SOUTH STATION
EXPANSION

South Station Expansion Project

Appendix 8 – Water and Wastewater Technical Report

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massDOT
Massachusetts Department of Transportation

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1. Introduction

The Massachusetts Department of Transportation (MassDOT), the Massachusetts Bay Transportation Authority (MBTA), and the National Railroad Passenger Corporation (Amtrak) have for decades identified the expansion of rail capacity at Boston South Station as a crucial transportation need, one that has been articulated in multiple local, regional, state, and Northeast Corridor (NEC)-wide planning documents.[1] In cooperation with the Federal Railroad Administration (FRA), Amtrak, and the MBTA, MassDOT is now pursuing the expansion of South Station to support existing NEC and commuter rail services and to provide for future Amtrak and MBTA service expansions. The current track capacity, layout, and operations of South Station limit the ability to accommodate projected future expanded services. In addition to expanding South Station terminal facilities, the South Station Expansion (SSX) project will also identify a solution to address existing and future intercity and commuter rail service layover needs. The SSX project includes planning, environmental reviews, and preliminary engineering for the five primary elements of the project:

1. **Expand the South Station terminal facilities**, including the addition of up to seven tracks and four platforms and construction of a new passenger concourse and other amenities.
2. **Acquire and demolish the U.S. Postal Service (USPS) General Mail Facility** located on Dorchester Avenue adjacent to South Station, which will provide an approximate 14-acre site on which to expand South Station. (Note that the relocation of the USPS facility will be the subject of a separate environmental review process by others.) Dorchester Avenue will be restored for public and station access.
3. **Create an extension of the Harborwalk along reopened Dorchester Avenue.**
4. **Provide for the possibility of future joint public/private development** adjacent to and over an expanded South Station.
5. **Provide adequate rail vehicle layover space** to address existing and future intercity and commuter rail service needs.

This Water and Wastewater Technical Report has been prepared in support of the Draft Environmental Impact Report (Draft EIR) and Environmental Assessment (EA) for the SSX project, in accordance with the Certificate of the Secretary of the Office of Energy and Environmental Affairs (EEA) on the Environmental Notification Form (ENF) for the SSX project (April 19, 2013), the Massachusetts Environmental Policy Act (MEPA) regulations, 301 CMR 11.00 (revised, May 10, 2013), and FRA's Procedures for Considering Environmental Impacts, 64 Federal Register (FR) 101 (26 May 1999), pp. 28545-28556.

2. Summary of Findings

This report evaluates the impacts of the SSX project on water supply and wastewater management associated with the project elements.

[1] Documents citing the need for an expanded South Station include: *Critical Infrastructure Needs on the Northeast Corridor* (2013), *The Northeast Corridor Infrastructure Master Plan* (2010); *The Amtrak Vision for High-Speed Rail in the Northeast Corridor* (2010), *A Vision for the Northeast Corridor* (2012), the Massachusetts Department of Transportation *Rail Plan* (2010), the Massachusetts Department of Transportation *Freight Plan* (2010), and the two most recent long range transportation plans of the Boston Region Metropolitan Planning Organization (2007, 2011).

The Boston Water and Sewer Commission (BWSC) indicates that there is currently adequate capacity in the existing water and sewer mains in the immediate vicinity of the South Station site. A preliminary review of the existing water and sewer mains along Atlantic Avenue indicates that there is likely adequate capacity to service the project alternative with the greatest demand (Alternative 3 – Joint/Private Development Maximum Build). Alternative 3 would result in an increase of approximately 411,950 gallons per day (gpd) of potable water and 453,150 gpd of sewage; an increase 122% from existing conditions. Alternative 1 – Transportation Improvements Only and Alternative 2 – Joint/Private Development Minimum Build would require less system capacity due to lower demand driven by reduced development amounts. The existing BWSC system would also have adequate capacity for these two Alterantives.

However, due to the location of proposed development structures, it is likely that new or larger service connections would be required to service the South Station site under Alternative 3. Most of the utilities that currently service the South Station Site are located on Kneeland Street and Atlantic Avenue. There is not as extensive of a network of utilities on Dorchester Avenue. Depending upon the construction sequencing of the joint/private development, there could be a need to provide new or larger water and sewer service connections on Dorchester Avenue. As design advances, MassDOT will re-evaluate the need for service upgrades at the South Station site.

Additionally, BWSC indicates that in the vicinity of the layover facility sites, the capacity of the existing system is adequate to provide the proposed water demand and accept the proposed wastewater discharge from the three sites.

For Widett Circle, water use and wastewater generation would decrease between existing and build conditions. Water intensive food production processes would be eliminated and much of the site would be converted from buildings to tracks. Therefore, water use would decrease from 13,140 gpd to 5,850 gpd and wastewater would decrease from 14,460 gpd to 6,440 gpd in the Build condition. This would represent a decrease of approximately 55% for both water use and wastewater generation.

For the Beacon Park Yard site, water demand and wastewater generation would increase under the Build condition as the site is currently unoccupied and no water or wastewater service exists. Water use would increase from zero gpd to 4,290 gpd and wastewater generation would increase from zero gpd to 3,900 gpd.

For the Readville – Yard 2 site, the existing layover facility would be expanded to include additional tracks and associated facilities. This expanded facility would result in an increase of approximately 80% in water use and wastewater generation. Water use would increase from 2,150 gpd to 3,870 gpd and wastewater generation would increase from 1,950 gpd to 3,510 gpd.

To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

3. Regulatory Context

Water and wastewater regulations pertaining to the SSX project include state, and local regulations concerning public drinking water supply delivery and wastewater management. The Massachusetts Water Resources Authority (MWRA) provides potable water to and accepts wastewater from many communities within the Metropolitan Boston area, including the four SSX project sites. The BWSC services individual properties through its water and wastewater piping network, distributes potable water, and collects wastewater throughout Boston. Per 248 CMR 10, water usage is determined based upon the amount of

wastewater generated using 310 CMR 15, the State Environmental Code (Title V). The methodologies used to estimate wastewater generated and water usage are included in Section 4.1. of this report.

New water infrastructure and connections to existing infrastructure would be designed and constructed in accordance with BWSC's governing regulations, including water distribution facilities. Compliance with the standards for the water system service connections and fire protection systems would be reviewed as part of BWSC's site plan review process, to be completed as design progresses. The review would include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants to be in conformance with BWSC and Boston Fire Department requirements.

In addition, the fire protection system would meet all applicable standards and requirements as set forth in the Boston Fire Prevention Code, the most recent Massachusetts Building Code, which refers to the National Fire Protection Association Handbook, the Massachusetts Fire Prevention Regulation (527 CMR), and the Massachusetts Fire Prevention Laws (M.G.L. CH 148).

3.1. Wastewater

BWSC's "Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains of the Boston Water and Sewer Commission"[2] regulate the design, construction, maintenance and operation of project wastewater facilities. The BWSC's regulations reinforce the requirements of the MWRA Sewer Use Rules and Regulations. For the construction, connection or the change in size or location of any wastewater service pipe connecting to a public sewer, BWSC requires the submission of a General Service Application to BWSC and adherence to BWSC design requirements, including required tests, studies, investigations and inspections.

Per BWSC regulations, the current South Station and layover facility site establishments, uses and occupants are not considered to be generators of "Industrial Waste." Industrial waste is defined as: "*any solid, liquid or gaseous waste or wastewater, resulting from an industrial or manufacturing process, a commercial, governmental, or institutional activity, or from the development, recovery or processing of natural resources. Industrial wastes do not include, and are distinct from, sanitary sewage, uncontaminated cooling water, non-contact cooling water and non-contact industrial process water."* No anticipated industrial waste components are anticipated to be generated as part of the SSX project. As a result, the project would not require special equipment other than oil/water separators to treat wastewater generated from restrooms and crew facilities, kitchens, restaurants, cafeterias and other cooking establishments.

Massachusetts Department of Environmental Protection's (MassDEP's) Policy on Managing Infiltration and Inflow in MWRA Community Systems[3] requires that additional wastewater flows must be offset by reducing inflow and infiltration (I/I) into sewer systems if the project generates 15,000 or more gpd of wastewater. Demonstration of compliance with MassDEP's policy to reduce I/I generally consists of calculating the net increase in wastewater flows to the sewer system and identifying improvements to the sewer system directly tributary to the MWRA interceptor system where the development will occur. Mitigation is required at a 4:1 ratio: for every one gallon of flow into the system due to the new development, four gallons of inflow must be removed from the system.

[2] Adopted February 27, 1998
[3] Massachusetts Department of Environmental Protection, Policy No. BRP 09-01, September 24, 2010.

MassDEP's Sewer System Extension and Connection Program, 314 CMR 7.00, was adopted to insure proper operation of wastewater treatment facilities and sewer systems within the Commonwealth. Both the MWRA and the BWSC requirements are governed by these regulations.

MWRA Sewer Use Rules and Regulations, 360 CMR 10.00, direct that for the communities it services, wastewater collection facilities must be designed to MWRA standards, including minimizing I/I and insuring the separation of stormwater, surface water, groundwater from sanitary sewage to avoid undue burdens on MWRA treatment facilities. Wastewater from BWSC's system is treated at MWRA's Deer Island Wastewater Treatment Facility, which ultimately discharges to Massachusetts Bay. MassDEP's Policy on Managing Infiltration and Inflow in MWRA Community Systems[4] requires additional wastewater flows to be offset by reducing I/I into sewer systems. MassDEP's Sewer System Extension and Connection Program (314 CMR 7),[5] mandates proper operation of wastewater treatment facilities and sewer systems within the Commonwealth.

Crossing through and in the immediate vicinity of the project sites are combined sewer outfalls (CSOs) which are regulated via National Pollution Discharge Elimination System (NPDES) permits, some of which include federal mandates regarding the frequency and volume of discharges. MWRA administers the NPDES program in the vicinity of the South Station site regulating the combined sewer outfalls (CSOs). Section 3 of Appendix 7 - *Water Quality and Stormwater Technical Report* provides a discussion of the NPDES program and classification of Fort Point Channel.

3.2. Water

BWSC's "Regulations Governing the Use of Water Distribution Facilities of the Boston Water and Sewer Commission," adopted December 21, 2000, regulate the design, construction, maintenance and operation of project water distribution network and facilities. As with wastewater, BWSC's regulations regarding water distribution generally reinforce the requirements of the MWRA regulations for water distribution facilities. Construction, connection or the change in size or location of any water service pipe connecting to a public water main require a permit from BWSC.

The "Boston Fire Prevention Code Ordinances of 1979**,"** Chapter 28, effective August 7, 1979, Title 11, Chapter 3, as amended, regulates the design, construction, maintenance and operation of the projects in the city. During the SSX project final design process, as required, hydrant flow tests and other investigations will be conducted to determine the existing BWSC distribution system's ability to provide fire suppression water in adequate pressures and volume.

4. Existing Conditions

This section describes existing water and wastewater systems in the immediate vicinity of the South Station site and three layover facility sites. Figure 1, Figure 2, Figure 3, and Figure 4 show the boundaries of the four project sites.

For this DEIR analysis, existing water use at the SSX project sites has been estimated on a conceptual level based upon the amount of wastewater generated, using 310 CMR 15, the State Environmental Code Regulating Septic Systems (Title 5). For the South Station site, for each use within a building space, a Unit Value was determined from Title 5. Where a Unit Value was not found that specifically addressed

[4] Massachusetts Department of Environmental Protection, Policy No. BRP 09-01, September 24, 2010.
[5] Massachusetts Executive Office of Environmental Affairs. 314 CMR 7.00. http://www.mass.gov/eea/agencies/massdep/water/regulations/314-cmr-7-00-sewer-system-extension-and-connection.html.

the Unit Values of a specific space, an alternative value was used and is cited in the footnotes. The Unit Value was applied to the Total Unit to determine the Quantity of the wastewater being generated at each Location. The total quantity generated is the sum of Quantity column. Existing water meter readings were obtained from BWSC for the MBTA and USPS properties. The total estimated use was compared to the actual water meter readings to confirm validity of generation levels. Domestic water demand is based on estimated wastewater generation with an added factor of 10% to account for consumption, system losses, and other use.

Domestic water demand is based on estimated sewage generation with an added factor of 10% to account for consumption, system losses, and other use. Estimated use was compared to actual water meter readings for buildings at the South Station site (including existing transportation facilities and the USPS General Mail Facility) to confirm generation levels. This exercise confirmed the estimation process described above.

4.1. South Station Site

Figure 5 presents a schematic of the existing water distribution and wastewater collection systems at the South Station site. This information was gathered through ground survey and identification of existing utilities of the site.

At the South Station site along Atlantic Avenue, an extensive BWSC water distribution system exists. To a lesser extent, a water system exists along Dorchester Avenue. Along Atlantic Avenue, from Kneeland Street to the existing South Station headhouse at Summer Street, there are three water mains providing service connections to the site. From the headhouse, the three water mains extend eastward on Summer Street past 245 Summer Street where they continue north on Dorchester Avenue. Two water mains are located along Dorchester Avenue, providing service to the USPS General Mail Facility. An additional water 8” main is located on the east side of the yard area adjacent the existing track.

Existing wastewater collection at the South Station site is provided through a series of BWSC sanitary sewer mains, combined sewer mains, and CSOs. In general, sanitary sewers convey wastewater (sewage). During storm events with higher flows where capacity is exceeded, wastewater and stormwater flows combine and are diverted to CSOs, which outlet to Fort Point Channel. A gravity sewer main exists along the west side of Dorchester Avenue, and at different points collects sewage from the USPS facility, the I-90 Vent Building, and the existing headhouse. At and adjacent to the South Station site, two combined sewer mains, originating off-site via Beach Street and Kneeland Street, discharge to Fort Point Channel via one of two CSOs, BOS 064 or BOS 065, along Dorchester Avenue. A third CSO, BOS 068, is located within the site just south of the existing USPS facility.

This combined sewer line flows northward from Foundry Street as a 30-inch by 60-inch reinforced concrete pipe. As it crosses Broadway it then heads eastward and crosses Dorchester Avenue. From there it enlarges to a 40-inch by 60-inch concrete culvert where it outlets to Fort Point Channel. During final design, MassDOT will confirm existing outflows.

Table 1 presents the existing estimated wastewater generation for the South Station site. Existing wastewater generation is estimated to be 338,950 gpd.

Domestic water use is based on estimated wastewater generation with an added factor of 10% to account for consumption, system losses, and other use. Based on an estimated wastewater generation of 338,950 gpd, existing water usage at the South Station site, consisting of the rail terminal, bus terminal South Station retail and office space, and the USPS facility, is estimated to be 372,850 gpd.

Table 1—Existing Estimated Wastewater Generation at South Station Site

Location	Use	Unit Flow[a] (gpd)	Total Unit	Quantity (gpd)
Existing South Station Headhouse	Rail Terminal[b]	5 gpd/passenger	46,000 passengers	230,000
CVS (2nd floor) @ South Station	Retail[c]	50 gpd/1,000 sf	21,710 sf	1,090
South Station Office (2nd-5th floors)	Office[c]	75 gpd/1,000 sf	12,890 sf	9,440
Bus Terminal Bus Level, Mezzanine/ Food Court	Bus Terminal[d]	5 gpd/passenger	15,100 passengers	75,550
Bus Terminal Parking Levels 1 and 2 (Passenger Vehicles)	Parking[e]	---	---	200
USPS General Mail Facility	Light Industry[c]	20 gpd/employee	1,136 employees	22,720
Total				**338,950**

a Values from 310 CMR 15 or 314 CMR 7
b Rail terminal = Amtrak +MBTA Commuter Rail passengers: 46,000 (2012). Assumes same per capita unit flow as airport from 310 CMR 15 (5 gallons/passenger)
c Assumes one employee/1000 SF of floor space
d Bus terminal = Local Bus and Intercity/Regional Bus passengers: 15,000 (2012). Assumes same per capita unit flow as airport from 310 CMR 15 (5 gallons/passenger).
e Estimated value, assuming 100 gallons/day per level = 200 gallons/day.

4.2. Layover Facility Sites

4.2.1. Widett Circle

As shown in Figure 6, BWSC water mains, sewers, and combined sewers are located within the Widett Circle Loop Road and in Foodmart Road in the vicinity of the Widett Circle layover facility site.[6] The water line within Foodmart Road connects on either end to the line within Widett Circle, making a loop in the water system. The water mains appear to be fed from a system off Frontage Road. The age and size of these pipes are unknown. A 12-inch separated sewer located within Foodmart Road discharges to a 15-inch separated sewer in Widett Circle, which collects waste from the facilities within Widett Circle and discharges to a combined sewer system on Albany Street.

A 20-inch by 16-inch CSO line bisects the site through the eastern part of Widett Circle and discharges overflow to Fort Point Channel (BOS 070). In addition, a 66-inch by 92-inch combined sewer line from the southeast ties into this trunk line on the site. The age and condition of these pipes are unknown. It is unclear if underground structures exist where connections occur. No sewer service from the existing facilities appears to connect to the combined sewer lines.

[6] Boston Water and Sewer Commission. *Utility Mapping*. April 2010.

Wastewater generation from the existing facilities within the Widett Circle layover facility site boundary was estimated based on a series of assumptions. The factory or industrial plant (warehouse) use (without cafeteria space, with 40% office space) was selected from MassDEP's Title 5: On-Site Sewage Treatment sewage flow estimates table (310 CMR 15.203) to best represent the existing facilities for estimating sewage flows. This use selection does not take into account any process wastewater which may originate from the existing facilities. Table 2 shows the estimated wastewater generation for the existing Widett Circle layover facility site.

Table 2—Existing Estimated Wastewater Generation at Widett Circle Site

Source	Unit	Quantity	Estimated Generation Rate (gallons/day)	Wastewater Estimate (gallons/day)
Factory/Warehouse Workers	Person	292	15/person	4,380
Office Space	sf	116,800	75/1,000 sf	8,760
Total				13,140

Notes: approximate number of factory/warehouse workers is based on 1 per 1,000 sf

Domestic water use is based on estimated wastewater generation with an added factor of 10% to account for consumption, system losses, and other use and does not include non-domestic water uses. Based on an estimated wastewater generation of 13,140 gpd, existing water usage at the Widett Circle layover facility site is estimated to be 14,460 gpd.

4.2.2. Beacon Park Yard

As shown in Figure 7, BWSC water mains, sewer mains, and combined sewers are located within the streets surrounding the Beacon Park layover facility site.[7] The 12-inch water main in Cambridge Street provides services to the existing I-90 toll buildings. A 6-inch service line also runs within the existing access road for the site. The age and condition of these pipes are unknown.

BWSC sewers and combined sewers are located within the surrounding streets, including Cambridge Street. Additionally, a 32-inch by 42-inch MWRA sewer crosses the site in a south-north direction. The large sewer crossing the site collects wastewater from sewer systems to the south of the site and discharges it to the Cottage Farm CSO facility in Cambridge. Beneath the tracks on the site, the sewer has a directional change where there is likely a larger structure. The age and condition of these pipes and structures are unknown. The location of existing sewer services, if any, from the site is unknown. As design advances, MassDOT will confirm existing conditions with BWSC.

Additionally, according to Massachusetts Turnpike Authority record plans, an underground waterway known as Salt Creek is conveyed in a seven-foot by seven-foot concrete culvert under the site and discharges directly to the Charles River.[8] The outfall to the Charles River includes a containment boom in the river to control the spread of oil and floatables. Stormwater from the parking areas at the Beacon Park Yard site is currently collected in a series of catch basins and likely discharges to the culverted stream. The existing ballasted tracks at the Beacon Park Yard site likely include underdrains to collect stormwater and outfall to the stream culvert to the east of the site. Based on existing aerial survey, no existing surface stormwater detention, infiltration, or treatment measures are in place in the Beacon Park Yard site. Additional information on the existing stormwater management infrastructure at Beacon Park Yard will be obtained during preliminary design.

[7] Boston Water and Sewer Commission. *Utility Mapping*. April 2010.
[8] Massachusetts Turnpike Authority. *Boston Extension Section No. C-2 Grading and Drainage Plan.* Sheet HC2-33.

No operations currently exist at the Beacon Park Yard layover facility site. Therefore, it is estimated that the existing wastewater generation and water usage from the Beacon Park Yard site are zero.

4.2.3. Readville – Yard 2

As shown in Figure 8, a 10-inch BWSC water main crossing the Readville-Yard 2 site provides water service to existing facilities, and connects the neighborhood south of the site to a 12-inch water main in Truman Highway.[9] BWSC separated sewers are located in the areas surrounding the site, including an 8-inch main in Wolcott Street to the south. Existing buildings on the Readville – Yard 2 site discharge their wastewater to the BWSC system. The age, condition and size of these pipes and services are unknown.

Wastewater generation from the existing facilities at the Readville – Yard 2 layover facility site was estimated based on a series of assumptions. The existing layover facility was estimated to have 10 trainsets with a 5-person crew per trainset. The factory or industrial plant (warehouse) with cafeteria use was selected from MassDEP's Title 5: On-Site Sewage Treatment sewage flow estimates table (310 CMR 15.203) as the best fit establishment for calculating sewage flows from the administrative staff. For the train staff, the wastewater generation rate was based on the best fit estimate of the washroom and toilet use of the camp, resident, mess hall use category. Table 3 shows the estimated wastewater generation for the existing Readville – Yard 2 layover facility site.

Table 3—Existing Estimated Wastewater Generation from Readville – Yard 2 Site

Source	Personnel	Estimate Generation Rate (gallons/day)	Wastewater Estimate (gallons/day)
Train Staff	50	35/person	1,750
Administrative Staff	5	20/person	100
Visitors	5	20/person	100
Total	60		1,950

Domestic water use is based on estimated wastewater generation with an added factor of 10% to account for consumption, system losses, and other use. Based on an estimated wastewater generation of 1,950 gpd, existing water usage at the Readville – Yard 2 layover facility site is estimated to be 2,150 gpd.

5. Potential Impacts

This section estimates utility usage associated with the SSX project and evaluates the impacts of the project on water supply and service distribution, and wastewater management.

For this DEIR analysis, proposed water use at the SSX project sites has been established on a conceptual level based upon the amount of wastewater generated, using 310 CMR 15, the State Environmental Code Regulating Septic Systems (Title 5). Domestic water demand is based on estimated sewage generation with an added factor of 10% to account for consumption, system losses, and other use.

[9] Massachusetts Turnpike Authority. *Boston Extension Section No. C-2 Grading and Drainage Plan.* Sheet HC2-33.

5.1. No Build Alternative

5.1.1. Summary

The No Build Alternative represents a future baseline condition against which the Build Alternatives are compared. With the No Build Alternative, South Station, including the headhouse and track operations, and the USPS General Mail Facility, would remain as they currently exist. The majority of Dorchester Avenue at the site would remain in private use by the USPS in support of USPS operations. Extending from the southern line of Summer Street, the MBTA would continue to maintain a permanent easement along Dorchester Avenue for pedestrians and vehicles of over approximately 200 feet. Generally unrestricted public access would continue to be provided along Dorchester Avenue of over approximately 400 feet for customer use of USPS facilities.

With the No Build Alternative, there would be no private development associated with South Station beyond the development previously approved by the Massachusetts EEA: the South Station Air Rights (SSAR) project. The SSAR project was approved by the Secretary of EEA in 2006 (EEA No. 3205/9131) as an approximate 1.8 million square foot mixed-use development to be located directly above the railroad tracks at the South Station headhouse. The SSAR project also includes a horizontally expanded bus terminal of approximately 70,000 square feet, pedestrian connections from the train station concourse and platforms to the expanded bus terminal, and a three-level parking garage with 775 spaces located above the bus terminal.

With the No Build Alternative, the Widett Circle site would remain in private development. The Beacon Park Yard site would remain largely the same as today, with the exception of highway reconfiguration of the Massachusetts Turnpike to the north of the site and MBTA Worcester Line track improvements to the south of the site. The MBTA would continue to use Readville – Yard 2 to provide layover space for 10 trainsets.

5.1.2. Impacts Analysis

Estimated water usage and wastewater generation for the No Build Alternative was not determined. The estimated water usage and wastewater generation for the SSX project is based on Alternative 3, which is the "worst case" scenario in terms of square footage of development.

5.2. South Station Build Alternatives

Alternative 1 - Transportation Improvements Only

Alternative 1 would include the previously-approved private development included in the No Build Alternative. In addition, South Station would be expanded onto the adjacent 14-acre USPS property. MassDOT would acquire and demolish the USPS General Mail Facility/South Postal Annex. The existing South Station Terminal would be expanded by approximately 400,000 square feet, consisting of an expanded passenger concourse and passenger support services. Capacity improvements would include construction of up to seven new tracks and four platforms for a total of up to 20 tracks and 11 platforms. Tower 1 Interlockings and approach interlockings at the terminal approach would be reconstructed. With Alternative 1, no provision would be made for future private development as part of the SSX project.

Dorchester Avenue would be restored for public and station access. Restoration of Dorchester Avenue would reconnect Dorchester Avenue to Summer Street as a public way. It would include landscaping and improved pedestrian and cycling connections and facilities (adjacent sidewalks, crosswalks, and cycle

track). Restoration also would include construction of a long-awaited extension of the Harborwalk along reopened Dorchester Avenue.

Alternative 2 - Joint/Private Development Minimum Build

Alternative 2 would include all of the improvements included in Alternative 1, including provisions for future private development by incorporating appropriate structural foundations into the overall station and track design. Future private development with Alternative 2 could include approximately 660,000 square feet of mixed-use development consisting of residential, office, and commercial uses, including retail and hotel uses, with building heights ranging up a maximum of 130 feet within jurisdictional filled tidelands. Development could include approximately 234 parking spaces, not including public/private shared parking opportunities.

Alternative 3 - Joint/Private Development Maximum Build

Alternative 3 would include all of the improvements included in Alternative 1, including provisions for future private development by incorporating appropriate structural foundations into the overall station and track design. Future private development with Alternative 3 potentially could include approximately 2.1 million square feet of mixed-use development consisting of residential, office, and commercial uses, including retail and hotel uses, with building heights ranging up to approximately 21 stories. Development could include approximately 506 additional parking spaces, not including public/private shared parking opportunities.

In Alternative 3, the maximum potential for future private development at the South Station complex would be limited by the FAA's maximum building height limits, pursuant to the Terminal Instrument Procedures (TERPS) regulations applicable to Boston Logan International Airport. Accordingly, MassDOT determined that building heights would be limited to approximately 290 feet. Alternative 3 would require an amendment to the MHP, modifying applicable Chapter 91 regulations

5.3. South Station Site

5.3.1. Impact Analysis

The estimated water usage and wastewater generation for the SSX project at the South Station site is based on Alternative 3, which is the "worst case" scenario in terms of square footage of development.

5.3.2. Estimated Water Demand and Wastewater Generation

Table 4 presents the estimated wastewater generation for the South Station site under Alternative 3, based on Massachusetts Environmental Code standard generation rates and assumptions presented in Section 4. The estimated total daily wastewater generated for the Alternative 3 would be 750,900 gpd, an increase of 122% or 411,950 gallons per day, from the existing 338,950 gpd.

Table 4—Estimated Proposed Wastewater Generation for South Station

Location	Use	Unit Flow (gpd)	Total Unit	Quantity (gpd)
Existing South Station Headhouse and Terminal Expansion	Rail Terminal[a,b]	5 gpd/passenger	83,000 passengers	415,000
CVS (2nd floor) @South Station	Retail[a]	50 gpd/1,000 sf	21,710 sf	1,090
South Station Office (2nd – 5TH floors)	Office[a]	75 gpd/1,000 sf	125,890 sf	9,440
Bus Terminal Bus Level, Mezzanine/Food Court	Bus Terminal[a,b]	5 gpd/passenger	17,300 passengers	86,500
Parking Levels 1 and 2 (Passenger Vehicles)	Parking[c]			200
Mixed-Use Development Residential, Studio (12%)	155 Units, 1 Bedroom [a]	110 gpd/bedroom	155 bedrooms	17,050
Residential, 1-Bedroom (53%)	513 Units, 1 Bedroom[a]	110 gpd/bedroom	513 bedrooms	56,430
Mixed-Use Development Residential, 2-Bedroom (30%)	155 Units, 2 Bedrooms[a]	110 gpd/bedroom	310 bedrooms	34,100
Mixed-Use Development Residential, 3-Bedroom (5%)	19 Units, 3 Bedrooms[a]	110 gpd/bedroom	57 bedrooms	6,270
Mixed-Use Development Office	Office[a]	75 gpd/1,000 sf	917,300 sf	68,800
Mixed-Use Development Hotel	417 Units, 1 Bedroom[a]	110 gpd/bedroom	334 bedrooms	45,870
Mixed-Use Development Hotel, Amenity	Lounge and Restaurant[a,d]	28 gpd/seat	220 seats	6,160
Mixed-Use Development Hotel, Amenity	Function Room[a,e]	2 gpd/seat/5	300 seats	120
Mixed-Use Development Hotel, Amenity	Retail[a]	50 gpd/1,000 sf	1,000 sf	50
Mixed-Use Development Retail	Retail[a]	50 gpd/1,000 sf	75,620 sf	3,780
Mixed-Use Development Total				**750,900**

a Values from 310 CMR 15 or 314 CMR 7
b Assumes same per capita unit flow as an airport from 310 CMR 15 (5 gallons/passenger) with 83,000 daily rail passengers and 17,300 daily intercity and local bus passengers (2035)
c Estimated value, assuming 100 gallons/day
d Estimated value, assuming one lounge at 150 seats and one restaurant at 200 seats, weighted average unit flow = 28 gallons/day
e Estimated value, assume seating for 300, unit flow similar to Country Club Dining (10 Gal/Seat), at one-fifth the frequency

Domestic water demand is based on estimated sewage generation with an added factor of 10% to account for consumption, system losses, and other use. Based upon these parameters, the daily flow would increase to 826,000 gallons per day, an increase of 122% or 453,150 gallons per day, from the existing 372,850 gallons per day.

5.3.3. Water Demand and Wastewater Impacts Analysis

Demand, Needs, and Capacity

According to BWSC, there is adequate capacity available in its water and sewer mains in the immediate vicinity of the South Station site to accommodate the SSX project Alternative 3. Capacities would need to be confirmed in the final design stages. The existing facilities on the site use potable water and produce wastewater through their commercial and domestic activities. Water demand and wastewater generated would increase as a result of the SSX project. Therefore, measures will need to be incorporated to mitigate the increased volumes. The SSX project would incorporate water efficiency measures to meet MassDOT GreenDOT sustainability goals related to water and wastewater. Measures such as low flush toilets, which would minimize the use of water and wastewater generation, will be considered as well as any other measures that would improve conservation. These measures will be further identified as the design progresses.

CSO and Infiltration / Inflow

In the Alternative 3, the estimated wastewater discharges associated with the SSX project would exceed the 15,000 gallon/day threshold required to perform I/I offsets, according to MassDEP's Policy on Managing Infiltration and Inflow in MWRA Community Systems. Therefore, the SSX project would be required to offset the increased flows. This will be done by finding where stormwater is entering into sanitary sewer lines and provide improvements to prevent the stormwater inflow. This may include replacing or relining existing pipes or installing new pipes. Through I/I reduction and minimal impacts to stormwater runoff rates, the SSX project will not adversely impact the CSOs with an increased flow of stormwater, in the South Station site vicinity. Best Management Practices (BMPS) will be considered and implemented for the management of stormwater which will assist with reducing I/I into the sewer system. The I/I mitigation plan will be further developed as project design progresses. The new development spaces will incorporate high-efficiency fixtures and systems, which should create substantial offset of waste water generation.

Construction Impacts

The proposed construction at the South Station will avoid impacts to existing subsurface utilities via direct contact with pipes and structure, vibrations or settling. The use of existing wastewater systems may be required during construction to provide a wastewater discharge for construction-time needs. An effort will be made to minimize conflicts between utilities and structural elements within the South Station site. For BWSC owned facilities, every effort will be made to not impact such facilities. Dewatering discharges will not be connected to the sewer system and will be done in accordance local, state and federal standards.

Presently the USPS building is situated over the BWSC's 81 inch x 81 inch Kneeland Street CSO. Demolition of the USPS building and any construction activity of new SSX facilities will be required to maintain the structural integrity and provide outlet protection of this CSO, and also access for continued inspection and maintenance activities.

Sea Level Rise

Sea levels are rising in Boston Harbor and across the globe, as evidenced through empirical data. In order to assess future risk and planning for rising seas, Massachusetts Office of Coastal Zone Management (CZM) recommends selecting specific scenarios. As directed by the Secretary of EEA, the SSX project DEIR assesses the impacts of a two-foot sea level rise upon the SSX project, which is consistent with planning for a project with a design life of 50 years.

Sea level rise could affect downstream CSOs and MWRA facilities, which in turn could affect the performance of the South Station wastewater system. At the three CSO outlets to Fort Point Channel (CSO 064, CSO 065 and CSO 068), may require additional mitigation measures to minimize seawater entering back into the combined sewer lines. Further coordination with BWSC will be performed as the project progresses.

5.4. Widett Circle Layover Facility Site

5.4.1. Description

The Widett Circle facility will be designed to store up to 30 trainsets (each set consisting of eight coach cars and one locomotive). The program includes:

- Power substation building (6,400 sf);
- Support shed building (7,500 sf); and
- Crew building (30,000 sf).

5.4.2. Proposed Wastewater

The Widett Circle layover facility would require domestic sewer service for the crew building and support sheds. Only light maintenance activities are proposed at the facility, therefore, no industrial wastewater would be generated.

Proposed improvements would include gravity services and gravity mains connecting services with manholes spaced at 300-foot minimum spacing. Sewer services would discharge to the existing BWSC 15-inch separated sewer in Widett Circle loop road. Figure 6 shows the existing wastewater utilities located within the site area along with the likely proposed tie-in location. The ultimate discharge point of the BWSC wastewater system is MWRA's Deer Island Wastewater Treatment Facility which discharges to Massachusetts Bay. Existing unused sewer mains and services on the site would be either removed or abandoned in place. The large existing CSO 070 that bisects the site would remain.

Dye testing and additional subsurface utility engineering will be utilized during subsequent design phases to determine existing stormwater and sewer line system connections.

Table 5 includes the estimated wastewater discharge for the Widett Circle site under the build condition. Wastewater generation would originate from crew washrooms, the crew kitchen, and sinks and floor drains in the support shed. Depending on the final design, wastewater generation could include oil/water separator overflow from the locomotive track areas.

Table 5—Estimated Wastewater Generation for Widett Circle

Source	Personnel	Estimate Generation Rate (gallons/day)	Wastewater Estimate (gallons/day)
Train Staff	150	35/person	5,250
Administrative Staff	15	20/person	300
Visitors	15	20/person	300
Total	**180**		**5,850**

Figure 6 shows the existing utilities located within the site area and the likely tie-in locations for utility extensions. Existing unused mains and services on the site would be either removed or abandoned in place. Since the existing sewer system is separated, the decrease in wastewater discharge to BWSC system would not affect potential combined overflows. The abandonment of existing sewer infrastructure on the site could reduce the amount of I/I entering the system from the current system.

5.4.3. Proposed Water

The Widett Circle layover facility would require domestic water service for the crew building and support sheds. Fire protection water would be required and hydrants are expected to be spaced at 500-foot intervals. Hydrants would be placed a maximum distance of 250-feet from structures.

Proposed improvements would include one or more taps into the existing BWSC mains in the Widett Circle loop road and BWSC meters and meter manholes. Water mains would run from the taps following the layout of the service roads to feed the building services and hydrants. Figure 6 shows the existing water utilities within the site area along with the likely proposed tie-in location. Existing unused water mains and services on the site would be either removed or abandoned in place. Proposed water mains could be constructed to maintain the loop in this portion of the water distribution system.

Domestic water demand is based on estimated sewage generation (5,850 gpd) with an added factor of 10% for consumption, system losses, and other use. Based upon these parameters, the Widett Circle layover facility would require approximately 6,440 gallons of water per day.

Based on discussions with BWSC, the capacity of this system is adequate to provide the proposed water demands. To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

5.4.4. Water Demand and Wastewater Impacts Analysis

This section discusses the impacts of the proposed water and wastewater system. In the build condition, there would be a decrease in the overall water demand and wastewater generated at the site from existing conditions, due to fewer personnel on site and no industrial use. Wastewater generation would decrease by an estimated 7,290 gpd, or 44% from existing conditions; and water usage would decrease by estimated 8,020 gpd (44%) from existing conditions, not accounting for industrial use.

Demand, Needs, and Capacity

The existing facilities on the site each have water service and produce wastewater through the industrial and domestic activities and staff washrooms and kitchens. Some of the activities occurring at the existing facilities may be very water intensive, although process water associated with the facilities was not included in this analysis. The water demand and wastewater discharge required for the proposed layover

facility at Widett Circle would eliminate the industrial discharge and reduce the personnel on site, therefore decreasing the estimated water demand and wastewater discharge of the site over existing conditions. Water demand would decrease by an estimated 8,020 gpd, or 55%. Wastewater discharge would decrease by an estimated 7,290 gpd, or 55%. This would result in less of a burden on these existing systems.

CSO and Infiltration / Inflow

The decrease of wastewater discharge to the system would not affect potential combined overflows because the existing system is separated. The build condition at the Widett Circle site would not exceed the 15,000 gpd of wastewater discharge threshold which required I/I offsets based on MassDEP regulations. The abandonment of existing sewer infrastructure on the site could reduce the amount of infiltration and inflow entering the system from the current system. Reduction of wastewater discharge from the site and I/I entering the system would result in an overall reduction in wastewater flow to the MWRA system.

Construction Impacts

The proposed construction at the site may damage subsurface utilities via direct contact with pipes and structure, vibrations or settling. Proactive design and construction activities, such as the location, identification and avoidance of existing utilities, would be utilized to minimize any impacts. The use of existing water and wastewater systems may be required during construction to provide a water supply and wastewater discharge for construction-time needs. Dewatering discharges to the sewer system are not anticipated.

Sea Level Rise

Sea levels are rising in Boston Harbor and across the globe, as evidenced through empirical data. In order to assess future risk and planning for rising seas, Massachusetts Office of Coastal Zone Management (CZM) recommends selecting specific scenarios. As directed by the Secretary of EEA, the SSX project DEIR assesses the impacts of a two-foot sea level rise upon the SSX project, which is consistent with planning for a project with a design life of 50 years.

Sea level rise is not anticipated to affect the performance of the water system because the system is a pressure system. Sea level rise could affect the performance of the wastewater system, depending on the conveyance path of wastewater between the Widett Circle site and the MWRA Deer Island facility.

The MWRA Deer Island Water Treatment Facility included provisions to address the effects of sea level rise during the plant upgrade in 1995. The plant was built at an elevation 1.9 feet higher to accommodate predicted sea level rise through 2050, the planned life of the facility. The plant's 9.5-mile, 24-foot diameter outfall tunnel should remain functional through 2050 regardless of the effects of sea level rise within Boston Harbor.[10] The wastewater system is a gravity system that is assisted with pumps to transport the wastewater to Deer Island. The pumps may be impacted by sea level rise, which would impact the Widett Circle site. As design advances, MassDOT will further investigate the wastewater system as it affects the Widett Circle site with respect to its vulnerability to increased sea levels.

[10] Climate Adaptation Knowledge Exchange. *Proactive Incorporation of Sea Level Rise into the Design of the Deer Island Wastewater Treatment Plant*. http://www.cakex.org/case-studies/2791.

5.5. Beacon Park Yard Layover Facility

5.5.1. Description

The proposed Beacon Park Yard layover facility site will be designed to store up to 20 trainsets (eight coach cars and one locomotive). The proposed layover facility would be equipped with several support buildings to allow midday layover of 20 commuter rail trainsets:

- Power substation building (5,400 sf).
- Support shed building (5,000 sf).
- Crew building (21,000 sf).

5.5.2. Proposed Wastewater

The Beacon Park Yard layover facility would require domestic sewer service for the crew building and support sheds. Only light maintenance activities are proposed at the facility. Therefore, no industrial wastewater discharges would be generated.

Proposed improvements would include gravity services and gravity mains connecting services with manholes spaced at 300-foot minimum spacing. Pumping could be necessary due to the distance to existing utilities and lack of topographic difference on the site. Sewer services would discharge to the existing BWSC sewers via the existing access road off of Cambridge Street. Figure 7 shows the existing wastewater utilities within the site area, along with the likely proposed tie-in location. This system ultimately drains to the MWRA's Deer Island Wastewater Treatment Facility, which discharges to Massachusetts Bay and may have an overflow to the Charles River. Existing unused sewer mains and services on the site would be either removed or abandoned in place. The large MWRA sewer that crosses the site would remain.

Dye testing and additional subsurface utility engineering will be utilized during subsequent design phases to determine existing stormwater and sewer line system connections.

Table 6 includes the estimated wastewater discharge for the additional facilities.

Table 6—Estimated Wastewater Generation for Beacon Park Yard

Source	Personnel	Estimate Generation Rate (gallons/day)	Wastewater Estimate (gallons/day)
Train Staff	100	35/person	3,500
Administrative Staff	10	20/person	200
Visitors	10	20/person	200
Total	**120**		**3,900**

Wastewater generation would originate from crew washrooms, the crew kitchen, and sinks and floor drains in the support shed. Depending on the final design, wastewater generation could include oil/water separator overflow from the locomotive track areas.

Based on discussions with BWSC, the capacity of this system is adequate to accept the proposed wastewater discharge. To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

5.5.3. Proposed Water

The facility would require domestic water service for the crew building and support sheds. Fire protection water would be required and hydrants are expected to be spaced at 500-foot intervals. Proposed improvements would include a tap into the existing 6-inch BWSC main in existing access road off of Cambridge Street and a BWSC meter and meter manhole. Figure 7 shows the existing water utilities within the site area, along with the likely proposed tie-in location. Water mains would run from the tap following the layout of the service roads to feed the building services and hydrants. Hydrants would be placed a maximum distance of 250-feet from structures. In addition, existing unused water mains and services on the site would be either removed or abandoned in place.

Domestic water demand is based on estimated sewage generation with an added factor of 10% for consumption, system losses, and other use. Based upon these parameters, the Beacon Park Yard layover facility would require approximately 4,290 gallons of water per day.

Based on discussions with BWSC, the capacity of this system is adequate to provide the proposed water demands. To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

5.5.4. Water Demand and Wastewater Impacts Analysis

This section discusses the impacts of the proposed water and wastewater system.

Demand, Needs, and Capacity

The existing site does not include water or sewer service currently in use. Therefore, the water demand wastewater discharge required for the layover facility would result in an increase to the overall needs from the BWSC system. The build condition would result in an increase of an estimated 4,290 gpd and 3,900 gpd for the water supply demand and wastewater discharge, respectively.

CSO and Infiltration / Inflow

The wastewater discharge to the system could affect potential combined overflows if the system the site discharges to is a combined system. MassDOT would work with BWSC and the MWRA to determine the impact of the minimal increase in wastewater discharges to the combined system and to determine if any on-site mitigation measures are required.

The Build condition at the Beacon Park Yard site would not exceed the 15,000 gpd of wastewater discharge threshold which required I/I offsets based on MassDEP regulations. The anticipated wastewater flows would be relatively negligible compared to the storm flows that trigger overflow conditions, however. New wastewater systems would be constructed with new pipes and proper connections which would limit potential leaks and minimize infiltration and inflow.

Construction Impacts

The proposed construction at the site may damage subsurface utilities via direct contact with pipes and structure, vibrations or settling. Good construction time practices, such as locating and avoiding existing utilities, would be used to limit any impacts. The use of existing water and wastewater systems could be required during construction to provide a water supply and wastewater discharge for construction-time needs. Dewatering discharges to the sewer system are not anticipated.

Sea Level Rise

Sea levels are rising in Boston Harbor and across the globe, as evidenced through empirical data. In order to assess future risk and planning for rising seas, Massachusetts Office of Coastal Zone Management (CZM) recommends selecting specific scenarios. As directed by the Secretary of EEA, the SSX project DEIR assesses the impacts of a two-foot sea level rise upon the SSX project, which is consistent with planning for a project with a design life of 50 years.

Sea level rise is not expected to affect the performance of the water system because the system is a pressure system. As described in Section 5.3.3, sea level rise could affect the performance of the wastewater system. Sea level rise could affect the functionality of the overflow portion of combined sewers. The Beacon Park Yard site could discharge wastewater to a combined sewer that has an overflow to the Charles River. Because the Charles River water level is controlled at the Charles River Dam downstream of the site, it is not anticipated that sea level rise would result in impacts to the overflow discharge.

5.6. Readville – Yard 2 Layover Facility

5.6.1. Description

The Readville – Yard 2 layover facility would be an expansion of the existing facility by eight additional trainsets (eight coach cars and one locomotive). The existing layover facility support buildings would be expanded to accommodate eight additional trainsets, including:

- Power substation building (1,700 sf onto existing facility).
- Support shed building (2,000 sf onto existing facility).
- Crew building (8,000 sf onto existing facility).

5.6.2. Proposed Wastewater

The additional facilities would require domestic sewer service for the crew building and support sheds. Only light maintenance activities are proposed at the facility therefore no industrial wastewater discharges would be generated.

Proposed improvements would include new gravity services to the BWSC utility and/or internal plumbing to connect the additional building spaces to existing services. The existing BWSC sewer system ultimately drains to the MWRA's Deer Island Wastewater Treatment Facility which discharges to Massachusetts Bay. Figure 8 shows the existing wastewater utilities within the site area along with the proposed facility elements.

Dye testing and additional subsurface utility engineering will be utilized during subsequent design phases to determine existing stormwater and sewer line system connections.

Table 7 includes the estimated wastewater discharge for the additional facilities at Readville – Yard 2.

Table 7—Estimated Additional Wastewater Generation for Readville – Yard 2

Source	Personnel	Estimate Generation Rate (gallons/day)	Wastewater Estimate (gallons/day)
Train Staff	40	35/person	1,400
Administrative Staff	4	20/person	80
Visitors	4	20/person	80
Total	**48**		**1,560**

Wastewater generation would originate from crew washrooms, the crew kitchen, and sinks and floor drains in the support shed. Depending on the final design, wastewater generation could include oil/water separator overflow from the locomotive track areas.

Based on discussions with BWSC, the capacity of this system is adequate to accept the proposed wastewater discharge. To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

5.6.3. Proposed Water

The facility would require domestic water service for the crew building and support sheds. Fire protection water would be required and hydrants are expected to be spaced at 500-foot intervals. Proposed improvements would include the relocation of the existing water main to avoid being covered by proposed buildings. Internal plumbing could be used to connect to existing services at the site and additional services to the relocated water main would be required for the buildings and proposed hydrants. Hydrants would be placed a maximum distance of 250-feet from structures. Figure 8 shows the existing wastewater utilities within the site area along with the proposed facility elements.

Domestic water demand is based on estimated sewage generation with an added factor of 10% for consumption, system losses, and other use. Based upon these parameters, Readville – Yard 2 would require approximately 1,720 gpd for the additional facilities.

Based on discussions with BWSC, the capacity of this system is adequate to provide the proposed water demands. To ensure capacity is adequate, MassDOT would work with BWSC to complete further evaluation during the design phase.

5.6.4. Water Demand and Wastewater Impacts Analysis

This section discusses the impacts of the proposed water and wastewater system.

Demand, Needs, and Capacity

The existing site has water services and wastewater discharges from the existing Readville – Yard 2 layover facility. Under the build condition, water supply demand would increase by an estimated 1,720 gpd and wastewater discharge would be an increase over existing conditions by an estimated 1,560 gpd. This represents an increase in water supply and wastewater discharge of approximately 80%.

Construction Impacts

The proposed construction at the site may damage subsurface utilities via direct contact with pipes and structure, vibrations or settling. Good construction time practices, such as locating and avoiding existing utilities, would be used to limit any impacts. The use of existing water and wastewater systems may be required during construction to provide a water supply and wastewater discharge for construction-time needs. Dewatering discharges to the sewer system are not anticipated.

Sea Level Rise

Sea levels are rising in Boston Harbor and across the globe, as evidenced through empirical data. In order to assess future risk and planning for rising seas, Massachusetts Office of Coastal Zone Management (CZM) recommends selecting specific scenarios. As directed by the Secretary of EEA, the SSX project DEIR assesses the impacts of a two-foot sea level rise upon the SSX project, which is consistent with planning for a project with a design life of 50 years.

Sea level rise is not expected to affect the performance of the water system because the system is a pressure system. As described in Section 5.3.3, sea level rise may affect the performance of the wastewater system depending on the conveyance path of wastewater between the Readville – Yard 2 site and the MWRA Deer Island facility.

5.7. Summary of Impacts

5.7.1. South Station

Table 8 summarizes the impacts of water demand and wastewater generation for the South Station site associated with Alternative 3 - Joint/Private Development Maximum Build. Due to the improvements, including the expanded terminal concourse and mixed-use development, there would be a large increase of water used and wastewater generated from existing conditions. Upgrades to the existing BWSC water and sewer mains along Atlantic Avenue or Summer Street would be necessary. Depending upon the sequencing of new construction proposed in Alternative 3, new service connections along Dorchester Avenue may be required to service the new joint/private development. As design advances, MassDOT will further investigate requirements for utility upgrades.

Table 8—South Station Impact Summary

Facility	Change in Water Demand Estimate (gallons/day)	Change in Wastewater Estimate (gallons/day)	Discharge Wastewater to CSO	New Infrastructure Required Off-site
South Station	+453,150	+411,950	No	Possible for I/I
Widett Circle	- 8,020	- 7,290	No	No
Beacon Park Yard	+4,290	+3,900	Possible	No
Readville – Yard 2	+1,720	+1,560	No	No

5.7.2. Layover Facility Sites

Table 8 summarizes impacts of water demand and wastewater generation for each of the layover facility sites. The location of layover facilities at the Widett Circle site would have fewer impacts to the existing water and sewer systems due to the decrease in use of those utilities for the build condition in comparison to existing conditions. At Beacon Park Yard, the potential increased discharge of wastewater to combined sewers could have an impact on frequency and volume of overflows to the Charles River. MassDOT would work with BWSC and MWRA during final design to determine the impact on the CSO frequency and to determine if mitigation measures are required. Based on MWRA's design allowance, sea level rise would not affect the MWRA Deer Island Waste Water Treatment Facility, the ultimate discharge point of wastewater from each of the sites.

6. Proposed Mitigation and Consistency with Regulatory Requirements

6.1. Wastewater

The BWSC indicates that there is adequate capacity available in its water and sewer mains in the immediate vicinity of the South Station site to accommodate the SSX project in Alternative 3. As design advances, MassDOT will confirm capacities and further investigate utility upgrade requirements.

In general, the sewer systems and services for the SSX project would be designed to:

- Exclude stormwater runoff.
- Minimize infiltration and inflow.
- Provide adequate capacity.
- Connect to existing systems in a manner that does not damage or degrade the function of the existing systems.
- Update and install new service connections as needed.
- Connect only to separated sewer systems.

The estimated wastewater discharges at the South Station site would exceed the 15,000 gpd threshold required to perform I/I offsets. Though discussions with BWSC, there likely is not adequate existing piping in the immediate vicinity of the project site to achieve the I/I requirements.

BWSC indicated that any piping that is hydrologically connected to the mains in the vicinity of the project site potentially could meet I/I requirements. Potential I/I mitigation sites include Dorchester Ave. and the North End neighborhood of Boston. As design progresses, MassDOT would investigate opportunities where improvements to existing sewer lines could be made to meet the 4:1 I/I requirements.

6.1.1. Regulatory Compliance

According to MWRA Sewer Use Rules and Regulations, 360 CMR 10.00, a Sewer Use Discharge Permit would be required at the South Station site due to the increase flow of 50,000 gpd. Due to the volume and nature of the discharge, a Sewer Use Discharge Permit would not be required for any of the layover facilities.

As outlined in the MWRA Sewer Use Rules and Regulations, an MWRA 8 (m) Permit will be required. This is required when other entities will performing construction activities within an easement or any other property interest held by the MWRA. Due to the need to connect to and extend sewer lines at both South Station and the layover sites, this permit will be required

According to MassDEP regulations, 314 CMR 7.00 a Sewer Extension/Connection Compliance Certification would be required for the construction, maintenance, modification or use any sewer system extension or connection. As is the case with the MWRA permits, the need to connect to and extend sewer lines at both South Station and the layover sites, this permit will also be required

New sewer infrastructure and connections to existing infrastructure would be designed and constructed in accordance with BWSC's governing regulations, including the sanitary, combined Sewers and storm drains.

MassDOT would coordinate with the BWSC on the design of the proposed mains and connections to the sewer system and would submit a site plan for review as the design progresses.

6.2. Water

In general, the water systems and services for the SSX project would be designed to:

- Minimize capacity needs via water saving measures and the use of low-flow plumbing fixtures.
- Provide adequate capacity for the needs of each site.
- Connect to existing systems in a manner that does not damage or degrade the function of the existing systems.
- Update and install new mains as need to add capacity the existing systems.
- Provide/maintain redundancy in the existing system when possible.
- Provide required separation from other utilities including wastewater systems on site.

7. Figures

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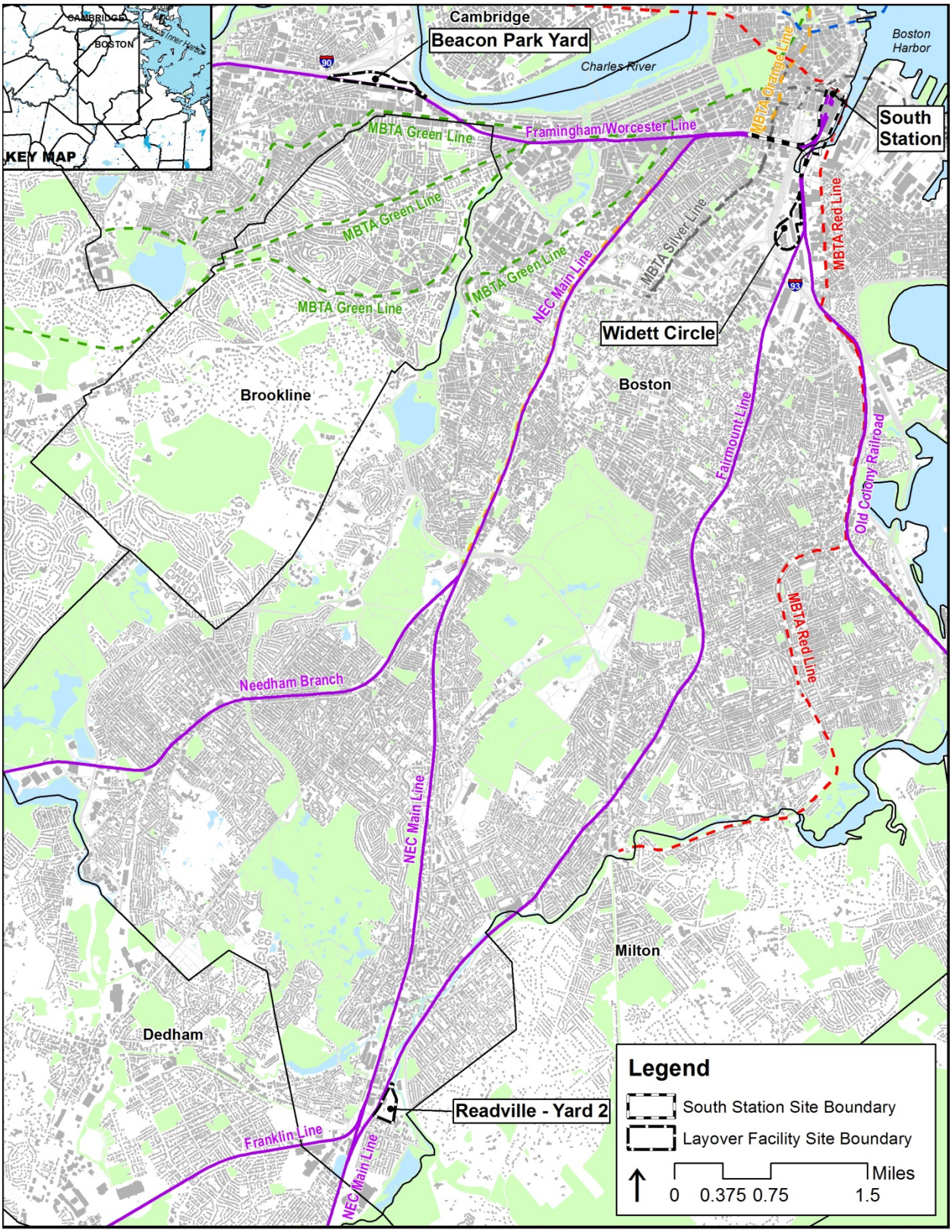

Figure 1—South Station Expansion Project Sites

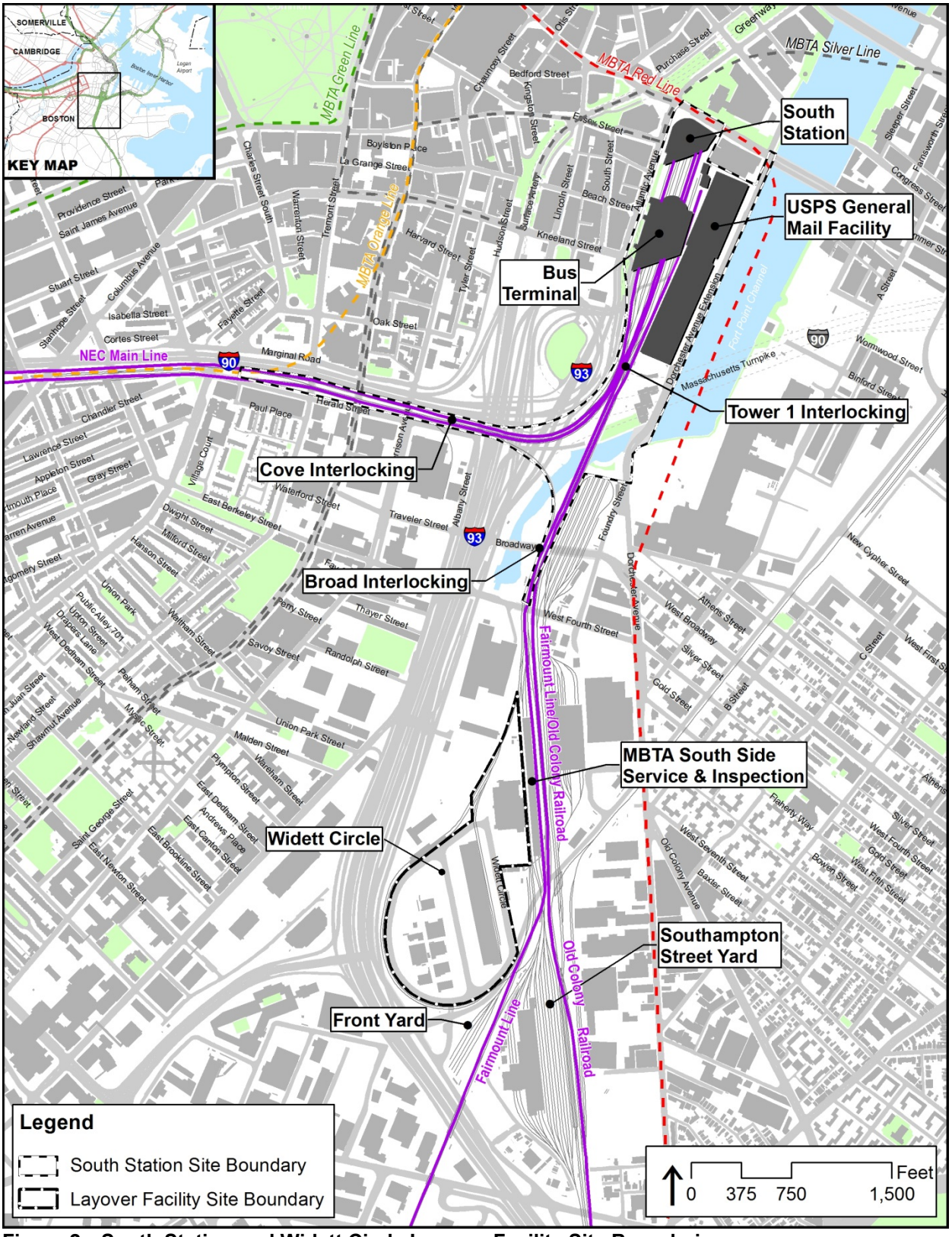

Figure 2—South Station and Widett Circle Layover Facility Site Boundaries

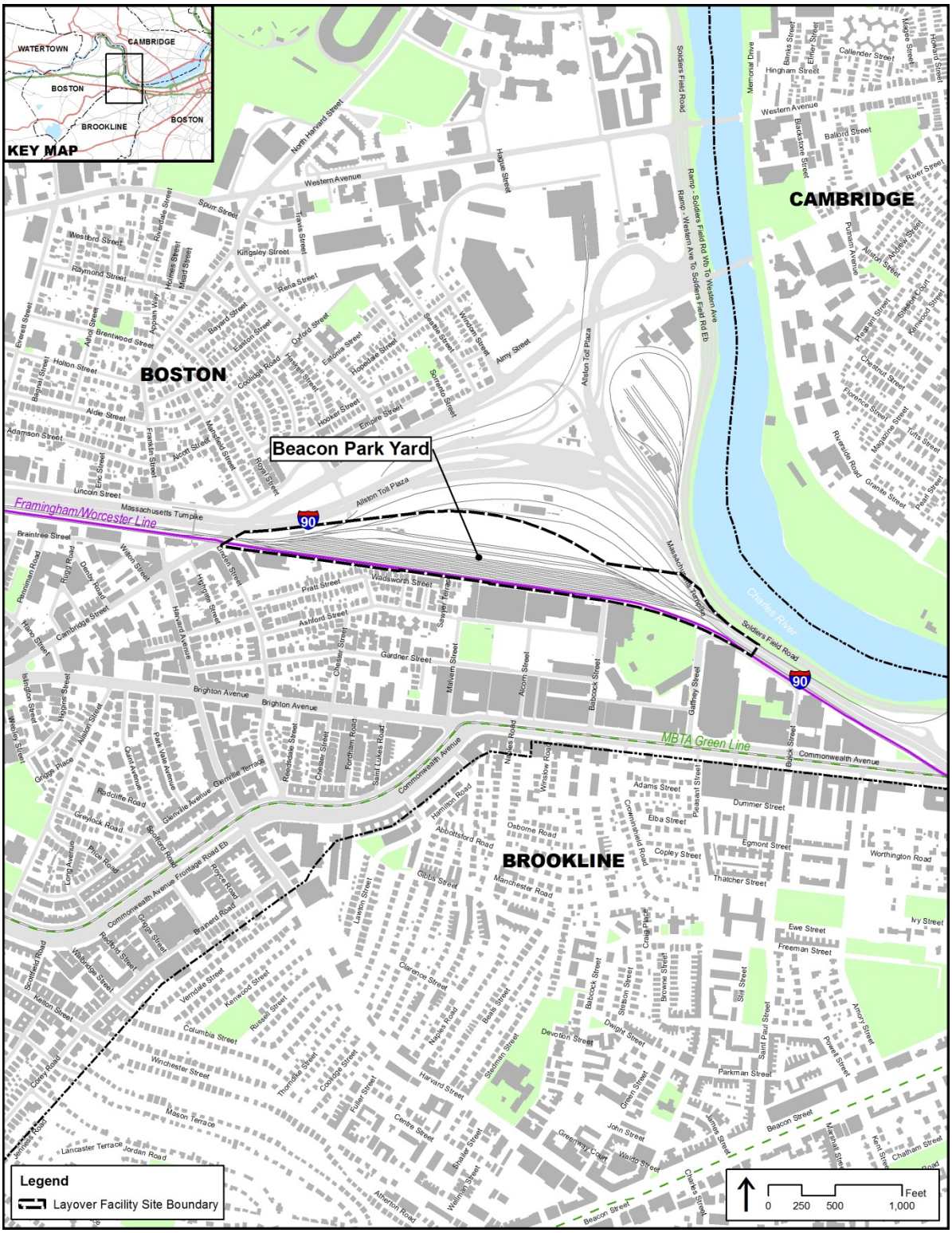

Figure 3—Beacon Park Yard Layover Facility Site Boundary

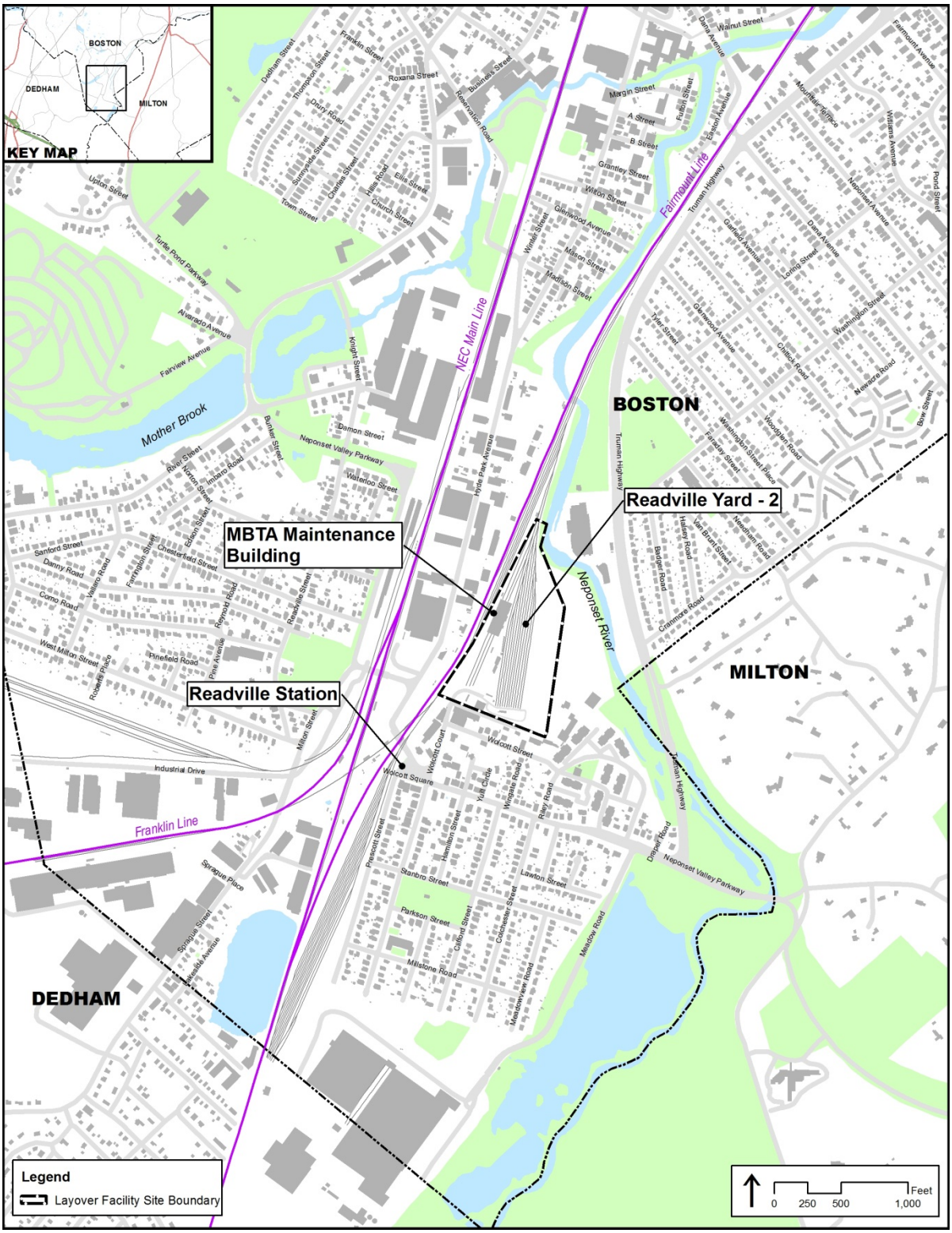

Figure 4—Readville - Yard 2 Layover Facility Site Boundary

Figure 5—Water Supply and Wastewater Existing Conditions – South Station

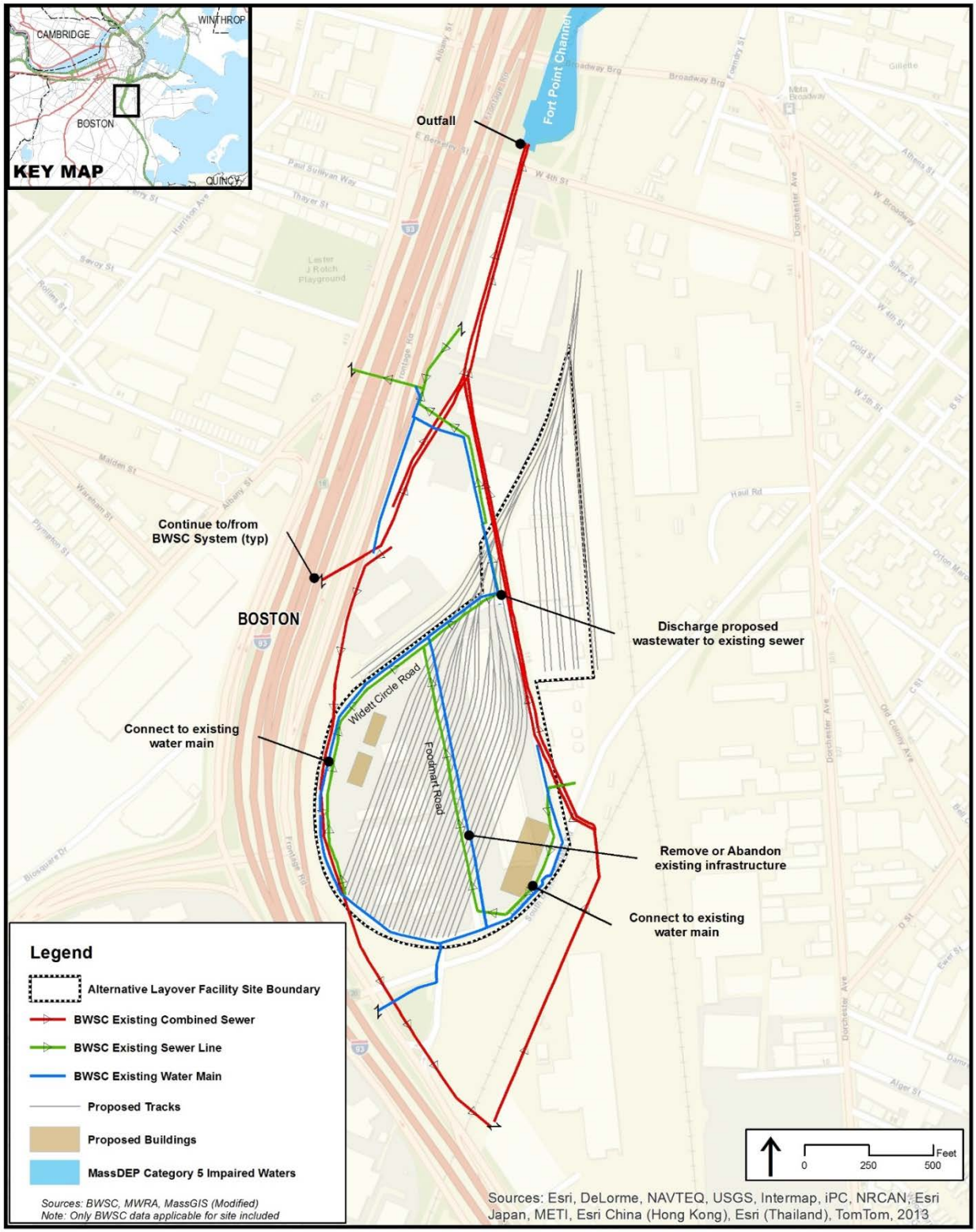

Figure 6—Water Supply and Wastewater Plan – Widett Circle

Figure 7—Water Supply and Wastewater Plan – Beacon Park Yard

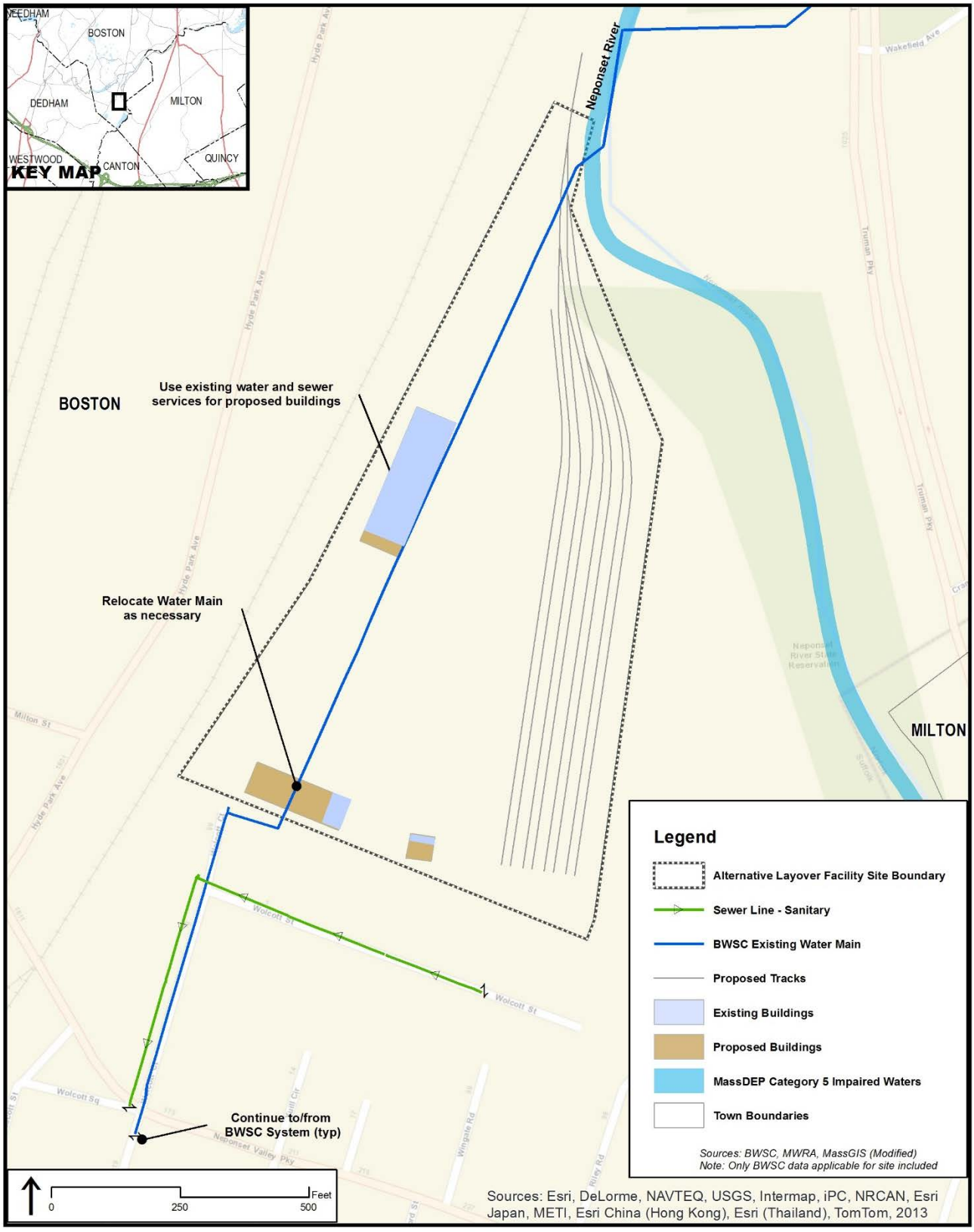

Figure 8—Water Supply and Wastewater Plan – Readville - Yard 2 Site