Stormwater Best Management Practices Recommendations Report

Prepared for

Boston Water and Sewer Commission

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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John P. Sullivan, P.E.
Chief Engineer

Dated: 9/26/16

Acronyms and Abbreviations

AACE	Advancement of Cost Engineering International
BAC	Boston Architecture Center
BMP	best management practice
BNAN	Boston Natural Areas Network
BPD	Boston Parks Department
BPS	Boston Public Schools
BRA	Boston Redevelopment Authority
BTD	Boston Transportation Department
BWSC	Boston Water and Sewer Commission
CCTV	closed-circuit television
CDM Smith	Camp, Dresser, McKee, Smith
CFU	colony forming unit
CIP	Capital Improvement Program
CMMS	computerized maintenance management system
CMOM	capacity management, operations, and maintenance
Commission	Boston Water and Sewer Commission
CSI	Complete Streets Initiative
CSO	combined sewer overflow
CWI	Citywide Illegal Connection Investigation (Program)
DCIA	directly-connected impervious area
DCR	Massachusetts Department of Conservation and Recreation
DisIA	disconnected impervious area
ft^2	square feet
GBG	Grow Boston Greener
GI	green infrastructure
GIS	geographic information system
gpd	gallon(s) per day
GSA	General Service Application
GSI	green stormwater infrastructure
I/I	infiltration and inflow
IDDE	illicit discharge detection and elimination
in/h	inches per hour
kg/yr	kilograms per year
lb/ac/yr	pounds per acre per year
lb/yr	pounds per year
LID	low impact development
LOI	Letter of Intent
LOS	level of service
MassDEP	Massachusetts Department of Environmental Protection

MBTA	Massachusetts Bay Transportation Authority
mL	milliliter
MOS	margin of safety
MOU	Memorandum of Understanding
MS4	municipal separate storm sewer system
MWRA	Massachusetts Water Resources Authority
NPDES	National Pollutant Discharge Elimination System
NPV	net present value
NRCS	Natural Resources Conservation Service
O&M	operation and maintenance
PROW	public right-of-way
PWD	The City of Boston Public Works Department
QAPP	quality assurance project plan
SBI	Stony Brook Illicit Connection Investigation Program
SDO	stormwater discharge outlet
SMP	standard maintenance protocol
SRF	State Revolving Fund
SSO	sanitary sewer overflow
SSOERP	Sanitary Sewer Overflow Emergency Response Plan
SSURGO	Soil Survey Geographic
SWMM	stormwater management model
SWPPP	Stormwater Pollution Prevention Plan
TMDL	total maximum daily load
USDA	U.S. Department of Agriculture
USDOJ	U.S. Department of Justice
USEPA	U.S. Environmental Protection Agency
WLA	waste load allocation
WQv	water quality volume

Executive Summary

This *Stormwater Best Management Practices Recommendations Report* is a watershed-scale stormwater management plan that evaluates systematic implementation of best management practices (BMPs) to cost-effectively achieve water quality goals. The report evaluates BMP suitability based on specific site conditions, analyzes various levels of BMP implementation, and recommends an optimal BMP implementation plan for reducing pollutant loads to the receiving waters for the City of Boston. The overall goal of this report is to present the optimized BMP implementation approach that achieves water quality targets through implementation of BMPs throughout the Boston Water and Sewer Commission's ("the Commission" or "BWSC") municipal separate storm sewer system (MS4) at the most efficient cost. A main objective of this report is to identify BMPs that can be practically implemented in the City of Boston and assess the extent of BMP implementation needed to reduce pollutant loads sufficiently to meet applicable total maximum daily loads (TMDLs) allocated to stormwater discharges. These objectives were met by using geographic information system (GIS) techniques and the Commission's calibrated stormwater model to develop and analyze numerous BMP implementation scenarios to assess pollutant load reductions to Boston's receiving waters and prioritize potential BMP implementation opportunities.

The United States Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MassDEP) developed TMDLs for impaired waterbodies receiving stormwater from the City of Boston. These TMDLs established the amount of pollutants that the targeted waterbodies can assimilate without exceeding water quality standards while maintaining the designated uses of the receiving waterbodies. The Commission reached a Consent Decree with the Conservation Law Foundation and the USEPA on August 23, 2012 settling Civil Action No. 10-10-250-RGS on stormwater discharges from the Commission's MS4. The Consent Decree (Section VII, Part D, Paragraph 27) requires the Commission to modify its storm drain system model to estimate pollutant loadings from its MS4 to the receiving waters within the City of Boston. The Commission submitted a *Stormwater Model Report* in December 2012 pursuant to the Consent Decree requirement. The report assesses the pollutant loading conditions to the receiving waters by developing a stormwater model calibrated with flow and water quality data collected recently by the Commission. On July 14, 2015, USEPA approved the *Stormwater Model Report* after the Commission addressed various review comments from the parties.

The Consent Decree (Section VII, Part D, Paragraph 28) requires the Commission to submit a BMP recommendations report within 20 months of approval of the *Stormwater Model Report*. It also requires the BMP recommendations report to provide technical analysis detailing how implementing BMPs will reduce pollutant loads to receiving waters within the Commission's MS4 and the extent to which BMPs will prevent BWSC stormwater discharges from causing or contributing to a violation of water quality standards.

1.0 Description of BWSC's MS4 Area

The Commission is responsible for the majority of the storm drains located within the City of Boston. The Commission's MS4, which was previously defined in the 2012 *Stormwater Model Report*, currently consists of 197 storm drain outfalls (BWSC, 2013). Some storm drains and outfalls in the City are owned and operated by other city agencies such as the Boston Parks Department (e.g., Boston Common) or state agencies such as the Department of Conservation and Recreation (e.g., Storrow Drive). The Commission's system also has 18 interconnections with the municipalities of Brookline, Dedham, Milton, Newton, and Somerville.

In total, the Commission's MS4 system drains approximately 36 square miles via approximately 590 miles of separate storm drains. This does not include approximately 10 square miles of the city that drain to the combined sewer system. As the Commission continues to separate areas of their collection system, the MS4 area will change. The Commission's combined sewer system is managed under a separate National Pollutant

Discharge Elimination System (NPDES) permit. The city's drainage discharges into the following four receiving waters, as shown in Figure ES-1:

1. Upper/Middle Charles River watershed to the southwest
2. Lower Charles River watershed to the north
3. Neponset River watershed to the south
4. Boston Harbor to the east

The core drainage network consists of a series of enclosed and open channel streams that convey stormwater flow to one of the four receiving waters listed above. The majority of these enclosed streams were once open channel streams until the late 19th and early 20th centuries.

The Commission's 2012 *Stormwater Model Report* grouped the subcatchments of the MS4 into 27 "reporting areas" (or "study areas") corresponding to the major drains, neighborhoods, and principal receiving waters. The BMP implementation analysis was performed at the reporting area level.

2.0 Water Quality Standards of Receiving Waters

The Commission's stormwater drainage system discharges to the receiving waterbodies described above. The water quality of the receiving waterbodies is impacted by both combined sewer systems and the storm drain systems associated with the Commission's MS4 and upstream communities. Water quality classifications for the receiving waters within the Commission's MS4 are shown on Figure ES-1. The water quality classifications are defined as follows:

- Class B (inland water class): designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation.
- Class SB (coastal and marine class): designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass.
- Class B (CSO) and SB (CSO): occasionally subject to short term impairment of swimming or other recreational uses due to untreated combined sewer overflow (CSO) discharges in a typical year; the aquatic life community may suffer adverse impacts yet it is still generally viable. In these waters, the uses for Class B and Class SB waters are maintained after the implementation of long-term control measures described in the approved combined sewer overflow (CSO) long-term control plan, except as identified in such plan.

To attain the designated classifications of the receiving waterbodies, USEPA and the MassDEP developed TMDLs for the impaired waterbodies to establish the amount of pollutants that the targeted waterbodies can assimilate without exceeding their water quality standards. The receiving waterbodies of the Commission's MS4 are regulated by the TMDLs summarized in Table ES-1; this table identifies what water quality parameters are regulated by TMDLs in each watershed. The Commission's discharges are regulated by their NPDES permit, which requires controls to reduce pollutants to the maximum extent practicable.

TABLE ES-1
Summary of TMDLs for Receiving Waters in Boston MS4

Watershed	TMDL (Control Number[1])	Status of TMDL	TMDL Approval Date	TMDL Basis	Base Year[2]
Upper/Middle Charles River	Nutrients (272.0) Pathogen (156.0)	Approved	2011 (TP) 2007 (pathogen)	Nutrients - Loads (lb/year) Pathogen – Concentration (CFU/100ml)[4]	1998-2002
Lower Charles River	TP[3] (301.0) Pathogen (156.0)	Approved	2007	TP - Loads (lb/year) Pathogen – Concentration (CFU/100ml)[4]	1998-2002
Neponset River	Bacteria (121.0; 121.5)	Approved	2013	Concentration (CFU/100ml)[4]	n/a
Boston Harbor	Pathogen	Draft	n/a	Concentration (CFU/100ml)	n/a

Notes

[1] The control number is a reference number corresponding to the issued TMDL, used for document control.

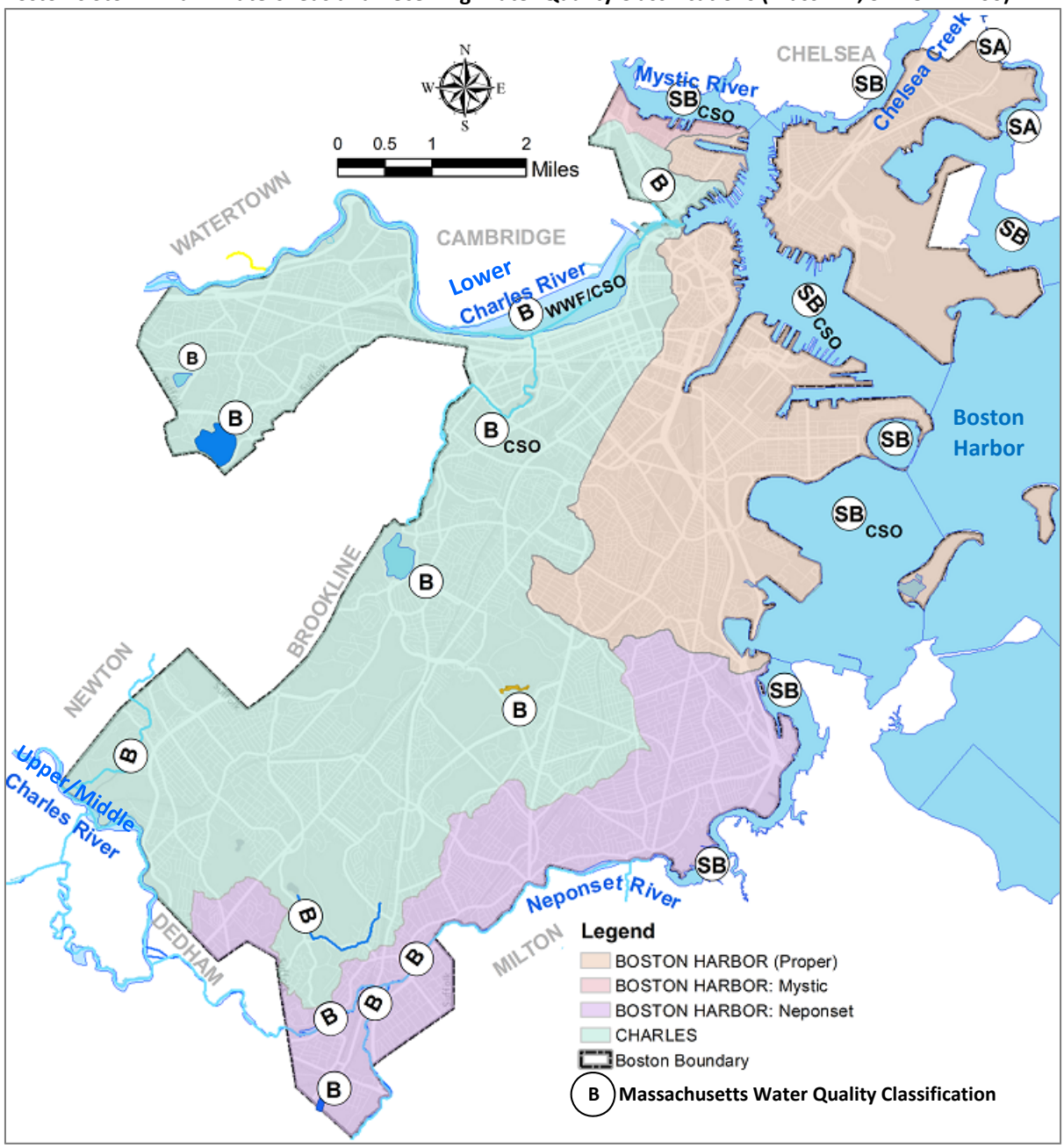
[2] The base year indicates what years' data were used to develop TMDLs.

[3] TP = total phosphorus

[4] CFU = colony forming units

FIGURE ES-1

Boston's Storm Drain Watersheds and Receiving Water Quality Classifications (MassDEP, 314 CMR 4.00)



Phosphorus TMDL for the Upper/Middle Charles River

The Upper/Middle Charles River watershed is approximately 268 square miles, containing approximately 87 percent of the total Charles River watershed area. There are two drainage basins from the Commission's MS4 that contribute stormwater waste loads to the Upper/Middle Charles River: the Sawmill Brook and West Roxbury reporting areas. For stormwater, the TMDL defines phosphorus discharge limits by percent reductions specific to land use categories. For example, low density residential areas require a 45 percent reduction while commercial/industrial areas require a 65 percent reduction (MassDEP, 2011). Based on this distribution of the required load reductions, the total phosphorus pollutant load reduction requirements for the individual reporting areas can be calculated using land use area weighted reduction percentages. The resulting total phosphorus waste load reduction required for the Sawmill Brook and West Roxbury catchments are 32 percent and 42 percent, respectively.

Phosphorus TMDL for the Lower Charles River

The Lower Charles River watershed is approximately 40 square miles and drains directly into the Lower Charles from small tributary streams that are mostly enclosed and from piped stormwater drainage systems serving the surrounding communities. Specific waste load allocations (WLAs) for contributing sources in the Lower Charles River watershed are identified for the Stony Brook watershed, Muddy River watershed, and Faneuil Brook watershed. A single WLA is identified for all of the other tributary drainage systems that discharge directly to the Lower Charles River.

The Commission developed a stormwater model and calibrated the model with flow and water quality data in 2012 to estimate existing pollutant loads to the Lower Charles River receiving waterbodies. Table ES-2 compares existing pollutant loads from various sources and lists pollutant load reduction requirements based on BWSC modeling results and TMDL waste load allocations (WLAs) to the Lower Charles River.

TABLE ES-2
Summary of the Total Phosphorus Load and WLA in the Lower Charles River[1]

	USGS, 2000[2]	MassDEP TMDL, 2007[3]		BWSC, 2015[4]	
Watershed	Existing WL (lb/yr)	Existing WL (lb/yr)	WLA (lb/yr)	Existing WL (lb/yr)	% Reduction Needed to Meet TMDL WLA
Stony Brook	5,410	11,300	4,300	6,520	36%
Muddy River	3,460	3,410	1,300	4,008	68%
Faneuil Brook	480	720	275	991	72%
Other Lower Charles[6]	_	_	879[5]	2,314	62%
TOTAL	**9,350**	**15,430**	**6,754**	**13,832**	**52%**

[1] Based on Table 1-3 of the *2015 Model Stormwater Report*

[2] Data summarized by USGS Study (Breault et al. 2002)

[3] Data summarized from MassDEP TMDL report (MassDEP 2007)

[4] Existing pollutant load based on most recently updated stormwater model by the Commission

[5] Extrapolated based on a required 62% reduction of the total existing waste load

[6] Remaining Other Lower Charles watersheds include Shepard Brook, Smelt Brook, Allston-Brighton, and Millers River

Pathogen TMDLs for Charles River

The Charles River watershed pathogen TMDL covers the entire watershed tributary to the Charles River. The indicator bacteria for the Charles River pathogen TMDL is fecal coliform. The relevant Charles River pathogen WLA for the BWSC storm drainage system is defined as the following: WLA not to exceed a geometric mean of 200 fecal coliform organisms per 100 mL in any set of representative samples, nor shall 10 percent of the samples exceed 400 organisms per 100 mL.

Bacteria TMDL for Neponset River

The 2002 *TMDL of Bacteria for Neponset River Basin* covers the entire Neponset River. The bacteria TMDL uses fecal coliform as the water quality indicator bacteria. Similar to the Charles River pathogen TMDL, the Neponset River TMDL requires that fecal coliform bacteria shall not exceed a geometric mean of 200 organisms per 100 mL in any representative set of samples, nor shall more than 10 percent of the samples exceed 400 organisms per 100 mL.

Draft Pathogen TMDL for Boston Harbor

The draft pathogen TMDL for the Boston Harbor covers all point sources and drainage to the Boston Harbor. The Boston drainage to the Boston Harbor is from both the combined sewer and separate stormwater systems. The separated BWSC drainage area contributing to the Boston Harbor comprises approximately 6.5

square miles that contribute to shellfishing areas, non-shellfishing areas, and marine beaches within Boston Harbor. The WLA for these areas are dependent on the water quality standards for the various classifications as shown in Table ES-3.

TABLE ES-3
Pathogen TMDLs for Boston Harbor (relevant to the Commission's MS4)

Surface Water Classification	Waste Load Allocation Indicator Bacteria (CFU/100 mL)
A	Not to exceed an arithmetic mean of 20 organisms in any set of representative samples, nor shall 10% of the samples exceed 100 organisms
B & Not Designated for Shellfishing SA & SB	Not to exceed a geometric mean of 200 organisms in any set of representative samples, nor shall 10% of the samples exceed 400 organisms
SA Designated Shellfishing Areas	Not to exceed a geometric mean of 14 organisms in any set of representative samples, nor shall 10% of the samples exceed 43 organisms
SB Designated Shellfishing Areas	Not to exceed a geometric mean of 88 organisms in any set of representative samples, nor shall 10% of the samples exceed 260 organisms
Marine Beaches	*Enterococci* not to exceed a geometric mean of 35 colonies in a statistically significant number of samples, nor shall any single sample exceed 104 colonies
Freshwater Beaches	*Enterococci* not to exceed a geometric mean of 33 colonies of the five most recent samples within the same bathing season, nor shall any single sample exceed 61 colonies OR *E. coli* not to exceed a geometric mean of 126 colonies of the five most recent samples within the same bathing season, nor shall any single sample exceed 235 colonies

Source: MassDEP, 2007

3.0 Best Management Practices

Stormwater best management practices (BMPs) are techniques, measures, or structural controls used to manage the quantity and improve the quality of stormwater runoff. This watershed-scale stormwater management plan evaluates management strategies, including BMPs that allow systematic implementation to cost-effectively achieve water quality goals. The management strategies are described as follows:

1. **Non-structural BMPs**
   Non-structural BMPs are institutional, educational, or pollution prevention practices designed to limit the generation of stormwater runoff or control the sources of pollutants contained in the runoff. Some examples include illicit discharge detection and elimination (IDDE) programs, street sweeping, and catch basin cleaning.

2. **Distributed structural BMPs**
   Distributed BMPs consist of individual structural BMPs installed in suitable areas to treat runoff from individual parcels. Examples include rain barrels, rain gardens, and dry wells.

3. **Cluster or neighborhood treatment systems**
   A cluster or neighborhood treatment system includes a series of interconnected structural BMPs to treat runoff generated from a large site or neighborhood. The system can be interconnected or linear (e.g., infiltration trenches) alongside the public right-of-ways. Boston's Complete Streets Initiative is a prime example of the use of such a system. A system can be designed to not only treat runoff generated within

the right-of-way but also runoff from abutting properties. One example is to extend the City's Complete Street Initiative in a manner similar to the Central Square green demonstration project.

4. **End of pipe treatment**
   End of pipe treatment is a centralized management strategy that can be cost-effective when applied appropriately. It includes construction of large-scale BMPs such as stream restoration, constructed wetland, dry/wet pond, etc. at or near storm drain outfalls prior to discharging into receiving waters. These types of BMPs typically require large land area to provide adequate removal efficiency.

Evaluation of Structural BMPs

Guidance documents from the Commission, MassDEP, and USEPA BMP technologies were used to identify applicable structural BMPs for implementation within the Commission's MS4. Figure ES-2 shows the structural BMPs ranked based on pollutant removal rates. The results of the structural BMP evaluation provided guidance to the selection of applicable BMPs with the following priority:

1. Infiltration class BMPs have the highest removal efficiency and thus are ranked highest.
2. Porous pavement combines infiltration and storage and performs similarly to some infiltration BMPs.
3. Treatment class BMPs, including bioretention (such as rain gardens, planter boxes, tree pits, media filters, gravel wetlands, and wet ponds), perform moderately well for total phosphorus and pathogen removal. They can be implemented on sites with various soil and groundwater conditions.

BMPs with conveyance as its main function are ranked lowest for water quality improvement purposes.

FIGURE ES-2
BMP Classification and Ranking Based on Pollutant Load Removal Efficiency

MassDEP BMP Class	Structure BMP	[1]TP Removal	[2]Pathogen Removal	[3]Combined Removal
Infiltration	Infiltration Basin			
Infiltration	Infiltration Trench			
Infiltration	Subsurface Structures			
Infiltration	Dry Well			
Infiltration	Leaching Catch Basins			
Other	Porous Pavement			
Treatment	Bioretention			
Treatment	Tree Pit			
Treatment	Media Filter			
Treatment	Gravel Wetland			
Treatment	Wet Pond			
Conveyance	Swale			
Treatment	Dry Pond			
Other	Green Roof			
Other	Rain Barrels			
Other	Cisterns			

NOTES:
1. The total phosphorus removal rates are based on USEPA Region 1's report on numeric performance curves as well as the *Massachusetts Stormwater Handbook*. The scale of the bar represents 0 to 100 percent removal rate.
2. Pathogen removal rates are based on the *Massachusetts Stormwater Handbook* (MassDEP, 2008).
3. The combined removal efficiency is the sum of the total phosphorus removal efficiency and the value applied for pathogen removal efficiency. The scale of the bar represents 0 to 100 percent removal rate.

Decisions on which high priority BMPs to implement are based on site-specific considerations as well as their pollutant removal efficiency for targeted TMDLs. The site conditions that were considered as part of this BMP implementation analysis include land use, soil properties, and depth to the groundwater table. Examining the various site conditions found in the Commission's watersheds resulted in a list of 10 BMP implementation categories, as listed in Table ES-4. Each BMP category was assigned the best-suited high-priority BMP to achieve maximum pollutant load reduction based on the land use and site conditions. By essentially placing every parcel of land and public right of way into one of these 10 categories, the citywide analysis for BMP suitability and effectiveness becomes a manageable modeling task. An advantage to using the BMPs listed in Table ES-4 is that these BMPs are able to be simulated explicitly by BMP type in the hydraulic model using the low impact development (LID) modules.

TABLE ES-4
Summary of BMP Categories

BMP Category #	Land use	Groundwater Depth	HSG Soil Type	Priority BMP	SWMM LID
1	Others	> 6 feet	A/B	Infiltration Class BMPs	Infiltration
2			C/D/Unknown	Treatment Class BMPs	Bioretention Cell
3		< 6 feet	A/B/C/D/Unknown	Treatment Class BMPs	Bioretention Cell
4	Commercial, Industrial & Institutional	> 6 feet	A/B	Infiltration Class BMPs	Infiltration
5			C/D/Unknown	Treatment Class BMPs	Bioretention Cell
6		< 6 feet	A/B/C/D/Unknown	Treatment Class BMPs	Bioretention Cell
7	Parking Lots	> 6 feet	A/B/Unknown	Porous Pavement	Porous Pavement
8	Residential	> 6 feet	A/B	Dry Well	Infiltration
9			C/D/Unknown	Treatment Class BMPs	Bioretention Cell
10		< 6 feet	A/B/C/D/Unknown	Rain Barrel/Cistern	Rain Barrel/Cistern

4.0 BMP Suitability Analysis

A GIS-based analysis was performed within the Commission's MS4 storm drain area to determine site suitability for implementation of high-priority BMPs. As illustrated in Figure ES-3, the BMP suitability analysis first identified criteria for quantifying BMP site suitability, and then used a criteria weighting and scoring process that quantitatively evaluated sites to determine suitability for implementation of structural BMPs.

FIGURE ES-3
Development of BMP Suitability Categories



Site suitability criteria were developed and scoring categories were defined on a scale from 1 to 5. The suitability analysis was performed separately for public right-of-ways (PROWs), non-residential, and residential areas within the Commission's MS4 to emphasize their unique considerations for implementing BMPs. For the three different areas, distinctive criteria and weighting factors were applied to evaluate BMP suitability, as shown in Table ES-5.

Composite scores for individual parcels of land and PROWs were calculated based on the criteria weightings and individual criteria scores. Based on composite scores, all potential BMP sites (streets and land areas) were placed into one of four BMP suitability categories: suitable, possible, unlikely, or not feasible. The geospatial distribution of the resulting site suitability categories is shown in Figures ES-4 and ES-5 for PROWs, non-residential areas, and residential areas (with the latter two areas combined for illustration). Note that sewer separation occurring after December of 2012 was not considered at the time of this analysis. However, these will be considered in future updates to the BMP implementation plan.

TABLE ES-5
BMP Site Suitability Criteria and Weights

	Criteria Weighting		
BMP Implementation Suitability Criteria	**PROWs**	**Non-Residential Areas**	**Residential Areas**
Annual TP Load (lb/acre)	10%	15%	10%
Impervious Area (acres/parcel)	N/A	20%	N/A
Hydrologic Soil Group	20%	10%	25%
Terrain (% slope)	20%	20%	10%
Depth to Groundwater (feet)	20%	10%	15%
Land Use	N/A	25%	N/A
Street Type	30%	N/A	N/A
Residential Open Space (acre/parcel)	N/A	N/A	40%

Table ES-6 presents a summary of the results of the BMP site suitability analysis; the total area (for non-residential and residential areas) and miles (for PROWs) for each suitability category is summarized alongside the percentage of the total MS4 area that each category represents.

TABLE ES-**6**
Summary of BMP Site Suitability Analysis Results

	BMP Suitability Category	**Land Area or Miles of Streets**	**Total Area Treated (mile^2)**	**% of Total MS4 Area (37 miles^2)**
PROW	Suitable	177 miles	4.3	12
	Possible	557 miles	13.6	37
	Unlikely	84 miles	2.0	5
Non-residential	Suitable	1,814 acres	2.8	8
	Possible	2,405 acres	3.8	10
	Unlikely	4,175 acres	6.5	18
Residential	Suitable	69 acres	0.1	0.3
	Possible	297 acres	0.5	1.4
	Unlikely	1,858 acres	2.9	7.8
Total	Suitable	177 miles & 1,883 acres	7.2	20.3
	Possible	557 miles & 2,702 acres	17.9	49
	Unlikely	84 miles & 6,033 acres	11.4	31

FIGURE ES-4
BMP Suitability Categories for PROWs in the BWSC MS4

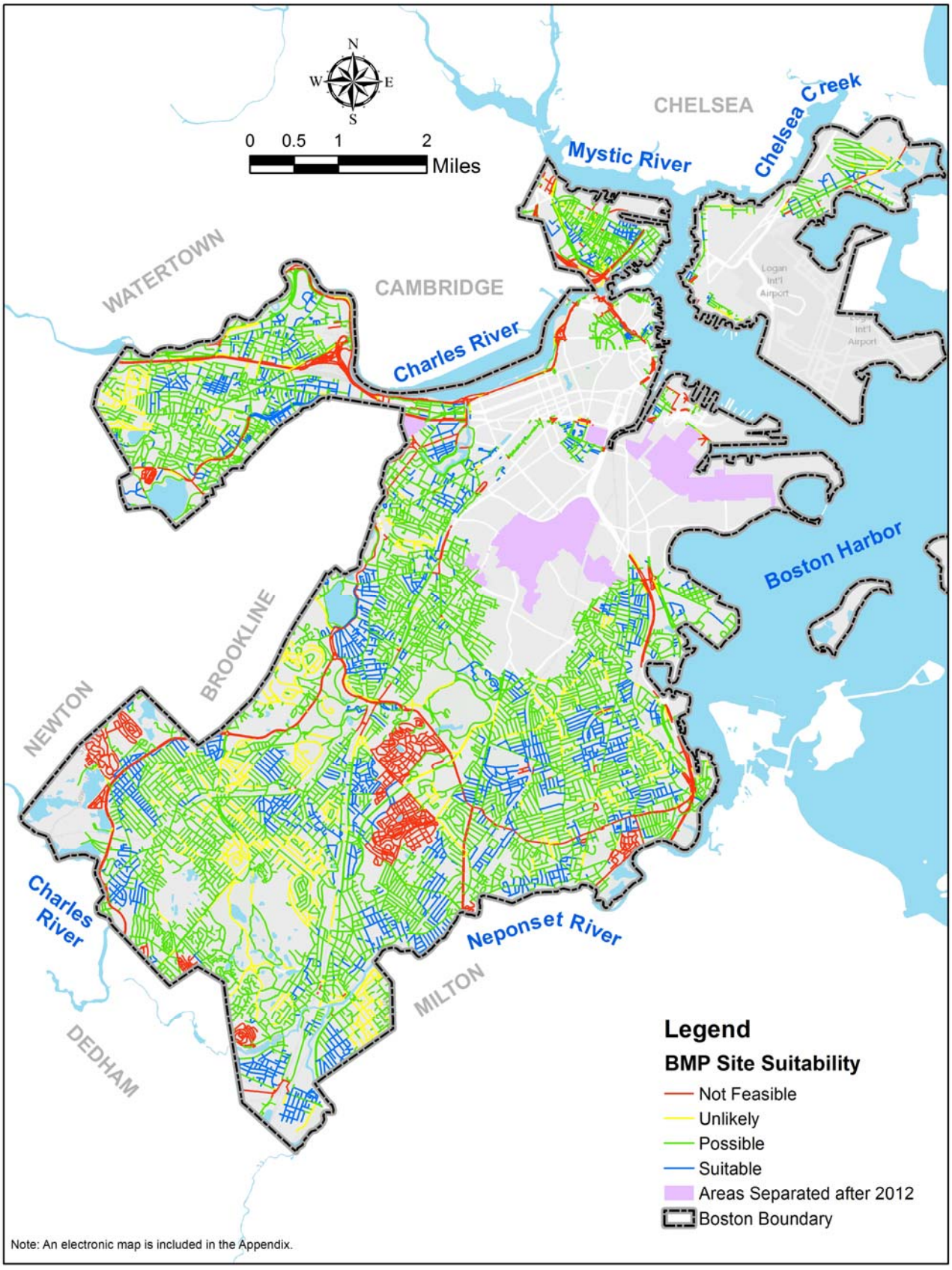
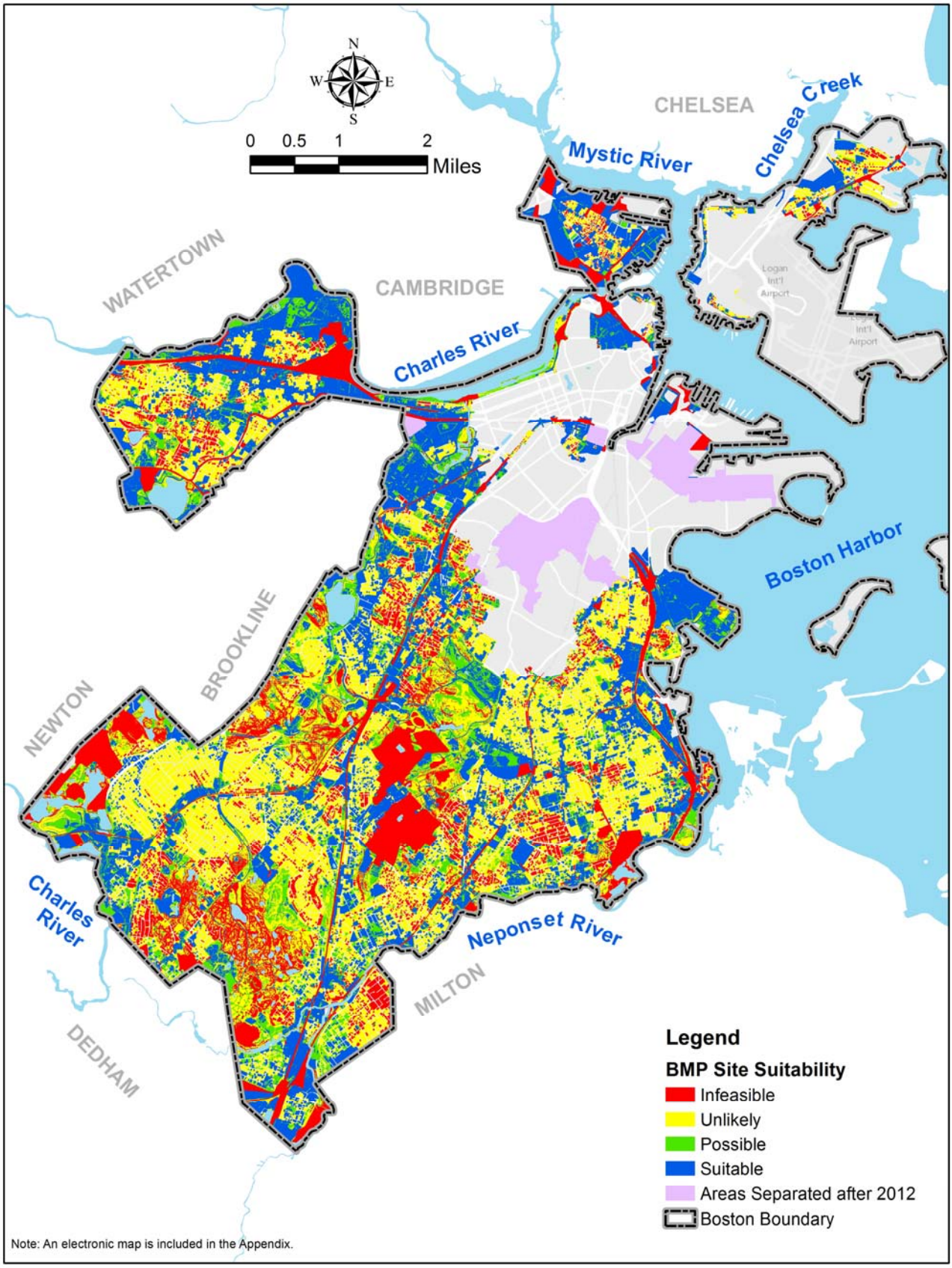


FIGURE ES-5

BMP Suitability Categories in Non-residential and Residential Land Use Areas



5.0 BMP Implementation Plan Scenarios

After establishing potential locations for BMPs through the site suitability analysis, the focus shifted to evaluating *how many* stormwater BMPs to incorporate and *where to focus* implementation efforts in order to meet TMDL requirements at the most efficient cost. A multitude of BMP implementation scenarios were simulated using the Commission's hydraulic model to determine the best BMP implementation scenario for each individual reporting area and ultimately the optimal BMP implementation plan for the MS4 area as a whole. The development and modeling of BMP scenarios are discussed in further detail below.

BMP Implementation Scenarios Development and Refinement

Based on the BMP suitability analysis, scenarios were developed to determine whether TMDL compliance could be achieved at varying levels of BMP implementation within the reporting areas. The process used to evaluate the BMP implementation scenarios is illustrated schematically in Figure ES-6. The process began by developing upper and lower BMP implementation limits for each of the 27 reporting areas. The lower limit is called the base scenario and was developed to form the basis of the program with practices that the Commission has already adopted. The base scenario represents treatment of approximately 5 percent of directly connected impervious area (DCIA) in the Commission's MS4 and includes 85 percent removal of illicit discharges, additional treatment of 1 inch of runoff from impervious surfaces in planned development and redevelopment sites, and 45 miles of PROW BMPs. The upper limit represents the theoretical maximum level of BMP implementation that exhaustively implements BMPs to treat 100 percent of the DCIA in each of the reporting areas. In addition to the components included in the base scenario, the maximum BMP implementation scenario includes:

- BMPs at all public schools to treat 1 inch of runoff from the schools.
- Porous pavement and/or bioretention to treat 1 inch of runoff from all parking lots greater than 10,000 square feet (ft^2).
- BMPs to treat 1 inch of runoff from commercial and industrial land use areas.
- BMPs in approximately 177 miles of street categorized as suitable by the BMP site suitability analysis.
- Any remaining untreated DCIA was assumed to be managed by infiltration and bioretention BMPs to reach 100 percent DCIA treatment.

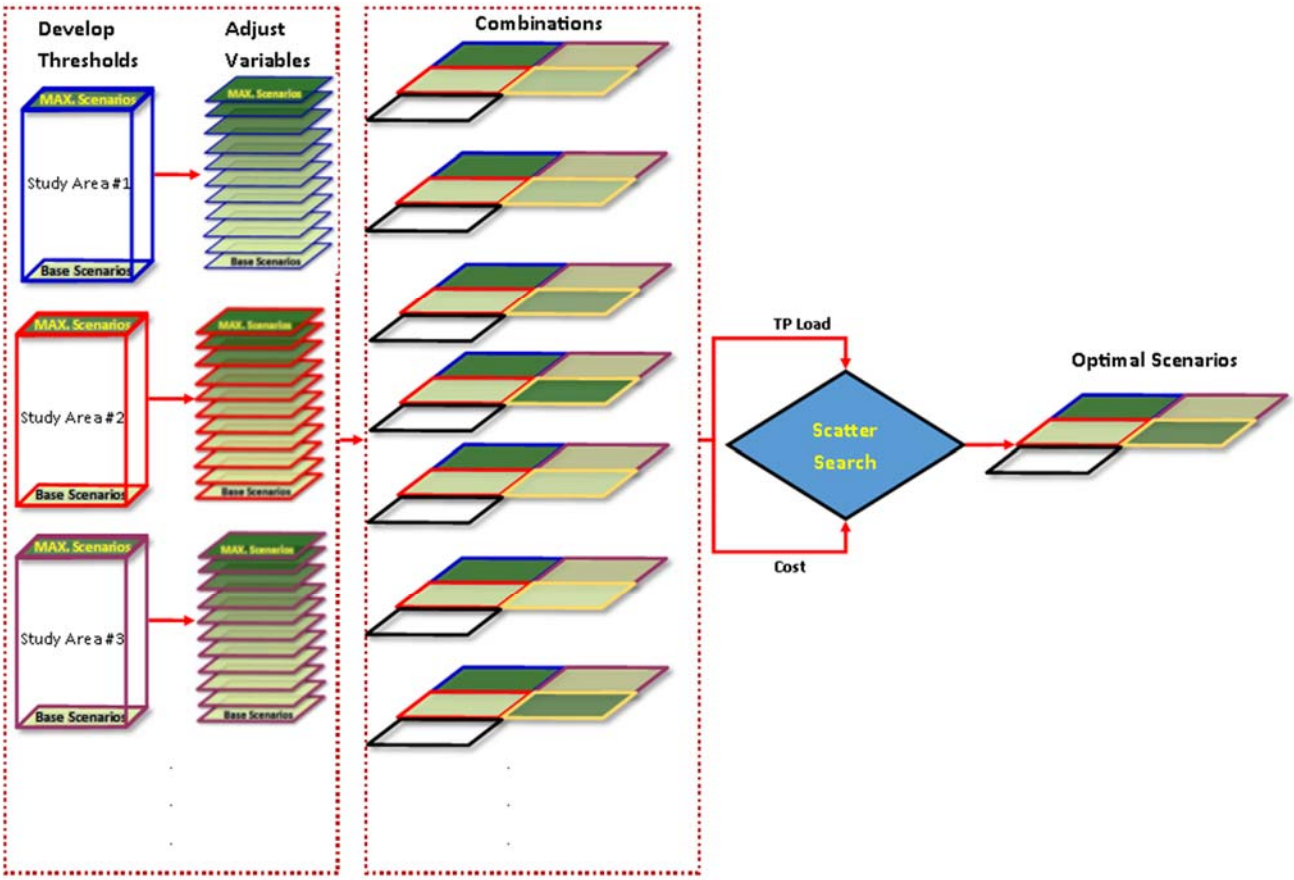
Once the upper and lower BMP implementation thresholds were set for each reporting area, additional implementation scenarios were generated by adjusting the level of BMP treatment at nine incremental intervals between the lower and upper limits. The nine intermediate scenarios were developed by implementing gradually increasing levels of BMPs that fall between the base and maximum BMP implementation scenarios to treat between 10 and 90 percent of the DCIA in each of the study areas.

Including the base and maximum BMP implementation scenarios resulted in 11 core BMP implementation scenarios generated for each of the 27 reporting areas. Additional scenarios were then developed by incorporating end of pipe treatment BMPs (i.e. constructed wetlands) of various sizes into several existing core scenarios. Wetland BMPs were added to the base scenario and the core scenarios up to and including the intermediate scenario that treated approximately 40 percent DCIA. For each implementation scenario where wetlands were added for additional treatment, four wetland treatment scenarios were considered. The four wetland treatment scenarios represent varying levels of water quality volume corresponding to treatment of 0.1, 0.2, 0.4, and 0.5 inches of runoff from their respective tributary DCIAs.

Thirty-one core model scenarios were created for each of the 27 reporting areas. Due to the independent nature of pollutant generation and treatment among the Commission's watersheds, multiple model runs were performed independently and then recombined to efficiently span the entire MS4 area and characterize systemwide behavior for a vast number of BMP implementation scenarios. Myriad BMP implementation scenarios were analyzed using the hydraulic model and post-processed to produce a scatter

graph showing pollutant loading values versus BMP implementation cost. As the goal of this analysis was to find the specific combination of BMPs to meet TMDL requirements at the most efficient cost, the optimal scenario was determined by searching the scatter plot to identify a cost-efficient implementation plan where pollutant loads drop below TMDL requirements.

FIGURE ES-6
Schematic of BMP Implementation Optimization Framework



Modeling Methodology

The Commission's storm drain model was developed in 2007 and calibrated with flow and water quality data in 2012, as described in the *2012 Stormwater Model Report* (CDM Smith, 2012). The 2012 *Stormwater Model Report* was also updated in August of 2014 and September of 2015. The storm drain model uses the computation engine from the USEPA's Stormwater Management Model (SWMM 5) within DHI's MIKE URBAN modeling platform. Buildup and washoff functions are used in the model to simulate pollutant loads to the receiving waterbodies. The pollutant buildup function simulates pollutant accumulations over time for a particular land use by a function of area or curb length. Pollutant washoff from a given land use area occurs during wet weather as a function of runoff. Pollutant removal also occurs in the storm drainage system and is simulated with various empirical decay/die-off functions (i.e., treatment functions in ponds and streams). The annual waste loads are simulated in the SWMM with a series of rainfalls from a representative 3-year period (2007 to 2009) based on measurements from five rain gages owned by the Commission. The waste load reductions from implementation of BMPs were simulated by using SWMM's LID module, similar to the modeling methods used in the 2015 *Stormwater Model Report.*

The hydraulic model was utilized to develop and analyze the BMP implementation scenarios. The first step in setting the model up was to determine areas to be managed by BMPs (i.e., management areas) based on the site suitability analysis and the scenarios developed to treat specific percentages of DCIA. The second step was to categorize the management areas based on the 10 BMP categories identified in Table ES-4. The

final step was to select and size priority BMPs (Figure ES-2) with the highest pollutant removal rates to apply to each of the categorized BMP management areas. SWMM allows users to explicitly simulate constructed wetlands with nodes and links representing its storage and treatment capabilities.

BMP Implementation Cost Estimates

Cost estimates for the individual BMP implementation scenarios were needed to determine the most cost effective scenario that will meet TMDL requirements. The development of a unit cost estimate included two components: identifying unit construction cost of BMPs and establishing life-cycle costs. The construction cost and life-cycle cost estimates were used to provide stormwater BMP program stakeholders with order-of-magnitude program costs to allow for evaluation of the implementation scenarios.

The unit construction costs from ongoing green infrastructure programs for other communities (Onondaga County, New York and Lancaster, Pennsylvania) and recent City of Boston BMP construction bid prices were relied upon to develop the unit costs for the bioretention, infiltration trench, porous paving, and constructed wetland BMPs. The unit construction costs were adjusted to account for the locational and temporal differences. The estimate was prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International for a Class 5 cost estimate.

The BMP life-cycle costs were estimated for a 30-year period of use. The life-cycle cost takes into account the unit construction costs, routine and non-routine maintenance costs, and a replacement cost. A summary of BMP construction costs and life-cycle costs for the main types of BMPs that were used in the analysis is provided in Table ES-7. Appendix B explains the cost estimate in more detail.

TABLE ES-7
Summary of BMP Construction and Life-Cycle Cost Estimates (cost per acre managed)

BMPs Implementation Cost Estimates	Bioretention	Infiltration	Porous Pavement	Constructed Wetland	Drywell
Construction Cost Year 2015[1]	$269,134	$210,998	$291,349	$97,688	$51,000
Life-Cycle Cost with Replacement[2]	$891,837	$562,902	$826,962	$337,987	n/a

[1] Construction costs are presented as cost per acre managed.

[2] Life-Cycle Costs = Present Value Cost of (Construction Costs + O&M Costs + Replacement Costs)

6.0 Evaluation of BMP Implementation Scenarios

This section summarizes the performance metrics of the 31 core scenarios for each reporting area as related to the pathogen and nutrient TMDLs and describes the methodology for determining the optimal BMP implementation plan.

Scenario Results: Pathogen

Table ES-8 summarizes the pathogen loads (in terms of average annual geometric mean) and the percentage of time the pathogen waste load exceeds the TMDL requirements for the existing conditions, the base implementation scenario, and the maximum implementation scenario. Pathogen loads for each of the reporting areas are significantly reduced from the existing conditions to the base implementation scenario. However, treating 100 percent of DCIA (i.e., the maximum scenario) only marginally improves pathogen loads in terms of percentage of time meeting the TMDL requirement relative to the results of the base scenario. These results reflect technological limitations in both the physical and modeling domains:

- **Physical domain limitations** are related to storm drain system conditions including illicit connections of sanitary sewage to the storm drain system and the urban environment. Illicit connections contain high concentrations of pathogens (7,100,000 CFU/100 mL *F. Coli*.) versus the observed stormwater runoff median pathogen concentration of 9,000 CFU/100 mL during wet weather (CDM Smith, 2015). Urban

development adversely impacted the surrounding environment and altered formerly meandering streams into enclosed drainage conduits. Subsequently, the natural assimilation of pathogens in a healthy stream ecosystem through the disinfecting function of penetrating sunlight was lost when the open streams became enclosed conduits.

- **Model domain limitations** are due to functional limitations of the SWMM LID module, which is not able to simulate pollutant removal directly through BMPs. Instead, it computes pollutant removal by flow volume reduction and has no means to account for a decrease in concentration, which is how the pathogen TMDLs are defined. This means that as long as there are flows entering the storm drainage system, pathogen concentrations remain the same, regardless of whether or not the flow passed through a BMP. In addition, the model applies a bacteria growth function to each enclosed conduit. With the existing modeling structure, it is impossible to simulate a scenario that would achieve TMDL goals unless the model were to define all runoff flows as containing zero bacteria and all illicit connections are eliminated in the modeling platform.

TABLE ES-8
Summary of Pathogen Loads

	Existing Conditions		Base BMP Implementation Scenario		Maximum BMP Implementation Scenario	
Scenarios	***Bacteria Count (CFU / 100mL)**	**% Time Exceeding 400 CFU / 100mL**	***Bacteria Count (CFU / 100mL)**	**% Time Exceeding 400 CFU / 100mL**	***Bacteria Count (CFU / 100mL)**	**% Time Exceeding 400 CFU / 100mL**
Stony Brook	10,287	91%	2,708	91%	2,144	91%
Muddy River	42,241	91%	8,059	91%	6,800	91%
Faneuil Brook	12,682	91%	3,058	91%	2,210	91%
Other Lower Charles	**9,872**	91%	1,951	90%	1,677	89%
Lower Charles Subtotal	**11,385**	**91%**	**2,306**	**90%**	**1,938**	**90%**
Saw Mill Brook	36,521	91%	8,743	86%	6,011	86%
West Roxbury	35,631	90%	3,875	83%	3,583	81%
Upper/Middle Charles Subtotal	**7,215**	**91%**	**1,262**	**85%**	**959**	**84%**
Neponset River	**17,649**	**91%**	**2,408**	**89%**	**1,737**	**88%**
Boston Harbor	**38,705**	**91%**	**5,421**	**90%**	**5,237**	**90%**

* Bacteria count values presented are the average annual geometric mean calculated from modeling results

Appendix A lists existing condition pathogens and other pollutant loads for all reporting areas and SDO catchments, while Appendix C tabulates these results for all 31 core scenarios (including the Base and Maximum implementation levels summarized in Table ES-8).

Based on the technical limitations related to pathogen TMDLs discussed above and the modeling results shown in Table ES-8, implementation of stormwater BMPs will not achieve the required pathogen removal rates to meet the TMDLs. Due to these limitations it is recommended that the optimal BMP implementation plan be developed based on the total phosphorus loads in the Charles River watersheds. Since there are currently no nutrient TMDLs for the Neponset River and Boston Harbor watersheds, it is recommended that the base BMP scenario be implemented in these two watersheds to allow for some level of pollutant reduction to the receiving waters. This approach would allow the Commission to start an iterative process of

implementing BMPs followed by collecting performance data that will allow for the Commission to gain more direct knowledge of pollutant load conditions and BMP effectiveness for pathogen removal during the early stages of the BMP implementation program.

Scenario Results: Total Phosphorous

Table ES-9 summarizes the total phosphorus load results of the model simulations with the Upper/Middle and Lower Charles River basins further broken down by reporting areas. The Neponset River and Boston Harbor watersheds are not broken down into smaller reporting areas. Although there is currently no nutrient TMDL for the Neponset River and Boston Harbor watersheds, total phosphorus load reductions were evaluated in these areas and are summarized in Table ES-9.

Overall, constructed wetlands were found to be highly effective in removing total phosphorus when placed near the storm drain outfall, even for relatively low design water quality volumes. This high level of effectiveness is mainly due to the capability of wetlands to treat runoff with relatively high pollutant concentrations during smaller storms (less than 0.5-inch storm events). Since constructed wetlands are limited by spatial constraints, the use of other types of structural BMPs might be necessary to meet water quality objectives upon gathering new information during future, more detailed site assessments (e.g. discovering a critical, immovable asset is buried within the prospective wetland site). The scenarios discussed in the results of this report incorporate both upstream green infrastructure BMPs and downstream constructed wetlands (where possible).

Lower Charles River Watershed

In Table ES-9 the Charles River watersheds' total phosphorus loads are highlighted in green when the scenario meets waste load allocations designated to the specific reporting area. Both Newton and Brookline discharge portions of their stormwater into the Lower Charles River via the Commission's storm drain system or natural waterbody flowing through the Commission's storm drain system or a natural water body. For this analysis it was assumed that pollutant loads from upstream communities would meet their respective TMDL requirement before entering the Commission's MS4 boundaries. This assumption is reflected in Table ES-9 with the Brookline and Newton reporting areas highlighted in blue. The Lower Charles River has specific WLAs (lb/year) assigned to 4 watersheds (refer to Table ES-2); these watersheds are further broken down into smaller reporting areas. As shown in Table ES-9, the pollutant loads from the individual reporting areas were added together to determine the total pollutant load to the watersheds that are regulated by TMDLs.

In the Lower Charles River watershed, the combined total phosphorus load meets the TMDL at Scenario 4.1. This is mainly due to the large reduction achieved in the Stony Brook watershed. The Muddy River watershed does not meet the total phosphorus TMDL even with 100 percent of its DCIA managed by BMPs with high total phosphorus removal rates. The underachieved pollutant removal conditions associated with the model simulations are most likely due to the limitations of the USEPA SWMM LID module and total phosphorus loads from illicit discharges.

Upper/Middle Charles River Watershed

In Table ES-9 the Charles River watersheds' total phosphorus loads are highlighted in green when the scenario meets waste load allocations designated to the specific reporting area. The total phosphorus TMDL for the Upper/Middle Charles River watershed was based on percentage reductions for specific land uses- 32 percent reduction for Sawmill Brook and 42 percent reduction for West Roxbury. In the West Roxbury study area, BMP implementation Scenario 1.2 (i.e., the base implementation scenario plus constructed wetland treatment for 0.2" of runoff at the end of the storm drain pipe) meets the TMDL, while Sawmill Brook meets its TMDL reduction requirement with Scenario 3. Based on the combined total phosphorus load reduction in the Upper/Middle Charles River watershed, total phosphorus TMDL compliance could also be achieved by implementing Scenario 1.5 for both Upper/Middle Charles reporting areas (rather than piecing together the two individual total phosphorus loads).

TABLE ES-9

Summary of Total Phosphorus Waste Load for 31 Core BMP Implementation Scenarios of Charles River Watershed

Scenario ID	West Roxbury	Sawmill Brook	**Upper Charles Total**	Upper Stony	Canterbury Brook	Roslindale Branch	Bussey Brook Boston	Bussey Brook Brookline	Goldsmith Brook	Lower Stony	**Stony Brook Total**	Village Brook Boston	Village Brook Newton	Village Brook Brookline	Other Muddy River Boston	Other Muddy River Brookline	**Muddy River Total**	Faneuil Brook Boston	Faneuil Brook Newton	**Faneuil Brook Total**	Shepard Brook	Smelt Brook Boston	Smelt Brook Brookline	Allston-Brighton Boston	Allston-Brighton Brookline	Millers River	**Other Lower Charles Total**	**Lower Charles Basin Total**	**Neponset River Total**	**Boston Harbor Total**	**Grand Total**
WLA	180	469	649								4,300						1,300			275	226[2]	283[2]	35[2]	186[2]	4[2]	146[2]	879[2]	6,754	-	-	-
0[1]	309	690	999	610	2,820	837	128	19	295	1,809	6,520	900	112	492	2,178	326	4,008	955	36	991	595	744	91	490	10	384	2,313	13,832	5,504	6,675	27,010
1	229	503	731	422	1,313	433	90	12	198	927	3,396	612	36	157	1,425	104	2,335	570	10	580	445	596	35	273	4	306	1,657	7,968	2,729	4,756	16,184
1.1	192	503	694	422	1,313	433	90	12	198	927	3,396	612	36	157	1,364	104	2,274	570	10	580	363	596	35	258	4	306	1,560	7,810	2,729	4,756	15,989
1.2	178	503	681	422	1,313	433	90	12	198	927	3,396	612	36	157	1,349	104	2,258	570	10	580	333	596	35	254	4	306	1,527	7,761	2,729	4,756	15,927
1.4	149	503	652	422	1,313	433	90	12	198	927	3,396	612	36	157	1,315	104	2,225	570	10	580	269	596	35	246	4	306	1,455	7,656	2,729	4,756	15,793
1.5	140	503	642	422	1,313	433	90	12	198	927	3,396	612	36	157	1,304	104	2,213	570	10	580	248	596	35	243	4	306	1,431	7,620	2,729	4,756	15,748
2	216	473	689	411	1,264	396	87	12	191	929	3,290	597	36	157	1,389	104	2,283	544	10	554	425	578	35	265	4	299	1,606	7,733	2,611	4,590	15,623
2.1	186	473	659	411	1,264	396	87	12	191	929	3,290	597	36	157	1,334	104	2,228	544	10	554	346	578	35	251	4	299	1,513	7,585	2,611	4,590	15,445
2.2	173	473	646	411	1,264	396	87	12	191	929	3,290	597	36	157	1,319	104	2,213	544	10	554	318	578	35	247	4	299	1,481	7,539	2,611	4,590	15,386
2.4	145	473	618	411	1,264	396	87	12	191	929	3,290	597	36	157	1,289	104	2,183	544	10	554	257	578	35	240	4	299	1,413	7,440	2,611	4,590	15,259
2.5	135	473	608	411	1,264	396	87	12	191	929	3,290	597	36	157	1,279	104	2,173	544	10	554	237	578	35	237	4	299	1,390	7,407	2,611	4,590	15,217
3	206	446	652	395	1,210	377	83	12	182	917	3,176	580	36	157	1,354	104	2,232	520	10	530	404	561	35	257	4	293	1,554	7,492	2,506	4,465	15,115
3.1	177	446	624	395	1,210	377	83	12	182	917	3,176	580	36	157	1,301	104	2,178	520	10	530	329	561	35	244	4	293	1,466	7,350	2,506	4,465	14,945
3.2	165	446	611	395	1,210	377	83	12	182	917	3,176	580	36	157	1,287	104	2,164	520	10	530	302	561	35	241	4	293	1,436	7,306	2,506	4,465	14,888
3.4	138	446	584	395	1,210	377	83	12	182	917	3,176	580	36	157	1,257	104	2,134	520	10	530	245	561	35	233	4	293	1,371	7,211	2,506	4,465	14,767
3.5	129	446	575	395	1,210	377	83	12	182	917	3,176	580	36	157	1,247	104	2,124	520	10	530	226	561	35	231	4	293	1,349	7,180	2,506	4,465	14,726
4	196	421	618	378	1,157	359	79	12	175	901	3,062	563	36	157	1,320	104	2,181	497	10	507	384	543	35	250	4	287	1,502	7,252	2,400	4,337	14,607
4.1	169	421	590	378	1,157	359	79	12	175	901	3,062	563	36	157	1,267	104	2,128	497	10	507	312	543	35	237	4	287	1,419	7,116	2,400	4,337	14,443
4.2	157	421	578	378	1,157	359	79	12	175	901	3,062	563	36	157	1,254	104	2,114	497	10	507	287	543	35	234	4	287	1,390	7,074	2,400	4,337	14,389
4.4	131	421	553	378	1,157	359	79	12	175	901	3,062	563	36	157	1,225	104	2,085	497	10	507	233	543	35	227	4	287	1,329	6,983	2,400	4,337	14,273
4.5	123	421	544	378	1,157	359	79	12	175	901	3,062	563	36	157	1,215	104	2,076	497	10	507	214	543	35	225	4	287	1,308	6,954	2,400	4,337	14,234
5	187	397	584	362	1,107	341	76	12	167	887	2,952	548	36	157	1,287	104	2,132	475	10	485	362	525	35	242	4	281	1,450	7,019	2,298	4,218	14,119
5.1	187	397	584	362	1,107	341	76	12	167	887	2,952	548	36	157	1,236	104	2,081	475	10	485	295	525	35	231	4	281	1,371	6,890	2,298	4,218	13,990
5.2	187	397	584	362	1,107	341	76	12	167	887	2,952	548	36	157	1,223	104	2,068	475	10	485	271	525	35	228	4	281	1,344	6,850	2,298	4,218	13,950
5.4	187	397	584	362	1,107	341	76	12	167	887	2,952	548	36	157	1,195	104	2,040	475	10	485	220	525	35	221	4	281	1,286	6,764	2,298	4,218	13,864
5.5	187	397	584	362	1,107	341	76	12	167	887	2,952	548	36	157	1,186	104	2,031	475	10	485	203	525	35	219	4	281	1,267	6,735	2,298	4,218	13,835
6	178	375	553	347	1,058	324	72	12	160	872	2,845	533	36	157	1,255	104	2,085	452	10	462	342	508	35	236	4	276	1,400	6,793	2,196	4,103	13,646
7	169	353	523	333	1,011	308	69	12	152	858	2,743	517	36	157	1,225	104	2,039	429	10	439	322	492	35	229	4	270	1,352	6,574	2,093	3,990	13,180
8	161	333	494	319	966	292	66	12	145	844	2,643	502	36	157	1,194	104	1,993	405	10	415	304	476	35	224	4	265	1,306	6,358	1,995	3,880	12,727
9	152	315	467	305	922	276	62	12	139	832	2,548	487	36	157	1,162	104	1,947	382	10	392	286	460	35	218	4	260	1,263	6,150	1,901	3,773	12,291
10	145	297	442	292	880	261	60	12	132	819	2,456	473	36	157	1,134	104	1,904	360	10	370	269	445	35	213	4	255	1,221	5,951	1,812	3,666	11,871
11	136	280	416	280	838	247	57	12	125	806	2,365	458	36	157	1,106	104	1,861	339	10	349	253	430	35	208	4	250	1,180	5,755	1,721	3,561	11,454

Notes:

[1] Existing pollutant load based on most recently updated stormwater model by the Commission

[2] Extrapolated based on a required 62% reduction of the total existing waste load

Legend

(green) Total phosphorus load is less than or equal to the WLA for the reporting area for that scenario

(blue) Reporting area is not part of BWSC's managed storm drain system; the WLAs in these reporting areas are assumed to be met (i.e., TP loads are equivalent to the required WLA) prior to entering the BWSC MS4 area.

7.0 Recommended Implementation Plan

The objective of the BMP implementation analysis was to search for a near-optimal implementation scenario, one that has the most efficient cost while achieving the TMDL target through implementation of BMPs throughout the Commission's MS4. A recommended BMP implementation plan was determined based on model scenario results for total phosphorous loads and BMP implementation scenario life-cycle costs. An optimal scenario was identified for each reporting area and then a master optimal scenario model was developed by combining the individual optimal scenarios of reporting areas into a single model. The master model was run to calculate the pollutant loads for the overall optimal scenario.

For an example of how the results of the modeling effort were utilized refer to Figures ES-7 and ES-8, which demonstrate how the BMP scenarios were analyzed and how the optimal scenario was selected. The optimization results for the Lower Charles River and West Roxbury reporting areas are shown on Figures ES-7 and ES-8. The scatter plot of the Lower Charles River watershed encompasses more than a million scenarios that combine reporting areas with various BMP implementation levels. The vertical red line in the figures marks the total phosphorus load threshold where the TMDL will be met if the scenarios are located on or at the left side of the line. The near-optimal scenarios arrive in the region where the lower edge of the data set (cost versus total phosphorus load) intersects the TMDL threshold line.

FIGURE ES-7
BMP Optimization Results for Lower Charles River Watershed

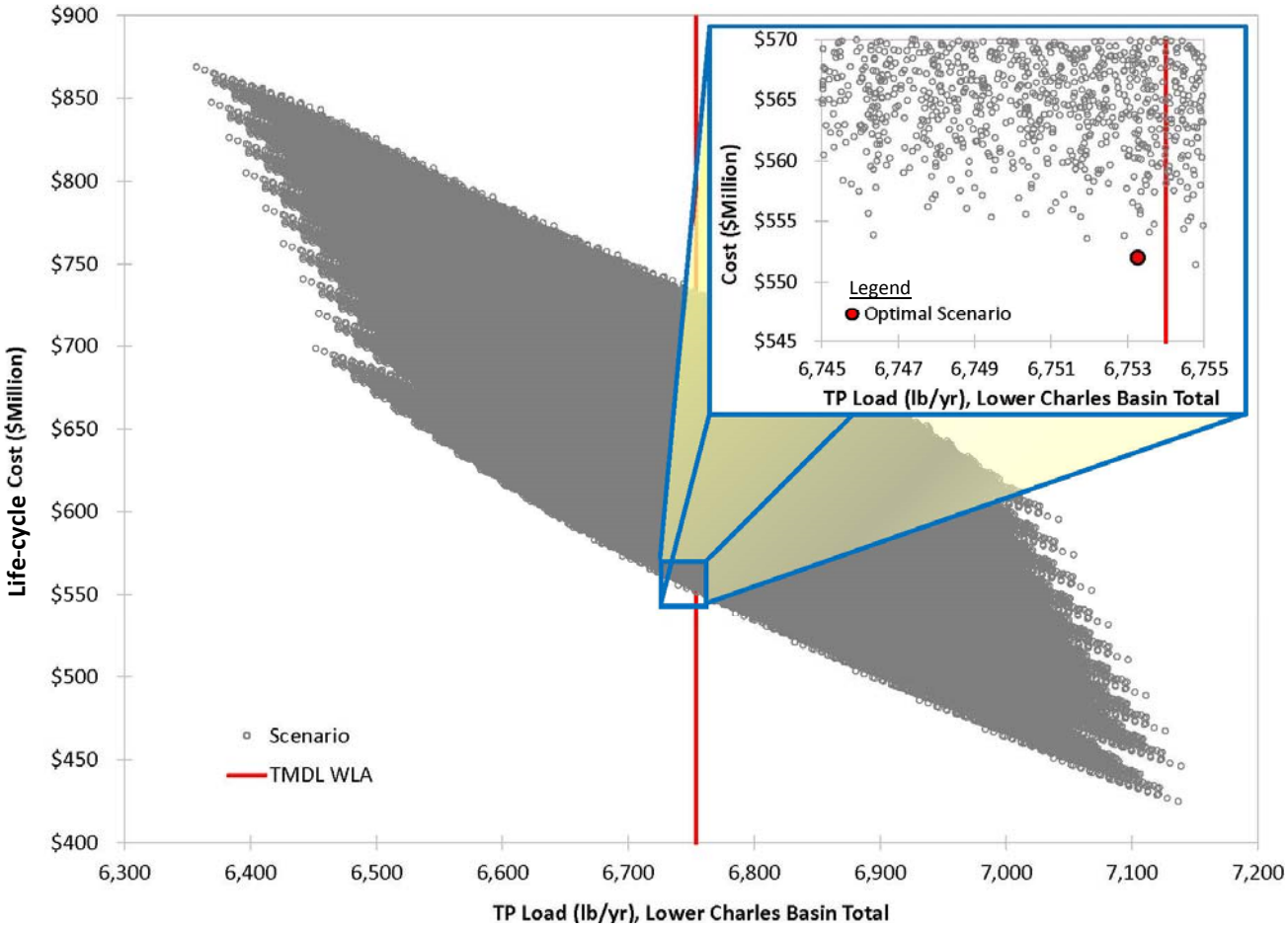
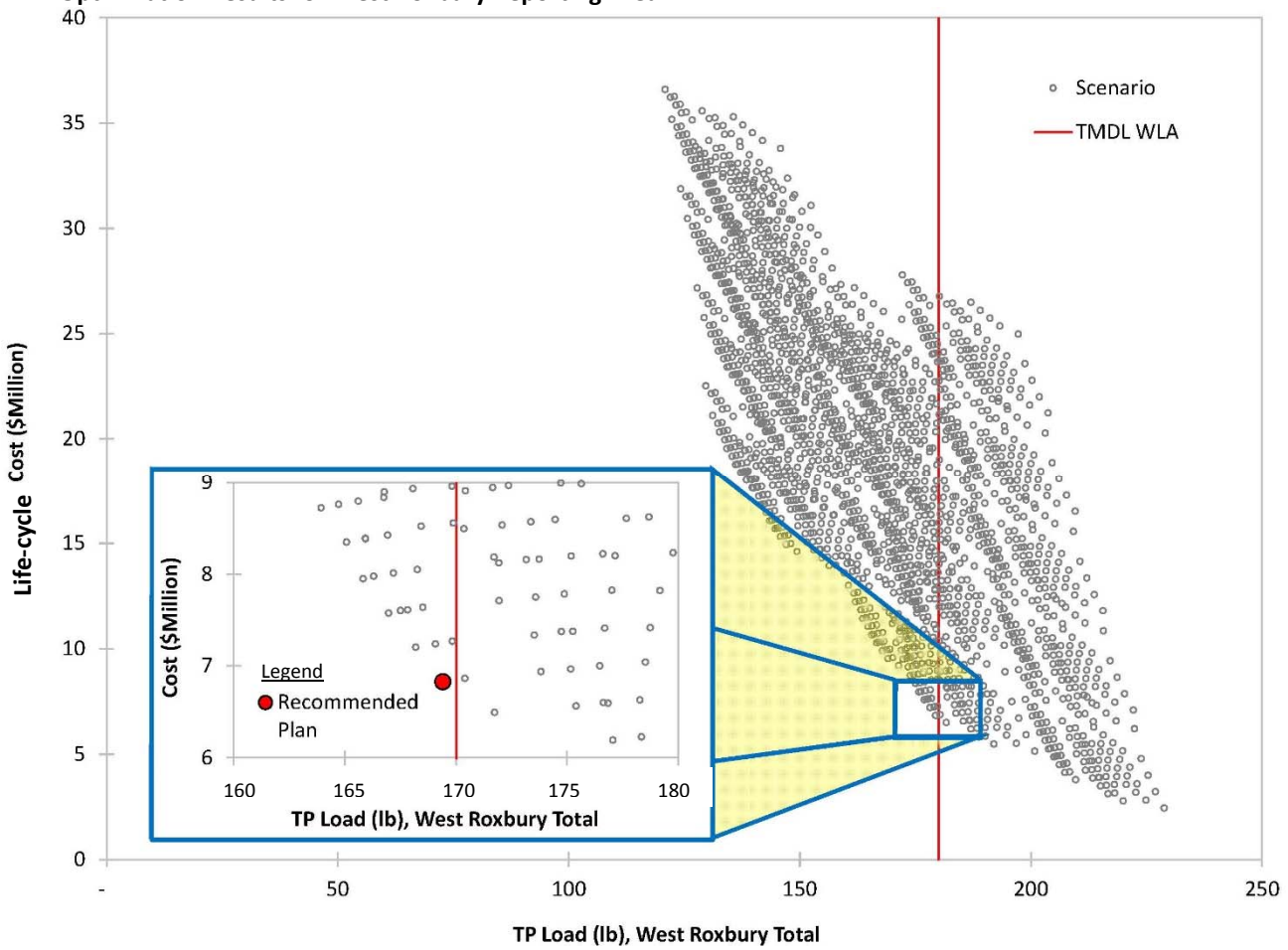


FIGURE ES-8
BMP Optimization Results for West Roxbury Reporting Area



Based on the optimization results, a recommended plan is identified for each reporting area in the Commission's watersheds; these results are shown geospatially on Figure ES-9. The recommended BMP implementation plan meets the total phosphorus TMDL allocated for the Commission's MS4 in both the Upper/Middle Charles River and the Lower Charles River watersheds. Although there is no total phosphorus TMDL for the Neponset River or Boston Harbor watersheds the recommended BMP implementation plan does result in total phosphorus load reductions in these areas as well.

In the Upper/Middle Charles River watershed, the West Roxbury and Sawmill Brook reporting areas meet their percentage based TMDL reduction requirements. The majority of the recommended BMPs in these two reporting areas are infiltration and bioretention types. The total life-cycle cost for the Upper/Middle Charles River is approximately $23 million.

In the Lower Charles River watershed, the optimal implementation scenario includes a high level of implementation in the Allston-Brighton neighborhood, including the Faneuil Brook, Shepard Brook, Smelt Brook, and Allston-Brighton reporting areas. The largest total phosphorus load and percentage reduction is for the Stony Brook reporting areas, which remove approximately 54 percent of total phosphorus. Although some of the reporting areas in the Lower Charles River watershed do not meet the specified TMDL, the total phosphorus load from the entire watershed meets the aggregate TMDL target for the Lower Charles River. The Commission can achieve the aggregate TMDL load reduction goal largely due to higher reductions in the Stony Brook reporting areas. The estimated life-cycle cost for implementation of the optimal scenario in the Lower Charles River watershed is approximately $552 million.

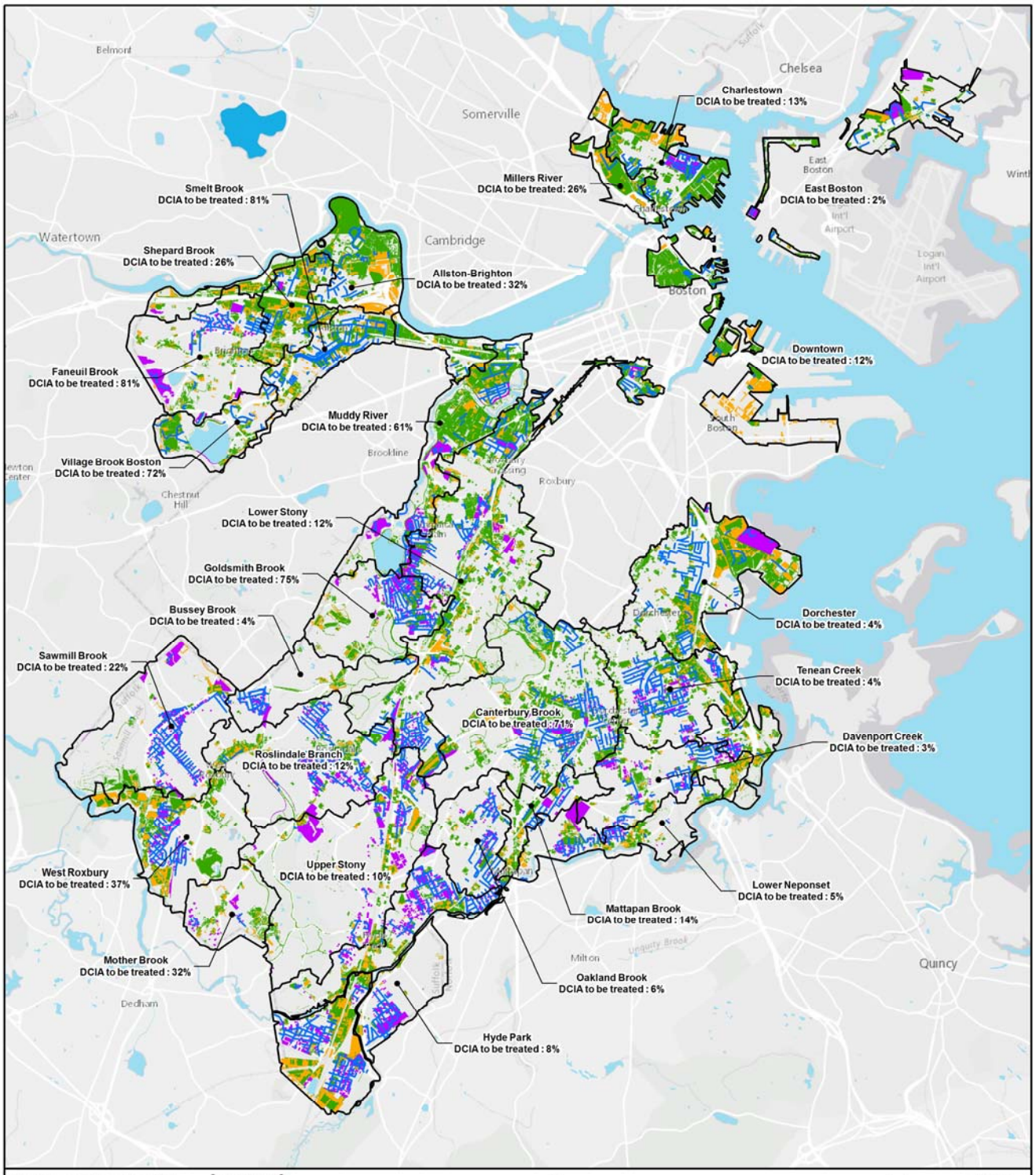
As discussed previously, although significant reduction of the total average annual pathogen loads may be achieved for the Charles River watersheds, Neponset River watershed, and Boston Harbor watershed, none of them will meet the pathogen TMDL requirement with the exception of select subwatersheds that discharge to the Boston Harbor. As discussed in Section 5.0, this is mainly due to technological limitations in both the physical and modeling domains.

In developing a citywide BMP implementation plan it is prudent to consider the costs versus benefits, implement an adaptive approach to set a tangible target initially, and then adjust the plan to achieve the ultimate goal of attaining designated uses of the water bodies. Therefore, it is recommended to develop a BMP implementation plan based on the total phosphorus loads in the Charles River watersheds and start with base level BMP implementation in the Neponset River and Boston Harbor watersheds, and monitor pathogen load conditions as the program progresses. Notwithstanding a lack of TMDL, the expectation is that BWSC should implement BMP controls within the Boston Harbor and Neponset River watersheds to reduce pollutant discharges to the maximum extent practicable consistent with BWSC's 1999 NPDES permit. The estimated life-cycle costs for implementation of the base scenario in the Boston Harbor and Neponset River watersheds are approximately $35 million and $42 million, respectively.

A summary of the recommended plan, including total phosphorus loads, BMP implementation costs, and quantity of treated areas, is shown in Table ES-10. Appendix D tabulates pollutant loads under the recommended BMP implementation plan for every SDO catchment.

FIGURE ES-9

Recommended BMP Implementation Plan



Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan. An electronic map is included in the Appendix.

TABLE ES-10

Summary of the Recommended Plan

Watershed	Subwatershed	Reporting Area	Scenario ID	Total Area Treated by BMP Type (ac)						% DCIA Treated	TP Load (lb/yr)	WLA	% TP Reduction (from Existing Conditions[1])	Cost ($M)	
				Infiltration	Bioretention	Drywell	Porous Pavement	Wetland	Subtotal					Life-cycle	Construction
Upper/ Middle Charles River	**Upper/ Middle Charles**	West Roxbury	2.5	14.3	11.3	4.4	3.7	13.0	46.7	37%	169	180	45%	$7	$2
		Sawmill Brook	3	17.8	7.8	4.6	1.4	0.0	31.5	22%	439	469	36%	$16	$6
		Total	-	**32.0**	**19.1**	**9.0**	**5.1**	**13.0**	**78.3**	**29%**	**607**	**649**	39%	**$23**	**$8**
Lower Charles River	**Stony Brook**	Upper Stony	1	7.4	9.8	0.0	0.0	0.0	17.2	10%	409		33%	$12	$4
		Canterbury Brook	8	99.0	78.1	18.4	15.7	0.0	211.2	71%	952		66%	$133	$45
		Roslindale Branch	2	14.3	6.8	2.2	0.3	0.0	23.5	12%	380		55%	$14	$5
		Bussey Brook	1	2.1	0.0	0.0	0.0	0.0	2.1	4%	99		33%	$1	$0
		Goldsmith Brook	7	35.0	8.2	16.4	5.7	0.0	65.3	75%	146		50%	$31	$12
		Lower Stony	1	24.2	20.3	0.0	0.0	0.0	44.5	12%	1,029		43%	$30	$10
		Subtotal	-	**181.9**	**123.2**	**37.0**	**21.7**	**0.0**	**363.7**	**31%**	**3,015**	**4,300**	**54%**	**$221**	**$76**
	Muddy River	Village Brook	8	22.8	21.6	0.7	3.3	0.0	48.5	72%	684		55%	$33	$11
		Other Muddy River	5.5	29.4	61.2	7.3	1.2	15.5	114.6	61%	1,297		48%	$74	$24
		Subtotal	-	**52.2**	**82.8**	**8.0**	**4.5**	**15.5**	**163.0**	**64%**	**1,981**	**1,300**	51%	**$107**	**$35**
	Faneuil Brook	**Faneuil Brook**	**9**	**56.6**	**60.3**	**16.5**	**2.9**	**0.0**	**136.4**	**81%**	**384**	**275**	**61%**	**$85**	**$28**
	Other Lower Charles	Shepard Brook	1.1	0.6	19.2	0.0	0.0	12.5	32.2	26%	351	226[2]	41%	$21	$6
		Smelt Brook	9	33.4	60.9	0.0	1.2	0.0	95.4	81%	482	318[2]	42%	$69	$22
		Allston-Brighton	1.5	0.0	53.8	0.0	0.0	6.5	60.3	32%	241	190[2]	52%	$37	$11
		Millers River	1	0.1	13.6	0.0	0.0	0.0	13.8	26%	300	146[2]	22%	$12	$4
		Subtotal	-	**90.7**	**207.8**	**16.5**	**4.1**	**18.9**	**338.0**	**70%**	**1,375**	**879[2]**	**41%**	**$138**	**$72**
		Total	-	**324.8**	**413.8**	**61.5**	**30.3**	**34.4**	**864.8**	**37%**	**6,753**	**6,754**	**51%**	**$552**	**$182**
Neponset River		Mother Brook	1	0.5	13.7	0.0	0.0	0.0	14.2	32%	116		51%	$12	$4
		Hyde Park	1	18.1	3.0	0.0	0.0	0.0	21.2	8%	634		38%	$12	$4
		Oakland Brook	1	5.0	0.0	0.0	0.0	0.0	5.0	6%	218		47%	$3	$1
		Mattapan Brook	1	2.9	5.1	0.0	0.0	0.0	8.0	14%	132		54%	$6	$2
		Lower Neponset	1	4.0	1.4	0.0	0.0	0.0	5.3	5%	372		39%	$3	$1
		Tenean Creek	1	6.7	0.8	0.0	0.0	0.0	7.4	4%	814		66%	$4	$2
		Davenport Creek	1	4.3	0.0	0.0	0.0	0.0	4.3	3%	351		36%	$2	$1
		Total	-	**41.4**	**24.0**	**0.0**	**0.0**	**0.0**	**65.4**	**8%**	**2,638**	-	52%	**$42**	**$14**
Boston Harbor		Charlestown	1	0.1	18.7	0.0	0.0	0.0	18.8	13%	1,419		20%	$16	$5
		East Boston	1	0.0	1.6	0.0	0.0	0.0	1.7	2%	765		31%	$1	$0
		Downtown	1	0.0	10.4	0.0	0.0	0.0	10.4	12%	933		37%	$9	$3
		Dorchester	1	0.2	9.8	0.0	0.0	0.0	10.0	4%	1,508		35%	$8	$3
		Total	-	**0.3**	**40.6**	**0.0**	**0.0**	**0.0**	**40.9**	**7%**	**4,625**	-	**31%**	**$35**	**$10**
		Program Total	-	**399**	**497**	**70**	**35**	**47**	**1049**	**26%**	**14,624**	-	**46%**	**$652**	**$215**

Notes:

[1] Existing pollutant load based on most recently updated stormwater model by the Commission

[2] Extrapolated based on a required 62% reduction of the total existing waste load

[3] The total life cycle implementation cost for the MS4 within the Lower Charles River watershed is $552 million. The total program cost of $652 million includes the entire MS4 (Upper/Middle Charles River watershed, Lower Charles River watershed, Neponset River watershed and Boston Harbor watershed).

[4] The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. The recommended plan is intended to provide guidance for more detailed study and field investigations to refine boundaries and site-specific characteristics. Actual field conditions should dictate the implementation of BMPs under the general principals prescribed in the recommended plan.

Recommended BMP Implementation Plan Components

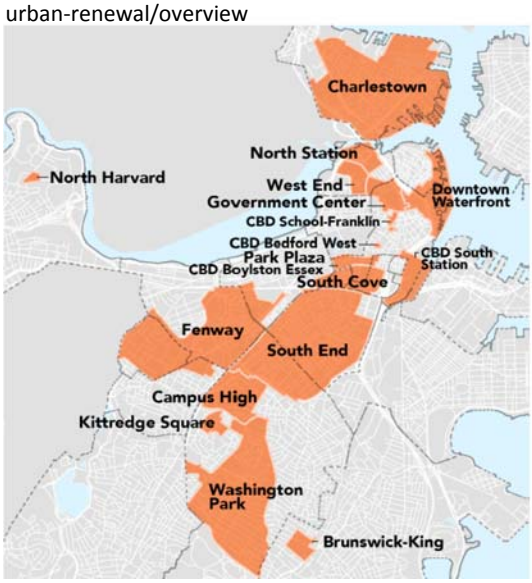
A detailed implementation plan including suitable sites, quantified BMP implementation levels, and specific types/suites of BMPs to be implemented is presented in Appendix E. In summary, the recommended BMP plan includes the following main components:

- Require BMP implementation for pollutant load reduction from future development and redevelopment areas.
  - Currently, the Commission reinforces the BMP implementation requirement for new development and redevelopment projects via its site plan review and approval process. New development and redevelopment projects are required to incorporate priority BMPs with high pollutant removal rates to treat 1 inch of runoff from the site prior to discharging into the Commission's MS4.
  - Other legal/regulatory mechanisms, such as by-laws and ordinances, will be necessary to re-enforce the recommended implementation plan.
  - The Commission will develop standard details for all BMP types and provide guidance to developers on implementing BMPs that will provide the pollutant removals necessary to meet the recommended plan. Currently, the Commission provides developers with its *Stormwater BMP Guidance Document* that is consistent with the MassDEP *Stormwater Handbook*.
  - Key BMP implementation opportunities include large area or cluster developments that are currently in various planning stages. Examples include future developments in the Guest Street area (Figure ES-10) and the Blue Hill Avenue/Cummings Highway station area.
  - Green components should also be promoted as a key aspect in long-term planning efforts. The Boston Redevelopment Authority (BRA) is leading Boston's urban renewal planning effort. Incorporating BMPs in these urban renewal areas, as shown in Figure ES-11, can significantly reduce pollutant loads to its receiving waterbodies.

FIGURE ES-10
Proposed Development in Guest Street Area
Ref: Sasaki Associates, et al., Brighton Guest Street Area Planning Study, March 2012.



FIGURE ES-11
Boston Urban Renewal Study Areas
Ref: ww.bostonredevelopmentauthority.org/planning/urban-renewal/overview



- Significantly reduce pollutant loads from roads and other large impervious areas.

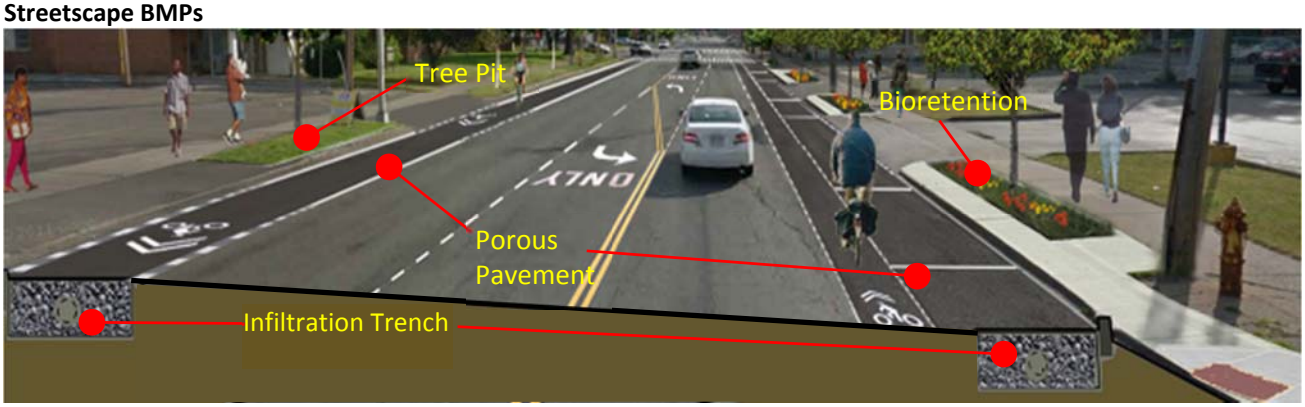
- Partner with MassDOT, the Department of Conservation and Recreation (DCR), and other relevant public agencies so the Commission can focus on major transportation projects and highways such as the I-90 interchanges improvement project and Commonwealth Avenue reconstruction project (Figure ES-12). Incorporate BMPs into these new and retrofit projects properly so they can reduce pollutant loads significantly.

FIGURE ES-12
I-90 Interchange Improvement Project



- Identify large impervious areas for retrofit. The recommended plan identifies large parking lots with areas greater than 10,000 ft^2 that present great BMP opportunities.
- Collaborate with the Boston Transportation Department to expand Boston's Complete Streets Initiative and to further define green design guidelines and emphasize implementation of priority BMPs with high pollutant removal efficiencies. This will also include designing, implementing, and monitoring new designs for green street facilities that effectively attenuate, infiltrate, and treat runoff in the storm drainage area. Many opportunity areas can be strategically planned to include implementation of a neighborhood greenways network to promote reduction of pollutant loads. Figure ES-13 shows an example of incorporating BMPs into a streetscape.

FIGURE ES-13
Streetscape BMPs



- Continue the current illicit discharge detection and elimination (IDDE) program with the intent to eliminate all illicit connections of sanitary sewers to the storm drain system. The illicit discharges are illegal sanitary connections to storm drain pipes, exfiltration from sanitary sewers and laterals, and defects in sanitary sewers and laterals. The Commission is one of the major New England utilities that has been developing and improving its strategies for identifying and eliminating such connections over many years. The methodology developed by the Commission has proven to be effective and has been used by other organizations as a reference program. The Commission has been implementing the program continuously since 1986 through its Citywide Connection Investigation program (CWI), as described in Section 2. It has demonstrated to be very effective by eliminating a large number of illicit discharges in the past. The Commission plans to eliminate all illicit discharges. However, considering the complex nature of the program and evolving development of the city, it is practical to assumed 85 percent removal of illicit discharges based on engineering judgement.

- Coordinate with neighboring towns to protect and/or restore streams' natural assimilation capabilities for water quality improvements. The Muddy River Restoration project is an example of a key opportunity that includes environmental restoration components for a healthy stream ecosystem in addition to providing flood protection for the neighboring areas.
- Retrofit BMPs in public lands. The key strategies for retrofits include:
  - Retrofitting BMPs to treat runoff from public schools. BMPs not only provide significant pollutant load reductions from school sites, but can also serve as public outreach and educational sites. The BMPs can promote stormwater management concepts and the environmental benefits of green approaches toward improving the quality of water in their receiving waterbodies.
  - Implementing BMP retrofits on publically owned land. BMPs can cost-effectively reduce pollutant loads while maintaining or improving the function of the facilities existing in these areas. The publically owned lands to consider for retrofits include open spaces such as parks and recreation areas, vacant parcels, and open areas within the regulated setback spaces of resource areas.
  - Exploring strategic locations for implementation of constructed wetlands at existing storm drain outlets to maximize the cost-effectiveness of pollutant load removal. Currently, a preliminary planning study is underway to explore the potential installation of a constructed wetland treatment system in the Olmsted Park / Daisy Field area in Jamaica Plain.
- Expand public outreach efforts to promote or incentivize implementation of BMPs on residential properties. This includes providing design guides, funding, or other means of incentives to support residential homeowners' BMP projects, including the use of drywells, rain gardens, tree planting, and other sustainable stormwater approaches.

Implementing the Recommended Plan

The recommended BMP implementation plan presented in this report is an optimal solution; in practice the actual number and type of BMPs implemented throughout the commission's MS4 are expected to change from the optimal solution. Many other BMP implementation plans may meet the same nutrient reduction goals, although at a higher cost.

The purpose of this implementation plan is to outline an adaptive management process that identifies immediate implementation activities, as well as a framework for making continued progress in reducing pollutant loads to the Commission's watersheds. To ensure effective implementation of the recommended BMP plan and ultimate compliance with total phosphorus and pathogen TMDLs, a phased approach is recommended to incorporate initial BMP implementation, monitoring, model improvement, and plan revisions.

The implementation schedule consists of three phases over a 30-year period. Each phase adapts to the knowledge obtained from the previous phase(s) via a comprehensive monitoring program and effectiveness evaluations of the completed implementation projects. The implementation plan is illustrated in Figure ES-14.

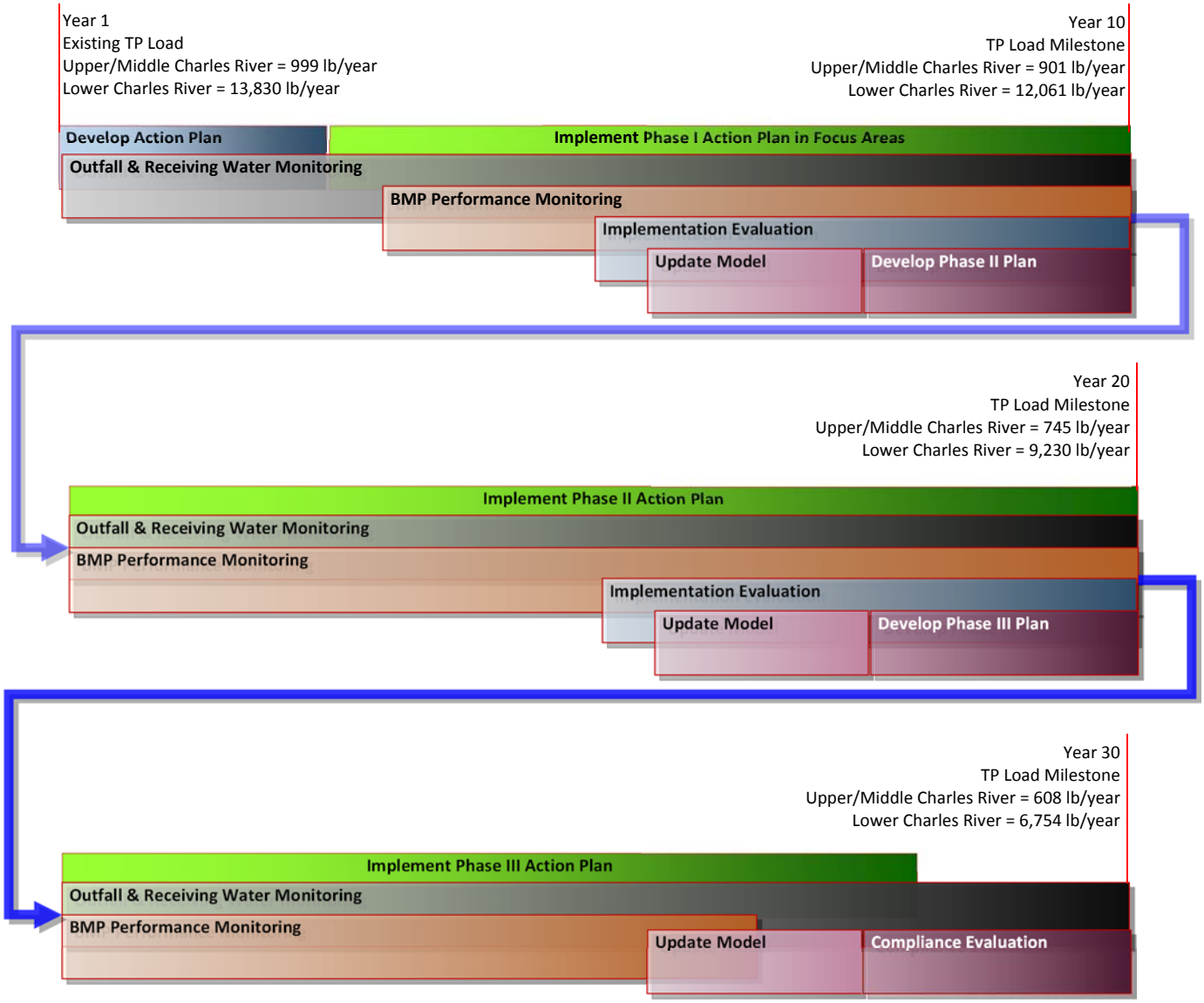
Phase I starts with selecting high-priority catchments (smaller areas within the reporting areas) in which to develop a focused BMP action plan. The individual catchment maps in Appendix E are provided to help locate suitable BMP sites for implementing various types of BMPs based on the large-scale, high-level planning data available as of 2015. The design considerations of section 3.1.2 will aid in selecting appropriate BMP types based on site characteristics. Preliminary designs/studies of the selected areas are needed to further investigate suitable BMP implementation sites based on actual field conditions and to develop an action plan for the design and construction of structural BMPs during the first 10-year period. The action plan provides costs and schedules to be incorporated into the Commission's capital investment planning processes to fund implementation. The goal of Phase I is to achieve 25 percent of the required total phosphorus reduction. The Phase I plan incorporates a comprehensive monitoring program for BMP

performance, storm drain outfall water quality, and receiving water quality. The recommended operation and maintenance (O&M) strategies will also be incorporated into the Commission's operations and maintenance program for planned and existing structural BMPs. Evaluation of implementation effectiveness will start with compiling the BMP monitoring data and preparing the model for updates and calibration. The calibrated model will then be used to estimate the pollutant load conditions and provide a basis for quantitative assessment of the subsequent implementation phases. The Commission will develop a Phase II implementation plan by adjusting various implementation strategies, if deemed necessary based on Phase I results, to achieve optimal cost-effectiveness of BMP implementation. The Phase II plan will adopt the successful strategies from the Phase I implementation period and adjust the implementation plan by incorporating changing regulatory, environmental, and economic conditions.

The second phase of the plan includes continued implementation of structural BMPs systematically throughout the city. The Phase II goal is to achieve 60 percent of required total phosphorus reduction. Monitoring and O&M programs will be updated as necessary to ensure the integrity of the Phase II plan. The stormwater model will be calibrated and validated as necessary in all or parts of the MS4 area based on the monitoring data. Using the calibrated model, the Commission will evaluate pollutant loading conditions at the end of Phase II and estimate the required pollutant load reduction needed to comply with Consent Decree requirements for the Phase III implementation plan.

The end goal of the Phase III implementation plan is to meet Consent Decree requirements by completing the implementation of the recommended BMPs and achieve 100 percent of the required total phosphorus reduction by the end of the last 10-year period. The projected total phosphorus loads are 608 pounds per year (lb/year) and 6,754 lb/year for the Upper/Middle Charles River watershed and the Lower Charles River watershed, respectively. Although there is no total phosphorous TMDL for the Neponset River nor Boston Harbor, base level BMP implementation would result in projected total phosphorous loads of 2,638 lb/year and 4,625 lb/year, respectively. The monitoring program will continue to provide data to evaluate pollutant loading trends as the implementation program progresses. The final calibrated model will be used to demonstrate compliance of Consent Decree requirement.

FIGURE ES-14
Schematic of Recommended Schedule of Implementation Plan



8.0 Monitoring of BMP Implementation Plan

A monitoring plan is recommended to support the adaptive BMP implementation plan and provide necessary data to update the Commission's hydraulic model. A monitoring program is required to validate the performance and pollutant removal effectiveness of the stormwater BMPs proposed to be implemented throughout Boston. To support the need for an adaptive implementation plan, three levels of monitoring are proposed: BMP performance, stormwater outfall waters, and receiving waters.

At the BMP level of monitoring, each type of BMP proposed for implementation by the Commission will be evaluated in terms of its key performance indicators and maintenance considerations. Initially, it is recommended that one installation of each BMP type be monitored. However, it is recommended that the Commission monitor various porous pavement materials. Project locations with multiple BMP technologies are recommended over smaller single-technology projects in order to increase the efficiency of installing monitoring equipment, such as sensors, data loggers and telemetry systems for data collection. Specifically, the proposed BMP level monitoring framework considers the need to:

- Evaluate BMP performance by comparing the pre- and post-implantation conditions by verifying the volume of runoff that is captured and water quality performance of each BMP.
- Verify field-measured infiltration rates and release rates (for extended detention or "slow release" systems) and compare to design rates for the constructed systems (and how such rates vary over time).
- Evaluate the maintenance requirements and associated O&M costs for each BMP type including frequency of cleaning, repair, and component replacement.
- Determine the maintenance requirements and associated O&M costs of vegetative components of each applicable BMP type.
- Compare long-term performance between various BMP types and evaluate any deleterious effects of infiltration in urban areas.

The BMP types proposed for monitoring include bioretention (such as vegetated curb extension), constructed wetlands, infiltration trenches (with and without trees), porous pavement, vegetative roofs, and water quality units/inlets. In addition to those monitoring considerations listed above, the installed BMPs should also be evaluated for:

- Potential impacts associated with deicing salts.
- Cold weather maintainability.
- Clogging potential for different types of porous pavements.
- Rate/prevalence of invasive plant establishment and/or vector establishment.
- The effectiveness of design components such as pretreatment devices, sand-based structural soils, geotextiles, and stone/sand filters, among other considerations.

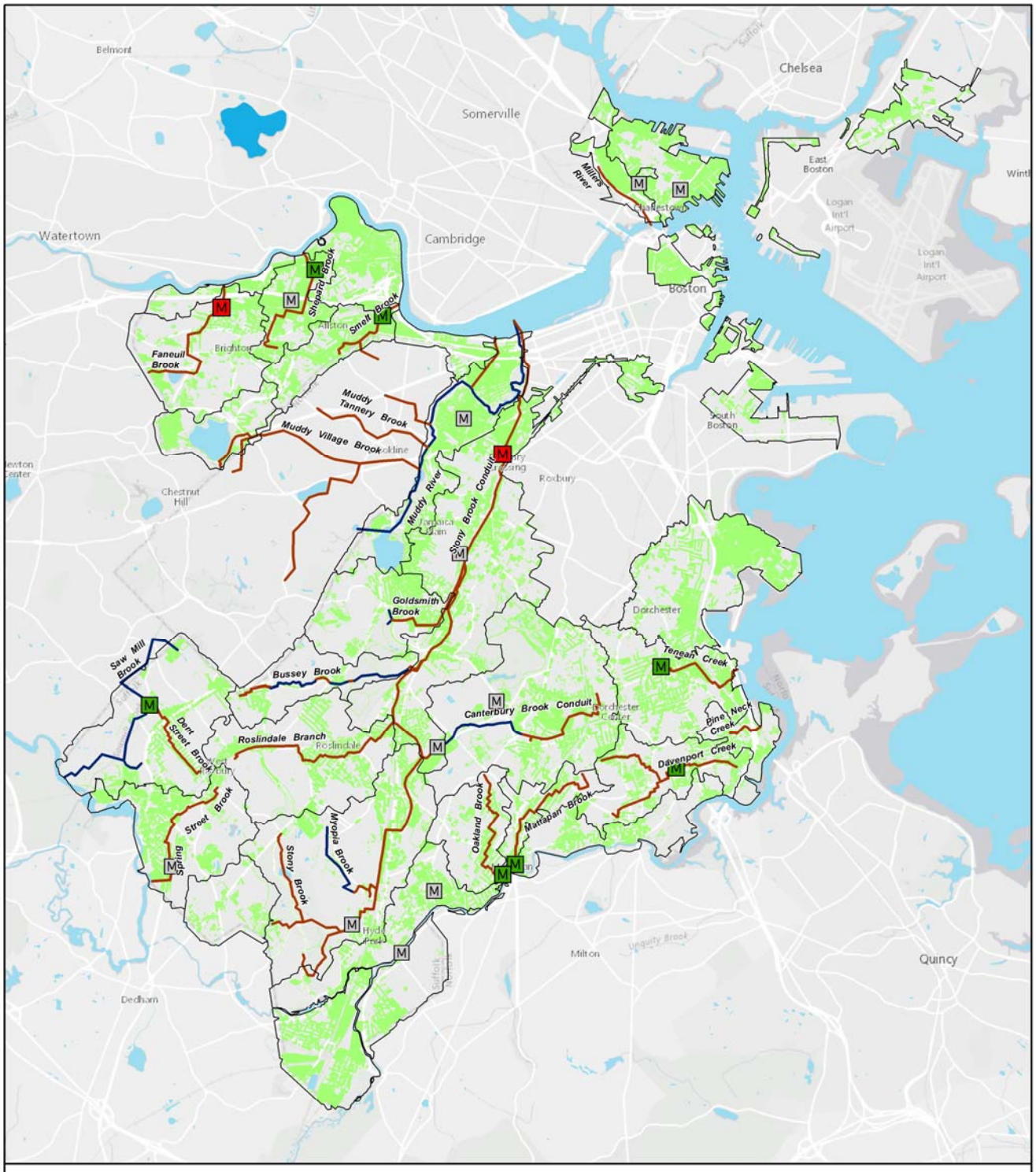
Although monitoring at the BMPs is important, the storm drain outfalls and receiving waters are where the Commission's BMP implementation program ultimately will be evaluated for regulatory compliance. The main objectives of the storm drain outfalls and receiving waters monitoring program are:

- Document the pollutant load impacts of stormwater discharges by comparing the water quality measurements before and after BMP implementation.
- Provide data for periodic calibration and validation of the model to sustain its vitality of representing system conditions.

The recommended key water quality parameters to be monitored at storm drain outfalls and in the receiving waters are: total phosphorus, dissolved phosphorus, *E. coli*, *Enterococcus*, and fecal coliform. It is proposed that monthly sampling be conducted at the select locations in order to provide a record of the water quality conditions in both dry and wet conditions, and seasonally. In addition to water quality monitoring, the Commission may also consider flow metering at some outfalls in order to assess the cumulative impacts of multiple BMP project implementations on stormwater runoff rates and volumes.

As illustrated on Figure ES-15, it is recommended to install long-term monitoring equipment at two of the Commission's existing major sites, the Stony Brook site and in Faneuil Brook, to continue collecting flow and water quality data at the sites previously operated by USGS. Additionally, it is recommended to implement a long-term program of rotating monitors at three other smaller sites each year (e.g., smaller outfalls, or other major systems, such as Sawmill Brook, Muddy River, Shepard Brook, Smelt Brook, Oakland Brook, Mattapan Brook, Davenport Creek, Pine Neck Creek, and Tenean Creek).

FIGURE ES-15
Recommended Monitoring Locations



Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.
An electronic map is included in the Appendix.

9.0 Recommended O&M Strategies

Based on the review of O&M strategies from seven peer communities, the current Massachusetts stormwater regulations, and current and potential modifications to BWSC stormwater regulations, five specific BMP O&M strategies were identified for the Commission to consider, particularly (although not exclusively) for BMPs installed on private property.

1. Update the current BWSC stormwater regulations to reflect BMP Program Objectives/Components.
2. Require a BMP O&M agreement to be registered on the private property containing the BMP(s).
3. Require either BWSC inspection or property owner self-certification for properties treating over 1,000 ft^2 of impervious area (area to be determined) every 3 to 5 years (frequency to be determined).
4. Establish a goal to randomly inspect BMPs on a relatively small fraction (5 percent, to be determined) of properties treating less than 15,000 ft^2 of impervious area (area to be determined) per year.
5. Require O&M records to be maintained for all BMPs.

In addition to the five strategies listed above, the following additional O&M strategies can potentially enhance the implementation program and can be incorporated in the future with regards to BMPs installed on public lands and right-of-ways.

- Develop a BMP O&M manual, which could include the following:
  - BMP background
  - Descriptions/photographs/schematics of the common types of BMPs
  - Develop standard maintenance protocols
  - O&M frequencies and seasonal considerations
  - Description of typical corrective measures
  - Vegetation maintenance (e.g., identify plants vs. weeds, pruning, pest/disease management)
  - Winterization of BMPs
- Develop a robust training/education/certification program for O&M staff or volunteers.
- Conduct a gap analysis of O&M requirements (i.e., what is already covered and what needs to be added/changed).
- Consider establishment of a stormwater user fee as both a sustainable funding stream and a way to incentivize BMP implementation and maintenance (i.e., through a credit mechanism).
- Identify potential dedicated funding sources for BMP O&M.
- Develop a clear and effective framework for interdepartmental coordination for BMP project implementation, including design, construction, and maintenance.
- Consider requiring that BMPs be “certified” by a licensed professional after construction to ensure initial BMP performance is as expected.
- Consider adoption of an asset management approach including use of computerized maintenance management systems (CMMS), project data tracking, Dig Safe responses, etc. CMMS has the potential to significantly streamline preventative BMP maintenance with regards to reporting and documentation, and tracking labor hours, costs, problems, and other issues.

Appendix F describes typical O&M practices for the stormwater BMPs recommended as part of this plan.

10.0 Conclusion

The main objectives of this report were to recommend BMPs that can be practically implemented in the City of Boston and to assess the extent of BMP implementation needed to reduce pollutant loads sufficiently to meet applicable TMDLs allocated to stormwater discharges. These objectives were met by using GIS techniques and the Commission's calibrated stormwater model to develop and analyze numerous BMP implementation scenarios. The approach used for the BMP analysis assessed BMP implementation feasibility against BMP design criteria and identified an optimal plan at the watershed scale for planning and benchmarking purposes. The BMP implementation plan analysis presented in this report meets relevant requirements set forth in the Consent Decree.

The methodology used to perform the BMP analysis relied upon modeling technologies to efficiently gather data, calculate pollutant loads of millions of scenarios, and analyze the results in search of the optimal mix of BMPs for the BWSC MS4 area. BMPs were identified for implementation in the City of Boston and a site suitability analysis was performed to determine what sites and streets were most feasible for BMP implementation. After feasible BMP sites were identified, the hydraulic model was utilized to simulate millions of scenarios representing numerous levels of BMP implementation in the 27 reporting areas. The modeling results were analyzed using an optimization approach to determine the most cost effective approach to achieve the total phosphorus TMDL requirements set forth by the USEPA in the Lower and Upper/Middle Charles River watersheds.

Although there is no total phosphorus TMDL for the Neponset River or Boston Harbor watersheds, the recommended BMP implementation plan does result in total phosphorus load reductions in these areas as well.

A major finding from the modeling effort was the identification of limitations associated with simulating pathogen waste load reduction through BMP implementation using the existing modeling platform. As a result of technical limitations associated with the modeling platform none of the modeled BMP implementation plans could be shown to achieve the pathogen TMDLs in any of the watersheds. Because of the technical limitations related to pathogen TMDLs, the recommended BMP implementation plan was developed based on the total phosphorus loads in the Lower and Upper/Middle Charles River watersheds and the base scenario was recommended to be implemented in the Neponset River and Boston Harbor watersheds, which will allow for some level of pollutant reduction to those receiving waters. This approach would allow the Commission to start an iterative process as the Commission gains more direct knowledge of pollutant load conditions during the early stages of the BMP implementation program.

To ensure effective implementation of the recommended BMP plan and ultimate compliance with total phosphorus and pathogen TMDLs, a phased approach is recommended to incorporate initial BMP implementation, monitoring, model improvement, and plan revisions. The implementation schedule consists of three phases over a 30-year period. Each phase adapts to the knowledge obtained from the previous phase(s) via a comprehensive monitoring program and effectiveness evaluations of the completed implementation projects.

The recommended BMP implementation plan presented in this report is based on a high level planning study with large scale data available that includes modeling data. It is intended to provide guidance for a more detailed study that involves field investigations on area/site-specific characteristics. The actual field conditions would dictate implementation of BMPs under general principals prescribed in the recommended plan. The recommended plan includes implementation of a monitoring plan to quantify BMP performance and reduction of pollutant loads from the storm drains and into the receiving waters. The monitoring will support the adaptive BMP implementation plan and provide necessary data to update the Commission's hydraulic model. Operations and maintenance recommendations for BMPs are also included in the plan and will be integral to ensuring long-term benefits from BMPs.

SECTION 1

Introduction

Boston Water and Sewer Commission ("BWSC" or "the Commission") reached a Consent Decree with the Conservation Law Foundation and the U.S. Environmental Protection Agency (USEPA) on August 23, 2012 settling Civil Action No. 10-10-250-RGS on stormwater discharges from the Commission's municipal separate storm sewer system (MS4). The Consent Decree requires the Commission to modify its storm drain system model to assess pollutant loadings from its MS4, to provide a technical analysis of implementing BMPs for reducing pollutant loads to the receiving waters, and to recommend and implement Best Management Practices (BMPs) for water quality improvement to meet designated receiving water quality standards.

The Commission submitted a *Stormwater Model Report* on December 2012 pursuant to the Consent Decree requirement. The report assesses the pollutant loading conditions to the receiving waters by developing a stormwater model calibrated with flow and water quality data collected recently by the Commission. On July 14th, 2015, USEPA approved the *Stormwater Model Report* after the Commission addressed various review comments from the consent parties. The Consent Decree requires the Commission to submit a BMP recommendations report within 20 months of approval of the *Stormwater Model Report*. Pursuant to the Consent Decree requirements, this report describes technical analysis to develop the BMP recommendations that can be practically implemented in the City of Boston and to assess the extent of BMP implementation needed to sufficiently reduce pollutant loads to meet applicable total maximum daily loads (TMDLs) allocated to stormwater discharges.

This section provides a brief overview of the Consent Decree requirements regarding the BMP recommendations and a summary of water quality standards for the Charles River, Neponset River, and Boston Harbor as well as modeling methodologies for evaluating BMPs and a brief summary of organization of the report.

1.1 Purpose of this Report

As a part of the Commission's stormwater management plan, this report evaluates the suitability of implementing BMPs for reducing pollutant loads to receiving waters from the Commission's municipal separate storm sewer system (MS4) in the City of Boston. The main objective is to recommend BMPs that can be practically implemented and assess the extent of BMP implementation needed to reduce pollutant loads sufficiently to meet applicable total maximum daily loads (TMDLs) and water quality standards (where possible) allocated to stormwater discharges. This report follows the requirements of Section VII, Part D, Paragraph 28 of the August 23, 2012 Consent Decree settling Civil Action No. 10-10-250-RGS brought by the Conservation Law Foundation and the U.S. Environmental Protection Agency (USEPA) against the Commission.

The Consent Decree requires the following:

> "*Within twenty (20) months of Approval of the Stormwater Model Report, the BWSC shall submit to EPA for review and Approval and to CLF and MassDEP a Stormwater BMP Recommendations Report. The Stormwater BMP Recommendations Report shall utilize the BMP Proposal and the BWSC Stormwater Model, as Approved by EPA, following consultation with CLF, to propose specific recommendations for BMPs or a suite of BMPs to be implemented for each sub-catchment area and a schedule for such implementation. The Stormwater BMP Report shall include a prioritized listing of sub-catchments suitable for the application of such BMPs based on the characterization of discharges and potential pollutant loadings, receiving water, and whether the receiving water is used for contact recreation or has significant aesthetic or ecological value. In any sub-catchments where GI/LID BMPs are not recommended for implementation, the BWSC shall provide a reason why such BMP implementation is not being recommended for each particular location. The Stormwater BMP*

Recommendations Report shall include a technical analysis of how the BMPs will assure consistency with all applicable waste load allocations and the extent to which the BMPs will prevent BWSC discharges from causing or contributing to a violation of water quality standards. Where the recommended BMPs will not prevent BWSC discharges from causing or contributing to a violation of water quality standards, the Stormwater BMP Recommendations Report shall contain a discussion of, and justification for, BMPs considered, but not recommended, noting specifically those BMPs that may provide for a higher level of control than the recommended BMP(s). The Stormwater BMP Recommendations Report shall contain, for each recommended BMP, an evaluation of whether written agreements are necessary to implement or maintain the recommended BMPs in each sub-catchment and sub-watershed and a maintenance schedule for each recommended BMP. For each sub-catchment area, BWSC shall also propose GI/LID BMPs that may be implemented, where necessary and appropriate, by private entities through application of BWSC's site plan approval process. The Stormwater BMP Recommendations Report shall include provisions for a representative post-construction sampling program to validate the BMP performance projected by the BWSC Stormwater Model. Upon Approval, the BWSC shall implement the BMPs recommended in the Stormwater BMP Recommendations Report, as Approved by EPA, following consultation with CLF, in accordance with the schedule set forth therein."

This report ranks BMP suitability for waste load reduction and provides a technical analysis for the BMP implementation plan. The report documents development of a comprehensive stormwater management strategy. The strategy prioritizes BMP implementation opportunities by using GIS techniques and developing implementation scenarios to assess waste load reductions based on the Commission's calibrated stormwater model. This report presents a comprehensive plan to meet Consent Decree requirements.

1.2 Stormwater Management Terms and Definitions

Several stormwater management technical terms can have overlapping or conflicting meanings depending on the context in which they are used. The principal terms in this report have distinct meanings, as follows:

Stormwater best management practices (BMPs) are techniques, measures, or structural controls used to manage the quantity and improve the quality of stormwater runoff. The draft MA MS4 General Permit (USEPA Region 1, 2014) further defines BMPs as "schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage."

Green infrastructure (GI) uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, GI refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, GI refers to stormwater management systems that mimic nature by soaking up and storing water. This report considers GI as a subset of BMPs that uses structural controls for stormwater management.

Low impact development (LID) is an approach to land development (or redevelopment) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product. In addition, LID is the name of the USEPA stormwater management model (SWMM) module for simulating hydrological responses from GI. In this report, the term LID is not used other than mentioned as the name of a SWMM module.

Additionally, in order to minimize confusion and maintain consistency with previous studies, some key hydrologic terms were adopted from the 2012 *Stormwater Model Report* (Camp, Dresser, McKee, Smith [CDM Smith], 2012) and are further explained as follows:

Catchment in this report refers to an area tributary to one of the Commission's permitted outfalls listed in the Commission's stormwater National Pollutant Discharge Elimination System (NPDES) permit. This definition corresponds with the Consent Decree's intended meaning for *sub-catchment*, as Paragraph 14 of that document indicates that each sub-catchment corresponds with a single outfall.

Subcatchment pertains to its meaning in SWMM as a *hydrologic unit of land whose topography and drainage system elements direct surface runoff to a single discharge point*. One or many SWMM subcatchments may represent the area tributary to a single outfall. Model subcatchments range from less than one acre in the Longwood Medical Area to hundreds of acres in Brookline, to 10 square miles and larger in the Upper Charles and Neponset watersheds. The median model subcatchment measures three acres. This definition differs from usage in the Consent Decree, which states that *Sub-catchment shall mean the geographical area served by and drained to a distinct portion of the MS4.*

Watershed describes the collection of catchments draining to principal components of the Boston drainage system. Smaller watersheds can be tributary to larger watersheds. For example, the Bussey Brook watershed drains to the Stony Brook watershed, which is a component of the Lower Charles Basin watershed, which is part of the Charles River watershed. As some of Boston's principal drainage systems, such as the Shepard Brook drain in Brighton, have a single outfall, the terms catchment and watershed can refer to the same drainage area. Similarly, as some small drainage systems in downtown Boston, Charlestown, and East Boston are modeled with only a single subcatchment, the terms subcatchment and catchment can also refer to the same drainage area. The term *basin* is used interchangeably with watershed in this report.

Reporting areas were defined during initial model development in 2005 and later refined by CDM Smith. These 27 reporting areas are generally more detailed than the eight watersheds (Charles River, Mystic River [including Chelsea River/Creek], Neponset River, Muddy River, Stony Brook, Boston Harbor, Dorchester Bay, and Boston Inner Harbor) identified in the Consent Decree for which detailed reporting information was requested. The only areas where the Commission's reporting areas offer less detail are in Charlestown, which drains to both the Mystic River and Inner Harbor, and in East Boston. Some reporting areas may include drainage from their neighboring communities.

A **Total Maximum Daily Load (TMDL)** is the greatest amount of a pollutant that a waterbody can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing. A TMDL calculates the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for that particular pollutant. The TMDL allocates said pollutant load to point sources **(Wasteload Allocation or WLA)** and nonpoint sources (Load Allocation or LA), which include both anthropogenic and natural background sources of the pollutant. TMDLs must also include a margin of safety (MOS) to account for the uncertainty in predicting how well pollutant reduction will result in meeting water quality standards and account for seasonal variations.

The TMDL calculation is:

TMDL = ΣWLA + ΣLA + MOS

Where: WLA is the sum of wasteload allocations (point sources), LA is the sum of load allocations (nonpoint sources and background), and MOS is the margin of safety.

1.3 Water Quality Standards and TMDLs

The Commission's stormwater drainage system in the City of Boston discharges to three main receiving waterbodies: (1) Charles River, (2) Neponset River, (3) Boston Harbor, and, to a lesser extent, the Mystic River. The water quality of the receiving waterbodies is impacted by both the combined sewer system and the storm drain system. Water quality classifications are shown in Figure 1-1 and are further defined in Table 1-1.

FIGURE 1-1

Boston's Storm Drain Watersheds and Receiving Water Quality Classifications

MassDEP, 314 CMR 4.00

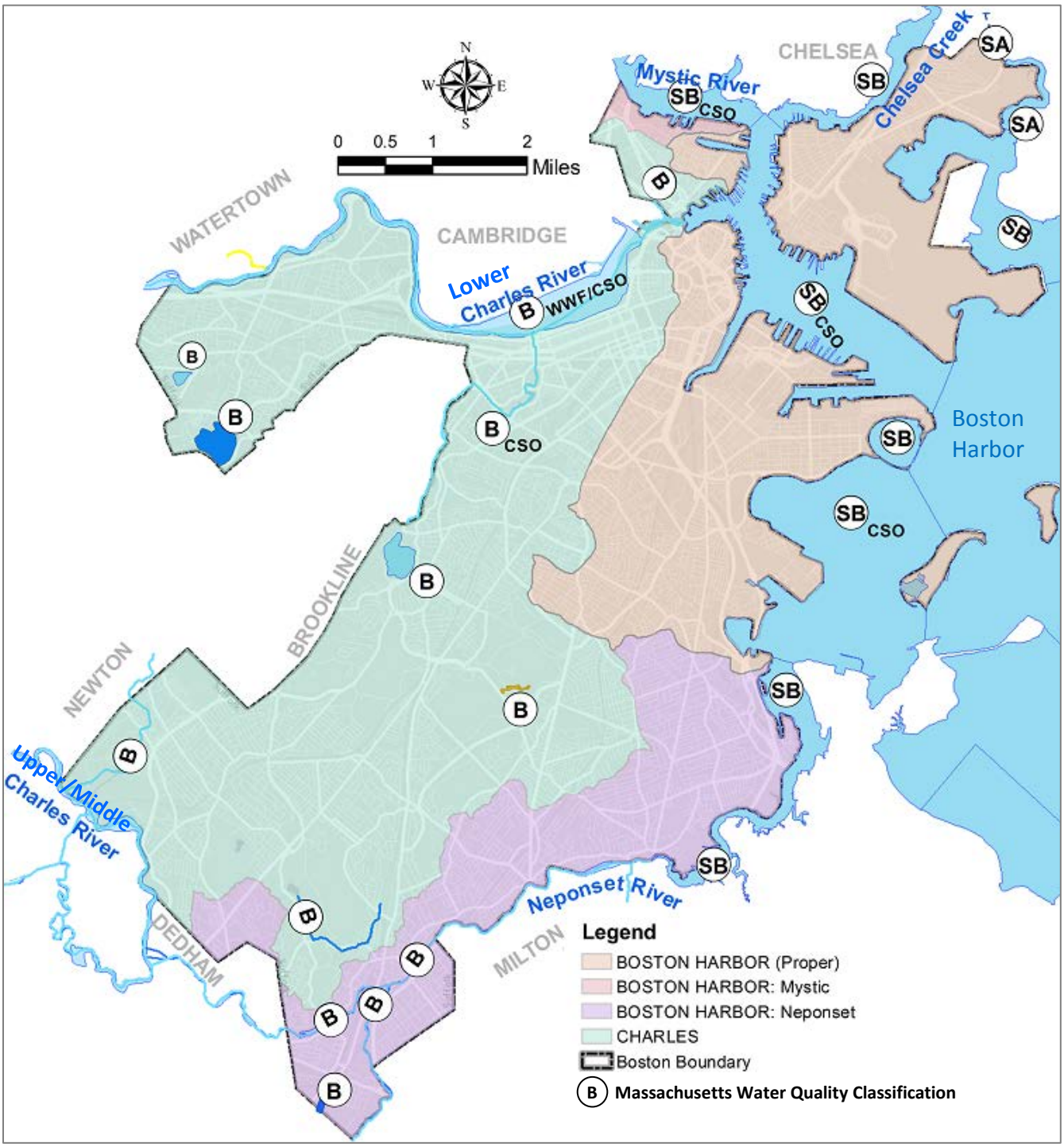


TABLE 1-1
Summary of Boston's Receiving Water Classifications

Waterbody	Boundary	Water Quality Classification[1]	Qualifier[2]
Upper/Middle Charles River	Milford Wastewater Treatment Facility to Watertown Dam	B	Warm Water
Lower Charles River	Watertown Dam to BU Bridge	B[3]	Warm Water CSO
Charles River Basin	BU Bridge to New Charles River Dam	B[3]	Warm Water CSO
Muddy River	Entire Length	B(CSO)	Warm Water
Mystic River	Amelia Earhart Dam to confluence with the Chelsea River	SB(CSO)	Shellfishing
Neponset River	Mother Brook to Milton Lower Falls Dam, Milton/Boston	B	Warm Water
Neponset River	Tidal Portion	SB	Shellfishing
Boston (Inner) Harbor	Westerly inside a line from the southern tip of Governors Island to Fort Independence including the Charles, Mystic, Island End and Chelsea (Creek) Rivers and Reserved, Fort Point and Little Mystic Channels	SB(CSO)	
Dorchester Bay	Dorchester Bay	SB	Shellfishing CSO

[1] Water quality classifications include:

- Class B (inland water class) waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation.
- Class SB (coastal and marine class) waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass.
- Class B (CSO) and SB (CSO) waters are occasionally are subject to short term impairment of swimming or other recreational uses due to untreated combined sewer overflow (CSO) discharges in a typical year, and the aquatic life community may suffer adverse impact yet is still generally viable. In these waters, the uses for Class B and Class SB waters are maintained after the implementation of long term control measures described in the approved CSO long term control plan, except as identified in such plan.

[2] Qualifiers indicates special considerations and uses applicable to the segment that may affect the application of criteria or antidegradation provisions of 314 CMR 4.00. It includes:

- Warm Water - in these waters dissolved oxygen and temperature criteria for warm water fisheries apply.
- CSO – these waters are identified as impacted by the discharge of combined sewer overflows; however, a long term control plan has not been approved or fully implemented for the CSO discharges.
- Shellfishing – these waters are occasionally are subject to short term impairment of shellfishing due to untreated CSO discharges in a typical year, and the aquatic life community may suffer adverse impact yet is still generally viable.

[3] Variance has been granted for Combined Sewer Overflows (CSOs) from the Watertown Dam to the Science Park Dam (Science Museum), Boston. This segment is expected to be extended to the New Charles River Dam, Boston through the next Triennial review of the Water Quality Standards.

To attain the designated uses of the receiving waterbodies, USEPA and the Massachusetts Department of Environmental Protection (MassDEP) developed TMDLs for impaired waterbodies to establish the amount of pollutants that the targeted waterbodies can assimilate without exceeding water quality standards. The following TMDLs have been established for the receiving waterbodies of the Commission's MS4:

- Final TMDL for nutrients in the Upper/Middle Charles River (2011).
- Final Phosphorus TMDL for the Lower Charles River (2007.)
- Final Pathogen TMDL for the Charles River Watershed (2007).
- Final TMDLs of Bacteria for the Neponset River Basin (2002) and Final Neponset Bacteria TMDL Addendum (2013).

A draft Pathogen TMDL was established for the Boston Harbor Watershed (excluding the Neponset River Sub-Basin) (USEPA, 2005). For this analysis, total phosphorus was selected as an indicator for the nutrient TMDL because it is typically the limiting element that controls algal biomass growth in rivers.

1.3.1 Nutrient TMDL for the Upper/Middle Charles River

The entire Charles River watershed drains an area of 308 square miles, which is composed of portions of 35 cities and towns. The Upper/Middle Charles River watershed is approximately 268 square miles, contains approximately 87 percent of the total watershed area, and drains over the Watertown Dam into the Lower Charles River. The TMDL listed segments include 9 mainstream segments, 11 tributaries, and 11 connected ponds, for a total of 31 segments. An overall annual reduction in total phosphorus of 50 percent is required to meet the desired targets with a 6 percent margin of safety. To achieve this annual reduction, this TMDL assigns waste load allocations (WLAs) requiring a 66 percent reduction in annual phosphorus load from wastewater discharges and a 51 percent reduction in annual phosphorus load from stormwater discharges.

There are two drainage basins from the Commission's MS4 that contribute nonpoint source waste loads to the Upper/Middle Charles River segment MA72-07 (from Chestnut Street in Needham to the Watertown Dam in Watertown). These basins comprise the Sawmill Brook and West Roxbury (mainly via Spring Street Brook) reporting areas, as shown in Figure 1-2.

For nonpoint sources and stormwater, the TMDL sets phosphorus discharge limits by land use category. The total phosphorus reductions from current conditions are as follows:

- Water/Wetland: 0 percent
- Forest: 0 percent
- Open/Agriculture: 35 percent
- Low Density Residential: 45 percent
- Medium Density Residential: 65 percent
- High Density Residential/Multi-Family: 65 percent
- Commercial/Industrial: 65 percent
- Transportation: 65 percent

Based on this distribution of the required load reductions, the total phosphorus pollutant load reduction requirements for specific watersheds can be calculated with land use area weighted reduction percentages as shown in Table 1-2. The resulting waste load reduction required for the Sawmill Brook (Boston) and West Roxbury catchments are 32 percent and 42 percent, respectively.

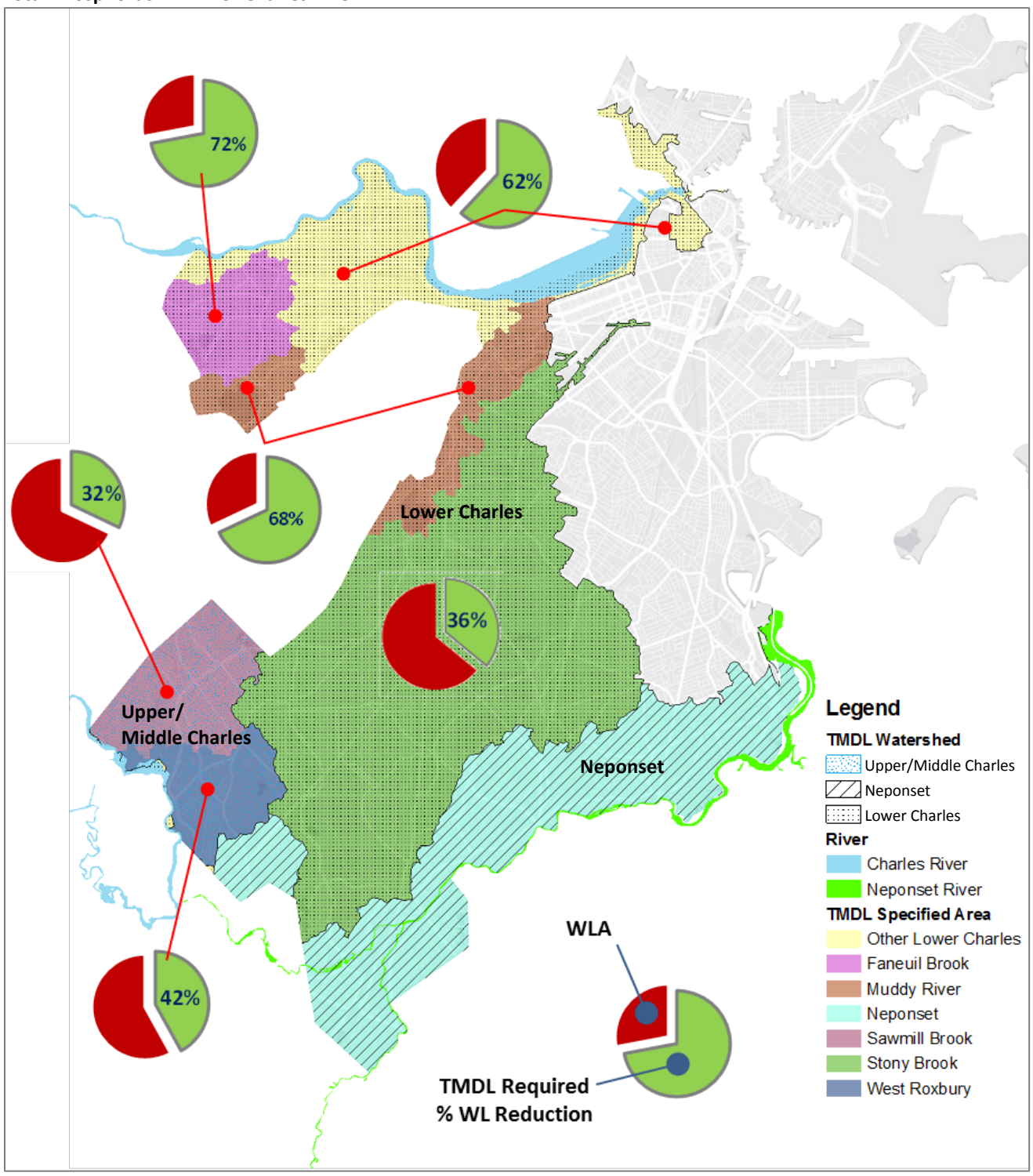
TABLE 1-2
Upper/Middle Charles River Total Phosphorus TMDL Allocations and Waste Load Reduction Requirements

Source	Current Total Phosphorus Load [kg/yr (lb/yr)][1]	TMDL Total Phosphorus Allocation [kg/yr (lb/yr)][1]	Percent Load Reduction Required to Meet Allocation (%)[1]	Drainage Area within BWSC MS4(Acres)[2]	
				Sawmill Brook	West Roxbury
Low Density Residential	4,979 (10,977)	2,739 (6,039)	45	394	336
Medium Density Residential	5,505 (12,136)	1,927 (4,248)	65	70	27
High Density Residential	5,964 (13,148)	2,088 (4,603)	65	70	27
Commercial/Industrial	6,294 (13,876)	2,203 (4,857)	65	49	263
Transportation	2,167 (4,777)	759 (1,673)	65	12	4
Open/Agriculture	1,504 (3,316)	977 (2,154)	35	278	48
Forest	4,394 (9,687)	4,394 (9,687)	0	404	183
Total	**30,807 (67,917)**	**15,087 (33,261)**		**1,277**	**888**
Weighted Average Total Phosphorus Reduction Required (%)			**51%**	**32%**	**42%**
Current total phosphorus Waste Load (lb/yr)[2]				690	311
WLA (lb/yr)				469	180

[1]MassDEP, Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River, Massachusetts, May 2011

[2]CDM Smith, 2015 *Stormwater Model Report*, December 2015

FIGURE 1-2
Total Phosphorus TMDL for Charles River



Notes:

Lower Charles WLA and TMDL Required % WL Reduction, CDM Smith, 2015.

Upper/Middle Charles WLA and TMDL required % WL reduction calculated per Table 1-2.

1.3.2 Phosphorus TMDL for the Lower Charles River

The Lower Charles River watershed is approximately 40 square miles and drains directly into the Lower Charles from small tributary streams that are mostly enclosed and from piped stormwater drainage systems

serving the surrounding communities including Boston, Brookline, Cambridge, Newton, and Watertown. There is also a combined sewer drainage area near the downstream end of the Charles River. WLAs are summarized into three broad categories: (1) upstream watershed at Watertown Dam, (2) non-combined sewer overflow (CSO) drainage areas that discharge directly to the Lower Charles River, and (3) CSO discharges.

The Commission's MS4 is part of the non-CSO drainage areas that discharge directly to the Lower Charles River, representing both point and nonpoint nutrient sources that discharge to the major tributaries and other smaller drainage systems. Gross allocations for contributing sources in the Lower watershed in Boston are identified for Stony Brook watershed, Muddy River watershed, Faneuil Brook watershed, and other tributary drainage systems that discharge directly to the Lower Charles.

The Commission developed a storm drainage model and calibrated the model with flow and water quality data collected in 2012 to estimate the existing waste load to its receiving waterbodies (CDM Smith, 2015). Table
1-3 compares existing waste load estimated by the USGS (2002) and MassDEP (2007) with BWSC modeling results (CDM Smith, 2015). The USGS results are based on flow-weighted average dry and wet weather concentrations and measured discharges for water year 2000 (WY 2000, October 1999 – September 2000) adapted from Table 27 of the USGS report (Breault et al. 2002). The TMDL study estimates are based on estimated discharges for 1998-2002 using SWMM flow models developed by the USGS in combination with a regression model developed by the USGS from its WY 2000 data. The MassDEP pollutant load estimates exceed the USGS estimates for all three streams. Most significantly, MassDEP's total phosphorus load to Stony Brook is more than double the load estimated by the USGS while loads to Muddy River are similar for both studies. Other than the loads to Stony Brook, the Commission's stormwater model estimates higher loads based on 2007-2009 hydrologic conditions. The Stony Brook load estimated by the Commission falls in between the USGS and DEP estimates.

TABLE 1-3
Summary of the Total Phosphorus Load and WLA in the Lower Charles River[1]

	USGS, 2000[2]	MassDEP TMDL, 2007[3]		BWSC, 2015[4]	
Watershed	**Existing WL (lb/yr)**	**Existing WL (lb/yr)**	**WLA (lb/yr)**	**Existing WL (lb/yr)**	**% Reduction Needed to Meet TMDL WLA**
Stony Brook	5,410	11,300	4,300	6,520	36%
Muddy River	3,460	3,410	1,300	4,008	68%
Faneuil Brook	480	720	275	991	72%
Other Lower Charles[6]	_	_	879[5]	2,314	62%
TOTAL	**9,350**	**15,430**	**6,754**	**13,832**	**52%**

[1] Based on Table 1-3 of the *2015 Model Stormwater Report.*

[2] Data summarized by USGS Study (Breault et al. 2002).

[3] Data summarized from MassDEP TMDL report (MassDEP 2007).

[4] Existing pollutant load based on most recently updated stormwater model by the Commission.

[5] Extrapolated based on a required 62% reduction of the total existing waste load.

[6] Remaining Other Lower Charles watersheds include Shepard Brook, Smelt Brook, Allston-Brighton, and Millers River

The values in Table 1-3 are presented to provide perspective. Although the existing waste load values differ, the values are consistent in that Stony Brook has the highest existing waste load, Muddy River has the next highest existing waste load, and Faneuil Brook and the Other Lower Charles areas have the lowest existing waste loads. This report will use the most recent data from the BWSC *2015 Stormwater Model Report* (CDM Smith, 2015) in the analyses presented herein.

1.3.3 Pathogen TMDL for the Charles River Watershed

The Charles River Watershed Pathogen TMDL covers the entire watershed tributary to the Charles River. It provides a prioritized list of pathogen-impaired waterbody segments that will require additional bacterial source tracking work and implementation of structural and non-structural BMPs. Twenty river segments were identified as having indicator bacteria in excess of applicable Massachusetts water quality standards. Three of these impaired river segments receive BWSC storm drainage, as shown in Table 1-4. Priorities shown in Table 1-4 are designated as follows:

- High priority was assigned to those segments where either dry or wet weather concentrations were equal to or greater than 10,000 colonies/100 milliliters (mL) since such high levels generally indicate a direct sanitary source.
- Medium priority was assigned to segments where concentrations ranged from 1,000 to 9,999 colonies/100ml/100 mL since this range of concentrations generally indicates a direct sewage source that may get diluted in the conveyance system.
- Low priority was assigned to segments where concentrations were observed less than 1,000 colonies/100 mL.

TABLE 1-4
Prioritized Pathogen Impaired Charles River Segments Relevant to Boston

Segment ID	Segment Name	Length (miles)	Segment Description	Priority "Dry"	Priority "Wet"
Boston Segment MA72-23	Upper Charles: Sawmill Brook	2.7	Headwaters, Newton to confluence with Charles River, Boston.	Medium	Medium
MA72-08	Lower Charles River	8.6	Watertown Dam, Watertown to Science Museum, Boston.	Medium	High
MA72-11	Lower Charles: Muddy River	4.2	Outlet of unnamed pond, Olmstead Park, Boston to confluence with Charles River, Boston.	Medium	High

MassDEP, 2007

The Charles River pathogen TMDL also provides a list of high priority pathogen sources, which have been identified within the watershed; the sources are categorized as follows:

- Illicit connection of sewage to storm drains (discharging in dry or wet weather or both)
- Defects in sewer infrastructure
- CSOs
- Stormwater discharges (including non-point source runoff)

The two significant "dry "weather contributors of bacteria are likely to be illicit connections and leaky sewer infrastructure at low river flow. CSOs, stormwater discharges, non-point source runoff, and episodic sanitary sewer overflows (SSOs) during rain events continue to impair the river's water quality during wet weather. Table 1-5 lists the high priority pathogen point source sites noted in the Charles River Pathogen TMDL relevant to the Commission's MS4.

TABLE 1-5
List of High Priority Charles River Sites Relevant to Boston[1]

Segment No.	Operator	Site ID(s)	Site Description	"Dry / Wet"
MA72-08	Boston / MBTA		Fleet Center Drainage (~36" outfall)	Wet
MA72-08	Boston	BWSC 04-2	Muddy River Conduit (~11'x14' diversion chamber)	Dry & Wet
MA72-08	Boston	BOS032	Faneuil Valley Brook Conduit	Dry
MA72-08	Boston	BOS034	Downstream of River St, upstream of BU bridge (~ 30" outfall)	Dry & Wet
MA72-08	Boston / Brookline	BOS035	Salt Creek conduit (Smelt Brook-Brookline (Middle boomed outfall)	Dry & Wet
MA72-08	Boston / Brookline	BOS132	Upstream of BU bridge	Wet
MA72-11	Boston / Brookline	MUD253, MUD273	Downstream side of Brookline Avenue.	Wet
MA72-08	Boston	MWR023	Stony Brook outfall	Dry

[1] As provided in the Charles River Pathogen TMDL, MassDEP 2007.

The bacteria standard applicable to reaches that receive BWSC storm drainage (Class B freshwater) is defined as: the geometric mean of all *E. coli* samples taken within the most recent 6 months shall not exceed 126 colonies per 100 mL typically based on a minimum of five samples and no single sample shall exceed 235 colonies per 100 mL. The Charles River pathogen TMDL defines a WLA and load allocation for various sources of pathogens to the impaired reaches. Table 1-6 lists the relevant Charles River pathogen WLA for the BWSC storm drainage system.

TABLE 1-6
Charles River Pathogen Waste Load Allocation Relevant to Boston

Surface Water Classification	Pathogen Source	Waste Load Allocation Indicator Bacteria (CFU/100 mL)[1]
B	Stormwater runoff Phase I and II	Not to exceed a geometric mean of 200 fecal coliform organisms in any set of representative samples, nor shall 10% of the samples exceed 400 organisms

[1] Waste Load Allocation and Load Allocation refer to fecal coliform densities, MassDEP 2007.
CFU – colony forming unit

1.3.4 Bacteria TMDL for the Neponset River Basin

The Neponset River Basin encompasses portions of Boston, Quincy, Milton, Dedham, Westwood, Dover, Medfield, Walpole, Foxborough, Sharon, Stoughton, and Randolph, and the entire towns of Canton and Norwood. The Neponset River is 29.5 miles in length and drains approximately 117 square miles. At its most downstream point, the Neponset River is tidally influenced for 3 miles from Baker Dam in Milton to its confluence with Dorchester Bay in Boston Harbor.

The 2002 *TMDL of Bacteria for Neponset River Basin* covers the entire Neponset River; Table 1-7 lists river segments that are relevant to Boston. The bacteria TMDL used fecal coliform bacteria as the water quality standard criteria. At that time, for Class B waters such as the Neponset River and its tributaries, the water quality standards required that fecal coliform bacteria shall not exceed a geometric mean of 200 organisms per 100 mL in any representative set of samples, nor shall more than 10 percent of the samples exceed 400 organisms per 100 mL.

TABLE 1-7
Pathogen Impaired Neponset River Basin Segments Relevant to Boston

Segment ID	Waterbody Name and Description
MA72-13	Mother Brook: Mother Brook Dam, Dedham to confluence with Neponset River, Boston.
MA73-01	Neponset River: Outlet of Neponset Reservoir, Foxborough to confluence with East Branch, Canton.
MA73-02	Neponset River: Confluence with East Branch, Canton to confluence with Mother Brook, Boston.
MA73-03	Neponset River: Confluence with Mother Brook, Boston to Milton Lower Falls Dam, Milton/Boston.
MA73-04	Neponset River: Milton Lower Falls Dam, Milton/Boston to mouth at Dorchester Bay, Boston/Quincy.

MassDEP 2007

In January of 2007, the Surface Water Quality Standards for Bacteria in Massachusetts were revised to *Escherichia coli* (*E. coli*) bacteria. Even though Massachusetts has adopted the *E. coli* organism as the determining criterion in its water quality standards, the fecal coliform criteria for the 20 segments in the original 2002 TMDL still apply for those segments. Massachusetts believes that the magnitude of bacteria (fecal coliform) loading reductions outlined in the original 2002 TMDL and summarized in Table 1-8 will be sufficient to attain the revised water quality standards criteria for *E. coli*.

TABLE 1-8
Fecal Coliform Waste Load Allocations for B and SB Waters

Surface Water Classification	Source	Waste Load Allocation Indicator Bacteria (CFU/100 mL)
B	Stormwater Runoff	Not to exceed a geometric mean of 200 organisms in any set of representative samples, nor shall 10% of the samples exceed 400 organisms
SB	Stormwater Runoff	Not to exceed a geometric mean of 200 organisms in any set of representative samples, nor shall 10% of the samples exceed 400 organisms

MassDEP 2007

1.3.5 Draft Pathogen TMDL for the Boston Harbor Watershed

The pathogen TMDL for the Boston Harbor covers all point sources and drainage to the Boston Harbor. The Boston drainage to the Boston Harbor is from both the combined sewer and separate stormwater systems. The separated BWSC drainage area contributing to the Boston Harbor comprises approximately 6.5 square miles that contribute to shellfishing areas, non-shellfishing areas, and marine beaches within Boston Harbor. The WLA for these areas match the water quality standards for the various classifications. Table 1-9 lists the classifications in the harbor and the associated WLAs for stormwater runoff from NPDES MS4 Phase I and Phase II communities.

TABLE 1-9
Pathogen TMDL for Boston Harbor Relevant to Boston

Surface Water Classification	Source	Waste Load Allocation Indicator Bacteria (CFU/100 mL)
A	Stormwater runoff Phase I and II	Not to exceed an arithmetic mean of 20 organisms in any set of representative samples, nor shall 10% of the samples exceed 100 organisms
B & Not Designated for Shellfishing SA & SB	Stormwater runoff Phase I and II	Not to exceed a geometric mean of 200 organisms in any set of representative samples, nor shall 10% of the samples exceed 400 organisms

TABLE 1-9
Pathogen TMDL for Boston Harbor Relevant to Boston

Surface Water Classification	Source	Waste Load Allocation Indicator Bacteria (CFU/100 mL)
SA Designated Shellfishing Areas	Stormwater Runoff Phase I and II	Not to exceed a geometric mean of 14 organisms in any set of representative samples, nor shall 10% of the samples exceed 43 organisms
SB Designated Shellfishing Areas	Stormwater runoff Phase I and II	Not to exceed a geometric mean of 88 organisms in any set of representative samples, nor shall 10% of the samples exceed 260 organisms
Marine Beaches	All Sources	*Enterococci* not to exceed a geometric mean of 35 colonies in a statistically significant number of samples, nor shall any single sample exceed 104 colonies
Freshwater Beaches	All Sources	*Enterococci* not to exceed a geometric mean of 33 colonies of the five most recent samples within the same bathing season, nor shall any single sample exceed 61 colonies OR *E. coli* not to exceed a geometric mean of 126 colonies of the five most recent samples within the same bathing season, nor shall any single sample exceed 235 colonies

MassDEP, 2007

1.4 Modeling Methodology for Evaluating BMPs

The Commission's storm drain model was developed in 2007 and calibrated with flow and water quality data in 2012, as described in the 2012 *Stormwater Model Report* (CDM Smith, 2012). The 2012 *Stormwater Model Report* was also updated in August 2014 and September 2015. The storm drain model uses the computation engine from the USEPA's Stormwater Management Model, SWMM 5, within DHI's MIKE URBAN modeling platform. Buildup and washoff functions are used in the model to simulate pollutant loads to the receiving waterbodies. Pollutant buildup simulates pollutant accumulations over time for a particular land use by a function of area or curb length. Pollutant washoff from a given land use area occurs during wet weather as a function of runoff. Pollutant removal also occurs in the storm drainage system and is simulated with various empirical decay/die-off functions (treatment functions in ponds and streams). The annual waste loads are simulated with a series of rainfalls from a representative 3-year period (2007 to 2009) based on measurements from five rain gauges owned by the Commission. The detailed description of stormwater modeling methodologies were discussed in the 2015 *Stormwater Model Report* dated December 2015 (CDM Smith, 2015), as amended.

The 2015 *Stormwater Model Report* included piloted waste load reduction scenarios with various levels of BMP implementation in five representative catchment areas. The BMPs were simulated by using SWMM's LID module. The *BMP Recommendations Report* uses similar modeling method to simulate waste load reductions for the selected implementation scenarios.

1.5 Organization of the Report

The organization of this report is summarized as follows:

- Section 2 describes the existing conditions of the Commission's MS4 through a high-level overview of the primary drainage network, the principal watersheds, and existing pollutant loads. In addition, the section also profiles the Commission's ongoing stormwater management programs as well as a variety of citywide stormwater initiatives related to stormwater quality improvements.
- Section 3 assesses pollutant removal efficiency of the structural BMPs, summarizes design considerations of BMPs, and describes BMP site suitability analysis to investigate potential sites suitable

for implementing BMPs within the Commission's MS4. The suitability analysis forms the basis for development of implementation scenarios for modeling analysis of pollutant load reductions.

- Section 4 describes development of implementation scenarios and discusses the modeling results of implementation scenarios. Optimization of implementation scenarios is discussed to select optimal scenarios as the recommended plan. Pollutant load calculation methods described in USEPA's Draft Massachusetts Stormwater General Permit is discussed and the results of this method were compared with results simulated by the Commission's stormwater model (EPA SWMM model).
- Section 5 summarizes the recommended BMP plan and discusses pollutant loads, costs, key aspects of the plan, and an implementation schedule with quantified milestones. Four conceptual plans are included in the section as examples of potential implementations in four representative areas.
- Sections 6 and 7 describe the recommended monitoring plan and operation and maintenance (O&M) strategies.

SECTION 2

Existing Conditions

This section focuses on detailing the existing conditions of the Commission's municipal separate storm sewer system (MS4) through a high-level overview of the primary drainage network, the principal watersheds, and existing pollutant loads. The pollutant loads are computed by rerunning the Commission's stormwater model with 2007 to 2009 rainfall conditions. This 2014 simulation is simply a replicate of the 2012 stormwater model and was run on CH2M HILL's computers to ensure consistency and to provide a baseline for moving forward with BMP scenario runs. The pollutant loads discussed in this section are strictly from model runs whereas section 4.3 presents total phosphorous results calculated using an alternate USEPA methodology.

In addition to the drainage system overview, this section will outline the Commission's ongoing stormwater management programs including the routine operation and maintenance (O&M) activities for structural controls, the Citywide Illegal Connection Investigation (CWI) Program, and the Site Plan Review process that specifically addresses stormwater management issues under its control. The Commission also supports a variety of citywide stormwater initiatives including routine street sweeping, GI demonstration projects, and the City's Complete Streets Initiative (CSI).

2.1 Description of BWSC's MS4

The Commission is responsible for the majority of the storm drains located within the city of Boston. The Commission was issued National Pollutant Discharge Elimination System (NPDES) Permit MAS010001, which became effective on October 29, 1999, authorizing stormwater and allowable non-stormwater discharges from its MS4. The permit expired 5 years later on October 30, 2004; however, USEPA administratively continued the permit as allowed by regulation after the Commission filed a permit renewal request. The Commission's MS4 currently consists of 197 storm drain outfalls including 99 major outfalls and 98 non-major outfalls (BWSC, 2013). The Commission's MS4 and any revisions to the inventory are accounted for in the annual stormwater management report, which is submitted to MassDEP and USEPA in compliance with the Commission's NPDES Stormwater Permit (MAS010001).

Some storm drains and outfalls in the City that are owned and operated by other city agencies such as the Boston Parks Department (e.g., Boston Common) or state agencies such as the Department of Conservation and Recreation (e.g., Storrow Drive). The Commission's system also has 18 interconnections with the municipalities of Brookline, Dedham, Milton, Newton, and Somerville. The Commission has established Memorandums of Understanding (MOUs) with those agencies and municipalities where the Commission does not have control over stormwater drains and outfalls that may affect the Commission's MS4 and compliance with its NPDES permit conditions.

In total, the Commission's MS4 system drains approximately 36 square miles via approximately 590 miles of separate storm drains (CDM Smith, 2015). This does not include approximately 10 square miles of the city that drain to the combined sewer system. The Commission's combined sewer system is managed under a separate NPDES permit. The city's drainage discharges into the following four receiving waters, as shown in Figure 1-1.

1. Upper/Middle Charles River watershed to the southwest
2. Lower Charles River watershed to the north
3. Neponset River watershed to the south
4. Boston Harbor to the east

As described in Section 1, USEPA and MassDEP have prescribed TMDLs for nutrients (phosphorus) and pathogens (fecal coliform bacteria) for the Upper/Middle and Lower Charles River watersheds, and for

bacteria (fecal coliform) for the Neponset River watershed. Currently, Boston Harbor does not have any established TMDLs, but a draft pathogen TMDL has been proposed by MassDEP and USEPA.

As shown in Figure 2-1, the core drainage network consists of a series of enclosed and open channel streams that convey stormwater flow to one of the four receiving waters listed above. The majority of these enclosed streams were once open channel streams until the late 19th and early 20th centuries. The Commission's MS4 is continuously evolving as a result of sewer separation in combined sewer areas, urban development and infrastructure improvements. The Commission will periodically update its MS4 information as necessary.

The Commission's 2015 *Stormwater Model Report* grouped the subcatchments of the MS4 into 27 "reporting areas" corresponding to the major drains, neighborhoods, and principal receiving waters, as shown in Figure 2-1. Table 2-1 provides a summary of these 27 reporting areas broken out by receiving water.

TABLE 2-1
City of Boston's 27 Reporting Areas

Reporting Area	Drainage Area (acres)	Imperviousness
1. West Roxbury	889	43%
2. Sawmill Brook	1,277	27%
Upper/Middle Charles Total	**2,166**	**34%**
3. Upper Stony	1,832	32%
4. Canterbury Brook	1,889	45%
5. Roslindale Branch	1,199	52%
6. Bussey Brook	839	28%
7. Goldsmith Brook	746	39%
8. Lower Stony	2,165	59%
Stony Brook Total	**8,670**	**45%**
9. Village Brook Boston	787	36%
10. Village Brook Brookline	2,061	36%
11. Other Muddy River	1,785	52%
Muddy River Total	**4,633**	**42%**
12. Faneuil Brook	1,316	45%
13. Shepard Brook	415	78%
14. Smelt Brook	846	71%
15. Allston-Brighton	796	69%
16. Millers River	208	56%
Other Lower Charles Total	**3,581**	**63%**
Charles River Basin Total	**19,050**	**46%**
17. Mother Brook	441	32%
18. Hyde Park	1,766	46%
19. Oakland Brook	519	49%
20. Mattapan Brook	304	65%
21. Lower Neponset	843	25%
22. Tenean Creek	873	62%
23. Davenport Creek	712	54%
Neponset River Basin Total	**5,458**	**33%**
24. Charlestown	556	87%
25. East Boston	438	68%

TABLE 2-1
City of Boston's 27 Reporting Areas

Reporting Area	Drainage Area (acres)	Imperviousness
26. Downtown	473	94%
27. Dorchester	1,124	67%
Boston Harbor Total	**2,591**	**76%**

Source: 2015 *Stormwater Model Report* (CDM Smith, 2015), Table 1-1

Additional details concerning the watersheds of the Upper/Middle Charles, Lower Charles, and Neponset River are provided in the following sections.

2.1.1 Upper/Middle Charles River Watershed

The Upper/Middle Charles River watershed comprises two reporting areas located in West Roxbury in the southwestern corner of Boston. The catchment abuts portions of the town of Dedham and the city of Newton, which both also drain into the Upper/Middle Charles River. The Upper/Middle Charles River watershed, its drainage network, and reporting areas are shown in Figure 2-2.

2.1.1.1 Tributary Streams/Brooks

The two main conduits of the Upper/Middle Charles River watershed are Spring Street Brook (enclosed) and Sawmill Brook (open channel). Dent Street Brook (enclosed) is tributary to Sawmill Brook. The headwaters of Sawmill Brook are within West Roxbury; the channel continues through a section of the City of Newton and crosses back into West Roxbury prior to its joining the Upper/Middle Charles.

2.1.1.2 Drainage Areas

General Description. The total drainage area within the Upper/Middle Charles River watershed is 2,165 acres (3.4 square miles), of which 34 percent (727 acres) is impervious (CDM Smith, 2015). As shown in Figure 2-2, the watershed is made up of two reporting areas, Sawmill Brook and West Roxbury. Per the data shown in Table 2-1, the West Roxbury reporting area is approximately 30 percent smaller than the Sawmill Brook area but has a higher percent impervious area (43% vs. 27%).

Land Use. Figure 2-3 depicts the modelling land uses within the Upper/Middle Charles River watershed. The watershed is predominantly residential but also contains large areas of forested and urban open land. Non-residential uses (industrial, commercial, urban public/institutional) are concentrated along the Charles River and Lower reaches of Sawmill Brook and Spring Street Brook. Figure 2-3 also lists the acreages for each of the land use categories.

2.1.1.3 TMDL Waste Load and Waste Load Allocation

The TMDLs are prescribed for the combined basins of the Upper/Middle Charles River watershed down to the Watertown Dam where the Lower Charles River watershed begins. Unlike the Lower Charles River watershed, the waste load TMDL for the Upper/Middle Charles River watershed is not allocated by subcatchment. As presented in Table 1-2, the Lower Charles TMDL establishes a WLA of 15,087 kilograms per year (kg/yr) (33,261 pounds per year [lb/yr]) of total phosphorus from the Upper/Middle Charles. The total phosphorus WLA accounts for contributions from wastewater point sources, stormwater point sources and non-point/background sources. The total phosphorus WLA also accounts for losses of total phosphorus and a margin of safety (MOS). The Charles River's TMDL for pathogens prescribes a WLA for the concentration of *E. coli*.

Table 7-5 of the 2015 *Stormwater Model Report* (CDM Smith, 2015) presented estimates for the existing waste loads of 13 surface water pollutants for each of the 27 reporting areas. Table 2-2 of this report summarizes the existing total phosphorus and pathogen waste loads for the Commission's Upper/Middle Charles River watersheds as presented in the 2015 *Stormwater Model Report*. Appendix A of this report tabulates the existing mean annual total loads for the 13 water quality parameters as estimated by the 2014 simulation of the 27 reporting areas.

FIGURE 2-1
City of Boston Stormwater Drainage System Overview

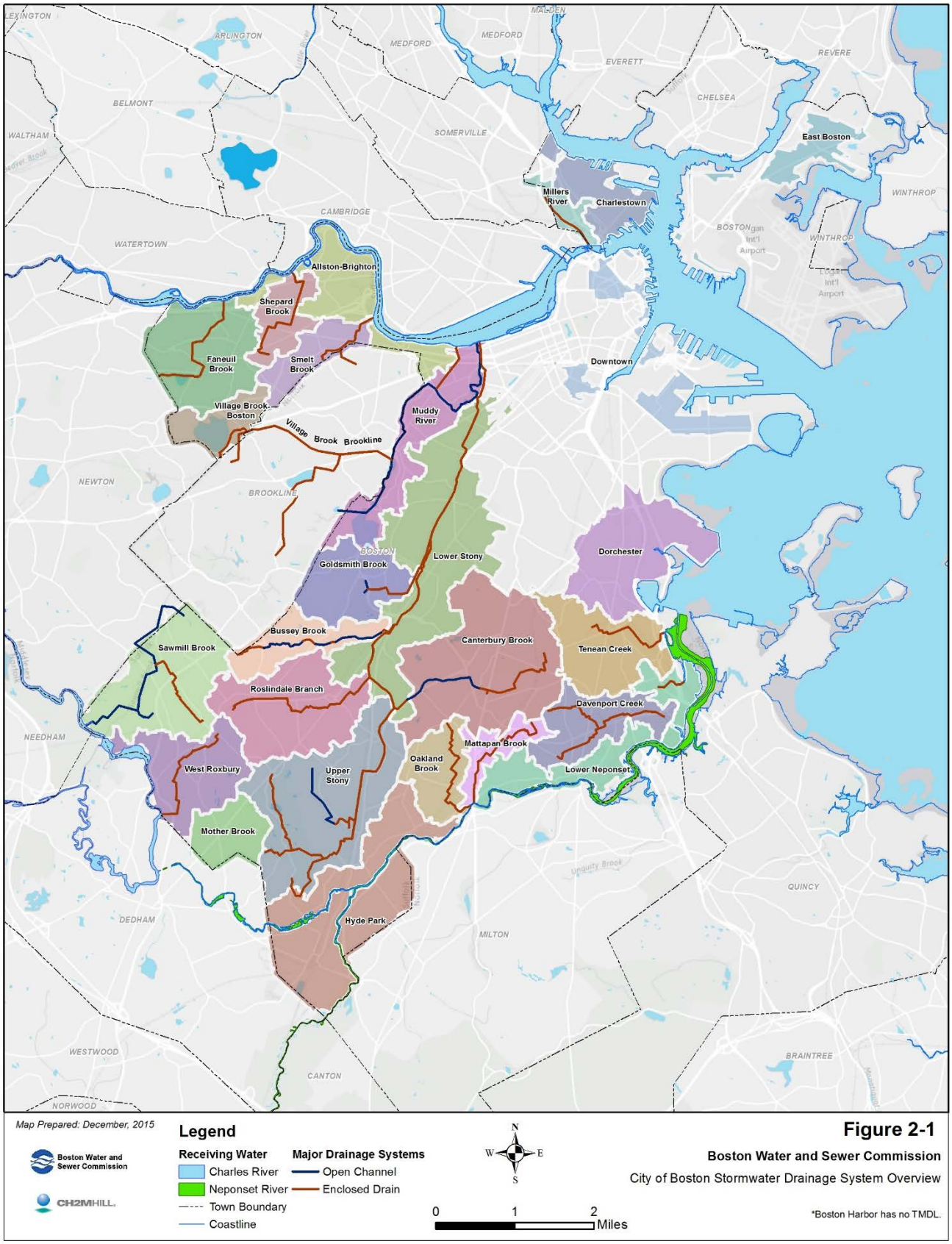


FIGURE 2-2
Upper/Middle Charles River Stormwater Drainage System

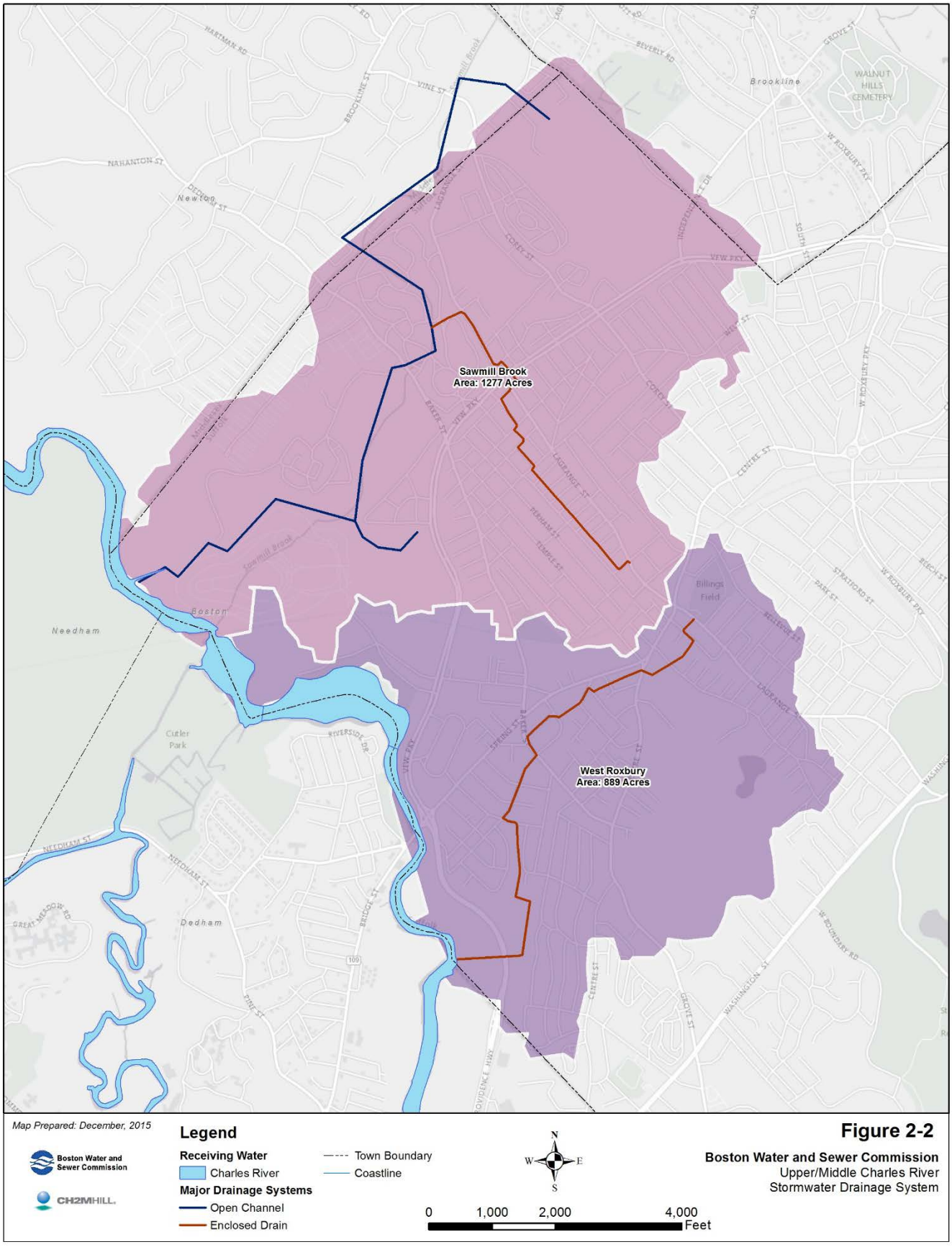


FIGURE 2-3
Upper/Middle Charles River Land Use Distribution

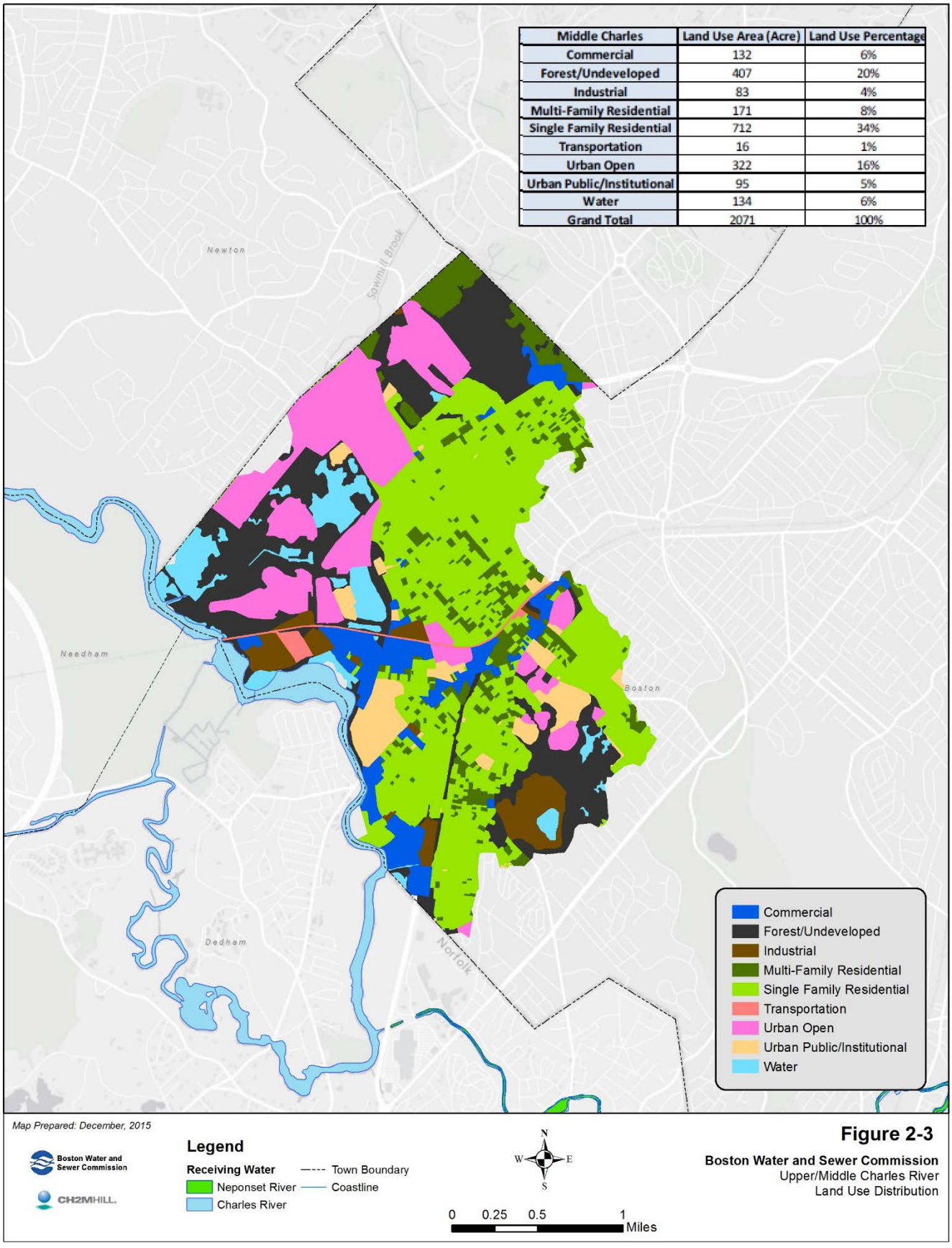


TABLE 2-2
Upper/Middle Charles River Watershed Existing Waste Loads
Total Phosphorus and Pathogens

TMDL	Reporting Area	Mean Annual Waste Load [1]
Total Phosphorus, lb/yr	West Roxbury	311
	Sawmill Brook	690
	Total	**1,001**
E.coli, 10^9 CFU/yr[2]	West Roxbury	114,681
	Sawmill Brook	169,841
	Total	**284,522**
Enterococcus, 10^9 CFU/yr	West Roxbury	72,898
	Sawmill Brook	111,099
	Total	**183,997**
Fecal Coliform, 10^9CFU/yr	West Roxbury	99,568
	Sawmill Brook	146,855
	Total	**246,423**

[1] 2015 Stormwater Model Report, (CDM Smith, 2015)

As presented previously in Table 1-2, the targeted TMDL reductions for total phosphorus from the Commission's Upper/Middle Charles reporting areas are 32 percent for Sawmill Brook and 42 percent for West Roxbury, hence the corresponding WLAs are 469 lb/yr and 180 lb/yr, respectively. The 2014 simulated total phosphorus loads from the Sawmill Brook and West Roxbury reporting areas are presented in Figure 2-4.

Although Table 2-2 presents the mean annual waste load of pathogens, the annual loading does not provide an indication of the frequency where pathogen concentrations exceed the applicable water quality standards for the Upper/Middle Charles. The Upper/Middle Charles River is classified as a Class B surface water, which has *E. coli* as its indicator bacteria. The applicable bacteria standard for a Class B waterbody is the following:

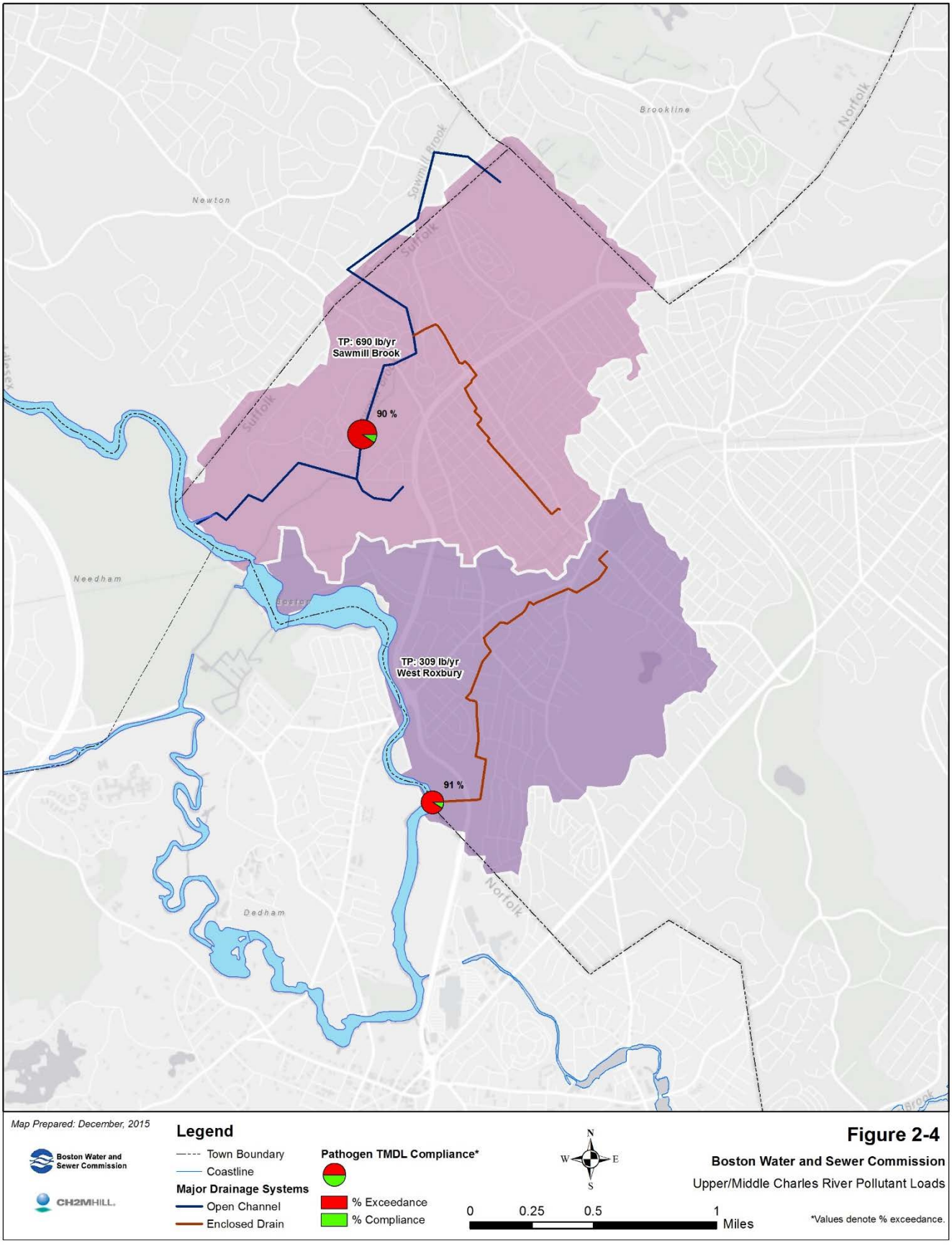
> *The geometric mean of all E. coli samples taken within the most recent six months shall not exceed 126 colonies per 100 mL typically based on a minimum of five samples and no single sample shall exceed 235 colonies per 100 ml.*

The 2015 Stormwater Model Report simulated *E. coli* concentrations in the Sawmill Brook over the course of a 3-year simulation and determined that the frequency of exceeding the water quality standard was 100 percent of the time. The receiving water quality analysis was expanded upon to analyze the simulated compliance with the pathogen TMDL at both the Sawmill Brook and the Spring Street Brook discharges. The simulated pathogen concentrations exceeded the TMDL 25 percent of the time for Sawmill Brook and 78 percent of the time for Spring Street Brook. Figure 2-4 also presents the pathogen TMDL compliance.

2.1.2 Lower Charles River Watershed

The Lower Charles River watershed is the largest watershed within the Commission's MS4. It includes portions of West Roxbury, Roslindale, Hyde Park, Mattapan, Dorchester, Roxbury, Jamaica Plain, Back Bay, Fenway/Kenmore, Allston-Brighton, and Charlestown. The watershed abuts portions of the Town of Brookline and the City of Newton, which both contribute flows to the Lower Charles River via the Commission's MS4.

FIGURE 2-4
Upper/Middle Charles River Pollutant Loads



2.1.2.1 Tributary Rivers and Conduits

The Lower Charles River watershed is comprised of three large watersheds: (1) Muddy River, (2) Stony Brook, and (3) Other Lower Charles. The drainage network and reporting areas for the Lower Charles River watersheds are shown in Figures 2-5 and 2-6.

Muddy River

The Muddy River drainage system begins in the headwaters of the Muddy River in the Town of Brookline near Jamaica Pond, flows through the Jamaica Plain neighborhood and continues along the municipal boundary between Brookline and Boston before crossing through the Fenway/Kenmore and Back Bay neighborhoods. The Muddy River discharges into the Lower Charles River at SDO023, 200 feet west of the Stony Brook Outfall, MWR023. The Muddy River system also includes the Muddy River Conduit, an enclosed conduit that conveys bypassed flow from the Brookline Avenue Gatehouse to the Charles River at SDO042. The Brookline Avenue Gatehouse typically directs flow through the Back Bay Fens under several major transportation arteries including the Massachusetts Turnpike, Commonwealth Avenue, Beacon Street, and Storrow Drive. During periods of high flow, flow can overtop the gate structure and overflow into the Muddy River Conduit, bypassing the Back Bay Fens.

The Village Brook drainage system begins in Newton (main branch) and Brookline (south branch). The main branch extends past the Chestnut Hill Reservoir through Allston-Brighton before continuing through Brookline and flows into the Muddy River at Leverett Pond in Fenway. The Muddy River itself is primarily an open channel, but its two tributaries (Village Brook and Tannery Brook) are enclosed conduit systems with the exception of a 100-foot section near the Chestnut Hill Reservoir.

The ongoing Muddy River Restoration project includes flood control, water quality improvements, landscape restoration, as well as habitat enhancement for the area between the Charles River and Perkins Street by Jamaica Pond, specifically including Charlesgate, the Back Bay Fens, the Riverway, Leveret Pond, Willow Pond, and Wards Pond. Stream restoration, including daylighting an urban stream, can improve the health of its ecological system and subsequently increase the waterbody's capability to assimilate nutrients and promote pathogen die-off rates.

Stony Brook

The Stony Brook system begins in the Hyde Park neighborhood and continues along the Southwest Corridor through Roslindale, Dorchester, Jamaica Plain, and Fenway/Kenmore to the Charlesgate area of Back Bay. The majority of the Stony Brook system is enclosed, but portions of several tributaries include open channels. The Stony Brook system has two gate control structures: Boston Gatehouse #1 and the MWRA Charlesgate gatehouse at Outfall MWR023. Boston Gatehouse #1 is located in Fenway near the Boston Museum of Fine Arts. When the gates at Gatehouse #1 are closed, Stony Brook flows are directed through the Foul Flow Conduit to the Charles River at outfall MWR023. When the gates at Gatehouse #1 are opened, Stony Brook flow is routed directed to the Muddy River and eventually the Charles River at the Muddy River's discharge point.

The Stony Brook system essentially consists of three parts. The Upper portion is completely separated. Separation of the Middle portion was completed around 2005; however, the Middle portion contains six permitted regulators that may activate during 1-year design storms; therefore, the Middle system still acts (under certain conditions) as a combined sewer system. The Lower portion of the Stony Brook system still contains combined sewers, although overflow may occur during certain design level storm events.

FIGURE 2-5

Lower Charles River – Muddy River and Stony Brook Stormwater Drainage System

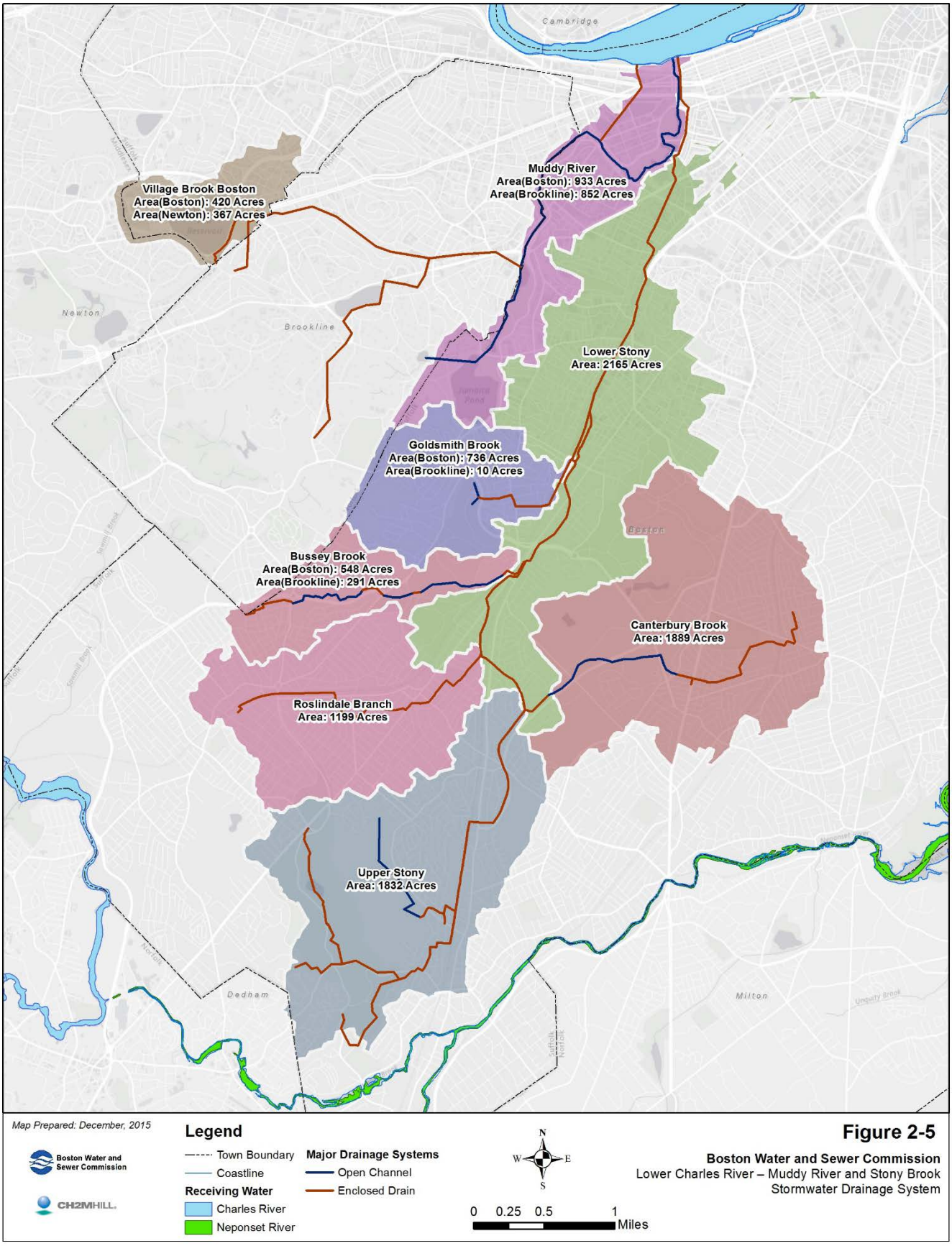
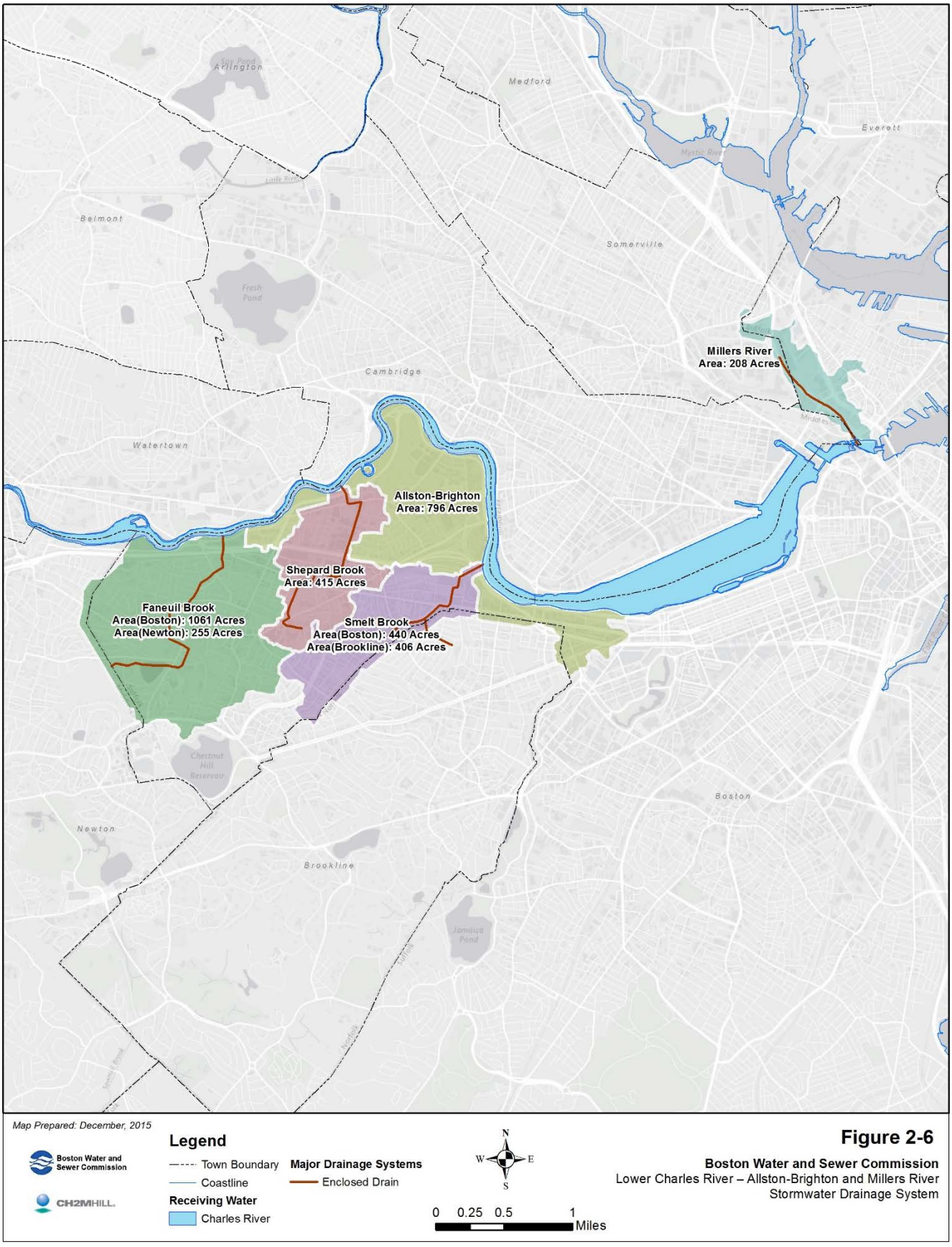


FIGURE 2-6

Lower Charles River – Allston-Brighton and Millers River Stormwater Drainage System



The Stony Brook system's tributaries include:

- Myopia Brook: Begins in the Roslindale neighborhood and is primarily an open channel along the George Wright Golf Course before becoming enclosed before discharging to Stony Brook in Hyde Park.
- Canterbury Brook: Begins as an enclosed drain in South Dorchester and becomes an open channel as it crosses through the Forest Hills area before becoming an enclosed conduit before discharging into Stony Brook in Roslindale.
- The Roslindale Branch of Stony Brook: Enclosed conduit system that extends through the center of Roslindale before discharging into the main branch of Stony Brook.
- Bussey Brook: Begins as an enclosed conduit along the boundary of West Roxbury and Brookline. Portions of Bussey Brook are open channel as it continues through the Allendale Woods and Arnold Arboretum before becoming enclosed before discharging into Stony Brook.
- Goldsmith Brook: Consists of two branches of enclosed conduits that begin in Jamaica Plain and become open channels as each cross through the Arnold Arboretum. The brook becomes an enclosed system as it leaves the arboretum and then discharges into the Stony Brook conduit.

Allston-Brighton

The Allston-Brighton drainage area comprises the Faneuil Brook, Shepard Brook, and Smelt Brook systems, which each discharge into the Lower Charles River. These systems are primarily located within the Allston-Brighton neighborhood and extend into Newton and Brookline and consist of the following:

- Faneuil Brook: Begins in Newton and is primarily an enclosed system with a partially open section above Chandler Pond in Brighton. The drain extends through Brighton before discharging to the Lower Charles.
- Sheppard Brook: Begins in Brighton and is an enclosed conduit that has been rerouted along Everett Street from its former course across North Harvard Street before discharging into the Lower Charles.
- Smelt Brook: Begins in Brookline and is an enclosed conduit that extends through Allston before discharging into the Lower Charles.

Millers River

There is one additional Lower Charles drainage area that is isolated from the others: Millers River, located mostly in Charlestown. The Millers River drainage area also includes portions of the Cities of Cambridge and Somerville and is primarily drained through an enclosed conduit that becomes an open channel at its downstream end before discharging into the Lower Charles River just upstream of the Charles River dam.

2.1.2.2 Drainage Areas

General Description. Table 2-1 provides the reporting areas, drainage areas, and percent impervious for the Stony Brook, Muddy River, and other Lower Charles (Allston-Brighton and Millers River) watersheds.

The drainage area within the Stony Brook watershed is 8,670 acres (13.5 square miles), of which 45 percent (3,902 acres) is impervious area (CDM Smith, 2015). As shown in Figure 2-5, the drainage area is made up of six reporting areas (Upper Stony, Canterbury Brook, Roslindale Branch, Bussey Brook, Goldsmith Brook, and Lower Stony). The reporting areas vary in size from 746 acres (Goldsmith) to 2,165 acres (Lower Stony) and vary in percent impervious between 28 percent (Bussey Brook) and 59 percent (Lower Stony), as shown in Table 2-1.

The drainage area within the Muddy River catchment is 4,633 acres (7.2 square miles) of which 42 percent (1,946 acres) is impervious area (CDM Smith, 2015). As shown in Figure 2-5, the drainage area is made up of three reporting areas (Village Brook Boston, Village Brook Brookline, and Other Muddy River). The reporting areas vary in size from 787 acres (Village Brook Boston) to 2,061 acres (Village Brook Brookline) and vary in

percent impervious between 36 percent (Village Brook Brookline) and 52 percent (Other Muddy River) as shown in Table 2-1.

The drainage area within the Allston-Brighton catchment is 3,373 acres (5.3 sq. miles) of which 61 percent (2,058 acres) is impervious area (CDM Smith, 2015). As shown in Figure 2-6, the drainage area is made up of four reporting areas (Faneuil Brook, Shepard Brook, Smelt Brook, and Allston-Brighton). The reporting areas vary in size from 415 acres (Shepard Brook) to 1,316 acres (Faneuil Brook) and vary in percent impervious between 45 percent (Faneuil Brook) and 78 percent (Shepard Brook) as shown in Table 2-1.

The drainage area within the Millers River catchment is 208 acres (0.3 square mile) of which 56 percent (116 acres) is impervious area (CDM Smith, 2015). As shown in Figure 2-6, the drainage area is made up of a single reporting area: Millers River.

Land Uses. Figure 2-7 presents the land uses within the Muddy River and Stony Brook drainage areas of the Lower Charles watershed. A tabulation of the area within each land use category is also shown on the figure.

The Muddy River drainage area is primarily divided between residential and urban public/institutional uses, with the residential areas concentrated in the Lower section of the catchment and urban public/institutional and commercial uses in the Upper section of the catchment. This section of the City has a considerable amount of urban public/institutional land use associated with medical care facilities and academic institutions.

The Stony Brook drainage area is primarily residential and urban open space/forest. Commercial, industrial, and transportation uses are concentrated along the Southwest Corridor and major transportation routes including VFW Parkway, Centre Street, Columbus Avenue, and Washington Street.

Figure 2-8 presents the land uses within the Allston-Brighton and Millers River drainage areas of the Lower Charles River watershed. The Allston-Brighton drainage area is primarily divided between residential and a mixture of transportation, commercial/industrial, parking, and urban public/institutional areas. The residential areas are concentrated in the areas south of the Massachusetts Turnpike. The Commercial, Industrial, Parking, Transportation, commercial, industrial, parking, transportation, and urban public/institutional areas are concentrated along the Massachusetts Turnpike corridor and along the banks of the Charles River. The Millers River drainage area is primarily parking, transportation, and industrial land concentrated along the Interstate 93 and railroad corridor between the Charles River and the city of Somerville.

FIGURE 2-7

Lower Charles River – Muddy River and Stony Brook Land Use Distribution

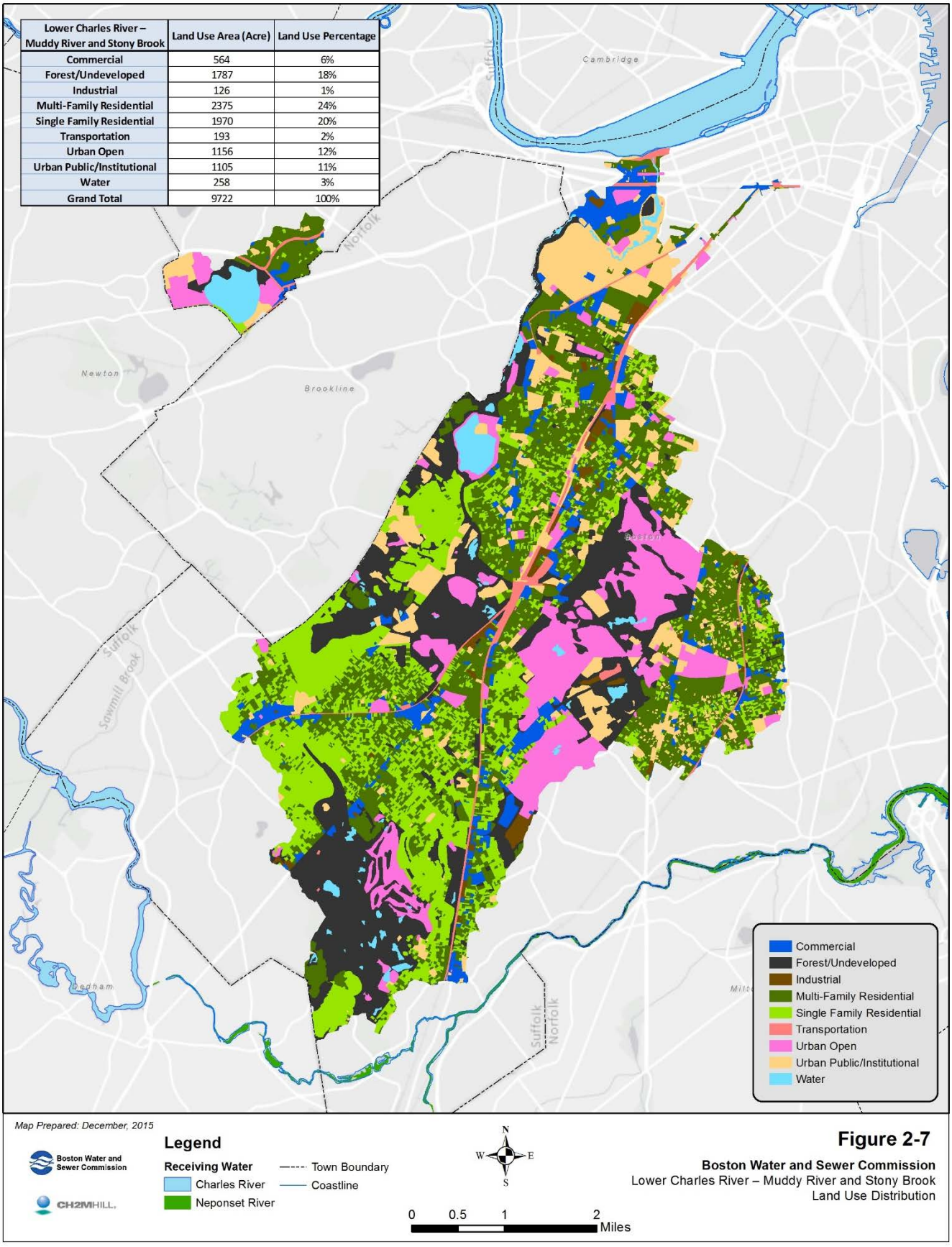
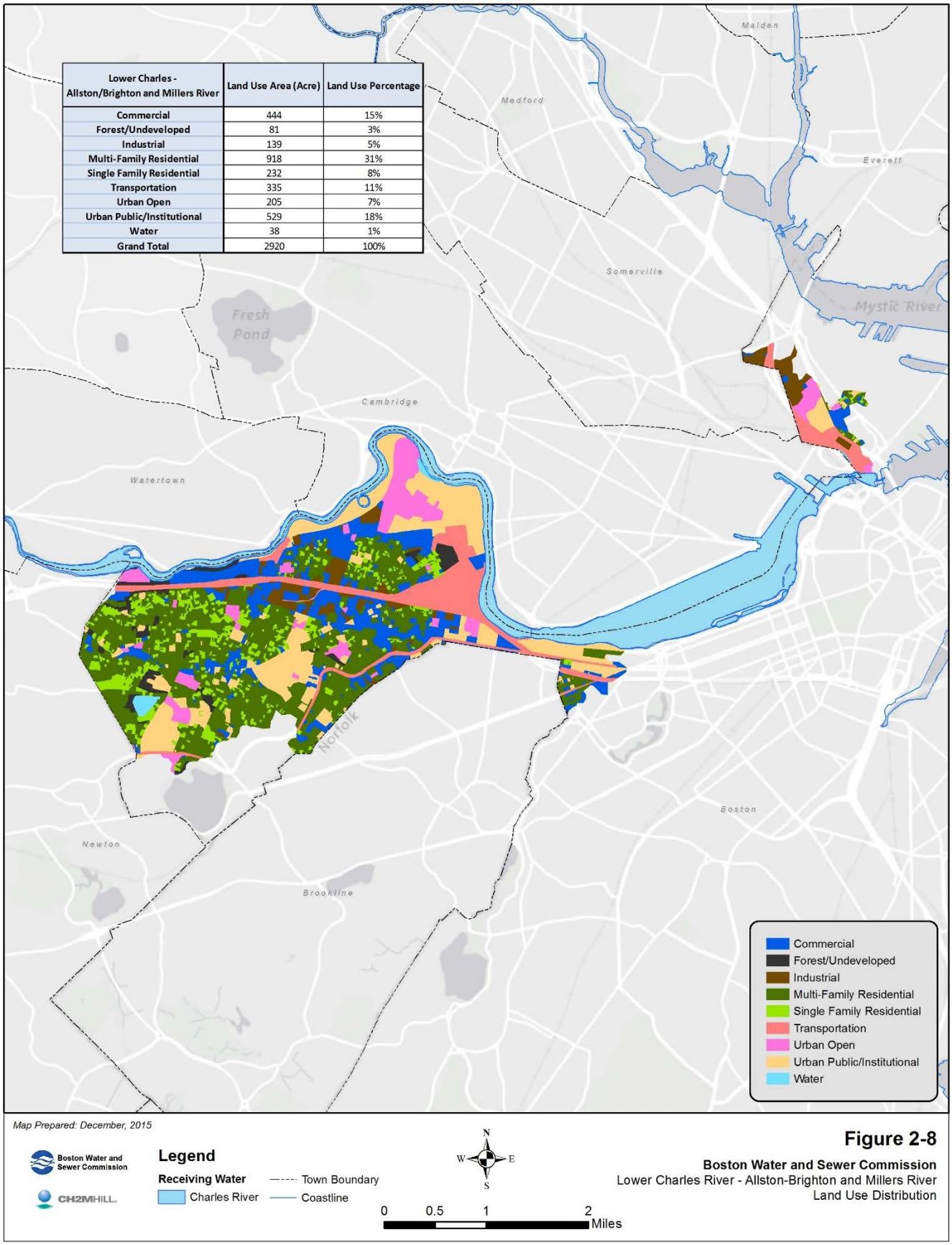


FIGURE 2-8

Lower Charles River - Allston-Brighton and Millers River Land Use Distribution



2.1.2.3 TMDL Waste Load and Waste Load Allocation

TMDLs are prescribed for the Lower Charles River watershed between the Watertown Dam and the Charles River Dam, which outlets to Boston Harbor. Unlike the Upper/Middle Charles River watershed, the Lower Charles River watershed's phosphorus TMDL waste load is allocated by subwatershed. The Lower Charles River TMDL also accounts for waste load from the Upper/Middle Charles River watershed.

As discussed in Section 1.2.2, the TMDL for the Lower Charles River establishes a total waste load of 15,428 lb/yr of total phosphorus from the Stony Brook watershed, Muddy River watershed, and other Lower Charles watershed. The existing mean annual total loads of total phosphorus and Pathogens from BWSC drainage areas to the Lower Charles River, as estimated by the 2015 Stormwater Model Report, are presented in Table 2-3.

TABLE 2-3
Lower Charles River Watershed Existing Waste Loads
Total Phosphorus and Pathogens

TMDL	Reporting Area		Mean Annual Waste Load [1]
Total Phosphorus, lb/yr	Stony Brook Total		6,873
	Muddy River Total		3,285
	Other Lower Charles total		3,298
		Total	*14,456*
E. coli, 10^9 CFU/yr	Stony Brook Total		1,700,957
	Muddy River Total		812,773
	Other Lower Charles total		1,112,196
		Total	*3,910,448*
Enterococcus 10^9 CFU/yr	Stony Brook Total		802395
	Muddy River Total		455,469
	Other Lower Charles total		695,113
		Total	*2,136,974*
Fecal Coliform, 10^9 CFU/yr	Stony Brook Total		1,927,244
	Muddy River Total		822,618
	Other Lower Charles total		914,968
		Total	*3,911,253*

[1] 2015 *Stormwater Model Report* (CDM Smith, 2015)

The simulated total phosphorus waste loads from the seven reporting areas that contribute to the Muddy River and Stony Brook watersheds are presented in Figures 2-9 and 2-10.

FIGURE 2-9
Lower Charles River – Muddy River and Stony Brook Pollutant Loads

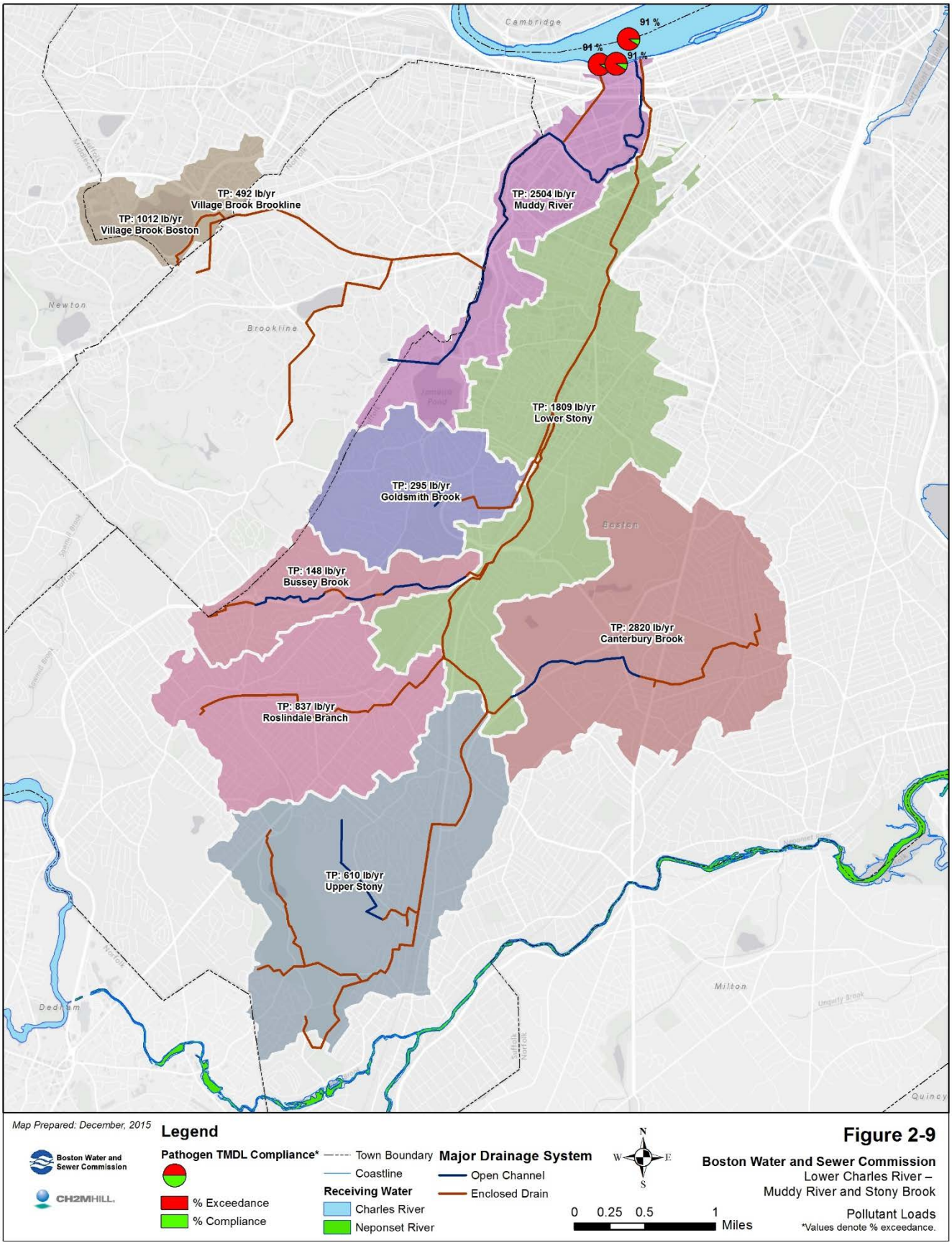


FIGURE 2-10
Lower Charles River -Allston-Brighton and Millers River Pollutant Loads

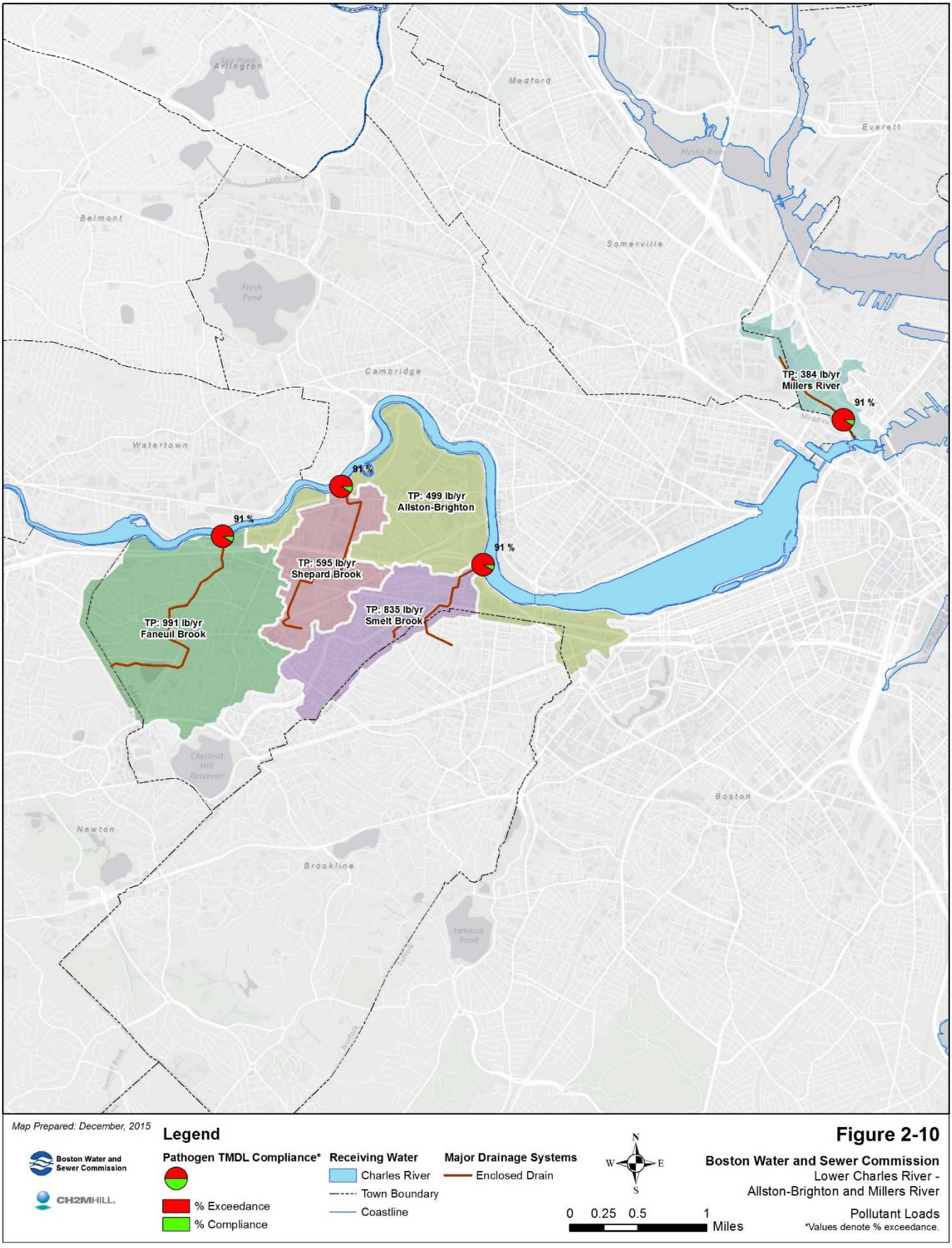


Table 2-3 presented the mean annual waste load of pathogens, but the annual loading does not provide an indication of the frequency where pathogen concentrations exceed the applicable water quality standards for the Lower Charles River. The Lower Charles River is classified as a Class B (CSO) surface water. Several of the tributary streams and brooks that drain into the Lower Charles River have open channel segments that are classified as Class B surface waterbodies, which have *E. coli* as its indicator bacteria (water quality standard: less than 126 colonies per 100 mL typically based on a minimum of five samples and no single sample shall exceed 235 colonies per 100 ml).

The 2015 *Stormwater Model Report* simulated *E. coli* concentrations in the open channel portions of Canterbury Brook, Bussey Brook, and the Upper portion of Stony Brook over the course of a 3-year simulation and determined that the frequency of *E. coli concentrations* exceeding the water quality standard was 100 percent of the time for Canterbury and Bussey Brook and 70 percent of the time for Upper Stony Brook. The Commission's storm drain model was not specifically designed to model receiving water quality. However, the previous receiving water quality analysis was expanded to analyze the frequency of exceeding the bacterial standards at the discharge points from several of the main tributaries to the Lower Charles River including the Stony Brook, Muddy River, Faneuil Brook, Shepard Brook, Smelt Brook, and Millers River. Figures 2-9 and 2-10 and Table 2-4 present the results of the receiving water quality analysis.

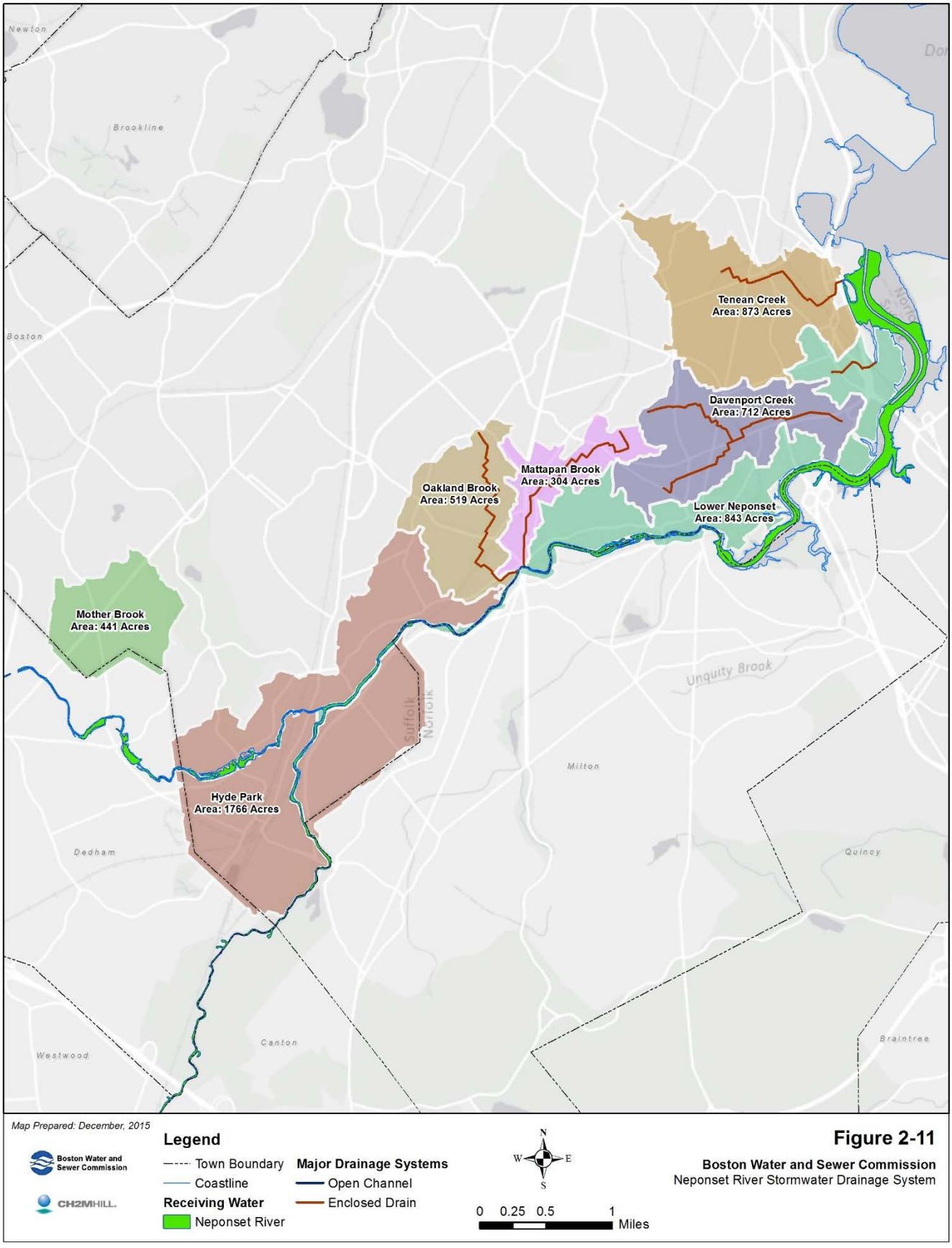
TABLE 2-4
Lower Charles River Tributary Frequency of Water Quality Standard Exceedance
E. coli

Tributary	Frequency of *E. coli* Exceedance
Stony Brook	100%
Muddy River	100%
Faneuil Brook	100%
Shepard Brook	100%
Smelt Brook	100%
Millers River	100%

2.1.3 Neponset River Watershed

The Neponset River Watershed is located along the southern border of Boston that abuts the Neponset River, the town of Dedham, the town of Milton, and the city of Quincy. The Neponset River Watershed, its drainage network, and reporting areas are shown in Figure 2-11.

FIGURE 2-11
Neponset River Stormwater Drainage System



2.1.3.1 Tributary Streams/Brooks

The core components of the BWSC model's Neponset River catchment are the Neponset River tributaries in Boston, including Mother Brook (open channel), Oakland Brook (enclosed), Mattapan Brook (enclosed), Davenport Creek (enclosed), Lower Neponset (Pine Neck Creek enclosed), and Tenean Creek (enclosed). Mother Brook is an open channel that extends between the Charles River in Dedham and where it discharges into the Neponset River in Hyde Park. Oakland Brook and Mattapan Brook are enclosed drains in Mattapan that discharge into the Neponset River near Fairmont Hill area. Davenport Creek, Pine Neck Creek, and Tenean Creek are enclosed drains in South Dorchester that discharge directly into the Neponset River at its downstream end.

2.1.3.2 Drainage Areas

General Description. The BWSC drainage area within the Neponset River catchment is 5,458 acres (8.5 square miles); 50 percent (2,729 acres) of which is impervious area (CDM Smith, 2015). As shown in Figure 2-11, the drainage area is made up of seven reporting areas (Mother Brook, Hyde Park, Oakland Brook, Mattapan Brook, Lower Neponset, Tenean Creek, and Davenport Creek). The reporting areas vary in size from 304 acres (Mattapan Brook) to 1,766 acres (Hyde Park) and vary in percent impervious from 25 percent (Lower Neponset) to 65 percent (Mattapan Brook) as shown in Table 2-1.

Land Use. Figure 2-12 presents the land uses within the Neponset River Watershed. The catchment is predominantly residential, but non-residential uses (industrial, commercial, urban public/institutional) are concentrated near major transportation centers including the Readville commuter rail station, Mattapan Massachusetts Bay Transportation Authority (MBTA) station, Central Avenue MBTA Station, Milton Village, and Interstate 93/Morrissey Boulevard.

2.1.3.3 TMDL Waste Load and Waste Load Allocation

As discussed in Section 1.2.4, the Neponset River does not have a nutrient TMDL, but does have a bacterial TMDL that was published in 2002. However, the updated receiving water quality analysis simulated the potential total phosphorus waste loads from the five reporting areas discharging to the Neponset River. The total phosphorus waste loads are presented in Figure 2-13. The bacteria TMDL was issued for fecal coliform before Massachusetts transitioned to using *E. coli* and *enterococci* as the indicator organisms for bacterial water quality standards.

The 2015 *Stormwater Model Report* estimated existing total phosphorus and pathogen mean annual total loads to the Neponset River from the BWSC storm drainage system, as summarized in Table 2-5. The data in Table 2-5 are shown as the sum of the loads from the seven individual reporting areas in the BWSC system model (Mother Brook, Hyde Park, Oakland Brook, Mattapan Brook, Lower Neponset, Tenean Creek, and Davenport Creek) that contribute flow to the Neponset River.

FIGURE 2-12
Neponset River Land Use Distribution

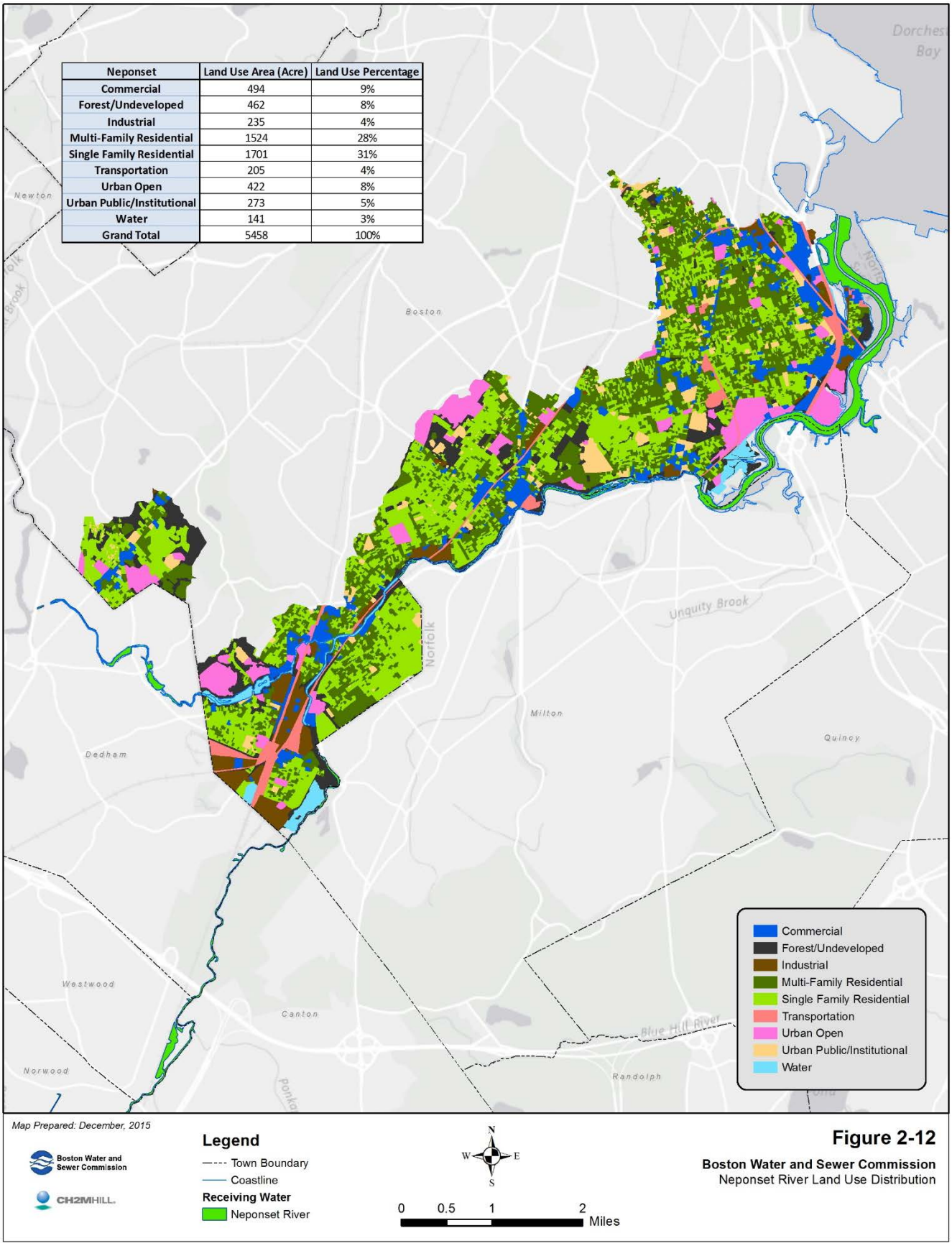


TABLE 2-5
Neponset River Watershed Estimated Existing Waste Loads Based on 2012 Model
Total Phosphorus and Pathogens

Water Quality Parameter	Reporting Area	Mean Annual Waste Load [1]
Total Phosphorus, lb/yr	Neponset River Total	5,476
E. coli, 10^9 CFU/yr	Neponset River Total	1,816,537
Enterococcus, 10^9 CFU/yr	Neponset River Total	833,939
Fecal Coliform, 10^9 CFU/yr	Neponset River Total	1,911,396

[1] 2015 *Stormwater Model Report* (CDM Smith, 2015)

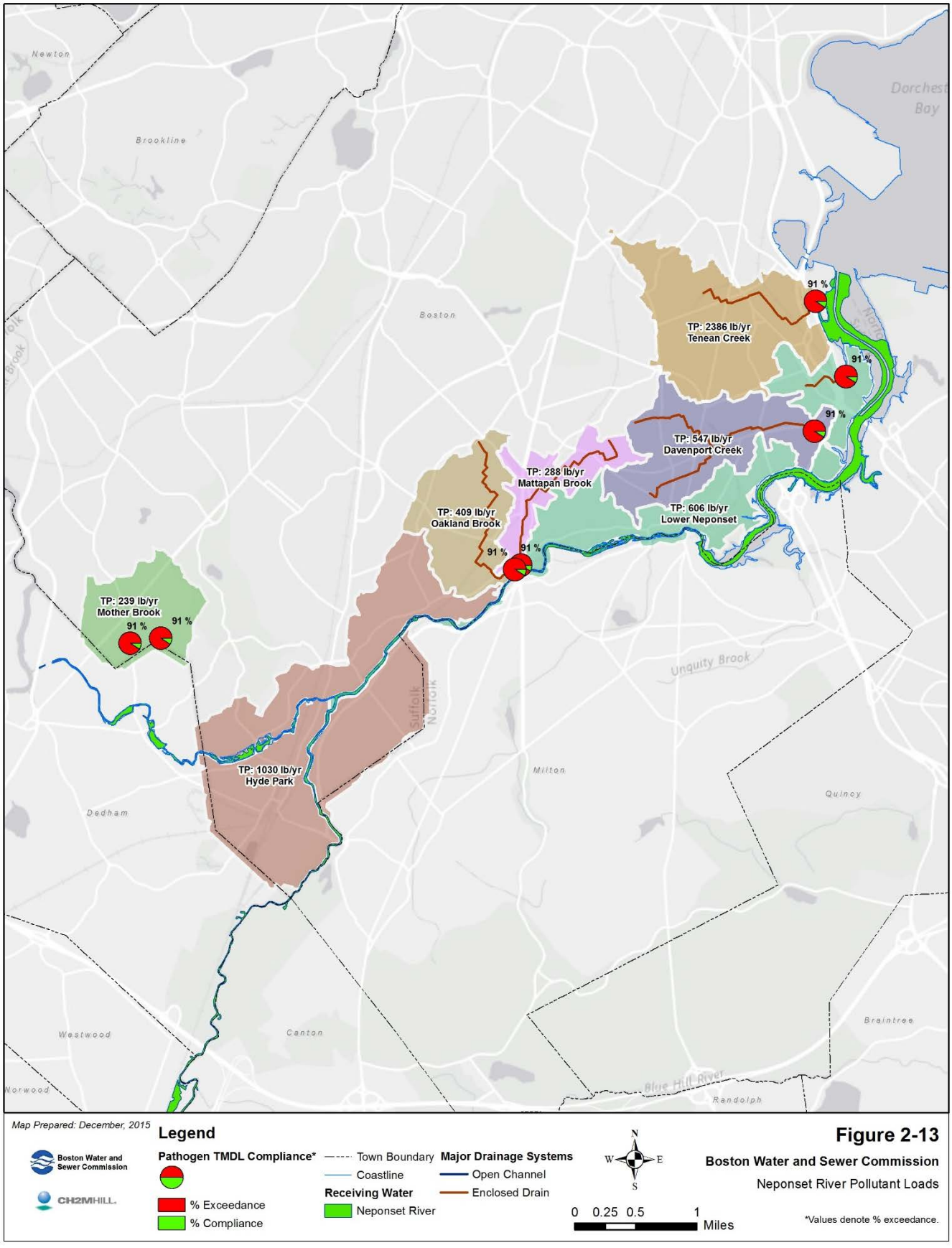
The 2012 *Stormwater Modeling project* did not analyze any of the Neponset River tributaries to determine the frequency of bacteria water quality standard exceedance. That analysis was therefore conducted as part of this study for the six streams within the Commission's MS4 that are tributary to the Neponset River using fecal coliform and *enterococci* as the indicator bacteria.

Figure 2-13 and Table 2-6 present the results of said receiving water quality analysis based on the Commission's stormwater model results.

TABLE 2-6
Neponset River Tributary Frequency of Water Quality Standard Exceedance
E. coli

Tributary	Frequency of *E. coli* Exceedance
Mother Brook	96%
Oakland Brook	100%
Mattapan Brook	100%
Davenport Creek	100%
Pine Neck Creek	100%
Tenean Creek	100%

FIGURE 2-13
Neponset River Pollutant Loads



2.1.4 Boston Harbor Watershed

The other receiving water that the Commission's storm drain system and combined sewer system discharge into is Boston Harbor. As shown in Figure 2-1, the primary separated storm drain areas of the BWSC service area that contribute stormwater flow to Boston Harbor are the following:

- Charlestown (not including Millers River watershed)
- East Boston
- Downtown Boston (North End, West End, Back Bay, South End, South Boston, and Roxbury)
- Dorchester

2.1.4.1 Tributary Streams/Brooks

There are no tributary streams or brooks within the Commission's drainage network that discharge directly to Boston Harbor. Instead, stormwater runoff flows directly to Boston Harbor through dozens of outfalls. The reporting areas for Boston Harbor are shown in Figure 2-14.

2.1.4.2 Drainage Areas

General Description. The Boston Harbor catchment consists of four reporting areas: Charlestown, East Boston, Downtown, and Dorchester. The reporting areas vary in size from 438 acres (East Boston) to 1,124 acres (Dorchester) and vary in percent impervious from 68 percent (East Boston) to 94 percent (Downtown) as shown in Table 2-1.

Land Uses. Figure 2-15 presents the land uses within the Boston Harbor catchment. The catchment is predominantly residential in Dorchester and portions of the Charlestown and East Boston reporting areas. Non-residential uses (commercial, industrial, and urban public/institutional) are concentrated along the Boston Harbor waterfront areas of the four reporting areas.

2.1.4.3 TMDL Waste Load and Waste Load Allocation

As discussed in Section 1.2.5, a draft TMDL for pathogens in the Boston Harbor Watershed was issued by MassDEP in 2005. The TMDL is still in draft form and has not been finalized. The receiving water quality analysis did simulate the total phosphorus and pathogen loads for the Boston Harbor reporting areas. The total phosphorus waste loads and draft pathogen TMDL compliance are presented in Figure 2-16.

The 2015 *Stormwater Model Report* estimated the existing total phosphorus and pathogen mean annual total loads as presented in Table 2-7. The data are shown as the sum of the loads from the four reporting areas (Charlestown, East Boston, Downtown, and Dorchester) that contribute flow to the Boston Harbor. See Appendix A for the existing mean annual total loads for 13 water quality parameters as estimated by the 2015 *Stormwater Model Report* and the 2014 simulation for the 27 reporting areas.

FIGURE 2-14
Boston Harbor Stormwater Drainage System

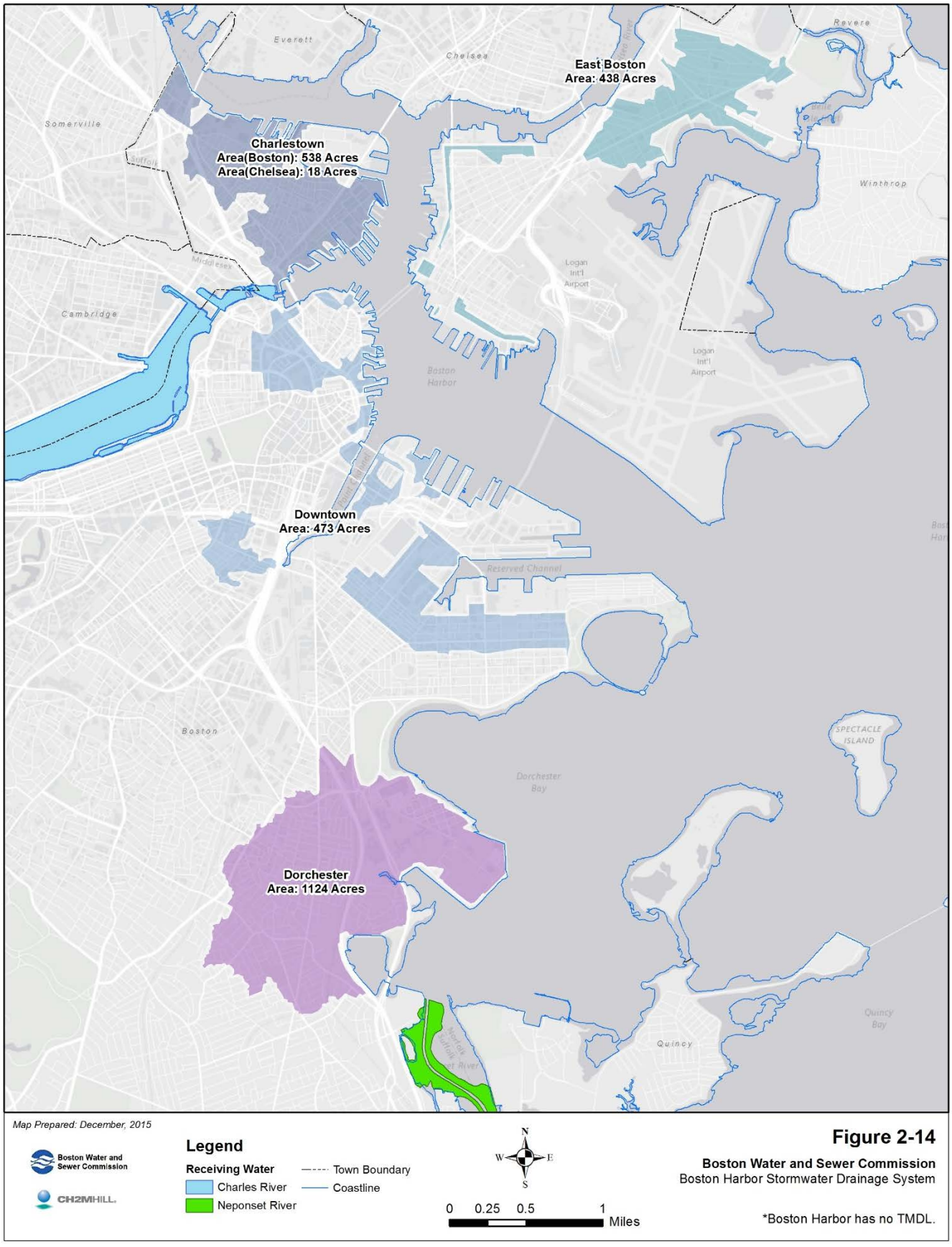
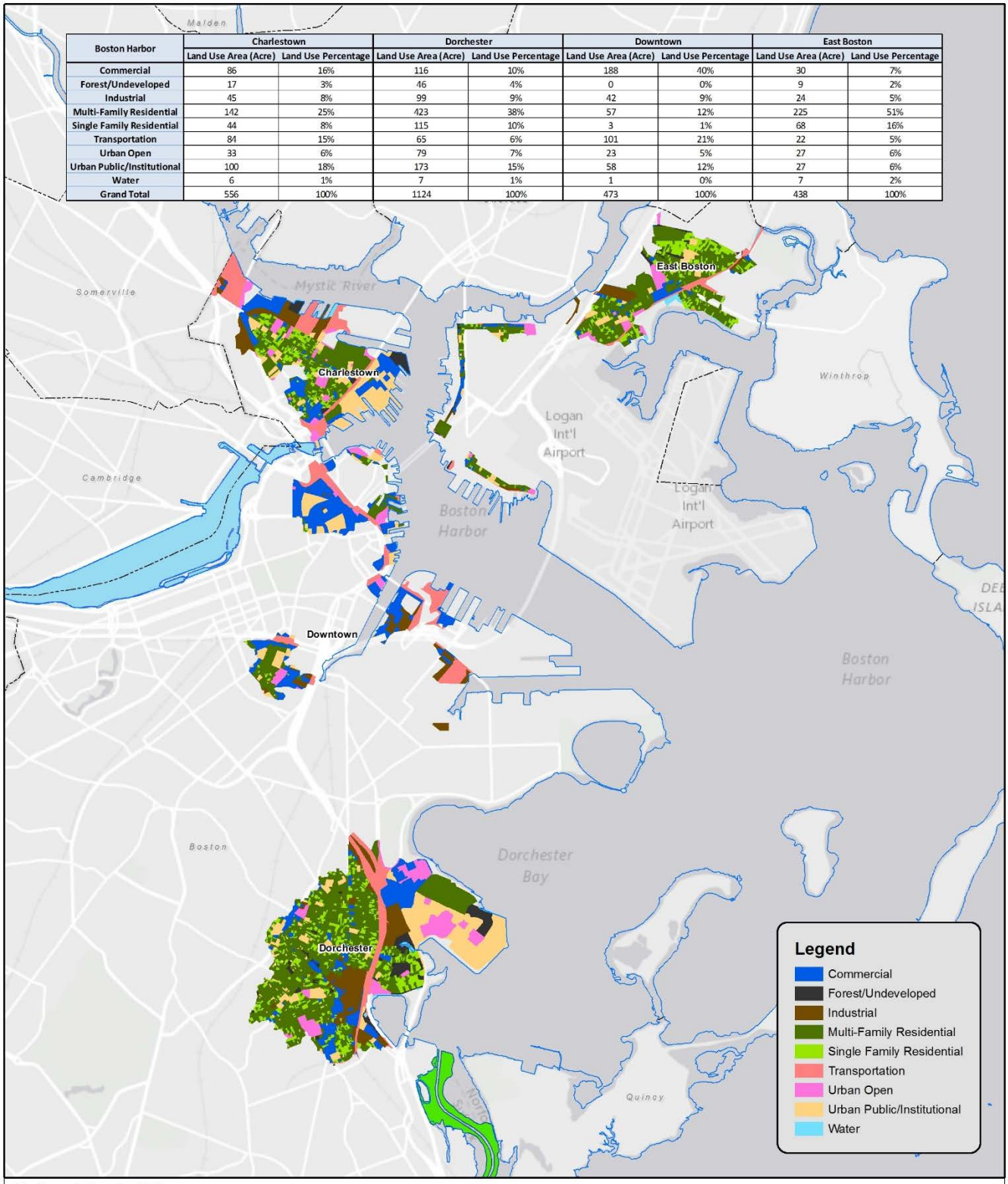


FIGURE 2-15

Boston Harbor Land Use Distribution

Boston Harbor	Charlestown		Dorchester		Downtown		East Boston	
	Land Use Area (Acre)	Land Use Percentage	Land Use Area (Acre)	Land Use Percentage	Land Use Area (Acre)	Land Use Percentage	Land Use Area (Acre)	Land Use Percentage
Commercial	86	16%	116	10%	188	40%	30	7%
Forest/Undeveloped	17	3%	46	4%	0	0%	9	2%
Industrial	45	8%	99	9%	42	9%	24	5%
Multi-Family Residential	142	25%	423	38%	57	12%	225	51%
Single Family Residential	44	8%	115	10%	3	1%	68	16%
Transportation	84	15%	65	6%	101	21%	22	5%
Urban Open	33	6%	79	7%	23	5%	27	6%
Urban Public/Institutional	100	18%	173	15%	58	12%	27	6%
Water	6	1%	7	1%	1	0%	7	2%
Grand Total	556	100%	1124	100%	473	100%	438	100%



Map Prepared: December, 2015

Boston Water and Sewer Commission

CH2MHILL

Legend

Town Boundary

Coastline

Receiving Water

Charles River

Neponset River

N W E S

0 0.5 1 2 Miles

Figure 2-15

Boston Water and Sewer Commission

Boston Harbor Land Use Distribution

*Boston Harbor has no TMDL.

TABLE 2-7
Boston Harbor Watershed Waste Loads
Total Phosphorus and Pathogens

TMDL	Reporting Area	Mean Annual Waste Load [1]
Total Phosphorus, lb/yr	Charlestown	1,963
	East Boston	1,104
	Downtown	1,485
	Dorchester	2,304
E. coli, 10^9 CFU/yr	Charlestown	776,732
	East Boston	431,868
	Downtown	395,901
	Dorchester	689,012
Enterococcus, 10^9 CFU/yr	Charlestown	517,080
	East Boston	251,850
	Downtown	216,161
	Dorchester	400,144
Fecal Coliform, 10^9 CFU/yr	Charlestown	512,076
	East Boston	313,170
	Downtown	484,352
	Dorchester	684,516

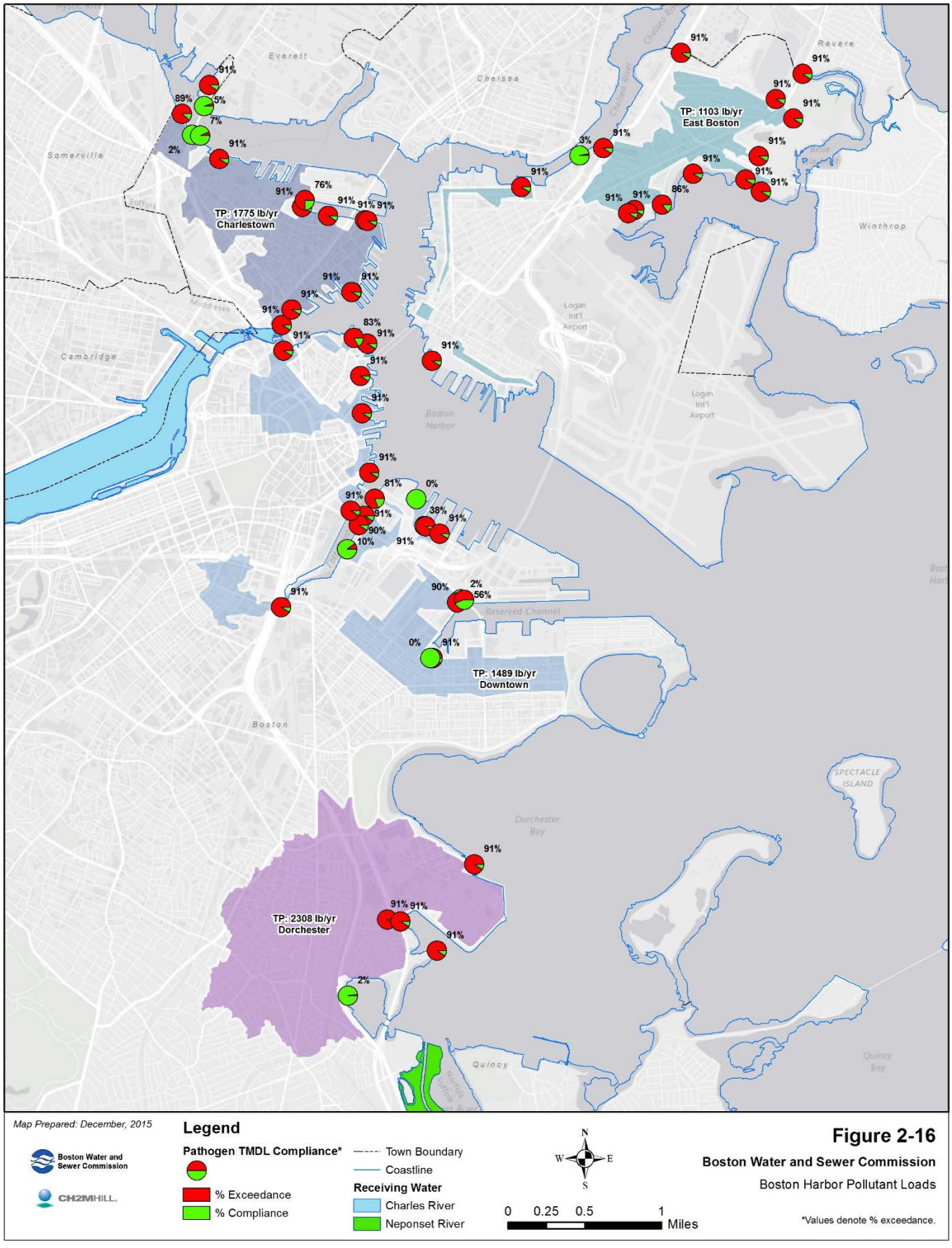
[1] 2015 Stormwater Model Report, CDM Smith, 2015

The 2015 Stormwater Model Report did not analyze any of the Boston Harbor reporting areas to determine the frequency of bacterial water quality standard exceedance. Therefore, this analysis was conducted for the Boston Harbor's four reporting areas. Table 2-8 presents the results of that receiving water quality analysis.

TABLE 2-8
Boston Harbor Frequency of Water Quality Standard Exceedance
Pathogens

Reporting Area	Frequency of Exceedance for Fecal Coliform / Enterococcus
Charlestown	69%
East Boston	90%
Downtown	79%
Dorchester	69%

FIGURE 2-16
Boston Harbor Pollutant Loads



2.2 Current Practices

The Commission is committed to an assortment of ongoing stormwater management programs focused on the prevention of pollutant discharges to storm drains and receiving waters. These programs include O&M of stormwater infrastructure (capacity management, operations, and maintenance [CMOM]), sewer system overflow control and response, the CWI IDDE Program, and Site Plan Review for development and redevelopment projects.

The Commission supports and actively coordinates with the City of Boston in a variety of citywide stormwater related management programs including citywide street sweeping, GI demonstration projects, the Grow Boston Greener campaign, and the CSI.

2.2.1 Operation and Maintenance of Stormwater Infrastructure

The Commission has several programs in place to maintain the storm drain system's capacity and condition to prevent CSOs, SSOs, and infiltration and inflow (I/I) through routine O&M activities including the following:

- Cleaning, inspection, repair, and replacement of storm drain infrastructure assets.
- Cleaning of sewer and storm drain pipe: In 2013, the Commission jetted, vactored, or rodded 367,763 linear feet of pipe resulting in the removal of 582 cubic yards of material (BWSC, 2013).
- Television inspection of sewer and drain pipe: In 2013, the Commission performed 68,558 linear feet of sewer and drain pipe closed circuit television (CCTV) inspections (BWSC, 2013). The Commission has implemented a program to significantly increase the amount of pipe inspections.
- Inspection and maintenance of brook inlets/outlets: The Commission routinely inspects and cleans debris from 12 brook inlets and outlets within the storm drain system network.
- Catch basin inspections and maintenance: The Commission has approximately 30,803 catch basins in the sewer and storm drain systems. In 2013, 10,301 catch basins were cleaned, producing an estimated 11,110 cubic yards of catch basin cleanings (BWSC, 2013).
- Particle separator inspection and maintenance: The Commission annually inspects and cleans the 16 particle separators located in the storm drain system. All 16 particle separators were inspected in 2013 and 7 required cleaning (BWSC, 2013).
- Capital improvement projects: The Commission's 2013-2015 Capital Improvement Program (CIP) includes $86.6 million for sewer and drain-related projects.

2.2.2 Sanitary System Overflow Control and Response

The Commission implemented an SSO response plan on September 23, 2012. The program was focused on improving the tracking and reporting of all SSOs to USEPA and MassDEP within 24 hours. The program leverages a tablet computer application and an SSO database supported by a *Sanitary Sewer Overflow Emergency Response Plan* (SSOERP) that was submitted on November 21, 2012 (CH2M HILL, 2012). The SSOERP provides a set of standard operating procedures for the Commission to follow beginning with the receipt of the potential SSO, responding to the SSO, documenting and reporting the event, and finishing with notifying the public and regulatory agencies of the event.

2.2.3 Illicit Connection Investigations

Illicit connections are a source of contamination in all urban storm drain systems. The Commission is one of the major New England utilities that has been developing and improving its strategies for identifying and eliminating such connections over many years. The methodology developed by the Commission has proven to be effective and has been used by other organizations as a reference program.

The Commission began investigating illicit connections in 1986. Since 1999, the Commission has maintained a systematic field program to investigate illegal connections.

- The Stony Brook Illicit Connection Investigation Program (SBI) was carried out between 1999 and 2005.
- The CWI Program Phase 1 was carried out between 2004 and 2008.
- The CWI Program Phase 2 was carried out between 2008 and 2012.
- The CWI Program Phase 3 began in 2012 and will be ongoing through 2016.

The objective of the CWI Program is to identify and eliminate illicit sanitary connections from buildings to the Commission's separated storm drain system. Field investigations are completed over a period of 4 years by the Commission's CWI program manager. The field investigations are conducted with minimal field equipment and no confined space entry. Field protocols developed for this project are based primarily on visual and olfactory observations as well as the results of field test kits, portable instrumentation, and building dye tests. In combination, these techniques provide a thorough inspection of the study area storm drains in a systematic and prioritized manner. These fundamentals are enhanced by an "adaptive implementation" approach wherein new methods are considered and integrated into the program over the life of the project.

A dry weather outfall screening program is implemented during the months of March through October each year. If flow is observed during screening, a sample is obtained and tested in the field using the same test kits as for manhole inspections. A sample is also sent to a laboratory for bacterial analysis.

Recent efforts have been focused on streamlining data management and interpretation to improve the quality of data and accelerate the rate of fieldwork. The field inspections are captured in a customized report using a small portable unit. The report includes inspection data and allows for digital sketches to be added. Each record contains a unique identifier of the feature being inspected that acts as the link to the Commission's geographic information system (GIS). The field inspection contractor submits data on a weekly basis using a web-based collaboration site, and the CWI program manager stores results in a project database. Exports from the project database are generated for two purposes: (1) automated progress maps and (2) integration into the Commission's work order tracking system. The database is also used to generate lists of buildings that will be dye-tested based on the results of manhole investigations.

To date, the CWI Program completed the following:

- Annual dry weather field screening of all of the Commission's SDOs, interconnections, and CSOs.
- Annual wet weather screening of the Commission's SDOs, interconnections, and CSOs where no flow was observed during dry weather screening, or where pollutant concentrations in dry weather flows were below specific thresholds.
- Annual updates of the Commission's subcatchment priority ranking based on the previous year's field screening data. The subcatchments are prioritized based on potential human health risk from certain indicator bacteria (*E. coli* and *enterococci*) as well as other factors. Highest priority catchments are those that discharge to public bathing beach areas (Constitution, Malibu, and Tenean). Second priority subcatchments are those with *E. coli* concentrations in excess of 10,000 colony forming units (CFU)/100 mL or *enterococci* concentrations in excess of 5,000 CFU/100 mL. For 2015, a total of 12 subcatchments were ranked Priority 1, and 55 subcatchments were ranked Priority 2 (BWSC, 2013).
- A total of 87 new illicit discharges (38 direct illicit connections and 49 leaking sewer laterals) were identified in 2014.
- A total of 103 illicit discharges (29 direct illicit connections and 74 leaking sewer laterals) were corrected or repaired. In 2014, the Commission estimated that a total of 18,131 gallons per day (gpd) of wastewater (8,593 gpd from direct illicit connections and 9,538 gpd from leaking sewer laterals) were removed from the storm drainage system and tributary receiving waters by correcting or repairing the 103 illicit discharges at an expense of $467,257 in 2013 (BWSC, 2013).

2.2.4 Site Plan Review

The Commission adopted Sewer Use Regulations in 1983, which have since been amended in 1989 and 1998. As part of those regulations, the Commission requests that a General Service Application (GSA) and a site plan be submitted for every new or reconstructed water, sewer, or storm drain service connection. The Commission has developed a set of standard requirements for site plans as part of its Site Plan Review process. In regards to stormwater management, the Commission's Sewer Use Regulations and Site Plan Requirements require project proponents to do the following:

- Evaluate the feasibility of retaining stormwater onsite with the objective of infiltrating the first inch of rainfall onsite before discharging to a storm drain or the combined sewer system.
- Install oil/particle separators on all proposed storm drains that serve outdoor paved areas in excess of 7,500 square feet (ft^2).
- Obtain a drainage discharge permit for all non-stormwater discharges including construction dewatering, subsurface drainage, noncontact cooling water, noncontact industrial process water, and waters associated with hydrological testing, groundwater remediation, or removal/installation of an underground storage tank.
- Provide erosion and sediment control measures to prevent flow of sediment into the Commission's sewer and storm drain systems.
- Install catch basin castings identifying the receiving water for the project's new or reconstructed catch basins.
- Obtain NPDES Construction General Permit coverage for projects resulting in the disturbance of more than 1 acre. This includes preparing a stormwater pollution prevention plan (SWPPP) and notifying the Commission of the anticipated construction start date so the Commission can arrange to inspect the site.
- Prepare an O&M plan for all stormwater management systems that include infiltration and catch basins.
- Obtain approval from the Commission's chief engineer before construction can begin.
- Link Site Plan Review to the Commission's Stormwater BMP Guidance Document (2013) incorporating the MassDEP Stormwater Handbook and BMP implementation requirements into new development and redevelopment.
- Obtain NPDES Permit for regulated Industrial Dischargers (2013) and submission of SWPPP plans for site maintenance and testing (where applicable), including inspection requirements.

In 2013, the Commission completed the following:

- Approved a total of 503 site plans of which 379 included provisions for onsite infiltration and 22 included an oil/particle separator (BWSC, 2013)
- Performed 199 site inspections of 52 construction projects (BWSC, 2013)
- Issued 14 drainage discharge permits for discharges to storm drains (BWSC, 2013)
- Issued catch basin castings as follows: 509 for Boston Harbor, 261 for Charles River, and 91 for the Neponset River (BWSC, 2013)

2.2.5 Street Sweeping

The Commission works with the City of Boston and other agencies that have direct responsibility for managing the city's roadways. Street sweeping is an effective BMP to prevent pollutants from reaching the sewer and storm drain systems.

The City of Boston Public Works Department (PWD) is responsible for street cleaning of city-owned streets. The PWD has two street cleaning programs: Posted and Non-posted. All Non-posted streets are cleaned once a week or more if necessary. The Posted Program is either a night or day program. The night program provides for nightly cleaning of select streets year round. Additional major arterial routes are cleaned once a week at night year round. The daily program operates typically from April 1 through November 30 with select areas extended from March 1 through December 31. The daily program provides for each side of a posted street to be cleaned once every other week.

In addition to these activities, the PWD may schedule additional cleaning during fall leaf season as well as before and after special events such as parades, road races, and festivals.

2.2.6 Green Demonstration Projects

On May 17, 2013, the Commission submitted the *Phase I BMP Implementation Plan* that provided recommendations for implementation of GI and LID measures for stormwater management for three demonstration projects located around the city. The demonstration projects include the following:

- MBTA Government Center Station Improvements Project
- Central Square (East Boston) CSI and Park Improvements Project
- Highway Reconstruction Audubon Circle Project

Working together with several agencies including the Boston Transportation Department (BTD), Boston PWD, Boston Parks Department (BPD), and the MBTA, the Commission and its consultant developed GI/LID strategies for each of the three demonstration projects focusing primarily on capturing and infiltrating the first 1 inch of rainfall. A broad selection of BMPs was considered to best demonstrate the variety of options available in an urban setting for meeting the Commission's stormwater management objectives.

MBTA Government Center Station Improvements Project: The designs for this MBTA project began years ago to comply with the American with Disabilities Act. The MBTA project began construction in late 2013 and is scheduled to be completed in 2016 (Figure 2-17). The GI/LID measures proposed for that project include the following:

- Tree trenches with porous paver overlay for infiltration of stormwater into sand-based structural soil to enhance tree health and capture and treat stormwater
- Passive irrigation system using roof runoff from the station headhouse to irrigate tree planters through perforated pipes
- Water quality filter units to improve water quality before discharge to the Commission's storm drain system

FIGURE 2-17
Rendering of Proposed MBTA Government Center Station Headhouse



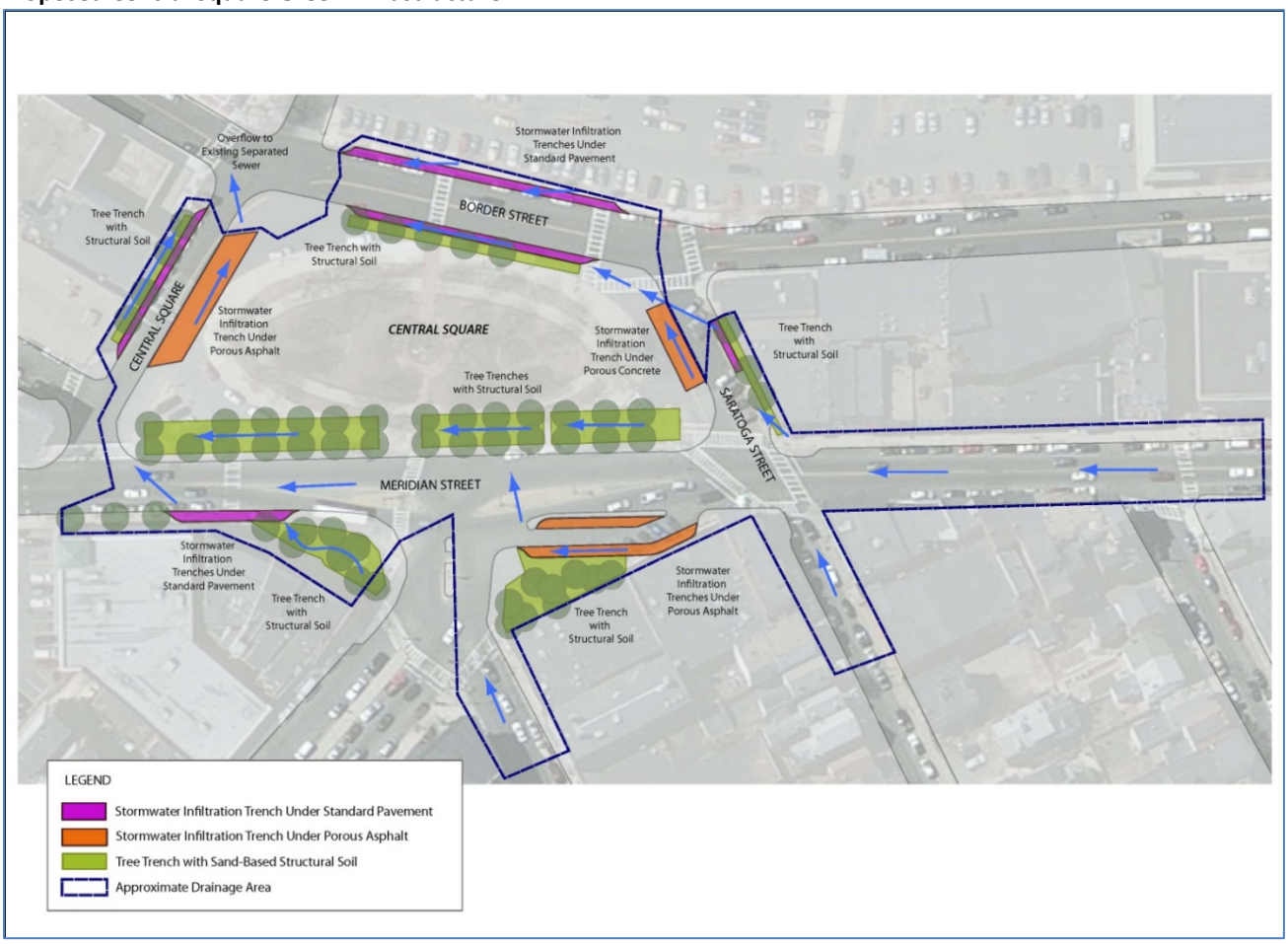
Source: MBTA, http://mbta.com/about_the_mbta/t_projects/default.asp?id=1004, accessed on May 17, 2014

Central Square (East Boston) CSI and Park Improvements Project. In cooperation with the BTD, PWD, and BPD, the Commission incorporated a variety of GI/LID measures into the project. Currently, the Central Square project is fully designed (Figure 2-18). The original bid proposals were due to the City on May 29, 2014, with construction planned to begin in the summer of 2014. However, the City rejected the original bids, revised its plans and subsequently re-issued the invitation. A contract for construction was awarded in February 2015 with construction beginning in Spring/Summer 2015. Construction should be completed in 2017. The following are GI/LID measures proposed for that project:

- Porous concrete sidewalk slabs overlying a gravel-based stormwater infiltration trench
- Porous asphalt parking stalls overlying a gravel-based stormwater infiltration trench
- Porous sidewalk paver overlay for infiltration of stormwater into sand-based structural soil trench
- Passive irrigation system using stormwater road runoff to irrigate a tree alley through perforated pipes
- Stormwater infiltration trenches under standard sidewalk and road pavement

The Central Square project includes using modified drainage manholes for routing stormwater into the various stormwater infiltration trenches to achieve the objective of controlling and storing the first 1 inch of rainfall. During periods of high stormwater flow, the control manhole weirs can be overtopped and stormwater is discharged to the Commission's storm drain system. The control weirs also are provided with a stop gate, which can be manually operated to redirect the stormwater trenches during winter operations. The Central Square GI systems were designed such that their performance can be monitored by using groundwater observation wells located in each stormwater infiltration trench and/or by installing flow monitoring equipment in the drain manholes downstream of the stormwater trenches.

FIGURE 2-18
Proposed Central Square Green Infrastructure

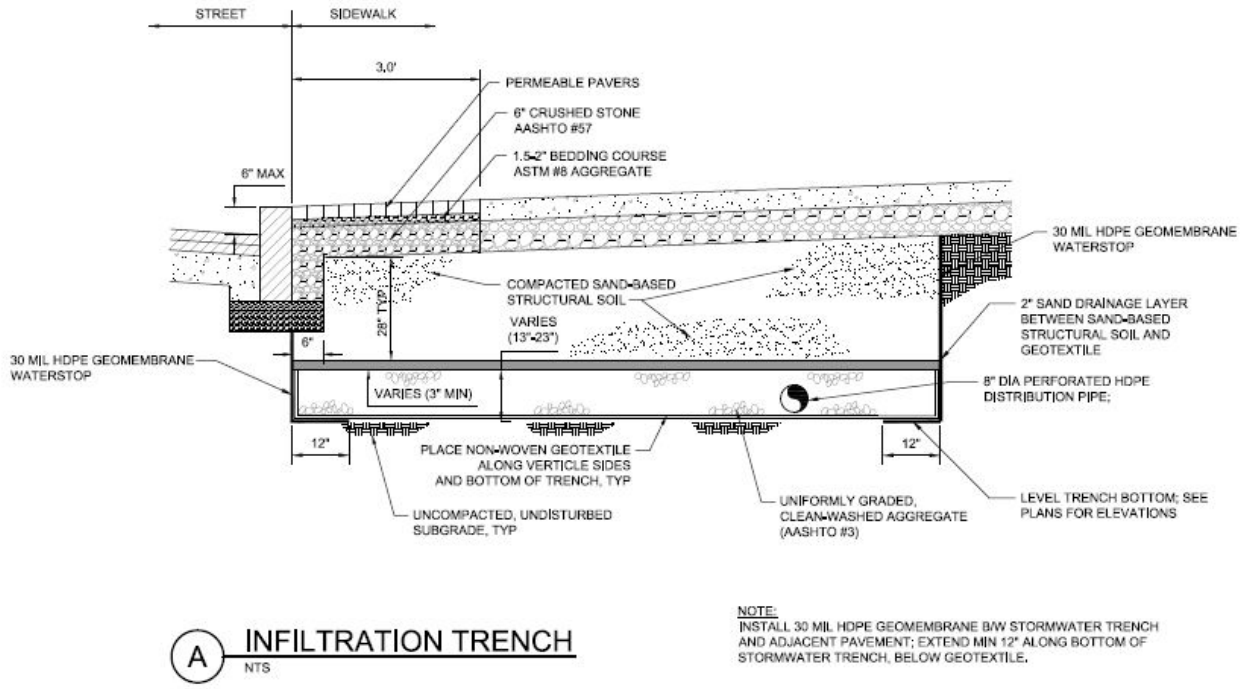


Highway Reconstruction Audubon Circle Project. In cooperation with BTD and PWD, the Commission has incorporated similar GI/LID measures at Audubon Circle as those employed at Central Square. Currently, the Audubon Circle project is in the final design phase. The project was scheduled to be bid later in 2014 with construction expected to begin in late 2014/early 2015. The plans were put out for bid in June 2016, with construction planned to begin in late 2016 or early 2017, depending upon award of the contract by the City. The following are GI/LID measures proposed for that project:

- Landscaped rain gardens for infiltration of stormwater into stormwater trenches with engineered soils for stormwater treatment
- Porous sidewalk paver overlay for infiltration of stormwater into sand-based structural soil trench
- Stormwater infiltration trenches with sand-based structural soils and gravel under sidewalks constructed of porous pavers and standard concrete slabs

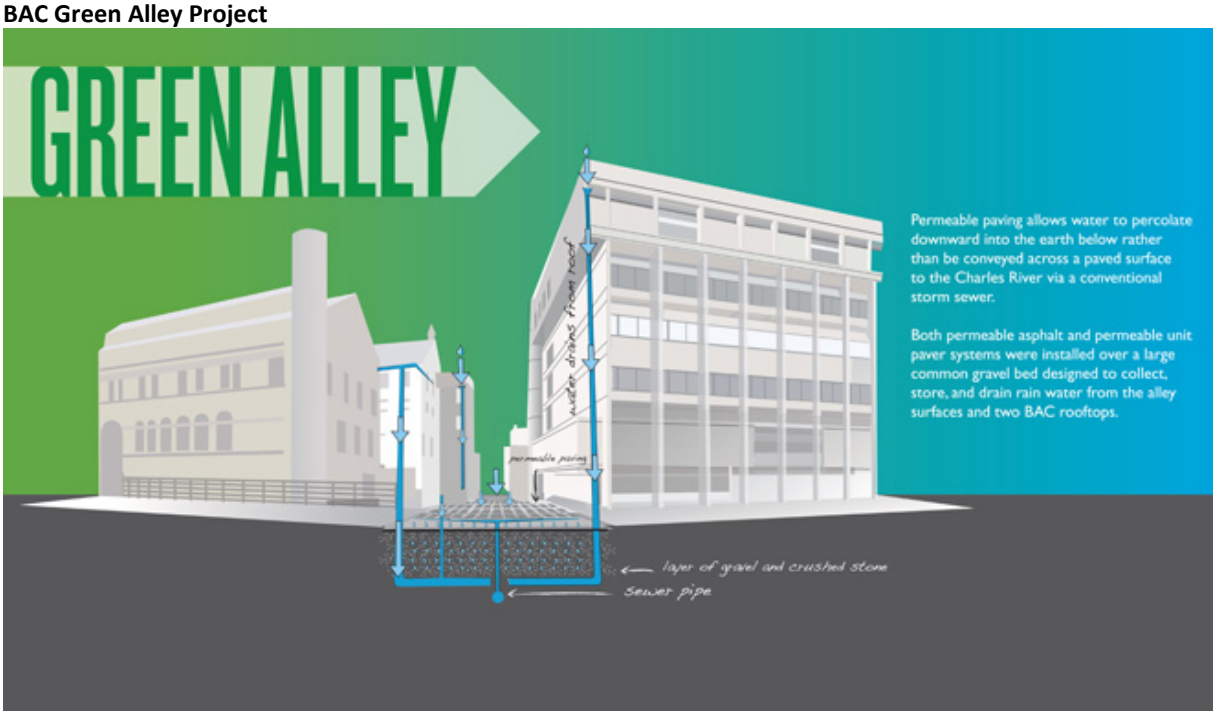
Similar to the Central Square project, the Audubon Circle GI design includes control drainage manholes with weirs and stop gates, observation wells for system performance monitoring, and locations suitable for flow monitoring downstream of the control manholes. The inclusion of rain gardens at three of the four corners of Audubon Circle provides for a landscape design element that provides public open space, a water feature using curb inlets, stormwater management, and passive irrigation for the various landscaped planters. Figure 2-19 provides a section for a typical stormwater infiltration trench proposed for the Audubon Circle project.

FIGURE 2-19
Audubon Circle Green Infrastructure – Proposed Stormwater Infiltration Trench



Boston Architecture Center Green Alley Project. The Boston Architecture Center (BAC), located on Newbury Street and Boylston Street in Boston's Back Bay neighborhood, recently completed a GI/LID project within the public alley separating the BAC's two buildings, as illustrated in Figure 2-20. Stormwater collected from the impervious asphalt and concrete in the alley formerly drained to two catch basins that discharged into the Commission's combined sewer system.

FIGURE 2-20
BAC Green Alley Project



Source: Boston Architecture Center, http://www.the-bac.edu/experience-the-bac/green-alley, accessed on May 17, 2014.

The BAC pursued the project as part of its Green Alley Initiative with the following objectives:

- Recharging groundwater through infiltration of stormwater through permeable paving surfaces (porous pavers and porous asphalt)
- Treating the collected stormwater before discharge to the Commission's combined sewer system
- Promoting the project's benefits and the potential to replicate it in other public alleys in the city

The BAC's design consultant estimated that the green alley would be capable of meeting the Commission's goal of capturing and infiltrating the first 1 inch of rainfall. During the course of performance monitoring after the project was completed, the field data indicated the system was outperforming the modeled conditions and was capable of capturing and infiltrating up to 3 inches of rainfall, which is equivalent to a 2-year storm event. The BAC maintains a website[1] where the public can view real-time precipitation data from the BAC's monitoring well.

Green Infrastructure at Five Boston Public Schools: The Commission is working with the Boston Public Schools (BPS) Facilities Management Department to integrate GI into the BPS 10-year Master Plan, which is currently in the early stages of development. GI demonstration projects will be constructed at five Boston public schools and stormwater education curriculum will be authored to accompany the new GI features at each school. The RFP for the research and design portion of this project was released in June 2015. A consulting firm was selected in August 2015 to complete the study and assemble design drawings during the 2015-2016 school year. The five schools participating in this project were evaluated by the chosen Firm to identify suitable locations and GI techniques to treat stormwater runoff.

The planning and design phase of this project began in September 2015 is ongoing. The first school construction project was bid in July 2016 and construction should commence in Fall 2016, which additional schools following in 2017. The Commission's 2015-2017 CIP contains funds for design and construction of the green infrastructure for this project.

2.2.7 Boston School Initiative

Boston Public Schools (BPS) is undertaking a comprehensive Educational and Facility Master Planning process to assess the physical condition of the 133 City-owned and leased BPS facilities and to provide a strategic planning framework for educational programming and major capital investments in the Boston public schools over the next ten years. Many public schools are located within the tributary areas for the Upper/Middle and Lower Charles River as well as the Neponset River. As part of the Master Planning process, The Commission is working with the BPS Facilities Management Department to integrate GI techniques in school yards and parking lots at BPS facilities as they are updated.

In Spring of 2015, the Commission solicited design services for GI demonstration projects at five Boston public schools and the contract was awarded to Horsley Witten Group in August. The five schools were evaluated by Horsley Witten and their team determined suitable locations to treat stormwater runoff. Data gathering, including soil sampling and infiltration analyses, was conducted, GI features are being designed for construction and accompanying educational curriculum will be developed as part of the scope of this project. Design is ongoing but 95% complete for the Washington Irving School, with expected construction starting in late 2016, additional school designs are being completed. The GI features that will be constructed at the five schools are intended to be used as demonstration projects for future redevelopment and stormwater management improvements at Boston public schools throughout the city.

[1] https://mybeacon.io/BAC-GreenAlley/presentation/524db55a226d5aba61000005/minisite/, May 17, 2014.

2.2.8 Complete Streets Initiative

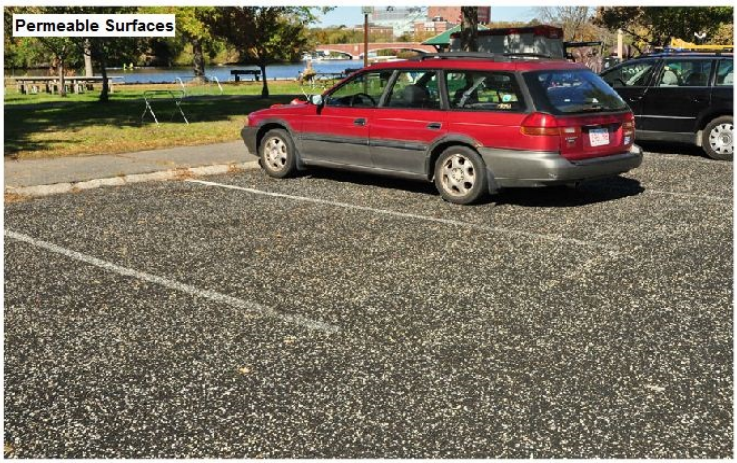
The City of Boston's CSI (CSI, 2014[2]) is a citywide initiative led by the BTD working in collaboration with a variety of city agencies including the Commission to develop new street design guidelines that are focused on the following three key areas:

- Multimodal Transportation – "Incorporates pedestrians, people with disabilities, bicyclists, transit users, motor vehicle drivers. Multimodal level of service (LOS) informs roadway design to ensure that streets are shared by all users and not dominated by cars." (CSI, 2014)
- Green Design: "Incorporates street trees, rain gardens, bio-swales, paving materials and permeable surfaces, with plants and soils collecting rain water to reduce flooding and pollution. Green design elements promote an environmentally sensitive, sustainable use of the public right-of-way." (CSI, 2014)
- Smart Technology: "Incorporate intelligent signals, smart meters, electric vehicle sharing, car and bicycle-sharing, way-finding and social networks for greater system efficiencies and user convenience." (CSI, 2014)

The Central Square and Audubon Circle projects are demonstration projects that incorporate the CSI approach with transportation, pedestrian, park, and stormwater improvements. The CSI agencies are in the process of standardizing design guidelines for use by city agencies as well as development/redevelopment project proponents. Currently the stormwater guidelines are encouraging the use of vegetated stormwater management through stormwater planters and rain gardens and stormwater infiltration through sidewalks and paved surfaces constructed of permeable surface materials. An example of a CSI stormwater planter (also referred to as a bio-swale) and a permeable asphalt parking area are provided in Figure 2-21.

FIGURE 2-21
Complete Streets Initiative – Stormwater Management Recommendations
Stormwater Planter (left) and Permeable Asphalt Parking Area (right)





[2] http://bostoncompletestreets.org, May 17, 2014

SECTION 3

Stormwater Management Strategies

This section introduces best management practices (BMPs), including their water quality benefits and role in stormwater management, describes the conditions under which several BMPs thrive, and evaluates the City's suitability for incorporating various BMPs. Section 3 explains the foundational processes integrated within the model scenarios evaluated in Section 4.

3.1 Best Management Practices (BMPs)

Assessments of BMP implementation and waste load reduction effectiveness in the Commission's MS4 require allocation of applicable BMPs to subcatchments based on the site conditions. The planning strategies are based on site conditions. The approach is a "bottom-up" decision matrix, which screens information existing at the site level (often a parcel), assesses implementation feasibility against BMP design criteria, and presents recommendations at a watershed scale for planning purposes. The BMP suitability analysis described in this section takes this "bottom-up" approach to evaluate the potential opportunities for implementing BMPs in the Commission's MS4 area. In addition, a top-down decision-making strategy was used to assess the likelihood of implementation. Feasibility of implementation relies not only on past experience of implementing similar programs but also on social and economic considerations for executing the plan.

This watershed-scale stormwater management plan evaluates management strategies that allow systematic implementation to cost-effectively achieve water quality goals. The management strategies are described as follows:

1. **Non-structural BMPs.** Non-structural BMPs are institutional, educational, or pollution prevention practices designed to limit the generation of stormwater runoff or control the sources of pollutants contained in the runoff. These include illicit discharge detection and elimination (IDDE) programs, street sweeping, catch basin cleaning, fertilizer management, and organic waste and leaf litter collection programs. A well implemented program can have significant impact on pollutant load. Some of these non-structural BMPs are currently being implemented around Boston, as described in more detail in Section 2.2.
2. **Distributed structural BMPs.** Distributed BMPs consist of individual structural BMPs installed in suitable areas to treat runoff from individual parcels. Examples include rain barrels, rain gardens, and dry wells.
3. **Cluster or neighborhood treatment system.** A cluster or neighborhood treatment system includes a series of interconnected structural BMPs to treat runoff generated from a large site or neighborhood. The system can be interconnected or linear (e.g., infiltration trenches) alongside the public right-of-ways. Boston's Complete Streets Initiative (CSI) is a prime example of such a system. A system can be designed to not only treat runoff generated within the right-of-way but also runoff from abutting properties. When planned and designed properly by holistically considering drainage boundary, sizing, and placement, this type of system provides systematic management of pollutant loads generated from the watershed similar to the function of a storm drain system alleviating flooding and ponding in an urban area. One example is to extend the City's CSI with the following benefits:
    - Other communities have had successful experiences adding green infrastructure to various street improvement/reconstruction projects.
    - BMPs are minimally intrusive to the residents while providing aesthetic value to the community.
    - BMPs utilize publicly-owned property.
    - BMPs provide site accessibility for future O&M.

4. **End-of-pipe treatment.** End-of-pipe treatment is a centralized management strategy that can be cost-effective when applied appropriately. It includes construction of large-scale BMPs such as stream restoration, constructed wetland, dry/wet pond, etc. at or near storm drain outfalls prior to discharging into receiving waters. These types of BMPs typically require large land area to provide adequate removal efficiency. They are occasionally difficult to implement in urban settings due to the limited open space around outfall areas and/or the high cost of land. However, when combined with other capital improvement projects, they can be cost-effective.

3.1.1 Pollutant Removal Efficiencies

The Commission, assisted by Geosyntec, developed a focused list of GI technologies suitable for an urban environment (*Stormwater Best Management Practices: Guidance Document*, Geosyntec, January 2013). The document evaluated 20 BMP types in 5 MassDEP BMP classes including pretreatment, treatment, infiltration, conveyance, and other. Based on site conditions, some of the BMPs identified in the document have been proposed or considered for demonstration projects as described in the *Phase I Stormwater Best Management Practices Implementation Plan* (CH2M HILL, 2013).

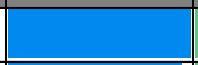
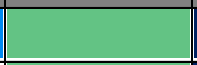
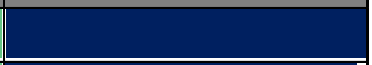
In addition to site-specific consideration, it is important to prioritize selection of BMPs based on their pollutant removal efficiency for targeted TMDLs. Figure 3-1 ranks the pollutant removal rates for some treatment BMPs' combined removal efficiency of total phosphorus and pathogens based on the *Massachusetts Stormwater Handbook* (MassDEP, 2008) and USEPA Region 1's *Stormwater Best Management Practices (BMP) Performance Analysis* (Tetra Tech, 2010).

In summary, the results of the BMP screening provide guidance to the selection of applicable BMPs with the following priority:

1. Infiltration class BMPs have the highest removal efficiency and thus are ranked highest. Infiltration class BMPs are highly dependent on soil infiltration properties and groundwater depth. The structural components of the infiltration BMPs (excluding infiltration basins) are buried underground and do not alter the aboveground function of the space where they are located.
2. Porous pavement combines infiltration and storage and performs similarly to some infiltration BMPs.
3. Treatment class BMPs, including bioretention (such as a rain garden and planter box), tree pit, media filter, gravel wetland, and wet pond, perform moderately well for total phosphorus and pathogen removal. They can be implemented on the site with various soil and groundwater conditions.
4. BMPs with conveyance as its main function are ranked lowest for water quality improvement purposes. The benefits are mainly to attenuate the peak runoff but provide limited treatment in reducing pollutant loads in discharges.

FIGURE 3-1

BMP Classification and Ranking Based on Pollutant Removal Efficiency

MassDEP BMP Class	Structure BMP	[1]TP Removal	[2]Pathogen Removal	[3]Combined Removal
Infiltration	Infiltration Basin			
Infiltration	Infiltration Trench			
Infiltration	Subsurface Structures			
Infiltration	Dry Well			
Infiltration	Leaching Catch Basins			
Other	Porous Pavement			
Treatment	Bioretention			
Treatment	Tree Pit			
Treatment	Media Filter			
Treatment	Gravel Wetland			
Treatment	Wet Pond			
Conveyance	Swale			
Treatment	Dry Pond			
Other	Green Roof			
Other	Rain Barrels			
Other	Cisterns			

NOTES:

1. The total phosphorus removal rates in Figure 3-1 are based on USEPA Region 1's report on numeric performance curves as well as the *Massachusetts Stormwater Handbook*. . The BMP removal efficiencies were developed based on design water quality volume and substrate soil infiltration properties for eight types of BMPs including infiltration trench, infiltration basin, gravel wetland, bioretention, grass swale, wet pond, dry pond, and porous pavement. Total phosphorus removal rates for other types of BMPs are based on the *Massachusetts Stormwater Handbook*. The scale of the bar represents 0 to 100 percent removal rate.
2. Pathogen removal rates are based on the *Massachusetts Stormwater Handbook* (MassDEP, 2008); the handbook provides a general range of removal efficiencies for each of the BMPs listed in Volume 2 Chapter 2: Structure BMP Specifications for the *Massachusetts Stormwater Handbook*. Three qualitative values were applied to rank the pathogen removal rates:
   - 30% for low pathogen removal rates
   - 60% for medium pathogen removal rates
   - 100% for high pathogen removal rates
3. The combined removal efficiency is the sum of the total phosphorus removal efficiency and the value applied for pathogen removal efficiency. The scale of the bar represents 0 to 100 percent removal rate.

3.1.2 BMP Design Considerations

Placement of high priority BMPs is highly dependent on the site conditions including land use, soils, and depth to the groundwater table. For this study, BMP design requirements of site conditions are generalized for planning purposes and described as follows:

- Infiltration Class BMPs generally require the depth to the groundwater table to be greater than 6 feet, as the *Massachusetts Stormwater Handbook* recommends a minimum of 2 feet of separation between the bottom of the BMPs and the groundwater table. The typical depth of infiltration BMPs is greater than 4 feet. Also, sites with well-drained soil (HSG A or B) will result in a higher pollutant removal efficiency as well as a smaller BMP footprint to treat the same size area.
- Porous pavement requires a site with a minimum infiltration rate of 0.17 inch per hour and a soil void space higher than 40 percent. The site cannot be a high speed traffic area. A typical design of porous pavement with a 4-foot porous layer (pavement and subsurface porous media) requires a depth to groundwater to be greater than 6 feet.
- Treatment class BMPs' design requirements vary based on their specific types. Some require depth to groundwater to be greater than 6 feet (e.g., bioretention with 4 feet of soil media) while planter boxes can be placed above grade. Although well -drained soil improves removal efficiency, it is generally not a restriction factor to this class of BMPs.
- Rain barrels and/or cisterns provide irrigation benefits. They can store rooftop runoff and delay discharge to pervious areas for infiltration. They are a popular choice for buildings, particularly in residential areas, and many municipalities have provided rain barrels to homeowners for free or at discounted prices. Rain barrels can be retrofitted to almost any site conditions with enough pervious surface to discharge to.

Land use is an important factor for determining the likelihood of implementation of certain types of BMPs. For example, it is less likely for a residential property owner to construct a rain garden if the site has a shallow groundwater depth. It is more likely for a rain garden to be implemented in a commercial area where there are stormwater regulations and site plan review requirements to enforce the stormwater management requirements for new development or redevelopment projects.

Combining site conditions discussed above produces 10 BMP categories as listed in Table 3-1. Each category can be assigned with high priority BMPs to achieve maximum pollutant load reduction. In addition, these BMPs can be simulated explicitly by BMP type in the SWMM LID module.

TABLE 3-1
Summary of BMP Categories Modeled/Analyzed

BMP Category #	Land use	Groundwater Depth	HSG Soil Type	Priority BMP	SWMM LID
1	Other	> 6 ft	A/B	Infiltration Class BMPs	Infiltration
2			C/D/Unknown	Treatment Class BMPs	Bioretention Cell
3		< 6 ft	A/B/C/D/Unknown	Treatment Class BMPs	Bioretention Cell
4	Commercial, Industrial & Institutional	> 6 ft	A/B	Infiltration Class BMPs	Infiltration
5			C/D/Unknown	Treatment Class BMPs	Bioretention Cell
6		< 6 ft	A/B/C/D/Unknown	Treatment Class BMPs	Bioretention Cell
7	Parking Lots	> 6 ft	A/B/Unknown	Porous Pavement	Porous Pavement
8	Residential	> 6 ft	A/B	Dry Well	Infiltration

TABLE 3-1
Summary of BMP Categories Modeled/Analyzed

BMP Category #	Land use	Groundwater Depth	HSG Soil Type	Priority BMP	SWMM LID
9	Residential		C/D/Unknown	Treatment Class BMPs	Bioretention Cell
10		< 6 ft	A/B/C/D/Unknown	Rain Barrel/Cistern	Rain Barrel/Cistern

3.2 BMP Site Suitability Analysis

A GIS-based analysis was performed within the Commission's MS4 storm drain area to determine site suitability for implementation of high-priority BMPs. The analysis utilized a scoring and ranking process that quantitatively evaluated sites where GI is most applicable based on multiple criteria. Various BMP implementation levels were calculated that represent prioritized areas for GI application to reduce stormwater pollutant loads.

The site suitability screening process included the development and ranking of criteria to identify areas within the Commission's MS4 area that may be suitable for GI. Each criterion was broken down into ranked categories depending on the relative suitability of conditions within each criterion. In addition, the criteria were weighted against one another to determine their relative importance within the scoring process.

3.2.1 Data for BMP Site Suitability Analysis

The data used for the analysis included the following:

- Existing pollutant loads: The Commission's *2015 Stormwater Model Report* lists unit pollutant loads (per acre per year) to receiving waterbodies for each model subcatchment. Total phosphorus load is the focus of this analysis, and it has been used to represent pollutant loading conditions.
- MassGIS. The MassGIS data can be downloaded from the following link:

  http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html

  Data layers used for the BMP suitability analysis include:

  - Impervious surface: This raster layer represents impervious surfaces covering the Commonwealth of Massachusetts. The surfaces were extracted using semi-automated techniques by Sanborn Map Company from 50-cm Vexcel UltraCam near infrared orthoimagery that was acquired in April 2005. The pixel size for the impervious surface data is 1 meter.
  - Land use: The Land Use data layer is a Massachusetts statewide, seamless digital dataset of land cover/land use, created using semi-automated methods, and based on 0.5 -meter resolution digital orthoimagery captured in April 2005.
  - Parcel: MassGIS' Level 3 Assessors' Parcel Mapping data set, containing property (land lot) boundaries and database information from each community's assessor.
  - Street: This layer is the official state-maintained street transportation dataset available from MassGIS and represents all the public and a good portion of the private roadways in Massachusetts, including designations for interstate, U.S., and state highways.
- Public school: It contains all public school sites in Boston.
- Terrain: Topology based on LiDAR data processed by CH2M HILL for the BWSC Wastewater and Stormwater Facilities Plan.

- BWSC GIS database for the following:
  - Building footprint
  - Sidewalk
  - Parking lot
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Hydrologic soil groups using: http://soildatamart.nrcs.usda.gov.
- Groundwater depth from the Soil Survey Geographic (SSURGO) database
- Boston Redevelopment Authority (BRA) Article 80 Development Projects whose status is Letter of Intent (LOI), Under Review and Board Approved. Status is as of September 3rd3, 2014.

3.2.2 Ranking

The geospatial datasets described above were converted to raster datasets with 4-foot by 4-foot grid cell resolution. Each grid cell's value field was then given a rank for each criterion, ranging from 1 to 5:

- 1 is the lowest score and represents the lowest suitability or pollutant removal potential for BMPs; typically, it indicates a least favorable or not feasible physical condition.
- A score of 2 represents a site condition that should be examined on a case-by-case basis because of the uncertainty existing in the data or because of missing data.
- A score of 3 suggests the site condition is difficult to meet BMP design requirements; the likelihood of implementation is low because of site constraints.
- A score of 4 is given to site conditions that meet some BMP design requirements; the likelihood of implementation is moderate.
- 5 is the highest score and represents the highest site suitability for BMPs. The site conditions meet most or all BMP design requirements.

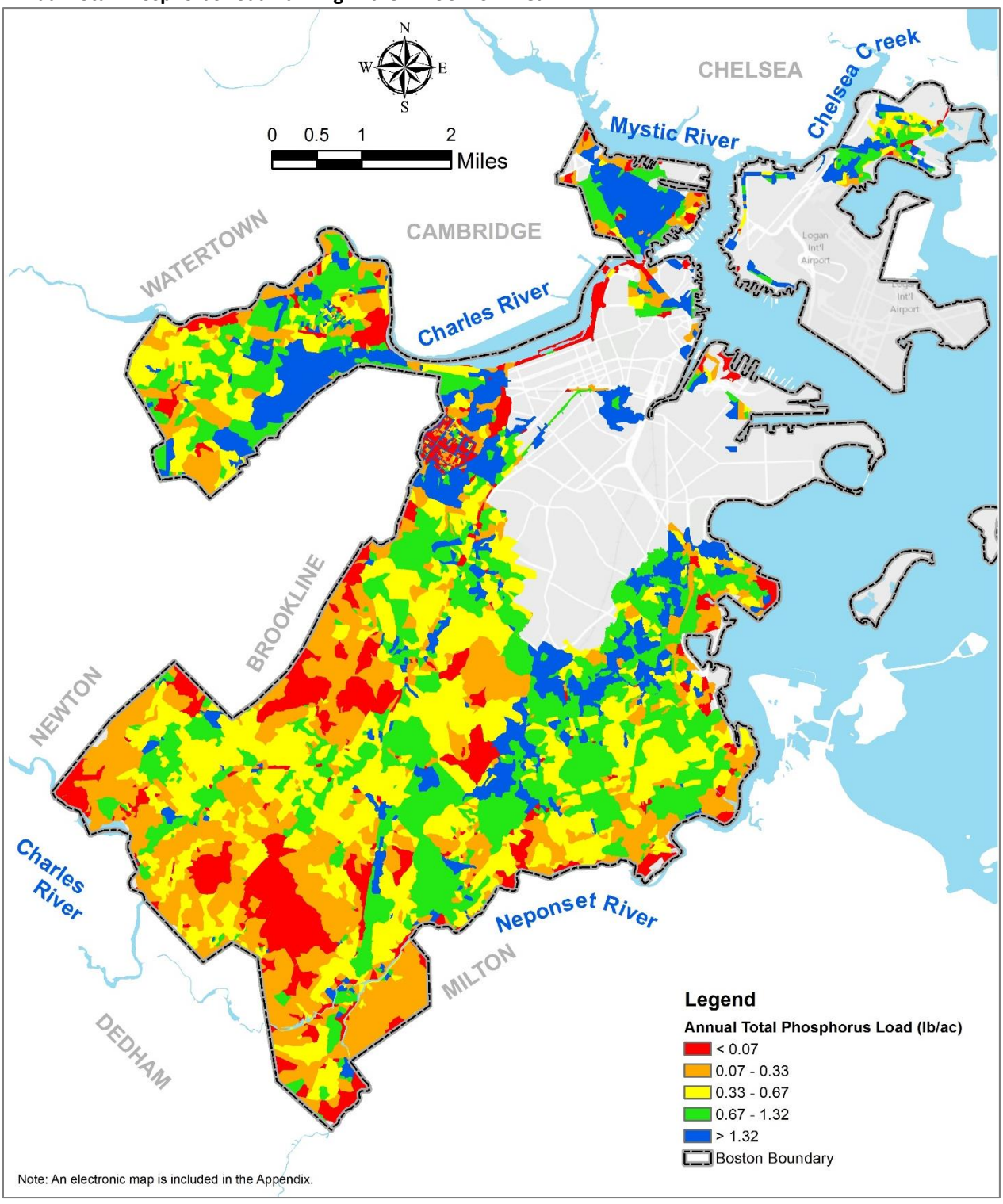
Table 3-2 summarizes the criteria and assigned ranks described above. The resulting rank results are shown in Figures 3-2 to 3-9.

TABLE 3-2
Ranking Criteria of Site Conditions

BMP Implementation Suitability Criteria	Not Feasible / Least Favorable	Case-by-Case	Low	Medium	High
Ranking Score	1	2	3	4	5
Annual TP Load (lb/acre)	< 0.07	0.07 - 0.33	0.33 - 0.67	0.67 - 1.32	> 1.32
Impervious Area (acres/parcel)	< 0.1	0.1 – 0.25	0.25 – 0.5	0.5 – 1	> 1
Hydrologic Soil Group	D, C/D	Unknown	C	B	A
Terrain (% slope)	> 17%	10 - 17%	5 -10%	0 - 5%	Depression
Depth to Groundwater (feet)	< 1	1 - 2	2 - 4	4 - 6	> 6
Land Use	Water	Others	Urban Open, Forest	Institutional	Commercial, Industrial
Street	Interstate & Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local
Residential Open Space (acre/parcel)	< 0.01	0.01 – 0.10	0.10 – 1	1 – 2	> 2

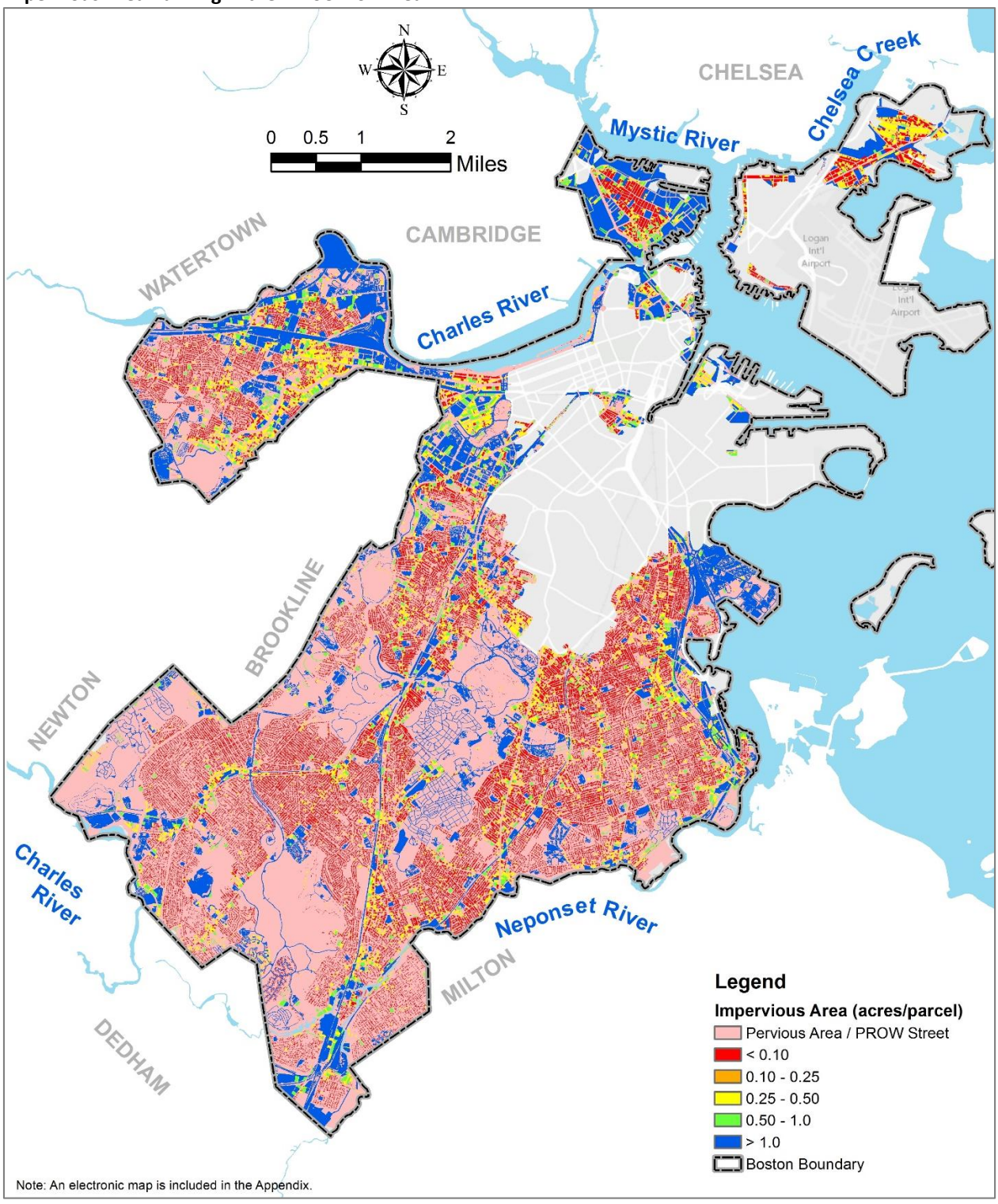
TP = total phosphorus

FIGURE 3-2
Annual Total Phosphorus Load Ranking in the BWSC MS4 Area



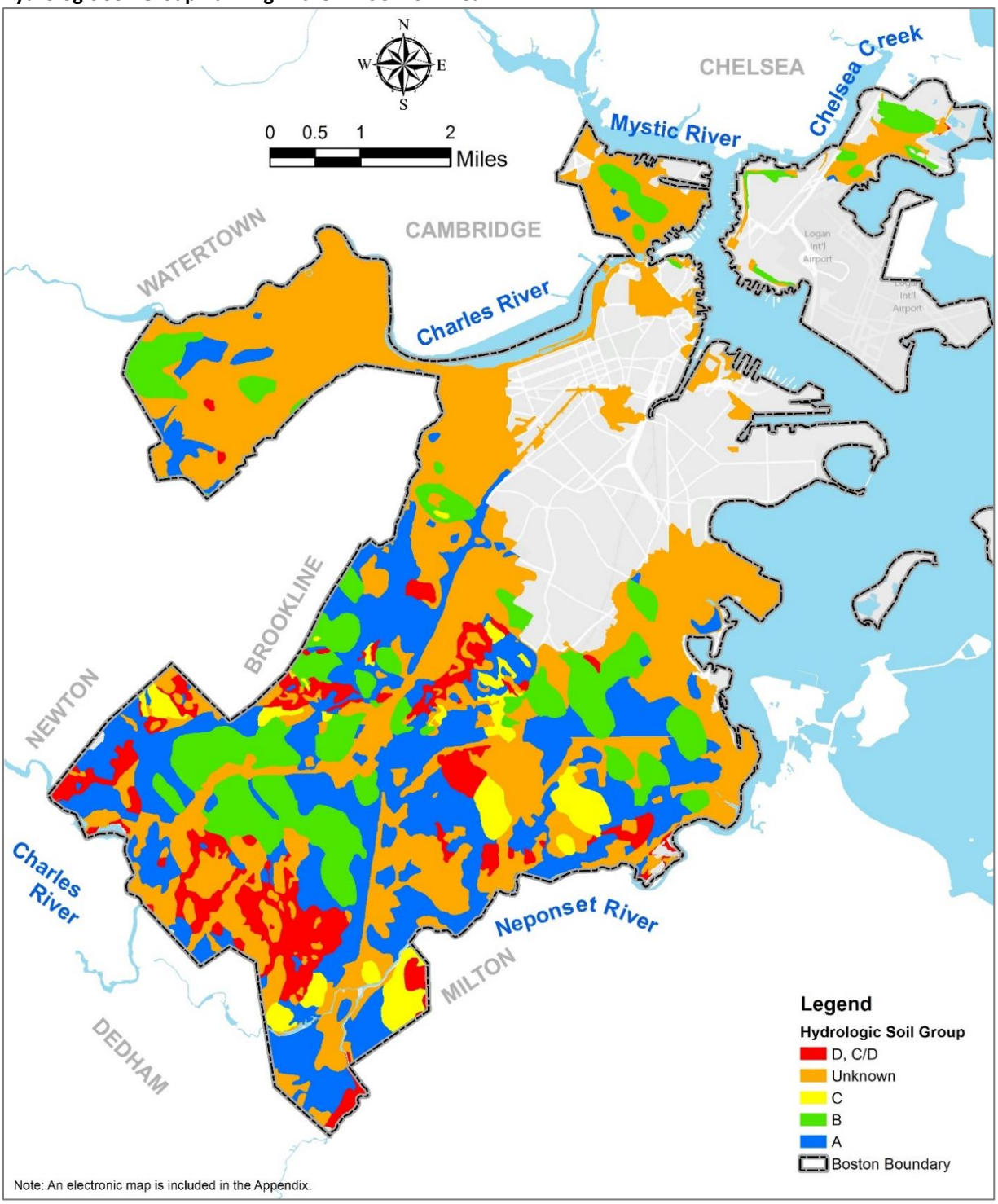
Total Phosphorus Load. The Commission's stormwater model computes annual pollutant loading on a per acre basis for each of the subcatchments. Pollutant loading is one of the most important considerations in this evaluation; targeting subcatchments with higher total phosphorus loads for BMP implementation will result in more efficient load reductions. For this evaluation annual total phosphorus loads (pounds per acre) were broken into five classes based on natural groupings inherent in the data.

FIGURE 3-3
Impervious Area Ranking in the BWSC MS4 Area



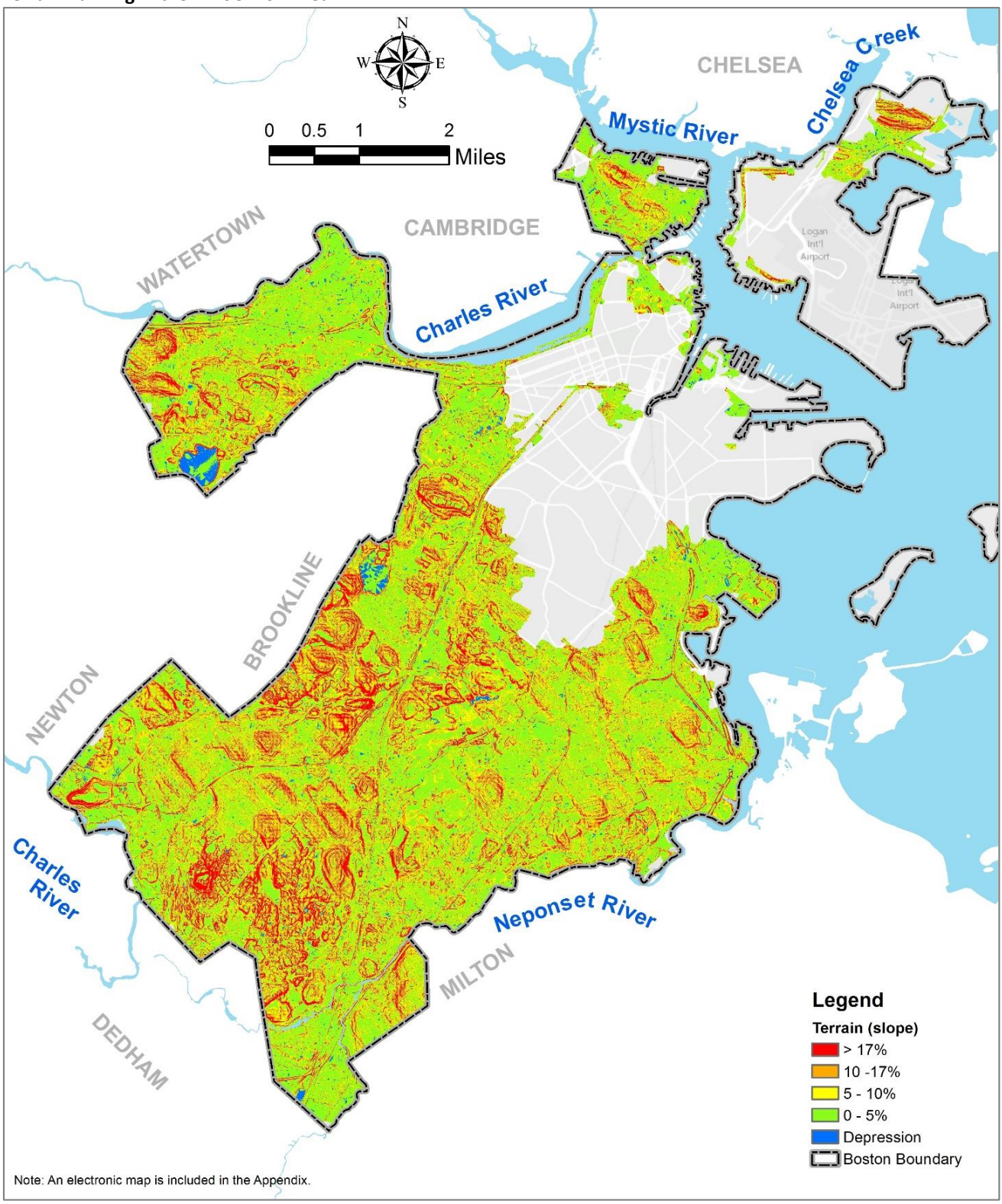
Impervious Area. The ranking of imperviousness was calculated on a per parcel basis with large impervious areas ranked higher than smaller ones. All streets, sidewalks, driveways, parking lots, buildings, etc. were considered 100 percent impervious. Pervious areas and streets are displayed in faint red to emphasize the remaining impervious areas later involved in the non-residential land use suitability calculation. Since imperviousness data was available in a 1 by 1-meter resolution, parcel boundaries were used to aggregate the impervious area to a larger workable scale.

FIGURE 3-4
Hydrologic Soil Group Ranking in the BWSC MS4 Area



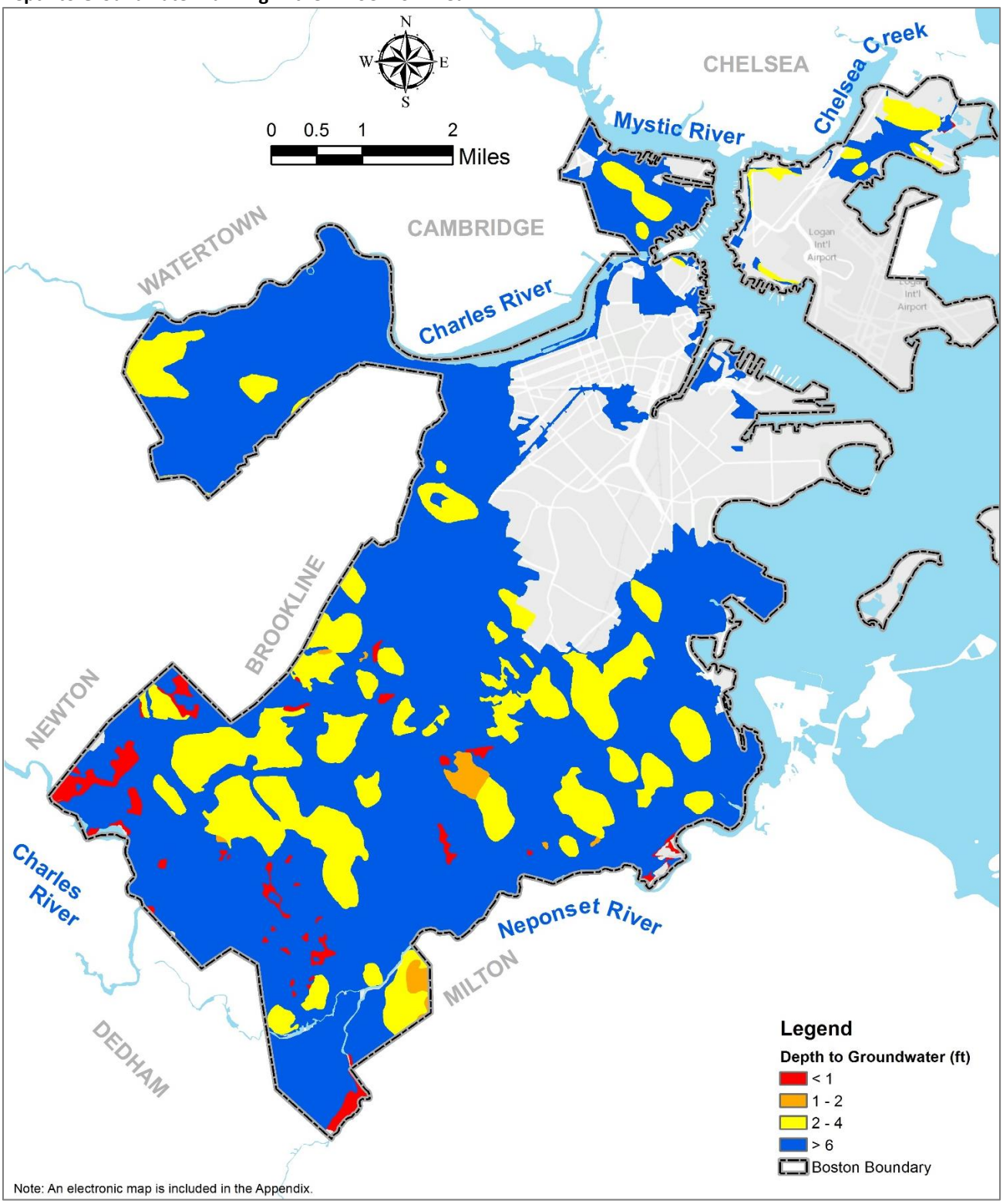
Hydrologic Soil Group. This criterion refers to soil percolation rates. Group "A" soils are the most permeable and therefore ranked the highest for their ability to readily infiltrate runoff (saturated hydraulic conductivity > 1.42 in/h). Group B soils have moderate infiltration potential when thoroughly wet (1.42 in/h < saturated hydraulic conductivity > 0.57 in/h. "C" soils have low infiltration potential (0.57 in/h < saturated hydraulic conductivity > 0.17 in/h). "D" soils have poor infiltration potential and often result in more standing water; therefore, they are ranked the lowest. Unknown soil types are conservatively assumed to have low to poor infiltration potential.

FIGURE 3-5
Terrain Ranking in the BWSC MS4 Area



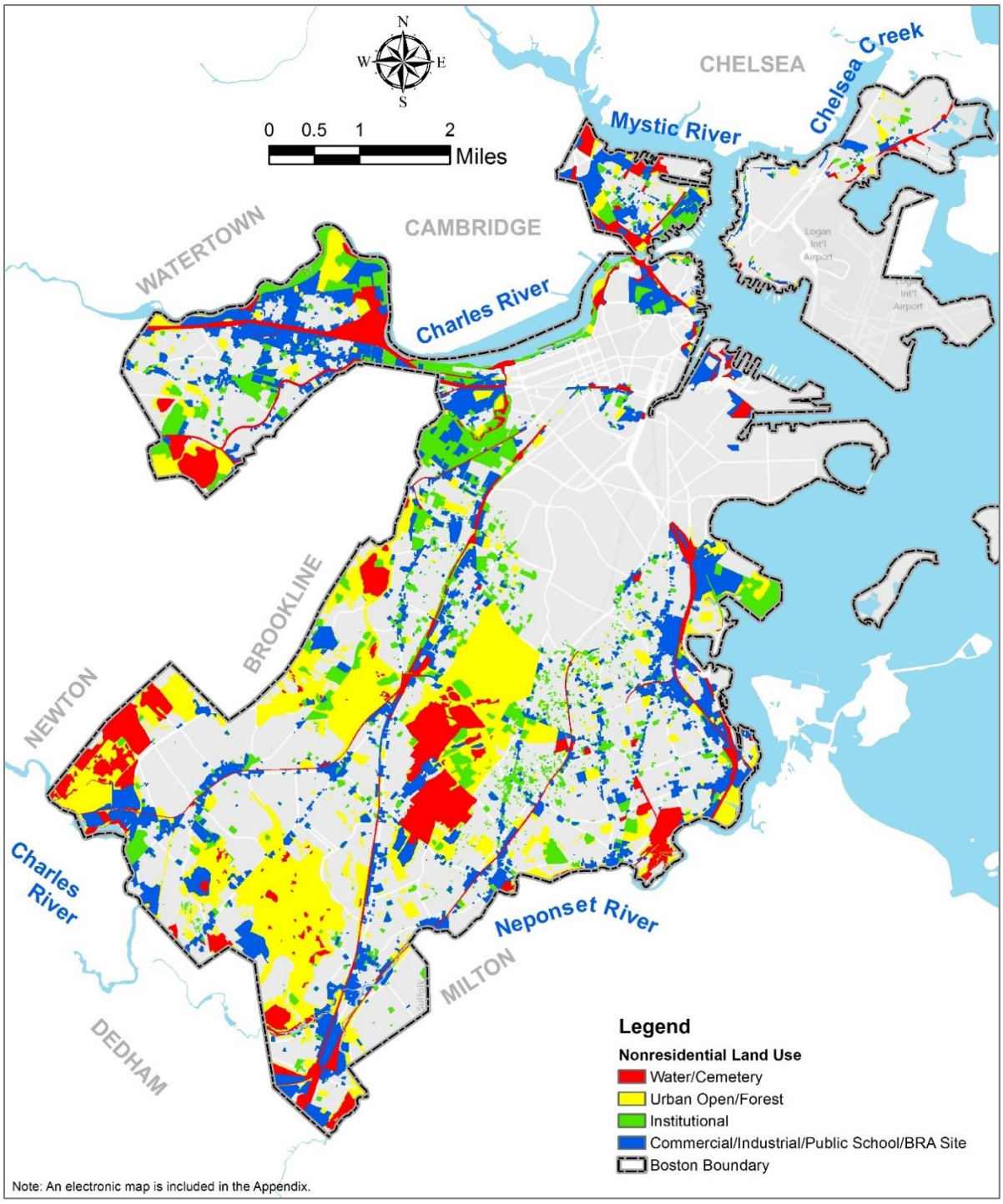
Terrain. Flat slopes and areas of depression were ranked higher than steep areas for their ability to allow stormwater to collect and infiltrate into the underlying soil rather than flowing downhill.

FIGURE 3-6
Depth to Groundwater Ranking in the BWSC MS4 Area



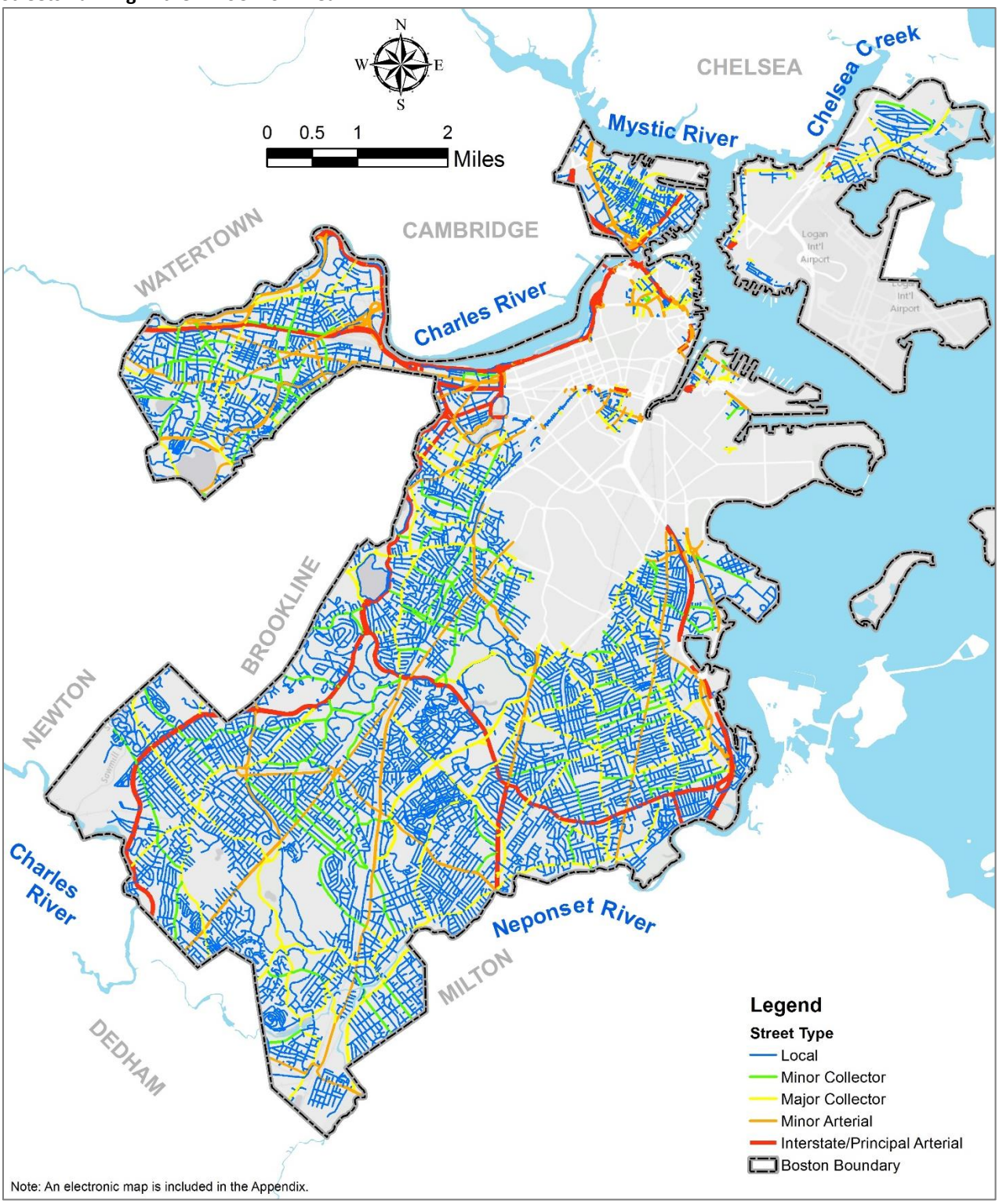
Depth to Groundwater. This criterion refers to the minimum depth from the ground surface to the highest elevation of the water table with values greater than 6 feet having high feasibility, and values less than 6 feet having low feasibility. There is no data value of 4 to 6 feet existing in the Soil Survey Geographic (SSURGO) database; therefore, 4 to 6 feet is not used for this dataset.

FIGURE 3-7
Non-residential Land Use in the BWSC MS4 Area



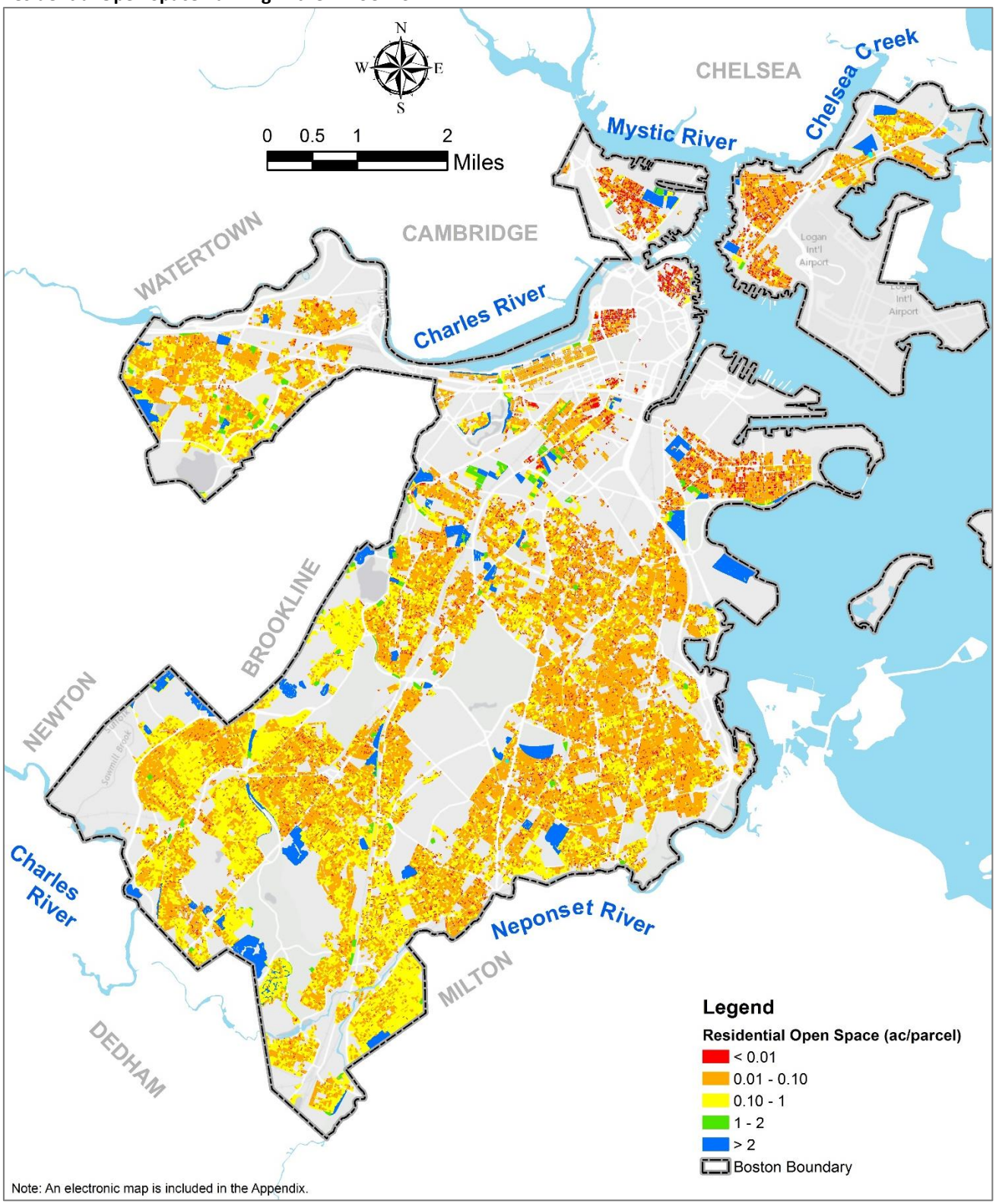
Non-residential Land Use. The ranking of land use criteria not only considers BMP implementation feasibility but also reflects waste load reduction potential. For example, forests contribute background pollutant loads to receiving waterbodies and therefore would be minimally impacted by BMPs implemented to manage forest runoff despite the ease of construction therein. On the other hand, commercial/industrial land uses not only contribute high pollutant loads but also have high likelihood of implementation due to future development or redevelopment potential. Public schools and BRA sites are similarly ranked for their high implementation likelihood. Streets and residential open space land uses were excluded and analyzed separately in Figures 3-8 and 3-9, respectively.

FIGURE 3-8
Streets Ranking in the BWSC MS4 Area



Streets. Streets were ranked according to usage type. Local streets are the best candidates for GI, while interstates and principal arterials are not feasible due to their heavy use and ownership complexity. Sidewalks were included to give extra weight to their parallel streets within the transportation land use. Long, continuous public sidewalks are potential sites for infiltration trenches.

FIGURE 3-9
Residential Open Space Ranking in the BWSC MS4



Residential Open Space. Residential open space sizes are calculated as the net of the residential parcel areas and their corresponding building footprints. This ranking is intended to represent the likelihood of implementing BMPs within the residential parcel boundary. The more open space available on certain residential parcels, the higher the potential for property owners to implement BMPs.

3.2.3 BMP Site Suitability Categories

Figure 3-10 illustrates the processes to develop implementation categories based on the BMP suitability analysis results described in Section 3.2 of this report.

FIGURE 3-10
Development of Implementation Categories Based on BMP Suitability



The BMP ranking raster datasets of each criteria were weighted against one another to determine the overall suitability for implementing prioritized BMPs. Each criterion was considered for relative importance within the group to determine category weighting factors. Each ranked criterion was classified by applying the assigned weighting factor to derive a final weighted score; then implementation categories were set based on threshold ranges of the composite scores that represent BMP implementation suitability. Due to the intricate spatial relationships among the various datasets and the high resolution raster calculations involved, highly ranked composite 4 by 4-foot grid cells are often interspersed among lower-scoring adjacent grid cells (and vice-versa). To visualize broader data trends, it is useful to vectorize the composite raster grid data into weighted average parcels and street corridors. Vectorized parcels were then categorized with various levels of implementation suitability based on each assigned composite score threshold.

This process was repeated to apply to three areas of different weighting factors, and criteria were applied to emphasize their unique considerations for implementing BMPs. These three areas are public right-of-ways, non-residential land use areas, and residential land use areas.

3.2.3.1 Public Right-of-Ways (PROWs)

As discussed in Section 2, one of the main goals of the city's Complete Street Initiative is to "incorporate street trees, rain gardens, bio-swales, paving materials and permeable surfaces, with plants and soils collecting rain water to reduce flooding and pollution. Green design elements promote an environmentally sensitive, sustainable use of the public right-of-way" (CSI, 2014). In urbanized areas, streets are an integral part of the existing stormwater management system. Crown-shaped roadway surfaces and curbs along the edges of streets form gutters that channelize and convey runoff (often in sheet flow form) from abutting properties prior to entering catch basins and the storm drainage pipe network. Pollutant loads are often normalized by the length of the curb. Incorporating GI elements to the design of the street would modify runoff patterns and improve water quality. In addition, the streets are publically-owned, and therefore, accessible for systematic implementation as well as for future O&M needs. BMP implementation experience in many other communities concluded that GI projects are most cost-effective when they are constructed to be a component of public works projects.

FIGURE 3-11
Weighting Factors for PROW
HSG = Hydrologic Soil Group; GW = Groundwater; TP WL = Total Phosphorus Waste Load.

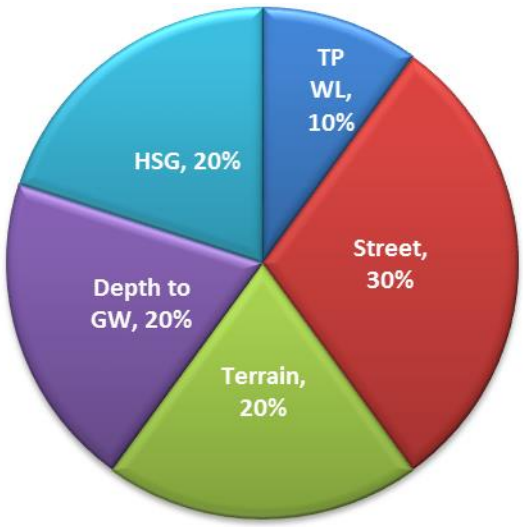


Figure 3-11 shows weighting factors for each criterion considered for streets. The classification of street type is given the highest weight. Site physical conditions

including terrain slopes, hydrological soil groups, and depth to groundwater were given equal weights of 20 percent each. The total phosphorus waste load criterion is evaluated less strictly to develop an implementation scenario that is applied to the maximum extent practical. The suitability criteria and composite thresholds for streets are shown in Table 3-3.

TABLE 3-3
Summary of Suitability Criteria and Composite Thresholds for Streets

BMP Suitability Category	Not Feasible	Unlikely	Possible	Suitable
Composite Score Threshold	**< 1.95**	**1.95 – 2.95**	**2.95 -4.05**	**> 4.05**
Annual TP (lb/acre)	< 0.07	0.07 - 0.33	0.33 - 0.67	> 0.67
Hydrologic Soil Group	D or not rated	D or not rated	C	B or A
Terrain (% slope)	> 17%	10 - 17%	5 -10%	< 5%
Depth to Groundwater (feet)	< 1	1 - 2	2 - 4	> 4
Street Type	Interstate & Principal Arterial	Minor Arterial	Major Collector	Minor Collector or Local

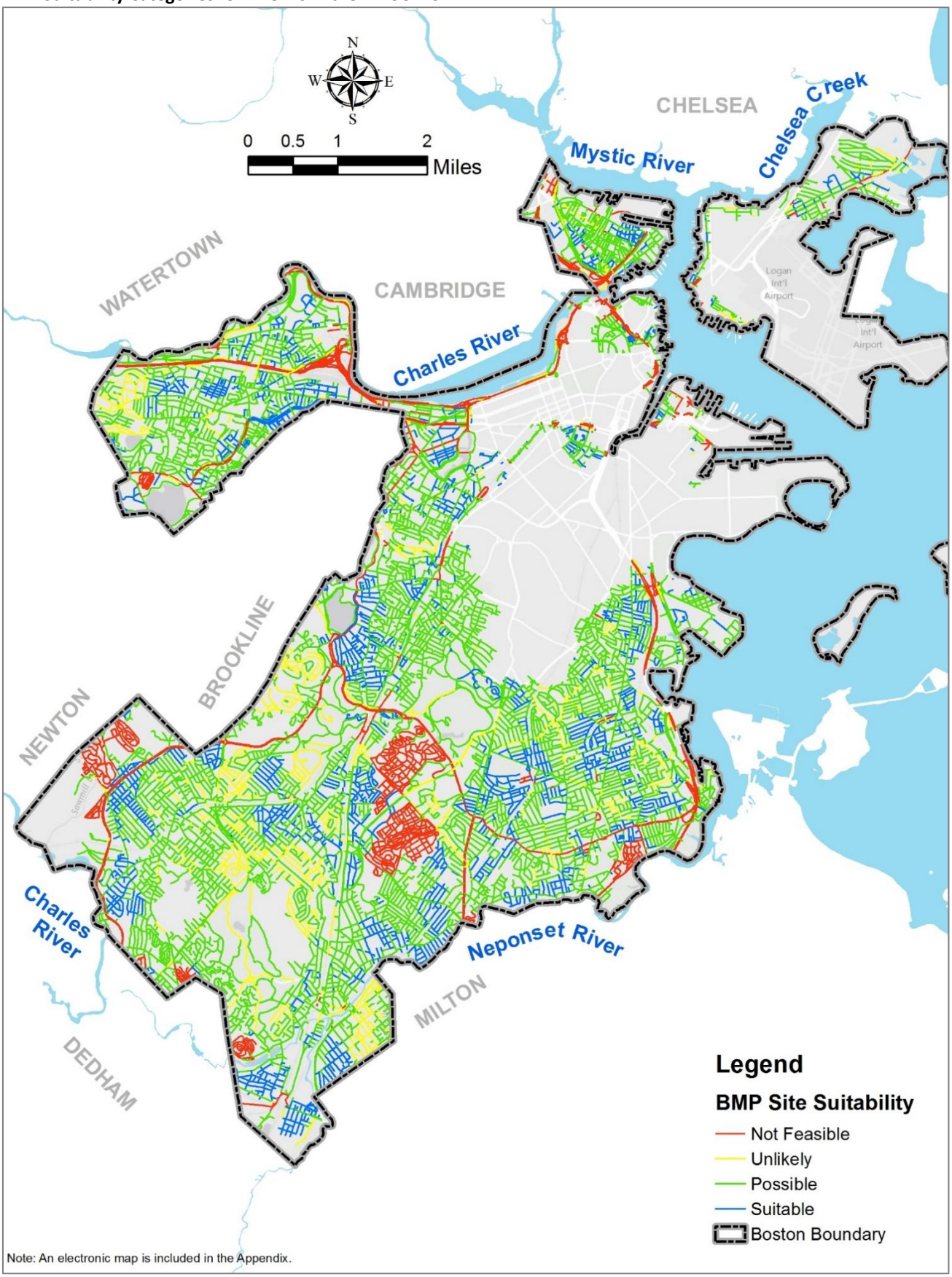
The suitable PROW totals approximately 177 miles and potentially could manage approximately 4.3 square miles of impervious area (2,700 acres) within the MS4 drainage area. Table 3-4 presents a summary of the results of this analysis. The total area treated represents 12 percent of the total MS4 area (approximately 37 square miles) and 65 percent of the 4,200 acres of directly-connected impervious area (DCIA) reported in the 2015 *Stormwater Model Report* (CDM Smith, 2015).

TABLE 3-4
Summary of BMP Suitability for Public Right-of-Ways

BMP Suitability Category	Street Length (miles)	Potential Treatment Area (mile^2)	% of Total MS4 Area (37 mile^2)
Suitable	177	4.3	12%
Possible	557	13.6	37%
Unlikely	84	2.0	5%

The geospatial distribution of the resulting suitability categories is presented in Figure 3-12.

FIGURE 3-12
BMP Suitability Categories for PROWs in the BWSC MS4



3.2.3.2 Non-residential Land Use Areas

Non-residential land use areas were evaluated based on the suitability criteria listed in Table 3-5.

TABLE 3-5
Summary of Suitability Criteria and Composite Thresholds for Non-residential Land Use Areas

BMP Suitability Category	Not Feasible	Unlikely	Possible	Suitable
Composite Score Threshold	**< 2.0**	**2.0 – 2.5**	**2.5 -3.0**	**> 3.0**
Annual TP (lb/acre)	< 0.07	0.07 - 0.33	0.33 - 0.67	> 0.67
Impervious Area (acres/parcel)	< 0.10	0.10 – 0.25	0.25 – 0.50	> 0.50
Hydrologic Soil Group	D, C/D	not rated	C	B or A
Terrain (% slope)	> 17%	10 - 17%	5 -10%	< 5%
Depth to Groundwater (feet)	< 1	1 - 2	2 - 4	> 4
Land Use	Water, Transportation, Cemetery	Others	Urban Open, Forest	Institutional Commercial, Industrial

Impervious area per parcel and land use criteria are included to target high pollutant loading areas as well as high likelihood of implementation. As shown in Figure 3-13, the highest weight is given to land use to emphasize the high pollutant generation from commercial and industrial land use areas. Soil and groundwater conditions are evaluated less strictly to ensure maximum applicable implementation when these land use areas undergo development or redevelopment in the future.

The geospatial distribution of the resulting suitability for non-residential areas is presented in Figure 3-14. The total area for each suitability category is summarized in Table 3-6 with the percentage of the total MS4 area.

FIGURE 3-13
Weighting Component for Non-residential Land Use
HSG = Hydrologic Soil Group; GW = Groundwater; TP WL = Total Phosphorus Waste Load.

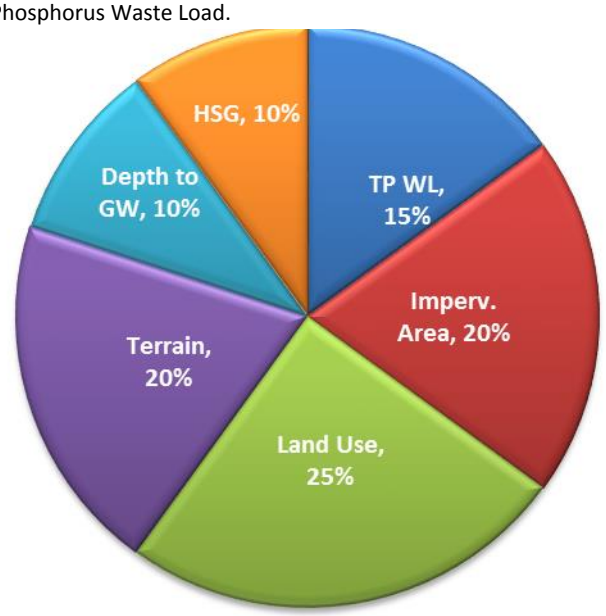
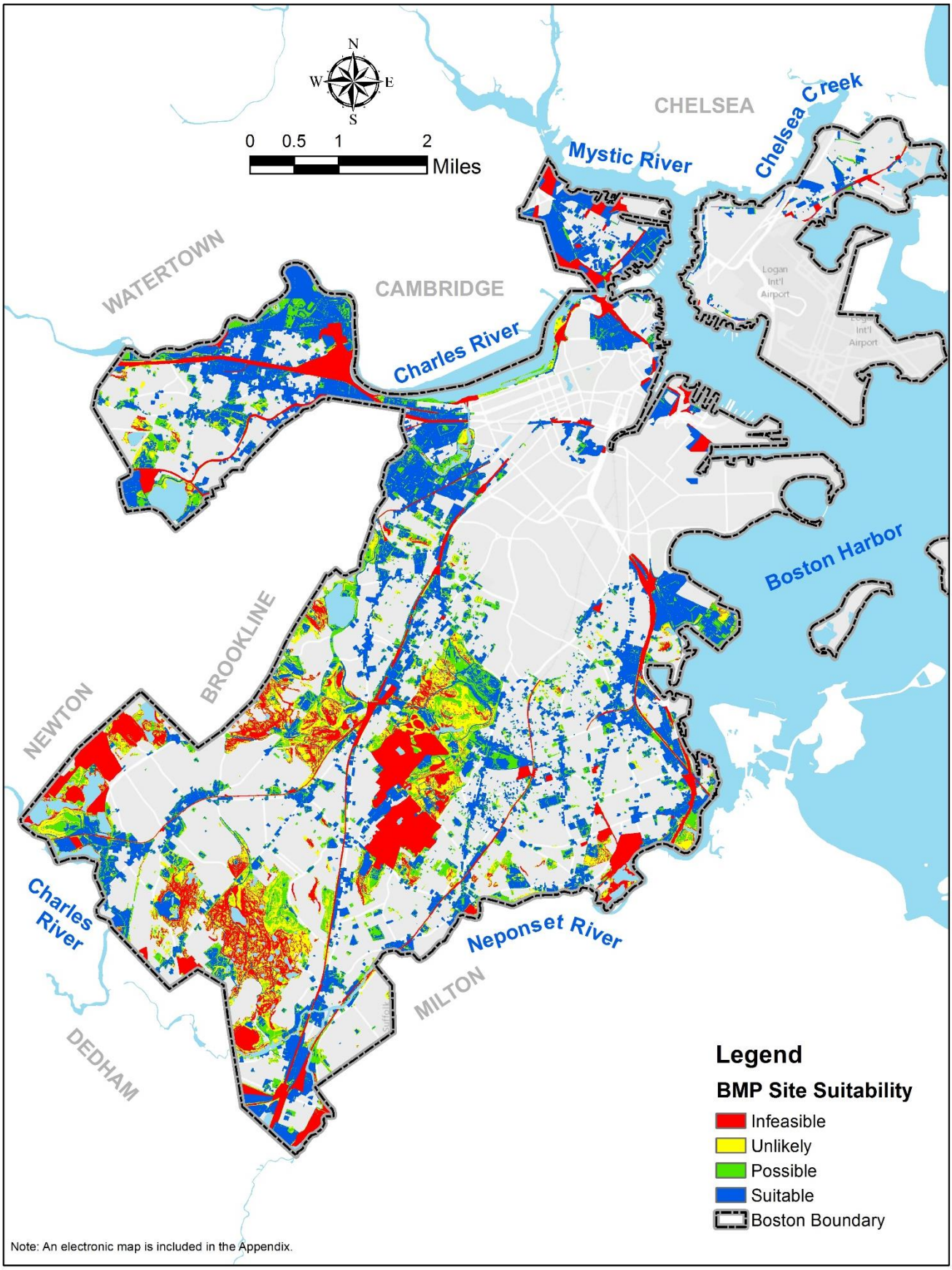


TABLE 3-6
Summary of BMP Suitability for Non-residential Land Use Areas

BMP Suitability Category	Suitable Areas in Each Land Use Area (acres)				Total Area Treated (mile^2)	% of Total MS4 Area (37 mile^2)
	Urban Open, Forest	Others	Commercial, Industrial, Institutional	Total		
Suitable	866	528	3,996	5,390	8.0	23
Possible	1,790	232	482	2,505	3.9	11
Unlikely	1,649	31	150	1,830	2.9	8

Figure 3-14
BMP Suitability Categories in Non-residential Land Use Areas



3.2.3.3 Residential Land Use Areas

Residential land use was evaluated with different weighting factors as shown in Table 3-7.

TABLE 3-7
Summary of Suitability Criteria and Composite Thresholds for Residential Land Use Areas

BMP Suitability Category	Not Feasible	Unlikely	Possible	Suitable
Composite Score Threshold	**< 2.75**	**2.75 – 3.65**	**3.65 – 3.75**	**> 3.75**
Annual TP (lb/acre)	< 0.07	0.07 - 0.33	0.33 - 0.67	> 0.67
Hydrologic Soil Group	n/a	C, D, not rated	B or A	B or A
Terrain (% slope)	> 5%	< 5%	< 5%	< 5%
Depth to Groundwater (feet)	< 1	1 - 2	> 2	> 2
Residential Open Space (acre/parcel)	> 0.1	0.1 - 1	0.1 – 1	> 1

The highest weighting factor was given to open space, as shown in Figure 3-15. The greater the open space on a residential parcel the higher the likelihood for residents to implement BMPs. Total phosphorus waste load is evaluated less strictly since the pollutant load from any residential land use area is the same. Soil and groundwater conditions play important roles toward the likelihood of property owners considering implementation of certain types of BMPs. It is less likely for a resident to consider BMPs if stormwater ponding occurs due to poor soils and high groundwater table.

The geospatial distribution of the resulting suitability categories for residential land use areas is presented in Figure 3-16. The total area for each suitability category is summarized in Table 3-8 with the percentage of the total MS4 area.

It should be noted that stormwater from residential areas categorized as “not feasible” or “low suitability” may still be managed by BMPs implemented downgradient (e.g., in the streets) to which the parcels drain.

FIGURE 3-15
Weighting Component for Residential Land Use Areas
HSG = Hydrologic Soil Group; GW = Groundwater; TP WL = Total Phosphorus Waste Load.

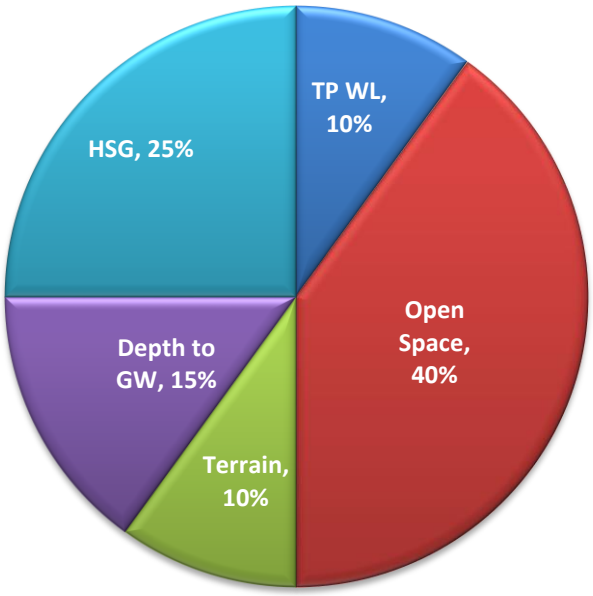
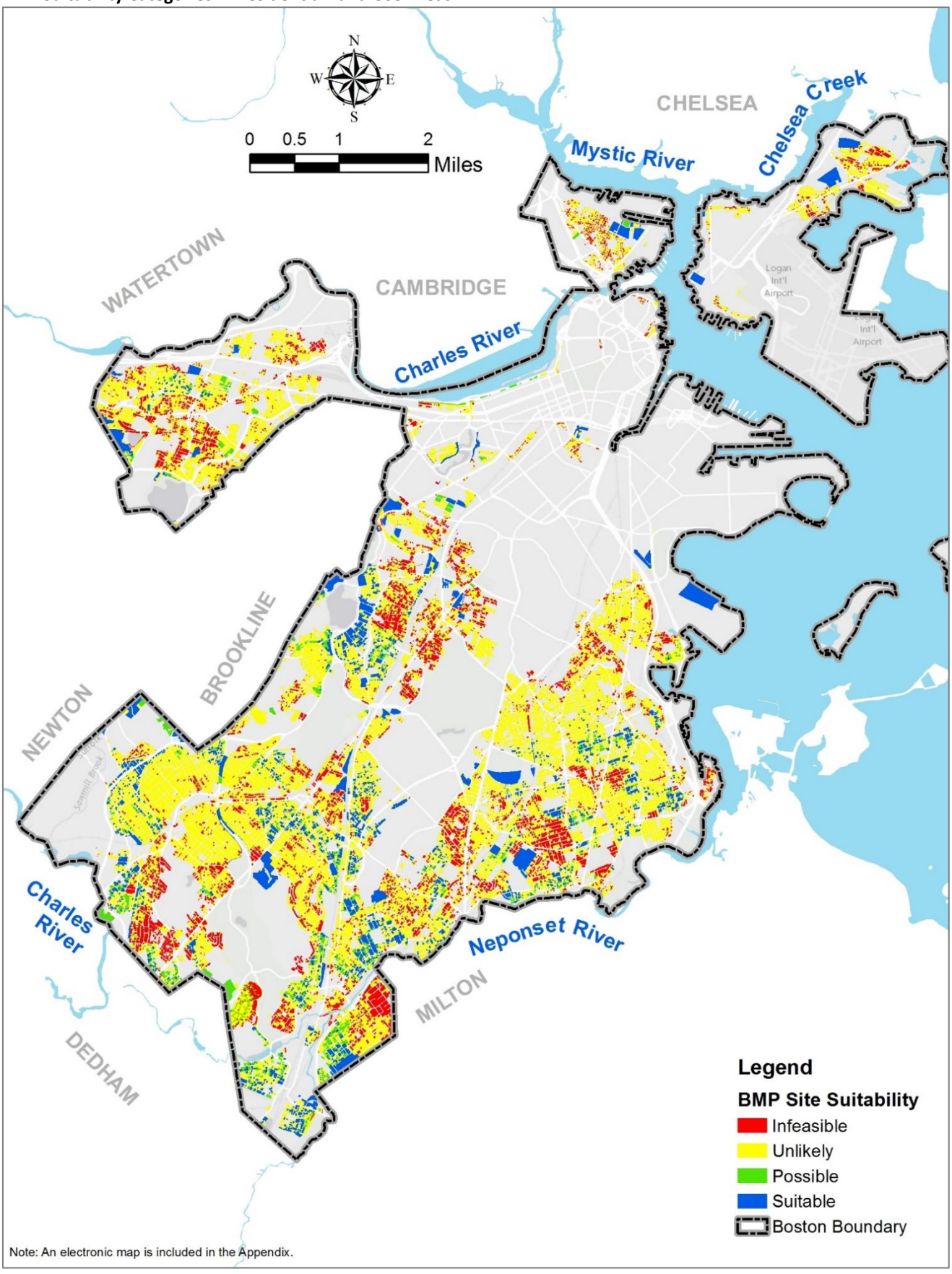


TABLE 3-8
Summary of BMP Suitability for Residential Land Use Areas

BMP Suitability Category	Potential Treatment Area		% of Total MS4 Area (37 mile^2)
	acres	mile^2	
Suitable	1,158	1.8	4.8
Possible	373	0.6	1.6
Unlikely	5,231	8.2	22.2

FIGURE 3-16
BMP Suitability Categories in Residential Land Use Areas



3.2.4 Siting Analysis of Constructed Wetlands

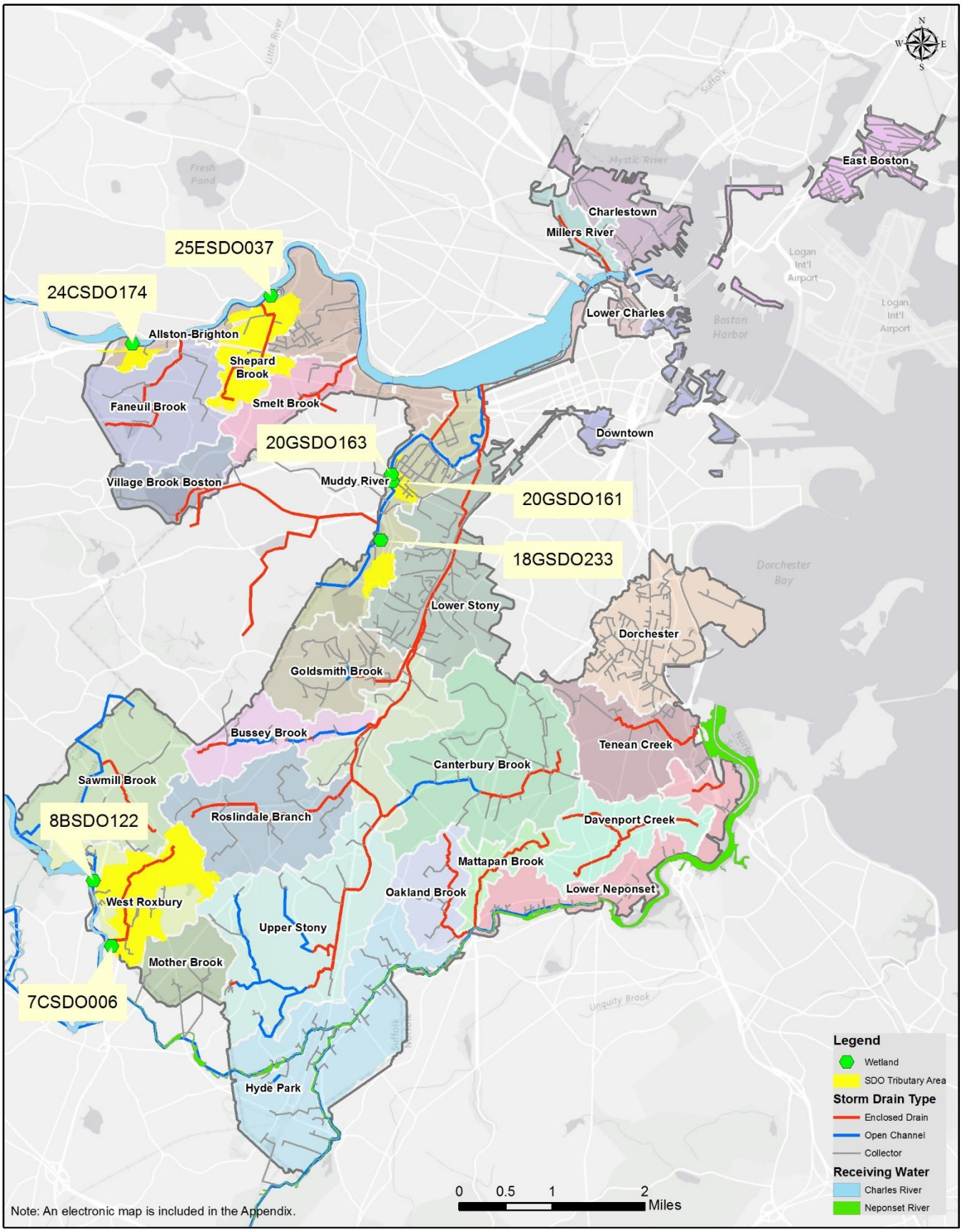
Among various types of end-of-pipe treatment BMPs, constructed wetlands provide the highest total phosphorous removal efficiency. The siting analysis of constructed wetland is separated from other site suitability analysis due to its unique requirements of large land size, vicinity to storm drainage outfalls and potential impact to existing function of the spaces. This section describes the investigation of opportunities for siting constructed wetlands to provide end-of-pipe treatment in the Charles River watershed. Seven sites along the Muddy River and Charles River were identified and evaluated as preliminary model evaluations revealed potentially more cost-effective total phosphorus reduction by constructed wetland than other BMPs. Areas tributary to the Neponset River and Boston Harbor were not considered as they do not have TMDLs for total phosphorus and the BMP screening analysis described in Section 3.2 indicates that wetlands have only moderate pathogen removal rates.

Possible wetland sites were first identified through a GIS analysis for high waste load areas using the best professional judgements of experienced water resource engineers based on available open spaces and vicinity of storm drain outfalls. Each of the sites were then assessed through a subsequent field visit to verify the GIS analysis. Figure 3-17 shows the locations of the seven sites that were identified as potential locations for constructed wetlands to provide stormwater management. However, for each of the site, there are two main constraints could potentially impact the implementation:

- The feasibility of diverting flow from the storm sewer must be further investigated.
- The impact of the wetland on passive recreation in the park must be further vetted.

FIGURE 3-17

Constructed Wetland sites with SDO Tributary Areas



Each of the sites are evaluated individually, as described below.

25ESDO037. This outfall drains areas tributary to a historical natural stream, Shepard Brook as shown in Figure 3-18. Centuries of urban development have altered the historical stream into covered culverts draining the 324-acre Shepard Brook watershed. The culverted brook runs under Christian Herter Park's playgrounds before discharging into the Charles River. Land uses in the Shepard Brook watershed are primarily commercial, institutional and high-density residential. Under existing conditions, the estimated total phosphorus waste load discharged at this outfall is approximately 595 lb/year, or 1.5 lb/ac/year. The park is a popular public park along the Charles River in the Allston-Brighton area of Boston that features several playgrounds, an outdoor theater, community gardens, walking trails, and passive recreation areas as shown in Figure 3-18. The park is relatively flat and is bordered by the Charles River to the north and Soldiers Field Road to the south. Visitors to the park generally arrive by car and park in a large parking lot between the playgrounds and the gardens.

The relatively large open space between the parking lot and the Charles River presents an excellent and relatively rare opportunity for a constructed wetland to provide stormwater treatment. The site was selected for conceptual design study for this report (described in section 5.3). The conceptual design includes 28,000 square feet (ft^2) constructed wetland with several cells (sediment forebay, plunge pool, micro-pool, several marsh zones, etc.) that would collectively treat runoff diverted from the nearby Shepard Brook storm sewer before discharging to the Charles River.

FIGURE 3-18
Potential Wetland Site for 25ESDO037



24CSDO174. The wetland site for 24CSDO174 is shown in Figure 3-19 (below). It is located along the Charles River in the Allston-Brighton area between the Community Rowing boathouse and the Daly Rink. The Community Rowing boathouse has one of the largest rowing programs in the United States with over 5,000 people rowing there annually. There is a large area of open space near the outfall point. The approximate area of the proposed wetland is 1.8 acres. The aerial view (in Figure 3-19) shows an unused open field located to the west of the boathouse parking lot.

The tributary area to this outfall includes approximately 56 acres of impervious area that is mainly high-density residential land use, as well as areas of urban open and commercial land use. Drainage from a section of I-90 also discharges through this 24-inch outfall. Under existing conditions, the estimated total phosphorus waste load discharged at 24CSDO174 is approximately 77 lb/year, or 0.8 lb/ac/year.

FIGURE 3-19
Potential Wetland Site for 24CSDO174



20GSDO163 and 20GSDO161. 20GSDO163 and 20GSDO161 are located along the Riverway, to the west of the Longwood Medical area. Both outfalls discharge to Muddy River. The river is 3.5 miles long and flows through part of the Emerald Necklace. This park features scenic paths used by commuters, runners, and bikers year-round. 20GSDO163 is located north of Pilgrim Road, as shown in Figure 3-20. The estimated size of the wetland at this outfall is about 0.6 acres, relatively small because of area constraints.

20GSDO161 is located to the south of Pilgrim Road (see Figure 3-21). This wetland has more open space in the area, with a shape area of 0.8 acres.

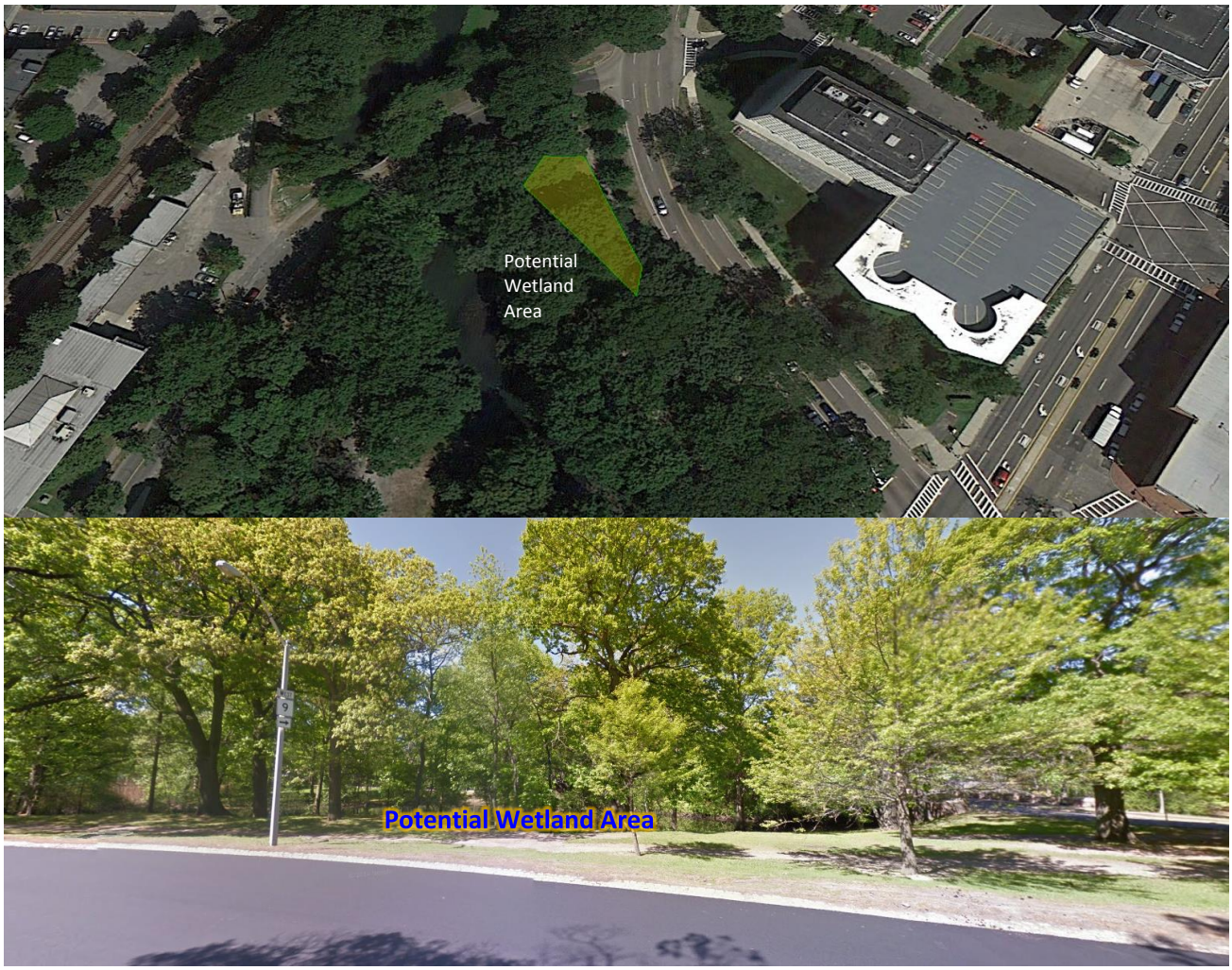
The tributary areas are mainly Longwood medical area with approximately 53 acres of impervious area. The land use is classified as mostly urban public and institutional with some commercial area. The Longwood Medical area has a high degree of impervious cover. Under existing conditions, the estimated total phosphorus waste load is approximately 165 lb/year (6.8 lb/ac/year). The outfall vicinity areas, along the Muddy River, are heavily wooded area that can be potential wetland sites.

FIGURE 3-20
POTENTIAL Wetland Site for 20GSDO163



FIGURE 3-21

Potential Constructed Wetland Site for 20GSDO161.



18GSDO233. 18GSDO233 discharges to Muddy River in Olmstead Park near Daisy Field, to west of the Jamaicaway along the Emerald Necklace. Olmstead Park is heavily wooded. It features Daisy baseball field, Leverett Pond, and rolling pathways. The park attracts visitors to the athletic fields and its open meadow, as well as hiking, walking and biking trails. The potential wetland area is about 3.5 acres, presented in Figure 3-22.

The tributary drainage area to 18GSDO233 is primarily residential land use, with approximately 67 acres of impervious area. Under existing conditions, the estimated total phosphorus waste load is approximately 325 lb/year, or 3.5 lb/ac/year. The Commission is currently in preliminary design phase to install a gravel wetland in this area.

FIGURE 3-22
Potential Wetland Site for 18GSDO233



7CSDO006. This outfall discharges to the Upper/Middle Charles River. The potential constructed wetland area is located in West Roxbury, east of the Veterans of Foreign Wars Parkway. The outfall discharges to Upper/Middle Charles River. The proposed site is located in an open space area between Town Fair Tire and Prime Toyota of Boston in a heavily wooded area next to the Charles River

The outfall drains approximately 233 acres of impervious area that is predominantly residential with some commercial land use types. Under existing conditions, the estimated total phosphorus waste load is approximately 206 lb/year (0.35 lb/ac/year). The proposed wetland is shown in Figure 3-23.

FIGURE 3-23
Potential Wetland Site for 7CSDO006



8BSDO122. 8BSDO122 discharges to the Upper/Middle Charles River north of 7CSDO006 and drains approximately 33 acres of impervious area. The proposed constructed wetland site in 8BSDO122 is also located in West Roxbury, along the VFW Parkway. The Charles River is immediately west of the proposed site. This proposed wetland is farther north than the one in 7CSDO006. The outfall drains to Upper/Middle Charles River and drains approximately 33 acres of impervious area.

Land uses in the area tributary to 8BSDO122 are similar to those in the 7CSDO006 drainage area- mainly residential with some commercial areas. The estimated total phosphorus waste load is relatively low at approximately 57 lb/year (1.1 lb/ac/year). This potential site is located next to the VA Boston Healthcare System and is relatively flat.

There is a fair amount of open space between the hospital parking lot and the Charles River that presents a suitable area for a constructed wetland to provide stormwater treatment, as shown in Figure 3-24. Both 7CSDO006 and 8BSDO122 are located in areas that are not as visitor friendly as the other potential wetland sites described above. However, they are located along the Charles River Bike Path, which is heavily used by commuters, walkers, bikers, and runners.

FIGURE 3-24
Potential Wetland Site for 8BSDO122



ARLINGTON
MEDFORD
EVERETT
REVERE
CHELSEA
BELMONT
SOMERVILLE
Chelsea Creek
Mystic River
WINTHROP
CAMBRIDGE
WATERTOWN
Lower Charles River
Muddy River
Boston Harbor
NEWTON
BROOKLINE
Upper/Middle Charles River
Neponset River
DEDHAM
MILTON
WESTWOOD
CANTON

Legend

BMP Site Suitability

- Infeasible
- Unlikely
- Possible
- Suitable
- Areas Separated after 2012

Receiving Water

- Boston Harbor
- Lower Charles River
- Neponset River
- Upper/Middle Charles River
- Boston Boundary

Map Prepared: December, 2015

Boston Water and Sewer Commission

CH2MHILL

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W E
S

0 1 2 Miles

BMP Suitability Categories in Non-Residential and Residential Land Use Areas

Boston Water and Sewer Commission

DRAFT

N:\Common_BWSC_Files\Wastewater and Storm Drainage Facilities Project\BMP Implementation Plan

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

SECTION 4

Implementation Plan Scenarios

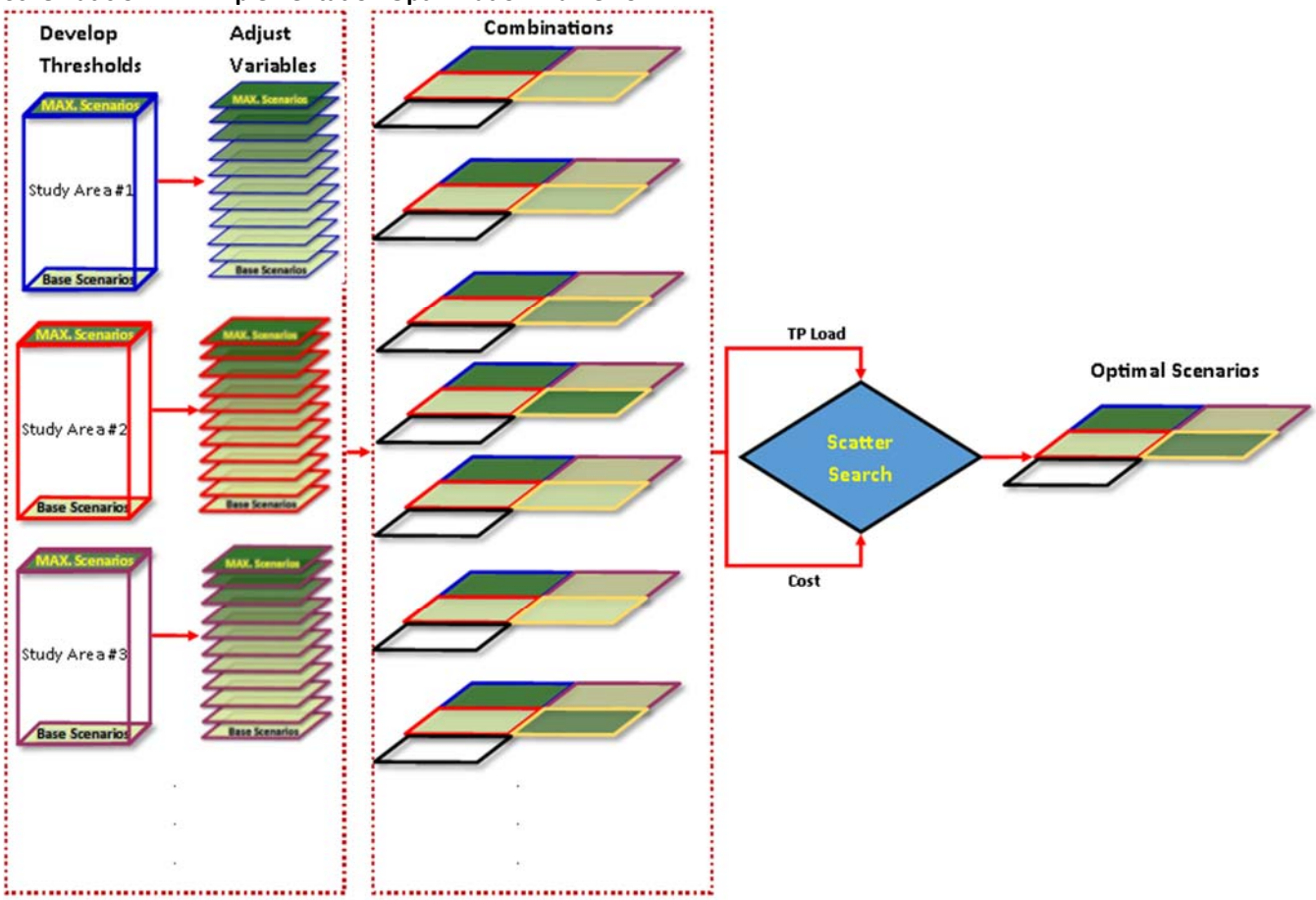
This section describes the development of model scenarios used to evaluate various levels of BMP implementation. Having established potential locations for BMPs in the site suitability analysis, this section focuses on evaluating *how much* GI to incorporate and *where to focus* implementation efforts in order to meet TMDL requirements at the most efficient cost. An optimized solution is presented, and these model results are compared with an alternate USEPA method.

The process used to evaluate BMP implementation scenarios is illustrated schematically in Figure 4-1. The process began by developing upper and lower BMP implementation limits for each of the 27 reporting areas. The lower limit is called the base scenario and was developed to form the basis of the program with practices that the Commission has already adopted. The base scenario represents treatment of approximately 5 percent of directly connected impervious area (DCIA) in the Commission's MS4 and includes 85 percent removal of illicit discharges, additional treatment of 1 inch of runoff from impervious surfaces in planned development sites and 45 miles of PROW BMPs. The upper limit represents the theoretical maximum level of BMP implementation that exhaustively implements BMPs to treat 100 percent of the DCIA in each of the reporting areas.

Once the upper and lower BMP implementation thresholds were set for each reporting area, additional implementation scenarios were generated by adjusting the level of BMP treatment at nine incremental intervals between the lower and upper limits. The nine intermediate scenarios were developed by implementing gradually increasing levels of BMPs that fall between the base and maximum BMP implementation scenarios to treat between 10 and 90 percent of the DCIA in each of the study areas. Including the base and maximum BMP implementation scenarios resulted in 11 core BMP implementation scenarios generated for each of the 27 reporting areas. Additional scenarios were then developed by incorporating end of pipe treatment BMPs (i.e. constructed wetlands) of various sizes into several existing core scenarios. Wetland BMPs were added to the base scenario and the core scenarios up to and including the intermediate scenario that treated approximately 40 percent DCIA. For each implementation scenario where wetlands were added for additional treatment, four wetland treatment scenarios were considered. The four wetland treatment scenarios represent varying levels of water quality volume corresponding to treatment of 0.1, 0.2, 0.4, and 0.5 inches of runoff from their respective tributary DCIAs.

Thirty-one core model scenarios were thus created for each of the 27 reporting areas. Due to the independent nature of pollutant generation and treatment among the Commission's watersheds, multiple model runs were performed independently and then recombined to efficiently span the entire MS4 area and characterize systemwide behavior for a vast number of BMP implementation scenarios. Myriad BMP implementation scenarios were analyzed using the hydraulic model and post-processed to produce a scatter graph showing pollutant loading values versus BMP implementation cost. As the goal of this analysis was to find the specific combination of BMPs to meet TMDL requirements at the most efficient cost, the optimal scenario was determined by searching the scatter plot to identify a cost-efficient implementation plan where pollutant loads drop below TMDL requirements.

FIGURE 4-1
Schematic of BMP Implementation Optimization Framework



4.1 Development of Implementation Scenarios

Incorporating large amounts of multifaceted data required a streamlined data flow between GIS databases, modeling platforms, and post-processing spreadsheets. This section discusses model setup using the SWMM low impact development (LID) module and how planning level BMPs were simulated in the model as well as pre- and post-processing procedures. Model scenarios and cost estimate methodology are also discussed herein.

4.1.1 Model Setup

The scenario models were developed using the SWMM 5 LID module, based on the Commission's stormwater model described in the 2015 *Stormwater Model Report* (CDM Smith, 2015). The first step was to determine areas to be managed by BMPs (management area) in model subcatchments based on the scenarios developed to treat specific percentages of DCIA. The second step was to categorize the areas based on the 10 BMP management categories listed in Table 3-1. The final step was to select and size priority BMPs with the highest pollutant removal rates for each of the categorized management areas.

4.1.1.1 LID Controls

The BMPs are modeled in the SWMM 5 LID module as hydrologic controls within the subcatchment, where BMPs provide some combination of detention, infiltration and/or evapotranspiration. The SWMM LID module allows the modeler to implicitly incorporate BMPs directly into the subcatchment without requiring additional delineation refinements. LID is the terminology used in SWMM to represent GI BMPs. Five different types of BMPs are included in the SWMM LID module:

- Bioretention (including rain gardens, green roofs, and street planters)
- Porous pavement

- Infiltration trenches
- Rain barrels/cisterns
- Vegetative swales

BMPs are represented in the model by a combination of five vertical layers: surface, pavement, soil, storage, and underdrain. Each of these layers is defined on a per-unit-area basis, and not all layers need to be defined for all types of BMPs. Table 4-1 summarizes required and optional layers in the SWMM LID module for each type of BMP. Figure 4-2 presents an example of a bioretention cell with four of these simulation layers represented.

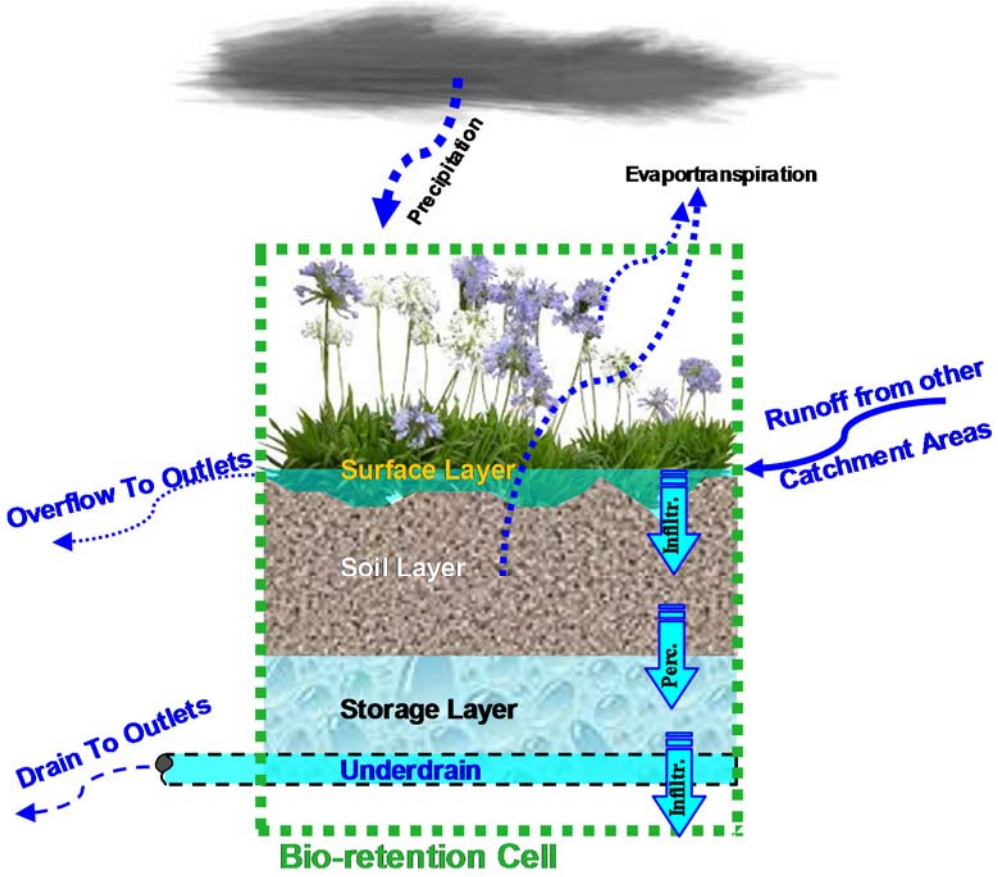
Both LID controls and pollutant buildup and washoff are nested within SWMM 5's land surface compartment while treatment functions are only allowed in its transport compartment. The SWMM LID module cannot currently simulate treatment by the BMPs. Instead, it simulates the pollutant removal indirectly by runoff reduction due to increased detention, infiltration, and evapotranspiration from BMPs. In most cases, this produces conservative estimates of pollutant load reduction from BMP implementation.

TABLE 4-1
SWMM 5 LID Technology Simulation Layer Requirements

LID Type	Surface	Pavement	Soil	Storage	Underdrain
Bioretention cell	X	--	X	O	O
Porous pavement	X	X	--	X	O
Infiltration trench	X	--	--	X	O
Rain barrel	--	--	--	X	X
Vegetative swale	X	--	--	--	--

(X) = REQUIRED; (O) = OPTIONAL; (--) = NOT USED

FIGURE 4-2
Flow Pathway Schematic for a Bioretention Cell



NOTES:

The surface layer receives runoff from a catchment area and can store the runoff and rainfall excesses in the surface layer depression area (e.g., rain garden/planter). A portion of rainfall excess will be infiltrated from the surface layer to the soil layer where it would retain water within its void volume (pore water), and the remaining portion will percolate into the storage layer (e.g. gravel or crashed stone layer). Additional percolation will occur once the storage area is full. Percolated water either enters the underdrain system or infiltrates into the natural soil layer underneath the bioretention cell.

Most BMPs for this planning study were simulated explicitly as LID controls in the SWMM 5 LID module. Each type can be defined as a unit, and a number of units can then be placed in the subcatchments based on the management area determined for each model scenario. BMP unit sizes were thus set for infiltration trenches, bioretention, porous pavement, and dry wells based on the typical sizing details described in the *Massachusetts Stormwater Handbook* (MassDEP, 2008). Massachusetts stormwater management standard #5 requires treating 1 inch of stormwater runoff generated from a high pollutant load impervious area, generally referred to as the design water quality volume (WQv). For this report, priority BMPs were sized to provide storage volume equivalent of 1 inch of runoff from the DCIA within a management area. To simulate conservative infiltration rates into the native soil, the hydraulic conductivity was set to 0.45 inches per hour (typical of HSG Type C soils) for infiltration trenches, porous pavement, and drywells while 0.09 inches per hour (typical of HSG Type D soils) was attributed to bioretention BMPs. The LID setup for each BMP is summarized in Table 4-2 and described below.

TABLE 4-2
Summary of SWMM LID Control Setups

	SWMM LID Control Parameters	Infiltration Trench	Bio-retention	Porous Pavement	Dry Well
Surface	Berm height (inches)	6	6	0.15	12
	Vegetation Volume (fraction)	0.8	0.1	0	0.75
	Surface Roughness (Manning's n)	0.15	0.2	0.015	0.15
	Surface Slope (percent)	1	10	1	1
Soil	Thickness (inches)		36		
	Porosity (volume fraction)		0.25		
	Field Capacity (volume fraction)		0.2		
	Wilting Point (volume fraction)		0.1		
	Conductivity (inches/hour)		0.45		
	Conductivity Slope		10		
	Suction Head (inches)		3.5		
Pavement	Thickness (inches)			24	
	Void Ratio (void/solids)			0.43	
	Impervious surface (fraction)			0	
	Permeability (inches/hour)			100	
	Clogging factor			0	
Storage	Thickness (inches)	48	12	30	60
	Void Ratio (void/solids)	0.75	0.75	0.75	0.75
	Seepage Rate (inches/hour)	0.45	0.09	0.45	0.45
	Clogging factor	0	0	0	0
Underdrain	Drain Coefficient (inches/hour)			0.01	
	Drain Exponent			0.5	
	Drain Offset Height (inches)			24	
Calculated Effective Storage (inches/unit)		21.8	19.9	20.2	25.7
Standardized BMP Unit Size (ft^2)		1	1	1	50
Managed DCIA (ft^2/unit)		21.8	19.9	20.2	1,285

Infiltration Trench. To simplify infiltration types of BMPs constructed in public right-of-ways (PROWs) and non-residential areas, infiltration trenches were selected as the representative BMP to provide infiltration and storage functions. It was assumed that infiltration trenches would generally be installed 4 feet wide along the length of suitable streets in each subcatchment. For example, a 1-mile-long by 4-foot-wide infiltration trench is 21,120 square feet (ft^2); represented in SWMM as 21,120 units of infiltration trench. The total managed DCIA for 1-mile of infiltration trench is calculated to be approximately 460,416 ft^2 (21,120 units x 21.8 ft^2 per unit). This tributary area calculation is determined by normalizing the effective storage

depth to 1 inch, as required to capture the first flush. In other words, one modeling unit of infiltration trench is 1 ft^2 in area and 48 inches deep with 21.8 inches of effective storage that treats 21.8 ft^2 of DCIA. Based on the typical infiltration trench (Figure 4-3) described in the MassDEP Stormwater Handbook (MassDEP, 2008), the effective storage (**21.8** inches) is calculated from the following two layers:

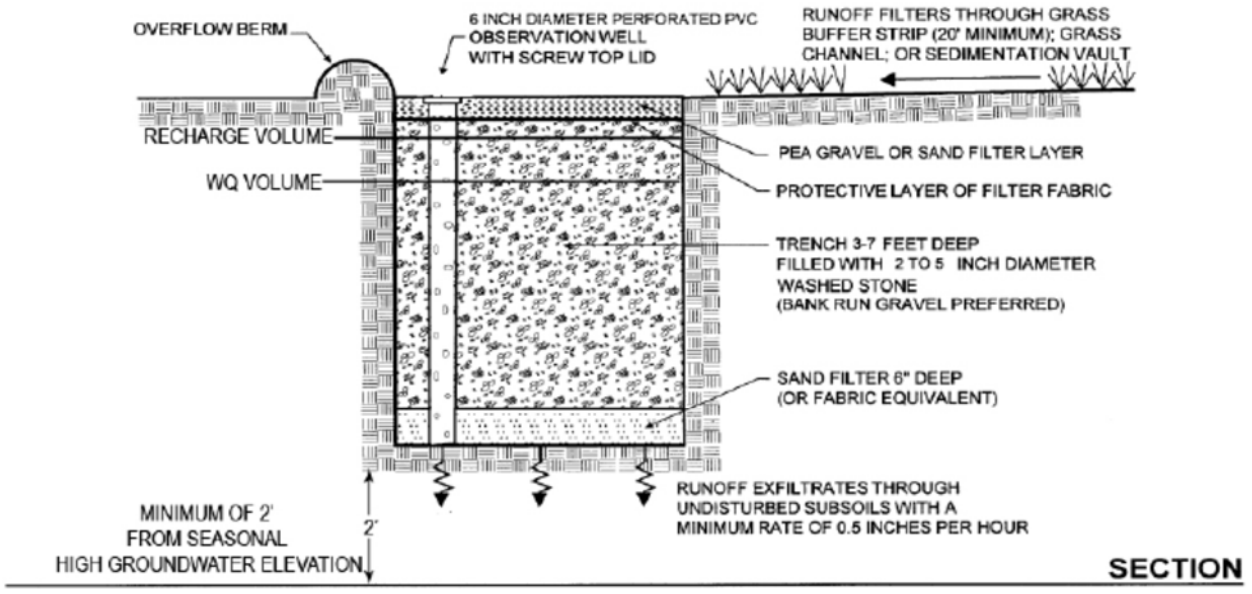
- Surface layer: These are void volumes in crushed stone, porous paver, or other types of inlets (such as perforated PVC pipes) that distribute runoff into the infiltration layer. The model assumes an average of **1.2** inches (20 percent of 6-inch-thick gravel or sand filter layer, or approximately 0.75 gallons) per square foot of infiltration trench.
- Storage layer: A standardized unit assumes 4 feet of trench depth with a void ratio of 0.75. Note that the void ratio is the ratio of voids to solids, not voids to total volume. Thus, a void ratio of 0.75 translates to a porosity of approximately 0.43. The equivalent storage depth per standardized unit is therefore **20.6** inches (roughly 12.8 gallons), as calculated below.

$$porosity = \frac{1}{1 + \frac{1}{void\ ratio}} = \frac{1}{1 + \frac{1}{0.75}} = 0.43$$

$$Storage\ volume = porosity \times total\ volume$$

$$= 0.43 \times 4\ ft^3 = 1.7 ft^3 = 20.6\ (ft^2 \cdot inches)$$

FIGURE 4-3
Example of Infiltration Trench
(Reference: Massachusetts Stormwater Handbook [MassDEP, 2008])



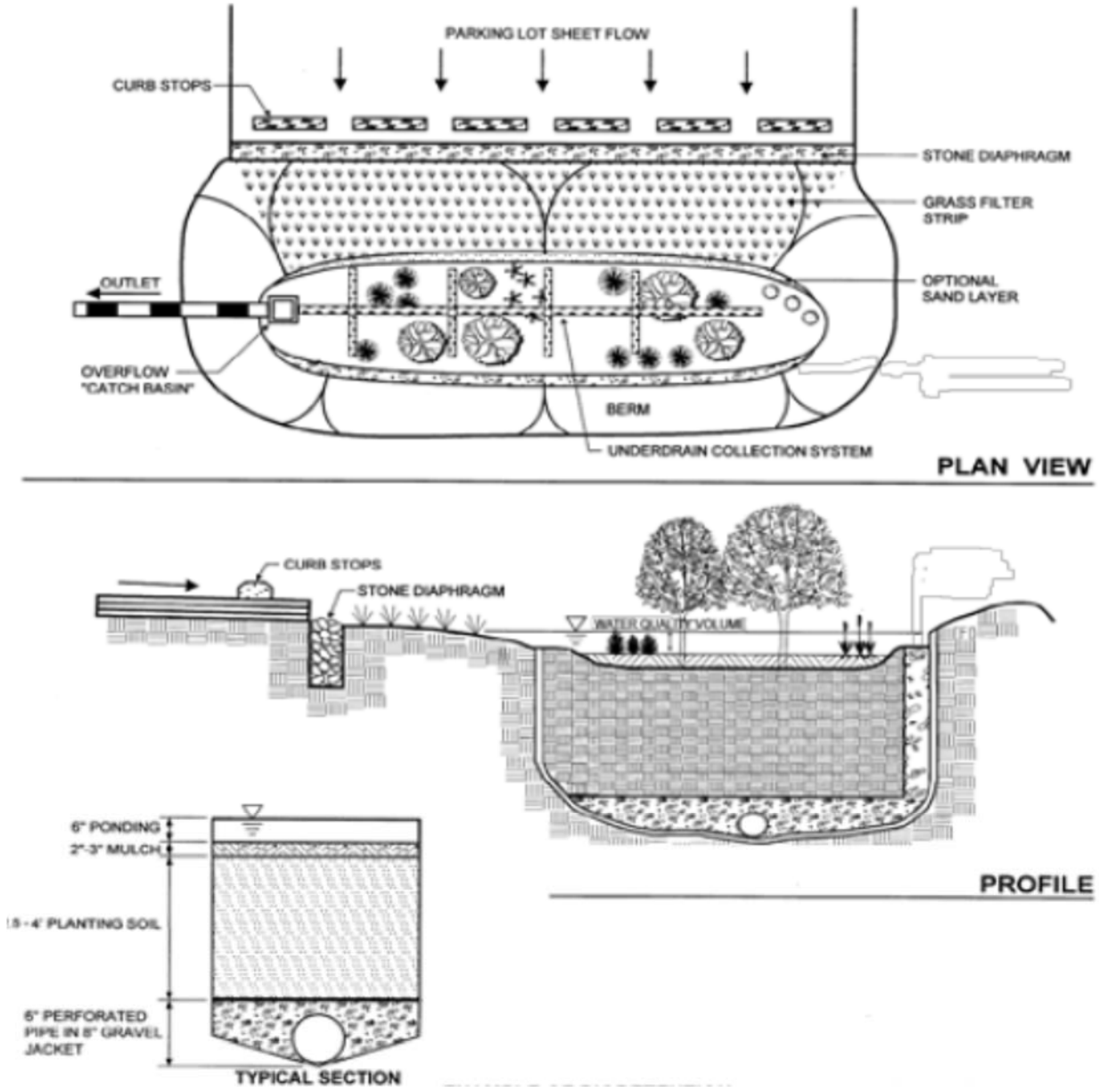
Bioretention. Bioretention BMPs are listed as priority BMPs with pollutant removal rates less than those of infiltration BMPs. However, they can be installed in places where infiltration is not practical (such as an area with high groundwater table and/or low permeability soil). There are many types of bioretention BMPs (for example, rain garden, tree planter box, street bump out, etc.) as illustrated in Figure 4-4, and they are generalized with four functional layers. To simplify the model setup, no underdrain layer was assumed for bioretention BMPs. Layers with effective storage are described below:

- Surface layer: This layer represents depression storage on the surface. An average of 6-inches of surface storage is assumed, and the effective storage is 5.4 inches after accounting for vegetation volumes.

- Soil layer: This layer represents the topsoil layer for planting. The standardized unit assumes 36 inches (3 feet) of topsoil with a porosity of 0.26. The effective storage is approximately 9.4 inches.
- Storage layer: This layer varies depending on the design of BMPs. It is basically an optional layer between the planting medium and native soil. Recognizing that many BMPs use engineered/structured soils and media, the standardized unit assumes 12 inches of storage with a void ratio of 0.75. This equals 5.1 inches of effective storage.

The total effective storage is approximately 19.9 inches, which is approximately 12.4 gallons in terms of water quality volume.

FIGURE 4-4
Example of Bioretention BMPs



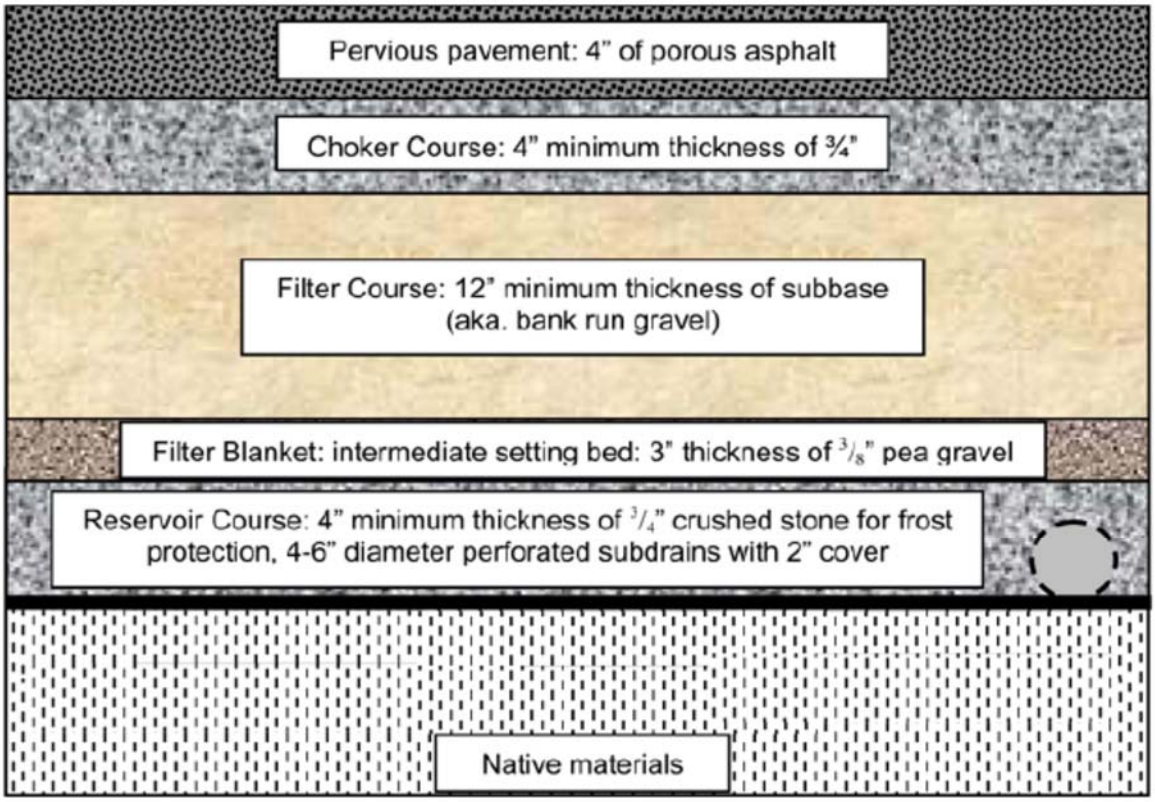
Reference: Massachusetts Stormwater Handbook [MassDEP, 2008]

Porous Pavement. The report assumes porous pavement only applies to parking lot areas. The effective storage is calculated based on standard details (Figure 4-5) illustrated in the *Massachusetts Stormwater Handbook* (MassDEP, 2008) and assumes a 30-inch crushed stone storage layer.

- Surface layer: This layer assumes 0.15 inches of depression storage to allow sheet flow to enter the porous pavement area from a surrounding parking area.
- Pavement layer: A total of 24 inches of thickness was assumed to include porous pavement, choker course, filter course, and other binder courses. An average void ratio of 0.43 is assumed for all pavement layers. The equivalent storage is approximately 7.2 inches.
- Storage layer: A 30-inch crushed stone storage layer is assumed for the standardized unit with a void ratio of 0.75. The equivalent storage is approximately 12.8 inches.

The total effective storage is approximately 20.2 inches, which is approximately 12.6 gallons in terms of water quality volume.

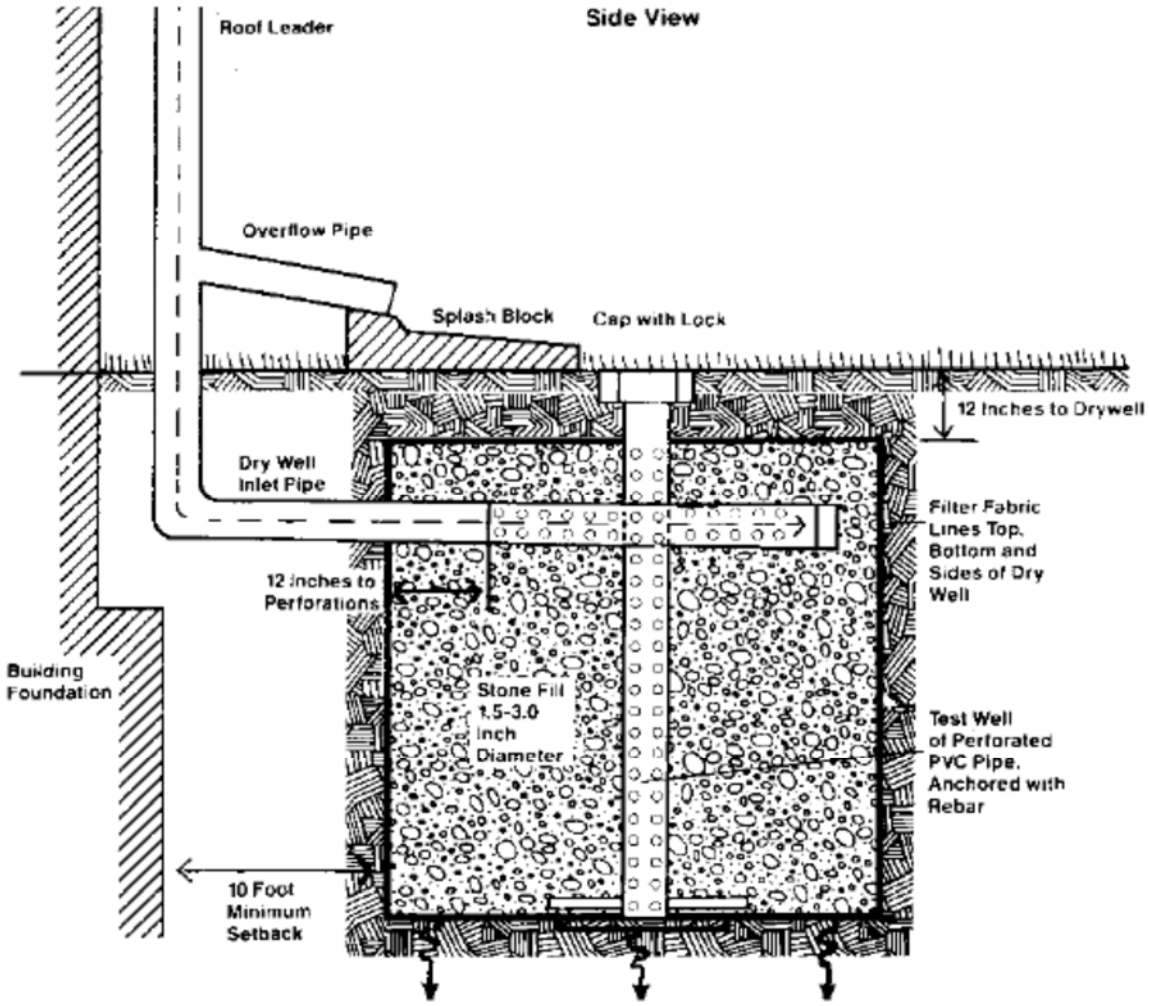
FIGURE 4-5
Example of Porous Pavement BMPs



Reference: Massachusetts Stormwater Handbook [MassDEP, 2008]

Drywell. This is a type of infiltration practice that is typically installed to treat rooftops or areas draining in a residential setting (Figure 4-6). A standardized unit assumes a BMP area of 50 ft^2 (unit with 8-foot diameter). The effective storage (25.7 inches) is calculated by the storage layer only since the installations are assumed to occupy a previously pervious area, and the model subcatchment hydrology in a pervious area has already been factored into the runoff simulation. The standardized unit assumes 5 feet of crushed stone bed depth with a void ratio of 0.75. The equivalent storage per standardized unit is approximately 25.7 inches (approximately 800 gallons).

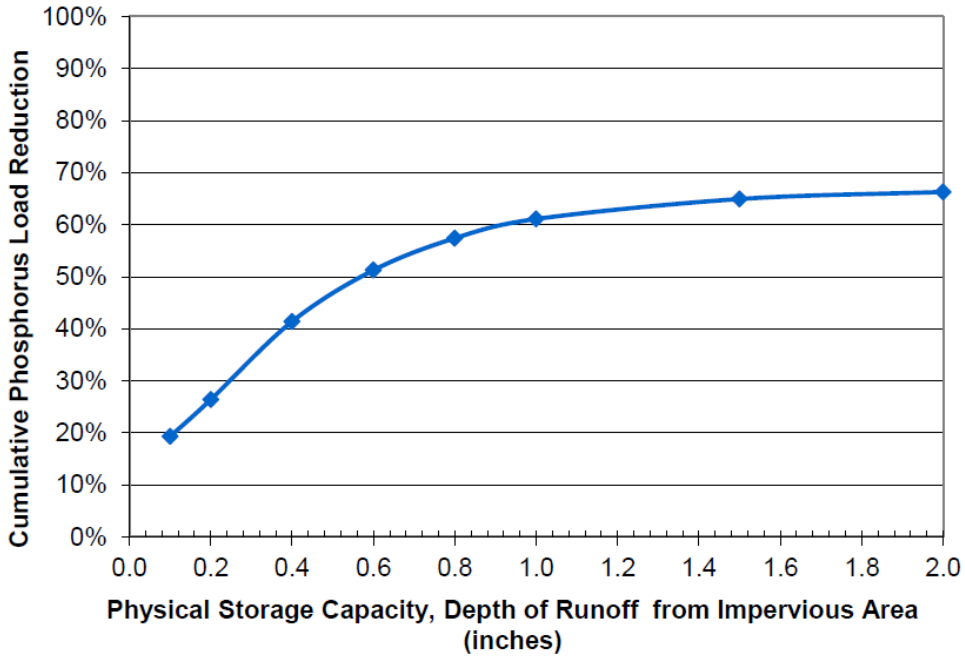
FIGURE 4-6
Example of Drywell



Reference: Massachusetts Stormwater Handbook [MassDEP, 2008]

Constructed Wetland. SWMM allows users to explicitly simulate constructed wetlands with nodes and links representing its storage and treatment capabilities. Pollutant removal rates are simulated with a zero order function with a constant removal rate based on its design WQv. The removal rate is based on the BMP performance curve for a gravel wetland as shown on Figure 4-7. The water quality volumes of proposed wetlands are typically limited by the sizes of the wetland sites. The wetland sizes at candidate locations were estimated based on the GIS study described in Section 3.2.4. Water quality volumes were back calculated based on the wetland footprint sizes and parameters listed in the *Massachusetts Stormwater Handbook* (MassDEP, 2008) (Chapter 2, Volume 2, Table CSW.1 Recommended Design Criteria for Stormwater Wetland Designs).

FIGURE 4-7
Total Phosphorus Removal Performance Curve for Gravel Wetland

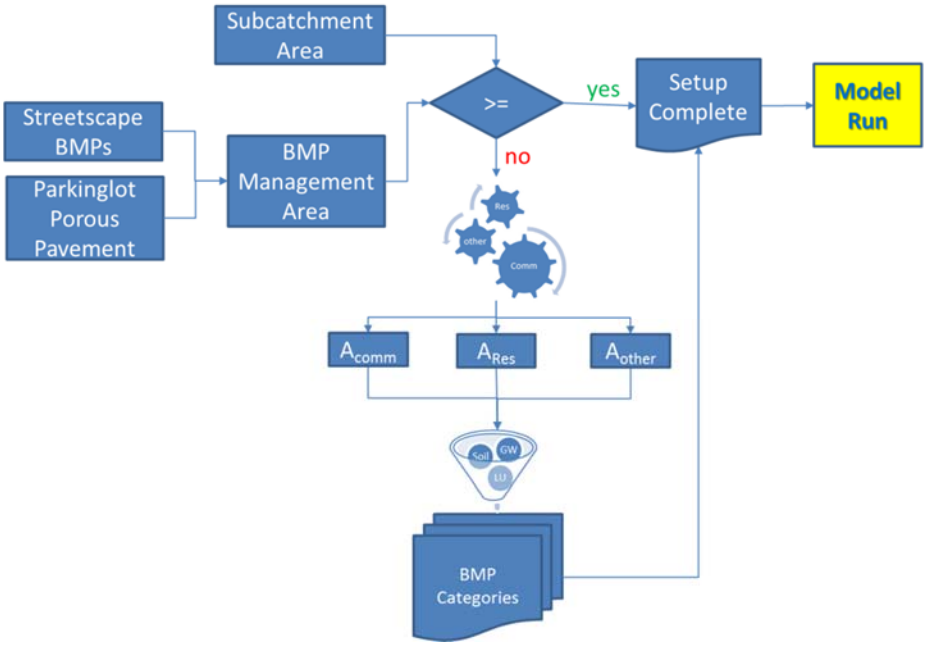


Reference: USEPA, 2014, Draft Massachusetts Stormwater General Permit, Appendix F, Attachment 3

4.1.1.2 LID Placement

Once BMPs were defined in the SWMM LID module, they were placed into each model subcatchment to develop implementation scenarios. This was executed with customized database procedures combined with ArcGIS tools to determine the numbers and types of BMPs in each model subcatchment. The placement procedures are illustrated on Figure 4-8.

FIGURE 4-8
SWMM LID Setup Workflow



1. Infiltration trenches and bioretention BMPs were selected to treat both BRA article 80 development sites and public schools depending on their underlying soil conditions. Infiltration BMPs were applied

where well-drained soils (that is, HSG of A, B, or C) are present and groundwater depths are greater than 6 feet. Bioretention BMPs manage the remaining BRA and public school areas.

2. Porous pavement was selected to receive runoff from parking lots in excess of 10,000 ft^2. To avoid disaggregating the parking lots and assigning them to multiple subcatchments, each parking lot was assigned to the subcatchment that contained its centroid for each implementation scenario. The entire parking lot area was assumed to drain to a porous pavement area sized to capture 1 inch of runoff.
3. Once the size of the infiltration trench was determined, the tributary area was computed based on treating 1 inch of runoff. The total treatment area (pavement area plus tributary area to the street BMP) was then compared with the total impervious area of the subcatchment. If the treatment area was larger than the subcatchment's available impervious area, the number of infiltration units and corresponding treatment area were adjusted as necessary to not exceed its total impervious area. If the treatment area was less than the subcatchment's impervious area, additional BMP treatment continued based on different land uses, as follows.
4. Residential land use comprises single-family and multi-family homes. Dry well was the selected BMP used to manage residential parcels with high suitability (that is, whenever A/B/C soils were present along with groundwater depths of 6 feet or more). Dry wells were used here because of their simplicity, low cost, compact size for residential lots, and because roof drains can be easily diverted to them. The number of dry well units was calculated to treat 1 inch of rooftop runoff for suitable residential areas.
5. Non-residential land use was managed similarly to residential land use in that remaining high suitability areas, after applying priority BMPs, were treated by infiltration and bioretention according to underlying soil conditions. Again, infiltration BMPs were applied to well-drained soils (that is, HSG of A, B, or C) with groundwater depths of at least 6 feet. Bioretention BMPs manage the remaining suitable non-residential areas as called for in each implementation scenario.
6. Finally, any remaining untreated directly connected impervious areas were assigned to infiltration trenches and bioretention. These BMPs were added in a 50/50 ratio until the desired DCIA treated was achieved for each implementation scenario. The combination of these two BMP types allows for treatment of both poorly drained and well-drained soils.

These placement processes were used initially to develop a base implementation scenario and maximum implementation scenario. Other scenarios were then developed to simulate implementation level between the base and maximum scenarios by adjusting the decision variable (treated DCIA areas) at nine equal intervals. The implementation scenarios are described in the following section.

4.1.2 Implementation Scenarios

Based on the BMP suitability analysis described in Section 3, BMP implementation scenarios were developed as outlined herein to determine whether TMDL compliance could be achieved. The BMP implementation scenarios are described as follows:

1. **A base implementation scenario** was developed to form the basis of the program with practices the Commission already has implemented. It treats approximately 5 percent of DCIA. It includes the following components.
    - 85 percent removal of illicit discharges: As described in Section 2.2.3, the Commission is actively identifying and eliminating illicit connections. The illicit discharges are illegal sanitary connections to storm drain pipes and exfiltration from and defects in sanitary sewers and laterals. The Commission plans to eliminate all illicit discharges. However, it is realistic to expect that, at any given time, illicit discharges may occur that the Commission has yet to discover and eliminate. This is especially true because exfiltration from and defects in sanitary sewers and laterals are very difficult to detect because they are related to the deterioration of sanitary sewers and laterals over time. In other words, a newly constructed sanitary pipe or lateral may become a source of illicit discharge 20 or 30 years later because of aging and/or other unforeseen events that alter its physical condition. It is

prudent to assume some of the waste load from dry weather flow will remain and investigate the potential offset by waste load reduction from stormwater BMPs to achieve TMDL goals. Considering the complex nature of the program and evolving development of the city, it is practical to assumed 85 percent removal of illicit discharges based on engineering judgement.

- Treatment of 1 inch of runoff from impervious surfaces in planned development sites: The Commission's site plan review process requires all new development and redevelopment projects to treat 1 inch of stormwater runoff from their impervious surfaces.
- 45 miles of PROW BMPs: BMPs include infiltration or bioretention to be incorporated as part of a street reconstruction program. Based on the current Boston Department of Transportation road reconstruction schedule, this rate is assumed to be 1.5 miles per year for the next 30 years.

2. **The maximum level of implementation scenario** includes an approach that exhaustively implements BMPs to treat 100 percent of the DCIA. In addition to the components included in the base scenario, this scenario includes:
   - BMPs at all public schools to treat 1 inch of runoff from the schools.
   - Porous pavement and/or bioretention to treat 1 inch of runoff from all parking lots greater than 10,000 ft^2.
   - BMPs to treat 1 inch of runoff from commercial and industrial land use area.
   - BMPs in approximately 177 miles of street categorized as suitable by the BMP site suitability analysis.
   - Any remaining untreated DCIA was assumed to be managed by infiltration and bioretention BMPs to reach 100 percent DCIA treatment.

   The Commission's 2015 *Stormwater Model Report* (CDM Smith, 2015) concluded that systemwide DCIA is 18 percent (approximately 4,200 acres). In other words, under existing conditions with a mean imperviousness of 63 percent, runoff generated from 18 percent of the impervious area enters the storm drain system directly while the remaining 82 percent of the impervious area passes through pervious area before entering the storm drain system.
3. **Nine intermediate implementation scenarios** were developed to treat between 10 and 90 percent of the DCIA in each subcatchment. This process includes implementing gradually increasing levels of BMPs that fall between the base and maximum BMP implementation scenarios. These intermediate scenarios were formed by essentially "slicing" the difference between the base and maximum BMP implementation levels into nine uniform layers.
4. **Wetland implementation scenarios** include additional end-of-pipe treatment on top of several prior scenarios (base to 40 percent DCIA treated). Four water quality volume treatment scenarios were considered for each wetland site: 0.1, 0.2, 0.4, and 0.5 inches of runoff from their respective tributary DCIAs.

A total of 31 systemwide scenario models were generated. The percentages of DCIA treated in each reporting area for these 31 core scenarios are summarized in Table 4-3.

TABLE 4-3
Summary of DCIA Treated of Implementation Scenarios

Scenario ID	Description	Middle Charles Total	Stony Brook Total	Muddy River Total	Other Lower Charles Total	Lower Charles Basin Total	Neponset River Total	Boston Harbor Total
1	Base Scenario	4%	11%	19%	16%	12%	8%	8%
1.1	+ Wetland 0.1" Qv	8%	11%	20%	18%	12%	8%	8%
1.2	+ Wetland 0.2" Qv	11%	11%	21%	20%	12%	8%	8%
1.4	+ Wetland 0.4" Qv	18%	11%	23%	24%	12%	8%	8%
1.5	+ Wetland 0.5" Qv	21%	11%	25%	26%	12%	8%	8%
2		12%	19%	26%	24%	20%	16%	17%
2.1	+ Wetland 0.1" Qv	16%	19%	28%	26%	20%	16%	17%
2.2	+ Wetland 0.2" Qv	19%	19%	29%	28%	20%	16%	17%
2.4	+ Wetland 0.4" Qv	26%	19%	31%	32%	20%	16%	17%
2.5	+ Wetland 0.5" Qv	29%	19%	32%	35%	20%	16%	17%
3		22%	27%	34%	32%	29%	24%	26%
3.1	+ Wetland 0.1" Qv	25%	27%	36%	34%	29%	24%	26%
3.2	+ Wetland 0.2" Qv	28%	27%	37%	37%	29%	24%	26%
3.4	+ Wetland 0.4" Qv	35%	27%	39%	41%	29%	24%	26%
3.5	+ Wetland 0.5" Qv	38%	27%	40%	43%	29%	24%	26%
4		31%	36%	42%	41%	38%	34%	35%
4.1	+ Wetland 0.1" Qv	35%	36%	44%	43%	38%	34%	35%
4.2	+ Wetland 0.2" Qv	38%	36%	45%	45%	38%	34%	35%
4.4	+ Wetland 0.4" Qv	44%	36%	47%	49%	38%	34%	35%
4.5	+ Wetland 0.5" Qv	48%	36%	49%	51%	38%	34%	35%
5		40%	45%	51%	49%	46%	43%	45%
5.1	+ Wetland 0.1" Qv	44%	45%	52%	51%	46%	43%	45%
5.2	+ Wetland 0.2" Qv	47%	45%	53%	53%	46%	43%	45%
5.4	+ Wetland 0.4" Qv	54%	45%	55%	58%	46%	43%	45%
5.5	+ Wetland 0.5" Qv	57%	45%	57%	60%	46%	43%	45%
6		50%	54%	59%	58%	55%	51%	54%
7		60%	63%	67%	66%	64%	61%	63%
8		69%	72%	75%	74%	73%	71%	72%
9		79%	81%	83%	83%	81%	80%	81%
10		88%	90%	91%	91%	90%	89%	91%
11	Maximum Scenario	100%	100%	100%	100%	100%	100%	100%

4.1.3 Model Simulations and Post Processing

The BMP implementation scenario model runs were performed using SWMM's kinematic wave routing method as described in the Commission's *2015 Stormwater Model Report*. The models simulations were performed for a 3-year representative period spanning from 2007 to 2009 using five BWSC rain gauges installed across the City (CDM Smith, 2015).

The 2015 *Stormwater Model Report* divided the Commission's MS4 into 27 reporting areas that correspond with the major drains, neighborhoods, and principal receiving waters. The reporting areas are more detailed than the "*subwatersheds"* identified in the Consent Decree. In addition, the report referred tributary areas to storm drain outfalls as "*subcatchments"* defined in the Consent Decree. Waste load results under current conditions were summarized by reporting areas as well as by storm drain outfalls. To maintain consistency with waste loads reported in the 2015 *Stormwater Model Report*, this report also presents waste loads by reporting areas and storm drain outfalls. In addition, waste loads of all implementation scenarios were computed with the same post-processing procedures described in the report to supplement the limited capability of the SWMM software.

Total phosphorus loads were computed as the product of the total phosphorus concentration and the flow rate time series. Annual mass loads were then compared with waste load allocations for each subwatershed specified in the TMDL reports to determine compliance.

Although bacteria loads were calculated using the same method as was used for total phosphorus, the average annual bacteria counts cannot be used to determine whether or not the level of implementation meets the pathogen TMDL, which uses fecal coliform concentration criteria. Correspondingly, the following fecal coliform concentration requirements were used:

- Less than a geometric mean of 200 organisms per 100 milliliters (mL) in any representative set of samples.
- Less than 10 percent of the samples exceed 400 organisms per 100 mL.

Massachusetts Surface Water Quality Standards (314 CMR 4.00) require that a minimum of five samples should be analyzed over a 6-month period for Class B or SB water (Section 4.05(3)(b)4.b.). Therefore, the bacteria time series were processed by converting each data point to a geometric mean value of bacteria counts over the previous 6 months. The processed time series were then screened to calculate the percentage of time exceeding 200 organisms per 100 mL. The pathogen TMDL is met when the following are true:

- The average annual geometric mean is less than 200 organisms per 100 mL.
- Samples exceed 400 organisms per 100 mL less than 10 percent of the time.

Average annual geometric mean bacteria counts per 100 mL are reported to compare scenario model results with the existing conditions and TMDL requirements and are a better indicator to measure the improvement made through various levels of implementation.

4.1.4 Cost Estimate

Planning level unit construction costs have become more readily available as more GI programs are implemented in the United States (USEPA, 2013[1], 2014[2]). The unit construction cost estimates developed for use in the Commission's BMP analysis referenced these resources with specific construction, design, contingencies, locational/temporal adjustments that were used to develop the unit construction costs, and unit life-cycle costs for evaluating the implementation scenario costs. This section summarizes the unit cost estimation of BMP implementations. A detailed description of the cost estimates is included in Appendix B.

[1] *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs* that was published in August 2013.

[2] *The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA* that was published in February 2014.

The development of a unit cost estimate included two key components: identifying unit construction cost of BMPs and establishing life-cycle costs. The construction cost and life-cycle cost estimates were used to provide stormwater BMP program stakeholders with order-of-magnitude program costs to allow for evaluation of the implementation scenarios described in Section 4.2.

The estimate was prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International. According to the definitions of AACE International, the Class 5 Estimate is defined as the following:

> ***Class 5 Estimate.*** *This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known. Strategic planning purposes include but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class estimate are -20 to -50 percent on the low side and +30 to +100 percent on the high side.*

The unit construction costs from the ongoing GI programs for other communities (Onondaga County, New York and Lancaster, Pennsylvania) and recent City of Boston BMP construction bid prices were relied upon to develop the unit costs for the bioretention, infiltration trench, porous paving, and construction wetland BMPs. The unit construction costs were adjusted to account for the inherent locational and temporal differences.

The BMP life-cycle costs were estimated for a 30-year period of use. The life-cycle cost takes into account the unit construction costs, routine and non-routine maintenance costs, and a replacement cost. As detailed in Appendix B, the annual unit construction cost is equivalent to the annual share of the original construction cost as evenly distributed over the 30-year period. In addition, the life-cycle cost for all BMPs except for drywells is based on a service life of 25 years within the 30-year planning horizon with a defined schedule for annual routine and periodic non-routine maintenance. A replacement cost was developed assuming 75 percent of the BMP would need to be replaced at the end of its 25-year service life. The net present value (NPV) over the 30-year period was then estimated for each BMP based on the total construction cost, annual construction cost, anticipated maintenance and replacement costs, and the expected service life. The itemized cost estimation worksheets for each type of BMPs are included in Appendix B. Estimated costs for the types of BMP used in this report are summarized in Table 4-4.

TABLE 4-4
Summary of BMP Construction and Life-Cycle Cost Estimates

BMPs Implementation Cost Estimates ($ per acre managed)	Bioretention	Infiltration	Porous Pavement	Constructed Wetland	Drywell
Construction Cost Year 2015[1]	$269,134	$210,998	$291,349	$97,688	
30 Year Construction Cost NPV[2]	$388,157	$304,311	$420,197	$140,889	$51,000
Life-Cycle Cost with Replacement[3]	$891,837	$562,902	$826,962	$337,987	

[1] Area managed by BMP multiplied by the BMP cost per unit area inclusive of the capital cost multipliers

[2] NPV of Construction Costs only

[3] Life-Cycle Costs = Present Value Cost of (Construction Costs + O&M Costs + Replacement Costs)

4.2 Evaluation of BMP Implementation Scenarios

This section summarizes the performance metrics of the 31 core scenarios and describes the optimization methodology for determining a single recommended BMP implementation plan.

4.2.1 Implementation Scenario Results

Mean annual loads were computed for each of the 13 water quality constituents for each outfall in the BWSC MS4 area. These results are presented in Appendix C for every outfall and core model scenario. The following section describes pathogen and total phosphorus pollutant loads for each receiving water under various levels of implementation.

4.2.1.1 Pathogen Loads

Table 4-5 summarizes pathogen loads and the percentage of time exceeding the TMDL requirement for existing conditions, the base implementation scenario, and the maximum implementation scenario. Pathogen loads and the percentage of time exceeding TMDL requirements are also shown on Figure 4-9, Figure 4-10, and Figure 4-11 for the existing conditions scenario, base implementation scenario, and maximum implementation scenario, respectively.

Charles River Watershed. The pathogen load, in terms of average annual geometric mean, has reduced significantly for each reporting area under the base implementation scenario as shown in Table 4-5. However, treating 100 percent of DCIA (maximum scenario) does not improve the bacteria load reduction in comparison to results of the base scenario, which treats less than 10 percent of DCIA.

There is marginal improvement in percentage of time for pathogens meeting the TMDL requirement. Pathogen concentrations exceed the TMDL of 400 CFU/100 mL 100 percent of the time for Faneuil Brook, Muddy River, and Stony Brook for both base and maximum implementation scenarios.

Neponset River Watershed. Similar to the Charles River watershed, under the base implementation scenario, there is marginal improvement in terms of percentage of time when pathogen loads at storm drain outfalls meet TMDL requirements, even though the average annual geometric mean pathogen loads are reduced significantly in most outfalls, as shown in Figure 4-9.

Boston Harbor Watershed. Although the average pathogen load to Boston Harbor does not meet the draft TMDL requirements, a number of storm drain outfalls would successfully achieve the pathogen TMDL requirement, as shown in Figure 4-9, Figure 4-10, and Figure 4-11. However, similar to other watersheds, there are no noticeable changes in the percentage of time meeting receiving water quality standards for the existing, base, and maximum scenarios.

These results reflect technological limitations in both physical and modeling domains:

- **Physical domain limitations** are related to system conditions including illicit discharges and the urban environment. Illicit connections contain high concentrations of pathogens (7,100,000 CFU/100 mL *F. Coli*.) in sanitary sewage versus the observed median concentration of 9,000 CFU/100 mL during wet weather (CDM Smith, 2015). It is not practical to eliminate all illicit discharges for reasons discussed in Section 4.1.2. Urban development adversely impacted the surrounding environmental and altered formerly meandering streams into enclosed drainage conduits. Subsequently, the natural assimilation of a healthy stream ecosystem through the disinfecting function of penetrating sunlight was lost.
- **Model domain limitations** are due to functional limitations of the SWMM LID module, which is not able to simulate pollutant removal by LID controls. Instead, it computes pollutant removal by flow volume reduction. This means that as long as there are flows entering the storm drainage system, pathogen concentrations remain the same as those calculated from the washoff function regardless of whether or not the flow passed through a BMP or not. In addition, the model applies a bacteria growth function to each enclosed conduit. With the existing modeling structure, it is impossible to achieve TMDL goals unless all runoff contains zero bacteria washoff and all illicit connections are eliminated.

Because of the technological limitations discussed above, it is recommended that the plan be developed based on total phosphorus loads in the Charles River watershed and that the base scenario be implemented in the Neponset and Boston Harbor watersheds. This approach would allow the Commission to start an iterative process as the Commission gains more direct knowledge of pollutant load conditions during the early stages of the BMP implementation program. For an effective iterative processes, it is also important to

monitor pathogen load conditions as the program progresses and improves the Commission's stormwater model via updates and calibration of flow and water quality as recommended in the Commission's Stormwater Model report (CDM Smith, 2015).

TABLE 4-5
Summary of Pathogen Loads

Scenarios	Existing Conditions		Base		Max	
	*Bacteria Count (CFU / 100mL)	% Time Exceeding 400 CFU / 100mL	*Bacteria Count (CFU / 100mL)	% Time Exceeding 400 CFU / 100mL	*Bacteria Count (CFU / 100mL)	% Time Exceeding 400 CFU / 100mL
Stony Brook	10,287	91%	2,708	91%	2,144	91%
Muddy River	42,241	91%	8,059	91%	6,800	91%
Faneuil Brook	12,682	91%	3,058	91%	2,210	91%
Other Lower Charles	**9,872**	91%	**1,951**	90%	**1,677**	89%
Lower Charles Subtotal	**11,385**	**91%**	**2,306**	**90%**	**1,938**	**90%**
Saw Mill Brook	36,521	91%	8,743	86%	6,011	86%
West Roxbury	35,631	90%	3,875	83%	3,583	81%
Upper/Middle Charles Subtotal	**7,215**	**91%**	**1,262**	**85%**	**959**	**84%**
Neponset River	**17,649**	**91%**	**2,408**	**89%**	**1,737**	**88%**
Boston Harbor	**38,705**	**91%**	**5,421**	**90%**	**5,237**	**90%**

Appendix A lists existing condition pathogens and other pollutant loads for all reporting areas and SDO catchments, while Appendix C tabulates these results for all 31 core scenarios (including the Base and Maximum implementation levels summarized in Table 4-5).

FIGURE 4-9

Pathogen Loads for Existing Conditions

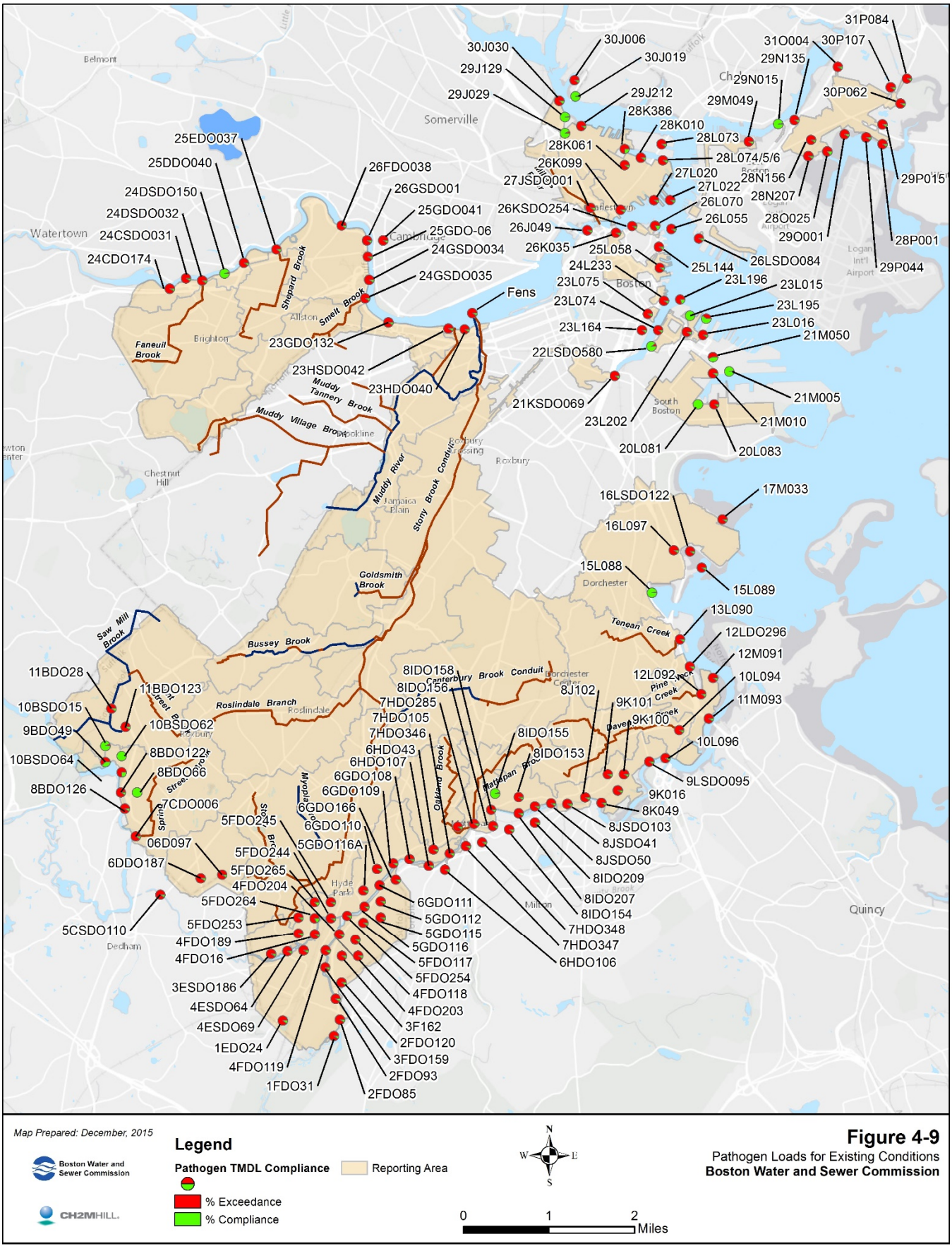


FIGURE 4-10

Pathogen Loads for the Base Implementation Scenario

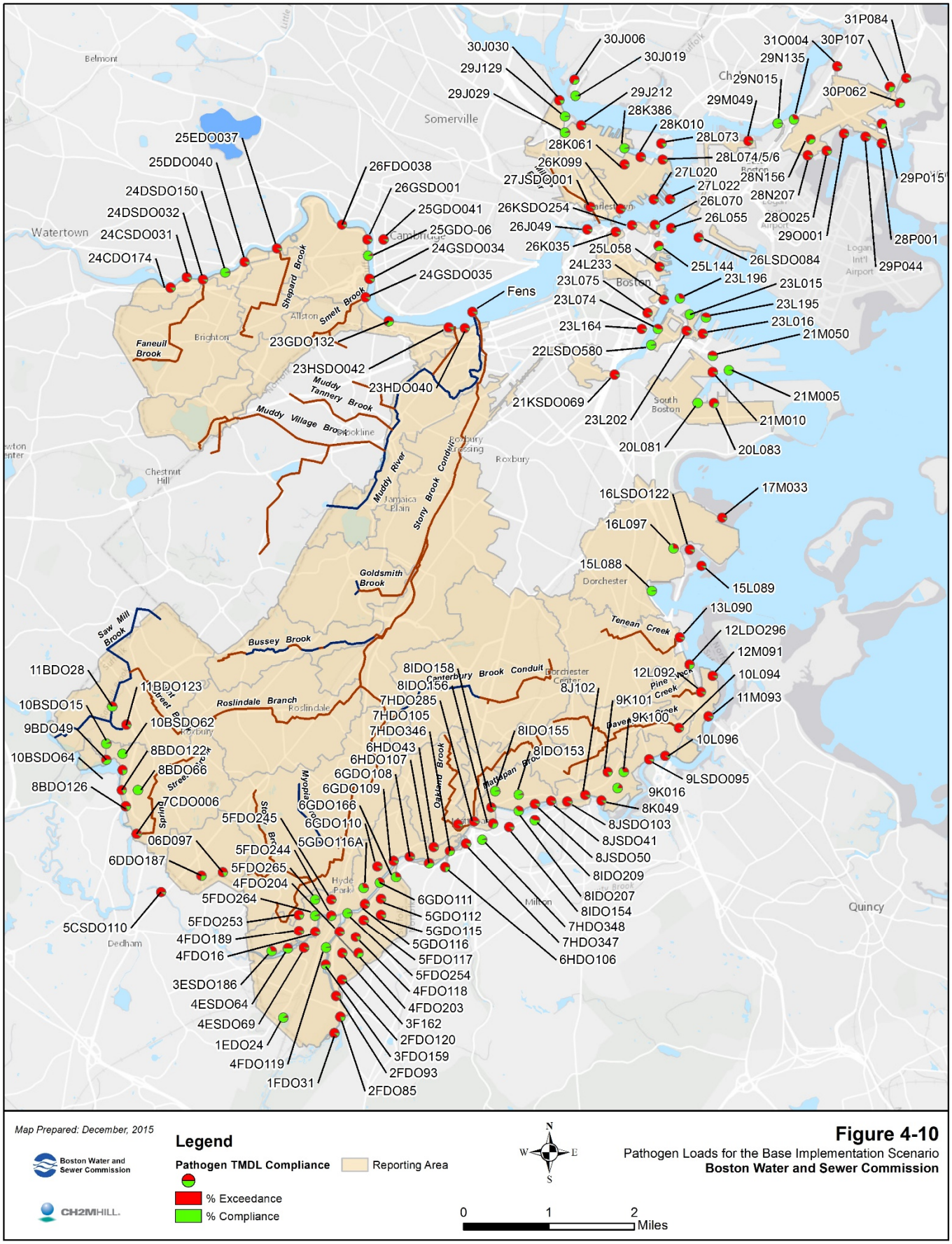
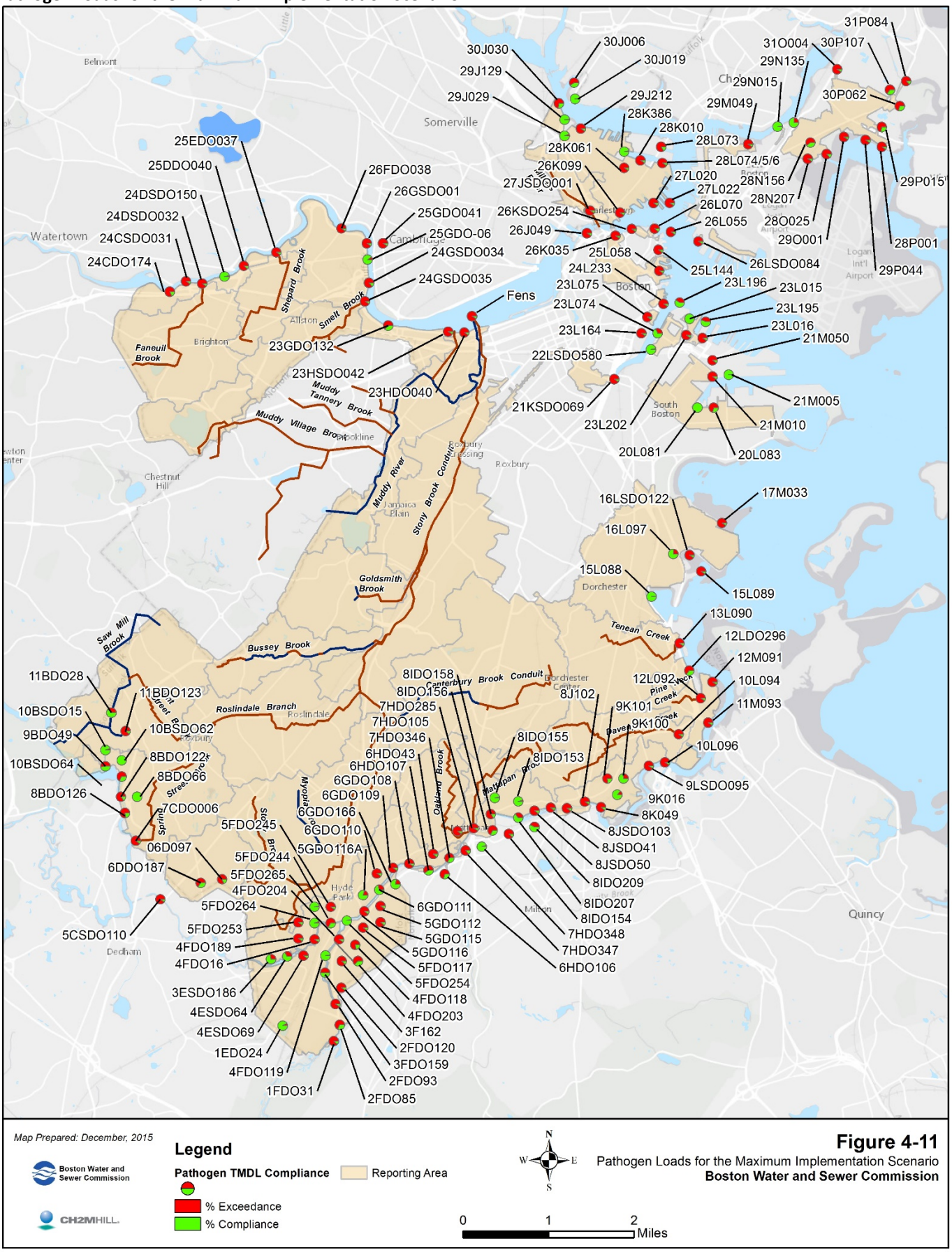


FIGURE 4-11

Pathogen Loads for the Maximum Implementation Scenario



4.2.1.2 Total Phosphorus Loads

Table 4-6 summarizes the total phosphorus load results of the model simulations with the Lower and Middle Charles River basins further broken down by reporting area. Most of the loads from the reporting areas were calculated based on the flow and concentration at the downstream end, and both instream treatment and subcatchments directly discharging to the streams were counted in the reporting areas located downstream. For this reason, the total phosphorus load calculated for Lower Stony (downstream reporting area in the Stony Brook watershed) was adjusted to maintain a mass balance for the overall pollutant loading to the Lower Charles River from the Stony Brook watershed.

Both Newton and Brookline discharge portions of their stormwater into the Lower Charles River via the Commission's storm drain system or a natural water body. It was assumed that pollutant loads (highlighted blue) from upstream communities would meet their respective TMDL requirement before entering the Boston city boundary. For example, Village Brook Brookline, as part of the Muddy River watershed, was assumed to reduce its waste load by 68 percent. Therefore, 32 percent of its existing conditions load of 492 pounds is reported for all scenarios.

In the Charles River watershed, total phosphorus loads are highlighted in green when the scenario meets waste load allocations designated to the specific subwatershed. The total phosphorus TMDL for the Upper/Middle Charles River watershed was based on percentage reductions for specific land uses. Scenario 1.2 (base implementation scenario + wetland) for the West Roxbury reporting area meets the TMDL while Sawmill Brook meets the TMDL reduction requirement after treating 22 percent of its DCIA (Scenario 3). Based on the combined reduction in the Upper/Middle Charles River watershed, total phosphorus TMDL compliance can be achieved with Scenario 1.5.

In the Lower Charles River watershed, the combined total phosphorus load meets the TMDL at Scenario 4.1. This is mainly due to the large reduction achieved in the Stony Brook subwatershed. The Muddy River subwatershed does not meet the total phosphorus TMDL even with 100 percent of its DCIA managed by BMPs with high total phosphorus removal rates. The pollutant loading calculation methodology used for the Massachusetts General Permit (USEPA Region 1, 2014) specifies the total phosphorus exportation rate from DCIA in different land use areas while it assumes a non-DCIA background loading rate similar to pervious areas based on hydrologic soil group in each land use category. It basically assumes TMDLs would be met once all DCIAs are managed by BMPs with a total phosphorus removal rate greater than the TMDL required reduction percentage. The underachieved pollutant removal conditions associated with the model simulations are most possible due to the following.

- Limitation of USEPA SWMM LID module - Although it allows explicit simulation of BMP performances, it is not to simulate water quality. Therefore, the pollutant removal rate is only simulated as runoff reduction. Since built-up and washoff functions do not differentiate DCIA and non-DCIA, SWMM results underestimate pollutant removal performance of BMPs with influent pollutant concentration from DCIA diluted by runoff from non-DCIA. To meet specific reduction requirements, it would require a similar runoff volume reduction ratio from an entire subcatchment area if the evaluation is to be based on the SWMM model. The main means of volume reduction are infiltration and evaporation (in a lesser magnitude). In most urban areas, it is not practical to infiltrate the percentage of total annual runoff volume similar to TMDL reduction requirement (up to 72 percent in the Faneuil Brook reporting area).
- Remaining total phosphorus load from illicit discharge - As described in the Commission's Stormwater Model Report (CDM Smith, 2015), the illicit discharges include not only illicit connections of sanitary sewer laterals to the storm drain system, but also exfiltration from defects in sanitary sewers and laterals as well as polluted groundwater inflow to the receiving water bodies. This results in the modeling assumption that the maximum extent possible illicit discharge removal rate is 85 percent. However, the remaining 15 percent could still be significant. For example, total phosphorus load from the remaining 15 percent illicit discharges into the Faneuil Brook reporting is 67 pounds per year, which is nearly a quarter of 275 pounds per year of total phosphorus WLA. It is important for the Commission

to continue monitoring the water quality in MS4 area to assess the effectiveness of its IDDE program and recalibrate the model to improve its stormwater model.

Constructed wetlands were found to be highly effective in removing total phosphorus when placed near the storm drain outfall, even for relatively low design water quality volumes. This high level of effectiveness is mainly due to the capability of wetlands to treat runoff with relatively high pollutant concentrations during smaller storms (less than 0.5-inch storm events).

Although there is currently no nutrient TMDL in the Neponset River and Boston Harbor watersheds, total phosphorus load reductions were evaluated in these area with reductions of 50 percent in the Neponset River watershed and 29 percent in the Boston Harbor watershed under the base implementation scenario.

Comparisons of total phosphorus loads between results from the SWMM model and USEPA method are detailed in Section 4.4.

4.2.1.3 Cost of Implementation Scenarios

The BMP construction unit costs and life-cycle unit costs with replacement were applied to each BMP implementation scenario. These cost estimates were then evaluated for each implementation scenario based on reporting area, subcatchment, storm drain outfall, or receiving water. The construction costs provide the 2015 fixed, one-time expense of constructing the BMPs; while the life-cycle costs take into account the cost of constructing and maintaining the system over the 30-year duration of the program. The life-cycle costs, as summarized in Table 4-7, were used in conjunction with BMP performance (that is, total phosphorus waste load) to determine the optimal BMP implementation scenario as discussed in Section 4.2.2. These costs are for implementing structural BMPs to remove pollutants from runoff in Boston's MS4 area and do not include costs associated with nonstructural BMPs such as weekly street sweeping, the IDDE program, catch basin cleaning, or the organic/leaf litter collection program. The main purpose of developing cost estimates for the BMPs in each reporting area was to provide data for optimizing BMP implementation.

The total program costs range from $276 million to more than $2.3 billion. Although the maximum implementation scenario (11) costs nearly 10 times as much as the base implementation scenario, the percentage of time meeting pathogen TMDL requirements remains largely the same, as shown in Table 4-4. This is mainly due to the technological limitations discussed in Section 4.2.1.1. The cost differences also support an adaptive approach that identifies immediate implementation activities and provides a framework for making continued progress in reducing pollutant loads to the Lower Charles River over the long run.

TABLE 4-6

Summary of Total Phosphorus Waste Loads for the 31 Core BMP Implementation Scenarios in the Charles River Watershed

Scenario ID	West Roxbury	Sawmill Brook	**Upper Charles Total**	Upper Stony	Canterbury Brook	Roslindale Branch	Bussey Brook Boston	Bussey Brook Brookline	Goldsmith Brook	Lower Stony	**Stony Brook Total**	Village Brook Boston	Village Brook Newton	Village Brook Brookline	Other Muddy River Boston	Other Muddy River Brookline	**Muddy River Total**	Faneuil Brook Boston	Faneuil Brook Newton	**Faneuil Brook Total**	Shepard Brook	Smelt Brook Boston	Smelt Brook Brookline	Allston-Brighton Boston	Allston-Brighton Brookline	Millers River	**Other Lower Charles Total**	**Lower Charles Basin Total**	**Neponset River Total**	**Boston Harbor Total**	**Grand Total**
WLA	180	469	649								4,300						1,300			275	226[2]	283[2]	35[2]	186[2]	4[2]	146[2]	879[2]	6,754	-	-	-
0[1]	309	690	**999**	610	2,820	837	128	19	295	1,809	**6,520**	900	112	492	2,178	326	**4,008**	955	36	**991**	595	744	91	490	10	384	**2,313**	**13,832**	**5,504**	**6,675**	**27,010**
1	229	503	**731**	422	1,313	433	90	12	198	927	**3,396**	612	36	157	1,425	104	**2,335**	570	10	**580**	445	596	35	273	4	306	**1,657**	**7,968**	**2,729**	**4,756**	**16,184**
1.1	192	503	**694**	422	1,313	433	90	12	198	927	**3,396**	612	36	157	1,364	104	**2,274**	570	10	**580**	363	596	35	258	4	306	**1,560**	**7,810**	**2,729**	**4,756**	**15,989**
1.2	178	503	**681**	422	1,313	433	90	12	198	927	**3,396**	612	36	157	1,349	104	**2,258**	570	10	**580**	333	596	35	254	4	306	**1,527**	**7,761**	**2,729**	**4,756**	**15,927**
1.4	149	503	**652**	422	1,313	433	90	12	198	927	**3,396**	612	36	157	1,315	104	**2,225**	570	10	**580**	269	596	35	246	4	306	**1,455**	**7,656**	**2,729**	**4,756**	**15,793**
1.5	140	503	**642**	422	1,313	433	90	12	198	927	**3,396**	612	36	157	1,304	104	**2,213**	570	10	**580**	248	596	35	243	4	306	**1,431**	**7,620**	**2,729**	**4,756**	**15,748**
2	216	473	**689**	411	1,264	396	87	12	191	929	**3,290**	597	36	157	1,389	104	**2,283**	544	10	**554**	425	578	35	265	4	299	**1,606**	**7,733**	**2,611**	**4,590**	**15,623**
2.1	186	473	**659**	411	1,264	396	87	12	191	929	**3,290**	597	36	157	1,334	104	**2,228**	544	10	**554**	346	578	35	251	4	299	**1,513**	**7,585**	**2,611**	**4,590**	**15,445**
2.2	173	473	**646**	411	1,264	396	87	12	191	929	**3,290**	597	36	157	1,319	104	**2,213**	544	10	**554**	318	578	35	247	4	299	**1,481**	**7,539**	**2,611**	**4,590**	**15,386**
2.4	145	473	**618**	411	1,264	396	87	12	191	929	**3,290**	597	36	157	1,289	104	**2,183**	544	10	**554**	257	578	35	240	4	299	**1,413**	**7,440**	**2,611**	**4,590**	**15,259**
2.5	135	473	**608**	411	1,264	396	87	12	191	929	**3,290**	597	36	157	1,279	104	**2,173**	544	10	**554**	237	578	35	237	4	299	**1,390**	**7,407**	**2,611**	**4,590**	**15,217**
3	206	446	**652**	395	1,210	377	83	12	182	917	**3,176**	580	36	157	1,354	104	**2,232**	520	10	**530**	404	561	35	257	4	293	**1,554**	**7,492**	**2,506**	**4,465**	**15,115**
3.1	177	446	**624**	395	1,210	377	83	12	182	917	**3,176**	580	36	157	1,301	104	**2,178**	520	10	**530**	329	561	35	244	4	293	**1,466**	**7,350**	**2,506**	**4,465**	**14,945**
3.2	165	446	**611**	395	1,210	377	83	12	182	917	**3,176**	580	36	157	1,287	104	**2,164**	520	10	**530**	302	561	35	241	4	293	**1,436**	**7,306**	**2,506**	**4,465**	**14,888**
3.4	138	446	**584**	395	1,210	377	83	12	182	917	**3,176**	580	36	157	1,257	104	**2,134**	520	10	**530**	245	561	35	233	4	293	**1,371**	**7,211**	**2,506**	**4,465**	**14,767**
3.5	129	446	**575**	395	1,210	377	83	12	182	917	**3,176**	580	36	157	1,247	104	**2,124**	520	10	**530**	226	561	35	231	4	293	**1,349**	**7,180**	**2,506**	**4,465**	**14,726**
4	196	421	**618**	378	1,157	359	79	12	175	901	**3,062**	563	36	157	1,320	104	**2,181**	497	10	**507**	384	543	35	250	4	287	**1,502**	**7,252**	**2,400**	**4,337**	**14,607**
4.1	169	421	**590**	378	1,157	359	79	12	175	901	**3,062**	563	36	157	1,267	104	**2,128**	497	10	**507**	312	543	35	237	4	287	**1,419**	**7,116**	**2,400**	**4,337**	**14,443**
4.2	157	421	**578**	378	1,157	359	79	12	175	901	**3,062**	563	36	157	1,254	104	**2,114**	497	10	**507**	287	543	35	234	4	287	**1,390**	**7,074**	**2,400**	**4,337**	**14,389**
4.4	131	421	**553**	378	1,157	359	79	12	175	901	**3,062**	563	36	157	1,225	104	**2,085**	497	10	**507**	233	543	35	227	4	287	**1,329**	**6,983**	**2,400**	**4,337**	**14,273**
4.5	123	421	**544**	378	1,157	359	79	12	175	901	**3,062**	563	36	157	1,215	104	**2,076**	497	10	**507**	214	543	35	225	4	287	**1,308**	**6,954**	**2,400**	**4,337**	**14,234**
5	187	397	**584**	362	1,107	341	76	12	167	887	**2,952**	548	36	157	1,287	104	**2,132**	475	10	**485**	362	525	35	242	4	281	**1,450**	**7,019**	**2,298**	**4,218**	**14,119**
5.1	187	397	**584**	362	1,107	341	76	12	167	887	**2,952**	548	36	157	1,236	104	**2,081**	475	10	**485**	295	525	35	231	4	281	**1,371**	**6,890**	**2,298**	**4,218**	**13,990**
5.2	187	397	**584**	362	1,107	341	76	12	167	887	**2,952**	548	36	157	1,223	104	**2,068**	475	10	**485**	271	525	35	228	4	281	**1,344**	**6,850**	**2,298**	**4,218**	**13,950**
5.4	187	397	**584**	362	1,107	341	76	12	167	887	**2,952**	548	36	157	1,195	104	**2,040**	475	10	**485**	220	525	35	221	4	281	**1,286**	**6,764**	**2,298**	**4,218**	**13,864**
5.5	187	397	**584**	362	1,107	341	76	12	167	887	**2,952**	548	36	157	1,186	104	**2,031**	475	10	**485**	203	525	35	219	4	281	**1,267**	**6,735**	**2,298**	**4,218**	**13,835**
6	178	375	**553**	347	1,058	324	72	12	160	872	**2,845**	533	36	157	1,255	104	**2,085**	452	10	**462**	342	508	35	236	4	276	**1,400**	**6,793**	**2,196**	**4,103**	**13,646**
7	169	353	**523**	333	1,011	308	69	12	152	858	**2,743**	517	36	157	1,225	104	**2,039**	429	10	**439**	322	492	35	229	4	270	**1,352**	**6,574**	**2,093**	**3,990**	**13,180**
8	161	333	**494**	319	966	292	66	12	145	844	**2,643**	502	36	157	1,194	104	**1,993**	405	10	**415**	304	476	35	224	4	265	**1,306**	**6,358**	**1,995**	**3,880**	**12,727**
9	152	315	**467**	305	922	276	62	12	139	832	**2,548**	487	36	157	1,162	104	**1,947**	382	10	**392**	286	460	35	218	4	260	**1,263**	**6,150**	**1,901**	**3,773**	**12,291**
10	145	297	**442**	292	880	261	60	12	132	819	**2,456**	473	36	157	1,134	104	**1,904**	360	10	**370**	269	445	35	213	4	255	**1,221**	**5,951**	**1,812**	**3,666**	**11,871**
11	136	280	**416**	280	838	247	57	12	125	806	**2,365**	458	36	157	1,106	104	**1,861**	339	10	**349**	253	430	35	208	4	250	**1,180**	**5,755**	**1,721**	**3,561**	**11,454**

Notes:

[1] Existing pollutant load based on most recently updated stormwater model by the Commission

[2] Extrapolated based on a required 62% reduction of the total existing waste load

Legend

(green) Total phosphorus load is less than or equal to the WLA for the reporting area for that scenario

(blue) Reporting area is not part of BWSC's managed storm drain system; the WLAs in these reporting areas are assumed to be met (i.e., TP loads are equivalent to the required WLA) prior to entering the BWSC MS4 area.

TABLE 4-7
Summary of Life-Cycle Implementation Costs ($ millions)

Scenarios ID	West Roxbury	Sawmill Brook	**Mid-Charles Total**	Upper Stony	Canterbury Brook	Roslindale Branch	Bussey Brook Boston	Goldsmith Brook	Lower Stony	**Stony Brook Subtotal**	Village Brook Boston	Other Muddy River Boston	**Muddy River Subtotal**	Faneuil Brook Boston	Shepard Brook	Smelt Brook Boston	Allston-Brighton Boston	Millers River	**Other Lower Charles Subtotal**	**Lower Charles Basin Total**	**Neponset River Total**	**Boston Harbor Total**	**Grand Total**
1	$ 2	$ 3	**$ 6**	$12	$ 10	$ 4	$ 1	$20	$ 30	**$ 78**	$ 3	$ 34	**$ 34**	$ 6	$16	$ 3	$34	$11	**$ 73**	**$ 193**	**$ 42**	**$ 34**	**$ 276**
1.1	$ 5	$ 3	**$ 9**	$12	$ 10	$ 4	$ 1	$20	$ 30	**$ 78**	$ 3	$ 38	**$ 35**	$ 6	$20	$ 3	$36	$11	**$ 79**	**$ 203**	**$ 42**	**$ 34**	**$ 289**
1.2	$ 8	$ 3	**$ 12**	$12	$ 10	$ 4	$ 1	$20	$ 30	**$ 78**	$ 3	$ 43	**$ 37**	$ 6	$25	$ 3	$38	$11	**$ 85**	**$ 213**	**$ 42**	**$ 34**	**$ 302**
1.4	$14	$ 3	**$ 18**	$12	$ 10	$ 4	$ 1	$20	$ 30	**$ 78**	$ 3	$ 51	**$ 39**	$ 6	$33	$ 3	$42	$11	**$ 97**	**$ 233**	**$ 42**	**$ 34**	**$ 329**
1.5	$17	$ 3	**$ 21**	$12	$ 10	$ 4	$ 1	$20	$ 30	**$ 78**	$ 3	$ 55	**$ 40**	$ 6	$37	$ 3	$43	$11	**$103**	**$ 244**	**$ 42**	**$ 34**	**$ 342**
2	$ 8	$ 9	**$ 18**	$19	$ 28	$13	$ 3	$21	$ 51	**$138**	$ 7	$ 43	**$ 43**	$ 16	$24	$11	$41	$14	**$107**	**$ 307**	**$ 79**	**$ 71**	**$ 477**
2.1	$11	$ 9	**$ 21**	$19	$ 28	$13	$ 3	$21	$ 51	**$138**	$ 7	$ 47	**$ 44**	$ 16	$28	$11	$42	$14	**$113**	**$ 317**	**$ 79**	**$ 71**	**$ 490**
2.2	$14	$ 9	**$ 24**	$19	$ 28	$13	$ 3	$21	$ 51	**$138**	$ 7	$ 51	**$ 45**	$ 16	$32	$11	$44	$14	**$119**	**$ 327**	**$ 79**	**$ 71**	**$ 503**
2.4	$20	$ 9	**$ 30**	$19	$ 28	$13	$ 3	$21	$ 51	**$138**	$ 7	$ 59	**$ 47**	$ 16	$41	$11	$48	$14	**$132**	**$ 348**	**$ 79**	**$ 71**	**$ 530**
2.5	$23	$ 9	**$ 33**	$19	$ 28	$13	$ 3	$21	$ 51	**$138**	$ 7	$ 63	**$ 48**	$ 16	$45	$11	$50	$14	**$138**	**$ 358**	**$ 79**	**$ 71**	**$ 543**
3	$14	$16	**$ 30**	$27	$ 45	$23	$ 6	$23	$ 72	**$198**	$11	$ 51	**$ 51**	$ 26	$31	$19	$47	$17	**$142**	**$ 423**	**$ 118**	**$ 108**	**$ 680**
3.1	$17	$16	**$ 33**	$27	$ 45	$23	$ 6	$23	$ 72	**$198**	$11	$ 55	**$ 52**	$ 26	$36	$19	$49	$17	**$148**	**$ 433**	**$ 118**	**$ 108**	**$ 693**
3.2	$20	$16	**$ 36**	$27	$ 45	$23	$ 6	$23	$ 72	**$198**	$11	$ 59	**$ 53**	$ 26	$40	$19	$51	$17	**$154**	**$ 443**	**$ 118**	**$ 108**	**$ 706**
3.4	$26	$16	**$ 42**	$27	$ 45	$23	$ 6	$23	$ 72	**$198**	$11	$ 68	**$ 56**	$ 26	$48	$19	$54	$17	**$166**	**$ 463**	**$ 118**	**$ 108**	**$ 733**
3.5	$29	$16	**$ 45**	$27	$ 45	$23	$ 6	$23	$ 72	**$198**	$11	$ 72	**$ 57**	$ 26	$52	$19	$56	$17	**$173**	**$ 473**	**$ 118**	**$ 108**	**$ 746**
4	$19	$22	**$ 42**	$34	$ 62	$32	$ 8	$25	$ 94	**$258**	$16	$ 60	**$ 60**	$ 35	$39	$27	$53	$20	**$177**	**$ 538**	**$ 156**	**$ 145**	**$ 883**
4.1	$23	$22	**$ 45**	$34	$ 62	$32	$ 8	$25	$ 94	**$258**	$16	$ 64	**$ 61**	$ 35	$43	$27	$55	$20	**$183**	**$ 549**	**$ 156**	**$ 145**	**$ 897**
4.2	$26	$22	**$ 48**	$34	$ 62	$32	$ 8	$25	$ 94	**$258**	$16	$ 68	**$ 62**	$ 35	$48	$27	$57	$20	**$189**	**$ 559**	**$ 156**	**$ 145**	**$ 910**
4.4	$32	$22	**$ 54**	$34	$ 62	$32	$ 8	$25	$ 94	**$258**	$16	$ 76	**$ 64**	$ 35	$56	$27	$61	$20	**$201**	**$ 579**	**$ 156**	**$ 145**	**$ 936**
4.5	$35	$22	**$ 57**	$34	$ 62	$32	$ 8	$25	$ 94	**$258**	$16	$ 80	**$ 65**	$ 35	$60	$27	$63	$20	**$207**	**$ 589**	**$ 156**	**$ 145**	**$ 949**
5	$26	$28	**$ 54**	$41	$ 80	$42	$11	$27	$115	**$318**	$20	$ 68	**$ 68**	$ 45	$47	$36	$60	$23	**$212**	**$ 654**	**$ 195**	**$ 182**	**$ 1,087**
5.1	$26	$28	**$ 54**	$41	$ 80	$42	$11	$27	$115	**$318**	$20	$ 73	**$ 70**	$ 45	$51	$36	$62	$23	**$218**	**$ 661**	**$ 195**	**$ 182**	**$ 1,094**
5.2	$26	$28	**$ 54**	$41	$ 80	$42	$11	$27	$115	**$318**	$20	$ 77	**$ 71**	$ 45	$55	$36	$63	$23	**$224**	**$ 669**	**$ 195**	**$ 182**	**$ 1,101**
5.4	$26	$28	**$ 54**	$41	$ 80	$42	$11	$27	$115	**$318**	$20	$ 85	**$ 73**	$ 45	$64	$36	$67	$23	**$236**	**$ 683**	**$ 195**	**$ 182**	**$ 1,115**
5.5	$26	$28	**$ 54**	$41	$ 80	$42	$11	$27	$115	**$318**	$20	$ 89	**$ 74**	$ 45	$68	$36	$69	$23	**$242**	**$ 690**	**$ 195**	**$ 182**	**$ 1,123**
6	$32	$34	**$ 66**	$49	$ 97	$51	$14	$29	$136	**$378**	$24	$ 77	**$ 77**	$ 55	$54	$44	$66	$26	**$247**	**$ 770**	**$ 233**	**$ 219**	**$ 1,290**
7	$38	$40	**$ 78**	$56	$115	$61	$16	$31	$158	**$439**	$28	$ 86	**$ 86**	$ 65	$62	$52	$72	$28	**$282**	**$ 886**	**$ 272**	**$ 257**	**$ 1,494**
8	$43	$47	**$ 91**	$64	$132	$70	$19	$32	$179	**$499**	$33	$ 94	**$ 94**	$ 75	$70	$60	$79	$31	**$317**	**$1,002**	**$ 310**	**$ 294**	**$ 1,698**
9	$49	$53	**$103**	$71	$150	$80	$22	$34	$200	**$559**	$37	$ 103	**$103**	$ 84	$77	$68	$85	$34	**$351**	**$1,118**	**$ 349**	**$ 331**	**$ 1,901**
10	$55	$59	**$115**	$79	$167	$89	$24	$36	$221	**$619**	$41	$ 111	**$111**	$ 94	$85	$77	$92	$37	**$386**	**$1,233**	**$ 387**	**$ 368**	**$ 2,105**
11	$61	$65	**$127**	$87	$185	$99	$27	$38	$243	**$681**	$46	$ 120	**$120**	$104	$93	$85	$98	$40	**$421**	**$1,352**	**$ 427**	**$ 405**	**$ 2,313**

4.2.2 Optimization of BMP Implementation for Total Phosphorus Reduction in Charles River Watershed

The objective of these analyses was to search for a near-optimal implementation scenario- one that has the most efficient cost while achieving the TMDL target. The decision variables used in the analyses are the percentage of DCIA to be treated by BMPs and the life-cycle cost of BMPs. Theoretically, the optimization process could be used to search through a large number of BMP implementation scenarios (for example, millions of scenarios), but this would be a time-consuming process with limited value to overcome the margin of error associated with the model. To more efficiently meet the objective, the decision space was confined to a manageable level to allow for a computationally practicable search for the optimal scenario. For this report, the decision space was confined as follows:

1. The decision variables were grouped into reporting areas and watersheds with separate TMDL requirements. When calculating pollutant loads, watersheds (such as Faneuil Brook, Muddy River and Stony Brook) were identified that directly discharge into the Lower Charles River independently of each other. Several watershed pollutant load results were subsequently combined to quantify overall

receiving water pollutant loads for any given scenario without requiring myriad unique, individual models.

2. An upper threshold for the decision variable (treated DCIA) was enforced, and variables were spaced at nine equal intervals between the lower and upper thresholds.

A preliminary screening of the scenarios was performed to further limit variable adjustment to a smaller range by plotting total phosphorus load against the total cost of implementation. Figures 4-12 and 4-13 show scatter plots of the 31 core scenarios in the Lower Charles River watershed and the West Roxbury reporting area. The scatter plots show that scenarios with constructed wetlands are located at the lower outer edge, which represents higher cost-effectiveness. A general overlay (dashed lines) of the results for scenarios with wetlands indicates that a higher design water quality volume (Q_v) for constructed wetlands results in better cost-effectiveness. This is mainly because the unit cost for constructed wetlands decreases as the size of the wetland increases. Therefore, scenarios with constructed wetlands designed using the highest water quality volumes (limited by site conditions) were selected for optimization. It should be noted that other considerations, such as quality of life, ecosystem health and other environmental benefits (e.g. the heat island effect) were not taken into account for the optimization analysis and should be considered when implementing GI in the future.

FIGURE 4-12
Total Phosphorus Load as a function of Estimated Life-Cycle Cost of Implementation Scenarios in the Lower Charles River Watershed

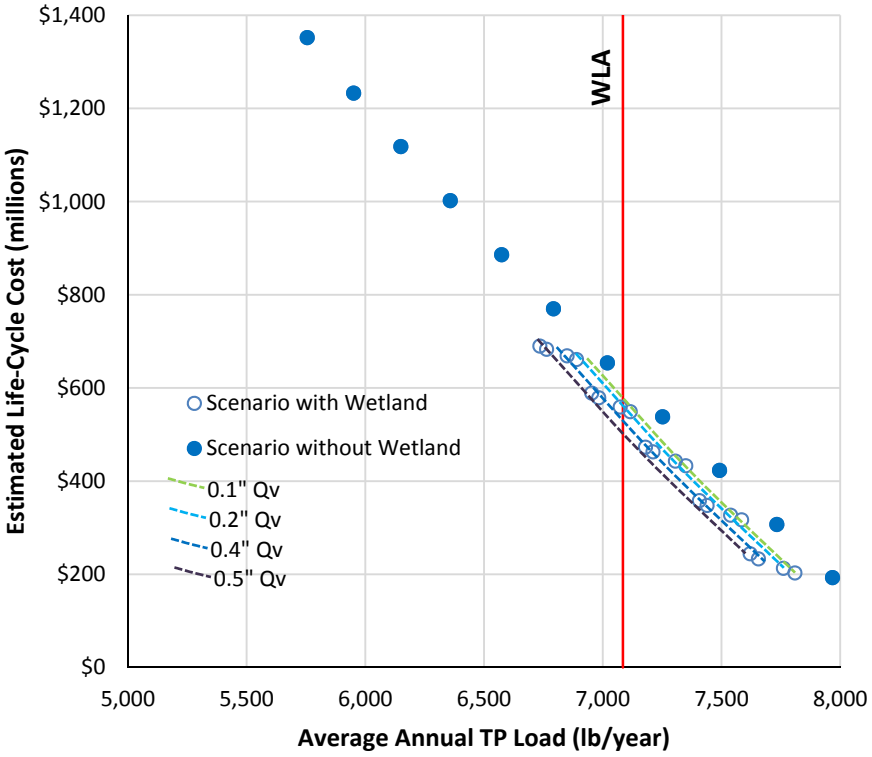
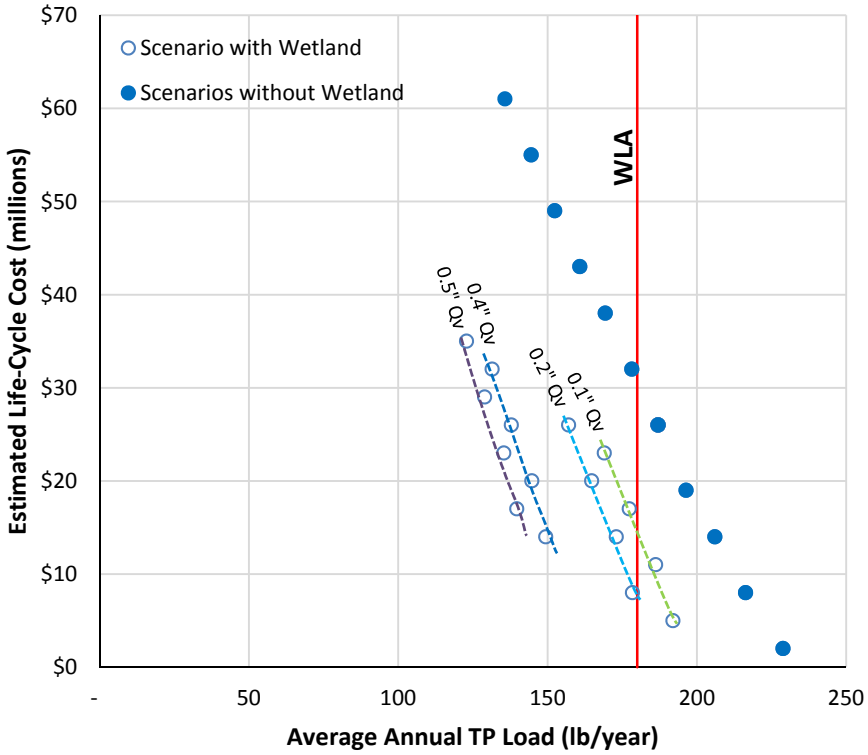


FIGURE 4-13
Total Phosphorus Load as function of Estimated Life-Cycle Cost of Implementation Scenarios in the West Roxbury Reporting Area



The optimization results for the Lower Charles River and West Roxbury reporting areas are shown on Figures 4-14 and 4-15. The scatter plot of the Lower Charles River watershed encompasses more than a million scenarios that combine reporting areas with various BMP implementation levels. The scatter plot of the West Roxbury reporting area consists of scenarios with BMP implementation levels varying by subcatchment (SDO tributary area) with two constructed wetlands proposed for 8BSDO122 and 7CSDO006. The vertical red line marks the TMDL threshold where the TMDL will be met if the scenarios are located to the left side of the line. The near-optimal scenarios arrive in the region where the lower edge of the data envelope (cost versus total phosphorus load) intersects the TMDL threshold line. A summary of optimization results is shown in Table 4-8 and further discussed in Section 4.3. To meet the total phosphorus TMDL requirement, the optimal implementation scenario will need to manage approximately 78 and 682 acres of DCIA (29 percent of total DCIA) for the Upper/Middle Charles River and Lower Charles River watersheds, respectively. The 30-year life-cycle cost of implementing such plans are approximately $575 million ($19 million/year) in these two watersheds. The recommended plan in Section 5 includes additional program costs for incorporating base levels of BMPs in the Neponset River and Boston Harbor watersheds.

TABLE 4-8
Summary of the Optimal Implementation Scenario in the Charles River Watershed

Watershed	DCIA Treated (Ac)	% DCIA Treated	TP Load (lb/yr)	% TP Reduction	Life-Cycle Cost ($M)
Upper/Middle Charles River	78	29%	607	39%	$23
Lower Charles River	865	37%	6,753	51%	$552

TP = total phosphorus

FIGURE 4-14

BMP Optimization Results for the Lower Charles River Watershed

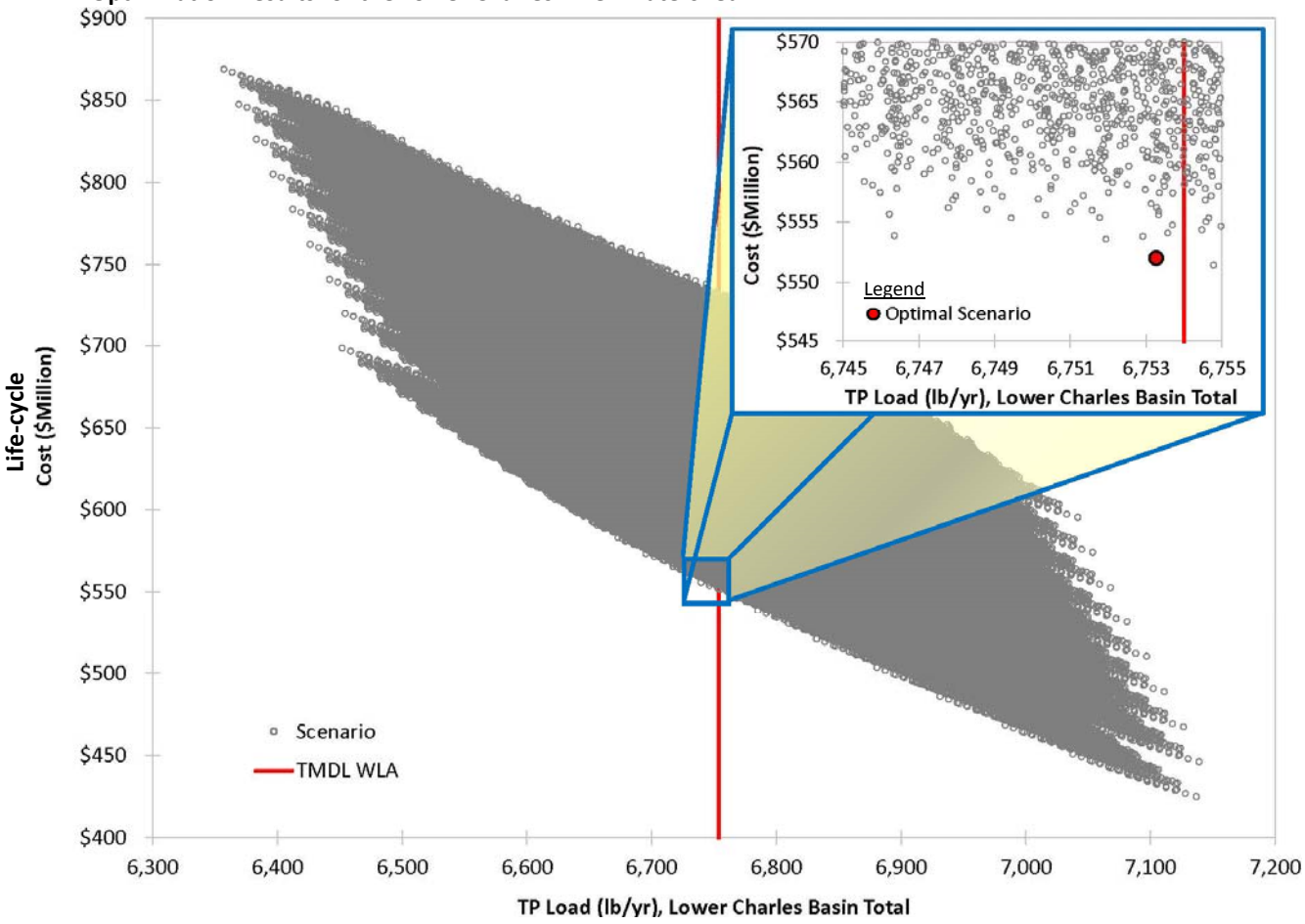
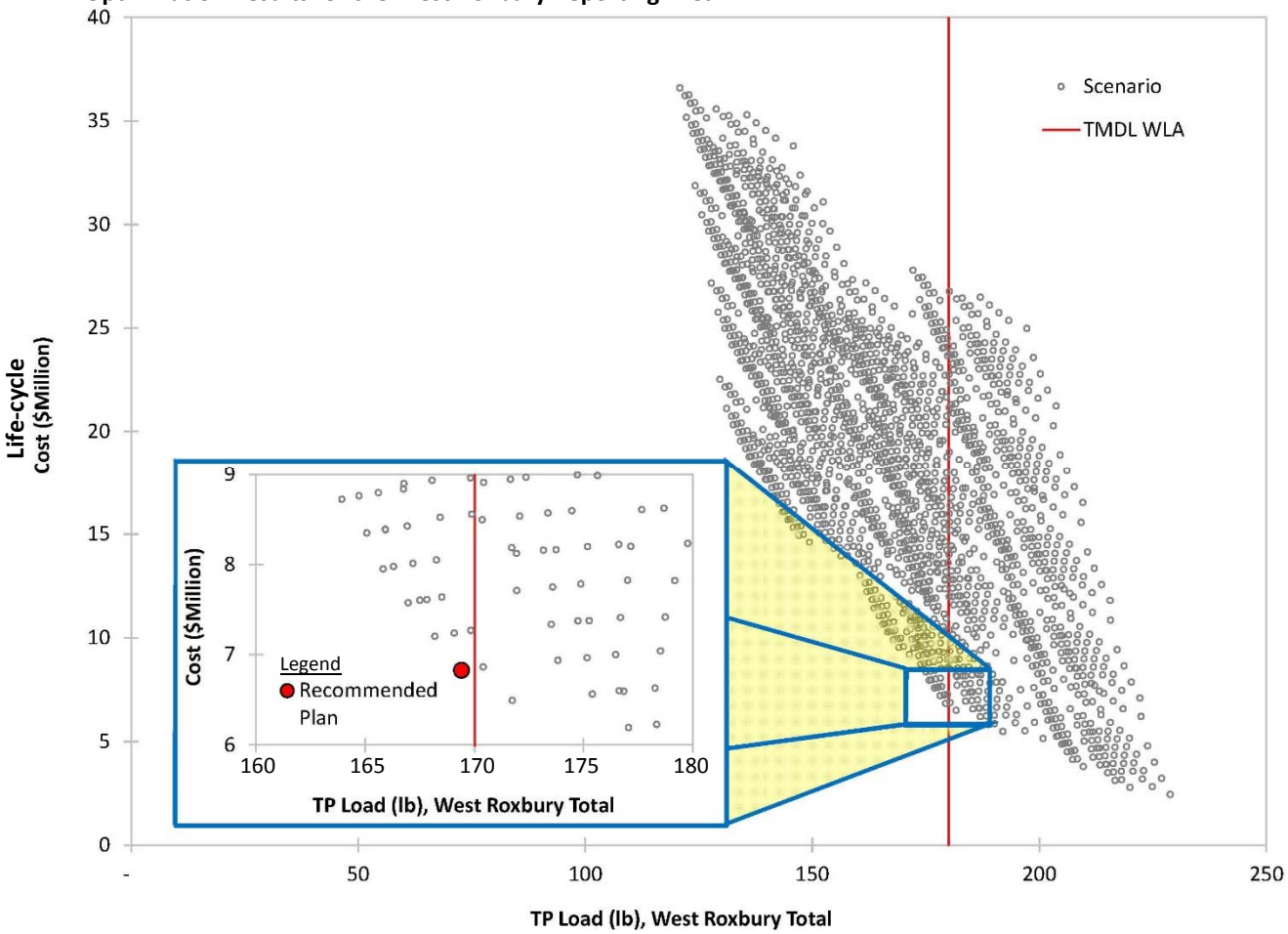


FIGURE 4-15
BMP Optimization Results for the West Roxbury Reporting Area



4.2.3 Summary of the Optimal Scenario

The optimal scenarios identified for each reporting area in the Charles River watershed are listed in Table 4-9. The scenario includes constructed wetlands for all seven candidate sites as described in Section 3.2.4. The size of these wetlands is limited by site conditions, and their total phosphorus reduction contributions are included in the results of this table (for the West Roxbury, Other Muddy River, Shepard Brook, and Allston-Brighton reporting areas). A master optimal scenario model was developed by combining the individual optimal scenarios of reporting areas into a single model. The master model was run to calculate the pollutant loads for the overall optimal scenario. It should be noted that total phosphorus loads for some reporting areas are slightly different from the values presented in Table 4-6 due to hydraulic interactions resulting from the combination. The total phosphorus loads calculated using the combined optimal scenario model are summarized in Table 4-9. Appendix D tabulates pollutant loads under the recommended BMP implementation plan for every SDO catchment.

The West Roxbury and Sawmill Brook reporting areas meet percentage based TMDL reduction requirements by implementing BMPs to manage 37 and 22 percent of their DCIA, respectively. The majority of the recommended BMPs are infiltration and bioretention types. The total life-cycle cost for the Upper/Middle Charles River is approximately $23 million.

In the Lower Charles River watershed, the optimal implementation scenario includes a high level of implementation in the Canterbury Brook, Goldsmith Brook, Village Brook, Faneuil Brook, and Smelt Brook reporting areas. The percentage of DCIA treated by BMPs in Faneuil Brook and Smelt Brook is 81 percent, and their resulting total phosphorus load reductions are 61 and 42 percent, respectively. The Muddy River reporting areas include 64 percent of DCIA treated and result in approximately 51 percent of total

phosphorus reduction with an assumed 68 percent reduction from Brookline's MS4. The largest total phosphorus load and corresponding load reduction is for the Stony Brook subwatershed, which removes approximately 54 percent of its total phosphorus- exceeding the 36 percent reduction identified in the Commission's Stormwater Model Report (CDM Smith, 2015). The total phosphorus WLA from the reporting areas is calculated to be approximately 6,754 pounds per year based on the TMDL report (USEPA, 2007) that listed specific WLA in pounds per year for main tributary watersheds including the Muddy River, Stony Brook, and Faneuil Brook while providing relative total phosphorus reduction targets in other drainage areas (62 percent). Although some of the reporting areas do not meet the specified TMDL, the total load meets the aggregate TMDL target for the Lower Charles River. The Commission can achieve the aggregate TMDL load reduction goal largely due to higher reductions in the Stony Brook reporting areas.

The estimated *life-cycle cost* for implementation of the optimal scenario in the Lower Charles River watershed is approximately $552 million ($221 million in Stony Brook reporting areas, $107 million in Muddy River, and $223 million in Faneuil Brook and the other remaining reporting areas tributary to the Lower Charles River). The estimated *construction cost* for implementation of BMPs in the Lower Charles River watershed is $182 million (including $76 million in Stony Brook, $35 million in Muddy River, and $72 million in the other Lower Charles River reporting areas). The total estimated life-cycle cost for implementation of the optimal scenario for the Upper/Middle and Lower Charles River areas is approximately $575 million (including $552 million for the Lower Charles and $23 million for the Upper/Middle Charles River watershed). The recommended plan in Section 5 includes additional program costs for incorporating base levels of BMPs in the Neponset River and Boston Harbor watersheds.

TABLE 4-9

Summary of the Optimal Implementation Scenario for the Charles River Watershed

Watershed	Sub-watershed	Reporting Area	Scenario ID	DCIA to be Treated		TP Load (lb/yr)	% TP Reduction	Cost ($M)	
				Acres	% DCIA Treated			Life-cycle	Construction
Upper/ Middle Charles River	**Upper/ Middle Charles**	West Roxbury	2.5	46.7	37%	169	45%	$7	$2
		Sawmill Brook	3	31.5	22%	439	36%	$16	$6
		Total	**-**	**78.3**	**29%**	**607**	**39%**	**$23**	**$8**
Lower Charles River	**Stony Brook**	Upper Stony	1	17.2	10%	409	33%	$12	$4
		Canterbury Brook	8	211.2	71%	952	66%	$133	$45
		Roslindale Branch	2	23.5	12%	380	55%	$14	$5
		Bussey Brook	1	2.1	4%	99	33%	$1	$0
		Goldsmith Brook	7	65.3	75%	146	50%	$31	$12
		Lower Stony	1	44.5	12%	1,029	43%	$30	$10
		Subtotal	**-**	**363.7**	**31%**	**3,015**	**54%**	**$221**	**$76**
	Muddy River	Village Brook	8	48.5	72%	684	55%	$33	$11
		Other Muddy River	5.5	114.6	61%	1,297	48%	$74	$24
		Subtotal	**-**	**163.0**	**64%**	**1,981**	**51%**	**$107**	**$35**
	Faneuil Brook	**Faneuil Brook**	**9**	**136.4**	**81%**	**384**	**61%**	**$85**	**$28**
	Other Lower Charles	Shepard Brook	1.1	32.2	26%	351	41%	$21	$6
		Smelt Brook	9	95.4	81%	482	42%	$69	$22
		Allston-Brighton	1.5	60.3	32%	241	52%	$37	$11
		Millers River	1	13.8	26%	300	22%	$12	$4
		Subtotal	**-**	**338.0**	**70%**	**1,375**	**41%**	**$138**	**$72**
		Total	**-**	**864.8**	**37%**	**6,753**	**51%**	**$552**	**$182**

4.3 Pollutant Load Results Calculated with USEPA Method

This section was prepared to compare the simulated total phosphorus load results with those computed via the USEPA's method described in the draft Massachusetts MS4 General Permit as required by the USEPA's comment letter on the Commission's Stormwater Modeling Report. The Massachusetts MS4 General Permit (USEPA, 2014), Appendix F, *Requirements for Discharges to Impaired Waters with an Approved TMDL*, provides information regarding pollutant load requirements and methods (USEPA method) for calculating baseline loads and reducing total phosphorus.

4.3.1 USEPA Methodology

The USEPA method estimates total phosphorus loads at existing conditions and apportions reduction credit due to structural and nonstructural BMP implementation that considers impervious and pervious land, land use type, and hydrologic soil group type. These datasets are the same as the ones described in Section 3.2.1 and include the following:

- Impervious surface: This raster layer represents impervious surfaces covering the Commonwealth of Massachusetts. The surfaces were extracted using semi-automated techniques by Sanborn Map Company from 50-cm Vexcel UltraCam near infrared orthoimagery that was acquired in April 2005. The pixel size for the impervious surface data is 1 meter.
- Land use: This data layer is a Massachusetts statewide, seamless digital dataset of land cover/land use, created using semi-automated methods based on 0.5-meter resolution digital orthoimagery captured in April 2005.
- USDA NRCS Web Soil Survey: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx Hydrologic soil groups using: http://soildatamart.nrcs.usda.gov
- Parcel: MassGIS' Level 3 Assessors' Parcel Mapping data set containing property (land lot) boundaries and database information from each community's assessor

The land use data layer consists of up to 40 different land use categories. These data were manipulated according to Appendix F, Table 1-3, *Crosswalk of MassGIS Land-use Categories to Land-use Groups for P Load Calculations* (USEPA, 2014). The result was a land use layer consisting of the 11 land use groups listed in Table 4-10 with a corresponding area in acres.

TABLE 4-10
Crosswalk of MassGIS Landuse Categories to Land-use Group for Total Phosphorus Loads Calculation*

MassGIS Land Use Code	MassGIS Description	USEPA TP Load Category
1	Crop Land	Agriculture
2	Pasture (active)	Agriculture
3	Forest	Forest
4	Wetland	Forest
5	Mining	Industrial
6	Open Land includes inactive pasture	open land
7	Participation Recreation	open land
8	spectator recreation	open land
9	Water Based Recreation	open land

TABLE 4-10
Crosswalk of MassGIS Landuse Categories to Land-use Group for Total Phosphorus Loads Calculation*

MassGIS Land Use Code	MassGIS Description	USEPA TP Load Category
10	Multi-Family Residential	High Density Residential
11	High Density Residential	High Density Residential
12	Medium Density Residential	Medium Density Residential
13	Low Density Residential	Low Density Residential
14	Saltwater Wetland	Water
15	Commercial	Commercial
16	Industrial	Industrial
17	Urban Open	open land
18	Transportation	Highway
19	Waste Disposal	Industrial
20	Water	Water
23	Cranberry bog	Agriculture
24	Powerline	open land
25	Saltwater Sandy Beach	open land
26	Golf Course	Agriculture
29	Marina	Commercial
31	Urban Public	Commercial
34	Cemetery	open land
35	Orchard	Forest
36	Nursery	Agriculture
37	Forested Wetland	Forest
38	Very Low Density residential	Low Density Residential
39	Junkyards	Industrial
40	Brush land/Successional	Forest

*Adopted from Table 1-3, Appendix F, Attachment 1 of the draft MA MS4 General Permit

Tables 4-11 and 4-12 present the acreages and percentages of imperviousness computed for each USEPA land use group for each of the 27 reporting areas. Table 4-10 shows that 40 percent of the study area is classified as multi-family/ high-density residential, with less than 5 percent of most reporting areas within the agriculture, highway, and low-density residential or medium-density residential categories. Table 4-11 shows that the overall study area is 47 percent impervious. The predominant multi-family/high-density residential land use averages 58 percent impervious, with commercial/industrial and highway areas more impervious (70 percent and 85 percent, respectively) while the other categories average one-third impervious or less.

TABLE 4-11

Reporting Area Acreage by USEPA Land-use Group

27 Reporting Areas	Agriculture	Commercial/Industrial	Forest	High Density Res.	Highway	Low Density Res.	Medium Density Res.	Open Land	Grand Total
West Roxbury	-	262	143	388	4	2	5	54	858
Sawmill Brook Boston	-	48	315	486	12	1	5	341	1,208
Sawmill Brook Brookline	231	39	282	214	-	79	165	61	1,071
Sawmill Brook Newton	164	65	443	323	-	4	197	36	1,230
Mid-Charles total	**395**	**414**	**1,184**	**1,412**	**16**	**85**	**371**	**491**	**4,368**
Upper Stony	96	153	686	759	20	1	43	58	1,816
Canterbury Brook	120	300	269	647	19	-	1	521	1,877
Roslindale Branch	-	133	57	975	11	-	1	23	1,200
Bussey Brook Boston	6	38	211	211	2	4	1	39	511
Bussey Brook Brookline	71	10	65	104	-	6	30	37	322
Goldsmith Brook	18	151	162	316	4	9	36	48	745
Lower Stony	18	579	210	1,037	96	2	13	210	2,165
Stony Brook Total	**328**	**1,365**	**1,659**	**4,049**	**153**	**22**	**125**	**936**	**8,636**
Village Brook Boston	-	58	28	112	19	6	1	72	297
Village Brook Brookline	146	48	109	441	29	320	228	62	1,382
Village Brook Newton	42	36	7	39	3	72	29	8	236
Other Muddy River Boston	9	390	101	167	23	2	2	66	759
Other Muddy River Brookline	111	40	123	408	12	115	25	86	920
Muddy River Total	**308**	**572**	**366**	**1,167**	**86**	**515**	**285**	**295**	**3,594**
Faneuil Brook Boston	-	193	27	603	19	-	-	44	886
Faneuil Brook Newton	77	13	2	128	1	13	62	4	300
Shepard Brook	-	245	2	124	18	-	-	17	407
Smelt Brook Boston	-	140	2	194	48	-	-	9	393
Smelt Brook Brookline	24	9	1	187		-	1	6	228
Allston-Brighton Boston	-	393	22	152	180	-	-	129	876
Allston-Brighton Brookline	50	10	6	132	16	13	9	21	257
Millers River	-	78	-	13	51	-	-	23	166
Other Lower Charles Total	**150**	**1,082**	**61**	**1,533**	**334**	**26**	**72**	**254**	**3,511**
Lower Charles Basin Subtotal	**786**	**3,018**	**2,086**	**6,749**	**573**	**562**	**482**	**1,485**	**15,741**
Charles River Total	**1,181**	**3,432**	**3,270**	**8,161**	**589**	**648**	**853**	**1,976**	**20,109**
Mother Brook	-	44	91	207	-	-	25	40	407
Hyde Park	-	316	181	540	92	12	400	102	1,642
Oakland Brook	-	48	59	324	4	-	-	82	518
Mattapan Brook	-	70	8	206	8	-	-	10	303
Lower Neponset	-	152	93	342	41	-	6	248	882
Tenean Creek	-	217	9	581	24	-	5	35	873
Davenport Creek	-	132	18	481	27	-	3	30	691
Neponset River Total	**0**	**978**	**460**	**2,682**	**197**	**12**	**439**	**548**	**5,316**
Charlestown	-	225	-	177	74	-	-	49	526
East Boston	1	81	5	291	21	-	2	36	436
Downtown	-	165	-	49	65	-	-	19	298
Dorchester	-	388	14	532	65	-	6	117	1,122
Grand Total	**1,181**	**5,269**	**3,749**	**11,891**	**1,011**	**660**	**1,301**	**2,744**	**27,807**

TABLE 4-12

Reporting Area Imperviousness by USEPA Land-use Group

27 Reporting Areas	Agriculture	Commercial/Industrial	Forest	High Density Res.	Highway	Low Density Res.	Medium Density Res.	Open Land	Grand Total
West Roxbury	-	75%	4%	41%	72%	35%	21%	28%	45%
Sawmill Brook Boston	-	24%	1%	22%	82%	1%	0%	14%	28%
Sawmill Brook Brookline	12%	5%	2%	8%	-	23%	14%	3%	22%
Sawmill Brook Newton	24%	2%	1%	12%	-	1%	18%	3%	26%
Mid-Charles total	**36%**	**60%**	**4%**	**42%**	**79%**	**24%**	**32%**	**21%**	**29%**
Upper Stony	8%	71%	5%	50%	83%	13%	33%	25%	32%
Canterbury Brook	11%	66%	16%	70%	71%	-	23%	25%	45%
Roslindale Branch	-	78%	11%	52%	68%	-	23%	28%	52%
Bussey Brook Boston	2%	46%	5%	33%	75%	9%	1%	4%	29%
Bussey Brook Brookline	19%	-	3%	13%	-	59%	36%	9%	26%
Goldsmith Brook Boston	71%	52%	9%	50%	77%	24%	31%	24%	39%
Lower Stony	21%	73%	11%	65%	81%	52%	39%	29%	59%
Stony Brook Total	**16%**	**69%**	**9%**	**57%**	**79%**	**30%**	**34%**	**25%**	**39%**
Village Brook Boston	0%	31%	3%	14%	32%	1%	0%	25%	63%
Village Brook Brookline	54%	2%	10%	43%	42%	25%	30%	13%	42%
Village Brook Newton	22%	-	0%	3%	3%	4%	4%	2%	38%
Other Muddy River Boston	0%	69%	7%	20%	54%	0%	4%	16%	69%
Other Muddy River Brookline	90%	0%	11%	46%	31%	24%	25%	13%	49%
Muddy River Total	**81%**	**60%**	**13%**	**63%**	**80%**	**28%**	**33%**	**34%**	**69%**
Faneuil Brook Boston	0%	56%	7%	43%	78%	0%	0%	20%	52%
Faneuil Brook Newton	10%	-	0%	7%	5%	33%	28%	1%	28%
Shepard Brook	-	86%	-	66%	95%	-	-	37%	78%
Smelt Brook Boston	0%	81%	2%	40%	96%	-	-	36%	83%
Smelt Brook Brookline	100%	2%	-	27%	-	-	33%	11%	57%
Allston-Brighton Bostor	0%	67%	12%	34%	82%	-	-	34%	66%
Allston-Brighton Brookline	99%	-	3%	34%	8%	28%	51%	4%	68%
Millers River	-	89%	-	96%	95%	-	-	33%	83%
Other Lower Charles Subtotal	**54%**	**67%**	**10%**	**58%**	90%	31%	31%	35%	62%
Lower Charles Basin Total	**51%**	**65%**	**11%**	**59%**	**83%**	**30%**	**32%**	**31%**	**57%**
Charles River Total	**45%**	**64%**	**8%**	**56%**	**85%**	**28%**	**33%**	**26%**	**43%**
Mother Brook	-	63%	6%	42%	-	-	33%	17%	33%
Hyde Park	-	81%	9%	50%	69%	24%	33%	27%	47%
Oakland Brook	-	67%	7%	61%	73%	-	-	17%	49%
Mattapan Brook	-	85%	5%	62%	78%	-	-	16%	65%
Lower Neponset	-	72%	4%	52%	76%	47%	28%	13%	40%
Tenean Creek	-	77%	4%	59%	76%	-	36%	34%	62%
Davenport Creek	-	69%	6%	53%	81%	-	43%	23%	54%
Neponset River Total	**0%**	**76%**	**7%**	**54%**	**74%**	**24%**	**33%**	**18%**	**48%**
Charlestown	0%	90%	-	92%	96%	-	-	63%	89%
East Boston	100%	87%	17%	68%	60%	-	45%	33%	68%
Downtown	0%	77%	-	68%	79%	-	-	31%	67%
Dorchester	0%	96%	9%	91%	98%	-	37%	63%	93%
Total	**45%**	**70%**	**8%**	**58%**	**84%**	**28%**	**33%**	**27%**	**47%**

DCIA was calculated according to USEPA's *Estimating Change in Impervious Area (IA) and Directly Connected Impervious Areas (DCIA) for Massachusetts Small MS4 Permit*. The DCIA was calculated according to Table 4-13. This method assigns a DCIA percentage based on an assumed land use type. Watershed selection areas are shown on Figure 4-16. Percent impervious area used in the DCIA equation was calculated based on the MassGIS imperviousness data layer.

TABLE 4-13
Sutherland Equations to Determine DCIA(%)

Watershed Selection	Criteria Assumed Land Use	Equation (where IA(%) >1)
Average	Commercial/Industrial, Institutional, Open land, and MDR	DCIA=0.1(IA)1.5
Highly connected	High density residential	DCIA=0.4(IA)1.2
Totally connected	--	DCIA=IA
Somewhat connected	Low density residential	DCIA=0.04(IA)1.7
Mostly disconnected	Agricultural; Forested	DCIA=0.01(IA)2

Notes: Table adapted from "Estimating Change in Impervious Area (IA) and Directly Connected Impervious Areas (DCIA) for Massachusetts Small MS4 Permit," USEPA April 2014

The calculated DCIA within each reporting area is summarized in Table 4-13 in acreage based on the USEPA's recommended Sutherland equation. The majority of the DCIA (51 percent) in the study area is located in multi-family/high-density residential land use areas, while less than 10 percent of DCIA is located within agriculture, highway, low-density residential or medium-density residential categories.

FIGURE 4-16
Watershed Selection Area of Boston MS4 Area

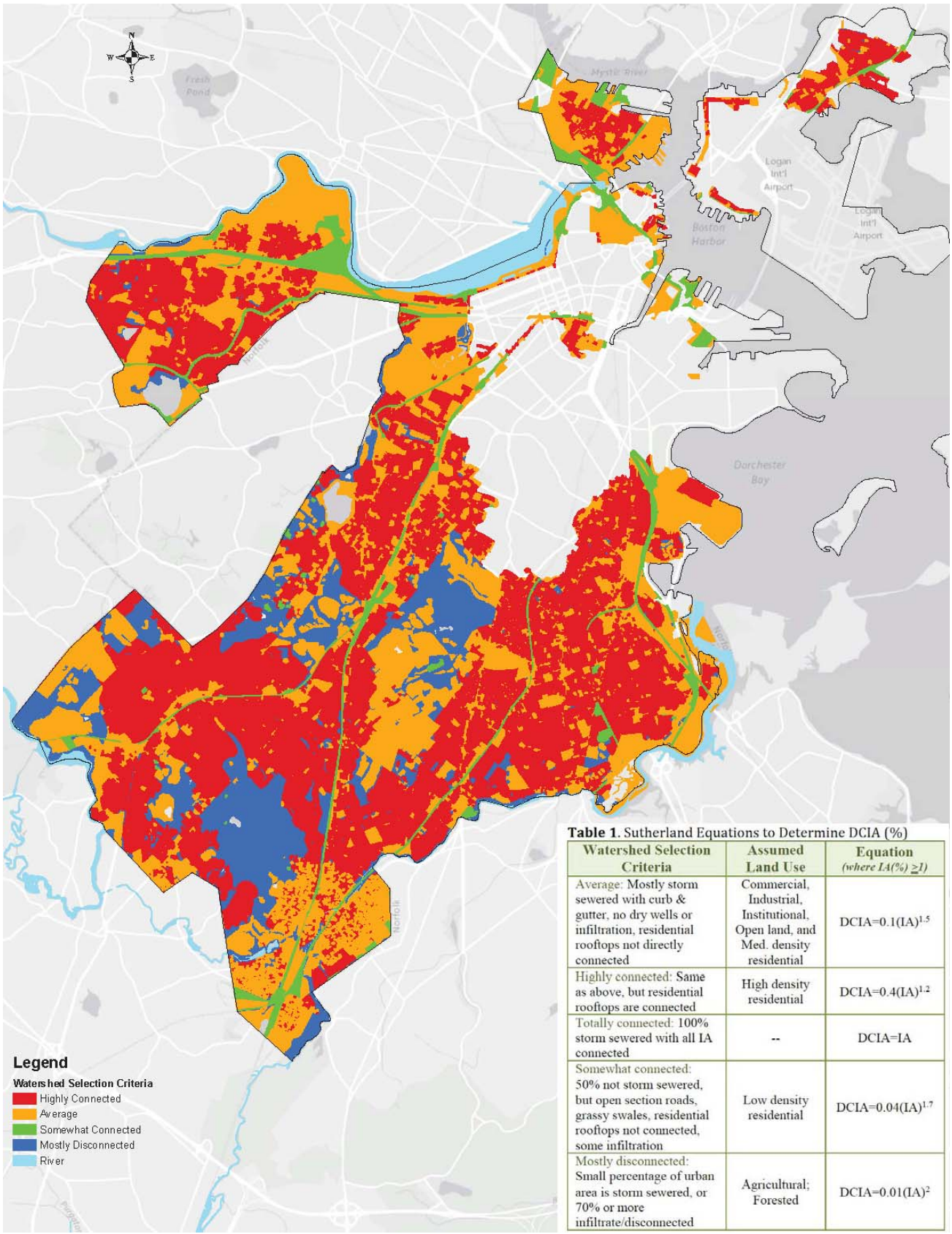


Table 1. Sutherland Equations to Determine DCIA (%)

Watershed Selection Criteria	Assumed Land Use	Equation *(where IA(%) ≥1)*
Average: Mostly storm sewered with curb & gutter, no dry wells or infiltration, residential rooftops not directly connected	Commercial, Industrial, Institutional, Open land, and Med. density residential	$DCIA=0.1(IA)^{1.5}$
Highly connected: Same as above, but residential rooftops are connected	High density residential	$DCIA=0.4(IA)^{1.2}$
Totally connected: 100% storm sewered with all IA connected	--	DCIA=IA
Somewhat connected: 50% not storm sewered, but open section roads, grassy swales, residential rooftops not connected, some infiltration	Low density residential	$DCIA=0.04(IA)^{1.7}$
Mostly disconnected: Small percentage of urban area is storm sewered, or 70% or more infiltrate/disconnected	Agricultural; Forested	$DCIA=0.01(IA)^{2}$

TABLE 4-14

Reporting Area DCIA Acreage Based on USEPA Land-use Group for Total Phosphorus Load

27 Reporting Areas	Agriculture	Commercial/Industrial	Forest	High Density Res.	Highway	Low Density Res.	Medium Density Res.	Open Land	Grand Total
West Roxbury	0	83	1	59	1	0	0	6	151
Sawmill Brook Boston	0	11	1	85	3	0	0	6	105
Sawmill Brook Brookline	2	1	1	13	0	1	5	1	25
Sawmill Brook Newton	4	0	1	21	0	0	7	1	35
Mid-Charles total	**6**	**94**	**4**	**178**	**5**	**1**	**12**	**14**	**316**
Upper Stony	0	54	4	166	6	0	4	3	237
Canterbury Brook	1	99	6	292	5	0	0	29	433
Roslindale Branch	0	59	1	239	3	0	0	2	304
Bussey Brook Boston	0	6	1	37	1	0	0	1	47
Bussey Brook Brookline	1	0	1	10		0	1	1	14
Goldsmith Brook	1	26	2	69	2	0	3	3	106
Lower Stony	1	256	3	397	47	0	2	26	732
Stony Brook Total	**4**	**501**	**19**	**1,210**	**63**	**1**	**10**	**65**	**1,872**
Village Brook Boston	0	28	1	57	9	0	0	17	113
Village Brook Brookline	24	1	1	117	11	14	23	6	197
Village Brook Newton	15	0	0	8	0	3	3	1	29
Muddy River Boston	0	235	5	80	13	0	1	15	349
Muddy River Brookline	45	0	1	154	6	3	2	7	218
Muddy River Total	**84**	**264**	**8**	**416**	**40**	**20**	**28**	**45**	**906**
Faneuil Brook Boston	0	57	1	148	9	0	0	3	217
Faneuil Brook Newton	1	0	0	13	0	1	3	0	17
Shepard Brook	0	141	0	54	12	0	0	4	212
Smelt Brook Boston	0	92	0	113	37	0	0	4	247
Smelt Brook Brookline	12	3	0	60	0	0	0	1	75
Allston-Brighton Boston	0	163	1	63	124	0	0	23	374
Allston-Brighton Brookline	27	0	0	55	8	2	2	2	96
Millers River	0	50	0	12	42	0	0	6	110
Other Lower Charles Subotal	**40**	**506**	**2**	**517**	**231**	**2**	**5**	**44**	**1,348**
Charles River Basin Total	**128**	**1,271**	**29**	**2,143**	**334**	**23**	**43**	**154**	**4,126**
Charles River Total	**134**	**1,365**	**33**	**2,321**	**338**	**24**	**55**	**168**	**4,442**
Mother Brook	0	8	0	26	0	0	2	1	37
Hyde Park	0	152	2	129	32	0	31	7	353
Oakland Brook	0	15	1	104	1	0	0	3	124
Mattapan Brook	0	40	0	75	3	0	0	1	119
Lower Neponset	0	52	1	82	13	0	0	8	157
Tenean Creek	0	104	0	192	10	0	1	6	313
Davenport Creek	0	46	0	123	10	0	1	2	182
Neponset River Total	**0**	**417**	**4**	**732**	**69**	**0**	**34**	**28**	**1,285**
Charlestown	0	170	0	141	62	0	0	24	396
East Boston	0	49	0	128	7	0	0	6	191
Downtown	0	145	0	37	60	0	0	10	252
Dorchester	0	195	0	230	31	0	1	22	479
Total	**134**	**2,341**	**37**	**3,590**	**568**	**25**	**90**	**256**	**7,046**

4.3.2 Baseline Total Phosphorus Load

To calculate the baseline phosphorus load using the USEPA method, the various datasets listed above were combined into one dataset. This was accomplished by using special analysis tools in ArcGIS. The land use file was converted into a raster so it could be combined with the imperviousness raster. This resulted in a raster file where each pixel was assigned a land use type that consisted of either pervious or impervious land. This raster was then converted into a shapefile to allow for easier manipulation and more efficient data analysis. ArcGIS built-in tools were then used to assign a hydrologic soil group and subcatchment to each pervious or impervious land use type.

The annual phosphorus load was calculated using the export rates based on Table 1-2, *Proposed average annual distinct P Load export rates for use in estimating P Load reduction credits the MA MS4 Permit* in Appendix F, Attachment 1 of Massachusetts MS4 General Permit (USEPA, 2014). The table assigns an export rate to each DCIA by land use. If the area is pervious, the export rate is assigned according to hydrologic soil group. Since DCIA is usually not 100 percent of impervious area, the disconnected impervious area (DisIA) was assumed to have the same total phosphorus export rate as pervious area as shown in Table 4-15.

TABLE 4-15
Total Phosphorus Export Rate by Land-use and Surface Cover

Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year
Commercial (Com) and Industrial (Ind)	DCIA	1.78
Multi-Family (MFR) and High- Density Residential (HDR)	DCIA	2.32
Medium -Density Residential (MDR)	DCIA	1.96
Low Density Residential (LDR) - "Rural"	DCIA	1.52
Highway (HWY)	DCIA	1.34
Forest (For)	DCIA	1.52
Open Land (Open)	DCIA	1.52
Agriculture (Ag)	DCIA	1.52
*Developed Land Pervious (DevPERV) – HSG A	Pervious & DisIA	0.03
*Developed Land Pervious (DevPERV) – HSG B	Pervious & DisIA	0.12
*Developed Land Pervious (DevPERV) – HSG C	Pervious & DisIA	0.21
*Developed Land Pervious (DevPERV) – HSG C/D	Pervious & DisIA	0.29
*Developed Land Pervious (DevPERV) – HSG D	Pervious & DisIA	0.37

Notes:
- For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value from this table. If the HSG is not known, assume HSG D conditions for the phosphorus load export rate.
- Agriculture includes row crops, actively managed hay fields, and pasture lands. Institutional land uses such as government properties, hospitals and schools are to be included in the commercial and industrial land use grouping for the purpose of calculating phosphorus loading.
- Impervious surfaces within the forest land use category are typically roadways adjacent to forested land uses.
- Adopted from Table 1-2, “Proposed average annual distinct P Load export rates for use in estimating P Load reduction credits the MA MS4 Permit” in Appendix F, Attachment 1 of Massachusetts MS4 General Permit (USEPA, 2014).

Table 4-16 shows the baseline phosphorus loads in the 27 reporting areas broken down by land use type. The total phosphorus load computed with the USEPA method is 12,258 pounds per year versus 15,830 pounds per year based on the Commission’s stormwater model (SWMM) for the Charles River Watershed. Variation in loads from different reporting areas among these methods occurs for two main reasons:

- The USEPA method estimates an illicit load contribution from each reporting area proportional with land use, while illicit flow estimates from SWMM are based on calibration of the stormwater model to observed dry- and wet-weather measurements for 13 modeled water quality parameters at 20 monitoring sites from the 2011-2012 field program as well as earlier water quality measurements.
- Modeled loads account for removal of phosphorus at specific locations in the stormwater drainage system. Within the Charles River basin, for example, removal is simulated at more than 20 natural wetlands, detention basins, ponds, and particle separators. This list includes Turtle Pond and Scarborough Pond along Stony Brook, Jamaica Pond and Leverett Pond along Muddy River, and Chandler Pond in Faneuil Brook.

These results demonstrate that the load estimation methods presented in the Stormwater Model report yield results that are generally higher than those calculated using the USEPA methodology. The model is calibrated to measured dry weather discharges, wet weather discharges, and water quality. It directly simulates key processes governing phosphorus loads. Therefore, the Commission's SWMM stormwater model offers greater spatial resolution than the USEPA watershed method.

TABLE 4-16

Summary of Average Annual Total Phosphorus Load (pounds/year) Calculated with USEPA Method

Watershed	Subwatershed	Reporting Area	Agriculture	Commercial/ Industrial	Forest	High Density Residential	Highway	Low Density Residential	Medium Density Res.	Open Land	Total	SWMM
Upper/ Middle Charles River	**Upper/ Middle Charles River**	West Roxbury	0	202	40	211	2	1	2	18	475	309
		Sawmill Brook	129	53	227	402	7	19	100	60	997	690
		Total	**129**	**255**	**267**	**613**	**10**	**20**	**101**	**78**	**1,472**	**999**
Lower Charles River	**Stony Brook**	Upper Stony	48	126	134	499	9	0	11	14	841	610
		Canterbury Brook	59	225	59	754	9	0	0	98	1,205	2,820
		Roslindale Branch	0	124	11	647	6	0	0	6	794	837
		Bussey Brook	21	18	56	168	1	2	13	17	296	148
		Goldsmith Brook	2	55	23	179	2	1	8	8	280	295
		Lower Stony	10	549	51	1,084	73	1	7	70	1,842	1,809
		Subtotal	**140**	**1,096**	**333**	**3,331**	**101**	**4**	**40**	**214**	**5,258**	**6,520**
	Muddy River	Village Brook	117	80	24	498	36	100	94	55	1,003	1,504
		Other Muddy River	104	474	44	602	31	20	11	50	1,337	2,504
		Subtotal	**221**	**555**	**68**	**1,100**	**67**	**120**	**104**	**105**	**2,340**	**4,008**
	Faneuil Brook	**Faneuil Brook**	**30**	**142**	**6**	**521**	**15**	**5**	**27**	**17**	**763**	**991**
	Other Lower Charles	Shepard Brook	0	284	1	150	18	0	0	10	462	595
		Smelt Brook	24	186	1	445	54	0	0	11	721	835
		Allston-Brighton	52	377	9	315	198	4	6	80	1,041	500
		Millers River	0	99		28	60	0	0	15	201	384
		Subtotal	**76**	**946**	**10**	**937**	**330**	**4**	**6**	**115**	**2,425**	**2,314**
		Total	**467**	**2,738**	**417**	**5,889**	**513**	**133**	**178**	**451**	**10,786**	**13,832**
Neponset River		Mother Brook	0	26	17	116	0	0	5	8	172	239
		Hyde Park	0	313	34	351	53	3	112	23	890	1,030
		Oakland Brook	0	34	12	294	2	0	0	10	353	409
		Mattapan Brook	0	80	2	202	6	0	0	2	291	288
		Lower Neponset	0	122	21	243	27	0	2	88	503	606
		Tenean Creek	0	215	2	498	19	0	2	15	751	2,386
		Davenport Creek	0	103	4	337	16	0	1	7	468	547
		Total	**0**	**892**	**91**	**2,041**	**123**	**3**	**123**	**153**	**3,428**	**5,504**
Boston Harbor		Charlestown	0	321	0	335	87	0	0	43	787	1,775
		East Boston	1	96	1	336	14	0	1	18	468	1,103
		Downtown	0	265	0	91	82	0	0	18	456	1,489
		Dorchester	0	415	5	626	54	0	3	64	1,167	2,308
		Total	**1**	**1,098**	**6**	**1,388**	**238**	**0**	**4**	**143**	**2,878**	**6,675**
		Program Total	**468**	**4,728**	**515**	**9,319**	**874**	**137**	**304**	**747**	**18,564**	**27,010**

4.3.3 Total Phosphorus Load of Optimal Scenario

According to Appendix F, Attachment 2 of the draft Massachusetts General Permit, credits for total phosphorus reduction can be applied if nonstructural BMPs are implemented. The nonstructural BMPs (described in Section 2 and Section 3.1.1) include street sweeping, catch basin cleaning, good housekeeping, and organic waste and leaf litter collection.

4.3.3.1 Street Sweeping

Total phosphorus load reduction credits associated with an Enhanced Sweeping Program were calculated according to the following equation:

$$Credit_{sweeping} = IA_{swept} * PLE_{IC\text{-}land\ use} * PRF_{sweeping} * AF$$

Where:

$Credit_{sweeping}$ = amount of phosphorus load removed by enhanced sweeping program (lb/yr)

IA_{swept} = impervious area swept in program (acres)

$PLE_{IC\text{-}land\ use}$ = Phosphorus Export Load Rate (lb/acres/yr)

$PRF_{sweeping}$ = Phosphorus Reduction Factor for sweeping based on sweeper type and frequency (Table 2-3 of Appendix F Attachment 2)

AF = Annual Frequency of sweeping

As described in Section 2, the City cleans the streets 10 months out of the year, setting the annual frequency value to a ratio of 10/12. $PRF_{sweeping}$ was set to 0.01, the most conservative value based on the USEPA method. This accounts for street sweeping in the spring and fall months using a mechanical broom. Table 4-17 shows the total phosphorus reduction in pounds per year per reporting area, which results in a small overall reduction of 28 pounds per year, as shown in Table 4-17.

4.3.3.2 Catch Basin Cleaning

The routine removal of debris and leaves from catch basins can also provide total phosphorus load reduction credits for the City of Boston. The credit can be calculated using the following equation:

$$Credit_{CB} = IA_{CB} * PLE_{IC} * PRF_{CB}$$

Where:

$Credit_{CB}$ = amount of phosphorus load removed by catch basin cleaning (lb/yr)

IA_{CB} = impervious drainage area to catch basins (acres)

$PLE_{IC\text{-}land\ use}$ = Phosphorus Export Load Rate (lb/acres/yr)

$PRF_{sweeping}$ = Phosphorus Reduction Factor for catch basin cleaning (Table 2-4 of Appendix F Attachment 2 (USEPA, 2014)

Impervious drainage area to catch basins was calculated by performing a geospatial analysis on city-owned catch basins in the City of Boston. The phosphorus reduction factor is set to 0.02 for semiannual catch basin cleaning. The Commission cleans approximately 10,000 catch basins per year. This is roughly one quarter of the catch basins in the city. Therefore, a factor of 12.5 percent was applied to the equation to represent the portion of the catch basins being cleaned semiannually. This results in a small reduction of 24 pounds per year, systemwide.

4.3.3.3 Enhanced Organic Waste and Leaf Litter Collection

Phosphorus load reduction credit can be earned by performing routine organic waste and leaf litter collection in the City of Boston. As described in Section 2, the leaf litter program, run by the Department of Public Works (DPW), runs April 1 through the first week of December. The phosphorus reduction credit is

calculated using the following equation from Appendix F, Attachment 2 of Massachusetts MS4 General Permit:

$$Credit_{leaf\ litter} = Watershed\ Area * PLE_{IC\text{-}land\ use} * 0.05$$

Where:

$Credit_{leaf\ litter}$ = amount of phosphorus load removed for organic waste and leaf litter collection program (lb/yr)

Watershed Area = All impervious area (acres) from which runoff is discharged into the TMDL waterbody or its tributaries in the Watershed

$PLE_{IC\text{-}land\ use}$ = Phosphorus Export Load Rate (lb/acres/yr) from Table 2-1

0.05 = 5% Phosphorus Reduction Factor for organic waste and leaf litter

The result of this equation is provided in Table 4-17. Organic waste and leaf litter collection provide most total phosphorus reduction credit in comparison to other nonstructural BMPs (street sweeping and catch basin cleaning) that provide minimal reduction credit (less than 30 pounds per year). In the Charles River watershed area, collection of organic waste and leaf litter provides nearly 50 percent of total phosphorus reduction credits from all structural BMPs.

TABLE 4-17
Total Phosphorus Load (lb/year) and Reduction Credit of Optimal Implementation Plan

Watershed	Subwatershed	Reporting Area	TP Reduction Credits (lb/year) by USEPA Method					TP Load (lb/Year)	
			Leaf Litter Collection	Catch Basin Cleaning	Street Sweeping	Structural BMP	Total	USEPA Method	SWMM
Upper/Mid Charles River	**Upper/Mid Charles River**	West Roxbury	36.4	0.1	0.7	98.1	135	340	169
		Sawmill Brook	34.1	0.0	0.7	58.2	290	706	439
		Total	**70.5**	**0.1**	**1.5**	**156.4**	**426**	**1,046**	**607**
Lower Charles River	**Stony Brook**	Upper Stony	60.2	0.1	1.3	30.3	92	749	409
		Canterbury Brook	84.5	0.0	2.2	350.2	437	768	952
		Roslindale Branch	69.1	0.0	1.7	45.3	116	678	380
		Bussey Brook	15.0	0.0	0.4	4.3	60	236	99
		Goldsmith Brook	28.7	0.0	0.6	111.0	140	140	146
		Lower Stony	89.7	0.0	3.0	71.6	164	1,678	1,029
		Subtotal	**332.3**	**0.1**	**8.8**	**608.4**	**1,009**	**4,395**	**3,015**
	Muddy River	Village Brook	17.5	0.8	0.5	72.9	591	412	684
		Other Muddy River	45.2	1.6	1.4	181.8	633	704	1,297
		Subtotal	**62.7**	**2.4**	**1.9**	**226.9**	**1,223**	**1,117**	**1,981**
	Faneuil Brook	**Faneuil Brook**	**48.8**	**2.2**	**1.2**	**265.2**	**419**	**344**	**384**
	Other Lower Charles	Shepard Brook	28.5	1.3	0.6	107.0	137	325	351
		Smelt Brook	31.2	1.4	0.9	145.0	295	425	482
		Allston-Brighton	49.5	1.9	1.8	76.0	129	913	241
		Millers River	11.4	0.5	0.5	16.0	28	173	300
		Subtotal	**120.6**	**5.1**	**3.8**	**344.0**	**589**	**1,836**	**1,375**
		Total	**564.0**	**9.8**	**15.6**	**1,124.2**	**3,240.8**	**7,545**	**6,754**

TABLE 4-17
Total Phosphorus Load (lb/year) and Reduction Credit of Optimal Implementation Plan

Watershed	Subwatershed	Reporting Area	TP Reduction Credits (lb/year) by USEPA Method					TP Load (lb/Year)	
			Leaf Litter Collection	Catch Basin Cleaning	Street Sweeping	Structural BMP	Total	USEPA Method	SWMM
Neponset River		Mother Brook	13.5	0.0	0.3	21.0	35	137	116
		Hyde Park	73.5	0.3	1.4	39.3	115	775	634
		Oakland Brook	26.8	0.5	0.6	9.3	37	316	218
		Mattapan Brook	20.7	0.5	0.6	12.6	34	257	132
		Lower Neponset	34.6	0.7	0.8	9.7	46	457	372
		Tenean Creek	57.1	2.7	1.6	15.1	76	675	814
		Davenport Creek	39.8	1.2	1.0	8.9	51	417	351
		Total	**266.1**	**5.8**	**6.2**	**113.6**	**392**	**3,036**	**2,638**
Boston Harbor		Charlestown	43.3	1.9	1.2	24.5	71	716	1,419
		East Boston	30.9	1.4	1.0	2.4	36	432	765
		Downtown	24.1	1.2	0.9	11.5	38	418	933
		Dorchester	74.6	3.3	2.0	12.8	93	1,074	1,508
		Total	**173.0**	**7.8**	**5.2**	**51.2**	**237**	**2,641**	**4,625**
Program Total			**1,074**	**24**	**28**	**1,445**	**4,295**	**14,269**	**14,624**

4.3.3.4 Structural BMPs

The USEPA method (method #2, USEPA, 2014, Appendix F, Attachment 3, page 12) was used to determine the total phosphorus load reduction for structural BMPs included in the optimal scenario. The structural reduction is based on a known design storage volume of BMPs that are sized to manage 1 inch of runoff volume from tributary impervious areas. The treatment area to BMP footprint ratio and percentage of total phosphorus reduction rates are summarized in Table 4-18. The values are based on a design water quality volume of 1 inch of runoff from their tributary impervious areas.

TABLE 4-18
Summary of BMP Treatment Ratio and Total Phosphorus Removal Rate

BMP	DCIA Treatment Area to BMP Footprint Ratio	TP Reduction (%)		
		HSG A	HSG B	HSG C
Infiltration	21.8	100%	96%	92%
Bioretention	19.9	76%	76%	76%
Porous Pavement	20.2	78%	78%	78%
Dry Well	29.3	100%	97%	93%

The procedures are illustrated in the flow chart shown on Figure 4-17:

1. Identify the structural BMP type and contributing impervious drainage area (IA) for the optimal scenario.
2. Calculate the treated DCIA based on the available storage volume (ft^3) of the structural BMP (BMP-Volume ft^3) using the BMP dimensions and design specifications as described in Section 4.1.1.1.

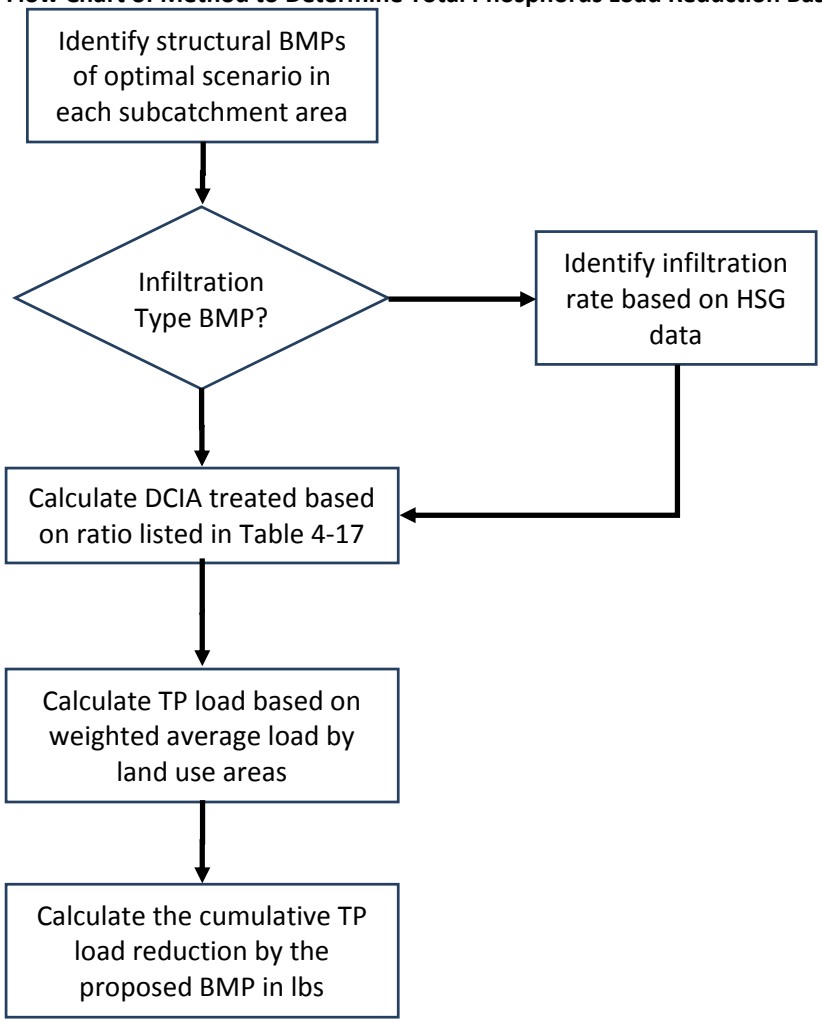
3. Calculate the total phosphorus load from managed DCIA based on the land use area-weighted average export rate.
4. Determine the percent phosphorus load reduction for the structural BMP (BMP Reduction %-P) using the appropriate BMP performance curve (USEPA, 2014) and the BMP-Volume calculated in step 2.
5. Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the structural BMP (BMP Reduction lbs-P) using the BMP Load as calculated from the procedure described above and the percent phosphorus load reduction determined in Step 4.

Constructed wetlands represent end-of-pipe treatment. Since stormwater entering the wetlands has already been treated by other BMPs (where applicable), the total phosphorus reduction percentages for the constructed wetlands were applied to the pollutant loads after reduction from other BMPs. The total phosphorus removal rates for each constructed wetland are summarized in Table 4-19.

TABLE 4-19
Summary of Constructed Wetlands

SDO	Reporting Area	Water Quality Volume (inch)	TP Removal Rate
24CSDO174	Allston-Brighton	0.2	26%
25ESDO037	Shepard Brook	0.1	19%
20GSDO161, 20GSDO163, 18GSDO233	Muddy River	0.5	46%
7CSDO006	West Roxbury	0.1	19%
8BSDO122	West Roxbury	0.4	41%

FIGURE 4-17
Flow Chart of Method to Determine Total Phosphorus Load Reduction Based on known BMP Implementation Level



The reduction credit from structural and non-structural BMPs (Section 4.3.2) was applied to the baseline phosphorus load and summarized in Table 4-17. Compared to the total phosphorus load simulated from the model, the total phosphorus load calculated according to USEPA method is generally higher than what is predicted with the SWMM model. This is mainly due to the reasons described in Section 4.3.1; the model provides better spatial representation of loading conditions from illicit discharges as well as natural assimilation processes of wetlands and ponds. In the Neponset River watershed, both the USEPA method and the SWMM model produced similar total phosphorus load results for the base scenario. However, in the Boston Harbor watershed, total phosphorus loads calculated according to the USEPA method is significantly (48 percent) lower than model prediction.

4.3.4 Conclusion

The discrepancies of total phosphorus loads calculated under the USEPA method and the SWMM model strongly suggest that the planning effort and compliance (computing pollutant loads for future conditions) matrix calculation should be based on one single method to ensure consistency. Since the Commission's SWMM model provides better spatial representation of its storm drainage system and proved to be more versatile in simulating assimilation processes in natural resource areas, it should be used for future planning and providing matrices for compliance.

SECTION 5

Recommended BMP Implementation Plan

The purpose of this section is to summarize the recommended BMP implementation plan and outline an approach to help ensure its successful incorporation. This section concludes with conceptual designs for four sites to demonstrate the benefits and practical integration of a small subset of recommended BMPs.

5.1 Summary of Recommended Plan

The recommended plan is shown in Figure 5-1 and is based on the optimal level of implementation, as described in Section 4.2. The optimal level of implementation would meet the total phosphorus total maximum daily load (TMDL) for both the Upper/Middle Charles River and the Lower Charles River at the most efficient cost. Substantial water quality improvements would be achieved for all 13 water quality constituents and reporting areas, as summarized in Table 5-1.

As discussed in Section 4.2.1.1, although significant reduction of the total average annual pathogen loads may be achieved for the Charles River watershed, Neponset River watershed, and Boston Harbor watershed, none of them will meet the pathogen TMDL requirement with the exception of a few selected subcatchments that discharge to the Boston Harbor. As previously discussed, this is mainly due to technological limitations in both physical and modeling domains. It is prudent to consider the costs versus benefits and implement an adaptive approach to set a tangible target initially, and then adjust the plan to achieve the ultimate goal of attaining designated uses of the water bodies. Therefore, it is recommended to develop a recommended plan based on the total phosphorus load in the Charles River watershed; start with base level BMP implementation in the Neponset and Boston Harbor watersheds, and monitor pathogen load conditions as the program progresses. The monitoring program is described in Section 6. In addition, it is also recommended to improve the Commission's stormwater model via updates and calibration of both flow and water quality, as recommended in the Commission's *Stormwater Model Report* (CDM Smith, 2015).

The resulting total phosphorus loads under the recommended plan are summarized in Table 5-2 and shown in Figure 5-2. The recommended plan will meet the total phosphorus TMDL for reporting areas in the Upper/Middle Charles River watershed. Although some of the individual reporting areas do not meet the specified TMDL in the Lower Charles River watershed, the total load meets the lumped TMDL target. This is mainly due to higher reductions achieved in the Stony Brook reporting areas. The detailed implementation plan including suitable sites, quantified implementation levels, and a specific suite of BMPs are presented in Appendix E for each catchment area (SDO tributary area). In summary, the recommended BMP plan includes the following main components:

1. Require BMP implementation for pollutant load reduction for future development and redevelopment areas.
    - Currently, the Commission reinforces the BMP implementation requirement for new development and redevelopment projects via its site plan review and approval process. New development and redevelopment projects are required to incorporate priority BMPs with high pollutant removal rates to treat 1 inch of runoff from the site prior to discharging into the Commission's municipal separate storm sewer system (MS4).

TABLE 5-1

Summary of Pollutant Loads from Reporting Areas under the Recommended Plan

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	9,747	46,989	1,527	7,644	267	169	46.4	16.1	53.8	22,645	9E+04	7E+04	6E+04
Sawmill Brook	14,859	68,152	2,948	23,156	547	439	117.7	27.9	83.3	34,319	1E+05	9E+04	8E+04
Mid-Charles total	**24,606**	**115,141**	**4,474**	**30,800**	**814**	**607**	**164.1**	**44.0**	**137.1**	**56,963**	**2E+05**	**2E+05**	**1E+05**
Upper Stony	16,858	83,629	3,075	11,097	547	409	97.3	30.0	92.5	43,314	2E+05	1E+05	1E+05
Canterbury Brook	29,101	122,724	5,323	24,104	1,841	952	240.9	40.5	131.0	54,763	2E+05	2E+05	2E+05
Roslindale Branch	18,012	88,552	2,648	6,909	537	380	67.0	24.9	82.2	41,844	2E+05	1E+05	1E+05
Bussey Brook	5,190	13,272	748	2,337	218	99	28.7	5.7	13.7	8,054	1E+04	1E+04	2E+04
Goldsmith Brook	6,753	33,187	1,080	5,160	192	146	32.2	11.2	35.7	16,042	6E+04	4E+04	4E+04
Lower Stony	36,448	172,975	5,395	16,304	1,502	1,029	189.1	66.4	248.9	79,594	3E+05	2E+05	2E+05
Stony Brook total	**112,362**	**514,339**	**18,269**	**65,911**	**4,837**	**3,015**	**655.1**	**178.7**	**604.1**	**243,611**	**9E+05**	**6E+05**	**7E+05**
Village Brook Boston	22,210	103,941	3,750	7,590	1,368	527	142.6	27.5	89.8	46,411	2E+05	1E+05	2E+05
Village Brook Brookline	21,265	80,219	3,580	20,188	1,434	157	184.4	24.3	69.0	33,690	1E+05	8E+04	1E+05
Other Muddy River	45,309	122,393	6,855	2,673	2,679	1,297	306.9	67.0	227.7	69,324	1E+05	1E+05	1E+05
Muddy River total	**88,784**	**306,553**	**14,186**	**22,903**	**5,482**	**1,981**	**633.9**	**118.8**	**386.4**	**149,426**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	15,675	81,498	2,982	8,635	685	384	89.3	27.1	88.8	43,372	2E+05	9E+04	9E+04
Shepard Brook	14,815	77,015	2,053	3,098	297	351	37.0	23.4	96.6	36,714	2E+05	1E+05	9E+04
Smelt Brook	19,731	111,554	2,988	4,501	378	482	48.6	32.7	120.3	53,580	2E+05	2E+05	1E+05
Allston-Brighton	13,214	48,925	1,418	6,429	378	241	50.7	19.3	76.9	23,066	8E+04	8E+04	8E+04
Millers River	12,530	54,388	1,418	3,809	271	300	34.2	15.8	67.8	25,632	1E+05	8E+04	7E+04
Other Lower Charles total	**75,965**	**373,380**	**10,859**	**26,472**	**2,009**	**1,757**	**259.8**	**118.4**	**450.4**	**182,365**	**7E+05**	**5E+05**	**4E+05**
Lower Charles Basin total	**277,111**	**1,194,272**	**43,314**	**115,286**	**12,327**	**6,753**	**1,548.8**	**415.9**	**1,441.0**	**575,402**	**2E+06**	**1E+06**	**2E+06**
Mother Brook	4,625	19,815	719	2,950	191	116	25.4	5.8	19.0	9,279	4E+04	3E+04	4E+04
Hyde Park	28,660	152,239	4,448	10,904	731	634	99.4	42.5	152.1	73,004	3E+05	2E+05	1E+05
Oakland Brook	9,620	50,001	1,584	5,862	306	218	44.6	15.1	47.8	23,766	1E+05	6E+04	7E+04
Mattapan Brook	6,412	31,379	944	2,182	215	132	25.2	8.6	31.0	14,764	6E+04	4E+04	4E+04
Lower Neponset	15,623	77,755	2,379	6,771	440	372	59.5	23.2	80.3	37,030	2E+05	1E+05	9E+04
Tenean Creek	36,114	172,405	5,485	5,332	1,884	814	181.1	41.5	146.0	76,474	3E+05	2E+05	2E+05
Davenport Creek	15,459	84,938	2,305	4,090	336	351	42.3	23.8	83.1	40,485	2E+05	1E+05	9E+04
Neponset River total	**116,512**	**588,531**	**17,865**	**38,092**	**4,102**	**2,638**	**477.6**	**160.6**	**559.3**	**274,801**	**1E+06**	**7E+05**	**7E+05**
Charlestown	47,249	286,576	7,073	4,810	772	1,419	92.4	84.1	320.5	134,639	6E+05	4E+05	3E+05
East Boston	27,758	169,041	4,481	4,027	556	765	66.2	46.3	165.0	80,057	4E+05	2E+05	2E+05
Downtown	33,582	139,848	3,947	3,194	1,185	933	115.1	36.4	198.9	64,284	3E+05	2E+05	2E+05
Dorchester	48,435	252,330	7,248	10,194	1,474	1,508	167.4	73.4	292.5	117,712	5E+05	4E+05	4E+05

TABLE 5-2

Summary of the Recommended Plan

Watershed	Subwatershed	Reporting Area	Scenario ID	Total Area Treated by BMP Type (ac)						% DCIA Treated	TP Load (lb/yr)	WLA	% TP Reduction (from Existing Conditions[1])	Cost ($M)	
				Infiltration	Bioretention	Drywell	Porous Pavement	Wetland	Subtotal					Life-cycle	Construction
Upper/ Middle Charles River	Upper/ Middle Charles	West Roxbury	2.5	14.3	11.3	4.4	3.7	13.0	46.7	37%	169	180	45%	$7	$2
		Sawmill Brook	3	17.8	7.8	4.6	1.4	0.0	31.5	22%	439	469	36%	$16	$6
		Total	-	**32.0**	**19.1**	**9.0**	**5.1**	**13.0**	**78.3**	**29%**	**607**	**649**	39%	**$23**	**$8**
Lower Charles River	Stony Brook	Upper Stony	1	7.4	9.8	0.0	0.0	0.0	17.2	10%	409		33%	$12	$4
		Canterbury Brook	8	99.0	78.1	18.4	15.7	0.0	211.2	71%	952		66%	$133	$45
		Roslindale Branch	2	14.3	6.8	2.2	0.3	0.0	23.5	12%	380		55%	$14	$5
		Bussey Brook	1	2.1	0.0	0.0	0.0	0.0	2.1	4%	99		33%	$1	$0
		Goldsmith Brook	7	35.0	8.2	16.4	5.7	0.0	65.3	75%	146		50%	$31	$12
		Lower Stony	1	24.2	20.3	0.0	0.0	0.0	44.5	12%	1,029		43%	$30	$10
		Subtotal	-	**181.9**	**123.2**	**37.0**	**21.7**	**0.0**	**363.7**	**31%**	**3,015**	**4,300**	**54%**	**$221**	**$76**
	Muddy River	Village Brook	8	22.8	21.6	0.7	3.3	0.0	48.5	72%	684		55%	$33	$11
		Other Muddy River	5.5	29.4	61.2	7.3	1.2	15.5	114.6	61%	1,297		48%	$74	$24
		Subtotal	-	**52.2**	**82.8**	**8.0**	**4.5**	**15.5**	**163.0**	**64%**	**1,981**	**1,300**	51%	**$107**	**$35**
	Faneuil Brook	**Faneuil Brook**	**9**	**56.6**	**60.3**	**16.5**	**2.9**	**0.0**	**136.4**	**81%**	**384**	**275**	**61%**	**$85**	**$28**
	Other Lower Charles	Shepard Brook	1.1	0.6	19.2	0.0	0.0	12.5	32.2	26%	351	226[2]	41%	$21	$6
		Smelt Brook	9	33.4	60.9	0.0	1.2	0.0	95.4	81%	482	318[2]	42%	$69	$22
		Allston-Brighton	1.5	0.0	53.8	0.0	0.0	6.5	60.3	32%	241	190[2]	52%	$37	$11
		Millers River	1	0.1	13.6	0.0	0.0	0.0	13.8	26%	300	146[2]	22%	$12	$4
		Subtotal	-	**90.7**	**207.8**	**16.5**	**4.1**	**18.9**	**338.0**	**70%**	**1,375**	**879[2]**	**41%**	**$138**	**$72**
	Total		-	**324.8**	**413.8**	**61.5**	**30.3**	**34.4**	**864.8**	**37%**	**6,753**	**6,754**	**51%**	**$552**	**$182**
Neponset River		Mother Brook	1	0.5	13.7	0.0	0.0	0.0	14.2	32%	116		51%	$12	$4
		Hyde Park	1	18.1	3.0	0.0	0.0	0.0	21.2	8%	634		38%	$12	$4
		Oakland Brook	1	5.0	0.0	0.0	0.0	0.0	5.0	6%	218		47%	$3	$1
		Mattapan Brook	1	2.9	5.1	0.0	0.0	0.0	8.0	14%	132		54%	$6	$2
		Lower Neponset	1	4.0	1.4	0.0	0.0	0.0	5.3	5%	372		39%	$3	$1
		Tenean Creek	1	6.7	0.8	0.0	0.0	0.0	7.4	4%	814		66%	$4	$2
		Davenport Creek	1	4.3	0.0	0.0	0.0	0.0	4.3	3%	351		36%	$2	$1
		Total	-	**41.4**	**24.0**	**0.0**	**0.0**	**0.0**	**65.4**	**8%**	**2,638**	-	52%	**$42**	**$14**
Boston Harbor		Charlestown	1	0.1	18.7	0.0	0.0	0.0	18.8	13%	1,419		20%	$16	$5
		East Boston	1	0.0	1.6	0.0	0.0	0.0	1.7	2%	765		31%	$1	$0
		Downtown	1	0.0	10.4	0.0	0.0	0.0	10.4	12%	933		37%	$9	$3
		Dorchester	1	0.2	9.8	0.0	0.0	0.0	10.0	4%	1,508		35%	$8	$3
		Total	-	**0.3**	**40.6**	**0.0**	**0.0**	**0.0**	**40.9**	**7%**	**4,625**	-	**31%**	**$35**	**$10**
		Program Total	-	**399**	**497**	**70**	**35**	**47**	**1049**	**26%**	**14,624**	-	**46%**	**$652**	**$215**

Notes:

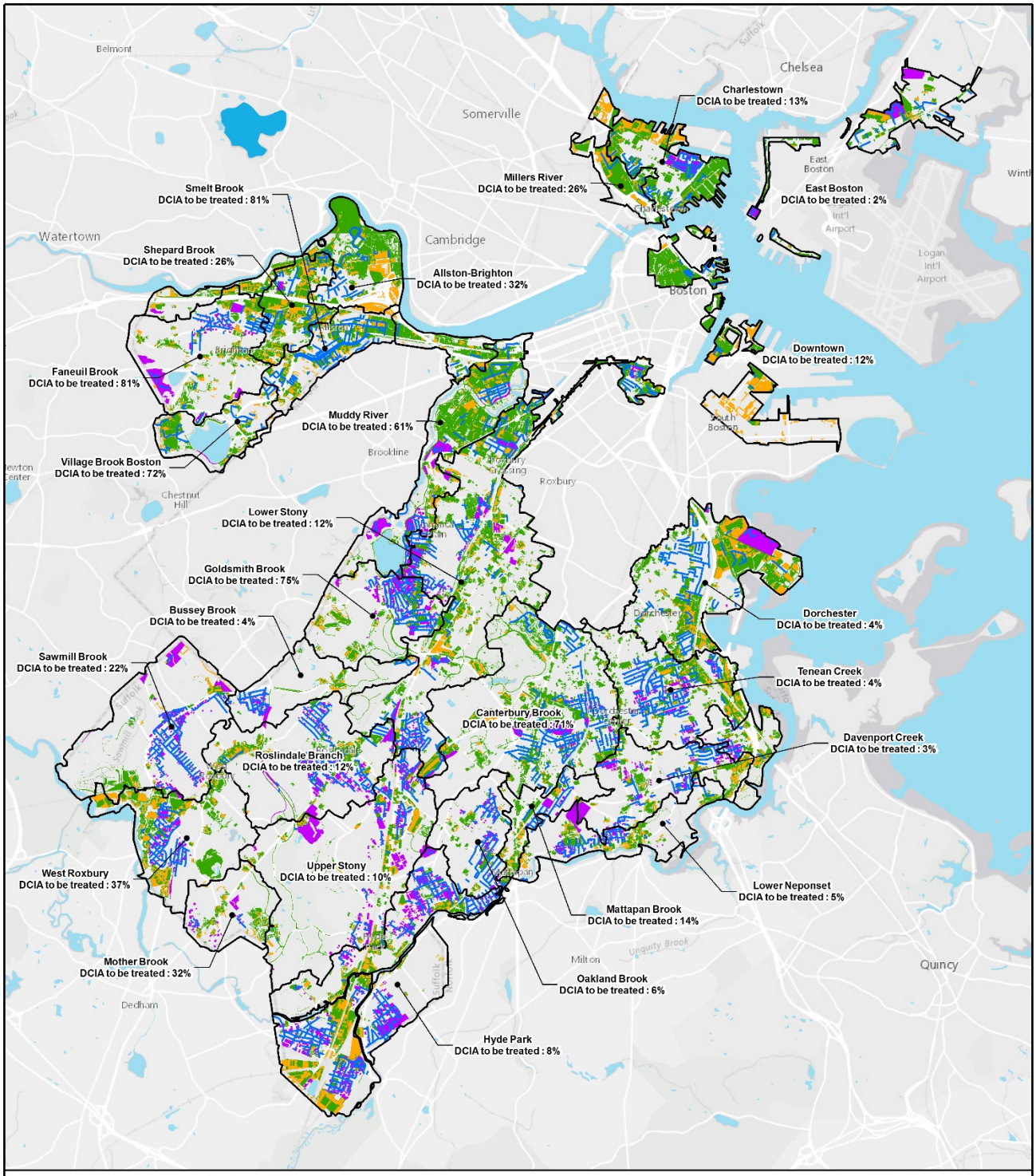
[1] Existing pollutant load based on most recently updated stormwater model by the Commission

[2] Extrapolated based on a required 62% reduction of the total existing waste load

[3] The total life cycle implementation cost for the MS4 within the Lower Charles River watershed is $552 million. The total program cost of $652 million includes the entire MS4 (Upper/Middle Charles River watershed, Lower Charles River watershed, Neponset River watershed and Boston Harbor watershed).

[4] The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. The recommended plan is intended to provide guidance for more detailed study and field investigations to refine boundaries and site-specific characteristics. Actual field conditions should dictate the implementation of BMPs under the general principals prescribed in the recommended plan.

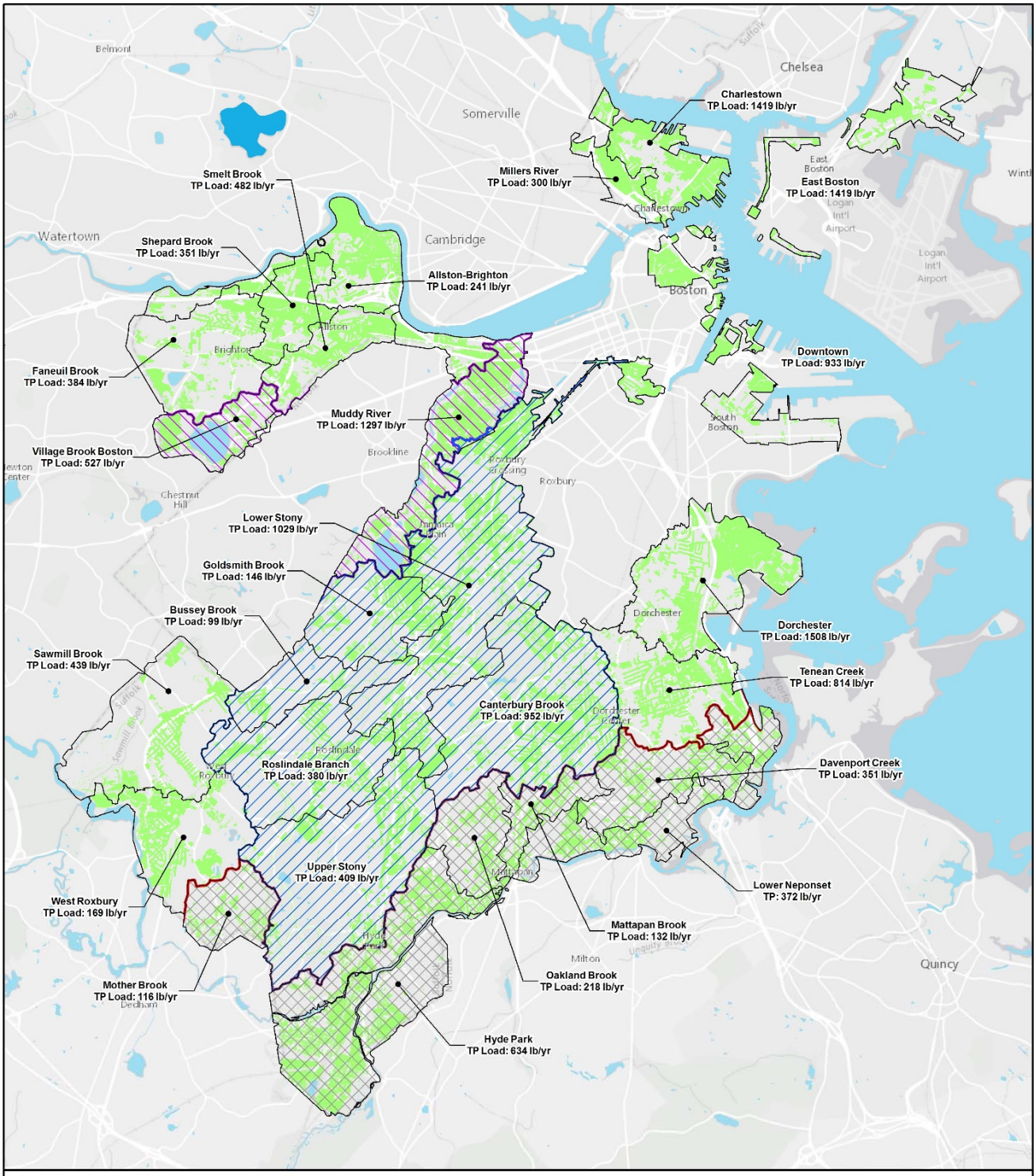
FIGURE 5-1
Recommended BMP Plan



Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.
An electronic map is included in the Appendix.

FIGURE 5-2

Total Pathogen and Pathogen Loads for the Recommended BMP Plan



Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan. An electronic map is included in the Appendix.

- Other legal/regulatory mechanisms, such as by-laws and ordinances, will be necessary to re-enforce the recommended implementation plan.
- In addition to the legal and regulatory means, the Commission will develop standard details for all BMP types and provide guidance to developers on implementing BMPs that will provide the pollutant removals necessary to meet the recommended plan. Currently, the Commission provides developers with its *BMP Guidance Document* that is consistent with the MassDEP *Stormwater Handbook*.
- Key opportunities include large area or cluster developments that are currently in various planning stages. Examples include future developments in the Guest Street area (Figure 5-3) and the Blue Hill Avenue/Cummings Highway station area.
- Green components should also be promoted as a key aspect in long-term planning efforts. The Boston Redevelopment Authority (BRA) is leading Boston's urban renewal planning effort. Incorporating BMPs in these urban renewal areas, as shown in Figure 5-4, can significantly reduce pollutant loads to its receiving water bodies.

2. Significantly reduce pollutant loads from roads and other large impervious areas.
   - Partner with MassDOT, the Department of Conservation and Recreation (DCR), and other relevant public agencies so the Commission can focus on major transportation projects and highways such as the I-90 interchanges improvement project (Figure 5-5) and Commonwealth Avenue reconstruction project. Incorporate BMPs into these new and retrofit projects properly so they can reduce pollutant loads significantly.
   - Identify large impervious areas for retrofit. The recommended plan identifies large parking lots with areas greater than 10,000 square feet (ft^2) that present great BMP opportunities.
   - Collaborate with the Boston Transportation Department to expand Boston's Complete Streets Initiative. This includes further defining its green design guidelines and emphasizing implementation of priority BMPs with high pollutant removal efficiencies. It also includes designing, implementing, and monitoring new designs for green street facilities that effectively attenuate, infiltrate, and treat runoff in the storm drainage area. Many of these

FIGURE 5-3
Proposed Development in Guest Street Area
Ref: Sasaki Associates, et al., Brighton Guest Street Area Planning Study, March 2012.



FIGURE 5-4
Boston Urban Renewal Study Areas
Ref: ww.bostonredevelopmentauthority.org/planning/urban-renewal/overview

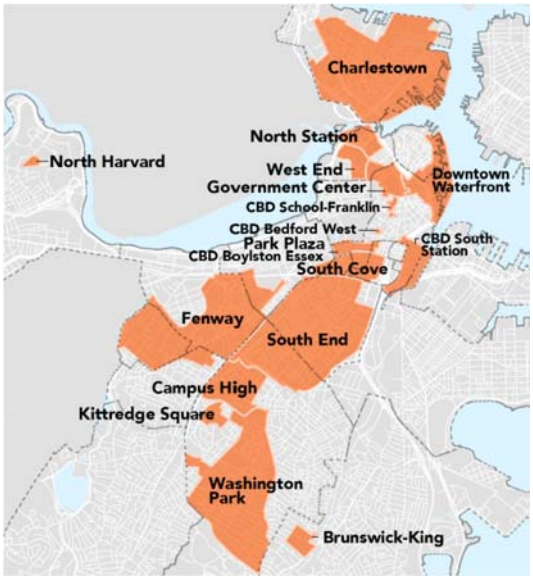
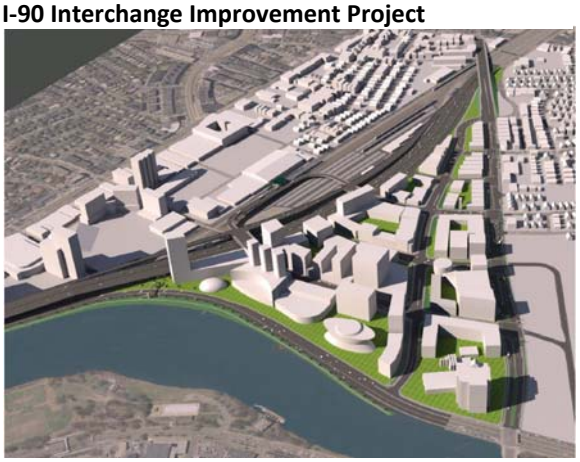
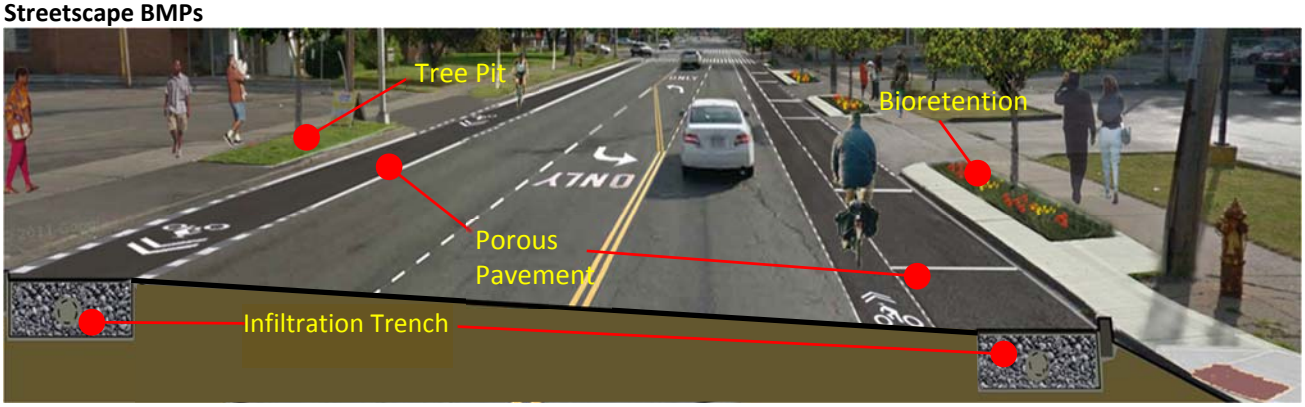


FIGURE 5-5
I-90 Interchange Improvement Project



opportunity areas can be strategically planned for implementation of a neighborhood greenways network to promote reduction of pollutant loads. Figure 5-6 shows an example of incorporating BMPs into a streetscape.

FIGURE 5-6
Streetscape BMPs



3. Continue the current illicit discharge detection and elimination (IDDE) program with the intent to eliminate all illicit connections of sanitary sewers to the storm drain system. The illicit discharges are illegal sanitary connections to storm drain pipes, exfiltration from sanitary sewers and laterals, and defects in sanitary sewers and laterals. The Commission is one of the major New England utilities that has been developing and improving its strategies for identifying and eliminating such connections over many years. The methodology developed by the Commission has proven to be effective and has been used by other organizations as a reference program. The Commission has been implementing the program continuously since 1986 through its Citywide Connection Investigation program (CWI), as described in Section 2. It has demonstrated to be very effective by eliminating a large number of illicit discharges in the past. The Commission plans to eliminate all illicit discharges. However, considering the complex nature of the program and evolving development of the city, it is practical to assumed 85 percent removal of illicit discharges based on engineering judgement.

4. Coordinate with neighboring towns to protect and/or restore streams' natural assimilation capabilities for water quality improvements. The Muddy River Restoration project is an example of a key opportunity that includes environmental restoration components for a healthy stream ecosystem in addition to providing flood protection for the neighboring areas.

5. Retrofit BMPs in public lands. The key strategies for retrofits include:

   - Retrofitting BMPs to treat runoff from public schools. BMPs will not only provide significant pollutant load reductions from school sites, but can also serve as public outreach and educational sites to promote a stormwater management concept and the environmental benefits of green approaches to improve the water quality of receiving water bodies.

   - Implementing BMP retrofits on publically-owned land to cost-effectively reduce pollutant loads while maintaining or improving the function of existing facilities in these areas. The publically-owned land includes open spaces such as parks and recreation areas, vacant parcels, and open areas within the regulated setback spaces of resource areas.

   - Exploring strategic locations for implementation of end-of-pipe treatment systems to maximize the cost-effectiveness of pollutant load removal. Currently, a preliminary planning study is underway to explore the potential installation of a constructed wetland treatment system in the Olmsted Park / Daisy Field area in Jamaica Plain. In addition, an example planning concept of a constructed wetland treatment system to manage stormwater from the Shepard Brook area is presented in Section 5.3.

6. Expand public outreach efforts to promote or incentivize implementation of BMPs on residential properties. This includes providing design guides, funding, or other means of incentives to support residential homeowners' BMP projects, including the use of drywells, rain gardens, tree planting, and other sustainable stormwater approaches.

5.2 Implementation

The purpose of this implementation plan is to outline an adaptive management process that identifies immediate implementation activities, as well as, a framework for making continued progress in reducing pollutant loads to achieve consistency with all applicable waste load allocations and the extent to which the BMPs will prevent BWSC discharges from causing or contributing to a violation of water quality standards to the Charles River, Neponset River, Boston Harbor and the Commission's other reporting areas over a long-term period. To ensure effective implementation, a phased approach is recommended to incorporate initial implementation, monitoring, model improvement, and plan revisions for compliance of total phosphorus and pathogen TMDLs. The implementation schedule consists of three phases over a 30-year period. Each phase adapts to the knowledge obtained from the previous phase(s) via comprehensive monitoring program and effectiveness evaluations of the completed implementation projects. The implementation plan is illustrated in Figure 5-7 and described as the following:

1. Phase I

   i) With the efforts described in Section 2 of this report that are currently underway, and the demonstration projects described in greater detail in the Commission's *Phase I Stormwater Best Management Practices Implementation Plan* (CH2M HILL, 2013), the Commission has already initiated the pilot phase. The pilot projects will continue and the post-construction activities (monitoring, operation, and maintenance) will become a part of the Phase I plan.

   ii) Under the guidance of the BMP Recommendation Report, Phase I starts with selecting high priority catchment areas to develop a focused action plan that will produce measureable pollutant reductions in these areas. The individual catchment maps in Appendix E are provided to help locate suitable BMP sites for implementing various types of BMPs based on the large-scale, high-level planning data available as of 2015. The design considerations of section 3.1.2 will aid in selecting appropriate BMP types based on site characteristics. Preliminary designs/studies of the selected areas are needed to further investigate suitable BMP implementation sites based on actual field conditions and to develop an action plan for the design and construction of structural BMPs during the first 10-year period. The action plan will also provide construction cost estimates for projects and/or area-specific implementation costs and schedules to be incorporated into the Commission's capital investment planning processes to fund implementation. The goal of the Phase I implementation is to achieve 25 percent of the required total phosphorus reduction:

      - Upper/Middle Charles River: 98 lb/yr = 25%*[999 lb/yr (existing load) – 607 lb/yr (WLA)]
      - Lower Charles River: 1,769 lb/yr = 25%*[13,830 lb/yr (existing load) – 6,754 lb/yr(WLA)]

      Therefore, the Phase I total phosphorus load milestone is estimated to be 901 lb/yr and 12,061 lb/yr for the Upper/Middle Charles River watershed and the Lower Charles River watershed, respectively.

   iii) For this implementation plan to be effective, it is critical to employ a comprehensive monitoring program to aid decision making with scientific facts that are often contingent on local conditions. The recommendations of the monitoring program are discussed in Section 6 and include monitoring of two key watershed components:

      - Outfall and Receiving Water Monitoring: the monitoring program will be carried out throughout the Phase I period in order to provide pre- and post-implementation pollutant load conditions. The monitoring data will be used to assess the effectiveness of the implementation program as it progresses.

- BMP Performance Monitoring: the monitoring program starts after the completion of the pilot projects (Central Square and/or Audubon Circle), as described in the Phase I stormwater BMP report (CH2M HILL, 2013). The program will include monitoring of each type of priority BMP proposed for implementation with the purpose of evaluating key performances and maintenance consideration items, as described in Section 6.

iv) During the Phase I period, the Commission will track the implementation of BMPs using an approach similar to one that would be used for asset management, described in Section 7. The recommended operation and maintenance strategies will also be incorporated into the Commission's O&M program for all planned and existing structural BMPs.

v) After collecting monitoring and implementation data for the first 5-year period, evaluation of implementation effectiveness will start with compiling the data in preparation for model updates and calibration. Model updating and calibration will consist of the following main tasks:

- Calibrate the dry weather pollutants with water quality data collected by the BMP implementation monitoring program and the Commission's IDDE program.
- Incorporate a BMP implementation tracking database into the Commission's stormwater model and calibrate the pollutant removal performance with BMP monitoring data.
- Calibrate the wet weather pollutant loads.

The calibrated model will be used to correlate the total phosphorus reduction achieved with monitoring data in the focused area or for specific BMP types. It will also be used to estimate the pollutant load conditions and provide a basis for quantitative assessment of the next implementation phases. In addition, the model results will be compared with pollutant load results calculated with the USEPA method described in the Massachusetts MS4 General Permit.

vi) Based on monitoring data, model calibration, and analysis, the Commission will develop a Phase II implementation plan by adjusting various implementation strategies, if necessary, to achieve optimal cost-effectiveness. The Phase II plan will adopt the successful strategies from the Phase I implementation period and adjust the implementation plan by incorporating changing regulatory, environmental, and economic conditions.

2. Phase II

i) During the Phase II period, the Commission will systematically execute the implementation plan throughout the City with projects funded by the Commission as well as other opportunities associated with new or re-development activities to leverage funding from others for BMP implementation. The goal of Phase II implementation is to achieve 65 percent of the required total phosphorus reduction at the end of a second 10-year period:

- Upper/Middle Charles River: 254 lb/yr = 65%*[999 lb/yr (existing load) – 607 lb/yr (WLA)]
- Lower Charles River: 4,600 lb/yr = 65%*[13,830 lb/yr (existing load) – 6,754 lb/yr(WLA)]

Therefore, the Phase II total phosphorus load milestone is estimated to be 745 lb/yr and 9,230 lb/yr for the Upper/Middle Charles River watershed and the Lower Charles River watershed, respectively.

ii) The Commission will continue to monitor BMP performance along with outfall and receiving water quality as the program progresses. The Commission will also update the O&M program as necessary to ensure constructed BMPs continue to perform as designed.

iii) As an adaptive living tool, the model should be updated with data from completed BMP projects to compute the reduction credit of constructed BMPs. It should also be calibrated and validated as necessary in all or parts of the MS4 areas based on the monitoring data.

iv) Using the model as a basis, the Commission should evaluate pollutant loading conditions at the end of Phase II and estimate the required pollutant load reduction needed to comply with consent decree requirements. In addition, the model results should be compared with pollutant load results calculated with the USEPA method described in the Massachusetts MS4 General Permit. Phase II should be used to develop the Phase III implementation plan for TMDL compliance.

3. Phase III

i) The end goal of the Phase III implementation plan is to meet consent decree requirements by completing the implementation of the recommended BMPs at the end of the last 10-year period with 100 percent required total phosphorus reduction:

- Upper/Middle Charles River: 391 lb/yr = 100%*[999 lb/yr (existing load) – 607 lb/yr (WLA)]
- Lower Charles River: 7,076 lb/yr = 100%*[13,830 lb/yr (existing load) – 6,754 lb/yr(WLA)]

Therefore, the Phase III total phosphorus load milestone is estimated to be 608 lb/yr and 6,754 lb/yr for the Upper/Middle Charles River watershed and the Lower Charles River watershed, respectively.

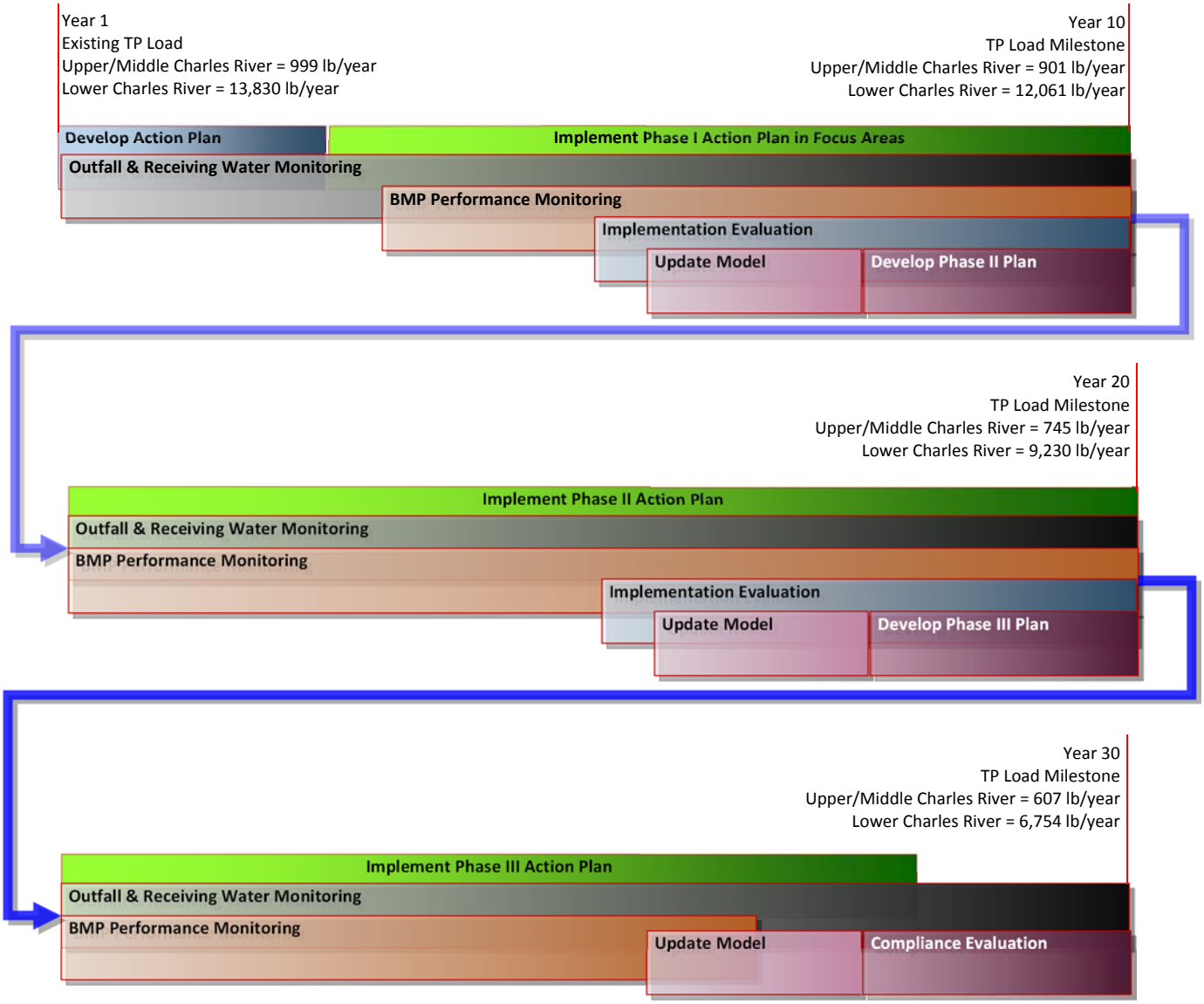
ii) The Commission will continue to monitor BMP pollutant removal performance and water quality at selected storm drain outfall and receiving water locations. The monitoring data will be analyzed for pollutant loading trends as the implementation program progresses.

iii) The Commission should continue to update the storm drain model by incorporating the constructed structural BMPs into the model. The model should also be calibrated and validated with monitoring data.

iv) It is expected that the planned construction of BMPs will be completed two years before the end of Phase III to allow time for evaluation of the pollutant loads in order to determine compliance of consent decree requirements. Compliance evaluation will also include analyses of BMP Recommendation Report implementation through both modeled results and USEPA's Table 1-2 Small MS4 Approach.

FIGURE 5-7

Schematic of Recommended Schedule of Implementation Plan



Note:

TP = total phosphorus

5.3 Conceptual Design Examples

This section demonstrates the potential benefits of conceptual designs of BMPs for four selected sites. Each of these sites are located in the Allston-Brighton neighborhood and tributary to storm drain outfalls with relatively high pollutant loads. The main purpose of these examples is to demonstrate subcatchment and/or site-specific evaluation and design development as a part of a phased action plan for the recommended BMP implementation plan.

As described in Section 3 of this report, the site suitability analysis quantitatively evaluates areas for BMP implementation within the Allston-Brighton area. It produced a map of the area ranking BMP suitability from "low" to "high." Building on this approach, specific potential sites were then identified for the conceptual BMP Recommendation Report implementation plan.

5.3.1 Concept Plan Methodology

Upon selection of the specific sites for concept plan development, each site was analyzed with respect to its potential to capture runoff from directly-connected impervious areas and to identify the most appropriate types of BMPs. In addition, this plan sought to maximize capture area (and improve cost-effectiveness) by investigating those directly-connected impervious areas outside of the individual site boundaries that could be captured with minimal additional investment in storm sewers and catch basins. The concept plans listed below depict the maximum capture areas for each site, keeping both cost-effectiveness and implementation feasibility at the forefront.

With respect to BMP type selection, the focus was on the most common BMP types, or slight variations thereof, as listed in Section 3. The BMPs considered for the BMP concept plans were infiltration trenches (often enhanced by street trees), bioretention (sometimes in curb extensions or sidewalk planters), porous pavement with infiltration trenches, bioswales (enhanced swales), and one constructed wetland. For each site, CH2M HILL selected those BMPs or combinations of BMPs that would best achieve the following goals:

- Capture/infiltrate the first 1 inch of runoff from contributing impervious areas (except for the constructed wetland, which will treat 0.1 inch of runoff due to site constrain).
- Reduce total phosphorus and pathogens to the maximum extent practical.
- Enhance public spaces and create community amenities.
- Be cost-effective with respect to construction and long-term operation and maintenance.

To the extent possible, BMPs integrating either trees or other vegetation were emphasized, in order to both enhance their effectiveness and add aesthetic value.

BMPs for each concept plan were generally placed at either low points or areas directly uphill from existing storm drains seemingly clear of utilities and other existing site features and uses. They were conceptually sized based on a maximum loading ratio (impervious area to BMP area) of 10:1, except for the constructed wetland, which had a loading ratio of around 194:1. Where space and surface topography allowed, BMPs were proposed with lesser loading ratios, which would reduce required excavation depths and promote potentially enhanced infiltration opportunities (due to the larger BMP surface area). It is important to note that should any of these BMP concepts be advanced into the design stage, more detailed investigations would be required to confirm the presence of existing utilities, the suitability of site soils based on in situ borings and permeability tests, adequate turning radii for bioretention curb extensions, and the feasibility of installing new storm sewers required to drain nearby areas into the BMPs.

Cost estimates for the four concept plans were developed using the typical BMP capital and life-cycle costs with replacement per impervious acre managed, as described in Section 4.1.4. BMP costs were estimated based on capture of 1 inch of runoff from the contributing impervious drainage areas. For variations of the typical BMPs (e.g., bioswales, which are enhanced swales), costs were adjusted appropriately, based on CH2M HILL's experience on other similar projects. With respect to estimating the total phosphorus removed

by each concept plan, the methodology described in Section 4 was followed. See Table 5-3 for a summary of the estimated capital and life-cycle costs for each concept plan, as well as estimates of directly connected impervious area treated, water quality volume managed, and phosphorus removed.

TABLE 5-3
Summary of Concept Plans Benefits and Costs

	Herter Park	Rogers Park	Cambridge Street	Commonwealth Ave
Directly Connected Impervious Area (DCIA) Treated (acres)	127.8	3.0	3.2	16.8
Hydrologic Soil Group	unknown	mainly unk, some C, small part C/D	unknown	unknown
Depth to Water Table (ft)	> 6	> 6	> 6	> 6
Total Green Infrastructure Surface Area (sf)	38760	15106	13855	91028
Infiltration Trench Surface Area (sf)	0	8625	9047	19600
Infiltration Trench With Trees Surface Area (sf)	4500	0	3056	21185
Porous Pavement Surface Area (sf)	0	0	0	12866
Bioretention Surface Area (sf)	6260	6481	1752	37377
Constructed Wetland Surface Area (sf)	28000	0	0	0
Water Quality Depth (in)	0.1 (wetland); 1.0 other GI	1.0	1.0	1.0
Water Quality Volume (cf)	55458	11066	11753	60890
Estimated Phosphorus Removal (lb/year)	86.4	20.8	8.7	43.6
Estimated GI Life Cycle Cost ($)	$ 7,802,220	$ 2,114,185	$ 1,977,740	$ 12,471,574
Estimated GI Life Cycle Cost / Lb of TP Removed ($/lb/yr)	$ 90,303	$ 101,644	$ 227,326	$ 286,045
Estimated GI Life Cycle Cost / DCIA Treated ($/acre)	$ 61,061	$ 693,536	$ 610,844	$ 743,504
Estimated GI Capital Cost ($)	$ 2,341,257	$ 713,592	$ 714,515	$ 4,166,528
Estimated GI Capital Cost / Lb of TP Removed ($/lb/yr)	$ 27,098	$ 34,307	$ 82,128	$ 95,563
Estimated GI Capital Cost / DCIA Treated ($/acre)	$ 18,323	$ 234,086	$ 220,685	$ 248,391

5.3.2 Rogers Park – Cluster/Neighborhood BMPs

PROPOSED STORMWATER CONCEPTS FOR ROGERS PARK



Stormwater Concept Overview:

Rogers Park is an 8.14-acre park in the Allston-Brighton area of Boston that features tennis courts, basketball courts, baseball fields, a playground, walking trails, and passive recreation areas. This well used and maintained park has been providing recreational opportunities for the surrounding neighborhoods since 1899. The park is bordered by Foster Street to the east, Rogers Park Ave to the south, Lake Street to the west, and several businesses and residences to the north. The site generally slopes from the east to the west. As shown in Figure 3, there is a planned BWSC CIP project along Rogers Park Ave.

The GI concept plan for Rogers Park consists of three bioretention curb extensions (two on Rogers Park Ave and one on Foster Street), two terraced bioretention areas on the slopes at the east end of the park, and one large infiltration trench below the baseball fields at the west end. Collectively, these BMPs would capture and infiltrate at least one-inch of runoff from all of the adjacent streets, assuming that several new storm sewer crossings are feasible. During larger storm events, overflow structures within the BMPs would allow excess runoff to flow into existing storm sewers. In addition to reducing and treating stormwater runoff, these BMPs have the potential to add aesthetic value to the park, promote traffic calming (especially on Rogers Park Ave), and not significantly impact any existing active or passive recreational uses.

Coordinating the construction of these conceptual BMPs, especially the bioretention curb extensions, with the planned BWSC CIP project along Rogers Park Ave has the potential to increase their cost effectiveness.

Legend

- Manholes
- Catch Basins
- Sewer Lines
- Drainage Area

Proposed GI Features

- Bioretention
- Infiltration Bed
- Bioretention Curb Extensions

Prepared by CH2M HILL - April 2015

PROPOSED STORMWATER CONCEPTS FOR ROGERS PARK







Existing Conditions



Example Photos of GI Technology



Drainage Area, Water Quality, and Cost Table

Directly Connected Impervious Area (DCIA) Treated (acres)	3.0
Hydrologic Soil Group*	mainly unk, some C, small part C/D
Depth to Water Table (ft)	> 6
Total Green Infrastructure Surface Area (sf)	15106
Infiltration Trench Surface Area (sf)	8625
Infiltration Trench With Trees Surface Area (sf)	0
Porous Pavement Surface Area (sf)	0
Bioretention Surface Area (sf)	6481
Constructed Wetland Surface Area (sf)	0
Water Quality Depth (in)	1.0
Water Quality Volume (cf)	11066
Estimated Phosphorus Removal (lb/year)	20.8
Estimated GI Life Cycle Cost ($)	$ 2,114,185
Estimated GI Life Cycle Cost / Lb of TP Removed ($/lb/yr)	$ 101,644
Estimated GI Life Cycle Cost/DCIA Treated ($/acre)	$ 693,536
Estimated GI Capital Cost ($)	$ 713,592
Estimated GI Capital Cost / LB of TP Removed ($/lb/yr)	$ 34,307
Estimated GI Capital Cost / DCIA Treated ($/acre)	$ 234,086

** unknown means "not rated or not available"*



Proposed Design

5.3.3 Herter Park – Constructed Wetland

PROPOSED STORMWATER CONCEPTS FOR HERTER PARK



Stormwater Concept Overview:

Christian Herter Park is a popular public park along the Charles River in the Allston-Brighton area of Boston that features several playgrounds, an outdoor theater, community gardens, walking trails, and passive recreation areas. The park is relatively flat and is bordered by the Charles River to the north and Soldiers Field Road to the south. Visitors to the park generally arrive by car and park in a large parking lot between the playgrounds and the gardens. An existing storm sewer draining the 415-acre (125 acres of directly connected impervious area) Shepard Brook watershed runs under the park's playgrounds before discharging along the banks of the Charles River.

The relatively large open space between the parking lot and the Charles River presents an excellent (and relatively rare) opportunity for a constructed wetland for stormwater treatment. The proposed 28,000-sf constructed wetland would include several cells (sediment forebay, plunge pool, micro-pool, several marsh zones, etc) that would collectively treat runoff diverted from the nearby Shepard Brook storm sewer before discharging to the Charles River. Prior to advancing this concept into the design phase, there are two main challenges that must be addressed. First, the feasibility of diverting flow from the storm sewer must be further investigated. Second, the impact of the wetland on passive recreation in the park must be further vetted, as the proposed wetland is in an area where crowds typically gather to watch the Head of the Charles Regatta and the Run of the Charles canoe and kayak race.

In addition to the constructed wetland, the GI concept plan also includes several BMPs meant to both capture runoff from the parking lot and enhance its aesthetics. At present, the 2.5-acre parking lot, which consists entirely of asphalt without any trees or vegetation, is antithetical to the character of the adjacent park. It therefore represents an opportunity to complement the proposed constructed wetland with numerous, evenly-spaced tree pits and a bioretention area at its east end. These proposed BMPs would collectively capture one-inch of runoff from the parking and direct excess runoff into the proposed constructed wetland.

Legend

- Manholes
- Catch Basins
- Outfalls
- Sewer Lines
- Drainage Areas

Proposed GI Features

- Bioretention
- Tree Pits
- Constructed Wetland

Prepared by CH2M HILL - April 2015

PROPOSED STORMWATER CONCEPTS FOR HERTER PARK





Existing Conditions



Proposed Design



Examples of GI Technology

Drainage Area, Water Quality, and Cost Table

Directly Connected Impervious Area (DCIA) Treated (acres)	127.8
Hydrologic Soil Group*	unknown
Depth to Water Table (ft)	> 6
Total Green Infrastructure Surface Area (sf)	38760
Infiltration Trench Surface Area (sf)	0
Infiltration Trench With Trees Surface Area (sf)	4500
Porous Pavement Surface Area (sf)	0
Bioretention Surface Area (sf)	6260
Constructed Wetland Surface Area (sf)	28000
Water Quality Depth (in)	0.1 (wetland); 1.0 other GI
Water Quality Volume (cf)	55458
Estimated Phosphorus Removal (lb/year)	86.4
Estimated GI Life Cycle Cost ($)	$ 7,802,220
Estimated GI Life Cycle Cost / Lb of TP Removed ($/lb/yr)	$ 90,303
Estimated GI Life Cycle Cost/DCIA Treated ($/acre)	$ 61,061
Estimated GI Capital Cost ($)	$ 2,341,257
Estimated GI Capital Cost / LB of TP Removed ($/lb/yr)	$ 27,098
Estimated GI Capital Cost / DCIA Treated ($/acre)	$ 18,323

** unknown means "not rated or not available"*

5.3.4 Cambridge Street – PROW BMPs in Non-Residential Area

PROPOSED STORMWATER CONCEPTS FOR CAMBRIDGE STREET





Stormwater Concept Overview:

Cambridge Street, from N. Beacon Street to Harvard Ave, is a heavily used 0.3-mile stretch in the Allston-Brighton area of Boston. It is a 2-way street (one lane in either direction, except at the southwestern end, which has two lanes in the southwesterly direction) with parking on both sides (except for driveways, bus stops, etc). This length of Cambridge Street is fronted mostly by commercial interests, though there is one block of townhouses and one block of multi-family residential units (both on the north side). The sidewalks are generally average in width and in fair to good condition. There are very few street trees in this stretch and no overhead wires. The slope is relatively mild (4.4% on average) and is from southwest to northeast. Connecting streets to the north generally slope away from this stretch of Cambridge, while connecting streets and properties to the south generally slope toward it. In October 2014, this stretch of Cambridge was reconstructed by Boston DOT.

Given its mild slope and lack of both street trees and overhead wires, this stretch of Cambridge Street represents a great opportunity to demonstrate right-of-way GI practices such as infiltration trenches (with and without trees) and bioretention curb extensions. As depicted on the GI concept plan, infiltration trenches constitute the majority of the proposed GI types and they are shown along the curb lines on both sides of the street. Where space allowed, bioretention curb extensions and infiltration trenches integrated with new street trees were incorporated in order to enhance the overall GI strategy for this street. Collectively, these BMPs would capture and infiltrate at least one-inch of runoff from both Cambridge Street itself and several of the contributing, immediately adjacent commercial properties to the south. During larger storm events, overflow structures within the BMPs would allow excess runoff to flow into existing storm sewers. In addition to reducing and treating stormwater runoff, these BMPs have the potential to greatly enhance the look and feel of the street, promote traffic calming (via the curb extensions), and create much needed tree canopy and shade.

Legend

- Catch Basins
- Sewer Lines
- Drainage Area

Proposed GI Features

- Infiltration Trench
- Infiltration Trench w/ Street Trees
- Bioretention Curb Extensions

Prepared by CH2M HILL - April 2015

CH2MHILL

PROPOSED STORMWATER CONCEPTS FOR CAMBRIDGE STREET







Existing Conditions





Example Photos of GI Technology

Drainage Area, Water Quality, and Cost Table

Directly Connected Impervious Area (DCIA) Treated (acres)	3.2
Hydrologic Soil Group*	unknown
Depth to Water Table (ft)	> 6
Total Green Infrastructure Surface Area (sf)	13855
Infiltration Trench Surface Area (sf)	9047
Infiltration Trench With Trees Surface Area (sf)	3056
Porous Pavement Surface Area (sf)	0
Bioretention Surface Area (sf)	1752
Constructed Wetland Surface Area (sf)	0
Water Quality Depth (in)	1.0
Water Quality Volume (cf)	11753
Estimated Phosphorus Removal (lb/year)	8.7
Estimated GI Life Cycle Cost ($)	$1,977,740
Estimated GI Life Cycle Cost / Lb of TP Removed ($/lb/yr)	$ 227,326
Estimated GI Life Cycle Cost/DCIA Treated ($/acre)	$ 610,844
Estimated GI Capital Cost ($)	$ 714,515
Estimated GI Capital Cost / LB of TP Removed ($/lb/yr)	$ 82,128
Estimated GI Capital Cost / DCIA Treated ($/acre)	$ 220,685

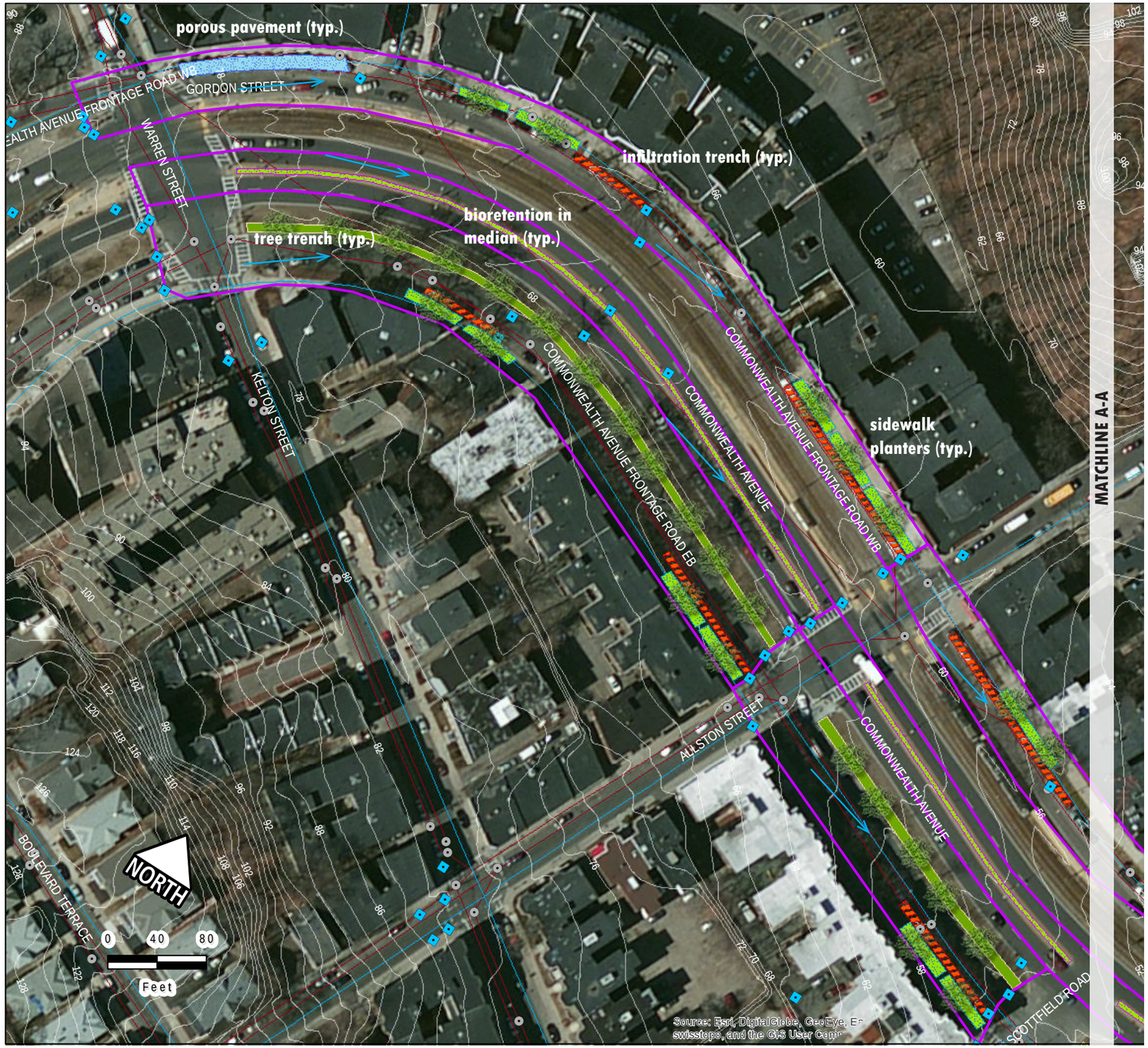
** unknown means "not rated or not available"*



Proposed Design

5.3.5 Commonwealth Avenue – PROW BMPs in Mixed-Use Area

PROPOSED STORMWATER CONCEPTS FOR COMMONWEALTH AVENUE



Stormwater Concept Overview:

Commonwealth Avenue, from Warren/Kelton Street to Brighton Avenue (Packard's Corner), is a heavily used 0.9-mile thoroughfare in the Allston-Brighton area of Boston that is currently being redesigned by the Boston Public Works Department (BPWD). With its solid apartment blocks, unique carriage roads, landscaped median, and MBTA transit corridor, this stretch of the signature Boston Boulevard is both a multi-modal transportation corridor and home to thousands of Bostonians. The redesigned corridor will feature designated bicycle facilities, pedestrian improvements (sidewalks and crosswalks), enhanced access to the MBTA Green Line, preservation and enhancement of historic landscape features, and implementation of innovative sustainable features. The focal point of this redesign will be the intersection of Commonwealth and Harvard Avenues, which through a combination of realignments and urban design features, will be revitalized, with an emphasis on maximizing pedestrian space and amenities. Construction of these planned improvements is anticipated to span from 2016 to 2020.

Given its very mild slope (from west to east, toward Packard's Corner), ample width, and numerous uses, this segment of Commonwealth offers multiple opportunities for effective GI implementation. As depicted in the GI concept plan, several different types of GI are proposed, including bioretention, infiltration trenches (with and without street trees), porous pavement with infiltration trenches, and bioswales (enhanced swales) within the existing paved median. In general, BMPs for each GI concept plan were placed at either low points or areas directly uphill from existing catch basins, in areas seemingly clear of utilities and other existing site features and uses. To the extent possible, BMPs integrating either trees or other vegetation were emphasized, in order to both enhance their effectiveness and add aesthetic value to the streetscape. Where vegetated BMPs were deemed infeasible, porous pavement was proposed, both as a demonstration opportunity and as a more effective alternative to infiltration trenches under standard (impervious) pavement. Collectively, these BMPs would capture and infiltrate at least one-inch of runoff from both Commonwealth itself and two contributing connecting streets to the north. During larger storm events, overflow structures within the BMPs would allow excess runoff to flow into existing storm sewers. In addition to capturing and treating significant quantities of stormwater runoff, these BMPs have the potential to be cost-effectively integrated with the planned BPWD redesign in a manner that would enhance it without changing it in any substantial way.

Legend

- Catch Basins
- Manholes
- Water Mains
- Sewer Lines
- Drainage Areas

Proposed GI Features

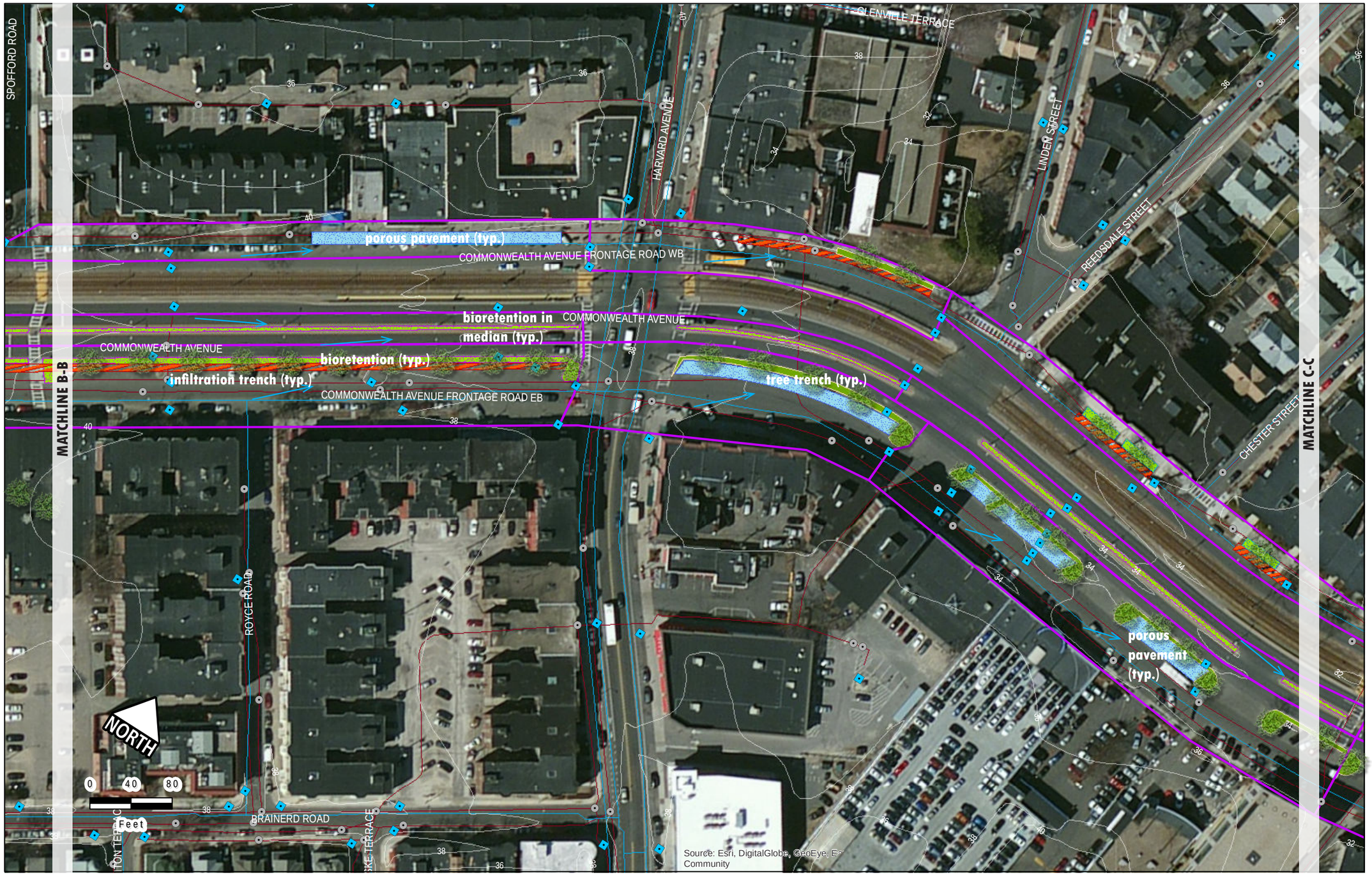
- Bioretention
- Infiltration Trench
- Porous Pavement
- Tree Trench
- Bioswale

Prepared by CH2M HILL - April 2015

PROPOSED STORMWATER CONCEPTS FOR COMMONWEALTH AVENUE



PROPOSED STORMWATER CONCEPTS FOR COMMONWEALTH AVENUE

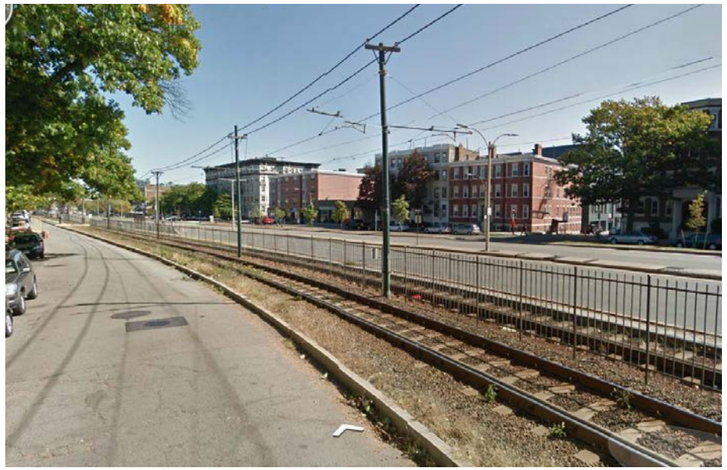


PROPOSED STORMWATER CONCEPTS FOR COMMONWEALTH AVENUE



PROPOSED STORMWATER CONCEPTS FOR COMMONWEALTH AVENUE







Existing Conditions



Proposed Design

Drainage Area, Water Quality, and Cost Table

Directly Connected Impervious Area (DCIA) Treated (acres)	16.8
Hydrologic Soil Group*	unknown
Depth to Water Table (ft)	> 6
Total Green Infrastructure Surface Area (sf)	91028
Infiltration Trench Surface Area (sf)	19600
Infiltration Trench With Trees Surface Area (sf)	21185
Porous Pavement Surface Area (sf)	12866
Bioretention Surface Area (sf)	37377
Constructed Wetland Surface Area (sf)	0
Water Quality Depth (in)	1.0
Water Quality Volume (cf)	60890
Estimated Phosphorus Removal (lb/year)	43.6
Estimated GI Life Cycle Cost ($)	$ 12,471,574
Estimated GI Life Cycle Cost / Lb of TP Removed ($/lb/yr)	$ 286,045
Estimated GI Life Cycle Cost/DCIA Treated ($/acre)	$ 743,504
Estimated GI Capital Cost ($)	$ 4,166,528
Estimated GI Capital Cost / LB of TP Removed ($/lb/yr)	$ 95,563
Estimated GI Capital Cost / DCIA Treated ($/acre)	$ 248,391

** unknown means "not rated or not available"*

SECTION 6

Monitoring

The purpose of this section is to provide a strategy to guide future monitoring to support the adaptive implementation plan and update the model, as described in the previous section. It is anticipated that various types of BMPs, such as bioretention, permeable pavements, and infiltration trenches, will be implemented to meet the goals and requirements of the adopted TMDLs, consent decree, and recommended BMP implementation plan. A monitoring program is required to validate the performance and pollutant removal effectiveness of the stormwater best management practices (BMPs) proposed to be implemented throughout Boston. Three levels of monitoring are proposed: individual BMP level, stormwater outfall level, and receiving water level (including Muddy River and other day lighted streams).

6.1 BMP Level Monitoring

At the BMP level of monitoring, each type of BMP proposed for implementation by the Commission will be evaluated in terms of key performance and maintenance considerations. Initially, it is recommended that one installation of each BMP type/class be monitored. However, it is recommended that the Commission should monitor different porous pavement surfaces. Project locations with multiple BMP technologies are recommended over smaller single-technology projects in order to increase the efficiency of installing monitoring equipment, such as sensors, data loggers and telemetry systems for data collection. It is recommended that the potential for partnerships be explored in order to help facilitate collaboration and to partially offset costs.

Specifically, the proposed BMP level monitoring framework considers the need to:

- Evaluate BMP performance by comparing the pre- and post-implementation conditions.
- Verify Runoff Volume Capture and Water Quality Performance of each BMP.
- Verify field-measured infiltration rates and designed release rates (for extended detention or “slow release” systems) vs. actual rates achieved in the constructed systems (and how such rates vary over time).
- Evaluate the maintenance requirements and associated O&M costs for each BMP type including frequency of cleaning, repair, and component replacement.
- Determine the maintenance requirements and associated O&M costs of vegetative components of each applicable BMP type.
- Compare long term performance between various BMP types and evaluate any deleterious effects of infiltration in highly urban areas.

Monitoring different materials and applications within each BMP type should also be considered, particularly for porous pavements. For example, it would be beneficial to understand variations in performance of porous pavers versus porous asphalt, or performance variations between porous asphalt in traffic applications versus recreational uses, such as basketball courts. Throughout the implementation of this monitoring program, new monitoring installations might be considered on a case by case basis to accommodate new application types or in the event that new technical, operational, or maintenance issues become apparent and were not covered by the initial group of monitoring projects or strategies. Additionally, new sites currently in design may be ideal monitoring sites as monitoring locations and/or equipment might be more readily incorporated into the design. For example, piezometers may be incorporated into projects currently in design in order to evaluate fluctuations in groundwater levels following BMP installation. Such considerations were included in the designs of two BMP projects for the Commission: Central Square and Audubon Circle. Specifically, the Central Square BMP systems were

designed such that their performance can be monitored through the use of groundwater observation wells located in each stormwater infiltration trench and/or through the installation of flow monitoring equipment in the drain manholes downstream of the stormwater trenches. Similarly, the Audubon Circle BMP design also includes observation wells for system performance monitoring and locations suitable for flow monitoring downstream of the control manholes.

Table 6-1 provides a summary matrix of the recommended BMP level monitoring program. The BMP types proposed for monitoring include bioretention (such as vegetated curb extension), constructed wetlands, infiltration trenches (with and without trees), porous pavement, vegetative roofs, and water quality units/inlets. In addition to those considerations listed above, the matrix proposes monitoring for:

- Potential impacts associated with deicing salts
- Cold weather maintainability
- Clogging potential for different types of porous pavements
- Rate/prevalence of invasive plant establishment and/or vector establishment
- The effectiveness of design components such as pretreatment devices, sand-based structural soils, geotextiles, and stone/sand filters, among other considerations

Such monitoring could be valuable for the long-term success of the Commission's BMP Recommendation Report implementation efforts, as it will potentially lead to improved BMP designs, better oversight during construction, and more effective decision making about BMP type selection, application, and placement. In addition, BMP level monitoring is critical to programmatic success in that it goes beyond the Commission's water quality goals to evaluate more palpable impacts on the communities in which they are located. These benefits may include aesthetic improvements, nuisance flood reduction, and enhanced safety for pedestrians/vehicles. It is often at the BMP/community level that BMP programs ultimately succeed or fail.

6.2 Stormwater Outfall and Receiving Water Monitoring

As important as the BMP level is for evaluating programmatic success, it is at the outfall and receiving water levels where the Commission's BMP implementation program will ultimately be evaluated for regulatory compliance. The main objectives of this proposed monitoring program are:

- Document the pollutant load impacts of stormwater discharges by comparing the water quality measurements before and after BMP implementation.
- Provide data for periodic calibration and validation of the model to sustain its vitality of representing system conditions. As discussed in Section 5.2, an adaptive implementation program requires the Commission to maintain and improve the stormwater model.

In addition to water quality monitoring, the Commission may also consider flow metering at outfalls in order to assess the cumulative impacts of multiple BMP project implementations on stormwater runoff rates and volumes. However, such metering is likely more meaningful at targeted locations immediately downstream of densely aggregated BMP installations, such as the proposed BMP project at Central Square. For that project, a flow meter was proposed to be placed in an existing manhole immediately downstream of the site in order to gauge the effectiveness of the proposed BMP systems at storing and removing runoff associated with the 1-inch storm event and to determine which events trigger overflows from those BMP systems.

Table 6-1 BMP Monitoring Maxtrix of the Recommended Plan

Research Questions	Key Demonstration Metrics	GI Type / Application	Monitoring Approach	Monitor Location	Frequency	Duration	Potential Academic Partner (University Research)	References
How does plant mortality vary with deicing salt load?	Effects of Deicing Salts	Bioretention/Bioswale	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the difference in long term performance (clogging potential) between stone/sand filters and geotextiles as used to create barrier between bioretention soils and aggregate storage bed?	Performance of geotextiles (a function of system drain down)	Bioretention/Bioswale	Level sensor & data logger	Outlet Structure	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the impact on groundwater conditions as a result of localized infiltration?	[1]High Groundwater Table / Mounding	Bioretention/Bioswale	Groundwater Monitoring well w/ data logger	1 near field, 1 far field	Continuous	1 or more years	Conduct Tests, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the rate of surface soil permeability decay and how does it vary with surrounding land use?	Surface Permeability	Bioretention/Bioswale	Double Ring Infiltration Test (ASTM D3385)	System Surface	Annual	Long term	Conduct Tests, analyze data and report findings	ASTM D3385 - Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer
How quickly does the system drain down to provide capacity for the next storm?	System drain down time	Bioretention/Bioswale	Level Sensor & data logger or Time Lapse Photography @ Inflow/Outflow Structures	Outlet Structure/Surface	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the percentage of plant mortality after the 2-year establishment period?	Vegetation Mortality	Bioretention/Bioswale	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	
Does the system capture the designed runoff volume and/or meet the desired volume capture goals and rate attenuation goals?	Volume Capture/Flow Attenuation	Bioretention/Bioswale	Level sensor or area/velocity meter, weir, & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the water quality composition (particularly sediment/nutrient load) of overflow from system and does it meet desired performance standards?	Runoff Characteristics	Bioretention/Bioswale	Rain gage, depth monitor, weir, sampler & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
How does plant mortality vary with deicing salt load?	Effects of Deicing Salts	Constructed Wetlands	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the percentage of plant mortality after the 2-year establishment period?	Vegetation Mortality	Constructed Wetlands	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	
What is the rate/prevalence of invasive plant establishment and/or vector establishment (e.g. mosquitoes and other nuisance animals)?	Invasive and Vector Establishment	Constructed Wetlands	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	
Does the system capture the designed runoff volume and/or meet the desired volume capture goals and rate attenuation goals?	Volume Capture/Flow Attenuation	Constructed Wetlands	Level sensor or area/velocity meter, weir, & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the water quality composition (particularly sediment/nutrient load) of overflow from system and does it meet desired performance standards?	Runoff Characteristics	Constructed Wetlands	Rain gage, depth monitor, weir, sampler & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
How does plant mortality vary with deicing salt load?	Effects of Deicing Salts	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	
What is the difference in long term performance (clogging potential) between stone/sand filters and geotextiles as used to create barrier between bioretention soils and aggregate storage bed?	Performance of geotextiles (a function of system drain down)	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Level sensor & data logger	Outlet Structure	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the impact on groundwater conditions as a result of localized infiltration?	[1]High Groundwater Table / Mounding	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Groundwater Monitoring well w/ data logger	1 near field, 1 far field	Continuous	1 or more years	Conduct Tests, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the rate of surface soil permeability decay and how does it vary with surrounding land use?	Surface Permeability	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Double Ring Infiltration Test (ASTM D3385)	System Surface	Annual	Long term	Conduct Tests, analyze data and report findings	ASTM D3385 - Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer
If designed for slow release or lined, does the system drain down at a rate that is effective in meeting required peak rate and water quality performance standards?	System drain down time when using underdrain system	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Monitored through flow measurements (volume capture)	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the percentage of plant mortality after the 2-year establishment period?	Vegetation Mortality	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Physical inspection after 2-yr establishment period	System Vegetation (field inspection)	Annual	Long term	Perform inspections, record data, report findings	
Does the system capture the designed runoff volume and/or meet the desired volume capture goals and rate attenuation goals?	Volume Capture/Flow Attenuation	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Level sensor or area/velocity meter, weir, & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the water quality composition (particularly sediment/nutrient load) of overflow from system and does it meet desired performance standards?	Runoff Characteristics	Curb Extension (bioretention/bioswale) along Roads, e.g. Green Streets	Rain gage, depth monitor, weir, sampler & data logger	Overflow pipe	Continuous	1 or more years	Install equipment, collect, analyze data and report findings	UNH Stormwater Center 2012 Biannual Report; Urban Stormwater BMP Performance Monitoring, EPA, 2009
What is the impact/performance of pretreatment devices (inlet filters) in reducing sediment loading of the infiltration/storage trench?	System Longevity	[2]Infiltration Trenches	Physical Inspection & Photos; qualitative assessments incl. trash, debris, sediment & frequency of cleaning; Assessment for indications of bypass	Water Quality Inlet Filters	Biannual	Long term		

6.2.1 Water Quality Characterization

A quality assurance project plan (QAPP) for the sampling program should be developed prior to initiation which will contain more detail about the sampling locations, methods, and quality control.

It is proposed that monthly sampling be conducted at the select locations in order to provide a record of the water quality conditions in both dry and wet conditions, and seasonally. Figure 6-1 shows flow monitoring sites that were used for previous data collection efforts and the sites that have been prepared for sampling access and other needs for long-term permanent and/or short-term temporary monitoring programs. It is recommended to install long-term monitoring equipment at the Stony Brook site (FM 08) and in Faneuil Brook (FM 10) to continue collecting flow and water quality data at the sites previously operated by USGS. Permanent monitoring there could be complemented by a long-term program of rotating monitors at select sites. It is recommended that the Commission consider including two previously monitored major sites for Faneuil Brook and Stony Brook (as shown in Figure 6-1), as well as three minor sites each year (e.g., smaller outfalls, or other major systems, such as Sawmill Brook, Muddy River, Shepard Brook, Smelt Brook, Oakland Brook, Mattapan Brook, Davenport Creek, Pine Neck Creek, and Tenean Creek).

The water quality parameters to be sampled are listed in Table 6-2. These are the parameters identified in the TMDLs, as discussed in section 1. During each monthly sampling event, it is recommended that one duplicate sample be collected for quality control checking (blind sample sent to lab; location randomly changed). Samples should be collected as grab samples using standard operating procedures. All samples should be analyzed by an accredited laboratory. Standard laboratory reports should be obtained with the applicable quality control data reports.

TABLE 6-2
Receiving Water Sampling Parameters

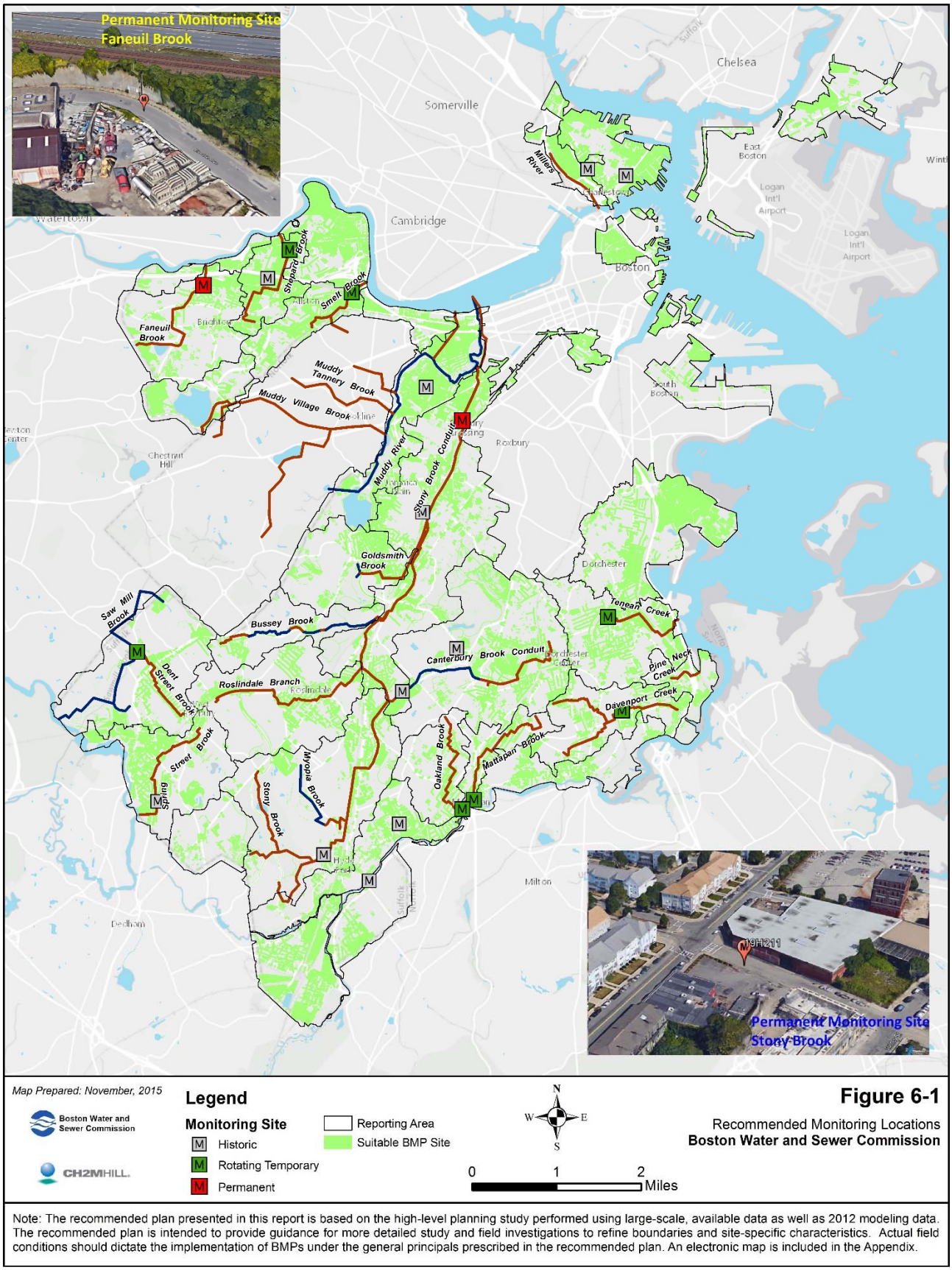
Parameter	Abbreviation	Reporting Units	Notes
Total Phosphorus	TP	mg/L	
Dissolved Phosphorus	DP	mg/L	Lab to filter
E. Coli	EC	MPN/100 mL	<6 hours delivery time to lab
Enterococcus	EF	MPN/100 mL	<6 hours delivery time to lab
Fecal Coliform	FC	MPN/100 mL	<6 hours delivery time to lab

Certified lab to provide bottles and preservative recommendations
Four samples (3 locations, plus one duplicate) monthly
mg/L = milligram per liter
TP = total phosphorus

6.2.2 Captured Volume

As stated above, the Commission may also consider flow metering at select outfalls in order to assess how effective BMP projects are at cumulatively reducing runoff rate and volume over time. The flow monitoring could be accomplished by the use of continuous monitoring devices incorporating velocity sensors and depth sensors. Monitoring could be conducted with support from a subcontracted flow monitoring consultant or trained BWSC staff.

FIGURE 6-1
Recommended Monitoring Locations



Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. The recommended plan is intended to provide guidance for more detailed study and field investigations to refine boundaries and site-specific characteristics. Actual field conditions should dictate the implementation of BMPs under the general principals prescribed in the recommended plan. An electronic map is included in the Appendix.

SECTION 7

Operation and Maintenance

The purpose of this section is to outline a high-level operations and maintenance (O&M) strategy that will help the Commission ensure that both public and private stormwater best management practices (BMPs) will achieve their designed storage capacities and predicted pollutant removals over their operational lifespan.

7.1 Introduction

The use of green infrastructure (GI) stormwater BMPs will be a major component of the Commission's efforts to reduce pollutant loads to receiving waters from its municipal separate storm sewer system (MS4). Specifically, the Commission is looking for those types of BMPs that can be practically and effectively implemented at levels sufficient to reduce waste loads to meet applicable total maximum daily loads (TMDLs) allocated to stormwater discharges. BMPs implemented at such levels will also allow the Commission to meet the requirements of the August 23, 2012 Consent Decree with the USEPA. The Commission recognizes that a critical component of green infrastructure BMP implementation is long-term O&M. It is only through a strong understanding of and commitment to long-term O&M that the Commission will be able to achieve its water quality requirements over the projected lifespans of green infrastructure BMPs. To this end, the following section summarizes the O&M efforts of seven peer communities that have utilized (or plan to utilize) GI to address similar water quality challenges. Following that section are sections focusing on O&M considerations at both the state and city (BWSC) levels, a detailed summary of potential modifications to the Commission's existing stormwater BMP regulations, a list of recommended O&M strategies, and finally a summary of typical O&M practices by BMP type (also see Appendix F of this report).



GI systems such as this bioretention area in a recreation center parking lot in Lancaster, PA are highly visible and require routine maintenance to remain both effective and attractive to the community.

7.2 Relevant O&M Strategies from Peer Communities

Onondaga County, New York

Overview of Program

Onondaga County, New York, is undertaking a combined sewer overflow (CSO) consent judgment driven green and grey infrastructure program, known to the community as **Save the Rain** (http://savetherain.us/). It was the first consent judgment in the U.S. requiring the use of GI for CSO abatement. Nearly 100 GI

projects have been implemented by the Onondaga County Department of Water Environment Protection (OCDWEP) and the City of Syracuse since the program began in 2009. An additional 74 GI projects have been implemented by private property owners through the County's Green Improvement Fund (GIF). GI is responsible for over 100,000,000 gallons of runoff removed from the collection system, annually.

Comparison to BWSC Program

Although the primary driver for Onondaga County is not a TMDL but CSOs, the program is similar in nature to the Commission as the County is relying on both public and private stormwater management projects to achieve the required stormwater and CSO reductions. In addition to projects funded by OCDWEP, the County is also currently working with the City to update their stormwater ordinance to better align with the program objectives.

O&M Strategies Applied

O&M for projects implemented by the County and City are the responsibility of various departments depending on the specific project location and GI techniques included. A maintenance manual, training program, and standard maintenance protocols (SMPs) were developed as part of the program. O&M activities are performed by a mix of in-house staff and contractors. For example, porous pavement vacuuming and vegetated roof maintenance is contracted out, while stormwater inlet filter insert cleaning is performed by OCDWEP staff. Recipients of GIF grant funding are required to submit a maintenance plan and sign an agreement obligating them to a minimum of 10 years of proper maintenance. The contract also requires that maintenance records be submitted upon request and gives the County the right to inspect the systems during construction, at completion, and after construction to ensure functionality. These inspections are conducted at least annually. For more information, visit the program's maintenance page on their website http://savetherain.us/resources/maintenance/.



Signage and stencils like this one used in Syracuse, NY help to retain institutional memory of the GI systems, prevent damage, and education the public.

Philadelphia, Pennsylvania

Overview of Program

Philadelphia's Green Stormwater Infrastructure (GSI) Program, known as "Green City, Clean Waters", was launched in 2009 and formalized in a Consent Order in 2011 in order to achieve significant CSO reductions in a cost-effective and community enhancing manner. The major elements of this large program include planning, design, construction, maintenance, and monitoring of GSI. With respect to elements related to maintenance, preparation of the GI Maintenance Manual Process was completed in 2012, while the actual *GI Maintenance Manual* itself was released in June 2014.

Several other programmatic elements, such as a stormwater ordinance, stormwater utility, and a private incentive program, are related to the GSI program. The stormwater ordinance, which has been in effect

since 2006, requires both new and redevelopment to achieve volume control by means of infiltration, unless proven unfeasible (the regulations are changing as of July 2015 to require treatment for 1.5 inches of impervious runoff as opposed to the current requirement of 1 inch of infiltration). Philadelphia's stormwater utility, which was codified in 2012, has led to the development of two innovative stormwater credit programs to encourage GSI: the Stormwater Management Incentives Program (SMIP) and the Greened Acre Retrofit Program (GARP). PWD, in conjunction with the Philadelphia Industrial Development Corporation (PIDC), created both SMIP and GARP in order to offer incentives and assistance to non-residential PWD customers and contractors. SMIP provides stormwater grants directly to non-residential property owners who want to construct GSI retrofits, while GARP provides stormwater grants to contractors or design/construction firms who can implement large-scale and cost-effective GSI retrofit projects across multiple non-residential private properties.

SMIP projects are evaluated based on a variety of criteria, including total volume of stormwater managed, cost-effectiveness, and other environmental and educational benefits. PWD is especially interested in those projects that are anticipated to cost less than $100,000 per impervious acre managed to implement and manage at least the first 1" of runoff. Applicants must be the property owner, PWD customer, or tenant with permission from the property owner. GARP funding is eligible to contractors or design/construction firms who are able to develop a GSI plan on private properties that total at least 10 acres in project size and are located in Philadelphia's combined sewer service area only. The contractor or firm will be the direct recipient of funds but must provide agreements or contracts with all participating property owners as part of the grant application. For GARP projects, PWD is looking for projects that will cost less than $90,000 per impervious acre managed to implement.

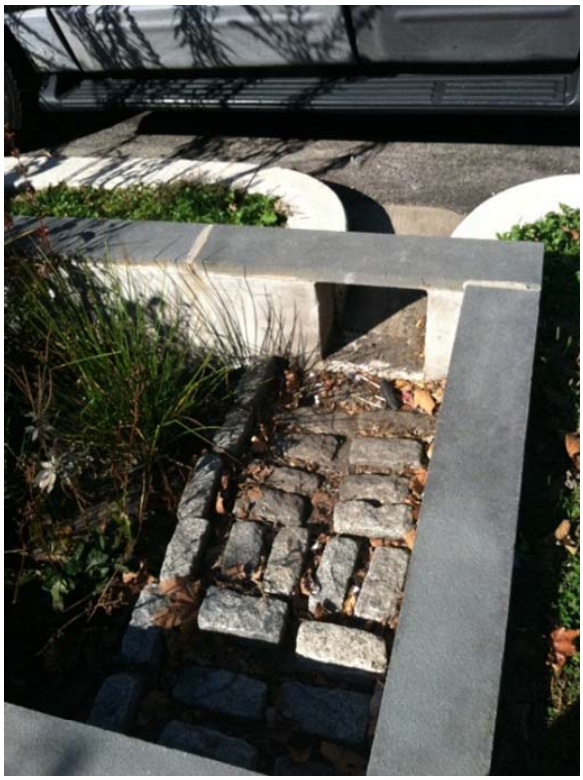
PWD, in conjunction with the Pennsylvania Horticultural Society and the Sustainable Business Network, has also recently initiated its Rain Check program, which is aimed at assisting homeowners in the city with managing stormwater and beautifying their homes. Under this program, homeowners can apply to receive free rain barrels and/or get a downspout planter, rain garden, or permeable pavement system installed at a reduced price. Homeowners receiving such benefits are not eligible for reductions in their annual stormwater bills. There are no O&M requirements associated with the Rain Check program.

Comparison to BWSC Program

Philadelphia's Green City, Clean Waters program is primarily focused on reducing CSOs and is similar in nature to the Commission as the City is relying on both public (especially right-of-way and parks) and private development to incorporate stormwater management projects to achieve water quality improvements. While PWD initially focused its efforts on right-of-way stormwater retrofits (similar to those proposed by the Commission); however, PWD has since focused more on "regional" GSI opportunities at parks, playgrounds, and schools.

O&M Strategies Applied

As of 2014, PWD's GSI Maintenance Group is responsible for maintaining approximately 106 city-owned GSI sites, which include around 300 individual GSI practices. By the end of 2015, the department will publicly operate and maintain around 157 sites and over 400 practices, and predicts continued exponential growth over the next 5 years. PWD's *Long Term Control Plan Update* includes relevant details for the maintenance of GSI.





Examples of street planter box systems in Philadelphia with (bottom photo) and without (top photo) a sediment forebay or trap. The top photos shows that without a way to capture sediment and debris, the vegetated system can get clogged with sediment and trash.

O&M for GSI systems on private property that were required by code for either new development or redevelopment are the responsibility of the owners. PWD requires that the owner of any land upon which GSI systems are placed, constructed, or implemented have an O&M Agreement, which is a legally binding agreement between the property owner and the City that must be executed and filed with the Department of Records. This agreement requires the property owner to construct the onsite GSI systems in strict accordance with the approved post-construction stormwater management plan and to maintain them such that they will adequately perform as designed. PWD reserves the right to inspect the long-term operation of the GSI systems; therefore, owners must provide stormwater easements if necessary for access for inspections and maintenance. Owners must also maintain a record of all inspections and maintenance activities.

For SMIP projects, all recipients have to execute an Economic Opportunity Plan and O&M Agreement as part of the sub-grant agreement. For GARP projects, all property owners must execute an O&M Agreement with PWD, and the contractor or design/construction firm must execute an Economic Opportunity Plan as part of the sub-grant agreement. Once projects are constructed under either program, participating property owners will be eligible for credits against their stormwater charges. Each property owner is legally obligated to operate and maintain their GSI system(s) constructed with grant proceeds for the duration of time specified in the Operations and Maintenance Agreement (typically 45 years) and according to the standards of PWD's O&M Manual. PWD's GSI Maintenance Group will inspect each GSI project once per year. The ultimate goal is to ensure that the volume managed on each site is maintained, and that if redevelopment occurs, the GSI system(s) will need to be replaced elsewhere on that same site. For both programs, O&M Agreements are officially recorded with the property deeds. An example of PWD's O&M Agreement can be found at http://docs.nrdc.org/water/files/wat_15012701a.pdf.

The O&M obligations required by these two programs will likely lead to increases in property maintenance costs for program participants. However, because PWD's stormwater fee structure offers significant monthly stormwater bill discounts (up to 80 percent reductions) for property owners who install GSI, property owners who retrofit their property are able to use a portion of their avoided stormwater fees to pay for the ongoing maintenance of GSI assets subsidized by PWD under these programs. Early reports indicate that the avoided fees are typically more than enough to pay for ongoing maintenance while still providing monthly

cost savings to the property owner relative to their pre-retrofit stormwater fees. Therefore, the O&M Agreements required under these programs ensure protection of the City's infrastructure investments, while the ongoing stormwater fee reductions serve as an effective incentive from the City to property owners for maintaining the asset.

Montgomery County, Maryland

Overview of Program

Montgomery County, in the Washington DC metropolitan area, has a large stormwater program associated with its NPDES MS4 permit. According to their Annual Report (Montgomery County Dept. of Environmental Protection (DEP), 2015), the County had over 8,700 stormwater management facilities under its jurisdiction in FY 2014.

Comparison to BWSC Program

Driven by impervious area treatment requirements related to the Chesapeake Bay and local watershed TMDLs, the program is similar in nature to the Commission as the county is relying on a large number of both public and private stormwater management projects to achieve stormwater reductions.

O&M Strategies Applied

Funded by their stormwater utility ("Water Quality Protection Charge"), DEP oversees inspection of all SWM facilities under County jurisdiction to assess repair and maintenance needs. Their goal is to inspect all facilities every 3 years (triennial inspections) using a contractor and the County is divided into three zones for these triennial inspections. If an inspection indicates that maintenance is required on a privately owned and maintained facility, a "maintenance need level" of routine, high, or emergency is assigned. The maintenance need level then determines what follow up notifications and enforcement actions might be taken with the property owner. Owners of stormwater facilities are required to have a recorded easement and maintenance agreement with the County. Standard easement and maintenance agreement ("covenant") documents are provided by the County.

Non-residential facilities generally must be maintained by their owners. O&M for other facilities is divided into "nonstructural" (e.g., grass cutting, landscaping, and trash removal) and "structural" maintenance. Owners of residential stormwater facilities can complete a Maintenance Transfer Process, after which, DEP will assume responsibility for structural maintenance of the facility (according the annual report, DEP maintains 1,400 privately-owned facilities). The County also handles structural maintenance for all "local government" stormwater facilities (e.g., those at schools, parks, and libraries) and either performs or shares responsibility for nonstructural maintenance of those facilities.

Contractors performing stormwater facility maintenance in the County must attend the County's Stormwater Facility Maintenance Contractor Training.

The stormwater utility (implemented in 2002) includes a fee credit program for properties that have stormwater management facilities. Credits must be renewed every 3 years, serving as a financial incentive for owners to keep their facilities in good working order.

Lancaster, Pennsylvania

Overview of Program

The City of Lancaster, PA is implementing an aggressive green infrastructure program based on their 2011 Green Infrastructure Plan. Over 50 GI projects have been implemented in parks, rights-of-way, at public buildings, and on private property as of March 2015. The program has been funded through grants, a low-interest State Revolving Fund (SRF) loan, and utility fees (wastewater until the stormwater utility was enacted in 2014). The city has also been very successful at integrating GI with other public improvements (e.g., park enhancements, street repaving, ADA/accessibility improvements, and utility repairs) to reduce the costs of GI implementation and improve local neighborhoods. GI in the city is responsible for over 20 million gallons of runoff capture, annually.

Comparison to BWSC Program

Driven by both CSOs and the Chesapeake Bay TMDL, the program is similar in nature to the Commission as the city is relying on both public and private stormwater management projects to achieve stormwater and CSO reductions.

O&M Strategies Applied

O&M for projects on city property are the responsibility of various departments depending on the specific project location and GI techniques included. For example, porous pavement systems are vacuumed by the streets department (an appropriate piece of equipment was purchased when an older street sweeper needed to be replaced) while bioretention vegetation is maintained by a crew from the parks department. O&M activities for public projects are performed by in-house staff and are being incorporated into the city's computerized maintenance management system (Lucity). Recipients of city funding through the SRF loan program are required to execute a landowner agreement that requires an easement/deed restriction and 40 years of O&M. If maintenance is not performed, the agreement gives the city the right to maintain, repair, or reconstruct the stormwater practice and charge the property owner the cost of such work. Per the City's MS4 permit, all BMPs installed in the MS4 area that were required due to regulated MS4 earth disturbance activities are inspected annually by the city. If any deficiencies are noted during inspections, the property owners are notified. These BMPs also have O&M agreements in-place between the City and property owner.

Portland, Oregon

Overview of Program

Portland, OR has one of the most mature, extensive, and successful GI programs in the country, with multiple overlapping policies and programs that have evolved over time. As part of its Long Term Control Plan, Portland has made significant investments in GI and related policies. Some of Portland's GI-related policies include its stormwater utility, stormwater regulations, Clean River Rewards (credit program), Floor Area Bonus for Roof Gardens and Ecoroofs, Community Watershed Stewardship Grants, and Downspout Disconnection Program. One of Portland's most successful GI programs has been its Green Streets Program, which formalized a process to "overlay multi-bureau project plans and scheduled Capital improvement Program (CIP) projects" to identify how GI elements can be cost-effectively incorporated into plans for new streets and retrofits. The City of Portland Bureau of Environmental Services (BES) manages the O&M for the City's green street program. This is a large program, currently numbering at approximately 1,300 green streets, and planned to grow to 2,000 green streets by 2019. The program experienced a very rapid expansion since its beginning in 2003. BES maintains many types of GI facilities in addition to the green street projects. For example, they manage vegetated parcel-based facilities (ponds, wetlands, etc.) which are larger regional type stormwater management facilities (located outside of the right-of-way on City-owned properties). To date, they have 144 parcel-based facilities ranging from 0.1 to several acres in size.

Comparison to BWSC Program

Driven by both CSOs and MS4 requirements, Portland's program is similar in nature to the Commission as the city is relying on both public and private stormwater management projects to achieve stormwater and CSO reductions and improved water quality. In addition, Portland also focused its early GI efforts on right-of-way retrofits and monitoring programs to demonstrate early successes and establish performance baselines.

O&M Strategies Applied

Portland operates under an Asset Management framework, which grew out of the sewer side of the department. As a way to handle the maintenance of GI, they have developed Service Levels for green street projects. Each Service Level, A, B, or C, has varying amounts and types of maintenance, frequencies, acceptable amount of plant cover, etc. The Service Levels are tied to budgets and costs. A Departmental decision set a goal of attaining Service Level B for the green street projects and funding was established for

this level of activity. The O&M activity for Service Level B includes four site visits per year with 3 to 4 maintenance treatments at each green street, as necessary.

Cincinnati, Ohio

Overview of Program

The Metropolitan Sewer District of Greater Cincinnati (MSDGC) has been implementing an integrated wet weather program as part of its consent decree with USEPA to address wet weather CSO issues. By proposing a blend of both gray and green "sustainable" infrastructure practices, MSDGC hopes to achieve a variety of goals such as improving water quality, protecting the environment and public health, and responsibly serving its ratepayers and communities. As part of its program, MSDGC has been exploring and implementing a variety of sewer separation projects that are coupled with GI practices in order remove stormwater from combined sewers, return it to the natural environment, reduce peak rates and volumes, and improve water quality.

MSDGC has classified their sustainable infrastructure projects into two main types: Direct Impact and Enabled Impact Projects. Direct Impact Projects are those that require direct investment by MSDGC for planning, design, and construction and long-term maintenance. These projects can include source control (i.e., GI), conveyance/storage projects, and product control. Enabled Impact Projects represent leveraged infrastructure investments, or are opportunities for cost sharing and collaboration between MSDGC and key watershed stakeholders for implementation of such programs as reforestation, porous pavement, bioswales, living walls, bioretention facilities, or downspout disconnection. Enabled Impact Projects include partnerships with MSDGC and public or private entities to implement GI to reduce the volume of stormwater entering combined sewers. Enabled Impact Projects can provide additional value and benefits to Direct Impact Projects, which in turn can lead to a better community understanding of sustainable infrastructure.

Comparison to BWSC Program

Like the Commission, MSDGC is still in the early stages of developing and implementing its GI program. They are still exploring the most effective methods of tracking, maintaining, and monitoring their existing and planned GI assets. Also like the Commission, MSDGC is driven by both CSOs and MS4 requirements, and will rely on both public and private stormwater management projects to achieve CSO reductions and water quality improvements.

O&M Strategies Applied

In 2014, MSDGC began developing its Sustainable Infrastructure O&M Program, which included development of a maintenance manual and standard maintenance protocols (including schedules, inspection forms, equipment/facility needs, etc.). As part of this effort, MSDGC also completed a peer community review of O&M policies and strategies in order to better inform its program development. Other elements of MSDGC's still evolving O&M Program include: a gap analysis and needs assessment; assessment of staff/program resources; identification of transitional maintenance program needs; updates to the CityWorks computerized maintenance management system (CMMS) to incorporate sustainable infrastructure assets and business processes; recommendations for budgeting and contracting processes and requirements; development of monitoring and enforcement plans; long term staffing projections; and education and training programs for O&M staff.

Depending on the project type, the appropriate MSDGC department is responsible for providing O&M procedures for the project. Currently, projects associated with the City's Stormwater Management Utility, a fully separate enterprise-funded agency responsible for overseeing the O&M of the public storm sewer system inside the City, adhere to the City's Stormwater Operation & Maintenance Master Plan, which was developed in 2005 and currently being updated. As part of its commitment to developing public-private partnerships, MSDGC is striving to help implement long-term, sustainable infrastructure solutions that are best matched with current conditions to improve the level of surface. For example, MSDGC has

Memorandums of Understanding (MOUs) with partners, such as Cincinnati Parks Board, whereby maintenance can be implemented and the private property owners may be billed for the service.

Seattle Public Utilities and King County Wastewater Treatment Division, Seattle, Washington

Overview of Programs

Green stormwater infrastructure (GSI) practices were first implemented as a stormwater management tool in the City of Seattle in 2000. For the first 11 years of GSI implementation, the efforts were focused in sub-basins with separated storm systems. Seattle Public Utilities (SPU) and King County Wastewater Treatment Division (WTD) are responsible for managing the CSOs in each of their jurisdictions and are working to address them under long-term CSO control plans. In 2011, with the Ballard CSO project, SPU undertook its first effort to utilize GSI to reduce CSOs in a sub-basin with combined sewer systems. WTD first implemented GSI as a stormwater management tool in 2013 through the Barton CSO project.

In 2013, the City of Seattle and King County each entered a consent decree with the U.S. Department of Justice (USDOJ) and the U.S. Environmental Protection Agency (USEPA) to ensure that their CSO control plans are completed by 2025 and 2030, respectively. GSI practices are not required in either of the consent decrees; however, the consent decrees encourage and allow the use of GSI to substitute in part for gray infrastructure control measures. Where applicable, each agency will quantify the efficacy of GSI control measures through post construction performance monitoring and/or modeling prior to final design of subsequent control measures. In 2012, SPU and KCWTD entered into an agreement to develop a joint-GSI program to identify the activities necessary to achieve consistency in procedures, design, construction and efficiencies in implementing GSI in the city.

Comparison to BWSC Program

The City of Seattle is not currently under a TMDL; however, there are numerous drivers for both SPU and WTD to implement GSI within the city.

- Volume and peak flow reductions to meet the CSO and consent decree targets, implemented through capital improvement projects by both SPU and WTD and through the RainWise incentive program that provides rebates to private property and is funded by both agencies.
- Water quality improvements in creek basins to meet the Integrated Plan targets under the City of Seattle's consent decree.
- Water quality and flow control under the NDPES Phase I permit implemented through stormwater code requiring GSI to the maximum extent feasible.
- City of Seattle Executive Order to achieve 700-million gallons of control (1,000 gallons per resident) through GSI by 2025.

O&M Strategies Applied

WTD and SPU are each responsible for O&M on all projects constructed as part of the CSO LTCP. Maintenance responsibilities reside with the entity that constructed the project and O&M activities are currently performed by in-house staff.

On private property, for GSI practices constructed through either code-compliance or the RainWise program, maintenance responsibilities reside with the property owner. RainWise projects must be completed by a trained RainWise contractor and inspected to ensure they meet the program requirements before a rebate is issued. Contractors must follow the terms of a RainWise warranty agreement and the homeowner must certify that the systems overflow and drain down properly after construction is complete. A homeowner agreement is also required which obligates the homeowner to 5 years of maintenance and permits SPU/WTD access to the property to monitor and evaluate the maintenance and performance of the system.

A maintenance manual, training program, and standard maintenance protocols (SMPs) are currently under development as part of the joint GSI program.

7.2.1 Summary of Relevant O&M Strategies from Peer Communities

Table 7-1 provides a summary of the key O&M strategies from the peer communities discussed above. In general, this table is focused on green infrastructure stormwater BMPs installed on private property. It is assumed that such BMPs installed on public property (right-of-way, parks, schools, open space, etc) are generally maintained by the public agency that implemented them. It is also worth noting that, as per the above discussion, some of the communities' efforts summarized in Table 7-1 are much farther along and developed than others. For example, communities like Portland and Seattle have much more established GI implementation and O&M programs than communities like Cincinnati.

TABLE 7-1
Summary of O&M Efforts in Peer Communities

O&M Program Elements	Criteria	Cincinnati, OH	Lancaster, PA	Montgomery County, MD	Onondaga County, NY	Philadelphia, PA	Portland, OR	Seattle, WA
GI Program Drivers	CSO	X	X		X	X	X	X
	MS4/TMDL		X	X	X		X	
O&M Responsibility	Property Owner	X	X	X	X	X	X	X
	Utility/Owner Shared	X (Enabled Projects)		X (Transfer Process)				
O&M Accountability	O&M Criteria/Guidelines	X	X	X	X	X	X	X
	O&M Plan Req'd	X	X	X	X	X	X	X
	O&M Plan Recorded Against Property Deed		X (Grant Funded)			X		
Training & Education	Training Workshops	X		X	X	X (BMP Maintenance Manual)	X	X
	Contractor Certification			X (mandatory training)				X (Rain Wise)
Enforcement	Utility-led Inspections	X	X	X	X (Annual for Grant Funded)	X (Annual for Grant Funded)	X	X
	Compliance Reporting - Property Owner					X (Grant Programs)	X	X (Rain Wise)
	Third-Party Verification							
Funding	Stormwater User Fee/BMP Credits/Rebates		X	X		X	X	X
	BMP Implementation Grants		X		X	X	X	
Asset Management Approach	Computerized Maintenance Management Systems or similar	X	X	X	X	X	X	X

7.3 State Regulations and Guidance

The State of Massachusetts regulates stormwater management through the Wetlands Protection Act (WPA), M.G.L. c. 131, § 40, and the Clean Waters Act (CWA), M.G.L. c. 21, §§ 26-53. Most recently in 2008 the Massachusetts DEP revised the ten Stormwater Standards that have been incorporated into the WPA Regulations (310 CMR 10.00) and the Water Quality Certification Regulations (314 CMR 9.00). The ten

stormwater standards were updated with the objectives of improving stormwater recharge, encouraging low impact development, and improving stormwater management on redevelopment projects. The Commission has developed similar stormwater management objectives as demonstrated in their Regulations and their January 2013 *Stormwater Best Management Practices Guidance Document*.

The State's revised stormwater management standards became effective on January 2, 2008. The Massachusetts Stormwater Standards do have limitations in that they are only applicable to projects subject to jurisdiction of the Wetlands Protection Regulations and/or Water Quality Certification Regulations. Additionally certain land uses (e.g., single-family residence and multi-family residences of four or fewer units) are exempted from the stormwater standards. In spite of these limitations the state stormwater standards are still effective guidance for those properties that are not subject to regulation and seeking to voluntarily comply. The ten Massachusetts stormwater standards are the following:

1. No untreated discharges/erosion
2. Peak rate
3. Recharge
4. Water quality
5. Land uses with higher potential pollutant loads
6. Critical areas
7. Redevelopment
8. Construction period
9. Operation & maintenance
10. Illicit discharges

For more information on these standards, including the 2008 updates to encourage low impact development (and green infrastructure), see the following link: http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/swstdchg.pdf.

The ten stormwater standards address specific conditions of their design, construction, operation, and maintenance. Typically compliance with these standards is documented in a Stormwater Report that is prepared by a professional engineer that certifies the stormwater management system design and submitted by the project proponent. As it pertains to stormwater BMP O&M, stormwater standard number 9 is focused on the Post Construction Operation and Maintenance of stormwater BMPs. Key features of this standard are that an O&M Plan be developed and implemented, the responsible party be designated, and maintenance logs must be maintained. All of these features are currently accounted for in the Commission's Regulations. The Massachusetts DEP's Stormwater Handbook (DEP, 2008) provides recommendations for minimum maintenance frequencies for BMPs, which the Commission has referenced in their BMP guidance document. One area where the state standards are stronger is that projects subject to jurisdiction of the Wetlands Protection Regulations have their Orders of Conditions (OOC) registered with the property deed at the county registry of deeds. These OOC can include continuing conditions that shall be complied with for perpetuity and are transferrable with changes in property ownership. These continuing conditions typically require the stormwater system operator must maintain the BMP, the BMP cannot be altered or replaced without local Conservation Commission review/approval, and that in the event a municipality takes over maintenance responsibilities that municipality must agree to the requirements of the O&M plan they are inheriting. The registration of these continuing O&M conditions on the property's deed therefore provides an additional enforcement mechanism for sustaining proper BMP operation and maintenance.

7.3.1 BWSC Rules and Regulations

The Commission adopted regulations for the use of their sanitary and combined sewers and storm drains in 1983. The regulations have since been amended in 1989 and 1998. As part of those regulations, the Commission requires that a General Service Application (GSA) and a site plan be submitted for every new or

reconstructed water, sewer, or storm drain service connection. The Commission has developed a set of standard requirements for site plans as part of their Site Plan Review process.

7.3.1.1 Existing Regulations

The Commission's Regulations require a project proponent to address stormwater management during the design/permitting, construction, and operation/maintenance phases of a project. In regards to stormwater management during the design/permitting phase of a project, the Commission's Regulations and Site Plan Requirements require project proponents to incorporate the following stormwater management elements:

- Evaluate the feasibility of retaining stormwater onsite with the objective of infiltrating the first inch of rainfall onsite before discharging to a storm drain or the combined sewer system.
- Install oil/particle separators on all proposed storm drains that serve outdoor paved areas in excess of 7,500 square feet (ft^2).
- Obtain a drainage discharge permit for all non-stormwater discharges including construction dewatering, subsurface drainage, non-contact cooling water, non-contact industrial process water, and waters associated with hydrological testing, groundwater remediation, or removal/installation of an underground storage tank.
- Provide erosion and sediment control measures to prevent flow of sediment into the Commission's sewer and storm drain systems.
- Install catch basin castings identifying the receiving water for the project's new or reconstructed catch basins.
- If applicable to the project site, comply with the City of Boston zoning requirements for the groundwater conservation overlay district.
- Obtain approval from the Commission's Chief Engineer before construction can begin.

In regards to the construction phase of a project, the Commission's regulations and Site Plan Requirements require the following stormwater management elements:

- Obtain a drainage discharge permit for all non-stormwater discharges including construction dewatering, subsurface drainage, non-contact cooling water, non-contact industrial process water, and waters associated with hydrological testing, groundwater remediation, or removal/installation of an underground storage tank.
- Provide erosion and sediment control measures to prevent flow of sediment into the Commission's sewer and storm drain systems.
- Obtain NPDES Construction General Permit coverage for projects resulting in the disturbance of more than 1 acre. This includes preparing a Stormwater Pollution Prevention Plan (SWPPP) and notifying the Commission of the anticipated construction start date so that the Commission can arrange to inspect the site.
- Utilize a Licensed Drain Layer authorized by the Commission to install, maintain and repair storm drains and building storm drains within the City of Boston.
- Storm drain connections shall be inspected by the Commission to establish that it is properly connected to the Commission's system.

The Commission's Regulations also provide the following specific requirements pertaining to the operation and maintenance of stormwater management systems:

- The maintenance and repair of a building storm drain is the responsibility of the property owner(s) and the owner(s) shall maintain, repair, modify or replace an existing building storm drain whenever the

Commission determines that such drains may negatively impact features such as water quality of the environment.

- Prepare an O&M Plan for all stormwater management systems that include infiltration and catch basins. The O&M plan must identify the owner(s) of the stormwater management system, the party or parties responsible for the O&M, the proposed inspection/maintenance schedule, and the maintenance tasks required of the system. The O&M plan is subject to approval by the Commission.
- Maintenance logs shall be maintained for particle separators to identify maintenance staff, the amount of residue removed, and the method of disposal of the residue.

The Commission's Regulations also provide the following specific requirements pertaining to ensuring compliance with the stormwater management regulations:

- The Commission requires that the project site plan is signed and sealed by a Massachusetts registered Professional Engineer and Professional Land Surveyor. The Commission reserves the right to inspect stormwater management facilities
- Stormwater management calculations must be submitted to document pre-/post-construction drainage conditions, infiltration of first inch of stormwater for the impervious area of the site, and compliance with the groundwater overlay district.
- The Commission reserves the right to inspect stormwater management facilities at any time during the construction and operation.
- Design, installation, maintenance, and operation records for stormwater management facilities are required to be maintained onsite and are subject to review by the Commission.
- Violations of the storm drain regulations are subject to enforcement by the Commission.



Street inlets connected to GI systems are maintained using familiar tools such as vacuum trucks that are already employed for standard inlet cleaning.

7.3.2 Recommended Modifications to the Commission's Stormwater BMP Regulations

In general the Commission's existing storm drain regulations are in agreement with the key objectives of the Massachusetts Stormwater Standards including encouraging stormwater recharge and requiring O&M plans

for stormwater BMPs. The Commission's Stormwater BMP Guidance Document serves as a more detailed resource for property owners, designers, contractors, and the public in regards to selection of stormwater BMPs for development projects that could require connection to the Commission's storm drain system.

The Commission's regulations were not developed with a citywide stormwater BMP program in mind. However, the Commission's BMP Guidance Document was developed to focus on those BMPs most suitable for development and redevelopment projects, which will be a critical component of the Commission's BMP program. Therefore, the following modifications to the Commission's storm drain regulations are recommended to address operation and maintenance of BMPs installed as part of a citywide BMP program.

- Article 1 – Import of Regulations, General Provisions and Definitions:
  - Section 10 – Definitions: Add definitions for the key recommended BMPs including bioretention, infiltration trench, and porous pavement.
  - Section 10 – Definitions: Consider expanding the qualifications for the Licensed Drain Layer to include the installation, maintenance, and repair of stormwater BMPs. Training and education of the contractors potentially responsible for O&M of the BMPs would be an important element of the BMP O&M requirements and provide an opportunity to emphasize how central proper O&M is to improving water quality.
- Article II – Use of Sewers:
  - Section 5 – Storm Drainage Connections: Add section with language specific to storm drainage connections from the recommended stormwater BMPs including bioretention, infiltration trench, porous pavement, and drywells.
  - Section 7 – Ownership and Maintenance of Building Sewers and Building Storm Drains: Consider adding a section specific to ownership and maintenance of stormwater BMPs.
- Article III – Building Sewers, Building Storm Drains, Connections and Appurtenances:
  - Similar to the existing section on Particle Separators, add sections with language specific to the design, operation and maintenance requirements for recommended BMPs.
- Article IV – Requirements for Design and Construction of Facilities:
  - Section 1 – Design and Construction Standards - Update to include reference to the Massachusetts Stormwater Handbook, Massachusetts Stormwater Standards, and the Commission's Stormwater BMP Guidance Document.
  - Update Section to include sections specifying compliance with Massachusetts Stormwater Standards 2 through 10, which are applicable to redevelopment projects.
  - In regard to Stormwater Standard 9 Operation and Maintenance, the Commission will consider requiring that the O&M of a property's stormwater management systems is documented in a site specific O&M manual prepared by a stormwater professional (e.g. professional engineer) and that the O&M manual is registered to the property deed. The submission, certification, and registration of an O&M plan provides the Commission with a means of making the property owner accountable for the proper operation and maintenance of the stormwater BMPs on their property. The registered O&M plan may also serve as a mechanism for enforcement should a property owner fail to properly maintain the BMPs. The Commission could prescribe the required elements to be included in an O&M plan (e.g. O&M contractor, O&M frequencies, and O&M recordkeeping). One particular area to address in the O&M requirements is specifying that snow removal operations are prohibited from storing snow within the footprint of BMPs due to the potential damage this could result in for the performance of the BMPs, unless such BMPs were specifically designed to accommodate snow storage.

- Article VII – Enforcement:
  - Part A Inspection, Section 1 – Right of Access: Update to include stormwater BMPs as a property feature subject to Commission access.
  - Part A Inspection, Section 1: Add language prescribing the Commission's frequency of inspecting stormwater BMPs for compliance with the regulations. The properties subject to Commission inspection could be prioritized based on amount of impervious area treated (e.g. greater than 15,000 square feet) and at a reasonable frequency to allow for the BMPs to become established (e.g. every 3 to 5 years post-construction). The Commission should also consider specifying a goal for conducting random compliance inspections of those properties not subject to routine inspections so as a means of encouraging proper O&M. The Commission could also consider that properties that treat a more significant amount of impervious area be required to self-certify compliance with their O&M plans on a similar schedule. The self-certification could consist of a self-assessment form prepared by a stormwater professional on behalf of the property owner.
  - Part B Record Keeping, Section 1: Update to include maintenance of O&M records for the recommended BMPs and that the property's current stormwater BMP O&M plan shall be maintained onsite.
  - Part D Enforcement Actions, Section 1: In the event that the Commission determines that a property owner has failed to properly maintain their BMPs in accordance with the regulations and the approved O&M plan, the Commission could take any of the enforcement actions available to them to return the property into compliance.

7.4 Recommended O&M Strategies for BWSC

Based on the above review of O&M strategies from seven peer communities, the current Massachusetts stormwater regulations, and current and potential modifications to BWSC stormwater regulations, five specific BMP O&M strategies are identified for the Commission to consider, particularly for BMPs installed on private property. Typical O&M strategies for specific BMPs are further discussed in Appendix F. While these recommendations will likely prove relatively easy to implement, they should have lasting positive impacts on the Commission's proposed BMP implementation efforts.

1. Update current BWSC stormwater regulations to reflect BMP Program Objectives/Components (as described in Section 7.3.2 – Potential Modifications to the Commission's Stormwater BMP Regulations).
2. Require a BMP O&M Agreement to be registered on the private property containing the BMP(s).
3. Require either BWSC inspection or Property Owner self-certification for properties treating over 1,000 sf of impervious (level TBD) every 3 to 5 years (frequency TBD).
4. Establish a goal to randomly inspect BMPs on a relatively small fraction (5%, TBD) of properties treating less than 15,000 sf of impervious (level TBD) per year.
5. Require O&M records to be maintained for all BMPs.

In addition to the five strategies listed above, the following additional O&M strategies are worthy of BWSC consideration:

- Develop a BMP O&M manual, which could include the following:
  - BMP background
  - Descriptions/photographs/schematics of the common types of BMPs
  - Develop standard maintenance protocols (SMPs)
  - O&M frequencies and seasonal considerations
  - Description of typical corrective measures

  - Vegetation maintenance (i.e. identification of plants vs. weeds, pruning, pest/disease management)
  - Winterization of BMPs
- Develop a robust training/education/certification program for O&M staff or volunteers.
- Conduct a gap analysis of O&M requirements (i.e. what is already covered and what needs to be added/changed).
- Consider establishment of a stormwater user fee as both a sustainable funding stream and a way to incentivize BMP implementation and maintenance (i.e., through a credit mechanism).
- Identify potential dedicated funding sources for BMP O&M.
- Develop a clear and effective framework for interdepartmental coordination for BMP project implementation, including design, construction, and maintenance.
- Consider requiring that BMPs be "certified" by a licensed professional after construction to ensure that initial BMP performance is as expected.
  - Authorized certifiers could include the following: MA Professional Engineer, Certified Professional in Stormwater Quality, Certified Stormwater Manager, Certified Environmental Professional, etc.
  - Some states currently require that licensed/trained professionals certify either that BMPs were constructed according to the final design plans (e.g., Pennsylvania) or that they are being inspected and maintained as required (e.g. North Carolina, Maine).
- Consider adoption of an asset management approach: Computerized Maintenance Management Systems (CMMS), project data tracking, Dig Safe responses, etc.
  - By defining BMP assets with respect to their type, location, quantity, and other key characteristics, and linking them to their respective standard maintenance protocols by work orders, which establish the "who, what, where, and when; CMMS has the potential to significantly streamline preventative BMP maintenance.
  - CMMS can also streamline maintenance reporting and documentation, providing an invaluable tool for tracking labor hours, costs, problems, and other issues.
  - CMMS can be tailored to the specific needs of a community based on the size of the program, the available resources and crews, and the availability of an existing CMMS.

SECTION 8

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Appendix A
Pollutant Loads under Existing Conditions

Table A1. Pollutant Loads under Existing Conditions by Reporting Area

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	14,066	64,043	2,214	7,582	681	309	82.2	19.2	63.2	29,486	1E+05	7E+04	1E+05
Sawmill Brook	25,265	111,774	4,616	21,304	1,487	690	193.8	35.3	107.2	53,212	2E+05	1E+05	1E+05
Mid-Charles total	**39,331**	**175,817**	**6,830**	**28,886**	**2,168**	**999**	**276.0**	**54.5**	**170.5**	**82,699**	**3E+05**	**2E+05**	**2E+05**
Upper Stony	25,530	116,257	4,538	10,972	1,463	610	176.4	35.5	107.9	56,990	2E+05	1E+05	2E+05
Canterbury Brook	102,589	378,093	17,012	21,664	9,671	2,820	912.7	73.9	234.2	145,432	6E+05	3E+05	9E+05
Roslindale Branch	39,022	166,082	5,941	5,578	2,687	837	249.7	35.8	113.4	70,438	3E+05	1E+05	3E+05
Bussey Brook	6,706	17,740	1,027	2,266	404	148	45.1	6.6	15.4	9,884	2E+04	1E+04	2E+04
Goldsmith Brook	13,551	64,529	2,088	4,062	652	295	69.0	17.9	58.5	30,064	1E+05	7E+04	9E+04
Lower Stony	73,116	278,775	11,370	16,136	6,309	1,809	604.0	75.8	268.0	110,775	4E+05	2E+05	5E+05
Stony Brook total	**260,513**	**1,021,476**	**41,976**	**60,679**	**21,186**	**6,520**	**2,056.9**	**245.3**	**797.3**	**423,582**	**2E+06**	**8E+05**	**2E+06**
Village Brook Boston	40,198	176,260	6,566	7,281	2,987	1,012	283.1	40.1	130.1	74,131	3E+05	2E+05	3E+05
Village Brook Brookline	22,024	85,944	3,693	20,196	1,454	492	186.2	25.8	73.6	36,835	1E+05	8E+04	1E+05
Other Muddy River	80,165	204,435	12,004	2,679	6,642	2,504	628.1	82.0	271.2	99,105	2E+05	1E+05	2E+05
Muddy River total	**142,387**	**466,638**	**22,263**	**22,264**	**11,082**	**4,008**	**1,097.3**	**147.9**	**474.9**	**210,071**	**6E+05**	**4E+05**	**6E+05**
Faneuil Brook	40,536	186,805	6,971	6,969	2,758	991	264.9	47.3	151.9	88,699	3E+05	2E+05	3E+05
Shepard Brook	22,289	106,924	3,140	2,836	929	595	91.3	28.9	117.4	48,715	2E+05	1E+05	2E+05
Smelt Brook	32,820	175,341	4,917	4,017	1,171	835	117.1	46.8	170.3	81,351	3E+05	2E+05	2E+05
Allston-Brighton	22,707	80,338	2,767	6,159	1,331	499	132.8	26.3	104.0	33,840	1E+05	9E+04	2E+05
Millers River	15,734	65,940	1,892	3,714	576	384	60.5	17.9	76.1	29,990	1E+05	9E+04	1E+05
Other Lower Charles total	**134,085**	**615,349**	**19,688**	**23,694**	**6,765**	**3,304**	**666.6**	**167.2**	**619.7**	**282,596**	**1E+06**	**7E+05**	**9E+05**
Lower Charles Basin total	**536,985**	**2,103,463**	**83,927**	**106,636**	**39,034**	**13,832**	**3,820.9**	**560.4**	**1,892.0**	**916,249**	**3E+06**	**2E+06**	**4E+06**
Mother Brook	10,307	40,037	1,603	2,745	775	239	75.4	8.6	26.6	16,593	7E+04	4E+04	9E+04
Hyde Park	47,118	224,335	7,357	10,766	2,530	1,030	255.7	54.1	187.1	101,081	4E+05	2E+05	3E+05
Oakland Brook	18,320	79,881	2,962	5,774	1,265	409	127.6	18.8	57.4	34,076	2E+05	7E+04	2E+05
Mattapan Brook	13,566	55,983	2,075	2,111	999	288	93.0	11.7	39.6	23,310	1E+05	5E+04	1E+05
Lower Neponset	26,362	116,158	4,103	6,733	1,583	606	158.8	28.9	96.4	51,107	2E+05	1E+05	2E+05
Tenean Creek	106,924	400,980	16,852	5,577	10,163	2,386	899.6	65.3	202.1	149,434	7E+05	2E+05	9E+05
Davenport Creek	24,401	117,684	3,743	4,029	1,275	547	123.7	28.8	97.4	52,856	2E+05	1E+05	2E+05
Neponset River total	**246,997**	**1,035,058**	**38,696**	**37,734**	**18,590**	**5,504**	**1,733.8**	**216.1**	**706.7**	**428,456**	**2E+06**	**8E+05**	**2E+06**
Charlestown	63,849	349,001	9,644	4,757	2,431	1,775	236.8	94.7	355.0	158,789	7E+05	5E+05	5E+05
East Boston	43,286	223,356	6,971	4,100	2,254	1,103	213.9	53.7	185.4	99,502	4E+05	3E+05	3E+05
Downtown	58,355	221,078	7,880	3,233	4,009	1,489	360.8	45.6	228.6	90,921	4E+05	2E+05	5E+05
Dorchester	84,507	372,959	13,006	10,260	5,549	2,308	521.5	88.5	334.6	158,485	7E+05	4E+05	7E+05

Table A2. Listing of Pollutant Loads per Storm Drain Outfall under Existing Conditions

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,330	5,183	185	863	55	26	7.5	1.4	6.1	2,496	7E+03	5E+03	6E+03
1FDO31	1,356	6,005	187	167	64	31	6.1	1.4	4.9	2,717	1E+04	7E+03	9E+03
02E086	476	1,831	75	309	32	10	3.7	0.5	1.5	785	3E+03	2E+03	3E+03
2FDO120	2,139	9,869	315	537	99	47	10.5	2.3	9.7	4,572	2E+04	1E+04	1E+04
2FDO93	2,177	13,823	368	98	68	50	6.6	3.5	11.5	6,496	3E+04	2E+04	1E+04
2FDO85	224	890	32	21	16	4	1.4	0.2	0.5	372	1E+03	7E+02	2E+03
3ESDO186	579	2,433	104	540	38	13	4.9	0.8	2.2	1,074	4E+03	2E+03	4E+03
3ESDO185	989	4,345	172	316	42	22	4.7	1.1	3.5	2,105	9E+03	5E+03	6E+03
3F162	1,339	5,496	222	478	107	29	10.8	1.2	3.5	2,252	9E+03	4E+03	1E+04
4ESDO69	2,602	11,427	397	874	124	60	13.6	3.0	11.0	5,287	2E+04	1E+04	2E+04
4ESDO64	104	338	16	56	9	3	0.9	0.1	0.2	127	6E+02	4E+02	1E+03
4FDO189	1,476	6,947	231	140	91	30	8.4	1.6	5.1	3,050	1E+04	6E+03	1E+04
4FDO204	1,928	8,466	308	479	133	40	13.0	1.9	5.7	3,620	1E+04	7E+03	1E+04
4FDO16	756	3,611	119	71	45	18	4.2	0.8	2.7	1,581	7E+03	4E+03	6E+03
4FDO203	265	1,030	44	173	20	5	2.3	0.3	0.7	430	2E+03	9E+02	2E+03
4FDO118	913	4,675	137	86	38	21	3.6	1.1	3.8	2,157	8E+03	5E+03	6E+03
4FDO119	1,434	5,764	153	45	30	39	3.6	0.9	10.9	3,034	5E+03	5E+03	5E+03
5CSDO110	1,705	5,484	272	639	135	44	13.7	1.2	3.8	2,344	1E+04	6E+03	2E+04
5EDO182	190	811	43	352	14	5	2.3	0.3	0.9	358	1E+03	7E+02	1E+03
5ESDO184	1,066	4,419	206	1,398	71	23	10.4	1.6	4.2	1,968	7E+03	4E+03	7E+03
5FDO117	1,566	6,789	263	711	111	33	11.8	1.7	5.0	2,901	1E+04	5E+03	1E+04
5FDO254	87	472	14	10	4	2	0.3	0.1	0.4	220	8E+02	5E+02	5E+02
5FDO265	31	73	3	3	2	0	0.1	0.0	0.1	32	7E+01	2E+01	1E+02
5FDO253	1,232	5,590	188	125	75	29	6.9	1.2	4.0	2,429	1E+04	5E+03	1E+04
5FDO245	2,073	10,957	330	332	91	44	9.1	2.8	9.4	5,087	2E+04	1E+04	1E+04
5FDO244	369	1,680	53	53	18	8	1.8	0.4	1.8	769	3E+03	2E+03	2E+03
5FDO264	28	80	3	5	1	2	0.1	0.0	0.1	30	3E+02	4E+02	5E+02
5GDO112	1,373	7,474	213	136	56	31	5.4	2.1	7.3	3,461	1E+04	7E+03	8E+03
5GDO116A	1,088	5,918	171	356	32	21	3.9	1.6	5.2	2,863	1E+04	6E+03	4E+03
5GDO115	419	2,096	67	32	24	9	2.2	0.5	1.7	935	4E+03	2E+03	3E+03
5GDO116	1,254	6,185	193	79	69	26	6.3	1.4	4.6	2,756	1E+04	5E+03	8E+03
6DDO57	289	1,041	43	136	22	5	2.3	0.2	0.6	427	2E+03	1E+03	3E+03
6DDO184	78	226	21	219	10	2	1.5	0.1	0.3	77	3E+02	2E+02	7E+02
6DDO91	66	163	30	481	9	3	2.2	0.3	0.5	66	2E+02	3E+02	5E+02
6DDO187	145	460	20	39	9	9	0.9	0.1	0.5	175	1E+03	2E+03	2E+03
6DDO86	68	270	13	71	5	1	0.7	0.1	0.2	115	4E+02	3E+02	5E+02
6DDO85	253	1,309	43	45	15	6	1.5	0.3	1.0	580	2E+03	1E+03	2E+03
6DDO83	586	2,554	102	274	45	13	4.7	0.6	1.8	1,074	4E+03	2E+03	5E+03
6DDO84	100	457	17	17	8	2	0.7	0.1	0.3	191	8E+02	3E+02	7E+02
06D097	711	3,646	111	84	34	14	3.3	0.9	2.7	1,676	6E+03	4E+03	5E+03
6GDO109	2,813	12,904	432	248	181	59	16.5	2.9	9.0	5,559	2E+04	1E+04	2E+04
6GDO110	3,219	16,160	514	328	181	68	16.9	3.8	11.8	7,214	3E+04	1E+04	2E+04
6GDO111	536	2,112	101	576	42	12	5.4	0.7	1.8	886	3E+03	1E+03	3E+03
6GDO166	291	1,019	60	504	24	7	3.6	0.4	1.0	423	2E+03	6E+02	2E+03
6GDO108	8,223	41,484	1,293	809	435	180	40.8	9.8	31.6	18,629	7E+04	4E+04	6E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	229	890	38	63	20	5	2.0	0.2	0.5	346	2E+03	6E+02	2E+03
6HDO106	389	1,659	61	172	23	7	2.5	0.4	1.2	740	3E+03	1E+03	2E+03

Table A2. Listing of Pollutant Loads per Storm Drain Outfall under Existing Conditions

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	1,071	5,135	169	384	55	22	6.0	1.3	4.2	2,321	9E+03	5E+03	6E+03
7CDO006	9,561	42,101	1,575	6,810	501	206	64.1	12.6	38.4	19,290	8E+04	5E+04	7E+04
7HDO285	13,566	55,983	2,075	2,111	999	288	93.0	11.7	39.6	23,310	1E+05	5E+04	1E+05
7HDO105	18,320	79,881	2,962	5,774	1,265	409	127.6	18.8	57.4	34,076	2E+05	7E+04	2E+05
7HDO348	85	477	14	8	4	2	0.3	0.1	0.4	222	9E+02	5E+02	5E+02
7HDO347	649	2,831	104	193	44	13	4.4	0.7	2.0	1,214	5E+03	3E+03	5E+03
7HDO346	573	2,925	92	66	32	12	3.0	0.7	2.1	1,302	5E+03	3E+03	4E+03
8BDO122	2,251	11,787	327	260	87	57	8.7	4.0	14.9	5,382	2E+04	1E+04	1E+04
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	1,232	7,378	200	112	36	27	3.6	2.0	6.6	3,519	1E+04	8E+03	6E+03
8CDO25	377	1,221	69	426	29	9	3.8	0.4	1.2	535	3E+03	2E+03	4E+03
8CDO26	331	1,118	61	366	23	8	3.2	0.4	1.1	508	2E+03	1E+03	3E+03
8DDO112	51	260	8	7	3	1	0.3	0.1	0.2	116	5E+02	4E+02	5E+02
8DSDO100	108	355	18	165	5	4	0.9	0.1	0.5	163	8E+02	1E+03	2E+03
8EDO35	210	620	40	426	16	4	2.7	0.3	0.7	268	9E+02	2E+03	3E+03
8EDO33	656	3,815	114	241	23	14	2.8	1.1	3.3	1,813	7E+03	4E+03	3E+03
8IDO153	59	346	9	3	2	1	0.2	0.1	0.3	163	6E+02	4E+02	3E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	57	2E+02	4E+02	4E+02
8IDO156	777	2,080	114	557	69	14	7.6	0.5	1.0	731	3E+03	4E+02	5E+03
8IDO209	215	1,109	35	17	12	5	1.1	0.3	0.8	497	2E+03	1E+03	1E+03
8IDO154	1,522	7,320	238	234	86	36	8.2	1.8	6.0	3,241	1E+04	8E+03	1E+04
8IDO158	608	3,242	98	123	27	14	2.8	0.9	3.2	1,497	6E+03	3E+03	4E+03
8IDO207	150	626	26	76	12	4	1.3	0.2	0.4	258	1E+03	7E+02	1E+03
8J102	1,931	10,781	311	210	82	44	8.0	3.0	10.7	4,977	2E+04	1E+04	1E+04
8JSDO103	1,673	8,826	275	297	82	36	8.2	2.2	7.0	4,041	2E+04	8E+03	1E+04
8JSDO41	908	5,110	149	96	39	20	3.8	1.4	4.5	2,358	9E+03	5E+03	5E+03
8JSDO50	2,296	10,325	346	338	144	50	13.6	2.7	9.0	4,453	2E+04	1E+04	2E+04
8K049	311	1,499	51	61	20	7	1.9	0.3	1.1	653	3E+03	1E+03	2E+03
9BDO49	373	1,042	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	160	636	25	17	13	3	1.2	0.1	0.3	253	1E+03	4E+02	1E+03
9EDO243	300	1,032	42	163	20	6	2.2	0.2	0.7	435	2E+03	2E+03	3E+03
9K100	146	432	22	51	11	8	1.1	0.1	0.4	149	1E+03	1E+03	2E+03
9K101	1,108	3,923	171	794	72	31	8.5	1.0	3.4	1,656	7E+03	7E+03	1E+04
9K016	219	684	51	422	25	6	3.4	0.3	0.6	239	1E+03	6E+02	2E+03
9LSDO095	268	1,060	43	317	7	12	1.5	0.4	1.4	511	3E+03	3E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	130	393	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	24,133	116,625	3,700	3,711	1,268	535	122.2	28.4	96.0	52,345	2E+05	1E+05	2E+05
10L096	2,373	12,728	388	260	101	81	10.0	3.1	11.3	5,767	3E+04	2E+04	2E+04
11BDO28	22,303	100,016	3,935	20,187	1,179	577	163.8	31.5	94.8	45,805	2E+05	1E+05	2E+05
11BDO123	5,243	23,435	808	586	331	128	30.6	5.1	16.6	10,090	5E+04	2E+04	5E+04
11IDO577	100,163	394,628	16,006	12,228	8,951	2,294	817.2	75.8	231.3	151,605	7E+05	3E+05	9E+05
11M093	1,813	6,321	273	707	106	36	11.4	1.5	5.7	2,978	1E+04	7E+03	1E+04
12BDO10	14	35	2	13	0	1	0.1	0.0	0.1	15	1E+02	2E+02	2E+02
12BDO14	33	82	4	29	1	2	0.2	0.0	0.1	36	3E+02	5E+02	6E+02
12BDO124	16,777	83,776	2,624	4,694	734	392	78.5	21.5	69.4	38,713	2E+05	1E+05	1E+05
12EDO418	248	1,140	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table A2. Listing of Pollutant Loads per Storm Drain Outfall under Existing Conditions

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	208	969	29	63	8	4	0.9	0.2	0.8	456	2E+03	1E+03	1E+03
12HOFDO92	1,987	5,867	684	2,374	303	201	38.0	3.6	14.1	4,514	9E+03	1E+04	2E+04
12HDO85/87	777	2,368	117	428	45	56	5.2	0.5	3.2	873	8E+03	1E+04	2E+04
12L092	4,586	18,218	689	927	327	96	31.1	4.1	13.4	7,621	3E+04	1E+04	3E+04
12LDO296	808	3,486	119	243	44	16	4.6	0.8	3.1	1,577	6E+03	3E+03	4E+03
12M091	475	1,695	73	273	20	9	2.6	0.5	1.6	852	3E+03	2E+03	3E+03
13DSDO078	2,157	6,706	279	1,443	126	35	14.7	1.7	4.9	2,915	1E+04	7E+03	1E+04
13EDO177	90	226	13	107	7	1	0.9	0.1	0.2	91	3E+02	4E+02	8E+02
13EDO174	1,641	8,907	242	285	44	31	4.7	2.4	7.8	4,302	2E+04	1E+04	8E+03
13EDO176	79	217	9	32	6	1	0.6	0.1	0.2	84	3E+02	4E+02	7E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	155	435	14	81	8	4	0.9	0.3	1.1	180	7E+02	1E+03	2E+03
13L090	106,116	397,494	16,733	5,334	10,119	2,370	895.1	64.5	199.0	147,857	7E+05	2E+05	9E+05
14CDO9	1,482	7,057	270	789	101	39	11.3	1.8	5.5	3,034	1E+04	8E+03	1E+04
15FSDO288	3,873	16,998	581	1,346	215	75	22.6	4.3	13.4	7,606	3E+04	2E+04	4E+04
15L089	34,260	128,383	5,336	4,589	3,004	761	275.1	23.2	74.8	50,001	2E+05	8E+04	3E+05
15L088	9,730	53,058	1,540	287	414	251	38.9	13.1	50.8	24,515	1E+05	6E+04	6E+04
16L097	777	2,427	100	572	40	43	5.3	1.5	6.8	944	5E+03	8E+03	1E+04
16LSDO122	17,688	73,333	2,762	2,389	1,322	477	122.9	14.7	53.4	30,093	1E+05	7E+04	2E+05
17M033	8,980	38,845	1,300	1,722	478	382	48.2	12.9	56.1	16,366	9E+04	7E+04	1E+05
18GSDO233	6,309	26,088	847	438	273	325	25.5	5.8	27.6	11,038	7E+04	8E+04	9E+04
19GDO043	7,981	43,615	1,294	327	406	184	37.4	11.1	36.8	19,496	8E+04	5E+04	5E+04
19GDO194	1,106	4,675	173	147	85	24	7.9	1.1	3.8	1,923	8E+03	5E+03	1E+04
19G199	65	191	2	2	2	2	0.1	0.2	0.8	83	1E+02	7E+02	8E+02
20G163	366	1,476	11	22	9	18	1.2	2.1	9.6	561	1E+03	5E+03	5E+03
20L083	271	1,124	32	8	6	10	0.9	0.1	2.4	595	6E+02	9E+02	1E+03
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	52	191	8	4	5	1	0.5	0.0	0.1	69	3E+02	1E+02	5E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	180	3E+02	4E+02	3E+02
21KSDO069	16,079	75,031	2,463	913	1,016	443	93.0	18.3	69.8	31,813	1E+05	8E+04	1E+05
21M005	165	469	13	34	4	3	0.4	0.1	1.0	250	2E+02	3E+02	3E+02
21M010	1,015	3,410	90	55	23	25	2.7	0.4	7.4	1,804	2E+03	2E+03	3E+03
21M050	522	1,515	41	19	17	9	1.6	0.2	3.1	766	1E+03	9E+02	3E+03
22CDO384	2,762	10,465	404	1,745	150	56	17.9	2.9	8.6	4,664	2E+04	1E+04	2E+04
22LSDO580	2,493	8,716	325	47	166	64	15.6	1.0	14.1	3,882	9E+03	4E+03	2E+04
23GDO132	5,872	13,838	476	2,125	279	95	29.1	4.3	18.1	5,763	1E+04	1E+04	2E+04
23HSDO042	31,526	120,593	4,717	4,732	2,325	860	220.1	31.1	118.6	50,780	2E+05	1E+05	2E+05
23HDO040	4,745	23,509	732	299	269	122	24.8	5.6	20.4	10,185	5E+04	3E+04	4E+04
23L196	199	456	15	33	10	2	0.9	0.1	0.7	198	4E+02	9E+01	8E+02
23L075	908	2,347	80	184	41	12	4.0	0.3	4.0	1,119	3E+03	9E+02	5E+03
23L074	195	463	15	19	10	2	0.8	0.1	0.5	209	3E+02	9E+01	6E+02
23L195	163	310	9	67	4	1	0.5	0.1	0.8	166	2E+02	6E+01	3E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	229	395	12	108	6	1	0.7	0.1	0.6	199	5E+01	9E+01	9E+01
23L164	1,304	3,465	132	89	64	56	5.6	0.4	5.5	1,417	1E+04	1E+04	2E+04
24CSDO031	392	2,271	65	50	12	8	1.2	0.6	2.1	1,093	4E+03	2E+03	2E+03

Table A2. Listing of Pollutant Loads per Storm Drain Outfall under Existing Conditions

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	2,762	13,066	452	988	141	77	15.4	3.4	11.5	5,930	3E+04	2E+04	2E+04
24DSDO150	37	88	3	20	1	0	0.1	0.0	0.1	48	8E+01	6E+02	6E+02
24DSDO032	40,536	186,805	6,971	6,969	2,758	991	264.9	47.3	151.9	88,699	3E+05	2E+05	3E+05
24GSDO035	32,820	175,341	4,917	4,017	1,171	835	117.1	46.8	170.3	81,351	3E+05	2E+05	2E+05
24GSDO034	2,166	8,010	202	793	61	33	7.2	3.1	14.1	3,838	1E+04	3E+04	3E+04
24L233	1,144	3,494	142	85	105	27	9.4	1.3	5.8	1,168	5E+03	1E+03	1E+04
25DDO040	766	3,497	111	191	32	24	3.4	1.1	4.8	1,597	7E+03	5E+03	6E+03
25EDO037	22,289	106,924	3,140	2,836	929	595	91.3	28.9	117.4	48,715	2E+05	1E+05	2E+05
25GDO041	304	978	45	31	33	8	3.0	0.3	1.2	306	2E+03	3E+02	3E+03
25GDO-06	469	1,407	29	181	19	15	2.3	1.7	7.5	556	9E+02	1E+03	2E+03
26J049	17,615	52,000	2,335	631	1,681	372	146.2	8.6	39.0	17,659	9E+04	2E+04	2E+05
25L144	1,102	5,560	178	13	76	26	6.8	1.2	3.8	2,316	1E+04	5E+03	9E+03
25L058	6,935	32,731	997	468	332	221	30.8	7.8	32.0	14,352	7E+04	5E+04	6E+04
26FDO038	392	1,174	59	115	40	10	3.8	0.3	1.0	379	2E+03	5E+02	4E+03
26GSDO01	9,546	36,009	1,326	1,664	712	230	67.2	11.5	43.6	14,330	6E+04	3E+04	7E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	748	2,258	115	81	84	16	7.5	0.2	0.6	702	4E+03	5E+02	7E+03
26J101	1,539	4,472	235	498	161	34	15.3	0.7	1.9	1,444	7E+03	2E+03	1E+04
26KSDO254	371	1,264	48	108	7	35	1.1	0.3	2.7	547	5E+03	8E+03	9E+03
26K035	285	649	20	20	12	2	1.0	0.1	1.3	312	8E+02	1E+02	1E+03
26K099	16,505	96,048	2,537	748	542	451	52.5	26.0	94.8	44,151	2E+05	1E+05	1E+05
26L055	438	1,864	70	13	37	10	3.3	0.3	1.0	733	3E+03	1E+03	4E+03
26LSDO084	357	1,103	55	15	41	8	3.6	0.1	0.3	344	2E+03	7E+02	4E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	454	912	31	333	14	7	2.0	0.5	2.4	426	5E+02	7E+02	8E+02
27JSDO096	2,435	5,233	142	297	90	22	7.4	0.7	5.2	2,424	4E+03	4E+03	8E+03
27JSDO001	10,479	54,660	1,517	1,418	371	336	38.4	15.3	62.7	24,736	1E+05	8E+04	8E+04
27L022	3,400	17,652	497	275	162	91	15.5	5.9	21.9	7,775	3E+04	2E+04	2E+04
27L020	3,262	16,733	474	273	159	87	15.2	5.5	20.6	7,331	3E+04	2E+04	2E+04
28K061	6,033	34,488	974	348	231	172	22.1	8.6	30.0	15,741	7E+04	5E+04	5E+04
28K010	5,155	31,930	859	239	168	132	16.4	8.3	27.6	14,852	6E+04	4E+04	3E+04
28K386	770	1,925	66	351	23	23	3.0	0.6	4.1	914	2E+03	3E+03	4E+03
28L073	220	677	32	70	21	4	2.0	0.1	0.2	242	1E+03	2E+03	4E+03
28L074/5/6	2,469	7,452	279	649	177	48	17.1	2.7	11.0	2,857	1E+04	8E+03	2E+04
28N156	445	2,293	71	100	17	15	1.8	0.6	2.1	1,060	5E+03	4E+03	4E+03
28N207	5,196	26,705	818	410	269	141	25.3	6.9	24.1	11,817	5E+04	3E+04	4E+04
28O025	106	397	18	18	7	3	0.7	0.1	0.3	178	1E+03	6E+02	1E+03
28P001	432	2,545	71	21	16	9	1.5	0.6	2.0	1,190	5E+03	3E+03	2E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	994	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	23,861	136,466	3,726	970	881	679	85.0	35.8	135.0	62,354	3E+05	2E+05	2E+05
29M049	2,524	11,229	392	169	174	75	15.8	2.5	8.8	4,623	2E+04	1E+04	2E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	495	2,624	73	140	14	11	1.7	0.7	2.9	1,264	4E+03	3E+03	2E+03
29O001	18,328	95,166	2,970	2,119	955	448	91.5	23.2	78.2	42,637	2E+05	1E+05	1E+05
29P015	125	695	21	13	6	3	0.6	0.2	0.5	316	1E+03	7E+02	8E+02
29P044	869	5,051	146	75	36	20	3.5	1.3	4.0	2,338	1E+04	5E+03	5E+03
30J006	356	1,056	43	166	22	8	2.4	0.2	1.1	459	1E+03	3E+03	5E+03

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Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr											10^9 CFU/yr	
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	795	1,734	45	137	23	7	2.1	0.2	2.8	875	7E+02	6E+02	1E+03
30P107	490	2,328	91	93	21	13	2.2	0.5	1.7	1,112	5E+03	3E+03	3E+03
30P062	443	2,507	74	45	19	10	1.9	0.6	2.0	1,166	5E+03	3E+03	3E+03
31O004	1,395	7,356	279	139	58	41	5.8	1.6	5.2	3,477	2E+04	1E+04	1E+04
31P084	433	2,369	68	68	16	9	1.6	0.6	2.0	1,108	4E+03	3E+03	3E+03
3FDO159	621	2,427	106	481	45	14	5.3	0.7	1.9	1,032	4E+03	3E+03	5E+03
11G318/319	535	1,551	95	674	22	51	4.1	0.5	3.1	598	6E+03	1E+04	1E+04
6FSDO233	28	81	8	83	3	1	0.5	0.0	0.1	28	1E+02	4E+01	2E+02
17FDO012	2,803	6,166	138	82	56	56	3.6	0.9	6.1	2,865	3E+04	6E+04	6E+04
21H047	805	2,865	77	73	47	22	4.4	1.8	7.3	1,107	4E+03	2E+03	5E+03
21H039	2,237	6,922	132	250	98	65	9.6	6.6	29.0	2,652	6E+03	5E+03	1E+04
20G161	4,096	14,955	561	216	251	146	23.2	6.0	25.1	6,480	3E+04	2E+04	3E+04
StonyMWRA	260,513	1,021,476	41,976	60,679	21,186	6,520	2056.9	245.3	797.3	423,582	2E+06	8E+05	2E+06
Fens	73,634	230,751	11,751	17,350	4,622	2,273	535.1	98.2	298.4	117,653	3E+05	2E+05	2E+05
20D055	9,796	51,434	1,635	452	558	222	51.1	12.4	40.0	22,928	9E+04	5E+04	7E+04
21D319	12,214	66,543	2,056	808	639	278	59.7	16.3	52.3	30,042	1E+05	7E+04	8E+04

Appendix B
Cost Estimate

B.1 Background

Planning level unit construction costs have become more readily available as more green infrastructure (GI) programs are implemented in the United States. Two valuable reference sources documenting the economic benefits of GI programs and their associated construction costs are the U.S. Environmental Protection Agency (USEPA) reports titled *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs* that was published in August 2013 and *The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA* that was published in February 2014. These case studies are discussed in greater detail in Sections 4.2.2 and 4.2.3. The unit construction cost estimates developed for use in the Commission's best management practice (BMP) analysis referenced these and other resources discussed below (e.g. the Commission's 2013 stormwater BMP guidance document by Geosyntec and Washington State Department of Ecology's 2012 BMP cost database by Herrera). In addition, BMP cost estimating tools developed for other GI programs and based on actual constructed GI project costs were updated and adapted for this effort. Section B.5 describes the specific construction, design, contingencies, and locational/temporal adjustments that were used to develop the unit construction costs, and unit life-cycle costs for evaluating the implementation scenario costs, which are discussed further in Section 4.3.2.

B.2 Economic Benefits of GI/LID Programs

Based on the potential for GI programs to provide a more cost-effective approach to managing municipal stormwater, USEPA selected 13 public entities that are in the process of implementing GI/low impact development (LID) programs based in part on the conclusions drawn from the economic analysis comparing GI/LID programs with traditional gray infrastructure. The USEPA report titled *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs* was published in August 2013. The issues facing the Commission are similar to those of several municipalities included in the USEPA case study including Milwaukee, Philadelphia, and Kirkland, Washington. Key details of these three communities GI/LID programs and the role economic analysis played is provided in Table B-1.

TABLE B-1
Summary of GI/LID Programs, Economic Analysis, and Key Findings

Public Entity	Milwaukee Metropolitan Sewerage District, WI	Philadelphia Water Department, PA	Kirkland Public Works Department, WA
GI/LID Program Objective	Integration of distributed GI/LID strategies into overall planning efforts including facilities plans, CSO control plans, and projects on both public and private lands.	Green City Clean Waters Program focused on reducing CSOs and improving water quality.	Integration of GI/LID into conceptual design phase of all capital improvement projects within public rights-of-way.
Results	Results will be used to help select which projects to implement and show where GI is a valid and effective approach. Regional Green Implementation Plan was issued in June 2013.	GI/LID-based approach integrated with targeted gray infrastructure selected as preferred approach to optimize net benefits. Program is active.	Nearly all CIP projects (transportation and other) contain GI/LID elements. Opportunities for GI/LID are investigated as early in the planning process as possible. Program is active.

Notes: Table adapted from USEPA's *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs, August 2013*.
CSO = combined sewer overflow
CIP = Capital Improvement Plan

B.3 Lancaster, Pennsylvania Case Study

Similar to the Milwaukee, Philadelphia, and Kirkland GI programs, the GI program being implemented by the City of Lancaster, Pennsylvania, also provides a prime example for implementing an approach that integrates

GI with other Capital Improvement Plan (CIP) projects to provide cost-effective solutions to stormwater management problems while also providing added environmental and social benefits.

USEPA recently evaluated the City of Lancaster, Pennsylvania's GI Plan in a more detailed case study analysis that was published in February 2014. The City of Lancaster released its GI Plan in 2011 with the goal of implementing GI to meet water quality goals and provide the community with various environmental, social, and economic benefits. Lancaster's GI Plan evaluated the cost effectiveness of reducing stormwater runoff using its "GI benefit calculator" (Lancaster, 2011). A BMP costing tool was developed as part of the GI Plan in order to evaluate the cost-benefits associated with variable levels of GI implementation. A key element of Lancaster's cost-estimate approach was determining the marginal (i.e. additional) costs associated with incorporating the GI elements. Lancaster's conclusion was that integration of GI as an element within other capital projects (for example, stormwater infiltration trenches in a streetscape project) provided a more cost-effective management strategy than implementing standalone GI projects (Lancaster, 2011).

As shown on Figure B-1, Table 5-11 from Lancaster's cost-benefit analysis for the 5-year and long-term (25-year) implementation plans estimated that the long-term program would reduce the average annual stormwater runoff by over 1 billion gallons per year at a total capital cost of $141 million, which resulted in a $0.10 marginal cost per gallon of combined sewer overflow (CSO) reduction, which is less than half the unit cost, $0.23 per gallon, for CSO reduction using gray infrastructure (Lancaster, 2011).

FIGURE B-1
Summary of Lancaster, PA Green Infrastructure Program Cost Estimates

Parameter	5-year Implementation	Long-Term Implementation
Impervious Area Managed by Green Infrastructure (ac)	221	1,265
Average Annual Runoff Reduction (MG/yr)	182	1,053
Average Annual Total Suspended Solids (TSS) Reduction (lb/yr)	252,000	1,457,000
Average Annual Total Phosphorus (TP) Reduction (lb/yr)	4,800	27,800
Average Annual Total Nitrogen (TN) Reduction (lb/yr)	10,700	61,600
Total Marginal Cost	$7,800,000	$77,000,000
Total Capital/Implementation Cost	$14,000,000	$141,000,000
Marginal Cost Per Gallon CSO Reduction ($/gal)	$0.06	$0.10
Total Cost Per Gallon CSO Reduction ($/gal)	$0.10	$0.18

Source: City of Lancaster, PA Green Infrastructure Plan, 2011.

The Lancaster case study as well as those presented in USEPA's August 2013 case study report demonstrate that implementing GI programs in conjunction with other ongoing capital improvement projects is being done in a cost-effective manner by a variety of public entities around the United States. The integrated GI management strategy has the potential to provide the Commission with a solution that takes into account financial, environmental, and social considerations.

BMP cost estimating tools developed for other GI programs and based on actual constructed GI project costs were updated and adapted for potential GI implementation in Boston. The resultant BMP costing tool served as the basis for developing unit construction and life-cycle cost estimates for the bioretention,

infiltration trench, and porous paving BMPs recommended for the Commission's program. The construction, design, contingency, locational/temporal adjustments, and operation and maintenance elements that are incorporated into the BMP costing tool are discussed further in Section B.5.

B.4 Cost Estimate Classification

Developing a unit cost estimate includes two key components: identifying unit construction cost of BMPs and establishing life cycle costs. The construction cost and life cycle cost estimates are used to provide the Commission with order-of-magnitude program costs to allow for evaluation of the implementation scenarios described in Section 4.

The estimate was prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International. According to the definitions of AACE International, the Class 5 Estimate is defined as the following:

> ***Class 5 Estimate.*** *This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known. Strategic planning purposes include but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class estimate are -20 to -50 percent on the low side and +30 to +100 percent on the high side.*

B.5 Unit Construction Costs of BMPs

The basis for the unit costs for BMPs was established using information provided in the Commission's 2013 stormwater BMP guidance document (Geosyntec, 2013) as well as other national GI studies (see Sections B.2 and B.3). In order to develop accurate unit construction costs for the bioretention, infiltration trench, porous paving, and constructed wetland BMPs incorporated into the BMP implementation simulations, a variety of sources were considered, including the following: recent City of Boston BMP construction bid prices; built GI retrofit projects in heavily urban environments such as Lancaster, Philadelphia, Syracuse, etc; the local and national GI references cited throughout this section; and professional experience/judgment of GI implementation costs. The resultant unit construction costs were then adjusted to account for inherent locational and temporal differences. A summary of the unit construction costs is presented in Table B-2.

TABLE B-2
Summary of BMP Unit Construction Costs per GI Footprint Area

BMPs	Unit	Unit Construction Cost[1]	Stormwater BMPs: Guidance Document[2]		
			Mean	Min	Max
Bioretention	ft^2	$44	$18	$5	$30
Infiltration Trench	ft^2	$34	$33	$25	$40
Pervious Pavement	ft^2	$23	$12	$8	$15
Dry Well	Each	$6,000	$750	$500	$1,000
Constructed Wetland	Acre	$98,000[3]	$50,000-$250,000 (project cost; criteria not specified)		

[1]Unit costs are based on unit construction costs of actual built GI projects in other communities, as well as those reported in the cited references. Unit costs include escalations for design, construction, permitting and locational/temporal differences. The planning level unit cost for the constructed wetland was developed from actual BWSC bid prices for construction materials (e.g. gravel, stone, sand-based structural soil, etc.) as well as costs from constructed wetland design guidance.

[2]Based on BWSC & Geosyntec, 2013, Stormwater Best Management Practices: Guidance Document.

[3]Cost estimate per acre of imperious area designed to treat 1" of rainfall.

For comparative purposes, the BMP unit costs per GI footprint area developed for the Commission's stormwater BMP program are compared to the values presented in the Commission's 2013 BMP guidance document. This is summarized in Table B-2. The unit construction costs developed for this analysis generally fall above the range of values presented in the Commission's 2013 stormwater BMP guidance document (Geosyntec, 2013). These costs are considered to be more conservative as they were developed from actual project construction/bid costs from as recently as 2014 and also include escalations because of design and other contingencies.

Construction costs per GI footprint area in the table above are directly related to the construction cost per area managed in Table B-3. The GI footprint area is the result of the construction cost per area managed multiplied by a standard design loading ratio. Additional information on sizing criteria is provided in this appendix.

The unit costs for GI are based on the costs of actual GI projects constructed in the City of Lancaster and cross-checked against known GI costs from other communities (Onondaga County, Philadelphia, etc), with appropriate adjustments applied. Costs from 27 projects, either recently constructed or in the final stages of design, were used to estimate construction costs per area managed ($/ft^2) for the three primary types of GI used in the City: bioretention, infiltration trenches, and porous pavements (Table B-3). The unit BMP construction costs were developed assuming that each BMP unit was sized to treat runoff from 1 acre of impervious area.

TABLE B-3
Green Infrastructure Project Estimates

GI Technology	Construction Cost per Impervious Area Managed ($/ft^2)	# of Projects used for Cost Development from Bid or Design Estimated Construction Costs
Bioretention	4.21	7
Infiltration Trench	3.30	12
Porous Pavement	4.56	8

These construction costs for bioretention, infiltration trenches, and porous pavements are based on projects completed as recent as 2014, and include all the necessary labor, equipment, and materials for installation per unit (ft^2) of BMP installed. Construction costs for drywell and wetlands were developed differently than the BMPs above. The unit construction cost developed for a dry well was based on a review of Massachusetts Department of Transportation (MassDOT) bid prices for leaching basins, which yielded a median cost of $5,100 and a mean of $6,234in District 6 based off 378 leaching basins from five different projects (April 2014 to April 2015). This is supportive of the $6,000 unit cost per drywell in this report. The development of wetland construction costs are explained below.

B.5.1 Cost Estimate Adjustments

The GI costs for bioretention, infiltration trench, and porous pavement were adjusted to reflect locational variances in construction costs between Lancaster and Boston. A locational adjustment of 9.6 percent was included as a capital cost multiplier. The 9.6 percent locational adjustment was developed based upon a comparison of the 2013 RS Means site infrastructure and demolition construction cost index for Lancaster (96.5) and Boston (105.6). The BMP tool also includes the ability to incorporate additional capital cost multipliers for the following elements:

- Administration Costs-Design, Legal Fees, & Construction (4%)
- Project Contingencies (10%)
- Interest (for 1 year of construction only assumed) (1%)

- Miscellaneous - PTI, test bore, ECI Inspector, R/W (4%)
- Field Engineering & Inspection (5%)
- Design & Eng. Services (10%)
- Program Management (1%)
- Planning & Preliminary Design (2%)
- Location Change (9.6%)

Based upon the capital cost multipliers above, the total escalation rate for bioretention, infiltration trenches, and porous pavement is 47 percent. These escalated capital construction costs were then used to calculate the net present values (NPVs) for BMP construction unit costs and BMP life cycle unit costs. The NPV construction and life cycle unit costs are then used to develop implementation scenario cost estimates.

B.5.2 Constructed Wetlands

Construction cost estimates of constructed wetlands incorporated information from local BMP construction bids as well as cost data reported in several BMP guidance documents (refer to reference list provided in this appendix). The constructed wetland unit cost takes into account excavation and grading, backfill, plantings, and spillway and drawdown structure. A combination of local construction bid prices and cost data from the BMP guidance reports produced the most conservative cost; therefore, this was used as a base for the construction cost estimate for constructed wetlands. The costs from local construction bid prices as well as those reported in two BMP guidance reports are presented in Table B-4.

TABLE B-4
Wetland Construction Cost Estimates

Reference	Excavation, Grading $/yd3	Backfill $/yd^3	Plantings $/ft^2	Spillway and Drawdown Structure $/ft^2 or EA
Boston Central Square[1]	41.25	37.92		
NCSU, 2000	8.00		$0.30	$0.25
Puget Sound[2] low	-	-	$1.52	$7,842.00
Puget Sound[2] avg	20.79	15.39	$1.68	$8,683.00
Puget Sound[2] high	-	-	$1.83	$9,525.00
Selected Values	**$41.25**	**$37.92**	**$1.83**	**$9,525.00**

[1]City of Boston CIP #13-24 East Boston Central Square Complete Streets and Park Improvements, February 26, 2015 bid results.

[2]Washington State Department of Ecology, *Puget Sound Stormwater BMP Cost Database*, Herrera Environmental Consultants, January 4, 2012.

Excavation, grading, and backfill cost estimates were adapted from weighted average bid prices for unclassified excavation and stormwater BMP backfill materials from the City of Boston's East Boston Central Square Complete Streets and Park Improvements Project (CIP #13-24). Cost estimates for the plantings, and spillway/drawdown structure were adapted from Puget Sound Stormwater BMP Cost Database (Herrera, 2012). The constructed wetland unit cost is based on a constructed wetland designed to treat 1 inch of rainfall from 1 acre of impervious area.

The high degree of variability in wetland construction costs speaks to the site-specific design requirements (such as land use, wetland footprint, soil quality, depth to groundwater, storm drain system connection, public access/visibility, etc.) for each wetland that make standardized design challenging. In light of these site-specific requirements, provisions were made to account for project appurtenances and project contingencies. Project appurtenances were estimated to be 20 percent of the construction subtotal and

could account for items such as a clay liner if required because of subsurface conditions. A 150 percent contingency was added to the base construction cost and consisted of 50 percent for general design/construction, 50 percent for storm drain system interconnection/pretreatment, and 50 percent for public outreach/landscape design.

The same cost multipliers used for the other BMPs (total of 47 percent for the various design, construction, and permitting factors) were added onto the unit wetland cost, resulting in a total projected construction unit cost estimate of $97,687.52 for a constructed wetland sized to treat 1 inch of runoff from 1 acre of impervious area. Table B-5 provides a summary of the BMP unit and construction costs developed for evaluating the cost of the implementation scenarios discussed in Section 4.

TABLE B-5
Cost Estimates for BMP Construction

Associated Costs and Cost Parameters for GI Technology					
BMP	**BIO**	**IT**	**PP**	**Wetland**	**Drywell**
Construction Cost per Area Managed ($/ft^2):	$4.21	$3.30	$4.56	$0.90	$1.16
Construction Cost per GI Footprint Area ($/ft^2):	$39.46	$30.94	$21.00	$23.91	
Construction Cost Estimate	$183,583.85	$143,927.55	$198,737.49	$39,075.01	$6,000.00[1]
Total Project Capital Cost Estimate	$269,133.92	$210,997.78	$291,349.16	$97,687.52	$51,000.00

[1]$6,000.00 is unit cost for a single dry well with a tributary area of 5,166 square feet.

B.5.3 BMP Life Cycle Costs

Life cycle unit cost estimates were developed for bioretention, infiltration trench, porous pavement, and constructed wetlands applying methodologies utilized for GI projects in other communities. Life-cycle costs for dry wells were not estimated. The BMP life cycle costs were estimated for a 30-year period of use. The life cycle cost takes into account the unit construction costs, routine and non-routine maintenance costs, and a replacement cost.

The annual unit construction cost is equivalent to the annual share of the original construction cost as evenly distributed over the 30-year period. This assumes that BMPs are installed at the same annual rate over the 30-year period.

The life cycle cost for all BMPs except for drywells is based on a service life of 25 years within the 30-year design plan with a defined schedule for annual routine and periodic non-routine maintenance. Routine maintenance is done once every year and is based on a maintenance cost per GI footprint area. Annual cost escalation was accounted for in the operation and maintenance estimates through applying an escalation rate of 3 percent per year to the annual maintenance costs. Non-routine maintenance is done every 3 years for bioretention, wetlands, and porous pavement and every 2 years for infiltration trench. Examples of the annual and non-routine maintenance activities with their respective cost for each BMP category are presented in Table B-6. These activities and cost estimates are based upon CH2M's experience in other communities and our familiarity with common BMP O&M activities.

TABLE B-6
Routine and Non-Routine Maintenance Activities

BMP	Cost (per ft² of BMP)	Activity	Frequency
Bioretention	$1.23	Cleaning and pipe jetting Weeding and mulching Pruning	Annual
	$0.58	Plant replacement	Every 3 years
Infiltration Trench	$0.35	Water quality inlet cleaning	Annual
	$0.37	Water quality inlet replacement	Every 2 years
Porous Pavement	$0.40	Vacuuming Stone Gutter cleaning	Annual
	$0.19	Power washing Stone gutter replacement	Every 3 years

The routine and non-routine maintenance costs for constructed wetlands were developed differently than the BMPs above. Sources for constructed wetlands provided a range of 4 to 14 percent construction costs of annual routine maintenance (Weiss, 2005). An average of 9 percent of the construction cost was used resulting in an annual maintenance cost of $2.15 per square foot. Non-routine maintenance costs for constructed wetlands were dealt with using bioretention values since the BMPs are similar in their soil media and plantings. Similar to the other BMPs an escalation rate of 3 percent was also factored into non-routine maintenance costs.

A replacement cost was developed assuming that 75 percent of each BMP type would need to be replaced at the end of its 25-year service life. The replacement cost for each BMP includes a 3 percent annual escalation rate.

The NPV over the 30-year period was then estimated for each BMP based on the total construction cost, annual construction cost, anticipated maintenance and replacement costs, and the expected service life. An annual escalation rate of 2.5 percent was used when calculating net present value for each BMP. This number was developed by taking a discount rate of 5.5 percent minus the 3.0 percent escalation rate used in the whole life cost assumptions for each BMP. Estimated costs for these all types of BMP used in this project are included in Table B-7. The detailed breakdown of life-cycle cost calculation sheets are included in Exhibit A.

TABLE B-7
Summary of BMP Construction and Life-Cycle Cost Estimates

BMP Construction and Life-Cycle Cost Summary Table					
	BIO	**IT**	**PP**	**Wetland**	**Drywell**
Construction Cost Year 2015 per Acre Managed*	$269,134	$210,998	$291,349	$97,688	$51,000
30 Year Construction Cost NPV per Acre Managed**	$388,157	$304,311	$420,197	$140,889	
Annual Construction Cost per Acre Managed, 30 Year Program	$26,707	$20,938	$28,912	$9,694	

TABLE B-7
Summary of BMP Construction and Life-Cycle Cost Estimates

BMP Construction and Life-Cycle Cost Summary Table				
Avg Annual Maintenance Cost per Acre Managed (30 Years of Routine/Non-Routine)	$10,859	$3,970	$7,139	$5,903
Escalated Replacement Cost per Acre Managed (25 years)***	$296,936	$232,795	$321,447	$63,202
Life Cycle Cost with Replacement per Acre Managed	$891,837	$562,902	$826,962	$337,987
Life Cycle Cost without Replacement per Acre Managed	$594,900	$330,108	$505,515	$274,786
30 Year Life Cycle NPV per Acre Managed****	$595,385	$410,006	$586,944	$230,255

*Area managed by BMP multiplied by the BMP cost per unit area inclusive of the capital cost multipliers

**NPV of Construction Costs only

***Based on 75% of the system needing replacement at the end of 25 years. This includes an annual 3% escalation rate.

****Life Cycle Costs = Present Value Cost of (Construction Costs + O&M Costs + Replacement Costs)

The BMP Unit Costs and Life Cycle Unit Costs with Replacement are applied to each BMP implementation scenario resulting in two sets of cost projections. These cost estimates could then be evaluated for each implementation scenario based on reporting area, sub-catchment, storm drain outfall, or receiving water. The construction costs provide the 2015 fixed, one-time expense of constructing the BMPs; while the life cycles costs take into account the cost of constructing and maintaining the system over the 30-year duration of the program. Both sets of costs were used in conjunction with BMP performance (that is, total phosphorous waste load) to determine the optimal BMP implementation scenario as discussed in Section 4.

Exhibit A
Life-Cycle Cost Estimate Tables

Whole Life Cost Parameters and Assumptions				
GI Technology:	**Bioretention**	**Infiltration Trench**	**Porous Pavement**	**Wetland**
Loading Ratio:	**9**	**9**	**5**	
Area Managed by GI (ft^2):	**43,560**	**43,560**	**43,560**	**43,560**
GI Footprint Area (ft^2):	**4,652**	**4,652**	**9,464**	**1,634**
Anticipated Level of Maintenance Category (H, M, L):	**M**	**M**	**M**	
Starting Year:	**2014**	**2014**	**2014**	**2014**
Include Salvage Value in Whole Life Costs?	**No**	**No**	**No**	**No**
Discount Rate:	5.5%	5.5%	5.5%	5.5%
Escalation Rate:	3.0%	3.0%	3.0%	3.0%
Service Life of System (years):	25	25	20	25
Planning Duration (years):	30	30	30	30
# of System Replacements in Planning Duration:	1	1	1	1
% of System Replaced at End of Service Life:	75%	75%	75%	75%
Replacement Cost at End of Service Life (w/o escalation):	$137,687.89	$107,945.66	$149,053.12	$29,306.26
[1]Residual Value at End of Planning Duration:	$18,448.00	$14,463.01	$19,970.76	$6,696.07
Annual Routine Maintenance Costs per GI Footprint Area ($/$ft^2$):	$1.23	$0.35	$0.40	$2.15
Adjusted Annual Routine Maintenance Costs per GI Footprint Area ($/$ft^2$):	$1.23	$0.35	$0.40	$2.15
% of Construction Cost of Adjusted Annual Routine Maintenance Costs (%)	3.1%	1.1%	1.9%	9.0%
Non-Routine Maintenance Event Costs per GI Footprint Area ($/$ft^2$):	$0.58	$0.37	$0.19	$0.58
Adjusted Non-Routine Maintenance Event Costs per GI Footprint Area ($/$ft^2$):	$0.58	$0.34	$0.18	$0.58
Frequency of Non-Routine Maintenance Events (years)	3	2	3	3

1: Residual Value = Value of Capital Cost remaining in asset at end of planning period.

Associated Costs and Cost Parameters for GI Technology

	BIO	IT	PP	Wetland
Construction Cost per Area Managed ($/ft^2):	$ 4.21	$ 3.30	$ 4.56	$0.90
Construction Cost per GI Footprint Area ($/ft^2):	$ 39.46	$ 30.94	$ 21.00	$ 23.91
Construction Cost Estimate	$ 183,583.85	$ 143,927.55	$ 198,737.49	$39,075.01
Total Project Capital Cost Estimate	$ 269,133.92	$ 210,997.78	$ 291,349.16	$97,687.52

Capital Cost Multipliers (BIO/IT/PP)	
Administration Costs-Design, Legal Fees, & Construction	4%
Project Contingencies	10%
Interest (for 1 year of construction only assumed)	1%
Miscellaneous - PTI, test bore, ECI Inspector, R/W	4%
Field Engineering & Inspection	5%
Design & Eng. Services	10%
Program Management	1%
Planning & Preliminary Design	2%
Location Change	9.6%
Total Capital cost Multiplier	47%

Whole Life Costs ($) - Infiltration Trench

Year	Calendar Year	Capital Costs ($)	Annual Unit Costs ($)	Routine Maintenance Costs ($)	Non-Routine Maintenance Costs ($)	Replacement Cost ($)	Salvage Value ($)	Total Construction Costs	Total Costs
Cash Sum ($)								**$ 421,996**	**$ 773,900**
0	2014	$ 210,997.78			$ -	$ -	$ -	$ 210,997.78	$ 210,997.78
1	2015	$ -	$ 7,033.26	$ 1,677.01	$ -	$ -	$ -	$ 7,033.26	$ 8,710.27
2	2016	$ -	$ 7,033.26	$ 1,727.32	$ 1,677.97	$ -	$ -	$ 7,033.26	$ 10,438.55
3	2017	$ -	$ 7,033.26	$ 1,779.14	$ -	$ -	$ -	$ 7,033.26	$ 8,812.40
4	2018	$ -	$ 7,033.26	$ 1,832.52	$ 1,780.16	$ -	$ -	$ 7,033.26	$ 10,645.94
5	2019	$ -	$ 7,033.26	$ 1,887.49	$ -	$ -	$ -	$ 7,033.26	$ 8,920.75
6	2020	$ -	$ 7,033.26	$ 1,944.12	$ 1,888.57	$ -	$ -	$ 7,033.26	$ 10,865.95
7	2021	$ -	$ 7,033.26	$ 2,002.44	$ -	$ -	$ -	$ 7,033.26	$ 9,035.70
8	2022	$ -	$ 7,033.26	$ 2,062.51	$ 2,003.59	$ -	$ -	$ 7,033.26	$ 11,099.36
9	2023	$ -	$ 7,033.26	$ 2,124.39	$ -	$ -	$ -	$ 7,033.26	$ 9,157.65
10	2024	$ -	$ 7,033.26	$ 2,188.12	$ 2,125.60	$ -	$ -	$ 7,033.26	$ 11,346.98
11	2025	$ -	$ 7,033.26	$ 2,253.77	$ -	$ -	$ -	$ 7,033.26	$ 9,287.02
12	2026	$ -	$ 7,033.26	$ 2,321.38	$ 2,255.05	$ -	$ -	$ 7,033.26	$ 11,609.69
13	2027	$ -	$ 7,033.26	$ 2,391.02	$ -	$ -	$ -	$ 7,033.26	$ 9,424.28
14	2028	$ -	$ 7,033.26	$ 2,462.75	$ 2,392.39	$ -	$ -	$ 7,033.26	$ 11,888.40
15	2029	$ -	$ 7,033.26	$ 2,536.63	$ -	$ -	$ -	$ 7,033.26	$ 9,569.89
16	2030	$ -	$ 7,033.26	$ 2,612.73	$ 2,538.08	$ -	$ -	$ 7,033.26	$ 12,184.07
17	2031	$ -	$ 7,033.26	$ 2,691.11	$ -	$ -	$ -	$ 7,033.26	$ 9,724.37
18	2032	$ -	$ 7,033.26	$ 2,771.85	$ 2,692.65	$ -	$ -	$ 7,033.26	$ 12,497.76
19	2033	$ -	$ 7,033.26	$ 2,855.00	$ -	$ -	$ -	$ 7,033.26	$ 9,888.26
20	2034	$ -	$ 7,033.26	$ 2,940.65	$ 2,856.63	$ -	$ -	$ 7,033.26	$ 12,830.55
21	2035	$ -	$ 7,033.26	$ 3,028.87	$ -	$ -	$ -	$ 7,033.26	$ 10,062.13
22	2036	$ -	$ 7,033.26	$ 3,119.74	$ 3,030.60	$ -	$ -	$ 7,033.26	$ 13,183.60
23	2037	$ -	$ 7,033.26	$ 3,213.33	$ -	$ -	$ -	$ 7,033.26	$ 10,246.59
24	2038	$ -	$ 7,033.26	$ 3,309.73	$ 3,215.17	$ -	$ -	$ 7,033.26	$ 13,558.16
25	2039	$ -	$ 7,033.26	$ 3,409.02	$ -	$ -	$ -	$ 7,033.26	$ 10,442.28
26	2040	$ -	$ 7,033.26	$ 3,511.29	$ 3,410.97	$ 232,794.67	$ -	$ 7,033.26	$ 246,750.19
27	2041	$ -	$ 7,033.26	$ 3,616.63	$ -	$ -	$ -	$ 7,033.26	$ 10,649.89
28	2042	$ -	$ 7,033.26	$ 3,725.13	$ 3,618.70	$ -	$ -	$ 7,033.26	$ 14,377.09
29	2043	$ -	$ 7,033.26	$ 3,836.88	$ -	$ -	$ -	$ 7,033.26	$ 10,870.14
30	2044	$ -	$ 7,033.26	$ 3,951.99	$ 3,839.08	$ -	$ -	$ 7,033.26	$ 14,824.33

Whole Life Costs ($) - Porous Pavement

Year	Calendar Year	Capital Costs ($)	Annual Unit Costs ($)	Routine Maintenance Costs ($)	Non-Routine Maintenance Costs ($)	Replacement Cost ($)	Salvage Value ($)		Total Costs
Cash Sum ($)								**$ 582,698**	**$ 1,118,311**
0	2014	$ 291,349.16			$ -	$ -	$ -	$ 291,349.16	$ 291,349.16
1	2015	$ -	$ 9,711.64	$ 3,899.34	$ -	$ -	$ -	$ 9,711.64	$ 13,610.98
2	2016	$ -	$ 9,711.64	$ 4,016.32	$ -	$ -	$ -	$ 9,711.64	$ 13,727.96
3	2017	$ -	$ 9,711.64	$ 4,136.81	$ 1,861.57	$ -	$ -	$ 9,711.64	$ 15,710.02
4	2018	$ -	$ 9,711.64	$ 4,260.92	$ -	$ -	$ -	$ 9,711.64	$ 13,972.55
5	2019	$ -	$ 9,711.64	$ 4,388.74	$ -	$ -	$ -	$ 9,711.64	$ 14,100.38
6	2020	$ -	$ 9,711.64	$ 4,520.41	$ 2,034.18	$ -	$ -	$ 9,711.64	$ 16,266.23
7	2021	$ -	$ 9,711.64	$ 4,656.02	$ -	$ -	$ -	$ 9,711.64	$ 14,367.66
8	2022	$ -	$ 9,711.64	$ 4,795.70	$ -	$ -	$ -	$ 9,711.64	$ 14,507.34
9	2023	$ -	$ 9,711.64	$ 4,939.57	$ 2,222.81	$ -	$ -	$ 9,711.64	$ 16,874.01
10	2024	$ -	$ 9,711.64	$ 5,087.76	$ -	$ -	$ -	$ 9,711.64	$ 14,799.40
11	2025	$ -	$ 9,711.64	$ 5,240.39	$ -	$ -	$ -	$ 9,711.64	$ 14,952.03
12	2026	$ -	$ 9,711.64	$ 5,397.60	$ 2,428.92	$ -	$ -	$ 9,711.64	$ 17,538.16
13	2027	$ -	$ 9,711.64	$ 5,559.53	$ -	$ -	$ -	$ 9,711.64	$ 15,271.17
14	2028	$ -	$ 9,711.64	$ 5,726.31	$ -	$ -	$ -	$ 9,711.64	$ 15,437.95
15	2029	$ -	$ 9,711.64	$ 5,898.10	$ 2,654.15	$ -	$ -	$ 9,711.64	$ 18,263.89
16	2030	$ -	$ 9,711.64	$ 6,075.05	$ -	$ -	$ -	$ 9,711.64	$ 15,786.69
17	2031	$ -	$ 9,711.64	$ 6,257.30	$ -	$ -	$ -	$ 9,711.64	$ 15,968.94
18	2032	$ -	$ 9,711.64	$ 6,445.02	$ 2,900.26	$ -	$ -	$ 9,711.64	$ 19,056.91
19	2033	$ -	$ 9,711.64	$ 6,638.37	$ -	$ -	$ -	$ 9,711.64	$ 16,350.01
20	2034	$ -	$ 9,711.64	$ 6,837.52	$ -	$ -	$ -	$ 9,711.64	$ 16,549.16
21	2035	$ -	$ 9,711.64	$ 7,042.64	$ 3,169.19	$ -	$ -	$ 9,711.64	$ 19,923.47
22	2036	$ -	$ 9,711.64	$ 7,253.92	$ -	$ -	$ -	$ 9,711.64	$ 16,965.56
23	2037	$ -	$ 9,711.64	$ 7,471.54	$ -	$ -	$ -	$ 9,711.64	$ 17,183.18
24	2038	$ -	$ 9,711.64	$ 7,695.69	$ 3,463.06	$ -	$ -	$ 9,711.64	$ 20,870.39
25	2039	$ -	$ 9,711.64	$ 7,926.56	$ -	$ -	$ -	$ 9,711.64	$ 17,638.20
26	2040	$ -	$ 9,711.64	$ 8,164.36	$ -	$ 321,446.66	$ -	$ 9,711.64	$ 339,322.65
27	2041	$ -	$ 9,711.64	$ 8,409.29	$ 3,784.18	$ -	$ -	$ 9,711.64	$ 21,905.10
28	2042	$ -	$ 9,711.64	$ 8,661.56	$ -	$ -	$ -	$ 9,711.64	$ 18,373.20
29	2043	$ -	$ 9,711.64	$ 8,921.41	$ -	$ -	$ -	$ 9,711.64	$ 18,633.05
30	2044	$ -	$ 9,711.64	$ 9,189.05	$ 4,135.07	$ -	$ -	$ 9,711.64	$ 23,035.77

Whole Life Costs ($) - Bioretention

Year	Calendar Year	Capital Costs ($)	Annual Unit Cost	Routine Maintenance Costs ($)	Non-Routine Maintenance Costs ($)	Replacement Cost ($)	Salvage Value ($)	Total Construction Costs	Total Costs
Cash Sum ($)								**$ 538,268**	**$ 1,160,971**
0	2014	$ 269,133.92			$ -	$ -	$ -	$ 269,133.92	$ 269,133.92
1	2015	$ -	$ 8,971.13	$ 5,893.50	$ -	$ -	$ -	$ 8,971.13	$ 14,864.63
2	2016	$ -	$ 8,971.13	$ 6,070.31	$ -	$ -	$ -	$ 8,971.13	$ 15,041.44
3	2017	$ -	$ 8,971.13	$ 6,252.42	$ 2,948.29	$ -	$ -	$ 8,971.13	$ 18,171.84
4	2018	$ -	$ 8,971.13	$ 6,439.99	$ -	$ -	$ -	$ 8,971.13	$ 15,411.12
5	2019	$ -	$ 8,971.13	$ 6,633.19	$ -	$ -	$ -	$ 8,971.13	$ 15,604.32
6	2020	$ -	$ 8,971.13	$ 6,832.18	$ 3,221.68	$ -	$ -	$ 8,971.13	$ 19,025.00
7	2021	$ -	$ 8,971.13	$ 7,037.15	$ -	$ -	$ -	$ 8,971.13	$ 16,008.28
8	2022	$ -	$ 8,971.13	$ 7,248.26	$ -	$ -	$ -	$ 8,971.13	$ 16,219.40
9	2023	$ -	$ 8,971.13	$ 7,465.71	$ 3,520.42	$ -	$ -	$ 8,971.13	$ 19,957.26
10	2024	$ -	$ 8,971.13	$ 7,689.68	$ -	$ -	$ -	$ 8,971.13	$ 16,660.81
11	2025	$ -	$ 8,971.13	$ 7,920.37	$ -	$ -	$ -	$ 8,971.13	$ 16,891.51
12	2026	$ -	$ 8,971.13	$ 8,157.99	$ 3,846.85	$ -	$ -	$ 8,971.13	$ 20,975.97
13	2027	$ -	$ 8,971.13	$ 8,402.73	$ -	$ -	$ -	$ 8,971.13	$ 17,373.86
14	2028	$ -	$ 8,971.13	$ 8,654.81	$ -	$ -	$ -	$ 8,971.13	$ 17,625.94
15	2029	$ -	$ 8,971.13	$ 8,914.45	$ 4,203.56	$ -	$ -	$ 8,971.13	$ 22,089.14
16	2030	$ -	$ 8,971.13	$ 9,181.88	$ -	$ -	$ -	$ 8,971.13	$ 18,153.02
17	2031	$ -	$ 8,971.13	$ 9,457.34	$ -	$ -	$ -	$ 8,971.13	$ 18,428.47
18	2032	$ -	$ 8,971.13	$ 9,741.06	$ 4,593.35	$ -	$ -	$ 8,971.13	$ 23,305.54
19	2033	$ -	$ 8,971.13	$ 10,033.29	$ -	$ -	$ -	$ 8,971.13	$ 19,004.42
20	2034	$ -	$ 8,971.13	$ 10,334.29	$ -	$ -	$ -	$ 8,971.13	$ 19,305.42
21	2035	$ -	$ 8,971.13	$ 10,644.32	$ 5,019.27	$ -	$ -	$ 8,971.13	$ 24,634.72
22	2036	$ -	$ 8,971.13	$ 10,963.65	$ -	$ -	$ -	$ 8,971.13	$ 19,934.78
23	2037	$ -	$ 8,971.13	$ 11,292.56	$ -	$ -	$ -	$ 8,971.13	$ 20,263.69
24	2038	$ -	$ 8,971.13	$ 11,631.34	$ 5,484.70	$ -	$ -	$ 8,971.13	$ 26,087.16
25	2039	$ -	$ 8,971.13	$ 11,980.28	$ -	$ -	$ -	$ 8,971.13	$ 20,951.41
26	2040	$ -	$ 8,971.13	$ 12,339.69	$ -	$ 296,936.49	$ -	$ 8,971.13	$ 318,247.31
27	2041	$ -	$ 8,971.13	$ 12,709.88	$ 5,993.27	$ -	$ -	$ 8,971.13	$ 27,674.28
28	2042	$ -	$ 8,971.13	$ 13,091.17	$ -	$ -	$ -	$ 8,971.13	$ 22,062.30
29	2043	$ -	$ 8,971.13	$ 13,483.91	$ -	$ -	$ -	$ 8,971.13	$ 22,455.04
30	2044	$ -	$ 8,971.13	$ 13,888.42	$ 6,549.01	$ -	$ -	$ 8,971.13	$ 29,408.57

Whole Life Costs ($) - Wetland

Year	Calendar Year	Capital Costs ($)	Annual Unit Costs ($)	Routine Maintenance Costs ($)	Non-Routine Maintenance Costs ($)	Replacement Cost ($)	Salvage Value ($)		Total Costs
Cash Sum ($)								**$ 195,375**	**$ 435,675**
0	2014	$ 97,687.52			$ -	$ -	$ -	$ 97,687.52	$ 97,687.52
1	2015	$ -	$ 3,256.25	$ 3,618.49	$ -	$ -	$ -	$ 3,256.25	$ 6,874.74
2	2016	$ -	$ 3,256.25	$ 3,727.05	$ -	$ -	$ -	$ 3,256.25	$ 6,983.30
3	2017	$ -	$ 3,256.25	$ 3,838.86	$ 321.39	$ -	$ -	$ 3,256.25	$ 7,416.50
4	2018	$ -	$ 3,256.25	$ 3,954.03	$ -	$ -	$ -	$ 3,256.25	$ 7,210.28
5	2019	$ -	$ 3,256.25	$ 4,072.65	$ -	$ -	$ -	$ 3,256.25	$ 7,328.90
6	2020	$ -	$ 3,256.25	$ 4,194.83	$ 351.19	$ -	$ -	$ 3,256.25	$ 7,802.27
7	2021	$ -	$ 3,256.25	$ 4,320.67	$ -	$ -	$ -	$ 3,256.25	$ 7,576.92
8	2022	$ -	$ 3,256.25	$ 4,450.29	$ -	$ -	$ -	$ 3,256.25	$ 7,706.54
9	2023	$ -	$ 3,256.25	$ 4,583.80	$ 383.76	$ -	$ -	$ 3,256.25	$ 8,223.81
10	2024	$ -	$ 3,256.25	$ 4,721.31	$ -	$ -	$ -	$ 3,256.25	$ 7,977.56
11	2025	$ -	$ 3,256.25	$ 4,862.95	$ -	$ -	$ -	$ 3,256.25	$ 8,119.20
12	2026	$ -	$ 3,256.25	$ 5,008.84	$ 419.34	$ -	$ -	$ 3,256.25	$ 8,684.44
13	2027	$ -	$ 3,256.25	$ 5,159.11	$ -	$ -	$ -	$ 3,256.25	$ 8,415.36
14	2028	$ -	$ 3,256.25	$ 5,313.88	$ -	$ -	$ -	$ 3,256.25	$ 8,570.13
15	2029	$ -	$ 3,256.25	$ 5,473.30	$ 458.23	$ -	$ -	$ 3,256.25	$ 9,187.78
16	2030	$ -	$ 3,256.25	$ 5,637.49	$ -	$ -	$ -	$ 3,256.25	$ 8,893.74
17	2031	$ -	$ 3,256.25	$ 5,806.62	$ -	$ -	$ -	$ 3,256.25	$ 9,062.87
18	2032	$ -	$ 3,256.25	$ 5,980.82	$ 500.72	$ -	$ -	$ 3,256.25	$ 9,737.79
19	2033	$ -	$ 3,256.25	$ 6,160.24	$ -	$ -	$ -	$ 3,256.25	$ 9,416.49
20	2034	$ -	$ 3,256.25	$ 6,345.05	$ -	$ -	$ -	$ 3,256.25	$ 9,601.30
21	2035	$ -	$ 3,256.25	$ 6,535.40	$ 547.15	$ -	$ -	$ 3,256.25	$ 10,338.80
22	2036	$ -	$ 3,256.25	$ 6,731.46	$ -	$ -	$ -	$ 3,256.25	$ 9,987.71
23	2037	$ -	$ 3,256.25	$ 6,933.41	$ -	$ -	$ -	$ 3,256.25	$ 10,189.66
24	2038	$ -	$ 3,256.25	$ 7,141.41	$ 597.89	$ -	$ -	$ 3,256.25	$ 10,995.55
25	2039	$ -	$ 3,256.25	$ 7,355.65	$ -	$ -	$ -	$ 3,256.25	$ 10,611.90
26	2040	$ -	$ 3,256.25	$ 7,576.32	$ -	$ 63,201.62	$ -	$ 3,256.25	$ 74,034.19
27	2041	$ -	$ 3,256.25	$ 7,803.61	$ 653.33	$ -	$ -	$ 3,256.25	$ 11,713.19
28	2042	$ -	$ 3,256.25	$ 8,037.72	$ -	$ -	$ -	$ 3,256.25	$ 11,293.97
29	2043	$ -	$ 3,256.25	$ 8,278.85	$ -	$ -	$ -	$ 3,256.25	$ 11,535.10
30	2044	$ -	$ 3,256.25	$ 8,527.22	$ 713.91	$ -	$ -	$ 3,256.25	$ 12,497.37

Constructed Wetland Design Information		
Wetland Component	**Value**	**Assumption**
Wetland footprint, sf	1634	Refer to wetland design
Vol of Excavation, CY	403	1,633.5 ft^2 to treat 1" rainfall
Max Pool Depth, ft	6	Design criteria
Freeboard, ft	1	Assumed
Overexcavation, ft	1	Contingency
Max Depth Excavation, ft	8	Conservatively assumed for entire footprint
Excavation beyond WQV, %	33	Based on difference between Max Excavation Depth and Max Pool Depth
WQV, cf	3630	For Basin Wetland Treating 1 acre IA, 1" rainfall
Volume of excavation, cf	10890	Allows for freeboard/overexcavation
Volume of excavation, CY	403	Unit Conversion
Backfill, cf	133	33% of excavation
Plantings, sf	817	50% of Wetland footprint

Constructed Wetland Unit Cost Development		
Wetland Component	**Cost**	**Assumption**
Excavation, grading	$16,638	Based on BWSC Central Square Reference
Backfill	$5,047	Based on BWSC Central Square Reference
Plantings	$1,495	Based on Puget Sound Reference
Spillway/Drawdown	$9,525	Based on Puget Sound Reference
Subtotal	$32,704	
Appurtenances, 20% of Subtotal	$6,371	
General Contingency, 50%	$19,538	50% General Design/Construction contingency
Storm Drain Contingency (piping/pretreatment), 50%	$19,538	50% Contingency for storm drain interconnections/pre-treatment
Landscape Design/Public Outreach Contingency, 50%	$19,538	50% Contingency for landscape architectural elements/public outreach
Total Basin Wetland Cost	$97,688	
Basin Wetland Unit Cost	$27	

*Appurtenances/General contingency could account for clay liner ($3-4K, if needed)

Constructed Wetland Unit Cost Reference				
Reference	**Excavation, Grading**	**Backfill**	**Plantings**	**Spillway and Drawdown Structure**
	$/CY	**$/CY**	**$/SF**	**$/SF or EA**
BWSC Central Square[1]	**41.25**	**37.92**		
NCSU, 2000	8.00		0.30	0.25
Puget Sound[2] low	20.79	15.39	1.52	7,842.00
Puget Sound[2] avg	20.79	15.39	1.68	8,683.00
Puget Sound[2] high	20.79	15.39	**1.83**	**9,525.00**
Selected VALUES	**41.25**	**37.92**	**1.83**	**9,525.00**

[1]City of Boston CIP #13-24 East Boston Central Square Complete Streets and Park Improvements, February 26, 2015 bid results.

[2]Washington State Department of Ecology, Puget Sound Stormwater BMP Cost Database, Herrera Environmental Consultants, January 4, 2012.

Appendix C
Pollutant Loads under Core Implementation Scenarios

Table C1-1. Scenario 1 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	10,260	50,921	1,611	7,629	269	223	46.6	17.5	58.9	25,064	9E+04	7E+04	6E+04
Sawmill Brook	17,784	86,421	3,328	21,539	586	503	116.5	32.3	99.1	44,092	1E+05	1E+05	9E+04
Mid-Charles total	**28,044**	**137,342**	**4,938**	**29,168**	**855**	**726**	**163.0**	**49.8**	**158.0**	**69,157**	**2E+05**	**2E+05**	**2E+05**
Upper Stony	17,688	89,949	3,222	11,111	549	422	97.8	32.3	99.7	47,510	2E+05	1E+05	1E+05
Canterbury Brook	38,743	177,913	6,612	21,855	1,973	1,313	245.6	55.3	191.2	82,967	3E+05	2E+05	3E+05
Roslindale Branch	20,966	106,189	3,036	5,641	621	433	70.7	29.3	97.6	51,052	2E+05	1E+05	1E+05
Bussey Brook	5,318	13,941	774	2,292	219	102	28.7	6.1	14.5	8,451	1E+04	1E+04	2E+04
Goldsmith Brook	9,171	49,134	1,416	4,296	210	198	31.5	15.7	51.7	24,332	9E+04	6E+04	5E+04
Lower Stony	34,219	158,858	5,017	16,380	1,512	927	189.9	64.3	242.2	73,025	3E+05	2E+05	2E+05
Stony Brook total	**126,105**	**595,983**	**20,077**	**61,575**	**5,085**	**3,396**	**664.1**	**203.0**	**697.0**	**287,336**	**1E+06**	**7E+05**	**8E+05**
Village Brook Boston	26,655	133,718	4,416	7,252	1,398	648	145.2	36.0	120.4	61,163	3E+05	2E+05	2E+05
Village Brook Brookline	21,972	85,789	3,682	20,188	1,441	157	185.1	25.9	73.8	36,722	1E+05	8E+04	1E+05
Other Muddy River	47,169	112,884	6,921	2,679	2,747	1,529	311.6	68.7	231.9	66,918	1E+05	9E+04	1E+05
Muddy River total	**95,796**	**332,391**	**15,019**	**22,433**	**5,586**	**2,335**	**642.0**	**130.6**	**426.1**	**164,803**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	23,707	131,469	4,234	7,060	800	580	95.3	41.3	137.1	70,548	2E+05	2E+05	1E+05
Shepard Brook	15,675	83,702	2,174	3,106	300	445	37.5	25.7	105.6	40,389	2E+05	1E+05	1E+05
Smelt Brook	26,206	153,221	3,884	4,040	444	630	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
Allston-Brighton	13,644	52,130	1,486	6,430	380	276	51.1	20.8	82.9	24,821	8E+04	8E+04	8E+04
Millers River	12,846	56,894	1,465	3,813	272	306	34.4	16.8	71.9	27,073	1E+05	8E+04	7E+04
Other Lower Charles total	**92,077**	**477,417**	**13,244**	**24,448**	**2,196**	**2,238**	**272.5**	**148.7**	**560.0**	**236,906**	**9E+05**	**6E+05**	**5E+05**
Lower Charles Basin total	**313,978**	**1,405,791**	**48,340**	**108,456**	**12,866**	**7,968**	**1,578.5**	**482.2**	**1,683.1**	**689,045**	**2E+06**	**2E+06**	**2E+06**
Mother Brook	4,817	21,260	750	2,951	192	119	25.5	6.3	20.5	10,131	4E+04	3E+04	4E+04
Hyde Park	30,875	169,651	4,789	10,928	737	669	100.6	48.0	171.0	83,058	3E+05	2E+05	1E+05
Oakland Brook	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
Mattapan Brook	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
Lower Neponset	16,368	83,502	2,514	6,782	442	383	60.0	25.4	87.7	40,690	2E+05	1E+05	1E+05
Tenean Creek	37,325	181,895	5,694	5,347	1,887	832	181.7	45.0	157.9	82,375	3E+05	2E+05	2E+05
Davenport Creek	16,237	91,087	2,443	4,100	338	362	42.7	26.1	90.7	44,380	2E+05	1E+05	1E+05
Neponset River total	**122,459**	**635,073**	**18,846**	**38,161**	**4,119**	**2,729**	**480.7**	**176.6**	**613.7**	**302,904**	**1E+06**	**7E+05**	**7E+05**
Charlestown	49,525	304,307	7,419	4,835	779	1,457	93.7	90.5	343.1	144,986	6E+05	5E+05	3E+05
East Boston	28,933	178,291	4,684	4,042	559	784	66.8	49.5	176.0	85,694	4E+05	2E+05	2E+05
Downtown	35,212	149,003	4,286	3,333	1,352	979	130.8	39.0	209.0	68,498	3E+05	2E+05	3E+05
Dorchester	50,100	265,271	7,526	10,214	1,479	1,537	168.5	78.6	311.9	125,541	5E+05	4E+05	4E+05

Table C1-2. Scenario 2 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	9,771	48,138	1,588	8,527	269	216	49.4	17.2	57.0	23,709	9E+04	6E+04	6E+04
Sawmill Brook	16,454	79,073	3,200	23,104	559	473	118.9	31.2	94.3	40,470	1E+05	9E+04	8E+04
Mid-Charles total	**26,225**	**127,210**	**4,788**	**31,631**	**828**	**689**	**168.3**	**48.4**	**151.3**	**64,178**	**2E+05**	**2E+05**	**1E+05**
Upper Stony	16,932	85,980	3,189	12,530	543	411	102.7	32.0	97.9	45,342	1E+05	1E+05	9E+04
Canterbury Brook	37,361	170,417	6,495	23,413	1,956	1,264	249.7	54.2	185.0	79,220	3E+05	2E+05	3E+05
Roslindale Branch	19,099	97,077	2,825	6,922	540	396	67.5	27.8	91.7	46,966	2E+05	1E+05	1E+05
Bussey Brook	5,141	13,485	780	2,911	213	99	30.5	6.3	14.9	8,201	1E+04	1E+04	2E+04
Goldsmith Brook	8,774	46,760	1,392	5,038	208	191	33.5	15.4	50.1	23,163	8E+04	6E+04	5E+04
Lower Stony	33,873	158,454	5,079	17,736	1,478	929	192.1	64.6	241.3	72,980	3E+05	2E+05	2E+05
Stony Brook total	**121,181**	**572,174**	**19,761**	**68,549**	**4,938**	**3,290**	**676.0**	**200.3**	**680.9**	**275,872**	**1E+06**	**7E+05**	**8E+05**
Village Brook Boston	26,096	130,043	4,344	7,443	1,397	633	145.6	35.1	117.0	59,539	2E+05	1E+05	2E+05
Village Brook Brookline	21,943	85,642	3,673	20,196	1,438	157	184.8	25.9	73.8	36,730	1E+05	8E+04	1E+05
Other Muddy River	46,495	113,222	6,902	2,679	2,732	1,493	311.9	68.4	231.4	66,550	1E+05	9E+04	1E+05
Muddy River total	**94,534**	**328,908**	**14,919**	**22,844**	**5,567**	**2,283**	**642.3**	**129.4**	**422.3**	**162,819**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	22,428	124,341	4,093	8,194	769	554	96.3	40.0	132.1	67,006	2E+05	1E+05	1E+05
Shepard Brook	14,969	79,660	2,091	3,280	292	425	37.3	24.5	100.7	38,463	2E+05	1E+05	9E+04
Smelt Brook	25,441	148,665	3,785	4,210	432	613	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
Allston-Brighton	13,331	50,446	1,459	6,675	378	269	51.6	20.3	80.9	24,005	8E+04	8E+04	8E+04
Millers River	12,625	55,806	1,444	3,845	269	299	34.3	16.5	70.5	26,573	1E+05	8E+04	7E+04
Other Lower Charles total	**88,796**	**458,919**	**12,873**	**26,203**	**2,141**	**2,159**	**272.9**	**144.4**	**542.6**	**227,970**	**8E+05**	**6E+05**	**5E+05**
Lower Charles Basin total	**304,510**	**1,360,001**	**47,553**	**117,597**	**12,646**	**7,733**	**1,591.3**	**474.2**	**1,645.7**	**666,661**	**2E+06**	**2E+06**	**2E+06**
Mother Brook	4,550	19,964	731	3,389	182	114	26.1	6.2	19.9	9,539	4E+04	3E+04	3E+04
Hyde Park	29,664	162,332	4,654	11,843	724	646	102.1	46.5	165.1	79,495	3E+05	2E+05	1E+05
Oakland Brook	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
Mattapan Brook	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
Lower Neponset	15,661	79,487	2,443	7,414	436	368	61.3	24.6	84.3	38,723	1E+05	1E+05	9E+04
Tenean Creek	35,535	172,572	5,460	6,136	1,810	792	177.3	43.2	150.7	78,119	3E+05	2E+05	2E+05
Davenport Creek	15,234	85,157	2,333	4,830	325	341	43.8	24.9	86.0	41,533	2E+05	1E+05	9E+04
Neponset River total	**116,729**	**602,788**	**18,209**	**42,521**	**3,993**	**2,611**	**482.9**	**170.6**	**588.6**	**287,549**	**1E+06**	**7E+05**	**7E+05**
Charlestown	48,298	296,893	7,263	5,002	761	1,423	92.5	88.6	335.6	141,540	6E+05	4E+05	3E+05
East Boston	28,115	173,093	4,583	4,418	553	763	67.3	48.4	171.5	83,261	3E+05	2E+05	2E+05
Downtown	33,091	141,338	3,992	3,463	1,167	927	115.1	37.6	203.5	65,682	3E+05	2E+05	2E+05
Dorchester	47,966	254,686	7,257	10,967	1,394	1,477	163.1	76.3	301.1	120,747	5E+05	4E+05	3E+05

Table C1-3. Scenario 3 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	9,307	45,437	1,526	8,574	263	206	49.0	16.5	54.2	22,377	8E+04	6E+04	6E+04
Sawmill Brook	15,462	72,995	3,052	23,178	547	446	117.9	29.6	88.6	37,390	1E+05	9E+04	8E+04
Mid-Charles total	**24,769**	**118,432**	**4,578**	**31,752**	**810**	**652**	**167.0**	**46.1**	**142.8**	**59,767**	**2E+05**	**1E+05**	**1E+05**
Upper Stony	16,233	81,865	3,095	12,816	536	395	102.8	31.0	94.2	43,130	1E+05	1E+05	9E+04
Canterbury Brook	36,046	162,995	6,310	23,523	1,936	1,210	248.2	52.2	176.9	75,545	3E+05	2E+05	3E+05
Roslindale Branch	18,247	92,080	2,704	6,985	524	377	66.3	26.5	87.2	44,519	2E+05	1E+05	1E+05
Bussey Brook	4,990	13,022	760	2,923	211	95	30.4	6.1	14.5	7,922	1E+04	1E+04	1E+04
Goldsmith Brook	8,422	44,431	1,337	5,063	205	182	33.3	14.7	47.7	22,010	8E+04	5E+04	5E+04
Lower Stony	33,202	155,514	5,012	17,805	1,456	917	190.2	63.5	236.4	71,724	3E+05	2E+05	2E+05
Stony Brook total	**117,139**	**549,907**	**19,217**	**69,115**	**4,868**	**3,176**	**671.2**	**194.0**	**656.9**	**264,849**	**1E+06**	**6E+05**	**8E+05**
Village Brook Boston	25,538	126,443	4,259	7,465	1,393	616	145.1	34.1	113.3	57,782	2E+05	1E+05	2E+05
Village Brook Brookline	21,972	85,863	3,678	20,196	1,437	157	184.8	25.9	74.1	36,796	1E+05	8E+04	1E+05
Other Muddy River	45,686	111,495	6,829	2,679	2,713	1,458	310.4	67.2	227.1	65,448	1E+05	9E+04	1E+05
Muddy River total	**93,196**	**323,801**	**14,766**	**22,911**	**5,543**	**2,232**	**640.4**	**127.3**	**414.5**	**160,026**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	21,524	118,756	3,949	8,267	757	530	95.3	38.4	126.8	64,022	2E+05	1E+05	1E+05
Shepard Brook	14,279	75,692	2,004	3,338	284	404	36.6	23.3	95.6	36,553	1E+05	1E+05	9E+04
Smelt Brook	24,765	144,403	3,692	4,253	424	596	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
Allston-Brighton	13,040	48,856	1,423	6,704	375	261	51.4	19.9	78.8	23,228	7E+04	7E+04	7E+04
Millers River	12,412	54,778	1,424	3,871	267	293	34.1	16.3	69.3	26,095	1E+05	8E+04	6E+04
Other Lower Charles total	**86,020**	**442,484**	**12,493**	**26,433**	**2,107**	**2,085**	**270.3**	**139.8**	**524.7**	**219,815**	**8E+05**	**6E+05**	**5E+05**
Lower Charles Basin total	**296,355**	**1,316,191**	**46,476**	**118,460**	**12,517**	**7,492**	**1,581.8**	**461.1**	**1,596.1**	**644,690**	**2E+06**	**2E+06**	**2E+06**
Mother Brook	4,373	18,961	705	3,400	180	108	25.9	6.0	19.0	9,047	4E+04	3E+04	3E+04
Hyde Park	28,545	155,378	4,492	11,916	713	621	101.2	44.7	158.4	76,060	3E+05	2E+05	1E+05
Oakland Brook	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
Mattapan Brook	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
Lower Neponset	15,004	75,588	2,349	7,454	429	352	60.8	23.5	80.3	36,785	1E+05	1E+05	9E+04
Tenean Creek	34,368	165,548	5,287	6,203	1,787	764	175.5	41.3	143.9	74,681	3E+05	2E+05	2E+05
Davenport Creek	14,554	80,916	2,236	4,879	318	325	43.2	23.7	81.9	39,466	2E+05	1E+05	8E+04
Neponset River total	**112,273**	**575,574**	**17,564**	**42,804**	**3,936**	**2,506**	**478.3**	**163.4**	**562.4**	**274,172**	**1E+06**	**6E+05**	**7E+05**
Charlestown	47,157	289,859	7,115	5,074	747	1,391	91.2	86.7	328.2	138,279	6E+05	4E+05	3E+05
East Boston	27,358	168,241	4,473	4,459	546	742	66.7	47.1	166.9	80,934	3E+05	2E+05	2E+05
Downtown	32,261	137,864	3,910	3,550	1,141	906	113.2	36.8	199.4	64,106	3E+05	2E+05	2E+05
Dorchester	46,289	245,326	7,028	11,047	1,357	1,426	159.9	73.8	290.8	116,327	5E+05	3E+05	3E+05

Table C1-4. Scenario 4 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	8,876	42,957	1,469	8,615	258	196	48.7	15.8	51.6	21,148	8E+04	6E+04	6E+04
Sawmill Brook	14,506	67,109	2,909	23,251	536	421	117.1	28.1	83.2	34,407	1E+05	8E+04	7E+04
Mid-Charles total	**23,382**	**110,066**	**4,378**	**31,866**	**794**	**618**	**165.8**	**43.9**	**134.8**	**55,554**	**2E+05**	**1E+05**	**1E+05**
Upper Stony	15,528	77,750	2,992	12,956	526	378	102.3	29.9	90.4	40,940	1E+05	9E+04	8E+04
Canterbury Brook	34,760	155,867	6,129	23,626	1,917	1,157	246.6	50.2	168.9	72,025	3E+05	2E+05	3E+05
Roslindale Branch	17,439	87,303	2,590	7,051	512	359	65.4	25.3	82.8	42,204	2E+05	1E+05	1E+05
Bussey Brook	4,840	12,566	740	2,937	208	92	30.2	5.9	14.1	7,643	1E+04	1E+04	1E+04
Goldsmith Brook	8,091	42,307	1,288	5,091	202	175	33.1	14.1	45.6	20,951	7E+04	5E+04	5E+04
Lower Stony	32,514	152,068	4,941	17,873	1,433	901	188.4	62.2	231.2	70,063	3E+05	2E+05	2E+05
Stony Brook total	**113,171**	**527,861**	**18,681**	**69,534**	**4,797**	**3,062**	**665.9**	**187.7**	**632.9**	**253,826**	**9E+05**	**6E+05**	**7E+05**
Village Brook Boston	25,001	122,915	4,175	7,494	1,388	599	144.7	33.1	109.7	56,078	2E+05	1E+05	2E+05
Village Brook Brookline	22,001	86,083	3,688	20,196	1,437	157	184.8	26.0	74.4	36,884	1E+05	8E+04	1E+05
Other Muddy River	44,895	109,996	6,751	2,679	2,694	1,424	308.9	66.2	223.3	64,441	1E+05	9E+04	1E+05
Muddy River total	**91,898**	**318,994**	**14,614**	**22,978**	**5,520**	**2,181**	**638.4**	**125.4**	**407.4**	**157,403**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	20,672	113,538	3,808	8,326	745	507	94.4	36.8	121.6	61,097	2E+05	1E+05	1E+05
Shepard Brook	13,573	71,577	1,912	3,394	276	384	36.0	22.1	90.3	34,569	1E+05	1E+05	8E+04
Smelt Brook	24,067	140,141	3,596	4,298	417	578	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
Allston-Brighton	12,745	47,213	1,387	6,735	371	253	51.2	19.3	76.7	22,428	7E+04	7E+04	7E+04
Millers River	12,206	53,763	1,404	3,896	264	287	34.0	16.0	68.1	25,632	1E+05	8E+04	6E+04
Other Lower Charles total	**83,264**	**426,232**	**12,107**	**26,648**	**2,074**	**2,010**	**267.7**	**135.1**	**506.7**	**211,577**	**8E+05**	**6E+05**	**5E+05**
Lower Charles Basin total	**288,332**	**1,273,087**	**45,402**	**119,160**	**12,391**	**7,252**	**1,572.0**	**448.1**	**1,547.0**	**622,806**	**2E+06**	**1E+06**	**2E+06**
Mother Brook	4,200	18,017	680	3,416	177	103	25.7	5.8	18.1	8,578	3E+04	3E+04	3E+04
Hyde Park	27,410	148,324	4,329	11,998	702	597	100.3	42.9	151.7	72,575	3E+05	2E+05	1E+05
Oakland Brook	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
Mattapan Brook	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
Lower Neponset	14,355	71,738	2,256	7,499	422	335	60.2	22.5	76.4	34,882	1E+05	9E+04	8E+04
Tenean Creek	33,216	158,526	5,118	6,266	1,767	736	173.6	39.5	137.1	71,331	3E+05	2E+05	2E+05
Davenport Creek	13,853	76,607	2,134	4,924	310	308	42.5	22.6	77.8	37,356	1E+05	9E+04	8E+04
Neponset River total	**107,806**	**548,316**	**16,918**	**43,100**	**3,880**	**2,400**	**473.6**	**156.2**	**536.2**	**260,842**	**1E+06**	**6E+05**	**6E+05**
Charlestown	46,001	282,709	6,966	5,144	733	1,358	90.0	84.7	320.7	134,961	6E+05	4E+05	3E+05
East Boston	26,609	163,455	4,364	4,500	539	722	66.1	45.9	162.4	78,641	3E+05	2E+05	2E+05
Downtown	31,453	134,362	3,827	3,639	1,118	884	111.4	36.0	195.1	62,503	2E+05	2E+05	2E+05
Dorchester	44,473	235,746	6,776	11,127	1,300	1,373	154.8	71.3	280.7	111,890	5E+05	3E+05	3E+05

Table C1-5. Scenario 5 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	8,445	40,493	1,413	8,656	253	187	48.4	15.1	49.1	19,926	7E+04	5E+04	5E+04
Sawmill Brook	13,595	61,568	2,773	23,325	526	397	116.3	26.6	78.0	31,592	9E+04	7E+04	7E+04
Mid-Charles total	**22,040**	**102,060**	**4,187**	**31,981**	**779**	**584**	**164.7**	**41.7**	**127.1**	**51,519**	**2E+05**	**1E+05**	**1E+05**
Upper Stony	14,874	73,855	2,894	13,007	518	362	101.8	28.8	86.6	38,860	1E+05	9E+04	8E+04
Canterbury Brook	33,510	148,886	5,954	23,736	1,898	1,107	245.2	48.4	161.2	68,593	3E+05	2E+05	3E+05
Roslindale Branch	16,638	82,673	2,477	7,114	498	341	64.3	24.1	78.5	39,926	2E+05	9E+04	1E+05
Bussey Brook	4,691	12,118	720	2,943	206	88	30.0	5.8	13.7	7,371	1E+04	1E+04	1E+04
Goldsmith Brook	7,775	40,264	1,240	5,117	199	167	32.8	13.5	43.5	19,937	7E+04	5E+04	4E+04
Lower Stony	31,862	148,900	4,874	17,954	1,410	887	186.4	61.1	226.4	68,556	3E+05	2E+05	2E+05
Stony Brook total	**109,349**	**506,696**	**18,159**	**69,872**	**4,729**	**2,952**	**660.6**	**181.6**	**609.9**	**243,244**	**9E+05**	**6E+05**	**7E+05**
Village Brook Boston	24,501	119,755	4,101	7,524	1,384	584	144.3	32.3	106.4	54,542	2E+05	1E+05	2E+05
Village Brook Brookline	21,965	85,716	3,682	20,188	1,437	157	184.8	25.9	74.1	36,730	1E+05	8E+04	1E+05
Other Muddy River	44,134	108,438	6,680	2,679	2,677	1,391	307.4	65.2	219.3	63,354	1E+05	8E+04	1E+05
Muddy River total	**90,600**	**313,909**	**14,462**	**23,045**	**5,497**	**2,132**	**636.4**	**123.4**	**399.9**	**154,625**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	19,790	108,100	3,666	8,392	733	485	93.4	35.3	116.3	58,151	2E+05	1E+05	1E+05
Shepard Brook	12,868	67,439	1,820	3,450	269	362	35.3	20.9	85.0	32,577	1E+05	9E+04	8E+04
Smelt Brook	23,362	135,731	3,497	4,340	409	560	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
Allston-Brighton	12,454	45,594	1,350	6,762	368	246	51.0	18.9	74.8	21,639	7E+04	7E+04	7E+04
Millers River	12,008	52,808	1,385	3,920	261	281	33.8	15.8	66.9	25,184	1E+05	8E+04	6E+04
Other Lower Charles total	**80,481**	**409,673**	**11,718**	**26,864**	**2,040**	**1,935**	**265.1**	**130.3**	**488.5**	**203,308**	**7E+05**	**5E+05**	**5E+05**
Lower Charles Basin total	**280,430**	**1,230,279**	**44,339**	**119,781**	**12,267**	**7,019**	**1,562.1**	**435.3**	**1,498.3**	**601,176**	**2E+06**	**1E+06**	**2E+06**
Mother Brook	4,042	17,151	659	3,436	175	99	25.5	5.5	17.3	8,148	3E+04	2E+04	3E+04
Hyde Park	26,302	141,432	4,169	12,079	691	573	99.5	41.1	145.2	69,168	2E+05	2E+05	1E+05
Oakland Brook	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
Mattapan Brook	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
Lower Neponset	13,706	67,900	2,163	7,545	416	319	59.7	21.4	72.5	32,981	1E+05	9E+04	8E+04
Tenean Creek	32,071	151,652	4,949	6,332	1,745	709	171.9	37.7	130.5	67,989	3E+05	1E+05	2E+05
Davenport Creek	13,189	72,473	2,040	4,972	304	292	42.2	21.5	73.7	35,305	1E+05	8E+04	8E+04
Neponset River total	**103,455**	**521,831**	**16,290**	**43,403**	**3,827**	**2,298**	**469.4**	**149.2**	**510.6**	**247,800**	**9E+05**	**6E+05**	**6E+05**
Charlestown	44,873	275,716	6,820	5,214	721	1,327	89.0	82.8	313.4	131,704	6E+05	4E+05	3E+05
East Boston	25,866	158,693	4,257	4,542	533	701	65.5	44.6	157.8	76,366	3E+05	2E+05	2E+05
Downtown	30,694	131,110	3,751	3,727	1,095	864	109.7	35.3	191.1	61,012	2E+05	2E+05	2E+05
Dorchester	42,963	227,288	6,573	11,211	1,272	1,326	152.4	69.0	271.1	107,879	4E+05	3E+05	3E+05

Table C1-6. Scenario 6 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	8,040	38,214	1,361	8,696	249	178	48.1	14.5	46.8	18,800	7E+04	5E+04	5E+04
Sawmill Brook	12,728	56,291	2,644	23,391	516	375	115.6	25.2	73.2	28,903	8E+04	7E+04	6E+04
Mid-Charles total	**20,768**	**94,506**	**4,005**	**32,088**	**765**	**553**	**163.7**	**39.7**	**119.9**	**47,702**	**2E+05**	**1E+05**	**1E+05**
Upper Stony	14,242	70,181	2,799	13,066	510	347	101.3	27.8	83.0	36,869	1E+05	8E+04	8E+04
Canterbury Brook	32,290	142,125	5,786	23,891	1,879	1,058	244.0	46.5	153.8	65,242	3E+05	2E+05	3E+05
Roslindale Branch	15,881	78,191	2,370	7,176	486	324	63.4	22.9	74.4	37,758	1E+05	9E+04	1E+05
Bussey Brook	4,545	11,685	701	2,956	204	84	29.9	5.6	13.2	7,108	1E+04	1E+04	1E+04
Goldsmith Brook	7,459	38,228	1,193	5,140	196	160	32.6	12.9	41.5	18,930	7E+04	5E+04	4E+04
Lower Stony	31,111	145,491	4,794	18,025	1,386	872	184.4	59.9	221.3	66,975	3E+05	2E+05	2E+05
Stony Brook total	**105,528**	**485,899**	**17,644**	**70,254**	**4,661**	**2,845**	**655.5**	**175.6**	**587.3**	**232,882**	**9E+05**	**6E+05**	**7E+05**
Village Brook Boston	23,994	116,448	4,022	7,546	1,379	568	143.9	31.3	103.0	52,925	2E+05	1E+05	2E+05
Village Brook Brookline	21,935	85,495	3,679	20,196	1,437	157	184.8	25.9	74.1	36,656	1E+05	8E+04	1E+05
Other Muddy River	43,411	107,321	6,609	2,679	2,659	1,359	306.1	64.3	215.9	62,442	1E+05	8E+04	1E+05
Muddy River total	**89,341**	**309,265**	**14,311**	**23,119**	**5,475**	**2,085**	**634.7**	**121.5**	**393.0**	**152,024**	**5E+05**	**3E+05**	**4E+05**
Faneuil Brook	18,908	102,662	3,522	8,458	721	462	92.4	33.7	110.9	55,211	2E+05	1E+05	1E+05
Shepard Brook	12,184	63,449	1,730	3,504	261	342	34.7	19.7	79.9	30,652	1E+05	9E+04	8E+04
Smelt Brook	22,693	131,543	3,404	4,384	402	543	50.9	38.5	141.3	63,758	3E+05	2E+05	1E+05
Allston-Brighton	12,178	44,062	1,316	6,793	365	240	50.8	18.4	73.0	20,881	6E+04	7E+04	7E+04
Millers River	11,817	51,845	1,366	3,944	259	276	33.7	15.5	65.8	24,743	9E+04	7E+04	6E+04
Other Lower Charles total	**77,780**	**393,561**	**11,338**	**27,083**	**2,008**	**1,862**	**262.5**	**125.8**	**470.8**	**195,245**	**7E+05**	**5E+05**	**4E+05**
Lower Charles Basin total	**272,649**	**1,188,725**	**43,293**	**120,456**	**12,144**	**6,793**	**1,552.7**	**422.9**	**1,451.1**	**580,151**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,891	16,335	638	3,450	173	94	25.4	5.3	16.5	7,745	3E+04	2E+04	3E+04
Hyde Park	25,239	134,822	4,016	12,156	681	550	98.7	39.4	138.9	65,892	2E+05	1E+05	1E+05
Oakland Brook	7,900	40,198	1,376	6,636	286	179	45.2	13.1	40.2	19,320	8E+04	5E+04	6E+04
Mattapan Brook	5,620	27,190	847	2,448	203	113	25.0	7.8	27.7	13,000	5E+04	3E+04	4E+04
Lower Neponset	13,082	64,222	2,074	7,590	409	303	59.2	20.4	68.8	31,159	1E+05	8E+04	8E+04
Tenean Creek	30,942	144,787	4,782	6,398	1,725	682	170.1	35.9	123.8	64,659	3E+05	1E+05	2E+05
Davenport Creek	12,466	67,974	1,933	5,016	296	275	41.5	20.3	69.4	33,100	1E+05	8E+04	7E+04
Neponset River total	**99,141**	**495,527**	**15,666**	**43,694**	**3,773**	**2,196**	**465.0**	**142.2**	**485.2**	**234,875**	**9E+05**	**5E+05**	**6E+05**
Charlestown	43,846	269,484	6,689	5,284	709	1,298	88.0	81.1	307.0	128,775	6E+05	4E+05	3E+05
East Boston	25,138	154,061	4,152	4,583	526	681	64.9	43.4	153.4	74,152	3E+05	2E+05	1E+05
Downtown	29,960	127,890	3,678	3,810	1,077	844	108.4	34.5	187.0	59,525	2E+05	2E+05	2E+05
Dorchester	41,461	218,946	6,371	11,294	1,243	1,280	149.9	66.6	261.7	103,914	4E+05	3E+05	3E+05

Table C1-7. Scenario 7 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	7,619	35,841	1,307	8,737	244	169	47.8	13.9	44.3	17,625	7E+04	5E+04	5E+04
Sawmill Brook	11,883	51,206	2,519	23,457	506	353	114.9	23.9	68.4	26,294	8E+04	6E+04	6E+04
Mid-Charles total	**19,502**	**87,047**	**3,826**	**32,194**	**750**	**523**	**162.7**	**37.7**	**112.7**	**43,919**	**1E+05**	**1E+05**	**1E+05**
Upper Stony	13,610	66,528	2,707	13,125	503	333	100.8	26.8	79.5	34,907	1E+05	8E+04	7E+04
Canterbury Brook	31,107	135,658	5,623	24,001	1,861	1,011	242.7	44.8	146.6	62,009	2E+05	2E+05	2E+05
Roslindale Branch	15,124	73,781	2,265	7,238	474	308	62.5	21.8	70.4	35,597	1E+05	8E+04	1E+05
Bussey Brook	4,401	11,266	683	2,968	202	81	29.8	5.4	12.8	6,846	1E+04	9E+03	1E+04
Goldsmith Brook	7,136	36,171	1,145	5,165	193	152	32.4	12.3	39.4	17,902	6E+04	4E+04	4E+04
Lower Stony	30,476	142,433	4,730	18,102	1,363	858	182.5	58.8	217.0	65,627	2E+05	2E+05	2E+05
Stony Brook total	**101,854**	**465,837**	**17,152**	**70,599**	**4,596**	**2,743**	**650.6**	**169.8**	**565.7**	**222,888**	**8E+05**	**5E+05**	**7E+05**
Village Brook Boston	23,480	113,068	3,942	7,575	1,375	553	143.5	30.4	99.6	51,301	2E+05	1E+05	2E+05
Village Brook Brookline	21,935	85,495	3,679	20,188	1,436	157	184.7	25.9	74.1	36,590	1E+05	8E+04	1E+05
Other Muddy River	42,688	105,910	6,541	2,679	2,643	1,329	304.7	63.4	212.7	61,502	1E+05	8E+04	1E+05
Muddy River total	**88,103**	**304,473**	**14,162**	**23,186**	**5,453**	**2,039**	**632.9**	**119.7**	**386.4**	**149,393**	**4E+05**	**3E+05**	**4E+05**
Faneuil Brook	18,019	97,150	3,377	8,517	710	439	91.5	32.0	105.4	52,206	2E+05	1E+05	1E+05
Shepard Brook	11,523	59,620	1,644	3,558	254	322	34.1	18.5	75.0	28,800	1E+05	8E+04	7E+04
Smelt Brook	22,032	127,427	3,311	4,426	395	527	50.4	37.4	137.2	61,781	2E+05	2E+05	1E+05
Allston-Brighton	11,902	42,562	1,282	6,823	362	233	50.6	18.0	71.3	20,143	6E+04	6E+04	7E+04
Millers River	11,618	50,905	1,348	3,968	257	270	33.5	15.3	64.6	24,310	9E+04	7E+04	6E+04
Other Lower Charles total	**75,094**	**377,665**	**10,963**	**27,293**	**1,977**	**1,792**	**260.1**	**121.2**	**453.4**	**187,239**	**7E+05**	**5E+05**	**4E+05**
Lower Charles Basin total	**265,051**	**1,147,975**	**42,276**	**121,078**	**12,026**	**6,574**	**1,543.5**	**410.7**	**1,405.5**	**559,519**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,742	15,561	618	3,465	170	90	25.2	5.1	15.8	7,358	3E+04	2E+04	3E+04
Hyde Park	24,125	127,887	3,855	12,235	671	526	97.9	37.6	132.3	62,450	2E+05	1E+05	1E+05
Oakland Brook	7,474	37,581	1,315	6,667	281	170	44.9	12.4	37.8	18,034	8E+04	4E+04	6E+04
Mattapan Brook	5,423	26,000	819	2,459	201	109	24.8	7.5	26.5	12,412	5E+04	3E+04	4E+04
Lower Neponset	12,429	60,346	1,981	7,635	403	287	58.7	19.4	64.8	29,230	1E+05	8E+04	7E+04
Tenean Creek	29,792	137,776	4,612	6,463	1,704	655	168.4	34.0	116.9	61,271	2E+05	1E+05	2E+05
Davenport Creek	11,728	63,247	1,824	5,061	289	257	40.9	19.0	64.7	30,786	1E+05	7E+04	7E+04
Neponset River total	**94,712**	**468,397**	**15,025**	**43,985**	**3,720**	**2,093**	**460.8**	**135.0**	**458.9**	**221,540**	**8E+05**	**5E+05**	**6E+05**
Charlestown	42,780	262,875	6,551	5,352	697	1,268	87.0	79.3	300.1	125,711	5E+05	4E+05	3E+05
East Boston	24,423	149,523	4,048	4,625	520	661	64.3	42.3	149.1	71,978	3E+05	2E+05	1E+05
Downtown	29,296	125,024	3,615	3,891	1,062	827	107.3	33.8	183.3	58,181	2E+05	2E+05	2E+05
Dorchester	39,993	210,758	6,174	11,375	1,216	1,234	147.5	64.4	252.3	100,018	4E+05	3E+05	3E+05

Table C1-8. Scenario 8 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	7,220	33,595	1,255	8,778	240	161	47.5	13.2	42.0	16,509	6E+04	4E+04	5E+04
Sawmill Brook	11,089	46,510	2,405	23,523	498	333	114.3	22.6	64.0	23,891	7E+04	5E+04	6E+04
Mid-Charles total	**18,310**	**80,105**	**3,660**	**32,301**	**737**	**494**	**161.8**	**35.9**	**106.1**	**40,399**	**1E+05**	**1E+05**	**1E+05**
Upper Stony	13,007	63,016	2,618	13,176	496	319	100.2	25.8	76.1	33,018	1E+05	7E+04	7E+04
Canterbury Brook	29,946	129,264	5,463	24,119	1,844	966	241.3	43.1	139.6	58,849	2E+05	2E+05	2E+05
Roslindale Branch	14,389	69,585	2,163	7,300	461	292	61.6	20.7	66.6	33,540	1E+05	8E+04	9E+04
Bussey Brook	4,262	10,854	665	2,979	199	78	29.6	5.3	12.5	6,592	1E+04	9E+03	1E+04
Goldsmith Brook	6,841	34,282	1,102	5,187	190	145	32.2	11.8	37.5	16,961	6E+04	4E+04	4E+04
Lower Stony	29,808	139,362	4,664	18,176	1,343	844	181.0	57.7	212.2	64,155	2E+05	2E+05	2E+05
Stony Brook total	**98,253**	**446,363**	**16,674**	**70,937**	**4,533**	**2,643**	**646.0**	**164.2**	**544.5**	**213,114**	**8E+05**	**5E+05**	**6E+05**
Village Brook Boston	22,966	109,761	3,863	7,597	1,371	538	143.1	29.4	96.1	49,669	2E+05	1E+05	2E+05
Village Brook Brookline	21,921	85,348	3,684	20,196	1,436	157	184.7	25.9	74.1	36,605	1E+05	8E+04	1E+05
Other Muddy River	41,994	104,727	6,472	2,679	2,627	1,298	303.4	62.6	209.7	60,536	1E+05	8E+04	1E+05
Muddy River total	**86,881**	**299,836**	**14,019**	**23,258**	**5,433**	**1,993**	**631.2**	**118.0**	**380.0**	**146,810**	**4E+05**	**3E+05**	**4E+05**
Faneuil Brook	17,086	91,198	3,222	8,576	698	415	90.5	30.3	99.4	49,023	2E+05	1E+05	1E+05
Shepard Brook	10,883	55,917	1,561	3,611	247	304	33.5	17.4	70.2	27,007	1E+05	8E+04	7E+04
Smelt Brook	21,363	123,239	3,219	4,470	388	510	49.8	36.3	133.0	59,789	2E+05	2E+05	1E+05
Allston-Brighton	11,639	41,110	1,249	6,854	359	227	50.4	17.6	69.7	19,429	6E+04	6E+04	6E+04
Millers River	11,442	50,023	1,331	3,993	255	265	33.4	15.1	63.6	23,898	9E+04	7E+04	6E+04
Other Lower Charles total	**72,413**	**361,486**	**10,582**	**27,503**	**1,945**	**1,722**	**257.6**	**116.6**	**435.9**	**179,146**	**7E+05**	**5E+05**	**4E+05**
Lower Charles Basin total	**257,546**	**1,107,685**	**41,275**	**121,699**	**11,912**	**6,358**	**1,534.7**	**398.8**	**1,360.3**	**539,070**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,609	14,872	600	3,475	168	86	25.1	5.0	15.1	7,016	3E+04	2E+04	3E+04
Hyde Park	23,071	121,381	3,704	12,313	661	503	97.1	35.9	126.0	59,223	2E+05	1E+05	1E+05
Oakland Brook	7,081	35,171	1,260	6,695	277	161	44.6	11.8	35.6	16,843	7E+04	4E+04	6E+04
Mattapan Brook	5,223	24,787	791	2,471	199	105	24.6	7.1	25.3	11,809	5E+04	3E+04	4E+04
Lower Neponset	11,820	56,765	1,895	7,682	396	272	58.2	18.4	61.2	27,455	1E+05	7E+04	7E+04
Tenean Creek	28,678	130,987	4,447	6,528	1,685	628	166.7	32.2	110.1	57,965	2E+05	1E+05	2E+05
Davenport Creek	10,999	58,655	1,717	5,105	281	240	40.2	17.7	60.3	28,538	1E+05	7E+04	7E+04
Neponset River total	**90,481**	**442,618**	**14,414**	**44,270**	**3,667**	**1,995**	**456.5**	**128.1**	**433.7**	**208,849**	**8E+05**	**5E+05**	**6E+05**
Charlestown	41,719	256,382	6,417	5,419	686	1,239	86.1	77.5	293.4	122,658	5E+05	4E+05	3E+05
East Boston	23,719	145,007	3,944	4,666	513	642	63.8	41.1	144.7	69,812	3E+05	2E+05	1E+05
Downtown	28,631	121,969	3,548	3,970	1,050	809	106.4	33.1	179.3	56,746	2E+05	2E+05	2E+05
Dorchester	38,581	202,970	5,987	11,457	1,191	1,190	145.4	62.2	243.3	96,304	4E+05	3E+05	3E+05

Table C1-9. Scenario 9 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	6,822	31,358	1,204	8,818	235	152	47.2	12.6	39.7	15,394	6E+04	4E+04	4E+04
Sawmill Brook	10,347	42,108	2,296	23,589	489	315	113.8	21.5	59.9	21,620	6E+04	5E+04	5E+04
Mid-Charles total	**17,169**	**73,467**	**3,501**	**32,408**	**724**	**467**	**161.0**	**34.1**	**99.7**	**37,014**	**1E+05**	**9E+04**	**1E+05**
Upper Stony	12,419	59,613	2,532	13,235	488	305	99.8	24.9	72.8	31,188	1E+05	7E+04	7E+04
Canterbury Brook	28,822	123,092	5,308	24,229	1,826	922	240.1	41.4	132.8	55,792	2E+05	1E+05	2E+05
Roslindale Branch	13,676	65,507	2,065	7,363	450	276	60.7	19.6	62.8	31,541	1E+05	7E+04	9E+04
Bussey Brook	4,125	10,457	647	2,990	197	75	29.5	5.1	12.1	6,341	1E+04	8E+03	1E+04
Goldsmith Brook	6,547	32,423	1,057	5,210	188	139	32.0	11.3	35.7	16,035	6E+04	4E+04	4E+04
Lower Stony	29,283	136,532	4,601	18,255	1,324	832	179.5	56.6	208.2	62,884	2E+05	1E+05	2E+05
Stony Brook total	**94,872**	**427,624**	**16,211**	**71,283**	**4,473**	**2,548**	**641.5**	**158.9**	**524.3**	**203,781**	**7E+05**	**5E+05**	**6E+05**
Village Brook Boston	22,466	106,527	3,786	7,627	1,366	523	142.7	28.5	92.8	48,097	2E+05	1E+05	2E+05
Village Brook Brookline	21,957	85,642	3,687	20,196	1,437	157	184.7	26.0	74.5	36,708	1E+05	8E+04	1E+05
Other Muddy River	41,249	102,985	6,396	2,679	2,611	1,266	302.3	61.7	206.4	59,372	1E+05	7E+04	1E+05
Muddy River total	**85,672**	**295,155**	**13,869**	**23,331**	**5,413**	**1,947**	**629.6**	**116.2**	**373.7**	**144,177**	**4E+05**	**3E+05**	**3E+05**
Faneuil Brook	16,189	85,539	3,074	8,635	686	392	89.6	28.6	93.7	45,974	2E+05	9E+04	1E+05
Shepard Brook	10,281	52,470	1,483	3,664	240	286	33.0	16.4	65.8	25,331	1E+05	7E+04	6E+04
Smelt Brook	20,731	119,344	3,131	4,511	381	495	49.2	35.2	129.1	57,901	2E+05	2E+05	1E+05
Allston-Brighton	11,385	39,709	1,218	6,885	356	222	50.3	17.2	68.2	18,733	6E+04	6E+04	6E+04
Millers River	11,258	49,156	1,314	4,018	253	260	33.3	14.8	62.5	23,494	9E+04	7E+04	6E+04
Other Lower Charles total	**69,844**	**346,217**	**10,219**	**27,712**	**1,916**	**1,655**	**255.4**	**112.3**	**419.3**	**171,433**	**6E+05**	**4E+05**	**4E+05**
Lower Charles Basin total	**250,388**	**1,068,996**	**40,300**	**122,326**	**11,803**	**6,150**	**1,526.6**	**387.4**	**1,317.4**	**519,390**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,488	14,258	584	3,488	167	83	24.9	4.8	14.5	6,709	3E+04	2E+04	3E+04
Hyde Park	22,035	115,015	3,556	12,392	650	481	96.3	34.2	120.0	56,064	2E+05	1E+05	1E+05
Oakland Brook	6,695	32,827	1,205	6,725	273	153	44.3	11.2	33.5	15,682	7E+04	4E+04	5E+04
Mattapan Brook	5,026	23,604	763	2,483	197	100	24.5	6.8	24.1	11,222	4E+04	3E+04	4E+04
Lower Neponset	11,235	53,348	1,813	7,727	390	258	57.8	17.4	57.7	25,756	1E+05	7E+04	7E+04
Tenean Creek	27,594	124,350	4,287	6,592	1,666	603	165.1	30.4	103.7	54,764	2E+05	1E+05	2E+05
Davenport Creek	10,313	54,350	1,616	5,149	274	224	39.6	16.6	56.1	26,423	1E+05	6E+04	6E+04
Neponset River total	**86,385**	**417,752**	**13,825**	**44,556**	**3,617**	**1,901**	**452.5**	**121.5**	**409.6**	**196,619**	**7E+05**	**4E+05**	**5E+05**
Charlestown	40,720	250,200	6,289	5,487	676	1,212	85.2	75.8	287.0	119,765	5E+05	4E+05	3E+05
East Boston	22,997	140,387	3,836	4,706	507	622	63.2	39.9	140.3	67,585	3E+05	2E+05	1E+05
Downtown	27,950	119,017	3,479	4,047	1,031	790	105.0	32.4	175.6	55,378	2E+05	2E+05	2E+05
Dorchester	37,229	195,506	5,808	11,538	1,167	1,149	143.3	60.1	234.8	92,728	4E+05	3E+05	3E+05

Table C1-10. Scenario 10 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	6,441	29,240	1,157	8,859	231	145	47.0	12.1	37.5	14,338	5E+04	4E+04	4E+04
Sawmill Brook	9,634	38,000	2,196	23,656	481	297	113.2	20.4	56.1	19,504	5E+04	4E+04	5E+04
Mid-Charles total	**16,075**	**67,240**	**3,352**	**32,514**	**712**	**442**	**160.2**	**32.5**	**93.7**	**33,841**	**1E+05**	**8E+04**	**9E+04**
Upper Stony	11,854	56,372	2,452	13,294	481	292	99.4	24.0	69.6	29,454	1E+05	6E+04	6E+04
Canterbury Brook	27,719	117,139	5,159	24,339	1,809	880	238.9	39.8	126.3	52,823	2E+05	1E+05	2E+05
Roslindale Branch	12,993	61,568	1,971	7,422	440	261	60.0	18.6	59.2	29,608	1E+05	7E+04	9E+04
Bussey Brook	3,989	10,068	630	3,003	195	72	29.4	5.0	11.7	6,094	9E+03	8E+03	1E+04
Goldsmith Brook	6,268	30,652	1,016	5,232	185	132	31.8	10.8	33.9	15,153	5E+04	4E+04	4E+04
Lower Stony	28,595	133,527	4,535	18,330	1,305	819	178.0	55.6	203.8	61,463	2E+05	1E+05	2E+05
Stony Brook total	**91,418**	**409,325**	**15,763**	**71,621**	**4,416**	**2,456**	**637.4**	**153.7**	**504.6**	**194,595**	**7E+05**	**5E+05**	**6E+05**
Village Brook Boston	21,981	103,367	3,711	7,649	1,362	509	142.3	27.6	89.6	46,546	2E+05	1E+05	2E+05
Village Brook Brookline	21,979	85,789	3,697	20,196	1,436	157	184.7	26.1	74.7	36,789	1E+05	8E+04	1E+05
Other Muddy River	40,553	101,523	6,323	2,679	2,596	1,238	301.1	60.9	203.6	58,339	1E+05	7E+04	1E+05
Muddy River total	**84,514**	**290,680**	**13,731**	**23,403**	**5,395**	**1,904**	**628.1**	**114.6**	**367.9**	**141,674**	**4E+05**	**3E+05**	**3E+05**
Faneuil Brook	15,300	80,028	2,928	8,694	675	370	88.6	27.0	88.0	42,975	1E+05	9E+04	9E+04
Shepard Brook	9,693	49,185	1,409	3,717	233	269	32.4	15.4	61.6	23,736	9E+04	7E+04	6E+04
Smelt Brook	20,106	115,449	3,043	4,553	374	480	48.7	34.2	125.2	56,042	2E+05	2E+05	1E+05
Allston-Brighton	11,133	38,341	1,186	6,914	353	217	50.2	16.9	66.9	18,049	5E+04	6E+04	6E+04
Millers River	11,082	48,267	1,297	4,042	251	255	33.2	14.6	61.4	23,082	9E+04	7E+04	6E+04
Other Lower Charles total	**67,315**	**331,270**	**9,863**	**27,919**	**1,887**	**1,591**	**253.1**	**108.0**	**403.1**	**163,885**	**6E+05**	**4E+05**	**4E+05**
Lower Charles Basin total	**243,246**	**1,031,275**	**39,357**	**122,943**	**11,697**	**5,951**	**1,518.7**	**376.3**	**1,275.6**	**500,153**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,374	13,702	570	3,502	165	80	24.8	4.7	14.0	6,432	3E+04	2E+04	3E+04
Hyde Park	21,019	108,805	3,412	12,471	640	460	95.5	32.6	114.1	52,979	2E+05	1E+05	1E+05
Oakland Brook	6,329	30,608	1,154	6,755	269	145	44.0	10.6	31.5	14,587	6E+04	3E+04	5E+04
Mattapan Brook	4,846	22,531	738	2,496	195	96	24.3	6.5	23.1	10,692	4E+04	2E+04	3E+04
Lower Neponset	10,681	50,144	1,736	7,773	384	245	57.4	16.6	54.5	24,160	9E+04	6E+04	6E+04
Tenean Creek	26,540	118,081	4,134	6,656	1,648	578	163.6	28.7	97.4	51,695	2E+05	1E+05	2E+05
Davenport Creek	9,643	50,188	1,519	5,193	267	208	39.1	15.4	52.0	24,376	9E+04	6E+04	6E+04
Neponset River total	**82,431**	**394,059**	**13,262**	**44,846**	**3,567**	**1,812**	**448.7**	**115.2**	**386.6**	**184,921**	**7E+05**	**4E+05**	**5E+05**
Charlestown	39,721	244,062	6,160	5,553	665	1,185	84.4	74.1	280.4	116,859	5E+05	4E+05	3E+05
East Boston	22,287	135,896	3,731	4,747	501	602	62.6	38.7	136.0	65,413	3E+05	2E+05	1E+05
Downtown	27,291	116,167	3,412	4,127	1,013	772	103.7	31.7	171.9	54,063	2E+05	2E+05	2E+05
Dorchester	35,874	188,034	5,628	11,619	1,143	1,107	141.3	58.0	226.0	89,163	4E+05	3E+05	3E+05

Table C1-11. Scenario 11 average annual reporting area loads

Reporting Area	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
West Roxbury	6,018	26,853	1,102	8,899	226	136	46.7	11.4	35.1	13,157	5E+04	3E+04	4E+04
Sawmill Brook	8,921	33,834	2,094	23,722	473	280	112.7	19.3	52.2	17,350	5E+04	4E+04	5E+04
Mid-Charles total	**14,939**	**60,686**	**3,196**	**32,621**	**699**	**416**	**159.4**	**30.7**	**87.4**	**30,508**	**1E+05**	**7E+04**	**9E+04**
Upper Stony	11,273	53,080	2,369	13,338	474	280	98.8	23.1	66.4	27,697	9E+04	6E+04	6E+04
Canterbury Brook	26,639	111,334	5,010	24,413	1,792	838	237.6	38.2	119.8	49,905	2E+05	1E+05	2E+05
Roslindale Branch	12,302	57,673	1,878	7,481	429	247	59.2	17.6	55.7	27,690	1E+05	6E+04	8E+04
Bussey Brook	3,855	9,693	613	3,012	193	69	29.2	4.8	11.4	5,848	9E+03	7E+03	1E+04
Goldsmith Brook	5,961	28,712	971	5,254	182	125	31.5	10.2	32.0	14,183	5E+04	3E+04	4E+04
Lower Stony	28,081	130,756	4,483	18,403	1,288	806	176.7	54.6	199.6	60,158	2E+05	1E+05	2E+05
Stony Brook total	**88,111**	**391,247**	**15,322**	**71,900**	**4,359**	**2,365**	**633.1**	**148.4**	**484.9**	**185,482**	**7E+05**	**4E+05**	**6E+05**
Village Brook Boston	21,488	100,208	3,633	7,678	1,358	494	142.0	26.7	86.3	44,966	2E+05	1E+05	2E+05
Village Brook Brookline	21,943	85,495	3,692	20,196	1,436	157	184.6	26.0	74.6	36,678	1E+05	8E+04	1E+05
Other Muddy River	39,898	100,310	6,262	2,679	2,581	1,210	300.0	60.2	201.2	57,432	1E+05	7E+04	1E+05
Muddy River total	**83,329**	**286,013**	**13,587**	**23,474**	**5,375**	**1,861**	**626.6**	**113.0**	**362.1**	**139,077**	**4E+05**	**3E+05**	**3E+05**
Faneuil Brook	14,462	74,884	2,793	8,760	665	349	87.8	25.5	82.7	40,190	1E+05	8E+04	9E+04
Shepard Brook	9,142	46,106	1,339	3,768	227	253	32.0	14.4	57.6	22,237	9E+04	6E+04	6E+04
Smelt Brook	19,489	111,627	2,956	4,596	367	464	48.1	33.2	121.3	54,197	2E+05	1E+05	1E+05
Allston-Brighton	10,887	36,991	1,156	6,942	351	212	50.0	16.6	65.5	17,380	5E+04	5E+04	6E+04
Millers River	10,906	47,436	1,281	4,066	249	250	33.1	14.4	60.4	22,693	8E+04	7E+04	5E+04
Other Lower Charles total	**64,885**	**317,045**	**9,525**	**28,133**	**1,858**	**1,529**	**251.0**	**104.0**	**387.6**	**156,698**	**6E+05**	**4E+05**	**4E+05**
Lower Charles Basin total	**236,326**	**994,306**	**38,434**	**123,507**	**11,591**	**5,755**	**1,510.7**	**365.5**	**1,234.6**	**481,256**	**2E+06**	**1E+06**	**1E+06**
Mother Brook	3,259	13,170	556	3,511	163	76	24.7	4.6	13.5	6,163	2E+04	2E+04	2E+04
Hyde Park	19,902	101,903	3,251	12,554	629	436	94.7	30.8	107.5	49,546	2E+05	1E+05	1E+05
Oakland Brook	5,961	28,396	1,102	6,778	265	137	43.7	10.1	29.5	13,492	6E+04	3E+04	5E+04
Mattapan Brook	4,661	21,436	713	2,507	193	93	24.2	6.2	22.0	10,149	4E+04	2E+04	3E+04
Lower Neponset	10,086	46,713	1,653	7,819	378	230	56.9	15.6	51.1	22,454	8E+04	6E+04	6E+04
Tenean Creek	25,531	111,962	3,987	6,720	1,630	555	162.1	27.1	91.4	48,738	2E+05	9E+04	2E+05
Davenport Creek	9,016	46,268	1,428	5,234	260	194	38.6	14.4	48.2	22,446	9E+04	5E+04	6E+04
Neponset River total	**78,416**	**369,848**	**12,690**	**45,124**	**3,518**	**1,721**	**444.8**	**108.8**	**363.2**	**172,988**	**7E+05**	**4E+05**	**5E+05**
Charlestown	38,763	238,176	6,037	5,618	656	1,158	83.6	72.5	274.2	114,116	5E+05	3E+05	3E+05
East Boston	21,578	131,389	3,625	4,786	494	583	62.0	37.5	131.6	63,239	3E+05	2E+05	1E+05
Downtown	26,633	113,305	3,344	4,208	995	754	102.3	31.0	168.3	52,740	3E+05	2E+05	4E+05
Dorchester	34,565	180,761	5,452	11,699	1,120	1,067	139.2	55.9	217.4	85,681	3E+05	2E+05	2E+05

Table C2-1. Scenario 1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,085	4,435	151	893	30	21	5.4	1.3	5.8	2,247	5E+03	5E+03	4E+03
1FDO31	902	4,311	116	180	20	20	2.2	1.1	4.2	2,102	7E+03	6E+03	5E+03
02E086	289	1,233	46	312	11	5	1.8	0.4	1.4	598	2E+03	2E+03	1E+03
2FDO120	1,554	7,893	223	547	35	34	4.9	2.1	9.1	3,922	1E+04	9E+03	8E+03
2FDO93	1,662	11,743	285	99	19	38	2.4	3.2	10.6	5,720	2E+04	1E+04	8E+03
2FDO85	106	498	13	25	3	2	0.3	0.1	0.4	244	8E+02	5E+02	4E+02
3ESDO186	363	1,700	69	543	14	8	2.9	0.7	2.0	830	3E+03	2E+03	1E+03
3ESDO185	660	3,053	117	330	15	14	2.4	0.9	2.9	1,582	6E+03	4E+03	3E+03
3F162	587	2,934	103	484	25	12	3.6	0.9	2.8	1,396	5E+03	3E+03	3E+03
4ESDO69	1,801	8,649	271	900	43	42	6.7	2.7	9.9	4,309	2E+04	1E+04	1E+04
4ESDO64	43	148	7	56	2	1	0.3	0.1	0.2	70	3E+02	4E+02	4E+02
4FDO189	875	5,068	135	136	20	17	2.2	1.4	4.8	2,482	9E+03	5E+03	4E+03
4FDO204	994	5,227	160	493	32	19	4.3	1.5	4.7	2,524	9E+03	5E+03	5E+03
4FDO16	470	2,716	74	69	11	12	1.2	0.7	2.5	1,311	5E+03	3E+03	3E+03
4FDO203	145	652	25	173	6	3	1.0	0.2	0.7	315	1E+03	9E+02	8E+02
4FDO118	667	3,835	98	88	11	16	1.3	1.0	3.6	1,878	7E+03	5E+03	3E+03
4FDO119	1,385	5,612	146	45	24	38	3.1	0.9	10.8	2,988	4E+03	5E+03	4E+03
5CSDO110	872	3,024	138	639	35	25	5.0	1.0	3.3	1,554	7E+03	5E+03	7E+03
5EDO182	122	600	32	351	6	3	1.6	0.3	0.8	294	9E+02	6E+02	4E+02
5ESDO184	713	3,285	151	1,416	31	15	6.9	1.5	3.9	1,611	5E+03	4E+03	3E+03
5FDO117	905	4,722	158	707	32	19	5.0	1.5	4.6	2,277	8E+03	5E+03	4E+03
5FDO254	62	396	10	10	1	1	0.1	0.1	0.4	197	7E+02	4E+02	2E+02
5FDO265	21	43	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	731	3,963	108	131	18	18	2.0	1.1	3.6	1,914	8E+03	5E+03	5E+03
5FDO245	1,545	9,311	246	328	28	32	3.6	2.6	9.1	4,591	2E+04	1E+04	7E+03
5FDO244	257	1,329	35	52	5	5	0.6	0.3	1.8	663	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	1,046	6,432	161	140	17	24	2.1	2.0	7.1	3,142	1E+04	7E+03	5E+03
5GDO116A	946	5,472	149	355	16	18	2.5	1.6	5.1	2,728	9E+03	6E+03	3E+03
5GDO115	262	1,603	42	32	5	6	0.6	0.4	1.6	786	3E+03	2E+03	1E+03
5GDO116	825	4,845	124	77	18	16	1.9	1.3	4.4	2,351	9E+03	5E+03	3E+03
6DDO57	153	614	22	135	6	2	0.9	0.2	0.6	299	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	87	276	11	42	2	7	0.3	0.1	0.4	118	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	36	187	8	50	2	1	0.4	0.1	0.2	86	3E+02	2E+02	2E+02
6DDO83	177	824	38	286	10	4	1.8	0.3	0.9	383	1E+03	1E+03	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,664	9,186	249	249	48	33	5.0	2.5	8.1	4,389	2E+04	1E+04	1E+04
6GDO110	2,025	12,272	325	336	44	42	5.1	3.4	10.9	5,981	2E+04	1E+04	9E+03
6GDO111	299	1,373	64	575	14	7	3.0	0.6	1.7	663	2E+03	1E+03	1E+03
6GDO166	166	630	40	504	9	4	2.3	0.4	1.0	306	9E+02	5E+02	6E+02
6GDO108	5,335	31,644	836	847	119	116	13.5	8.6	28.5	15,352	6E+04	4E+04	3E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	87	432	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	243	1,157	38	173	7	4	1.1	0.4	1.1	569	2E+03	1E+03	8E+02

Table C2-1. Scenario 1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	553	2,871	90	397	16	11	2.6	0.9	2.8	1,401	5E+03	3E+03	2E+03
7CDO006	6,770	32,628	1,132	6,842	195	144	37.6	11.5	35.6	16,131	6E+04	4E+04	5E+04
7HDO285	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
7HDO105	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
7HDO348	53	355	9	9	1	1	0.1	0.1	0.3	177	6E+02	4E+02	2E+02
7HDO347	353	1,854	57	194	11	7	1.6	0.5	1.7	899	3E+03	2E+03	2E+03
7HDO346	328	2,068	53	67	5	7	0.7	0.6	1.8	1,012	4E+03	2E+03	1E+03
8BDO122	1,734	9,972	246	268	32	45	3.9	3.8	14.1	4,765	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	969	6,276	157	119	12	21	1.6	1.8	6.0	3,095	1E+04	7E+03	4E+03
8CDO25	216	721	43	425	9	5	2.1	0.4	1.1	383	2E+03	2E+03	2E+03
8CDO26	203	721	41	365	8	5	1.8	0.4	1.0	386	2E+03	1E+03	2E+03
8DDO112	35	208	6	7	1	1	0.1	0.1	0.2	101	4E+02	4E+02	3E+02
8DSDO100	92	304	16	165	3	4	0.8	0.1	0.5	147	7E+02	1E+03	1E+03
8EDO35	140	404	29	425	8	2	1.9	0.3	0.6	203	5E+02	2E+03	2E+03
8EDO33	544	3,461	96	240	9	12	1.6	1.0	3.3	1,706	6E+03	4E+03	2E+03
8IDO153	43	287	7	3	0	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	56	2E+02	4E+02	4E+02
8IDO156	350	749	46	558	19	4	3.3	0.3	0.7	328	5E+02	1E+02	8E+02
8IDO209	111	711	18	18	1	2	0.2	0.2	0.6	352	1E+03	9E+02	5E+02
8IDO154	978	5,581	152	238	22	24	2.8	1.7	5.6	2,701	1E+04	8E+03	6E+03
8IDO158	440	2,684	71	123	9	10	1.2	0.9	3.0	1,317	5E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,301	8,260	211	223	23	30	3.0	2.6	9.2	4,022	1E+04	9E+03	6E+03
8JSDO103	1,094	6,687	182	301	23	23	3.0	1.9	6.2	3,283	1E+04	7E+03	5E+03
8JSDO41	632	4,098	105	98	11	14	1.4	1.2	4.1	2,003	7E+03	5E+03	3E+03
8JSDO50	1,379	7,408	200	342	37	30	4.4	2.4	8.3	3,552	1E+04	1E+04	8E+03
8K049	182	1,094	31	60	5	4	0.6	0.3	1.0	531	2E+03	1E+03	9E+02
9BDO49	373	1,041	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	67	345	10	17	2	1	0.2	0.1	0.3	165	6E+02	4E+02	3E+02
9EDO243	188	682	25	162	7	4	1.0	0.2	0.6	330	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	710	2,670	109	804	25	22	4.5	0.9	3.1	1,274	5E+03	7E+03	7E+03
9K016	70	216	27	421	7	3	1.9	0.2	0.6	98	3E+02	5E+02	6E+02
9LSDO095	253	991	42	321	7	11	1.5	0.4	1.3	478	3E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	129	392	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	15,984	90,096	2,402	3,779	331	351	41.2	25.7	89.4	43,901	2E+05	1E+05	9E+04
10L096	1,745	10,729	288	260	28	67	3.6	2.9	10.8	5,150	2E+04	2E+04	1E+04
11BDO28	16,160	78,999	2,964	20,378	509	434	106.3	29.1	88.2	38,713	1E+05	1E+05	1E+05
11BDO123	3,042	16,175	456	597	79	79	8.8	4.3	14.7	7,760	3E+04	2E+04	2E+04
11IDO577	38,838	202,385	6,234	12,170	1,687	927	187.1	58.2	192.9	93,109	4E+05	2E+05	3E+05
11M093	1,209	4,464	176	707	35	23	5.2	1.4	5.3	2,392	1E+04	7E+03	8E+03
12BDO10	14	34	2	14	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	33	81	4	29	1	2	0.1	0.0	0.1	36	3E+02	5E+02	5E+02
12BDO124	12,272	67,682	1,919	4,874	268	287	38.5	19.5	63.6	33,106	1E+05	9E+04	8E+04
12EDO418	248	1,139	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table C2-1. Scenario 1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	167	843	23	63	3	3	0.5	0.2	0.7	418	1E+03	1E+03	1E+03
12HOFDO92	1,031	2,890	414	2,439	105	160	21.1	3.2	13.1	2,856	5E+03	9E+03	1E+04
12HDO85/87	513	1,543	77	456	15	50	2.7	0.4	3.0	619	7E+03	1E+04	1E+04
12L092	2,536	11,743	363	930	86	51	10.2	3.5	12.0	5,632	2E+04	1E+04	1E+04
12LDO296	552	2,660	78	243	14	10	2.0	0.7	2.9	1,318	4E+03	3E+03	2E+03
12M091	389	1,427	59	273	10	7	1.7	0.5	1.6	771	3E+03	2E+03	2E+03
13DSDO078	1,994	6,197	253	1,442	107	31	13.0	1.7	4.8	2,760	9E+03	7E+03	1E+04
13EDO177	58	124	8	107	3	1	0.5	0.1	0.1	61	9E+01	4E+02	5E+02
13EDO174	1,451	8,311	212	284	22	27	2.8	2.3	7.6	4,121	1E+04	1E+04	6E+03
13EDO176	41	99	3	31	1	0	0.2	0.1	0.2	48	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	117	314	8	81	3	3	0.5	0.3	1.0	143	4E+02	1E+03	2E+03
13L090	36,773	179,236	5,615	5,104	1,873	822	179.8	44.3	155.0	81,057	3E+05	2E+05	2E+05
14CDO9	860	5,109	170	785	27	25	4.9	1.7	5.2	2,445	1E+04	7E+03	6E+03
15FSDO288	2,236	11,523	343	1,434	51	41	8.7	3.7	11.4	5,702	2E+04	2E+04	2E+04
15L089	14,786	67,601	2,219	4,537	682	326	73.6	17.7	62.8	31,453	1E+05	7E+04	9E+04
15L088	7,621	46,312	1,204	283	168	204	17.5	12.4	49.2	22,421	9E+04	6E+04	4E+04
16L097	602	1,880	72	571	19	39	3.5	1.5	6.7	779	4E+03	8E+03	8E+03
16LSDO122	9,017	46,606	1,385	2,399	287	285	33.3	12.4	48.3	22,010	9E+04	7E+04	7E+04
17M033	5,933	29,145	818	1,722	126	312	17.7	12.0	53.6	13,353	7E+04	7E+04	7E+04
18GSDO233	4,982	22,737	634	445	85	303	9.3	5.8	28.5	10,303	7E+04	8E+04	8E+04
19GDO043	5,429	35,641	887	312	102	128	11.1	10.3	35.3	17,093	7E+04	4E+04	3E+04
19GDO194	467	2,443	74	167	18	10	2.1	0.8	2.9	1,160	4E+03	4E+03	4E+03
19G199	65	191	2	2	2	2	0.1	0.2	0.8	81	1E+02	7E+02	8E+02
20G163	355	1,409	10	22	9	17	1.1	2.0	9.0	539	1E+03	4E+03	5E+03
20L083	219	949	26	7	4	9	0.6	0.1	2.1	515	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	72	2	4	1	0	0.1	0.0	0.1	34	1E+02	9E+01	1E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	173	3E+02	4E+02	3E+02
21KSDO069	9,436	54,271	1,404	881	228	295	24.6	16.4	65.6	25,522	1E+05	8E+04	7E+04
21M005	161	462	13	35	4	3	0.4	0.1	1.0	246	2E+02	3E+02	3E+02
21M010	983	3,312	85	55	20	25	2.4	0.4	7.4	1,775	2E+03	2E+03	3E+03
21M050	462	1,327	32	19	10	8	1.0	0.2	3.0	708	1E+03	8E+02	2E+03
22CDO384	2,616	10,009	380	1,745	132	53	16.4	2.8	8.5	4,526	2E+04	1E+04	1E+04
22LSDO580	1,266	4,644	126	59	25	33	3.2	0.6	12.4	2,571	3E+03	3E+03	4E+03
23GDO132	4,590	9,833	272	2,118	127	67	15.8	3.9	17.3	4,554	8E+03	9E+03	1E+04
23HSDO042	19,151	83,555	2,813	4,793	900	588	99.9	27.3	108.5	38,603	2E+05	1E+05	1E+05
23HDO040	3,011	18,085	455	290	63	83	6.9	5.1	19.3	8,547	4E+04	3E+04	2E+04
23L196	147	294	7	33	4	1	0.4	0.1	0.7	149	1E+02	4E+01	2E+02
23L075	659	1,625	49	205	19	7	2.1	0.3	3.5	861	2E+03	7E+02	3E+03
23L074	147	313	7	19	4	1	0.3	0.0	0.4	163	9E+01	6E+01	2E+02
23L195	153	292	9	71	4	1	0.5	0.1	0.7	157	2E+02	6E+01	4E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	961	2,393	77	87	23	48	2.0	0.3	5.3	1,093	8E+03	1E+04	1E+04
24CSDO031	327	2,068	54	49	4	7	0.6	0.6	2.0	1,032	4E+03	2E+03	1E+03

Table C2-1. Scenario 1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,955	10,538	323	983	45	59	7.0	3.2	11.0	5,168	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	23,707	131,469	4,234	7,060	800	606	95.3	41.3	137.1	70,548	2E+05	2E+05	1E+05
24GSDO035	26,206	153,221	3,884	4,040	444	686	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
24GSDO034	1,827	7,017	179	855	42	27	5.8	2.7	11.8	3,443	1E+04	2E+04	2E+04
24L233	456	1,344	33	82	23	12	2.3	1.1	5.3	518	1E+03	9E+02	3E+03
25DDO040	594	2,948	84	191	12	20	1.7	1.0	4.7	1,426	6E+03	5E+03	4E+03
25EDO037	15,675	83,702	2,174	3,106	300	445	37.5	25.7	105.6	40,389	2E+05	1E+05	1E+05
25GDO041	76	264	9	29	6	3	0.6	0.3	1.1	91	3E+02	2E+02	6E+02
25GDO-06	239	648	18	216	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	9,304	26,625	1,080	709	747	197	65.7	6.3	31.8	9,700	4E+04	2E+04	8E+04
25L144	550	3,836	90	9	10	14	1.1	1.0	3.5	1,795	8E+03	5E+03	3E+03
25L058	4,849	26,162	669	464	91	173	9.9	7.2	30.3	12,324	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,954	18,585	531	1,831	127	92	16.9	8.2	31.3	8,745	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	162	428	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	461	1,103	63	491	33	10	4.2	0.4	1.2	426	2E+03	8E+02	3E+03
26KSDO254	354	1,211	45	108	5	35	0.9	0.2	2.7	531	5E+03	8E+03	9E+03
26K035	199	421	11	31	6	1	0.5	0.1	1.1	228	5E+02	8E+01	9E+02
26K099	13,426	86,274	2,048	740	182	382	21.3	25.0	92.7	41,146	2E+05	1E+05	9E+04
26L055	182	1,064	29	12	7	4	0.6	0.3	0.8	491	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	397	791	30	354	13	6	2.0	0.5	2.2	372	4E+02	6E+02	6E+02
27JSDO096	2,128	4,291	96	301	55	15	4.5	0.6	4.9	2,133	2E+03	4E+03	5E+03
27JSDO001	8,238	47,554	1,181	1,487	137	269	18.3	14.4	58.8	22,443	1E+05	7E+04	6E+04
27L022	2,395	14,543	343	279	46	69	5.5	5.6	21.1	6,823	3E+04	2E+04	1E+04
27L020	2,270	13,661	322	277	45	65	5.4	5.2	19.8	6,385	3E+04	2E+04	1E+04
28K061	4,675	30,240	757	340	69	142	8.1	8.3	29.1	14,455	7E+04	5E+04	3E+04
28K010	4,159	28,807	700	236	50	110	6.2	8.0	27.0	13,904	6E+04	4E+04	2E+04
28K386	729	1,797	59	351	19	22	2.6	0.6	4.1	875	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,265	3,703	109	686	52	22	6.3	2.2	9.2	1,641	5E+03	7E+03	1E+04
28N156	351	2,001	57	99	6	13	0.8	0.6	2.1	972	4E+03	3E+03	3E+03
28N207	3,473	21,231	544	406	68	102	7.8	6.4	22.8	10,127	4E+04	3E+04	2E+04
28O025	56	256	10	17	1	2	0.2	0.1	0.2	130	7E+02	6E+02	6E+02
28P001	336	2,244	56	20	5	7	0.5	0.6	2.0	1,099	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	18,519	119,932	2,898	1,025	265	558	31.5	34.5	130.4	57,232	3E+05	2E+05	1E+05
29M049	1,362	7,577	207	162	36	49	3.9	2.1	8.1	3,513	2E+04	1E+04	1E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	443	2,463	65	139	8	10	1.2	0.7	2.9	1,215	4E+03	3E+03	2E+03
29O001	12,302	76,280	2,008	2,099	239	314	29.4	21.4	74.4	36,898	1E+05	1E+05	7E+04
29P015	84	568	15	12	1	2	0.2	0.2	0.5	278	1E+03	6E+02	4E+02
29P044	647	4,357	111	74	10	15	1.2	1.2	3.9	2,128	8E+03	5E+03	3E+03
30J006	244	707	25	166	8	5	1.2	0.2	1.1	354	9E+02	3E+03	4E+03

Table C2-1. Scenario 1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	758	1,619	39	137	18	6	1.7	0.2	2.8	840	5E+02	6E+02	9E+02
30P107	372	1,976	72	93	6	11	0.9	0.5	1.7	1,001	4E+03	3E+03	2E+03
30P062	319	2,122	55	44	5	7	0.6	0.6	1.9	1,049	4E+03	2E+03	1E+03
31O004	1,074	6,476	226	138	19	34	2.4	1.5	5.0	3,174	2E+04	1E+04	7E+03
31P084	331	2,051	52	68	4	7	0.6	0.6	2.0	1,012	4E+03	2E+03	1E+03
3FDO159	347	1,529	63	485	14	8	2.7	0.6	1.7	741	2E+03	2E+03	2E+03
11G318/319	385	1,082	75	697	13	40	3.3	0.5	2.6	436	5E+03	8E+03	8E+03
6FSDO233	8	18	4	82	1	0	0.3	0.0	0.1	9	1E+01	2E+01	2E+01
17FDO012	2,803	6,166	138	82	56	56	3.6	0.9	6.1	2,830	3E+04	6E+04	6E+04
21H047	533	1,969	34	71	16	15	1.7	1.6	6.8	827	2E+03	2E+03	2E+03
21H039	1,516	4,664	67	315	45	46	5.2	5.2	22.9	1,874	4E+03	4E+03	5E+03
20G161	2,765	11,787	329	221	70	119	7.7	5.8	24.8	5,343	3E+04	2E+04	2E+04
StonyMWRA	126,105	595,983	20,077	61,575	5,085	3,402	664.1	203.0	697.0	287,336	1E+06	7E+05	8E+05
Fens	73,634	230,751	11,751	17,350	4,622	2,273	535.1	98.2	298.4	117,653	3E+05	2E+05	2E+05
20D055	6,133	39,985	1,051	429	123	141	13.3	11.4	37.7	19,467	8E+04	5E+04	3E+04
21D319	8,025	53,234	1,389	796	149	185	17.1	15.0	49.4	25,941	1E+05	6E+04	4E+04

Table C2-2. Scenario 1.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,085	4,435	151	893	30	21	5.4	1.3	5.8	2,247	5E+03	5E+03	4E+03
1FDO31	902	4,311	116	180	20	20	2.2	1.1	4.2	2,102	7E+03	6E+03	5E+03
02E086	289	1,233	46	312	11	5	1.8	0.4	1.4	598	2E+03	2E+03	1E+03
2FDO120	1,554	7,893	223	547	35	34	4.9	2.1	9.1	3,922	1E+04	9E+03	8E+03
2FDO93	1,662	11,743	285	99	19	38	2.4	3.2	10.6	5,720	2E+04	1E+04	8E+03
2FDO85	106	498	13	25	3	2	0.3	0.1	0.4	244	8E+02	5E+02	4E+02
3ESDO186	363	1,700	69	543	14	8	2.9	0.7	2.0	830	3E+03	2E+03	1E+03
3ESDO185	660	3,053	117	330	15	14	2.4	0.9	2.9	1,582	6E+03	4E+03	3E+03
3F162	587	2,934	103	484	25	12	3.6	0.9	2.8	1,396	5E+03	3E+03	3E+03
4ESDO69	1,801	8,649	271	900	43	42	6.7	2.7	9.9	4,309	2E+04	1E+04	1E+04
4ESDO64	43	148	7	56	2	1	0.3	0.1	0.2	70	3E+02	4E+02	4E+02
4FDO189	875	5,068	135	136	20	17	2.2	1.4	4.8	2,482	9E+03	5E+03	4E+03
4FDO204	994	5,227	160	493	32	19	4.3	1.5	4.7	2,524	9E+03	5E+03	5E+03
4FDO16	470	2,716	74	69	11	12	1.2	0.7	2.5	1,311	5E+03	3E+03	3E+03
4FDO203	145	652	25	173	6	3	1.0	0.2	0.7	315	1E+03	9E+02	8E+02
4FDO118	667	3,835	98	88	11	16	1.3	1.0	3.6	1,878	7E+03	5E+03	3E+03
4FDO119	1,385	5,612	146	45	24	38	3.1	0.9	10.8	2,988	4E+03	5E+03	4E+03
5CSDO110	872	3,024	138	639	35	25	5.0	1.0	3.3	1,554	7E+03	5E+03	7E+03
5EDO182	122	600	32	351	6	3	1.6	0.3	0.8	294	9E+02	6E+02	4E+02
5ESDO184	713	3,285	151	1,416	31	15	6.9	1.5	3.9	1,611	5E+03	4E+03	3E+03
5FDO117	905	4,722	158	707	32	19	5.0	1.5	4.6	2,277	8E+03	5E+03	4E+03
5FDO254	62	396	10	10	1	1	0.1	0.1	0.4	197	7E+02	4E+02	2E+02
5FDO265	21	43	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	731	3,963	108	131	18	18	2.0	1.1	3.6	1,914	8E+03	5E+03	5E+03
5FDO245	1,545	9,311	246	328	28	32	3.6	2.6	9.1	4,591	2E+04	1E+04	7E+03
5FDO244	257	1,329	35	52	5	5	0.6	0.3	1.8	663	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	1,046	6,432	161	140	17	24	2.1	2.0	7.1	3,142	1E+04	7E+03	5E+03
5GDO116A	946	5,472	149	355	16	18	2.5	1.6	5.1	2,728	9E+03	6E+03	3E+03
5GDO115	262	1,603	42	32	5	6	0.6	0.4	1.6	786	3E+03	2E+03	1E+03
5GDO116	825	4,845	124	77	18	16	1.9	1.3	4.4	2,351	9E+03	5E+03	3E+03
6DDO57	153	614	22	135	6	2	0.9	0.2	0.6	299	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	87	276	11	42	2	7	0.3	0.1	0.4	118	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	36	187	8	50	2	1	0.4	0.1	0.2	86	3E+02	2E+02	2E+02
6DDO83	177	824	38	286	10	4	1.8	0.3	0.9	383	1E+03	1E+03	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,664	9,186	249	249	48	33	5.0	2.5	8.1	4,389	2E+04	1E+04	1E+04
6GDO110	2,025	12,272	325	336	44	42	5.1	3.4	10.9	5,981	2E+04	1E+04	9E+03
6GDO111	299	1,373	64	575	14	7	3.0	0.6	1.7	663	2E+03	1E+03	1E+03
6GDO166	166	630	40	504	9	4	2.3	0.4	1.0	306	9E+02	5E+02	6E+02
6GDO108	5,335	31,644	836	847	119	116	13.5	8.6	28.5	15,352	6E+04	4E+04	3E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	87	432	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	243	1,157	38	173	7	4	1.1	0.4	1.1	569	2E+03	1E+03	8E+02

Table C2-2. Scenario 1.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	553	2,871	90	397	16	11	2.6	0.9	2.8	1,401	5E+03	3E+03	2E+03
7CDO006	6,770	32,628	1,132	6,842	195	144	37.6	11.5	35.6	16,131	6E+04	4E+04	5E+04
7HDO285	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
7HDO105	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
7HDO348	53	355	9	9	1	1	0.1	0.1	0.3	177	6E+02	4E+02	2E+02
7HDO347	353	1,854	57	194	11	7	1.6	0.5	1.7	899	3E+03	2E+03	2E+03
7HDO346	328	2,068	53	67	5	7	0.7	0.6	1.8	1,012	4E+03	2E+03	1E+03
8BDO122	1,734	9,972	246	268	32	45	3.9	3.8	14.1	4,765	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	969	6,276	157	119	12	21	1.6	1.8	6.0	3,095	1E+04	7E+03	4E+03
8CDO25	216	721	43	425	9	5	2.1	0.4	1.1	383	2E+03	2E+03	2E+03
8CDO26	203	721	41	365	8	5	1.8	0.4	1.0	386	2E+03	1E+03	2E+03
8DDO112	35	208	6	7	1	1	0.1	0.1	0.2	101	4E+02	4E+02	3E+02
8DSDO100	92	304	16	165	3	4	0.8	0.1	0.5	147	7E+02	1E+03	1E+03
8EDO35	140	404	29	425	8	2	1.9	0.3	0.6	203	5E+02	2E+03	2E+03
8EDO33	544	3,461	96	240	9	12	1.6	1.0	3.3	1,706	6E+03	4E+03	2E+03
8IDO153	43	287	7	3	0	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	56	2E+02	4E+02	4E+02
8IDO156	350	749	46	558	19	4	3.3	0.3	0.7	328	5E+02	1E+02	8E+02
8IDO209	111	711	18	18	1	2	0.2	0.2	0.6	352	1E+03	9E+02	5E+02
8IDO154	978	5,581	152	238	22	24	2.8	1.7	5.6	2,701	1E+04	8E+03	6E+03
8IDO158	440	2,684	71	123	9	10	1.2	0.9	3.0	1,317	5E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,301	8,260	211	223	23	30	3.0	2.6	9.2	4,022	1E+04	9E+03	6E+03
8JSDO103	1,094	6,687	182	301	23	23	3.0	1.9	6.2	3,283	1E+04	7E+03	5E+03
8JSDO41	632	4,098	105	98	11	14	1.4	1.2	4.1	2,003	7E+03	5E+03	3E+03
8JSDO50	1,379	7,408	200	342	37	30	4.4	2.4	8.3	3,552	1E+04	1E+04	8E+03
8K049	182	1,094	31	60	5	4	0.6	0.3	1.0	531	2E+03	1E+03	9E+02
9BDO49	373	1,041	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	67	345	10	17	2	1	0.2	0.1	0.3	165	6E+02	4E+02	3E+02
9EDO243	188	682	25	162	7	4	1.0	0.2	0.6	330	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	710	2,670	109	804	25	22	4.5	0.9	3.1	1,274	5E+03	7E+03	7E+03
9K016	70	216	27	421	7	3	1.9	0.2	0.6	98	3E+02	5E+02	6E+02
9LSDO095	253	991	42	321	7	11	1.5	0.4	1.3	478	3E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	129	392	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	15,984	90,096	2,402	3,779	331	351	41.2	25.7	89.4	43,901	2E+05	1E+05	9E+04
10L096	1,745	10,729	288	260	28	67	3.6	2.9	10.8	5,150	2E+04	2E+04	1E+04
11BDO28	16,160	78,999	2,964	20,378	509	434	106.3	29.1	88.2	38,713	1E+05	1E+05	1E+05
11BDO123	3,042	16,175	456	597	79	79	8.8	4.3	14.7	7,760	3E+04	2E+04	2E+04
11IDO577	38,838	202,385	6,234	12,170	1,687	927	187.1	58.2	192.9	93,109	4E+05	2E+05	3E+05
11M093	1,209	4,464	176	707	35	23	5.2	1.4	5.3	2,392	1E+04	7E+03	8E+03
12BDO10	14	34	2	14	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	33	81	4	29	1	2	0.1	0.0	0.1	36	3E+02	5E+02	5E+02
12BDO124	12,272	67,682	1,919	4,874	268	287	38.5	19.5	63.6	33,106	1E+05	9E+04	8E+04
12EDO418	248	1,139	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table C2-2. Scenario 1.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	167	843	23	63	3	3	0.5	0.2	0.7	418	1E+03	1E+03	1E+03
12HOFDO92	1,031	2,890	414	2,439	105	160	21.1	3.2	13.1	2,856	5E+03	9E+03	1E+04
12HDO85/87	513	1,543	77	456	15	50	2.7	0.4	3.0	619	7E+03	1E+04	1E+04
12L092	2,536	11,743	363	930	86	51	10.2	3.5	12.0	5,632	2E+04	1E+04	1E+04
12LDO296	552	2,660	78	243	14	10	2.0	0.7	2.9	1,318	4E+03	3E+03	2E+03
12M091	389	1,427	59	273	10	7	1.7	0.5	1.6	771	3E+03	2E+03	2E+03
13DSDO078	1,994	6,197	253	1,442	107	31	13.0	1.7	4.8	2,760	9E+03	7E+03	1E+04
13EDO177	58	124	8	107	3	1	0.5	0.1	0.1	61	9E+01	4E+02	5E+02
13EDO174	1,451	8,311	212	284	22	27	2.8	2.3	7.6	4,121	1E+04	1E+04	6E+03
13EDO176	41	99	3	31	1	0	0.2	0.1	0.2	48	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	117	314	8	81	3	3	0.5	0.3	1.0	143	4E+02	1E+03	2E+03
13L090	36,773	179,236	5,615	5,104	1,873	822	179.8	44.3	155.0	81,057	3E+05	2E+05	2E+05
14CDO9	860	5,109	170	785	27	25	4.9	1.7	5.2	2,445	1E+04	7E+03	6E+03
15FSDO288	2,236	11,523	343	1,434	51	41	8.7	3.7	11.4	5,702	2E+04	2E+04	2E+04
15L089	14,786	67,601	2,219	4,537	682	326	73.6	17.7	62.8	31,453	1E+05	7E+04	9E+04
15L088	7,621	46,312	1,204	283	168	204	17.5	12.4	49.2	22,421	9E+04	6E+04	4E+04
16L097	602	1,880	72	571	19	39	3.5	1.5	6.7	779	4E+03	8E+03	8E+03
16LSDO122	9,017	46,606	1,385	2,399	287	285	33.3	12.4	48.3	22,010	9E+04	7E+04	7E+04
17M033	5,933	29,145	818	1,722	126	312	17.7	12.0	53.6	13,353	7E+04	7E+04	7E+04
18GSDO233	4,518	20,297	568	439	82	215	8.9	5.2	25.2	9,201	6E+04	7E+04	7E+04
19GDO043	5,429	35,641	887	312	102	128	11.1	10.3	35.3	17,093	7E+04	4E+04	3E+04
19GDO194	467	2,443	74	167	18	10	2.1	0.8	2.9	1,160	4E+03	4E+03	4E+03
19G199	65	191	2	2	2	1	0.1	0.2	0.8	83	1E+02	7E+02	8E+02
20G163	359	1,434	11	22	9	14	1.1	2.1	9.2	548	1E+03	5E+03	5E+03
20L083	219	949	26	7	4	9	0.6	0.1	2.1	515	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	72	2	4	1	0	0.1	0.0	0.1	34	1E+02	9E+01	1E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	180	3E+02	4E+02	3E+02
21KSDO069	9,436	54,271	1,404	881	228	295	24.6	16.4	65.6	25,522	1E+05	8E+04	7E+04
21M005	161	462	13	35	4	3	0.4	0.1	1.0	246	2E+02	3E+02	3E+02
21M010	983	3,312	85	55	20	25	2.4	0.4	7.4	1,775	2E+03	2E+03	3E+03
21M050	462	1,327	32	19	10	8	1.0	0.2	3.0	708	1E+03	8E+02	2E+03
22CDO384	2,616	10,009	380	1,745	132	53	16.4	2.8	8.5	4,526	2E+04	1E+04	1E+04
22LSDO580	1,266	4,644	126	59	25	33	3.2	0.6	12.4	2,571	3E+03	3E+03	4E+03
23GDO132	4,590	9,833	272	2,118	127	67	15.8	3.9	17.3	4,554	8E+03	9E+03	1E+04
23HSDO042	19,143	83,555	2,813	4,793	900	586	99.9	27.3	108.5	38,596	2E+05	1E+05	1E+05
23HDO040	3,011	18,085	455	290	63	83	6.9	5.1	19.3	8,547	4E+04	3E+04	2E+04
23L196	147	294	7	33	4	1	0.4	0.1	0.7	149	1E+02	4E+01	2E+02
23L075	659	1,625	49	205	19	7	2.1	0.3	3.5	861	2E+03	7E+02	3E+03
23L074	147	313	7	19	4	1	0.3	0.0	0.4	163	9E+01	6E+01	2E+02
23L195	153	292	9	71	4	1	0.5	0.1	0.7	157	2E+02	6E+01	4E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	961	2,393	77	87	23	48	2.0	0.3	5.3	1,093	8E+03	1E+04	1E+04
24CSDO031	327	2,068	54	49	4	7	0.6	0.6	2.0	1,032	4E+03	2E+03	1E+03

Table C2-2. Scenario 1.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,814	9,509	296	985	44	44	6.9	2.9	10.0	4,647	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	23,744	131,763	4,249	7,061	805	491	95.9	41.3	137.1	70,673	2E+05	2E+05	1E+05
24GSDO035	26,206	153,221	3,884	4,040	444	686	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
24GSDO034	1,827	7,017	179	855	42	27	5.8	2.7	11.8	3,443	1E+04	2E+04	2E+04
24L233	456	1,344	33	82	23	12	2.3	1.1	5.3	518	1E+03	9E+02	3E+03
25DDO040	594	2,948	84	191	12	20	1.7	1.0	4.7	1,426	6E+03	5E+03	4E+03
25EDO037	15,653	83,555	2,171	3,107	300	363	37.5	25.6	105.2	40,330	2E+05	1E+05	1E+05
25GDO041	76	264	9	29	6	3	0.6	0.3	1.1	91	3E+02	2E+02	6E+02
25GDO-06	239	648	18	216	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	9,304	26,625	1,080	709	747	197	65.7	6.3	31.8	9,700	4E+04	2E+04	8E+04
25L144	550	3,836	90	9	10	14	1.1	1.0	3.5	1,795	8E+03	5E+03	3E+03
25L058	4,849	26,162	669	464	91	173	9.9	7.2	30.3	12,324	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,954	18,585	531	1,831	127	92	16.9	8.2	31.3	8,745	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	162	428	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	461	1,103	63	491	33	10	4.2	0.4	1.2	426	2E+03	8E+02	3E+03
26KSDO254	354	1,211	45	108	5	35	0.9	0.2	2.7	531	5E+03	8E+03	9E+03
26K035	199	421	11	31	6	1	0.5	0.1	1.1	228	5E+02	8E+01	9E+02
26K099	13,426	86,274	2,048	740	182	382	21.3	25.0	92.7	41,146	2E+05	1E+05	9E+04
26L055	182	1,064	29	12	7	4	0.6	0.3	0.8	491	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	397	791	30	354	13	6	2.0	0.5	2.2	372	4E+02	6E+02	6E+02
27JSDO096	2,128	4,291	96	301	55	15	4.5	0.6	4.9	2,133	2E+03	4E+03	5E+03
27JSDO001	8,238	47,554	1,181	1,487	137	269	18.3	14.4	58.8	22,443	1E+05	7E+04	6E+04
27L022	2,395	14,543	343	279	46	69	5.5	5.6	21.1	6,823	3E+04	2E+04	1E+04
27L020	2,270	13,661	322	277	45	65	5.4	5.2	19.8	6,385	3E+04	2E+04	1E+04
28K061	4,675	30,240	757	340	69	142	8.1	8.3	29.1	14,455	7E+04	5E+04	3E+04
28K010	4,159	28,807	700	236	50	110	6.2	8.0	27.0	13,904	6E+04	4E+04	2E+04
28K386	729	1,797	59	351	19	22	2.6	0.6	4.1	875	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,265	3,703	109	686	52	22	6.3	2.2	9.2	1,641	5E+03	7E+03	1E+04
28N156	351	2,001	57	99	6	13	0.8	0.6	2.1	972	4E+03	3E+03	3E+03
28N207	3,473	21,231	544	406	68	102	7.8	6.4	22.8	10,127	4E+04	3E+04	2E+04
28O025	56	256	10	17	1	2	0.2	0.1	0.2	130	7E+02	6E+02	6E+02
28P001	336	2,244	56	20	5	7	0.5	0.6	2.0	1,099	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	18,519	119,932	2,898	1,025	265	558	31.5	34.5	130.4	57,232	3E+05	2E+05	1E+05
29M049	1,362	7,577	207	162	36	49	3.9	2.1	8.1	3,513	2E+04	1E+04	1E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	443	2,463	65	139	8	10	1.2	0.7	2.9	1,215	4E+03	3E+03	2E+03
29O001	12,302	76,280	2,008	2,099	239	314	29.4	21.4	74.4	36,898	1E+05	1E+05	7E+04
29P015	84	568	15	12	1	2	0.2	0.2	0.5	278	1E+03	6E+02	4E+02
29P044	647	4,357	111	74	10	15	1.2	1.2	3.9	2,128	8E+03	5E+03	3E+03
30J006	244	707	25	166	8	5	1.2	0.2	1.1	354	9E+02	3E+03	4E+03

Table C2-2. Scenario 1.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	758	1,619	39	137	18	6	1.7	0.2	2.8	840	5E+02	6E+02	9E+02
30P107	372	1,976	72	93	6	11	0.9	0.5	1.7	1,001	4E+03	3E+03	2E+03
30P062	319	2,122	55	44	5	7	0.6	0.6	1.9	1,049	4E+03	2E+03	1E+03
31O004	1,074	6,476	226	138	19	34	2.4	1.5	5.0	3,174	2E+04	1E+04	7E+03
31P084	331	2,051	52	68	4	7	0.6	0.6	2.0	1,012	4E+03	2E+03	1E+03
3FDO159	347	1,529	63	485	14	8	2.7	0.6	1.7	741	2E+03	2E+03	2E+03
11G318/319	385	1,082	75	697	13	40	3.3	0.5	2.6	436	5E+03	8E+03	8E+03
6FSDO233	8	18	4	82	1	0	0.3	0.0	0.1	9	1E+01	2E+01	2E+01
17FDO012	2,803	6,166	138	82	56	80	3.6	0.9	6.1	2,865	3E+04	6E+04	6E+04
21H047	533	1,969	34	71	16	15	1.7	1.6	6.8	827	2E+03	2E+03	2E+03
21H039	1,516	4,664	67	315	45	46	5.2	5.2	22.9	1,874	4E+03	4E+03	5E+03
20G161	2,756	11,685	328	223	71	96	7.8	5.7	24.7	5,299	3E+04	2E+04	2E+04
StonyMWRA	126,105	595,983	20,077	61,575	5,085	3,402	664.1	203.0	697.0	287,336	1E+06	7E+05	8E+05
Fens	73,399	230,383	11,729	17,350	4,619	2,213	534.7	97.9	297.6	117,433	3E+05	2E+05	2E+05
20D055	6,133	39,985	1,051	429	123	141	13.3	11.4	37.7	19,467	8E+04	5E+04	3E+04
21D319	8,025	53,234	1,389	796	149	185	17.1	15.0	49.4	25,941	1E+05	6E+04	4E+04

Table C2-3. Scenario 1.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,085	4,435	151	893	30	21	5.4	1.3	5.8	2,247	5E+03	5E+03	4E+03
1FDO31	902	4,311	116	180	20	20	2.2	1.1	4.2	2,102	7E+03	6E+03	5E+03
02E086	289	1,233	46	312	11	5	1.8	0.4	1.4	598	2E+03	2E+03	1E+03
2FDO120	1,554	7,893	223	547	35	34	4.9	2.1	9.1	3,922	1E+04	9E+03	8E+03
2FDO93	1,662	11,743	285	99	19	38	2.4	3.2	10.6	5,720	2E+04	1E+04	8E+03
2FDO85	106	498	13	25	3	2	0.3	0.1	0.4	244	8E+02	5E+02	4E+02
3ESDO186	363	1,700	69	543	14	8	2.9	0.7	2.0	830	3E+03	2E+03	1E+03
3ESDO185	660	3,053	117	330	15	14	2.4	0.9	2.9	1,582	6E+03	4E+03	3E+03
3F162	587	2,934	103	484	25	12	3.6	0.9	2.8	1,396	5E+03	3E+03	3E+03
4ESDO69	1,801	8,649	271	900	43	42	6.7	2.7	9.9	4,309	2E+04	1E+04	1E+04
4ESDO64	43	148	7	56	2	1	0.3	0.1	0.2	70	3E+02	4E+02	4E+02
4FDO189	875	5,068	135	136	20	17	2.2	1.4	4.8	2,482	9E+03	5E+03	4E+03
4FDO204	994	5,227	160	493	32	19	4.3	1.5	4.7	2,524	9E+03	5E+03	5E+03
4FDO16	470	2,716	74	69	11	12	1.2	0.7	2.5	1,311	5E+03	3E+03	3E+03
4FDO203	145	652	25	173	6	3	1.0	0.2	0.7	315	1E+03	9E+02	8E+02
4FDO118	667	3,835	98	88	11	16	1.3	1.0	3.6	1,878	7E+03	5E+03	3E+03
4FDO119	1,385	5,612	146	45	24	38	3.1	0.9	10.8	2,988	4E+03	5E+03	4E+03
5CSDO110	872	3,024	138	639	35	25	5.0	1.0	3.3	1,554	7E+03	5E+03	7E+03
5EDO182	122	600	32	351	6	3	1.6	0.3	0.8	294	9E+02	6E+02	4E+02
5ESDO184	713	3,285	151	1,416	31	15	6.9	1.5	3.9	1,611	5E+03	4E+03	3E+03
5FDO117	905	4,722	158	707	32	19	5.0	1.5	4.6	2,277	8E+03	5E+03	4E+03
5FDO254	62	396	10	10	1	1	0.1	0.1	0.4	197	7E+02	4E+02	2E+02
5FDO265	21	43	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	731	3,963	108	131	18	18	2.0	1.1	3.6	1,914	8E+03	5E+03	5E+03
5FDO245	1,545	9,311	246	328	28	32	3.6	2.6	9.1	4,591	2E+04	1E+04	7E+03
5FDO244	257	1,329	35	52	5	5	0.6	0.3	1.8	663	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	1,046	6,432	161	140	17	24	2.1	2.0	7.1	3,142	1E+04	7E+03	5E+03
5GDO116A	946	5,472	149	355	16	18	2.5	1.6	5.1	2,728	9E+03	6E+03	3E+03
5GDO115	262	1,603	42	32	5	6	0.6	0.4	1.6	786	3E+03	2E+03	1E+03
5GDO116	825	4,845	124	77	18	16	1.9	1.3	4.4	2,351	9E+03	5E+03	3E+03
6DDO57	153	614	22	135	6	2	0.9	0.2	0.6	299	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	87	276	11	42	2	7	0.3	0.1	0.4	118	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	36	187	8	50	2	1	0.4	0.1	0.2	86	3E+02	2E+02	2E+02
6DDO83	177	824	38	286	10	4	1.8	0.3	0.9	383	1E+03	1E+03	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,664	9,186	249	249	48	33	5.0	2.5	8.1	4,389	2E+04	1E+04	1E+04
6GDO110	2,025	12,272	325	336	44	42	5.1	3.4	10.9	5,981	2E+04	1E+04	9E+03
6GDO111	299	1,373	64	575	14	7	3.0	0.6	1.7	663	2E+03	1E+03	1E+03
6GDO166	166	630	40	504	9	4	2.3	0.4	1.0	306	9E+02	5E+02	6E+02
6GDO108	5,335	31,644	836	847	119	116	13.5	8.6	28.5	15,352	6E+04	4E+04	3E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	87	432	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	243	1,157	38	173	7	4	1.1	0.4	1.1	569	2E+03	1E+03	8E+02

Table C2-3. Scenario 1.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	553	2,871	90	397	16	11	2.6	0.9	2.8	1,401	5E+03	3E+03	2E+03
7CDO006	6,770	32,628	1,132	6,842	195	144	37.6	11.5	35.6	16,131	6E+04	4E+04	5E+04
7HDO285	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
7HDO105	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
7HDO348	53	355	9	9	1	1	0.1	0.1	0.3	177	6E+02	4E+02	2E+02
7HDO347	353	1,854	57	194	11	7	1.6	0.5	1.7	899	3E+03	2E+03	2E+03
7HDO346	328	2,068	53	67	5	7	0.7	0.6	1.8	1,012	4E+03	2E+03	1E+03
8BDO122	1,734	9,972	246	268	32	45	3.9	3.8	14.1	4,765	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	969	6,276	157	119	12	21	1.6	1.8	6.0	3,095	1E+04	7E+03	4E+03
8CDO25	216	721	43	425	9	5	2.1	0.4	1.1	383	2E+03	2E+03	2E+03
8CDO26	203	721	41	365	8	5	1.8	0.4	1.0	386	2E+03	1E+03	2E+03
8DDO112	35	208	6	7	1	1	0.1	0.1	0.2	101	4E+02	4E+02	3E+02
8DSDO100	92	304	16	165	3	4	0.8	0.1	0.5	147	7E+02	1E+03	1E+03
8EDO35	140	404	29	425	8	2	1.9	0.3	0.6	203	5E+02	2E+03	2E+03
8EDO33	544	3,461	96	240	9	12	1.6	1.0	3.3	1,706	6E+03	4E+03	2E+03
8IDO153	43	287	7	3	0	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	56	2E+02	4E+02	4E+02
8IDO156	350	749	46	558	19	4	3.3	0.3	0.7	328	5E+02	1E+02	8E+02
8IDO209	111	711	18	18	1	2	0.2	0.2	0.6	352	1E+03	9E+02	5E+02
8IDO154	978	5,581	152	238	22	24	2.8	1.7	5.6	2,701	1E+04	8E+03	6E+03
8IDO158	440	2,684	71	123	9	10	1.2	0.9	3.0	1,317	5E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,301	8,260	211	223	23	30	3.0	2.6	9.2	4,022	1E+04	9E+03	6E+03
8JSDO103	1,094	6,687	182	301	23	23	3.0	1.9	6.2	3,283	1E+04	7E+03	5E+03
8JSDO41	632	4,098	105	98	11	14	1.4	1.2	4.1	2,003	7E+03	5E+03	3E+03
8JSDO50	1,379	7,408	200	342	37	30	4.4	2.4	8.3	3,552	1E+04	1E+04	8E+03
8K049	182	1,094	31	60	5	4	0.6	0.3	1.0	531	2E+03	1E+03	9E+02
9BDO49	373	1,041	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	67	345	10	17	2	1	0.2	0.1	0.3	165	6E+02	4E+02	3E+02
9EDO243	188	682	25	162	7	4	1.0	0.2	0.6	330	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	710	2,670	109	804	25	22	4.5	0.9	3.1	1,274	5E+03	7E+03	7E+03
9K016	70	216	27	421	7	3	1.9	0.2	0.6	98	3E+02	5E+02	6E+02
9LSDO095	253	991	42	321	7	11	1.5	0.4	1.3	478	3E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	129	392	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	15,984	90,096	2,402	3,779	331	351	41.2	25.7	89.4	43,901	2E+05	1E+05	9E+04
10L096	1,745	10,729	288	260	28	67	3.6	2.9	10.8	5,150	2E+04	2E+04	1E+04
11BDO28	16,160	78,999	2,964	20,378	509	434	106.3	29.1	88.2	38,713	1E+05	1E+05	1E+05
11BDO123	3,042	16,175	456	597	79	79	8.8	4.3	14.7	7,760	3E+04	2E+04	2E+04
11IDO577	38,838	202,385	6,234	12,170	1,687	927	187.1	58.2	192.9	93,109	4E+05	2E+05	3E+05
11M093	1,209	4,464	176	707	35	23	5.2	1.4	5.3	2,392	1E+04	7E+03	8E+03
12BDO10	14	34	2	14	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	33	81	4	29	1	2	0.1	0.0	0.1	36	3E+02	5E+02	5E+02
12BDO124	12,272	67,682	1,919	4,874	268	287	38.5	19.5	63.6	33,106	1E+05	9E+04	8E+04
12EDO418	248	1,139	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table C2-3. Scenario 1.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	167	843	23	63	3	3	0.5	0.2	0.7	418	1E+03	1E+03	1E+03
12HOFDO92	1,031	2,890	414	2,439	105	160	21.1	3.2	13.1	2,856	5E+03	9E+03	1E+04
12HDO85/87	513	1,543	77	456	15	50	2.7	0.4	3.0	619	7E+03	1E+04	1E+04
12L092	2,536	11,743	363	930	86	51	10.2	3.5	12.0	5,632	2E+04	1E+04	1E+04
12LDO296	552	2,660	78	243	14	10	2.0	0.7	2.9	1,318	4E+03	3E+03	2E+03
12M091	389	1,427	59	273	10	7	1.7	0.5	1.6	771	3E+03	2E+03	2E+03
13DSDO078	1,994	6,197	253	1,442	107	31	13.0	1.7	4.8	2,760	9E+03	7E+03	1E+04
13EDO177	58	124	8	107	3	1	0.5	0.1	0.1	61	9E+01	4E+02	5E+02
13EDO174	1,451	8,311	212	284	22	27	2.8	2.3	7.6	4,121	1E+04	1E+04	6E+03
13EDO176	41	99	3	31	1	0	0.2	0.1	0.2	48	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	117	314	8	81	3	3	0.5	0.3	1.0	143	4E+02	1E+03	2E+03
13L090	36,773	179,236	5,615	5,104	1,873	822	179.8	44.3	155.0	81,057	3E+05	2E+05	2E+05
14CDO9	860	5,109	170	785	27	25	4.9	1.7	5.2	2,445	1E+04	7E+03	6E+03
15FSDO288	2,236	11,523	343	1,434	51	41	8.7	3.7	11.4	5,702	2E+04	2E+04	2E+04
15L089	14,786	67,601	2,219	4,537	682	326	73.6	17.7	62.8	31,453	1E+05	7E+04	9E+04
15L088	7,621	46,312	1,204	283	168	204	17.5	12.4	49.2	22,421	9E+04	6E+04	4E+04
16L097	602	1,880	72	571	19	39	3.5	1.5	6.7	779	4E+03	8E+03	8E+03
16LSDO122	9,017	46,606	1,385	2,399	287	285	33.3	12.4	48.3	22,010	9E+04	7E+04	7E+04
17M033	5,933	29,145	818	1,722	126	312	17.7	12.0	53.6	13,353	7E+04	7E+04	7E+04
18GSDO233	4,518	20,297	568	439	82	197	8.9	5.2	25.2	9,201	6E+04	7E+04	7E+04
19GDO043	5,429	35,641	887	312	102	128	11.1	10.3	35.3	17,093	7E+04	4E+04	3E+04
19GDO194	467	2,443	74	167	18	10	2.1	0.8	2.9	1,160	4E+03	4E+03	4E+03
19G199	65	191	2	2	2	1	0.1	0.2	0.8	83	1E+02	7E+02	8E+02
20G163	359	1,434	11	22	9	13	1.1	2.1	9.2	548	1E+03	5E+03	5E+03
20L083	219	949	26	7	4	9	0.6	0.1	2.1	515	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	72	2	4	1	0	0.1	0.0	0.1	34	1E+02	9E+01	1E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	180	3E+02	4E+02	3E+02
21KSDO069	9,436	54,271	1,404	881	228	295	24.6	16.4	65.6	25,522	1E+05	8E+04	7E+04
21M005	161	462	13	35	4	3	0.4	0.1	1.0	246	2E+02	3E+02	3E+02
21M010	983	3,312	85	55	20	25	2.4	0.4	7.4	1,775	2E+03	2E+03	3E+03
21M050	462	1,327	32	19	10	8	1.0	0.2	3.0	708	1E+03	8E+02	2E+03
22CDO384	2,616	10,009	380	1,745	132	53	16.4	2.8	8.5	4,526	2E+04	1E+04	1E+04
22LSDO580	1,266	4,644	126	59	25	33	3.2	0.6	12.4	2,571	3E+03	3E+03	4E+03
23GDO132	4,590	9,833	272	2,118	127	67	15.8	3.9	17.3	4,554	8E+03	9E+03	1E+04
23HSDO042	19,143	83,555	2,813	4,793	900	585	99.9	27.3	108.5	38,596	2E+05	1E+05	1E+05
23HDO040	3,011	18,085	455	290	63	83	6.9	5.1	19.3	8,547	4E+04	3E+04	2E+04
23L196	147	294	7	33	4	1	0.4	0.1	0.7	149	1E+02	4E+01	2E+02
23L075	659	1,625	49	205	19	7	2.1	0.3	3.5	861	2E+03	7E+02	3E+03
23L074	147	313	7	19	4	1	0.3	0.0	0.4	163	9E+01	6E+01	2E+02
23L195	153	292	9	71	4	1	0.5	0.1	0.7	157	2E+02	6E+01	4E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	961	2,393	77	87	23	48	2.0	0.3	5.3	1,093	8E+03	1E+04	1E+04
24CSDO031	327	2,068	54	49	4	7	0.6	0.6	2.0	1,032	4E+03	2E+03	1E+03

Table C2-3. Scenario 1.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,814	9,509	296	985	44	40	6.9	2.9	10.0	4,647	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	23,744	131,763	4,249	7,061	805	449	95.9	41.3	137.1	70,673	2E+05	2E+05	1E+05
24GSDO035	26,206	153,221	3,884	4,040	444	686	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
24GSDO034	1,827	7,017	179	855	42	27	5.8	2.7	11.8	3,443	1E+04	2E+04	2E+04
24L233	456	1,344	33	82	23	12	2.3	1.1	5.3	518	1E+03	9E+02	3E+03
25DDO040	594	2,948	84	191	12	20	1.7	1.0	4.7	1,426	6E+03	5E+03	4E+03
25EDO037	15,653	83,555	2,171	3,107	300	333	37.5	25.6	105.2	40,330	2E+05	1E+05	1E+05
25GDO041	76	264	9	29	6	3	0.6	0.3	1.1	91	3E+02	2E+02	6E+02
25GDO-06	239	648	18	216	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	9,304	26,625	1,080	709	747	197	65.7	6.3	31.8	9,700	4E+04	2E+04	8E+04
25L144	550	3,836	90	9	10	14	1.1	1.0	3.5	1,795	8E+03	5E+03	3E+03
25L058	4,849	26,162	669	464	91	173	9.9	7.2	30.3	12,324	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,954	18,585	531	1,831	127	92	16.9	8.2	31.3	8,745	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	162	428	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	461	1,103	63	491	33	10	4.2	0.4	1.2	426	2E+03	8E+02	3E+03
26KSDO254	354	1,211	45	108	5	35	0.9	0.2	2.7	531	5E+03	8E+03	9E+03
26K035	199	421	11	31	6	1	0.5	0.1	1.1	228	5E+02	8E+01	9E+02
26K099	13,426	86,274	2,048	740	182	382	21.3	25.0	92.7	41,146	2E+05	1E+05	9E+04
26L055	182	1,064	29	12	7	4	0.6	0.3	0.8	491	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	397	791	30	354	13	6	2.0	0.5	2.2	372	4E+02	6E+02	6E+02
27JSDO096	2,128	4,291	96	301	55	15	4.5	0.6	4.9	2,133	2E+03	4E+03	5E+03
27JSDO001	8,238	47,554	1,181	1,487	137	269	18.3	14.4	58.8	22,443	1E+05	7E+04	6E+04
27L022	2,395	14,543	343	279	46	69	5.5	5.6	21.1	6,823	3E+04	2E+04	1E+04
27L020	2,270	13,661	322	277	45	65	5.4	5.2	19.8	6,385	3E+04	2E+04	1E+04
28K061	4,675	30,240	757	340	69	142	8.1	8.3	29.1	14,455	7E+04	5E+04	3E+04
28K010	4,159	28,807	700	236	50	110	6.2	8.0	27.0	13,904	6E+04	4E+04	2E+04
28K386	729	1,797	59	351	19	22	2.6	0.6	4.1	875	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,265	3,703	109	686	52	22	6.3	2.2	9.2	1,641	5E+03	7E+03	1E+04
28N156	351	2,001	57	99	6	13	0.8	0.6	2.1	972	4E+03	3E+03	3E+03
28N207	3,473	21,231	544	406	68	102	7.8	6.4	22.8	10,127	4E+04	3E+04	2E+04
28O025	56	256	10	17	1	2	0.2	0.1	0.2	130	7E+02	6E+02	6E+02
28P001	336	2,244	56	20	5	7	0.5	0.6	2.0	1,099	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	18,519	119,932	2,898	1,025	265	558	31.5	34.5	130.4	57,232	3E+05	2E+05	1E+05
29M049	1,362	7,577	207	162	36	49	3.9	2.1	8.1	3,513	2E+04	1E+04	1E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	443	2,463	65	139	8	10	1.2	0.7	2.9	1,215	4E+03	3E+03	2E+03
29O001	12,302	76,280	2,008	2,099	239	314	29.4	21.4	74.4	36,898	1E+05	1E+05	7E+04
29P015	84	568	15	12	1	2	0.2	0.2	0.5	278	1E+03	6E+02	4E+02
29P044	647	4,357	111	74	10	15	1.2	1.2	3.9	2,128	8E+03	5E+03	3E+03
30J006	244	707	25	166	8	5	1.2	0.2	1.1	354	9E+02	3E+03	4E+03

Table C2-3. Scenario 1.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	758	1,619	39	137	18	6	1.7	0.2	2.8	840	5E+02	6E+02	9E+02
30P107	372	1,976	72	93	6	11	0.9	0.5	1.7	1,001	4E+03	3E+03	2E+03
30P062	319	2,122	55	44	5	7	0.6	0.6	1.9	1,049	4E+03	2E+03	1E+03
31O004	1,074	6,476	226	138	19	34	2.4	1.5	5.0	3,174	2E+04	1E+04	7E+03
31P084	331	2,051	52	68	4	7	0.6	0.6	2.0	1,012	4E+03	2E+03	1E+03
3FDO159	347	1,529	63	485	14	8	2.7	0.6	1.7	741	2E+03	2E+03	2E+03
11G318/319	385	1,082	75	697	13	40	3.3	0.5	2.6	436	5E+03	8E+03	8E+03
6FSDO233	8	18	4	82	1	0	0.3	0.0	0.1	9	1E+01	2E+01	2E+01
17FDO012	2,803	6,166	138	82	56	80	3.6	0.9	6.1	2,865	3E+04	6E+04	6E+04
21H047	533	1,969	34	71	16	15	1.7	1.6	6.8	827	2E+03	2E+03	2E+03
21H039	1,516	4,664	67	315	45	46	5.2	5.2	22.9	1,874	4E+03	4E+03	5E+03
20G161	2,756	11,685	328	223	71	88	7.8	5.7	24.7	5,299	3E+04	2E+04	2E+04
StonyMWRA	126,105	595,983	20,077	61,575	5,085	3,402	664.1	203.0	697.0	287,336	1E+06	7E+05	8E+05
Fens	73,399	230,383	11,729	17,350	4,619	2,199	534.7	97.9	297.6	117,433	3E+05	2E+05	2E+05
20D055	6,133	39,985	1,051	429	123	141	13.3	11.4	37.7	19,467	8E+04	5E+04	3E+04
21D319	8,025	53,234	1,389	796	149	185	17.1	15.0	49.4	25,941	1E+05	6E+04	4E+04

Table C2-4. Scenario 1.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,085	4,435	151	893	30	21	5.4	1.3	5.8	2,247	5E+03	5E+03	4E+03
1FDO31	902	4,311	116	180	20	20	2.2	1.1	4.2	2,102	7E+03	6E+03	5E+03
02E086	289	1,233	46	312	11	5	1.8	0.4	1.4	598	2E+03	2E+03	1E+03
2FDO120	1,554	7,893	223	547	35	34	4.9	2.1	9.1	3,922	1E+04	9E+03	8E+03
2FDO93	1,662	11,743	285	99	19	38	2.4	3.2	10.6	5,720	2E+04	1E+04	8E+03
2FDO85	106	498	13	25	3	2	0.3	0.1	0.4	244	8E+02	5E+02	4E+02
3ESDO186	363	1,700	69	543	14	8	2.9	0.7	2.0	830	3E+03	2E+03	1E+03
3ESDO185	660	3,053	117	330	15	14	2.4	0.9	2.9	1,582	6E+03	4E+03	3E+03
3F162	587	2,934	103	484	25	12	3.6	0.9	2.8	1,396	5E+03	3E+03	3E+03
4ESDO69	1,801	8,649	271	900	43	42	6.7	2.7	9.9	4,309	2E+04	1E+04	1E+04
4ESDO64	43	148	7	56	2	1	0.3	0.1	0.2	70	3E+02	4E+02	4E+02
4FDO189	875	5,068	135	136	20	17	2.2	1.4	4.8	2,482	9E+03	5E+03	4E+03
4FDO204	994	5,227	160	493	32	19	4.3	1.5	4.7	2,524	9E+03	5E+03	5E+03
4FDO16	470	2,716	74	69	11	12	1.2	0.7	2.5	1,311	5E+03	3E+03	3E+03
4FDO203	145	652	25	173	6	3	1.0	0.2	0.7	315	1E+03	9E+02	8E+02
4FDO118	667	3,835	98	88	11	16	1.3	1.0	3.6	1,878	7E+03	5E+03	3E+03
4FDO119	1,385	5,612	146	45	24	38	3.1	0.9	10.8	2,988	4E+03	5E+03	4E+03
5CSDO110	872	3,024	138	639	35	25	5.0	1.0	3.3	1,554	7E+03	5E+03	7E+03
5EDO182	122	600	32	351	6	3	1.6	0.3	0.8	294	9E+02	6E+02	4E+02
5ESDO184	713	3,285	151	1,416	31	15	6.9	1.5	3.9	1,611	5E+03	4E+03	3E+03
5FDO117	905	4,722	158	707	32	19	5.0	1.5	4.6	2,277	8E+03	5E+03	4E+03
5FDO254	62	396	10	10	1	1	0.1	0.1	0.4	197	7E+02	4E+02	2E+02
5FDO265	21	43	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	731	3,963	108	131	18	18	2.0	1.1	3.6	1,914	8E+03	5E+03	5E+03
5FDO245	1,545	9,311	246	328	28	32	3.6	2.6	9.1	4,591	2E+04	1E+04	7E+03
5FDO244	257	1,329	35	52	5	5	0.6	0.3	1.8	663	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	1,046	6,432	161	140	17	24	2.1	2.0	7.1	3,142	1E+04	7E+03	5E+03
5GDO116A	946	5,472	149	355	16	18	2.5	1.6	5.1	2,728	9E+03	6E+03	3E+03
5GDO115	262	1,603	42	32	5	6	0.6	0.4	1.6	786	3E+03	2E+03	1E+03
5GDO116	825	4,845	124	77	18	16	1.9	1.3	4.4	2,351	9E+03	5E+03	3E+03
6DDO57	153	614	22	135	6	2	0.9	0.2	0.6	299	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	87	276	11	42	2	7	0.3	0.1	0.4	118	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	36	187	8	50	2	1	0.4	0.1	0.2	86	3E+02	2E+02	2E+02
6DDO83	177	824	38	286	10	4	1.8	0.3	0.9	383	1E+03	1E+03	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,664	9,186	249	249	48	33	5.0	2.5	8.1	4,389	2E+04	1E+04	1E+04
6GDO110	2,025	12,272	325	336	44	42	5.1	3.4	10.9	5,981	2E+04	1E+04	9E+03
6GDO111	299	1,373	64	575	14	7	3.0	0.6	1.7	663	2E+03	1E+03	1E+03
6GDO166	166	630	40	504	9	4	2.3	0.4	1.0	306	9E+02	5E+02	6E+02
6GDO108	5,335	31,644	836	847	119	116	13.5	8.6	28.5	15,352	6E+04	4E+04	3E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	87	432	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	243	1,157	38	173	7	4	1.1	0.4	1.1	569	2E+03	1E+03	8E+02

Table C2-4. Scenario 1.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	553	2,871	90	397	16	11	2.6	0.9	2.8	1,401	5E+03	3E+03	2E+03
7CDO006	6,770	32,628	1,132	6,842	195	144	37.6	11.5	35.6	16,131	6E+04	4E+04	5E+04
7HDO285	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
7HDO105	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
7HDO348	53	355	9	9	1	1	0.1	0.1	0.3	177	6E+02	4E+02	2E+02
7HDO347	353	1,854	57	194	11	7	1.6	0.5	1.7	899	3E+03	2E+03	2E+03
7HDO346	328	2,068	53	67	5	7	0.7	0.6	1.8	1,012	4E+03	2E+03	1E+03
8BDO122	1,734	9,972	246	268	32	45	3.9	3.8	14.1	4,765	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	969	6,276	157	119	12	21	1.6	1.8	6.0	3,095	1E+04	7E+03	4E+03
8CDO25	216	721	43	425	9	5	2.1	0.4	1.1	383	2E+03	2E+03	2E+03
8CDO26	203	721	41	365	8	5	1.8	0.4	1.0	386	2E+03	1E+03	2E+03
8DDO112	35	208	6	7	1	1	0.1	0.1	0.2	101	4E+02	4E+02	3E+02
8DSDO100	92	304	16	165	3	4	0.8	0.1	0.5	147	7E+02	1E+03	1E+03
8EDO35	140	404	29	425	8	2	1.9	0.3	0.6	203	5E+02	2E+03	2E+03
8EDO33	544	3,461	96	240	9	12	1.6	1.0	3.3	1,706	6E+03	4E+03	2E+03
8IDO153	43	287	7	3	0	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	56	2E+02	4E+02	4E+02
8IDO156	350	749	46	558	19	4	3.3	0.3	0.7	328	5E+02	1E+02	8E+02
8IDO209	111	711	18	18	1	2	0.2	0.2	0.6	352	1E+03	9E+02	5E+02
8IDO154	978	5,581	152	238	22	24	2.8	1.7	5.6	2,701	1E+04	8E+03	6E+03
8IDO158	440	2,684	71	123	9	10	1.2	0.9	3.0	1,317	5E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,301	8,260	211	223	23	30	3.0	2.6	9.2	4,022	1E+04	9E+03	6E+03
8JSDO103	1,094	6,687	182	301	23	23	3.0	1.9	6.2	3,283	1E+04	7E+03	5E+03
8JSDO41	632	4,098	105	98	11	14	1.4	1.2	4.1	2,003	7E+03	5E+03	3E+03
8JSDO50	1,379	7,408	200	342	37	30	4.4	2.4	8.3	3,552	1E+04	1E+04	8E+03
8K049	182	1,094	31	60	5	4	0.6	0.3	1.0	531	2E+03	1E+03	9E+02
9BDO49	373	1,041	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	67	345	10	17	2	1	0.2	0.1	0.3	165	6E+02	4E+02	3E+02
9EDO243	188	682	25	162	7	4	1.0	0.2	0.6	330	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	710	2,670	109	804	25	22	4.5	0.9	3.1	1,274	5E+03	7E+03	7E+03
9K016	70	216	27	421	7	3	1.9	0.2	0.6	98	3E+02	5E+02	6E+02
9LSDO095	253	991	42	321	7	11	1.5	0.4	1.3	478	3E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	129	392	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	15,984	90,096	2,402	3,779	331	351	41.2	25.7	89.4	43,901	2E+05	1E+05	9E+04
10L096	1,745	10,729	288	260	28	67	3.6	2.9	10.8	5,150	2E+04	2E+04	1E+04
11BDO28	16,160	78,999	2,964	20,378	509	434	106.3	29.1	88.2	38,713	1E+05	1E+05	1E+05
11BDO123	3,042	16,175	456	597	79	79	8.8	4.3	14.7	7,760	3E+04	2E+04	2E+04
11IDO577	38,838	202,385	6,234	12,170	1,687	927	187.1	58.2	192.9	93,109	4E+05	2E+05	3E+05
11M093	1,209	4,464	176	707	35	23	5.2	1.4	5.3	2,392	1E+04	7E+03	8E+03
12BDO10	14	34	2	14	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	33	81	4	29	1	2	0.1	0.0	0.1	36	3E+02	5E+02	5E+02
12BDO124	12,272	67,682	1,919	4,874	268	287	38.5	19.5	63.6	33,106	1E+05	9E+04	8E+04
12EDO418	248	1,139	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table C2-4. Scenario 1.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	167	843	23	63	3	3	0.5	0.2	0.7	418	1E+03	1E+03	1E+03
12HOFDO92	1,031	2,890	414	2,439	105	160	21.1	3.2	13.1	2,856	5E+03	9E+03	1E+04
12HDO85/87	513	1,543	77	456	15	50	2.7	0.4	3.0	619	7E+03	1E+04	1E+04
12L092	2,536	11,743	363	930	86	51	10.2	3.5	12.0	5,632	2E+04	1E+04	1E+04
12LDO296	552	2,660	78	243	14	10	2.0	0.7	2.9	1,318	4E+03	3E+03	2E+03
12M091	389	1,427	59	273	10	7	1.7	0.5	1.6	771	3E+03	2E+03	2E+03
13DSDO078	1,994	6,197	253	1,442	107	31	13.0	1.7	4.8	2,760	9E+03	7E+03	1E+04
13EDO177	58	124	8	107	3	1	0.5	0.1	0.1	61	9E+01	4E+02	5E+02
13EDO174	1,451	8,311	212	284	22	27	2.8	2.3	7.6	4,121	1E+04	1E+04	6E+03
13EDO176	41	99	3	31	1	0	0.2	0.1	0.2	48	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	117	314	8	81	3	3	0.5	0.3	1.0	143	4E+02	1E+03	2E+03
13L090	36,773	179,236	5,615	5,104	1,873	822	179.8	44.3	155.0	81,057	3E+05	2E+05	2E+05
14CDO9	860	5,109	170	785	27	25	4.9	1.7	5.2	2,445	1E+04	7E+03	6E+03
15FSDO288	2,236	11,523	343	1,434	51	41	8.7	3.7	11.4	5,702	2E+04	2E+04	2E+04
15L089	14,786	67,601	2,219	4,537	682	326	73.6	17.7	62.8	31,453	1E+05	7E+04	9E+04
15L088	7,621	46,312	1,204	283	168	204	17.5	12.4	49.2	22,421	9E+04	6E+04	4E+04
16L097	602	1,880	72	571	19	39	3.5	1.5	6.7	779	4E+03	8E+03	8E+03
16LSDO122	9,017	46,606	1,385	2,399	287	285	33.3	12.4	48.3	22,010	9E+04	7E+04	7E+04
17M033	5,933	29,145	818	1,722	126	312	17.7	12.0	53.6	13,353	7E+04	7E+04	7E+04
18GSDO233	4,518	20,297	568	439	82	157	8.9	5.2	25.2	9,201	6E+04	7E+04	7E+04
19GDO043	5,429	35,641	887	312	102	128	11.1	10.3	35.3	17,093	7E+04	4E+04	3E+04
19GDO194	467	2,443	74	167	18	10	2.1	0.8	2.9	1,160	4E+03	4E+03	4E+03
19G199	65	191	2	2	2	1	0.1	0.2	0.8	83	1E+02	7E+02	8E+02
20G163	359	1,434	11	22	9	10	1.1	2.1	9.2	548	1E+03	5E+03	5E+03
20L083	219	949	26	7	4	9	0.6	0.1	2.1	515	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	72	2	4	1	0	0.1	0.0	0.1	34	1E+02	9E+01	1E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	180	3E+02	4E+02	3E+02
21KSDO069	9,436	54,271	1,404	881	228	295	24.6	16.4	65.6	25,522	1E+05	8E+04	7E+04
21M005	161	462	13	35	4	3	0.4	0.1	1.0	246	2E+02	3E+02	3E+02
21M010	983	3,312	85	55	20	25	2.4	0.4	7.4	1,775	2E+03	2E+03	3E+03
21M050	462	1,327	32	19	10	8	1.0	0.2	3.0	708	1E+03	8E+02	2E+03
22CDO384	2,616	10,009	380	1,745	132	53	16.4	2.8	8.5	4,526	2E+04	1E+04	1E+04
22LSDO580	1,266	4,644	126	59	25	33	3.2	0.6	12.4	2,571	3E+03	3E+03	4E+03
23GDO132	4,590	9,833	272	2,118	127	67	15.8	3.9	17.3	4,554	8E+03	9E+03	1E+04
23HSDO042	19,143	83,555	2,813	4,793	900	584	99.9	27.3	108.5	38,596	2E+05	1E+05	1E+05
23HDO040	3,011	18,085	455	290	63	83	6.9	5.1	19.3	8,547	4E+04	3E+04	2E+04
23L196	147	294	7	33	4	1	0.4	0.1	0.7	149	1E+02	4E+01	2E+02
23L075	659	1,625	49	205	19	7	2.1	0.3	3.5	861	2E+03	7E+02	3E+03
23L074	147	313	7	19	4	1	0.3	0.0	0.4	163	9E+01	6E+01	2E+02
23L195	153	292	9	71	4	1	0.5	0.1	0.7	157	2E+02	6E+01	4E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	961	2,393	77	87	23	48	2.0	0.3	5.3	1,093	8E+03	1E+04	1E+04
24CSDO031	327	2,068	54	49	4	7	0.6	0.6	2.0	1,032	4E+03	2E+03	1E+03

Table C2-4. Scenario 1.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,814	9,509	296	985	44	32	6.9	2.9	10.0	4,647	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	23,744	131,763	4,249	7,061	805	358	95.9	41.3	137.1	70,673	2E+05	2E+05	1E+05
24GSDO035	26,206	153,221	3,884	4,040	444	686	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
24GSDO034	1,827	7,017	179	855	42	27	5.8	2.7	11.8	3,443	1E+04	2E+04	2E+04
24L233	456	1,344	33	82	23	12	2.3	1.1	5.3	518	1E+03	9E+02	3E+03
25DDO040	594	2,948	84	191	12	20	1.7	1.0	4.7	1,426	6E+03	5E+03	4E+03
25EDO037	15,653	83,555	2,171	3,107	300	269	37.5	25.6	105.2	40,330	2E+05	1E+05	1E+05
25GDO041	76	264	9	29	6	3	0.6	0.3	1.1	91	3E+02	2E+02	6E+02
25GDO-06	239	648	18	216	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	9,304	26,625	1,080	709	747	197	65.7	6.3	31.8	9,700	4E+04	2E+04	8E+04
25L144	550	3,836	90	9	10	14	1.1	1.0	3.5	1,795	8E+03	5E+03	3E+03
25L058	4,849	26,162	669	464	91	173	9.9	7.2	30.3	12,324	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,954	18,585	531	1,831	127	92	16.9	8.2	31.3	8,745	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	162	428	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	461	1,103	63	491	33	10	4.2	0.4	1.2	426	2E+03	8E+02	3E+03
26KSDO254	354	1,211	45	108	5	35	0.9	0.2	2.7	531	5E+03	8E+03	9E+03
26K035	199	421	11	31	6	1	0.5	0.1	1.1	228	5E+02	8E+01	9E+02
26K099	13,426	86,274	2,048	740	182	382	21.3	25.0	92.7	41,146	2E+05	1E+05	9E+04
26L055	182	1,064	29	12	7	4	0.6	0.3	0.8	491	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	397	791	30	354	13	6	2.0	0.5	2.2	372	4E+02	6E+02	6E+02
27JSDO096	2,128	4,291	96	301	55	15	4.5	0.6	4.9	2,133	2E+03	4E+03	5E+03
27JSDO001	8,238	47,554	1,181	1,487	137	269	18.3	14.4	58.8	22,443	1E+05	7E+04	6E+04
27L022	2,395	14,543	343	279	46	69	5.5	5.6	21.1	6,823	3E+04	2E+04	1E+04
27L020	2,270	13,661	322	277	45	65	5.4	5.2	19.8	6,385	3E+04	2E+04	1E+04
28K061	4,675	30,240	757	340	69	142	8.1	8.3	29.1	14,455	7E+04	5E+04	3E+04
28K010	4,159	28,807	700	236	50	110	6.2	8.0	27.0	13,904	6E+04	4E+04	2E+04
28K386	729	1,797	59	351	19	22	2.6	0.6	4.1	875	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,265	3,703	109	686	52	22	6.3	2.2	9.2	1,641	5E+03	7E+03	1E+04
28N156	351	2,001	57	99	6	13	0.8	0.6	2.1	972	4E+03	3E+03	3E+03
28N207	3,473	21,231	544	406	68	102	7.8	6.4	22.8	10,127	4E+04	3E+04	2E+04
28O025	56	256	10	17	1	2	0.2	0.1	0.2	130	7E+02	6E+02	6E+02
28P001	336	2,244	56	20	5	7	0.5	0.6	2.0	1,099	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	18,519	119,932	2,898	1,025	265	558	31.5	34.5	130.4	57,232	3E+05	2E+05	1E+05
29M049	1,362	7,577	207	162	36	49	3.9	2.1	8.1	3,513	2E+04	1E+04	1E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	443	2,463	65	139	8	10	1.2	0.7	2.9	1,215	4E+03	3E+03	2E+03
29O001	12,302	76,280	2,008	2,099	239	314	29.4	21.4	74.4	36,898	1E+05	1E+05	7E+04
29P015	84	568	15	12	1	2	0.2	0.2	0.5	278	1E+03	6E+02	4E+02
29P044	647	4,357	111	74	10	15	1.2	1.2	3.9	2,128	8E+03	5E+03	3E+03
30J006	244	707	25	166	8	5	1.2	0.2	1.1	354	9E+02	3E+03	4E+03

Table C2-4. Scenario 1.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	758	1,619	39	137	18	6	1.7	0.2	2.8	840	5E+02	6E+02	9E+02
30P107	372	1,976	72	93	6	11	0.9	0.5	1.7	1,001	4E+03	3E+03	2E+03
30P062	319	2,122	55	44	5	7	0.6	0.6	1.9	1,049	4E+03	2E+03	1E+03
31O004	1,074	6,476	226	138	19	34	2.4	1.5	5.0	3,174	2E+04	1E+04	7E+03
31P084	331	2,051	52	68	4	7	0.6	0.6	2.0	1,012	4E+03	2E+03	1E+03
3FDO159	347	1,529	63	485	14	8	2.7	0.6	1.7	741	2E+03	2E+03	2E+03
11G318/319	385	1,082	75	697	13	40	3.3	0.5	2.6	436	5E+03	8E+03	8E+03
6FSDO233	8	18	4	82	1	0	0.3	0.0	0.1	9	1E+01	2E+01	2E+01
17FDO012	2,803	6,166	138	82	56	80	3.6	0.9	6.1	2,865	3E+04	6E+04	6E+04
21H047	533	1,969	34	71	16	15	1.7	1.6	6.8	827	2E+03	2E+03	2E+03
21H039	1,516	4,664	67	315	45	46	5.2	5.2	22.9	1,874	4E+03	4E+03	5E+03
20G161	2,756	11,685	328	223	71	70	7.8	5.7	24.7	5,299	3E+04	2E+04	2E+04
StonyMWRA	126,105	595,983	20,077	61,575	5,085	3,402	664.1	203.0	697.0	287,336	1E+06	7E+05	8E+05
Fens	73,399	230,383	11,729	17,350	4,619	2,166	534.7	97.9	297.6	117,433	3E+05	2E+05	2E+05
20D055	6,133	39,985	1,051	429	123	141	13.3	11.4	37.7	19,467	8E+04	5E+04	3E+04
21D319	8,025	53,234	1,389	796	149	185	17.1	15.0	49.4	25,941	1E+05	6E+04	4E+04

Table C2-5. Scenario 1.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,085	4,435	151	893	30	21	5.4	1.3	5.8	2,247	5E+03	5E+03	4E+03
1FDO31	902	4,311	116	180	20	20	2.2	1.1	4.2	2,102	7E+03	6E+03	5E+03
02E086	289	1,233	46	312	11	5	1.8	0.4	1.4	598	2E+03	2E+03	1E+03
2FDO120	1,554	7,893	223	547	35	34	4.9	2.1	9.1	3,922	1E+04	9E+03	8E+03
2FDO93	1,662	11,743	285	99	19	38	2.4	3.2	10.6	5,720	2E+04	1E+04	8E+03
2FDO85	106	498	13	25	3	2	0.3	0.1	0.4	244	8E+02	5E+02	4E+02
3ESDO186	363	1,700	69	543	14	8	2.9	0.7	2.0	830	3E+03	2E+03	1E+03
3ESDO185	660	3,053	117	330	15	14	2.4	0.9	2.9	1,582	6E+03	4E+03	3E+03
3F162	587	2,934	103	484	25	12	3.6	0.9	2.8	1,396	5E+03	3E+03	3E+03
4ESDO69	1,801	8,649	271	900	43	42	6.7	2.7	9.9	4,309	2E+04	1E+04	1E+04
4ESDO64	43	148	7	56	2	1	0.3	0.1	0.2	70	3E+02	4E+02	4E+02
4FDO189	875	5,068	135	136	20	17	2.2	1.4	4.8	2,482	9E+03	5E+03	4E+03
4FDO204	994	5,227	160	493	32	19	4.3	1.5	4.7	2,524	9E+03	5E+03	5E+03
4FDO16	470	2,716	74	69	11	12	1.2	0.7	2.5	1,311	5E+03	3E+03	3E+03
4FDO203	145	652	25	173	6	3	1.0	0.2	0.7	315	1E+03	9E+02	8E+02
4FDO118	667	3,835	98	88	11	16	1.3	1.0	3.6	1,878	7E+03	5E+03	3E+03
4FDO119	1,385	5,612	146	45	24	38	3.1	0.9	10.8	2,988	4E+03	5E+03	4E+03
5CSDO110	872	3,024	138	639	35	25	5.0	1.0	3.3	1,554	7E+03	5E+03	7E+03
5EDO182	122	600	32	351	6	3	1.6	0.3	0.8	294	9E+02	6E+02	4E+02
5ESDO184	713	3,285	151	1,416	31	15	6.9	1.5	3.9	1,611	5E+03	4E+03	3E+03
5FDO117	905	4,722	158	707	32	19	5.0	1.5	4.6	2,277	8E+03	5E+03	4E+03
5FDO254	62	396	10	10	1	1	0.1	0.1	0.4	197	7E+02	4E+02	2E+02
5FDO265	21	43	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	731	3,963	108	131	18	18	2.0	1.1	3.6	1,914	8E+03	5E+03	5E+03
5FDO245	1,545	9,311	246	328	28	32	3.6	2.6	9.1	4,591	2E+04	1E+04	7E+03
5FDO244	257	1,329	35	52	5	5	0.6	0.3	1.8	663	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	1,046	6,432	161	140	17	24	2.1	2.0	7.1	3,142	1E+04	7E+03	5E+03
5GDO116A	946	5,472	149	355	16	18	2.5	1.6	5.1	2,728	9E+03	6E+03	3E+03
5GDO115	262	1,603	42	32	5	6	0.6	0.4	1.6	786	3E+03	2E+03	1E+03
5GDO116	825	4,845	124	77	18	16	1.9	1.3	4.4	2,351	9E+03	5E+03	3E+03
6DDO57	153	614	22	135	6	2	0.9	0.2	0.6	299	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	87	276	11	42	2	7	0.3	0.1	0.4	118	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	36	187	8	50	2	1	0.4	0.1	0.2	86	3E+02	2E+02	2E+02
6DDO83	177	824	38	286	10	4	1.8	0.3	0.9	383	1E+03	1E+03	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,664	9,186	249	249	48	33	5.0	2.5	8.1	4,389	2E+04	1E+04	1E+04
6GDO110	2,025	12,272	325	336	44	42	5.1	3.4	10.9	5,981	2E+04	1E+04	9E+03
6GDO111	299	1,373	64	575	14	7	3.0	0.6	1.7	663	2E+03	1E+03	1E+03
6GDO166	166	630	40	504	9	4	2.3	0.4	1.0	306	9E+02	5E+02	6E+02
6GDO108	5,335	31,644	836	847	119	116	13.5	8.6	28.5	15,352	6E+04	4E+04	3E+04
6G165	32	135	5	41	1	1	0.2	0.1	0.1	68	2E+02	2E+02	1E+02
6HDO43	87	432	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	243	1,157	38	173	7	4	1.1	0.4	1.1	569	2E+03	1E+03	8E+02

Table C2-5. Scenario 1.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	553	2,871	90	397	16	11	2.6	0.9	2.8	1,401	5E+03	3E+03	2E+03
7CDO006	6,770	32,628	1,132	6,842	195	144	37.6	11.5	35.6	16,131	6E+04	4E+04	5E+04
7HDO285	6,756	34,069	999	2,186	216	137	25.4	9.5	34.3	16,380	6E+04	4E+04	4E+04
7HDO105	10,082	53,609	1,656	5,867	307	225	44.9	16.3	51.6	25,890	1E+05	6E+04	7E+04
7HDO348	53	355	9	9	1	1	0.1	0.1	0.3	177	6E+02	4E+02	2E+02
7HDO347	353	1,854	57	194	11	7	1.6	0.5	1.7	899	3E+03	2E+03	2E+03
7HDO346	328	2,068	53	67	5	7	0.7	0.6	1.8	1,012	4E+03	2E+03	1E+03
8BDO122	1,734	9,972	246	268	32	45	3.9	3.8	14.1	4,765	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	969	6,276	157	119	12	21	1.6	1.8	6.0	3,095	1E+04	7E+03	4E+03
8CDO25	216	721	43	425	9	5	2.1	0.4	1.1	383	2E+03	2E+03	2E+03
8CDO26	203	721	41	365	8	5	1.8	0.4	1.0	386	2E+03	1E+03	2E+03
8DDO112	35	208	6	7	1	1	0.1	0.1	0.2	101	4E+02	4E+02	3E+02
8DSDO100	92	304	16	165	3	4	0.8	0.1	0.5	147	7E+02	1E+03	1E+03
8EDO35	140	404	29	425	8	2	1.9	0.3	0.6	203	5E+02	2E+03	2E+03
8EDO33	544	3,461	96	240	9	12	1.6	1.0	3.3	1,706	6E+03	4E+03	2E+03
8IDO153	43	287	7	3	0	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
8IDO155	28	111	5	55	1	0	0.2	0.0	0.1	56	2E+02	4E+02	4E+02
8IDO156	350	749	46	558	19	4	3.3	0.3	0.7	328	5E+02	1E+02	8E+02
8IDO209	111	711	18	18	1	2	0.2	0.2	0.6	352	1E+03	9E+02	5E+02
8IDO154	978	5,581	152	238	22	24	2.8	1.7	5.6	2,701	1E+04	8E+03	6E+03
8IDO158	440	2,684	71	123	9	10	1.2	0.9	3.0	1,317	5E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,301	8,260	211	223	23	30	3.0	2.6	9.2	4,022	1E+04	9E+03	6E+03
8JSDO103	1,094	6,687	182	301	23	23	3.0	1.9	6.2	3,283	1E+04	7E+03	5E+03
8JSDO41	632	4,098	105	98	11	14	1.4	1.2	4.1	2,003	7E+03	5E+03	3E+03
8JSDO50	1,379	7,408	200	342	37	30	4.4	2.4	8.3	3,552	1E+04	1E+04	8E+03
8K049	182	1,094	31	60	5	4	0.6	0.3	1.0	531	2E+03	1E+03	9E+02
9BDO49	373	1,041	36	114	6	26	0.9	0.2	1.7	469	4E+03	8E+03	8E+03
9EDO229	67	345	10	17	2	1	0.2	0.1	0.3	165	6E+02	4E+02	3E+02
9EDO243	188	682	25	162	7	4	1.0	0.2	0.6	330	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	710	2,670	109	804	25	22	4.5	0.9	3.1	1,274	5E+03	7E+03	7E+03
9K016	70	216	27	421	7	3	1.9	0.2	0.6	98	3E+02	5E+02	6E+02
9LSDO095	253	991	42	321	7	11	1.5	0.4	1.3	478	3E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	39	97	3	9	1	1	0.1	0.0	0.2	48	2E+02	5E+02	6E+02
10BSDO64	129	392	16	61	4	4	0.5	0.1	0.7	272	6E+02	7E+02	8E+02
10L094	15,984	90,096	2,402	3,779	331	351	41.2	25.7	89.4	43,901	2E+05	1E+05	9E+04
10L096	1,745	10,729	288	260	28	67	3.6	2.9	10.8	5,150	2E+04	2E+04	1E+04
11BDO28	16,160	78,999	2,964	20,378	509	434	106.3	29.1	88.2	38,713	1E+05	1E+05	1E+05
11BDO123	3,042	16,175	456	597	79	79	8.8	4.3	14.7	7,760	3E+04	2E+04	2E+04
11IDO577	38,838	202,385	6,234	12,170	1,687	927	187.1	58.2	192.9	93,109	4E+05	2E+05	3E+05
11M093	1,209	4,464	176	707	35	23	5.2	1.4	5.3	2,392	1E+04	7E+03	8E+03
12BDO10	14	34	2	14	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	33	81	4	29	1	2	0.1	0.0	0.1	36	3E+02	5E+02	5E+02
12BDO124	12,272	67,682	1,919	4,874	268	287	38.5	19.5	63.6	33,106	1E+05	9E+04	8E+04
12EDO418	248	1,139	39	64	4	5	0.5	0.3	1.0	602	2E+03	2E+03	1E+03

Table C2-5. Scenario 1.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	167	843	23	63	3	3	0.5	0.2	0.7	418	1E+03	1E+03	1E+03
12HOFDO92	1,031	2,890	414	2,439	105	160	21.1	3.2	13.1	2,856	5E+03	9E+03	1E+04
12HDO85/87	513	1,543	77	456	15	50	2.7	0.4	3.0	619	7E+03	1E+04	1E+04
12L092	2,536	11,743	363	930	86	51	10.2	3.5	12.0	5,632	2E+04	1E+04	1E+04
12LDO296	552	2,660	78	243	14	10	2.0	0.7	2.9	1,318	4E+03	3E+03	2E+03
12M091	389	1,427	59	273	10	7	1.7	0.5	1.6	771	3E+03	2E+03	2E+03
13DSDO078	1,994	6,197	253	1,442	107	31	13.0	1.7	4.8	2,760	9E+03	7E+03	1E+04
13EDO177	58	124	8	107	3	1	0.5	0.1	0.1	61	9E+01	4E+02	5E+02
13EDO174	1,451	8,311	212	284	22	27	2.8	2.3	7.6	4,121	1E+04	1E+04	6E+03
13EDO176	41	99	3	31	1	0	0.2	0.1	0.2	48	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	117	314	8	81	3	3	0.5	0.3	1.0	143	4E+02	1E+03	2E+03
13L090	36,773	179,236	5,615	5,104	1,873	822	179.8	44.3	155.0	81,057	3E+05	2E+05	2E+05
14CDO9	860	5,109	170	785	27	25	4.9	1.7	5.2	2,445	1E+04	7E+03	6E+03
15FSDO288	2,236	11,523	343	1,434	51	41	8.7	3.7	11.4	5,702	2E+04	2E+04	2E+04
15L089	14,786	67,601	2,219	4,537	682	326	73.6	17.7	62.8	31,453	1E+05	7E+04	9E+04
15L088	7,621	46,312	1,204	283	168	204	17.5	12.4	49.2	22,421	9E+04	6E+04	4E+04
16L097	602	1,880	72	571	19	39	3.5	1.5	6.7	779	4E+03	8E+03	8E+03
16LSDO122	9,017	46,606	1,385	2,399	287	285	33.3	12.4	48.3	22,010	9E+04	7E+04	7E+04
17M033	5,933	29,145	818	1,722	126	312	17.7	12.0	53.6	13,353	7E+04	7E+04	7E+04
18GSDO233	4,518	20,297	568	439	82	144	8.9	5.2	25.2	9,201	6E+04	7E+04	7E+04
19GDO043	5,429	35,641	887	312	102	128	11.1	10.3	35.3	17,093	7E+04	4E+04	3E+04
19GDO194	467	2,443	74	167	18	10	2.1	0.8	2.9	1,160	4E+03	4E+03	4E+03
19G199	65	191	2	2	2	1	0.1	0.2	0.8	83	1E+02	7E+02	8E+02
20G163	359	1,434	11	22	9	9	1.1	2.1	9.2	548	1E+03	5E+03	5E+03
20L083	219	949	26	7	4	9	0.6	0.1	2.1	515	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	72	2	4	1	0	0.1	0.0	0.1	34	1E+02	9E+01	1E+02
21H048	138	417	5	4	3	3	0.3	0.4	1.8	180	3E+02	4E+02	3E+02
21KSDO069	9,436	54,271	1,404	881	228	295	24.6	16.4	65.6	25,522	1E+05	8E+04	7E+04
21M005	161	462	13	35	4	3	0.4	0.1	1.0	246	2E+02	3E+02	3E+02
21M010	983	3,312	85	55	20	25	2.4	0.4	7.4	1,775	2E+03	2E+03	3E+03
21M050	462	1,327	32	19	10	8	1.0	0.2	3.0	708	1E+03	8E+02	2E+03
22CDO384	2,616	10,009	380	1,745	132	53	16.4	2.8	8.5	4,526	2E+04	1E+04	1E+04
22LSDO580	1,266	4,644	126	59	25	33	3.2	0.6	12.4	2,571	3E+03	3E+03	4E+03
23GDO132	4,590	9,833	272	2,118	127	67	15.8	3.9	17.3	4,554	8E+03	9E+03	1E+04
23HSDO042	19,143	83,555	2,813	4,793	900	584	99.9	27.3	108.5	38,596	2E+05	1E+05	1E+05
23HDO040	3,011	18,085	455	290	63	83	6.9	5.1	19.3	8,547	4E+04	3E+04	2E+04
23L196	147	294	7	33	4	1	0.4	0.1	0.7	149	1E+02	4E+01	2E+02
23L075	659	1,625	49	205	19	7	2.1	0.3	3.5	861	2E+03	7E+02	3E+03
23L074	147	313	7	19	4	1	0.3	0.0	0.4	163	9E+01	6E+01	2E+02
23L195	153	292	9	71	4	1	0.5	0.1	0.7	157	2E+02	6E+01	4E+02
23L202	157	302	7	33	4	0	0.3	0.1	0.7	163	3E+02	5E+01	6E+02
23L016	122	243	6	33	3	0	0.3	0.0	0.5	133	4E+02	7E+01	8E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	961	2,393	77	87	23	48	2.0	0.3	5.3	1,093	8E+03	1E+04	1E+04
24CSDO031	327	2,068	54	49	4	7	0.6	0.6	2.0	1,032	4E+03	2E+03	1E+03

Table C2-5. Scenario 1.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,814	9,509	296	985	44	30	6.9	2.9	10.0	4,647	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	23,744	131,763	4,249	7,061	805	327	95.9	41.3	137.1	70,673	2E+05	2E+05	1E+05
24GSDO035	26,206	153,221	3,884	4,040	444	686	54.1	44.1	162.6	74,075	3E+05	2E+05	1E+05
24GSDO034	1,827	7,017	179	855	42	27	5.8	2.7	11.8	3,443	1E+04	2E+04	2E+04
24L233	456	1,344	33	82	23	12	2.3	1.1	5.3	518	1E+03	9E+02	3E+03
25DDO040	594	2,948	84	191	12	20	1.7	1.0	4.7	1,426	6E+03	5E+03	4E+03
25EDO037	15,653	83,555	2,171	3,107	300	248	37.5	25.6	105.2	40,330	2E+05	1E+05	1E+05
25GDO041	76	264	9	29	6	3	0.6	0.3	1.1	91	3E+02	2E+02	6E+02
25GDO-06	239	648	18	216	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	9,304	26,625	1,080	709	747	197	65.7	6.3	31.8	9,700	4E+04	2E+04	8E+04
25L144	550	3,836	90	9	10	14	1.1	1.0	3.5	1,795	8E+03	5E+03	3E+03
25L058	4,849	26,162	669	464	91	173	9.9	7.2	30.3	12,324	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,954	18,585	531	1,831	127	92	16.9	8.2	31.3	8,745	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	40	1E+01	2E+01	2E+01
26JSDO100	162	428	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	461	1,103	63	491	33	10	4.2	0.4	1.2	426	2E+03	8E+02	3E+03
26KSDO254	354	1,211	45	108	5	35	0.9	0.2	2.7	531	5E+03	8E+03	9E+03
26K035	199	421	11	31	6	1	0.5	0.1	1.1	228	5E+02	8E+01	9E+02
26K099	13,426	86,274	2,048	740	182	382	21.3	25.0	92.7	41,146	2E+05	1E+05	9E+04
26L055	182	1,064	29	12	7	4	0.6	0.3	0.8	491	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	397	791	30	354	13	6	2.0	0.5	2.2	372	4E+02	6E+02	6E+02
27JSDO096	2,128	4,291	96	301	55	15	4.5	0.6	4.9	2,133	2E+03	4E+03	5E+03
27JSDO001	8,238	47,554	1,181	1,487	137	269	18.3	14.4	58.8	22,443	1E+05	7E+04	6E+04
27L022	2,395	14,543	343	279	46	69	5.5	5.6	21.1	6,823	3E+04	2E+04	1E+04
27L020	2,270	13,661	322	277	45	65	5.4	5.2	19.8	6,385	3E+04	2E+04	1E+04
28K061	4,675	30,240	757	340	69	142	8.1	8.3	29.1	14,455	7E+04	5E+04	3E+04
28K010	4,159	28,807	700	236	50	110	6.2	8.0	27.0	13,904	6E+04	4E+04	2E+04
28K386	729	1,797	59	351	19	22	2.6	0.6	4.1	875	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,265	3,703	109	686	52	22	6.3	2.2	9.2	1,641	5E+03	7E+03	1E+04
28N156	351	2,001	57	99	6	13	0.8	0.6	2.1	972	4E+03	3E+03	3E+03
28N207	3,473	21,231	544	406	68	102	7.8	6.4	22.8	10,127	4E+04	3E+04	2E+04
28O025	56	256	10	17	1	2	0.2	0.1	0.2	130	7E+02	6E+02	6E+02
28P001	336	2,244	56	20	5	7	0.5	0.6	2.0	1,099	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	2.0	412	4E+03	7E+03	7E+03
29J212	18,519	119,932	2,898	1,025	265	558	31.5	34.5	130.4	57,232	3E+05	2E+05	1E+05
29M049	1,362	7,577	207	162	36	49	3.9	2.1	8.1	3,513	2E+04	1E+04	1E+04
29N015	137	605	18	26	3	6	0.5	0.1	1.4	331	3E+02	6E+02	6E+02
29N135	443	2,463	65	139	8	10	1.2	0.7	2.9	1,215	4E+03	3E+03	2E+03
29O001	12,302	76,280	2,008	2,099	239	314	29.4	21.4	74.4	36,898	1E+05	1E+05	7E+04
29P015	84	568	15	12	1	2	0.2	0.2	0.5	278	1E+03	6E+02	4E+02
29P044	647	4,357	111	74	10	15	1.2	1.2	3.9	2,128	8E+03	5E+03	3E+03
30J006	244	707	25	166	8	5	1.2	0.2	1.1	354	9E+02	3E+03	4E+03

Table C2-5. Scenario 1.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	69	190	8	90	2	1	0.5	0.1	0.6	94	1E+02	7E+02	8E+02
30J030	758	1,619	39	137	18	6	1.7	0.2	2.8	840	5E+02	6E+02	9E+02
30P107	372	1,976	72	93	6	11	0.9	0.5	1.7	1,001	4E+03	3E+03	2E+03
30P062	319	2,122	55	44	5	7	0.6	0.6	1.9	1,049	4E+03	2E+03	1E+03
31O004	1,074	6,476	226	138	19	34	2.4	1.5	5.0	3,174	2E+04	1E+04	7E+03
31P084	331	2,051	52	68	4	7	0.6	0.6	2.0	1,012	4E+03	2E+03	1E+03
3FDO159	347	1,529	63	485	14	8	2.7	0.6	1.7	741	2E+03	2E+03	2E+03
11G318/319	385	1,082	75	697	13	40	3.3	0.5	2.6	436	5E+03	8E+03	8E+03
6FSDO233	8	18	4	82	1	0	0.3	0.0	0.1	9	1E+01	2E+01	2E+01
17FDO012	2,803	6,166	138	82	56	80	3.6	0.9	6.1	2,865	3E+04	6E+04	6E+04
21H047	533	1,969	34	71	16	15	1.7	1.6	6.8	827	2E+03	2E+03	2E+03
21H039	1,516	4,664	67	315	45	46	5.2	5.2	22.9	1,874	4E+03	4E+03	5E+03
20G161	2,756	11,685	328	223	71	64	7.8	5.7	24.7	5,299	3E+04	2E+04	2E+04
StonyMWRA	126,105	595,983	20,077	61,575	5,085	3,402	664.1	203.0	697.0	287,336	1E+06	7E+05	8E+05
Fens	73,399	230,383	11,729	17,350	4,619	2,155	534.7	97.9	297.6	117,433	3E+05	2E+05	2E+05
20D055	6,133	39,985	1,051	429	123	141	13.3	11.4	37.7	19,467	8E+04	5E+04	3E+04
21D319	8,025	53,234	1,389	796	149	185	17.1	15.0	49.4	25,941	1E+05	6E+04	4E+04

Table C2-6. Scenario 2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,051	4,265	147	905	29	21	5.4	1.3	5.7	2,161	5E+03	4E+03	3E+03
1FDO31	880	4,193	114	191	20	20	2.2	1.1	4.1	2,044	7E+03	6E+03	5E+03
02E086	279	1,177	45	325	11	5	1.9	0.4	1.3	569	2E+03	1E+03	1E+03
2FDO120	1,495	7,547	216	576	34	33	5.0	2.0	8.8	3,750	1E+04	9E+03	8E+03
2FDO93	1,617	11,427	278	110	19	37	2.4	3.1	10.3	5,564	2E+04	1E+04	8E+03
2FDO85	103	484	13	28	3	2	0.3	0.1	0.4	237	8E+02	5E+02	4E+02
3ESDO186	348	1,610	68	562	14	8	2.9	0.7	1.9	785	3E+03	2E+03	1E+03
3ESDO185	639	2,934	115	358	15	14	2.5	0.9	2.8	1,521	6E+03	4E+03	3E+03
3F162	566	2,799	101	509	25	12	3.7	0.9	2.7	1,329	5E+03	3E+03	3E+03
4ESDO69	1,734	8,267	265	966	43	40	6.9	2.6	9.6	4,120	1E+04	1E+04	9E+03
4ESDO64	42	141	8	91	2	1	0.5	0.1	0.2	66	2E+02	4E+02	4E+02
4FDO189	836	4,786	130	174	20	16	2.4	1.3	4.5	2,338	8E+03	5E+03	4E+03
4FDO204	955	4,977	155	511	32	19	4.3	1.5	4.5	2,399	8E+03	5E+03	5E+03
4FDO16	450	2,590	71	85	11	11	1.3	0.7	2.4	1,250	5E+03	3E+03	3E+03
4FDO203	139	621	25	184	6	3	1.1	0.2	0.6	300	1E+03	8E+02	8E+02
4FDO118	638	3,657	95	110	11	15	1.3	1.0	3.4	1,792	7E+03	5E+03	3E+03
4FDO119	1,348	5,472	142	45	24	37	3.1	0.9	10.6	2,917	4E+03	5E+03	4E+03
5CSDO110	819	2,836	135	758	32	24	5.2	1.0	3.3	1,468	7E+03	5E+03	7E+03
5EDO182	117	566	33	376	6	3	1.7	0.3	0.8	277	9E+02	6E+02	4E+02
5ESDO184	685	3,123	150	1,476	31	15	7.2	1.5	3.9	1,530	5E+03	4E+03	3E+03
5FDO117	862	4,445	154	769	32	18	5.2	1.5	4.4	2,138	8E+03	4E+03	4E+03
5FDO254	60	380	10	11	1	1	0.1	0.1	0.4	189	7E+02	4E+02	2E+02
5FDO265	20	41	1	3	1	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	689	3,713	104	172	17	17	2.0	1.0	3.5	1,796	7E+03	5E+03	4E+03
5FDO245	1,481	8,885	237	353	28	31	3.6	2.5	8.7	4,379	2E+04	1E+04	6E+03
5FDO244	250	1,293	34	55	5	5	0.6	0.3	1.7	645	2E+03	1E+03	1E+03
5FDO264	20	55	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	1,005	6,159	156	165	17	23	2.2	2.0	6.8	3,009	1E+04	7E+03	4E+03
5GDO116A	892	5,118	145	448	16	17	2.8	1.6	4.9	2,551	9E+03	5E+03	3E+03
5GDO115	255	1,561	41	38	5	6	0.6	0.4	1.5	765	3E+03	2E+03	1E+03
5GDO116	788	4,614	121	125	18	15	2.0	1.2	4.2	2,239	8E+03	5E+03	3E+03
6DDO57	147	581	24	194	6	2	1.1	0.2	0.6	282	8E+02	1E+03	1E+03
6DDO184	6	17	13	239	3	1	1.0	0.1	0.2	6	3E+01	4E+00	5E+01
6DDO91	7	20	27	527	6	2	2.2	0.3	0.5	7	3E+01	4E+00	5E+01
6DDO187	84	264	12	56	2	6	0.4	0.1	0.4	112	9E+02	1E+03	1E+03
6DDO86	6	17	5	81	1	0	0.4	0.0	0.1	6	3E+01	4E+00	5E+01
6DDO85	38	191	8	50	2	1	0.4	0.1	0.2	88	3E+02	2E+02	2E+02
6DDO83	176	816	38	294	10	4	1.8	0.3	0.9	379	1E+03	9E+02	1E+03
6DDO84	8	34	2	19	1	0	0.1	0.0	0.0	14	6E+01	2E+01	6E+01
06D097	43	125	13	147	6	1	0.9	0.1	0.2	42	3E+02	5E+01	5E+02
6GDO109	1,569	8,723	235	268	43	31	4.6	2.4	7.8	4,187	2E+04	9E+03	9E+03
6GDO110	1,947	11,736	314	379	44	40	5.2	3.2	10.4	5,716	2E+04	1E+04	9E+03
6GDO111	286	1,296	63	608	14	7	3.1	0.6	1.6	625	2E+03	1E+03	1E+03
6GDO166	159	596	42	549	10	4	2.5	0.4	1.0	289	9E+02	5E+02	6E+02
6GDO108	5,099	30,189	803	934	114	111	13.2	8.3	27.4	14,661	6E+04	3E+04	3E+04
6G165	30	127	6	54	1	1	0.2	0.1	0.2	64	2E+02	2E+02	1E+02
6HDO43	87	434	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	233	1,099	37	178	7	4	1.2	0.4	1.0	540	2E+03	1E+03	8E+02

Table C2-6. Scenario 2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	545	2,829	90	410	16	11	2.6	0.9	2.8	1,381	5E+03	3E+03	2E+03
7CDO006	6,454	30,821	1,130	7,650	200	140	40.6	11.4	34.7	15,234	6E+04	4E+04	4E+04
7HDO285	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
7HDO105	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
7HDO348	51	344	9	10	1	1	0.1	0.1	0.3	171	6E+02	4E+02	2E+02
7HDO347	347	1,819	56	198	11	7	1.6	0.5	1.7	881	3E+03	2E+03	2E+03
7HDO346	326	2,055	53	67	5	7	0.7	0.6	1.8	1,006	4E+03	2E+03	1E+03
8BDO122	1,645	9,421	234	291	31	43	3.9	3.6	13.4	4,506	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	6E-01	9E-01	9E-01
8BDO126	927	5,986	151	133	12	20	1.6	1.7	5.7	2,952	1E+04	7E+03	4E+03
8CDO25	206	689	45	480	10	5	2.4	0.4	1.1	365	2E+03	1E+03	2E+03
8CDO26	193	684	42	412	8	5	2.0	0.4	1.1	365	2E+03	1E+03	2E+03
8DDO112	34	204	6	7	1	1	0.1	0.1	0.2	99	4E+02	4E+02	3E+02
8DSDO100	88	288	16	174	3	4	0.8	0.1	0.5	140	6E+02	1E+03	1E+03
8EDO35	136	387	30	451	8	2	2.0	0.3	0.6	193	5E+02	2E+03	2E+03
8EDO33	516	3,262	92	250	9	11	1.6	1.0	3.1	1,608	6E+03	4E+03	2E+03
8IDO153	41	274	7	4	0	1	0.1	0.1	0.2	135	5E+02	3E+02	2E+02
8IDO155	27	105	5	58	1	0	0.3	0.0	0.1	53	2E+02	4E+02	3E+02
8IDO156	341	731	47	583	19	4	3.3	0.3	0.8	319	5E+02	1E+02	8E+02
8IDO209	112	722	18	18	1	2	0.2	0.2	0.6	357	1E+03	9E+02	5E+02
8IDO154	927	5,242	146	288	22	23	2.9	1.6	5.3	2,535	9E+03	7E+03	6E+03
8IDO158	422	2,557	69	133	9	9	1.2	0.8	2.9	1,254	4E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,258	7,973	205	234	23	29	3.0	2.5	8.9	3,878	1E+04	9E+03	5E+03
8JSDO103	1,042	6,319	174	323	22	22	3.1	1.8	5.9	3,100	1E+04	7E+03	5E+03
8JSDO41	599	3,857	100	113	11	14	1.4	1.2	3.9	1,884	7E+03	4E+03	3E+03
8JSDO50	1,321	7,045	195	411	37	29	4.6	2.3	8.0	3,376	1E+04	9E+03	8E+03
8K049	175	1,049	30	64	5	4	0.6	0.3	1.0	508	2E+03	1E+03	9E+02
9BDO49	358	996	36	143	7	25	1.0	0.2	1.7	449	3E+03	7E+03	8E+03
9EDO229	64	325	10	23	2	1	0.2	0.1	0.3	156	6E+02	4E+02	3E+02
9EDO243	181	649	25	185	7	4	1.1	0.2	0.6	313	1E+03	2E+03	2E+03
9K100	56	152	9	62	2	5	0.3	0.0	0.3	62	6E+02	1E+03	1E+03
9K101	680	2,528	109	876	26	21	4.8	0.9	3.0	1,204	5E+03	6E+03	7E+03
9K016	67	207	29	463	7	3	2.1	0.3	0.6	93	3E+02	5E+02	6E+02
9LSDO095	242	940	41	335	7	11	1.6	0.4	1.3	454	2E+03	2E+03	3E+03
10BSDO62	32	59	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	37	93	3	10	1	1	0.1	0.0	0.2	46	2E+02	5E+02	6E+02
10BSDO64	129	384	17	85	4	4	0.6	0.1	0.8	264	6E+02	7E+02	8E+02
10L094	14,991	84,217	2,292	4,495	318	331	42.2	24.5	84.7	41,080	2E+05	1E+05	8E+04
10L096	1,676	10,281	278	279	27	64	3.6	2.8	10.4	4,932	2E+04	2E+04	1E+04
11BDO28	14,889	71,841	2,841	21,649	488	407	108.3	28.0	83.4	35,311	1E+05	1E+05	8E+04
11BDO123	2,811	15,036	427	731	67	74	8.2	4.1	14.0	7,261	3E+04	2E+04	2E+04
11IDO577	37,295	192,978	6,038	12,868	1,660	892	186.7	56.0	184.5	88,626	4E+05	2E+05	3E+05
11M093	1,162	4,287	172	738	34	22	5.3	1.3	5.2	2,296	9E+03	6E+03	7E+03
12BDO10	13	32	2	19	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	31	77	4	41	1	2	0.2	0.0	0.1	34	3E+02	5E+02	5E+02
12BDO124	10,876	59,980	1,764	5,966	231	256	38.6	18.2	58.4	29,520	1E+05	8E+04	6E+04
12EDO418	237	1,076	38	82	4	5	0.6	0.3	1.0	569	2E+03	2E+03	1E+03

Table C2-6. Scenario 2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	158	791	23	83	3	3	0.5	0.2	0.7	393	1E+03	1E+03	9E+02
12HOFDO92	1,044	2,921	439	2,875	110	155	23.7	3.5	13.5	2,740	5E+03	9E+03	1E+04
12HDO85/87	493	1,476	75	466	15	48	2.8	0.4	2.9	593	6E+03	1E+04	1E+04
12L092	2,412	11,111	352	1,054	83	48	10.3	3.4	11.6	5,336	2E+04	1E+04	1E+04
12LDO296	525	2,522	76	266	14	10	2.0	0.7	2.8	1,251	4E+03	2E+03	2E+03
12M091	373	1,360	57	279	10	7	1.7	0.5	1.5	734	3E+03	2E+03	2E+03
13DSDO078	1,835	5,629	231	1,514	91	28	11.9	1.6	4.6	2,560	8E+03	6E+03	1E+04
13EDO177	56	120	10	162	3	1	0.8	0.1	0.2	59	8E+01	4E+02	4E+02
13EDO174	1,383	7,863	206	393	22	26	3.2	2.3	7.3	3,899	1E+04	1E+04	6E+03
13EDO176	40	95	5	77	2	1	0.4	0.1	0.2	46	6E+01	3E+02	3E+02
13FDO95	11	24	2	26	0	0	0.1	0.0	0.0	12	3E+01	1E+02	2E+02
13FDO011	26	49	1	1	1	0	0.0	0.0	0.0	24	3E+01	1E+02	1E+02
13F093	112	299	9	105	4	3	0.6	0.3	1.0	137	4E+02	1E+03	2E+03
13L090	35,009	170,050	5,384	5,870	1,796	783	175.3	42.5	147.9	76,868	3E+05	2E+05	2E+05
14CDO9	825	4,871	169	880	28	24	5.2	1.7	5.0	2,330	9E+03	7E+03	6E+03
15FSDO288	2,144	10,994	342	1,684	51	40	9.5	3.6	11.2	5,447	2E+04	2E+04	2E+04
15L089	14,168	64,845	2,150	4,969	651	314	72.3	17.3	61.0	30,233	1E+05	7E+04	9E+04
15L088	7,149	43,931	1,131	277	144	192	15.3	11.9	46.8	21,341	8E+04	5E+04	4E+04
16L097	581	1,811	73	613	19	38	3.6	1.4	6.5	750	4E+03	7E+03	8E+03
16LSDO122	8,752	45,246	1,355	2,520	280	278	33.0	12.1	47.2	21,378	9E+04	7E+04	7E+04
17M033	5,762	28,271	804	1,847	126	303	18.0	11.7	52.1	12,948	7E+04	7E+04	6E+04
18GSDO233	4,821	21,914	620	542	84	297	9.5	5.7	27.7	9,913	6E+04	8E+04	8E+04
19GDO043	5,285	34,708	867	339	100	124	10.9	10.1	34.4	16,660	7E+04	4E+04	3E+04
19GDO194	456	2,373	72	168	18	10	2.1	0.8	2.8	1,126	4E+03	4E+03	4E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	336	1,312	10	23	8	16	1.1	1.9	8.3	502	1E+03	4E+03	4E+03
20L083	218	944	26	7	4	9	0.7	0.1	2.1	511	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	69	2	5	1	0	0.1	0.0	0.1	32	1E+02	8E+01	1E+02
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,201	52,860	1,376	919	225	288	24.4	16.0	64.1	24,861	1E+05	8E+04	7E+04
21M005	157	450	13	36	4	3	0.4	0.1	0.9	240	2E+02	3E+02	3E+02
21M010	958	3,240	84	63	19	24	2.4	0.4	7.3	1,737	2E+03	2E+03	3E+03
21M050	449	1,293	31	20	10	8	0.9	0.2	3.0	690	1E+03	8E+02	2E+03
22CDO384	2,612	9,994	383	1,798	133	53	16.6	2.8	8.5	4,519	2E+04	1E+04	1E+04
22LSDO580	1,260	4,716	130	74	25	35	3.3	0.7	12.7	2,612	3E+03	3E+03	5E+03
23GDO132	4,547	9,722	271	2,132	126	65	15.8	3.9	17.0	4,504	7E+03	9E+03	1E+04
23HSDO042	18,769	81,792	2,773	4,871	891	575	99.4	26.7	106.0	37,758	1E+05	1E+05	1E+05
23HDO040	2,946	17,688	447	300	63	82	6.9	5.0	18.9	8,363	4E+04	2E+04	2E+04
23L196	144	288	7	35	4	1	0.4	0.1	0.7	145	1E+02	4E+01	2E+02
23L075	647	1,595	48	209	19	7	2.1	0.3	3.5	845	2E+03	7E+02	3E+03
23L074	142	304	7	21	4	1	0.3	0.0	0.4	158	9E+01	6E+01	2E+02
23L195	150	285	9	72	4	1	0.5	0.1	0.7	153	2E+02	6E+01	3E+02
23L202	153	294	7	34	4	0	0.3	0.1	0.7	159	3E+02	5E+01	6E+02
23L016	119	237	6	34	3	0	0.3	0.0	0.5	130	4E+02	7E+01	7E+02
23L015	159	274	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	928	2,313	75	93	23	47	2.0	0.3	5.1	1,057	8E+03	1E+04	1E+04
24CSDO031	313	1,972	52	55	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03

Table C2-6. Scenario 2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,869	10,009	314	1,071	45	56	7.3	3.1	10.5	4,906	2E+04	2E+04	2E+04
24DSDO150	34	82	3	23	1	0	0.1	0.0	0.1	45	8E+01	5E+02	6E+02
24DSDO032	22,428	124,341	4,093	8,194	769	580	96.3	40.0	132.1	67,006	2E+05	1E+05	1E+05
24GSDO035	25,441	148,665	3,785	4,210	432	668	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
24GSDO034	1,776	6,796	176	894	42	26	5.9	2.6	11.6	3,335	1E+04	2E+04	2E+04
24L233	447	1,321	33	85	23	12	2.3	1.1	5.3	508	1E+03	9E+02	3E+03
25DDO040	576	2,852	83	204	12	19	1.7	1.0	4.5	1,379	6E+03	5E+03	4E+03
25EDO037	14,969	79,660	2,091	3,280	292	425	37.3	24.5	100.7	38,463	2E+05	1E+05	9E+04
25GDO041	75	259	9	30	6	3	0.6	0.3	1.1	89	3E+02	2E+02	6E+02
25GDO-06	239	650	18	217	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	7,797	21,840	841	698	568	161	50.1	5.6	29.8	8,253	4E+04	2E+04	6E+04
25L144	557	3,815	92	10	12	14	1.2	1.0	3.4	1,778	8E+03	5E+03	3E+03
25L058	4,714	25,412	653	483	89	168	9.8	7.0	29.5	11,971	6E+04	5E+04	4E+04
26FDO038	50	150	14	136	7	2	1.0	0.1	0.2	47	3E+02	5E+01	6E+02
26GSDO01	3,852	17,953	520	1,914	126	90	17.0	8.0	30.4	8,444	3E+04	2E+04	2E+04
26JSDO052	42	79	4	64	2	0	0.3	0.1	0.2	38	1E+01	2E+01	2E+01
26JSDO100	160	424	22	78	14	3	1.5	0.1	0.2	147	7E+02	1E+02	1E+03
26J101	449	1,077	63	496	32	10	4.2	0.4	1.2	415	2E+03	8E+02	3E+03
26KSDO254	345	1,181	44	112	5	34	0.9	0.2	2.6	518	5E+03	7E+03	8E+03
26K035	196	415	11	32	6	1	0.5	0.1	1.1	225	5E+02	8E+01	9E+02
26K099	13,110	84,364	2,006	765	176	374	20.8	24.5	90.8	40,256	2E+05	1E+05	8E+04
26L055	179	1,043	28	12	7	4	0.6	0.3	0.8	481	2E+03	1E+03	1E+03
26LSDO084	71	208	10	16	7	1	0.6	0.0	0.1	73	3E+02	5E+02	1E+03
26L070	219	375	5	19	4	0	0.3	0.0	0.1	187	8E+01	2E+01	2E+02
27JSDO044	390	776	29	357	12	6	2.0	0.5	2.2	366	4E+02	6E+02	6E+02
27JSDO096	2,105	4,241	95	309	55	15	4.5	0.6	4.9	2,108	2E+03	4E+03	5E+03
27JSDO001	8,069	46,554	1,160	1,501	135	263	18.1	14.1	57.6	21,980	1E+05	7E+04	5E+04
27L022	2,330	14,132	334	287	45	67	5.5	5.4	20.5	6,633	3E+04	2E+04	1E+04
27L020	2,205	13,257	313	284	44	63	5.3	5.1	19.2	6,199	3E+04	2E+04	1E+04
28K061	4,571	29,571	744	359	68	139	8.1	8.1	28.6	14,146	6E+04	4E+04	3E+04
28K010	4,060	28,116	685	245	50	107	6.1	7.8	26.4	13,573	6E+04	4E+04	2E+04
28K386	708	1,747	58	360	18	21	2.6	0.6	4.0	851	2E+03	3E+03	4E+03
28L073	77	233	10	71	5	1	0.6	0.1	0.1	107	4E+02	2E+03	2E+03
28L074/5/6	1,249	3,664	109	700	51	22	6.4	2.2	9.1	1,623	5E+03	7E+03	1E+04
28N156	338	1,922	55	114	6	13	0.9	0.5	2.0	934	4E+03	3E+03	3E+03
28N207	3,371	20,606	531	445	66	99	7.8	6.2	22.3	9,833	4E+04	3E+04	2E+04
28O025	54	248	9	20	1	2	0.2	0.1	0.2	126	7E+02	6E+02	6E+02
28P001	325	2,163	54	25	5	7	0.5	0.6	1.9	1,060	4E+03	3E+03	1E+03
29J129	172	315	13	142	5	3	0.8	0.1	0.5	153	2E+02	4E+02	4E+02
29J029	374	968	41	179	7	32	1.1	0.2	1.9	401	4E+03	6E+03	7E+03
29J212	18,041	116,845	2,831	1,066	258	544	30.9	33.7	127.4	55,806	2E+05	2E+05	1E+05
29M049	1,321	7,325	202	179	36	48	3.9	2.1	7.8	3,394	2E+04	1E+04	1E+04
29N015	133	592	18	27	2	6	0.5	0.1	1.4	324	3E+02	5E+02	6E+02
29N135	432	2,399	64	144	7	10	1.2	0.7	2.8	1,185	4E+03	3E+03	2E+03
29O001	11,912	73,781	1,962	2,310	236	305	29.8	20.9	72.4	35,737	1E+05	9E+04	7E+04
29P015	82	549	14	13	1	2	0.2	0.2	0.5	269	1E+03	6E+02	4E+02
29P044	631	4,243	109	79	10	14	1.2	1.2	3.8	2,073	8E+03	5E+03	3E+03
30J006	238	691	25	175	8	5	1.3	0.2	1.1	346	9E+02	3E+03	3E+03

Table C2-6. Scenario 2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	66	182	8	93	2	1	0.5	0.1	0.5	90	1E+02	7E+02	7E+02
30J030	731	1,565	38	146	18	6	1.7	0.2	2.7	812	5E+02	5E+02	9E+02
30P107	359	1,900	70	103	6	10	0.9	0.5	1.6	963	4E+03	3E+03	2E+03
30P062	308	2,046	53	52	5	7	0.6	0.6	1.9	1,013	4E+03	2E+03	1E+03
31O004	1,046	6,297	221	147	18	33	2.4	1.4	4.8	3,089	1E+04	1E+04	7E+03
31P084	321	1,993	51	76	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03
3FDO159	333	1,451	62	491	14	7	2.7	0.6	1.6	702	2E+03	2E+03	2E+03
11G318/319	368	1,030	74	736	13	38	3.4	0.5	2.5	416	4E+03	7E+03	8E+03
6FSDO233	8	17	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	536	2,025	35	74	16	16	1.7	1.7	7.2	847	2E+03	2E+03	2E+03
21H039	1,535	4,799	67	315	45	48	5.2	5.5	24.2	1,921	4E+03	4E+03	5E+03
20G161	2,690	11,523	324	225	68	108	7.5	5.4	23.1	5,262	3E+04	2E+04	2E+04
StonyMWRA	121,181	572,174	19,761	68,549	4,938	3,297	676.0	200.3	680.9	275,872	1E+06	7E+05	8E+05
Fens	72,819	229,428	11,699	17,674	4,613	2,235	536.0	97.7	297.3	116,698	3E+05	2E+05	2E+05
20D055	5,926	38,515	1,019	469	122	136	13.2	11.0	36.4	18,747	7E+04	4E+04	3E+04
21D319	7,804	51,676	1,354	824	147	180	17.0	14.6	48.0	25,184	1E+05	6E+04	4E+04

Table C2-7. Scenario 2.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,051	4,265	147	905	29	21	5.4	1.3	5.7	2,161	5E+03	4E+03	3E+03
1FDO31	880	4,193	114	191	20	20	2.2	1.1	4.1	2,044	7E+03	6E+03	5E+03
02E086	279	1,177	45	325	11	5	1.9	0.4	1.3	569	2E+03	1E+03	1E+03
2FDO120	1,495	7,547	216	576	34	33	5.0	2.0	8.8	3,750	1E+04	9E+03	8E+03
2FDO93	1,617	11,427	278	110	19	37	2.4	3.1	10.3	5,564	2E+04	1E+04	8E+03
2FDO85	103	484	13	28	3	2	0.3	0.1	0.4	237	8E+02	5E+02	4E+02
3ESDO186	348	1,610	68	562	14	8	2.9	0.7	1.9	785	3E+03	2E+03	1E+03
3ESDO185	639	2,934	115	358	15	14	2.5	0.9	2.8	1,521	6E+03	4E+03	3E+03
3F162	566	2,799	101	509	25	12	3.7	0.9	2.7	1,329	5E+03	3E+03	3E+03
4ESDO69	1,734	8,267	265	966	43	40	6.9	2.6	9.6	4,120	1E+04	1E+04	9E+03
4ESDO64	42	141	8	91	2	1	0.5	0.1	0.2	66	2E+02	4E+02	4E+02
4FDO189	836	4,786	130	174	20	16	2.4	1.3	4.5	2,338	8E+03	5E+03	4E+03
4FDO204	955	4,977	155	511	32	19	4.3	1.5	4.5	2,399	8E+03	5E+03	5E+03
4FDO16	450	2,590	71	85	11	11	1.3	0.7	2.4	1,250	5E+03	3E+03	3E+03
4FDO203	139	621	25	184	6	3	1.1	0.2	0.6	300	1E+03	8E+02	8E+02
4FDO118	638	3,657	95	110	11	15	1.3	1.0	3.4	1,792	7E+03	5E+03	3E+03
4FDO119	1,348	5,472	142	45	24	37	3.1	0.9	10.6	2,917	4E+03	5E+03	4E+03
5CSDO110	819	2,836	135	758	32	24	5.2	1.0	3.3	1,468	7E+03	5E+03	7E+03
5EDO182	117	566	33	376	6	3	1.7	0.3	0.8	277	9E+02	6E+02	4E+02
5ESDO184	685	3,123	150	1,476	31	15	7.2	1.5	3.9	1,530	5E+03	4E+03	3E+03
5FDO117	862	4,445	154	769	32	18	5.2	1.5	4.4	2,138	8E+03	4E+03	4E+03
5FDO254	60	380	10	11	1	1	0.1	0.1	0.4	189	7E+02	4E+02	2E+02
5FDO265	20	41	1	3	1	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	689	3,713	104	172	17	17	2.0	1.0	3.5	1,796	7E+03	5E+03	4E+03
5FDO245	1,481	8,885	237	353	28	31	3.6	2.5	8.7	4,379	2E+04	1E+04	6E+03
5FDO244	250	1,293	34	55	5	5	0.6	0.3	1.7	645	2E+03	1E+03	1E+03
5FDO264	20	55	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	1,005	6,159	156	165	17	23	2.2	2.0	6.8	3,009	1E+04	7E+03	4E+03
5GDO116A	892	5,118	145	448	16	17	2.8	1.6	4.9	2,551	9E+03	5E+03	3E+03
5GDO115	255	1,561	41	38	5	6	0.6	0.4	1.5	765	3E+03	2E+03	1E+03
5GDO116	788	4,614	121	125	18	15	2.0	1.2	4.2	2,239	8E+03	5E+03	3E+03
6DDO57	147	581	24	194	6	2	1.1	0.2	0.6	282	8E+02	1E+03	1E+03
6DDO184	6	17	13	239	3	1	1.0	0.1	0.2	6	3E+01	4E+00	5E+01
6DDO91	7	20	27	527	6	2	2.2	0.3	0.5	7	3E+01	4E+00	5E+01
6DDO187	84	264	12	56	2	6	0.4	0.1	0.4	112	9E+02	1E+03	1E+03
6DDO86	6	17	5	81	1	0	0.4	0.0	0.1	6	3E+01	4E+00	5E+01
6DDO85	38	191	8	50	2	1	0.4	0.1	0.2	88	3E+02	2E+02	2E+02
6DDO83	176	816	38	294	10	4	1.8	0.3	0.9	379	1E+03	9E+02	1E+03
6DDO84	8	34	2	19	1	0	0.1	0.0	0.0	14	6E+01	2E+01	6E+01
06D097	43	125	13	147	6	1	0.9	0.1	0.2	42	3E+02	5E+01	5E+02
6GDO109	1,569	8,723	235	268	43	31	4.6	2.4	7.8	4,187	2E+04	9E+03	9E+03
6GDO110	1,947	11,736	314	379	44	40	5.2	3.2	10.4	5,716	2E+04	1E+04	9E+03
6GDO111	286	1,296	63	608	14	7	3.1	0.6	1.6	625	2E+03	1E+03	1E+03
6GDO166	159	596	42	549	10	4	2.5	0.4	1.0	289	9E+02	5E+02	6E+02
6GDO108	5,099	30,189	803	934	114	111	13.2	8.3	27.4	14,661	6E+04	3E+04	3E+04
6G165	30	127	6	54	1	1	0.2	0.1	0.2	64	2E+02	2E+02	1E+02
6HDO43	87	434	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	233	1,099	37	178	7	4	1.2	0.4	1.0	540	2E+03	1E+03	8E+02

Table C2-7. Scenario 2.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	545	2,829	90	410	16	11	2.6	0.9	2.8	1,381	5E+03	3E+03	2E+03
7CDO006	6,454	30,821	1,130	7,650	200	140	40.6	11.4	34.7	15,234	6E+04	4E+04	4E+04
7HDO285	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
7HDO105	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
7HDO348	51	344	9	10	1	1	0.1	0.1	0.3	171	6E+02	4E+02	2E+02
7HDO347	347	1,819	56	198	11	7	1.6	0.5	1.7	881	3E+03	2E+03	2E+03
7HDO346	326	2,055	53	67	5	7	0.7	0.6	1.8	1,006	4E+03	2E+03	1E+03
8BDO122	1,645	9,421	234	291	31	43	3.9	3.6	13.4	4,506	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	6E-01	9E-01	9E-01
8BDO126	927	5,986	151	133	12	20	1.6	1.7	5.7	2,952	1E+04	7E+03	4E+03
8CDO25	206	689	45	480	10	5	2.4	0.4	1.1	365	2E+03	1E+03	2E+03
8CDO26	193	684	42	412	8	5	2.0	0.4	1.1	365	2E+03	1E+03	2E+03
8DDO112	34	204	6	7	1	1	0.1	0.1	0.2	99	4E+02	4E+02	3E+02
8DSDO100	88	288	16	174	3	4	0.8	0.1	0.5	140	6E+02	1E+03	1E+03
8EDO35	136	387	30	451	8	2	2.0	0.3	0.6	193	5E+02	2E+03	2E+03
8EDO33	516	3,262	92	250	9	11	1.6	1.0	3.1	1,608	6E+03	4E+03	2E+03
8IDO153	41	274	7	4	0	1	0.1	0.1	0.2	135	5E+02	3E+02	2E+02
8IDO155	27	105	5	58	1	0	0.3	0.0	0.1	53	2E+02	4E+02	3E+02
8IDO156	341	731	47	583	19	4	3.3	0.3	0.8	319	5E+02	1E+02	8E+02
8IDO209	112	722	18	18	1	2	0.2	0.2	0.6	357	1E+03	9E+02	5E+02
8IDO154	927	5,242	146	288	22	23	2.9	1.6	5.3	2,535	9E+03	7E+03	6E+03
8IDO158	422	2,557	69	133	9	9	1.2	0.8	2.9	1,254	4E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,258	7,973	205	234	23	29	3.0	2.5	8.9	3,878	1E+04	9E+03	5E+03
8JSDO103	1,042	6,319	174	323	22	22	3.1	1.8	5.9	3,100	1E+04	7E+03	5E+03
8JSDO41	599	3,857	100	113	11	14	1.4	1.2	3.9	1,884	7E+03	4E+03	3E+03
8JSDO50	1,321	7,045	195	411	37	29	4.6	2.3	8.0	3,376	1E+04	9E+03	8E+03
8K049	175	1,049	30	64	5	4	0.6	0.3	1.0	508	2E+03	1E+03	9E+02
9BDO49	358	996	36	143	7	25	1.0	0.2	1.7	449	3E+03	7E+03	8E+03
9EDO229	64	325	10	23	2	1	0.2	0.1	0.3	156	6E+02	4E+02	3E+02
9EDO243	181	649	25	185	7	4	1.1	0.2	0.6	313	1E+03	2E+03	2E+03
9K100	56	152	9	62	2	5	0.3	0.0	0.3	62	6E+02	1E+03	1E+03
9K101	680	2,528	109	876	26	21	4.8	0.9	3.0	1,204	5E+03	6E+03	7E+03
9K016	67	207	29	463	7	3	2.1	0.3	0.6	93	3E+02	5E+02	6E+02
9LSDO095	242	940	41	335	7	11	1.6	0.4	1.3	454	2E+03	2E+03	3E+03
10BSDO62	32	59	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	37	93	3	10	1	1	0.1	0.0	0.2	46	2E+02	5E+02	6E+02
10BSDO64	129	384	17	85	4	4	0.6	0.1	0.8	264	6E+02	7E+02	8E+02
10L094	14,991	84,217	2,292	4,495	318	331	42.2	24.5	84.7	41,080	2E+05	1E+05	8E+04
10L096	1,676	10,281	278	279	27	64	3.6	2.8	10.4	4,932	2E+04	2E+04	1E+04
11BDO28	14,889	71,841	2,841	21,649	488	407	108.3	28.0	83.4	35,311	1E+05	1E+05	8E+04
11BDO123	2,811	15,036	427	731	67	74	8.2	4.1	14.0	7,261	3E+04	2E+04	2E+04
11IDO577	37,295	192,978	6,038	12,868	1,660	892	186.7	56.0	184.5	88,626	4E+05	2E+05	3E+05
11M093	1,162	4,287	172	738	34	22	5.3	1.3	5.2	2,296	9E+03	6E+03	7E+03
12BDO10	13	32	2	19	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	31	77	4	41	1	2	0.2	0.0	0.1	34	3E+02	5E+02	5E+02
12BDO124	10,876	59,980	1,764	5,966	231	256	38.6	18.2	58.4	29,520	1E+05	8E+04	6E+04
12EDO418	237	1,076	38	82	4	5	0.6	0.3	1.0	569	2E+03	2E+03	1E+03

Table C2-7. Scenario 2.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	158	791	23	83	3	3	0.5	0.2	0.7	393	1E+03	1E+03	9E+02
12HOFDO92	1,044	2,921	439	2,875	110	155	23.7	3.5	13.5	2,740	5E+03	9E+03	1E+04
12HDO85/87	493	1,476	75	466	15	48	2.8	0.4	2.9	593	6E+03	1E+04	1E+04
12L092	2,412	11,111	352	1,054	83	48	10.3	3.4	11.6	5,336	2E+04	1E+04	1E+04
12LDO296	525	2,522	76	266	14	10	2.0	0.7	2.8	1,251	4E+03	2E+03	2E+03
12M091	373	1,360	57	279	10	7	1.7	0.5	1.5	734	3E+03	2E+03	2E+03
13DSDO078	1,835	5,629	231	1,514	91	28	11.9	1.6	4.6	2,560	8E+03	6E+03	1E+04
13EDO177	56	120	10	162	3	1	0.8	0.1	0.2	59	8E+01	4E+02	4E+02
13EDO174	1,383	7,863	206	393	22	26	3.2	2.3	7.3	3,899	1E+04	1E+04	6E+03
13EDO176	40	95	5	77	2	1	0.4	0.1	0.2	46	6E+01	3E+02	3E+02
13FDO95	11	24	2	26	0	0	0.1	0.0	0.0	12	3E+01	1E+02	2E+02
13FDO011	26	49	1	1	1	0	0.0	0.0	0.0	24	3E+01	1E+02	1E+02
13F093	112	299	9	105	4	3	0.6	0.3	1.0	137	4E+02	1E+03	2E+03
13L090	35,009	170,050	5,384	5,870	1,796	783	175.3	42.5	147.9	76,868	3E+05	2E+05	2E+05
14CDO9	825	4,871	169	880	28	24	5.2	1.7	5.0	2,330	9E+03	7E+03	6E+03
15FSDO288	2,144	10,994	342	1,684	51	40	9.5	3.6	11.2	5,447	2E+04	2E+04	2E+04
15L089	14,168	64,845	2,150	4,969	651	314	72.3	17.3	61.0	30,233	1E+05	7E+04	9E+04
15L088	7,149	43,931	1,131	277	144	192	15.3	11.9	46.8	21,341	8E+04	5E+04	4E+04
16L097	581	1,811	73	613	19	38	3.6	1.4	6.5	750	4E+03	7E+03	8E+03
16LSDO122	8,752	45,246	1,355	2,520	280	278	33.0	12.1	47.2	21,378	9E+04	7E+04	7E+04
17M033	5,762	28,271	804	1,847	126	303	18.0	11.7	52.1	12,948	7E+04	7E+04	6E+04
18GSDO233	4,378	19,614	558	537	81	211	9.1	5.1	24.6	8,877	6E+04	7E+04	7E+04
19GDO043	5,285	34,708	867	339	100	124	10.9	10.1	34.4	16,660	7E+04	4E+04	3E+04
19GDO194	456	2,373	72	168	18	10	2.1	0.8	2.8	1,126	4E+03	4E+03	4E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	340	1,344	10	23	9	13	1.1	1.9	8.6	515	1E+03	4E+03	4E+03
20L083	218	944	26	7	4	9	0.7	0.1	2.1	511	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	69	2	5	1	0	0.1	0.0	0.1	32	1E+02	8E+01	1E+02
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,201	52,860	1,376	919	225	288	24.4	16.0	64.1	24,861	1E+05	8E+04	7E+04
21M005	157	450	13	36	4	3	0.4	0.1	0.9	240	2E+02	3E+02	3E+02
21M010	958	3,240	84	63	19	24	2.4	0.4	7.3	1,737	2E+03	2E+03	3E+03
21M050	449	1,293	31	20	10	8	0.9	0.2	3.0	690	1E+03	8E+02	2E+03
22CDO384	2,612	9,994	383	1,798	133	53	16.6	2.8	8.5	4,519	2E+04	1E+04	1E+04
22LSDO580	1,260	4,716	130	74	25	35	3.3	0.7	12.7	2,612	3E+03	3E+03	5E+03
23GDO132	4,547	9,722	271	2,132	126	65	15.8	3.9	17.0	4,504	7E+03	9E+03	1E+04
23HSDO042	18,761	81,792	2,773	4,871	891	573	99.4	26.7	106.0	37,758	1E+05	1E+05	1E+05
23HDO040	2,946	17,688	447	300	63	82	6.9	5.0	18.9	8,363	4E+04	2E+04	2E+04
23L196	144	288	7	35	4	1	0.4	0.1	0.7	145	1E+02	4E+01	2E+02
23L075	647	1,595	48	209	19	7	2.1	0.3	3.5	845	2E+03	7E+02	3E+03
23L074	142	304	7	21	4	1	0.3	0.0	0.4	158	9E+01	6E+01	2E+02
23L195	150	285	9	72	4	1	0.5	0.1	0.7	153	2E+02	6E+01	3E+02
23L202	153	294	7	34	4	0	0.3	0.1	0.7	159	3E+02	5E+01	6E+02
23L016	119	237	6	34	3	0	0.3	0.0	0.5	130	4E+02	7E+01	7E+02
23L015	159	274	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	928	2,313	75	93	23	47	2.0	0.3	5.1	1,057	8E+03	1E+04	1E+04
24CSDO031	313	1,972	52	55	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03

Table C2-7. Scenario 2.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,731	9,017	288	1,072	44	42	7.2	2.8	9.5	4,403	2E+04	2E+04	1E+04
24DSDO150	34	82	3	23	1	0	0.1	0.0	0.1	45	8E+01	5E+02	6E+02
24DSDO032	22,362	123,973	4,089	8,194	773	468	96.6	39.9	131.5	66,822	2E+05	1E+05	1E+05
24GSDO035	25,441	148,665	3,785	4,210	432	668	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
24GSDO034	1,776	6,796	176	894	42	26	5.9	2.6	11.6	3,335	1E+04	2E+04	2E+04
24L233	447	1,321	33	85	23	12	2.3	1.1	5.3	508	1E+03	9E+02	3E+03
25DDO040	576	2,852	83	204	12	19	1.7	1.0	4.5	1,379	6E+03	5E+03	4E+03
25EDO037	14,933	79,513	2,086	3,281	292	346	37.3	24.4	100.2	38,368	2E+05	1E+05	9E+04
25GDO041	75	259	9	30	6	3	0.6	0.3	1.1	89	3E+02	2E+02	6E+02
25GDO-06	239	650	18	217	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	7,797	21,840	841	698	568	161	50.1	5.6	29.8	8,253	4E+04	2E+04	6E+04
25L144	557	3,815	92	10	12	14	1.2	1.0	3.4	1,778	8E+03	5E+03	3E+03
25L058	4,714	25,412	653	483	89	168	9.8	7.0	29.5	11,971	6E+04	5E+04	4E+04
26FDO038	50	150	14	136	7	2	1.0	0.1	0.2	47	3E+02	5E+01	6E+02
26GSDO01	3,852	17,953	520	1,914	126	90	17.0	8.0	30.4	8,444	3E+04	2E+04	2E+04
26JSDO052	42	79	4	64	2	0	0.3	0.1	0.2	38	1E+01	2E+01	2E+01
26JSDO100	160	424	22	78	14	3	1.5	0.1	0.2	147	7E+02	1E+02	1E+03
26J101	449	1,077	63	496	32	10	4.2	0.4	1.2	415	2E+03	8E+02	3E+03
26KSDO254	345	1,181	44	112	5	34	0.9	0.2	2.6	518	5E+03	7E+03	8E+03
26K035	196	415	11	32	6	1	0.5	0.1	1.1	225	5E+02	8E+01	9E+02
26K099	13,110	84,364	2,006	765	176	374	20.8	24.5	90.8	40,256	2E+05	1E+05	8E+04
26L055	179	1,043	28	12	7	4	0.6	0.3	0.8	481	2E+03	1E+03	1E+03
26LSDO084	71	208	10	16	7	1	0.6	0.0	0.1	73	3E+02	5E+02	1E+03
26L070	219	375	5	19	4	0	0.3	0.0	0.1	187	8E+01	2E+01	2E+02
27JSDO044	390	776	29	357	12	6	2.0	0.5	2.2	366	4E+02	6E+02	6E+02
27JSDO096	2,105	4,241	95	309	55	15	4.5	0.6	4.9	2,108	2E+03	4E+03	5E+03
27JSDO001	8,069	46,554	1,160	1,501	135	263	18.1	14.1	57.6	21,980	1E+05	7E+04	5E+04
27L022	2,330	14,132	334	287	45	67	5.5	5.4	20.5	6,633	3E+04	2E+04	1E+04
27L020	2,205	13,257	313	284	44	63	5.3	5.1	19.2	6,199	3E+04	2E+04	1E+04
28K061	4,571	29,571	744	359	68	139	8.1	8.1	28.6	14,146	6E+04	4E+04	3E+04
28K010	4,060	28,116	685	245	50	107	6.1	7.8	26.4	13,573	6E+04	4E+04	2E+04
28K386	708	1,747	58	360	18	21	2.6	0.6	4.0	851	2E+03	3E+03	4E+03
28L073	77	233	10	71	5	1	0.6	0.1	0.1	107	4E+02	2E+03	2E+03
28L074/5/6	1,249	3,664	109	700	51	22	6.4	2.2	9.1	1,623	5E+03	7E+03	1E+04
28N156	338	1,922	55	114	6	13	0.9	0.5	2.0	934	4E+03	3E+03	3E+03
28N207	3,371	20,606	531	445	66	99	7.8	6.2	22.3	9,833	4E+04	3E+04	2E+04
28O025	54	248	9	20	1	2	0.2	0.1	0.2	126	7E+02	6E+02	6E+02
28P001	325	2,163	54	25	5	7	0.5	0.6	1.9	1,060	4E+03	3E+03	1E+03
29J129	172	315	13	142	5	3	0.8	0.1	0.5	153	2E+02	4E+02	4E+02
29J029	374	968	41	179	7	32	1.1	0.2	1.9	401	4E+03	6E+03	7E+03
29J212	18,041	116,845	2,831	1,066	258	544	30.9	33.7	127.4	55,806	2E+05	2E+05	1E+05
29M049	1,321	7,325	202	179	36	48	3.9	2.1	7.8	3,394	2E+04	1E+04	1E+04
29N015	133	592	18	27	2	6	0.5	0.1	1.4	324	3E+02	5E+02	6E+02
29N135	432	2,399	64	144	7	10	1.2	0.7	2.8	1,185	4E+03	3E+03	2E+03
29O001	11,912	73,781	1,962	2,310	236	305	29.8	20.9	72.4	35,737	1E+05	9E+04	7E+04
29P015	82	549	14	13	1	2	0.2	0.2	0.5	269	1E+03	6E+02	4E+02
29P044	631	4,243	109	79	10	14	1.2	1.2	3.8	2,073	8E+03	5E+03	3E+03
30J006	238	691	25	175	8	5	1.3	0.2	1.1	346	9E+02	3E+03	3E+03

Table C2-7. Scenario 2.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	66	182	8	93	2	1	0.5	0.1	0.5	90	1E+02	7E+02	7E+02
30J030	731	1,565	38	146	18	6	1.7	0.2	2.7	812	5E+02	5E+02	9E+02
30P107	359	1,900	70	103	6	10	0.9	0.5	1.6	963	4E+03	3E+03	2E+03
30P062	308	2,046	53	52	5	7	0.6	0.6	1.9	1,013	4E+03	2E+03	1E+03
31O004	1,046	6,297	221	147	18	33	2.4	1.4	4.8	3,089	1E+04	1E+04	7E+03
31P084	321	1,993	51	76	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03
3FDO159	333	1,451	62	491	14	7	2.7	0.6	1.6	702	2E+03	2E+03	2E+03
11G318/319	368	1,030	74	736	13	38	3.4	0.5	2.5	416	4E+03	7E+03	8E+03
6FSDO233	8	17	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	536	2,025	35	74	16	16	1.7	1.7	7.2	847	2E+03	2E+03	2E+03
21H039	1,535	4,799	67	315	45	48	5.2	5.5	24.2	1,921	4E+03	4E+03	5E+03
20G161	2,679	11,413	322	228	69	87	7.5	5.4	23.1	5,213	3E+04	2E+04	2E+04
StonyMWRA	121,181	572,174	19,761	68,549	4,938	3,297	676.0	200.3	680.9	275,872	1E+06	7E+05	8E+05
Fens	72,620	229,060	11,685	17,666	4,611	2,181	535.7	97.4	296.7	116,478	3E+05	2E+05	2E+05
20D055	5,926	38,515	1,019	469	122	136	13.2	11.0	36.4	18,747	7E+04	4E+04	3E+04
21D319	7,804	51,676	1,354	824	147	180	17.0	14.6	48.0	25,184	1E+05	6E+04	4E+04

Table C2-8. Scenario 2.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,051	4,265	147	905	29	21	5.4	1.3	5.7	2,161	5E+03	4E+03	3E+03
1FDO31	880	4,193	114	191	20	20	2.2	1.1	4.1	2,044	7E+03	6E+03	5E+03
02E086	279	1,177	45	325	11	5	1.9	0.4	1.3	569	2E+03	1E+03	1E+03
2FDO120	1,495	7,547	216	576	34	33	5.0	2.0	8.8	3,750	1E+04	9E+03	8E+03
2FDO93	1,617	11,427	278	110	19	37	2.4	3.1	10.3	5,564	2E+04	1E+04	8E+03
2FDO85	103	484	13	28	3	2	0.3	0.1	0.4	237	8E+02	5E+02	4E+02
3ESDO186	348	1,610	68	562	14	8	2.9	0.7	1.9	785	3E+03	2E+03	1E+03
3ESDO185	639	2,934	115	358	15	14	2.5	0.9	2.8	1,521	6E+03	4E+03	3E+03
3F162	566	2,799	101	509	25	12	3.7	0.9	2.7	1,329	5E+03	3E+03	3E+03
4ESDO69	1,734	8,267	265	966	43	40	6.9	2.6	9.6	4,120	1E+04	1E+04	9E+03
4ESDO64	42	141	8	91	2	1	0.5	0.1	0.2	66	2E+02	4E+02	4E+02
4FDO189	836	4,786	130	174	20	16	2.4	1.3	4.5	2,338	8E+03	5E+03	4E+03
4FDO204	955	4,977	155	511	32	19	4.3	1.5	4.5	2,399	8E+03	5E+03	5E+03
4FDO16	450	2,590	71	85	11	11	1.3	0.7	2.4	1,250	5E+03	3E+03	3E+03
4FDO203	139	621	25	184	6	3	1.1	0.2	0.6	300	1E+03	8E+02	8E+02
4FDO118	638	3,657	95	110	11	15	1.3	1.0	3.4	1,792	7E+03	5E+03	3E+03
4FDO119	1,348	5,472	142	45	24	37	3.1	0.9	10.6	2,917	4E+03	5E+03	4E+03
5CSDO110	819	2,836	135	758	32	24	5.2	1.0	3.3	1,468	7E+03	5E+03	7E+03
5EDO182	117	566	33	376	6	3	1.7	0.3	0.8	277	9E+02	6E+02	4E+02
5ESDO184	685	3,123	150	1,476	31	15	7.2	1.5	3.9	1,530	5E+03	4E+03	3E+03
5FDO117	862	4,445	154	769	32	18	5.2	1.5	4.4	2,138	8E+03	4E+03	4E+03
5FDO254	60	380	10	11	1	1	0.1	0.1	0.4	189	7E+02	4E+02	2E+02
5FDO265	20	41	1	3	1	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	689	3,713	104	172	17	17	2.0	1.0	3.5	1,796	7E+03	5E+03	4E+03
5FDO245	1,481	8,885	237	353	28	31	3.6	2.5	8.7	4,379	2E+04	1E+04	6E+03
5FDO244	250	1,293	34	55	5	5	0.6	0.3	1.7	645	2E+03	1E+03	1E+03
5FDO264	20	55	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	1,005	6,159	156	165	17	23	2.2	2.0	6.8	3,009	1E+04	7E+03	4E+03
5GDO116A	892	5,118	145	448	16	17	2.8	1.6	4.9	2,551	9E+03	5E+03	3E+03
5GDO115	255	1,561	41	38	5	6	0.6	0.4	1.5	765	3E+03	2E+03	1E+03
5GDO116	788	4,614	121	125	18	15	2.0	1.2	4.2	2,239	8E+03	5E+03	3E+03
6DDO57	147	581	24	194	6	2	1.1	0.2	0.6	282	8E+02	1E+03	1E+03
6DDO184	6	17	13	239	3	1	1.0	0.1	0.2	6	3E+01	4E+00	5E+01
6DDO91	7	20	27	527	6	2	2.2	0.3	0.5	7	3E+01	4E+00	5E+01
6DDO187	84	264	12	56	2	6	0.4	0.1	0.4	112	9E+02	1E+03	1E+03
6DDO86	6	17	5	81	1	0	0.4	0.0	0.1	6	3E+01	4E+00	5E+01
6DDO85	38	191	8	50	2	1	0.4	0.1	0.2	88	3E+02	2E+02	2E+02
6DDO83	176	816	38	294	10	4	1.8	0.3	0.9	379	1E+03	9E+02	1E+03
6DDO84	8	34	2	19	1	0	0.1	0.0	0.0	14	6E+01	2E+01	6E+01
06D097	43	125	13	147	6	1	0.9	0.1	0.2	42	3E+02	5E+01	5E+02
6GDO109	1,569	8,723	235	268	43	31	4.6	2.4	7.8	4,187	2E+04	9E+03	9E+03
6GDO110	1,947	11,736	314	379	44	40	5.2	3.2	10.4	5,716	2E+04	1E+04	9E+03
6GDO111	286	1,296	63	608	14	7	3.1	0.6	1.6	625	2E+03	1E+03	1E+03
6GDO166	159	596	42	549	10	4	2.5	0.4	1.0	289	9E+02	5E+02	6E+02
6GDO108	5,099	30,189	803	934	114	111	13.2	8.3	27.4	14,661	6E+04	3E+04	3E+04
6G165	30	127	6	54	1	1	0.2	0.1	0.2	64	2E+02	2E+02	1E+02
6HDO43	87	434	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	233	1,099	37	178	7	4	1.2	0.4	1.0	540	2E+03	1E+03	8E+02

Table C2-8. Scenario 2.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	545	2,829	90	410	16	11	2.6	0.9	2.8	1,381	5E+03	3E+03	2E+03
7CDO006	6,454	30,821	1,130	7,650	200	140	40.6	11.4	34.7	15,234	6E+04	4E+04	4E+04
7HDO285	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
7HDO105	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
7HDO348	51	344	9	10	1	1	0.1	0.1	0.3	171	6E+02	4E+02	2E+02
7HDO347	347	1,819	56	198	11	7	1.6	0.5	1.7	881	3E+03	2E+03	2E+03
7HDO346	326	2,055	53	67	5	7	0.7	0.6	1.8	1,006	4E+03	2E+03	1E+03
8BDO122	1,645	9,421	234	291	31	43	3.9	3.6	13.4	4,506	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	6E-01	9E-01	9E-01
8BDO126	927	5,986	151	133	12	20	1.6	1.7	5.7	2,952	1E+04	7E+03	4E+03
8CDO25	206	689	45	480	10	5	2.4	0.4	1.1	365	2E+03	1E+03	2E+03
8CDO26	193	684	42	412	8	5	2.0	0.4	1.1	365	2E+03	1E+03	2E+03
8DDO112	34	204	6	7	1	1	0.1	0.1	0.2	99	4E+02	4E+02	3E+02
8DSDO100	88	288	16	174	3	4	0.8	0.1	0.5	140	6E+02	1E+03	1E+03
8EDO35	136	387	30	451	8	2	2.0	0.3	0.6	193	5E+02	2E+03	2E+03
8EDO33	516	3,262	92	250	9	11	1.6	1.0	3.1	1,608	6E+03	4E+03	2E+03
8IDO153	41	274	7	4	0	1	0.1	0.1	0.2	135	5E+02	3E+02	2E+02
8IDO155	27	105	5	58	1	0	0.3	0.0	0.1	53	2E+02	4E+02	3E+02
8IDO156	341	731	47	583	19	4	3.3	0.3	0.8	319	5E+02	1E+02	8E+02
8IDO209	112	722	18	18	1	2	0.2	0.2	0.6	357	1E+03	9E+02	5E+02
8IDO154	927	5,242	146	288	22	23	2.9	1.6	5.3	2,535	9E+03	7E+03	6E+03
8IDO158	422	2,557	69	133	9	9	1.2	0.8	2.9	1,254	4E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,258	7,973	205	234	23	29	3.0	2.5	8.9	3,878	1E+04	9E+03	5E+03
8JSDO103	1,042	6,319	174	323	22	22	3.1	1.8	5.9	3,100	1E+04	7E+03	5E+03
8JSDO41	599	3,857	100	113	11	14	1.4	1.2	3.9	1,884	7E+03	4E+03	3E+03
8JSDO50	1,321	7,045	195	411	37	29	4.6	2.3	8.0	3,376	1E+04	9E+03	8E+03
8K049	175	1,049	30	64	5	4	0.6	0.3	1.0	508	2E+03	1E+03	9E+02
9BDO49	358	996	36	143	7	25	1.0	0.2	1.7	449	3E+03	7E+03	8E+03
9EDO229	64	325	10	23	2	1	0.2	0.1	0.3	156	6E+02	4E+02	3E+02
9EDO243	181	649	25	185	7	4	1.1	0.2	0.6	313	1E+03	2E+03	2E+03
9K100	56	152	9	62	2	5	0.3	0.0	0.3	62	6E+02	1E+03	1E+03
9K101	680	2,528	109	876	26	21	4.8	0.9	3.0	1,204	5E+03	6E+03	7E+03
9K016	67	207	29	463	7	3	2.1	0.3	0.6	93	3E+02	5E+02	6E+02
9LSDO095	242	940	41	335	7	11	1.6	0.4	1.3	454	2E+03	2E+03	3E+03
10BSDO62	32	59	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	37	93	3	10	1	1	0.1	0.0	0.2	46	2E+02	5E+02	6E+02
10BSDO64	129	384	17	85	4	4	0.6	0.1	0.8	264	6E+02	7E+02	8E+02
10L094	14,991	84,217	2,292	4,495	318	331	42.2	24.5	84.7	41,080	2E+05	1E+05	8E+04
10L096	1,676	10,281	278	279	27	64	3.6	2.8	10.4	4,932	2E+04	2E+04	1E+04
11BDO28	14,889	71,841	2,841	21,649	488	407	108.3	28.0	83.4	35,311	1E+05	1E+05	8E+04
11BDO123	2,811	15,036	427	731	67	74	8.2	4.1	14.0	7,261	3E+04	2E+04	2E+04
11IDO577	37,295	192,978	6,038	12,868	1,660	892	186.7	56.0	184.5	88,626	4E+05	2E+05	3E+05
11M093	1,162	4,287	172	738	34	22	5.3	1.3	5.2	2,296	9E+03	6E+03	7E+03
12BDO10	13	32	2	19	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	31	77	4	41	1	2	0.2	0.0	0.1	34	3E+02	5E+02	5E+02
12BDO124	10,876	59,980	1,764	5,966	231	256	38.6	18.2	58.4	29,520	1E+05	8E+04	6E+04
12EDO418	237	1,076	38	82	4	5	0.6	0.3	1.0	569	2E+03	2E+03	1E+03

Table C2-8. Scenario 2.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	158	791	23	83	3	3	0.5	0.2	0.7	393	1E+03	1E+03	9E+02
12HOFDO92	1,044	2,921	439	2,875	110	155	23.7	3.5	13.5	2,740	5E+03	9E+03	1E+04
12HDO85/87	493	1,476	75	466	15	48	2.8	0.4	2.9	593	6E+03	1E+04	1E+04
12L092	2,412	11,111	352	1,054	83	48	10.3	3.4	11.6	5,336	2E+04	1E+04	1E+04
12LDO296	525	2,522	76	266	14	10	2.0	0.7	2.8	1,251	4E+03	2E+03	2E+03
12M091	373	1,360	57	279	10	7	1.7	0.5	1.5	734	3E+03	2E+03	2E+03
13DSDO078	1,835	5,629	231	1,514	91	28	11.9	1.6	4.6	2,560	8E+03	6E+03	1E+04
13EDO177	56	120	10	162	3	1	0.8	0.1	0.2	59	8E+01	4E+02	4E+02
13EDO174	1,383	7,863	206	393	22	26	3.2	2.3	7.3	3,899	1E+04	1E+04	6E+03
13EDO176	40	95	5	77	2	1	0.4	0.1	0.2	46	6E+01	3E+02	3E+02
13FDO95	11	24	2	26	0	0	0.1	0.0	0.0	12	3E+01	1E+02	2E+02
13FDO011	26	49	1	1	1	0	0.0	0.0	0.0	24	3E+01	1E+02	1E+02
13F093	112	299	9	105	4	3	0.6	0.3	1.0	137	4E+02	1E+03	2E+03
13L090	35,009	170,050	5,384	5,870	1,796	783	175.3	42.5	147.9	76,868	3E+05	2E+05	2E+05
14CDO9	825	4,871	169	880	28	24	5.2	1.7	5.0	2,330	9E+03	7E+03	6E+03
15FSDO288	2,144	10,994	342	1,684	51	40	9.5	3.6	11.2	5,447	2E+04	2E+04	2E+04
15L089	14,168	64,845	2,150	4,969	651	314	72.3	17.3	61.0	30,233	1E+05	7E+04	9E+04
15L088	7,149	43,931	1,131	277	144	192	15.3	11.9	46.8	21,341	8E+04	5E+04	4E+04
16L097	581	1,811	73	613	19	38	3.6	1.4	6.5	750	4E+03	7E+03	8E+03
16LSDO122	8,752	45,246	1,355	2,520	280	278	33.0	12.1	47.2	21,378	9E+04	7E+04	7E+04
17M033	5,762	28,271	804	1,847	126	303	18.0	11.7	52.1	12,948	7E+04	7E+04	6E+04
18GSDO233	4,378	19,614	558	537	81	193	9.1	5.1	24.6	8,877	6E+04	7E+04	7E+04
19GDO043	5,285	34,708	867	339	100	124	10.9	10.1	34.4	16,660	7E+04	4E+04	3E+04
19GDO194	456	2,373	72	168	18	10	2.1	0.8	2.8	1,126	4E+03	4E+03	4E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	340	1,344	10	23	9	12	1.1	1.9	8.6	515	1E+03	4E+03	4E+03
20L083	218	944	26	7	4	9	0.7	0.1	2.1	511	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	69	2	5	1	0	0.1	0.0	0.1	32	1E+02	8E+01	1E+02
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,201	52,860	1,376	919	225	288	24.4	16.0	64.1	24,861	1E+05	8E+04	7E+04
21M005	157	450	13	36	4	3	0.4	0.1	0.9	240	2E+02	3E+02	3E+02
21M010	958	3,240	84	63	19	24	2.4	0.4	7.3	1,737	2E+03	2E+03	3E+03
21M050	449	1,293	31	20	10	8	0.9	0.2	3.0	690	1E+03	8E+02	2E+03
22CDO384	2,612	9,994	383	1,798	133	53	16.6	2.8	8.5	4,519	2E+04	1E+04	1E+04
22LSDO580	1,260	4,716	130	74	25	35	3.3	0.7	12.7	2,612	3E+03	3E+03	5E+03
23GDO132	4,547	9,722	271	2,132	126	65	15.8	3.9	17.0	4,504	7E+03	9E+03	1E+04
23HSDO042	18,761	81,792	2,773	4,871	891	573	99.4	26.7	106.0	37,758	1E+05	1E+05	1E+05
23HDO040	2,946	17,688	447	300	63	82	6.9	5.0	18.9	8,363	4E+04	2E+04	2E+04
23L196	144	288	7	35	4	1	0.4	0.1	0.7	145	1E+02	4E+01	2E+02
23L075	647	1,595	48	209	19	7	2.1	0.3	3.5	845	2E+03	7E+02	3E+03
23L074	142	304	7	21	4	1	0.3	0.0	0.4	158	9E+01	6E+01	2E+02
23L195	150	285	9	72	4	1	0.5	0.1	0.7	153	2E+02	6E+01	3E+02
23L202	153	294	7	34	4	0	0.3	0.1	0.7	159	3E+02	5E+01	6E+02
23L016	119	237	6	34	3	0	0.3	0.0	0.5	130	4E+02	7E+01	7E+02
23L015	159	274	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	928	2,313	75	93	23	47	2.0	0.3	5.1	1,057	8E+03	1E+04	1E+04
24CSDO031	313	1,972	52	55	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03

Table C2-8. Scenario 2.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,731	9,017	288	1,072	44	39	7.2	2.8	9.5	4,403	2E+04	2E+04	1E+04
24DSDO150	34	82	3	23	1	0	0.1	0.0	0.1	45	8E+01	5E+02	6E+02
24DSDO032	22,362	123,973	4,089	8,194	773	427	96.6	39.9	131.5	66,822	2E+05	1E+05	1E+05
24GSDO035	25,441	148,665	3,785	4,210	432	668	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
24GSDO034	1,776	6,796	176	894	42	26	5.9	2.6	11.6	3,335	1E+04	2E+04	2E+04
24L233	447	1,321	33	85	23	12	2.3	1.1	5.3	508	1E+03	9E+02	3E+03
25DDO040	576	2,852	83	204	12	19	1.7	1.0	4.5	1,379	6E+03	5E+03	4E+03
25EDO037	14,933	79,513	2,086	3,281	292	318	37.3	24.4	100.2	38,368	2E+05	1E+05	9E+04
25GDO041	75	259	9	30	6	3	0.6	0.3	1.1	89	3E+02	2E+02	6E+02
25GDO-06	239	650	18	217	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	7,797	21,840	841	698	568	161	50.1	5.6	29.8	8,253	4E+04	2E+04	6E+04
25L144	557	3,815	92	10	12	14	1.2	1.0	3.4	1,778	8E+03	5E+03	3E+03
25L058	4,714	25,412	653	483	89	168	9.8	7.0	29.5	11,971	6E+04	5E+04	4E+04
26FDO038	50	150	14	136	7	2	1.0	0.1	0.2	47	3E+02	5E+01	6E+02
26GSDO01	3,852	17,953	520	1,914	126	90	17.0	8.0	30.4	8,444	3E+04	2E+04	2E+04
26JSDO052	42	79	4	64	2	0	0.3	0.1	0.2	38	1E+01	2E+01	2E+01
26JSDO100	160	424	22	78	14	3	1.5	0.1	0.2	147	7E+02	1E+02	1E+03
26J101	449	1,077	63	496	32	10	4.2	0.4	1.2	415	2E+03	8E+02	3E+03
26KSDO254	345	1,181	44	112	5	34	0.9	0.2	2.6	518	5E+03	7E+03	8E+03
26K035	196	415	11	32	6	1	0.5	0.1	1.1	225	5E+02	8E+01	9E+02
26K099	13,110	84,364	2,006	765	176	374	20.8	24.5	90.8	40,256	2E+05	1E+05	8E+04
26L055	179	1,043	28	12	7	4	0.6	0.3	0.8	481	2E+03	1E+03	1E+03
26LSDO084	71	208	10	16	7	1	0.6	0.0	0.1	73	3E+02	5E+02	1E+03
26L070	219	375	5	19	4	0	0.3	0.0	0.1	187	8E+01	2E+01	2E+02
27JSDO044	390	776	29	357	12	6	2.0	0.5	2.2	366	4E+02	6E+02	6E+02
27JSDO096	2,105	4,241	95	309	55	15	4.5	0.6	4.9	2,108	2E+03	4E+03	5E+03
27JSDO001	8,069	46,554	1,160	1,501	135	263	18.1	14.1	57.6	21,980	1E+05	7E+04	5E+04
27L022	2,330	14,132	334	287	45	67	5.5	5.4	20.5	6,633	3E+04	2E+04	1E+04
27L020	2,205	13,257	313	284	44	63	5.3	5.1	19.2	6,199	3E+04	2E+04	1E+04
28K061	4,571	29,571	744	359	68	139	8.1	8.1	28.6	14,146	6E+04	4E+04	3E+04
28K010	4,060	28,116	685	245	50	107	6.1	7.8	26.4	13,573	6E+04	4E+04	2E+04
28K386	708	1,747	58	360	18	21	2.6	0.6	4.0	851	2E+03	3E+03	4E+03
28L073	77	233	10	71	5	1	0.6	0.1	0.1	107	4E+02	2E+03	2E+03
28L074/5/6	1,249	3,664	109	700	51	22	6.4	2.2	9.1	1,623	5E+03	7E+03	1E+04
28N156	338	1,922	55	114	6	13	0.9	0.5	2.0	934	4E+03	3E+03	3E+03
28N207	3,371	20,606	531	445	66	99	7.8	6.2	22.3	9,833	4E+04	3E+04	2E+04
28O025	54	248	9	20	1	2	0.2	0.1	0.2	126	7E+02	6E+02	6E+02
28P001	325	2,163	54	25	5	7	0.5	0.6	1.9	1,060	4E+03	3E+03	1E+03
29J129	172	315	13	142	5	3	0.8	0.1	0.5	153	2E+02	4E+02	4E+02
29J029	374	968	41	179	7	32	1.1	0.2	1.9	401	4E+03	6E+03	7E+03
29J212	18,041	116,845	2,831	1,066	258	544	30.9	33.7	127.4	55,806	2E+05	2E+05	1E+05
29M049	1,321	7,325	202	179	36	48	3.9	2.1	7.8	3,394	2E+04	1E+04	1E+04
29N015	133	592	18	27	2	6	0.5	0.1	1.4	324	3E+02	5E+02	6E+02
29N135	432	2,399	64	144	7	10	1.2	0.7	2.8	1,185	4E+03	3E+03	2E+03
29O001	11,912	73,781	1,962	2,310	236	305	29.8	20.9	72.4	35,737	1E+05	9E+04	7E+04
29P015	82	549	14	13	1	2	0.2	0.2	0.5	269	1E+03	6E+02	4E+02
29P044	631	4,243	109	79	10	14	1.2	1.2	3.8	2,073	8E+03	5E+03	3E+03
30J006	238	691	25	175	8	5	1.3	0.2	1.1	346	9E+02	3E+03	3E+03

Table C2-8. Scenario 2.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	66	182	8	93	2	1	0.5	0.1	0.5	90	1E+02	7E+02	7E+02
30J030	731	1,565	38	146	18	6	1.7	0.2	2.7	812	5E+02	5E+02	9E+02
30P107	359	1,900	70	103	6	10	0.9	0.5	1.6	963	4E+03	3E+03	2E+03
30P062	308	2,046	53	52	5	7	0.6	0.6	1.9	1,013	4E+03	2E+03	1E+03
31O004	1,046	6,297	221	147	18	33	2.4	1.4	4.8	3,089	1E+04	1E+04	7E+03
31P084	321	1,993	51	76	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03
3FDO159	333	1,451	62	491	14	7	2.7	0.6	1.6	702	2E+03	2E+03	2E+03
11G318/319	368	1,030	74	736	13	38	3.4	0.5	2.5	416	4E+03	7E+03	8E+03
6FSDO233	8	17	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	536	2,025	35	74	16	16	1.7	1.7	7.2	847	2E+03	2E+03	2E+03
21H039	1,535	4,799	67	315	45	48	5.2	5.5	24.2	1,921	4E+03	4E+03	5E+03
20G161	2,679	11,413	322	228	69	80	7.5	5.4	23.1	5,213	3E+04	2E+04	2E+04
StonyMWRA	121,181	572,174	19,761	68,549	4,938	3,297	676.0	200.3	680.9	275,872	1E+06	7E+05	8E+05
Fens	72,620	229,060	11,685	17,666	4,611	2,167	535.7	97.4	296.7	116,478	3E+05	2E+05	2E+05
20D055	5,926	38,515	1,019	469	122	136	13.2	11.0	36.4	18,747	7E+04	4E+04	3E+04
21D319	7,804	51,676	1,354	824	147	180	17.0	14.6	48.0	25,184	1E+05	6E+04	4E+04

Table C2-9. Scenario 2.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,051	4,265	147	905	29	21	5.4	1.3	5.7	2,161	5E+03	4E+03	3E+03
1FDO31	880	4,193	114	191	20	20	2.2	1.1	4.1	2,044	7E+03	6E+03	5E+03
02E086	279	1,177	45	325	11	5	1.9	0.4	1.3	569	2E+03	1E+03	1E+03
2FDO120	1,495	7,547	216	576	34	33	5.0	2.0	8.8	3,750	1E+04	9E+03	8E+03
2FDO93	1,617	11,427	278	110	19	37	2.4	3.1	10.3	5,564	2E+04	1E+04	8E+03
2FDO85	103	484	13	28	3	2	0.3	0.1	0.4	237	8E+02	5E+02	4E+02
3ESDO186	348	1,610	68	562	14	8	2.9	0.7	1.9	785	3E+03	2E+03	1E+03
3ESDO185	639	2,934	115	358	15	14	2.5	0.9	2.8	1,521	6E+03	4E+03	3E+03
3F162	566	2,799	101	509	25	12	3.7	0.9	2.7	1,329	5E+03	3E+03	3E+03
4ESDO69	1,734	8,267	265	966	43	40	6.9	2.6	9.6	4,120	1E+04	1E+04	9E+03
4ESDO64	42	141	8	91	2	1	0.5	0.1	0.2	66	2E+02	4E+02	4E+02
4FDO189	836	4,786	130	174	20	16	2.4	1.3	4.5	2,338	8E+03	5E+03	4E+03
4FDO204	955	4,977	155	511	32	19	4.3	1.5	4.5	2,399	8E+03	5E+03	5E+03
4FDO16	450	2,590	71	85	11	11	1.3	0.7	2.4	1,250	5E+03	3E+03	3E+03
4FDO203	139	621	25	184	6	3	1.1	0.2	0.6	300	1E+03	8E+02	8E+02
4FDO118	638	3,657	95	110	11	15	1.3	1.0	3.4	1,792	7E+03	5E+03	3E+03
4FDO119	1,348	5,472	142	45	24	37	3.1	0.9	10.6	2,917	4E+03	5E+03	4E+03
5CSDO110	819	2,836	135	758	32	24	5.2	1.0	3.3	1,468	7E+03	5E+03	7E+03
5EDO182	117	566	33	376	6	3	1.7	0.3	0.8	277	9E+02	6E+02	4E+02
5ESDO184	685	3,123	150	1,476	31	15	7.2	1.5	3.9	1,530	5E+03	4E+03	3E+03
5FDO117	862	4,445	154	769	32	18	5.2	1.5	4.4	2,138	8E+03	4E+03	4E+03
5FDO254	60	380	10	11	1	1	0.1	0.1	0.4	189	7E+02	4E+02	2E+02
5FDO265	20	41	1	3	1	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	689	3,713	104	172	17	17	2.0	1.0	3.5	1,796	7E+03	5E+03	4E+03
5FDO245	1,481	8,885	237	353	28	31	3.6	2.5	8.7	4,379	2E+04	1E+04	6E+03
5FDO244	250	1,293	34	55	5	5	0.6	0.3	1.7	645	2E+03	1E+03	1E+03
5FDO264	20	55	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	1,005	6,159	156	165	17	23	2.2	2.0	6.8	3,009	1E+04	7E+03	4E+03
5GDO116A	892	5,118	145	448	16	17	2.8	1.6	4.9	2,551	9E+03	5E+03	3E+03
5GDO115	255	1,561	41	38	5	6	0.6	0.4	1.5	765	3E+03	2E+03	1E+03
5GDO116	788	4,614	121	125	18	15	2.0	1.2	4.2	2,239	8E+03	5E+03	3E+03
6DDO57	147	581	24	194	6	2	1.1	0.2	0.6	282	8E+02	1E+03	1E+03
6DDO184	6	17	13	239	3	1	1.0	0.1	0.2	6	3E+01	4E+00	5E+01
6DDO91	7	20	27	527	6	2	2.2	0.3	0.5	7	3E+01	4E+00	5E+01
6DDO187	84	264	12	56	2	6	0.4	0.1	0.4	112	9E+02	1E+03	1E+03
6DDO86	6	17	5	81	1	0	0.4	0.0	0.1	6	3E+01	4E+00	5E+01
6DDO85	38	191	8	50	2	1	0.4	0.1	0.2	88	3E+02	2E+02	2E+02
6DDO83	176	816	38	294	10	4	1.8	0.3	0.9	379	1E+03	9E+02	1E+03
6DDO84	8	34	2	19	1	0	0.1	0.0	0.0	14	6E+01	2E+01	6E+01
06D097	43	125	13	147	6	1	0.9	0.1	0.2	42	3E+02	5E+01	5E+02
6GDO109	1,569	8,723	235	268	43	31	4.6	2.4	7.8	4,187	2E+04	9E+03	9E+03
6GDO110	1,947	11,736	314	379	44	40	5.2	3.2	10.4	5,716	2E+04	1E+04	9E+03
6GDO111	286	1,296	63	608	14	7	3.1	0.6	1.6	625	2E+03	1E+03	1E+03
6GDO166	159	596	42	549	10	4	2.5	0.4	1.0	289	9E+02	5E+02	6E+02
6GDO108	5,099	30,189	803	934	114	111	13.2	8.3	27.4	14,661	6E+04	3E+04	3E+04
6G165	30	127	6	54	1	1	0.2	0.1	0.2	64	2E+02	2E+02	1E+02
6HDO43	87	434	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	233	1,099	37	178	7	4	1.2	0.4	1.0	540	2E+03	1E+03	8E+02

Table C2-9. Scenario 2.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	545	2,829	90	410	16	11	2.6	0.9	2.8	1,381	5E+03	3E+03	2E+03
7CDO006	6,454	30,821	1,130	7,650	200	140	40.6	11.4	34.7	15,234	6E+04	4E+04	4E+04
7HDO285	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
7HDO105	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
7HDO348	51	344	9	10	1	1	0.1	0.1	0.3	171	6E+02	4E+02	2E+02
7HDO347	347	1,819	56	198	11	7	1.6	0.5	1.7	881	3E+03	2E+03	2E+03
7HDO346	326	2,055	53	67	5	7	0.7	0.6	1.8	1,006	4E+03	2E+03	1E+03
8BDO122	1,645	9,421	234	291	31	43	3.9	3.6	13.4	4,506	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	6E-01	9E-01	9E-01
8BDO126	927	5,986	151	133	12	20	1.6	1.7	5.7	2,952	1E+04	7E+03	4E+03
8CDO25	206	689	45	480	10	5	2.4	0.4	1.1	365	2E+03	1E+03	2E+03
8CDO26	193	684	42	412	8	5	2.0	0.4	1.1	365	2E+03	1E+03	2E+03
8DDO112	34	204	6	7	1	1	0.1	0.1	0.2	99	4E+02	4E+02	3E+02
8DSDO100	88	288	16	174	3	4	0.8	0.1	0.5	140	6E+02	1E+03	1E+03
8EDO35	136	387	30	451	8	2	2.0	0.3	0.6	193	5E+02	2E+03	2E+03
8EDO33	516	3,262	92	250	9	11	1.6	1.0	3.1	1,608	6E+03	4E+03	2E+03
8IDO153	41	274	7	4	0	1	0.1	0.1	0.2	135	5E+02	3E+02	2E+02
8IDO155	27	105	5	58	1	0	0.3	0.0	0.1	53	2E+02	4E+02	3E+02
8IDO156	341	731	47	583	19	4	3.3	0.3	0.8	319	5E+02	1E+02	8E+02
8IDO209	112	722	18	18	1	2	0.2	0.2	0.6	357	1E+03	9E+02	5E+02
8IDO154	927	5,242	146	288	22	23	2.9	1.6	5.3	2,535	9E+03	7E+03	6E+03
8IDO158	422	2,557	69	133	9	9	1.2	0.8	2.9	1,254	4E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,258	7,973	205	234	23	29	3.0	2.5	8.9	3,878	1E+04	9E+03	5E+03
8JSDO103	1,042	6,319	174	323	22	22	3.1	1.8	5.9	3,100	1E+04	7E+03	5E+03
8JSDO41	599	3,857	100	113	11	14	1.4	1.2	3.9	1,884	7E+03	4E+03	3E+03
8JSDO50	1,321	7,045	195	411	37	29	4.6	2.3	8.0	3,376	1E+04	9E+03	8E+03
8K049	175	1,049	30	64	5	4	0.6	0.3	1.0	508	2E+03	1E+03	9E+02
9BDO49	358	996	36	143	7	25	1.0	0.2	1.7	449	3E+03	7E+03	8E+03
9EDO229	64	325	10	23	2	1	0.2	0.1	0.3	156	6E+02	4E+02	3E+02
9EDO243	181	649	25	185	7	4	1.1	0.2	0.6	313	1E+03	2E+03	2E+03
9K100	56	152	9	62	2	5	0.3	0.0	0.3	62	6E+02	1E+03	1E+03
9K101	680	2,528	109	876	26	21	4.8	0.9	3.0	1,204	5E+03	6E+03	7E+03
9K016	67	207	29	463	7	3	2.1	0.3	0.6	93	3E+02	5E+02	6E+02
9LSDO095	242	940	41	335	7	11	1.6	0.4	1.3	454	2E+03	2E+03	3E+03
10BSDO62	32	59	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	37	93	3	10	1	1	0.1	0.0	0.2	46	2E+02	5E+02	6E+02
10BSDO64	129	384	17	85	4	4	0.6	0.1	0.8	264	6E+02	7E+02	8E+02
10L094	14,991	84,217	2,292	4,495	318	331	42.2	24.5	84.7	41,080	2E+05	1E+05	8E+04
10L096	1,676	10,281	278	279	27	64	3.6	2.8	10.4	4,932	2E+04	2E+04	1E+04
11BDO28	14,889	71,841	2,841	21,649	488	407	108.3	28.0	83.4	35,311	1E+05	1E+05	8E+04
11BDO123	2,811	15,036	427	731	67	74	8.2	4.1	14.0	7,261	3E+04	2E+04	2E+04
11IDO577	37,295	192,978	6,038	12,868	1,660	892	186.7	56.0	184.5	88,626	4E+05	2E+05	3E+05
11M093	1,162	4,287	172	738	34	22	5.3	1.3	5.2	2,296	9E+03	6E+03	7E+03
12BDO10	13	32	2	19	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	31	77	4	41	1	2	0.2	0.0	0.1	34	3E+02	5E+02	5E+02
12BDO124	10,876	59,980	1,764	5,966	231	256	38.6	18.2	58.4	29,520	1E+05	8E+04	6E+04
12EDO418	237	1,076	38	82	4	5	0.6	0.3	1.0	569	2E+03	2E+03	1E+03

Table C2-9. Scenario 2.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	158	791	23	83	3	3	0.5	0.2	0.7	393	1E+03	1E+03	9E+02
12HOFDO92	1,044	2,921	439	2,875	110	155	23.7	3.5	13.5	2,740	5E+03	9E+03	1E+04
12HDO85/87	493	1,476	75	466	15	48	2.8	0.4	2.9	593	6E+03	1E+04	1E+04
12L092	2,412	11,111	352	1,054	83	48	10.3	3.4	11.6	5,336	2E+04	1E+04	1E+04
12LDO296	525	2,522	76	266	14	10	2.0	0.7	2.8	1,251	4E+03	2E+03	2E+03
12M091	373	1,360	57	279	10	7	1.7	0.5	1.5	734	3E+03	2E+03	2E+03
13DSDO078	1,835	5,629	231	1,514	91	28	11.9	1.6	4.6	2,560	8E+03	6E+03	1E+04
13EDO177	56	120	10	162	3	1	0.8	0.1	0.2	59	8E+01	4E+02	4E+02
13EDO174	1,383	7,863	206	393	22	26	3.2	2.3	7.3	3,899	1E+04	1E+04	6E+03
13EDO176	40	95	5	77	2	1	0.4	0.1	0.2	46	6E+01	3E+02	3E+02
13FDO95	11	24	2	26	0	0	0.1	0.0	0.0	12	3E+01	1E+02	2E+02
13FDO011	26	49	1	1	1	0	0.0	0.0	0.0	24	3E+01	1E+02	1E+02
13F093	112	299	9	105	4	3	0.6	0.3	1.0	137	4E+02	1E+03	2E+03
13L090	35,009	170,050	5,384	5,870	1,796	783	175.3	42.5	147.9	76,868	3E+05	2E+05	2E+05
14CDO9	825	4,871	169	880	28	24	5.2	1.7	5.0	2,330	9E+03	7E+03	6E+03
15FSDO288	2,144	10,994	342	1,684	51	40	9.5	3.6	11.2	5,447	2E+04	2E+04	2E+04
15L089	14,168	64,845	2,150	4,969	651	314	72.3	17.3	61.0	30,233	1E+05	7E+04	9E+04
15L088	7,149	43,931	1,131	277	144	192	15.3	11.9	46.8	21,341	8E+04	5E+04	4E+04
16L097	581	1,811	73	613	19	38	3.6	1.4	6.5	750	4E+03	7E+03	8E+03
16LSDO122	8,752	45,246	1,355	2,520	280	278	33.0	12.1	47.2	21,378	9E+04	7E+04	7E+04
17M033	5,762	28,271	804	1,847	126	303	18.0	11.7	52.1	12,948	7E+04	7E+04	6E+04
18GSDO233	4,378	19,614	558	537	81	154	9.1	5.1	24.6	8,877	6E+04	7E+04	7E+04
19GDO043	5,285	34,708	867	339	100	124	10.9	10.1	34.4	16,660	7E+04	4E+04	3E+04
19GDO194	456	2,373	72	168	18	10	2.1	0.8	2.8	1,126	4E+03	4E+03	4E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	340	1,344	10	23	9	10	1.1	1.9	8.6	515	1E+03	4E+03	4E+03
20L083	218	944	26	7	4	9	0.7	0.1	2.1	511	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	69	2	5	1	0	0.1	0.0	0.1	32	1E+02	8E+01	1E+02
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,201	52,860	1,376	919	225	288	24.4	16.0	64.1	24,861	1E+05	8E+04	7E+04
21M005	157	450	13	36	4	3	0.4	0.1	0.9	240	2E+02	3E+02	3E+02
21M010	958	3,240	84	63	19	24	2.4	0.4	7.3	1,737	2E+03	2E+03	3E+03
21M050	449	1,293	31	20	10	8	0.9	0.2	3.0	690	1E+03	8E+02	2E+03
22CDO384	2,612	9,994	383	1,798	133	53	16.6	2.8	8.5	4,519	2E+04	1E+04	1E+04
22LSDO580	1,260	4,716	130	74	25	35	3.3	0.7	12.7	2,612	3E+03	3E+03	5E+03
23GDO132	4,547	9,722	271	2,132	126	65	15.8	3.9	17.0	4,504	7E+03	9E+03	1E+04
23HSDO042	18,761	81,792	2,773	4,871	891	572	99.4	26.7	106.0	37,758	1E+05	1E+05	1E+05
23HDO040	2,946	17,688	447	300	63	82	6.9	5.0	18.9	8,363	4E+04	2E+04	2E+04
23L196	144	288	7	35	4	1	0.4	0.1	0.7	145	1E+02	4E+01	2E+02
23L075	647	1,595	48	209	19	7	2.1	0.3	3.5	845	2E+03	7E+02	3E+03
23L074	142	304	7	21	4	1	0.3	0.0	0.4	158	9E+01	6E+01	2E+02
23L195	150	285	9	72	4	1	0.5	0.1	0.7	153	2E+02	6E+01	3E+02
23L202	153	294	7	34	4	0	0.3	0.1	0.7	159	3E+02	5E+01	6E+02
23L016	119	237	6	34	3	0	0.3	0.0	0.5	130	4E+02	7E+01	7E+02
23L015	159	274	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	928	2,313	75	93	23	47	2.0	0.3	5.1	1,057	8E+03	1E+04	1E+04
24CSDO031	313	1,972	52	55	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03

Table C2-9. Scenario 2.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,731	9,017	288	1,072	44	31	7.2	2.8	9.5	4,403	2E+04	2E+04	1E+04
24DSDO150	34	82	3	23	1	0	0.1	0.0	0.1	45	8E+01	5E+02	6E+02
24DSDO032	22,362	123,973	4,089	8,194	773	341	96.6	39.9	131.5	66,822	2E+05	1E+05	1E+05
24GSDO035	25,441	148,665	3,785	4,210	432	668	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
24GSDO034	1,776	6,796	176	894	42	26	5.9	2.6	11.6	3,335	1E+04	2E+04	2E+04
24L233	447	1,321	33	85	23	12	2.3	1.1	5.3	508	1E+03	9E+02	3E+03
25DDO040	576	2,852	83	204	12	19	1.7	1.0	4.5	1,379	6E+03	5E+03	4E+03
25EDO037	14,933	79,513	2,086	3,281	292	257	37.3	24.4	100.2	38,368	2E+05	1E+05	9E+04
25GDO041	75	259	9	30	6	3	0.6	0.3	1.1	89	3E+02	2E+02	6E+02
25GDO-06	239	650	18	217	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	7,797	21,840	841	698	568	161	50.1	5.6	29.8	8,253	4E+04	2E+04	6E+04
25L144	557	3,815	92	10	12	14	1.2	1.0	3.4	1,778	8E+03	5E+03	3E+03
25L058	4,714	25,412	653	483	89	168	9.8	7.0	29.5	11,971	6E+04	5E+04	4E+04
26FDO038	50	150	14	136	7	2	1.0	0.1	0.2	47	3E+02	5E+01	6E+02
26GSDO01	3,852	17,953	520	1,914	126	90	17.0	8.0	30.4	8,444	3E+04	2E+04	2E+04
26JSDO052	42	79	4	64	2	0	0.3	0.1	0.2	38	1E+01	2E+01	2E+01
26JSDO100	160	424	22	78	14	3	1.5	0.1	0.2	147	7E+02	1E+02	1E+03
26J101	449	1,077	63	496	32	10	4.2	0.4	1.2	415	2E+03	8E+02	3E+03
26KSDO254	345	1,181	44	112	5	34	0.9	0.2	2.6	518	5E+03	7E+03	8E+03
26K035	196	415	11	32	6	1	0.5	0.1	1.1	225	5E+02	8E+01	9E+02
26K099	13,110	84,364	2,006	765	176	374	20.8	24.5	90.8	40,256	2E+05	1E+05	8E+04
26L055	179	1,043	28	12	7	4	0.6	0.3	0.8	481	2E+03	1E+03	1E+03
26LSDO084	71	208	10	16	7	1	0.6	0.0	0.1	73	3E+02	5E+02	1E+03
26L070	219	375	5	19	4	0	0.3	0.0	0.1	187	8E+01	2E+01	2E+02
27JSDO044	390	776	29	357	12	6	2.0	0.5	2.2	366	4E+02	6E+02	6E+02
27JSDO096	2,105	4,241	95	309	55	15	4.5	0.6	4.9	2,108	2E+03	4E+03	5E+03
27JSDO001	8,069	46,554	1,160	1,501	135	263	18.1	14.1	57.6	21,980	1E+05	7E+04	5E+04
27L022	2,330	14,132	334	287	45	67	5.5	5.4	20.5	6,633	3E+04	2E+04	1E+04
27L020	2,205	13,257	313	284	44	63	5.3	5.1	19.2	6,199	3E+04	2E+04	1E+04
28K061	4,571	29,571	744	359	68	139	8.1	8.1	28.6	14,146	6E+04	4E+04	3E+04
28K010	4,060	28,116	685	245	50	107	6.1	7.8	26.4	13,573	6E+04	4E+04	2E+04
28K386	708	1,747	58	360	18	21	2.6	0.6	4.0	851	2E+03	3E+03	4E+03
28L073	77	233	10	71	5	1	0.6	0.1	0.1	107	4E+02	2E+03	2E+03
28L074/5/6	1,249	3,664	109	700	51	22	6.4	2.2	9.1	1,623	5E+03	7E+03	1E+04
28N156	338	1,922	55	114	6	13	0.9	0.5	2.0	934	4E+03	3E+03	3E+03
28N207	3,371	20,606	531	445	66	99	7.8	6.2	22.3	9,833	4E+04	3E+04	2E+04
28O025	54	248	9	20	1	2	0.2	0.1	0.2	126	7E+02	6E+02	6E+02
28P001	325	2,163	54	25	5	7	0.5	0.6	1.9	1,060	4E+03	3E+03	1E+03
29J129	172	315	13	142	5	3	0.8	0.1	0.5	153	2E+02	4E+02	4E+02
29J029	374	968	41	179	7	32	1.1	0.2	1.9	401	4E+03	6E+03	7E+03
29J212	18,041	116,845	2,831	1,066	258	544	30.9	33.7	127.4	55,806	2E+05	2E+05	1E+05
29M049	1,321	7,325	202	179	36	48	3.9	2.1	7.8	3,394	2E+04	1E+04	1E+04
29N015	133	592	18	27	2	6	0.5	0.1	1.4	324	3E+02	5E+02	6E+02
29N135	432	2,399	64	144	7	10	1.2	0.7	2.8	1,185	4E+03	3E+03	2E+03
29O001	11,912	73,781	1,962	2,310	236	305	29.8	20.9	72.4	35,737	1E+05	9E+04	7E+04
29P015	82	549	14	13	1	2	0.2	0.2	0.5	269	1E+03	6E+02	4E+02
29P044	631	4,243	109	79	10	14	1.2	1.2	3.8	2,073	8E+03	5E+03	3E+03
30J006	238	691	25	175	8	5	1.3	0.2	1.1	346	9E+02	3E+03	3E+03

Table C2-9. Scenario 2.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	66	182	8	93	2	1	0.5	0.1	0.5	90	1E+02	7E+02	7E+02
30J030	731	1,565	38	146	18	6	1.7	0.2	2.7	812	5E+02	5E+02	9E+02
30P107	359	1,900	70	103	6	10	0.9	0.5	1.6	963	4E+03	3E+03	2E+03
30P062	308	2,046	53	52	5	7	0.6	0.6	1.9	1,013	4E+03	2E+03	1E+03
31O004	1,046	6,297	221	147	18	33	2.4	1.4	4.8	3,089	1E+04	1E+04	7E+03
31P084	321	1,993	51	76	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03
3FDO159	333	1,451	62	491	14	7	2.7	0.6	1.6	702	2E+03	2E+03	2E+03
11G318/319	368	1,030	74	736	13	38	3.4	0.5	2.5	416	4E+03	7E+03	8E+03
6FSDO233	8	17	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	536	2,025	35	74	16	16	1.7	1.7	7.2	847	2E+03	2E+03	2E+03
21H039	1,535	4,799	67	315	45	48	5.2	5.5	24.2	1,921	4E+03	4E+03	5E+03
20G161	2,679	11,413	322	228	69	64	7.5	5.4	23.1	5,213	3E+04	2E+04	2E+04
StonyMWRA	121,181	572,174	19,761	68,549	4,938	3,297	676.0	200.3	680.9	275,872	1E+06	7E+05	8E+05
Fens	72,620	229,060	11,685	17,666	4,611	2,138	535.7	97.4	296.7	116,478	3E+05	2E+05	2E+05
20D055	5,926	38,515	1,019	469	122	136	13.2	11.0	36.4	18,747	7E+04	4E+04	3E+04
21D319	7,804	51,676	1,354	824	147	180	17.0	14.6	48.0	25,184	1E+05	6E+04	4E+04

Table C2-10. Scenario 2.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,051	4,265	147	905	29	21	5.4	1.3	5.7	2,161	5E+03	4E+03	3E+03
1FDO31	880	4,193	114	191	20	20	2.2	1.1	4.1	2,044	7E+03	6E+03	5E+03
02E086	279	1,177	45	325	11	5	1.9	0.4	1.3	569	2E+03	1E+03	1E+03
2FDO120	1,495	7,547	216	576	34	33	5.0	2.0	8.8	3,750	1E+04	9E+03	8E+03
2FDO93	1,617	11,427	278	110	19	37	2.4	3.1	10.3	5,564	2E+04	1E+04	8E+03
2FDO85	103	484	13	28	3	2	0.3	0.1	0.4	237	8E+02	5E+02	4E+02
3ESDO186	348	1,610	68	562	14	8	2.9	0.7	1.9	785	3E+03	2E+03	1E+03
3ESDO185	639	2,934	115	358	15	14	2.5	0.9	2.8	1,521	6E+03	4E+03	3E+03
3F162	566	2,799	101	509	25	12	3.7	0.9	2.7	1,329	5E+03	3E+03	3E+03
4ESDO69	1,734	8,267	265	966	43	40	6.9	2.6	9.6	4,120	1E+04	1E+04	9E+03
4ESDO64	42	141	8	91	2	1	0.5	0.1	0.2	66	2E+02	4E+02	4E+02
4FDO189	836	4,786	130	174	20	16	2.4	1.3	4.5	2,338	8E+03	5E+03	4E+03
4FDO204	955	4,977	155	511	32	19	4.3	1.5	4.5	2,399	8E+03	5E+03	5E+03
4FDO16	450	2,590	71	85	11	11	1.3	0.7	2.4	1,250	5E+03	3E+03	3E+03
4FDO203	139	621	25	184	6	3	1.1	0.2	0.6	300	1E+03	8E+02	8E+02
4FDO118	638	3,657	95	110	11	15	1.3	1.0	3.4	1,792	7E+03	5E+03	3E+03
4FDO119	1,348	5,472	142	45	24	37	3.1	0.9	10.6	2,917	4E+03	5E+03	4E+03
5CSDO110	819	2,836	135	758	32	24	5.2	1.0	3.3	1,468	7E+03	5E+03	7E+03
5EDO182	117	566	33	376	6	3	1.7	0.3	0.8	277	9E+02	6E+02	4E+02
5ESDO184	685	3,123	150	1,476	31	15	7.2	1.5	3.9	1,530	5E+03	4E+03	3E+03
5FDO117	862	4,445	154	769	32	18	5.2	1.5	4.4	2,138	8E+03	4E+03	4E+03
5FDO254	60	380	10	11	1	1	0.1	0.1	0.4	189	7E+02	4E+02	2E+02
5FDO265	20	41	1	3	1	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	689	3,713	104	172	17	17	2.0	1.0	3.5	1,796	7E+03	5E+03	4E+03
5FDO245	1,481	8,885	237	353	28	31	3.6	2.5	8.7	4,379	2E+04	1E+04	6E+03
5FDO244	250	1,293	34	55	5	5	0.6	0.3	1.7	645	2E+03	1E+03	1E+03
5FDO264	20	55	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	1,005	6,159	156	165	17	23	2.2	2.0	6.8	3,009	1E+04	7E+03	4E+03
5GDO116A	892	5,118	145	448	16	17	2.8	1.6	4.9	2,551	9E+03	5E+03	3E+03
5GDO115	255	1,561	41	38	5	6	0.6	0.4	1.5	765	3E+03	2E+03	1E+03
5GDO116	788	4,614	121	125	18	15	2.0	1.2	4.2	2,239	8E+03	5E+03	3E+03
6DDO57	147	581	24	194	6	2	1.1	0.2	0.6	282	8E+02	1E+03	1E+03
6DDO184	6	17	13	239	3	1	1.0	0.1	0.2	6	3E+01	4E+00	5E+01
6DDO91	7	20	27	527	6	2	2.2	0.3	0.5	7	3E+01	4E+00	5E+01
6DDO187	84	264	12	56	2	6	0.4	0.1	0.4	112	9E+02	1E+03	1E+03
6DDO86	6	17	5	81	1	0	0.4	0.0	0.1	6	3E+01	4E+00	5E+01
6DDO85	38	191	8	50	2	1	0.4	0.1	0.2	88	3E+02	2E+02	2E+02
6DDO83	176	816	38	294	10	4	1.8	0.3	0.9	379	1E+03	9E+02	1E+03
6DDO84	8	34	2	19	1	0	0.1	0.0	0.0	14	6E+01	2E+01	6E+01
06D097	43	125	13	147	6	1	0.9	0.1	0.2	42	3E+02	5E+01	5E+02
6GDO109	1,569	8,723	235	268	43	31	4.6	2.4	7.8	4,187	2E+04	9E+03	9E+03
6GDO110	1,947	11,736	314	379	44	40	5.2	3.2	10.4	5,716	2E+04	1E+04	9E+03
6GDO111	286	1,296	63	608	14	7	3.1	0.6	1.6	625	2E+03	1E+03	1E+03
6GDO166	159	596	42	549	10	4	2.5	0.4	1.0	289	9E+02	5E+02	6E+02
6GDO108	5,099	30,189	803	934	114	111	13.2	8.3	27.4	14,661	6E+04	3E+04	3E+04
6G165	30	127	6	54	1	1	0.2	0.1	0.2	64	2E+02	2E+02	1E+02
6HDO43	87	434	15	64	4	2	0.5	0.1	0.4	203	7E+02	5E+02	5E+02
6HDO106	233	1,099	37	178	7	4	1.2	0.4	1.0	540	2E+03	1E+03	8E+02

Table C2-10. Scenario 2.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	545	2,829	90	410	16	11	2.6	0.9	2.8	1,381	5E+03	3E+03	2E+03
7CDO006	6,454	30,821	1,130	7,650	200	140	40.6	11.4	34.7	15,234	6E+04	4E+04	4E+04
7HDO285	6,488	32,526	971	2,396	213	132	25.7	9.2	33.0	15,631	6E+04	4E+04	4E+04
7HDO105	9,597	50,750	1,618	6,514	303	217	46.5	15.9	49.7	24,508	1E+05	6E+04	7E+04
7HDO348	51	344	9	10	1	1	0.1	0.1	0.3	171	6E+02	4E+02	2E+02
7HDO347	347	1,819	56	198	11	7	1.6	0.5	1.7	881	3E+03	2E+03	2E+03
7HDO346	326	2,055	53	67	5	7	0.7	0.6	1.8	1,006	4E+03	2E+03	1E+03
8BDO122	1,645	9,421	234	291	31	43	3.9	3.6	13.4	4,506	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	6E-01	9E-01	9E-01
8BDO126	927	5,986	151	133	12	20	1.6	1.7	5.7	2,952	1E+04	7E+03	4E+03
8CDO25	206	689	45	480	10	5	2.4	0.4	1.1	365	2E+03	1E+03	2E+03
8CDO26	193	684	42	412	8	5	2.0	0.4	1.1	365	2E+03	1E+03	2E+03
8DDO112	34	204	6	7	1	1	0.1	0.1	0.2	99	4E+02	4E+02	3E+02
8DSDO100	88	288	16	174	3	4	0.8	0.1	0.5	140	6E+02	1E+03	1E+03
8EDO35	136	387	30	451	8	2	2.0	0.3	0.6	193	5E+02	2E+03	2E+03
8EDO33	516	3,262	92	250	9	11	1.6	1.0	3.1	1,608	6E+03	4E+03	2E+03
8IDO153	41	274	7	4	0	1	0.1	0.1	0.2	135	5E+02	3E+02	2E+02
8IDO155	27	105	5	58	1	0	0.3	0.0	0.1	53	2E+02	4E+02	3E+02
8IDO156	341	731	47	583	19	4	3.3	0.3	0.8	319	5E+02	1E+02	8E+02
8IDO209	112	722	18	18	1	2	0.2	0.2	0.6	357	1E+03	9E+02	5E+02
8IDO154	927	5,242	146	288	22	23	2.9	1.6	5.3	2,535	9E+03	7E+03	6E+03
8IDO158	422	2,557	69	133	9	9	1.2	0.8	2.9	1,254	4E+03	3E+03	2E+03
8IDO207	60	313	12	77	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	1,258	7,973	205	234	23	29	3.0	2.5	8.9	3,878	1E+04	9E+03	5E+03
8JSDO103	1,042	6,319	174	323	22	22	3.1	1.8	5.9	3,100	1E+04	7E+03	5E+03
8JSDO41	599	3,857	100	113	11	14	1.4	1.2	3.9	1,884	7E+03	4E+03	3E+03
8JSDO50	1,321	7,045	195	411	37	29	4.6	2.3	8.0	3,376	1E+04	9E+03	8E+03
8K049	175	1,049	30	64	5	4	0.6	0.3	1.0	508	2E+03	1E+03	9E+02
9BDO49	358	996	36	143	7	25	1.0	0.2	1.7	449	3E+03	7E+03	8E+03
9EDO229	64	325	10	23	2	1	0.2	0.1	0.3	156	6E+02	4E+02	3E+02
9EDO243	181	649	25	185	7	4	1.1	0.2	0.6	313	1E+03	2E+03	2E+03
9K100	56	152	9	62	2	5	0.3	0.0	0.3	62	6E+02	1E+03	1E+03
9K101	680	2,528	109	876	26	21	4.8	0.9	3.0	1,204	5E+03	6E+03	7E+03
9K016	67	207	29	463	7	3	2.1	0.3	0.6	93	3E+02	5E+02	6E+02
9LSDO095	242	940	41	335	7	11	1.6	0.4	1.3	454	2E+03	2E+03	3E+03
10BSDO62	32	59	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	37	93	3	10	1	1	0.1	0.0	0.2	46	2E+02	5E+02	6E+02
10BSDO64	129	384	17	85	4	4	0.6	0.1	0.8	264	6E+02	7E+02	8E+02
10L094	14,991	84,217	2,292	4,495	318	331	42.2	24.5	84.7	41,080	2E+05	1E+05	8E+04
10L096	1,676	10,281	278	279	27	64	3.6	2.8	10.4	4,932	2E+04	2E+04	1E+04
11BDO28	14,889	71,841	2,841	21,649	488	407	108.3	28.0	83.4	35,311	1E+05	1E+05	8E+04
11BDO123	2,811	15,036	427	731	67	74	8.2	4.1	14.0	7,261	3E+04	2E+04	2E+04
11IDO577	37,295	192,978	6,038	12,868	1,660	892	186.7	56.0	184.5	88,626	4E+05	2E+05	3E+05
11M093	1,162	4,287	172	738	34	22	5.3	1.3	5.2	2,296	9E+03	6E+03	7E+03
12BDO10	13	32	2	19	0	1	0.1	0.0	0.1	14	1E+02	2E+02	2E+02
12BDO14	31	77	4	41	1	2	0.2	0.0	0.1	34	3E+02	5E+02	5E+02
12BDO124	10,876	59,980	1,764	5,966	231	256	38.6	18.2	58.4	29,520	1E+05	8E+04	6E+04
12EDO418	237	1,076	38	82	4	5	0.6	0.3	1.0	569	2E+03	2E+03	1E+03

Table C2-10. Scenario 2.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	158	791	23	83	3	3	0.5	0.2	0.7	393	1E+03	1E+03	9E+02
12HOFDO92	1,044	2,921	439	2,875	110	155	23.7	3.5	13.5	2,740	5E+03	9E+03	1E+04
12HDO85/87	493	1,476	75	466	15	48	2.8	0.4	2.9	593	6E+03	1E+04	1E+04
12L092	2,412	11,111	352	1,054	83	48	10.3	3.4	11.6	5,336	2E+04	1E+04	1E+04
12LDO296	525	2,522	76	266	14	10	2.0	0.7	2.8	1,251	4E+03	2E+03	2E+03
12M091	373	1,360	57	279	10	7	1.7	0.5	1.5	734	3E+03	2E+03	2E+03
13DSDO078	1,835	5,629	231	1,514	91	28	11.9	1.6	4.6	2,560	8E+03	6E+03	1E+04
13EDO177	56	120	10	162	3	1	0.8	0.1	0.2	59	8E+01	4E+02	4E+02
13EDO174	1,383	7,863	206	393	22	26	3.2	2.3	7.3	3,899	1E+04	1E+04	6E+03
13EDO176	40	95	5	77	2	1	0.4	0.1	0.2	46	6E+01	3E+02	3E+02
13FDO95	11	24	2	26	0	0	0.1	0.0	0.0	12	3E+01	1E+02	2E+02
13FDO011	26	49	1	1	1	0	0.0	0.0	0.0	24	3E+01	1E+02	1E+02
13F093	112	299	9	105	4	3	0.6	0.3	1.0	137	4E+02	1E+03	2E+03
13L090	35,009	170,050	5,384	5,870	1,796	783	175.3	42.5	147.9	76,868	3E+05	2E+05	2E+05
14CDO9	825	4,871	169	880	28	24	5.2	1.7	5.0	2,330	9E+03	7E+03	6E+03
15FSDO288	2,144	10,994	342	1,684	51	40	9.5	3.6	11.2	5,447	2E+04	2E+04	2E+04
15L089	14,168	64,845	2,150	4,969	651	314	72.3	17.3	61.0	30,233	1E+05	7E+04	9E+04
15L088	7,149	43,931	1,131	277	144	192	15.3	11.9	46.8	21,341	8E+04	5E+04	4E+04
16L097	581	1,811	73	613	19	38	3.6	1.4	6.5	750	4E+03	7E+03	8E+03
16LSDO122	8,752	45,246	1,355	2,520	280	278	33.0	12.1	47.2	21,378	9E+04	7E+04	7E+04
17M033	5,762	28,271	804	1,847	126	303	18.0	11.7	52.1	12,948	7E+04	7E+04	6E+04
18GSDO233	4,378	19,614	558	537	81	141	9.1	5.1	24.6	8,877	6E+04	7E+04	7E+04
19GDO043	5,285	34,708	867	339	100	124	10.9	10.1	34.4	16,660	7E+04	4E+04	3E+04
19GDO194	456	2,373	72	168	18	10	2.1	0.8	2.8	1,126	4E+03	4E+03	4E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	340	1,344	10	23	9	9	1.1	1.9	8.6	515	1E+03	4E+03	4E+03
20L083	218	944	26	7	4	9	0.7	0.1	2.1	511	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	14	69	2	5	1	0	0.1	0.0	0.1	32	1E+02	8E+01	1E+02
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,201	52,860	1,376	919	225	288	24.4	16.0	64.1	24,861	1E+05	8E+04	7E+04
21M005	157	450	13	36	4	3	0.4	0.1	0.9	240	2E+02	3E+02	3E+02
21M010	958	3,240	84	63	19	24	2.4	0.4	7.3	1,737	2E+03	2E+03	3E+03
21M050	449	1,293	31	20	10	8	0.9	0.2	3.0	690	1E+03	8E+02	2E+03
22CDO384	2,612	9,994	383	1,798	133	53	16.6	2.8	8.5	4,519	2E+04	1E+04	1E+04
22LSDO580	1,260	4,716	130	74	25	35	3.3	0.7	12.7	2,612	3E+03	3E+03	5E+03
23GDO132	4,547	9,722	271	2,132	126	65	15.8	3.9	17.0	4,504	7E+03	9E+03	1E+04
23HSDO042	18,761	81,792	2,773	4,871	891	571	99.4	26.7	106.0	37,758	1E+05	1E+05	1E+05
23HDO040	2,946	17,688	447	300	63	82	6.9	5.0	18.9	8,363	4E+04	2E+04	2E+04
23L196	144	288	7	35	4	1	0.4	0.1	0.7	145	1E+02	4E+01	2E+02
23L075	647	1,595	48	209	19	7	2.1	0.3	3.5	845	2E+03	7E+02	3E+03
23L074	142	304	7	21	4	1	0.3	0.0	0.4	158	9E+01	6E+01	2E+02
23L195	150	285	9	72	4	1	0.5	0.1	0.7	153	2E+02	6E+01	3E+02
23L202	153	294	7	34	4	0	0.3	0.1	0.7	159	3E+02	5E+01	6E+02
23L016	119	237	6	34	3	0	0.3	0.0	0.5	130	4E+02	7E+01	7E+02
23L015	159	274	11	133	5	1	0.7	0.1	0.5	138	3E+01	4E+01	5E+01
23L164	928	2,313	75	93	23	47	2.0	0.3	5.1	1,057	8E+03	1E+04	1E+04
24CSDO031	313	1,972	52	55	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03

Table C2-10. Scenario 2.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,731	9,017	288	1,072	44	28	7.2	2.8	9.5	4,403	2E+04	2E+04	1E+04
24DSDO150	34	82	3	23	1	0	0.1	0.0	0.1	45	8E+01	5E+02	6E+02
24DSDO032	22,362	123,973	4,089	8,194	773	312	96.6	39.9	131.5	66,822	2E+05	1E+05	1E+05
24GSDO035	25,441	148,665	3,785	4,210	432	668	53.5	43.0	158.4	71,922	3E+05	2E+05	1E+05
24GSDO034	1,776	6,796	176	894	42	26	5.9	2.6	11.6	3,335	1E+04	2E+04	2E+04
24L233	447	1,321	33	85	23	12	2.3	1.1	5.3	508	1E+03	9E+02	3E+03
25DDO040	576	2,852	83	204	12	19	1.7	1.0	4.5	1,379	6E+03	5E+03	4E+03
25EDO037	14,933	79,513	2,086	3,281	292	237	37.3	24.4	100.2	38,368	2E+05	1E+05	9E+04
25GDO041	75	259	9	30	6	3	0.6	0.3	1.1	89	3E+02	2E+02	6E+02
25GDO-06	239	650	18	217	9	7	1.4	0.8	3.5	272	3E+02	4E+02	5E+02
26J049	7,797	21,840	841	698	568	161	50.1	5.6	29.8	8,253	4E+04	2E+04	6E+04
25L144	557	3,815	92	10	12	14	1.2	1.0	3.4	1,778	8E+03	5E+03	3E+03
25L058	4,714	25,412	653	483	89	168	9.8	7.0	29.5	11,971	6E+04	5E+04	4E+04
26FDO038	50	150	14	136	7	2	1.0	0.1	0.2	47	3E+02	5E+01	6E+02
26GSDO01	3,852	17,953	520	1,914	126	90	17.0	8.0	30.4	8,444	3E+04	2E+04	2E+04
26JSDO052	42	79	4	64	2	0	0.3	0.1	0.2	38	1E+01	2E+01	2E+01
26JSDO100	160	424	22	78	14	3	1.5	0.1	0.2	147	7E+02	1E+02	1E+03
26J101	449	1,077	63	496	32	10	4.2	0.4	1.2	415	2E+03	8E+02	3E+03
26KSDO254	345	1,181	44	112	5	34	0.9	0.2	2.6	518	5E+03	7E+03	8E+03
26K035	196	415	11	32	6	1	0.5	0.1	1.1	225	5E+02	8E+01	9E+02
26K099	13,110	84,364	2,006	765	176	374	20.8	24.5	90.8	40,256	2E+05	1E+05	8E+04
26L055	179	1,043	28	12	7	4	0.6	0.3	0.8	481	2E+03	1E+03	1E+03
26LSDO084	71	208	10	16	7	1	0.6	0.0	0.1	73	3E+02	5E+02	1E+03
26L070	219	375	5	19	4	0	0.3	0.0	0.1	187	8E+01	2E+01	2E+02
27JSDO044	390	776	29	357	12	6	2.0	0.5	2.2	366	4E+02	6E+02	6E+02
27JSDO096	2,105	4,241	95	309	55	15	4.5	0.6	4.9	2,108	2E+03	4E+03	5E+03
27JSDO001	8,069	46,554	1,160	1,501	135	263	18.1	14.1	57.6	21,980	1E+05	7E+04	5E+04
27L022	2,330	14,132	334	287	45	67	5.5	5.4	20.5	6,633	3E+04	2E+04	1E+04
27L020	2,205	13,257	313	284	44	63	5.3	5.1	19.2	6,199	3E+04	2E+04	1E+04
28K061	4,571	29,571	744	359	68	139	8.1	8.1	28.6	14,146	6E+04	4E+04	3E+04
28K010	4,060	28,116	685	245	50	107	6.1	7.8	26.4	13,573	6E+04	4E+04	2E+04
28K386	708	1,747	58	360	18	21	2.6	0.6	4.0	851	2E+03	3E+03	4E+03
28L073	77	233	10	71	5	1	0.6	0.1	0.1	107	4E+02	2E+03	2E+03
28L074/5/6	1,249	3,664	109	700	51	22	6.4	2.2	9.1	1,623	5E+03	7E+03	1E+04
28N156	338	1,922	55	114	6	13	0.9	0.5	2.0	934	4E+03	3E+03	3E+03
28N207	3,371	20,606	531	445	66	99	7.8	6.2	22.3	9,833	4E+04	3E+04	2E+04
28O025	54	248	9	20	1	2	0.2	0.1	0.2	126	7E+02	6E+02	6E+02
28P001	325	2,163	54	25	5	7	0.5	0.6	1.9	1,060	4E+03	3E+03	1E+03
29J129	172	315	13	142	5	3	0.8	0.1	0.5	153	2E+02	4E+02	4E+02
29J029	374	968	41	179	7	32	1.1	0.2	1.9	401	4E+03	6E+03	7E+03
29J212	18,041	116,845	2,831	1,066	258	544	30.9	33.7	127.4	55,806	2E+05	2E+05	1E+05
29M049	1,321	7,325	202	179	36	48	3.9	2.1	7.8	3,394	2E+04	1E+04	1E+04
29N015	133	592	18	27	2	6	0.5	0.1	1.4	324	3E+02	5E+02	6E+02
29N135	432	2,399	64	144	7	10	1.2	0.7	2.8	1,185	4E+03	3E+03	2E+03
29O001	11,912	73,781	1,962	2,310	236	305	29.8	20.9	72.4	35,737	1E+05	9E+04	7E+04
29P015	82	549	14	13	1	2	0.2	0.2	0.5	269	1E+03	6E+02	4E+02
29P044	631	4,243	109	79	10	14	1.2	1.2	3.8	2,073	8E+03	5E+03	3E+03
30J006	238	691	25	175	8	5	1.3	0.2	1.1	346	9E+02	3E+03	3E+03

Table C2-10. Scenario 2.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	66	182	8	93	2	1	0.5	0.1	0.5	90	1E+02	7E+02	7E+02
30J030	731	1,565	38	146	18	6	1.7	0.2	2.7	812	5E+02	5E+02	9E+02
30P107	359	1,900	70	103	6	10	0.9	0.5	1.6	963	4E+03	3E+03	2E+03
30P062	308	2,046	53	52	5	7	0.6	0.6	1.9	1,013	4E+03	2E+03	1E+03
31O004	1,046	6,297	221	147	18	33	2.4	1.4	4.8	3,089	1E+04	1E+04	7E+03
31P084	321	1,993	51	76	4	7	0.6	0.6	1.9	985	4E+03	2E+03	1E+03
3FDO159	333	1,451	62	491	14	7	2.7	0.6	1.6	702	2E+03	2E+03	2E+03
11G318/319	368	1,030	74	736	13	38	3.4	0.5	2.5	416	4E+03	7E+03	8E+03
6FSDO233	8	17	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	536	2,025	35	74	16	16	1.7	1.7	7.2	847	2E+03	2E+03	2E+03
21H039	1,535	4,799	67	315	45	48	5.2	5.5	24.2	1,921	4E+03	4E+03	5E+03
20G161	2,679	11,413	322	228	69	58	7.5	5.4	23.1	5,213	3E+04	2E+04	2E+04
StonyMWRA	121,181	572,174	19,761	68,549	4,938	3,297	676.0	200.3	680.9	275,872	1E+06	7E+05	8E+05
Fens	72,620	229,060	11,685	17,666	4,611	2,128	535.7	97.4	296.7	116,478	3E+05	2E+05	2E+05
20D055	5,926	38,515	1,019	469	122	136	13.2	11.0	36.4	18,747	7E+04	4E+04	3E+04
21D319	7,804	51,676	1,354	824	147	180	17.0	14.6	48.0	25,184	1E+05	6E+04	4E+04

Table C2-11. Scenario 3 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,017	4,105	144	911	29	20	5.4	1.3	5.5	2,080	5E+03	4E+03	3E+03
1FDO31	842	3,987	109	197	19	19	2.2	1.0	3.9	1,943	7E+03	5E+03	5E+03
02E086	268	1,121	44	326	11	5	1.9	0.4	1.3	541	2E+03	1E+03	1E+03
2FDO120	1,435	7,205	208	585	34	32	4.9	1.9	8.4	3,578	1E+04	8E+03	8E+03
2FDO93	1,576	11,119	271	111	19	36	2.4	3.0	10.0	5,416	2E+04	1E+04	8E+03
2FDO85	100	467	13	30	3	2	0.3	0.1	0.4	229	7E+02	5E+02	4E+02
3ESDO186	333	1,523	66	564	14	8	2.9	0.7	1.8	741	2E+03	2E+03	1E+03
3ESDO185	611	2,779	110	361	15	13	2.5	0.8	2.7	1,442	6E+03	4E+03	3E+03
3F162	547	2,679	98	505	25	11	3.7	0.9	2.6	1,268	4E+03	3E+03	3E+03
4ESDO69	1,665	7,871	255	973	43	39	6.8	2.5	9.2	3,925	1E+04	1E+04	9E+03
4ESDO64	40	134	8	92	2	1	0.5	0.1	0.2	63	2E+02	3E+02	4E+02
4FDO189	794	4,500	124	175	20	15	2.3	1.2	4.3	2,197	8E+03	5E+03	4E+03
4FDO204	920	4,753	150	509	32	18	4.3	1.4	4.3	2,287	8E+03	5E+03	4E+03
4FDO16	431	2,467	68	86	11	11	1.2	0.7	2.3	1,190	5E+03	3E+03	3E+03
4FDO203	134	589	24	184	6	3	1.1	0.2	0.6	283	9E+02	8E+02	7E+02
4FDO118	613	3,494	91	111	11	15	1.3	0.9	3.3	1,712	6E+03	5E+03	3E+03
4FDO119	1,310	5,331	139	45	23	36	3.0	0.8	10.4	2,844	4E+03	5E+03	4E+03
5CSDO110	789	2,715	131	761	32	23	5.1	1.0	3.2	1,404	6E+03	5E+03	7E+03
5EDO182	111	533	32	376	6	3	1.7	0.3	0.8	261	8E+02	5E+02	4E+02
5ESDO184	658	2,965	146	1,479	31	15	7.1	1.4	3.7	1,451	5E+03	4E+03	3E+03
5FDO117	823	4,194	148	772	32	17	5.1	1.4	4.2	2,014	7E+03	4E+03	4E+03
5FDO254	58	364	9	12	1	1	0.1	0.1	0.4	181	6E+02	4E+02	2E+02
5FDO265	20	40	1	3	0	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	657	3,503	99	174	17	16	2.0	1.0	3.3	1,692	7E+03	4E+03	4E+03
5FDO245	1,419	8,473	227	356	27	30	3.6	2.4	8.3	4,177	1E+04	9E+03	6E+03
5FDO244	243	1,252	33	55	5	5	0.6	0.3	1.7	624	2E+03	1E+03	1E+03
5FDO264	19	53	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	966	5,900	151	167	17	22	2.1	1.9	6.6	2,883	1E+04	7E+03	4E+03
5GDO116A	838	4,761	136	451	16	16	2.8	1.5	4.6	2,373	8E+03	5E+03	3E+03
5GDO115	248	1,520	40	38	5	6	0.6	0.4	1.5	745	3E+03	2E+03	1E+03
5GDO116	755	4,400	116	126	17	15	1.9	1.2	4.0	2,133	8E+03	5E+03	3E+03
6DDO57	141	549	23	194	6	2	1.1	0.2	0.6	266	8E+02	1E+03	1E+03
6DDO184	7	19	13	239	3	1	1.0	0.1	0.2	7	3E+01	5E+00	5E+01
6DDO91	10	24	27	526	6	2	2.2	0.3	0.5	9	3E+01	6E+00	5E+01
6DDO187	80	251	11	56	2	6	0.4	0.1	0.4	107	8E+02	1E+03	1E+03
6DDO86	7	21	5	80	1	0	0.4	0.0	0.1	7	3E+01	7E+00	5E+01
6DDO85	40	202	8	50	2	1	0.4	0.1	0.2	93	3E+02	2E+02	2E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	9	38	2	19	1	0	0.1	0.0	0.0	16	6E+01	3E+01	6E+01
06D097	54	165	14	144	6	1	0.9	0.1	0.2	62	3E+02	8E+01	5E+02
6GDO109	1,512	8,370	227	270	42	30	4.5	2.3	7.5	4,015	2E+04	9E+03	9E+03
6GDO110	1,871	11,214	302	383	43	39	5.1	3.1	10.0	5,459	2E+04	1E+04	9E+03
6GDO111	273	1,223	62	609	14	6	3.1	0.6	1.6	588	2E+03	1E+03	1E+03
6GDO166	153	564	41	550	10	4	2.5	0.4	1.0	273	8E+02	5E+02	6E+02
6GDO108	4,899	28,881	772	945	111	106	13.0	7.9	26.2	14,021	5E+04	3E+04	3E+04
6G165	29	120	5	54	1	1	0.2	0.1	0.1	60	2E+02	1E+02	9E+01
6HDO43	87	436	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	223	1,041	35	179	7	4	1.2	0.3	1.0	511	2E+03	1E+03	7E+02

Table C2-11. Scenario 3 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	537	2,790	89	411	16	11	2.6	0.9	2.8	1,362	5E+03	3E+03	2E+03
7CDO006	6,135	28,976	1,088	7,687	196	134	40.4	11.0	33.0	14,315	5E+04	4E+04	4E+04
7HDO285	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
7HDO105	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
7HDO348	50	331	8	10	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
7HDO347	341	1,785	55	199	11	7	1.6	0.5	1.7	864	3E+03	2E+03	2E+03
7HDO346	323	2,039	53	68	5	7	0.7	0.6	1.8	998	4E+03	2E+03	1E+03
8BDO122	1,570	8,936	223	295	30	41	3.8	3.4	12.7	4,276	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	9E-01
8BDO126	887	5,703	145	134	12	19	1.6	1.6	5.5	2,814	1E+04	6E+03	3E+03
8CDO25	197	653	44	482	10	5	2.4	0.4	1.1	345	2E+03	1E+03	2E+03
8CDO26	184	647	41	414	8	5	2.0	0.4	1.0	345	2E+03	1E+03	2E+03
8DDO112	33	200	5	7	1	1	0.1	0.1	0.2	97	4E+02	4E+02	3E+02
8DSDO100	84	272	15	174	3	4	0.8	0.1	0.4	132	6E+02	1E+03	1E+03
8EDO35	131	369	30	452	8	2	2.0	0.3	0.6	184	4E+02	2E+03	2E+03
8EDO33	487	3,057	87	251	9	11	1.6	0.9	2.9	1,507	5E+03	3E+03	2E+03
8IDO153	39	257	6	4	0	1	0.1	0.1	0.2	127	5E+02	3E+02	1E+02
8IDO155	26	99	5	58	1	0	0.3	0.0	0.1	50	2E+02	3E+02	3E+02
8IDO156	333	714	47	585	19	4	3.3	0.3	0.8	311	5E+02	1E+02	8E+02
8IDO209	114	732	19	18	1	2	0.2	0.2	0.7	363	1E+03	9E+02	5E+02
8IDO154	883	4,947	139	290	22	22	2.9	1.5	5.0	2,385	9E+03	7E+03	6E+03
8IDO158	404	2,436	66	134	8	9	1.2	0.8	2.8	1,194	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,217	7,687	198	236	23	28	2.9	2.4	8.6	3,736	1E+04	9E+03	5E+03
8JSDO103	991	5,963	166	323	22	21	3.0	1.7	5.6	2,923	1E+04	6E+03	4E+03
8JSDO41	566	3,621	95	114	10	13	1.4	1.1	3.6	1,769	6E+03	4E+03	2E+03
8JSDO50	1,268	6,703	188	415	37	28	4.5	2.2	7.6	3,208	1E+04	9E+03	7E+03
8K049	168	1,000	29	64	5	4	0.6	0.3	0.9	483	2E+03	1E+03	9E+02
9BDO49	344	953	35	145	6	23	1.0	0.2	1.6	430	3E+03	7E+03	7E+03
9EDO229	61	307	9	23	2	1	0.2	0.1	0.3	147	5E+02	3E+02	3E+02
9EDO243	175	616	24	184	7	3	1.1	0.2	0.6	296	1E+03	2E+03	2E+03
9K100	54	145	8	62	2	5	0.3	0.0	0.3	59	6E+02	1E+03	1E+03
9K101	651	2,389	106	879	25	20	4.8	0.9	2.9	1,136	5E+03	6E+03	6E+03
9K016	65	198	29	463	7	3	2.1	0.3	0.6	89	3E+02	4E+02	5E+02
9LSDO095	231	888	40	336	7	10	1.6	0.4	1.2	429	2E+03	2E+03	3E+03
10BSDO62	31	57	1	1	1	0	0.0	0.0	0.1	30	7E+00	5E-01	1E+01
10BSDO15	36	89	3	10	1	1	0.1	0.0	0.2	45	2E+02	5E+02	5E+02
10BSDO64	124	363	16	86	4	3	0.6	0.1	0.7	251	5E+02	6E+02	8E+02
10L094	14,323	80,028	2,197	4,543	311	315	41.6	23.4	80.6	39,037	1E+05	9E+04	8E+04
10L096	1,596	9,752	265	281	27	61	3.5	2.7	9.8	4,677	2E+04	2E+04	1E+04
11BDO28	13,955	65,984	2,704	21,708	478	384	107.5	26.5	78.2	32,437	1E+05	9E+04	8E+04
11BDO123	2,677	14,227	406	742	65	70	8.0	3.9	13.3	6,870	3E+04	2E+04	2E+04
11IDO577	35,921	184,307	5,838	12,948	1,642	858	185.1	53.6	175.9	84,437	3E+05	2E+05	2E+05
11M093	1,121	4,124	168	744	34	21	5.3	1.3	5.0	2,208	9E+03	6E+03	7E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,994	54,440	1,634	6,028	221	235	37.9	16.8	53.5	26,808	1E+05	7E+04	6E+04
12EDO418	225	1,014	36	83	4	4	0.6	0.3	0.9	538	2E+03	2E+03	1E+03

Table C2-11. Scenario 3 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	150	744	22	83	3	2	0.5	0.2	0.7	369	1E+03	1E+03	8E+02
12HOFDO92	1,008	2,809	430	2,879	110	147	23.6	3.4	13.1	2,621	4E+03	8E+03	1E+04
12HDO85/87	474	1,416	73	468	15	46	2.7	0.4	2.8	569	6E+03	1E+04	1E+04
12L092	2,308	10,531	338	1,060	81	46	10.2	3.2	11.0	5,049	2E+04	1E+04	1E+04
12LDO296	505	2,406	73	268	13	9	2.0	0.7	2.7	1,193	4E+03	2E+03	2E+03
12M091	357	1,292	55	281	10	7	1.7	0.4	1.5	697	3E+03	2E+03	2E+03
13DSDO078	1,809	5,488	228	1,515	90	28	11.9	1.6	4.5	2,491	8E+03	6E+03	1E+04
13EDO177	54	116	10	162	3	1	0.8	0.1	0.2	57	8E+01	4E+02	4E+02
13EDO174	1,316	7,430	196	397	22	24	3.1	2.2	6.9	3,682	1E+04	9E+03	6E+03
13EDO176	38	90	5	77	2	1	0.4	0.1	0.2	44	6E+01	3E+02	3E+02
13FDO95	10	23	2	27	0	0	0.1	0.0	0.0	12	3E+01	1E+02	1E+02
13FDO011	25	47	1	1	1	0	0.0	0.0	0.0	24	2E+01	1E+02	1E+02
13F093	108	285	9	106	3	3	0.6	0.2	1.0	130	4E+02	1E+03	2E+03
13L090	33,863	163,142	5,214	5,935	1,774	755	173.5	40.7	141.2	73,487	3E+05	2E+05	2E+05
14CDO9	789	4,633	164	880	27	23	5.2	1.6	4.8	2,215	9E+03	6E+03	5E+03
15FSDO288	2,064	10,465	330	1,696	50	38	9.4	3.5	10.7	5,184	2E+04	2E+04	2E+04
15L089	13,786	62,795	2,100	5,029	643	305	71.7	16.8	59.1	29,241	1E+05	6E+04	9E+04
15L088	6,753	41,660	1,071	264	132	182	14.2	11.3	44.5	20,275	8E+04	5E+04	4E+04
16L097	560	1,735	71	616	19	36	3.6	1.4	6.2	718	4E+03	7E+03	8E+03
16LSDO122	8,525	43,975	1,326	2,539	277	272	32.8	11.8	46.0	20,768	9E+04	6E+04	7E+04
17M033	5,610	27,521	788	1,861	124	294	17.8	11.4	50.7	12,618	6E+04	6E+04	6E+04
18GSDO233	4,666	21,128	602	546	83	290	9.4	5.5	26.8	9,546	6E+04	8E+04	7E+04
19GDO043	5,152	33,826	848	344	98	121	10.7	9.9	33.5	16,248	7E+04	4E+04	3E+04
19GDO194	443	2,291	70	168	17	10	2.1	0.8	2.7	1,085	4E+03	3E+03	3E+03
19G199	61	180	2	2	1	1	0.1	0.2	0.8	78	1E+02	7E+02	7E+02
20G163	326	1,279	10	23	8	15	1.0	1.8	8.2	489	1E+03	4E+03	4E+03
20L083	216	938	26	8	4	9	0.7	0.1	2.1	507	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	64	2	5	1	0	0.1	0.0	0.1	30	1E+02	7E+01	9E+01
21H048	128	382	5	4	3	3	0.3	0.4	1.6	165	3E+02	3E+02	3E+02
21KSDO069	9,010	51,713	1,352	933	223	283	24.2	15.7	62.8	24,324	1E+05	8E+04	6E+04
21M005	152	438	12	38	3	3	0.4	0.1	0.9	234	2E+02	3E+02	3E+02
21M010	930	3,167	83	71	19	24	2.3	0.4	7.2	1,700	2E+03	2E+03	3E+03
21M050	436	1,255	30	21	9	8	0.9	0.2	2.9	670	1E+03	8E+02	2E+03
22CDO384	2,574	9,722	377	1,802	133	52	16.6	2.8	8.3	4,387	2E+04	9E+03	1E+04
22LSDO580	1,224	4,614	128	85	24	34	3.3	0.7	12.5	2,560	3E+03	3E+03	4E+03
23GDO132	4,511	9,627	269	2,141	126	64	15.8	3.8	16.7	4,461	7E+03	9E+03	1E+04
23HSDO042	18,438	80,175	2,738	4,911	886	564	99.1	26.2	103.7	36,994	1E+05	1E+05	1E+05
23HDO040	2,880	17,284	439	305	62	80	6.8	4.9	18.5	8,172	4E+04	2E+04	2E+04
23L196	140	281	7	36	4	1	0.4	0.1	0.7	141	1E+02	4E+01	2E+02
23L075	635	1,567	48	213	18	7	2.1	0.3	3.4	830	2E+03	7E+02	3E+03
23L074	138	295	7	22	4	1	0.3	0.0	0.4	154	9E+01	6E+01	1E+02
23L195	146	279	9	74	4	1	0.5	0.1	0.7	150	2E+02	6E+01	3E+02
23L202	149	287	7	36	4	0	0.3	0.1	0.7	155	3E+02	5E+01	6E+02
23L016	115	230	6	35	3	0	0.3	0.0	0.5	126	4E+02	7E+01	7E+02
23L015	159	275	11	133	5	1	0.7	0.1	0.5	139	3E+01	4E+01	5E+01
23L164	897	2,237	73	98	22	45	2.0	0.3	4.9	1,021	8E+03	1E+04	1E+04
24CSDO031	299	1,878	50	55	4	6	0.6	0.5	1.9	938	4E+03	2E+03	1E+03

Table C2-11. Scenario 3 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,786	9,509	301	1,077	45	53	7.3	3.0	10.0	4,659	2E+04	2E+04	1E+04
24DSDO150	33	79	3	23	1	0	0.1	0.0	0.1	43	7E+01	5E+02	6E+02
24DSDO032	21,524	118,756	3,949	8,267	757	556	95.3	38.4	126.8	64,022	2E+05	1E+05	1E+05
24GSDO035	24,765	144,403	3,692	4,253	424	650	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
24GSDO034	1,728	6,591	172	902	41	26	5.9	2.6	11.4	3,234	1E+04	2E+04	2E+04
24L233	438	1,299	33	87	23	12	2.3	1.1	5.2	499	1E+03	9E+02	3E+03
25DDO040	557	2,754	80	206	12	19	1.7	1.0	4.4	1,332	5E+03	4E+03	4E+03
25EDO037	14,279	75,692	2,004	3,338	284	404	36.6	23.3	95.6	36,553	1E+05	1E+05	9E+04
25GDO041	74	254	9	31	6	3	0.6	0.2	1.0	87	3E+02	2E+02	6E+02
25GDO-06	239	655	18	217	9	7	1.4	0.8	3.6	274	3E+02	4E+02	5E+02
26J049	7,584	21,231	817	699	550	157	48.6	5.5	29.2	8,040	3E+04	1E+04	6E+04
25L144	554	3,765	91	10	13	14	1.3	1.0	3.4	1,752	8E+03	5E+03	3E+03
25L058	4,579	24,640	635	492	88	164	9.7	6.8	28.7	11,611	6E+04	5E+04	4E+04
26FDO038	54	157	14	134	7	2	1.0	0.1	0.2	50	3E+02	5E+01	6E+02
26GSDO01	3,759	17,350	507	1,917	125	88	16.9	7.8	29.5	8,150	3E+04	2E+04	2E+04
26JSDO052	40	76	4	65	2	0	0.3	0.1	0.2	37	1E+01	2E+01	2E+01
26JSDO100	158	420	22	79	14	3	1.5	0.1	0.2	146	7E+02	1E+02	1E+03
26J101	440	1,060	63	499	32	9	4.2	0.4	1.2	407	2E+03	7E+02	3E+03
26KSDO254	335	1,151	44	113	5	33	0.9	0.2	2.6	505	5E+03	7E+03	8E+03
26K035	193	410	11	32	5	1	0.5	0.1	1.1	222	5E+02	8E+01	9E+02
26K099	12,816	82,526	1,967	780	172	366	20.4	24.0	88.8	39,397	2E+05	1E+05	8E+04
26L055	176	1,025	28	12	7	4	0.6	0.3	0.8	473	2E+03	1E+03	1E+03
26LSDO084	70	206	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	213	365	5	21	4	0	0.3	0.0	0.1	183	8E+01	2E+01	2E+02
27JSDO044	383	762	29	359	12	6	2.0	0.5	2.2	359	4E+02	6E+02	6E+02
27JSDO096	2,084	4,195	94	316	55	15	4.5	0.6	4.8	2,085	2E+03	4E+03	5E+03
27JSDO001	7,915	45,680	1,142	1,510	134	257	18.0	13.9	56.5	21,583	1E+05	7E+04	5E+04
27L022	2,268	13,735	326	289	44	65	5.4	5.3	20.0	6,451	3E+04	2E+04	1E+04
27L020	2,146	12,875	306	287	43	61	5.2	5.0	18.7	6,025	2E+04	2E+04	1E+04
28K061	4,483	29,035	733	364	67	137	8.0	8.0	28.1	13,896	6E+04	4E+04	3E+04
28K010	3,960	27,411	669	247	49	104	6.0	7.6	25.7	13,235	6E+04	4E+04	2E+04
28K386	686	1,694	58	366	18	21	2.6	0.6	3.9	825	2E+03	3E+03	3E+03
28L073	76	228	9	72	5	1	0.6	0.1	0.1	104	4E+02	2E+03	2E+03
28L074/5/6	1,233	3,627	109	705	51	22	6.3	2.2	9.0	1,605	5E+03	7E+03	1E+04
28N156	325	1,838	53	114	6	12	0.9	0.5	1.9	893	4E+03	3E+03	2E+03
28N207	3,289	20,084	520	449	65	97	7.7	6.1	21.7	9,590	4E+04	3E+04	2E+04
28O025	52	240	9	20	1	2	0.2	0.1	0.2	122	7E+02	5E+02	6E+02
28P001	313	2,083	52	26	5	7	0.5	0.6	1.9	1,021	4E+03	2E+03	1E+03
29J129	167	306	13	144	5	3	0.8	0.1	0.5	149	2E+02	4E+02	4E+02
29J029	363	943	41	181	7	31	1.1	0.2	1.9	391	4E+03	6E+03	7E+03
29J212	17,600	113,906	2,768	1,081	253	531	30.4	32.9	124.5	54,462	2E+05	2E+05	1E+05
29M049	1,284	7,095	196	182	36	46	3.9	2.0	7.5	3,286	2E+04	1E+04	1E+04
29N015	130	580	18	28	2	6	0.5	0.1	1.4	318	3E+02	5E+02	5E+02
29N135	420	2,331	63	146	7	10	1.2	0.7	2.7	1,152	4E+03	3E+03	2E+03
29O001	11,560	71,503	1,911	2,329	233	296	29.5	20.3	70.2	34,627	1E+05	9E+04	6E+04
29P015	79	530	14	13	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	612	4,112	106	80	10	14	1.2	1.1	3.7	2,010	8E+03	5E+03	3E+03
30J006	232	675	25	177	8	5	1.3	0.2	1.0	338	9E+02	3E+03	3E+03

Table C2-11. Scenario 3 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	64	174	7	93	2	1	0.5	0.1	0.5	86	1E+02	7E+02	7E+02
30J030	706	1,515	38	155	17	6	1.7	0.2	2.6	786	5E+02	5E+02	9E+02
30P107	346	1,824	67	104	6	10	0.9	0.5	1.6	926	4E+03	3E+03	2E+03
30P062	299	1,980	52	53	5	7	0.6	0.6	1.8	980	4E+03	2E+03	1E+03
31O004	1,018	6,122	216	149	18	32	2.3	1.4	4.7	3,006	1E+04	1E+04	7E+03
31P084	313	1,942	50	77	4	6	0.6	0.5	1.9	960	4E+03	2E+03	1E+03
3FDO159	320	1,377	60	493	14	7	2.7	0.5	1.6	665	2E+03	2E+03	2E+03
11G318/319	352	980	73	738	13	36	3.4	0.5	2.4	396	4E+03	7E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,687	5,863	131	79	54	75	3.5	0.9	5.8	2,734	3E+04	5E+04	5E+04
21H047	522	1,980	34	75	15	16	1.7	1.7	7.1	828	2E+03	2E+03	2E+03
21H039	1,501	4,708	66	315	44	47	5.2	5.5	23.9	1,883	4E+03	4E+03	5E+03
20G161	2,624	11,229	317	226	67	106	7.3	5.3	22.6	5,127	2E+04	2E+04	2E+04
StonyMWRA	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
Fens	71,878	226,341	11,589	17,696	4,594	2,197	534.4	96.2	292.3	114,861	3E+05	2E+05	2E+05
20D055	5,714	37,008	984	474	121	131	13.1	10.6	35.0	18,012	7E+04	4E+04	3E+04
21D319	7,584	50,096	1,316	832	146	175	16.8	14.2	46.6	24,420	1E+05	6E+04	4E+04

Table C2-12. Scenario 3.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,017	4,105	144	911	29	20	5.4	1.3	5.5	2,080	5E+03	4E+03	3E+03
1FDO31	842	3,987	109	197	19	19	2.2	1.0	3.9	1,943	7E+03	5E+03	5E+03
02E086	268	1,121	44	326	11	5	1.9	0.4	1.3	541	2E+03	1E+03	1E+03
2FDO120	1,435	7,205	208	585	34	32	4.9	1.9	8.4	3,578	1E+04	8E+03	8E+03
2FDO93	1,576	11,119	271	111	19	36	2.4	3.0	10.0	5,416	2E+04	1E+04	8E+03
2FDO85	100	467	13	30	3	2	0.3	0.1	0.4	229	7E+02	5E+02	4E+02
3ESDO186	333	1,523	66	564	14	8	2.9	0.7	1.8	741	2E+03	2E+03	1E+03
3ESDO185	611	2,779	110	361	15	13	2.5	0.8	2.7	1,442	6E+03	4E+03	3E+03
3F162	547	2,679	98	505	25	11	3.7	0.9	2.6	1,268	4E+03	3E+03	3E+03
4ESDO69	1,665	7,871	255	973	43	39	6.8	2.5	9.2	3,925	1E+04	1E+04	9E+03
4ESDO64	40	134	8	92	2	1	0.5	0.1	0.2	63	2E+02	3E+02	4E+02
4FDO189	794	4,500	124	175	20	15	2.3	1.2	4.3	2,197	8E+03	5E+03	4E+03
4FDO204	920	4,753	150	509	32	18	4.3	1.4	4.3	2,287	8E+03	5E+03	4E+03
4FDO16	431	2,467	68	86	11	11	1.2	0.7	2.3	1,190	5E+03	3E+03	3E+03
4FDO203	134	589	24	184	6	3	1.1	0.2	0.6	283	9E+02	8E+02	7E+02
4FDO118	613	3,494	91	111	11	15	1.3	0.9	3.3	1,712	6E+03	5E+03	3E+03
4FDO119	1,310	5,331	139	45	23	36	3.0	0.8	10.4	2,844	4E+03	5E+03	4E+03
5CSDO110	789	2,715	131	761	32	23	5.1	1.0	3.2	1,404	6E+03	5E+03	7E+03
5EDO182	111	533	32	376	6	3	1.7	0.3	0.8	261	8E+02	5E+02	4E+02
5ESDO184	658	2,965	146	1,479	31	15	7.1	1.4	3.7	1,451	5E+03	4E+03	3E+03
5FDO117	823	4,194	148	772	32	17	5.1	1.4	4.2	2,014	7E+03	4E+03	4E+03
5FDO254	58	364	9	12	1	1	0.1	0.1	0.4	181	6E+02	4E+02	2E+02
5FDO265	20	40	1	3	0	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	657	3,503	99	174	17	16	2.0	1.0	3.3	1,692	7E+03	4E+03	4E+03
5FDO245	1,419	8,473	227	356	27	30	3.6	2.4	8.3	4,177	1E+04	9E+03	6E+03
5FDO244	243	1,252	33	55	5	5	0.6	0.3	1.7	624	2E+03	1E+03	1E+03
5FDO264	19	53	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	966	5,900	151	167	17	22	2.1	1.9	6.6	2,883	1E+04	7E+03	4E+03
5GDO116A	838	4,761	136	451	16	16	2.8	1.5	4.6	2,373	8E+03	5E+03	3E+03
5GDO115	248	1,520	40	38	5	6	0.6	0.4	1.5	745	3E+03	2E+03	1E+03
5GDO116	755	4,400	116	126	17	15	1.9	1.2	4.0	2,133	8E+03	5E+03	3E+03
6DDO57	141	549	23	194	6	2	1.1	0.2	0.6	266	8E+02	1E+03	1E+03
6DDO184	7	19	13	239	3	1	1.0	0.1	0.2	7	3E+01	5E+00	5E+01
6DDO91	10	24	27	526	6	2	2.2	0.3	0.5	9	3E+01	6E+00	5E+01
6DDO187	80	251	11	56	2	6	0.4	0.1	0.4	107	8E+02	1E+03	1E+03
6DDO86	7	21	5	80	1	0	0.4	0.0	0.1	7	3E+01	7E+00	5E+01
6DDO85	40	202	8	50	2	1	0.4	0.1	0.2	93	3E+02	2E+02	2E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	9	38	2	19	1	0	0.1	0.0	0.0	16	6E+01	3E+01	6E+01
06D097	54	165	14	144	6	1	0.9	0.1	0.2	62	3E+02	8E+01	5E+02
6GDO109	1,512	8,370	227	270	42	30	4.5	2.3	7.5	4,015	2E+04	9E+03	9E+03
6GDO110	1,871	11,214	302	383	43	39	5.1	3.1	10.0	5,459	2E+04	1E+04	9E+03
6GDO111	273	1,223	62	609	14	6	3.1	0.6	1.6	588	2E+03	1E+03	1E+03
6GDO166	153	564	41	550	10	4	2.5	0.4	1.0	273	8E+02	5E+02	6E+02
6GDO108	4,899	28,881	772	945	111	106	13.0	7.9	26.2	14,021	5E+04	3E+04	3E+04
6G165	29	120	5	54	1	1	0.2	0.1	0.1	60	2E+02	1E+02	9E+01
6HDO43	87	436	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	223	1,041	35	179	7	4	1.2	0.3	1.0	511	2E+03	1E+03	7E+02

Table C2-12. Scenario 3.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	537	2,790	89	411	16	11	2.6	0.9	2.8	1,362	5E+03	3E+03	2E+03
7CDO006	6,135	28,976	1,088	7,687	196	134	40.4	11.0	33.0	14,315	5E+04	4E+04	4E+04
7HDO285	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
7HDO105	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
7HDO348	50	331	8	10	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
7HDO347	341	1,785	55	199	11	7	1.6	0.5	1.7	864	3E+03	2E+03	2E+03
7HDO346	323	2,039	53	68	5	7	0.7	0.6	1.8	998	4E+03	2E+03	1E+03
8BDO122	1,570	8,936	223	295	30	41	3.8	3.4	12.7	4,276	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	9E-01
8BDO126	887	5,703	145	134	12	19	1.6	1.6	5.5	2,814	1E+04	6E+03	3E+03
8CDO25	197	653	44	482	10	5	2.4	0.4	1.1	345	2E+03	1E+03	2E+03
8CDO26	184	647	41	414	8	5	2.0	0.4	1.0	345	2E+03	1E+03	2E+03
8DDO112	33	200	5	7	1	1	0.1	0.1	0.2	97	4E+02	4E+02	3E+02
8DSDO100	84	272	15	174	3	4	0.8	0.1	0.4	132	6E+02	1E+03	1E+03
8EDO35	131	369	30	452	8	2	2.0	0.3	0.6	184	4E+02	2E+03	2E+03
8EDO33	487	3,057	87	251	9	11	1.6	0.9	2.9	1,507	5E+03	3E+03	2E+03
8IDO153	39	257	6	4	0	1	0.1	0.1	0.2	127	5E+02	3E+02	1E+02
8IDO155	26	99	5	58	1	0	0.3	0.0	0.1	50	2E+02	3E+02	3E+02
8IDO156	333	714	47	585	19	4	3.3	0.3	0.8	311	5E+02	1E+02	8E+02
8IDO209	114	732	19	18	1	2	0.2	0.2	0.7	363	1E+03	9E+02	5E+02
8IDO154	883	4,947	139	290	22	22	2.9	1.5	5.0	2,385	9E+03	7E+03	6E+03
8IDO158	404	2,436	66	134	8	9	1.2	0.8	2.8	1,194	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,217	7,687	198	236	23	28	2.9	2.4	8.6	3,736	1E+04	9E+03	5E+03
8JSDO103	991	5,963	166	323	22	21	3.0	1.7	5.6	2,923	1E+04	6E+03	4E+03
8JSDO41	566	3,621	95	114	10	13	1.4	1.1	3.6	1,769	6E+03	4E+03	2E+03
8JSDO50	1,268	6,703	188	415	37	28	4.5	2.2	7.6	3,208	1E+04	9E+03	7E+03
8K049	168	1,000	29	64	5	4	0.6	0.3	0.9	483	2E+03	1E+03	9E+02
9BDO49	344	953	35	145	6	23	1.0	0.2	1.6	430	3E+03	7E+03	7E+03
9EDO229	61	307	9	23	2	1	0.2	0.1	0.3	147	5E+02	3E+02	3E+02
9EDO243	175	616	24	184	7	3	1.1	0.2	0.6	296	1E+03	2E+03	2E+03
9K100	54	145	8	62	2	5	0.3	0.0	0.3	59	6E+02	1E+03	1E+03
9K101	651	2,389	106	879	25	20	4.8	0.9	2.9	1,136	5E+03	6E+03	6E+03
9K016	65	198	29	463	7	3	2.1	0.3	0.6	89	3E+02	4E+02	5E+02
9LSDO095	231	888	40	336	7	10	1.6	0.4	1.2	429	2E+03	2E+03	3E+03
10BSDO62	31	57	1	1	1	0	0.0	0.0	0.1	30	7E+00	5E-01	1E+01
10BSDO15	36	89	3	10	1	1	0.1	0.0	0.2	45	2E+02	5E+02	5E+02
10BSDO64	124	363	16	86	4	3	0.6	0.1	0.7	251	5E+02	6E+02	8E+02
10L094	14,323	80,028	2,197	4,543	311	315	41.6	23.4	80.6	39,037	1E+05	9E+04	8E+04
10L096	1,596	9,752	265	281	27	61	3.5	2.7	9.8	4,677	2E+04	2E+04	1E+04
11BDO28	13,955	65,984	2,704	21,708	478	384	107.5	26.5	78.2	32,437	1E+05	9E+04	8E+04
11BDO123	2,677	14,227	406	742	65	70	8.0	3.9	13.3	6,870	3E+04	2E+04	2E+04
11IDO577	35,921	184,307	5,838	12,948	1,642	858	185.1	53.6	175.9	84,437	3E+05	2E+05	2E+05
11M093	1,121	4,124	168	744	34	21	5.3	1.3	5.0	2,208	9E+03	6E+03	7E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,994	54,440	1,634	6,028	221	235	37.9	16.8	53.5	26,808	1E+05	7E+04	6E+04
12EDO418	225	1,014	36	83	4	4	0.6	0.3	0.9	538	2E+03	2E+03	1E+03

Table C2-12. Scenario 3.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	150	744	22	83	3	2	0.5	0.2	0.7	369	1E+03	1E+03	8E+02
12HOFDO92	1,008	2,809	430	2,879	110	147	23.6	3.4	13.1	2,621	4E+03	8E+03	1E+04
12HDO85/87	474	1,416	73	468	15	46	2.7	0.4	2.8	569	6E+03	1E+04	1E+04
12L092	2,308	10,531	338	1,060	81	46	10.2	3.2	11.0	5,049	2E+04	1E+04	1E+04
12LDO296	505	2,406	73	268	13	9	2.0	0.7	2.7	1,193	4E+03	2E+03	2E+03
12M091	357	1,292	55	281	10	7	1.7	0.4	1.5	697	3E+03	2E+03	2E+03
13DSDO078	1,809	5,488	228	1,515	90	28	11.9	1.6	4.5	2,491	8E+03	6E+03	1E+04
13EDO177	54	116	10	162	3	1	0.8	0.1	0.2	57	8E+01	4E+02	4E+02
13EDO174	1,316	7,430	196	397	22	24	3.1	2.2	6.9	3,682	1E+04	9E+03	6E+03
13EDO176	38	90	5	77	2	1	0.4	0.1	0.2	44	6E+01	3E+02	3E+02
13FDO95	10	23	2	27	0	0	0.1	0.0	0.0	12	3E+01	1E+02	1E+02
13FDO011	25	47	1	1	1	0	0.0	0.0	0.0	24	2E+01	1E+02	1E+02
13F093	108	285	9	106	3	3	0.6	0.2	1.0	130	4E+02	1E+03	2E+03
13L090	33,863	163,142	5,214	5,935	1,774	755	173.5	40.7	141.2	73,487	3E+05	2E+05	2E+05
14CDO9	789	4,633	164	880	27	23	5.2	1.6	4.8	2,215	9E+03	6E+03	5E+03
15FSDO288	2,064	10,465	330	1,696	50	38	9.4	3.5	10.7	5,184	2E+04	2E+04	2E+04
15L089	13,786	62,795	2,100	5,029	643	305	71.7	16.8	59.1	29,241	1E+05	6E+04	9E+04
15L088	6,753	41,660	1,071	264	132	182	14.2	11.3	44.5	20,275	8E+04	5E+04	4E+04
16L097	560	1,735	71	616	19	36	3.6	1.4	6.2	718	4E+03	7E+03	8E+03
16LSDO122	8,525	43,975	1,326	2,539	277	272	32.8	11.8	46.0	20,768	9E+04	6E+04	7E+04
17M033	5,610	27,521	788	1,861	124	294	17.8	11.4	50.7	12,618	6E+04	6E+04	6E+04
18GSDO233	4,249	18,974	543	541	80	207	9.0	4.9	23.9	8,576	6E+04	7E+04	7E+04
19GDO043	5,152	33,826	848	344	98	121	10.7	9.9	33.5	16,248	7E+04	4E+04	3E+04
19GDO194	443	2,291	70	168	17	10	2.1	0.8	2.7	1,085	4E+03	3E+03	3E+03
19G199	61	180	2	2	1	1	0.1	0.2	0.8	78	1E+02	7E+02	7E+02
20G163	330	1,309	10	23	8	13	1.1	1.9	8.4	501	1E+03	4E+03	4E+03
20L083	216	938	26	8	4	9	0.7	0.1	2.1	507	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	64	2	5	1	0	0.1	0.0	0.1	30	1E+02	7E+01	9E+01
21H048	128	382	5	4	3	3	0.3	0.4	1.6	165	3E+02	3E+02	3E+02
21KSDO069	9,010	51,713	1,352	933	223	283	24.2	15.7	62.8	24,324	1E+05	8E+04	6E+04
21M005	152	438	12	38	3	3	0.4	0.1	0.9	234	2E+02	3E+02	3E+02
21M010	930	3,167	83	71	19	24	2.3	0.4	7.2	1,700	2E+03	2E+03	3E+03
21M050	436	1,255	30	21	9	8	0.9	0.2	2.9	670	1E+03	8E+02	2E+03
22CDO384	2,574	9,722	377	1,802	133	52	16.6	2.8	8.3	4,387	2E+04	9E+03	1E+04
22LSDO580	1,224	4,614	128	85	24	34	3.3	0.7	12.5	2,560	3E+03	3E+03	4E+03
23GDO132	4,511	9,627	269	2,141	126	64	15.8	3.8	16.7	4,461	7E+03	9E+03	1E+04
23HSDO042	18,431	80,175	2,738	4,911	886	562	99.1	26.2	103.7	36,986	1E+05	1E+05	1E+05
23HDO040	2,880	17,284	439	305	62	80	6.8	4.9	18.5	8,172	4E+04	2E+04	2E+04
23L196	140	281	7	36	4	1	0.4	0.1	0.7	141	1E+02	4E+01	2E+02
23L075	635	1,567	48	213	18	7	2.1	0.3	3.4	830	2E+03	7E+02	3E+03
23L074	138	295	7	22	4	1	0.3	0.0	0.4	154	9E+01	6E+01	1E+02
23L195	146	279	9	74	4	1	0.5	0.1	0.7	150	2E+02	6E+01	3E+02
23L202	149	287	7	36	4	0	0.3	0.1	0.7	155	3E+02	5E+01	6E+02
23L016	115	230	6	35	3	0	0.3	0.0	0.5	126	4E+02	7E+01	7E+02
23L015	159	275	11	133	5	1	0.7	0.1	0.5	139	3E+01	4E+01	5E+01
23L164	897	2,237	73	98	22	45	2.0	0.3	4.9	1,021	8E+03	1E+04	1E+04
24CSDO031	299	1,878	50	55	4	6	0.6	0.5	1.9	938	4E+03	2E+03	1E+03

Table C2-12. Scenario 3.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,655	8,561	277	1,077	44	40	7.2	2.7	9.1	4,179	2E+04	2E+04	1E+04
24DSDO150	33	79	3	23	1	0	0.1	0.0	0.1	43	7E+01	5E+02	6E+02
24DSDO032	21,436	118,168	3,940	8,267	760	448	95.5	38.2	126.0	63,736	2E+05	1E+05	1E+05
24GSDO035	24,765	144,403	3,692	4,253	424	650	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
24GSDO034	1,728	6,591	172	902	41	26	5.9	2.6	11.4	3,234	1E+04	2E+04	2E+04
24L233	438	1,299	33	87	23	12	2.3	1.1	5.2	499	1E+03	9E+02	3E+03
25DDO040	557	2,754	80	206	12	19	1.7	1.0	4.4	1,332	5E+03	4E+03	4E+03
25EDO037	14,242	75,472	1,998	3,339	284	329	36.6	23.3	95.2	36,442	1E+05	1E+05	9E+04
25GDO041	74	254	9	31	6	3	0.6	0.2	1.0	87	3E+02	2E+02	6E+02
25GDO-06	239	655	18	217	9	7	1.4	0.8	3.6	274	3E+02	4E+02	5E+02
26J049	7,584	21,231	817	699	550	157	48.6	5.5	29.2	8,040	3E+04	1E+04	6E+04
25L144	554	3,765	91	10	13	14	1.3	1.0	3.4	1,752	8E+03	5E+03	3E+03
25L058	4,579	24,640	635	492	88	164	9.7	6.8	28.7	11,611	6E+04	5E+04	4E+04
26FDO038	54	157	14	134	7	2	1.0	0.1	0.2	50	3E+02	5E+01	6E+02
26GSDO01	3,759	17,350	507	1,917	125	88	16.9	7.8	29.5	8,150	3E+04	2E+04	2E+04
26JSDO052	40	76	4	65	2	0	0.3	0.1	0.2	37	1E+01	2E+01	2E+01
26JSDO100	158	420	22	79	14	3	1.5	0.1	0.2	146	7E+02	1E+02	1E+03
26J101	440	1,060	63	499	32	9	4.2	0.4	1.2	407	2E+03	7E+02	3E+03
26KSDO254	335	1,151	44	113	5	33	0.9	0.2	2.6	505	5E+03	7E+03	8E+03
26K035	193	410	11	32	5	1	0.5	0.1	1.1	222	5E+02	8E+01	9E+02
26K099	12,816	82,526	1,967	780	172	366	20.4	24.0	88.8	39,397	2E+05	1E+05	8E+04
26L055	176	1,025	28	12	7	4	0.6	0.3	0.8	473	2E+03	1E+03	1E+03
26LSDO084	70	206	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	213	365	5	21	4	0	0.3	0.0	0.1	183	8E+01	2E+01	2E+02
27JSDO044	383	762	29	359	12	6	2.0	0.5	2.2	359	4E+02	6E+02	6E+02
27JSDO096	2,084	4,195	94	316	55	15	4.5	0.6	4.8	2,085	2E+03	4E+03	5E+03
27JSDO001	7,915	45,680	1,142	1,510	134	257	18.0	13.9	56.5	21,583	1E+05	7E+04	5E+04
27L022	2,268	13,735	326	289	44	65	5.4	5.3	20.0	6,451	3E+04	2E+04	1E+04
27L020	2,146	12,875	306	287	43	61	5.2	5.0	18.7	6,025	2E+04	2E+04	1E+04
28K061	4,483	29,035	733	364	67	137	8.0	8.0	28.1	13,896	6E+04	4E+04	3E+04
28K010	3,960	27,411	669	247	49	104	6.0	7.6	25.7	13,235	6E+04	4E+04	2E+04
28K386	686	1,694	58	366	18	21	2.6	0.6	3.9	825	2E+03	3E+03	3E+03
28L073	76	228	9	72	5	1	0.6	0.1	0.1	104	4E+02	2E+03	2E+03
28L074/5/6	1,233	3,627	109	705	51	22	6.3	2.2	9.0	1,605	5E+03	7E+03	1E+04
28N156	325	1,838	53	114	6	12	0.9	0.5	1.9	893	4E+03	3E+03	2E+03
28N207	3,289	20,084	520	449	65	97	7.7	6.1	21.7	9,590	4E+04	3E+04	2E+04
28O025	52	240	9	20	1	2	0.2	0.1	0.2	122	7E+02	5E+02	6E+02
28P001	313	2,083	52	26	5	7	0.5	0.6	1.9	1,021	4E+03	2E+03	1E+03
29J129	167	306	13	144	5	3	0.8	0.1	0.5	149	2E+02	4E+02	4E+02
29J029	363	943	41	181	7	31	1.1	0.2	1.9	391	4E+03	6E+03	7E+03
29J212	17,600	113,906	2,768	1,081	253	531	30.4	32.9	124.5	54,462	2E+05	2E+05	1E+05
29M049	1,284	7,095	196	182	36	46	3.9	2.0	7.5	3,286	2E+04	1E+04	1E+04
29N015	130	580	18	28	2	6	0.5	0.1	1.4	318	3E+02	5E+02	5E+02
29N135	420	2,331	63	146	7	10	1.2	0.7	2.7	1,152	4E+03	3E+03	2E+03
29O001	11,560	71,503	1,911	2,329	233	296	29.5	20.3	70.2	34,627	1E+05	9E+04	6E+04
29P015	79	530	14	13	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	612	4,112	106	80	10	14	1.2	1.1	3.7	2,010	8E+03	5E+03	3E+03
30J006	232	675	25	177	8	5	1.3	0.2	1.0	338	9E+02	3E+03	3E+03

Table C2-12. Scenario 3.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	64	174	7	93	2	1	0.5	0.1	0.5	86	1E+02	7E+02	7E+02
30J030	706	1,515	38	155	17	6	1.7	0.2	2.6	786	5E+02	5E+02	9E+02
30P107	346	1,824	67	104	6	10	0.9	0.5	1.6	926	4E+03	3E+03	2E+03
30P062	299	1,980	52	53	5	7	0.6	0.6	1.8	980	4E+03	2E+03	1E+03
31O004	1,018	6,122	216	149	18	32	2.3	1.4	4.7	3,006	1E+04	1E+04	7E+03
31P084	313	1,942	50	77	4	6	0.6	0.5	1.9	960	4E+03	2E+03	1E+03
3FDO159	320	1,377	60	493	14	7	2.7	0.5	1.6	665	2E+03	2E+03	2E+03
11G318/319	352	980	73	738	13	36	3.4	0.5	2.4	396	4E+03	7E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,687	5,863	131	79	54	75	3.5	0.9	5.8	2,734	3E+04	5E+04	5E+04
21H047	522	1,980	34	75	15	16	1.7	1.7	7.1	828	2E+03	2E+03	2E+03
21H039	1,501	4,708	66	315	44	47	5.2	5.5	23.9	1,883	4E+03	4E+03	5E+03
20G161	2,611	11,111	314	228	68	85	7.4	5.3	22.5	5,077	2E+04	2E+04	2E+04
StonyMWRA	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
Fens	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
20D055	5,714	37,008	984	474	121	131	13.1	10.6	35.0	18,012	7E+04	4E+04	3E+04
21D319	7,584	50,096	1,316	832	146	175	16.8	14.2	46.6	24,420	1E+05	6E+04	4E+04

Table C2-13. Scenario 3.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,017	4,105	144	911	29	20	5.4	1.3	5.5	2,080	5E+03	4E+03	3E+03
1FDO31	842	3,987	109	197	19	19	2.2	1.0	3.9	1,943	7E+03	5E+03	5E+03
02E086	268	1,121	44	326	11	5	1.9	0.4	1.3	541	2E+03	1E+03	1E+03
2FDO120	1,435	7,205	208	585	34	32	4.9	1.9	8.4	3,578	1E+04	8E+03	8E+03
2FDO93	1,576	11,119	271	111	19	36	2.4	3.0	10.0	5,416	2E+04	1E+04	8E+03
2FDO85	100	467	13	30	3	2	0.3	0.1	0.4	229	7E+02	5E+02	4E+02
3ESDO186	333	1,523	66	564	14	8	2.9	0.7	1.8	741	2E+03	2E+03	1E+03
3ESDO185	611	2,779	110	361	15	13	2.5	0.8	2.7	1,442	6E+03	4E+03	3E+03
3F162	547	2,679	98	505	25	11	3.7	0.9	2.6	1,268	4E+03	3E+03	3E+03
4ESDO69	1,665	7,871	255	973	43	39	6.8	2.5	9.2	3,925	1E+04	1E+04	9E+03
4ESDO64	40	134	8	92	2	1	0.5	0.1	0.2	63	2E+02	3E+02	4E+02
4FDO189	794	4,500	124	175	20	15	2.3	1.2	4.3	2,197	8E+03	5E+03	4E+03
4FDO204	920	4,753	150	509	32	18	4.3	1.4	4.3	2,287	8E+03	5E+03	4E+03
4FDO16	431	2,467	68	86	11	11	1.2	0.7	2.3	1,190	5E+03	3E+03	3E+03
4FDO203	134	589	24	184	6	3	1.1	0.2	0.6	283	9E+02	8E+02	7E+02
4FDO118	613	3,494	91	111	11	15	1.3	0.9	3.3	1,712	6E+03	5E+03	3E+03
4FDO119	1,310	5,331	139	45	23	36	3.0	0.8	10.4	2,844	4E+03	5E+03	4E+03
5CSDO110	789	2,715	131	761	32	23	5.1	1.0	3.2	1,404	6E+03	5E+03	7E+03
5EDO182	111	533	32	376	6	3	1.7	0.3	0.8	261	8E+02	5E+02	4E+02
5ESDO184	658	2,965	146	1,479	31	15	7.1	1.4	3.7	1,451	5E+03	4E+03	3E+03
5FDO117	823	4,194	148	772	32	17	5.1	1.4	4.2	2,014	7E+03	4E+03	4E+03
5FDO254	58	364	9	12	1	1	0.1	0.1	0.4	181	6E+02	4E+02	2E+02
5FDO265	20	40	1	3	0	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	657	3,503	99	174	17	16	2.0	1.0	3.3	1,692	7E+03	4E+03	4E+03
5FDO245	1,419	8,473	227	356	27	30	3.6	2.4	8.3	4,177	1E+04	9E+03	6E+03
5FDO244	243	1,252	33	55	5	5	0.6	0.3	1.7	624	2E+03	1E+03	1E+03
5FDO264	19	53	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	966	5,900	151	167	17	22	2.1	1.9	6.6	2,883	1E+04	7E+03	4E+03
5GDO116A	838	4,761	136	451	16	16	2.8	1.5	4.6	2,373	8E+03	5E+03	3E+03
5GDO115	248	1,520	40	38	5	6	0.6	0.4	1.5	745	3E+03	2E+03	1E+03
5GDO116	755	4,400	116	126	17	15	1.9	1.2	4.0	2,133	8E+03	5E+03	3E+03
6DDO57	141	549	23	194	6	2	1.1	0.2	0.6	266	8E+02	1E+03	1E+03
6DDO184	7	19	13	239	3	1	1.0	0.1	0.2	7	3E+01	5E+00	5E+01
6DDO91	10	24	27	526	6	2	2.2	0.3	0.5	9	3E+01	6E+00	5E+01
6DDO187	80	251	11	56	2	6	0.4	0.1	0.4	107	8E+02	1E+03	1E+03
6DDO86	7	21	5	80	1	0	0.4	0.0	0.1	7	3E+01	7E+00	5E+01
6DDO85	40	202	8	50	2	1	0.4	0.1	0.2	93	3E+02	2E+02	2E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	9	38	2	19	1	0	0.1	0.0	0.0	16	6E+01	3E+01	6E+01
06D097	54	165	14	144	6	1	0.9	0.1	0.2	62	3E+02	8E+01	5E+02
6GDO109	1,512	8,370	227	270	42	30	4.5	2.3	7.5	4,015	2E+04	9E+03	9E+03
6GDO110	1,871	11,214	302	383	43	39	5.1	3.1	10.0	5,459	2E+04	1E+04	9E+03
6GDO111	273	1,223	62	609	14	6	3.1	0.6	1.6	588	2E+03	1E+03	1E+03
6GDO166	153	564	41	550	10	4	2.5	0.4	1.0	273	8E+02	5E+02	6E+02
6GDO108	4,899	28,881	772	945	111	106	13.0	7.9	26.2	14,021	5E+04	3E+04	3E+04
6G165	29	120	5	54	1	1	0.2	0.1	0.1	60	2E+02	1E+02	9E+01
6HDO43	87	436	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	223	1,041	35	179	7	4	1.2	0.3	1.0	511	2E+03	1E+03	7E+02

Table C2-13. Scenario 3.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	537	2,790	89	411	16	11	2.6	0.9	2.8	1,362	5E+03	3E+03	2E+03
7CDO006	6,135	28,976	1,088	7,687	196	134	40.4	11.0	33.0	14,315	5E+04	4E+04	4E+04
7HDO285	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
7HDO105	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
7HDO348	50	331	8	10	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
7HDO347	341	1,785	55	199	11	7	1.6	0.5	1.7	864	3E+03	2E+03	2E+03
7HDO346	323	2,039	53	68	5	7	0.7	0.6	1.8	998	4E+03	2E+03	1E+03
8BDO122	1,570	8,936	223	295	30	41	3.8	3.4	12.7	4,276	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	9E-01
8BDO126	887	5,703	145	134	12	19	1.6	1.6	5.5	2,814	1E+04	6E+03	3E+03
8CDO25	197	653	44	482	10	5	2.4	0.4	1.1	345	2E+03	1E+03	2E+03
8CDO26	184	647	41	414	8	5	2.0	0.4	1.0	345	2E+03	1E+03	2E+03
8DDO112	33	200	5	7	1	1	0.1	0.1	0.2	97	4E+02	4E+02	3E+02
8DSDO100	84	272	15	174	3	4	0.8	0.1	0.4	132	6E+02	1E+03	1E+03
8EDO35	131	369	30	452	8	2	2.0	0.3	0.6	184	4E+02	2E+03	2E+03
8EDO33	487	3,057	87	251	9	11	1.6	0.9	2.9	1,507	5E+03	3E+03	2E+03
8IDO153	39	257	6	4	0	1	0.1	0.1	0.2	127	5E+02	3E+02	1E+02
8IDO155	26	99	5	58	1	0	0.3	0.0	0.1	50	2E+02	3E+02	3E+02
8IDO156	333	714	47	585	19	4	3.3	0.3	0.8	311	5E+02	1E+02	8E+02
8IDO209	114	732	19	18	1	2	0.2	0.2	0.7	363	1E+03	9E+02	5E+02
8IDO154	883	4,947	139	290	22	22	2.9	1.5	5.0	2,385	9E+03	7E+03	6E+03
8IDO158	404	2,436	66	134	8	9	1.2	0.8	2.8	1,194	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,217	7,687	198	236	23	28	2.9	2.4	8.6	3,736	1E+04	9E+03	5E+03
8JSDO103	991	5,963	166	323	22	21	3.0	1.7	5.6	2,923	1E+04	6E+03	4E+03
8JSDO41	566	3,621	95	114	10	13	1.4	1.1	3.6	1,769	6E+03	4E+03	2E+03
8JSDO50	1,268	6,703	188	415	37	28	4.5	2.2	7.6	3,208	1E+04	9E+03	7E+03
8K049	168	1,000	29	64	5	4	0.6	0.3	0.9	483	2E+03	1E+03	9E+02
9BDO49	344	953	35	145	6	23	1.0	0.2	1.6	430	3E+03	7E+03	7E+03
9EDO229	61	307	9	23	2	1	0.2	0.1	0.3	147	5E+02	3E+02	3E+02
9EDO243	175	616	24	184	7	3	1.1	0.2	0.6	296	1E+03	2E+03	2E+03
9K100	54	145	8	62	2	5	0.3	0.0	0.3	59	6E+02	1E+03	1E+03
9K101	651	2,389	106	879	25	20	4.8	0.9	2.9	1,136	5E+03	6E+03	6E+03
9K016	65	198	29	463	7	3	2.1	0.3	0.6	89	3E+02	4E+02	5E+02
9LSDO095	231	888	40	336	7	10	1.6	0.4	1.2	429	2E+03	2E+03	3E+03
10BSDO62	31	57	1	1	1	0	0.0	0.0	0.1	30	7E+00	5E-01	1E+01
10BSDO15	36	89	3	10	1	1	0.1	0.0	0.2	45	2E+02	5E+02	5E+02
10BSDO64	124	363	16	86	4	3	0.6	0.1	0.7	251	5E+02	6E+02	8E+02
10L094	14,323	80,028	2,197	4,543	311	315	41.6	23.4	80.6	39,037	1E+05	9E+04	8E+04
10L096	1,596	9,752	265	281	27	61	3.5	2.7	9.8	4,677	2E+04	2E+04	1E+04
11BDO28	13,955	65,984	2,704	21,708	478	384	107.5	26.5	78.2	32,437	1E+05	9E+04	8E+04
11BDO123	2,677	14,227	406	742	65	70	8.0	3.9	13.3	6,870	3E+04	2E+04	2E+04
11IDO577	35,921	184,307	5,838	12,948	1,642	858	185.1	53.6	175.9	84,437	3E+05	2E+05	2E+05
11M093	1,121	4,124	168	744	34	21	5.3	1.3	5.0	2,208	9E+03	6E+03	7E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,994	54,440	1,634	6,028	221	235	37.9	16.8	53.5	26,808	1E+05	7E+04	6E+04
12EDO418	225	1,014	36	83	4	4	0.6	0.3	0.9	538	2E+03	2E+03	1E+03

Table C2-13. Scenario 3.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	150	744	22	83	3	2	0.5	0.2	0.7	369	1E+03	1E+03	8E+02
12HOFDO92	1,008	2,809	430	2,879	110	147	23.6	3.4	13.1	2,621	4E+03	8E+03	1E+04
12HDO85/87	474	1,416	73	468	15	46	2.7	0.4	2.8	569	6E+03	1E+04	1E+04
12L092	2,308	10,531	338	1,060	81	46	10.2	3.2	11.0	5,049	2E+04	1E+04	1E+04
12LDO296	505	2,406	73	268	13	9	2.0	0.7	2.7	1,193	4E+03	2E+03	2E+03
12M091	357	1,292	55	281	10	7	1.7	0.4	1.5	697	3E+03	2E+03	2E+03
13DSDO078	1,809	5,488	228	1,515	90	28	11.9	1.6	4.5	2,491	8E+03	6E+03	1E+04
13EDO177	54	116	10	162	3	1	0.8	0.1	0.2	57	8E+01	4E+02	4E+02
13EDO174	1,316	7,430	196	397	22	24	3.1	2.2	6.9	3,682	1E+04	9E+03	6E+03
13EDO176	38	90	5	77	2	1	0.4	0.1	0.2	44	6E+01	3E+02	3E+02
13FDO95	10	23	2	27	0	0	0.1	0.0	0.0	12	3E+01	1E+02	1E+02
13FDO011	25	47	1	1	1	0	0.0	0.0	0.0	24	2E+01	1E+02	1E+02
13F093	108	285	9	106	3	3	0.6	0.2	1.0	130	4E+02	1E+03	2E+03
13L090	33,863	163,142	5,214	5,935	1,774	755	173.5	40.7	141.2	73,487	3E+05	2E+05	2E+05
14CDO9	789	4,633	164	880	27	23	5.2	1.6	4.8	2,215	9E+03	6E+03	5E+03
15FSDO288	2,064	10,465	330	1,696	50	38	9.4	3.5	10.7	5,184	2E+04	2E+04	2E+04
15L089	13,786	62,795	2,100	5,029	643	305	71.7	16.8	59.1	29,241	1E+05	6E+04	9E+04
15L088	6,753	41,660	1,071	264	132	182	14.2	11.3	44.5	20,275	8E+04	5E+04	4E+04
16L097	560	1,735	71	616	19	36	3.6	1.4	6.2	718	4E+03	7E+03	8E+03
16LSDO122	8,525	43,975	1,326	2,539	277	272	32.8	11.8	46.0	20,768	9E+04	6E+04	7E+04
17M033	5,610	27,521	788	1,861	124	294	17.8	11.4	50.7	12,618	6E+04	6E+04	6E+04
18GSDO233	4,249	18,974	543	541	80	189	9.0	4.9	23.9	8,576	6E+04	7E+04	7E+04
19GDO043	5,152	33,826	848	344	98	121	10.7	9.9	33.5	16,248	7E+04	4E+04	3E+04
19GDO194	443	2,291	70	168	17	10	2.1	0.8	2.7	1,085	4E+03	3E+03	3E+03
19G199	61	180	2	2	1	1	0.1	0.2	0.8	78	1E+02	7E+02	7E+02
20G163	330	1,309	10	23	8	12	1.1	1.9	8.4	501	1E+03	4E+03	4E+03
20L083	216	938	26	8	4	9	0.7	0.1	2.1	507	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	64	2	5	1	0	0.1	0.0	0.1	30	1E+02	7E+01	9E+01
21H048	128	382	5	4	3	3	0.3	0.4	1.6	165	3E+02	3E+02	3E+02
21KSDO069	9,010	51,713	1,352	933	223	283	24.2	15.7	62.8	24,324	1E+05	8E+04	6E+04
21M005	152	438	12	38	3	3	0.4	0.1	0.9	234	2E+02	3E+02	3E+02
21M010	930	3,167	83	71	19	24	2.3	0.4	7.2	1,700	2E+03	2E+03	3E+03
21M050	436	1,255	30	21	9	8	0.9	0.2	2.9	670	1E+03	8E+02	2E+03
22CDO384	2,574	9,722	377	1,802	133	52	16.6	2.8	8.3	4,387	2E+04	9E+03	1E+04
22LSDO580	1,224	4,614	128	85	24	34	3.3	0.7	12.5	2,560	3E+03	3E+03	4E+03
23GDO132	4,511	9,627	269	2,141	126	64	15.8	3.8	16.7	4,461	7E+03	9E+03	1E+04
23HSDO042	18,431	80,175	2,738	4,911	886	562	99.1	26.2	103.7	36,986	1E+05	1E+05	1E+05
23HDO040	2,880	17,284	439	305	62	80	6.8	4.9	18.5	8,172	4E+04	2E+04	2E+04
23L196	140	281	7	36	4	1	0.4	0.1	0.7	141	1E+02	4E+01	2E+02
23L075	635	1,567	48	213	18	7	2.1	0.3	3.4	830	2E+03	7E+02	3E+03
23L074	138	295	7	22	4	1	0.3	0.0	0.4	154	9E+01	6E+01	1E+02
23L195	146	279	9	74	4	1	0.5	0.1	0.7	150	2E+02	6E+01	3E+02
23L202	149	287	7	36	4	0	0.3	0.1	0.7	155	3E+02	5E+01	6E+02
23L016	115	230	6	35	3	0	0.3	0.0	0.5	126	4E+02	7E+01	7E+02
23L015	159	275	11	133	5	1	0.7	0.1	0.5	139	3E+01	4E+01	5E+01
23L164	897	2,237	73	98	22	45	2.0	0.3	4.9	1,021	8E+03	1E+04	1E+04
24CSDO031	299	1,878	50	55	4	6	0.6	0.5	1.9	938	4E+03	2E+03	1E+03

Table C2-13. Scenario 3.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,655	8,561	277	1,077	44	37	7.2	2.7	9.1	4,179	2E+04	2E+04	1E+04
24DSDO150	33	79	3	23	1	0	0.1	0.0	0.1	43	7E+01	5E+02	6E+02
24DSDO032	21,436	118,168	3,940	8,267	760	409	95.5	38.2	126.0	63,736	2E+05	1E+05	1E+05
24GSDO035	24,765	144,403	3,692	4,253	424	650	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
24GSDO034	1,728	6,591	172	902	41	26	5.9	2.6	11.4	3,234	1E+04	2E+04	2E+04
24L233	438	1,299	33	87	23	12	2.3	1.1	5.2	499	1E+03	9E+02	3E+03
25DDO040	557	2,754	80	206	12	19	1.7	1.0	4.4	1,332	5E+03	4E+03	4E+03
25EDO037	14,242	75,472	1,998	3,339	284	302	36.6	23.3	95.2	36,442	1E+05	1E+05	9E+04
25GDO041	74	254	9	31	6	3	0.6	0.2	1.0	87	3E+02	2E+02	6E+02
25GDO-06	239	655	18	217	9	7	1.4	0.8	3.6	274	3E+02	4E+02	5E+02
26J049	7,584	21,231	817	699	550	157	48.6	5.5	29.2	8,040	3E+04	1E+04	6E+04
25L144	554	3,765	91	10	13	14	1.3	1.0	3.4	1,752	8E+03	5E+03	3E+03
25L058	4,579	24,640	635	492	88	164	9.7	6.8	28.7	11,611	6E+04	5E+04	4E+04
26FDO038	54	157	14	134	7	2	1.0	0.1	0.2	50	3E+02	5E+01	6E+02
26GSDO01	3,759	17,350	507	1,917	125	88	16.9	7.8	29.5	8,150	3E+04	2E+04	2E+04
26JSDO052	40	76	4	65	2	0	0.3	0.1	0.2	37	1E+01	2E+01	2E+01
26JSDO100	158	420	22	79	14	3	1.5	0.1	0.2	146	7E+02	1E+02	1E+03
26J101	440	1,060	63	499	32	9	4.2	0.4	1.2	407	2E+03	7E+02	3E+03
26KSDO254	335	1,151	44	113	5	33	0.9	0.2	2.6	505	5E+03	7E+03	8E+03
26K035	193	410	11	32	5	1	0.5	0.1	1.1	222	5E+02	8E+01	9E+02
26K099	12,816	82,526	1,967	780	172	366	20.4	24.0	88.8	39,397	2E+05	1E+05	8E+04
26L055	176	1,025	28	12	7	4	0.6	0.3	0.8	473	2E+03	1E+03	1E+03
26LSDO084	70	206	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	213	365	5	21	4	0	0.3	0.0	0.1	183	8E+01	2E+01	2E+02
27JSDO044	383	762	29	359	12	6	2.0	0.5	2.2	359	4E+02	6E+02	6E+02
27JSDO096	2,084	4,195	94	316	55	15	4.5	0.6	4.8	2,085	2E+03	4E+03	5E+03
27JSDO001	7,915	45,680	1,142	1,510	134	257	18.0	13.9	56.5	21,583	1E+05	7E+04	5E+04
27L022	2,268	13,735	326	289	44	65	5.4	5.3	20.0	6,451	3E+04	2E+04	1E+04
27L020	2,146	12,875	306	287	43	61	5.2	5.0	18.7	6,025	2E+04	2E+04	1E+04
28K061	4,483	29,035	733	364	67	137	8.0	8.0	28.1	13,896	6E+04	4E+04	3E+04
28K010	3,960	27,411	669	247	49	104	6.0	7.6	25.7	13,235	6E+04	4E+04	2E+04
28K386	686	1,694	58	366	18	21	2.6	0.6	3.9	825	2E+03	3E+03	3E+03
28L073	76	228	9	72	5	1	0.6	0.1	0.1	104	4E+02	2E+03	2E+03
28L074/5/6	1,233	3,627	109	705	51	22	6.3	2.2	9.0	1,605	5E+03	7E+03	1E+04
28N156	325	1,838	53	114	6	12	0.9	0.5	1.9	893	4E+03	3E+03	2E+03
28N207	3,289	20,084	520	449	65	97	7.7	6.1	21.7	9,590	4E+04	3E+04	2E+04
28O025	52	240	9	20	1	2	0.2	0.1	0.2	122	7E+02	5E+02	6E+02
28P001	313	2,083	52	26	5	7	0.5	0.6	1.9	1,021	4E+03	2E+03	1E+03
29J129	167	306	13	144	5	3	0.8	0.1	0.5	149	2E+02	4E+02	4E+02
29J029	363	943	41	181	7	31	1.1	0.2	1.9	391	4E+03	6E+03	7E+03
29J212	17,600	113,906	2,768	1,081	253	531	30.4	32.9	124.5	54,462	2E+05	2E+05	1E+05
29M049	1,284	7,095	196	182	36	46	3.9	2.0	7.5	3,286	2E+04	1E+04	1E+04
29N015	130	580	18	28	2	6	0.5	0.1	1.4	318	3E+02	5E+02	5E+02
29N135	420	2,331	63	146	7	10	1.2	0.7	2.7	1,152	4E+03	3E+03	2E+03
29O001	11,560	71,503	1,911	2,329	233	296	29.5	20.3	70.2	34,627	1E+05	9E+04	6E+04
29P015	79	530	14	13	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	612	4,112	106	80	10	14	1.2	1.1	3.7	2,010	8E+03	5E+03	3E+03
30J006	232	675	25	177	8	5	1.3	0.2	1.0	338	9E+02	3E+03	3E+03

Table C2-13. Scenario 3.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	64	174	7	93	2	1	0.5	0.1	0.5	86	1E+02	7E+02	7E+02
30J030	706	1,515	38	155	17	6	1.7	0.2	2.6	786	5E+02	5E+02	9E+02
30P107	346	1,824	67	104	6	10	0.9	0.5	1.6	926	4E+03	3E+03	2E+03
30P062	299	1,980	52	53	5	7	0.6	0.6	1.8	980	4E+03	2E+03	1E+03
31O004	1,018	6,122	216	149	18	32	2.3	1.4	4.7	3,006	1E+04	1E+04	7E+03
31P084	313	1,942	50	77	4	6	0.6	0.5	1.9	960	4E+03	2E+03	1E+03
3FDO159	320	1,377	60	493	14	7	2.7	0.5	1.6	665	2E+03	2E+03	2E+03
11G318/319	352	980	73	738	13	36	3.4	0.5	2.4	396	4E+03	7E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,687	5,863	131	79	54	75	3.5	0.9	5.8	2,734	3E+04	5E+04	5E+04
21H047	522	1,980	34	75	15	16	1.7	1.7	7.1	828	2E+03	2E+03	2E+03
21H039	1,501	4,708	66	315	44	47	5.2	5.5	23.9	1,883	4E+03	4E+03	5E+03
20G161	2,611	11,111	314	228	68	78	7.4	5.3	22.5	5,077	2E+04	2E+04	2E+04
StonyMWRA	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
Fens	4,591	226,121	534	17,688	4,591	2,132	534.0	96.0	291.8	114,787	3E+05	2E+05	2E+05
20D055	5,714	37,008	984	474	121	131	13.1	10.6	35.0	18,012	7E+04	4E+04	3E+04
21D319	7,584	50,096	1,316	832	146	175	16.8	14.2	46.6	24,420	1E+05	6E+04	4E+04

Table C2-14. Scenario 3.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,017	4,105	144	911	29	20	5.4	1.3	5.5	2,080	5E+03	4E+03	3E+03
1FDO31	842	3,987	109	197	19	19	2.2	1.0	3.9	1,943	7E+03	5E+03	5E+03
02E086	268	1,121	44	326	11	5	1.9	0.4	1.3	541	2E+03	1E+03	1E+03
2FDO120	1,435	7,205	208	585	34	32	4.9	1.9	8.4	3,578	1E+04	8E+03	8E+03
2FDO93	1,576	11,119	271	111	19	36	2.4	3.0	10.0	5,416	2E+04	1E+04	8E+03
2FDO85	100	467	13	30	3	2	0.3	0.1	0.4	229	7E+02	5E+02	4E+02
3ESDO186	333	1,523	66	564	14	8	2.9	0.7	1.8	741	2E+03	2E+03	1E+03
3ESDO185	611	2,779	110	361	15	13	2.5	0.8	2.7	1,442	6E+03	4E+03	3E+03
3F162	547	2,679	98	505	25	11	3.7	0.9	2.6	1,268	4E+03	3E+03	3E+03
4ESDO69	1,665	7,871	255	973	43	39	6.8	2.5	9.2	3,925	1E+04	1E+04	9E+03
4ESDO64	40	134	8	92	2	1	0.5	0.1	0.2	63	2E+02	3E+02	4E+02
4FDO189	794	4,500	124	175	20	15	2.3	1.2	4.3	2,197	8E+03	5E+03	4E+03
4FDO204	920	4,753	150	509	32	18	4.3	1.4	4.3	2,287	8E+03	5E+03	4E+03
4FDO16	431	2,467	68	86	11	11	1.2	0.7	2.3	1,190	5E+03	3E+03	3E+03
4FDO203	134	589	24	184	6	3	1.1	0.2	0.6	283	9E+02	8E+02	7E+02
4FDO118	613	3,494	91	111	11	15	1.3	0.9	3.3	1,712	6E+03	5E+03	3E+03
4FDO119	1,310	5,331	139	45	23	36	3.0	0.8	10.4	2,844	4E+03	5E+03	4E+03
5CSDO110	789	2,715	131	761	32	23	5.1	1.0	3.2	1,404	6E+03	5E+03	7E+03
5EDO182	111	533	32	376	6	3	1.7	0.3	0.8	261	8E+02	5E+02	4E+02
5ESDO184	658	2,965	146	1,479	31	15	7.1	1.4	3.7	1,451	5E+03	4E+03	3E+03
5FDO117	823	4,194	148	772	32	17	5.1	1.4	4.2	2,014	7E+03	4E+03	4E+03
5FDO254	58	364	9	12	1	1	0.1	0.1	0.4	181	6E+02	4E+02	2E+02
5FDO265	20	40	1	3	0	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	657	3,503	99	174	17	16	2.0	1.0	3.3	1,692	7E+03	4E+03	4E+03
5FDO245	1,419	8,473	227	356	27	30	3.6	2.4	8.3	4,177	1E+04	9E+03	6E+03
5FDO244	243	1,252	33	55	5	5	0.6	0.3	1.7	624	2E+03	1E+03	1E+03
5FDO264	19	53	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	966	5,900	151	167	17	22	2.1	1.9	6.6	2,883	1E+04	7E+03	4E+03
5GDO116A	838	4,761	136	451	16	16	2.8	1.5	4.6	2,373	8E+03	5E+03	3E+03
5GDO115	248	1,520	40	38	5	6	0.6	0.4	1.5	745	3E+03	2E+03	1E+03
5GDO116	755	4,400	116	126	17	15	1.9	1.2	4.0	2,133	8E+03	5E+03	3E+03
6DDO57	141	549	23	194	6	2	1.1	0.2	0.6	266	8E+02	1E+03	1E+03
6DDO184	7	19	13	239	3	1	1.0	0.1	0.2	7	3E+01	5E+00	5E+01
6DDO91	10	24	27	526	6	2	2.2	0.3	0.5	9	3E+01	6E+00	5E+01
6DDO187	80	251	11	56	2	6	0.4	0.1	0.4	107	8E+02	1E+03	1E+03
6DDO86	7	21	5	80	1	0	0.4	0.0	0.1	7	3E+01	7E+00	5E+01
6DDO85	40	202	8	50	2	1	0.4	0.1	0.2	93	3E+02	2E+02	2E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	9	38	2	19	1	0	0.1	0.0	0.0	16	6E+01	3E+01	6E+01
06D097	54	165	14	144	6	1	0.9	0.1	0.2	62	3E+02	8E+01	5E+02
6GDO109	1,512	8,370	227	270	42	30	4.5	2.3	7.5	4,015	2E+04	9E+03	9E+03
6GDO110	1,871	11,214	302	383	43	39	5.1	3.1	10.0	5,459	2E+04	1E+04	9E+03
6GDO111	273	1,223	62	609	14	6	3.1	0.6	1.6	588	2E+03	1E+03	1E+03
6GDO166	153	564	41	550	10	4	2.5	0.4	1.0	273	8E+02	5E+02	6E+02
6GDO108	4,899	28,881	772	945	111	106	13.0	7.9	26.2	14,021	5E+04	3E+04	3E+04
6G165	29	120	5	54	1	1	0.2	0.1	0.1	60	2E+02	1E+02	9E+01
6HDO43	87	436	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	223	1,041	35	179	7	4	1.2	0.3	1.0	511	2E+03	1E+03	7E+02

Table C2-14. Scenario 3.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	537	2,790	89	411	16	11	2.6	0.9	2.8	1,362	5E+03	3E+03	2E+03
7CDO006	6,135	28,976	1,088	7,687	196	134	40.4	11.0	33.0	14,315	5E+04	4E+04	4E+04
7HDO285	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
7HDO105	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
7HDO348	50	331	8	10	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
7HDO347	341	1,785	55	199	11	7	1.6	0.5	1.7	864	3E+03	2E+03	2E+03
7HDO346	323	2,039	53	68	5	7	0.7	0.6	1.8	998	4E+03	2E+03	1E+03
8BDO122	1,570	8,936	223	295	30	41	3.8	3.4	12.7	4,276	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	9E-01
8BDO126	887	5,703	145	134	12	19	1.6	1.6	5.5	2,814	1E+04	6E+03	3E+03
8CDO25	197	653	44	482	10	5	2.4	0.4	1.1	345	2E+03	1E+03	2E+03
8CDO26	184	647	41	414	8	5	2.0	0.4	1.0	345	2E+03	1E+03	2E+03
8DDO112	33	200	5	7	1	1	0.1	0.1	0.2	97	4E+02	4E+02	3E+02
8DSDO100	84	272	15	174	3	4	0.8	0.1	0.4	132	6E+02	1E+03	1E+03
8EDO35	131	369	30	452	8	2	2.0	0.3	0.6	184	4E+02	2E+03	2E+03
8EDO33	487	3,057	87	251	9	11	1.6	0.9	2.9	1,507	5E+03	3E+03	2E+03
8IDO153	39	257	6	4	0	1	0.1	0.1	0.2	127	5E+02	3E+02	1E+02
8IDO155	26	99	5	58	1	0	0.3	0.0	0.1	50	2E+02	3E+02	3E+02
8IDO156	333	714	47	585	19	4	3.3	0.3	0.8	311	5E+02	1E+02	8E+02
8IDO209	114	732	19	18	1	2	0.2	0.2	0.7	363	1E+03	9E+02	5E+02
8IDO154	883	4,947	139	290	22	22	2.9	1.5	5.0	2,385	9E+03	7E+03	6E+03
8IDO158	404	2,436	66	134	8	9	1.2	0.8	2.8	1,194	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,217	7,687	198	236	23	28	2.9	2.4	8.6	3,736	1E+04	9E+03	5E+03
8JSDO103	991	5,963	166	323	22	21	3.0	1.7	5.6	2,923	1E+04	6E+03	4E+03
8JSDO41	566	3,621	95	114	10	13	1.4	1.1	3.6	1,769	6E+03	4E+03	2E+03
8JSDO50	1,268	6,703	188	415	37	28	4.5	2.2	7.6	3,208	1E+04	9E+03	7E+03
8K049	168	1,000	29	64	5	4	0.6	0.3	0.9	483	2E+03	1E+03	9E+02
9BDO49	344	953	35	145	6	23	1.0	0.2	1.6	430	3E+03	7E+03	7E+03
9EDO229	61	307	9	23	2	1	0.2	0.1	0.3	147	5E+02	3E+02	3E+02
9EDO243	175	616	24	184	7	3	1.1	0.2	0.6	296	1E+03	2E+03	2E+03
9K100	54	145	8	62	2	5	0.3	0.0	0.3	59	6E+02	1E+03	1E+03
9K101	651	2,389	106	879	25	20	4.8	0.9	2.9	1,136	5E+03	6E+03	6E+03
9K016	65	198	29	463	7	3	2.1	0.3	0.6	89	3E+02	4E+02	5E+02
9LSDO095	231	888	40	336	7	10	1.6	0.4	1.2	429	2E+03	2E+03	3E+03
10BSDO62	31	57	1	1	1	0	0.0	0.0	0.1	30	7E+00	5E-01	1E+01
10BSDO15	36	89	3	10	1	1	0.1	0.0	0.2	45	2E+02	5E+02	5E+02
10BSDO64	124	363	16	86	4	3	0.6	0.1	0.7	251	5E+02	6E+02	8E+02
10L094	14,323	80,028	2,197	4,543	311	315	41.6	23.4	80.6	39,037	1E+05	9E+04	8E+04
10L096	1,596	9,752	265	281	27	61	3.5	2.7	9.8	4,677	2E+04	2E+04	1E+04
11BDO28	13,955	65,984	2,704	21,708	478	384	107.5	26.5	78.2	32,437	1E+05	9E+04	8E+04
11BDO123	2,677	14,227	406	742	65	70	8.0	3.9	13.3	6,870	3E+04	2E+04	2E+04
11IDO577	35,921	184,307	5,838	12,948	1,642	858	185.1	53.6	175.9	84,437	3E+05	2E+05	2E+05
11M093	1,121	4,124	168	744	34	21	5.3	1.3	5.0	2,208	9E+03	6E+03	7E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,994	54,440	1,634	6,028	221	235	37.9	16.8	53.5	26,808	1E+05	7E+04	6E+04
12EDO418	225	1,014	36	83	4	4	0.6	0.3	0.9	538	2E+03	2E+03	1E+03

Table C2-14. Scenario 3.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	150	744	22	83	3	2	0.5	0.2	0.7	369	1E+03	1E+03	8E+02
12HOFDO92	1,008	2,809	430	2,879	110	147	23.6	3.4	13.1	2,621	4E+03	8E+03	1E+04
12HDO85/87	474	1,416	73	468	15	46	2.7	0.4	2.8	569	6E+03	1E+04	1E+04
12L092	2,308	10,531	338	1,060	81	46	10.2	3.2	11.0	5,049	2E+04	1E+04	1E+04
12LDO296	505	2,406	73	268	13	9	2.0	0.7	2.7	1,193	4E+03	2E+03	2E+03
12M091	357	1,292	55	281	10	7	1.7	0.4	1.5	697	3E+03	2E+03	2E+03
13DSDO078	1,809	5,488	228	1,515	90	28	11.9	1.6	4.5	2,491	8E+03	6E+03	1E+04
13EDO177	54	116	10	162	3	1	0.8	0.1	0.2	57	8E+01	4E+02	4E+02
13EDO174	1,316	7,430	196	397	22	24	3.1	2.2	6.9	3,682	1E+04	9E+03	6E+03
13EDO176	38	90	5	77	2	1	0.4	0.1	0.2	44	6E+01	3E+02	3E+02
13FDO95	10	23	2	27	0	0	0.1	0.0	0.0	12	3E+01	1E+02	1E+02
13FDO011	25	47	1	1	1	0	0.0	0.0	0.0	24	2E+01	1E+02	1E+02
13F093	108	285	9	106	3	3	0.6	0.2	1.0	130	4E+02	1E+03	2E+03
13L090	33,863	163,142	5,214	5,935	1,774	755	173.5	40.7	141.2	73,487	3E+05	2E+05	2E+05
14CDO9	789	4,633	164	880	27	23	5.2	1.6	4.8	2,215	9E+03	6E+03	5E+03
15FSDO288	2,064	10,465	330	1,696	50	38	9.4	3.5	10.7	5,184	2E+04	2E+04	2E+04
15L089	13,786	62,795	2,100	5,029	643	305	71.7	16.8	59.1	29,241	1E+05	6E+04	9E+04
15L088	6,753	41,660	1,071	264	132	182	14.2	11.3	44.5	20,275	8E+04	5E+04	4E+04
16L097	560	1,735	71	616	19	36	3.6	1.4	6.2	718	4E+03	7E+03	8E+03
16LSDO122	8,525	43,975	1,326	2,539	277	272	32.8	11.8	46.0	20,768	9E+04	6E+04	7E+04
17M033	5,610	27,521	788	1,861	124	294	17.8	11.4	50.7	12,618	6E+04	6E+04	6E+04
18GSDO233	4,249	18,974	543	541	80	151	9.0	4.9	23.9	8,576	6E+04	7E+04	7E+04
19GDO043	5,152	33,826	848	344	98	121	10.7	9.9	33.5	16,248	7E+04	4E+04	3E+04
19GDO194	443	2,291	70	168	17	10	2.1	0.8	2.7	1,085	4E+03	3E+03	3E+03
19G199	61	180	2	2	1	1	0.1	0.2	0.8	78	1E+02	7E+02	7E+02
20G163	330	1,309	10	23	8	9	1.1	1.9	8.4	501	1E+03	4E+03	4E+03
20L083	216	938	26	8	4	9	0.7	0.1	2.1	507	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	64	2	5	1	0	0.1	0.0	0.1	30	1E+02	7E+01	9E+01
21H048	128	382	5	4	3	3	0.3	0.4	1.6	165	3E+02	3E+02	3E+02
21KSDO069	9,010	51,713	1,352	933	223	283	24.2	15.7	62.8	24,324	1E+05	8E+04	6E+04
21M005	152	438	12	38	3	3	0.4	0.1	0.9	234	2E+02	3E+02	3E+02
21M010	930	3,167	83	71	19	24	2.3	0.4	7.2	1,700	2E+03	2E+03	3E+03
21M050	436	1,255	30	21	9	8	0.9	0.2	2.9	670	1E+03	8E+02	2E+03
22CDO384	2,574	9,722	377	1,802	133	52	16.6	2.8	8.3	4,387	2E+04	9E+03	1E+04
22LSDO580	1,224	4,614	128	85	24	34	3.3	0.7	12.5	2,560	3E+03	3E+03	4E+03
23GDO132	4,511	9,627	269	2,141	126	64	15.8	3.8	16.7	4,461	7E+03	9E+03	1E+04
23HSDO042	18,431	80,175	2,738	4,911	886	561	99.1	26.2	103.7	36,986	1E+05	1E+05	1E+05
23HDO040	2,880	17,284	439	305	62	80	6.8	4.9	18.5	8,172	4E+04	2E+04	2E+04
23L196	140	281	7	36	4	1	0.4	0.1	0.7	141	1E+02	4E+01	2E+02
23L075	635	1,567	48	213	18	7	2.1	0.3	3.4	830	2E+03	7E+02	3E+03
23L074	138	295	7	22	4	1	0.3	0.0	0.4	154	9E+01	6E+01	1E+02
23L195	146	279	9	74	4	1	0.5	0.1	0.7	150	2E+02	6E+01	3E+02
23L202	149	287	7	36	4	0	0.3	0.1	0.7	155	3E+02	5E+01	6E+02
23L016	115	230	6	35	3	0	0.3	0.0	0.5	126	4E+02	7E+01	7E+02
23L015	159	275	11	133	5	1	0.7	0.1	0.5	139	3E+01	4E+01	5E+01
23L164	897	2,237	73	98	22	45	2.0	0.3	4.9	1,021	8E+03	1E+04	1E+04
24CSDO031	299	1,878	50	55	4	6	0.6	0.5	1.9	938	4E+03	2E+03	1E+03

Table C2-14. Scenario 3.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,655	8,561	277	1,077	44	29	7.2	2.7	9.1	4,179	2E+04	2E+04	1E+04
24DSDO150	33	79	3	23	1	0	0.1	0.0	0.1	43	7E+01	5E+02	6E+02
24DSDO032	21,436	118,168	3,940	8,267	760	326	95.5	38.2	126.0	63,736	2E+05	1E+05	1E+05
24GSDO035	24,765	144,403	3,692	4,253	424	650	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
24GSDO034	1,728	6,591	172	902	41	26	5.9	2.6	11.4	3,234	1E+04	2E+04	2E+04
24L233	438	1,299	33	87	23	12	2.3	1.1	5.2	499	1E+03	9E+02	3E+03
25DDO040	557	2,754	80	206	12	19	1.7	1.0	4.4	1,332	5E+03	4E+03	4E+03
25EDO037	14,242	75,472	1,998	3,339	284	245	36.6	23.3	95.2	36,442	1E+05	1E+05	9E+04
25GDO041	74	254	9	31	6	3	0.6	0.2	1.0	87	3E+02	2E+02	6E+02
25GDO-06	239	655	18	217	9	7	1.4	0.8	3.6	274	3E+02	4E+02	5E+02
26J049	7,584	21,231	817	699	550	157	48.6	5.5	29.2	8,040	3E+04	1E+04	6E+04
25L144	554	3,765	91	10	13	14	1.3	1.0	3.4	1,752	8E+03	5E+03	3E+03
25L058	4,579	24,640	635	492	88	164	9.7	6.8	28.7	11,611	6E+04	5E+04	4E+04
26FDO038	54	157	14	134	7	2	1.0	0.1	0.2	50	3E+02	5E+01	6E+02
26GSDO01	3,759	17,350	507	1,917	125	88	16.9	7.8	29.5	8,150	3E+04	2E+04	2E+04
26JSDO052	40	76	4	65	2	0	0.3	0.1	0.2	37	1E+01	2E+01	2E+01
26JSDO100	158	420	22	79	14	3	1.5	0.1	0.2	146	7E+02	1E+02	1E+03
26J101	440	1,060	63	499	32	9	4.2	0.4	1.2	407	2E+03	7E+02	3E+03
26KSDO254	335	1,151	44	113	5	33	0.9	0.2	2.6	505	5E+03	7E+03	8E+03
26K035	193	410	11	32	5	1	0.5	0.1	1.1	222	5E+02	8E+01	9E+02
26K099	12,816	82,526	1,967	780	172	366	20.4	24.0	88.8	39,397	2E+05	1E+05	8E+04
26L055	176	1,025	28	12	7	4	0.6	0.3	0.8	473	2E+03	1E+03	1E+03
26LSDO084	70	206	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	213	365	5	21	4	0	0.3	0.0	0.1	183	8E+01	2E+01	2E+02
27JSDO044	383	762	29	359	12	6	2.0	0.5	2.2	359	4E+02	6E+02	6E+02
27JSDO096	2,084	4,195	94	316	55	15	4.5	0.6	4.8	2,085	2E+03	4E+03	5E+03
27JSDO001	7,915	45,680	1,142	1,510	134	257	18.0	13.9	56.5	21,583	1E+05	7E+04	5E+04
27L022	2,268	13,735	326	289	44	65	5.4	5.3	20.0	6,451	3E+04	2E+04	1E+04
27L020	2,146	12,875	306	287	43	61	5.2	5.0	18.7	6,025	2E+04	2E+04	1E+04
28K061	4,483	29,035	733	364	67	137	8.0	8.0	28.1	13,896	6E+04	4E+04	3E+04
28K010	3,960	27,411	669	247	49	104	6.0	7.6	25.7	13,235	6E+04	4E+04	2E+04
28K386	686	1,694	58	366	18	21	2.6	0.6	3.9	825	2E+03	3E+03	3E+03
28L073	76	228	9	72	5	1	0.6	0.1	0.1	104	4E+02	2E+03	2E+03
28L074/5/6	1,233	3,627	109	705	51	22	6.3	2.2	9.0	1,605	5E+03	7E+03	1E+04
28N156	325	1,838	53	114	6	12	0.9	0.5	1.9	893	4E+03	3E+03	2E+03
28N207	3,289	20,084	520	449	65	97	7.7	6.1	21.7	9,590	4E+04	3E+04	2E+04
28O025	52	240	9	20	1	2	0.2	0.1	0.2	122	7E+02	5E+02	6E+02
28P001	313	2,083	52	26	5	7	0.5	0.6	1.9	1,021	4E+03	2E+03	1E+03
29J129	167	306	13	144	5	3	0.8	0.1	0.5	149	2E+02	4E+02	4E+02
29J029	363	943	41	181	7	31	1.1	0.2	1.9	391	4E+03	6E+03	7E+03
29J212	17,600	113,906	2,768	1,081	253	531	30.4	32.9	124.5	54,462	2E+05	2E+05	1E+05
29M049	1,284	7,095	196	182	36	46	3.9	2.0	7.5	3,286	2E+04	1E+04	1E+04
29N015	130	580	18	28	2	6	0.5	0.1	1.4	318	3E+02	5E+02	5E+02
29N135	420	2,331	63	146	7	10	1.2	0.7	2.7	1,152	4E+03	3E+03	2E+03
29O001	11,560	71,503	1,911	2,329	233	296	29.5	20.3	70.2	34,627	1E+05	9E+04	6E+04
29P015	79	530	14	13	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	612	4,112	106	80	10	14	1.2	1.1	3.7	2,010	8E+03	5E+03	3E+03
30J006	232	675	25	177	8	5	1.3	0.2	1.0	338	9E+02	3E+03	3E+03

Table C2-14. Scenario 3.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	64	174	7	93	2	1	0.5	0.1	0.5	86	1E+02	7E+02	7E+02
30J030	706	1,515	38	155	17	6	1.7	0.2	2.6	786	5E+02	5E+02	9E+02
30P107	346	1,824	67	104	6	10	0.9	0.5	1.6	926	4E+03	3E+03	2E+03
30P062	299	1,980	52	53	5	7	0.6	0.6	1.8	980	4E+03	2E+03	1E+03
31O004	1,018	6,122	216	149	18	32	2.3	1.4	4.7	3,006	1E+04	1E+04	7E+03
31P084	313	1,942	50	77	4	6	0.6	0.5	1.9	960	4E+03	2E+03	1E+03
3FDO159	320	1,377	60	493	14	7	2.7	0.5	1.6	665	2E+03	2E+03	2E+03
11G318/319	352	980	73	738	13	36	3.4	0.5	2.4	396	4E+03	7E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,687	5,863	131	79	54	75	3.5	0.9	5.8	2,734	3E+04	5E+04	5E+04
21H047	522	1,980	34	75	15	16	1.7	1.7	7.1	828	2E+03	2E+03	2E+03
21H039	1,501	4,708	66	315	44	47	5.2	5.5	23.9	1,883	4E+03	4E+03	5E+03
20G161	2,611	11,111	314	228	68	62	7.4	5.3	22.5	5,077	2E+04	2E+04	2E+04
StonyMWRA	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
Fens	71,694	226,121	11,574	17,688	4,591	2,103	534.0	96.0	291.8	114,787	3E+05	2E+05	2E+05
20D055	5,714	37,008	984	474	121	131	13.1	10.6	35.0	18,012	7E+04	4E+04	3E+04
21D319	7,584	50,096	1,316	832	146	175	16.8	14.2	46.6	24,420	1E+05	6E+04	4E+04

Table C2-15. Scenario 3.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,017	4,105	144	911	29	20	5.4	1.3	5.5	2,080	5E+03	4E+03	3E+03
1FDO31	842	3,987	109	197	19	19	2.2	1.0	3.9	1,943	7E+03	5E+03	5E+03
02E086	268	1,121	44	326	11	5	1.9	0.4	1.3	541	2E+03	1E+03	1E+03
2FDO120	1,435	7,205	208	585	34	32	4.9	1.9	8.4	3,578	1E+04	8E+03	8E+03
2FDO93	1,576	11,119	271	111	19	36	2.4	3.0	10.0	5,416	2E+04	1E+04	8E+03
2FDO85	100	467	13	30	3	2	0.3	0.1	0.4	229	7E+02	5E+02	4E+02
3ESDO186	333	1,523	66	564	14	8	2.9	0.7	1.8	741	2E+03	2E+03	1E+03
3ESDO185	611	2,779	110	361	15	13	2.5	0.8	2.7	1,442	6E+03	4E+03	3E+03
3F162	547	2,679	98	505	25	11	3.7	0.9	2.6	1,268	4E+03	3E+03	3E+03
4ESDO69	1,665	7,871	255	973	43	39	6.8	2.5	9.2	3,925	1E+04	1E+04	9E+03
4ESDO64	40	134	8	92	2	1	0.5	0.1	0.2	63	2E+02	3E+02	4E+02
4FDO189	794	4,500	124	175	20	15	2.3	1.2	4.3	2,197	8E+03	5E+03	4E+03
4FDO204	920	4,753	150	509	32	18	4.3	1.4	4.3	2,287	8E+03	5E+03	4E+03
4FDO16	431	2,467	68	86	11	11	1.2	0.7	2.3	1,190	5E+03	3E+03	3E+03
4FDO203	134	589	24	184	6	3	1.1	0.2	0.6	283	9E+02	8E+02	7E+02
4FDO118	613	3,494	91	111	11	15	1.3	0.9	3.3	1,712	6E+03	5E+03	3E+03
4FDO119	1,310	5,331	139	45	23	36	3.0	0.8	10.4	2,844	4E+03	5E+03	4E+03
5CSDO110	789	2,715	131	761	32	23	5.1	1.0	3.2	1,404	6E+03	5E+03	7E+03
5EDO182	111	533	32	376	6	3	1.7	0.3	0.8	261	8E+02	5E+02	4E+02
5ESDO184	658	2,965	146	1,479	31	15	7.1	1.4	3.7	1,451	5E+03	4E+03	3E+03
5FDO117	823	4,194	148	772	32	17	5.1	1.4	4.2	2,014	7E+03	4E+03	4E+03
5FDO254	58	364	9	12	1	1	0.1	0.1	0.4	181	6E+02	4E+02	2E+02
5FDO265	20	40	1	3	0	0	0.0	0.0	0.1	22	2E+01	1E+01	3E+01
5FDO253	657	3,503	99	174	17	16	2.0	1.0	3.3	1,692	7E+03	4E+03	4E+03
5FDO245	1,419	8,473	227	356	27	30	3.6	2.4	8.3	4,177	1E+04	9E+03	6E+03
5FDO244	243	1,252	33	55	5	5	0.6	0.3	1.7	624	2E+03	1E+03	1E+03
5FDO264	19	53	2	6	0	2	0.0	0.0	0.1	22	2E+02	4E+02	4E+02
5GDO112	966	5,900	151	167	17	22	2.1	1.9	6.6	2,883	1E+04	7E+03	4E+03
5GDO116A	838	4,761	136	451	16	16	2.8	1.5	4.6	2,373	8E+03	5E+03	3E+03
5GDO115	248	1,520	40	38	5	6	0.6	0.4	1.5	745	3E+03	2E+03	1E+03
5GDO116	755	4,400	116	126	17	15	1.9	1.2	4.0	2,133	8E+03	5E+03	3E+03
6DDO57	141	549	23	194	6	2	1.1	0.2	0.6	266	8E+02	1E+03	1E+03
6DDO184	7	19	13	239	3	1	1.0	0.1	0.2	7	3E+01	5E+00	5E+01
6DDO91	10	24	27	526	6	2	2.2	0.3	0.5	9	3E+01	6E+00	5E+01
6DDO187	80	251	11	56	2	6	0.4	0.1	0.4	107	8E+02	1E+03	1E+03
6DDO86	7	21	5	80	1	0	0.4	0.0	0.1	7	3E+01	7E+00	5E+01
6DDO85	40	202	8	50	2	1	0.4	0.1	0.2	93	3E+02	2E+02	2E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	9	38	2	19	1	0	0.1	0.0	0.0	16	6E+01	3E+01	6E+01
06D097	54	165	14	144	6	1	0.9	0.1	0.2	62	3E+02	8E+01	5E+02
6GDO109	1,512	8,370	227	270	42	30	4.5	2.3	7.5	4,015	2E+04	9E+03	9E+03
6GDO110	1,871	11,214	302	383	43	39	5.1	3.1	10.0	5,459	2E+04	1E+04	9E+03
6GDO111	273	1,223	62	609	14	6	3.1	0.6	1.6	588	2E+03	1E+03	1E+03
6GDO166	153	564	41	550	10	4	2.5	0.4	1.0	273	8E+02	5E+02	6E+02
6GDO108	4,899	28,881	772	945	111	106	13.0	7.9	26.2	14,021	5E+04	3E+04	3E+04
6G165	29	120	5	54	1	1	0.2	0.1	0.1	60	2E+02	1E+02	9E+01
6HDO43	87	436	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	223	1,041	35	179	7	4	1.2	0.3	1.0	511	2E+03	1E+03	7E+02

Table C2-15. Scenario 3.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	537	2,790	89	411	16	11	2.6	0.9	2.8	1,362	5E+03	3E+03	2E+03
7CDO006	6,135	28,976	1,088	7,687	196	134	40.4	11.0	33.0	14,315	5E+04	4E+04	4E+04
7HDO285	6,266	31,144	938	2,408	210	127	25.5	8.8	31.6	14,955	6E+04	4E+04	4E+04
7HDO105	9,164	48,039	1,556	6,545	299	208	46.2	15.2	47.3	23,178	9E+04	6E+04	7E+04
7HDO348	50	331	8	10	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
7HDO347	341	1,785	55	199	11	7	1.6	0.5	1.7	864	3E+03	2E+03	2E+03
7HDO346	323	2,039	53	68	5	7	0.7	0.6	1.8	998	4E+03	2E+03	1E+03
8BDO122	1,570	8,936	223	295	30	41	3.8	3.4	12.7	4,276	2E+04	1E+04	8E+03
8BDO66	2	4	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	9E-01
8BDO126	887	5,703	145	134	12	19	1.6	1.6	5.5	2,814	1E+04	6E+03	3E+03
8CDO25	197	653	44	482	10	5	2.4	0.4	1.1	345	2E+03	1E+03	2E+03
8CDO26	184	647	41	414	8	5	2.0	0.4	1.0	345	2E+03	1E+03	2E+03
8DDO112	33	200	5	7	1	1	0.1	0.1	0.2	97	4E+02	4E+02	3E+02
8DSDO100	84	272	15	174	3	4	0.8	0.1	0.4	132	6E+02	1E+03	1E+03
8EDO35	131	369	30	452	8	2	2.0	0.3	0.6	184	4E+02	2E+03	2E+03
8EDO33	487	3,057	87	251	9	11	1.6	0.9	2.9	1,507	5E+03	3E+03	2E+03
8IDO153	39	257	6	4	0	1	0.1	0.1	0.2	127	5E+02	3E+02	1E+02
8IDO155	26	99	5	58	1	0	0.3	0.0	0.1	50	2E+02	3E+02	3E+02
8IDO156	333	714	47	585	19	4	3.3	0.3	0.8	311	5E+02	1E+02	8E+02
8IDO209	114	732	19	18	1	2	0.2	0.2	0.7	363	1E+03	9E+02	5E+02
8IDO154	883	4,947	139	290	22	22	2.9	1.5	5.0	2,385	9E+03	7E+03	6E+03
8IDO158	404	2,436	66	134	8	9	1.2	0.8	2.8	1,194	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,217	7,687	198	236	23	28	2.9	2.4	8.6	3,736	1E+04	9E+03	5E+03
8JSDO103	991	5,963	166	323	22	21	3.0	1.7	5.6	2,923	1E+04	6E+03	4E+03
8JSDO41	566	3,621	95	114	10	13	1.4	1.1	3.6	1,769	6E+03	4E+03	2E+03
8JSDO50	1,268	6,703	188	415	37	28	4.5	2.2	7.6	3,208	1E+04	9E+03	7E+03
8K049	168	1,000	29	64	5	4	0.6	0.3	0.9	483	2E+03	1E+03	9E+02
9BDO49	344	953	35	145	6	23	1.0	0.2	1.6	430	3E+03	7E+03	7E+03
9EDO229	61	307	9	23	2	1	0.2	0.1	0.3	147	5E+02	3E+02	3E+02
9EDO243	175	616	24	184	7	3	1.1	0.2	0.6	296	1E+03	2E+03	2E+03
9K100	54	145	8	62	2	5	0.3	0.0	0.3	59	6E+02	1E+03	1E+03
9K101	651	2,389	106	879	25	20	4.8	0.9	2.9	1,136	5E+03	6E+03	6E+03
9K016	65	198	29	463	7	3	2.1	0.3	0.6	89	3E+02	4E+02	5E+02
9LSDO095	231	888	40	336	7	10	1.6	0.4	1.2	429	2E+03	2E+03	3E+03
10BSDO62	31	57	1	1	1	0	0.0	0.0	0.1	30	7E+00	5E-01	1E+01
10BSDO15	36	89	3	10	1	1	0.1	0.0	0.2	45	2E+02	5E+02	5E+02
10BSDO64	124	363	16	86	4	3	0.6	0.1	0.7	251	5E+02	6E+02	8E+02
10L094	14,323	80,028	2,197	4,543	311	315	41.6	23.4	80.6	39,037	1E+05	9E+04	8E+04
10L096	1,596	9,752	265	281	27	61	3.5	2.7	9.8	4,677	2E+04	2E+04	1E+04
11BDO28	13,955	65,984	2,704	21,708	478	384	107.5	26.5	78.2	32,437	1E+05	9E+04	8E+04
11BDO123	2,677	14,227	406	742	65	70	8.0	3.9	13.3	6,870	3E+04	2E+04	2E+04
11IDO577	35,921	184,307	5,838	12,948	1,642	858	185.1	53.6	175.9	84,437	3E+05	2E+05	2E+05
11M093	1,121	4,124	168	744	34	21	5.3	1.3	5.0	2,208	9E+03	6E+03	7E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,994	54,440	1,634	6,028	221	235	37.9	16.8	53.5	26,808	1E+05	7E+04	6E+04
12EDO418	225	1,014	36	83	4	4	0.6	0.3	0.9	538	2E+03	2E+03	1E+03

Table C2-15. Scenario 3.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	150	744	22	83	3	2	0.5	0.2	0.7	369	1E+03	1E+03	8E+02
12HOFDO92	1,008	2,809	430	2,879	110	147	23.6	3.4	13.1	2,621	4E+03	8E+03	1E+04
12HDO85/87	474	1,416	73	468	15	46	2.7	0.4	2.8	569	6E+03	1E+04	1E+04
12L092	2,308	10,531	338	1,060	81	46	10.2	3.2	11.0	5,049	2E+04	1E+04	1E+04
12LDO296	505	2,406	73	268	13	9	2.0	0.7	2.7	1,193	4E+03	2E+03	2E+03
12M091	357	1,292	55	281	10	7	1.7	0.4	1.5	697	3E+03	2E+03	2E+03
13DSDO078	1,809	5,488	228	1,515	90	28	11.9	1.6	4.5	2,491	8E+03	6E+03	1E+04
13EDO177	54	116	10	162	3	1	0.8	0.1	0.2	57	8E+01	4E+02	4E+02
13EDO174	1,316	7,430	196	397	22	24	3.1	2.2	6.9	3,682	1E+04	9E+03	6E+03
13EDO176	38	90	5	77	2	1	0.4	0.1	0.2	44	6E+01	3E+02	3E+02
13FDO95	10	23	2	27	0	0	0.1	0.0	0.0	12	3E+01	1E+02	1E+02
13FDO011	25	47	1	1	1	0	0.0	0.0	0.0	24	2E+01	1E+02	1E+02
13F093	108	285	9	106	3	3	0.6	0.2	1.0	130	4E+02	1E+03	2E+03
13L090	33,863	163,142	5,214	5,935	1,774	755	173.5	40.7	141.2	73,487	3E+05	2E+05	2E+05
14CDO9	789	4,633	164	880	27	23	5.2	1.6	4.8	2,215	9E+03	6E+03	5E+03
15FSDO288	2,064	10,465	330	1,696	50	38	9.4	3.5	10.7	5,184	2E+04	2E+04	2E+04
15L089	13,786	62,795	2,100	5,029	643	305	71.7	16.8	59.1	29,241	1E+05	6E+04	9E+04
15L088	6,753	41,660	1,071	264	132	182	14.2	11.3	44.5	20,275	8E+04	5E+04	4E+04
16L097	560	1,735	71	616	19	36	3.6	1.4	6.2	718	4E+03	7E+03	8E+03
16LSDO122	8,525	43,975	1,326	2,539	277	272	32.8	11.8	46.0	20,768	9E+04	6E+04	7E+04
17M033	5,610	27,521	788	1,861	124	294	17.8	11.4	50.7	12,618	6E+04	6E+04	6E+04
18GSDO233	4,249	18,974	543	541	80	138	9.0	4.9	23.9	8,576	6E+04	7E+04	7E+04
19GDO043	5,152	33,826	848	344	98	121	10.7	9.9	33.5	16,248	7E+04	4E+04	3E+04
19GDO194	443	2,291	70	168	17	10	2.1	0.8	2.7	1,085	4E+03	3E+03	3E+03
19G199	63	186	2	2	1	1	0.1	0.2	0.8	81	1E+02	7E+02	7E+02
20G163	330	1,309	10	23	8	9	1.1	1.9	8.4	501	1E+03	4E+03	4E+03
20L083	216	938	26	8	4	9	0.7	0.1	2.1	507	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	64	2	5	1	0	0.1	0.0	0.1	30	1E+02	7E+01	9E+01
21H048	133	399	5	4	3	3	0.3	0.4	1.7	173	3E+02	3E+02	3E+02
21KSDO069	9,010	51,713	1,352	933	223	283	24.2	15.7	62.8	24,324	1E+05	8E+04	6E+04
21M005	152	438	12	38	3	3	0.4	0.1	0.9	234	2E+02	3E+02	3E+02
21M010	930	3,167	83	71	19	24	2.3	0.4	7.2	1,700	2E+03	2E+03	3E+03
21M050	436	1,255	30	21	9	8	0.9	0.2	2.9	670	1E+03	8E+02	2E+03
22CDO384	2,574	9,722	377	1,802	133	52	16.6	2.8	8.3	4,387	2E+04	9E+03	1E+04
22LSDO580	1,224	4,614	128	85	24	34	3.3	0.7	12.5	2,560	3E+03	3E+03	4E+03
23GDO132	4,511	9,627	269	2,141	126	64	15.8	3.8	16.7	4,461	7E+03	9E+03	1E+04
23HSDO042	18,431	80,175	2,738	4,911	886	560	99.1	26.2	103.7	36,986	1E+05	1E+05	1E+05
23HDO040	2,880	17,284	439	305	62	80	6.8	4.9	18.5	8,172	4E+04	2E+04	2E+04
23L196	140	281	7	36	4	1	0.4	0.1	0.7	141	1E+02	4E+01	2E+02
23L075	635	1,567	48	213	18	7	2.1	0.3	3.4	830	2E+03	7E+02	3E+03
23L074	138	295	7	22	4	1	0.3	0.0	0.4	154	9E+01	6E+01	1E+02
23L195	146	279	9	74	4	1	0.5	0.1	0.7	150	2E+02	6E+01	3E+02
23L202	149	287	7	36	4	0	0.3	0.1	0.7	155	3E+02	5E+01	6E+02
23L016	115	230	6	35	3	0	0.3	0.0	0.5	126	4E+02	7E+01	7E+02
23L015	159	275	11	133	5	1	0.7	0.1	0.5	139	3E+01	4E+01	5E+01
23L164	897	2,237	73	98	22	45	2.0	0.3	4.9	1,021	8E+03	1E+04	1E+04
24CSDO031	299	1,878	50	55	4	6	0.6	0.5	1.9	938	4E+03	2E+03	1E+03

Table C2-15. Scenario 3.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,655	8,561	277	1,077	44	27	7.2	2.7	9.1	4,179	2E+04	2E+04	1E+04
24DSDO150	33	79	3	23	1	0	0.1	0.0	0.1	43	7E+01	5E+02	6E+02
24DSDO032	21,436	118,168	3,940	8,267	760	299	95.5	38.2	126.0	63,736	2E+05	1E+05	1E+05
24GSDO035	24,765	144,403	3,692	4,253	424	650	52.8	41.9	154.2	69,916	3E+05	2E+05	1E+05
24GSDO034	1,728	6,591	172	902	41	26	5.9	2.6	11.4	3,234	1E+04	2E+04	2E+04
24L233	438	1,299	33	87	23	12	2.3	1.1	5.2	499	1E+03	9E+02	3E+03
25DDO040	557	2,754	80	206	12	19	1.7	1.0	4.4	1,332	5E+03	4E+03	4E+03
25EDO037	14,242	75,472	1,998	3,339	284	226	36.6	23.3	95.2	36,442	1E+05	1E+05	9E+04
25GDO041	74	254	9	31	6	3	0.6	0.2	1.0	87	3E+02	2E+02	6E+02
25GDO-06	239	655	18	217	9	7	1.4	0.8	3.6	274	3E+02	4E+02	5E+02
26J049	7,584	21,231	817	699	550	157	48.6	5.5	29.2	8,040	3E+04	1E+04	6E+04
25L144	554	3,765	91	10	13	14	1.3	1.0	3.4	1,752	8E+03	5E+03	3E+03
25L058	4,579	24,640	635	492	88	164	9.7	6.8	28.7	11,611	6E+04	5E+04	4E+04
26FDO038	54	157	14	134	7	2	1.0	0.1	0.2	50	3E+02	5E+01	6E+02
26GSDO01	3,759	17,350	507	1,917	125	88	16.9	7.8	29.5	8,150	3E+04	2E+04	2E+04
26JSDO052	40	76	4	65	2	0	0.3	0.1	0.2	37	1E+01	2E+01	2E+01
26JSDO100	158	420	22	79	14	3	1.5	0.1	0.2	146	7E+02	1E+02	1E+03
26J101	440	1,060	63	499	32	9	4.2	0.4	1.2	407	2E+03	7E+02	3E+03
26KSDO254	335	1,151	44	113	5	33	0.9	0.2	2.6	505	5E+03	7E+03	8E+03
26K035	193	410	11	32	5	1	0.5	0.1	1.1	222	5E+02	8E+01	9E+02
26K099	12,816	82,526	1,967	780	172	366	20.4	24.0	88.8	39,397	2E+05	1E+05	8E+04
26L055	176	1,025	28	12	7	4	0.6	0.3	0.8	473	2E+03	1E+03	1E+03
26LSDO084	70	206	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	213	365	5	21	4	0	0.3	0.0	0.1	183	8E+01	2E+01	2E+02
27JSDO044	383	762	29	359	12	6	2.0	0.5	2.2	359	4E+02	6E+02	6E+02
27JSDO096	2,084	4,195	94	316	55	15	4.5	0.6	4.8	2,085	2E+03	4E+03	5E+03
27JSDO001	7,915	45,680	1,142	1,510	134	257	18.0	13.9	56.5	21,583	1E+05	7E+04	5E+04
27L022	2,268	13,735	326	289	44	65	5.4	5.3	20.0	6,451	3E+04	2E+04	1E+04
27L020	2,146	12,875	306	287	43	61	5.2	5.0	18.7	6,025	2E+04	2E+04	1E+04
28K061	4,483	29,035	733	364	67	137	8.0	8.0	28.1	13,896	6E+04	4E+04	3E+04
28K010	3,960	27,411	669	247	49	104	6.0	7.6	25.7	13,235	6E+04	4E+04	2E+04
28K386	686	1,694	58	366	18	21	2.6	0.6	3.9	825	2E+03	3E+03	3E+03
28L073	76	228	9	72	5	1	0.6	0.1	0.1	104	4E+02	2E+03	2E+03
28L074/5/6	1,233	3,627	109	705	51	22	6.3	2.2	9.0	1,605	5E+03	7E+03	1E+04
28N156	325	1,838	53	114	6	12	0.9	0.5	1.9	893	4E+03	3E+03	2E+03
28N207	3,289	20,084	520	449	65	97	7.7	6.1	21.7	9,590	4E+04	3E+04	2E+04
28O025	52	240	9	20	1	2	0.2	0.1	0.2	122	7E+02	5E+02	6E+02
28P001	313	2,083	52	26	5	7	0.5	0.6	1.9	1,021	4E+03	2E+03	1E+03
29J129	167	306	13	144	5	3	0.8	0.1	0.5	149	2E+02	4E+02	4E+02
29J029	363	943	41	181	7	31	1.1	0.2	1.9	391	4E+03	6E+03	7E+03
29J212	17,600	113,906	2,768	1,081	253	531	30.4	32.9	124.5	54,462	2E+05	2E+05	1E+05
29M049	1,284	7,095	196	182	36	46	3.9	2.0	7.5	3,286	2E+04	1E+04	1E+04
29N015	130	580	18	28	2	6	0.5	0.1	1.4	318	3E+02	5E+02	5E+02
29N135	420	2,331	63	146	7	10	1.2	0.7	2.7	1,152	4E+03	3E+03	2E+03
29O001	11,560	71,503	1,911	2,329	233	296	29.5	20.3	70.2	34,627	1E+05	9E+04	6E+04
29P015	79	530	14	13	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	612	4,112	106	80	10	14	1.2	1.1	3.7	2,010	8E+03	5E+03	3E+03
30J006	232	675	25	177	8	5	1.3	0.2	1.0	338	9E+02	3E+03	3E+03

Table C2-15. Scenario 3.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	64	174	7	93	2	1	0.5	0.1	0.5	86	1E+02	7E+02	7E+02
30J030	706	1,515	38	155	17	6	1.7	0.2	2.6	786	5E+02	5E+02	9E+02
30P107	346	1,824	67	104	6	10	0.9	0.5	1.6	926	4E+03	3E+03	2E+03
30P062	299	1,980	52	53	5	7	0.6	0.6	1.8	980	4E+03	2E+03	1E+03
31O004	1,018	6,122	216	149	18	32	2.3	1.4	4.7	3,006	1E+04	1E+04	7E+03
31P084	313	1,942	50	77	4	6	0.6	0.5	1.9	960	4E+03	2E+03	1E+03
3FDO159	320	1,377	60	493	14	7	2.7	0.5	1.6	665	2E+03	2E+03	2E+03
11G318/319	352	980	73	738	13	36	3.4	0.5	2.4	396	4E+03	7E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,789	6,065	135	82	56	76	3.6	0.9	5.9	2,830	3E+04	5E+04	5E+04
21H047	522	1,980	34	75	15	16	1.7	1.7	7.1	828	2E+03	2E+03	2E+03
21H039	1,501	4,708	66	315	44	47	5.2	5.5	23.9	1,883	4E+03	4E+03	5E+03
20G161	2,611	11,111	314	228	68	57	7.4	5.3	22.5	5,077	2E+04	2E+04	2E+04
StonyMWRA	117,139	549,907	19,217	69,115	4,868	3,183	671.2	194.0	656.9	264,849	1E+06	6E+05	8E+05
Fens	71,694	226,121	11,574	17,688	4,591	2,094	534.0	96.0	291.8	114,787	3E+05	2E+05	2E+05
20D055	5,714	37,008	984	474	121	131	13.1	10.6	35.0	18,012	7E+04	4E+04	3E+04
21D319	7,584	50,096	1,316	832	146	175	16.8	14.2	46.6	24,420	1E+05	6E+04	4E+04

Table C2-16. Scenario 4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	984	3,950	141	917	29	19	5.3	1.2	5.3	2,001	5E+03	4E+03	3E+03
1FDO31	805	3,775	104	198	19	18	2.2	1.0	3.7	1,839	7E+03	5E+03	4E+03
02E086	258	1,066	43	328	10	5	1.9	0.4	1.2	515	2E+03	1E+03	1E+03
2FDO120	1,376	6,862	201	592	33	30	4.9	1.9	8.0	3,407	1E+04	8E+03	7E+03
2FDO93	1,534	10,825	264	112	18	36	2.3	2.9	9.8	5,273	2E+04	1E+04	8E+03
2FDO85	97	450	13	34	3	1	0.3	0.1	0.4	220	7E+02	5E+02	4E+02
3ESDO186	319	1,440	64	565	14	7	2.9	0.6	1.8	700	2E+03	2E+03	1E+03
3ESDO185	586	2,646	105	364	15	13	2.5	0.8	2.6	1,373	6E+03	3E+03	3E+03
3F162	527	2,551	95	505	24	11	3.7	0.8	2.4	1,204	4E+03	3E+03	3E+03
4ESDO69	1,599	7,503	246	981	42	37	6.8	2.4	8.8	3,741	1E+04	9E+03	9E+03
4ESDO64	39	127	8	92	2	1	0.5	0.1	0.2	60	2E+02	3E+02	3E+02
4FDO189	753	4,224	117	177	20	15	2.3	1.2	4.0	2,059	7E+03	4E+03	3E+03
4FDO204	884	4,525	144	510	31	17	4.3	1.3	4.1	2,173	8E+03	5E+03	4E+03
4FDO16	413	2,349	66	87	11	10	1.2	0.6	2.2	1,132	4E+03	3E+03	3E+03
4FDO203	128	557	24	185	6	3	1.1	0.2	0.6	267	9E+02	7E+02	7E+02
4FDO118	587	3,333	87	113	10	14	1.3	0.9	3.1	1,634	6E+03	4E+03	3E+03
4FDO119	1,273	5,184	136	45	22	35	2.9	0.8	10.2	2,768	4E+03	4E+03	4E+03
5CSDO110	752	2,569	127	766	31	22	5.1	1.0	3.1	1,325	6E+03	5E+03	6E+03
5EDO182	106	501	31	376	6	3	1.7	0.3	0.8	245	8E+02	5E+02	4E+02
5ESDO184	631	2,815	143	1,483	30	14	7.1	1.4	3.6	1,376	4E+03	3E+03	3E+03
5FDO117	783	3,937	142	774	32	16	5.1	1.3	3.9	1,885	7E+03	4E+03	4E+03
5FDO254	55	348	9	12	1	1	0.1	0.1	0.4	174	6E+02	4E+02	2E+02
5FDO265	19	38	1	3	0	0	0.0	0.0	0.1	21	2E+01	1E+01	3E+01
5FDO253	628	3,313	94	175	16	15	2.0	0.9	3.1	1,597	6E+03	4E+03	4E+03
5FDO245	1,359	8,076	218	360	27	28	3.6	2.3	7.9	3,981	1E+04	9E+03	6E+03
5FDO244	235	1,214	32	56	5	5	0.6	0.3	1.6	605	2E+03	1E+03	9E+02
5FDO264	18	51	2	6	0	2	0.0	0.0	0.1	21	2E+02	4E+02	4E+02
5GDO112	925	5,627	144	169	17	21	2.1	1.8	6.3	2,749	1E+04	6E+03	4E+03
5GDO116A	786	4,425	129	454	15	15	2.7	1.4	4.3	2,206	7E+03	5E+03	2E+03
5GDO115	241	1,474	39	39	5	6	0.6	0.4	1.5	722	3E+03	2E+03	1E+03
5GDO116	725	4,198	111	128	17	14	1.9	1.1	3.8	2,034	7E+03	4E+03	3E+03
6DDO57	135	519	23	196	6	2	1.1	0.2	0.5	251	7E+02	1E+03	1E+03
6DDO184	8	22	13	238	3	1	1.0	0.1	0.2	8	3E+01	7E+00	5E+01
6DDO91	13	29	27	525	6	2	2.2	0.3	0.5	12	3E+01	1E+01	6E+01
6DDO187	76	237	11	56	2	6	0.4	0.1	0.4	100	8E+02	1E+03	1E+03
6DDO86	9	25	5	80	1	0	0.4	0.0	0.1	10	3E+01	1E+01	5E+01
6DDO85	42	219	9	49	2	1	0.4	0.1	0.2	102	4E+02	2E+02	2E+02
6DDO83	175	805	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	10	44	2	19	1	0	0.1	0.0	0.0	19	7E+01	3E+01	6E+01
06D097	69	227	15	141	6	2	0.9	0.1	0.2	93	4E+02	2E+02	5E+02
6GDO109	1,434	7,871	215	275	41	28	4.4	2.2	7.0	3,771	2E+04	8E+03	9E+03
6GDO110	1,778	10,582	287	389	42	37	5.0	2.9	9.4	5,146	2E+04	1E+04	8E+03
6GDO111	261	1,150	60	610	14	6	3.1	0.6	1.5	552	2E+03	1E+03	9E+02
6GDO166	146	532	40	551	9	4	2.5	0.4	0.9	257	8E+02	4E+02	5E+02
6GDO108	4,708	27,639	744	958	109	102	12.9	7.6	25.1	13,419	5E+04	3E+04	2E+04
6G165	27	113	5	54	1	1	0.2	0.1	0.1	56	2E+02	1E+02	9E+01
6HDO43	87	435	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	214	986	34	180	7	4	1.2	0.3	0.9	483	2E+03	9E+02	7E+02

Table C2-16. Scenario 4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	530	2,753	88	412	15	11	2.6	0.9	2.8	1,343	5E+03	3E+03	2E+03
7CDO006	5,844	27,315	1,050	7,716	193	128	40.2	10.5	31.5	13,485	5E+04	4E+04	4E+04
7HDO285	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
7HDO105	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
7HDO348	48	318	8	10	0	1	0.1	0.1	0.3	159	6E+02	4E+02	2E+02
7HDO347	336	1,754	55	200	11	7	1.6	0.5	1.6	848	3E+03	2E+03	2E+03
7HDO346	320	2,019	52	68	5	7	0.7	0.6	1.8	988	4E+03	2E+03	1E+03
8BDO122	1,495	8,466	212	299	29	38	3.7	3.2	12.0	4,052	2E+04	1E+04	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	8E-01
8BDO126	850	5,437	138	135	12	18	1.5	1.6	5.2	2,683	1E+04	6E+03	3E+03
8CDO25	188	617	43	483	10	5	2.4	0.4	1.0	325	1E+03	1E+03	2E+03
8CDO26	175	610	40	415	8	5	2.0	0.4	1.0	325	1E+03	1E+03	2E+03
8DDO112	33	197	5	8	1	1	0.1	0.1	0.2	95	4E+02	4E+02	3E+02
8DSDO100	80	257	15	175	3	3	0.8	0.1	0.4	125	5E+02	1E+03	1E+03
8EDO35	126	353	30	453	8	2	2.0	0.3	0.6	176	4E+02	2E+03	2E+03
8EDO33	461	2,879	83	252	9	10	1.6	0.9	2.8	1,419	5E+03	3E+03	2E+03
8IDO153	37	244	6	4	0	1	0.1	0.1	0.2	120	4E+02	3E+02	1E+02
8IDO155	25	93	5	58	1	0	0.3	0.0	0.1	47	1E+02	3E+02	3E+02
8IDO156	324	697	47	587	19	4	3.3	0.3	0.8	302	5E+02	1E+02	8E+02
8IDO209	115	742	19	18	1	2	0.2	0.2	0.7	367	1E+03	9E+02	5E+02
8IDO154	836	4,634	132	292	22	21	2.9	1.4	4.7	2,231	8E+03	6E+03	5E+03
8IDO158	386	2,318	63	135	8	9	1.2	0.8	2.6	1,136	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,177	7,408	192	237	22	27	2.9	2.3	8.3	3,600	1E+04	8E+03	5E+03
8JSDO103	942	5,623	158	325	22	20	3.0	1.6	5.3	2,754	1E+04	6E+03	4E+03
8JSDO41	534	3,394	90	114	10	12	1.3	1.0	3.4	1,656	6E+03	4E+03	2E+03
8JSDO50	1,214	6,366	180	419	36	26	4.5	2.1	7.2	3,042	1E+04	8E+03	7E+03
8K049	161	954	28	64	4	3	0.6	0.3	0.9	460	2E+03	1E+03	8E+02
9BDO49	329	908	34	147	6	22	1.0	0.2	1.5	411	3E+03	7E+03	7E+03
9EDO229	58	290	9	23	2	1	0.2	0.1	0.2	138	5E+02	3E+02	3E+02
9EDO243	167	584	24	188	7	3	1.1	0.2	0.6	281	1E+03	1E+03	2E+03
9K100	51	138	8	63	2	5	0.3	0.0	0.3	57	6E+02	9E+02	1E+03
9K101	622	2,257	102	883	25	19	4.8	0.9	2.8	1,071	4E+03	5E+03	6E+03
9K016	63	189	29	463	7	3	2.1	0.3	0.6	85	3E+02	4E+02	5E+02
9LSDO095	221	841	38	337	7	10	1.6	0.3	1.2	407	2E+03	2E+03	2E+03
10BSDO62	30	55	1	1	1	0	0.0	0.0	0.1	29	7E+00	5E-01	1E+01
10BSDO15	34	85	3	10	1	1	0.1	0.0	0.2	43	2E+02	4E+02	5E+02
10BSDO64	119	344	15	88	4	3	0.6	0.1	0.7	238	5E+02	6E+02	7E+02
10L094	13,632	75,766	2,096	4,587	303	299	41.0	22.3	76.6	36,950	1E+05	9E+04	8E+04
10L096	1,508	9,157	250	282	26	57	3.5	2.5	9.2	4,389	2E+04	2E+04	1E+04
11BDO28	13,051	60,377	2,573	21,774	469	362	106.9	25.0	73.1	29,674	1E+05	8E+04	7E+04
11BDO123	2,543	13,426	387	753	63	66	7.8	3.7	12.5	6,481	3E+04	2E+04	2E+04
11IDO577	34,598	176,003	5,645	13,022	1,623	825	183.5	51.2	167.6	80,469	3E+05	2E+05	2E+05
11M093	1,077	3,952	162	749	33	21	5.2	1.3	4.8	2,113	9E+03	6E+03	7E+03
12BDO10	12	29	2	19	0	1	0.1	0.0	0.1	13	9E+01	2E+02	2E+02
12BDO14	28	69	4	41	1	2	0.2	0.0	0.1	30	2E+02	4E+02	4E+02
12BDO124	9,142	49,090	1,509	6,092	213	214	37.2	15.4	48.8	24,177	9E+04	6E+04	5E+04
12EDO418	214	953	34	83	4	4	0.6	0.3	0.9	506	2E+03	2E+03	1E+03

Table C2-16. Scenario 4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	143	699	21	83	3	2	0.5	0.2	0.6	347	1E+03	1E+03	8E+02
12HOFDO92	972	2,697	421	2,884	109	139	23.6	3.4	12.6	2,505	4E+03	8E+03	1E+04
12HDO85/87	455	1,352	71	471	14	43	2.7	0.4	2.7	543	6E+03	1E+04	1E+04
12L092	2,211	9,994	324	1,068	80	44	10.1	3.1	10.4	4,783	2E+04	1E+04	1E+04
12LDO296	484	2,292	71	270	13	9	2.0	0.7	2.6	1,136	4E+03	2E+03	2E+03
12M091	342	1,227	53	282	10	7	1.7	0.4	1.4	662	3E+03	2E+03	2E+03
13DSDO078	1,786	5,354	225	1,518	90	27	11.8	1.6	4.4	2,425	8E+03	6E+03	1E+04
13EDO177	53	112	10	162	3	1	0.7	0.1	0.2	54	8E+01	3E+02	4E+02
13EDO174	1,250	7,000	187	401	21	23	3.1	2.0	6.6	3,472	1E+04	9E+03	5E+03
13EDO176	37	86	5	77	2	1	0.4	0.1	0.2	42	6E+01	3E+02	3E+02
13FDO95	10	22	2	27	0	0	0.1	0.0	0.0	11	3E+01	1E+02	1E+02
13FDO011	24	45	1	1	1	0	0.0	0.0	0.0	23	2E+01	1E+02	1E+02
13F093	104	271	9	107	3	2	0.6	0.2	0.9	124	4E+02	1E+03	1E+03
13L090	32,731	156,234	5,047	5,996	1,753	727	171.7	38.8	134.6	70,195	3E+05	1E+05	2E+05
14CDO9	756	4,411	159	882	27	22	5.2	1.5	4.6	2,108	9E+03	6E+03	5E+03
15FSDO288	1,981	9,928	318	1,710	50	37	9.4	3.4	10.2	4,916	2E+04	1E+04	2E+04
15L089	13,382	60,715	2,048	5,090	633	296	71.0	16.3	57.2	28,234	1E+05	6E+04	8E+04
15L088	6,305	39,286	1,002	251	112	170	12.3	10.8	42.4	19,195	7E+04	5E+04	3E+04
16L097	535	1,648	69	618	18	34	3.6	1.3	5.9	683	4E+03	7E+03	7E+03
16LSDO122	8,311	42,777	1,299	2,557	273	266	32.5	11.5	44.9	20,194	9E+04	6E+04	7E+04
17M033	5,478	26,882	774	1,872	123	287	17.7	11.2	49.5	12,331	6E+04	6E+04	6E+04
18GSDO233	4,531	20,430	585	551	81	284	9.3	5.3	26.1	9,215	6E+04	7E+04	7E+04
19GDO043	5,029	33,011	830	349	96	119	10.6	9.6	32.8	15,859	6E+04	4E+04	3E+04
19GDO194	432	2,216	68	169	17	9	2.1	0.8	2.6	1,048	4E+03	3E+03	3E+03
19G199	60	174	2	2	1	1	0.1	0.2	0.7	76	1E+02	6E+02	7E+02
20G163	316	1,246	10	23	8	15	1.0	1.8	8.0	476	1E+03	4E+03	4E+03
20L083	214	932	26	9	4	9	0.7	0.1	2.1	504	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	60	2	5	1	0	0.1	0.0	0.0	28	1E+02	7E+01	9E+01
21H048	123	364	4	4	3	3	0.3	0.4	1.5	158	3E+02	3E+02	3E+02
21KSDO069	8,804	50,464	1,326	947	221	277	24.0	15.3	61.4	23,736	1E+05	7E+04	6E+04
21M005	148	427	12	39	3	3	0.4	0.1	0.9	228	1E+02	2E+02	3E+02
21M010	905	3,092	82	78	18	24	2.3	0.4	7.1	1,662	2E+03	2E+03	3E+03
21M050	424	1,221	30	25	9	7	0.9	0.2	2.8	652	2E+03	9E+02	3E+03
22CDO384	2,502	9,230	365	1,805	132	51	16.5	2.6	7.8	4,143	1E+04	9E+03	1E+04
22LSDO580	1,186	4,505	126	95	23	34	3.2	0.7	12.3	2,503	3E+03	3E+03	4E+03
23GDO132	4,472	9,517	268	2,152	125	63	15.8	3.8	16.4	4,415	7E+03	9E+03	1E+04
23HSDO042	18,115	78,632	2,705	4,951	882	554	98.8	25.7	101.5	36,244	1E+05	1E+05	1E+05
23HDO040	2,816	16,887	430	309	61	78	6.8	4.8	18.1	7,988	3E+04	2E+04	2E+04
23L196	136	273	7	37	4	1	0.4	0.1	0.7	138	1E+02	4E+01	2E+02
23L075	624	1,539	47	217	18	7	2.1	0.3	3.4	815	2E+03	7E+02	3E+03
23L074	133	286	7	24	4	1	0.3	0.0	0.4	149	8E+01	6E+01	1E+02
23L195	142	272	9	75	4	1	0.5	0.1	0.7	146	2E+02	6E+01	3E+02
23L202	145	279	7	37	4	0	0.3	0.1	0.7	151	3E+02	5E+01	6E+02
23L016	112	224	6	36	3	0	0.3	0.0	0.5	123	4E+02	7E+01	7E+02
23L015	160	276	11	133	5	1	0.7	0.1	0.5	139	3E+01	5E+01	5E+01
23L164	865	2,158	71	103	22	44	2.0	0.3	4.8	986	7E+03	9E+03	1E+04
24CSDO031	286	1,787	48	56	4	6	0.6	0.5	1.8	893	3E+03	2E+03	1E+03

Table C2-16. Scenario 4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,695	8,943	287	1,082	44	50	7.2	2.8	9.5	4,378	2E+04	2E+04	1E+04
24DSDO150	32	76	2	23	1	0	0.1	0.0	0.1	41	7E+01	5E+02	5E+02
24DSDO032	20,672	113,538	3,808	8,326	745	533	94.4	36.8	121.6	61,097	2E+05	1E+05	1E+05
24GSDO035	24,067	140,141	3,596	4,298	417	632	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
24GSDO034	1,683	6,395	169	911	41	25	5.9	2.6	11.2	3,137	1E+04	2E+04	2E+04
24L233	430	1,277	32	89	23	12	2.3	1.1	5.1	489	1E+03	8E+02	3E+03
25DDO040	538	2,660	78	208	12	18	1.7	1.0	4.2	1,286	5E+03	4E+03	4E+03
25EDO037	13,573	71,577	1,912	3,394	276	384	36.0	22.1	90.3	34,569	1E+05	1E+05	8E+04
25GDO041	72	247	9	31	6	3	0.6	0.2	1.0	84	3E+02	2E+02	5E+02
25GDO-06	240	660	18	217	9	7	1.4	0.8	3.6	276	3E+02	5E+02	6E+02
26J049	7,408	20,716	797	700	536	153	47.4	5.3	28.7	7,863	3E+04	1E+04	6E+04
25L144	546	3,702	90	10	13	13	1.3	1.0	3.3	1,722	8E+03	5E+03	3E+03
25L058	4,445	23,861	617	500	86	159	9.6	6.6	27.9	11,244	5E+04	4E+04	4E+04
26FDO038	58	165	14	133	7	2	1.0	0.1	0.2	54	3E+02	6E+01	6E+02
26GSDO01	3,670	16,762	494	1,922	124	86	16.8	7.5	28.7	7,863	3E+04	2E+04	2E+04
26JSDO052	39	73	4	65	2	0	0.3	0.1	0.2	35	9E+00	1E+01	2E+01
26JSDO100	156	417	22	80	14	3	1.5	0.1	0.2	144	7E+02	1E+02	1E+03
26J101	433	1,048	63	502	32	9	4.2	0.4	1.2	400	2E+03	7E+02	3E+03
26KSDO254	326	1,118	43	114	5	32	0.9	0.2	2.5	492	5E+03	7E+03	8E+03
26K035	191	405	11	33	5	1	0.5	0.1	1.1	219	5E+02	8E+01	9E+02
26K099	12,515	80,616	1,927	796	169	358	20.1	23.5	86.8	38,500	2E+05	1E+05	8E+04
26L055	173	1,007	28	12	7	4	0.6	0.2	0.8	464	2E+03	1E+03	1E+03
26LSDO084	69	204	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	208	356	5	22	4	0	0.3	0.0	0.1	178	8E+01	2E+01	2E+02
27JSDO044	376	748	29	362	12	6	2.0	0.5	2.1	352	3E+02	6E+02	6E+02
27JSDO096	2,064	4,151	94	322	54	14	4.5	0.6	4.8	2,063	2E+03	4E+03	5E+03
27JSDO001	7,753	44,776	1,124	1,519	132	252	17.8	13.6	55.5	21,172	9E+04	7E+04	5E+04
27L022	2,208	13,353	318	292	44	64	5.3	5.2	19.5	6,274	3E+04	2E+04	1E+04
27L020	2,088	12,508	298	290	43	60	5.1	4.8	18.2	5,854	2E+04	2E+04	1E+04
28K061	4,384	28,403	720	369	66	134	7.9	7.8	27.6	13,610	6E+04	4E+04	3E+04
28K010	3,863	26,727	655	249	48	102	6.0	7.4	25.1	12,912	5E+04	4E+04	2E+04
28K386	664	1,642	57	373	18	20	2.6	0.6	3.8	800	2E+03	3E+03	3E+03
28L073	74	223	9	73	5	1	0.6	0.1	0.1	102	4E+02	2E+03	2E+03
28L074/5/6	1,217	3,591	108	709	51	22	6.3	2.1	8.9	1,588	5E+03	7E+03	1E+04
28N156	312	1,761	51	115	5	12	0.9	0.5	1.8	856	4E+03	3E+03	2E+03
28N207	3,200	19,526	507	454	64	95	7.6	5.9	21.2	9,326	4E+04	3E+04	2E+04
28O025	50	233	9	20	1	2	0.2	0.1	0.2	118	7E+02	5E+02	6E+02
28P001	302	2,005	50	26	4	7	0.5	0.5	1.8	983	4E+03	2E+03	1E+03
29J129	162	296	13	146	5	2	0.8	0.1	0.5	144	2E+02	4E+02	4E+02
29J029	353	918	40	184	6	31	1.1	0.2	1.8	381	4E+03	6E+03	6E+03
29J212	17,159	110,966	2,706	1,095	248	518	29.9	32.1	121.6	53,109	2E+05	2E+05	1E+05
29M049	1,246	6,867	191	184	35	45	3.8	1.9	7.3	3,177	1E+04	1E+04	1E+04
29N015	126	566	17	28	2	5	0.5	0.1	1.3	310	3E+02	5E+02	5E+02
29N135	409	2,269	61	147	7	9	1.2	0.6	2.7	1,122	4E+03	3E+03	1E+03
29O001	11,222	69,313	1,861	2,348	230	287	29.2	19.8	68.2	33,569	1E+05	9E+04	6E+04
29P015	76	510	13	13	1	2	0.2	0.1	0.5	250	9E+02	6E+02	3E+02
29P044	594	3,990	103	80	10	13	1.2	1.1	3.6	1,950	8E+03	5E+03	3E+03
30J006	225	658	25	179	8	5	1.3	0.2	1.0	329	8E+02	3E+03	3E+03

Table C2-16. Scenario 4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	62	166	7	94	2	1	0.5	0.1	0.5	82	1E+02	6E+02	7E+02
30J030	683	1,466	37	163	17	5	1.7	0.2	2.6	761	5E+02	5E+02	9E+02
30P107	333	1,750	65	105	6	10	0.9	0.4	1.5	890	4E+03	3E+03	2E+03
30P062	284	1,875	49	53	4	6	0.6	0.5	1.7	930	3E+03	2E+03	1E+03
31O004	991	5,952	210	150	18	31	2.3	1.4	4.6	2,924	1E+04	1E+04	6E+03
31P084	304	1,889	49	78	4	6	0.6	0.5	1.8	934	4E+03	2E+03	1E+03
3FDO159	307	1,307	59	495	14	7	2.7	0.5	1.5	629	2E+03	2E+03	2E+03
11G318/319	336	928	71	739	13	34	3.4	0.5	2.3	376	4E+03	6E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,596	5,677	127	77	52	73	3.3	0.8	5.6	2,646	3E+04	5E+04	5E+04
21H047	508	1,936	34	76	15	15	1.7	1.6	7.0	810	2E+03	2E+03	2E+03
21H039	1,470	4,624	65	318	44	47	5.1	5.4	23.6	1,848	4E+03	4E+03	5E+03
20G161	2,560	10,928	309	226	66	103	7.2	5.2	22.0	4,993	2E+04	2E+04	2E+04
StonyMWRA	113,171	527,861	18,681	69,534	4,797	3,069	665.9	187.7	632.9	253,826	9E+05	6E+05	7E+05
Fens	70,967	223,475	11,479	17,718	4,577	2,160	532.8	94.9	287.8	113,171	3E+05	2E+05	2E+05
20D055	5,509	35,553	950	479	119	127	12.9	10.1	33.6	17,299	7E+04	4E+04	3E+04
21D319	7,371	48,619	1,281	839	144	170	16.7	13.8	45.2	23,700	9E+04	6E+04	4E+04

Table C2-17. Scenario 4.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	984	3,950	141	917	29	19	5.3	1.2	5.3	2,001	5E+03	4E+03	3E+03
1FDO31	805	3,775	104	198	19	18	2.2	1.0	3.7	1,839	7E+03	5E+03	4E+03
02E086	258	1,066	43	328	10	5	1.9	0.4	1.2	515	2E+03	1E+03	1E+03
2FDO120	1,376	6,862	201	592	33	30	4.9	1.9	8.0	3,407	1E+04	8E+03	7E+03
2FDO93	1,534	10,825	264	112	18	36	2.3	2.9	9.8	5,273	2E+04	1E+04	8E+03
2FDO85	97	450	13	34	3	1	0.3	0.1	0.4	220	7E+02	5E+02	4E+02
3ESDO186	319	1,440	64	565	14	7	2.9	0.6	1.8	700	2E+03	2E+03	1E+03
3ESDO185	586	2,646	105	364	15	13	2.5	0.8	2.6	1,373	6E+03	3E+03	3E+03
3F162	527	2,551	95	505	24	11	3.7	0.8	2.4	1,204	4E+03	3E+03	3E+03
4ESDO69	1,599	7,503	246	981	42	37	6.8	2.4	8.8	3,741	1E+04	9E+03	9E+03
4ESDO64	39	127	8	92	2	1	0.5	0.1	0.2	60	2E+02	3E+02	3E+02
4FDO189	753	4,224	117	177	20	15	2.3	1.2	4.0	2,059	7E+03	4E+03	3E+03
4FDO204	884	4,525	144	510	31	17	4.3	1.3	4.1	2,173	8E+03	5E+03	4E+03
4FDO16	413	2,349	66	87	11	10	1.2	0.6	2.2	1,132	4E+03	3E+03	3E+03
4FDO203	128	557	24	185	6	3	1.1	0.2	0.6	267	9E+02	7E+02	7E+02
4FDO118	587	3,333	87	113	10	14	1.3	0.9	3.1	1,634	6E+03	4E+03	3E+03
4FDO119	1,273	5,184	136	45	22	35	2.9	0.8	10.2	2,768	4E+03	4E+03	4E+03
5CSDO110	752	2,569	127	766	31	22	5.1	1.0	3.1	1,325	6E+03	5E+03	6E+03
5EDO182	106	501	31	376	6	3	1.7	0.3	0.8	245	8E+02	5E+02	4E+02
5ESDO184	631	2,815	143	1,483	30	14	7.1	1.4	3.6	1,376	4E+03	3E+03	3E+03
5FDO117	783	3,937	142	774	32	16	5.1	1.3	3.9	1,885	7E+03	4E+03	4E+03
5FDO254	55	348	9	12	1	1	0.1	0.1	0.4	174	6E+02	4E+02	2E+02
5FDO265	19	38	1	3	0	0	0.0	0.0	0.1	21	2E+01	1E+01	3E+01
5FDO253	628	3,313	94	175	16	15	2.0	0.9	3.1	1,597	6E+03	4E+03	4E+03
5FDO245	1,359	8,076	218	360	27	28	3.6	2.3	7.9	3,981	1E+04	9E+03	6E+03
5FDO244	235	1,214	32	56	5	5	0.6	0.3	1.6	605	2E+03	1E+03	9E+02
5FDO264	18	51	2	6	0	2	0.0	0.0	0.1	21	2E+02	4E+02	4E+02
5GDO112	925	5,627	144	169	17	21	2.1	1.8	6.3	2,749	1E+04	6E+03	4E+03
5GDO116A	786	4,425	129	454	15	15	2.7	1.4	4.3	2,206	7E+03	5E+03	2E+03
5GDO115	241	1,474	39	39	5	6	0.6	0.4	1.5	722	3E+03	2E+03	1E+03
5GDO116	725	4,198	111	128	17	14	1.9	1.1	3.8	2,034	7E+03	4E+03	3E+03
6DDO57	135	519	23	196	6	2	1.1	0.2	0.5	251	7E+02	1E+03	1E+03
6DDO184	8	22	13	238	3	1	1.0	0.1	0.2	8	3E+01	7E+00	5E+01
6DDO91	13	29	27	525	6	2	2.2	0.3	0.5	12	3E+01	1E+01	6E+01
6DDO187	76	237	11	56	2	6	0.4	0.1	0.4	100	8E+02	1E+03	1E+03
6DDO86	9	25	5	80	1	0	0.4	0.0	0.1	10	3E+01	1E+01	5E+01
6DDO85	42	219	9	49	2	1	0.4	0.1	0.2	102	4E+02	2E+02	2E+02
6DDO83	175	805	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	10	44	2	19	1	0	0.1	0.0	0.0	19	7E+01	3E+01	6E+01
06D097	69	227	15	141	6	2	0.9	0.1	0.2	93	4E+02	2E+02	5E+02
6GDO109	1,434	7,871	215	275	41	28	4.4	2.2	7.0	3,771	2E+04	8E+03	9E+03
6GDO110	1,778	10,582	287	389	42	37	5.0	2.9	9.4	5,146	2E+04	1E+04	8E+03
6GDO111	261	1,150	60	610	14	6	3.1	0.6	1.5	552	2E+03	1E+03	9E+02
6GDO166	146	532	40	551	9	4	2.5	0.4	0.9	257	8E+02	4E+02	5E+02
6GDO108	4,708	27,639	744	958	109	102	12.9	7.6	25.1	13,419	5E+04	3E+04	2E+04
6G165	27	113	5	54	1	1	0.2	0.1	0.1	56	2E+02	1E+02	9E+01
6HDO43	87	435	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	214	986	34	180	7	4	1.2	0.3	0.9	483	2E+03	9E+02	7E+02

Table C2-17. Scenario 4.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	530	2,753	88	412	15	11	2.6	0.9	2.8	1,343	5E+03	3E+03	2E+03
7CDO006	5,844	27,315	1,050	7,716	193	128	40.2	10.5	31.5	13,485	5E+04	4E+04	4E+04
7HDO285	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
7HDO105	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
7HDO348	48	318	8	10	0	1	0.1	0.1	0.3	159	6E+02	4E+02	2E+02
7HDO347	336	1,754	55	200	11	7	1.6	0.5	1.6	848	3E+03	2E+03	2E+03
7HDO346	320	2,019	52	68	5	7	0.7	0.6	1.8	988	4E+03	2E+03	1E+03
8BDO122	1,495	8,466	212	299	29	38	3.7	3.2	12.0	4,052	2E+04	1E+04	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	8E-01
8BDO126	850	5,437	138	135	12	18	1.5	1.6	5.2	2,683	1E+04	6E+03	3E+03
8CDO25	188	617	43	483	10	5	2.4	0.4	1.0	325	1E+03	1E+03	2E+03
8CDO26	175	610	40	415	8	5	2.0	0.4	1.0	325	1E+03	1E+03	2E+03
8DDO112	33	197	5	8	1	1	0.1	0.1	0.2	95	4E+02	4E+02	3E+02
8DSDO100	80	257	15	175	3	3	0.8	0.1	0.4	125	5E+02	1E+03	1E+03
8EDO35	126	353	30	453	8	2	2.0	0.3	0.6	176	4E+02	2E+03	2E+03
8EDO33	461	2,879	83	252	9	10	1.6	0.9	2.8	1,419	5E+03	3E+03	2E+03
8IDO153	37	244	6	4	0	1	0.1	0.1	0.2	120	4E+02	3E+02	1E+02
8IDO155	25	93	5	58	1	0	0.3	0.0	0.1	47	1E+02	3E+02	3E+02
8IDO156	324	697	47	587	19	4	3.3	0.3	0.8	302	5E+02	1E+02	8E+02
8IDO209	115	742	19	18	1	2	0.2	0.2	0.7	367	1E+03	9E+02	5E+02
8IDO154	836	4,634	132	292	22	21	2.9	1.4	4.7	2,231	8E+03	6E+03	5E+03
8IDO158	386	2,318	63	135	8	9	1.2	0.8	2.6	1,136	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,177	7,408	192	237	22	27	2.9	2.3	8.3	3,600	1E+04	8E+03	5E+03
8JSDO103	942	5,623	158	325	22	20	3.0	1.6	5.3	2,754	1E+04	6E+03	4E+03
8JSDO41	534	3,394	90	114	10	12	1.3	1.0	3.4	1,656	6E+03	4E+03	2E+03
8JSDO50	1,214	6,366	180	419	36	26	4.5	2.1	7.2	3,042	1E+04	8E+03	7E+03
8K049	161	954	28	64	4	3	0.6	0.3	0.9	460	2E+03	1E+03	8E+02
9BDO49	329	908	34	147	6	22	1.0	0.2	1.5	411	3E+03	7E+03	7E+03
9EDO229	58	290	9	23	2	1	0.2	0.1	0.2	138	5E+02	3E+02	3E+02
9EDO243	167	584	24	188	7	3	1.1	0.2	0.6	281	1E+03	1E+03	2E+03
9K100	51	138	8	63	2	5	0.3	0.0	0.3	57	6E+02	9E+02	1E+03
9K101	622	2,257	102	883	25	19	4.8	0.9	2.8	1,071	4E+03	5E+03	6E+03
9K016	63	189	29	463	7	3	2.1	0.3	0.6	85	3E+02	4E+02	5E+02
9LSDO095	221	841	38	337	7	10	1.6	0.3	1.2	407	2E+03	2E+03	2E+03
10BSDO62	30	55	1	1	1	0	0.0	0.0	0.1	29	7E+00	5E-01	1E+01
10BSDO15	34	85	3	10	1	1	0.1	0.0	0.2	43	2E+02	4E+02	5E+02
10BSDO64	119	344	15	88	4	3	0.6	0.1	0.7	238	5E+02	6E+02	7E+02
10L094	13,632	75,766	2,096	4,587	303	299	41.0	22.3	76.6	36,950	1E+05	9E+04	8E+04
10L096	1,508	9,157	250	282	26	57	3.5	2.5	9.2	4,389	2E+04	2E+04	1E+04
11BDO28	13,051	60,377	2,573	21,774	469	362	106.9	25.0	73.1	29,674	1E+05	8E+04	7E+04
11BDO123	2,543	13,426	387	753	63	66	7.8	3.7	12.5	6,481	3E+04	2E+04	2E+04
11IDO577	34,598	176,003	5,645	13,022	1,623	825	183.5	51.2	167.6	80,469	3E+05	2E+05	2E+05
11M093	1,077	3,952	162	749	33	21	5.2	1.3	4.8	2,113	9E+03	6E+03	7E+03
12BDO10	12	29	2	19	0	1	0.1	0.0	0.1	13	9E+01	2E+02	2E+02
12BDO14	28	69	4	41	1	2	0.2	0.0	0.1	30	2E+02	4E+02	4E+02
12BDO124	9,142	49,090	1,509	6,092	213	214	37.2	15.4	48.8	24,177	9E+04	6E+04	5E+04
12EDO418	214	953	34	83	4	4	0.6	0.3	0.9	506	2E+03	2E+03	1E+03

Table C2-17. Scenario 4.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	143	699	21	83	3	2	0.5	0.2	0.6	347	1E+03	1E+03	8E+02
12HOFDO92	972	2,697	421	2,884	109	139	23.6	3.4	12.6	2,505	4E+03	8E+03	1E+04
12HDO85/87	455	1,352	71	471	14	43	2.7	0.4	2.7	543	6E+03	1E+04	1E+04
12L092	2,211	9,994	324	1,068	80	44	10.1	3.1	10.4	4,783	2E+04	1E+04	1E+04
12LDO296	484	2,292	71	270	13	9	2.0	0.7	2.6	1,136	4E+03	2E+03	2E+03
12M091	342	1,227	53	282	10	7	1.7	0.4	1.4	662	3E+03	2E+03	2E+03
13DSDO078	1,786	5,354	225	1,518	90	27	11.8	1.6	4.4	2,425	8E+03	6E+03	1E+04
13EDO177	53	112	10	162	3	1	0.7	0.1	0.2	54	8E+01	3E+02	4E+02
13EDO174	1,250	7,000	187	401	21	23	3.1	2.0	6.6	3,472	1E+04	9E+03	5E+03
13EDO176	37	86	5	77	2	1	0.4	0.1	0.2	42	6E+01	3E+02	3E+02
13FDO95	10	22	2	27	0	0	0.1	0.0	0.0	11	3E+01	1E+02	1E+02
13FDO011	24	45	1	1	1	0	0.0	0.0	0.0	23	2E+01	1E+02	1E+02
13F093	104	271	9	107	3	2	0.6	0.2	0.9	124	4E+02	1E+03	1E+03
13L090	32,731	156,234	5,047	5,996	1,753	727	171.7	38.8	134.6	70,195	3E+05	1E+05	2E+05
14CDO9	756	4,411	159	882	27	22	5.2	1.5	4.6	2,108	9E+03	6E+03	5E+03
15FSDO288	1,981	9,928	318	1,710	50	37	9.4	3.4	10.2	4,916	2E+04	1E+04	2E+04
15L089	13,382	60,715	2,048	5,090	633	296	71.0	16.3	57.2	28,234	1E+05	6E+04	8E+04
15L088	6,305	39,286	1,002	251	112	170	12.3	10.8	42.4	19,195	7E+04	5E+04	3E+04
16L097	535	1,648	69	618	18	34	3.6	1.3	5.9	683	4E+03	7E+03	7E+03
16LSDO122	8,311	42,777	1,299	2,557	273	266	32.5	11.5	44.9	20,194	9E+04	6E+04	7E+04
17M033	5,478	26,882	774	1,872	123	287	17.7	11.2	49.5	12,331	6E+04	6E+04	6E+04
18GSDO233	4,119	18,320	528	546	79	202	8.9	4.7	23.1	8,275	5E+04	7E+04	6E+04
19GDO043	5,029	33,011	830	349	96	119	10.6	9.6	32.8	15,859	6E+04	4E+04	3E+04
19GDO194	432	2,216	68	169	17	9	2.1	0.8	2.6	1,048	4E+03	3E+03	3E+03
19G199	60	174	2	2	1	1	0.1	0.2	0.7	76	1E+02	6E+02	7E+02
20G163	320	1,275	10	23	8	13	1.0	1.8	8.2	488	1E+03	4E+03	4E+03
20L083	214	932	26	9	4	9	0.7	0.1	2.1	504	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	60	2	5	1	0	0.1	0.0	0.0	28	1E+02	7E+01	9E+01
21H048	123	364	4	4	3	3	0.3	0.4	1.5	158	3E+02	3E+02	3E+02
21KSDO069	8,804	50,464	1,326	947	221	277	24.0	15.3	61.4	23,736	1E+05	7E+04	6E+04
21M005	148	427	12	39	3	3	0.4	0.1	0.9	228	1E+02	2E+02	3E+02
21M010	905	3,092	82	78	18	24	2.3	0.4	7.1	1,662	2E+03	2E+03	3E+03
21M050	424	1,221	30	25	9	7	0.9	0.2	2.8	652	2E+03	9E+02	3E+03
22CDO384	2,502	9,230	365	1,805	132	51	16.5	2.6	7.8	4,143	1E+04	9E+03	1E+04
22LSDO580	1,186	4,505	126	95	23	34	3.2	0.7	12.3	2,503	3E+03	3E+03	4E+03
23GDO132	4,472	9,517	268	2,152	125	63	15.8	3.8	16.4	4,415	7E+03	9E+03	1E+04
23HSDO042	18,107	78,632	2,704	4,951	882	552	98.8	25.7	101.5	36,244	1E+05	1E+05	1E+05
23HDO040	2,816	16,887	430	309	61	78	6.8	4.8	18.1	7,988	3E+04	2E+04	2E+04
23L196	136	273	7	37	4	1	0.4	0.1	0.7	138	1E+02	4E+01	2E+02
23L075	624	1,539	47	217	18	7	2.1	0.3	3.4	815	2E+03	7E+02	3E+03
23L074	133	286	7	24	4	1	0.3	0.0	0.4	149	8E+01	6E+01	1E+02
23L195	142	272	9	75	4	1	0.5	0.1	0.7	146	2E+02	6E+01	3E+02
23L202	145	279	7	37	4	0	0.3	0.1	0.7	151	3E+02	5E+01	6E+02
23L016	112	224	6	36	3	0	0.3	0.0	0.5	123	4E+02	7E+01	7E+02
23L015	160	276	11	133	5	1	0.7	0.1	0.5	139	3E+01	5E+01	5E+01
23L164	865	2,158	71	103	22	44	2.0	0.3	4.8	986	7E+03	9E+03	1E+04
24CSDO031	286	1,787	48	56	4	6	0.6	0.5	1.8	893	3E+03	2E+03	1E+03

Table C2-17. Scenario 4.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,571	8,047	264	1,083	43	38	7.1	2.5	8.6	3,925	2E+04	1E+04	1E+04
24DSDO150	32	76	2	23	1	0	0.1	0.0	0.1	41	7E+01	5E+02	5E+02
24DSDO032	20,525	112,583	3,788	8,326	747	428	94.5	36.5	120.4	60,612	2E+05	1E+05	1E+05
24GSDO035	24,067	140,141	3,596	4,298	417	632	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
24GSDO034	1,683	6,395	169	911	41	25	5.9	2.6	11.2	3,137	1E+04	2E+04	2E+04
24L233	430	1,277	32	89	23	12	2.3	1.1	5.1	489	1E+03	8E+02	3E+03
25DDO040	538	2,660	78	208	12	18	1.7	1.0	4.2	1,286	5E+03	4E+03	4E+03
25EDO037	13,544	71,371	1,906	3,395	276	312	36.0	22.0	89.9	34,473	1E+05	1E+05	8E+04
25GDO041	72	247	9	31	6	3	0.6	0.2	1.0	84	3E+02	2E+02	5E+02
25GDO-06	240	660	18	217	9	7	1.4	0.8	3.6	276	3E+02	5E+02	6E+02
26J049	7,408	20,716	797	700	536	153	47.4	5.3	28.7	7,863	3E+04	1E+04	6E+04
25L144	546	3,702	90	10	13	13	1.3	1.0	3.3	1,722	8E+03	5E+03	3E+03
25L058	4,445	23,861	617	500	86	159	9.6	6.6	27.9	11,244	5E+04	4E+04	4E+04
26FDO038	58	165	14	133	7	2	1.0	0.1	0.2	54	3E+02	6E+01	6E+02
26GSDO01	3,670	16,762	494	1,922	124	86	16.8	7.5	28.7	7,863	3E+04	2E+04	2E+04
26JSDO052	39	73	4	65	2	0	0.3	0.1	0.2	35	9E+00	1E+01	2E+01
26JSDO100	156	417	22	80	14	3	1.5	0.1	0.2	144	7E+02	1E+02	1E+03
26J101	433	1,048	63	502	32	9	4.2	0.4	1.2	400	2E+03	7E+02	3E+03
26KSDO254	326	1,118	43	114	5	32	0.9	0.2	2.5	492	5E+03	7E+03	8E+03
26K035	191	405	11	33	5	1	0.5	0.1	1.1	219	5E+02	8E+01	9E+02
26K099	12,515	80,616	1,927	796	169	358	20.1	23.5	86.8	38,500	2E+05	1E+05	8E+04
26L055	173	1,007	28	12	7	4	0.6	0.2	0.8	464	2E+03	1E+03	1E+03
26LSDO084	69	204	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	208	356	5	22	4	0	0.3	0.0	0.1	178	8E+01	2E+01	2E+02
27JSDO044	376	748	29	362	12	6	2.0	0.5	2.1	352	3E+02	6E+02	6E+02
27JSDO096	2,064	4,151	94	322	54	14	4.5	0.6	4.8	2,063	2E+03	4E+03	5E+03
27JSDO001	7,753	44,776	1,124	1,519	132	252	17.8	13.6	55.5	21,172	9E+04	7E+04	5E+04
27L022	2,208	13,353	318	292	44	64	5.3	5.2	19.5	6,274	3E+04	2E+04	1E+04
27L020	2,088	12,508	298	290	43	60	5.1	4.8	18.2	5,854	2E+04	2E+04	1E+04
28K061	4,384	28,403	720	369	66	134	7.9	7.8	27.6	13,610	6E+04	4E+04	3E+04
28K010	3,863	26,727	655	249	48	102	6.0	7.4	25.1	12,912	5E+04	4E+04	2E+04
28K386	664	1,642	57	373	18	20	2.6	0.6	3.8	800	2E+03	3E+03	3E+03
28L073	74	223	9	73	5	1	0.6	0.1	0.1	102	4E+02	2E+03	2E+03
28L074/5/6	1,217	3,591	108	709	51	22	6.3	2.1	8.9	1,588	5E+03	7E+03	1E+04
28N156	312	1,761	51	115	5	12	0.9	0.5	1.8	856	4E+03	3E+03	2E+03
28N207	3,200	19,526	507	454	64	95	7.6	5.9	21.2	9,326	4E+04	3E+04	2E+04
28O025	50	233	9	20	1	2	0.2	0.1	0.2	118	7E+02	5E+02	6E+02
28P001	302	2,005	50	26	4	7	0.5	0.5	1.8	983	4E+03	2E+03	1E+03
29J129	162	296	13	146	5	2	0.8	0.1	0.5	144	2E+02	4E+02	4E+02
29J029	353	918	40	184	6	31	1.1	0.2	1.8	381	4E+03	6E+03	6E+03
29J212	17,159	110,966	2,706	1,095	248	518	29.9	32.1	121.6	53,109	2E+05	2E+05	1E+05
29M049	1,246	6,867	191	184	35	45	3.8	1.9	7.3	3,177	1E+04	1E+04	1E+04
29N015	126	566	17	28	2	5	0.5	0.1	1.3	310	3E+02	5E+02	5E+02
29N135	409	2,269	61	147	7	9	1.2	0.6	2.7	1,122	4E+03	3E+03	1E+03
29O001	11,222	69,313	1,861	2,348	230	287	29.2	19.8	68.2	33,569	1E+05	9E+04	6E+04
29P015	76	510	13	13	1	2	0.2	0.1	0.5	250	9E+02	6E+02	3E+02
29P044	594	3,990	103	80	10	13	1.2	1.1	3.6	1,950	8E+03	5E+03	3E+03
30J006	225	658	25	179	8	5	1.3	0.2	1.0	329	8E+02	3E+03	3E+03

Table C2-17. Scenario 4.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	62	166	7	94	2	1	0.5	0.1	0.5	82	1E+02	6E+02	7E+02
30J030	683	1,466	37	163	17	5	1.7	0.2	2.6	761	5E+02	5E+02	9E+02
30P107	333	1,750	65	105	6	10	0.9	0.4	1.5	890	4E+03	3E+03	2E+03
30P062	284	1,875	49	53	4	6	0.6	0.5	1.7	930	3E+03	2E+03	1E+03
31O004	991	5,952	210	150	18	31	2.3	1.4	4.6	2,924	1E+04	1E+04	6E+03
31P084	304	1,889	49	78	4	6	0.6	0.5	1.8	934	4E+03	2E+03	1E+03
3FDO159	307	1,307	59	495	14	7	2.7	0.5	1.5	629	2E+03	2E+03	2E+03
11G318/319	336	928	71	739	13	34	3.4	0.5	2.3	376	4E+03	6E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,596	5,677	127	77	52	73	3.3	0.8	5.6	2,646	3E+04	5E+04	5E+04
21H047	508	1,936	34	76	15	15	1.7	1.6	7.0	810	2E+03	2E+03	2E+03
21H039	1,470	4,624	65	318	44	47	5.1	5.4	23.6	1,848	4E+03	4E+03	5E+03
20G161	2,546	10,810	306	228	66	83	7.3	5.2	22.0	4,940	2E+04	2E+04	2E+04
StonyMWRA	113,171	527,861	18,681	69,534	4,797	3,069	665.9	187.7	632.9	253,826	9E+05	6E+05	7E+05
Fens	70,754	223,035	11,457	17,710	4,574	2,108	532.3	94.6	286.8	112,950	3E+05	2E+05	2E+05
20D055	5,509	35,553	950	479	119	127	12.9	10.1	33.6	17,299	7E+04	4E+04	3E+04
21D319	7,371	48,619	1,281	839	144	170	16.7	13.8	45.2	23,700	9E+04	6E+04	4E+04

Table C2-18. Scenario 4.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	984	3,950	141	917	29	19	5.3	1.2	5.3	2,001	5E+03	4E+03	3E+03
1FDO31	805	3,775	104	198	19	18	2.2	1.0	3.7	1,839	7E+03	5E+03	4E+03
02E086	258	1,066	43	328	10	5	1.9	0.4	1.2	515	2E+03	1E+03	1E+03
2FDO120	1,376	6,862	201	592	33	30	4.9	1.9	8.0	3,407	1E+04	8E+03	7E+03
2FDO93	1,534	10,825	264	112	18	36	2.3	2.9	9.8	5,273	2E+04	1E+04	8E+03
2FDO85	97	450	13	34	3	1	0.3	0.1	0.4	220	7E+02	5E+02	4E+02
3ESDO186	319	1,440	64	565	14	7	2.9	0.6	1.8	700	2E+03	2E+03	1E+03
3ESDO185	586	2,646	105	364	15	13	2.5	0.8	2.6	1,373	6E+03	3E+03	3E+03
3F162	527	2,551	95	505	24	11	3.7	0.8	2.4	1,204	4E+03	3E+03	3E+03
4ESDO69	1,599	7,503	246	981	42	37	6.8	2.4	8.8	3,741	1E+04	9E+03	9E+03
4ESDO64	39	127	8	92	2	1	0.5	0.1	0.2	60	2E+02	3E+02	3E+02
4FDO189	753	4,224	117	177	20	15	2.3	1.2	4.0	2,059	7E+03	4E+03	3E+03
4FDO204	884	4,525	144	510	31	17	4.3	1.3	4.1	2,173	8E+03	5E+03	4E+03
4FDO16	413	2,349	66	87	11	10	1.2	0.6	2.2	1,132	4E+03	3E+03	3E+03
4FDO203	128	557	24	185	6	3	1.1	0.2	0.6	267	9E+02	7E+02	7E+02
4FDO118	587	3,333	87	113	10	14	1.3	0.9	3.1	1,634	6E+03	4E+03	3E+03
4FDO119	1,273	5,184	136	45	22	35	2.9	0.8	10.2	2,768	4E+03	4E+03	4E+03
5CSDO110	752	2,569	127	766	31	22	5.1	1.0	3.1	1,325	6E+03	5E+03	6E+03
5EDO182	106	501	31	376	6	3	1.7	0.3	0.8	245	8E+02	5E+02	4E+02
5ESDO184	631	2,815	143	1,483	30	14	7.1	1.4	3.6	1,376	4E+03	3E+03	3E+03
5FDO117	783	3,937	142	774	32	16	5.1	1.3	3.9	1,885	7E+03	4E+03	4E+03
5FDO254	55	348	9	12	1	1	0.1	0.1	0.4	174	6E+02	4E+02	2E+02
5FDO265	19	38	1	3	0	0	0.0	0.0	0.1	21	2E+01	1E+01	3E+01
5FDO253	628	3,313	94	175	16	15	2.0	0.9	3.1	1,597	6E+03	4E+03	4E+03
5FDO245	1,359	8,076	218	360	27	28	3.6	2.3	7.9	3,981	1E+04	9E+03	6E+03
5FDO244	235	1,214	32	56	5	5	0.6	0.3	1.6	605	2E+03	1E+03	9E+02
5FDO264	18	51	2	6	0	2	0.0	0.0	0.1	21	2E+02	4E+02	4E+02
5GDO112	925	5,627	144	169	17	21	2.1	1.8	6.3	2,749	1E+04	6E+03	4E+03
5GDO116A	786	4,425	129	454	15	15	2.7	1.4	4.3	2,206	7E+03	5E+03	2E+03
5GDO115	241	1,474	39	39	5	6	0.6	0.4	1.5	722	3E+03	2E+03	1E+03
5GDO116	725	4,198	111	128	17	14	1.9	1.1	3.8	2,034	7E+03	4E+03	3E+03
6DDO57	135	519	23	196	6	2	1.1	0.2	0.5	251	7E+02	1E+03	1E+03
6DDO184	8	22	13	238	3	1	1.0	0.1	0.2	8	3E+01	7E+00	5E+01
6DDO91	13	29	27	525	6	2	2.2	0.3	0.5	12	3E+01	1E+01	6E+01
6DDO187	76	237	11	56	2	6	0.4	0.1	0.4	100	8E+02	1E+03	1E+03
6DDO86	9	25	5	80	1	0	0.4	0.0	0.1	10	3E+01	1E+01	5E+01
6DDO85	42	219	9	49	2	1	0.4	0.1	0.2	102	4E+02	2E+02	2E+02
6DDO83	175	805	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	10	44	2	19	1	0	0.1	0.0	0.0	19	7E+01	3E+01	6E+01
06D097	69	227	15	141	6	2	0.9	0.1	0.2	93	4E+02	2E+02	5E+02
6GDO109	1,434	7,871	215	275	41	28	4.4	2.2	7.0	3,771	2E+04	8E+03	9E+03
6GDO110	1,778	10,582	287	389	42	37	5.0	2.9	9.4	5,146	2E+04	1E+04	8E+03
6GDO111	261	1,150	60	610	14	6	3.1	0.6	1.5	552	2E+03	1E+03	9E+02
6GDO166	146	532	40	551	9	4	2.5	0.4	0.9	257	8E+02	4E+02	5E+02
6GDO108	4,708	27,639	744	958	109	102	12.9	7.6	25.1	13,419	5E+04	3E+04	2E+04
6G165	27	113	5	54	1	1	0.2	0.1	0.1	56	2E+02	1E+02	9E+01
6HDO43	87	435	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	214	986	34	180	7	4	1.2	0.3	0.9	483	2E+03	9E+02	7E+02

Table C2-18. Scenario 4.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	530	2,753	88	412	15	11	2.6	0.9	2.8	1,343	5E+03	3E+03	2E+03
7CDO006	5,844	27,315	1,050	7,716	193	128	40.2	10.5	31.5	13,485	5E+04	4E+04	4E+04
7HDO285	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
7HDO105	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
7HDO348	48	318	8	10	0	1	0.1	0.1	0.3	159	6E+02	4E+02	2E+02
7HDO347	336	1,754	55	200	11	7	1.6	0.5	1.6	848	3E+03	2E+03	2E+03
7HDO346	320	2,019	52	68	5	7	0.7	0.6	1.8	988	4E+03	2E+03	1E+03
8BDO122	1,495	8,466	212	299	29	38	3.7	3.2	12.0	4,052	2E+04	1E+04	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	8E-01
8BDO126	850	5,437	138	135	12	18	1.5	1.6	5.2	2,683	1E+04	6E+03	3E+03
8CDO25	188	617	43	483	10	5	2.4	0.4	1.0	325	1E+03	1E+03	2E+03
8CDO26	175	610	40	415	8	5	2.0	0.4	1.0	325	1E+03	1E+03	2E+03
8DDO112	33	197	5	8	1	1	0.1	0.1	0.2	95	4E+02	4E+02	3E+02
8DSDO100	80	257	15	175	3	3	0.8	0.1	0.4	125	5E+02	1E+03	1E+03
8EDO35	126	353	30	453	8	2	2.0	0.3	0.6	176	4E+02	2E+03	2E+03
8EDO33	461	2,879	83	252	9	10	1.6	0.9	2.8	1,419	5E+03	3E+03	2E+03
8IDO153	37	244	6	4	0	1	0.1	0.1	0.2	120	4E+02	3E+02	1E+02
8IDO155	25	93	5	58	1	0	0.3	0.0	0.1	47	1E+02	3E+02	3E+02
8IDO156	324	697	47	587	19	4	3.3	0.3	0.8	302	5E+02	1E+02	8E+02
8IDO209	115	742	19	18	1	2	0.2	0.2	0.7	367	1E+03	9E+02	5E+02
8IDO154	836	4,634	132	292	22	21	2.9	1.4	4.7	2,231	8E+03	6E+03	5E+03
8IDO158	386	2,318	63	135	8	9	1.2	0.8	2.6	1,136	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,177	7,408	192	237	22	27	2.9	2.3	8.3	3,600	1E+04	8E+03	5E+03
8JSDO103	942	5,623	158	325	22	20	3.0	1.6	5.3	2,754	1E+04	6E+03	4E+03
8JSDO41	534	3,394	90	114	10	12	1.3	1.0	3.4	1,656	6E+03	4E+03	2E+03
8JSDO50	1,214	6,366	180	419	36	26	4.5	2.1	7.2	3,042	1E+04	8E+03	7E+03
8K049	161	954	28	64	4	3	0.6	0.3	0.9	460	2E+03	1E+03	8E+02
9BDO49	329	908	34	147	6	22	1.0	0.2	1.5	411	3E+03	7E+03	7E+03
9EDO229	58	290	9	23	2	1	0.2	0.1	0.2	138	5E+02	3E+02	3E+02
9EDO243	167	584	24	188	7	3	1.1	0.2	0.6	281	1E+03	1E+03	2E+03
9K100	51	138	8	63	2	5	0.3	0.0	0.3	57	6E+02	9E+02	1E+03
9K101	622	2,257	102	883	25	19	4.8	0.9	2.8	1,071	4E+03	5E+03	6E+03
9K016	63	189	29	463	7	3	2.1	0.3	0.6	85	3E+02	4E+02	5E+02
9LSDO095	221	841	38	337	7	10	1.6	0.3	1.2	407	2E+03	2E+03	2E+03
10BSDO62	30	55	1	1	1	0	0.0	0.0	0.1	29	7E+00	5E-01	1E+01
10BSDO15	34	85	3	10	1	1	0.1	0.0	0.2	43	2E+02	4E+02	5E+02
10BSDO64	119	344	15	88	4	3	0.6	0.1	0.7	238	5E+02	6E+02	7E+02
10L094	13,632	75,766	2,096	4,587	303	299	41.0	22.3	76.6	36,950	1E+05	9E+04	8E+04
10L096	1,508	9,157	250	282	26	57	3.5	2.5	9.2	4,389	2E+04	2E+04	1E+04
11BDO28	13,051	60,377	2,573	21,774	469	362	106.9	25.0	73.1	29,674	1E+05	8E+04	7E+04
11BDO123	2,543	13,426	387	753	63	66	7.8	3.7	12.5	6,481	3E+04	2E+04	2E+04
11IDO577	34,598	176,003	5,645	13,022	1,623	825	183.5	51.2	167.6	80,469	3E+05	2E+05	2E+05
11M093	1,077	3,952	162	749	33	21	5.2	1.3	4.8	2,113	9E+03	6E+03	7E+03
12BDO10	12	29	2	19	0	1	0.1	0.0	0.1	13	9E+01	2E+02	2E+02
12BDO14	28	69	4	41	1	2	0.2	0.0	0.1	30	2E+02	4E+02	4E+02
12BDO124	9,142	49,090	1,509	6,092	213	214	37.2	15.4	48.8	24,177	9E+04	6E+04	5E+04
12EDO418	214	953	34	83	4	4	0.6	0.3	0.9	506	2E+03	2E+03	1E+03

Table C2-18. Scenario 4.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	143	699	21	83	3	2	0.5	0.2	0.6	347	1E+03	1E+03	8E+02
12HOFDO92	972	2,697	421	2,884	109	139	23.6	3.4	12.6	2,505	4E+03	8E+03	1E+04
12HDO85/87	455	1,352	71	471	14	43	2.7	0.4	2.7	543	6E+03	1E+04	1E+04
12L092	2,211	9,994	324	1,068	80	44	10.1	3.1	10.4	4,783	2E+04	1E+04	1E+04
12LDO296	484	2,292	71	270	13	9	2.0	0.7	2.6	1,136	4E+03	2E+03	2E+03
12M091	342	1,227	53	282	10	7	1.7	0.4	1.4	662	3E+03	2E+03	2E+03
13DSDO078	1,786	5,354	225	1,518	90	27	11.8	1.6	4.4	2,425	8E+03	6E+03	1E+04
13EDO177	53	112	10	162	3	1	0.7	0.1	0.2	54	8E+01	3E+02	4E+02
13EDO174	1,250	7,000	187	401	21	23	3.1	2.0	6.6	3,472	1E+04	9E+03	5E+03
13EDO176	37	86	5	77	2	1	0.4	0.1	0.2	42	6E+01	3E+02	3E+02
13FDO95	10	22	2	27	0	0	0.1	0.0	0.0	11	3E+01	1E+02	1E+02
13FDO011	24	45	1	1	1	0	0.0	0.0	0.0	23	2E+01	1E+02	1E+02
13F093	104	271	9	107	3	2	0.6	0.2	0.9	124	4E+02	1E+03	1E+03
13L090	32,731	156,234	5,047	5,996	1,753	727	171.7	38.8	134.6	70,195	3E+05	1E+05	2E+05
14CDO9	756	4,411	159	882	27	22	5.2	1.5	4.6	2,108	9E+03	6E+03	5E+03
15FSDO288	1,981	9,928	318	1,710	50	37	9.4	3.4	10.2	4,916	2E+04	1E+04	2E+04
15L089	13,382	60,715	2,048	5,090	633	296	71.0	16.3	57.2	28,234	1E+05	6E+04	8E+04
15L088	6,305	39,286	1,002	251	112	170	12.3	10.8	42.4	19,195	7E+04	5E+04	3E+04
16L097	535	1,648	69	618	18	34	3.6	1.3	5.9	683	4E+03	7E+03	7E+03
16LSDO122	8,311	42,777	1,299	2,557	273	266	32.5	11.5	44.9	20,194	9E+04	6E+04	7E+04
17M033	5,478	26,882	774	1,872	123	287	17.7	11.2	49.5	12,331	6E+04	6E+04	6E+04
18GSDO233	4,119	18,320	528	546	79	184	8.9	4.7	23.1	8,275	5E+04	7E+04	6E+04
19GDO043	5,029	33,011	830	349	96	119	10.6	9.6	32.8	15,859	6E+04	4E+04	3E+04
19GDO194	432	2,216	68	169	17	9	2.1	0.8	2.6	1,048	4E+03	3E+03	3E+03
19G199	60	174	2	2	1	1	0.1	0.2	0.7	76	1E+02	6E+02	7E+02
20G163	320	1,275	10	23	8	11	1.0	1.8	8.2	488	1E+03	4E+03	4E+03
20L083	214	932	26	9	4	9	0.7	0.1	2.1	504	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	60	2	5	1	0	0.1	0.0	0.0	28	1E+02	7E+01	9E+01
21H048	123	364	4	4	3	3	0.3	0.4	1.5	158	3E+02	3E+02	3E+02
21KSDO069	8,804	50,464	1,326	947	221	277	24.0	15.3	61.4	23,736	1E+05	7E+04	6E+04
21M005	148	427	12	39	3	3	0.4	0.1	0.9	228	1E+02	2E+02	3E+02
21M010	905	3,092	82	78	18	24	2.3	0.4	7.1	1,662	2E+03	2E+03	3E+03
21M050	424	1,221	30	25	9	7	0.9	0.2	2.8	652	2E+03	9E+02	3E+03
22CDO384	2,502	9,230	365	1,805	132	51	16.5	2.6	7.8	4,143	1E+04	9E+03	1E+04
22LSDO580	1,186	4,505	126	95	23	34	3.2	0.7	12.3	2,503	3E+03	3E+03	4E+03
23GDO132	4,472	9,517	268	2,152	125	63	15.8	3.8	16.4	4,415	7E+03	9E+03	1E+04
23HSDO042	18,107	78,632	2,704	4,951	882	551	98.8	25.7	101.5	36,244	1E+05	1E+05	1E+05
23HDO040	2,816	16,887	430	309	61	78	6.8	4.8	18.1	7,988	3E+04	2E+04	2E+04
23L196	136	273	7	37	4	1	0.4	0.1	0.7	138	1E+02	4E+01	2E+02
23L075	624	1,539	47	217	18	7	2.1	0.3	3.4	815	2E+03	7E+02	3E+03
23L074	133	286	7	24	4	1	0.3	0.0	0.4	149	8E+01	6E+01	1E+02
23L195	142	272	9	75	4	1	0.5	0.1	0.7	146	2E+02	6E+01	3E+02
23L202	145	279	7	37	4	0	0.3	0.1	0.7	151	3E+02	5E+01	6E+02
23L016	112	224	6	36	3	0	0.3	0.0	0.5	123	4E+02	7E+01	7E+02
23L015	160	276	11	133	5	1	0.7	0.1	0.5	139	3E+01	5E+01	5E+01
23L164	865	2,158	71	103	22	44	2.0	0.3	4.8	986	7E+03	9E+03	1E+04
24CSDO031	286	1,787	48	56	4	6	0.6	0.5	1.8	893	3E+03	2E+03	1E+03

Table C2-18. Scenario 4.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,571	8,047	264	1,083	43	34	7.1	2.5	8.6	3,925	2E+04	1E+04	1E+04
24DSDO150	32	76	2	23	1	0	0.1	0.0	0.1	41	7E+01	5E+02	5E+02
24DSDO032	20,525	112,583	3,788	8,326	747	391	94.5	36.5	120.4	60,612	2E+05	1E+05	1E+05
24GSDO035	24,067	140,141	3,596	4,298	417	632	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
24GSDO034	1,683	6,395	169	911	41	25	5.9	2.6	11.2	3,137	1E+04	2E+04	2E+04
24L233	430	1,277	32	89	23	12	2.3	1.1	5.1	489	1E+03	8E+02	3E+03
25DDO040	538	2,660	78	208	12	18	1.7	1.0	4.2	1,286	5E+03	4E+03	4E+03
25EDO037	13,544	71,371	1,906	3,395	276	287	36.0	22.0	89.9	34,473	1E+05	1E+05	8E+04
25GDO041	72	247	9	31	6	3	0.6	0.2	1.0	84	3E+02	2E+02	5E+02
25GDO-06	240	660	18	217	9	7	1.4	0.8	3.6	276	3E+02	5E+02	6E+02
26J049	7,408	20,716	797	700	536	153	47.4	5.3	28.7	7,863	3E+04	1E+04	6E+04
25L144	546	3,702	90	10	13	13	1.3	1.0	3.3	1,722	8E+03	5E+03	3E+03
25L058	4,445	23,861	617	500	86	159	9.6	6.6	27.9	11,244	5E+04	4E+04	4E+04
26FDO038	58	165	14	133	7	2	1.0	0.1	0.2	54	3E+02	6E+01	6E+02
26GSDO01	3,670	16,762	494	1,922	124	86	16.8	7.5	28.7	7,863	3E+04	2E+04	2E+04
26JSDO052	39	73	4	65	2	0	0.3	0.1	0.2	35	9E+00	1E+01	2E+01
26JSDO100	156	417	22	80	14	3	1.5	0.1	0.2	144	7E+02	1E+02	1E+03
26J101	433	1,048	63	502	32	9	4.2	0.4	1.2	400	2E+03	7E+02	3E+03
26KSDO254	326	1,118	43	114	5	32	0.9	0.2	2.5	492	5E+03	7E+03	8E+03
26K035	191	405	11	33	5	1	0.5	0.1	1.1	219	5E+02	8E+01	9E+02
26K099	12,515	80,616	1,927	796	169	358	20.1	23.5	86.8	38,500	2E+05	1E+05	8E+04
26L055	173	1,007	28	12	7	4	0.6	0.2	0.8	464	2E+03	1E+03	1E+03
26LSDO084	69	204	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	208	356	5	22	4	0	0.3	0.0	0.1	178	8E+01	2E+01	2E+02
27JSDO044	376	748	29	362	12	6	2.0	0.5	2.1	352	3E+02	6E+02	6E+02
27JSDO096	2,064	4,151	94	322	54	14	4.5	0.6	4.8	2,063	2E+03	4E+03	5E+03
27JSDO001	7,753	44,776	1,124	1,519	132	252	17.8	13.6	55.5	21,172	9E+04	7E+04	5E+04
27L022	2,208	13,353	318	292	44	64	5.3	5.2	19.5	6,274	3E+04	2E+04	1E+04
27L020	2,088	12,508	298	290	43	60	5.1	4.8	18.2	5,854	2E+04	2E+04	1E+04
28K061	4,384	28,403	720	369	66	134	7.9	7.8	27.6	13,610	6E+04	4E+04	3E+04
28K010	3,863	26,727	655	249	48	102	6.0	7.4	25.1	12,912	5E+04	4E+04	2E+04
28K386	664	1,642	57	373	18	20	2.6	0.6	3.8	800	2E+03	3E+03	3E+03
28L073	74	223	9	73	5	1	0.6	0.1	0.1	102	4E+02	2E+03	2E+03
28L074/5/6	1,217	3,591	108	709	51	22	6.3	2.1	8.9	1,588	5E+03	7E+03	1E+04
28N156	312	1,761	51	115	5	12	0.9	0.5	1.8	856	4E+03	3E+03	2E+03
28N207	3,200	19,526	507	454	64	95	7.6	5.9	21.2	9,326	4E+04	3E+04	2E+04
28O025	50	233	9	20	1	2	0.2	0.1	0.2	118	7E+02	5E+02	6E+02
28P001	302	2,005	50	26	4	7	0.5	0.5	1.8	983	4E+03	2E+03	1E+03
29J129	162	296	13	146	5	2	0.8	0.1	0.5	144	2E+02	4E+02	4E+02
29J029	353	918	40	184	6	31	1.1	0.2	1.8	381	4E+03	6E+03	6E+03
29J212	17,159	110,966	2,706	1,095	248	518	29.9	32.1	121.6	53,109	2E+05	2E+05	1E+05
29M049	1,246	6,867	191	184	35	45	3.8	1.9	7.3	3,177	1E+04	1E+04	1E+04
29N015	126	566	17	28	2	5	0.5	0.1	1.3	310	3E+02	5E+02	5E+02
29N135	409	2,269	61	147	7	9	1.2	0.6	2.7	1,122	4E+03	3E+03	1E+03
29O001	11,222	69,313	1,861	2,348	230	287	29.2	19.8	68.2	33,569	1E+05	9E+04	6E+04
29P015	76	510	13	13	1	2	0.2	0.1	0.5	250	9E+02	6E+02	3E+02
29P044	594	3,990	103	80	10	13	1.2	1.1	3.6	1,950	8E+03	5E+03	3E+03
30J006	225	658	25	179	8	5	1.3	0.2	1.0	329	8E+02	3E+03	3E+03

Table C2-18. Scenario 4.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	62	166	7	94	2	1	0.5	0.1	0.5	82	1E+02	6E+02	7E+02
30J030	683	1,466	37	163	17	5	1.7	0.2	2.6	761	5E+02	5E+02	9E+02
30P107	333	1,750	65	105	6	10	0.9	0.4	1.5	890	4E+03	3E+03	2E+03
30P062	284	1,875	49	53	4	6	0.6	0.5	1.7	930	3E+03	2E+03	1E+03
31O004	991	5,952	210	150	18	31	2.3	1.4	4.6	2,924	1E+04	1E+04	6E+03
31P084	304	1,889	49	78	4	6	0.6	0.5	1.8	934	4E+03	2E+03	1E+03
3FDO159	307	1,307	59	495	14	7	2.7	0.5	1.5	629	2E+03	2E+03	2E+03
11G318/319	336	928	71	739	13	34	3.4	0.5	2.3	376	4E+03	6E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,596	5,677	127	77	52	73	3.3	0.8	5.6	2,646	3E+04	5E+04	5E+04
21H047	508	1,936	34	76	15	15	1.7	1.6	7.0	810	2E+03	2E+03	2E+03
21H039	1,470	4,624	65	318	44	47	5.1	5.4	23.6	1,848	4E+03	4E+03	5E+03
20G161	2,546	10,810	306	228	66	76	7.3	5.2	22.0	4,940	2E+04	2E+04	2E+04
StonyMWRA	113,171	527,861	18,681	69,534	4,797	3,069	665.9	187.7	632.9	253,826	9E+05	6E+05	7E+05
Fens	70,754	223,035	11,457	17,710	4,574	2,095	532.3	94.6	286.8	112,950	3E+05	2E+05	2E+05
20D055	5,509	35,553	950	479	119	127	12.9	10.1	33.6	17,299	7E+04	4E+04	3E+04
21D319	7,371	48,619	1,281	839	144	170	16.7	13.8	45.2	23,700	9E+04	6E+04	4E+04

Table C2-19. Scenario 4.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	984	3,950	141	917	29	19	5.3	1.2	5.3	2,001	5E+03	4E+03	3E+03
1FDO31	805	3,775	104	198	19	18	2.2	1.0	3.7	1,839	7E+03	5E+03	4E+03
02E086	258	1,066	43	328	10	5	1.9	0.4	1.2	515	2E+03	1E+03	1E+03
2FDO120	1,376	6,862	201	592	33	30	4.9	1.9	8.0	3,407	1E+04	8E+03	7E+03
2FDO93	1,534	10,825	264	112	18	36	2.3	2.9	9.8	5,273	2E+04	1E+04	8E+03
2FDO85	97	450	13	34	3	1	0.3	0.1	0.4	220	7E+02	5E+02	4E+02
3ESDO186	319	1,440	64	565	14	7	2.9	0.6	1.8	700	2E+03	2E+03	1E+03
3ESDO185	586	2,646	105	364	15	13	2.5	0.8	2.6	1,373	6E+03	3E+03	3E+03
3F162	527	2,551	95	505	24	11	3.7	0.8	2.4	1,204	4E+03	3E+03	3E+03
4ESDO69	1,599	7,503	246	981	42	37	6.8	2.4	8.8	3,741	1E+04	9E+03	9E+03
4ESDO64	39	127	8	92	2	1	0.5	0.1	0.2	60	2E+02	3E+02	3E+02
4FDO189	753	4,224	117	177	20	15	2.3	1.2	4.0	2,059	7E+03	4E+03	3E+03
4FDO204	884	4,525	144	510	31	17	4.3	1.3	4.1	2,173	8E+03	5E+03	4E+03
4FDO16	413	2,349	66	87	11	10	1.2	0.6	2.2	1,132	4E+03	3E+03	3E+03
4FDO203	128	557	24	185	6	3	1.1	0.2	0.6	267	9E+02	7E+02	7E+02
4FDO118	587	3,333	87	113	10	14	1.3	0.9	3.1	1,634	6E+03	4E+03	3E+03
4FDO119	1,273	5,184	136	45	22	35	2.9	0.8	10.2	2,768	4E+03	4E+03	4E+03
5CSDO110	752	2,569	127	766	31	22	5.1	1.0	3.1	1,325	6E+03	5E+03	6E+03
5EDO182	106	501	31	376	6	3	1.7	0.3	0.8	245	8E+02	5E+02	4E+02
5ESDO184	631	2,815	143	1,483	30	14	7.1	1.4	3.6	1,376	4E+03	3E+03	3E+03
5FDO117	783	3,937	142	774	32	16	5.1	1.3	3.9	1,885	7E+03	4E+03	4E+03
5FDO254	55	348	9	12	1	1	0.1	0.1	0.4	174	6E+02	4E+02	2E+02
5FDO265	19	38	1	3	0	0	0.0	0.0	0.1	21	2E+01	1E+01	3E+01
5FDO253	628	3,313	94	175	16	15	2.0	0.9	3.1	1,597	6E+03	4E+03	4E+03
5FDO245	1,359	8,076	218	360	27	28	3.6	2.3	7.9	3,981	1E+04	9E+03	6E+03
5FDO244	235	1,214	32	56	5	5	0.6	0.3	1.6	605	2E+03	1E+03	9E+02
5FDO264	18	51	2	6	0	2	0.0	0.0	0.1	21	2E+02	4E+02	4E+02
5GDO112	925	5,627	144	169	17	21	2.1	1.8	6.3	2,749	1E+04	6E+03	4E+03
5GDO116A	786	4,425	129	454	15	15	2.7	1.4	4.3	2,206	7E+03	5E+03	2E+03
5GDO115	241	1,474	39	39	5	6	0.6	0.4	1.5	722	3E+03	2E+03	1E+03
5GDO116	725	4,198	111	128	17	14	1.9	1.1	3.8	2,034	7E+03	4E+03	3E+03
6DDO57	135	519	23	196	6	2	1.1	0.2	0.5	251	7E+02	1E+03	1E+03
6DDO184	8	22	13	238	3	1	1.0	0.1	0.2	8	3E+01	7E+00	5E+01
6DDO91	13	29	27	525	6	2	2.2	0.3	0.5	12	3E+01	1E+01	6E+01
6DDO187	76	237	11	56	2	6	0.4	0.1	0.4	100	8E+02	1E+03	1E+03
6DDO86	9	25	5	80	1	0	0.4	0.0	0.1	10	3E+01	1E+01	5E+01
6DDO85	42	219	9	49	2	1	0.4	0.1	0.2	102	4E+02	2E+02	2E+02
6DDO83	175	805	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	10	44	2	19	1	0	0.1	0.0	0.0	19	7E+01	3E+01	6E+01
06D097	69	227	15	141	6	2	0.9	0.1	0.2	93	4E+02	2E+02	5E+02
6GDO109	1,434	7,871	215	275	41	28	4.4	2.2	7.0	3,771	2E+04	8E+03	9E+03
6GDO110	1,778	10,582	287	389	42	37	5.0	2.9	9.4	5,146	2E+04	1E+04	8E+03
6GDO111	261	1,150	60	610	14	6	3.1	0.6	1.5	552	2E+03	1E+03	9E+02
6GDO166	146	532	40	551	9	4	2.5	0.4	0.9	257	8E+02	4E+02	5E+02
6GDO108	4,708	27,639	744	958	109	102	12.9	7.6	25.1	13,419	5E+04	3E+04	2E+04
6G165	27	113	5	54	1	1	0.2	0.1	0.1	56	2E+02	1E+02	9E+01
6HDO43	87	435	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	214	986	34	180	7	4	1.2	0.3	0.9	483	2E+03	9E+02	7E+02

Table C2-19. Scenario 4.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	530	2,753	88	412	15	11	2.6	0.9	2.8	1,343	5E+03	3E+03	2E+03
7CDO006	5,844	27,315	1,050	7,716	193	128	40.2	10.5	31.5	13,485	5E+04	4E+04	4E+04
7HDO285	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
7HDO105	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
7HDO348	48	318	8	10	0	1	0.1	0.1	0.3	159	6E+02	4E+02	2E+02
7HDO347	336	1,754	55	200	11	7	1.6	0.5	1.6	848	3E+03	2E+03	2E+03
7HDO346	320	2,019	52	68	5	7	0.7	0.6	1.8	988	4E+03	2E+03	1E+03
8BDO122	1,495	8,466	212	299	29	38	3.7	3.2	12.0	4,052	2E+04	1E+04	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	8E-01
8BDO126	850	5,437	138	135	12	18	1.5	1.6	5.2	2,683	1E+04	6E+03	3E+03
8CDO25	188	617	43	483	10	5	2.4	0.4	1.0	325	1E+03	1E+03	2E+03
8CDO26	175	610	40	415	8	5	2.0	0.4	1.0	325	1E+03	1E+03	2E+03
8DDO112	33	197	5	8	1	1	0.1	0.1	0.2	95	4E+02	4E+02	3E+02
8DSDO100	80	257	15	175	3	3	0.8	0.1	0.4	125	5E+02	1E+03	1E+03
8EDO35	126	353	30	453	8	2	2.0	0.3	0.6	176	4E+02	2E+03	2E+03
8EDO33	461	2,879	83	252	9	10	1.6	0.9	2.8	1,419	5E+03	3E+03	2E+03
8IDO153	37	244	6	4	0	1	0.1	0.1	0.2	120	4E+02	3E+02	1E+02
8IDO155	25	93	5	58	1	0	0.3	0.0	0.1	47	1E+02	3E+02	3E+02
8IDO156	324	697	47	587	19	4	3.3	0.3	0.8	302	5E+02	1E+02	8E+02
8IDO209	115	742	19	18	1	2	0.2	0.2	0.7	367	1E+03	9E+02	5E+02
8IDO154	836	4,634	132	292	22	21	2.9	1.4	4.7	2,231	8E+03	6E+03	5E+03
8IDO158	386	2,318	63	135	8	9	1.2	0.8	2.6	1,136	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,177	7,408	192	237	22	27	2.9	2.3	8.3	3,600	1E+04	8E+03	5E+03
8JSDO103	942	5,623	158	325	22	20	3.0	1.6	5.3	2,754	1E+04	6E+03	4E+03
8JSDO41	534	3,394	90	114	10	12	1.3	1.0	3.4	1,656	6E+03	4E+03	2E+03
8JSDO50	1,214	6,366	180	419	36	26	4.5	2.1	7.2	3,042	1E+04	8E+03	7E+03
8K049	161	954	28	64	4	3	0.6	0.3	0.9	460	2E+03	1E+03	8E+02
9BDO49	329	908	34	147	6	22	1.0	0.2	1.5	411	3E+03	7E+03	7E+03
9EDO229	58	290	9	23	2	1	0.2	0.1	0.2	138	5E+02	3E+02	3E+02
9EDO243	167	584	24	188	7	3	1.1	0.2	0.6	281	1E+03	1E+03	2E+03
9K100	51	138	8	63	2	5	0.3	0.0	0.3	57	6E+02	9E+02	1E+03
9K101	622	2,257	102	883	25	19	4.8	0.9	2.8	1,071	4E+03	5E+03	6E+03
9K016	63	189	29	463	7	3	2.1	0.3	0.6	85	3E+02	4E+02	5E+02
9LSDO095	221	841	38	337	7	10	1.6	0.3	1.2	407	2E+03	2E+03	2E+03
10BSDO62	30	55	1	1	1	0	0.0	0.0	0.1	29	7E+00	5E-01	1E+01
10BSDO15	34	85	3	10	1	1	0.1	0.0	0.2	43	2E+02	4E+02	5E+02
10BSDO64	119	344	15	88	4	3	0.6	0.1	0.7	238	5E+02	6E+02	7E+02
10L094	13,632	75,766	2,096	4,587	303	299	41.0	22.3	76.6	36,950	1E+05	9E+04	8E+04
10L096	1,508	9,157	250	282	26	57	3.5	2.5	9.2	4,389	2E+04	2E+04	1E+04
11BDO28	13,051	60,377	2,573	21,774	469	362	106.9	25.0	73.1	29,674	1E+05	8E+04	7E+04
11BDO123	2,543	13,426	387	753	63	66	7.8	3.7	12.5	6,481	3E+04	2E+04	2E+04
11IDO577	34,598	176,003	5,645	13,022	1,623	825	183.5	51.2	167.6	80,469	3E+05	2E+05	2E+05
11M093	1,077	3,952	162	749	33	21	5.2	1.3	4.8	2,113	9E+03	6E+03	7E+03
12BDO10	12	29	2	19	0	1	0.1	0.0	0.1	13	9E+01	2E+02	2E+02
12BDO14	28	69	4	41	1	2	0.2	0.0	0.1	30	2E+02	4E+02	4E+02
12BDO124	9,142	49,090	1,509	6,092	213	214	37.2	15.4	48.8	24,177	9E+04	6E+04	5E+04
12EDO418	214	953	34	83	4	4	0.6	0.3	0.9	506	2E+03	2E+03	1E+03

Table C2-19. Scenario 4.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	143	699	21	83	3	2	0.5	0.2	0.6	347	1E+03	1E+03	8E+02
12HOFDO92	972	2,697	421	2,884	109	139	23.6	3.4	12.6	2,505	4E+03	8E+03	1E+04
12HDO85/87	455	1,352	71	471	14	43	2.7	0.4	2.7	543	6E+03	1E+04	1E+04
12L092	2,211	9,994	324	1,068	80	44	10.1	3.1	10.4	4,783	2E+04	1E+04	1E+04
12LDO296	484	2,292	71	270	13	9	2.0	0.7	2.6	1,136	4E+03	2E+03	2E+03
12M091	342	1,227	53	282	10	7	1.7	0.4	1.4	662	3E+03	2E+03	2E+03
13DSDO078	1,786	5,354	225	1,518	90	27	11.8	1.6	4.4	2,425	8E+03	6E+03	1E+04
13EDO177	53	112	10	162	3	1	0.7	0.1	0.2	54	8E+01	3E+02	4E+02
13EDO174	1,250	7,000	187	401	21	23	3.1	2.0	6.6	3,472	1E+04	9E+03	5E+03
13EDO176	37	86	5	77	2	1	0.4	0.1	0.2	42	6E+01	3E+02	3E+02
13FDO95	10	22	2	27	0	0	0.1	0.0	0.0	11	3E+01	1E+02	1E+02
13FDO011	24	45	1	1	1	0	0.0	0.0	0.0	23	2E+01	1E+02	1E+02
13F093	104	271	9	107	3	2	0.6	0.2	0.9	124	4E+02	1E+03	1E+03
13L090	32,731	156,234	5,047	5,996	1,753	727	171.7	38.8	134.6	70,195	3E+05	1E+05	2E+05
14CDO9	756	4,411	159	882	27	22	5.2	1.5	4.6	2,108	9E+03	6E+03	5E+03
15FSDO288	1,981	9,928	318	1,710	50	37	9.4	3.4	10.2	4,916	2E+04	1E+04	2E+04
15L089	13,382	60,715	2,048	5,090	633	296	71.0	16.3	57.2	28,234	1E+05	6E+04	8E+04
15L088	6,305	39,286	1,002	251	112	170	12.3	10.8	42.4	19,195	7E+04	5E+04	3E+04
16L097	535	1,648	69	618	18	34	3.6	1.3	5.9	683	4E+03	7E+03	7E+03
16LSDO122	8,311	42,777	1,299	2,557	273	266	32.5	11.5	44.9	20,194	9E+04	6E+04	7E+04
17M033	5,478	26,882	774	1,872	123	287	17.7	11.2	49.5	12,331	6E+04	6E+04	6E+04
18GSDO233	4,119	18,320	528	546	79	147	8.9	4.7	23.1	8,275	5E+04	7E+04	6E+04
19GDO043	5,029	33,011	830	349	96	119	10.6	9.6	32.8	15,859	6E+04	4E+04	3E+04
19GDO194	432	2,216	68	169	17	9	2.1	0.8	2.6	1,048	4E+03	3E+03	3E+03
19G199	60	174	2	2	1	1	0.1	0.2	0.7	76	1E+02	6E+02	7E+02
20G163	320	1,275	10	23	8	9	1.0	1.8	8.2	488	1E+03	4E+03	4E+03
20L083	214	932	26	9	4	9	0.7	0.1	2.1	504	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	60	2	5	1	0	0.1	0.0	0.0	28	1E+02	7E+01	9E+01
21H048	123	364	4	4	3	3	0.3	0.4	1.5	158	3E+02	3E+02	3E+02
21KSDO069	8,804	50,464	1,326	947	221	277	24.0	15.3	61.4	23,736	1E+05	7E+04	6E+04
21M005	148	427	12	39	3	3	0.4	0.1	0.9	228	1E+02	2E+02	3E+02
21M010	905	3,092	82	78	18	24	2.3	0.4	7.1	1,662	2E+03	2E+03	3E+03
21M050	424	1,221	30	25	9	7	0.9	0.2	2.8	652	2E+03	9E+02	3E+03
22CDO384	2,502	9,230	365	1,805	132	51	16.5	2.6	7.8	4,143	1E+04	9E+03	1E+04
22LSDO580	1,186	4,505	126	95	23	34	3.2	0.7	12.3	2,503	3E+03	3E+03	4E+03
23GDO132	4,472	9,517	268	2,152	125	63	15.8	3.8	16.4	4,415	7E+03	9E+03	1E+04
23HSDO042	18,107	78,632	2,704	4,951	882	550	98.8	25.7	101.5	36,244	1E+05	1E+05	1E+05
23HDO040	2,816	16,887	430	309	61	78	6.8	4.8	18.1	7,988	3E+04	2E+04	2E+04
23L196	136	273	7	37	4	1	0.4	0.1	0.7	138	1E+02	4E+01	2E+02
23L075	624	1,539	47	217	18	7	2.1	0.3	3.4	815	2E+03	7E+02	3E+03
23L074	133	286	7	24	4	1	0.3	0.0	0.4	149	8E+01	6E+01	1E+02
23L195	142	272	9	75	4	1	0.5	0.1	0.7	146	2E+02	6E+01	3E+02
23L202	145	279	7	37	4	0	0.3	0.1	0.7	151	3E+02	5E+01	6E+02
23L016	112	224	6	36	3	0	0.3	0.0	0.5	123	4E+02	7E+01	7E+02
23L015	160	276	11	133	5	1	0.7	0.1	0.5	139	3E+01	5E+01	5E+01
23L164	865	2,158	71	103	22	44	2.0	0.3	4.8	986	7E+03	9E+03	1E+04
24CSDO031	286	1,787	48	56	4	6	0.6	0.5	1.8	893	3E+03	2E+03	1E+03

Table C2-19. Scenario 4.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,571	8,047	264	1,083	43	27	7.1	2.5	8.6	3,925	2E+04	1E+04	1E+04
24DSDO150	32	76	2	23	1	0	0.1	0.0	0.1	41	7E+01	5E+02	5E+02
24DSDO032	20,525	112,583	3,788	8,326	747	312	94.5	36.5	120.4	60,612	2E+05	1E+05	1E+05
24GSDO035	24,067	140,141	3,596	4,298	417	632	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
24GSDO034	1,683	6,395	169	911	41	25	5.9	2.6	11.2	3,137	1E+04	2E+04	2E+04
24L233	430	1,277	32	89	23	12	2.3	1.1	5.1	489	1E+03	8E+02	3E+03
25DDO040	538	2,660	78	208	12	18	1.7	1.0	4.2	1,286	5E+03	4E+03	4E+03
25EDO037	13,544	71,371	1,906	3,395	276	233	36.0	22.0	89.9	34,473	1E+05	1E+05	8E+04
25GDO041	72	247	9	31	6	3	0.6	0.2	1.0	84	3E+02	2E+02	5E+02
25GDO-06	240	660	18	217	9	7	1.4	0.8	3.6	276	3E+02	5E+02	6E+02
26J049	7,408	20,716	797	700	536	153	47.4	5.3	28.7	7,863	3E+04	1E+04	6E+04
25L144	546	3,702	90	10	13	13	1.3	1.0	3.3	1,722	8E+03	5E+03	3E+03
25L058	4,445	23,861	617	500	86	159	9.6	6.6	27.9	11,244	5E+04	4E+04	4E+04
26FDO038	58	165	14	133	7	2	1.0	0.1	0.2	54	3E+02	6E+01	6E+02
26GSDO01	3,670	16,762	494	1,922	124	86	16.8	7.5	28.7	7,863	3E+04	2E+04	2E+04
26JSDO052	39	73	4	65	2	0	0.3	0.1	0.2	35	9E+00	1E+01	2E+01
26JSDO100	156	417	22	80	14	3	1.5	0.1	0.2	144	7E+02	1E+02	1E+03
26J101	433	1,048	63	502	32	9	4.2	0.4	1.2	400	2E+03	7E+02	3E+03
26KSDO254	326	1,118	43	114	5	32	0.9	0.2	2.5	492	5E+03	7E+03	8E+03
26K035	191	405	11	33	5	1	0.5	0.1	1.1	219	5E+02	8E+01	9E+02
26K099	12,515	80,616	1,927	796	169	358	20.1	23.5	86.8	38,500	2E+05	1E+05	8E+04
26L055	173	1,007	28	12	7	4	0.6	0.2	0.8	464	2E+03	1E+03	1E+03
26LSDO084	69	204	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	208	356	5	22	4	0	0.3	0.0	0.1	178	8E+01	2E+01	2E+02
27JSDO044	376	748	29	362	12	6	2.0	0.5	2.1	352	3E+02	6E+02	6E+02
27JSDO096	2,064	4,151	94	322	54	14	4.5	0.6	4.8	2,063	2E+03	4E+03	5E+03
27JSDO001	7,753	44,776	1,124	1,519	132	252	17.8	13.6	55.5	21,172	9E+04	7E+04	5E+04
27L022	2,208	13,353	318	292	44	64	5.3	5.2	19.5	6,274	3E+04	2E+04	1E+04
27L020	2,088	12,508	298	290	43	60	5.1	4.8	18.2	5,854	2E+04	2E+04	1E+04
28K061	4,384	28,403	720	369	66	134	7.9	7.8	27.6	13,610	6E+04	4E+04	3E+04
28K010	3,863	26,727	655	249	48	102	6.0	7.4	25.1	12,912	5E+04	4E+04	2E+04
28K386	664	1,642	57	373	18	20	2.6	0.6	3.8	800	2E+03	3E+03	3E+03
28L073	74	223	9	73	5	1	0.6	0.1	0.1	102	4E+02	2E+03	2E+03
28L074/5/6	1,217	3,591	108	709	51	22	6.3	2.1	8.9	1,588	5E+03	7E+03	1E+04
28N156	312	1,761	51	115	5	12	0.9	0.5	1.8	856	4E+03	3E+03	2E+03
28N207	3,200	19,526	507	454	64	95	7.6	5.9	21.2	9,326	4E+04	3E+04	2E+04
28O025	50	233	9	20	1	2	0.2	0.1	0.2	118	7E+02	5E+02	6E+02
28P001	302	2,005	50	26	4	7	0.5	0.5	1.8	983	4E+03	2E+03	1E+03
29J129	162	296	13	146	5	2	0.8	0.1	0.5	144	2E+02	4E+02	4E+02
29J029	353	918	40	184	6	31	1.1	0.2	1.8	381	4E+03	6E+03	6E+03
29J212	17,159	110,966	2,706	1,095	248	518	29.9	32.1	121.6	53,109	2E+05	2E+05	1E+05
29M049	1,246	6,867	191	184	35	45	3.8	1.9	7.3	3,177	1E+04	1E+04	1E+04
29N015	126	566	17	28	2	5	0.5	0.1	1.3	310	3E+02	5E+02	5E+02
29N135	409	2,269	61	147	7	9	1.2	0.6	2.7	1,122	4E+03	3E+03	1E+03
29O001	11,222	69,313	1,861	2,348	230	287	29.2	19.8	68.2	33,569	1E+05	9E+04	6E+04
29P015	76	510	13	13	1	2	0.2	0.1	0.5	250	9E+02	6E+02	3E+02
29P044	594	3,990	103	80	10	13	1.2	1.1	3.6	1,950	8E+03	5E+03	3E+03
30J006	225	658	25	179	8	5	1.3	0.2	1.0	329	8E+02	3E+03	3E+03

Table C2-19. Scenario 4.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	62	166	7	94	2	1	0.5	0.1	0.5	82	1E+02	6E+02	7E+02
30J030	683	1,466	37	163	17	5	1.7	0.2	2.6	761	5E+02	5E+02	9E+02
30P107	333	1,750	65	105	6	10	0.9	0.4	1.5	890	4E+03	3E+03	2E+03
30P062	284	1,875	49	53	4	6	0.6	0.5	1.7	930	3E+03	2E+03	1E+03
31O004	991	5,952	210	150	18	31	2.3	1.4	4.6	2,924	1E+04	1E+04	6E+03
31P084	304	1,889	49	78	4	6	0.6	0.5	1.8	934	4E+03	2E+03	1E+03
3FDO159	307	1,307	59	495	14	7	2.7	0.5	1.5	629	2E+03	2E+03	2E+03
11G318/319	336	928	71	739	13	34	3.4	0.5	2.3	376	4E+03	6E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,596	5,677	127	77	52	73	3.3	0.8	5.6	2,646	3E+04	5E+04	5E+04
21H047	508	1,936	34	76	15	15	1.7	1.6	7.0	810	2E+03	2E+03	2E+03
21H039	1,470	4,624	65	318	44	47	5.1	5.4	23.6	1,848	4E+03	4E+03	5E+03
20G161	2,546	10,810	306	228	66	61	7.3	5.2	22.0	4,940	2E+04	2E+04	2E+04
StonyMWRA	113,171	527,861	18,681	69,534	4,797	3,069	665.9	187.7	632.9	253,826	9E+05	6E+05	7E+05
Fens	70,754	223,035	11,457	17,710	4,574	2,067	532.3	94.6	286.8	112,950	3E+05	2E+05	2E+05
20D055	5,509	35,553	950	479	119	127	12.9	10.1	33.6	17,299	7E+04	4E+04	3E+04
21D319	7,371	48,619	1,281	839	144	170	16.7	13.8	45.2	23,700	9E+04	6E+04	4E+04

Table C2-20. Scenario 4.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	984	3,950	141	917	29	19	5.3	1.2	5.3	2,001	5E+03	4E+03	3E+03
1FDO31	805	3,775	104	198	19	18	2.2	1.0	3.7	1,839	7E+03	5E+03	4E+03
02E086	258	1,066	43	328	10	5	1.9	0.4	1.2	515	2E+03	1E+03	1E+03
2FDO120	1,376	6,862	201	592	33	30	4.9	1.9	8.0	3,407	1E+04	8E+03	7E+03
2FDO93	1,534	10,825	264	112	18	36	2.3	2.9	9.8	5,273	2E+04	1E+04	8E+03
2FDO85	97	450	13	34	3	1	0.3	0.1	0.4	220	7E+02	5E+02	4E+02
3ESDO186	319	1,440	64	565	14	7	2.9	0.6	1.8	700	2E+03	2E+03	1E+03
3ESDO185	586	2,646	105	364	15	13	2.5	0.8	2.6	1,373	6E+03	3E+03	3E+03
3F162	527	2,551	95	505	24	11	3.7	0.8	2.4	1,204	4E+03	3E+03	3E+03
4ESDO69	1,599	7,503	246	981	42	37	6.8	2.4	8.8	3,741	1E+04	9E+03	9E+03
4ESDO64	39	127	8	92	2	1	0.5	0.1	0.2	60	2E+02	3E+02	3E+02
4FDO189	753	4,224	117	177	20	15	2.3	1.2	4.0	2,059	7E+03	4E+03	3E+03
4FDO204	884	4,525	144	510	31	17	4.3	1.3	4.1	2,173	8E+03	5E+03	4E+03
4FDO16	413	2,349	66	87	11	10	1.2	0.6	2.2	1,132	4E+03	3E+03	3E+03
4FDO203	128	557	24	185	6	3	1.1	0.2	0.6	267	9E+02	7E+02	7E+02
4FDO118	587	3,333	87	113	10	14	1.3	0.9	3.1	1,634	6E+03	4E+03	3E+03
4FDO119	1,273	5,184	136	45	22	35	2.9	0.8	10.2	2,768	4E+03	4E+03	4E+03
5CSDO110	752	2,569	127	766	31	22	5.1	1.0	3.1	1,325	6E+03	5E+03	6E+03
5EDO182	106	501	31	376	6	3	1.7	0.3	0.8	245	8E+02	5E+02	4E+02
5ESDO184	631	2,815	143	1,483	30	14	7.1	1.4	3.6	1,376	4E+03	3E+03	3E+03
5FDO117	783	3,937	142	774	32	16	5.1	1.3	3.9	1,885	7E+03	4E+03	4E+03
5FDO254	55	348	9	12	1	1	0.1	0.1	0.4	174	6E+02	4E+02	2E+02
5FDO265	19	38	1	3	0	0	0.0	0.0	0.1	21	2E+01	1E+01	3E+01
5FDO253	628	3,313	94	175	16	15	2.0	0.9	3.1	1,597	6E+03	4E+03	4E+03
5FDO245	1,359	8,076	218	360	27	28	3.6	2.3	7.9	3,981	1E+04	9E+03	6E+03
5FDO244	235	1,214	32	56	5	5	0.6	0.3	1.6	605	2E+03	1E+03	9E+02
5FDO264	18	51	2	6	0	2	0.0	0.0	0.1	21	2E+02	4E+02	4E+02
5GDO112	925	5,627	144	169	17	21	2.1	1.8	6.3	2,749	1E+04	6E+03	4E+03
5GDO116A	786	4,425	129	454	15	15	2.7	1.4	4.3	2,206	7E+03	5E+03	2E+03
5GDO115	241	1,474	39	39	5	6	0.6	0.4	1.5	722	3E+03	2E+03	1E+03
5GDO116	725	4,198	111	128	17	14	1.9	1.1	3.8	2,034	7E+03	4E+03	3E+03
6DDO57	135	519	23	196	6	2	1.1	0.2	0.5	251	7E+02	1E+03	1E+03
6DDO184	8	22	13	238	3	1	1.0	0.1	0.2	8	3E+01	7E+00	5E+01
6DDO91	13	29	27	525	6	2	2.2	0.3	0.5	12	3E+01	1E+01	6E+01
6DDO187	76	237	11	56	2	6	0.4	0.1	0.4	100	8E+02	1E+03	1E+03
6DDO86	9	25	5	80	1	0	0.4	0.0	0.1	10	3E+01	1E+01	5E+01
6DDO85	42	219	9	49	2	1	0.4	0.1	0.2	102	4E+02	2E+02	2E+02
6DDO83	175	805	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	10	44	2	19	1	0	0.1	0.0	0.0	19	7E+01	3E+01	6E+01
06D097	69	227	15	141	6	2	0.9	0.1	0.2	93	4E+02	2E+02	5E+02
6GDO109	1,434	7,871	215	275	41	28	4.4	2.2	7.0	3,771	2E+04	8E+03	9E+03
6GDO110	1,778	10,582	287	389	42	37	5.0	2.9	9.4	5,146	2E+04	1E+04	8E+03
6GDO111	261	1,150	60	610	14	6	3.1	0.6	1.5	552	2E+03	1E+03	9E+02
6GDO166	146	532	40	551	9	4	2.5	0.4	0.9	257	8E+02	4E+02	5E+02
6GDO108	4,708	27,639	744	958	109	102	12.9	7.6	25.1	13,419	5E+04	3E+04	2E+04
6G165	27	113	5	54	1	1	0.2	0.1	0.1	56	2E+02	1E+02	9E+01
6HDO43	87	435	15	64	4	2	0.5	0.1	0.4	204	7E+02	5E+02	5E+02
6HDO106	214	986	34	180	7	4	1.2	0.3	0.9	483	2E+03	9E+02	7E+02

Table C2-20. Scenario 4.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	530	2,753	88	412	15	11	2.6	0.9	2.8	1,343	5E+03	3E+03	2E+03
7CDO006	5,844	27,315	1,050	7,716	193	128	40.2	10.5	31.5	13,485	5E+04	4E+04	4E+04
7HDO285	6,041	29,770	907	2,422	208	122	25.3	8.5	30.3	14,271	6E+04	3E+04	4E+04
7HDO105	8,730	45,334	1,494	6,574	294	198	45.9	14.5	44.8	21,848	9E+04	5E+04	6E+04
7HDO348	48	318	8	10	0	1	0.1	0.1	0.3	159	6E+02	4E+02	2E+02
7HDO347	336	1,754	55	200	11	7	1.6	0.5	1.6	848	3E+03	2E+03	2E+03
7HDO346	320	2,019	52	68	5	7	0.7	0.6	1.8	988	4E+03	2E+03	1E+03
8BDO122	1,495	8,466	212	299	29	38	3.7	3.2	12.0	4,052	2E+04	1E+04	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	5E-01	8E-01	8E-01
8BDO126	850	5,437	138	135	12	18	1.5	1.6	5.2	2,683	1E+04	6E+03	3E+03
8CDO25	188	617	43	483	10	5	2.4	0.4	1.0	325	1E+03	1E+03	2E+03
8CDO26	175	610	40	415	8	5	2.0	0.4	1.0	325	1E+03	1E+03	2E+03
8DDO112	33	197	5	8	1	1	0.1	0.1	0.2	95	4E+02	4E+02	3E+02
8DSDO100	80	257	15	175	3	3	0.8	0.1	0.4	125	5E+02	1E+03	1E+03
8EDO35	126	353	30	453	8	2	2.0	0.3	0.6	176	4E+02	2E+03	2E+03
8EDO33	461	2,879	83	252	9	10	1.6	0.9	2.8	1,419	5E+03	3E+03	2E+03
8IDO153	37	244	6	4	0	1	0.1	0.1	0.2	120	4E+02	3E+02	1E+02
8IDO155	25	93	5	58	1	0	0.3	0.0	0.1	47	1E+02	3E+02	3E+02
8IDO156	324	697	47	587	19	4	3.3	0.3	0.8	302	5E+02	1E+02	8E+02
8IDO209	115	742	19	18	1	2	0.2	0.2	0.7	367	1E+03	9E+02	5E+02
8IDO154	836	4,634	132	292	22	21	2.9	1.4	4.7	2,231	8E+03	6E+03	5E+03
8IDO158	386	2,318	63	135	8	9	1.2	0.8	2.6	1,136	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,177	7,408	192	237	22	27	2.9	2.3	8.3	3,600	1E+04	8E+03	5E+03
8JSDO103	942	5,623	158	325	22	20	3.0	1.6	5.3	2,754	1E+04	6E+03	4E+03
8JSDO41	534	3,394	90	114	10	12	1.3	1.0	3.4	1,656	6E+03	4E+03	2E+03
8JSDO50	1,214	6,366	180	419	36	26	4.5	2.1	7.2	3,042	1E+04	8E+03	7E+03
8K049	161	954	28	64	4	3	0.6	0.3	0.9	460	2E+03	1E+03	8E+02
9BDO49	329	908	34	147	6	22	1.0	0.2	1.5	411	3E+03	7E+03	7E+03
9EDO229	58	290	9	23	2	1	0.2	0.1	0.2	138	5E+02	3E+02	3E+02
9EDO243	167	584	24	188	7	3	1.1	0.2	0.6	281	1E+03	1E+03	2E+03
9K100	51	138	8	63	2	5	0.3	0.0	0.3	57	6E+02	9E+02	1E+03
9K101	622	2,257	102	883	25	19	4.8	0.9	2.8	1,071	4E+03	5E+03	6E+03
9K016	63	189	29	463	7	3	2.1	0.3	0.6	85	3E+02	4E+02	5E+02
9LSDO095	221	841	38	337	7	10	1.6	0.3	1.2	407	2E+03	2E+03	2E+03
10BSDO62	30	55	1	1	1	0	0.0	0.0	0.1	29	7E+00	5E-01	1E+01
10BSDO15	34	85	3	10	1	1	0.1	0.0	0.2	43	2E+02	4E+02	5E+02
10BSDO64	119	344	15	88	4	3	0.6	0.1	0.7	238	5E+02	6E+02	7E+02
10L094	13,632	75,766	2,096	4,587	303	299	41.0	22.3	76.6	36,950	1E+05	9E+04	8E+04
10L096	1,508	9,157	250	282	26	57	3.5	2.5	9.2	4,389	2E+04	2E+04	1E+04
11BDO28	13,051	60,377	2,573	21,774	469	362	106.9	25.0	73.1	29,674	1E+05	8E+04	7E+04
11BDO123	2,543	13,426	387	753	63	66	7.8	3.7	12.5	6,481	3E+04	2E+04	2E+04
11IDO577	34,598	176,003	5,645	13,022	1,623	825	183.5	51.2	167.6	80,469	3E+05	2E+05	2E+05
11M093	1,077	3,952	162	749	33	21	5.2	1.3	4.8	2,113	9E+03	6E+03	7E+03
12BDO10	12	29	2	19	0	1	0.1	0.0	0.1	13	9E+01	2E+02	2E+02
12BDO14	28	69	4	41	1	2	0.2	0.0	0.1	30	2E+02	4E+02	4E+02
12BDO124	9,142	49,090	1,509	6,092	213	214	37.2	15.4	48.8	24,177	9E+04	6E+04	5E+04
12EDO418	214	953	34	83	4	4	0.6	0.3	0.9	506	2E+03	2E+03	1E+03

Table C2-20. Scenario 4.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	143	699	21	83	3	2	0.5	0.2	0.6	347	1E+03	1E+03	8E+02
12HOFDO92	972	2,697	421	2,884	109	139	23.6	3.4	12.6	2,505	4E+03	8E+03	1E+04
12HDO85/87	455	1,352	71	471	14	43	2.7	0.4	2.7	543	6E+03	1E+04	1E+04
12L092	2,211	9,994	324	1,068	80	44	10.1	3.1	10.4	4,783	2E+04	1E+04	1E+04
12LDO296	484	2,292	71	270	13	9	2.0	0.7	2.6	1,136	4E+03	2E+03	2E+03
12M091	342	1,227	53	282	10	7	1.7	0.4	1.4	662	3E+03	2E+03	2E+03
13DSDO078	1,786	5,354	225	1,518	90	27	11.8	1.6	4.4	2,425	8E+03	6E+03	1E+04
13EDO177	53	112	10	162	3	1	0.7	0.1	0.2	54	8E+01	3E+02	4E+02
13EDO174	1,250	7,000	187	401	21	23	3.1	2.0	6.6	3,472	1E+04	9E+03	5E+03
13EDO176	37	86	5	77	2	1	0.4	0.1	0.2	42	6E+01	3E+02	3E+02
13FDO95	10	22	2	27	0	0	0.1	0.0	0.0	11	3E+01	1E+02	1E+02
13FDO011	24	45	1	1	1	0	0.0	0.0	0.0	23	2E+01	1E+02	1E+02
13F093	104	271	9	107	3	2	0.6	0.2	0.9	124	4E+02	1E+03	1E+03
13L090	32,731	156,234	5,047	5,996	1,753	727	171.7	38.8	134.6	70,195	3E+05	1E+05	2E+05
14CDO9	756	4,411	159	882	27	22	5.2	1.5	4.6	2,108	9E+03	6E+03	5E+03
15FSDO288	1,981	9,928	318	1,710	50	37	9.4	3.4	10.2	4,916	2E+04	1E+04	2E+04
15L089	13,382	60,715	2,048	5,090	633	296	71.0	16.3	57.2	28,234	1E+05	6E+04	8E+04
15L088	6,305	39,286	1,002	251	112	170	12.3	10.8	42.4	19,195	7E+04	5E+04	3E+04
16L097	535	1,648	69	618	18	34	3.6	1.3	5.9	683	4E+03	7E+03	7E+03
16LSDO122	8,311	42,777	1,299	2,557	273	266	32.5	11.5	44.9	20,194	9E+04	6E+04	7E+04
17M033	5,478	26,882	774	1,872	123	287	17.7	11.2	49.5	12,331	6E+04	6E+04	6E+04
18GSDO233	4,119	18,320	528	546	79	135	8.9	4.7	23.1	8,275	5E+04	7E+04	6E+04
19GDO043	5,029	33,011	830	349	96	119	10.6	9.6	32.8	15,859	6E+04	4E+04	3E+04
19GDO194	432	2,216	68	169	17	9	2.1	0.8	2.6	1,048	4E+03	3E+03	3E+03
19G199	60	174	2	2	1	1	0.1	0.2	0.7	76	1E+02	6E+02	7E+02
20G163	320	1,275	10	23	8	8	1.0	1.8	8.2	488	1E+03	4E+03	4E+03
20L083	214	932	26	9	4	9	0.7	0.1	2.1	504	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	13	60	2	5	1	0	0.1	0.0	0.0	28	1E+02	7E+01	9E+01
21H048	123	364	4	4	3	3	0.3	0.4	1.5	158	3E+02	3E+02	3E+02
21KSDO069	8,804	50,464	1,326	947	221	277	24.0	15.3	61.4	23,736	1E+05	7E+04	6E+04
21M005	148	427	12	39	3	3	0.4	0.1	0.9	228	1E+02	2E+02	3E+02
21M010	905	3,092	82	78	18	24	2.3	0.4	7.1	1,662	2E+03	2E+03	3E+03
21M050	424	1,221	30	25	9	7	0.9	0.2	2.8	652	2E+03	9E+02	3E+03
22CDO384	2,502	9,230	365	1,805	132	51	16.5	2.6	7.8	4,143	1E+04	9E+03	1E+04
22LSDO580	1,186	4,505	126	95	23	34	3.2	0.7	12.3	2,503	3E+03	3E+03	4E+03
23GDO132	4,472	9,517	268	2,152	125	63	15.8	3.8	16.4	4,415	7E+03	9E+03	1E+04
23HSDO042	18,107	78,632	2,704	4,951	882	550	98.8	25.7	101.5	36,244	1E+05	1E+05	1E+05
23HDO040	2,816	16,887	430	309	61	78	6.8	4.8	18.1	7,988	3E+04	2E+04	2E+04
23L196	136	273	7	37	4	1	0.4	0.1	0.7	138	1E+02	4E+01	2E+02
23L075	624	1,539	47	217	18	7	2.1	0.3	3.4	815	2E+03	7E+02	3E+03
23L074	133	286	7	24	4	1	0.3	0.0	0.4	149	8E+01	6E+01	1E+02
23L195	142	272	9	75	4	1	0.5	0.1	0.7	146	2E+02	6E+01	3E+02
23L202	145	279	7	37	4	0	0.3	0.1	0.7	151	3E+02	5E+01	6E+02
23L016	112	224	6	36	3	0	0.3	0.0	0.5	123	4E+02	7E+01	7E+02
23L015	160	276	11	133	5	1	0.7	0.1	0.5	139	3E+01	5E+01	5E+01
23L164	865	2,158	71	103	22	44	2.0	0.3	4.8	986	7E+03	9E+03	1E+04
24CSDO031	286	1,787	48	56	4	6	0.6	0.5	1.8	893	3E+03	2E+03	1E+03

Table C2-20. Scenario 4.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,571	8,047	264	1,083	43	25	7.1	2.5	8.6	3,925	2E+04	1E+04	1E+04
24DSDO150	32	76	2	23	1	0	0.1	0.0	0.1	41	7E+01	5E+02	5E+02
24DSDO032	20,525	112,583	3,788	8,326	747	286	94.5	36.5	120.4	60,612	2E+05	1E+05	1E+05
24GSDO035	24,067	140,141	3,596	4,298	417	632	52.2	40.8	149.9	67,851	3E+05	2E+05	1E+05
24GSDO034	1,683	6,395	169	911	41	25	5.9	2.6	11.2	3,137	1E+04	2E+04	2E+04
24L233	430	1,277	32	89	23	12	2.3	1.1	5.1	489	1E+03	8E+02	3E+03
25DDO040	538	2,660	78	208	12	18	1.7	1.0	4.2	1,286	5E+03	4E+03	4E+03
25EDO037	13,544	71,371	1,906	3,395	276	214	36.0	22.0	89.9	34,473	1E+05	1E+05	8E+04
25GDO041	72	247	9	31	6	3	0.6	0.2	1.0	84	3E+02	2E+02	5E+02
25GDO-06	240	660	18	217	9	7	1.4	0.8	3.6	276	3E+02	5E+02	6E+02
26J049	7,408	20,716	797	700	536	153	47.4	5.3	28.7	7,863	3E+04	1E+04	6E+04
25L144	546	3,702	90	10	13	13	1.3	1.0	3.3	1,722	8E+03	5E+03	3E+03
25L058	4,445	23,861	617	500	86	159	9.6	6.6	27.9	11,244	5E+04	4E+04	4E+04
26FDO038	58	165	14	133	7	2	1.0	0.1	0.2	54	3E+02	6E+01	6E+02
26GSDO01	3,670	16,762	494	1,922	124	86	16.8	7.5	28.7	7,863	3E+04	2E+04	2E+04
26JSDO052	39	73	4	65	2	0	0.3	0.1	0.2	35	9E+00	1E+01	2E+01
26JSDO100	156	417	22	80	14	3	1.5	0.1	0.2	144	7E+02	1E+02	1E+03
26J101	433	1,048	63	502	32	9	4.2	0.4	1.2	400	2E+03	7E+02	3E+03
26KSDO254	326	1,118	43	114	5	32	0.9	0.2	2.5	492	5E+03	7E+03	8E+03
26K035	191	405	11	33	5	1	0.5	0.1	1.1	219	5E+02	8E+01	9E+02
26K099	12,515	80,616	1,927	796	169	358	20.1	23.5	86.8	38,500	2E+05	1E+05	8E+04
26L055	173	1,007	28	12	7	4	0.6	0.2	0.8	464	2E+03	1E+03	1E+03
26LSDO084	69	204	10	16	7	1	0.6	0.0	0.1	72	3E+02	4E+02	9E+02
26L070	208	356	5	22	4	0	0.3	0.0	0.1	178	8E+01	2E+01	2E+02
27JSDO044	376	748	29	362	12	6	2.0	0.5	2.1	352	3E+02	6E+02	6E+02
27JSDO096	2,064	4,151	94	322	54	14	4.5	0.6	4.8	2,063	2E+03	4E+03	5E+03
27JSDO001	7,753	44,776	1,124	1,519	132	252	17.8	13.6	55.5	21,172	9E+04	7E+04	5E+04
27L022	2,208	13,353	318	292	44	64	5.3	5.2	19.5	6,274	3E+04	2E+04	1E+04
27L020	2,088	12,508	298	290	43	60	5.1	4.8	18.2	5,854	2E+04	2E+04	1E+04
28K061	4,384	28,403	720	369	66	134	7.9	7.8	27.6	13,610	6E+04	4E+04	3E+04
28K010	3,863	26,727	655	249	48	102	6.0	7.4	25.1	12,912	5E+04	4E+04	2E+04
28K386	664	1,642	57	373	18	20	2.6	0.6	3.8	800	2E+03	3E+03	3E+03
28L073	74	223	9	73	5	1	0.6	0.1	0.1	102	4E+02	2E+03	2E+03
28L074/5/6	1,217	3,591	108	709	51	22	6.3	2.1	8.9	1,588	5E+03	7E+03	1E+04
28N156	312	1,761	51	115	5	12	0.9	0.5	1.8	856	4E+03	3E+03	2E+03
28N207	3,200	19,526	507	454	64	95	7.6	5.9	21.2	9,326	4E+04	3E+04	2E+04
28O025	50	233	9	20	1	2	0.2	0.1	0.2	118	7E+02	5E+02	6E+02
28P001	302	2,005	50	26	4	7	0.5	0.5	1.8	983	4E+03	2E+03	1E+03
29J129	162	296	13	146	5	2	0.8	0.1	0.5	144	2E+02	4E+02	4E+02
29J029	353	918	40	184	6	31	1.1	0.2	1.8	381	4E+03	6E+03	6E+03
29J212	17,159	110,966	2,706	1,095	248	518	29.9	32.1	121.6	53,109	2E+05	2E+05	1E+05
29M049	1,246	6,867	191	184	35	45	3.8	1.9	7.3	3,177	1E+04	1E+04	1E+04
29N015	126	566	17	28	2	5	0.5	0.1	1.3	310	3E+02	5E+02	5E+02
29N135	409	2,269	61	147	7	9	1.2	0.6	2.7	1,122	4E+03	3E+03	1E+03
29O001	11,222	69,313	1,861	2,348	230	287	29.2	19.8	68.2	33,569	1E+05	9E+04	6E+04
29P015	76	510	13	13	1	2	0.2	0.1	0.5	250	9E+02	6E+02	3E+02
29P044	594	3,990	103	80	10	13	1.2	1.1	3.6	1,950	8E+03	5E+03	3E+03
30J006	225	658	25	179	8	5	1.3	0.2	1.0	329	8E+02	3E+03	3E+03

Table C2-20. Scenario 4.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	62	166	7	94	2	1	0.5	0.1	0.5	82	1E+02	6E+02	7E+02
30J030	683	1,466	37	163	17	5	1.7	0.2	2.6	761	5E+02	5E+02	9E+02
30P107	333	1,750	65	105	6	10	0.9	0.4	1.5	890	4E+03	3E+03	2E+03
30P062	284	1,875	49	53	4	6	0.6	0.5	1.7	930	3E+03	2E+03	1E+03
31O004	991	5,952	210	150	18	31	2.3	1.4	4.6	2,924	1E+04	1E+04	6E+03
31P084	304	1,889	49	78	4	6	0.6	0.5	1.8	934	4E+03	2E+03	1E+03
3FDO159	307	1,307	59	495	14	7	2.7	0.5	1.5	629	2E+03	2E+03	2E+03
11G318/319	336	928	71	739	13	34	3.4	0.5	2.3	376	4E+03	6E+03	7E+03
6FSDO233	7	16	5	88	1	0	0.4	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,596	5,677	127	77	52	73	3.3	0.8	5.6	2,646	3E+04	5E+04	5E+04
21H047	508	1,936	34	76	15	15	1.7	1.6	7.0	810	2E+03	2E+03	2E+03
21H039	1,470	4,624	65	318	44	47	5.1	5.4	23.6	1,848	4E+03	4E+03	5E+03
20G161	2,546	10,810	306	228	66	55	7.3	5.2	22.0	4,940	2E+04	2E+04	2E+04
StonyMWRA	113,171	527,861	18,681	69,534	4,797	3,069	665.9	187.7	632.9	253,826	9E+05	6E+05	7E+05
Fens	70,754	223,035	11,457	17,710	4,574	2,058	532.3	94.6	286.8	112,950	3E+05	2E+05	2E+05
20D055	5,509	35,553	950	479	119	127	12.9	10.1	33.6	17,299	7E+04	4E+04	3E+04
21D319	7,371	48,619	1,281	839	144	170	16.7	13.8	45.2	23,700	9E+04	6E+04	4E+04

Table C2-21. Scenario 5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	951	3,798	137	923	28	19	5.3	1.2	5.1	1,924	5E+03	4E+03	3E+03
1FDO31	774	3,605	100	202	19	17	2.2	1.0	3.5	1,755	6E+03	5E+03	4E+03
02E086	247	1,013	42	329	10	5	1.9	0.4	1.2	488	2E+03	1E+03	1E+03
2FDO120	1,319	6,532	193	597	33	29	4.9	1.8	7.7	3,242	1E+04	7E+03	7E+03
2FDO93	1,493	10,523	257	113	18	35	2.3	2.9	9.5	5,124	2E+04	1E+04	7E+03
2FDO85	93	427	12	37	3	1	0.3	0.1	0.4	209	7E+02	5E+02	4E+02
3ESDO186	305	1,360	63	567	14	7	2.9	0.6	1.7	660	2E+03	1E+03	1E+03
3ESDO185	563	2,517	101	364	15	12	2.5	0.8	2.5	1,307	5E+03	3E+03	3E+03
3F162	507	2,425	92	506	24	11	3.6	0.8	2.3	1,141	4E+03	2E+03	3E+03
4ESDO69	1,534	7,138	237	985	41	35	6.7	2.3	8.4	3,560	1E+04	9E+03	8E+03
4ESDO64	37	120	8	92	2	1	0.5	0.1	0.2	56	2E+02	3E+02	3E+02
4FDO189	714	3,958	111	179	20	14	2.3	1.1	3.8	1,926	7E+03	4E+03	3E+03
4FDO204	850	4,302	139	512	31	16	4.3	1.3	3.9	2,062	7E+03	4E+03	4E+03
4FDO16	397	2,247	63	88	11	10	1.2	0.6	2.1	1,082	4E+03	3E+03	2E+03
4FDO203	123	526	23	186	6	2	1.1	0.2	0.6	252	8E+02	7E+02	7E+02
4FDO118	562	3,179	84	115	10	13	1.3	0.9	3.0	1,559	6E+03	4E+03	3E+03
4FDO119	1,238	5,056	133	46	22	35	2.9	0.8	10.0	2,701	4E+03	4E+03	4E+03
5CSDO110	721	2,450	123	769	31	21	5.1	0.9	2.9	1,260	6E+03	4E+03	6E+03
5EDO182	101	471	30	377	6	3	1.7	0.3	0.8	230	7E+02	5E+02	3E+02
5ESDO184	605	2,668	140	1,486	30	14	7.1	1.3	3.5	1,301	4E+03	3E+03	3E+03
5FDO117	746	3,695	137	777	31	16	5.1	1.3	3.7	1,764	6E+03	3E+03	4E+03
5FDO254	53	330	8	12	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
5FDO265	18	37	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	598	3,124	90	177	16	15	2.0	0.9	2.9	1,503	6E+03	4E+03	4E+03
5FDO245	1,301	7,694	209	363	27	27	3.5	2.2	7.6	3,793	1E+04	8E+03	6E+03
5FDO244	228	1,174	31	57	5	5	0.6	0.3	1.6	585	2E+03	1E+03	9E+02
5FDO264	18	49	2	6	0	2	0.0	0.0	0.1	20	2E+02	4E+02	4E+02
5GDO112	887	5,376	139	171	16	20	2.1	1.7	6.0	2,626	9E+03	6E+03	4E+03
5GDO116A	739	4,112	121	457	15	14	2.7	1.3	4.0	2,050	7E+03	4E+03	2E+03
5GDO115	234	1,426	38	39	5	5	0.6	0.4	1.4	698	2E+03	2E+03	1E+03
5GDO116	695	4,002	107	129	17	14	1.9	1.1	3.7	1,937	7E+03	4E+03	3E+03
6DDO57	129	490	22	200	6	2	1.1	0.2	0.5	236	7E+02	9E+02	9E+02
6DDO184	10	24	13	238	3	1	1.0	0.1	0.2	9	3E+01	1E+01	6E+01
6DDO91	16	34	27	524	6	2	2.2	0.3	0.5	14	3E+01	2E+01	6E+01
6DDO187	73	224	10	57	2	5	0.4	0.1	0.4	95	7E+02	1E+03	1E+03
6DDO86	11	31	5	79	1	0	0.4	0.0	0.1	13	4E+01	2E+01	6E+01
6DDO85	46	244	9	49	2	1	0.4	0.1	0.2	114	4E+02	2E+02	2E+02
6DDO83	175	806	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	11	52	3	19	1	0	0.1	0.0	0.1	23	9E+01	4E+01	7E+01
06D097	87	313	17	138	6	2	1.0	0.1	0.3	136	5E+02	3E+02	6E+02
6GDO109	1,373	7,488	206	278	40	27	4.4	2.1	6.7	3,587	1E+04	8E+03	9E+03
6GDO110	1,695	10,009	274	394	42	35	5.0	2.8	8.9	4,863	2E+04	1E+04	8E+03
6GDO111	249	1,083	59	612	14	6	3.1	0.6	1.4	518	2E+03	1E+03	9E+02
6GDO166	140	502	40	552	9	4	2.5	0.4	0.9	242	7E+02	4E+02	5E+02
6GDO108	4,520	26,404	715	969	107	97	12.7	7.3	24.0	12,816	5E+04	3E+04	2E+04
6G165	26	105	5	54	1	0	0.2	0.1	0.1	53	1E+02	1E+02	8E+01
6HDO43	87	437	15	65	4	2	0.5	0.1	0.4	205	7E+02	5E+02	5E+02
6HDO106	205	934	33	181	7	4	1.1	0.3	0.9	457	1E+03	9E+02	7E+02

Table C2-21. Scenario 5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	523	2,715	87	413	15	10	2.6	0.9	2.7	1,325	4E+03	3E+03	2E+03
7CDO006	5,550	25,654	1,013	7,746	190	122	40.0	10.1	30.0	12,655	5E+04	3E+04	4E+04
7HDO285	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
7HDO105	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
7HDO348	46	307	8	10	0	1	0.1	0.1	0.3	153	5E+02	4E+02	2E+02
7HDO347	319	1,652	52	202	11	6	1.6	0.5	1.5	798	3E+03	2E+03	2E+03
7HDO346	296	1,854	49	70	5	6	0.7	0.5	1.7	907	3E+03	2E+03	1E+03
8BDO122	1,423	8,010	202	304	28	36	3.6	3.1	11.4	3,835	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	4E-01	7E-01	8E-01
8BDO126	811	5,165	132	137	11	17	1.5	1.5	4.9	2,551	9E+03	6E+03	3E+03
8CDO25	178	582	42	484	10	5	2.4	0.4	1.0	306	1E+03	1E+03	2E+03
8CDO26	166	574	38	416	8	5	2.0	0.4	1.0	305	1E+03	1E+03	2E+03
8DDO112	32	195	5	8	1	1	0.1	0.1	0.2	94	4E+02	4E+02	3E+02
8DSDO100	76	242	15	176	3	3	0.8	0.1	0.4	118	5E+02	1E+03	1E+03
8EDO35	122	336	29	454	8	2	2.0	0.3	0.6	167	4E+02	2E+03	2E+03
8EDO33	435	2,698	78	253	9	10	1.6	0.8	2.6	1,330	5E+03	3E+03	2E+03
8IDO153	35	230	6	4	0	1	0.0	0.1	0.2	113	4E+02	3E+02	1E+02
8IDO155	23	87	5	58	1	0	0.3	0.0	0.1	44	1E+02	3E+02	3E+02
8IDO156	315	679	47	589	19	4	3.3	0.3	0.8	293	5E+02	1E+02	8E+02
8IDO209	117	753	19	18	1	2	0.2	0.2	0.7	373	1E+03	9E+02	5E+02
8IDO154	790	4,331	125	294	21	19	2.8	1.3	4.4	2,082	8E+03	6E+03	5E+03
8IDO158	369	2,202	60	135	8	8	1.2	0.7	2.5	1,080	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,130	7,083	185	239	22	26	2.9	2.2	7.9	3,440	1E+04	8E+03	5E+03
8JSDO103	894	5,287	150	327	21	19	2.9	1.5	4.9	2,587	9E+03	6E+03	4E+03
8JSDO41	504	3,177	84	115	10	11	1.3	1.0	3.2	1,550	6E+03	3E+03	2E+03
8JSDO50	1,162	6,042	173	423	36	25	4.5	2.0	6.8	2,884	1E+04	8E+03	7E+03
8K049	155	909	27	65	4	3	0.6	0.3	0.8	438	2E+03	1E+03	8E+02
9BDO49	314	858	32	150	6	21	1.0	0.2	1.4	389	3E+03	6E+03	7E+03
9EDO229	55	273	8	23	2	1	0.2	0.1	0.2	130	5E+02	3E+02	3E+02
9EDO243	161	554	23	189	6	3	1.1	0.2	0.6	266	1E+03	1E+03	2E+03
9K100	49	131	8	63	2	4	0.3	0.0	0.3	54	5E+02	9E+02	9E+02
9K101	595	2,130	99	886	25	18	4.8	0.9	2.6	1,010	4E+03	5E+03	6E+03
9K016	61	181	28	463	7	3	2.1	0.3	0.6	81	3E+02	4E+02	5E+02
9LSDO095	211	793	37	339	6	9	1.6	0.3	1.1	383	2E+03	2E+03	2E+03
10BSDO62	29	54	1	1	1	0	0.0	0.0	0.1	28	7E+00	5E-01	1E+01
10BSDO15	33	82	3	11	1	1	0.1	0.0	0.2	41	2E+02	4E+02	5E+02
10BSDO64	114	326	15	89	4	3	0.6	0.1	0.7	226	5E+02	5E+02	7E+02
10L094	12,978	71,680	2,003	4,633	298	283	40.6	21.1	72.6	34,921	1E+05	8E+04	7E+04
10L096	1,422	8,576	236	284	26	54	3.4	2.4	8.6	4,107	2E+04	1E+04	1E+04
11BDO28	12,199	55,094	2,449	21,840	460	341	106.2	23.7	68.4	27,058	1E+05	7E+04	7E+04
11BDO123	2,421	12,684	368	764	62	62	7.7	3.5	11.9	6,121	3E+04	2E+04	2E+04
11IDO577	33,268	167,698	5,452	13,103	1,605	792	182.0	48.9	159.2	76,427	3E+05	2E+05	2E+05
11M093	1,037	3,788	158	755	33	20	5.2	1.2	4.7	2,024	8E+03	5E+03	7E+03
12BDO10	11	28	2	19	0	1	0.1	0.0	0.1	12	9E+01	1E+02	2E+02
12BDO14	27	65	4	41	1	2	0.2	0.0	0.1	29	2E+02	4E+02	4E+02
12BDO124	8,341	44,063	1,392	6,155	205	195	36.6	14.1	44.3	21,701	8E+04	6E+04	5E+04
12EDO418	203	895	32	84	4	4	0.6	0.2	0.8	476	2E+03	1E+03	1E+03

Table C2-21. Scenario 5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	136	655	20	84	3	2	0.5	0.2	0.6	325	1E+03	1E+03	7E+02
12HOFDO92	937	2,590	413	2,890	108	131	23.5	3.3	12.2	2,393	4E+03	7E+03	9E+03
12HDO85/87	434	1,285	69	473	14	41	2.7	0.4	2.5	516	5E+03	1E+04	1E+04
12L092	2,111	9,443	311	1,077	78	42	10.0	2.9	9.9	4,511	2E+04	1E+04	1E+04
12LDO296	464	2,178	68	272	13	8	2.0	0.6	2.5	1,079	3E+03	2E+03	2E+03
12M091	327	1,165	51	284	9	6	1.7	0.4	1.3	628	2E+03	2E+03	2E+03
13DSDO078	1,763	5,223	221	1,520	90	27	11.8	1.5	4.3	2,361	7E+03	6E+03	1E+04
13EDO177	51	108	10	162	3	1	0.7	0.1	0.2	52	7E+01	3E+02	4E+02
13EDO174	1,186	6,588	177	405	21	22	3.0	1.9	6.2	3,268	1E+04	8E+03	5E+03
13EDO176	35	82	5	77	2	1	0.4	0.1	0.2	40	5E+01	3E+02	3E+02
13FDO95	10	21	2	27	0	0	0.1	0.0	0.0	11	2E+01	1E+02	1E+02
13FDO011	24	44	1	1	1	0	0.0	0.0	0.0	22	2E+01	9E+01	1E+02
13F093	99	257	9	108	3	2	0.6	0.2	0.9	118	4E+02	1E+03	1E+03
13L090	31,607	149,474	4,881	6,060	1,732	700	169.9	37.1	128.0	66,910	3E+05	1E+05	2E+05
14CDO9	724	4,199	154	883	27	21	5.2	1.5	4.4	2,005	8E+03	6E+03	5E+03
15FSDO288	1,913	9,487	308	1,721	49	35	9.4	3.2	9.8	4,697	2E+04	1E+04	2E+04
15L089	13,015	58,739	2,000	5,153	625	288	70.5	15.9	55.4	27,271	1E+05	6E+04	8E+04
15L088	5,983	37,383	954	240	105	162	11.6	10.3	40.5	18,291	7E+04	5E+04	3E+04
16L097	511	1,561	67	621	18	32	3.6	1.3	5.6	648	4E+03	6E+03	7E+03
16LSDO122	8,106	41,579	1,271	2,575	270	261	32.3	11.2	43.8	19,621	8E+04	6E+04	6E+04
17M033	5,332	26,147	758	1,886	121	279	17.6	10.9	48.2	12,001	6E+04	6E+04	6E+04
18GSDO233	4,370	19,577	565	555	80	276	9.1	5.1	25.1	8,818	6E+04	7E+04	7E+04
19GDO043	4,907	32,202	813	354	95	116	10.5	9.4	32.0	15,484	6E+04	4E+04	3E+04
19GDO194	419	2,135	67	169	17	9	2.0	0.7	2.5	1,008	4E+03	3E+03	3E+03
19G199	58	169	2	2	1	1	0.1	0.2	0.7	73	1E+02	6E+02	6E+02
20G163	307	1,213	9	23	8	15	1.0	1.7	7.8	464	1E+03	4E+03	4E+03
20L083	213	926	26	9	4	8	0.7	0.1	2.1	500	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	57	2	5	1	0	0.1	0.0	0.0	26	1E+02	6E+01	8E+01
21H048	118	347	4	3	3	3	0.2	0.3	1.5	151	2E+02	3E+02	3E+02
21KSDO069	8,620	49,347	1,303	960	219	272	23.8	15.0	60.2	23,215	1E+05	7E+04	6E+04
21M005	144	416	12	40	3	3	0.4	0.1	0.9	222	1E+02	2E+02	2E+02
21M010	879	3,018	81	85	18	23	2.3	0.4	6.9	1,623	2E+03	2E+03	3E+03
21M050	411	1,187	29	29	9	7	0.9	0.2	2.8	634	1E+03	8E+02	3E+03
22CDO384	2,463	8,965	358	1,806	132	50	16.5	2.6	7.6	4,015	1E+04	8E+03	1E+04
22LSDO580	1,152	4,401	124	106	23	33	3.2	0.6	12.1	2,449	3E+03	3E+03	4E+03
23GDO132	4,434	9,421	267	2,161	124	62	15.7	3.7	16.1	4,372	7E+03	8E+03	1E+04
23HSDO042	17,791	77,015	2,671	4,991	877	543	98.5	25.2	99.2	35,487	1E+05	1E+05	1E+05
23HDO040	2,753	16,505	422	314	61	77	6.7	4.7	17.7	7,804	3E+04	2E+04	2E+04
23L196	132	266	7	39	4	1	0.4	0.1	0.7	134	1E+02	4E+01	2E+02
23L075	613	1,512	47	220	18	7	2.1	0.3	3.3	802	1E+03	7E+02	3E+03
23L074	129	278	7	25	4	1	0.3	0.0	0.4	145	8E+01	5E+01	1E+02
23L195	139	265	9	76	4	1	0.5	0.1	0.7	143	2E+02	6E+01	3E+02
23L202	141	272	7	38	4	0	0.3	0.1	0.7	147	3E+02	5E+01	6E+02
23L016	109	217	6	38	3	0	0.3	0.0	0.5	119	4E+02	7E+01	7E+02
23L015	161	277	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	836	2,087	70	108	21	42	1.9	0.3	4.7	954	7E+03	9E+03	1E+04
24CSDO031	273	1,699	45	57	4	6	0.5	0.5	1.7	850	3E+03	2E+03	1E+03

Table C2-21. Scenario 5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,601	8,356	272	1,086	43	47	7.1	2.6	8.9	4,087	2E+04	1E+04	1E+04
24DSDO150	31	73	2	23	1	0	0.1	0.0	0.1	40	7E+01	5E+02	5E+02
24DSDO032	19,790	108,100	3,666	8,392	733	510	93.4	35.3	116.3	58,151	2E+05	1E+05	1E+05
24GSDO035	23,362	135,731	3,497	4,340	409	614	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
24GSDO034	1,637	6,197	165	919	40	25	5.9	2.5	11.0	3,040	1E+04	2E+04	2E+04
24L233	421	1,254	32	91	23	11	2.3	1.1	5.0	480	1E+03	8E+02	3E+03
25DDO040	520	2,570	76	210	12	17	1.7	0.9	4.1	1,243	5E+03	4E+03	4E+03
25EDO037	12,868	67,439	1,820	3,450	269	362	35.3	20.9	85.0	32,577	1E+05	9E+04	8E+04
25GDO041	71	241	9	31	6	3	0.6	0.2	0.9	82	3E+02	2E+02	5E+02
25GDO-06	241	667	18	217	9	7	1.4	0.8	3.7	278	3E+02	5E+02	6E+02
26J049	7,236	20,209	777	701	522	149	46.2	5.2	28.2	7,679	3E+04	1E+04	6E+04
25L144	538	3,636	89	11	13	13	1.3	1.0	3.2	1,692	8E+03	4E+03	3E+03
25L058	4,321	23,163	601	509	85	154	9.5	6.5	27.1	10,913	5E+04	4E+04	4E+04
26FDO038	62	174	14	132	7	2	1.0	0.1	0.2	58	3E+02	6E+01	6E+02
26GSDO01	3,584	16,197	482	1,925	123	85	16.7	7.3	28.0	7,591	3E+04	2E+04	2E+04
26JSDO052	38	71	4	66	2	0	0.3	0.1	0.2	34	8E+00	1E+01	1E+01
26JSDO100	154	414	22	81	14	3	1.5	0.1	0.2	142	7E+02	1E+02	1E+03
26J101	427	1,038	63	506	33	9	4.2	0.4	1.1	394	2E+03	7E+02	3E+03
26KSDO254	316	1,087	42	116	5	31	0.9	0.2	2.4	478	5E+03	7E+03	8E+03
26K035	188	399	11	34	5	1	0.5	0.1	1.1	216	5E+02	8E+01	9E+02
26K099	12,214	78,705	1,887	812	165	350	19.8	23.0	84.9	37,618	2E+05	1E+05	8E+04
26L055	170	990	27	13	7	4	0.6	0.2	0.8	456	2E+03	1E+03	1E+03
26LSDO084	69	203	10	16	7	1	0.6	0.0	0.1	71	3E+02	4E+02	9E+02
26L070	202	347	5	23	4	0	0.3	0.0	0.1	173	8E+01	2E+01	2E+02
27JSDO044	369	735	29	364	12	6	2.0	0.5	2.1	346	3E+02	6E+02	6E+02
27JSDO096	2,044	4,109	93	329	54	14	4.5	0.6	4.8	2,041	2E+03	4E+03	5E+03
27JSDO001	7,599	43,909	1,105	1,529	130	247	17.7	13.4	54.4	20,768	9E+04	7E+04	5E+04
27L022	2,149	12,978	310	294	43	62	5.2	5.0	19.0	6,099	2E+04	2E+04	1E+04
27L020	2,031	12,140	291	292	42	58	5.1	4.7	17.7	5,686	2E+04	2E+04	1E+04
28K061	4,278	27,712	705	374	65	131	7.8	7.7	27.0	13,287	6E+04	4E+04	3E+04
28K010	3,763	26,022	639	252	48	99	5.9	7.3	24.5	12,574	5E+04	3E+04	2E+04
28K386	644	1,592	56	379	17	20	2.6	0.6	3.7	776	2E+03	3E+03	3E+03
28L073	73	219	9	73	5	1	0.6	0.1	0.1	99	4E+02	2E+03	2E+03
28L074/5/6	1,202	3,556	108	714	50	22	6.3	2.1	8.8	1,571	4E+03	7E+03	1E+04
28N156	302	1,698	50	116	5	11	0.9	0.5	1.8	825	4E+03	3E+03	2E+03
28N207	3,104	18,908	494	458	63	92	7.5	5.8	20.5	9,032	4E+04	3E+04	2E+04
28O025	49	225	9	20	1	2	0.2	0.1	0.2	114	7E+02	5E+02	5E+02
28P001	291	1,928	49	26	4	6	0.5	0.5	1.7	945	4E+03	2E+03	1E+03
29J129	157	287	13	148	5	2	0.8	0.1	0.5	140	2E+02	3E+02	4E+02
29J029	345	899	40	186	6	30	1.1	0.2	1.8	372	4E+03	6E+03	6E+03
29J212	16,748	108,247	2,648	1,110	244	505	29.5	31.4	118.9	51,845	2E+05	2E+05	1E+05
29M049	1,210	6,653	186	186	35	43	3.8	1.9	7.0	3,075	1E+04	1E+04	1E+04
29N015	123	554	17	29	2	5	0.5	0.1	1.3	304	3E+02	5E+02	5E+02
29N135	397	2,208	60	149	7	9	1.2	0.6	2.6	1,092	4E+03	2E+03	1E+03
29O001	10,876	67,072	1,811	2,366	227	278	28.9	19.2	66.1	32,496	1E+05	8E+04	6E+04
29P015	73	490	13	13	1	2	0.2	0.1	0.4	240	9E+02	6E+02	3E+02
29P044	578	3,880	100	81	9	13	1.2	1.1	3.5	1,897	7E+03	5E+03	3E+03
30J006	219	642	25	181	8	5	1.2	0.2	1.0	321	8E+02	3E+03	3E+03

Table C2-21. Scenario 5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	59	159	7	95	2	1	0.5	0.1	0.5	78	1E+02	6E+02	6E+02
30J030	659	1,419	37	170	17	5	1.7	0.2	2.5	738	5E+02	5E+02	9E+02
30P107	320	1,678	63	105	6	9	0.9	0.4	1.4	854	4E+03	3E+03	2E+03
30P062	271	1,778	47	53	4	6	0.6	0.5	1.6	881	3E+03	2E+03	1E+03
31O004	964	5,791	206	151	17	31	2.3	1.3	4.5	2,848	1E+04	9E+03	6E+03
31P084	296	1,840	48	79	4	6	0.6	0.5	1.8	911	3E+03	2E+03	1E+03
3FDO159	295	1,236	57	497	14	7	2.7	0.5	1.4	594	2E+03	2E+03	2E+03
11G318/319	320	881	69	741	13	32	3.4	0.5	2.2	357	4E+03	6E+03	6E+03
6FSDO233	7	15	5	88	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,510	5,498	124	74	50	71	3.2	0.8	5.5	2,561	3E+04	5E+04	5E+04
21H047	495	1,895	33	77	15	15	1.6	1.6	6.9	792	2E+03	2E+03	2E+03
21H039	1,445	4,556	65	322	43	46	5.1	5.4	23.4	1,820	3E+03	4E+03	5E+03
20G161	2,501	10,648	302	225	65	100	7.1	5.1	21.5	4,870	2E+04	2E+04	2E+04
StonyMWRA	109,349	506,696	18,159	69,872	4,729	2,959	660.6	181.6	609.9	243,244	9E+05	6E+05	7E+05
Fens	70,056	220,389	11,369	17,740	4,559	2,122	531.2	93.5	283.0	111,334	3E+05	2E+05	2E+05
20D055	5,301	34,083	916	484	118	122	12.8	9.7	32.2	16,579	6E+04	4E+04	3E+04
21D319	7,174	47,260	1,249	847	143	166	16.5	13.4	44.0	23,046	9E+04	5E+04	3E+04

Table C2-22. Scenario 5.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	951	3,798	137	923	28	19	5.3	1.2	5.1	1,924	5E+03	4E+03	3E+03
1FDO31	774	3,605	100	202	19	17	2.2	1.0	3.5	1,755	6E+03	5E+03	4E+03
02E086	247	1,013	42	329	10	5	1.9	0.4	1.2	488	2E+03	1E+03	1E+03
2FDO120	1,319	6,532	193	597	33	29	4.9	1.8	7.7	3,242	1E+04	7E+03	7E+03
2FDO93	1,493	10,523	257	113	18	35	2.3	2.9	9.5	5,124	2E+04	1E+04	7E+03
2FDO85	93	427	12	37	3	1	0.3	0.1	0.4	209	7E+02	5E+02	4E+02
3ESDO186	305	1,360	63	567	14	7	2.9	0.6	1.7	660	2E+03	1E+03	1E+03
3ESDO185	563	2,517	101	364	15	12	2.5	0.8	2.5	1,307	5E+03	3E+03	3E+03
3F162	507	2,425	92	506	24	11	3.6	0.8	2.3	1,141	4E+03	2E+03	3E+03
4ESDO69	1,534	7,138	237	985	41	35	6.7	2.3	8.4	3,560	1E+04	9E+03	8E+03
4ESDO64	37	120	8	92	2	1	0.5	0.1	0.2	56	2E+02	3E+02	3E+02
4FDO189	714	3,958	111	179	20	14	2.3	1.1	3.8	1,926	7E+03	4E+03	3E+03
4FDO204	850	4,302	139	512	31	16	4.3	1.3	3.9	2,062	7E+03	4E+03	4E+03
4FDO16	397	2,247	63	88	11	10	1.2	0.6	2.1	1,082	4E+03	3E+03	2E+03
4FDO203	123	526	23	186	6	2	1.1	0.2	0.6	252	8E+02	7E+02	7E+02
4FDO118	562	3,179	84	115	10	13	1.3	0.9	3.0	1,559	6E+03	4E+03	3E+03
4FDO119	1,238	5,056	133	46	22	35	2.9	0.8	10.0	2,701	4E+03	4E+03	4E+03
5CSDO110	721	2,450	123	769	31	21	5.1	0.9	2.9	1,260	6E+03	4E+03	6E+03
5EDO182	101	471	30	377	6	3	1.7	0.3	0.8	230	7E+02	5E+02	3E+02
5ESDO184	605	2,668	140	1,486	30	14	7.1	1.3	3.5	1,301	4E+03	3E+03	3E+03
5FDO117	746	3,695	137	777	31	16	5.1	1.3	3.7	1,764	6E+03	3E+03	4E+03
5FDO254	53	330	8	12	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
5FDO265	18	37	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	598	3,124	90	177	16	15	2.0	0.9	2.9	1,503	6E+03	4E+03	4E+03
5FDO245	1,301	7,694	209	363	27	27	3.5	2.2	7.6	3,793	1E+04	8E+03	6E+03
5FDO244	228	1,174	31	57	5	5	0.6	0.3	1.6	585	2E+03	1E+03	9E+02
5FDO264	18	49	2	6	0	2	0.0	0.0	0.1	20	2E+02	4E+02	4E+02
5GDO112	887	5,376	139	171	16	20	2.1	1.7	6.0	2,626	9E+03	6E+03	4E+03
5GDO116A	739	4,112	121	457	15	14	2.7	1.3	4.0	2,050	7E+03	4E+03	2E+03
5GDO115	234	1,426	38	39	5	5	0.6	0.4	1.4	698	2E+03	2E+03	1E+03
5GDO116	695	4,002	107	129	17	14	1.9	1.1	3.7	1,937	7E+03	4E+03	3E+03
6DDO57	129	490	22	200	6	2	1.1	0.2	0.5	236	7E+02	9E+02	9E+02
6DDO184	10	24	13	238	3	1	1.0	0.1	0.2	9	3E+01	1E+01	6E+01
6DDO91	16	34	27	524	6	2	2.2	0.3	0.5	14	3E+01	2E+01	6E+01
6DDO187	73	224	10	57	2	5	0.4	0.1	0.4	95	7E+02	1E+03	1E+03
6DDO86	11	31	5	79	1	0	0.4	0.0	0.1	13	4E+01	2E+01	6E+01
6DDO85	46	244	9	49	2	1	0.4	0.1	0.2	114	4E+02	2E+02	2E+02
6DDO83	175	806	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	11	52	3	19	1	0	0.1	0.0	0.1	23	9E+01	4E+01	7E+01
06D097	87	313	17	138	6	2	1.0	0.1	0.3	136	5E+02	3E+02	6E+02
6GDO109	1,373	7,488	206	278	40	27	4.4	2.1	6.7	3,587	1E+04	8E+03	9E+03
6GDO110	1,695	10,009	274	394	42	35	5.0	2.8	8.9	4,863	2E+04	1E+04	8E+03
6GDO111	249	1,083	59	612	14	6	3.1	0.6	1.4	518	2E+03	1E+03	9E+02
6GDO166	140	502	40	552	9	4	2.5	0.4	0.9	242	7E+02	4E+02	5E+02
6GDO108	4,520	26,404	715	969	107	97	12.7	7.3	24.0	12,816	5E+04	3E+04	2E+04
6G165	26	105	5	54	1	0	0.2	0.1	0.1	53	1E+02	1E+02	8E+01
6HDO43	87	437	15	65	4	2	0.5	0.1	0.4	205	7E+02	5E+02	5E+02
6HDO106	205	934	33	181	7	4	1.1	0.3	0.9	457	1E+03	9E+02	7E+02

Table C2-22. Scenario 5.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	523	2,715	87	413	15	10	2.6	0.9	2.7	1,325	4E+03	3E+03	2E+03
7CDO006	5,550	25,654	1,013	7,746	190	122	40.0	10.1	30.0	12,655	5E+04	3E+04	4E+04
7HDO285	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
7HDO105	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
7HDO348	46	307	8	10	0	1	0.1	0.1	0.3	153	5E+02	4E+02	2E+02
7HDO347	319	1,652	52	202	11	6	1.6	0.5	1.5	798	3E+03	2E+03	2E+03
7HDO346	296	1,854	49	70	5	6	0.7	0.5	1.7	907	3E+03	2E+03	1E+03
8BDO122	1,423	8,010	202	304	28	36	3.6	3.1	11.4	3,835	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	4E-01	7E-01	8E-01
8BDO126	811	5,165	132	137	11	17	1.5	1.5	4.9	2,551	9E+03	6E+03	3E+03
8CDO25	178	582	42	484	10	5	2.4	0.4	1.0	306	1E+03	1E+03	2E+03
8CDO26	166	574	38	416	8	5	2.0	0.4	1.0	305	1E+03	1E+03	2E+03
8DDO112	32	195	5	8	1	1	0.1	0.1	0.2	94	4E+02	4E+02	3E+02
8DSDO100	76	242	15	176	3	3	0.8	0.1	0.4	118	5E+02	1E+03	1E+03
8EDO35	122	336	29	454	8	2	2.0	0.3	0.6	167	4E+02	2E+03	2E+03
8EDO33	435	2,698	78	253	9	10	1.6	0.8	2.6	1,330	5E+03	3E+03	2E+03
8IDO153	35	230	6	4	0	1	0.0	0.1	0.2	113	4E+02	3E+02	1E+02
8IDO155	23	87	5	58	1	0	0.3	0.0	0.1	44	1E+02	3E+02	3E+02
8IDO156	315	679	47	589	19	4	3.3	0.3	0.8	293	5E+02	1E+02	8E+02
8IDO209	117	753	19	18	1	2	0.2	0.2	0.7	373	1E+03	9E+02	5E+02
8IDO154	790	4,331	125	294	21	19	2.8	1.3	4.4	2,082	8E+03	6E+03	5E+03
8IDO158	369	2,202	60	135	8	8	1.2	0.7	2.5	1,080	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,130	7,083	185	239	22	26	2.9	2.2	7.9	3,440	1E+04	8E+03	5E+03
8JSDO103	894	5,287	150	327	21	19	2.9	1.5	4.9	2,587	9E+03	6E+03	4E+03
8JSDO41	504	3,177	84	115	10	11	1.3	1.0	3.2	1,550	6E+03	3E+03	2E+03
8JSDO50	1,162	6,042	173	423	36	25	4.5	2.0	6.8	2,884	1E+04	8E+03	7E+03
8K049	155	909	27	65	4	3	0.6	0.3	0.8	438	2E+03	1E+03	8E+02
9BDO49	314	858	32	150	6	21	1.0	0.2	1.4	389	3E+03	6E+03	7E+03
9EDO229	55	273	8	23	2	1	0.2	0.1	0.2	130	5E+02	3E+02	3E+02
9EDO243	161	554	23	189	6	3	1.1	0.2	0.6	266	1E+03	1E+03	2E+03
9K100	49	131	8	63	2	4	0.3	0.0	0.3	54	5E+02	9E+02	9E+02
9K101	595	2,130	99	886	25	18	4.8	0.9	2.6	1,010	4E+03	5E+03	6E+03
9K016	61	181	28	463	7	3	2.1	0.3	0.6	81	3E+02	4E+02	5E+02
9LSDO095	211	793	37	339	6	9	1.6	0.3	1.1	383	2E+03	2E+03	2E+03
10BSDO62	29	54	1	1	1	0	0.0	0.0	0.1	28	7E+00	5E-01	1E+01
10BSDO15	33	82	3	11	1	1	0.1	0.0	0.2	41	2E+02	4E+02	5E+02
10BSDO64	114	326	15	89	4	3	0.6	0.1	0.7	226	5E+02	5E+02	7E+02
10L094	12,978	71,680	2,003	4,633	298	283	40.6	21.1	72.6	34,921	1E+05	8E+04	7E+04
10L096	1,422	8,576	236	284	26	54	3.4	2.4	8.6	4,107	2E+04	1E+04	1E+04
11BDO28	12,199	55,094	2,449	21,840	460	341	106.2	23.7	68.4	27,058	1E+05	7E+04	7E+04
11BDO123	2,421	12,684	368	764	62	62	7.7	3.5	11.9	6,121	3E+04	2E+04	2E+04
11IDO577	33,268	167,698	5,452	13,103	1,605	792	182.0	48.9	159.2	76,427	3E+05	2E+05	2E+05
11M093	1,037	3,788	158	755	33	20	5.2	1.2	4.7	2,024	8E+03	5E+03	7E+03
12BDO10	11	28	2	19	0	1	0.1	0.0	0.1	12	9E+01	1E+02	2E+02
12BDO14	27	65	4	41	1	2	0.2	0.0	0.1	29	2E+02	4E+02	4E+02
12BDO124	8,341	44,063	1,392	6,155	205	195	36.6	14.1	44.3	21,701	8E+04	6E+04	5E+04
12EDO418	203	895	32	84	4	4	0.6	0.2	0.8	476	2E+03	1E+03	1E+03

Table C2-22. Scenario 5.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	136	655	20	84	3	2	0.5	0.2	0.6	325	1E+03	1E+03	7E+02
12HOFDO92	937	2,590	413	2,890	108	131	23.5	3.3	12.2	2,393	4E+03	7E+03	9E+03
12HDO85/87	434	1,285	69	473	14	41	2.7	0.4	2.5	516	5E+03	1E+04	1E+04
12L092	2,111	9,443	311	1,077	78	42	10.0	2.9	9.9	4,511	2E+04	1E+04	1E+04
12LDO296	464	2,178	68	272	13	8	2.0	0.6	2.5	1,079	3E+03	2E+03	2E+03
12M091	327	1,165	51	284	9	6	1.7	0.4	1.3	628	2E+03	2E+03	2E+03
13DSDO078	1,763	5,223	221	1,520	90	27	11.8	1.5	4.3	2,361	7E+03	6E+03	1E+04
13EDO177	51	108	10	162	3	1	0.7	0.1	0.2	52	7E+01	3E+02	4E+02
13EDO174	1,186	6,588	177	405	21	22	3.0	1.9	6.2	3,268	1E+04	8E+03	5E+03
13EDO176	35	82	5	77	2	1	0.4	0.1	0.2	40	5E+01	3E+02	3E+02
13FDO95	10	21	2	27	0	0	0.1	0.0	0.0	11	2E+01	1E+02	1E+02
13FDO011	24	44	1	1	1	0	0.0	0.0	0.0	22	2E+01	9E+01	1E+02
13F093	99	257	9	108	3	2	0.6	0.2	0.9	118	4E+02	1E+03	1E+03
13L090	31,607	149,474	4,881	6,060	1,732	700	169.9	37.1	128.0	66,910	3E+05	1E+05	2E+05
14CDO9	724	4,199	154	883	27	21	5.2	1.5	4.4	2,005	8E+03	6E+03	5E+03
15FSDO288	1,913	9,487	308	1,721	49	35	9.4	3.2	9.8	4,697	2E+04	1E+04	2E+04
15L089	13,015	58,739	2,000	5,153	625	288	70.5	15.9	55.4	27,271	1E+05	6E+04	8E+04
15L088	5,983	37,383	954	240	105	162	11.6	10.3	40.5	18,291	7E+04	5E+04	3E+04
16L097	511	1,561	67	621	18	32	3.6	1.3	5.6	648	4E+03	6E+03	7E+03
16LSDO122	8,106	41,579	1,271	2,575	270	261	32.3	11.2	43.8	19,621	8E+04	6E+04	6E+04
17M033	5,332	26,147	758	1,886	121	279	17.6	10.9	48.2	12,001	6E+04	6E+04	6E+04
18GSDO233	3,995	17,688	513	550	78	197	8.8	4.6	22.5	7,981	5E+04	6E+04	6E+04
19GDO043	4,907	32,202	813	354	95	116	10.5	9.4	32.0	15,484	6E+04	4E+04	3E+04
19GDO194	419	2,135	67	169	17	9	2.0	0.7	2.5	1,008	4E+03	3E+03	3E+03
19G199	58	169	2	2	1	1	0.1	0.2	0.7	73	1E+02	6E+02	6E+02
20G163	310	1,241	10	24	8	12	1.0	1.8	8.0	475	1E+03	4E+03	4E+03
20L083	213	926	26	9	4	8	0.7	0.1	2.1	500	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	57	2	5	1	0	0.1	0.0	0.0	26	1E+02	6E+01	8E+01
21H048	118	347	4	3	3	3	0.2	0.3	1.5	151	2E+02	3E+02	3E+02
21KSDO069	8,620	49,347	1,303	960	219	272	23.8	15.0	60.2	23,215	1E+05	7E+04	6E+04
21M005	144	416	12	40	3	3	0.4	0.1	0.9	222	1E+02	2E+02	2E+02
21M010	879	3,018	81	85	18	23	2.3	0.4	6.9	1,623	2E+03	2E+03	3E+03
21M050	411	1,187	29	29	9	7	0.9	0.2	2.8	634	1E+03	8E+02	3E+03
22CDO384	2,463	8,965	358	1,806	132	50	16.5	2.6	7.6	4,015	1E+04	8E+03	1E+04
22LSDO580	1,152	4,401	124	106	23	33	3.2	0.6	12.1	2,449	3E+03	3E+03	4E+03
23GDO132	4,434	9,421	267	2,161	124	62	15.7	3.7	16.1	4,372	7E+03	8E+03	1E+04
23HSDO042	17,784	77,015	2,671	4,991	877	541	98.5	25.2	99.1	35,480	1E+05	1E+05	1E+05
23HDO040	2,753	16,505	422	314	61	77	6.7	4.7	17.7	7,804	3E+04	2E+04	2E+04
23L196	132	266	7	39	4	1	0.4	0.1	0.7	134	1E+02	4E+01	2E+02
23L075	613	1,512	47	220	18	7	2.1	0.3	3.3	802	1E+03	7E+02	3E+03
23L074	129	278	7	25	4	1	0.3	0.0	0.4	145	8E+01	5E+01	1E+02
23L195	139	265	9	76	4	1	0.5	0.1	0.7	143	2E+02	6E+01	3E+02
23L202	141	272	7	38	4	0	0.3	0.1	0.7	147	3E+02	5E+01	6E+02
23L016	109	217	6	38	3	0	0.3	0.0	0.5	119	4E+02	7E+01	7E+02
23L015	161	277	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	836	2,087	70	108	21	42	1.9	0.3	4.7	954	7E+03	9E+03	1E+04
24CSDO031	273	1,699	45	57	4	6	0.5	0.5	1.7	850	3E+03	2E+03	1E+03

Table C2-22. Scenario 5.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,487	7,532	251	1,088	42	35	7.0	2.4	8.1	3,668	1E+04	1E+04	1E+04
24DSDO150	31	73	2	23	1	0	0.1	0.0	0.1	40	7E+01	5E+02	5E+02
24DSDO032	19,651	107,145	3,646	8,392	736	410	93.5	34.9	115.2	57,688	2E+05	1E+05	1E+05
24GSDO035	23,362	135,731	3,497	4,340	409	614	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
24GSDO034	1,637	6,197	165	919	40	25	5.9	2.5	11.0	3,040	1E+04	2E+04	2E+04
24L233	421	1,254	32	91	23	11	2.3	1.1	5.0	480	1E+03	8E+02	3E+03
25DDO040	520	2,570	76	210	12	17	1.7	0.9	4.1	1,243	5E+03	4E+03	4E+03
25EDO037	12,831	67,219	1,814	3,450	269	295	35.3	20.8	84.7	32,474	1E+05	9E+04	8E+04
25GDO041	71	241	9	31	6	3	0.6	0.2	0.9	82	3E+02	2E+02	5E+02
25GDO-06	241	667	18	217	9	7	1.4	0.8	3.7	278	3E+02	5E+02	6E+02
26J049	7,236	20,209	777	701	522	149	46.2	5.2	28.2	7,679	3E+04	1E+04	6E+04
25L144	538	3,636	89	11	13	13	1.3	1.0	3.2	1,692	8E+03	4E+03	3E+03
25L058	4,321	23,163	601	509	85	154	9.5	6.5	27.1	10,913	5E+04	4E+04	4E+04
26FDO038	62	174	14	132	7	2	1.0	0.1	0.2	58	3E+02	6E+01	6E+02
26GSDO01	3,584	16,197	482	1,925	123	85	16.7	7.3	28.0	7,591	3E+04	2E+04	2E+04
26JSDO052	38	71	4	66	2	0	0.3	0.1	0.2	34	8E+00	1E+01	1E+01
26JSDO100	154	414	22	81	14	3	1.5	0.1	0.2	142	7E+02	1E+02	1E+03
26J101	427	1,038	63	506	33	9	4.2	0.4	1.1	394	2E+03	7E+02	3E+03
26KSDO254	316	1,087	42	116	5	31	0.9	0.2	2.4	478	5E+03	7E+03	8E+03
26K035	188	399	11	34	5	1	0.5	0.1	1.1	216	5E+02	8E+01	9E+02
26K099	12,214	78,705	1,887	812	165	350	19.8	23.0	84.9	37,618	2E+05	1E+05	8E+04
26L055	170	990	27	13	7	4	0.6	0.2	0.8	456	2E+03	1E+03	1E+03
26LSDO084	69	203	10	16	7	1	0.6	0.0	0.1	71	3E+02	4E+02	9E+02
26L070	202	347	5	23	4	0	0.3	0.0	0.1	173	8E+01	2E+01	2E+02
27JSDO044	369	735	29	364	12	6	2.0	0.5	2.1	346	3E+02	6E+02	6E+02
27JSDO096	2,044	4,109	93	329	54	14	4.5	0.6	4.8	2,041	2E+03	4E+03	5E+03
27JSDO001	7,599	43,909	1,105	1,529	130	247	17.7	13.4	54.4	20,768	9E+04	7E+04	5E+04
27L022	2,149	12,978	310	294	43	62	5.2	5.0	19.0	6,099	2E+04	2E+04	1E+04
27L020	2,031	12,140	291	292	42	58	5.1	4.7	17.7	5,686	2E+04	2E+04	1E+04
28K061	4,278	27,712	705	374	65	131	7.8	7.7	27.0	13,287	6E+04	4E+04	3E+04
28K010	3,763	26,022	639	252	48	99	5.9	7.3	24.5	12,574	5E+04	3E+04	2E+04
28K386	644	1,592	56	379	17	20	2.6	0.6	3.7	776	2E+03	3E+03	3E+03
28L073	73	219	9	73	5	1	0.6	0.1	0.1	99	4E+02	2E+03	2E+03
28L074/5/6	1,202	3,556	108	714	50	22	6.3	2.1	8.8	1,571	4E+03	7E+03	1E+04
28N156	302	1,698	50	116	5	11	0.9	0.5	1.8	825	4E+03	3E+03	2E+03
28N207	3,104	18,908	494	458	63	92	7.5	5.8	20.5	9,032	4E+04	3E+04	2E+04
28O025	49	225	9	20	1	2	0.2	0.1	0.2	114	7E+02	5E+02	5E+02
28P001	291	1,928	49	26	4	6	0.5	0.5	1.7	945	4E+03	2E+03	1E+03
29J129	157	287	13	148	5	2	0.8	0.1	0.5	140	2E+02	3E+02	4E+02
29J029	345	899	40	186	6	30	1.1	0.2	1.8	372	4E+03	6E+03	6E+03
29J212	16,748	108,247	2,648	1,110	244	505	29.5	31.4	118.9	51,845	2E+05	2E+05	1E+05
29M049	1,210	6,653	186	186	35	43	3.8	1.9	7.0	3,075	1E+04	1E+04	1E+04
29N015	123	554	17	29	2	5	0.5	0.1	1.3	304	3E+02	5E+02	5E+02
29N135	397	2,208	60	149	7	9	1.2	0.6	2.6	1,092	4E+03	2E+03	1E+03
29O001	10,876	67,072	1,811	2,366	227	278	28.9	19.2	66.1	32,496	1E+05	8E+04	6E+04
29P015	73	490	13	13	1	2	0.2	0.1	0.4	240	9E+02	6E+02	3E+02
29P044	578	3,880	100	81	9	13	1.2	1.1	3.5	1,897	7E+03	5E+03	3E+03
30J006	219	642	25	181	8	5	1.2	0.2	1.0	321	8E+02	3E+03	3E+03

Table C2-22. Scenario 5.1 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	59	159	7	95	2	1	0.5	0.1	0.5	78	1E+02	6E+02	6E+02
30J030	659	1,419	37	170	17	5	1.7	0.2	2.5	738	5E+02	5E+02	9E+02
30P107	320	1,678	63	105	6	9	0.9	0.4	1.4	854	4E+03	3E+03	2E+03
30P062	271	1,778	47	53	4	6	0.6	0.5	1.6	881	3E+03	2E+03	1E+03
31O004	964	5,791	206	151	17	31	2.3	1.3	4.5	2,848	1E+04	9E+03	6E+03
31P084	296	1,840	48	79	4	6	0.6	0.5	1.8	911	3E+03	2E+03	1E+03
3FDO159	295	1,236	57	497	14	7	2.7	0.5	1.4	594	2E+03	2E+03	2E+03
11G318/319	320	881	69	741	13	32	3.4	0.5	2.2	357	4E+03	6E+03	6E+03
6FSDO233	7	15	5	88	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,510	5,498	124	74	50	71	3.2	0.8	5.5	2,561	3E+04	5E+04	5E+04
21H047	495	1,895	33	77	15	15	1.6	1.6	6.9	792	2E+03	2E+03	2E+03
21H039	1,445	4,556	65	322	43	46	5.1	5.4	23.4	1,820	3E+03	4E+03	5E+03
20G161	2,489	10,531	300	227	65	81	7.1	5.1	21.5	4,818	2E+04	2E+04	2E+04
StonyMWRA	109,349	506,696	18,159	69,872	4,729	2,959	660.6	181.6	609.9	243,244	9E+05	6E+05	7E+05
Fens	69,865	220,022	11,346	17,740	4,557	2,073	530.9	93.3	282.3	111,187	3E+05	2E+05	2E+05
20D055	5,301	34,083	916	484	118	122	12.8	9.7	32.2	16,579	6E+04	4E+04	3E+04
21D319	7,174	47,260	1,249	847	143	166	16.5	13.4	44.0	23,046	9E+04	5E+04	3E+04

Table C2-23. Scenario 5.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	951	3,798	137	923	28	19	5.3	1.2	5.1	1,924	5E+03	4E+03	3E+03
1FDO31	774	3,605	100	202	19	17	2.2	1.0	3.5	1,755	6E+03	5E+03	4E+03
02E086	247	1,013	42	329	10	5	1.9	0.4	1.2	488	2E+03	1E+03	1E+03
2FDO120	1,319	6,532	193	597	33	29	4.9	1.8	7.7	3,242	1E+04	7E+03	7E+03
2FDO93	1,493	10,523	257	113	18	35	2.3	2.9	9.5	5,124	2E+04	1E+04	7E+03
2FDO85	93	427	12	37	3	1	0.3	0.1	0.4	209	7E+02	5E+02	4E+02
3ESDO186	305	1,360	63	567	14	7	2.9	0.6	1.7	660	2E+03	1E+03	1E+03
3ESDO185	563	2,517	101	364	15	12	2.5	0.8	2.5	1,307	5E+03	3E+03	3E+03
3F162	507	2,425	92	506	24	11	3.6	0.8	2.3	1,141	4E+03	2E+03	3E+03
4ESDO69	1,534	7,138	237	985	41	35	6.7	2.3	8.4	3,560	1E+04	9E+03	8E+03
4ESDO64	37	120	8	92	2	1	0.5	0.1	0.2	56	2E+02	3E+02	3E+02
4FDO189	714	3,958	111	179	20	14	2.3	1.1	3.8	1,926	7E+03	4E+03	3E+03
4FDO204	850	4,302	139	512	31	16	4.3	1.3	3.9	2,062	7E+03	4E+03	4E+03
4FDO16	397	2,247	63	88	11	10	1.2	0.6	2.1	1,082	4E+03	3E+03	2E+03
4FDO203	123	526	23	186	6	2	1.1	0.2	0.6	252	8E+02	7E+02	7E+02
4FDO118	562	3,179	84	115	10	13	1.3	0.9	3.0	1,559	6E+03	4E+03	3E+03
4FDO119	1,238	5,056	133	46	22	35	2.9	0.8	10.0	2,701	4E+03	4E+03	4E+03
5CSDO110	721	2,450	123	769	31	21	5.1	0.9	2.9	1,260	6E+03	4E+03	6E+03
5EDO182	101	471	30	377	6	3	1.7	0.3	0.8	230	7E+02	5E+02	3E+02
5ESDO184	605	2,668	140	1,486	30	14	7.1	1.3	3.5	1,301	4E+03	3E+03	3E+03
5FDO117	746	3,695	137	777	31	16	5.1	1.3	3.7	1,764	6E+03	3E+03	4E+03
5FDO254	53	330	8	12	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
5FDO265	18	37	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	598	3,124	90	177	16	15	2.0	0.9	2.9	1,503	6E+03	4E+03	4E+03
5FDO245	1,301	7,694	209	363	27	27	3.5	2.2	7.6	3,793	1E+04	8E+03	6E+03
5FDO244	228	1,174	31	57	5	5	0.6	0.3	1.6	585	2E+03	1E+03	9E+02
5FDO264	18	49	2	6	0	2	0.0	0.0	0.1	20	2E+02	4E+02	4E+02
5GDO112	887	5,376	139	171	16	20	2.1	1.7	6.0	2,626	9E+03	6E+03	4E+03
5GDO116A	739	4,112	121	457	15	14	2.7	1.3	4.0	2,050	7E+03	4E+03	2E+03
5GDO115	234	1,426	38	39	5	5	0.6	0.4	1.4	698	2E+03	2E+03	1E+03
5GDO116	695	4,002	107	129	17	14	1.9	1.1	3.7	1,937	7E+03	4E+03	3E+03
6DDO57	129	490	22	200	6	2	1.1	0.2	0.5	236	7E+02	9E+02	9E+02
6DDO184	10	24	13	238	3	1	1.0	0.1	0.2	9	3E+01	1E+01	6E+01
6DDO91	16	34	27	524	6	2	2.2	0.3	0.5	14	3E+01	2E+01	6E+01
6DDO187	73	224	10	57	2	5	0.4	0.1	0.4	95	7E+02	1E+03	1E+03
6DDO86	11	31	5	79	1	0	0.4	0.0	0.1	13	4E+01	2E+01	6E+01
6DDO85	46	244	9	49	2	1	0.4	0.1	0.2	114	4E+02	2E+02	2E+02
6DDO83	175	806	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	11	52	3	19	1	0	0.1	0.0	0.1	23	9E+01	4E+01	7E+01
06D097	87	313	17	138	6	2	1.0	0.1	0.3	136	5E+02	3E+02	6E+02
6GDO109	1,373	7,488	206	278	40	27	4.4	2.1	6.7	3,587	1E+04	8E+03	9E+03
6GDO110	1,695	10,009	274	394	42	35	5.0	2.8	8.9	4,863	2E+04	1E+04	8E+03
6GDO111	249	1,083	59	612	14	6	3.1	0.6	1.4	518	2E+03	1E+03	9E+02
6GDO166	140	502	40	552	9	4	2.5	0.4	0.9	242	7E+02	4E+02	5E+02
6GDO108	4,520	26,404	715	969	107	97	12.7	7.3	24.0	12,816	5E+04	3E+04	2E+04
6G165	26	105	5	54	1	0	0.2	0.1	0.1	53	1E+02	1E+02	8E+01
6HDO43	87	437	15	65	4	2	0.5	0.1	0.4	205	7E+02	5E+02	5E+02
6HDO106	205	934	33	181	7	4	1.1	0.3	0.9	457	1E+03	9E+02	7E+02

Table C2-23. Scenario 5.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	523	2,715	87	413	15	10	2.6	0.9	2.7	1,325	4E+03	3E+03	2E+03
7CDO006	5,550	25,654	1,013	7,746	190	122	40.0	10.1	30.0	12,655	5E+04	3E+04	4E+04
7HDO285	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
7HDO105	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
7HDO348	46	307	8	10	0	1	0.1	0.1	0.3	153	5E+02	4E+02	2E+02
7HDO347	319	1,652	52	202	11	6	1.6	0.5	1.5	798	3E+03	2E+03	2E+03
7HDO346	296	1,854	49	70	5	6	0.7	0.5	1.7	907	3E+03	2E+03	1E+03
8BDO122	1,423	8,010	202	304	28	36	3.6	3.1	11.4	3,835	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	4E-01	7E-01	8E-01
8BDO126	811	5,165	132	137	11	17	1.5	1.5	4.9	2,551	9E+03	6E+03	3E+03
8CDO25	178	582	42	484	10	5	2.4	0.4	1.0	306	1E+03	1E+03	2E+03
8CDO26	166	574	38	416	8	5	2.0	0.4	1.0	305	1E+03	1E+03	2E+03
8DDO112	32	195	5	8	1	1	0.1	0.1	0.2	94	4E+02	4E+02	3E+02
8DSDO100	76	242	15	176	3	3	0.8	0.1	0.4	118	5E+02	1E+03	1E+03
8EDO35	122	336	29	454	8	2	2.0	0.3	0.6	167	4E+02	2E+03	2E+03
8EDO33	435	2,698	78	253	9	10	1.6	0.8	2.6	1,330	5E+03	3E+03	2E+03
8IDO153	35	230	6	4	0	1	0.0	0.1	0.2	113	4E+02	3E+02	1E+02
8IDO155	23	87	5	58	1	0	0.3	0.0	0.1	44	1E+02	3E+02	3E+02
8IDO156	315	679	47	589	19	4	3.3	0.3	0.8	293	5E+02	1E+02	8E+02
8IDO209	117	753	19	18	1	2	0.2	0.2	0.7	373	1E+03	9E+02	5E+02
8IDO154	790	4,331	125	294	21	19	2.8	1.3	4.4	2,082	8E+03	6E+03	5E+03
8IDO158	369	2,202	60	135	8	8	1.2	0.7	2.5	1,080	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,130	7,083	185	239	22	26	2.9	2.2	7.9	3,440	1E+04	8E+03	5E+03
8JSDO103	894	5,287	150	327	21	19	2.9	1.5	4.9	2,587	9E+03	6E+03	4E+03
8JSDO41	504	3,177	84	115	10	11	1.3	1.0	3.2	1,550	6E+03	3E+03	2E+03
8JSDO50	1,162	6,042	173	423	36	25	4.5	2.0	6.8	2,884	1E+04	8E+03	7E+03
8K049	155	909	27	65	4	3	0.6	0.3	0.8	438	2E+03	1E+03	8E+02
9BDO49	314	858	32	150	6	21	1.0	0.2	1.4	389	3E+03	6E+03	7E+03
9EDO229	55	273	8	23	2	1	0.2	0.1	0.2	130	5E+02	3E+02	3E+02
9EDO243	161	554	23	189	6	3	1.1	0.2	0.6	266	1E+03	1E+03	2E+03
9K100	49	131	8	63	2	4	0.3	0.0	0.3	54	5E+02	9E+02	9E+02
9K101	595	2,130	99	886	25	18	4.8	0.9	2.6	1,010	4E+03	5E+03	6E+03
9K016	61	181	28	463	7	3	2.1	0.3	0.6	81	3E+02	4E+02	5E+02
9LSDO095	211	793	37	339	6	9	1.6	0.3	1.1	383	2E+03	2E+03	2E+03
10BSDO62	29	54	1	1	1	0	0.0	0.0	0.1	28	7E+00	5E-01	1E+01
10BSDO15	33	82	3	11	1	1	0.1	0.0	0.2	41	2E+02	4E+02	5E+02
10BSDO64	114	326	15	89	4	3	0.6	0.1	0.7	226	5E+02	5E+02	7E+02
10L094	12,978	71,680	2,003	4,633	298	283	40.6	21.1	72.6	34,921	1E+05	8E+04	7E+04
10L096	1,422	8,576	236	284	26	54	3.4	2.4	8.6	4,107	2E+04	1E+04	1E+04
11BDO28	12,199	55,094	2,449	21,840	460	341	106.2	23.7	68.4	27,058	1E+05	7E+04	7E+04
11BDO123	2,421	12,684	368	764	62	62	7.7	3.5	11.9	6,121	3E+04	2E+04	2E+04
11IDO577	33,268	167,698	5,452	13,103	1,605	792	182.0	48.9	159.2	76,427	3E+05	2E+05	2E+05
11M093	1,037	3,788	158	755	33	20	5.2	1.2	4.7	2,024	8E+03	5E+03	7E+03
12BDO10	11	28	2	19	0	1	0.1	0.0	0.1	12	9E+01	1E+02	2E+02
12BDO14	27	65	4	41	1	2	0.2	0.0	0.1	29	2E+02	4E+02	4E+02
12BDO124	8,341	44,063	1,392	6,155	205	195	36.6	14.1	44.3	21,701	8E+04	6E+04	5E+04
12EDO418	203	895	32	84	4	4	0.6	0.2	0.8	476	2E+03	1E+03	1E+03

Table C2-23. Scenario 5.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	136	655	20	84	3	2	0.5	0.2	0.6	325	1E+03	1E+03	7E+02
12HOFDO92	937	2,590	413	2,890	108	131	23.5	3.3	12.2	2,393	4E+03	7E+03	9E+03
12HDO85/87	434	1,285	69	473	14	41	2.7	0.4	2.5	516	5E+03	1E+04	1E+04
12L092	2,111	9,443	311	1,077	78	42	10.0	2.9	9.9	4,511	2E+04	1E+04	1E+04
12LDO296	464	2,178	68	272	13	8	2.0	0.6	2.5	1,079	3E+03	2E+03	2E+03
12M091	327	1,165	51	284	9	6	1.7	0.4	1.3	628	2E+03	2E+03	2E+03
13DSDO078	1,763	5,223	221	1,520	90	27	11.8	1.5	4.3	2,361	7E+03	6E+03	1E+04
13EDO177	51	108	10	162	3	1	0.7	0.1	0.2	52	7E+01	3E+02	4E+02
13EDO174	1,186	6,588	177	405	21	22	3.0	1.9	6.2	3,268	1E+04	8E+03	5E+03
13EDO176	35	82	5	77	2	1	0.4	0.1	0.2	40	5E+01	3E+02	3E+02
13FDO95	10	21	2	27	0	0	0.1	0.0	0.0	11	2E+01	1E+02	1E+02
13FDO011	24	44	1	1	1	0	0.0	0.0	0.0	22	2E+01	9E+01	1E+02
13F093	99	257	9	108	3	2	0.6	0.2	0.9	118	4E+02	1E+03	1E+03
13L090	31,607	149,474	4,881	6,060	1,732	700	169.9	37.1	128.0	66,910	3E+05	1E+05	2E+05
14CDO9	724	4,199	154	883	27	21	5.2	1.5	4.4	2,005	8E+03	6E+03	5E+03
15FSDO288	1,913	9,487	308	1,721	49	35	9.4	3.2	9.8	4,697	2E+04	1E+04	2E+04
15L089	13,015	58,739	2,000	5,153	625	288	70.5	15.9	55.4	27,271	1E+05	6E+04	8E+04
15L088	5,983	37,383	954	240	105	162	11.6	10.3	40.5	18,291	7E+04	5E+04	3E+04
16L097	511	1,561	67	621	18	32	3.6	1.3	5.6	648	4E+03	6E+03	7E+03
16LSDO122	8,106	41,579	1,271	2,575	270	261	32.3	11.2	43.8	19,621	8E+04	6E+04	6E+04
17M033	5,332	26,147	758	1,886	121	279	17.6	10.9	48.2	12,001	6E+04	6E+04	6E+04
18GSDO233	3,995	17,688	513	550	78	180	8.8	4.6	22.5	7,981	5E+04	6E+04	6E+04
19GDO043	4,907	32,202	813	354	95	116	10.5	9.4	32.0	15,484	6E+04	4E+04	3E+04
19GDO194	419	2,135	67	169	17	9	2.0	0.7	2.5	1,008	4E+03	3E+03	3E+03
19G199	58	169	2	2	1	1	0.1	0.2	0.7	73	1E+02	6E+02	6E+02
20G163	310	1,241	10	24	8	11	1.0	1.8	8.0	475	1E+03	4E+03	4E+03
20L083	213	926	26	9	4	8	0.7	0.1	2.1	500	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	57	2	5	1	0	0.1	0.0	0.0	26	1E+02	6E+01	8E+01
21H048	118	347	4	3	3	3	0.2	0.3	1.5	151	2E+02	3E+02	3E+02
21KSDO069	8,620	49,347	1,303	960	219	272	23.8	15.0	60.2	23,215	1E+05	7E+04	6E+04
21M005	144	416	12	40	3	3	0.4	0.1	0.9	222	1E+02	2E+02	2E+02
21M010	879	3,018	81	85	18	23	2.3	0.4	6.9	1,623	2E+03	2E+03	3E+03
21M050	411	1,187	29	29	9	7	0.9	0.2	2.8	634	1E+03	8E+02	3E+03
22CDO384	2,463	8,965	358	1,806	132	50	16.5	2.6	7.6	4,015	1E+04	8E+03	1E+04
22LSDO580	1,152	4,401	124	106	23	33	3.2	0.6	12.1	2,449	3E+03	3E+03	4E+03
23GDO132	4,434	9,421	267	2,161	124	62	15.7	3.7	16.1	4,372	7E+03	8E+03	1E+04
23HSDO042	17,784	77,015	2,671	4,991	877	541	98.5	25.2	99.1	35,480	1E+05	1E+05	1E+05
23HDO040	2,753	16,505	422	314	61	77	6.7	4.7	17.7	7,804	3E+04	2E+04	2E+04
23L196	132	266	7	39	4	1	0.4	0.1	0.7	134	1E+02	4E+01	2E+02
23L075	613	1,512	47	220	18	7	2.1	0.3	3.3	802	1E+03	7E+02	3E+03
23L074	129	278	7	25	4	1	0.3	0.0	0.4	145	8E+01	5E+01	1E+02
23L195	139	265	9	76	4	1	0.5	0.1	0.7	143	2E+02	6E+01	3E+02
23L202	141	272	7	38	4	0	0.3	0.1	0.7	147	3E+02	5E+01	6E+02
23L016	109	217	6	38	3	0	0.3	0.0	0.5	119	4E+02	7E+01	7E+02
23L015	161	277	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	836	2,087	70	108	21	42	1.9	0.3	4.7	954	7E+03	9E+03	1E+04
24CSDO031	273	1,699	45	57	4	6	0.5	0.5	1.7	850	3E+03	2E+03	1E+03

Table C2-23. Scenario 5.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,487	7,532	251	1,088	42	32	7.0	2.4	8.1	3,668	1E+04	1E+04	1E+04
24DSDO150	31	73	2	23	1	0	0.1	0.0	0.1	40	7E+01	5E+02	5E+02
24DSDO032	19,651	107,145	3,646	8,392	736	374	93.5	34.9	115.2	57,688	2E+05	1E+05	1E+05
24GSDO035	23,362	135,731	3,497	4,340	409	614	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
24GSDO034	1,637	6,197	165	919	40	25	5.9	2.5	11.0	3,040	1E+04	2E+04	2E+04
24L233	421	1,254	32	91	23	11	2.3	1.1	5.0	480	1E+03	8E+02	3E+03
25DDO040	520	2,570	76	210	12	17	1.7	0.9	4.1	1,243	5E+03	4E+03	4E+03
25EDO037	12,831	67,219	1,814	3,450	269	271	35.3	20.8	84.7	32,474	1E+05	9E+04	8E+04
25GDO041	71	241	9	31	6	3	0.6	0.2	0.9	82	3E+02	2E+02	5E+02
25GDO-06	241	667	18	217	9	7	1.4	0.8	3.7	278	3E+02	5E+02	6E+02
26J049	7,236	20,209	777	701	522	149	46.2	5.2	28.2	7,679	3E+04	1E+04	6E+04
25L144	538	3,636	89	11	13	13	1.3	1.0	3.2	1,692	8E+03	4E+03	3E+03
25L058	4,321	23,163	601	509	85	154	9.5	6.5	27.1	10,913	5E+04	4E+04	4E+04
26FDO038	62	174	14	132	7	2	1.0	0.1	0.2	58	3E+02	6E+01	6E+02
26GSDO01	3,584	16,197	482	1,925	123	85	16.7	7.3	28.0	7,591	3E+04	2E+04	2E+04
26JSDO052	38	71	4	66	2	0	0.3	0.1	0.2	34	8E+00	1E+01	1E+01
26JSDO100	154	414	22	81	14	3	1.5	0.1	0.2	142	7E+02	1E+02	1E+03
26J101	427	1,038	63	506	33	9	4.2	0.4	1.1	394	2E+03	7E+02	3E+03
26KSDO254	316	1,087	42	116	5	31	0.9	0.2	2.4	478	5E+03	7E+03	8E+03
26K035	188	399	11	34	5	1	0.5	0.1	1.1	216	5E+02	8E+01	9E+02
26K099	12,214	78,705	1,887	812	165	350	19.8	23.0	84.9	37,618	2E+05	1E+05	8E+04
26L055	170	990	27	13	7	4	0.6	0.2	0.8	456	2E+03	1E+03	1E+03
26LSDO084	69	203	10	16	7	1	0.6	0.0	0.1	71	3E+02	4E+02	9E+02
26L070	202	347	5	23	4	0	0.3	0.0	0.1	173	8E+01	2E+01	2E+02
27JSDO044	369	735	29	364	12	6	2.0	0.5	2.1	346	3E+02	6E+02	6E+02
27JSDO096	2,044	4,109	93	329	54	14	4.5	0.6	4.8	2,041	2E+03	4E+03	5E+03
27JSDO001	7,599	43,909	1,105	1,529	130	247	17.7	13.4	54.4	20,768	9E+04	7E+04	5E+04
27L022	2,149	12,978	310	294	43	62	5.2	5.0	19.0	6,099	2E+04	2E+04	1E+04
27L020	2,031	12,140	291	292	42	58	5.1	4.7	17.7	5,686	2E+04	2E+04	1E+04
28K061	4,278	27,712	705	374	65	131	7.8	7.7	27.0	13,287	6E+04	4E+04	3E+04
28K010	3,763	26,022	639	252	48	99	5.9	7.3	24.5	12,574	5E+04	3E+04	2E+04
28K386	644	1,592	56	379	17	20	2.6	0.6	3.7	776	2E+03	3E+03	3E+03
28L073	73	219	9	73	5	1	0.6	0.1	0.1	99	4E+02	2E+03	2E+03
28L074/5/6	1,202	3,556	108	714	50	22	6.3	2.1	8.8	1,571	4E+03	7E+03	1E+04
28N156	302	1,698	50	116	5	11	0.9	0.5	1.8	825	4E+03	3E+03	2E+03
28N207	3,104	18,908	494	458	63	92	7.5	5.8	20.5	9,032	4E+04	3E+04	2E+04
28O025	49	225	9	20	1	2	0.2	0.1	0.2	114	7E+02	5E+02	5E+02
28P001	291	1,928	49	26	4	6	0.5	0.5	1.7	945	4E+03	2E+03	1E+03
29J129	157	287	13	148	5	2	0.8	0.1	0.5	140	2E+02	3E+02	4E+02
29J029	345	899	40	186	6	30	1.1	0.2	1.8	372	4E+03	6E+03	6E+03
29J212	16,748	108,247	2,648	1,110	244	505	29.5	31.4	118.9	51,845	2E+05	2E+05	1E+05
29M049	1,210	6,653	186	186	35	43	3.8	1.9	7.0	3,075	1E+04	1E+04	1E+04
29N015	123	554	17	29	2	5	0.5	0.1	1.3	304	3E+02	5E+02	5E+02
29N135	397	2,208	60	149	7	9	1.2	0.6	2.6	1,092	4E+03	2E+03	1E+03
29O001	10,876	67,072	1,811	2,366	227	278	28.9	19.2	66.1	32,496	1E+05	8E+04	6E+04
29P015	73	490	13	13	1	2	0.2	0.1	0.4	240	9E+02	6E+02	3E+02
29P044	578	3,880	100	81	9	13	1.2	1.1	3.5	1,897	7E+03	5E+03	3E+03
30J006	219	642	25	181	8	5	1.2	0.2	1.0	321	8E+02	3E+03	3E+03

Table C2-23. Scenario 5.2 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	59	159	7	95	2	1	0.5	0.1	0.5	78	1E+02	6E+02	6E+02
30J030	659	1,419	37	170	17	5	1.7	0.2	2.5	738	5E+02	5E+02	9E+02
30P107	320	1,678	63	105	6	9	0.9	0.4	1.4	854	4E+03	3E+03	2E+03
30P062	271	1,778	47	53	4	6	0.6	0.5	1.6	881	3E+03	2E+03	1E+03
31O004	964	5,791	206	151	17	31	2.3	1.3	4.5	2,848	1E+04	9E+03	6E+03
31P084	296	1,840	48	79	4	6	0.6	0.5	1.8	911	3E+03	2E+03	1E+03
3FDO159	295	1,236	57	497	14	7	2.7	0.5	1.4	594	2E+03	2E+03	2E+03
11G318/319	320	881	69	741	13	32	3.4	0.5	2.2	357	4E+03	6E+03	6E+03
6FSDO233	7	15	5	88	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,510	5,498	124	74	50	71	3.2	0.8	5.5	2,561	3E+04	5E+04	5E+04
21H047	495	1,895	33	77	15	15	1.6	1.6	6.9	792	2E+03	2E+03	2E+03
21H039	1,445	4,556	65	322	43	46	5.1	5.4	23.4	1,820	3E+03	4E+03	5E+03
20G161	2,489	10,531	300	227	65	74	7.1	5.1	21.5	4,818	2E+04	2E+04	2E+04
StonyMWRA	109,349	506,696	18,159	69,872	4,729	2,959	660.6	181.6	609.9	243,244	9E+05	6E+05	7E+05
Fens	69,865	220,022	11,346	17,740	4,557	2,061	530.9	93.3	282.3	111,187	3E+05	2E+05	2E+05
20D055	5,301	34,083	916	484	118	122	12.8	9.7	32.2	16,579	6E+04	4E+04	3E+04
21D319	7,174	47,260	1,249	847	143	166	16.5	13.4	44.0	23,046	9E+04	5E+04	3E+04

Table C2-24. Scenario 5.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	951	3,798	137	923	28	19	5.3	1.2	5.1	1,924	5E+03	4E+03	3E+03
1FDO31	774	3,605	100	202	19	17	2.2	1.0	3.5	1,755	6E+03	5E+03	4E+03
02E086	247	1,013	42	329	10	5	1.9	0.4	1.2	488	2E+03	1E+03	1E+03
2FDO120	1,319	6,532	193	597	33	29	4.9	1.8	7.7	3,242	1E+04	7E+03	7E+03
2FDO93	1,493	10,523	257	113	18	35	2.3	2.9	9.5	5,124	2E+04	1E+04	7E+03
2FDO85	93	427	12	37	3	1	0.3	0.1	0.4	209	7E+02	5E+02	4E+02
3ESDO186	305	1,360	63	567	14	7	2.9	0.6	1.7	660	2E+03	1E+03	1E+03
3ESDO185	563	2,517	101	364	15	12	2.5	0.8	2.5	1,307	5E+03	3E+03	3E+03
3F162	507	2,425	92	506	24	11	3.6	0.8	2.3	1,141	4E+03	2E+03	3E+03
4ESDO69	1,534	7,138	237	985	41	35	6.7	2.3	8.4	3,560	1E+04	9E+03	8E+03
4ESDO64	37	120	8	92	2	1	0.5	0.1	0.2	56	2E+02	3E+02	3E+02
4FDO189	714	3,958	111	179	20	14	2.3	1.1	3.8	1,926	7E+03	4E+03	3E+03
4FDO204	850	4,302	139	512	31	16	4.3	1.3	3.9	2,062	7E+03	4E+03	4E+03
4FDO16	397	2,247	63	88	11	10	1.2	0.6	2.1	1,082	4E+03	3E+03	2E+03
4FDO203	123	526	23	186	6	2	1.1	0.2	0.6	252	8E+02	7E+02	7E+02
4FDO118	562	3,179	84	115	10	13	1.3	0.9	3.0	1,559	6E+03	4E+03	3E+03
4FDO119	1,238	5,056	133	46	22	35	2.9	0.8	10.0	2,701	4E+03	4E+03	4E+03
5CSDO110	721	2,450	123	769	31	21	5.1	0.9	2.9	1,260	6E+03	4E+03	6E+03
5EDO182	101	471	30	377	6	3	1.7	0.3	0.8	230	7E+02	5E+02	3E+02
5ESDO184	605	2,668	140	1,486	30	14	7.1	1.3	3.5	1,301	4E+03	3E+03	3E+03
5FDO117	746	3,695	137	777	31	16	5.1	1.3	3.7	1,764	6E+03	3E+03	4E+03
5FDO254	53	330	8	12	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
5FDO265	18	37	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	598	3,124	90	177	16	15	2.0	0.9	2.9	1,503	6E+03	4E+03	4E+03
5FDO245	1,301	7,694	209	363	27	27	3.5	2.2	7.6	3,793	1E+04	8E+03	6E+03
5FDO244	228	1,174	31	57	5	5	0.6	0.3	1.6	585	2E+03	1E+03	9E+02
5FDO264	18	49	2	6	0	2	0.0	0.0	0.1	20	2E+02	4E+02	4E+02
5GDO112	887	5,376	139	171	16	20	2.1	1.7	6.0	2,626	9E+03	6E+03	4E+03
5GDO116A	739	4,112	121	457	15	14	2.7	1.3	4.0	2,050	7E+03	4E+03	2E+03
5GDO115	234	1,426	38	39	5	5	0.6	0.4	1.4	698	2E+03	2E+03	1E+03
5GDO116	695	4,002	107	129	17	14	1.9	1.1	3.7	1,937	7E+03	4E+03	3E+03
6DDO57	129	490	22	200	6	2	1.1	0.2	0.5	236	7E+02	9E+02	9E+02
6DDO184	10	24	13	238	3	1	1.0	0.1	0.2	9	3E+01	1E+01	6E+01
6DDO91	16	34	27	524	6	2	2.2	0.3	0.5	14	3E+01	2E+01	6E+01
6DDO187	73	224	10	57	2	5	0.4	0.1	0.4	95	7E+02	1E+03	1E+03
6DDO86	11	31	5	79	1	0	0.4	0.0	0.1	13	4E+01	2E+01	6E+01
6DDO85	46	244	9	49	2	1	0.4	0.1	0.2	114	4E+02	2E+02	2E+02
6DDO83	175	806	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	11	52	3	19	1	0	0.1	0.0	0.1	23	9E+01	4E+01	7E+01
06D097	87	313	17	138	6	2	1.0	0.1	0.3	136	5E+02	3E+02	6E+02
6GDO109	1,373	7,488	206	278	40	27	4.4	2.1	6.7	3,587	1E+04	8E+03	9E+03
6GDO110	1,695	10,009	274	394	42	35	5.0	2.8	8.9	4,863	2E+04	1E+04	8E+03
6GDO111	249	1,083	59	612	14	6	3.1	0.6	1.4	518	2E+03	1E+03	9E+02
6GDO166	140	502	40	552	9	4	2.5	0.4	0.9	242	7E+02	4E+02	5E+02
6GDO108	4,520	26,404	715	969	107	97	12.7	7.3	24.0	12,816	5E+04	3E+04	2E+04
6G165	26	105	5	54	1	0	0.2	0.1	0.1	53	1E+02	1E+02	8E+01
6HDO43	87	437	15	65	4	2	0.5	0.1	0.4	205	7E+02	5E+02	5E+02
6HDO106	205	934	33	181	7	4	1.1	0.3	0.9	457	1E+03	9E+02	7E+02

Table C2-24. Scenario 5.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	523	2,715	87	413	15	10	2.6	0.9	2.7	1,325	4E+03	3E+03	2E+03
7CDO006	5,550	25,654	1,013	7,746	190	122	40.0	10.1	30.0	12,655	5E+04	3E+04	4E+04
7HDO285	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
7HDO105	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
7HDO348	46	307	8	10	0	1	0.1	0.1	0.3	153	5E+02	4E+02	2E+02
7HDO347	319	1,652	52	202	11	6	1.6	0.5	1.5	798	3E+03	2E+03	2E+03
7HDO346	296	1,854	49	70	5	6	0.7	0.5	1.7	907	3E+03	2E+03	1E+03
8BDO122	1,423	8,010	202	304	28	36	3.6	3.1	11.4	3,835	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	4E-01	7E-01	8E-01
8BDO126	811	5,165	132	137	11	17	1.5	1.5	4.9	2,551	9E+03	6E+03	3E+03
8CDO25	178	582	42	484	10	5	2.4	0.4	1.0	306	1E+03	1E+03	2E+03
8CDO26	166	574	38	416	8	5	2.0	0.4	1.0	305	1E+03	1E+03	2E+03
8DDO112	32	195	5	8	1	1	0.1	0.1	0.2	94	4E+02	4E+02	3E+02
8DSDO100	76	242	15	176	3	3	0.8	0.1	0.4	118	5E+02	1E+03	1E+03
8EDO35	122	336	29	454	8	2	2.0	0.3	0.6	167	4E+02	2E+03	2E+03
8EDO33	435	2,698	78	253	9	10	1.6	0.8	2.6	1,330	5E+03	3E+03	2E+03
8IDO153	35	230	6	4	0	1	0.0	0.1	0.2	113	4E+02	3E+02	1E+02
8IDO155	23	87	5	58	1	0	0.3	0.0	0.1	44	1E+02	3E+02	3E+02
8IDO156	315	679	47	589	19	4	3.3	0.3	0.8	293	5E+02	1E+02	8E+02
8IDO209	117	753	19	18	1	2	0.2	0.2	0.7	373	1E+03	9E+02	5E+02
8IDO154	790	4,331	125	294	21	19	2.8	1.3	4.4	2,082	8E+03	6E+03	5E+03
8IDO158	369	2,202	60	135	8	8	1.2	0.7	2.5	1,080	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,130	7,083	185	239	22	26	2.9	2.2	7.9	3,440	1E+04	8E+03	5E+03
8JSDO103	894	5,287	150	327	21	19	2.9	1.5	4.9	2,587	9E+03	6E+03	4E+03
8JSDO41	504	3,177	84	115	10	11	1.3	1.0	3.2	1,550	6E+03	3E+03	2E+03
8JSDO50	1,162	6,042	173	423	36	25	4.5	2.0	6.8	2,884	1E+04	8E+03	7E+03
8K049	155	909	27	65	4	3	0.6	0.3	0.8	438	2E+03	1E+03	8E+02
9BDO49	314	858	32	150	6	21	1.0	0.2	1.4	389	3E+03	6E+03	7E+03
9EDO229	55	273	8	23	2	1	0.2	0.1	0.2	130	5E+02	3E+02	3E+02
9EDO243	161	554	23	189	6	3	1.1	0.2	0.6	266	1E+03	1E+03	2E+03
9K100	49	131	8	63	2	4	0.3	0.0	0.3	54	5E+02	9E+02	9E+02
9K101	595	2,130	99	886	25	18	4.8	0.9	2.6	1,010	4E+03	5E+03	6E+03
9K016	61	181	28	463	7	3	2.1	0.3	0.6	81	3E+02	4E+02	5E+02
9LSDO095	211	793	37	339	6	9	1.6	0.3	1.1	383	2E+03	2E+03	2E+03
10BSDO62	29	54	1	1	1	0	0.0	0.0	0.1	28	7E+00	5E-01	1E+01
10BSDO15	33	82	3	11	1	1	0.1	0.0	0.2	41	2E+02	4E+02	5E+02
10BSDO64	114	326	15	89	4	3	0.6	0.1	0.7	226	5E+02	5E+02	7E+02
10L094	12,978	71,680	2,003	4,633	298	283	40.6	21.1	72.6	34,921	1E+05	8E+04	7E+04
10L096	1,422	8,576	236	284	26	54	3.4	2.4	8.6	4,107	2E+04	1E+04	1E+04
11BDO28	12,199	55,094	2,449	21,840	460	341	106.2	23.7	68.4	27,058	1E+05	7E+04	7E+04
11BDO123	2,421	12,684	368	764	62	62	7.7	3.5	11.9	6,121	3E+04	2E+04	2E+04
11IDO577	33,268	167,698	5,452	13,103	1,605	792	182.0	48.9	159.2	76,427	3E+05	2E+05	2E+05
11M093	1,037	3,788	158	755	33	20	5.2	1.2	4.7	2,024	8E+03	5E+03	7E+03
12BDO10	11	28	2	19	0	1	0.1	0.0	0.1	12	9E+01	1E+02	2E+02
12BDO14	27	65	4	41	1	2	0.2	0.0	0.1	29	2E+02	4E+02	4E+02
12BDO124	8,341	44,063	1,392	6,155	205	195	36.6	14.1	44.3	21,701	8E+04	6E+04	5E+04
12EDO418	203	895	32	84	4	4	0.6	0.2	0.8	476	2E+03	1E+03	1E+03

Table C2-24. Scenario 5.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	136	655	20	84	3	2	0.5	0.2	0.6	325	1E+03	1E+03	7E+02
12HOFDO92	937	2,590	413	2,890	108	131	23.5	3.3	12.2	2,393	4E+03	7E+03	9E+03
12HDO85/87	434	1,285	69	473	14	41	2.7	0.4	2.5	516	5E+03	1E+04	1E+04
12L092	2,111	9,443	311	1,077	78	42	10.0	2.9	9.9	4,511	2E+04	1E+04	1E+04
12LDO296	464	2,178	68	272	13	8	2.0	0.6	2.5	1,079	3E+03	2E+03	2E+03
12M091	327	1,165	51	284	9	6	1.7	0.4	1.3	628	2E+03	2E+03	2E+03
13DSDO078	1,763	5,223	221	1,520	90	27	11.8	1.5	4.3	2,361	7E+03	6E+03	1E+04
13EDO177	51	108	10	162	3	1	0.7	0.1	0.2	52	7E+01	3E+02	4E+02
13EDO174	1,186	6,588	177	405	21	22	3.0	1.9	6.2	3,268	1E+04	8E+03	5E+03
13EDO176	35	82	5	77	2	1	0.4	0.1	0.2	40	5E+01	3E+02	3E+02
13FDO95	10	21	2	27	0	0	0.1	0.0	0.0	11	2E+01	1E+02	1E+02
13FDO011	24	44	1	1	1	0	0.0	0.0	0.0	22	2E+01	9E+01	1E+02
13F093	99	257	9	108	3	2	0.6	0.2	0.9	118	4E+02	1E+03	1E+03
13L090	31,607	149,474	4,881	6,060	1,732	700	169.9	37.1	128.0	66,910	3E+05	1E+05	2E+05
14CDO9	724	4,199	154	883	27	21	5.2	1.5	4.4	2,005	8E+03	6E+03	5E+03
15FSDO288	1,913	9,487	308	1,721	49	35	9.4	3.2	9.8	4,697	2E+04	1E+04	2E+04
15L089	13,015	58,739	2,000	5,153	625	288	70.5	15.9	55.4	27,271	1E+05	6E+04	8E+04
15L088	5,983	37,383	954	240	105	162	11.6	10.3	40.5	18,291	7E+04	5E+04	3E+04
16L097	511	1,561	67	621	18	32	3.6	1.3	5.6	648	4E+03	6E+03	7E+03
16LSDO122	8,106	41,579	1,271	2,575	270	261	32.3	11.2	43.8	19,621	8E+04	6E+04	6E+04
17M033	5,332	26,147	758	1,886	121	279	17.6	10.9	48.2	12,001	6E+04	6E+04	6E+04
18GSDO233	3,995	17,688	513	550	78	144	8.8	4.6	22.5	7,981	5E+04	6E+04	6E+04
19GDO043	4,907	32,202	813	354	95	116	10.5	9.4	32.0	15,484	6E+04	4E+04	3E+04
19GDO194	419	2,135	67	169	17	9	2.0	0.7	2.5	1,008	4E+03	3E+03	3E+03
19G199	58	169	2	2	1	1	0.1	0.2	0.7	73	1E+02	6E+02	6E+02
20G163	310	1,241	10	24	8	9	1.0	1.8	8.0	475	1E+03	4E+03	4E+03
20L083	213	926	26	9	4	8	0.7	0.1	2.1	500	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	57	2	5	1	0	0.1	0.0	0.0	26	1E+02	6E+01	8E+01
21H048	118	347	4	3	3	3	0.2	0.3	1.5	151	2E+02	3E+02	3E+02
21KSDO069	8,620	49,347	1,303	960	219	272	23.8	15.0	60.2	23,215	1E+05	7E+04	6E+04
21M005	144	416	12	40	3	3	0.4	0.1	0.9	222	1E+02	2E+02	2E+02
21M010	879	3,018	81	85	18	23	2.3	0.4	6.9	1,623	2E+03	2E+03	3E+03
21M050	411	1,187	29	29	9	7	0.9	0.2	2.8	634	1E+03	8E+02	3E+03
22CDO384	2,463	8,965	358	1,806	132	50	16.5	2.6	7.6	4,015	1E+04	8E+03	1E+04
22LSDO580	1,152	4,401	124	106	23	33	3.2	0.6	12.1	2,449	3E+03	3E+03	4E+03
23GDO132	4,434	9,421	267	2,161	124	62	15.7	3.7	16.1	4,372	7E+03	8E+03	1E+04
23HSDO042	17,784	77,015	2,671	4,991	877	540	98.5	25.2	99.1	35,480	1E+05	1E+05	1E+05
23HDO040	2,753	16,505	422	314	61	77	6.7	4.7	17.7	7,804	3E+04	2E+04	2E+04
23L196	132	266	7	39	4	1	0.4	0.1	0.7	134	1E+02	4E+01	2E+02
23L075	613	1,512	47	220	18	7	2.1	0.3	3.3	802	1E+03	7E+02	3E+03
23L074	129	278	7	25	4	1	0.3	0.0	0.4	145	8E+01	5E+01	1E+02
23L195	139	265	9	76	4	1	0.5	0.1	0.7	143	2E+02	6E+01	3E+02
23L202	141	272	7	38	4	0	0.3	0.1	0.7	147	3E+02	5E+01	6E+02
23L016	109	217	6	38	3	0	0.3	0.0	0.5	119	4E+02	7E+01	7E+02
23L015	161	277	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	836	2,087	70	108	21	42	1.9	0.3	4.7	954	7E+03	9E+03	1E+04
24CSDO031	273	1,699	45	57	4	6	0.5	0.5	1.7	850	3E+03	2E+03	1E+03

Table C2-24. Scenario 5.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,487	7,532	251	1,088	42	26	7.0	2.4	8.1	3,668	1E+04	1E+04	1E+04
24DSDO150	31	73	2	23	1	0	0.1	0.0	0.1	40	7E+01	5E+02	5E+02
24DSDO032	19,651	107,145	3,646	8,392	736	299	93.5	34.9	115.2	57,688	2E+05	1E+05	1E+05
24GSDO035	23,362	135,731	3,497	4,340	409	614	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
24GSDO034	1,637	6,197	165	919	40	25	5.9	2.5	11.0	3,040	1E+04	2E+04	2E+04
24L233	421	1,254	32	91	23	11	2.3	1.1	5.0	480	1E+03	8E+02	3E+03
25DDO040	520	2,570	76	210	12	17	1.7	0.9	4.1	1,243	5E+03	4E+03	4E+03
25EDO037	12,831	67,219	1,814	3,450	269	220	35.3	20.8	84.7	32,474	1E+05	9E+04	8E+04
25GDO041	71	241	9	31	6	3	0.6	0.2	0.9	82	3E+02	2E+02	5E+02
25GDO-06	241	667	18	217	9	7	1.4	0.8	3.7	278	3E+02	5E+02	6E+02
26J049	7,236	20,209	777	701	522	149	46.2	5.2	28.2	7,679	3E+04	1E+04	6E+04
25L144	538	3,636	89	11	13	13	1.3	1.0	3.2	1,692	8E+03	4E+03	3E+03
25L058	4,321	23,163	601	509	85	154	9.5	6.5	27.1	10,913	5E+04	4E+04	4E+04
26FDO038	62	174	14	132	7	2	1.0	0.1	0.2	58	3E+02	6E+01	6E+02
26GSDO01	3,584	16,197	482	1,925	123	85	16.7	7.3	28.0	7,591	3E+04	2E+04	2E+04
26JSDO052	38	71	4	66	2	0	0.3	0.1	0.2	34	8E+00	1E+01	1E+01
26JSDO100	154	414	22	81	14	3	1.5	0.1	0.2	142	7E+02	1E+02	1E+03
26J101	427	1,038	63	506	33	9	4.2	0.4	1.1	394	2E+03	7E+02	3E+03
26KSDO254	316	1,087	42	116	5	31	0.9	0.2	2.4	478	5E+03	7E+03	8E+03
26K035	188	399	11	34	5	1	0.5	0.1	1.1	216	5E+02	8E+01	9E+02
26K099	12,214	78,705	1,887	812	165	350	19.8	23.0	84.9	37,618	2E+05	1E+05	8E+04
26L055	170	990	27	13	7	4	0.6	0.2	0.8	456	2E+03	1E+03	1E+03
26LSDO084	69	203	10	16	7	1	0.6	0.0	0.1	71	3E+02	4E+02	9E+02
26L070	202	347	5	23	4	0	0.3	0.0	0.1	173	8E+01	2E+01	2E+02
27JSDO044	369	735	29	364	12	6	2.0	0.5	2.1	346	3E+02	6E+02	6E+02
27JSDO096	2,044	4,109	93	329	54	14	4.5	0.6	4.8	2,041	2E+03	4E+03	5E+03
27JSDO001	7,599	43,909	1,105	1,529	130	247	17.7	13.4	54.4	20,768	9E+04	7E+04	5E+04
27L022	2,149	12,978	310	294	43	62	5.2	5.0	19.0	6,099	2E+04	2E+04	1E+04
27L020	2,031	12,140	291	292	42	58	5.1	4.7	17.7	5,686	2E+04	2E+04	1E+04
28K061	4,278	27,712	705	374	65	131	7.8	7.7	27.0	13,287	6E+04	4E+04	3E+04
28K010	3,763	26,022	639	252	48	99	5.9	7.3	24.5	12,574	5E+04	3E+04	2E+04
28K386	644	1,592	56	379	17	20	2.6	0.6	3.7	776	2E+03	3E+03	3E+03
28L073	73	219	9	73	5	1	0.6	0.1	0.1	99	4E+02	2E+03	2E+03
28L074/5/6	1,202	3,556	108	714	50	22	6.3	2.1	8.8	1,571	4E+03	7E+03	1E+04
28N156	302	1,698	50	116	5	11	0.9	0.5	1.8	825	4E+03	3E+03	2E+03
28N207	3,104	18,908	494	458	63	92	7.5	5.8	20.5	9,032	4E+04	3E+04	2E+04
28O025	49	225	9	20	1	2	0.2	0.1	0.2	114	7E+02	5E+02	5E+02
28P001	291	1,928	49	26	4	6	0.5	0.5	1.7	945	4E+03	2E+03	1E+03
29J129	157	287	13	148	5	2	0.8	0.1	0.5	140	2E+02	3E+02	4E+02
29J029	345	899	40	186	6	30	1.1	0.2	1.8	372	4E+03	6E+03	6E+03
29J212	16,748	108,247	2,648	1,110	244	505	29.5	31.4	118.9	51,845	2E+05	2E+05	1E+05
29M049	1,210	6,653	186	186	35	43	3.8	1.9	7.0	3,075	1E+04	1E+04	1E+04
29N015	123	554	17	29	2	5	0.5	0.1	1.3	304	3E+02	5E+02	5E+02
29N135	397	2,208	60	149	7	9	1.2	0.6	2.6	1,092	4E+03	2E+03	1E+03
29O001	10,876	67,072	1,811	2,366	227	278	28.9	19.2	66.1	32,496	1E+05	8E+04	6E+04
29P015	73	490	13	13	1	2	0.2	0.1	0.4	240	9E+02	6E+02	3E+02
29P044	578	3,880	100	81	9	13	1.2	1.1	3.5	1,897	7E+03	5E+03	3E+03
30J006	219	642	25	181	8	5	1.2	0.2	1.0	321	8E+02	3E+03	3E+03

Table C2-24. Scenario 5.4 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	59	159	7	95	2	1	0.5	0.1	0.5	78	1E+02	6E+02	6E+02
30J030	659	1,419	37	170	17	5	1.7	0.2	2.5	738	5E+02	5E+02	9E+02
30P107	320	1,678	63	105	6	9	0.9	0.4	1.4	854	4E+03	3E+03	2E+03
30P062	271	1,778	47	53	4	6	0.6	0.5	1.6	881	3E+03	2E+03	1E+03
31O004	964	5,791	206	151	17	31	2.3	1.3	4.5	2,848	1E+04	9E+03	6E+03
31P084	296	1,840	48	79	4	6	0.6	0.5	1.8	911	3E+03	2E+03	1E+03
3FDO159	295	1,236	57	497	14	7	2.7	0.5	1.4	594	2E+03	2E+03	2E+03
11G318/319	320	881	69	741	13	32	3.4	0.5	2.2	357	4E+03	6E+03	6E+03
6FSDO233	7	15	5	88	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,510	5,498	124	74	50	71	3.2	0.8	5.5	2,561	3E+04	5E+04	5E+04
21H047	495	1,895	33	77	15	15	1.6	1.6	6.9	792	2E+03	2E+03	2E+03
21H039	1,445	4,556	65	322	43	46	5.1	5.4	23.4	1,820	3E+03	4E+03	5E+03
20G161	2,489	10,531	300	227	65	59	7.1	5.1	21.5	4,818	2E+04	2E+04	2E+04
StonyMWRA	109,349	506,696	18,159	69,872	4,729	2,959	660.6	181.6	609.9	243,244	9E+05	6E+05	7E+05
Fens	69,865	220,022	11,346	17,740	4,557	2,033	530.9	93.3	282.3	111,187	3E+05	2E+05	2E+05
20D055	5,301	34,083	916	484	118	122	12.8	9.7	32.2	16,579	6E+04	4E+04	3E+04
21D319	7,174	47,260	1,249	847	143	166	16.5	13.4	44.0	23,046	9E+04	5E+04	3E+04

Table C2-25. Scenario 5.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	951	3,798	137	923	28	19	5.3	1.2	5.1	1,924	5E+03	4E+03	3E+03
1FDO31	774	3,605	100	202	19	17	2.2	1.0	3.5	1,755	6E+03	5E+03	4E+03
02E086	247	1,013	42	329	10	5	1.9	0.4	1.2	488	2E+03	1E+03	1E+03
2FDO120	1,319	6,532	193	597	33	29	4.9	1.8	7.7	3,242	1E+04	7E+03	7E+03
2FDO93	1,493	10,523	257	113	18	35	2.3	2.9	9.5	5,124	2E+04	1E+04	7E+03
2FDO85	93	427	12	37	3	1	0.3	0.1	0.4	209	7E+02	5E+02	4E+02
3ESDO186	305	1,360	63	567	14	7	2.9	0.6	1.7	660	2E+03	1E+03	1E+03
3ESDO185	563	2,517	101	364	15	12	2.5	0.8	2.5	1,307	5E+03	3E+03	3E+03
3F162	507	2,425	92	506	24	11	3.6	0.8	2.3	1,141	4E+03	2E+03	3E+03
4ESDO69	1,534	7,138	237	985	41	35	6.7	2.3	8.4	3,560	1E+04	9E+03	8E+03
4ESDO64	37	120	8	92	2	1	0.5	0.1	0.2	56	2E+02	3E+02	3E+02
4FDO189	714	3,958	111	179	20	14	2.3	1.1	3.8	1,926	7E+03	4E+03	3E+03
4FDO204	850	4,302	139	512	31	16	4.3	1.3	3.9	2,062	7E+03	4E+03	4E+03
4FDO16	397	2,247	63	88	11	10	1.2	0.6	2.1	1,082	4E+03	3E+03	2E+03
4FDO203	123	526	23	186	6	2	1.1	0.2	0.6	252	8E+02	7E+02	7E+02
4FDO118	562	3,179	84	115	10	13	1.3	0.9	3.0	1,559	6E+03	4E+03	3E+03
4FDO119	1,238	5,056	133	46	22	35	2.9	0.8	10.0	2,701	4E+03	4E+03	4E+03
5CSDO110	721	2,450	123	769	31	21	5.1	0.9	2.9	1,260	6E+03	4E+03	6E+03
5EDO182	101	471	30	377	6	3	1.7	0.3	0.8	230	7E+02	5E+02	3E+02
5ESDO184	605	2,668	140	1,486	30	14	7.1	1.3	3.5	1,301	4E+03	3E+03	3E+03
5FDO117	746	3,695	137	777	31	16	5.1	1.3	3.7	1,764	6E+03	3E+03	4E+03
5FDO254	53	330	8	12	1	1	0.1	0.1	0.3	165	6E+02	4E+02	2E+02
5FDO265	18	37	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	598	3,124	90	177	16	15	2.0	0.9	2.9	1,503	6E+03	4E+03	4E+03
5FDO245	1,301	7,694	209	363	27	27	3.5	2.2	7.6	3,793	1E+04	8E+03	6E+03
5FDO244	228	1,174	31	57	5	5	0.6	0.3	1.6	585	2E+03	1E+03	9E+02
5FDO264	18	49	2	6	0	2	0.0	0.0	0.1	20	2E+02	4E+02	4E+02
5GDO112	887	5,376	139	171	16	20	2.1	1.7	6.0	2,626	9E+03	6E+03	4E+03
5GDO116A	739	4,112	121	457	15	14	2.7	1.3	4.0	2,050	7E+03	4E+03	2E+03
5GDO115	234	1,426	38	39	5	5	0.6	0.4	1.4	698	2E+03	2E+03	1E+03
5GDO116	695	4,002	107	129	17	14	1.9	1.1	3.7	1,937	7E+03	4E+03	3E+03
6DDO57	129	490	22	200	6	2	1.1	0.2	0.5	236	7E+02	9E+02	9E+02
6DDO184	10	24	13	238	3	1	1.0	0.1	0.2	9	3E+01	1E+01	6E+01
6DDO91	16	34	27	524	6	2	2.2	0.3	0.5	14	3E+01	2E+01	6E+01
6DDO187	73	224	10	57	2	5	0.4	0.1	0.4	95	7E+02	1E+03	1E+03
6DDO86	11	31	5	79	1	0	0.4	0.0	0.1	13	4E+01	2E+01	6E+01
6DDO85	46	244	9	49	2	1	0.4	0.1	0.2	114	4E+02	2E+02	2E+02
6DDO83	175	806	38	294	10	4	1.8	0.3	0.9	374	1E+03	9E+02	1E+03
6DDO84	11	52	3	19	1	0	0.1	0.0	0.1	23	9E+01	4E+01	7E+01
06D097	87	313	17	138	6	2	1.0	0.1	0.3	136	5E+02	3E+02	6E+02
6GDO109	1,373	7,488	206	278	40	27	4.4	2.1	6.7	3,587	1E+04	8E+03	9E+03
6GDO110	1,695	10,009	274	394	42	35	5.0	2.8	8.9	4,863	2E+04	1E+04	8E+03
6GDO111	249	1,083	59	612	14	6	3.1	0.6	1.4	518	2E+03	1E+03	9E+02
6GDO166	140	502	40	552	9	4	2.5	0.4	0.9	242	7E+02	4E+02	5E+02
6GDO108	4,520	26,404	715	969	107	97	12.7	7.3	24.0	12,816	5E+04	3E+04	2E+04
6G165	26	105	5	54	1	0	0.2	0.1	0.1	53	1E+02	1E+02	8E+01
6HDO43	87	437	15	65	4	2	0.5	0.1	0.4	205	7E+02	5E+02	5E+02
6HDO106	205	934	33	181	7	4	1.1	0.3	0.9	457	1E+03	9E+02	7E+02

Table C2-25. Scenario 5.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	523	2,715	87	413	15	10	2.6	0.9	2.7	1,325	4E+03	3E+03	2E+03
7CDO006	5,550	25,654	1,013	7,746	190	122	40.0	10.1	30.0	12,655	5E+04	3E+04	4E+04
7HDO285	5,833	28,491	877	2,435	206	118	25.2	8.1	29.0	13,639	5E+04	3E+04	4E+04
7HDO105	8,311	42,733	1,434	6,606	290	188	45.5	13.8	42.5	20,569	8E+04	5E+04	6E+04
7HDO348	46	307	8	10	0	1	0.1	0.1	0.3	153	5E+02	4E+02	2E+02
7HDO347	319	1,652	52	202	11	6	1.6	0.5	1.5	798	3E+03	2E+03	2E+03
7HDO346	296	1,854	49	70	5	6	0.7	0.5	1.7	907	3E+03	2E+03	1E+03
8BDO122	1,423	8,010	202	304	28	36	3.6	3.1	11.4	3,835	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	2	4E-01	7E-01	8E-01
8BDO126	811	5,165	132	137	11	17	1.5	1.5	4.9	2,551	9E+03	6E+03	3E+03
8CDO25	178	582	42	484	10	5	2.4	0.4	1.0	306	1E+03	1E+03	2E+03
8CDO26	166	574	38	416	8	5	2.0	0.4	1.0	305	1E+03	1E+03	2E+03
8DDO112	32	195	5	8	1	1	0.1	0.1	0.2	94	4E+02	4E+02	3E+02
8DSDO100	76	242	15	176	3	3	0.8	0.1	0.4	118	5E+02	1E+03	1E+03
8EDO35	122	336	29	454	8	2	2.0	0.3	0.6	167	4E+02	2E+03	2E+03
8EDO33	435	2,698	78	253	9	10	1.6	0.8	2.6	1,330	5E+03	3E+03	2E+03
8IDO153	35	230	6	4	0	1	0.0	0.1	0.2	113	4E+02	3E+02	1E+02
8IDO155	23	87	5	58	1	0	0.3	0.0	0.1	44	1E+02	3E+02	3E+02
8IDO156	315	679	47	589	19	4	3.3	0.3	0.8	293	5E+02	1E+02	8E+02
8IDO209	117	753	19	18	1	2	0.2	0.2	0.7	373	1E+03	9E+02	5E+02
8IDO154	790	4,331	125	294	21	19	2.8	1.3	4.4	2,082	8E+03	6E+03	5E+03
8IDO158	369	2,202	60	135	8	8	1.2	0.7	2.5	1,080	4E+03	3E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,130	7,083	185	239	22	26	2.9	2.2	7.9	3,440	1E+04	8E+03	5E+03
8JSDO103	894	5,287	150	327	21	19	2.9	1.5	4.9	2,587	9E+03	6E+03	4E+03
8JSDO41	504	3,177	84	115	10	11	1.3	1.0	3.2	1,550	6E+03	3E+03	2E+03
8JSDO50	1,162	6,042	173	423	36	25	4.5	2.0	6.8	2,884	1E+04	8E+03	7E+03
8K049	155	909	27	65	4	3	0.6	0.3	0.8	438	2E+03	1E+03	8E+02
9BDO49	314	858	32	150	6	21	1.0	0.2	1.4	389	3E+03	6E+03	7E+03
9EDO229	55	273	8	23	2	1	0.2	0.1	0.2	130	5E+02	3E+02	3E+02
9EDO243	161	554	23	189	6	3	1.1	0.2	0.6	266	1E+03	1E+03	2E+03
9K100	49	131	8	63	2	4	0.3	0.0	0.3	54	5E+02	9E+02	9E+02
9K101	595	2,130	99	886	25	18	4.8	0.9	2.6	1,010	4E+03	5E+03	6E+03
9K016	61	181	28	463	7	3	2.1	0.3	0.6	81	3E+02	4E+02	5E+02
9LSDO095	211	793	37	339	6	9	1.6	0.3	1.1	383	2E+03	2E+03	2E+03
10BSDO62	29	54	1	1	1	0	0.0	0.0	0.1	28	7E+00	5E-01	1E+01
10BSDO15	33	82	3	11	1	1	0.1	0.0	0.2	41	2E+02	4E+02	5E+02
10BSDO64	114	326	15	89	4	3	0.6	0.1	0.7	226	5E+02	5E+02	7E+02
10L094	12,978	71,680	2,003	4,633	298	283	40.6	21.1	72.6	34,921	1E+05	8E+04	7E+04
10L096	1,422	8,576	236	284	26	54	3.4	2.4	8.6	4,107	2E+04	1E+04	1E+04
11BDO28	12,199	55,094	2,449	21,840	460	341	106.2	23.7	68.4	27,058	1E+05	7E+04	7E+04
11BDO123	2,421	12,684	368	764	62	62	7.7	3.5	11.9	6,121	3E+04	2E+04	2E+04
11IDO577	33,268	167,698	5,452	13,103	1,605	792	182.0	48.9	159.2	76,427	3E+05	2E+05	2E+05
11M093	1,037	3,788	158	755	33	20	5.2	1.2	4.7	2,024	8E+03	5E+03	7E+03
12BDO10	11	28	2	19	0	1	0.1	0.0	0.1	12	9E+01	1E+02	2E+02
12BDO14	27	65	4	41	1	2	0.2	0.0	0.1	29	2E+02	4E+02	4E+02
12BDO124	8,341	44,063	1,392	6,155	205	195	36.6	14.1	44.3	21,701	8E+04	6E+04	5E+04
12EDO418	203	895	32	84	4	4	0.6	0.2	0.8	476	2E+03	1E+03	1E+03

Table C2-25. Scenario 5.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	136	655	20	84	3	2	0.5	0.2	0.6	325	1E+03	1E+03	7E+02
12HOFDO92	937	2,590	413	2,890	108	131	23.5	3.3	12.2	2,393	4E+03	7E+03	9E+03
12HDO85/87	434	1,285	69	473	14	41	2.7	0.4	2.5	516	5E+03	1E+04	1E+04
12L092	2,111	9,443	311	1,077	78	42	10.0	2.9	9.9	4,511	2E+04	1E+04	1E+04
12LDO296	464	2,178	68	272	13	8	2.0	0.6	2.5	1,079	3E+03	2E+03	2E+03
12M091	327	1,165	51	284	9	6	1.7	0.4	1.3	628	2E+03	2E+03	2E+03
13DSDO078	1,763	5,223	221	1,520	90	27	11.8	1.5	4.3	2,361	7E+03	6E+03	1E+04
13EDO177	51	108	10	162	3	1	0.7	0.1	0.2	52	7E+01	3E+02	4E+02
13EDO174	1,186	6,588	177	405	21	22	3.0	1.9	6.2	3,268	1E+04	8E+03	5E+03
13EDO176	35	82	5	77	2	1	0.4	0.1	0.2	40	5E+01	3E+02	3E+02
13FDO95	10	21	2	27	0	0	0.1	0.0	0.0	11	2E+01	1E+02	1E+02
13FDO011	24	44	1	1	1	0	0.0	0.0	0.0	22	2E+01	9E+01	1E+02
13F093	99	257	9	108	3	2	0.6	0.2	0.9	118	4E+02	1E+03	1E+03
13L090	31,607	149,474	4,881	6,060	1,732	700	169.9	37.1	128.0	66,910	3E+05	1E+05	2E+05
14CDO9	724	4,199	154	883	27	21	5.2	1.5	4.4	2,005	8E+03	6E+03	5E+03
15FSDO288	1,913	9,487	308	1,721	49	35	9.4	3.2	9.8	4,697	2E+04	1E+04	2E+04
15L089	13,015	58,739	2,000	5,153	625	288	70.5	15.9	55.4	27,271	1E+05	6E+04	8E+04
15L088	5,983	37,383	954	240	105	162	11.6	10.3	40.5	18,291	7E+04	5E+04	3E+04
16L097	511	1,561	67	621	18	32	3.6	1.3	5.6	648	4E+03	6E+03	7E+03
16LSDO122	8,106	41,579	1,271	2,575	270	261	32.3	11.2	43.8	19,621	8E+04	6E+04	6E+04
17M033	5,332	26,147	758	1,886	121	279	17.6	10.9	48.2	12,001	6E+04	6E+04	6E+04
18GSDO233	3,995	17,688	513	550	78	132	8.8	4.6	22.5	7,981	5E+04	6E+04	6E+04
19GDO043	4,907	32,202	813	354	95	116	10.5	9.4	32.0	15,484	6E+04	4E+04	3E+04
19GDO194	419	2,135	67	169	17	9	2.0	0.7	2.5	1,008	4E+03	3E+03	3E+03
19G199	58	169	2	2	1	1	0.1	0.2	0.7	73	1E+02	6E+02	6E+02
20G163	310	1,241	10	24	8	8	1.0	1.8	8.0	475	1E+03	4E+03	4E+03
20L083	213	926	26	9	4	8	0.7	0.1	2.1	500	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	57	2	5	1	0	0.1	0.0	0.0	26	1E+02	6E+01	8E+01
21H048	118	347	4	3	3	3	0.2	0.3	1.5	151	2E+02	3E+02	3E+02
21KSDO069	8,620	49,347	1,303	960	219	272	23.8	15.0	60.2	23,215	1E+05	7E+04	6E+04
21M005	144	416	12	40	3	3	0.4	0.1	0.9	222	1E+02	2E+02	2E+02
21M010	879	3,018	81	85	18	23	2.3	0.4	6.9	1,623	2E+03	2E+03	3E+03
21M050	411	1,187	29	29	9	7	0.9	0.2	2.8	634	1E+03	8E+02	3E+03
22CDO384	2,463	8,965	358	1,806	132	50	16.5	2.6	7.6	4,015	1E+04	8E+03	1E+04
22LSDO580	1,152	4,401	124	106	23	33	3.2	0.6	12.1	2,449	3E+03	3E+03	4E+03
23GDO132	4,434	9,421	267	2,161	124	62	15.7	3.7	16.1	4,372	7E+03	8E+03	1E+04
23HSDO042	17,784	77,015	2,671	4,991	877	539	98.5	25.2	99.1	35,480	1E+05	1E+05	1E+05
23HDO040	2,753	16,505	422	314	61	77	6.7	4.7	17.7	7,804	3E+04	2E+04	2E+04
23L196	132	266	7	39	4	1	0.4	0.1	0.7	134	1E+02	4E+01	2E+02
23L075	613	1,512	47	220	18	7	2.1	0.3	3.3	802	1E+03	7E+02	3E+03
23L074	129	278	7	25	4	1	0.3	0.0	0.4	145	8E+01	5E+01	1E+02
23L195	139	265	9	76	4	1	0.5	0.1	0.7	143	2E+02	6E+01	3E+02
23L202	141	272	7	38	4	0	0.3	0.1	0.7	147	3E+02	5E+01	6E+02
23L016	109	217	6	38	3	0	0.3	0.0	0.5	119	4E+02	7E+01	7E+02
23L015	161	277	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	836	2,087	70	108	21	42	1.9	0.3	4.7	954	7E+03	9E+03	1E+04
24CSDO031	273	1,699	45	57	4	6	0.5	0.5	1.7	850	3E+03	2E+03	1E+03

Table C2-25. Scenario 5.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,487	7,532	251	1,088	42	24	7.0	2.4	8.1	3,668	1E+04	1E+04	1E+04
24DSDO150	31	73	2	23	1	0	0.1	0.0	0.1	40	7E+01	5E+02	5E+02
24DSDO032	19,651	107,145	3,646	8,392	736	273	93.5	34.9	115.2	57,688	2E+05	1E+05	1E+05
24GSDO035	23,362	135,731	3,497	4,340	409	614	51.6	39.6	145.5	65,757	3E+05	2E+05	1E+05
24GSDO034	1,637	6,197	165	919	40	25	5.9	2.5	11.0	3,040	1E+04	2E+04	2E+04
24L233	421	1,254	32	91	23	11	2.3	1.1	5.0	480	1E+03	8E+02	3E+03
25DDO040	520	2,570	76	210	12	17	1.7	0.9	4.1	1,243	5E+03	4E+03	4E+03
25EDO037	12,831	67,219	1,814	3,450	269	203	35.3	20.8	84.7	32,474	1E+05	9E+04	8E+04
25GDO041	71	241	9	31	6	3	0.6	0.2	0.9	82	3E+02	2E+02	5E+02
25GDO-06	241	667	18	217	9	7	1.4	0.8	3.7	278	3E+02	5E+02	6E+02
26J049	7,236	20,209	777	701	522	149	46.2	5.2	28.2	7,679	3E+04	1E+04	6E+04
25L144	538	3,636	89	11	13	13	1.3	1.0	3.2	1,692	8E+03	4E+03	3E+03
25L058	4,321	23,163	601	509	85	154	9.5	6.5	27.1	10,913	5E+04	4E+04	4E+04
26FDO038	62	174	14	132	7	2	1.0	0.1	0.2	58	3E+02	6E+01	6E+02
26GSDO01	3,584	16,197	482	1,925	123	85	16.7	7.3	28.0	7,591	3E+04	2E+04	2E+04
26JSDO052	38	71	4	66	2	0	0.3	0.1	0.2	34	8E+00	1E+01	1E+01
26JSDO100	154	414	22	81	14	3	1.5	0.1	0.2	142	7E+02	1E+02	1E+03
26J101	427	1,038	63	506	33	9	4.2	0.4	1.1	394	2E+03	7E+02	3E+03
26KSDO254	316	1,087	42	116	5	31	0.9	0.2	2.4	478	5E+03	7E+03	8E+03
26K035	188	399	11	34	5	1	0.5	0.1	1.1	216	5E+02	8E+01	9E+02
26K099	12,214	78,705	1,887	812	165	350	19.8	23.0	84.9	37,618	2E+05	1E+05	8E+04
26L055	170	990	27	13	7	4	0.6	0.2	0.8	456	2E+03	1E+03	1E+03
26LSDO084	69	203	10	16	7	1	0.6	0.0	0.1	71	3E+02	4E+02	9E+02
26L070	202	347	5	23	4	0	0.3	0.0	0.1	173	8E+01	2E+01	2E+02
27JSDO044	369	735	29	364	12	6	2.0	0.5	2.1	346	3E+02	6E+02	6E+02
27JSDO096	2,044	4,109	93	329	54	14	4.5	0.6	4.8	2,041	2E+03	4E+03	5E+03
27JSDO001	7,599	43,909	1,105	1,529	130	247	17.7	13.4	54.4	20,768	9E+04	7E+04	5E+04
27L022	2,149	12,978	310	294	43	62	5.2	5.0	19.0	6,099	2E+04	2E+04	1E+04
27L020	2,031	12,140	291	292	42	58	5.1	4.7	17.7	5,686	2E+04	2E+04	1E+04
28K061	4,278	27,712	705	374	65	131	7.8	7.7	27.0	13,287	6E+04	4E+04	3E+04
28K010	3,763	26,022	639	252	48	99	5.9	7.3	24.5	12,574	5E+04	3E+04	2E+04
28K386	644	1,592	56	379	17	20	2.6	0.6	3.7	776	2E+03	3E+03	3E+03
28L073	73	219	9	73	5	1	0.6	0.1	0.1	99	4E+02	2E+03	2E+03
28L074/5/6	1,202	3,556	108	714	50	22	6.3	2.1	8.8	1,571	4E+03	7E+03	1E+04
28N156	302	1,698	50	116	5	11	0.9	0.5	1.8	825	4E+03	3E+03	2E+03
28N207	3,104	18,908	494	458	63	92	7.5	5.8	20.5	9,032	4E+04	3E+04	2E+04
28O025	49	225	9	20	1	2	0.2	0.1	0.2	114	7E+02	5E+02	5E+02
28P001	291	1,928	49	26	4	6	0.5	0.5	1.7	945	4E+03	2E+03	1E+03
29J129	157	287	13	148	5	2	0.8	0.1	0.5	140	2E+02	3E+02	4E+02
29J029	345	899	40	186	6	30	1.1	0.2	1.8	372	4E+03	6E+03	6E+03
29J212	16,748	108,247	2,648	1,110	244	505	29.5	31.4	118.9	51,845	2E+05	2E+05	1E+05
29M049	1,210	6,653	186	186	35	43	3.8	1.9	7.0	3,075	1E+04	1E+04	1E+04
29N015	123	554	17	29	2	5	0.5	0.1	1.3	304	3E+02	5E+02	5E+02
29N135	397	2,208	60	149	7	9	1.2	0.6	2.6	1,092	4E+03	2E+03	1E+03
29O001	10,876	67,072	1,811	2,366	227	278	28.9	19.2	66.1	32,496	1E+05	8E+04	6E+04
29P015	73	490	13	13	1	2	0.2	0.1	0.4	240	9E+02	6E+02	3E+02
29P044	578	3,880	100	81	9	13	1.2	1.1	3.5	1,897	7E+03	5E+03	3E+03
30J006	219	642	25	181	8	5	1.2	0.2	1.0	321	8E+02	3E+03	3E+03

Table C2-25. Scenario 5.5 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	59	159	7	95	2	1	0.5	0.1	0.5	78	1E+02	6E+02	6E+02
30J030	659	1,419	37	170	17	5	1.7	0.2	2.5	738	5E+02	5E+02	9E+02
30P107	320	1,678	63	105	6	9	0.9	0.4	1.4	854	4E+03	3E+03	2E+03
30P062	271	1,778	47	53	4	6	0.6	0.5	1.6	881	3E+03	2E+03	1E+03
31O004	964	5,791	206	151	17	31	2.3	1.3	4.5	2,848	1E+04	9E+03	6E+03
31P084	296	1,840	48	79	4	6	0.6	0.5	1.8	911	3E+03	2E+03	1E+03
3FDO159	295	1,236	57	497	14	7	2.7	0.5	1.4	594	2E+03	2E+03	2E+03
11G318/319	320	881	69	741	13	32	3.4	0.5	2.2	357	4E+03	6E+03	6E+03
6FSDO233	7	15	5	88	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,510	5,498	124	74	50	71	3.2	0.8	5.5	2,561	3E+04	5E+04	5E+04
21H047	495	1,895	33	77	15	15	1.6	1.6	6.9	792	2E+03	2E+03	2E+03
21H039	1,445	4,556	65	322	43	46	5.1	5.4	23.4	1,820	3E+03	4E+03	5E+03
20G161	2,489	10,531	300	227	65	54	7.1	5.1	21.5	4,818	2E+04	2E+04	2E+04
StonyMWRA	109,349	506,696	18,159	69,872	4,729	2,959	660.6	181.6	609.9	243,244	9E+05	6E+05	7E+05
Fens	69,865	220,022	11,346	17,740	4,557	2,025	530.9	93.3	282.3	111,187	3E+05	2E+05	2E+05
20D055	5,301	34,083	916	484	118	122	12.8	9.7	32.2	16,579	6E+04	4E+04	3E+04
21D319	7,174	47,260	1,249	847	143	166	16.5	13.4	44.0	23,046	9E+04	5E+04	3E+04

Table C2-26. Scenario 6 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	918	3,638	134	929	28	18	5.3	1.2	4.9	1,842	4E+03	4E+03	3E+03
1FDO31	744	3,442	96	202	18	16	2.1	0.9	3.3	1,675	6E+03	4E+03	4E+03
02E086	237	962	41	331	10	5	1.9	0.4	1.1	462	1E+03	1E+03	1E+03
2FDO120	1,263	6,207	186	604	32	28	4.8	1.7	7.3	3,079	1E+04	7E+03	7E+03
2FDO93	1,452	10,229	251	114	18	34	2.3	2.8	9.2	4,984	2E+04	1E+04	7E+03
2FDO85	90	408	12	40	3	1	0.3	0.1	0.4	199	6E+02	4E+02	3E+02
3ESDO186	291	1,281	61	568	14	7	2.9	0.6	1.6	620	2E+03	1E+03	1E+03
3ESDO185	539	2,388	97	366	15	11	2.5	0.7	2.4	1,241	5E+03	3E+03	3E+03
3F162	488	2,298	89	507	24	10	3.6	0.8	2.2	1,078	4E+03	2E+03	3E+03
4ESDO69	1,473	6,796	229	992	41	34	6.7	2.2	8.0	3,390	1E+04	8E+03	8E+03
4ESDO64	36	114	8	92	2	1	0.5	0.1	0.2	53	2E+02	3E+02	3E+02
4FDO189	675	3,702	105	181	19	13	2.2	1.0	3.5	1,798	6E+03	4E+03	3E+03
4FDO204	818	4,105	134	514	31	16	4.2	1.2	3.7	1,964	7E+03	4E+03	4E+03
4FDO16	379	2,133	60	89	10	10	1.2	0.6	2.0	1,026	4E+03	3E+03	2E+03
4FDO203	117	496	22	187	6	2	1.1	0.2	0.5	237	8E+02	6E+02	6E+02
4FDO118	538	3,026	80	117	10	13	1.2	0.8	2.9	1,484	5E+03	4E+03	3E+03
4FDO119	1,206	4,939	130	47	21	34	2.8	0.8	9.8	2,640	4E+03	4E+03	4E+03
5CSDO110	691	2,332	119	773	31	20	5.1	0.9	2.8	1,196	5E+03	4E+03	6E+03
5EDO182	96	442	30	377	6	3	1.7	0.3	0.7	215	7E+02	4E+02	3E+02
5ESDO184	579	2,526	137	1,490	30	13	7.1	1.3	3.4	1,231	4E+03	3E+03	3E+03
5FDO117	709	3,460	131	780	31	15	5.1	1.2	3.5	1,647	6E+03	3E+03	4E+03
5FDO254	49	307	8	12	1	1	0.1	0.1	0.3	153	5E+02	3E+02	2E+02
5FDO265	18	36	1	4	0	0	0.0	0.0	0.1	20	2E+01	1E+01	3E+01
5FDO253	570	2,943	86	179	16	14	1.9	0.8	2.8	1,412	6E+03	4E+03	4E+03
5FDO245	1,245	7,329	201	366	26	26	3.5	2.1	7.2	3,612	1E+04	8E+03	5E+03
5FDO244	221	1,136	31	57	5	5	0.6	0.3	1.5	567	2E+03	1E+03	9E+02
5FDO264	17	46	2	6	0	2	0.0	0.0	0.1	19	2E+02	3E+02	4E+02
5GDO112	838	5,041	131	173	16	19	2.0	1.6	5.6	2,461	9E+03	6E+03	4E+03
5GDO116A	690	3,802	114	460	15	13	2.7	1.2	3.7	1,895	6E+03	4E+03	2E+03
5GDO115	226	1,376	37	39	5	5	0.6	0.4	1.4	673	2E+03	1E+03	1E+03
5GDO116	667	3,818	102	131	17	13	1.9	1.0	3.5	1,846	7E+03	4E+03	3E+03
6DDO57	123	461	22	201	6	2	1.1	0.2	0.5	222	6E+02	8E+02	9E+02
6DDO184	11	26	13	237	3	1	1.0	0.1	0.2	10	3E+01	1E+01	6E+01
6DDO91	18	40	27	523	6	2	2.2	0.3	0.5	17	3E+01	3E+01	7E+01
6DDO187	69	212	10	57	2	5	0.4	0.1	0.3	90	7E+02	1E+03	1E+03
6DDO86	12	38	5	79	2	0	0.4	0.0	0.1	16	5E+01	3E+01	7E+01
6DDO85	51	277	10	49	2	1	0.4	0.1	0.3	131	5E+02	3E+02	3E+02
6DDO83	175	809	38	294	10	4	1.8	0.3	0.9	375	1E+03	9E+02	1E+03
6DDO84	13	63	3	19	1	0	0.1	0.0	0.1	29	1E+02	5E+01	7E+01
06D097	108	428	19	136	6	2	1.0	0.2	0.4	194	7E+02	4E+02	7E+02
6GDO109	1,318	7,142	198	282	39	26	4.3	2.0	6.4	3,416	1E+04	8E+03	8E+03
6GDO110	1,608	9,406	260	397	41	33	4.9	2.6	8.4	4,565	2E+04	1E+04	8E+03
6GDO111	237	1,016	57	613	14	6	3.1	0.5	1.4	485	2E+03	9E+02	9E+02
6GDO166	134	474	39	552	9	4	2.5	0.4	0.9	228	7E+02	4E+02	5E+02
6GDO108	4,342	25,243	688	982	105	93	12.5	7.0	23.0	12,243	5E+04	3E+04	2E+04
6G165	25	99	5	54	1	0	0.2	0.0	0.1	50	1E+02	1E+02	7E+01
6HDO43	87	438	15	65	4	2	0.5	0.1	0.4	205	7E+02	4E+02	5E+02
6HDO106	196	883	32	182	7	3	1.1	0.3	0.9	431	1E+03	8E+02	6E+02

Table C2-26. Scenario 6 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	516	2,676	86	414	15	10	2.6	0.9	2.7	1,306	4E+03	3E+03	2E+03
7CDO006	5,278	24,148	978	7,775	188	117	39.9	9.7	28.6	11,905	5E+04	3E+04	4E+04
7HDO285	5,620	27,190	847	2,448	203	113	25.0	7.8	27.7	13,000	5E+04	3E+04	4E+04
7HDO105	7,900	40,198	1,376	6,636	286	179	45.2	13.1	40.2	19,320	8E+04	5E+04	6E+04
7HDO348	44	291	7	10	0	1	0.1	0.1	0.3	145	5E+02	4E+02	2E+02
7HDO347	311	1,601	51	203	11	6	1.5	0.5	1.5	772	3E+03	2E+03	2E+03
7HDO346	288	1,803	47	71	5	6	0.7	0.5	1.6	883	3E+03	2E+03	1E+03
8BDO122	1,354	7,569	192	308	27	34	3.5	2.9	10.8	3,623	1E+04	9E+03	7E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	1	4E-01	7E-01	7E-01
8BDO126	774	4,910	126	138	11	16	1.5	1.4	4.7	2,425	9E+03	5E+03	3E+03
8CDO25	170	549	41	486	9	5	2.4	0.4	1.0	288	1E+03	1E+03	2E+03
8CDO26	157	539	37	417	8	4	2.0	0.3	0.9	286	1E+03	9E+02	1E+03
8DDO112	32	190	5	8	1	1	0.1	0.1	0.2	92	4E+02	3E+02	3E+02
8DSDO100	73	228	14	176	3	3	0.8	0.1	0.4	111	5E+02	1E+03	1E+03
8EDO35	117	320	29	455	8	2	2.0	0.3	0.6	159	4E+02	2E+03	2E+03
8EDO33	409	2,515	74	254	8	9	1.6	0.8	2.4	1,240	4E+03	3E+03	2E+03
8IDO153	33	215	5	4	0	1	0.0	0.1	0.2	106	4E+02	2E+02	1E+02
8IDO155	22	82	5	59	1	0	0.3	0.0	0.1	42	1E+02	3E+02	3E+02
8IDO156	307	663	47	591	19	4	3.3	0.3	0.8	285	5E+02	1E+02	8E+02
8IDO209	118	764	19	18	1	2	0.2	0.2	0.7	378	1E+03	9E+02	5E+02
8IDO154	746	4,042	118	297	21	18	2.8	1.2	4.1	1,940	7E+03	6E+03	5E+03
8IDO158	352	2,091	58	136	8	8	1.2	0.7	2.4	1,024	4E+03	2E+03	2E+03
8IDO207	60	312	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,081	6,736	177	240	22	25	2.8	2.1	7.5	3,269	1E+04	7E+03	5E+03
8JSDO103	847	4,960	142	329	21	18	2.9	1.4	4.6	2,424	9E+03	5E+03	4E+03
8JSDO41	475	2,968	80	116	10	11	1.3	0.9	3.0	1,447	5E+03	3E+03	2E+03
8JSDO50	1,116	5,764	167	427	35	24	4.4	1.9	6.5	2,747	1E+04	7E+03	6E+03
8K049	148	864	25	65	4	3	0.6	0.2	0.8	416	2E+03	1E+03	8E+02
9BDO49	298	808	31	152	6	19	0.9	0.2	1.4	367	3E+03	6E+03	6E+03
9EDO229	53	256	8	24	2	1	0.2	0.1	0.2	122	4E+02	3E+02	2E+02
9EDO243	154	523	22	188	6	3	1.1	0.2	0.5	250	9E+02	1E+03	2E+03
9K100	47	125	8	64	2	4	0.3	0.0	0.3	51	5E+02	8E+02	9E+02
9K101	568	2,007	97	890	24	17	4.7	0.8	2.5	949	4E+03	5E+03	5E+03
9K016	59	173	28	464	7	3	2.1	0.3	0.6	77	3E+02	3E+02	5E+02
9LSDO095	201	747	36	340	6	8	1.6	0.3	1.1	361	2E+03	2E+03	2E+03
10BSDO62	28	52	1	1	1	0	0.0	0.0	0.1	27	7E+00	5E-01	1E+01
10BSDO15	32	78	3	11	1	1	0.1	0.0	0.2	39	2E+02	4E+02	4E+02
10BSDO64	109	310	14	90	4	3	0.6	0.1	0.6	214	4E+02	5E+02	6E+02
10L094	12,265	67,226	1,897	4,677	290	267	39.9	19.9	68.3	32,739	1E+05	8E+04	7E+04
10L096	1,342	8,032	223	286	25	50	3.4	2.2	8.1	3,846	2E+04	1E+04	1E+04
11BDO28	11,383	50,074	2,331	21,907	452	321	105.6	22.4	63.9	24,574	9E+04	7E+04	6E+04
11BDO123	2,300	11,956	350	770	60	59	7.6	3.3	11.2	5,770	2E+04	2E+04	2E+04
11IDO577	31,982	159,688	5,268	13,220	1,587	761	180.6	46.7	151.2	72,547	3E+05	2E+05	2E+05
11M093	996	3,629	153	760	32	19	5.2	1.2	4.5	1,936	8E+03	5E+03	7E+03
12BDO10	11	26	2	19	0	1	0.1	0.0	0.1	11	8E+01	1E+02	1E+02
12BDO14	26	61	4	42	1	2	0.2	0.0	0.1	27	2E+02	4E+02	4E+02
12BDO124	7,562	39,272	1,279	6,214	197	177	36.0	12.9	40.0	19,335	7E+04	5E+04	4E+04
12EDO418	192	838	31	85	3	4	0.6	0.2	0.8	446	2E+03	1E+03	9E+02

Table C2-26. Scenario 6 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	129	613	19	85	3	2	0.5	0.2	0.6	304	1E+03	9E+02	7E+02
12HOFDO92	903	2,486	405	2,899	107	124	23.5	3.3	11.8	2,284	4E+03	7E+03	9E+03
12HDO85/87	414	1,222	67	476	14	38	2.7	0.4	2.4	491	5E+03	9E+03	1E+04
12L092	2,018	8,929	298	1,084	77	40	9.9	2.8	9.4	4,259	2E+04	9E+03	1E+04
12LDO296	445	2,075	66	275	13	8	1.9	0.6	2.3	1,027	3E+03	2E+03	1E+03
12M091	312	1,103	49	286	9	6	1.7	0.4	1.3	594	2E+03	1E+03	2E+03
13DSDO078	1,739	5,093	218	1,522	89	27	11.8	1.5	4.2	2,296	7E+03	6E+03	1E+04
13EDO177	49	104	10	163	3	1	0.7	0.1	0.2	50	7E+01	3E+02	3E+02
13EDO174	1,124	6,191	168	409	20	21	3.0	1.8	5.8	3,070	1E+04	7E+03	5E+03
13EDO176	34	79	5	77	2	1	0.4	0.1	0.2	38	5E+01	2E+02	2E+02
13FDO95	9	20	2	27	0	0	0.1	0.0	0.0	10	2E+01	1E+02	1E+02
13FDO011	23	42	1	1	1	0	0.0	0.0	0.0	21	2E+01	8E+01	9E+01
13F093	95	244	9	108	3	2	0.6	0.2	0.8	112	4E+02	1E+03	1E+03
13L090	30,497	142,713	4,716	6,123	1,712	674	168.2	35.3	121.5	63,633	2E+05	1E+05	2E+05
14CDO9	692	3,988	149	884	27	20	5.1	1.4	4.2	1,903	8E+03	5E+03	5E+03
15FSDO288	1,841	9,017	298	1,729	49	34	9.4	3.1	9.4	4,466	2E+04	1E+04	2E+04
15L089	12,655	56,857	1,954	5,216	618	280	70.1	15.4	53.7	26,353	1E+05	6E+04	8E+04
15L088	5,660	35,472	905	228	97	153	10.8	9.8	38.5	17,380	6E+04	4E+04	3E+04
16L097	487	1,476	66	624	18	30	3.5	1.2	5.2	613	3E+03	6E+03	6E+03
16LSDO122	7,900	40,462	1,245	2,593	267	255	32.0	11.0	42.8	19,085	8E+04	6E+04	6E+04
17M033	5,185	25,419	742	1,899	119	271	17.5	10.6	46.8	11,670	6E+04	6E+04	6E+04
18GSDO233	4,220	18,791	546	559	78	269	9.0	4.9	24.2	8,451	6E+04	7E+04	7E+04
19GDO043	4,772	31,291	793	359	93	113	10.3	9.2	31.1	15,050	6E+04	4E+04	3E+04
19GDO194	407	2,057	65	170	17	9	2.0	0.7	2.4	969	3E+03	3E+03	3E+03
19G199	56	163	2	2	1	1	0.1	0.2	0.7	71	1E+02	6E+02	6E+02
20G163	298	1,181	9	24	7	14	1.0	1.7	7.6	452	1E+03	4E+03	4E+03
20L083	211	920	26	10	4	8	0.7	0.1	2.1	497	5E+02	8E+02	9E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	12	53	2	5	1	0	0.1	0.0	0.0	24	9E+01	6E+01	8E+01
21H048	113	331	4	3	3	3	0.2	0.3	1.4	144	2E+02	3E+02	2E+02
21KSDO069	8,422	48,156	1,278	974	216	266	23.7	14.7	58.8	22,656	1E+05	7E+04	6E+04
21M005	140	405	12	42	3	3	0.4	0.1	0.9	217	1E+02	2E+02	2E+02
21M010	855	2,948	80	92	17	23	2.3	0.4	6.8	1,587	2E+03	2E+03	3E+03
21M050	399	1,154	29	32	9	7	0.9	0.2	2.7	617	1E+03	8E+02	3E+03
22CDO384	2,428	8,723	353	1,807	132	49	16.5	2.5	7.4	3,897	1E+04	8E+03	1E+04
22LSDO580	1,118	4,299	123	116	22	32	3.2	0.6	11.9	2,394	2E+03	3E+03	4E+03
23GDO132	4,399	9,326	266	2,171	124	61	15.7	3.7	15.9	4,331	7E+03	8E+03	1E+04
23HSDO042	17,475	75,545	2,638	5,032	872	533	98.3	24.7	97.0	34,752	1E+05	1E+05	1E+05
23HDO040	2,692	16,123	414	318	60	75	6.7	4.6	17.3	7,628	3E+04	2E+04	2E+04
23L196	128	259	7	40	4	1	0.4	0.1	0.6	130	1E+02	4E+01	2E+02
23L075	601	1,482	47	224	18	7	2.1	0.3	3.3	786	1E+03	7E+02	3E+03
23L074	125	269	7	27	3	1	0.3	0.0	0.4	141	8E+01	5E+01	1E+02
23L195	135	258	9	78	4	1	0.5	0.1	0.7	139	2E+02	5E+01	3E+02
23L202	137	265	7	40	4	0	0.3	0.1	0.6	143	3E+02	5E+01	6E+02
23L016	106	211	6	39	3	0	0.3	0.0	0.5	116	4E+02	7E+01	7E+02
23L015	161	278	11	132	5	1	0.7	0.1	0.5	140	3E+01	5E+01	5E+01
23L164	809	2,024	68	113	21	41	1.9	0.3	4.5	924	7E+03	9E+03	1E+04
24CSDO031	260	1,614	43	57	4	5	0.5	0.5	1.6	807	3E+03	2E+03	1E+03

Table C2-26. Scenario 6 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,512	7,804	259	1,092	42	44	7.1	2.5	8.3	3,811	1E+04	1E+04	1E+04
24DSDO150	30	70	2	24	1	0	0.1	0.0	0.1	38	6E+01	4E+02	5E+02
24DSDO032	18,908	102,662	3,522	8,458	721	487	92.4	33.7	110.9	55,211	2E+05	1E+05	1E+05
24GSDO035	22,693	131,543	3,404	4,384	402	596	50.9	38.5	141.3	63,758	3E+05	2E+05	1E+05
24GSDO034	1,592	6,012	161	928	39	24	5.9	2.5	10.9	2,948	9E+03	2E+04	2E+04
24L233	413	1,233	32	94	22	11	2.3	1.1	4.9	471	1E+03	8E+02	3E+03
25DDO040	502	2,474	73	212	12	17	1.7	0.9	4.0	1,196	5E+03	4E+03	3E+03
25EDO037	12,184	63,449	1,730	3,504	261	342	34.7	19.7	79.9	30,652	1E+05	9E+04	8E+04
25GDO041	69	234	9	31	6	2	0.6	0.2	0.9	79	3E+02	1E+02	5E+02
25GDO-06	243	677	18	217	9	7	1.4	0.9	3.8	281	3E+02	5E+02	6E+02
26J049	7,097	19,812	763	702	511	146	45.3	5.1	27.7	7,540	3E+04	1E+04	6E+04
25L144	530	3,574	88	11	13	13	1.3	1.0	3.2	1,662	7E+03	4E+03	3E+03
25L058	4,193	22,428	584	518	83	150	9.3	6.3	26.3	10,567	5E+04	4E+04	4E+04
26FDO038	66	183	14	131	7	2	1.0	0.1	0.2	62	3E+02	7E+01	6E+02
26GSDO01	3,504	15,668	470	1,930	122	83	16.6	7.2	27.4	7,327	2E+04	2E+04	2E+04
26JSDO052	36	68	4	66	2	0	0.3	0.1	0.2	33	8E+00	1E+01	1E+01
26JSDO100	152	410	22	81	14	3	1.5	0.1	0.2	141	7E+02	1E+02	1E+03
26J101	421	1,029	63	509	33	9	4.3	0.4	1.1	388	2E+03	6E+02	3E+03
26KSDO254	309	1,063	41	117	4	31	0.9	0.2	2.4	468	5E+03	7E+03	7E+03
26K035	185	394	11	35	5	1	0.5	0.1	1.1	214	5E+02	8E+01	9E+02
26K099	11,934	76,941	1,850	828	162	343	19.5	22.5	83.1	36,788	2E+05	1E+05	8E+04
26L055	168	973	27	13	6	4	0.6	0.2	0.8	448	2E+03	1E+03	1E+03
26LSDO084	68	201	10	16	7	1	0.6	0.0	0.1	70	3E+02	4E+02	9E+02
26L070	197	337	5	24	4	0	0.3	0.0	0.1	169	8E+01	2E+01	2E+02
27JSDO044	362	721	29	367	12	6	2.0	0.5	2.1	339	3E+02	5E+02	6E+02
27JSDO096	2,028	4,070	93	335	54	14	4.5	0.6	4.7	2,022	2E+03	4E+03	5E+03
27JSDO001	7,444	43,056	1,088	1,538	128	241	17.5	13.2	53.4	20,378	9E+04	7E+04	5E+04
27L022	2,091	12,610	303	297	42	60	5.2	4.9	18.5	5,928	2E+04	2E+04	1E+04
27L020	1,975	11,787	283	295	41	56	5.0	4.6	17.2	5,521	2E+04	2E+04	1E+04
28K061	4,191	27,168	694	380	64	129	7.7	7.5	26.5	13,029	6E+04	4E+04	3E+04
28K010	3,672	25,383	624	254	47	97	5.8	7.1	23.9	12,265	5E+04	3E+04	2E+04
28K386	624	1,545	55	385	17	19	2.5	0.5	3.6	753	2E+03	3E+03	3E+03
28L073	71	214	9	74	4	1	0.6	0.1	0.1	97	4E+02	2E+03	2E+03
28L074/5/6	1,188	3,525	108	719	50	22	6.3	2.1	8.7	1,556	4E+03	6E+03	9E+03
28N156	286	1,601	47	116	5	11	0.9	0.5	1.7	778	3E+03	3E+03	2E+03
28N207	3,015	18,350	481	462	62	89	7.4	5.6	20.0	8,767	4E+04	3E+04	2E+04
28O025	47	217	8	20	1	2	0.2	0.1	0.2	110	6E+02	5E+02	5E+02
28P001	281	1,853	47	27	4	6	0.5	0.5	1.6	910	3E+03	2E+03	1E+03
29J129	152	278	13	149	5	2	0.8	0.1	0.5	136	2E+02	3E+02	4E+02
29J029	335	873	39	188	6	29	1.1	0.2	1.8	362	4E+03	6E+03	6E+03
29J212	16,380	105,895	2,599	1,124	240	495	29.1	30.7	116.6	50,750	2E+05	2E+05	1E+05
29M049	1,174	6,431	181	188	35	41	3.8	1.8	6.8	2,970	1E+04	1E+04	9E+03
29N015	120	542	17	30	2	5	0.5	0.1	1.3	298	3E+02	5E+02	5E+02
29N135	387	2,151	59	150	7	9	1.2	0.6	2.6	1,065	4E+03	2E+03	1E+03
29O001	10,538	64,897	1,762	2,385	224	269	28.7	18.6	64.0	31,445	1E+05	8E+04	6E+04
29P015	71	470	12	13	1	2	0.2	0.1	0.4	231	9E+02	5E+02	3E+02
29P044	563	3,774	98	82	9	13	1.2	1.1	3.4	1,846	7E+03	4E+03	3E+03
30J006	213	626	24	183	8	5	1.2	0.2	1.0	313	8E+02	3E+03	3E+03

Table C2-26. Scenario 6 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	57	151	7	95	2	1	0.5	0.1	0.4	75	1E+02	5E+02	6E+02
30J030	637	1,374	36	178	16	5	1.7	0.2	2.5	715	5E+02	5E+02	9E+02
30P107	307	1,611	60	106	6	9	0.9	0.4	1.4	821	3E+03	2E+03	2E+03
30P062	259	1,694	45	53	4	6	0.6	0.5	1.6	841	3E+03	2E+03	1E+03
31O004	940	5,644	202	153	17	30	2.3	1.3	4.4	2,777	1E+04	9E+03	6E+03
31P084	288	1,792	47	79	4	6	0.6	0.5	1.8	888	3E+03	2E+03	1E+03
3FDO159	283	1,168	55	499	14	6	2.7	0.5	1.4	560	2E+03	2E+03	2E+03
11G318/319	305	834	67	742	13	30	3.4	0.5	2.1	339	3E+03	5E+03	6E+03
6FSDO233	7	14	5	89	1	0	0.4	0.0	0.1	7	1E+01	2E+01	2E+01
17FDO012	2,424	5,320	120	71	48	70	3.1	0.8	5.3	2,477	2E+04	5E+04	5E+04
21H047	482	1,853	33	79	14	15	1.6	1.6	6.7	774	2E+03	2E+03	2E+03
21H039	1,421	4,493	64	327	43	46	5.1	5.3	23.2	1,793	3E+03	4E+03	5E+03
20G161	2,443	10,369	295	225	64	98	7.0	4.9	21.0	4,747	2E+04	2E+04	2E+04
StonyMWRA	105,528	485,899	17,644	70,254	4,661	2,852	655.5	175.6	587.3	232,882	9E+05	6E+05	7E+05
Fens	69,174	217,596	11,258	17,769	4,543	2,087	529.8	92.2	278.7	109,643	3E+05	2E+05	2E+05
20D055	5,084	32,526	877	489	116	117	12.6	9.3	30.7	15,815	6E+04	4E+04	2E+04
21D319	6,952	45,702	1,213	854	141	161	16.4	13.0	42.6	22,281	9E+04	5E+04	3E+04

Table C2-27. Scenario 7 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	883	3,474	130	935	27	18	5.3	1.1	4.8	1,759	4E+03	3E+03	3E+03
1FDO31	710	3,259	92	207	18	15	2.1	0.9	3.1	1,584	6E+03	4E+03	4E+03
02E086	227	906	39	332	10	4	1.9	0.4	1.1	434	1E+03	1E+03	1E+03
2FDO120	1,209	5,898	179	609	31	26	4.8	1.6	7.0	2,925	1E+04	7E+03	7E+03
2FDO93	1,411	9,928	244	115	18	33	2.2	2.7	9.0	4,837	2E+04	1E+04	7E+03
2FDO85	87	389	12	43	3	1	0.3	0.1	0.3	190	6E+02	4E+02	3E+02
3ESDO186	278	1,207	59	570	13	6	2.9	0.6	1.5	583	2E+03	1E+03	1E+03
3ESDO185	517	2,268	93	367	14	11	2.4	0.7	2.3	1,179	5E+03	3E+03	3E+03
3F162	469	2,180	86	508	24	10	3.6	0.7	2.1	1,019	3E+03	2E+03	2E+03
4ESDO69	1,411	6,452	220	997	40	32	6.6	2.1	7.6	3,218	1E+04	8E+03	8E+03
4ESDO64	34	107	7	93	2	1	0.5	0.1	0.2	50	2E+02	2E+02	3E+02
4FDO189	639	3,458	99	183	19	12	2.2	1.0	3.3	1,677	6E+03	3E+03	3E+03
4FDO204	785	3,893	129	516	31	15	4.2	1.2	3.5	1,858	6E+03	4E+03	4E+03
4FDO16	363	2,025	58	90	10	9	1.2	0.5	1.9	973	4E+03	3E+03	2E+03
4FDO203	112	468	22	187	6	2	1.1	0.2	0.5	223	7E+02	6E+02	6E+02
4FDO118	503	2,801	75	119	9	12	1.2	0.8	2.6	1,374	5E+03	4E+03	3E+03
4FDO119	1,169	4,799	127	48	21	33	2.7	0.8	9.5	2,568	4E+03	4E+03	4E+03
5CSDO110	653	2,186	114	777	30	18	5.1	0.9	2.7	1,116	5E+03	4E+03	6E+03
5EDO182	91	414	29	378	6	3	1.7	0.3	0.7	201	6E+02	4E+02	3E+02
5ESDO184	554	2,388	134	1,493	29	13	7.1	1.3	3.2	1,162	4E+03	3E+03	2E+03
5FDO117	674	3,242	126	782	31	14	5.1	1.2	3.3	1,538	6E+03	3E+03	3E+03
5FDO254	46	285	7	12	1	1	0.1	0.1	0.3	142	5E+02	3E+02	2E+02
5FDO265	17	35	1	4	0	0	0.0	0.0	0.1	19	2E+01	1E+01	3E+01
5FDO253	543	2,766	82	181	16	14	1.9	0.8	2.6	1,324	5E+03	4E+03	4E+03
5FDO245	1,190	6,970	193	370	26	25	3.5	2.0	6.9	3,434	1E+04	7E+03	5E+03
5FDO244	214	1,097	30	58	5	5	0.6	0.3	1.5	547	2E+03	1E+03	9E+02
5FDO264	16	45	2	6	0	2	0.0	0.0	0.1	18	2E+02	3E+02	3E+02
5GDO112	789	4,700	123	175	16	18	2.0	1.5	5.2	2,293	8E+03	5E+03	3E+03
5GDO116A	645	3,510	107	463	14	12	2.6	1.1	3.5	1,749	6E+03	4E+03	2E+03
5GDO115	221	1,343	36	40	5	5	0.6	0.4	1.4	657	2E+03	1E+03	1E+03
5GDO116	640	3,644	98	132	16	12	1.9	1.0	3.3	1,760	6E+03	4E+03	3E+03
6DDO57	118	435	21	203	6	2	1.1	0.2	0.5	208	6E+02	8E+02	8E+02
6DDO184	12	29	13	237	3	1	1.0	0.1	0.2	12	3E+01	2E+01	7E+01
6DDO91	21	45	27	522	6	2	2.2	0.3	0.5	20	3E+01	4E+01	9E+01
6DDO187	66	200	10	58	2	5	0.4	0.1	0.3	85	6E+02	9E+02	1E+03
6DDO86	14	47	5	78	2	0	0.4	0.0	0.1	21	6E+01	4E+01	8E+01
6DDO85	57	319	11	49	2	1	0.4	0.1	0.3	152	5E+02	3E+02	3E+02
6DDO83	176	817	38	294	10	4	1.8	0.3	0.9	380	1E+03	9E+02	1E+03
6DDO84	15	77	3	18	1	0	0.1	0.0	0.1	36	1E+02	7E+01	8E+01
06D097	133	566	22	133	7	3	1.0	0.2	0.5	264	9E+02	6E+02	8E+02
6GDO109	1,264	6,800	190	284	39	25	4.3	1.9	6.1	3,248	1E+04	7E+03	8E+03
6GDO110	1,498	8,657	242	403	40	31	4.9	2.4	7.7	4,191	2E+04	9E+03	7E+03
6GDO111	226	955	56	614	14	6	3.1	0.5	1.3	454	1E+03	8E+02	8E+02
6GDO166	128	446	38	553	9	4	2.5	0.4	0.9	214	6E+02	4E+02	5E+02
6GDO108	4,167	24,089	661	988	104	90	12.4	6.7	21.9	11,677	4E+04	3E+04	2E+04
6G165	23	92	5	54	1	0	0.2	0.0	0.1	46	1E+02	1E+02	7E+01
6HDO43	76	366	14	66	4	2	0.5	0.1	0.3	170	6E+02	4E+02	4E+02
6HDO106	187	833	30	183	7	3	1.1	0.3	0.8	406	1E+03	8E+02	6E+02

Table C2-27. Scenario 7 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	509	2,642	86	415	15	10	2.6	0.8	2.7	1,289	4E+03	3E+03	2E+03
7CDO006	4,986	22,509	941	7,804	185	111	39.7	9.3	27.1	11,089	4E+04	3E+04	4E+04
7HDO285	5,423	26,000	819	2,459	201	109	24.8	7.5	26.5	12,412	5E+04	3E+04	4E+04
7HDO105	7,474	37,581	1,315	6,667	281	170	44.9	12.4	37.8	18,034	8E+04	4E+04	6E+04
7HDO348	42	274	7	10	0	1	0.1	0.1	0.3	137	5E+02	3E+02	2E+02
7HDO347	289	1,461	48	204	11	6	1.5	0.5	1.4	703	2E+03	2E+03	2E+03
7HDO346	280	1,750	46	71	5	6	0.7	0.5	1.6	856	3E+03	2E+03	1E+03
8BDO122	1,288	7,159	183	312	26	33	3.4	2.8	10.2	3,426	1E+04	8E+03	6E+03
8BDO66	2	3	0	3	0	0	0.0	0.0	0.0	1	4E-01	6E-01	6E-01
8BDO126	737	4,660	120	140	11	16	1.5	1.3	4.5	2,303	8E+03	5E+03	3E+03
8CDO25	160	515	40	487	9	4	2.3	0.4	0.9	269	1E+03	1E+03	2E+03
8CDO26	148	503	36	418	8	4	2.0	0.3	0.9	266	1E+03	9E+02	1E+03
8DDO112	31	187	5	8	1	1	0.1	0.0	0.2	90	3E+02	3E+02	3E+02
8DSDO100	69	214	14	177	3	3	0.8	0.1	0.4	104	4E+02	9E+02	9E+02
8EDO35	113	305	29	456	8	2	2.0	0.3	0.6	151	3E+02	1E+03	2E+03
8EDO33	384	2,340	70	255	8	8	1.5	0.7	2.3	1,153	4E+03	3E+03	2E+03
8IDO153	31	202	5	5	0	1	0.0	0.1	0.2	100	4E+02	2E+02	1E+02
8IDO155	21	76	4	59	1	0	0.3	0.0	0.1	39	1E+02	2E+02	2E+02
8IDO156	299	646	47	593	19	4	3.3	0.3	0.7	276	5E+02	9E+01	8E+02
8IDO209	83	514	13	19	1	2	0.2	0.1	0.5	254	9E+02	6E+02	4E+02
8IDO154	703	3,763	111	299	21	17	2.8	1.2	3.8	1,803	7E+03	5E+03	4E+03
8IDO158	333	1,961	55	137	8	7	1.1	0.7	2.2	960	3E+03	2E+03	2E+03
8IDO207	60	313	12	78	2	2	0.4	0.1	0.3	152	6E+02	5E+02	4E+02
8J102	1,033	6,396	169	241	21	24	2.8	2.0	7.1	3,101	1E+04	7E+03	5E+03
8JSDO103	801	4,649	135	330	21	17	2.9	1.4	4.4	2,270	8E+03	5E+03	4E+03
8JSDO41	447	2,767	75	116	10	10	1.3	0.8	2.8	1,348	5E+03	3E+03	2E+03
8JSDO50	1,063	5,431	159	430	35	23	4.4	1.8	6.1	2,583	9E+03	7E+03	6E+03
8K049	141	815	24	65	4	3	0.6	0.2	0.7	391	1E+03	9E+02	7E+02
9BDO49	283	761	30	154	6	18	0.9	0.2	1.3	346	2E+03	5E+03	6E+03
9EDO229	50	241	8	24	2	1	0.2	0.1	0.2	114	4E+02	2E+02	2E+02
9EDO243	147	495	22	190	6	3	1.1	0.2	0.5	236	9E+02	1E+03	1E+03
9K100	45	118	7	65	2	4	0.3	0.0	0.2	49	5E+02	7E+02	8E+02
9K101	542	1,888	94	894	24	16	4.7	0.8	2.4	891	4E+03	4E+03	5E+03
9K016	57	166	28	464	7	3	2.1	0.3	0.6	73	2E+02	3E+02	4E+02
9LSDO095	191	702	35	341	6	8	1.6	0.3	1.0	340	2E+03	2E+03	2E+03
10BSDO62	27	51	1	1	1	0	0.0	0.0	0.1	26	7E+00	5E-01	1E+01
10BSDO15	30	74	2	11	1	1	0.1	0.0	0.2	37	2E+02	4E+02	4E+02
10BSDO64	104	292	14	92	4	3	0.6	0.1	0.6	202	4E+02	5E+02	6E+02
10L094	11,538	62,545	1,789	4,720	283	249	39.3	18.7	63.7	30,446	1E+05	7E+04	7E+04
10L096	1,264	7,510	210	288	25	47	3.3	2.1	7.6	3,589	2E+04	1E+04	1E+04
11BDO28	10,604	45,305	2,219	21,965	444	302	105.0	21.1	59.6	22,208	8E+04	6E+04	6E+04
11BDO123	2,167	11,133	330	778	58	55	7.4	3.1	10.4	5,367	2E+04	2E+04	2E+04
11IDO577	30,740	152,046	5,089	13,301	1,570	730	179.1	44.5	143.5	68,821	3E+05	2E+05	2E+05
11M093	954	3,463	148	765	32	18	5.2	1.2	4.3	1,845	8E+03	5E+03	6E+03
12BDO10	10	25	2	19	0	1	0.1	0.0	0.1	11	7E+01	1E+02	1E+02
12BDO14	24	58	4	42	1	1	0.2	0.0	0.1	26	2E+02	3E+02	3E+02
12BDO124	6,827	34,745	1,173	6,274	189	160	35.5	11.7	36.0	17,101	6E+04	4E+04	4E+04
12EDO418	181	783	29	86	3	3	0.6	0.2	0.7	417	2E+03	1E+03	9E+02

Table C2-27. Scenario 7 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	122	572	18	86	3	2	0.5	0.2	0.5	284	9E+02	8E+02	6E+02
12HOFDO92	870	2,385	398	2,905	106	116	23.4	3.2	11.4	2,179	4E+03	7E+03	8E+03
12HDO85/87	395	1,163	65	478	14	36	2.7	0.4	2.3	467	5E+03	8E+03	9E+03
12L092	1,928	8,429	286	1,092	76	38	9.8	2.6	8.9	4,014	2E+04	9E+03	1E+04
12LDO296	426	1,971	63	277	13	8	1.9	0.6	2.2	974	3E+03	2E+03	1E+03
12M091	297	1,043	47	288	9	6	1.7	0.4	1.2	561	2E+03	1E+03	2E+03
13DSDO078	1,717	4,969	215	1,524	89	26	11.7	1.5	4.1	2,236	7E+03	5E+03	9E+03
13EDO177	48	100	10	164	3	1	0.7	0.1	0.2	48	6E+01	3E+02	3E+02
13EDO174	1,064	5,809	159	414	20	19	2.9	1.7	5.5	2,881	1E+04	7E+03	4E+03
13EDO176	33	75	5	78	2	1	0.4	0.1	0.2	37	5E+01	2E+02	2E+02
13FDO95	9	19	2	27	0	0	0.1	0.0	0.0	10	2E+01	1E+02	1E+02
13FDO011	22	40	1	1	0	0	0.0	0.0	0.0	20	2E+01	8E+01	8E+01
13F093	91	231	9	109	3	2	0.6	0.2	0.8	107	3E+02	9E+02	1E+03
13L090	29,366	135,805	4,549	6,186	1,692	647	166.4	33.4	114.7	60,296	2E+05	1E+05	2E+05
14CDO9	662	3,786	144	886	26	19	5.1	1.4	4.1	1,805	7E+03	5E+03	5E+03
15FSDO288	1,760	8,495	286	1,739	48	32	9.4	3.0	8.9	4,203	2E+04	1E+04	1E+04
15L089	12,280	54,866	1,906	5,276	610	272	69.5	14.9	51.8	25,383	1E+05	5E+04	8E+04
15L088	5,354	33,657	858	217	90	145	10.1	9.3	36.7	16,513	6E+04	4E+04	3E+04
16L097	464	1,393	64	627	18	28	3.5	1.1	4.9	579	3E+03	5E+03	6E+03
16LSDO122	7,701	39,338	1,219	2,611	263	250	31.8	10.7	41.8	18,548	8E+04	6E+04	6E+04
17M033	5,036	24,677	725	1,912	118	263	17.3	10.3	45.5	11,332	6E+04	6E+04	6E+04
18GSDO233	4,075	18,041	528	564	77	262	8.9	4.7	23.4	8,098	6E+04	7E+04	7E+04
19GDO043	4,647	30,446	774	364	92	110	10.2	8.9	30.2	14,653	6E+04	4E+04	2E+04
19GDO194	396	1,982	63	171	17	9	2.0	0.7	2.3	931	3E+03	3E+03	3E+03
19G199	54	158	2	2	1	1	0.1	0.2	0.7	68	1E+02	5E+02	6E+02
20G163	289	1,149	9	24	7	14	0.9	1.7	7.5	440	1E+03	4E+03	4E+03
20L083	208	912	26	10	4	8	0.7	0.1	2.0	493	5E+02	8E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	11	50	2	5	1	0	0.1	0.0	0.0	22	8E+01	5E+01	8E+01
21H048	108	315	4	3	2	2	0.2	0.3	1.3	137	2E+02	3E+02	2E+02
21KSDO069	8,245	47,120	1,257	987	214	262	23.5	14.4	57.7	22,171	1E+05	7E+04	6E+04
21M005	136	394	12	43	3	3	0.4	0.1	0.9	211	1E+02	2E+02	2E+02
21M010	831	2,879	78	99	17	22	2.3	0.4	6.7	1,551	1E+03	2E+03	3E+03
21M050	388	1,124	28	36	8	7	0.9	0.2	2.7	602	1E+03	8E+02	3E+03
22CDO384	2,393	8,488	347	1,809	131	48	16.5	2.4	7.2	3,779	1E+04	8E+03	1E+04
22LSDO580	1,088	4,213	121	125	21	32	3.2	0.6	11.8	2,349	2E+03	3E+03	4E+03
23GDO132	4,359	9,223	264	2,180	123	60	15.7	3.6	15.6	4,283	7E+03	8E+03	1E+04
23HSDO042	17,174	74,075	2,607	5,072	868	523	98.0	24.2	94.9	34,061	1E+05	1E+05	1E+05
23HDO040	2,630	15,741	406	322	59	73	6.6	4.5	16.9	7,452	3E+04	2E+04	2E+04
23L196	124	251	7	41	4	1	0.4	0.1	0.6	127	1E+02	4E+01	2E+02
23L075	590	1,456	46	227	18	7	2.1	0.3	3.2	771	1E+03	6E+02	3E+03
23L074	121	262	7	28	3	1	0.3	0.0	0.4	137	8E+01	5E+01	1E+02
23L195	132	252	9	79	4	1	0.5	0.1	0.7	136	2E+02	5E+01	3E+02
23L202	133	257	7	41	3	0	0.3	0.1	0.6	139	3E+02	5E+01	6E+02
23L016	102	205	6	40	3	0	0.3	0.0	0.5	113	4E+02	7E+01	7E+02
23L015	162	280	11	132	5	1	0.7	0.1	0.5	141	3E+01	5E+01	5E+01
23L164	783	1,961	67	117	20	39	1.9	0.3	4.4	896	7E+03	8E+03	1E+04
24CSDO031	248	1,531	41	58	4	5	0.5	0.4	1.5	766	3E+03	2E+03	1E+03

Table C2-27. Scenario 7 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,426	7,270	246	1,097	42	41	7.0	2.4	7.8	3,547	1E+04	1E+04	1E+04
24DSDO150	29	67	2	24	1	0	0.1	0.0	0.1	36	6E+01	4E+02	4E+02
24DSDO032	18,019	97,150	3,377	8,517	710	465	91.5	32.0	105.4	52,206	2E+05	1E+05	1E+05
24GSDO035	22,032	127,427	3,311	4,426	395	579	50.4	37.4	137.2	61,781	2E+05	2E+05	1E+05
24GSDO034	1,548	5,828	158	936	39	24	5.9	2.5	10.7	2,857	9E+03	2E+04	2E+04
24L233	405	1,213	32	96	22	11	2.3	1.0	4.8	462	1E+03	8E+02	3E+03
25DDO040	483	2,373	71	214	11	16	1.7	0.9	3.8	1,147	5E+03	4E+03	3E+03
25EDO037	11,523	59,620	1,644	3,558	254	322	34.1	18.5	75.0	28,800	1E+05	8E+04	7E+04
25GDO041	68	228	9	31	6	2	0.6	0.2	0.8	77	3E+02	1E+02	5E+02
25GDO-06	244	688	18	218	9	7	1.5	0.9	3.9	285	3E+02	5E+02	6E+02
26J049	6,984	19,496	753	702	504	144	44.6	5.0	27.2	7,415	3E+04	1E+04	6E+04
25L144	521	3,510	87	11	13	13	1.3	0.9	3.1	1,632	7E+03	4E+03	3E+03
25L058	4,078	21,782	570	526	82	146	9.3	6.1	25.6	10,259	5E+04	4E+04	4E+04
26FDO038	71	193	15	129	7	2	1.0	0.1	0.3	66	3E+02	8E+01	7E+02
26GSDO01	3,427	15,160	458	1,936	121	82	16.6	7.0	26.8	7,078	2E+04	2E+04	2E+04
26JSDO052	35	65	4	67	1	0	0.3	0.1	0.2	31	7E+00	1E+01	1E+01
26JSDO100	151	407	22	82	14	3	1.5	0.1	0.2	139	7E+02	1E+02	1E+03
26J101	414	1,016	63	512	33	9	4.3	0.4	1.1	382	2E+03	6E+02	3E+03
26KSDO254	300	1,032	40	118	4	30	0.9	0.2	2.3	455	4E+03	6E+03	7E+03
26K035	183	390	11	36	5	1	0.5	0.1	1.1	211	5E+02	8E+01	9E+02
26K099	11,655	75,178	1,811	844	159	336	19.2	22.0	81.3	35,957	2E+05	1E+05	7E+04
26L055	165	955	27	13	6	4	0.6	0.2	0.8	440	2E+03	1E+03	9E+02
26LSDO084	67	199	10	17	7	1	0.6	0.0	0.1	69	3E+02	4E+02	9E+02
26L070	191	328	5	25	3	0	0.3	0.0	0.1	164	8E+01	2E+01	2E+02
27JSDO044	355	707	29	369	12	6	2.0	0.5	2.0	333	3E+02	5E+02	6E+02
27JSDO096	2,009	4,032	92	341	53	14	4.5	0.6	4.7	2,003	2E+03	4E+03	5E+03
27JSDO001	7,306	42,277	1,072	1,548	127	237	17.4	13.0	52.4	20,025	9E+04	7E+04	5E+04
27L022	2,036	12,250	296	299	42	58	5.1	4.8	17.9	5,763	2E+04	2E+04	1E+04
27L020	1,922	11,449	276	297	41	55	4.9	4.5	16.7	5,362	2E+04	2E+04	1E+04
28K061	4,090	26,514	680	384	63	126	7.6	7.4	25.9	12,728	6E+04	4E+04	3E+04
28K010	3,565	24,618	607	256	46	94	5.7	6.9	23.2	11,905	5E+04	3E+04	2E+04
28K386	604	1,498	55	391	16	19	2.5	0.5	3.6	730	2E+03	3E+03	3E+03
28L073	70	209	9	74	4	1	0.6	0.1	0.1	94	3E+02	2E+03	2E+03
28L074/5/6	1,171	3,486	108	723	50	21	6.3	2.1	8.6	1,538	4E+03	6E+03	9E+03
28N156	273	1,521	45	117	5	10	0.8	0.4	1.6	740	3E+03	3E+03	2E+03
28N207	2,932	17,828	469	466	61	87	7.4	5.5	19.5	8,517	4E+04	2E+04	2E+04
28O025	46	210	8	21	1	2	0.2	0.1	0.2	106	6E+02	5E+02	5E+02
28P001	271	1,784	45	27	4	6	0.5	0.5	1.6	875	3E+03	2E+03	1E+03
29J129	147	269	13	151	5	2	0.8	0.1	0.5	131	2E+02	3E+02	3E+02
29J029	324	845	38	190	6	29	1.1	0.2	1.7	350	4E+03	6E+03	6E+03
29J212	16,006	103,397	2,548	1,139	236	484	28.7	30.1	114.2	49,611	2E+05	1E+05	1E+05
29M049	1,141	6,239	176	191	35	40	3.8	1.8	6.6	2,879	1E+04	1E+04	9E+03
29N015	117	529	17	31	2	5	0.5	0.1	1.3	291	3E+02	5E+02	5E+02
29N135	377	2,097	58	152	7	9	1.2	0.6	2.5	1,038	4E+03	2E+03	1E+03
29O001	10,207	62,766	1,714	2,405	221	261	28.4	18.0	62.0	30,424	1E+05	8E+04	6E+04
29P015	68	451	12	13	1	2	0.2	0.1	0.4	221	8E+02	5E+02	3E+02
29P044	548	3,673	96	83	9	12	1.2	1.0	3.3	1,796	7E+03	4E+03	3E+03
30J006	207	610	24	185	8	5	1.2	0.2	1.0	305	8E+02	3E+03	3E+03

Table C2-27. Scenario 7 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	55	144	7	96	2	1	0.5	0.1	0.4	71	1E+02	5E+02	5E+02
30J030	615	1,329	36	185	16	5	1.7	0.2	2.4	692	5E+02	5E+02	8E+02
30P107	293	1,528	58	107	6	8	0.9	0.4	1.3	779	3E+03	2E+03	2E+03
30P062	247	1,615	43	54	4	5	0.6	0.5	1.5	801	3E+03	2E+03	1E+03
31O004	915	5,491	197	154	17	29	2.2	1.3	4.3	2,704	1E+04	9E+03	6E+03
31P084	280	1,745	46	80	4	6	0.6	0.5	1.7	865	3E+03	2E+03	1E+03
3FDO159	271	1,106	54	500	14	6	2.7	0.5	1.3	528	2E+03	1E+03	2E+03
11G318/319	291	789	65	744	12	28	3.4	0.5	2.0	321	3E+03	5E+03	6E+03
6FSDO233	6	14	5	89	1	0	0.4	0.0	0.1	7	9E+00	2E+01	1E+01
17FDO012	2,343	5,152	117	69	46	68	3.0	0.8	5.2	2,398	2E+04	5E+04	5E+04
21H047	470	1,809	32	81	14	14	1.6	1.5	6.6	755	2E+03	2E+03	2E+03
21H039	1,401	4,442	64	332	42	45	5.1	5.3	23.1	1,770	3E+03	4E+03	5E+03
20G161	2,380	10,075	288	225	63	95	6.9	4.8	20.4	4,615	2E+04	2E+04	2E+04
StonyMWRA	101,854	465,837	17,152	70,599	4,596	2,750	650.6	169.8	565.7	222,888	8E+05	5E+05	7E+05
Fens	68,299	214,657	11,148	17,791	4,526	2,053	528.3	91.0	274.5	107,880	3E+05	2E+05	2E+05
20D055	4,866	30,975	839	493	115	111	12.4	8.8	29.1	15,058	6E+04	3E+04	2E+04
21D319	6,735	44,181	1,177	861	140	156	16.2	12.6	41.2	21,532	8E+04	5E+04	3E+04

Table C2-28. Scenario 8 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	851	3,319	127	941	27	1,104	5.2	1.1	4.6	1,681	4E+03	3E+03	3E+03
1FDO31	681	3,103	88	208	18	827	2.1	0.8	3.0	1,506	5E+03	4E+03	4E+03
02E086	216	852	38	334	10	354	1.9	0.4	1.0	407	1E+03	1E+03	1E+03
2FDO120	1,154	5,584	171	616	31	1,562	4.7	1.6	6.6	2,768	9E+03	6E+03	6E+03
2FDO93	1,372	9,649	238	116	17	2,635	2.2	2.6	8.7	4,701	2E+04	1E+04	7E+03
2FDO85	84	371	12	46	3	108	0.3	0.1	0.3	181	6E+02	4E+02	3E+02
3ESDO186	265	1,134	57	572	13	549	2.9	0.5	1.5	547	2E+03	1E+03	1E+03
3ESDO185	494	2,147	89	368	14	689	2.4	0.7	2.2	1,118	5E+03	3E+03	2E+03
3F162	451	2,069	84	510	24	716	3.6	0.7	2.0	963	3E+03	2E+03	2E+03
4ESDO69	1,351	6,128	212	1,003	40	2,042	6.6	2.0	7.3	3,056	1E+04	7E+03	7E+03
4ESDO64	32	101	7	93	2	62	0.5	0.1	0.2	47	2E+02	2E+02	3E+02
4FDO189	604	3,222	94	185	19	899	2.2	0.9	3.1	1,559	6E+03	3E+03	3E+03
4FDO204	754	3,702	125	519	30	1,124	4.2	1.1	3.3	1,761	6E+03	4E+03	4E+03
4FDO16	347	1,924	56	90	10	520	1.2	0.5	1.8	923	4E+03	2E+03	2E+03
4FDO203	107	440	21	188	6	186	1.1	0.2	0.5	209	7E+02	5E+02	6E+02
4FDO118	477	2,638	71	121	9	722	1.2	0.7	2.5	1,294	5E+03	3E+03	2E+03
4FDO119	1,132	4,655	123	49	20	733	2.7	0.7	9.3	2,494	4E+03	4E+03	4E+03
5CSDO110	623	2,071	110	781	30	841	5.0	0.8	2.5	1,052	5E+03	3E+03	5E+03
5EDO182	87	386	29	378	6	279	1.7	0.3	0.7	187	6E+02	4E+02	3E+02
5ESDO184	530	2,255	131	1,496	29	1,241	7.1	1.2	3.1	1,094	3E+03	3E+03	2E+03
5FDO117	639	3,023	121	785	30	1,097	5.0	1.1	3.1	1,429	5E+03	3E+03	3E+03
5FDO254	43	264	7	12	1	80	0.1	0.1	0.3	131	5E+02	3E+02	1E+02
5FDO265	17	34	1	4	0	6	0.0	0.0	0.1	19	2E+01	1E+01	3E+01
5FDO253	517	2,597	78	183	16	711	1.9	0.7	2.4	1,240	5E+03	3E+03	4E+03
5FDO245	1,138	6,632	185	373	25	1,911	3.4	1.9	6.6	3,267	1E+04	7E+03	5E+03
5FDO244	206	1,059	29	59	4	270	0.6	0.3	1.4	528	2E+03	1E+03	8E+02
5FDO264	15	43	2	6	0	8	0.0	0.0	0.1	18	2E+02	3E+02	3E+02
5GDO112	739	4,366	115	177	15	1,396	2.0	1.4	4.8	2,128	8E+03	5E+03	3E+03
5GDO116A	601	3,234	101	466	14	1,055	2.6	1.1	3.2	1,611	5E+03	3E+03	2E+03
5GDO115	212	1,289	35	40	5	342	0.6	0.3	1.3	630	2E+03	1E+03	1E+03
5GDO116	612	3,465	94	134	16	930	1.8	0.9	3.2	1,672	6E+03	4E+03	3E+03
6DDO57	113	409	20	202	6	177	1.1	0.2	0.5	195	6E+02	7E+02	8E+02
6DDO184	14	32	13	236	3	121	1.0	0.1	0.2	13	3E+01	3E+01	7E+01
6DDO91	24	51	27	521	6	264	2.2	0.3	0.5	23	3E+01	6E+01	1E+02
6DDO187	63	190	9	58	2	56	0.4	0.1	0.3	80	6E+02	8E+02	9E+02
6DDO86	17	57	6	78	2	49	0.4	0.0	0.1	26	8E+01	6E+01	9E+01
6DDO85	64	371	12	48	3	117	0.4	0.1	0.4	178	6E+02	4E+02	3E+02
6DDO83	178	829	38	294	10	329	1.8	0.3	0.9	385	1E+03	9E+02	1E+03
6DDO84	18	93	4	18	1	31	0.1	0.0	0.1	44	2E+02	9E+01	9E+01
06D097	162	739	26	130	7	230	1.0	0.2	0.7	350	1E+03	8E+02	1E+03
6GDO109	1,209	6,456	182	288	38	1,779	4.2	1.8	5.7	3,081	1E+04	7E+03	8E+03
6GDO110	1,414	8,076	229	407	40	2,259	4.8	2.3	7.2	3,904	1E+04	9E+03	7E+03
6GDO111	216	894	54	616	13	505	3.0	0.5	1.3	424	1E+03	8E+02	8E+02
6GDO166	122	419	38	554	9	360	2.5	0.4	0.8	201	6E+02	3E+02	5E+02
6GDO108	3,980	22,862	632	999	102	6,361	12.2	6.4	20.8	11,075	4E+04	3E+04	2E+04
6G165	22	86	5	54	1	46	0.2	0.0	0.1	43	1E+02	1E+02	6E+01
6HDO43	74	353	13	66	4	112	0.5	0.1	0.3	163	6E+02	3E+02	4E+02
6HDO106	179	784	29	184	7	270	1.1	0.3	0.8	381	1E+03	7E+02	6E+02

Table C2-28. Scenario 8 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	502	2,607	85	415	15	839	2.6	0.8	2.6	1,272	4E+03	3E+03	2E+03
7CDO006	4,714	20,995	906	7,834	182	8,914	39.5	8.9	25.7	10,332	4E+04	3E+04	3E+04
7HDO285	5,223	24,787	791	2,471	199	7,140	24.6	7.1	25.3	11,809	5E+04	3E+04	4E+04
7HDO105	7,081	35,171	1,260	6,695	277	11,824	44.6	11.8	35.6	16,843	7E+04	4E+04	6E+04
7HDO348	39	258	7	10	0	75	0.1	0.1	0.2	129	5E+02	3E+02	2E+02
7HDO347	278	1,389	46	205	10	431	1.5	0.4	1.3	667	2E+03	2E+03	2E+03
7HDO346	271	1,689	45	71	5	476	0.7	0.5	1.5	826	3E+03	2E+03	1E+03
8BDO122	1,221	6,742	174	316	26	2,605	3.4	2.6	9.6	3,225	1E+04	8E+03	6E+03
8BDO66	1	3	0	3	0	3	0.0	0.0	0.0	1	3E-01	6E-01	6E-01
8BDO126	702	4,415	114	141	10	1,276	1.4	1.3	4.2	2,183	8E+03	5E+03	3E+03
8CDO25	152	484	39	488	9	355	2.3	0.4	0.9	251	1E+03	9E+02	2E+03
8CDO26	139	471	35	419	8	326	2.0	0.3	0.9	248	1E+03	8E+02	1E+03
8DDO112	31	183	5	8	1	48	0.1	0.0	0.2	88	3E+02	3E+02	3E+02
8DSDO100	66	201	14	177	3	118	0.8	0.1	0.4	98	4E+02	9E+02	9E+02
8EDO35	109	290	29	458	8	262	2.0	0.3	0.6	143	3E+02	1E+03	2E+03
8EDO33	360	2,176	66	256	8	697	1.5	0.7	2.1	1,072	4E+03	2E+03	2E+03
8IDO153	29	188	5	5	0	52	0.0	0.1	0.2	93	3E+02	2E+02	1E+02
8IDO155	20	71	4	59	1	43	0.3	0.0	0.1	36	1E+02	2E+02	2E+02
8IDO156	290	629	46	595	18	341	3.3	0.3	0.7	268	5E+02	9E+01	8E+02
8IDO209	80	488	13	19	1	137	0.2	0.1	0.4	241	9E+02	6E+02	4E+02
8IDO154	662	3,496	105	301	20	1,074	2.7	1.1	3.5	1,671	6E+03	5E+03	4E+03
8IDO158	314	1,833	52	138	8	619	1.1	0.6	2.1	896	3E+03	2E+03	2E+03
8IDO207	60	313	12	78	2	114	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	986	6,068	161	243	21	1,925	2.8	1.9	6.8	2,940	1E+04	7E+03	4E+03
8JSDO103	757	4,347	128	332	20	1,277	2.8	1.3	4.1	2,119	8E+03	5E+03	3E+03
8JSDO41	419	2,571	70	117	9	781	1.2	0.8	2.6	1,251	4E+03	3E+03	2E+03
8JSDO50	1,013	5,120	152	434	34	1,716	4.3	1.7	5.8	2,430	8E+03	6E+03	6E+03
8K049	133	763	23	65	4	222	0.6	0.2	0.7	365	1E+03	9E+02	7E+02
9BDO49	268	713	28	156	6	149	0.9	0.1	1.2	325	2E+03	5E+03	5E+03
9EDO229	48	226	7	24	2	63	0.2	0.1	0.2	107	4E+02	2E+02	2E+02
9EDO243	141	467	21	190	6	174	1.1	0.2	0.5	223	8E+02	1E+03	1E+03
9K100	43	112	7	67	2	45	0.3	0.0	0.2	46	4E+02	7E+02	8E+02
9K101	516	1,773	91	897	24	775	4.7	0.8	2.3	835	3E+03	4E+03	5E+03
9K016	55	158	28	464	7	253	2.1	0.3	0.6	69	2E+02	3E+02	4E+02
9LSDO095	181	659	34	343	6	304	1.6	0.3	1.0	319	2E+03	1E+03	2E+03
10BSDO62	27	49	1	1	1	4	0.0	0.0	0.1	26	7E+00	4E-01	1E+01
10BSDO15	29	70	2	12	1	14	0.1	0.0	0.2	36	1E+02	3E+02	4E+02
10BSDO64	100	276	13	93	4	101	0.6	0.1	0.6	191	4E+02	4E+02	6E+02
10L094	10,817	57,996	1,683	4,763	275	17,424	38.6	17.4	59.3	28,219	1E+05	7E+04	6E+04
10L096	1,190	6,997	197	290	25	1,937	3.2	1.9	7.0	3,342	1E+04	1E+04	1E+04
11BDO28	9,869	40,874	2,115	22,032	437	20,011	104.5	20.0	55.6	20,003	7E+04	6E+04	6E+04
11BDO123	2,060	10,501	314	786	57	2,949	7.3	2.9	9.8	5,057	2E+04	1E+04	2E+04
11IDO577	29,527	144,476	4,913	13,382	1,553	42,351	177.7	42.4	135.9	65,161	3E+05	1E+05	2E+05
11M093	915	3,310	144	771	31	1,125	5.1	1.1	4.2	1,761	7E+03	5E+03	6E+03
12BDO10	10	23	2	19	0	13	0.1	0.0	0.1	10	7E+01	1E+02	1E+02
12BDO14	23	54	4	42	1	27	0.2	0.0	0.1	24	2E+02	3E+02	3E+02
12BDO124	6,137	30,556	1,075	6,335	183	10,626	35.1	10.6	32.2	15,021	6E+04	4E+04	4E+04
12EDO418	171	729	27	87	3	212	0.5	0.2	0.7	389	1E+03	1E+03	8E+02

Table C2-28. Scenario 8 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	115	534	17	86	3	167	0.5	0.2	0.5	265	8E+02	8E+02	6E+02
12HOFDO92	838	2,288	391	2,912	106	3,211	23.4	3.2	11.0	2,077	3E+03	6E+03	8E+03
12HDO85/87	376	1,102	63	480	14	391	2.7	0.4	2.2	443	4E+03	8E+03	9E+03
12L092	1,836	7,937	274	1,100	74	2,509	9.7	2.5	8.4	3,771	1E+04	8E+03	1E+04
12LDO296	407	1,870	61	279	12	568	1.9	0.6	2.1	924	3E+03	2E+03	1E+03
12M091	282	984	45	290	9	369	1.7	0.4	1.2	530	2E+03	1E+03	2E+03
13DSDO078	1,695	4,849	212	1,526	88	1,449	11.7	1.4	4.0	2,177	7E+03	5E+03	9E+03
13EDO177	46	96	10	164	3	88	0.8	0.1	0.2	46	6E+01	2E+02	3E+02
13EDO174	1,005	5,437	150	418	19	1,619	2.9	1.6	5.1	2,697	9E+03	6E+03	4E+03
13EDO176	31	71	5	78	1	62	0.4	0.1	0.2	35	4E+01	2E+02	2E+02
13FDO95	9	18	2	27	0	15	0.1	0.0	0.0	9	2E+01	1E+02	1E+02
13FDO011	21	39	1	1	0	2	0.0	0.0	0.0	19	2E+01	7E+01	8E+01
13F093	87	219	8	110	3	186	0.6	0.2	0.7	101	3E+02	8E+02	1E+03
13L090	28,271	129,118	4,386	6,249	1,673	31,600	164.8	31.6	108.0	57,041	2E+05	1E+05	2E+05
14CDO9	631	3,585	139	887	26	1,325	5.1	1.3	3.9	1,707	7E+03	5E+03	4E+03
15FSDO288	1,695	8,076	277	1,746	48	2,876	9.3	2.9	8.6	3,996	2E+04	1E+04	1E+04
15L089	11,920	52,999	1,860	5,337	603	14,477	69.1	14.5	50.1	24,471	9E+04	5E+04	8E+04
15L088	5,070	31,967	816	206	84	8,841	9.5	8.8	34.9	15,704	6E+04	4E+04	3E+04
16L097	441	1,312	62	630	17	1,077	3.5	1.1	4.6	546	3E+03	5E+03	5E+03
16LSDO122	7,503	38,243	1,193	2,629	260	10,443	31.5	10.4	40.8	18,019	8E+04	6E+04	6E+04
17M033	4,896	23,979	710	1,925	116	10,075	17.2	10.1	44.3	11,016	6E+04	6E+04	5E+04
18GSDO233	3,935	17,321	511	569	76	4,470	8.7	4.5	22.5	7,760	5E+04	7E+04	7E+04
19GDO043	4,526	29,645	756	369	90	8,694	10.0	8.7	29.5	14,279	6E+04	4E+04	2E+04
19GDO194	384	1,910	61	171	17	650	2.0	0.6	2.2	895	3E+03	3E+03	3E+03
19G199	52	153	2	1	1	1	0.1	0.1	0.7	66	1E+02	5E+02	5E+02
20G163	280	1,118	9	24	7	1,623	0.9	1.6	7.3	428	1E+03	3E+03	4E+03
20L083	206	902	26	11	4	115	0.7	0.1	2.0	488	5E+02	8E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	11	46	2	5	1	12	0.1	0.0	0.0	20	8E+01	5E+01	8E+01
21H048	104	299	4	3	2	2	0.2	0.3	1.2	131	2E+02	2E+02	2E+02
21KSDO069	8,040	45,819	1,229	999	212	14,051	23.3	14.1	56.2	21,554	9E+04	7E+04	6E+04
21M005	132	383	12	44	3	66	0.4	0.1	0.8	205	1E+02	2E+02	2E+02
21M010	807	2,809	77	106	16	395	2.2	0.4	6.6	1,515	1E+03	2E+03	2E+03
21M050	377	1,092	28	39	8	184	0.9	0.2	2.6	585	1E+03	8E+02	3E+03
22CDO384	2,359	8,260	341	1,810	131	2,374	16.4	2.4	7.0	3,666	1E+04	7E+03	1E+04
22LSDO580	1,057	4,118	119	135	21	634	3.1	0.6	11.6	2,299	2E+03	3E+03	4E+03
23GDO132	4,323	9,120	263	2,190	122	3,586	15.7	3.6	15.3	4,239	7E+03	8E+03	1E+04
23HSDO042	16,865	72,562	2,574	5,111	863	23,751	97.7	23.8	92.7	33,327	1E+05	9E+04	1E+05
23HDO040	2,576	15,410	399	327	59	4,400	6.6	4.4	16.6	7,294	3E+04	2E+04	2E+04
23L196	121	245	7	43	4	86	0.4	0.1	0.6	123	1E+02	4E+01	2E+02
23L075	580	1,433	46	231	17	278	2.1	0.3	3.2	759	1E+03	6E+02	3E+03
23L074	117	254	7	29	3	38	0.3	0.0	0.4	133	8E+01	5E+01	1E+02
23L195	128	245	9	80	4	70	0.5	0.1	0.7	132	2E+02	5E+01	3E+02
23L202	129	250	7	42	3	51	0.3	0.1	0.6	136	3E+02	5E+01	6E+02
23L016	99	199	6	41	3	43	0.3	0.0	0.5	109	4E+02	7E+01	7E+02
23L015	163	281	11	132	5	90	0.7	0.1	0.5	141	3E+01	5E+01	5E+01
23L164	758	1,897	65	121	20	295	1.9	0.3	4.3	867	6E+03	8E+03	1E+04
24CSDO031	236	1,452	39	58	4	424	0.5	0.4	1.4	727	3E+03	2E+03	1E+03

Table C2-28. Scenario 8 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,344	6,765	233	1,102	41	2,224	7.0	2.2	7.3	3,295	1E+04	1E+04	1E+04
24DSDO150	28	64	2	24	1	17	0.1	0.0	0.1	35	6E+01	4E+02	4E+02
24DSDO032	17,086	91,198	3,222	8,576	698	30,292	90.5	30.3	99.4	49,023	2E+05	1E+05	1E+05
24GSDO035	21,363	123,239	3,219	4,470	388	36,288	49.8	36.3	133.0	59,789	2E+05	2E+05	1E+05
24GSDO034	1,504	5,645	155	944	38	2,417	5.9	2.4	10.5	2,766	9E+03	2E+04	2E+04
24L233	397	1,190	32	98	22	1,022	2.3	1.0	4.7	453	1E+03	8E+02	3E+03
25DDO040	464	2,276	69	216	11	847	1.7	0.8	3.6	1,100	4E+03	3E+03	3E+03
25EDO037	10,883	55,917	1,561	3,611	247	17,387	33.5	17.4	70.2	27,007	1E+05	8E+04	7E+04
25GDO041	66	222	9	31	6	188	0.6	0.2	0.8	75	3E+02	1E+02	5E+02
25GDO-06	246	701	18	218	9	921	1.5	0.9	4.0	290	4E+02	5E+02	6E+02
26J049	6,895	19,254	745	702	499	4,941	44.2	4.9	26.8	7,322	3E+04	1E+04	6E+04
25L144	513	3,447	86	11	13	918	1.3	0.9	3.1	1,603	7E+03	4E+03	3E+03
25L058	3,964	21,135	555	535	81	5,931	9.2	5.9	24.9	9,958	5E+04	4E+04	4E+04
26FDO038	75	204	15	128	7	105	1.0	0.1	0.3	71	4E+02	1E+02	7E+02
26GSDO01	3,352	14,661	447	1,942	120	6,867	16.5	6.9	26.4	6,830	2E+04	2E+04	2E+04
26JSDO052	33	62	4	67	1	51	0.3	0.1	0.1	30	7E+00	1E+01	1E+01
26JSDO100	149	403	22	83	14	81	1.5	0.1	0.2	137	7E+02	1E+02	1E+03
26J101	407	1,006	64	515	33	378	4.3	0.4	1.1	375	2E+03	6E+02	3E+03
26KSDO254	291	1,006	39	120	4	220	0.9	0.2	2.3	444	4E+03	6E+03	7E+03
26K035	180	385	11	37	5	76	0.5	0.1	1.1	209	5E+02	8E+01	9E+02
26K099	11,369	73,399	1,775	859	156	21,547	19.0	21.5	79.5	35,120	2E+05	1E+05	7E+04
26L055	162	935	26	13	6	230	0.6	0.2	0.7	431	2E+03	1E+03	9E+02
26LSDO084	67	197	10	17	7	25	0.6	0.0	0.1	68	3E+02	4E+02	9E+02
26L070	186	319	5	26	3	24	0.3	0.0	0.1	160	8E+01	2E+01	2E+02
27JSDO044	348	693	29	372	12	458	2.0	0.5	2.0	327	3E+02	5E+02	5E+02
27JSDO096	1,992	3,993	92	347	53	617	4.5	0.6	4.6	1,983	2E+03	4E+03	5E+03
27JSDO001	7,161	41,469	1,055	1,559	125	12,743	17.2	12.7	51.5	19,651	9E+04	6E+04	5E+04
27L022	1,980	11,890	288	301	41	4,647	5.0	4.6	17.4	5,597	2E+04	2E+04	1E+04
27L020	1,867	11,104	269	299	40	4,325	4.9	4.3	16.2	5,202	2E+04	1E+04	1E+04
28K061	4,001	25,948	669	389	62	7,239	7.5	7.2	25.4	12,463	6E+04	4E+04	3E+04
28K010	3,462	23,891	591	259	46	6,690	5.7	6.7	22.5	11,552	5E+04	3E+04	2E+04
28K386	584	1,451	54	397	16	536	2.5	0.5	3.5	708	2E+03	3E+03	3E+03
28L073	68	204	9	75	4	51	0.6	0.1	0.1	92	3E+02	2E+03	2E+03
28L074/5/6	1,157	3,454	108	728	49	2,067	6.3	2.1	8.5	1,522	4E+03	6E+03	9E+03
28N156	259	1,432	43	118	5	421	0.8	0.4	1.5	696	3E+03	2E+03	2E+03
28N207	2,849	17,314	458	470	60	5,320	7.3	5.3	18.9	8,275	3E+04	2E+04	2E+04
28O025	44	203	8	21	1	56	0.2	0.1	0.2	103	6E+02	5E+02	5E+02
28P001	261	1,715	44	27	4	472	0.5	0.5	1.5	841	3E+03	2E+03	1E+03
29J129	142	261	13	153	5	98	0.8	0.1	0.5	127	2E+02	3E+02	3E+02
29J029	313	816	37	192	6	190	1.1	0.2	1.7	338	3E+03	5E+03	6E+03
29J212	15,623	100,898	2,495	1,153	232	29,388	28.4	29.4	111.8	48,443	2E+05	1E+05	1E+05
29M049	1,107	6,039	172	193	34	1,698	3.7	1.7	6.3	2,784	1E+04	1E+04	9E+03
29N015	114	517	16	32	2	81	0.5	0.1	1.2	285	3E+02	5E+02	5E+02
29N135	367	2,044	57	153	7	598	1.1	0.6	2.4	1,013	3E+03	2E+03	1E+03
29O001	9,877	60,590	1,664	2,423	218	17,475	28.1	17.5	60.0	29,373	1E+05	8E+04	5E+04
29P015	65	433	12	13	1	123	0.2	0.1	0.4	213	8E+02	5E+02	3E+02
29P044	534	3,577	94	83	9	1,002	1.2	1.0	3.2	1,750	7E+03	4E+03	2E+03
30J006	201	594	24	186	8	153	1.2	0.2	1.0	297	7E+02	3E+03	3E+03

Table C2-28. Scenario 8 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	52	137	7	96	2	108	0.5	0.1	0.4	68	9E+01	5E+02	5E+02
30J030	594	1,285	35	192	15	226	1.7	0.2	2.4	669	5E+02	5E+02	8E+02
30P107	278	1,437	54	107	6	381	0.9	0.4	1.3	733	3E+03	2E+03	1E+03
30P062	236	1,535	41	54	4	442	0.6	0.4	1.4	763	3E+03	2E+03	1E+03
31O004	890	5,340	192	156	17	1,254	2.2	1.3	4.2	2,632	1E+04	9E+03	6E+03
31P084	271	1,693	45	81	4	489	0.6	0.5	1.7	840	3E+03	2E+03	1E+03
3FDO159	259	1,043	53	502	14	468	2.7	0.5	1.3	497	2E+03	1E+03	1E+03
11G318/319	276	745	64	745	12	459	3.4	0.5	1.9	304	3E+03	5E+03	5E+03
6FSDO233	6	13	5	89	1	46	0.4	0.0	0.1	7	8E+00	1E+01	1E+01
17FDO012	2,261	4,984	114	66	45	66	2.9	0.7	5.1	2,318	2E+04	4E+04	5E+04
21H047	458	1,773	32	83	14	1,521	1.6	1.5	6.5	740	2E+03	2E+03	2E+03
21H039	1,383	4,397	63	338	42	5,275	5.0	5.3	23.0	1,750	3E+03	4E+03	5E+03
20G161	2,322	9,796	281	226	62	4,686	6.8	4.7	19.9	4,489	2E+04	2E+04	2E+04
StonyMWRA	98,253	446,363	16,674	70,937	4,533	164,245	646.0	164.2	544.5	213,114	8E+05	5E+05	6E+05
Fens	67,439	211,864	11,045	17,821	4,511	2,018	526.9	89.8	270.7	106,189	3E+05	2E+05	2E+05
20D055	4,645	29,388	801	498	113	8,385	12.2	8.4	27.6	14,279	5E+04	3E+04	2E+04
21D319	6,523	42,696	1,141	869	138	12,162	16.0	12.2	39.8	20,804	8E+04	5E+04	3E+04

Table C2-29. Scenario 9 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	818	3,166	124	947	27	16	5.2	1.1	4.4	1,603	4E+03	3E+03	3E+03
1FDO31	653	2,955	85	212	17	14	2.1	0.8	2.8	1,434	5E+03	4E+03	4E+03
02E086	206	800	37	335	10	4	1.8	0.3	1.0	381	1E+03	9E+02	1E+03
2FDO120	1,102	5,286	165	622	30	24	4.7	1.5	6.3	2,618	9E+03	6E+03	6E+03
2FDO93	1,333	9,370	231	116	17	31	2.2	2.6	8.5	4,562	2E+04	1E+04	7E+03
2FDO85	80	354	11	49	3	1	0.4	0.1	0.3	172	5E+02	4E+02	3E+02
3ESDO186	252	1,063	56	573	13	6	2.9	0.5	1.4	511	2E+03	1E+03	1E+03
3ESDO185	472	2,031	85	370	14	10	2.4	0.7	2.1	1,058	4E+03	3E+03	2E+03
3F162	434	1,963	81	511	24	9	3.6	0.7	1.9	910	3E+03	2E+03	2E+03
4ESDO69	1,292	5,806	205	1,010	39	29	6.6	2.0	6.9	2,894	1E+04	7E+03	7E+03
4ESDO64	31	96	7	93	2	1	0.5	0.1	0.2	44	1E+02	2E+02	2E+02
4FDO189	570	2,998	88	186	18	11	2.2	0.8	2.9	1,447	5E+03	3E+03	3E+03
4FDO204	721	3,497	120	521	30	14	4.2	1.1	3.2	1,660	6E+03	3E+03	4E+03
4FDO16	329	1,809	53	91	10	8	1.2	0.5	1.7	866	3E+03	2E+03	2E+03
4FDO203	102	414	20	189	6	2	1.1	0.2	0.5	195	6E+02	5E+02	5E+02
4FDO118	453	2,492	68	123	9	11	1.2	0.7	2.4	1,223	4E+03	3E+03	2E+03
4FDO119	1,102	4,549	121	50	19	32	2.6	0.7	9.2	2,439	4E+03	4E+03	4E+03
5CSDO110	595	1,961	107	784	29	17	5.0	0.8	2.4	991	5E+03	3E+03	5E+03
5EDO182	82	361	28	379	6	3	1.7	0.3	0.7	175	5E+02	3E+02	3E+02
5ESDO184	506	2,126	128	1,499	29	12	7.1	1.2	3.0	1,030	3E+03	2E+03	2E+03
5FDO117	607	2,824	116	787	30	13	5.0	1.0	2.9	1,329	5E+03	3E+03	3E+03
5FDO254	40	243	6	12	1	1	0.1	0.1	0.3	121	4E+02	3E+02	1E+02
5FDO265	16	32	1	5	0	0	0.0	0.0	0.1	18	2E+01	1E+01	3E+01
5FDO253	491	2,435	74	185	16	13	1.9	0.7	2.3	1,160	5E+03	3E+03	4E+03
5FDO245	1,080	6,256	176	376	25	22	3.4	1.8	6.2	3,079	1E+04	7E+03	5E+03
5FDO244	200	1,026	28	60	4	4	0.6	0.3	1.4	511	2E+03	1E+03	8E+02
5FDO264	15	41	2	6	0	1	0.0	0.0	0.1	17	2E+02	3E+02	3E+02
5GDO112	694	4,054	108	179	15	16	1.9	1.3	4.5	1,975	7E+03	4E+03	3E+03
5GDO116A	559	2,964	94	469	13	11	2.6	1.0	3.0	1,476	5E+03	3E+03	2E+03
5GDO115	205	1,242	34	41	5	5	0.6	0.3	1.3	606	2E+03	1E+03	9E+02
5GDO116	586	3,295	90	135	16	11	1.8	0.9	3.0	1,587	6E+03	3E+03	3E+03
6DDO57	108	384	20	203	6	2	1.1	0.2	0.4	183	5E+02	6E+02	7E+02
6DDO184	15	35	13	236	3	1	1.0	0.1	0.2	15	3E+01	4E+01	8E+01
6DDO91	27	57	27	520	6	2	2.2	0.3	0.5	26	4E+01	8E+01	1E+02
6DDO187	60	178	9	59	2	4	0.4	0.1	0.3	75	6E+02	8E+02	9E+02
6DDO86	19	69	6	78	2	1	0.4	0.1	0.1	32	1E+02	8E+01	1E+02
6DDO85	73	433	14	48	3	2	0.4	0.1	0.4	209	8E+02	4E+02	3E+02
6DDO83	180	844	39	294	10	4	1.8	0.3	0.9	393	1E+03	9E+02	1E+03
6DDO84	20	113	4	18	1	0	0.1	0.0	0.1	54	2E+02	1E+02	1E+02
06D097	194	939	31	128	7	4	1.0	0.3	0.8	451	2E+03	1E+03	1E+03
6GDO109	1,157	6,131	175	291	37	23	4.1	1.7	5.4	2,921	1E+04	6E+03	8E+03
6GDO110	1,333	7,525	216	412	39	27	4.7	2.1	6.7	3,630	1E+04	8E+03	7E+03
6GDO111	205	837	53	617	13	5	3.0	0.5	1.2	395	1E+03	7E+02	8E+02
6GDO166	117	394	37	555	9	3	2.5	0.4	0.8	188	6E+02	3E+02	5E+02
6GDO108	3,787	21,598	602	1,008	99	81	12.0	6.0	19.7	10,457	4E+04	2E+04	2E+04
6G165	21	80	4	55	1	0	0.2	0.0	0.1	40	1E+02	9E+01	6E+01
6HDO43	72	341	13	66	4	2	0.5	0.1	0.3	157	6E+02	3E+02	4E+02
6HDO106	171	739	28	185	7	3	1.1	0.3	0.7	358	1E+03	7E+02	6E+02

Table C2-29. Scenario 9 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	495	2,573	84	417	15	10	2.6	0.8	2.6	1,255	4E+03	3E+03	2E+03
7CDO006	4,446	19,518	872	7,863	179	100	39.4	8.5	24.3	9,590	4E+04	3E+04	3E+04
7HDO285	5,026	23,604	763	2,483	197	100	24.5	6.8	24.1	11,222	4E+04	3E+04	4E+04
7HDO105	6,695	32,827	1,205	6,725	273	153	44.3	11.2	33.5	15,682	7E+04	4E+04	5E+04
7HDO348	37	242	6	10	0	1	0.1	0.1	0.2	121	4E+02	3E+02	2E+02
7HDO347	268	1,323	45	206	10	5	1.5	0.4	1.2	634	2E+03	2E+03	2E+03
7HDO346	263	1,636	44	72	5	6	0.7	0.5	1.5	800	3E+03	2E+03	1E+03
8BDO122	1,154	6,325	164	321	25	29	3.3	2.5	9.0	3,025	1E+04	7E+03	6E+03
8BDO66	1	3	0	3	0	0	0.0	0.0	0.0	1	3E-01	5E-01	5E-01
8BDO126	663	4,142	108	142	10	14	1.4	1.2	4.0	2,048	7E+03	5E+03	3E+03
8CDO25	144	453	38	490	9	4	2.3	0.3	0.9	234	1E+03	8E+02	1E+03
8CDO26	131	439	35	420	8	4	2.0	0.3	0.8	230	1E+03	7E+02	1E+03
8DDO112	30	179	5	8	1	1	0.1	0.0	0.2	86	3E+02	3E+02	3E+02
8DSDO100	62	188	13	178	3	3	0.8	0.1	0.3	92	4E+02	8E+02	8E+02
8EDO35	104	275	29	459	8	2	2.0	0.3	0.6	135	3E+02	1E+03	1E+03
8EDO33	338	2,021	63	257	8	7	1.5	0.7	2.0	996	4E+03	2E+03	1E+03
8IDO153	28	177	4	5	0	1	0.0	0.0	0.2	87	3E+02	2E+02	1E+02
8IDO155	19	66	4	59	1	0	0.3	0.0	0.1	34	9E+01	2E+02	2E+02
8IDO156	282	613	46	597	18	4	3.3	0.3	0.7	260	5E+02	9E+01	8E+02
8IDO209	76	465	12	19	1	2	0.2	0.1	0.4	230	8E+02	6E+02	3E+02
8IDO154	623	3,244	99	304	20	15	2.7	1.0	3.3	1,547	6E+03	4E+03	4E+03
8IDO158	296	1,710	49	139	8	7	1.1	0.6	2.0	835	3E+03	2E+03	1E+03
8IDO207	60	314	12	78	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	941	5,755	154	244	21	21	2.7	1.8	6.4	2,785	1E+04	6E+03	4E+03
8JSDO103	715	4,061	121	334	20	15	2.8	1.2	3.8	1,978	7E+03	4E+03	3E+03
8JSDO41	393	2,385	66	118	9	9	1.2	0.7	2.4	1,159	4E+03	3E+03	2E+03
8JSDO50	963	4,818	146	438	34	21	4.3	1.6	5.4	2,281	8E+03	6E+03	6E+03
8K049	126	710	22	66	4	3	0.6	0.2	0.6	339	1E+03	8E+02	7E+02
9BDO49	253	668	27	159	6	15	0.9	0.1	1.1	305	2E+03	4E+03	5E+03
9EDO229	45	211	7	24	2	1	0.2	0.1	0.2	100	3E+02	2E+02	2E+02
9EDO243	135	440	21	191	6	3	1.1	0.2	0.5	209	8E+02	1E+03	1E+03
9K100	41	106	7	68	2	3	0.3	0.0	0.2	44	4E+02	6E+02	7E+02
9K101	491	1,664	89	901	24	15	4.7	0.8	2.2	782	3E+03	4E+03	4E+03
9K016	53	151	28	465	7	3	2.1	0.3	0.5	66	2E+02	3E+02	4E+02
9LSDO095	172	616	33	344	6	7	1.6	0.3	0.9	298	2E+03	1E+03	2E+03
10BSDO62	26	48	1	1	1	0	0.0	0.0	0.1	25	7E+00	4E-01	1E+01
10BSDO15	28	67	2	12	1	1	0.1	0.0	0.1	34	1E+02	3E+02	3E+02
10BSDO64	95	260	13	94	4	2	0.6	0.1	0.5	180	4E+02	4E+02	5E+02
10L094	10,141	53,734	1,584	4,805	268	217	38.1	16.3	55.1	26,125	1E+05	6E+04	6E+04
10L096	1,118	6,516	186	292	24	41	3.2	1.8	6.6	3,109	1E+04	1E+04	9E+03
11BDO28	9,171	36,729	2,018	22,090	430	269	104.1	19.0	51.9	17,938	6E+04	5E+04	5E+04
11BDO123	1,949	9,833	298	794	55	49	7.2	2.8	9.2	4,731	2E+04	1E+04	2E+04
11IDO577	28,329	137,054	4,741	13,456	1,536	672	176.3	40.2	128.5	61,560	3E+05	1E+05	2E+05
11M093	876	3,157	139	776	31	17	5.1	1.1	4.0	1,676	7E+03	4E+03	6E+03
12BDO10	9	22	2	20	0	1	0.1	0.0	0.1	10	6E+01	1E+02	1E+02
12BDO14	22	51	4	42	1	1	0.2	0.0	0.1	23	1E+02	3E+02	3E+02
12BDO124	5,484	26,632	983	6,393	176	129	34.6	9.6	28.7	13,073	5E+04	3E+04	3E+04
12EDO418	161	678	25	88	3	3	0.5	0.2	0.6	362	1E+03	1E+03	7E+02

Table C2-29. Scenario 9 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	109	496	16	87	3	2	0.5	0.2	0.5	246	8E+02	7E+02	5E+02
12HOFDO92	807	2,195	384	2,919	105	103	23.4	3.2	10.6	1,980	3E+03	6E+03	7E+03
12HDO85/87	358	1,044	61	482	14	32	2.7	0.4	2.1	419	4E+03	7E+03	8E+03
12L092	1,750	7,474	263	1,108	73	34	9.6	2.4	7.9	3,540	1E+04	7E+03	1E+04
12LDO296	389	1,773	59	281	12	7	1.9	0.5	2.0	875	3E+03	2E+03	1E+03
12M091	269	927	44	292	9	5	1.7	0.4	1.1	499	2E+03	1E+03	2E+03
13DSDO078	1,676	4,737	210	1,528	88	26	11.7	1.4	3.9	2,122	6E+03	5E+03	9E+03
13EDO177	44	93	10	165	3	1	0.8	0.1	0.2	44	6E+01	2E+02	3E+02
13EDO174	949	5,080	142	422	19	17	2.9	1.5	4.8	2,520	8E+03	6E+03	4E+03
13EDO176	30	67	5	78	1	1	0.4	0.1	0.2	33	4E+01	2E+02	2E+02
13FDO95	8	17	2	27	0	0	0.1	0.0	0.0	9	2E+01	9E+01	9E+01
13FDO011	20	37	1	1	0	0	0.0	0.0	0.0	19	1E+01	7E+01	7E+01
13F093	83	206	8	111	3	2	0.6	0.2	0.7	96	3E+02	8E+02	1E+03
13L090	27,205	122,577	4,228	6,310	1,654	595	163.2	29.9	101.6	53,888	2E+05	1E+05	2E+05
14CDO9	603	3,403	135	888	26	18	5.1	1.3	3.7	1,619	6E+03	4E+03	4E+03
15FSDO288	1,631	7,672	268	1,754	47	30	9.3	2.8	8.2	3,793	2E+04	1E+04	1E+04
15L089	11,552	51,103	1,814	5,396	596	256	68.6	14.0	48.3	23,538	9E+04	5E+04	8E+04
15L088	4,799	30,358	775	195	78	130	8.9	8.4	33.3	14,933	6E+04	4E+04	3E+04
16L097	418	1,235	61	633	17	25	3.5	1.0	4.3	514	3E+03	5E+03	5E+03
16LSDO122	7,314	37,214	1,170	2,646	257	240	31.3	10.2	39.9	17,519	7E+04	5E+04	6E+04
17M033	4,765	23,340	695	1,938	115	248	17.1	9.8	43.1	10,722	5E+04	5E+04	5E+04
18GSDO233	3,803	16,645	495	573	74	250	8.6	4.3	21.8	7,444	5E+04	6E+04	6E+04
19GDO043	4,412	28,888	739	374	89	104	9.9	8.5	28.7	13,919	6E+04	3E+04	2E+04
19GDO194	373	1,837	60	172	17	8	2.0	0.6	2.1	859	3E+03	3E+03	3E+03
19G199	50	147	1	1	1	1	0.1	0.1	0.6	64	1E+02	5E+02	5E+02
20G163	272	1,087	8	25	7	13	0.9	1.6	7.1	416	1E+03	3E+03	4E+03
20L083	204	894	26	11	4	8	0.7	0.1	2.0	484	5E+02	8E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	10	43	2	5	1	0	0.1	0.0	0.0	19	7E+01	4E+01	7E+01
21H048	99	283	4	3	2	2	0.2	0.3	1.1	124	2E+02	2E+02	2E+02
21KSDO069	7,848	44,658	1,204	1,012	210	250	23.1	13.7	54.9	21,003	9E+04	6E+04	6E+04
21M005	128	373	11	45	3	3	0.4	0.1	0.8	200	1E+02	2E+02	2E+02
21M010	784	2,743	76	113	16	21	2.2	0.4	6.5	1,481	1E+03	2E+03	2E+03
21M050	365	1,059	27	42	8	7	0.9	0.2	2.5	567	1E+03	8E+02	3E+03
22CDO384	2,327	8,040	336	1,811	131	46	16.4	2.3	6.8	3,560	1E+04	7E+03	1E+04
22LSDO580	1,028	4,031	118	144	20	31	3.1	0.6	11.4	2,253	2E+03	3E+03	4E+03
23GDO132	4,287	9,024	262	2,199	121	57	15.7	3.5	14.9	4,196	6E+03	8E+03	1E+04
23HSDO042	16,564	71,077	2,542	5,150	859	503	97.4	23.3	90.7	32,614	1E+05	9E+04	1E+05
23HDO040	2,521	15,080	392	331	58	71	6.5	4.3	16.2	7,137	3E+04	2E+04	2E+04
23L196	117	238	7	44	3	1	0.4	0.1	0.6	120	1E+02	4E+01	2E+02
23L075	569	1,407	45	234	17	7	2.1	0.3	3.1	744	1E+03	6E+02	3E+03
23L074	114	247	7	31	3	1	0.3	0.0	0.4	129	8E+01	5E+01	1E+02
23L195	125	239	9	81	4	1	0.5	0.1	0.7	129	2E+02	5E+01	3E+02
23L202	125	243	7	43	3	0	0.3	0.1	0.6	132	3E+02	5E+01	6E+02
23L016	96	193	6	42	3	0	0.3	0.0	0.5	106	4E+02	7E+01	7E+02
23L015	164	282	11	131	5	1	0.7	0.1	0.5	142	3E+01	5E+01	6E+01
23L164	732	1,834	63	125	19	37	1.9	0.3	4.1	838	6E+03	8E+03	1E+04
24CSDO031	225	1,376	37	59	4	5	0.5	0.4	1.4	689	3E+03	2E+03	1E+03

Table C2-29. Scenario 9 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,265	6,279	221	1,107	40	36	6.9	2.1	6.8	3,053	1E+04	1E+04	1E+04
24DSDO150	27	62	2	25	1	0	0.1	0.0	0.1	33	5E+01	4E+02	4E+02
24DSDO032	16,189	85,539	3,074	8,635	686	418	89.6	28.6	93.7	45,974	2E+05	9E+04	1E+05
24GSDO035	20,731	119,344	3,131	4,511	381	546	49.2	35.2	129.1	57,901	2E+05	2E+05	1E+05
24GSDO034	1,459	5,455	151	952	37	23	5.8	2.4	10.3	2,672	9E+03	2E+04	2E+04
24L233	389	1,172	32	100	22	11	2.3	1.0	4.6	445	1E+03	8E+02	3E+03
25DDO040	445	2,173	66	218	11	14	1.7	0.8	3.5	1,050	4E+03	3E+03	3E+03
25EDO037	10,281	52,470	1,483	3,664	240	286	33.0	16.4	65.8	25,331	1E+05	7E+04	6E+04
25GDO041	65	216	9	31	6	2	0.6	0.2	0.7	73	3E+02	1E+02	5E+02
25GDO-06	249	717	18	218	9	8	1.5	1.0	4.2	295	4E+02	5E+02	6E+02
26J049	6,754	18,842	729	704	487	139	43.2	4.8	26.4	7,178	3E+04	1E+04	6E+04
25L144	505	3,384	84	12	13	12	1.3	0.9	3.0	1,574	7E+03	4E+03	3E+03
25L058	3,862	20,569	542	543	80	138	9.1	5.8	24.2	9,686	5E+04	4E+04	4E+04
26FDO038	80	216	15	127	8	2	1.0	0.1	0.3	77	4E+02	1E+02	7E+02
26GSDO01	3,283	14,190	437	1,947	119	80	16.5	6.7	25.9	6,594	2E+04	1E+04	2E+04
26JSDO052	32	59	4	68	1	0	0.3	0.0	0.1	29	6E+00	1E+01	1E+01
26JSDO100	147	400	22	83	14	3	1.5	0.1	0.2	136	7E+02	1E+02	1E+03
26J101	399	992	64	518	33	9	4.3	0.4	1.0	368	2E+03	6E+02	3E+03
26KSDO254	283	978	39	121	4	28	0.9	0.2	2.2	432	4E+03	6E+03	7E+03
26K035	178	381	11	37	5	1	0.5	0.1	1.1	207	5E+02	8E+01	9E+02
26K099	11,126	71,863	1,745	875	153	323	18.7	21.1	78.0	34,399	2E+05	1E+05	7E+04
26L055	159	917	26	13	6	4	0.6	0.2	0.7	422	2E+03	1E+03	9E+02
26LSDO084	66	195	9	17	7	1	0.6	0.0	0.1	67	3E+02	3E+02	8E+02
26L070	181	310	5	28	3	0	0.3	0.0	0.1	155	8E+01	2E+01	2E+02
27JSDO044	341	680	29	374	11	5	2.0	0.5	2.0	320	3E+02	5E+02	5E+02
27JSDO096	1,975	3,954	91	352	53	13	4.5	0.6	4.6	1,964	2E+03	4E+03	5E+03
27JSDO001	7,028	40,749	1,041	1,570	124	228	17.1	12.5	50.6	19,320	8E+04	6E+04	5E+04
27L022	1,925	11,545	281	304	40	55	5.0	4.5	17.0	5,434	2E+04	2E+04	1E+04
27L020	1,814	10,759	262	302	39	52	4.8	4.2	15.8	5,044	2E+04	1E+04	1E+04
28K061	3,909	25,361	657	394	61	121	7.4	7.1	24.9	12,184	5E+04	4E+04	3E+04
28K010	3,369	23,237	576	261	45	89	5.6	6.5	21.9	11,236	5E+04	3E+04	2E+04
28K386	565	1,408	53	403	16	18	2.5	0.5	3.4	687	2E+03	3E+03	3E+03
28L073	67	200	9	75	4	1	0.6	0.1	0.1	89	3E+02	2E+03	2E+03
28L074/5/6	1,141	3,417	107	733	49	21	6.3	2.0	8.4	1,504	4E+03	6E+03	9E+03
28N156	245	1,350	41	119	5	9	0.8	0.4	1.4	657	3E+03	2E+03	2E+03
28N207	2,762	16,762	445	475	60	82	7.2	5.2	18.4	8,010	3E+04	2E+04	2E+04
28O025	42	195	8	21	1	1	0.2	0.1	0.2	99	6E+02	4E+02	5E+02
28P001	251	1,651	42	27	4	5	0.5	0.5	1.5	810	3E+03	2E+03	1E+03
29J129	137	252	12	154	5	2	0.8	0.1	0.5	123	2E+02	3E+02	3E+02
29J029	303	791	37	194	6	27	1.1	0.2	1.6	327	3E+03	5E+03	6E+03
29J212	15,249	98,400	2,443	1,168	229	462	28.1	28.7	109.3	47,289	2E+05	1E+05	1E+05
29M049	1,077	5,866	168	196	34	37	3.7	1.6	6.1	2,701	1E+04	9E+03	8E+03
29N015	111	505	16	33	2	5	0.5	0.1	1.2	279	3E+02	5E+02	5E+02
29N135	356	1,989	56	155	7	8	1.1	0.6	2.4	986	3E+03	2E+03	1E+03
29O001	9,539	58,393	1,612	2,441	215	243	27.9	16.9	57.9	28,307	1E+05	7E+04	5E+04
29P015	63	415	11	13	1	1	0.2	0.1	0.4	204	8E+02	5E+02	3E+02
29P044	521	3,492	92	84	9	12	1.1	1.0	3.2	1,709	7E+03	4E+03	2E+03
30J006	195	578	24	188	8	5	1.2	0.2	0.9	289	7E+02	3E+03	3E+03

Table C2-29. Scenario 9 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	50	130	7	97	2	1	0.5	0.1	0.4	64	9E+01	4E+02	5E+02
30J030	573	1,243	35	199	15	5	1.7	0.2	2.3	647	5E+02	5E+02	8E+02
30P107	263	1,350	52	108	5	7	0.9	0.4	1.2	690	3E+03	2E+03	1E+03
30P062	223	1,442	39	54	4	5	0.6	0.4	1.3	716	3E+03	2E+03	1E+03
31O004	862	5,173	187	157	16	28	2.2	1.2	4.1	2,551	1E+04	8E+03	6E+03
31P084	263	1,641	44	82	3	6	0.6	0.5	1.6	815	3E+03	2E+03	1E+03
3FDO159	248	983	51	504	14	6	2.7	0.5	1.2	467	1E+03	1E+03	1E+03
11G318/319	262	703	62	747	12	25	3.4	0.5	1.9	287	3E+03	4E+03	5E+03
6FSDO233	6	12	5	89	1	0	0.4	0.0	0.1	6	7E+00	1E+01	1E+01
17FDO012	2,184	4,823	110	64	43	65	2.8	0.7	4.9	2,243	2E+04	4E+04	5E+04
21H047	447	1,736	32	85	14	14	1.6	1.5	6.4	725	2E+03	2E+03	2E+03
21H039	1,368	4,361	63	342	42	45	5.0	5.3	23.0	1,734	3E+03	4E+03	5E+03
20G161	2,267	9,539	274	228	61	90	6.7	4.6	19.4	4,370	2E+04	2E+04	2E+04
StonyMWRA	94,872	427,624	16,211	71,283	4,473	2,555	641.5	158.9	524.3	203,781	7E+05	5E+05	6E+05
Fens	66,587	208,998	10,935	17,850	4,496	1,985	525.7	88.6	266.8	104,426	3E+05	2E+05	2E+05
20D055	4,425	27,815	762	502	112	101	12.1	7.9	26.1	13,500	5E+04	3E+04	2E+04
21D319	6,318	41,271	1,108	877	137	146	15.9	11.8	38.5	20,106	8E+04	5E+04	3E+04

Table C2-30. Scenario 10 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	785	3,012	120	953	26	16	5.2	1.0	4.2	1,524	4E+03	3E+03	2E+03
1FDO31	626	2,813	81	214	17	13	2.0	0.8	2.7	1,363	5E+03	4E+03	3E+03
02E086	197	750	36	337	10	4	1.8	0.3	0.9	356	1E+03	9E+02	9E+02
2FDO120	1,050	5,002	158	628	30	23	4.6	1.4	6.0	2,477	8E+03	6E+03	6E+03
2FDO93	1,293	9,083	225	117	17	30	2.2	2.5	8.2	4,424	2E+04	1E+04	6E+03
2FDO85	78	338	11	52	3	1	0.4	0.1	0.3	164	5E+02	3E+02	3E+02
3ESDO186	240	997	54	575	13	6	2.9	0.5	1.4	478	1E+03	1E+03	9E+02
3ESDO185	451	1,915	82	371	14	9	2.4	0.6	2.0	999	4E+03	2E+03	2E+03
3F162	417	1,861	79	513	23	9	3.6	0.7	1.8	858	3E+03	2E+03	2E+03
4ESDO69	1,234	5,498	197	1,015	38	28	6.5	1.9	6.6	2,740	1E+04	7E+03	7E+03
4ESDO64	30	90	7	93	2	1	0.5	0.1	0.2	41	1E+02	2E+02	2E+02
4FDO189	537	2,782	83	188	18	10	2.2	0.8	2.7	1,340	5E+03	3E+03	3E+03
4FDO204	691	3,309	116	524	30	14	4.2	1.0	3.0	1,565	5E+03	3E+03	4E+03
4FDO16	312	1,695	50	92	10	8	1.2	0.5	1.6	810	3E+03	2E+03	2E+03
4FDO203	98	389	20	189	6	2	1.1	0.2	0.5	183	6E+02	4E+02	5E+02
4FDO118	431	2,352	65	125	9	10	1.2	0.6	2.2	1,154	4E+03	3E+03	2E+03
4FDO119	1,068	4,420	118	51	19	31	2.6	0.7	9.0	2,372	3E+03	4E+03	4E+03
5CSDO110	568	1,854	103	788	29	16	5.0	0.8	2.3	932	4E+03	3E+03	5E+03
5EDO182	78	336	27	379	6	3	1.7	0.3	0.6	162	5E+02	3E+02	3E+02
5ESDO184	483	2,003	125	1,502	29	12	7.1	1.2	2.9	968	3E+03	2E+03	2E+03
5FDO117	576	2,632	112	790	30	12	5.0	1.0	2.8	1,234	4E+03	2E+03	3E+03
5FDO254	37	224	6	12	1	1	0.1	0.1	0.2	112	4E+02	2E+02	1E+02
5FDO265	15	31	1	5	0	0	0.0	0.0	0.1	17	1E+01	1E+01	3E+01
5FDO253	466	2,283	71	186	15	12	1.9	0.6	2.2	1,083	5E+03	3E+03	4E+03
5FDO245	1,016	5,830	166	380	24	21	3.3	1.7	5.8	2,867	1E+04	6E+03	4E+03
5FDO244	193	991	27	60	4	4	0.6	0.3	1.3	494	2E+03	1E+03	8E+02
5FDO264	14	38	2	6	0	1	0.0	0.0	0.1	16	2E+02	3E+02	3E+02
5GDO112	649	3,749	101	181	14	14	1.9	1.2	4.2	1,824	6E+03	4E+03	3E+03
5GDO116A	519	2,719	89	472	13	10	2.6	0.9	2.8	1,354	4E+03	3E+03	2E+03
5GDO115	198	1,196	33	41	5	5	0.6	0.3	1.2	583	2E+03	1E+03	9E+02
5GDO116	560	3,134	87	137	16	11	1.8	0.8	2.9	1,508	6E+03	3E+03	2E+03
6DDO57	103	360	19	204	6	2	1.1	0.2	0.4	170	5E+02	6E+02	7E+02
6DDO184	16	38	13	235	3	1	1.0	0.1	0.2	16	3E+01	5E+01	9E+01
6DDO91	30	63	27	519	6	2	2.2	0.3	0.5	29	4E+01	1E+02	2E+02
6DDO187	57	168	9	60	2	4	0.4	0.1	0.3	71	5E+02	7E+02	8E+02
6DDO86	22	83	6	77	2	1	0.4	0.1	0.1	39	1E+02	1E+02	1E+02
6DDO85	83	505	16	48	3	2	0.4	0.2	0.5	245	9E+02	5E+02	4E+02
6DDO83	182	861	39	294	10	4	1.8	0.3	0.9	402	1E+03	9E+02	1E+03
6DDO84	24	136	5	18	1	1	0.1	0.0	0.1	65	2E+02	1E+02	1E+02
06D097	231	1,171	36	125	8	4	1.0	0.3	1.0	567	2E+03	1E+03	1E+03
6GDO109	1,105	5,814	167	294	36	22	4.1	1.6	5.2	2,767	1E+04	6E+03	7E+03
6GDO110	1,257	7,009	204	416	39	25	4.7	2.0	6.2	3,373	1E+04	7E+03	6E+03
6GDO111	195	781	52	618	13	5	3.0	0.5	1.2	367	1E+03	6E+02	7E+02
6GDO166	111	369	37	556	9	3	2.5	0.3	0.8	176	5E+02	3E+02	4E+02
6GDO108	3,600	20,363	573	1,019	98	77	11.8	5.7	18.5	9,847	4E+04	2E+04	2E+04
6G165	20	74	4	55	1	0	0.2	0.0	0.1	37	1E+02	8E+01	5E+01
6HDO43	71	331	13	67	4	2	0.5	0.1	0.3	152	5E+02	3E+02	4E+02
6HDO106	162	692	27	186	7	3	1.1	0.2	0.7	335	1E+03	6E+02	5E+02

Table C2-30. Scenario 10 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	489	2,537	83	418	15	10	2.6	0.8	2.6	1,238	4E+03	3E+03	2E+03
7CDO006	4,187	18,100	841	7,893	176	95	39.3	8.2	23.0	8,877	3E+04	2E+04	3E+04
7HDO285	4,846	22,531	738	2,496	195	96	24.3	6.5	23.1	10,692	4E+04	2E+04	3E+04
7HDO105	6,329	30,608	1,154	6,755	269	145	44.0	10.6	31.5	14,587	6E+04	3E+04	5E+04
7HDO348	35	226	6	10	0	1	0.1	0.1	0.2	113	4E+02	3E+02	2E+02
7HDO347	258	1,261	43	207	10	5	1.5	0.4	1.2	603	2E+03	2E+03	2E+03
7HDO346	256	1,587	42	72	5	5	0.7	0.4	1.4	775	3E+03	2E+03	1E+03
8BDO122	1,093	5,946	156	325	24	27	3.2	2.3	8.5	2,844	1E+04	7E+03	5E+03
8BDO66	1	3	0	3	0	0	0.0	0.0	0.0	1	3E-01	5E-01	5E-01
8BDO126	626	3,887	102	144	10	13	1.4	1.1	3.7	1,922	7E+03	4E+03	2E+03
8CDO25	136	424	37	491	9	4	2.3	0.3	0.8	218	1E+03	8E+02	1E+03
8CDO26	123	407	34	421	7	4	2.0	0.3	0.8	213	1E+03	7E+02	1E+03
8DDO112	29	175	5	8	1	1	0.1	0.0	0.2	84	3E+02	3E+02	3E+02
8DSDO100	59	176	13	179	3	2	0.8	0.1	0.3	86	3E+02	7E+02	7E+02
8EDO35	100	261	28	460	8	2	2.0	0.3	0.6	128	3E+02	1E+03	1E+03
8EDO33	316	1,868	59	258	8	7	1.5	0.6	1.9	920	3E+03	2E+03	1E+03
8IDO153	26	165	4	5	0	1	0.0	0.0	0.1	81	3E+02	2E+02	9E+01
8IDO155	18	62	4	59	1	0	0.3	0.0	0.1	31	8E+01	2E+02	2E+02
8IDO156	274	597	46	599	18	4	3.3	0.3	0.7	252	5E+02	9E+01	8E+02
8IDO209	73	444	12	20	1	1	0.2	0.1	0.4	220	8E+02	5E+02	3E+02
8IDO154	585	2,999	94	306	20	14	2.7	0.9	3.0	1,426	5E+03	4E+03	4E+03
8IDO158	278	1,590	46	139	7	6	1.1	0.5	1.8	775	3E+03	2E+03	1E+03
8IDO207	60	315	12	78	2	2	0.4	0.1	0.3	153	6E+02	5E+02	4E+02
8J102	898	5,451	147	245	20	20	2.7	1.7	6.1	2,635	1E+04	6E+03	4E+03
8JSDO103	674	3,777	114	335	20	14	2.8	1.1	3.5	1,836	7E+03	4E+03	3E+03
8JSDO41	368	2,209	62	119	9	8	1.2	0.7	2.2	1,071	4E+03	2E+03	2E+03
8JSDO50	925	4,596	141	442	34	20	4.3	1.5	5.2	2,171	8E+03	6E+03	5E+03
8K049	118	661	21	66	4	3	0.6	0.2	0.6	315	1E+03	7E+02	6E+02
9BDO49	239	625	26	161	5	14	0.9	0.1	1.0	286	2E+03	4E+03	4E+03
9EDO229	43	197	7	24	2	1	0.2	0.1	0.2	92	3E+02	2E+02	2E+02
9EDO243	129	415	20	193	6	3	1.1	0.2	0.5	196	7E+02	9E+02	1E+03
9K100	39	100	7	69	2	3	0.3	0.0	0.2	42	4E+02	6E+02	6E+02
9K101	467	1,559	86	905	23	14	4.7	0.7	2.1	730	3E+03	3E+03	4E+03
9K016	51	144	28	465	7	3	2.1	0.3	0.5	63	2E+02	2E+02	4E+02
9LSDO095	163	576	32	345	6	7	1.6	0.3	0.9	279	2E+03	1E+03	2E+03
10BSDO62	25	46	1	1	1	0	0.0	0.0	0.1	24	6E+00	4E-01	1E+01
10BSDO15	27	63	2	12	1	1	0.1	0.0	0.1	32	1E+02	3E+02	3E+02
10BSDO64	90	244	12	96	4	2	0.6	0.1	0.5	169	3E+02	4E+02	5E+02
10L094	9,480	49,611	1,487	4,848	261	201	37.5	15.1	51.1	24,097	9E+04	6E+04	6E+04
10L096	1,052	6,053	174	294	24	38	3.2	1.7	6.1	2,883	1E+04	1E+04	9E+03
11BDO28	8,525	32,893	1,928	22,156	423	254	103.7	18.0	48.5	16,020	6E+04	5E+04	5E+04
11BDO123	1,842	9,201	282	801	54	46	7.1	2.6	8.6	4,422	2E+04	1E+04	1E+04
11IDO577	27,168	129,999	4,574	13,536	1,520	644	175.0	38.2	121.3	58,099	2E+05	1E+05	2E+05
11M093	839	3,011	135	781	30	17	5.1	1.1	3.9	1,595	7E+03	4E+03	6E+03
12BDO10	9	21	2	20	0	1	0.1	0.0	0.1	9	6E+01	1E+02	1E+02
12BDO14	21	48	3	42	1	1	0.2	0.0	0.1	22	1E+02	3E+02	3E+02
12BDO124	4,870	23,009	898	6,453	170	116	34.3	8.7	25.5	11,266	4E+04	3E+04	3E+04
12EDO418	151	629	24	88	3	3	0.5	0.2	0.6	336	1E+03	1E+03	7E+02

Table C2-30. Scenario 10 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	102	461	15	88	3	2	0.5	0.1	0.4	228	7E+02	7E+02	5E+02
12HOFDO92	777	2,105	377	2,926	104	97	23.4	3.1	10.3	1,885	3E+03	5E+03	7E+03
12HDO85/87	340	988	59	485	14	30	2.7	0.4	2.0	397	4E+03	7E+03	8E+03
12L092	1,667	7,025	252	1,116	72	33	9.5	2.3	7.5	3,318	1E+04	7E+03	1E+04
12LDO296	371	1,677	57	284	12	7	1.9	0.5	1.9	827	3E+03	2E+03	1E+03
12M091	255	874	42	293	9	5	1.7	0.3	1.1	470	2E+03	1E+03	1E+03
13DSDO078	1,654	4,624	207	1,530	87	25	11.6	1.4	3.8	2,067	6E+03	5E+03	9E+03
13EDO177	43	89	10	165	3	1	0.8	0.1	0.2	43	6E+01	2E+02	3E+02
13EDO174	894	4,736	134	426	18	16	2.8	1.4	4.5	2,348	8E+03	6E+03	4E+03
13EDO176	29	64	5	79	1	0	0.4	0.1	0.2	31	3E+01	2E+02	2E+02
13FDO95	8	17	2	27	0	0	0.1	0.0	0.0	8	2E+01	8E+01	8E+01
13FDO011	19	36	1	1	0	0	0.0	0.0	0.0	18	1E+01	6E+01	6E+01
13F093	79	194	8	112	3	2	0.6	0.2	0.6	90	3E+02	7E+02	1E+03
13L090	26,169	116,404	4,077	6,372	1,636	571	161.7	28.2	95.5	50,868	2E+05	1E+05	2E+05
14CDO9	576	3,229	131	890	26	17	5.1	1.2	3.6	1,534	6E+03	4E+03	4E+03
15FSDO288	1,570	7,294	259	1,761	47	29	9.3	2.7	7.9	3,605	1E+04	1E+04	1E+04
15L089	11,192	49,200	1,768	5,456	589	248	68.2	13.6	46.6	22,605	9E+04	5E+04	7E+04
15L088	4,538	28,814	735	184	72	123	8.3	8.0	31.6	14,190	5E+04	4E+04	2E+04
16L097	397	1,160	59	636	17	23	3.4	1.0	4.0	484	2E+03	4E+03	5E+03
16LSDO122	7,136	36,244	1,148	2,664	254	236	31.1	10.0	39.0	17,056	7E+04	5E+04	6E+04
17M033	4,622	22,612	679	1,950	113	240	16.9	9.6	41.8	10,398	5E+04	5E+04	5E+04
18GSDO233	3,669	15,961	478	578	73	243	8.5	4.1	21.0	7,119	5E+04	6E+04	6E+04
19GDO043	4,289	28,058	720	379	88	101	9.8	8.2	27.9	13,529	5E+04	3E+04	2E+04
19GDO194	363	1,773	58	172	17	8	2.0	0.6	2.0	827	3E+03	2E+03	3E+03
19G199	49	142	1	1	1	1	0.1	0.1	0.6	61	1E+02	5E+02	5E+02
20G163	264	1,057	8	25	7	13	0.9	1.5	6.9	405	9E+02	3E+03	3E+03
20L083	202	886	25	12	4	8	0.7	0.1	2.0	479	5E+02	8E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	10	41	2	5	1	0	0.1	0.0	0.0	17	7E+01	4E+01	7E+01
21H048	94	267	3	3	2	2	0.2	0.2	1.1	117	2E+02	2E+02	2E+02
21KSDO069	7,657	43,490	1,178	1,024	208	245	22.9	13.4	53.6	20,452	9E+04	6E+04	6E+04
21M005	124	363	11	47	3	3	0.4	0.1	0.8	194	1E+02	2E+02	2E+02
21M010	762	2,678	75	119	16	21	2.2	0.4	6.4	1,447	1E+03	2E+03	2E+03
21M050	354	1,029	27	45	8	6	0.9	0.2	2.5	551	1E+03	7E+02	3E+03
22CDO384	2,293	7,812	330	1,813	131	45	16.4	2.3	6.5	3,444	1E+04	7E+03	1E+04
22LSDO580	999	3,943	116	152	20	30	3.1	0.6	11.2	2,207	2E+03	3E+03	4E+03
23GDO132	4,249	8,921	260	2,208	121	56	15.6	3.5	14.6	4,150	6E+03	7E+03	1E+04
23HSDO042	16,270	69,681	2,512	5,188	855	494	97.2	22.8	88.7	31,938	1E+05	9E+04	1E+05
23HDO040	2,472	14,793	387	335	58	70	6.5	4.2	15.9	7,000	3E+04	2E+04	2E+04
23L196	114	232	7	45	3	1	0.4	0.1	0.6	117	1E+02	4E+01	2E+02
23L075	559	1,380	45	237	17	7	2.1	0.3	3.1	731	1E+03	6E+02	3E+03
23L074	110	240	7	32	3	1	0.3	0.0	0.4	125	8E+01	5E+01	1E+02
23L195	122	233	9	82	4	1	0.5	0.1	0.6	126	2E+02	5E+01	3E+02
23L202	122	237	7	45	3	0	0.3	0.1	0.6	129	3E+02	5E+01	6E+02
23L016	93	187	6	43	3	0	0.3	0.0	0.5	103	4E+02	7E+01	7E+02
23L015	165	284	11	131	5	1	0.7	0.1	0.5	143	4E+01	6E+01	6E+01
23L164	708	1,777	62	130	19	36	1.8	0.3	4.0	811	6E+03	7E+03	1E+04
24CSDO031	211	1,285	35	59	3	4	0.5	0.4	1.3	644	2E+03	1E+03	9E+02

Table C2-30. Scenario 10 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,188	5,807	209	1,113	40	34	6.9	2.0	6.3	2,818	1E+04	1E+04	9E+03
24DSDO150	26	59	2	25	1	0	0.1	0.0	0.1	32	5E+01	3E+02	4E+02
24DSDO032	15,300	80,028	2,928	8,694	675	395	88.6	27.0	88.0	42,975	1E+05	9E+04	9E+04
24GSDO035	20,106	115,449	3,043	4,553	374	531	48.7	34.2	125.2	56,042	2E+05	2E+05	1E+05
24GSDO034	1,415	5,268	147	960	37	22	5.8	2.3	10.2	2,579	8E+03	2E+04	2E+04
24L233	381	1,151	32	102	22	11	2.2	1.0	4.5	436	1E+03	8E+02	3E+03
25DDO040	425	2,069	64	220	11	14	1.6	0.8	3.3	999	4E+03	3E+03	3E+03
25EDO037	9,693	49,185	1,409	3,717	233	269	32.4	15.4	61.6	23,736	9E+04	7E+04	6E+04
25GDO041	64	211	9	32	6	2	0.6	0.2	0.7	71	3E+02	1E+02	5E+02
25GDO-06	252	735	18	218	9	8	1.5	1.0	4.4	301	4E+02	6E+02	6E+02
26J049	6,618	18,453	714	706	476	136	42.3	4.7	26.0	7,038	3E+04	1E+04	6E+04
25L144	498	3,327	83	12	13	12	1.3	0.9	3.0	1,548	7E+03	4E+03	3E+03
25L058	3,771	20,077	531	552	79	135	9.0	5.7	23.7	9,458	5E+04	4E+04	3E+04
26FDO038	85	229	15	126	8	2	1.0	0.1	0.4	82	4E+02	1E+02	7E+02
26GSDO01	3,219	13,757	426	1,953	119	80	16.4	6.6	25.7	6,373	2E+04	1E+04	2E+04
26JSDO052	31	56	4	68	1	0	0.3	0.0	0.1	27	6E+00	9E+00	9E+00
26JSDO100	145	397	22	84	14	3	1.5	0.1	0.2	134	7E+02	1E+02	1E+03
26J101	392	980	64	521	33	8	4.4	0.4	1.0	362	2E+03	5E+02	3E+03
26KSDO254	275	953	38	122	4	28	0.9	0.2	2.2	421	4E+03	6E+03	7E+03
26K035	176	376	11	38	5	1	0.5	0.1	1.1	204	5E+02	8E+01	9E+02
26K099	10,861	70,195	1,709	891	150	316	18.5	20.7	76.2	33,606	1E+05	1E+05	7E+04
26L055	156	898	26	13	6	3	0.6	0.2	0.7	413	2E+03	1E+03	9E+02
26LSDO084	65	194	9	17	7	1	0.6	0.0	0.1	66	3E+02	3E+02	8E+02
26L070	175	301	5	29	3	0	0.3	0.0	0.1	150	8E+01	2E+01	2E+02
27JSDO044	335	667	29	377	11	5	2.0	0.5	2.0	314	3E+02	5E+02	5E+02
27JSDO096	1,958	3,918	91	358	52	13	4.5	0.6	4.6	1,947	2E+03	4E+03	5E+03
27JSDO001	6,902	40,051	1,027	1,581	122	223	17.0	12.4	49.8	18,997	8E+04	6E+04	5E+04
27L022	1,875	11,229	275	306	40	54	4.9	4.4	16.5	5,286	2E+04	1E+04	1E+04
27L020	1,766	10,457	256	304	39	50	4.8	4.1	15.3	4,901	2E+04	1E+04	1E+04
28K061	3,816	24,765	644	399	60	119	7.4	6.9	24.4	11,905	5E+04	4E+04	3E+04
28K010	3,281	22,619	563	264	44	87	5.5	6.4	21.4	10,942	5E+04	3E+04	2E+04
28K386	546	1,361	52	409	15	17	2.5	0.5	3.3	664	2E+03	3E+03	3E+03
28L073	65	195	9	76	4	1	0.6	0.1	0.1	87	3E+02	2E+03	2E+03
28L074/5/6	1,126	3,379	107	737	49	21	6.3	2.0	8.3	1,486	4E+03	6E+03	9E+03
28N156	232	1,268	39	119	5	9	0.8	0.4	1.3	617	3E+03	2E+03	2E+03
28N207	2,682	16,263	434	479	59	80	7.1	5.0	17.9	7,768	3E+04	2E+04	2E+04
28O025	41	188	8	21	1	1	0.2	0.1	0.2	95	6E+02	4E+02	5E+02
28P001	242	1,582	41	28	4	5	0.5	0.4	1.4	776	3E+03	2E+03	1E+03
29J129	132	243	12	156	4	2	0.8	0.1	0.5	118	2E+02	3E+02	3E+02
29J029	292	765	36	196	6	26	1.1	0.2	1.6	317	3E+03	5E+03	5E+03
29J212	14,881	95,975	2,391	1,181	225	451	27.7	28.0	106.9	46,143	2E+05	1E+05	9E+04
29M049	1,044	5,672	163	198	34	36	3.7	1.6	5.9	2,610	1E+04	9E+03	8E+03
29N015	108	494	16	33	2	5	0.4	0.1	1.2	273	3E+02	4E+02	5E+02
29N135	347	1,938	55	156	6	8	1.1	0.6	2.3	961	3E+03	2E+03	1E+03
29O001	9,208	56,277	1,563	2,460	212	234	27.6	16.3	55.9	27,279	1E+05	7E+04	5E+04
29P015	60	397	11	14	1	1	0.2	0.1	0.4	195	7E+02	4E+02	3E+02
29P044	509	3,413	90	85	9	12	1.1	1.0	3.1	1,670	6E+03	4E+03	2E+03
30J006	190	563	24	190	8	5	1.2	0.2	0.9	281	7E+02	2E+03	3E+03

Table C2-30. Scenario 10 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	48	123	7	98	2	1	0.5	0.1	0.4	61	8E+01	4E+02	4E+02
30J030	554	1,204	35	206	15	5	1.7	0.2	2.3	627	5E+02	4E+02	8E+02
30P107	248	1,266	49	109	5	7	0.9	0.3	1.1	648	3E+03	2E+03	1E+03
30P062	211	1,355	37	55	4	5	0.5	0.4	1.3	673	2E+03	2E+03	9E+02
31O004	831	4,987	181	159	16	27	2.1	1.2	3.9	2,462	1E+04	8E+03	5E+03
31P084	255	1,594	43	82	3	5	0.6	0.5	1.6	792	3E+03	2E+03	1E+03
3FDO159	237	926	50	505	13	6	2.7	0.4	1.2	437	1E+03	1E+03	1E+03
11G318/319	249	662	61	749	12	23	3.4	0.4	1.8	271	3E+03	4E+03	4E+03
6FSDO233	6	12	5	89	1	0	0.4	0.0	0.1	6	7E+00	1E+01	1E+01
17FDO012	2,109	4,665	107	62	42	63	2.7	0.7	4.8	2,169	2E+04	4E+04	4E+04
21H047	435	1,699	31	87	13	14	1.6	1.5	6.2	708	2E+03	2E+03	2E+03
21H039	1,355	4,333	63	347	41	45	5.0	5.3	23.0	1,721	3E+03	4E+03	5E+03
20G161	2,211	9,274	268	230	60	88	6.6	4.5	18.9	4,248	2E+04	2E+04	2E+04
StonyMWRA	91,418	409,325	15,763	71,621	4,416	2,463	637.4	153.7	504.6	194,595	7E+05	5E+05	6E+05
Fens	65,771	206,206	10,832	17,880	4,482	1,954	524.5	87.5	263.3	102,735	3E+05	1E+05	2E+05
20D055	4,219	26,345	727	507	110	96	11.9	7.5	24.7	12,779	5E+04	3E+04	2E+04
21D319	6,099	39,720	1,070	883	135	141	15.7	11.3	37.0	19,342	7E+04	4E+04	3E+04

Table C2-31. Scenario 11 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	753	2,865	117	955	26	15	5.2	1.0	4.1	1,449	3E+03	3E+03	2E+03
1FDO31	570	2,474	74	233	16	12	2.1	0.7	2.4	1,196	4E+03	3E+03	3E+03
02E086	187	702	35	338	10	4	1.8	0.3	0.9	332	1E+03	8E+02	9E+02
2FDO120	1,001	4,727	152	633	29	22	4.6	1.4	5.7	2,339	8E+03	5E+03	6E+03
2FDO93	1,253	8,789	218	118	17	29	2.1	2.4	7.9	4,278	2E+04	1E+04	6E+03
2FDO85	65	268	10	56	2	1	0.4	0.1	0.2	129	4E+02	3E+02	2E+02
3ESDO186	228	933	53	576	13	6	2.9	0.5	1.3	446	1E+03	9E+02	9E+02
3ESDO185	430	1,806	78	372	13	9	2.4	0.6	1.9	942	4E+03	2E+03	2E+03
3F162	401	1,761	77	513	23	9	3.6	0.6	1.7	808	3E+03	2E+03	2E+03
4ESDO69	1,176	5,191	189	1,021	38	27	6.5	1.8	6.3	2,585	9E+03	6E+03	7E+03
4ESDO64	28	85	7	94	2	1	0.5	0.1	0.1	39	1E+02	2E+02	2E+02
4FDO189	506	2,579	78	190	18	10	2.1	0.7	2.5	1,238	4E+03	2E+03	2E+03
4FDO204	647	3,031	109	525	29	13	4.1	0.9	2.8	1,426	5E+03	3E+03	3E+03
4FDO16	294	1,578	47	93	10	7	1.1	0.4	1.4	752	3E+03	2E+03	2E+03
4FDO203	92	358	19	190	6	2	1.0	0.2	0.4	167	5E+02	4E+02	5E+02
4FDO118	408	2,211	61	126	9	9	1.1	0.6	2.1	1,084	4E+03	3E+03	2E+03
4FDO119	1,035	4,292	115	52	18	30	2.5	0.7	8.8	2,306	3E+03	4E+03	3E+03
5CSDO110	536	1,727	99	791	29	15	5.0	0.8	2.2	861	4E+03	3E+03	5E+03
5EDO182	74	312	27	379	6	2	1.7	0.3	0.6	150	5E+02	3E+02	2E+02
5ESDO184	460	1,883	123	1,506	28	12	7.1	1.2	2.8	908	3E+03	2E+03	2E+03
5FDO117	545	2,444	108	793	30	12	5.0	0.9	2.6	1,139	4E+03	2E+03	3E+03
5FDO254	34	205	5	13	0	1	0.1	0.1	0.2	103	3E+02	2E+02	1E+02
5FDO265	15	30	1	5	0	0	0.0	0.0	0.1	17	1E+01	1E+01	2E+01
5FDO253	441	2,129	67	188	15	12	1.9	0.6	2.0	1,008	4E+03	3E+03	4E+03
5FDO245	954	5,413	156	383	24	20	3.3	1.6	5.4	2,660	9E+03	6E+03	4E+03
5FDO244	186	955	27	61	4	4	0.6	0.2	1.3	476	2E+03	1E+03	7E+02
5FDO264	13	36	2	7	0	1	0.0	0.0	0.1	15	2E+02	2E+02	3E+02
5GDO112	606	3,463	95	183	14	13	1.9	1.1	3.8	1,683	6E+03	4E+03	3E+03
5GDO116A	480	2,478	83	475	13	9	2.5	0.9	2.6	1,232	4E+03	2E+03	1E+03
5GDO115	190	1,147	32	42	5	5	0.6	0.3	1.2	559	2E+03	1E+03	9E+02
5GDO116	535	2,975	83	138	15	10	1.8	0.8	2.7	1,429	5E+03	3E+03	2E+03
6DDO57	98	337	19	205	6	2	1.1	0.2	0.4	159	4E+02	5E+02	6E+02
6DDO184	18	41	13	235	3	1	1.0	0.1	0.2	18	4E+01	6E+01	1E+02
6DDO91	33	69	27	518	6	2	2.2	0.3	0.5	32	5E+01	1E+02	2E+02
6DDO187	54	158	8	60	2	4	0.4	0.1	0.2	66	5E+02	6E+02	7E+02
6DDO86	25	99	6	77	2	1	0.4	0.1	0.1	47	1E+02	1E+02	1E+02
6DDO85	94	587	18	48	3	2	0.4	0.2	0.5	286	1E+03	6E+02	4E+02
6DDO83	186	886	40	294	10	4	1.8	0.3	0.9	414	1E+03	1E+03	1E+03
6DDO84	28	162	5	18	1	1	0.1	0.1	0.2	78	3E+02	2E+02	1E+02
06D097	272	1,440	43	122	8	5	1.1	0.4	1.3	702	2E+03	2E+03	2E+03
6GDO109	1,027	5,305	155	298	36	20	4.0	1.5	4.7	2,516	1E+04	6E+03	7E+03
6GDO110	1,183	6,515	192	419	38	24	4.6	1.8	5.8	3,127	1E+04	7E+03	6E+03
6GDO111	185	728	51	619	13	5	3.0	0.5	1.1	340	1E+03	6E+02	7E+02
6GDO166	106	345	36	557	9	3	2.5	0.3	0.8	164	5E+02	3E+02	4E+02
6GDO108	3,402	19,070	542	1,029	95	73	11.6	5.3	17.4	9,208	3E+04	2E+04	2E+04
6G165	19	69	4	55	1	0	0.2	0.0	0.1	34	9E+01	7E+01	5E+01
6HDO43	69	319	13	66	4	1	0.5	0.1	0.3	146	5E+02	3E+02	4E+02
6HDO106	155	649	26	187	7	3	1.1	0.2	0.7	313	1E+03	6E+02	5E+02

Table C2-31. Scenario 11 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	482	2,502	83	419	15	10	2.6	0.8	2.5	1,220	4E+03	3E+03	2E+03
7CDO006	3,887	16,424	802	7,922	173	90	39.1	7.8	21.5	8,047	3E+04	2E+04	3E+04
7HDO285	4,661	21,436	713	2,507	193	93	24.2	6.2	22.0	10,149	4E+04	2E+04	3E+04
7HDO105	5,961	28,396	1,102	6,778	265	137	43.7	10.1	29.5	13,492	6E+04	3E+04	5E+04
7HDO348	33	212	6	10	0	1	0.1	0.1	0.2	106	4E+02	3E+02	1E+02
7HDO347	247	1,196	42	208	10	5	1.5	0.4	1.1	571	2E+03	2E+03	2E+03
7HDO346	223	1,365	37	73	5	5	0.7	0.4	1.2	667	2E+03	2E+03	9E+02
8BDO122	1,030	5,560	147	329	23	26	3.2	2.2	8.0	2,659	1E+04	6E+03	5E+03
8BDO66	1	2	0	3	0	0	0.0	0.0	0.0	1	3E-01	4E-01	4E-01
8BDO126	590	3,635	96	145	10	12	1.4	1.1	3.5	1,798	6E+03	4E+03	2E+03
8CDO25	128	395	37	492	9	4	2.3	0.3	0.8	202	1E+03	7E+02	1E+03
8CDO26	115	378	33	422	7	4	2.0	0.3	0.8	196	1E+03	6E+02	1E+03
8DDO112	29	172	5	8	1	1	0.1	0.0	0.2	83	3E+02	3E+02	3E+02
8DSDO100	56	164	13	179	3	2	0.8	0.1	0.3	80	3E+02	7E+02	7E+02
8EDO35	96	247	28	461	8	2	2.0	0.3	0.6	121	3E+02	1E+03	1E+03
8EDO33	295	1,729	56	259	8	7	1.5	0.6	1.7	850	3E+03	2E+03	1E+03
8IDO153	24	153	4	5	0	0	0.0	0.0	0.1	76	3E+02	2E+02	9E+01
8IDO155	17	57	4	60	1	0	0.3	0.0	0.1	29	8E+01	2E+02	2E+02
8IDO156	265	581	46	601	18	4	3.3	0.3	0.7	244	5E+02	8E+01	8E+02
8IDO209	63	377	10	20	1	1	0.2	0.1	0.3	186	7E+02	4E+02	3E+02
8IDO154	549	2,770	88	308	19	13	2.6	0.9	2.8	1,312	5E+03	4E+03	3E+03
8IDO158	261	1,475	44	140	7	6	1.1	0.5	1.7	719	2E+03	2E+03	1E+03
8IDO207	46	222	10	79	2	1	0.4	0.1	0.3	108	4E+02	4E+02	3E+02
8J102	856	5,159	140	247	20	19	2.6	1.6	5.8	2,492	9E+03	6E+03	4E+03
8JSDO103	634	3,512	108	337	20	13	2.8	1.1	3.3	1,703	6E+03	4E+03	3E+03
8JSDO41	343	2,038	58	119	9	8	1.2	0.6	2.0	987	4E+03	2E+03	1E+03
8JSDO50	871	4,252	133	445	33	19	4.2	1.4	4.8	2,002	7E+03	5E+03	5E+03
8K049	111	611	20	66	4	2	0.6	0.2	0.6	290	1E+03	7E+02	6E+02
9BDO49	226	583	24	163	5	13	0.9	0.1	1.0	267	2E+03	4E+03	4E+03
9EDO229	41	184	6	25	2	1	0.2	0.1	0.2	86	3E+02	2E+02	2E+02
9EDO243	123	391	19	192	6	2	1.1	0.2	0.4	185	7E+02	8E+02	1E+03
9K100	37	95	7	71	2	3	0.3	0.0	0.2	39	3E+02	5E+02	6E+02
9K101	444	1,457	84	908	23	13	4.7	0.7	2.0	681	3E+03	3E+03	4E+03
9K016	49	138	27	465	7	3	2.1	0.2	0.5	59	2E+02	2E+02	3E+02
9LSDO095	154	537	31	346	6	6	1.5	0.3	0.9	260	1E+03	1E+03	2E+03
10BSDO62	24	45	1	1	1	0	0.0	0.0	0.1	23	6E+00	4E-01	1E+01
10BSDO15	25	60	2	12	1	1	0.1	0.0	0.1	31	1E+02	3E+02	3E+02
10BSDO64	83	217	12	97	3	2	0.6	0.1	0.4	152	3E+02	3E+02	4E+02
10L094	8,863	45,731	1,397	4,888	255	187	37.0	14.1	47.3	22,186	9E+04	5E+04	5E+04
10L096	983	5,598	163	296	24	36	3.1	1.6	5.6	2,662	1E+04	9E+03	8E+03
11BDO28	7,871	29,057	1,838	22,215	416	239	103.2	17.0	45.1	14,110	5E+04	4E+04	5E+04
11BDO123	1,728	8,517	265	809	53	43	7.0	2.4	8.0	4,089	2E+04	1E+04	1E+04
11IDO577	26,044	123,018	4,411	13,580	1,504	617	173.6	36.3	114.3	54,719	2E+05	1E+05	2E+05
11M093	802	2,868	131	786	30	16	5.1	1.0	3.7	1,515	6E+03	4E+03	6E+03
12BDO10	8	19	2	20	0	1	0.1	0.0	0.0	9	5E+01	9E+01	9E+01
12BDO14	20	45	3	43	1	1	0.2	0.0	0.1	20	1E+02	2E+02	2E+02
12BDO124	4,246	19,313	812	6,514	164	102	33.9	7.8	22.3	9,428	4E+04	2E+04	3E+04
12EDO418	142	581	22	89	3	3	0.5	0.2	0.6	311	1E+03	9E+02	6E+02

Table C2-31. Scenario 11 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	96	426	14	90	3	2	0.5	0.1	0.4	211	6E+02	6E+02	5E+02
12HOFDO92	747	2,017	371	2,931	103	91	23.3	3.1	9.9	1,795	3E+03	5E+03	7E+03
12HDO85/87	323	935	58	487	13	28	2.7	0.4	1.9	375	4E+03	6E+03	7E+03
12L092	1,584	6,587	241	1,124	70	31	9.4	2.1	7.0	3,101	1E+04	6E+03	9E+03
12LDO296	354	1,584	54	286	12	6	1.9	0.5	1.8	780	2E+03	1E+03	1E+03
12M091	241	820	40	295	8	5	1.6	0.3	1.0	441	2E+03	1E+03	1E+03
13DSDO078	1,635	4,519	205	1,532	87	25	11.6	1.4	3.8	2,016	6E+03	5E+03	9E+03
13EDO177	41	86	10	166	3	1	0.8	0.1	0.2	41	5E+01	2E+02	2E+02
13EDO174	840	4,406	126	430	18	15	2.8	1.3	4.2	2,184	7E+03	5E+03	3E+03
13EDO176	27	60	5	79	1	0	0.4	0.1	0.2	30	3E+01	2E+02	2E+02
13FDO95	8	16	2	27	0	0	0.1	0.0	0.0	8	1E+01	7E+01	8E+01
13FDO011	19	34	1	1	0	0	0.0	0.0	0.0	17	1E+01	5E+01	6E+01
13F093	75	183	8	113	3	2	0.6	0.2	0.6	85	3E+02	7E+02	9E+02
13L090	25,177	110,378	3,932	6,435	1,618	548	160.3	26.6	89.6	47,958	2E+05	9E+04	2E+05
14CDO9	550	3,061	127	891	26	16	5.0	1.2	3.4	1,452	6E+03	4E+03	4E+03
15FSDO288	1,488	6,767	247	1,768	46	27	9.2	2.5	7.4	3,342	1E+04	1E+04	1E+04
15L089	10,847	47,392	1,724	5,515	581	241	67.7	13.1	44.9	21,723	8E+04	4E+04	7E+04
15L088	4,288	27,315	697	174	67	116	7.7	7.6	30.0	13,470	5E+04	3E+04	2E+04
16L097	376	1,088	58	638	16	22	3.4	0.9	3.8	454	2E+03	4E+03	4E+03
16LSDO122	6,959	35,289	1,126	2,681	251	232	30.9	9.7	38.2	16,593	7E+04	5E+04	6E+04
17M033	4,474	21,855	662	1,963	112	232	16.8	9.3	40.4	10,046	5E+04	5E+04	5E+04
18GSDO233	3,531	15,241	461	583	72	236	8.4	3.9	20.1	6,782	5E+04	6E+04	6E+04
19GDO043	4,178	27,315	703	384	86	99	9.6	8.0	27.2	13,176	5E+04	3E+04	2E+04
19GDO194	353	1,706	57	173	17	8	2.0	0.6	1.9	794	3E+03	2E+03	3E+03
19G199	47	137	1	1	1	1	0.1	0.1	0.6	59	9E+01	4E+02	5E+02
20G163	255	1,027	8	26	6	13	0.9	1.5	6.7	393	9E+02	3E+03	3E+03
20L083	200	878	25	13	4	8	0.6	0.1	2.0	475	5E+02	7E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	9	38	2	5	1	0	0.1	0.0	0.0	16	6E+01	3E+01	7E+01
21H048	90	252	3	3	2	2	0.2	0.2	1.0	111	2E+02	2E+02	2E+02
21KSDO069	7,474	42,373	1,154	1,037	206	239	22.8	13.1	52.3	19,922	9E+04	6E+04	5E+04
21M005	120	352	11	48	3	2	0.4	0.1	0.8	189	1E+02	2E+02	2E+02
21M010	740	2,612	74	125	15	21	2.2	0.4	6.2	1,412	1E+03	2E+03	2E+03
21M050	343	999	26	48	8	6	0.9	0.2	2.4	536	1E+03	7E+02	2E+03
22CDO384	2,257	7,562	324	1,814	130	45	16.4	2.2	6.3	3,323	1E+04	6E+03	1E+04
22LSDO580	971	3,851	115	160	19	30	3.1	0.6	11.0	2,158	2E+03	3E+03	4E+03
23GDO132	4,212	8,818	259	2,217	120	55	15.6	3.4	14.3	4,106	6E+03	7E+03	1E+04
23HSDO042	15,984	68,299	2,482	5,226	850	485	96.9	22.4	86.8	31,269	1E+05	9E+04	1E+05
23HDO040	2,397	14,301	376	339	57	68	6.4	4.1	15.4	6,762	3E+04	2E+04	2E+04
23L196	110	225	6	46	3	1	0.4	0.1	0.6	113	1E+02	4E+01	2E+02
23L075	549	1,356	45	240	17	7	2.1	0.3	3.1	718	1E+03	6E+02	3E+03
23L074	107	234	7	33	3	1	0.3	0.0	0.4	122	7E+01	5E+01	1E+02
23L195	118	227	9	83	4	1	0.5	0.1	0.6	122	2E+02	5E+01	3E+02
23L202	118	230	7	46	3	0	0.3	0.1	0.6	125	3E+02	5E+01	6E+02
23L016	90	182	6	43	3	0	0.3	0.0	0.5	100	4E+02	7E+01	7E+02
23L015	166	285	11	131	5	1	0.7	0.1	0.5	144	4E+01	6E+01	6E+01
23L164	685	1,718	61	136	18	34	1.8	0.3	3.9	785	6E+03	7E+03	1E+04
24CSDO031	198	1,190	33	60	3	4	0.5	0.4	1.2	596	2E+03	1E+03	9E+02

Table C2-31. Scenario 11 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,114	5,367	198	1,118	39	31	6.8	1.9	5.9	2,599	1E+04	9E+03	9E+03
24DSDO150	25	56	2	25	1	0	0.1	0.0	0.1	30	5E+01	3E+02	3E+02
24DSDO032	14,462	74,884	2,793	8,760	665	374	87.8	25.5	82.7	40,190	1E+05	8E+04	9E+04
24GSDO035	19,489	111,627	2,956	4,596	367	515	48.1	33.2	121.3	54,197	2E+05	1E+05	1E+05
24GSDO034	1,371	5,080	144	969	36	22	5.8	2.3	10.0	2,485	8E+03	2E+04	2E+04
24L233	374	1,131	32	104	21	10	2.2	1.0	4.5	427	1E+03	7E+02	3E+03
25DDO040	405	1,962	61	222	11	13	1.6	0.7	3.2	947	4E+03	3E+03	3E+03
25EDO037	9,142	46,106	1,339	3,768	227	253	32.0	14.4	57.6	22,237	9E+04	6E+04	6E+04
25GDO041	62	205	9	32	6	2	0.6	0.2	0.6	69	3E+02	1E+02	5E+02
25GDO-06	256	754	18	218	9	8	1.5	1.0	4.5	308	4E+02	6E+02	7E+02
26J049	6,479	18,049	698	709	465	133	41.4	4.7	25.6	6,898	1E+05	3E+04	2E+05
25L144	490	3,270	82	12	13	12	1.3	0.9	2.9	1,522	7E+03	4E+03	3E+03
25L058	3,671	19,526	518	560	78	131	8.9	5.5	23.0	9,193	4E+04	4E+04	3E+04
26FDO038	91	243	15	124	8	2	1.0	0.1	0.4	88	4E+02	2E+02	7E+02
26GSDO01	3,154	13,316	416	1,958	118	80	16.4	6.5	25.4	6,152	2E+04	1E+04	2E+04
26JSDO052	29	54	4	69	1	0	0.3	0.0	0.1	26	5E+00	8E+00	9E+00
26JSDO100	143	393	22	85	14	3	1.5	0.1	0.2	132	7E+02	1E+02	1E+03
26J101	385	968	64	524	33	8	4.4	0.4	1.0	355	2E+03	5E+02	3E+03
26KSDO254	267	930	37	123	4	27	0.8	0.2	2.1	411	4E+03	6E+03	7E+03
26K035	173	372	11	39	5	1	0.5	0.1	1.1	202	5E+02	8E+01	9E+02
26K099	10,619	68,681	1,678	905	148	310	18.3	20.3	74.7	32,900	1E+05	1E+05	7E+04
26L055	153	878	25	14	6	3	0.6	0.2	0.7	404	2E+03	9E+02	9E+02
26LSDO084	65	192	9	17	6	1	0.6	0.0	0.1	66	3E+02	3E+02	8E+02
26L070	170	292	5	30	3	0	0.3	0.0	0.1	146	8E+01	2E+01	2E+02
27JSDO044	328	653	29	379	11	5	2.0	0.4	1.9	307	3E+02	5E+02	5E+02
27JSDO096	1,941	3,882	90	363	52	13	4.5	0.6	4.5	1,928	2E+03	4E+03	5E+03
27JSDO001	6,764	39,279	1,010	1,591	121	219	16.9	12.1	48.8	18,644	8E+04	6E+04	5E+04
27L022	1,824	10,898	268	308	39	52	4.8	4.3	16.0	5,132	2E+04	1E+04	1E+04
27L020	1,716	10,134	250	306	38	49	4.7	4.0	14.9	4,753	2E+04	1E+04	1E+04
28K061	3,714	24,104	629	404	59	116	7.3	6.8	23.8	11,596	5E+04	4E+04	3E+04
28K010	3,200	22,046	550	266	44	85	5.5	6.2	20.8	10,670	5E+04	3E+04	2E+04
28K386	526	1,313	52	415	15	17	2.5	0.5	3.2	641	2E+03	3E+03	3E+03
28L073	63	191	9	76	4	1	0.6	0.1	0.1	84	3E+02	2E+03	2E+03
28L074/5/6	1,112	3,348	107	741	48	21	6.3	2.0	8.2	1,471	4E+03	6E+03	9E+03
28N156	218	1,184	37	120	5	8	0.8	0.4	1.3	576	2E+03	2E+03	2E+03
28N207	2,594	15,704	421	483	58	77	7.0	4.9	17.3	7,503	3E+04	2E+04	2E+04
28O025	39	181	7	21	1	1	0.2	0.1	0.2	92	5E+02	4E+02	5E+02
28P001	230	1,504	39	28	4	5	0.5	0.4	1.3	737	3E+03	2E+03	1E+03
29J129	128	235	12	158	4	2	0.8	0.1	0.5	114	2E+02	3E+02	3E+02
29J029	282	739	35	198	6	25	1.1	0.2	1.6	306	3E+03	5E+03	5E+03
29J212	14,536	93,697	2,343	1,195	222	441	27.4	27.4	104.6	45,085	2E+05	1E+05	9E+04
29M049	1,013	5,501	159	200	34	34	3.7	1.5	5.7	2,529	1E+04	9E+03	8E+03
29N015	105	483	16	34	2	5	0.4	0.1	1.2	267	3E+02	4E+02	5E+02
29N135	336	1,878	53	157	6	8	1.1	0.6	2.3	932	3E+03	2E+03	1E+03
29O001	8,885	54,197	1,515	2,477	209	226	27.3	15.8	53.9	26,272	1E+05	7E+04	5E+04
29P015	58	379	10	14	1	1	0.2	0.1	0.3	186	7E+02	4E+02	3E+02
29P044	498	3,339	88	86	9	11	1.1	0.9	3.0	1,634	6E+03	4E+03	2E+03
30J006	184	547	23	192	7	5	1.2	0.2	0.9	272	7E+02	2E+03	3E+03

Table C2-31. Scenario 11 average annual outfall loads

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	46	116	7	98	2	1	0.5	0.1	0.4	58	8E+01	4E+02	4E+02
30J030	535	1,165	34	213	14	5	1.7	0.2	2.3	607	5E+02	4E+02	8E+02
30P107	233	1,187	46	109	5	7	0.8	0.3	1.1	607	3E+03	2E+03	1E+03
30P062	199	1,273	35	55	4	4	0.5	0.4	1.2	631	2E+03	1E+03	9E+02
31O004	807	4,846	176	160	16	26	2.1	1.2	3.8	2,393	1E+04	8E+03	5E+03
31P084	247	1,547	42	83	3	5	0.6	0.5	1.5	769	3E+03	2E+03	1E+03
3FDO159	227	871	49	507	13	5	2.7	0.4	1.1	410	1E+03	1E+03	1E+03
11G318/319	236	623	59	750	12	22	3.4	0.4	1.7	255	2E+03	4E+03	4E+03
6FSDO233	5	11	5	89	1	0	0.4	0.0	0.1	6	6E+00	1E+01	1E+01
17FDO012	2,030	4,487	103	59	40	62	2.6	0.7	4.7	2,084	2E+04	4E+04	4E+04
21H047	424	1,662	31	90	13	14	1.5	1.4	6.1	693	2E+03	2E+03	2E+03
21H039	1,345	4,312	63	351	41	45	5.1	5.3	23.0	1,710	3E+03	4E+03	5E+03
20G161	2,157	9,017	261	234	59	85	6.5	4.3	18.4	4,126	2E+04	2E+04	2E+04
StonyMWRA	88,111	391,247	15,322	71,900	4,359	2,372	633.1	148.4	484.9	185,482	7E+05	4E+05	6E+05
Fens	64,948	203,413	10,729	17,909	4,467	1,922	523.2	86.5	259.9	101,045	3E+05	1E+05	2E+05
20D055	4,015	24,890	691	512	109	91	11.7	7.1	23.2	12,059	5E+04	3E+04	2E+04
21D319	5,875	38,147	1,032	890	134	136	15.6	10.9	35.6	18,563	7E+04	4E+04	3E+04

Appendix D
Pollutant Loads under Recommended Implementation Plan by SDO Catchment

Table D. Pollutant Loads of Recommended Implementation Plan by SDO Area

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
1EDO24	1,045	4,101	144	892	30	20	5.3	1.2	5.4	2,054	5E+03	4E+03	3E+03
1FDO31	850	3,898	108	179	20	19	2.2	1.0	3.7	1,862	7E+03	6E+03	5E+03
02E086	272	1,099	43	312	11	5	1.8	0.4	1.2	519	2E+03	2E+03	1E+03
2FDO120	1,478	7,281	211	546	34	32	4.9	1.9	8.3	3,565	1E+04	9E+03	8E+03
2FDO93	1,532	10,737	266	97	19	36	2.3	2.9	9.6	5,157	2E+04	1E+04	8E+03
2FDO85	98	439	12	25	3	1	0.3	0.1	0.4	210	8E+02	5E+02	4E+02
3ESDO186	339	1,511	66	543	14	8	2.9	0.6	1.8	719	3E+03	2E+03	1E+03
3ESDO185	605	2,640	106	329	15	13	2.4	0.8	2.5	1,346	6E+03	4E+03	3E+03
3F162	540	2,566	96	484	25	11	3.6	0.8	2.4	1,181	5E+03	3E+03	3E+03
4ESDO69	1,709	7,922	256	899	43	40	6.6	2.4	9.0	3,891	2E+04	1E+04	1E+04
4ESDO64	42	137	6	56	2	1	0.3	0.1	0.2	63	3E+02	4E+02	4E+02
4FDO189	783	4,346	121	135	20	16	2.2	1.2	4.0	2,061	9E+03	5E+03	4E+03
4FDO204	904	4,525	146	492	32	18	4.3	1.3	4.0	2,114	9E+03	5E+03	5E+03
4FDO16	434	2,435	68	69	11	11	1.2	0.6	2.2	1,149	5E+03	3E+03	3E+03
4FDO203	136	580	24	172	6	3	1.0	0.2	0.6	273	1E+03	8E+02	8E+02
4FDO118	627	3,519	92	88	11	15	1.2	0.9	3.3	1,698	7E+03	5E+03	3E+03
4FDO119	1,357	5,359	140	44	24	37	3.1	0.8	10.3	2,833	4E+03	5E+03	4E+03
5CSDO110	839	2,825	133	639	35	25	5.0	0.9	3.1	1,434	7E+03	5E+03	7E+03
5EDO182	112	519	31	351	6	3	1.6	0.3	0.8	247	9E+02	6E+02	4E+02
5ESDO184	671	2,956	144	1,415	30	15	6.9	1.4	3.6	1,419	5E+03	4E+03	3E+03
5FDO117	829	4,126	146	706	32	17	4.9	1.3	4.0	1,929	8E+03	4E+03	4E+03
5FDO254	55	338	9	10	1	1	0.1	0.1	0.3	163	7E+02	4E+02	2E+02
5FDO265	21	42	1	3	1	0	0.0	0.0	0.1	23	2E+01	1E+01	3E+01
5FDO253	691	3,648	102	130	18	17	1.9	1.0	3.3	1,729	7E+03	5E+03	5E+03
5FDO245	1,406	8,216	225	327	28	30	3.5	2.3	7.9	3,959	2E+04	1E+04	6E+03
5FDO244	247	1,246	33	52	5	5	0.6	0.3	1.6	613	2E+03	1E+03	1E+03
5FDO264	20	57	2	5	0	2	0.0	0.0	0.1	23	3E+02	4E+02	4E+02
5GDO112	938	5,591	145	138	17	22	2.0	1.7	6.1	2,660	1E+04	7E+03	4E+03
5GDO116A	848	4,706	133	354	15	16	2.4	1.4	4.4	2,282	9E+03	6E+03	3E+03
5GDO115	240	1,431	39	32	5	6	0.6	0.4	1.4	687	3E+03	2E+03	1E+03
5GDO116	758	4,311	114	76	18	15	1.8	1.1	3.8	2,041	8E+03	5E+03	3E+03
6DDO57	145	550	20	135	6	2	0.9	0.2	0.5	261	9E+02	1E+03	1E+03
6DDO184	5	15	13	240	3	1	1.0	0.1	0.2	5	3E+01	3E+00	5E+01
6DDO91	5	15	27	528	6	2	2.2	0.3	0.5	5	3E+01	3E+00	5E+01
6DDO187	85	265	11	42	2	7	0.3	0.1	0.4	111	9E+02	1E+03	1E+03
6DDO86	5	15	5	81	1	0	0.4	0.0	0.1	5	3E+01	3E+00	5E+01
6DDO85	35	174	8	50	2	1	0.4	0.1	0.2	78	3E+02	2E+02	2E+02
6DDO83	165	730	36	286	10	4	1.8	0.3	0.8	328	1E+03	9E+02	1E+03
6DDO84	7	32	2	19	1	0	0.1	0.0	0.0	13	5E+01	2E+01	6E+01
06D097	33	103	13	148	5	1	0.9	0.1	0.2	31	2E+02	4E+01	5E+02
6GDO109	1,579	8,525	236	248	48	32	5.0	2.3	7.4	4,009	2E+04	1E+04	1E+04
6GDO110	1,814	10,619	293	334	44	39	5.0	2.9	9.2	5,025	2E+04	1E+04	9E+03
6GDO111	277	1,202	60	575	14	6	3.0	0.6	1.5	563	2E+03	1E+03	1E+03
6GDO166	159	572	39	503	9	4	2.3	0.4	0.9	272	9E+02	5E+02	6E+02
6GDO108	4,936	28,520	775	842	118	110	13.3	7.6	25.4	13,558	6E+04	4E+04	3E+04
6G165	31	127	5	41	1	1	0.2	0.0	0.1	63	2E+02	2E+02	1E+02
6HDO43	80	380	14	64	4	2	0.5	0.1	0.3	172	7E+02	4E+02	5E+02
6HDO106	232	1,072	36	172	7	4	1.1	0.3	1.0	519	2E+03	1E+03	8E+02

Table D. Pollutant Loads of Recommended Implementation Plan by SDO Area

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
6HDO107	515	2,574	84	396	16	10	2.6	0.8	2.5	1,235	5E+03	3E+03	2E+03
7CDO006	6,440	30,049	1,078	6,839	194	112	37.5	10.6	32.7	14,573	6E+04	4E+04	5E+04
7HDO285	6,412	31,379	944	2,182	215	132	25.2	8.6	31.0	14,764	6E+04	4E+04	4E+04
7HDO105	9,620	50,001	1,584	5,862	306	218	44.6	15.1	47.8	23,766	1E+05	6E+04	7E+04
7HDO348	47	304	8	9	1	1	0.1	0.1	0.3	147	6E+02	4E+02	2E+02
7HDO347	324	1,624	52	194	11	6	1.5	0.5	1.5	765	3E+03	2E+03	2E+03
7HDO346	297	1,827	49	66	5	6	0.7	0.5	1.6	877	4E+03	2E+03	1E+03
8BDO122	1,637	9,230	230	267	32	23	3.9	3.4	12.7	4,299	2E+04	1E+04	8E+03
8BDO66	2	4	0	2	0	0	0.0	0.0	0.0	2	6E-01	1E+00	1E+00
8BDO126	900	5,742	145	118	12	20	1.5	1.6	5.3	2,748	1E+04	7E+03	4E+03
8CDO25	210	691	42	425	9	5	2.1	0.4	1.0	362	2E+03	2E+03	2E+03
8CDO26	196	685	39	365	8	5	1.8	0.3	1.0	361	2E+03	1E+03	2E+03
8DDO112	33	191	5	7	1	1	0.1	0.0	0.2	91	4E+02	4E+02	3E+02
8DSDO100	89	284	15	165	3	4	0.8	0.1	0.4	135	7E+02	1E+03	1E+03
8EDO35	139	395	29	425	8	2	1.9	0.3	0.6	197	5E+02	2E+03	2E+03
8EDO33	508	3,178	89	240	9	11	1.6	0.9	2.9	1,518	6E+03	4E+03	2E+03
8IDO153	40	264	6	3	0	1	0.0	0.1	0.2	127	5E+02	3E+02	2E+02
8IDO155	27	100	5	55	1	0	0.2	0.0	0.1	50	2E+02	4E+02	4E+02
8IDO156	349	742	46	558	19	4	3.3	0.3	0.7	324	5E+02	1E+02	8E+02
8IDO209	104	659	17	18	1	2	0.2	0.2	0.6	316	1E+03	9E+02	5E+02
8IDO154	928	5,190	142	238	22	24	2.7	1.5	5.1	2,436	1E+04	8E+03	6E+03
8IDO158	391	2,302	64	123	8	9	1.2	0.7	2.6	1,096	4E+03	3E+03	2E+03
8IDO207	57	293	11	77	2	2	0.4	0.1	0.3	139	5E+02	5E+02	4E+02
8J102	1,217	7,613	196	222	23	29	2.9	2.3	8.3	3,593	1E+04	9E+03	6E+03
8JSDO103	1,034	6,210	170	300	22	22	3.0	1.7	5.6	2,959	1E+04	7E+03	5E+03
8JSDO41	592	3,788	98	97	11	14	1.3	1.1	3.7	1,792	7E+03	4E+03	3E+03
8JSDO50	1,313	6,899	188	341	37	29	4.3	2.2	7.5	3,221	1E+04	1E+04	8E+03
8K049	172	1,016	29	60	5	4	0.6	0.3	0.9	478	2E+03	1E+03	9E+02
9BDO49	344	949	35	144	6	23	1.0	0.2	1.6	427	3E+03	7E+03	8E+03
9EDO229	64	320	9	17	2	1	0.2	0.1	0.3	149	6E+02	4E+02	3E+02
9EDO243	184	648	24	162	6	4	1.0	0.2	0.6	307	1E+03	2E+03	2E+03
9K100	58	160	8	54	2	5	0.3	0.0	0.3	65	7E+02	1E+03	1E+03
9K101	695	2,554	106	803	25	22	4.5	0.9	3.0	1,199	5E+03	7E+03	7E+03
9K016	69	210	27	421	7	3	1.9	0.2	0.6	94	3E+02	5E+02	6E+02
9LSDO095	247	941	40	321	7	11	1.5	0.4	1.3	449	2E+03	2E+03	3E+03
10BSDO62	33	60	1	1	1	0	0.0	0.0	0.1	31	8E+00	5E-01	1E+01
10BSDO15	38	96	3	9	1	1	0.1	0.0	0.2	47	2E+02	5E+02	6E+02
10BSDO64	127	373	15	61	4	3	0.5	0.1	0.7	257	6E+02	7E+02	8E+02
10L094	15,212	83,996	2,265	3,770	329	340	40.8	23.4	81.8	40,036	2E+05	1E+05	9E+04
10L096	1,648	9,958	270	259	28	66	3.6	2.6	9.9	4,639	2E+04	2E+04	1E+04
11BDO28	13,382	61,516	2,612	21,708	476	375	107.2	25.0	73.5	29,748	1E+05	9E+04	8E+04
11BDO123	2,585	13,257	389	727	69	70	8.3	3.5	12.1	6,227	3E+04	2E+04	2E+04
11IDO577	28,454	136,172	4,734	13,367	1,550	684	177.1	39.1	125.2	60,003	3E+05	1E+05	2E+05
11M093	1,174	4,200	169	707	35	22	5.2	1.3	5.0	2,239	9E+03	6E+03	8E+03
12BDO10	13	31	2	19	0	1	0.1	0.0	0.1	13	1E+02	2E+02	2E+02
12BDO14	30	73	4	41	1	2	0.2	0.0	0.1	32	2E+02	5E+02	5E+02
12BDO124	9,517	50,699	1,556	6,023	220	228	37.6	15.5	49.6	24,545	1E+05	7E+04	6E+04
12EDO418	226	996	35	82	4	5	0.6	0.3	0.9	516	2E+03	2E+03	1E+03

Table D. Pollutant Loads of Recommended Implementation Plan by SDO Area

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
12FSDO305	159	780	21	63	3	3	0.5	0.2	0.7	376	1E+03	1E+03	1E+03
12HOFDO92	836	2,274	390	2,912	106	109	23.4	3.2	10.8	2,050	3E+03	6E+03	8E+03
12HDO85/87	376	1,099	63	480	14	34	2.7	0.4	2.2	441	4E+03	8E+03	9E+03
12L092	2,446	11,060	348	928	85	49	10.1	3.2	11.2	5,221	2E+04	1E+04	1E+04
12LDO296	532	2,502	75	243	14	10	2.0	0.7	2.7	1,223	4E+03	3E+03	2E+03
12M091	377	1,350	57	272	10	7	1.7	0.4	1.5	722	3E+03	2E+03	2E+03
13DSDO078	1,965	5,964	247	1,441	107	31	13.0	1.6	4.5	2,612	9E+03	7E+03	1E+04
13EDO177	58	123	8	107	3	1	0.5	0.1	0.1	60	9E+01	4E+02	5E+02
13EDO174	1,368	7,665	196	283	22	25	2.7	2.1	6.9	3,696	1E+04	1E+04	6E+03
13EDO176	40	94	5	77	2	1	0.4	0.1	0.2	45	7E+01	3E+02	3E+02
13FDO95	11	25	1	19	0	0	0.1	0.0	0.0	13	3E+01	2E+02	2E+02
13FDO011	27	51	1	1	1	0	0.0	0.0	0.0	25	3E+01	1E+02	1E+02
13F093	115	305	8	81	3	3	0.5	0.2	0.9	139	4E+02	1E+03	2E+03
13L090	35,583	169,903	5,410	5,089	1,870	805	179.2	40.8	143.2	75,251	3E+05	2E+05	2E+05
14CDO9	744	4,286	156	880	27	22	5.2	1.5	4.4	1,991	9E+03	6E+03	5E+03
15FSDO288	1,680	7,863	272	1,738	48	31	9.3	2.7	8.2	3,798	2E+04	1E+04	1E+04
15L089	14,404	64,662	2,153	4,532	681	320	73.4	16.7	59.2	29,674	1E+05	7E+04	9E+04
15L088	7,272	43,571	1,146	279	167	198	17.3	11.5	45.7	20,775	8E+04	6E+04	4E+04
16L097	593	1,824	72	571	19	39	3.5	1.3	6.2	750	4E+03	8E+03	8E+03
16LSDO122	8,723	44,276	1,336	2,396	286	281	33.1	11.6	45.5	20,599	9E+04	7E+04	7E+04
17M033	5,786	28,043	794	1,720	126	309	17.6	11.3	50.8	12,662	7E+04	7E+04	7E+04
18GSDO233	3,884	16,829	495	549	77	131	8.7	4.2	21.3	7,459	5E+04	6E+04	6E+04
19GDO043	4,870	31,666	803	327	97	118	10.6	9.1	31.2	14,955	6E+04	4E+04	3E+04
19GDO194	408	2,047	65	169	17	9	2.0	0.7	2.4	955	4E+03	3E+03	3E+03
19G199	57	162	2	2	1	1	0.1	0.1	0.7	71	1E+02	6E+02	6E+02
20G163	299	1,175	9	24	8	8	1.0	1.7	7.5	451	1E+03	4E+03	4E+03
20L083	216	916	26	7	4	8	0.6	0.1	2.0	492	5E+02	8E+02	8E+02
20L081	-	-	-	-	-	-	-	-	-	-	-	-	-
21CSDO212	10	42	2	5	1	0	0.1	0.0	0.0	18	7E+01	4E+01	7E+01
21H048	116	332	4	3	3	3	0.2	0.3	1.3	143	2E+02	3E+02	3E+02
21KSDO069	9,090	51,618	1,348	877	227	289	24.4	15.3	61.6	23,905	1E+05	8E+04	7E+04
21M005	160	448	12	35	4	3	0.4	0.1	0.9	237	2E+02	3E+02	3E+02
21M010	974	3,218	83	55	20	24	2.3	0.4	7.0	1,712	2E+03	2E+03	3E+03
21M050	458	1,290	31	19	10	8	0.9	0.2	2.9	682	1E+03	8E+02	2E+03
22CDO384	2,293	7,782	330	1,811	131	46	16.4	2.2	6.5	3,407	1E+04	7E+03	1E+04
22LSDO580	1,251	4,497	122	59	25	32	3.1	0.6	11.8	2,470	3E+03	3E+03	4E+03
23GDO132	4,573	9,722	271	2,118	127	66	15.8	3.8	16.5	4,500	8E+03	9E+03	1E+04
23HSDO042	18,012	77,456	2,676	4,895	883	545	98.7	25.2	99.6	35,325	1E+05	1E+05	1E+05
23HDO040	2,649	15,690	406	312	60	75	6.7	4.4	16.6	7,323	3E+04	2E+04	2E+04
23L196	147	291	7	33	4	1	0.4	0.1	0.7	147	1E+02	4E+01	2E+02
23L075	656	1,592	48	205	19	7	2.1	0.3	3.3	836	2E+03	7E+02	3E+03
23L074	147	308	7	19	4	1	0.3	0.0	0.4	160	9E+01	6E+01	1E+02
23L195	153	290	9	71	4	1	0.5	0.1	0.7	155	2E+02	6E+01	3E+02
23L202	156	299	7	33	4	0	0.3	0.0	0.7	160	3E+02	5E+01	6E+02
23L016	122	241	6	33	3	0	0.3	0.0	0.5	131	4E+02	7E+01	7E+02
23L015	158	273	11	133	5	1	0.7	0.1	0.5	137	3E+01	4E+01	5E+01
23L164	960	2,380	77	87	23	48	2.0	0.3	5.1	1,080	8E+03	1E+04	1E+04
24CSDO031	311	1,938	51	49	4	7	0.6	0.5	1.9	955	4E+03	2E+03	1E+03

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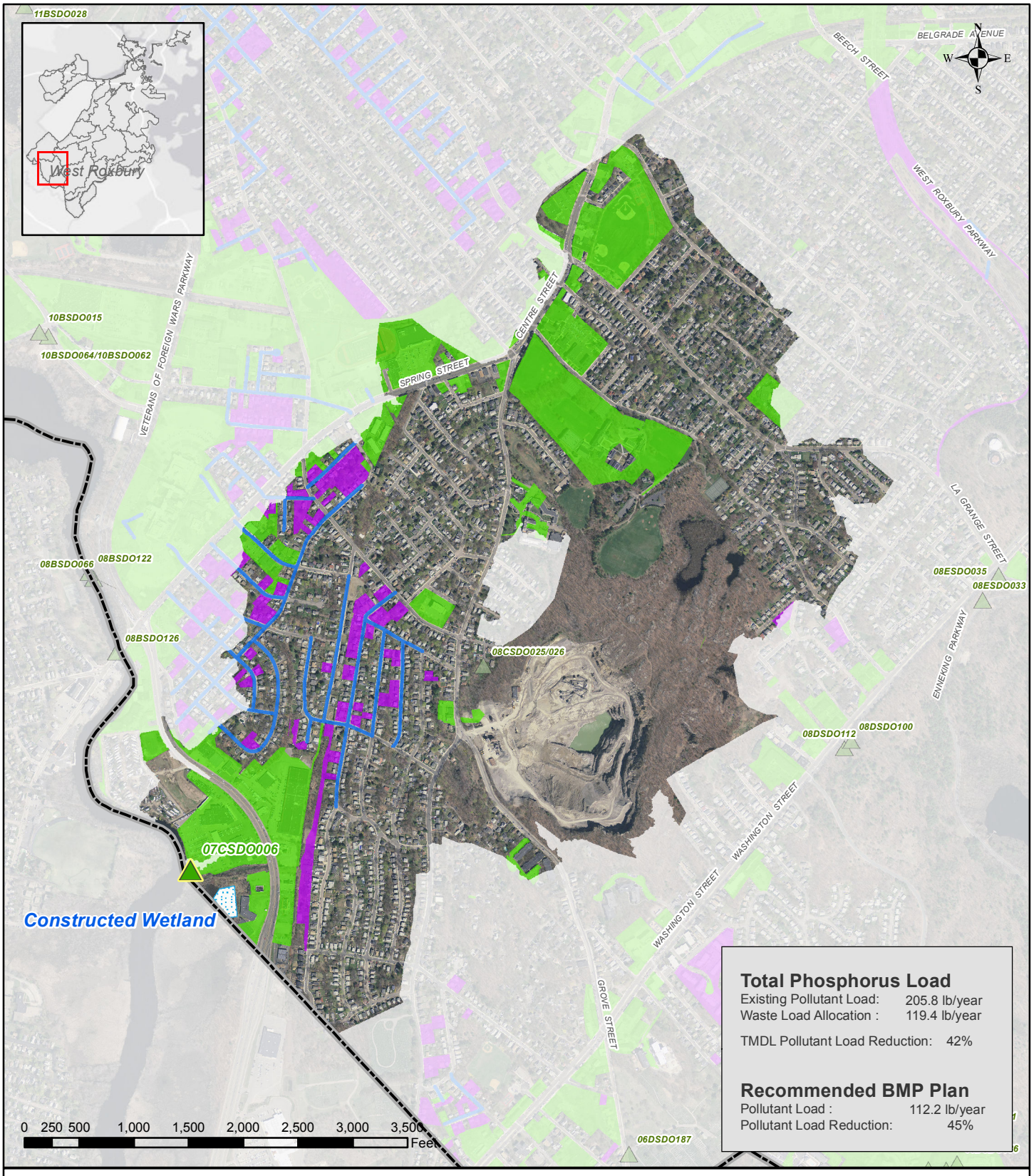
Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
24CDO174	1,757	9,068	287	985	44	29	6.9	2.7	9.5	4,386	2E+04	2E+04	2E+04
24DSDO150	36	85	2	20	1	0	0.1	0.0	0.1	46	8E+01	6E+02	6E+02
24DSDO032	15,675	81,498	2,982	8,635	685	409	89.3	27.1	88.8	43,372	2E+05	9E+04	9E+04
24GSDO035	19,731	111,554	2,988	4,501	378	530	48.6	32.7	120.3	53,580	2E+05	2E+05	1E+05
24GSDO034	1,774	6,610	172	855	42	26	5.8	2.5	11.0	3,225	1E+04	2E+04	2E+04
24L233	451	1,311	33	82	23	12	2.3	1.1	5.0	504	1E+03	9E+02	3E+03
25DDO040	572	2,779	81	190	12	20	1.7	1.0	4.4	1,328	6E+03	5E+03	4E+03
25EDO037	14,815	77,015	2,053	3,098	297	351	37.0	23.4	96.6	36,714	2E+05	1E+05	9E+04
25GDO041	75	257	9	29	6	3	0.6	0.2	1.0	88	3E+02	2E+02	6E+02
25GDO-06	235	626	18	216	9	6	1.4	0.7	3.3	263	3E+02	4E+02	5E+02
26J049	8,370	22,980	855	578	581	165	50.6	5.7	31.8	8,811	4E+04	2E+04	7E+04
25L144	521	3,608	86	9	10	13	1.1	1.0	3.2	1,670	8E+03	5E+03	3E+03
25L058	4,668	24,758	643	462	91	170	9.8	6.7	28.6	11,515	6E+04	5E+04	4E+04
26FDO038	46	144	14	137	7	2	1.0	0.1	0.2	43	3E+02	5E+01	6E+02
26GSDO01	3,835	17,696	514	1,830	126	90	16.8	7.6	29.1	8,231	3E+04	2E+04	2E+04
26JSDO052	43	82	4	63	2	0	0.3	0.1	0.2	39	1E+01	2E+01	2E+01
26JSDO100	162	427	22	78	14	3	1.4	0.1	0.2	149	7E+02	1E+02	1E+03
26J101	460	1,101	63	491	33	10	4.2	0.4	1.2	425	2E+03	8E+02	3E+03
26KSDO254	351	1,186	44	108	5	35	0.9	0.2	2.6	515	5E+03	8E+03	9E+03
26K035	198	415	11	31	6	1	0.5	0.1	1.1	223	5E+02	8E+01	9E+02
26K099	12,625	80,028	1,933	732	179	369	20.8	23.0	85.6	37,611	2E+05	1E+05	8E+04
26L055	174	1,005	28	12	7	4	0.6	0.2	0.8	458	2E+03	1E+03	1E+03
26LSDO084	72	211	10	14	7	1	0.6	0.0	0.1	75	3E+02	5E+02	1E+03
26L070	224	385	5	17	4	0	0.3	0.0	0.1	192	7E+01	1E+01	1E+02
27JSDO044	396	784	30	354	13	6	2.0	0.5	2.1	369	4E+02	6E+02	6E+02
27JSDO096	2,125	4,257	95	301	55	15	4.5	0.6	4.7	2,109	2E+03	4E+03	5E+03
27JSDO001	7,922	45,085	1,135	1,483	136	263	18.1	13.5	55.3	21,032	1E+05	7E+04	6E+04
27L022	2,300	13,816	328	278	46	67	5.5	5.2	19.8	6,394	3E+04	2E+04	1E+04
27L020	2,179	12,971	309	276	45	63	5.3	4.9	18.6	5,986	3E+04	2E+04	1E+04
28K061	4,439	28,396	718	338	69	138	8.0	7.6	27.1	13,338	6E+04	5E+04	3E+04
28K010	3,931	27,029	665	234	49	106	6.1	7.4	25.1	12,868	6E+04	4E+04	2E+04
28K386	726	1,768	58	351	19	22	2.6	0.6	3.9	856	2E+03	3E+03	4E+03
28L073	79	238	9	69	5	1	0.6	0.1	0.1	109	4E+02	2E+03	3E+03
28L074/5/6	1,250	3,597	107	686	51	22	6.3	2.1	8.6	1,588	5E+03	7E+03	1E+04
28N156	339	1,907	54	99	6	13	0.8	0.5	1.9	911	4E+03	3E+03	3E+03
28N207	3,333	20,136	520	404	67	100	7.7	5.9	21.4	9,450	4E+04	3E+04	2E+04
28O025	54	244	9	17	1	2	0.2	0.1	0.2	122	7E+02	6E+02	6E+02
28P001	320	2,121	53	20	5	7	0.5	0.6	1.9	1,024	4E+03	3E+03	1E+03
29J129	177	324	13	140	5	3	0.8	0.1	0.5	158	2E+02	4E+02	4E+02
29J029	384	993	42	176	7	33	1.1	0.2	1.9	412	4E+03	7E+03	7E+03
29J212	17,718	113,685	2,771	1,016	263	545	31.1	32.3	122.4	53,514	2E+05	2E+05	1E+05
29M049	1,306	7,141	198	161	36	49	3.8	2.0	7.6	3,261	2E+04	1E+04	1E+04
29N015	134	575	18	26	3	6	0.5	0.1	1.3	311	3E+02	5E+02	6E+02
29N135	424	2,308	62	139	7	10	1.2	0.6	2.7	1,124	4E+03	3E+03	2E+03
29O001	11,795	72,297	1,919	2,092	238	306	29.2	20.0	69.8	34,436	1E+05	1E+05	7E+04
29P015	80	538	14	12	1	2	0.2	0.1	0.5	259	1E+03	6E+02	4E+02
29P044	613	4,087	105	73	10	14	1.2	1.1	3.6	1,958	8E+03	5E+03	3E+03
30J006	243	697	25	166	8	5	1.2	0.2	1.0	347	9E+02	3E+03	4E+03

Table D. Pollutant Loads of Recommended Implementation Plan by SDO Area

Outfall ID	BOD5	COD	TKN	Nitrate + Nitrite	Ammonia	Total Phosphorus	Ortho-phosphate	Total Copper	Total Zinc	TSS	E. coli	Entero-coccus	Fecal Coliform
	lb/yr										10^9 CFU/yr		
30J019	68	186	7	90	2	1	0.5	0.1	0.5	92	1E+02	7E+02	8E+02
30J030	756	1,596	38	137	18	6	1.7	0.2	2.6	825	5E+02	6E+02	9E+02
30P107	362	1,891	69	92	6	10	0.9	0.5	1.6	947	4E+03	3E+03	2E+03
30P062	307	2,029	52	44	5	7	0.6	0.6	1.8	988	4E+03	2E+03	1E+03
31O004	1,031	6,098	214	137	18	33	2.3	1.4	4.6	2,937	2E+04	1E+04	7E+03
31P084	316	1,934	49	67	4	7	0.6	0.5	1.8	937	4E+03	2E+03	1E+03
3FDO159	327	1,373	60	484	14	7	2.7	0.5	1.5	649	2E+03	2E+03	2E+03
11G318/319	276	744	64	745	12	27	3.4	0.5	1.9	303	3E+03	5E+03	5E+03
6FSDO233	8	17	4	82	1	0	0.3	0.0	0.1	8	1E+01	2E+01	2E+01
17FDO012	2,508	5,482	124	74	50	71	3.2	0.8	5.4	2,551	3E+04	5E+04	5E+04
21H047	482	1,806	32	77	15	15	1.6	1.5	6.4	751	2E+03	2E+03	2E+03
21H039	1,415	4,378	64	322	43	45	5.0	5.0	21.8	1,746	3E+03	4E+03	5E+03
20G161	2,399	9,833	286	226	64	52	7.0	4.7	20.0	4,467	2E+04	2E+04	2E+04
StonyMWRA	112,362	514,339	18,269	65,911	4,837	3,022	655.1	178.7	604.1	243,611	9E+05	6E+05	7E+05
Fens	68,123	213,408	11,104	17,696	4,539	1,953	528.5	89.1	270.1	106,777	3E+05	2E+05	2E+05
20D055	4,406	27,521	763	495	113	102	12.1	7.8	25.6	13,198	5E+04	3E+04	2E+04
21D319	6,123	39,610	1,079	867	137	145	15.8	11.2	36.6	19,063	8E+04	5E+04	3E+04

Appendix E
Recommended BMP Plan Maps by SDO Catchment

Appendix E-1
Recommended BMP Plan Maps by SDO Catchment: Upper/Middle Charles River Watershed



Total Phosphorus Load

Existing Pollutant Load:	205.8 lb/year
Waste Load Allocation :	119.4 lb/year
TMDL Pollutant Load Reduction:	42%

Recommended BMP Plan

Pollutant Load :	112.2 lb/year
Pollutant Load Reduction:	45%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 96 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 19.3 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 2.8 Miles
- Recommended area: 0.3 Miles

Constructed Wetland

Boston Boundary

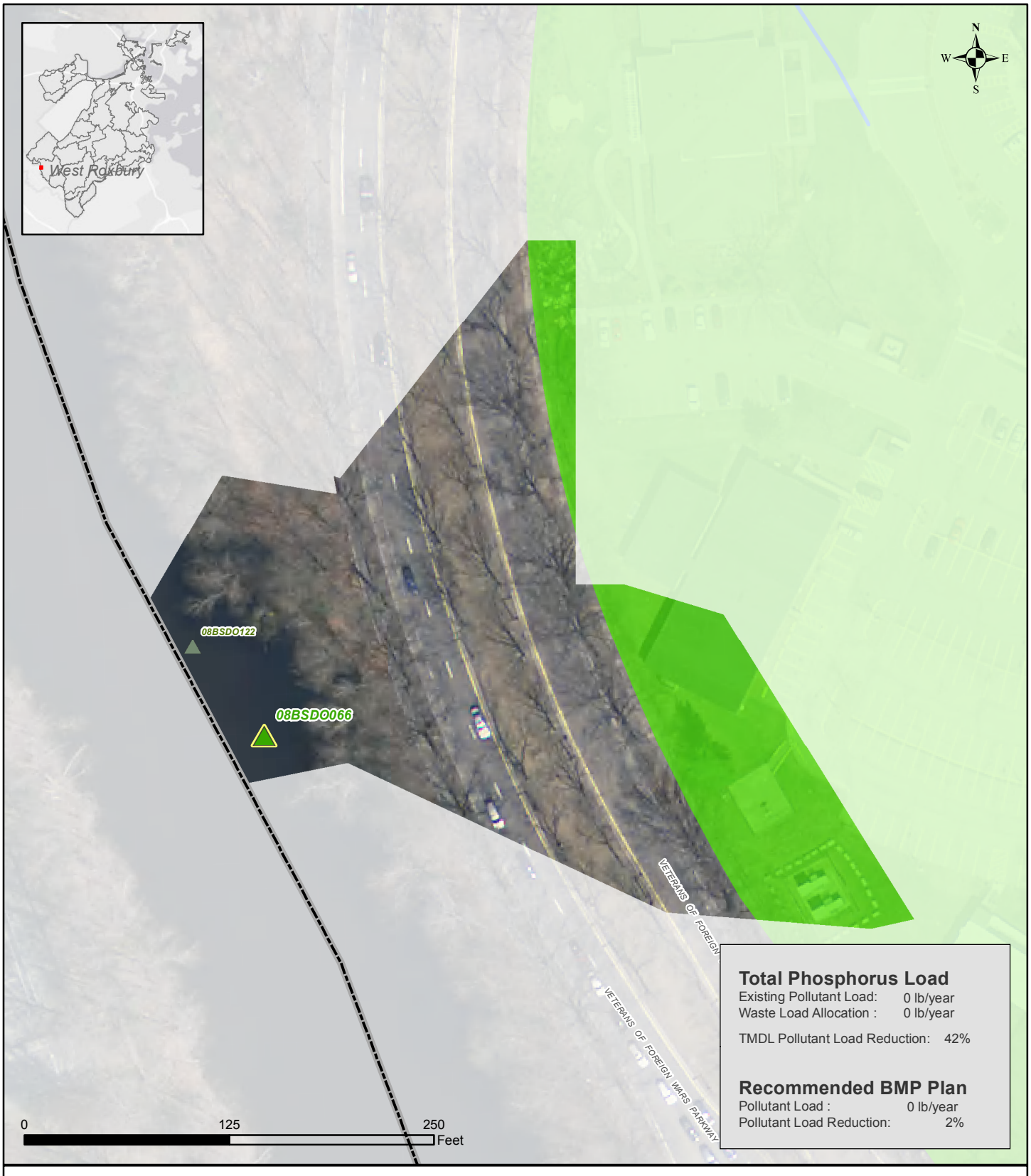
Total Catchment Area: 618.1 Acres

Recommended BMP Plan

Reporting Area: West Roxbury
Catchment: 07CSDO0006

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0 lb/year
Waste Load Allocation : 0 lb/year

TMDL Pollutant Load Reduction: 42%

Recommended BMP Plan

Pollutant Load : 0 lb/year
Pollutant Load Reduction: 2%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.1 Acres

Boston Water and Sewer Commission

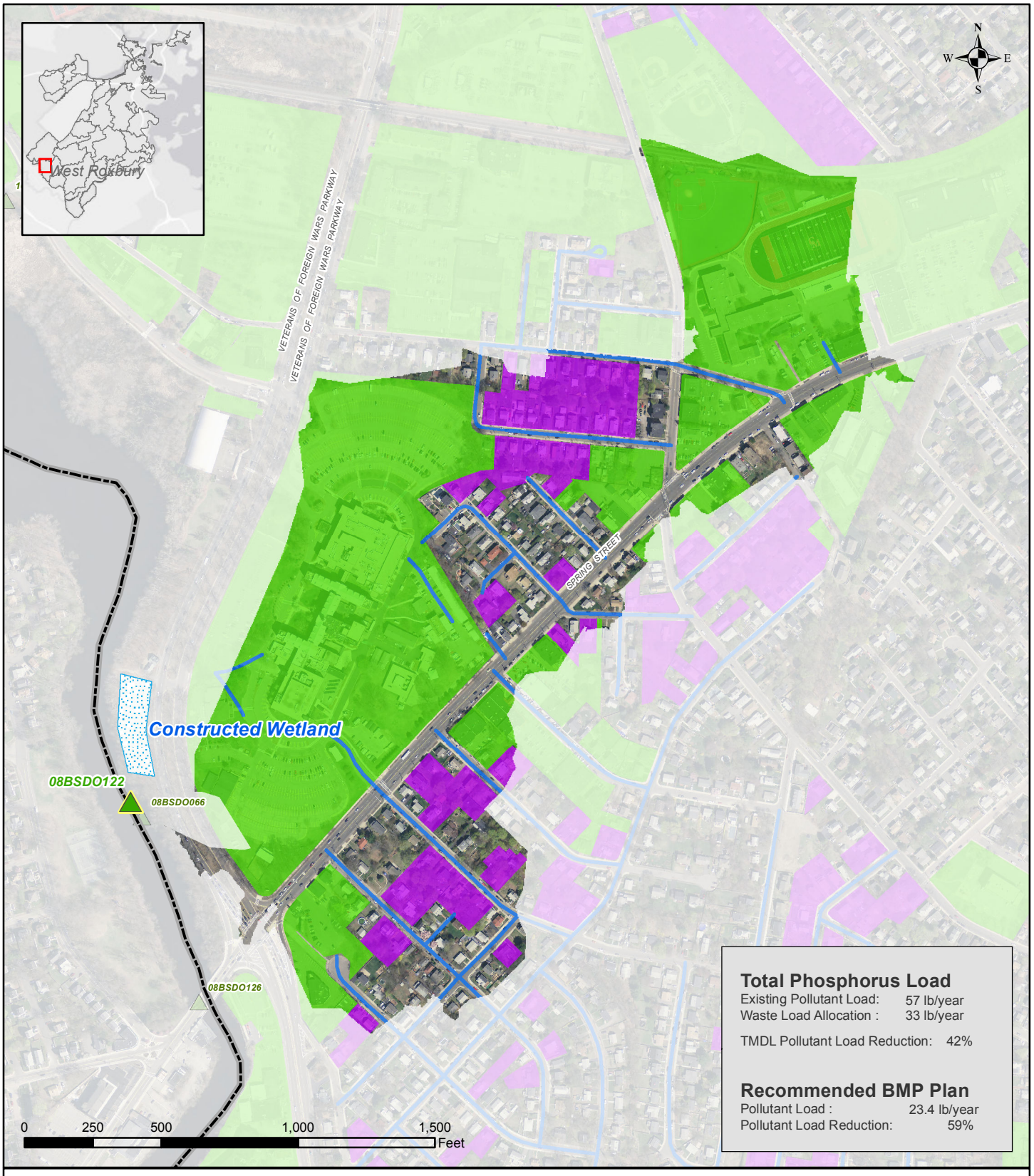
CH2MHILL

Recommended BMP Plan

Reporting Area: West Roxbury
Catchment: 08BSDO066

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 46.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 10.5 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.4 Miles
Recommended area: 0.1 Miles

Constructed Wetland

Boston Boundary

Total Catchment Area: 81.3 Acres

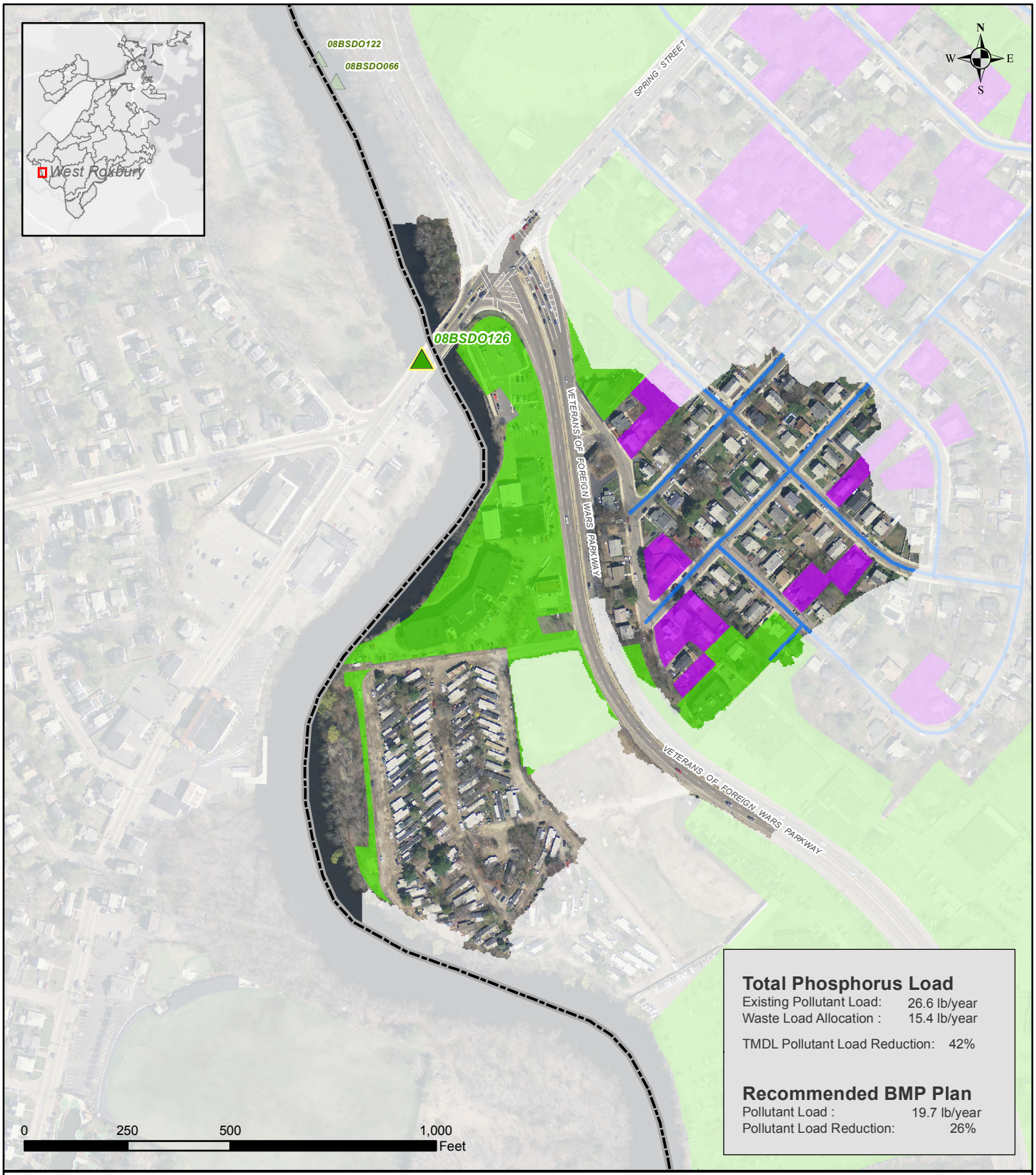
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: West Roxbury
Catchment: 08BSDO122

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 2.1 Acres
Recommended area: 0 Acres

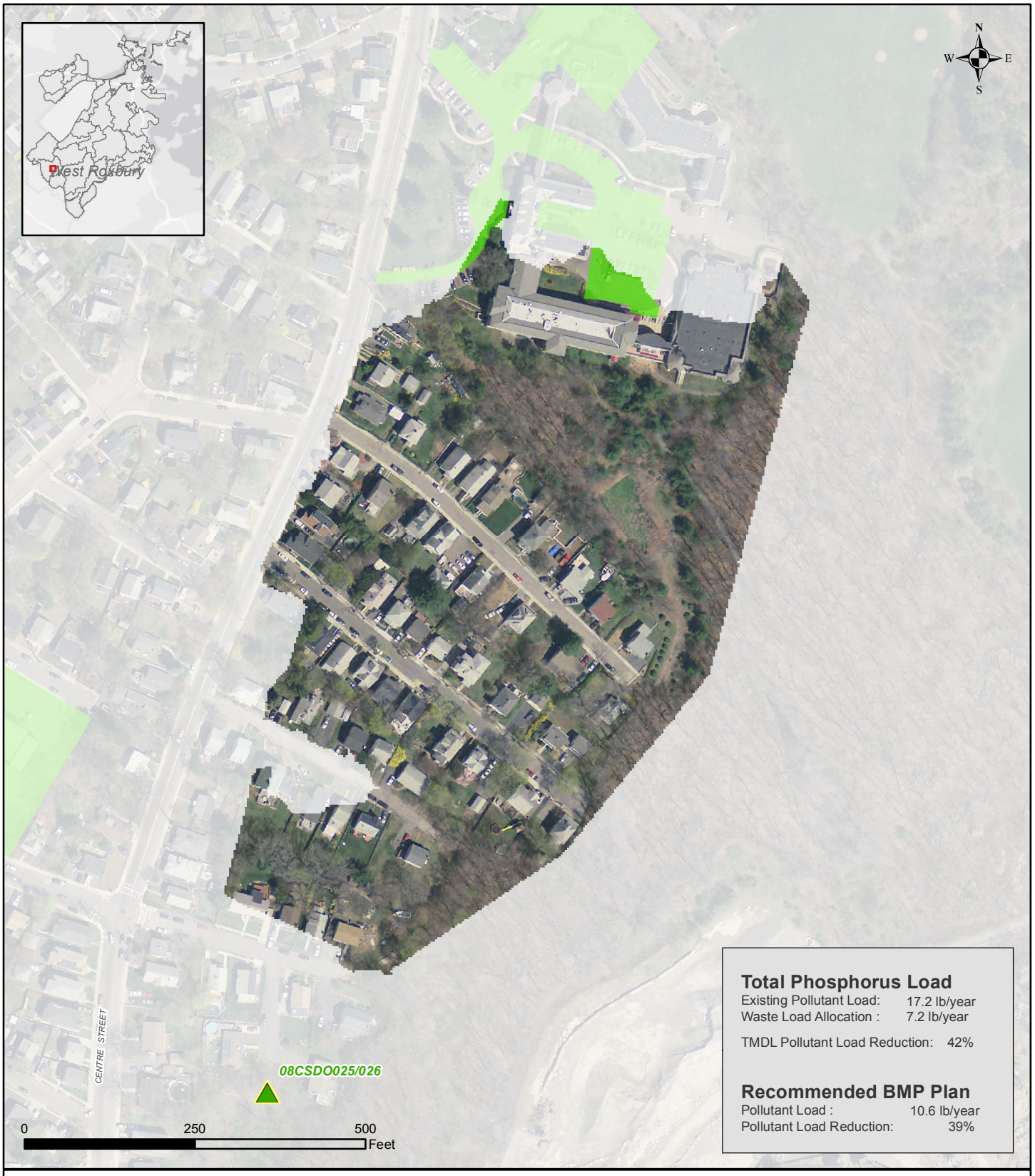
Suitable Public Right of Way
Total area of suitable sites: 0.5 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 39.7 Acres

Recommended BMP Plan
Reporting Area: West Roxbury
Catchment: 08BSDO126

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 17.2 lb/year
Waste Load Allocation : 7.2 lb/year

TMDL Pollutant Load Reduction: 42%

Recommended BMP Plan

Pollutant Load : 10.6 lb/year
Pollutant Load Reduction: 39%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 12.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: West Roxbury
Catchment: 08CSDO025/026

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 25.8 lb/year
Waste Load Allocation : 17.5 lb/year

TMDL Pollutant Load Reduction: 32%

Recommended BMP Plan

Pollutant Load : 23.4 lb/year
Pollutant Load Reduction: 9%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 15.9 Acres
Recommended area: 0.4 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 16.5 Acres

Boston Water and Sewer Commission

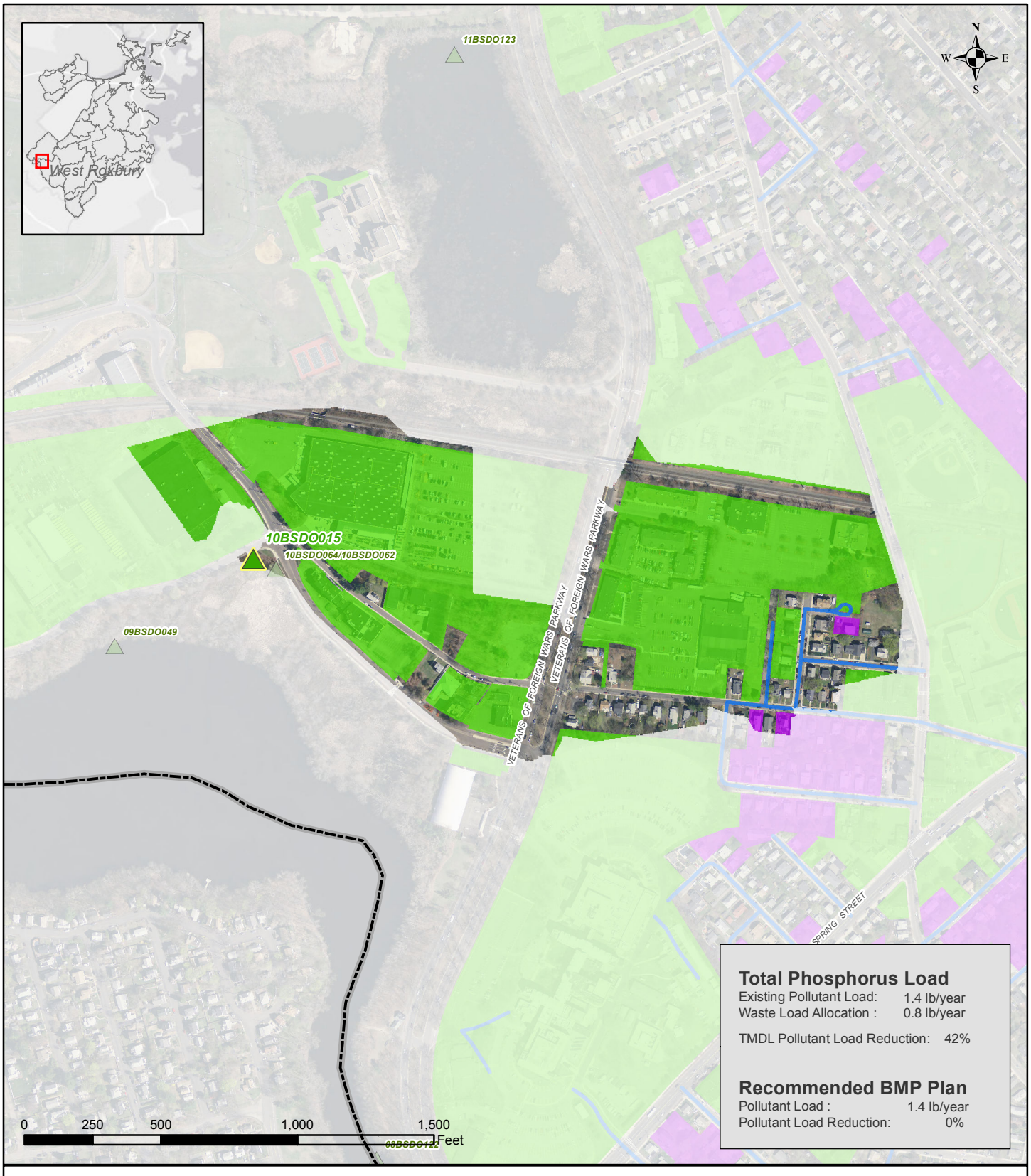
CH2MHILL

Recommended BMP Plan

Reporting Area: Sawmill Brook
Catchment: 09BSDO049

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	1.4 lb/year
Waste Load Allocation :	0.8 lb/year
TMDL Pollutant Load Reduction:	42%

Recommended BMP Plan

Pollutant Load :	1.4 lb/year
Pollutant Load Reduction:	0%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 31.2 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0.6 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.3 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 46.4 Acres

Boston Water and Sewer Commission

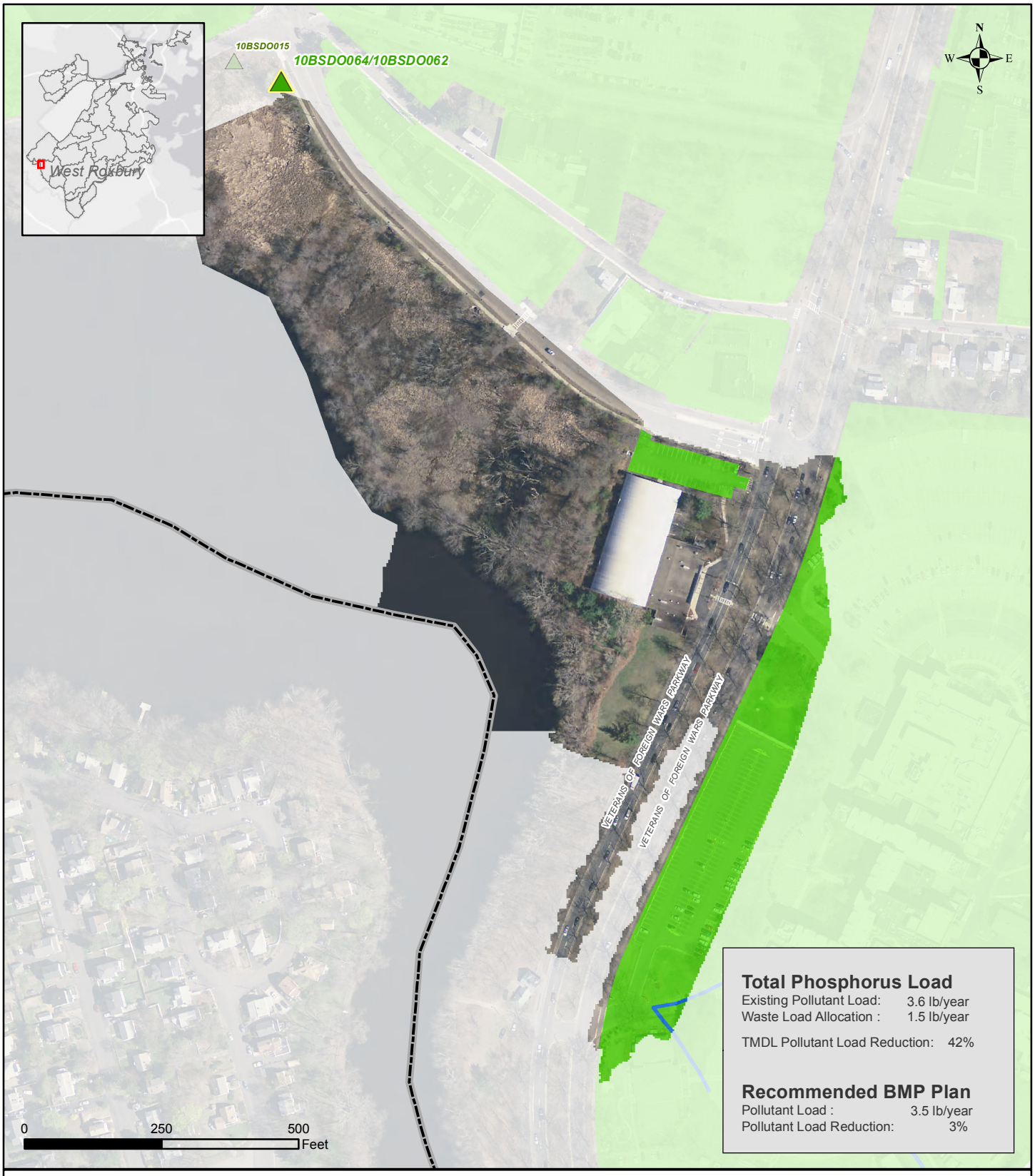
CH2MHILL

Recommended BMP Plan

Reporting Area: West Roxbury
Catchment: 10BSDO015

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 18.5 Acres

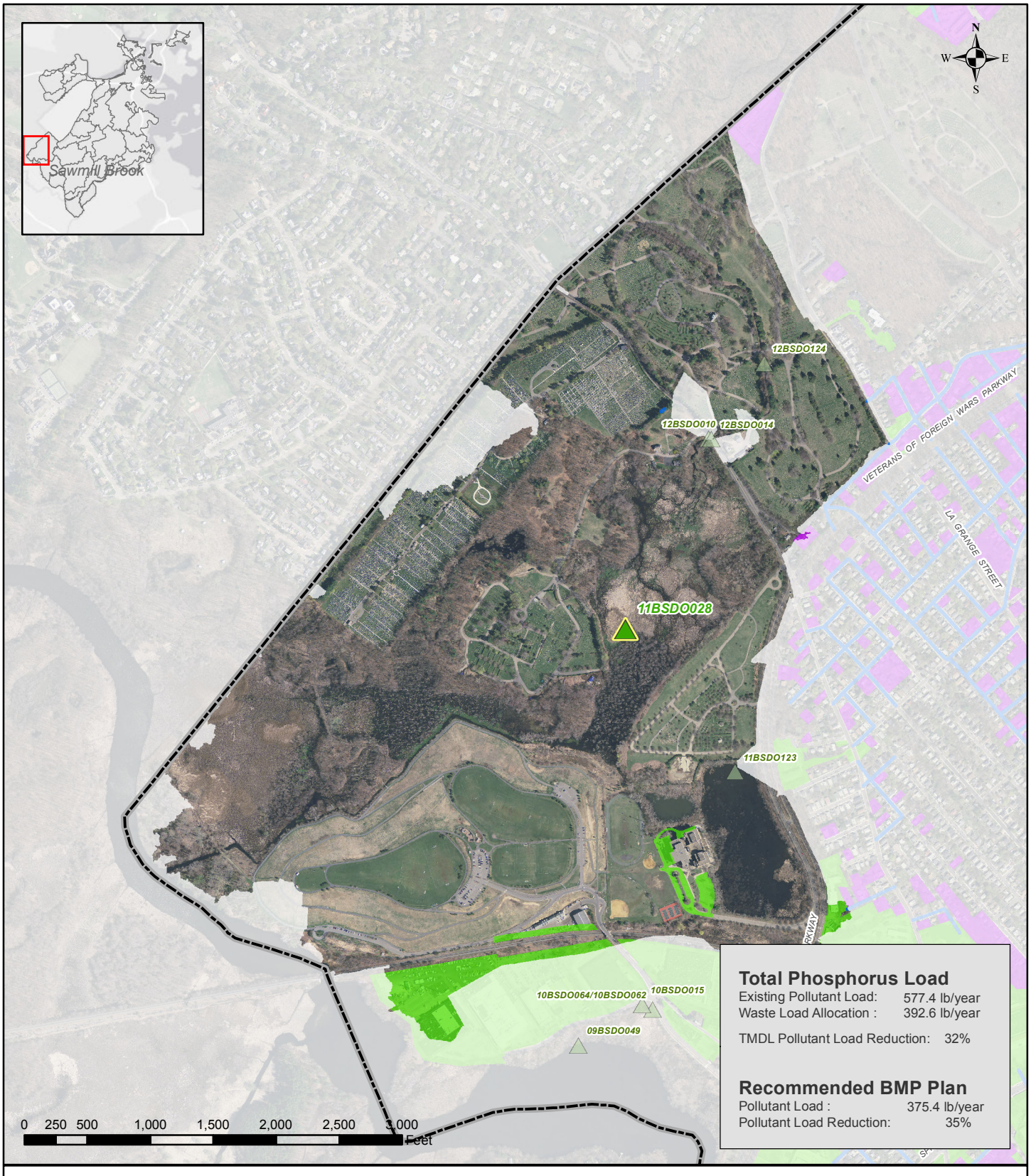
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: West Roxbury
Catchment: 10BSDO064/10BSDO062

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	577.4 lb/year
Waste Load Allocation :	392.6 lb/year
TMDL Pollutant Load Reduction:	32%

Recommended BMP Plan

Pollutant Load :	375.4 lb/year
Pollutant Load Reduction:	35%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 17.3 Acres
- Recommended area: 17.3 Acres

Residential Parcel
- Total area of suitable sites: 0.1 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 504.9 Acres

Boston Water and Sewer Commission

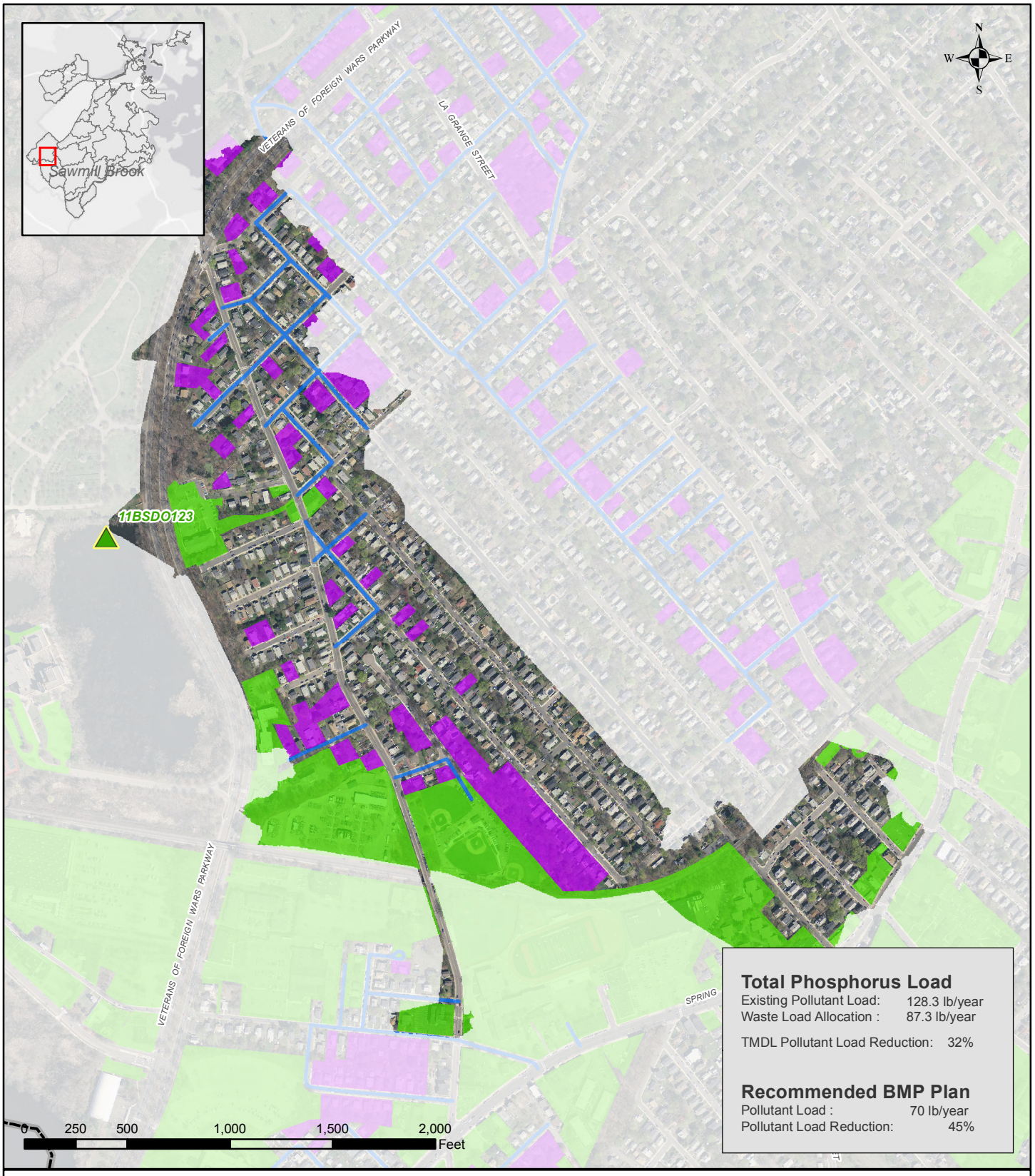
CH2MHILL

Recommended BMP Plan

Reporting Area: Sawmill Brook
Catchment: 11BSDO028

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 23.6 Acres
Recommended area: 0.9 Acres

Residential Parcel
Total area of suitable sites: 13 Acres
Recommended area: 0.7 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.2 Miles
Recommended area: 0.2 Miles

Boston Boundary
Total Catchment Area: 119.9 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Sawmill Brook
Catchment: 11BSDO123

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	1 lb/year
Waste Load Allocation :	0.7 lb/year
TMDL Pollutant Load Reduction:	32%

Recommended BMP Plan

Pollutant Load :	0.9 lb/year
Pollutant Load Reduction:	14%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.9 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Sawmill Brook
Catchment: 12BSDO010

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.1 lb/year
Waste Load Allocation : 1.4 lb/year

TMDL Pollutant Load Reduction: 32%

Recommended BMP Plan

Pollutant Load : 1.9 lb/year
Pollutant Load Reduction: 10%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.8 Acres

Boston Water and Sewer Commission

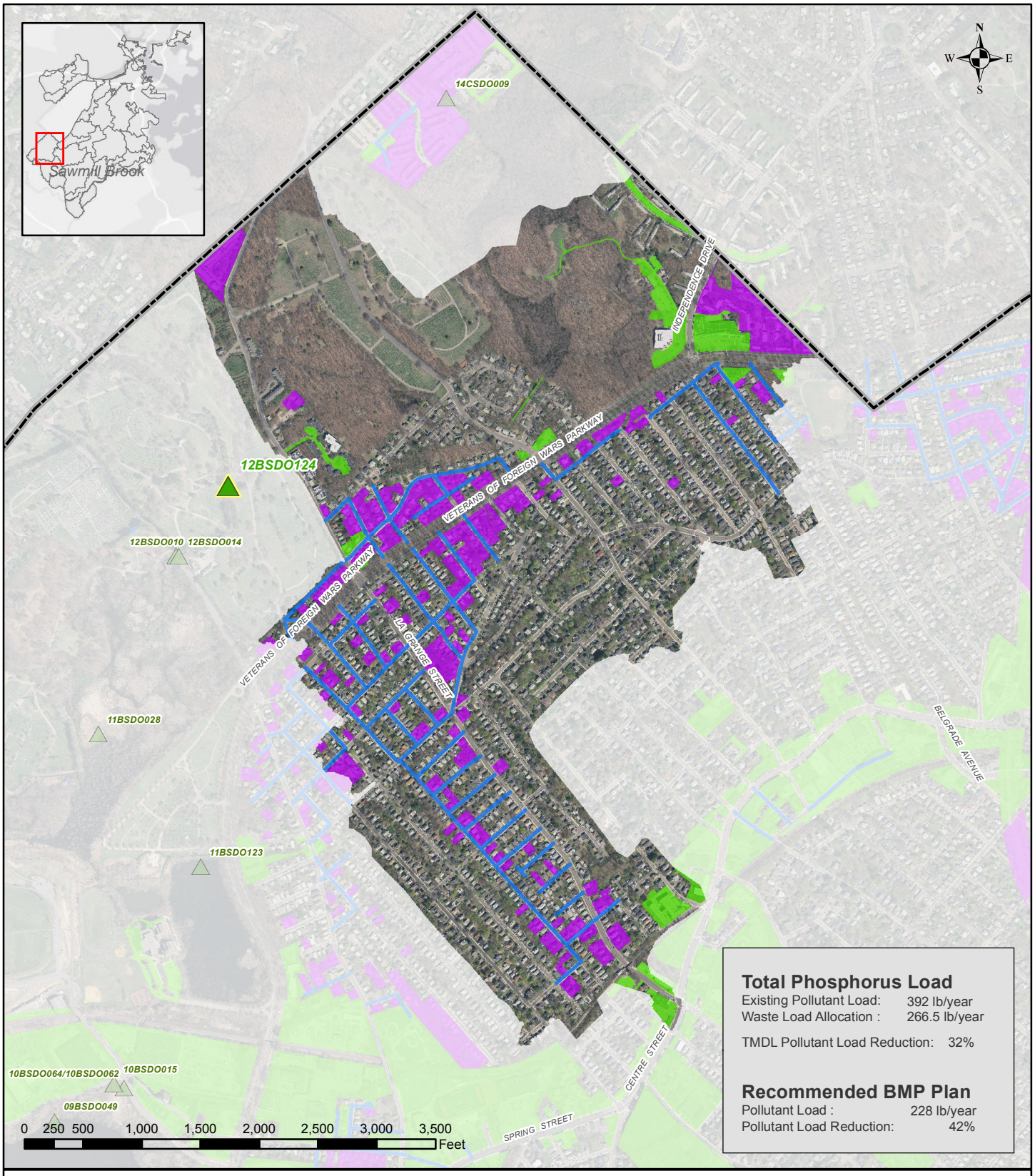
CH2MHILL

Recommended BMP Plan

Reporting Area: Sawmill Brook
Catchment: 12BSDO014

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 392 lb/year
Waste Load Allocation : 266.5 lb/year

TMDL Pollutant Load Reduction: 32%

Recommended BMP Plan

Pollutant Load : 228 lb/year
Pollutant Load Reduction: 42%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 16.4 Acres
Recommended area: 6.2 Acres

Residential Parcel
Total area of suitable sites: 44.2 Acres
Recommended area: 3.8 Acres

Suitable Public Right of Way
Total area of suitable sites: 5.2 Miles
Recommended area: 1.2 Miles

Boston Boundary
Total Catchment Area: 518.0 Acres

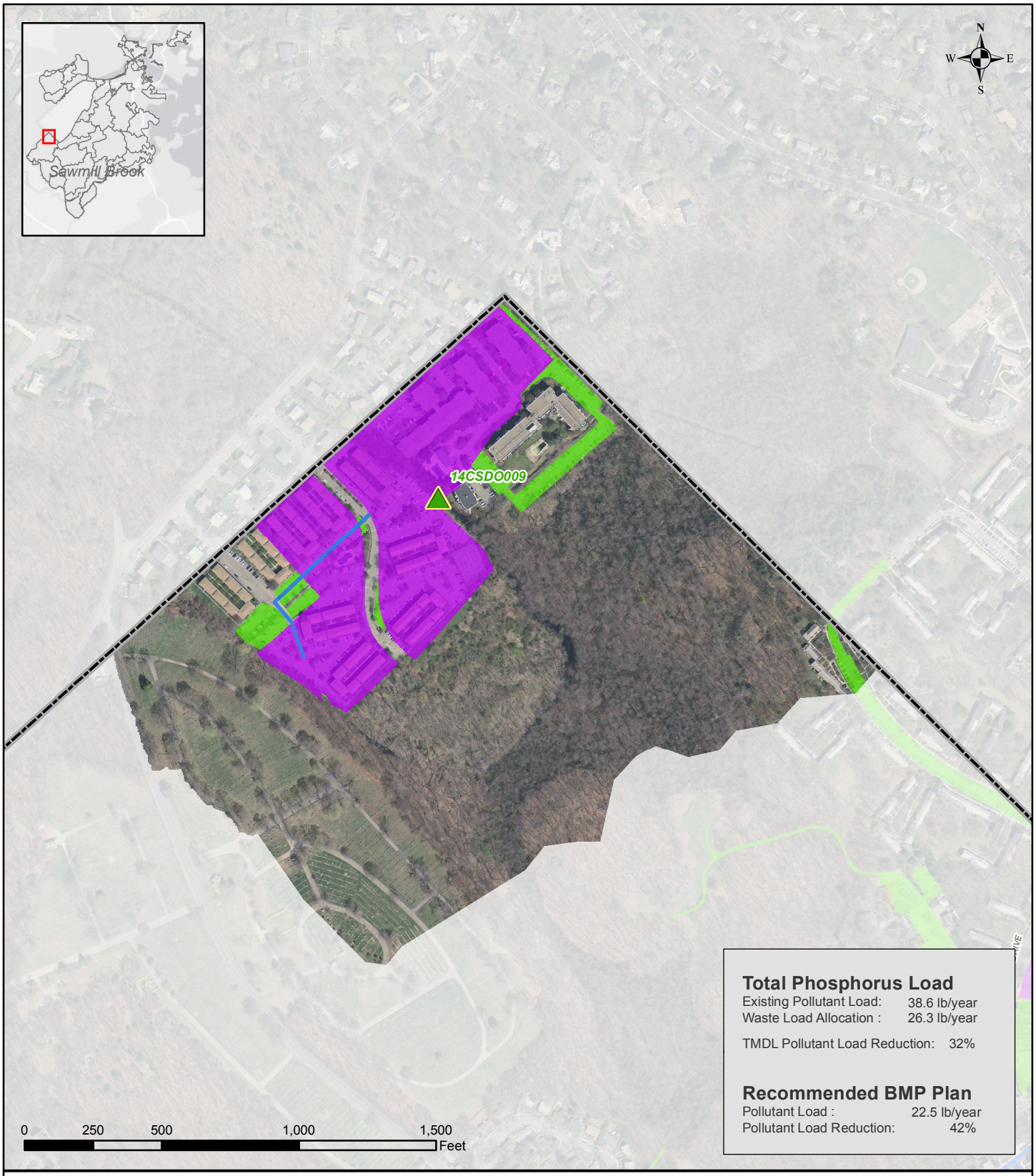
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Sawmill Brook
Catchment: 12BSDO124

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	38.6 lb/year
Waste Load Allocation :	26.3 lb/year
TMDL Pollutant Load Reduction:	32%

Recommended BMP Plan

Pollutant Load :	22.5 lb/year
Pollutant Load Reduction:	42%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 2.7 Acres
- Recommended area: 0.7 Acres

Residential Parcel
- Total area of suitable sites: 15.8 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.1 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 108.8 Acres

Boston Water and Sewer Commission

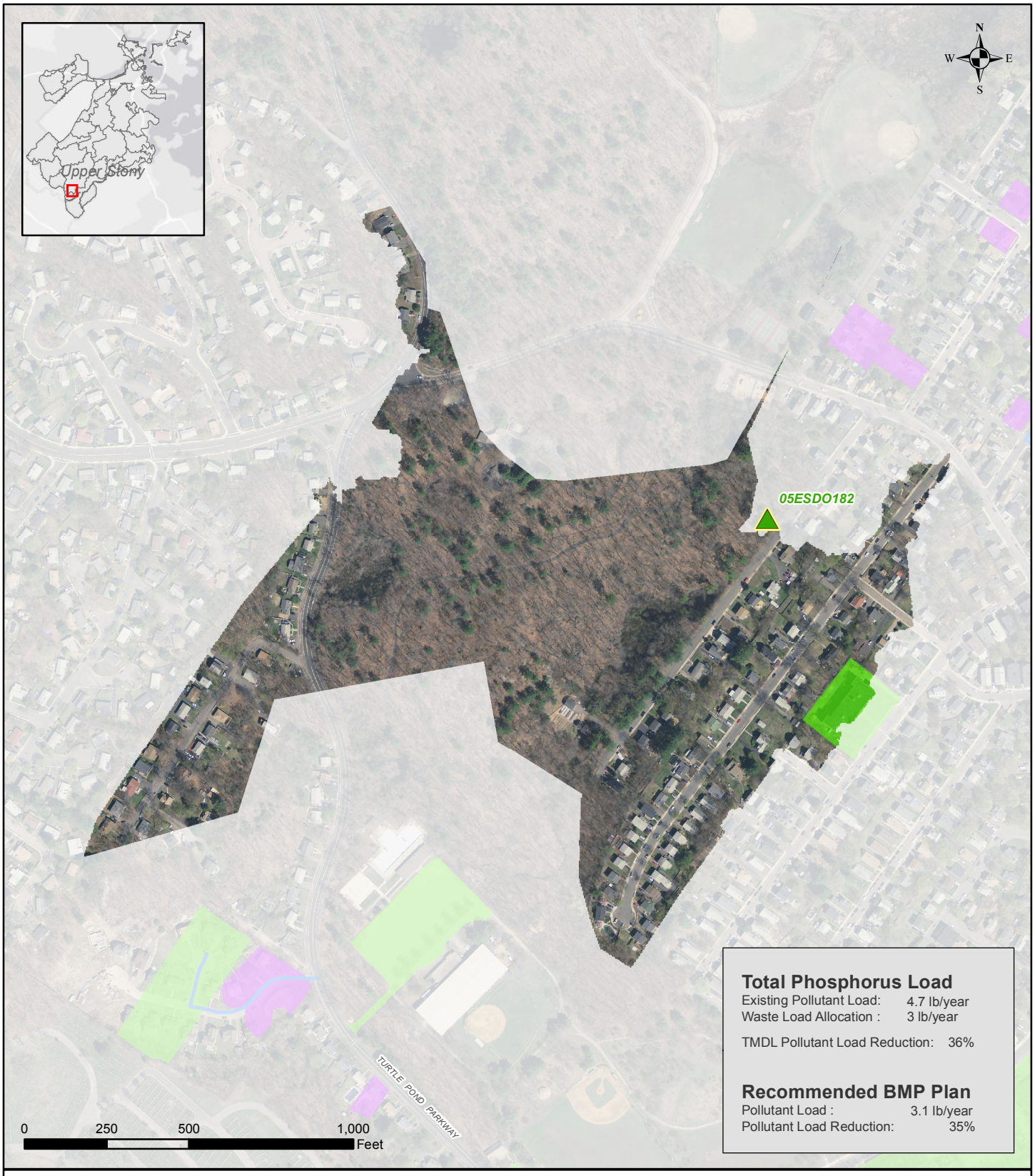
CH2MHILL

Recommended BMP Plan
Reporting Area: Sawmill Brook
Catchment: 14CSDO009

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-2
Recommended BMP Plan Maps by SDO Catchment: Stony Brook Watershed



Total Phosphorus Load

Existing Pollutant Load: 4.7 lb/year
Waste Load Allocation : 3 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 3.1 lb/year
Pollutant Load Reduction: 35%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 44.6 Acres

Boston Water and Sewer Commission

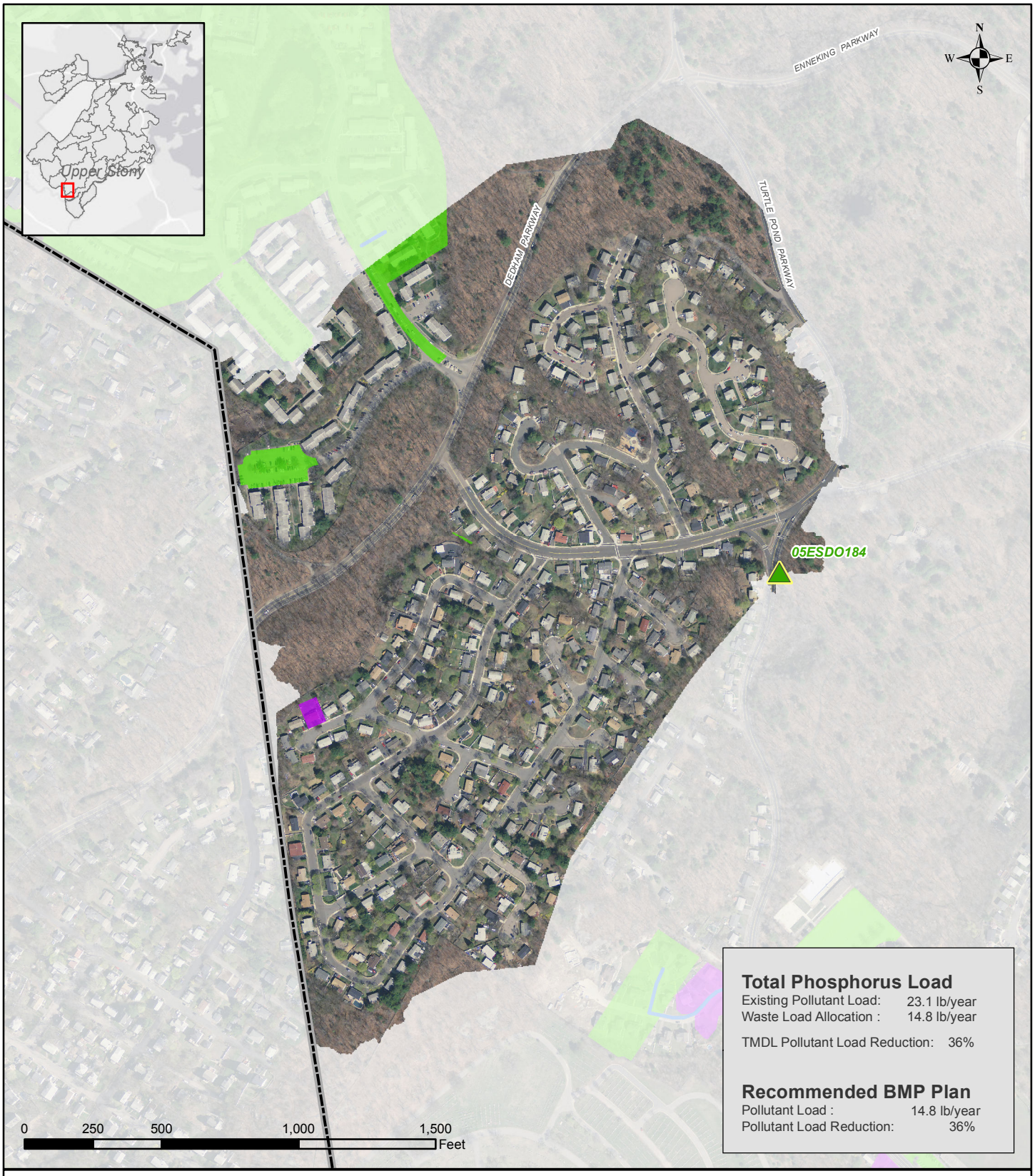
CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 05ESDO182

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 23.1 lb/year
Waste Load Allocation : 14.8 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 14.8 lb/year
Pollutant Load Reduction: 36%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 15.6 Acres
Recommended area: 0.3 Acres

Residential Parcel
Total area of suitable sites: 0.2 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 111.5 Acres

Boston Water and Sewer Commission

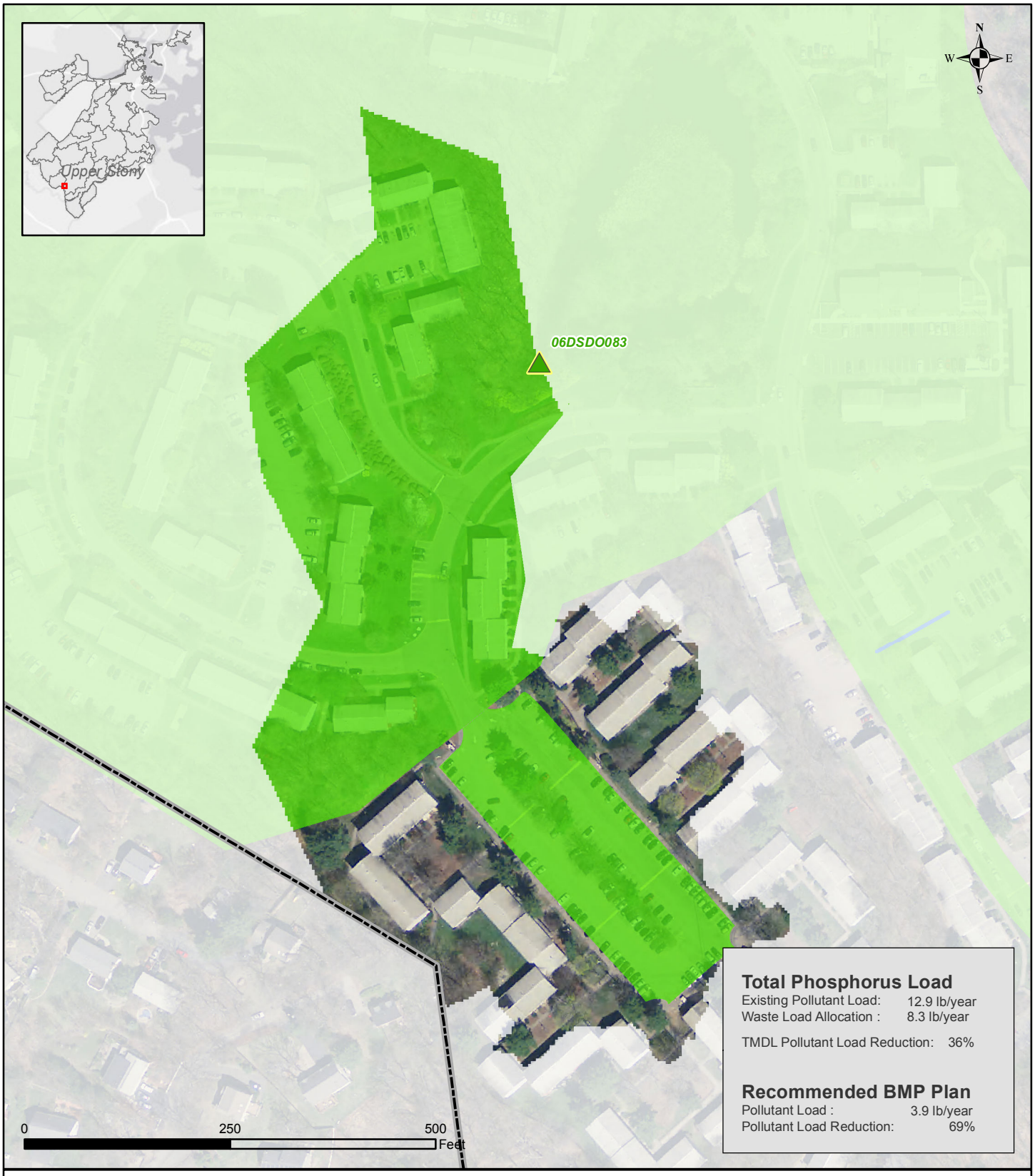
CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 05ESDO184

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 12.9 lb/year
Waste Load Allocation : 8.3 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 3.9 lb/year
Pollutant Load Reduction: 69%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 6.1 Acres
Recommended area: 2.3 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.3 Acres

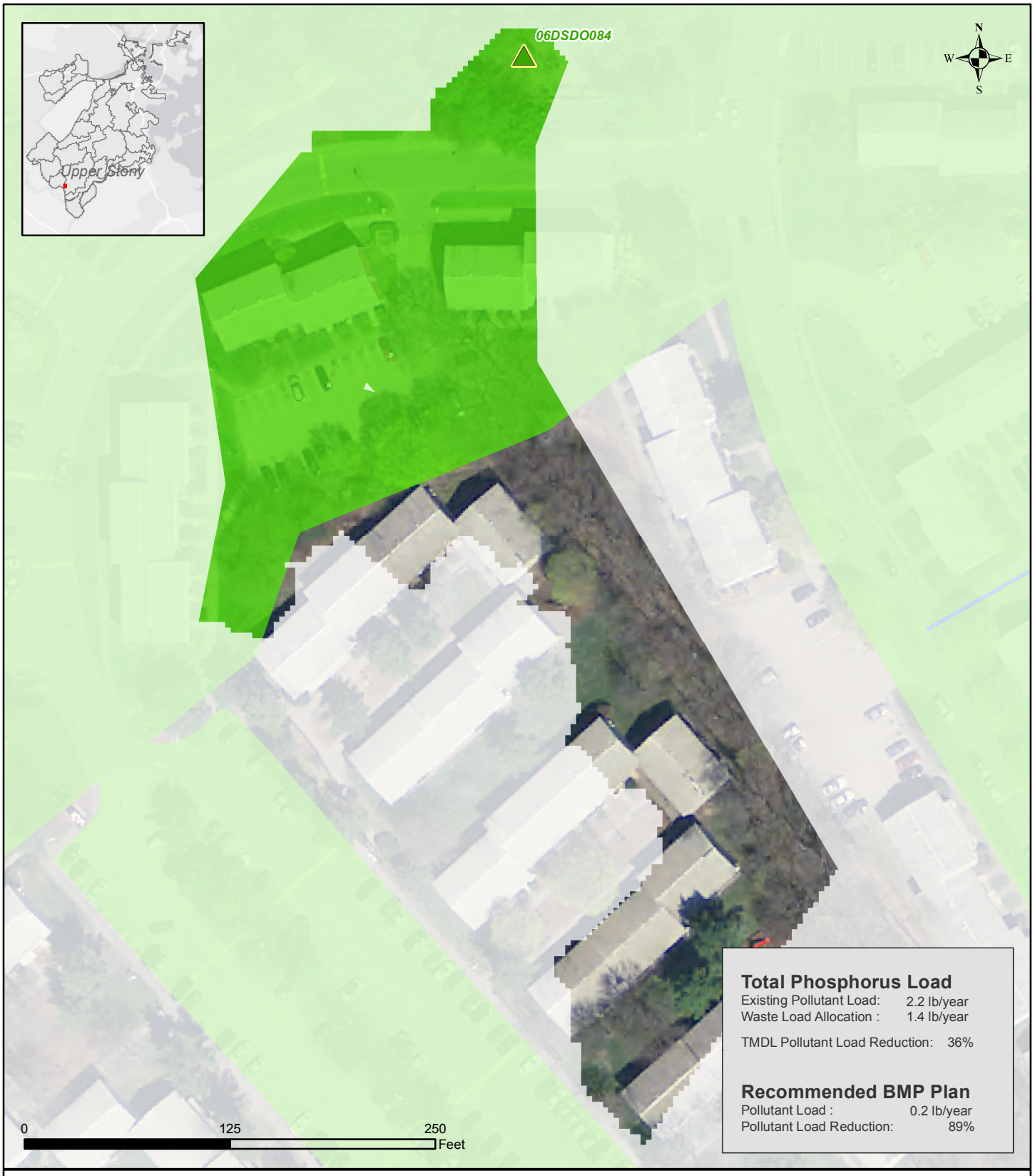
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 06DSDO083

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.1 Acres
Recommended area: 0.5 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

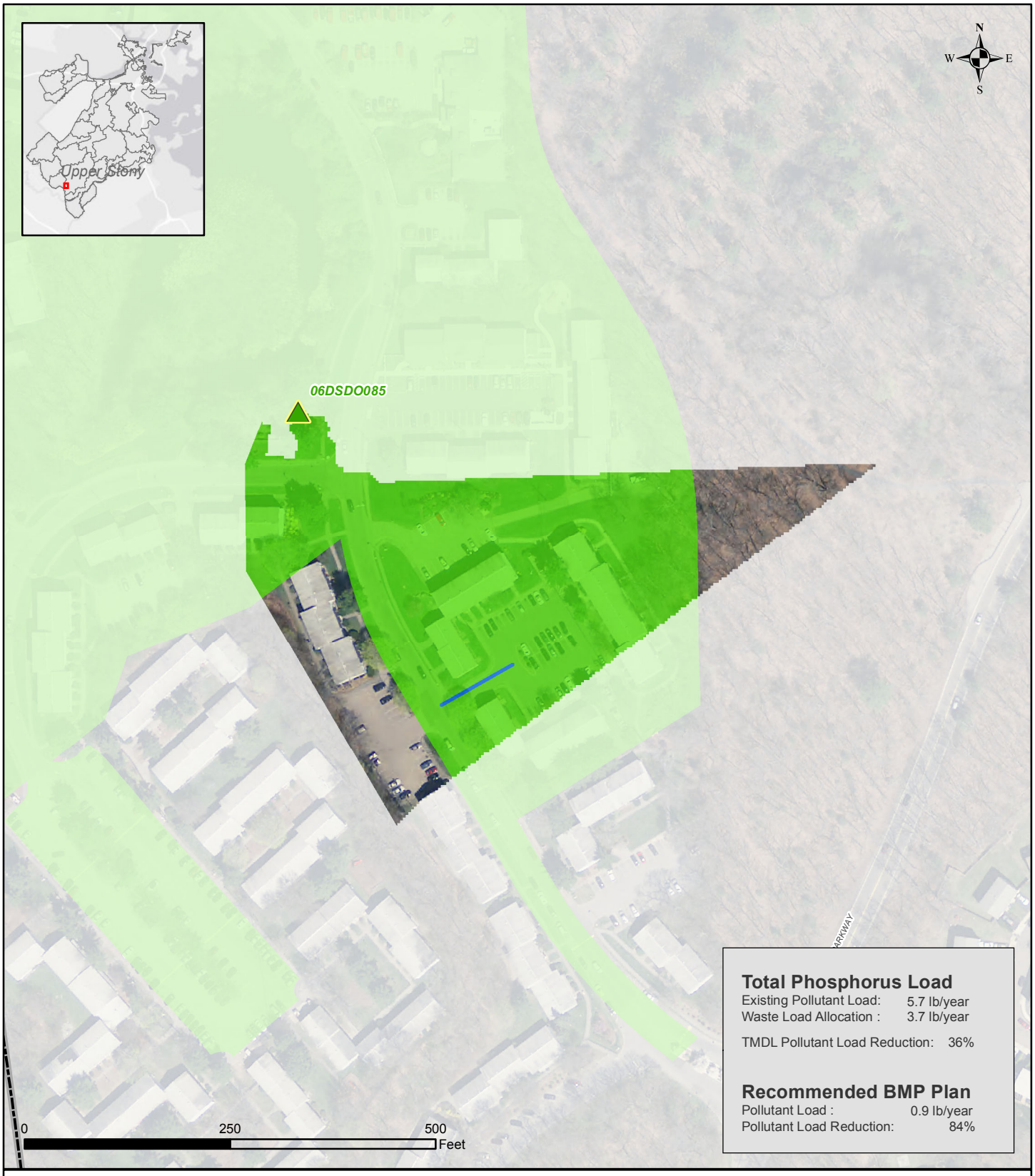
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.1 Acres

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 06DSDO084

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	5.7 lb/year
Waste Load Allocation :	3.7 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	0.9 lb/year
Pollutant Load Reduction:	84%

Legend

Boston Water and Sewer Commission

CH2MHILL.

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 3 Acres
- Recommended area: 1.1 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

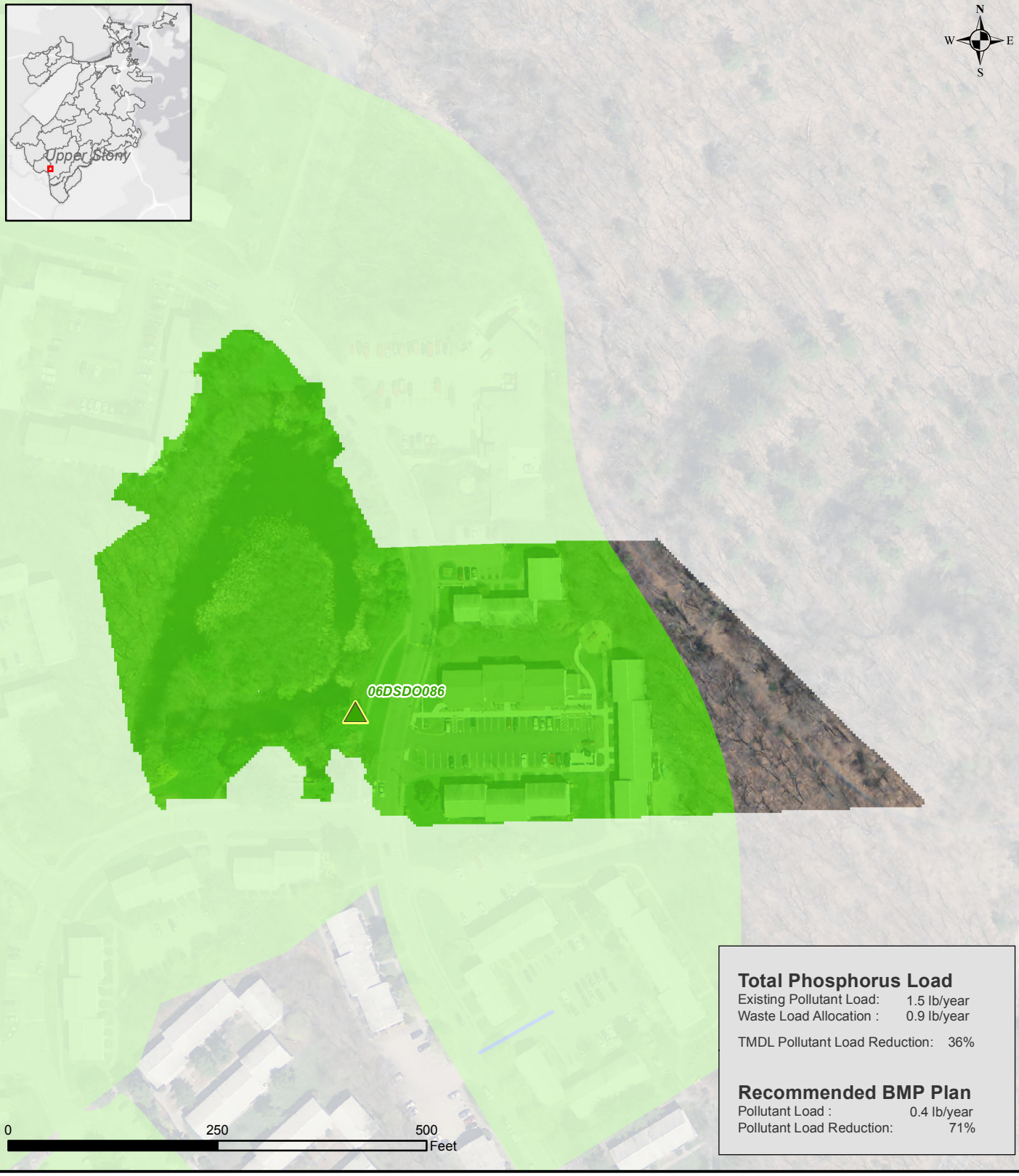
Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 4.0 Acres

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 06DSDO085

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.5 lb/year
Waste Load Allocation : 0.9 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.4 lb/year
Pollutant Load Reduction: 71%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.9 Acres
Recommended area: 1.3 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 6.9 Acres

Boston Water and Sewer Commission

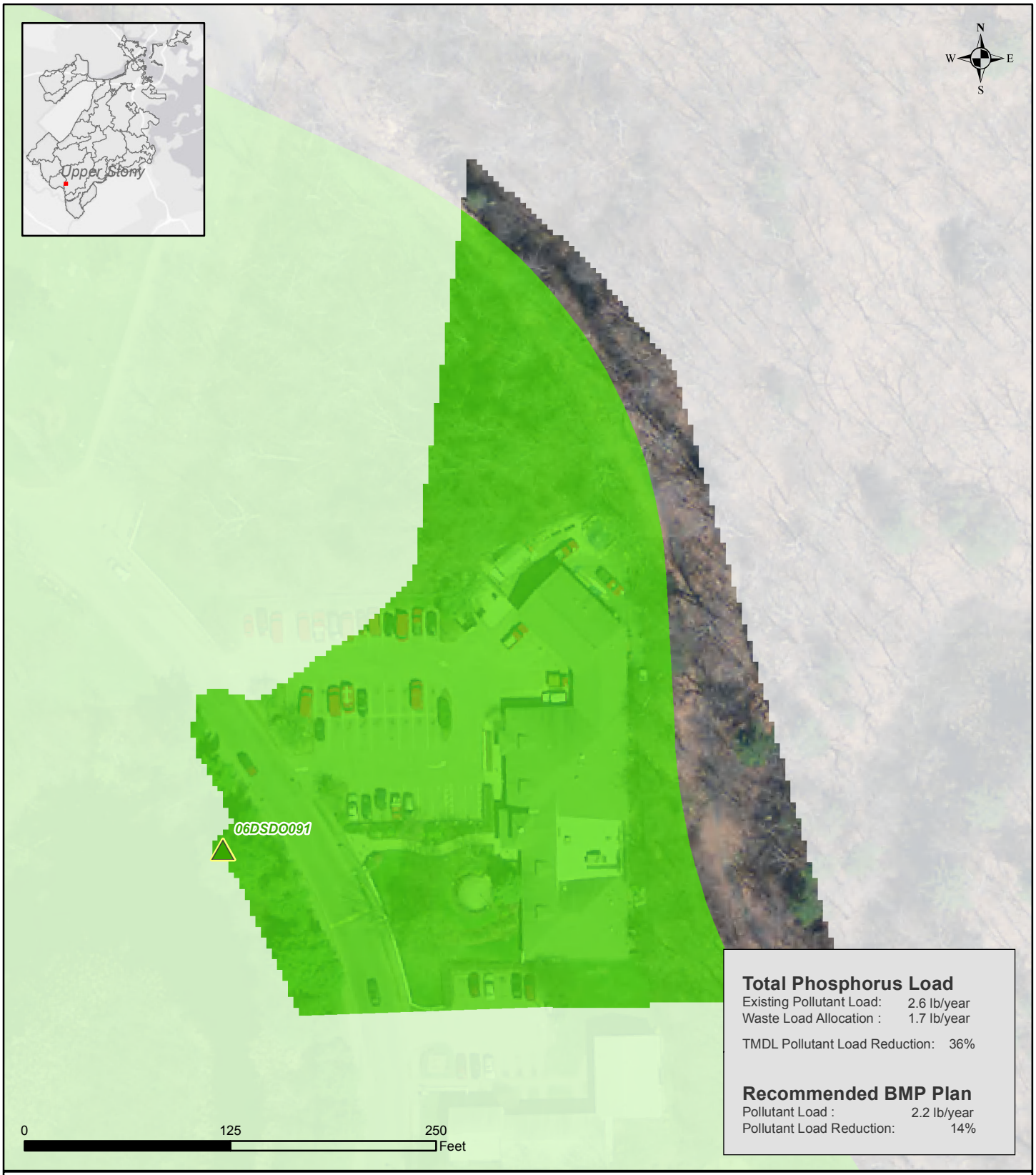
CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 06DSDO086

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.6 lb/year
Waste Load Allocation : 1.7 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 2.2 lb/year
Pollutant Load Reduction: 14%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2.1 Acres
Recommended area: 2.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.6 Acres

Boston Water and Sewer Commission

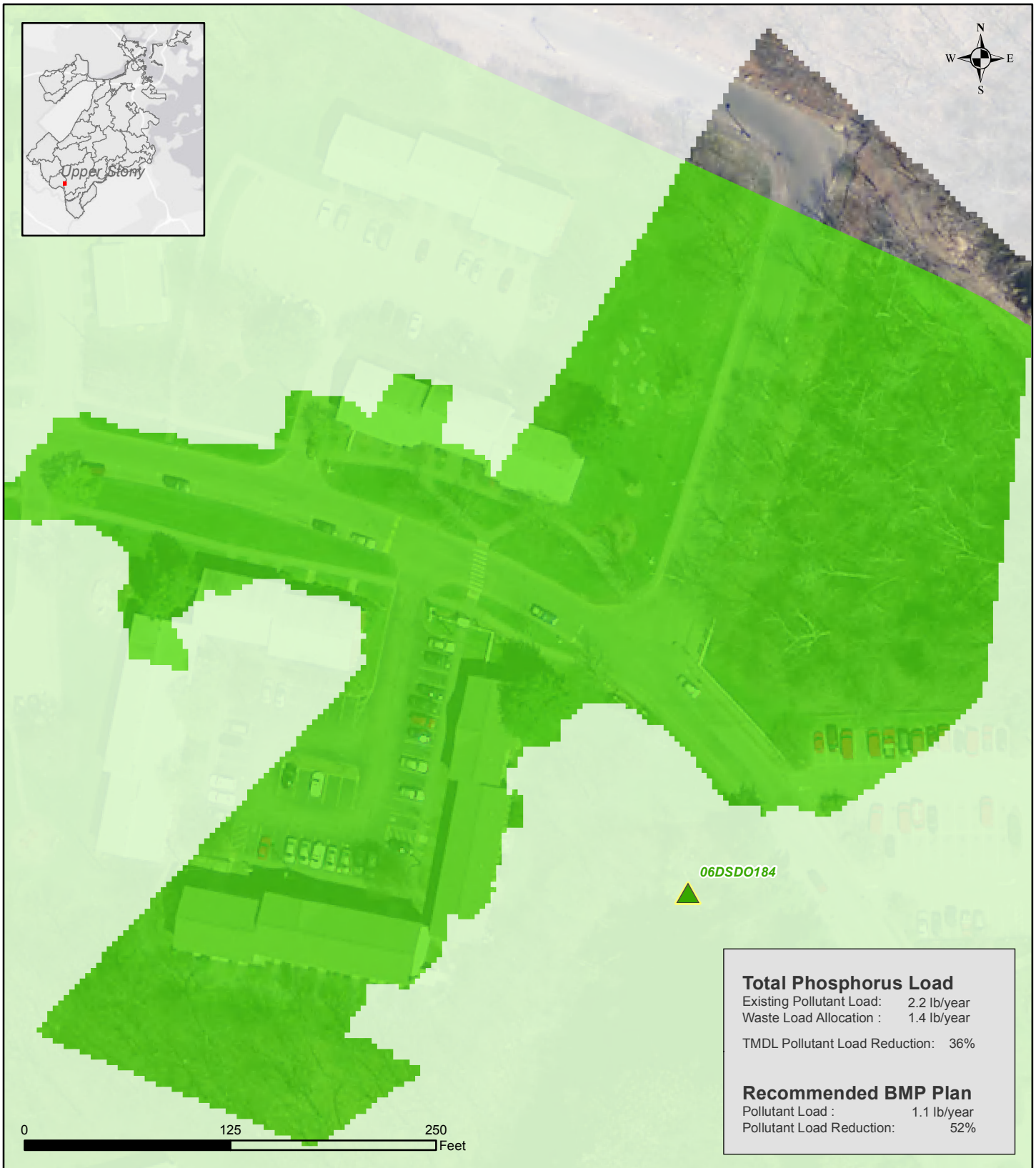
CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 06DSDO091

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.2 lb/year
Waste Load Allocation : 1.4 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 1.1 lb/year
Pollutant Load Reduction: 52%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.9 Acres
Recommended area: 1.4 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 4.2 Acres

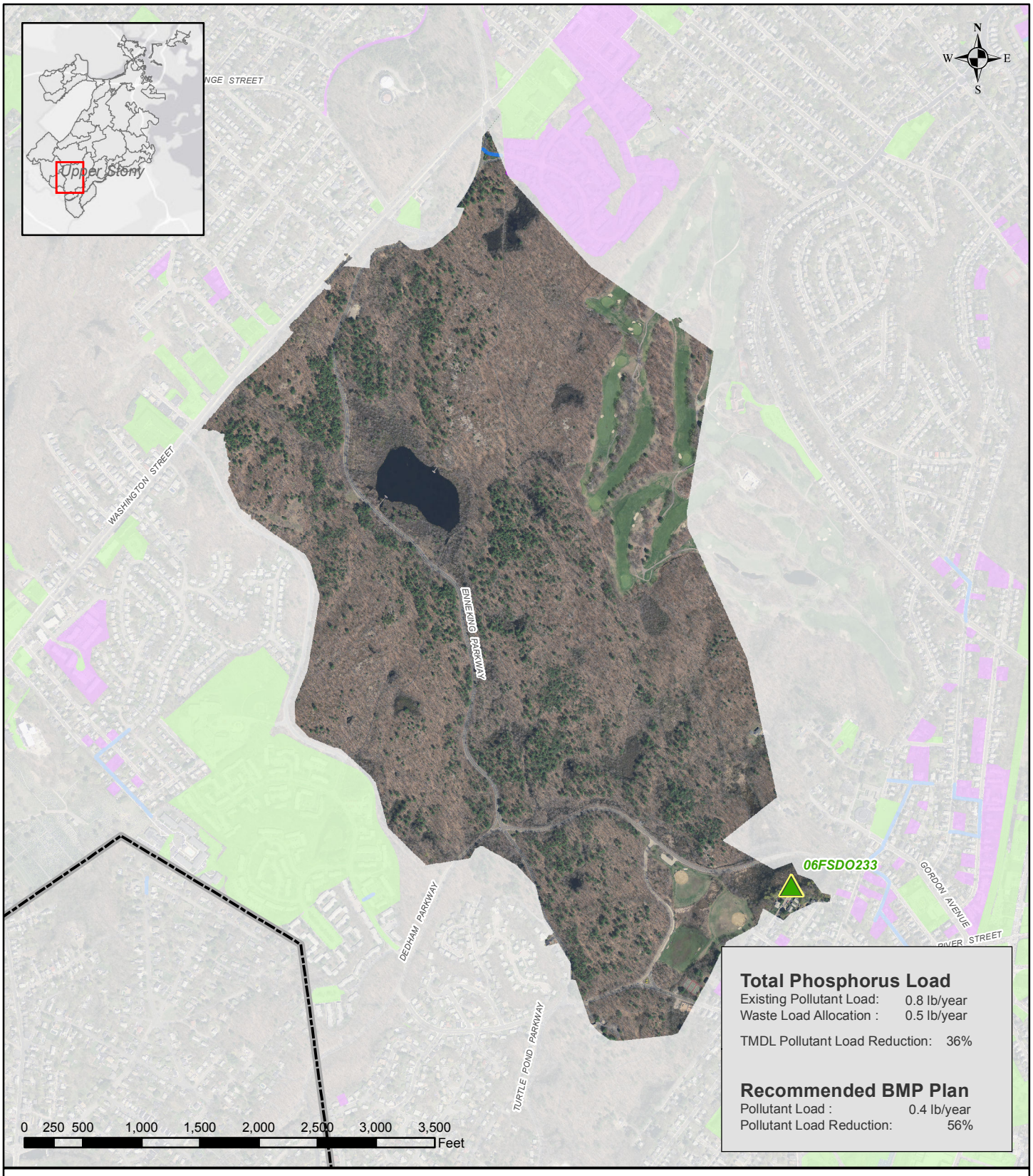
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 06DSDO184

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.8 lb/year
Waste Load Allocation : 0.5 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.4 lb/year
Pollutant Load Reduction: 56%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 484.3 Acres

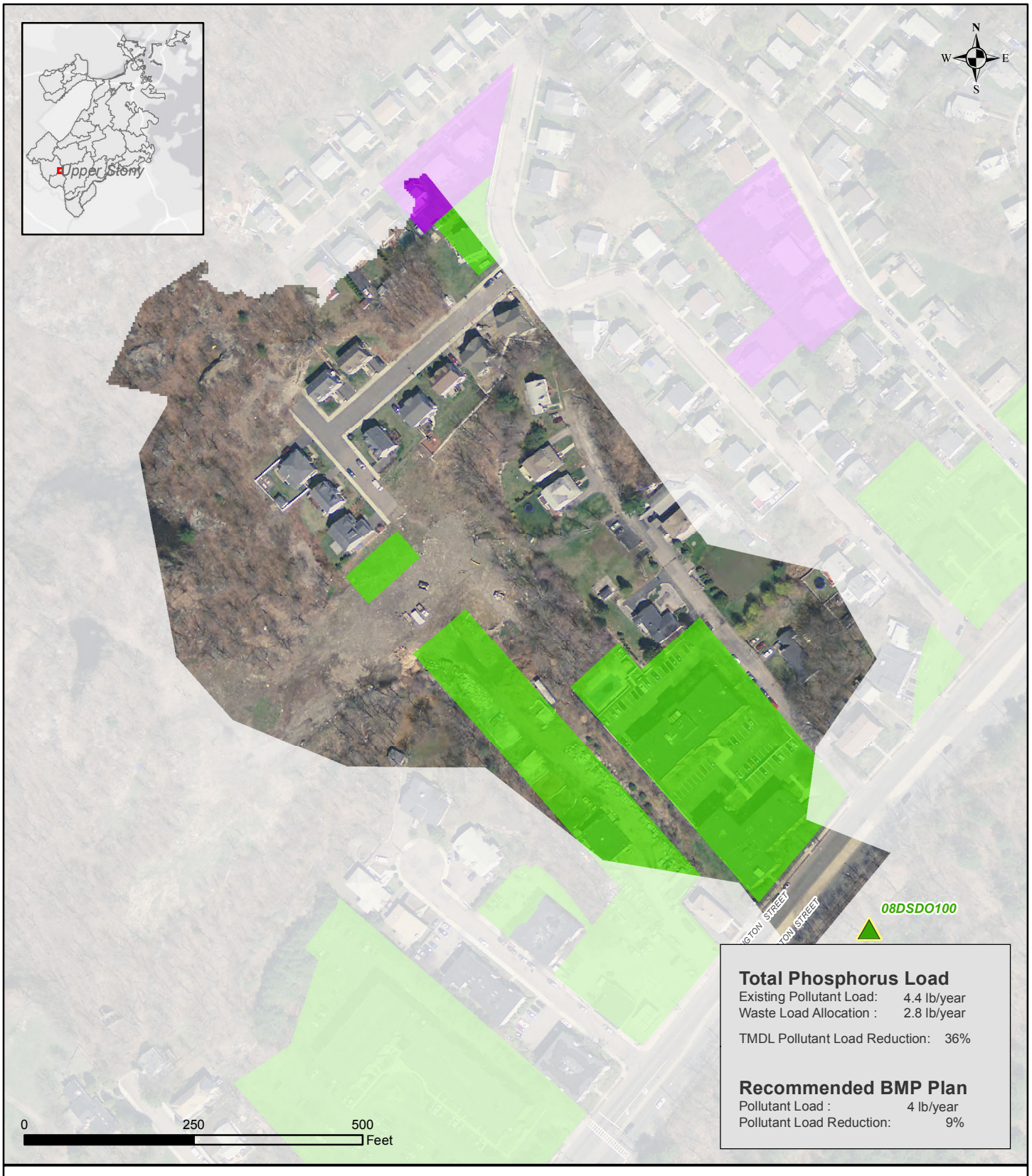
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 06FSDO233

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 4.4 lb/year
Waste Load Allocation : 2.8 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 4 lb/year
Pollutant Load Reduction: 9%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 15.4 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 08DSDO100

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.1 lb/year
Waste Load Allocation : 0.7 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.7 lb/year
Pollutant Load Reduction: 37%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.5 Acres

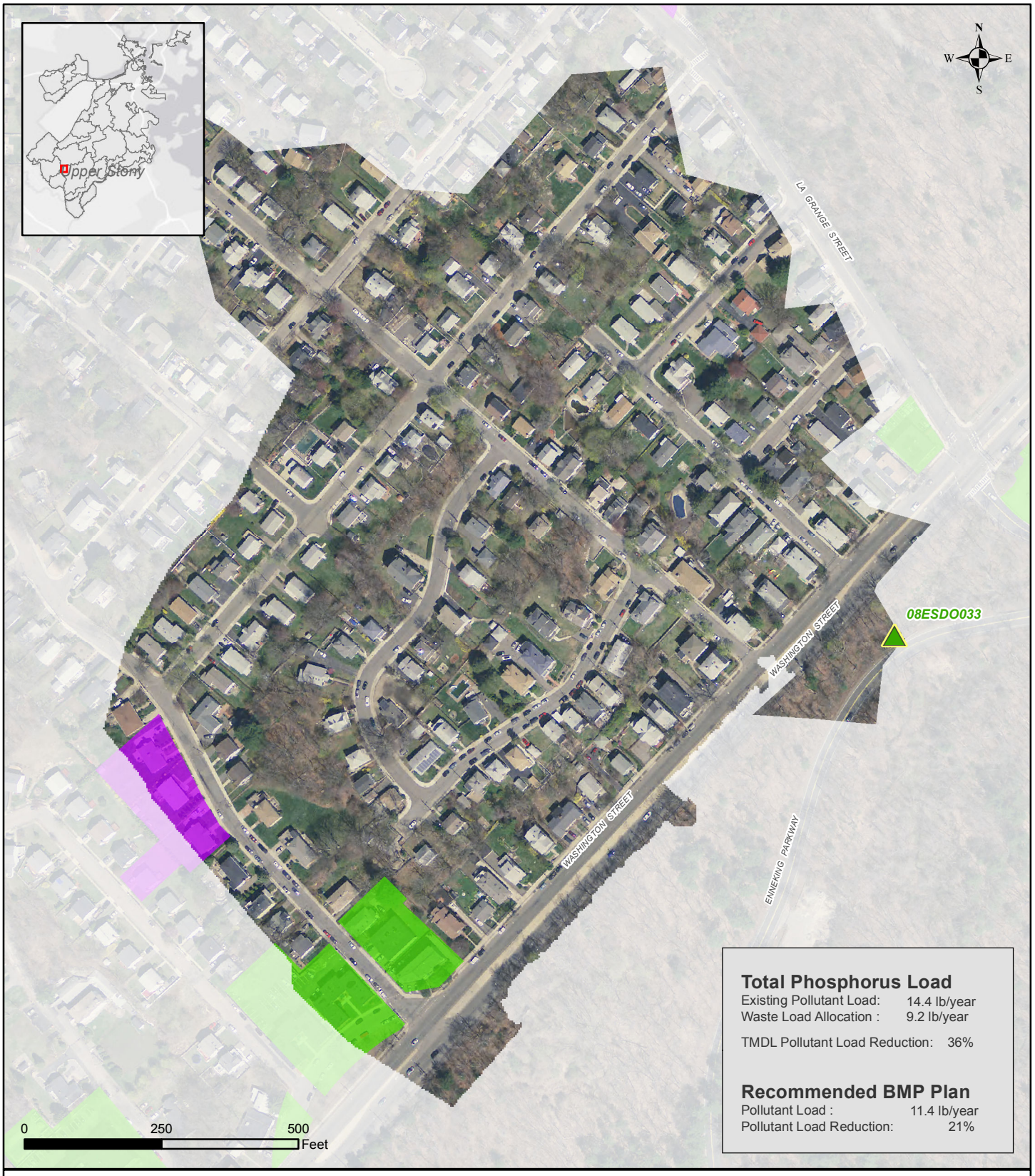
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 08DSDO112

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 14.4 lb/year
Waste Load Allocation : 9.2 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 11.4 lb/year
Pollutant Load Reduction: 21%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.5 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 38.5 Acres

Boston Water and Sewer Commission

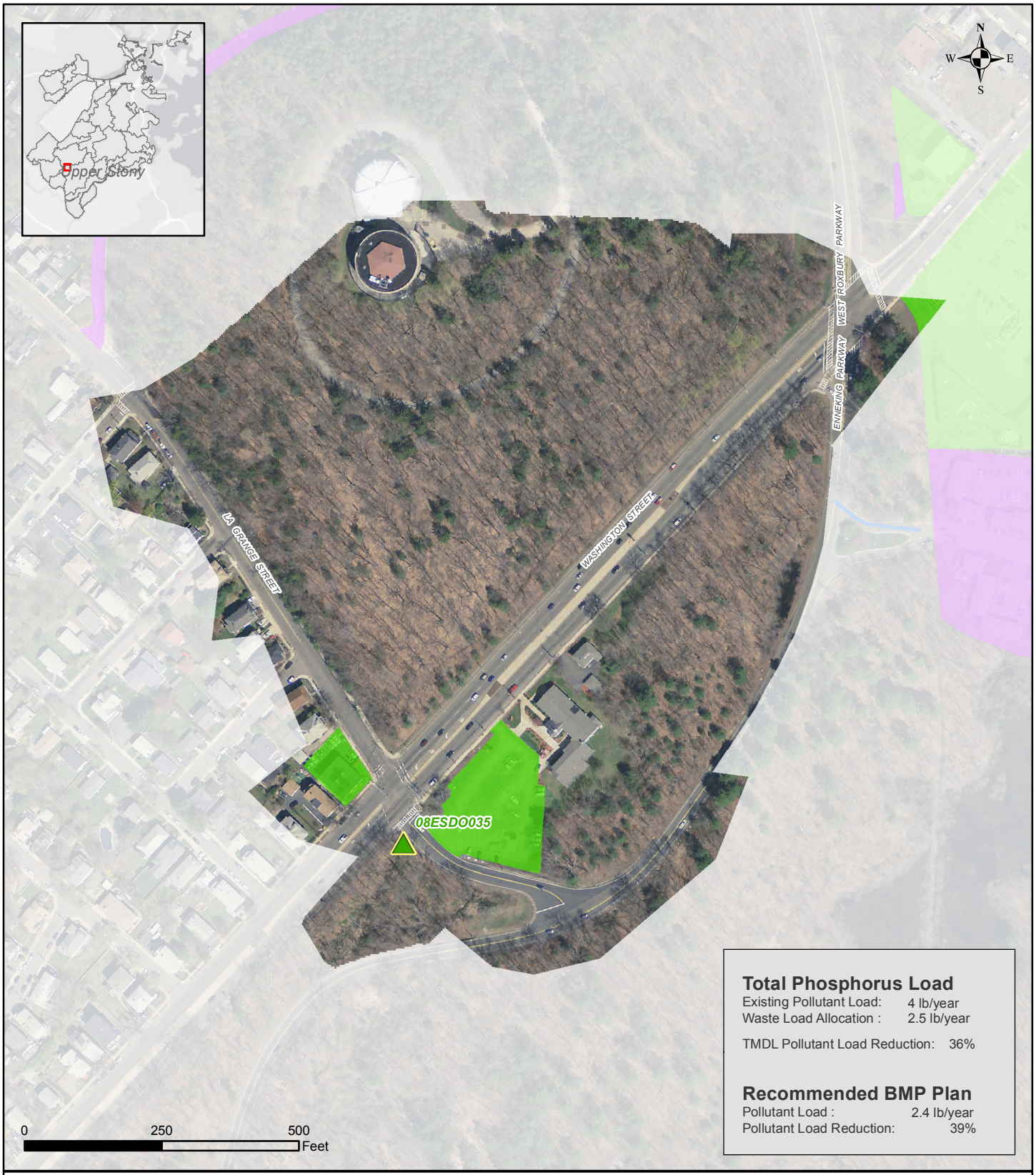
CH2MHILL

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 08ESDO033

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	4 lb/year
Waste Load Allocation :	2.5 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	2.4 lb/year
Pollutant Load Reduction:	39%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	1.1	Acres
Recommended area:	0	Acres

Residential Parcel

Total area of suitable sites:	0	Acres
Recommended area:	0	Acres

Suitable Public Right of Way

Total area of suitable sites:	0	Miles
Recommended area:	0	Miles

Boston Boundary

Total Catchment Area:	31.1	Acres

Recommended BMP Plan

Reporting Area: Upper Stony
Catchment: 08ESDO035

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 3.4 lb/year
Waste Load Allocation : 2.2 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 1.3 lb/year
Pollutant Load Reduction: 63%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 4.2 Acres

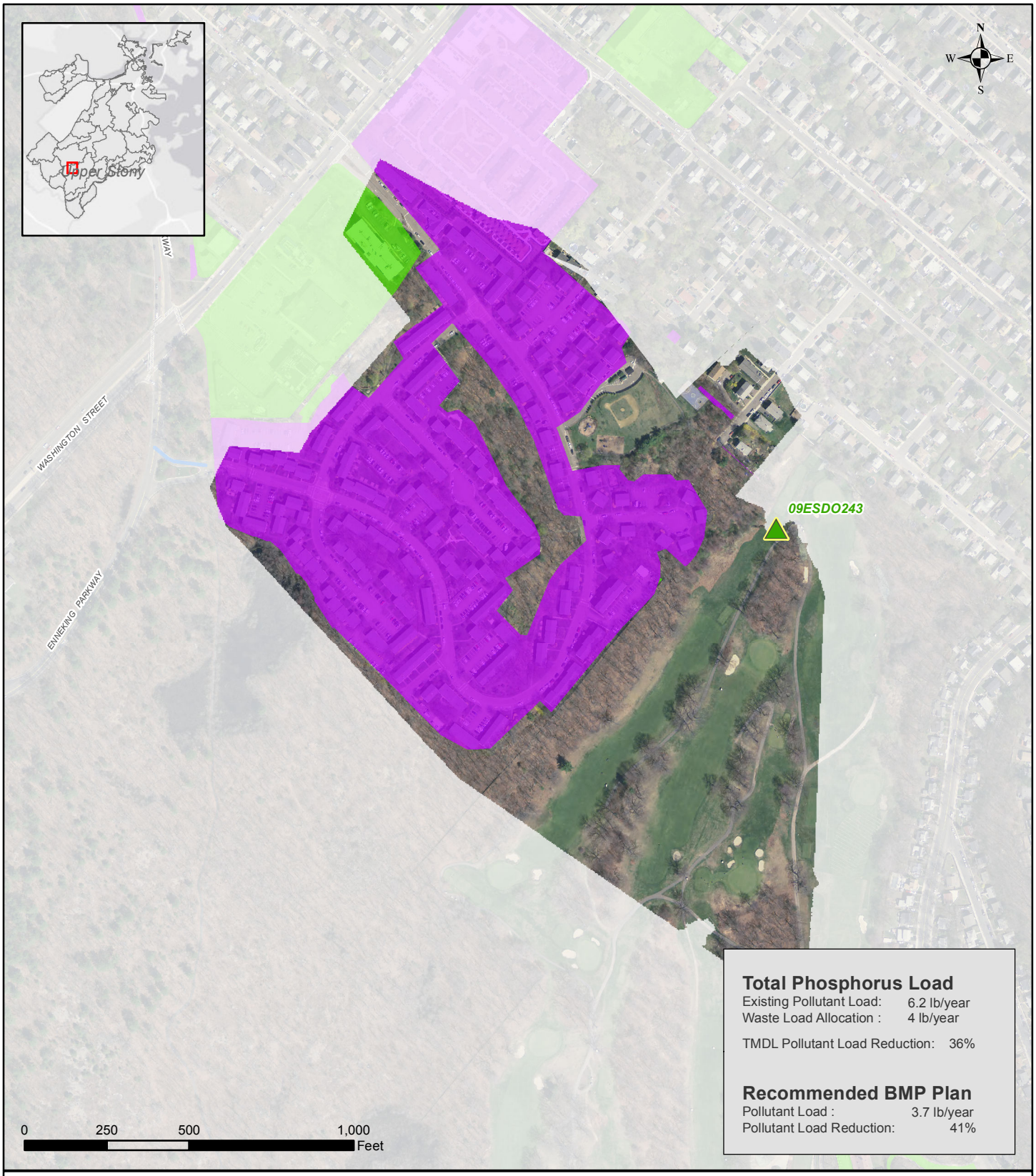
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 09ESDO229

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 6.2 lb/year
Waste Load Allocation : 4 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 3.7 lb/year
Pollutant Load Reduction: 41%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 26.6 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 58.6 Acres

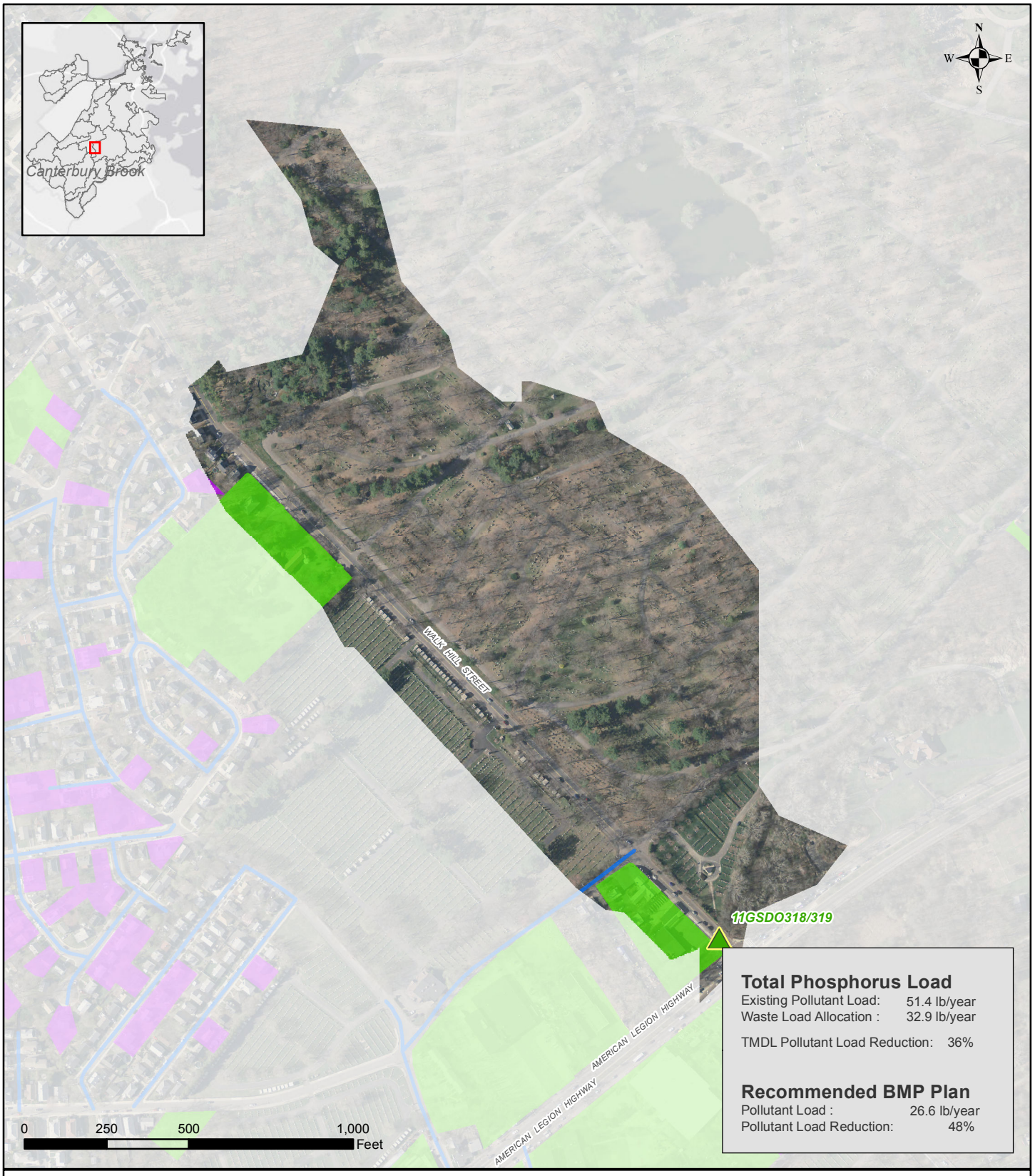
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Upper Stony
Catchment: 09ESDO243

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	51.4 lb/year
Waste Load Allocation :	32.9 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	26.6 lb/year
Pollutant Load Reduction:	48%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	2.9 Acres
Recommended area:	0.4 Acres

Residential Parcel

Total area of suitable sites:	0 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.1 Miles
Recommended area:	0.1 Miles

Boston Boundary

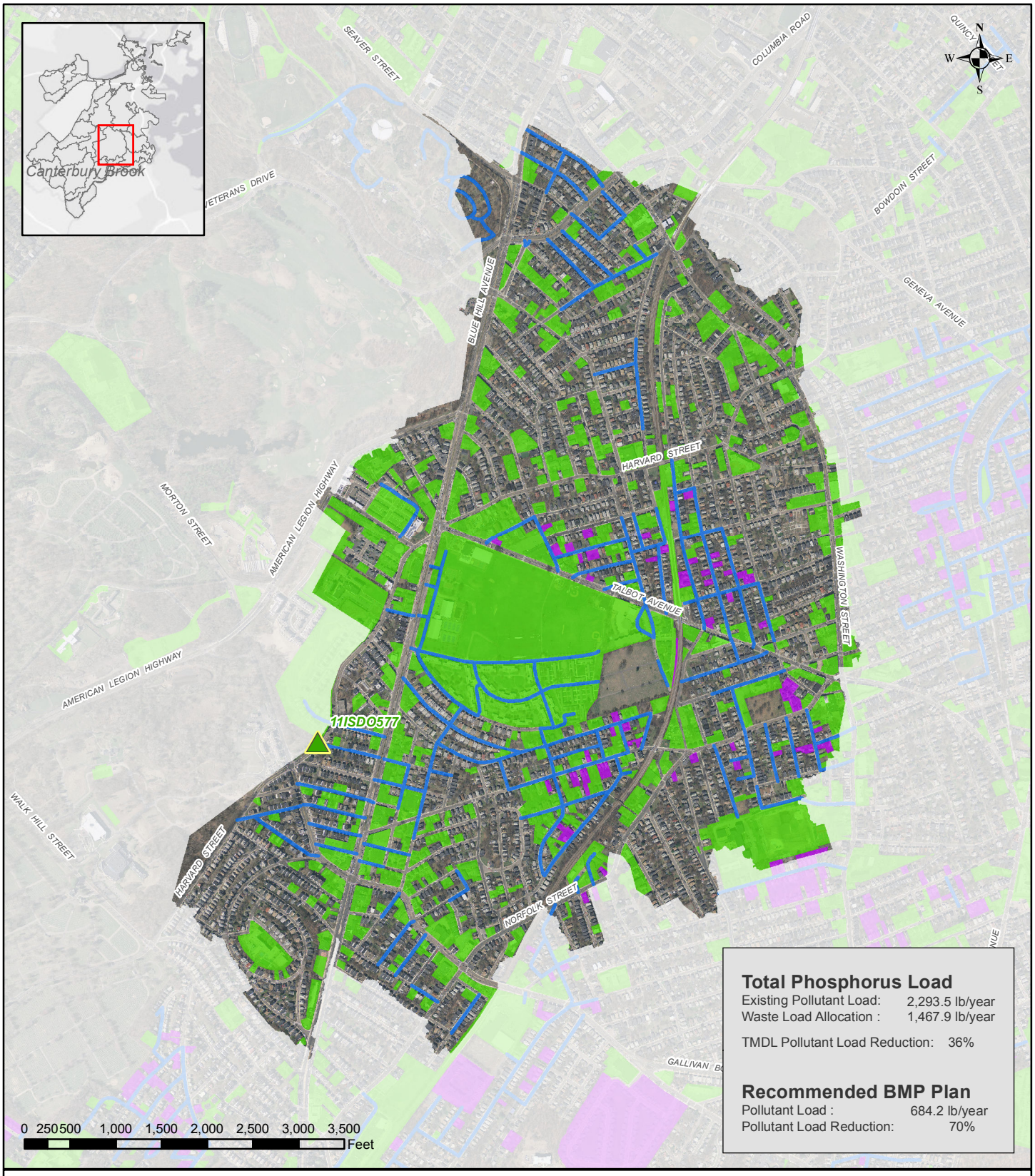
Total Catchment Area: 49.0 Acres

Recommended BMP Plan

Reporting Area: Canterbury Brook
Catchment: 11GSDO318/319

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2,293.5 lb/year
Waste Load Allocation : 1,467.9 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 684.2 lb/year
Pollutant Load Reduction: 70%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 292.2 Acres
Recommended area: 69.8 Acres

Residential Parcel
Total area of suitable sites: 44.4 Acres
Recommended area: 15.2 Acres

Suitable Public Right of Way
Total area of suitable sites: 12.4 Miles
Recommended area: 6.5 Miles

Boston Boundary
Total Catchment Area: 983.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Canterbury Brook
Catchment: 11ISDO577

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 5 lb/year
Waste Load Allocation : 3.2 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 4.5 lb/year
Pollutant Load Reduction: 8%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 19.9 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Roslindale Branch
Catchment: 12ESDO418

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

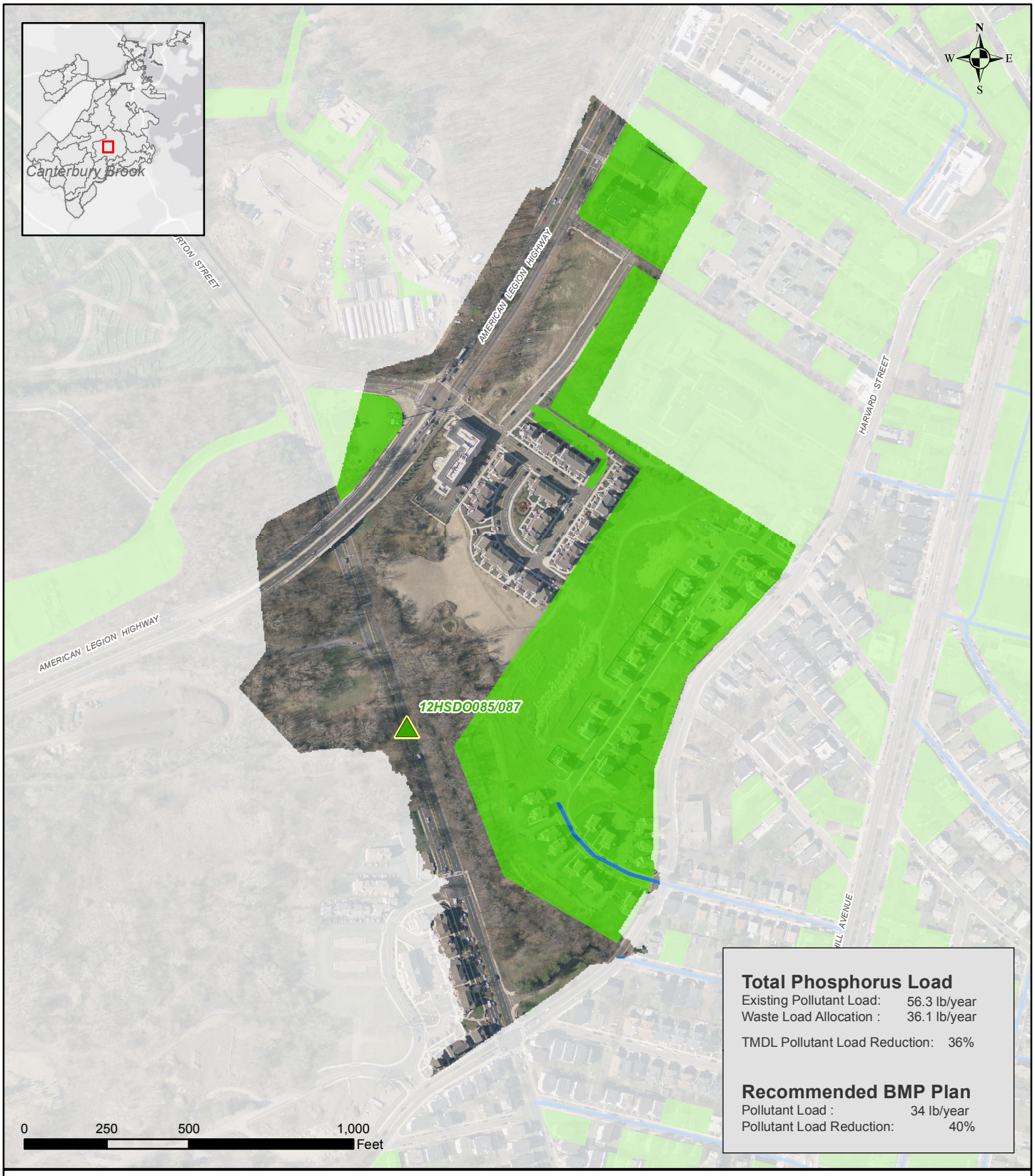
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.6 Acres

Recommended BMP Plan
Reporting Area: Lower Stony
Catchment: 12FSDO305

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	56.3 lb/year
Waste Load Allocation :	36.1 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	34 lb/year
Pollutant Load Reduction:	40%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 21.1 Acres
- Recommended area: 1.7 Acres

Residential Parcel
- Total area of suitable sites: 6.1 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.1 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 52.9 Acres

Boston Water and Sewer Commission

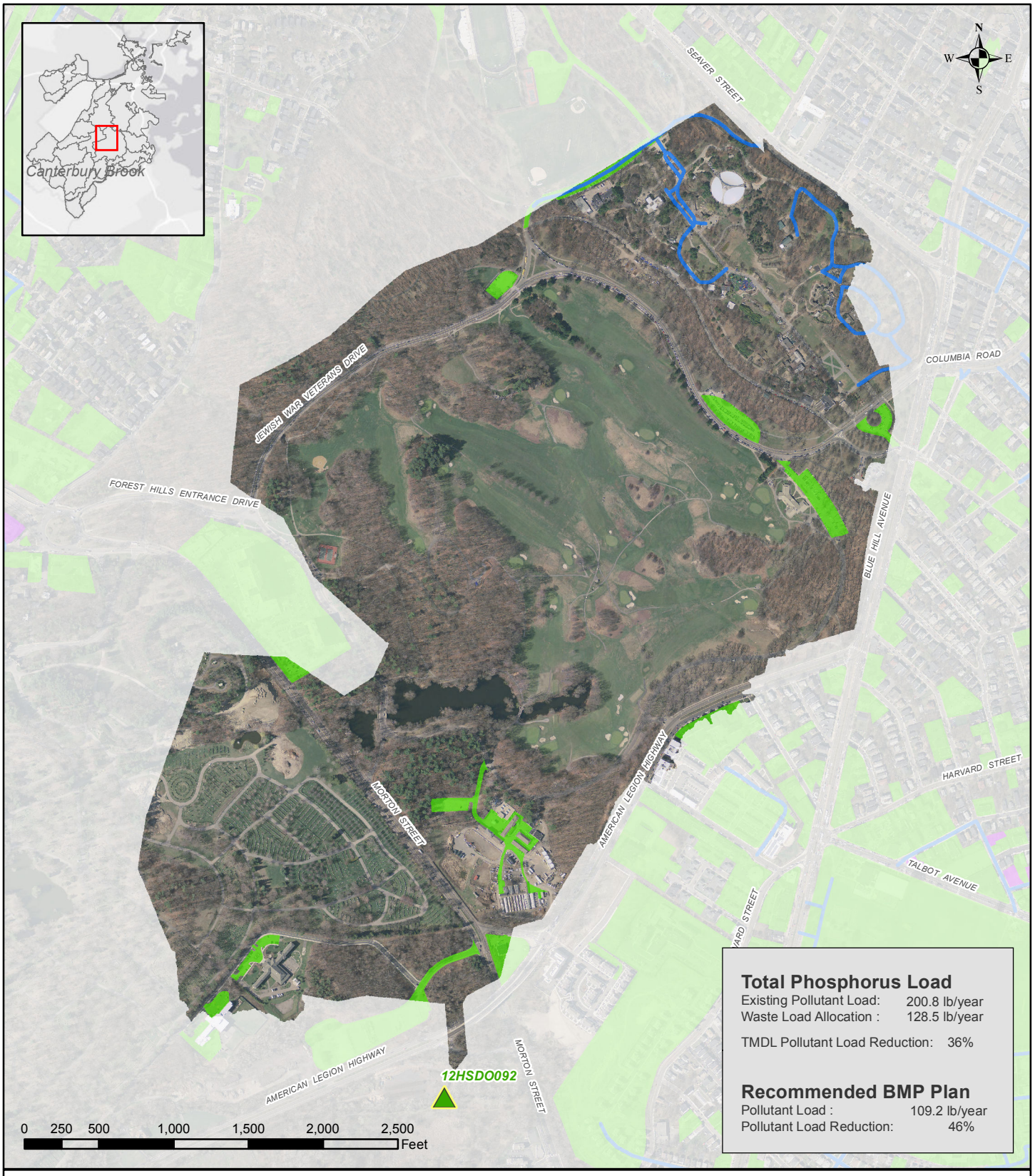
CH2MHILL

Recommended BMP Plan

Reporting Area: Canterbury Brook
Catchment: 12HSDO085/087

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	200.8 lb/year
Waste Load Allocation :	128.5 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	109.2 lb/year
Pollutant Load Reduction:	46%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 10.1 Acres
- Recommended area: 10.1 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 1 Miles
- Recommended area: 0.6 Miles

Boston Boundary
- Total Catchment Area: 424.4 Acres

Boston Water and Sewer Commission

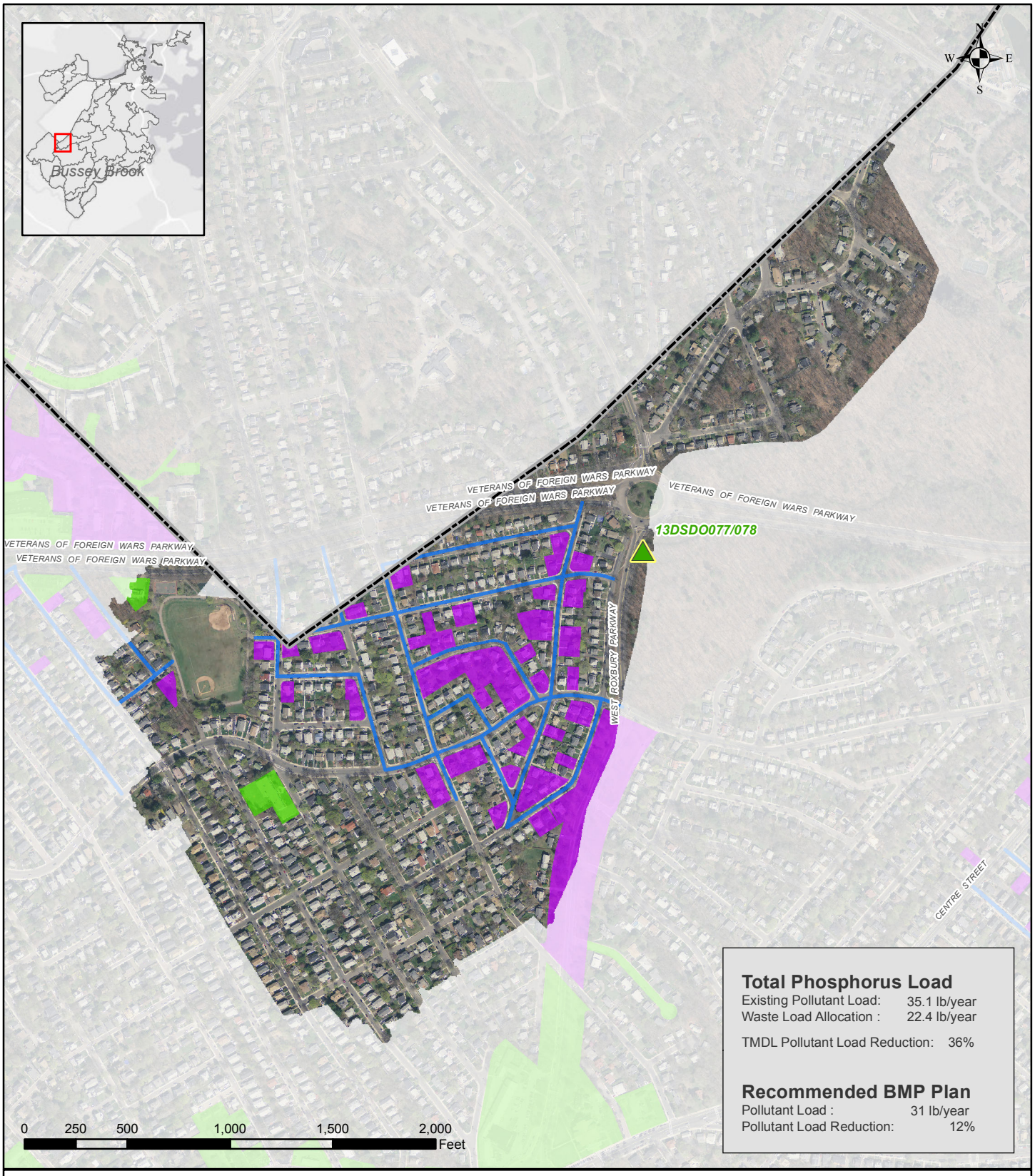
CH2MHILL

Recommended BMP Plan

Reporting Area: Canterbury Brook
Catchment: 12HSDO092

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	35.1 lb/year
Waste Load Allocation :	22.4 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	31 lb/year
Pollutant Load Reduction:	12%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 12.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 2.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 150.7 Acres

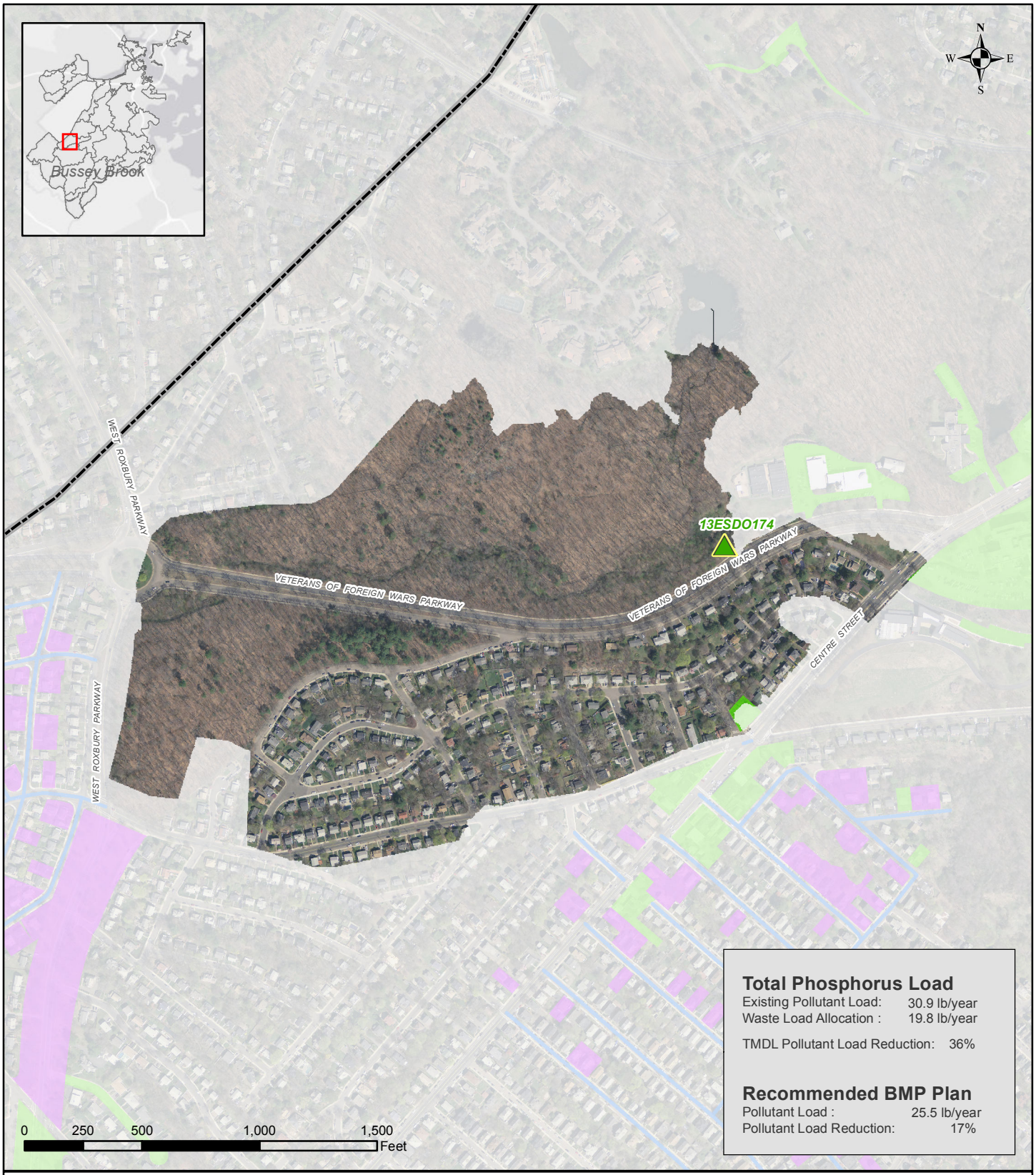
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Bussey Brook
Catchment: 13DSDO077/078

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 30.9 lb/year
Waste Load Allocation : 19.8 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 25.5 lb/year
Pollutant Load Reduction: 17%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 97.6 Acres

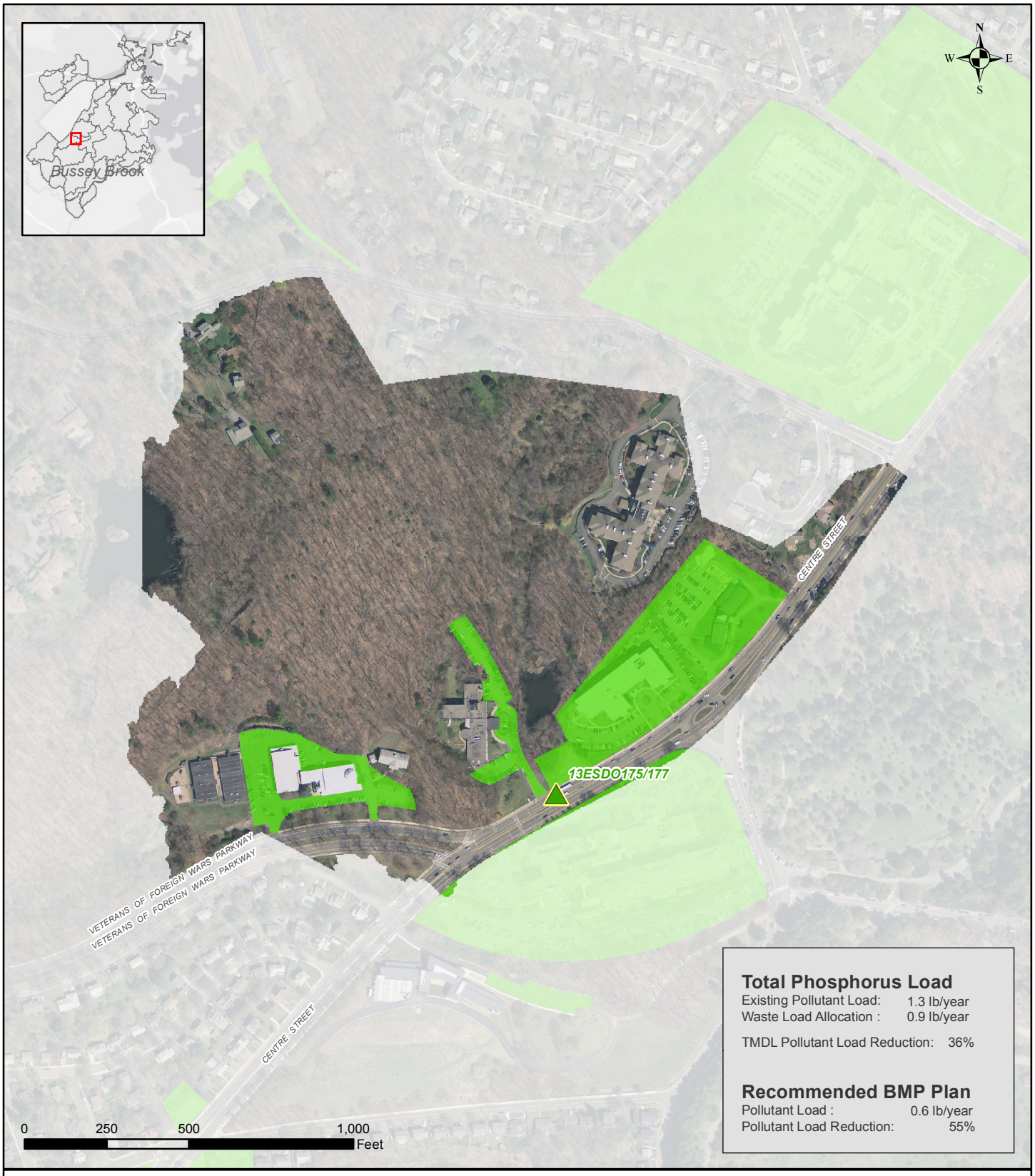
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Bussey Brook
Catchment: 13ESDO174

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.3 lb/year
Waste Load Allocation : 0.9 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.6 lb/year
Pollutant Load Reduction: 55%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

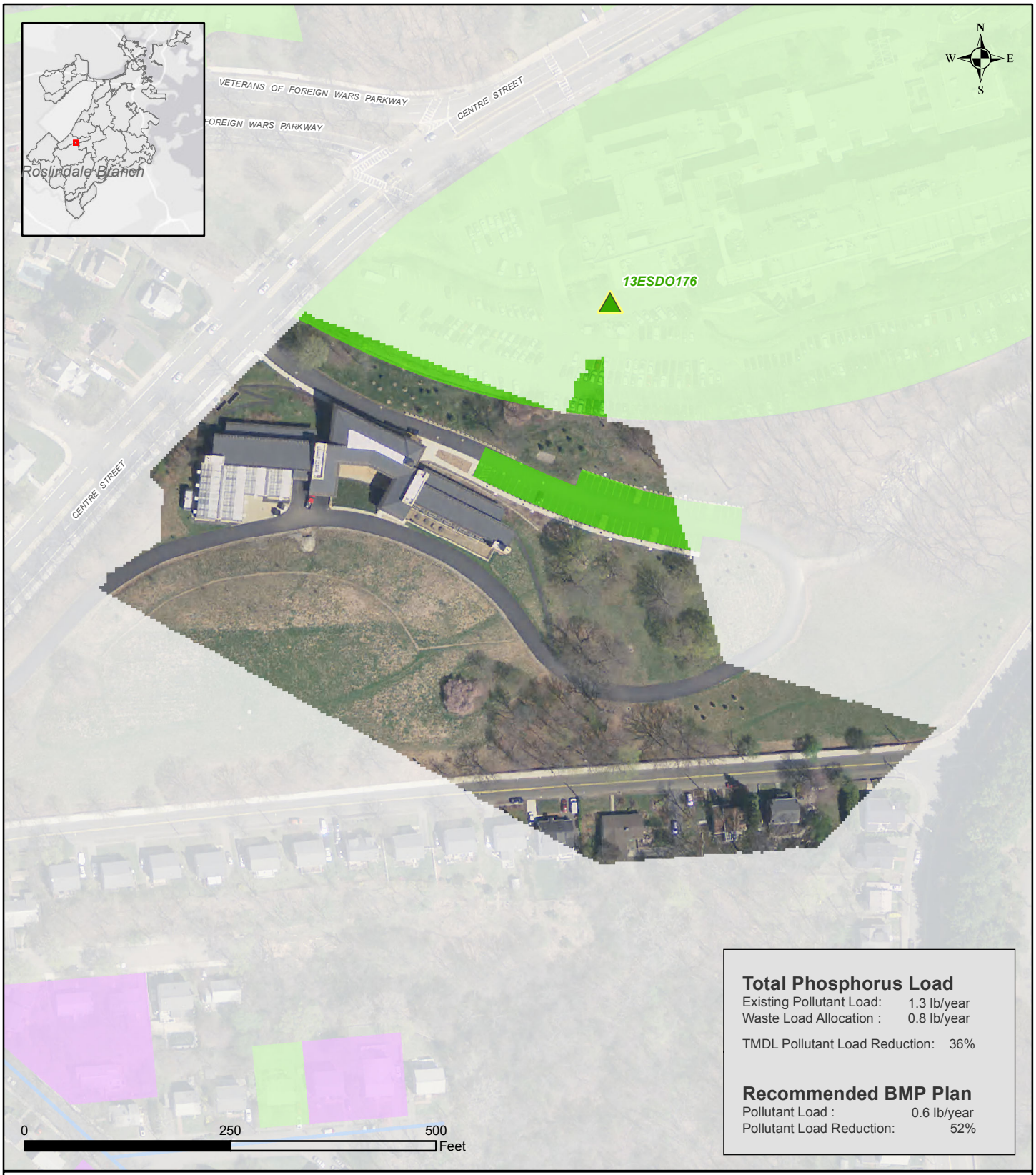
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 60.5 Acres

Recommended BMP Plan
Reporting Area: Bussey Brook
Catchment: 13ESDO175/177

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.3 lb/year
Waste Load Allocation : 0.8 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.6 lb/year
Pollutant Load Reduction: 52%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.5 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 8.0 Acres

Boston Water and Sewer Commission

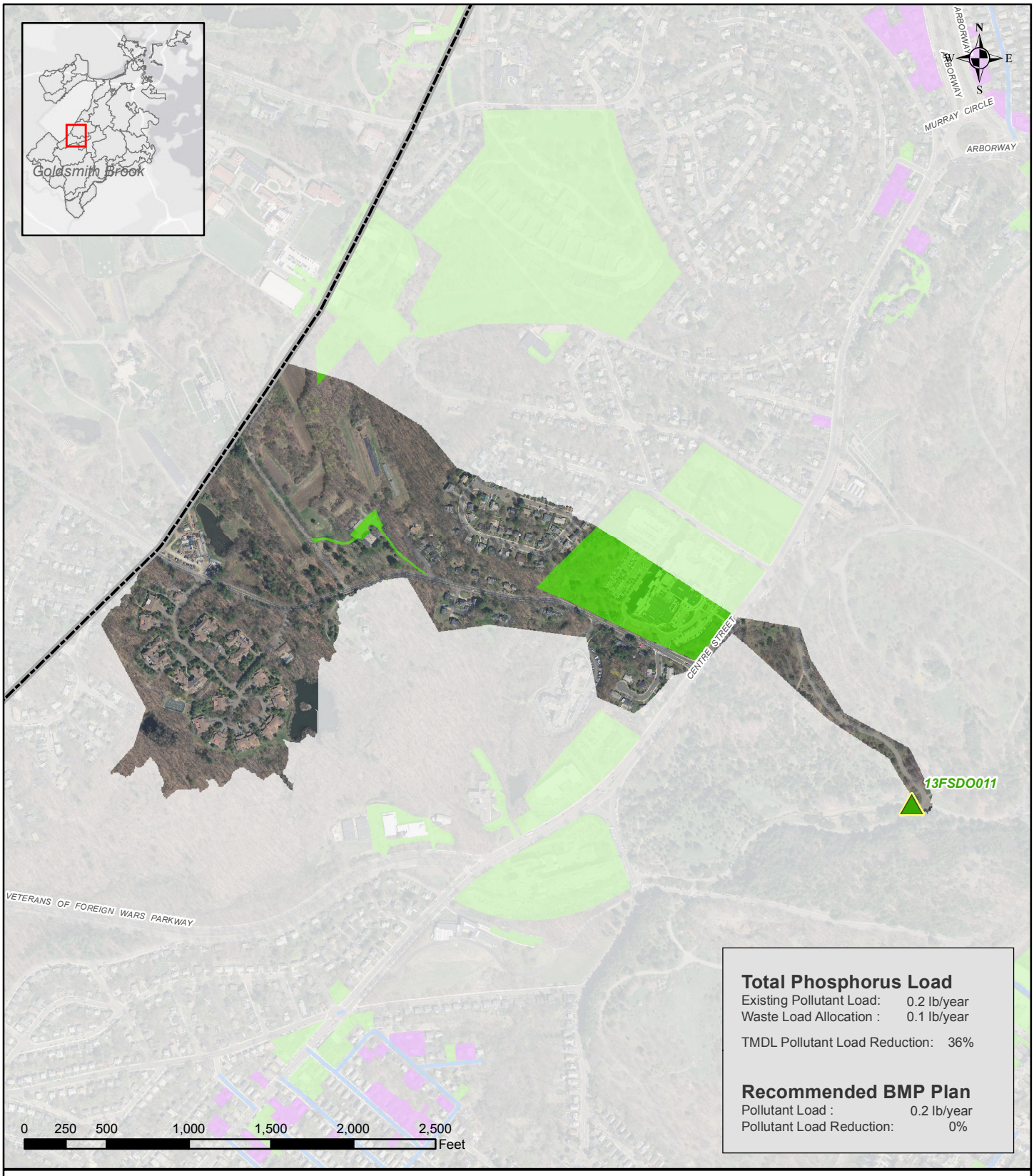
CH2MHILL

Recommended BMP Plan

Reporting Area: Roslindale Branch
Catchment: 13ESDO176

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.2 lb/year
Waste Load Allocation : 0.1 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 0.2 lb/year
Pollutant Load Reduction: 0%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 10.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 116.7 Acres

Boston Water and Sewer Commission

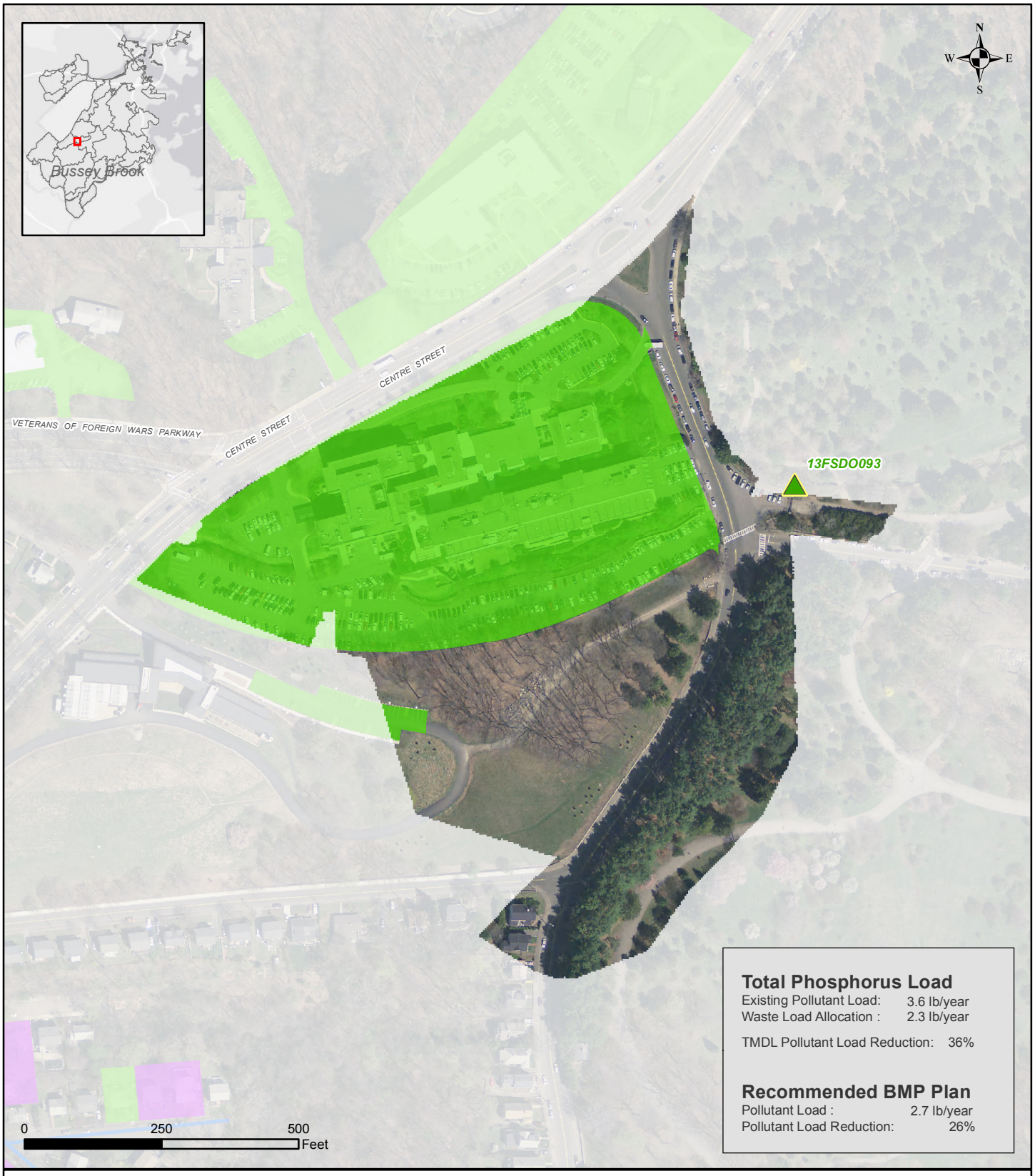
CH2MHILL

Recommended BMP Plan

Reporting Area: Goldsmith Brook
Catchment: 13FSDO011

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 3.6 lb/year
Waste Load Allocation : 2.3 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 2.7 lb/year
Pollutant Load Reduction: 26%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 19.3 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Bussey Brook
Catchment: 13FSDO093

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.





13FSDO095



0 125 250 Feet

Total Phosphorus Load

Existing Pollutant Load:	0.2 lb/year
Waste Load Allocation :	0.1 lb/year
TMDL Pollutant Load Reduction:	36%

Recommended BMP Plan

Pollutant Load :	0.2 lb/year
Pollutant Load Reduction:	0%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

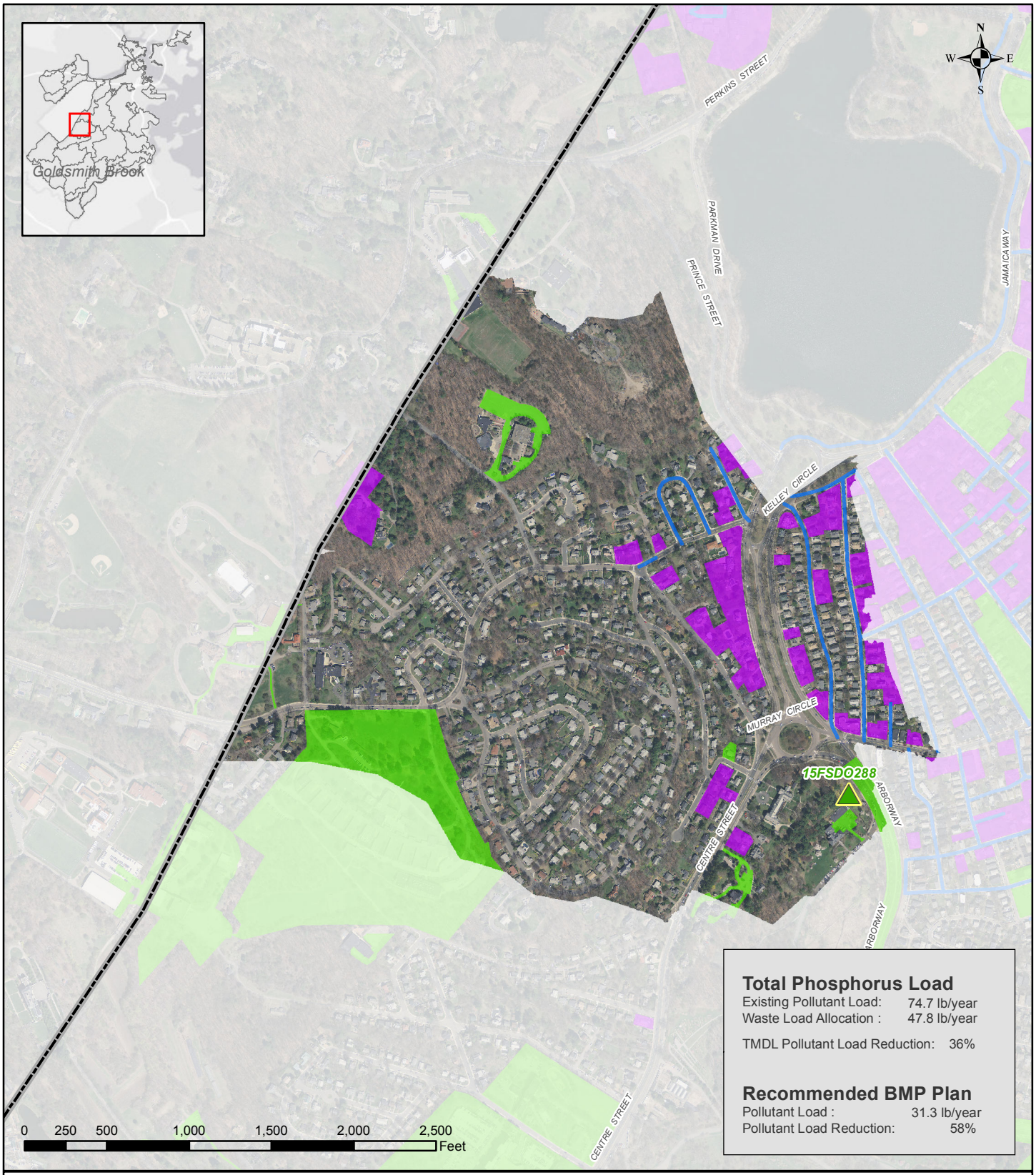
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.2 Acres

Recommended BMP Plan
Reporting Area: Bussey Brook
Catchment: 13FSDO095

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 74.7 lb/year
Waste Load Allocation : 47.8 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 31.3 lb/year
Pollutant Load Reduction: 58%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 15.6 Acres
Recommended area: 4.1 Acres

Residential Parcel
Total area of suitable sites: 15.4 Acres
Recommended area: 4.4 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.1 Miles
Recommended area: 1.1 Miles

Boston Boundary
Total Catchment Area: 261.6 Acres

Boston Water and Sewer Commission

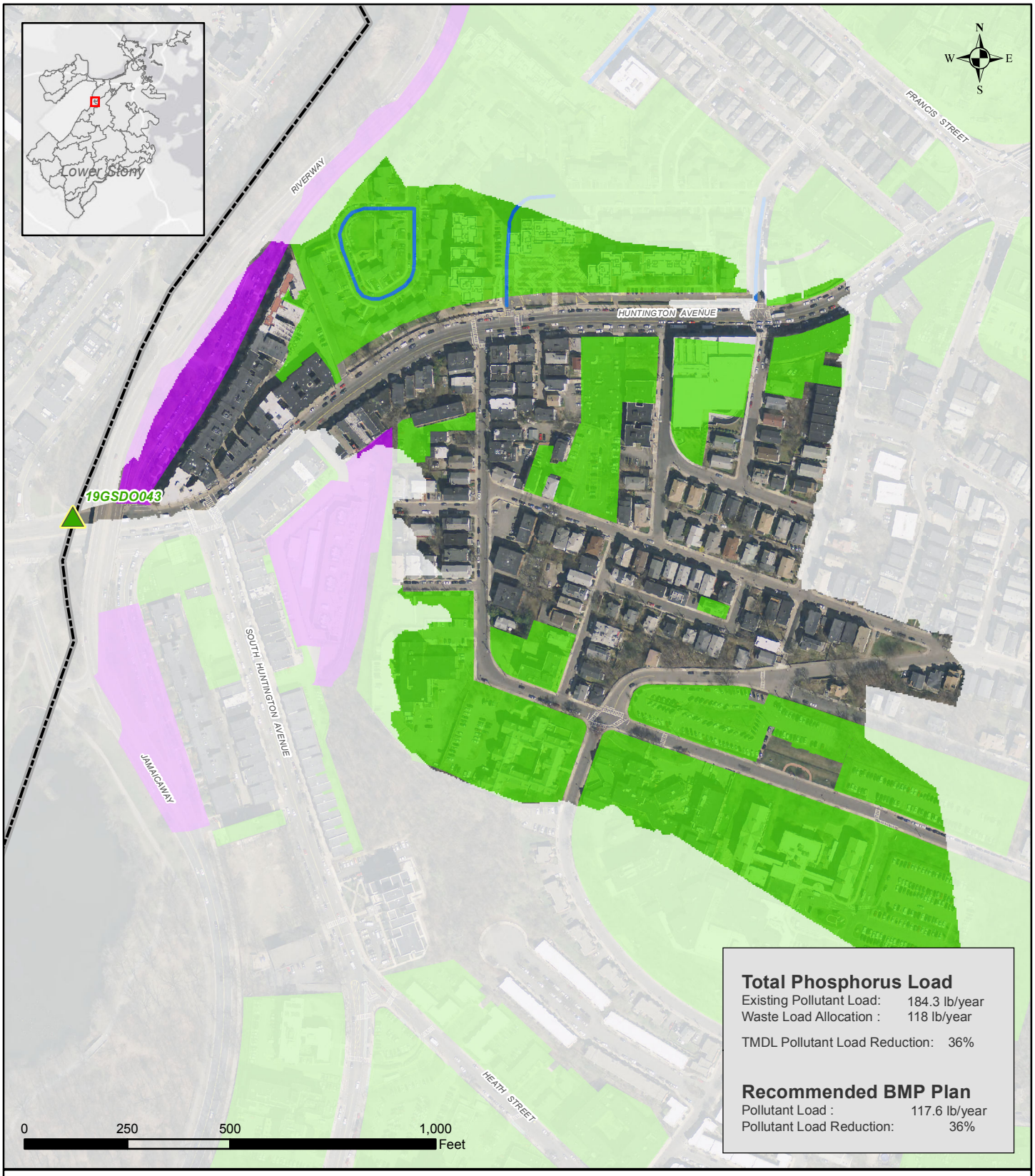
CH2MHILL

Recommended BMP Plan

Reporting Area: Goldsmith Brook
Catchment: 15FSDO288

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 184.3 lb/year
Waste Load Allocation : 118 lb/year

TMDL Pollutant Load Reduction: 36%

Recommended BMP Plan

Pollutant Load : 117.6 lb/year
Pollutant Load Reduction: 36%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 20.6 Acres
Recommended area: 3.2 Acres

Residential Parcel
Total area of suitable sites: 8.4 Acres
Recommended area: 0.4 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.2 Miles

Boston Boundary
Total Catchment Area: 46.3 Acres

Boston Water and Sewer Commission

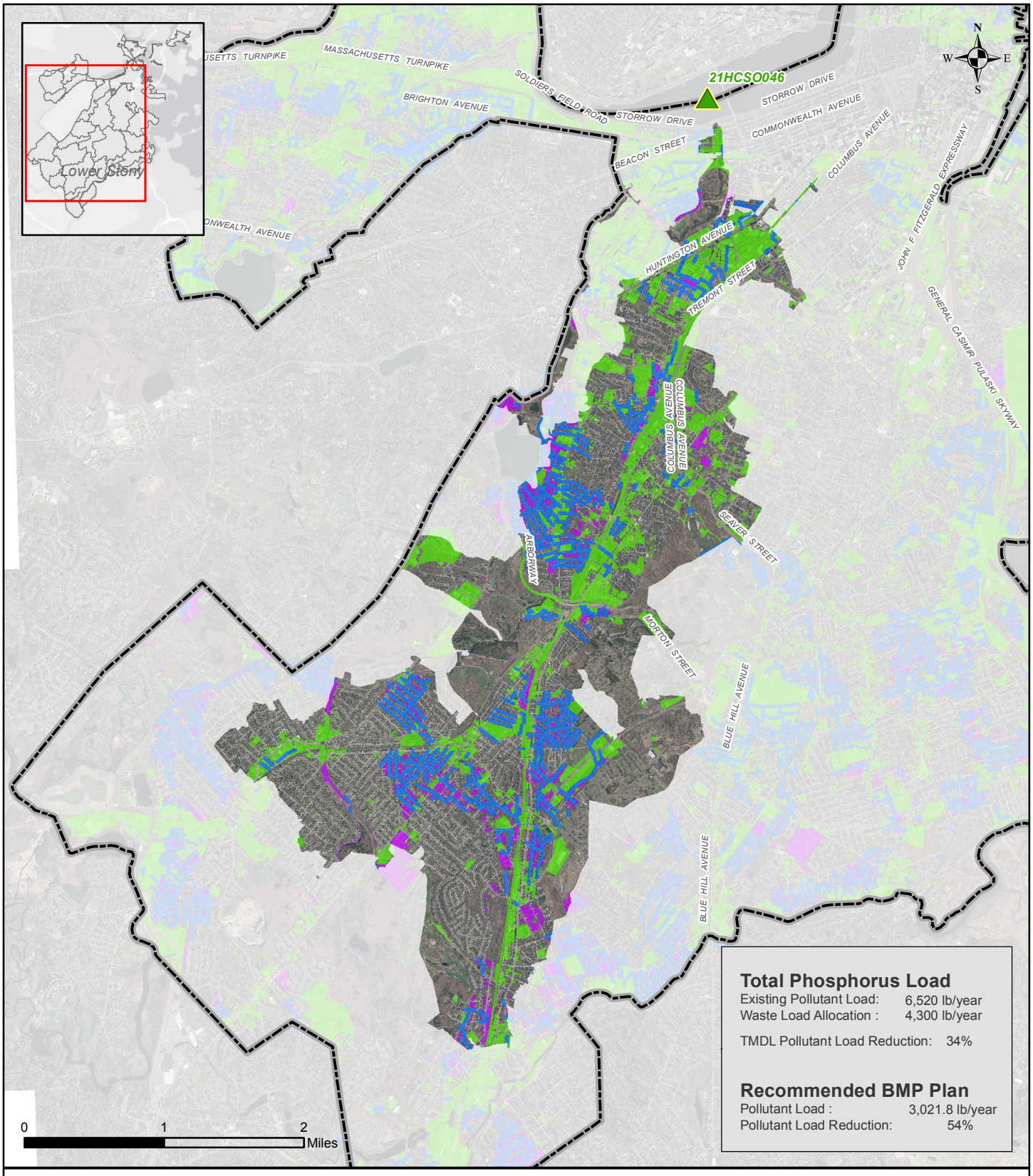
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Stony
Catchment: 19GSDO043

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 6,520 lb/year
Waste Load Allocation : 4,300 lb/year

TMDL Pollutant Load Reduction: 34%

Recommended BMP Plan

Pollutant Load : 3,021.8 lb/year
Pollutant Load Reduction: 54%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1,058.1 Acres
Recommended area: 51.3 Acres

Residential Parcel
Total area of suitable sites: 314.9 Acres
Recommended area: 17.4 Acres

Suitable Public Right of Way
Total area of suitable sites: 34.4 Miles
Recommended area: 7.9 Miles

Boston Boundary
Total Catchment Area: 5,559.2 Acres

Boston Water and Sewer Commission

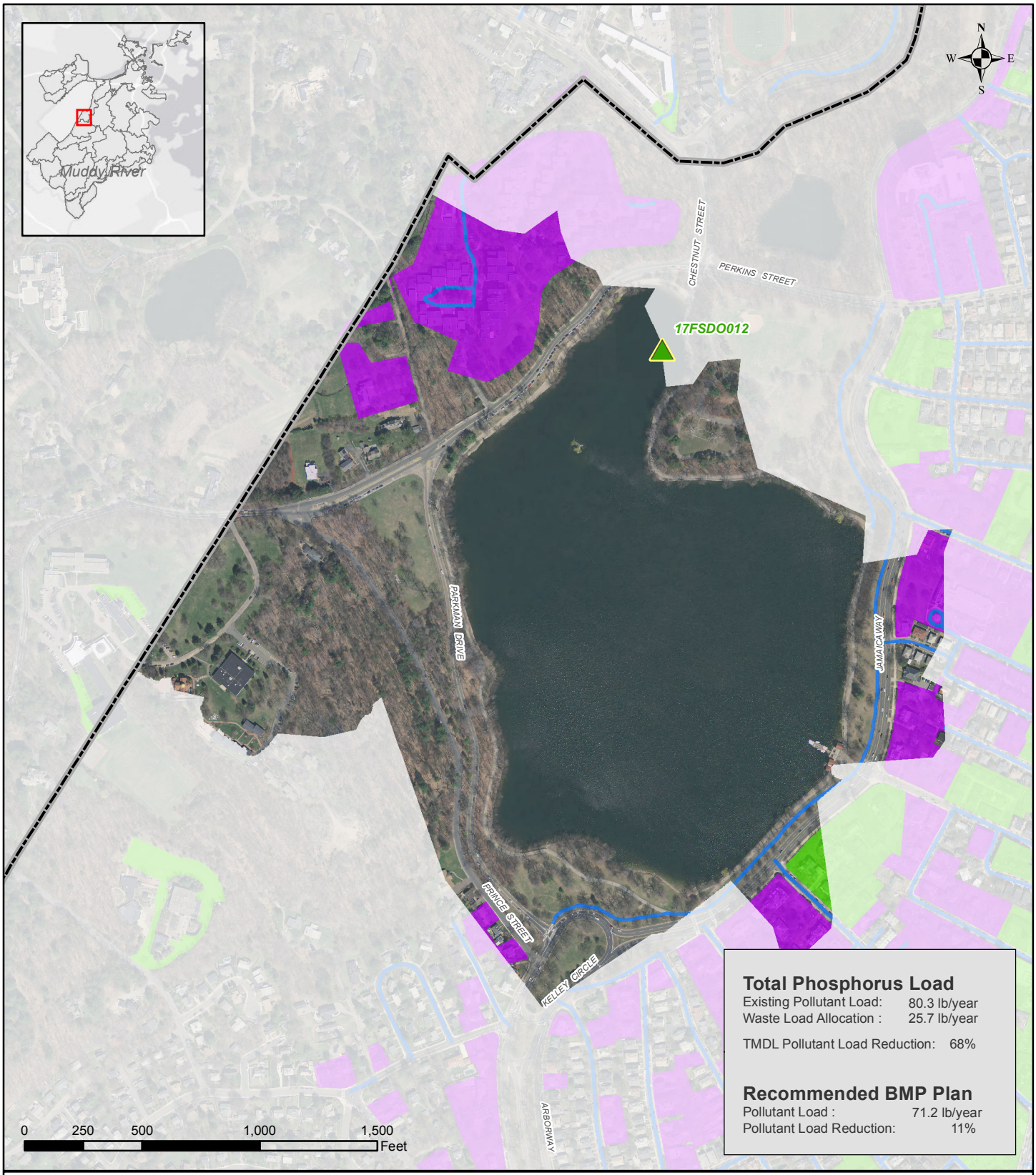
CH2MHILL

Recommended BMP Plan
Reporting Area: Lower Stony
Catchment: 21HCSO046

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-3
Recommended BMP Plan Maps by SDO Catchment: Muddy River Watershed



Total Phosphorus Load

Existing Pollutant Load:	80.3 lb/year
Waste Load Allocation :	25.7 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	71.2 lb/year
Pollutant Load Reduction:	11%

Legend

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	1 Acres
Recommended area:	1 Acres

Residential Parcel

Total area of suitable sites:	14.2 Acres
Recommended area:	2.2 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.7 Miles
Recommended area:	0.5 Miles

Boston Boundary

Total Catchment Area: 164.6 Acres

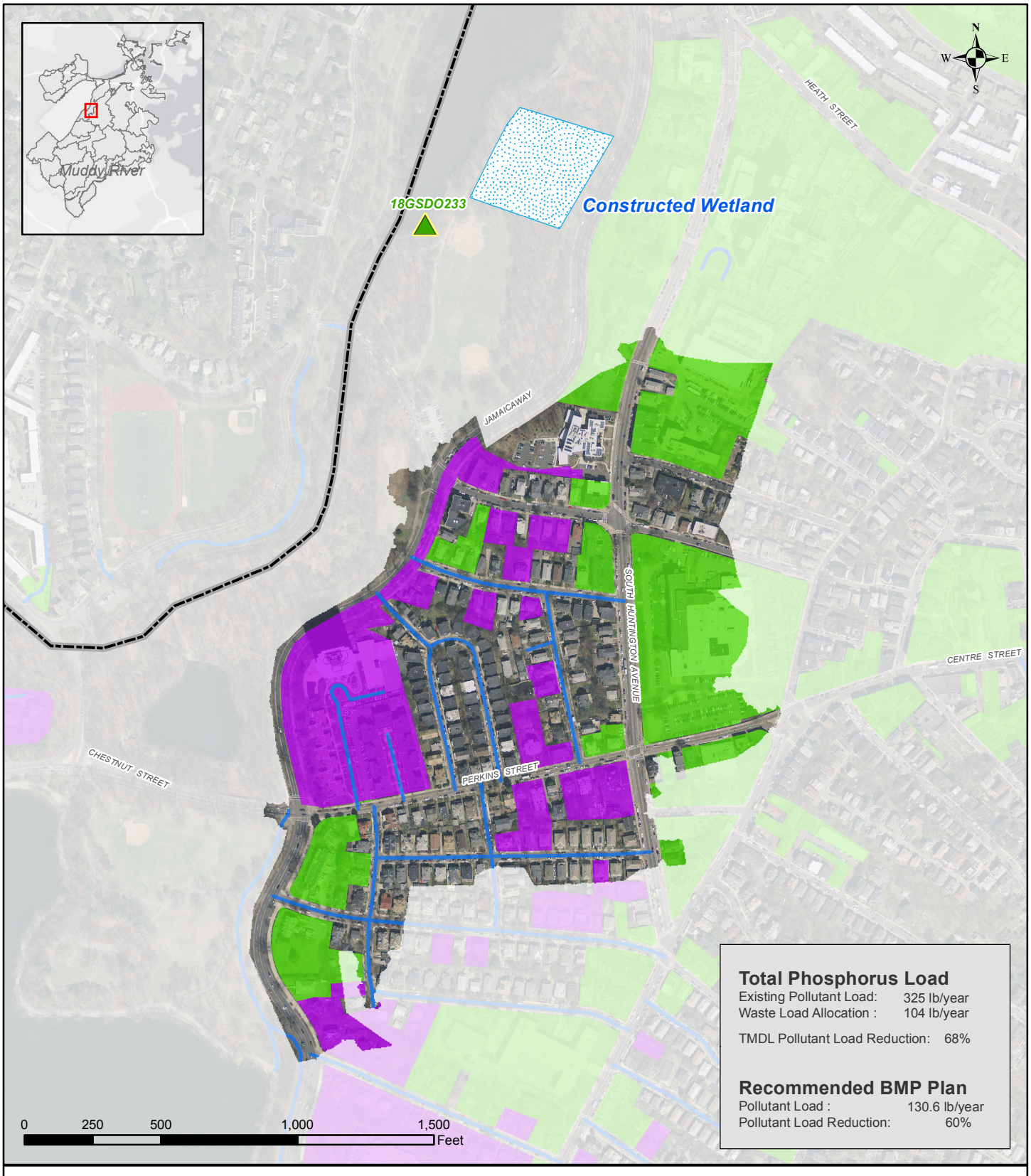
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 17FSDO012

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	325 lb/year
Waste Load Allocation :	104 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	130.6 lb/year
Pollutant Load Reduction:	60%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 16 Acres
- Recommended area: 1.7 Acres

Residential Parcel
- Total area of suitable sites: 14.4 Acres
- Recommended area: 3.4 Acres

Suitable Public Right of Way
- Total area of suitable sites: 1.3 Miles
- Recommended area: 0.2 Miles

Constructed Wetland

Boston Boundary

Total Catchment Area: 68.1 Acres

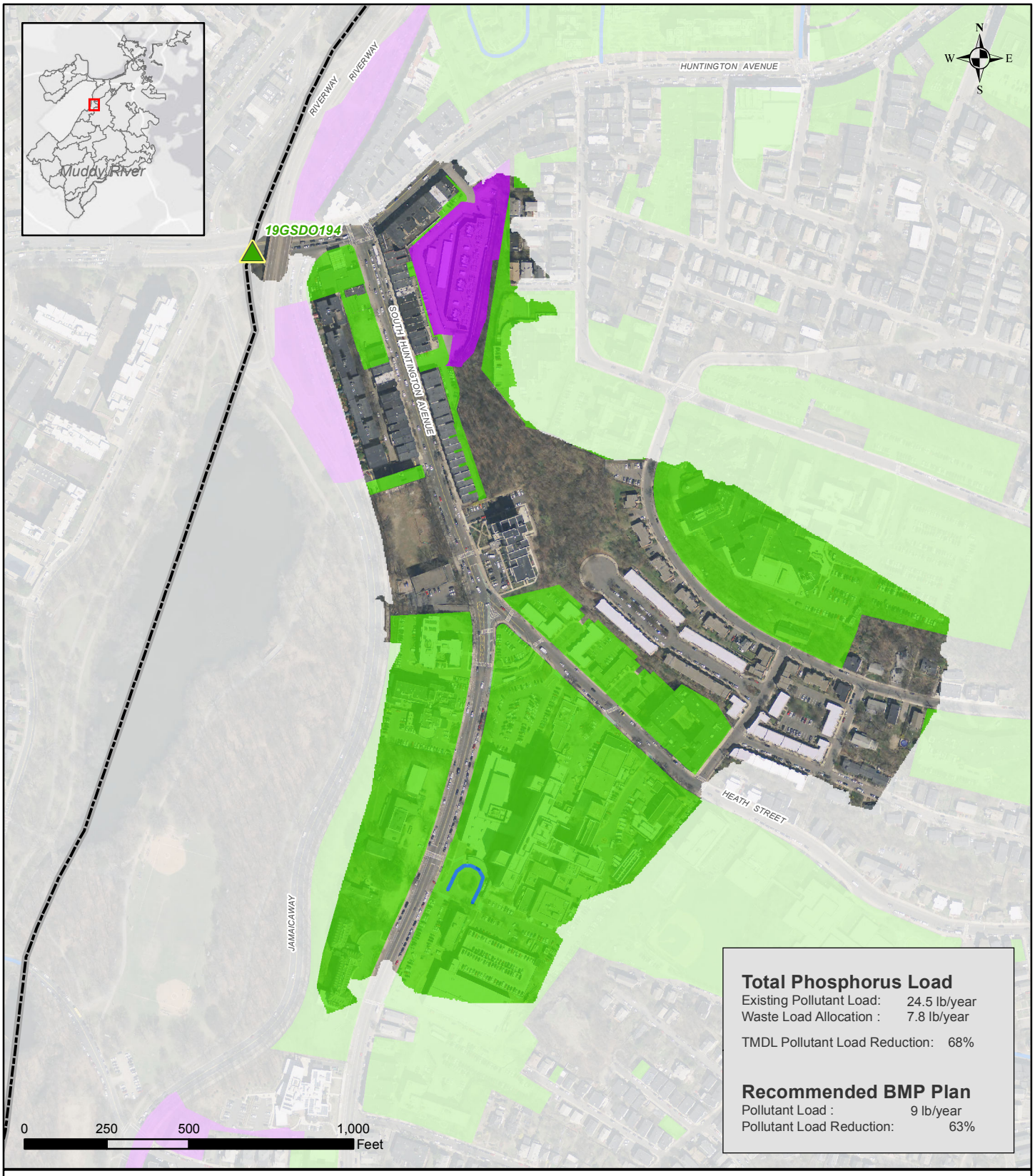
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 18GSDO233

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 28.6 Acres
Recommended area: 0.7 Acres

Residential Parcel
Total area of suitable sites: 4.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 58.0 Acres

Boston Water and Sewer Commission

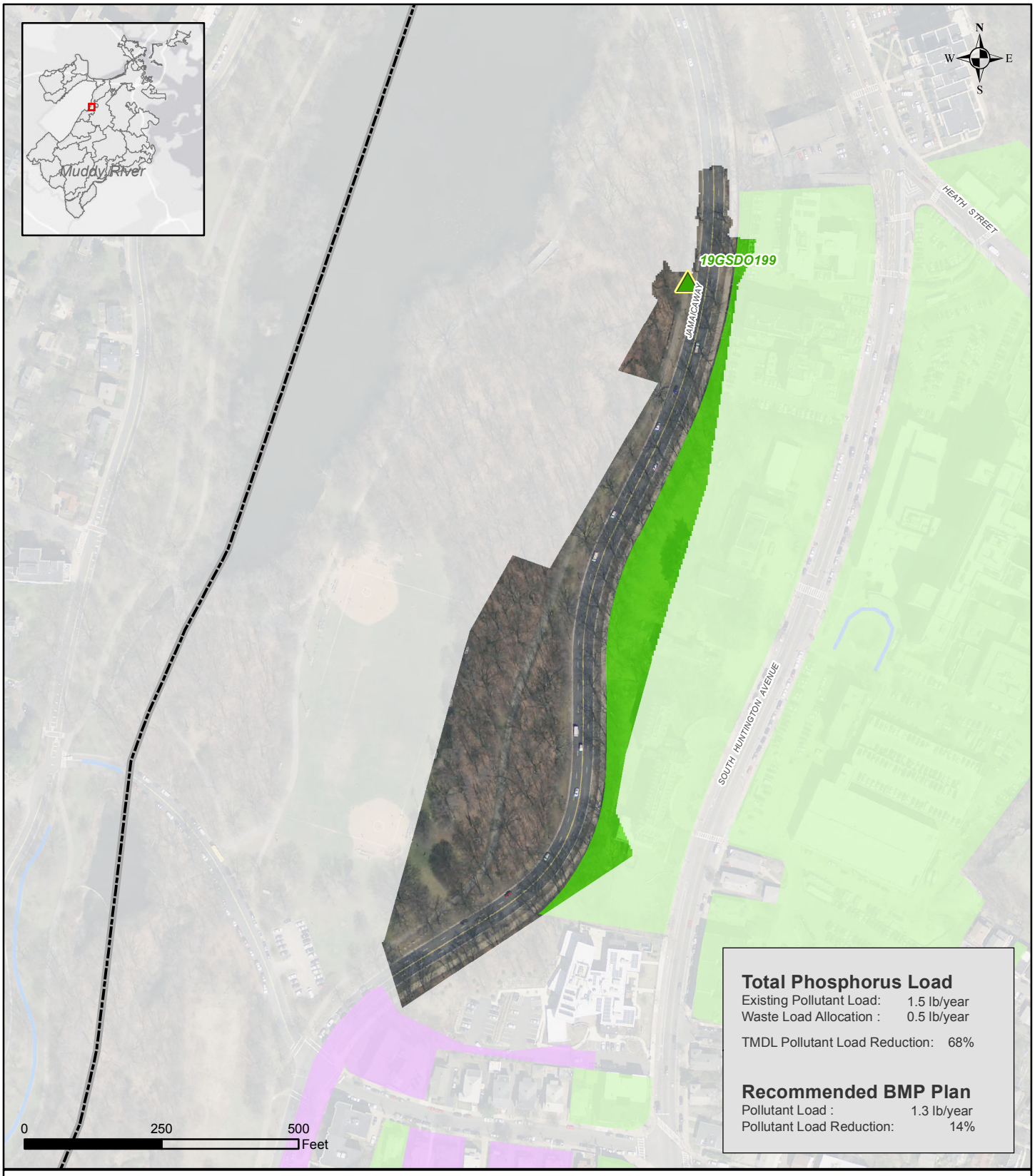
CH2MHILL

Recommended BMP Plan

Reporting Area: Muddy River
Catchment: 19GSDO194

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	1.5 lb/year
Waste Load Allocation :	0.5 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	1.3 lb/year
Pollutant Load Reduction:	14%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	1.2 Acres
Recommended area:	1.2 Acres

Residential Parcel

Total area of suitable sites:	0 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0 Miles
Recommended area:	0 Miles

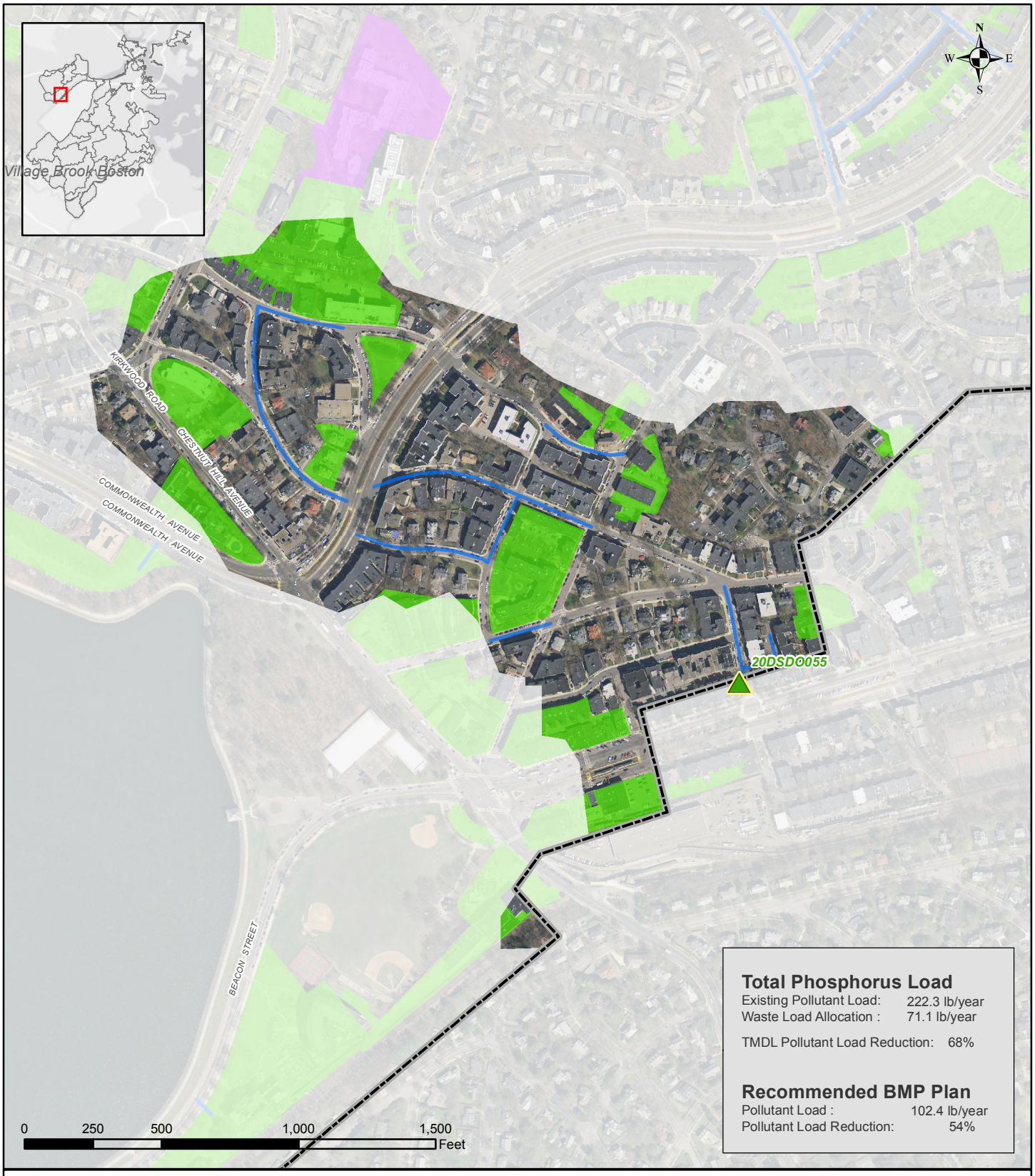
Boston Boundary

Total Catchment Area: 8.9 Acres

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 19GSDO199

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 222.3 lb/year
Waste Load Allocation : 71.1 lb/year

TMDL Pollutant Load Reduction: 68%

Recommended BMP Plan

Pollutant Load : 102.4 lb/year
Pollutant Load Reduction: 54%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 15.2 Acres
Recommended area: 7.9 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.7 Miles
Recommended area: 0.6 Miles

Boston Boundary
Total Catchment Area: 87.6 Acres

Boston Water and Sewer Commission

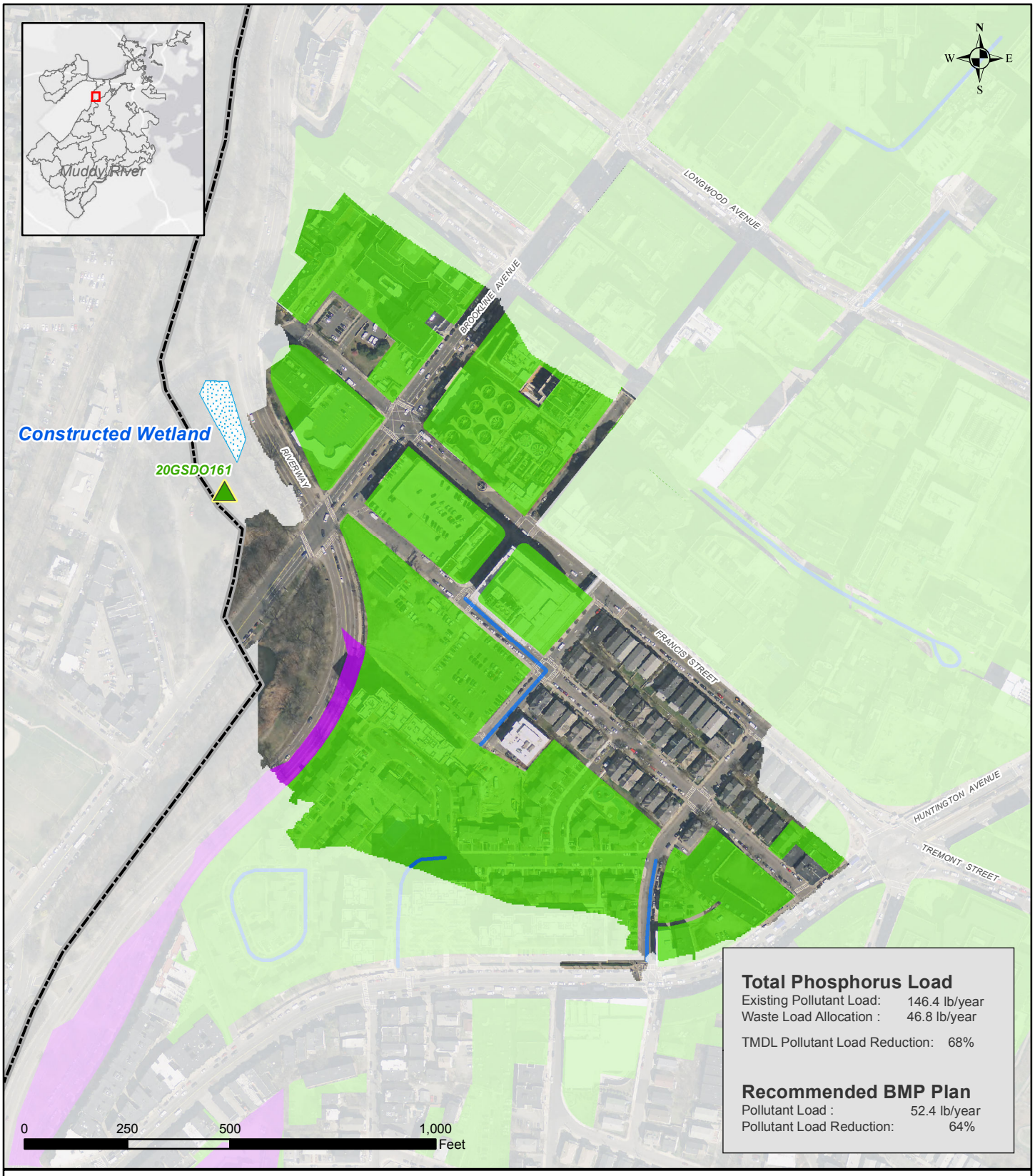
CH2MHILL

Recommended BMP Plan

Reporting Area: Village Brook Boston
Catchment: 20DSDO055

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	146.4 lb/year
Waste Load Allocation :	46.8 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	52.4 lb/year
Pollutant Load Reduction:	64%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	21.4 Acres
Recommended area:	5.3 Acres

Residential Parcel

Total area of suitable sites:	7.1 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.2 Miles
Recommended area:	0.2 Miles

Constructed Wetland

Boston Boundary

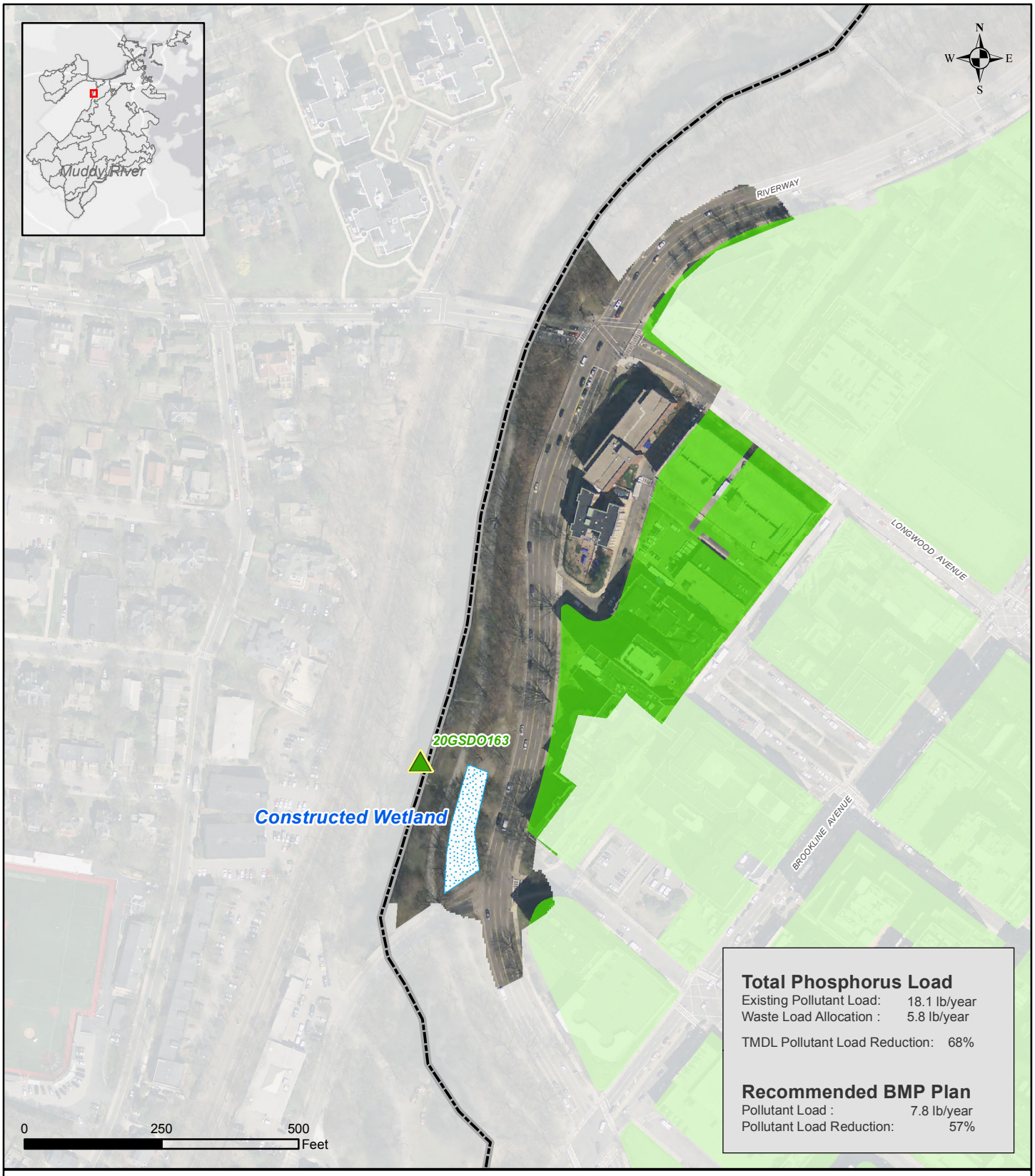
Total Catchment Area: 35.1 Acres

Recommended BMP Plan

Reporting Area: Muddy River
Catchment: 20GSDO161

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3 Acres
Recommended area: 0.6 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Constructed Wetland

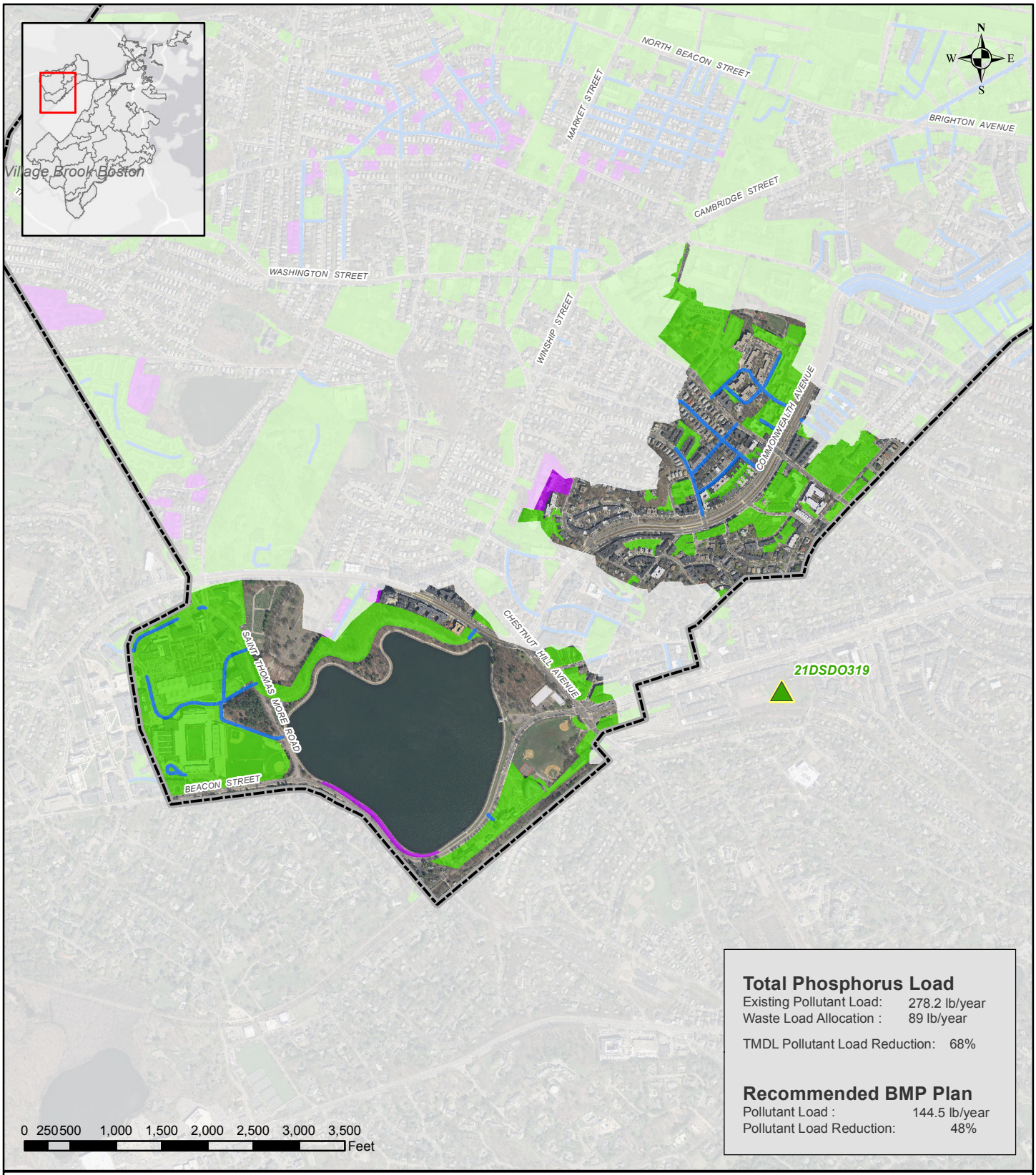
Boston Boundary

Total Catchment Area: 19.7 Acres

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 20GSDO163

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 278.2 lb/year
Waste Load Allocation : 89 lb/year

TMDL Pollutant Load Reduction: 68%

Recommended BMP Plan

Pollutant Load : 144.5 lb/year
Pollutant Load Reduction: 48%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 138.4 Acres
Recommended area: 7.4 Acres

Residential Parcel
Total area of suitable sites: 4.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 2.2 Miles
Recommended area: 0.6 Miles

Boston Boundary
Total Catchment Area: 476.2 Acres

Boston Water and Sewer Commission

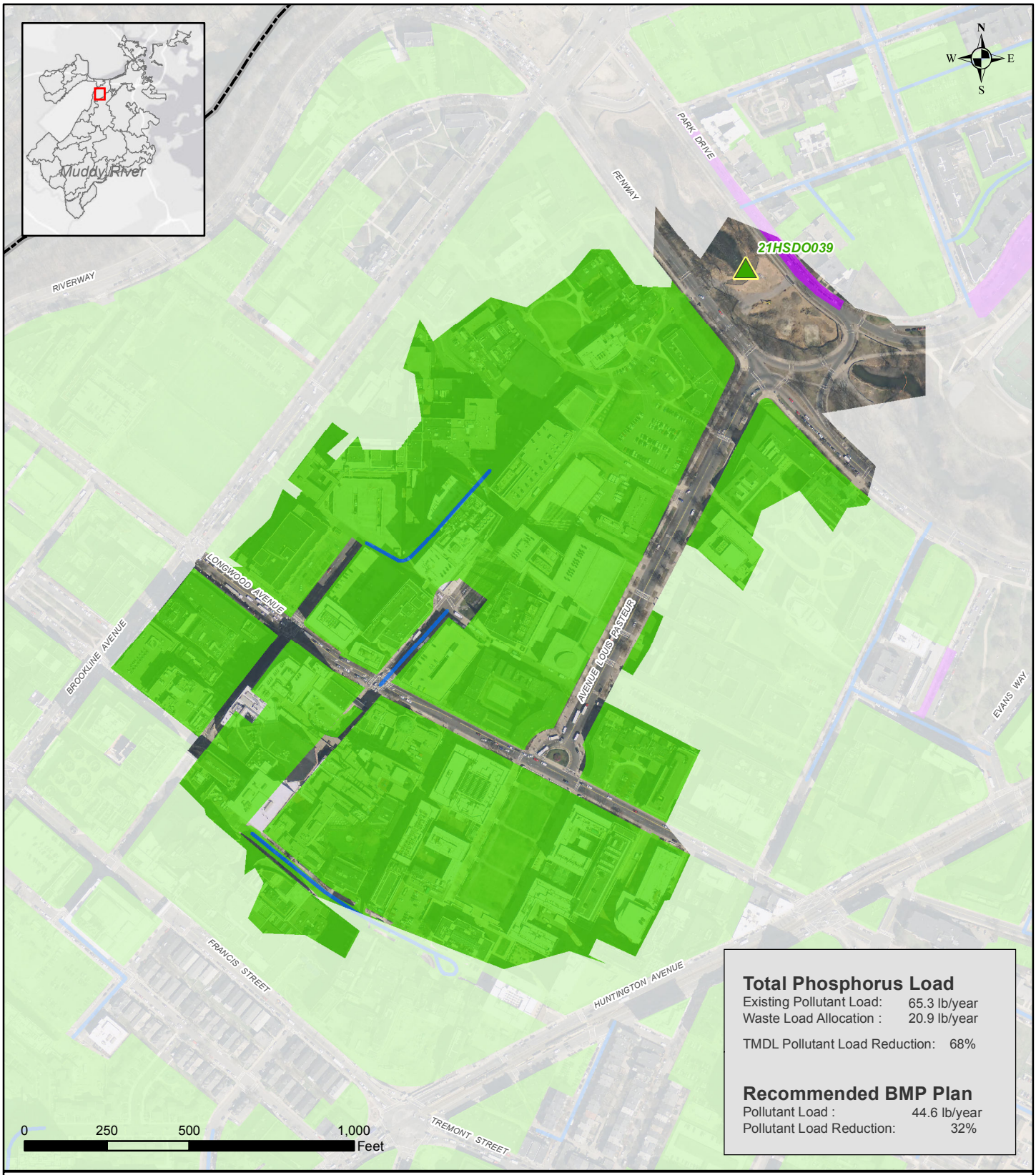
CH2MHILL

Recommended BMP Plan

Reporting Area: Village Brook Boston
Catchment: 21DSDO319

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	65.3 lb/year
Waste Load Allocation :	20.9 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	44.6 lb/year
Pollutant Load Reduction:	32%

Legend

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	56.6	Acres
Recommended area:	15.1	Acres

Residential Parcel

Total area of suitable sites:	0.3	Acres
Recommended area:	0	Acres

Suitable Public Right of Way

Total area of suitable sites:	0.3	Miles
Recommended area:	0.3	Miles

Boston Boundary

Total Catchment Area:	68.5	Acres

Boston Water and Sewer Commission

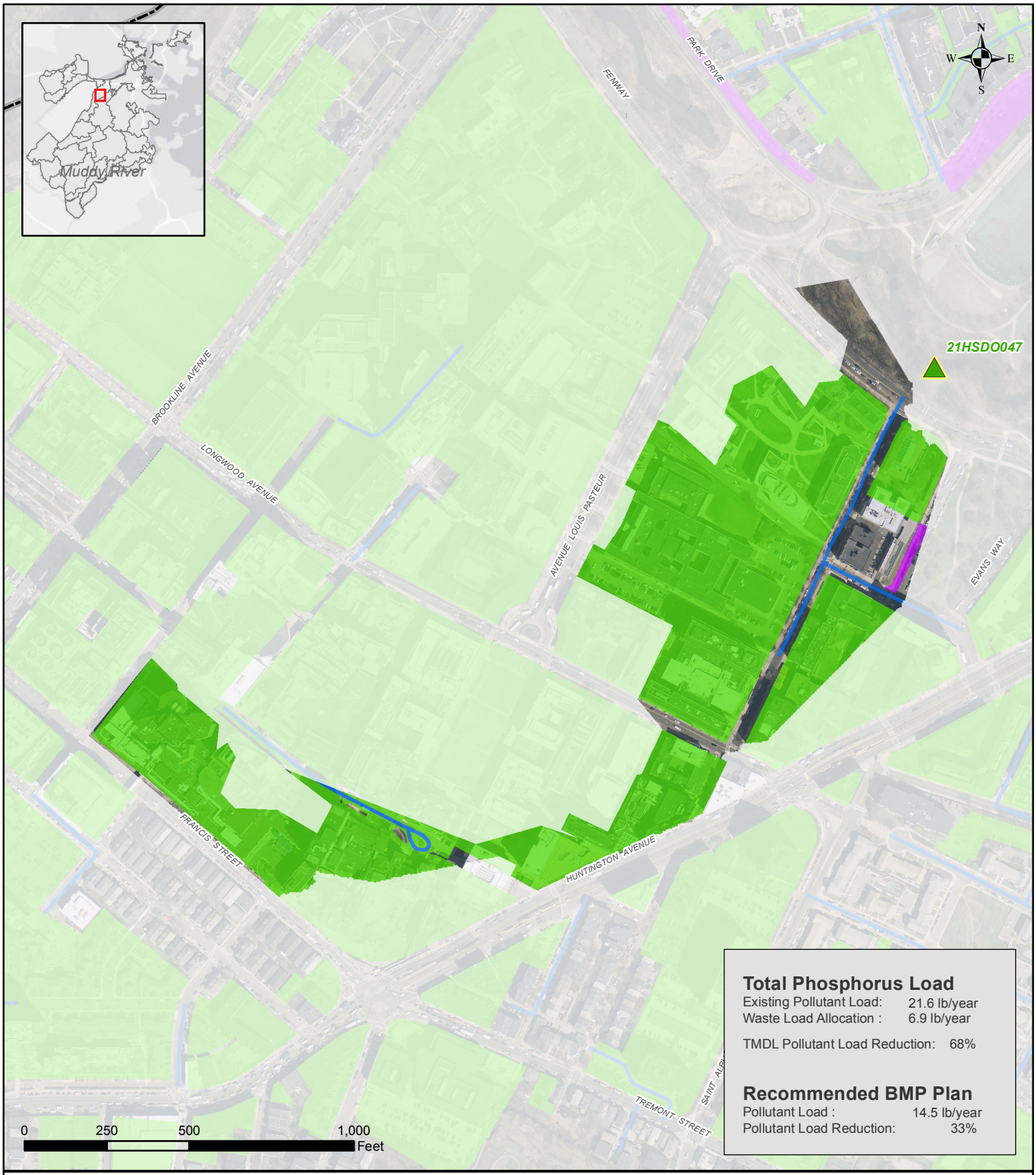
CH2MHILL

Recommended BMP Plan

Reporting Area: Muddy River
Catchment: 21HSDO039

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	21.6 lb/year
Waste Load Allocation :	6.9 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	14.5 lb/year
Pollutant Load Reduction:	33%

Legend

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	18.9 Acres
Recommended area:	1.7 Acres

Residential Parcel

Total area of suitable sites:	0.1 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.3 Miles
Recommended area:	0.1 Miles

Boston Boundary

Total Catchment Area:	28.3 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 21HSDO047

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 3.5 Acres

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 21HSDO048

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 122 lb/year
Waste Load Allocation : 39 lb/year

TMDL Pollutant Load Reduction: 68%

Recommended BMP Plan

Pollutant Load : 75 lb/year
Pollutant Load Reduction: 38%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.7 Acres
Recommended area: 1.8 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.4 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 15.3 Acres

Boston Water and Sewer Commission

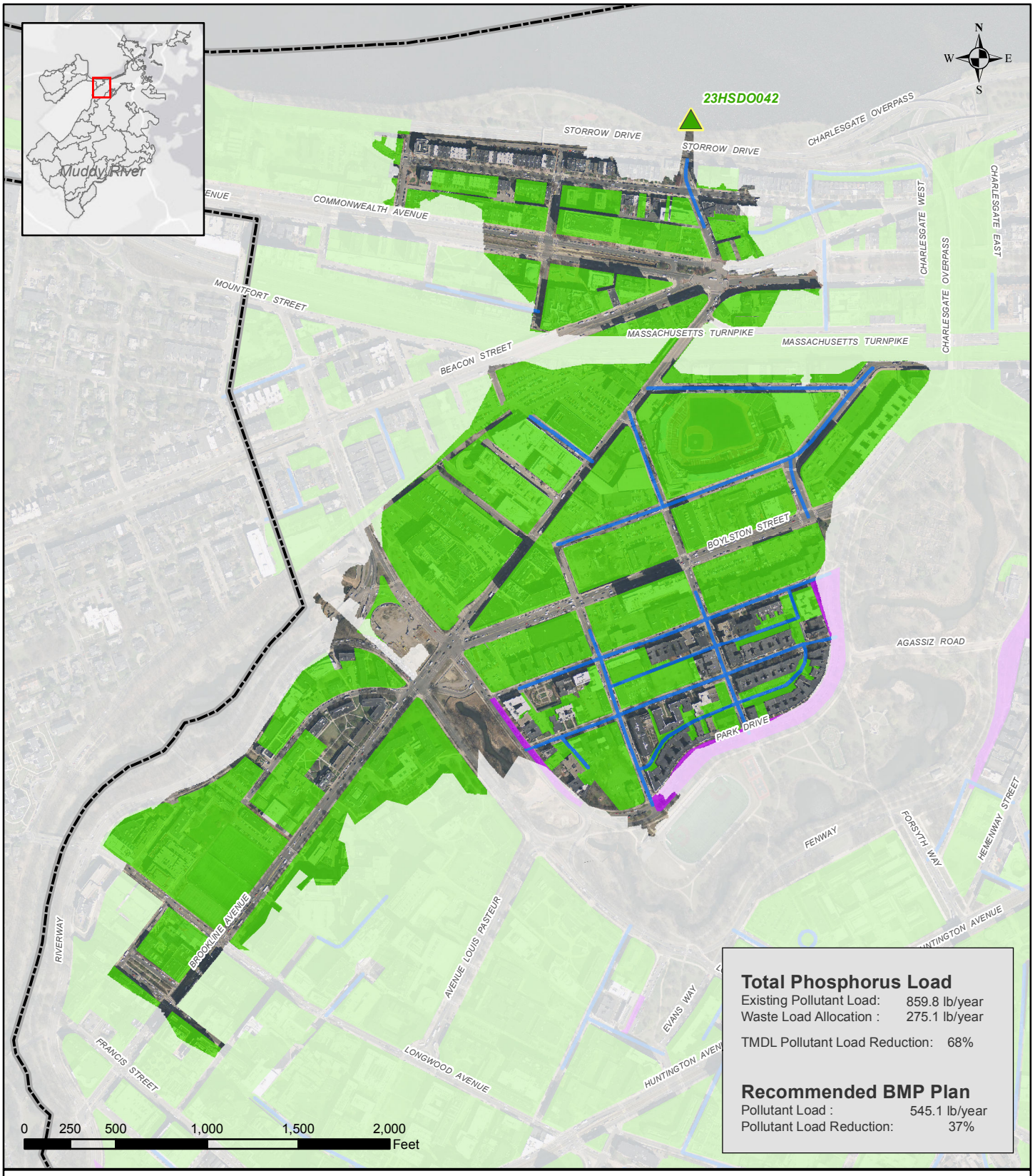
CH2MHILL

Recommended BMP Plan

Reporting Area: Muddy River
Catchment: 23HSDO040

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	859.8 lb/year
Waste Load Allocation :	275.1 lb/year
TMDL Pollutant Load Reduction:	68%

Recommended BMP Plan

Pollutant Load :	545.1 lb/year
Pollutant Load Reduction:	37%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 117.6 Acres
- Recommended area: 41.3 Acres

Residential Parcel
- Total area of suitable sites: 0.9 Acres
- Recommended area: 0.9 Acres

Suitable Public Right of Way
- Total area of suitable sites: 2.4 Miles
- Recommended area: 1.7 Miles

Boston Boundary
- Total Catchment Area: 193.7 Acres

Boston Water and Sewer Commission

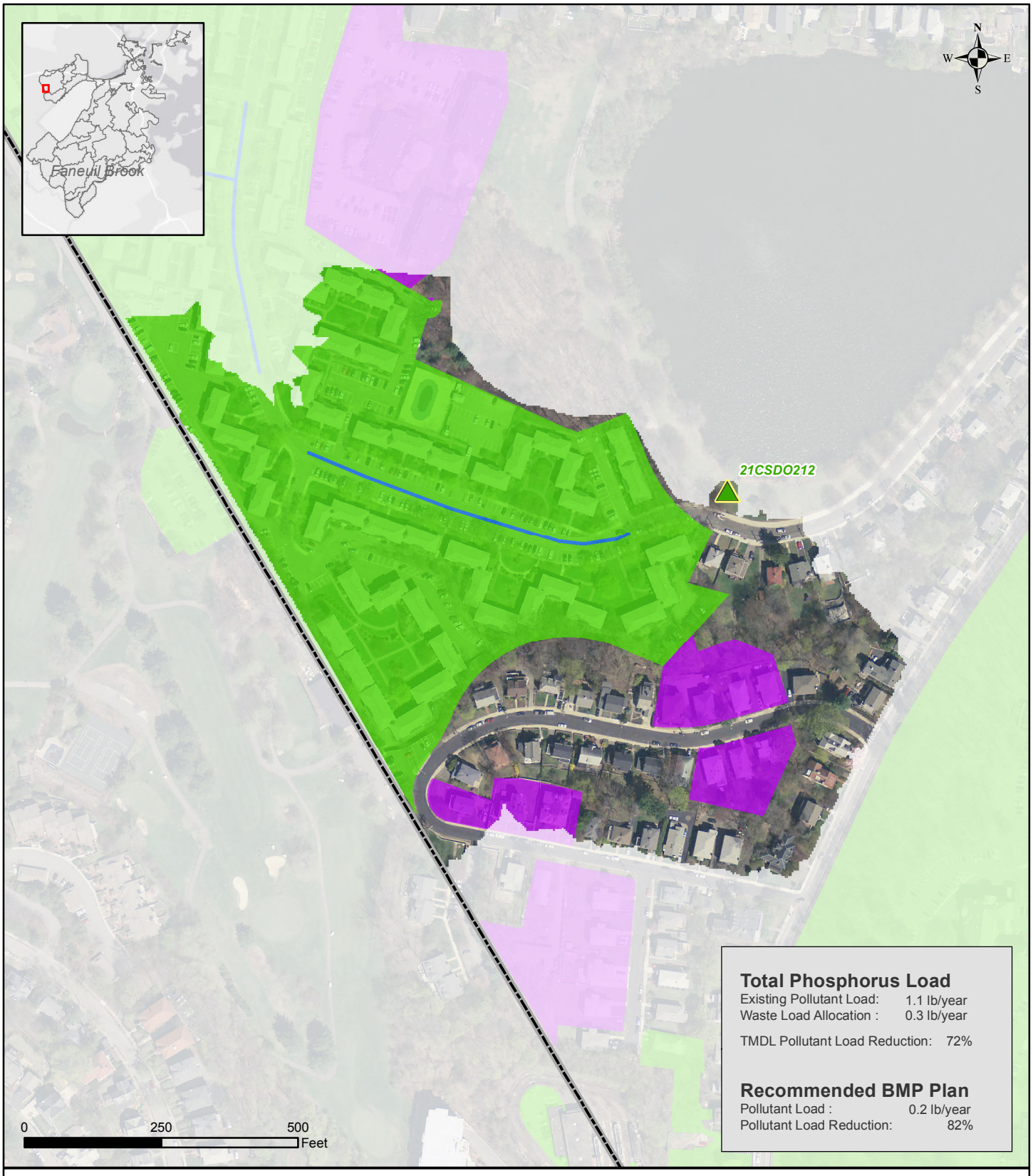
CH2MHILL

Recommended BMP Plan
Reporting Area: Muddy River
Catchment: 23HSDO042

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-4
Recommended BMP Plan Maps by SDO Catchment: Faneuil Brook Watershed



Total Phosphorus Load

Existing Pollutant Load: 1.1 lb/year
Waste Load Allocation : 0.3 lb/year

TMDL Pollutant Load Reduction: 72%

Recommended BMP Plan

Pollutant Load : 0.2 lb/year
Pollutant Load Reduction: 82%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 10.7 Acres
Recommended area: 0.4 Acres

Residential Parcel
Total area of suitable sites: 12.3 Acres
Recommended area: 2.6 Acres

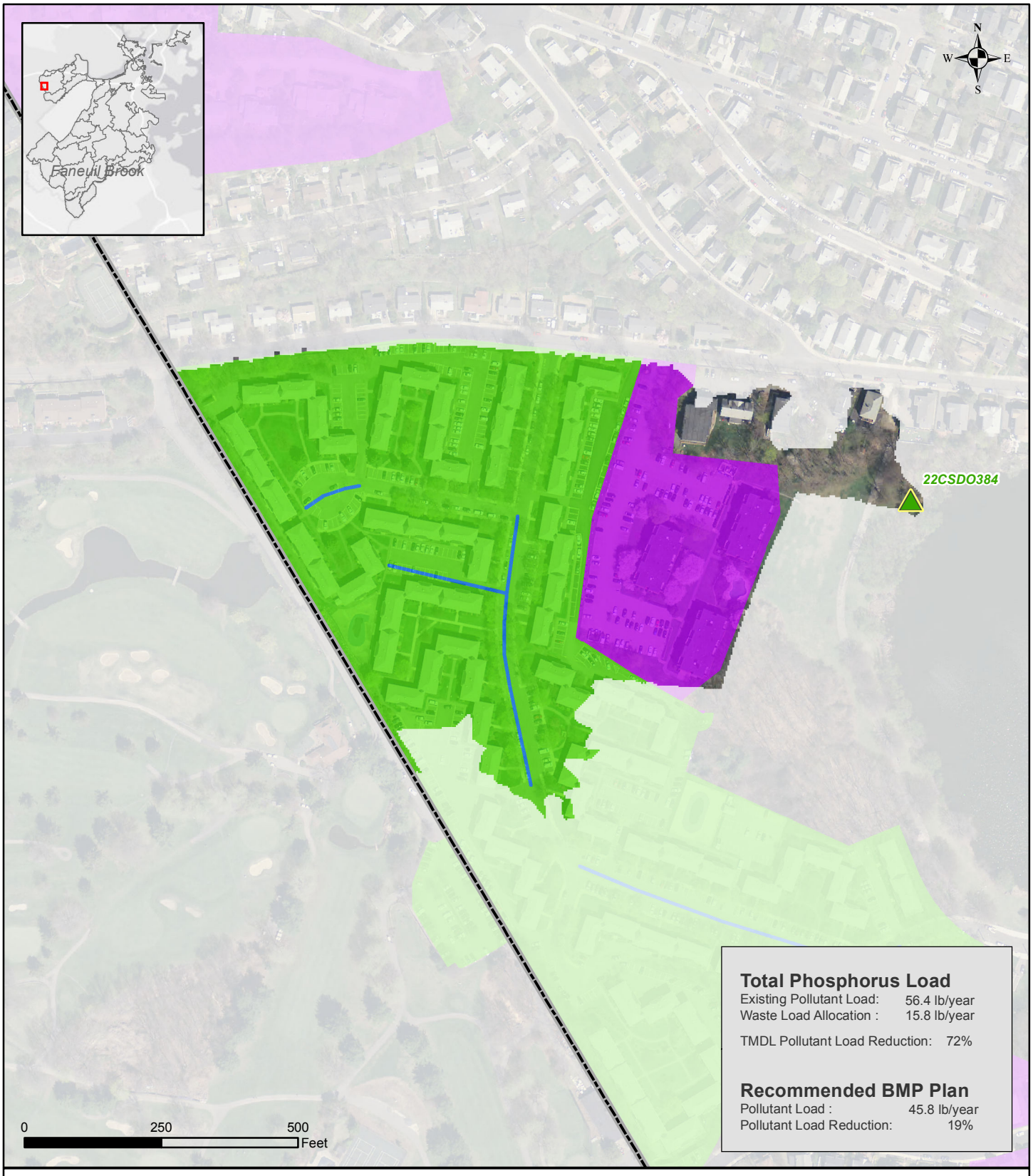
Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 19.5 Acres

Recommended BMP Plan
Reporting Area: Faneuil Brook
Catchment: 21CSDO212

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	56.4 lb/year
Waste Load Allocation :	15.8 lb/year
TMDL Pollutant Load Reduction:	72%

Recommended BMP Plan

Pollutant Load :	45.8 lb/year
Pollutant Load Reduction:	19%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	10	Acres
Recommended area:	0.2	Acres

Residential Parcel

Total area of suitable sites:	13	Acres
Recommended area:	2.1	Acres

Suitable Public Right of Way

Total area of suitable sites:	0.2	Miles
Recommended area:	0.1	Miles

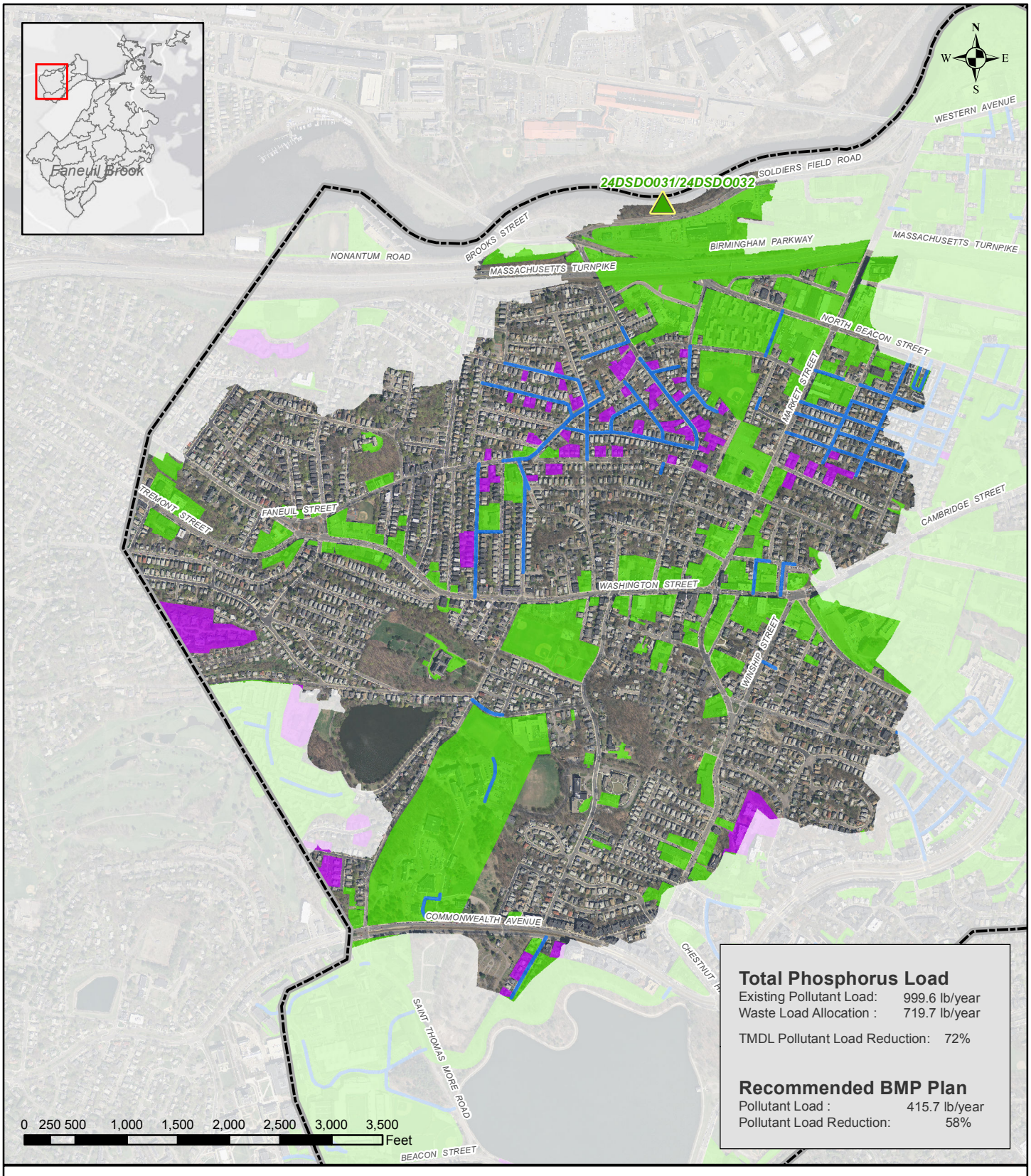
Boston Boundary

Total Catchment Area:	18.5	Acres

Recommended BMP Plan
Reporting Area: Faneuil Brook
Catchment: 22CSDO384

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 999.6 lb/year
Waste Load Allocation : 719.7 lb/year

TMDL Pollutant Load Reduction: 72%

Recommended BMP Plan

Pollutant Load : 415.7 lb/year
Pollutant Load Reduction: 58%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 204.4 Acres
Recommended area: 62.6 Acres

Residential Parcel
Total area of suitable sites: 32.5 Acres
Recommended area: 11.8 Acres

Suitable Public Right of Way
Total area of suitable sites: 4.3 Miles
Recommended area: 4.3 Miles

Boston Boundary
Total Catchment Area: 882.5 Acres

Boston Water and Sewer Commission

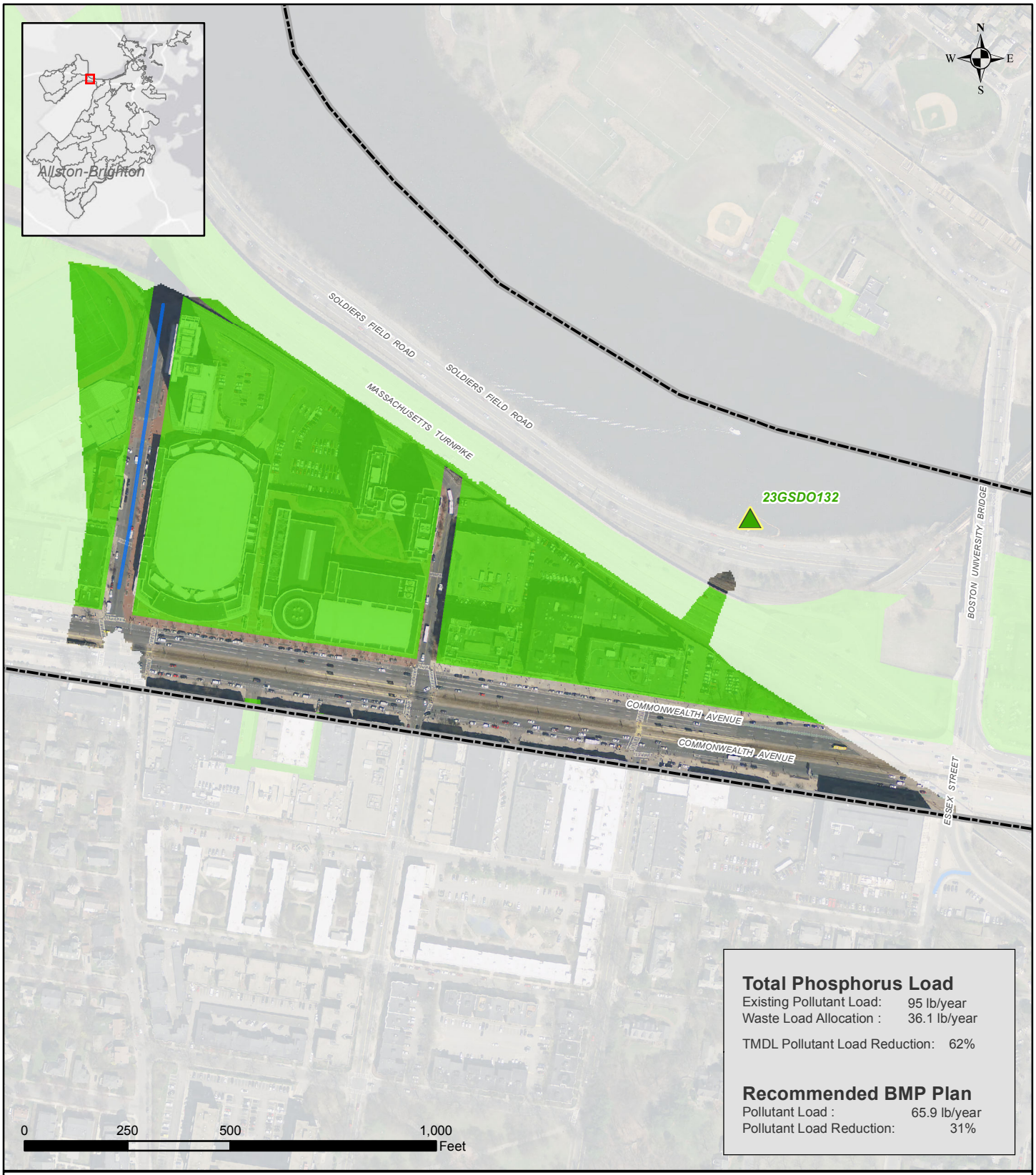
CH2MHILL

Recommended BMP Plan
Reporting Area: Faneuil Brook
Catchment: 24DSDO031/24DSDO032

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-5
Recommended BMP Plan Maps by SDO Catchment: Other Lower Charles River Watershed



Total Phosphorus Load

Existing Pollutant Load:	95 lb/year
Waste Load Allocation :	36.1 lb/year
TMDL Pollutant Load Reduction:	62%

Recommended BMP Plan

Pollutant Load :	65.9 lb/year
Pollutant Load Reduction:	31%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 18.3 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.2 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 40.7 Acres

Boston Water and Sewer Commission

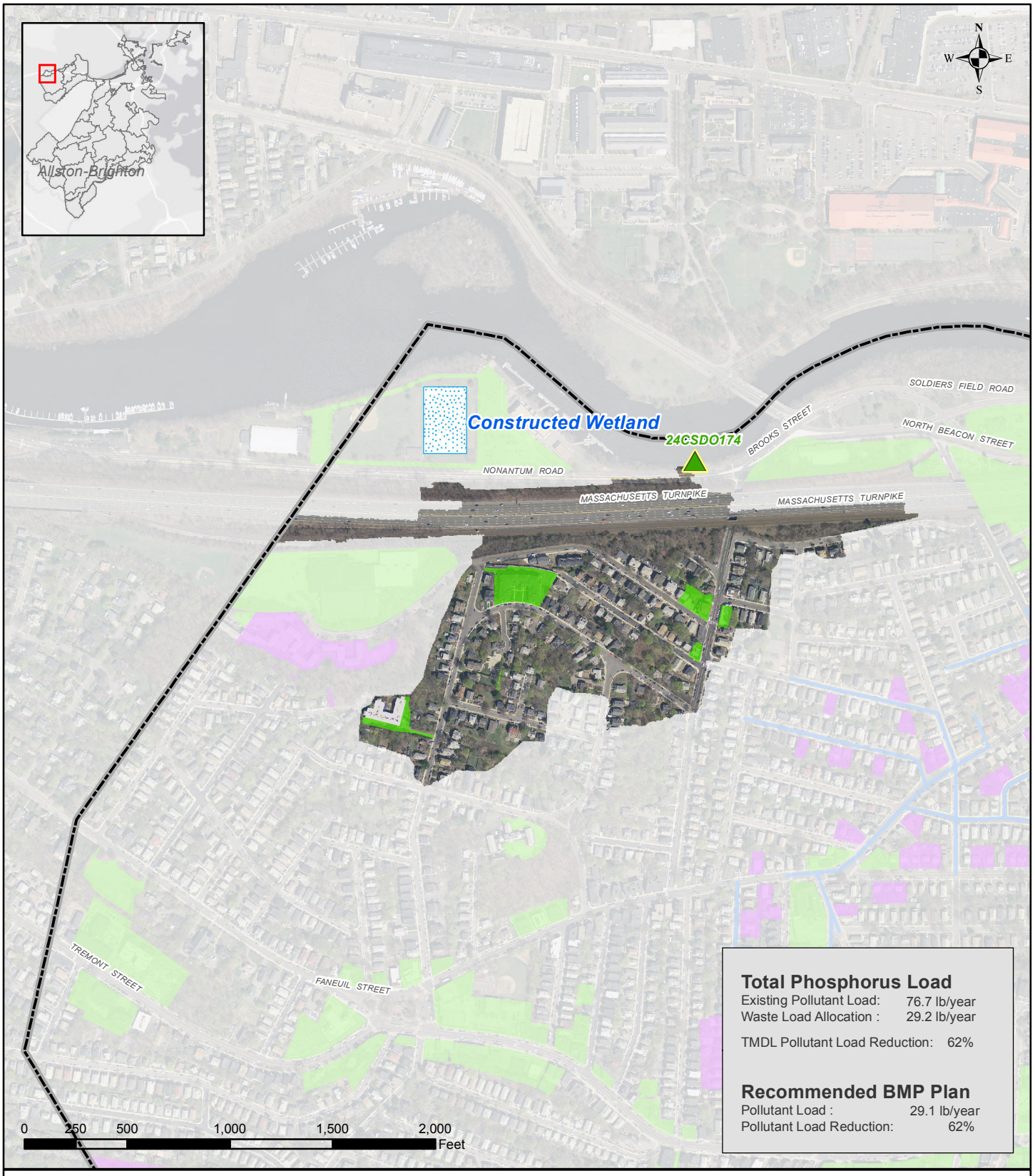
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 23GSDO132

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 76.7 lb/year
Waste Load Allocation : 29.2 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 29.1 lb/year
Pollutant Load Reduction: 62%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Constructed Wetland

Boston Boundary

Total Catchment Area: 51.2 Acres

Boston Water and Sewer Commission

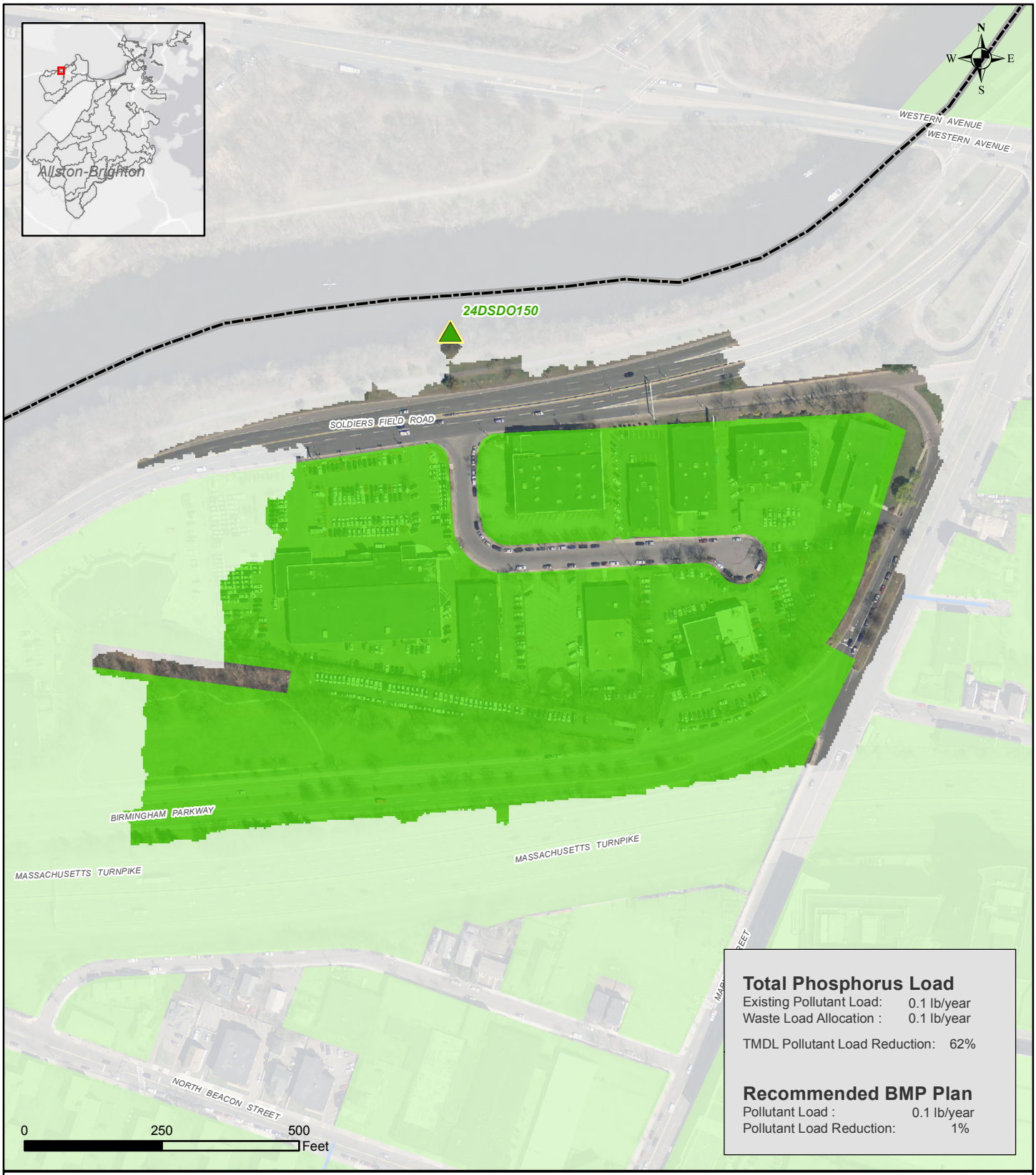
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 24CSDO174

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.1 lb/year
Waste Load Allocation : 0.1 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 0.1 lb/year
Pollutant Load Reduction: 1%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 17.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 22.4 Acres

Boston Water and Sewer Commission

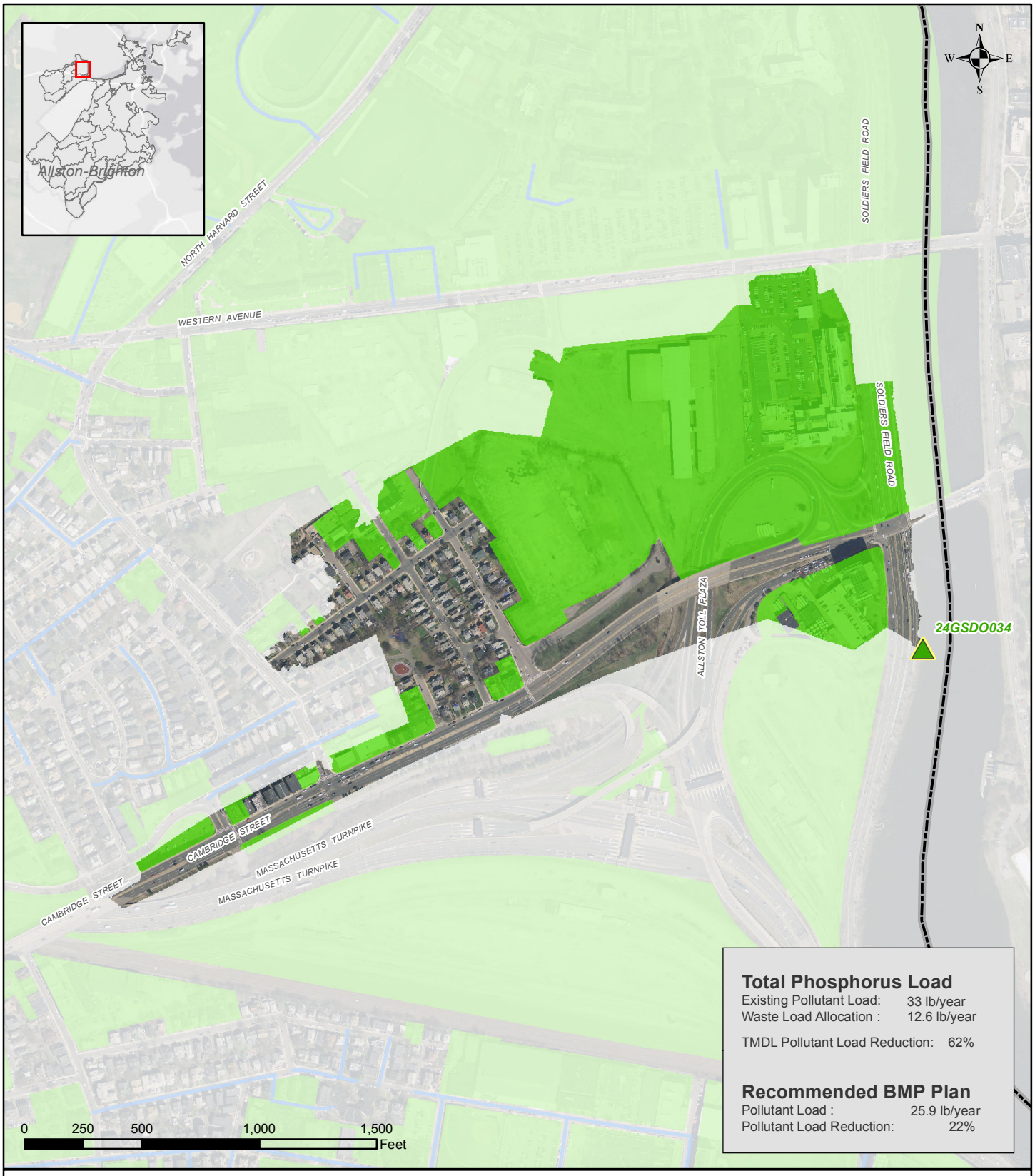
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 24DSDO150

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 33 lb/year
Waste Load Allocation : 12.6 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 25.9 lb/year
Pollutant Load Reduction: 22%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 48.5 Acres
Recommended area: 3.9 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 77.4 Acres

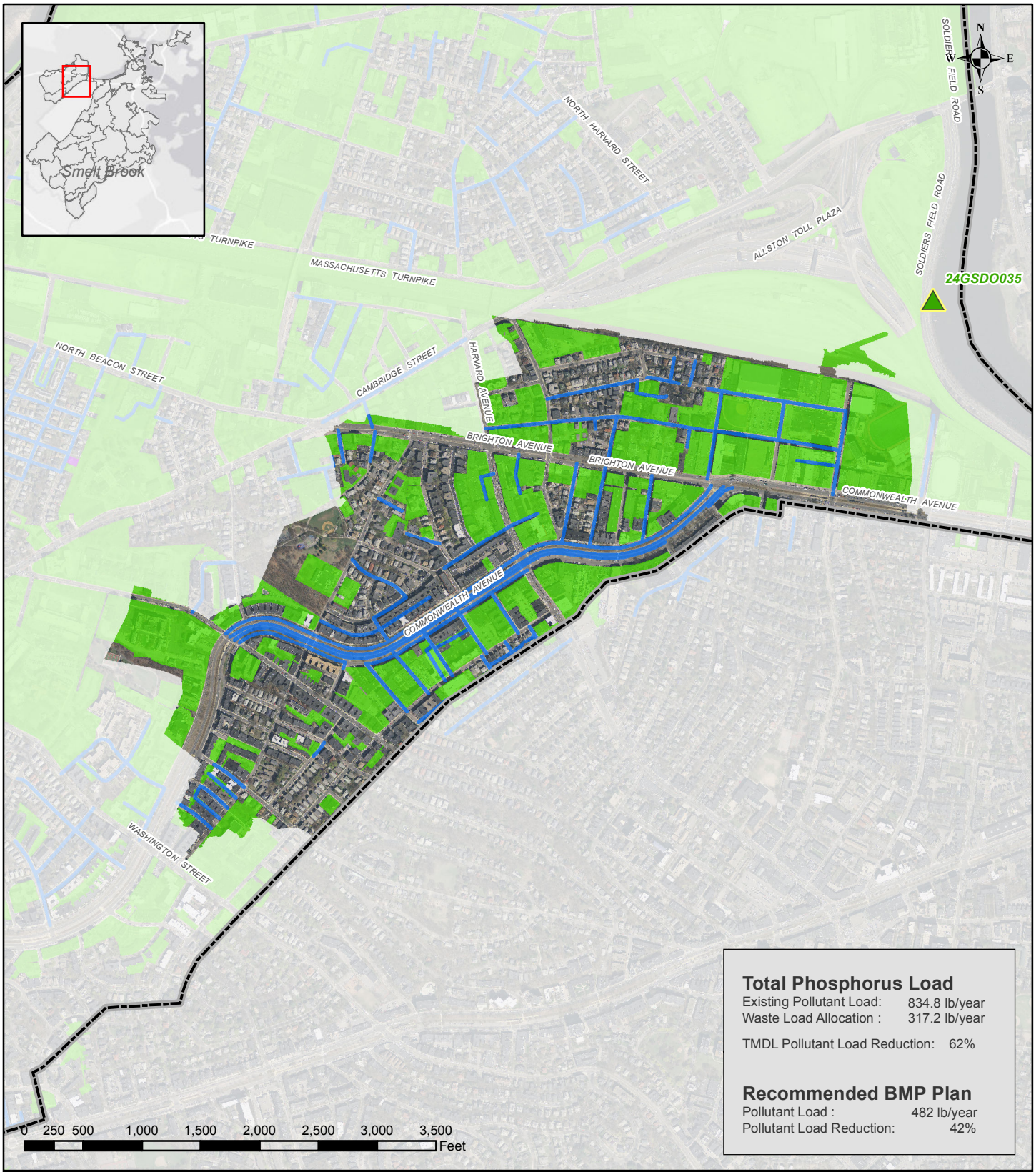
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Allston-Brighton
Catchment: 24GSDO034

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 834.8 lb/year
Waste Load Allocation : 317.2 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 482 lb/year
Pollutant Load Reduction: 42%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 125.7 Acres
Recommended area: 57.7 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 7.7 Miles
Recommended area: 2.7 Miles

Boston Boundary
Total Catchment Area: 332.3 Acres

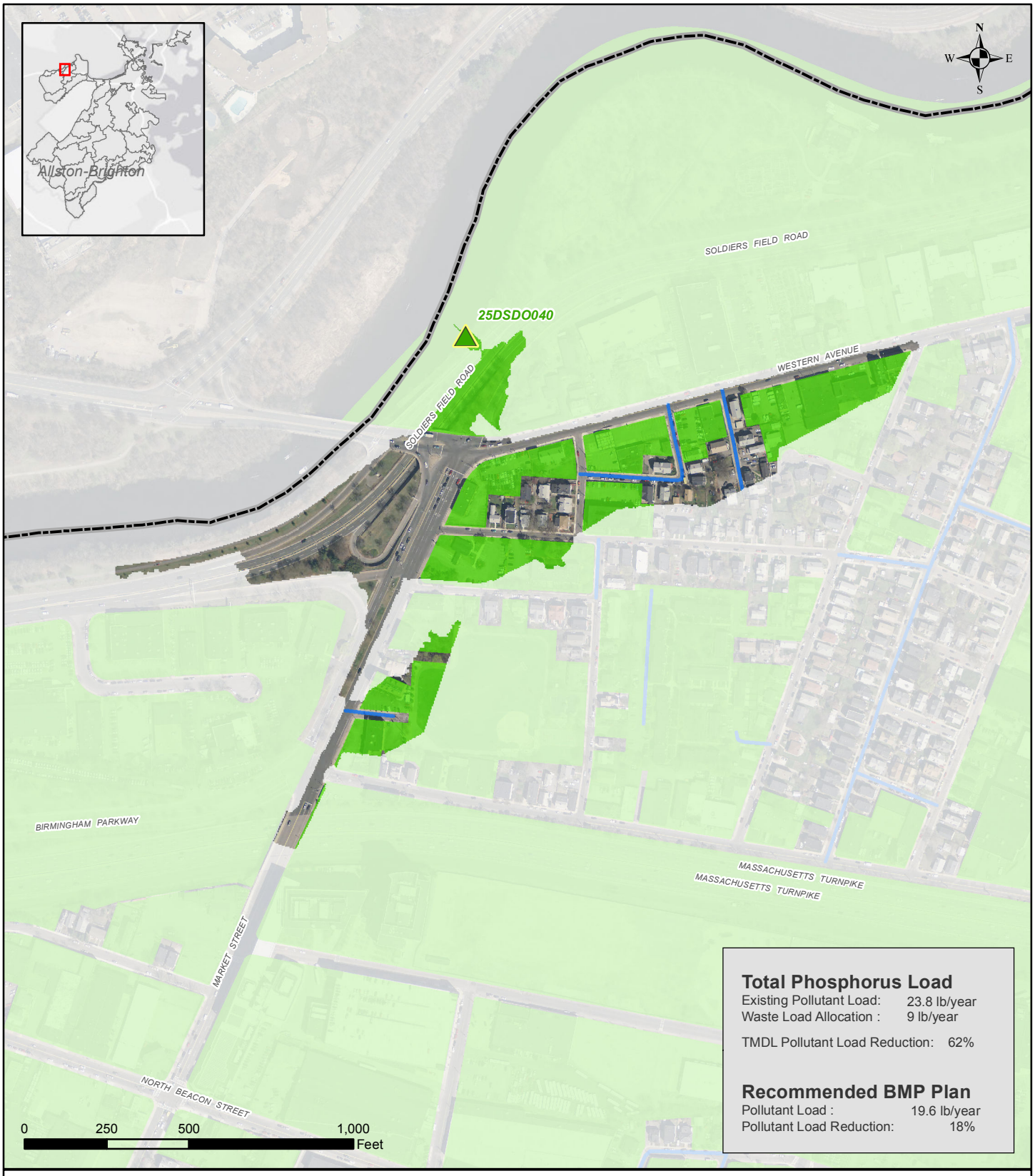
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Smelt Brook
Catchment: 24GSDO035

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 23.8 lb/year
Waste Load Allocation : 9 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 19.6 lb/year
Pollutant Load Reduction: 18%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

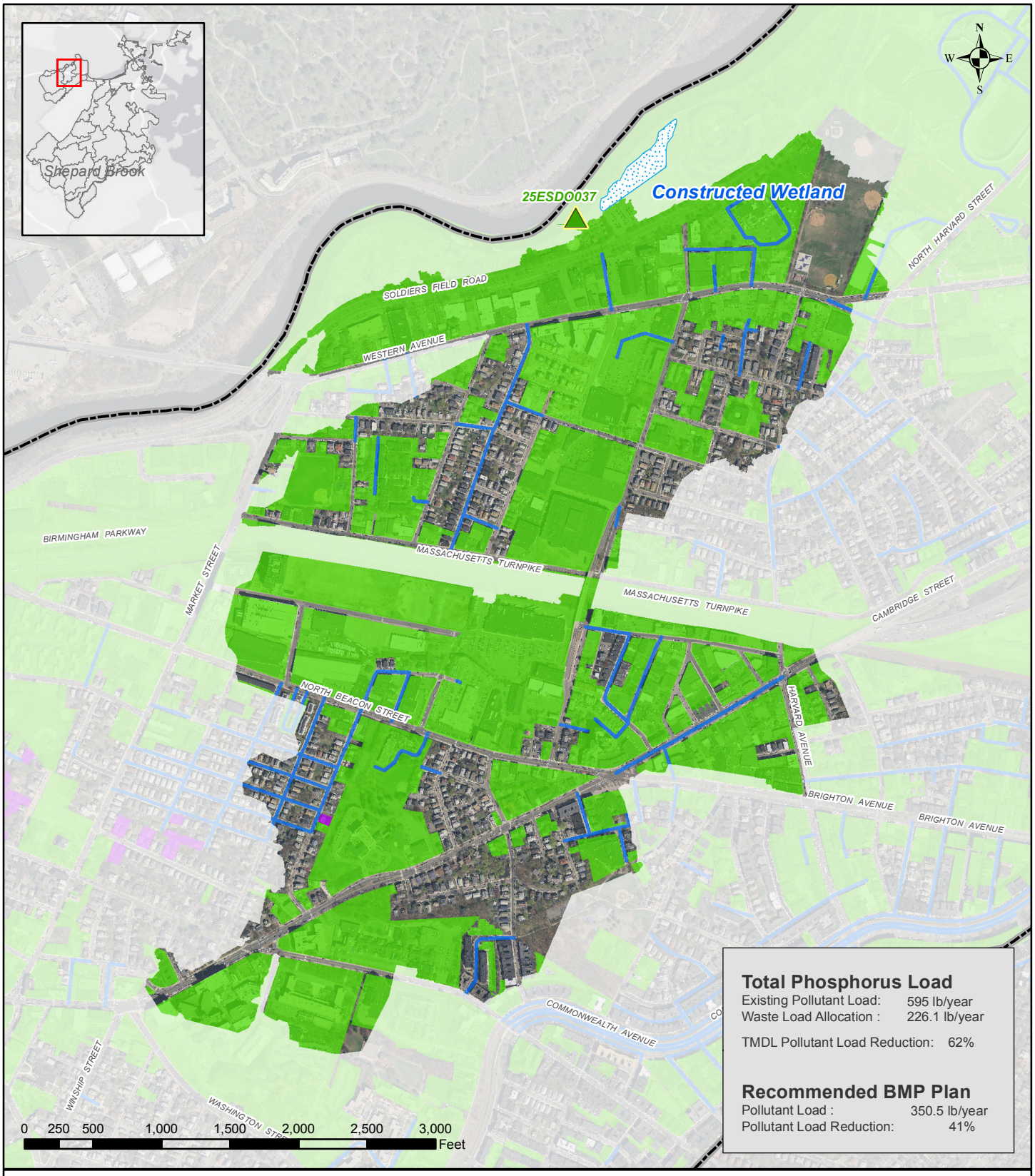
Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 17.6 Acres

Recommended BMP Plan
Reporting Area: Allston-Brighton
Catchment: 25DSDO040

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 261.7 Acres
Recommended area: 20.1 Acres

Residential Parcel
Total area of suitable sites: 4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 3.6 Miles
Recommended area: 0.1 Miles

Constructed Wetland

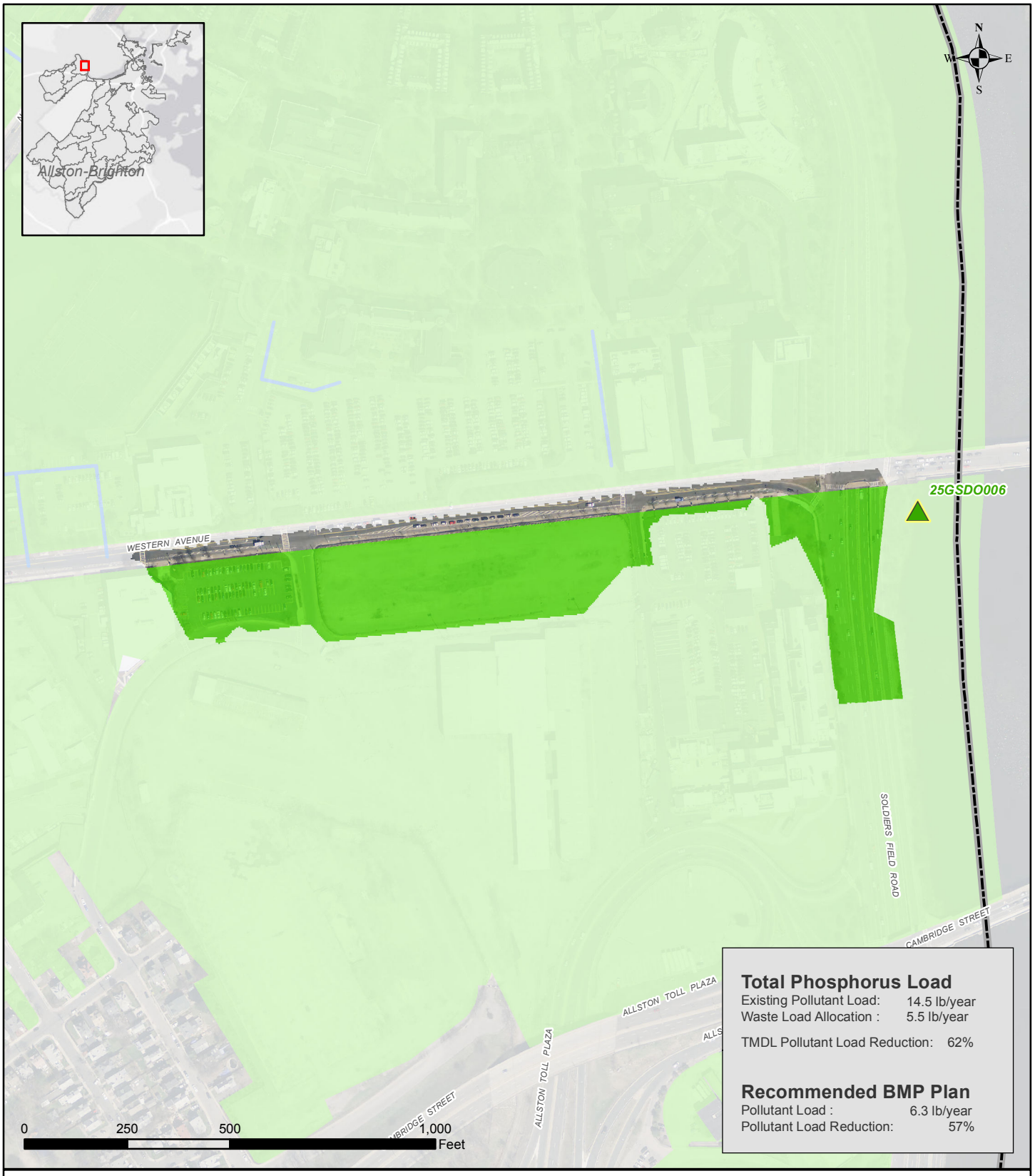
Boston Boundary

Total Catchment Area: 412.7 Acres

Recommended BMP Plan
Reporting Area: Shepard Brook
Catchment: 25ESDO037

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 14.5 lb/year
Waste Load Allocation : 5.5 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 6.3 lb/year
Pollutant Load Reduction: 57%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.8 Acres
Recommended area: 4.7 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.7 Acres

Boston Water and Sewer Commission

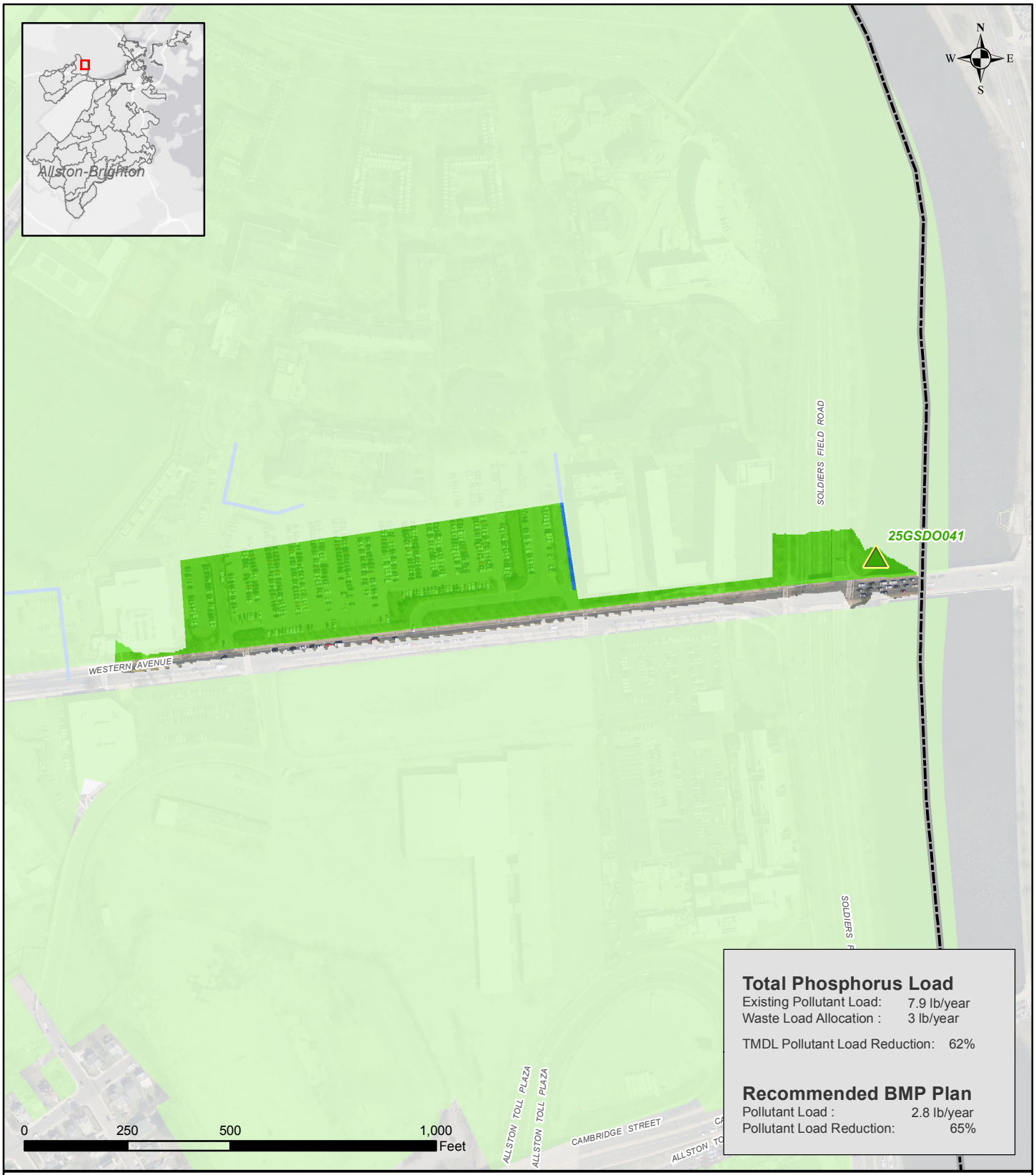
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 25GSDO006

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 7.9 lb/year
Waste Load Allocation : 3 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 2.8 lb/year
Pollutant Load Reduction: 65%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 7.6 Acres

Boston Water and Sewer Commission

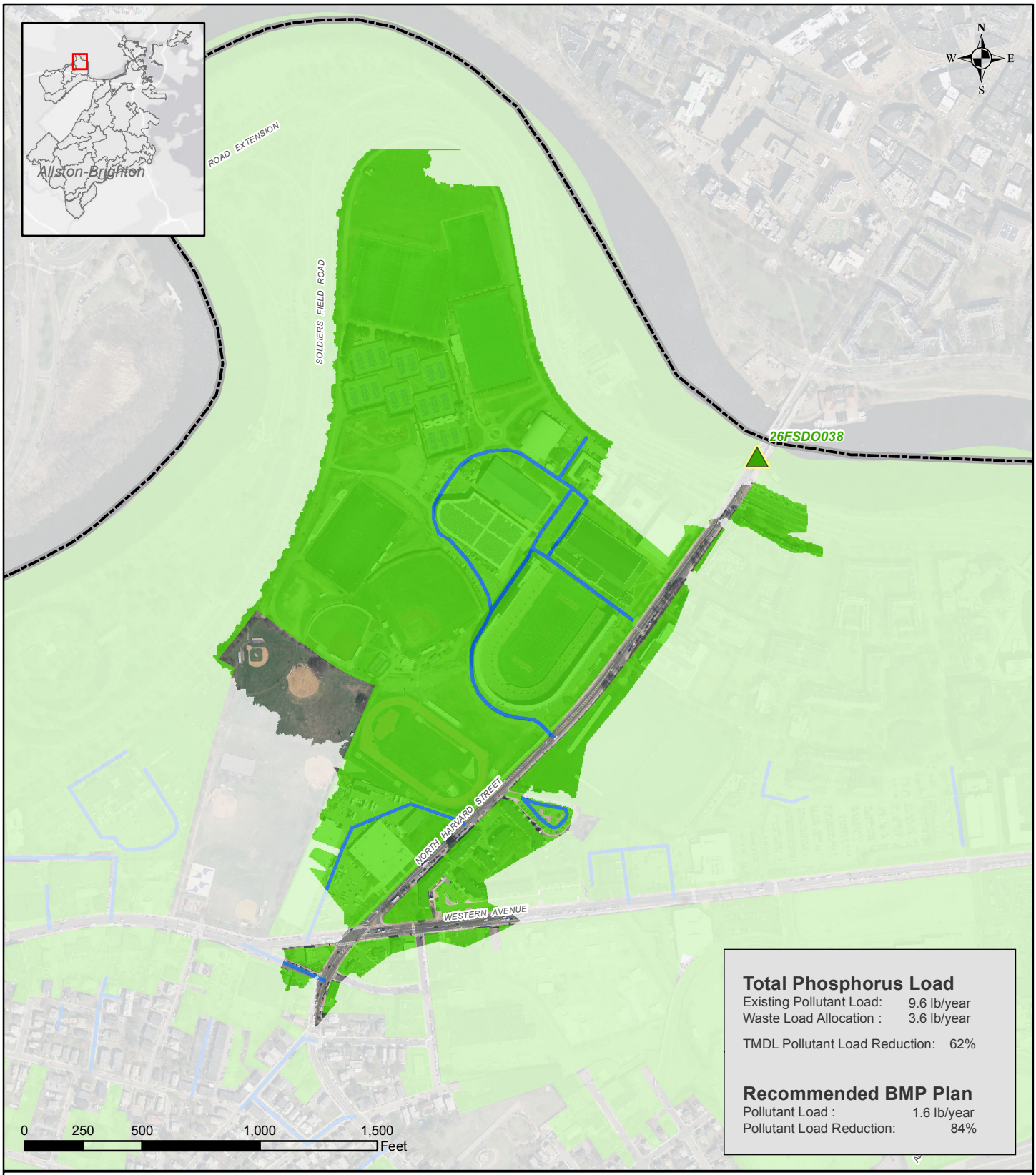
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 25GSDO041

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 79.5 Acres
Recommended area: 15.8 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

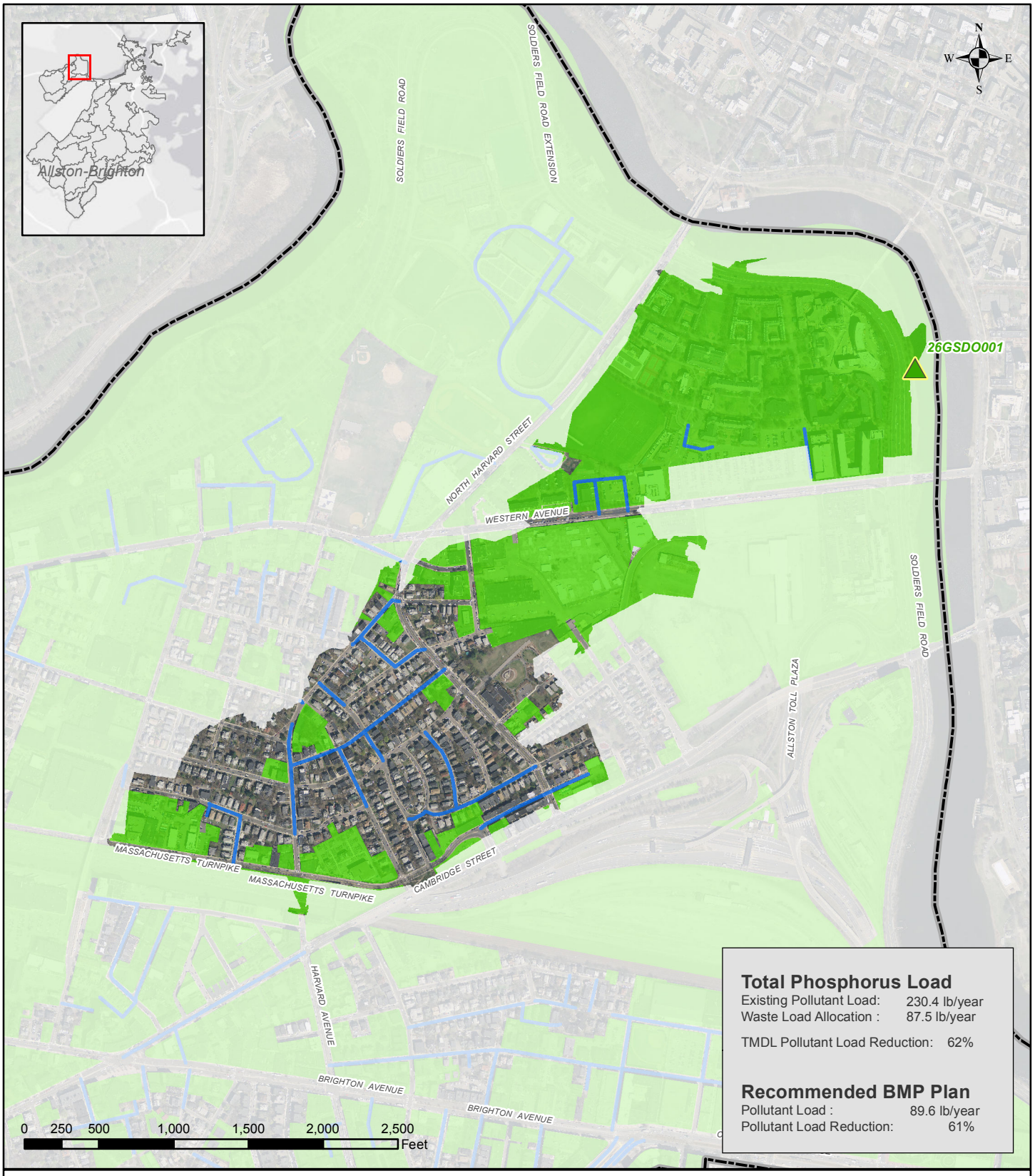
Suitable Public Right of Way
Total area of suitable sites: 1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 89.2 Acres

Recommended BMP Plan
Reporting Area: Allston-Brighton
Catchment: 26FSDO038

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 230.4 lb/year
Waste Load Allocation : 87.5 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 89.6 lb/year
Pollutant Load Reduction: 61%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 105.4 Acres
Recommended area: 25.4 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.6 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 177.5 Acres

Boston Water and Sewer Commission

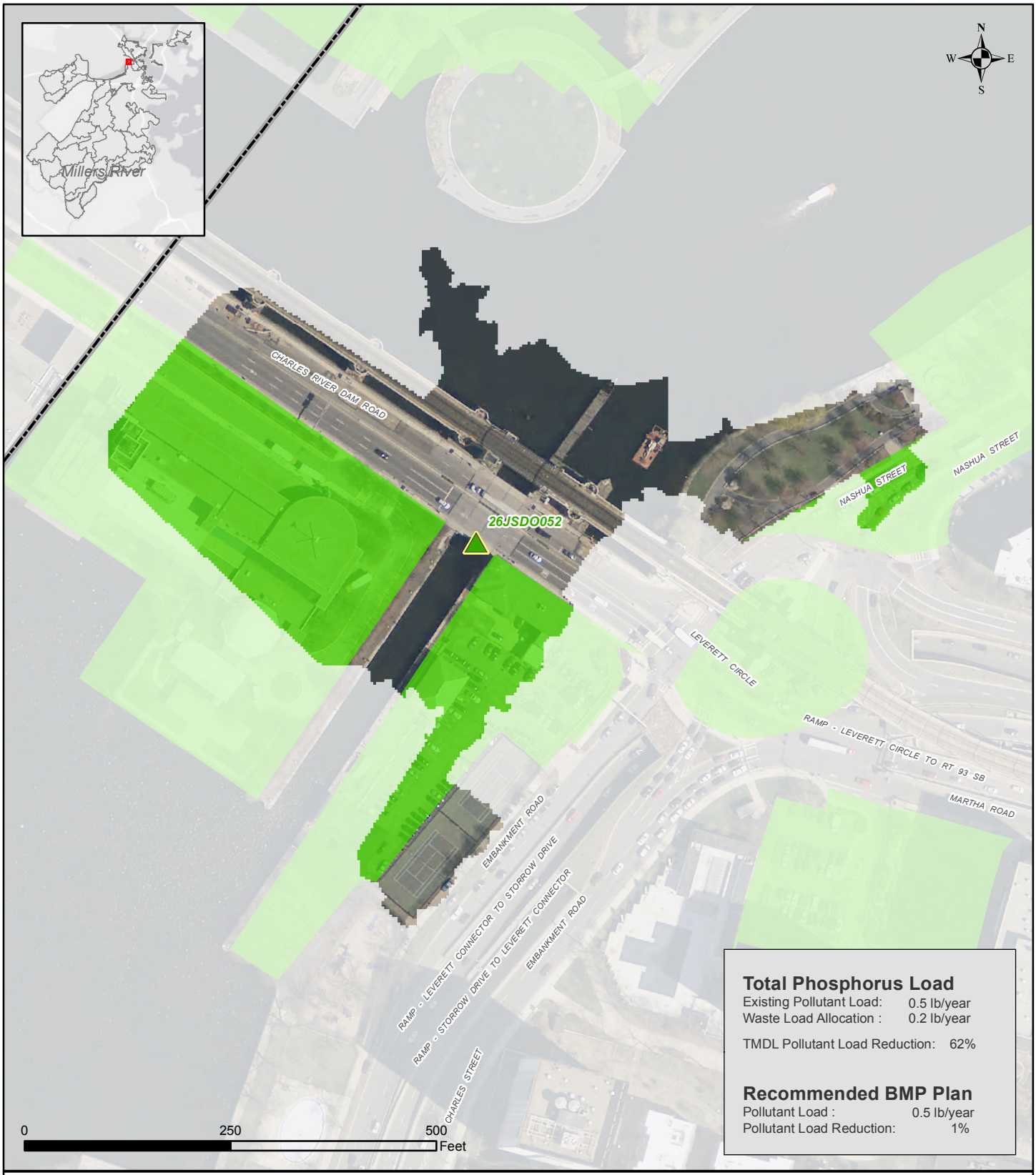
CH2MHILL

Recommended BMP Plan

Reporting Area: Allston-Brighton
Catchment: 26GSDO001

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.5 lb/year
Waste Load Allocation : 0.2 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 0.5 lb/year
Pollutant Load Reduction: 1%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 6.4 Acres

Boston Water and Sewer Commission

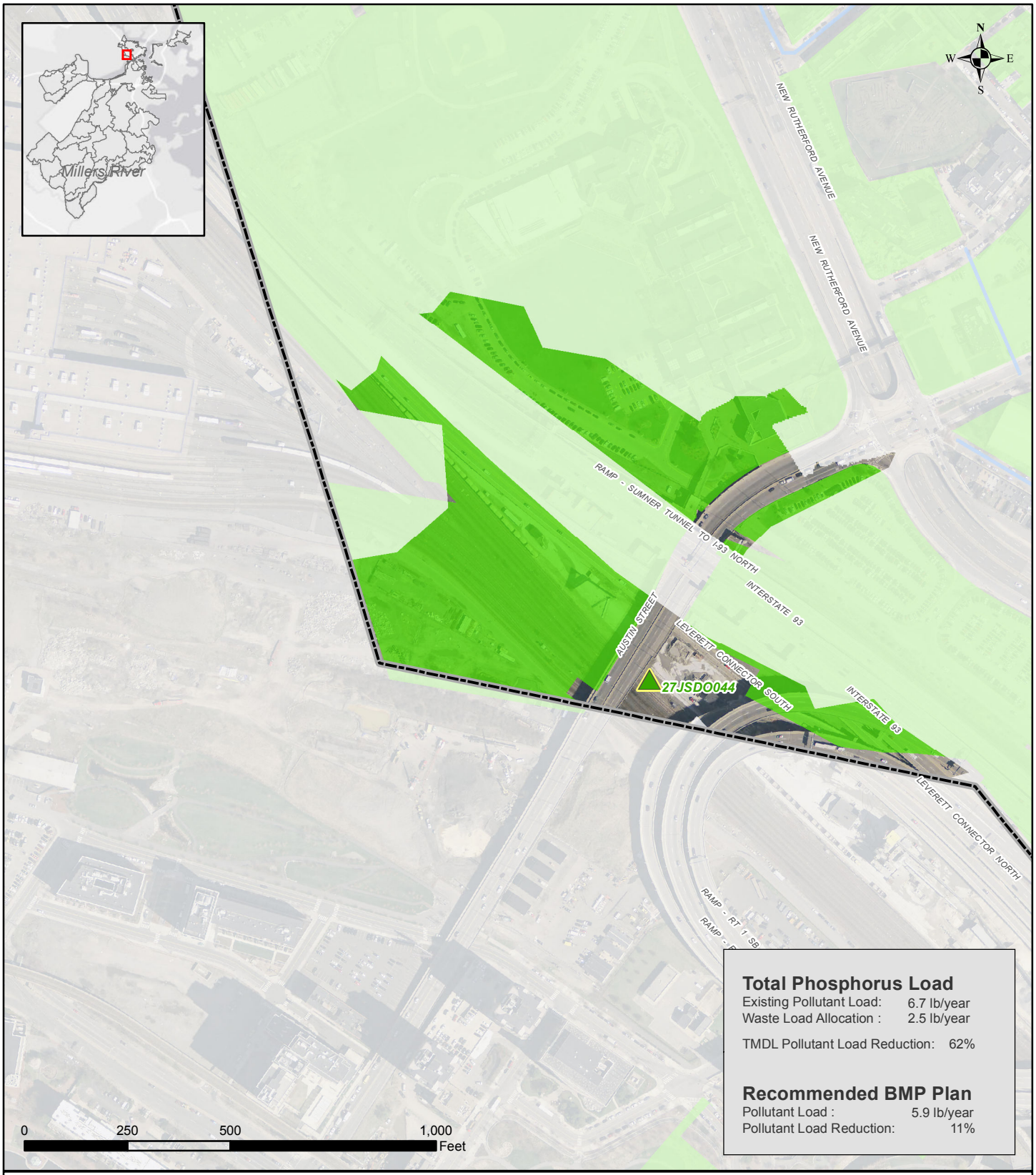
CH2MHILL

Recommended BMP Plan

Reporting Area: Millers River
Catchment: 26JSDO052

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	6.7 lb/year
Waste Load Allocation :	2.5 lb/year
TMDL Pollutant Load Reduction:	62%

Recommended BMP Plan

Pollutant Load :	5.9 lb/year
Pollutant Load Reduction:	11%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	15.2 Acres
Recommended area:	3.2 Acres

Residential Parcel

Total area of suitable sites:	0 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0 Miles
Recommended area:	0 Miles

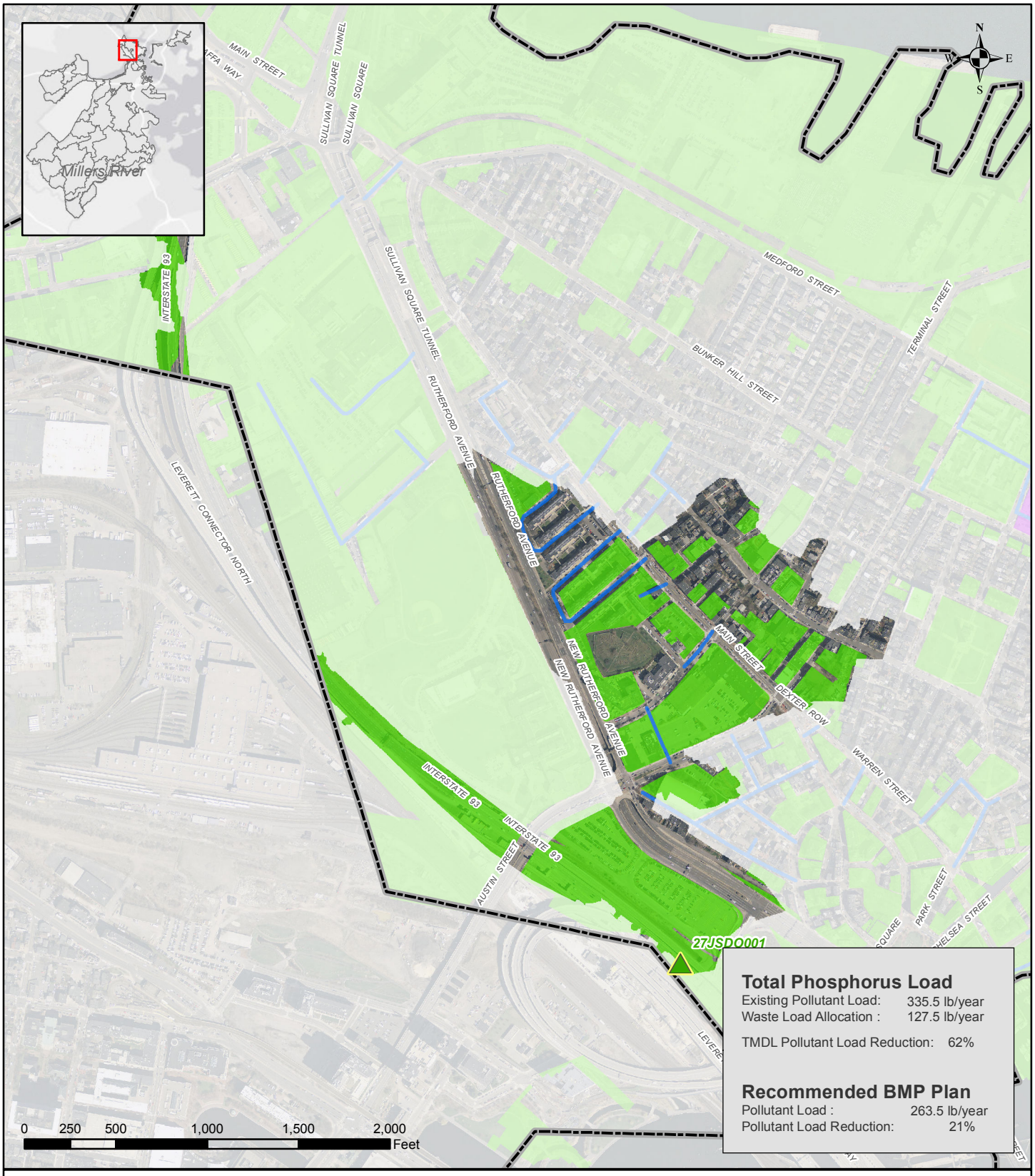
Boston Boundary

Total Catchment Area:	20.5 Acres

Recommended BMP Plan
Reporting Area: Millers River
Catchment: 27JSDO044

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 335.5 lb/year
Waste Load Allocation : 127.5 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 263.5 lb/year
Pollutant Load Reduction: 21%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 40.7 Acres
Recommended area: 9.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.6 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 83.9 Acres

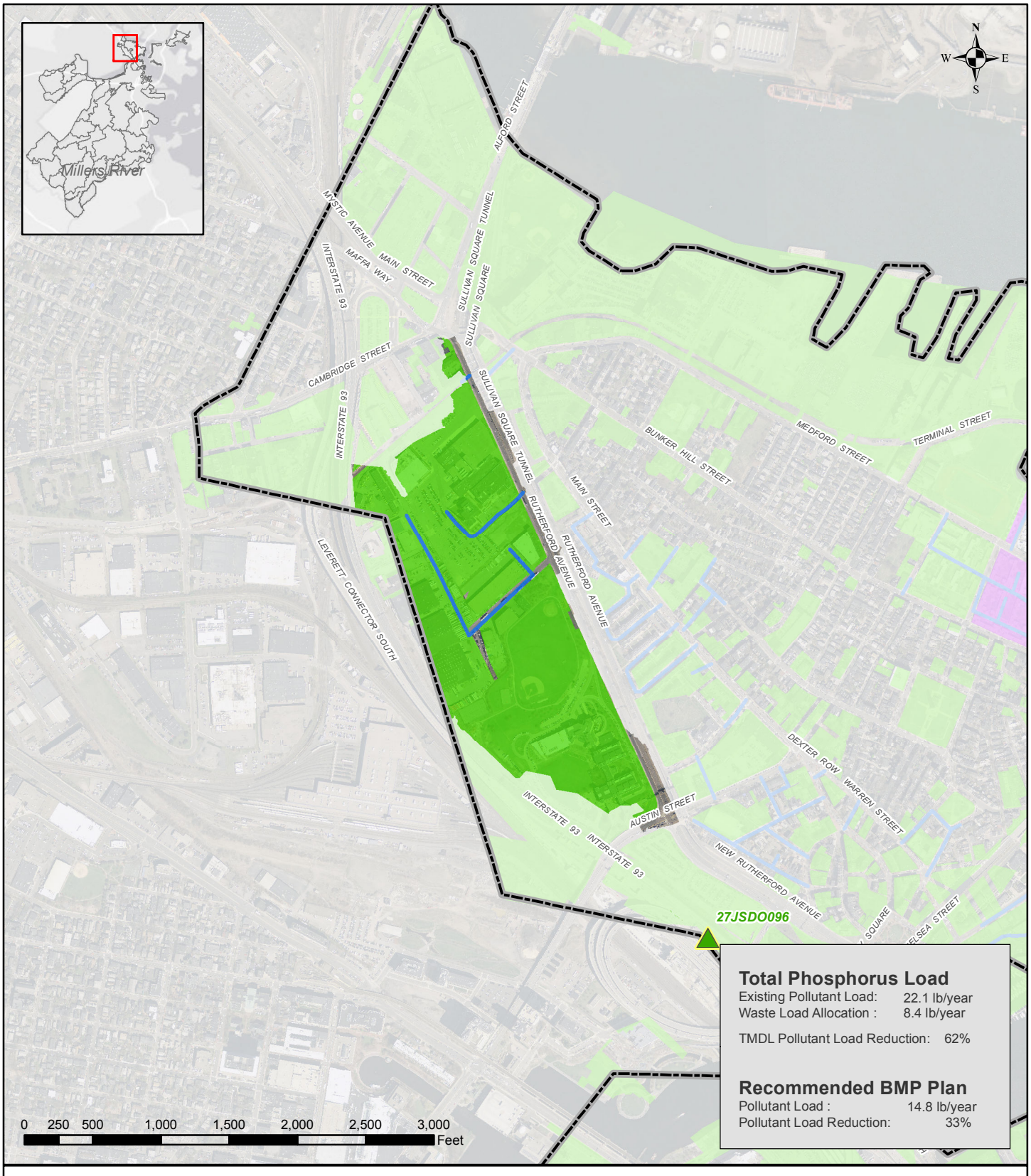
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Millers River
Catchment: 27JSDO001

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 22.1 lb/year
Waste Load Allocation : 8.4 lb/year

TMDL Pollutant Load Reduction: 62%

Recommended BMP Plan

Pollutant Load : 14.8 lb/year
Pollutant Load Reduction: 33%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 66.6 Acres
Recommended area: 1.3 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.5 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 79.7 Acres

Boston Water and Sewer Commission

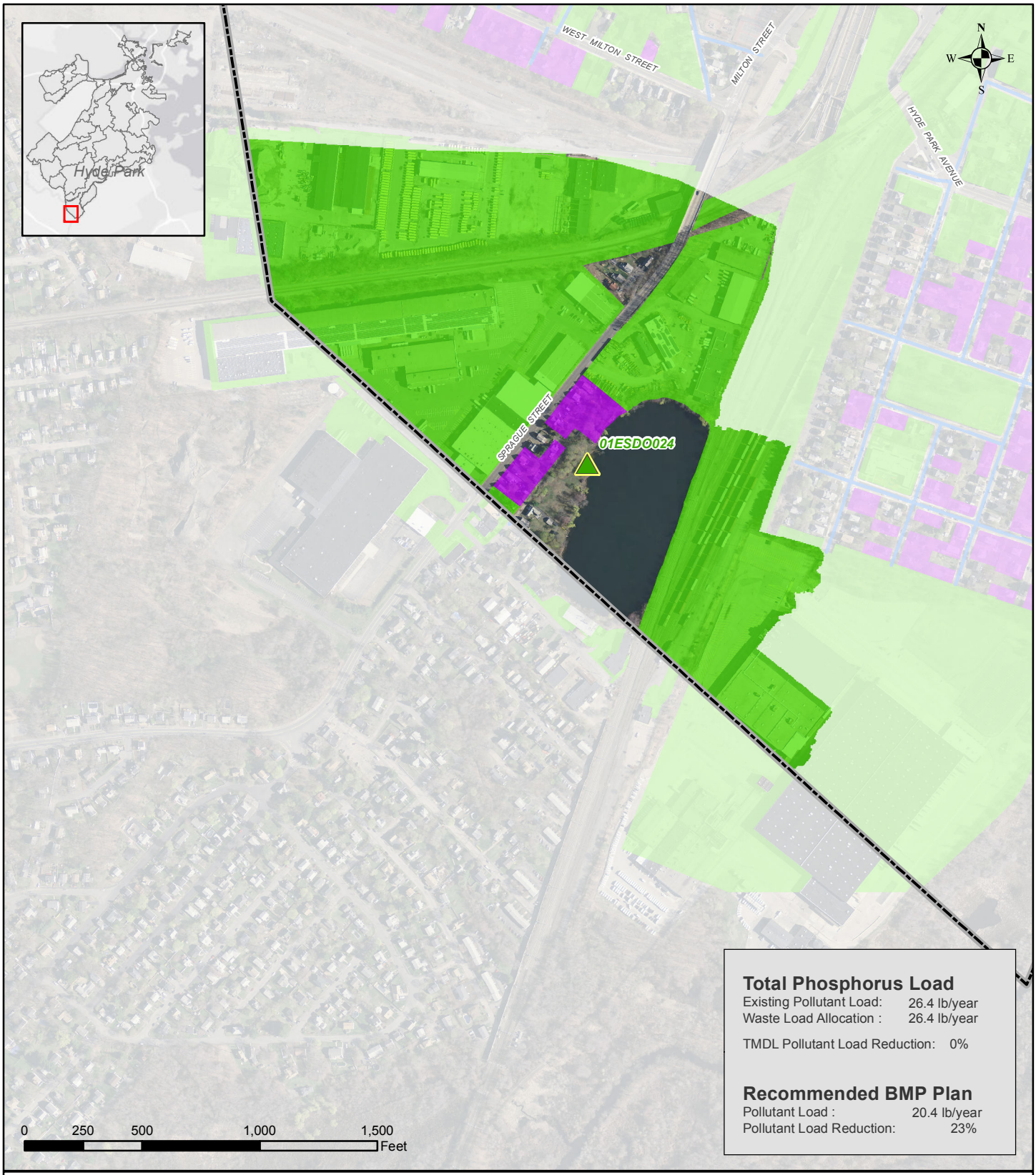
CH2MHILL

Recommended BMP Plan
Reporting Area: Millers River
Catchment: 27JSDO096

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-6
Recommended BMP Plan Maps by SDO Catchment: Neponset River Watershed



Total Phosphorus Load

Existing Pollutant Load:	26.4 lb/year
Waste Load Allocation :	26.4 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	20.4 lb/year
Pollutant Load Reduction:	23%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 70.3 Acres
- Recommended area: 0.7 Acres

Residential Parcel
- Total area of suitable sites: 2.1 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 116.2 Acres

Boston Water and Sewer Commission

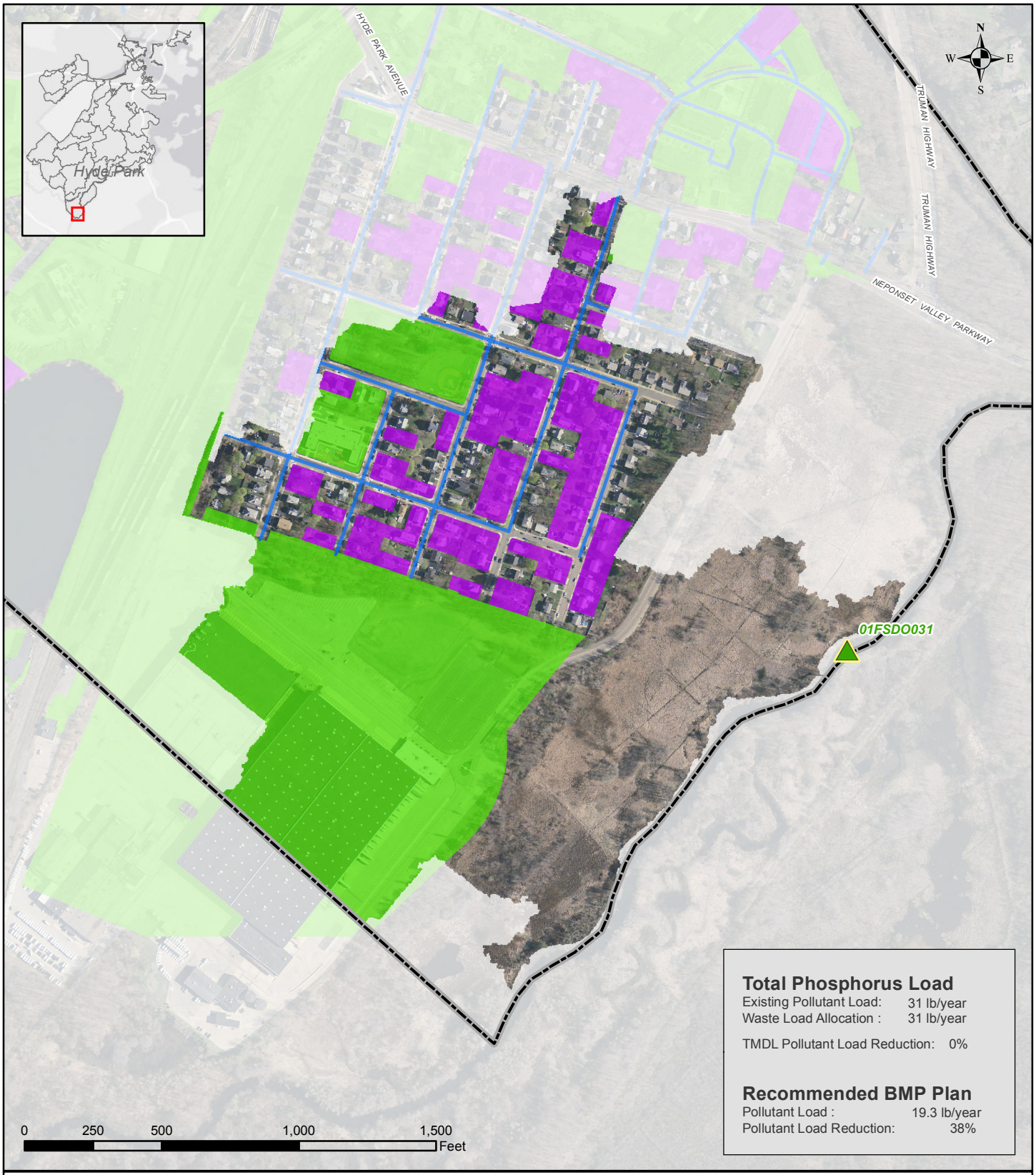
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 01ESDO024

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 31 lb/year
Waste Load Allocation : 31 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 19.3 lb/year
Pollutant Load Reduction: 38%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 32.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 13.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 89.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 01FSDO031

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 9.6 lb/year
Waste Load Allocation : 9.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 5.2 lb/year
Pollutant Load Reduction: 46%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 7.7 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 51.7 Acres

Boston Water and Sewer Commission

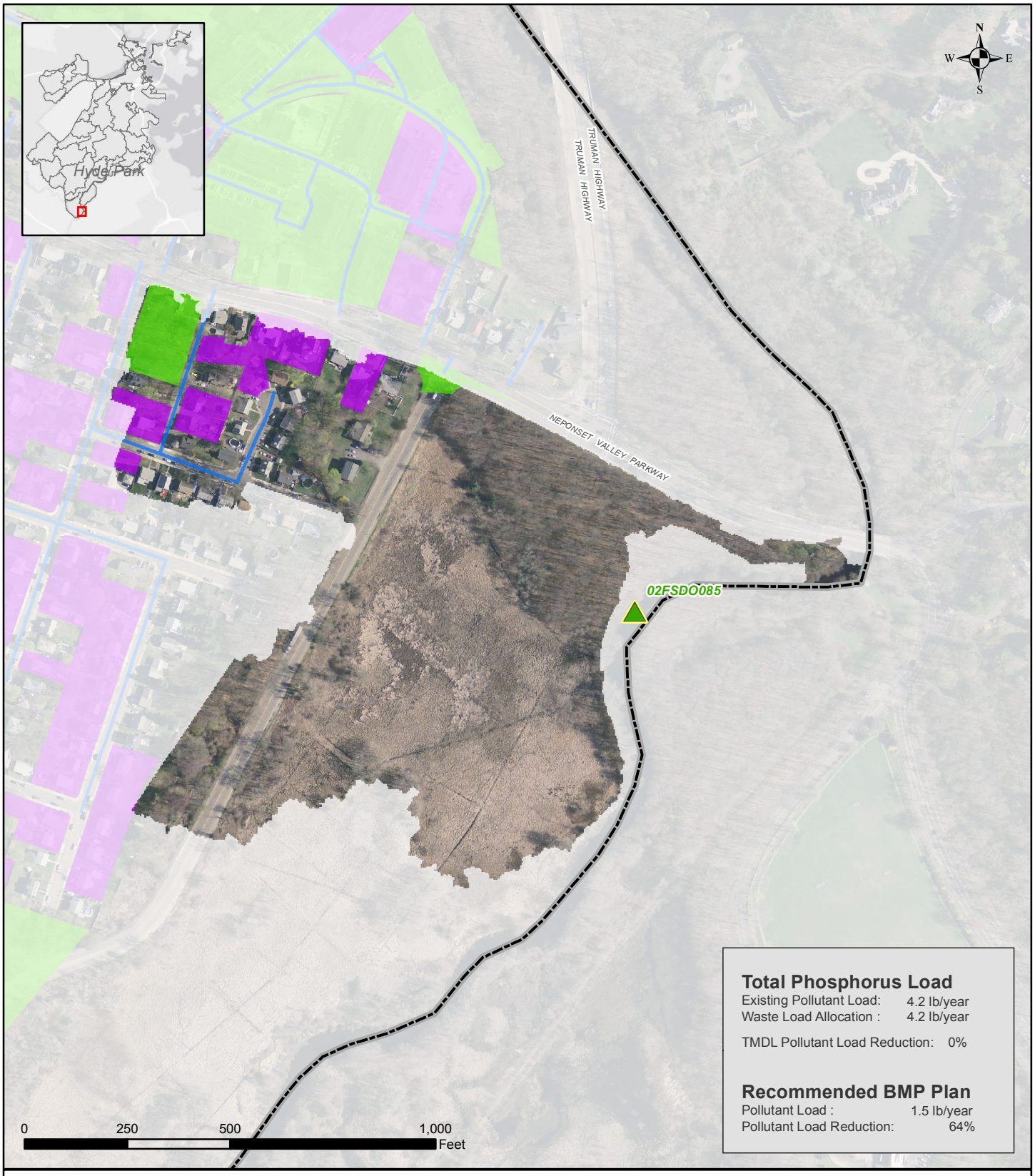
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 02ESDO086

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 4.2 lb/year
Waste Load Allocation : 4.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.5 lb/year
Pollutant Load Reduction: 64%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 1.9 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 27.6 Acres

Boston Water and Sewer Commission

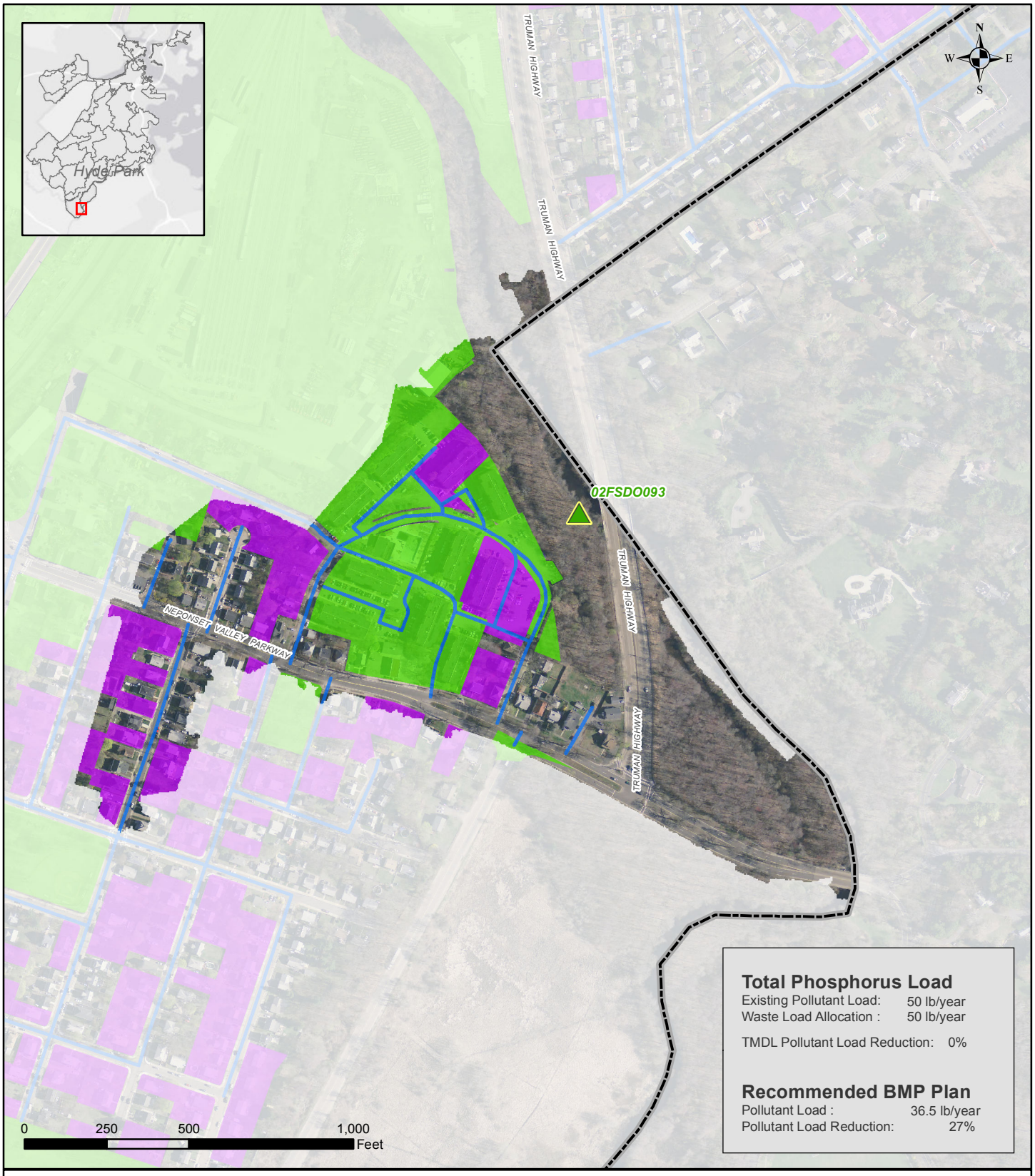
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 02FSDO085

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 50 lb/year
Waste Load Allocation : 50 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 36.5 lb/year
Pollutant Load Reduction: 27%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 8.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 10.7 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 43.2 Acres

Boston Water and Sewer Commission

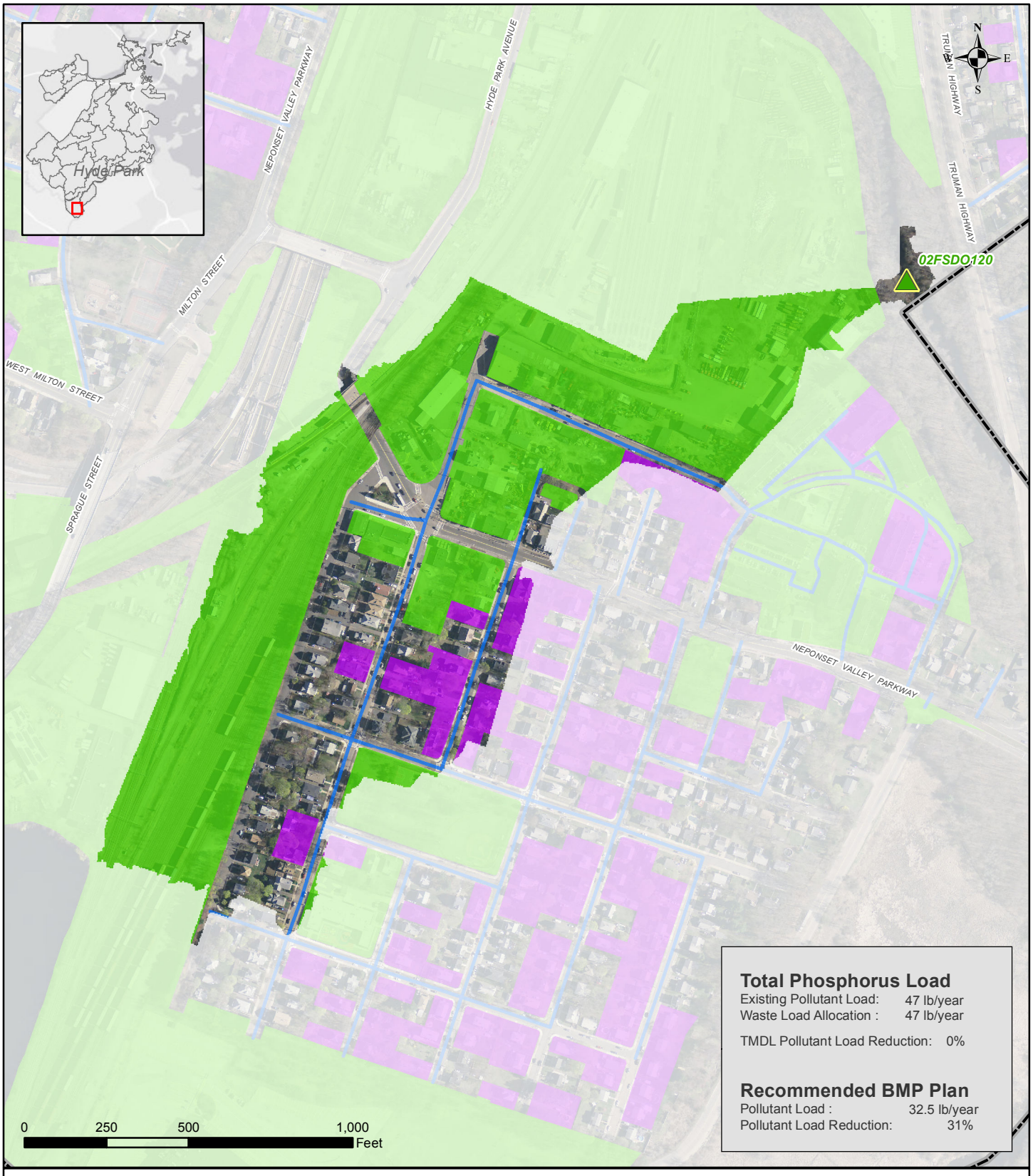
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 02FSDO093

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 47 lb/year
Waste Load Allocation : 47 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 32.5 lb/year
Pollutant Load Reduction: 31%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 27.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.8 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 43.1 Acres

Boston Water and Sewer Commission

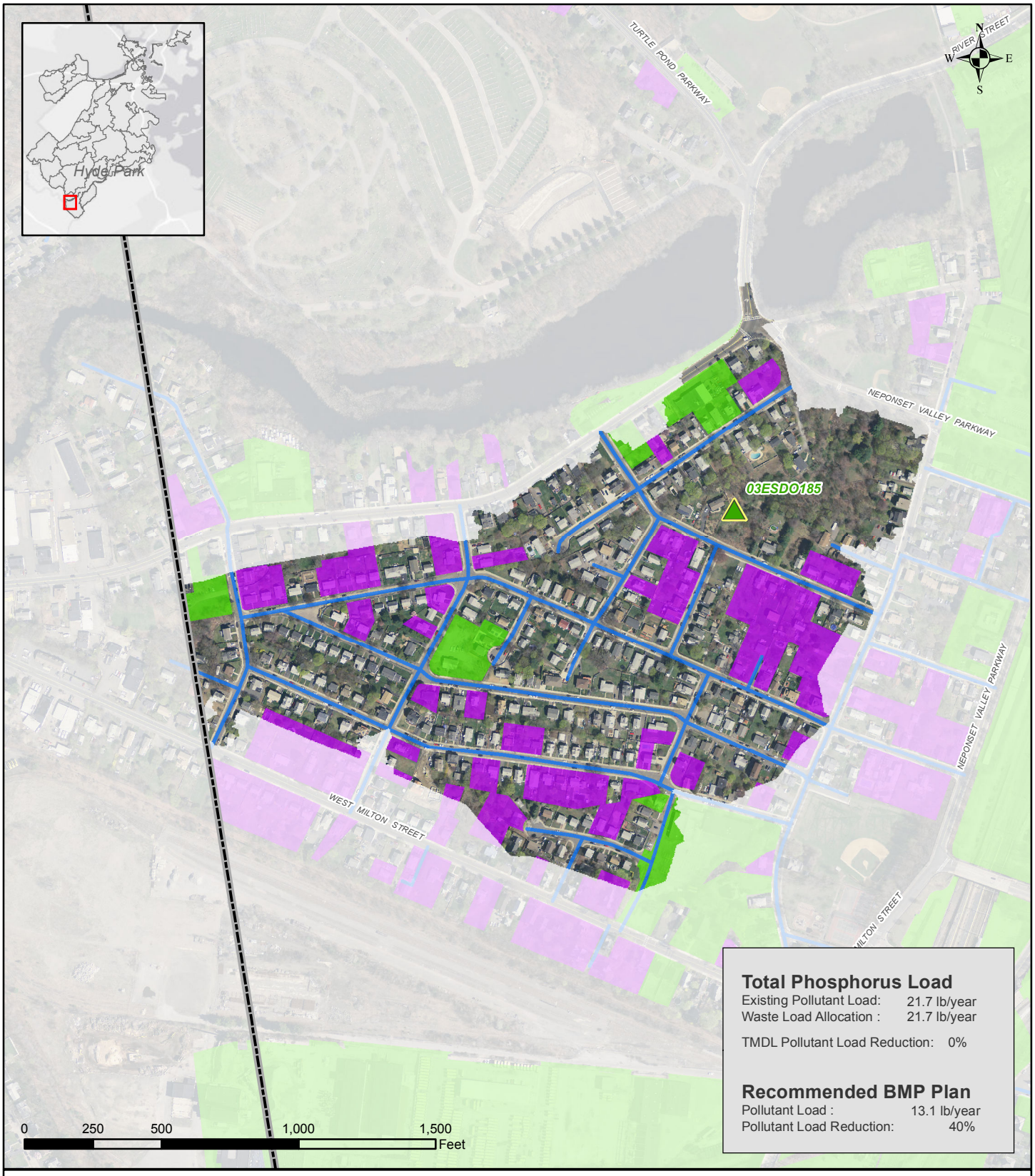
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 02FSDO120

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 21.7 lb/year
Waste Load Allocation : 21.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 13.1 lb/year
Pollutant Load Reduction: 40%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 11.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 2.4 Miles
Recommended area: 0.2 Miles

Boston Boundary
Total Catchment Area: 69.4 Acres

Boston Water and Sewer Commission

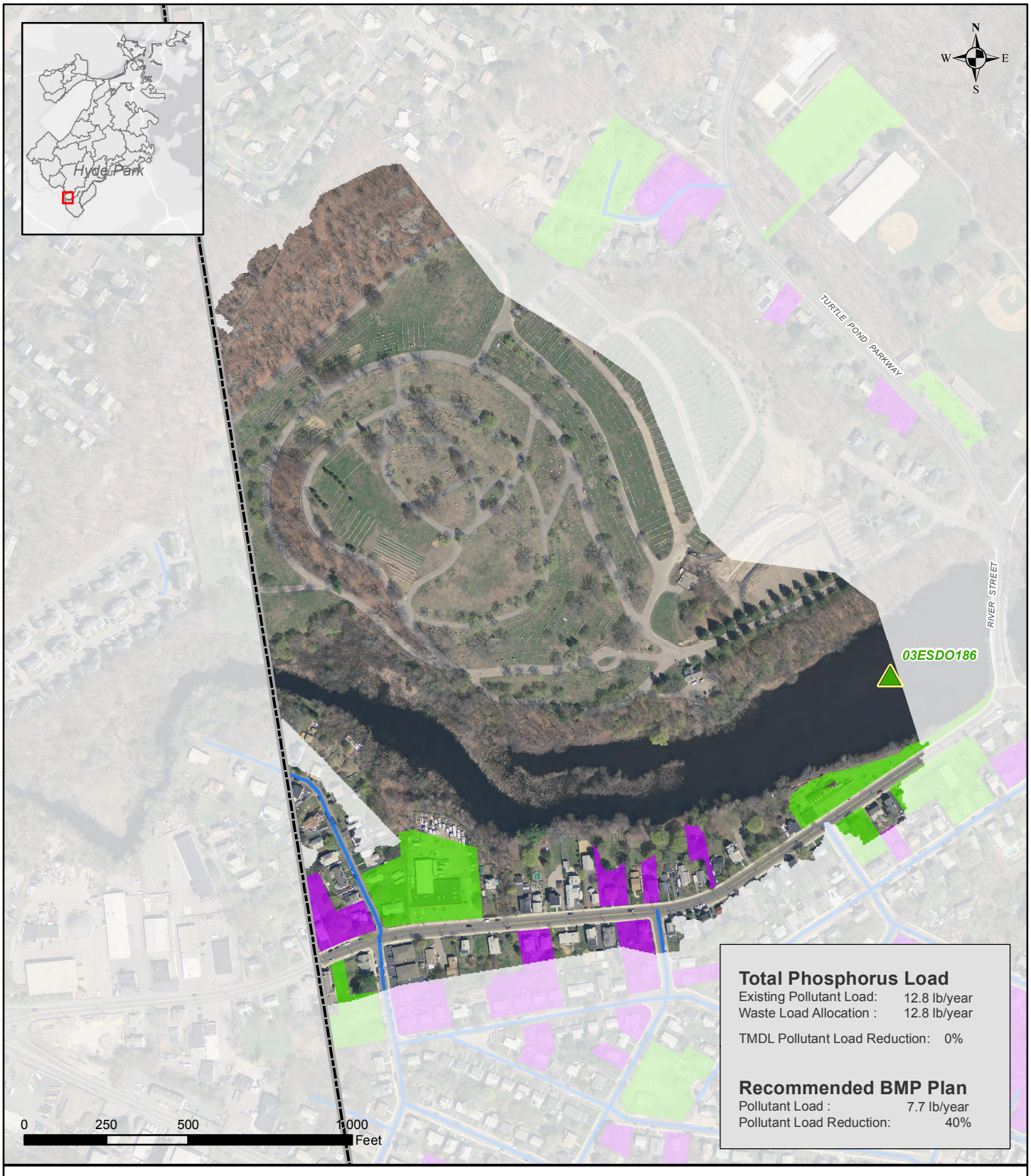
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 03ESDO185

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	12.8 lb/year
Waste Load Allocation :	12.8 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	7.7 lb/year
Pollutant Load Reduction:	40%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 2.9 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 2.1 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.2 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 83.0 Acres

Boston Water and Sewer Commission

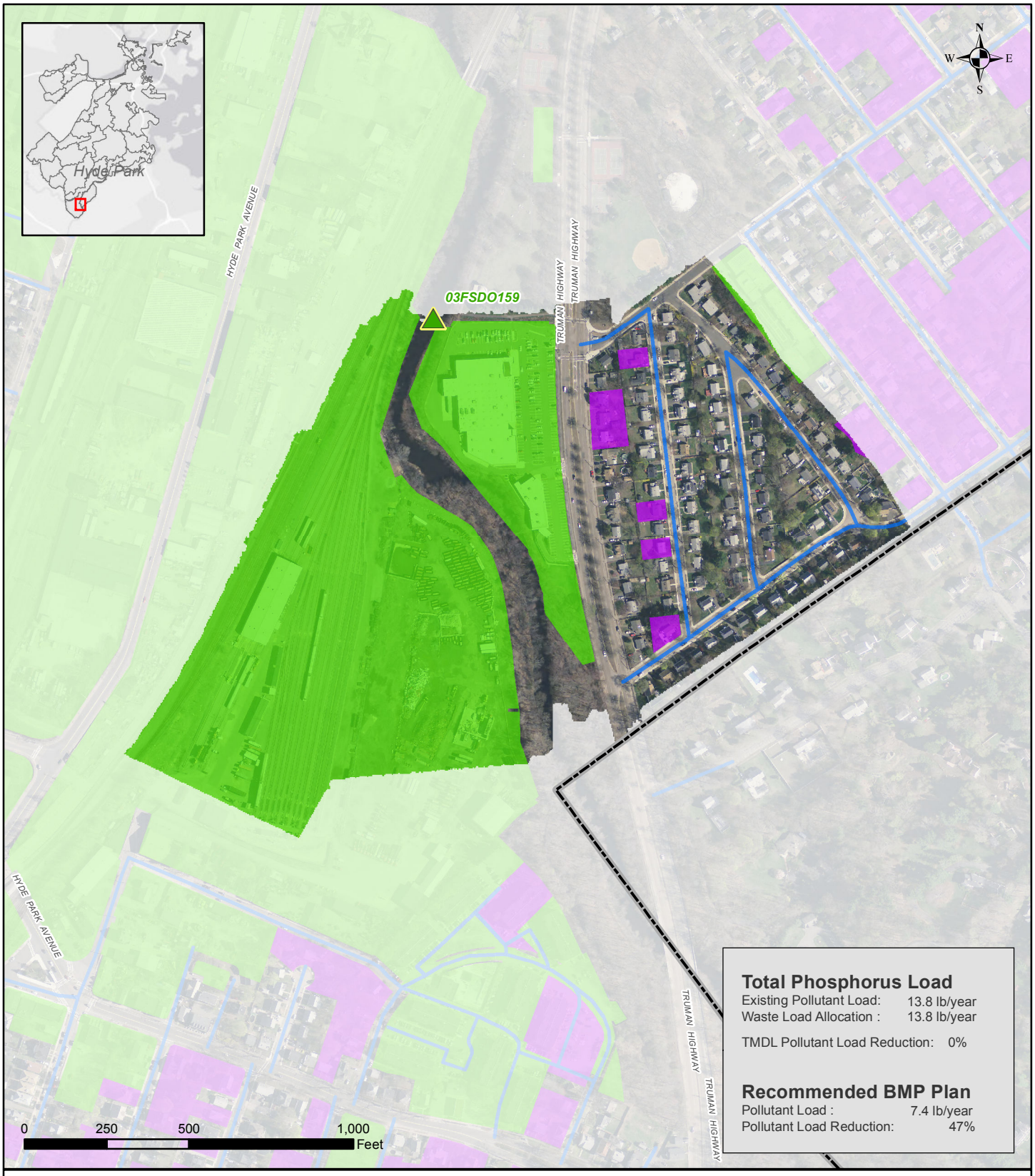
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 03ESDO186

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 13.8 lb/year
Waste Load Allocation : 13.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 7.4 lb/year
Pollutant Load Reduction: 47%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 28.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.7 Miles
Recommended area: 0.1 Miles

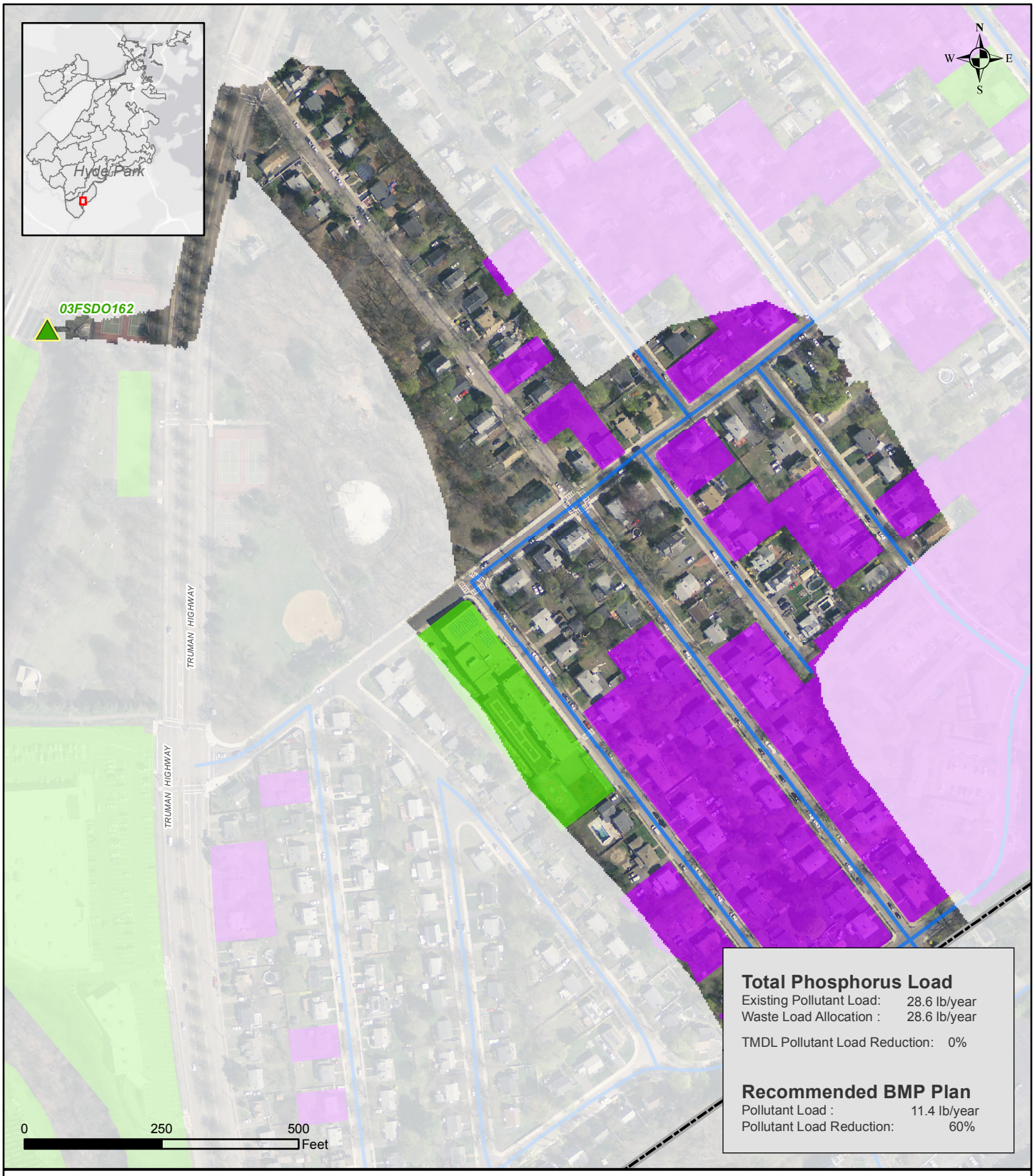
Boston Boundary
Total Catchment Area: 54.1 Acres

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 03FSDO159

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 7.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.9 Miles
Recommended area: 0.1 Miles

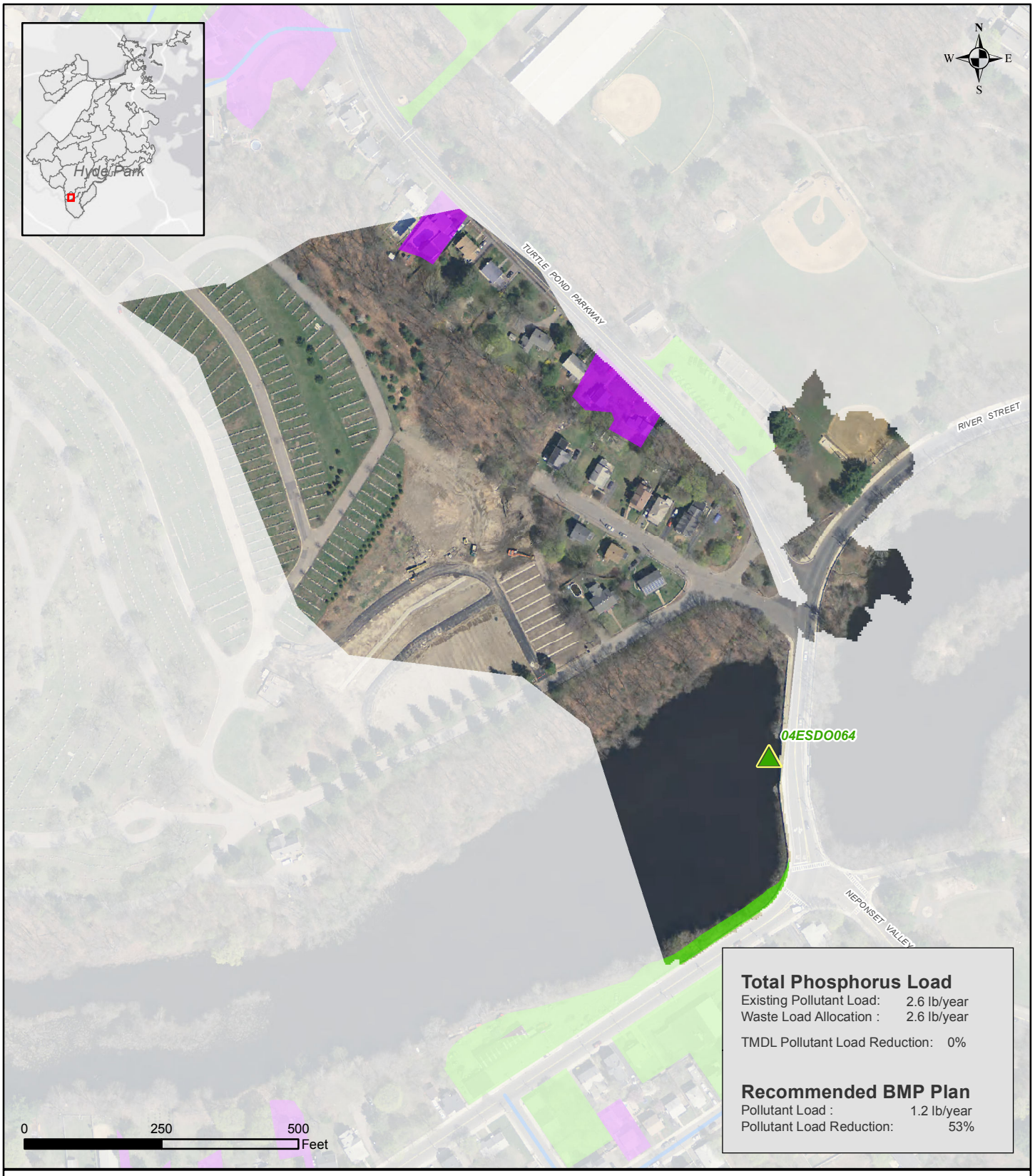
Boston Boundary
Total Catchment Area: 25.2 Acres

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 03FSDO162

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.6 lb/year
Waste Load Allocation : 2.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.2 lb/year
Pollutant Load Reduction: 53%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 19.9 Acres

Boston Water and Sewer Commission

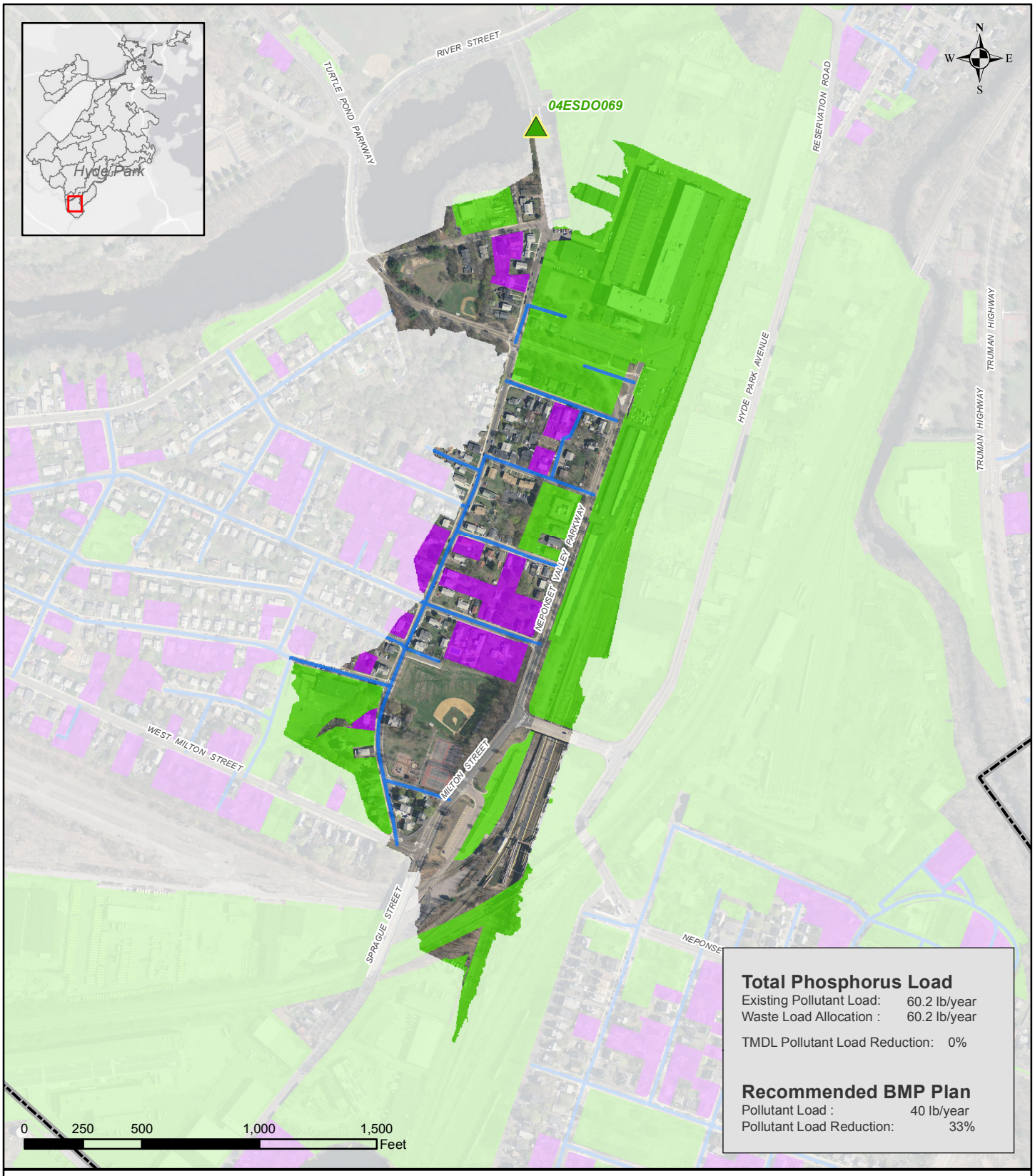
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04ESDO064

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 60.2 lb/year
Waste Load Allocation : 60.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 40 lb/year
Pollutant Load Reduction: 33%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 31.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 6.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 70.4 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04ESDO069

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 18.3 lb/year
Waste Load Allocation : 18.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 11.4 lb/year
Pollutant Load Reduction: 38%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 16.1 Acres

Boston Water and Sewer Commission

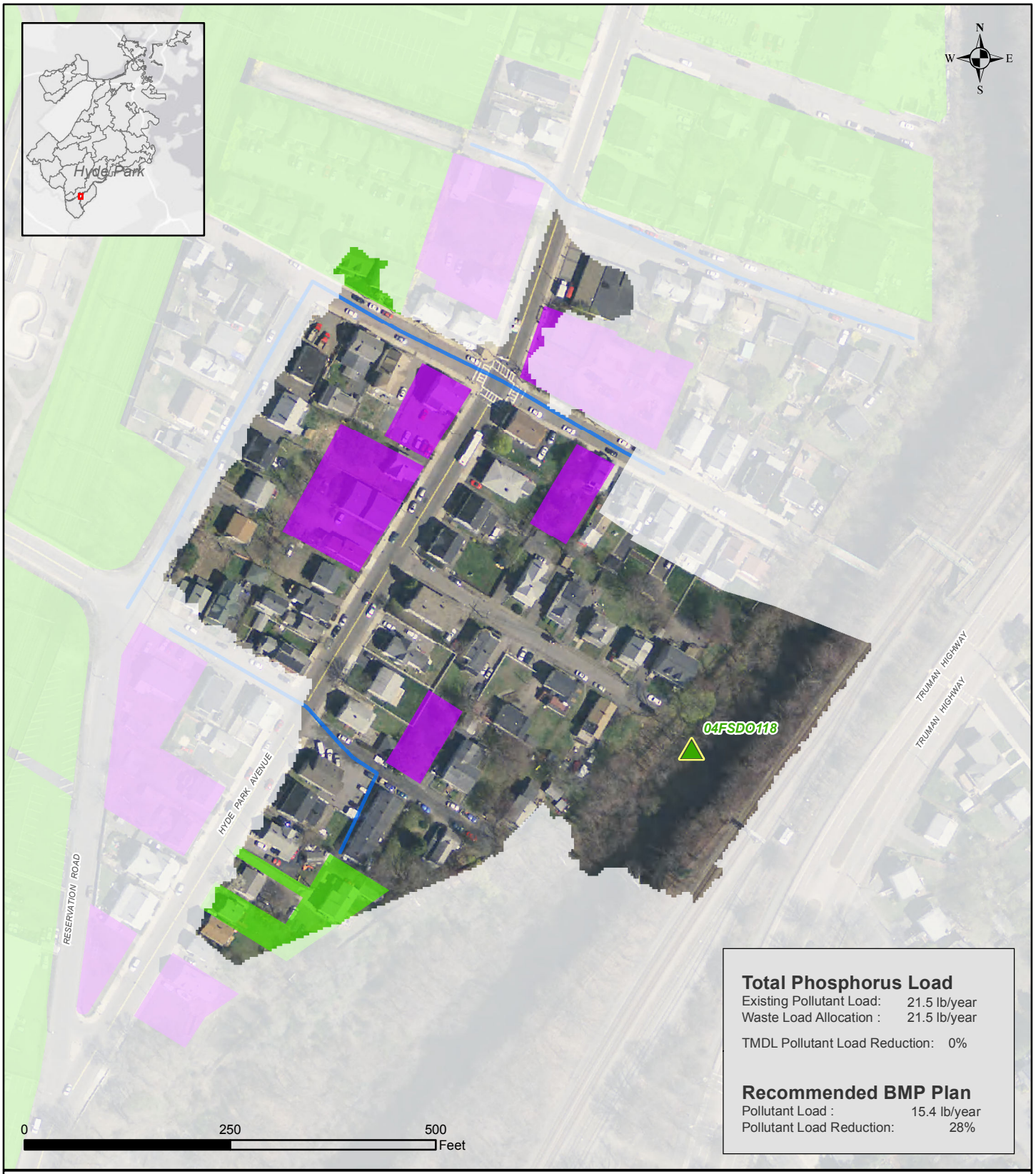
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04FSDO016

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 21.5 lb/year
Waste Load Allocation : 21.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 15.4 lb/year
Pollutant Load Reduction: 28%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 1.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 9.0 Acres

Boston Water and Sewer Commission

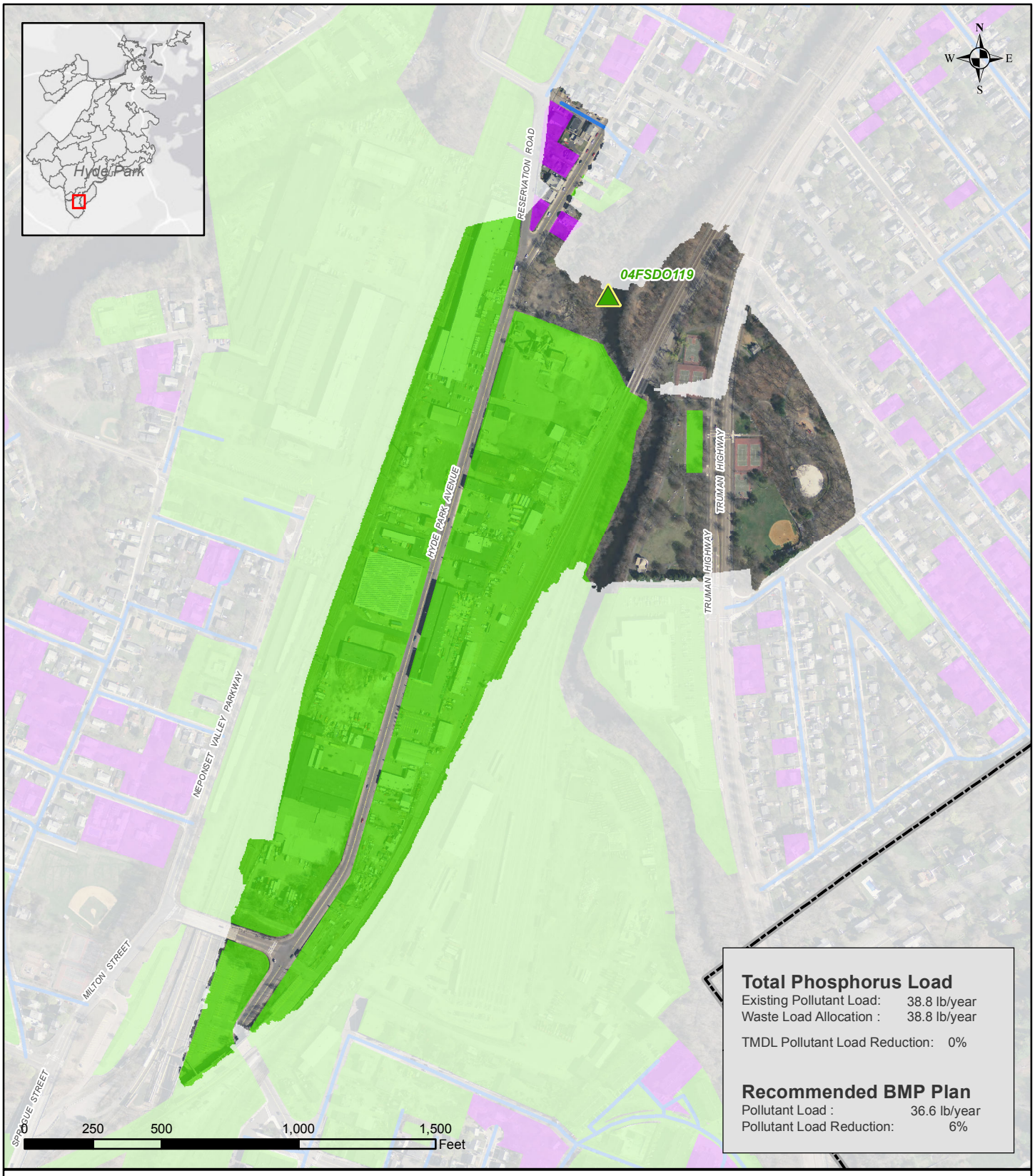
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04FSDO118

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 38.8 lb/year
Waste Load Allocation : 38.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 36.6 lb/year
Pollutant Load Reduction: 6%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 38.9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.7 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 63.9 Acres

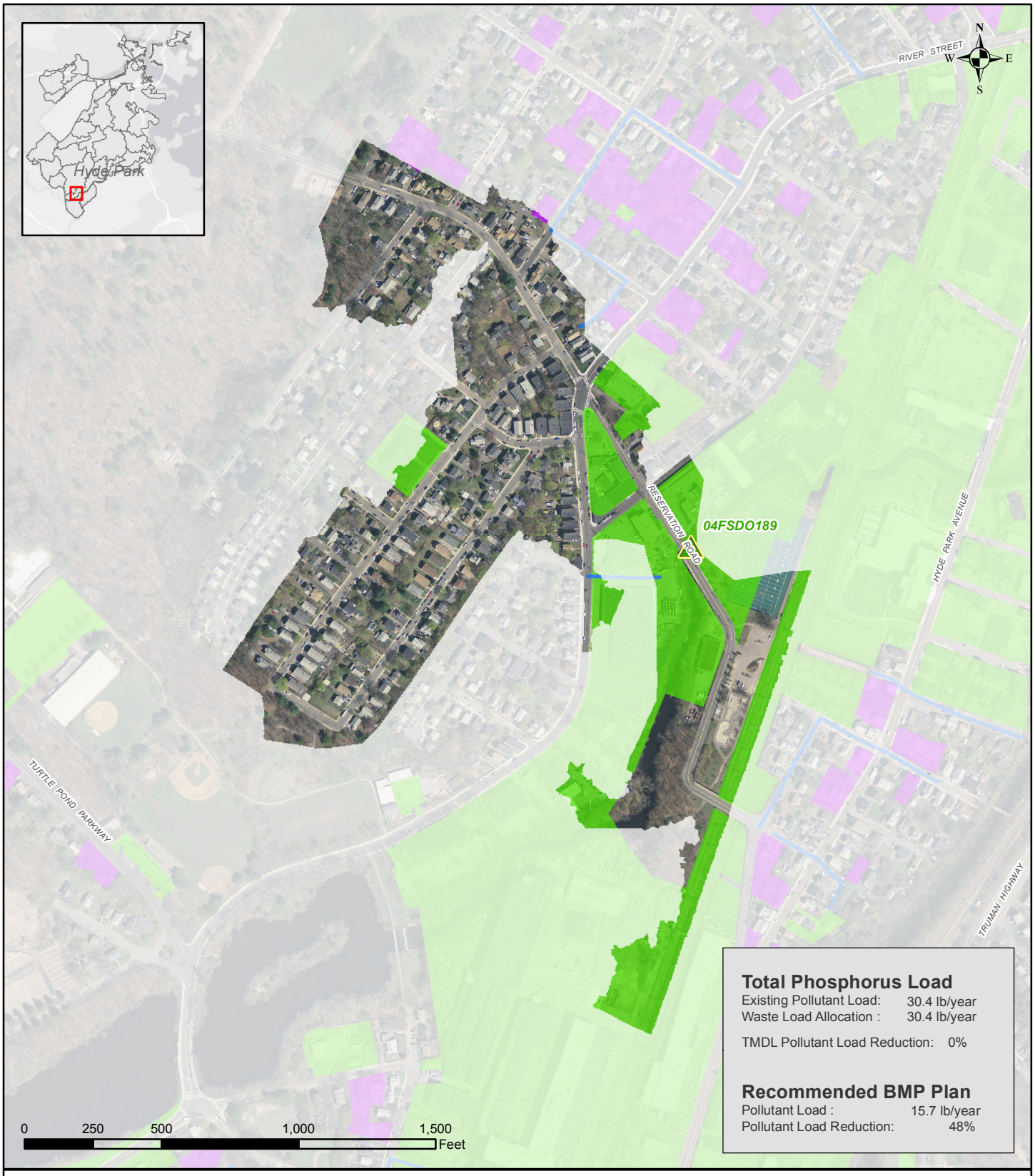
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 04FSDO119

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 30.4 lb/year
Waste Load Allocation : 30.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 15.7 lb/year
Pollutant Load Reduction: 48%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 11.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 50.4 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04FSDO189

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 5.4 lb/year
Waste Load Allocation : 5.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 2.6 lb/year
Pollutant Load Reduction: 52%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 1.3 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04FSDO203

Boston Water and Sewer Commission

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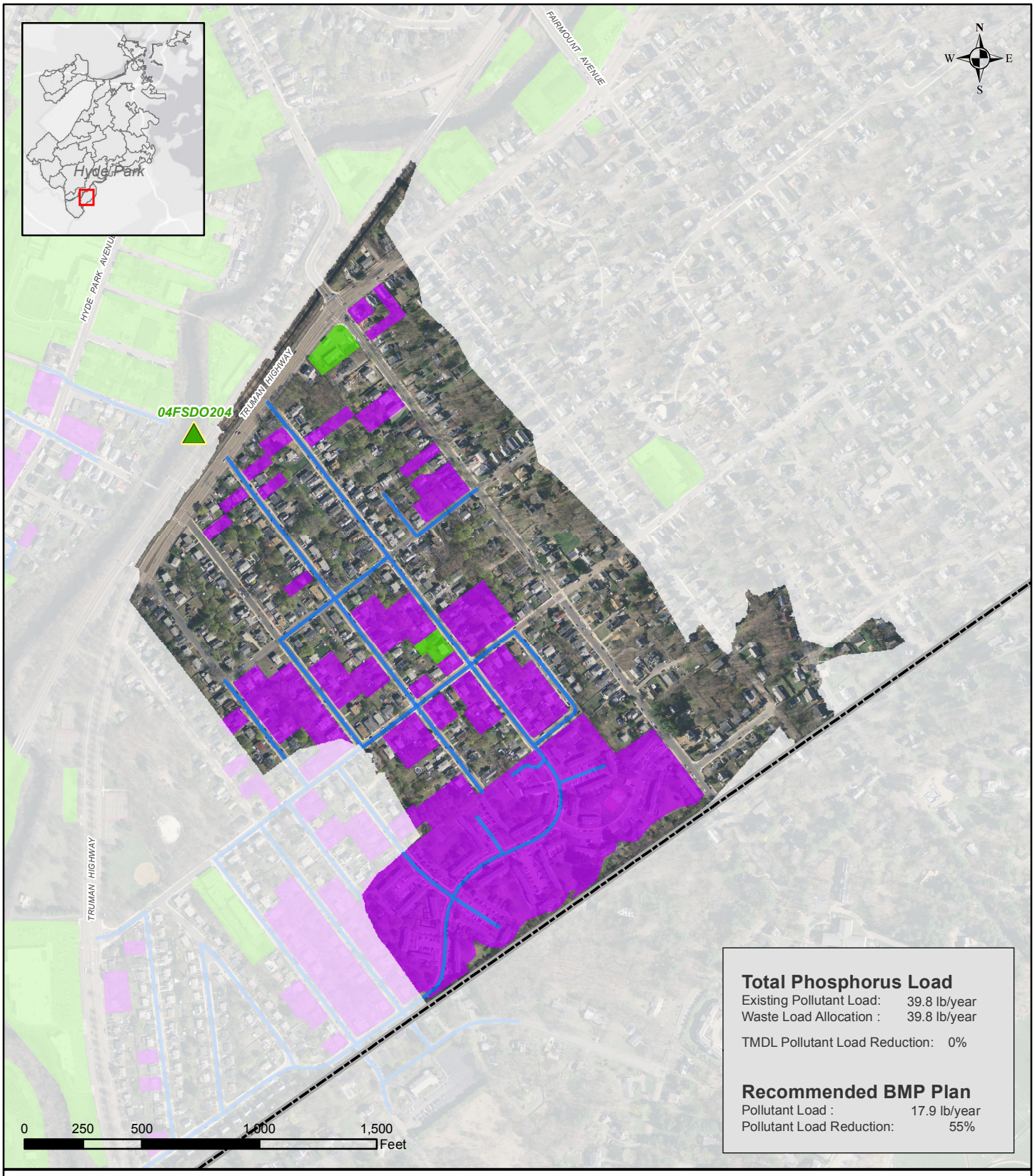


Total Phosphorus Load

Existing Pollutant Load: 39.8 lb/year
Waste Load Allocation : 39.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 17.9 lb/year
Pollutant Load Reduction: 55%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 31.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.8 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 107.2 Acres

Boston Water and Sewer Commission

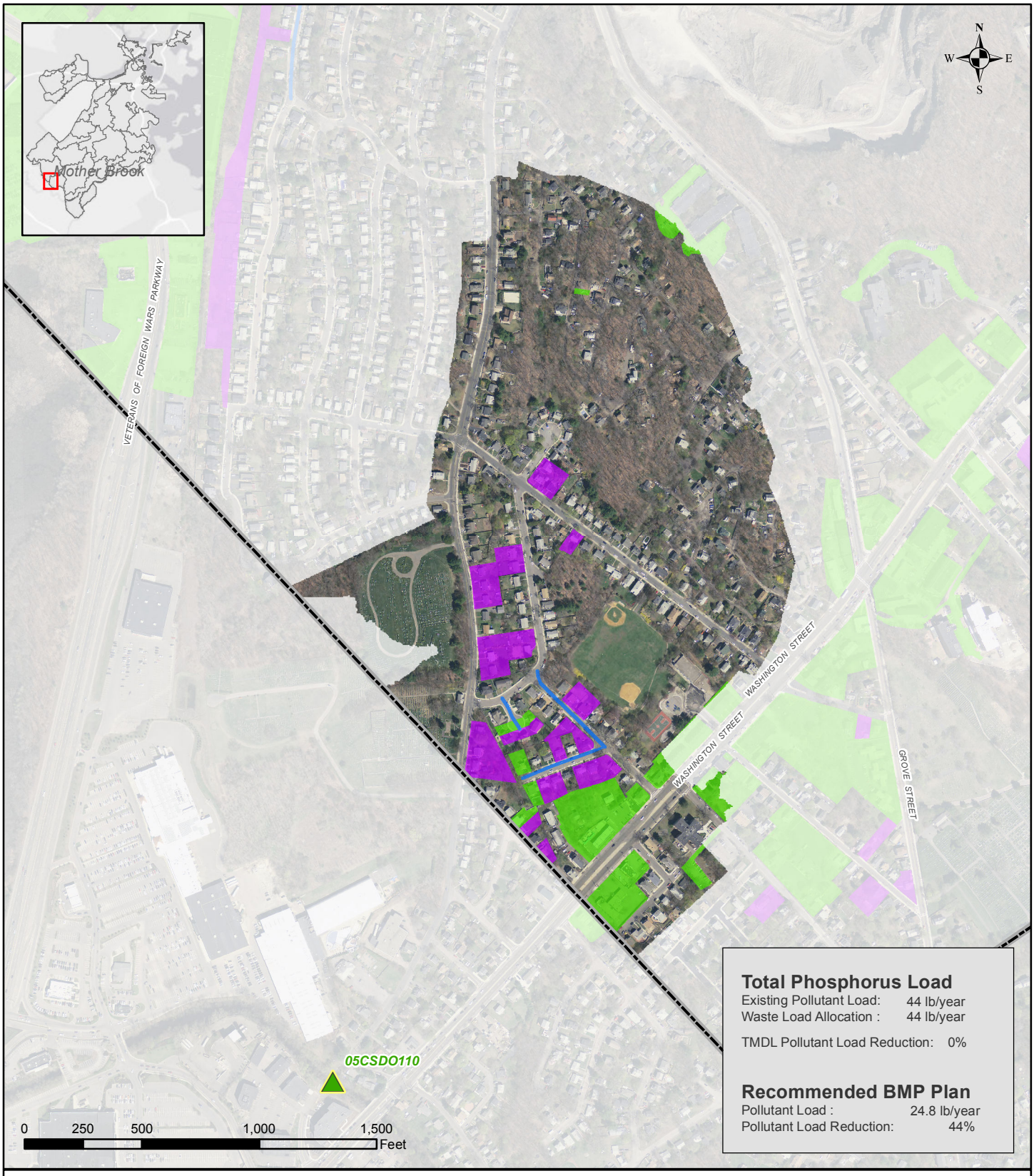
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 04FSDO204

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	44 lb/year
Waste Load Allocation :	44 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	24.8 lb/year
Pollutant Load Reduction:	44%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	5 Acres
Recommended area:	0 Acres

Residential Parcel

Total area of suitable sites:	5.3 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.2 Miles
Recommended area:	0.1 Miles

Boston Boundary

Total Catchment Area:	98.8 Acres

Recommended BMP Plan

Reporting Area: Mother Brook
Catchment: 05CSDO110

Boston Water and Sewer Commission

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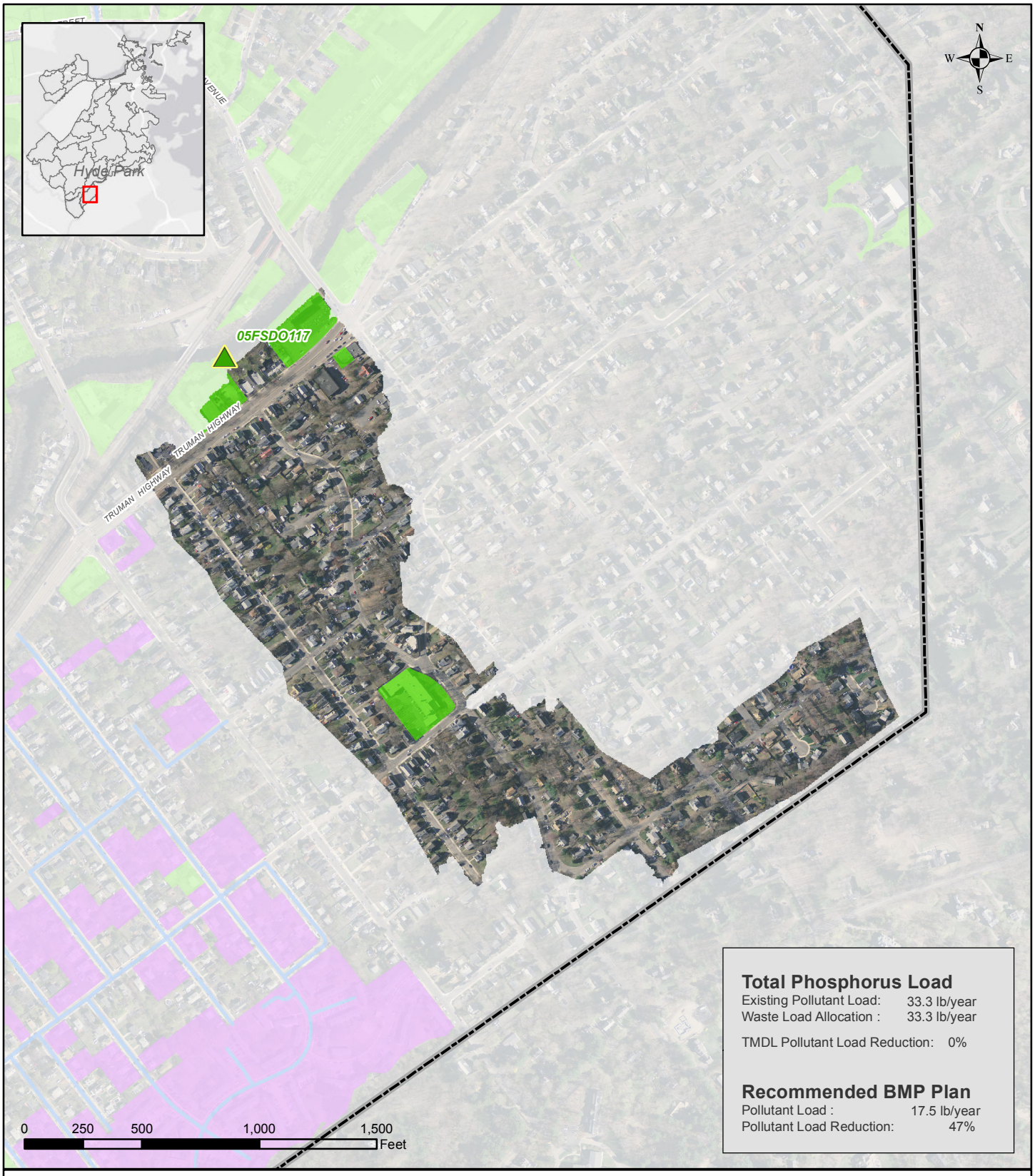


Total Phosphorus Load

Existing Pollutant Load: 33.3 lb/year
Waste Load Allocation : 33.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 17.5 lb/year
Pollutant Load Reduction: 47%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 58.2 Acres

Boston Water and Sewer Commission

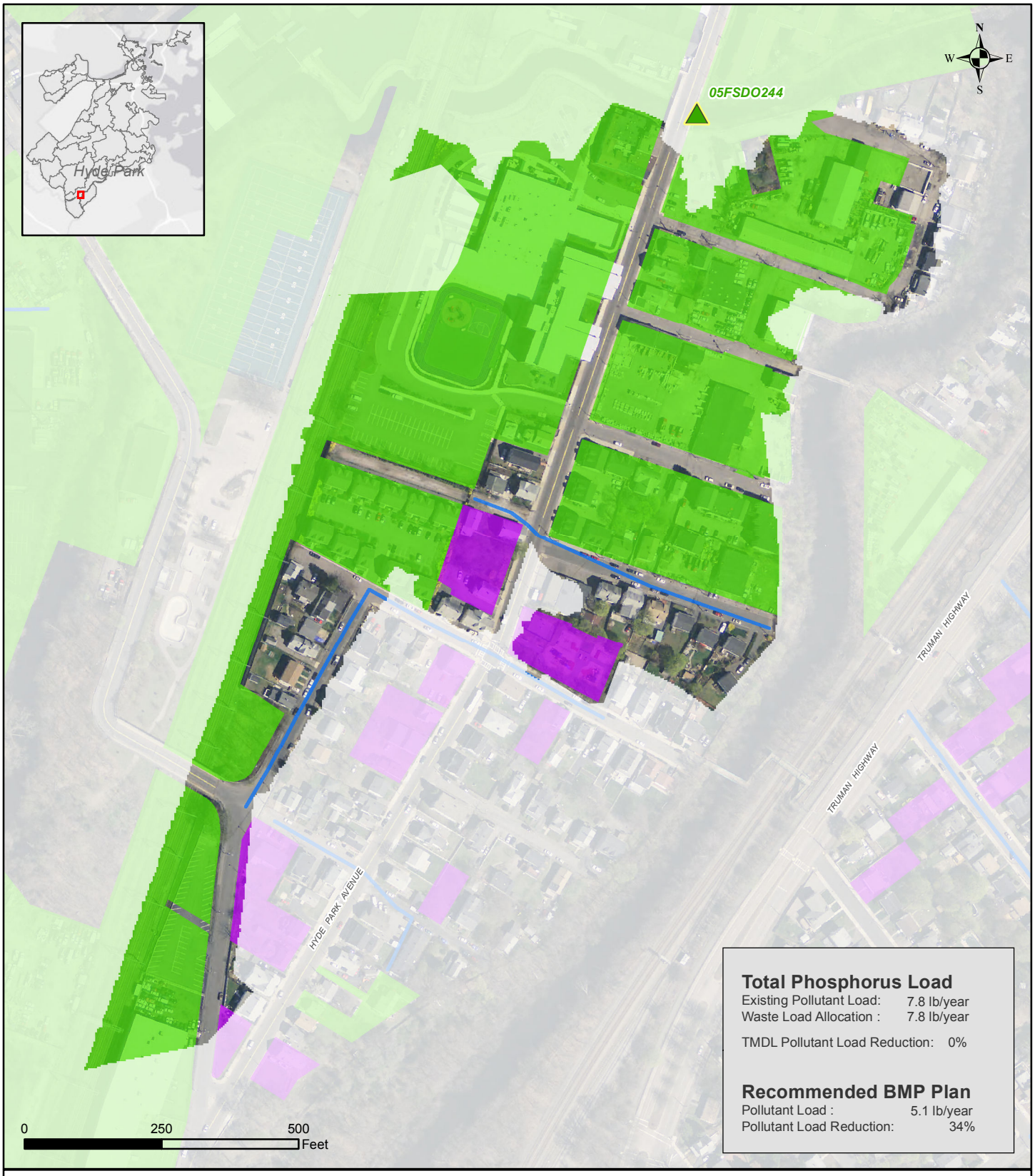
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05FSDO117

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	7.8 lb/year
Waste Load Allocation :	7.8 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	5.1 lb/year
Pollutant Load Reduction:	34%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 14.5 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 2 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.2 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 21.9 Acres

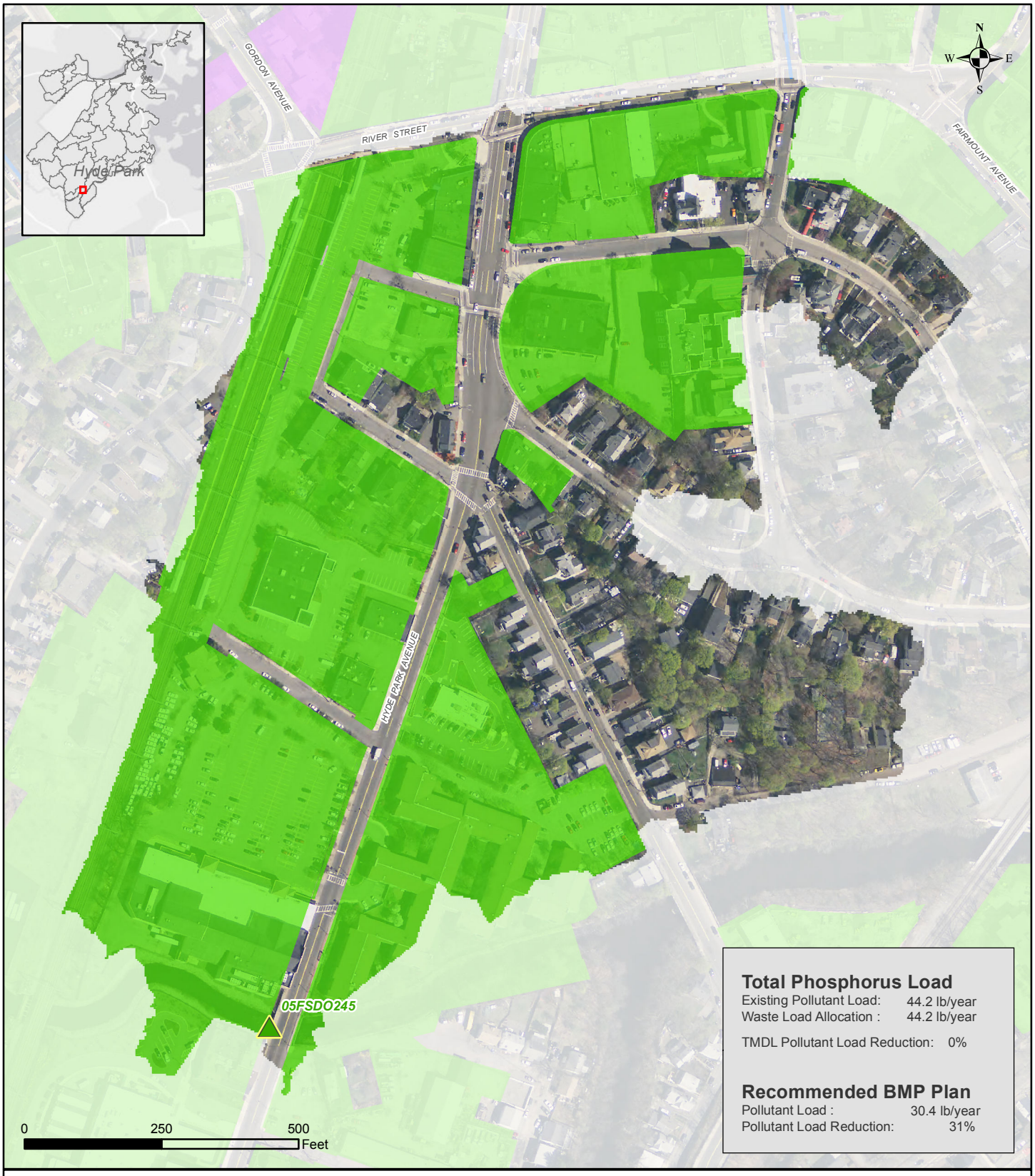
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 05FSDO244

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 44.2 lb/year
Waste Load Allocation : 44.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 30.4 lb/year
Pollutant Load Reduction: 31%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 23.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 39.3 Acres

Boston Water and Sewer Commission

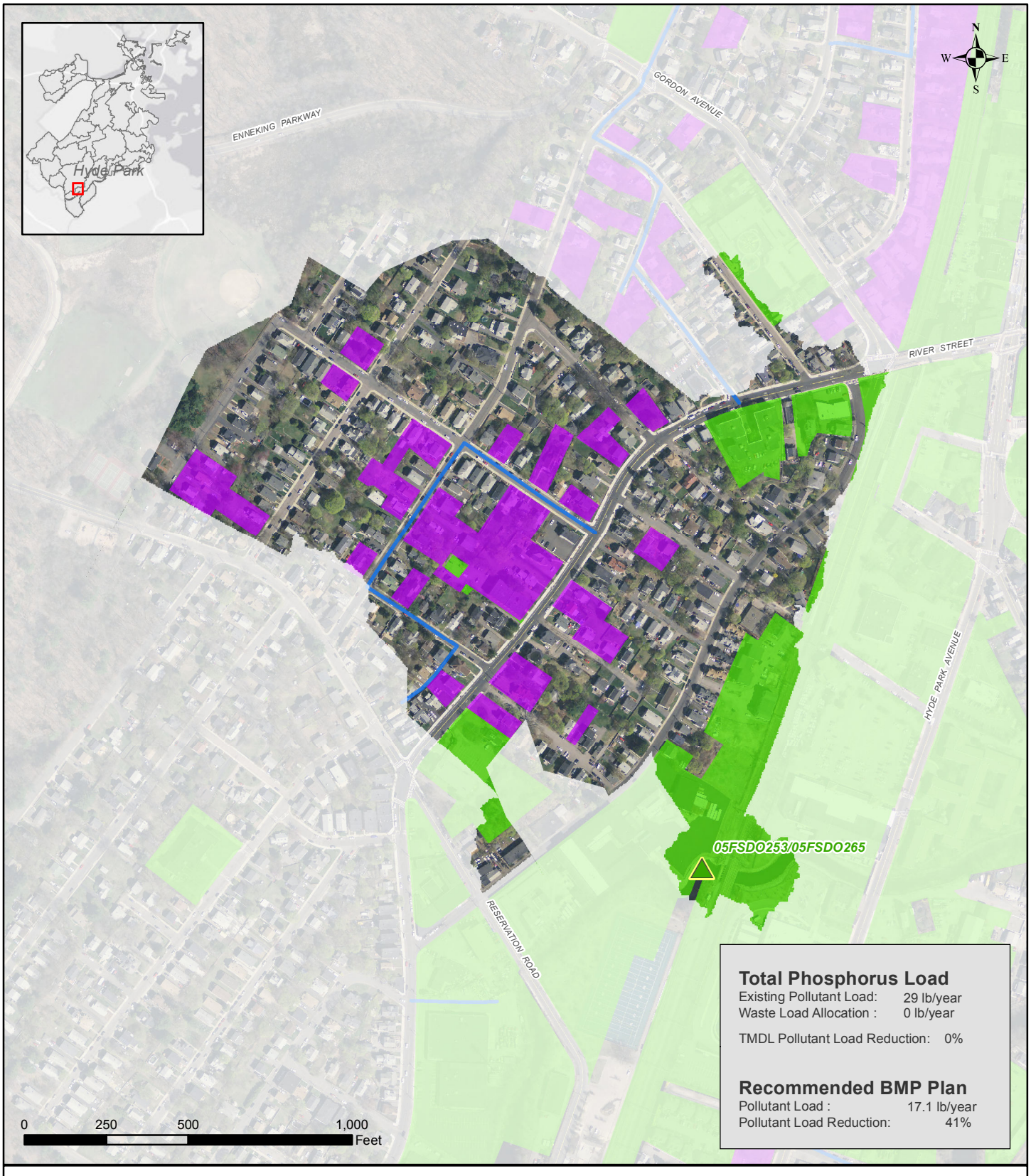
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05FSDO245

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 29 lb/year
Waste Load Allocation : 0 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 17.1 lb/year
Pollutant Load Reduction: 41%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 7.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.3 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 56.5 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05FSDO253/05FSDO265

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.8 lb/year
Waste Load Allocation : 1.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.2 lb/year
Pollutant Load Reduction: 36%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 5.6 Acres

Boston Water and Sewer Commission

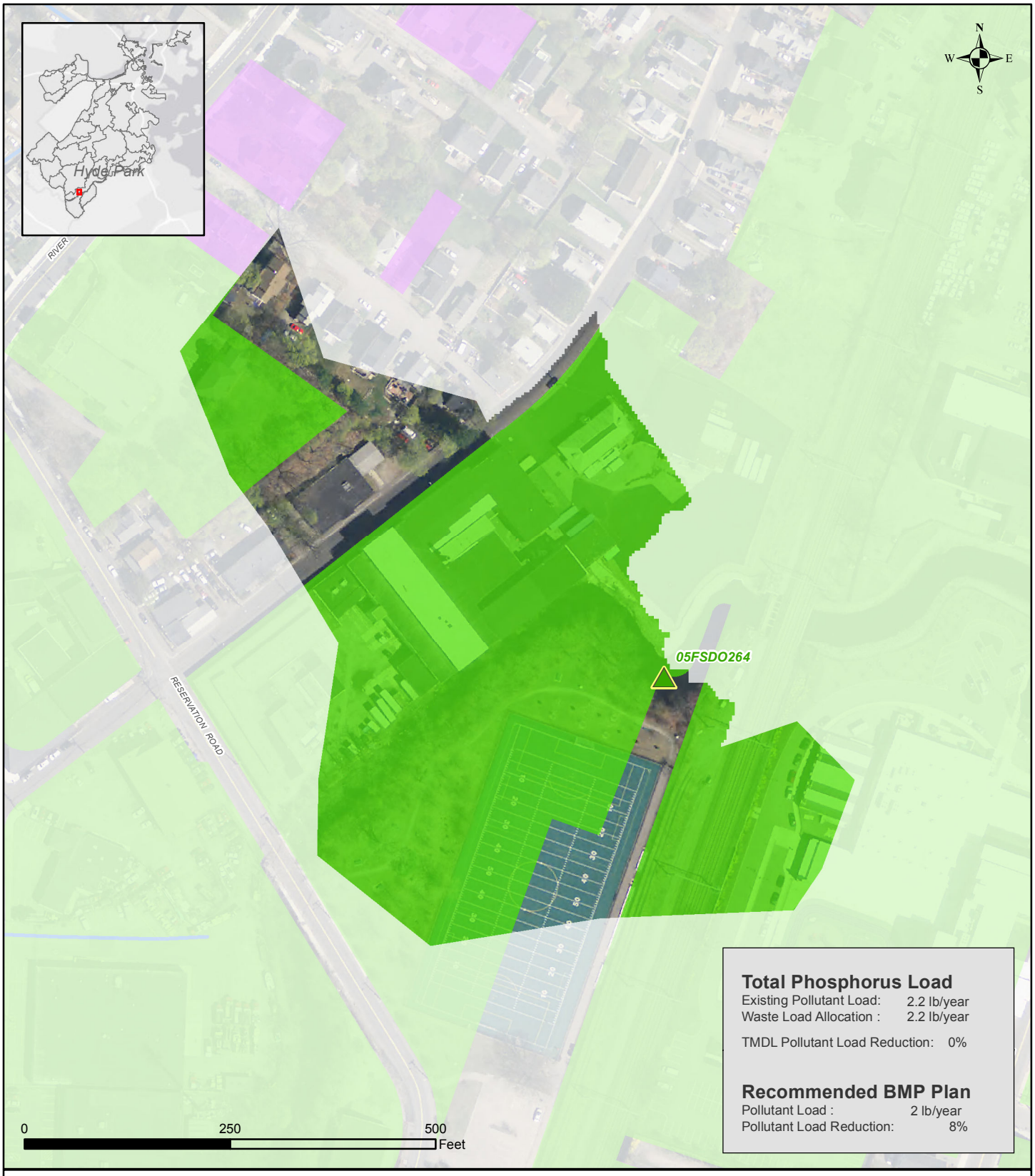
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05FSDO254

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.2 lb/year
Waste Load Allocation : 2.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 2 lb/year
Pollutant Load Reduction: 8%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 6.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 8.3 Acres

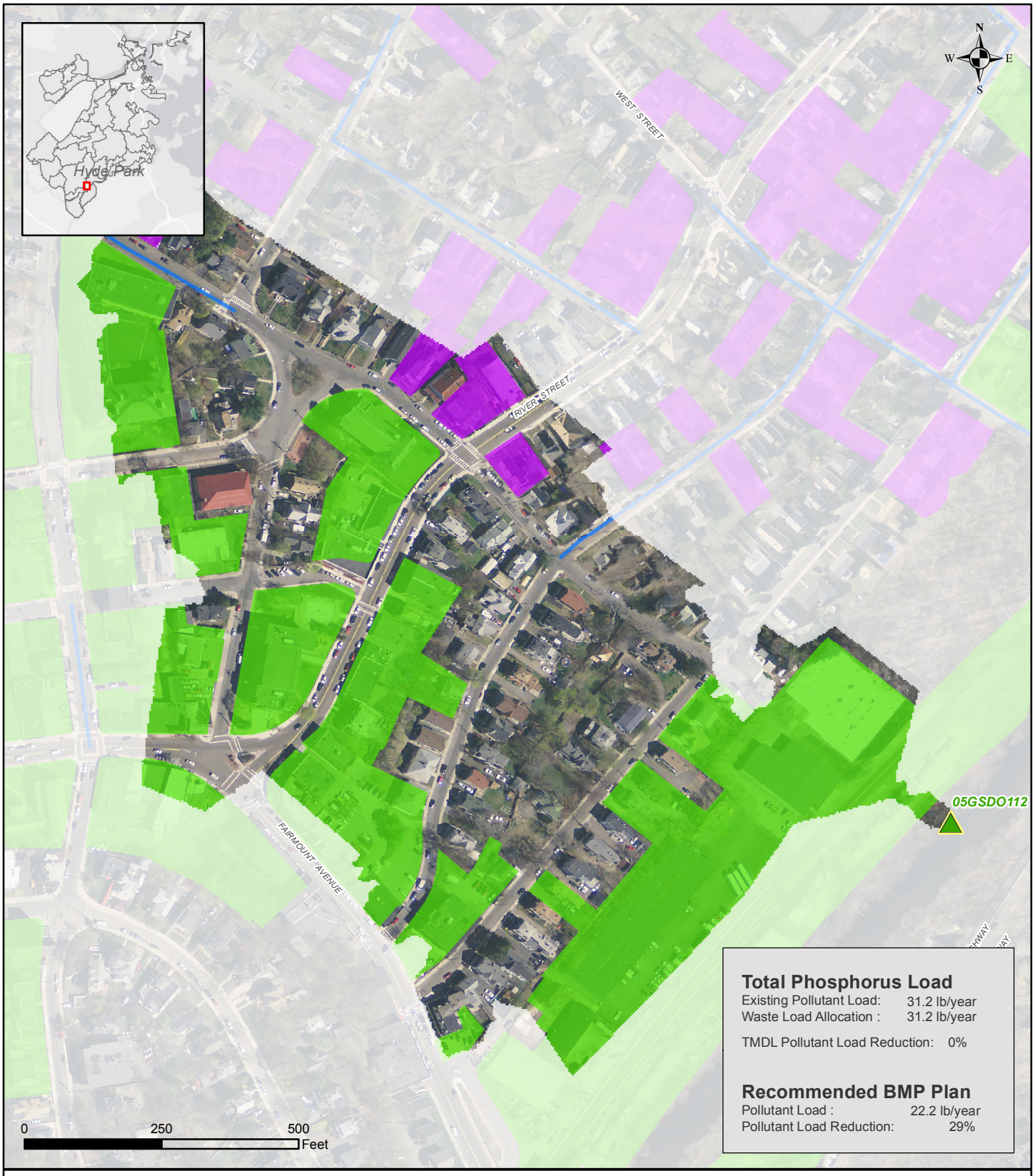
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 05FSDO264

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	31.2 lb/year
Waste Load Allocation :	31.2 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	22.2 lb/year
Pollutant Load Reduction:	29%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 11.7 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0.9 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.1 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 28.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05GSDO112

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	9.5 lb/year
Waste Load Allocation :	9.5 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	5.6 lb/year
Pollutant Load Reduction:	41%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 2.6 Acres
- Recommended area: 0.1 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 17.4 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05GSDO115

Boston Water and Sewer Commission

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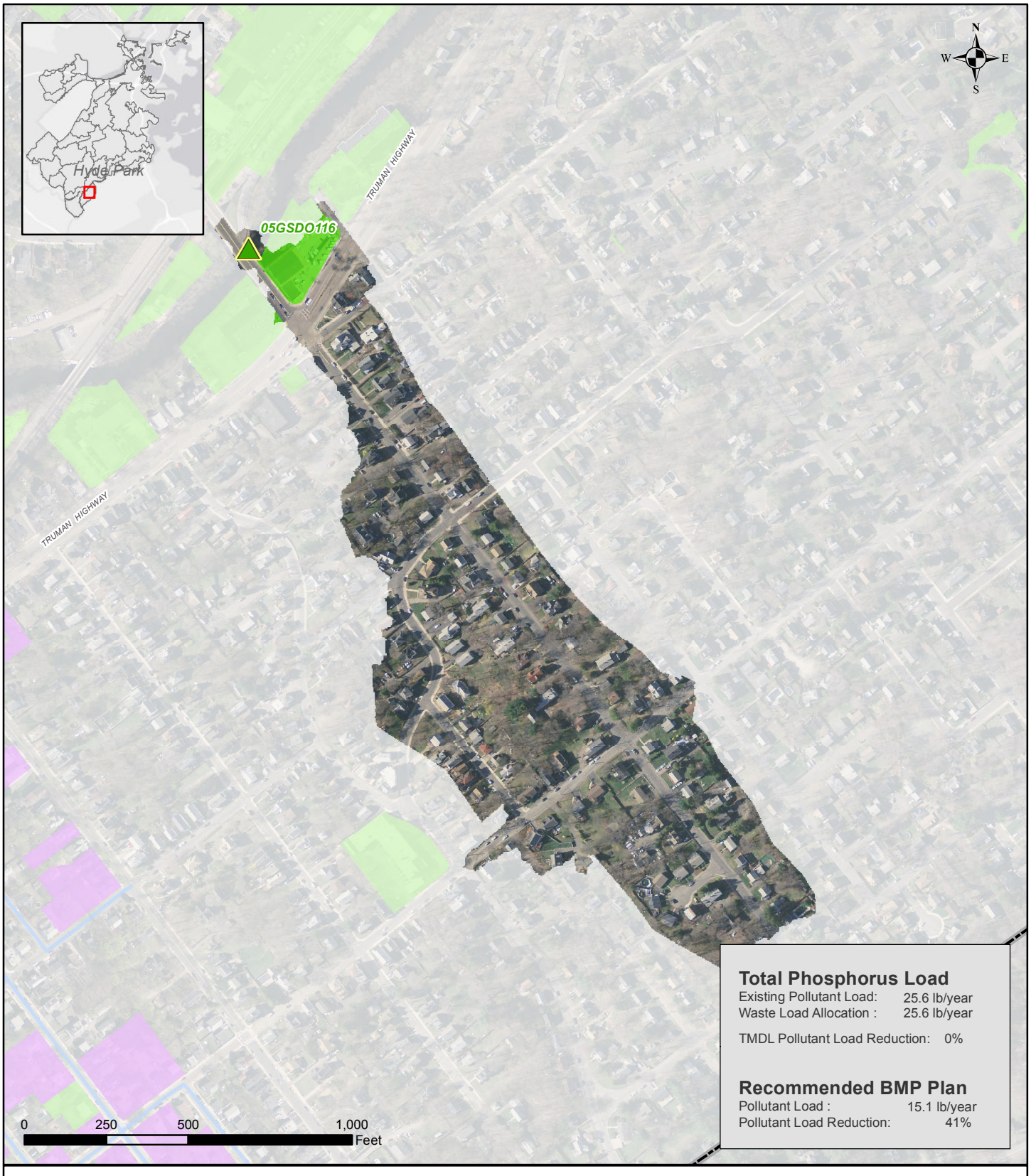


Total Phosphorus Load

Existing Pollutant Load: 25.6 lb/year
Waste Load Allocation : 25.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 15.1 lb/year
Pollutant Load Reduction: 41%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 28.9 Acres

Boston Water and Sewer Commission

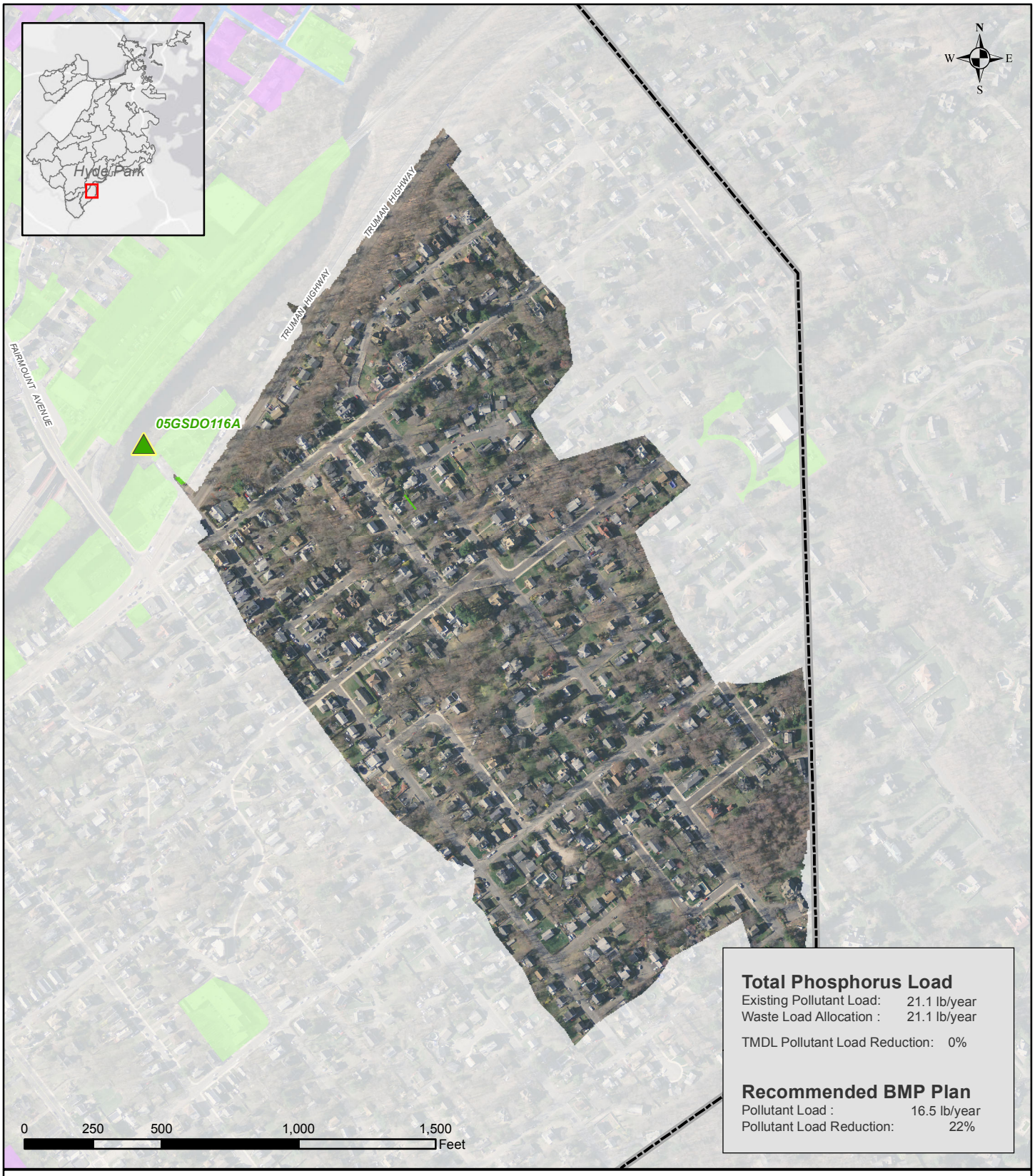
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05GSDO116

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 21.1 lb/year
Waste Load Allocation : 21.1 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 16.5 lb/year
Pollutant Load Reduction: 22%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 88.0 Acres

Boston Water and Sewer Commission

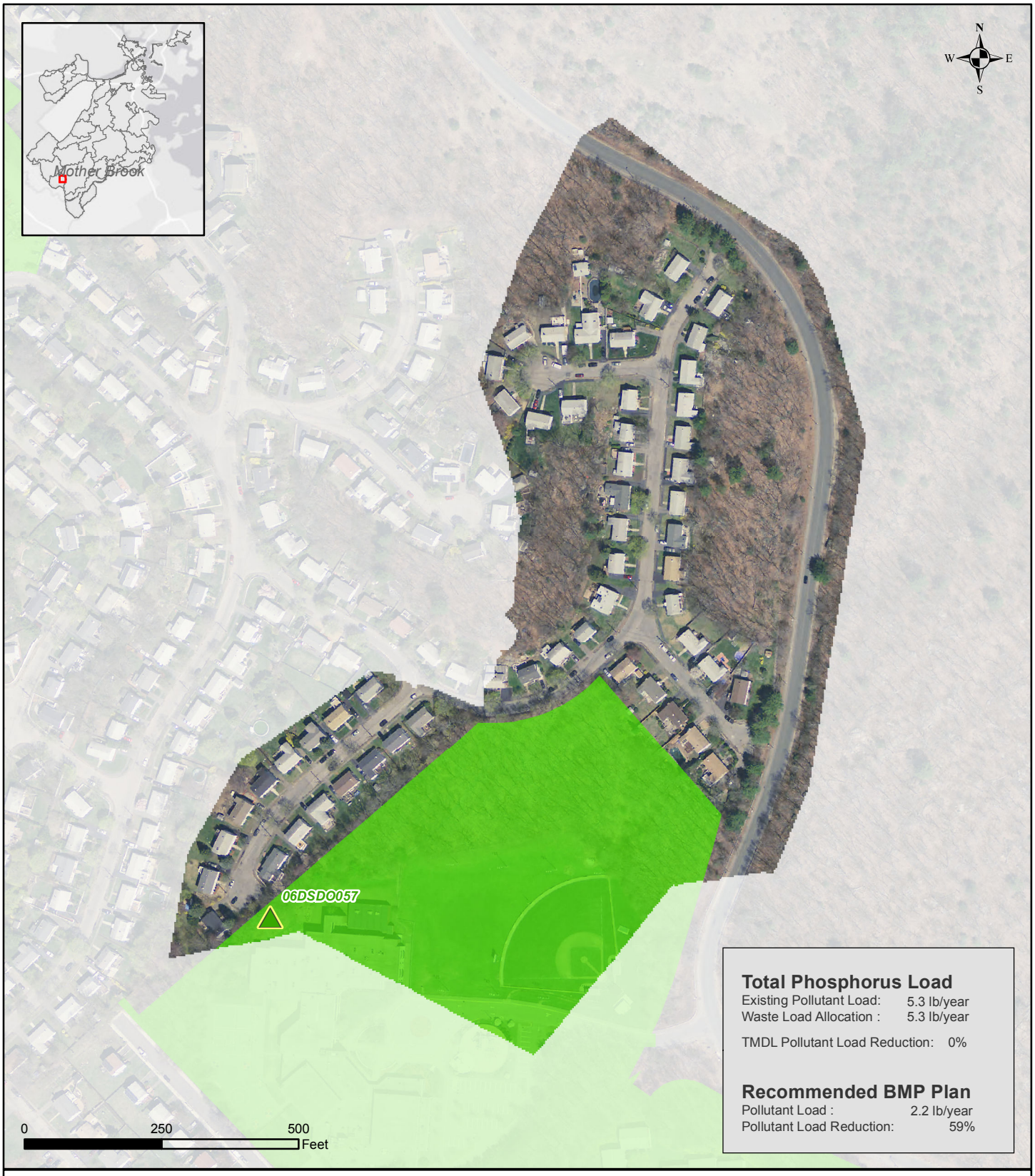
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 05GSDO116A

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 5.3 lb/year
Waste Load Allocation : 5.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 2.2 lb/year
Pollutant Load Reduction: 59%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 24.6 Acres

Boston Water and Sewer Commission

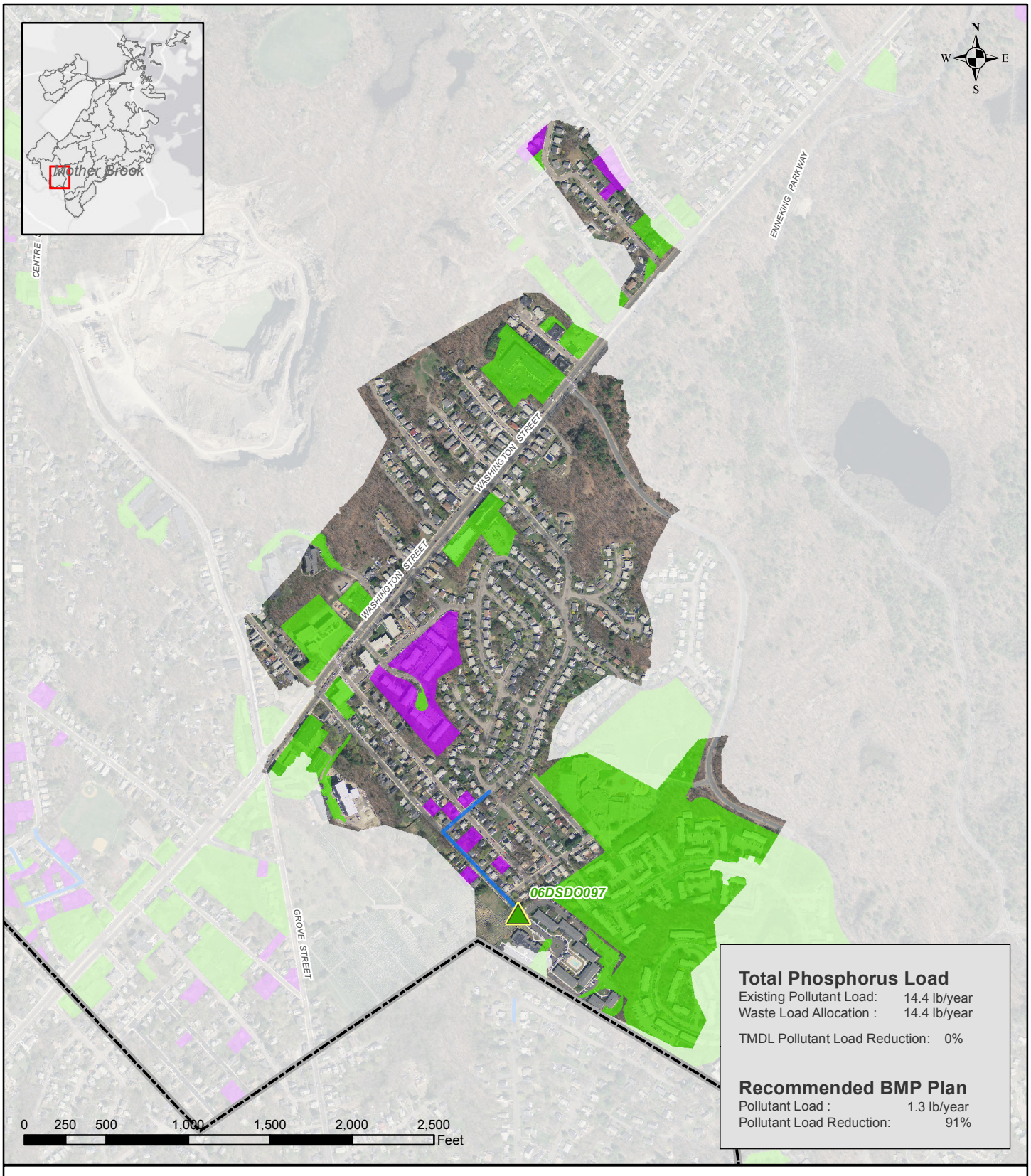
CH2MHILL

Recommended BMP Plan

Reporting Area: Mother Brook
Catchment: 06DSDO057

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 14.4 lb/year
Waste Load Allocation : 14.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.3 lb/year
Pollutant Load Reduction: 91%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 44.7 Acres
Recommended area: 8.9 Acres

Residential Parcel
Total area of suitable sites: 6.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 183.8 Acres

Boston Water and Sewer Commission

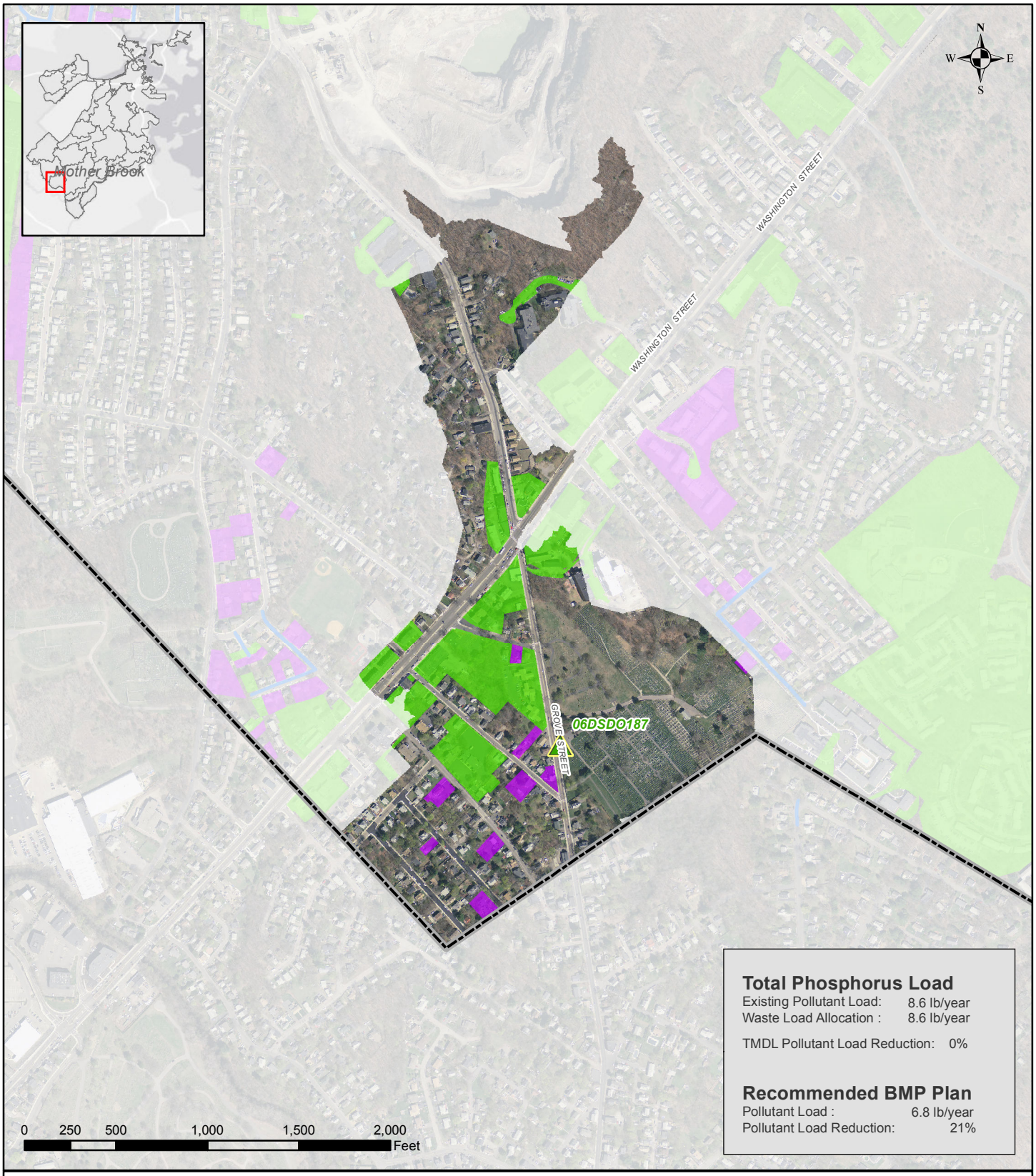
CH2MHILL

Recommended BMP Plan

Reporting Area: Mother Brook
Catchment: 06DSDO097

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	8.6 lb/year
Waste Load Allocation :	8.6 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	6.8 lb/year
Pollutant Load Reduction:	21%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 13.5 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 2.3 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.1 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 118.3 Acres

Boston Water and Sewer Commission

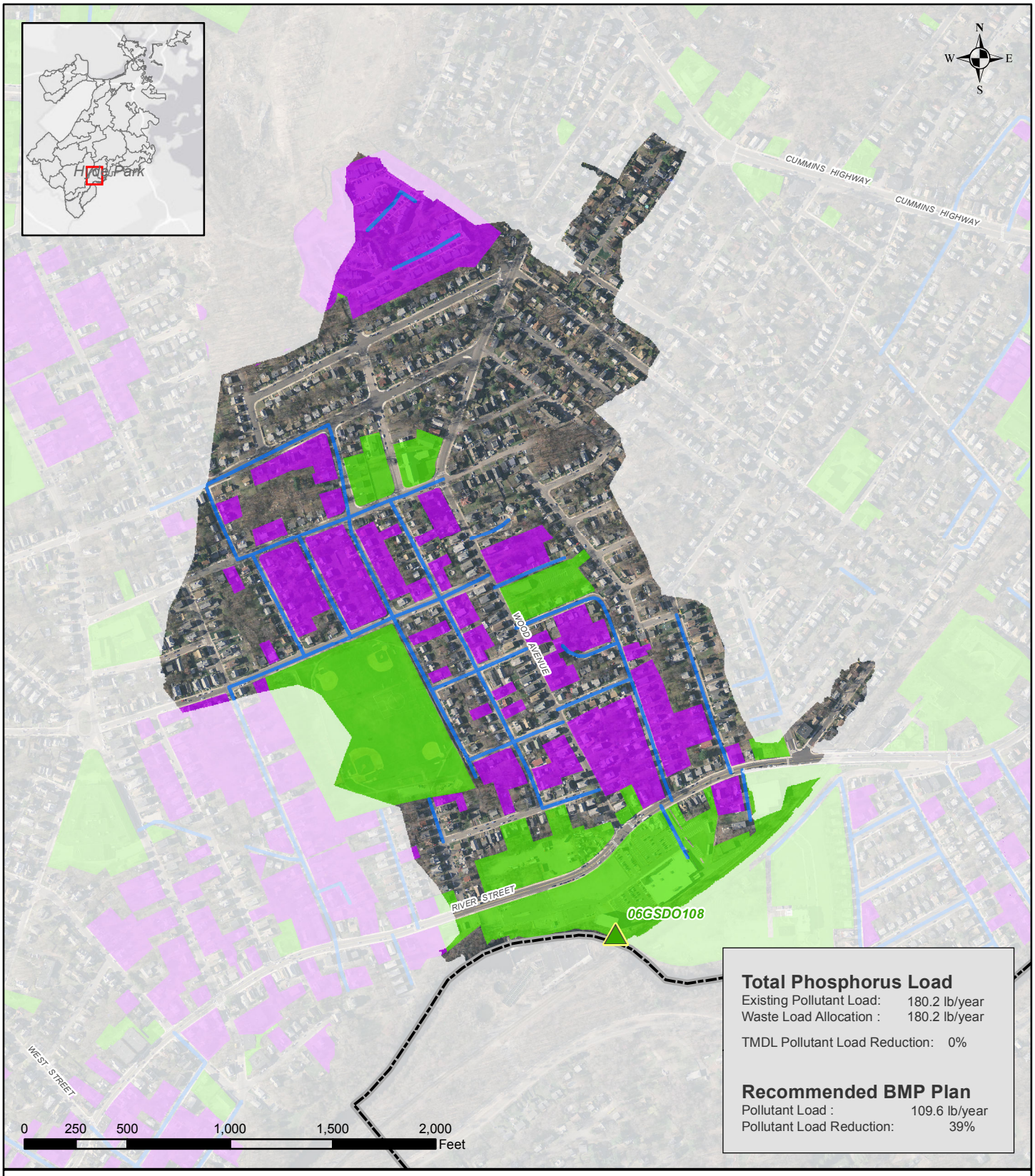
CH2MHILL

Recommended BMP Plan

Reporting Area: Mother Brook
Catchment: 06DSDO187

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 180.2 lb/year
Waste Load Allocation : 180.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 109.6 lb/year
Pollutant Load Reduction: 39%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 28.7 Acres
Recommended area: 2.2 Acres

Residential Parcel
Total area of suitable sites: 29.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 2.7 Miles
Recommended area: 0.2 Miles

Boston Boundary
Total Catchment Area: 163.9 Acres

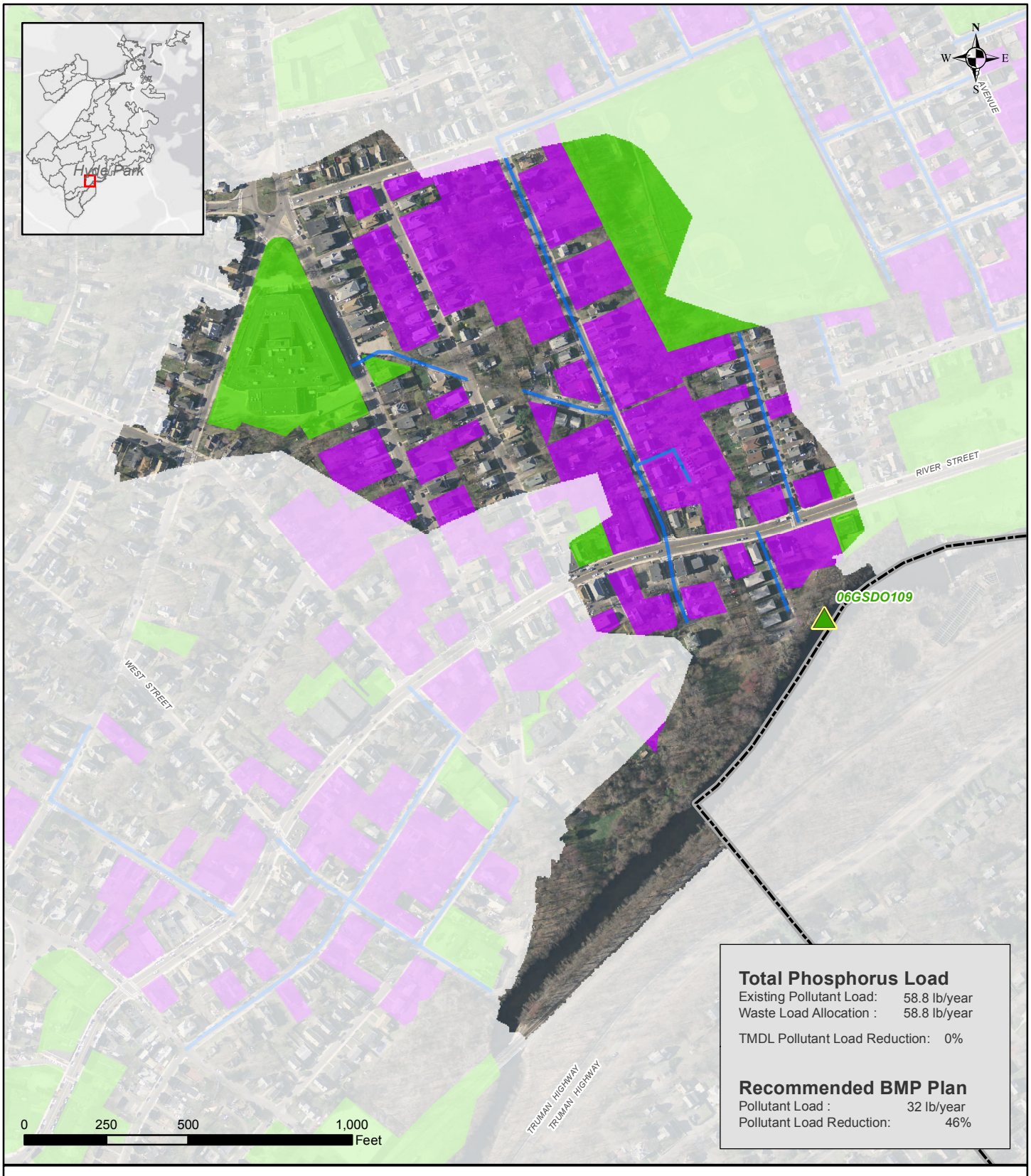
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 06GSDO108

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 7.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 16.5 Acres
Recommended area: 0 Acres

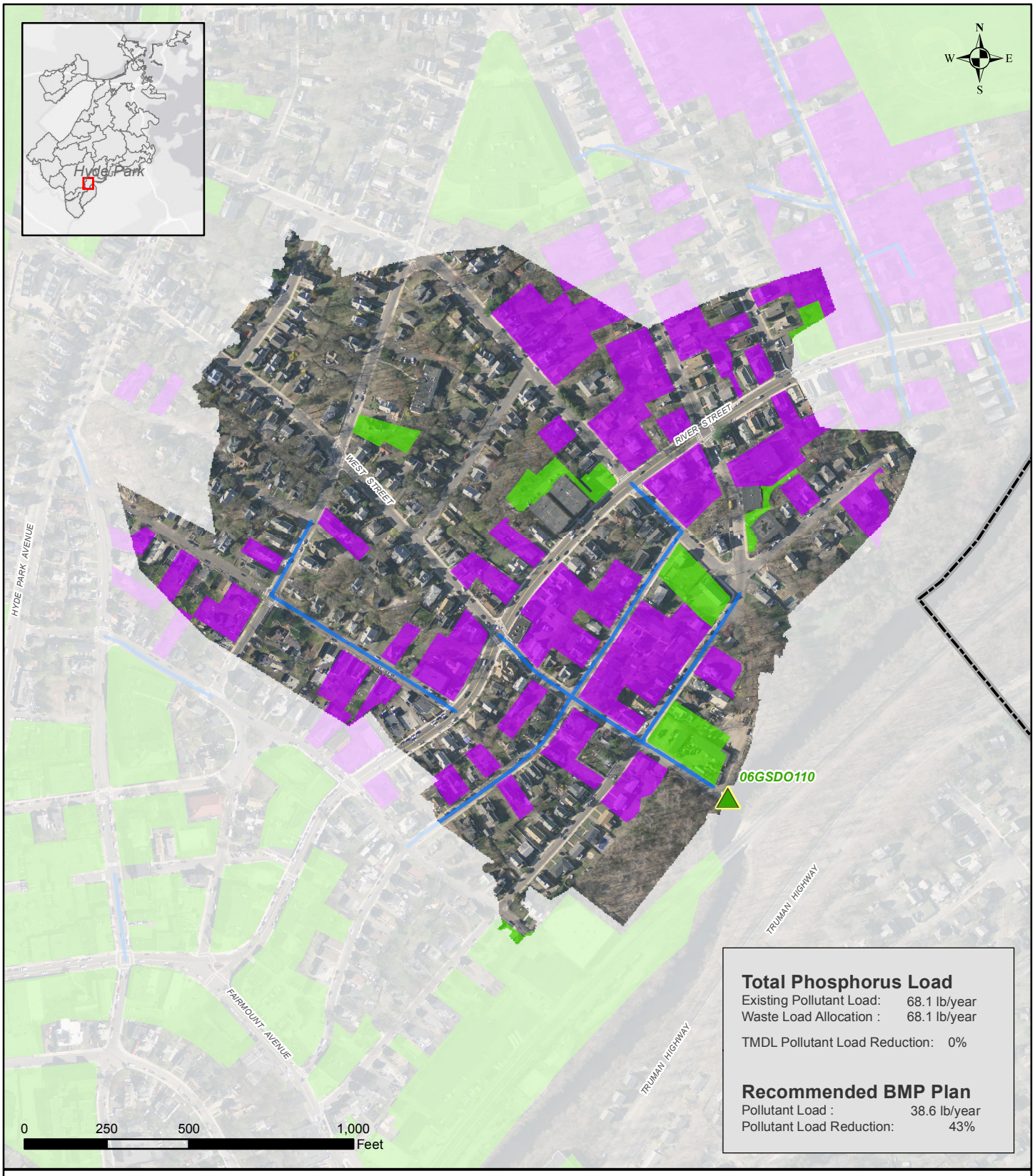
Suitable Public Right of Way
Total area of suitable sites: 0.6 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 60.9 Acres

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 06GSDO109

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	68.1 lb/year
Waste Load Allocation :	68.1 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	38.6 lb/year
Pollutant Load Reduction:	43%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 2.5 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 14.9 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.7 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 68.4 Acres

Boston Water and Sewer Commission

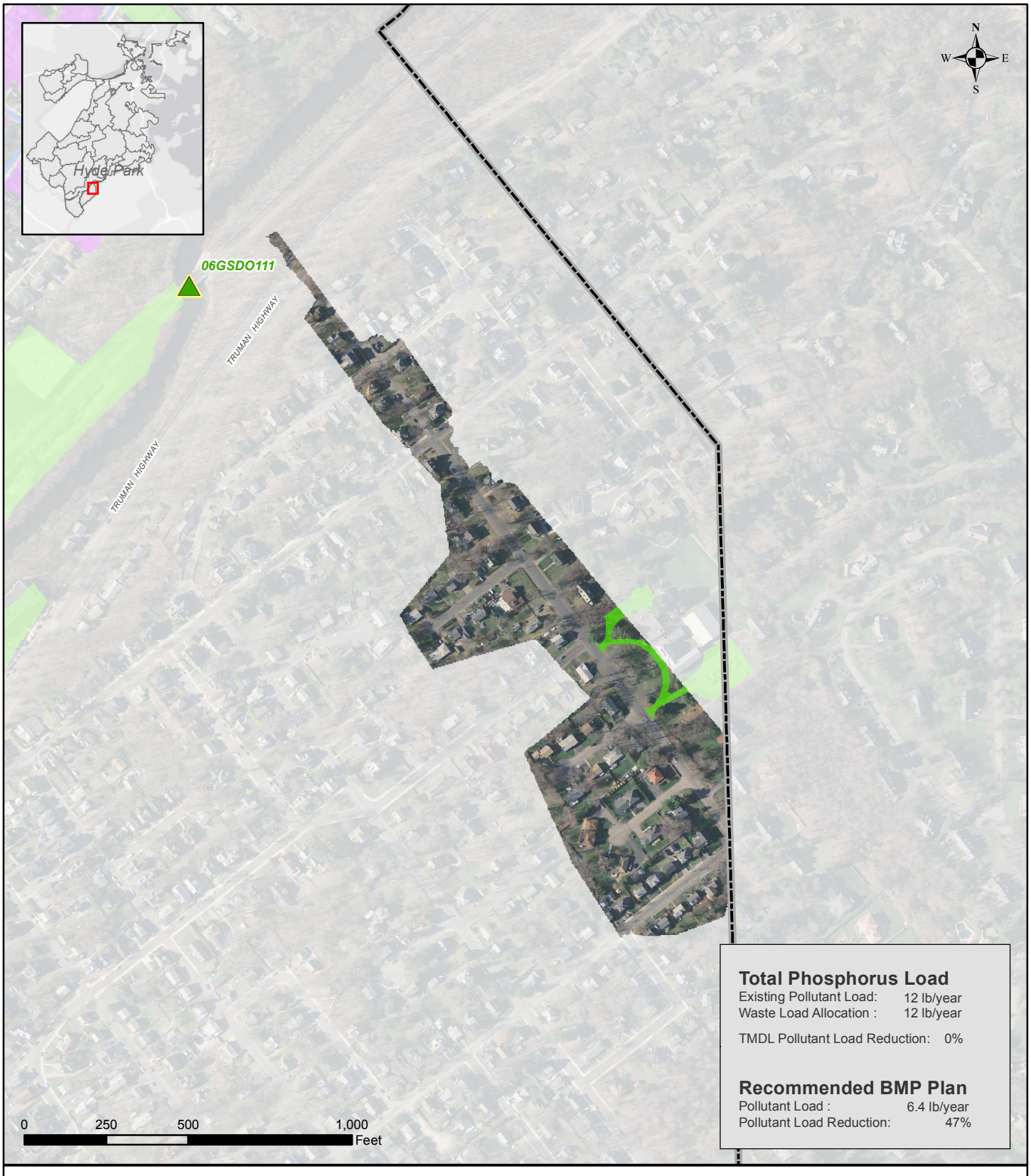
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 06GSDO110

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 12 lb/year
Waste Load Allocation : 12 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 6.4 lb/year
Pollutant Load Reduction: 47%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 17.9 Acres

Boston Water and Sewer Commission

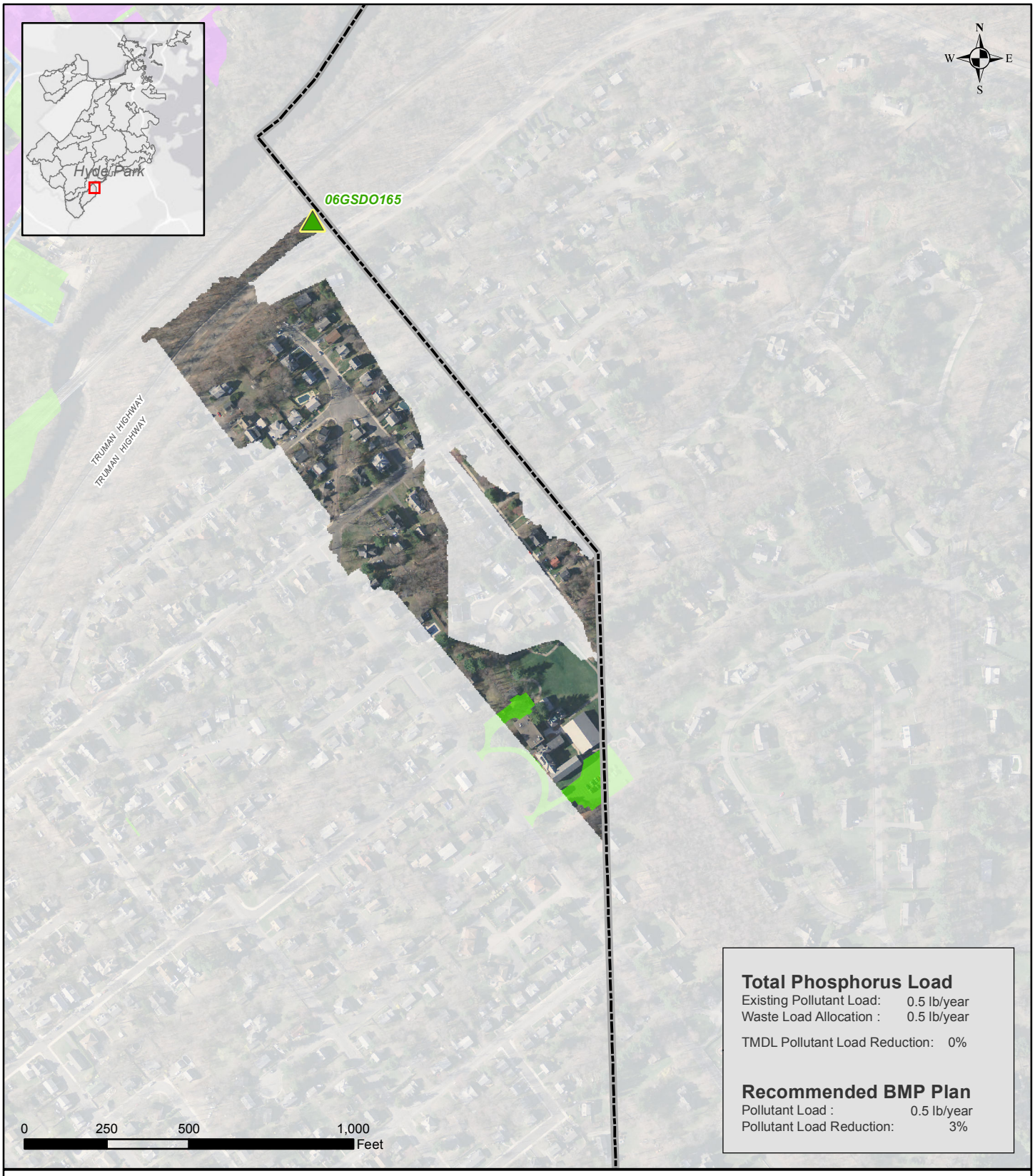
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 06GSDO111

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	0.5 lb/year
Waste Load Allocation :	0.5 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	0.5 lb/year
Pollutant Load Reduction:	3%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 0.7 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

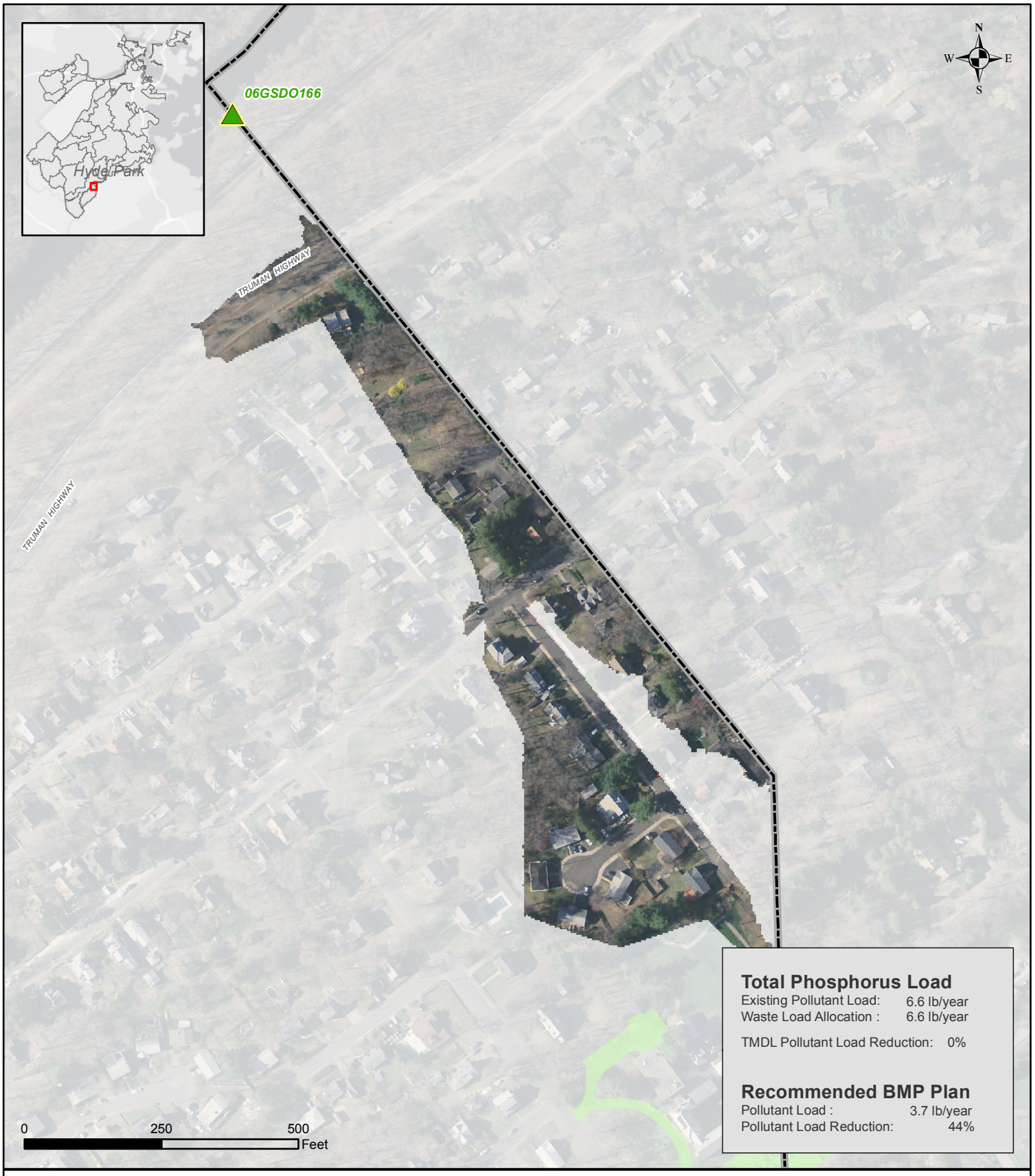
Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 22.9 Acres

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 06GSDO165

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 6.6 lb/year
Waste Load Allocation : 6.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 3.7 lb/year
Pollutant Load Reduction: 44%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 8.8 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 06GSDO166

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 4.9 lb/year
Waste Load Allocation : 4.9 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.7 lb/year
Pollutant Load Reduction: 66%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 2.9 Acres

Boston Water and Sewer Commission

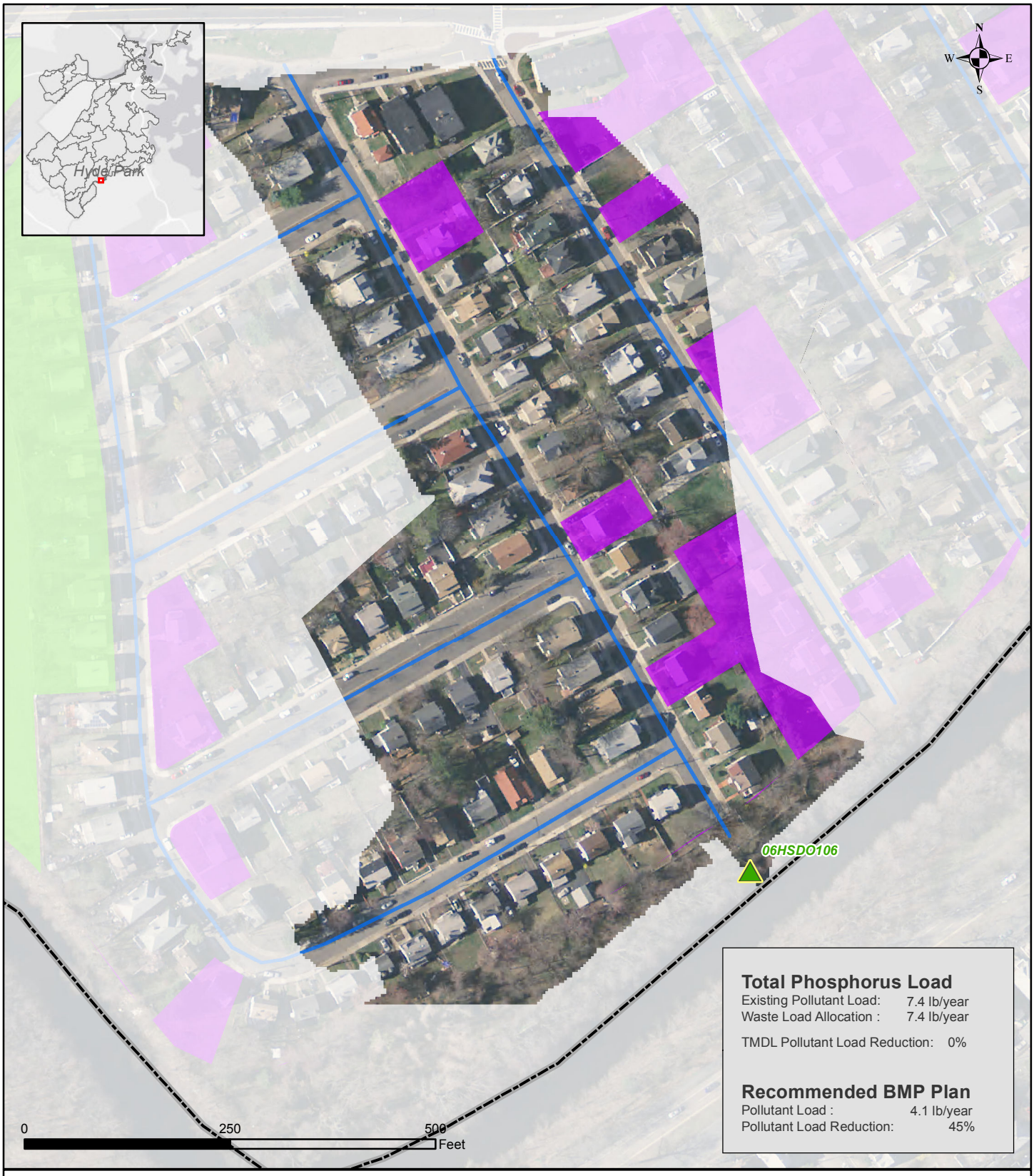
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 06HSDO043

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 7.4 lb/year
Waste Load Allocation : 7.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 4.1 lb/year
Pollutant Load Reduction: 45%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 1.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.5 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 12.9 Acres

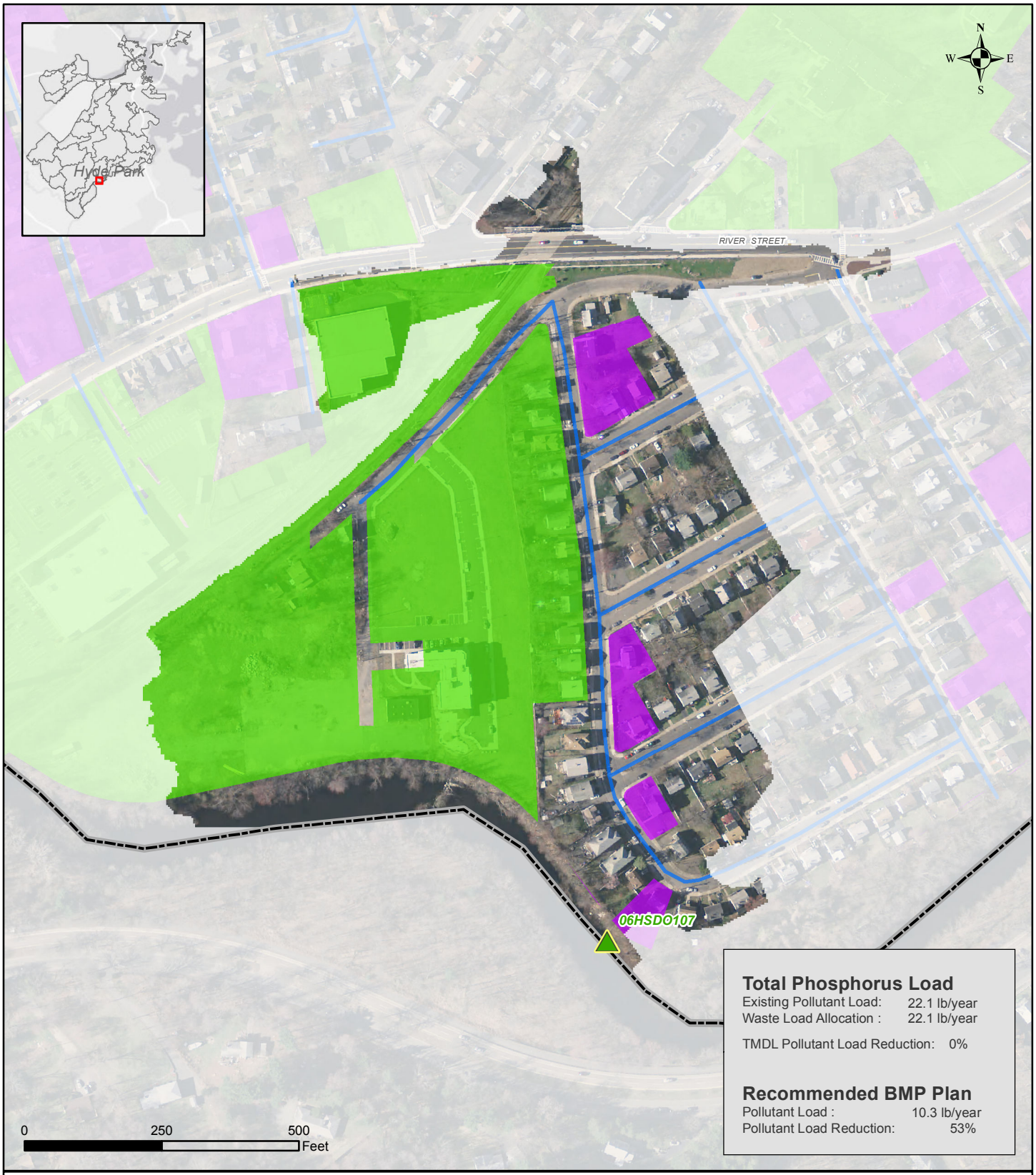
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Hyde Park
Catchment: 06HSDO106

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	22.1 lb/year
Waste Load Allocation :	22.1 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	10.3 lb/year
Pollutant Load Reduction:	53%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 10.4 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 1.1 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.5 Miles
- Recommended area: 0.3 Miles

Boston Boundary
- Total Catchment Area: 24.9 Acres

Boston Water and Sewer Commission

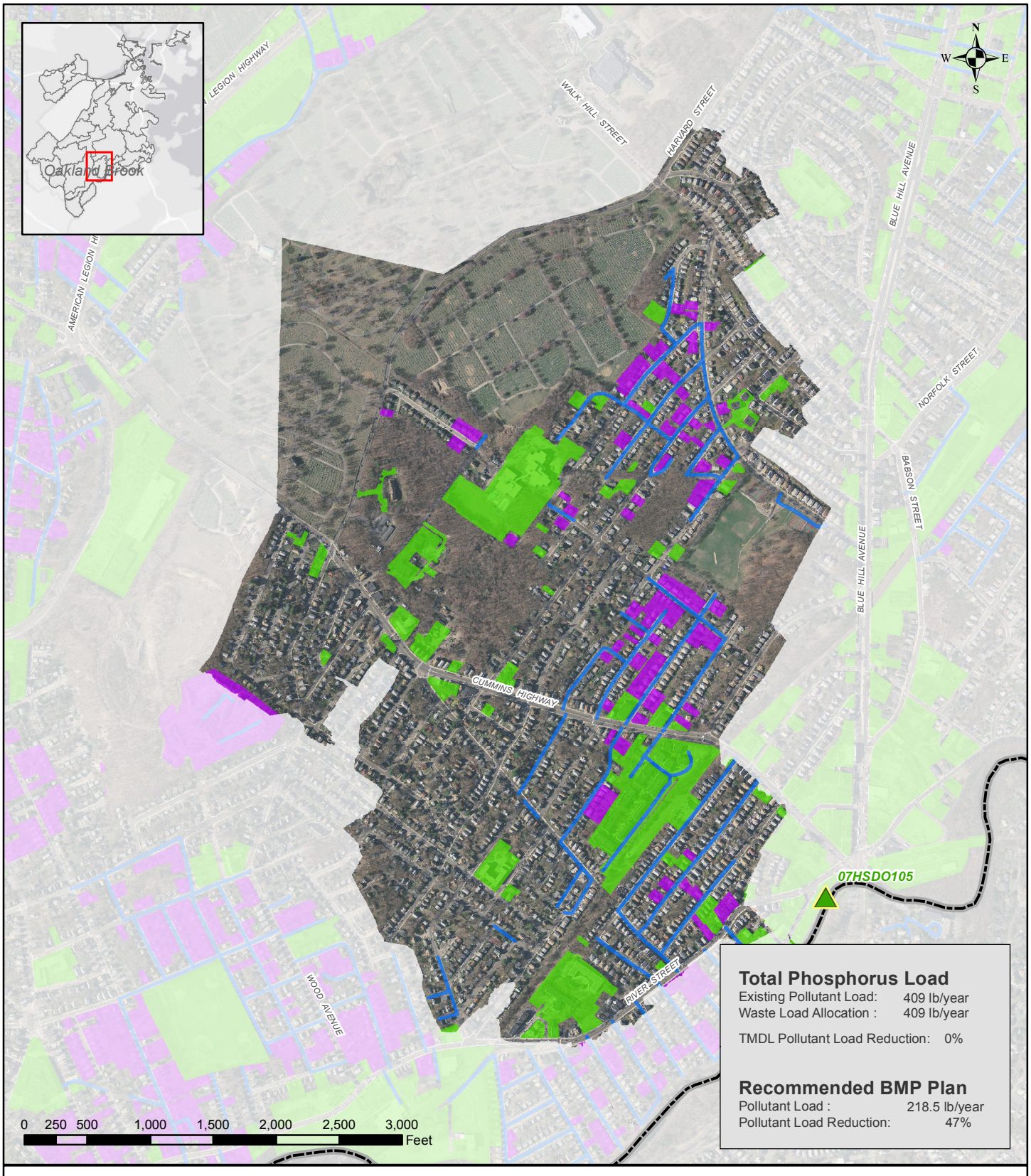
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 06HSDO107

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 409 lb/year
Waste Load Allocation : 409 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 218.5 lb/year
Pollutant Load Reduction: 47%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 49.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 20.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 4.8 Miles
Recommended area: 0.4 Miles

Boston Boundary
Total Catchment Area: 528.7 Acres

Boston Water and Sewer Commission

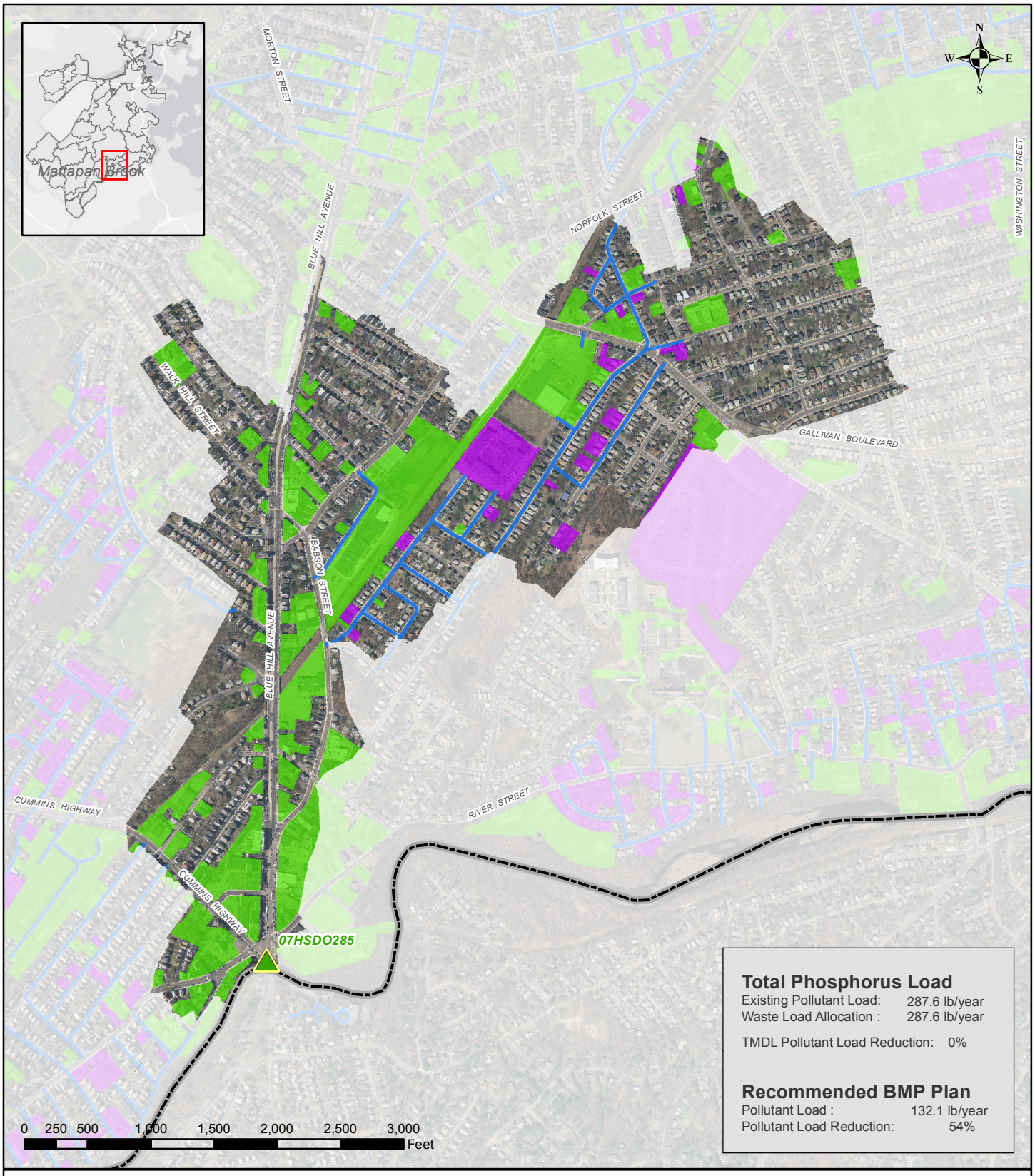
CH2MHILL

Recommended BMP Plan

Reporting Area: Oakland Brook
Catchment: 07HSDO105

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 287.6 lb/year
Waste Load Allocation : 287.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 132.1 lb/year
Pollutant Load Reduction: 54%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 73.9 Acres
Recommended area: 5.1 Acres

Residential Parcel
Total area of suitable sites: 11.2 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 2.2 Miles
Recommended area: 0.3 Miles

Boston Boundary
Total Catchment Area: 329.5 Acres

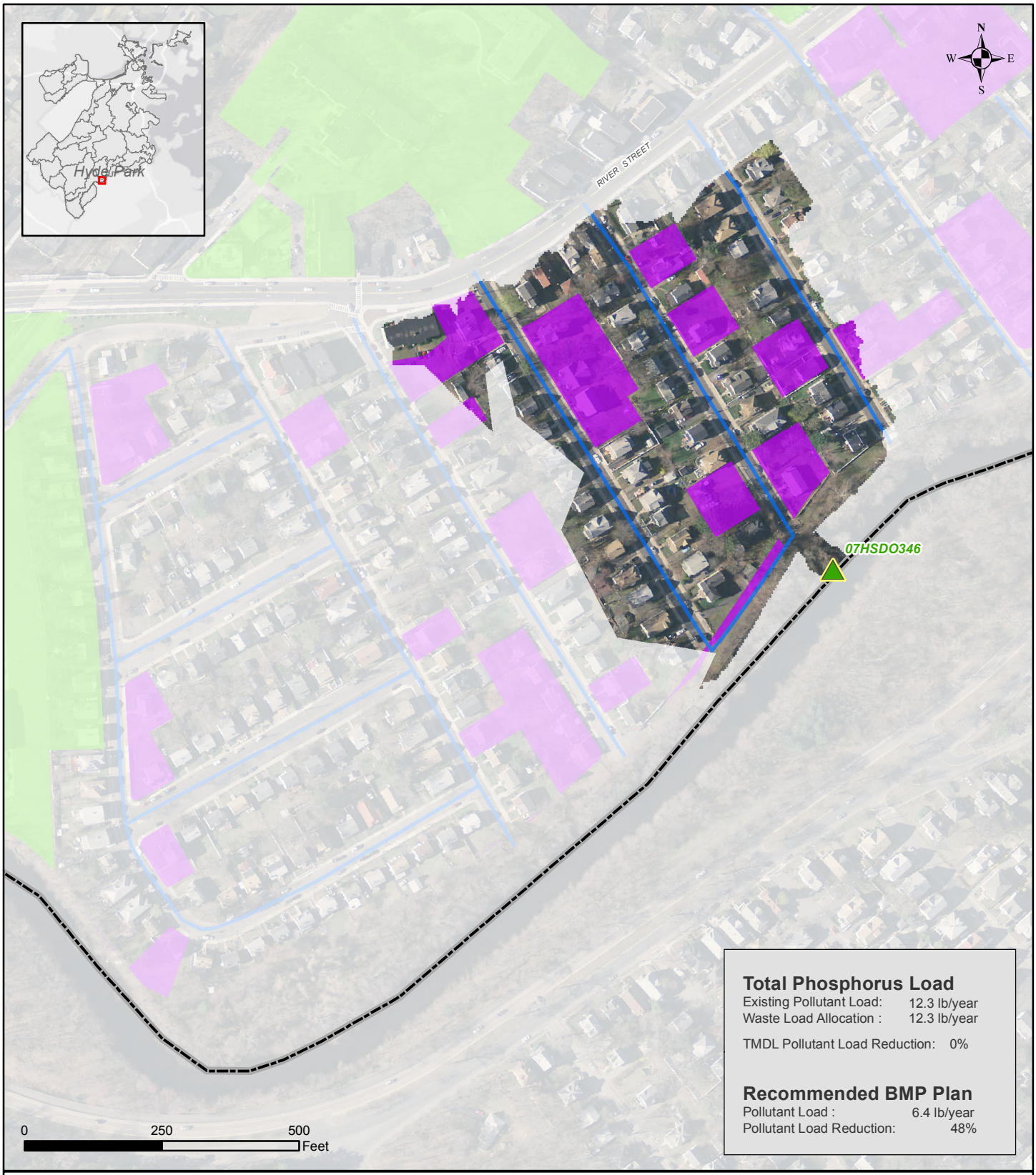
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Mattapan Brook
Catchment: 07HSDO285

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 12.3 lb/year
Waste Load Allocation : 12.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 6.4 lb/year
Pollutant Load Reduction: 48%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 2.4 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.4 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 11.2 Acres

Boston Water and Sewer Commission

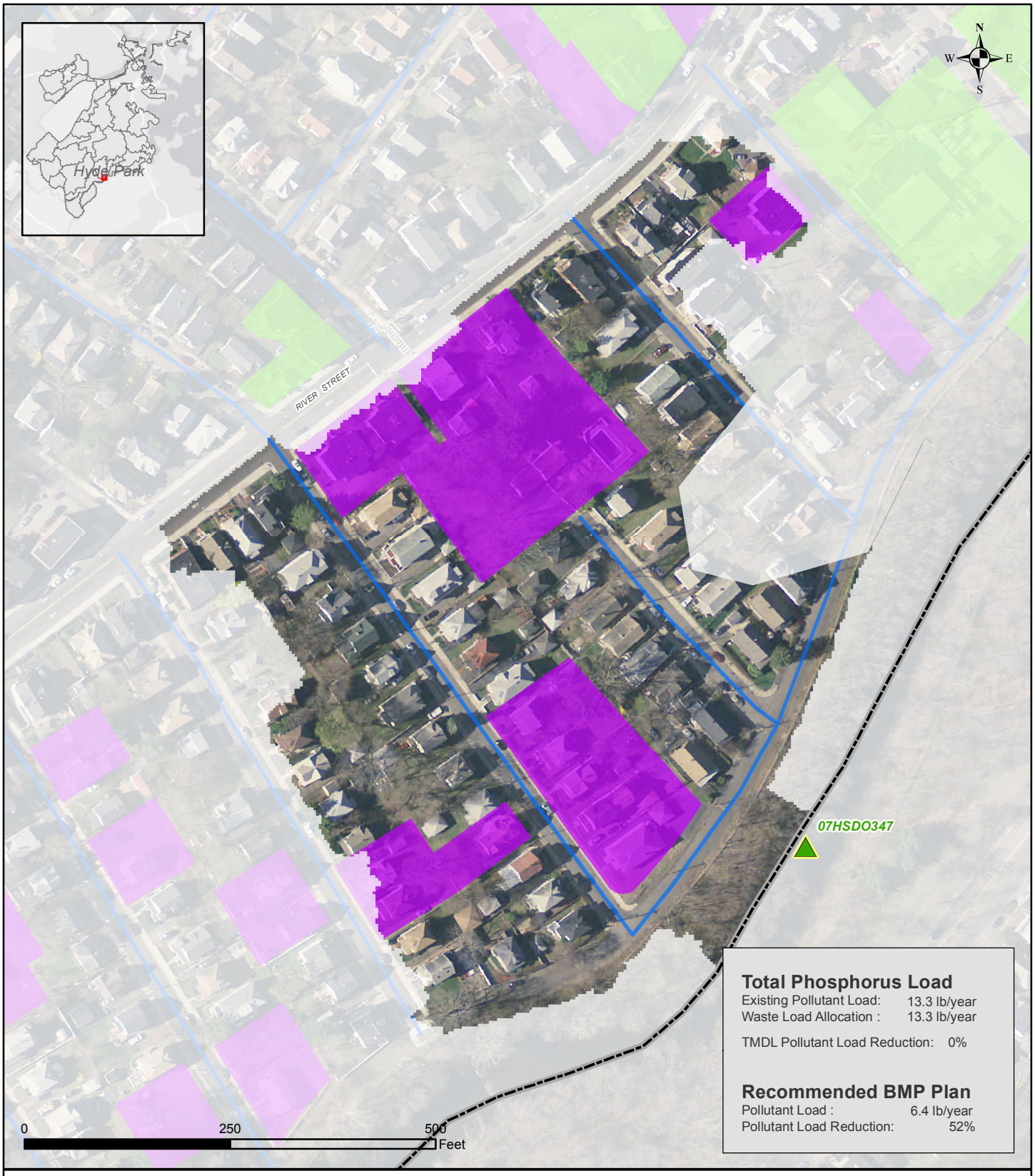
CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 07HSDO346

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 13.3 lb/year
Waste Load Allocation : 13.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 6.4 lb/year
Pollutant Load Reduction: 52%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 2.9 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.4 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 12.0 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Hyde Park
Catchment: 07HSDO347

Boston Water and Sewer Commission

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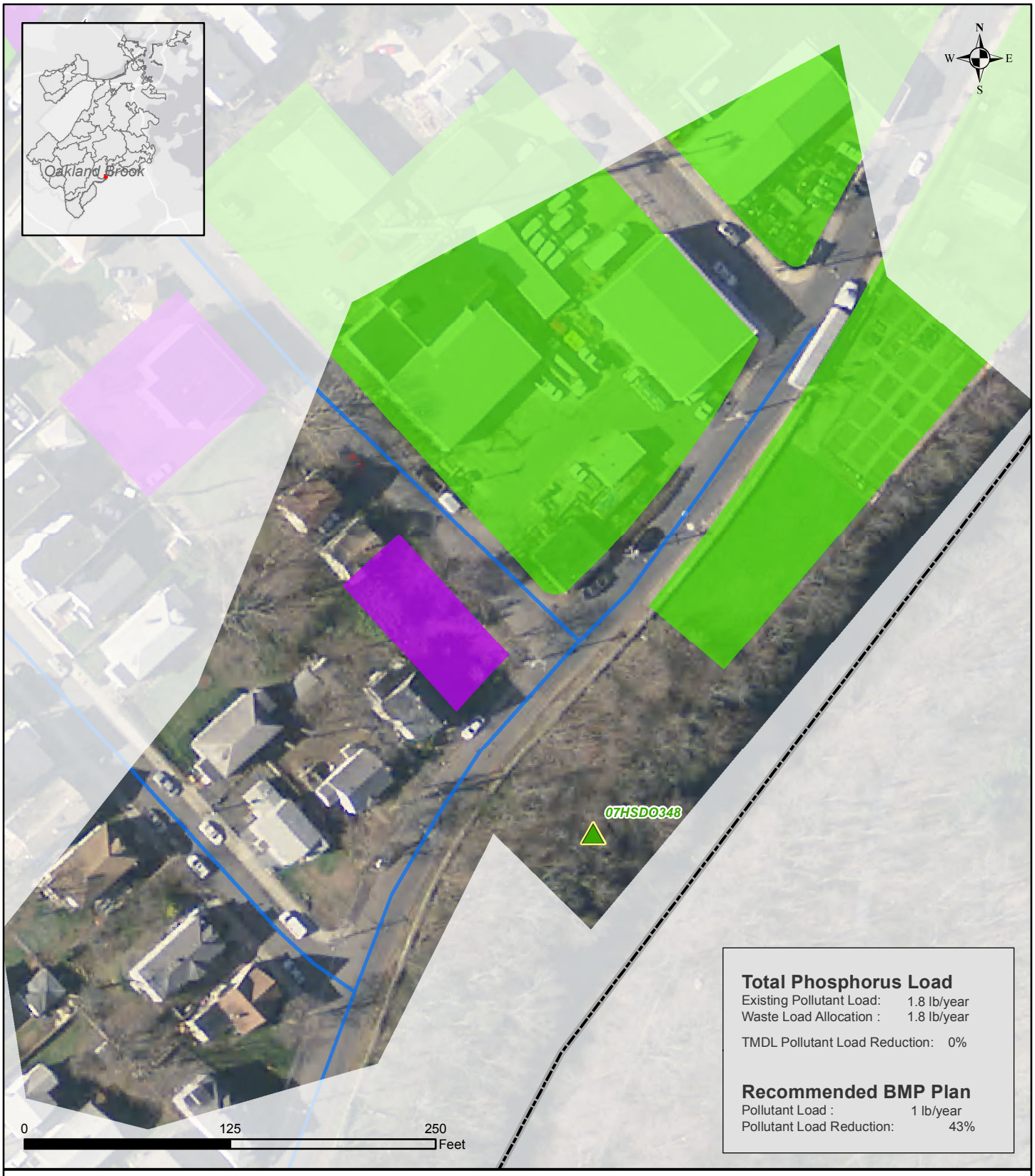


Total Phosphorus Load

Existing Pollutant Load: 1.8 lb/year
Waste Load Allocation : 1.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1 lb/year
Pollutant Load Reduction: 43%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 4.5 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Oakland Brook
Catchment: 07HSDO348

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.3 lb/year
Waste Load Allocation : 1.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.9 lb/year
Pollutant Load Reduction: 31%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 2.8 Acres

Boston Water and Sewer Commission

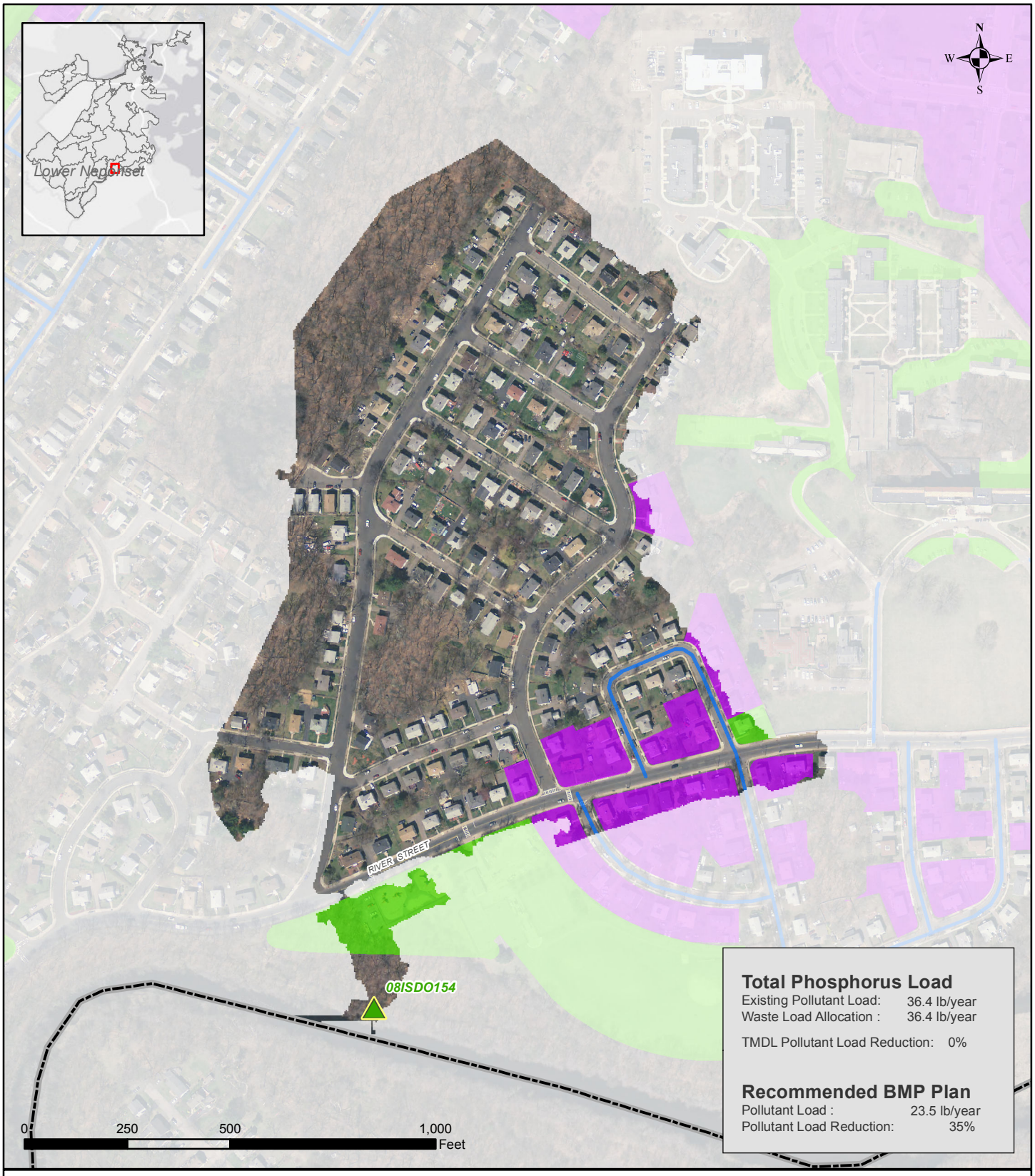
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08ISDO153

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	36.4 lb/year
Waste Load Allocation :	36.4 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	23.5 lb/year
Pollutant Load Reduction:	35%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 0.9 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 2.4 Acres
- Recommended area: 0 Acres

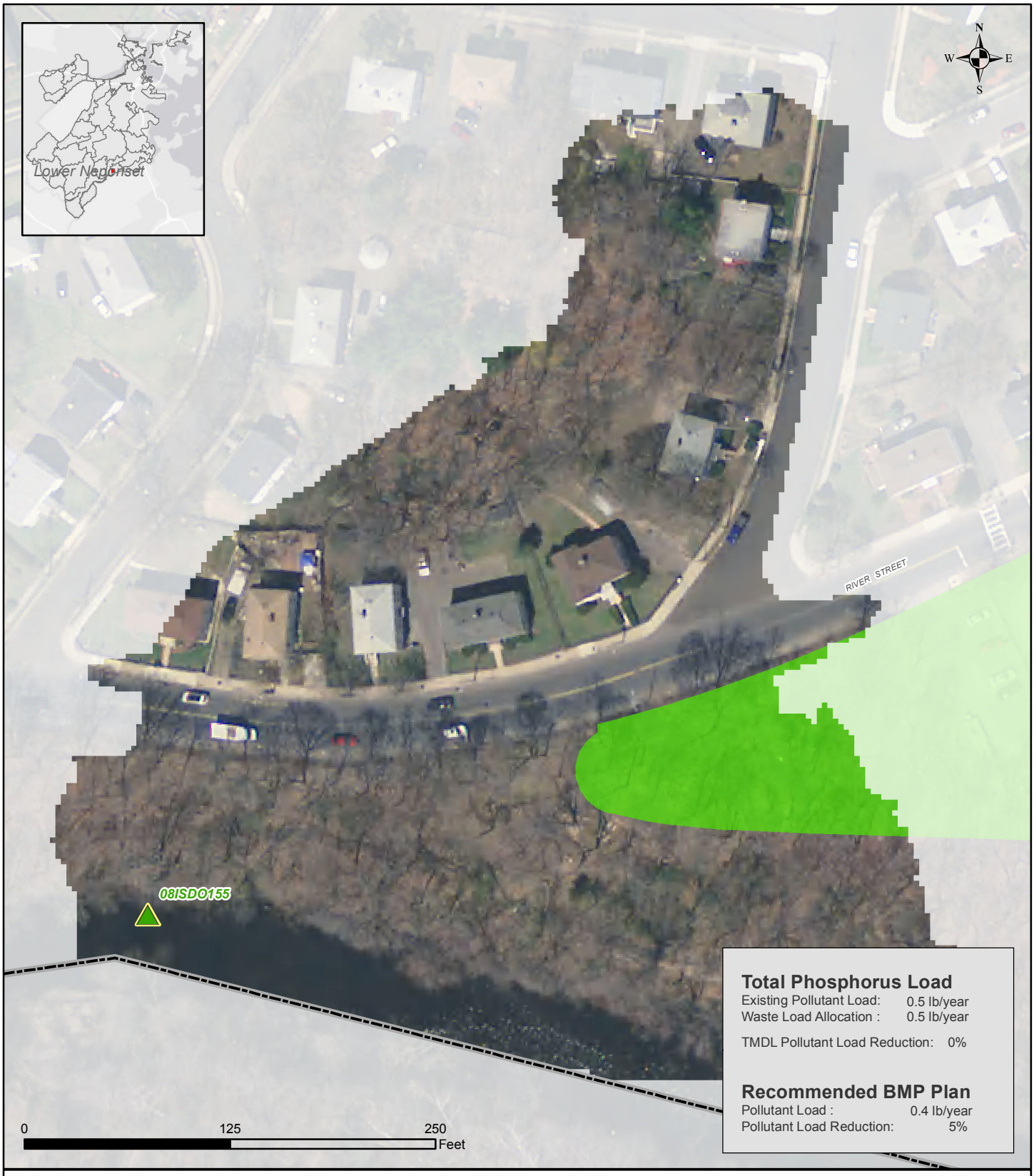
Suitable Public Right of Way
- Total area of suitable sites: 0.2 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 36.0 Acres

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 08ISDO154

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 4.6 Acres

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08ISDO155

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 13.7 lb/year
Waste Load Allocation : 13.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 4.3 lb/year
Pollutant Load Reduction: 69%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 31.1 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08ISDO156

Boston Water and Sewer Commission

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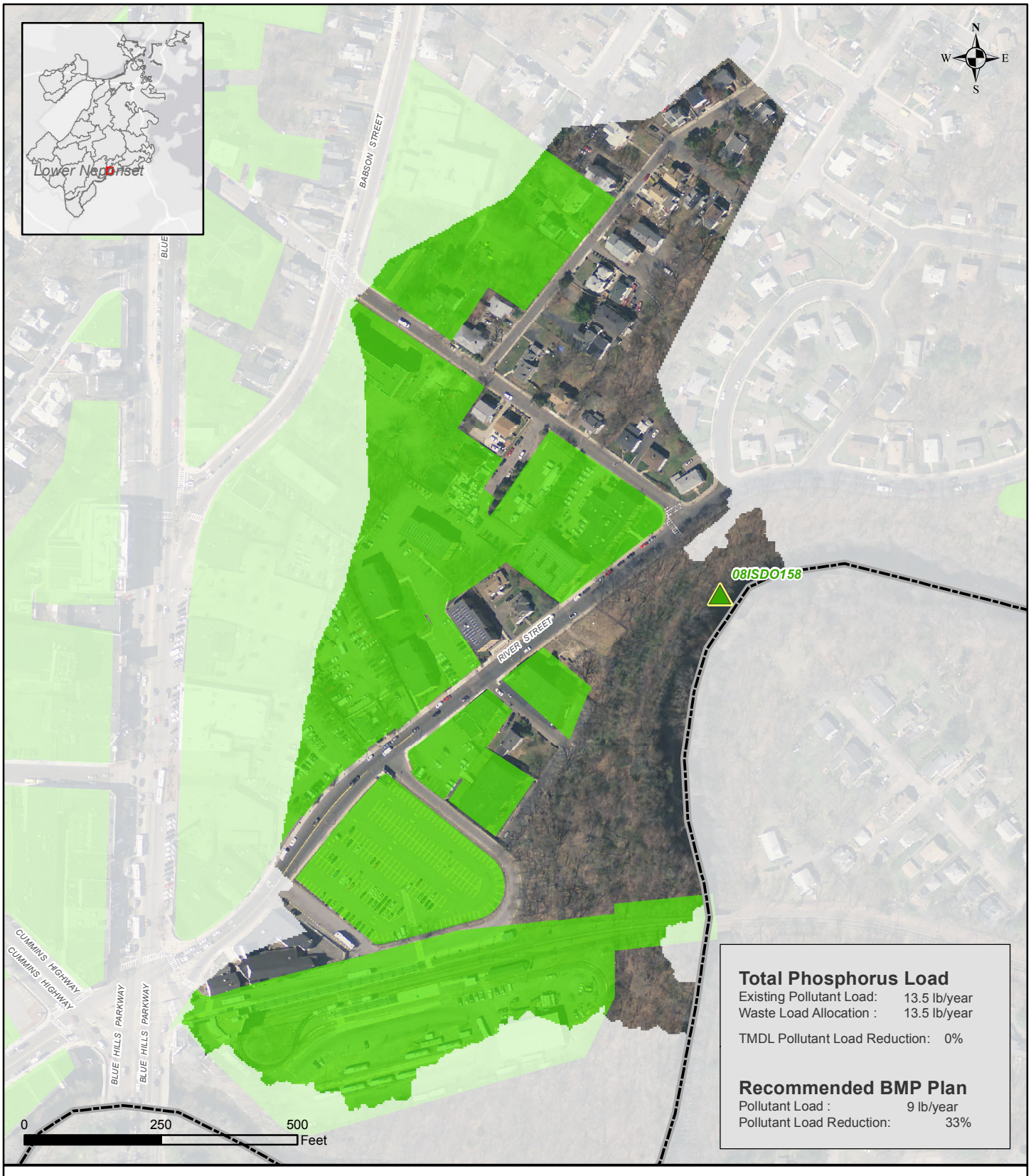


Total Phosphorus Load

Existing Pollutant Load: 13.5 lb/year
Waste Load Allocation : 13.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 9 lb/year
Pollutant Load Reduction: 33%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 13.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 28.9 Acres

Boston Water and Sewer Commission

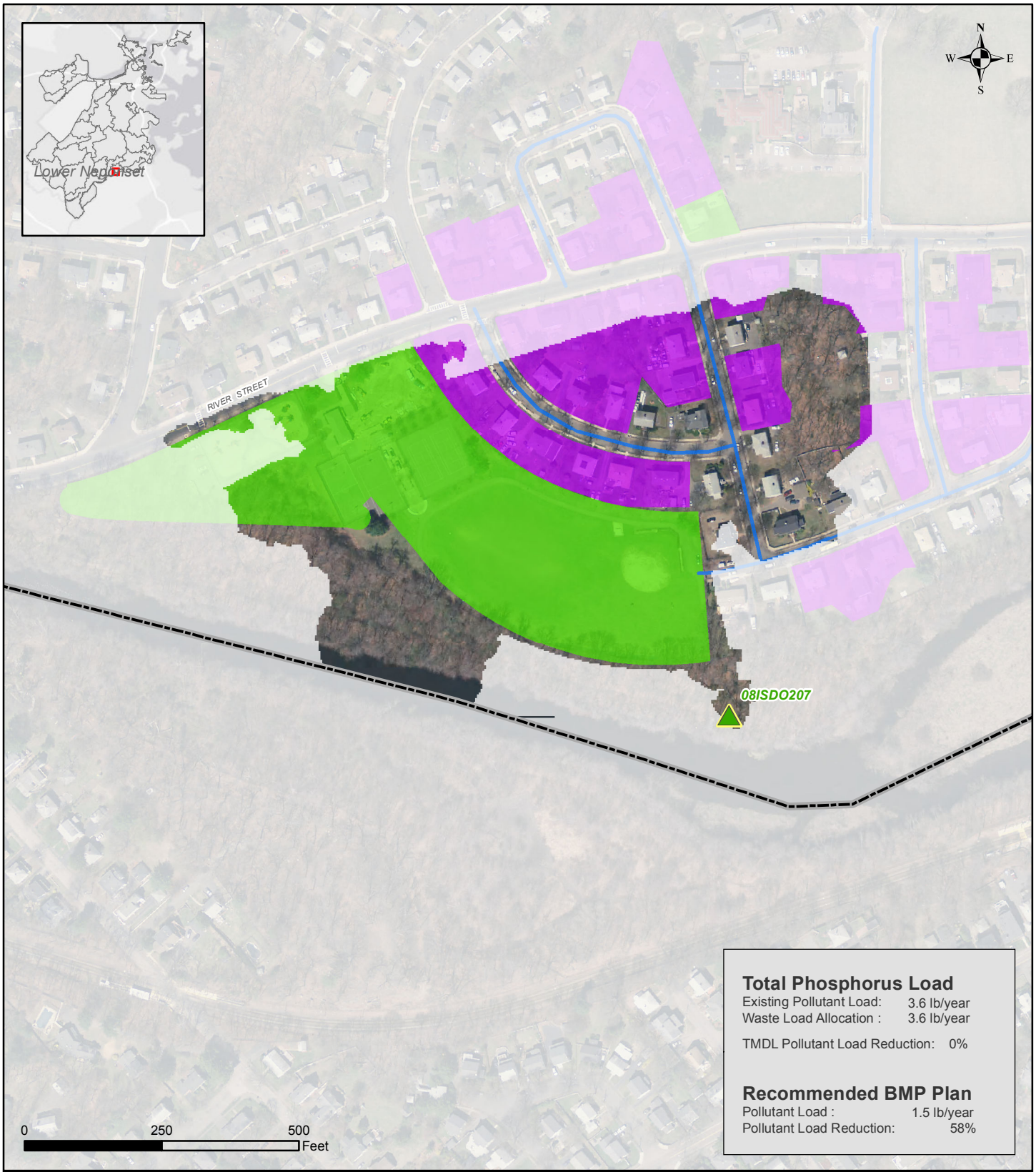
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08ISDO158

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	3.6 lb/year
Waste Load Allocation :	3.6 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	1.5 lb/year
Pollutant Load Reduction:	58%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	5.5	Acres
Recommended area:	0	Acres

Residential Parcel

Total area of suitable sites:	2.5	Acres
Recommended area:	0	Acres

Suitable Public Right of Way

Total area of suitable sites:	0.2	Miles
Recommended area:	0.1	Miles

Boston Boundary

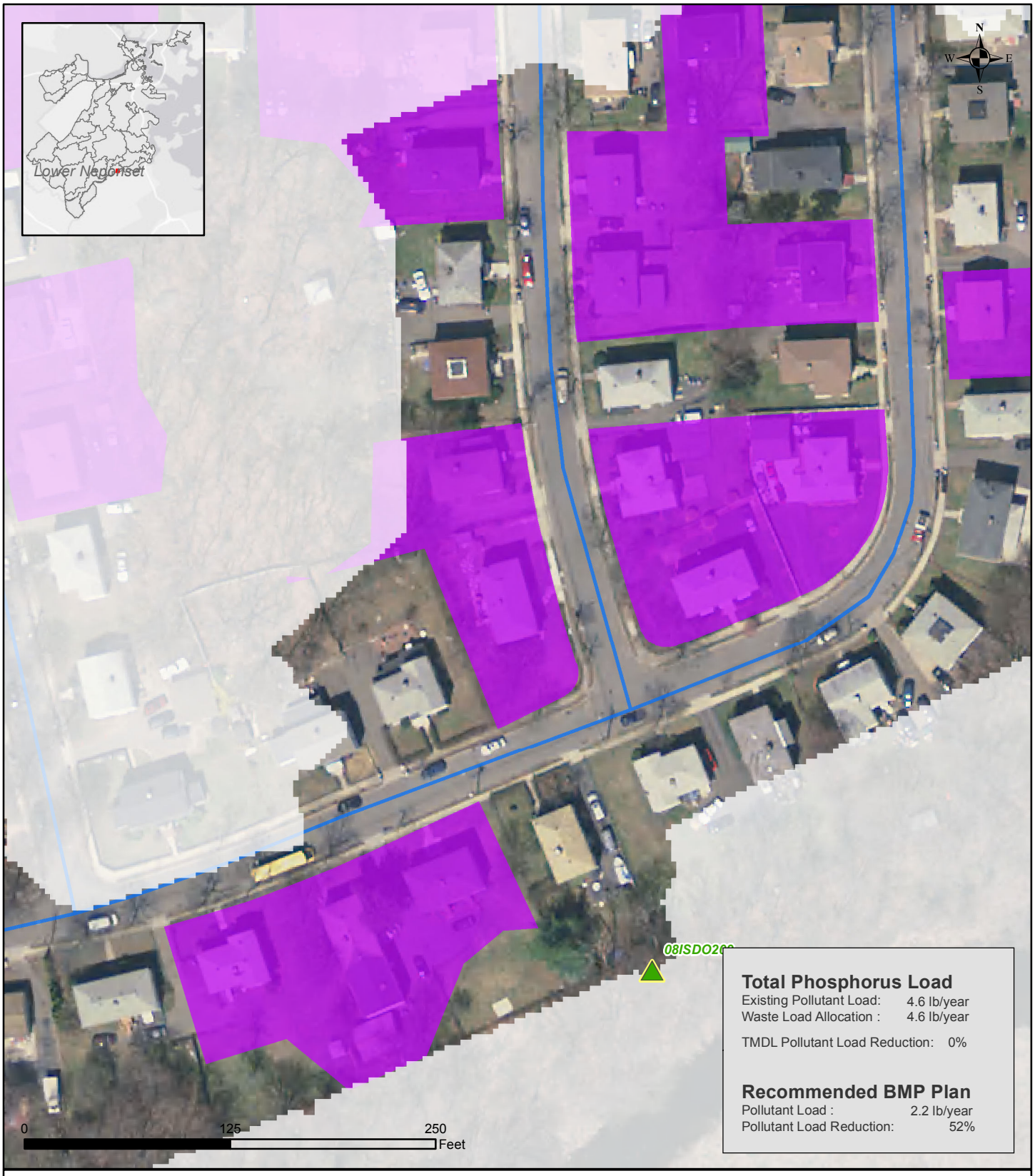
Total Catchment Area:	14.6	Acres

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08ISDO207

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 2 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 6.1 Acres

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 08ISDO209

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	20.5 lb/year
Waste Load Allocation :	20.5 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	13.7 lb/year
Pollutant Load Reduction:	33%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	4.1 Acres
Recommended area:	0 Acres

Residential Parcel

Total area of suitable sites:	0.8 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.2 Miles
Recommended area:	0.1 Miles

Boston Boundary

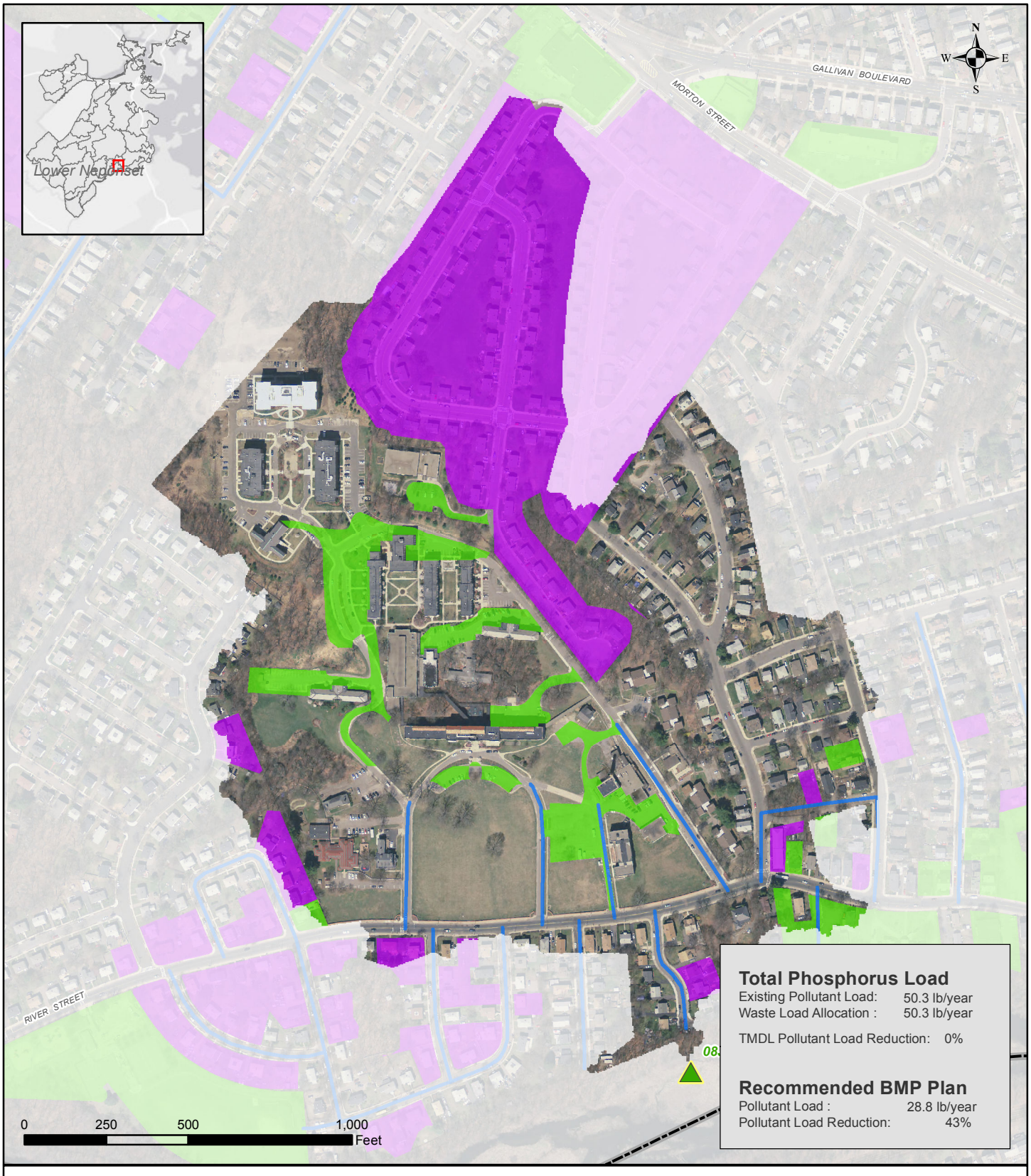
Total Catchment Area: 13.9 Acres

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08JSDO036/041

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 6.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 17.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.6 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 79.8 Acres

Boston Water and Sewer Commission

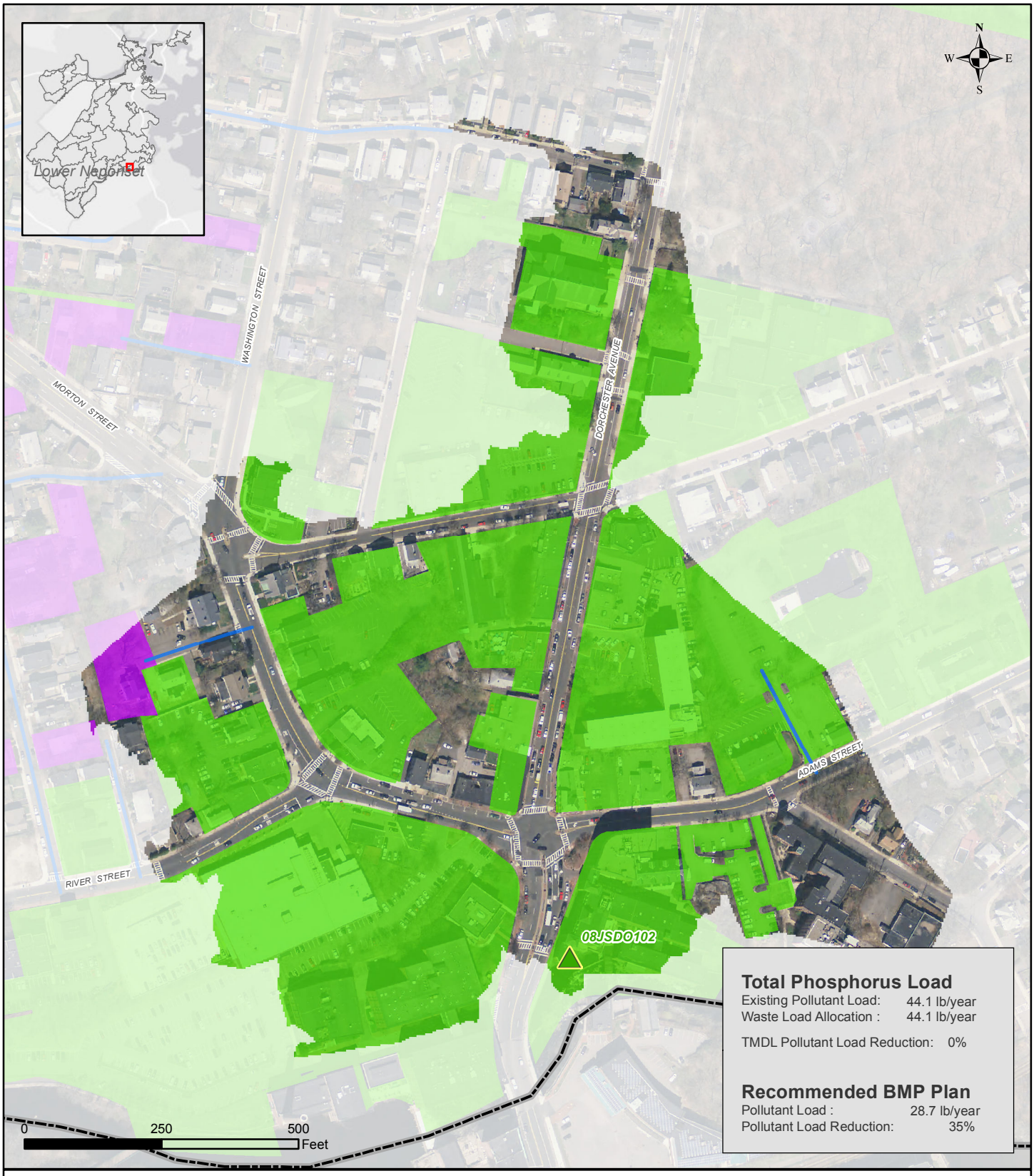
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08JSDO050/049

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 44.1 lb/year
Waste Load Allocation : 44.1 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 28.7 lb/year
Pollutant Load Reduction: 35%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 17.6 Acres
Recommended area: 1.4 Acres

Residential Parcel
Total area of suitable sites: 0.5 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 28.5 Acres

Boston Water and Sewer Commission

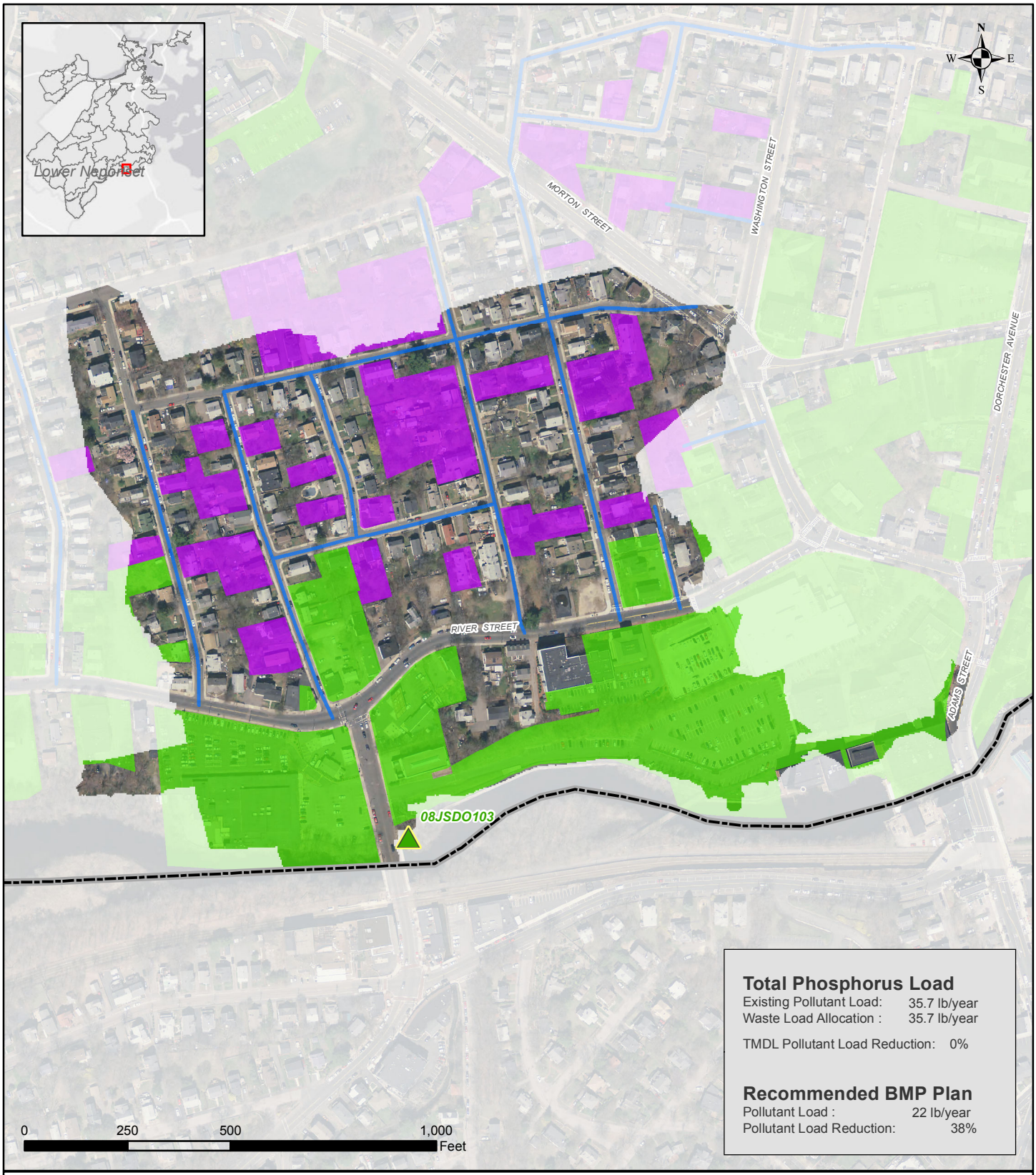
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08JSDO102

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	35.7 lb/year
Waste Load Allocation :	35.7 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	22 lb/year
Pollutant Load Reduction:	38%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 11.9 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 6.2 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 1.1 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 41.6 Acres

Boston Water and Sewer Commission

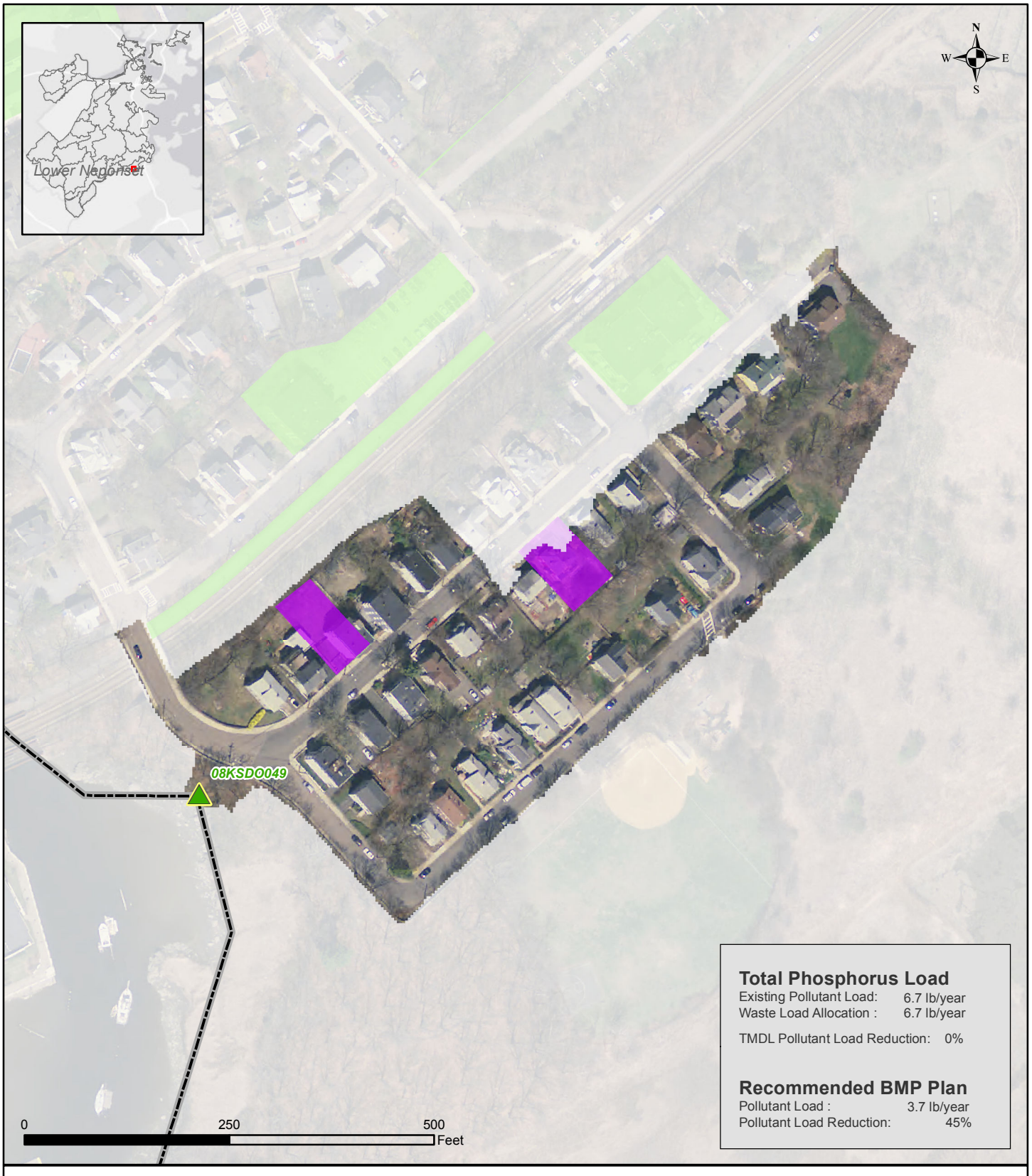
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08JSDO103

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 6.7 lb/year
Waste Load Allocation : 6.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 3.7 lb/year
Pollutant Load Reduction: 45%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 6.3 Acres

Boston Water and Sewer Commission

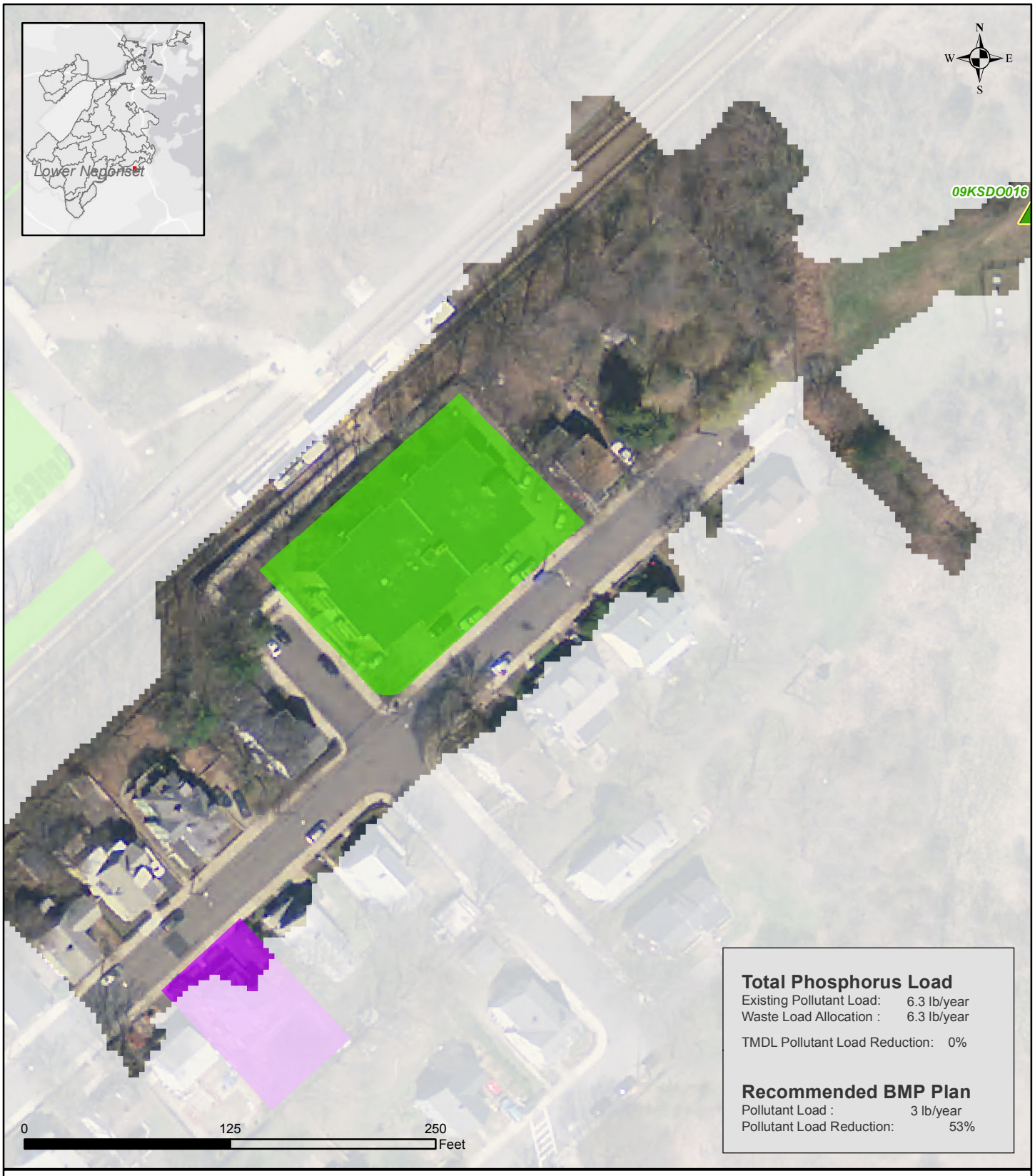
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 08KSDO049

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

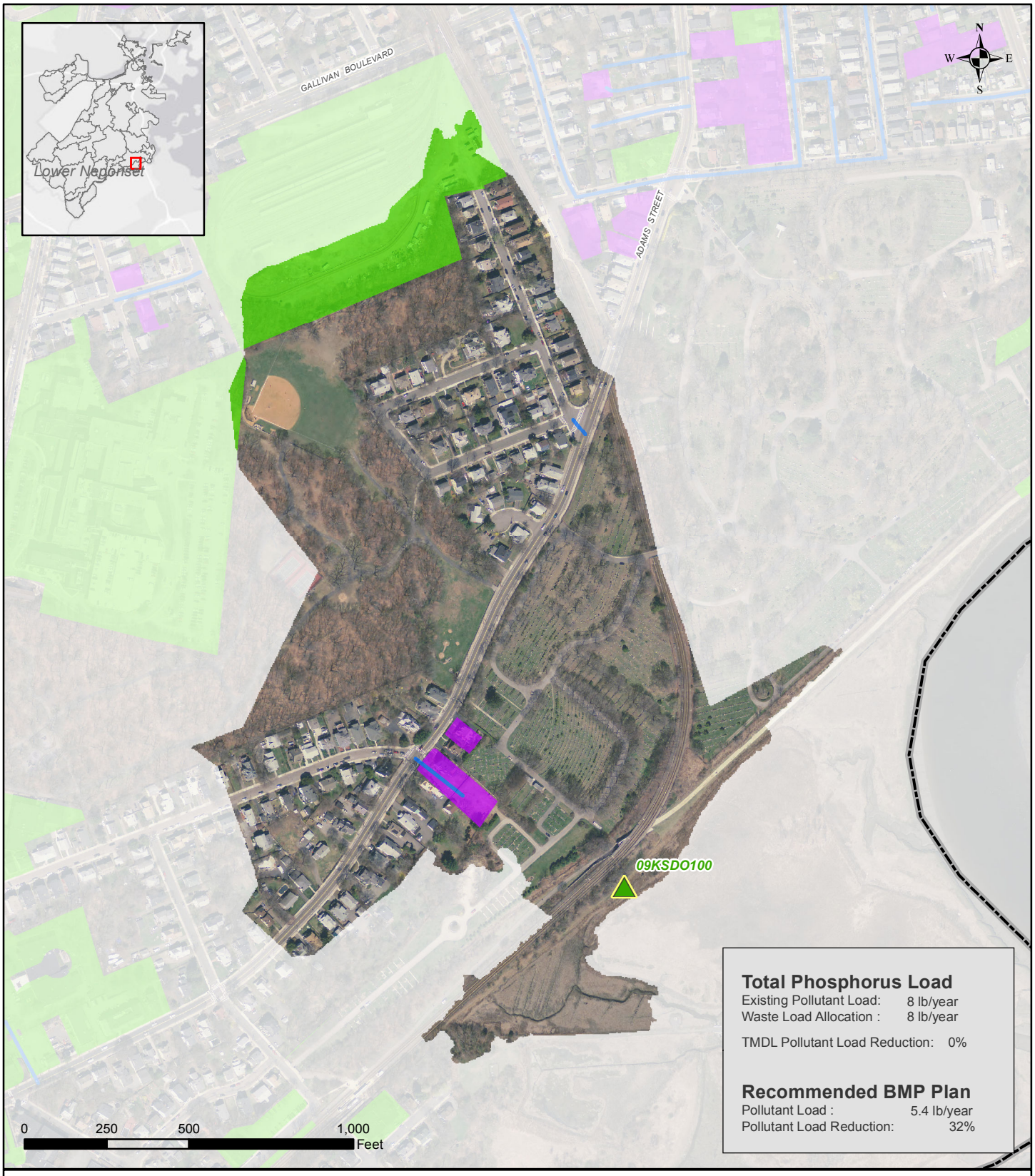
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 3.0 Acres

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 09KSDO016

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.7 Acres
Recommended area: 0 Acres

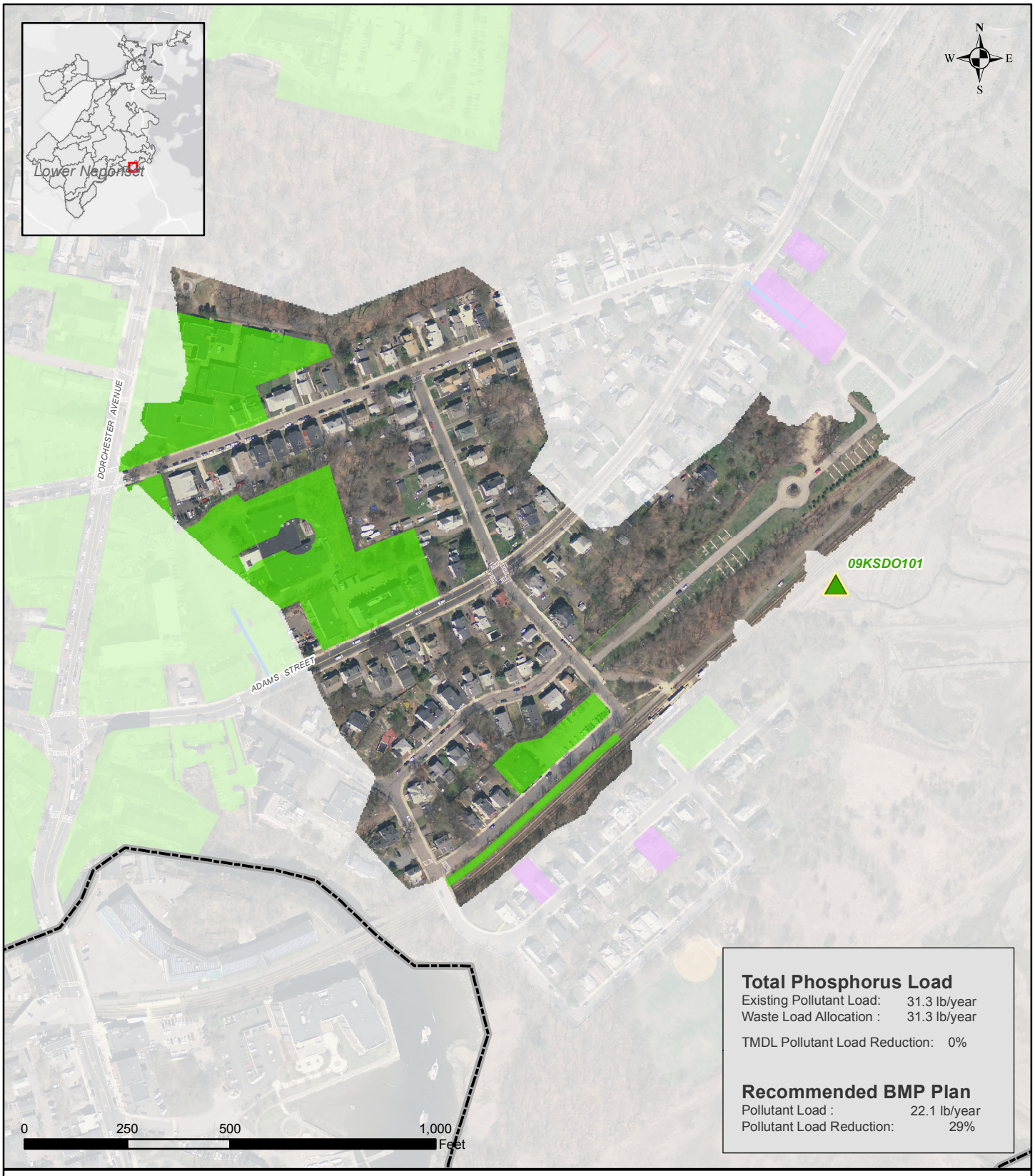
Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 63.1 Acres

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 09KSDO100

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 31.3 lb/year
Waste Load Allocation : 31.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 22.1 lb/year
Pollutant Load Reduction: 29%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 32.7 Acres

Boston Water and Sewer Commission

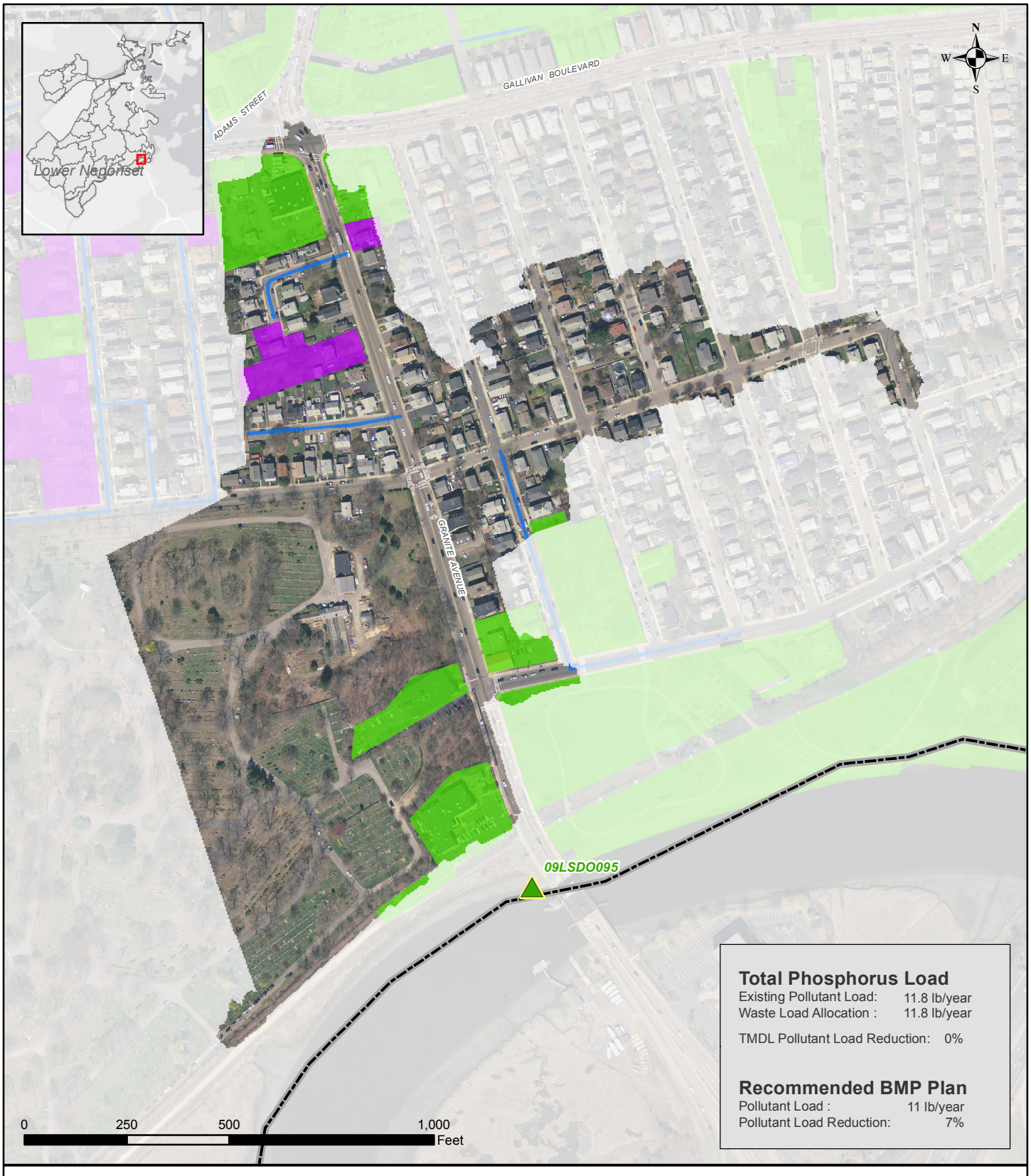
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 09KSDO101

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 1 Acres
Recommended area: 0 Acres

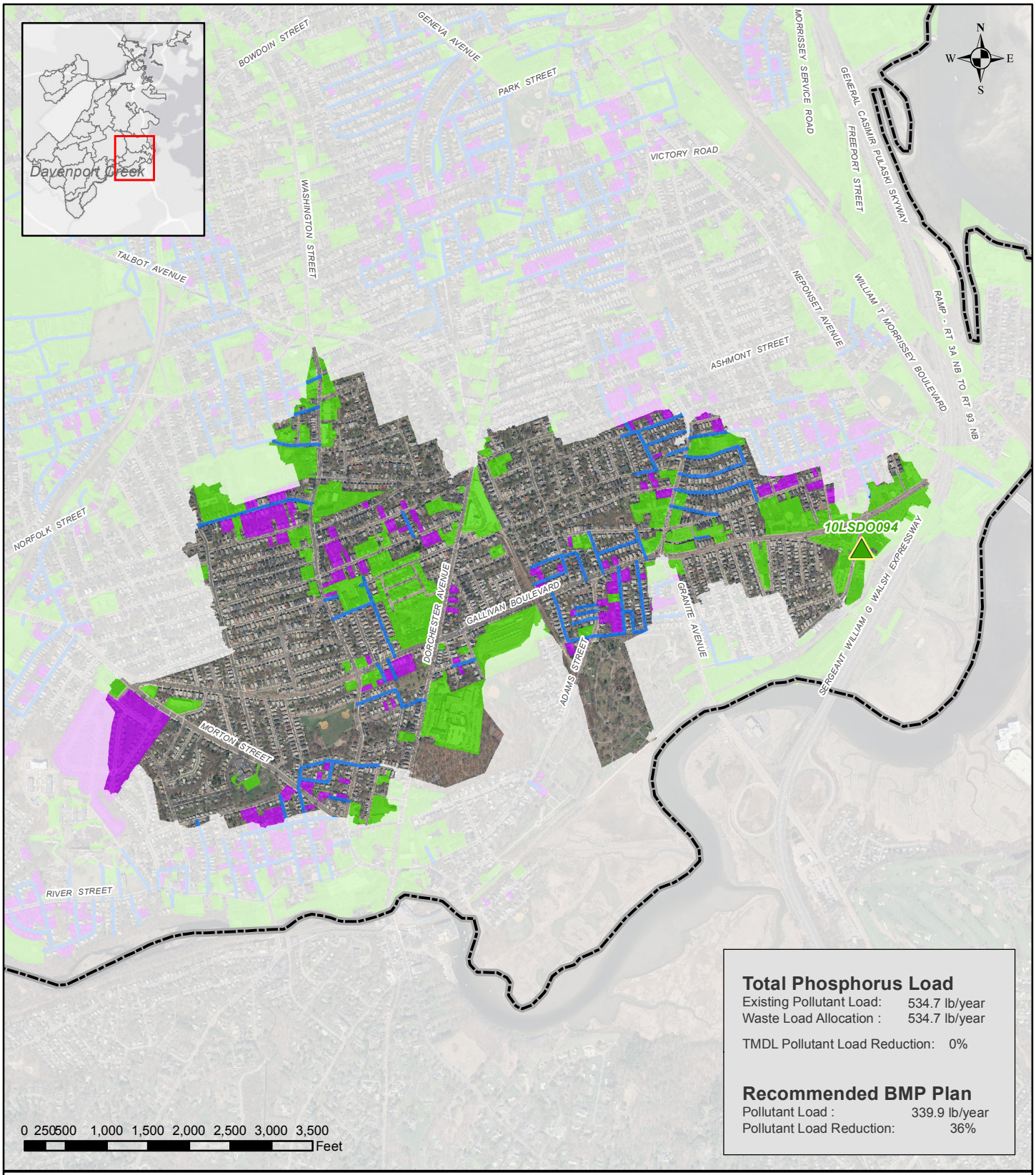
Suitable Public Right of Way
Total area of suitable sites: 0.3 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 36.5 Acres

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 09LSDO095

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 534.7 lb/year
Waste Load Allocation : 534.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 339.9 lb/year
Pollutant Load Reduction: 36%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 117 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 46 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 4.4 Miles
Recommended area: 0.4 Miles

Boston Boundary
Total Catchment Area: 647.7 Acres

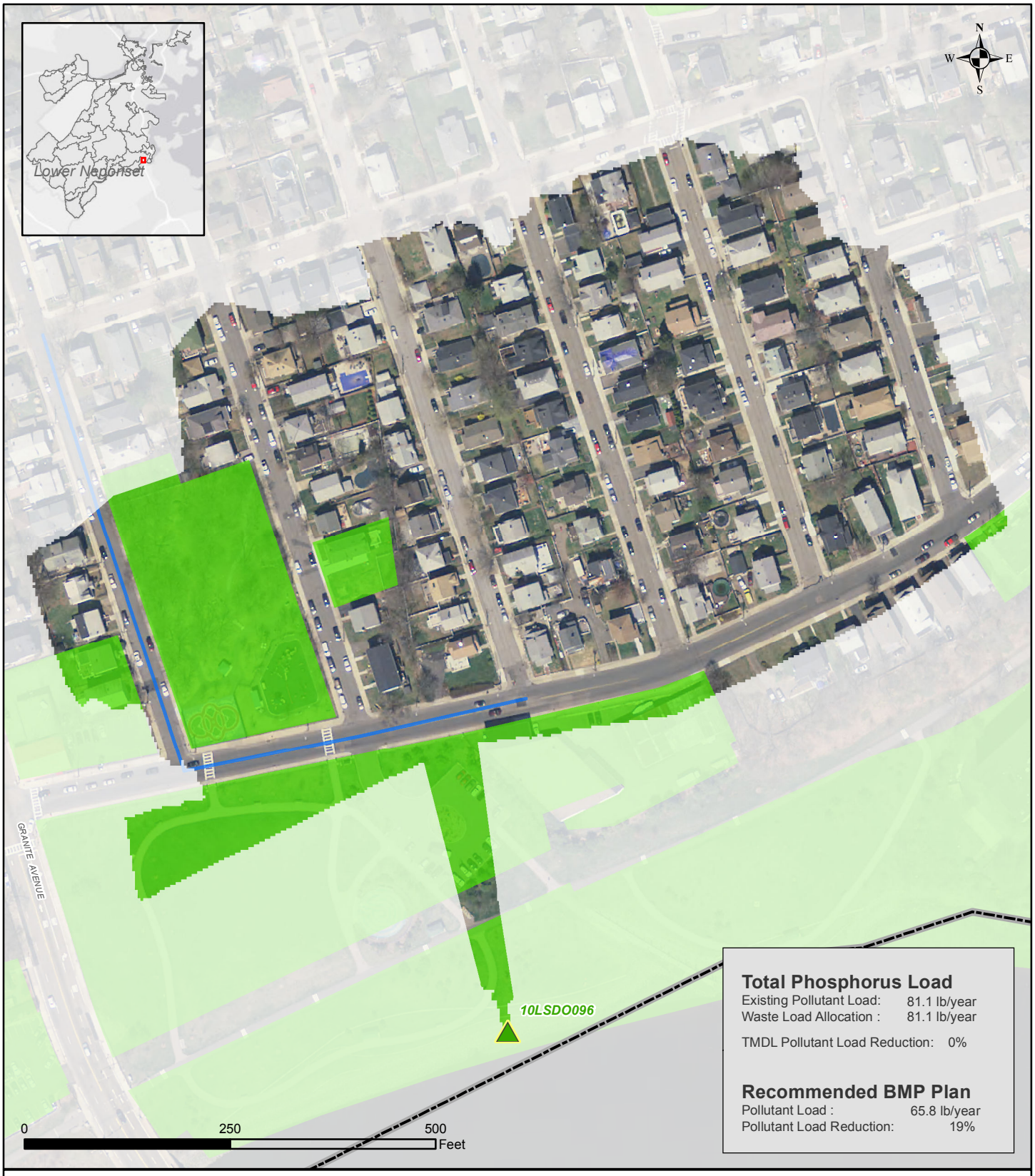
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Davenport Creek
Catchment: 10LSDO094

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 14.7 Acres

Boston Water and Sewer Commission

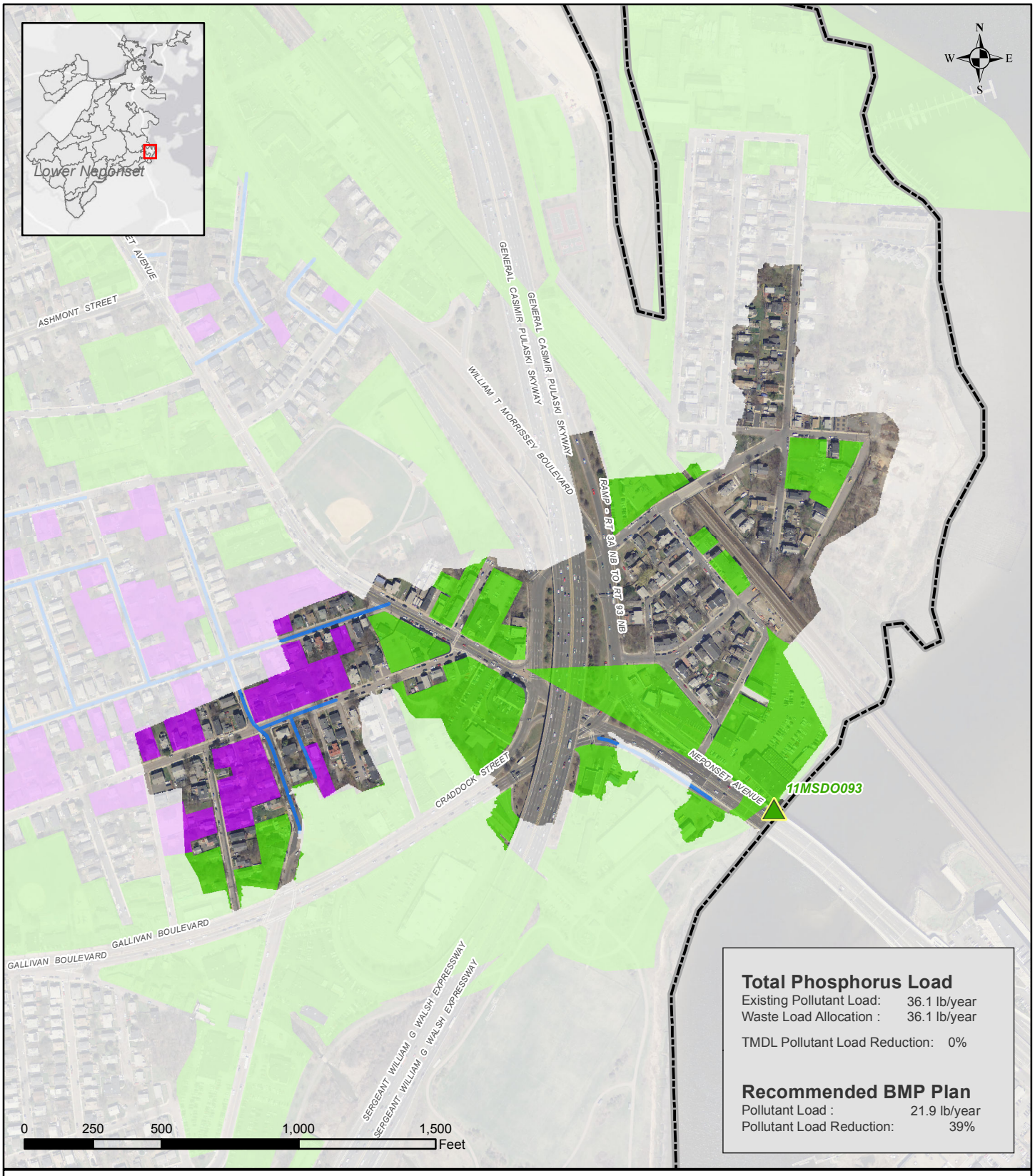
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 10LSDO096

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 36.1 lb/year
Waste Load Allocation : 36.1 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 21.9 lb/year
Pollutant Load Reduction: 39%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 15.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 3.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.3 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 54.4 Acres

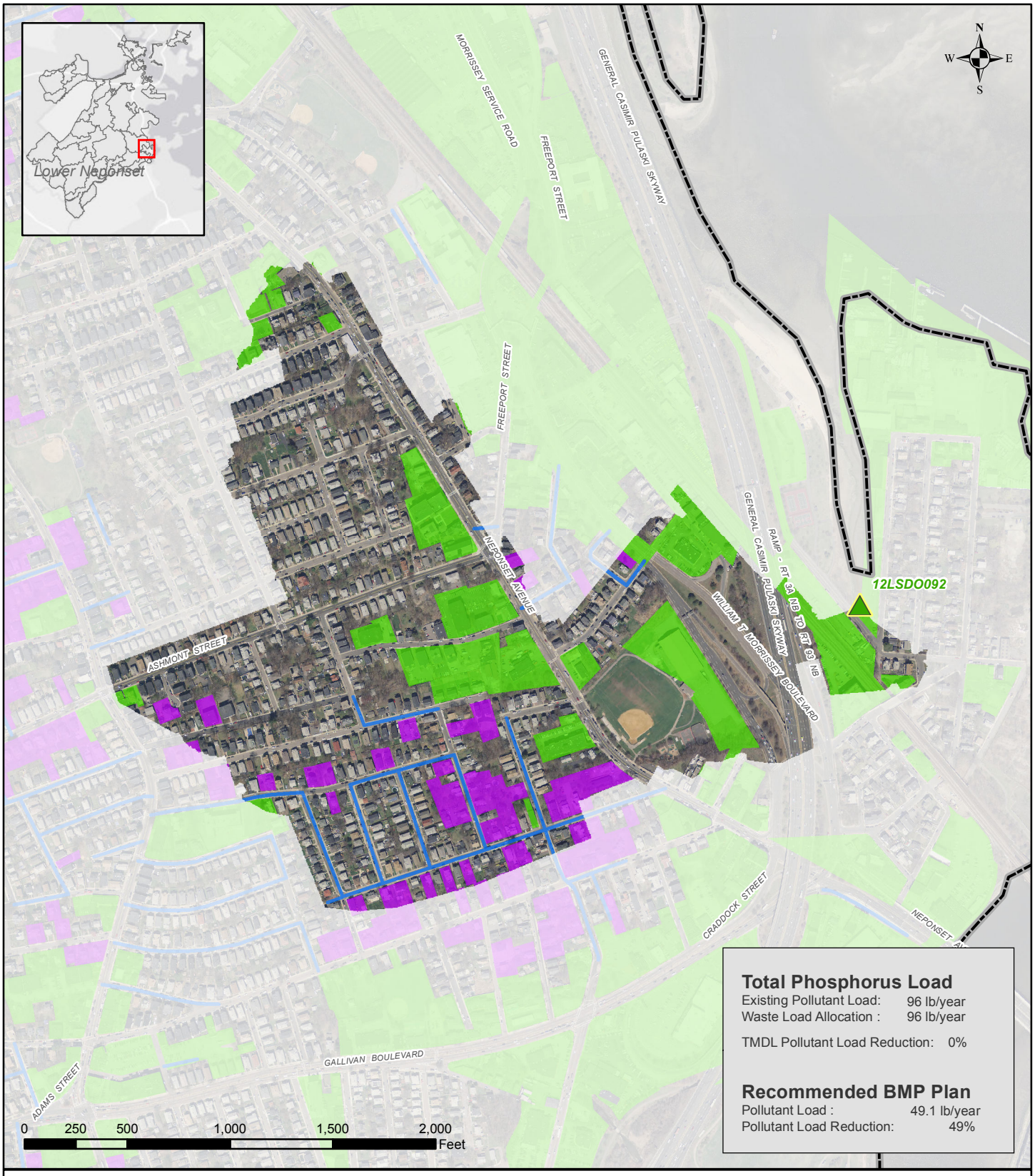
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Lower Neponset
Catchment: 11MSDO093

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 96 lb/year
Waste Load Allocation : 96 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 49.1 lb/year
Pollutant Load Reduction: 49%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 20.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 7.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.1 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 121.5 Acres

Boston Water and Sewer Commission

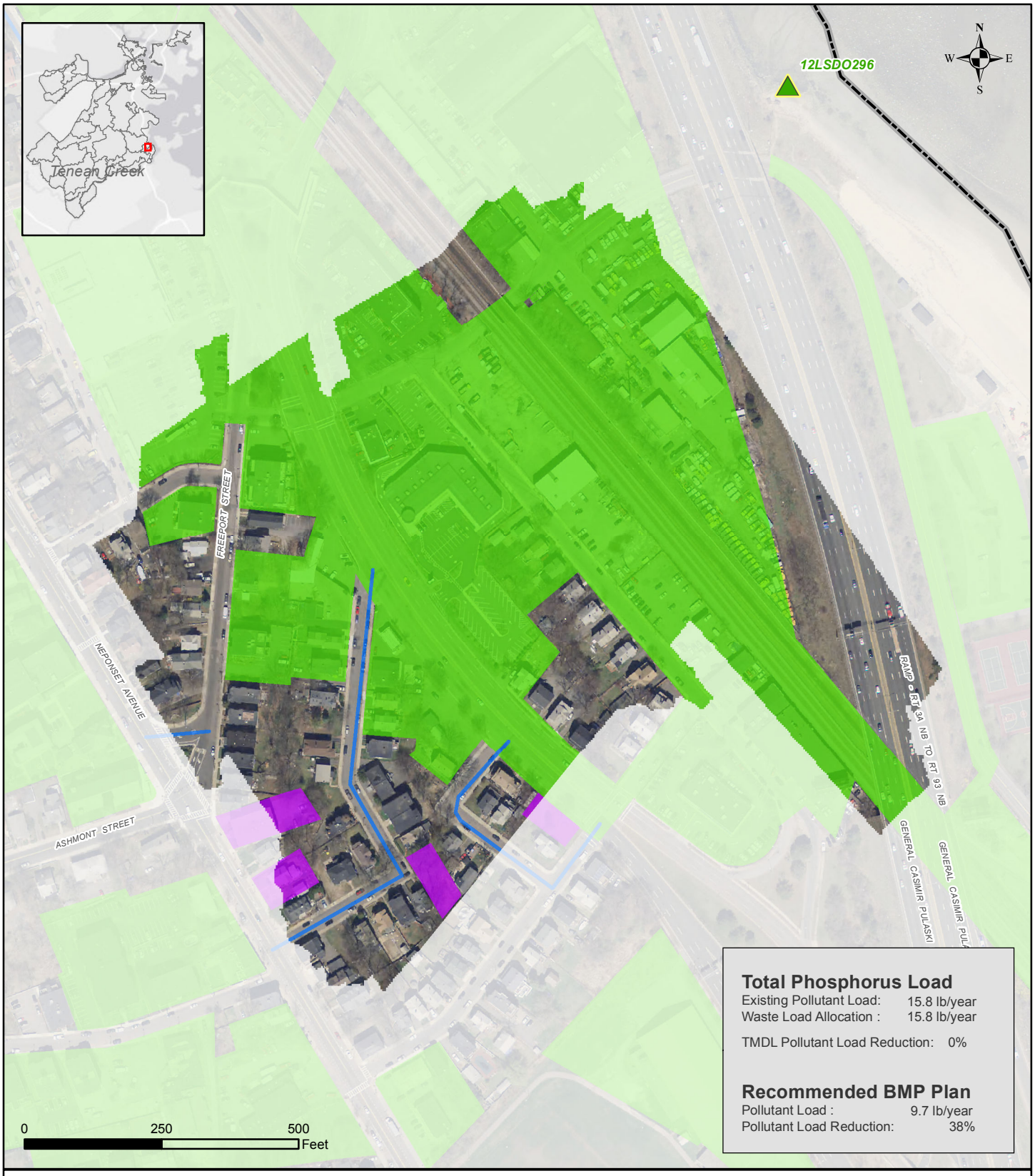
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 12LSDO092

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 15.8 lb/year
Waste Load Allocation : 15.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 9.7 lb/year
Pollutant Load Reduction: 38%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 17.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.9 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 28.0 Acres

Boston Water and Sewer Commission

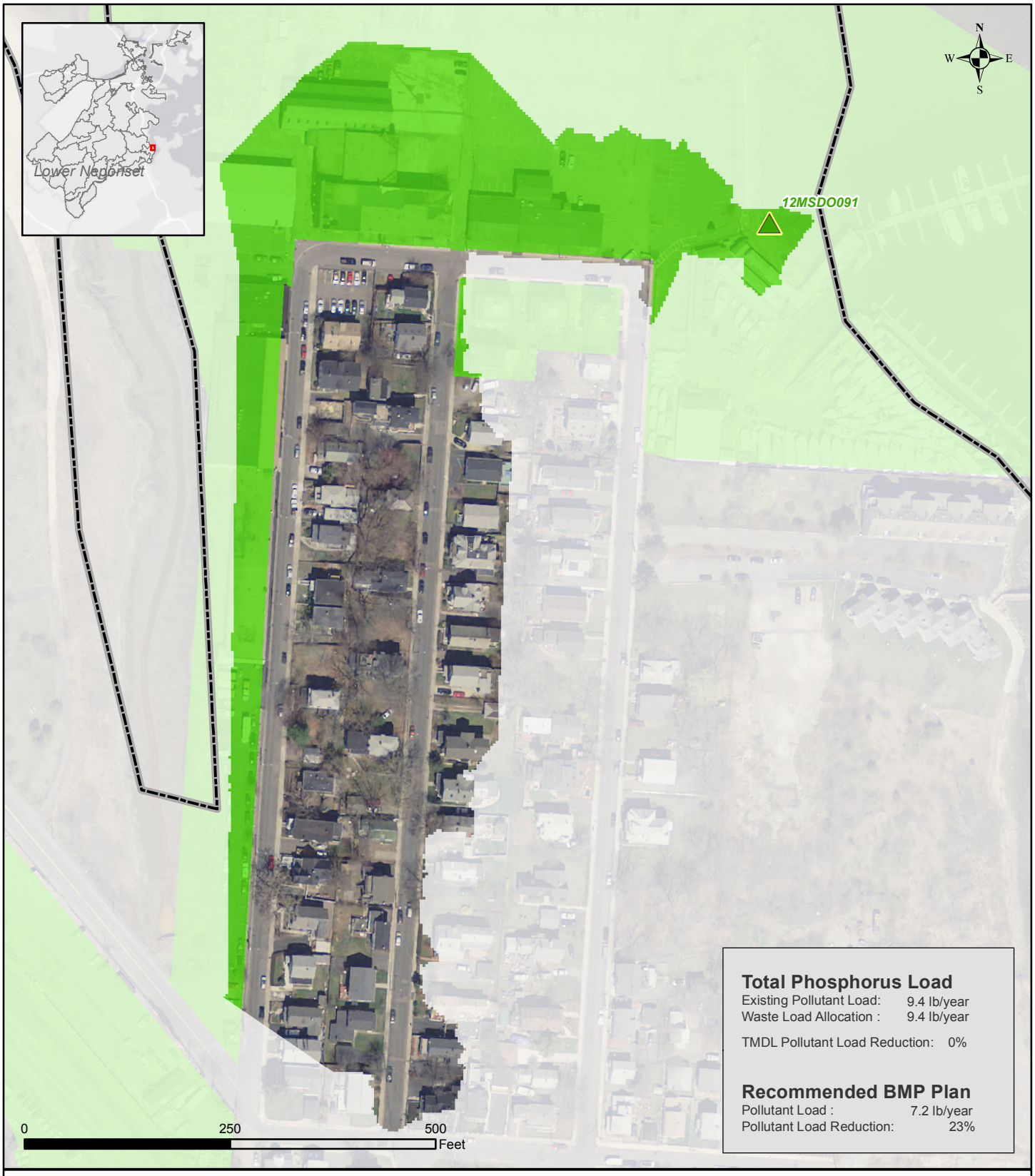
CH2MHILL

Recommended BMP Plan

Reporting Area: Tenean Creek
Catchment: 12LSDO296

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 9.4 lb/year
Waste Load Allocation : 9.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 7.2 lb/year
Pollutant Load Reduction: 23%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.6 Acres

Boston Water and Sewer Commission

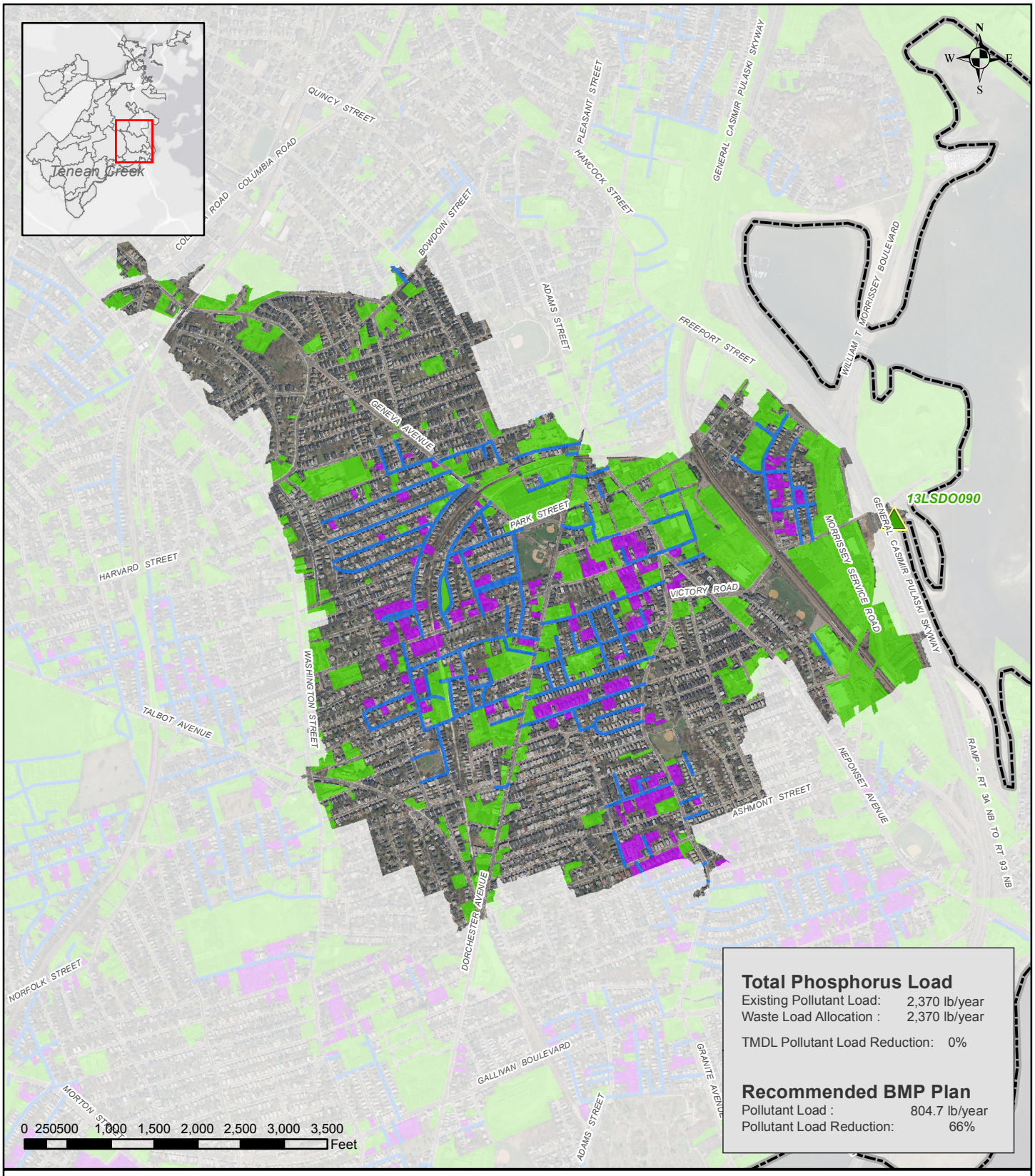
CH2MHILL

Recommended BMP Plan

Reporting Area: Lower Neponset
Catchment: 12MSDO091

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	2,370 lb/year
Waste Load Allocation :	2,370 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	804.7 lb/year
Pollutant Load Reduction:	66%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 186.6 Acres
- Recommended area: 0.8 Acres

Residential Parcel
- Total area of suitable sites: 44.4 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 10 Miles
- Recommended area: 0.6 Miles

Boston Boundary
- Total Catchment Area: 838.8 Acres

Boston Water and Sewer Commission

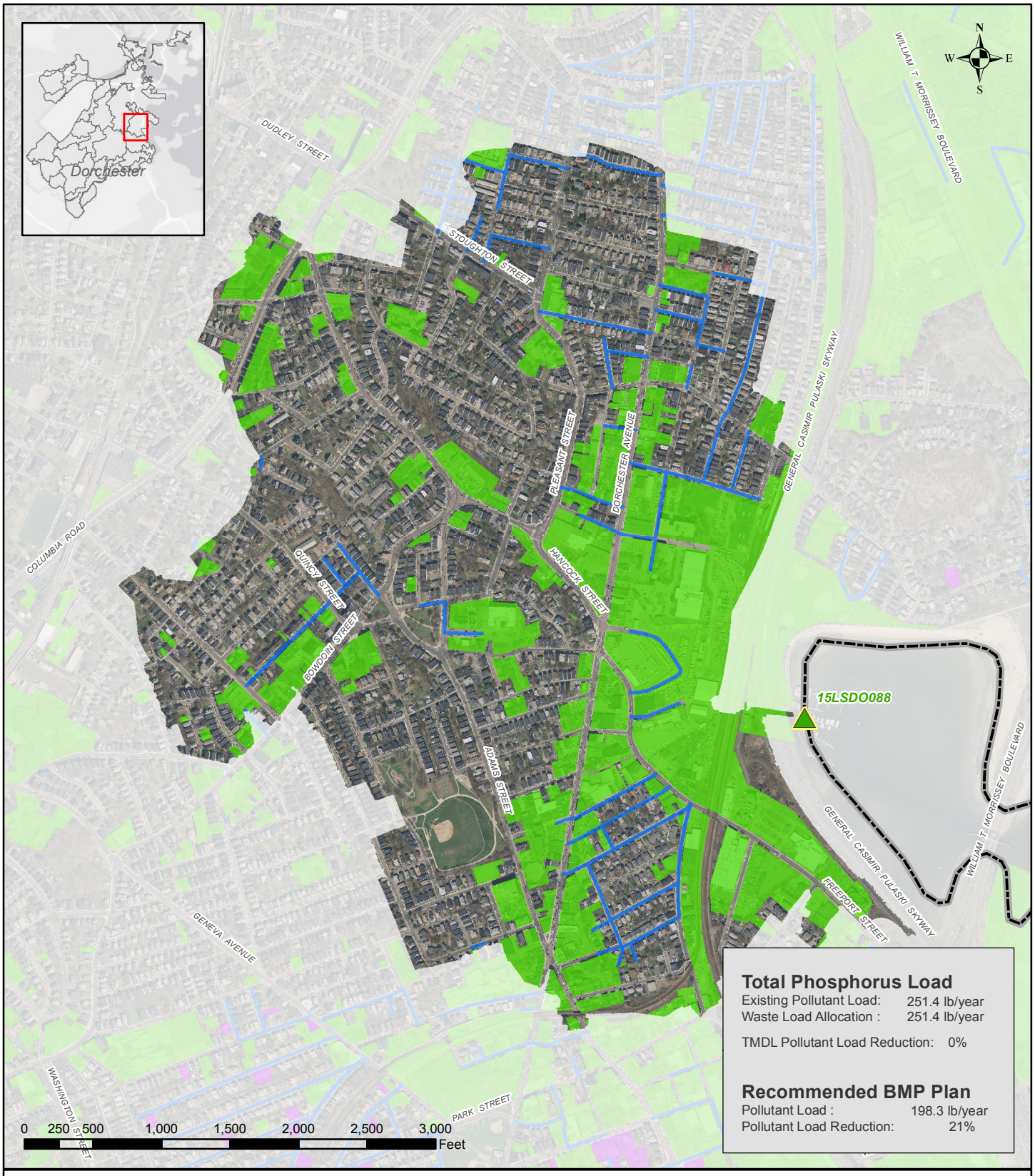
CH2MHILL

Recommended BMP Plan
Reporting Area: Tenean Creek
Catchment: 13LSDO090

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix E-7
Recommended BMP Plan Maps by SDO Catchment: Boston Harbor Watershed



Total Phosphorus Load

Existing Pollutant Load:	251.4 lb/year
Waste Load Allocation :	251.4 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	198.3 lb/year
Pollutant Load Reduction:	21%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 143.7 Acres
- Recommended area: 1.2 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 4 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 489.4 Acres

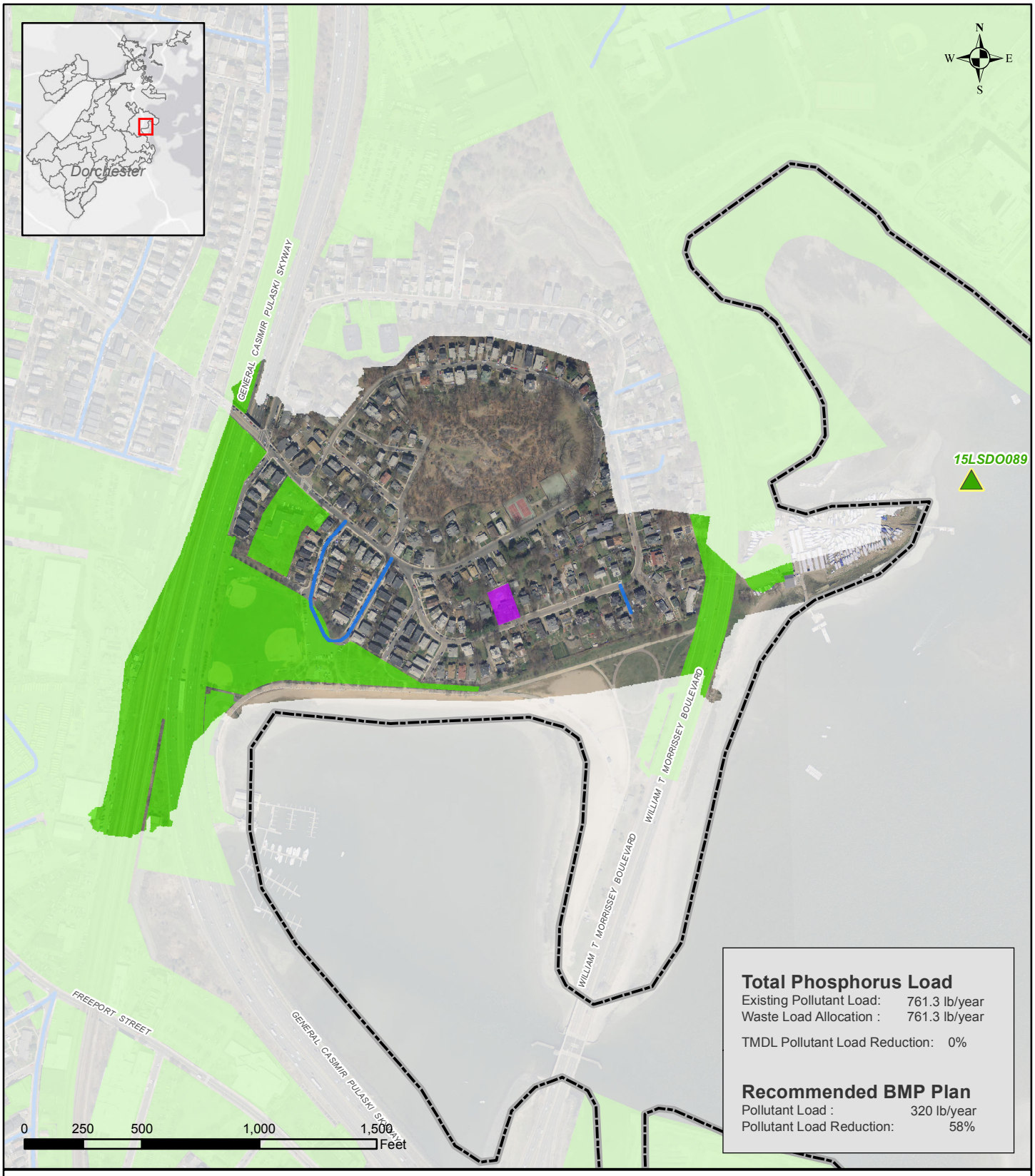
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Dorchester
Catchment: 15LSDO088

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 761.3 lb/year
Waste Load Allocation : 761.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 320 lb/year
Pollutant Load Reduction: 58%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 21 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.2 Miles
Recommended area: 0.1 Miles

Boston Boundary
Total Catchment Area: 74.7 Acres

Boston Water and Sewer Commission

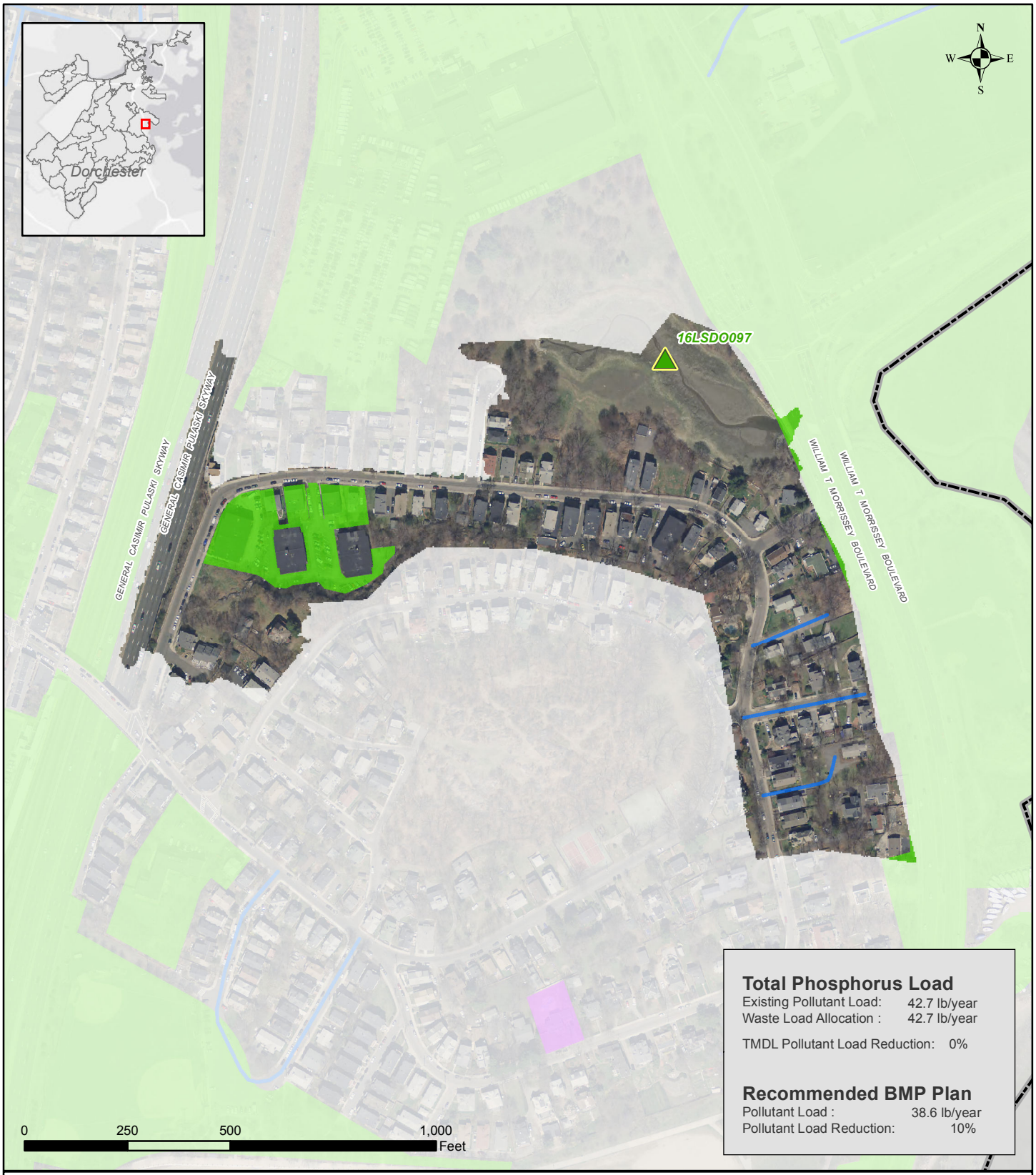
CH2MHILL

Recommended BMP Plan

Reporting Area: Dorchester
Catchment: 15LSDO089

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 42.7 lb/year
Waste Load Allocation : 42.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 38.6 lb/year
Pollutant Load Reduction: 10%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 22.5 Acres

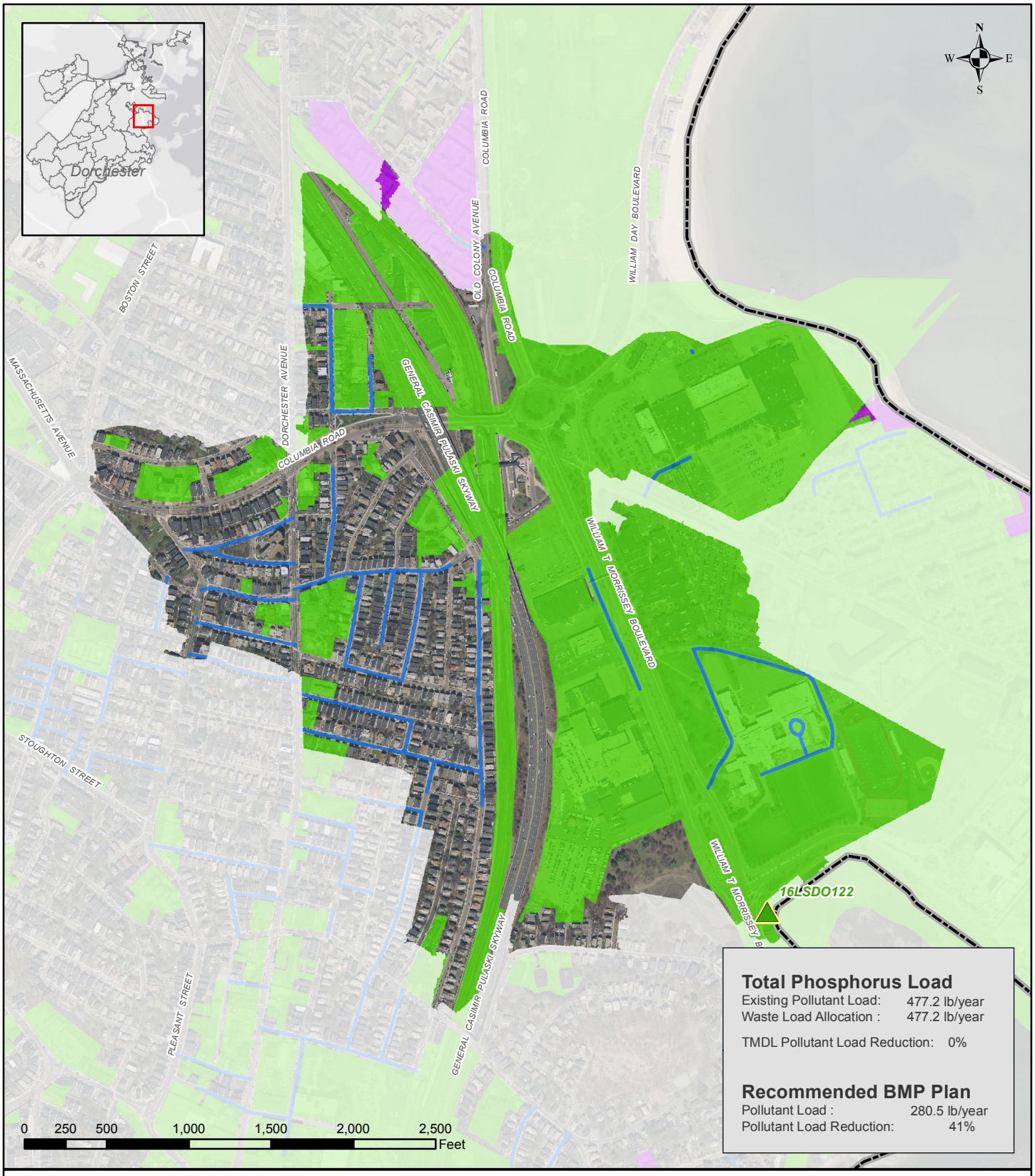
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Dorchester
Catchment: 16LSDO097

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 477.2 lb/year
Waste Load Allocation : 477.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 280.5 lb/year
Pollutant Load Reduction: 41%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 180.1 Acres
Recommended area: 6.5 Acres

Residential Parcel
Total area of suitable sites: 0.9 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 3 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 293.8 Acres

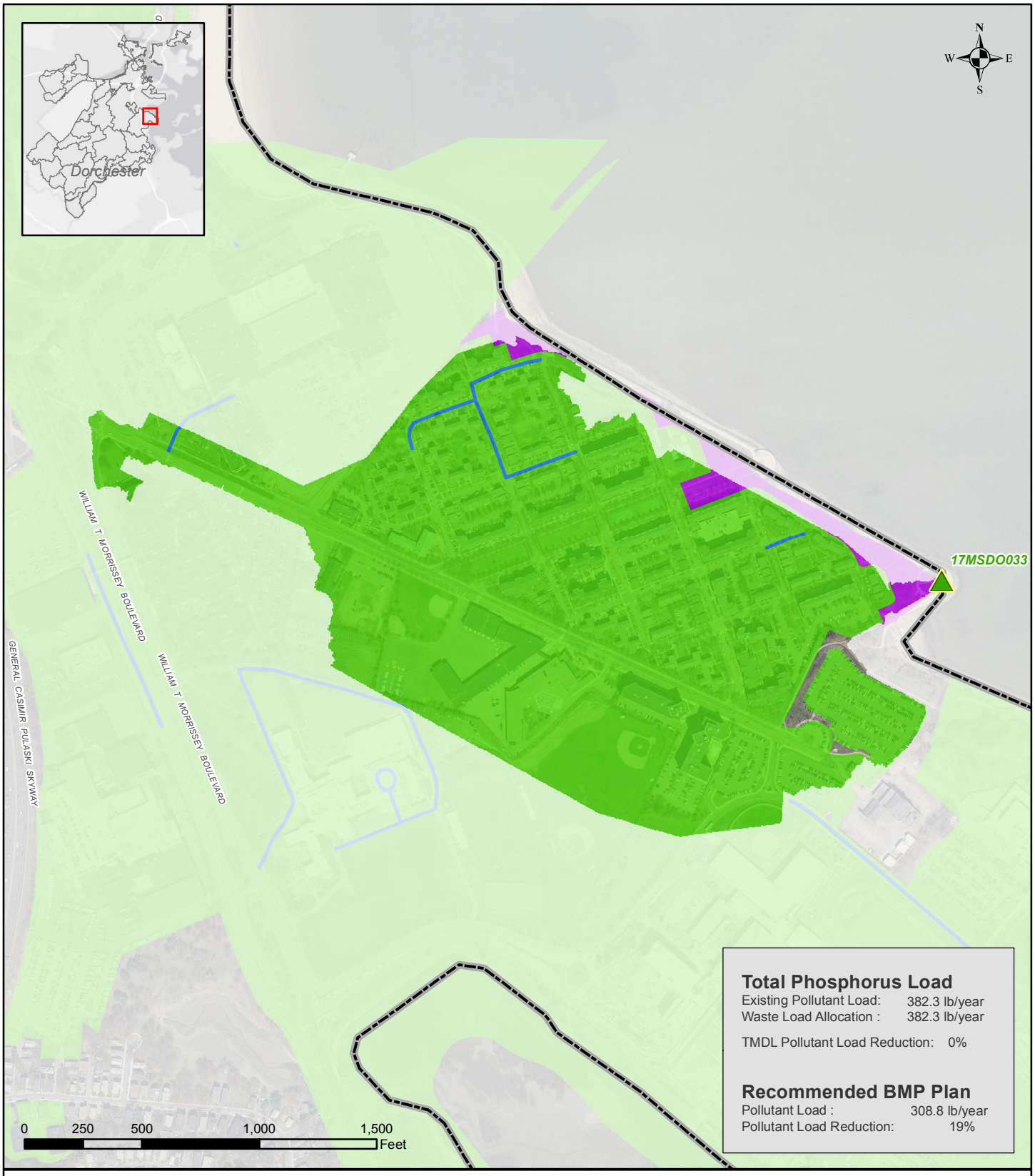
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Dorchester
Catchment: 16LSDO122

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 81.3 Acres
Recommended area: 2.1 Acres

Residential Parcel
Total area of suitable sites: 45.9 Acres
Recommended area: 0 Acres

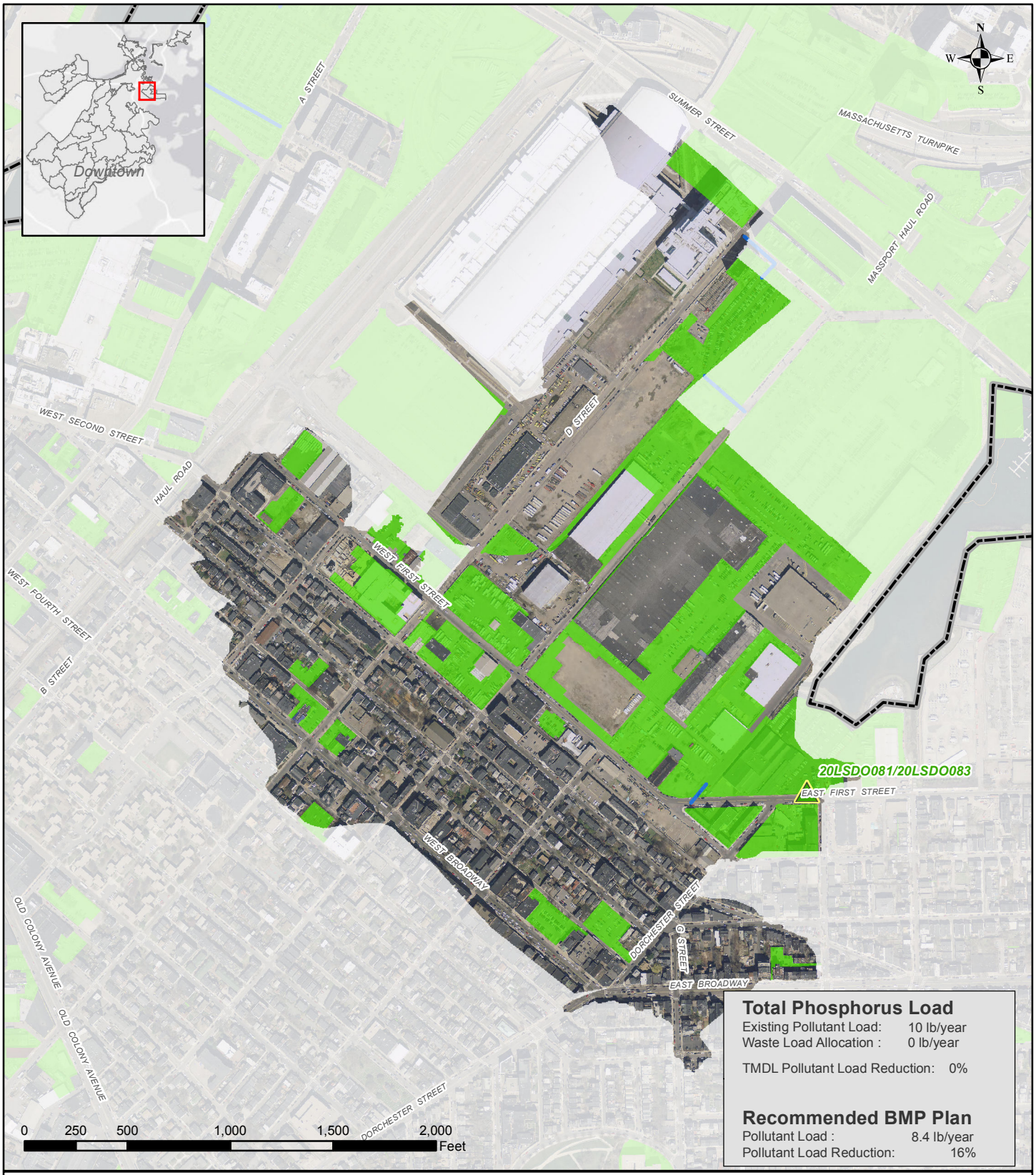
Suitable Public Right of Way
Total area of suitable sites: 0.3 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 83.6 Acres

Recommended BMP Plan
Reporting Area: Dorchester
Catchment: 17MSDO033

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 10 lb/year
Waste Load Allocation : 0 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 8.4 lb/year
Pollutant Load Reduction: 16%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 42.3 Acres
Recommended area: 0.8 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 170.6 Acres

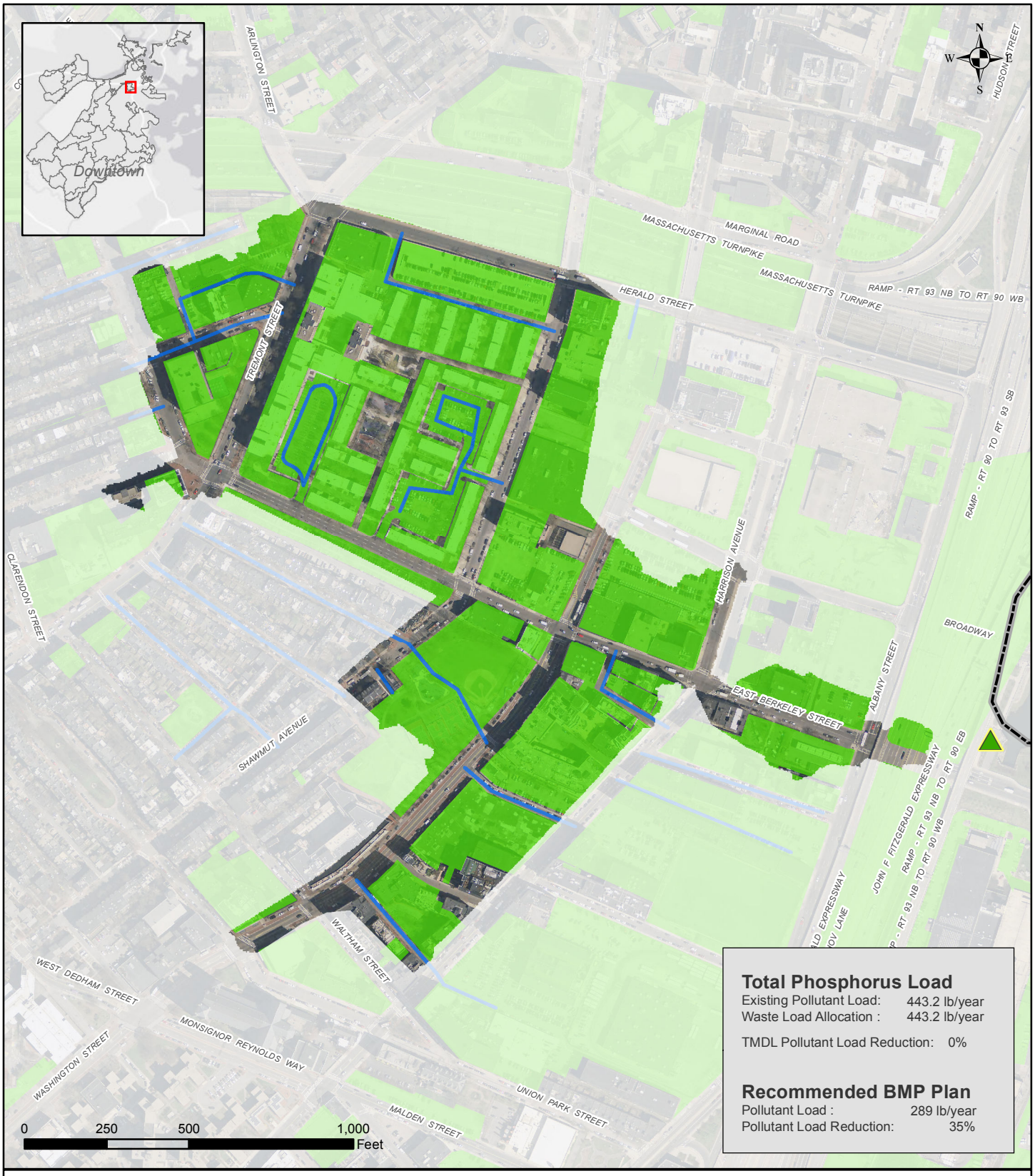
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 20LSDO081/20LSDO083

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 443.2 lb/year
Waste Load Allocation : 443.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 289 lb/year
Pollutant Load Reduction: 35%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 33.3 Acres
Recommended area: 0.5 Acres

Residential Parcel
Total area of suitable sites: 4.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.9 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 51.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 21KSDO069

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 12.4 lb/year
Waste Load Allocation : 0 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 10.7 lb/year
Pollutant Load Reduction: 14%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 11.4 Acres

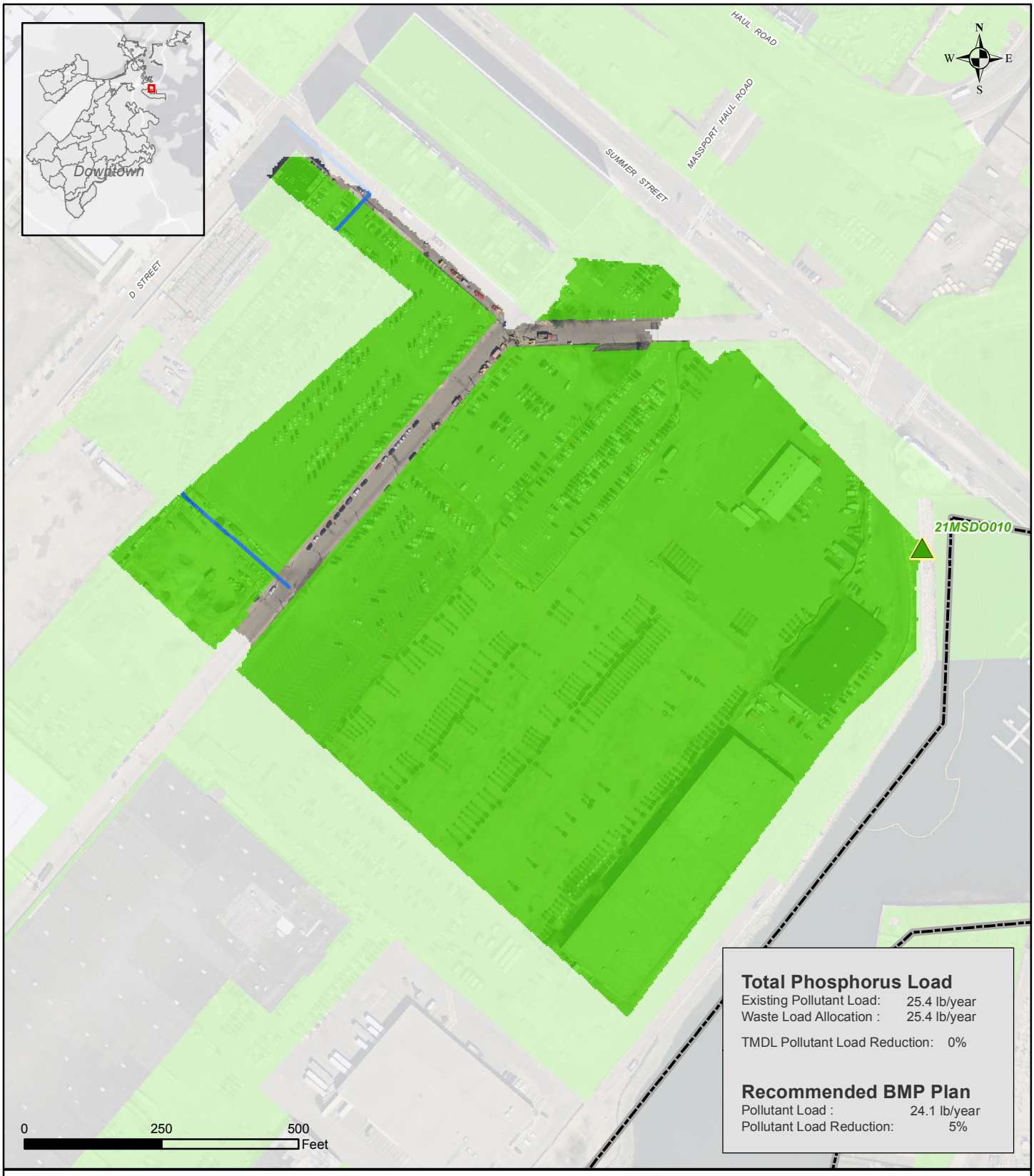
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 21MSDO005/21MSDO050

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 25.4 lb/year
Waste Load Allocation : 25.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 24.1 lb/year
Pollutant Load Reduction: 5%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 25.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 26.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 21MSDO010

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 64.3 lb/year
Waste Load Allocation : 64.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 32.5 lb/year
Pollutant Load Reduction: 50%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 17.2 Acres
Recommended area: 0.3 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.4 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 22.1

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 22LSDO580

Boston Water and Sewer Commission

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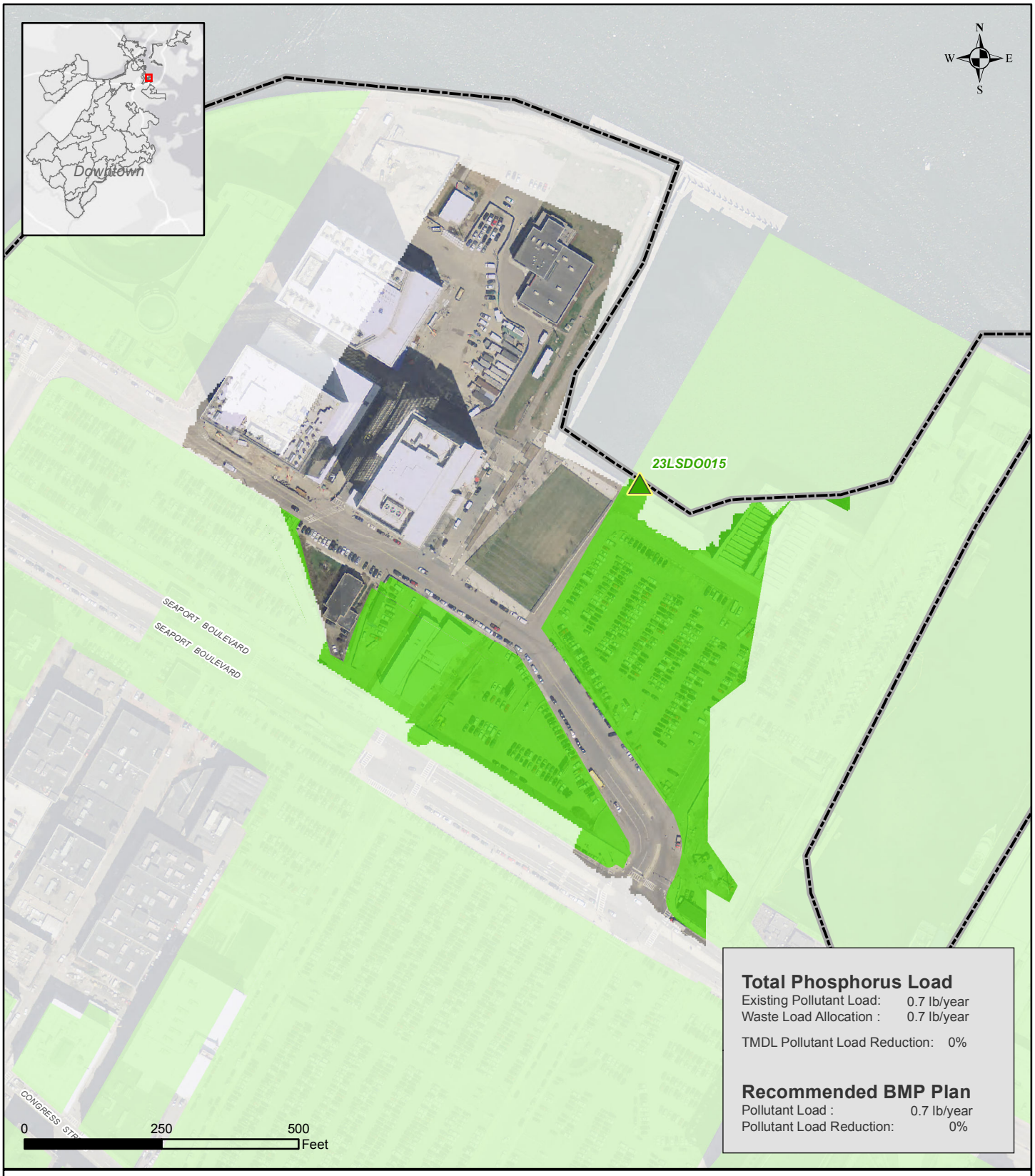


Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 6.2 Acres
Recommended area: 3.6 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

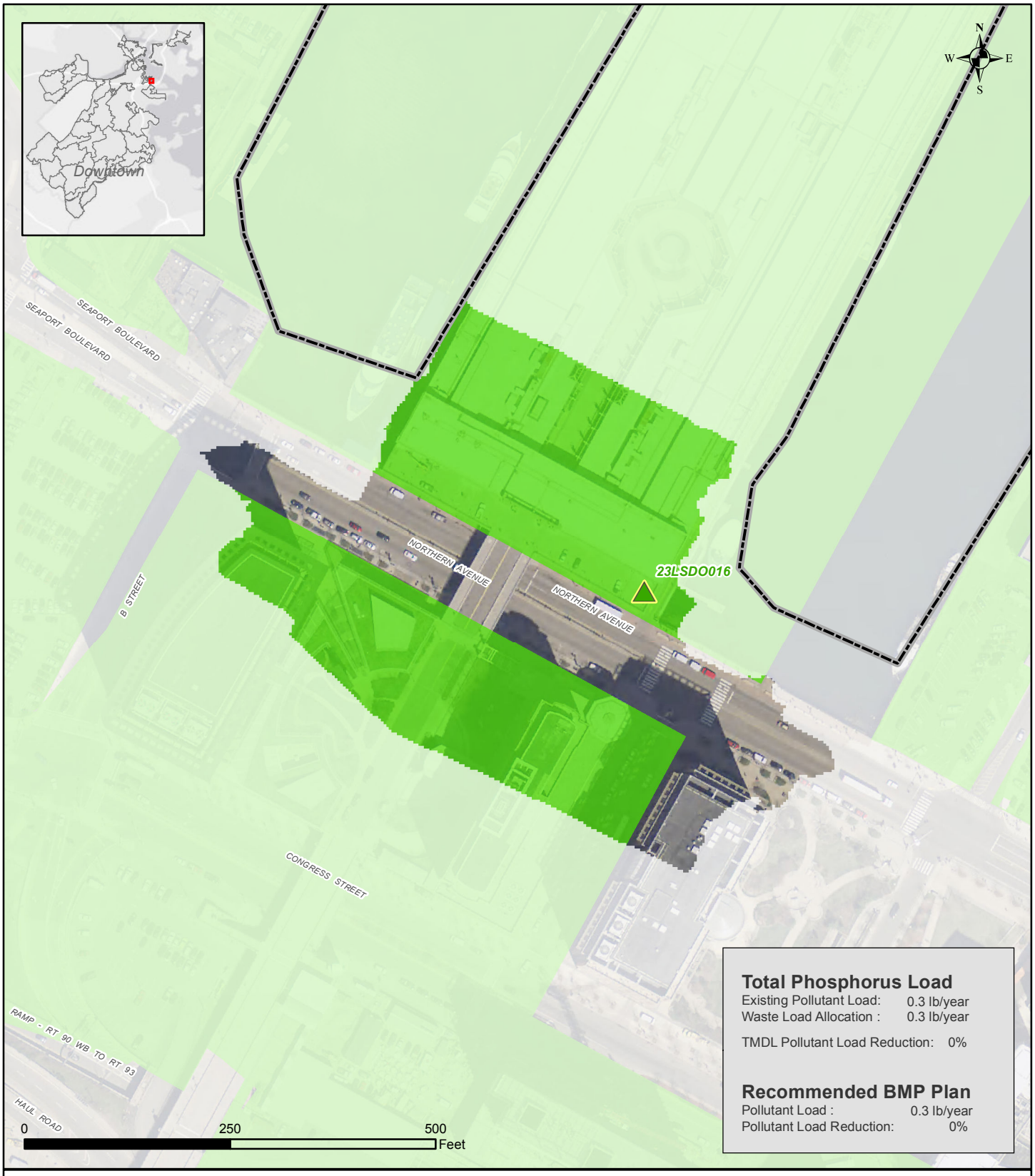
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 16.0 Acres

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 23LSDO015

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.3 lb/year
Waste Load Allocation : 0.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.3 lb/year
Pollutant Load Reduction: 0%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 6.1 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 23LSDO016

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2 lb/year
Waste Load Allocation : 2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.9 lb/year
Pollutant Load Reduction: 55%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.4 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.7 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 23LSDO074

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 20.5 Acres
Recommended area: 2.8 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 32.1 Acres

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 23LSDO075

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 55.6 lb/year
Waste Load Allocation : 55.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 48 lb/year
Pollutant Load Reduction: 14%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 10.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 14.5 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 23LSDO164

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.5 lb/year
Waste Load Allocation : 0.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.5 lb/year
Pollutant Load Reduction: 0%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 10.8 Acres
Recommended area: 0.4 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 12.9 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 23LSDO195

Boston Water and Sewer Commission

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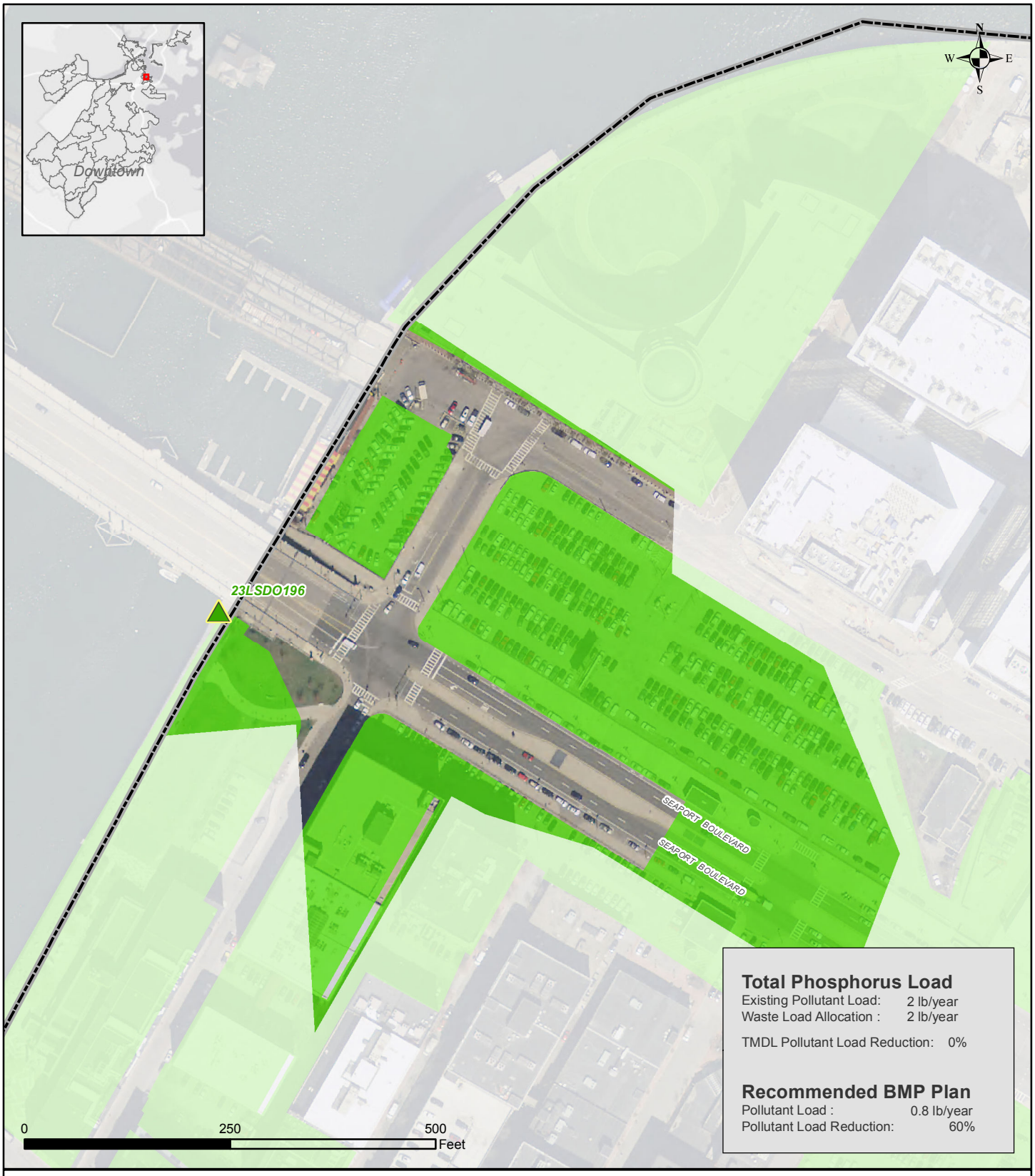


Total Phosphorus Load

Existing Pollutant Load: 2 lb/year
Waste Load Allocation : 2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.8 lb/year
Pollutant Load Reduction: 60%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 5.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.1 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 23LSDO196

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.4 lb/year
Waste Load Allocation : 0.4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.4 lb/year
Pollutant Load Reduction: 1%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 9.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 10.5 Acres

Boston Water and Sewer Commission

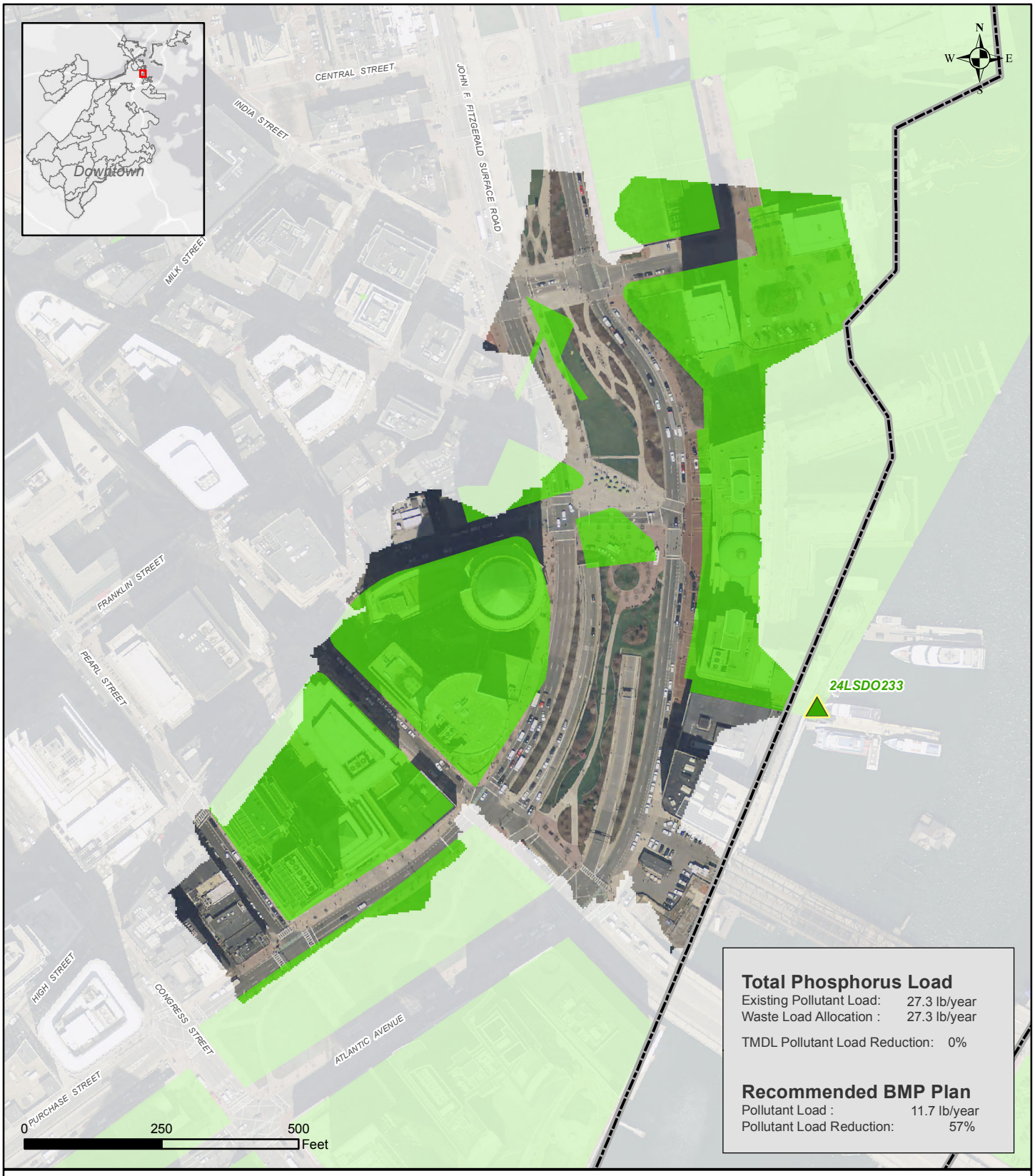
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 23LSDO202

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	27.3 lb/year
Waste Load Allocation :	27.3 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	11.7 lb/year
Pollutant Load Reduction:	57%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 9.8 Acres
- Recommended area: 0.1 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 20.7 Acres

Boston Water and Sewer Commission

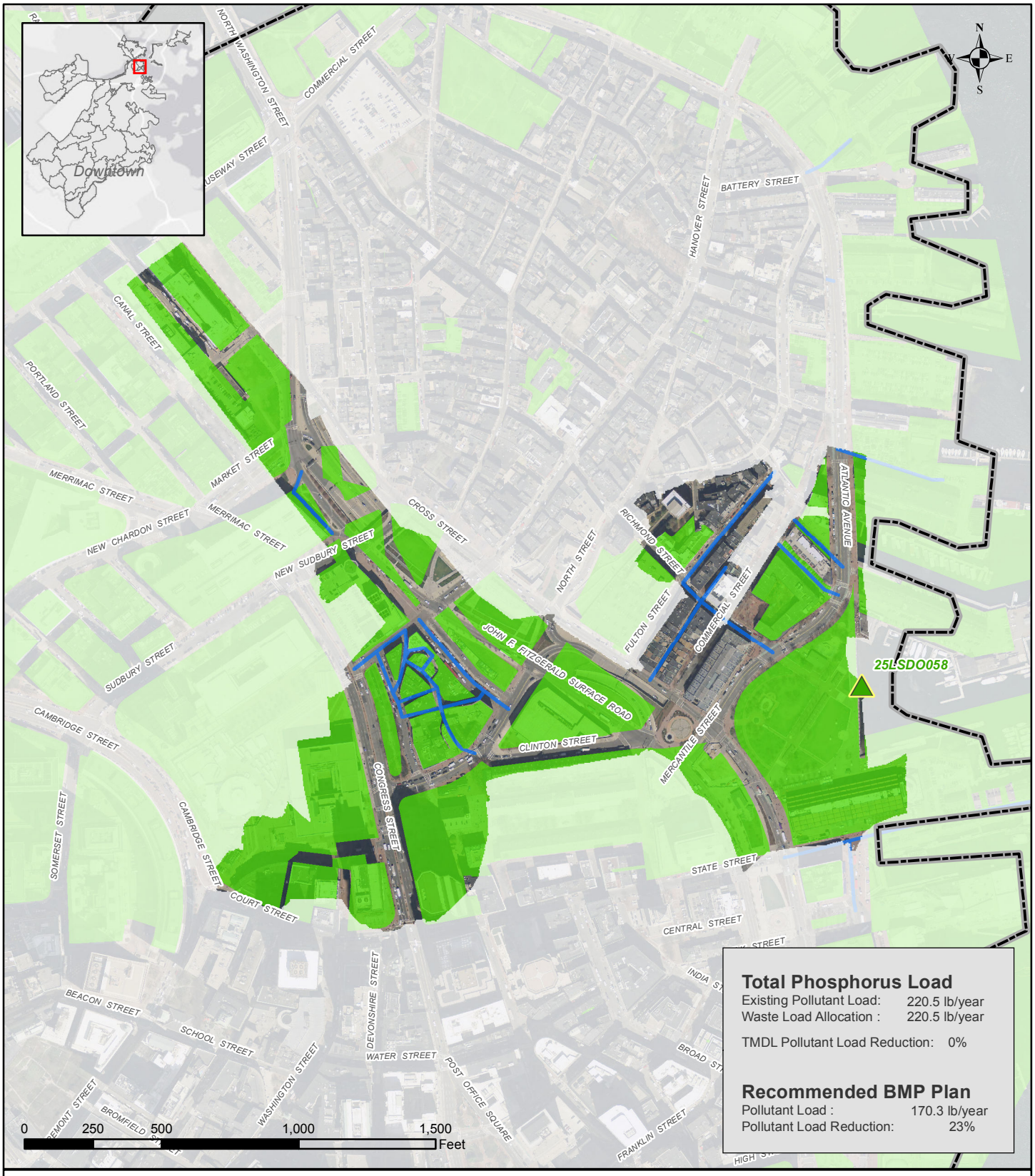
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 24LSDO233

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 220.5 lb/year
Waste Load Allocation : 220.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 170.3 lb/year
Pollutant Load Reduction: 23%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 33.1 Acres
Recommended area: 1 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.9 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 56.1 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 25LSDO058

Boston Water and Sewer Commission

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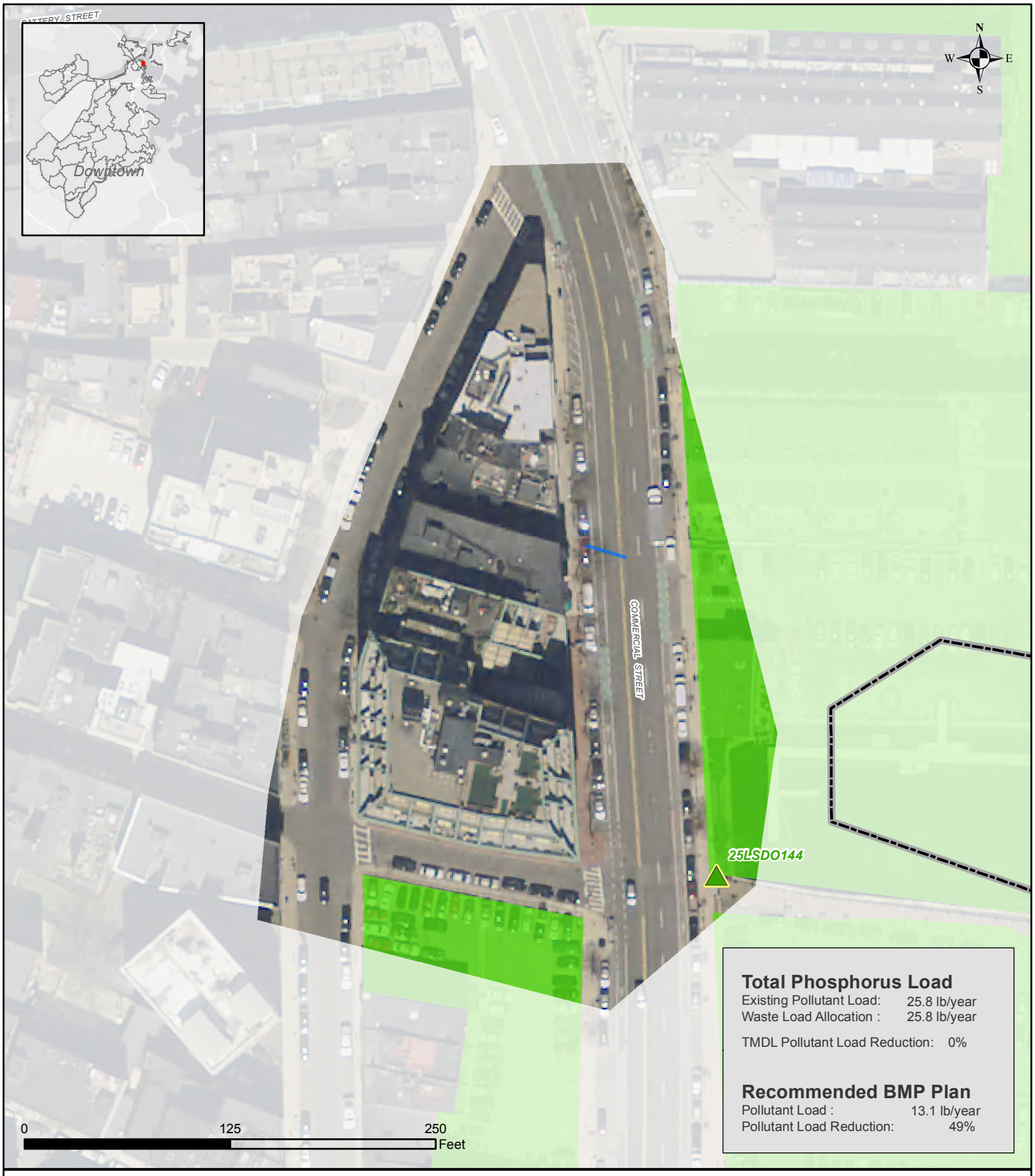


Total Phosphorus Load

Existing Pollutant Load: 25.8 lb/year
Waste Load Allocation : 25.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 13.1 lb/year
Pollutant Load Reduction: 49%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.6 Acres

Boston Water and Sewer Commission

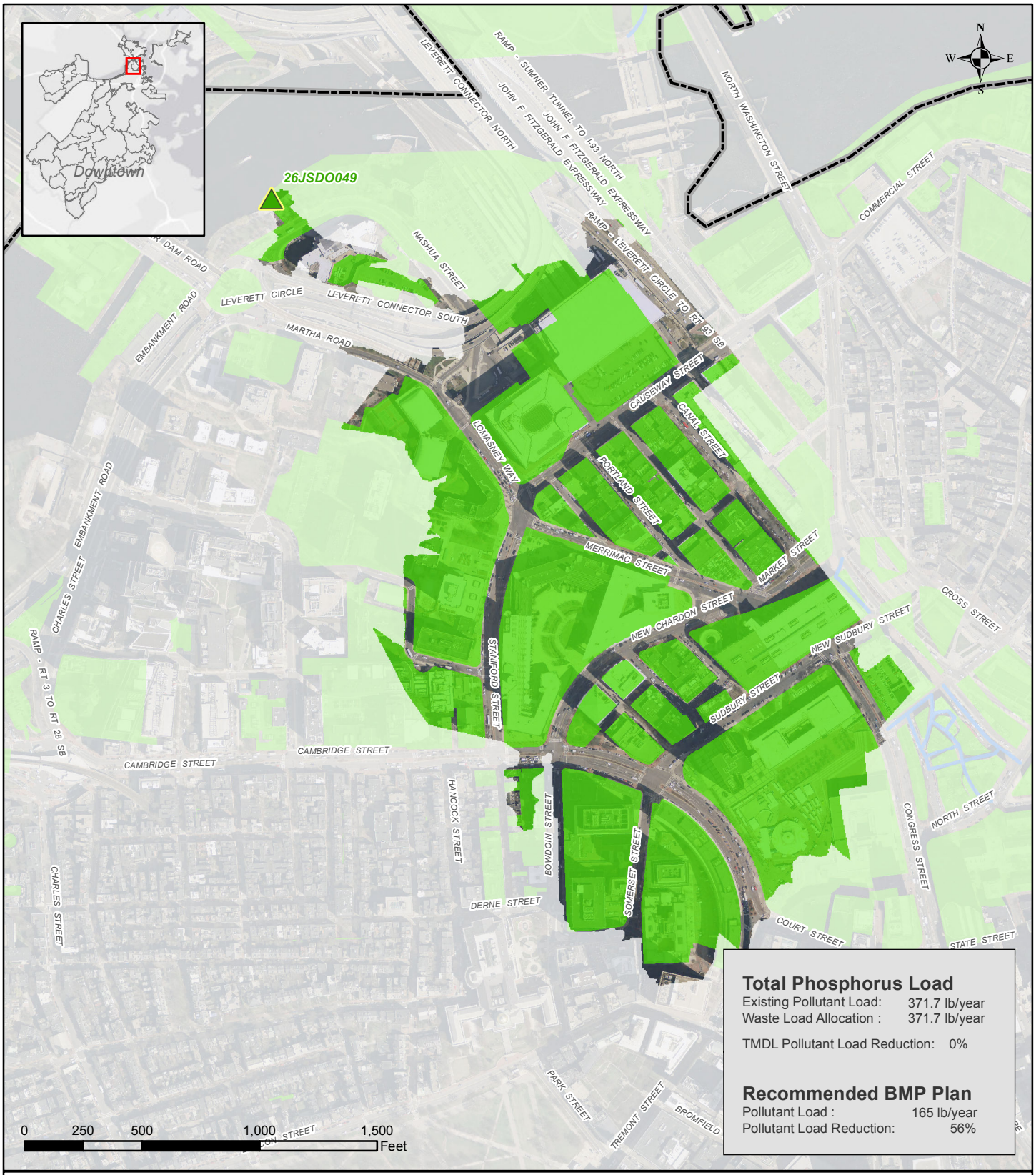
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 25LSDO144

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 371.7 lb/year
Waste Load Allocation : 371.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 165 lb/year
Pollutant Load Reduction: 56%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 67.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 99.2 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 26JSDO049

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 15.8 lb/year
Waste Load Allocation : 15.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 2.8 lb/year
Pollutant Load Reduction: 82%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 9.6 Acres

Recommended BMP Plan
Reporting Area: Downtown
Catchment: 26JSDO100

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 33.8 lb/year
Waste Load Allocation : 33.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 9.9 lb/year
Pollutant Load Reduction: 71%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 5.4 Acres

Boston Water and Sewer Commission

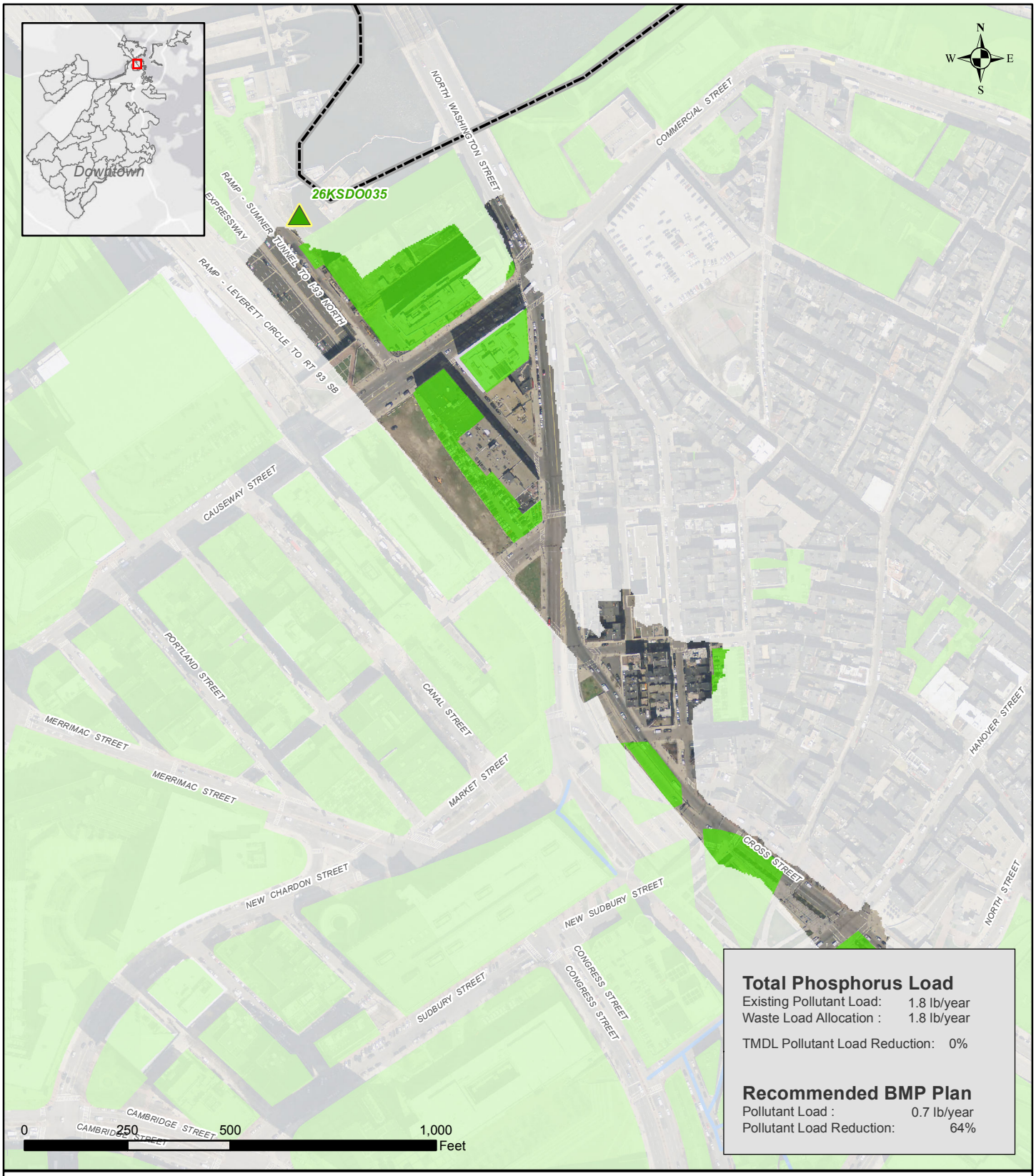
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 26JSDO101

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 1.8 lb/year
Waste Load Allocation : 1.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.7 lb/year
Pollutant Load Reduction: 64%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 3.6 Acres
Recommended area: 0.8 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 12.5 Acres

Boston Water and Sewer Commission

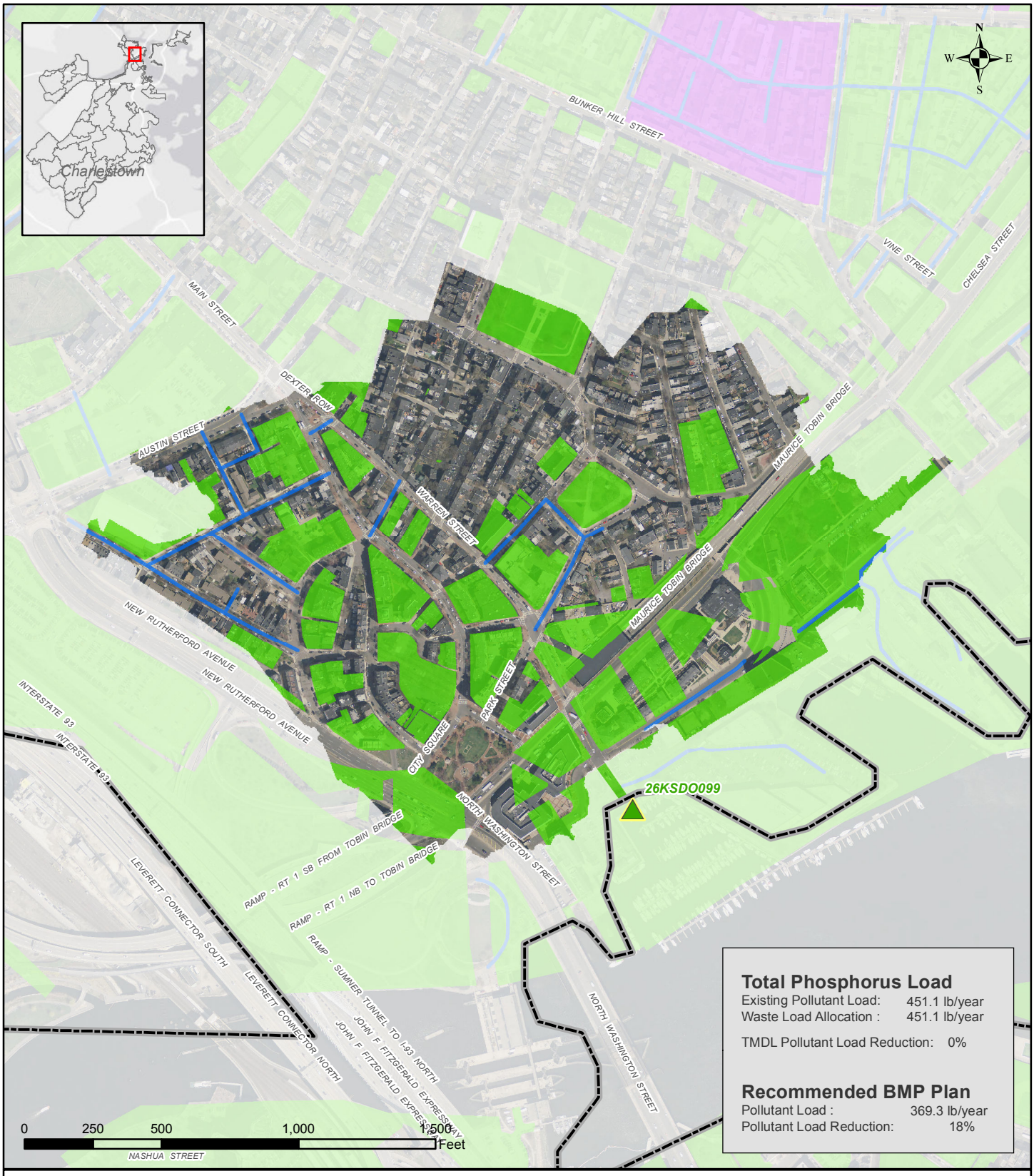
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 26KSDO035

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	451.1 lb/year
Waste Load Allocation :	451.1 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	369.3 lb/year
Pollutant Load Reduction:	18%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 31.4 Acres
- Recommended area: 0.5 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

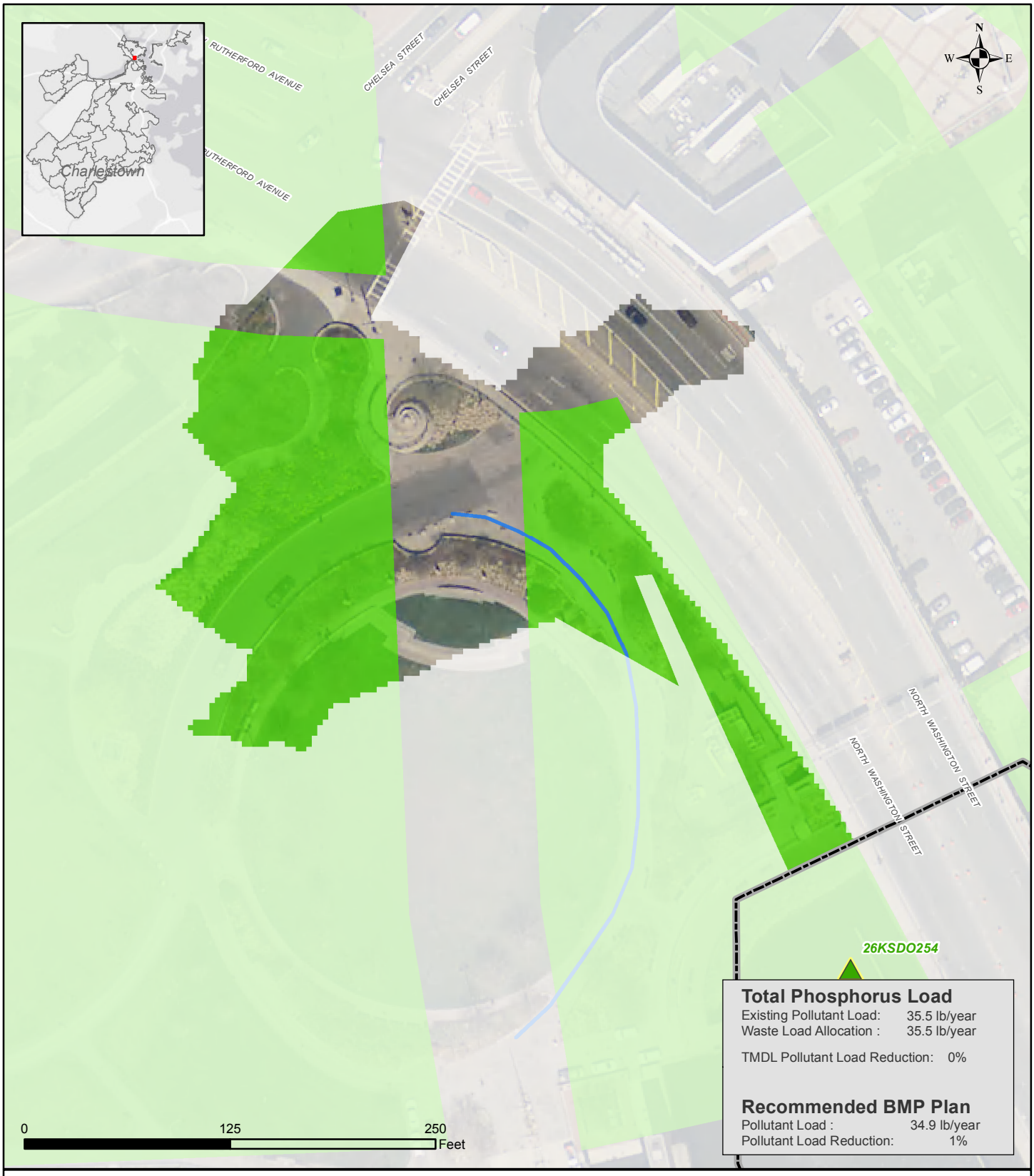
Suitable Public Right of Way
- Total area of suitable sites: 0.9 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 82.9 Acres

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 26KSDO099

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 35.5 lb/year
Waste Load Allocation : 35.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 34.9 lb/year
Pollutant Load Reduction: 1%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.6 Acres

Boston Water and Sewer Commission

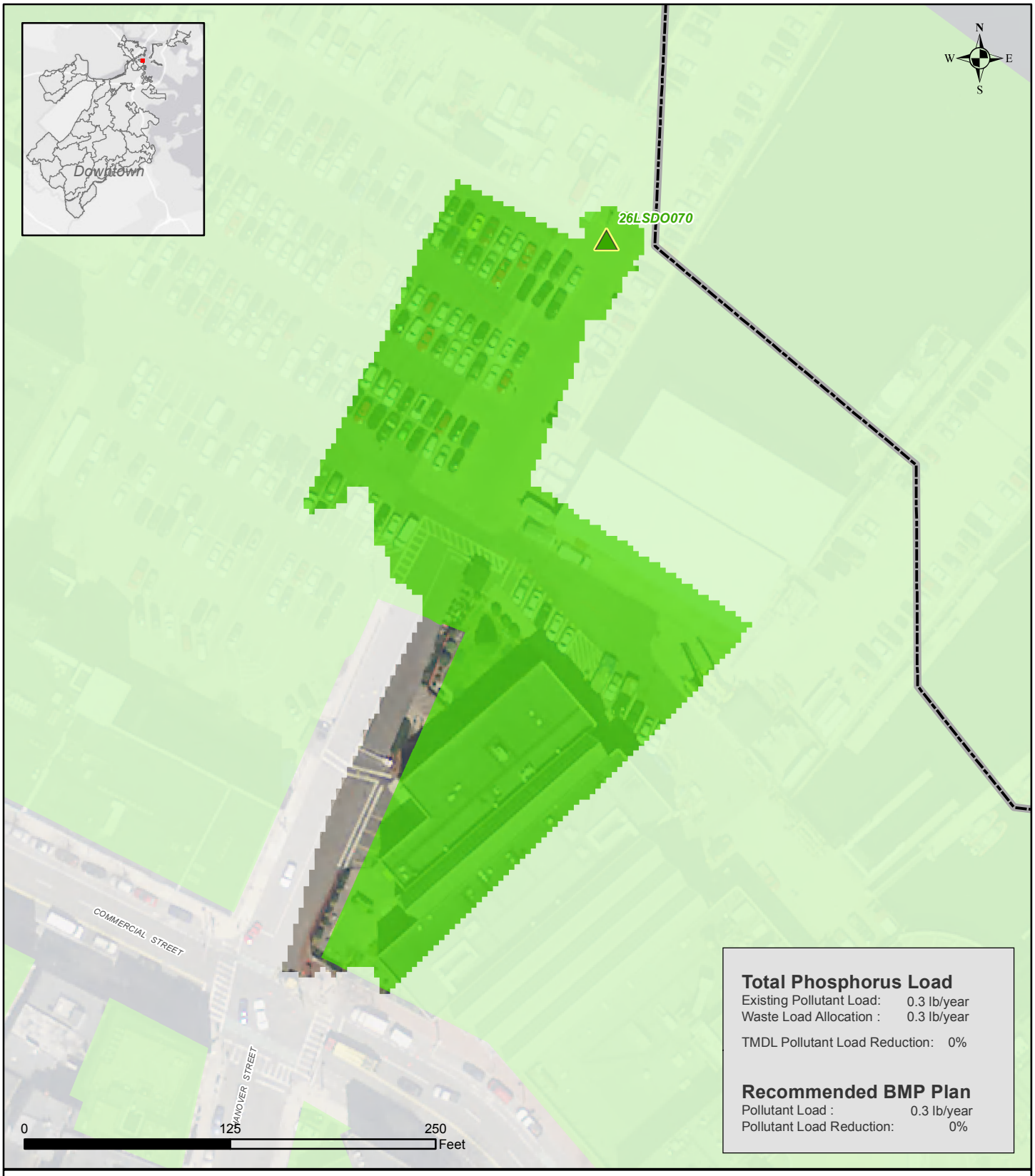
CH2MHILL

Recommended BMP Plan

Reporting Area: Charlestown
Catchment: 26KSDO254

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 0.3 lb/year
Waste Load Allocation : 0.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.3 lb/year
Pollutant Load Reduction: 0%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 1.5 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 26LSDO070

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.6 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.7 Acres

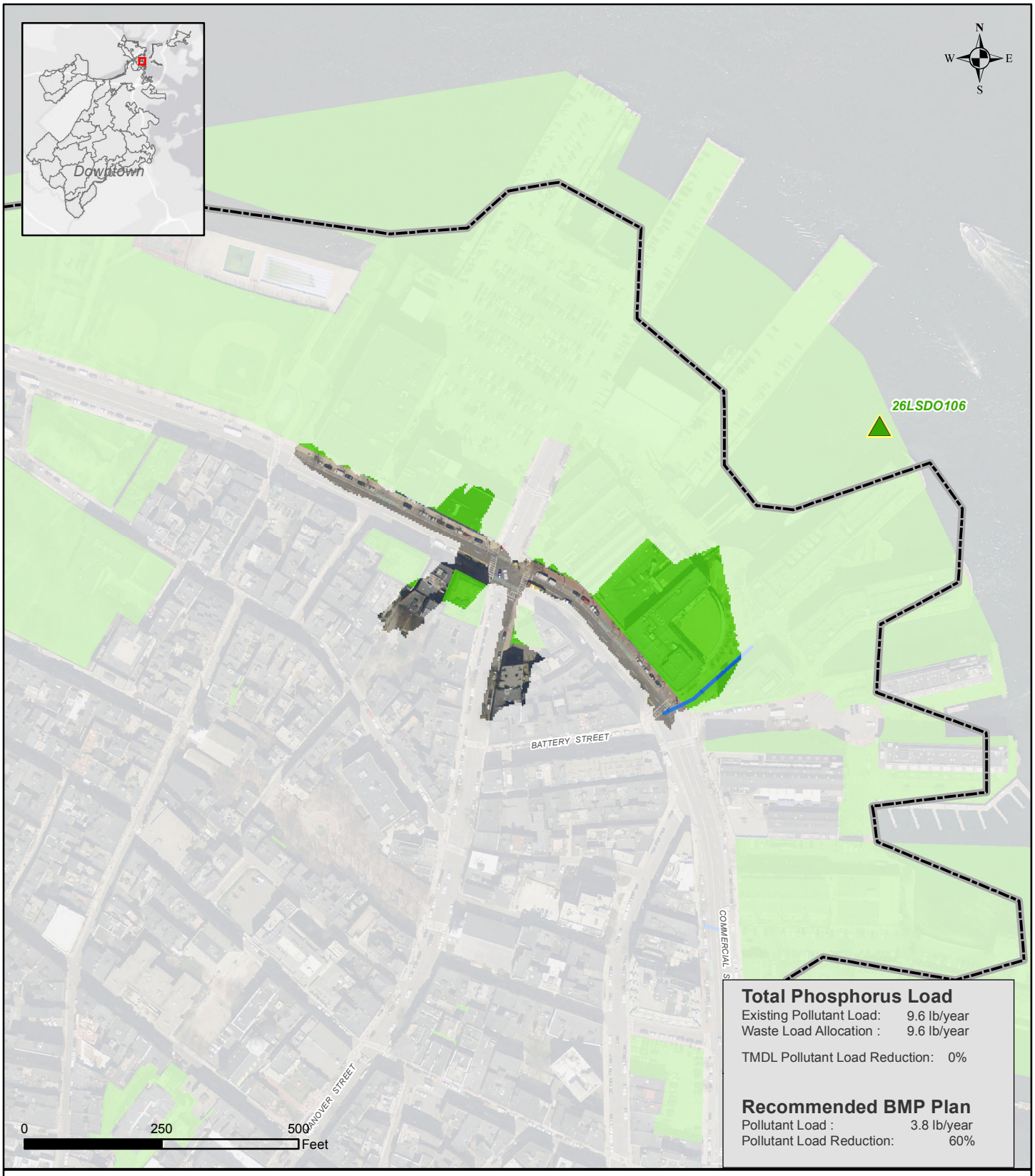
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 26LSDO084

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 9.6 lb/year
Waste Load Allocation : 9.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 3.8 lb/year
Pollutant Load Reduction: 60%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.7 Acres

Boston Water and Sewer Commission

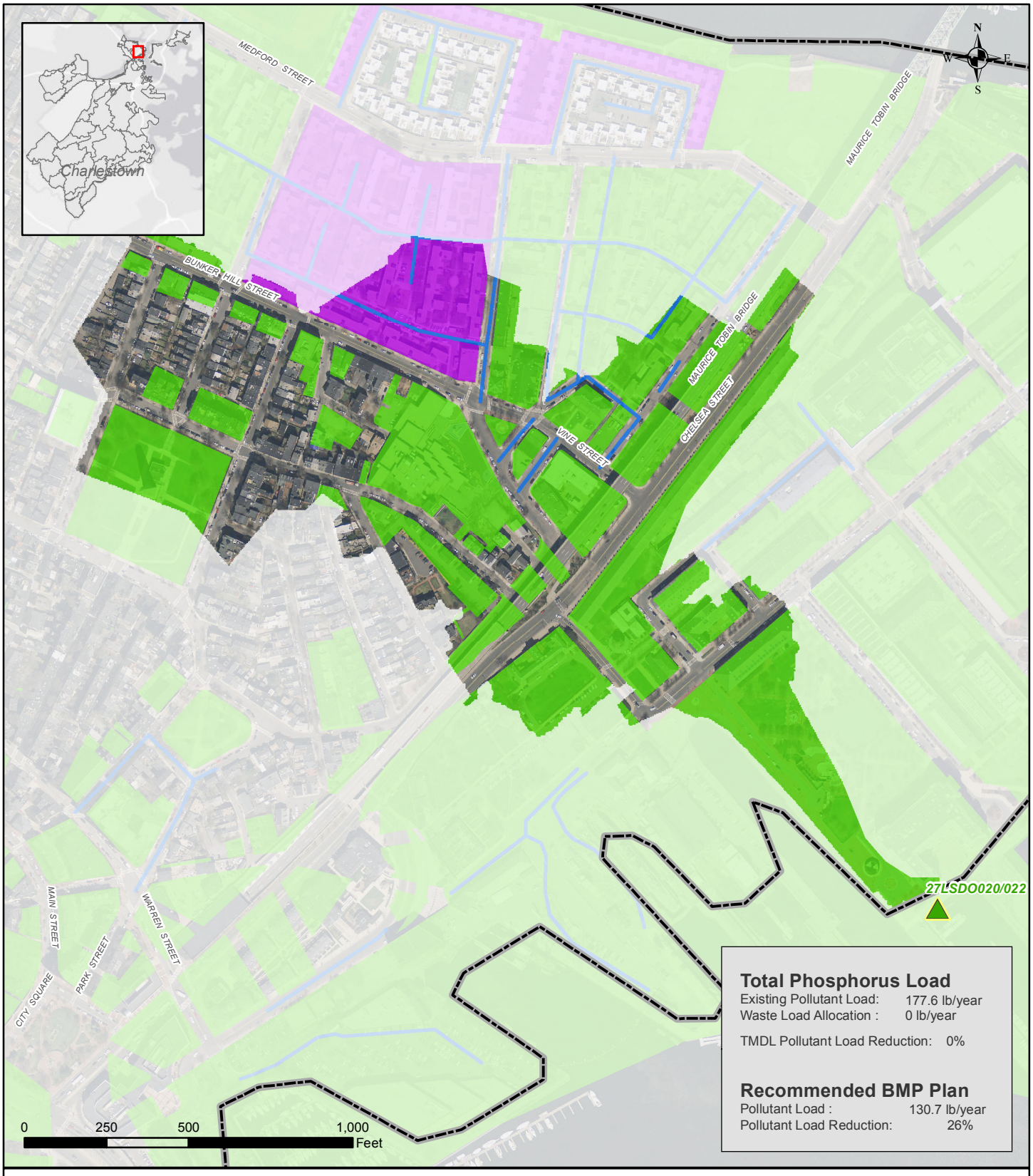
CH2MHILL

Recommended BMP Plan

Reporting Area: Downtown
Catchment: 26LSDO106

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 177.6 lb/year
Waste Load Allocation : 0 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 130.7 lb/year
Pollutant Load Reduction: 26%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 24.7 Acres
Recommended area: 3.3 Acres

Residential Parcel
Total area of suitable sites: 4.7 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.4 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 48.6 Acres

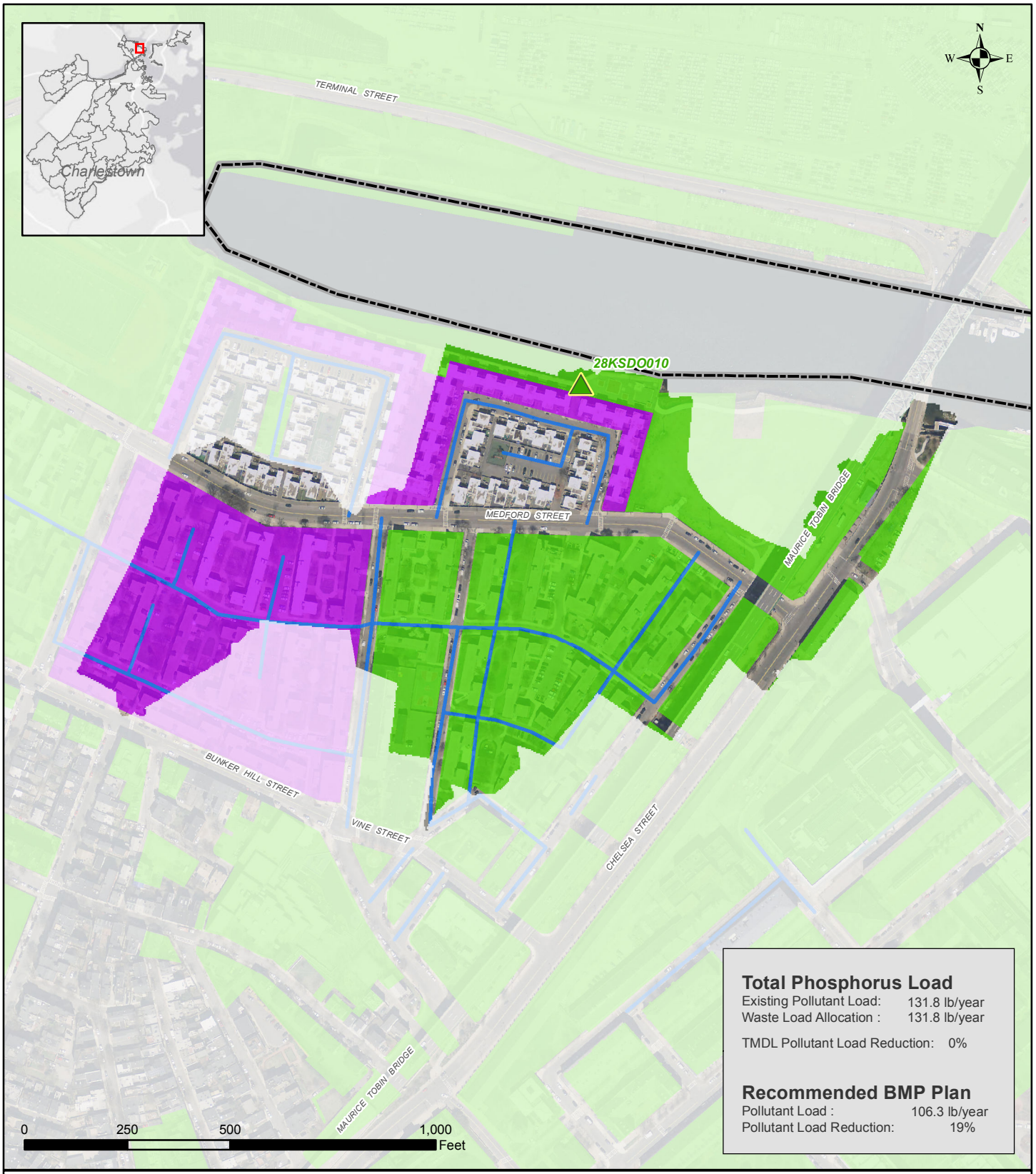
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 27LSDO020/022

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 131.8 lb/year
Waste Load Allocation : 131.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 106.3 lb/year
Pollutant Load Reduction: 19%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 12.2 Acres
Recommended area: 0.1 Acres

Residential Parcel
Total area of suitable sites: 12.9 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 26.5 Acres

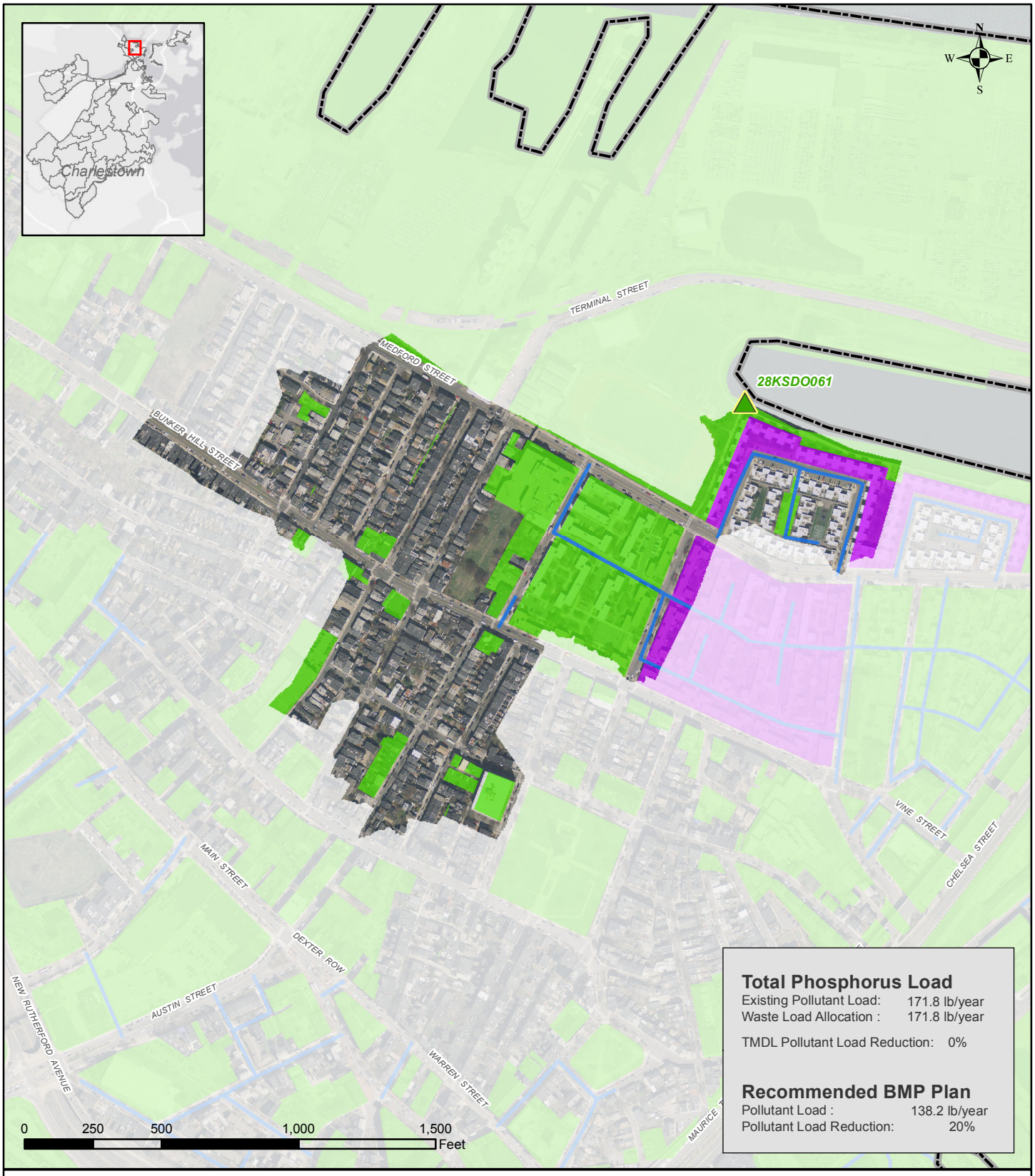
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 28KSDO010

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	171.8 lb/year
Waste Load Allocation :	171.8 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	138.2 lb/year
Pollutant Load Reduction:	20%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel

Total area of suitable sites:	12.1 Acres
Recommended area:	0 Acres

Residential Parcel

Total area of suitable sites:	8.3 Acres
Recommended area:	0 Acres

Suitable Public Right of Way

Total area of suitable sites:	0.5 Miles
Recommended area:	0 Miles

Boston Boundary

Total Catchment Area:	48.0 Acres

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 28KSDO061

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 48 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

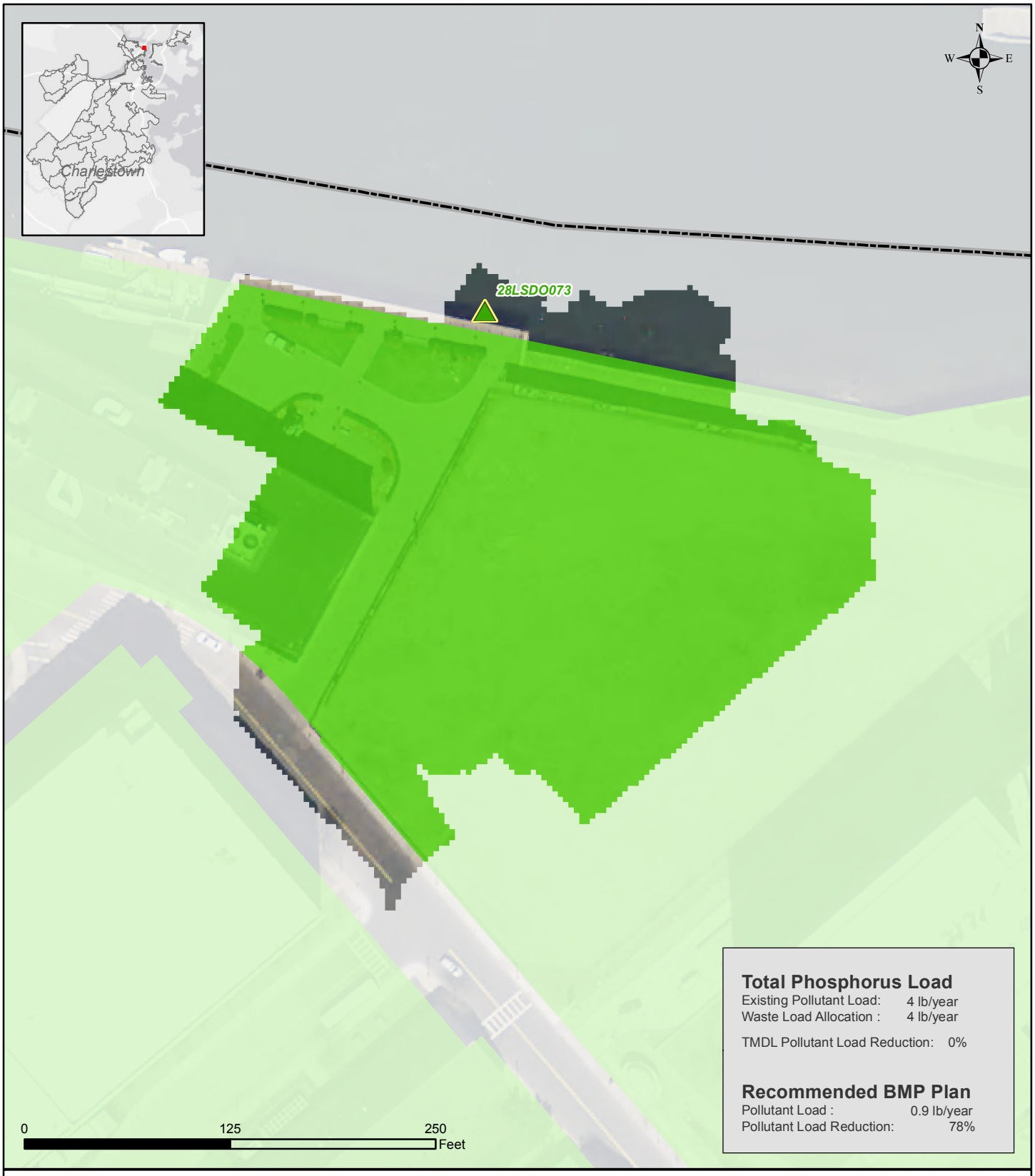
Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 50.7 Acres

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 28KSDO386

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 4 lb/year
Waste Load Allocation : 4 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 0.9 lb/year
Pollutant Load Reduction: 78%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.4 Acres

Boston Water and Sewer Commission

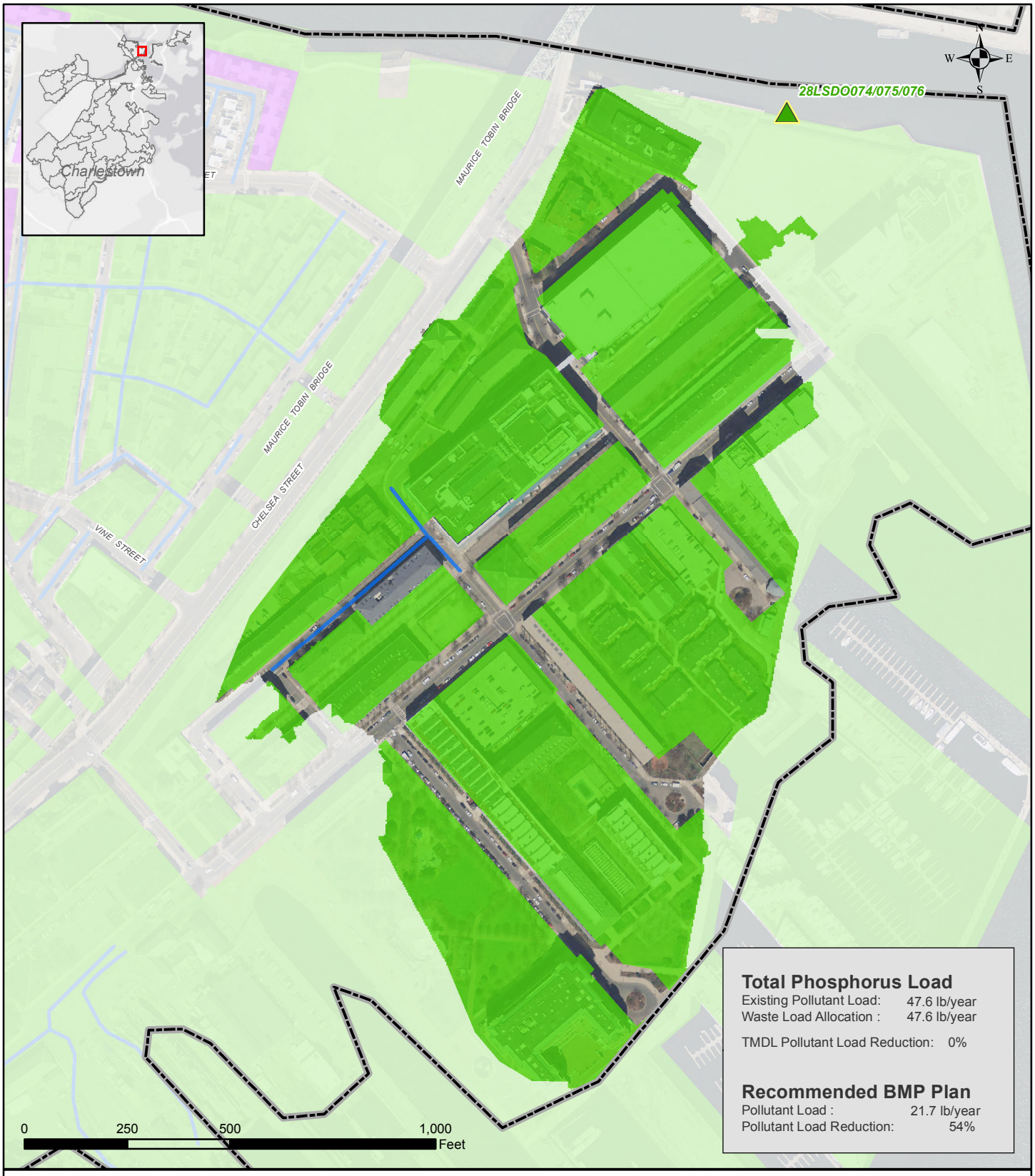
CH2MHILL

Recommended BMP Plan

Reporting Area: Charlestown
Catchment: 28LSDO073

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 47.6 lb/year
Waste Load Allocation : 47.6 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 21.7 lb/year
Pollutant Load Reduction: 54%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 35.1 Acres
Recommended area: 5 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 44.0 Acres

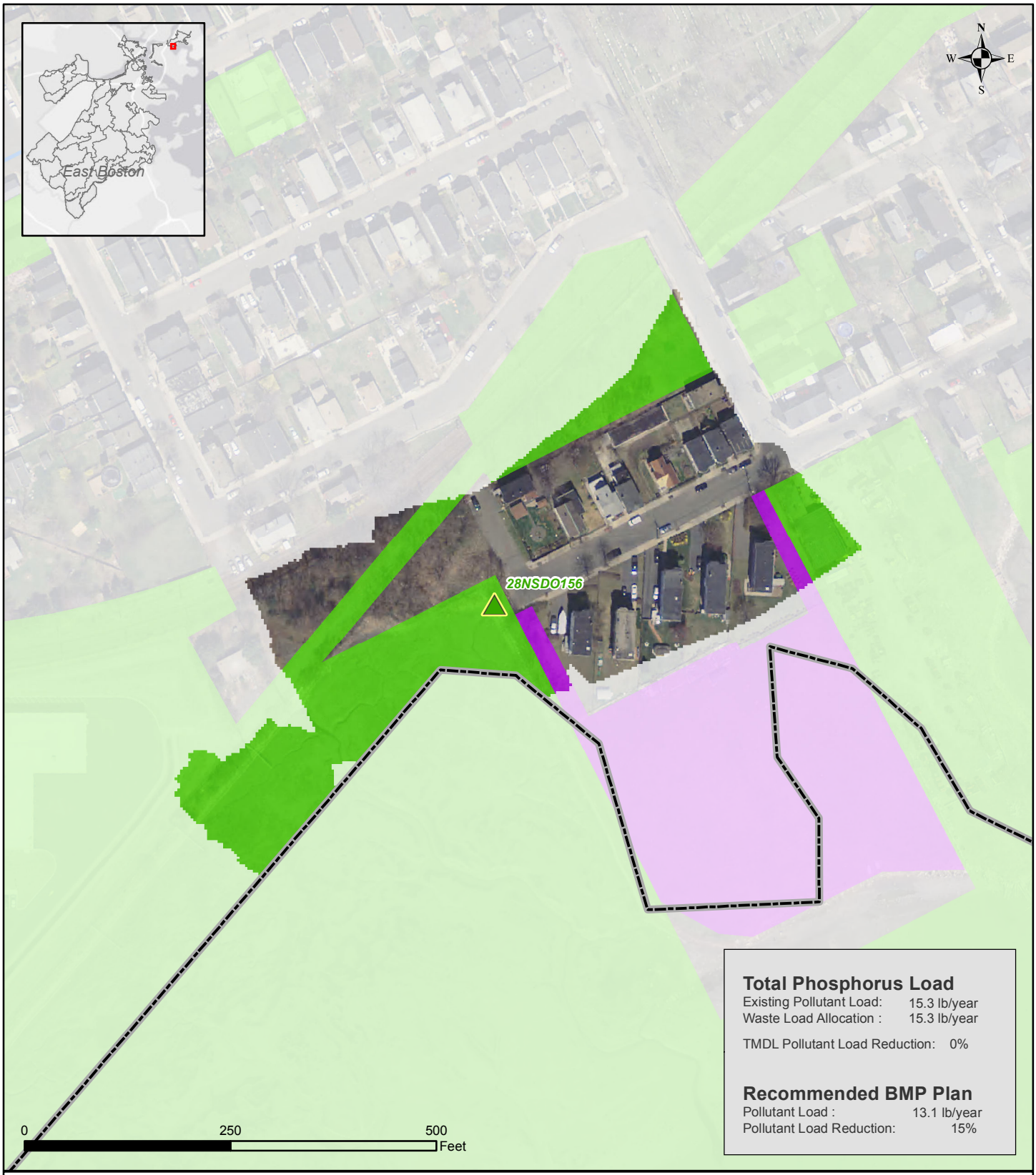
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 28LSDO074/075/076

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 15.3 lb/year
Waste Load Allocation : 15.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 13.1 lb/year
Pollutant Load Reduction: 15%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.7 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0.1 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 5.2 Acres

Boston Water and Sewer Commission

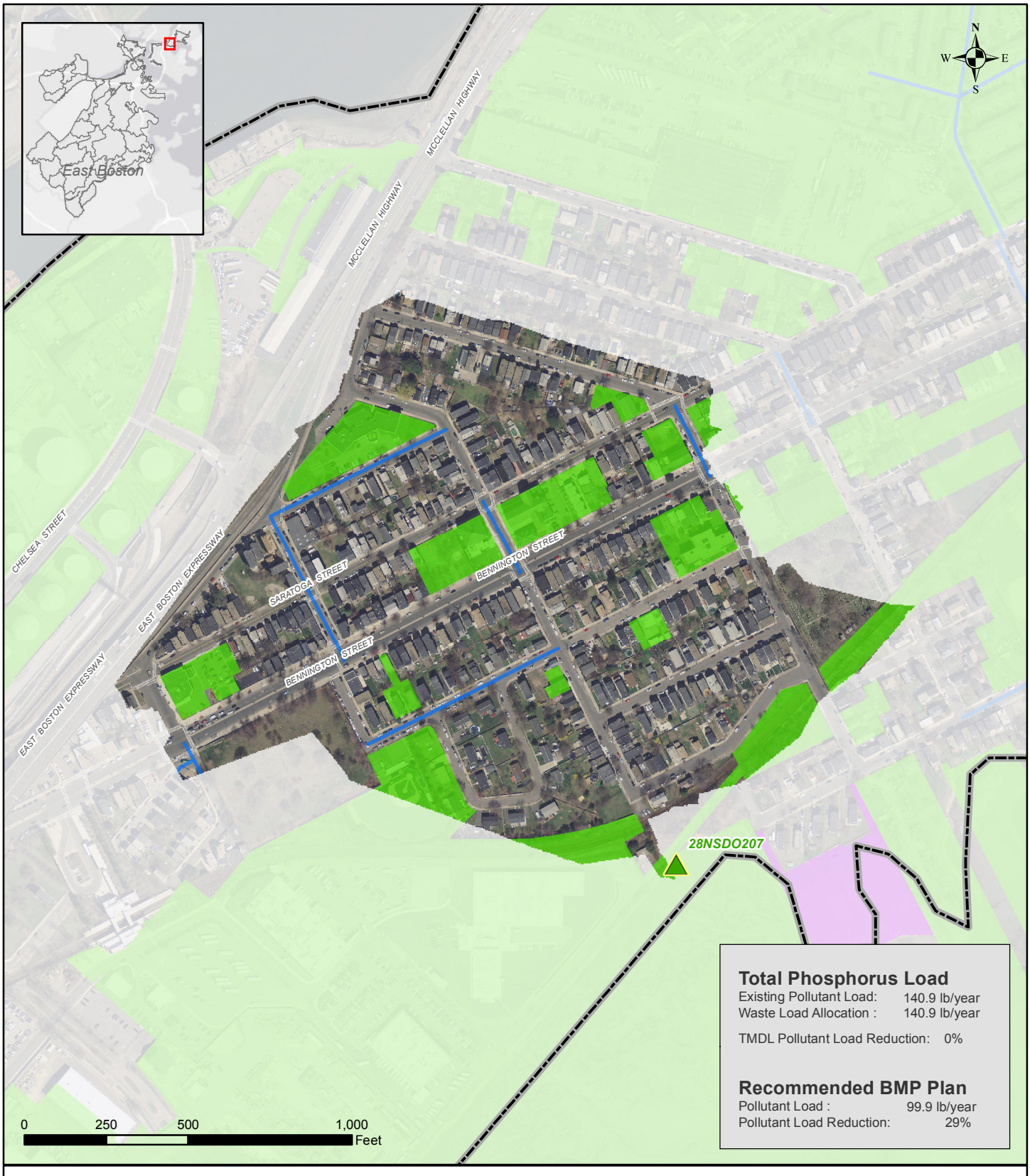
CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 28NSDO156

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	140.9 lb/year
Waste Load Allocation :	140.9 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	99.9 lb/year
Pollutant Load Reduction:	29%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 9.6 Acres
- Recommended area: 0.4 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0.5 Miles
- Recommended area: 0.1 Miles

Boston Boundary
- Total Catchment Area: 55.5 Acres

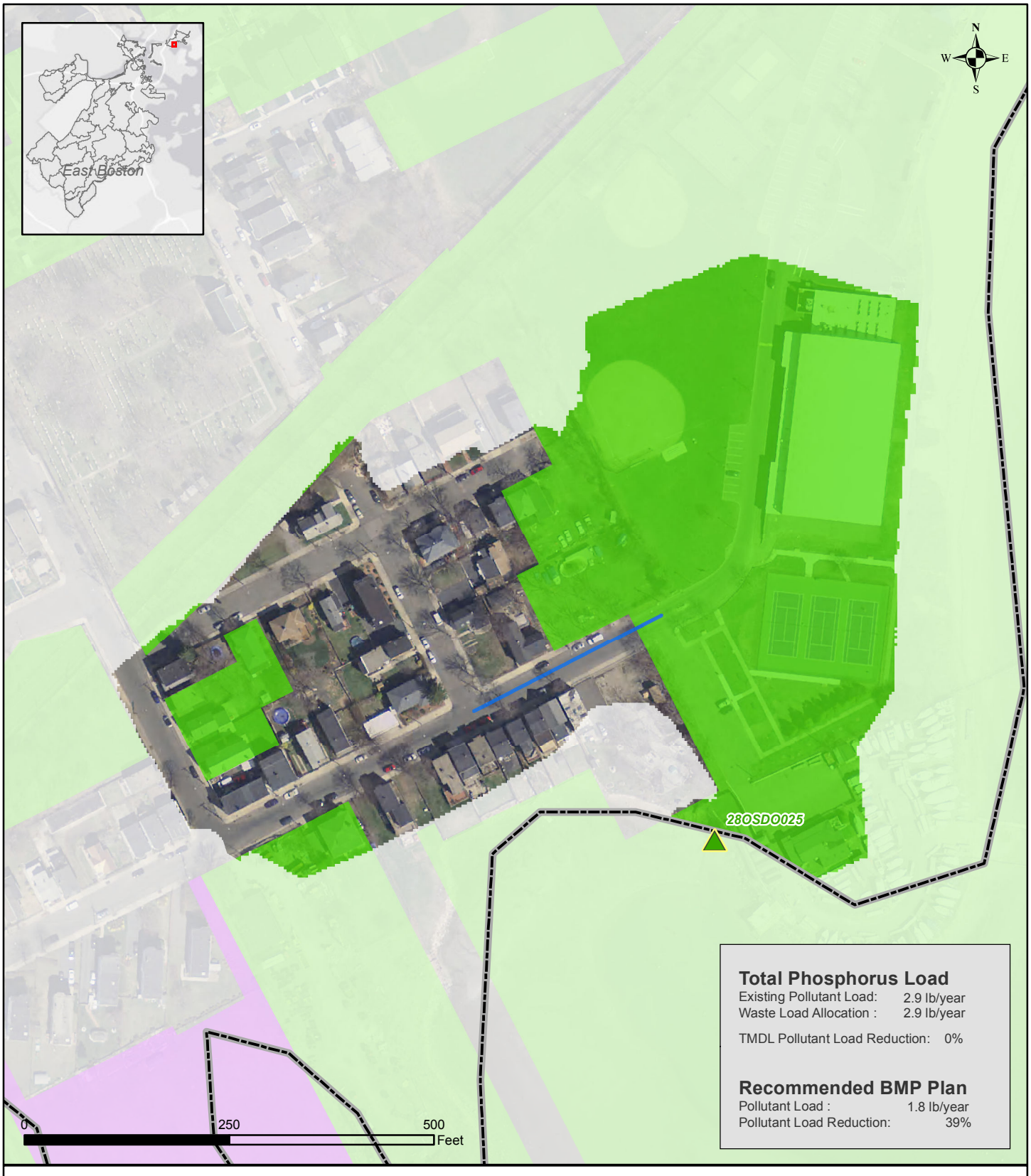
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 28NSDO207

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.9 lb/year
Waste Load Allocation : 2.9 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.8 lb/year
Pollutant Load Reduction: 39%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 4.1 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 10.6 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 28OSDO025

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 9.5 lb/year
Waste Load Allocation : 9.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 7.1 lb/year
Pollutant Load Reduction: 25%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.4 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 4.7 Acres

Boston Water and Sewer Commission

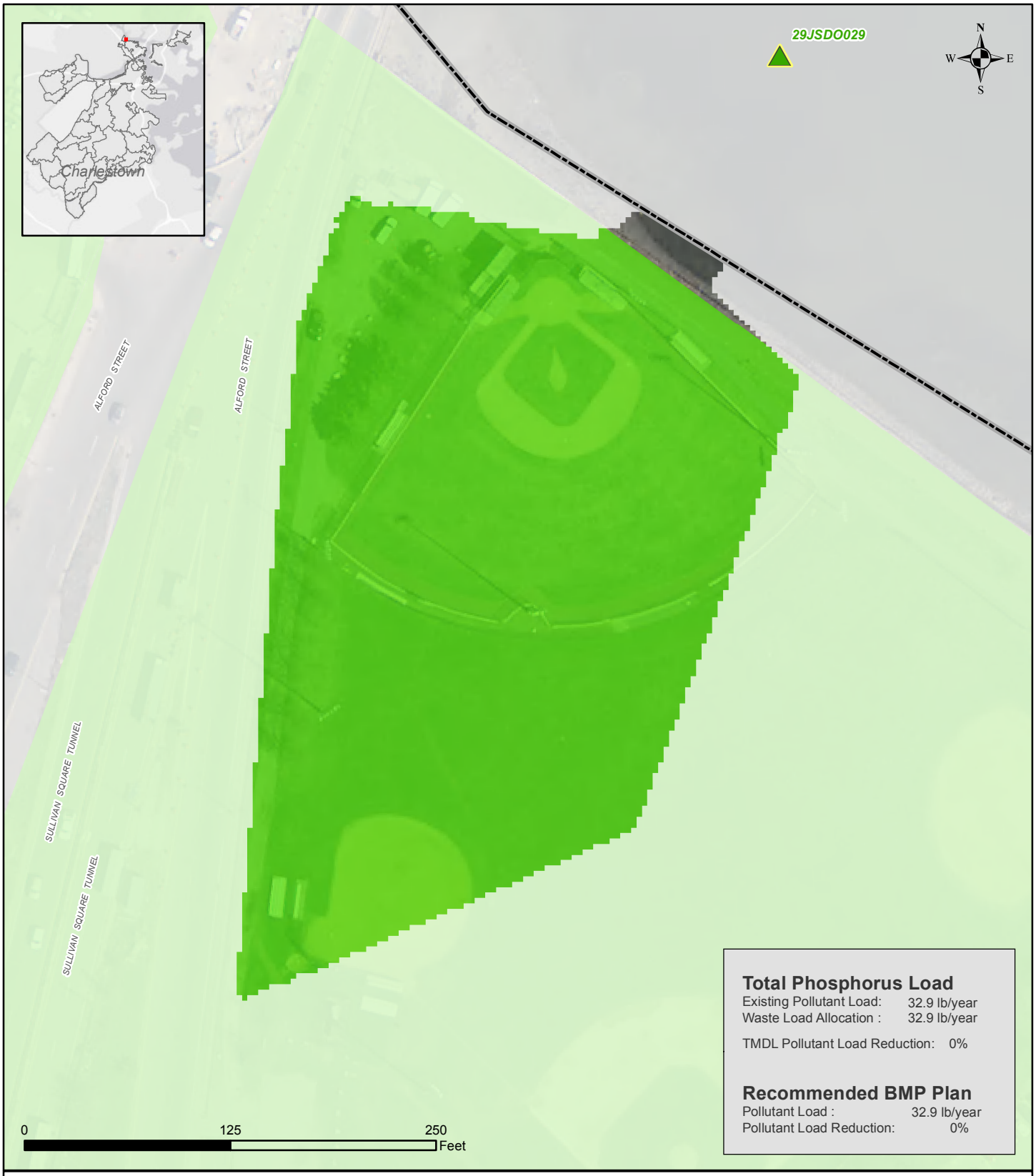
CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 28PSDO001

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 32.9 lb/year
Waste Load Allocation : 32.9 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 32.9 lb/year
Pollutant Load Reduction: 0%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 2.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.6 Acres

Boston Water and Sewer Commission

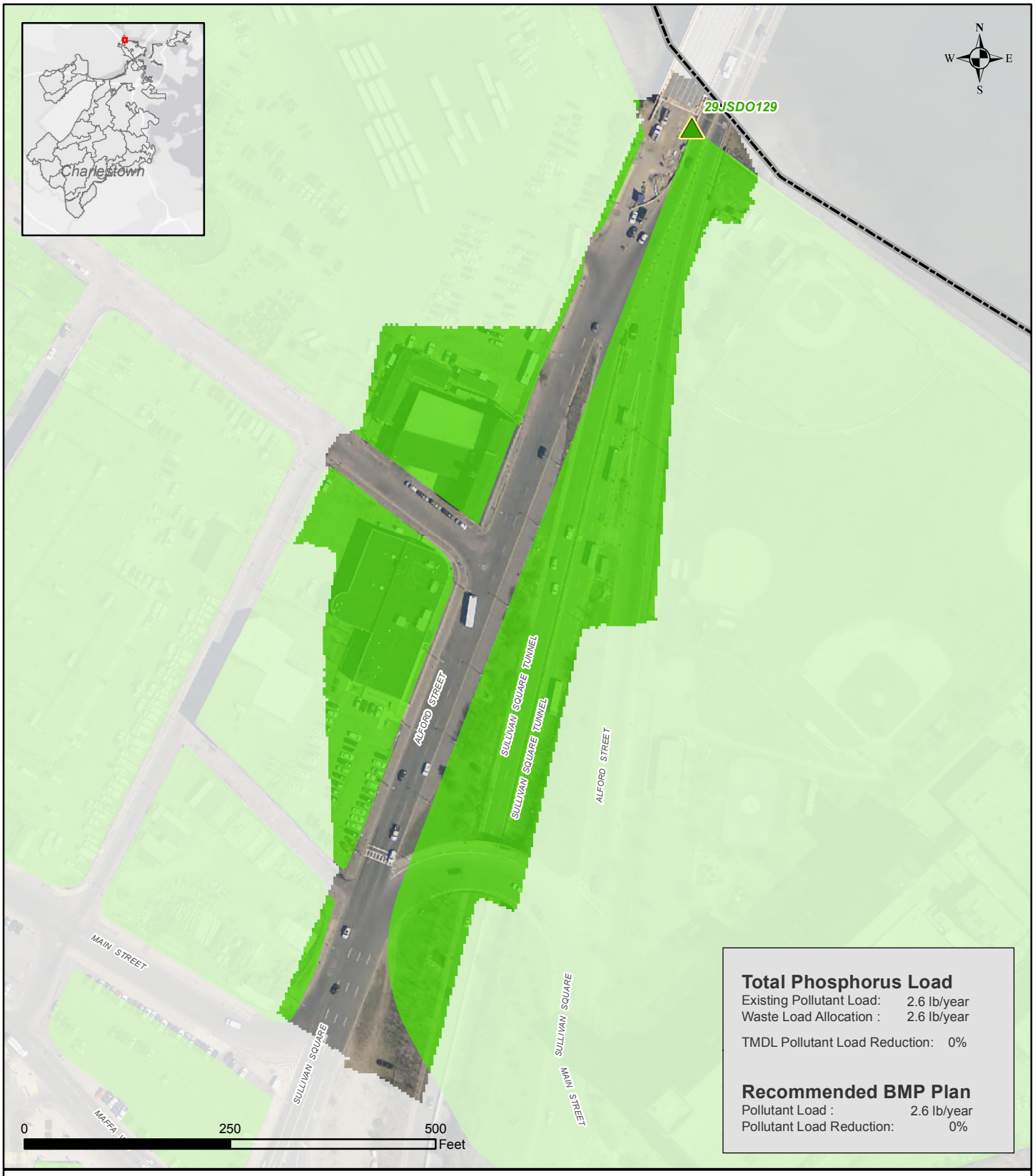
CH2MHILL

Recommended BMP Plan

Reporting Area: Charlestown
Catchment: 29JSDO029

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	2.6 lb/year
Waste Load Allocation :	2.6 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	2.6 lb/year
Pollutant Load Reduction:	0%

Legend

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 4.8 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 7.2 Acres

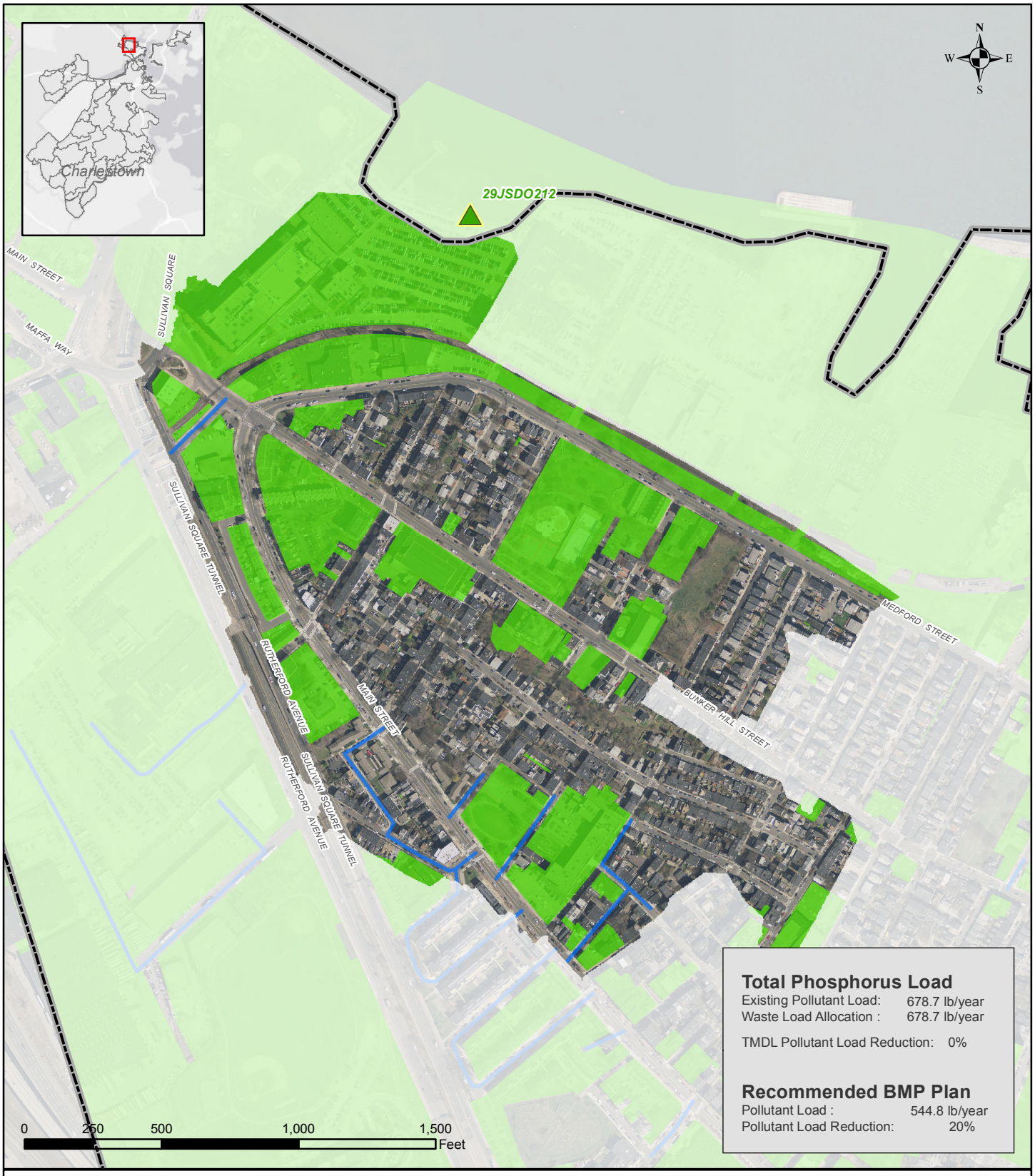
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 29JSDO129

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 678.7 lb/year
Waste Load Allocation : 678.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 544.8 lb/year
Pollutant Load Reduction: 20%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 38.4 Acres
Recommended area: 10 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.5 Miles
Recommended area: 0.1 Miles

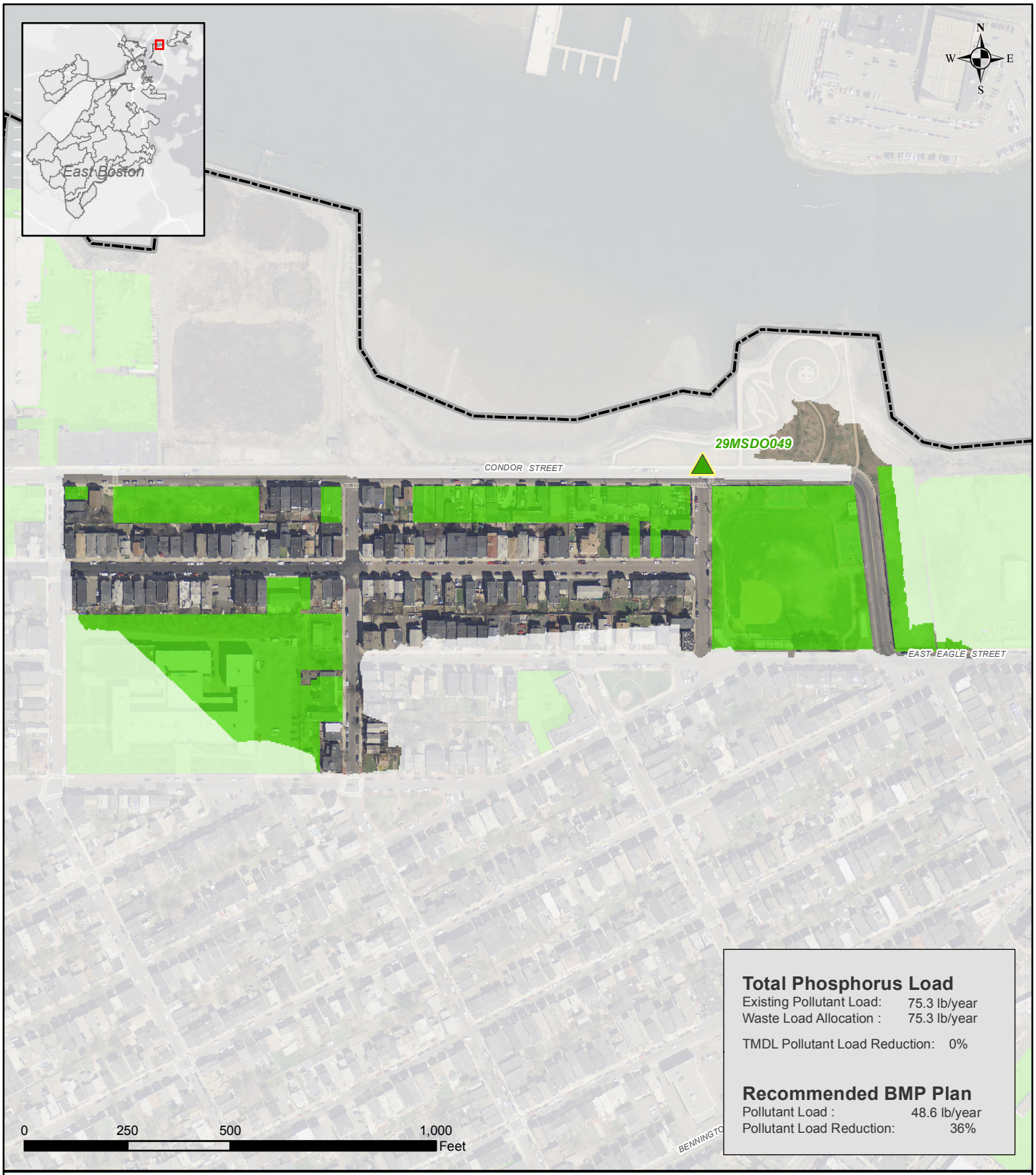
Boston Boundary
Total Catchment Area: 100.1 Acres

Recommended BMP Plan

Reporting Area: Charlestown
Catchment: 29JSDO212

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 75.3 lb/year
Waste Load Allocation : 75.3 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 48.6 lb/year
Pollutant Load Reduction: 36%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 9.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 22.3 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 29MSDO049

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 5.7 lb/year
Waste Load Allocation : 5.7 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 5.5 lb/year
Pollutant Load Reduction: 4%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.2 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 3.0 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 29NSDO015

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	11.3 lb/year
Waste Load Allocation :	11.3 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	9.8 lb/year
Pollutant Load Reduction:	14%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 13.7 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

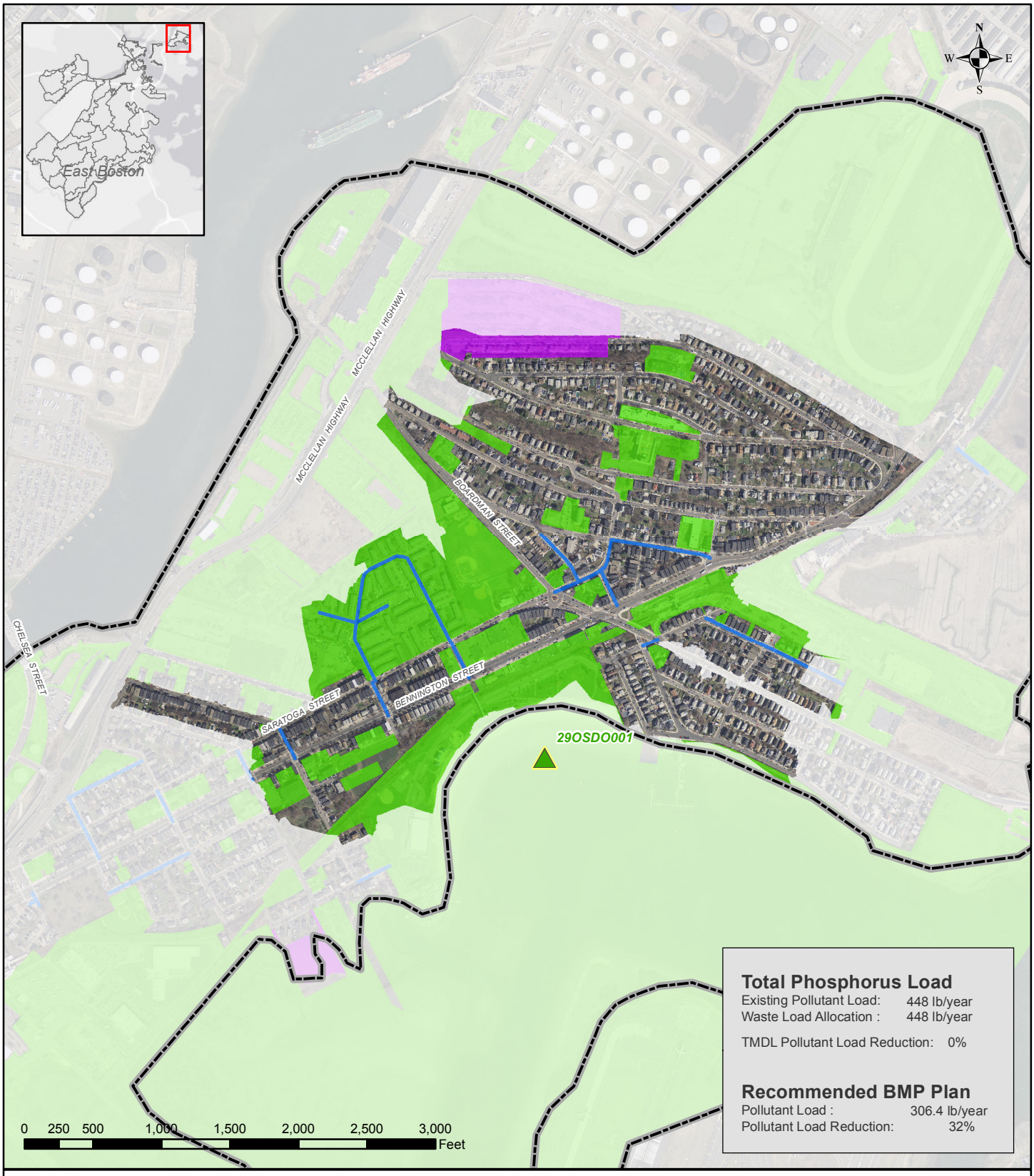
Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 18.6 Acres

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 29NSDO135

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 448 lb/year
Waste Load Allocation : 448 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 306.4 lb/year
Pollutant Load Reduction: 32%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 74.1 Acres
Recommended area: 0.4 Acres

Residential Parcel
Total area of suitable sites: 20.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 1.2 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 232.8 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 29OSDO001

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 2.8 lb/year
Waste Load Allocation : 2.8 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 1.9 lb/year
Pollutant Load Reduction: 34%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.9 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0.1 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 2.6 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 29PSDO015

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 19.5 lb/year
Waste Load Allocation : 19.5 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 14.1 lb/year
Pollutant Load Reduction: 28%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 0.8 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 6.0 Acres

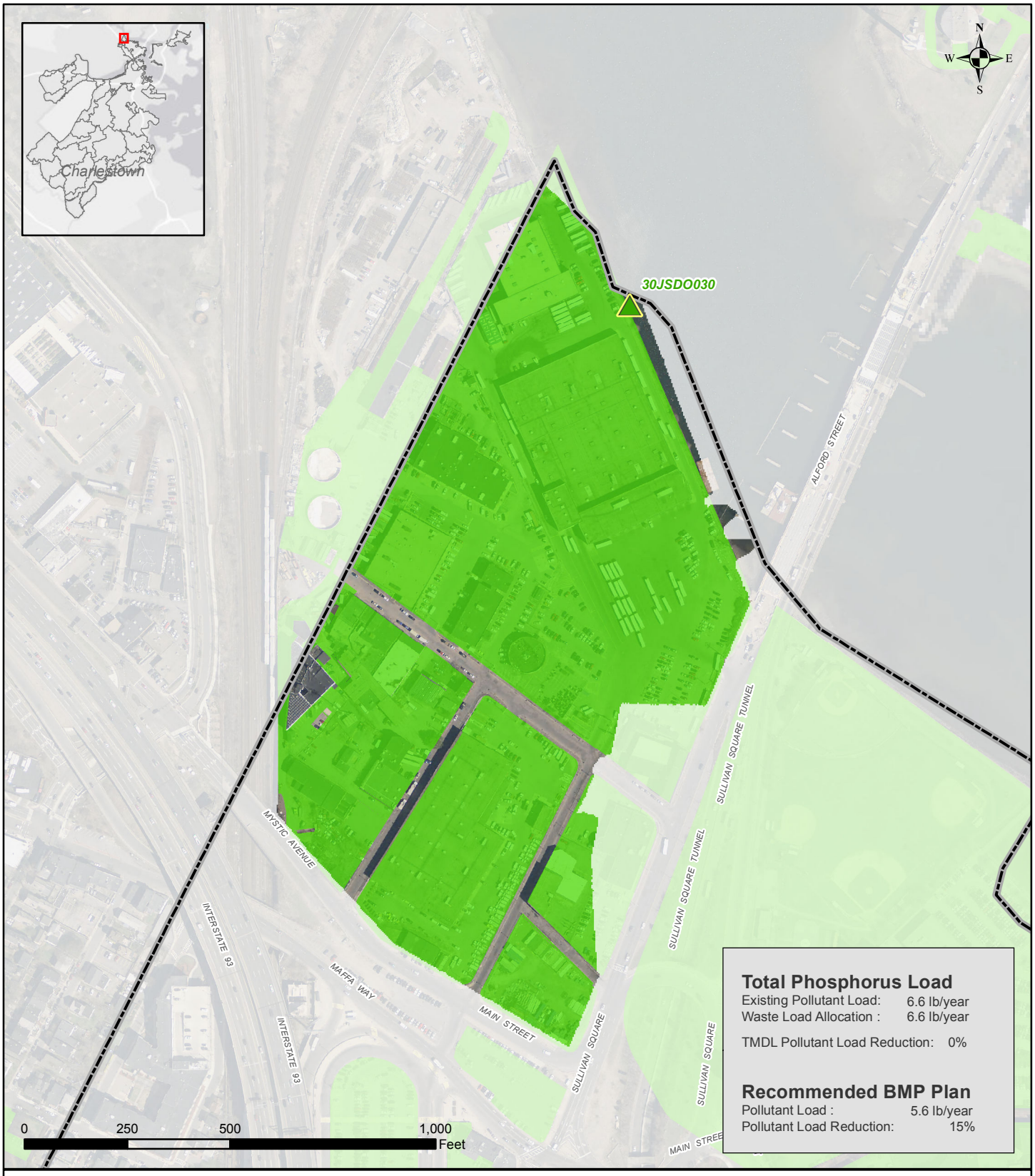
Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 29PSDO044

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	6.6 lb/year
Waste Load Allocation :	6.6 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	5.6 lb/year
Pollutant Load Reduction:	15%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 30.7 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 36.4 Acres

Recommended BMP Plan
Reporting Area: Charlestown
Catchment: 30JSDO030

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	9.8 lb/year
Waste Load Allocation :	9.8 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	6.8 lb/year
Pollutant Load Reduction:	30%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 1.1 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0 Acres
- Recommended area: 0 Acres

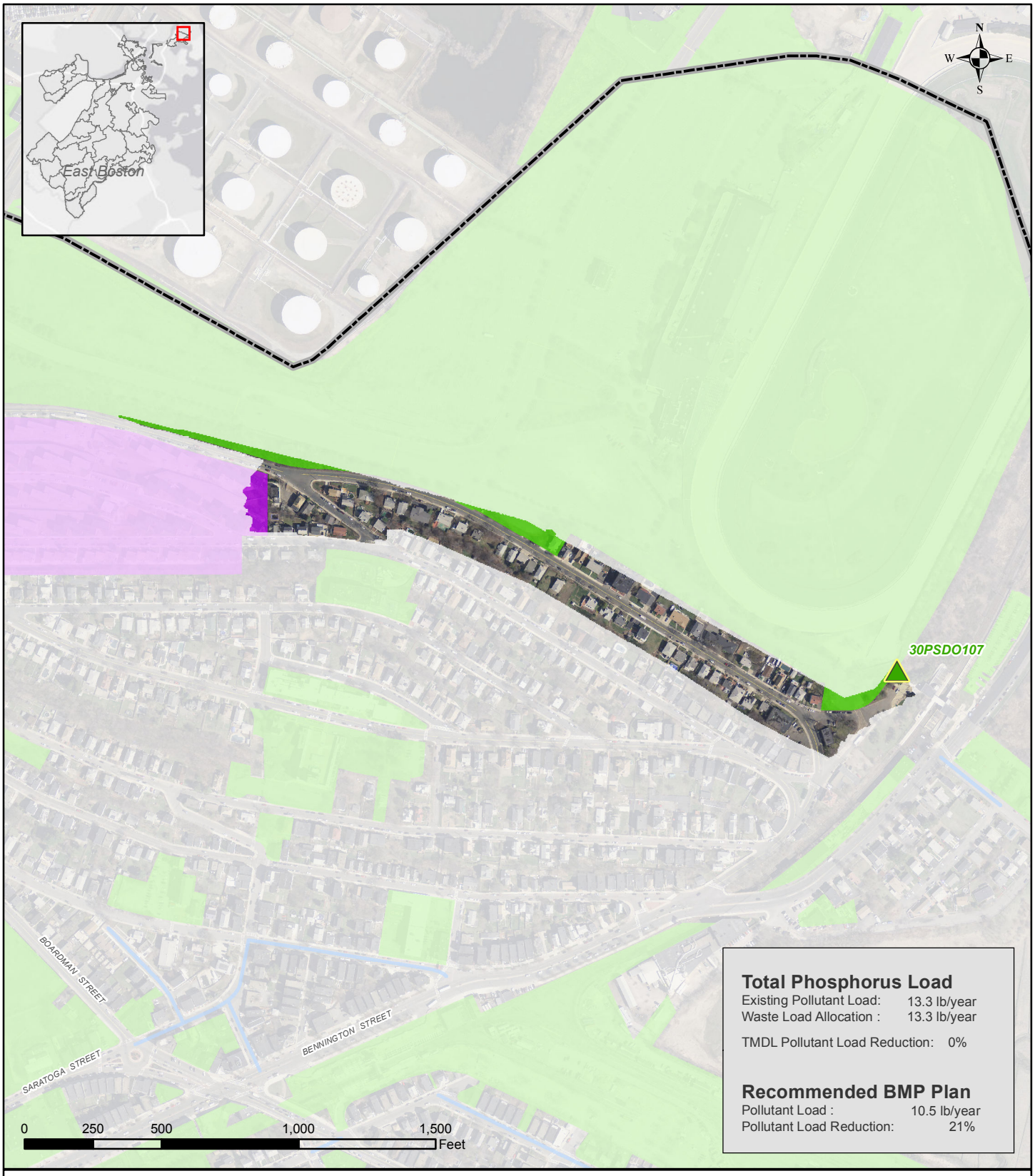
Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 7.9 Acres

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 30PSDO062

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load:	13.3 lb/year
Waste Load Allocation :	13.3 lb/year
TMDL Pollutant Load Reduction:	0%

Recommended BMP Plan

Pollutant Load :	10.5 lb/year
Pollutant Load Reduction:	21%

Legend

Boston Water and Sewer Commission

CH2MHILL

Suitable BMP Areas

Non-Residential Parcel
- Total area of suitable sites: 1.1 Acres
- Recommended area: 0 Acres

Residential Parcel
- Total area of suitable sites: 0.3 Acres
- Recommended area: 0 Acres

Suitable Public Right of Way
- Total area of suitable sites: 0 Miles
- Recommended area: 0 Miles

Boston Boundary
- Total Catchment Area: 12.6 Acres

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 30PSDO107

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 41.2 lb/year
Waste Load Allocation : 41.2 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 33 lb/year
Pollutant Load Reduction: 20%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.5 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 9.8 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 12.7 Acres

Boston Water and Sewer Commission

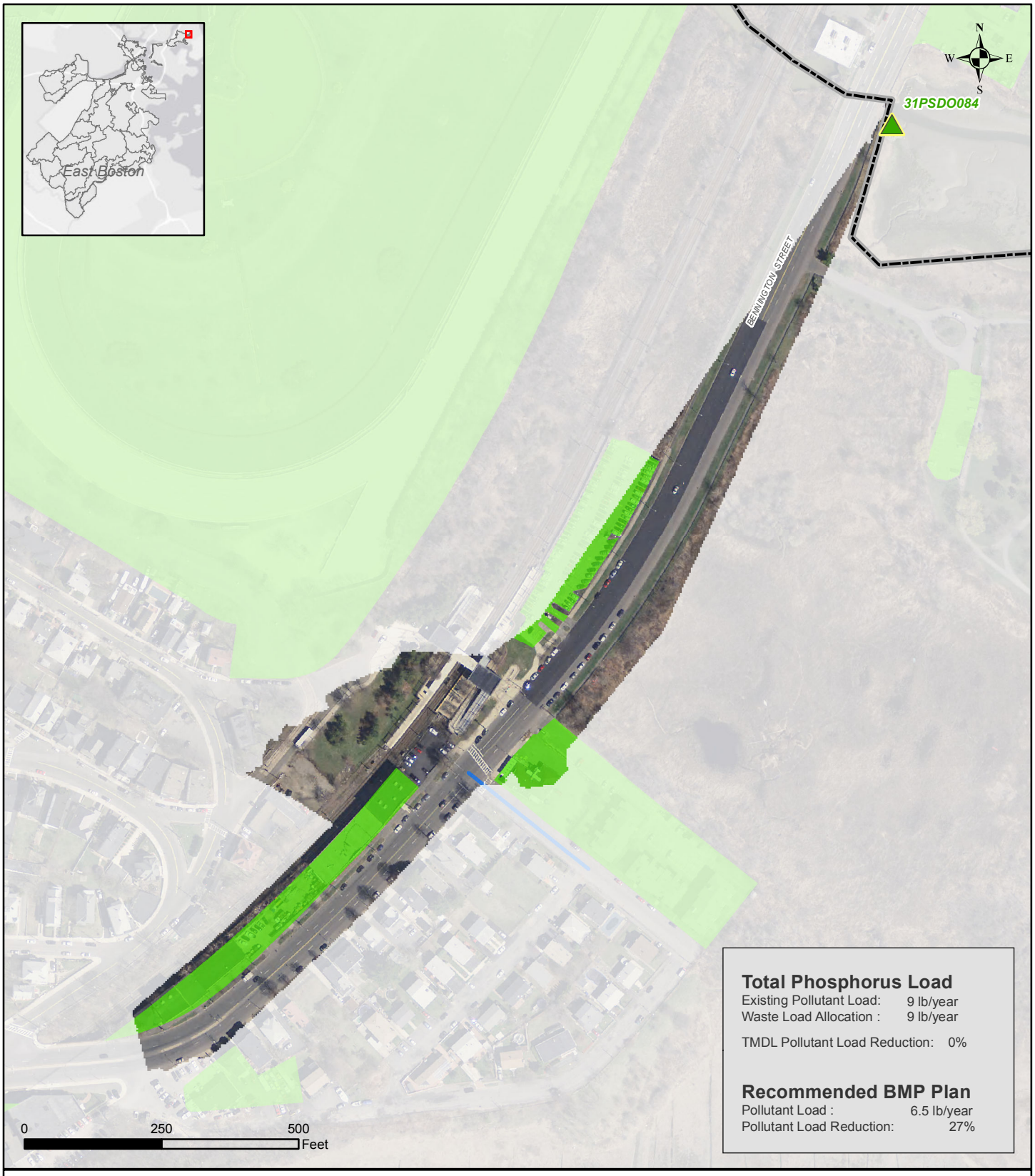
CH2MHILL

Recommended BMP Plan

Reporting Area: East Boston
Catchment: 31OSDO004

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.



Total Phosphorus Load

Existing Pollutant Load: 9 lb/year
Waste Load Allocation : 9 lb/year

TMDL Pollutant Load Reduction: 0%

Recommended BMP Plan

Pollutant Load : 6.5 lb/year
Pollutant Load Reduction: 27%

Legend

Suitable BMP Areas

Non-Residential Parcel
Total area of suitable sites: 1.3 Acres
Recommended area: 0 Acres

Residential Parcel
Total area of suitable sites: 0 Acres
Recommended area: 0 Acres

Suitable Public Right of Way
Total area of suitable sites: 0 Miles
Recommended area: 0 Miles

Boston Boundary
Total Catchment Area: 8.6 Acres

Boston Water and Sewer Commission

CH2MHILL

Recommended BMP Plan
Reporting Area: East Boston
Catchment: 31PSDO084

Boston Water and Sewer Commission

Note: The recommended plan presented in this report is based on the high-level planning study performed using large-scale, available data as well as 2012 modeling data. Actual field conditions will dictate the implementation of BMPs on site-specific locations consistent with the principals prescribed in the recommended plan.

Appendix F
Typical Stormwater BMP O&M Practices

A variety of stormwater BMPs are recommended as part of this plan. Examples include:

- Green Streets (which incorporate a combination of BMPs such as permeable pavements, bioretention, bioswales, infiltration trenches, and others).
- Code-driven Requirements such as ordinance revisions for new development and redevelopment (may include green roofs, bioretention, permeable pavements, infiltration trenches, cisterns, and bioswales, and others).
- Residential BMPs (rain barrels, downspout disconnection, rain gardens, dry wells, and others).
- Other types (constructed wetlands, gravel wetlands, media filters, and others).





Many GI maintenance activities are already routinely performed as part of conventional infrastructure and landscape maintenance programs.

Brief general descriptions of typical O&M practices for the above referenced types of BMPs follow.

Rain Garden/Bioretention

- Clear debris and trash (2 to 4 times per year)
- Clear catch basin/sump/forebay and properly dispose of waste (2 times per year)
- General landscaping such as weeding, infill planting, and irrigation during drought, among other practices (as needed)
- Replacement of mulch as needed (every 2 to 3 years)
- The first 2 to 3 years may require enhanced maintenance until the vegetation is well established.

Dry Well

- Clear debris and trash (2 to 4 times per year)
- Observe actual infiltration rate in comparison to design infiltration rate (annually)
- If infiltration rate is significantly diminished below the design rate, appropriate measures shall be taken to maintain proper functioning of system (replace the media, remove sediment build-up, scarify subgrade, etc)

Underground Infiltration System

- For systems under pervious areas, maintain surface area above infiltration system as designed and avoid compaction by restricting access/frequency of heavy vehicle use (as needed)
- Stabilize any bare soils by adding turf reinforcement matting, mulch, hydroseeding, or other suitable means (as needed)
- Maintain inlets/overflows/cleanouts as necessary (minimum 2 times per year)

Green Roof

- Weeding (2 times per year)
- Fertilize, infill planting (as needed, more frequently during establishment)
- Irrigation may be required during drought, especially during the establishment period
- The first 2 to 3 years may require more frequent attention until the vegetation is well established

Porous Pavement

- Vacuum sweep (2 to 4 times per year)
- Avoid using any sand/cinder based winter traction materials on or near pavement
- Clear away visible debris (as needed)
- Visually inspect surface condition (at least annually, observe during storm events if possible)
- Never seal coat or slurry seal pavement
- Maintain inlets/overflows/cleanouts as necessary
- Keep all contributing areas permanently stabilized
- Never stockpile mulch, top soil, or other deleterious materials on the porous pavement surface
- Clogged areas should be power-washed once identified

Tree Planting

- Pruning(at 1, 3, and 7 years)
- Watering (during dry periods, particularly in first year)
- Removal of trash and debris
- Maintenance of grate or other ground cover (as needed)

Planter Box/Tree Trench

- Weeding and general landscaping (2 to 3 times per year)
- Watering (during dry periods)
- Periodic replacement of soils, plants, and mulch (as needed)
- Removal of trash and debris

Cistern

- Regular inspection of cistern unit and its discharge apparatus (quarterly)
- Clear away and remove debris and sediment (as needed based on water quality)
- Clean gutters and downspouts connected to unit (1 to 2 times per year)
- Document the frequency and rate water is removed from the unit

Constructed Wetlands

- Inspect wetland during both the growing and non-growing seasons (2 to 3 times per year for the first three years following construction, 1 time per year after that)
- Clean out sediment forebay (1 time per year)
- Clean out sediment in basin/wetland systems (once every 10 years)