







Stormwater Management Facility Routine Maintenance Manual District 3 – Marlboro Shop

Version 1.0





Stormwater and Drainage
Asset Management Program

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I. INTRODUCTION

The Maryland State Highway Administration (SHA) Highway Hydraulics Division (HHD) has established the Stormwater and Drainage Asset Management Program to guide the operation and remediation of the numerous permanent stormwater and drainage assets owned by SHA that convey and treat highway runoff. The program goal is to provide preventive care, and remedial solutions when problems are identified, for the stormwater and drainage infrastructure within the right-of-way. The program applies a life-cycle approach to its management of stormwater and drainage assets. Operations of these assets, especially routine maintenance, is a critical phase in this life-cycle. Routine maintenance is necessary to ensure that these assets function effectively, and to prevent the need for costly and time-consuming repairs and retrofits.



This Stormwater Management Facility Routine Maintenance Manual has been developed by HHD to aid and inform SHA maintenance personnel who work out of SHA maintenance shops to perform routine maintenance on stormwater and drainage assets. Of SHA's numerous assets, this manual specifically addresses the routine maintenance of stormwater management (SWM) facilities. SWM facilities are structural and non-structural practices designed to manage the volume, flow rate, and quality of stormwater runoff before that water enters natural waterways or groundwater. These SWM facilities play an important role in protecting Maryland's water and land resources.

This manual has been prepared specifically for the **District 3 Marlboro Shop** (Shop). The manual serves two main purposes:

- 1. To define the location and type of all SWM facilities in the Shop area, and
- 2. To provide guidelines on recommended routine maintenance activities for these SWM facilities.

The following narrative identifies and describes the routine maintenance categories of SHA SWM facilities, recommended guidelines for routine maintenance of these facilities, and solutions for commonly-occurring minor maintenance issues. Routine Maintenance Guidelines are included in Appendix A of this manual. A map of each SWM facility in the Shop area is provided in Appendix B, and an index summarizing all of the SWM facilities is provided in Appendix C.

How to Use This Manual

Follow these steps to determine the maintenance requirements of a particular SWM facility:

- 1. **Identify the SWM facility number.** If the SWM facility number is unknown, use the overview map and tile maps in Appendix B to navigate to the SWM facility by its location. Both the tile maps and detail maps identify the SWM facility number.
- 2. **Identify the SWM facility routine maintenance category.** Using the Index of Stormwater Management Facilities in Appendix C, locate the identified SWM facility number in the table and read across the row to determine its routine maintenance category. Section III of this manual describes how SWM facilities are divided into routine maintenance categories.
- 3. Follow the Routine Maintenance Guidelines applicable to the identified category. Routine Maintenance Guidelines for SWM facilities can be found in Appendix A, along with sample schematics and photographs. Note that some routine maintenance categories, as described in Section III, either do not require routine maintenance by Shop maintenance personnel or should be maintained per SHA Turfgrass Management Guidelines.

II. GLOSSARY

The following terms are used within this manual to describe the components of SHA stormwater management facilities and their associated routine maintenance activities. Portions of this glossary were adapted from the "2000 Maryland Stormwater Design Manual" produced by the Maryland Department of the Environment, Water Management Administration.

Aquatic Perimeter Planting – Vegetation generally living within 15 feet from the edge of the permanent pool in Wet Ponds. Aquatic perimeter planting is not mowed as part of SWM facility routine maintenance.

Basin – A land feature that holds water, with slopes on all sides. A basin may be constructed by excavating a pit in the ground or by constructing a dam or fill embankment.

Berm – A mound or bank of earth, compacted and stabilized on an uninterrupted continuous slope, that is used as a barrier for water.

Check Dam – A small dam (typically 6" to 12" in height) constructed across a bio-swale or other linear SWM facility that holds water in order to give it time to soak into the ground. A check dam may be constructed out of earth, timber or concrete.

Cleanout – A capped vertical pipe (typically 6" dia. PVC) that extends from the underdrain of a Filtration Facility to above the ground surface. Cleanouts are only present if the Filtration Facility has an underdrain.

The cleanout allows the underdrain to be accessed from the surface in order to clean the underdrain. From the surface, a cleanout may appear identical to an observation well – the two can only be distinguished by removing the cap and investigating belowground to determine if the vertical pipe is connected to an underdrain.

Concentrated Flow – Stormwater runoff that accumulates or converges into well-defined channels.

Dam – A barrier against the flow of water intended to: confine or raise water for storage or diversion; slow the speed of runoff; reduce erosion potential; and/or encourage sediment to settle out of water.

Dewatering Pipe – A small pipe running from the bottom of a forebay to the main treatment area of a SWM facility in order to allow water in the forebay to drain out.

Embankment – The side slope areas of SWM facilities. There are two main types of embankments: fill embankments and cut embankments. Fill embankments are created by placing fill material above existing ground to hold water in the facility. Some fill embankments contain a buried structural component to add stability and prevent seepage. Cut embankments are the side slopes of a facility that was created by excavating below existing ground.

End Structure – Any structure located at the end of a pipe where the pipe is open to a ditch, stream, or other natural land feature (i.e. where the pipe daylights). Examples of end structures include end walls and flared end sections.

Erosion – The process of water wearing away the soil surface.

Filter Bed – The section of a Filtration Facility below the ground that contains filter media and the underdrain pipe, if present.

Filter Media – Layers of sand, organic matter, soil, gravel and/or other media in a Filtration Facility used to remove pollutants and sediment from water soaking into the ground. The filter media cleans water before it reaches a stream or other natural body of water.

Filtration – The separation or removal of pollutants and sediment from stormwater runoff as water moves downward through filter media.

Footprint – The general area of land covered by a SWM facility.

Forebay – Storage space where runoff enters a SWM facility at an inflow point. The forebay traps incoming sediment before it can accumulate in the main treatment area of a SWM facility. It is often separated from the main treatment area by an earthen or stone weir. The forebay may be designed to be dry or may be designed to have a permanent pool of water. A dry forebay may include a dewatering pipe.

Herbaceous Vegetation – Plants that have non-woody stems which die down to the soil level at the end of the growing season; excludes trees and shrubs.

Infiltration – The downward movement of water into the ground.

Inflow/Outflow Protection – A device or material (usually riprap, gabions or a concrete structure) placed at inflow and outflow points and used to protect the soil surface from erosion caused by concentrated flows.

Inflow Point – Any place where a concentrated flow of water enters a SWM facility. Examples of inflow points include pipes, end structures, curb openings, and ditches.

Inlet – A structure at ground level with an opening that intercepts water and directs it into a pipe. An inlet is typically a concrete structure with a metal grate covering the opening. An inlet may also be called a catch basin.

Maintenance Access – A permanent entrance or access way into a SWM facility that is stabilized and graded to allow vehicular access.

Major Sediment Accumulation – Sediment that has accumulated in a large enough quantity that mechanical equipment must be used to remove it.

Minor Sediment Accumulation – Accumulated sediment that can be easily removed with a shovel.

Observation Well – A capped vertical pipe (typically 6" dia. PVC) that extends from the bottom of a Filtration Facility's filter bed or an Infiltration Facility's stone reservoir to above the ground surface. Observation wells are not connected to other pipes. By removing the cap and looking in the observation well, an inspector is able to measure the level of water below the ground at any given time. From the surface, an observation well may appear identical to a cleanout – the two can only be distinguished by removing the cap and investigating belowground to determine if the vertical pipe is connected to an underdrain.

Outfall – The place where water leaves a pipe or ditch carrying water away from a SWM facility; located outside of the SWM facility footprint and downstream of an outflow point. An outfall is typically a ditch or stream.

Outflow Point – Any structure or place where a concentrated flow of water leaves a SWM facility; located within the SWM facility footprint. Examples of outflow points include riser structures, inlets, pipes, and weirs.

Permanent Pool – An area within a SWM facility that is intentionally designed to permanently hold some volume of water at all times. Generally, any water that is *not* in a permanent pool is supposed to soak into the ground within 72 hours after a storm. After a storm it may be difficult to determine in the field whether standing water is intended to be a permanent pool, so maintenance personnel may need to reference design plans to identify permanent pools.

Pond Drain – A small pipe that runs from the bottom of a SWM facility to the bottom of a riser structure. A pond drain can be used to dewater a SWM facility. In Wet Ponds, this opening in the riser may be intentionally sealed or blocked to maintain the permanent pool. Pond drains may be outfitted with locks or valves where they connect to the riser structure.

Retrofit – Changes made to an existing SWM facility in order to improve the overall function. Retrofits generally involve more design and permitting than typical maintenance activities. SWM facilities that are intended to be retrofitted or are undergoing retrofit may be excluded from routine maintenance activities.

Riser Structure – A vertical corrugated metal pipe or concrete box structure which extends above the bottom of a SWM facility. The riser structure is the main outflow point that allows water to flow out of the facility.

Runoff – Water from rain, snow or other precipitation that does not soak into the ground, but instead flows over the land surface.

Sediment – Solid material, such as soil particles, that is carried by (and eventually settles out of) water.

Seepage – The process of water moving through or emerging from a fill embankment. Seepage is a sign that the embankment may potentially be failing. This problem may be indicated by wet soil on the outside of a fill embankment. Any signs of seepage should be reported to HHD.

Stone Reservoir – The section of an Infiltration Facility below the ground that is filled with stone. The stone reservoir serves as short-term storage-space for water that has soaked into the facility, in order to hold that water until it can infiltrate into the ground below the stone reservoir.

Stormwater Management (SWM) Facility – A structural or non-structural practice designed to manage the volume, flow rate, and quality of stormwater runoff before that water enters natural waterways or groundwater. SWM facilities may be located belowground or at the land surface.

SWM Facility Number – A unique identification number assigned to a SWM facility by HHD for the purpose of tracking activities and functions associated with that facility.

Toe (of Embankment) – Typically where the embankment slope stops, levels out, or meets existing grade; generally the bottom of the slope. It may be difficult to determine in the field where the outer toe of a fill embankment is if the SWM facility is located on a slope, so maintenance personnel may need to reference design plans in order to determine this location.

Trash Rack – A metal grill, grate, or other device installed at the point where water flows into a riser structure, meant to prevent oversized debris from entering the structure.

Underdrain – A horizontal perforated or slotted pipe that lies at the bottom of a filter bed in a Filtration Facility. Most Filtration Facilities have underdrains. The underdrain allows water that has soaked all the way through the filter bed to flow to the outfall.

Weir – A barrier that holds ponded water until the water depth reaches the height of the barrier, at which point water then flows over the weir. Examples of weirs include a barrier between the forebay and the main treatment area of a SWM facility (resembling a small dam), a low point in the top of an embankment through which excess water flows away from the facility, or a wall that limits or controls the flow of water into a riser structure.

III. TYPES OF STORMWATER MANAGEMENT FACLITIES

As of 2015, the State Highway Administration (SHA) owns and maintains more than 3,600 permanent stormwater management (SWM) facilities throughout the state of Maryland, and this number is increasing each year. The **Marlboro Shop** (Shop) area contains over 210 SWM facilities, all of which must be routinely maintained in order to preserve their ability to perform effectively. These SWM facilities play an important role in managing both the quantity and quality of stormwater runoff entering Maryland's waterways. Title 4, Subtitle 2 of the Environment Article of the Annotated Code of Maryland states that "...the management of stormwater runoff is necessary to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding, all of which have adverse impacts on the water and land resources of Maryland."

As part of the Stormwater and Drainage Asset Management program, HHD has developed a geodatabase inventory that identifies all SHA infrastructure that captures, treats, and conveys stormwater runoff within SHA right-of-way. This geodatabase defines the location, facility number, and type of all SWM facilities owned by SHA in the state of Maryland. There are 46 different types of SWM facilities in the HHD geodatabase, all varying widely in design and function. Some SWM facilities are ponds, traditionally designed according to older guidelines. Many of the newer facilities are smaller in footprint, but greater in number, and are designed according to Environmental Site Design (ESD) guidelines. These newer ESD facility types are indicated below with "(ESD)".

SWM Facility Routine Maintenance Categories

There are three defining characteristics of SWM facilities relating to routine maintenance requirements: (1) how the SWM facilities function, (2) how they appear at the land surface, and (3) how they should be maintained. Based on these three characteristics, the 46 SHA SWM facility types have each been classified into one of seven routine maintenance categories. This manual provides routine maintenance guidelines for five of the seven categories (Categories 1-5). Routine maintenance of SWM facilities in the other two categories (Categories 6-7) is either not the responsibility of Shop maintenance personnel or is guided by SHA Turfgrass Management Guidelines. The routine maintenance categories are as follows:

1. **Dry Pond** – A Dry Pond is a SWM facility that is designed to hold stormwater runoff, then release the runoff over a period of time. The purpose of a Dry Pond is to allow time for pollutants and sediment

to settle out of water, and to manage the volume of stormwater runoff in order to prevent floods. A Dry Pond generally appears to be a grass basin. It is not designed have a permanent pool of water, and therefore should not have standing water during dry weather conditions. Dry Ponds should be maintained by following the Dry Pond Routine Maintenance Guidelines in Appendix A. The category of Dry Pond includes the following SWM facility types:

- Dry Pond
- Dry Extended Detention Pond



- 2. Wet Pond Similar to a Dry Pond, a Wet Pond is a SWM facility that is designed to hold stormwater runoff, then release the runoff over a period of time, with the purpose of removing pollutants and sediment from water and providing flood protection. Unlike a Dry Pond, however, a Wet Pond is designed to permanently hold some volume of water at all times. A Wet Pond generally includes a grassed embankment and aquatic perimeter planting around a pool of water. Wet Ponds should be maintained by following the Wet Pond Routine Maintenance Guidelines in Appendix A. The category of Wet Pond includes the following SWM facility types:
 - Wet Pond
 - Shallow Marsh
 - Wet Extended Detention Pond
 - Micropool Extended Detention Pond
 - Wet Swale (ESD)
 - Pocket Pond
 - ED Shallow Wetland
 - Pond/Wetland System
 - Pocket Wetland
 - P-4 (Multiple Pond System)
 - W-1 (Shallow Wetland)



Example Wet Pond

Note that wetland SWM facility types in this category are not considered jurisdictional wetlands or natural resources protected by the Maryland Department of the Environment (MDE). Wetland SWM facility types may be accessed and maintained without an MDE permit.

3. **Infiltration Facility** – An Infiltration Facility is a SWM facility that is designed to temporarily hold stormwater runoff while allowing the water to soak into the ground over time. The purpose of an Infiltration Facility is to reduce the amount of stormwater runoff flowing on top of the land surface by

redirecting that water into the ground. An Infiltration Facility may be in the form of a basin or a ditch. It may have a stone or grass bottom, and typically includes an observation well. Infiltration Facilities may also have stone reservoirs belowground. Infiltration Facilities should be maintained by following the Infiltration Facility Routine Maintenance Guidelines in Appendix A. The category of Infiltration Facility includes the following SWM facility types:

- Infiltration Trench
- Infiltration Basin
- Dry Well (*ESD*)



4. Filtration Facility - A Filtration Facility is a SWM facility that is designed to temporarily hold stormwater runoff above a filter bed. Over time, the water soaks through the filter media, which removes pollutants and sediment from the water. A Filtration Facility often includes an underdrain and cleanout(s) extending above the surface of the ground. The facility may be fully vegetated, or have only mulch on the bottom, or be landscaped with both vegetation and mulch. Filtration Facilities should be maintained by following the Filtration Facility Routine Maintenance Guidelines in

Appendix A. The category of Filtration Facility includes the following SWM facility types:

- Micro-Bioretention (ESD)
- Bioretention
- Surface Sand Filter
- Submerged Gravel Wetland (ESD)
- Rain Garden (ESD)
- Landscape Infiltration (ESD)
- Organic Filter
- Enhanced Filter (ESD)



Example Filtration Facility

- 5. **Bio-swale** A Bio-swale is a specific type of Filtration Facility that is located in a ditch with a 2 to 8 foot wide flat bottom. Like a Filtration Facility, the purpose of a Bio-swale is to remove pollutants from stormwater runoff. A Bio-swale generally includes check dams spaced evenly along the length of the facility. The check dams are intended to create ponding of water for a period of time while the
 - water soaks through the filter media. Note that Bio-swales are identified as a separate category from the Filtration Facility category because they make up a relatively large percentage of SHA SWM facilities. Bio-swales should be maintained by following the Bio-swale Routine Maintenance Guidelines in Appendix A. Dry swales are functionally and physically very similar to bio-swales and can be maintained the same way. The category of Bio-swale includes the following SWM facility types:
 - Bio-swale (ESD)
 - Dry Swale



- 6. **Turfgrass Maintenance** Some SWM facilities do not have visible features that distinguish them from other grassed areas that SHA maintenance personnel routinely mow and maintain. SHA maintenance personnel *are* responsible for the routine maintenance of these simple turfgrass SWM
 - facilities. However, guidelines for such routine maintenance are not provided in this manual. Instead, follow SHA Turfgrass Management Guidelines to maintain the following facility types:
 - Grass Swale (*ESD*)
 - Grass Channel Credit
 - Disconnection of Non-Rooftop Runoff (ESD)
 - Infiltration Berm (ESD)
 - Sheetflow to Conservation Areas (ESD)



Example Turfgrass SWM Facility

- 7. **No Routine Maintenance** Although the following SWM facility types may be mapped and included in the Index in this manual, SHA maintenance personnel are *not* responsible for their routine maintenance unless otherwise directed by HHD:
 - Underground Detention
 Underground Sand Filter
 Permeable Pavement (ESD)
 Porous Pavement
 Other Infiltration
 Other Filtering
 - Rainwater Harvesting (ESD)Other Open Channel System
 - Oil Grit Separator
 Stream Restoration
 Y-1
 - Other

How to Identify Routine Maintenance Categories

The routine maintenance category that any SWM facility falls into can be identified as follows:

Option A: Given a known SWM facility number, the SWM facility type and routine maintenance category can be read from the Index of Stormwater Management Facilities in Appendix C.

Option B: Read the SWM facility type at the top right corner of a detail map in Appendix B. Then return to this section (pages 3 through 5) to determine which routine maintenance category the identified SWM facility type is listed under.

IV. ROUTINE MAINTENANCE OF SWM FACILITIES

There are four levels of stormwater management (SWM) facility maintenance: (1) routine, (2) minor, (3) major, and (4) retrofit. Effective routine maintenance of SWM facilities will typically ensure good function and pleasing aesthetics of the facilities, and can be essential in the minimization of minor and major maintenance needs over time. Failure of SWM facilities to perform as designed can negatively affect both SHA SWM permit compliance and achievement of Chesapeake Bay TMDL goals.

The SHA maintenance shops are generally responsible for routine maintenance of SWM facilities, and for repair or correction of any minor issues that occur. HHD is committed to providing the shops with support in these operational activities. When performing routine and minor maintenance activities, contact HHD if any questions or concerns are raised regarding SWM facilities or other stormwater and drainage assets.

Major maintenance issues and SWM facility retrofits are the responsibility of HHD. Consequently, any SWM facilities that are in need of major maintenance or are designated as retrofit facilities will not be the responsibility of the SHA shops while the repair or retrofit implementation is occurring. HHD will annually provide a list to the **Marlboro Shop** (Shop) that clearly identifies all SHA SWM facilities in the Shop area, along with who is responsible for their maintenance. Note that the mapping provided in Appendix B may include SWM facilities that do not need to be routinely maintained by the Shop. Therefore, in order to effectively plan routine and minor maintenance to be completed by the Shop, this mapping should be used in conjunction with the annual list of facilities and personnel responsible for maintenance.

Routine Maintenance Guidelines

Routine Maintenance Guidelines for five SWM facility routine maintenance categories are provided in Appendix A of this manual. Each set of guidelines is accompanied by a sample schematic of a SWM facility type associated with that category, along with sample photographs of such facilities. For all five of these SWM facility routine maintenance categories, it is recommended that that routine maintenance of a facility be performed at least twice a year: once in the spring between March 15th and May 15th and once in the fall between September 15th and November 15th.

In order to simplify the routine maintenance requirements for maintenance personnel, mowing guidelines have been standardized for the five SWM facility routine maintenance categories (Categories 1-5). Herbaceous SWM facility vegetation, excluding aquatic perimeter planting, should be mowed to a height of 6-inches once each year in the fall. Facilities should be mowed using an articulated or side arm mower. Boom-axe, flail or rotary heads should be attached for proper mowing based on the type of vegetation being cut. Equivalent equipment, as available to the maintenance crew for safe mowing procedures, is acceptable.

In general, SWM facilities should be mowed according to the guidelines presented in this manual within the limits of 15 feet beyond the top of a cut embankment; 15 feet beyond the outer toe of a fill embankment; or the ditch bottom for a linear SWM facility located in a ditch. Refer to the SWM Facility Limits of Mowing in Appendix A for profiles of these mowing limits. Note that mowing according to this manual's

guidelines may be in addition to mowing according to other guidelines. For example, a Bio-swale should be mowed according to the Bio-Swale Routine Maintenance Guidelines within the limits of the flat ditch bottom, and should generally also be mowed according to SHA Turfgrass Management Guidelines outside of those limits along the ditch side slopes.

Other routine maintenance activities that should be performed each year include removing trash and debris, stabilizing eroded areas, and re-seeding sparsely vegetated areas. While performing this routine maintenance, maintenance personnel should also inspect the SWM facility to identify potential issues that may require minor or major maintenance. Check for deterioration or damage to any structures associated with the facility; soft spots, depressions, water seepage or any other signs of potential structural failure in the embankment; and/or a build-up of sediment. Identification of and responses to such issues are further explained in Section V of this manual.

Of the five SWM facility routine maintenance categories for which guidelines are provided in this manual, only Wet Ponds should have a permanent pool of water during dry weather conditions. Any SWM facility classified as one of the other four maintenance categories is not functioning properly if water remains in the facility more than 72 hours after a storm. Actions that maintenance personnel can perform to solve the issue of undesirable ponding water include clearing clogs or obstructions to outflow points, removing accumulated sediment and debris, and cleaning out the underdrain, if present. See Page 9 for further information. Regardless of whether the undesirable ponding water issue is solved, report any actions taken to remediate the issue and the results to HHD.

In order to function properly, Filtration and Infiltration Facilities depend on the infiltration of water into and through soil layers at specific rates, per the design of the SWM facility. When soil and/or filter media become compacted, the rate of infiltration through the media is reduced. Therefore, it is important to perform all maintenance activities on Filtration and Infiltration facilities (including Bio-swales) in a manner that prevents compaction of the facility bottom. Do not drive equipment over the bottoms of Infiltration facilities, Filtration facilities, or Bio-swales at any time. If compacted soil is ever observed in a Filtration or Infiltration facility, report the condition to HHD.

Do not perform maintenance on any portions of a SWM facility that contain saturated or wet soil at the surface. If saturated soils are observed, the routine maintenance activities for the affected areas should be rescheduled to occur when drier conditions are present, during the same season, if possible.

V. IDENTIFYING AND SOLVING COMMON PROBLEMS

While major issues with SWM facilities are the responsibility of, and should be reported to HHD, minor issues are typically handled by Shop maintenance personnel. The following pages define common issues that may be observed at SWM facilities, along with their solutions. Portions of this Section V were adapted from Chapter 7, "Best Management Practice Assessment Guidelines for Maintenance and Remediation," of the "Stormwater NPDES Program Standard Procedures Manual" produced by SHA.

Erosion

A common problem that occurs at many SWM facilities is erosion, often along an unstable ditch or embankment slope. When soils are not properly compacted during construction, or when vegetation does not establish properly along a slope or channel, erosion can occur. It is important to repair minor erosion immediately because bare soil that is exposed by erosion becomes even more susceptible to additional erosion, and thus minor erosion can quickly become a major problem.

Problem	Solution
	Fill the eroded area with Furnished Topsoil as necessary to
	restore the original ground surface. If the eroded area is adjacent
Minor erosion	to existing riprap, stabilize the repaired area with Class I Riprap.
	Else, re-seed the repaired area with SHA Turfgrass Seed Mix
	and install Type 'A' Soil Stabilization Matting.
Major erosion	Report to HHD.



Sediment Accumulation

Sediment is carried into SWM facilities with stormwater runoff, and as the water is held in the facility the sediment settles out of the water. Many SWM facilities have forebays to allow most of the sediment to settle out before the water reaches the main treatment area. Sediment can also accumulate in a SWM facility as a result of erosion upstream of the facility. Sediment accumulation in the main treatment area is a problem because it can slow infiltration of water into the ground, reduce the volume of water that can be stored in the facility, and/or clog outflow points. If identified, maintenance personnel should remove minor accumulated sediment from forebays, outfalls and other areas.

Problem	Solution
	Remove minor accumulated sediment with a shovel. If
Minor sediment accumulation	necessary, re-seed the affected area with SHA Turfgrass Seed
	Mix and install Type 'A' Soil Stabilization Matting.
Major sediment accumulation	Report to HHD.



Lack of Vegetation

Lack of vegetation is most commonly identified by areas of visible bare soil, and is a problem because it bare soil is vulnerable to erosion. While small areas of bare soil are not uncommon in the life-cycle of a SWM facility, large areas of bare soil may indicate that permanent or reoccurring conditions are not favorable for plant growth. In such cases, the condition should be reported to HHD so that HHD can assess the facility and determine whether there is an underlying issue causing the lack of vegetation.

Problem	Solution
Small area of bare soil	Re-seed the bare area with SHA Turfgrass Seed Mix and install
Siliali alea of bale soil	Type 'A' Soil Stabilization Matting.
Large area of bare soil	Report to HHD.



Excessive Vegetation

The growth of excessive vegetation over time can adversely impact a SWM facility by blocking pipes, structures, and weirs or by growing into and interfering with the proper function of filter media. Excessive vegetation can also interfere with an inspector's ability to perform required periodic inspections of facilities and structures. In most cases, vegetation should be controlled by routine mowing of SWM facilities. However, if excessive vegetation is encountered it should be removed.

Problem	Solution
Excessive vegetation	Clear the vegetation with a weed trimmer.



Damaged or Deteriorated Structure or Pipe

Structures and pipes in SWM facilities are occasionally damaged by large debris, ice, soil settlement, or other conditions. These critical components of SWM facilities also deteriorate over time. It is important to maintain structures and pipes in good condition to ensure that water is collected and conveyed to the intended location. If maintenance personnel encounter a damaged or deteriorated structure or pipe, inform the Shop Resident Maintenance Engineer to determine how to repair the structure or pipe.

Problem	Solution
Damaged or deteriorated structure	Report to Resident Maintenance Engineer.
or pipe	



Unstable Embankment

The embankment of a SWM facility holds water in the facility. Failure of an embankment results in water leaving the facility in problematic ways and locations, and is an indication that the facility cannot manage stormwater runoff as intended. Unmanaged runoff can lead to downstream flooding. It is therefore important to identify signs of potential embankment failure, including soft spots or depressions in the embankment, as well as seepage of water through a fill embankment. Erosion and holes, such as animal burrows, could also contribute to embankment failure.

Problem	Solution
Animal burrows or other holes	Eliminate holes by filling them with soil.
Erosion	See Identifying and Solving Erosion on page 6.
Soft spots, depressions, seepage, or other problem.	Report to HHD.



Undesirable Ponding Water

For all routine maintenance categories except Wet Ponds, no ponding water should be visible in the facility 72 hours after a storm. Only a Wet Pond should have a permanent pool of water during dry weather conditions. Undesirable ponding water may indicate that outflow point(s) are clogged; accumulated sediment/debris or clogged/compacted filter media is reducing the rate of infiltration; or the underdrain of a Filtration Facility is blocked. Regardless of whether the issue of undesirable ponding water is solved, report the actions taken to remediate the issue and the results to HHD.

Problem	Solution
Outflow point(s) are clogged	Clear clogs in or obstructions to the outflow point(s).
Leaves/sediment/debris has	Remove minor leaf/sediment/debris buildup from the bottom of
accumulated on the facility bottom	the facility. Report major buildup to HHD.
Underdrain is blocked	Clean out the underdrain with a vacuum truck.
Filter media is clogged or	Report to HHD.
compacted, or other problem.	Report to TITID.



VI. MAPPING AND INDEX DESCRIPTION

To effectively maintain all of the SWM facilities in the **Marlboro Shop** (Shop) area, Shop personnel must know the location and type of each facility. HHD has therefore developed maps of each of the existing SHA-owned SWM facilities in the Shop area, specifying the locations and types of the facilities. These maps are contained in Appendix B of this manual, and were prepared utilizing April 2015 geodatabase data. There are three types of maps provided:

- 1. An overview map of the entire Shop area, defining the limits of the Shop area within a reference grid.
- 2. Tile maps corresponding to the reference grid on the overview map, showing portions of the Shop area in greater detail. These tile maps show the general locations of the SWM facilities. Each SWM facility is labeled with a unique identification number.
- 3. One detail map for each SWM facility in the Shop area, defining the specific location and type of the facility, as well as the approximate layout of the facility.

The following information and features are displayed on the detail maps:

- The SWM facility number.
- The SWM facility type, corresponding to the facility types listed in Section III of this manual.
- The approximate facility footprint. A diamond or circle may be shown if the actual facility footprint was not available in the HHD geodatabase.
- SHA-owned pipes and drainage structures in the vicinity of the SWM facility, as defined in the HHD geodatabase. Structure numbers and pipe sizes and materials are labeled, if the information was available in the HHD geodatabase. Pipes are labeled as "UNK" if the pipe size and material was not available.
- The approximate SHA Right-of-Way line. This line is approximate and does not define ownership.
- Mile points along SHA-owned roads.
- Names of roadways in the immediate vicinity of the SWM facility, for location reference.
- The Shop boundary, if applicable.

Note that some detail maps show multiple SWM facilities, for cases where facilities are in close proximity to each other. In such cases, the SWM facility corresponding to the facility number and type written in the top right corner of the sheet is shown with a blue outline and red label, while other nearby facilities are shown with a yellow outline and gray label.

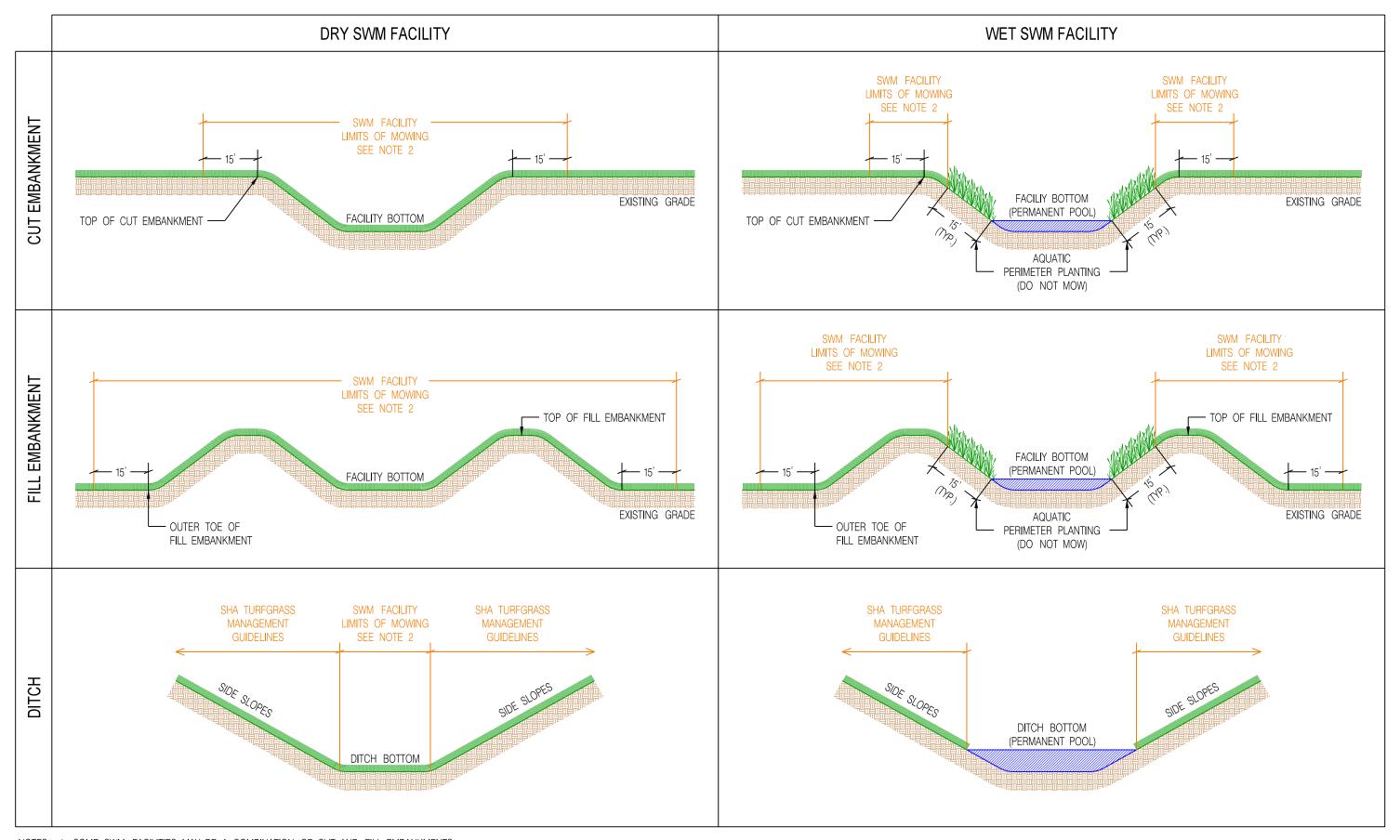
The locations and types of all of the SWM facilities in the Shop area have been summarized in the Index of Stormwater Management Facilities, found in Appendix C. This Index lists the SWM facility number, facility type, and routine maintenance category of all of the SWM facilities mapped in Appendix B, along with the number of the tile map that the SWM facility can be found on. This Index is presented in two forms: one sorted by SWM facility number, and one sorted by tile map.

This manual is a living document. Please provide comments and feedback to Kiona A. Leah at 410-545-8044 or at kleah@sha.state.md.us.

APPENDIX A

Routine Maintenance Guidelines

SWM Facility Limits of Mowing



NOTES: 1. SOME SWM FACILITIES MAY BE A COMBINATION OF CUT AND FILL EMBANKMENTS.

^{2. &}quot;SWM FACILITY LIMITS OF MOWING" ARE LIMITS OF MOWING ACCORDING TO GUIDELINES PRESENTED IN THIS STORMWATER MANAGEMENT FACILITY ROUTINE MAINTENANCE MANUAL. THERE MAY BE ADDITIONAL MOWING OUTSIDE OF THESE LIMITS ACCORDING TO OTHER GUIDELINES, SUCH AS SHA TURFGRASS MANAGEMENT GUIDELINES, WHERE APPLICABLE.

Dry Pond Routine Maintenance Guidelines

Maintaining Dry Ponds

Description and Purpose: Aesthetic and structural maintenance of Dry Ponds.

Scheduling: Once each spring (March 15 – May 15) and fall (September 15 – November 15).

Team:	
Facility Maintenance Technician IV	1
Facility Maintenance Technician	3
Equipment:	
MOT/Safety Equipment	Α
Pick-Up Truck	В
Shovel	С
Weed Trimmer	D
Articulated or Side Arm Mower	Ε
Spreader	F
Material:	
Furnished Topsoil	G
SHA Turfgrass Seed Mix	Н
Type 'A' Soil Stabilization Matting	ı
Class I Riprap	J
• •	
Unit of Measure:	
Each Dry Pond	

Payment:

Maintaining Dry Ponds should be charged to Activity [TBD], with the approval of the Office of Highway Design – Highway Hydraulics Division (HHD). When inspecting/supporting the work of contractors, the Agency Code [TBD] should also be used.

Notes:

Follow guidelines for recommended personal protective equipment. Place signs and other safety devices in accordance with MUTCD and WZTC.

Do not perform maintenance on portions of the facility with saturated soil

Spring	g Maintenance Work Method:	Equip./ Material
1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the pond, trash rack, and other structure(s).	(B, C)
3.	Check for deterioration or damage to structure(s). Notify Resident Maintenance Engineer if repair work is needed.	
4.	Check for clogs and clear vegetation obstructing the structure(s).	(D)
5.	Remove accumulated sediment from the facility.	(B, C)
6.	Check each side of the embankment, if present. Eliminate any animal burrows/holes by filling them with soil. Report any soft spots, depressions, or water seepage to HHD.	(C, G)
7.	Haul removed trash, debris, vegetation, and sediment to designated disposal area.	(B)
8.	Remove MOT devices.	

Fall Maintenance Work Method:

1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the	(B, C)
2	pond, trash rack, and other structure(s).	(5, 5)
3.	Mow herbaceous vegetation within the SWM facility limits of mowing to a height of	(D, E)
	6-inches.	
4.	Seed sparsely vegetated areas and install	(F, H, I)
	matting.	
5.	Fill eroded areas with topsoil as necessary to	(C, F, G
	restore the original ground. Stabilize eroded	H, I, J)
	areas adjacent to existing riprap with riprap.	
	Else, seed and install matting.	
6.	Haul removed trash, leaves, and debris to	(B)
	designated disposal area.	

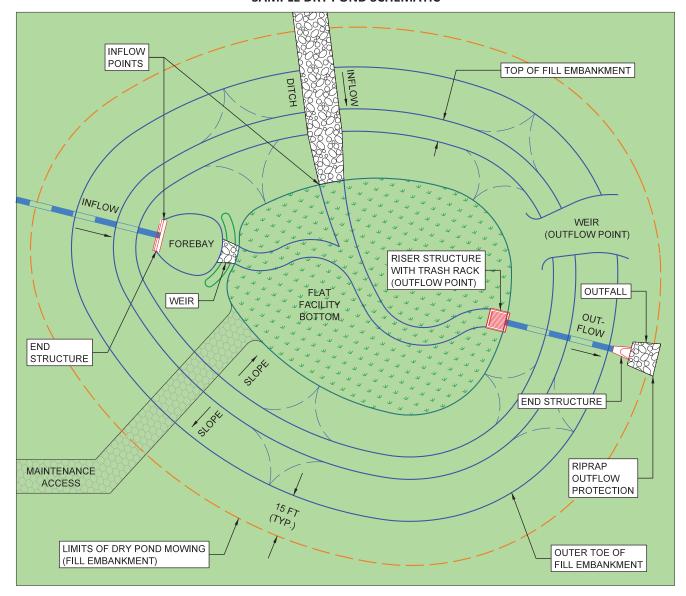
Troubleshooting:

7. Remove MOT devices.

If water is still ponding in the facility 72 hours after a storm, determine the cause and resolve in the following order:

- 1. Check for clogs and clear any obstructions to the outflow point(s).
- 2. Report to HHD.

SAMPLE DRY POND SCHEMATIC



SAMPLE DRY POND PHOTOS





Wet Pond Routine Maintenance Guidelines

Equip./

Maintaining Wet Ponds

Description and Purpose: Aesthetic and structural maintenance of Wet Ponds.

Scheduling: Once each spring (March 15 – May 15) and fall (September 15 – November 15).

Team: Facility Maintenance Technician IV Facility Maintenance Technician	1 3
Equipment: MOT/Safety Equipment Pick-Up Truck	A B
Shovel Weed Trimmer	C
Articulated or Side Arm Mower Spreader	E F
Material: Furnished Topsoil	G
SHA Turfgrass Seed Mix	Н
Type 'A' Soil Stabilization Matting Class I Riprap	J
Unit of Measure: Each Wet Pond	

Payment:

Maintaining Wet Ponds should be charged to Activity [TBD], with the approval of the Office of Highway Design – Highway Hydraulics Division (HHD). When inspecting/supporting the work of contractors, the Agency Code [TBD] should also be used.

Notes:

Follow guidelines for recommended personal protective equipment. Place signs and other safety devices in accordance with MUTCD and WZTC.

Do not perform maintenance on portions of the facility with saturated soil

		Lquip./
Spring	g Maintenance Work Method:	Material
1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the pond, trash rack, and other structure(s).	(B, C)
3.	Check for deterioration or damage to structure(s). Notify Resident Maintenance	
	Engineer if repair work is needed.	
4.	Check for clogs and clear vegetation obstructing the structure(s).	(D)
5.	Remove accumulated sediment from the facility.	(B, C)
6.	Check each side of the embankment, if present. Eliminate any animal burrows/holes by filling them with soil. Report any soft spots, depressions, or water seepage to HHD.	(C, G)
7.	Haul removed trash, debris, vegetation, and sediment to designated disposal area.	(B)
8.	Remove MOT devices.	

Fall Maintenance Work Method:

1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the	(B, C)
	pond, trash rack, and other structure(s).	
3.	Mow herbaceous vegetation within the	(D, E)
	SWM facility limits of mowing to a height of	
	6-inches.	
4.	Seed sparsely vegetated areas and install	(F, H, I)
	matting.	
5.	Fill eroded areas with topsoil as necessary to	(C, F, G
	restore the original ground. Stabilize eroded	H, I, J)
	areas adjacent to existing riprap with riprap.	
	Else, seed and install matting.	
6.	Haul removed trash, leaves, and debris to	(B)
	designated disposal area.	

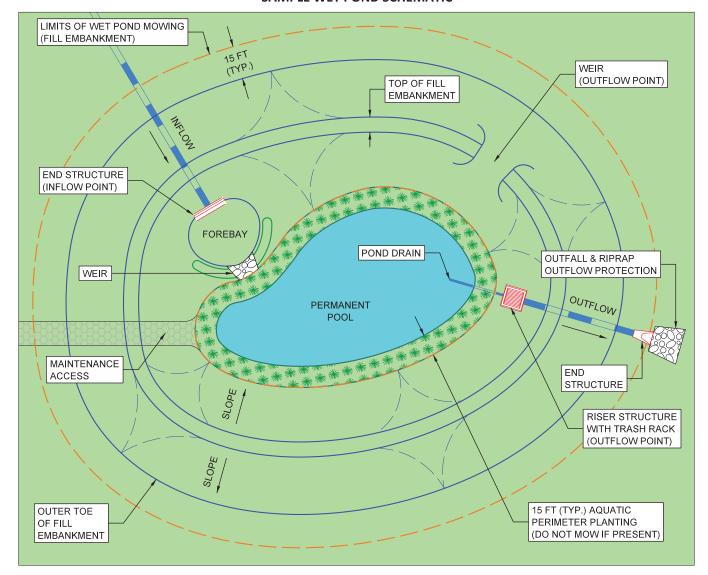
Troubleshooting:

If the Wet Pond is dry and has no standing water, determine the cause and resolve in the following order:

- 1. Check that the pond drain opening in the riser is completely sealed.
- 2. Report to HHD.

7. Remove MOT devices.

SAMPLE WET POND SCHEMATIC



SAMPLE WET POND PHOTOS





Infiltration Facility Routine Maintenance Guidelines

Maintaining Infiltration Facilities

Description and Purpose: Aesthetic and structural maintenance of Infiltration Facilities.

Scheduling: Once each spring (March 15 – May 15) and fall (September 15 – November 15).

Team:		
Facility Maintenance Technician IV	1	Spring Maintenance Wo
Facility Maintenance Technician	3	1. Install MOT device
		2. Remove trash, lea
Equipment:		facility and associ
MOT/Safety Equipment	Α	3. Replenish stone, i
Pick-Up Truck	В	4. Check for deterio
Shovel	С	structure(s). Notif
Weed Trimmer	D	Engineer if repair
Articulated or Side Arm Mower	Е	Check for clogs ar
Spreader	F	obstructing the st
		6. Replace any broke
Material:		well caps.
No. 2 Stone or Class 0 Riprap	G	7. Remove accumula
Screw Caps Sizes 4 and 6	Н	facility.
Furnished Topsoil	1	8. Check each side of
SHA Turfgrass Seed Mix	J	present. Eliminate
Type 'A' Soil Stabilization Matting	K	by filling them wi
Class I Riprap	L	spots, depression
		HHD.
Unit of Measure:		9. Haul removed tra
Each Infiltration Facility		sediment to desig
		10. Remove MOT dev

Payment:

Maintaining Infiltration Facilities should be charged to Activity [TBD], with the approval of the Office of Highway Design – Highway Hydraulics Division (HHD). When inspecting/supporting the work of contractors, the Agency Code [TBD] should also be used.

Notes:

Follow guidelines for recommended personal protective equipment. Place signs and other safety devices in accordance with MUTCD and WZTC.

Perform all maintenance activities in a manner to prevent compaction of the facility bottom. Do not drive on the facility bottom. Report observed compaction to HHD.

Do not perform maintenance on portions of the facility with saturated soil.

Spring	g Maintenance Work Method: Install MOT devices.	Equip./ Material (A)
2.	Remove trash, leaves, and debris from the	(B, C)
	facility and associated structure(s).	(-, -,
3.	Replenish stone, if necessary.	(G)
4.	Check for deterioration or damage to	. ,
	structure(s). Notify Resident Maintenance	
	Engineer if repair work is needed.	
5.	Check for clogs and clear vegetation	(D)
	obstructing the structure(s).	
6.	Replace any broken/missing observation	(H)
	well caps.	
7.	Remove accumulated sediment from the	(B, C)
	facility.	
8.	Check each side of the embankment, if	(C, I)
	present. Eliminate any animal burrows/holes	
	by filling them with soil. Report any soft	
	spots, depressions, or water seepage to	
0	HHD.	(D)
9.	Haul removed trash, debris, vegetation, and	(B)
10	sediment to designated disposal area.	
10.	Remove MOT devices.	
Fall M	laintenance Work Method:	
1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the	(B, C)
	facility and associated structure(s).	
3.	Mow herbaceous vegetation within the	(D, E)
	SWM facility limits of mowing to a height of	
	6-inches.	
4.	Seed sparsely vegetated areas and install	(F, J, K)
	matting.	
5.	Fill eroded areas with topsoil as necessary to	(C, F, I,
	restore the original ground. Stabilize eroded	J, K, L)
	the second second section to the second seco	

Troubleshooting:

3. Report to HHD.

If water is still ponding in the facility 72 hours after a storm, determine the cause and resolve in the following order:

1. Check for clogs and clear any obstructions to the outflow point(s).

2. Remove leaf/sediment/debris buildup from the bottom of the facility.

(B, C)

areas adjacent to existing riprap with riprap.

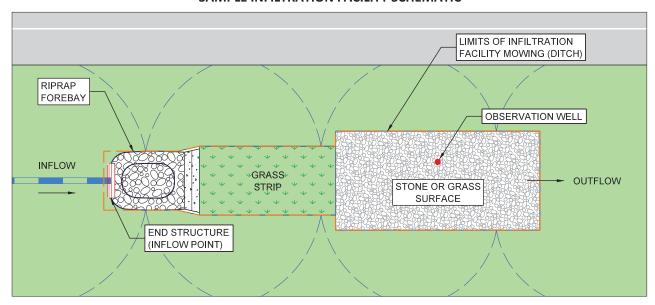
(B)

6. Haul removed trash, leaves, and debris to

Else, seed and install matting.

designated disposal area.7. Remove MOT devices.

SAMPLE INFILTRATION FACILITY SCHEMATIC



SAMPLE INFILTRATION FACILITY PHOTOS









Filtration Facility Routine Maintenance Guidelines

Maintaining Filtration Facilities

Description and Purpose: Aesthetic and structural maintenance of Filtration Facilities. **Scheduling:** Once each spring (March 15 – May 15) and fall (September 15 – November 15).

	-		o and an (september 25 more)	
Team:				Equip./
Facility Maintenance Technician IV	1	pring Maintenand	ce Work Method:	Material
Facility Maintenance Technician	3	 Install MOT 	devices.	(A)
		2. Remove tras	sh, leaves, and debris from the	(B, C)
Equipment:		facility and a	associated structure(s).	
MOT/Safety Equipment	Α	3. Replenish m	ulch, if present.	(C, H)
Pick-Up Truck	В	4. Check for de	eterioration or damage to	
Shovel	С	structure(s).	. Notify Resident Maintenance	
Weed Trimmer	D	Engineer if r	epair work is needed.	
Articulated or Side Arm Mower	Ε	5. Check for clo	ogs and clear vegetation	(D)
Spreader	F	obstructing	the structure(s).	
Vacuum Truck	G	6. Replace any	broken/missing cleanout caps.	(1)
		7. Remove acc	umulated sediment from the	(B, C)
Material:		facility.		
Shredded Hardwood Mulch	Н	8. Check each	side of the embankment, if	(C, J)
Screw Caps Sizes 4 and 6	1	present. Elin	minate any animal burrows/holes	
Furnished Topsoil	J	by filling the	em with soil. Report any soft	
SHA Turfgrass Seed Mix	K	spots, depre	essions, or water seepage to	
Type 'A' Soil Stabilization Matting	L	HHD.		
Class I Riprap	M	9. Haul remove	ed trash, debris, vegetation, and	(B)
		sediment to	designated disposal area.	
Unit of Measure:		10. Remove MC	OT devices.	
Each Filtration Facility				
		all Maintenance \	Work Method:	
Payment:		 Install MOT 	devices.	(A)

Maintaining Filtration Facilities should be charged to Activity [TBD], with the approval of the Office of Highway Design – Highway Hydraulics Division (HHD). When inspecting/supporting the work of contractors, the Agency Code [TBD] should also be used.

Notes:

Follow guidelines for recommended personal protective equipment. Place signs and other safety devices in accordance with MUTCD and WZTC.

Perform all maintenance activities in a manner to prevent compaction of the filter bed. Do not drive on the filter bed. Report observed compaction to HHD.

Do not perform maintenance on portions of the facility with saturated soil.

Ι.	ilistali MOT devices.	(~)
2.	Remove trash, leaves, and debris from the	(B, C)
	facility and associated structure(s).	
3.	Mow herbaceous vegetation within the	(D, E)
	SWM facility limits of mowing to a height of	
	6-inches.	
4.	Seed sparsely vegetated areas and install	(F, K, L)
	matting.	
5.	Fill eroded areas with topsoil as necessary to	(C, F, J,
	restore the original ground. Stabilize eroded	K, L, M)
	areas adjacent to existing riprap with riprap.	

Else, seed and install matting. 6. Haul removed trash, leaves, and debris to designated disposal area.

(B)

(B, C)

(G)

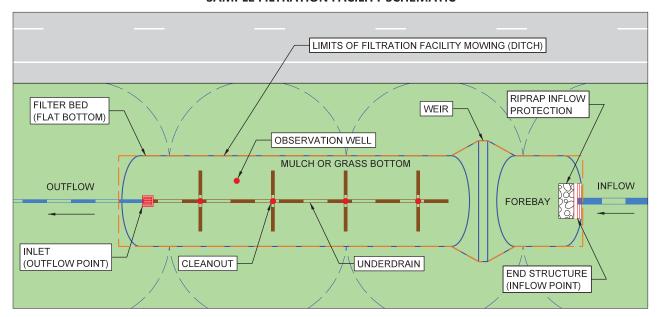
7. Remove MOT devices.

Troubleshooting:

If water is still ponding in the facility 72 hours after a storm, determine the cause and resolve in the following order:

- 1. Check for clogs and clear any obstructions to the outflow point(s).
- 2. Remove leaf/sediment/debris buildup from the bottom of the facility.
- 3. Check for and clear underdrain obstructions.
- 4. Report to HHD.

SAMPLE FILTRATION FACILITY SCHEMATIC



SAMPLE FILTRATION FACILITY PHOTOS









Bio-Swale Routine Maintenance Guidelines

Equip./

Maintaining Bio-Swales

Description and Purpose: Aesthetic and structural maintenance of Bio-swales.

Scheduling: Once each spring (March 15 – May 15) and fall (September 15 – November 15).

Team: Facility Maintenance Technician IV Facility Maintenance Technician	1
racility Maintenance reclinician	3
Equipment: MOT/Safety Equipment Pick-Up Truck Shovel Weed Trimmer Articulated or Side Arm Mower Spreader Vacuum Truck	A B C D E F G
Material:	
Screw Caps Sizes 4 and 6	Н
SHA Turfgrass Seed Mix	1
Type 'A' Soil Stabilization Matting	J
Furnished Topsoil	K
Class I Riprap	L
Unit of Managemen	

Unit of Measure:

Each Bio-swale

Payment:

Maintaining Bio-swales should be charged to Activity [TBD], with the approval of the Office of Highway Design – Highway Hydraulics Division (HHD). When inspecting/supporting the work of contractors, the Agency Code [TBD] should also be used.

Notes:

Follow guidelines for recommended personal protective equipment. Place signs and other safety devices in accordance with MUTCD and WZTC.

Perform all maintenance activities in a manner to prevent compaction of the filter bed. Do not drive on the filter bed. Report observed compaction to HHD.

Do not perform maintenance on portions of the facility with saturated soil.

Spring	Material	
1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the	(B, C)
	facility and associated structure(s).	
3.	Check for deterioration or damage to	
	structure(s). Notify Resident Maintenance	
	Engineer if repair work is needed.	
4.	Check for clogs and clear vegetation	(D)
	obstructing the structure(s).	
5.	Replace any broken/missing cleanout caps.	(H)
6.	Remove accumulated sediment from the	(B, C)
	facility.	
7.	Haul removed trash, debris, vegetation, and	(B)
	sediment to designated disposal area.	
8.	Remove MOT devices.	

Fall Maintenance Work Method:

1.	Install MOT devices.	(A)
2.	Remove trash, leaves, and debris from the	(B, C)
	facility and associated structure(s).	
3.	Mow herbaceous vegetation within the	(D, E)
	SWM facility limits of mowing to a height of	
	6-inches.	
4.	Seed sparsely vegetated areas and install	(F, I, J)
	matting.	
5.	Fill eroded areas with topsoil as necessary to	(C, F, I,
	restore the original ground. Stabilize eroded	J, K, L)
	areas adjacent to existing riprap with riprap.	
	Else, seed and install matting.	
6.	Haul removed trash, leaves, and debris to	(B)
	designated disposal area.	

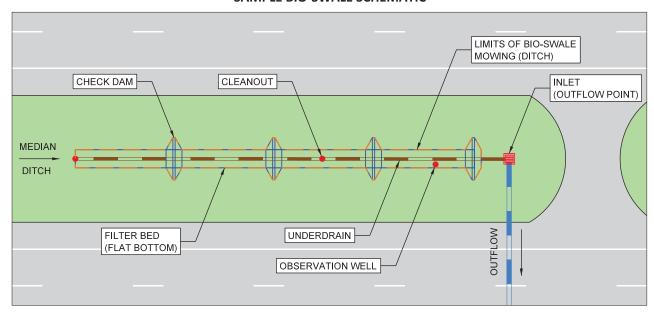
Troubleshooting:

7. Remove MOT devices.

If water is still ponding in the facility 72 hours after a storm, determine the cause and resolve in the following order:

- 1. Check for clogs and clear any obstructions to the outflow point(s).
- 2. Remove leaf/sediment/debris buildup from (B, C) the bottom of the facility.
- 3. Check for and clear underdrain obstructions. (G)
- 4. Report to HHD.

SAMPLE BIO-SWALE SCHEMATIC



SAMPLE BIO-SWALE PHOTOS



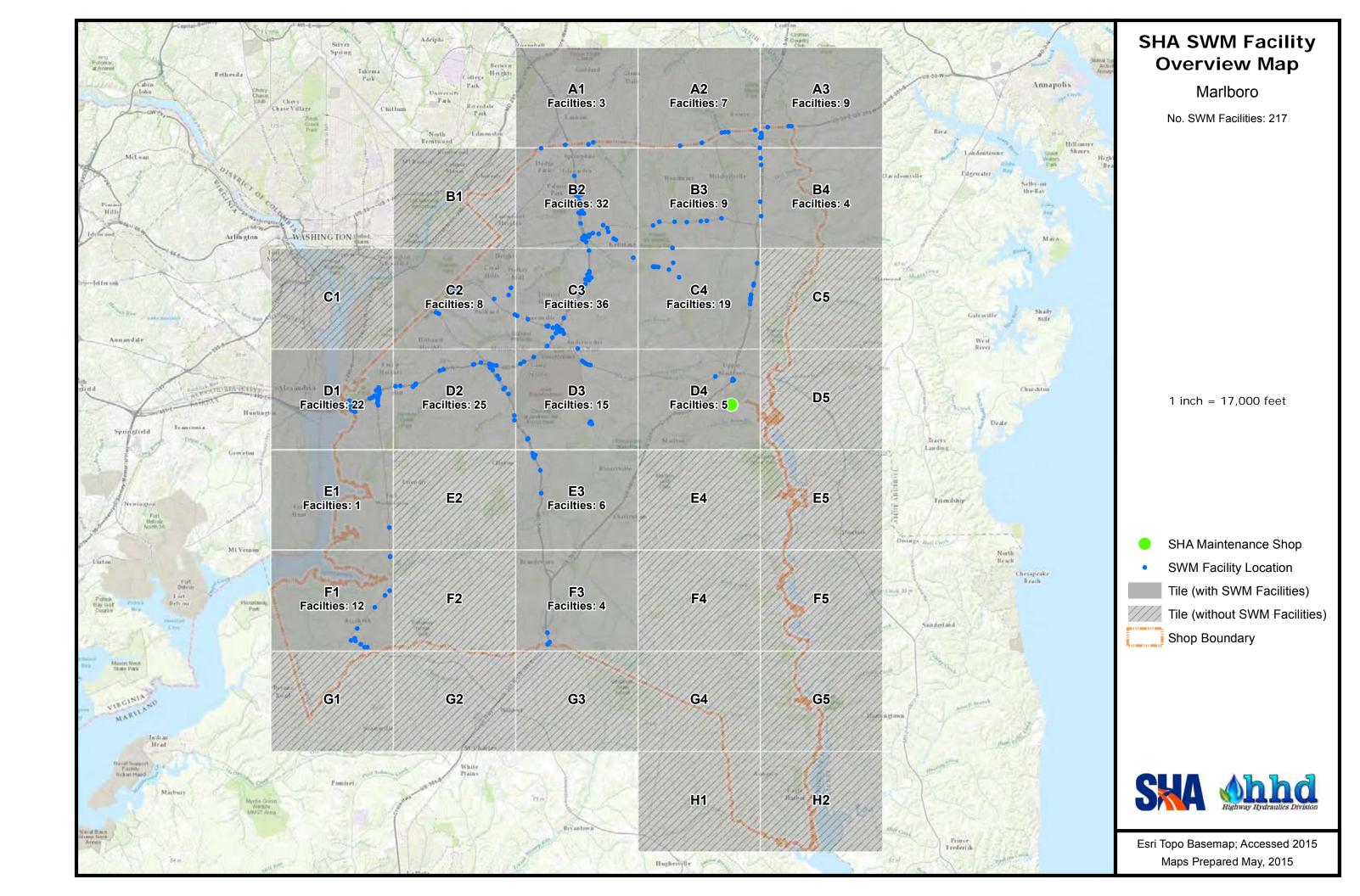




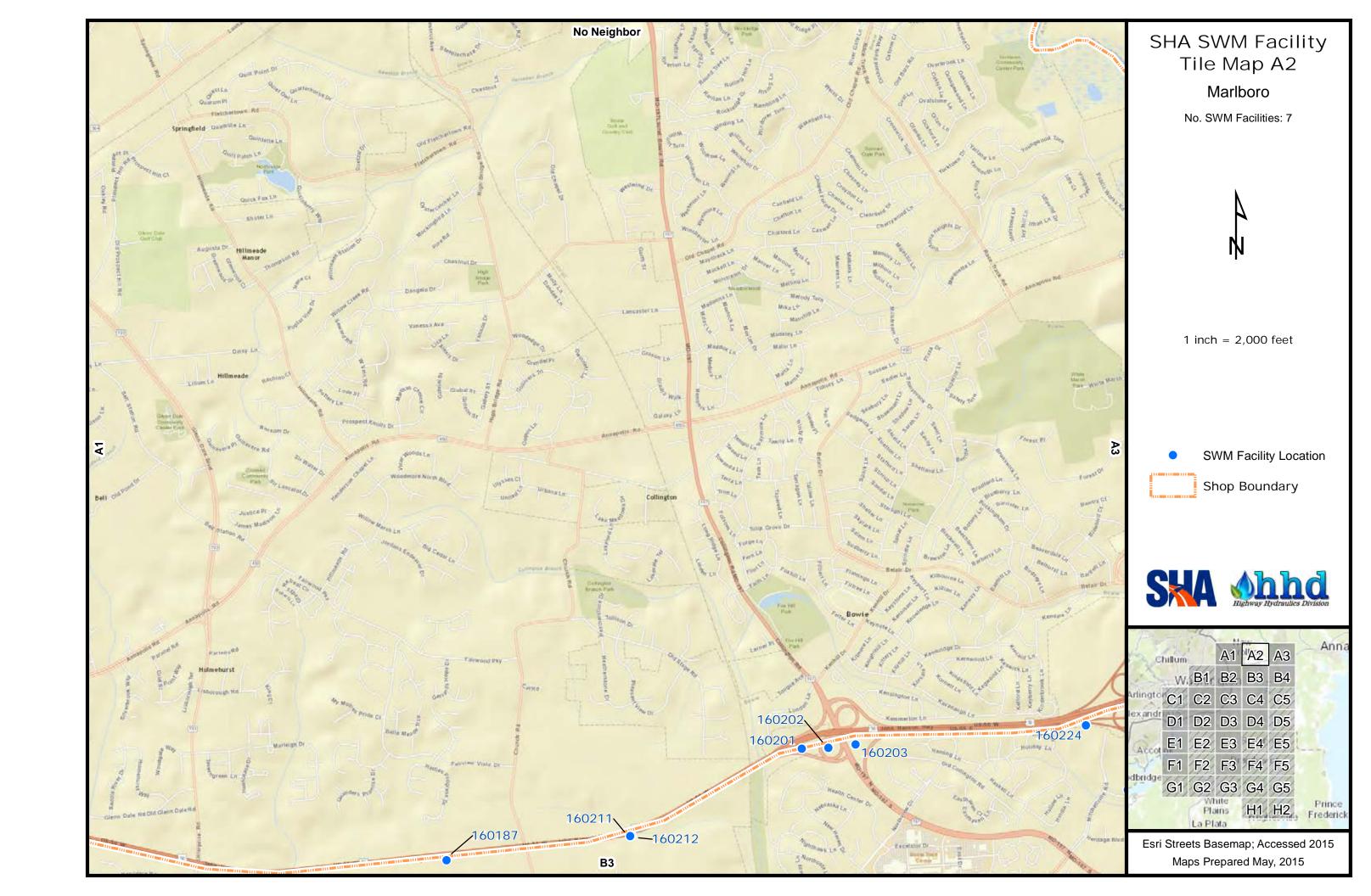


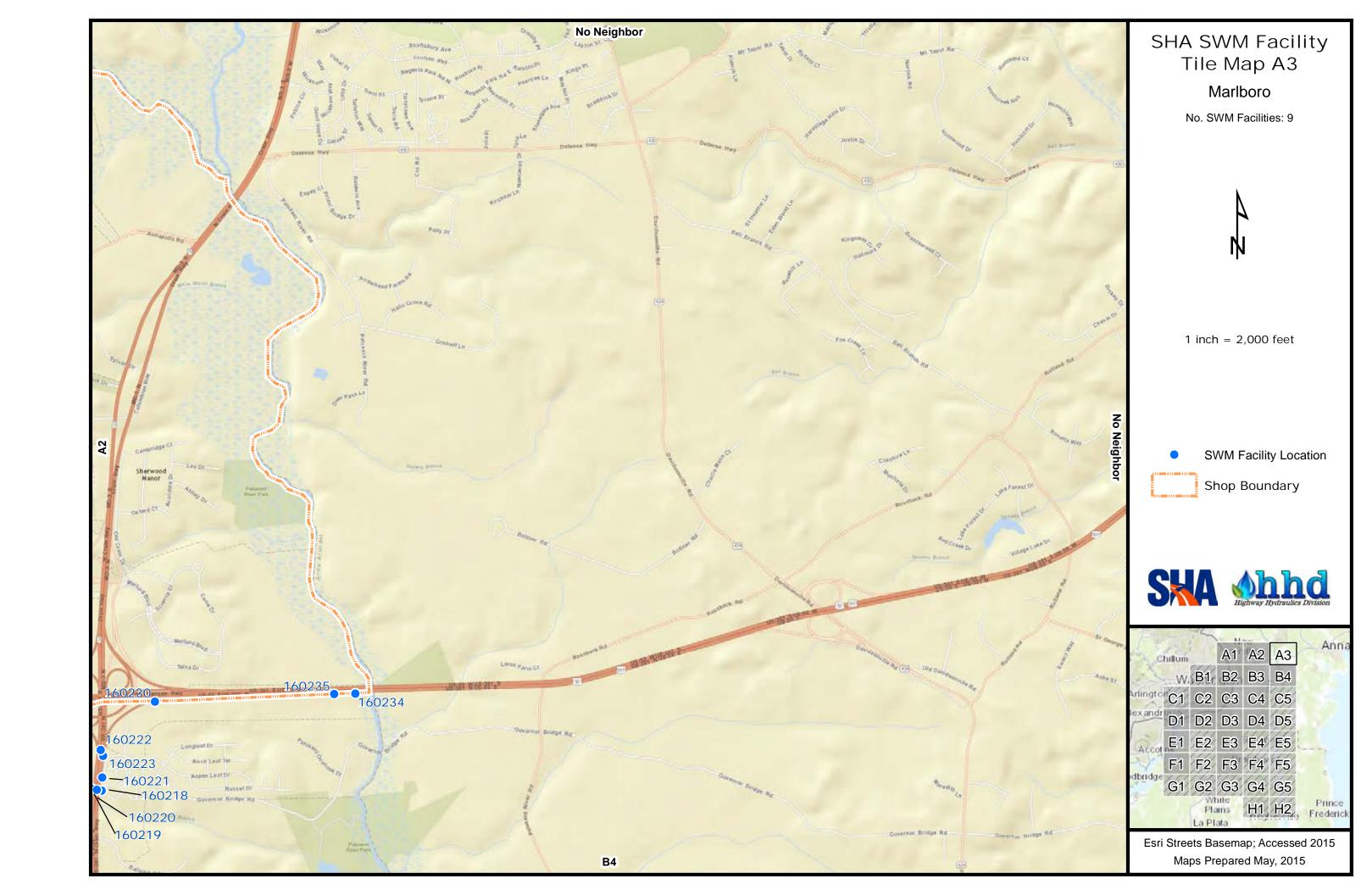
APPENDIX B

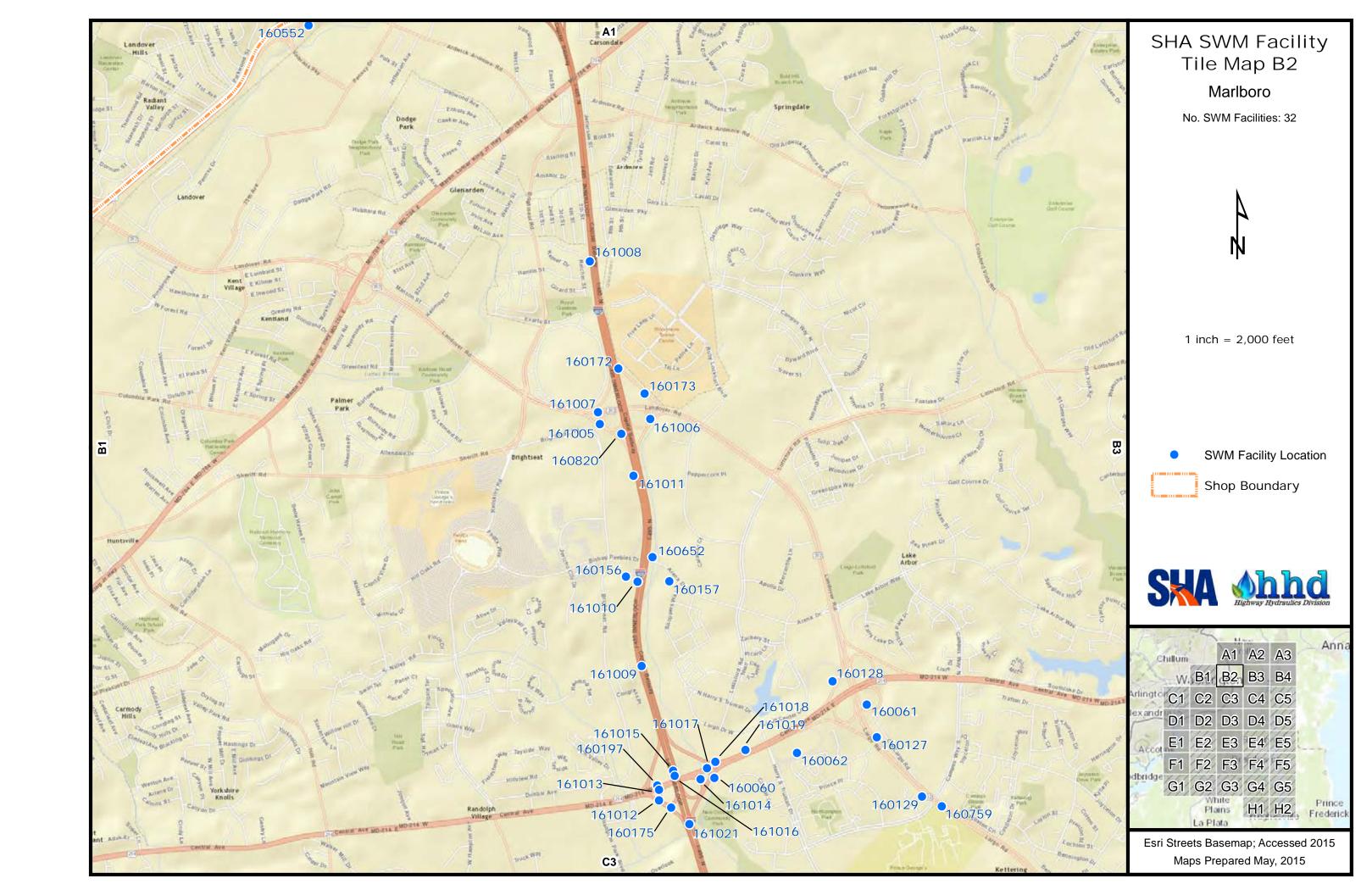
Stormwater Management Facility Mapping

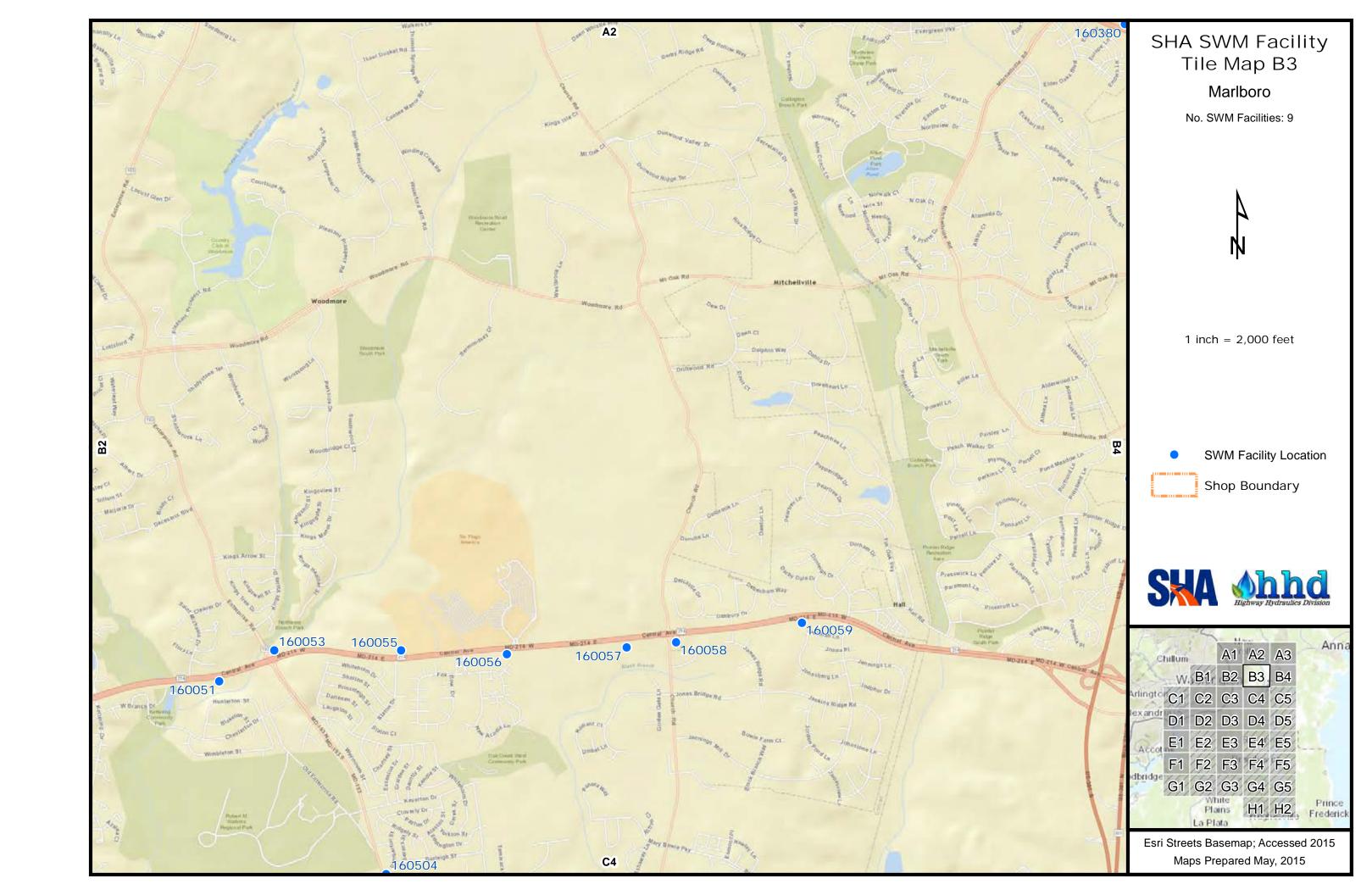


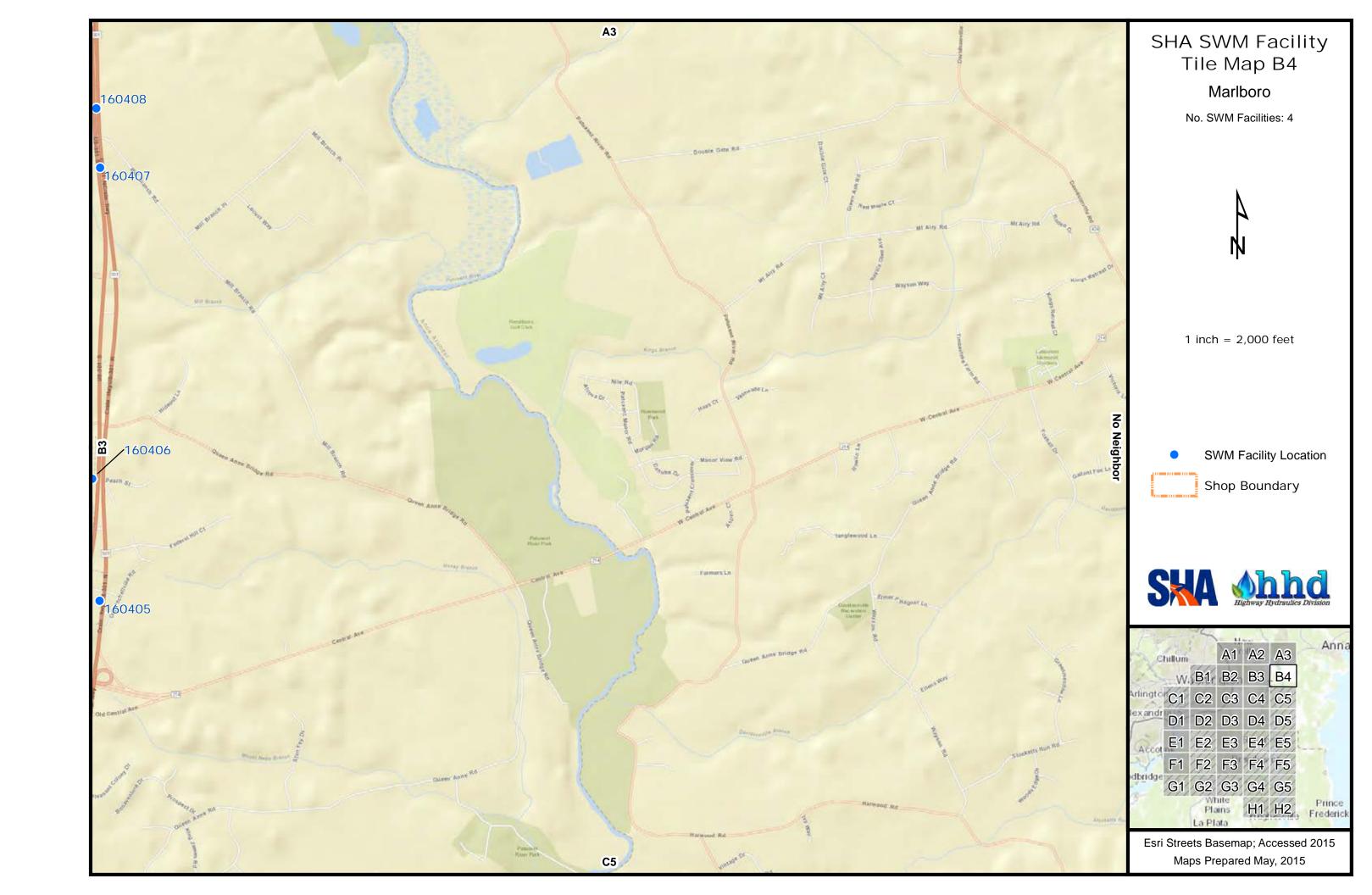


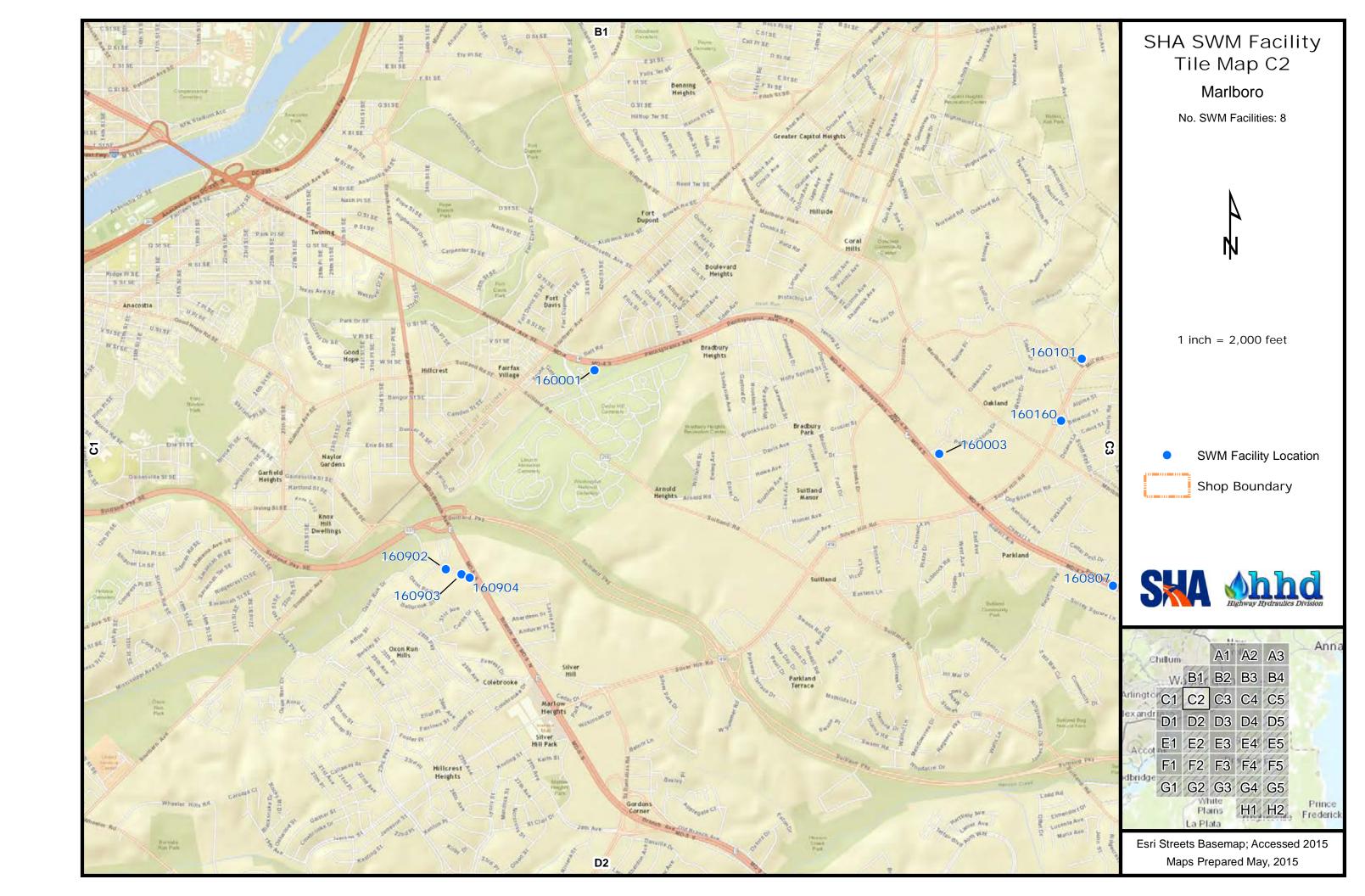


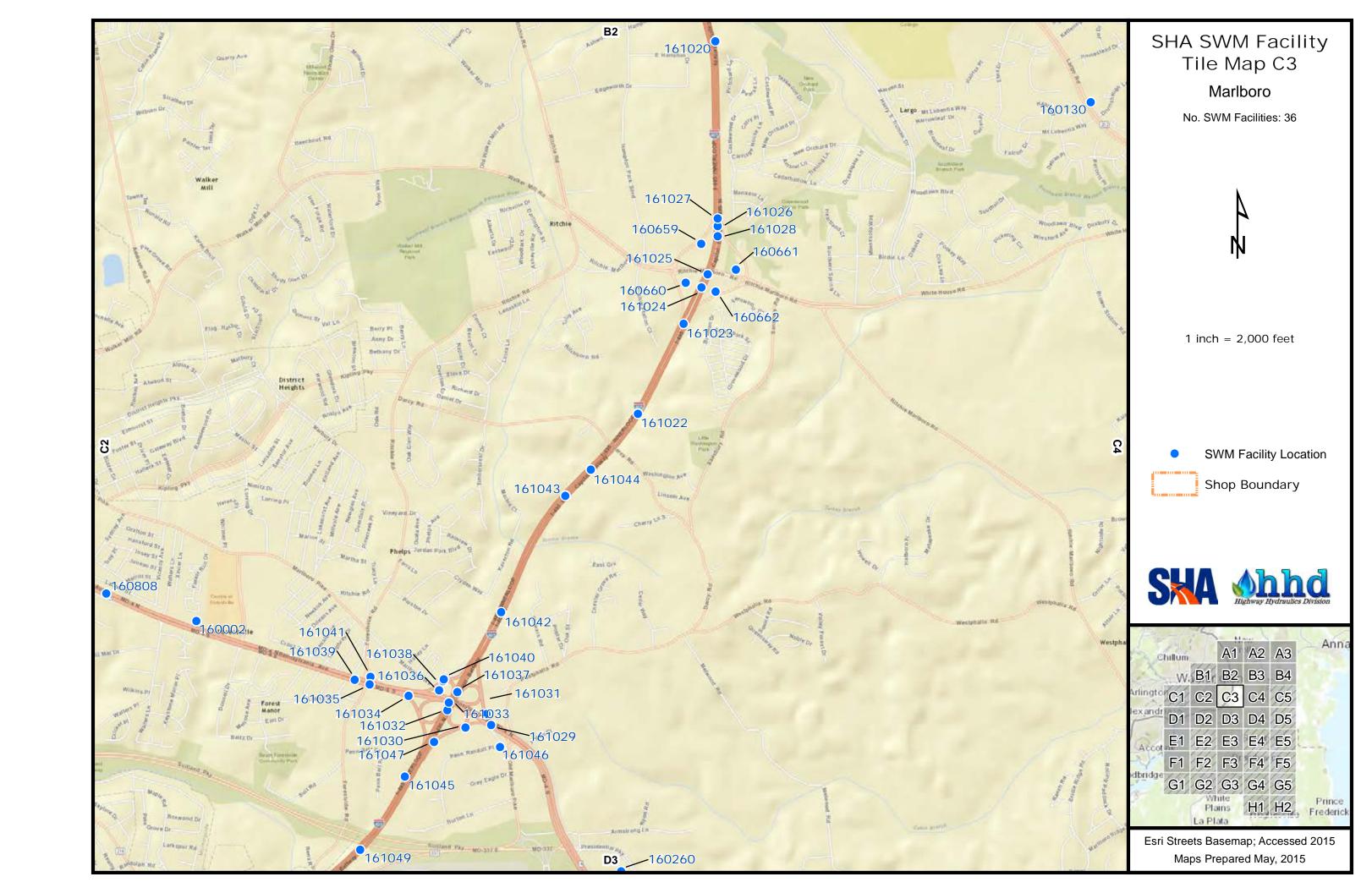


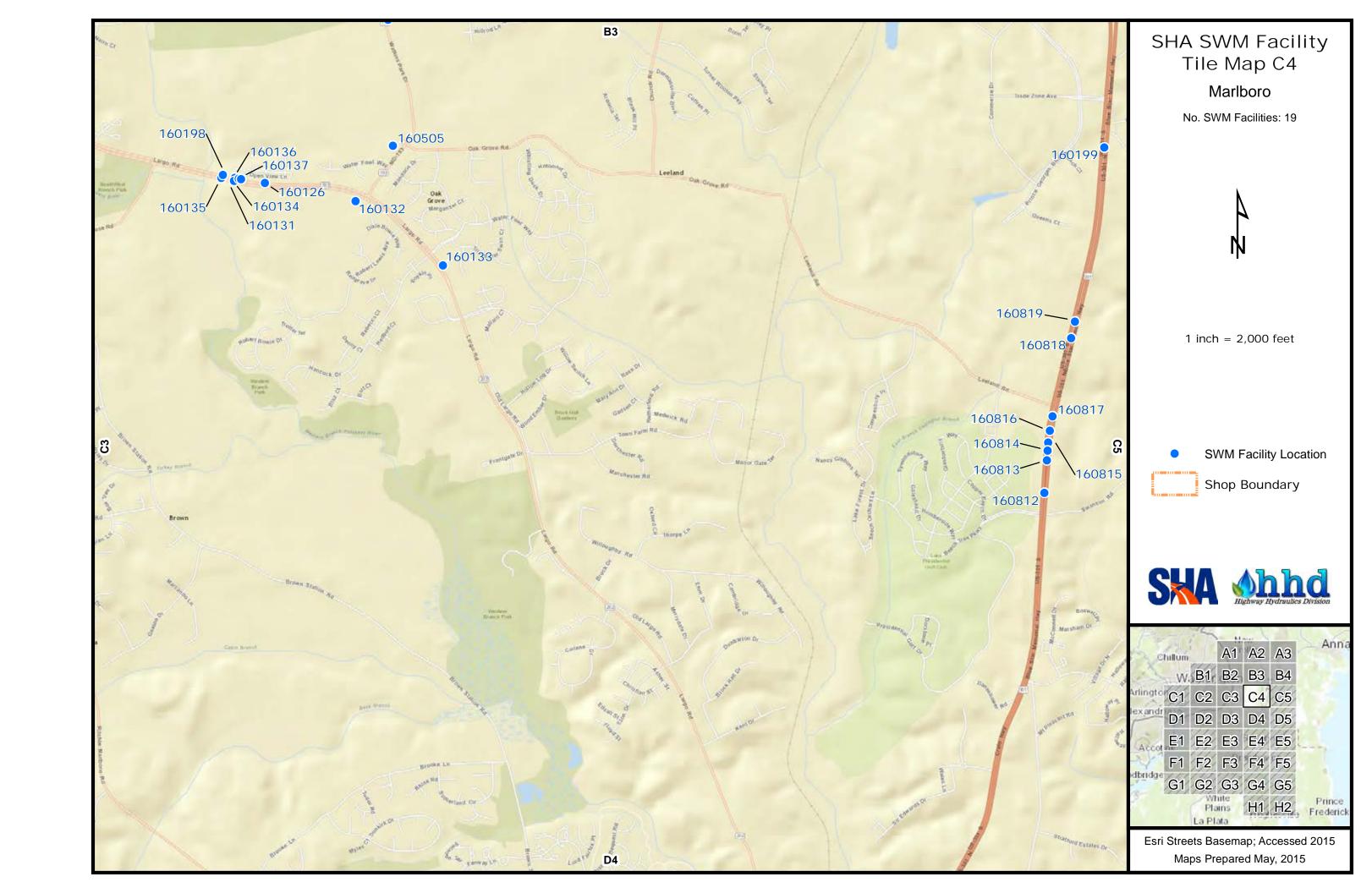


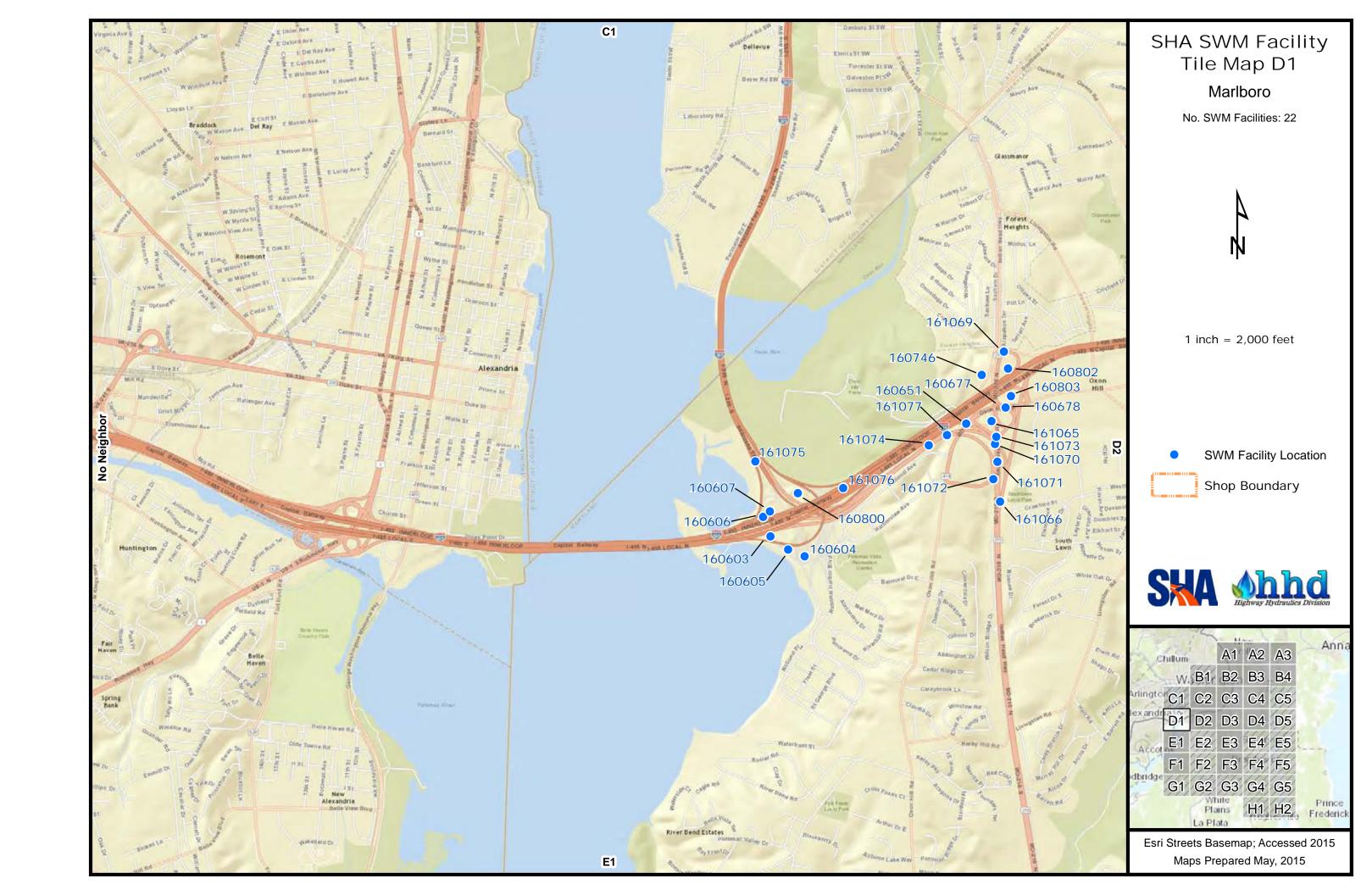




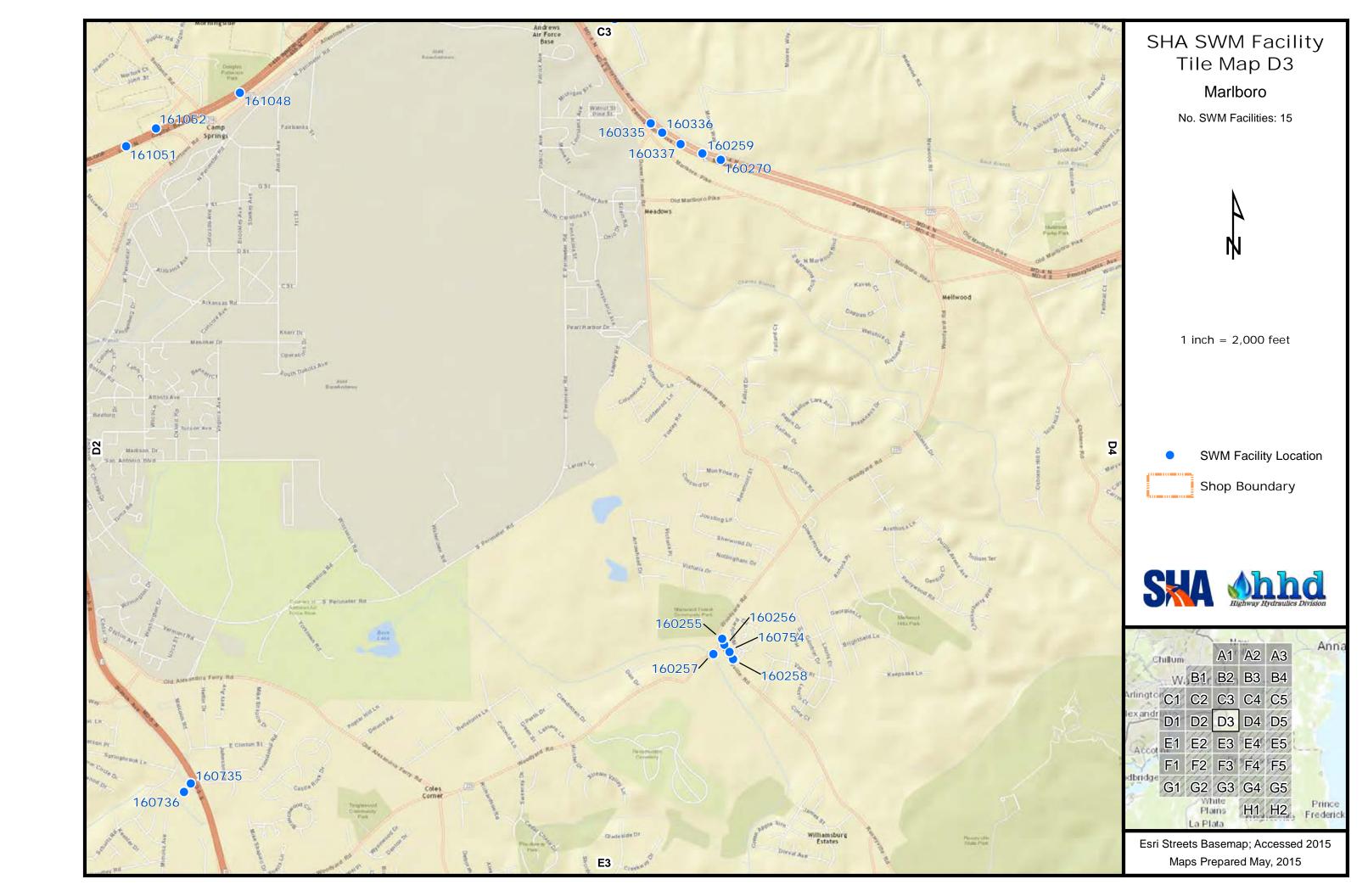


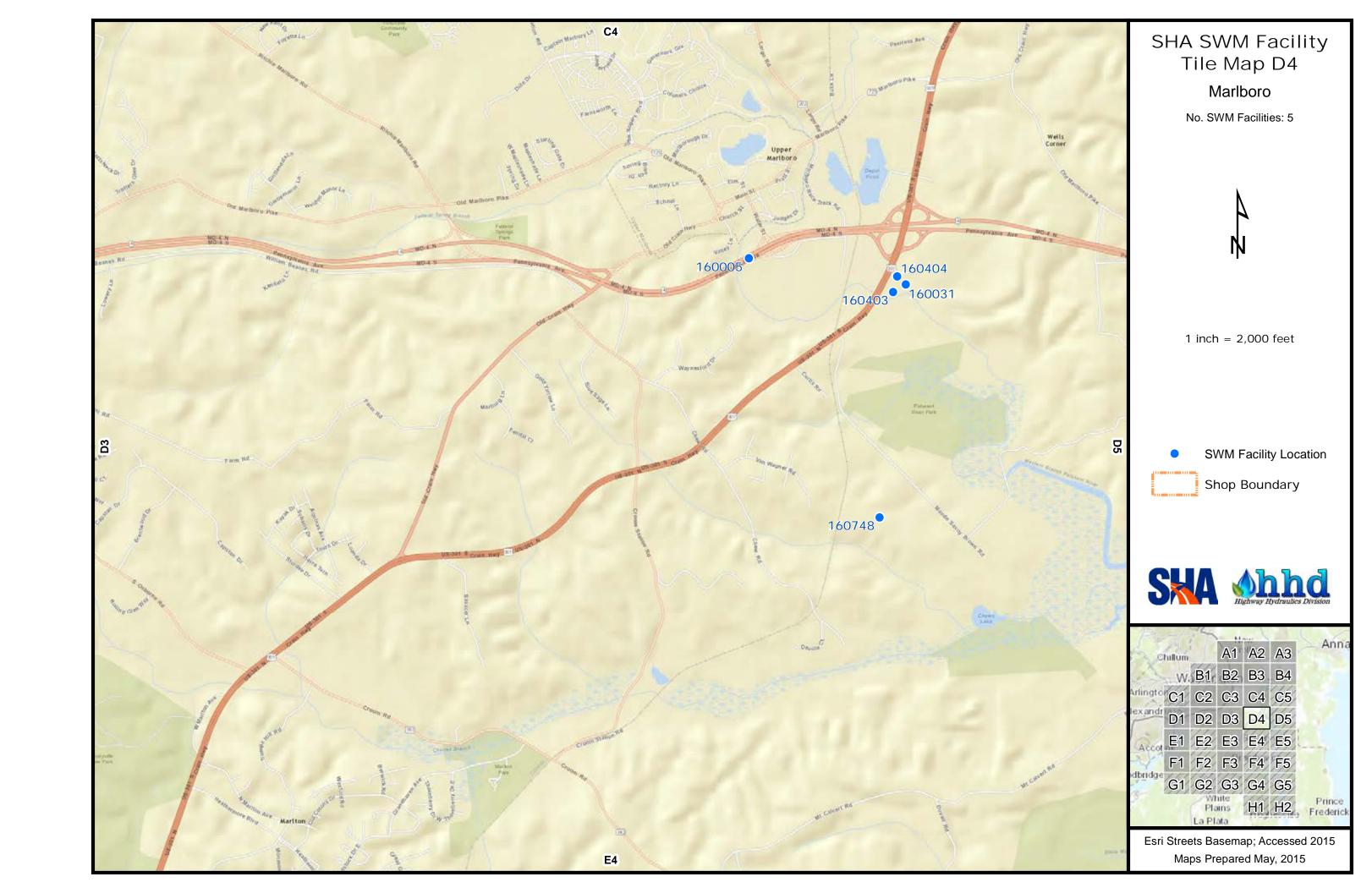


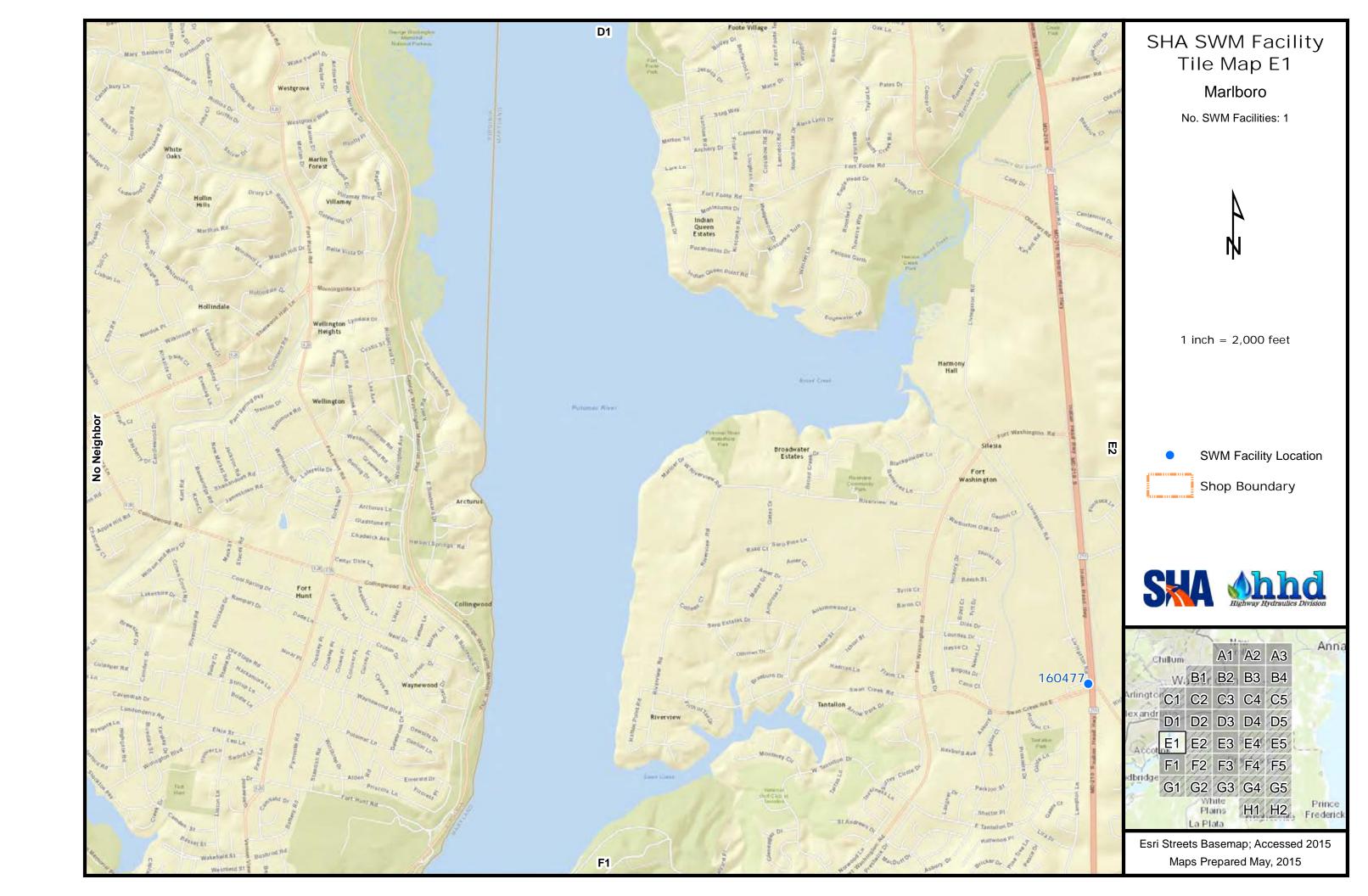


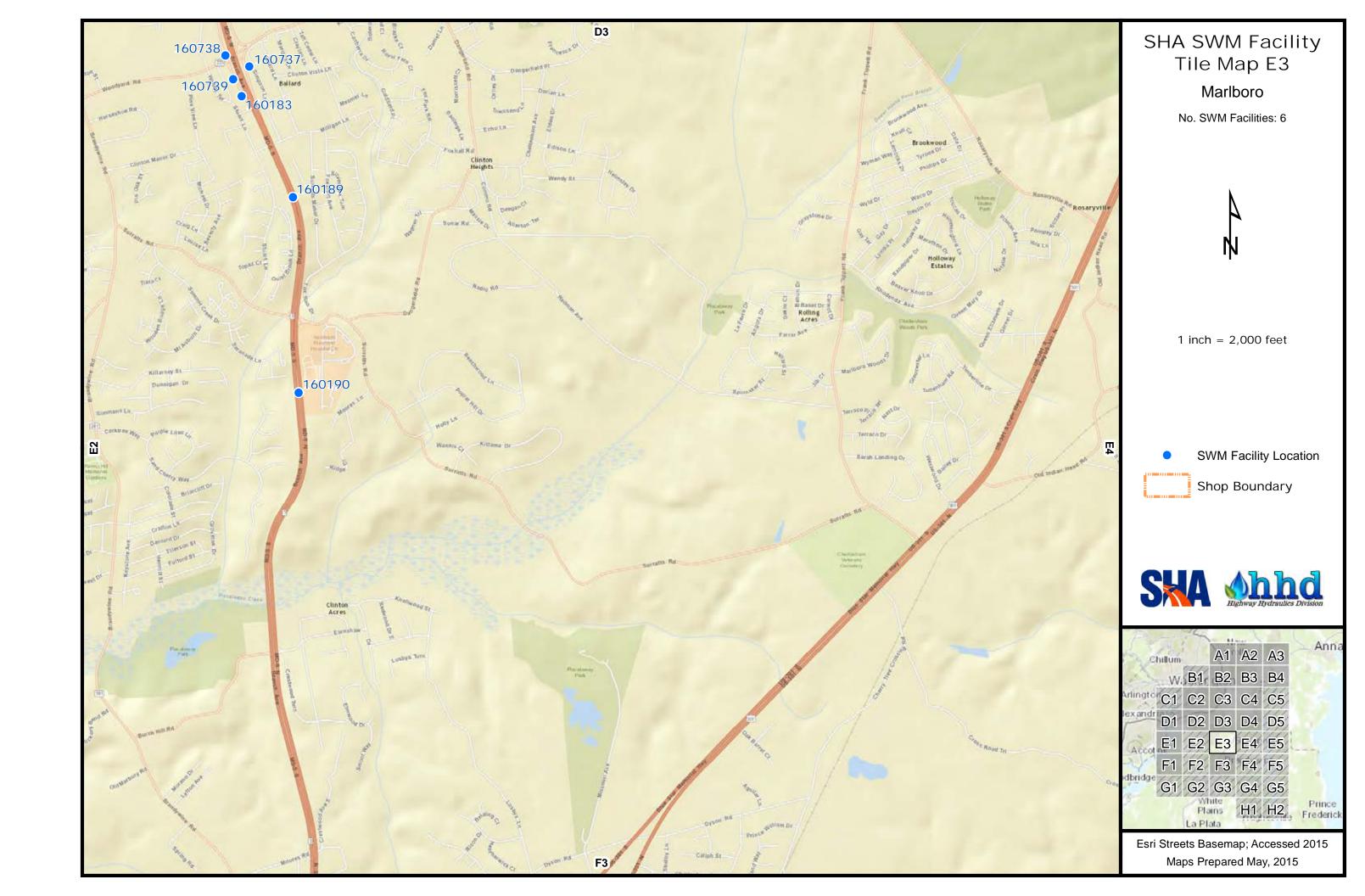


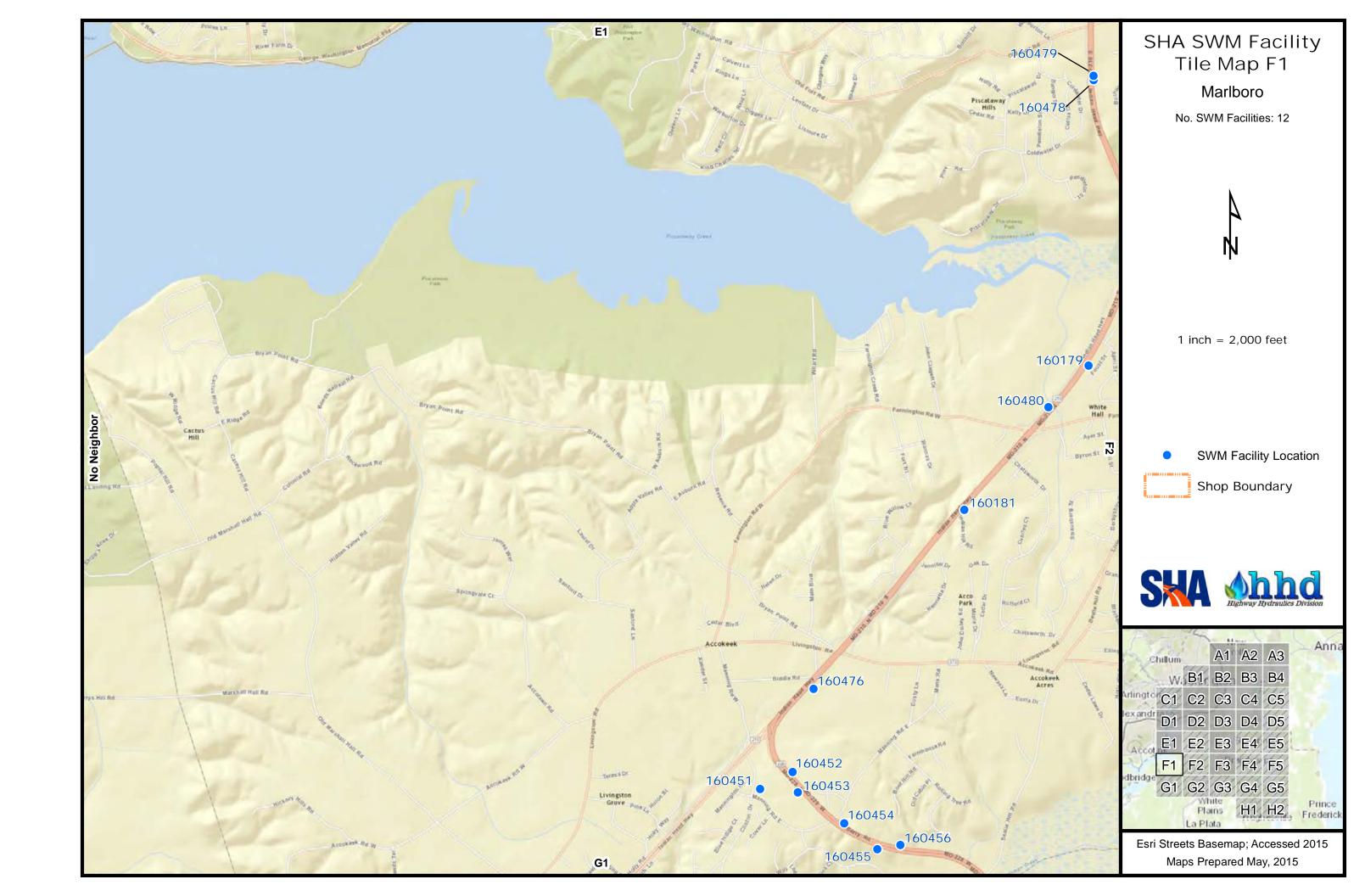






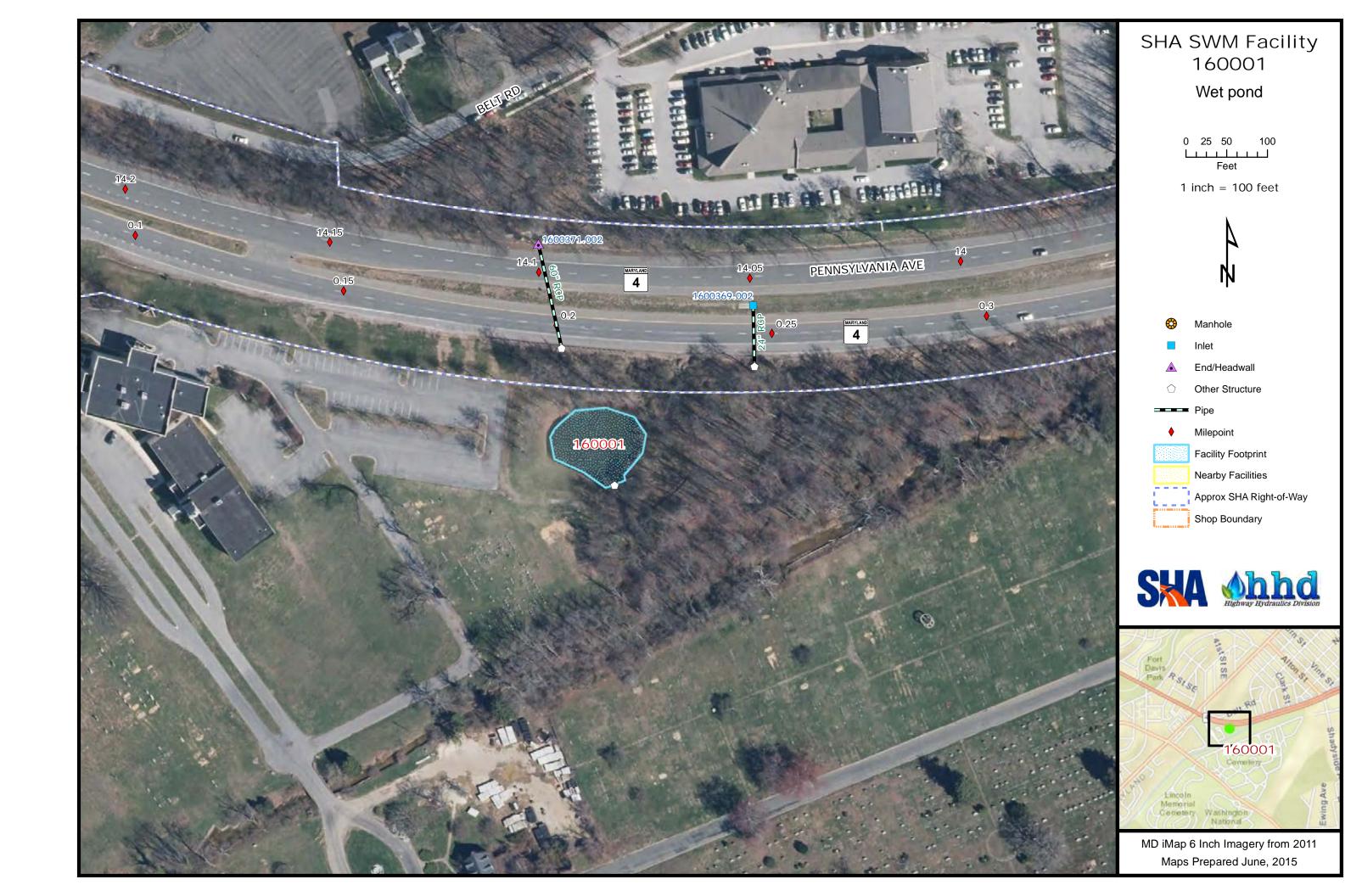








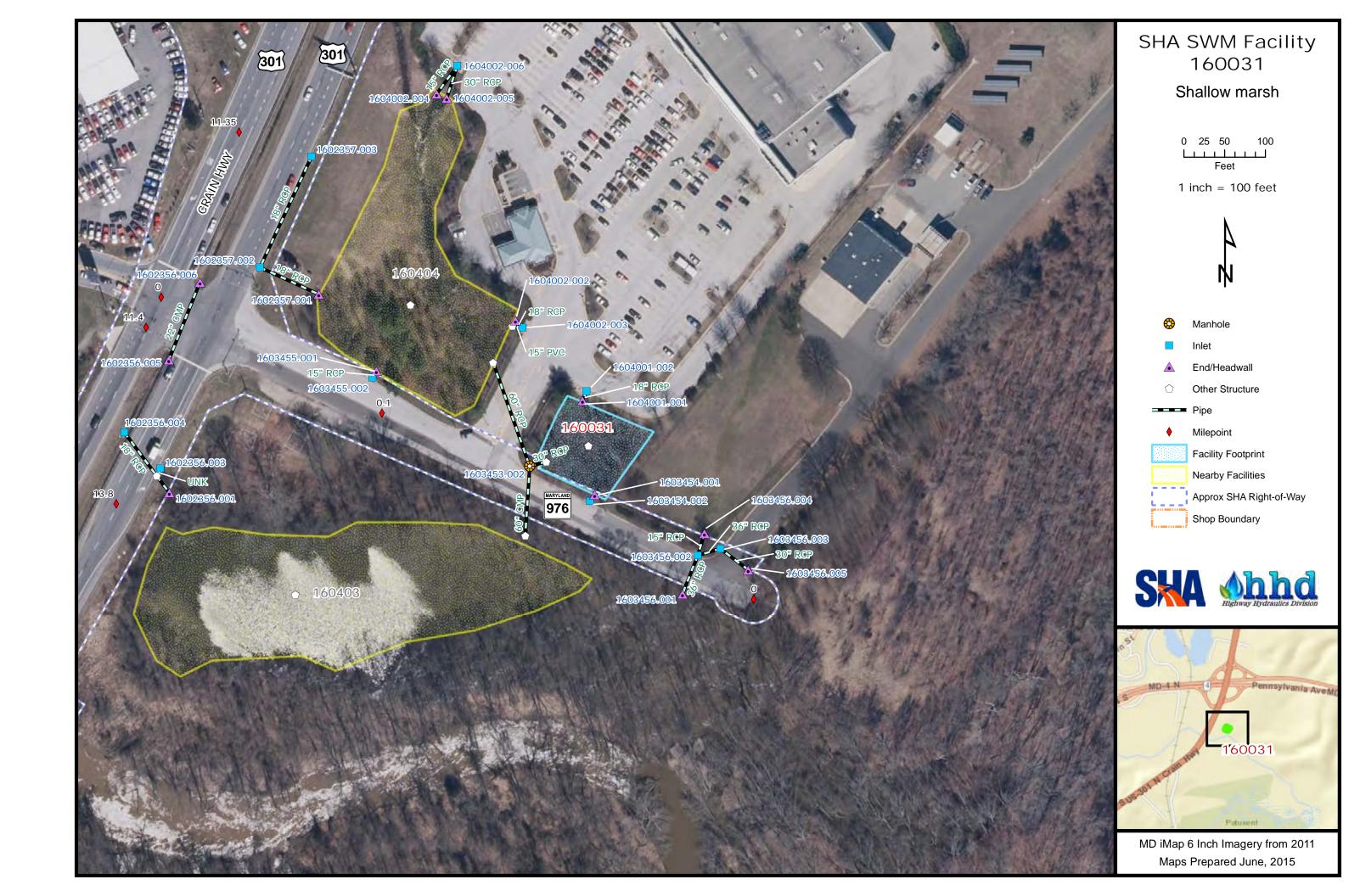










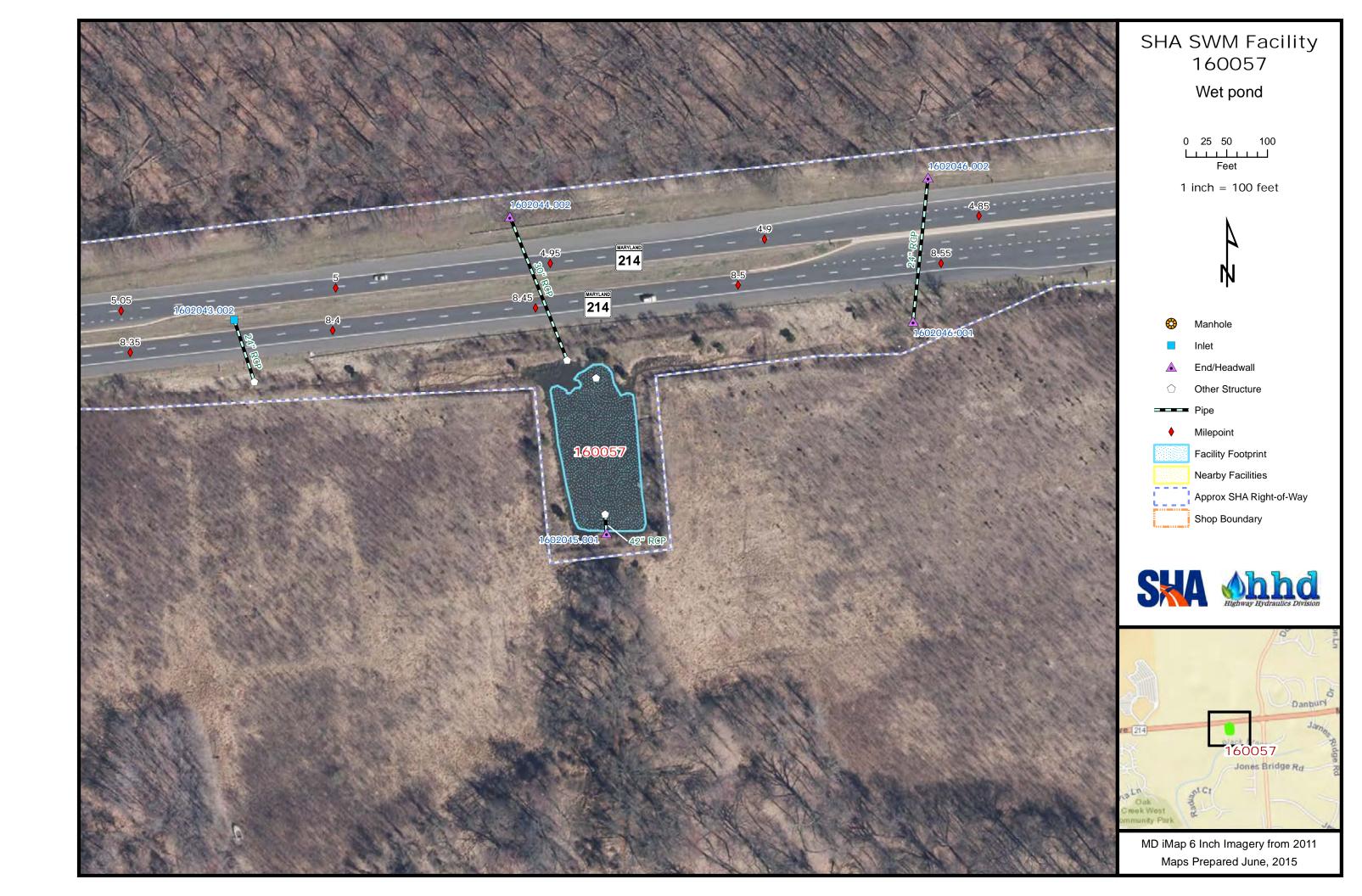








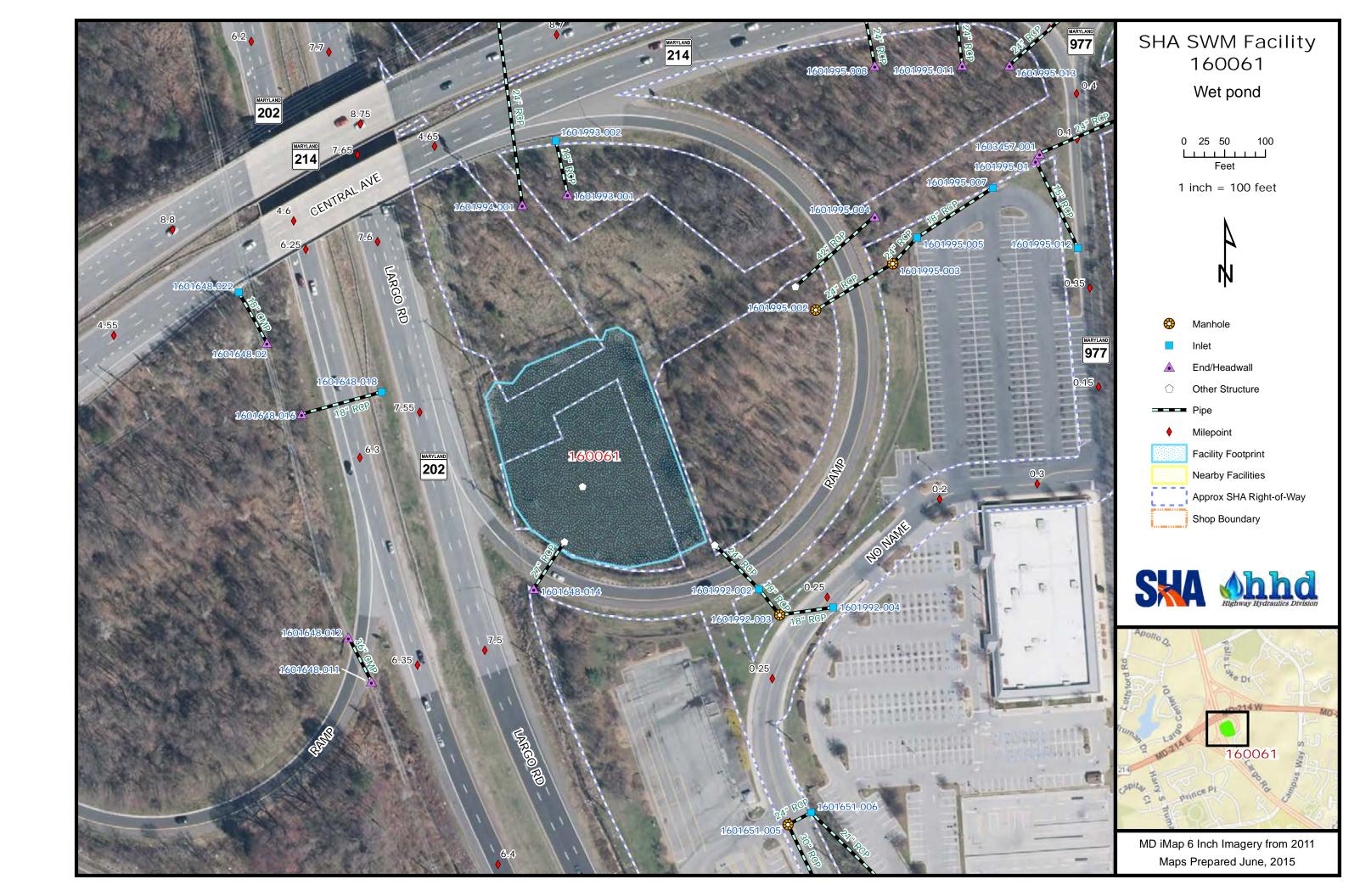


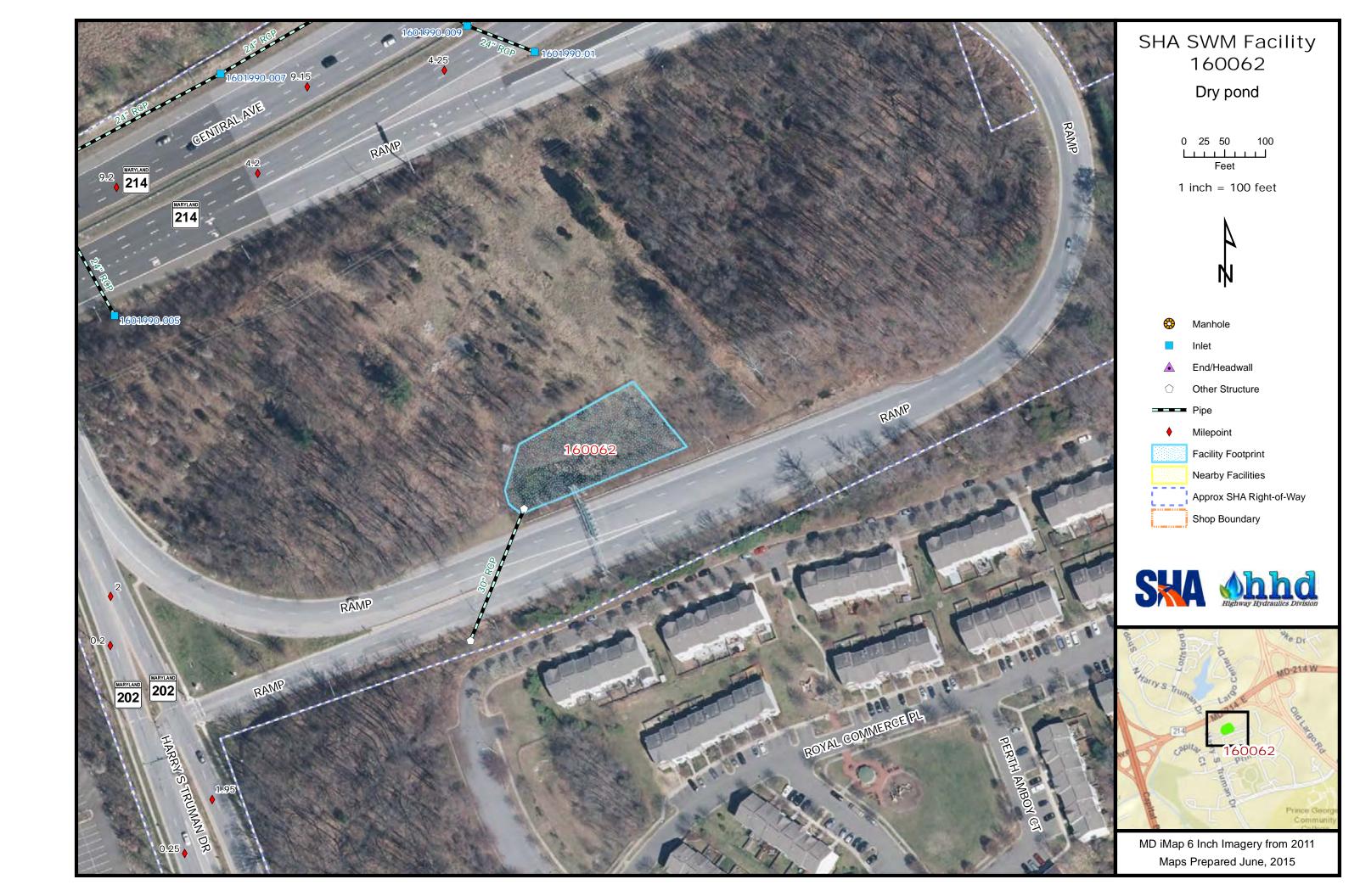






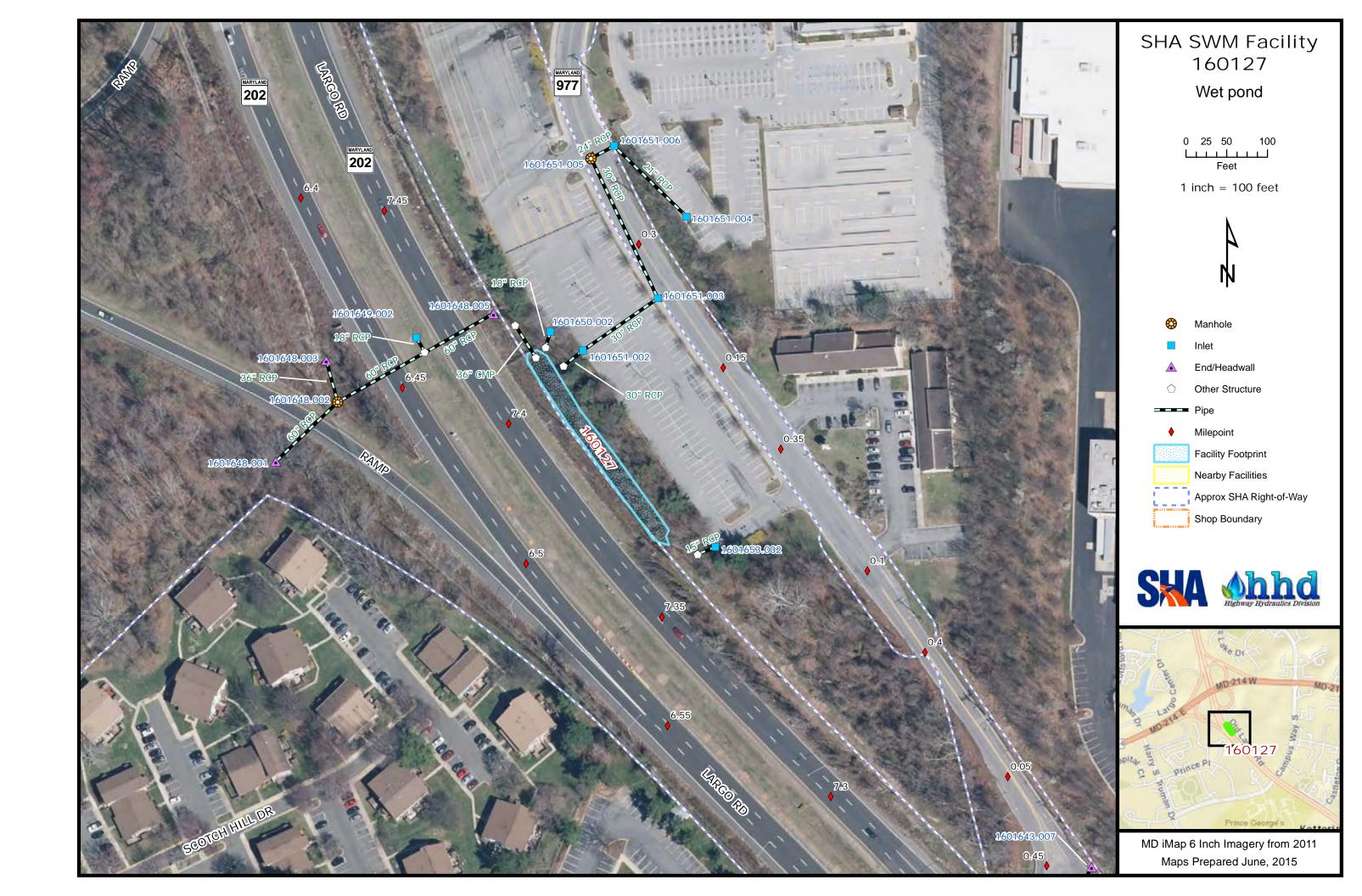


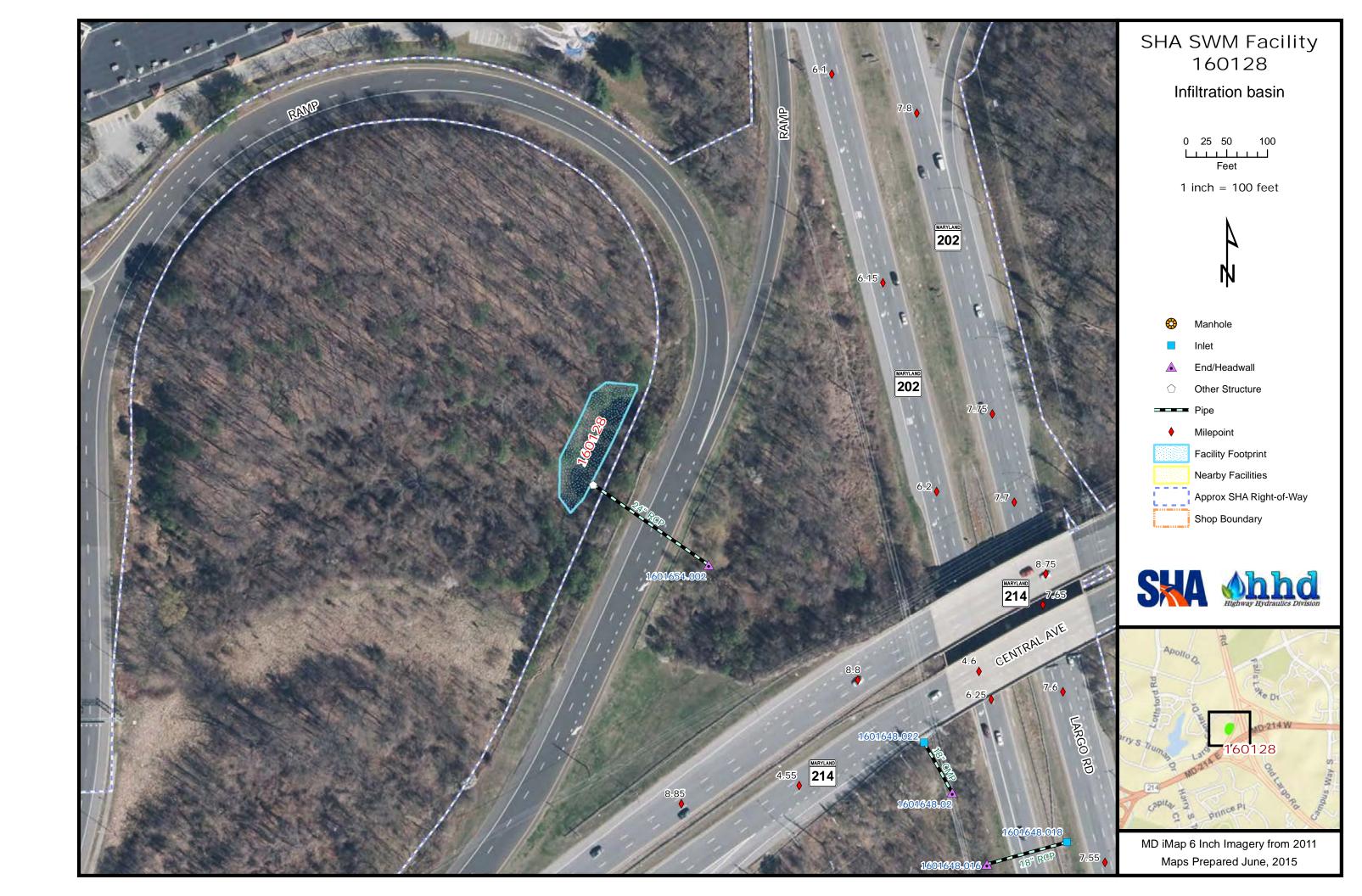


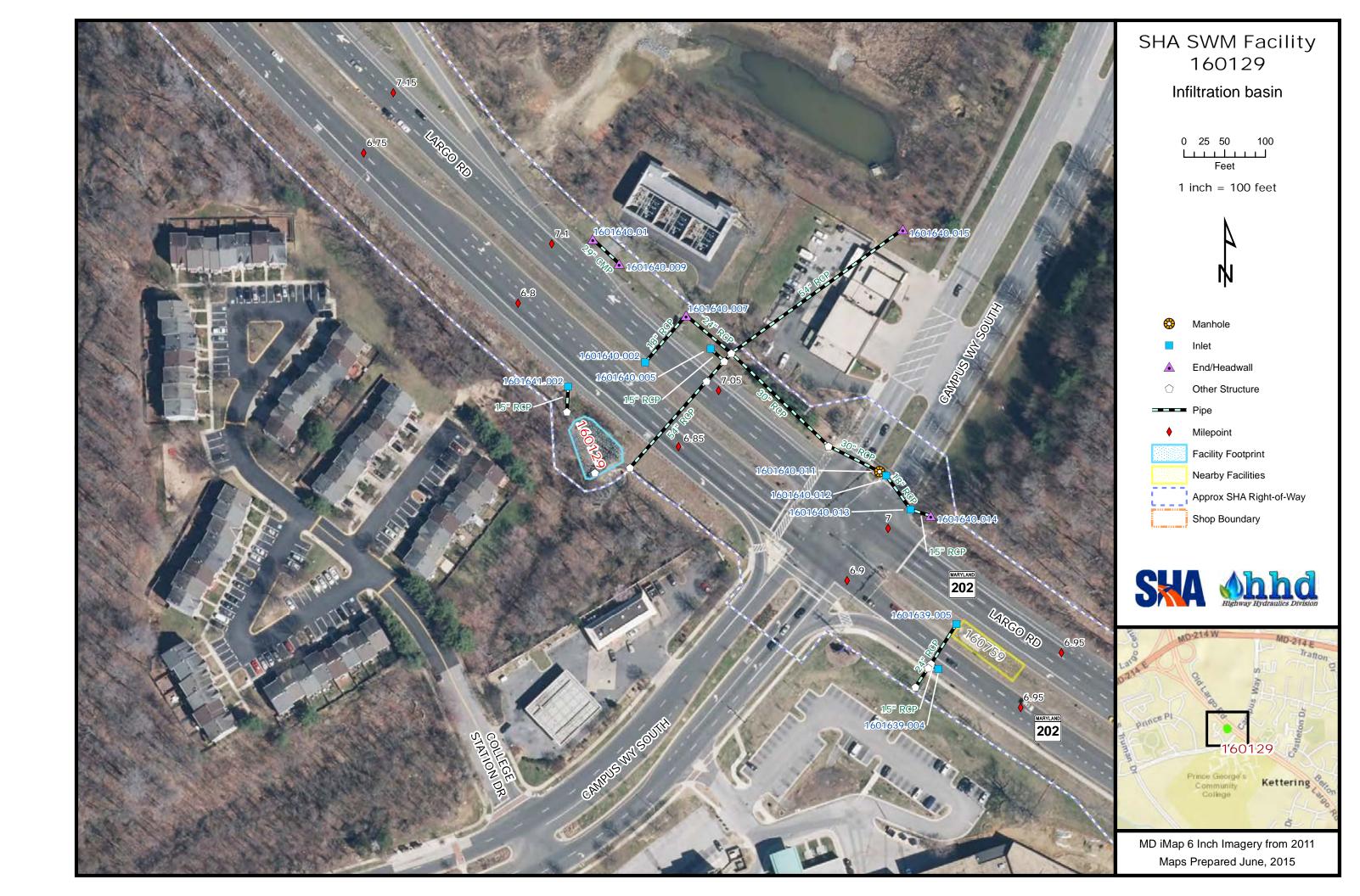






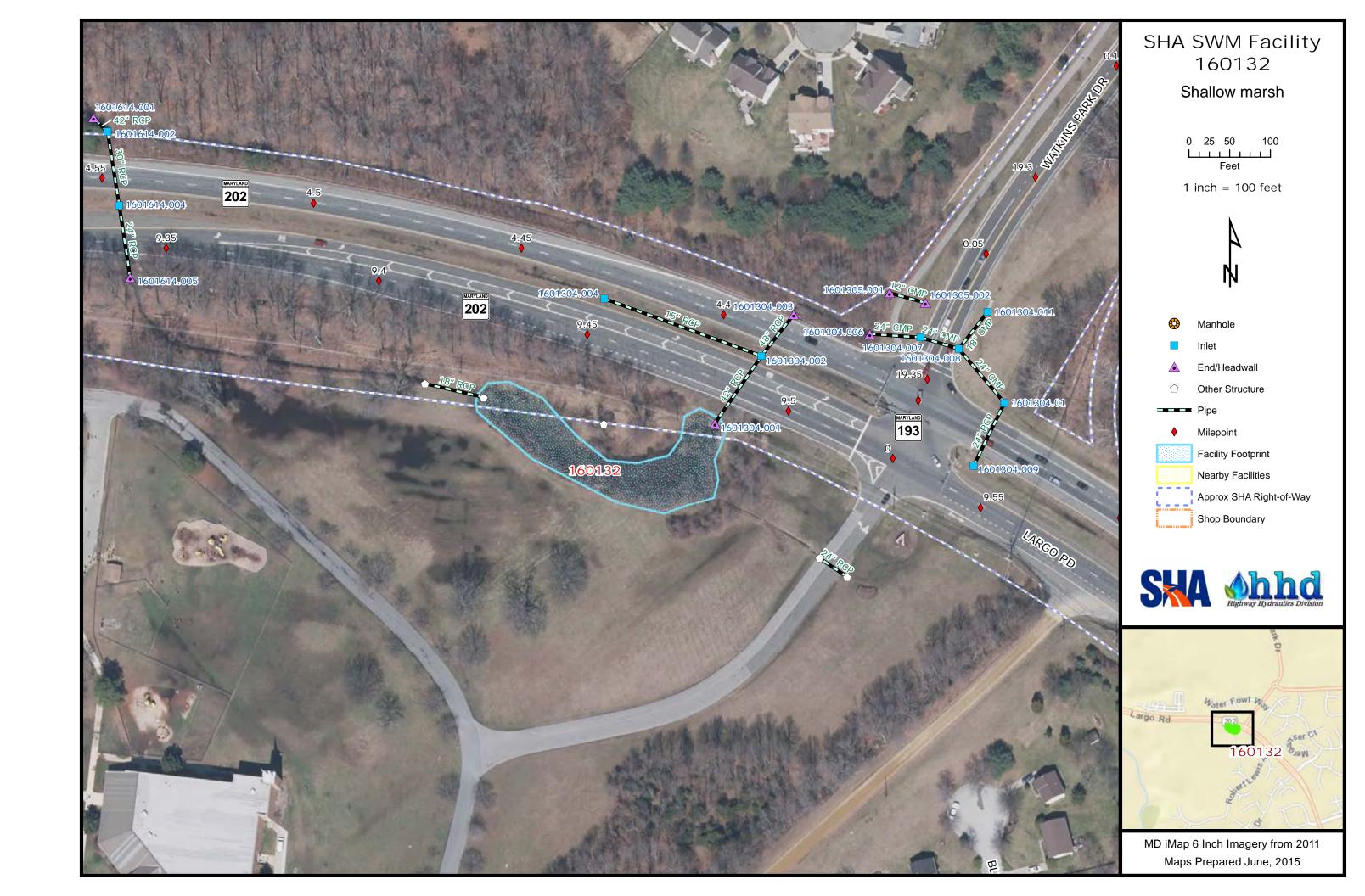


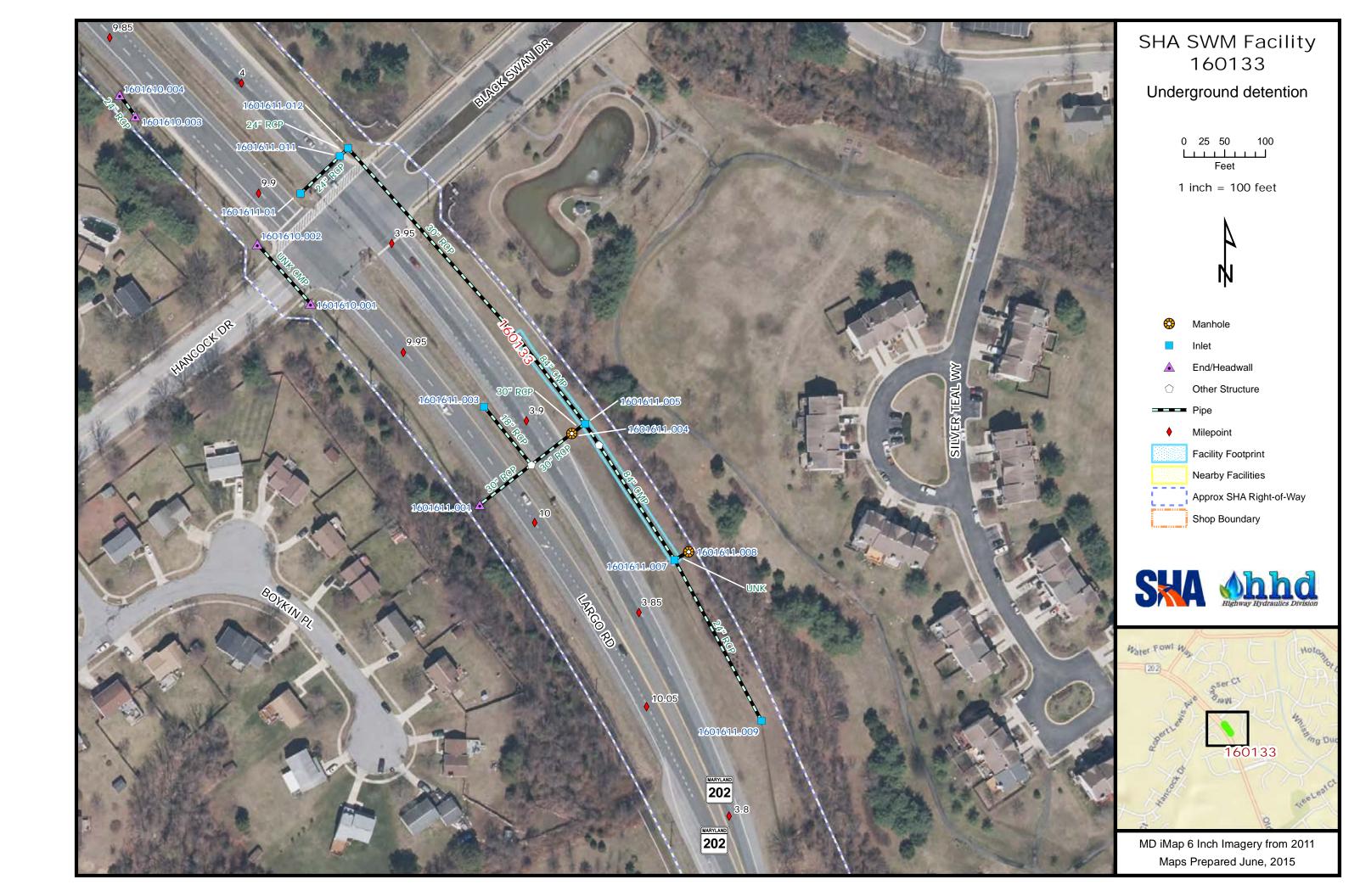




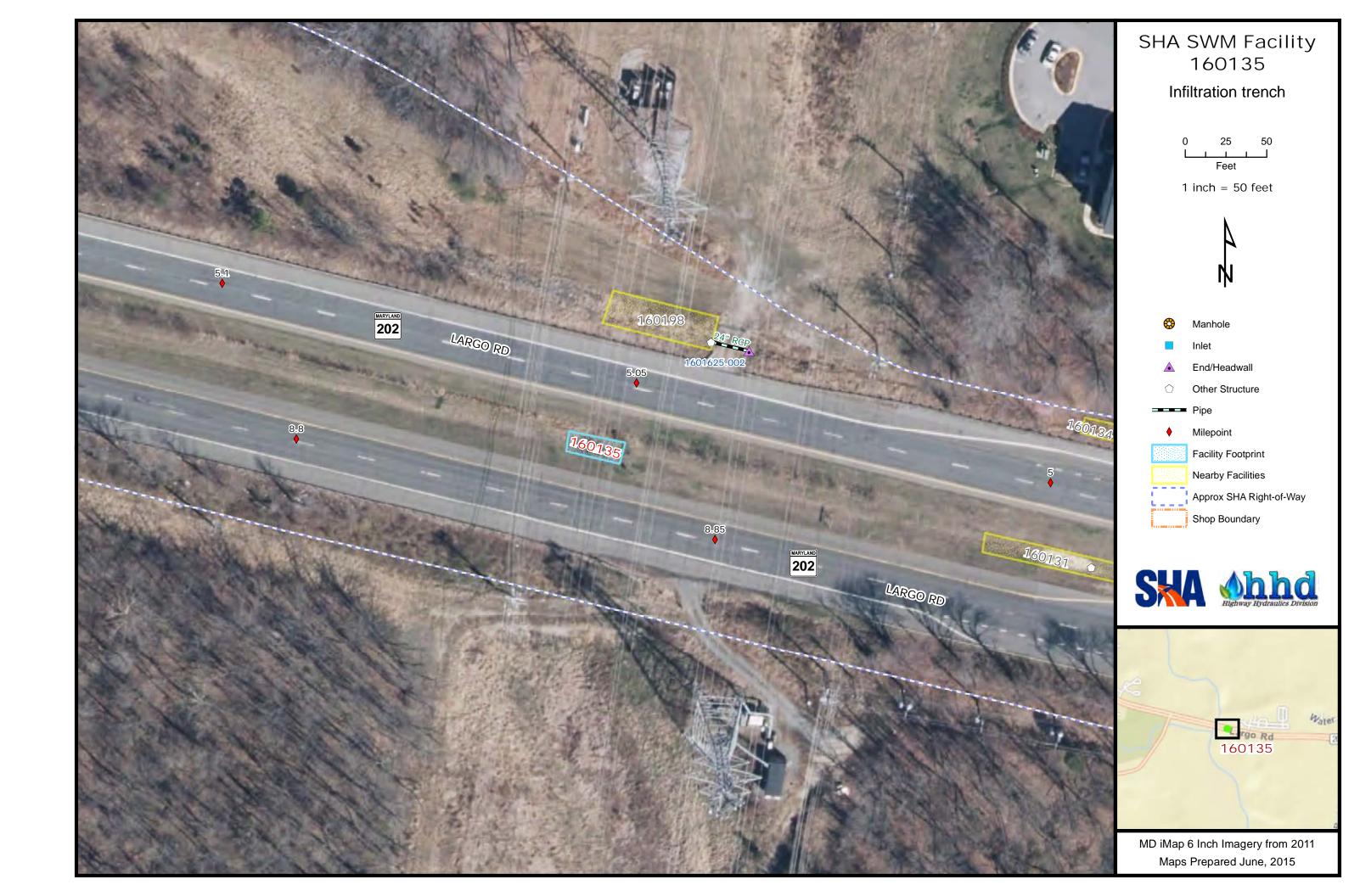






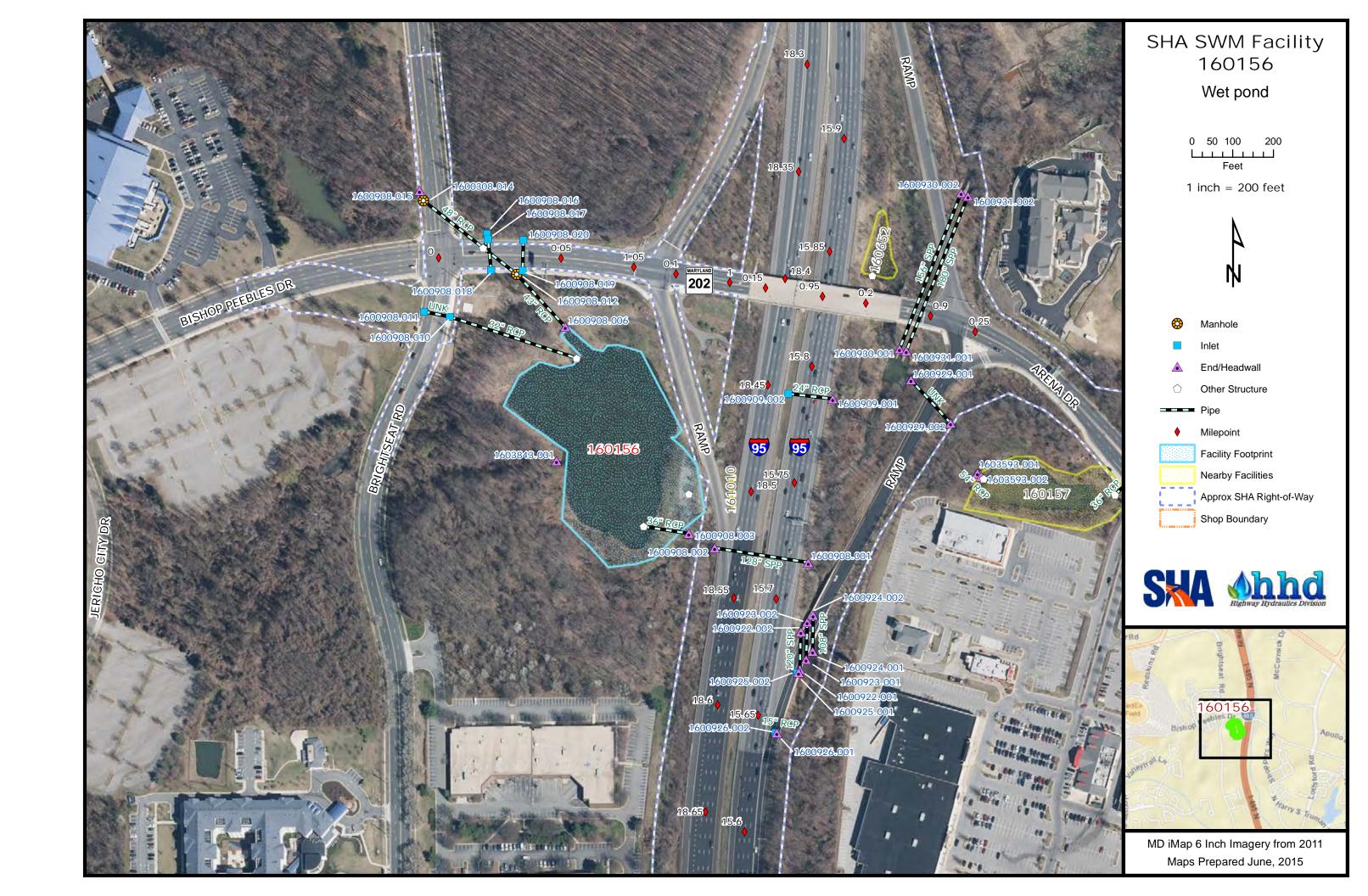




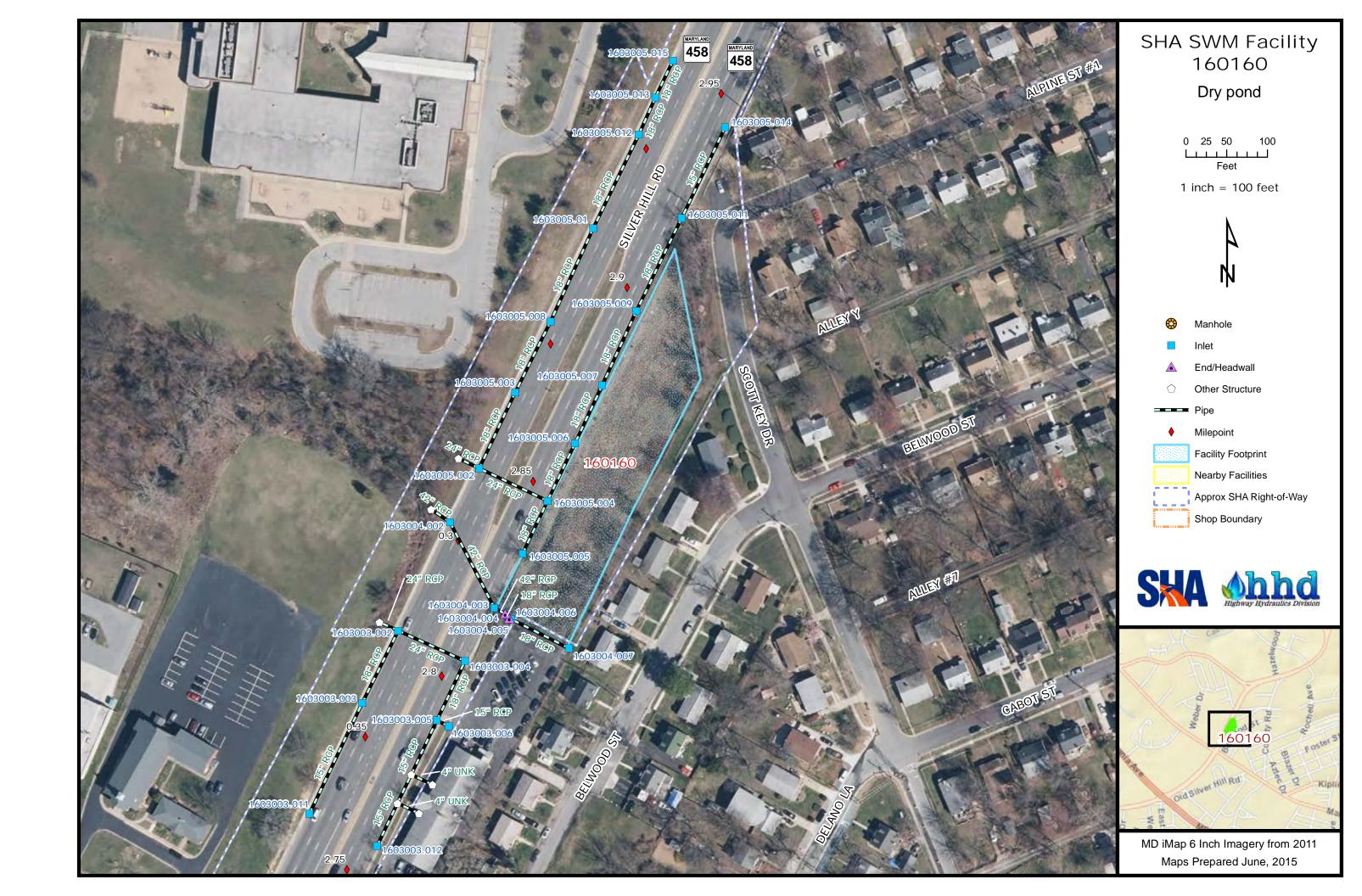




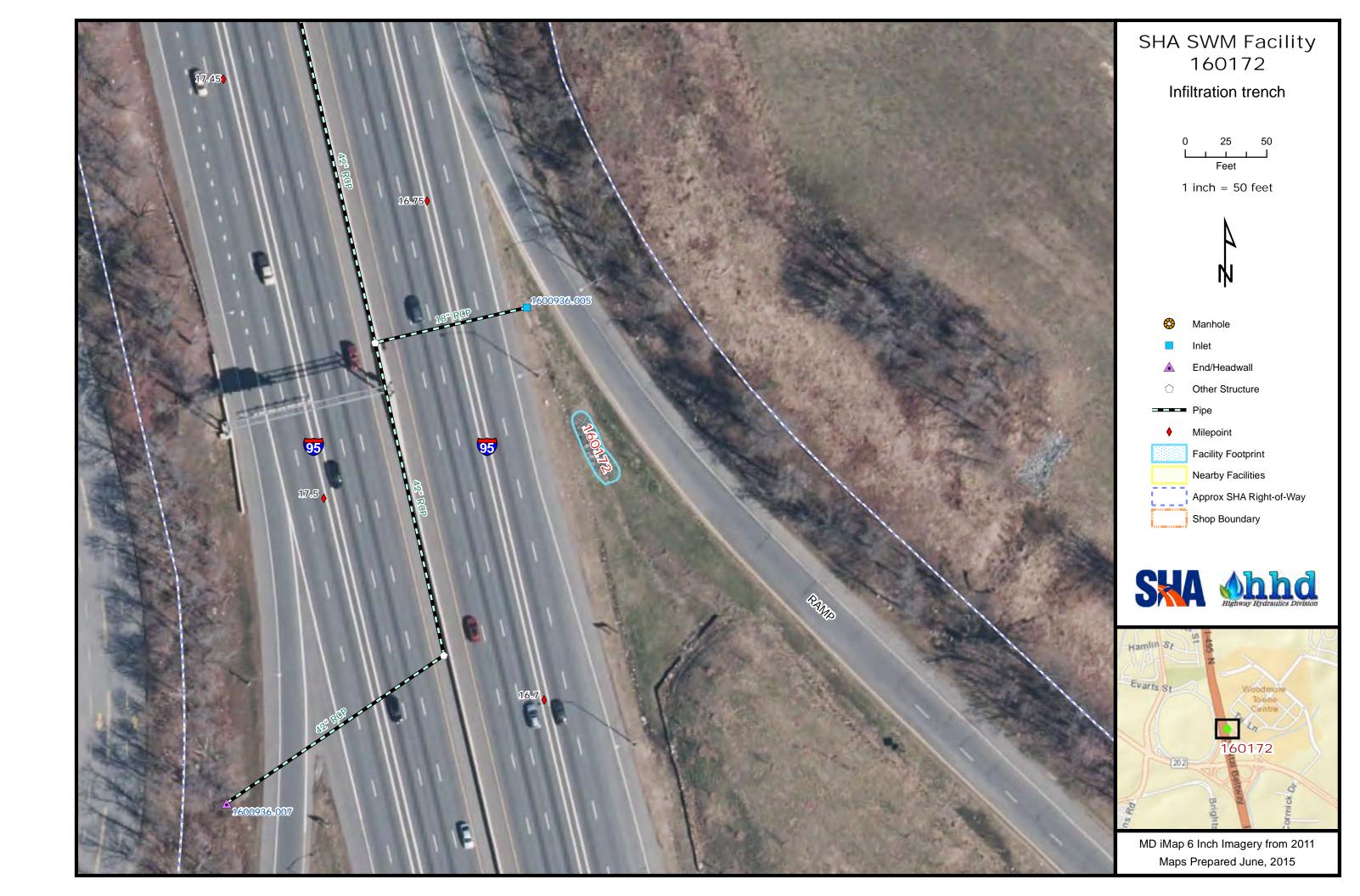




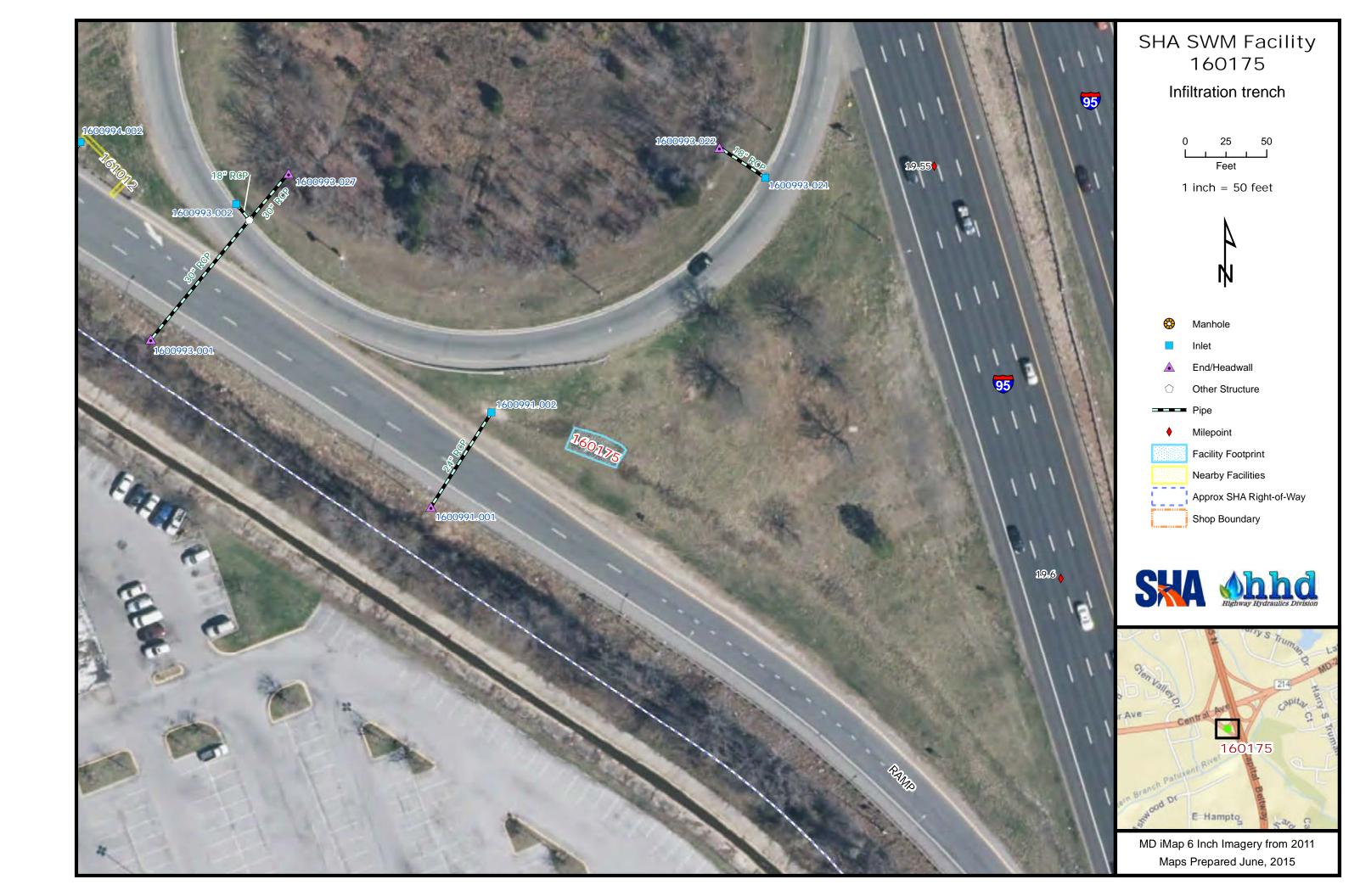


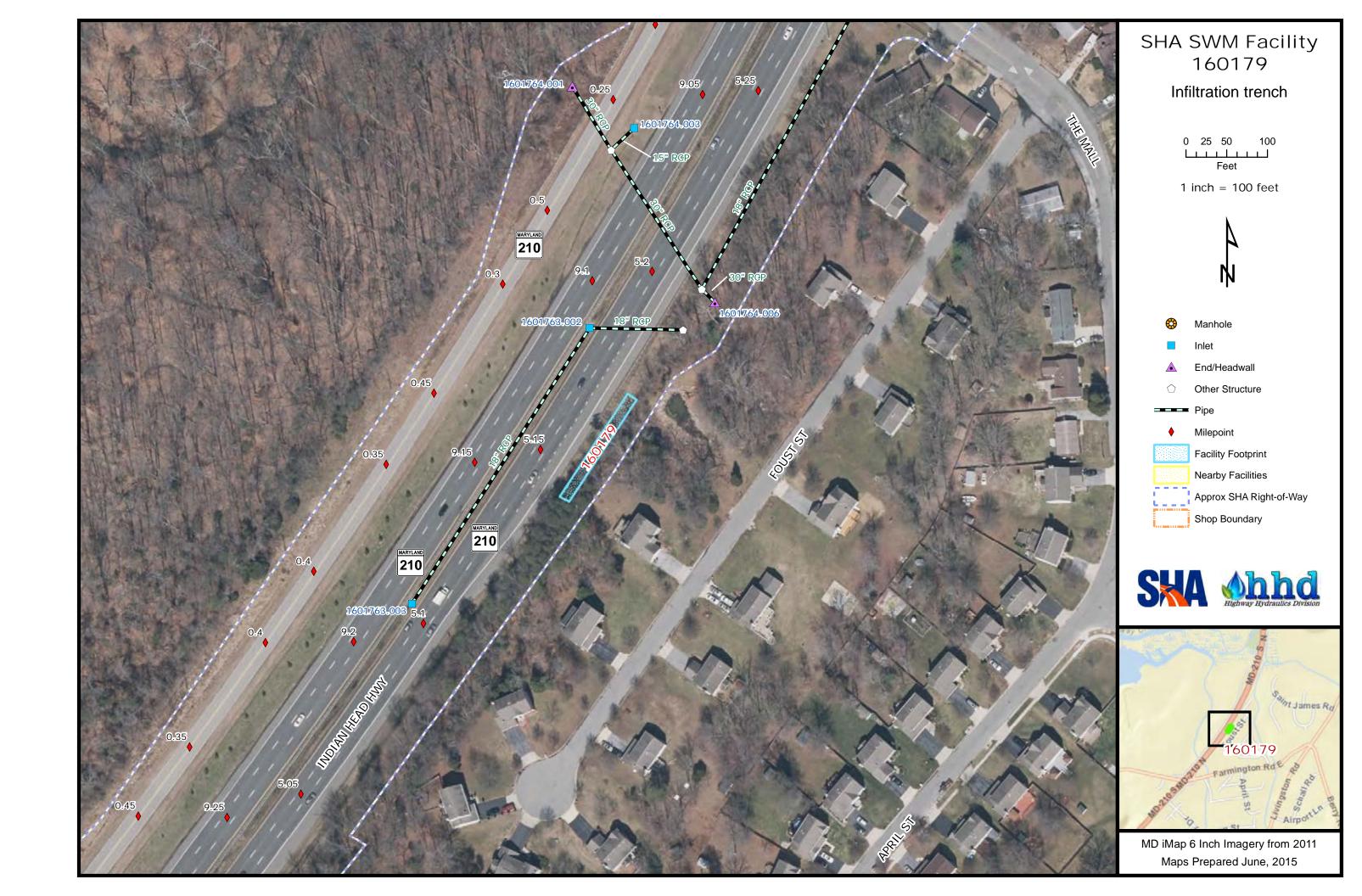


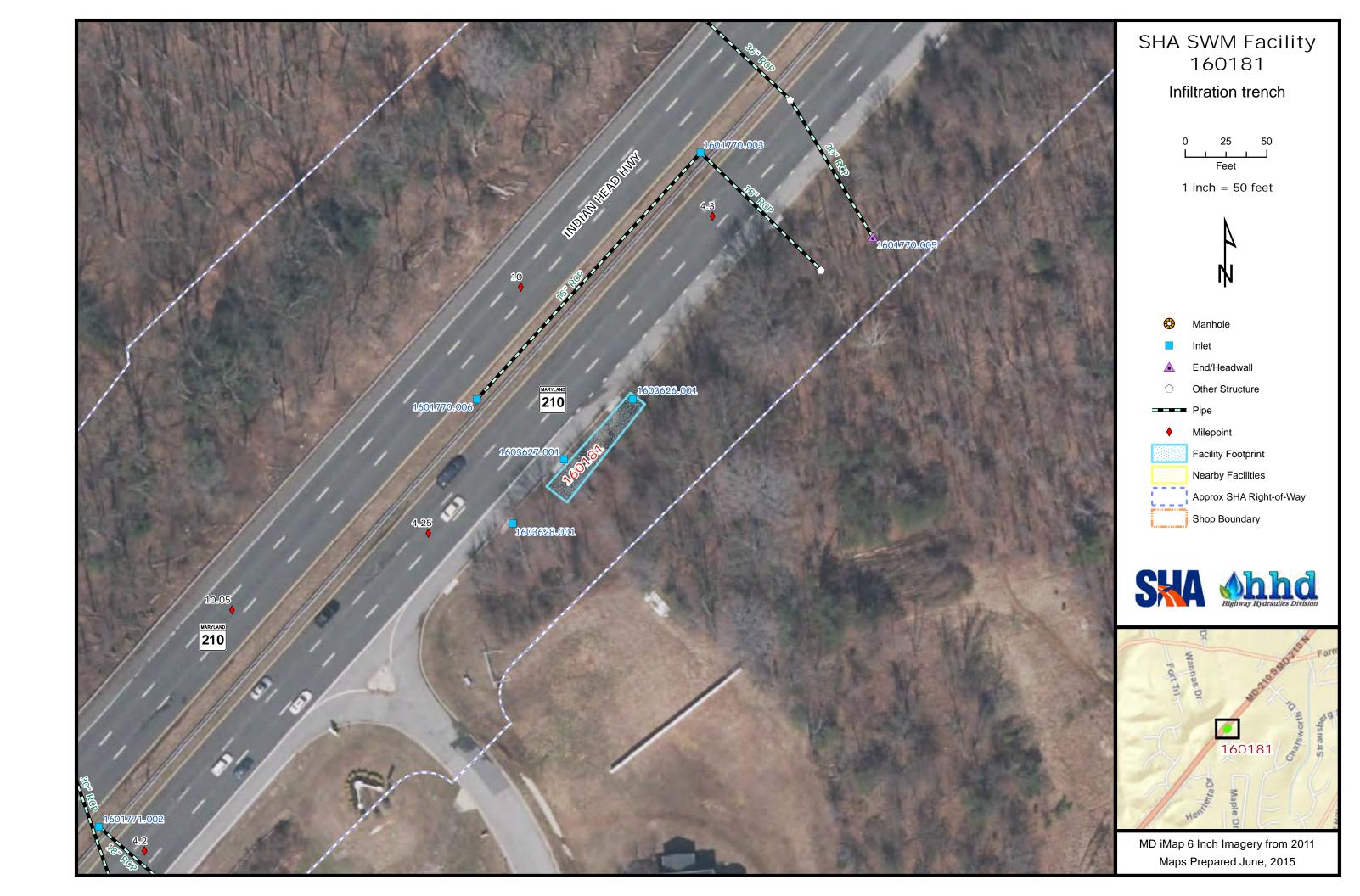


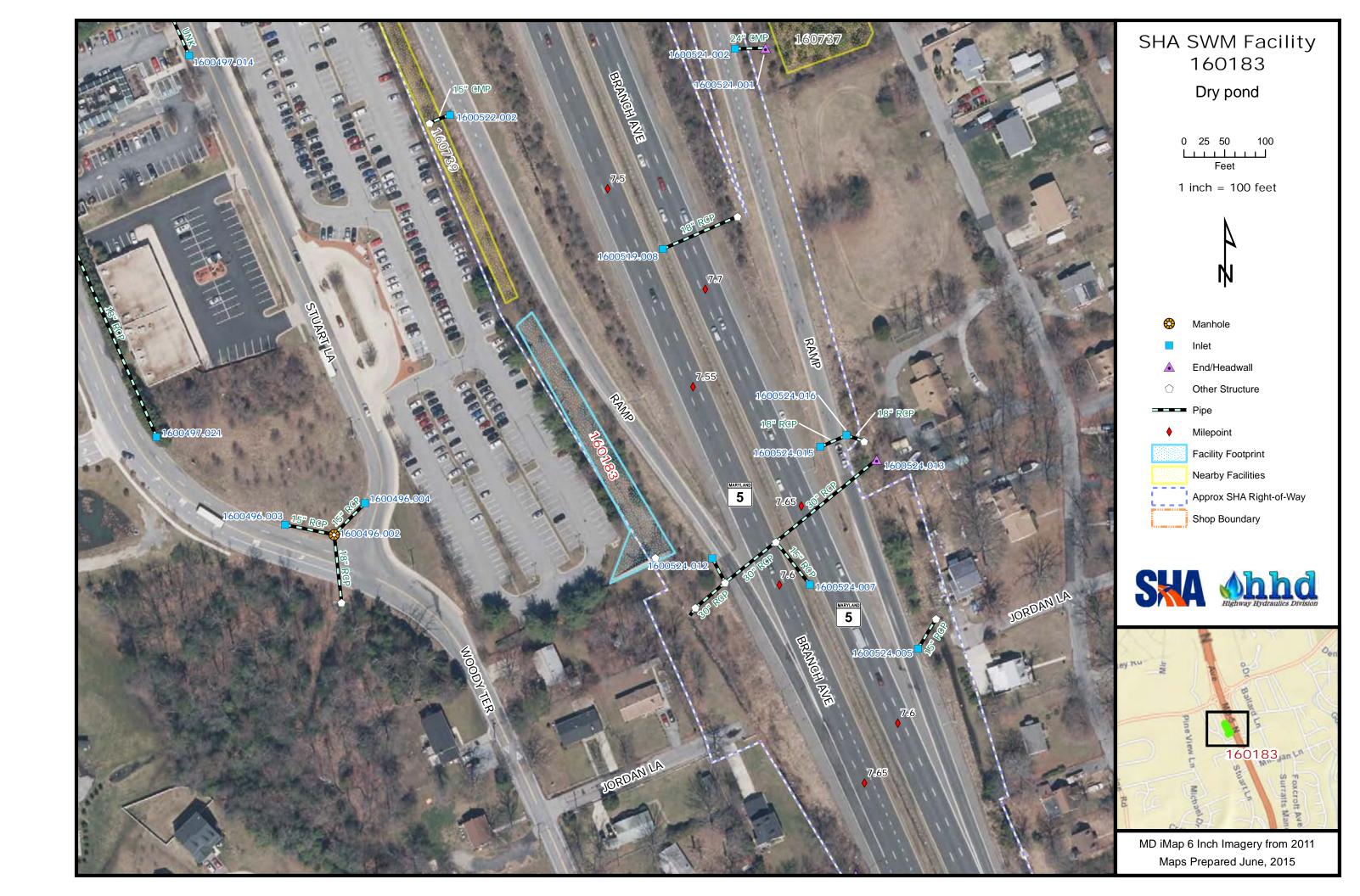


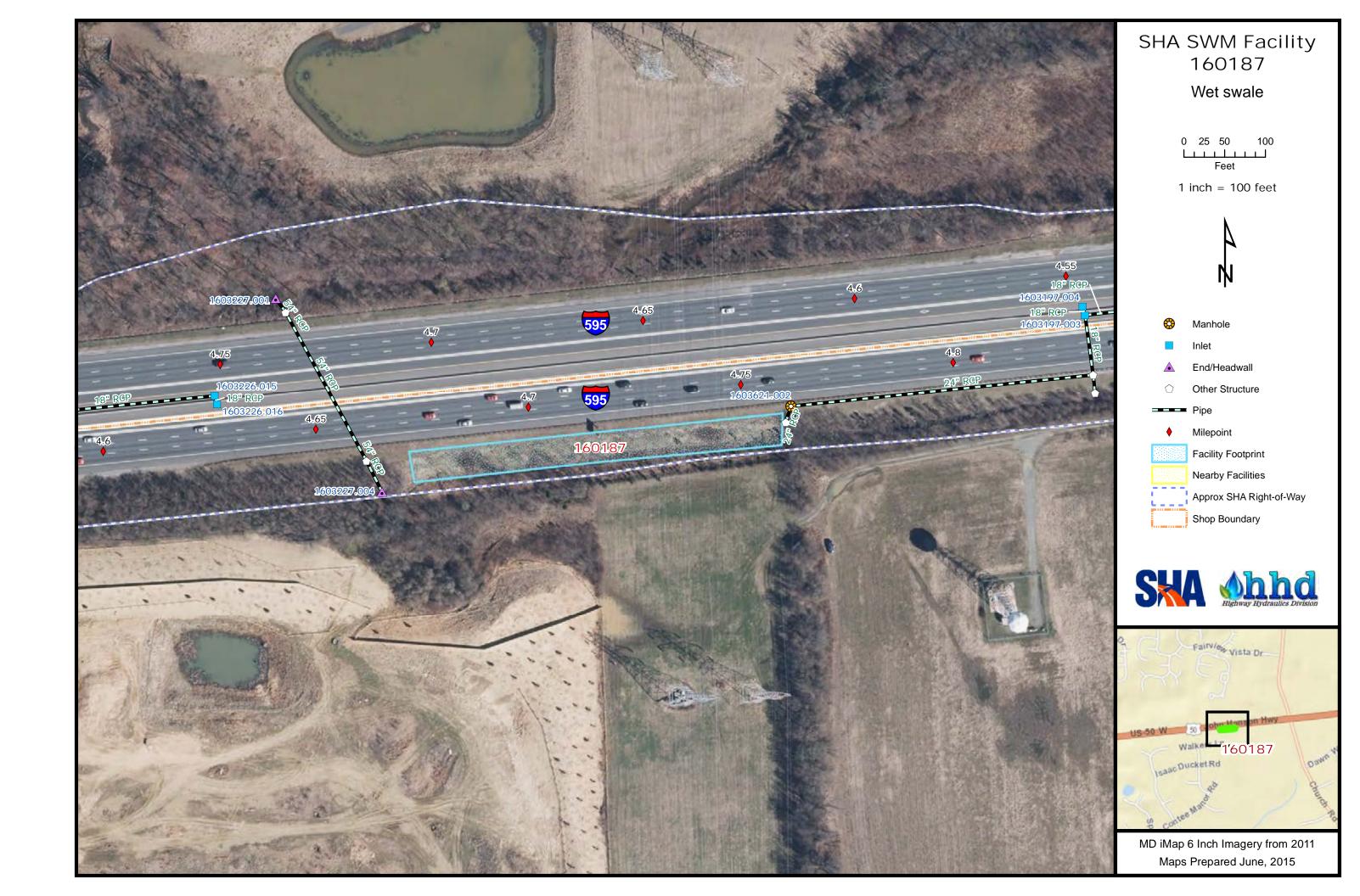










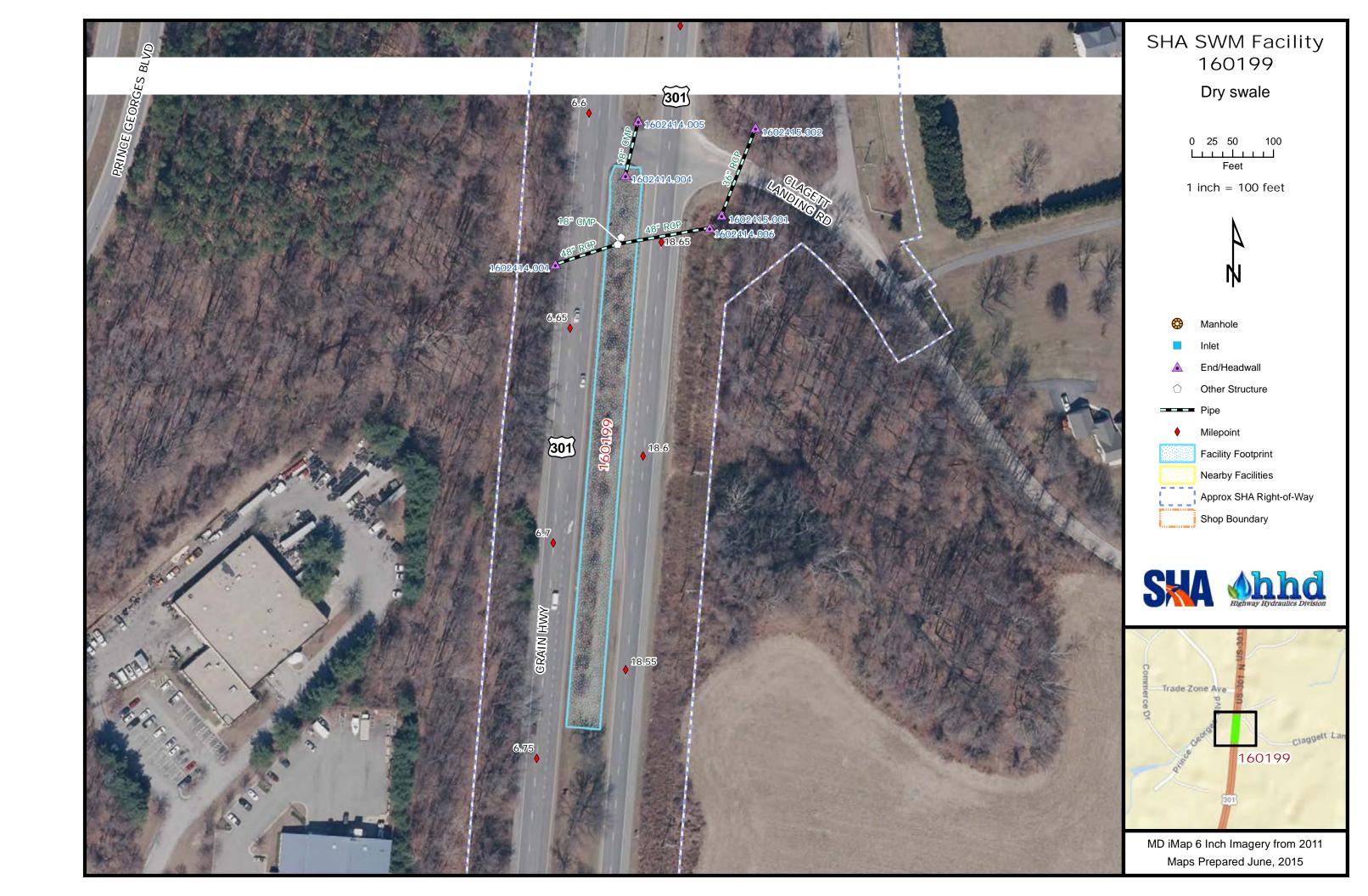


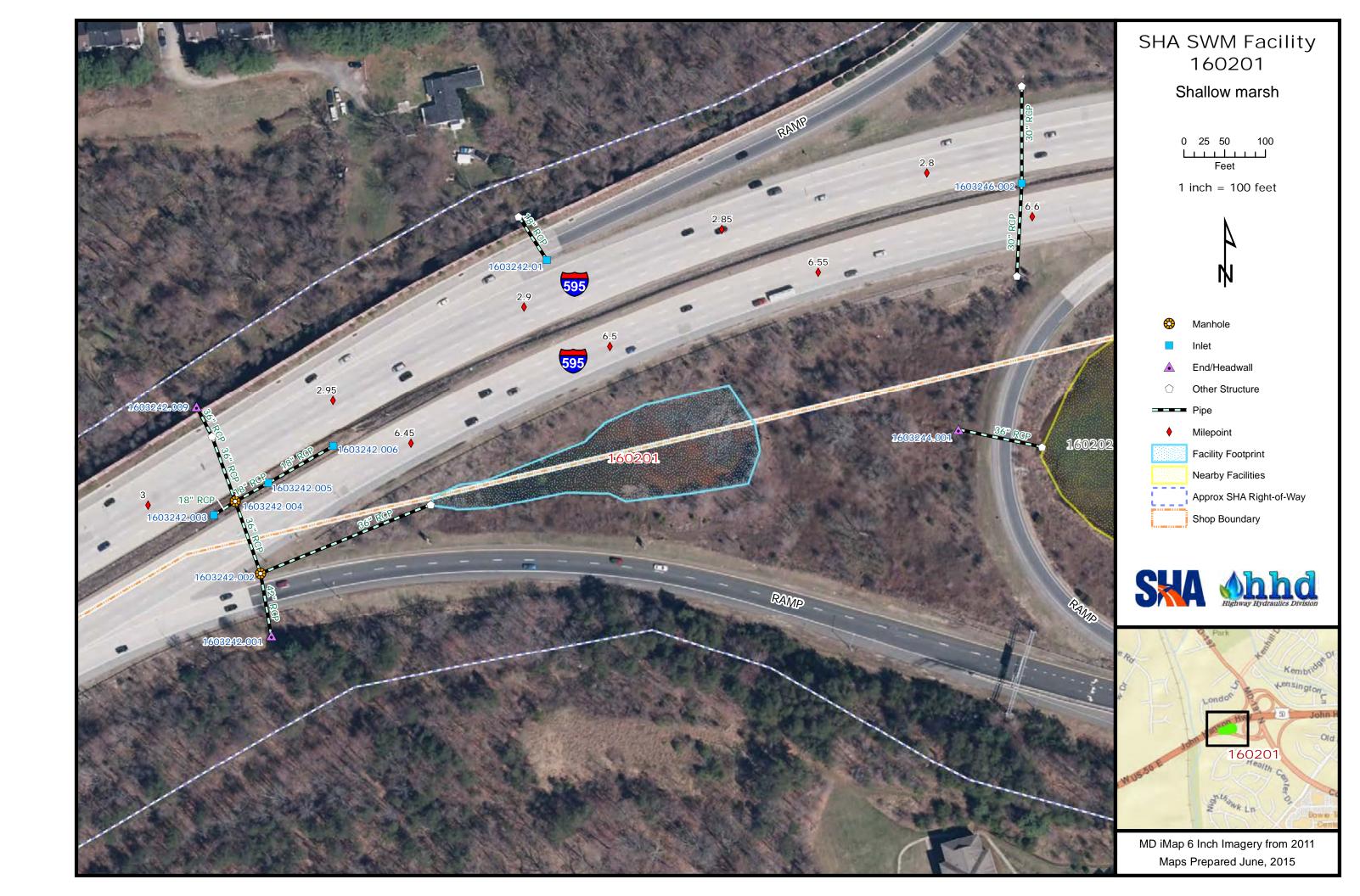


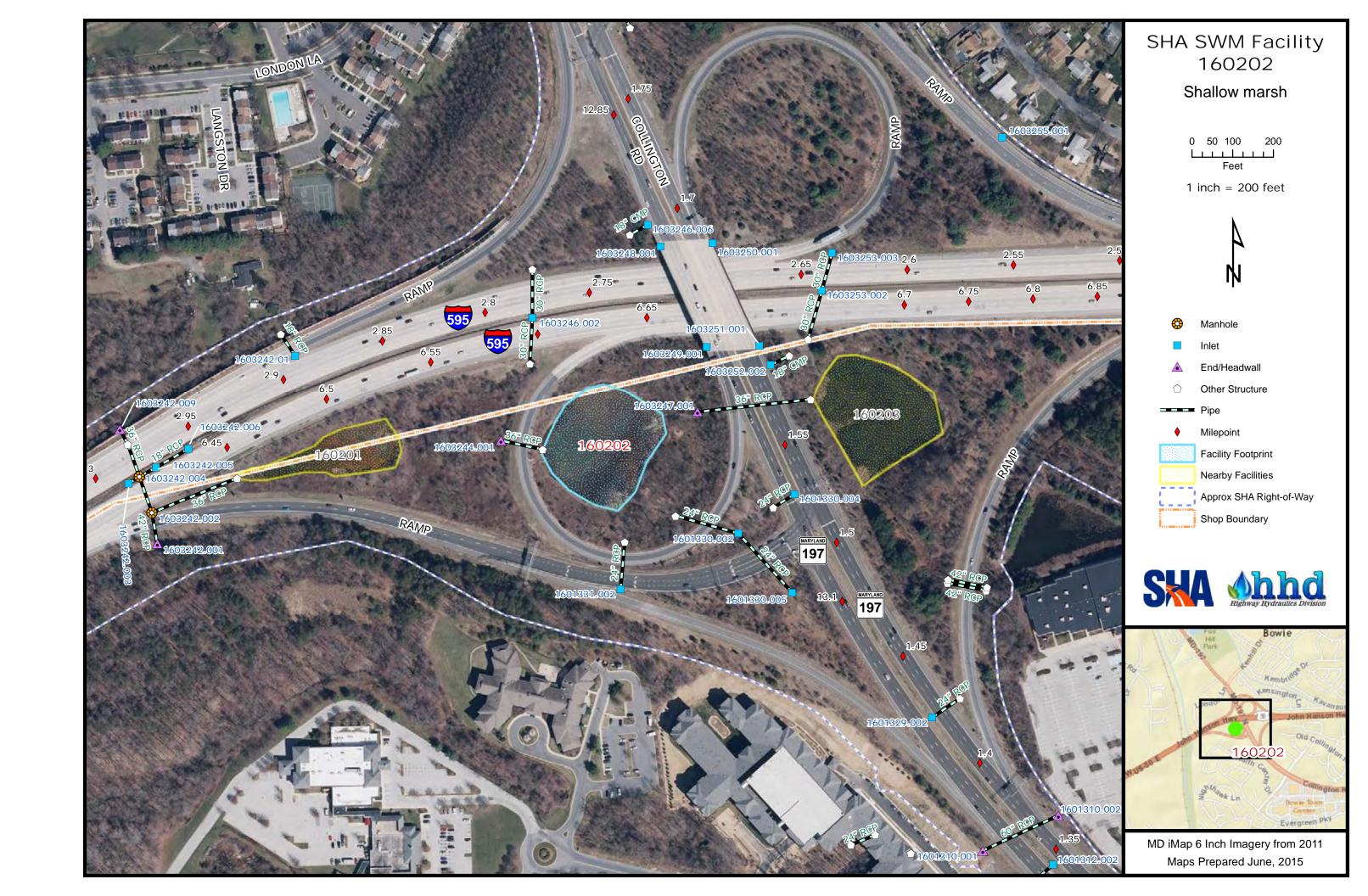


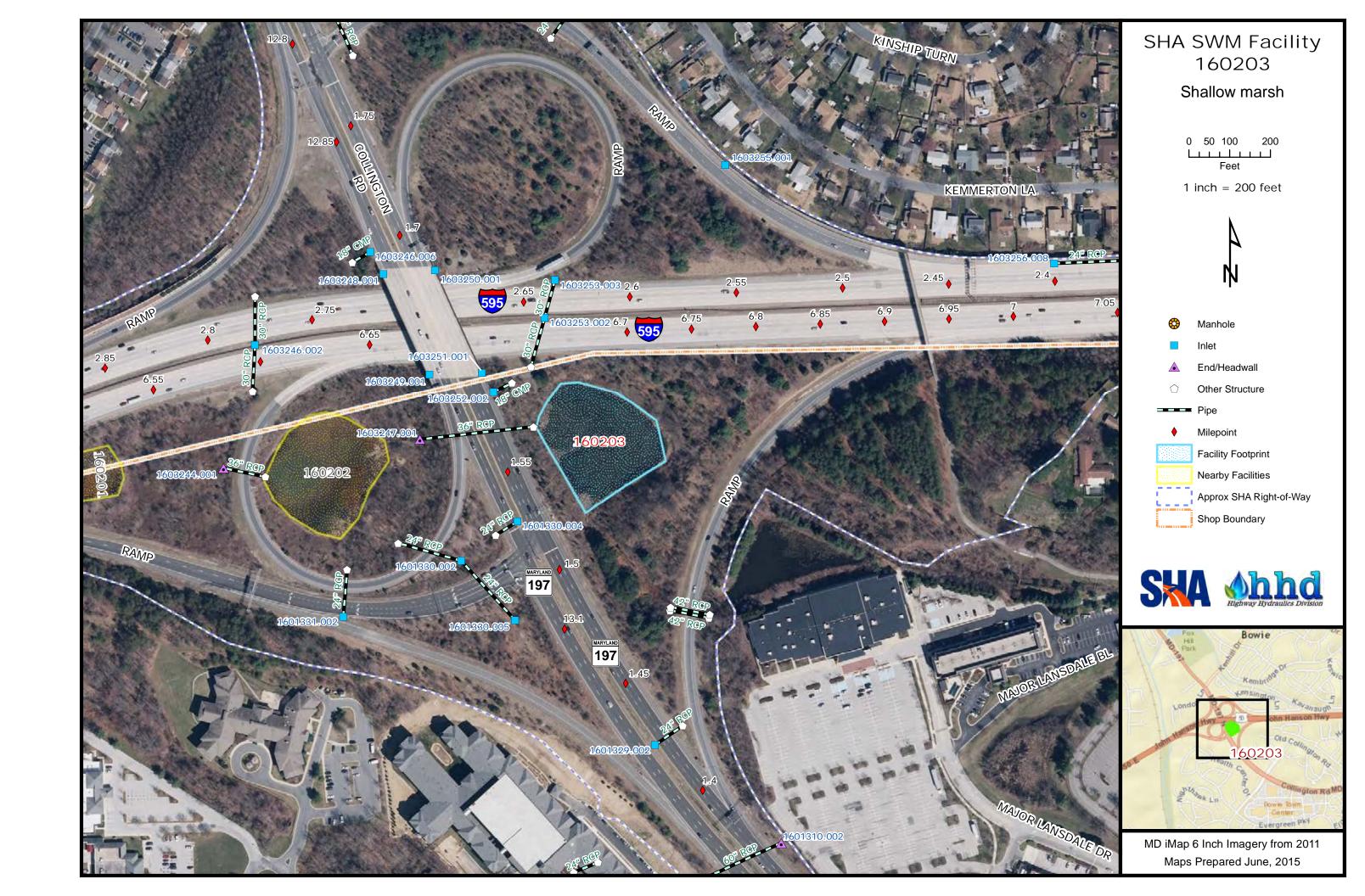








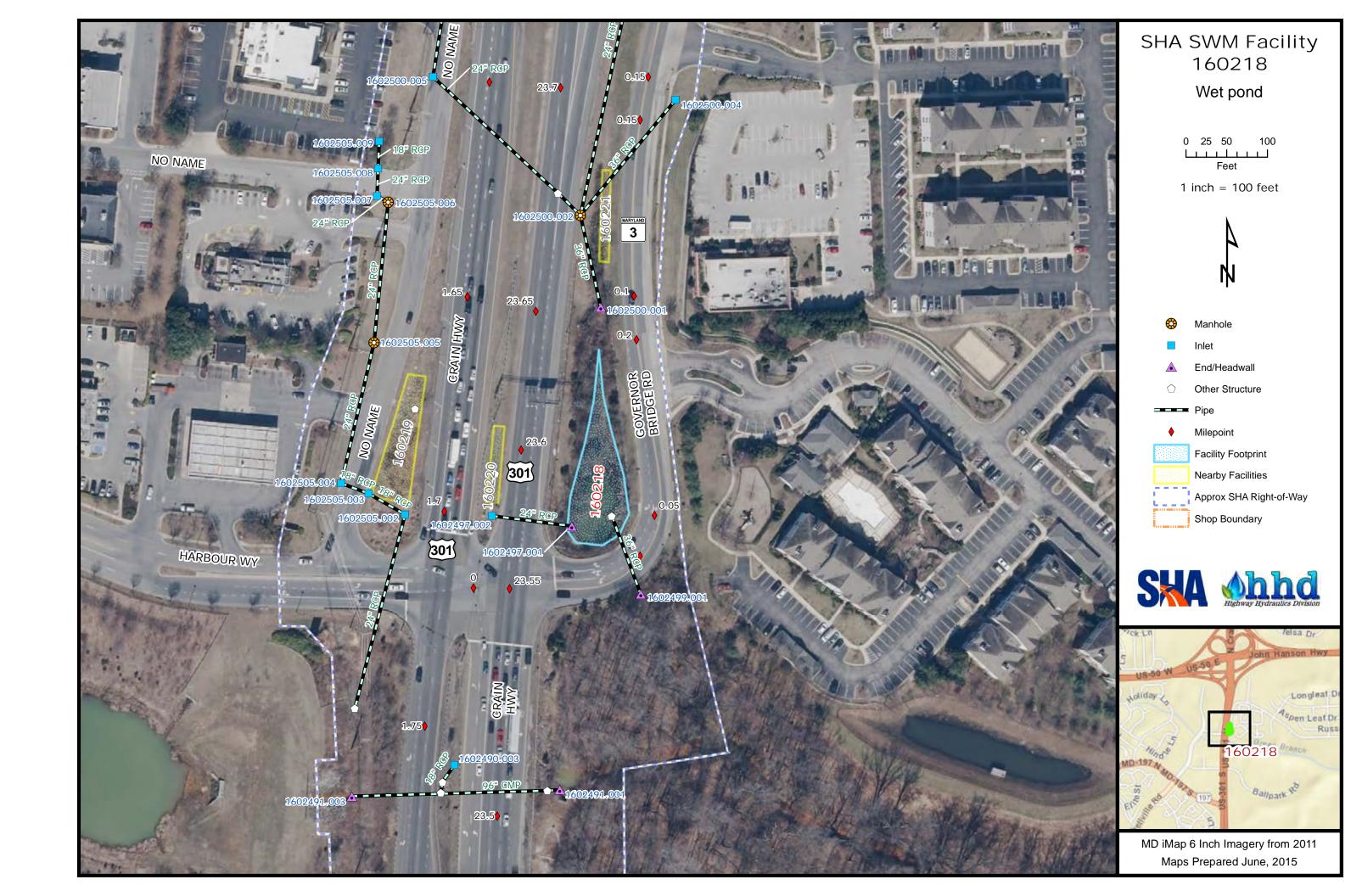




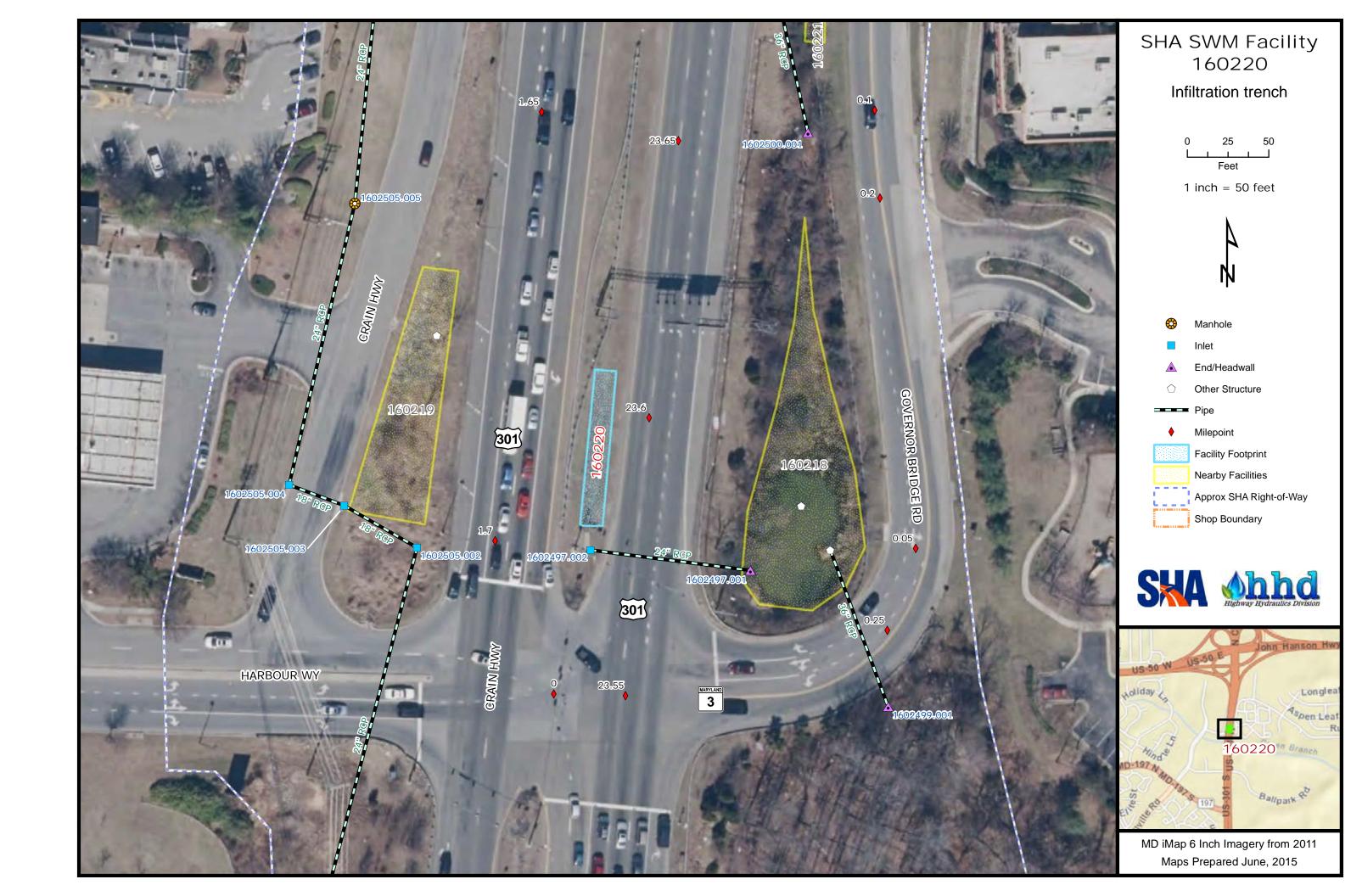


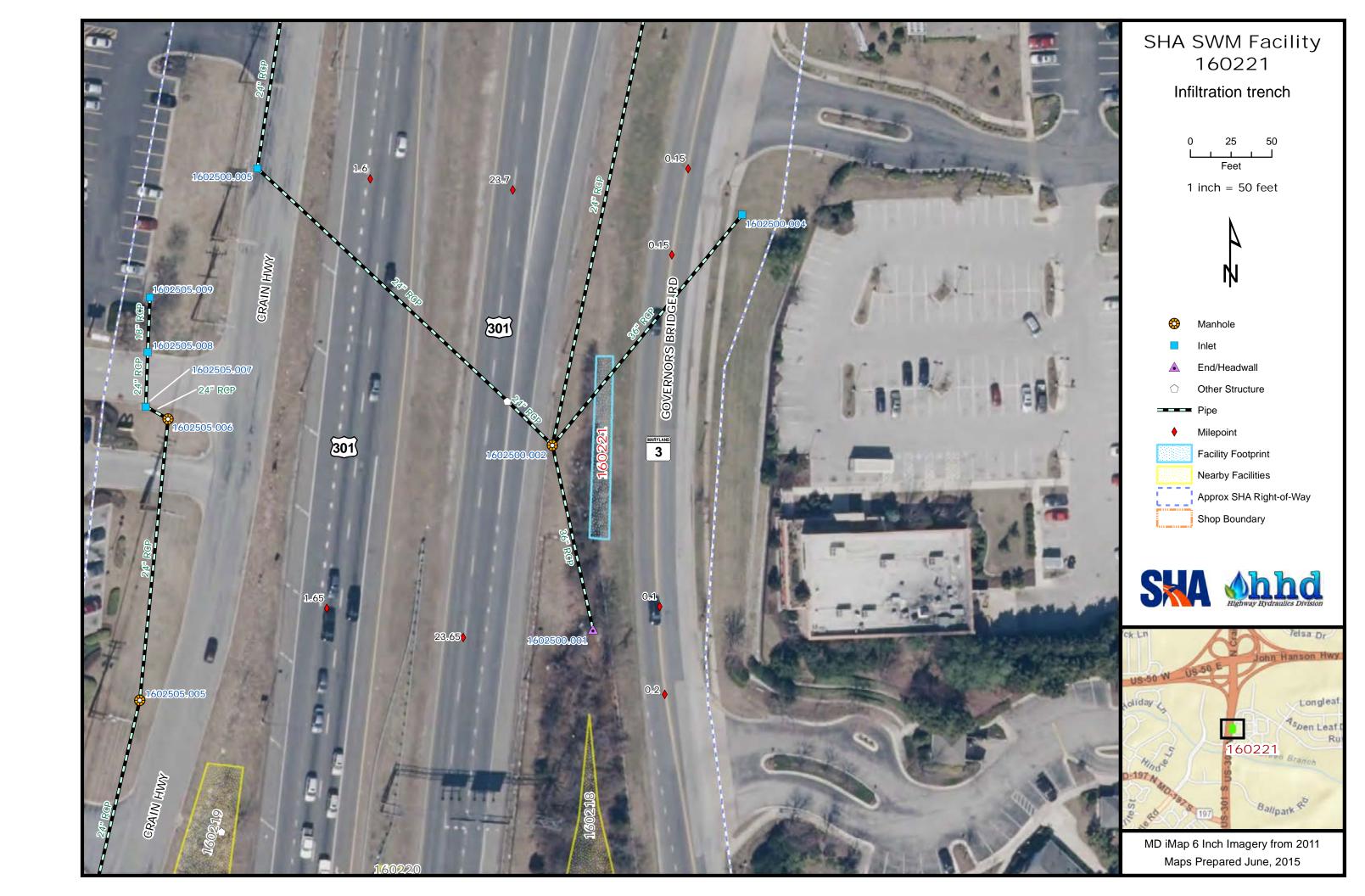


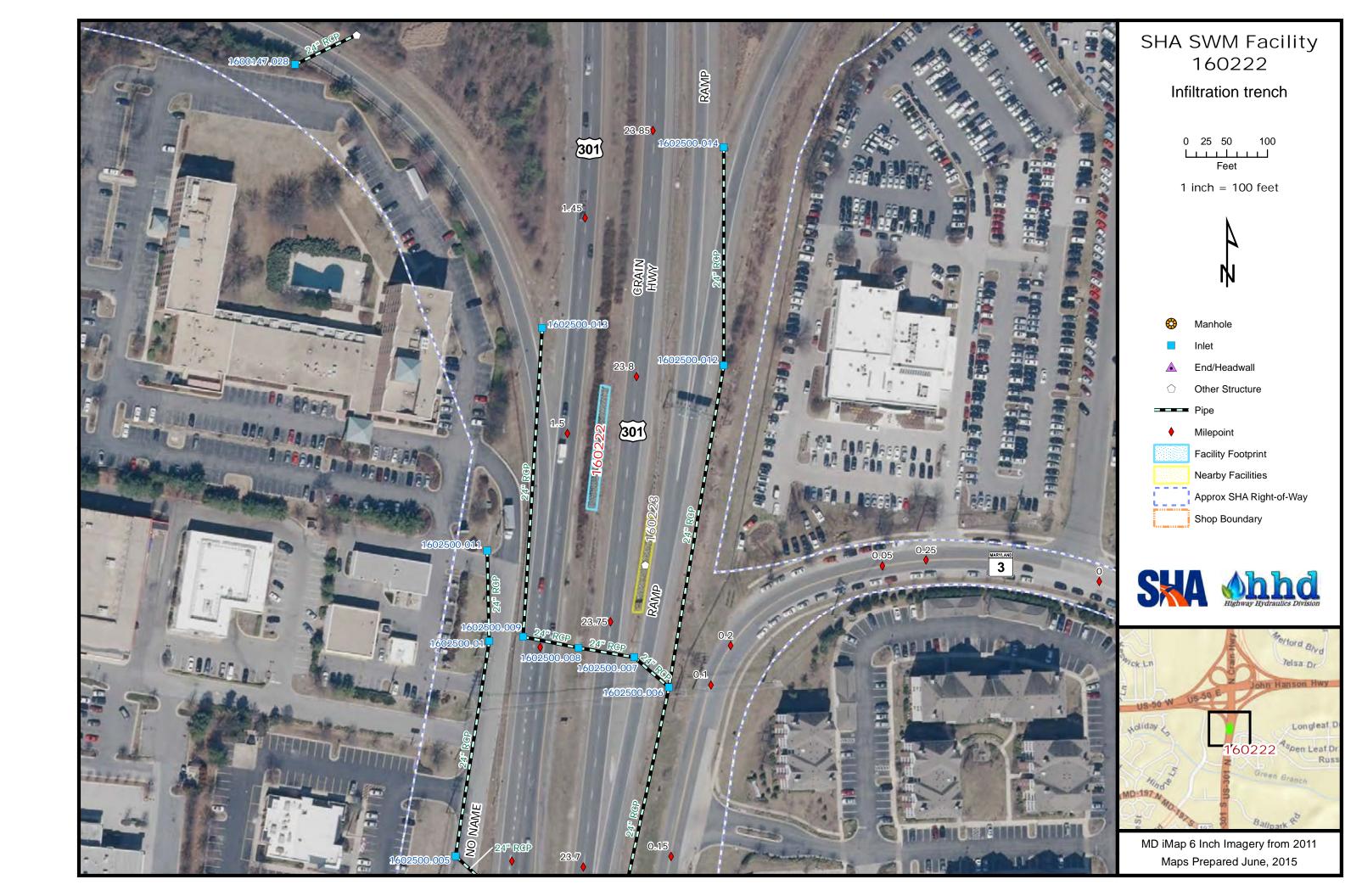


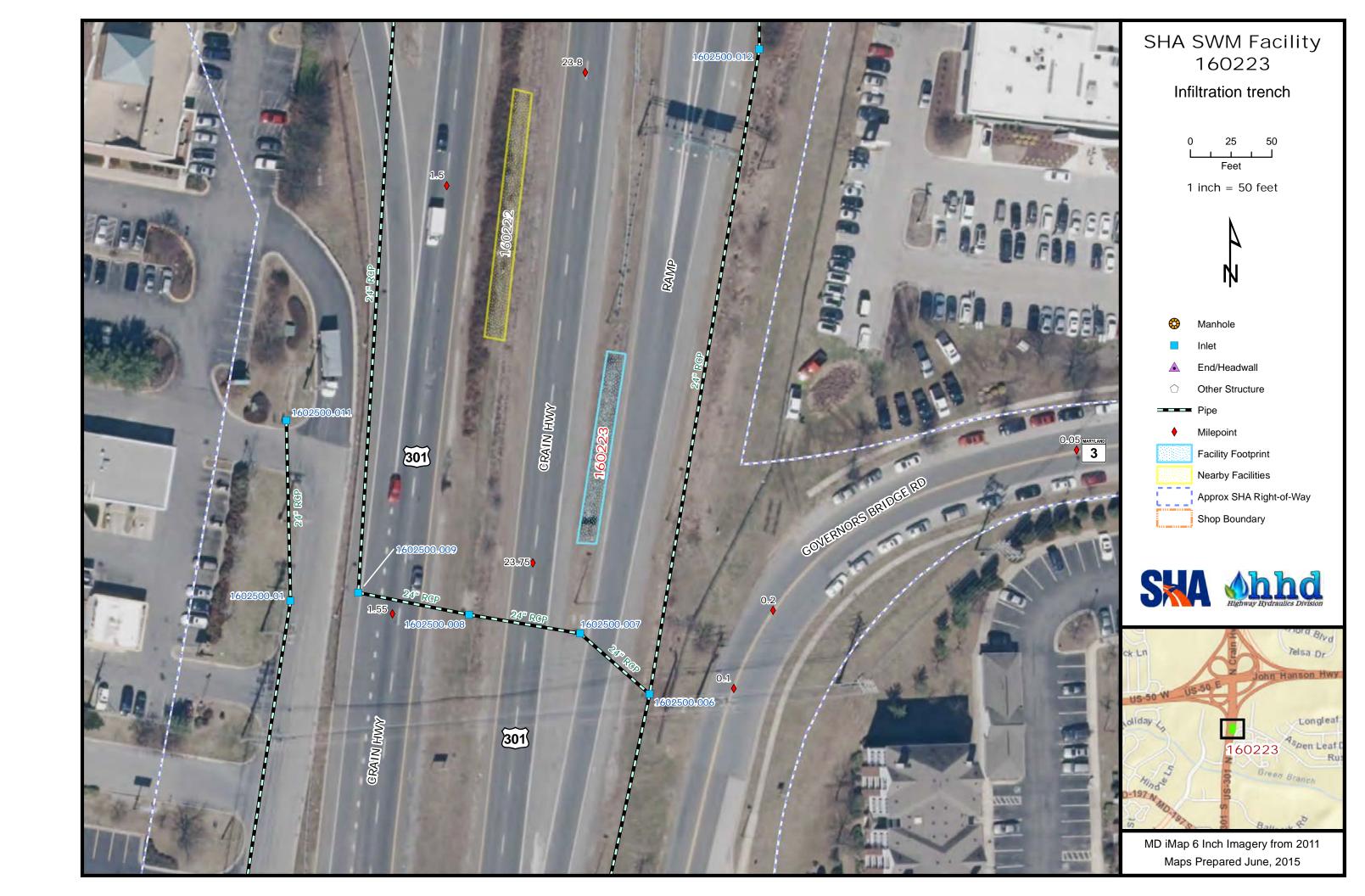




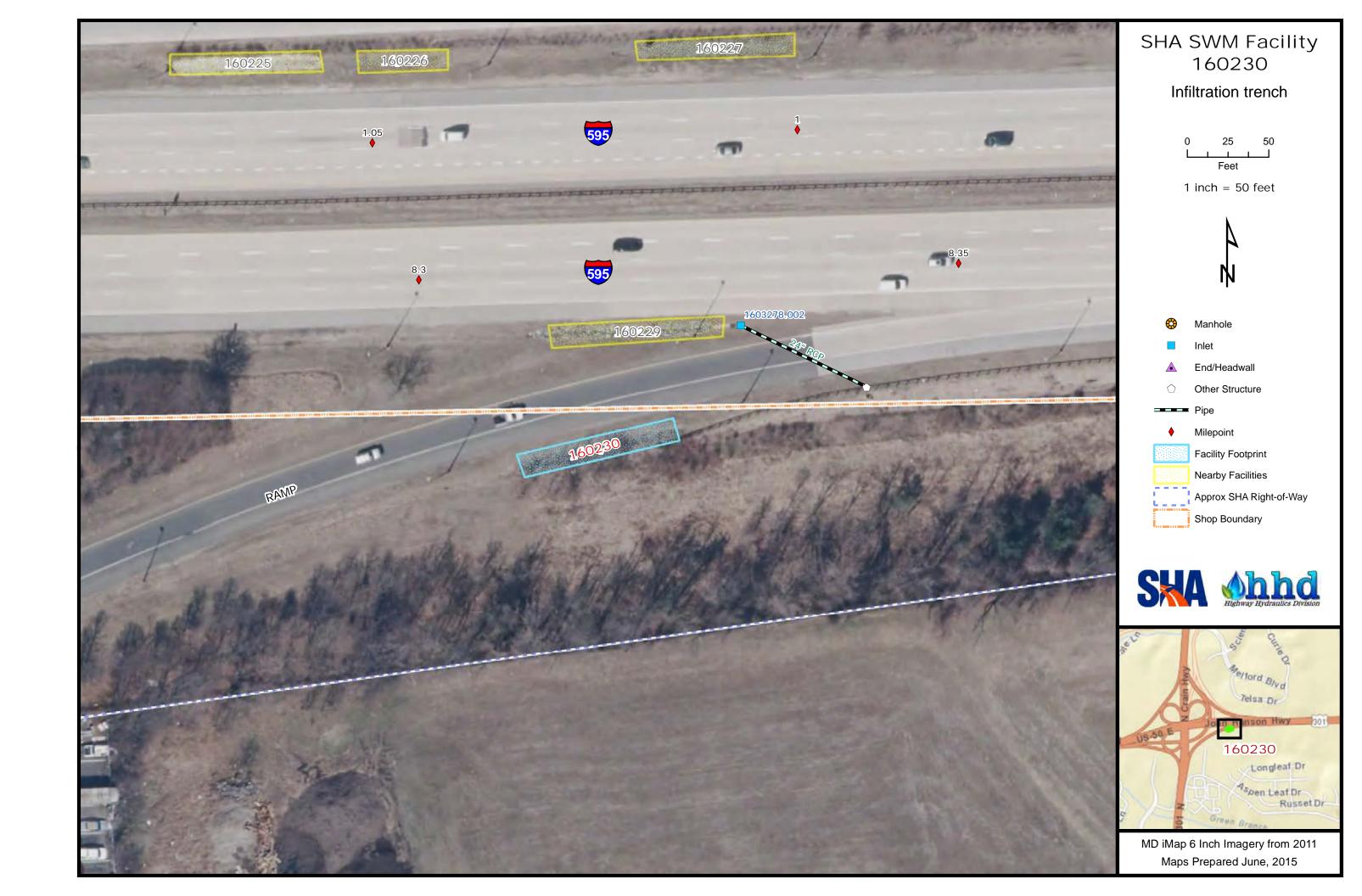






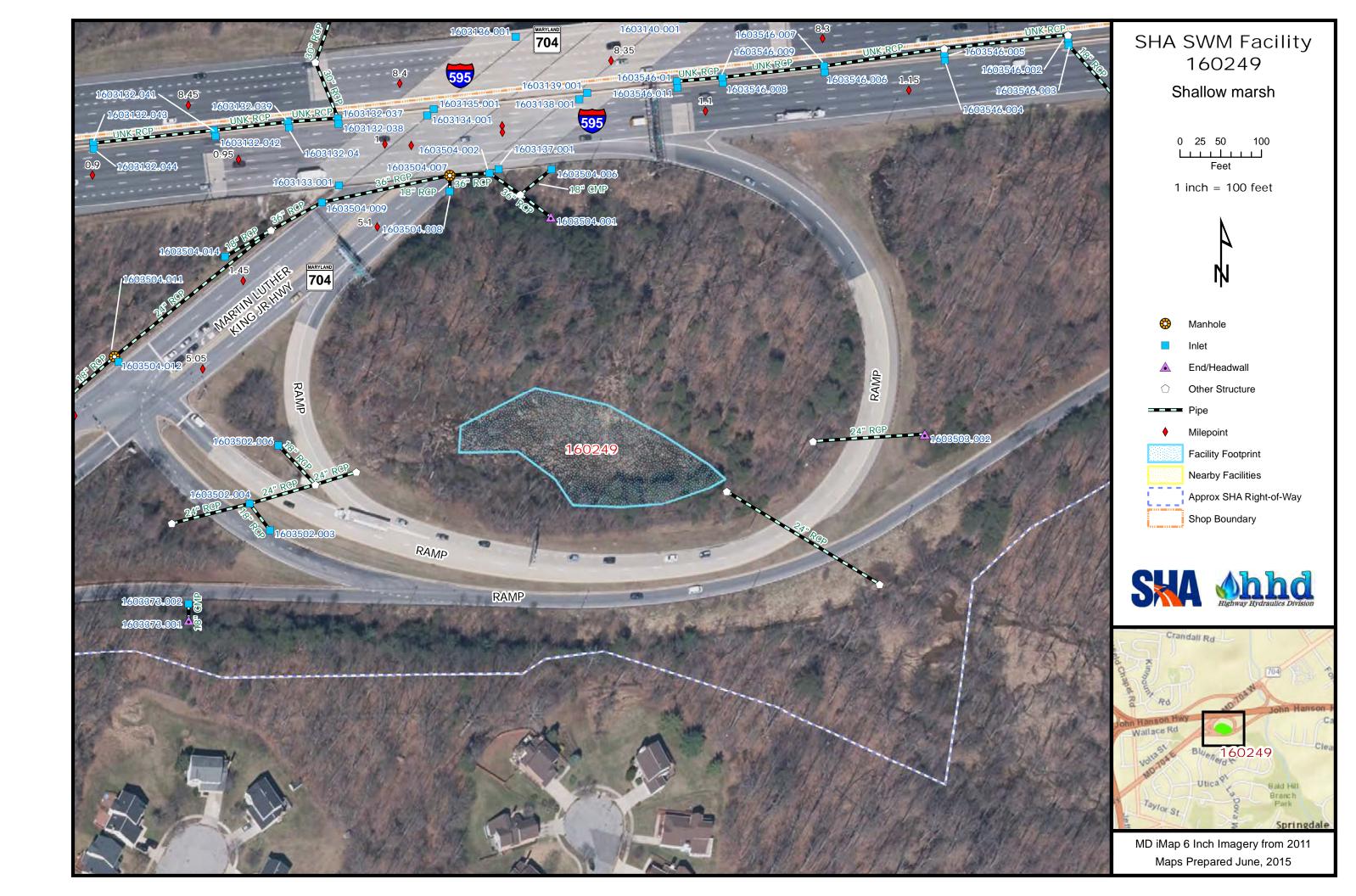




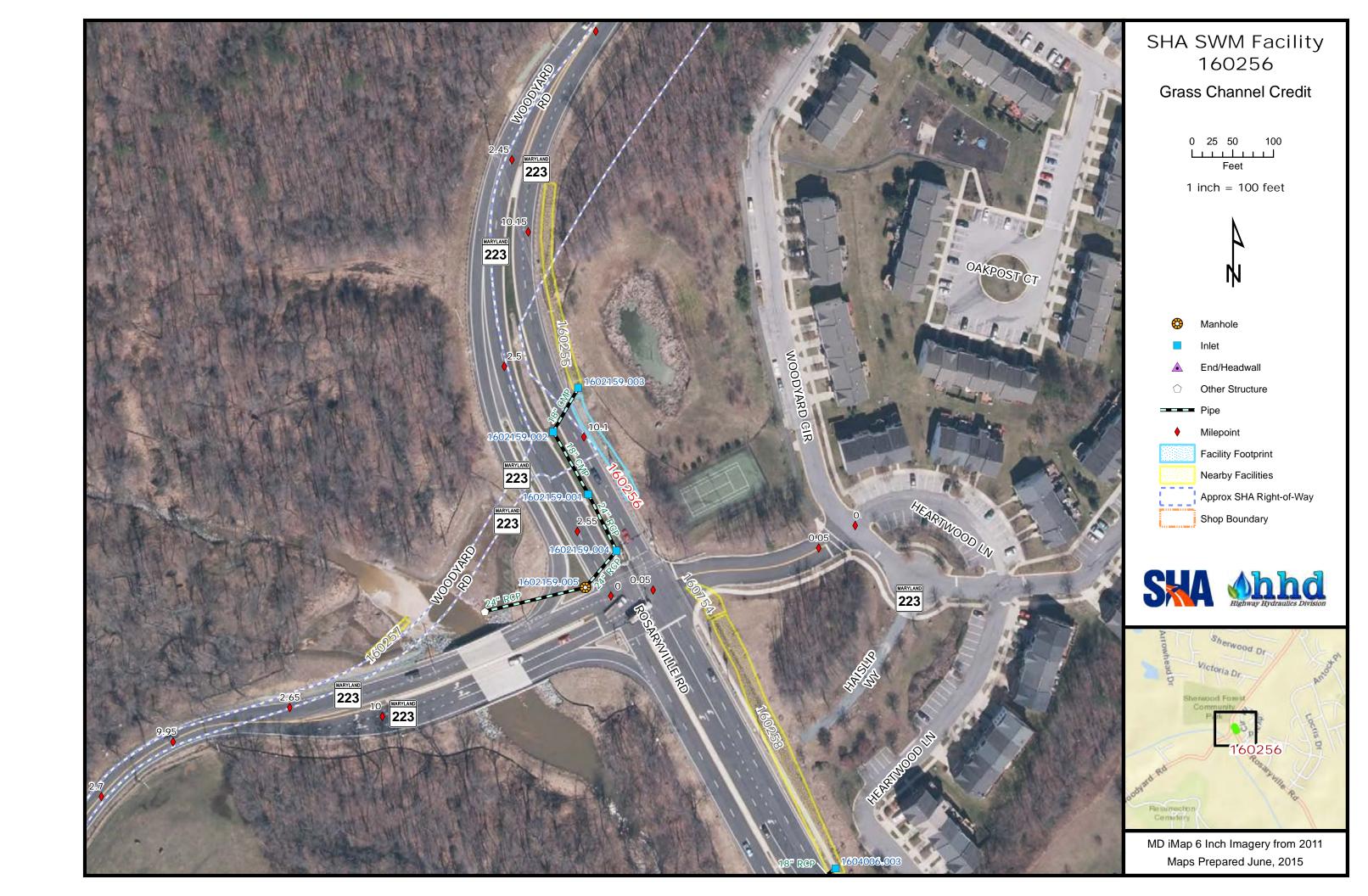


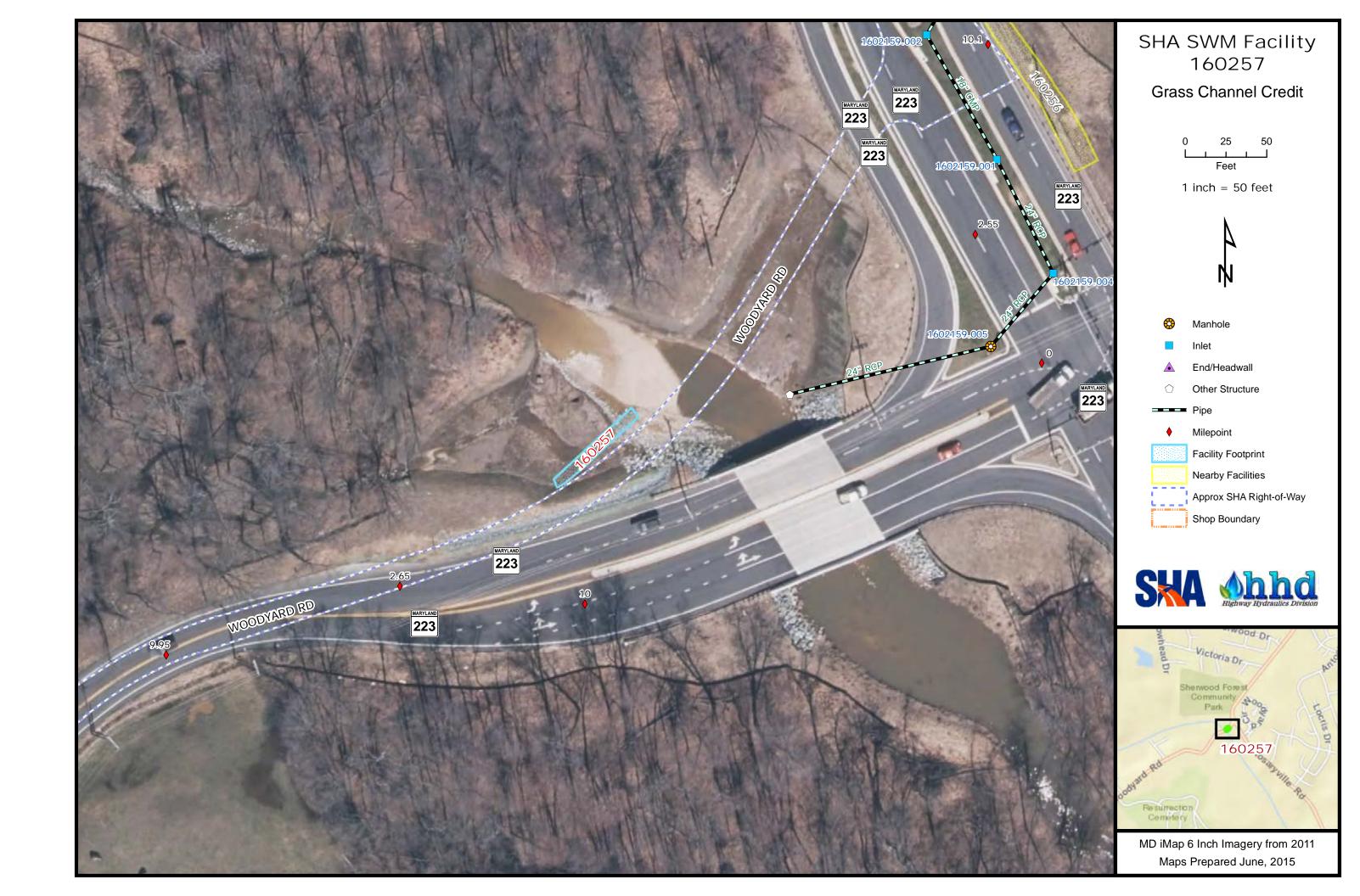


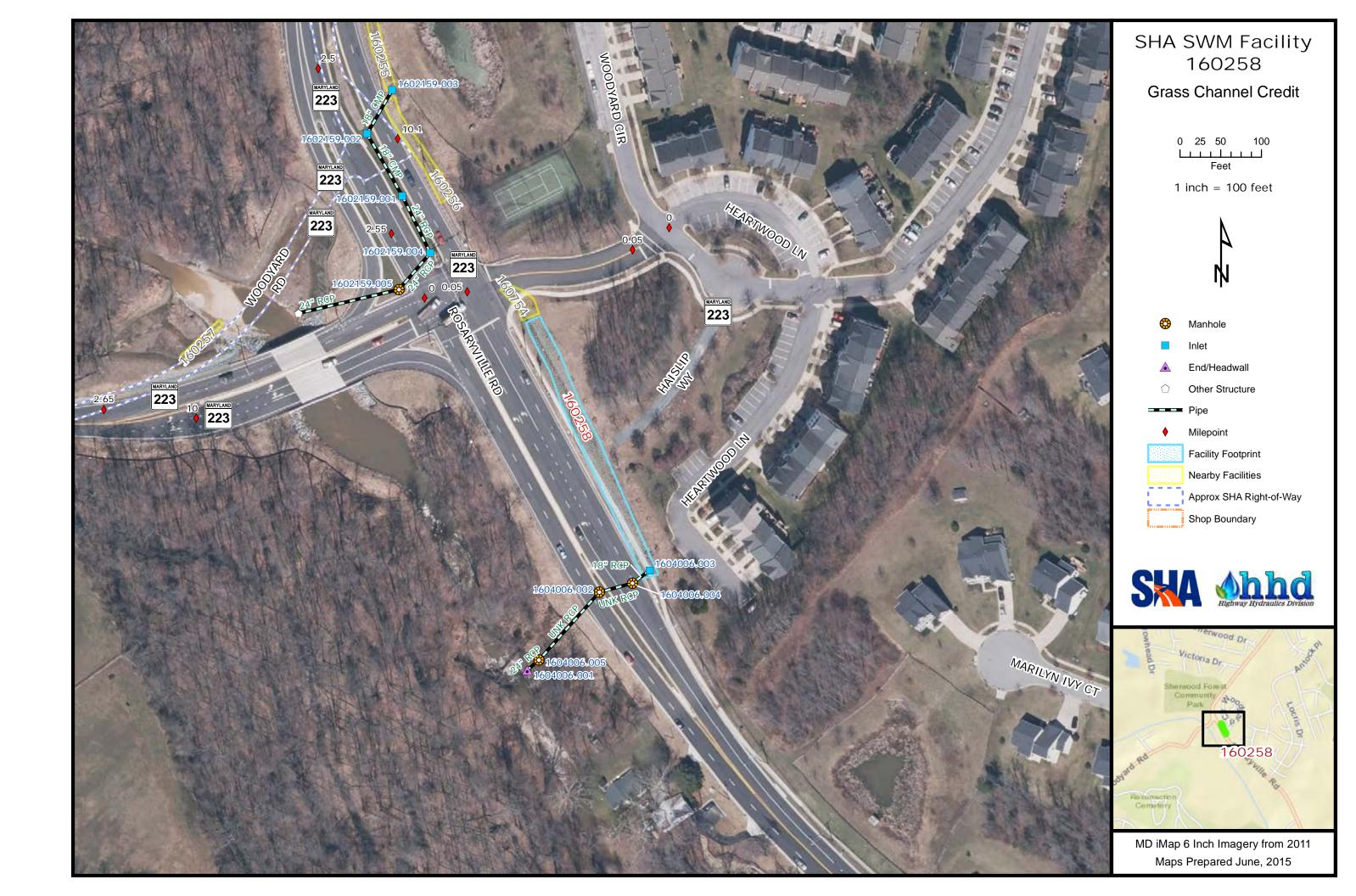


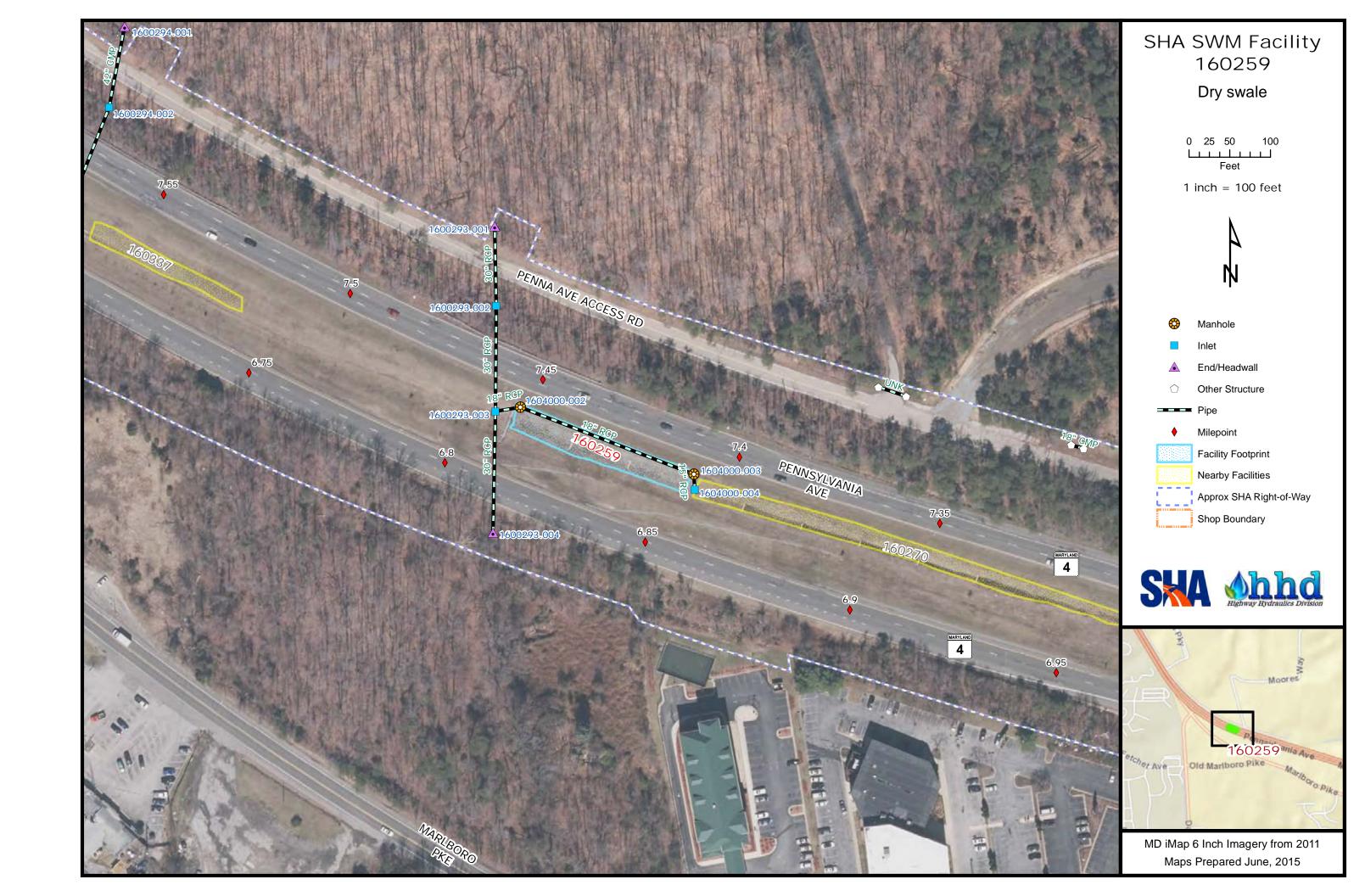






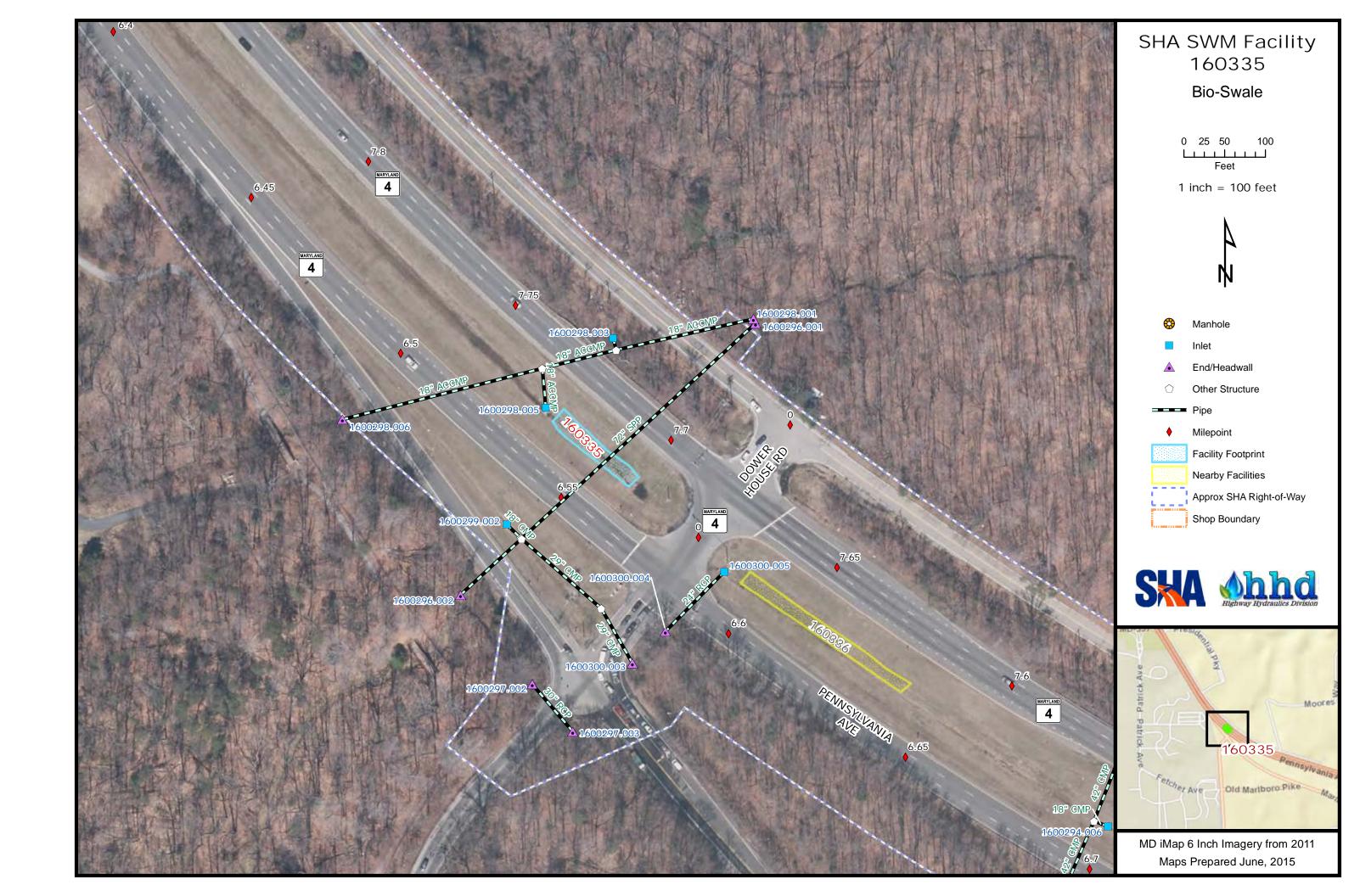


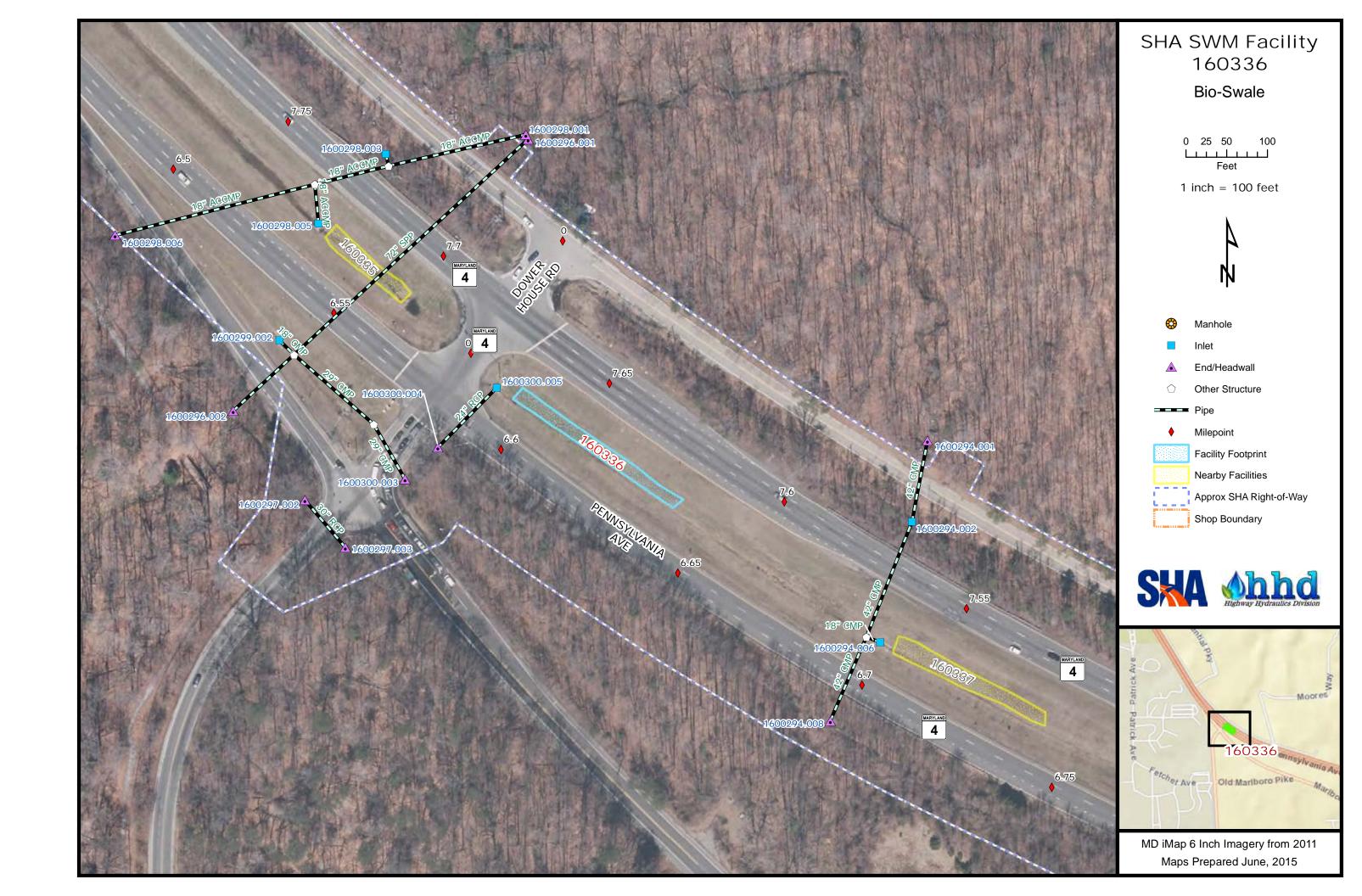


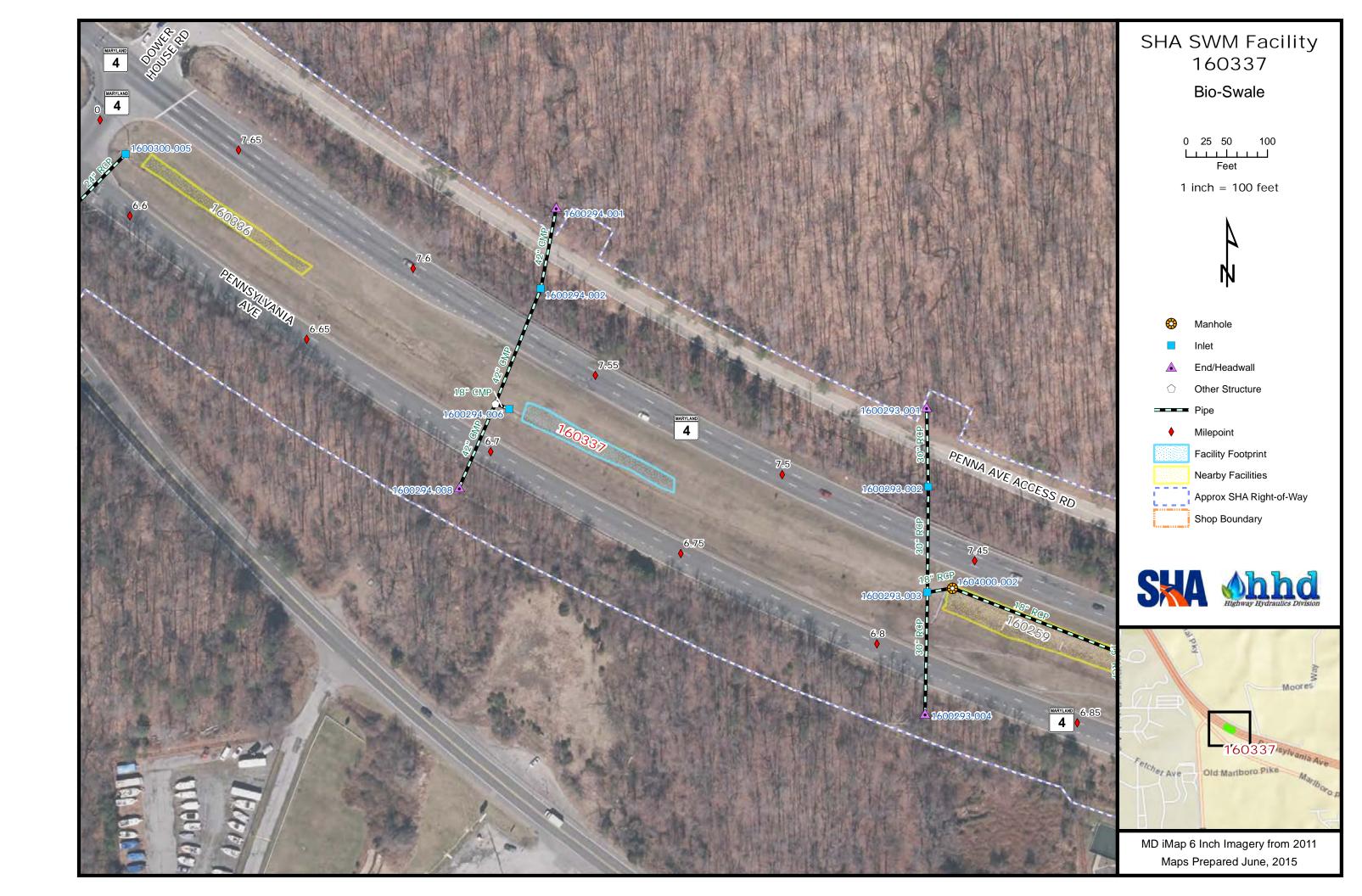


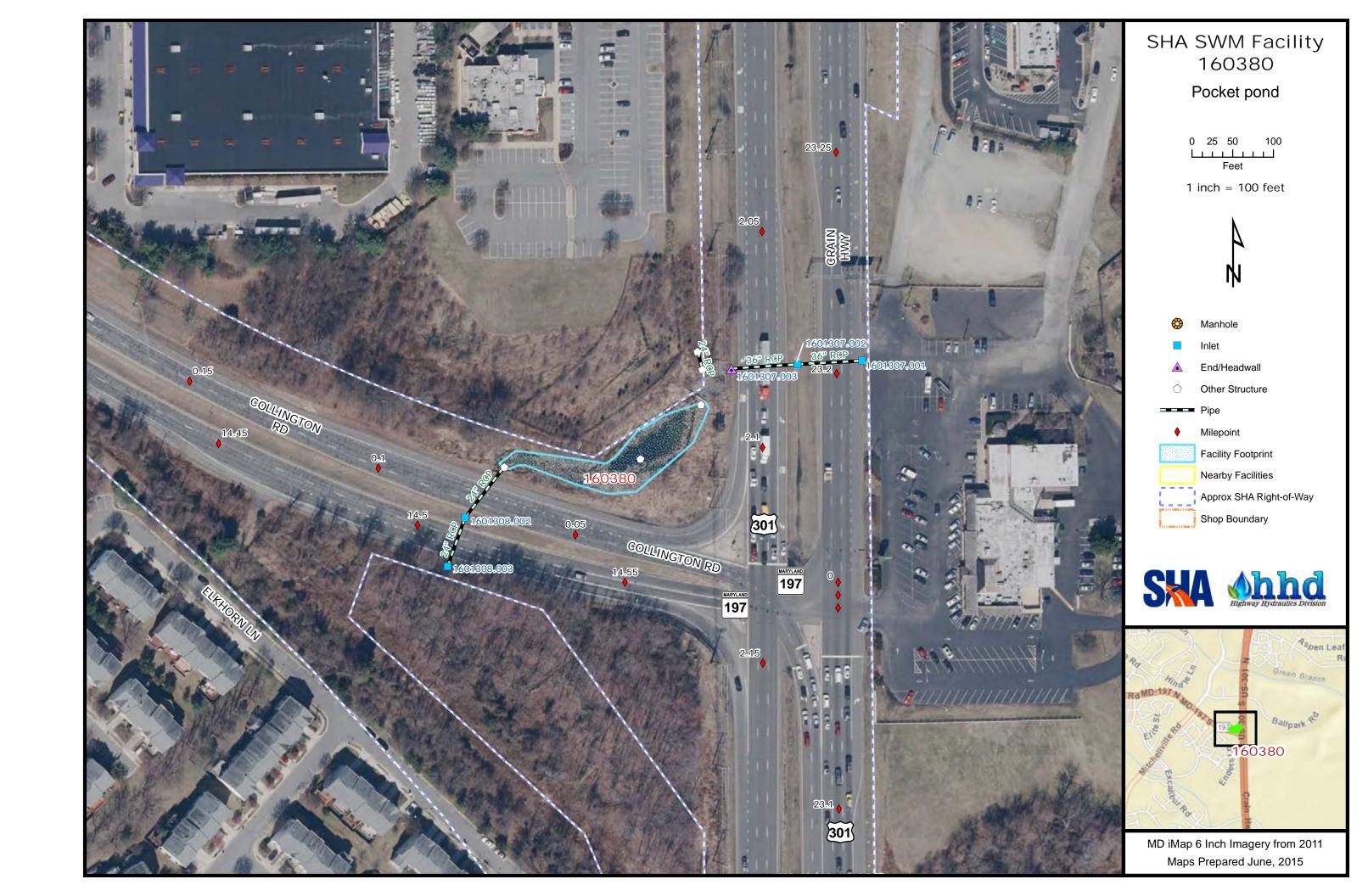








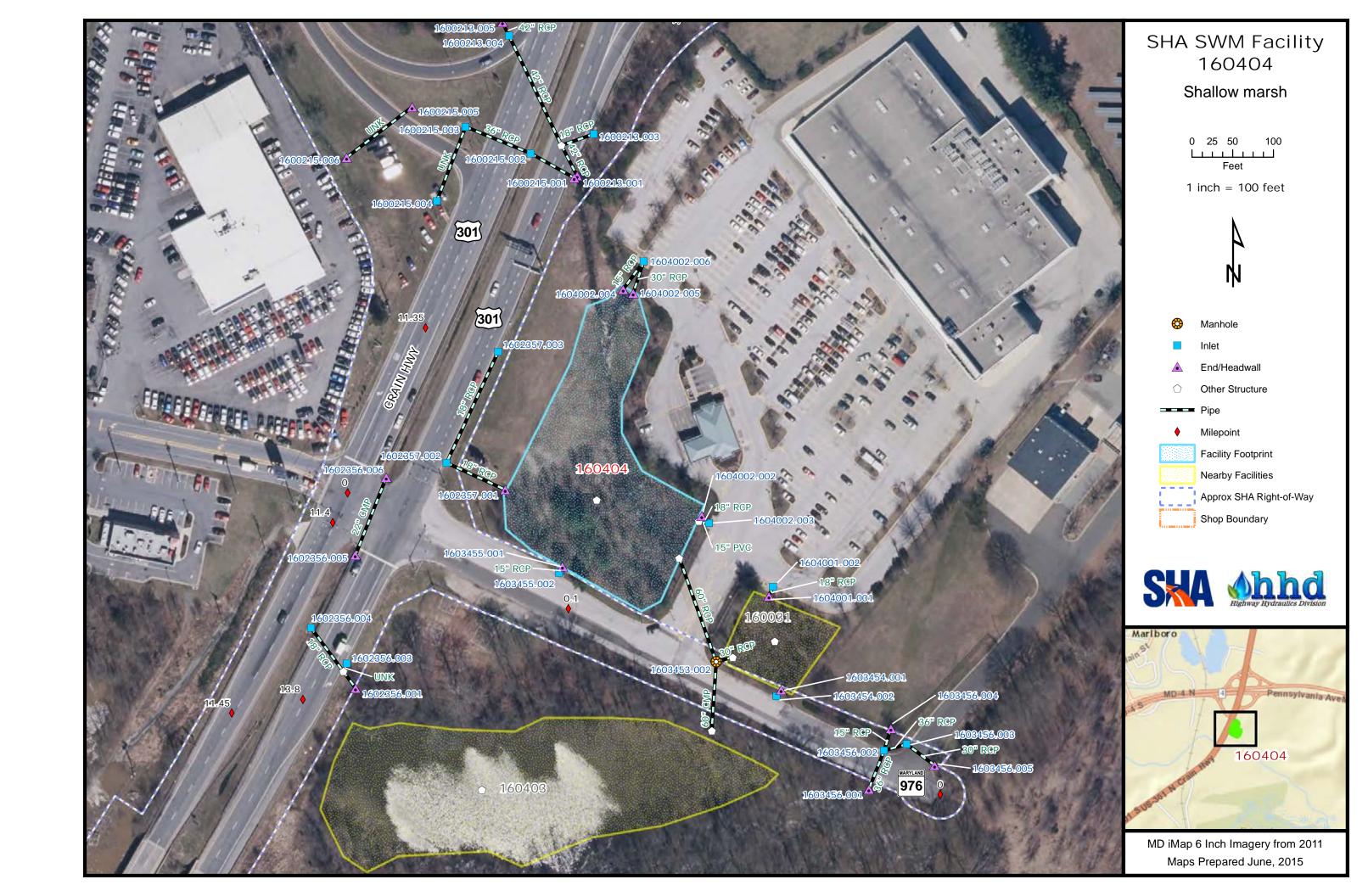




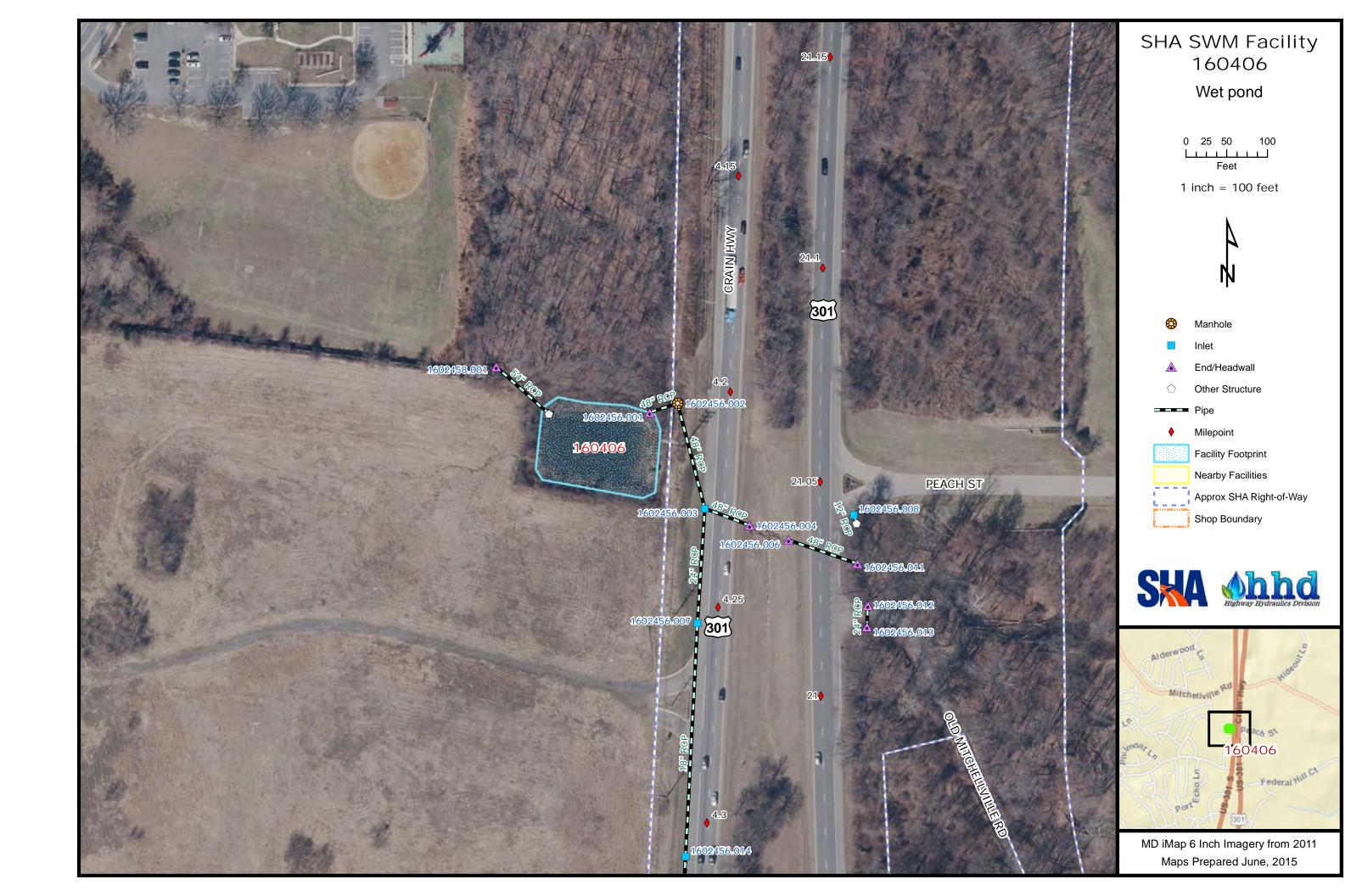




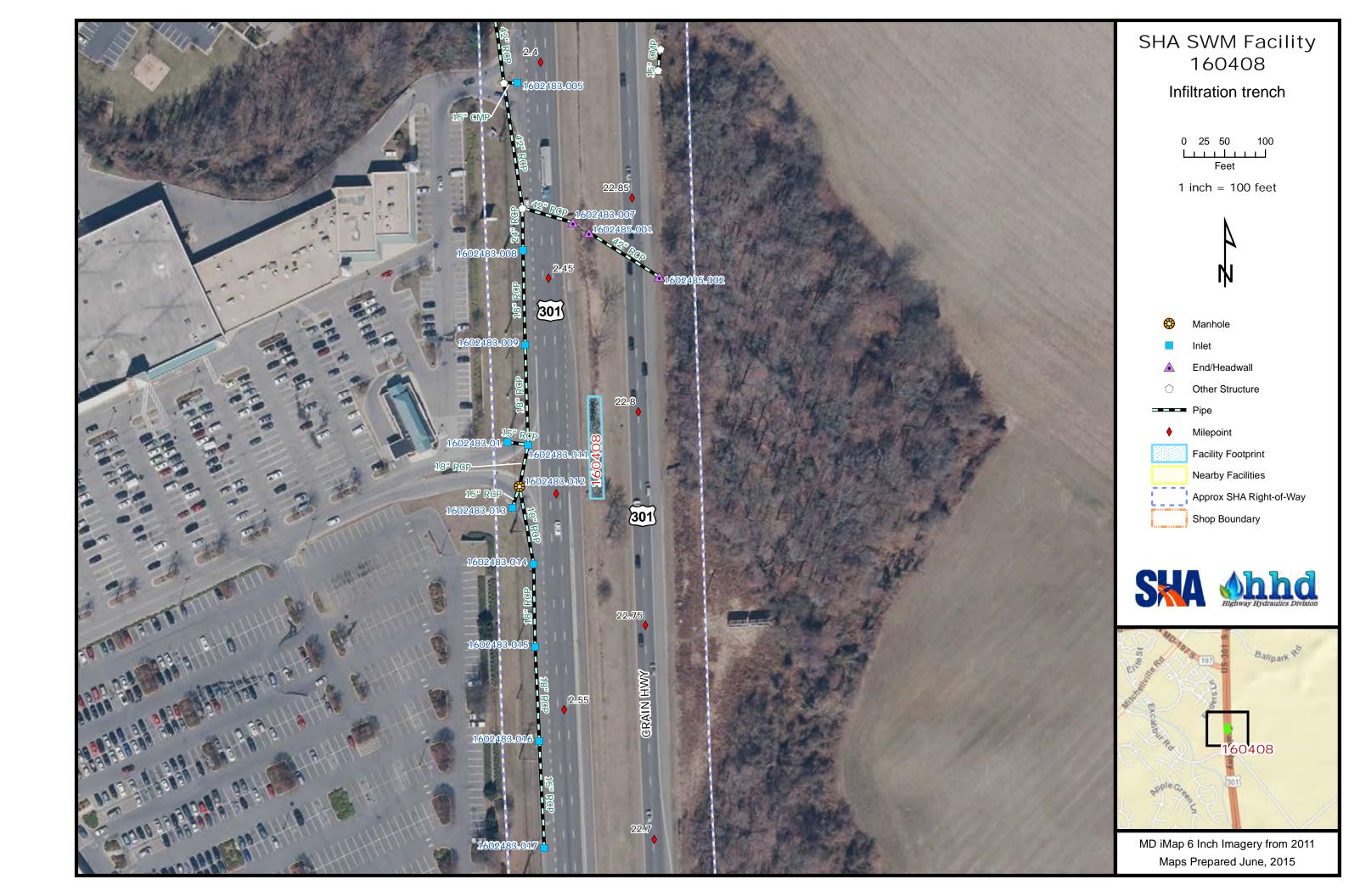


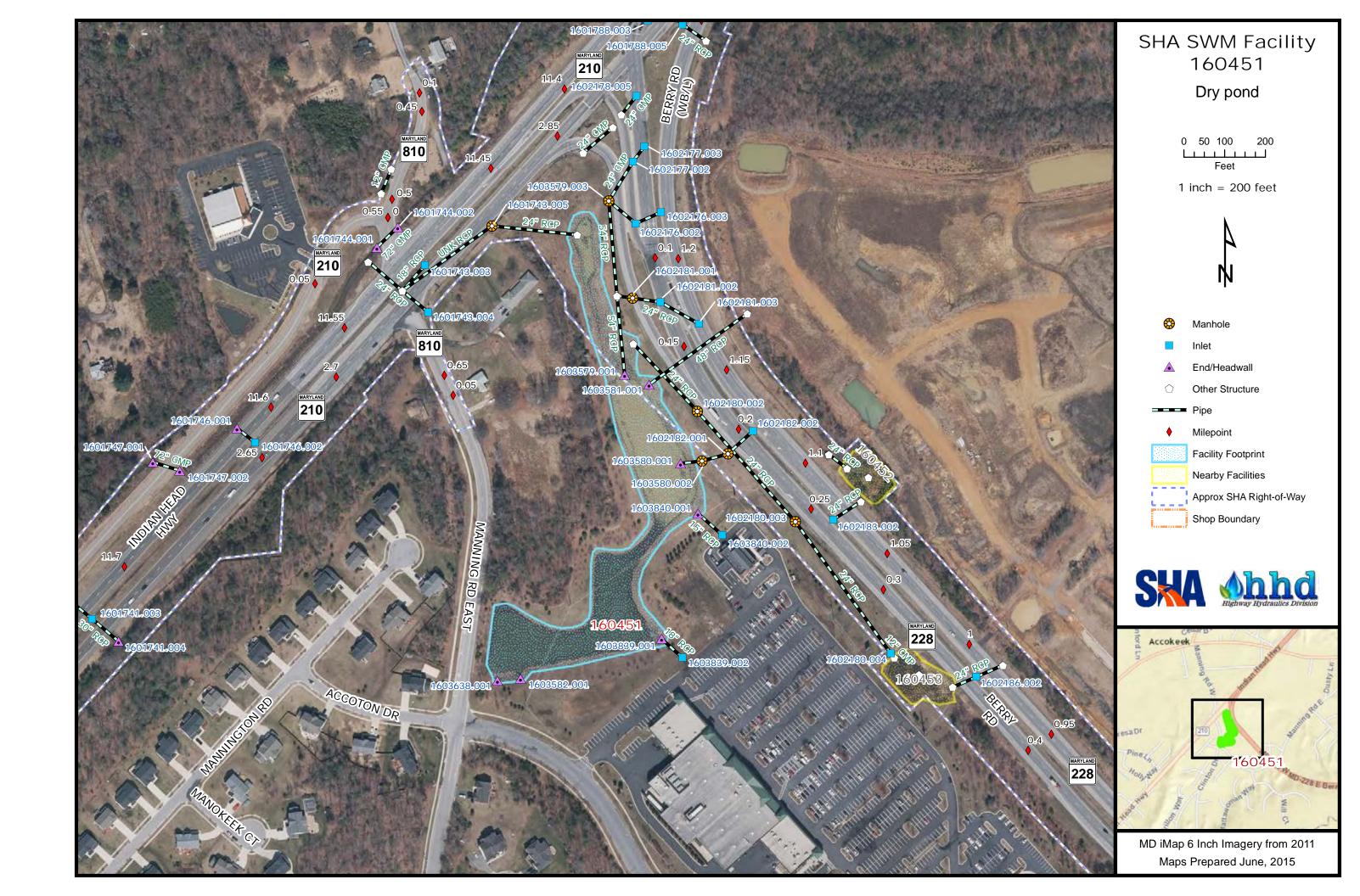


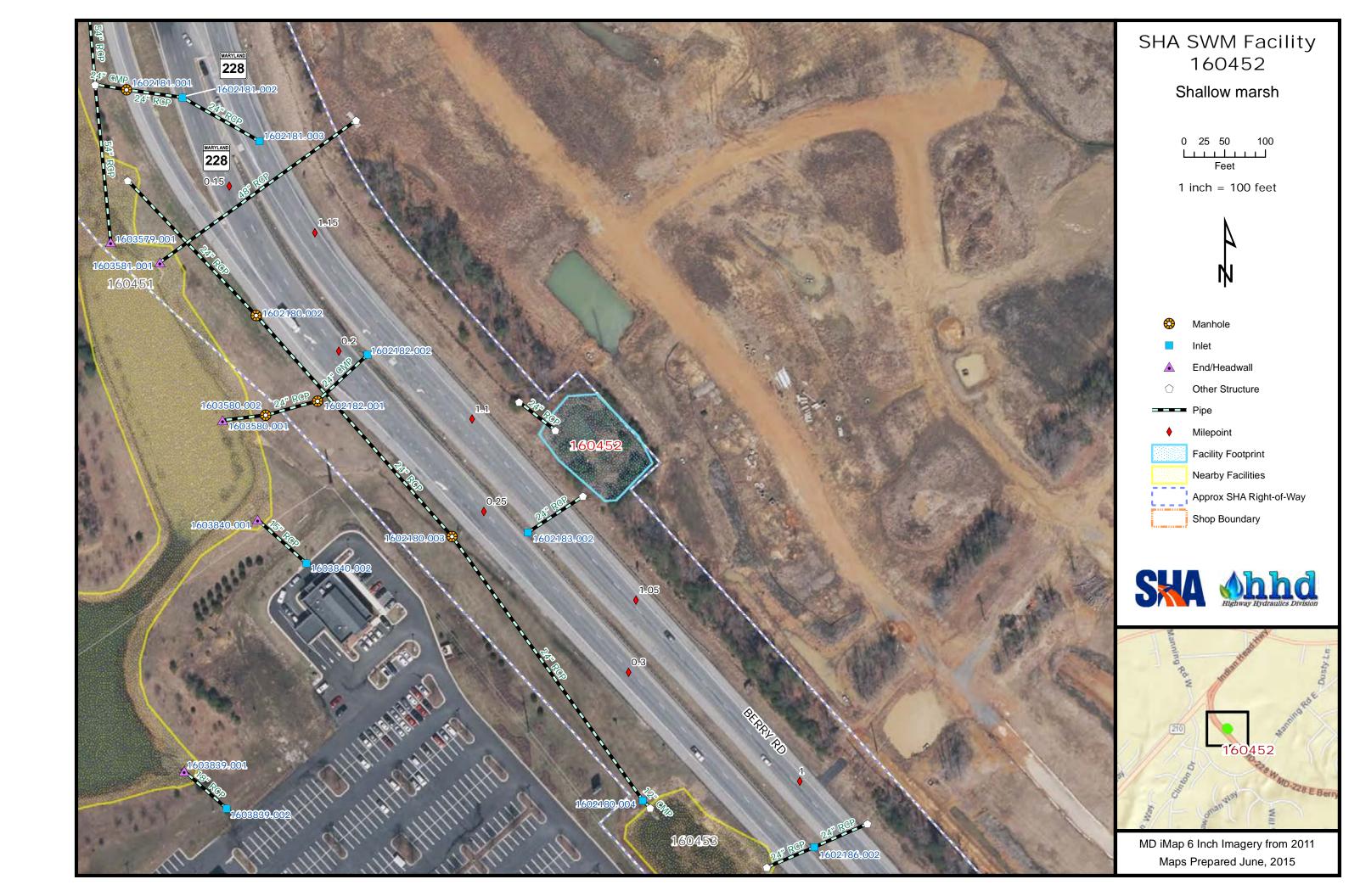


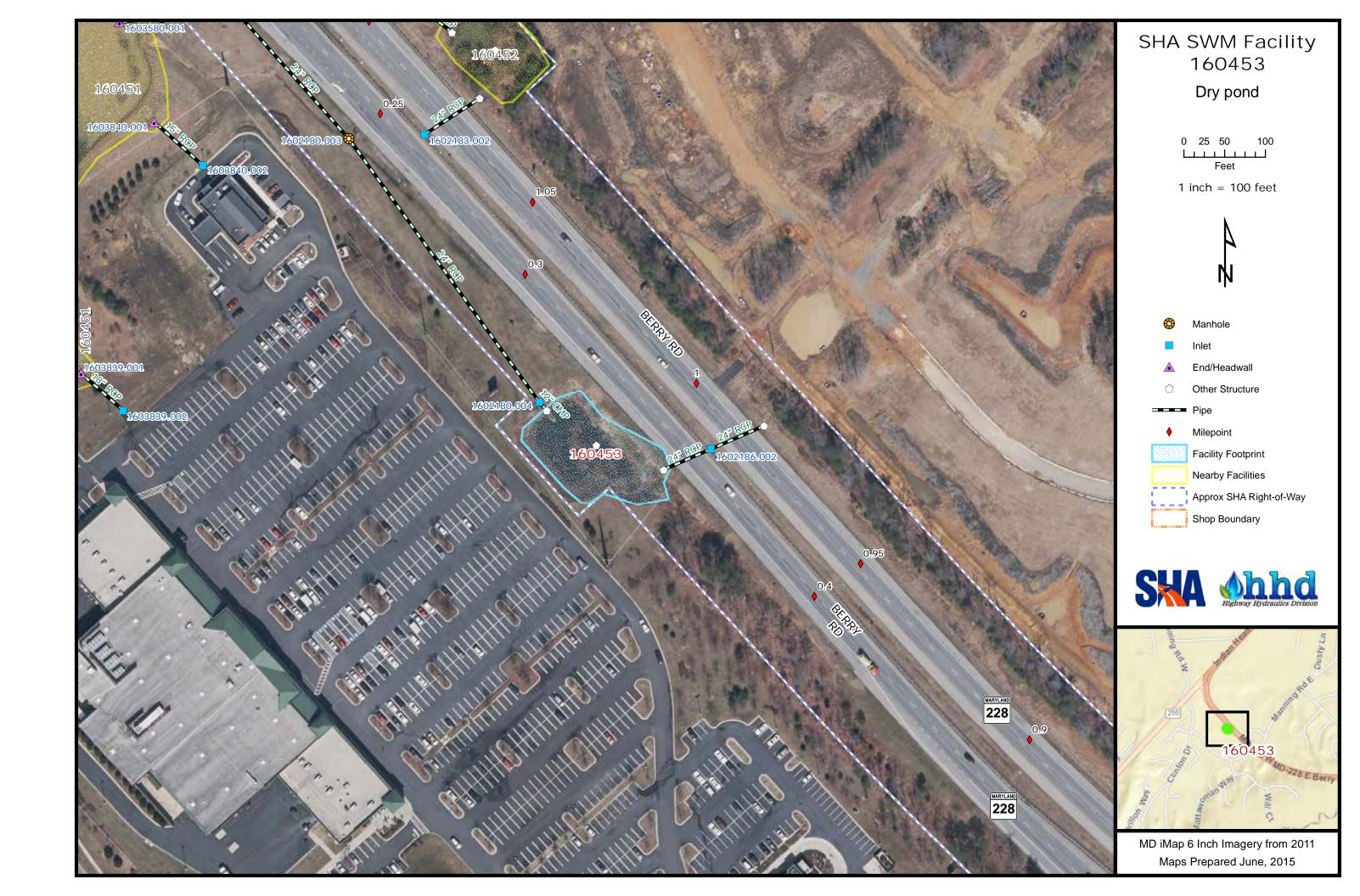














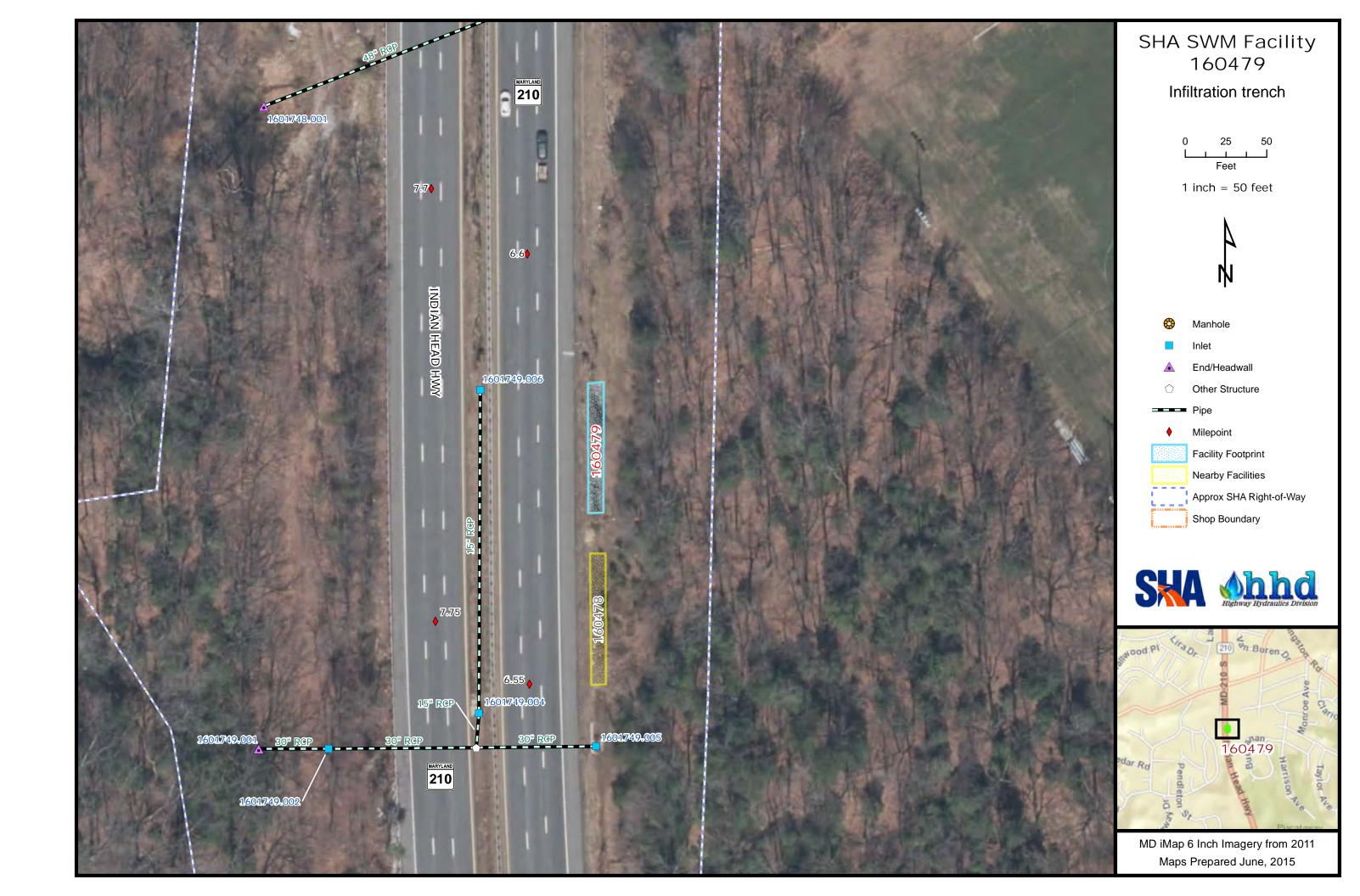


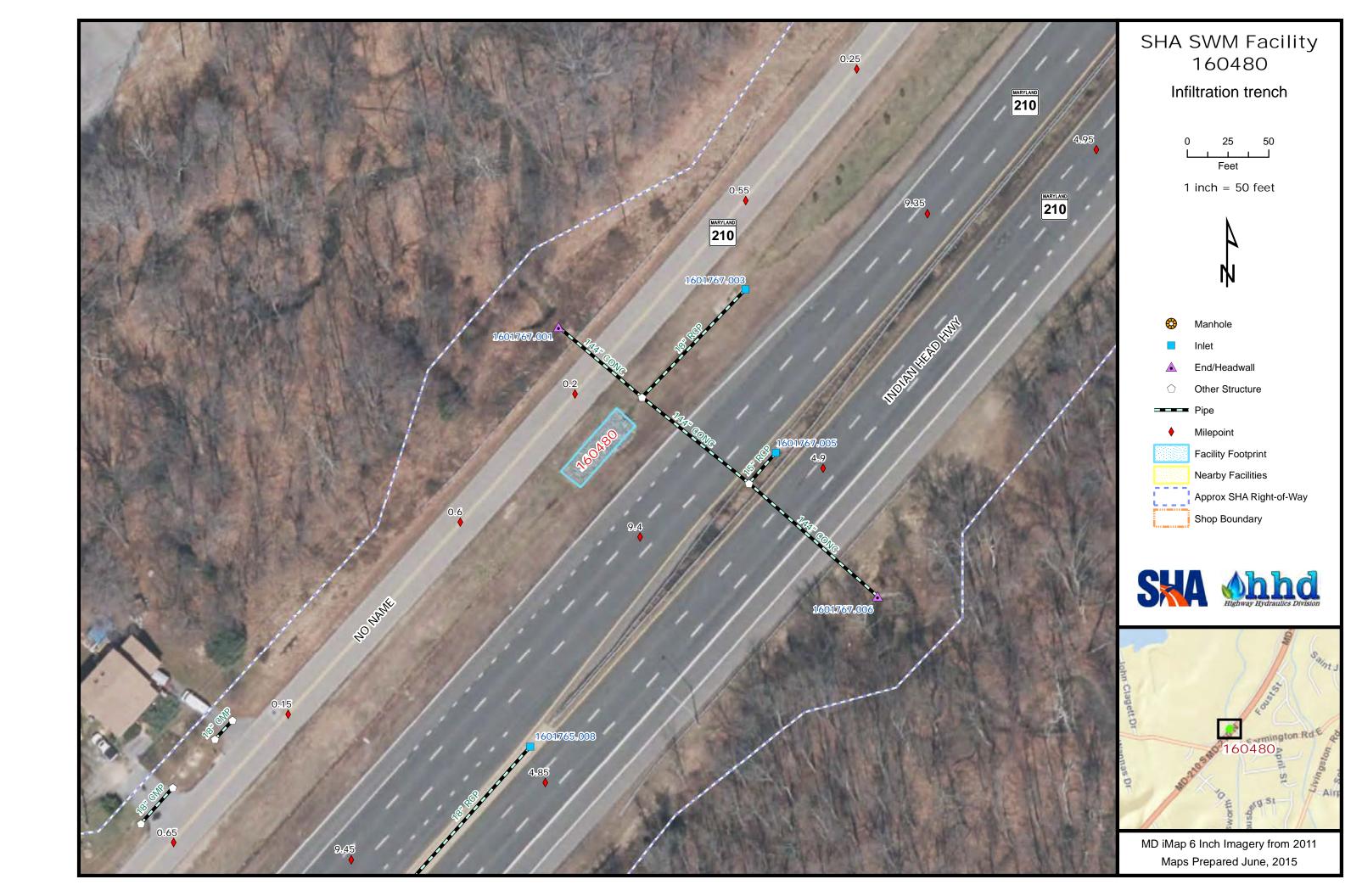






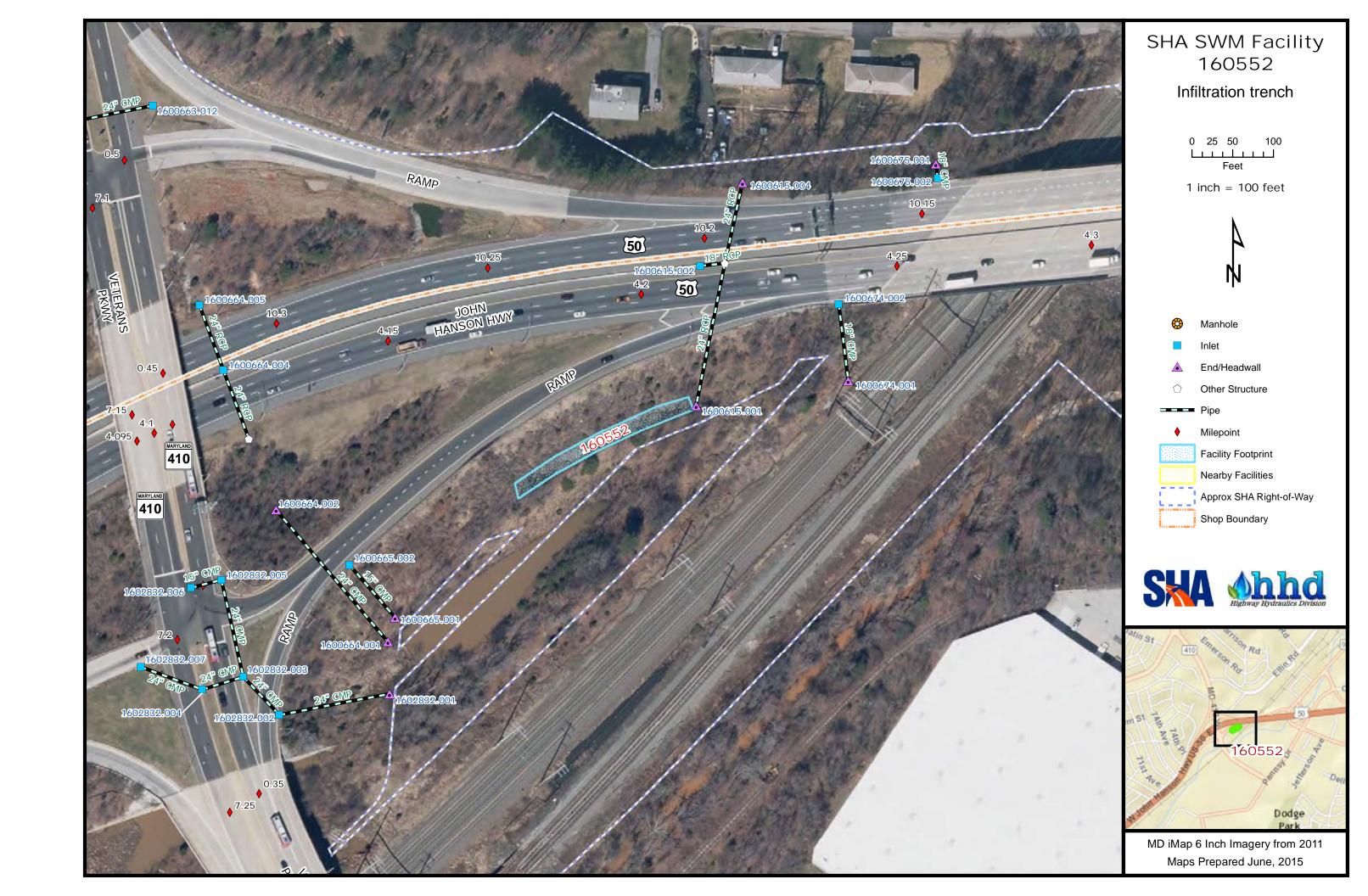




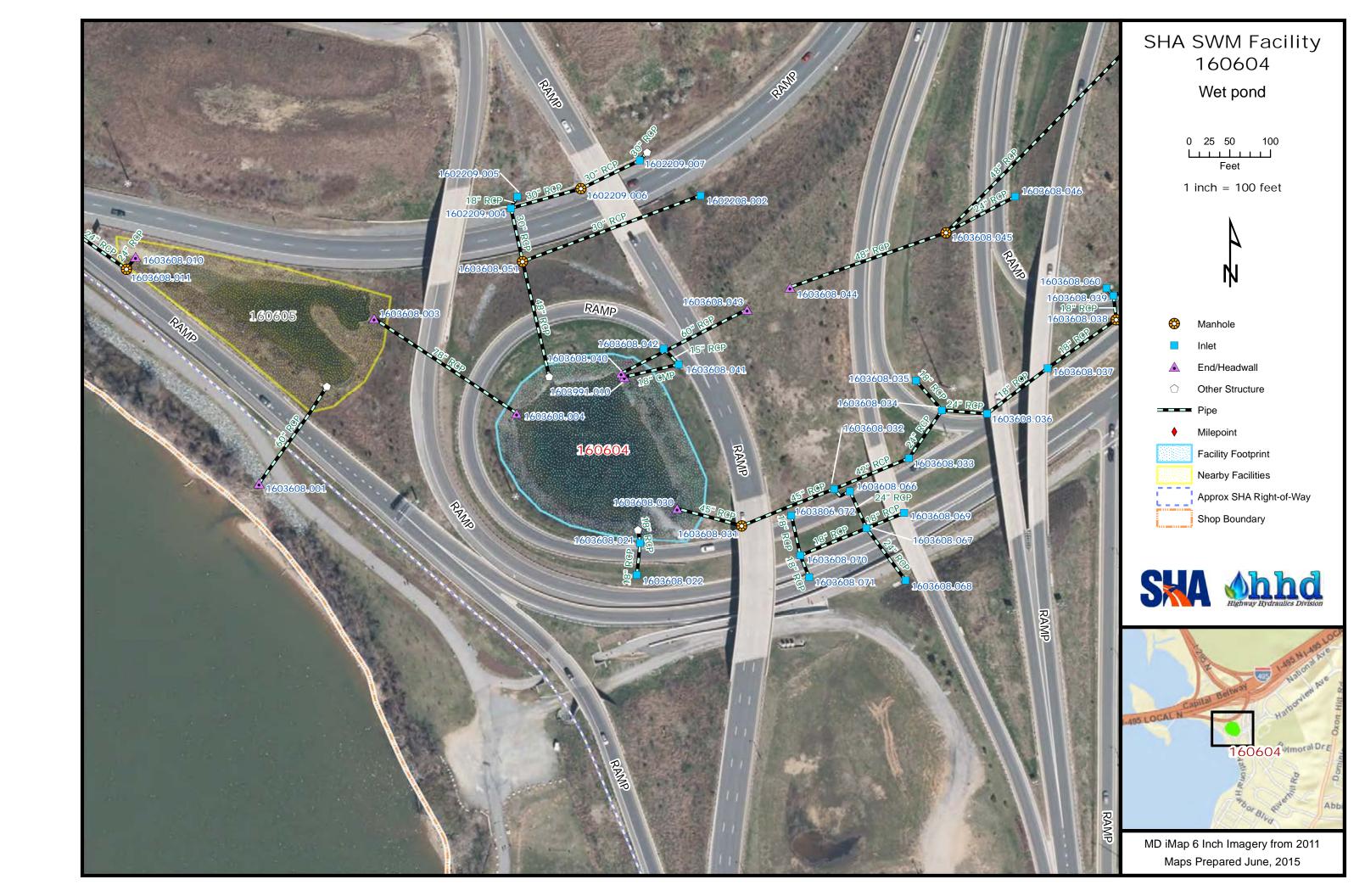




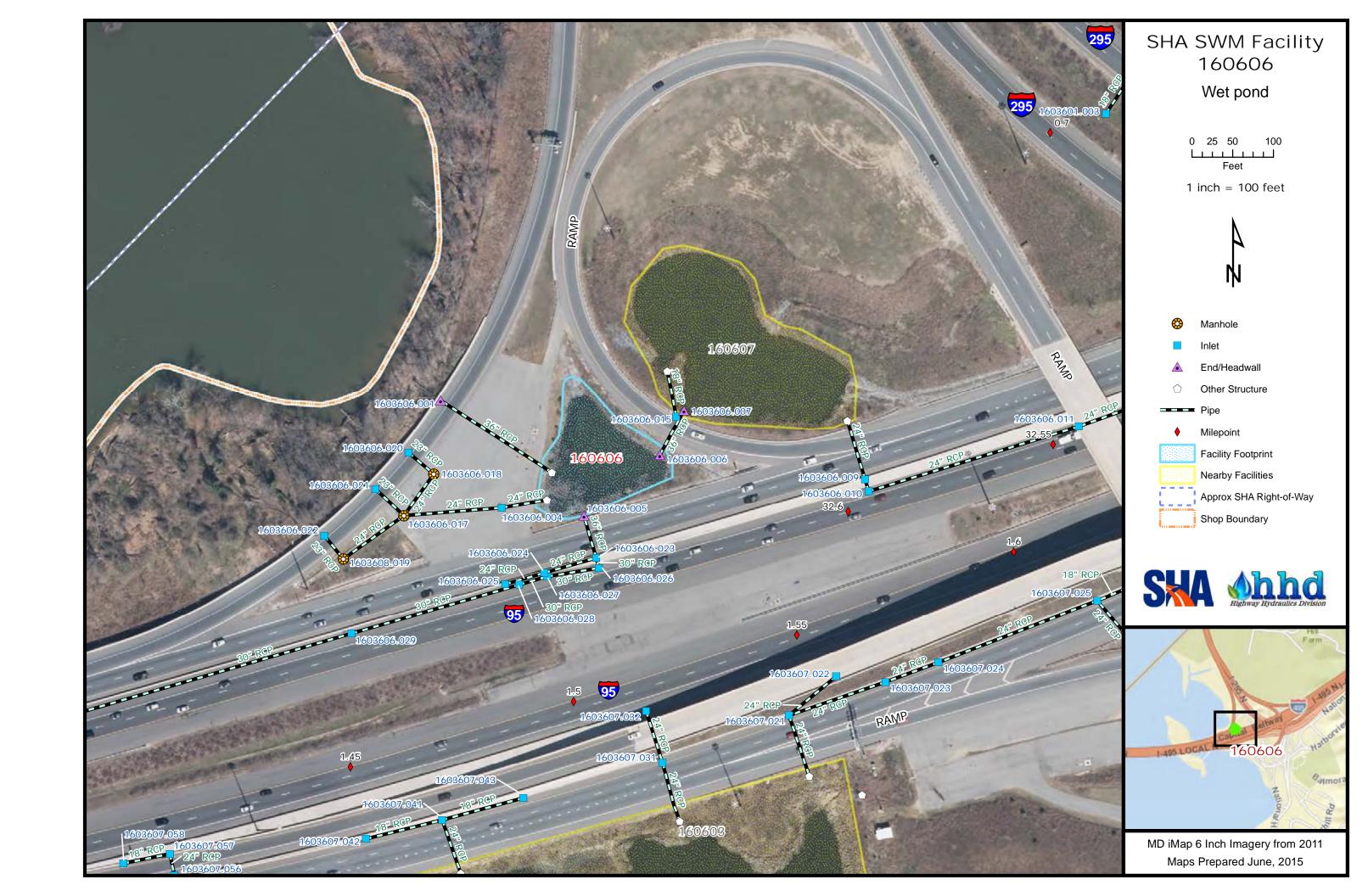




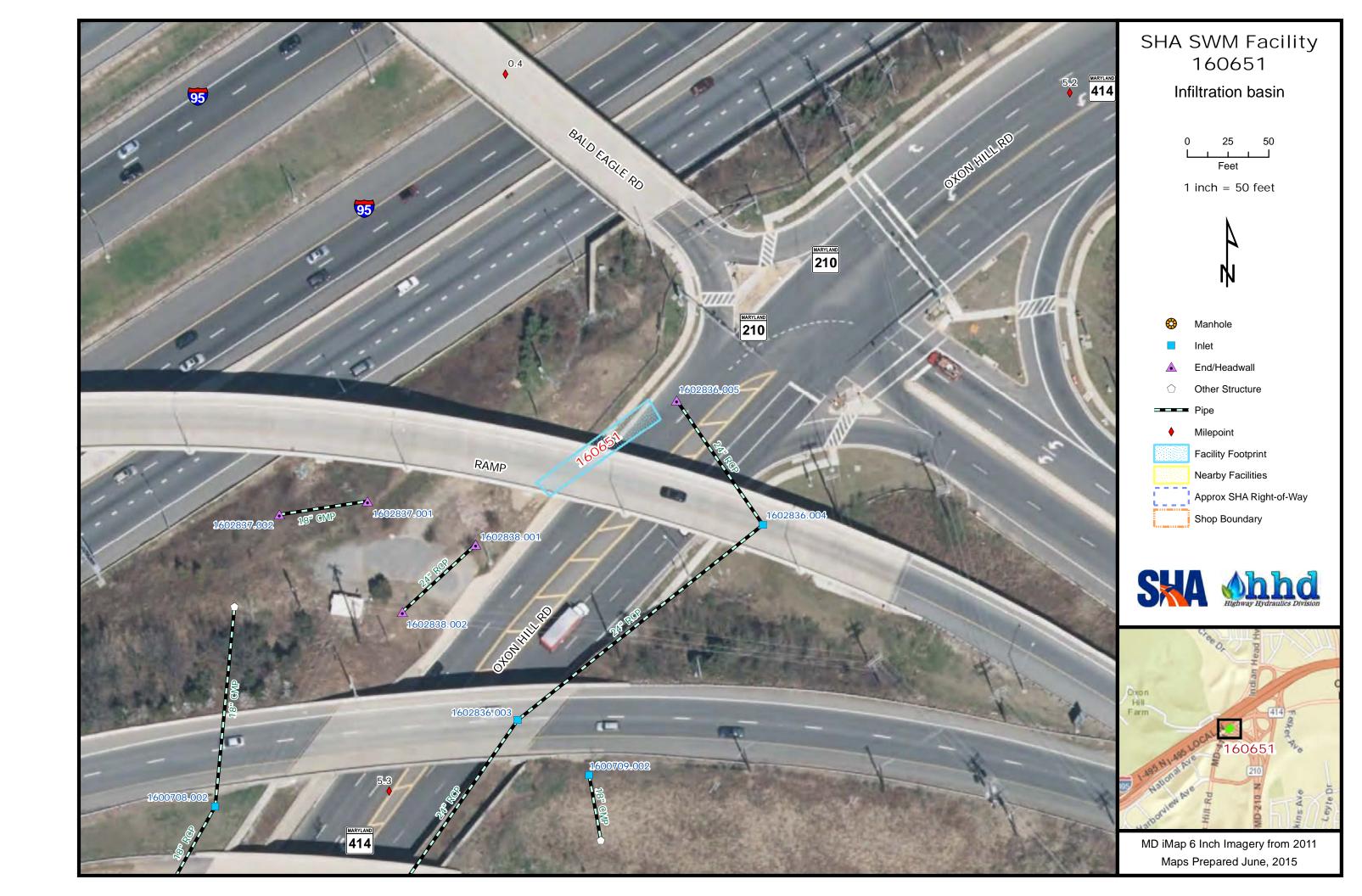












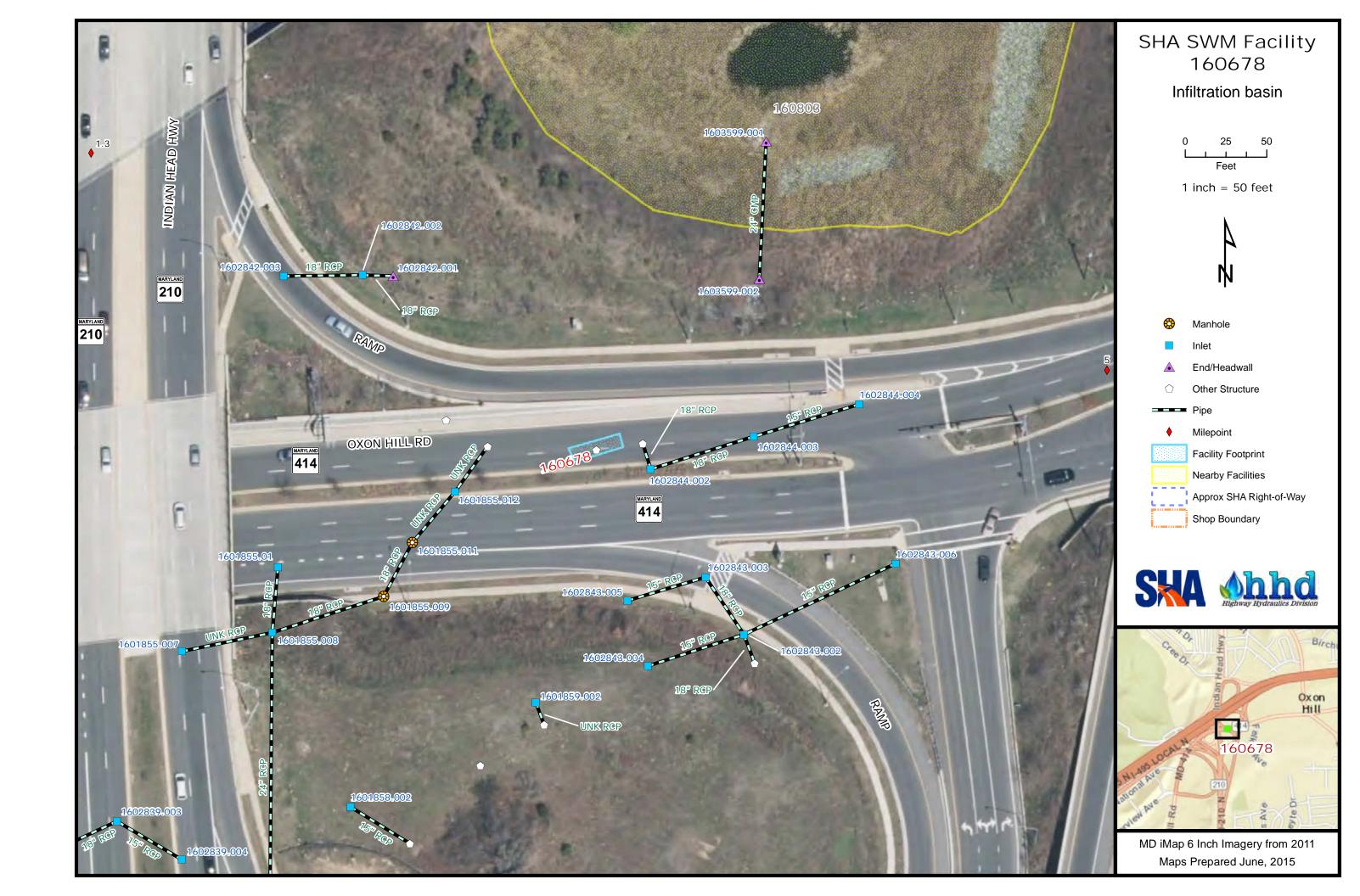


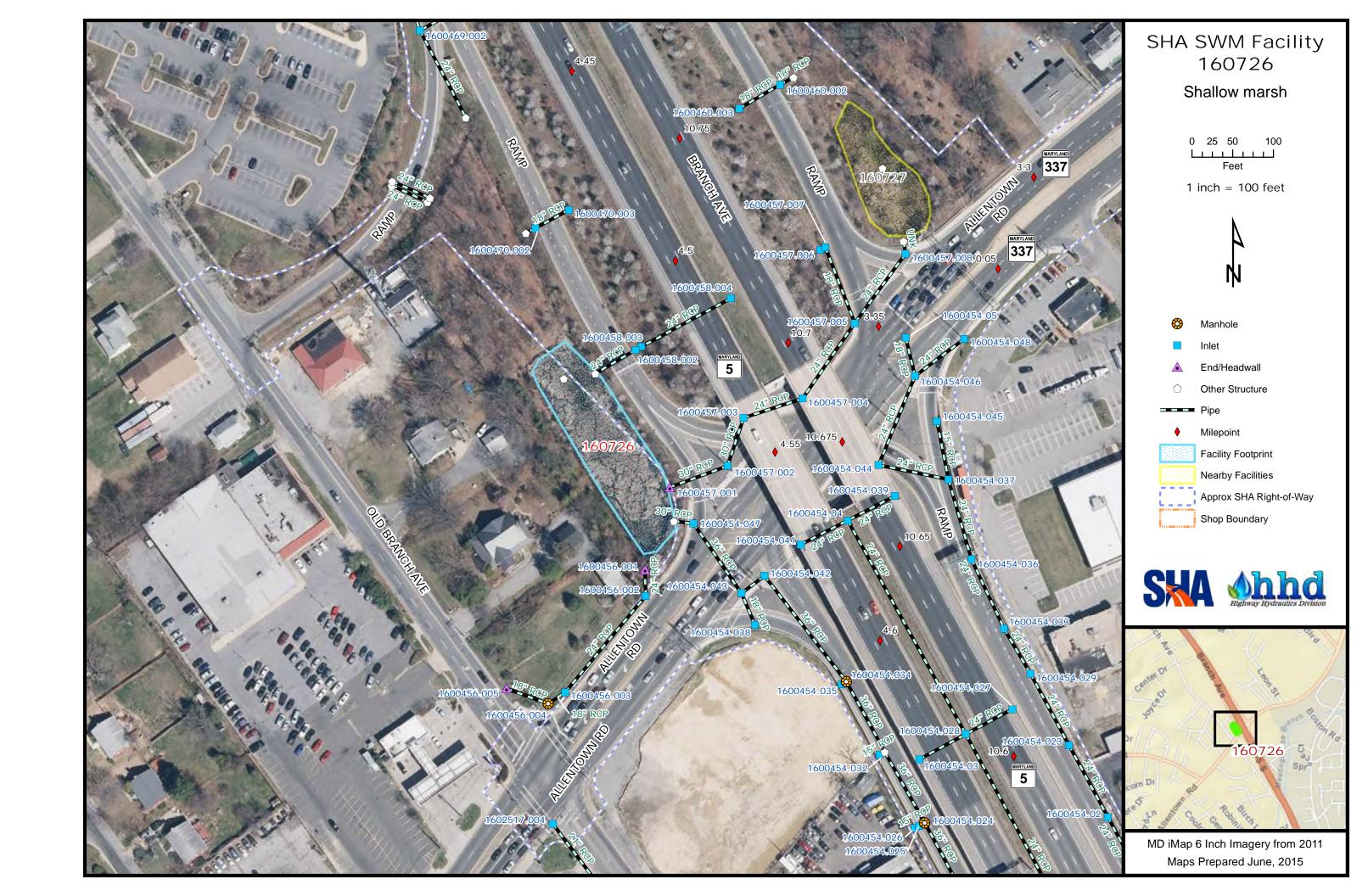


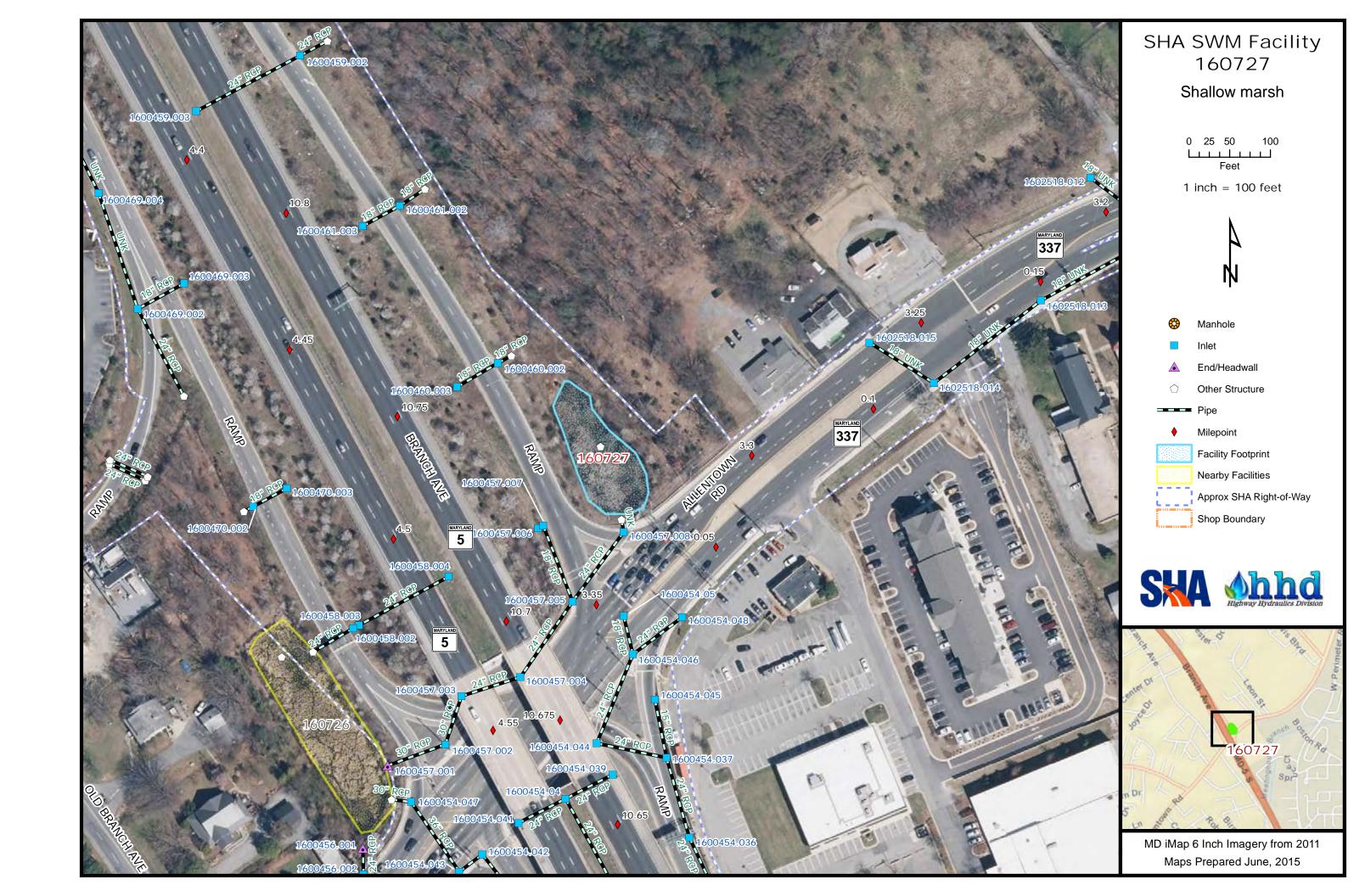


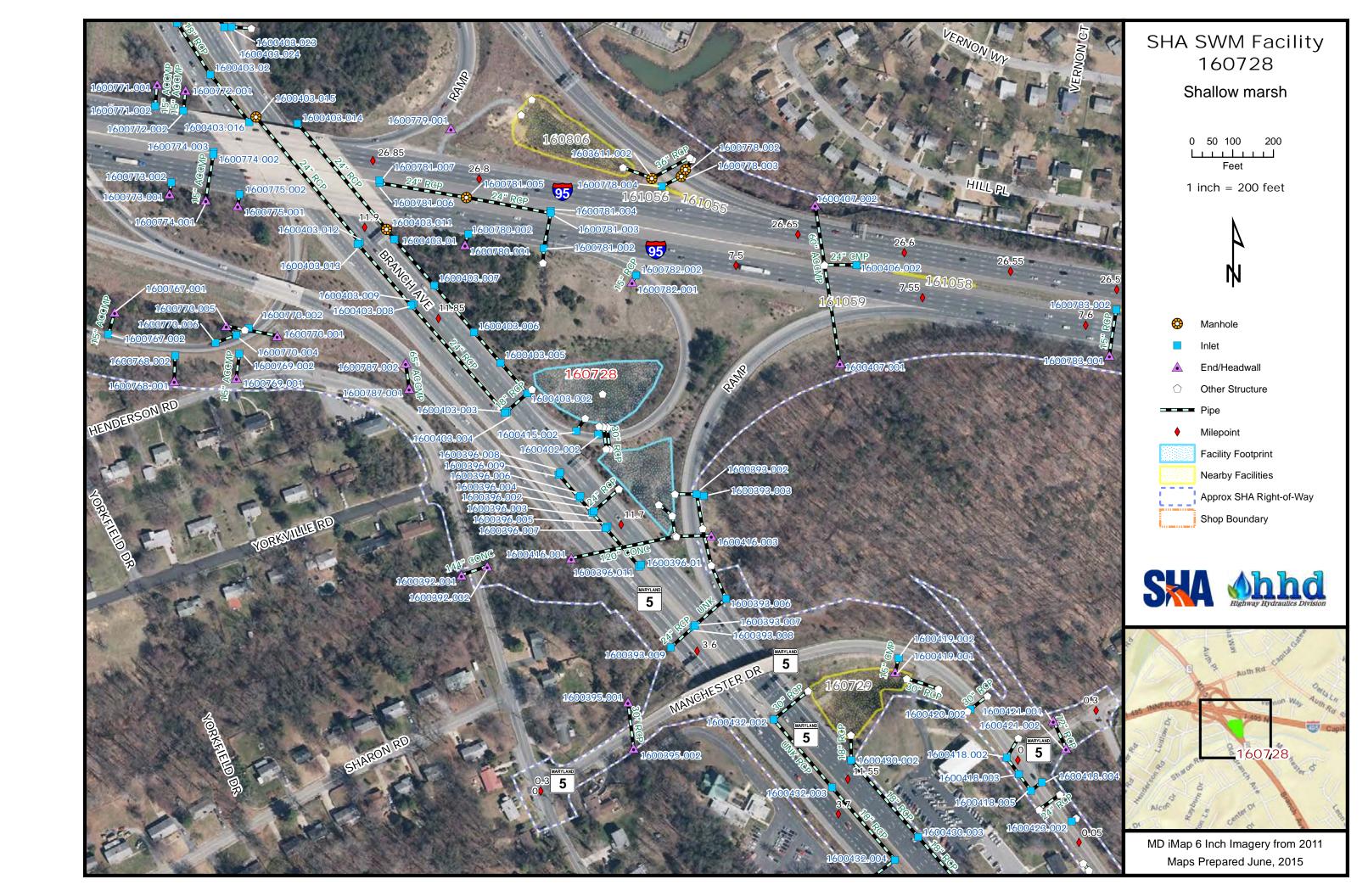


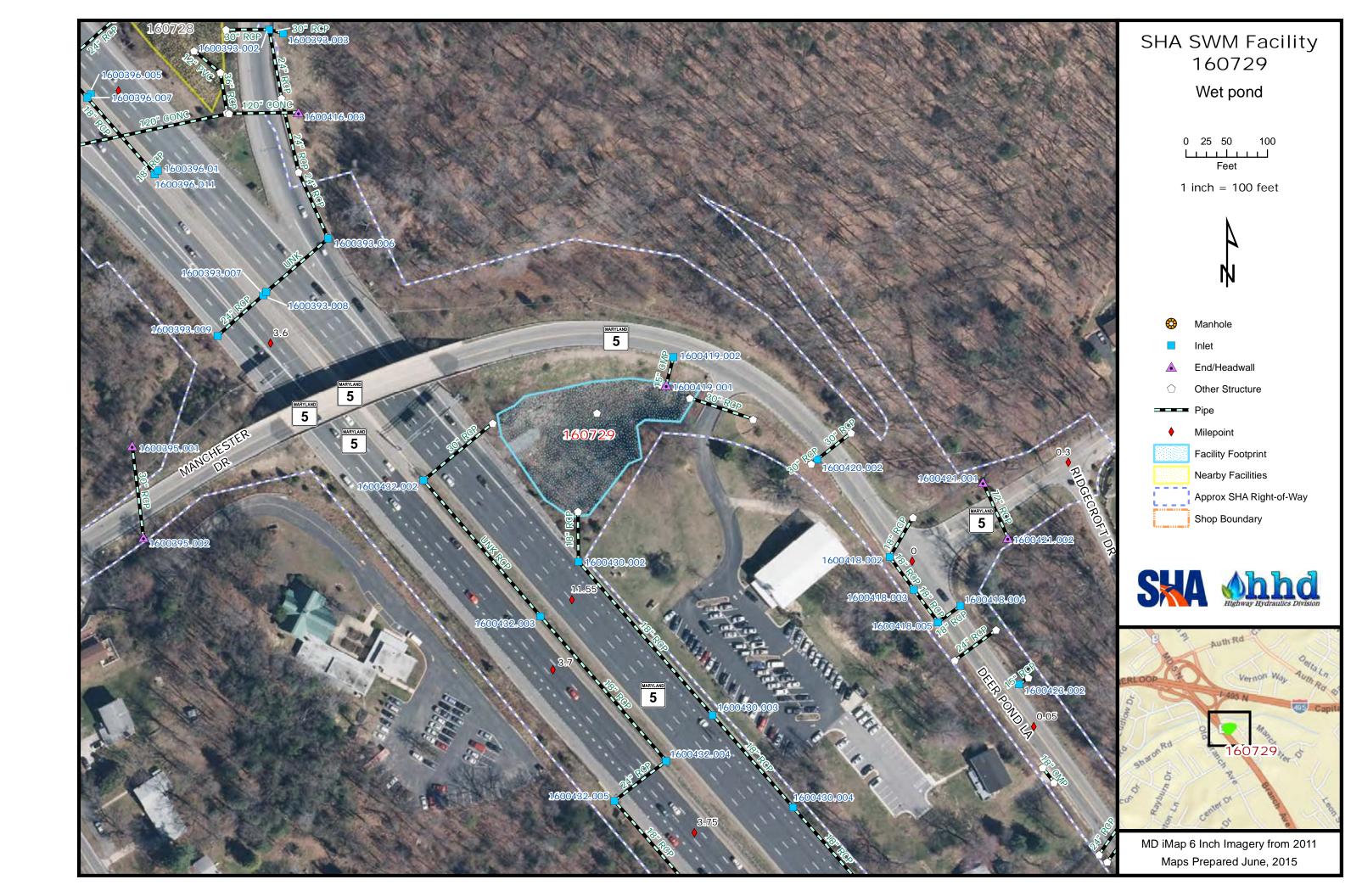


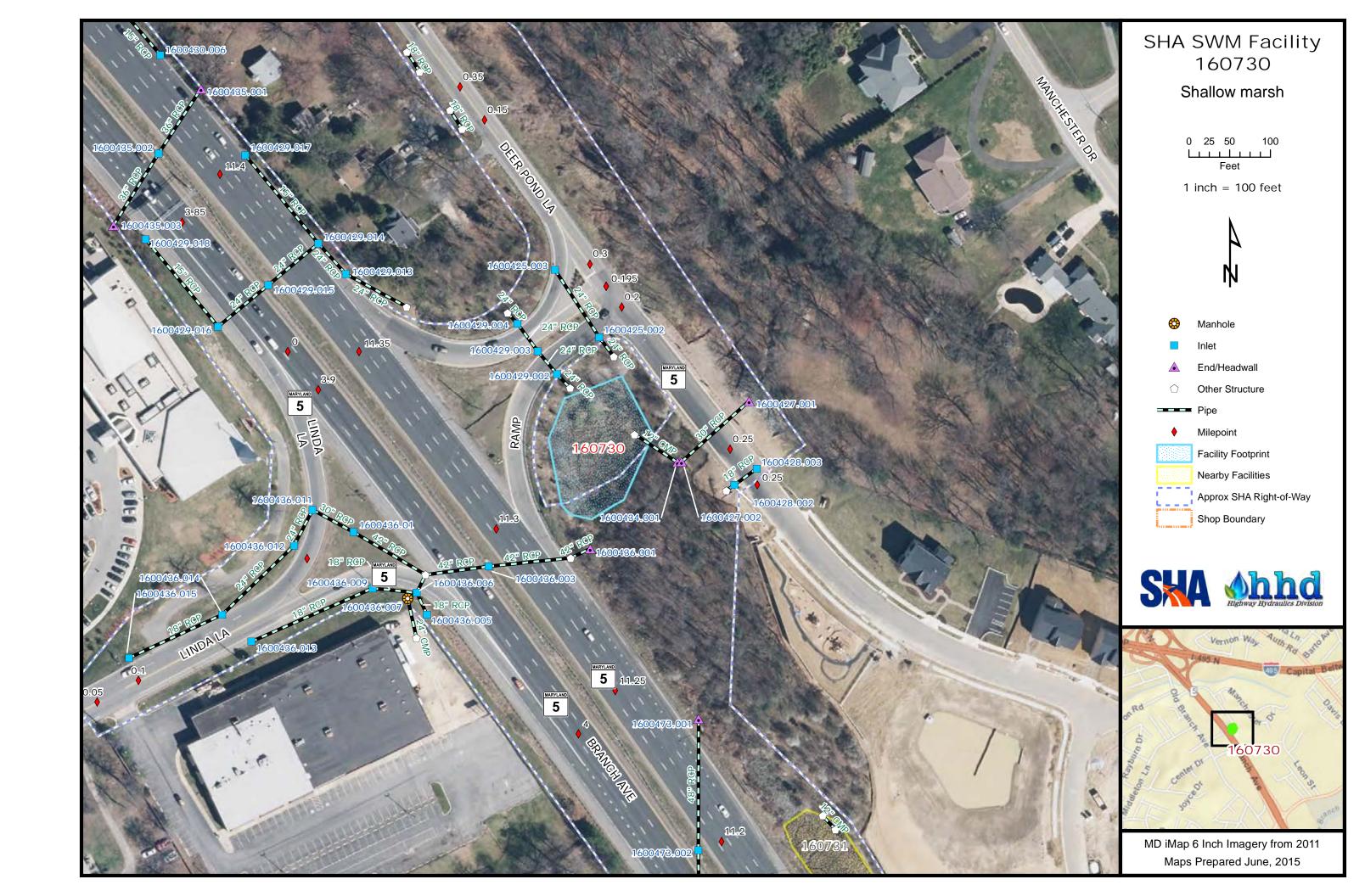






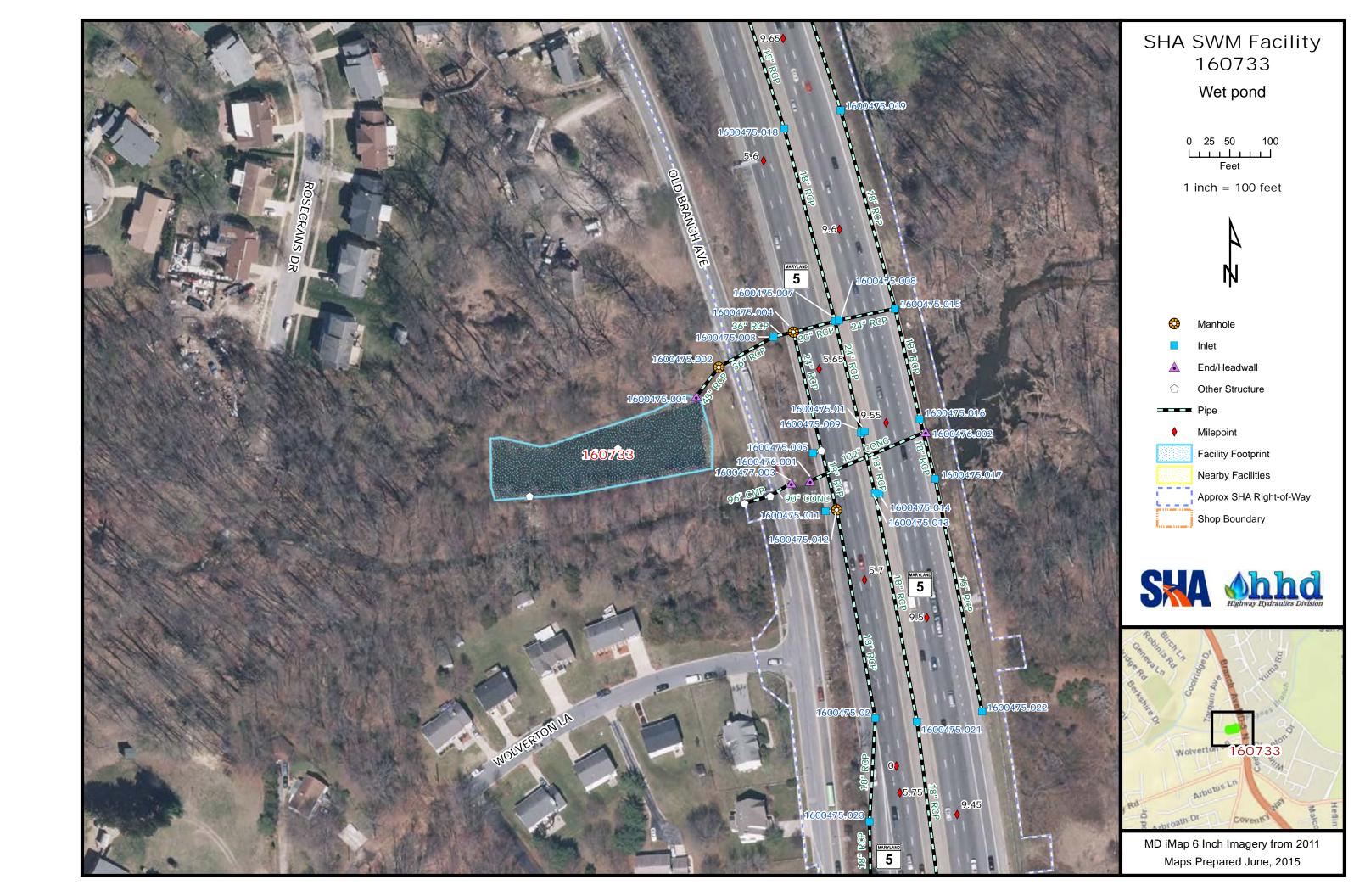




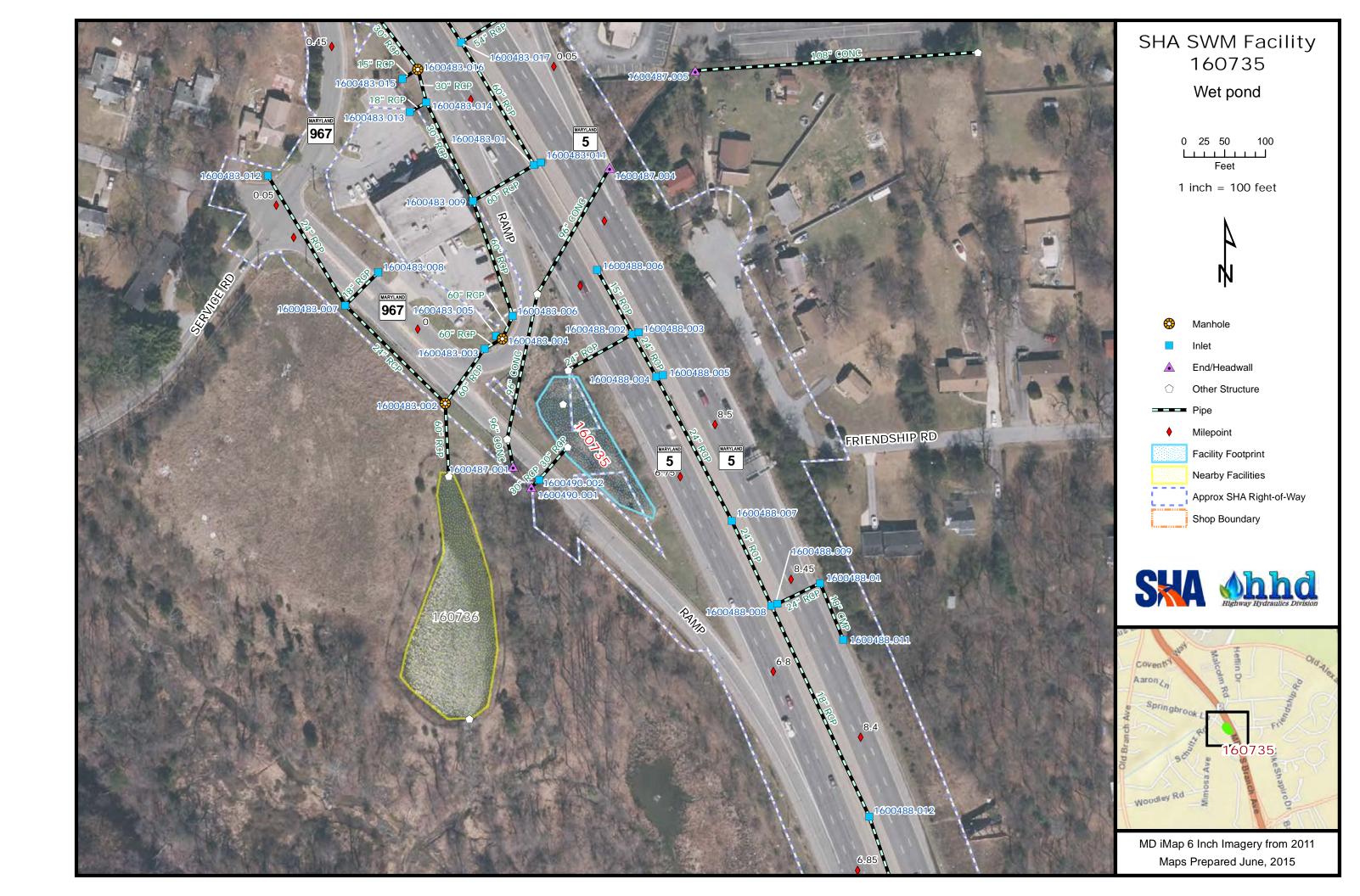




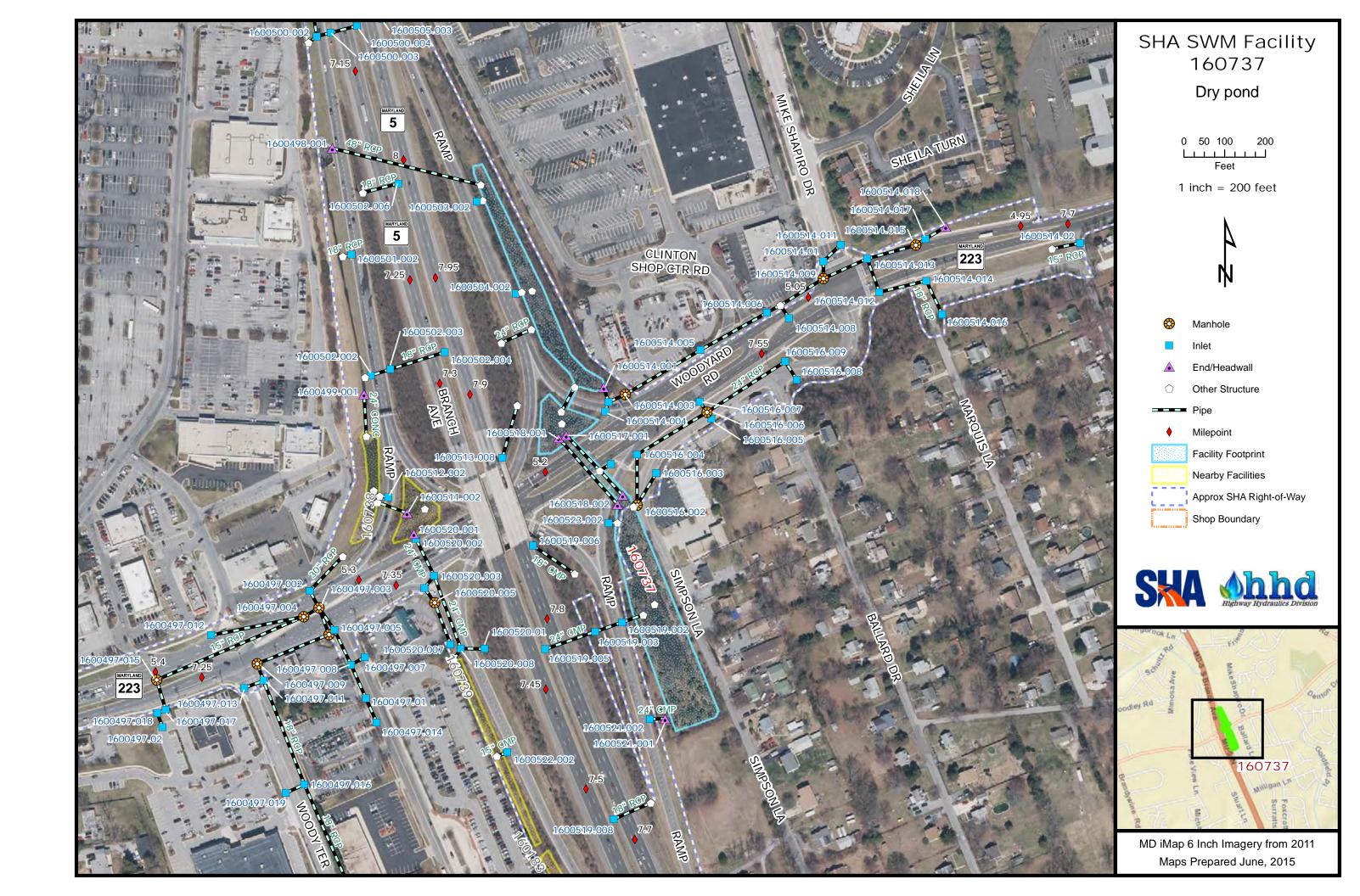


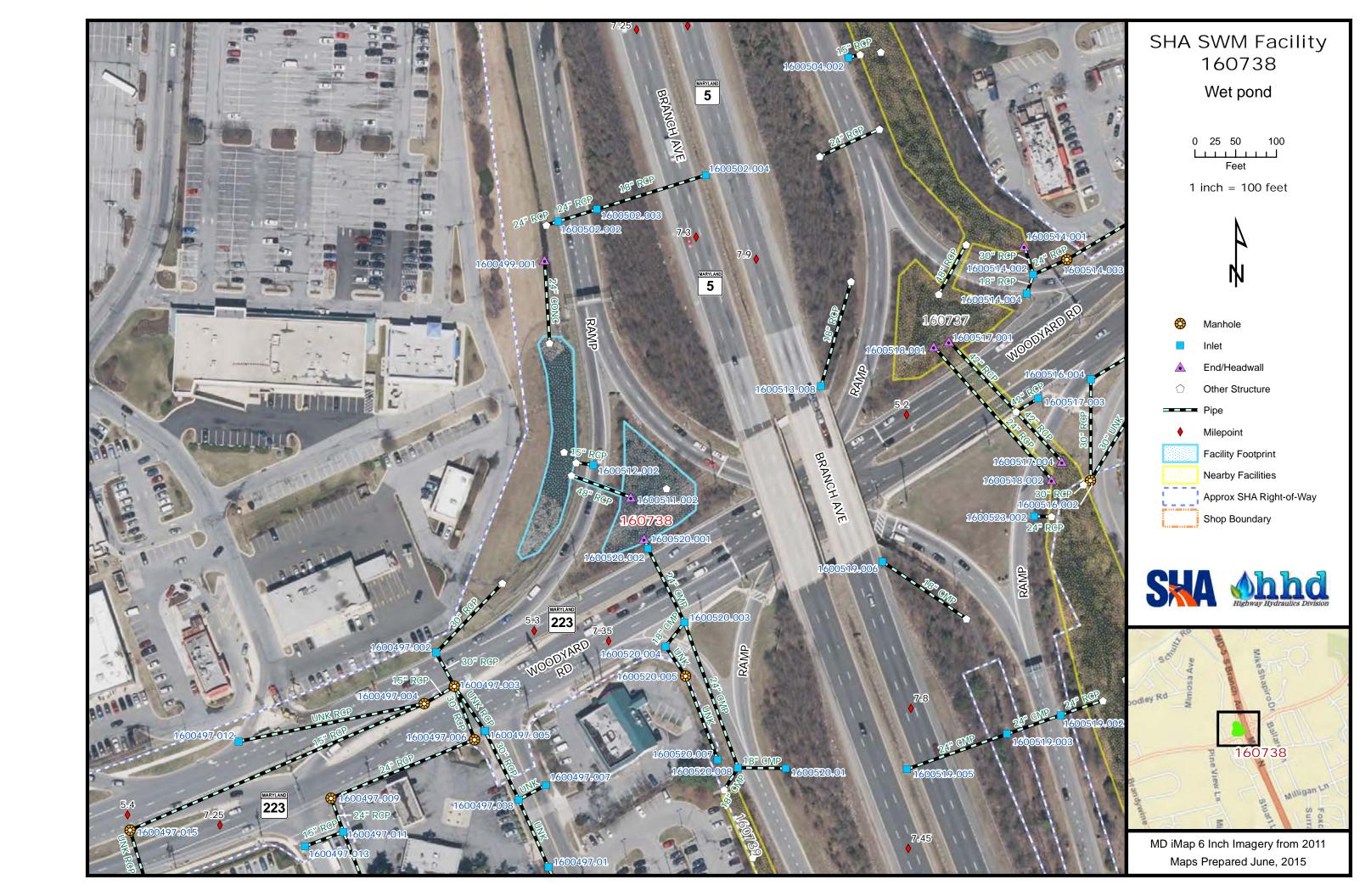


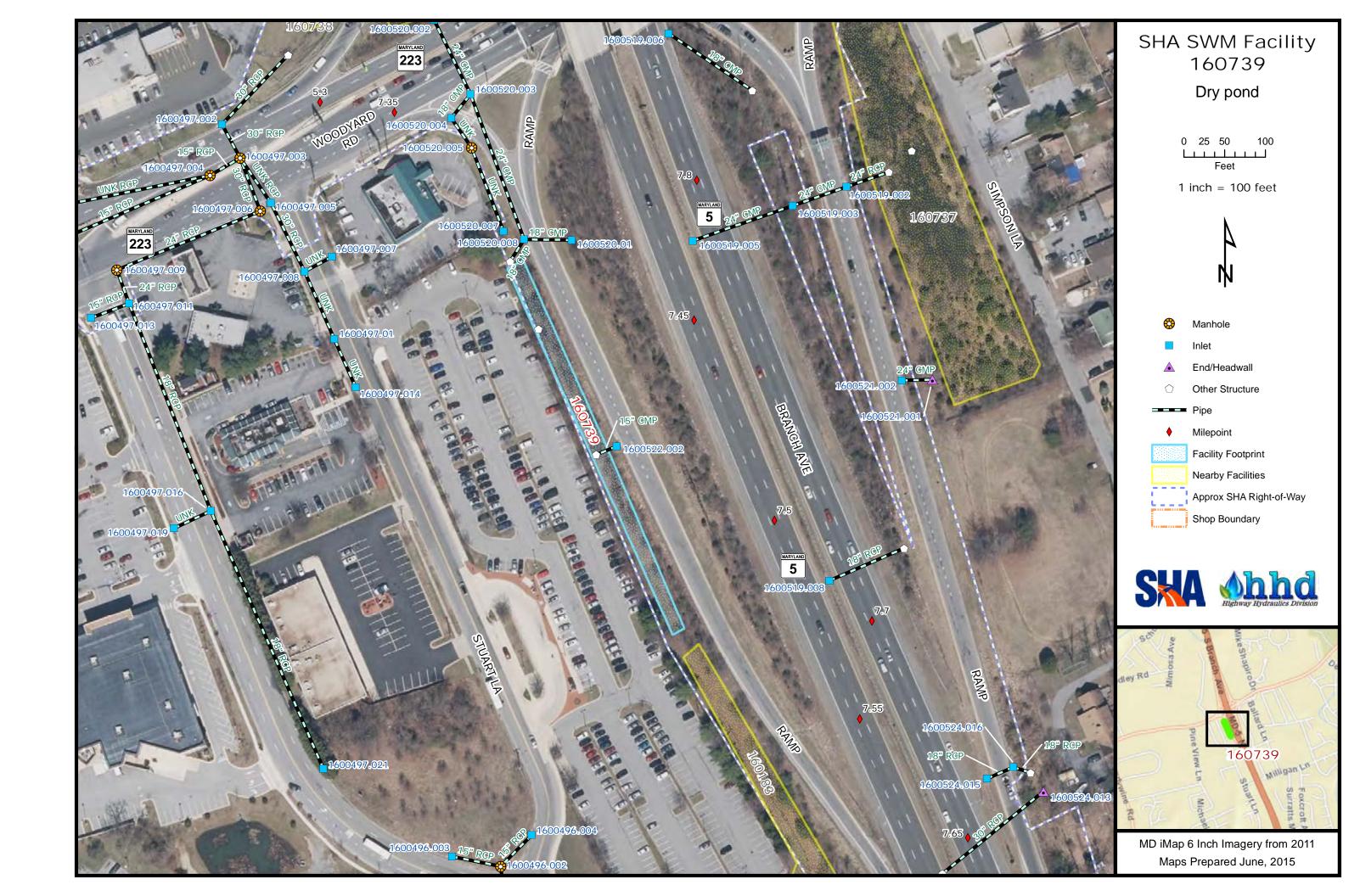


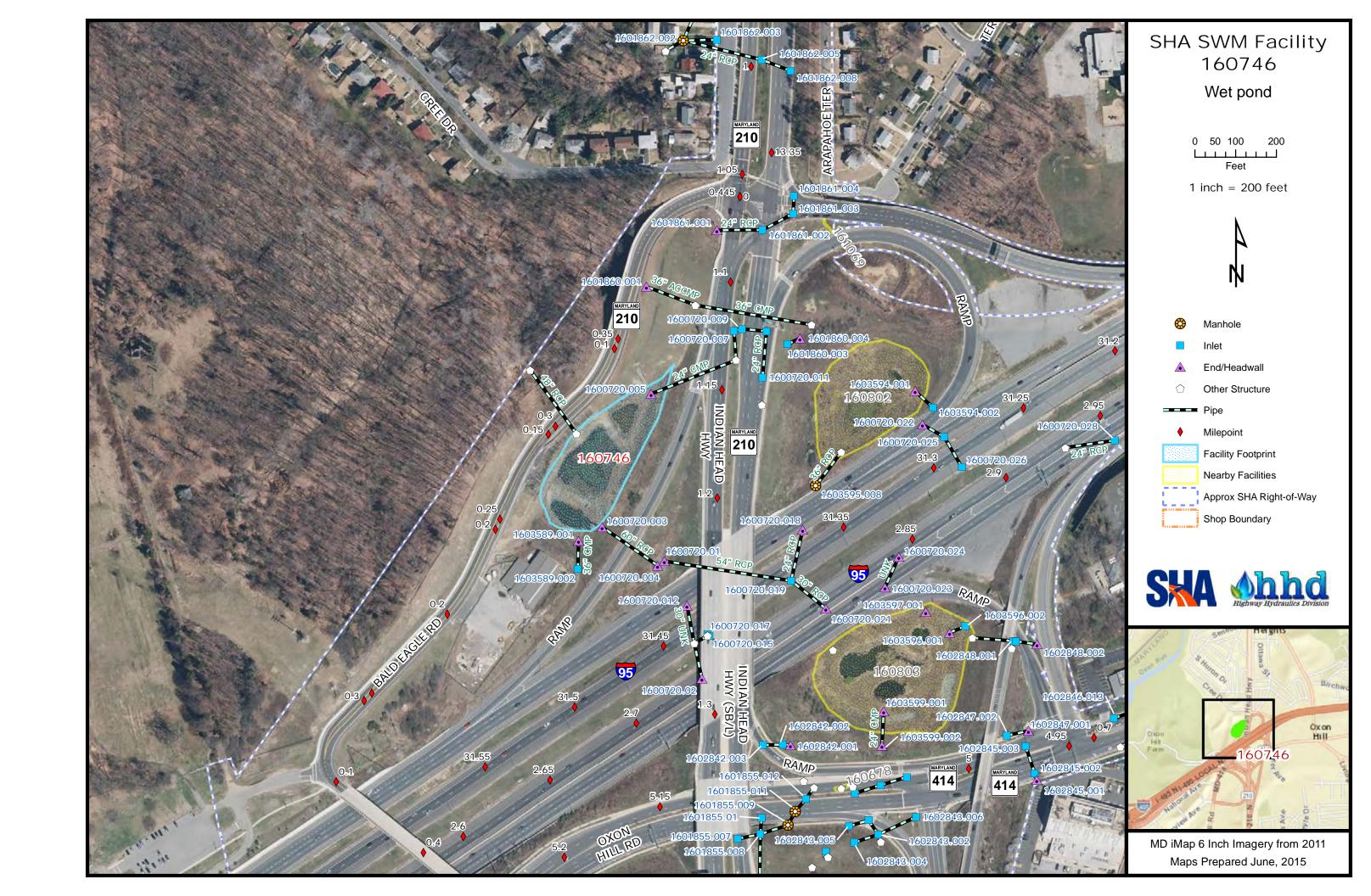




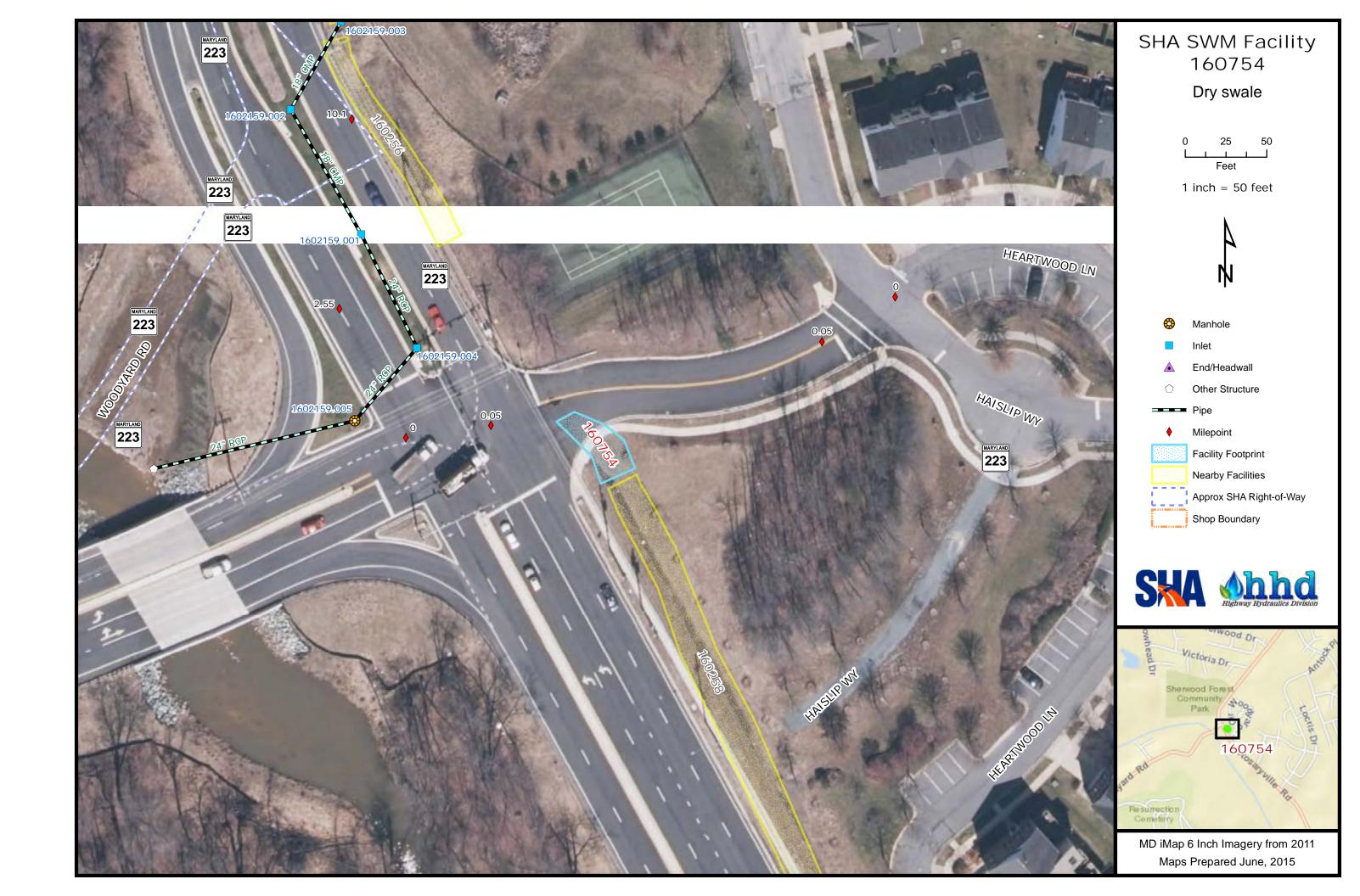


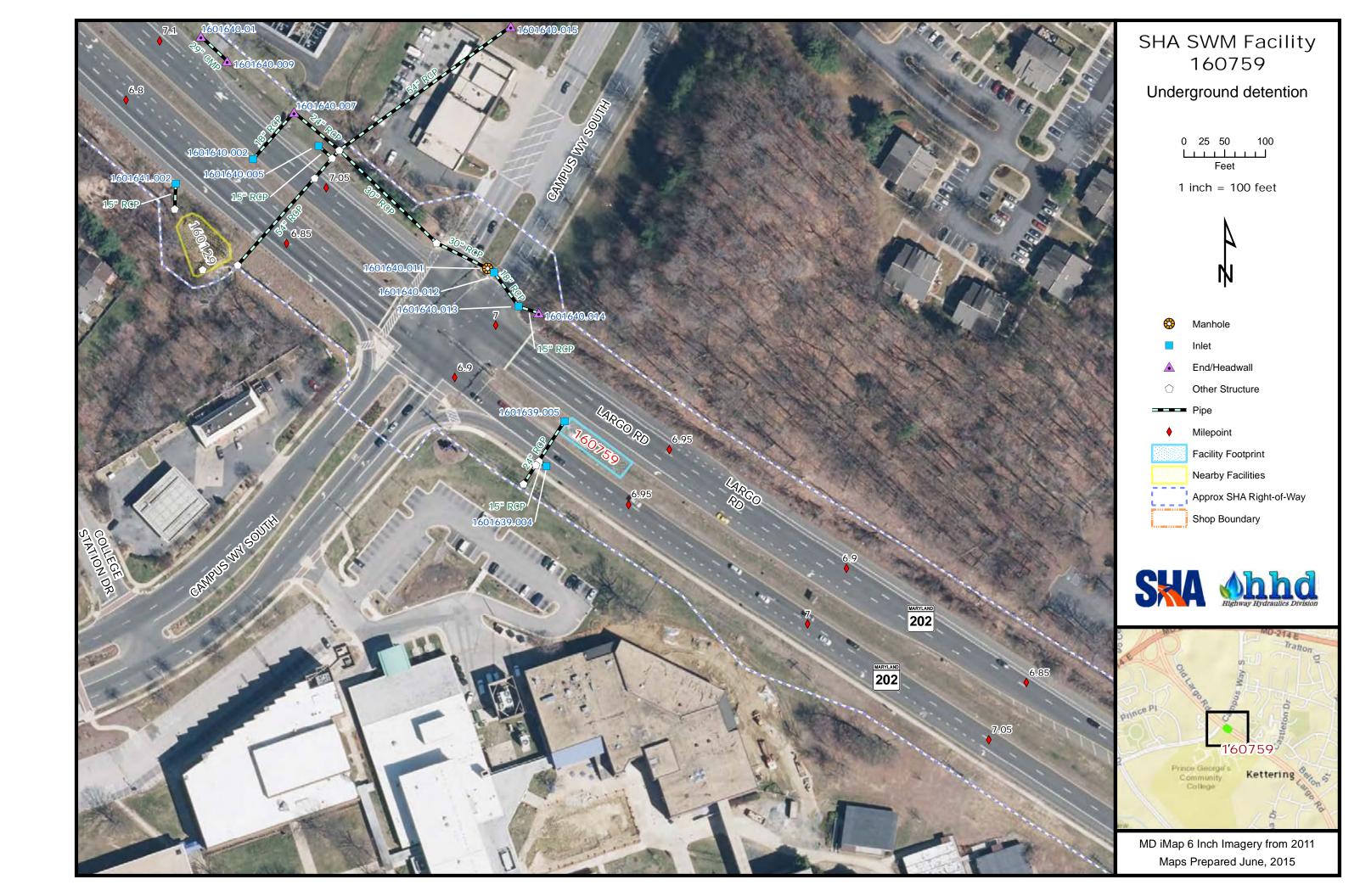


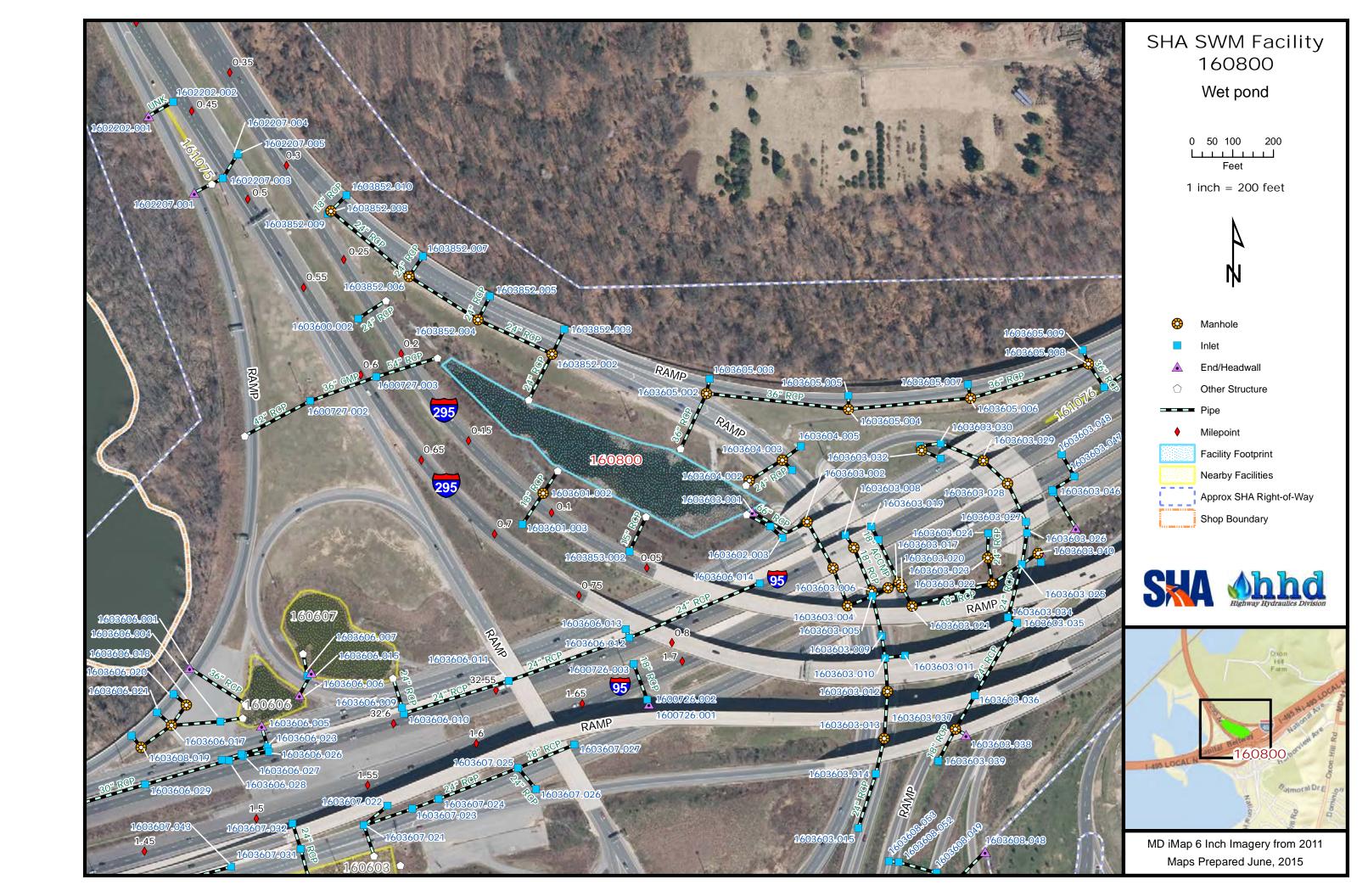








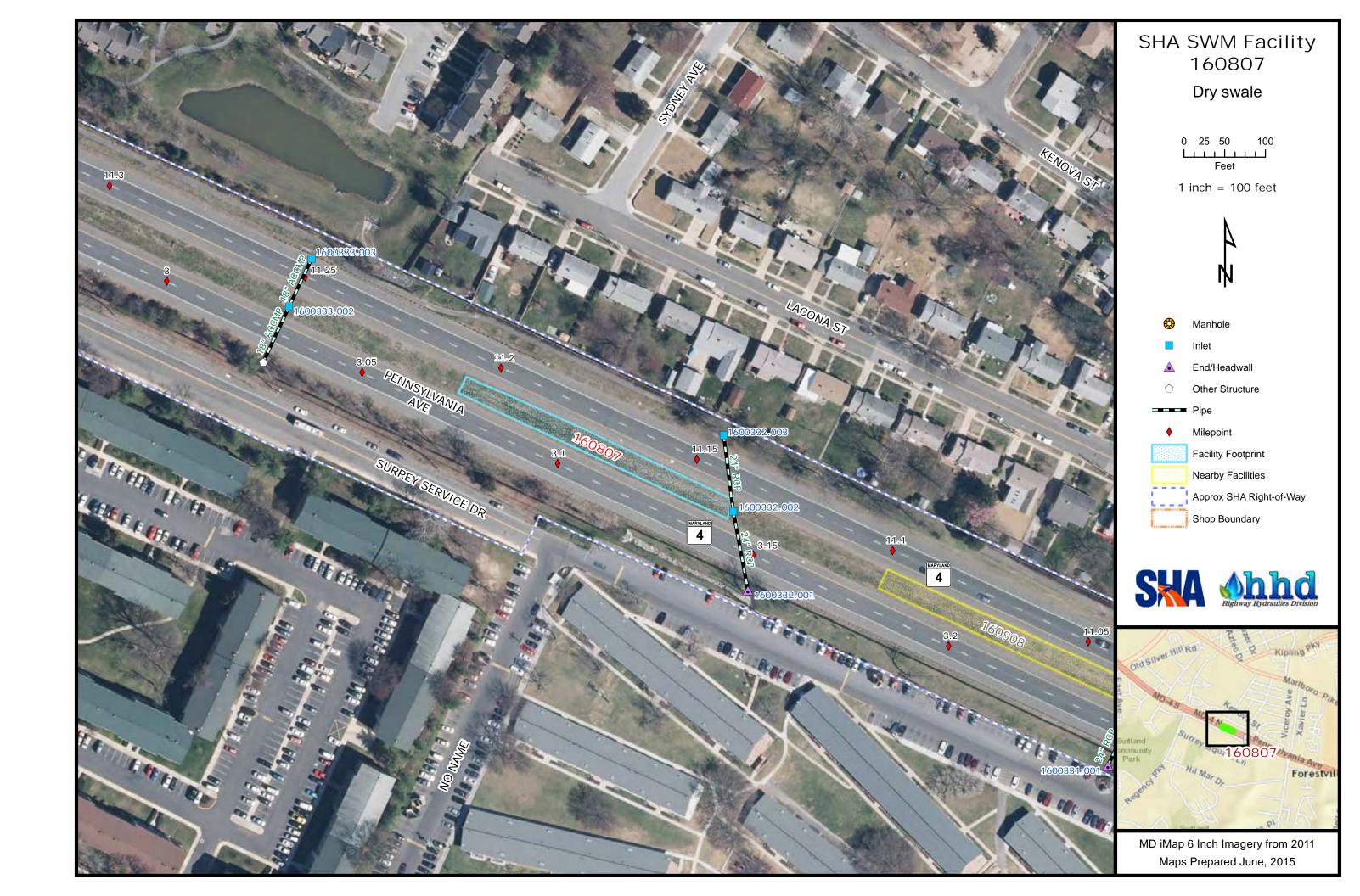


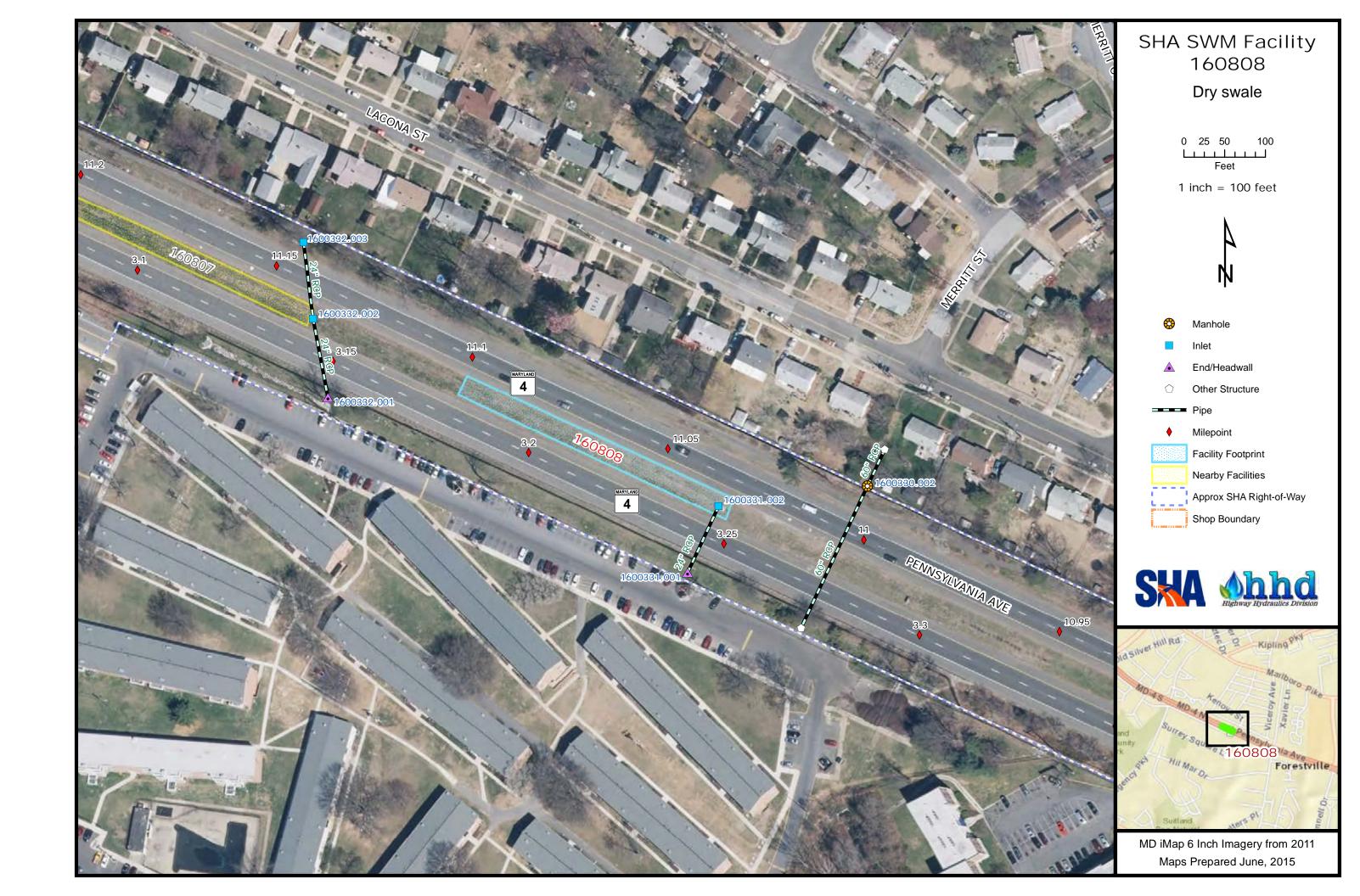












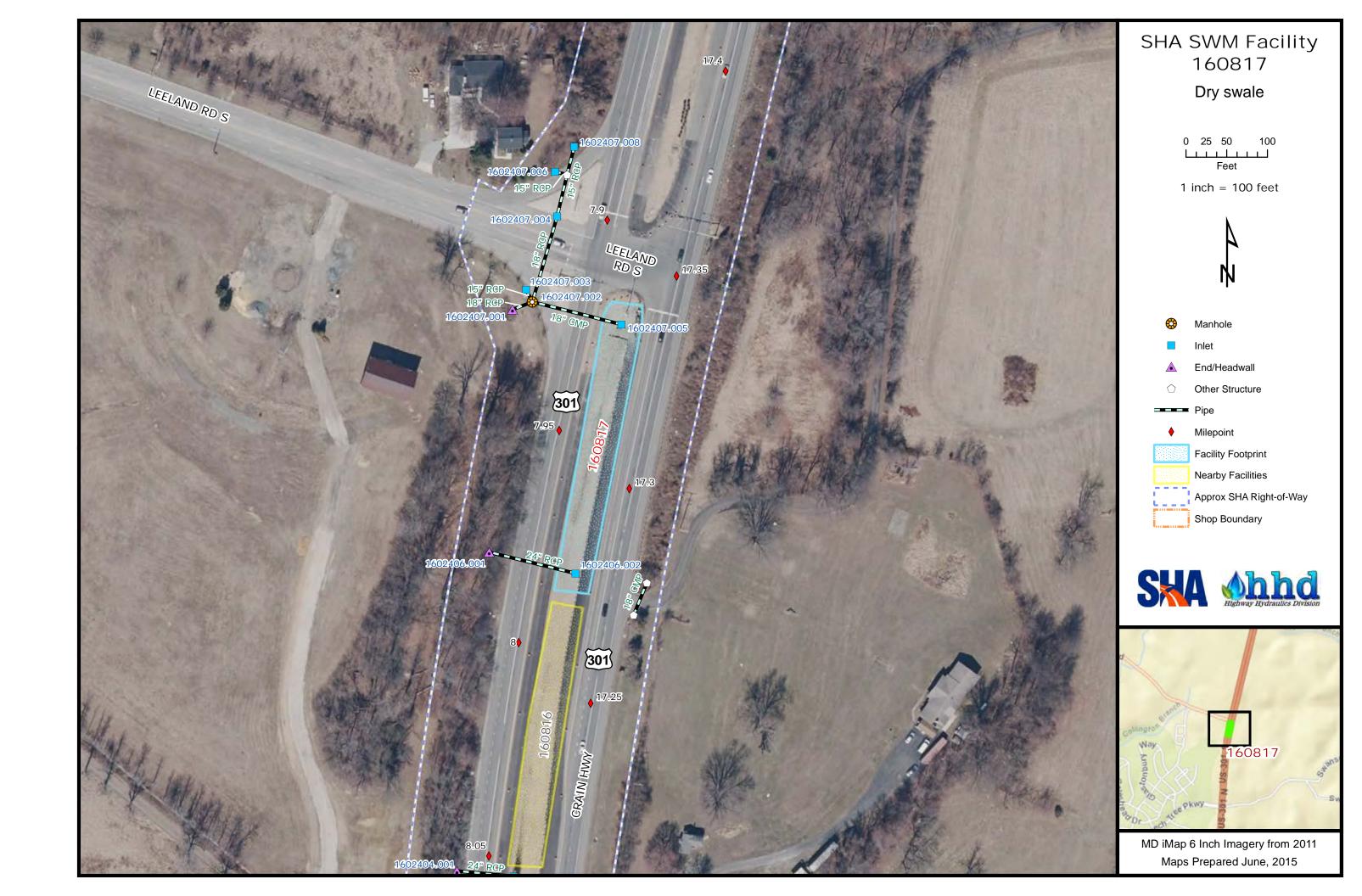


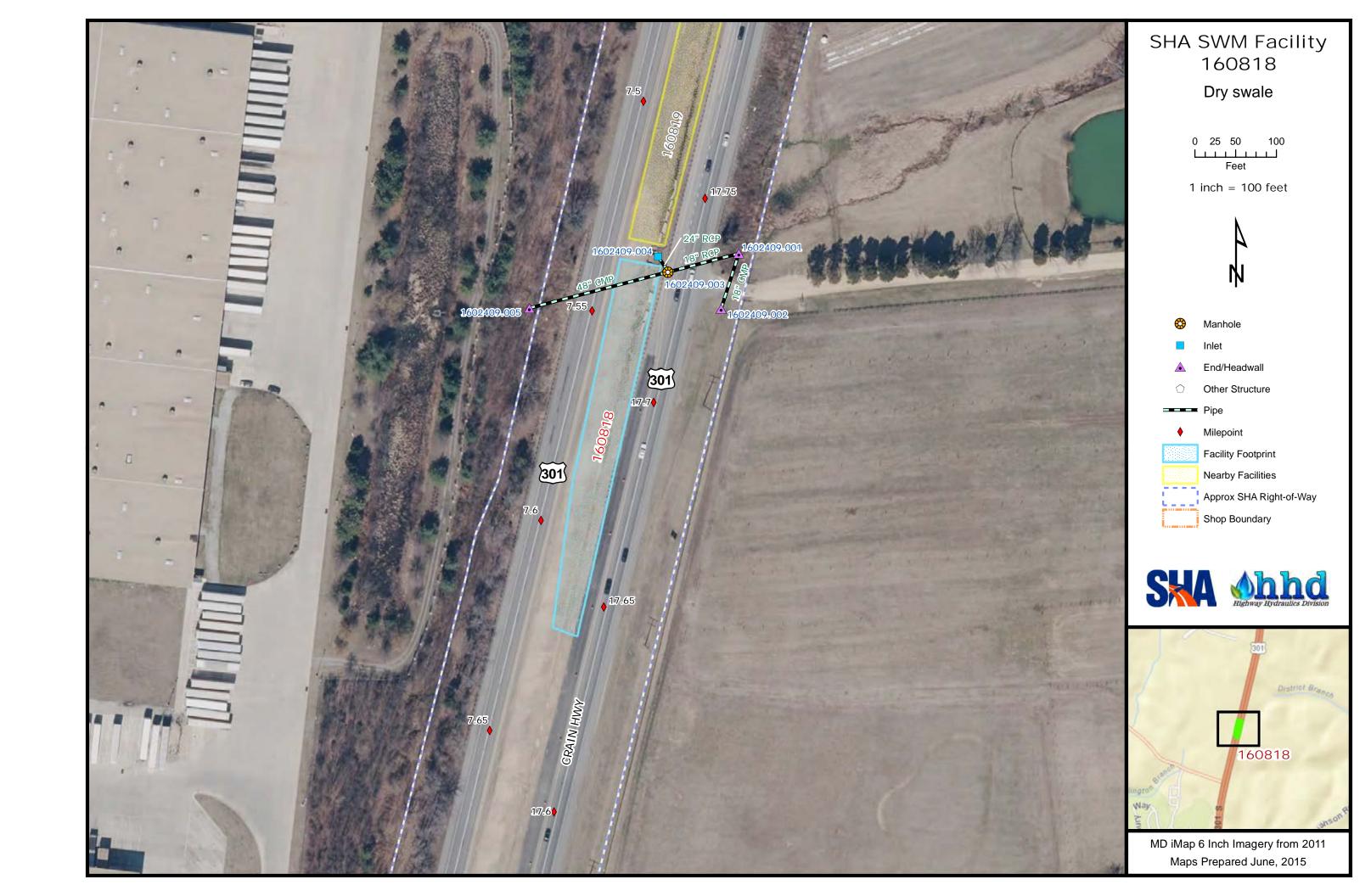


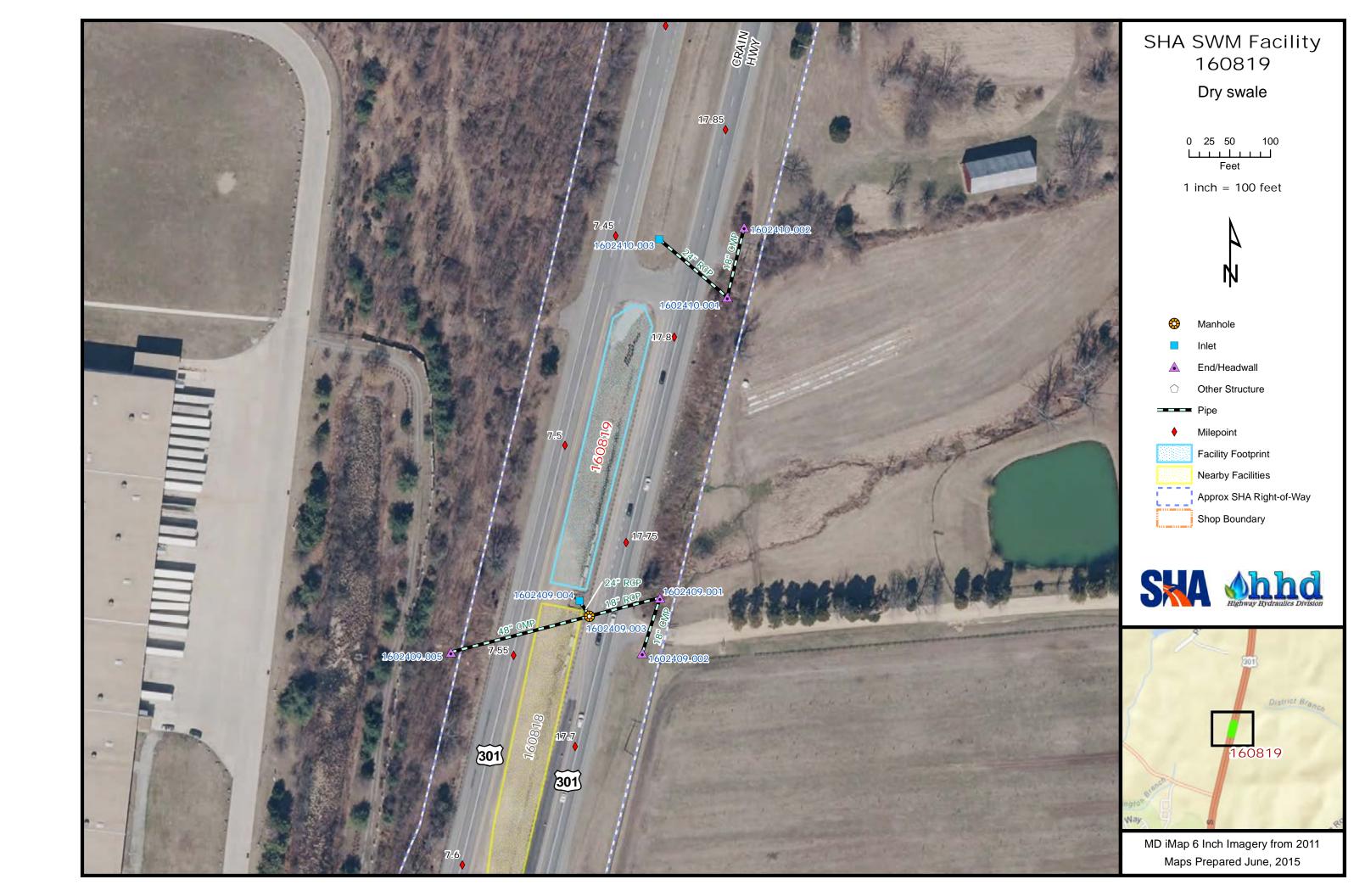




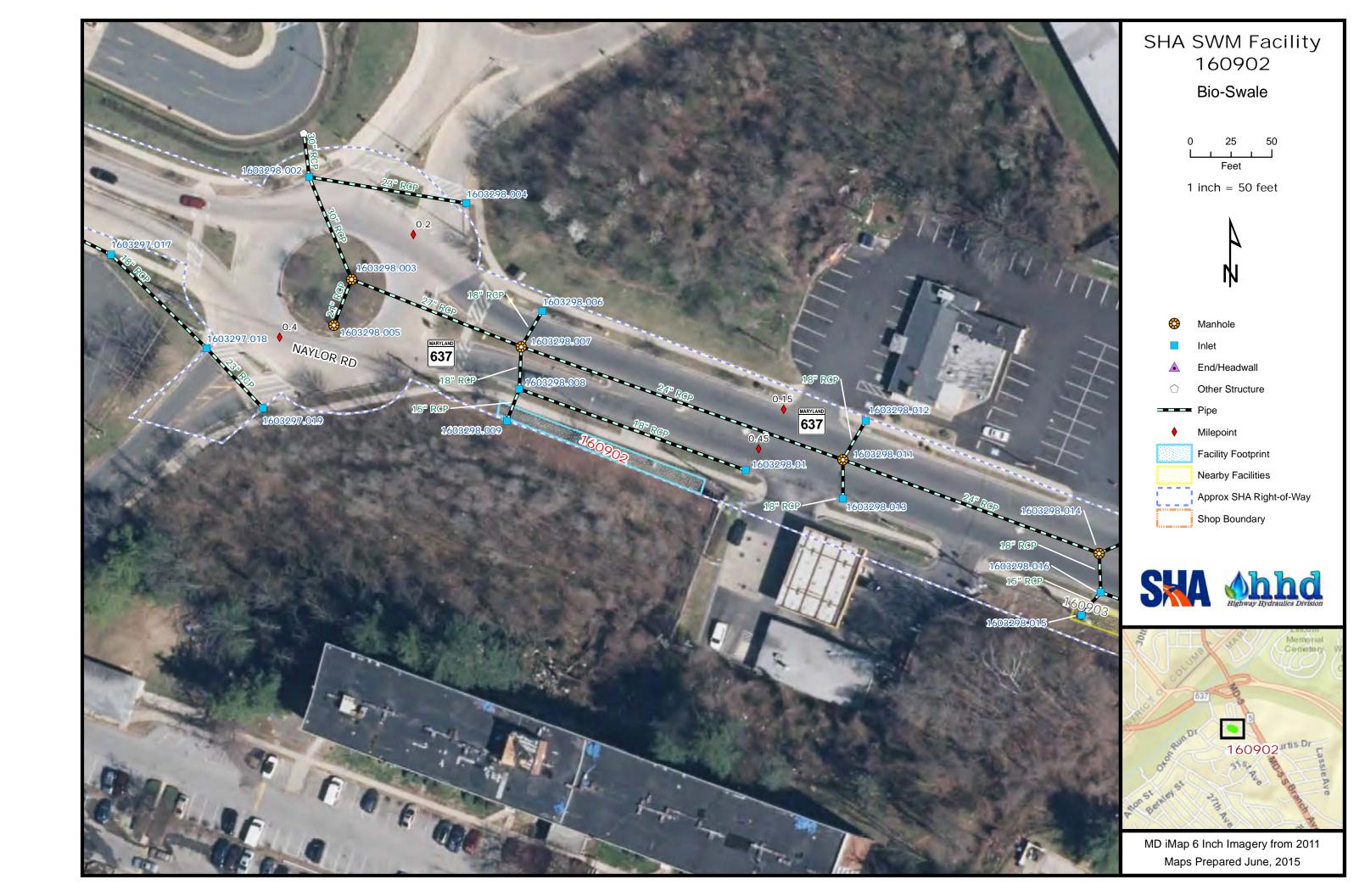




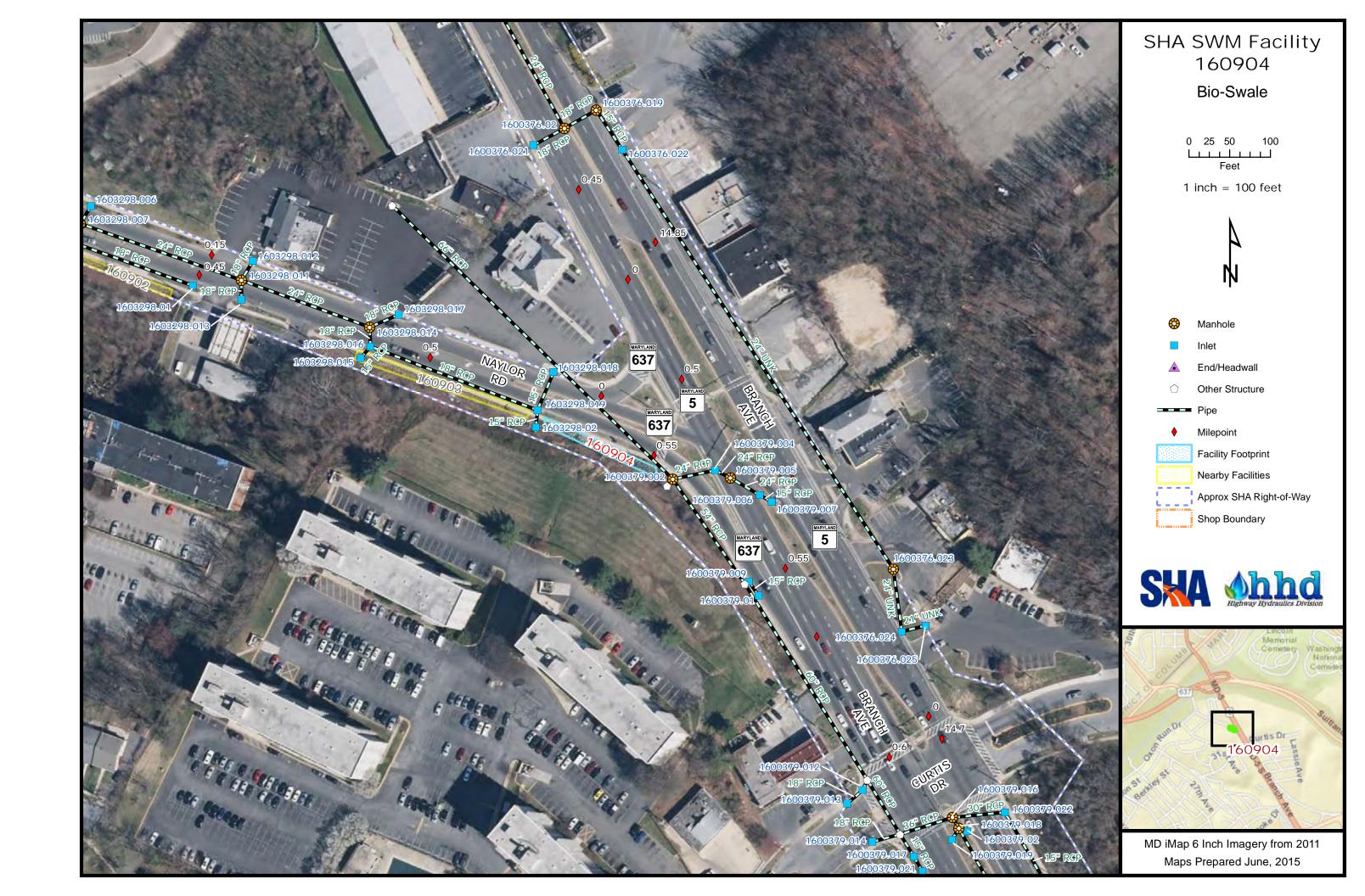






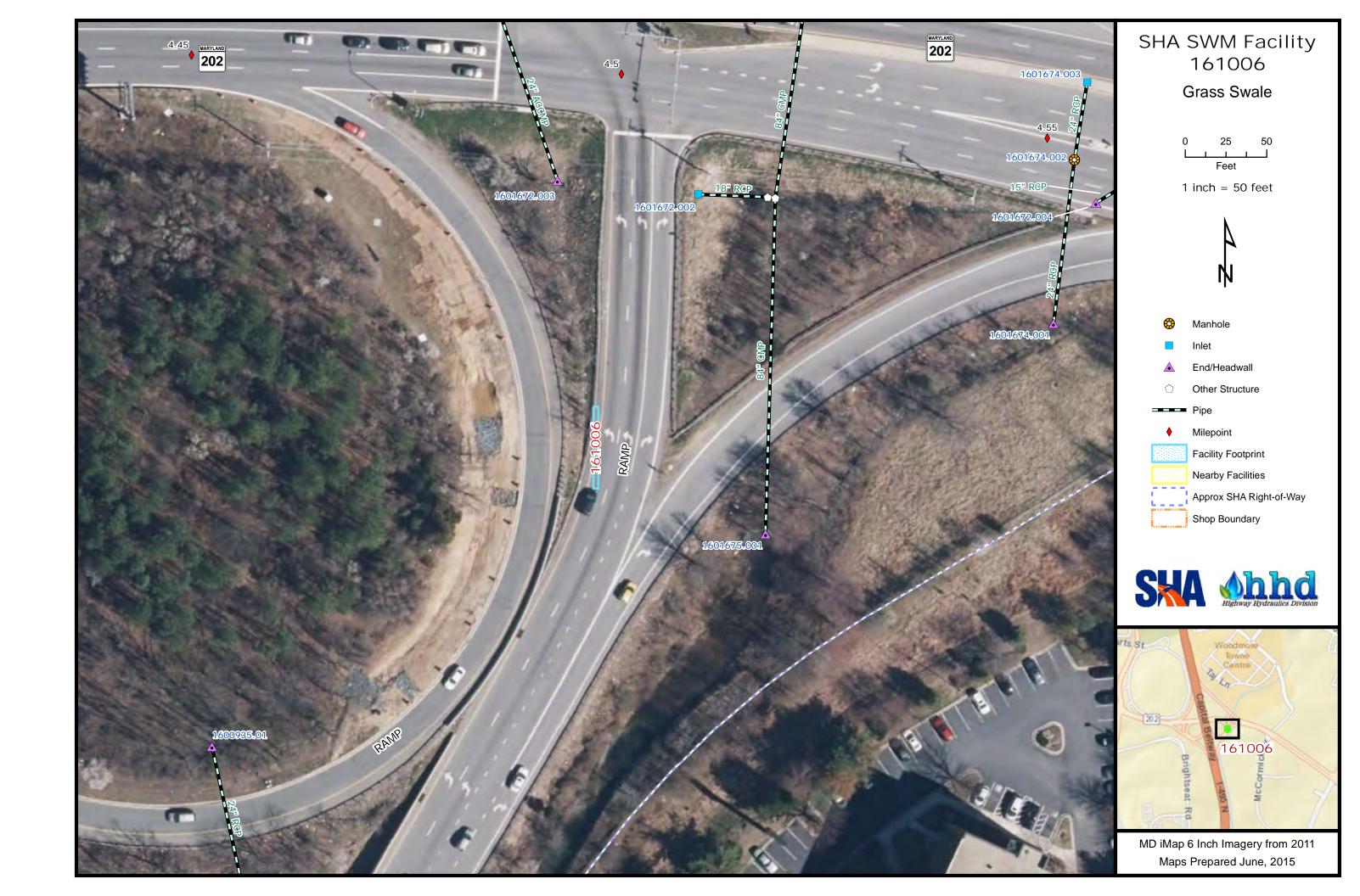




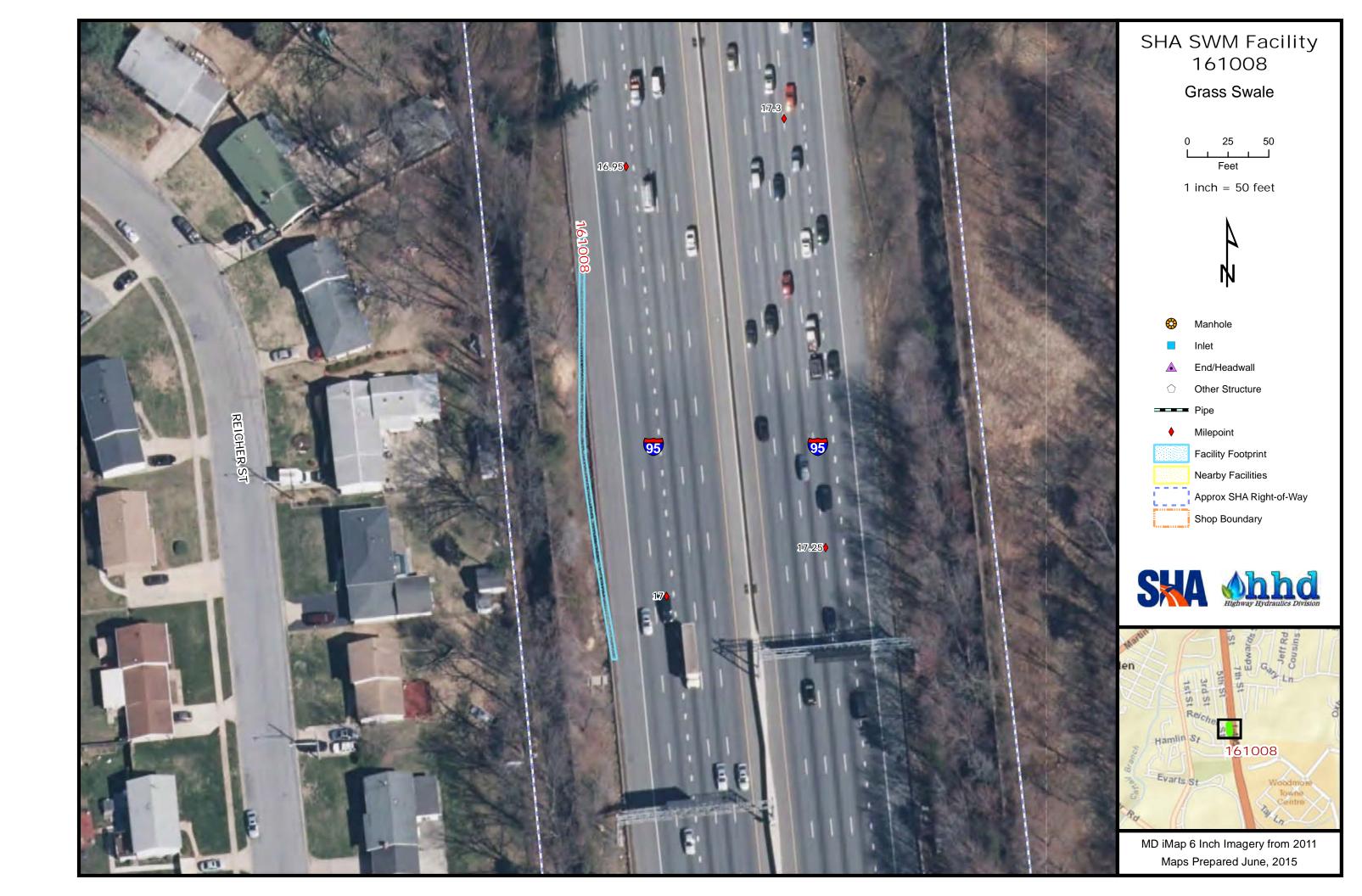


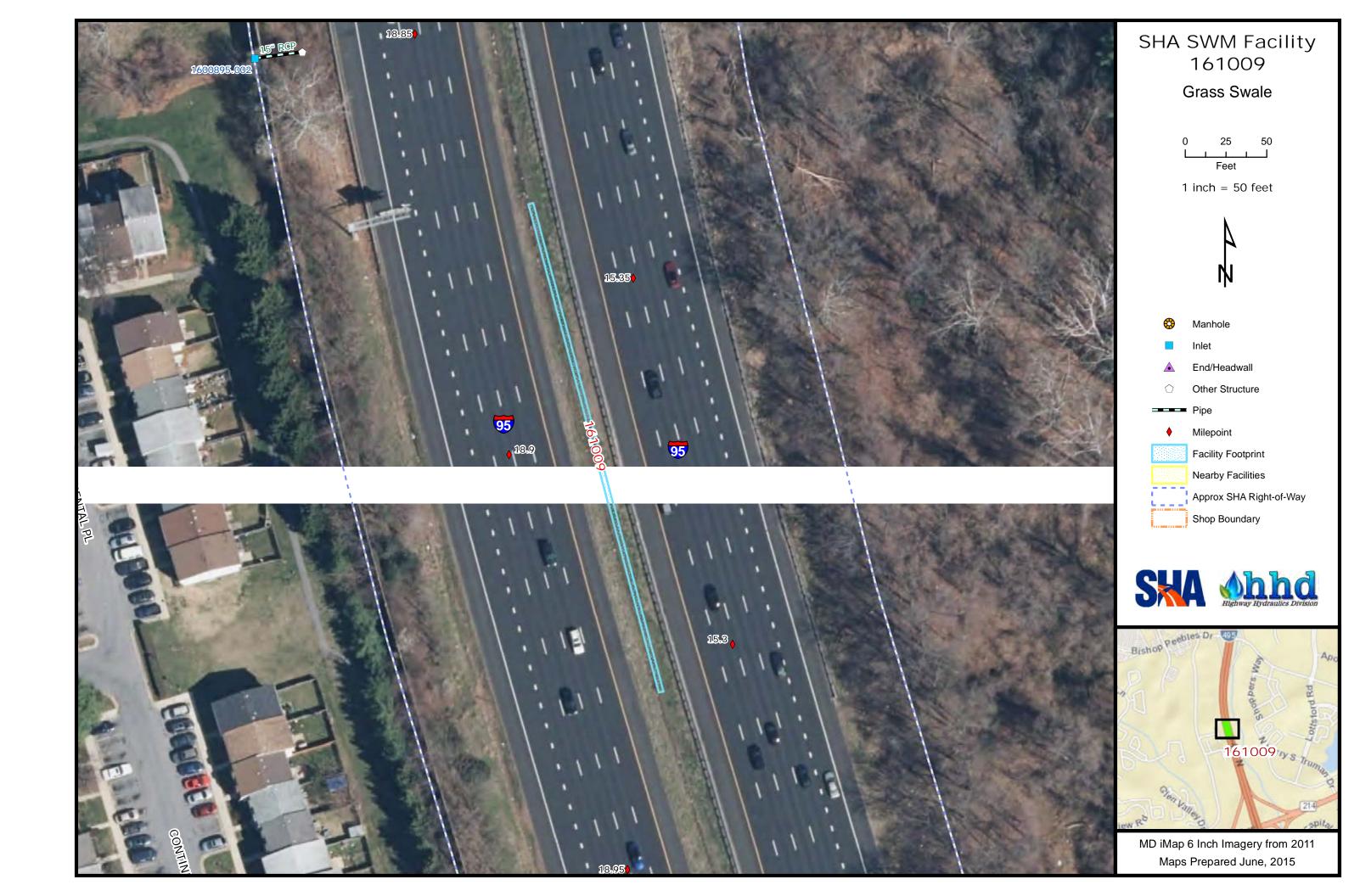




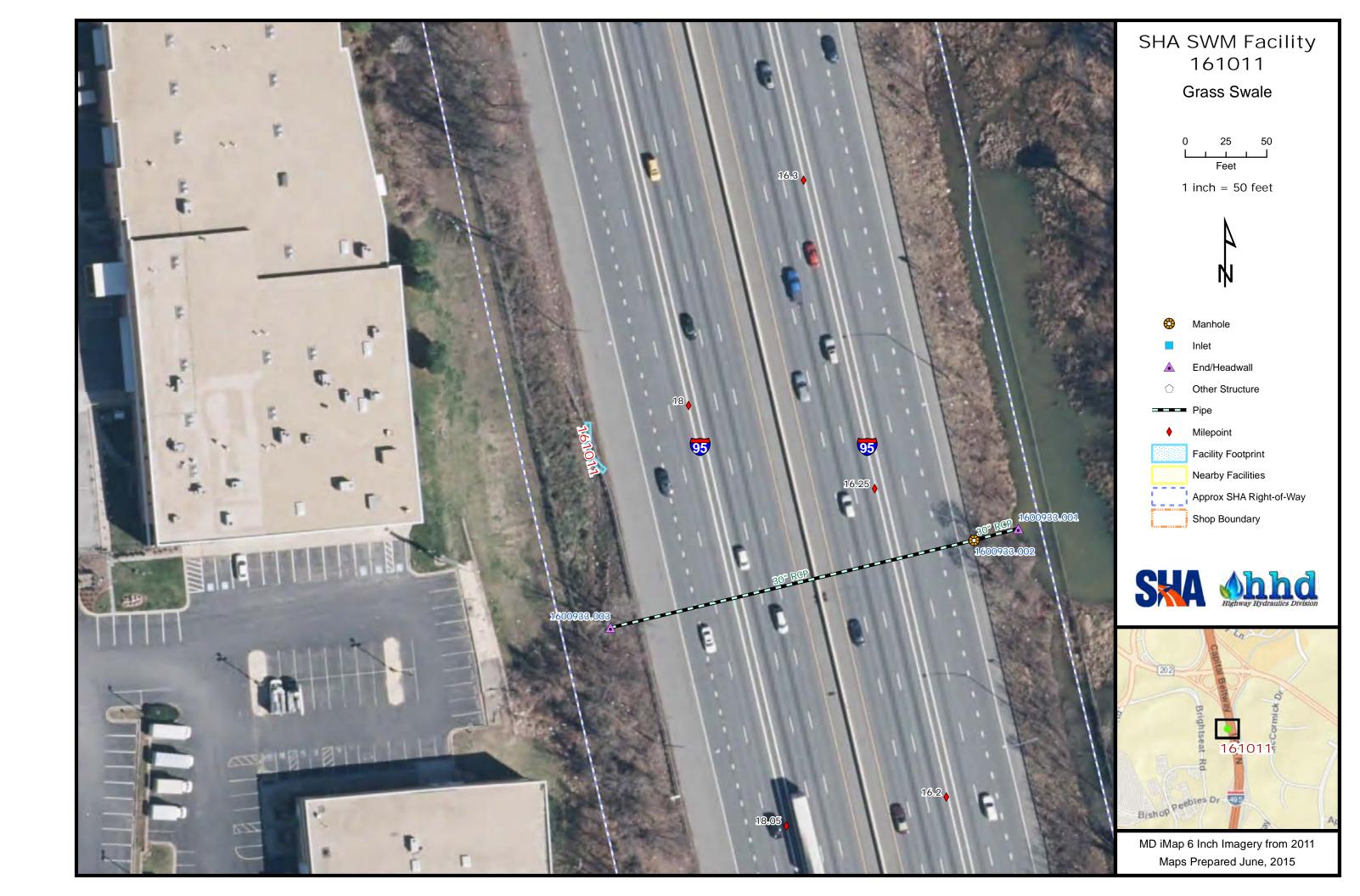


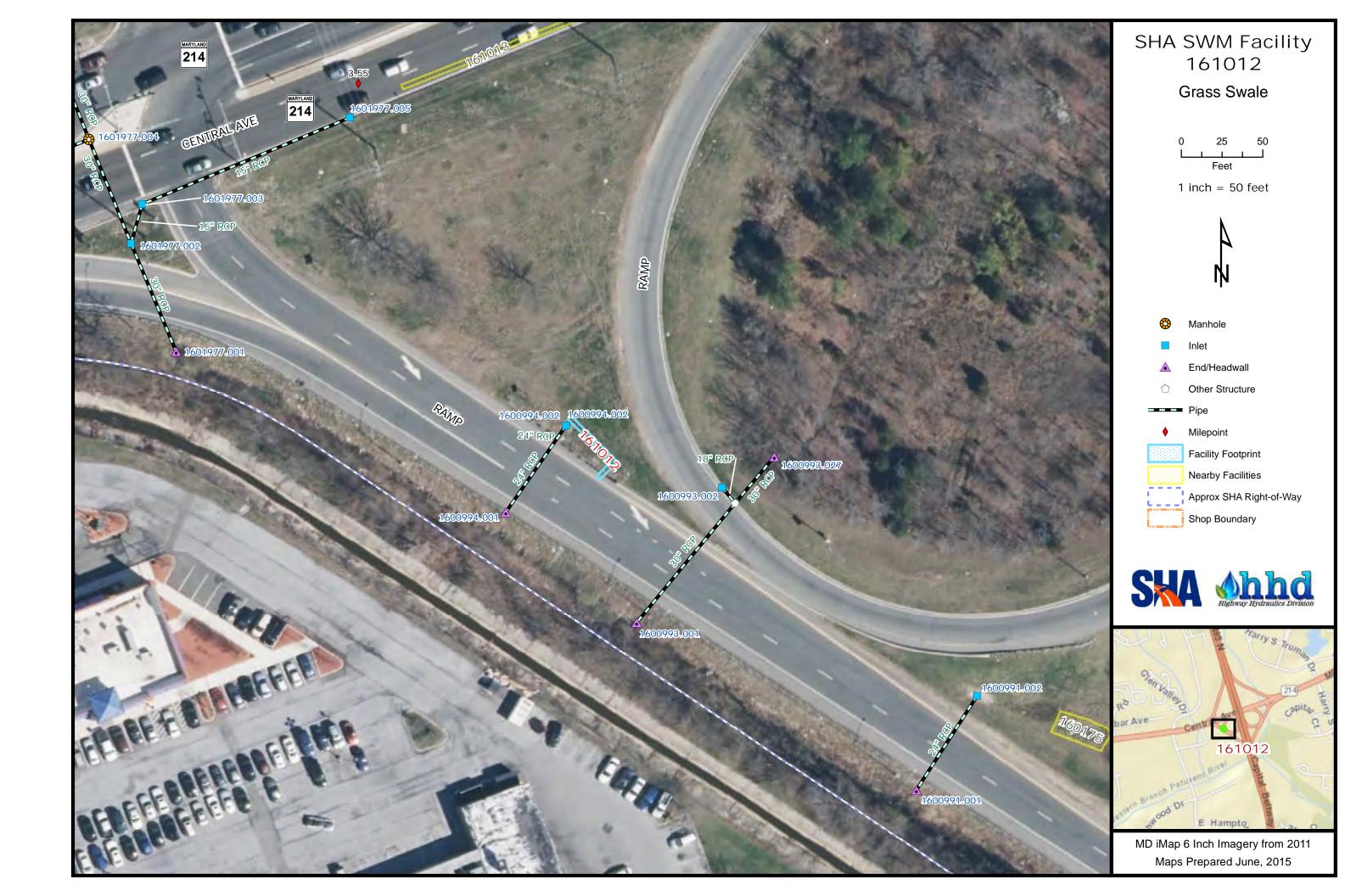


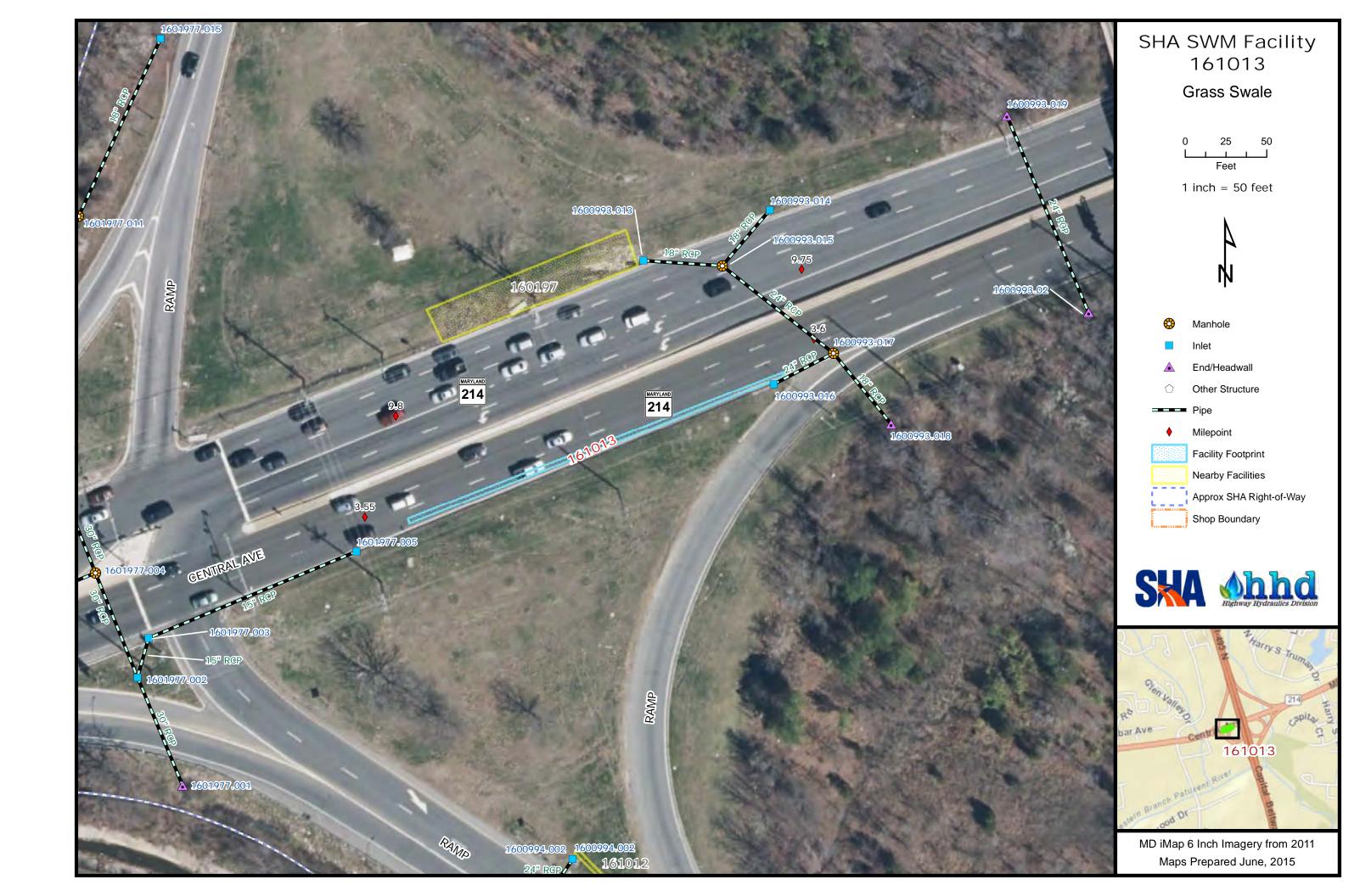


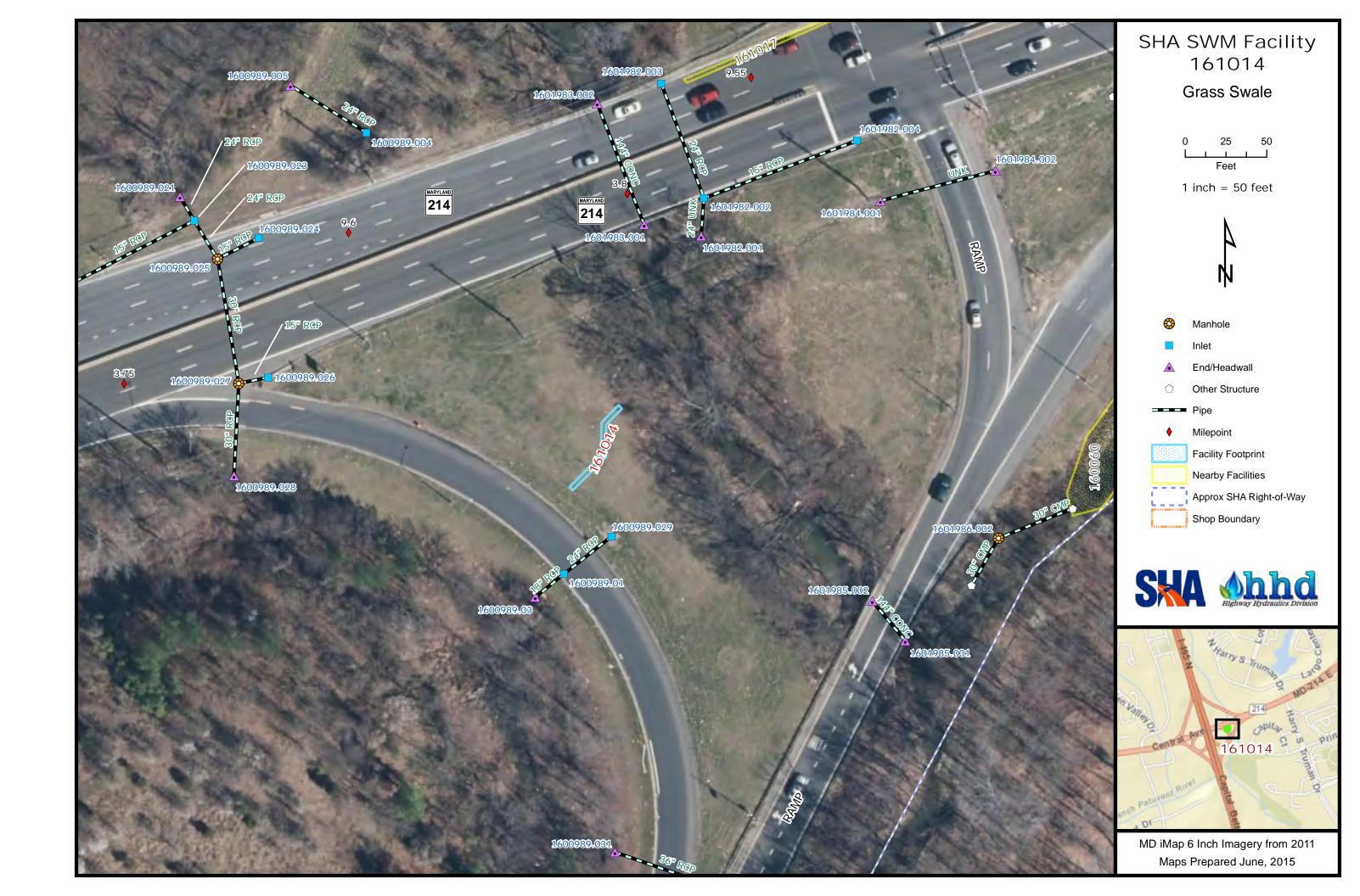


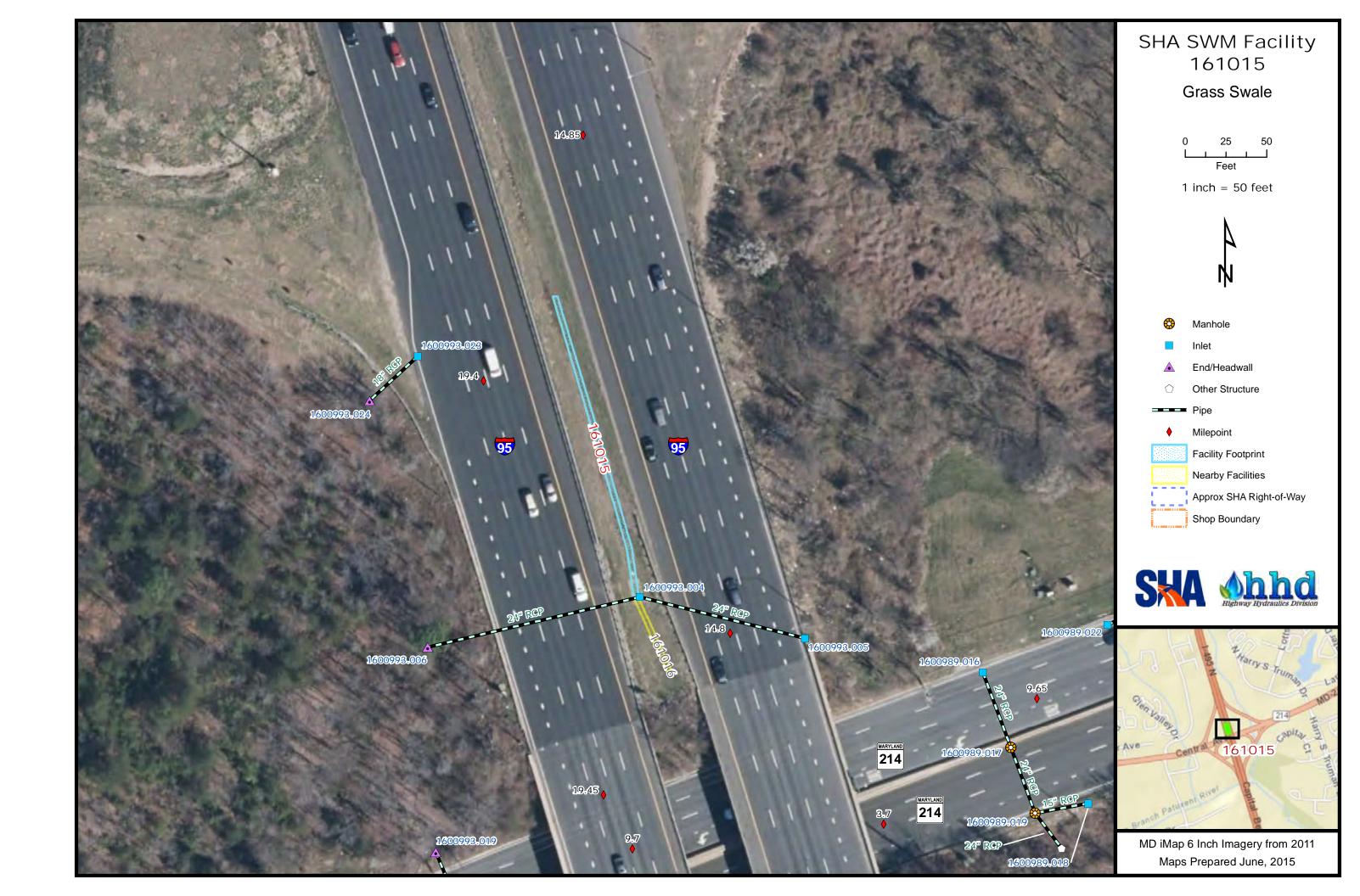






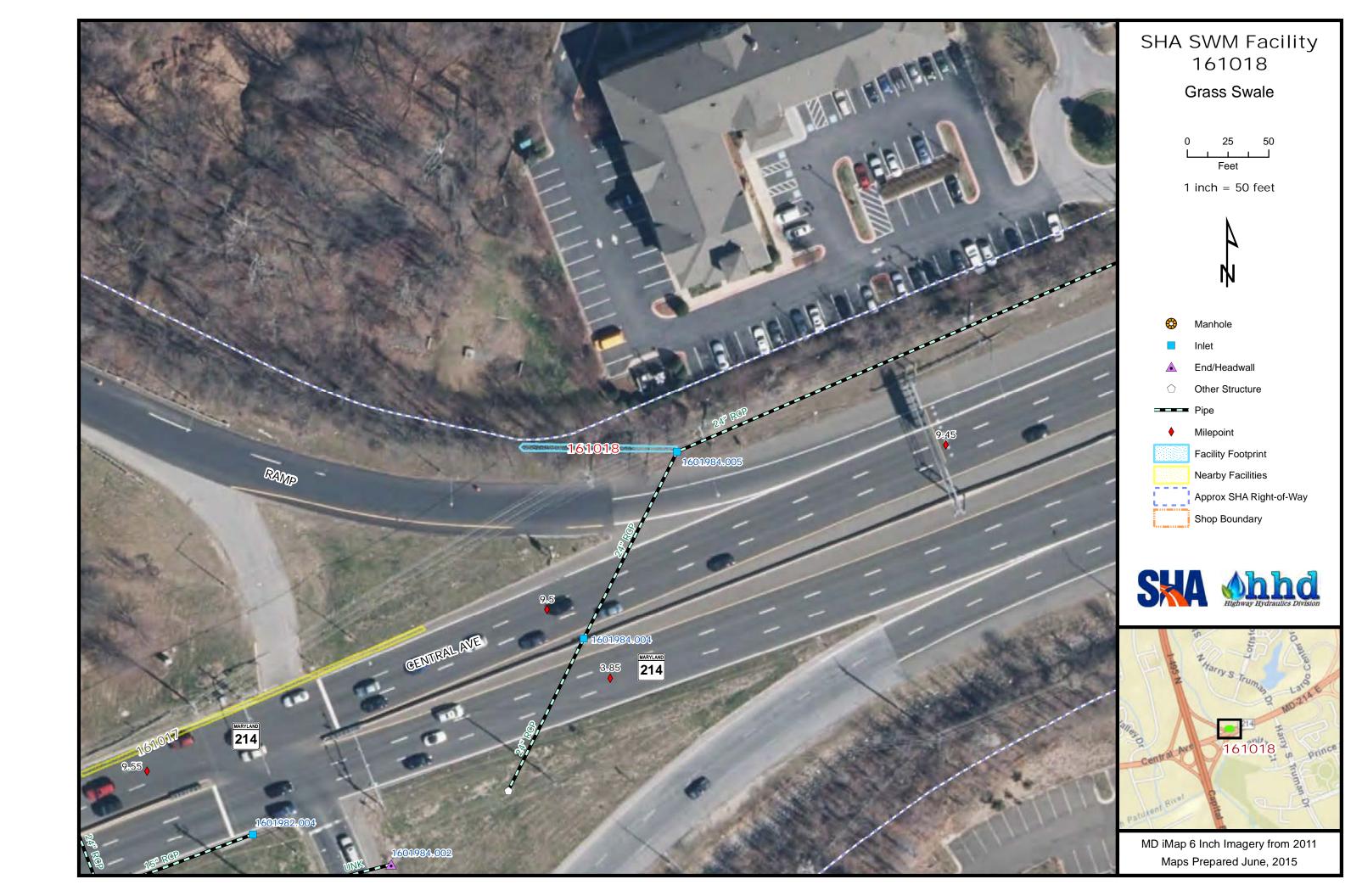


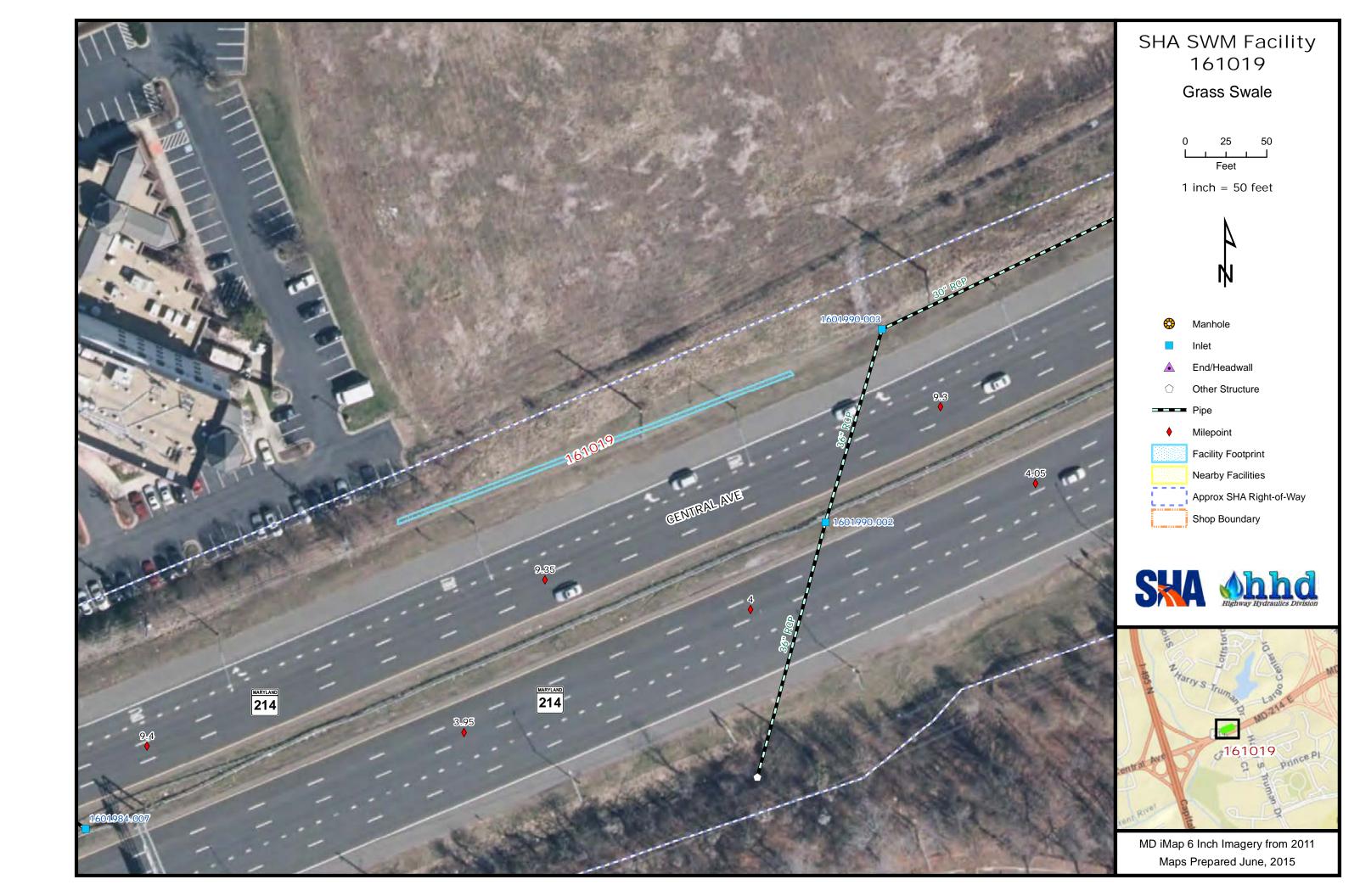






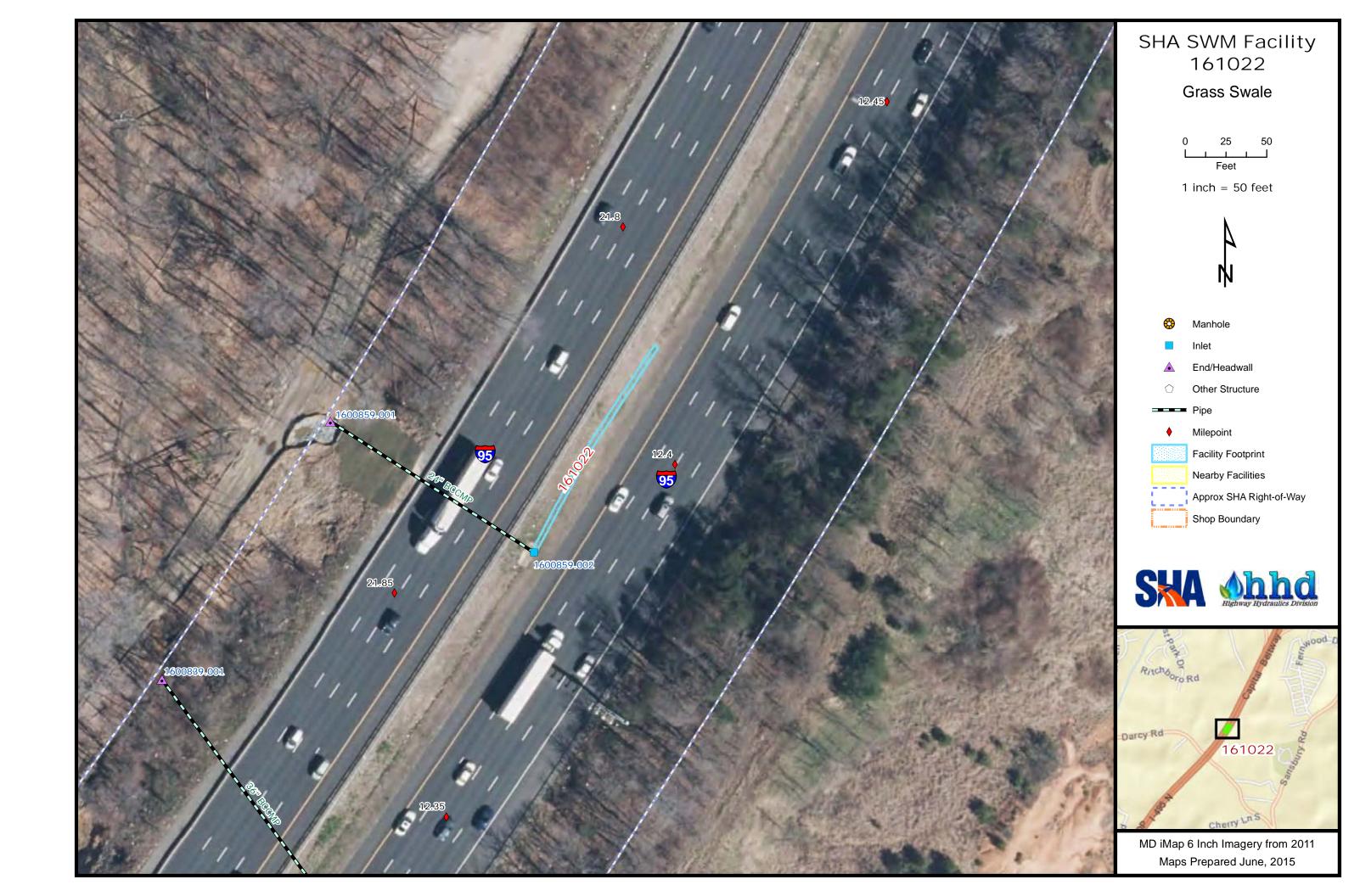


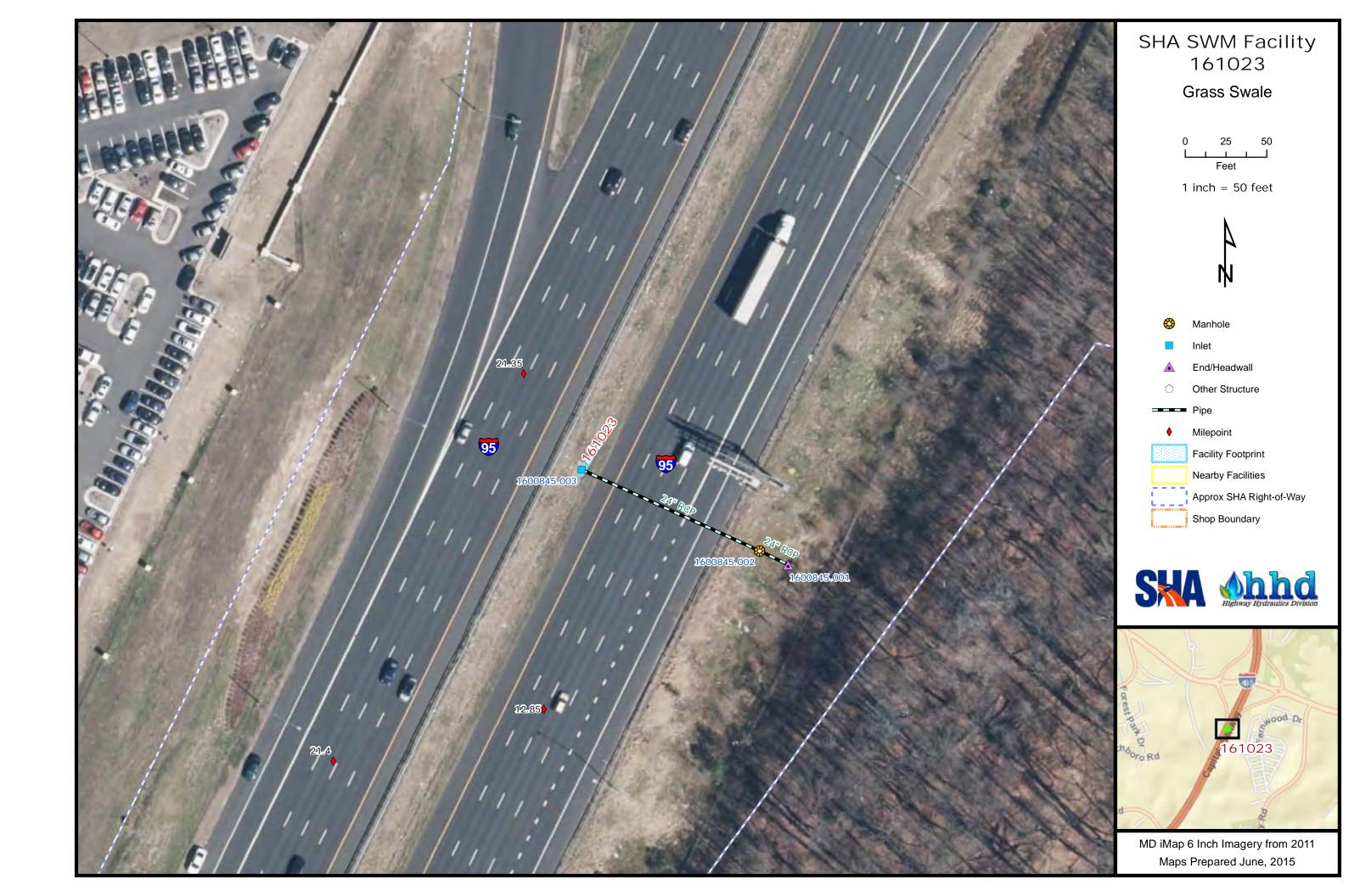






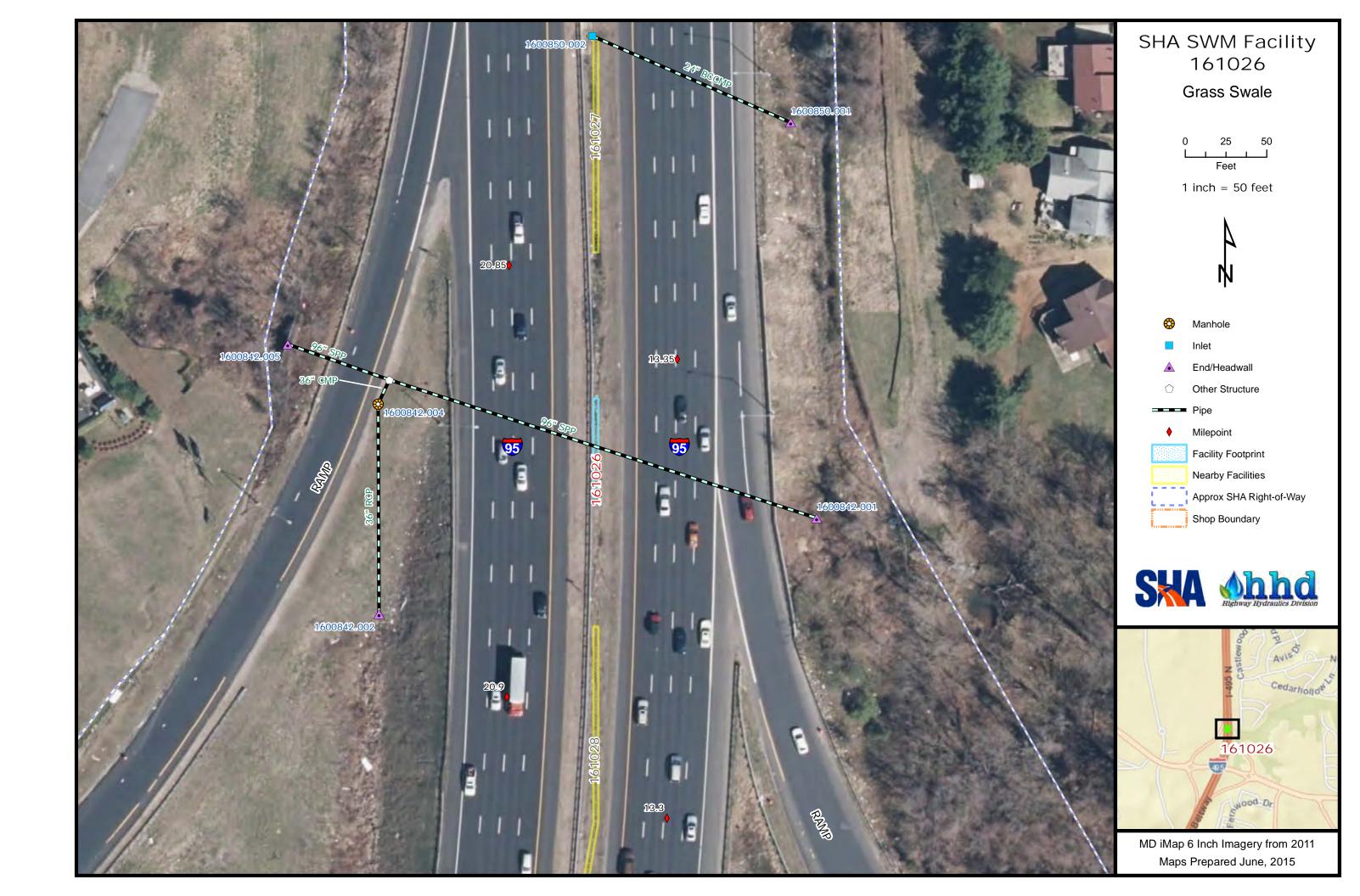


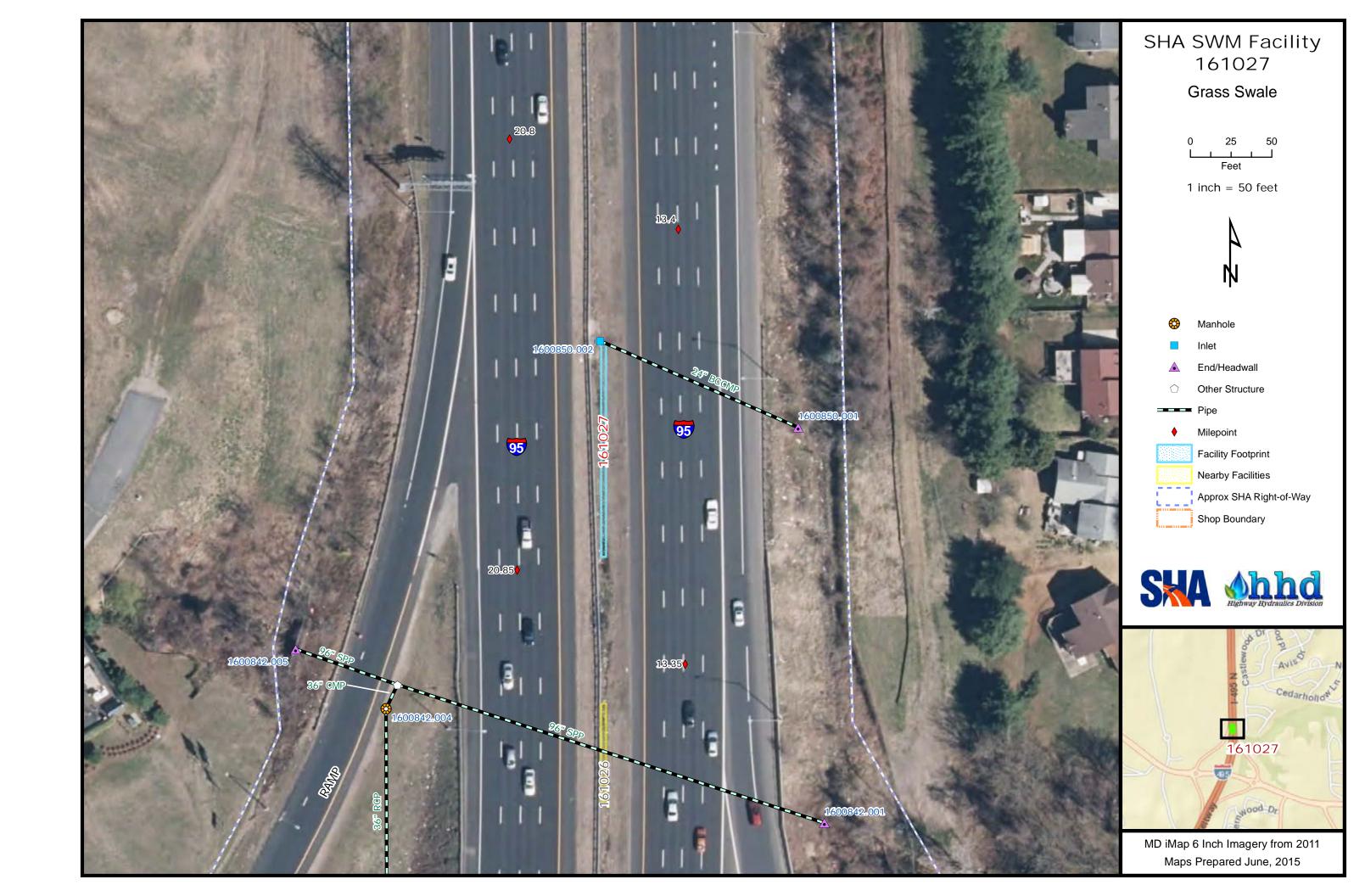


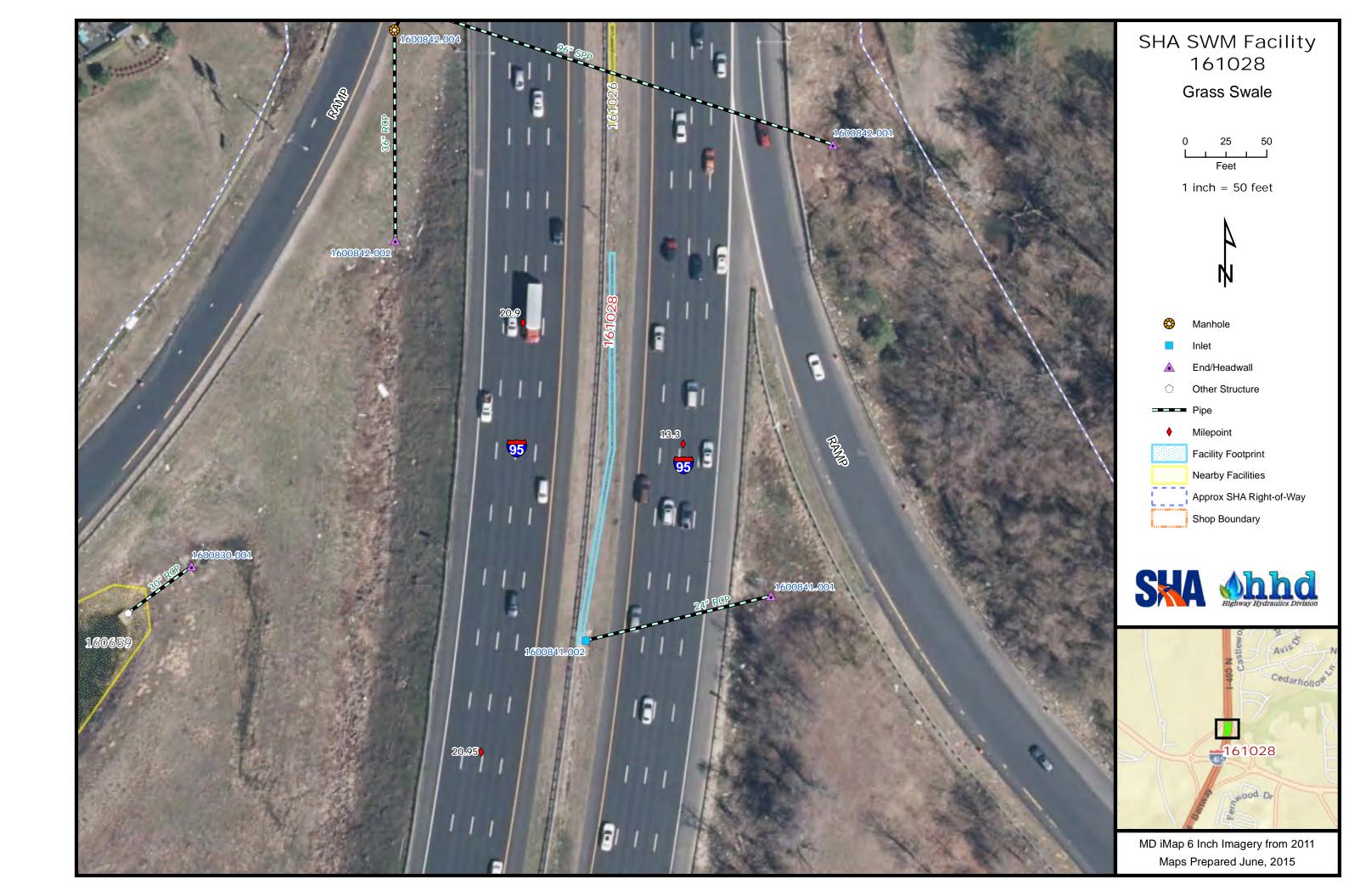


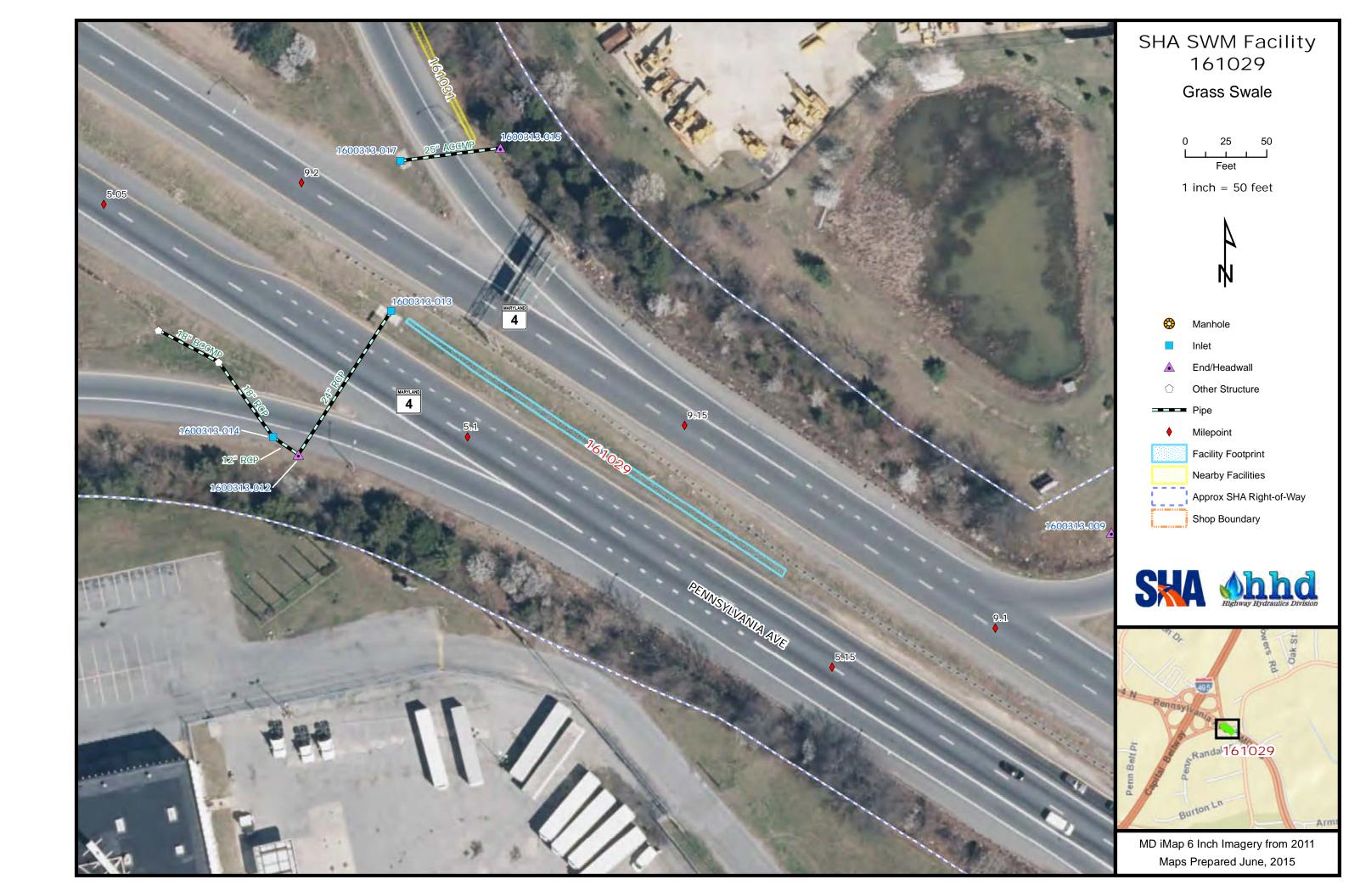






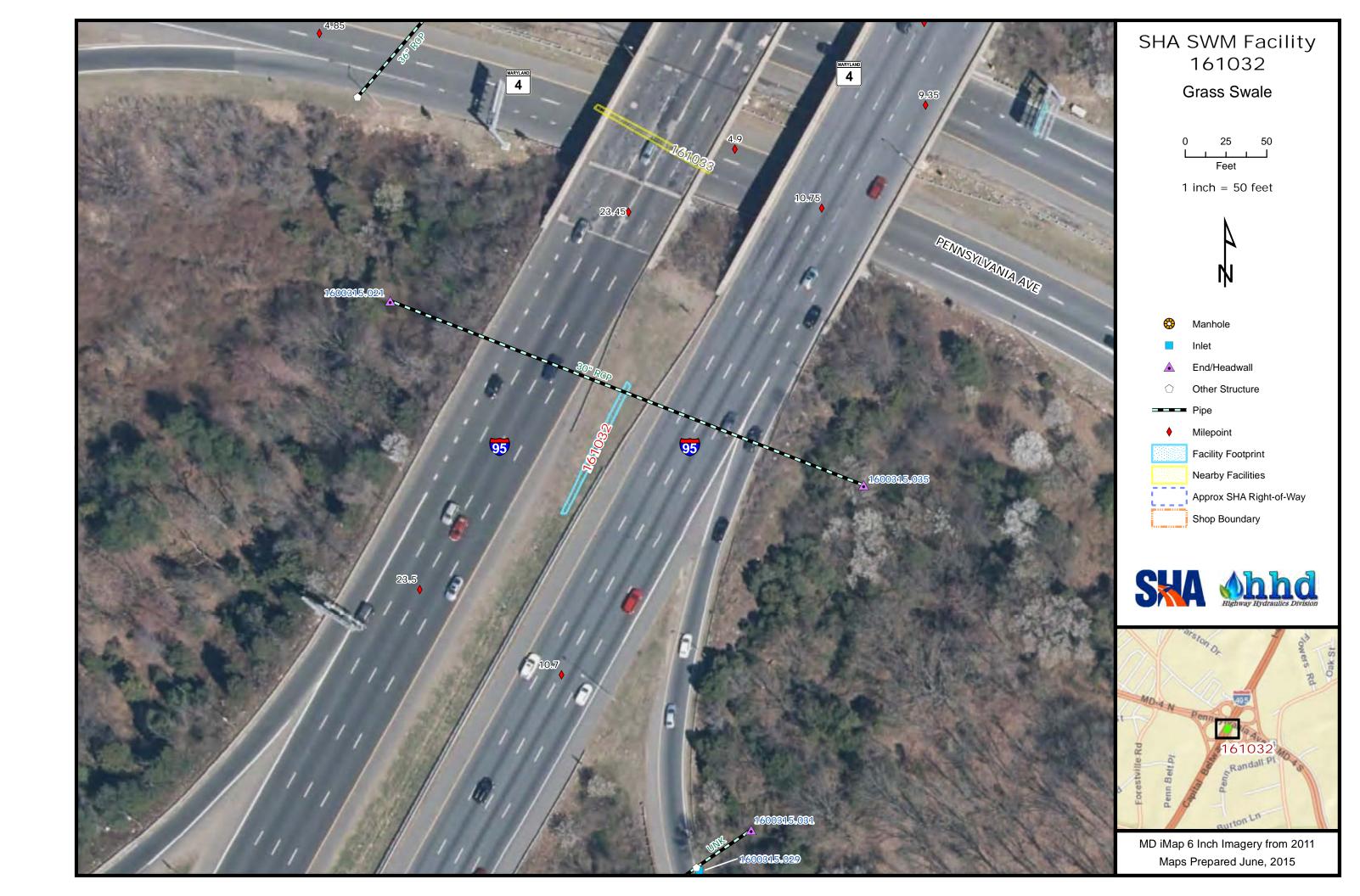


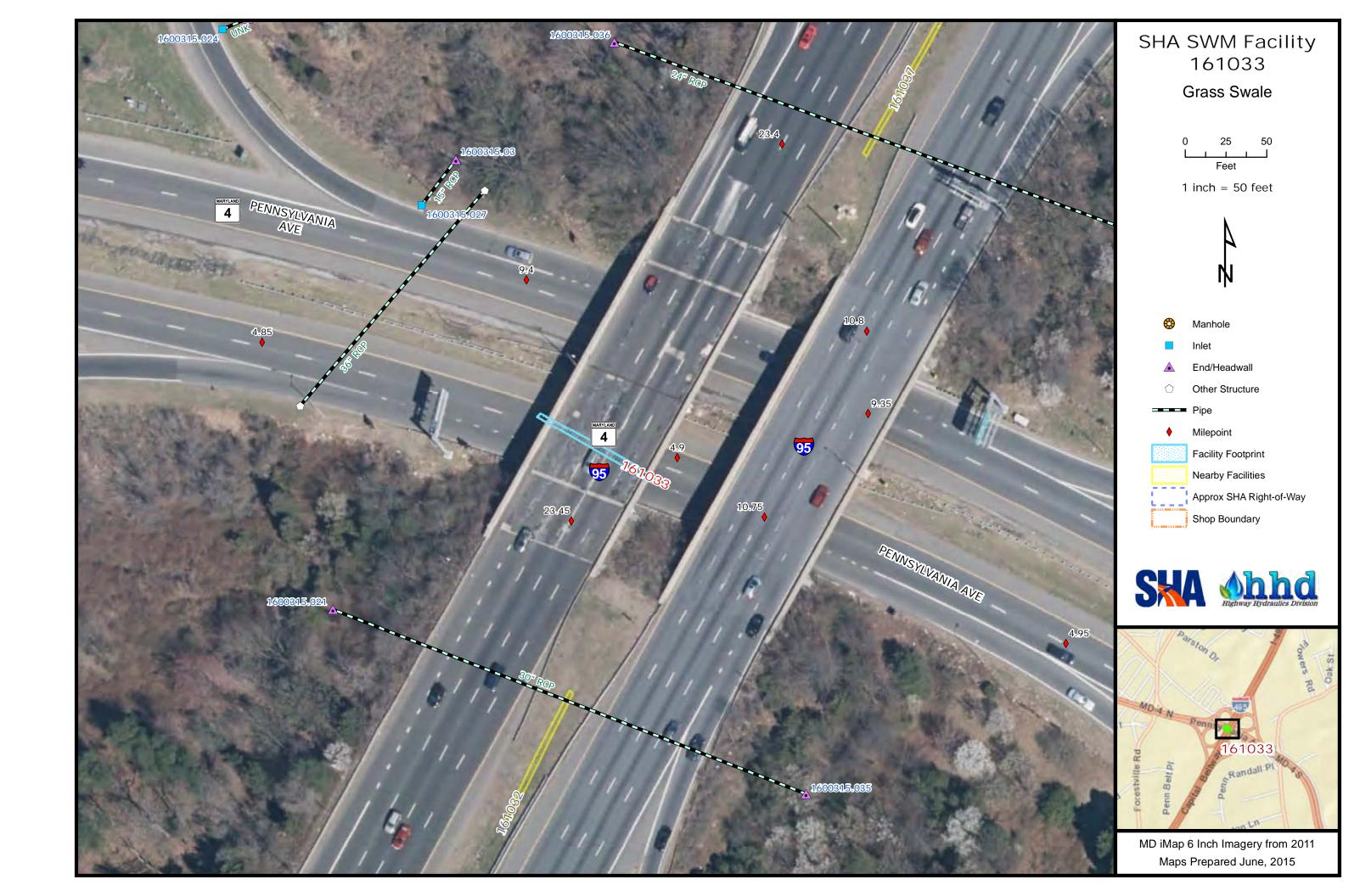


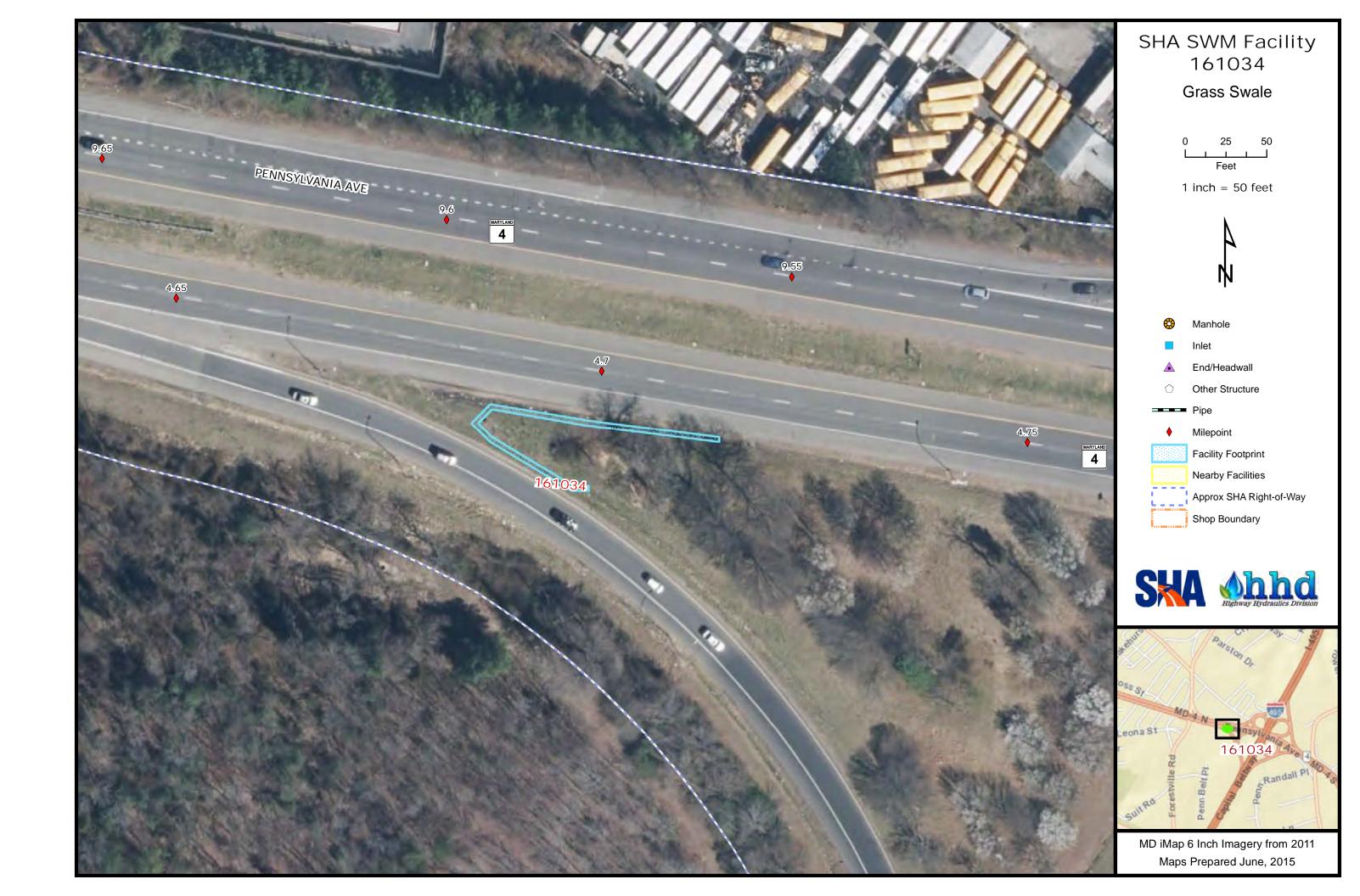


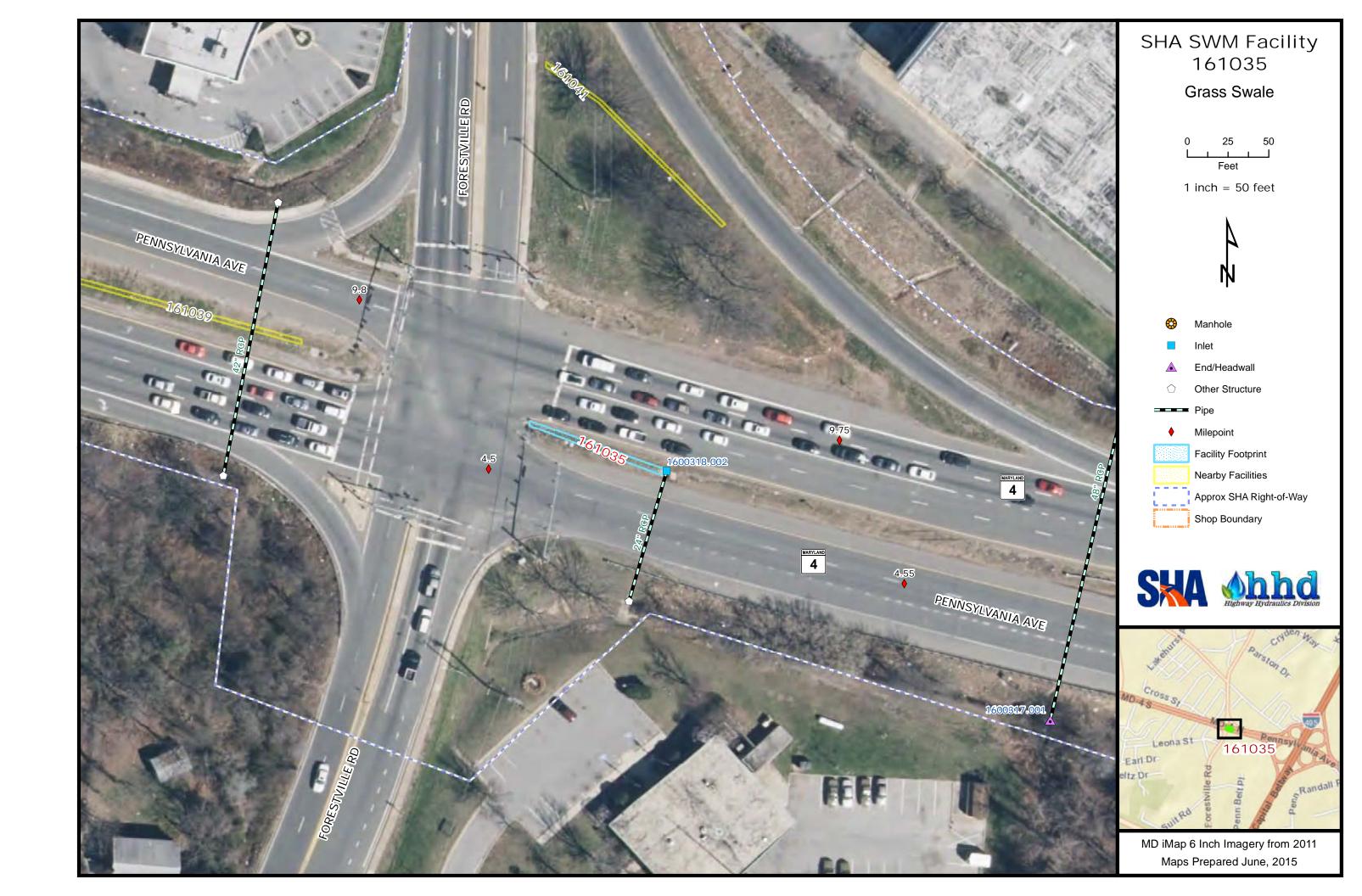


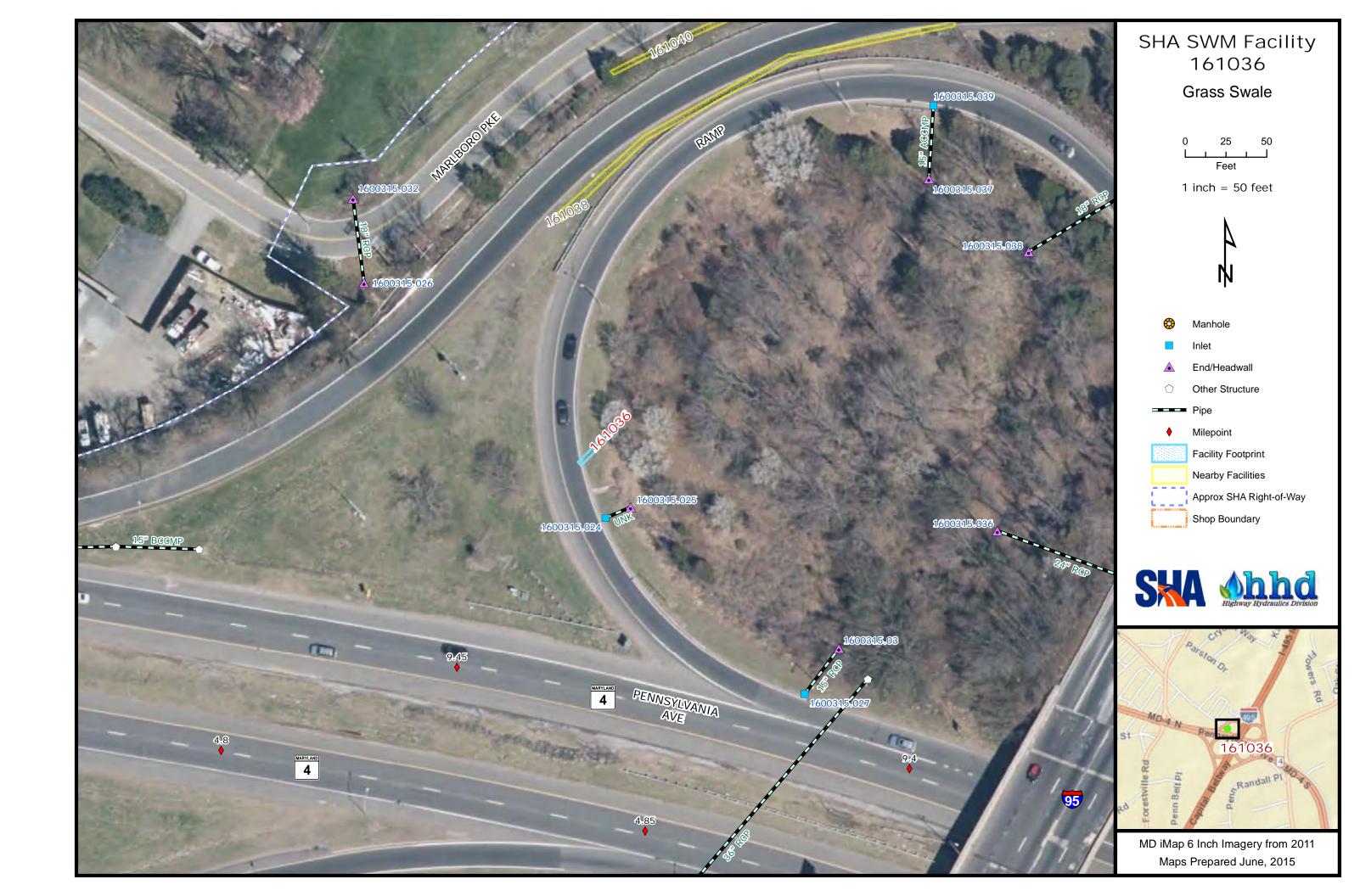


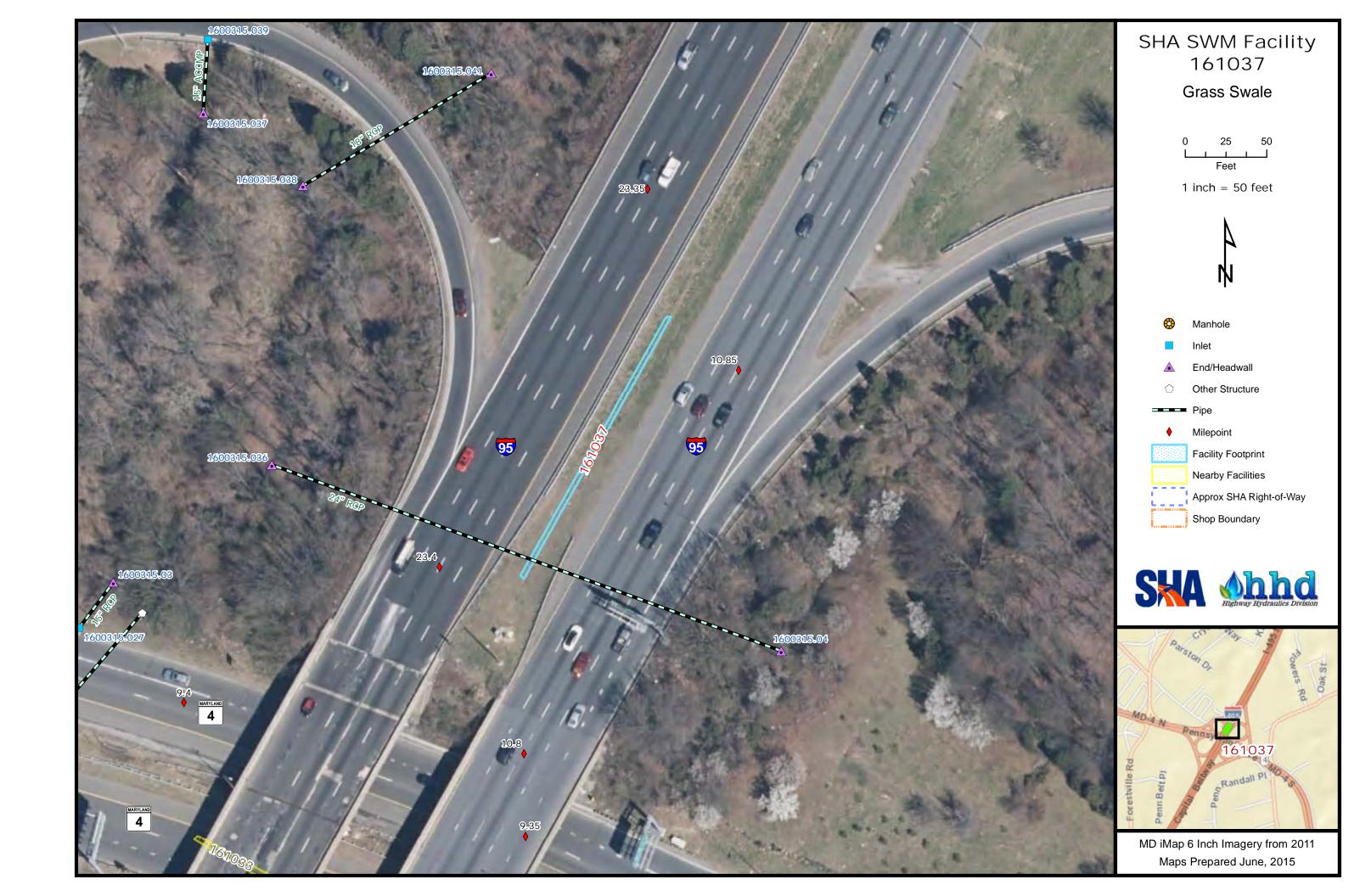




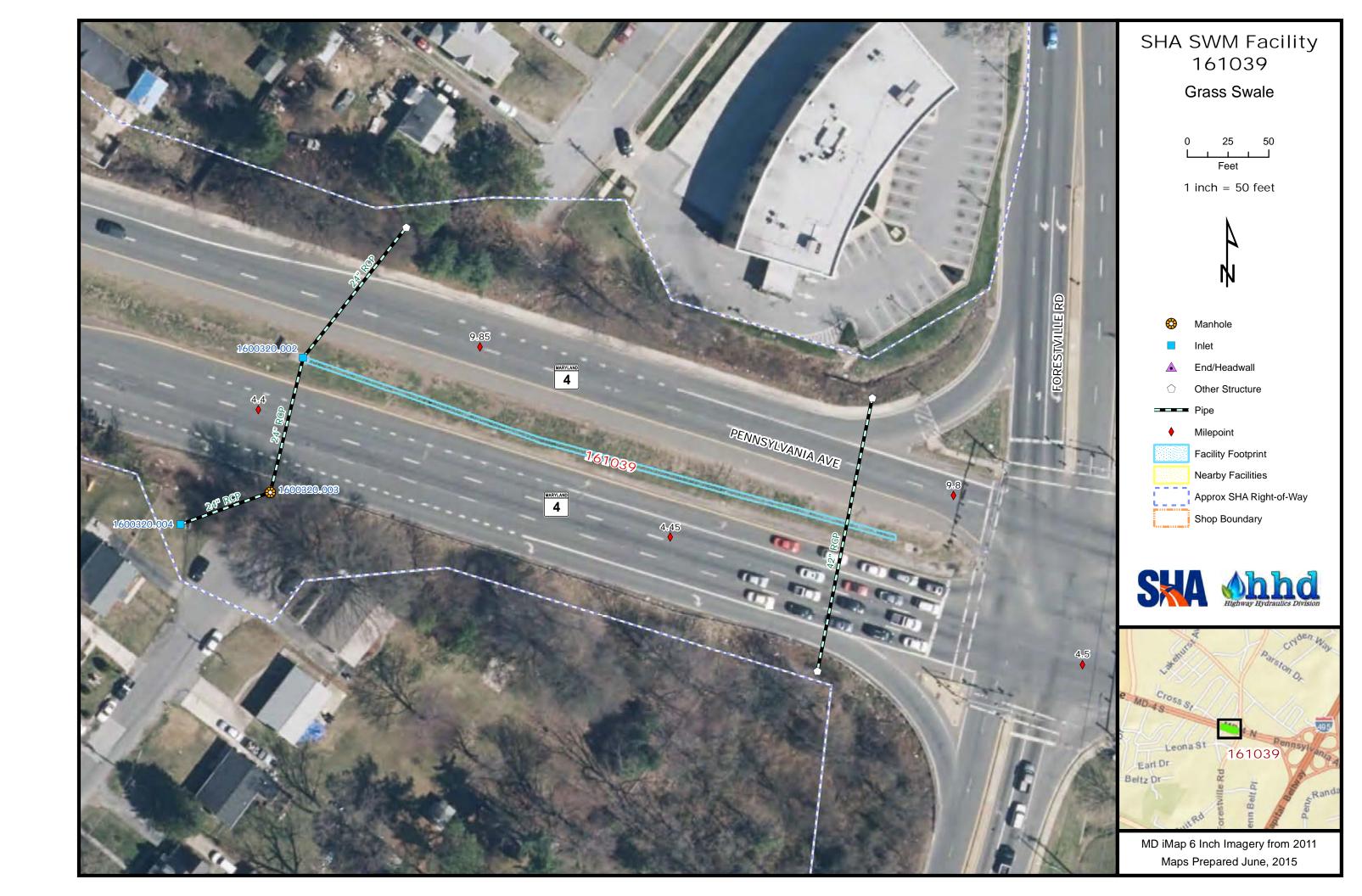










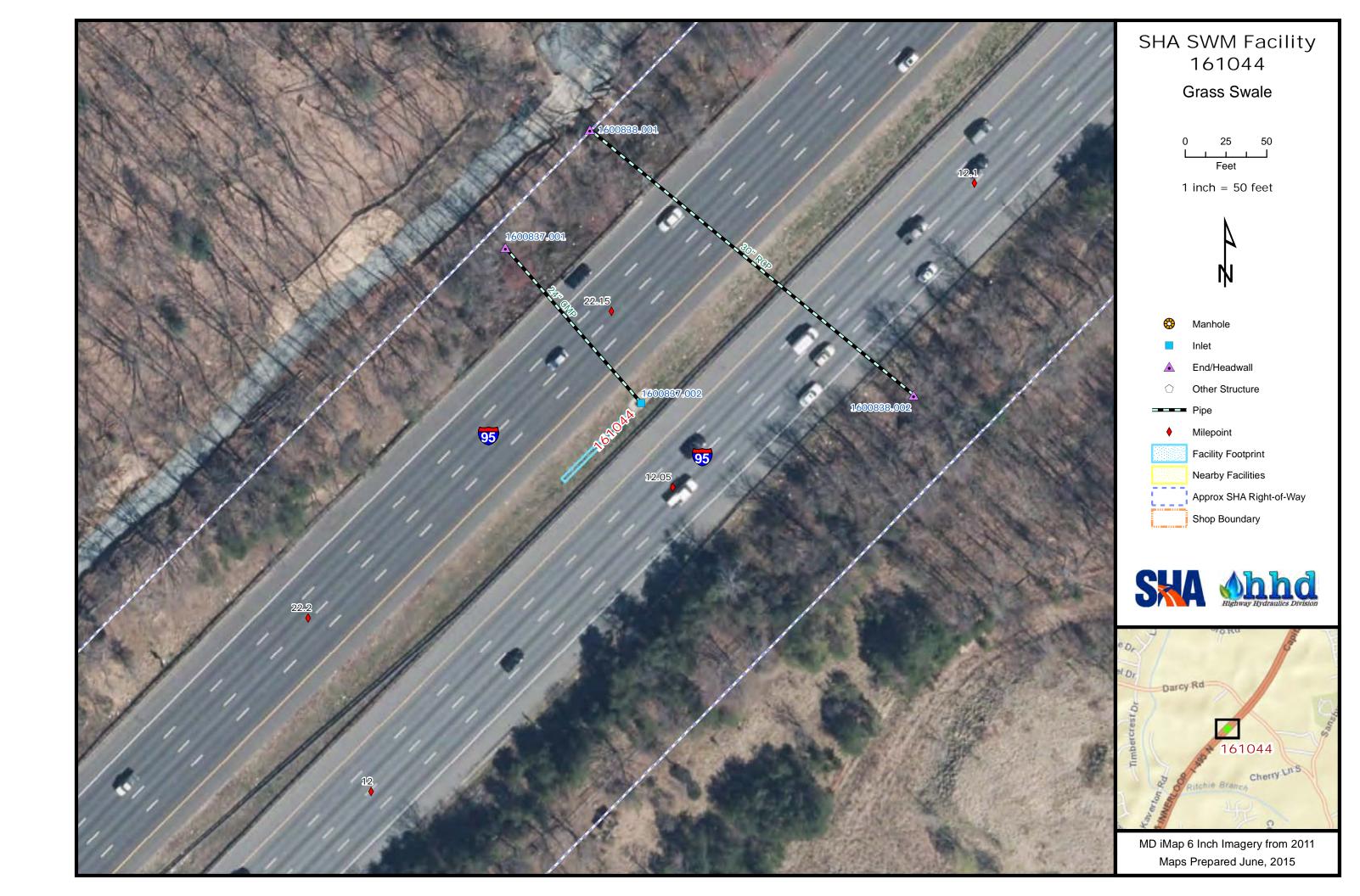




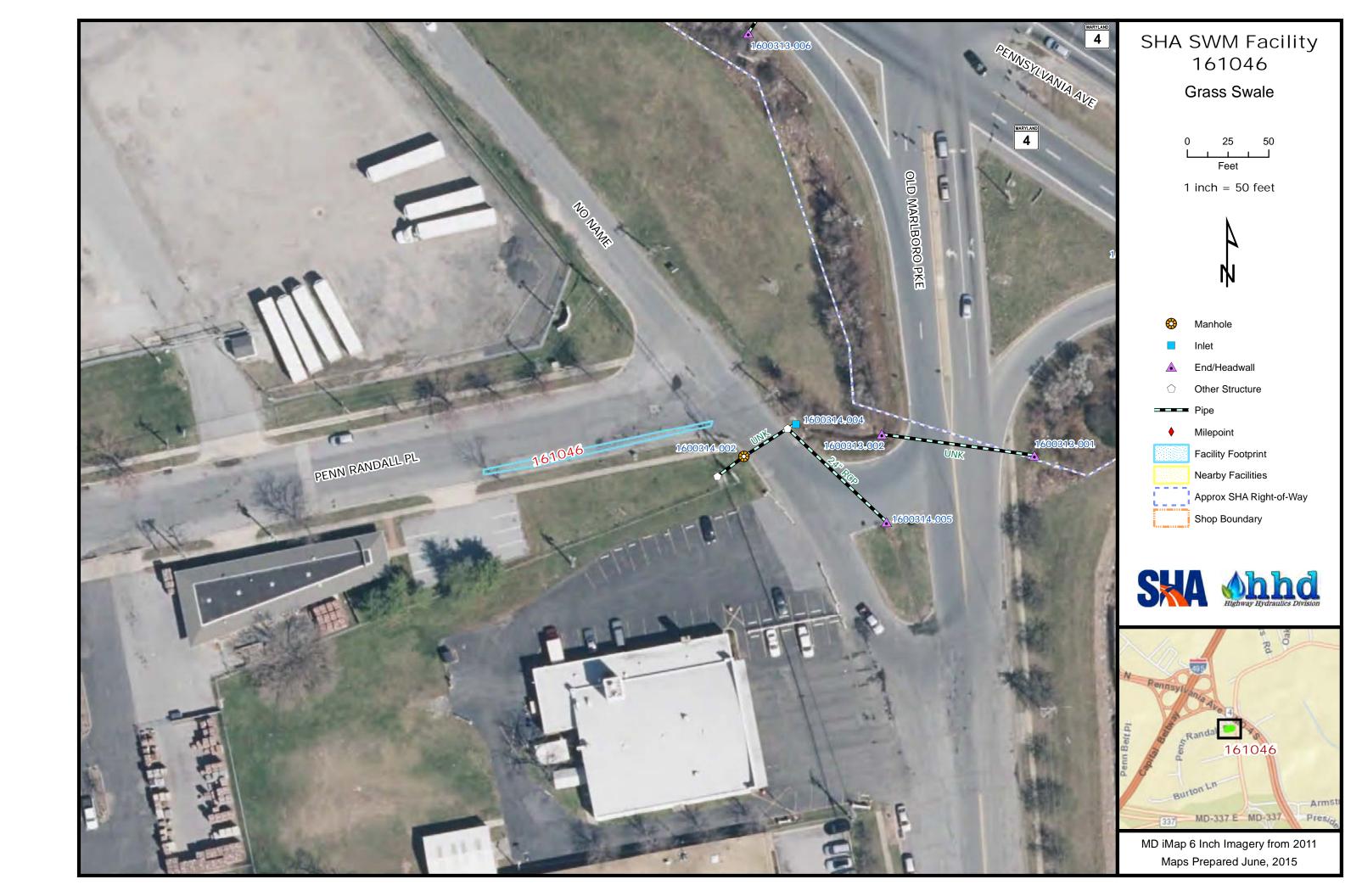




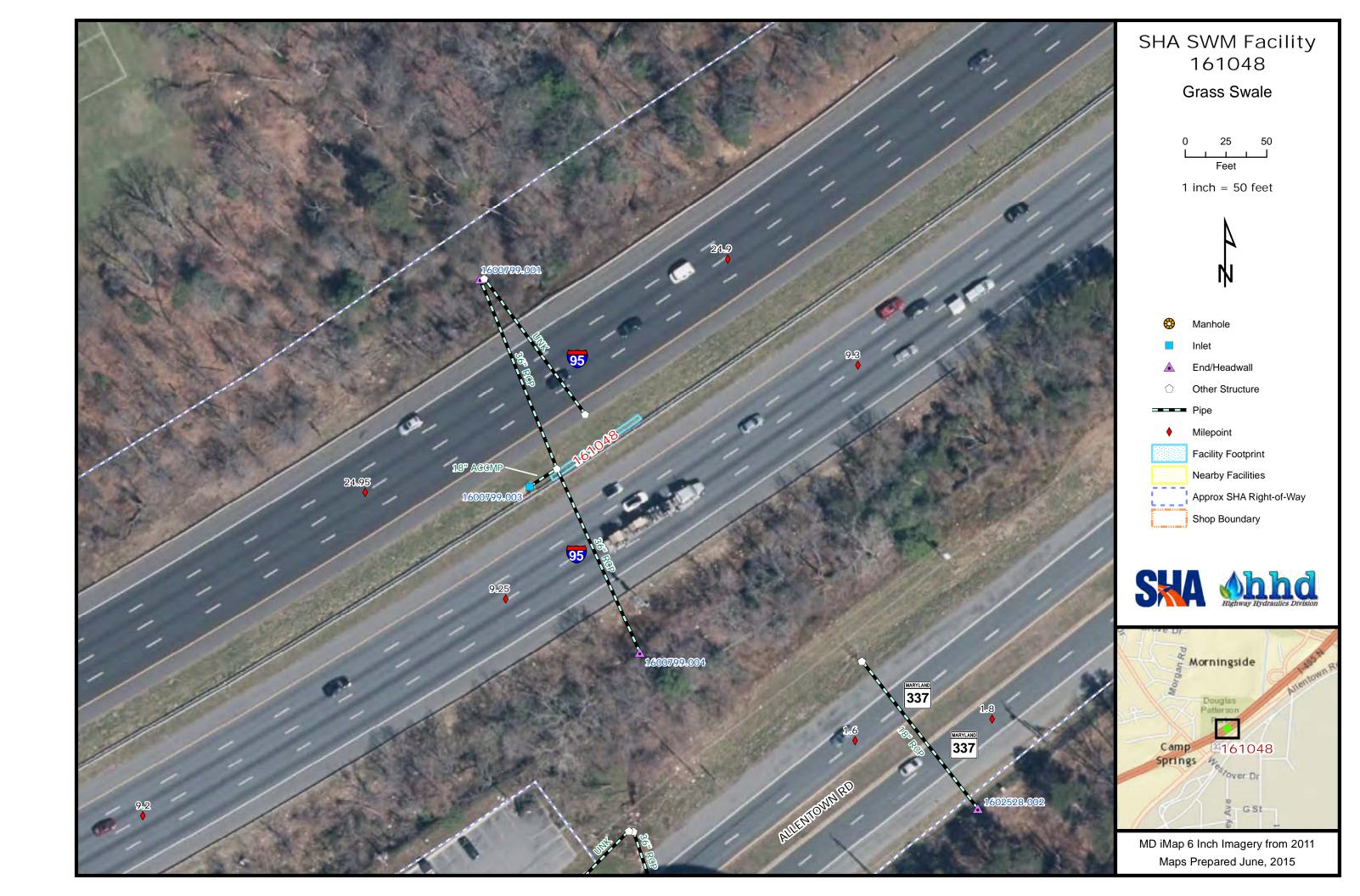


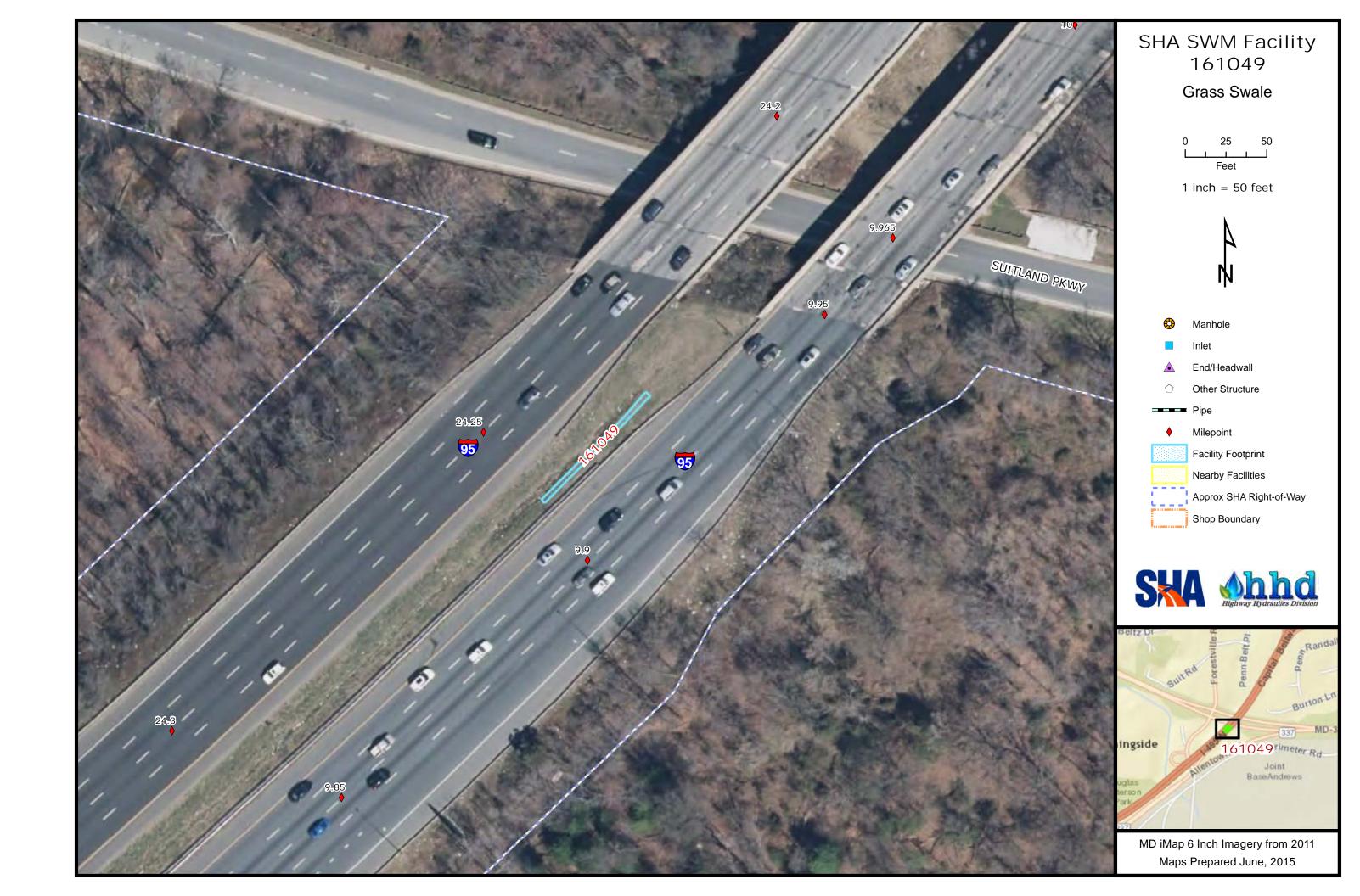




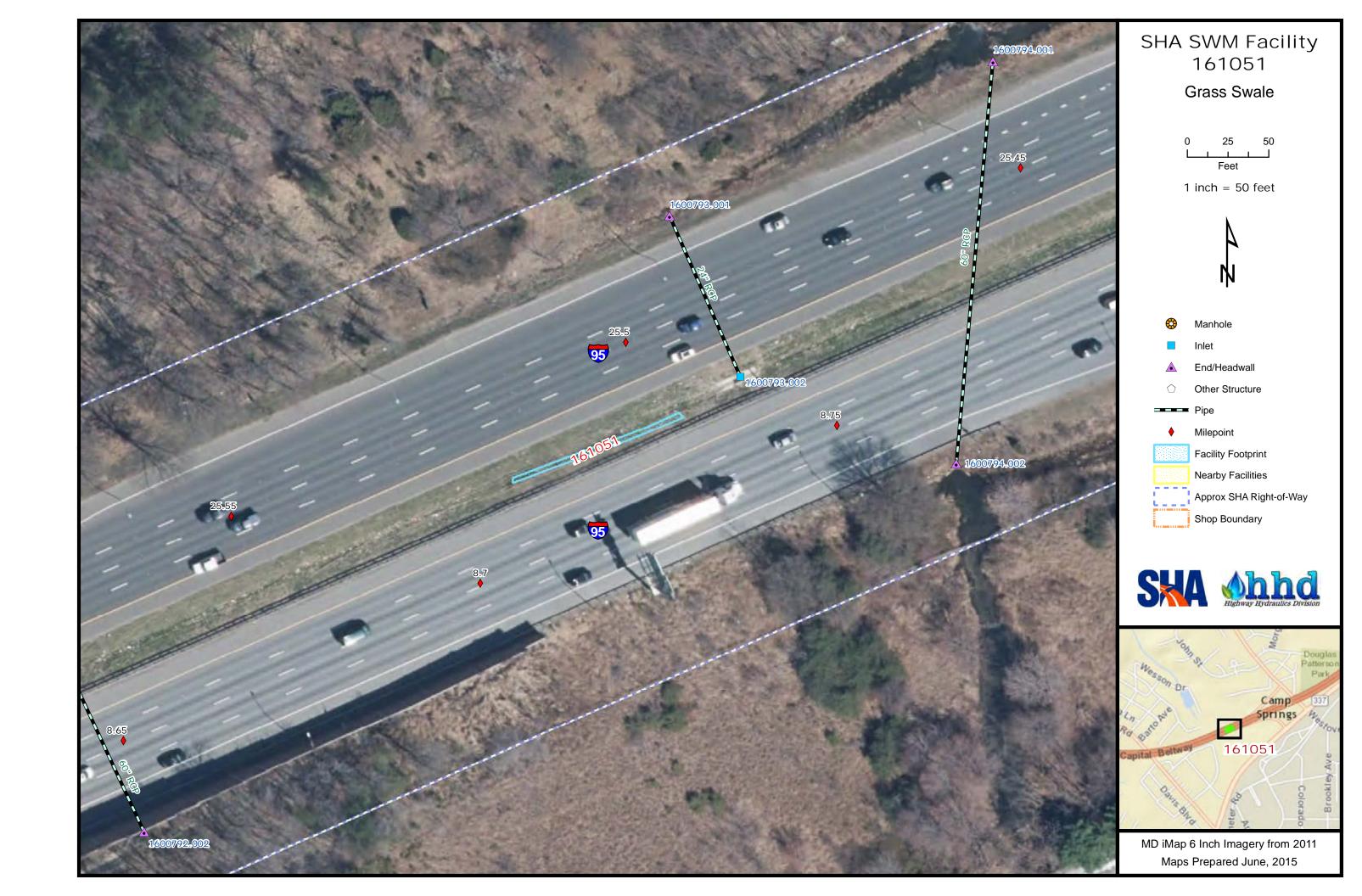




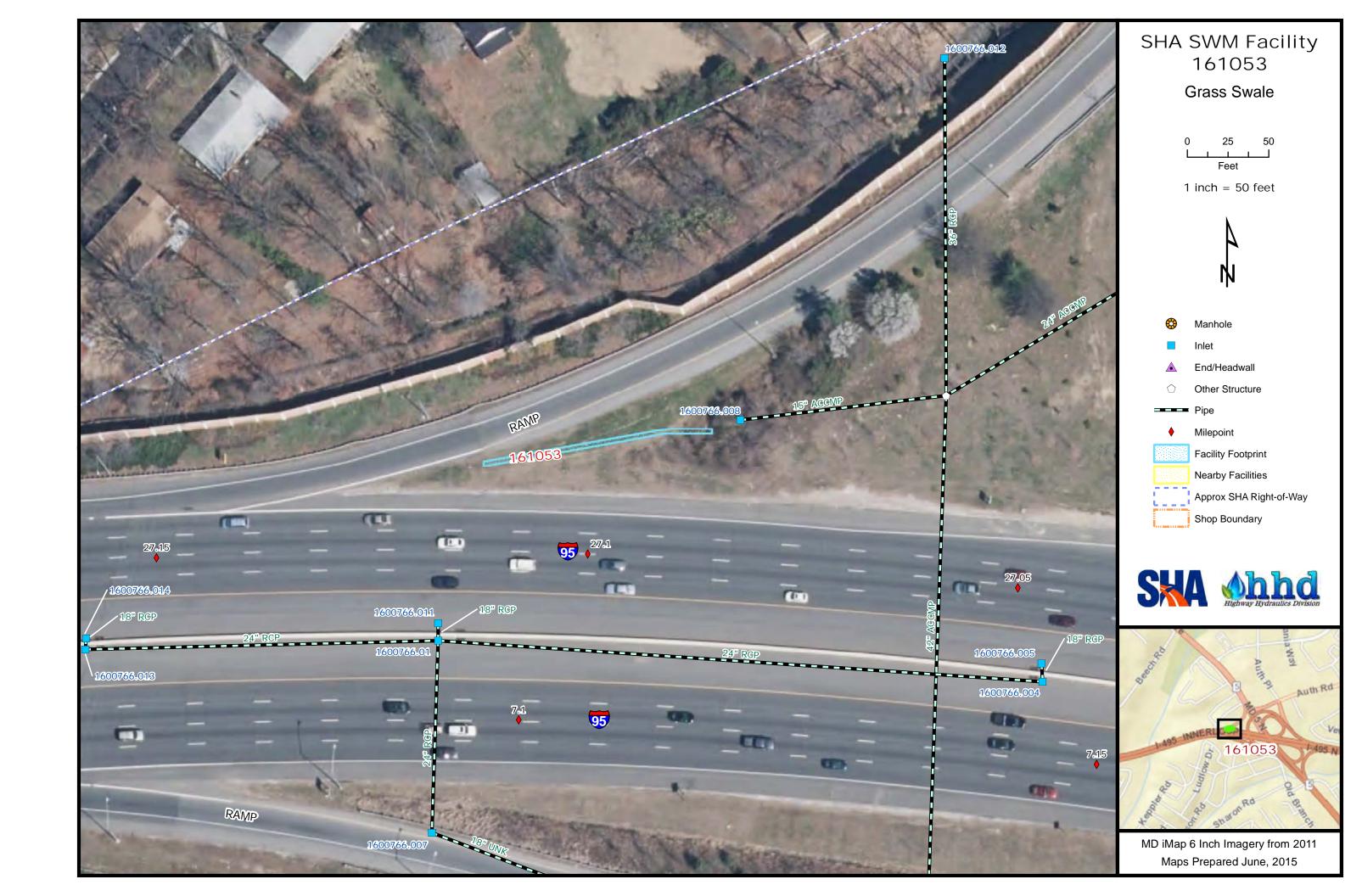






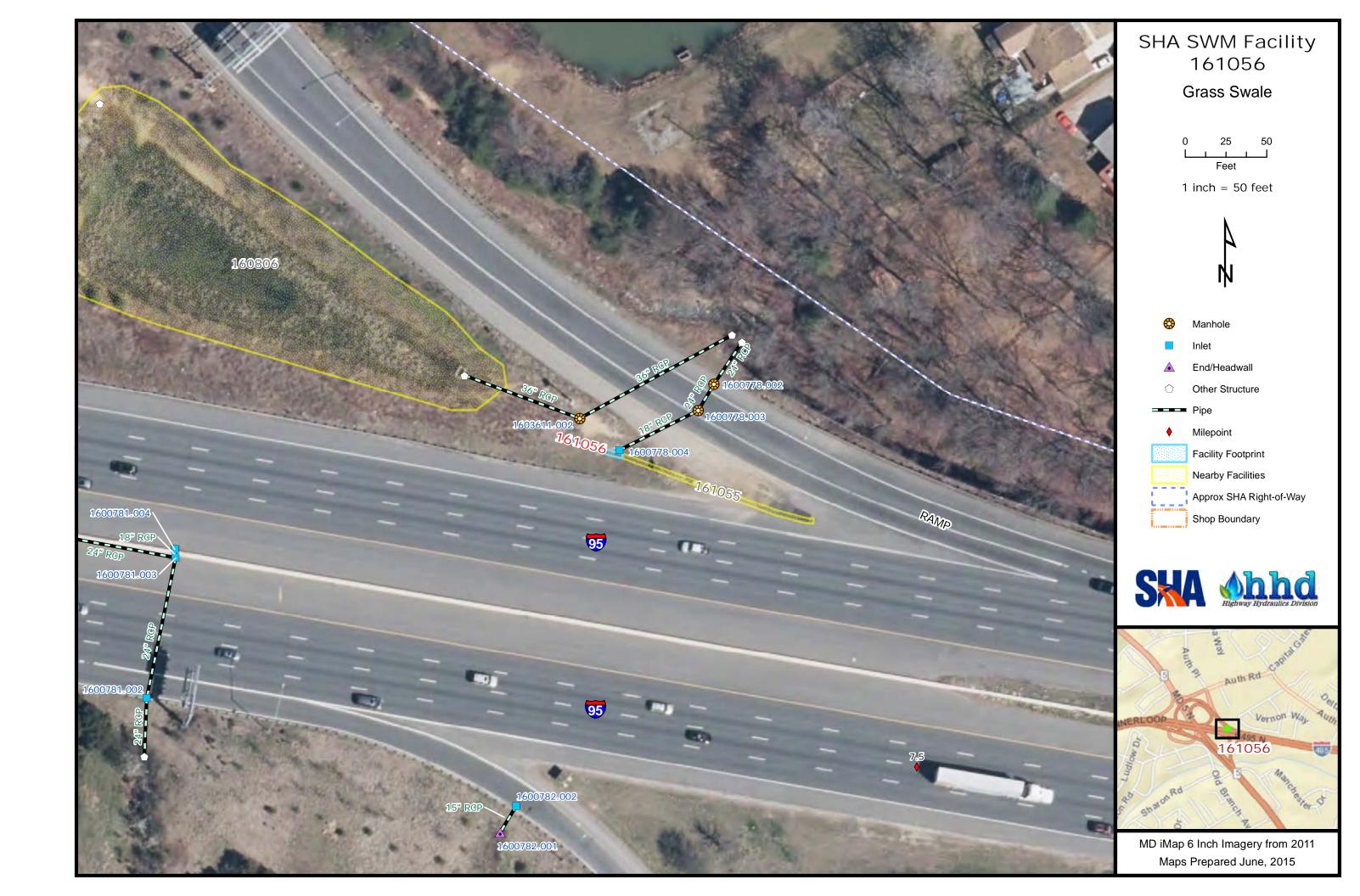




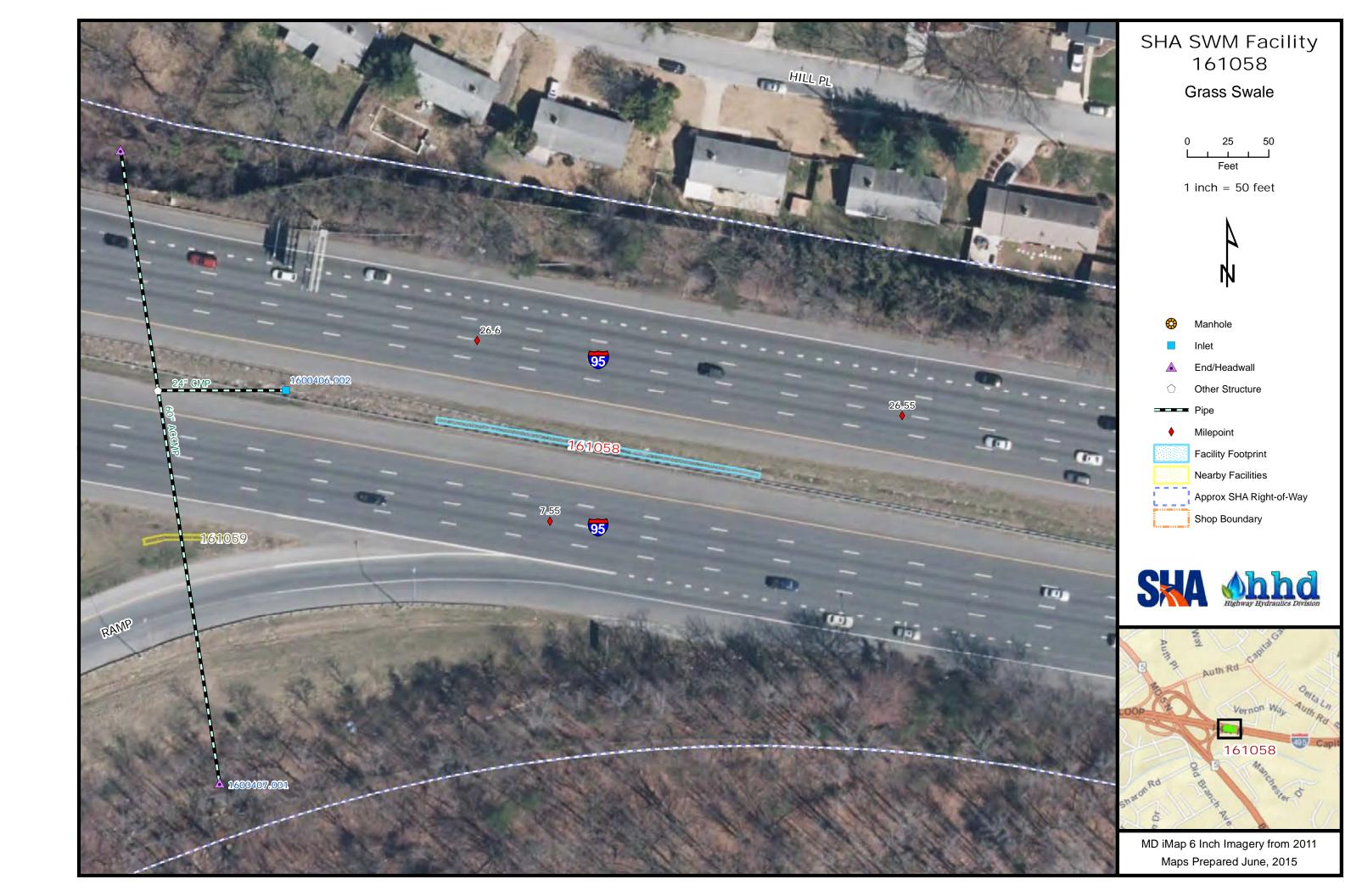


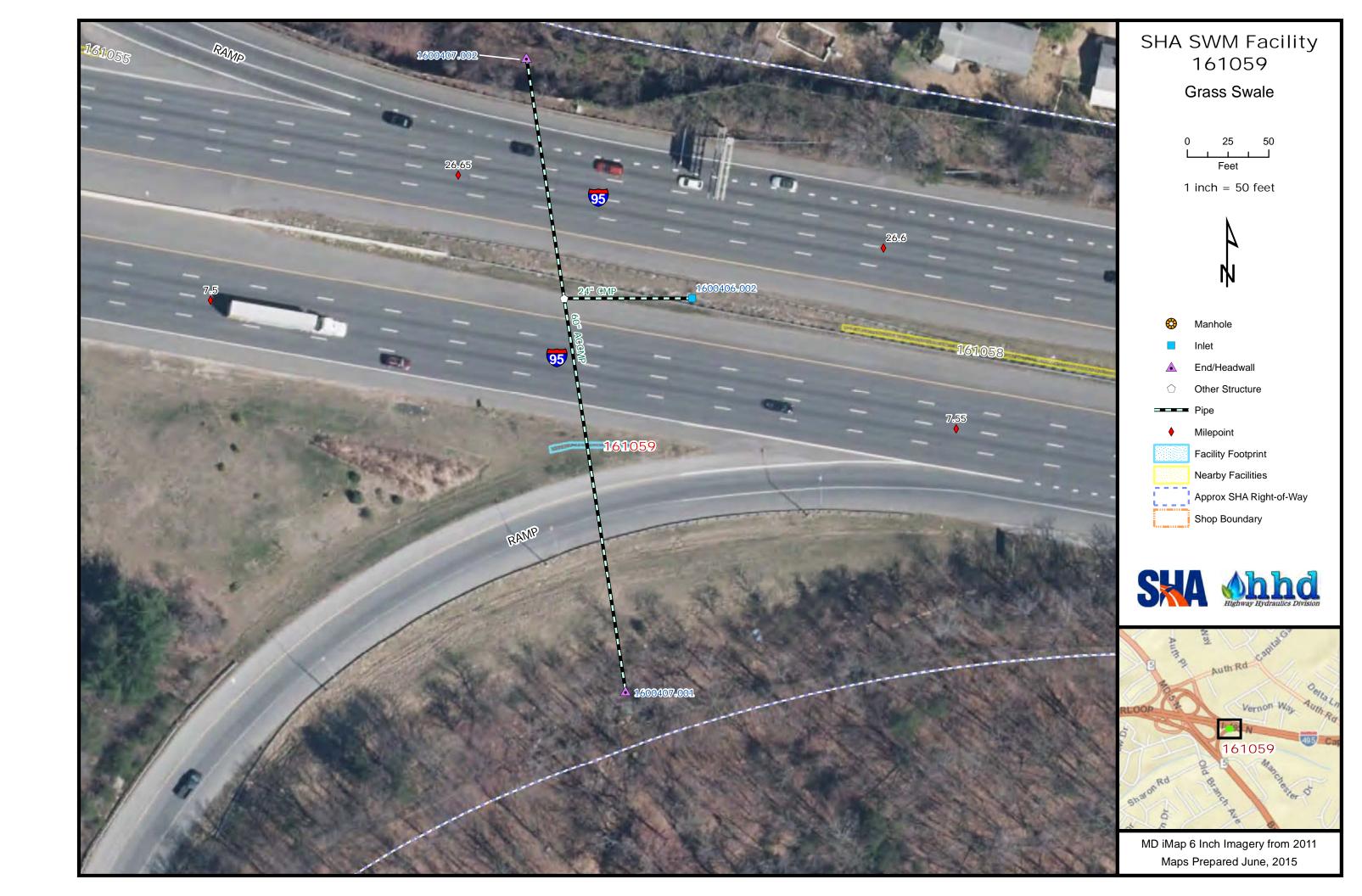


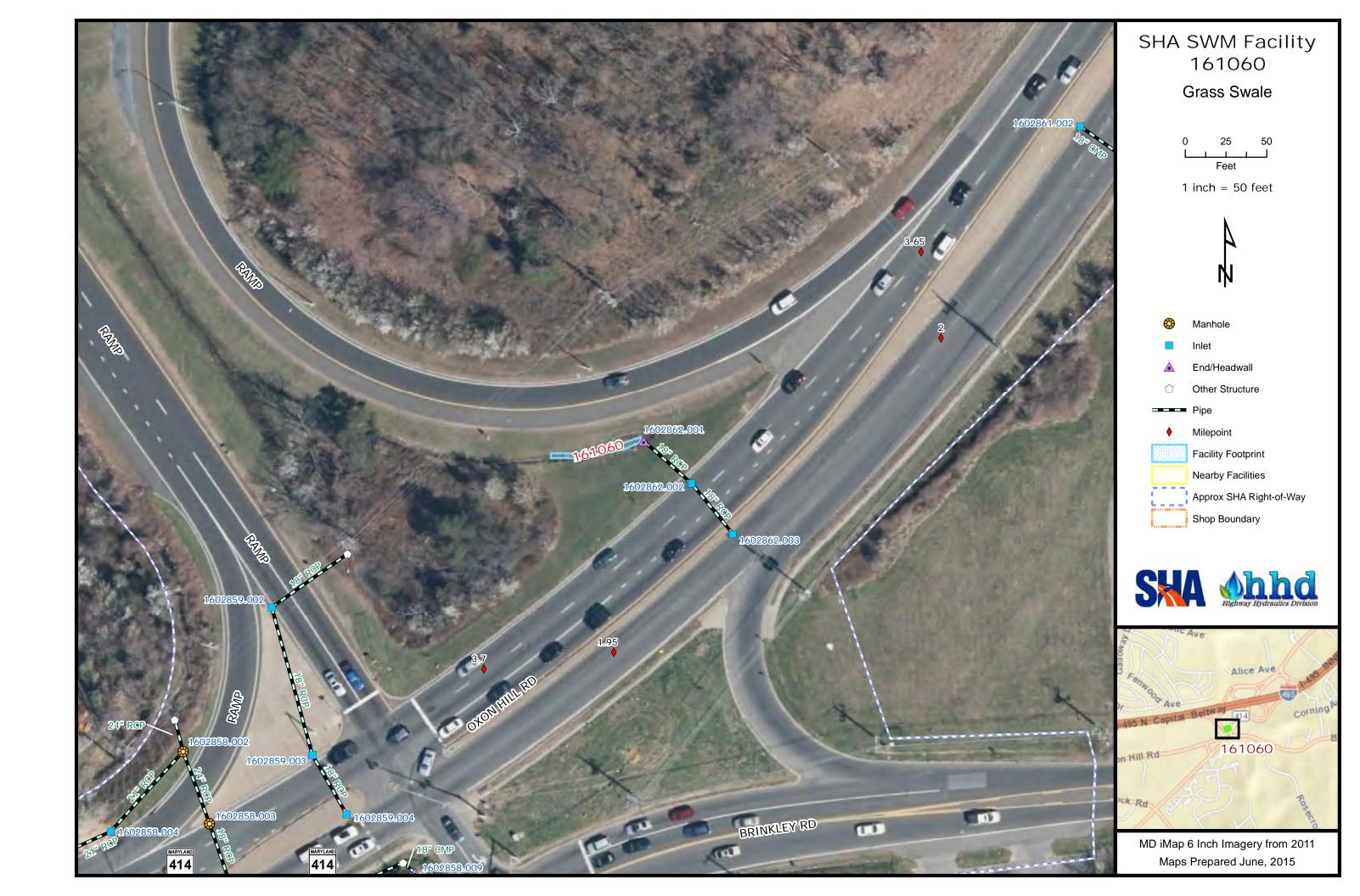






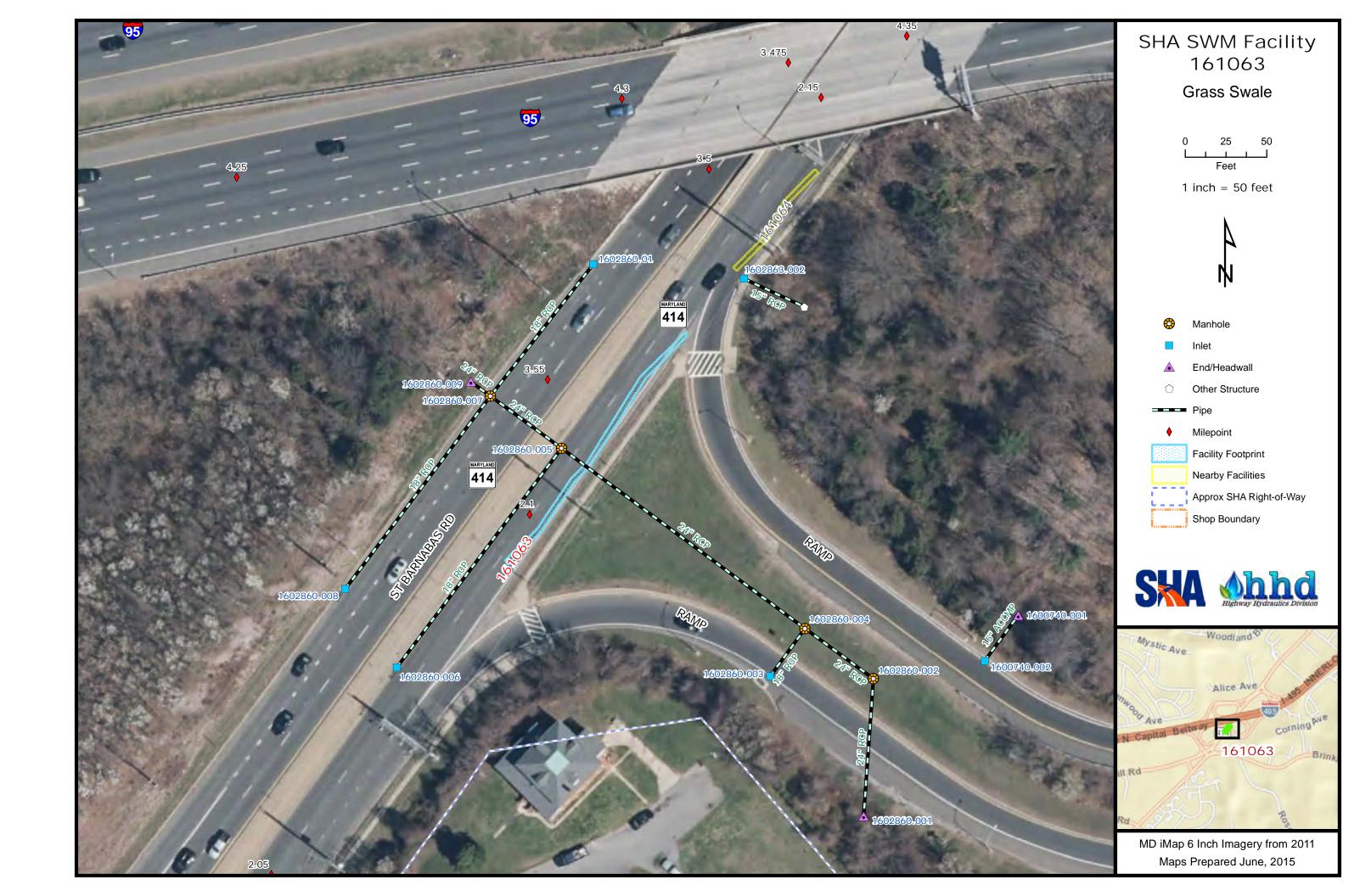




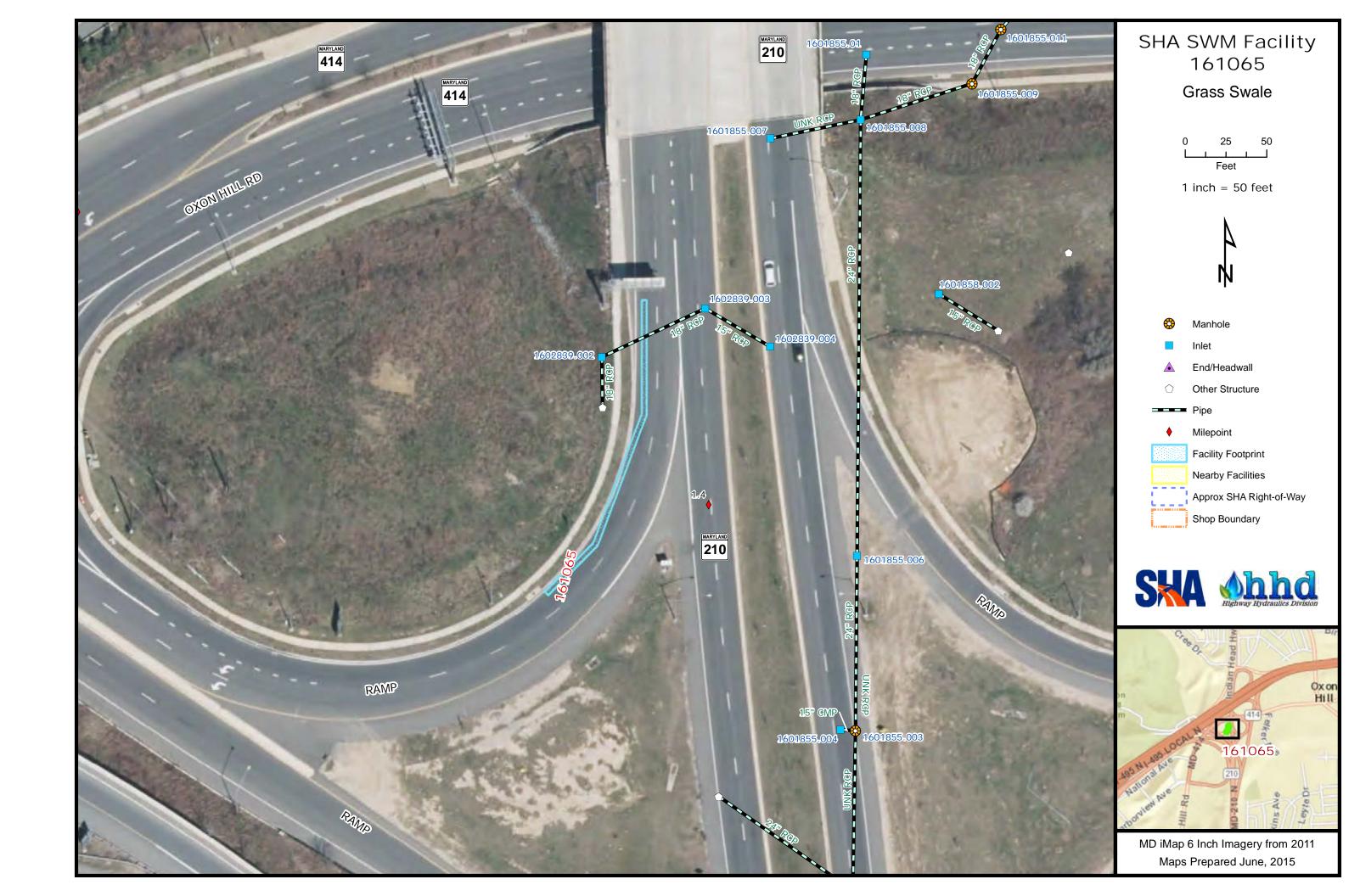




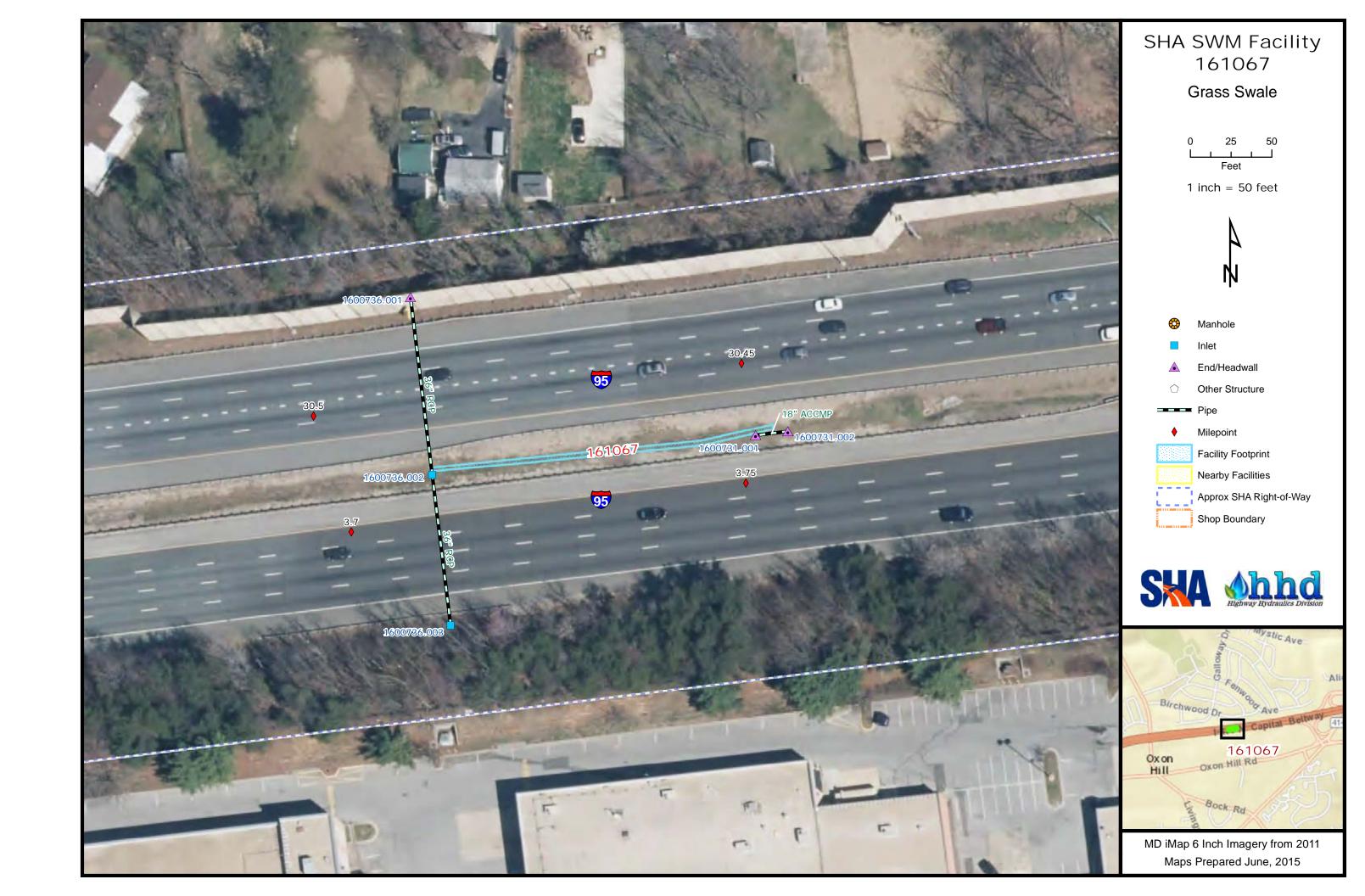


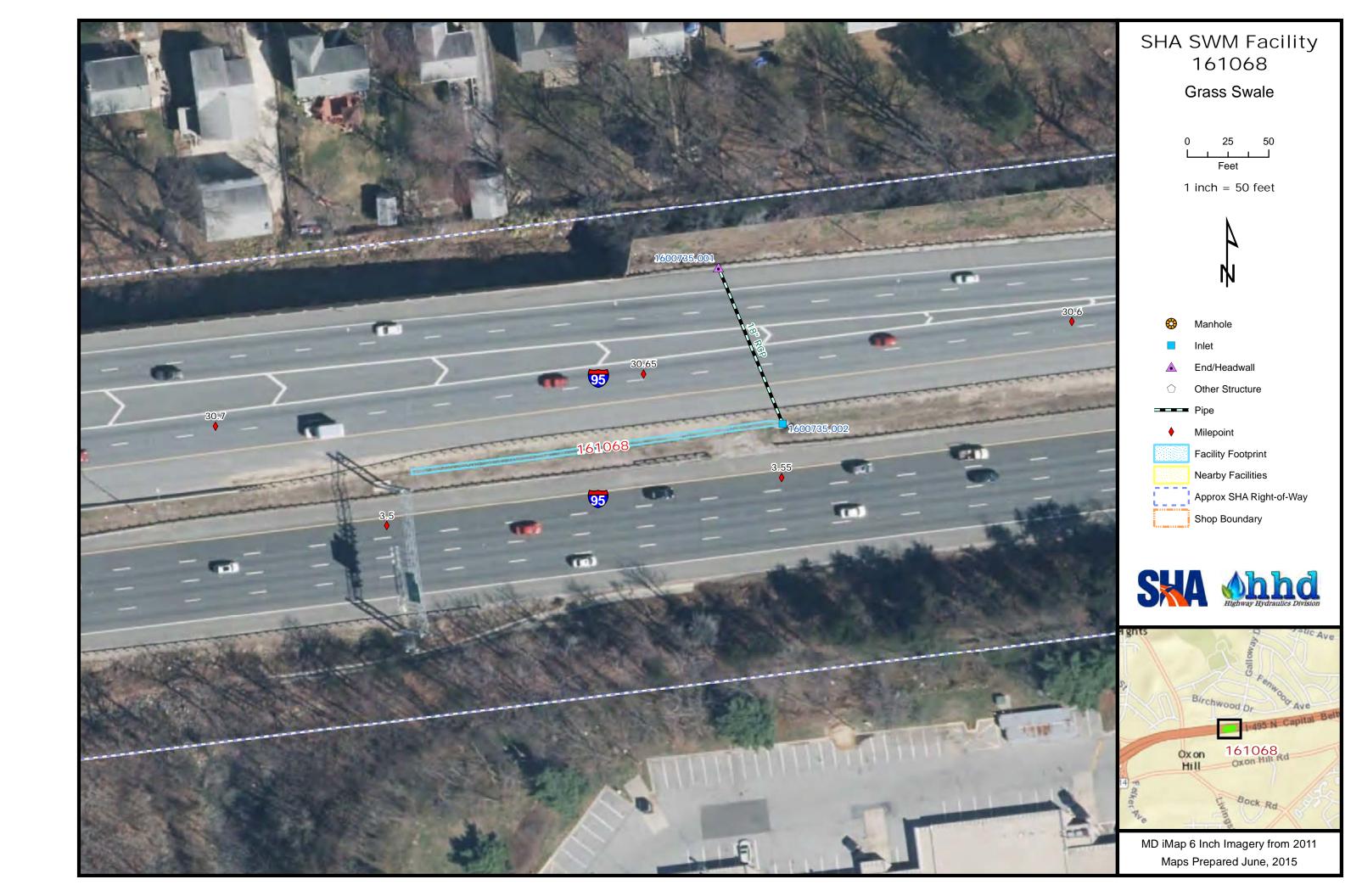






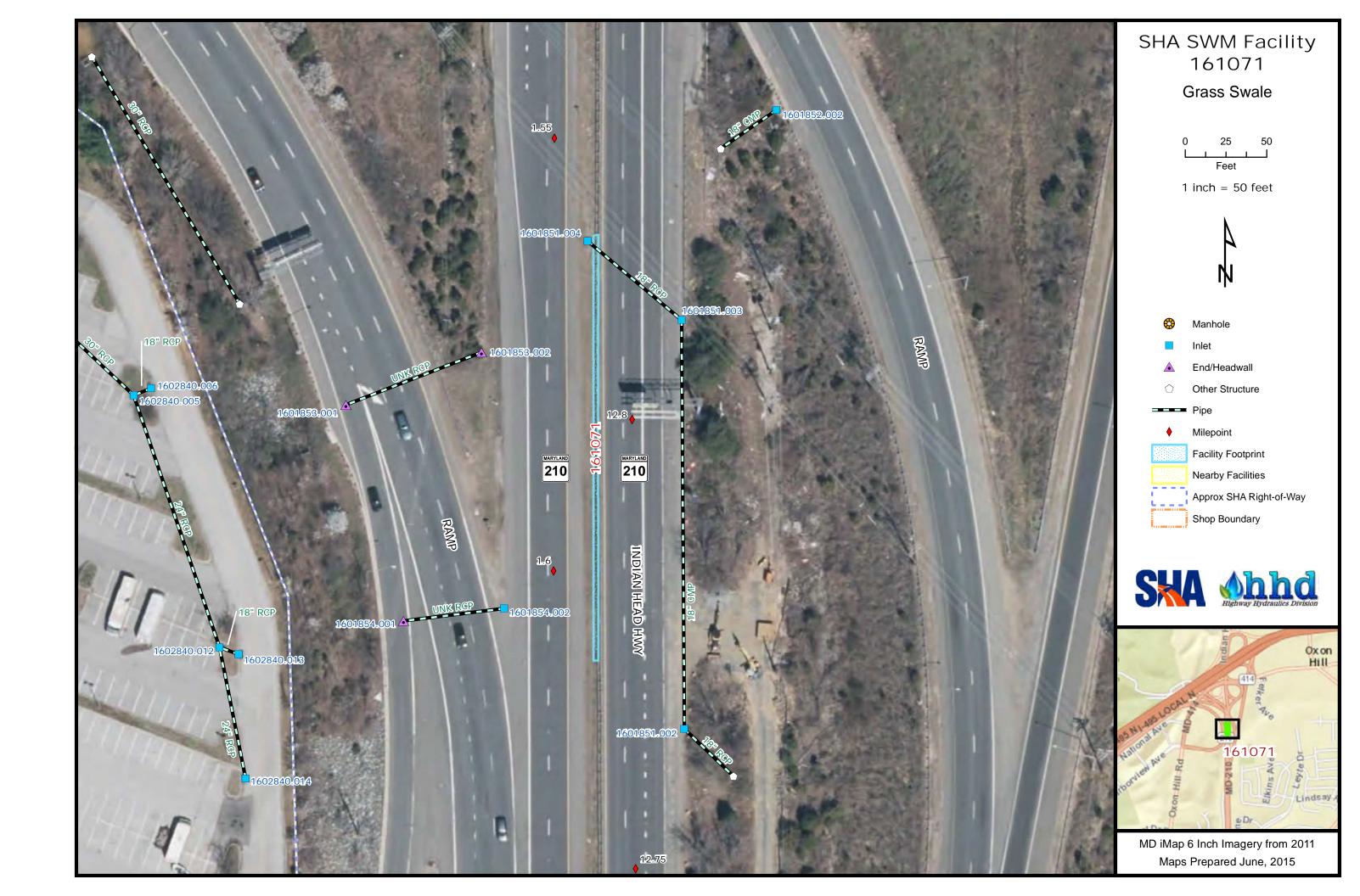


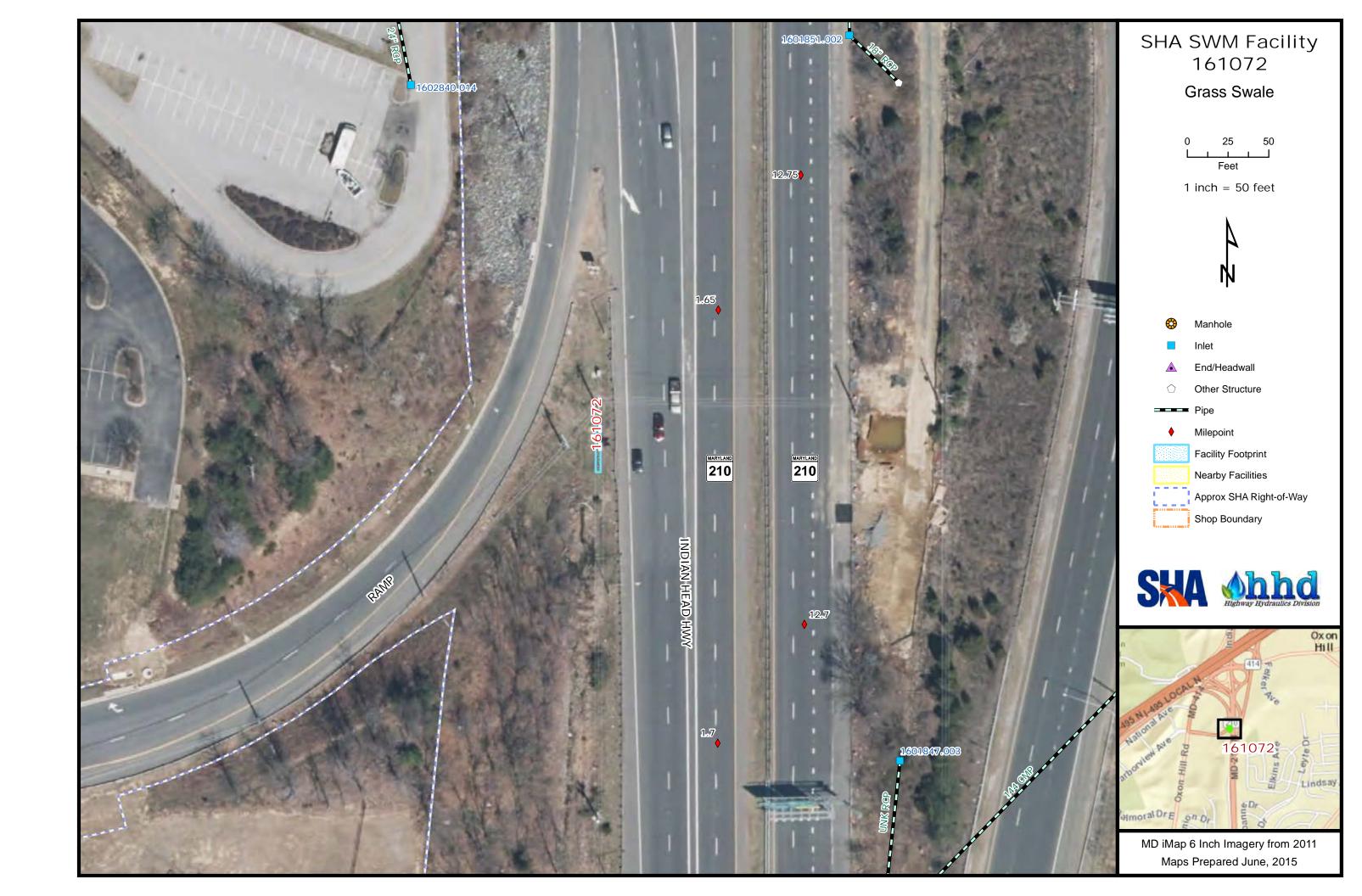




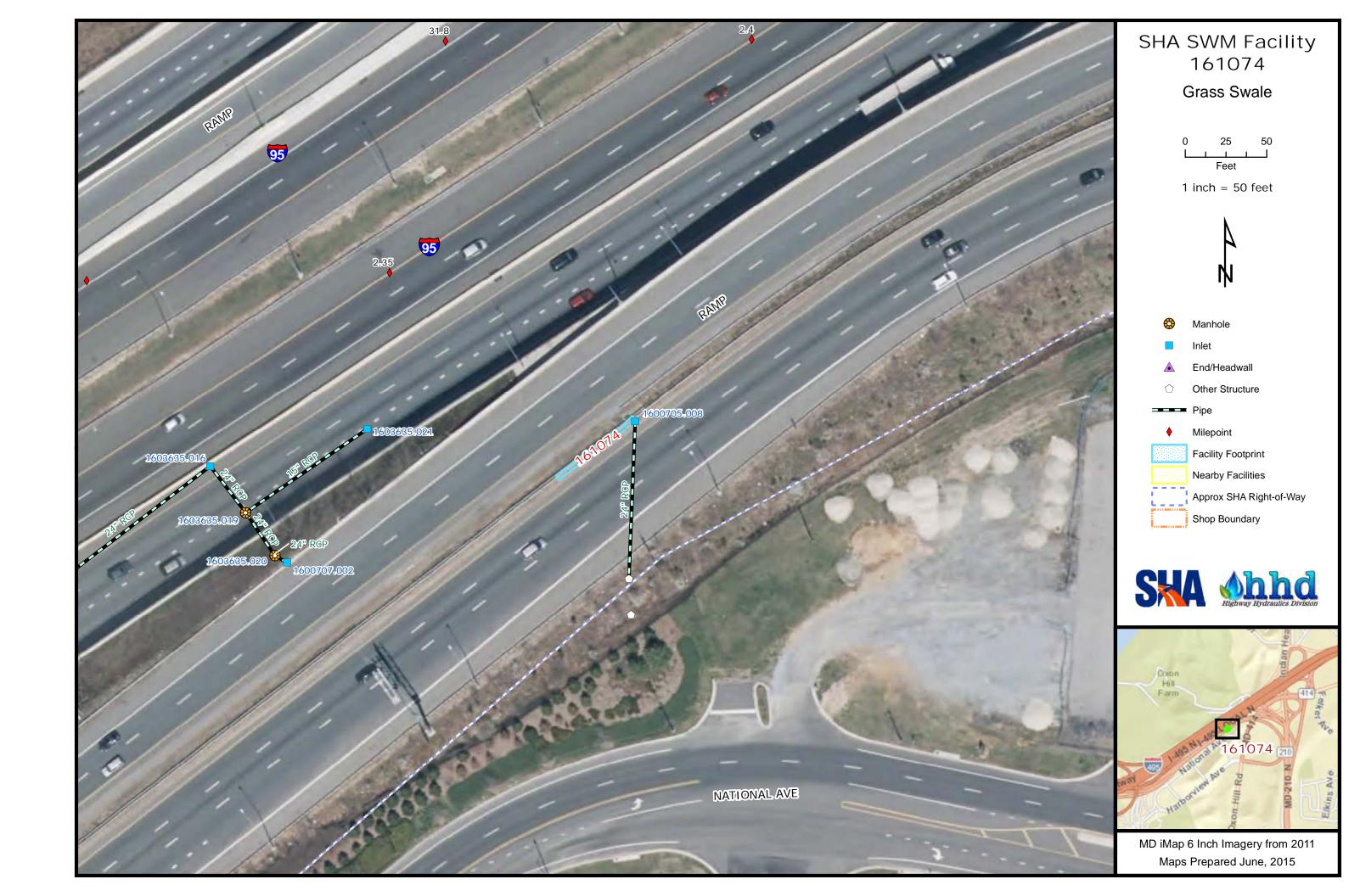


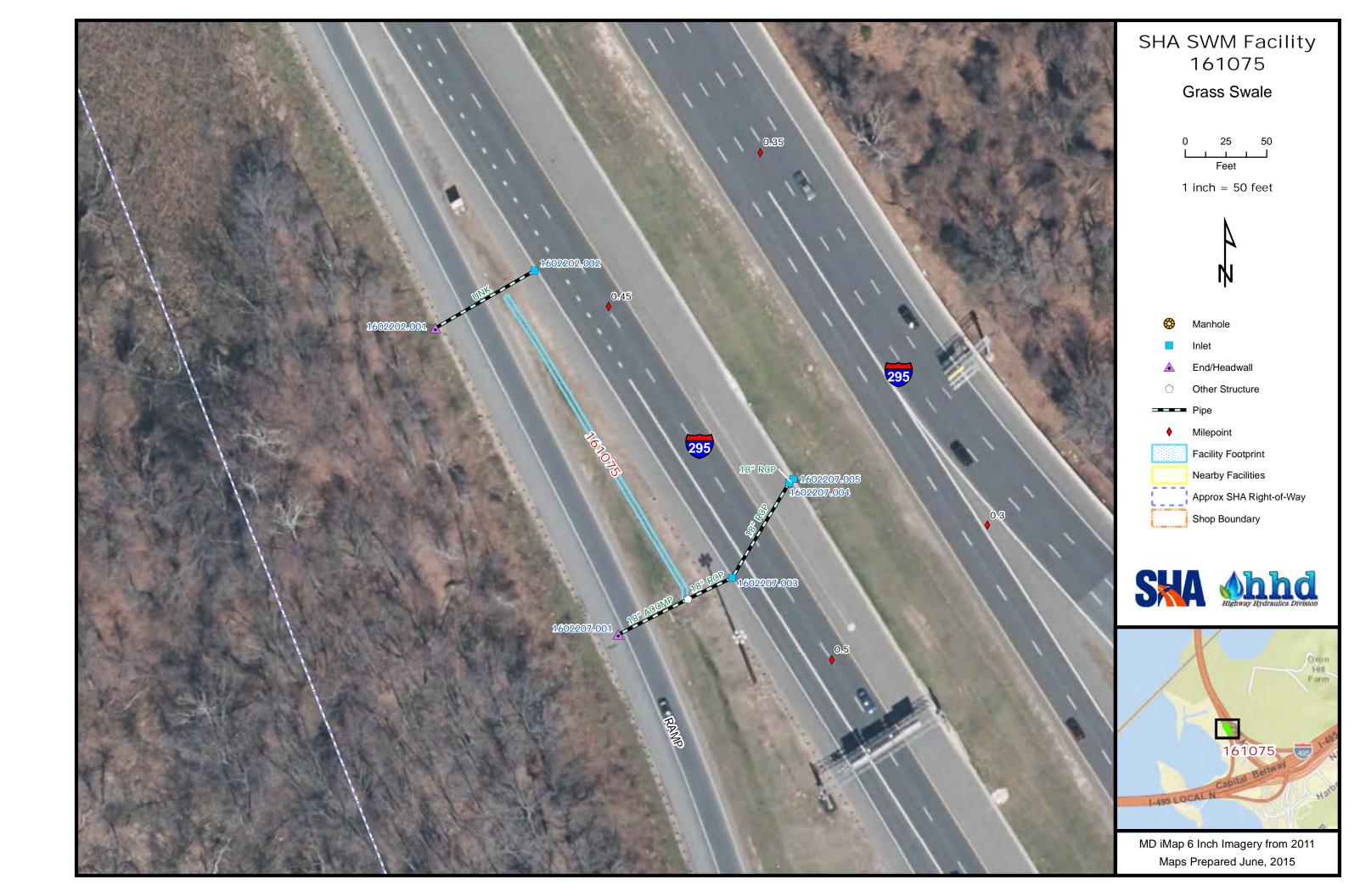


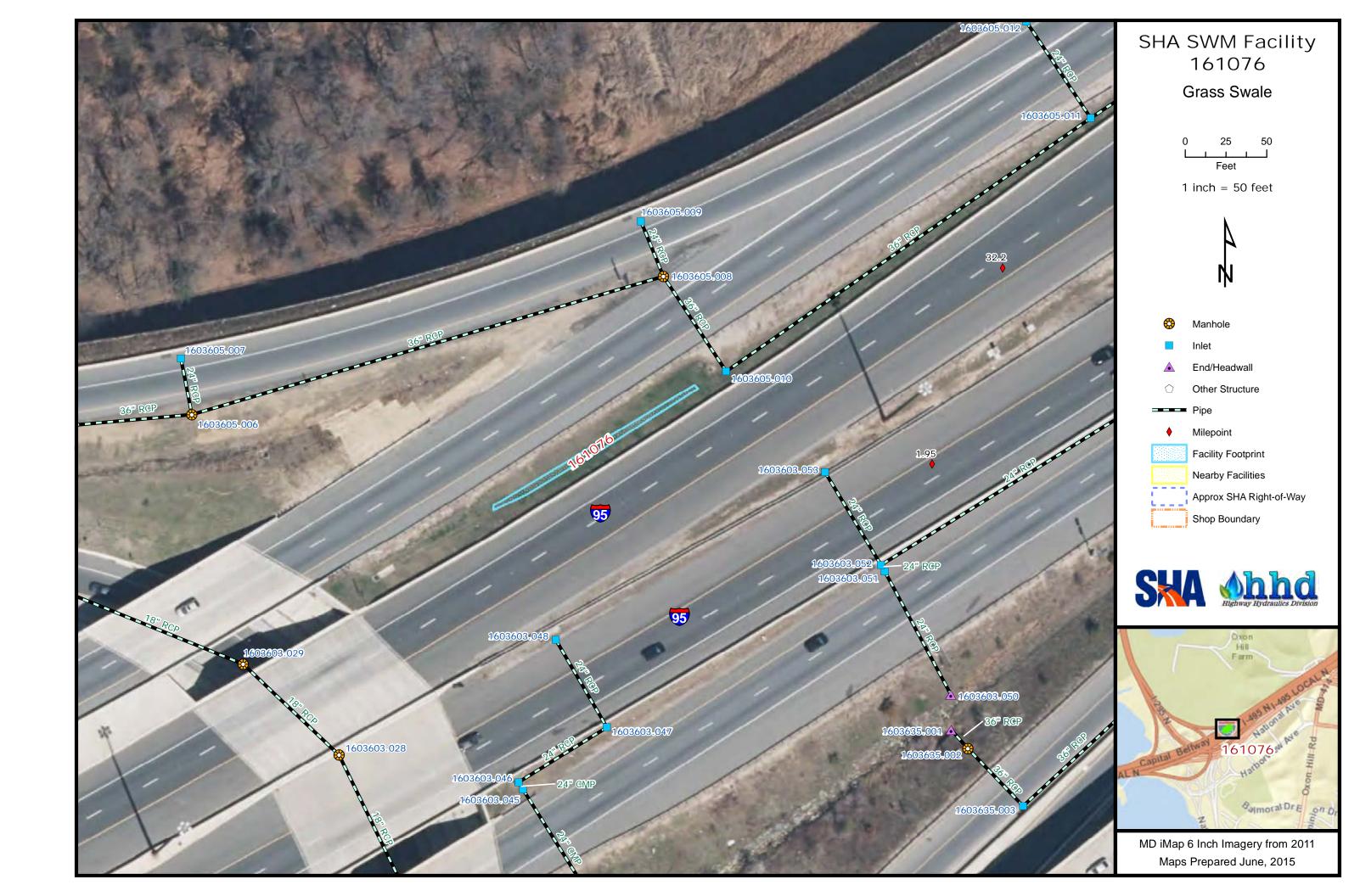


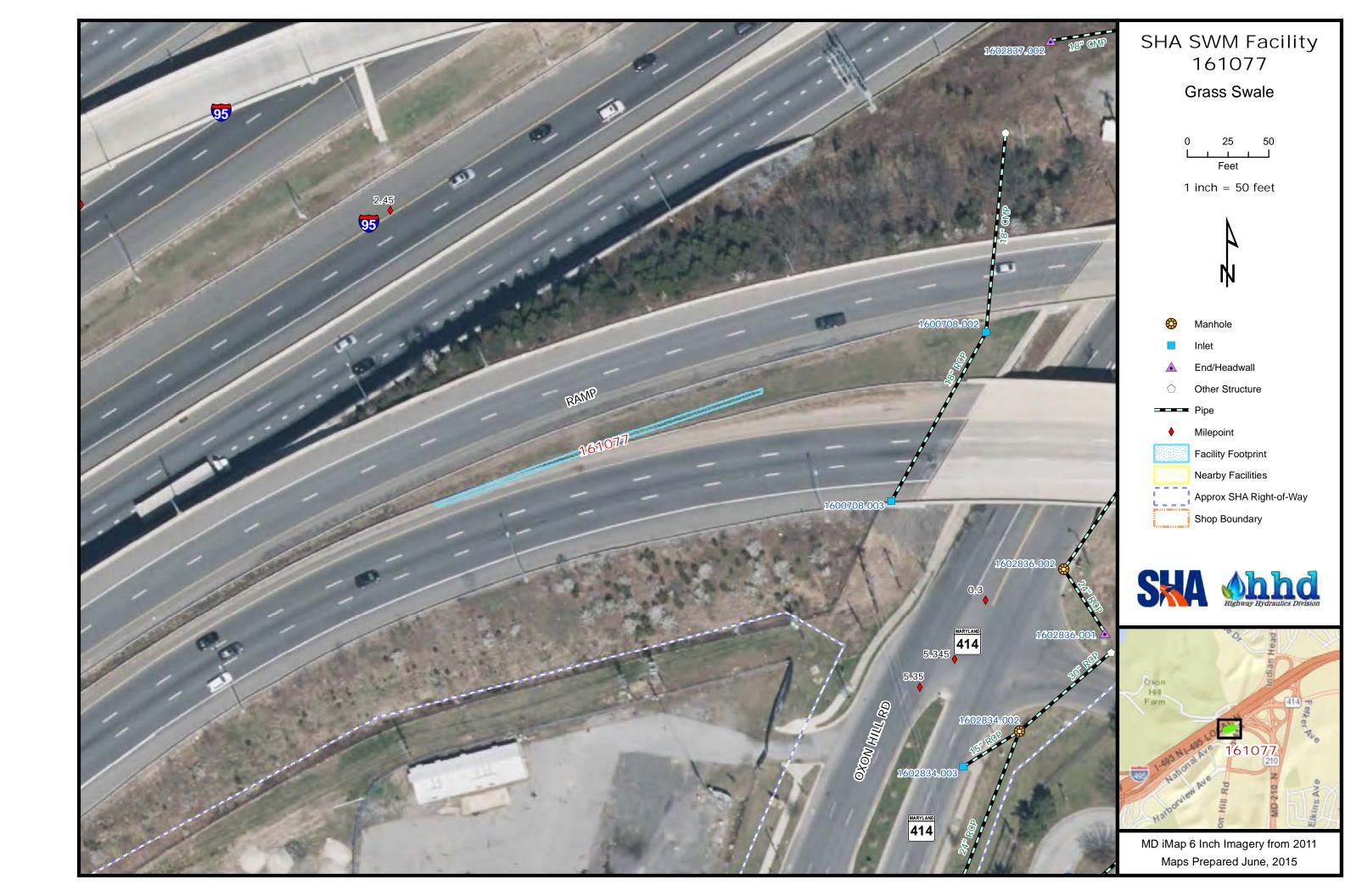












APPENDIX C

Index of Stormwater Management Facilities

Index of Stormwater Management Facilities - Marlboro Shop (Sorted By HHD Facility No.)

SWM	CWM Fo cility Type	Routine Maintenance	Tile Men
Facility No.	SWM Facility Type	Category	Tile Map
080085	Infiltration trench	Infiltration Facility	F3
160001	Wet pond	Wet Pond	C2
160002	Shallow marsh	Wet Pond	C3
160003	Wet pond	Wet Pond	C2
160005	Wet pond	Wet Pond	D4
160031	Shallow marsh	Wet Pond	D4
160051	Wet pond	Wet Pond	В3
160053	Shallow marsh	Wet Pond	В3
160055	Wet pond	Wet Pond	В3
160056	Wet pond	Wet Pond	В3
160057	Wet pond	Wet Pond	В3
160058	Wet pond	Wet Pond	В3
160059	Infiltration basin	Infiltration Facility	В3
160060	Infiltration basin	Infiltration Facility	B2
160061	Wet pond	Wet Pond	B2
160062	Dry pond	Dry Pond	B2
160101	Dry pond	Dry Pond	C2
160126	Infiltration trench	Infiltration Facility	C4
160127	Wet pond	Wet Pond	B2
160128	Infiltration basin	Infiltration Facility	B2
160129	Infiltration basin	Infiltration Facility	B2
160130	Shallow marsh	Wet Pond	C3
160131	Infiltration trench	Infiltration Facility	C4
160132	Shallow marsh	Wet Pond	C4
160133	Underground detention	No Routine Maintenance	C4
160134	Infiltration trench	Infiltration Facility	C4
160135	Infiltration trench	Infiltration Facility	C4
160136	Infiltration trench	Infiltration Facility	C4
160137	Infiltration trench	Infiltration Facility	C4
160156	Wet pond	Wet Pond	B2
160157	Wet pond	Wet Pond	B2
160160	Dry pond	Dry Pond	C2
160161	Wet pond	Wet Pond	F3
160172	Infiltration trench	Infiltration Facility	B2
160173	Infiltration trench	Infiltration Facility	B2
160175	Infiltration trench	Infiltration Facility	B2
160179	Infiltration trench	Infiltration Facility	F1
160181	Infiltration trench	Infiltration Facility	F1

SWM	OWNER TO THE	Routine Maintenance	T'1. M.
Facility No.	SWM Facility Type	Category	Tile Map
160183	Dry pond	Dry Pond	E3
160187	Wet swale	Wet Pond	A2
160189	Dry pond	Dry Pond	E3
160190	Dry pond	Dry Pond	E3
160197	Infiltration trench	Infiltration Facility	B2
160198	Infiltration trench	Infiltration Facility	C4
160199	Dry swale	Bio-Swale	C4
160201	Shallow marsh	Wet Pond	A2
160202	Shallow marsh	Wet Pond	A2
160203	Shallow marsh	Wet Pond	A2
160210	Dry pond	Dry Pond	A1
160211	Infiltration trench	Infiltration Facility	A2
160212	Infiltration trench	Infiltration Facility	A2
160218	Wet pond	Wet Pond	A3
160219	Bioretention	Filtration Facility	A3
160220	Infiltration trench	Infiltration Facility	A3
160221	Infiltration trench	Infiltration Facility	A3
160222	Infiltration trench	Infiltration Facility	A3
160223	Infiltration trench	Infiltration Facility	A3
160224	Infiltration trench	Infiltration Facility	A2
160230	Infiltration trench	Infiltration Facility	A3
160234	Infiltration trench	Infiltration Facility	A3
160235	Infiltration trench	Infiltration Facility	A3
160249	Shallow marsh	Wet Pond	A1
160255	Grass Channel Credit	Turfgrass Maintenance	D3
160256	Grass Channel Credit	Turfgrass Maintenance	D3
160257	Grass Channel Credit	Turfgrass Maintenance	D3
160258	Grass Channel Credit	Turfgrass Maintenance	D3
160259	Dry swale	Bio-Swale	D3
160260	Wet extended detention pond	Wet Pond	C3
160270	Wet swale	Wet Pond	D3
160335	Bio-Swale	Bio-Swale	D3
160336	Bio-Swale	Bio-Swale	D3
160337	Bio-Swale	Bio-Swale	D3
160380	Pocket pond	Wet Pond	В3
160401	Infiltration trench	Infiltration Facility	F3
160402	Infiltration trench	Infiltration Facility	F3
160403	Shallow marsh	Wet Pond	D4

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SWM	CWM Fo cility Tym	Routine Maintenance	Tile Men
Facility No.	SWM Facility Type	Category	Tile Map
160404	Shallow marsh	Wet Pond	D4
160405	Dry pond	Dry Pond	B4
160406	Wet pond	Wet Pond	B4
160407	Infiltration trench	Infiltration Facility	B4
160408	Infiltration trench	Infiltration Facility	B4
160451	Dry pond	Dry Pond	F1
160452	Shallow marsh	Wet Pond	F1
160453	Dry pond	Dry Pond	F1
160454	Infiltration basin	Infiltration Facility	F1
160455	Infiltration trench	Infiltration Facility	F1
160456	Wet pond	Wet Pond	F1
160476	Wet pond	Wet Pond	F1
160477	Infiltration basin	Infiltration Facility	E1
160478	Infiltration trench	Infiltration Facility	F1
160479	Infiltration trench	Infiltration Facility	F1
160480	Infiltration trench	Infiltration Facility	F1
160504	Infiltration basin	Infiltration Facility	В3
160505	Wet pond	Wet Pond	C4
160552	Infiltration trench	Infiltration Facility	B2
160603	Wet pond	Wet Pond	D1
160604	Wet pond	Wet Pond	D1
160605	Wet pond	Wet Pond	D1
160606	Wet pond	Wet Pond	D1
160607	Wet pond	Wet Pond	D1
160651	Infiltration basin	Infiltration Facility	D1
160652	Wet pond	Wet Pond	B2
160659	Wet pond	Wet Pond	C3
160660	Wet pond	Wet Pond	C3
160661	Wet pond	Wet Pond	C3
160662	Wet pond	Wet Pond	C3
160678	Infiltration basin	Infiltration Facility	D1
160726	Shallow marsh	Wet Pond	D2
160727	Shallow marsh	Wet Pond	D2
160728	Shallow marsh	Wet Pond	D2
160729	Wet pond	Wet Pond	D2
160730	Shallow marsh	Wet Pond	D2
160731	Shallow marsh	Wet Pond	D2
160732	Wet pond	Wet Pond	D2

SWM	CWA F '1'. T	Routine Maintenance	T1. M.
Facility No.	SWM Facility Type	Category	Tile Map
160733	Wet pond	Wet Pond	D2
160734	Wet pond	Wet Pond	D2
160735	Wet pond	Wet Pond	D3
160736	Wet pond	Wet Pond	D3
160737	Dry pond	Dry Pond	E3
160738	Wet pond	Wet Pond	E3
160739	Dry pond	Dry Pond	E3
160746	Wet pond	Wet Pond	D1
160748	Infiltration basin	Infiltration Facility	D4
160754	Dry swale	Bio-Swale	D3
160759	Underground detention	No Routine Maintenance	B2
160800	Wet pond	Wet Pond	D1
160802	Wet pond	Wet Pond	D1
160803	Wet pond	Wet Pond	D1
160806	Wet pond	Wet Pond	D2
160807	Dry swale	Bio-Swale	C2
160808	Dry swale	Bio-Swale	C3
160812	Dry swale	Bio-Swale	C4
160813	Dry swale	Bio-Swale	C4
160814	Dry swale	Bio-Swale	C4
160815	Dry swale	Bio-Swale	C4
160816	Dry swale	Bio-Swale	C4
160817	Dry swale	Bio-Swale	C4
160818	Dry swale	Bio-Swale	C4
160819	Dry swale	Bio-Swale	C4
160820	Wet pond	Wet Pond	B2
160902	Bio-Swale	Bio-Swale	C2
160903	Bio-Swale	Bio-Swale	C2
160904	Bio-Swale	Bio-Swale	C2
161004	Grass Swale	Turfgrass Maintenance	A1
161005	Grass Swale	Turfgrass Maintenance	B2
161006	Grass Swale	Turfgrass Maintenance	B2
161007	Grass Swale	Turfgrass Maintenance	B2
161008	Grass Swale	Turfgrass Maintenance	B2
161009	Grass Swale	Turfgrass Maintenance	B2
161010	Grass Swale	Turfgrass Maintenance	B2
161011	Grass Swale	Turfgrass Maintenance	B2
161012	Grass Swale	Turfgrass Maintenance	B2

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161013 Grass Swale Turfgrass Maintenance 161014 Grass Swale Turfgrass Maintenance 161015 Grass Swale Turfgrass Maintenance 161016 Grass Swale Turfgrass Maintenance 161017 Grass Swale Turfgrass Maintenance 161018 Grass Swale Turfgrass Maintenance 161019 Grass Swale Turfgrass Maintenance 161020 Grass Swale Turfgrass Maintenance 161021 Grass Swale Turfgrass Maintenance 161022 Grass Swale Turfgrass Maintenance 161023 Grass Swale Turfgrass Maintenance 161023 Grass Swale Turfgrass Maintenance 161023 Grass Swale Turfgrass Maintenance	B2 B2 B2 B2 B2 B2 B2 C3 B2
161014Grass SwaleTurfgrass Maintenance161015Grass SwaleTurfgrass Maintenance161016Grass SwaleTurfgrass Maintenance161017Grass SwaleTurfgrass Maintenance161018Grass SwaleTurfgrass Maintenance161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 B2 B2 B2 B2 B2 C3 B2
161015Grass SwaleTurfgrass Maintenance161016Grass SwaleTurfgrass Maintenance161017Grass SwaleTurfgrass Maintenance161018Grass SwaleTurfgrass Maintenance161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 B2 B2 B2 B2 C3 B2
161016Grass SwaleTurfgrass Maintenance161017Grass SwaleTurfgrass Maintenance161018Grass SwaleTurfgrass Maintenance161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 B2 B2 B2 C3 B2
161017Grass SwaleTurfgrass Maintenance161018Grass SwaleTurfgrass Maintenance161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 B2 B2 C3 B2
161018Grass SwaleTurfgrass Maintenance161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 B2 C3 B2
161019Grass SwaleTurfgrass Maintenance161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	B2 C3 B2
161020Grass SwaleTurfgrass Maintenance161021Grass SwaleTurfgrass Maintenance161022Grass SwaleTurfgrass Maintenance161023Grass SwaleTurfgrass Maintenance	C3 B2
161021 Grass Swale Turfgrass Maintenance 161022 Grass Swale Turfgrass Maintenance 161023 Grass Swale Turfgrass Maintenance	B2
161022 Grass Swale Turfgrass Maintenance 161023 Grass Swale Turfgrass Maintenance	
161023 Grass Swale Turfgrass Maintenance	
	C3
1/1024	C3
161024 Grass Swale Turfgrass Maintenance	C3
161025 Grass Swale Turfgrass Maintenance	C3
161026 Grass Swale Turfgrass Maintenance	C3
161027 Grass Swale Turfgrass Maintenance	C3
161028 Grass Swale Turfgrass Maintenance	C3
161029 Grass Swale Turfgrass Maintenance	C3
161030 Grass Swale Turfgrass Maintenance	C3
161031 Grass Swale Turfgrass Maintenance	C3
161032 Grass Swale Turfgrass Maintenance	C3
161033 Grass Swale Turfgrass Maintenance	C3
161034 Grass Swale Turfgrass Maintenance	C3
161035 Grass Swale Turfgrass Maintenance	C3
161036 Grass Swale Turfgrass Maintenance	C3
161037 Grass Swale Turfgrass Maintenance	C3
161038 Grass Swale Turfgrass Maintenance	C3
161039 Grass Swale Turfgrass Maintenance	C3
161040 Grass Swale Turfgrass Maintenance	C3
161041 Grass Swale Turfgrass Maintenance	C3
161042 Grass Swale Turfgrass Maintenance	C3
161043 Grass Swale Turfgrass Maintenance	C3
161044 Grass Swale Turfgrass Maintenance	C3
161045 Grass Swale Turfgrass Maintenance	C3
161046 Grass Swale Turfgrass Maintenance	C3
161047 Grass Swale Turfgrass Maintenance	C3
161048 Grass Swale Turfgrass Maintenance	D3
161049 Grass Swale Turfgrass Maintenance	C3
161050 Grass Swale Turfgrass Maintenance	D2

SWM Facility No.	SWM Facility Type	Routine Maintenance Category	Tile Map
161051	Grass Swale	Turfgrass Maintenance	D3
161052	Grass Swale	Turfgrass Maintenance	D3
161053	Grass Swale	Turfgrass Maintenance	D2
161054	Grass Swale	Turfgrass Maintenance	D2
161055	Grass Swale	Turfgrass Maintenance	D2
161056	Grass Swale	Turfgrass Maintenance	D2
161057	Grass Swale	Turfgrass Maintenance	D2
161058	Grass Swale	Turfgrass Maintenance	D2
161059	Grass Swale	Turfgrass Maintenance	D2
161060	Grass Swale	Turfgrass Maintenance	D2
161061	Grass Swale	Turfgrass Maintenance	D2
161062	Grass Swale	Turfgrass Maintenance	D2
161063	Grass Swale	Turfgrass Maintenance	D2
161064	Grass Swale	Turfgrass Maintenance	D2
161065	Grass Swale	Turfgrass Maintenance	D1
161066	Grass Swale	Turfgrass Maintenance	D1
161067	Grass Swale	Turfgrass Maintenance	D2
161068	Grass Swale	Turfgrass Maintenance	D2
161069	Grass Swale	Turfgrass Maintenance	D1
161070	Grass Swale	Turfgrass Maintenance	D1
161071	Grass Swale	Turfgrass Maintenance	D1
161072	Grass Swale	Turfgrass Maintenance	D1
161073	Grass Swale	Turfgrass Maintenance	D1
161074	Grass Swale	Turfgrass Maintenance	D1
161075	Grass Swale	Turfgrass Maintenance	D1
161076	Grass Swale	Turfgrass Maintenance	D1
161077	Grass Swale	Turfgrass Maintenance	D1

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SWM	CWA F: 114 T	Routine Maintenance	T:1- M
Facility No.	SWM Facility Type	Category	Tile Map
160210	Dry pond	Dry Pond	A1
160249	Shallow marsh	Wet Pond	A1
161004	Grass Swale	Turfgrass Maintenance	A1
160187	Wet swale	Wet Pond	A2
160201	Shallow marsh	Wet Pond	A2
160202	Shallow marsh	Wet Pond	A2
160203	Shallow marsh	Wet Pond	A2
160211	Infiltration trench	Infiltration Facility	A2
160212	Infiltration trench	Infiltration Facility	A2
160224	Infiltration trench	Infiltration Facility	A2
160218	Wet pond	Wet Pond	A3
160219	Bioretention	Filtration Facility	A3
160220	Infiltration trench	Infiltration Facility	A3
160221	Infiltration trench	Infiltration Facility	A3
160222	Infiltration trench	Infiltration Facility	A3
160223	Infiltration trench	Infiltration Facility	A3
160230	Infiltration trench	Infiltration Facility	A3
160234	Infiltration trench	Infiltration Facility	A3
160235	Infiltration trench	Infiltration Facility	A3
160060	Infiltration basin	Infiltration Facility	B2
160061	Wet pond	Wet Pond	B2
160062	Dry pond	Dry Pond	B2
160127	Wet pond	Wet Pond	B2
160128	Infiltration basin	Infiltration Facility	B2
160129	Infiltration basin	Infiltration Facility	B2
160156	Wet pond	Wet Pond	B2
160157	Wet pond	Wet Pond	B2
160172	Infiltration trench	Infiltration Facility	B2
160173	Infiltration trench	Infiltration Facility	B2
160175	Infiltration trench	Infiltration Facility	B2
160197	Infiltration trench	Infiltration Facility	B2
160552	Infiltration trench	Infiltration Facility	B2
160652	Wet pond	Wet Pond	B2
160759	Underground detention	No Routine Maintenance	B2
160820	Wet pond	Wet Pond	B2
161005	Grass Swale	Turfgrass Maintenance	B2
161006	Grass Swale	Turfgrass Maintenance	B2
161007	Grass Swale	Turfgrass Maintenance	B2

SWM	CWM F. T. T.	Routine Maintenance	T1. M.
Facility No.	SWM Facility Type	Category	Tile Map
161008	Grass Swale	Turfgrass Maintenance	B2
161009	Grass Swale	Turfgrass Maintenance	B2
161010	Grass Swale	Turfgrass Maintenance	B2
161011	Grass Swale	Turfgrass Maintenance	B2
161012	Grass Swale	Turfgrass Maintenance	B2
161013	Grass Swale	Turfgrass Maintenance	B2
161014	Grass Swale	Turfgrass Maintenance	B2
161015	Grass Swale	Turfgrass Maintenance	B2
161016	Grass Swale	Turfgrass Maintenance	B2
161017	Grass Swale	Turfgrass Maintenance	B2
161018	Grass Swale	Turfgrass Maintenance	B2
161019	Grass Swale	Turfgrass Maintenance	B2
161021	Grass Swale	Turfgrass Maintenance	B2
160051	Wet pond	Wet Pond	В3
160053	Shallow marsh	Wet Pond	В3
160055	Wet pond	Wet Pond	В3
160056	Wet pond	Wet Pond	В3
160057	Wet pond	Wet Pond	В3
160058	Wet pond	Wet Pond	В3
160059	Infiltration basin	Infiltration Facility	В3
160380	Pocket pond	Wet Pond	В3
160504	Infiltration basin	Infiltration Facility	В3
160405	Dry pond	Dry Pond	B4
160406	Wet pond	Wet Pond	B4
160407	Infiltration trench	Infiltration Facility	B4
160408	Infiltration trench	Infiltration Facility	B4
160001	Wet pond	Wet Pond	C2
160003	Wet pond	Wet Pond	C2
160101	Dry pond	Dry Pond	C2
160160	Dry pond	Dry Pond	C2
160807	Dry swale	Bio-Swale	C2
160902	Bio-Swale	Bio-Swale	C2
160903	Bio-Swale	Bio-Swale	C2
160904	Bio-Swale	Bio-Swale	C2
160002	Shallow marsh	Wet Pond	C3
160130	Shallow marsh	Wet Pond	C3
160260	Wet extended detention pond	Wet Pond	C3
160659	Wet pond	Wet Pond	C3

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SWM Facility No.	SWM Facility Type	Routine Maintenance Category	Tile Map
160660	Wet pond	Wet Pond	C3
160661	Wet pond	Wet Pond	C3
160662	Wet pond	Wet Pond	C3
160808	Dry swale	Bio-Swale	C3
161020	Grass Swale	Turfgrass Maintenance	C3
161022	Grass Swale	Turfgrass Maintenance	C3
161023	Grass Swale	Turfgrass Maintenance	C3
161024	Grass Swale	Turfgrass Maintenance	C3
161025	Grass Swale	Turfgrass Maintenance	C3
161026	Grass Swale	Turfgrass Maintenance	C3
161027	Grass Swale	Turfgrass Maintenance	C3
161028	Grass Swale	Turfgrass Maintenance	C3
161029	Grass Swale	Turfgrass Maintenance	C3
161030	Grass Swale	Turfgrass Maintenance	C3
161031	Grass Swale	Turfgrass Maintenance	C3
161032	Grass Swale	Turfgrass Maintenance	C3
161033	Grass Swale	Turfgrass Maintenance	C3
161034	Grass Swale	Turfgrass Maintenance	C3
161035	Grass Swale	Turfgrass Maintenance	C3
161036	Grass Swale	Turfgrass Maintenance	C3
161037	Grass Swale	Turfgrass Maintenance	C3
161038	Grass Swale	Turfgrass Maintenance	C3
161039	Grass Swale	Turfgrass Maintenance	C3
161040	Grass Swale	Turfgrass Maintenance	C3
161041	Grass Swale	Turfgrass Maintenance	C3
161042	Grass Swale	Turfgrass Maintenance	C3
161043	Grass Swale	Turfgrass Maintenance	C3
161044	Grass Swale	Turfgrass Maintenance	C3
161045	Grass Swale	Turfgrass Maintenance	C3
161046	Grass Swale	Turfgrass Maintenance	C3
161047	Grass Swale	Turfgrass Maintenance	C3
161049	Grass Swale	Turfgrass Maintenance	C3
160126	Infiltration trench	Infiltration Facility	C4
160131	Infiltration trench	Infiltration Facility	C4
160132	Shallow marsh	Wet Pond	C4
160133	Underground detention	No Routine Maintenance	C4
160134	Infiltration trench	Infiltration Facility	C4
160135	Infiltration trench	Infiltration Facility	C4

SWM	SWM Engility Type	Routine Maintenance	Tilo Mon
Facility No.	SWM Facility Type	Category	Tile Map
160136	Infiltration trench	Infiltration Facility	C4
160137	Infiltration trench	Infiltration Facility	C4
160198	Infiltration trench	Infiltration Facility	C4
160199	Dry swale	Bio-Swale	C4
160505	Wet pond	Wet Pond	C4
160812	Dry swale	Bio-Swale	C4
160813	Dry swale	Bio-Swale	C4
160814	Dry swale	Bio-Swale	C4
160815	Dry swale	Bio-Swale	C4
160816	Dry swale	Bio-Swale	C4
160817	Dry swale	Bio-Swale	C4
160818	Dry swale	Bio-Swale	C4
160819	Dry swale	Bio-Swale	C4
160603	Wet pond	Wet Pond	D1
160604	Wet pond	Wet Pond	D1
160605	Wet pond	Wet Pond	D1
160606	Wet pond	Wet Pond	D1
160607	Wet pond	Wet Pond	D1
160651	Infiltration basin	Infiltration Facility	D1
160678	Infiltration basin	Infiltration Facility	D1
160746	Wet pond	Wet Pond	D1
160800	Wet pond	Wet Pond	D1
160802	Wet pond	Wet Pond	D1
160803	Wet pond	Wet Pond	D1
161065	Grass Swale	Turfgrass Maintenance	D1
161066	Grass Swale	Turfgrass Maintenance	D1
161069	Grass Swale	Turfgrass Maintenance	D1
161070	Grass Swale	Turfgrass Maintenance	D1
161071	Grass Swale	Turfgrass Maintenance	D1
161072	Grass Swale	Turfgrass Maintenance	D1
161073	Grass Swale	Turfgrass Maintenance	D1
161074	Grass Swale	Turfgrass Maintenance	D1
161075	Grass Swale	Turfgrass Maintenance	D1
161076	Grass Swale	Turfgrass Maintenance	D1
161077	Grass Swale	Turfgrass Maintenance	D1
160726	Shallow marsh	Wet Pond	D2
160727	Shallow marsh	Wet Pond	D2
160728	Shallow marsh	Wet Pond	D2

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SWM	SWM Facility Type	Routine Maintenance	Tile Map
Facility No.		Category	
160729	Wet pond	Wet Pond	D2
160730	Shallow marsh	Wet Pond	D2
160731	Shallow marsh	Wet Pond	D2
160732	Wet pond	Wet Pond	D2
160733	Wet pond	Wet Pond	D2
160734	Wet pond	Wet Pond	D2
160806	Wet pond	Wet Pond	D2
161050	Grass Swale	Turfgrass Maintenance	D2
161053	Grass Swale	Turfgrass Maintenance	D2
161054	Grass Swale	Turfgrass Maintenance	D2
161055	Grass Swale	Turfgrass Maintenance	D2
161056	Grass Swale	Turfgrass Maintenance	D2
161057	Grass Swale	Turfgrass Maintenance	D2
161058	Grass Swale	Turfgrass Maintenance	D2
161059	Grass Swale	Turfgrass Maintenance	D2
161060	Grass Swale	Turfgrass Maintenance	D2
161061	Grass Swale	Turfgrass Maintenance	D2
161062	Grass Swale	Turfgrass Maintenance	D2
161063	Grass Swale	Turfgrass Maintenance	D2
161064	Grass Swale	Turfgrass Maintenance	D2
161067	Grass Swale	Turfgrass Maintenance	D2
161068	Grass Swale	Turfgrass Maintenance	D2
160255	Grass Channel Credit	Turfgrass Maintenance	D3
160256	Grass Channel Credit	Turfgrass Maintenance	D3
160257	Grass Channel Credit	Turfgrass Maintenance	D3
160258	Grass Channel Credit	Turfgrass Maintenance	D3
160259	Dry swale	Bio-Swale	D3
160270	Wet swale	Wet Pond	D3
160335	Bio-Swale	Bio-Swale	D3
160336	Bio-Swale	Bio-Swale	D3
160337	Bio-Swale	Bio-Swale	D3
160735	Wet pond	Wet Pond	D3
160736	Wet pond	Wet Pond	D3
160754	Dry swale	Bio-Swale	D3
161048	Grass Swale	Turfgrass Maintenance	D3
161051	Grass Swale	Turfgrass Maintenance	D3
161052	Grass Swale	Turfgrass Maintenance	D3
160005	Wet pond	Wet Pond	D4

SWM Facility No.	SWM Facility Type	Routine Maintenance Category	Tile Map
160031	Shallow marsh	Wet Pond	D4
160403	Shallow marsh	Wet Pond	D4
160404	Shallow marsh	Wet Pond	D4
160748	Infiltration basin	Infiltration Facility	D4
160477	Infiltration basin	Infiltration Facility	E1
160183	Dry pond	Dry Pond	E3
160189	Dry pond	Dry Pond	E3
160190	Dry pond	Dry Pond	E3
160737	Dry pond	Dry Pond	E3
160738	Wet pond	Wet Pond	E3
160739	Dry pond	Dry Pond	E3
160179	Infiltration trench	Infiltration Facility	F1
160181	Infiltration trench	Infiltration Facility	F1
160451	Dry pond	Dry Pond	F1
160452	Shallow marsh	Wet Pond	F1
160453	Dry pond	Dry Pond	F1
160454	Infiltration basin	Infiltration Facility	F1
160455	Infiltration trench	Infiltration Facility	F1
160456	Wet pond	Wet Pond	F1
160476	Wet pond	Wet Pond	F1
160478	Infiltration trench	Infiltration Facility	F1
160479	Infiltration trench	Infiltration Facility	F1
160480	Infiltration trench	Infiltration Facility	F1
080085	Infiltration trench	Infiltration Facility	F3
160161	Wet pond	Wet Pond	F3
160401	Infiltration trench	Infiltration Facility	F3
160402	Infiltration trench	Infiltration Facility	F3