AECOM Environment

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INFRASTRUCTURE OPERATIONS AND MAINTENANCE PLAN

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List of Acronyms

BMP – Best Management Practice

BUD - Beneficial Use Determination

DEP – Department of Environmental Protection

DPW – Department of Public Works

O&M – Operations and Maintenance Procedures

SOP – Standard Operating Procedures

NPDES – National Pollutant Discharge Elimination System

MS4 - Municipal Separate Storm Sewer Systems

1.0 Purpose and Regulatory Information

In accordance with the National Pollutant Discharge Elimination System (NPDES) Small Municipal Separate Storm Sewer Systems (MS4) General Permit, the Town of Tewksbury has adopted an Infrastructure O&M that is intended to ensure operations conducted in Tewksbury do not contribute to stormwater pollution. This document includes procedures for street sweeping, catch basin cleaning, winter road maintenance, and Best Management Practices (BMP) maintenance. Inspection forms for BMP maintenance and logs for catch basin cleanings and street sweeping are included. This document is intended to be used by contractors doing work for the town, or by town employees. This Operations and Maintenance plan (O&M) should be reviewed and revised periodically depending on Town operations, facility changes, or in response to regulatory changes.

2.0 Applicable Operations

The O&M Plan covers the following Town operations:

- Planning considerations, procedures, storage and disposal, reuse operations, and log for street sweeping.
- Planning considerations, procedures, storage and disposal, reuse options, and log for catch basin cleanings.
- Planning considerations, procedures, alternative materials, storage and disposal for winter road maintenance. Winter road maintenance includes snow disposal and salt/sand operations and disposal.
- Procedures for frequency of type of maintenance for all types of BMP's, BMP waste disposal, and inspection log for BMP's.

3.0 Existing Conditions

Tewksbury, Massachusetts is a town in Middlesex County with a population of approximately 30,000. Most of the town maintenance activities are conducted by the Department of Public Works (DPW). The DPW building is a multi-use site, which is the home base for many municipal departments, including forestry, sewer, and highway. Currently, the town includes street sweeping in its yearly activities and uses a contractor for catch basin cleaning. The town also stores road salt/sand at the DPW and plows snow.

4.0 Standard Operating Procedures

4.1 Street Sweeping

Street sweepings consist of materials such as sand, salt, leaves, and debris removed from streets, parking lots and sidewalks. Street sweeping is used to prevent these materials from entering the stormwater system and to improve the appearance and safety of public roadways. These materials are not as clean as virgin earth materials and should be handled with care. Typically, street sweepings contain low levels of chemical compounds associated with stormwater runoff. (DEEP, 2007). The Town of Tewksbury has developed a comprehensive management plan for collecting street sweepings, for safely storing the materials, for reusing the materials locally in a manner that does not pose a risk to public health or water quality and, if necessary, disposing of the materials. This section reviews planning considerations to be implemented prior to the development of a comprehensive management plan. The following sections review the Standard Operating Procedures (SOPs) and BMPs associated with street sweeping. These include planning considerations for frequency, location, and volume; procedures for performing street sweeping and storage and disposal of materials, and considerations for reuse of materials.

4.1.1 Planning Considerations

This section reviews planning considerations to be implemented prior to the development of a comprehensive management plan.

Frequency and Locations of Cleaning

According to the NPDES *General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*, all streets that are paved municipal roadways, and all open-air parking lots with directly connected impervious area discharging to its MS4, must be swept a minimum of twice per calendar year, usually once in the fall and once in the spring. Roadways and lots with directly connected impervious area discharging to the MS4 include those served by catch basins, drop inlets, or other structures where stormwater is conveyed in a manner that is uninterrupted by vegetation or other pervious media. It is also recommended that streets be swept as soon as possible after snow melt. Factors to consider for the prioritization of street sweeping include categorization of roads for traffic volumes, proximity of streets to watercourses and wetlands, and overhead vegetation. Municipalities should sweep streets that are more urbanized because they are usually associated with higher pollutant loadings. According to the NPDES General Permit for MS4 the permitee must implement a sweeping optimization program that uses mapping and record keeping. Items to record include cleaning dates and frequencies, equipment, techniques, and volumes collected.

Amount of Sweepings

Street sweepings can be estimated as a ton per street mile or on a ton per capita basis. The amount of street sweepings is directly related to the amount of sand that is applied in the winter. The amount of sweepings can be calculated by dividing the yearly average of amount of sand by the miles of road within the municipality.

4.1.2 Procedures

The Town is advised to follow the subsequent procedures for efficient and effective street sweeping:

- If possible, schedule additional street sweeping after large storm events or for maintenance projects that leave debris behind.
- It is recommended to apply a light water spray to minimize the dust before sweeping.
- High velocity blowers are not recommended.
- It is recommended that street sweepers be inspected at least once per week, including start up inspections.
- It is recommended to sweep in the range of 3 to 7 mph, depending on specific conditions.
- It is recommended to implement and enforce parking restrictions where parked cars are making it difficult to reach the curb.
- Make sure the brooms for the sweepers are changed regularly based on manufacturer recommendations.

4.1.3 Storage and Disposal

Where possible, street sweepings should be reused in accordance with the procedures outlined in Section 4.1.4 of this document. However, MassDEP does not prohibit the disposal of street sweepings (MassDEP). Sweepings may be disposed in either lined or unlined permitted solid waste landfills without prior approval from the department. The following sections describe procedures for storage of street sweepings prior to either reuse or disposal.

Temporary Storage

Temporary storage sites include sites that are used for less than one year, unless the MassDEP regional office in the region where the sweepings are stored grants a written extension. The following conditions must be met in order for sweepings to be temporarily stored:

- Storage must be at a site where the sweepings are generated or at a location, including the DPW yard, which is under the control of a governmental entity which is doing or has contracted the sweeping.
- The sweepings shall be protected from wind and rain to the extent necessary to prevent dust, erosion and off-site migration.
- The sweepings should not be stored within the 100-foot buffer zone of a wetland or wetland resource area, including bordering vegetative wetlands and riverfront area.
- The sweepings should not be stored within 500-feet of a ground or surface drinking water supply.
- Storage should incorporate good management practice and result in no public nuisance.

Permanent Storage

Sweepings that are not reused should be stored in a permanent solid waste disposal facility and inside a building or have a tarp covering the pile. It is recommended that a barrier or berm be used to contain stormwater runoff.

4.1.4 Reuse

The following section reviews possibilities for reuse of catch basin cleanings in Massachusetts.

Preparation

Solid waste, such as trash and paper, should be removed from the sweepings prior to use. Leaves and other organic matter should also be removed when good engineering practice indicates it is necessary to produce a material that is suitable for the intended use.

Testing

It has been shown that sweepings from all areas, excluding urban center roads, had main pollutants of concern including total petroleum hydrocarbons (TPH) and polynuclear aromatic hydrocarbons (PAHs). These test results indicated that sweepings contain levels or contamination that is unsuitable for unrestricted use. However, not including urban center roads, the levels of contamination were consistent and low enough to allow the use of sweepings in restricted applications without requiring testing or pre-approval as long as certain conditions were met. Also, because sweepings from urban center roads are not approved for all uses, they should be kept separate from other sweepings if the intended purpose is for reuse (MassDEP).

Uses

Landfills: Street sweepings may be used for daily cover at lined and unlined permitted solid waste landfills and do not need MassDEP approval if the sweepings satisfy requirements for daily cover material specified at 310 CMR 19.130(15).

Additive to Restricted Use Compost: Street sweepings shall be used as an additive to compost without prior MassDEP approval only if the conditions and restrictions listed below are followed:

- The sweepings have not been collected from urban center roads.
- The compost is only used in public ways.
- The compost is not used in residential areas.
- The compost is kept above the groundwater level.
- The compost is not used in designated “No Salt Areas”.
- The compost is not used within the 100-foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- The compost is not used within 500-feet of a ground or surface water drinking supply.

Fill in Public Ways: Street sweepings can be used for fill in public ways without prior MassDEP approval only if the conditions and restrictions listed below are followed:

- The sweepings have not been collected from urban center roads.
- The sweepings are used under the road surface or as fill along the side of the road within the public way.
- The sweepings are not used in residential areas.
- The sweepings are kept above the level of the groundwater.
- The sweepings are not used in designated “No Salt Areas”.

- The sweepings are not used within the 100-foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- The sweepings are not used within 500-feet of a ground or surface water drinking supply.

Other Uses: Any use not pre-approved in the preceding section requires MassDEP approval under the Beneficial Use provisions of the Solid Waste Management Facility Regulations at 310 CMR 19.060. A Beneficial Use Determination (BUD) can be made after the submission of an application characterizing the waste and describing the proposed beneficial use.

Note: See Appendix A for a map to use for street sweeping. See Appendix B for a street sweeping log.

4.2 Catch Basins

Catch basin cleanings consist of materials such as sand, silt, leaves and debris that accumulate in and are removed from catch basins. Materials that are removed from other drainage structures such as swirl concentrators, separators, detention and retention basins are often similar to catch basin cleanings and generally should be handled in a similar manner. The material removed from catch basins often contains a higher percentage of fine-grained material such as silt and clay. It is usually wet and has a higher organic content than street sweepings due to decomposition of wet leaves. Catch basin cleanings generally have higher levels of pollutants than street sweepings. The finer grained sediments in catch basins and other drainage structures adsorb more metals and other pollutants than the coarser sand typically found in street sweepings. Catch basins are also more likely to have been affected by spills and polluted runoff than street sweepings (DEEP). The Town of Tewksbury has developed a comprehensive management plan that includes SOPs and BMPs to address catch basin cleanings. The following sections discuss these measures, which include planning considerations for frequency, location and volume; procedures for performing catch basin cleanings, storage and disposal procedures, and considerations for reuse.

4.2.1 Planning Considerations

This section reviews planning considerations used in the development of the Town's Comprehensive Management plan. These considerations should be reviewed at a minimum on a yearly basis, or when updating the Comprehensive Management plan.

Frequency and Locations of Cleaning

According to the NPDES *General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*, the town shall optimize routine cleaning and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located in close proximity to construction activities (roadway construction, residential, commercial, or industrial development or redevelopment). Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.

- For other catch basins, routine cleaning should be conducted frequently enough to ensure that no catch basin becomes more than 50 percent full.
- The permittee shall document in the SWMP, and in the first annual report, its plan for optimizing catch basin cleaning. Documentation shall include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4.

The permittee shall report in each annual report the number of catch basins inspected and cleaned, and the volume or mass of material removed from each catch tributary to impaired waters, and the total volume or mass of material removed from all catch basins. Factors to consider for the prioritization of catch basin cleaning include categorization of roads for traffic volumes, proximity of streets to watercourse and wetlands, number of accidents, number of catch basins, litter frequency, and overhead vegetation. It is also recommended that catch basins contribute to higher pollutant loadings or which discharge to surface waters be cleaned more frequently.

Amount of Catch Basin Cleanings
For catch basins in urban areas, an acceptable value for estimating mass is 0.1 pounds per calendar day.

4.2.2 Procedures: Inspection

This section recommends inspection activities to be used before and after catch basin cleanings.

- An excessive sediment or debris loading is assumed to be a catch basin sump more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half of the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
- Schedule catch basin cleanings at a minimum of once per year. Frequency should be increased if inspection identifies higher-than-average sediment or debris loading. Frequency should also be increased in construction zones or other areas prone to higher-than-average sediment and debris loading.
- Inspect all catch basins for obstructions, structural damage, and depth of sediment every month. Clean out catch basins if they are half full of sediment.
- The following should be overseen by the subcontractor hired by the Town:
    - Clean the cyclone screens after inspecting them for an abundance of liquid or debris every week.

4.2.3 Procedures: Maintenance

The following section describes SOPs and recommends BMPs to be used during catch basin cleanings.

- Excessive sediment or debris loading is defined as described in the previous section.
- Ensure that no sump shall be more than 50 percent full, particularly for catch basins serving catchments that drain to tributary to impaired water bodies.
- If a catch basin sump is more than 50 percent full during two consecutive routine cleaning events, the permittee shall investigate the contributing drainage area for sources of

excessive sediment loading, and to the extent practicable, abate contributing sources. The permittee shall describe any actions taken in its annual report.

- The following should be overseen by the subcontractor hired by the Town:
    - Clean the debris body of the truck every week.

4.2.4 Storage and Disposal

It is recommended to reuse catch basin cleanings as outlined in Section 4.2.4. However, catch basin cleanings may contain a higher concentration of contaminants than street sweepings, so the options for reuse are limited. The following sections address procedures for storage and disposal of catch basin cleanings.

Storage

Storage areas for catch basin cleanings must be sized to handle the expected volume of material, and must allow for any necessary testing or processing for reuse. The storage area should be designed to resist erosion of storage piles, and minimize the production of excess dust and debris. Berms and other containment systems should be used to properly contain stormwater runoff from the site.

Disposal Procedures

The use of a vactor truck is typically used for cleaning catch basins. The contents of the vactor truck can be divided into decant liquids and solids which require specific disposal protocol and discharge permits. Catch basin maintenance using a vactor truck can result in three types of discharges:

1. Decant wastewater which is discharged from the vactor truck with a sediment trap and hose.
2. Dump wastewater which is the discharge of both sludge and water from the vactor truck.
3. Rinse wastewater which is the discharge resulting from cleaning the inside of the truck after a dump discharge.

The discharge of decant wastewater and/or any other wastewater associated with catch basin maintenance to a watercourse or wetland, or returned to a catch basin or storm drain system, is prohibited. However, catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP usually does not require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence of contamination. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as Hazardous Waste if appropriate. Any cleanings from combined sewers may be required to be tested before disposal.

4.2.5 Reuse

In Massachusetts, the only option for reuse of catch basin cleanings is at landfills. As discussed previously, catch basin cleanings must be sufficiently dry and free of decant liquid prior to re-use. Otherwise, the material will need to undergo a Paint Filter Liquids Test. This test consists of placing a predetermined amount of material in a paint filter, and if any material passes through the filter within a five minute period, the material is considered to contain free liquids (EPA, 2004). Once catch basin

cleanings are sufficiently dry or have passed the Paint Filter Liquids Test, they may be used as grading and shaping material at landfills undergoing closure. Catch basin cleanings may also be used as a daily cover or grading material at active landfills, but only with specific MassDEP approval of the proposed use.

The following section reviews the only available option for reuse of catch basin cleanings in Massachusetts.

Landfills
MassDEP 310 CMR19.130 (7) prohibits Massachusetts landfills from accepting materials with free draining liquids. The agency will generally be satisfied that the material is sufficiently dry if there is no free water in a truck used to transport the catch basin cleanings. Otherwise, the material will need to undergo a Paint Filter Liquids Test. However, catch basin cleanings can be used as grading and shaping material at landfills undergoing closure. The cleanings may be used as a daily cover or grading material at active landfills only with specific MassDEP approval of the proposed use.

Note: See Appendix A for a map to use for catch basin cleanings. See Appendix B for a catch basin cleaning log.

4.3 Winter Road Maintenance

It is difficult for municipalities to find a place to dispose of collected snow from roads, parking lots, bridges, and sidewalks. Snow and ice can create hazardous driving and walking conditions, but collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment. As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where it may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels (MassDEP, 2001). There are several steps that the Town of Tewksbury takes to minimize the impacts of snow disposal and winter road maintenance on public health and the environment. These steps help the community avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. The following sections review the SOPs and BMPs associated with winter road maintenance. These include planning considerations for site selection of road salt/sand storage and snow storage; procedures for plowing and salt/sand application; consideration of alternative deicing materials; and disposal of salt/sand, and snow.

4.3.1 Planning Considerations

This section reviews planning considerations used in the development of the Town's Comprehensive Management plan. These considerations should be reviewed at a minimum of a yearly basis, or when updating the Comprehensive Management plan. It addresses site selection options for snow disposal and deicing materials.

Snow Disposal Planning

Snow disposal sites should be located adjacent to or on pervious surfaces in upland areas away from water resources and wells. At these locations, meltwater from the snow can filter in to the soil, leaving behind sand and debris that can be removed in the springtime. The following practices and areas should be avoided:

- Avoid dumping of snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed in open water can cause navigational hazards when it freezes into ice blocks.
- Do not dump snow within a Zone II or Interim Wellhead Protection Area (IWPA) of a public water supply well or within 75 feet of a private well, where road salt may contaminate water supplies.
- Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater (see the next page for information on ordering maps from MassGIS showing the locations of aquifers, Zone II's, and IWPAs in your community).
- Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater; and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

Salt/Sand Materials Storage Planning

The following guidelines should be followed when planning for an appropriate location for salt and sand piles:

- Cover sand/salt piles with a tarp or store inside a storage building.
- Sand/salt piles should be stored on impervious surfaces.
- Sand/salt piles should be stored outside the 100-year floodplain for further protection against surface water contamination.

4.3.2 Procedures

The following section describes SOPs and recommendations for BMPs to be used during winter maintenance activities, including plowing and sand/salt application.

Snow Plowing

- Identify snow storage areas prior to plowing. As previously discussed, areas should be selected based on availability of impervious surfaces and location of the 100-year floodplain, for protection against surface water contamination.
- Avoid plowing, pushing, blowing, or storing excess snow or other debris into storm drains. Do not hose down sidewalks or parking lots except where wash water will only enter grassy or graveled areas where it can infiltrate into the ground.
- Avoid plowing, pushing, blowing, or storing excess snow or other debris into storm drains.

Sanding

- Only use clean sand for winter road maintenance.
- Use the lowest possible application rate that will be effective.
- Make sure to sweep roads and parking lots after winter sanding operations.

Salt/Deicer Application

- Hand apply salt and/or chemical deicers only on sidewalks where required for pedestrian safety.
- Use the lowest amount of product that will be effective.
- Do not apply salt and/or chemical deicers near storm drains.
- Be aware of Low salt/No salt areas; sensitive watershed areas.

4.3.3 Alternative Materials

Salt and sand are the most common and cheapest methods for winter road maintenance. However, there are alternative products that can be used to better manage the roadways during the winter months. Table 4-1 presents a few options, and list the cost and general characteristics of the product. Use of these products should be considered prior to performing winter road maintenance.

Table 4.1. Deicing Alternatives (Keating, 2004)

Substance	Cost	Characteristics
Calcium Chloride ($CaCl_2$)	Flake $290/ton, pellet $340/ton	• Melts ice at temperatures of -25 ° F • If used as recommended, will not harm vegetation
Magnesium Chloride ($MgCl_2$)	Flake $260/ton, pellet $300/ton	• Lowest practical temperature: 5 ° F • If used as recommended, will not harm vegetation; however, $MgCl_2$, on a percentage basis, contains 17-56% more chloride ion than other salt-type deicers
Potassium Chloride (KCl)	$240/ton	• Lowest practical temperature: 12 ° F • Will not harm vegetation
Urea	$280/ton	• Lowest practical temperature: 15 ° F • Will not harm vegetation
Calcium Magnesium Acetate (CMA)	$2,000/ton	• Will work below 0 ° F • Low toxicity and biodegradable

4.3.4 Storage and Disposal

It is important to properly dispose of and maintain the snow piles after they have been collected to avoid contamination of nearby waterbodies and groundwater. The following section describes disposal practices during the winter months.

Salt/Sand Loading and Storage Procedures

- Stockpiled salt/sand should be stored under cover or covered with a tarp.
- When loading sand, do not overload the truck.
- Loading areas and yards should be swept frequently to prevent sand build up and runoff.

Disposal Site Maintenance

- A silt fence or equivalent barrier should be placed securely on the down gradient side of the snow disposal site.
- To filter pollutants out of the meltwater, a 50-foot vegetative buffer strip should be maintained during the growth season between the disposal site and adjacent waterbodies.
- Debris should be cleared from the site prior to using the site for snow disposal.
- Debris should be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.

Emergency Snow Disposal

If all upland disposal sites have been exhausted, snow can be disposed of near a waterbody, as long as there is a 50-foot vegetative buffer between the site and the waterbody. Use the following contacts in case of uncertainty of where to dispose snow:

Tewksbury Conservation Commission: 978-640-4370

MassDEP Northeast Region: 978-694-3200

4.4 BMP Maintenance

The effectiveness of post-construction stormwater control BMPs depends upon regular inspections of the control measures. Routine maintenance is performed regularly to maintain both the aesthetics of the BMPs and their effectiveness. Routine inspection and maintenance helps prevent potential nuisances (odors, mosquitoes, weeds, etc.), reduces the need for repair maintenance, and reduces the chance of polluting stormwater runoff by finding and fixing problems before the next rainfall. In addition to maintaining the effectiveness of stormwater BMPs and reducing the incidence of pests, proper inspection and maintenance is essential to avoid the health and safety threats which are common in poorly maintained BMP's. The failure of structural stormwater BMPs can lead to downstream flooding, which can cause property damage, injury, and even death.

4.4.1 Procedures and Frequency of Cleaning

Table 4-2 lists different types of BMP's and the associated maintenance activities and frequencies.

Table 4.2. Maintenance costs, activities, and schedules for urban management practices (Adapted from CWP, 1998)

Type of Practice	Management Practice	Maintenance Activity	Schedule
Detention/ Retention Practices	Ponds/ wetlands	• Cleaning and removal of debris after major storm events; (>2" rainfall) • Harvesting vegetation when a 50% reduction in the original open water surface area occurs • Repairing embankment and side slopes • Repairing control structure	Annual or as needed
		• Removing accumulated sediment from forebays or sediment storage areas when 60% of the original volume has been lost	5-year cycle
		• Removing accumulated sediment from main cells of pond once 50% of the original volume has been lost	20-year cycle
	Dry Ponds	See above	
	Wetlands	See above	
Infiltration Facilities	Infiltration Trench	• Cleaning and removing debris after major storm events; (>2" rainfall) • Mowing and maintaining upland vegetated areas • Sediment cleanout • Repairing or replacing stone aggregate • Maintaining inlets and outlets	Annual or as needed
		• Removing accumulated sediment from forebays or sediment storage areas when 50% of the original volume has been lost	4-year cycle
	Infiltration Basin	• Cleaning and removing debris after major storm events; (>2" rainfall) • Mowing and maintaining upland vegetated areas • Sediment cleanout	Annual or as needed
		• Removing accumulated sediment from forebays or sediment storage areas when 50% of the original volume has been lost	3- to 5-year cycle
Filtration Practices	Sand Filters	• Removing trash and debris from control openings • Repairing leaks from the sedimentation chamber or deterioration of structural components • Removing the top few inches of sand, and cultivation of the surface, when filter bed is clogged	Annual or as needed

Type of Practice	Management Practice	Maintenance Activity	Schedule
		• Cleaning out accumulated sediment from filter bed chamber once depth exceeds approximately 1/2", or when the filter layer will no longer draw down within 24 hours • Cleaning out accumulated sediment from sedimentation chamber once depth exceeds 12 inches	3- to 5-year cycle
	Dry Swales, Grassed Channels, Biofilters	• Mowing and removing litter/debris • Stabilizing eroded side slopes and bottom • Managing nutrient and pesticide use • Dethatching swale bottom and removing thatching • Discing or aerating swale bottom	Annual or as needed
		• Scraping swale bottom and removing sediment to restore original cross section and infiltration rate • Seeding or sodding to restore ground cover (use proper erosion and sediment control)	5-year cycle
	Filter Strips	• Mowing and removing litter/debris • Managing nutrient and pesticide use • Aerating soil on the filter strip • Repairing eroded or sparse grass areas	Annual or as needed
	Bioretention	• Repairing erosion areas • Mulching of void areas • Removing and replacing all dead and diseased vegetation • Watering plant material	Biannual or as needed
		• Removing mulch and applying a new layer	Annual

4.4.2 BMP Waste Disposal

Landfill and solid waste facility requirements should be followed for all BMP waste. All sediment removed from the BMP's shall be disposed of according to current erosion and sediment control regulations. When cleaning, standing water, unpolluted and clear water, can be decanted and discharged to the storm system. However, water that is turbid should be pumped and hauled to an acceptable wastewater disposal facility or treated by filtration, which can include pumping through a bag filter and discharged to the sanitary sewer system.

Sediments from BMP's should be disposed of in a similar manner to catch basin cleanings. Refer to Section 4.2.3 for more detailed disposal techniques.

Note: See Appendix A for a map to use during BMP inspections. See Appendix B for a BMP inspection log.

5.0 References

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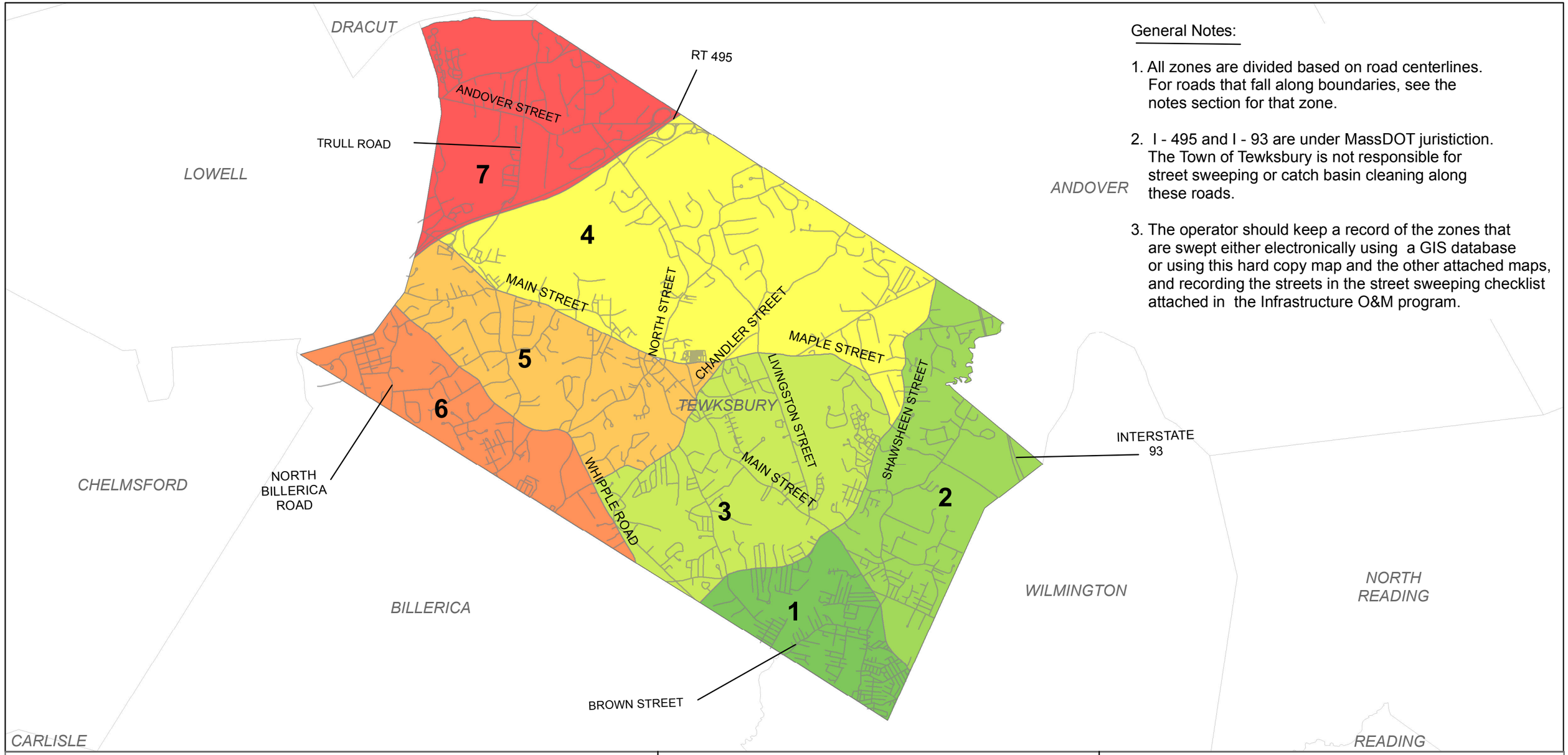
Appendix A

GIS Maps



General Notes:

1. All zones are divided based on road centerlines. For roads that fall along boundaries, see the notes section for that zone.

2. I - 495 and I - 93 are under MassDOT juristiction. The Town of Tewksbury is not responsible for street sweeping or catch basin cleaning along these roads.

3. The operator should keep a record of the zones that are swept either electronically using a GIS database or using this hard copy map and the other attached maps, and recording the streets in the street sweeping checklist attached in the Infrastructure O&M program.

N

0 2,500 5,000 10,000 15,000 20,000 Feet

1 in = 4,500 ft

Map Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury Street Sweeping and Catch Basin Cleaning Map

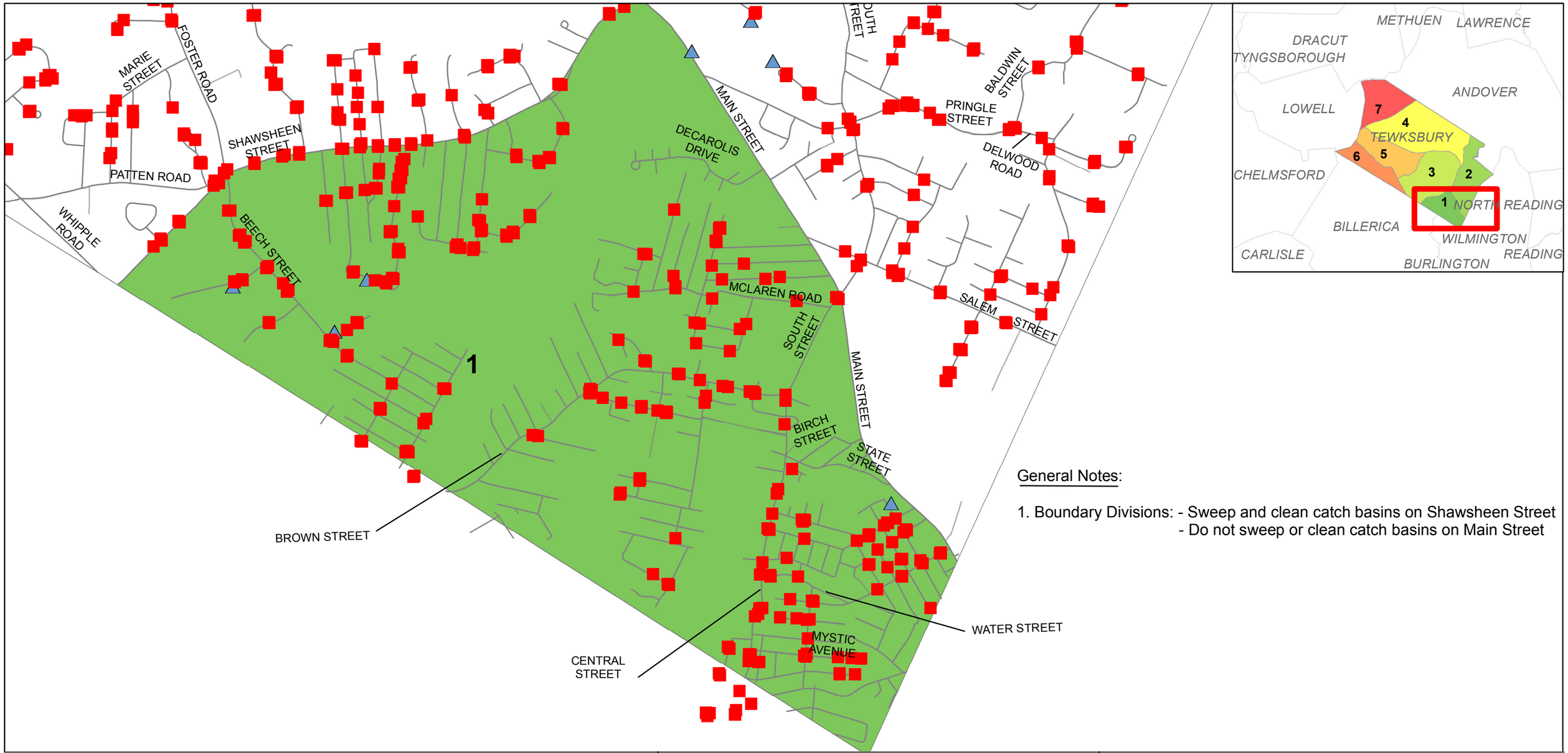
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Shawsheen Street
   - Do not sweep or clean catch basins on Main Street

N

0 625 1,250 2,500 3,750 5,000 Feet

1 in = 1,125 ft

Map Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and Catch Basin Cleaning Map
Zone 1

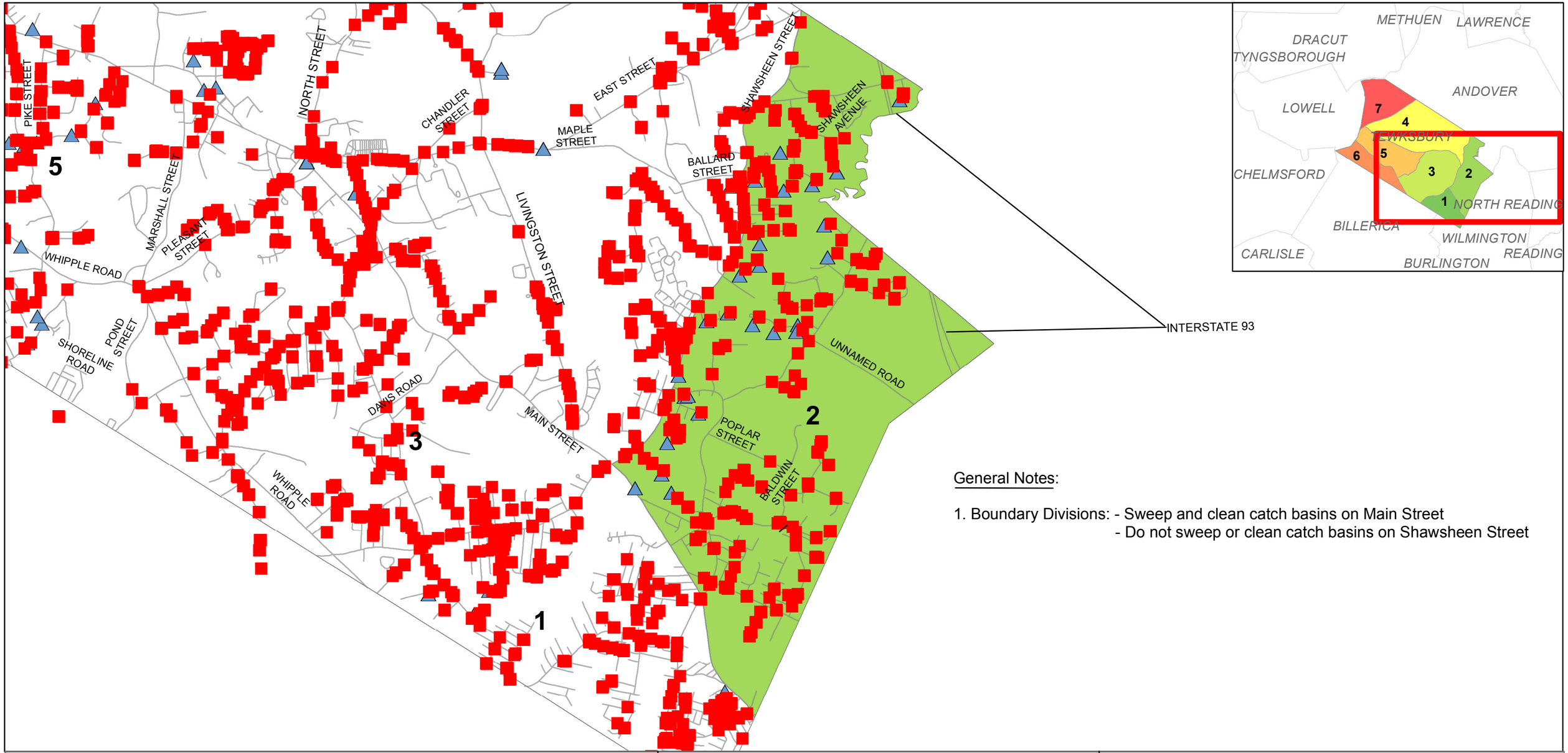
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Main Street
   - Do not sweep or clean catch basins on Shawsheen Street

N

0 1,500 3,000 6,000 9,000 12,000 Feet

1 in = 2,500 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and Catch Basin Cleaning Map
Zone 2

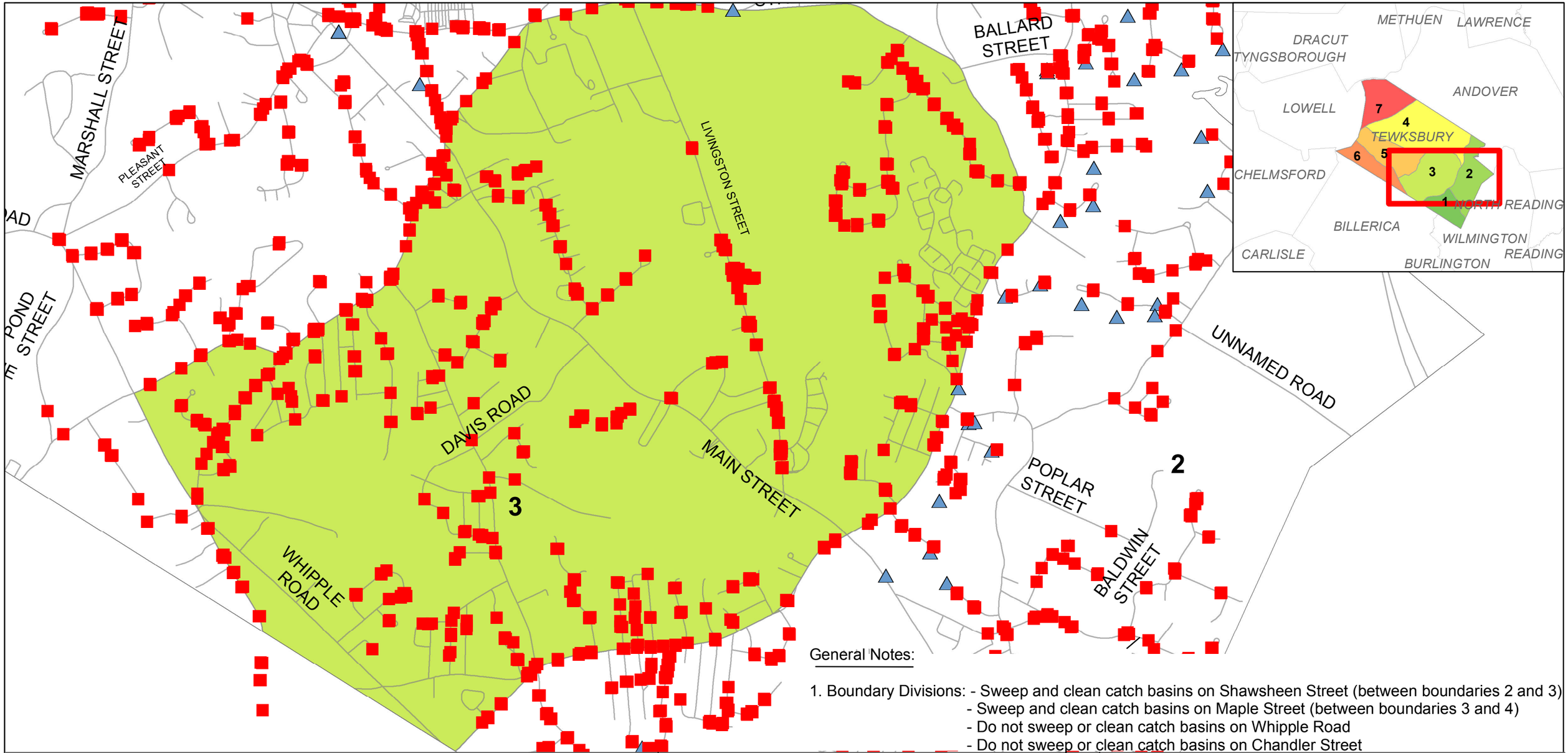
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Shawsheen Street (between boundaries 2 and 3)
   - Sweep and clean catch basins on Maple Street (between boundaries 3 and 4)
   - Do not sweep or clean catch basins on Whipple Road
   - Do not sweep or clean catch basins on Chandler Street

N

0 750 1,500 3,000 4,500 6,000 Feet

1 in = 1,500 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and Catch Basin Cleaning Map
Zone 3

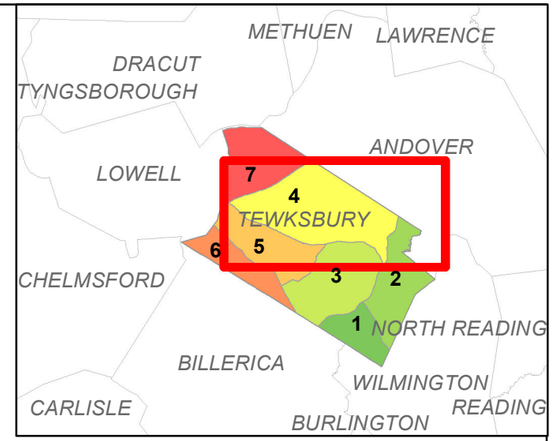
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Shawsheen Street (between boundaries 2 and 4)
   - Sweep and clean catch basins on Main Street (between boundaries 4 and 5)
   - Do not sweep or clean catch basins on Maple Street
   - Do not sweep or clean catch basins on Rt 495

N

0 1,000 2,000 4,000 6,000 8,000 Feet

1 in = 1,875 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and Catch Basin Cleaning Map
Zone 4

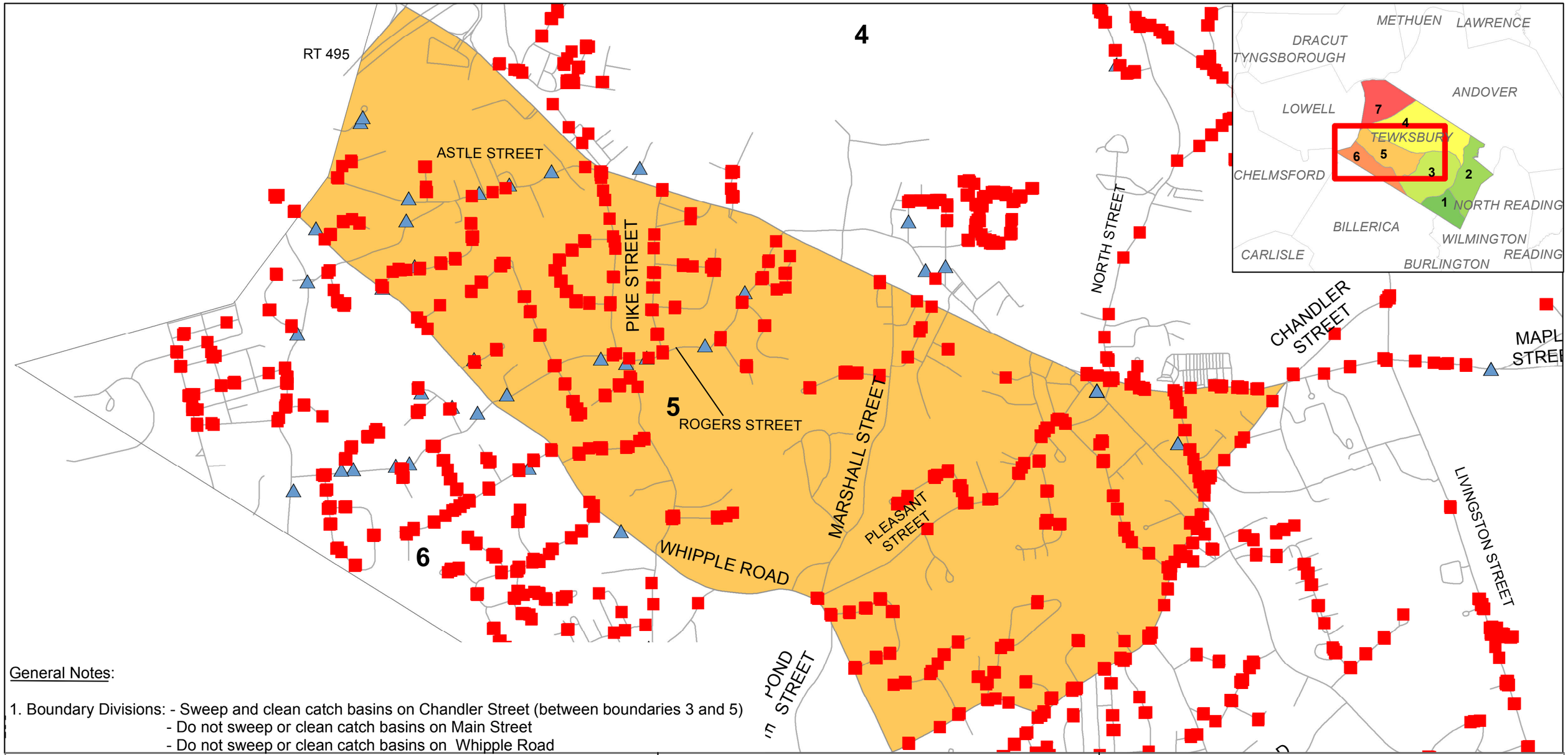
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Chandler Street (between boundaries 3 and 5)
   - Do not sweep or clean catch basins on Main Street
   - Do not sweep or clean catch basins on Whipple Road

N

0 750 1,500 3,000 4,500 6,000 Feet

1 in = 1,500 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

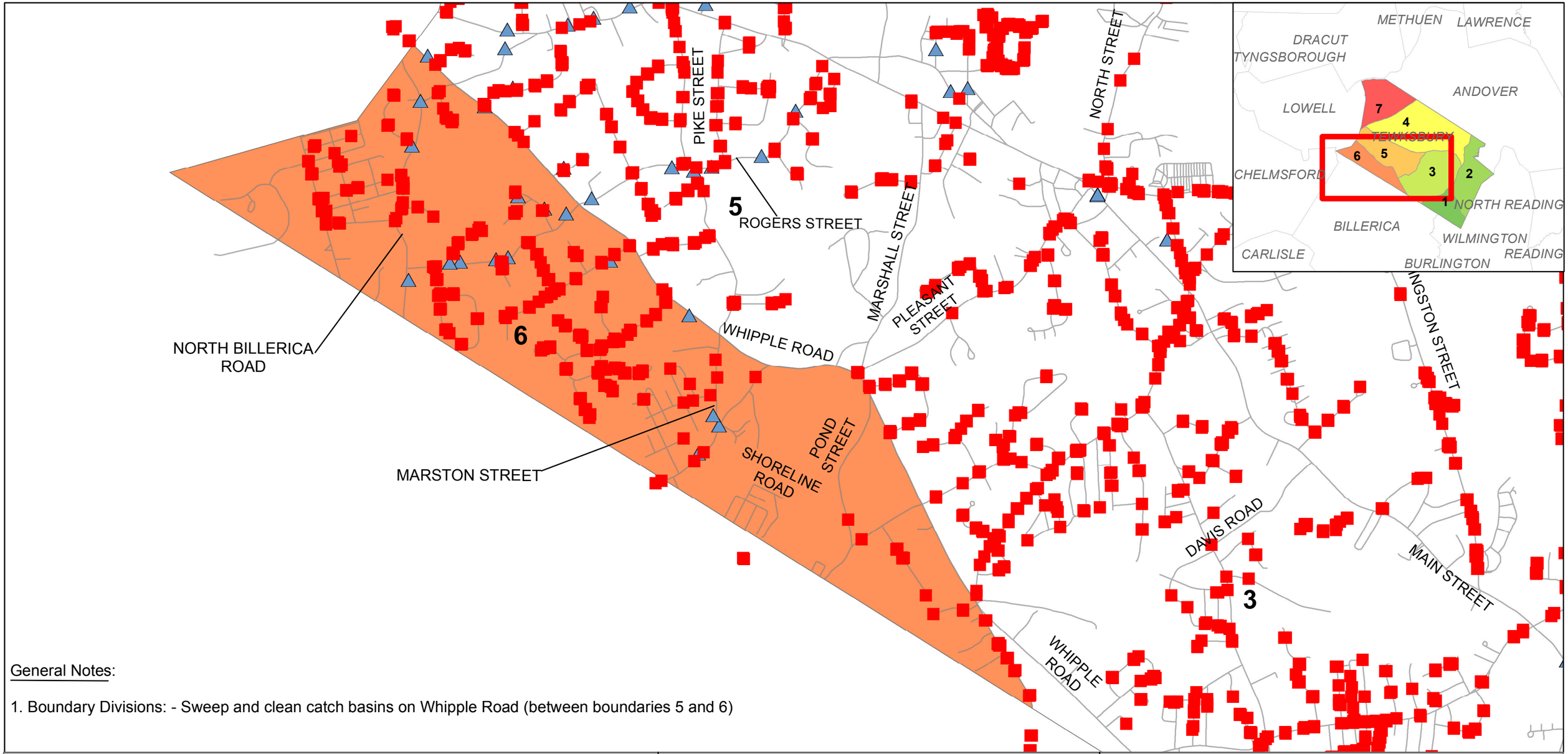
Town of Tewksbury
Street Sweeping and
Catch Basin Cleaning Map
Zone 5
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM



General Notes:

1. Boundary Divisions: - Sweep and clean catch basins on Whipple Road (between boundaries 5 and 6)

N

0 875 1,750 3,500 5,250 7,000 Feet

1 in = 1,750 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and Catch Basin Cleaning Map
Zone 6

NPDES Infrastructure O&M

January 2014

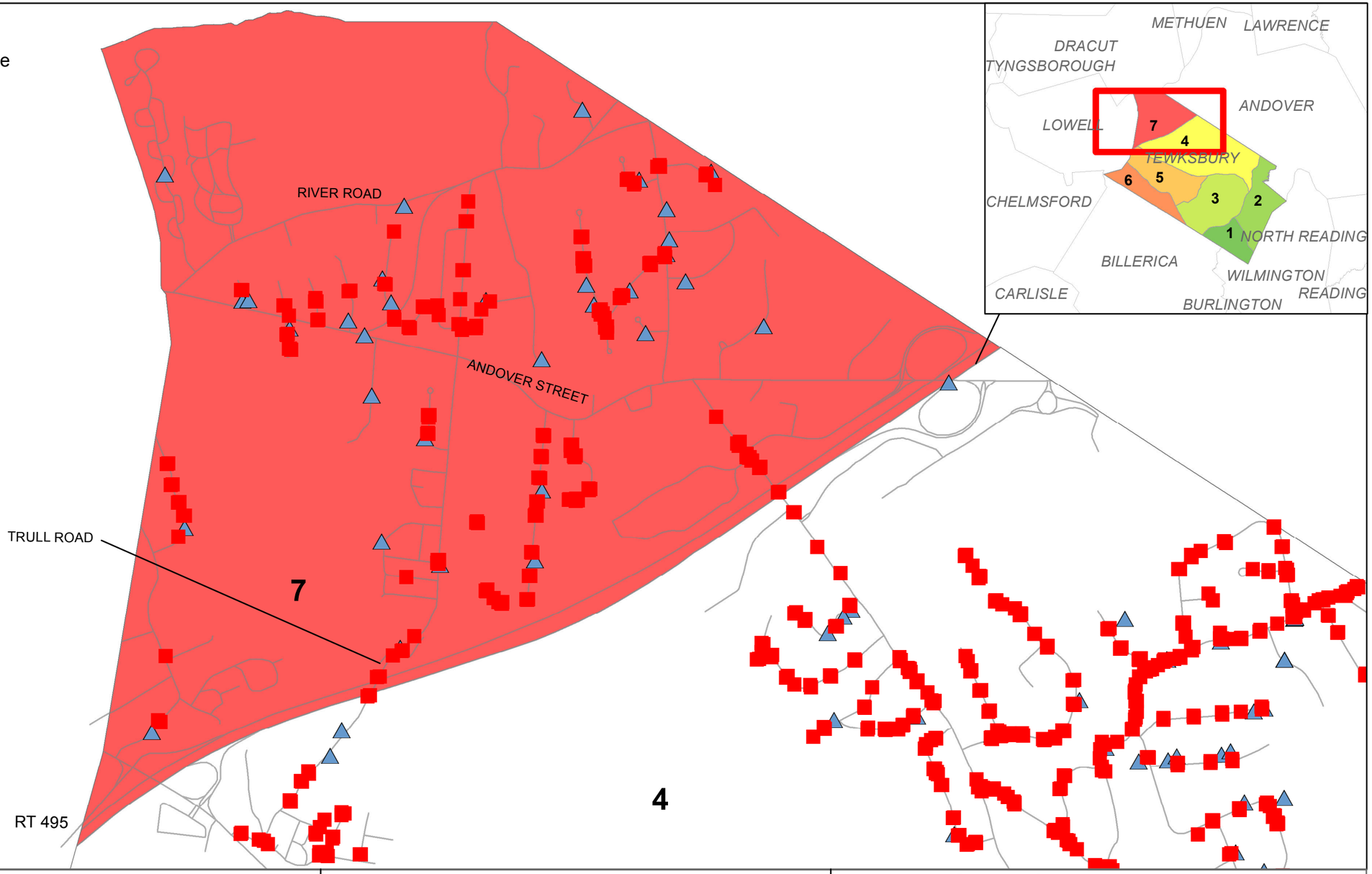
Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM

General Notes:

1. Boundary Divisions: - There are no boundaries to be swept or cleaned (do not sweep or clean 495)



N

0 750 1,500 3,000 4,500 6,000 Feet

1 in = 1,500 ft

Map Projection: NAD 1983 State Plane Massachusetts Mainland FIPS
Data Sources: Town of Tewksbury GIS database

Town of Tewksbury
Street Sweeping and
Catch Basin Cleaning Map
Zone 7
NPDES Infrastructure O&M

January 2014

Legend

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7
- Town Boundary
- Streets
- Towns
- Outfalls
- Catch Basins

AECOM

Appendix B

Logs

TOWN OF TEWKSBURY STREET SWEEPING LOG

Inspection Date:_____

Inspection Conducted By: _____

Weather: _____

Street Swept	Number of Curb Miles	Volume or Weight Removed
Total		

TOWN OF TEWKSBURY CATCH BASIN CLEANING LOG

Inspection Date:_____

Inspection Conducted By: _____

Weather: _____

Street	Number of Catch Basins Cleaned	Volume or Weight Removed
Total		

TOWN OF TEWKSBURY BMP INSPECTION LOG

Inspection Date:_____ Property Location: _____

Inspection Conducted By: _____

Weather: _____

INSPECTION RATING SYSTEM

0 = Good condition. Well maintained, no action required. Satisfactory Performance.
1 = Moderate condition. Should monitor. Satisfactory Performance.
2 = Degraded condition. Routine maintenance and repair needed. Unsatisfactory Performance.
3 = Serious condition. Immediate need for repair or replacement. Unsatisfactory Performance.

NOTE TO INSPECTOR: All personnel entering any confined spaces must take appropriate safety measures and follow applicable OSHA regulations.

Activity Reference & Description	Rating	Additional Notes/Action Needed
Filtration Practices		
1. Stable conveyance to facility	0 1 2 3 N/A	
2. Excessive trash/debris/sediment accumulation	0 1 2 3 N/A	
3. Signs of erosion	0 1 2 3 N/A	
4. Evidence of clogging	0 1 2 3 N/A	
5. Dead vegetation/exposed soil	0 1 2 3 N/A	
6. Evidence of standing water	0 1 2 3 N/A	
7. Underdrain system (if equipped) broken / clogged	0 1 2 3 N/A	
8. Evidence of oil/chemical accumulation	0 1 2 3 N/A	
9. Adequate plant covering present	0 1 2 3 N/A	
10. Overgrown vegetation	0 1 2 3 N/A	
11. Public hazards observed	0 1 2 3 N/A	
Infiltration Practices		
1. Stable conveyance to facility	0 1 2 3 N/A	
2. Excessive trash/debris/sediment accumulation	0 1 2 3 N/A	
3. Signs of erosion	0 1 2 3 N/A	
4. Evidence of standing water	0 1 2 3 N/A	
5. Evidence of clogging	0 1 2 3 N/A	
6. Maintenance access to facilities	0 1 2 3 N/A	
7. Evidence of erosion around inlet	0 1 2 3 N/A	
8. Upland vegetation areas maintained	0 1 2 3 N/A	
Detention/Retention Facilities		
1. Stable conveyance to facility	0 1 2 3 N/A	
2. Signs of erosion	0 1 2 3 N/A	

3. Excessive trash/debris/sediment accumulation	0 1 2 3 N/A	
4. Excessive sediment. If >50% of volume is excessive	0 1 2 3 N/A	
5. Evidence of clogging	0 1 2 3 N/A	
6. Maintenance access to facilities	0 1 2 3 N/A	
7. Condition of structural components	0 1 2 3 N/A	
8. Low orifice trash debris accumulation causing blockage	0 1 2 3 N/A	
9. Berms/embankments, overall condition	0 1 2 3 N/A	
10. Cattails removed	0 1 2 3 N/A	
11. Outlets providing stable conveyance out of facility	0 1 2 3 N/A	

Department of Public Works:
Tewksbury, MA
(978) 640-4440