-1: 14 trees originally planted within plot
   - 3-E-3: 12 trees originally planted within plot
   - 4-E-2: 5 trees originally planted within plot

TABLE 2-4
SUMMER 2008 NON-RIVERBANK RE-VEGETATION AREA MONITORING SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Parcel ID	Quantity of Plants Planted	Plant Type and Species	Common Name	Size/Stock	Comments	Monitoring Requirements	Maintenance Standard	Number of live trees/shrubs	% Survival	Meets Maintenance Standard
1	I8-24-1	6	*Betula nigra*	River Birch Clump	8-10 ft		2008	100%	6	100	Yes
		12	*Acer rubrum*	Red Maple	1.75"-2" cal		2008	100%	12	100	Yes
		6	*Quercus alba*	White Oak	1.75"-2" cal		2008	100%	6	100	Yes
		11	*Acer saccharum*	Sugar Maple	1.75"-2" cal		2008	100%	9	82	No
		8	*Fraxinus americana*	White Ash	1.75"-2" cal		2008	100%	8	100	Yes
		6	*Fraxinus pennsylvanica*	Green Ash	1.75"-2" cal		2008	100%	6	100	Yes
		6	*Quercus palustris*	Pin Oak	1.75"-2" cal		2008	100%	6	100	Yes
		7	*Pinus strobus*	White Pine	5-6 ft		2008	100%	7	100	Yes
		7	*Abies fraseri*	Frasier Fir	5-6 ft		2008	100%	7	100	Yes
		6	*Tsuga canadensis*	Eastern Canadian Hemlock	5-6 ft		2008	100%	6	100	Yes
	I9-5-13	13	*Thula occidentalis*	Dark American Arborvitae	12 ft		2008	100%	13	100	Yes
		12	*Thula occidentalis*	Dark American Arborvitae	4 ft		2008	100%	12	100	Yes
4	**Area A (Trees Only)**										
	I7-1-101	8	*Acer rubrum*	Red Maple	2" cal	Soccer Field Area	2008 to 2011	100%	8	100	Yes
		6	*Betula nigra*	River Birch Clump	8-10 ft	Soccer Field Area	2008 to 2011	100%	6	100	Yes
		16	*Tsuga canadensis*	Eastern Canadian Hemlock	8-10 ft	Top of bank along walk path	2008 to 2011	100%	16	100	Yes
	I7-1-101	5	*Pinus strobus*	White Pine	8-10 ft	Area A	2008 to 2011	80%	5	100	Yes
		10	*Acer saccharum*	Sugar Maple	1.5"-2" cal	Area A	2008 to 2011	80%	10	100	Yes
		10	*Quercus rubra*	Red Oak	1.5"-2" cal	Area A	2008 to 2011	80%	10	100	Yes
		5	*Betula papyrifera*	Paper Birch	8-10 ft	Area A	2008 to 2011	80%	5	100	Yes
		4	*Acer saccharum*	Silver Maple	1.5"-2" cal	Area A	2008 to 2011	80%	4	100	Yes
	Total	34									
	Area B (Trees and Shrubs)										
	I7-1-101	13	*Pinus strobus*	White Pine	8-10 ft	Area B	2008 to 2011	80%	13	100	Yes
		16	*Acer saccharum*	Sugar Maple	1.5"-2" cal	Area B	2008 to 2011	80%	16	100	Yes
		15	*Quercus rubra*	Red Oak	1.5"-2" cal	Area B	2008 to 2011	80%	15	100	Yes
		10	*Betula papyrifera*	Paper Birch	8-10 ft	Area B	2008 to 2011	80%	10	100	Yes
	Total	54									
	I7-1-101	23	*Cornus amomum*	Silky Dogwood	1-gal	Area B	2008 to 2011	80%	78	85	Yes
		23	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area B	2008 to 2011	80%			
		23	*Ilex verticillata*	Winterberry Holly	1-gal	Area B	2008 to 2011	80%			
		23	*Prunus virginiana*	Chokecherry	1-gal	Area B	2008 to 2011	80%			
	Total	92									
	Area C & D (Shrubs)										
	I7-1-101	14	*Cornus amomum*	Silky Dogwood	1-gal	Area C *	2008 to 2011	80%	57	88	Yes
		13	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area C *	2008 to 2011	80%			
		13	*Ilex verticillata*	Winterberry Holly	1-gal	Area C *	2008 to 2011	80%			
		13	*Prunus virginiana*	Chokecherry	1-gal	Area C *	2008 to 2011	80%			
	I7-1-101	3	*Cornus amomum*	Silky Dogwood	1-gal	Area D	2008 to 2011	80%			
		3	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area D	2008 to 2011	80%			
		3	*Ilex verticillata*	Winterberry Holly	1-gal	Area D	2008 to 2011	80%			
		3	*Prunus virginiana*	Chokecherry	1-gal	Area D	2008 to 2011	80%			
	Total	65									
	Area D (Trees)										
	I7-1-101	2	*Pinus strobus*	White Pine	8-10 ft	Area D	2008 to 2011	80%	2	100	Yes
		2	*Acer saccharum*	Sugar Maple	1.5"-2" cal.	Area D	2008 to 2011	80%	2	100	
		2	*Betula papyrifera*	Paper Birch	8-10 ft	Area D	2008 to 2011	80%	2	100	
	Total	6									

TABLE 2-4
SUMMER 2008 NON-RIVERBANK RE-VEGETATION AREA MONITORING SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Parcel ID	Quantity of Plants Planted	Plant Type and Species	Common Name	Size/Stock	Comments	Monitoring Requirements	Maintenance Standard	Number of live trees/shrubs	% Survival	Meets Maintenance Standard
	Area E (Trees and Shrubs)										
	I7-1-101	5	*Pinus strobus*	White Pine	8-10 ft	Area E	2008 to 2011	80%	96	88	Yes
		3	*Betula papyrifera*	Paper Birch	8-10 ft	Area E	2008 to 2011	80%			
		40	*Acer saccharum*	Silver Maple	1.5"-2" cal.	Area E	2008 to 2011	80%			
		30	*Acer rubrum*	Red Maple	1.5"-2" cal.	Area E	2008 to 2011	80%			
	I7-1-101	7	*Salix nigra*	Black Willow	1-gal	Area E	2008 to 2011	80%			
		16	*Populus deltoides*	Eastern Cottonwood	1-gal	Area E	2008 to 2011	80%			
		8	*Acer negundo*	Box Elder	1-gal	Area E	2008 to 2011	80%			
	Total	109									
	I7-1-101	37	*Cornus amomum*	Silky Dogwood	1-gal	Area E	2008 to 2011	80%	127	84	Yes
		38	*Viburnum dentatum*	Northern Arrowwood	1-gal	Area E	2008 to 2011	80%			
		38	*Ilex verticillata*	Winterberry Holly	1-gal	Area E	2008 to 2011	80%			
		38	*Prunus virginiana*	Chokecherry	1-gal	Area E	2008 to 2011	80%			
	Total	151									
	Parcel I6-1-67										
	I6-1-67	3	*Amelanchier sp.*	Serviceberry (shadbush)	6-8 ft		2008	100%	3	100	Yes
		2	*Fraxinus pennsylvanica*	Green Ash	6-8 ft		2008	100%	2	100	Yes
		3	*Betula papyrifera*	White Birch	6-8 ft		2008	100%	3	100	Yes
		7	*Pinus strobus*	White Pine	5-6 ft		2008	100%	7	100	Yes
		2	*Quercus rubra*	Red Oak	6-8 ft		2008	100%	2	100	Yes
		2	*Abies balsamea*	Balsam Fir	5-6 ft		2008	100%	2	100	Yes
		2	*Acer rubrum*	Red Maple	6-8 ft		2008	100%	2	100	Yes
	Total	21									
4	I6-1-67	13	*Vaccinium macrocarpon*	American Cranberry	3-4 ft		2008	100%	44	100	Yes
		14	*Viburnum dentatum*	Northern Arrowwood	3-4 ft		2008	100%			
		2	*Cornus sericea*	Red Osier Dogwood	1-gal		2008	100%			
		2	*Cornus amomum*	Silky Dogwood	1-gal		2008	100%			
		4	*Ilex verticillata*	Winterberry Holly	1-gal		2008	100%			
		4	*Prunus virginiana*	Chokecherry	1-gal		2008	100%			
		5	*Viburnum dentatum*	Northern Arrowwood	1-gal		2008	100%			
	Total	44									
	Parcel I6-1-66										
	I6-1-66	7	*Amelanchier sp.*	Serviceberry (shadbush)	6-8 ft		2008	100%	7	100	Yes
		6	*Fraxinus pensylvanica*	Green Ash	6-8 ft		2008	100%	6	100	Yes
		4	*Betula papyrifera*	White Birch	6-8 ft		2008	100%	4	100	Yes
		8	*Pinus strobus*	White Pine	5-6 ft		2008	100%	8	100	Yes
		9	*Quercus rubra*	Red Oak	6-8 ft		2008	100%	9	100	Yes
		4	*Abies balsamea*	Balsam Fir	5-6 ft		2008	100%	4	100	Yes
		12	*Acer rubrum*	Red Maple	6-8 ft		2008	100%	12	100	Yes
	Total	50									
	I6-1-66	8	*Vaccinium macrocarpon*	American Cranberry	3-4 ft		2008	100%	37	100	Yes
		7	*Viburnum dentatum*	Northern Arrowwood	3-4 ft		2008	100%			
		6	*Cornus amomum*	Silky Dogwood	1-gal		2008	100%			
		5	*Ilex verticillata*	Winterberry Holly	1-gal		2008	100%			
		5	*Prunus virginiana*	Chokecherry	1-gal		2008	100%			
		6	*Viburnum dentatum*	Northern Arrowwood	1-gal		2008	100%			
	Total	37									

Notes:
1. * Planting area located on Western Mass Electric Company (WMECO) Right of Way (ROW). WMECO requirements do not allow tree planting in ROW areas; therefore only shrubs were planted.
2. ft = feet
3. gal = gallon
4. " = inches

TABLE 2-5
SUMMER 2008 RIVERBANK AND NON-RIVERBANK HERBACEOUS COVER AND INVASIVE SPECIES MONITORING SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Phase No.	Monitoring Plot/Area	Bank	Plot No.	Herbaceous Cover (%)	Invasive Plant Cover (%)
1	Lyman - Elm	West	1-W-1	>95	<5
			1-W-2	>95	<5
			1-W-3	>95	<5
		East	1-E-1	>95	<5
			1-E-2	>95	<5
			1-E-3	>95	<5
	Parcel I8-24-1			>95	<5
2	Elm - Dawes	West	2-W-1	>95	<5
			2-W-2	>95	<5
			2-W-3	>95	<5
		East	2-E-1	>95	<5
			2-E-2	>95	<5
			2-E-3	>95	<5
3	Dawes - Pomeroy	West	3-W-1	>95	<5
			3-W-2	>95	<5
			3-W-3	92.5	<5
		East	3-E-1	>95	<5
			3-E-2	>95	<5
			3-E-3	>95	<5
4	Pomeroy - Confluence	West	4-W-1	>95	<5
			4-W-2	>95	<5
			4-W-3	>95	<5
		East	4-E-1	>95	<5
			4-E-2	>95	<5
			4-E-3	>95	<5
	Parcel I6-1-66			>95	<5
	Parcel I6-1-67			>95	<5
	FGP (Parcel I7-1-101)			>95	<5

TABLE 3-1
SUMMARY OF AREAS OF EROSION IDENTIFIED DURING 2008 RIVERBANK SOIL INSPECTION

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Areas/Items Not Meeting Maintenance Standards	Description	Response Action
1 - West bank of river on Parcel I9-4-203	Top-of-bank erosion likely due to concentrated runoff from parking lot located at the top of the bank. Less than 0.5 cy of material loss; no evidence of eroded material in river.	Rip rap was placed in the eroded area to restore the area to surrounding grades and protect it from future potential material loss.
2 - East bank of river on Parcel I7-20-1	Top-of-bank erosion likely due to concentrated runoff from road located at the top of the bank. Less than 0.5 cy of material loss; no evidence of eroded material in river.	Evaluate during next monitoring visit.
3 - Areas of exposed Geoweb: Parcel I8-23-6, I8-23-4, and I8-23-1	Minor mid-bank erosion has resulted in the exposure of some Geoweb. Less than 0.5 cy of material loss; no evidence of eroded material in river.	Evaluate during next monitoring visit.
4 - Areas of exposed Geoweb: Parcel I8-23-2/3	Minor mid-bank erosion has resulted in the exposure of some Geoweb. Less than 0.5 cy of material loss; no evidence of eroded material in river.	Additional riprap was placed in the eroded area. This area will be evaluated again during the next monitoring visit.
5 - Areas of exposed Geoweb: Parcel I6-1-68	Minor mid-bank erosion has resulted in the exposure of some Geoweb. Less than 0.5 cy of material loss; no evidence of eroded material in river.	Two red-osier dogwoods were planted along the base of the eroded area to protect the area from future potential material loss.
6 - West bank of river on Parcel I9-4-203	Top-of-bank erosion noted during a bank inspection conducted by EPA after the annual monitoring event.	Rip rap was placed in the eroded area to restore the area to surrounding grades and protect it from future potential material loss.

TABLE 7-1
2008 SURFACE WATER MONITORING SUMMARY

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Sample ID	Sample Location	Date Collected	Parameter									
				Conventional Parameters			Field Measurements					
			Total PCBs (ppm)	Particulate Organic Carbon (ppm)	Total Suspended Solids (ppm)	Chlorophyll (ppm)	Conductivity (mS/cm)	pH (Standard Units)	Sample Depth (m)	Turbidity (NTU)	Water Temperature (°C)
LOCATION-4	Lyman Street Bridge	01/29/08	ND(0.0000220)	0.20	2.70	0.00076	0.381	7.44	0.68	2	1.95
		02/28/08	ND(0.0000220)	0.33	3.37	0.00045	0.388	7.47	1.40	3	0.20
		03/26/08	ND(0.0000220)	0.33	ND(1.00)	ND(0.00015)	0.287	7.43	0.95	2	4.72
		04/30/08	ND(0.0000220)	0.35	4.10	ND(0.00015)	0.178	7.63	1.42	3	8.47
		05/28/08	ND(0.0000220)	0.45	4.93	0.00092	0.480	7.75	0.50	3	18.64
		06/25/08	0.0000840	0.66	6.37	0.0010	0.258	7.66	0.80	4	20.06
		07/31/08	ND(0.0000220)	0.35	1.96	0.00095	0.363	7.58	0.55	2	23.18
		08/26/08	ND(0.0000220)	0.19	2.20	0.0023	0.817	8.55	0.38	3	19.46
		09/24/08	ND(0.0000220)	0.40	4.50	0.0025	0.584	8.17	0.47	7	16.70
		10/30/08	ND(0.0000220)	0.48	ND(1.00)	0.0013	0.173	6.97	1.40	4	5.24
		11/18/08	ND(0.0000220)	0.48	2.80	0.0011	0.269	7.68	0.63	2	4.37
		12/16/08	ND(0.0000220)	0.57	6.70	0.00054	0.140	7.06	1.90	7	1.78
LOCATION-6A	Pomeroy Ave. Bridge	01/29/08	ND(0.00000550)	0.45	ND(1.03)	0.0010	0.438	7.59	1.17	2	1.93
		02/28/08	ND(0.00000550)	0.51	3.49	0.00066	0.307	7.58	1.82	3	0.79
		03/26/08	ND(0.00000550)	0.23	ND(1.00)	0.00087	0.303	7.30	1.83	2	4.75
		04/30/08	ND(0.00000550)	0.40	4.10	0.00095	0.183	7.63	1.97	3	8.29
		05/28/08	ND(0.00000550)	0.39	1.63	0.0014	0.481	7.84	0.57	3	18.63
		06/25/08	ND(0.00000550)	0.84	6.13	0.0014	0.264	7.74	1.18	4	20.20
		07/31/08	0.00000650	0.31	3.17	0.0011	0.379	7.55	0.93	3	23.12
		08/26/08	0.00000690	0.17	1.70	0.0025	0.842	8.56	0.60	3	19.97
		09/24/08	0.00000690	0.39	3.40	0.0024	0.584	8.25	0.53	6	17.03
		10/30/08	ND(0.00000550)	0.54	5.30	0.00042	0.147	6.99	2.48	5	5.35
		11/18/08	ND(0.00000550)	0.40	2.60	0.00072	0.275	7.70	1.28	4	14.57
		12/16/08	R	0.58	8.00	0.00061	0.139	7.10	3.02	9	1.95

Notes:

1. On 6/25/08, turbidity at Sample Location 4 was 4 NTU, flow at USGS Coltsville gaging station 166 cfs, over 1 inch rain during previous two days.
2. Sampling methods involved the collection of composite grab samples at each location, representative of three stations (25, 50, and 75 percent of the total river width at each location) at 50 percent of the total river depth at each station. Reported sample depth is the average of the three depths at the composite sample locations.
3. Samples were collected by ARCADIS, and submitted to Northeast Analytical, Inc. for analysis.
4. ND - Analyte was not detected. The number in parentheses is the associated detection limit.
5. GE conducted validation of the PCB analytical data for sample LOCATION-6A. Results for all Aroclors were rejected (R) due to excessive contamination found in the associated quality assurance/quality control (QA/QC) blank sample.

TABLE 8-1
SUMMARY OF POST-CONSTRUCTION MONITORING ACTIVITIES[1]

2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

Monitoring Activity	Frequency	Duration	Year to be Performed							Reporting Requirement	Comments on Future Monitoring Activities
			2007	2008	2009	2010	2011	2012	2017		
Restoration Monitoring											
Riverbank Soil Restoration	Annually, and following flow event greater than 3,500 cfs	5 years + Proposal		Year 1	Year 2	Year 3	Year 4	Year 5		Trip report to be submitted within 30 days after each monitoring event.	Performed during low flow (July or August typically), and after any flow event over 3,500 cfs, along the entire 1 1/2-Mile. Visual observation for signs of significant erosion (e.g., ruts, gullies, washouts, or sloughing).
Riprap in the River Channel, Riverbank or Swales and ACB	Annually, and following flow event greater than 3,500 cfs	5 years + Proposal		Year 1	Year 2	Year 3	Year 4	Year 5			Performed during low flow (July or August typically), and after any flow event over 3,500 cfs, along the entire 1 1/2-Mile. Visual observation for reduction in thickness that threatens the stability of the riverbanks or river channel or results in erosion of underlying soils or sediments. Also, for swales, no movement of riprap that resutls in the exposure of the underlying geotextile fabric. For ACB, no significant damages to the ACB, and to the shotcrete which is tying the ACB to the base of the adjacent retaining wall on Parcel I8 10-5 and the shotcrete at the transition between the ACB and the adjacent riprap at the downstream end of the ACB.
Aquatic Habitat Enhancement Structures	Annually, and following flow event greater than 3,500 cfs	5 years		Year 1	Year 2	Year 3	Year 4	Year 5			Performed during low flow (July or August typically), and after any flow event over 3,500 cfs, along the entire 1 1/2-Mile. Visual observation for signs of significant movement of structures or riprap, as well as signs of significant riverbank erosion.
Ancillary Items - Critical	Annually	5 years + Proposal		Year 1	Year 2	Year 3	Year 4	Year 5			Performed during low flow (July or August typically). Visual observation of retaining walls, designated guardrails and fances to confirm no substantial variation from As-Builts condition.
Ancillary Items - Non-critical	Annually	2 Years from Installation	Year 1[2]	Year 2							Completed.
Riverbank Plantings	Twice annually	5 years		Year 1	Year 2	Year 3	Year 4	Year 5		One report required after each monitoring event (two per year), to be submitted within 30 days after each monitroing event.	Performed in May and July in various locations (See Table 2-1 through 2-4). Visual observation to check for 80% survivability of riverbank plantings.
Non-Riverbank Plantings	Twice annually	Varies, see Table 2-1		Year 1	Year 2	Year 3[3]	Year 4[3]				Performed in May and July at specific properties in the 1 1/2-Mile. Visual observation to check for 80% survivability on the Fred Garner Park trees (except 8 red maples and 6 river birches on soccer field, and 16 hemlocks along walking path, which have 100% survivability) and 100% survivability on other properties.
Herbaceous Vegetation Cover	Annually	5 years		Year 1	Year 2	Year 3	Year 4	Year 5			Performed in summer to check for >95% sustainabiliy of herbaceous vegetation cover in 24 plots and FGP (Parcel I7-1-101). Also qualitatively evaluated in spring and summer through Meander Survey.
Invasive Species	Annually	5 years		Year 1	Year 2	Year 3	Year 4	Year 5			Performed in summer to check for <5% of invasive species in 24 plots and FGP (Parcel I7-1-101). Also qualitatively evaluated in spring and summer through Meander Survey.
Sediment Sampling	Every 5 years	15 years + Proposal	First Round[4]					Second Round	Third Round	Summary report submitted within 60 days of completion of sampling, including receipt of validated data.	Performed in low flow conditions(recommended for late June or early July). Sampling between Transect 66 and Transect 210 in 200-ft intervals (every 4th transect).
Macroinvertebrate Sampling	Every 5 years	15 years + Proposal	First Round[5]					Second Round	Third Round	Summary report submitted within 90 days of completion of sampling, including receipt of validated data.	Performed in low flow conditions(recommended for late June or early July). Sampling at Transects T070, T134 and T170.
Surface Water Sampling	Annually	Indefinite								See note 6.	See note 6.
ERE Inspections	Once per year	In perpetuity			Year 1	Annual				Summary report to be submitted within 30 days of the inspection.	Performed in November at non-GE-owned and non-state owned parcels with EREs.
Conditional Solutions Inspections	Once per year	In perpetuity			Year 1	Annual				Summary report to be submitted within 30 days of the inspection.	Performed in November at parcels with Conditional Solutions.

Notes:
1. Please refer to EPA's *Interim Post-Removal Site Control Plan: 1 1/2-Mile Removal Reach*, May 2008, for additional details.
2. Performed by EPA. Please refer to EPA's *2007 Annual Inspection, Monitoring and Maintenance Report: 1 1/2-Mile Reach*, January 2008, for details.
3. Semi-annual monitoring events for Fred Garner Park plantings will continue through 2011, and the semi-annual monitoring events for the replanted and stressed trees in Parcel I8-24-1 will continue through 2010.
4. Performed by EPA. Please refer to EPA's *Post-Remediation Sediment Sampling Report*, August 2007, for details.
5. Performed by EPA. Please refer to EPA's *Post-Remediation Aquatic Community Assessment Report*, December 2007, for details.
6. Surface water sampling will not be conducted subject to the following conditions: A) GE continues with its ongoing monthly water sampling at Lyman Street and Pomeroy Avenue and reports the results in the Annual Report; and B) If GE discontinues its current monthly water column sampling, EPA reserves the right to require GE to perform water column monitoring as part of the 1 1/2-Mile activities.
7. GE shall notify EPA of all scheduled monitoring, inspections and maintenance activities, except for surface water sampling, 14 days in advance to allow for arrangements of oversight
8. All monitoring activities shall be summarized in an Annual Report, which will include a summary of all monitoring and any corrective actions that were performed. Annual reports are to be submitted by January 31st of the following yea
9. For those Monitoring Programs for which "Proposal" is noted as part of the duration, GE shall propose to EPA an appropriate long-term monitoring program at the end of the initial monitoring period.

ARCADIS

Figures

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 80' 160'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

STUDY AREA LOCATION MAP

ARCADIS

FIGURE
1-1

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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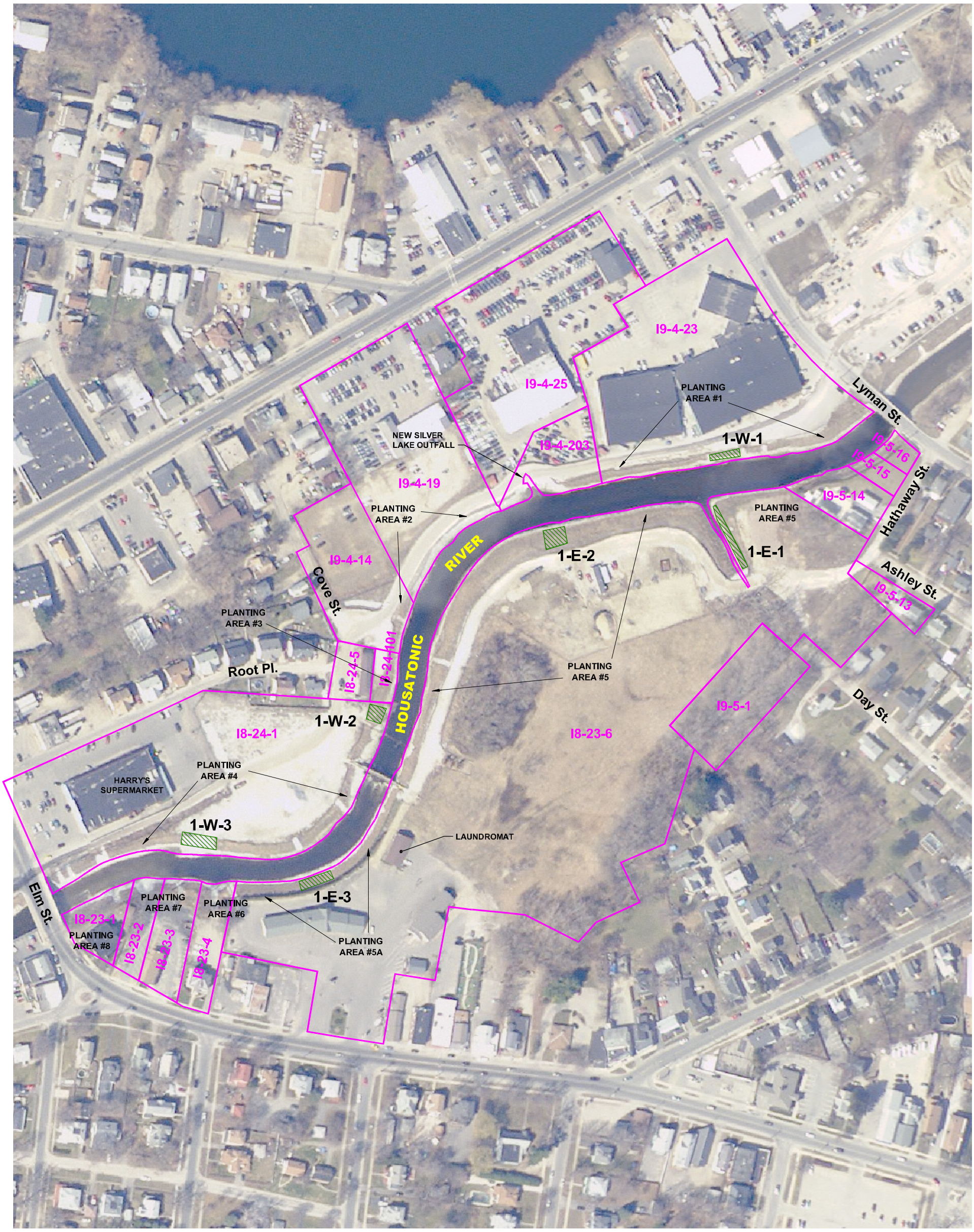

LEGEND

I9-4-19	PARCEL ID
	APPROXIMATE PROPERTY LINE
	VEGITATIVE MONITORING PLOT
1-W-3	VEGITATIVE MONITORING PLOT ID

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 1 STUDY AREA RESTORED BANK PLANTING AREAS

ARCADIS

FIGURE
2-1

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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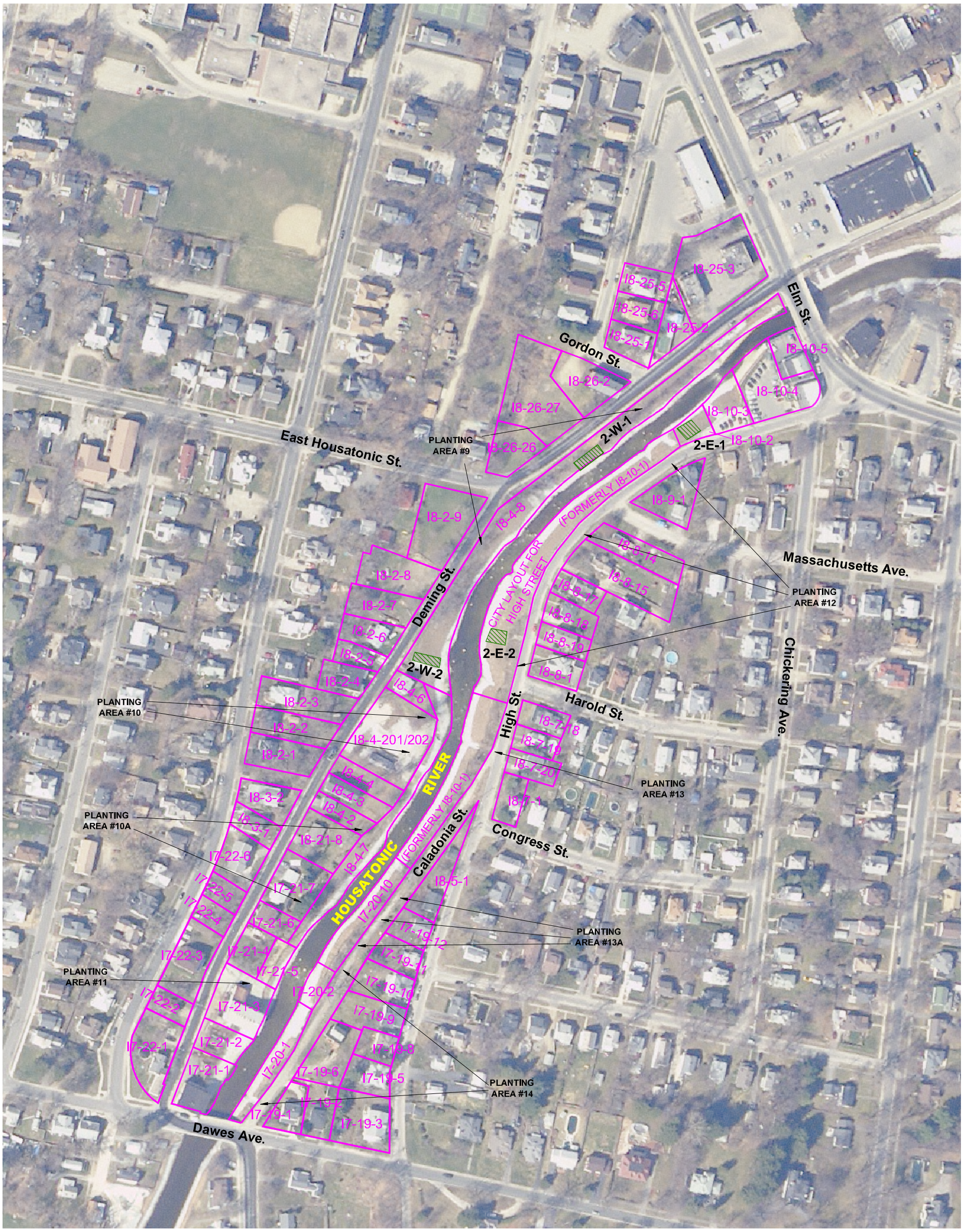

LEGEND

I7-19-1	PARCEL ID
	APPROXIMATE PROPERTY LINE
	VEGITATIVE MONITORING PLOT
2-W-2	VEGITATIVE MONITORING PLOT ID

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 2 STUDY AREA RESTORED BANK PLANTING AREAS

ARCADIS

FIGURE
2-2

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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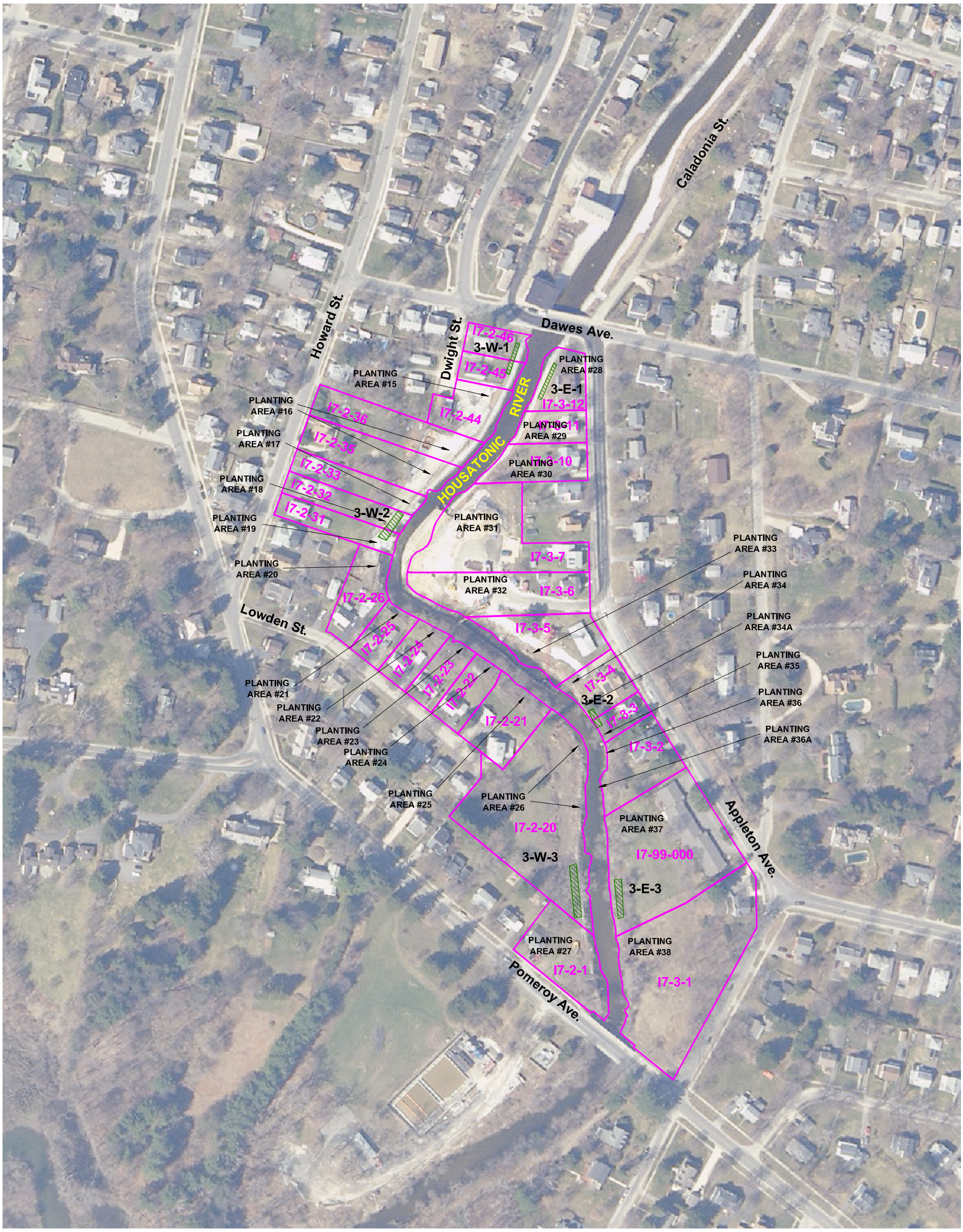

LEGEND

I7-2-20	PARCEL ID
	APPROXIMATE PROPERTY LINE
	VEGITATIVE MONITORING PLOT
3-E-2	VEGITATIVE MONITORING PLOT ID

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 3 STUDY AREA RESTORED PLANTING AREAS

ARCADIS

FIGURE
2-3

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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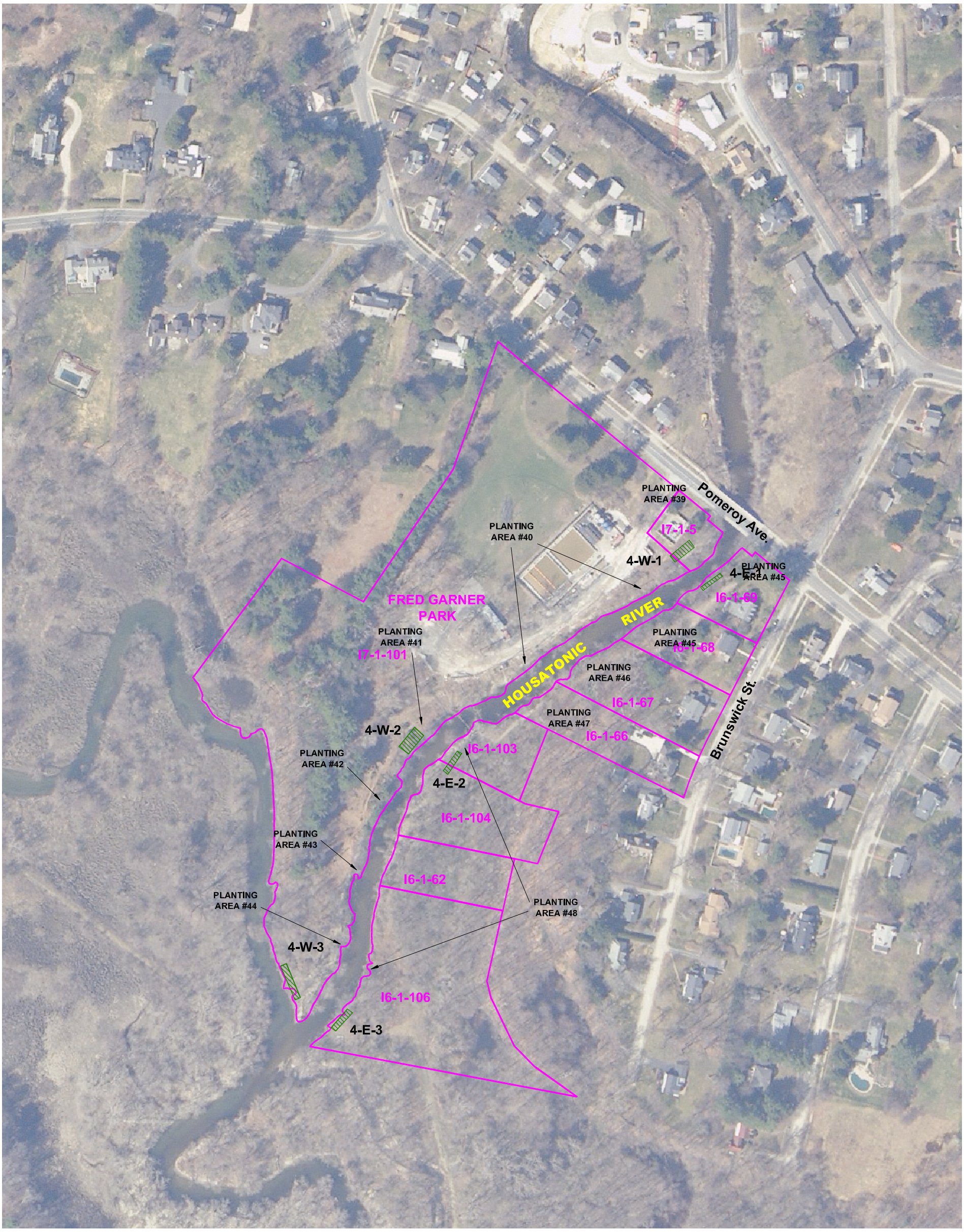

LEGEND

I6-1-106	PARCEL ID
	APPROXIMATE PROPERTY LINE
	VEGITATIVE MONITORING PLOT
4-W-1	VEGITATIVE MONITORING PLOT ID

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 4 STUDY AREA RESTORED PLANTING AREAS

ARCADIS

FIGURE
2-4

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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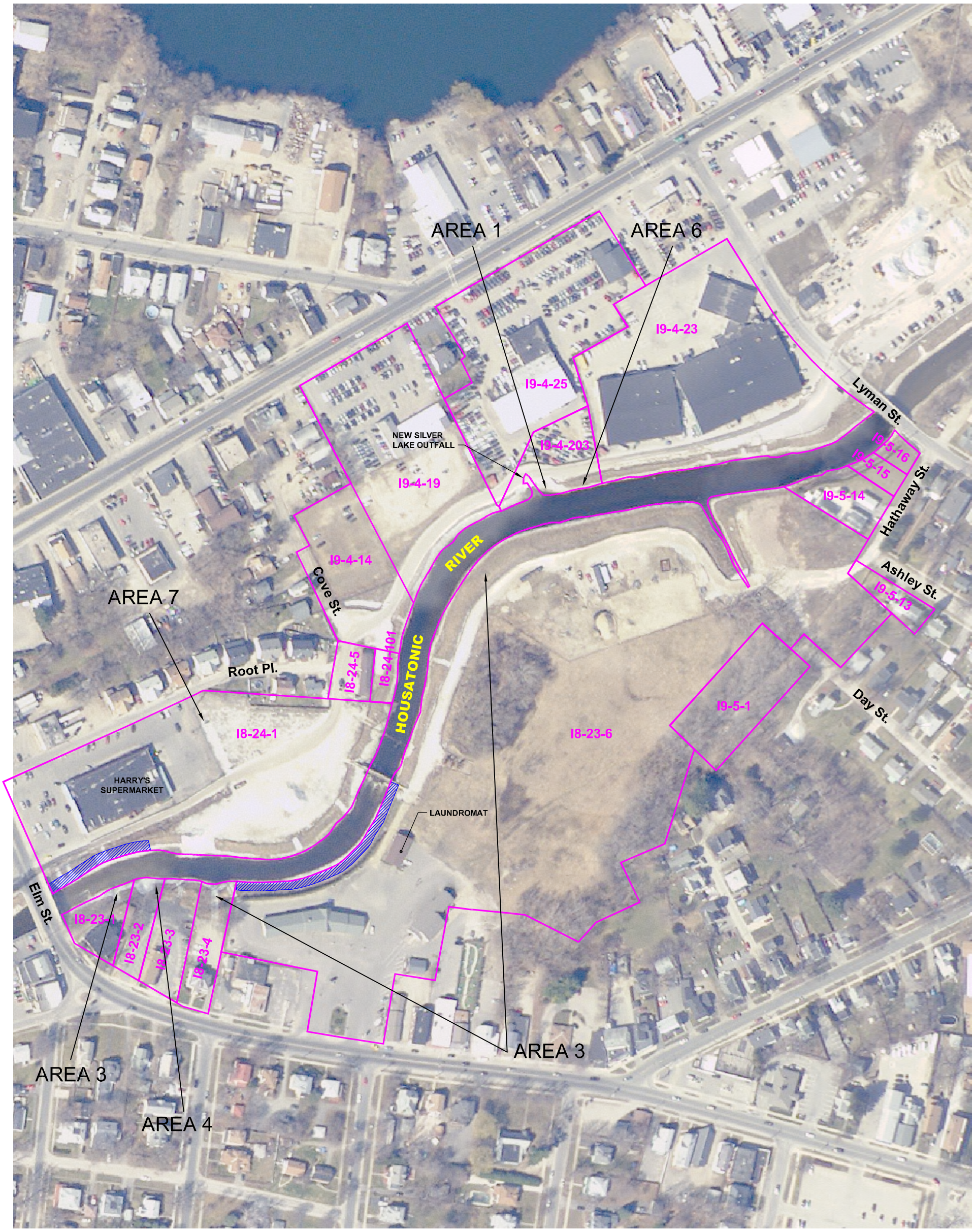

LEGEND

I9-4-19	PARCEL ID
	APPROXIMATE PROPERTY LINE
	APPROXIMATE LOCATION OF RETAINING WALL

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 1 STUDY AREA RESTORED BANK 2008 EROSION INSPECTION

ARCADIS

FIGURE
3-1

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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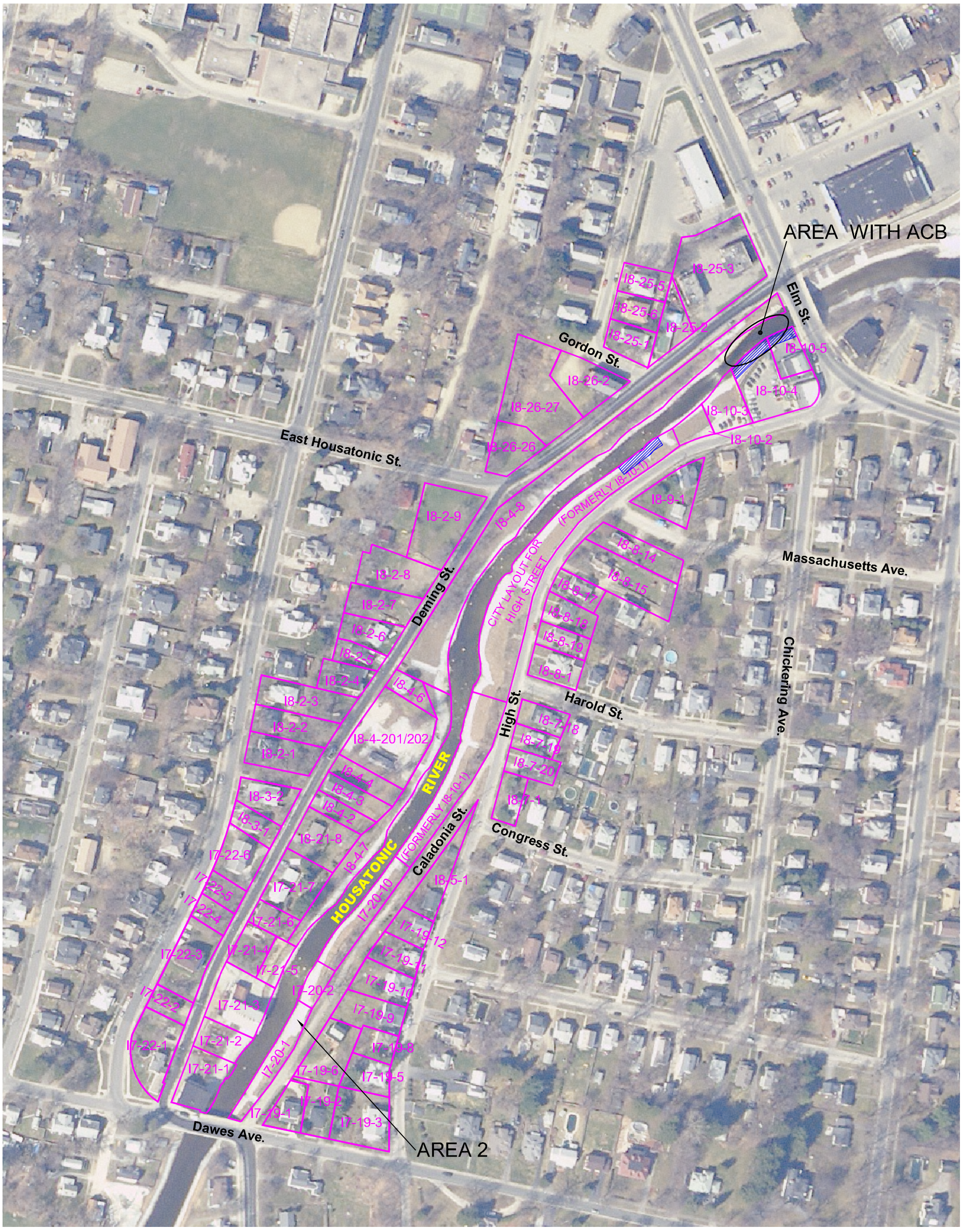

LEGEND

I7-19-1 PARCEL ID

APPROXIMATE PROPERTY LINE

APPROXIMATE LOCATION OF RETAINING WALL

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 2 STUDY AREA RESTORED BANK 2008 EROSION INSPECTION

ARCADIS

FIGURE
3-2

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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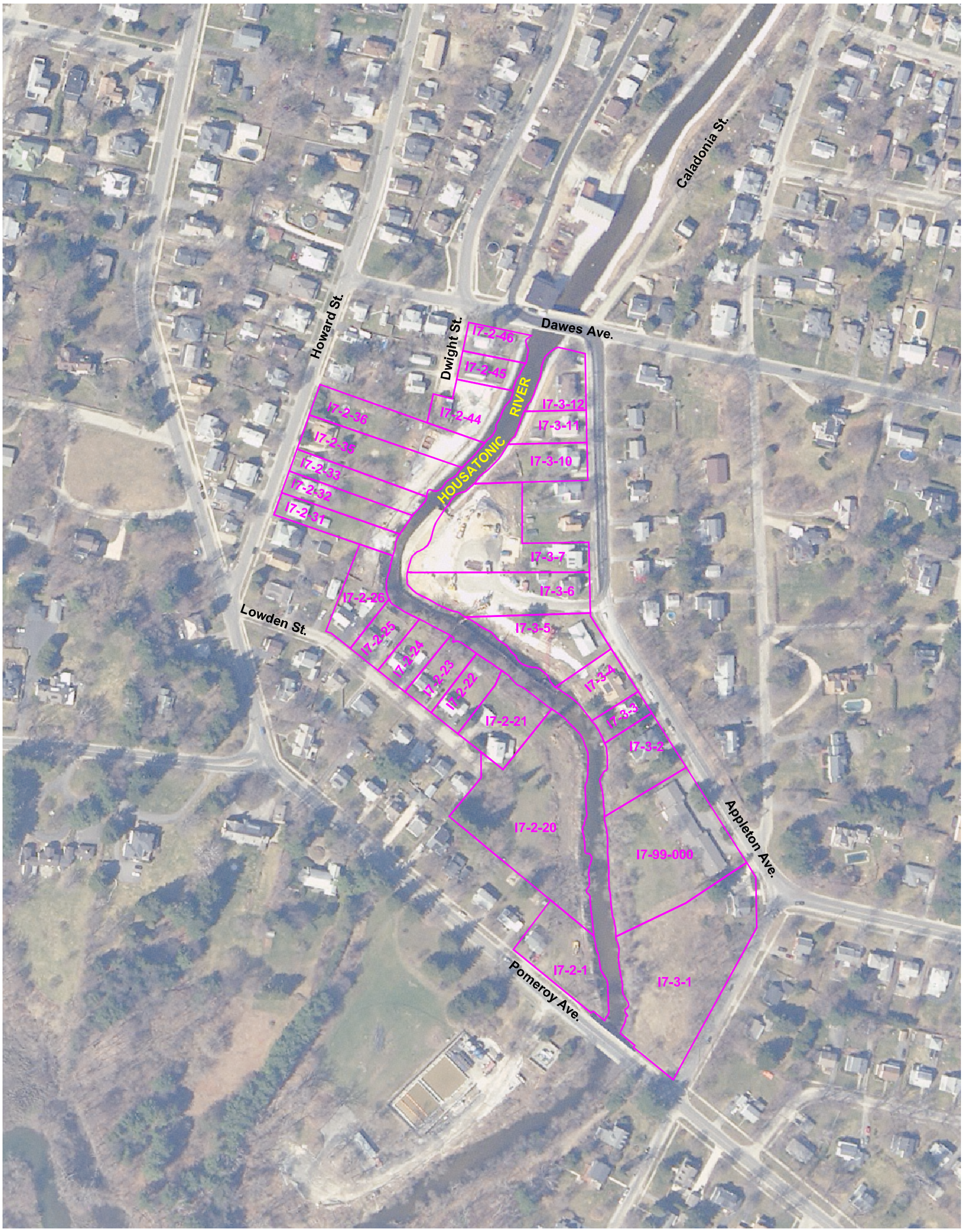

LEGEND

I7-2-20 PARCEL ID

APPROXIMATE PROPERTY LINE

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 3 STUDY AREA RESTORED BANK 2008 EROSION INSPECTION

ARCADIS

FIGURE
3-3

CITY: SYRACUSE DIV/GROUP: 141 DB: LAF GMS LAF LD: DMW PIC: P. KEANEY PM: D. KNUTSEN TM: L. PUTNAM LYR: ON=*;OFF=*REF*
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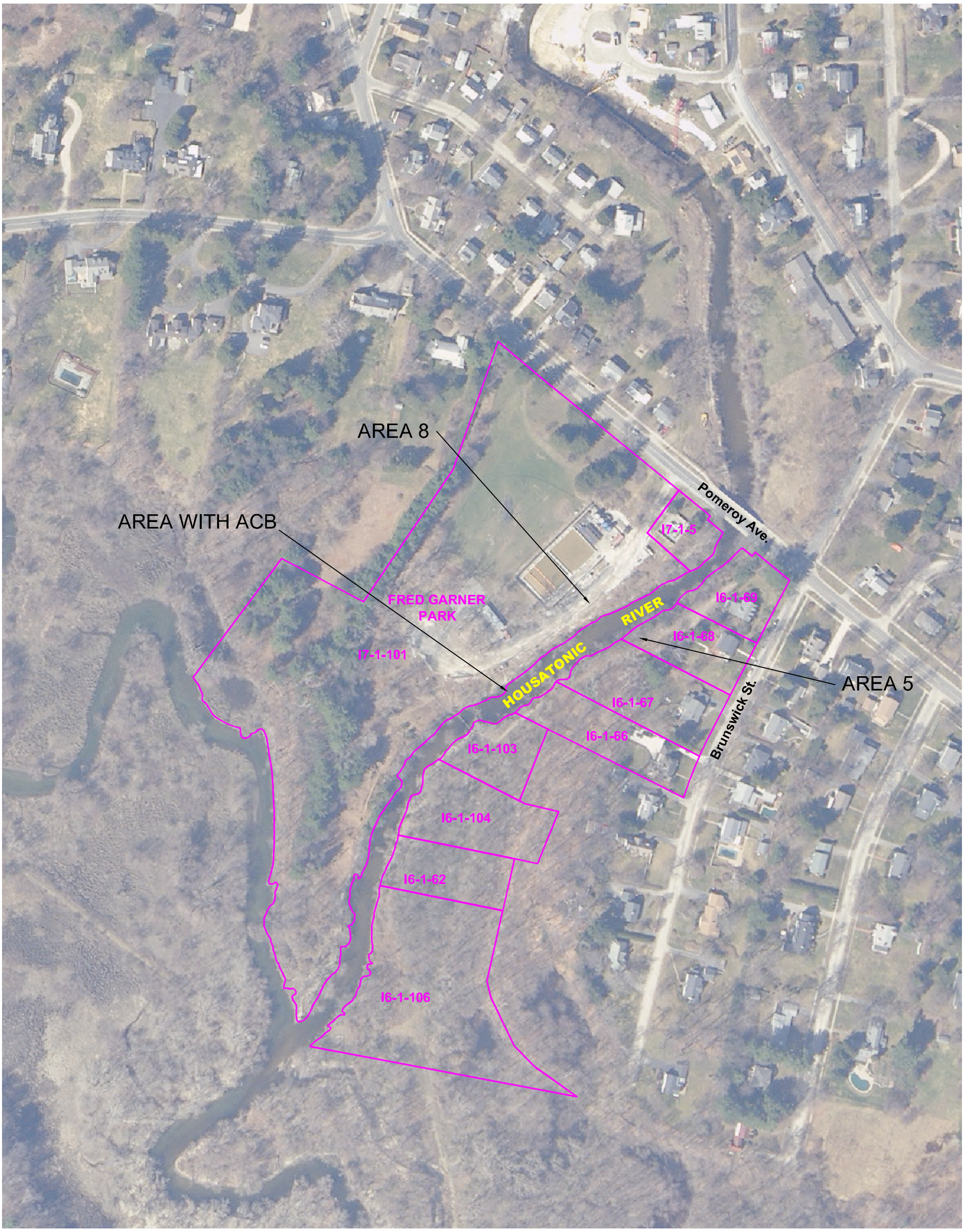

LEGEND

I6-1-106 PARCEL ID

APPROXIMATE PROPERTY LINE

NOTES:

1. THE BASEMAP IMAGES PRESENTED ON THIS FIGURE WERE OBTAINED FROM THE OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MassGIS) COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS 1:5000 COLOR ORTHO IMAGERY, 2005.
2. NOT ALL PHYSICAL FEATURES SHOWN.

0 30' 60'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
2008 ANNUAL MONITORING REPORT
1 1/2-MILE REACH OF THE HOUSATONIC RIVER

PHASE 4 STUDY AREA RESTORED BANK 2008 EROSION INSPECTION

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FIGURE
3-4

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Appendices

Appendix A

Riverbank Inspection Photographic Log

Photograph 1: Area 1

Photograph 2: Area 1

Photograph 3: Area 2

Photograph 4: Area 2

Photograph 5: Area 3A: Exposed Geoweb on Parcel I8-23-4

Photograph 6: Area 3A: Exposed Geoweb on Parcel I8-23-6

Photograph 7: Area 3A: Exposed Geoweb South on Parcel I8-23-6

Photograph 8: Area 3B: Exposed Geoweb on Parcel I8-23-2/3

Photograph 9: Area 3C: Exposed Geoweb on Parcel I6-1-68

Photograph 10: Area 3C: Exposed Geoweb on Parcel I6-1-68

Photograph 11: Area 4

Photograph 12: Area 4