SECTION 7.0

AFFECTED ENVIRONMENT, TAUNTON

SECTION 7.1
TRANSPORTATION

7.1.1 INTRODUCTION

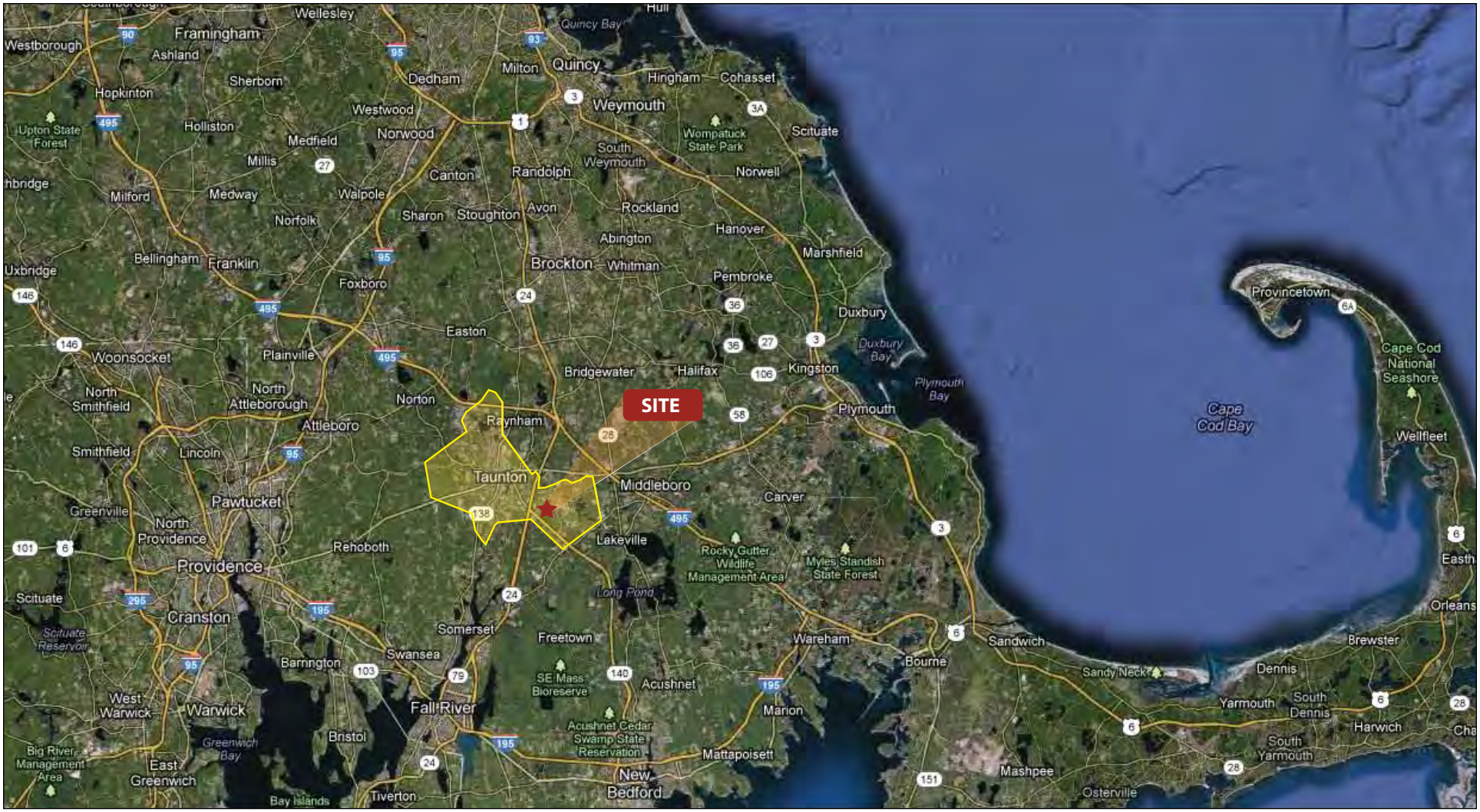
The Mashpee Wampanoag Tribe (the Tribe) is planning to develop a resort casino on a parcel of land in Taunton, Massachusetts, a portion of which is located in Phase 2 of the destination Liberty Union Industrial Park (LUIP). As shown in **Figure 7.1-1**, the site abuts a section of Stevens Street and the state highways Route 24 to the west and Route 140 to the south. A MassDOT rail right-of-way and high tension power lines are present on a portion of the site. Access is afforded to the site from O'Connell Way, an industrial park roadway that intersects with Stevens Street just north of its interchange with Route 140.

At full build-out under the Proposed Development (Alternative A), the casino itself will involve a total of 400,019 gross square feet with 132,156 square feet of gaming space; this includes 3,000 slot machines, 150 table games plus 40 poker tables for a total of 4,400 total gaming positions, and an entertainment lounge. Also included are a 4-5 venue food court, two fine dining restaurants, and other dining spaces (buffet restaurant, 24-hour restaurant, employee dining area) comprising approximately 41,165 square feet. The Proposed Development also includes back-house support area, a 23,423 square foot event center, up to 4,431structured parking spaces and an additional 1,940 surface parking spaces. At full build, there will be a total of 900 hotel rooms, plus a 25,000 square foot indoor/outdoor water park.

To help the host City of Taunton understand the traffic impacts of the proposed project and possible mitigating measures, a preliminary traffic study for a core area of intersections and roadways within the City of Taunton was submitted on May 21, 2012. This study was appended to the Environmental Notification Form (ENF) filed for the project submitted to the Massachusetts Office of Environmental Affairs MEPA Office on July 2, 2012 and noticed in the Environmental Monitor on July 11, 2012.

In response to the ENF, the Secretary of Energy and Environmental Affairs issued a Certificate, dated August 24, 2012, requiring an Environmental Impact Report, and on the U.S. Environmental Protection Agency (EPA) on September 6, 2012 submitted its scoping comments. Both requested an expanded study having a broader study area to better capture regional as well as local impacts.

This chapter describes existing traffic conditions in terms of traffic, public transportation, pedestrian and bicycle conditions and aviation. The goal of the proponent is to work with the City of Taunton, neighboring communities, and the Commonwealth of Massachusetts to deliver a successful project with minimal impacts on local or regional roads, intersections, highways or ramps, and to mitigate any impacts that are a result of the Proposed Development.



Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-1
Locus Map

7.1.2 EXISTING 2012 CONDITIONS

7.1.2.1 Expanded Study Area

As mentioned, the ENF had included a study area wholly contained within the City of Taunton. The expanded scope of analysis, as specified by the Secretary's Certificate, included the locations shown in **Figures 7.1-2 and 7.1-3.** These regional locations include signalized and unsignalized intersections, and a variety of interchanges and mainline roadway segments, as described below.

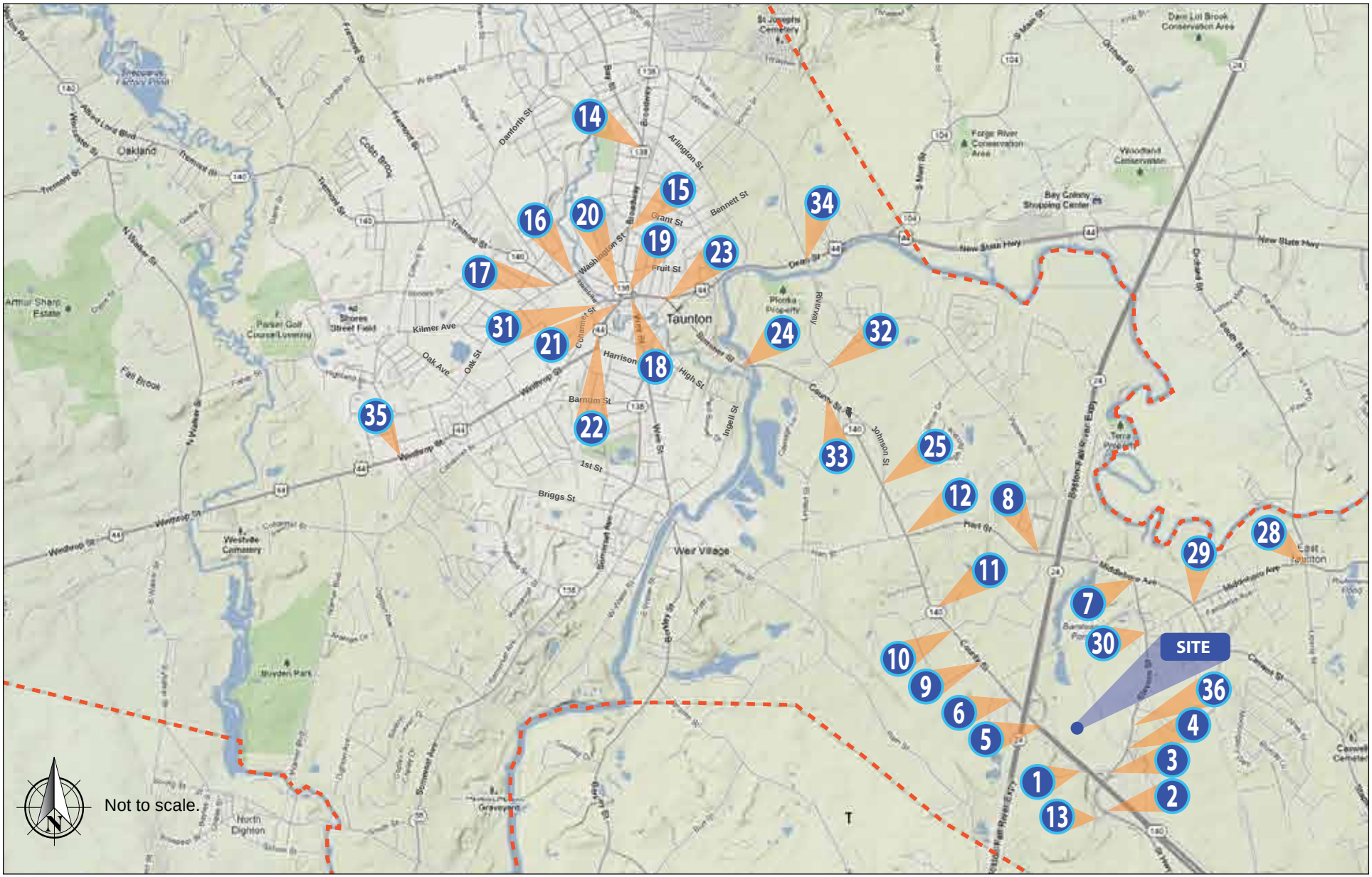
Signalized Intersections

The following 15 signalized intersections in the City of Taunton were included in the original study area:

2. Galleria Mall Drive South/County Street (Route 140);
3. Overpass Connector/Route 140 NB Ramps/Stevens Street;
5. Route 24 NB Ramps (Exit 12B)/County Street (Route 140);
6. Route 24 SB Ramps (Exit 12A)/County Street (Route 140);
9. Mozzone Boulevard/County Street (Route 140);
11. Erika Drive/County Street (Route 140);
12. Hart Street/County Street (Route 140);
15. Washington Street/Broadway (Route 138);
17. Oak Street/Washington Street (Route 140)/Tremont Street;
18. Cohannet Street (Route 140)/Weir Street (Route 138);
22. High Street/Winthrop Street (Route 44);
23. Main Street (Routes 140 and 44)/Church Green (Route 44)/Summer Street (Route 140);
33. County Street (Route 140)/Gordon M. Owen Riverway Extension;
34. Dean Street (Route 44)/Longmeadow Road/Gordon Owen Parkway; and
35. Winthrop Street (Route 44)/Highland Street.

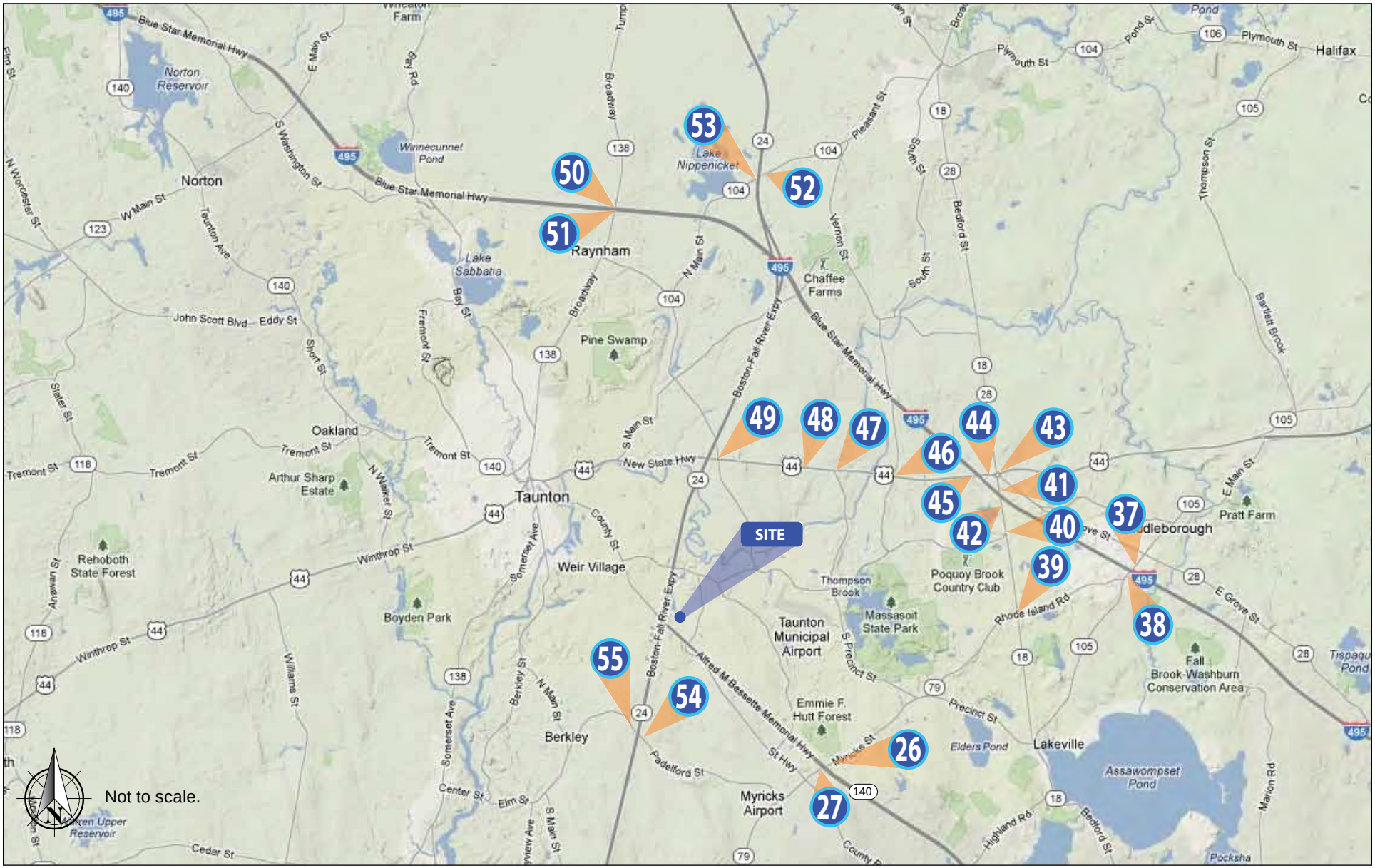
The Scope added seven signalized intersections, including:

39. Bedford Street (Route 18)/Rhode Island Road (Route 79) in Lakeville;
47. New State Highway (Route 44)/Church Street in Raynham;
49. New State Highway (Route 44)/Orchard Street in Raynham;
50. Broadway (Route 138)/I-495 NB Ramps (Exit 8) in Raynham;
51. Broadway (Route 138)/I-495 SB Ramps (Exit 8) in Raynham;
52. Pleasant Street (Route 104)/Route 24 NB Ramps (Exit 15) in Bridgewater; and
53. Pleasant Street (Route 104)/Route 24 SB Ramps (Exit 15) in Bridgewater.



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-2
Study Area Intersections – Taunton



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-3
Study Area Intersections – Expanded Area

Unsignalized Intersections

The following 20 unsignalized intersections in the City of Taunton were included in the original study area:

1. Galleria Mall Driveway North/County Road/Overpass Connector;
4. O'Connell Way/Stevens Street;
7. Middleboro Avenue/Stevens Street;
8. Hart Street/Middleboro Avenue/Pool Street/Bristol Plymouth High School Driveway;
10. Bristol Plymouth High School Driveway/Hess Gas Station/County Street (Route 140);
13. Galleria Mall Driveway South/Galleria Mall Drive;
14. Exeter Street/Bay Street/Broadway (Route 138);
16. Washington Street (Route 140)/R. Martin Sr. Parkway (Route 140);
19. Court Street/Broadway (Route 138)/Weir Street;
20. Court Street/Western Green (44/138);
21. Cohannet Street (Route 140)/Western Green (44/138);
24. Summer Street (Route 140)/County Street (Route 140)/Ingell Street;
25. County Street (Route 140)/Johnson Street;
26. Myricks Street (Route 79)/Route 140 NB Ramps (Exit 10)
27. Myricks Street (Route 79)/Route 140 SB Ramps (Exit 10);
28. Middleboro Avenue/Old Colony Avenue/Liberty Street;
29. Middleboro Avenue/Pinehill Street/Caswell Street;
30. Pinehill Street/Stevens Street;
31. F. R. Martin Parkway/Cohannet Street; and
32. Williams Street/Gordon Owen Parkway.

The Scope added 12 unsignalized locations, including:

37. South Main Street (Route 105)/I-495 NB Ramps (Exit 4) in Middleborough;
38. South Main Street (Route 105)/I-495 SB Ramps (Exit 4) in Middleborough;
40. Bedford Street (Route 18)/Taunton Street in Lakeville;
41. Bedford Street (Route 18) at I-495 NB Ramps (Exit 5) in Middleborough;
42. Bedford Street (Route 18) at I-495 SB Ramps (Exit 5) in Middleborough;
43. Route 18/I-495/Route 28 (Middleborough Rotary);
44. Harding Street (Route 44) at I-495 NB Ramps (Exit 6) in Middleborough;
45. Harding Street (Route 44) at I-495 SB Ramps (Exit 6) in Middleborough;
46. New State Highway (Route 44)/Richmond Street in Taunton;
48. New State Highway (Route 44)/Hill Street in Raynham;
54. Padelford Street/Route 24 NB Ramps (Exit 11) in Berkley; and
55. Padelford Street/Route 24 SB Ramps (Exit 11) in Berkley.

Route 24 and 140 Interchange

The original City of Taunton study area also includes analysis of the Route 24 and Route 140 mainline capacity; three merge and four diverge locations at the Route 24/Route 140 interchange; two merge and two diverge locations at the Route 24/Route 140 interchange; and weaving analysis along Route 140 for a design year of 2022.

Freeway Segment Operations

The Scope called for a variety of additional analyses covering diverge, merge, weaving and mainline operations at or between the following interchanges:

Route 24/Padelford Street (Exit 11) in Berkley:
Route 24/Route 79 in Fall River;
Route 24/Route 44 in Raynham;
I-495 (Exit 6)/Route 44 in Middleborough;
I-495 (Exit 5)/Route 18 in Middleborough;
I-495 (Exit 4)/Route 105 in Middleborough; and,
I-495 (Exit 8)/Route 138 in Middleborough.

Site Access

Today, the portion of the site south of the MassDOT railroad tracks is accessed from Stevens Street via O'Connell Way. The site is indirectly served by Route 24, but is accessed from Exit 12 (Route 140) via Stevens Street, which connects to Route 140 in a second interchange at Exit 11A (Stevens Street). Existing site access is shown in **Figure 7.1-4.**

7.1.2.2 Roadway Conditions

Roadway conditions and 2012 daily volumes within the study area are described below.

Route 24 is a four- to six-lane limited access highway running north to south and providing a major link between the greater Boston area and communities to the southeast. It begins at I-95/Route 128 south of Boston and ends at the Rhode Island state line south of Fall River. It carries 72,237 vehicles per day, north of Route 140, and 53,600 vehicles per day, south of Route 140 in Taunton. Route 24 intersects with Route 140 (Interchange 12) in close proximity to the site. Route 24 operates as four lanes (two lanes in each direction) at the Route 140 interchange, but has been widened by MassDOT for approximately 2,700 feet north in advance of Exit 12 to add to the length of the deceleration lane. The merge lane on Route 24 Northbound was also lengthened by approximately 2,000 feet north of Route 140.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-4
Existing Site Access

Route 140 is a 108-mile long state highway that passes through parts of southeastern and central Massachusetts. The highway follows a southeast-northwest trajectory, running from U.S. Route 6 in New Bedford northwest to an intersection with Massachusetts Route 23 in Winchendon, a few miles south of the New Hampshire border. Just south of the site, Route 140 operates as a limited access highway from Route 24 down to its southern terminus at US-6 in New Bedford. In 2012, Route 140 carried 43,375 vehicles per average day between Route 24 (Exit 12) and Stevens Street (Exit 11).

Route 44 is a 237-mile long United States highway running east to west through southeast Massachusetts, Rhode Island, Connecticut, and New York. Within Massachusetts, it is a 38-mile long highway which follows a southwest-northeast trajectory. It enters the state from Connecticut in Seekonk along Taunton Avenue and ends in Plymouth at Massachusetts Route 3A. Locally, Route 44 operates as an arterial and is a main street through downtown Taunton. It lies a few miles North of the site and intersects with Route 140, the Project Site's main access route, and Route 24, the nearest major interchange. It is primarily a two-lane arterial although it briefly widens to a four-lane highway between Route 104 and Route 24. West of Route 495, Route 44 carried 34,350 vehicles per average day in 2012.

Route 495 is a 121-mile state highway that forms an approximately 30 mile-radius arc around the city of Boston, stretching from the southeastern to the northeast portion of Massachusetts. The highway follows a southeast-northeast trajectory, beginning in Wareham as a continuation of Route 25 and terminating in Salisbury at the New Hampshire border. Route 495 operates as a four- to six-lane limited access highway. Within the proximity of the site, it is a six-lane highway which lies approximately five miles north and ten miles east of the site as the highway traverses southeast-northwest. North of Route 24, it carried 75,309 vehicles per average day in 2012; south of Route 24, it carried 59,411 vehicles per day in 2012.

Route 18 is a 21-mile long south-north state highway. It is primarily a four-lane roadway which begins in downtown New Bedford as a continuation of John F. Kennedy Memorial Highway and terminates at Route 53 in Weymouth. Locally, it operates as a two-lane collector and intersects at Route 495. It runs north-south approximately five miles east of the site.

Route 105 is a 29-mile south-north state highway in southeastern Massachusetts. It begins at U.S. Route 6 in Marion and terminates at Route 106 in Halifax. It is a four-lane collector, winding mainly through Plymouth county and parts of Bristol and Norfolk counties. The highway most closely nears the site five miles to the east in Lakeville, MA. The route intersects both Route 495 and Route 18 to the east of the site.

Route 138 is a 44-mile long north-south state highway in southeastern Massachusetts. It begins in Fall River as an extension to Rhode Island Route 138 and ends at Route 28 in Milton. It operates as a collector, varying between two to four lanes. The road lies west of the site and serves as a main street through downtown Taunton.

Route 104 is only a 13-mile long west-east highway in southeastern Massachusetts. It spans four towns, including Taunton. The highway operates a two-lane collector, beginning in Taunton at Route 44 and

terminating in at Route 106 in East Bridgewater. The highway begins several miles north of the Project Site.

Stevens Street intersects with Route 140 south of the site in a partial cloverleaf interchange (Interchange 11), that also serves the Silver City Galleria Mall. To reach the site from Route 24, drivers must exit at Interchange 12 to Route 140 SB and then exit at Exit 11A onto Stevens Street. At O'Connell Way, Stevens Street operates as one through lane in each direction, with an added northbound right turn lane and an exclusive southbound left turn lane to Revolutionary Drive. Beyond Revolutionary Drive, Stevens Street narrows to one lane in each direction with no shoulders. Counts conducted in March 2012 documented 8,847 vehicles per day on Stevens Street south of O'Connell Way, with an 85th percentile speed of 37 miles per hour. The posted speed limit is 30 miles per hour. There is a sidewalk on the east side of the roadway and an elementary school to the east, approximately 1,100 feet north of O'Connell Way.

Middleboro Avenue/Hart Street lies north of the site. It crosses Route 24 via an overpass. While the bridge provides two lanes in each direction, Middleboro Avenue narrows as it abuts the site to one lane in each direction east of Route 24. At Stevens Street, Middleboro Avenue becomes more residential in nature. East of Stevens Street, Middleboro Avenue carried 8,367 vehicles per day in March 2012. West of Stevens Street, Middleboro Avenue carried 11,092 vehicles per day, with an 85th percentile speed of approximately 38-39 miles per hour.

O'Connell Way is accessed via Stevens Street. It is a 51-foot wide access road, providing access to the Liberty & Union Industrial Park Phase II (the site). At Stevens Street, it intersects to the east with Revolutionary Road, which serves Phase I of the Industrial Park. This road is designed to handle the large trucks generated by Industrial Park tenants including the Crossroads Commerce Center. O'Connell Way currently ends in a cul-de-sac to the south of the Crossroads Commerce Center, but an access easement continues around the westerly building ending at the CSX right of way. West of Stevens Street, 3,604 vehicles per day were counted on O'Connell Way. The 85th percentile speed was approximately 30 miles per hour.

Galleria Mall Overpass crosses over Route 140 between Stevens Street and County Road providing access to the Silver City Galleria Mall and Route 140 NB on-ramp at Stevens Street. The roadway is approximately 60-feet in width, providing two travel lanes in each direction, separated by a six-foot median with a guiderail. A fight-foot pedestrian sidewalk is provided along the north side of the roadway. West of Stevens Street, 2,700 vehicles per day were counted on the overpass. The 85th percentile speed was approximately 27 miles per hour.

Galleria Mall Drive is one of the main entrances to the Silver City Galleria Mall via County Street and Exit 11B from Route 140 SB. The roadway is approximately 55-feet wide with two travel lanes in each direction, separated by a six-foot median with a guiderail. South of County Street, approximately 7,770 vehicles per day were counted on Galleria Mall Drive. The 85th percentile speed was approximately 23 miles per hour.

7.1.2.3 Intersection Conditions

Intersection conditions, based on field observations in March 2012 and September 2012, are discussed below. See **Figures 7.1.2** and **7.1.3** for intersection numbering.

Signalized Intersections

The operating characteristics of each signalized intersection are described below.

2. Galleria Mall Drive South/County Street (Route 140), Taunton has three approaches. The Galleria Mall Drive eastbound approach consists of a 12-foot shared left-turn/thru lane and a 12-foot shared through/right-turn lane. A six-foot raised median with a guard-rail separates the east-west direction of travel on Galleria Mall Drive. The Route 140 Southbound Exit 11B off-ramp is a 20-foot single lane, that provides access to northbound on County Street, and is controlled by a yield sign. The County Street northbound approach consists of a 12-foot shared left-turn/through lane and a 12-foot through lane. Approximately 200-feet south of the County Street northbound approach, the Route 140 Southbound Exit 11 on-ramp consists of a 20-foot single lane and is controlled by a yield sign. The County Street southbound approach consists of a 12-foot shared left-turn/through lane, a 12-foot through lane, and an exclusive 22-foot right-turn slip-lane.

The posted speed limit on County Street is 40 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

3. Overpass Connector/Route 140 NB Ramps/Stevens Street, Taunton has four approaches. The Overpass eastbound approach consists of a 13-foot shared left-turn/through lane, an 11-foot shared through/right-turn lane, and an exclusive 21-foot right-turn only lane. A six-foot raised median with a guard-rail separates the east-west direction of travel on the Overpass Connector. The Route 140 Northbound Exit Ramp approach consists of a 12-foot left-turn only lane, and an 11-foot through lane. The right turn lane is channelized prior to the stop line. The Stevens Street northbound approach consists of an 11-foot shared left-turn/through lane and a shared 12-foot through/right-turn lane, which operates under Yield control. An eight-foot painted median separates the north-south direction of travel on the northbound approach of Stevens Street. The Stevens Street southbound approach consists of two 12-foot left-turn only lanes and a 12-foot shared through/right-turn lane.

The posted speed limit on Stevens Street is 30 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the north side of the intersection, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

5. Route 24 NB Ramps (Exit 12B)/County Street (Route 140), Taunton has two approaches. The Route 24 Northbound Exit Ramp westbound approach consists of a 17-foot lane, which directs vehicles northbound on Route 140. The Route 140 Northbound approach consists of an 11-foot through lane, a 12-foot through lane, and an exclusive 17-foot right-turn only lane, which operates under Yield control. A 13-foot median with a guide-rail separates the north-south direction of travel on the northbound approach

of Route 140. The Route 140 Southbound approach consists of an 11-foot left-turn lane and two 12-feet through lanes. A six-foot median with a guide-rail separates the north-south direction of travel on the southbound approach of Route 140.

The posted speed limit on Route 140 is 40 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

6. Route 24 SB Ramps (Exit 12)/County Street (Route 140), Taunton has three approaches. The Route 24 Southbound Exit Ramp approach consists of a 19-foot left-turn lane, a 12-foot right-turn lane and 14-foot right-turn lane. The Route 140 Northbound approach consists of a 12-foot left-turn lane, an 11-foot through lane and a 14-foot through lane. A six-foot median with a guard-rail separates the north-south direction of travel on the northbound approach of Route 140. The Route 140 Southbound approach consists of a 12-foot through lane and a shared 12-foot through/right-turn lane. The right turn operates under Yield control. A 12-foot median with a guide-rail separates the north-south direction of travel on the southbound approach of Route 140.

The posted speed limit on Route 140 is 40 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

9. Mozzone Boulevard/County Street (Route 140), Taunton has three approaches. The Mozzone Boulevard approach consists of an 11-foot left-turn lane and an 11-foot right-turn lane. The Route 140 Northbound approach consists of a 12-foot shared left-turn/through lane and a 12-foot through lane. The Route 140 Southbound approach consists of a 12-foot through lane and a shared 12-foot through/right-turn lane.

The posted speed limit on Route 140 is 40 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

11. Erika Drive/County Street (Route 140), Taunton has four approaches. The Erika Drive eastbound approach consists of a 12-foot left-turn lane, a shared 12-foot left-turn/through lane, and a 12-foot right-turn lane. The private driveway westbound approach consists of a shared 16-foot left-turn/through/right-turn lane. The Route 140 Northbound approach consists of an 11-foot left-turn lane, a 12-foot through lane, and a shared 12-foot through/right-turn lane. The Route 140 Southbound approach consists of a shared 12-foot left-turn/through lane, a 12-foot through lane, and a 12-foot right-turn lane.

The posted speed limit on Route 140 is 35 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the north side of the intersection, as are pedestrian signal indications.

12. Hart Street/County Street (Route 140, Taunton, known as "Hart's Four Corners", has four approaches. The Hart Street eastbound approach consists of a shared 11-foot left-turn/through lane and a 10-foot right-lane. The Hart Street westbound approach consists of a shared 11-foot left-turn/through lane

and a 10-foot right-turn lane. The Route 140 Northbound approach consists of an 11-foot left-turn lane and a shared 10-foot through/right-turn lane. The Route 140 Southbound approach consists of an 11-foot left-turn lane and a shared 11-foot through/right-turn lane.

The posted speed limit on Route 140 is 35 MPH. Parking is prohibited along all approaches of the intersection. A Greater Attleboro Taunton Regional Transit Authority (GATRA) bus stop is located on the near side of the Route 140 Southbound approach. Crosswalks and wheelchair ramps are maintained on all legs of the intersection, as are pedestrian signal indications.

Future roadway and traffic control improvements are proposed at this intersection though a Massachusetts Department of Transportation project. The improvements include widening of County Street and new traffic signal operations and equipment. These future improvements will be reflected in the No-Action and Build conditions analyses.

15. Washington Street/Broadway (Route 138), Taunton has four approaches. The Washington Street eastbound approach consists of a shared 15-foot left-turn/through/right-turn lane. The Washington Street westbound approach consists of a shared 10-foot left-turn/through/right-turn lane. The Broadway northbound approach consists of a shared 15-foot left-turn/through/right-turn lane. The Broadway southbound approach consists of a shared 12-foot left-turn/through lane and a 12-foot right-turn lane.

Signage on all the approaches restricts vehicles from turning right on red. The posted speed limit on Broadway is 20 MPH. Parking is provided on the Broadway northbound approach, with half-hour parking on the east side of the street and one-hour parking on the west side. Parking is not provided along the other approaches. Crosswalks and wheelchair ramps are maintained on all legs of the intersection, as are pedestrian signal indications. The pavement and pavement markings are in fair condition, but are inconsistent with allowable turns.

17. Oak Street/Washington Street (Route 140)/Tremont Street, Taunton has four approaches. The Tremont Street eastbound approach consists of a 12-foot left-turn lane and a shared 12-foot left-turn/through/right-turn lane. The Plaza westbound approach consists of a shared 19-foot left-turn/through/right-turn lane. The Oak Street northbound approach consists of a shared 14-foot left-turn/through lane and a shared 12-foot through/right-turn lane. The Washington Street southbound approach consists of a shared l 12-foot left-turn/through lane and an 11-foot right-turn lane.

The posted speed limit on Tremont Street is 20 MPH. Parking is prohibited along all approaches of the intersection. A GATRA bus stop is located on the far side of the Washington Street southbound approach. Crosswalks and wheelchair ramps are maintained on all legs of the intersection, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

18. Cohannet Street (Route 140)/Weir Street (Route 138), Taunton has three approaches. The Cohannet Street eastbound approach consists of a 12-foot left-turn lane, two 12-feet through lanes, and a 14-foot right-turn lane. The Main Street westbound approach consists of an 18-foot right-turn only lane and is not a signalized approach. The Weir Street northbound approach consists of a 10- through lane and 10-foot right-turn lane.

Signage on the Cohannet Street and Weir Street approaches restricts vehicles from turning right on red. The posted speed limit on Weir Street is 20 MPH. Parking is provided on the Cohannet eastbound approach, with two-hour meter parking from 9:00 AM through 5:00 PM on the south side of the street and along both sides of Main Street. Crosswalks and wheelchair ramps are maintained on the eastbound and northbound approaches, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

22. High Street/Winthrop Street (Route 44), Taunton has four approaches. The High Street eastbound approach consists of a shared 19-foot left-turn/through/right-turn lane. The High Street westbound approach consists of a 10-foot left-turn lane and a shared through lane/right-turn lane. The Winthrop Street northbound approach consists of an 11-foot left-turn lane and a shared 11-foot through/right-turn lane. The Winthrop southbound approach consists of a shared 11-foot left-turn/through lane and a shared 11-foot through/right-turn lane.

Signage on all the approaches restricts vehicles from turning right on red. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained in the area, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

23. Main Street (Routes 140 and 44)/Church Green (Route 44)/Summer Street (Route 140), Taunton has three approaches. The Main Street eastbound approach consists of a 15-foot left-turn lane, a 15-foot through lane, and a 23-foot right-turn lane. The Church Green westbound approach consists of a shared 14-foot through/right-turn lane. The Summer Street northbound approach consists of a shared 15-foot left-turn/through lane and a 15-foot right-turn lane.

The posted speed limit on Main Street is 20 MPH. Parking is provided on the Summer Street eastbound approach, with two-hour meter parking from 9:00 AM through 5:00 PM on the south side of the street and along both sides of Main Street. Crosswalks and wheelchair ramps are maintained on the westbound and northbound approaches, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

33. County Street (Route 140)/Gordon M. Owen Riverway Extension, Taunton has three approaches. The County Street eastbound approach consists of a shared 12-foot left-turn/through lane. The County Street westbound approach consists of an 11-foot through lane and 10-foot right-turn lane. The Gordon M. Owen Riverway Extension southbound approach consists of a shared 13-foot left-turn/through/right-turn lane.

Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the westbound and southbound approach, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

34. Dean Street (Route 44)/Longmeadow Road/Gordon Owen Parkway, Taunton has four approaches. The Dean Street eastbound approach consists of a 10-foot left-turn lane, a 12-foot through lane, and a 15-foot right-turn lane. The Dean Street westbound approach consists of an 11-foot left-turn lane, an 11-foot through lane, and a shared 12-foot through/right-turn lane. The Gordon Owen Parkway northbound approach consists of 12-foot left-turn lane and a shared 12-foot through/right-turn lane. The Longmeadow southbound approach consists of a shared 15-foot left-turn/through/right-turn lane; however, field observations indicate that the approach generally operates with an exclusive left-turn lane and a shared through/right-turn lane

Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained in the area, as are pedestrian signal indications. The pavement and pavement markings are in fair condition.

35. Winthrop Street (Route 44)/Highland Street, Taunton has four approaches. Both the eastbound and westbound approaches on Winthrop Street consist of a left-turn lane and a shared through/right-turn lane. The northbound and southbound Highland Street approaches have a shared left-turn/through/right-turn lane.

Crosswalks and wheelchair ramps are maintained in the area, as are pedestrian signal indications. The pavement and pavement markings are in good condition.

39. Bedford Street (Route 18)/Rhode Island Road (Route 79), Lakeville has four approaches. Both the Bedford Street northbound and southbound approaches consist of a shared 12-foot left-turn/through/right-turn lane with a six-foot shoulder. The Rhode Island Road eastbound and westbound approach consists of a shared 12-foot left-turn/through/right-turn lane with a one-foot shoulder.

The posted speed limit on Bedford Street northbound is 45 MPH. The posted speed limited on Rhode Island Road is 25 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

47. New State Highway (Route 44)/Church Street, Raynham has four approaches. Both the Route 44 eastbound and westbound approach consists of a shared 13-foot left-turn/through/right-turn lane. The Church Street northbound approach consists of an 11-foot left-turn/through/right-turn lane. The Church Street southbound approach consists of a 16-foot left-turn/through/right-turn lane.

The posted speed limit on Route 44 is 50 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

49. New State Highway (Route 44)/Orchard Street, Raynham has four approaches. The Route 44 Eastbound approach consists of a 12-foot shared left-turn/though lane and a 20-foot through/right-turn lane. The Route 44 Westbound approach consists of an 11-foot shared left-turn/through lane, an 11-foot

through lane, and a shared 11-foot right-turn lane. The Orchard Street northbound approach consists of 12-foot left-turn lane and a shared 13-foot through/right-turn lane. The Orchard Street southbound approach consists of a12-foot left-turn lane and a shared 12-foot through/right-turn lane.

The posted speed limit on Route 44 is 50 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are not provided in the area.

50. Broadway (Route 138) at I-495 NB Ramps, Raynham is located at a diamond highway interchange with three approaches and an on-ramp. The Broadway northbound approach consists of a 10-foot left-turn lane and two 12-foot through lanes. The Broadway southbound approach consists of two 12-foot through lanes and a 20-foot right-turn slip-lane. A raised median separates the north-south direction of travel on Broadway. The I-495 Northbound Exit 8 off-ramp consists of a shared 16-foot left-turn/through lane and single 16-foot right-turn slip-lane. The slip-lane provides access northbound onto Broadway, and is controlled by a yield sign. The I-495 Northbound Exit 8 on-ramp, opposing the off-ramp, is 20-feet wide.

Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the east side of the intersection; however, there are no pedestrian signal controls.

51. Broadway (Route 138) at I-495 SB Ramps, Raynham is located at a diamond highway interchange with three approaches and an on-ramp. The Broadway northbound approach consists of two 12-foot through lanes and 20-foot right-turn slip-lane. Broadway southbound approach consists of a 10-foot left-turn lane and two 12-foot through lanes. A raised median separates the north-south direction of travel on Broadway. The I-495 Southbound Exit 8 off-ramp consists of a 16-foot left-turn lane and 16-foot right-turn slip-lane. The slip-lane provides access southbound onto Broadway, and is controlled by a yield sign. The I-495 Southbound Exit 8 on-ramp, opposing the off-ramp, is 20-feet wide.

Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the east side of the intersection; however, there are no pedestrian signal controls.

52. Pleasant Street (Route 104) at Route 24 NB Ramp, Bridgewater is located at a partial cloverleaf highway interchange with three approaches. The Pleasant Street eastbound approach consists of a 12-foot through lane and a 19-foot right-turn lane channelized by a raised island. The Pleasant Street westbound approach consists of a shared 12-foot left-turn/through lane and a 12-foot through lane. The Route 24 Northbound Exit 15 off-ramp consists of a 19-foot left-turn lane and 20-foot right-turn slip-lane. The slip-lane provides access eastbound onto Pleasant Street, and is controlled by an added lane merge sign. The Route 24 Northbound Exit 15 on-ramp, on the same side as the off-ramp, is 20-feet wide.

The posted speed limit on Pleasant Street is 40 MPH. Parking is prohibited along all approaches of the intersection. A six-foot sidewalk is provided on the north side of the intersection.

53. Pleasant Street (Route 104) at Route 24 SB Ramps, Bridgewater is located at a partial cloverleaf highway interchange with three approaches. Pleasant Street eastbound approach consists of a shared 12-foot right-turn/through lane. The Pleasant Street westbound approach consists of a12-foot through lane

and 12-foot right-turn lane, which has a 160-foot storage length that transitions into an eight-foot lane channelized by a raised median. The Route 24 Southbound Exit 15 off-ramp consists of a 21-foot left-turn lane and 20-foot right-turn slip-lane. The slip-lane provides access eastbound onto Pleasant Street, and is controlled by an added lane merge sign. The Route 24 Southbound Exit 15 on-ramp, on the same side as the off-ramp, is 23-feet wide.

The posted speed limit on Pleasant Street is 40 MPH. Parking is prohibited along all approaches of the intersection. Crosswalks and wheelchair ramps are maintained on the north side of the intersection; however, there are no pedestrian signal controls. A six-foot sidewalk is provided on the north side of the intersection.

Unsignalized Intersections

The operating characteristics of the unsignalized intersections are described below.

1. Galleria Mall Driveway North/County Road/Overpass Connector, Taunton has three approaches. The Galleria Mall Driveway eastbound approach consists of two lanes, an 11-foot through lane with no control restrictions and a 12-foot through/left-turn lane, which is stop-controlled. The westbound approach on County Road consists of two lanes, a 12-foot through lane, which is stop-controlled, and a 12-foot channelized right-turn lane onto the Overpass Connector. The southbound approach from the Overpass Connector consists of a 13-foot left-turn lane and a 13-foot channelized right-turn lane. This approach is separated from northbound traffic by a five-foot median.

Crosswalks are provided between the parking lots at the Galleria Mall and an overflow parking lot northeast of the intersection. A 6.5-foot crosswalk crosses the eastbound approach between the parking lot and the sidewalk along the west side of the Overpass Connector, and a four-foot crosswalk crosses the southbound approach to the overflow lot. Wheelchair ramps are not provided at any of the crosswalks.

4. O'Connell Way/Stevens Street (proposed site drive), Taunton has four approaches. The O'Connell Way eastbound approach consists of a single 26-foot lane. The westbound approach consists of two lanes, a 13-foot through/right-turn lane and a 10-foot left-turn lane. The westbound approach is separated from oncoming traffic by a landscaped median. The Stevens Street northbound approach consists of a 12-foot shared left-turn/through lane and a 12-foot right-turn lane. The Stevens Street southbound approach consists of an 11-foot left-turn lane and a 12-foot through lane. There is also a three-foot shoulder on the southbound approach.

A six-foot sidewalk is provided on the east side of Stevens Street. There is an 8.5-foot crosswalk across the industrial driveway.

7. Middleboro Avenue/Stevens Street, Taunton has three approaches. The Middleboro Avenue eastbound approach has a single 13-foot lane. The westbound approach has a single 15-foot lane. The Stevens Street northbound approach consists of a single 11-foot lane. Middleboro Avenue is free-flowing, while Stevens Street is stop-controlled.

There is a five-foot sidewalk along the north side of Middleboro Street, and an eight-foot sidewalk along the west side of Stevens Street at the intersection.

8. Hart Street/Middleboro Avenue/Poole Street/Bristol Plymouth High School Driveway, Taunton has four approaches. The Hart Street eastbound approach consists of a single 18-foot travel lane. The Middleboro Avenue westbound approach consists of a single 14-foot lane. The northbound approach at the Bristol Plymouth High School Driveway has a single 13-foot lane. The Poole Street southbound approach consists of a single 13-foot lane. The northbound and southbound approaches are offset from one another by approximately 80 feet. Hart Street and Middleboro Avenue are free-flowing, while Poole Street and Bristol HS are stop-controlled.

Five-foot sidewalks are provided on both Hart Street approaches before the intersection with Bristol Plymouth High School Driveway. No crosswalks or pedestrian ramps are provided.

Route 140 at the MassDOT rail grade crossing, Taunton is an ungated rail crossing with advance crossbuck markings and flashing overhead warning lights. This is just west of Route 24; at this location Route 140 is one lane in each direction.

10. Bristol Plymouth High School Driveway/Hess Gas Station/County Street (Route 140), Taunton has four approaches. The eastbound approach at Hess gas station is 37.5 feet wide. The Bristol Plymouth High School Driveway southbound approach consists of two 12-foot lanes: a left-turn lane and a right-turn lane. The County Street northbound approach consists of two 12-foot travel lanes and a three-foot shoulder. Left turns into Hess are prohibited in the northbound direction. The County Street southbound approach has two 12-foot lanes with a six-foot shoulder. The County Street northbound and southbound travel lanes are separated by a painted median that is seven feet wide at the intersection.

Sidewalks are provided on the north side of County Street, measuring six feet wide. New pedestrian ramps with tactile warning strips are provided, but there is no crosswalk across the Bristol Plymouth High School Driveway.

13. Galleria Mall Driveway South/Galleria Mall Drive , Taunton has three approaches. The Galleria Mall Driveway South westbound approach consists of a 13.5-foot channelized right-turn lane and a 13-foot left-turn lane, both of which are stop-controlled. The Galleria Mall Drive northbound approach consists of a 13-foot channelized right-turn lane and a 14-foot through lane, which is stop-controlled. The southbound approach on Galleria Mall drive consists of a 10-foot left turn lane and a 12-foot through lane.

No sidewalks are provided at this intersection.

14. Exeter Street/Bay Street/Broadway (Route 138), Taunton has four approaches. The Exeter Street eastbound approach has a single 13-foot lane. The Broadway northbound approach consists of an 18-foot lane with a two-foot shoulder. The Broadway southbound approach has a single 20-foot travel lane. The Bay Street southeast-bound approach has a single 16-foot lane. Broadway is free-flowing, while the Exeter Street and Bay Street approaches are stop-controlled.

Asphalt sidewalks are provided along all approaches at this intersection. On each side of Exeter Street, there are five-foot sidewalks. On Broadway, there are eight-foot sidewalks on each side. On Bay Street, there is a four-foot sidewalk along the west side of the roadway.

16. Washington Street (Route 140)/F. R. Martin Sr. Parkway (Route 140), Taunton has four approaches. The Washington Street eastbound approach consists of a 12-foot through lane and a 13-foot right-turn lane, which has a storage length of 150 feet. The Washington Street westbound approach has a single 17-foot lane. The F. R. Martin Sr. Parkway northbound approach on consists of a 10-foot left-turn lane and a 12-foot right-turn lane with a storage length of 200 feet. The southbound driveway approach has a single 12-foot lane. Washington Street is free-flowing, while F. R. Martin Parkway is stop-controlled.

A 5.5-foot sidewalk is provided on both sides of Washington Street and both sides of F. R. Martin Sr. Parkway. Crosswalks are provided on the eastern and western sides of the intersection.

19. Court Street/Broadway (Route 138)/Weir Street, Taunton has two approaches. The Broadway northbound approach consists of a 31-foot channelized left-turn lane and a 14-foot through lane. The Broadway southbound approach has a single 13-foot channelized right-turn lane. Eight-foot on-street parking lanes are provided on both sides of Broadway and Weir Street as well as on the north side of Court Street.

Sidewalks are provided along Broadway and are typically eight to nine feet wide. Crosswalks are provided across all sides of the intersection.

20. Court Street/Western Green (Route 44/Route 138), Taunton has three approaches. The Post Office Square eastbound approach has a single 10-foot travel lane. The Court Street westbound approach consists of three lanes: a 13-foot left-turn lane, a 13-foot shared left-turn/through lane, and a 20-foot channelized right-turn lane. A bus stop is located on the north side of Court Street to the east of the intersection. The Court Street southbound approach has a single 11-foot lane. Eight-foot on-street parking lanes are provided on the west side of Court Street to the north of the intersection and on both sides of Post Office Square. The Court Street westbound approach is free-flowing, while the southbound and eastbound approaches are stop-controlled.

Sidewalks are provided along all approaches to the intersection and all are at least nine feet wide. Crosswalks are provided across the north, south, and west sides of the intersection and are nine feet wide.

21. Cohannet Street (Route 140)/Western Green (44/138), Taunton has three approaches. The eastbound approach on Cohannet Street is a single 24-foot travel lane adjacent to a 10-foot parking lane and bus stop. The northbound approach on Winthrop Street approaches the intersection at a 45-degree angle with Cohannet Street with a single 11-foot travel lane adjacent to a 7.5-foot parking lane. The southbound approach on Western Green consists of a 14-foot left-turn lane, a 12-foot left turn lane, and a 12-foot through/right lane. Cohannet Street and Winthrop Street are stop-controlled, while Western Green is free-flowing.

Sidewalks are provided along all approaches and are typically nine to 14 feet wide. Crosswalks are provided across all approaches and are typically nine feet wide.

24. Summer Street (Route 140)/County Street (Route 140)/Ingell Street, Taunton has three approaches. The Summer Street eastbound approach consists of a 13-foot through lane and a 12-foot channelized right-turn lane. The County Street westbound approach has a single 19-foot travel lane. The Ingell Street northbound approach consists of a 12-foot travel lane, which widens to a 17-foot left-turn lane and a 16-foot channelized right-turn lane. Summer Street and County Street are free-flowing, while Ingell Street is stop-controlled.

Sidewalks are provided along all approaches and are typically four to five feet wide. A 12-foot crosswalk is provided across Ingell Street.

25. County Street (Route 140)/Johnson Street, Taunton has four approaches. The County Street eastbound approach has a single 12.5-foot travel lane with a four-foot shoulder. The County Street westbound approach has a 13-foot travel lane with a three-foot shoulder. The Johnson Street northbound approach is unmarked and approximately 11 feet wide. The Johnson Street southbound approach has a single10-foot travel lane. The entrance to the Trucci's parking lot is approximately 60 feet away from the intersection, adjacent to the westbound approach on County Street. County Street is free-flowing, while Johnson Street is stop-controlled.

Sidewalks are provided on both sides of County Street, on the west side of Johnson Street to the south of the intersection, and on both sides of Johnson Street to the north of the intersection. Sidewalks are typically four to five feet wide. Crosswalks are not provided at this location.

26. Myricks Street (Route 79)/Route 140 at Exit 10 NB Ramps, Taunton has three approaches. The Myricks Street eastbound approach consists of a 15-foot shared left-turn/through lane. The Myricks Street westbound approach has a 15-foot shared through/right-turn lane. The southbound approach on the Route 140 ramp consists of a 21-foot channelized left-turn lane and a 19-foot channelized right-turn lane. Myricks Street is free-flowing, while the ramp is stop-controlled.

Sidewalks and crosswalks are not provided at this intersection.

27. Myricks Street (Route 79)/Route 140 at Exit 10 SB Ramps, Taunton has three approaches. The Myricks Street eastbound approach consists of a 15-foot shared through/right-turn lane. The Myricks Street westbound approach has a 20-foot shared left-turn/through lane. The southbound approach on the Route 140 ramp consists of a 20-foot channelized left-turn lane and a 20-foot channelized right-turn lane. Myricks Street is free-flowing, while the ramp is stop-controlled.

No sidewalks or crosswalks are provided at this intersection.

28. Middleboro Avenue/Old Colony Avenue/Liberty Street, Taunton has four approaches. The eastbound approach on Middleboro Avenue is a single 14-foot travel lane. The westbound approach on Middleboro Avenue is 16-foot travel lane. The northbound approach on Liberty Street is a single 20-foot travel lane.

The southbound approach on Old Colony Avenue is a single 16-foot travel lane. Liberty Street is offset from Old Colony Avenue by about 40 feet. Liberty Street and Old Colony Avenue operate under Stop control; Middleboro Avenue is free flow.

Sidewalks are provided on the south side of Middleboro Avenue and on both sides of Liberty Street, and are typically five to seven feet wide. Crosswalks are provided across Liberty Street and Old Colony Avenue, with a crosswalk across Middleboro Avenue between the other two crosswalks. Pedestrian ramps are either not provided or are in poor condition.

29. Middleboro Avenue/Pinehill Street/Caswell Street, Taunton has four approaches. The Pinehill Street eastbound approach has a single 14-foot lane. The Middleboro Avenue westbound approach has a single 14-foot travel lane. The Caswell Street northbound approach consists of a single 10-foot travel lane. The Middleboro Avenue southbound approach has a single 13-foot travel lane. The northbound, southbound, and eastbound approaches are stop-controlled, while the westbound approach is free-flowing.

Sidewalks are provided along the north side of Middleboro Street, the south/west side of Pinehill Street, and both sides of Caswell Street. The sidewalks are typically four to seven feet wide. Crosswalks are provided across all approaches of the intersection and are typically seven to nine feet wide. Pedestrian ramps are either not provided or are in poor condition.

30. Pinehill Street/Stevens Street, Taunton has three approaches. The Pinehill Street westbound approach has a single 11-foot travel lane. The Stevens Street northbound approach consists of a single 12-foot travel lane. The Stevens Street southbound approach consists of a single 11-foot travel lane.

Sidewalks are provided along the east side of Stevens Street and on each side of Pinehill Street. Sidewalks are typically five to six feet wide. A seven-foot crosswalk is provided across Pinehill Street.

31. F. R. Martin Parkway/Cohannet Street, Taunton has three approaches. The Cohannet Street eastbound approach has a single 16-foot approach. The Cohannet Street westbound approach has a single 12-foot travel lane. The F. R. Martin Parkway southbound approach has a single 17-foot lane. Eight-foot on-street parking lanes are provided on both sides of Cohannet Street. Cohannet Street is free-flowing, while F. R. Martin Parkway is stop-controlled.

Sidewalks with a typical width of five to six feet are provided along all approaches. There is a crosswalk provided across F. R. Martin Parkway. Pedestrian ramps are in fair to poor condition.

32. Williams Street/Gordon Owen Parkway, Taunton is a flashing signal-controlled intersection with four approaches. The Gordon Owen Parkway eastbound approach has a single 21-foot travel lane. The Gordon M. Owen Riverway Extension westbound approach has a single 13-foot travel lane. The eastbound and westbound approaches are controlled by a flashing yellow indication. The Williams Street northbound approach has a single 11-foot travel lane. The Williams Street southbound approach has a single 12-foot travel lane. The northbound and southbound approaches on Williams Street are controlled by a flashing red indication at the intersection.

Sidewalks are provided on the west side Williams Street to the south of the intersection, the north side of Riverway Extension to the east of the intersection, and on both sides of Gordon Owen Parkway and Williams Street to the north of the intersection. The sidewalks are typically four to seven feet wide. Eight foot wide crosswalks are provided on the north and west sides of the intersection.

37. South Main Street (Route 105) at I-495 NB Ramps, Middleborough has three approaches. The westbound ramp approach has a 17-foot left-turn lane and a 17-foot channelized right-turn lane. The Route 105 northbound approach has two 12-foot lanes. The southbound approach also has two 12-foot travel lanes. The Route 105 approaches are free flow, while the ramp is stop-controlled.

38. South Main Street (Route 105) at I-495 SB Ramps, Middleborough has three approaches. The eastbound ramp approach has a 20-foot left-turn lane and a 20-foot channelized right-turn lane. The Route 105 northbound approach has two 12-foot lanes. The southbound approach also has two 12-foot travel lanes. The Route 105 approaches are free flow, while the ramp is stop-controlled.

40. Bedford Street (Route 18)/Taunton Street, Lakeville is a flashing signal-controlled intersection with four approaches. The northbound and southbound approaches on Bedford Street are single 12-foot travel lanes. The eastbound approach on Taunton Street is a single 10-foot travel lane with a channelized right-turn lane that is 16 feet wide. Taunton Street from the westbound approach is a 19-foot road that is unmarked. The eastbound and westbound approaches on Taunton Street operate under stop control in conjunction with a flashing red indication at the intersection; Bedford Street is controlled by a flashing yellow indication.

41. Bedford Street (Route 18) at I-495 NB Ramps, Middleborough has three approaches. The northbound approach on Bedford Street has a single 15-foot travel lane. The southbound approach on Bedford Street has a single 10-foot travel lane and a 10-foot right-turn lane for the approach to the I-495 Southbound Ramp. The I-495 Northbound Exit 5 off-ramp consists of an 18-foot left-turn lane and a 19-foot channelized right-turn lane. The right-turn lane provides access northbound onto Bedford Street, and is controlled by a yield sign. The I-495 Northbound on-ramp is 20-feet wide. The off-ramp operates under stop-control; Bedford Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

42. Bedford Street (Route 18) at I-495 SB Ramp, Middleborough has three approaches. The northbound approach on Bedford Street has a single 12-foot travel lane. The southbound approach on Bedford Street has a single 11-foot travel lane. The I-495 Southbound Exit 5 off-ramp consists of an 18-foot left-turn lane and an 18-foot channelized right-turn lane. The right-turn lane provides access southbound onto Bedford Street, and is controlled by a yield sign. The I-495 Southbound Exit 5 on-ramp is 19-feet wide. The off-ramp operates under stop control; Bedford Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

43. Route 18/Route 44/Route 28 (Middleborough Rotary) is a 300-foot diameter rotary with five approaches. The Route 18 northbound approach has a 31-foot entry lane with a 34-foot exit lane. The Route 28 north-westbound approach has a 32-foot entry lane with a 38-foot exit lane. Route 44 westbound has a 17-foot entry lane with an 18-foot exit lane. Route 18/Route 28 southbound has a 19-foot entry lane with a 39-foot exit lane. Route 44 eastbound has a 23-foot entry lane with a 25-foot exit lane. The circulating width of the rotary is approximately 35 feet.

No sidewalks or crosswalks are provided at this intersection.

44. Harding Street (Route 44) at I-495 NB Ramps, Middleborough is located at a highway interchange with three approaches. The eastbound approach on Harding Street has a single 16-foot travel lane. The westbound approach on Harding Street has a 13-foot travel lane and a 22-foot channelized right-turn lane. The I-495 Northbound Exit 6 off-ramp consists of an 18-foot left-turn lane and a 20-foot channelized right-turn lane. The right-turn lane provides access westbound onto Harding Street, and is controlled by a yield sign. The I-495 Northbound Exit 6 on-ramp is 25-feet wide. The off-ramp operates under stop control; Harding Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

45. Harding Street (Route 44) at I-495 SB Ramps, Middleborough has three approaches. The eastbound approach on Harding Street has a single 23-foot travel lane with a 20-foot right-turn slip-lane. The westbound approach on Harding Street has a 13-foot travel lane. The I-495 Southbound Exit 6 off-ramp consists of a 17-foot left-turn lane and an 18-foot channelized right-turn lane. The right-turn lane provides access eastbound onto Harding Street, and is controlled by a yield sign. The I-495 Southbound Exit 6 on-ramp is 20-feet wide. The off-ramp operates under stop control; Harding Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

46. New State Highway (Route 44)/Richmond Street, Taunton has four approaches. The eastbound approach on Route 44 is a single 13-foot travel lane. The westbound approach on Route 44 is a single 12-foot travel lane. The northbound approach on Richmond Street is a single 12-foot travel lane. The southbound approach on Richmond Street is a single 10-foot travel lane. Both approaches at Richmond Street operate under stop-control; Route 44 is free flow.

No sidewalks or crosswalks are provided at this intersection.

48. New State Highway (Route 44)/Hill Street, Raynham has four approaches. The eastbound approach on Route 44 is a single 14-foot travel lane with a 16-foot right turn-lane, which has a 135-foot storage length. The westbound approach on Route 44 is a single 13-foot travel lane. The northbound approach on Taunton Street is a single 11-foot travel lane. The southbound approach on Taunton Street is a single 12-foot travel lane. Both approaches on Hill Street operate under stop-control; New State Highway is free flow.

No sidewalks or crosswalks are provided at this intersection.

54. Padelford Street at Route 24 NB Ramp, Berkley is located at a highway interchange with three approaches. The eastbound and approach on Padelford Street has a single 15-foot travel lane with a 20-foot right-turn lane channelized by a raised island. The westbound approach on Padelford Street has a 15-foot travel lane. The Route 24 Northbound Exit 11 off-ramp consists of a 20-foot left-turn lane and a 20-foot channelized right-turn. The right-turn lane provides access eastbound onto Padelford Street, and is controlled by a yield sign. The Route 24 Northbound Exit 11 on-ramp is 22-feet wide. The off-ramp operates under stop-control; Padelford Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

55. Padelford Street at Route 24 SB Ramps, Berkley is located at a highway interchange with three approaches. The eastbound and approach on Padelford Street has a single 15-foot travel. The westbound approach on Padelford Street has a 17-foot travel lane and a 16-foot channelized right-turn. The Route 24 Southbound Exit 11 consists of a 20-foot left-turn lane and a 20-foot channelized right-turn. The right-turn lane provides access westbound onto Padelford Street, and is controlled by a yield sign. The Route 24 Southbound Exit 11 on-ramp is 24-feet wide. The off-ramp operates under stop-control; Padelford Street is free flow.

No sidewalks or crosswalks are provided at this intersection.

7.1.2.4 Interchange Conditions

Route 24/Route 140 Interchange (Exit 12), Taunton is a five-ramp partial cloverleaf configuration. In the vicinity of the interchange Route 24 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing above Route 140. Motorists traveling along Route 24 northbound can access Route 140 southbound at Exit 12A, while access to Route 140 northbound is provided at Exit 12B. Along Route 24 southbound, motorists can access Route 140 northbound and southbound at Exit 12; at this location a third travel lane along Route 24 southbound is provided, approximately 2,700 feet in length, serving as a deceleration lane. Route 24 northbound also has an extended acceleration lane. In the vicinity of the interchange, Route 140 generally consists of two travel lanes in each direction. From Route 140, motorists traveling in either the northbound or southbound direction can access Route 24 northbound at Exit 12A and Route 24 southbound at Exit 12B; both ramp locations are controlled by a traffic signal at Route 140.

Route 140/Stevens Street Interchange (Exit 11), Taunton is a partial cloverleaf. In the vicinity of the interchange, Route 140 consists of two travel lanes in each direction. Along Route 140 northbound, motorists can access Stevens Street at Exit 11. Along Route 140 southbound, motorist can access County Street at Exit 11B and Stevens Street, via the Stevens Street Connector, at Exit 11A. In the vicinity of the interchange, Stevens Street generally consists of two travel lanes in each direction and passes above Route 140. Neither ramp location is controlled by traffic signals.

Route 24/Padelford Street (Exit 11), Berkley is a partial cloverleaf configuration. In the vicinity of the interchange, Route 24 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing above Padelford Street. Along Route 24, motorists can access Padelford

eastbound and westbound at Exit 11; at this location a third travel lane along Route 24 northbound and southbound are provided, approximately 800 feet in length, serving as a deceleration lane. In the vicinity of the interchange, Padelford Street consists of one travel lane in each direction and passes below Route 24. Neither ramp location is controlled by traffic signals.

Route 24/Route 79 (Exit 9), Assonet is partial cloverleaf configuration. In the vicinity of the interchange Route 24 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing above Route 79. Along Route 24, motorists can access Route 79 eastbound and westbound at Exit 9; at this location a third travel lane along Route 24 southbound and southbound are provided, approximately 250 feet in length, serving as a deceleration lane. Route 24 northbound and southbound also has extended acceleration lanes which are approximately 450 feet each. In the vicinity of the interchange, Route 79 consists of one travel lane in each direction and passes below Route 24. Neither ramp location is controlled by traffic signals.

Route 24/Route 104 (Exit 15), Bridgewater is a partial cloverleaf configuration. In the vicinity of the interchange Route 24 northbound and southbound consists of three travel lanes in each direction and is grade separated, passing below Route 104. Along Route 24, motorists can access Route 104 eastbound and westbound at Exit 15; at this location a fourth travel lane along Route 24 southbound and northbound are provided, approximately 200 and 150 feet in length, respectively, serving as deceleration lanes. Route 24 northbound and southbound also has extended acceleration lanes which are 100 and 220 feet, respectively. In the vicinity of the interchange, Route 104 generally consists of one travel lane in each direction and passes above Route 24. Both ramp locations are controlled by a traffic signal at Route 104.

I-495/Route 24 (Exits 7AB on 495 and Exits 14AB on 24), Bridgewater is a full cloverleaf configuration for two major highways. The interchange provides exit only access. In the vicinity of the interchange Route 24 northbound and southbound consists of three travel lanes in each direction and is grade separated, where Route 24 southbound weaves below and northbound crosses above I-495. Motorists traveling along Route 24 northbound can access I-495 southbound at Exit 14A, while access to I-495 northbound is provided at Exit 14B. Along Route 24 southbound, motorists can access I-495 southbound at Exit 14A, while access to I-495 northbound is provided at Exit 14B. At all four Route 24 exit locations a fourth travel lanes are provided, which are each approximately 100 feet in length, serving as deceleration lanes. Route 24 northbound also has extended acceleration lanes from I-495 northbound and southbound which are 100 feet and 700 feet, respectively. Route 24 southbound has extended acceleration lanes from I-495 northbound and southbound which are approximately 150 feet each.

In the vicinity of the interchange, I-495 generally consists of three travel lanes in each direction. Motorists traveling along I-495 northbound can access Route 24 northbound at Exit 7A, while access to Route 24 southbound is provided at Exit 7B. Along I-494 southbound, motorists can access Route 24 northbound at Exit 7A, while access to Route 24 southbound is provided at Exit 7B.

I-495 (Exits 6)/Route 44, Middleborough is a partial cloverleaf configuration. In the vicinity of the interchange I-495 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing below Route 44. Along I-495, motorists can access Route 44 eastbound and westbound at Exit 6; at this location a third travel lane along I-495 northbound and southbound are

provided, approximately 100 feet in length, serving as a deceleration lane. I-495 northbound also has an extended acceleration lane which is 100 feet. I-495 southbound has an extended acceleration lane which is 300 feet, which also serves as the deceleration lane for I-495 southbound at Exit 5. In the vicinity of the interchange, Route 44 consists of one travel lane in each direction and passes above I-495. Neither ramp location is controlled by traffic signals.

I-495 (Exits 5)/Route 18, Middleborough is a partial cloverleaf configuration. In the vicinity of the interchange I-495 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing below Route 18. Along I-495, motorists can access Route 18 eastbound and westbound at Exit 5; at this location a third travel lane along I-495 northbound and southbound are provided, serving as a deceleration lane. The I-495 northbound deceleration lane is approximately 100 feet in length and the southbound lane is approximately 300 feet, which also serves as the acceleration lane for I-495 southbound at Exit 6. I-495 northbound and southbound has an extended acceleration lane which is 100 feet, serving as acceleration lanes. In the vicinity of the interchange, Route 44 generally consists of one travel lane in each direction and passes above I-495. Neither ramp location is controlled by traffic signals.

I-495 (Exit 4)/Route 105 Middleborough is a partial cloverleaf configuration. In the vicinity of the interchange I-495 northbound and southbound consists of two travel lanes in each direction and is grade separated, passing above Route 105. Along I-495, motorists can access Route 105 northbound and southbound at Exit 4; at these locations a third travel lane along I-495 northbound and southbound are provided, approximately 100 feet in length, serving as a deceleration lanes. I-495 northbound and southbound also has extended acceleration lanes which are approximately 100 feet each. In the vicinity of the interchange, Route 105 generally consists of two travel lanes in each direction and passes below I-495. Neither ramp location is controlled by traffic signals.

I-495 (Exit 8)/Route 138, Raynham is a diamond configuration. In the vicinity of the interchange I-495 northbound and southbound consists of three travel lanes in each direction and is grade separated, below Route 138. Along I-495, motorists can access Route 138 eastbound and westbound at Exit 8; at this locations a fourth travel lane along I-495 northbound and southbound are provided, approximately 150 feet in length, serving as a deceleration lane. I-495 northbound and southbound also has extended acceleration lanes which are approximately 100 and 150 feet, respectively. In the vicinity of the interchange, Route 138 generally consists of two travel lanes in each direction and passes above I-495. Both ramp locations are controlled by a traffic signal at Route 138.

7.1.2.5 Data Collection Program

To establish existing conditions, traffic volume counts began in March 2012 and continued in September and October 2012 as shown below. Count data and location diagrams are included in **Appendix B-1.**

- Automatic Traffic Recorder (ATR) counts were conducted over a 72-hour period on Thursday, Friday and Saturday March 15, 16 and 17 to establish weekday, Friday and Saturday daily and hourly volumes at intersections in close proximity to the site and in the City of Taunton. From the ATR counts, it was established that within the Taunton study area, the weekday AM peak hour

occurs from 7:15 to 8:15 AM, the weekday PM peak hour occurs from 4:30 to 5:30 PM and the Saturday peak hour occurs from 11:45 to 12:45 PM. Additional ATR counts at 17 more locations in the broader region were taken between September 27 and October 1 and again between October 11 and October 14 (to avoid the Columbus Day holiday weekend).

- Automatic Traffic Recorder Counts were conducted on May 3, 4, 5 and 6 at 18 locations at the Route 24/140 interchange and Route 140/Stevens Street interchange, again established in cooperation with the City's technical experts.
- Manual intersection Turning Movement Counts (TMC) were conducted on March 15 -17, March 23-24 and April 14-15 at 33 intersections within the city of Taunton. These locations had been established in cooperation with the City's peer review consultant. Counts were conducted during the weekday peak periods of 7:00 to 9:00 AM and 4:00 to 6:00 PM and the Saturday midday peak period from 11:00 AM to 2:00 PM. Additional counts outside of the city of Taunton were taken between September 27 and October 1 and again between October 11 and October 14.
- In response to Massachusetts Department of Transportation (MassDOT) comments, a video installation was established at the Route 24 southbound ramp to Route 140 to record queue lengths and traffic operations in order to assist in calibrating the VISSIM model. The video captures vehicles entering and existing Route 24 southbound to and from Route 140.

Roadway Volumes

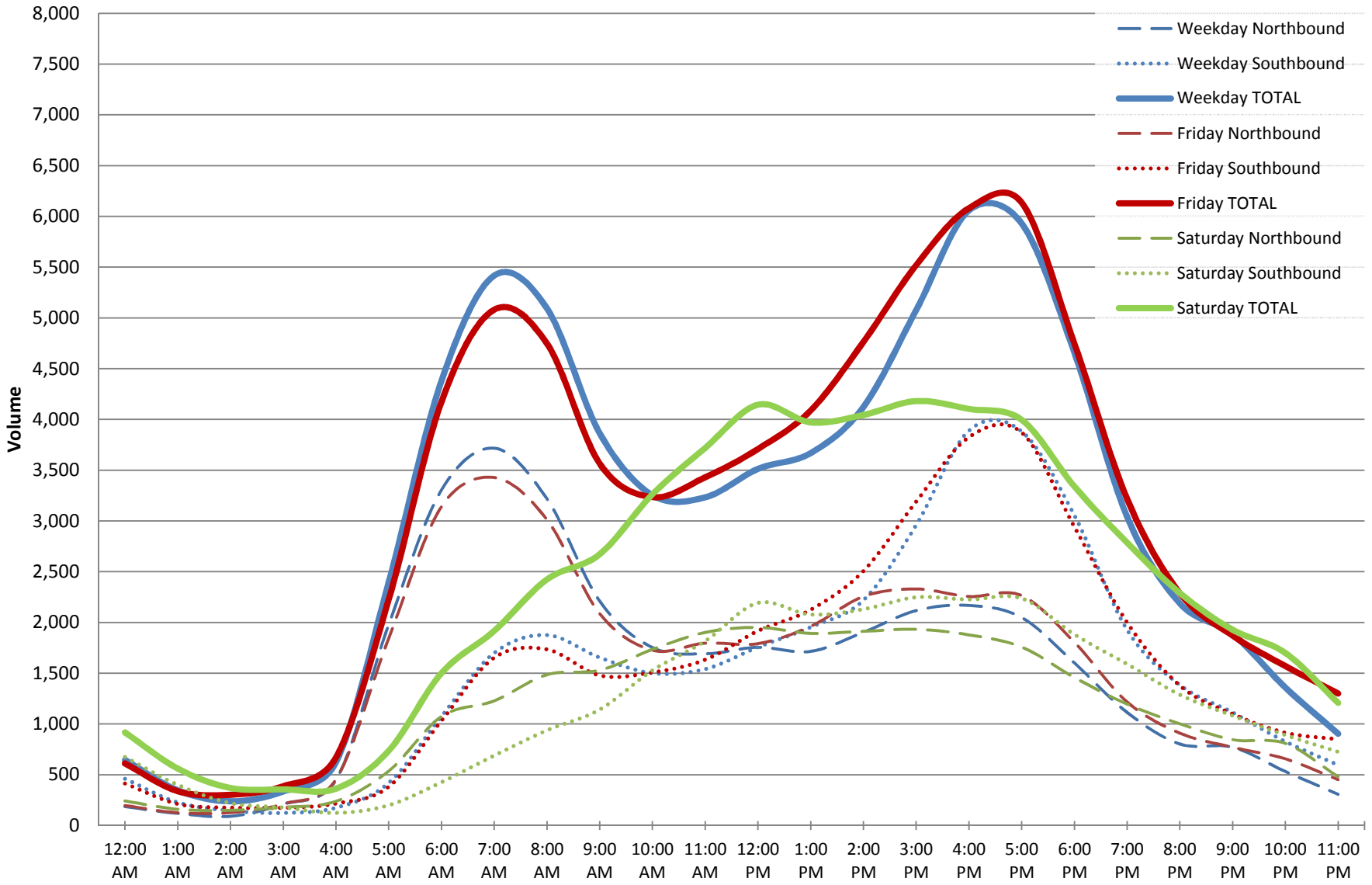
Table 7.1-1 summarizes average weekday traffic volumes at the roadway locations counted.

TABLE 7.1-1
AVERAGE DAILY TRAFFIC SUMMARY

	ADT	% Trucks	K*	Direction	85th Percentile Speed (mph)
O'Connell Way west of Stevens Street	3,604	7.7%	7.9%	50% EB	31
Stevens Street south of O'Connell Way	8,847	7.8%	9.8%	52% NB	37
Galleria Mall Overpass west of Stevens Street	2,704	3.1%	10.8%	57% WB	23
Galleria Mall Drive south of County Street	7,662	3.2%	10.6%	54% WB	23
Middleboro Street east of Stevens Street	8,367	3.5%	9.2%	51% WB	38
Middleboro Street west of Stevens Street	11,092	2.6%	9.2%	52% WB	39
52&53. Route 24 north of Route 104 (Exit 15)	99,055	6.7%	8.5%	50% EB	-
Route 24 between Route 104 (Exit 14) & I-495 (Exit 15)	106,354	12.5%	8.3%	50% NB	72
Route 24 between Route 44 (Exit 13) & I-495 (Exit 14)	80,775	6.6%	8.1%	50% NB	-
Route 24 north between Route 140 (Exit 12) & Route 44 (Exit 13)	72,237	13.4%	8.4%	50% EB	32
Route 24 between Padelford Street (Exit 11) & Route 140 (Exit 12)	53,600	10.5%	8.9%	53% NB	37
Route 24 south of Padelford Street (Exit 11)	46,391	6.5%	8.9%	50% NB	-
Route 140 between Route 24 (Exit 12) & Stevens Street (Exit 11)	43,375	6.8%	8.6%	50% EB	65
Route 140 east of Stevens Street (Exit 11)	33,335	8.8%	8.6%	51% EB	73
I-495 north of Route 138 (Exit 8)	79,890	9.7%	9.2%	51% NB	-
I-495 between Route 24 (Exit 7) & Route 138 (Exit 8)	75,309	14.7%	8.8%	50% NB	74
I-495 between Route 44 (Exit 6) & Route 24 (Exit 7)	59,411	7.4%	8.9%	50% NB	-
I-495 between Route 105 (Exit 4) & Route 18 (Exit 5)	45,933	6.9%	8.7%	51% SB	-
I-495 south of Route 105 (Exit 4)	41,404	6.8%	8.5%	51% SB	-
Route 44 west of Route 24	34,350	4.1%	7.0%	51% WB	41
Route 44 east of Orchard Street	31,473	6.1%	6.4%	53% EB	40
Route 24 south of Exit 6	36,281	9.5%	9.7%	56% SB	71
Route 79 south of Exit 6	26,958	7.4%	9.7%	53% SB	67

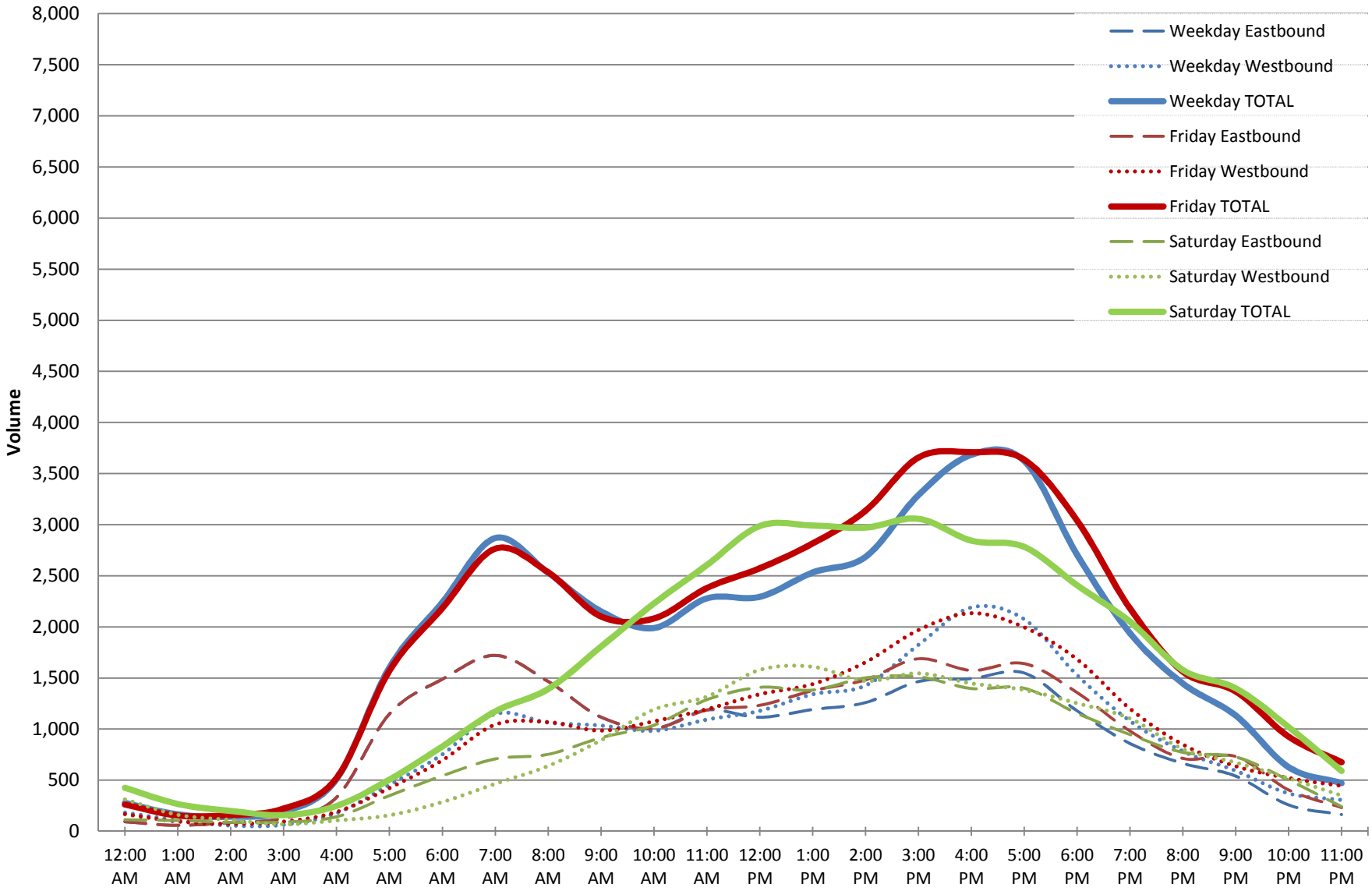
*K – Proportion of single peak hour volume compared to the ADT

Figure 7.1-5 and **Figure 7.1-6** illustrate the weekday, Friday, and Saturday hourly traffic volumes on the Routes 24 and Route 140 highways, respectively. These highways serve as the major access routes to the proposed project site.



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-5
Daily Traffic Variations:
Route 24 North of Route 140



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-6
Daily Traffic Variations:
Route 140 East of Route 24

Intersection Volumes

Existing intersection volumes for the AM, Friday PM and Saturday peak hours are shown in **Figure 7.1-7** through **Figure 7.1-18.** The volumes have been balanced between adjacent study area intersections.

Interchange Volumes

Existing interchange volumes for the AM, Friday PM and Saturday peak hours are shown in **Figure 7.1-19, Figure 7.1-20,** and **Figure 7.1-21.**

Peak Hours

The count data revealed the following peak hours:

- Weekday morning peak hour is 8:00 AM to 9:00 AM (analysis hour for intersections);
- Friday afternoon peak hour is 4:00 PM to 5:00 PM (analysis hour for intersections);
- Saturday midday peak hour is 11:45 AM to 12:45 PM (analysis hour for intersections)
- Saturday Route 24 peak hour is 4:00 PM to 5:00 PM (analysis hour for Route 24 locations); and
- Sunday peak hour is 4:00 PM to 5:00 PM.

Seasonal Adjustment Factors

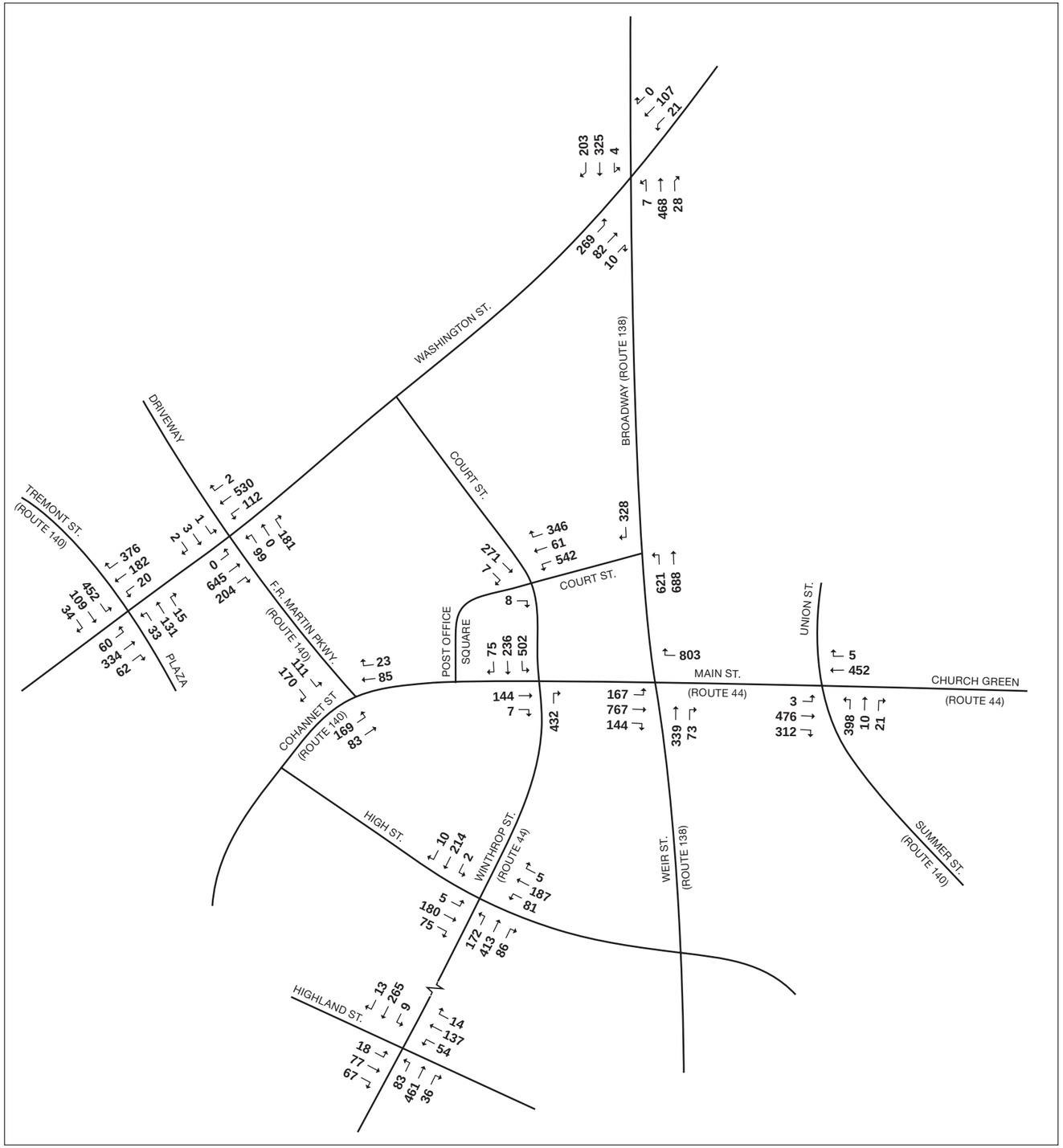
In accordance with MassDOT procedures, the intersection traffic volumes collected in March 2012 and interchange traffic volumes collected in May 2012 were adjusted upward by 2.7% to reflect annual average conditions. Because April volumes are above the annual average, the volumes collected in April were not adjusted. Similarly, based on the historical counts for Taunton, September and October have volumes that are above the monthly average for the year. September is 2.9% above average and October is 1.8% above average. To be conservative, these volumes were not adjusted.

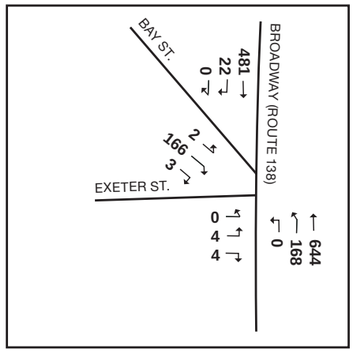
MassDOT no longer publishes seasonal factors, but instead recommends use of monthly ADTs from a nearby permanent count station to determine the seasonal variations. The most relevant count location for this study was at Count Station 6072, Route 24 in Taunton north of Route 140; thus this location was used as the basis for the adjustment.

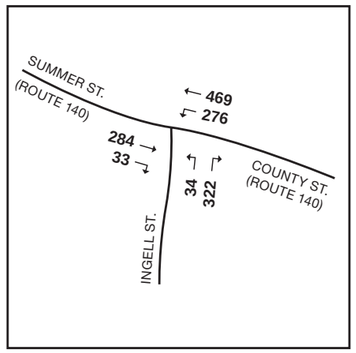
Consistency with MassDOT Recorded Volumes

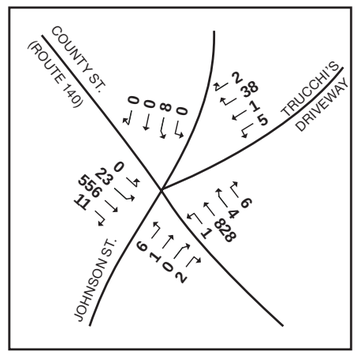
Volumes for the Route 24/Route 140 interchange were collected as a part of a MassDOT study that reported an evening peak hour volume of 1,800 vph on the Route 24 SB ramp to Route 140. This value is significantly higher than the 1,440 vph shown in **Figure 7.1-19** of this report.

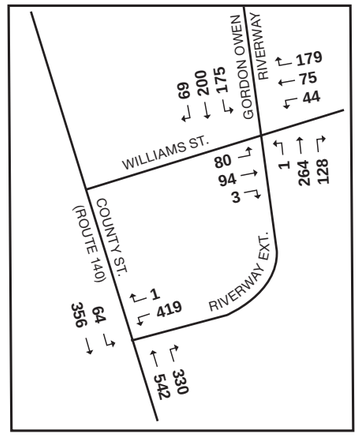
Volumes on the Route 24 southbound ramp to and from Route 140 have been counted several times for the purpose of this project during the evening peak hour. Turning movement counts were collected at the intersection of Route 24 SB Ramps (Exit 12)/County Street (Route 140) on Friday, March 16, 2012 and Thursday, October 11, 2012. ATRs were collected on the Route 24 SB ramp to Route 140 on Thursday, May 3, 2012 and Friday, May 4, 2012.

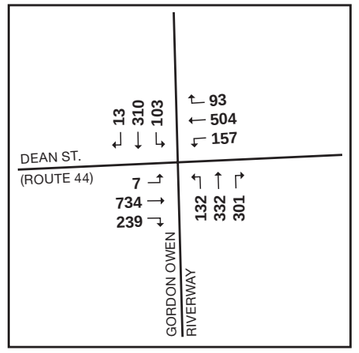








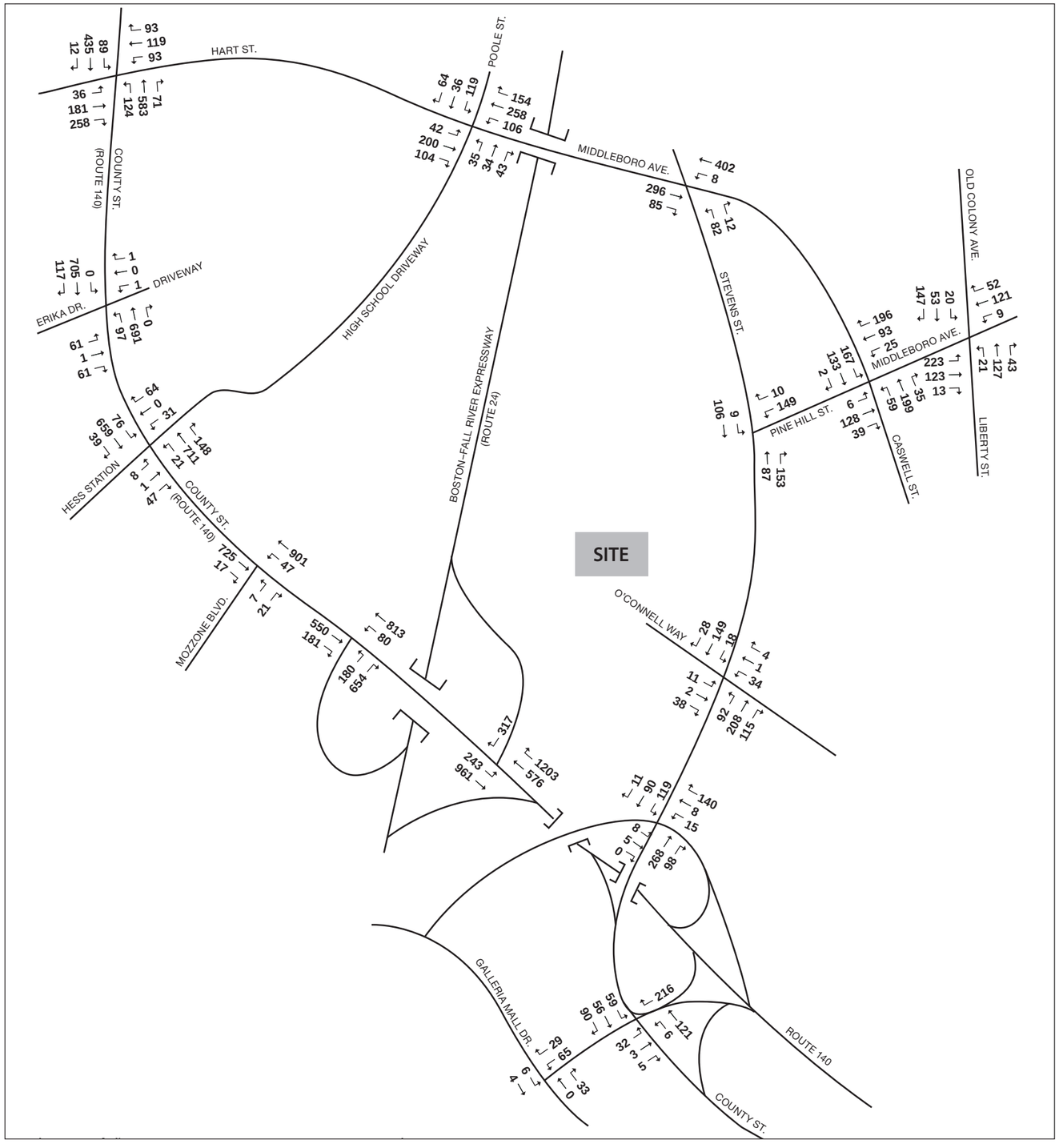


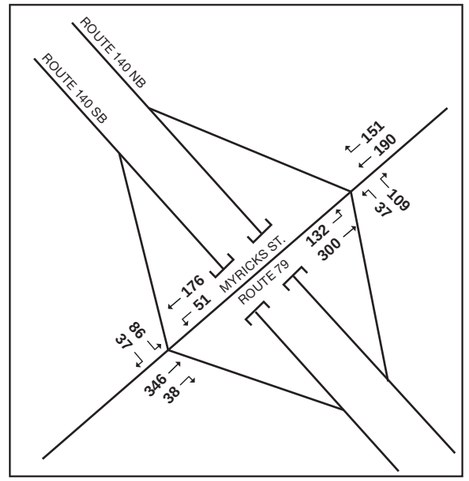


Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-7
Existing Conditions (2012) AM Peak Hour Volumes – West Taunton

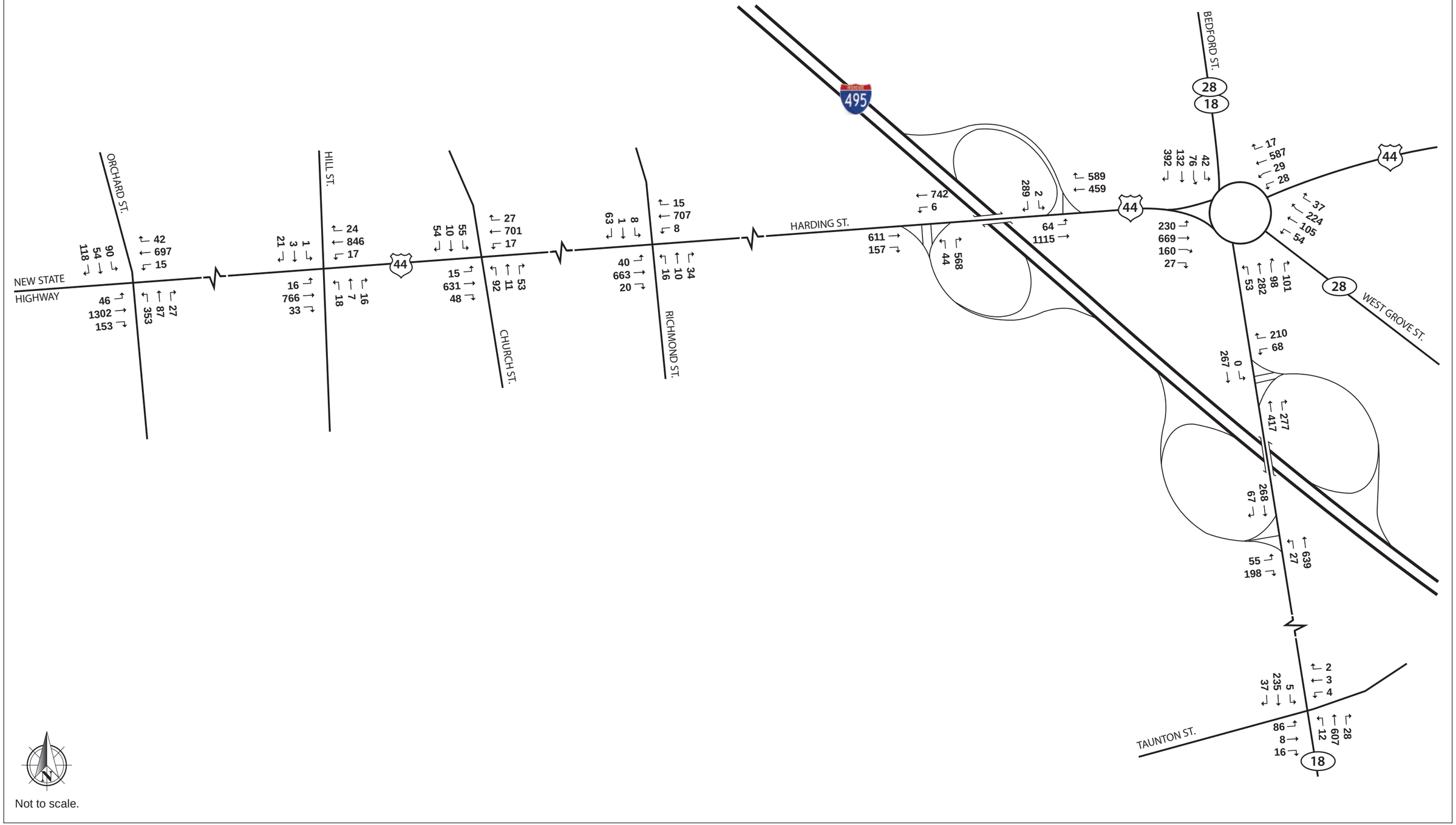




Not to scale.

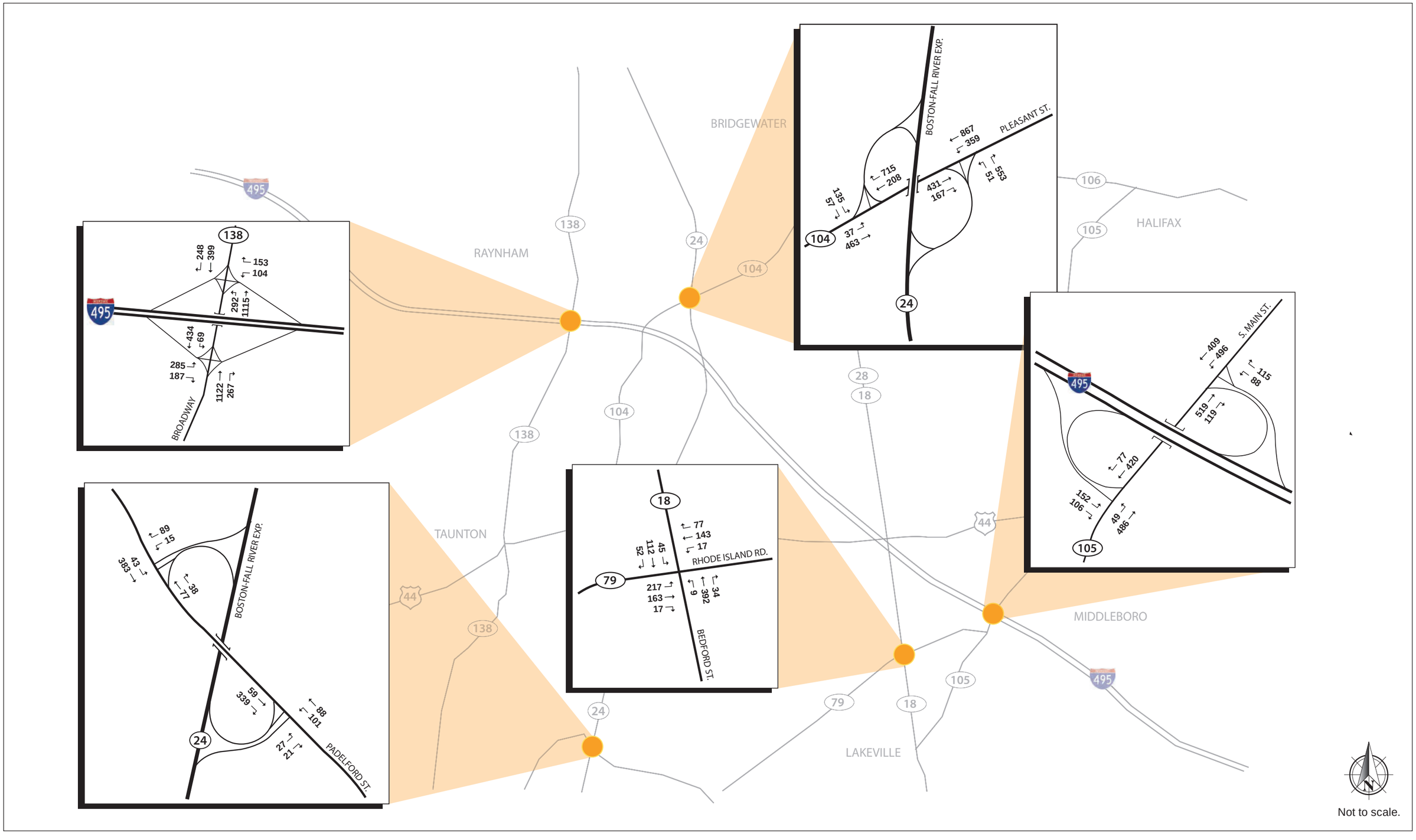
SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-8
Existing Conditions (2012) AM Peak Hour Volumes – East Taunton



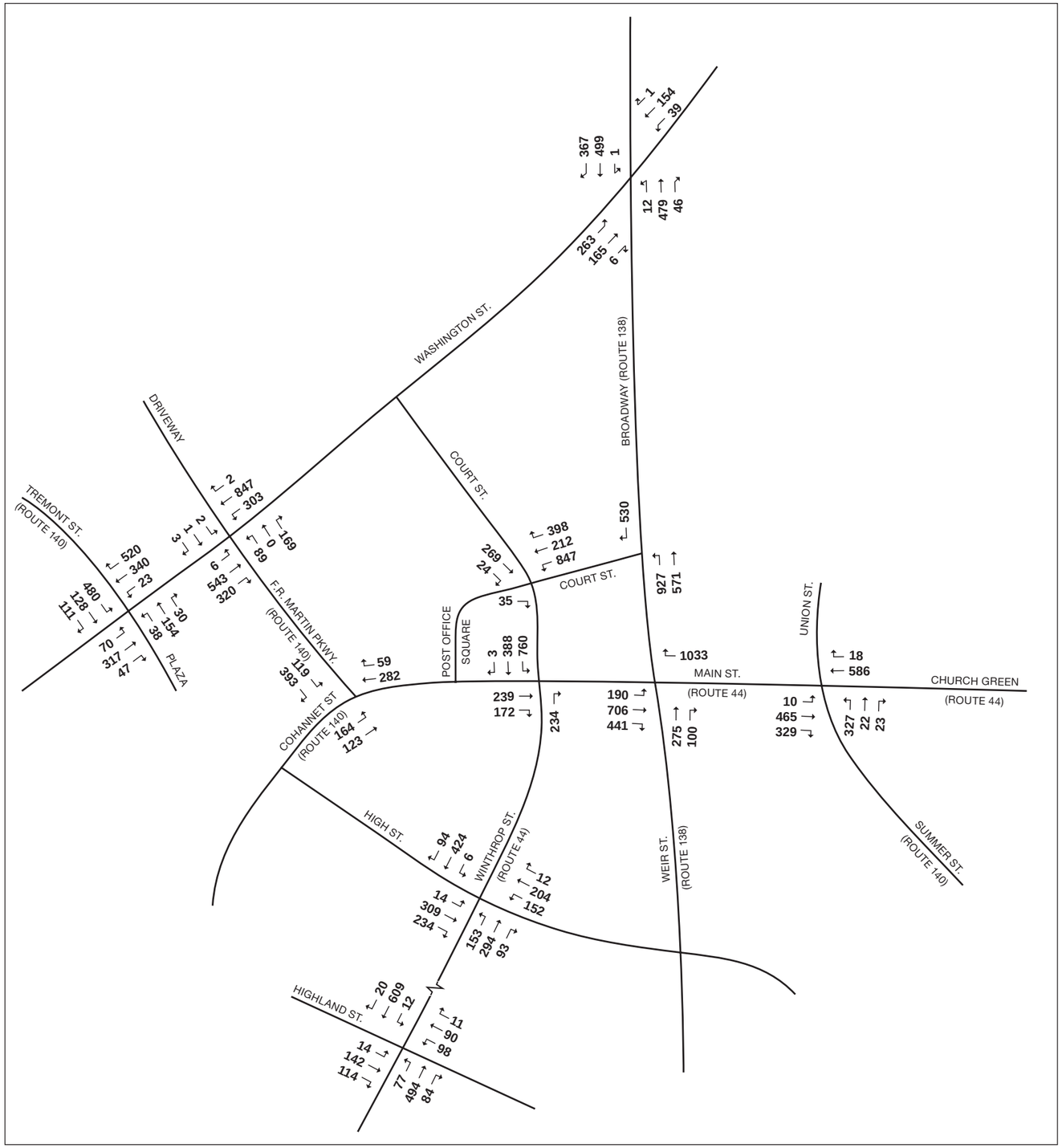
SOURCE: Howard/Stein-Hudson Associates, Inc.

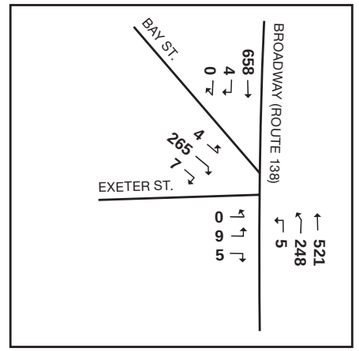
Figure 7.1-9
Existing Conditions (2012) AM Peak Hour Volumes – Route 44 Corridor

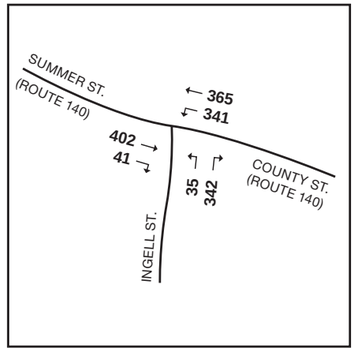


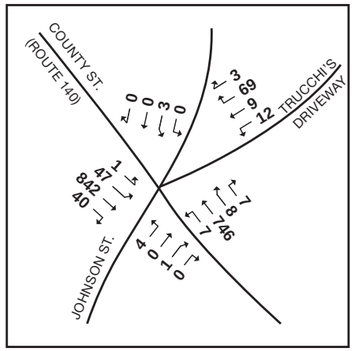
SOURCE: Howard/Stein-Hudson Associates, Inc.

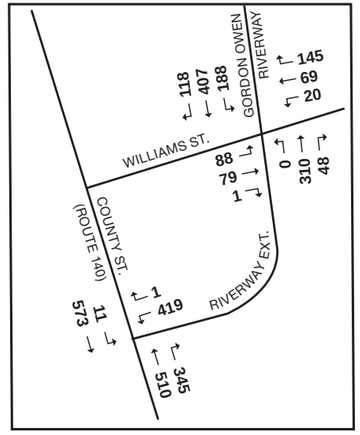
Figure 7.1-10
Existing Conditions (2012) AM Peak Hour Volumes – Other Local Intersections

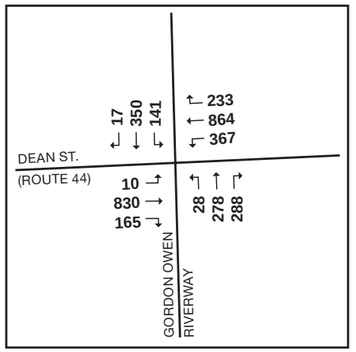








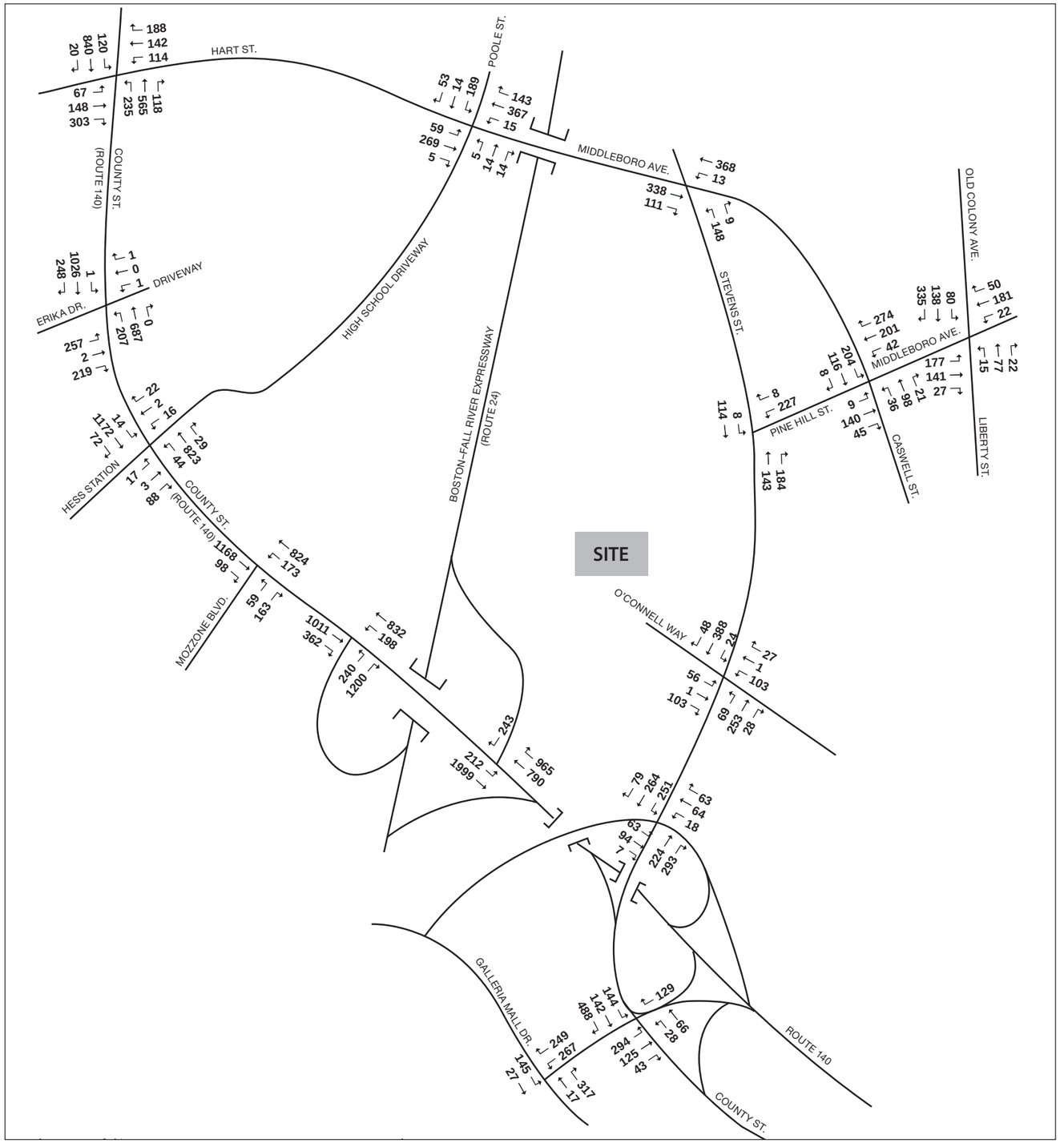


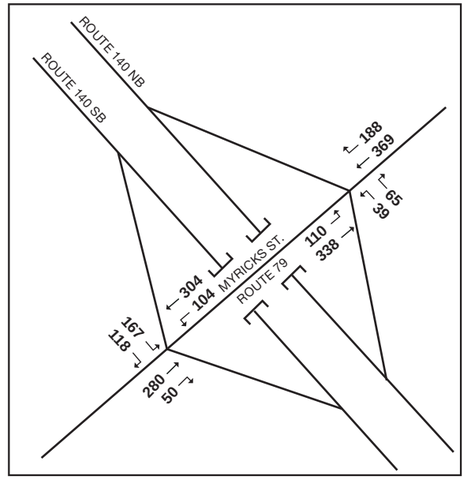


Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-11
Existing Conditions (2012) PM Peak Hour Volumes – West Taunton

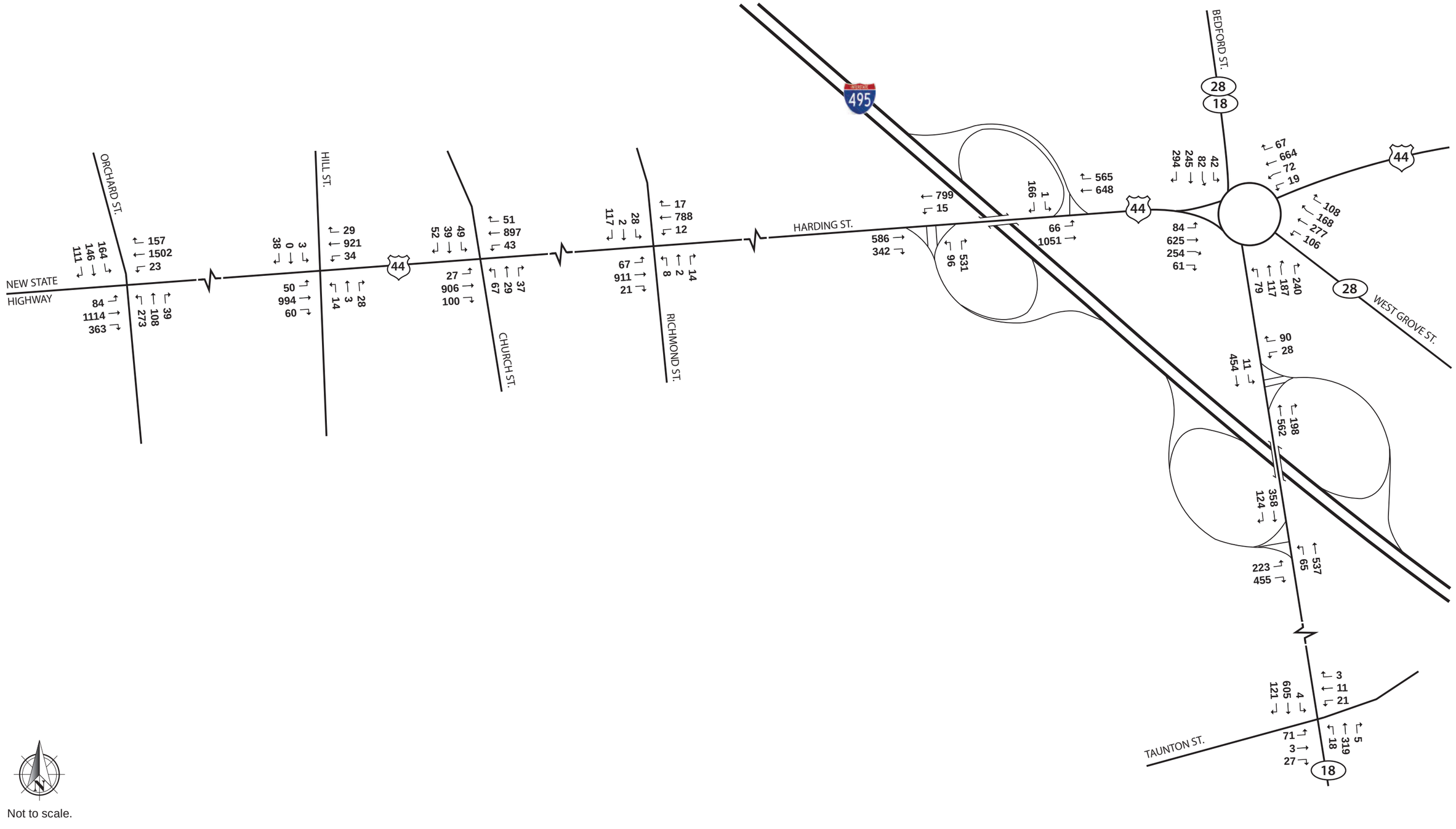




Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

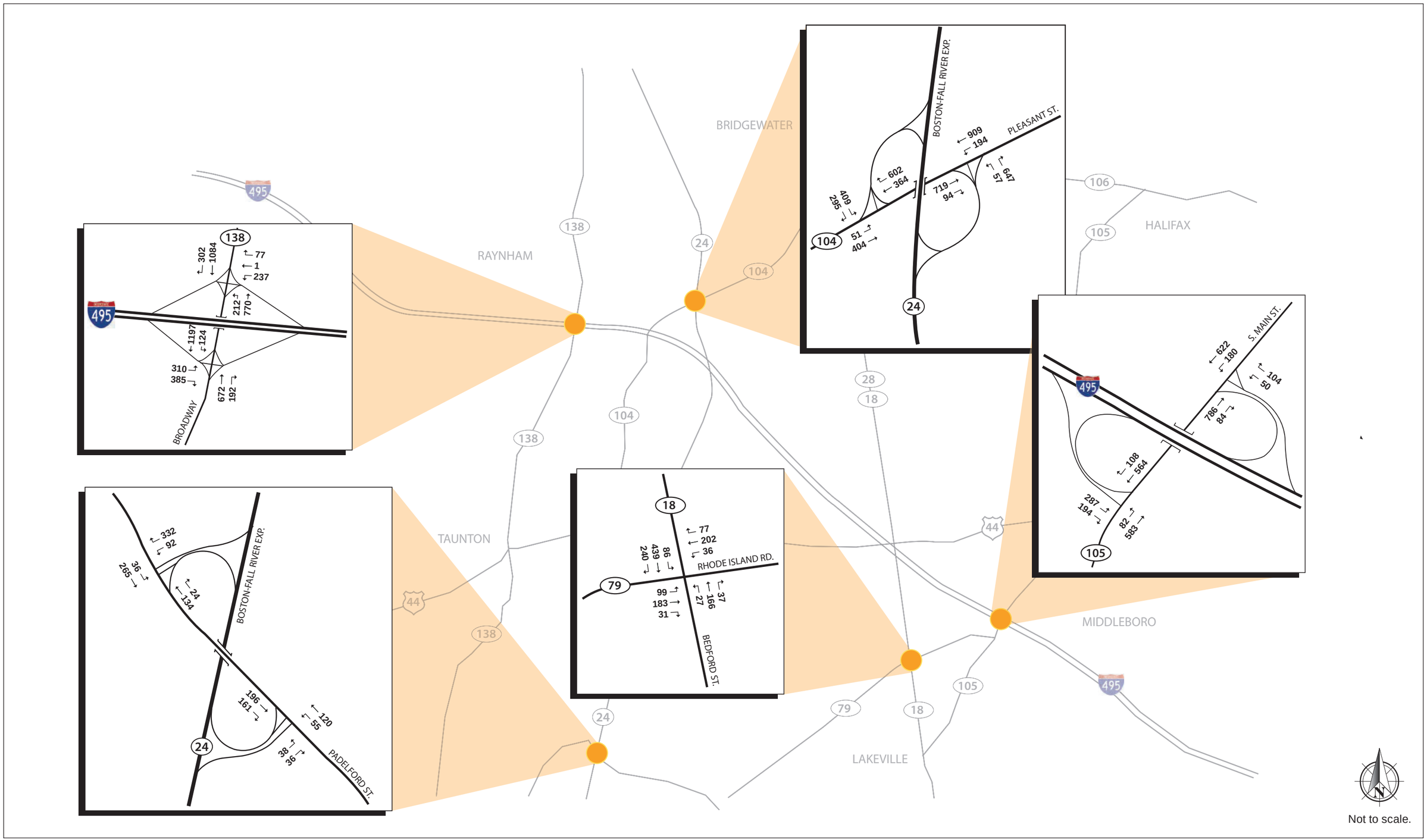
Figure 7.1-12
Existing Conditions (2012) PM Peak Hour Volumes – East Taunton



Not to scale.

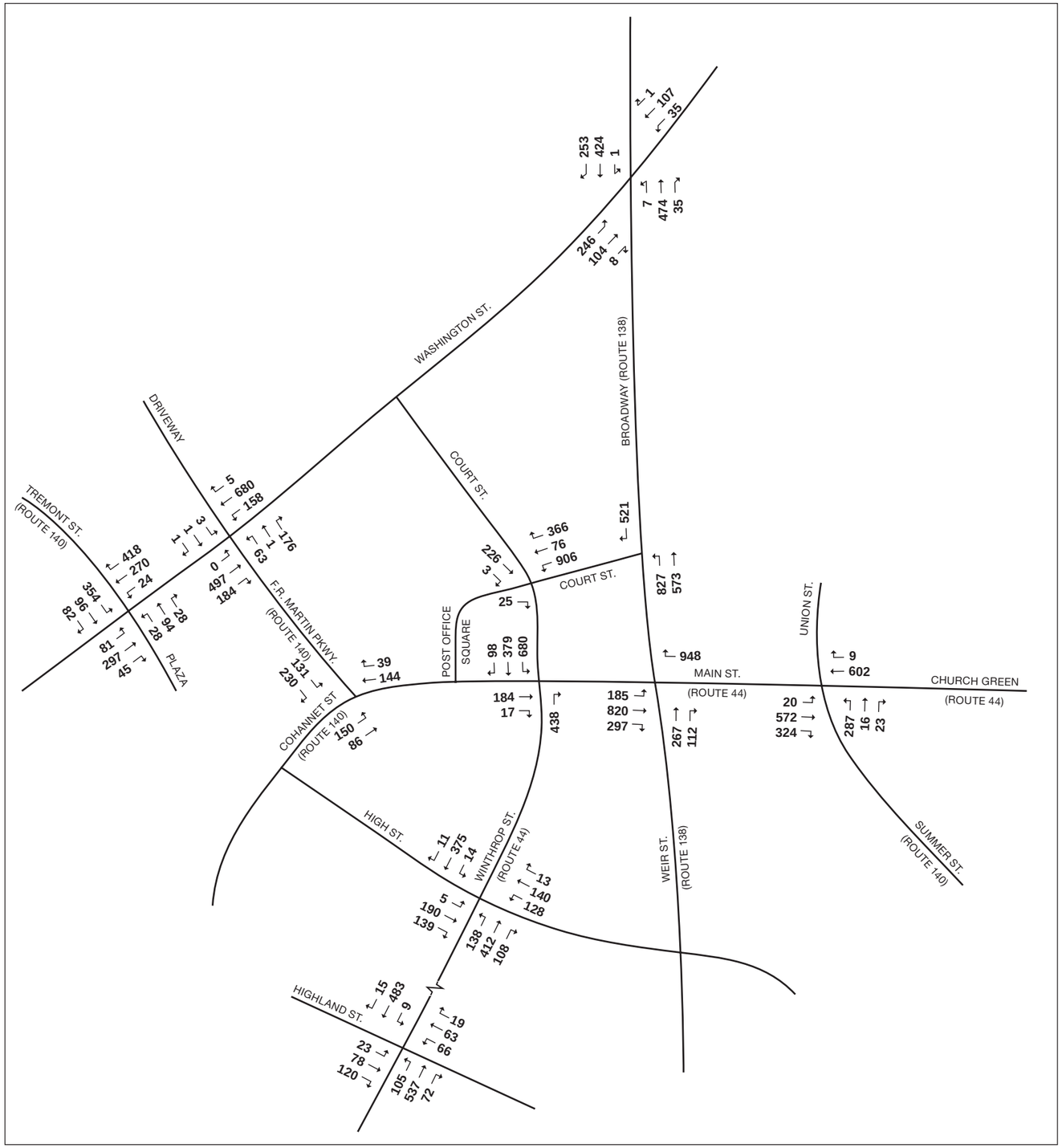
SOURCE: Howard/Stein-Hudson Associates, Inc.

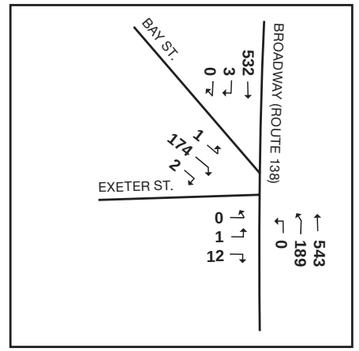
Figure 7.1-13
Existing Conditions (2012) PM Peak Hour Volumes – Route 44 Corridor

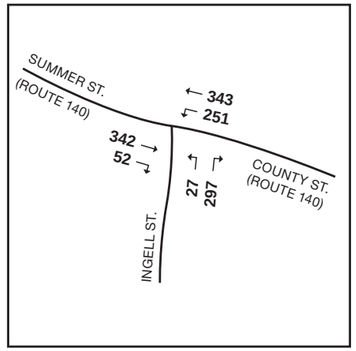


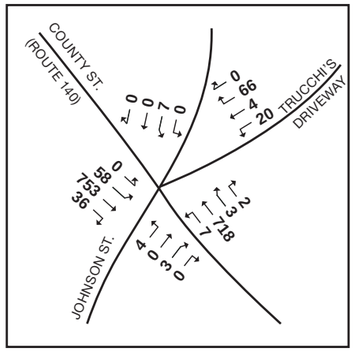
SOURCE: Howard/Stein-Hudson Associates, Inc.

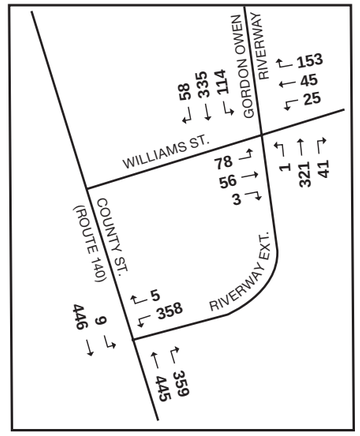
Figure 7.1-14
Existing Conditions (2012) PM Peak Hour Volumes – Other Local Intersections

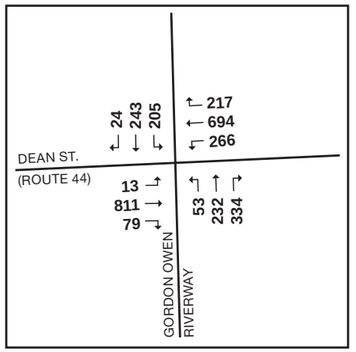








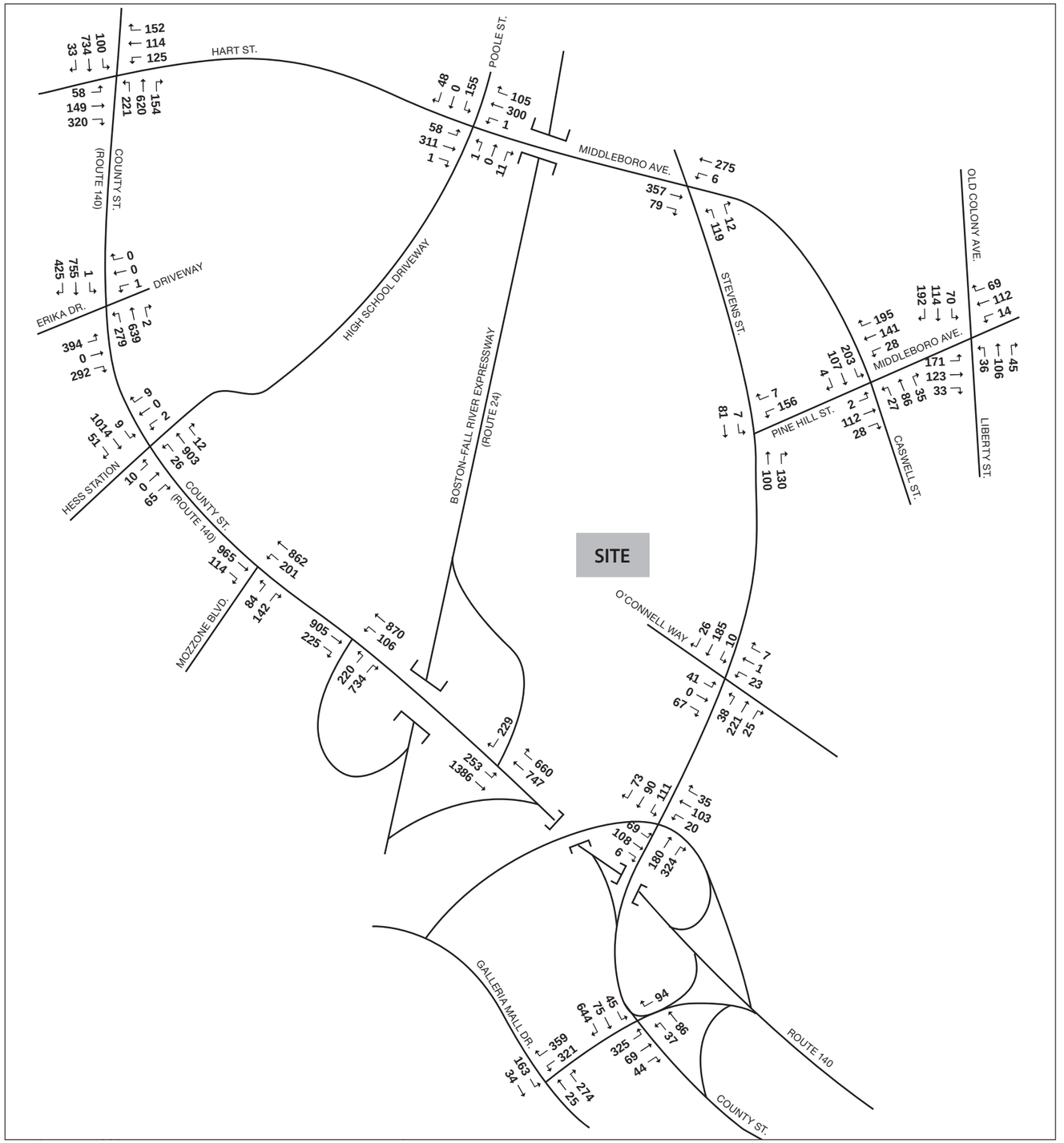


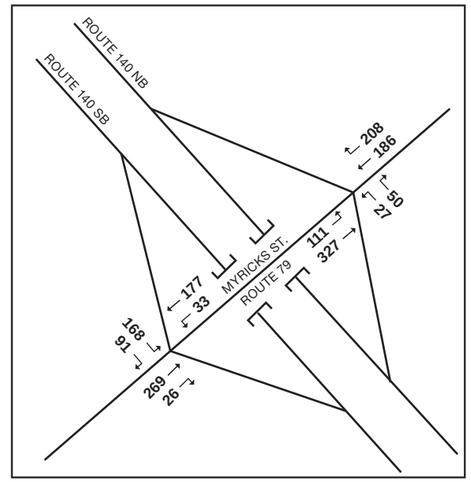


Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-15
Existing Conditions (2012) Saturday Midday Peak Hour Volumes – West Taunton

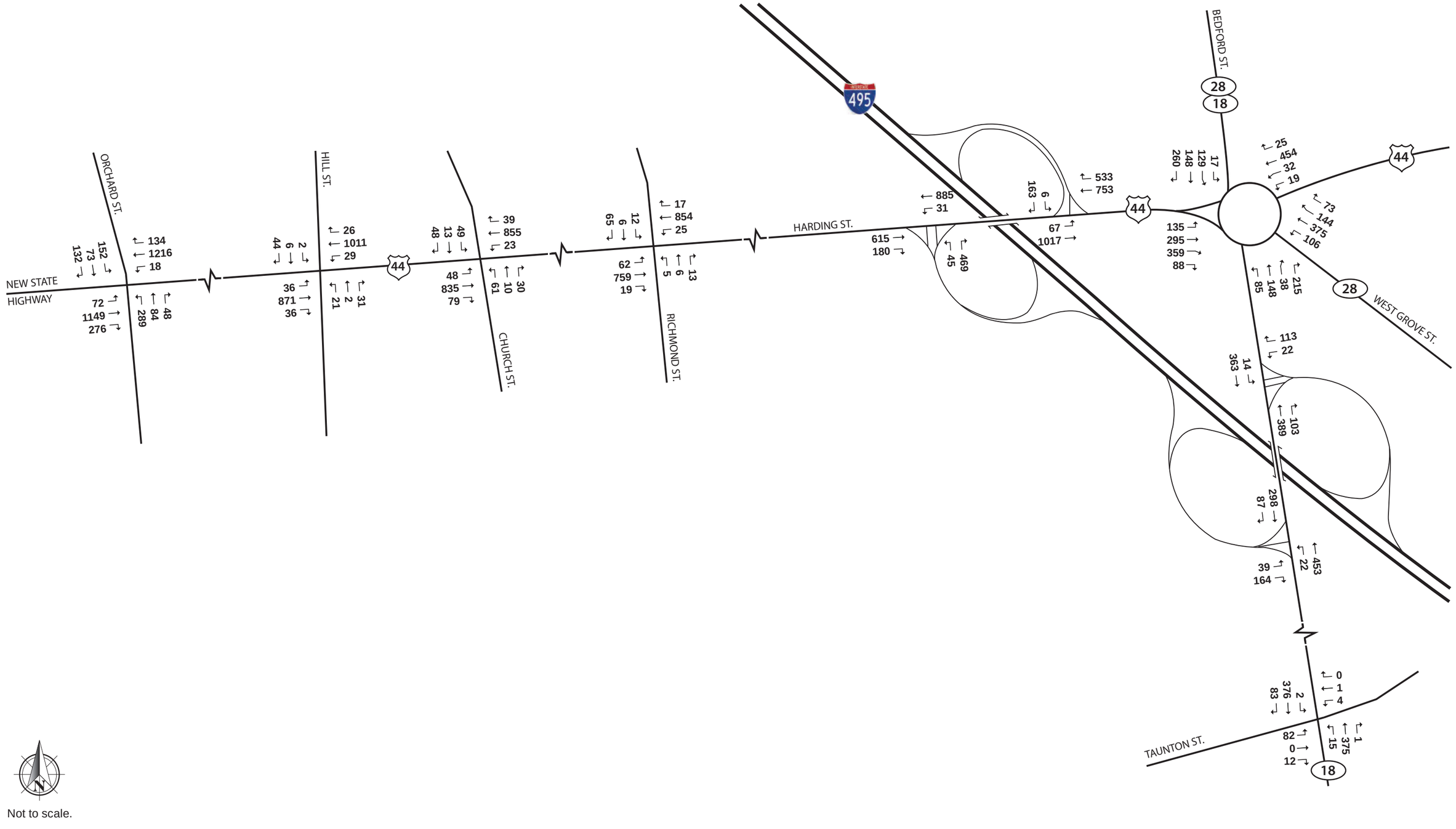




Not to scale.

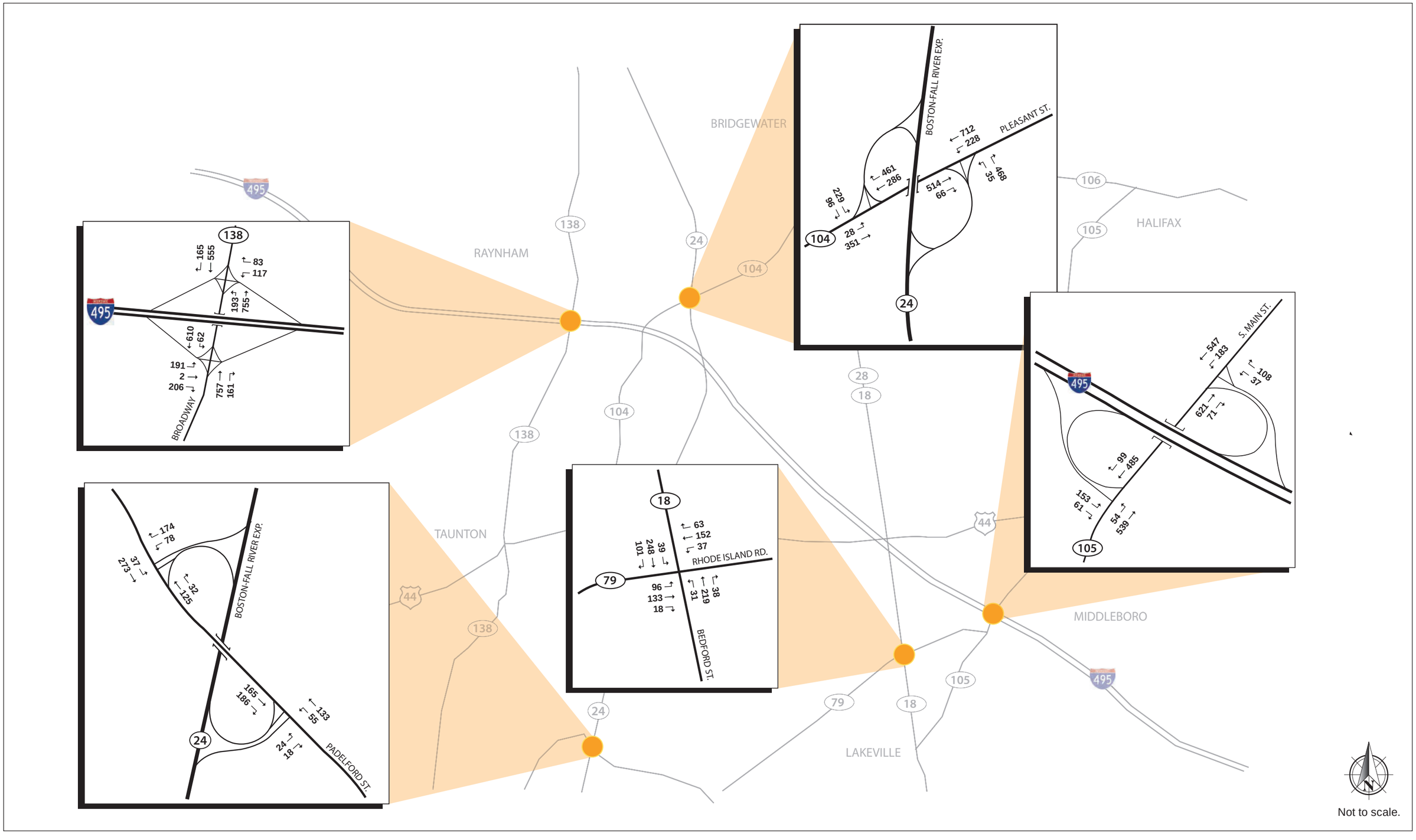
SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-16
Existing Conditions (2012) Saturday Midday Peak Hour Volumes – East Taunton



SOURCE: Howard/Stein-Hudson Associates, Inc.

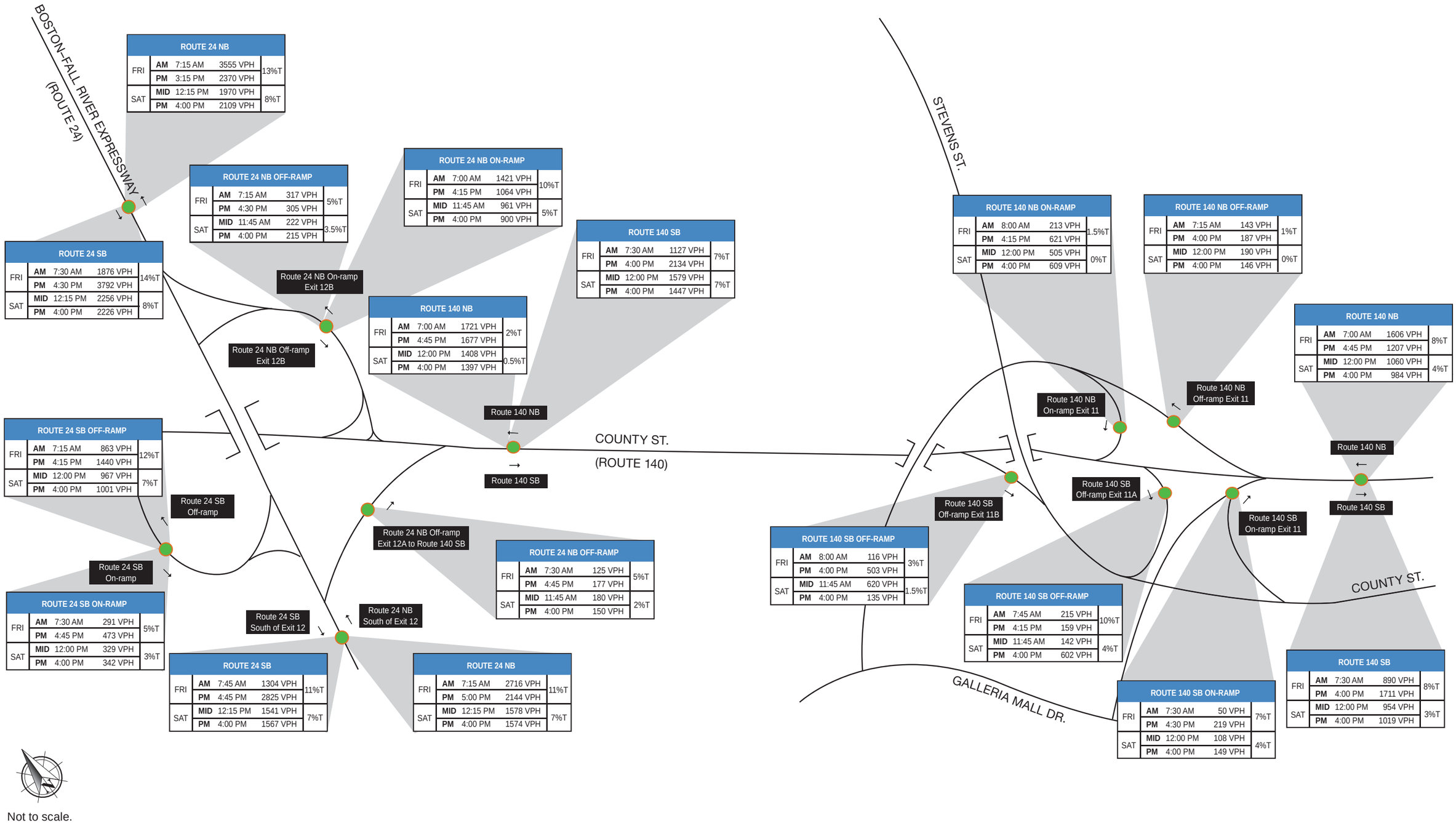
Figure 7.1-17
Existing Conditions (2012) Saturday Midday Peak Hour Volumes – Route 44 Corridor



Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

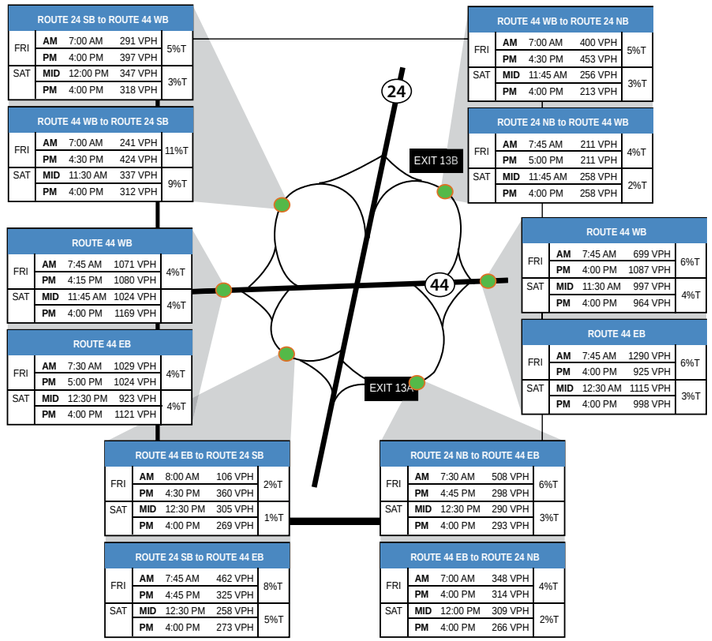
Figure 7.1-18
Existing Conditions (2012) Saturday Midday Peak Hour Volumes – Other Local Intersections

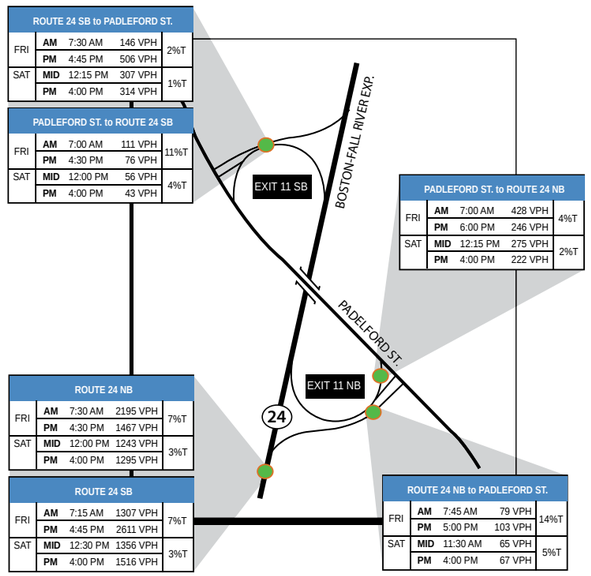


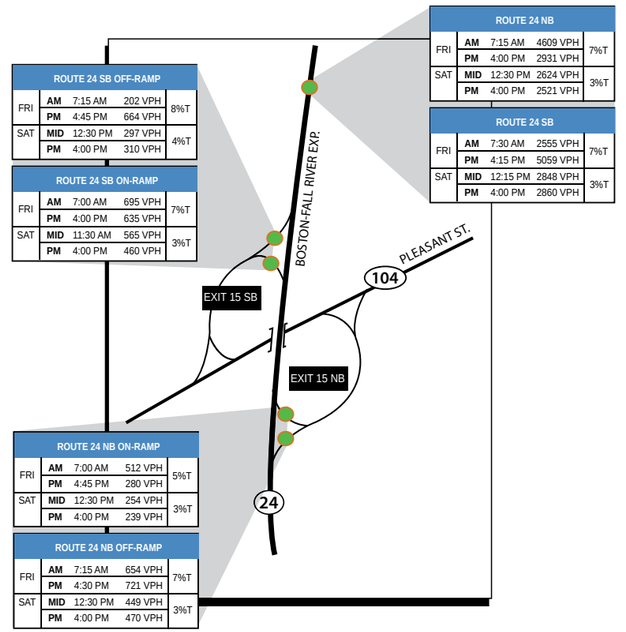
Not to scale.

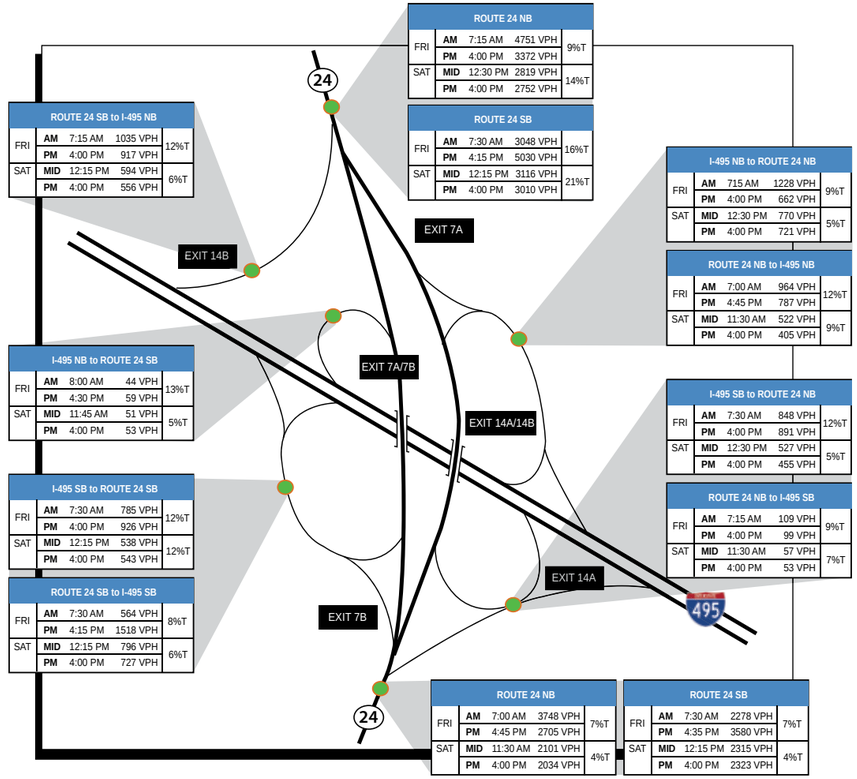
SOURCE: Howard/Stein-Hudson Associates, Inc.

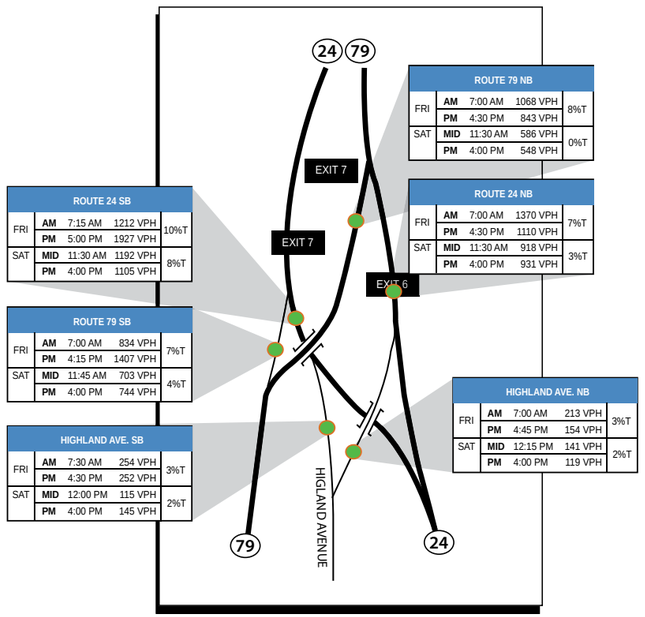
Figure 7.1-19
Existing Conditions (2012) Interchange Volumes – Route 140 Interchanges







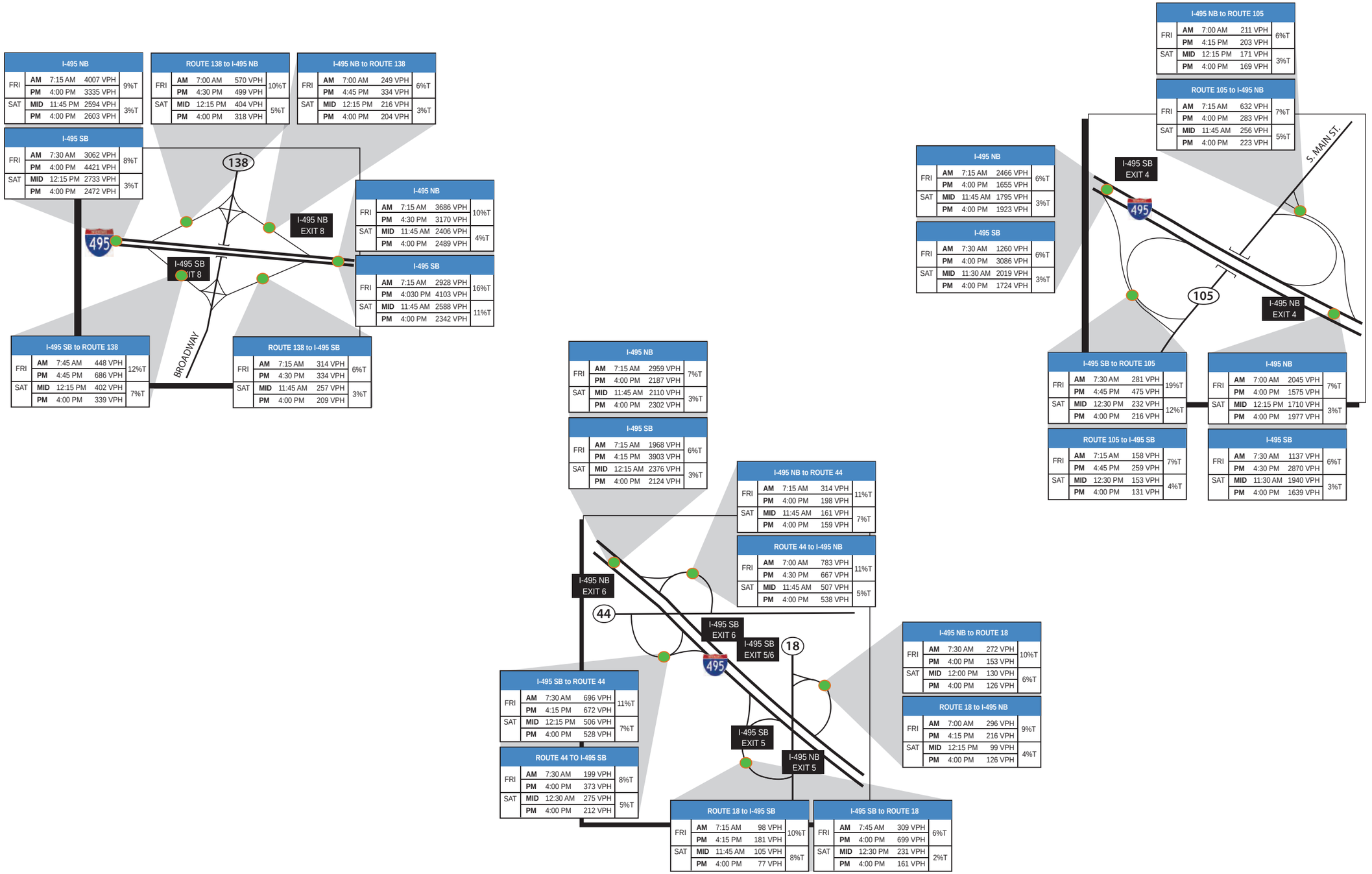




Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-20
Existing Conditions (2012) Interchange Volumes – Route 24 Interchanges



Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-21
Existing Conditions (2012) Interchange Volumes – Other Area Interchanges

The Friday, March 16 balanced TMCs showed a volume of 1,158 vph on the ramp during the evening peak period, while the Thursday, October 11 showed a volume of 1,533 vph. The Thursday and Friday ATRs collected in May 2012 showed volumes of 1,457 vph and 1,440 vph, respectively. Aside from the turning movement volumes collected in March, the variability between the counts on the Route 24 SB ramp to Route 140 is within 100 vph and considerably lower than the volumes reported in the MassDOT study.

Due to the unknown source of the MassDOT counts and the relative consistency between the counts collected for this project, it is believed that the evening volumes reported and analyzed in this report are indicative of typical conditions at this location.

The ATR volumes from May 2012 also show that the evening peak hour conditions on Friday are similar to the evening peak hour on Thursday.

7.1.2.6 Safety Analysis

Intersection Safety Analysis

The study team performed a safety analysis at the study area intersections to identify and evaluate possible safety issues that exist.

Crash data for the original City of Taunton locations were obtained from MassDOT for the most recent three-year period available (2007–09). During that period, 499 vehicular accidents were reported at the study area intersections. Within the 499 reported collisions, seven crashes involved a pedestrian, and two collisions involved a cyclist. **Table 7.1-2** summarizes the crashes at the study area intersections. Detailed crash data is included in **Appendix B-2.**

TABLE 7.1-2
ORIGINAL STUDY AREA CRASH RATE SUMMARY

Intersection	Number of Crashes				Crash Rate	
	2007	2008	2009	TOTAL	Intersection Average	District 5 Average
Signalized						
2. Galleria Mall Drive South/County Street	2	3	1	**6**	0.40	0.77
3. Overpass Connector/Route 140 NB Ramps/Stevens Street	1	0	9	**10**	0.69	
5. Route 24 NB Ramps/County Street	6	7	7	**20**	0.41	
6. Route 24 SB Ramps/County Street	8	1	4	**13**	0.30	
9. Mozzone Boulevard/County Street	5	7	7	**19**	0.63	
11. Erika Drive/County Street	4	5	1	**10**	0.31	
12. Hart Street/County Street	14	16	14	**44**	**1.26**	
15. Washington Street/Broadway	1	2	14	**17**	0.56	
17. Oak Street/Washington Street/Tremont Street	11	7	8	**26**	**0.82**	
18. Cohannet Street/Weir Street	6	16	6	**28**	**0.80**	
22. High Street/Winthrop Street	3	11	5	**19**	0.75	
23. Main Street/Church Green/Summer Street	4	2	3	**9**	0.40	

TABLE 7.1-2
ORIGINAL STUDY AREA CRASH RATE SUMMARY (CONTINUED)

Intersection	Number of Crashes				Crash Rate	
	2007	2008	2009	TOTAL	Intersection Average	District 5 Average
Signalized						
33. County Street/Riverway Extension	0	3	8	**11**	0.49	
34. Dean Street/Longmeadow Road/Gordon Owen Parkway	6	19	16	**41**	**0.94**	
35. Winthrop Street/Highland Street	3	7	6	**16**	0.71	
Unsignalized						
1. Galleria Mall Driveway North/County Road/Overpass Connector	0	1	0	**1**	-	
4. O'Connell Way/Driveway/Stevens Street	0	0	0	**0**	0.00	
7. Middleboro Avenue/Stevens Street	1	2	3	**6**	0.51	
8. Hart Street/Middleboro Avenue/Pool Street/Bristol Plymouth HS Driveway	6	7	4	**17**	**1.25**	
10. Bristol Plymouth HS Driveway/Hess Gas Station/County Street	0	1	3	**4**	0.14	
13. Galleria Mall Drive South/Galleria Mall Drive	0	0	0	**0**	0.00	
14. Exeter Street/Bay Street/Broadway	9	7	6	**22**	**0.85**	
16. Washington Street/F. R. Martin Parkway	3	3	6	**12**	0.35	
19. Court Street/Broadway/Weir Street	5	9	5	**19**	**0.74**	
20. Court Street/Western Green	4	5	6	**15**	0.66	0.60
21. Cohannet Street/Western Green	6	7	8	**21**	**0.92**	
24. Summer Street/County Street/Ingell Street	11	8	3	**22**	**1.18**	
25. County Street/Johnson Street	1	0	4	**5**	0.23	
26. Myricks Street/Route 140 NB Ramps	0	0	0	**0**	0.00	
27. Myricks Street/Route 140 SB Ramps	0	0	0	**0**	0.00	
28. Middleboro Avenue/Old Colony Avenue/Liberty Street	3	4	3	**10**	**0.66**	
29. Middleboro Avenue/Pinehill Street/Caswell Street	6	2	3	**11**	**0.77**	
30. Pinehill Street/Stevens Street	1	1	0	**2**	0.25	
31. F. R. Martin Parkway/Cohannet Street	1	1	3	**5**	0.34	
32. Williams Street/Gordon Owen Parkway	7	15	16	**38**	**2.12**	

As shown above in bold type, four signalized intersections exceeded the MassDOT District 5 average rate of 0.77 crashes per million entering vehicles, and eight exceeded the average rate of 0.60 crashes per million entering vehicles for unsignalized intersections.

Crash data for the expanded 2012 study locations were obtained from MassDOT for the most recent three-year period available (2008–10). During that period, 364 vehicular accidents were reported at the study area intersections. Within the 364 reported collisions, there were no crashes involving a pedestrians or cyclists. **Table 7.1-3** summarizes the crashes at the study area intersections. Detailed crash data is included in **Appendix B-2.**

TABLE 7.1-3
EXPANDED 2012 AREA CRASH RATE SUMMARY

Intersection	Number of Crashes				Crash Rate	
	2008	2009	2010	TOTAL	Intersection Average	District 5 Average
Signalized						
39. Bedford Street (Route 18)/Rhode Island Road (Route 79)	1	6	4	11	0.56	0.77
47. New State Highway (Route 44)/Church Street	6	9	5	20	0.52	
49. New State Highway (Route 44)/Orchard Street	19	25	27	60	0.49	
50. Broadway (Route 138)/I-495 NB Ramps (Exit 8)	2	1	2	5	0.15	
51. Broadway (Route 138)/I-495 SB Ramps (Exit 8)	1	2	1	4	0.11	
52. Pleasant Street (Route 104)/Route 24 NB Ramps (Exit 15)	0	1	0	1	0.03	
53. Pleasant Street (Route 104)/Route 24 SB Ramps (Exit 15)	0	0	0	0	0.00	
Unsignalized						
37. South Main Street (Route 105)/I-495 NB Ramps (Exit 4)	11	10	14	35	**1.61**	0.60
38. South Main Street (Route 105)/ I-495 SB Ramps (Exit 4)	4	8	4	16	**0.74**	
40. Bedford Street (Route 18)/Taunton Street (Route 79)	1	3	4	8	0.54	
41. Bedford Street (Route 18)/I-495 NB Ramps (Exit 5)	0	1	4	5	0.31	
42. Bedford Street (Route 18)/I-495 SB Ramps (Exit 5)	0	0	1	1	0.05	
43. Route 18/I-495/Route 28 (Middleborough Rotary)	57	46	50	153	**3.80**	
44. Harding Street (Route 44)/I-495 NB Ramps (Exit 6)	5	1	3	9	0.23	
45. Harding Street (Route 44)/I-495 SB Ramps (Exit 6)	1	0	2	3	0.08	
46. New State Highway (Route 44)/Richmond Street	5	5	3	13	0.39	
48. New State Highway (Route 44)/Hill Street	8	4	6	18	0.49	
54. Padelford Street/Route 24 NB Ramps (Exit 11)	1	0	0	1	0.14	
55. Padelford Street/Route 24 SB Ramps (Exit 11)	0	1	0	1	0.10	

As shown above in bold, three unsignalized intersections exceeded the MassDOT District 5 average rate of 0.60 crashes per million entering vehicles. In particular, the Middleborough Rotary has a crash rate of 3.80 crashes per million entering vehicles.

Routes 24 and 140 Freeway Segments: Detailed Crash Analysis

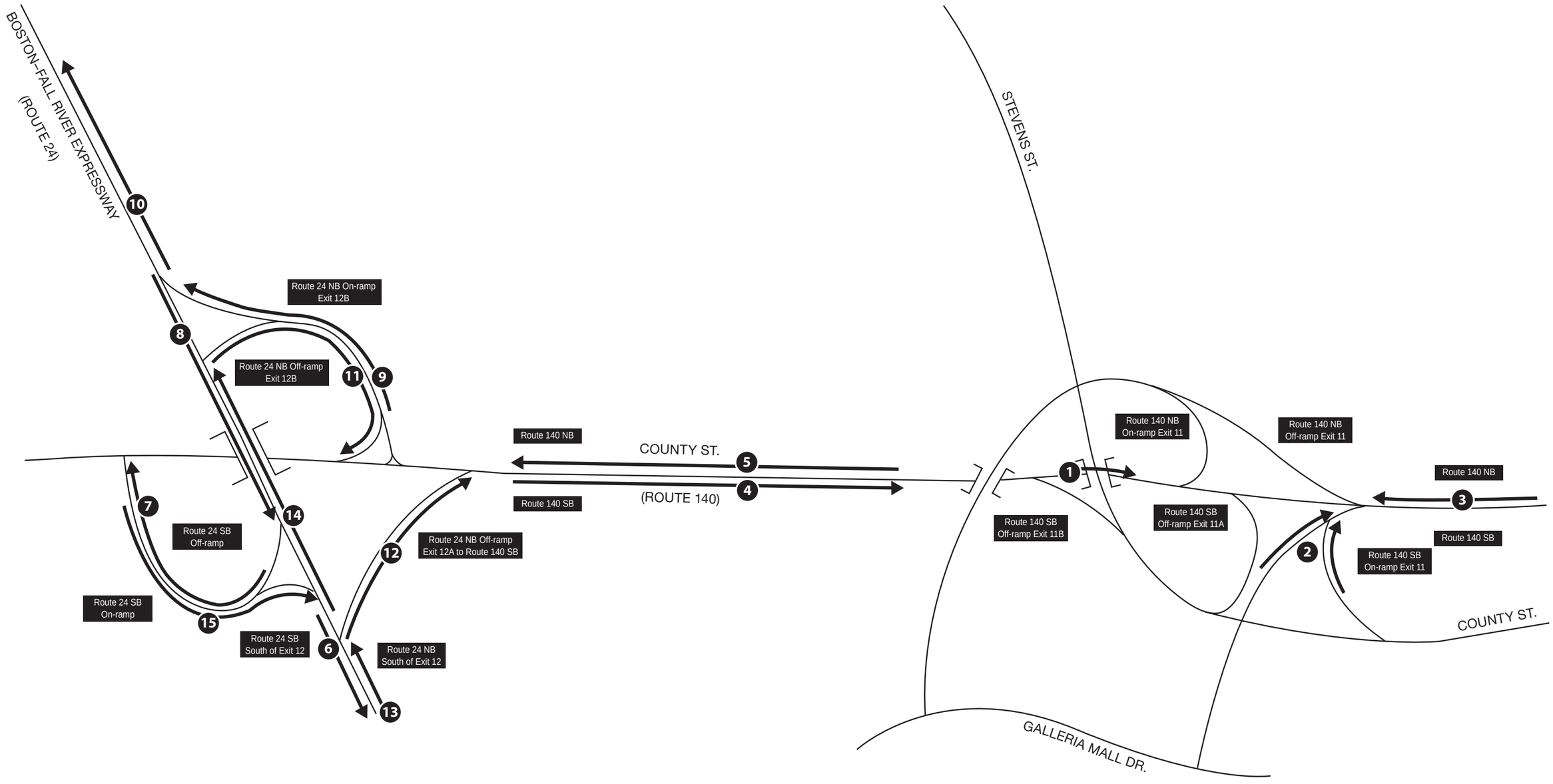
Crash data for the Route 24 and Route 140 highway segments were obtained from MassDOT for the most recent three-year period available (2008–2010) to identify and evaluate possible safety issues that exist. During that period, 238 vehicular accidents were reported along the selected highway segments. Within the 238 reported collisions, one crash involved a fatality. A detailed crash analysis is summarized in **Table 7.1-4** and an accident locus map in **Figure 7.1-22.**

TABLE 7.1-4
ROUTES 24 AND 140 FREEWAY SEGMENT CRASH SUMMARY

Segment	Number of Crashes				Crash Rate	
	2008	2009	2010	TOTAL	Segment Average	District 5 Average
1. Route 140 under Stevens Street Overpass	1	3	4	8	**3.58**	1.99
2. Route 140 SB on-ramp from County Street	2	1	0	3	**7.79**	
3. Route 140 east of Stevens Street	1	8	3	12	1.49	
4. Route 140 SB between Route 24 & Stevens Street	0	2	1	3	0.68	
5. Route 140 NB between Route 24 & Stevens Street	2	0	0	2	0.27	
6. Route 24 SB south of Route 140	2	0	2	4	0.33	
7. Route 24 SB off-ramp to Route 140	0	1	5	6	1.89	
8. Route 24 SB north of Route 140	28	53	35	116	**9.30**	
9. Route 24 NB on-ramp from Route 140	0	1	1	2	0.50	
10. Route 24 NB north of Route 140	4	1	0	5	0.90	
11. Route 24 NB off-ramp to Route 140 NB	0	1	0	1	1.28	
12. Route 24 NB off-ramp to Route 140 SB	0	1	1	2	**3.34**	
13. Route 24 NB south of Route 140	1	0	0	1	0.09	
14. Route 24 NB between Route 140 ramps	41	18	13	72	**9.17**	
15. Route 24 SB on-ramp from Route 140	0	0	1	1	0.86	

As shown in **Table 7.1-4,** the Route 24 northbound and southbound segments adjacent to exit 12 and 12B, estimate a 9.30 and 9.17 crash rate, respectively, from 2008-2010. During the three-year study period, of the 238 reported crashes, approximately 134 crashes involved rear-end collisions; approximately 118 of the crashes were located on the mainline of Route 24, indicative of drivers following too close. Approximately 82 of the crashes occurred in the southbound direction on the approach to the Exit 12 off-ramp and approximately 36 occurred in the northbound direction on the approach to the Exit 12B off-ramp. In response to these conditions, the deceleration lane on Route 24 southbound north of the interchange was lengthened to a total of 2,700. Single vehicle type crashes are also common among the reported accidents at the Exit 12 off-ramps with approximately 20 percent, indicative of operators losing control of the vehicles.

Approximately 60% of the accidents within the study limit involved property damage only and approximately 30% involved personal injury (non-fatal). Detailed crash analysis and crash rate worksheets can be found in **Appendix B-2.**



Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-22
Detailed Crash Analysis –
Route 24 and Route 140 Freeway Segments

7.1.2.7 Operations Analysis

Definitions and Methodology

Intersection Operations

The criterion for evaluating intersection traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. The study team calculated average delay and associated LOS at study area intersections using Trafficware's Synchro 7 software, which also evaluates the impact on traffic operations from closely spaced intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM).

Level of service and delay (in seconds) are based on intersection geometry and available traffic data for each intersection. Both the City of Taunton and Massachusetts Department of Transportation provided the intersection signal timing and phasing used in this analysis.

Table 7.1-5 summarizes the delay and LOS thresholds for signalized and unsignalized intersections, as defined in the HCM. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition (unacceptable), with significant traffic delay. The threshold at LOS E/LOS F indicates that the intersection, or intersection approach, is theoretically at capacity. LOS D is generally considered acceptable in an urban environment, such as the Taunton study area, and below theoretical operating capacity.

TABLE 7.1-5
LEVEL OF SERVICE CRITERIA (HCM EXCERPT)

Level of Service	Average Stopped Delay (seconds/vehicle.)	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Interchange Operations

Traffic operations at and between the Route 24/Route 140 and Route 140/Stevens Street interchanges were analyzed using Highway Capacity Software (HCS2010), which is based on methodology prescribed in the 2010 HCM for uninterrupted flow. Similar to the intersection operations analysis detailed above, the criterion for evaluating traffic operations is level of service (LOS), but is determined based on capacity rather than delay. LOS for freeways is defined on the basis of density measured in passenger cars per lane per hour (pc/ln/h).

VISSIM analysis software was also used to simulate traffic conditions at the Route 24/140 interchange as well as the interchanges in the expanded study area, as required in the MassDOT scope. The models were calibrated using the extensive data collected on each of the highway and ramp segments, including

average and 85th percentile speeds, truck percentages, and vehicle volumes. Other calibrating factors included: cooperative lane changing maneuvers, conflict areas, priority settings, advanced merging, signal controls, detectors, and speed decisions. Finally, the VISSIM models were compared to the HCS2010 results and video that was collected during the peak hours at the Route 24/140 interchange to verify accuracy.

In addition to the Route 24/Route 140 interchange, MassDOT requested expanding the study area to the following interchanges for additional analyses covering diverge, merge, weaving and mainline operations:

- Route 24/Padelford Street (Exit 11) in Berkley;
- I-495/Route 24;
- Route 24/Route 104;
- Route 24/Route 79 in Fall River;
- Route 24/Route 44 in Raynham;
- I-495 (Exit 6)/Route 44 in Middleborough;
- I-495 (Exit 5)/Route 18 in Middleborough;
- I-495 (Exit 4)/Route 105 in Middleborough; and,
- I-495 (Exit 8)/Route 138 in Middleborough.

Lengths of freeways are comprised of several continuously connected segments that can be analyzed individually to determine LOS and capacity. The three types of segments include basic, merge, diverge, and weaving segments.

Merge and Diverge Segments

Merge and Diverge segments are those in which two or more traffic streams combine (or merge) to form a single traffic stream or a single traffic stream that divides (or diverges) to form two or more traffic streams. The LOS criteria for merge and diverge segments are detailed in **Table 7.1-6.**

TABLE 7.1-6
LOS CRITERIA FOR MERGE AND DIVERGE SEGMENTS (HCM EXCERPT)

LOS	Density (pc/h/ln)	Comments
A	≤10	Unrestricted Operations
B	>10 – 20	Merging and diverging maneuvers noticeable to drivers
C	>20 – 28	Influence area speeds begin to decline
D	>28 – 35	Influence area turbulence becomes intrusive
E	>35	Turbulence felt by virtually all drivers
F	Demand Exceeds Capacity	Ramp and freeway queues up

Weaving Segments

Weaving segments are those in which two or more traffic streams traveling in the same direction cross paths without the aid of traffic control devices; for example, an on-ramp followed by an off-ramp along the same direction of a freeway. The LOS criteria for weaving segments are detailed in **Table 7.1-7.**

TABLE 7.1-7
LOS CRITERIA FOR WEAVING SEGMENTS (HCM EXCERPT)

LOS	Density (pc/h/ln)	
	Freeway Weaving Segments	Weaving Segments on Multilane Highway or C-D Roadways*
A	0 – 10	0 – 12
B	>10 – 20	>12 – 24
C	>20 – 28	>24 – 32
D	>28 – 35	>32 – 36
E	>35	>36
F	Demand Exceeds Capacity	

Source: *Highway Capacity Manual 2010,* Volume 2: Uninterrupted Flow, Exhibit 12-10.
*Collector-distributor (C-D) roadways

Basic Freeway Segments

Basic Freeway segments are section of freeway that are not interrupted by merges, diverges, or weaving. The LOS criteria for weaving segments are detailed in **Table 7.1-8.**

TABLE 7.1-8
LOS CRITERIA FOR BASIC FREEWAY SEGMENTS (HCM EXCERPT)

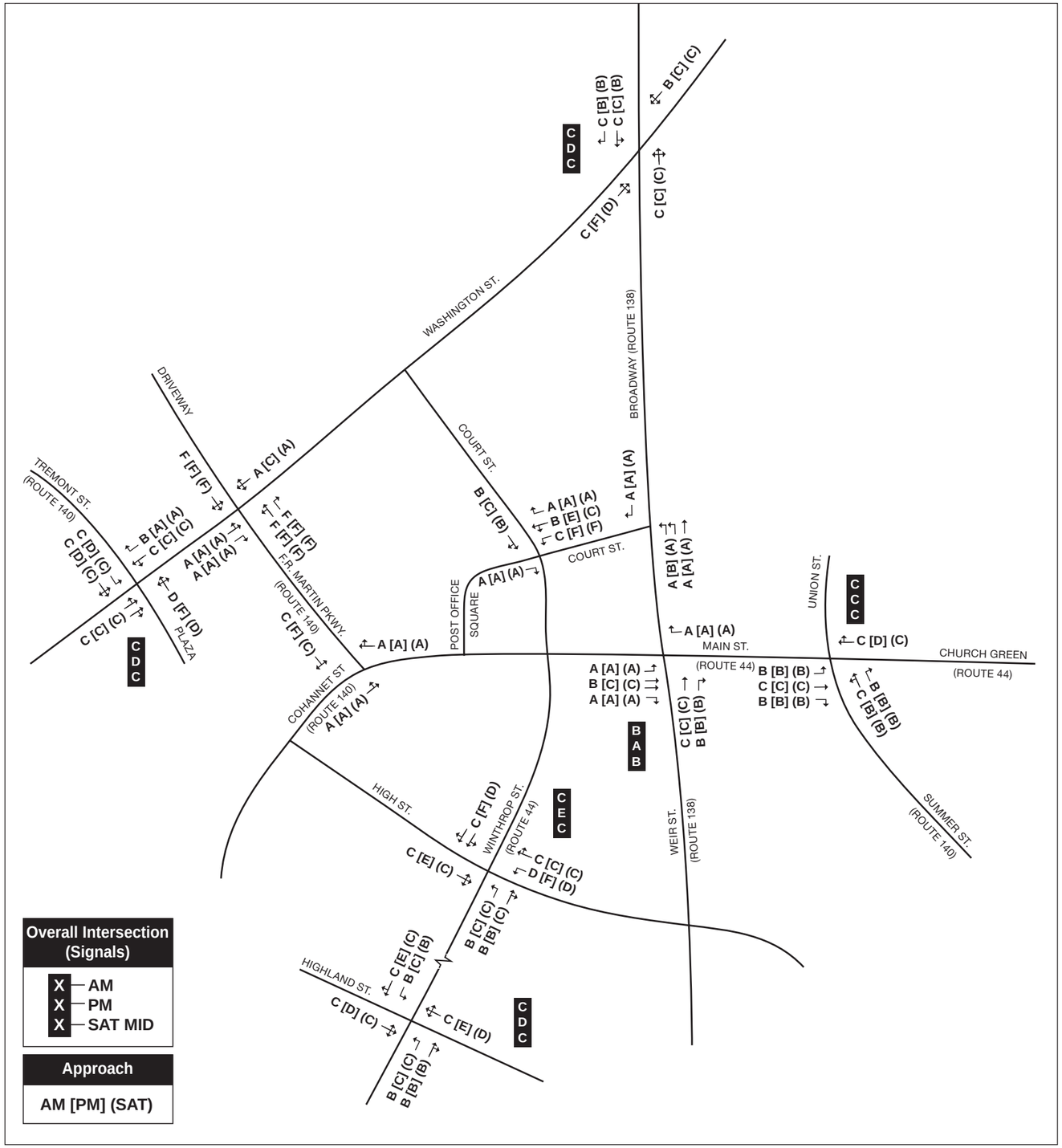
LOS	Density (pc/h/ln)
A	≤ 11
B	>11 – 18
C	>18 – 26
D	>26 – 35
E	>35 – 45
F	> 45 or any component v/c (flow rate to capacity ratio) >1.00

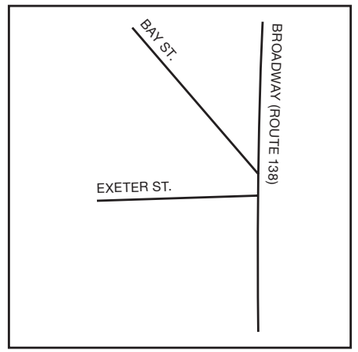
Source: *Highway Capacity Manual 2010,* Volume 2: Uninterrupted Flow, Exhibit 10-7.
*Collector-distributor (C-D) roadways

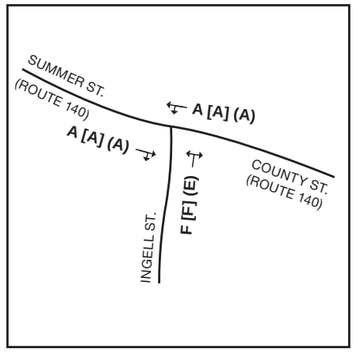
LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition with significant traffic delay. The threshold of LOS E/LOS F indicates that the segment is theoretically at capacity. LOS D is generally considered acceptable in a dense environment such as the Taunton study area, and below theoretical operating capacity.

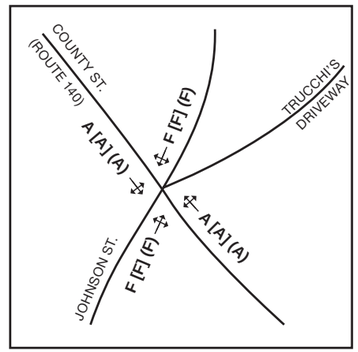
AM Peak Hour Intersection Operations

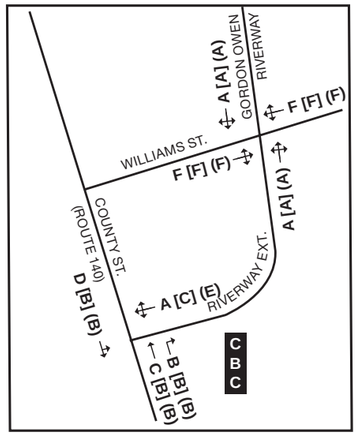
Figure 7.1-23 through **Figure 7.1-26** show the Existing Conditions level of service summary for study area intersections during the weekday AM peak hour. Summary tables including the delay, v/c ratio, average queue length, and 95th percentile queue length are shown in Table 1 of **Appendix B-3.** Detailed Synchro analyses for all conditions are also presented in **Appendix B-3.**

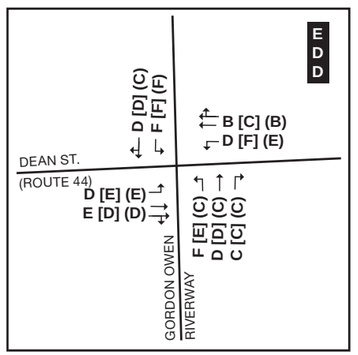








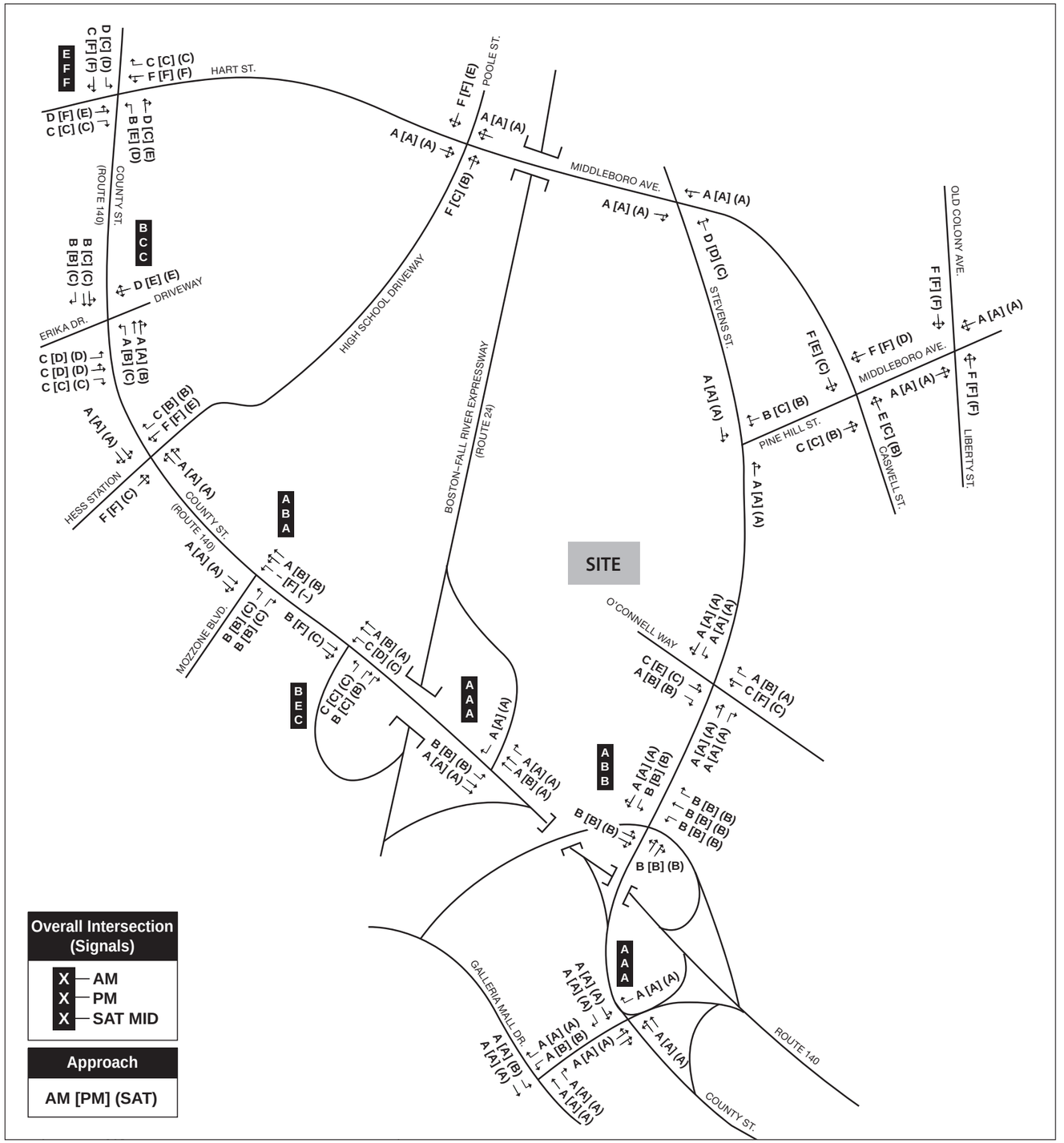


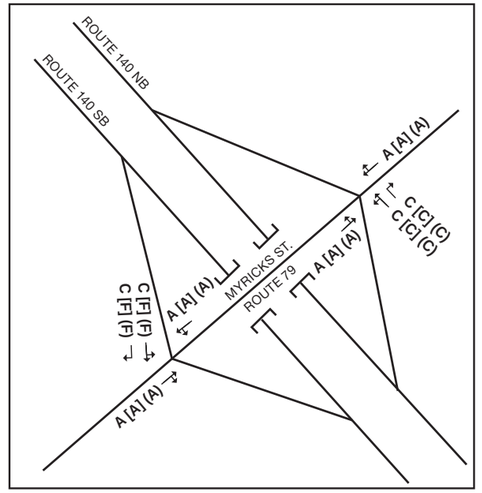


Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-23
Existing Conditions (2012) Intersection LOS Summary – West Taunton

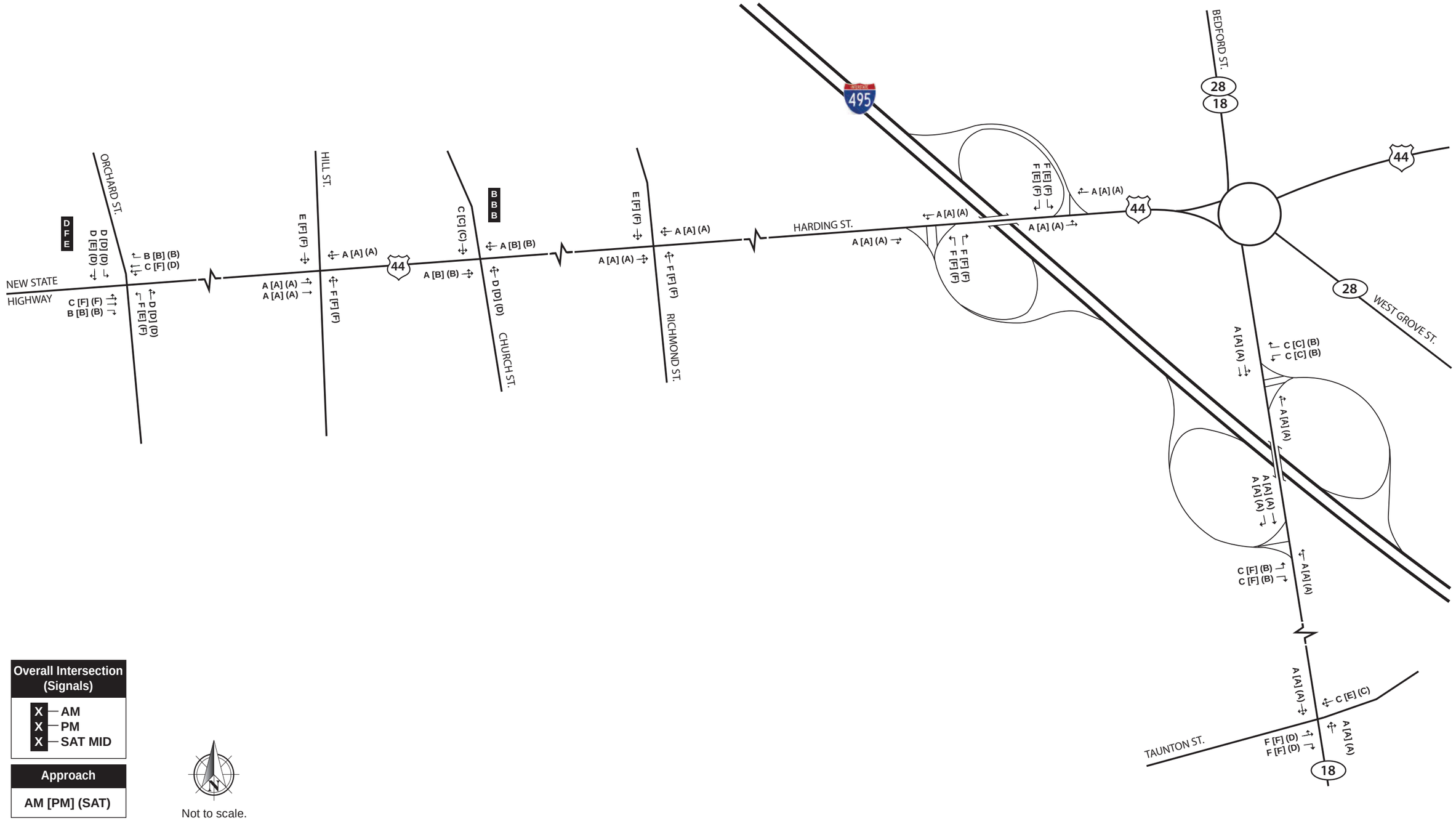




Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-24
Existing Conditions (2012) Intersection LOS Summary – East Taunton



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-25
Existing Conditions (2012) Intersection LOS Summary – Route 44 Corridor

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-26
Existing Conditions (2012) Intersection LOS Summary – Other Local Intersections

Under morning peak hour conditions, all of the study area intersections operate at an acceptable overall LOS D or better, with the exception of Hart Street/County Street, Dean Street/Longmeadow Road/Gordon Owen Parkway, and Cape Highway/Orchard Street.

Hart's Four Corners (Hart Street/County Street)

The intersection at Hart Street/County Street operates at an overall LOS E during the morning peak hour. The Hart Street westbound shared left-turn/through movement operates at LOS F. This is mainly due to the left-turning movement in the westbound direction not being able to find acceptable gaps in the opposing traffic, restricting through traffic in this lane.

Dean Street/Longmeadow Road/Gordon Owen Parkway

Dean Street/Longmeadow Road/Gordon Owen Parkway provides a major access to the Taunton High School and one of the middle schools. The intersection of Dean Street/Longmeadow Road/Gordon Owen Parkway operates at an overall LOS E during the morning peak hour. The eastbound through and shared through/right-turn operates at LOS E due to the heavy volumes during the morning peak hour traveling toward the schools that are located off of Gordon Owen Parkway. The northbound and southbound left-turning movements operate at LOS F. This is due to the heavy volumes on the single-lane approaches and the lack of gaps in the opposing traffic to allow vehicles to make permitted left-turns, restricting through and right-turn movements.

Cape Highway (Route 44)/Orchard Street

The Orchard Street northbound left-turn movement operates at a LOS F. This is mainly due to the heavy volume and insufficient green time for this protected movement.

Other Intersection Approaches

There are also several minor street approaches at the unsignalized intersections that operate at LOS E or F due to insufficient gaps in the main street traffic. These locations include:

- Bristol HS Driveway NB and Poole Street SB at Hart Street/Middleboro Avenue/Poole Street/Bristol Plymouth HS Driveway;
- Hess Station EB and Bristol HS Driveway WB left/through at Bristol Plymouth HS Driveway/County Street;
- Driveway EB and F.R. Martin Parkway WB at Washington Street/F.R. Martin Parkway;
- Ingell Street NB at Summer Street/County Street/Ingell Street;
- Johnson Street NB and SB at County Street/Johnson Street;
- Liberty Street NB and Old Colony Avenue SB at Middleboro Avenue /Old Colony Avenue/Liberty Street;
- Middleboro Avenue WB, Caswell Street NB, and Pinehill Street SB at Middleboro Avenue/Pinehill Street/Caswell Street;

- Williams Street NB and SB at Gordon Owen Parkway/Riverway Extension/Williams Street;
- I-495 Ramp WB at South Main Street/I-495 NB Ramps;
- I-495 Ramp EB at South Main Street/I-495 SB Ramps;
- Taunton Street EB at Bedford Street/Taunton Street;
- I-495 Ramp SB at Cape Highway/I-495 NB Ramps;
- I-495 Ramp NB at Cape Highway/I-495 SB Ramps;
- Richmond Street NB and SB at Cape Highway/Richmond Street; and
- Hills Street at NB and SB at Cape Highway/Hill Street.

Friday PM Peak Hour Intersection Operations

Figure 7.2-23 through **Figure7.2-26** show the Existing Conditions level of service summary for study area intersections during the Friday PM peak hour. Summary tables including the delay, v/c ratio, average queue length, and 95th percentile queue length are shown in Table 2 of **Appendix B-3.** Detailed Synchro analyses for all conditions are also presented in **Appendix B-3.**

Under existing evening conditions, all of the study area intersections operate at an overall LOS D or better, with the exception of the Route 24 SB ramp at Route 140, Hart Street/County Street, High Street/Winthrop Street, and Cape Highway/Orchard Street.

Route 24 SB Ramp (Exit 12)/County Street (Route 140)

The intersection of Route 24 SB Ramp (Exit 12)/County Street (Route 140) operated at an overall LOS E during the evening peak hour. The County Street southbound approach operates at LOS F due to the high traffic volumes.

Hart's Four Corners (Hart Street/County Street)

The intersection of Hart Street/County Street operates at an overall LOS F during the evening peak hour. The Hart Street eastbound and westbound shared left-turn/through lanes operate at LOS F. This is mainly due to the left-turning movements in both directions not being able to find acceptable gaps in the opposing through traffic, restricting the through movements. The County Street northbound left-turn and southbound shared through/right-turn movement also operate at LOS E and F, respectively. This is due to the heavy volumes for these movements.

MassDOT has reviewed and commented on 25% plans to improve this location as part of Project #605679. These plans propose to widen County Street, adding an additional through lane to both the northbound and southbound approaches at the intersection. The Existing Conditions analysis does not reflect these improvements.

High Street/Winthrop Street

The intersection of High Street/Winthrop Street operates at an overall LOS E during the evening peak hour. The High Street eastbound approach operates at LOS E, which is likely due to the heavy volume on the single-lane approach and the lack of gaps in the opposing traffic to allow eastbound vehicles to make

left-turns, restricting through and right-turn movements. The westbound left-turns operate at LOS F, likely due to the heavy volume and insufficient green time during the protected phase. Winthrop Street southbound approach operates at LOS F due to the heavy volumes in this direction.

Cape Highway (Route 44)/Orchard Street

The intersection of Cape Highway/Orchard Street operates at an overall LOS F during the evening peak hour. The Cape Highway shared left-turn/through and through lanes, in both eastbound and westbound directions, operate at LOS F. This is likely due to the heavy volume for this shared movement and the lack of gaps in the opposing through traffic to allow vehicles to make left-turns, restricting through movements. The Orchard Street northbound left-turn movement operates at LOS E due to the heavy volumes for this protected movement. The Orchard Street southbound shared through/right-turn operates at LOS E due to the insufficient green time for the movement.

Other Intersection Approaches

Although other intersections operate at an acceptable overall LOS, various approaches operate at LOS E or F; specifically:

At ***Mozzone Boulevard/County Street,*** the northbound County Street de-facto left-turn lane operates at LOS F. This delay is due to the lack of gaps in the southbound traffic to allow northbound vehicles to make the left-turn.

The Driveway westbound movements, at ***Erika Drive/County Street,*** operate at LOS E. This is due to the long cycle length at this location.

At ***Washington Street/Broadway,*** the Washington Street eastbound approach operates at LOS F. This is due the heavy left-turn volume on the single-lane approach and lack of gaps in the opposing traffic to allow eastbound vehicles to make the left-turn.

At ***Oak Street/Washington Street/Tremont Street,*** the Plaza westbound approach operates at LOS F. This is due to the long cycle length at this location and insufficient green time for this approach.

At ***Dean Street/Longmeadow Road/Gordon Owen Parkway,*** the northbound and southbound left-turns operate at LOS E and F, respectively. This is due to the heavy volumes on the single-lane approaches and the lack of gaps in the opposing traffic to allow vehicles to make permitted left-turns. The Dean Street eastbound and westbound left-turn movements also operate at LOS E and LOS F, respectively, due to heavy volumes and insufficient green time.

At ***Winthrop Street/Highland Street***, the Winthrop through/right movement operates at LOS E due to the heavy volumes for this movement. The Highland northbound approach operates at LOS E due the heavy left-turn volume on the single-lane approach and lack of gaps in the opposing traffic to allow eastbound vehicles to make the left-turn.

The Bedford Street southbound approach, at ***Bedford Street/Rhode Island Road***, operates at LOS E due to the heavy volume on the single-lane approach and the lack of gaps in the northbound traffic to allow southbound vehicles to make a permitted left-turn, restricting through and right-turn movements.

Several minor street approaches at the unsignalized intersections operate at LOS E or F due to insufficient gaps in the main street traffic. These locations include:

- O'Connell Way EB left/through and Driveway WB left/through at O'Connell Way/Stevens Street;
- Poole Street SB at Hart Street/Middleboro Avenue/Poole Street/Bristol Plymouth HS Driveway;
- Hess Station EB and Bristol HS Driveway WB left/through at Bristol Plymouth HS Driveway/County Street;
- Driveway EB and F.R. Martin Parkway WB at Washington Street/F.R. Martin Parkway;
- Court Street WB left-turn and left/through at Court Street/Western Green/Post Office Square;
- Ingell Street NB at Summer Street/County Street/Ingell Street;
- Johnson Street NB and SB at County Street/Johnson Street;
- Route 140 SB Ramp at Myricks Street/Route 140 SB Ramp;
- Liberty Street NB and Old Colony Avenue SB at Middleboro Avenue/Liberty Street/Old Colony Avenue;
- Middleboro Avenue WB and Pinehill Street EB at Middleboro Avenue/Pinehill Street/Caswell Street;
- F.R. Martin Parkway SB at F.R. Martin Parkway/Cohannet Street;
- Williams Street NB and SB at Gordon Owen Parkway/Riverway Extension/Williams Street;
- I-495 Ramp EB at South Main Street/I-495 SB Ramps;
- Taunton Street EB and WB at Bedford Street/Taunton Street;
- I-495 Ramp EB at Bedford Street/I-495 SB Ramps;
- I-495 Ramp SB at Cape Highway/I-495 NB Ramps;
- I-495 Ramp NB at Cape Highway/I-495 SB Ramps;
- Richmond Street NB and SB at Cape Highway/Richmond Street; and
- Hill Street NB and SB at Cape Highway/Hill Street.

Saturday Midday Peak Hour Intersection Operations

Figure 7.2-23 through **Figure 7.2-26** show the Existing Conditions level of service summary for study area intersections during the Saturday midday peak hour. Summary tables including the delay, v/c ratio, average queue length, and 95th percentile queue length are shown in Table 3 of **Appendix B-3.** Detailed Synchro analyses for all conditions are also presented in **Appendix B-3.** Under Saturday midday conditions, all of the study area intersections operate at an overall LOS D or better, with the exception of Hart Street/County Street and Cape Highway/Orchard Street.

Hart's Four Corners (Hart Street/County Street)

The intersection of Hart Street/County Street operates at an overall LOS F during the Saturday midday peak hour. The Hart Street eastbound and westbound shared left-turn/through lanes operate at LOS E and F, respectively. This is mainly due to the left-turning movements in both directions not being able to find acceptable gaps in the opposing through traffic, restricting through movements. The County Street northbound and southbound shared through/right-turn lanes operate at LOS E and F, respectively. This is due to the heavy volumes on County Street. As previously stated, plans to improve this location are currently at the 25% design level.

Cape Highway/Orchard Street

The intersection of Cape Highway/Orchard Street operates at an overall LOS E during the Saturday midday peak hour. The Cape Highway eastbound shared left-turn/through and through lanes operate at LOS F. This is likely due to the shared lane and the lack of gaps in the opposing through traffic to allow eastbound vehicles to make the left-turn. The Orchard Street northbound left-turn movement operates at LOS F, mainly due to the heavy volumes for the movement.

Other Intersection Approaches

Although other intersections operate at an acceptable overall LOS, various approaches operate at LOS E and F; specifically:

The westbound driveway approach, at ***Erika Drive/County Street,*** operates at LOS E. This is due to the long cycle length at this location.

At ***County Street/Gordon M. Owen Riverway Extension,*** the southbound Riverway Extension approach operates at LOS F due to insufficient green time for the turning volumes.

At ***Dean Street/Longmeadow Road/Gordon Owen Parkway,*** the Dean eastbound and westbound left-turn movements operates at LOS E. This is likely due to the lack of gaps in the opposing through traffic to allow the vehicles to make the left-turn. The Longmeadow Road southbound left-turn operates at LOS F due to the heavy left-turning volumes for this approach.

There are also several minor street approaches at the unsignalized intersections that operate at LOS E or F due to insufficient gaps in the main street traffic. These locations include:

- Poole Street SB at Hart Street/Middleboro Avenue/Poole Street/Bristol Plymouth HS Driveway;
- Bristol Plymouth HS Driveway WB at Bristol Plymouth HS Driveway/County Street;
- Driveway EB and F.R. Martin Parkway WB at Washington Street/F.R. Martin Parkway;
- Court Street WB left at Court Street/Western Green/Post Office Square;
- Ingell Street NB at Summer Street/County Street/Ingell Street;
- Johnson Street NB and SB at County Street/Johnson Street;
- Liberty St. NB and Old Colony Avenue SB at Middleboro Ave./Liberty Street/Old Colony Ave.;

- Williams Street NB and SB at Gordon Owen Parkway/Williams Street/Riverway Extension;
- I-495 Ramp WB at South Main Street/I-495 NB Ramps;
- I-495 Ramp EB at South Main Street/I-495 SB Ramps;
- I-495 Ramp SB at Cape Highway/I-495 NB Ramps;
- I-495 Ramp NB at Cape Highway /I-495 SB Ramps;
- Richmond NB and SB at Cape Highway /Richmond Street; and
- Hill Street NB and SB at Cape Highway /Hill Street.

Interchange Operations

Figure 7.1-27, Figure 7.1-28, and **Figure 7.1-29** illustrate the existing levels of service at the study area interchanges for the Friday AM, Friday PM, Saturday midday, and Saturday PM peak hours. Highway Capacity Manual analyses for all conditions are presented in **Appendix B-4.** Under existing peak hour conditions, as shown all basic, merge, diverge, and weaving segments operate at an acceptable LOS D or better during all time periods with the exception of five freeway segments.

Route 24/Route 140 Interchange

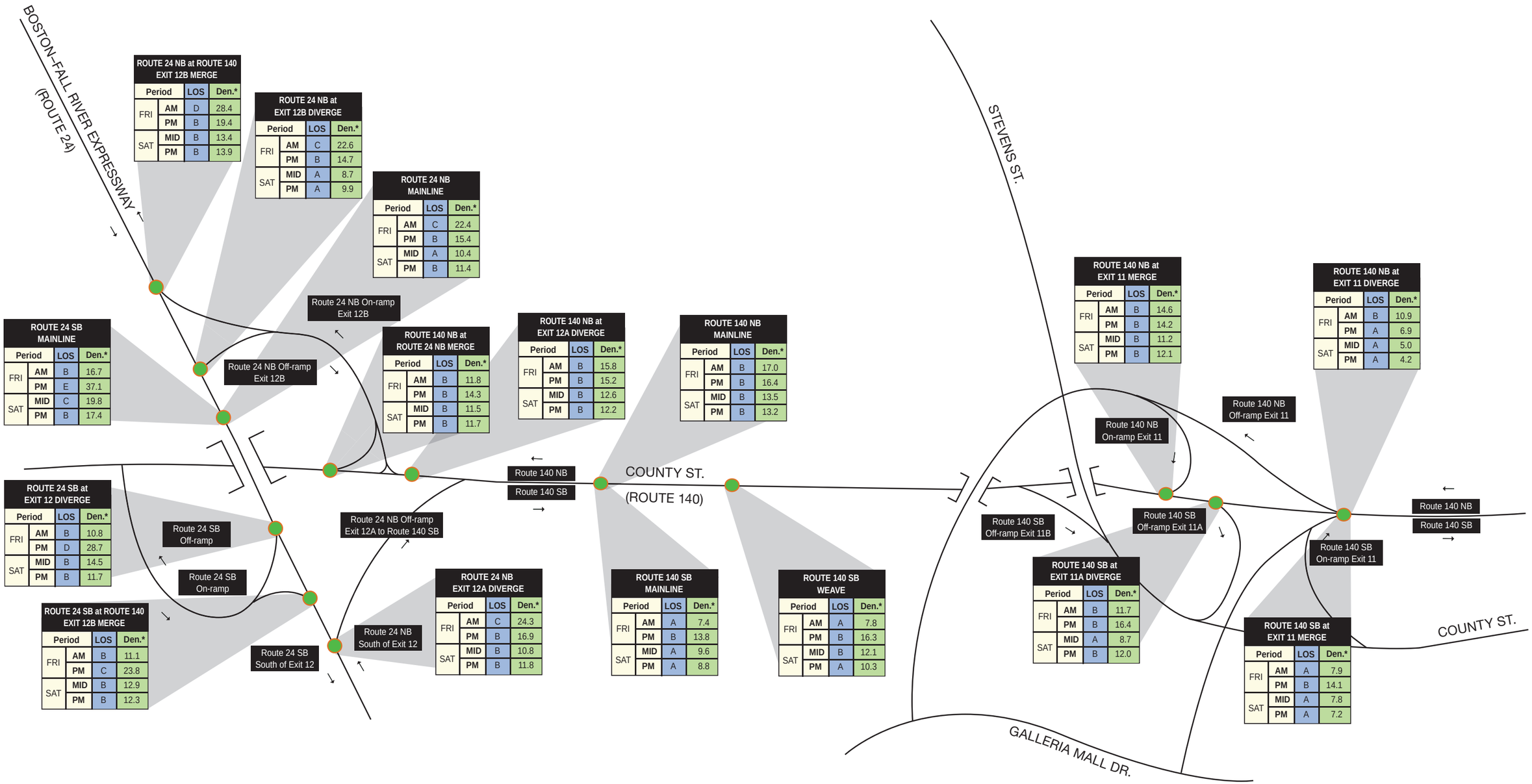
During the Friday PM peak hour the Route 24 Southbound basic segment (or mainline), just upstream Exit 12, currently operates at LOS E with a density of 37.1 pc/h/ln – considered to be operating at capacity. Route 24 southbound, which consists of two travel lanes, currently carries approximately 3,800 vehicles per hour during the Friday PM peak hour. The Route 24 southbound basic roadway segment operates at LOS B during the Friday AM and Saturday PM peak hours; and LOS C during the Saturday Midday peak hour.

I-495/Route44 (Exit 6)/Route 18 (Exit 5) Interchange

During the Friday PM peak hour the I-495 southbound weave segment between Exits 6 & 5, currently operates at LOS E with a density of 37.1 pc/h/ln. This section of I-495 southbound, which consists of two travel lanes, currently carries approximately 3,600 vehicles per hour during the Friday PM peak hour. The weaving segment between Exits 6 & 5 operates at LOS B during the Friday AM, Saturday Midday, and Saturday PM peak hours.

Route 24/Route 44 Interchange

During the Friday PM peak hour the Route 24 southbound weave segment between exits 13B & 13A, currently operates at LOS E with a density of 36.4 pc/h/ln. This section of Route 24, which consists of two travel lanes, currently carries approximately 3,600 vehicles per hour during the Friday PM peak hour. The weaving segment between exits 13B & 13A operates at LOS C during the Friday AM, Saturday Midday, and Saturday PM peak hours.



ROUTE 24 NB at ROUTE 140 EXIT 12B MERGE

Period		LOS	Den.*
FRI	AM	D	28.4
	PM	B	19.4
SAT	MID	B	13.4
	PM	B	13.9

ROUTE 24 NB at EXIT 12B DIVERGE

Period		LOS	Den.*
FRI	AM	C	22.6
	PM	B	14.7
SAT	MID	A	8.7
	PM	A	9.9

ROUTE 24 NB MAINLINE

Period		LOS	Den.*
FRI	AM	C	22.4
	PM	B	15.4
SAT	MID	A	10.4
	PM	B	11.4

ROUTE 24 SB MAINLINE

Period		LOS	Den.*
FRI	AM	B	16.7
	PM	E	37.1
SAT	MID	C	19.8
	PM	B	17.4

ROUTE 140 NB at ROUTE 24 NB MERGE

Period		LOS	Den.*
FRI	AM	B	11.8
	PM	B	14.3
SAT	MID	B	11.5
	PM	B	11.7

ROUTE 140 NB at EXIT 12A DIVERGE

Period		LOS	Den.*
FRI	AM	B	15.8
	PM	B	15.2
SAT	MID	B	12.6
	PM	B	12.2

ROUTE 140 NB MAINLINE

Period		LOS	Den.*
FRI	AM	B	17.0
	PM	B	16.4
SAT	MID	B	13.5
	PM	B	13.2

ROUTE 24 SB at EXIT 12 DIVERGE

Period		LOS	Den.*
FRI	AM	B	10.8
	PM	D	28.7
SAT	MID	B	14.5
	PM	B	11.7

ROUTE 24 SB at ROUTE 140 EXIT 12B MERGE

Period		LOS	Den.*
FRI	AM	B	11.1
	PM	C	23.8
SAT	MID	B	12.9
	PM	B	12.3

ROUTE 24 NB EXIT 12A DIVERGE

Period		LOS	Den.*
FRI	AM	C	24.3
	PM	B	16.9
SAT	MID	B	10.8
	PM	B	11.8

ROUTE 140 SB MAINLINE

Period		LOS	Den.*
FRI	AM	A	7.4
	PM	B	13.8
SAT	MID	A	9.6
	PM	A	8.8

ROUTE 140 SB WEAVE

Period		LOS	Den.*
FRI	AM	A	7.8
	PM	B	16.3
SAT	MID	B	12.1
	PM	A	10.3

ROUTE 140 NB at EXIT 11 MERGE

Period		LOS	Den.*
FRI	AM	B	14.6
	PM	B	14.2
SAT	MID	B	11.2
	PM	B	12.1

ROUTE 140 NB at EXIT 11 DIVERGE

Period		LOS	Den.*
FRI	AM	B	10.9
	PM	A	6.9
SAT	MID	A	5.0
	PM	A	4.2

ROUTE 140 SB at EXIT 11A DIVERGE

Period		LOS	Den.*
FRI	AM	B	11.7
	PM	B	16.4
SAT	MID	A	8.7
	PM	B	12.0

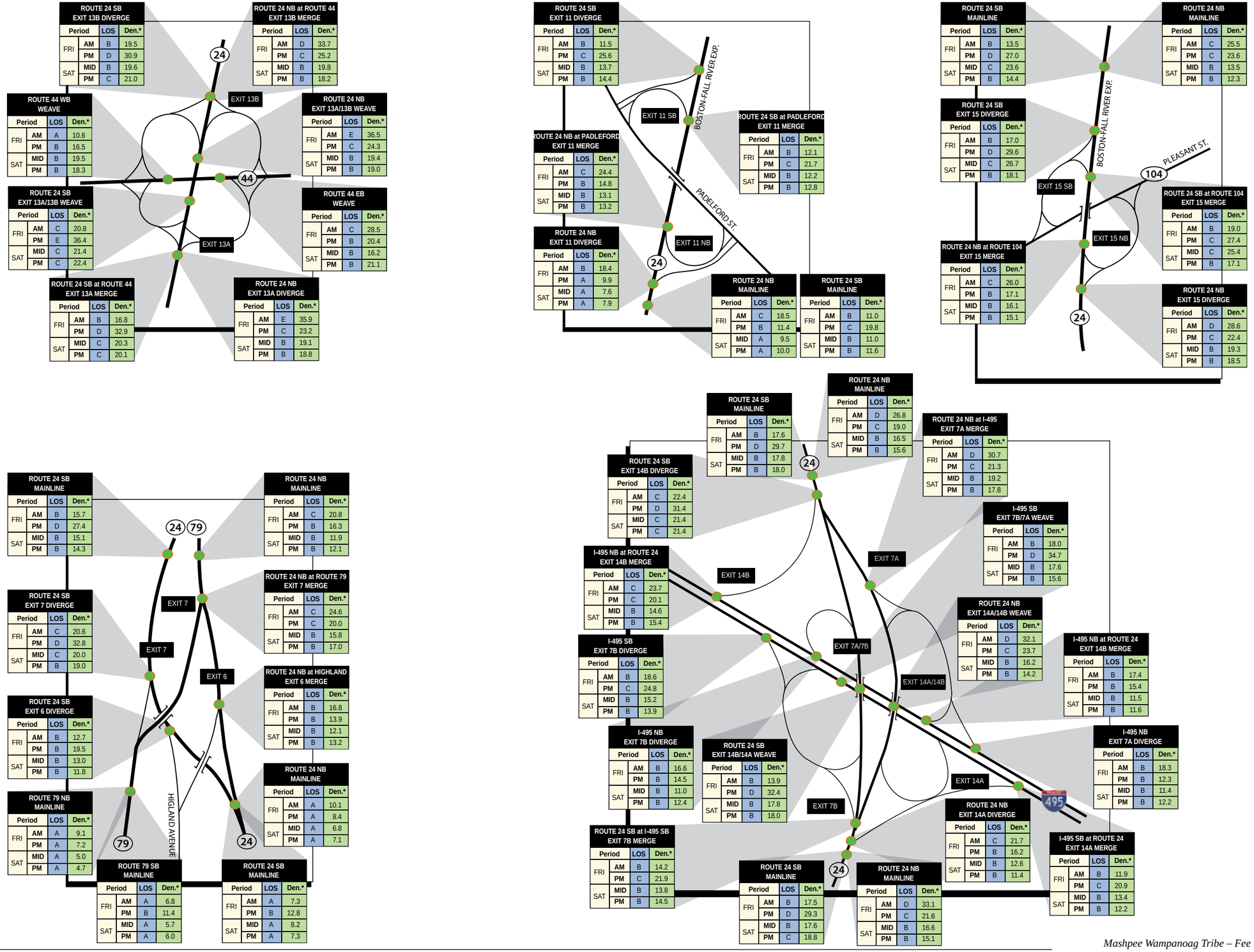
ROUTE 140 SB at EXIT 11 MERGE

Period		LOS	Den.*
FRI	AM	A	7.9
	PM	B	14.1
SAT	MID	A	7.8
	PM	A	7.2

Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

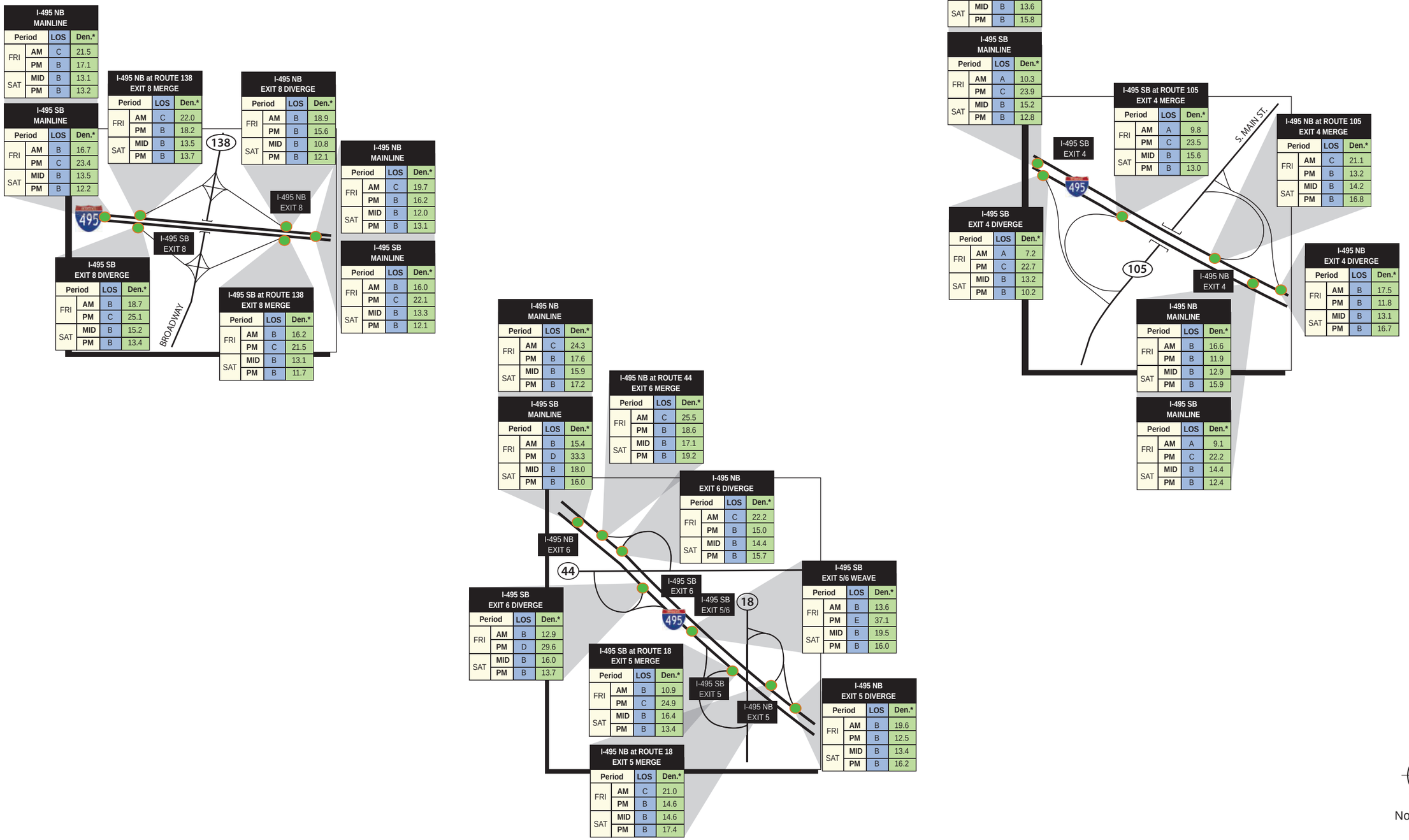
Figure 7.1-27
Existing Conditions (2012) Interchange LOS Summary–
Route 140 Interchanges



Not to scale.

SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-28
Existing Conditions (2012) Interchange LOS Summary – Route 24 Interchanges



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-29
Existing Conditions (2012) Intersection LOS Summary – Other Area Interchanges

During the Friday AM peak hour the Route 24 northbound exit 13A diverge segment to Route 44 eastbound, currently operates at LOS E with a density of 35.9 pc/h/ln. The exit 13A off-ramp consists of one travel lane and currently carries approximately 500 vehicles per hour during the Friday AM peak hour. The diverge segment at exit 13A operates at LOS C during the Friday PM and LOS B during the Saturday Midday and Saturday PM peak hours.

During the Friday AM peak hour the Route 24 northbound weave segment between exits 13A & 13B, currently operates at LOS E with a density of 36.5 pc/h/ln. This section of Route 24, which consists of two travel lanes, currently carries approximately 3,600 vehicles per hour during the Friday AM peak hour. The weaving segment between exits 13A & 13B operates at LOS C during the Friday PM and LOS B during the Saturday Midday and Saturday PM peak hours.

7.1.2.8 Existing Transit and Ridesharing Service

GATRA Bus Service

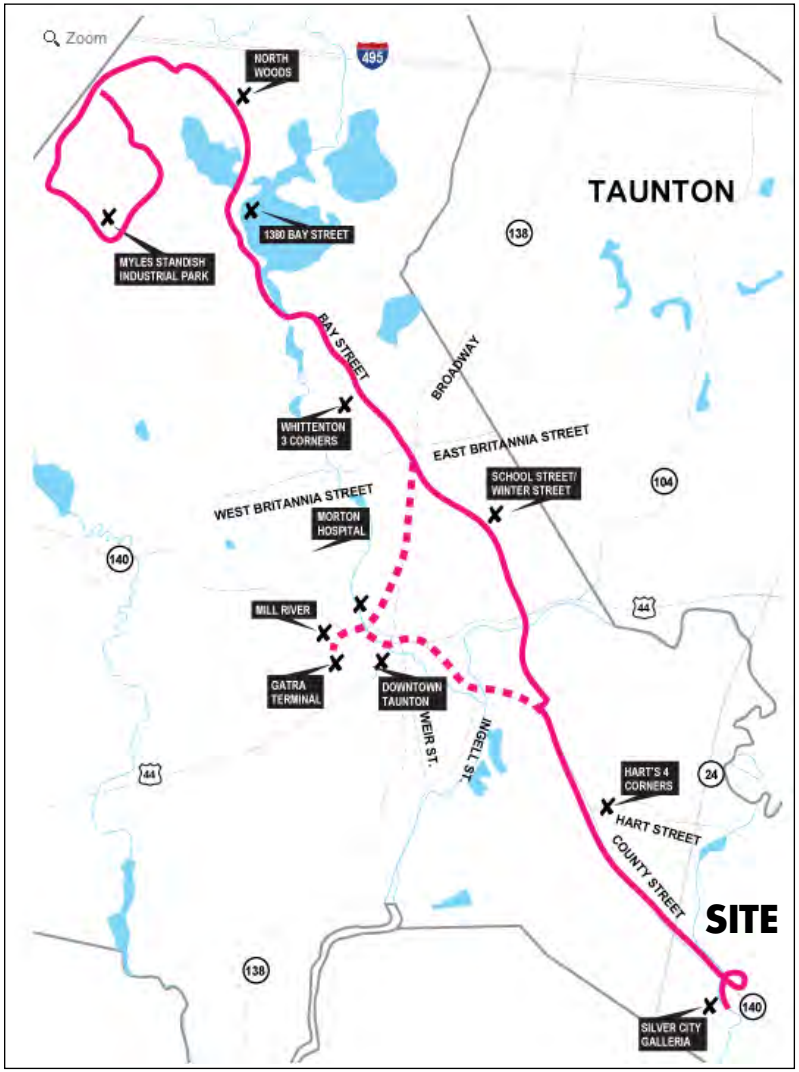
Existing transit service past the site is provided by the Greater Attleboro-Taunton Regional Transit Authority (GATRA). GATRA provides fixed-route bus services in the cities of Attleboro and Taunton, and the towns of Duxbury, Franklin, Kingston, Mansfield, Marshfield, Middleborough, North Attleboro, Norton, Plainville, Plymouth, Raynham, Seekonk, and Wareham. All 26 member communities have demand response (Dial-A-Ride) services for people with disabilities and seniors. In addition, GATRA provides shuttle services to MBTA stations in the towns of Bellingham, Franklin, Norton, Mansfield, Medway, Middleborough, and Pembroke. Route planning for GATRA is performed by the Southeastern Massachusetts Planning and Economic Development District (SRPEDD).

The site is convenient to several GATRA bus routes:

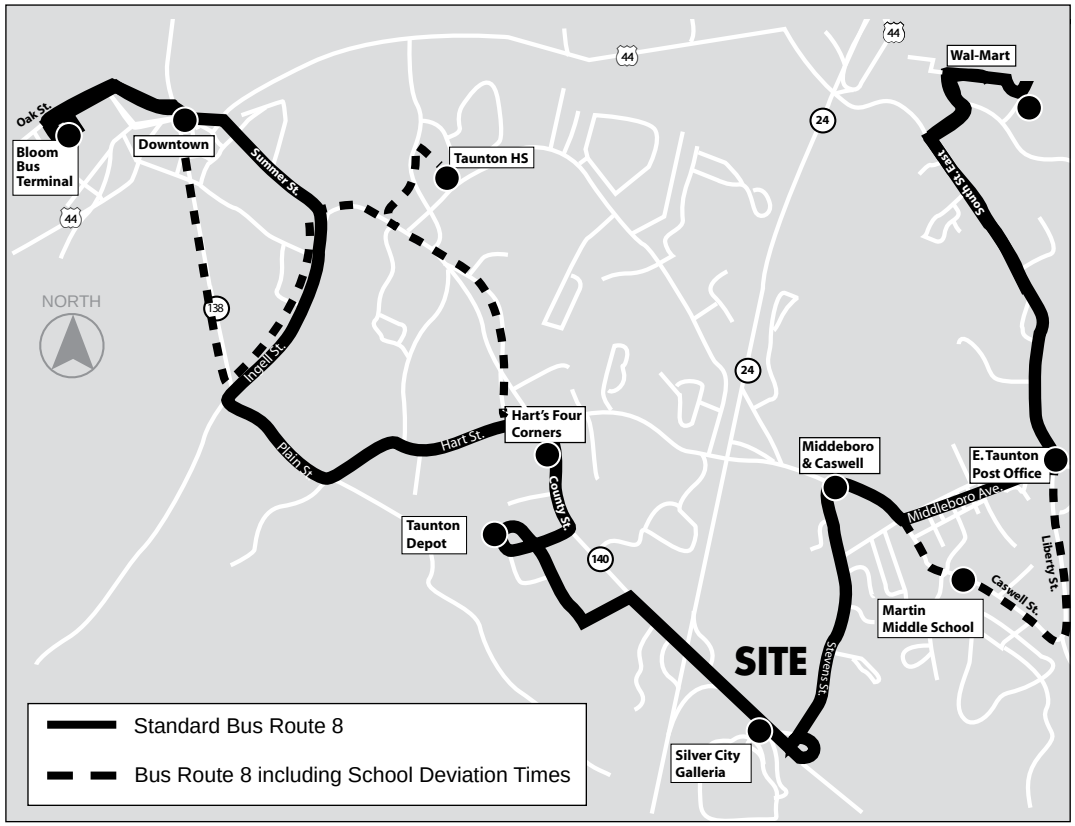
- ***Route 3*** connects the Silver City Galleria with the Myles Standish Industrial Park. It travels near to the site on Route 140 (County Street). Route 3 provides hourly service during the weekday AM and PM peak periods only. No weekend or evening service is provided.
- ***Route 7*** travels between the Bloom Bus Terminal in East Taunton and Pine Hill Estates in Raynham with several stops including the Taunton High School and Walmart.
- ***Route 8*** travels between the Bloom Bus Terminal in East Taunton, the Silver City Galleria and the Raynham Walmart, again travelling near the site on Route 140 (County Street) and Stevens Street. Route 8 provides service on approximately an hourly basis between 5:45 AM and 8:00 PM weekdays and between 10:00 AM and 7:00 PM on Saturdays. No Sunday service is provided.
- The ***Middleborough-Taunton Connector*** runs every two hours between 10:00 AM and 3:00 PM three days a week between the Middleborough Council on Aging and the GATRA terminal in Taunton, passing by the Raynham Wal-Mart, the Route 44 medical walk-in clinic, Mill River Plaza and the Morton Hospital on its route.

These routes are shown in **Figure 7.1-30.**

GATRA Bus Route 3



GATRA Bus Route 8



SOURCE: Howard/Stein-Hudson Associates, Inc.

Figure 7.1-30
Greater Attleboro Taunton Regional Transit Authority (GATRA) Bus Routes

GATRA fares can either be paid on board buses with cash (exact fare only) or by purchase of tickets from the bus driver. Single ride tickets as well as one-day, three-day or 10-ride passes are available for purchase on the bus. Monthly (31-day) passes and 10-Ride Dial-A-Ride tickets are available for purchase at GATRA ticket agent offices, specifically at the GATRA bus terminal in downtown Taunton.

MBTA Commuter Rail Service

Commuter rail service offered by Massachusetts Bay Transportation Authority (MBTA) is the primary form of commuter options to the Boston area. Two Old Colony Line stations are within 30 minutes travel time to the site along the Middleborough/Lakeville branch, which connects South Station in Boston to Middleborough/Lakeville. AMTRAK, intercity bus, and MBTA rapid transit and Silver Line connections are also available at South Station.

- Middleborough/Lakeville station is approximately nine miles (15 minutes) from the site along Routes 79 and 140. This service offers 12 trips to and from South Station in Boston during weekdays and eight trips in each direction on Saturdays and Sundays. The frequency of train service is approximately 45 minutes in the morning and evening peak periods with the frequency reduced to two hours during off peak hours. The frequency of train service on Saturdays and Sundays is approximately every two hours.
- On the same line, and with the same frequency of service, is Campello Station in Brockton, which is 17.4 miles from the site, or a 25 minute drive via Route 24. The Brockton Area Transit intermodal center and bus transfer point is also located at Campello Station.

Also fairly convenient to the site is Mansfield Station on the Providence/Stoughton Line, which is 22.4 miles (32 minutes) away from the site via Route 495 to Route 24. This service offers 18 trips to and from South Station in Boston during weekdays and nine trips in each direction on Saturdays and Sundays. The frequency of train service is approximately 22 minutes in the morning and evening peak periods. The frequency of train service on Saturdays and Sundays is approximately every two hours. The Providence/Stoughton Line also connects the site both with the AMTRAK terminal in downtown Providence and T.F. Green Airport in Warwick, Rhode Island.

Brockton Area Transit Authority Service

The Brockton Area Transit Authority (BAT) was established in 1974, serving the communities of Brockton, Rockland and Stoughton, to the north of the Taunton casino site. BAT's Intermodal Transportation Centre (BAT Centre), adjacent to MBTA Old Colony Rail Station, serves as the transit hub for the South Shore and Greater Brockton areas. The Centre includes a waiting area, a dispatch and information center, retail vendors, and commuter parking. BAT has a distinctive coalition with the local business community; BAT's innovative transportation solutions have contributed positively to their service area's economy.

BAT's fixed route service connects neighboring communities and the Central Business District in Boston, as well as major industrial parks, three colleges, medical facilities, shopping centers and area commuter rails. Service is offered seven days a week. Weekday service to the MBTA's Ashmont Station begins at 4:50 a.m. and ends at 12:30 a.m. Weekday service in the City of Brockton and neighboring communities begins at 6:00 a.m. and ends at 9:00 p.m. with reduced service on Saturdays and limited Sunday service.

BAT's paratransit service, known as dial-a-bat, began operation in 1977. As one of the first coordinated paratransit systems in the nation, dial-a-bat provides transportation to disabled and elderly persons throughout BAT's service area as well as to medical facilities in Boston. Coordinated efforts provide service utilizing private operators, councils on aging, taxi, chair car and livery providers. BAT, throughout its network of transportation providers, serves a number of human service agencies and private businesses under contract.

Southeastern Regional Transit Authority Service

The Southeastern Regional Transit Authority (SRTA) was established in 1974 in response to Massachusetts' legislation which authorized the establishment of regional transit authorities. The Authority has grown in size and scope to 63 fixed route buses, primarily serving the cities of Fall River and New Bedford. Hours of operation are 5:30 a.m. to 7:00 p.m. The SRTA also has 23 Demand Response vehicles with the same hours of operation that provides service from Mattapoisett to Swansea.

SRTA service is provided in the towns of Acushnet, Dartmouth, Fairhaven, Fall River, Freetown, Mattapoisett, New Bedford, Somerset, Swansea, and Westport. Route planning for SRTA is performed by the Southeastern Regional Planning and Economic Development District (SRPEDD).

Private Bus Service

Private bus service in Southeastern Massachusetts is operated by DATTCO, Bloom Bus Service, Plymouth and Brockton, Bonanza/Peter Pan, and Tremblay's Bus Company, as follows:

- DATTCO runs weekday, Saturday and Sunday service between its terminal in Fairhaven and Boston via New Bedford and Taunton at the Galleria Mall. DATTCO also runs charter service to Mohegan Sun casino.
- Bloom Bus Service runs between its terminal on Grosvenor Street in Taunton and Boston via the Raynham Dog Track, Route 24, and the Westgate Mall. Bloom also operates charter service to the Foxwoods casino.
- Plymouth and Brockton Railway Company runs service to Boston and Logan Airport from the Outer Cape, Plymouth, Kingston, Duxbury, Marshfield and Rockland.
- Bonanza/Peter Pan Bus runs from Providence to Cape Cod along route I-195, stopping in Fall River and New Bedford. They also offer service from Newport RI and Fall River to Boston via Route 24, and from Woods Hole, Falmouth and Bourne to Boston via Routes 495 and 24.

- Tremblay's Bus Company offers charter services in Southeastern Massachusetts, including service to Foxwoods casino from Fall River and New Bedford, Somerset, Wareham, South Dennis, Hyannis, the Sagamore Park and Ride Lot, Wareham and Buzzard's Bay.

Vanpools/Carpools

Vanpools in communities of the South Coast region are provided through MassRIDES, a program of MassDOT.

Park-and-Ride

Park-and-ride facilities and carpool/vanpool services are offered along the primary regional travel corridors in the South Coast region. Park-and ride lots are associated with car-pooling, van-pooling, or private bus service to Boston.

There are nine public park-and-ride lots located in the South Coast region, of which five are located along the primary roadways from the region to the Boston metropolitan area and four not in the immediate vicinity of the primary access routes to Boston. In addition, three private park-and-ride lots in the South Coast region are available exclusively for customers using the private bus services to Boston. Four park-and-ride lots are located near the site along Route 24, at:

- Exit 10 in Freetown (33 spaces);
- Silver City Galleria Mall (187 spaces);
- Exit 15 in Bridgewater (60 spaces); and
- Exit 16 in West Bridgewater (185 spaces).

Three public park-and-ride lots are outside the South Coast region, but still along the Route 24 access corridor to Boston. Park-and-ride facilities as feeders for bus and car-pooling and vanpooling services are limited in their effectiveness as a transportation connection with Boston, due to the inconvenience of transfers and travel times associated with the congested roadway system, both in terms of traveling to the park-and-ride facility and travel from the park-and-ride facility to Boston.

7.1.2.9 MassDOT Rail Right-of-Way

The rail line that bisects the site is owned by the state of Massachusetts and administered by MassDOT. CSX, MA Coastal Rail, and the Cape Cod Central Railway own trackage rights over it.

CSX currently operates one freight train per day (typically 20-50 cars) in each direction, or two total per day. The cargo is mixed, from time to time including hazardous materials such as ammonia. Typically, however, it consists of cargo such as steel, fly ash, earth products (i.e. rock), broken glass, and lard. Unless the price of diesel were to increase dramatically thereby improving the economics of rail versus truck, there is not likely to be any significant increase in freight traffic on the line.

MA Coastal has infrequent freight deliveries but also can make passenger trips and does, albeit infrequently, run trips such as tourist rides or dinner rides in Southeastern Massachusetts.

7.1.2.10 Existing Pedestrian and Bicycle Conditions

Pedestrian conditions in the study area, as described previously in **Sections 7.1.2.2 and 7.1.2.3**, are variable. Sidewalks are provided along some stretches of road, but they are discontinuous. Crosswalks, pedestrian signals and HP ramps are similarly inconsistent at study area intersections. Directly adjacent to the site, a sidewalk is provided along the east side of Stevens Street for most of its length. This provides pedestrian access to the East Taunton Elementary School. No designated bicycle facilities were observed either on the LUIP site or on study area roadways.

7.1.2.11 Aviation

Less than three miles from the site (by land) is the Taunton Municipal Airport at King Field, a public use airport serving the aviation needs of southeastern Massachusetts. The Taunton Airport Commission has completed several improvement projects in recent years including the construction of several new private hangars. Per the airport website, the airport's primary runway – Runway 12-30 – is paved and has a full-length parallel taxiway. A medium intensity, radio-controlled, edge lighting system services both the runway and the taxiway. Runway 30 is serviced by a non-precision NDB/GPS approach as well as a VASI. Runway 30 also has been designated for a future LPV approach. The airport offers 100LL, fuel, tiedowns, and has an automatic weather station (ASOS).

The airport supports several on-airport Fixed Base Operators that offer aircraft maintenance, including American Aero Services, K and K Aircraft, and Superior Aero Services. Atlantic Aviation Flight Center is a flight school and charter operation. A total of 119 aircraft are based at the airport, accounting for 31,390 annual operations in 2008, the most recent year for which data were available. According to MassDOT's *2010 Massachusetts Statewide Airport System Plan,* aircraft based at the Taunton airport are projected to increase to 126 by 2015, 131 by 2020, and 144 by 2030. These forecasts did not take a potential casino into account.

Based on information presented on its website, the airport is one of the fastest growing in Massachusetts, with a significant increase in the number of based aircraft. There are 19 FAA-registered aircraft based at the airport. Ground access to the site from the airport is afforded by Middleboro Avenue, Pine Hill Street and Stevens Street.

There are two heliports in Taunton, one of which serves the Morton Hospital. The second, the Princess House Heliport, is privately owned. Located about eight miles from the site (by land), the heliport provides ground access to the casino site via Routes 138 and 140.

SECTION 7.2
FLOODPLAIN, WETLANDS AND OTHER WATERS OF THE U.S.

This section describes rivers, streams, floodplain, groundwater resources, wetlands and other waters of the U.S. including vernal pools identified on the specific parcels proposed to be taken into trust in Taunton, Massachusetts within and adjacent to the Liberty & Union Industrial Park (the Project Site) as well as in the vicinity of the transportation mitigation improvements proposed at the Route 24/140 Interchange and at the Stevens Street/Route 140 interchange. Unless otherwise noted below, together these areas, i.e., the Project Site and the areas of the proposed transportation mitigation measures, are collectively referred to in this Section as the "Study Area."

7.2.1 WETLANDS

During the months of September, October and November 2012, and June 2013, professional wetland scientists and certified soil scientists from Epsilon Associates, Inc. (Epsilon) delineated wetlands[1] and other waters of the U.S.[2] on the Project Site and offsite locations where roadway and intersection improvement measures are proposed. The delineation work was conducted in accordance with the U.S. Army Corps of Engineers (Corps) 1987 Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012).[3]

On November 8, 2012, a representative from the Corps inspected sections of the proposed wetland boundaries on the Project Site. No changes were made to the wetland lines as a result of this initial evaluation. The project proponent will provide the Corps with a detailed wetland delineation report as part of the Section 404 and Preliminary Jurisdictional Determination review processes. The on-site and off-site wetland boundaries in the immediate vicinity of proposed work are depicted on **Figure 7.2-1**.

[1] According to 33 C.F.R. § 328.3(b), "wetlands" means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas."

[2] "Waters of the United States" is broadly defined in the federal regulations that implement the Clean Water Act. It includes tidal waters, rivers, streams, lakes, ponds and wetlands. 33 C.F.R. § 328.3(a).

[3] Wetland resource areas were also delineated in accordance with the Massachusetts Department of Environmental Protection's handbook, "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act" (MassDEP, 1995); and the local Taunton Conservation Commission Wetlands Ordinance (City of Taunton Ordinances, Chapter 16, Section 30-38). A discussion of local and state regulated resource areas will be presented in the separate Draft Environmental Impact Report (DEIR) as required by the Massachusetts Environmental Policy Act (MEPA) and implementing regulations (301 CMR 11.00).

G:\Projects2\MA\Taunton\2975\DEIS\waters.mxd

LEGEND

- LIT Boundary
- 1 Wetland Delineation Boundary (Wetland ID)[1]
- Ordinary High Water Mark (OHWM)
- Intermittent Stream

Scale 1:4,800
1 inch = 400 feet

0 200 400 Feet

Basemap: 2011 Google Earth Imagery

HART STREET
COTLEY RIVER
BARSTOWS POND DAM
BARSTOWS POND
STEVENS STREET
VERNAL POOL
RAILROAD TRACKS
INDUSTRIAL DRIVE
COTLEY RIVER
O'CONNELL WAY
COTLEY ROAD
REVOLUTIONARY DRIVE
STEVENS STREET CONNECTOR
24
140
1
2
3
4
5
6
7
8
10
11

NOTE:
1. Wetland resource areas were delineated by professional wetland scientists and certified soil scientists from Epsilon Associates during the months of September, October, and November 2012, and June 2013. The limits of wetland resource areas located outside the Study Area were estimated by Epsilon using MassGIS mapping data and field observations.

SOURCE: Epsilon Associates, Inc.

Figure 7.2-1
Waters of the U.S.

7.2.2 WETLAND DELINEATION METHODOLOGY

7.2.2.1 Preliminary Data Review

Prior to performing fieldwork, background information was reviewed to assist in the initial identification of wetlands, surface waterbodies, and ephemeral waterbodies (e.g., vernal pools) within the Study Area. Information sources included color-infrared aerial photographs of the Study Area, USGS 7.5-Minute Series Topographic Quadrangle Maps, MassGIS™ Wetlands Maps, NRCS Soil Surveys, FEMA FIRMs, and several base map and environmental data layers distributed by MassGIS™. The delineation team also reviewed existing conditions plans and permit drawings depicting wetlands delineated by others on and adjacent to the Study Area over the past ten plus years.

The site plans, permit drawings, USGS topographic maps, the MassGIS™ wetlands data layer, NRCS soil maps, and the aerial photographs referenced above were used to indicate the potential presence of wetlands in the Study Area. The MassGIS™ wetland information was particularly useful, showing different types of wetland environments and the potential presence of hydrologic connections between wetlands. The soil maps indicated the potential presence of wetlands via hydric soil classifications (e.g., somewhat poorly drained, poorly drained, and very poorly drained soils).

7.2.2.2 Methodology

In accordance with 33 CFR 328.4 (Limits of Jurisdiction), the limits of Corps jurisdiction in non-tidal waters, in the absence of adjacent wetlands, extends to the ordinary high water mark (OHWM).[4] Consistent with this definition, the edge of jurisdictional wetlands were delineated with pink flagging tape with the label "Wetland Delineation" and a flag series number (e.g., A-1). Where the OHWM of rivers and streams was not coincident with the edge of wetlands, the OHWM limit was delineated with blue flagging tape with the label "B" and a unique flag series number (e.g., B-1). Blue flagging tape was also used to identify the locations of transects and plots where Corps wetland determination forms were completed. The upland data point along each transect contained a "U" in the flag series whereas the wetland data point along the same transect contained a "W" in the flag series. Wetland flags were located in the field by Registered Professional Land Surveyors using traditional survey methods. The survey data were incorporated onto the project drawings and maps.

Vegetation cover types were classified into distinctive upland, wetland, and aquatic ecological communities. Water bodies and watercourses, including rivers, streams and drainage ditches were characterized within the Study Area. Photographs were taken at select wetland areas representative of the Study Area. Data from the delineated wetlands including vegetation, soil characteristics, hydrology, photographic information, and sketches were recorded in a field notebook.

[4] According to 33 CFR 328.3(e) and Corps Regulatory Guidance Letters, an OHWM is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas.

Soils, the first of three diagnostic characteristics of a wetland, were examined and evaluated both within and outside the wetland boundaries using a soil Dutch auger to a depth of approximately 20 inches. Soils were characterized throughout this depth. Soil colors were identified using a Munsell® Soil Color Chart (Munsell, 1998), and other characteristics such as soil texture and moisture were recorded. Hydric characteristics such as organic soil layers, reduced matrices, and redoximorphic features were noted when they occurred.

The Corps delineation manual provides guidelines for determining the presence of wetland hydrology, the second of the three diagnostic characteristics of a wetland. In general, the criteria for wetland hydrology are met if the area is inundated or saturated at the soil surface during the growing season for a time sufficient to develop hydric soils and support hydrophytic vegetation. In some instances, other field characteristics specified in the manual to identify wetland hydrology were also utilized. These characteristics included water-stained leaves, blow-downs, shallow root systems and drainage patterns. Hydrologic characteristics as well as the depth of surface water, or depth to soil saturation, were recorded for each wetland area.

To determine the presence of hydrophytic vegetation, the third of the diagnostic wetland characteristics, the dominant species in each major vegetative stratum (e.g., tree, shrub/sapling, herbaceous, and woody vine) were identified and recorded for each wetland area using the Corps Standard Dominance Test procedure. Each plant was then assigned a wetland indicator status (e.g., obligate, facultative, etc.) from the Corps 2012 National Wetland Plant List (NWPL). A prevalence of dominant species (i.e., greater than 50 percent) that are facultative, facultative wetland, and obligate wetland indicates the presence of hydrophytic vegetation.

7.2.3 WETLAND CHARACTERISTICS

Delineated wetlands and other waters of the U.S. were categorized to a subsystem or class level according to the U. S. Fish & Wildlife Service (USFWS) Classification of Wetlands and Deepwater Habitats of the United States (the "Cowardin Approach")[5]. The USFWS System broadly defines wetland types by hydrology and vegetative cover. Wetlands are categorized within a classification hierarchy of Systems, Subsystems, and Classes. Systems, the highest level of the classification hierarchy, include the Marine, Estuarine, Riverine, Lacustrine, and Palustrine Systems. Marine and Estuarine Systems each have two Subsystems - Subtidal and Intertidal; the Riverine System has four Subsystems - Tidal, Lower Perennial, Upper Perennial, and Intermittent; the Lacustrine System has two Subsystems - Littoral and Limnetic; and the Palustrine has no Subsystems.

Within the Subsystems, Classes are based on substrate material and flooding regime, or on vegetative life form. The same Classes may appear under one or more of the Systems or Subsystems. Six Classes are based on substrate and flooding regime: (1) Rock Bottom with a substrate of bedrock, boulders, or stones; (2) Unconsolidated Bottom with a substrate of cobbles, gravel, sand, mud, or organic material; (3) Rocky

[5] Cowardin, L. et al. (1979). Classification of Wetlands and Deepwater Habitats of the United States, United States Fish and Wildlife Service, Biological Services Program, Washington, D.C., FWS/OBS-79/31.

Shore with the same substrates as Rock Bottom; (4) Unconsolidated Shore with the same substrates as Unconsolidated Bottom; (5) Streambed with any of the substrates; and (6) Reef with a substrate composed of the living and dead remains of invertebrates (corals, mollusks, or worms). The bottom Classes, (1) and (2) above, are flooded all or most of the time and the shore Classes, (3) and (4), are exposed most of the time. The Class Streambed is restricted to channels of intermittent streams and tidal channels that are dewatered at low tide. The life form of the dominant vegetation defines the five Classes based on vegetative form: (1) Aquatic Bed, dominated by plants that grow principally on or below the surface of the water; (2) Moss- Lichen Wetland, dominated by mosses or lichens; (3) Emergent Wetland, dominated by emergent herbaceous angiosperms; (4) Scrub-Shrub Wetland, dominated by shrubs or small trees; and (5) Forested Wetland, dominated by large trees.

Using the Cowardin approach, the wetland systems identified within the Study Area include predominantly Riverine Lower Perennial Unconsolidated Bottom (UB), Riverine Intermittent Streambed and Palustrine Forested Wetlands (PFO). Palustrine Scrub-Shrub Wetlands (PSS), Palustrine Emergent Wetlands (PEM) and Lacustrine Littoral/Limnetic wetlands are also present to a lesser degree.

- **Riverine Lower Perennial UB (Cotley River)** includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.5 percent. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water. The Riverine System is bounded on the landward side by upland, by the channel bank (including natural and man-made levees), or by wetland dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens. In Lower Perennial subsystems the gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur, the fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.
- **Riverine Intermittent Streambed (unnamed intermittent streams)** contains flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
- **Lacustrine systems** are defined as wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses and lichens with greater than 30 percent aerial coverage; and (3) total area exceeds 8 hectares (20 acres). Subsystems consist of Littoral and Limnetic zones, i.e. zones characterized by varying plant growth and flood conditions.

- **PFO** is defined as woody vegetation that is 6 meters (20 feet) tall or taller covering 30 percent or more of the wetland area. They may occur in the Palustrine and Estuarine Systems and normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer. Forested wetlands typically receive runoff from adjacent areas, have poorly drained soils and may be inundated for extended periods during the growing season. These areas may have several inches to a foot of water in the wet seasons while completely drying out in the summer months.
- **PSS** wetlands are dominated by woody vegetation (i.e. young trees, shrubs) less than 6 meters (20 feet) tall covering 30 percent or more of the wetland area. Scrub-shrub wetlands occur mostly in landscape depressions where inundation is typically seasonal. These areas may have several inches to several feet of water in the wet seasons while completely drying out in the summer months. PSS wetlands are frequently found in conjunction with an emergent wetland area or on the fringe of a forested wetland. Scrub-shrub wetlands may represent a successional stage leading to a forested wetland, or they may be relatively stable communities.
- **PEM** class wetlands are characterized by an open structure and the presence of erect, rooted, herbaceous hydrophytes with few or no woody plant species present. This vegetation, often dominated by perennial grasses, sedges and rushes, is present for the majority of the growing season in most years. PEM wetlands commonly occur in landscape depressions where water from slope or field drainage collects, and at the margins of inundated pond and river wetland systems. The soils typically consist of a layer of well-decomposed organic muck overlying mineral material. Emergent wetlands are known by many names including marsh and wet meadow.

Tables 7.2-1 and 7.2-2 present a summary of the delineated wetlands and waters of the U.S. on the Project Site and in the vicinity of the Route 24/140 interchange and Stevens Street/Route 140 interchange respectively.[6] These waters of the U.S. are shown on **Figure 7.2-1** above**.** A more detailed depiction of these wetlands, including specific flag numbers and data collection points, is provided in **Appendix C**. It is assumed that all of the delineated wetlands and streams are jurisdictional "waters of the U.S." for the purposes of Sections 401 and 404 of the U.S. Clean Water Act.

There are a variety of regional specific plant communities within these classes of wetlands. These plant communities and wetland systems provide varying functions and values relative to their position in the landscape. Refer to **Section 7.2.6** and **Appendix C** for a discussion of wetlands functions and values.

[6] This section does not describe waters of the U.S. that were delineated by Epsilon in the vicinity of other off-site traffic improvement locations because no work is involved in these locations that could potentially affect or alter a water of the U.S. Proposed work in these locations is generally limited to pavement striping, re-timing of lights and other similar non-invasive traffic enhancement measures.

TABLE 7.2-1
SUMMARY DESCRIPTIONS OF DELINEATED WATERS OF THE U.S. ON THE PROJECT SITE

Wetland Series ID	Cowardin Classification	General Description of Delineated Waters of the U.S.
1	PEM	This isolated vegetated wetland (IVW) occurs in a shallow topographic depression dominated by cattail, beggar-ticks, soft rush, spike rush and lurid sedge. Primary hydrologic input derived from groundwater discharge, surface runoff and precipitation. Periodically contains standing water.
2	Riverine Lower Perennial UB (Cotley River), Riverine Intermittent Streambed, PFO, PSS	Gently sloping wetland complex consisting of the Cotley River and three intermittent streams / tributaries. Vegetated wetlands primarily consisting of forest communities are contiguous to these surface waters, and are dominated by red maple and yellow birch in the overstory. The understory and ground cover species consist of ironwood, arrowwood, sweet pepperbush, cinnamon fern and sensitive fern. For the most part, hydrologic input is derived from upstream watersheds/drainage areas, groundwater discharge, surface runoff and precipitation.
3	Riverine Intermittent Streambed, PFO, PSS, PEM	Topographically flat to gently sloping wetlands contiguous to two intermittent streams. The eastern portion of this wetland complex is dominated by forested wetlands with representative canopy species including red maple, swamp white oak, white pine and red oak. Understory and groundcover species consist of ironwood, spicebush, arrowwood, and marsh fern. The western portion of Wetland 3 primarily consists of emergent wetlands, with the most abundant species including cattail, purple vervain, soft rush, wool grass, sensitive fern and lurid sedge. Throughout this wetland complex, hydrologic input is derived from groundwater discharge, surface runoff and precipitation.
4	Riverine Lower Perennial UB (Cotley River), Lacustrine (Barstow's Pond) PFO,PEM	Gently sloping wetland complex consisting of the Cotley River and Barstows Pond. Vegetated wetlands primarily consisting of narrow bands of forest and emergent communities are contiguous to these surface waters. Collectively, these wetlands are dominated by red maple arrowwood, sweet pepperbush, cattail, tussock sedge and wild rice. For the most part, hydrologic input is derived from upstream watersheds/drainage areas, groundwater discharge, surface runoff and precipitation.
5 & 6	PFO	These pocket wetlands are isolated in the landscape and occur in topographic depressions. In each, the vegetative community is dominated by red maple in the overstory, with understory species including winterberry, highbush blueberry and arrowwood of varying densities. Evidence of periodic standing water (stains/marks on trees) was observed. Hydrologic input is limited to groundwater discharge, surface runoff and precipitation.
7	PSS	This pocket wetland is isolated in the landscape and occurs in a topographic depression. The central portion of the wetland is dominated by buttonbush, with standing water present throughout. Peripheral portions of the wetland primarily include silky dogwood, winterberry, highbush blueberry and arrowwood. Based on site-specific observations, this wetland functions as a vernal pool breeding habitat for wood frog and spotted salamander. Hydrologic input is limited to groundwater discharge, surface runoff and precipitation.
8	PFO	This wetland is isolated in the landscape and occurs in a topographic depression similar to Wetlands 5, 6 and 7 described above. Plant species, while sparse, primarily include winterberry, arrowwood and highbush blueberry. Like Wetlands 1, 5, 6 and 7, hydrologic input is limited to groundwater discharge, surface runoff and precipitation.
9	PEM	This small pocket wetland occurs in a shallow topographic depression dominated by cattail. Primary hydrologic input is derived from surface runoff and precipitation. Periodically contains standing water over rock / dense gravels.

TABLE 7.2-2
SUMMARY DESCRIPTIONS OF DELINEATED WATERS OF THE U.S.
IN THE VICINITY OF ROUTE 24/140 INTERCHANGE AND STEVENS STREET/ROUTE 140 INTERCHANGE

Wetland Series ID	Cowardin Classification	General Description of Delineated Waters of the U.S.
10	Riverine Intermittent Streambed, PFO, PSS, PEM	This wetland system is located at the Route 24/Route 140 interchange and consists of vegetated wetlands, pockets of standing water and intermittent streams / drainage ditches associated with existing roadway stormwater management systems. Primary hydrologic inputs include stormwater runoff and overland flows. Dominant wetland vegetation includes common reed, red maple, highbush blueberry and sweet pepperbush.
11	Riverine Lower Perennial UB (Cotley River), Riverine Intermittent Streambed, PFO, PSS, PEM	This wetland complex is centered at the Route 140/Stevens Street interchange and consists of vegetated wetlands, pockets of standing water and drainage ditches associated with existing roadway stormwater management systems. It also includes the southern extent of the Cotley River within the Study Area. Primary hydrologic inputs include stormwater and surface runoff. Dominant wetland vegetation includes common reed, red maple and a variety of wetland shrub species.

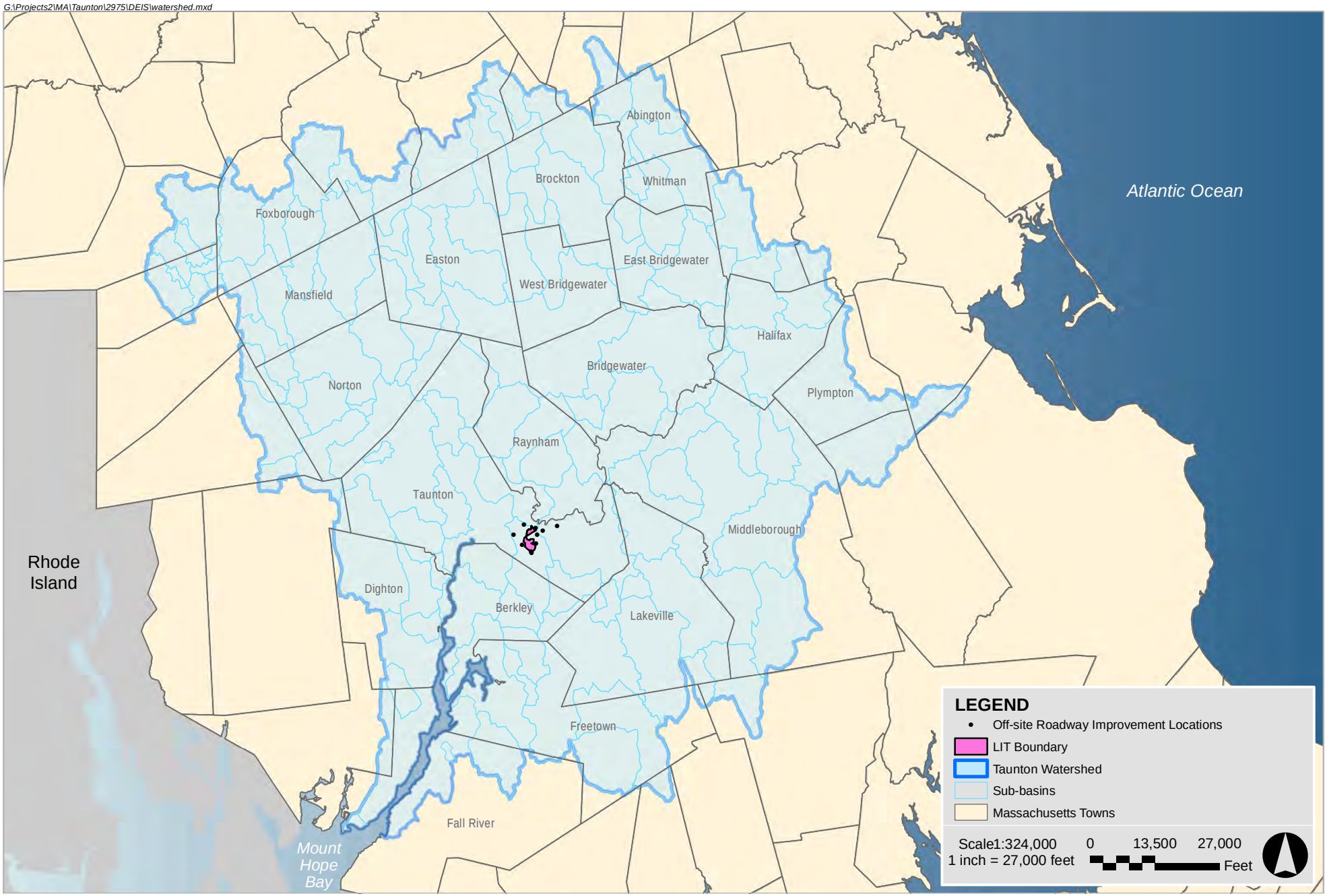
7.2.4 RIVERS, STREAMS AND VERNAL POOLS

The Study Area is located in the Narragansett Basin watershed (8-digit Hydrologic Unit Code 01090004) and the Taunton River sub-basin. See **Figure 7.2-2**, Major Watershed and Sub-basin Map. Surface waters in Massachusetts are classified by the Massachusetts Surface Water Quality Standards found at 314 CMR 4.00. This classification scheme assigns all inland and coastal and marine waters to classes according to the intended beneficial uses of those waters. According to 314 CMR 4.06(7), the portion of the Taunton River located northeast of the Project Site constitutes a Class B/Warm Water waterway. Consequently, the Cotley River, a tributary to the Taunton River, also is listed as a Class B/Warm Water waterway. Thus, in accordance with 314 CMR 4.05 (3)(b):

> "These [Class B] waters are designated as 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."

Under section 305(b) of the federal Clean Water Act (CWA), states are required to survey their water quality for attainment of the goals of the CWA and to report the water quality assessments biennially. The attainment of CWA goals is measured by assessing whether the waters support their designated uses (i.e., the waterbody classifications discussed above).

Section 303(d) of the CWA and the implementing regulations at 40 CFR 130.7 require states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and to prioritize and schedule them for the development of a total maximum daily load (TMDL). A TMDL establishes the maximum amount of a pollutant that may be introduced into a waterbody and still ensure attainment and maintenance of water quality standards.



SOURCE: Epsilon Associates, Inc.

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Figure 7.2-2

Taunton Watershed and Sub-basin Map

The "Water Quality Assessment Status for Reporting Year 2010", published by the US Environmental Protection Agency (EPA), characterized the 20.4-mile segment of the Taunton River from its source in Bridgewater to the Route 24 bridge as "Good" with respect to its designated uses of "Fish, Shellfish, and Wildlife Protection and Propagation". This contrasts with river segments downstream of the Route 24 bridge which are characterized as "TMDL Needed". The USEPA assessment did not address aesthetics, fish consumption, or primary and secondary contact recreation.

Descriptions of the vernal pools and surface water bodies within the Study Area is provided below.

7.2.4.1 Cotley River/Barstows Pond

The Cotley River watershed encompasses an area of approximately 6.5 square miles with the river, itself, commencing in a wetland/cranberry bog complex northeast of Route 140, south of Seekell Street. From this point, the river flows through a section of Berkley and then in a northerly direction through forested and scrub-shrub wetlands located on the Project Site (see **Figure 7.2-3**, USGS locus Map).

Within the Study Area, the Cotley River varies from approximately 20 to 30 feet wide, with bank heights varying along its reach. Approaching Barstows Pond, the width of the river widens to greater than 100 feet.

The dominant vegetative communities along the riparian corridor include Palustrine forested and scrub-shrub wetlands [primarily red maple *(Acer rubrum)* swamp]. Throughout the Project Site, the river substrate consists primarily of silt and organic debris. At the northern extent of the northern parcel, the Cotley River flows beneath an existing service road and railroad tracks via a concrete culvert, and stone and concrete bridge, respectively. From this point northward, the river flows through a mix of forested and scrub-shrub wetlands before eventually discharging into Barstows Pond. At the northern limit of Barstows Pond, immediately south of Hart Street, an earthen dam with a timber crib spillway serves to impound the Cotley River and create Barstows Pond.

7.2.4.2 Unnamed Intermittent Streams

There are three unnamed intermittent streams on the Project Site, all of which are associated with Wetlands 2 and 3. There are also man made drainage channels associated with Wetland 10 and the Route 24/140 interchange drainage network. In general, these streams have small drainage/catchment areas and are therefore relatively small - generally approximately 10 feet wide with water depths of less than 6-inches. They flow primarily through forested wetlands or scrub-shrub wetlands, and eventually merge with the Cotley River west of O'Connell Way.

The intermittent stream associated with Wetland 3 that forms the eastern boundary of the Study Area is manmade. Adjacent to and down-slope of the stream there is a berm derived from the stockpiling of material excavated to create the existing channel. At a certain point along the stream, there also is a drainage area boundary, such that from this point water generally flows to the north and south, eventually discharging to the Cotley River.

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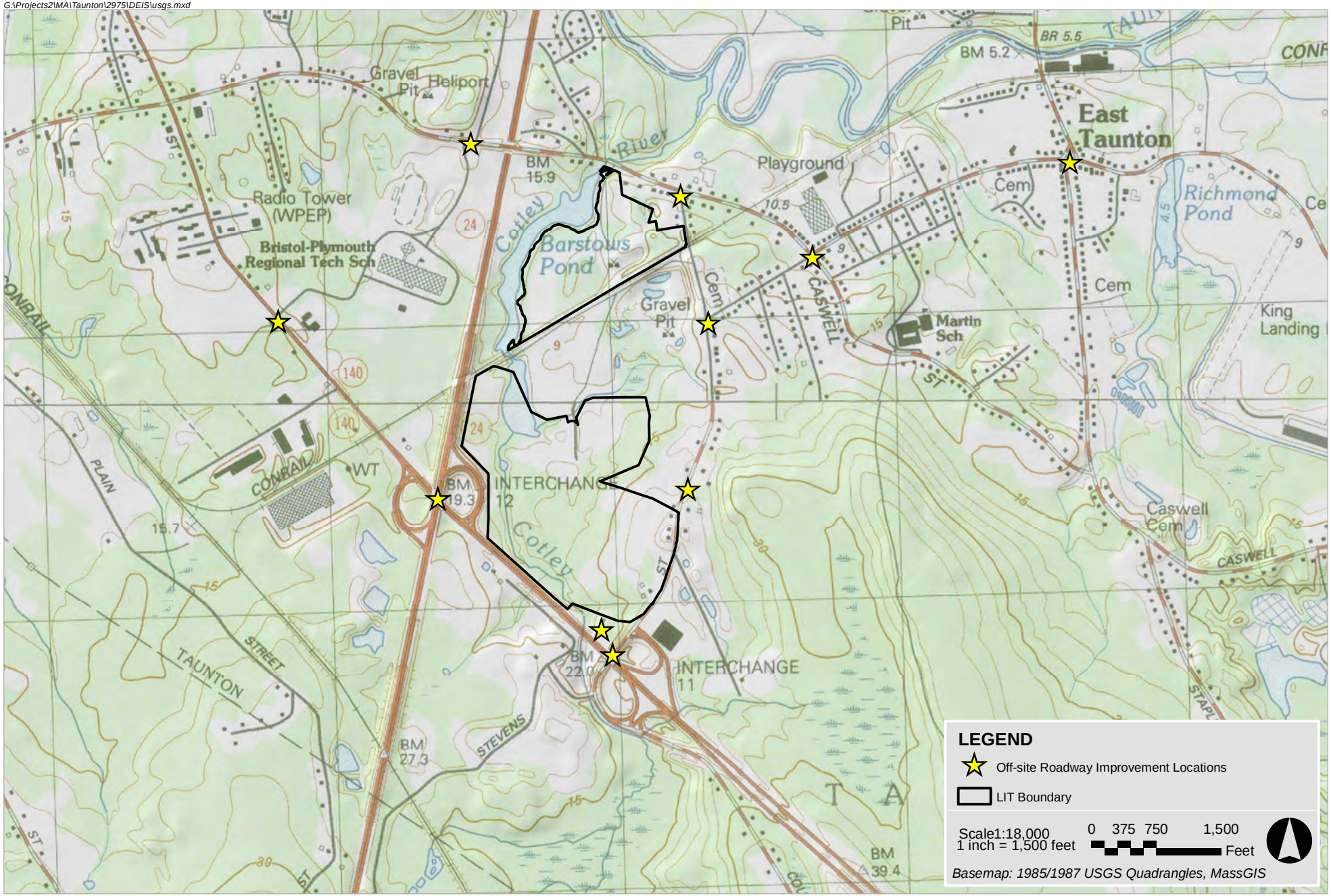

SOURCE: Epsilon Associates, Inc.

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Figure 7.2-3

USGS Locus Map

7.2.4.3 Taunton River

The Cotley River flows in a northeasterly direction from the Study Area to its confluence with the Taunton River located approximately 2,000 feet to the northeast (see **Figure 7.2-3**, USGS Locus Map). The Taunton River proper begins at the confluence of the Matfield and Town Rivers just east of Bridgewater, Massachusetts and flows south for approximately 36 miles before it empties into Mount Hope Bay at Fall River. The Taunton River has an average discharge of 1,050 cubic feet per second (cfs) (679 million gallons per day (MGD)), although this flow varies seasonally with monthly mean values ranging from a low of 332 cfs in August to a high of 2,090 cfs in March.[7] Approximately 23 miles of the Taunton River is affected by tides, and the lower eight miles of the river is a tidal estuary.

From its headwaters in Bridgewater to the Braga Bridge in Fall River, the Taunton River has been classified as a Wild and Scenic River pursuant to the 1968 Wild and Scenic Rivers Act, administered by the National Park Service (NPS).

7.2.4.4 Vernal Pools

In general, Vernal Pools are temporary bodies of fresh water that provide breeding habitat (typically in the spring) for many vertebrate [e.g., mole salamanders (*Ambystoma spp.),* wood frogs *(Lithobates sylvaticus)* and invertebrate species [e.g., fairy shrimp (*Eubranchipus vernalis*)]. Vernal Pool habitat can occur where water is contained for more than two months in the spring and summer of most years and where no reproducing fish populations are present. Vernal Pools are common in Massachusetts and occur in almost every town in the state. According to the current Massachusetts Natural Heritage and Endangered Species Program (NHESP) Atlas (NHESP, 2008), there are no known certified or potentially certifiable vernal pools located in the Study Area. However, there are a number of potentially certifiable vernal pools located north, east and south of the Project Site. See **Figure 7.2-4**, NHESP Rare Species and Vernal Pool Map.

During the months of March and April 2012 Epsilon identified one wetland system (Wetland Series 7) located in the northern portion of the Study Area north of the railroad tracks that functions as Vernal Pool habitat based on the presence of spotted salamander *(Ambystoma maculatum)* and wood frog *(Lithobates sylvaticus)* egg masses, hydrologic characteristics, juxtaposition in the landscape and topography and plant community composition. This area has not been previously mapped by NHESP (see **Figure 7.2-4**). Wetland Series 7 is characterized as a Palustrine scrub-shrub wetland. Dominant vegetation includes buttonbush *(Cephalanthus occidentalis*) in the central portion of the wetland, with peripheral portions of the wetland primarily consisting of silky dogwood, winterberry, highbush blueberry and arrowwood. There is also significant growth of Japanese knotweed (*Fallopia japonica*) within the vernal pool boundary. The estimated depth of standing water at the time of inspection was approximately 18-inches.

[7] Ries III, K.G. 1990. Estimating surface-water runoff to Narragansett Bay, Rhode Island and Massachusetts. US Geological Survey, Water Resources Investigations Report 89-4164.

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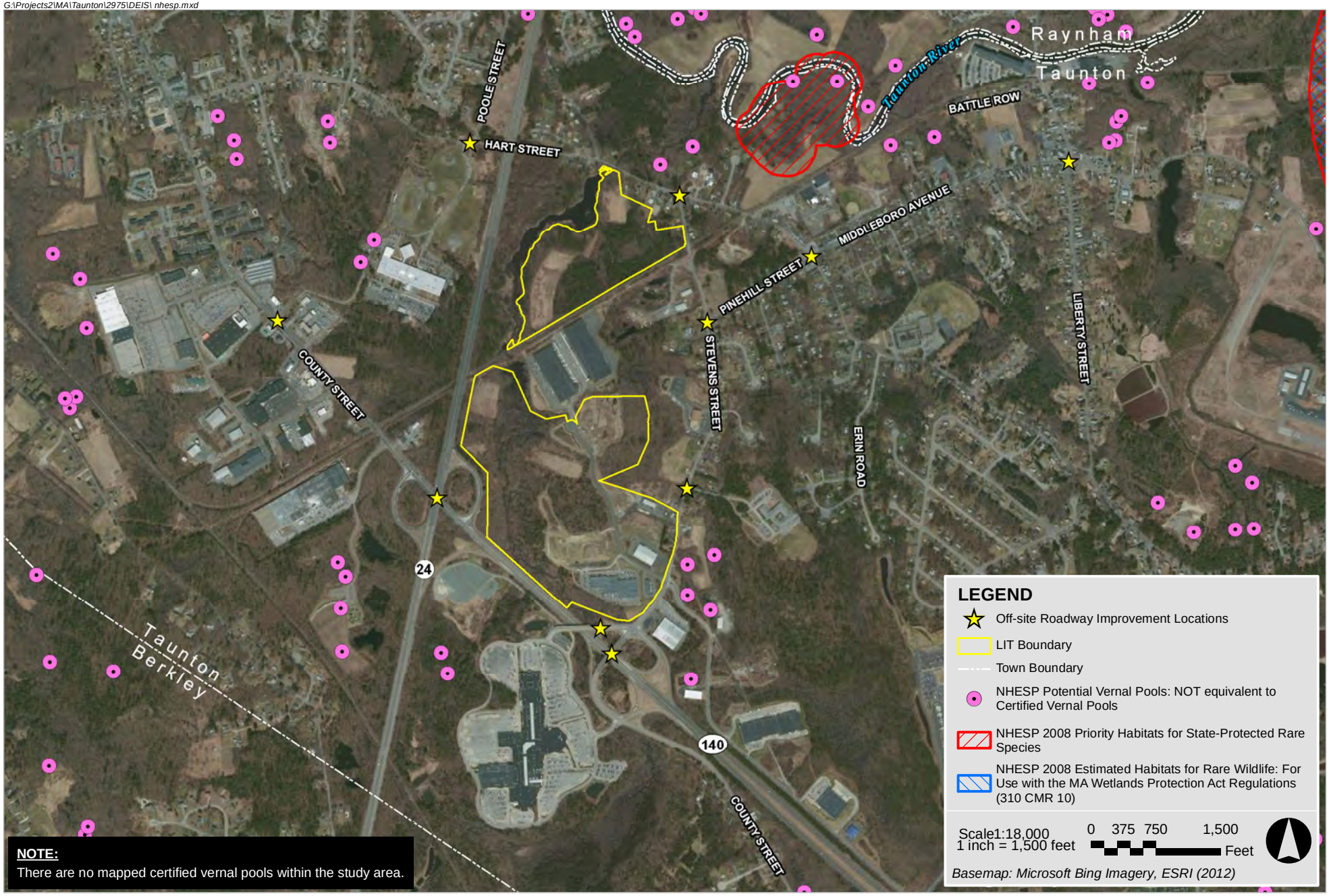

SOURCE: Epsilon Associates, Inc.

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Figure 7.2-4

NHESP Rare Species and Vernal Pools Map

The bottom substrate is soft and mucky. The aforementioned data is included on the "Vernal Pool Characterization and Valuation Form" provided in **Appendix C**. This form is provided by the Corps - New England District.

According to the Corps Section 10/404 General Permit for the Commonwealth of Massachusetts the Critical Terrestrial Habitat of Vernal Pools extends 750 feet beyond the edge of the pool. Under certain circumstances this area can provide habitat for amphibians during the non-breeding season for foraging, dispersing, and hibernating. During the breeding season, adults migrate to pools through this zone. Juvenile and adult wood frogs and mole salamanders select closed-canopy forests during emigration and dispersal in managed forest landscapes.[8] Spotted salamanders often occur under, or closely associated with, woody debris on the forest floor.[9] Other mole salamanders in the region have similar habitat needs.[10] As depicted on **Figure 7.2-5**, Waters of the U.S. and Potential Vernal Pool Habitats, the Critical Terrestrial Habitat extending onto the Project Site from off-site Potential Vernal Pools mapped by NHESP is generally comprised of developed areas and impervious surface and does not provide viable upland habitat for Vernal Pool species. The Critical Terrestrial Habitat associated with the on-site Vernal Pool in Wetland Series 7 comprises areas of contiguous coniferous and mixed deciduous forest to the east and west. The Critical Terrestrial Habitat south of the Vernal Pool comprises the railroad tracks and other developed areas. To the north and west, the forest canopy has been fragmented by former agricultural fields. The Cotley River wetland system and riparian corridor are also west and north of the vernal pool.

7.2.5 100-YEAR FLOODPLAIN

According to the current Federal Emergency Management Agency (FEMA) – Flood Insurance Rate Map (FIRM), a portion of the Project Site along the Cotley River is located in a Zone A, within which no base flood elevations have been established. See **Figure 7.2-6**, MassGIS Floodplain Map. Project engineers have calculated the base flood elevation for the 100-year storm event as ranging between 24 feet NGVD and 37 feet NGVD south of the railroad tracks (see **Figure 7.2-7**, 100-year Floodplain Elevations South of Railroad Tracks). North of the railroad tracks the 100-year floodplain is projected to be approximately 17 feet NGVD assuming the dam at Barstows Pond is removed (as is currently proposed by others unrelated to this Project). See **Figure 7.2-8,** 100-year Floodplain Elevations North of Railroad Tracks). Within this zone, lands subject to flooding during 100-year storm events primarily consist of forested and other wetlands associated with the Cotley River. The Cotley River floodplain, as determined by project engineers, also extends towards Route 140 and Stevens Street (see **Figure 7.2-7**). The Route 24/140 interchange is located outside the 100 year floodplain.

[8] deMaynadier, P. G. and M. L. Hunter, Jr. 1999. Forest canopy closure and juvenile emigration by poolbreeding amphibians in Maine. Journal of Wildlife Management 63: 441-450.

[9] Windmiller, B. S. 1996. The pond, the forest, and the city: Spotted salamander ecology and conservation in a human-dominated landscape (Ph.D. dissertation). Tufts University, Medford, MA.

[10] Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

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LEGEND

- NHESP Potential Vernal Pool: NOT Equivalent to Certified Vernal Pool
- LIT Boundary
- 1 — Wetland Delineation Boundary (Wetland ID)[1]
- Ordinary High Water Mark (OHWM)
- Intermittent Stream

Scale 1:6,000
1 inch = 500 feet

0 250 500 Feet

Basemap: 2011 Google Earth Imagery

TAUNTON RIVER
COTLEY RIVER
BARSTOWS POND DAM
BARSTOWS POND
OLD HART STREET
HART STREET
WILLIAMS AVENUE
MIDDLEBORO AVENUE
Vernal Pool Buffer Zone (250 feet)
Vernal Pool Envelope (100 feet)
VERNAL POOL[2]
Critical Terrestrial Habitat (750 feet)
RAILROAD TRACKS
PINEHILL STREET
WOODLAWN STREET
STEVENS STREET
AZALEA DRIVE
GARDEN STREET
COTLEY RIVER
O'CONNELL WAY
STEVENS STREET CONNECTOR
REVOLUTIONARY DRIVE
COTLEY ROAD
24
140
1
2
3
4
5
6
7
8
9
10
11

NOTES:
1. Wetland resource areas were delineated by professional wetland scientists and certified soil scientists from Epsilon Associates during the months of September, October, and November 2012, and June 2013. The limits of wetland resource areas located outside the Study Area were estimated by Epsilon using MassGIS mapping data and field observations.
2. Wetland Series 7 functions as vernal pool habitat based on the presence of wood frog (Lithobates sylvaticus) egg masses that were identified by Epsilon Associates in March and April 2012.
3. According to MassGIS data and the NHESP Atlas (2008), there are no mapped Certified Vernal Pools in the study area.

SOURCE: Epsilon Associates, Inc.

Figure 7.2-5
Waters of the U.S. and Potential Vernal Pool Habitats

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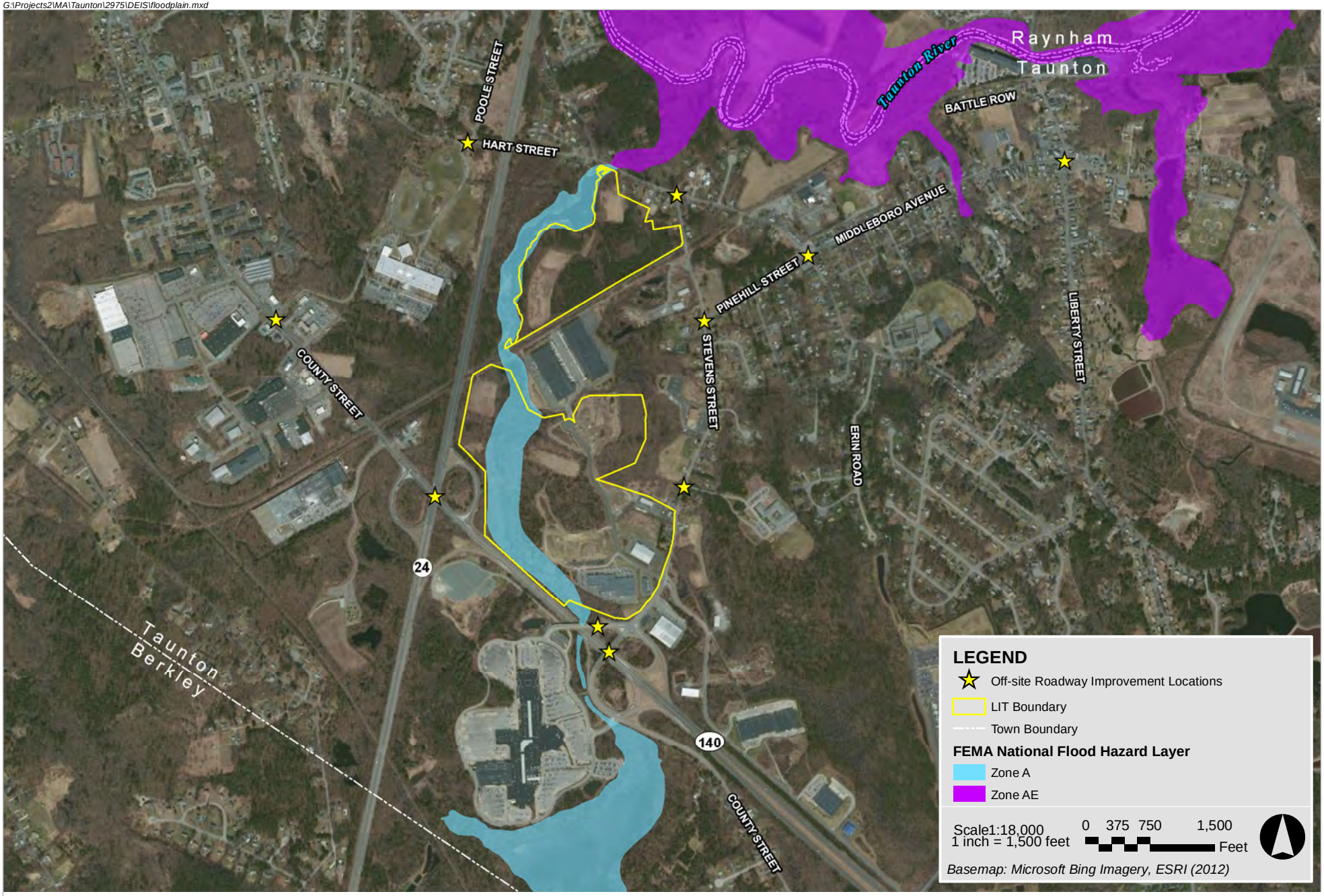

SOURCE: Epsilon Associates, Inc.

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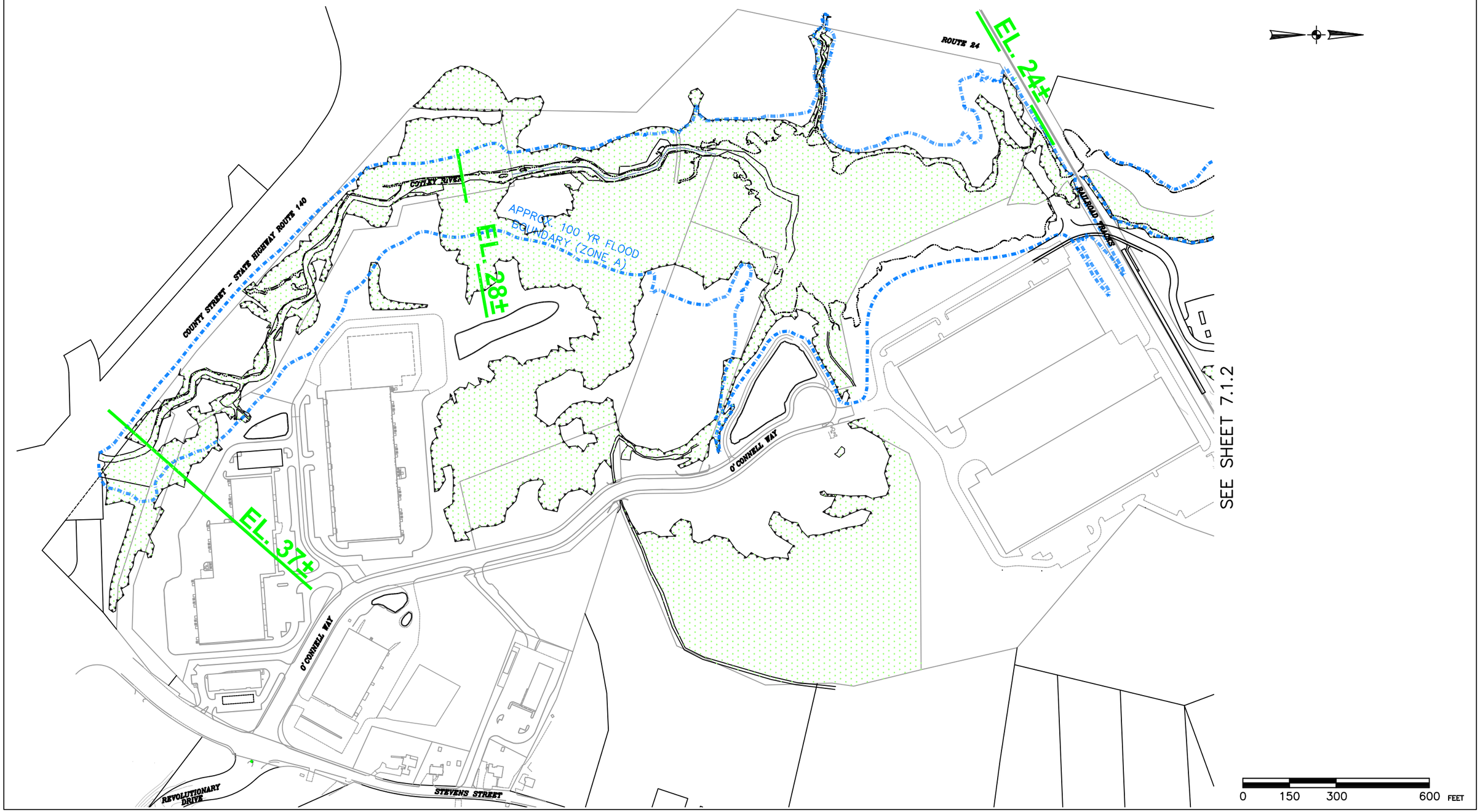
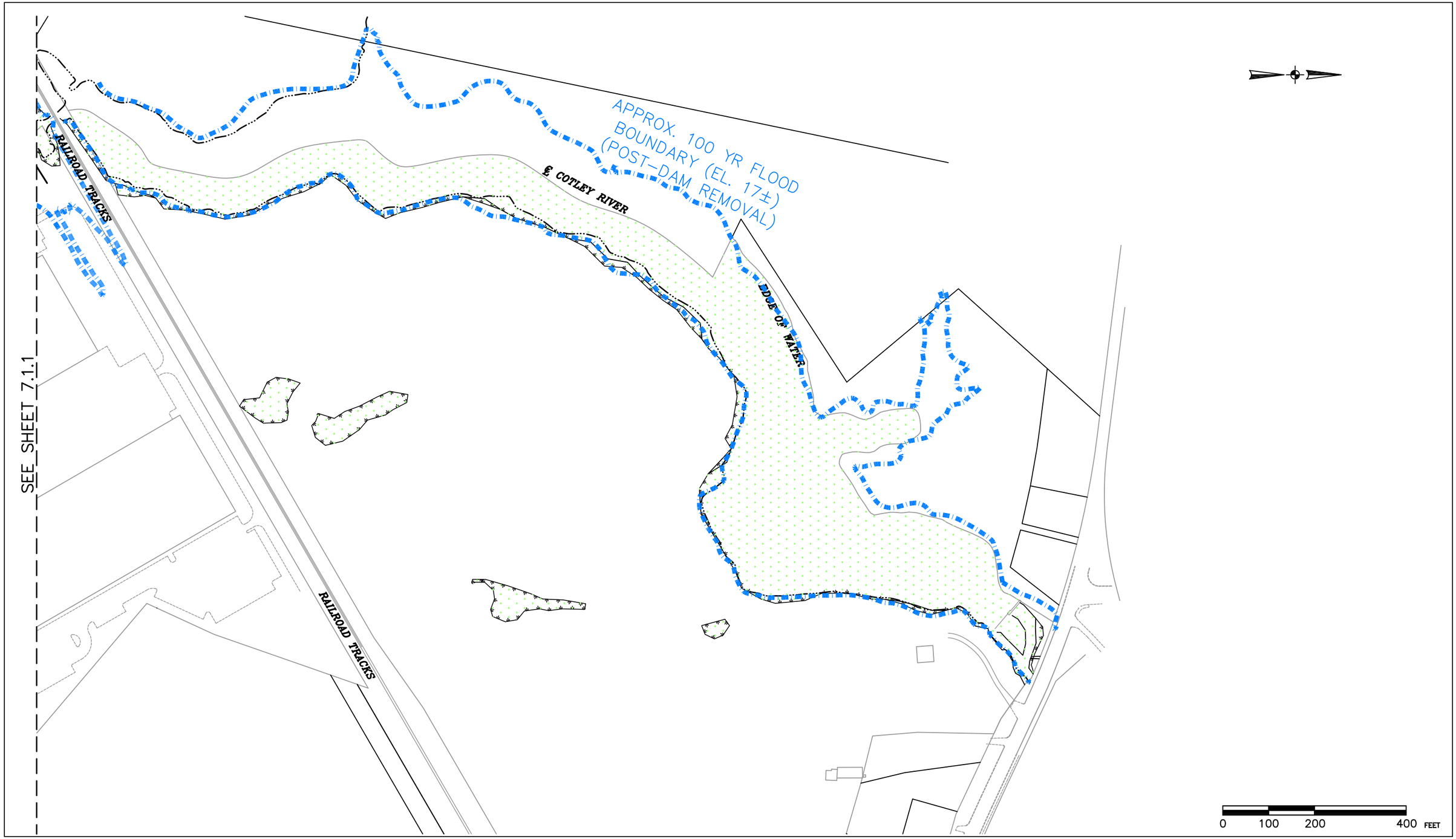
Figure 7.2-6

Floodplain Map



SOURCE: FIELD ENGINEERING CO., INC.

Figure 7.2-7
FLOODLINE EXHIBIT
PROPOSED ACTION-LIT SITE (SOUTH OF THE RAILROAD TRACKS)



SOURCE: FIELD ENGINEERING CO., INC.

Figure 7.2-8
FLOODLINE EXHIBIT
PROPOSED ACTION-LIT SITE (NORTH OF THE RAILROAD TRACKS)

7.2.6 FUNCTIONS AND VALUES ASSESSMENT OF WETLANDS AND OTHER WATERS OF THE U.S.

This section includes a general description of the functions and values of the wetland systems delineated within the Study Area. A more detailed functions and value assessment is provided in **Appendix C** for those discrete locations in the Study Area where a discharge of dredged or fill material is proposed in waters of the U.S.

Wetland habitats within the Study Area were evaluated using the Corps "Highway Methodology Workbook Supplement for Wetlands Functions and Values: A Descriptive Approach". This method incorporates both wetland science and human judgment of values. More specifically, functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society. They relate to the ecological significance of wetland properties with regard to subjective human values. Values are benefits that derive from either one or more functions and the physical characteristics associated with a wetland. The value of a particular wetland function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions. The 13 functions and values that are considered by the Corps include the following:

Functions

1. Ground Water Recharge/Discharge
2. Floodflow Alteration (Storage & Desynchronization)
3. Fish and Shellfish Habitat
4. Sediment/Toxicant/Pathogen Retention
5. Nutrient Removal/Retention/Transformation
6. Production Export
7. Sediment/Shoreline Stabilization
8. Wildlife Habitat

Values

9. Recreation
10. Educational/Scientific Value
11. Uniqueness/Heritage
12. Visual Quality/Aesthetics
13. Threatened or Endangered Species Habitat

Functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society or from a local, regional, and/or national perspective. The principal functions of wetlands within the Study Area vary and include groundwater discharge/recharge, floodflow alteration, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, sediment/shoreline stabilization and wildlife habitat. Refer to **Appendix C** for additional detail.

7.2.7 GROUNDWATER RESOURCES

Based on a review of data contained in the MassGIS™ statewide database of spatial information, the Project Site is not located in an area mapped as either a high or medium yield aquifer, nor is it located in a Sole Source Aquifer area. In addition, neither the Project Site nor the off-site traffic improvement areas are designated as Zone I or Zone II under the MassDEP Drinking Water Program.

Protected water supply areas in the vicinity of the Project are shown on **Figure 7.2-9**, Groundwater Resources Map.

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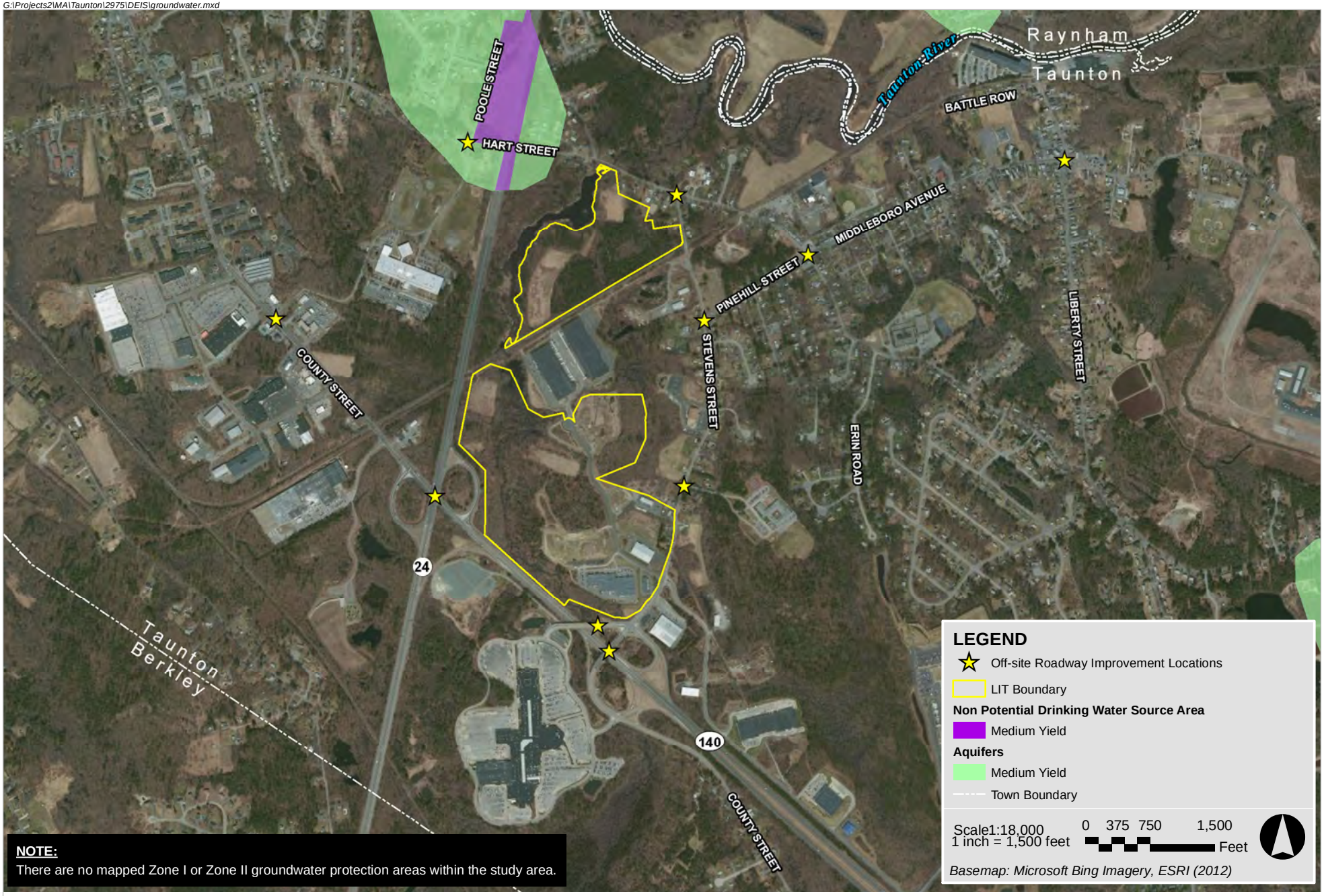

SOURCE: Epsilon Associates, Inc.

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Figure 7.2-9

Groundwater Resources Map

SECTION 7.3
STORMWATER

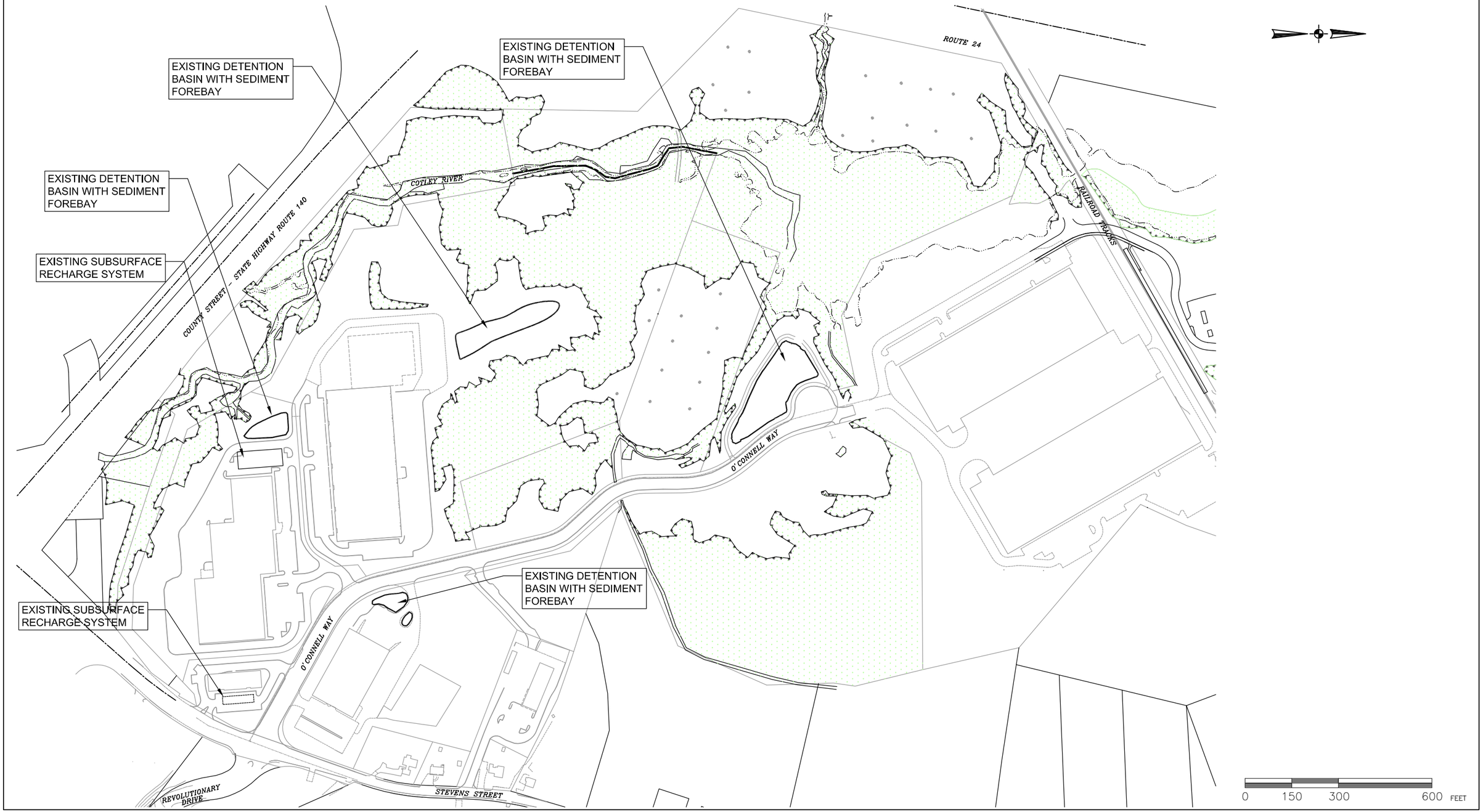
Existing stormwater management for the developed portions of the Project Site consists of a combination of detention basins, sediment forebays, grassed swales, deep sump hooded catch basins and infiltration systems designed to promote groundwater recharge. These stormwater management system components were constructed between 2007 and 2011 during construction of O'Connell Way and the existing development within the LUIP. They were designed to collect and treat stormwater runoff generated by impervious surfaces including roadways, parking areas and buildings. The majority of these areas discharge treated stormwater runoff towards the Cotley River and adjacent wetlands. None of these areas discharge into a critical area[1] as defined by the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Standards[2] including but not limited to drinking water supplies and certified vernal pools. The existing stormwater management components and the sub-catchment areas they treat are depicted on **Figure 7.3-1**. A Conceptual Stormwater Management Report describing existing and proposed site conditions is provided in **Appendix D**.

There are no stormwater management controls on the undeveloped area north of the railroad tracks. As noted above, this area comprises wetlands including the Cotley River, upland meadow and mixed deciduous upland forest.

With regard to off-site locations where proposed roadway improvements will occur, the existing stormwater systems generally consist of curbing, piping, catch basins and drainage swales that discharge through culverts and flared end pipes towards wetlands and streams located on either side of the roadway surfaces and intersections. For additional detail refer to **Figures 7.3-2 and 7.3-3**, depicting existing stormwater management system components at the Route 24/Route 140 intersection and at the Stevens Street/Route 140 intersection where the proposed Route 140 Northbound Ramp is to be located.

[1] Critical areas include Outstanding Resource Waters as designated in Massachusetts Surface Water Quality Standards (314 CMR 4.00), Special Resource Waters as designated in 314 CMR 4.00, recharge areas for public water supplies as defined in 310 CMR 22.02 (Zone Is, Zone IIs and Interim Wellhead Protection Areas for ground water sources and Zone As for surface water sources), bathing beaches as defined in 105 CMR 445.000, cold-water fisheries as defined in 310 CMR 10.04 and 314 CMR 9.02, and shellfish growing areas as defined in 310 CMR 10.04 and 314 CMR 9.02.

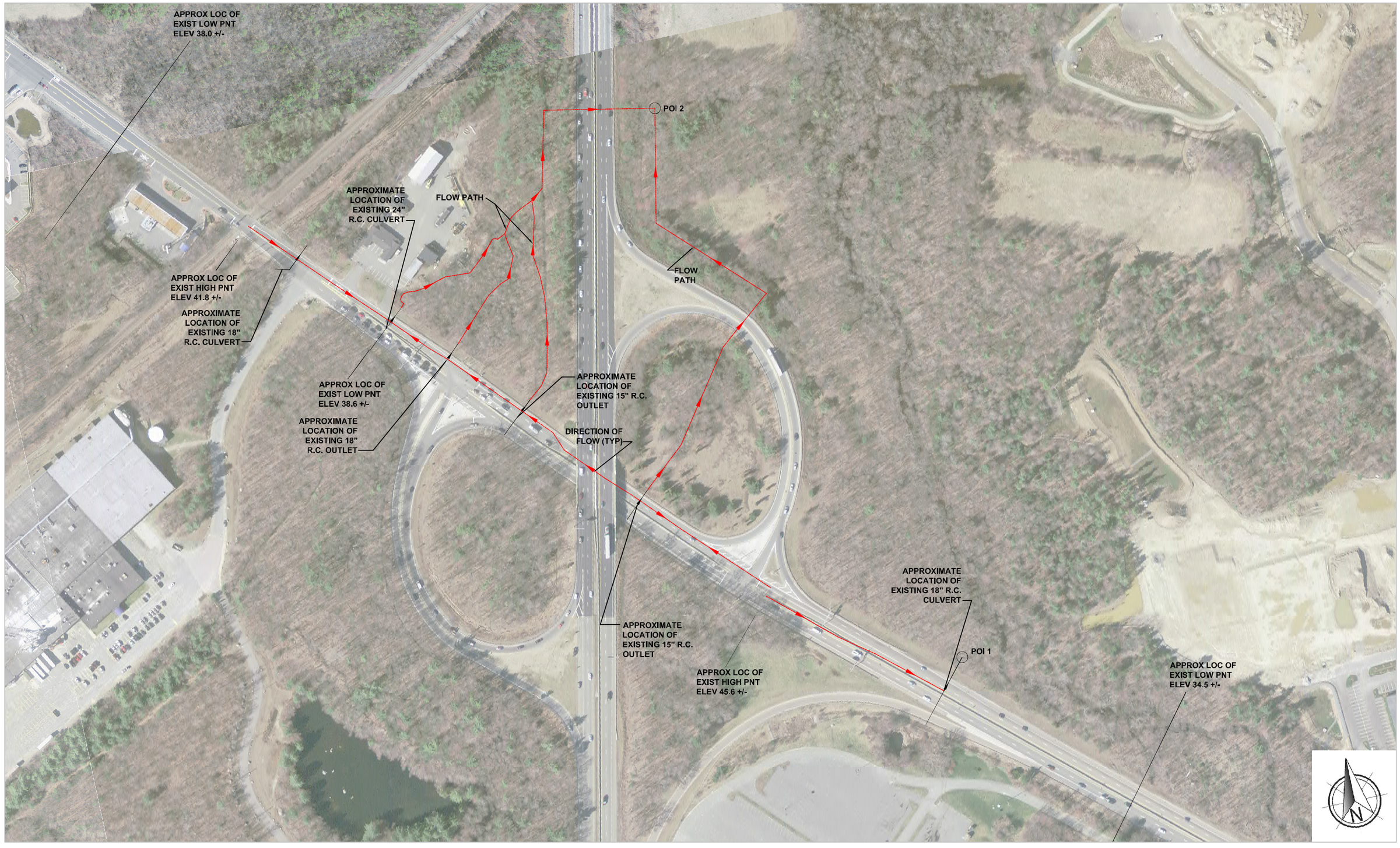
[2] The state stormwater management standards address water quality (pollutants) and water quantity (flooding, low base flow and recharge) by establishing standards that require the implementation of a wide variety of stormwater management strategies.



SOURCE: FIELD ENGINEERING CO. INC.

Figure 7.3-1

CONCEPTUAL STORMWATER MANAGEMENT SYSTEM PLAN
EXISTING CONDITIONS



SOURCE: Fay, Spofford & Thorndike

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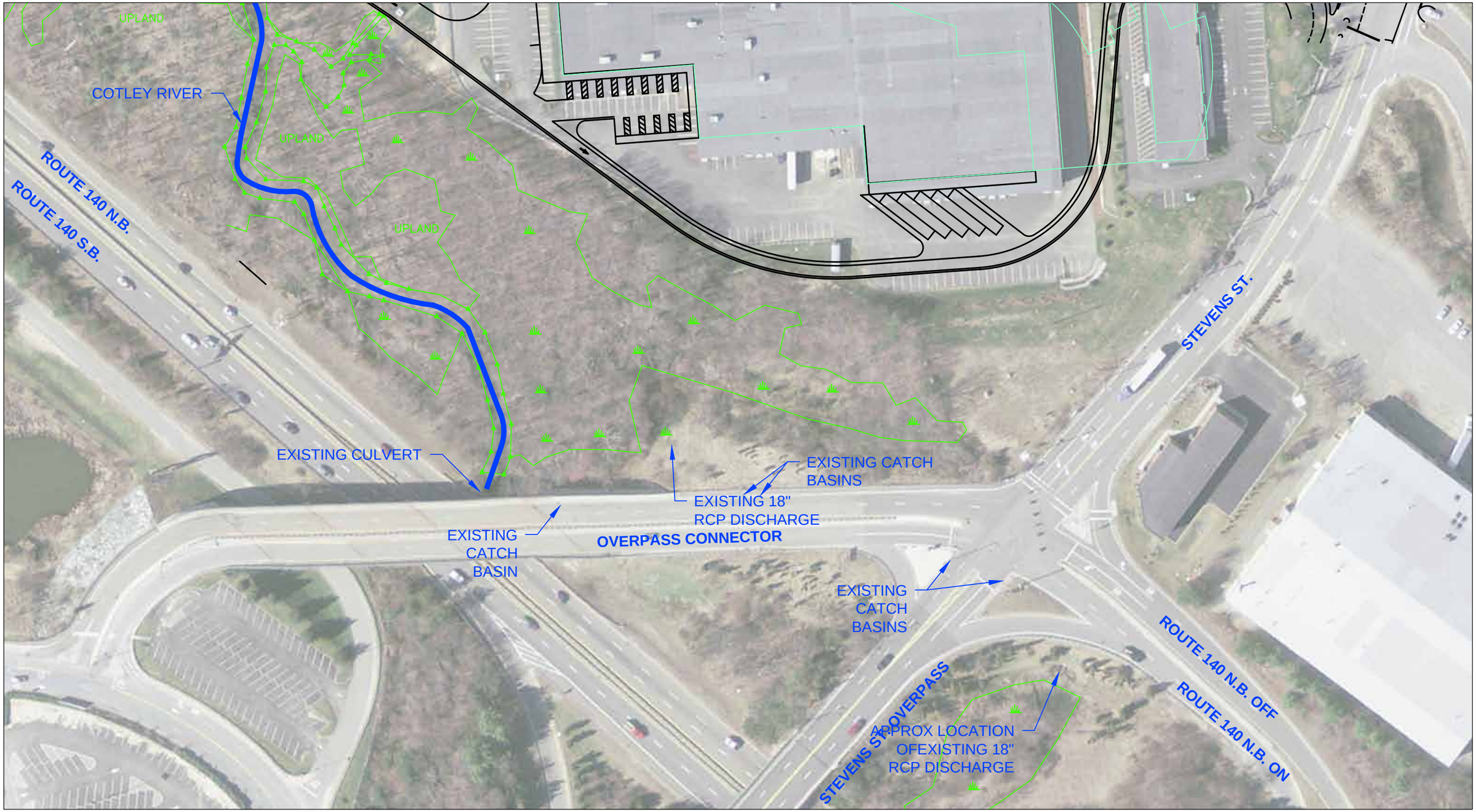
Figure 7.3-2

Existing Drainage Design - Route 24 NB and SB Ramps/County Street (Route 140)



SOURCE: Epilson Associates, Inc.

Figure 7.3-3
Existing Stormwater Management System at Proposed Route 140 Northbound Entrance Ramp

SECTION 7.4
GEOLOGY AND SOILS

7.4.1 TOPOGRAPHY

According to the 7.5-minute U.S. Geological Survey (USGS) Taunton and Assonet Topographic Quadrangle maps, the topographic relief of the Project Site ranges from approximately six feet above mean sea level (MSL) at Middleboro Avenue to approximately 18 feet MSL near the intersection of O'Connell Way and Stevens Street. Topography generally slopes in a westerly direction across the majority of the Project Site from Stevens Street toward the Cotley River. The extreme western portion of the site slopes eastward toward the Cotley River. The Cotley River flows in a westerly direction along the southern portion of the site roughly parallel to Route 140 before turning northward parallel to Route 24. The Cotley River flows through a culvert beneath the existing railroad tracks and eventually into Barstows Pond located to the north and the Taunton River located approximately 2,000 feet northeast of the site. The Cotley River exhibits some downcutting along its banks, which represents the steepest slopes within the Project Site, these areas are limited to the southwestern portion of the project site, and some offsite areas.

With regard to off-site locations where roadway improvement work is proposed, the area immediately adjacent to the Route 140/Stevens Street interchange and Route 140/Route 24 interchanges are artificially constructed filled landforms and support adjacent steep slopes. Land along Route 24, Route 140, Stevens Street, and Middleborough Avenue is generally broad and flat, similar to the Project Site. General topographic relief ranges from 15 feet MSL to 30 feet MSL. See **Figure 7.2-3** above, USGS Locus Map.

7.4.2 SOILS

The General Soil Map Units mapped by the United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) within the Study Area are depicted on **Figure 7.4-1**, Soil Map. A summary of the predominant soil associations within the Study Area from the Soil Survey of Bristol County is provided on **Table 7.4-1** below. The southern portion of the Study Area is generally managed or developed land within and adjacent to the LUIP. The portion of the Study Area north of the railroad tracks comprises an early successional upland field east of the Cotley River. This field does not appear to be currently maintained for active agricultural uses including crops or hay; although given the lack of woody vegetation; it does appear to be mowed on a semi-regular basis.

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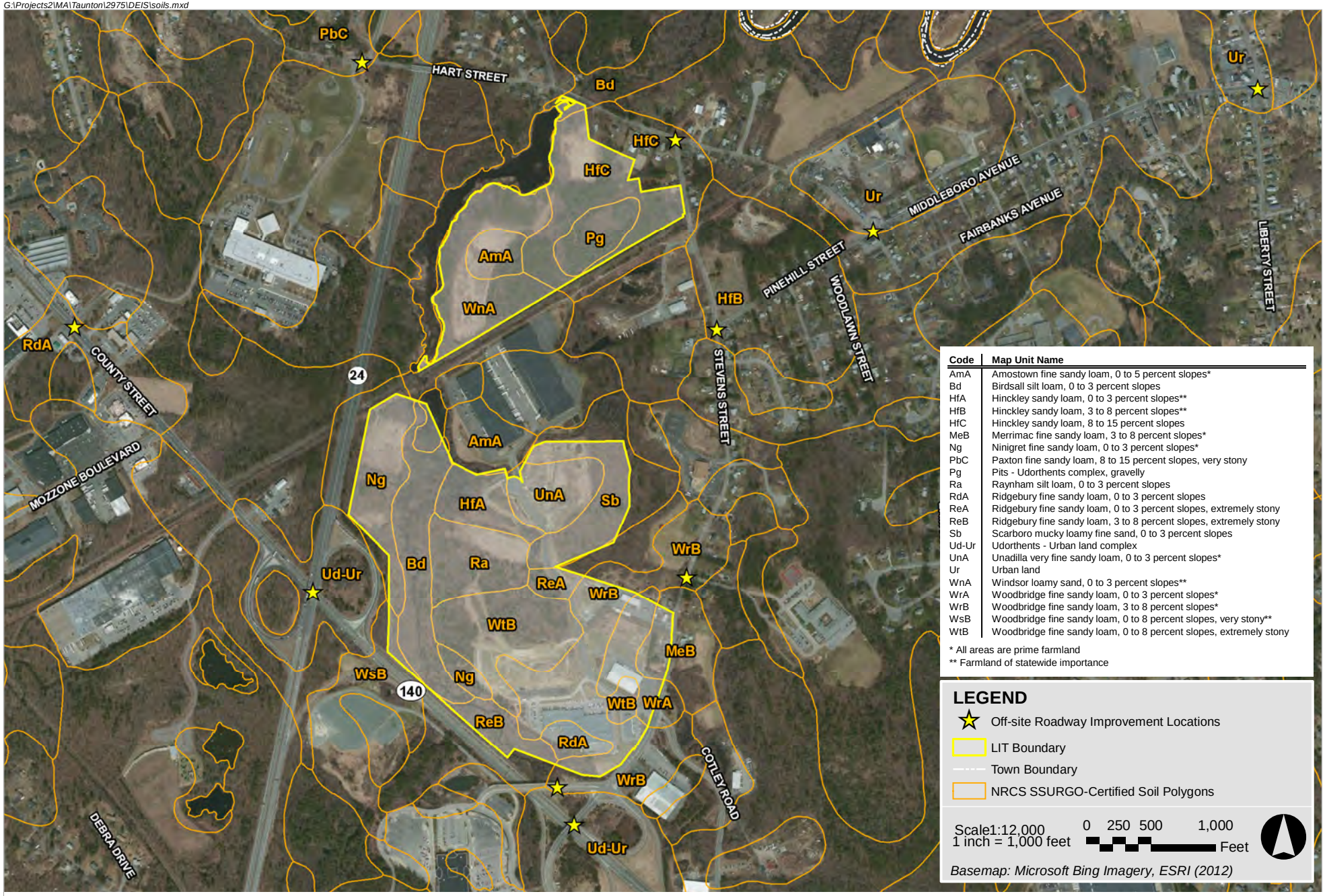

Code	Map Unit Name
AmA	Amostown fine sandy loam, 0 to 5 percent slopes*
Bd	Birdsall silt loam, 0 to 3 percent slopes
HfA	Hinckley sandy loam, 0 to 3 percent slopes**
HfB	Hinckley sandy loam, 3 to 8 percent slopes**
HfC	Hinckley sandy loam, 8 to 15 percent slopes
MeB	Merrimac fine sandy loam, 3 to 8 percent slopes*
Ng	Ninigret fine sandy loam, 0 to 3 percent slopes*
PbC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony
Pg	Pits - Udorthents complex, gravelly
Ra	Raynham silt loam, 0 to 3 percent slopes
RdA	Ridgebury fine sandy loam, 0 to 3 percent slopes
ReA	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony
ReB	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
Sb	Scarboro mucky loamy fine sand, 0 to 3 percent slopes
Ud-Ur	Udorthents - Urban land complex
UnA	Unadilla very fine sandy loam, 0 to 3 percent slopes*
Ur	Urban land
WnA	Windsor loamy sand, 0 to 3 percent slopes**
WrA	Woodbridge fine sandy loam, 0 to 3 percent slopes*
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes*
WsB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony**
WtB	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

* All areas are prime farmland
** Farmland of statewide importance

SOURCE: Epsilon Associates, Inc.

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Figure 7.4-1
Soils Map

The Project Site contains soils that are considered prime farmland[1] including Merrimac, Ninigret, Woodbridge, Unadilla and Amostown soil series. Soils containing farmland of statewide importance[2] include Hinckley and Woodbridge series within the southern portion of the Project Site and Windsor soils within the northern portion of the Project Site. None of these areas comprise active agricultural land.

The locations where roadway improvements are proposed generally comprise roadway pavement and urban fill (Udorthents).

TABLE 7.4-1
DESCRIPTION OF SOILS WITHIN THE STUDY AREA

Map Unit[3]	Map Unit Name	General Soil Description	Drainage Classification	Hydric Soil
Project Site (south)				
AmA	Amostown fine sandy loam (0-5% slope)	Very deep soils formed in glacial outwash fine gravel can be found up to 10%.	Moderately well drained	No
Bd	Birdsall silt loam (0-3% slope)	Deep soils, formed in water laid deposits of silt and fine sands	Very poorly drained	Yes
HfA	Hinckley sandy loam ()-3% slope)	Very deep soils formed by glaciofluvial deposits with from 5 to 50% gravels.	Excessively well drained	No
MeB	Merrimac fine sandy loam (3-8% slope)	Very deep soils formed in glacial outwash. Rock fragments can range from 10 to 50%.	Somewhat excessively drained	No
Ng	Ninigret fine sandy loam (0-3% slope)	Very deep stratified glacial outwash (fine loamy over sand/gravel)	Moderately well drained	No
Ra	Raynham silt loam (0-3% slope)	Very deep silty glaciolacustrine deposits	Poorly drained	Yes
RdA	Ridgebury fine sandy loam (0-3% slope)	Very deep till derived in granite, gneiss, or schist rock. Rock fragments can range from 5 to 25%, stone sized fragments less than 1%, moderately slow infiltration	Somewhat poorly drained to poorly drained	Yes
ReA	Ridgebury fine sandy loam (0-3% slope), extremely stony	Very deep till derived in granite, gneiss, or schist rock. Rock fragments can range from 5 to 25%,stone sized fragments between 3-15%, moderately slow infiltration	Somewhat poorly drained to poorly drained	Yes
ReB	Ridgebury fine sandy loam (3-8% slope), extremely stony	Very deep till derived in granite, gneiss, or schist rock. Rock fragments can range from 5 to 25%, stone sized fragments between 3-15%, moderately slow infiltration	Somewhat poorly drained to poorly drained	Yes

[1] Prime farmland soils means, in part, those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. See http://soils.usda.gov/technical/handbook/contents/part622.html.

[2] State or local important farmland soils means (in part) those soils that fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber or forage crops. They include those soils that are nearly prime farmland and that economically produce high yields of crops when treated or managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. See http://soils.usda.gov/technical/handbook/contents/part622.html.

[3] Soils indicated in a bold font are designated by USDA-NRCS as Prime or State/Locally Important soils.

TABLE 7.4-1
DESCRIPTION OF SOILS WITHIN THE STUDY AREA (CONTINUED)

Map Unit[4]	Map Unit Name	General Soil Description	Drainage Classification	Hydric Soil
Project Site (north)				
Sb	Scarboro mucky loamy fine sand (0-3% slope)	Very deep sandy glaciofluvial deposits dominated by organic material.	Very poorly drained	Yes
UnA	Unadilla very fine sandy loam (0-3% slope)	Very deep, silty lacustrine deposits found on terraces	Well drained	No
WrA	Woodbridge fine sandy loam (0-3% slope)	Soils moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments.	Moderately well drained	No
WrB	Woodbridge fine sandy loam (3-8% slope)	Soils moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments.	Moderately well drained	No
WsB	Woodbridge fine sandy loam (3-8% slope), very stony	Soils moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments. Stone sized fragments between 0.1 and 3%.	Moderately well drained	No
WtB	Woodbridge fine sandy loam (3-8% slope), extremely stony	Soils moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments. Stone sized fragments between 3-15%.	Moderately well drained	No
AmA	Amostown fine sandy loam (0-5% slope)	Very deep soils formed in glacial outwash fine gravel can be found up to 10%.	Moderately well drained	No
Bd	Birdsall silt loam (0-3% slope)	Deep soils, formed in water laid deposits of silt and fine sands	Very poorly drained	Yes
HfC	Hinckley sandy loam (8-15% slope)	Very deep soils formed by glaciofluvial deposits with from 5 to 50% gravels.	Excessively well drained	No
Pg	Pits-Udorthents complex	Soils dominated by man-manipulated soils and gravel/sand mining operations.	Well drained	No
WnA	Windsor loamy sand (0-3% slope)	Very deep sandy outwash deposits with up to 10% gravel	Excessively well drained	No
Off-site (Stevens Street & Route 140)				
ReB	Ridgebury fine sandy loam (3-8%)	Very deep till derived in granite, gneiss, or schist rock. Rock fragments can range from 5 to 25%, moderately slow infiltration	Somewhat poorly drained to poorly drained	Yes
PaB	Paxton fine sandy loam (3-8%)	Very deep soils formed in lodgment till.	Well drained	No
WrB	Woodbridge fine sandy loam (3-8%)	Soils moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments.	Moderately well drained	No
Ud-Ur	Udorthents – Urban land complex	Soils dominated by man-manipulated soils.	Well drained	No
Off-site (Route 140 & Route 24)				
WrB	Woodbridge fine sandy loam (3-8%)	Moderately deep to densic contact formed in lodgment till can have up to 34% rock fragments.	Moderately well drained	No
Ud-Ur	Udorthents – Urban land complex	Soils dominated by man-manipulated soils.	Well drained	No

[4] Soils indicated in a bold font are designated by USDA-NRCS as Prime or State/Locally Important soils.

7.4.3 GEOLOGIC SETTING, MINERAL AND PALEONTOLOGICAL RESOURCES

The Study Area is located entirely within the Narragansett Basin, which is composed of sedimentary rock of Upper and Middle Pennsylvanian age.[5] Rocks generally consist of sandstone, graywade, shale and conglomerate, with minor beds of meta-antracite (coal). Generally, bedrock is found deep, under subsequent glacial deposits. The Rhode Island Formation, a subset of the Narragansett Basin, is the only bedrock outcrop within the general vicinity of the site; which occurs in isolated outcrops within the area. It is likely that large boulders found along the southern portion of the Cotley River, as it flows onto the Project Site, are associated with the Rhode Island Formation outcrops.

The surficial geology of the Study Area consists of glacial deposits on nearly level to rolling topography (see **Figure 7.4-2**, Surficial Geology Map). According to Geology of the Taunton Quadrangle, Bristol and Plymouth Counties, Massachusetts, Geological Survey Bulletin 1163-D surficial geology within the vicinity of the site consists of glacial fluvial and till deposits. These sediments were left by the glaciers as they advanced through the area and as the ice retreated. Portions to the west of the Cotley River generally consist of till deposits while the area east of the Cotley River consists of glacial-fluvial lake bottom sediments. The till deposits consist of an unsorted, unstratified and heterogeneous mixture of clay to boulder size particles. These glacial-fluvial sediments were deposited within lake bottoms as the lakes shallowed and disappeared and consist of stratified sand and gravel deposited from glacial melt-water. A thin finger of alluvium, deposited from past flooding events, is located along the western portion of the Cotley River.

No active or relict fault lines are mapped within the general vicinity of the Project Site or the off-site roadway improvement locations according to the Bedrock Geologic Map of Massachusetts.

[5] See Bedrock Geologic Map of Massachusetts, edited by E-an Zen and published in 1983.

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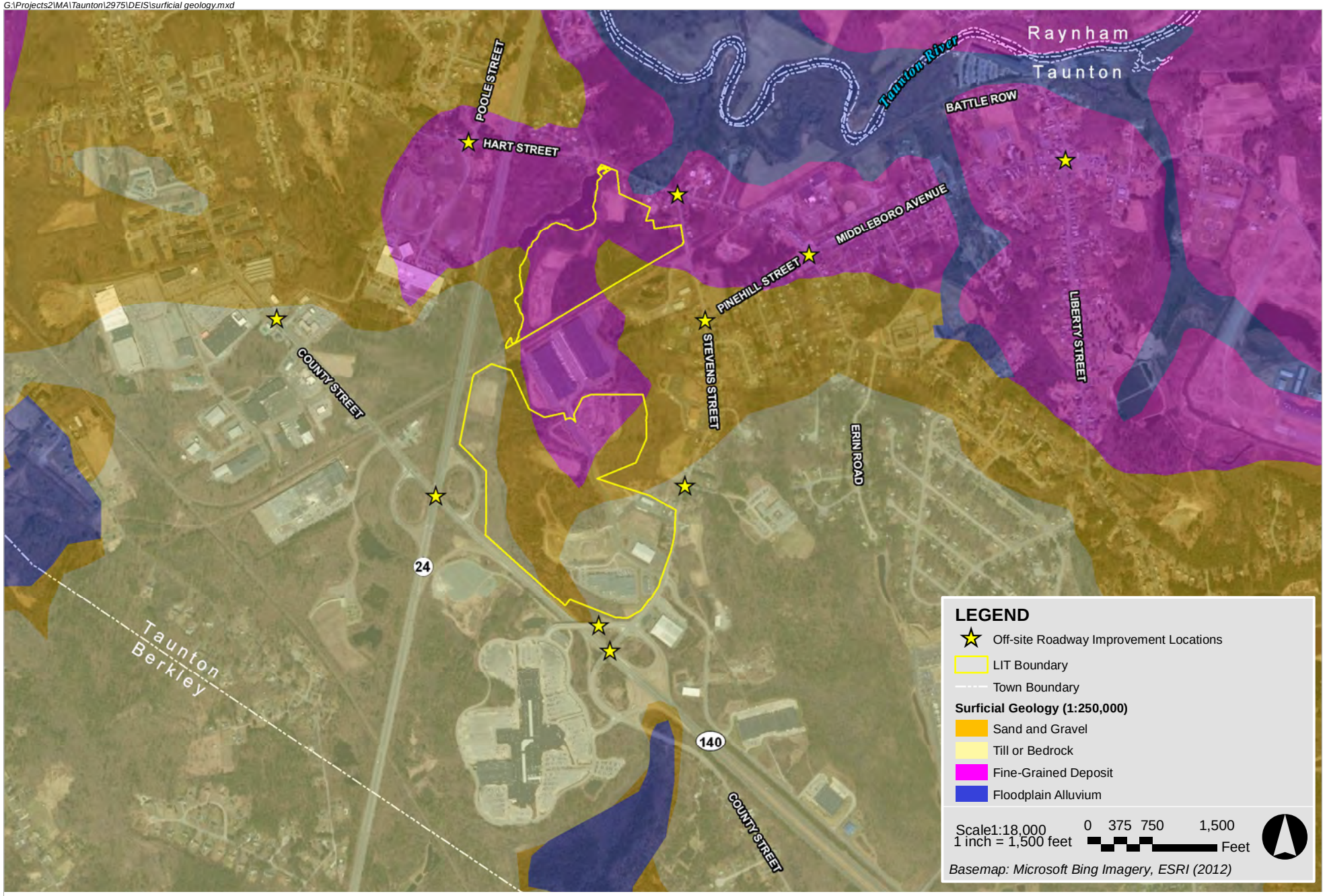

SOURCE: Epsilon Associates, Inc.

Figure 7.4-2
Surficial Geology Map

SECTION 7.5
RARE SPECIES AND WILDLIFE HABITAT

This section provides an overview of the habitat types and associated wildlife and vegetation communities contained within the Study Area.

7.5.1 PROJECT SITE

Approximately 30 percent of the area south of the railroad tracks within the Project Site is currently developed. This includes roadways, parking areas, and buildings. These developed areas do not provide significant wildlife habitat nor do they contain significant plant communities beyond grassed areas and other landscaped areas.

The undeveloped areas of the Project Site are primarily located north of the railroad tracks and adjacent to the Cotley River. This area contains a mix of upland, wetland, and riparian communities. These areas likely provide suitable habitat for a variety of generalist wildlife species. In addition to forested, scrub/shrub, emergent and open water wetlands associated with the Cotley River, wildlife diversity in the Project area is also likely enhanced by the presence of mature upland forests and old field communities, particularly north of the railroad tracks.

The Cotley River and the adjoining riparian habitat is a primary habitat feature on the Project Site. The river flows for approximately 1.2 miles in the western portion of the Project Site to Barstows Pond at the northernmost extent of the Project Site. Several smaller unnamed intermittent streams flow into it within the Project Site and the channel is directed through multiple manmade structures (i.e., culvert, railroad bridge). The channel becomes undefined where it enters a large scrub-shrub and emergent wetland located south of the railroad tracks and again north of the railroad where it enters Barstows Pond. The riparian corridor immediately adjacent to the river is almost entirely forested within the Project Site, dominated by red maple, white pine and black tupelo (*Nyssa sylvatica*) interspersed with swamp white oak (*Quercus bicolor*), American elm (*Ulmus americana*) and upland oaks and hickories (*Carya* spp.) exhibiting morphological adaptations to wet conditions. The understory is varied, generally dominated by sweet pepperbush, highbush blueberry, viburnums, dogwoods, greenbriar, poison ivy and hydrophyte fern species. There is good vertical and horizontal habitat diversity and microhabitat features associated with the Cotley River and adjoining wetlands and floodplain habitats.

Old field/early successional plant communities south of the railroad tracks are limited to one field between O'Connell Way and the Cotley River. North of the railroad, there are two more expansive open field communities. Based on plant species composition (i.e. the dominance of herbaceous plant species and the general absence of woody plant species), it is assumed these fields are mowed periodically to curtail the establishment and growth of woody plants. As a consequence, these open old field communities likely provide suitable habitat for common garter snakes (*Thamnophis sirtalis*) and other

snakes and small mammals including mice, voles and cottontail rabbits *(Sylvilagus spp)*. Accordingly, these plant communities serve as potential hunting grounds for such birds of prey as red-tailed hawks (*Buteo jamaicensis*), among others.

The upland forests within the Project Site, dominated by oaks (*Quercus* spp.), red maples (*Acer rubrum*), birches (*Betula* spp.) and white pine (*Pinus strobus*) provide diverse ecological niches for wildlife, particularly with respect to food sources and breeding/nesting sites. Regarding acorn-producing oaks, Martin, Zim and Nelson (1951) state that "Acorns rate a position at, or very near, the top of the wildlife food list, not so much because they are a preferred food item but because they constitute a good and abundantly available staple - the staff of life for many wildlife species." Wildlife species that feed upon acorns include white-tailed deer *(Odocoileus virginianus)*, raccoon *(Procyon lotor)* gray squirrel (*Sciurus carolinensis*), Eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), blue jay (*Cyanocitta cristata*), white-breasted nuthatch (*Sitta carolinensis*), tufted titmouse (*Baeolophus bicolor*) and red-bellied woodpecker (*Melanerpes carolinus*), among others.

The wetlands and riparian areas on the Project Site provide suitable wildlife habitat within the context of the greater suburban system in which the Study Area is located. There is good vertical and horizontal diversity and micro-habitat features in the form of pits and mounds topography, burrowable soils, snags, shruv thickets, food plants, and woody debris, throughout. From the omnivorous Eastern coyote *(Canis latrans*), red fox *(Vulpes fulva)*, opossum *(Didelphis marsupialis)*, raccoon *(Procyon lotor)* and striped skunk *(Mephitis mephitis)*, to the herbivorous white-tailed deer *(Odocoileus viginianus)*, woodchuck *(Marmota monax)* and meadow vole *(Microtus pennsylvanicus)*, and from birds of prey and wild turkeys *(Meleagris gallopavo)* to garter snakes *(Thamnophis sirtalis)*, snapping turtles *(Chelydra s. serpentina)*, wood frogs *(Rana sylvatica)* and green frogs *(Rana clamitans)*, at least some of these species and others are likely associated with the project areas wetlands and upland communities. The seeds, buds, flowers, twigs and foliage of maples (e.g., red maple common to both wetlands and uplands) also serve as food for numerous wildlife species, including white-tailed deer (twigs/foliage), Eastern chipmunk (seeds), red fox (seeds/flowers/bark/twigs), white-footed mouse (seeds) and evening grosbeak (*Coccothraustes vespertinus*; seeds/buds/flowers). Gray and yellow birch (*Betula populifolia* and *Betula allegheniensis*, respectively) are important wildlife food sources, as well. Birch twigs and foliage are consumed by eastern cottontail, and birch seeds by black-capped chickadees (*Poecile atricapilla*) and tree sparrows (*Spizella arborea*). As described by Martin, Zim and Nelson (1951), "Pines rank near the very top in importance to wildlife". Species that feed on white pine seeds, bark foliage or twigs include white-tailed deer, red squirrel (*Tamiasciurus hudsonicus*), eastern cottontail, white-footed mouse, white-breasted nuthatch and black-capped chickadee.

As noted above, red maple is utilized for food by several species of wildlife. This tree is the dominant component of the forested wetlands in the project area. Other plant species common to forested and/or scrub/shrub wetlands include highbush blueberry (*Vaccinium corymbosum*), various species of viburnum (*Viburnum* spp.), silky dogwood (*Cornus amomum*), greenbrier (*Smilax rotundifolia*) and winterberry (*Ilex verticillata*). Collectively, these and other wetland plant species provide sources of food for wildlife, such as white-tailed deer, red fox, Eastern cottontail, cardinal (*Cardinalis cardinalis*), evening grosbeak,

cedar waxwing (*Bombycilla cedrorum*), bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), mockingbird (*Mimus polyglottos*), Eastern kingbird (*Tyrannus tyrannus*) and purple finch (*Carpodacus purpureus*), among many others.

Lastly, it should be noted that many of the plant species associated with wetlands and uplands in the project area serve as nectar plants for bees, butterflies and hummingbirds; and as larval host/food plants for a wide variety of butterflies (New England Wild Flower Society, 2000).

7.5.2 OFF-SITE ROADWAY IMPROVEMENT LOCATIONS

Nine off-site roadway locations have been identified for traffic improvements and mitigation measures related to the overall Project. Principal among these are the Route 24/Route 140 interchange and the Route 140/Stevens Street interchange. The remaining seven roadway locations have been selected for lesser-scale roadway improvements (signage, pavement markings, signalization work, geometric modifications, etc). The locations of these areas are depicted on **Figure 7.2-3 above**, USGS Locus Map.

Overall, the dominant environmental characteristic of these off-site locations is their proximity to major highways and/or smaller residential roads. With the exception of the proposed Route 140 Northbound Entrance Ramp at Stevens Street, the work areas associated with these off-site traffic improvements are anticipated to generally consist of the existing paved roadway and adjacent roadway embankments, which are typically maintained as mowed grassed areas. The wildlife habitat value and connectivity of these areas is limited by the nearness of adjacent high traffic volume roadways and, in some cases, the presence of highway right-of-way fencing. The vegetation at, or adjacent to, many of these locations is dominated by invasive species including phragmites, (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*) and invasive woody shrubs such as multiflora rose (*Rosa multiflora*), autumn olive (*Umbellata eleagnus*) and honeysuckle (*Lonicera* spp.). Dense growth of vine species including oriental bittersweet (*Celastrus orbiculatus*), greenbriar and poison ivy is also common at these roadway locations.

The wetland habitats proximate to these traffic improvement locations may generally be characterized as stormwater drainage features (i.e., ditches, toe-of-slope vegetated swales, detention basins) created by the construction of roadways and stormwater drainage structures. They typically exhibit variable, flashy hydrology in rapid response to storm events and the primary hydrologic input is stormwater runoff from road drainage structures and paved areas.

As a result of the environmental factors described above, wildlife utilization of these traffic improvement locations is likely to be minimal and limited to transient use by generalist species such as whitetail deer, squirrels, raccoon, skunk, and other small mammals as well as song birds and birds of prey. The wetland habitats may be suitable for turtle and frog species such as snapping turtle (*Chelydra s. serpentina*), green frog (*Rana clamitans*) and bullfrog (*Rana catesbeiana*).

A representative list of wildlife species for the Study Area is provided below in **Table 7.5-1**.

TABLE 7.5-1
REPRESENTATIVE LIST OF WILDLIFE SPECIES LIKELY TO BE FOUND IN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
MAMMALS	
Whitetail Deer	*Odocoileus virginianus*
Coyote	*Canis latrans*
Red Fox	*Vulpes fulva*
Opossum	*Didelphis virginiana*
Striped Skunk	*Mephitis mephitis*
Raccoon	*Procyon lotor*
Woodchuck	*Marmota monax*
Eastern Cottontail	*Sylvilagus floridanus*
Gray Squirrel	*Sciurus carolinensis*
Red Squirrel	*Tamiasciurus hudsonicus*
Eastern Chipmunk	*Tamias striatus*
Star-nosed Mole	*Condylura cristata*
Shorttail Shrew	*Blarina brevicauda*
White-footed Mouse	*Peromyscus leucopus*
Meadow Vole	*Microtus pennsylvanicus*
House Mouse	*Mus musculus*
BIRDS	
Canada Goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Great-horned Owl	*Bubo virginianus*
Barred Owl	*Strix varia*
Wild Turkey	*Meleagris gallopavo*
American Woodcock	*Scolopax minor*
Mourning Dove	*Zenaida macroura*
Red-bellied Woodpecker	*Melanerpes carolinus*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Eastern Phoebe	*Sayornis phoebe*
Eastern Kingbird	*Tyrannus tyrannus*
Yellow-throated Vireo	*Vireo flavifrons*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachythynchos*
Tree Swallow	*Tachycineta bicolor*
Black-capped Chickadee	*Poecile atricapilla*
Tufted Titmouse	*Baeolophus bicolor*
White-breasted Nuthatch	*Sitta carolinensis*
Eastern Bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
Blue-winged Warbler	*Vermivora pinus*
Yellow Warbler	*Dendroica petechia*
Black-and-white Warbler	*Mniotilta varia*
Common Yellowthroat	*Geothlypis trichas*
Canada Warbler	*Wilsonia canadensis*
Eastern Towhee	*Pipilo erythrophthalmus*
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*

TABLE 7.5-1
REPRESENTATIVE LIST OF WILDLIFE SPECIES LIKELY TO BE FOUND IN THE STUDY AREA (CONTINUED)

COMMON NAME	SCIENTIFIC NAME
BIRDS	
Field Sparrow	*Spizella pusilla*
Song Sparrow	*Melospiza melodia*
Swamp Sparrow	*Melospiza georgiana*
White-throated Sparrow	*Zonotrichia albicollis*
Dark-eyed Junco	*Junco hyemalis*
Northern Cardinal	*Cardinalis cardinalis*
Red-winged Blackbird	*Agelaius phoeniceus*
Common Grackle	*Quiscalus quiscula*
Baltimore Oriole	*Icterus galbula*
Purple Finch	*Carpodacus purpureus*
American Goldfinch	*Carduelis tristis*
Evening Grosbeak	*Coccothraustes vespertinus*
REPTILES	
Common Snapping Turtle	*Chelydra s. serpentina*
Painted Turtle	*Chrysemys picta*
Northern Water Snake	*Nerodia s. sipedon*
Northern Brown Snake	*Storeria d. dekayi*
Common Garter Snake	*Thamnophis sirtalis*
Eastern Smooth Green Snake	*Liochorophis vernalis*
Eastern Milk Snake	*Lampropeltis t. triangulum*
AMPHIBIANS	
Red-spotted Newt	*Notophthalmus v. viridescens*
Northern Redback Salamander	*Plethodon cinereus*
American Toad	*Bufo a. americanus*
Northern Spring Peeper	*Pseudacris c. crucifer*
Gray Treefrog	*Hyla versicolor*
Bullfrog	*Rana catesbeiana*
Green Frog	*Rana clamitans melanota*
Wood Frog	*Rana sylvatica*

7.5.3 THREATENED AND ENDANGERED PLANT & WILDLIFE SPECIES

According to available U.S. Fish and Wildlife Service (USFWS) data there are no known federally-listed species located on or near the Study Area.[1]

According to the Massachusetts Natural Heritage Atlas (MassGIS, 2008), prepared by the NHESP, the Study Area does not contain any areas of Priority Habitat or Estimated Habitat for state-listed species. See **Figure 7.2-4** above, NHESP Rare Species and Vernal Pool Map.

7.5.4 ECOSYSTEMS AND BIOLOGICAL COMMUNITIES

The Natural Heritage & Endangered Species Program has produced biodiversity conservation plans, entitled "BioMap" and "Living Waters." These plans and associated mapping were not produced at a scale that could be used for regulatory purposes; rather, they were designed to guide biodiversity

[1] U.S. Fish and Wildlife Service (USFWS). 2012. Information, Planning, and Conservation System (IPaC) Initial Project Scoping. Available at http://ecos.fws.gov/ipac/.

conservation in the state by focusing land protection efforts on areas that are critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems. As part of this program, NHESP has designated areas in the Commonwealth as BioMap Core Habitats, BioMap Critical Natural Landscapes and Living Waters Critical Supporting Watersheds, among other categories. No part of the Project Site or associated off-site traffic improvement locations are situated within any mapped NHESP Biomap or Living Waters areas. There are areas mapped as Core Habitats, BioMap Critical Natural Landscapes and Living Waters Critical Supporting Watersheds located north of the Project Site associated with the Taunton River. See **Figure 7.5-1**, Ecosystems Map, for additional detail.

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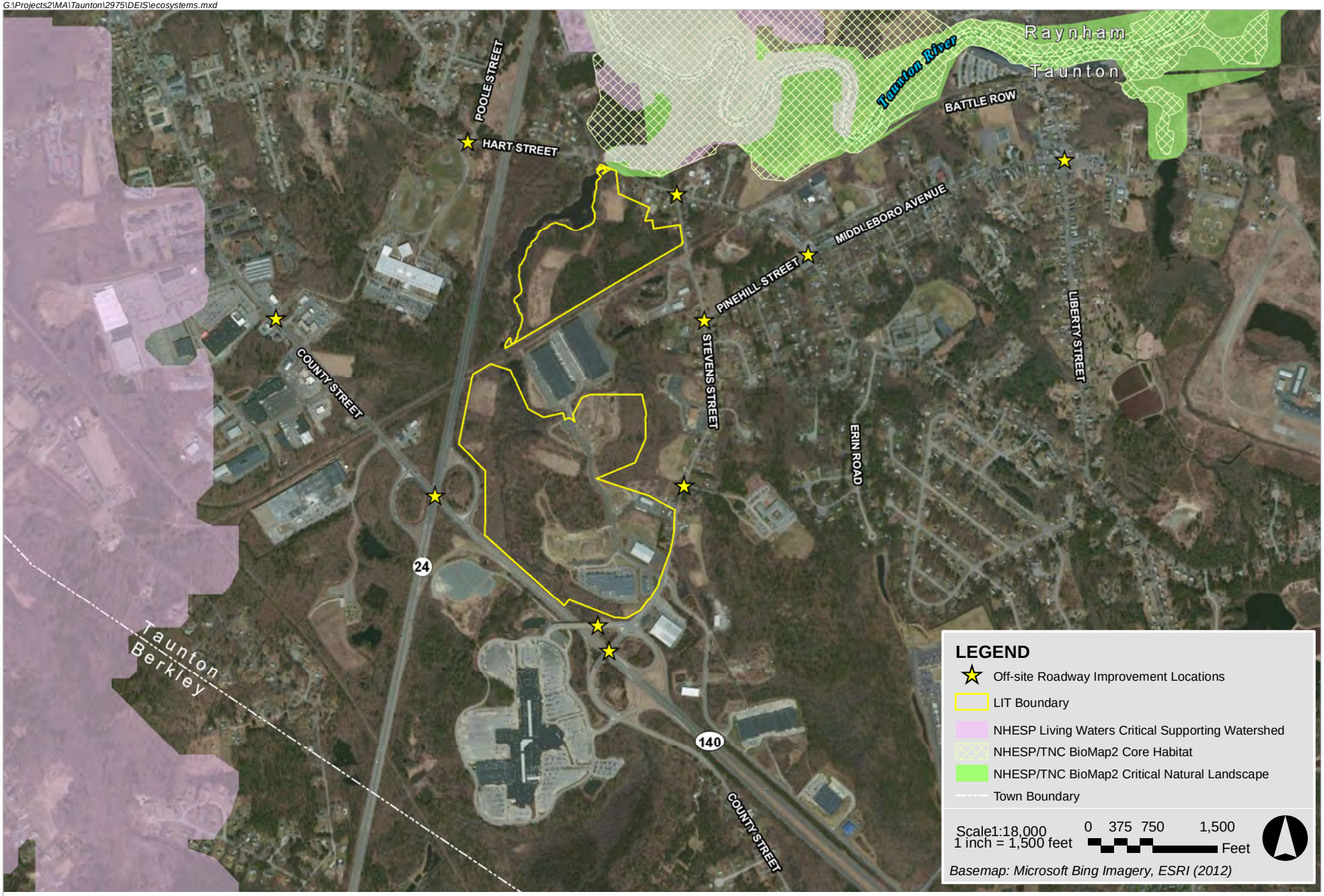


SOURCE: Epsilon Associates, Inc.

Figure 7.5-1
Ecosystems Map

SECTION 7.6
HAZARDOUS MATERIALS

7.6.1 PHASE I SITE ASSESSMENT

An ASTM International Phase I Environmental Site Assessment (ESA) has been performed for the Project Site in Taunton.1 The three residential parcels at 61, 65, and 67 Stevens Street were not included in the Phase I ESA but have since been evaluated as part of this DEIS. These parcels are identified as parcels 17, 15, and 16, respectively, on **Figure 2.1-3**. Together, the ESA and review of the residential properties combined is termed for purposes of this discussion as the "Hazardous Materials Review" (HMR).

The HMR identified five recognized environmental conditions (RECs) for Project Site. An REC is defined by ASTM as evidence of a past, current, or future potential release of oil and/or hazardous materials (OHM). These RECs are as follows:

- The barn and shed located on the northern portion of the Project Site(Parcel 13a in **Figure 2.1-3**) appear to be old enough that there may be lead paint and asbestos containing materials present. The amount of debris and dilapidated nature of both buildings prevented investigators from entering and examining the interiors of the buildings. Metal debris, gas cans, and three, unlabeled, 55-gallon drums were also observed in the vicinity of the buildings.
- Dumping of old building materials and trash has occurred sporadically throughout the undeveloped and vacant areas of the Project Site.
- 57 Stevens Street abuts the Project Site. It appears that 57 Stevens Street contains an auto salvage yard. 57 Stevens Street also appears to contain an approximately 500-gallon aboveground storage tank (AST), an approximately 60-gallon tank and a compressed gas tank, all tipped on their sides. It has not been confirmed if these items contained any liquids or if they were empty.
- On November 14, 1988, a spill of gasoline was released to soil on the residential property at 61 Stevens Street on the Project Site (Parcel 17 in **Figure 2.1-3**). The case was closed by MassDEP. No additional information is available about the release. It is unlikely that the release impacted other portions of the Project Site.
- Two releases of OHM have been reported on parcels abutting the Project Site. Both releases achieved regulatory closure with MassDEP through Class A-2 Response Action Outcome (RAO) Statements. A Class A-2 RAO indicates that a permanent solution has been achieved but contamination has not been reduced to background. The releases are discussed in more detail below.

On November 17, 1997, a semi-trailer traveling northbound on Route 24 was involved in an accident and released approximately 120-gallons of diesel fuel to the roadway. The Massachusetts Department of Environmental Protection (MassDEP) assigned Release Tracking Number (RTN) 3-13494 to the release.

[1] *Phase I Environmental Site Assessment LibertyUnion Industrial Park, Taunton, Massachusetts*, GEI Consultants, June 29, 2012. The ESA is available for review at the BIA's Eastern Regional Office during normal business hours.

While the release was mostly contained to pavement, some diesel fuel spilled onto an adjacent embankment. Frank Corp Environmental Services (Frank Corp), of New Bedford, Massachusetts, excavated this area to a depth of 2 to 3 feet. One composite soil sample taken from the limits of excavation was submitted to Groundwater Analytical, of Buzzards Bay, Massachusetts, for analysis of extractable petroleum hydrocarbons (EPH). Target EPH compounds were detected above the laboratory reporting limit, but significantly below the applicable reportable concentrations. Groundwater was not encountered during excavation of fuel impacted soil, and consequently was believed to have not been affected by the release. Kaegael Environmental, Inc., of New Bedford, Massachusetts, concluded that a condition of "no significant risk" was appropriate for the Property and submitted a Class A-2 RAO to MassDEP on January 15, 1998.

On March 9, 2007, a truck traveling northbound on Route 24 was involved in an accident and released approximately 100-gallons of diesel fuel to the asphalt breakdown lane, grass slope, and nearby drainage ditch. MassDEP assigned RTN 3-20375 to the release. Frank Corp contained and absorbed the spill using Speedy Dry and Microsorb absorbents, and excavated petroleum impacted soil. Atlantic Environmental Technologies, of New Bedford, Massachusetts, collected four confirmatory soil samples from the base of the excavation, along with two surface water samples and two sediment samples from the drainage ditch. All samples were submitted to Groundwater Analytical, of Buzzards Bay, Massachusetts, for analysis of EPH and volatile petroleum hydrocarbons (VPH). EPH and VPH compounds were detected above the laboratory reporting limit in all of the samples collected, but were below the applicable reportable concentrations. Atlantic Environmental Technologies concluded that a condition of "no significant risk" was appropriate for the Property and submitted an Immediate Response Action Plan and Completion Report and Class A-2 RAO to MassDEP on April 27, 2007.

Information available about the releases did not adequately describe their locations with relation to the Property. As the releases appear to have been limited to an area immediately adjacent to the roadway, it appears that the releases, while adjacent to the Property, were not on it.

No evidence of a current release of OHM was identified during the review of current buildings and operations on the Project Site.

7.6.2 HAZARDOUS MATERIALS ON RAIL LINE

CSX Railroad currently operates two freight trains a day along the track that bisects the development site, one train in each direction. Cargo generally consists of broken glass, non-ferrous metals, steel, fly ash, rock, and lard. CSX does not currently carry any hazardous materials along the right-of-way. This is due, however, to a lack of demand for any such material and not on any prohibition against carrying hazardous materials.

SECTION 7.7
WATER SUPPLY

7.7.1 CITY OF TAUNTON WATER SUPPLY

The City of Taunton supplies water to the Project Site. The City of Taunton receives its water from the Assawompset Pond Complex in Lakeville, Middleborough, Rochester and Freetown, (see **Figure 7.7-1**) and the Dever Wells located in Taunton. Between these two sources, the City of Taunton is authorized to withdraw 7.49 million gallons per day (MGD) of water.

The Assawompset Pond Complex (APC) safely yields 27.5 MGD.[1] Of this amount, the City of Taunton is allowed to withdraw 7.29 MGD and the City of New Bedford is allowed to withdraw the remaining 18.27 MGD.[2] The average day raw water withdrawals from 2007 to 2011 are listed for each community in **Table 7.7-1** below. The available withdrawal remaining is calculated based on total APC withdrawal for each community.

TABLE 7.7-1
AVERAGE DAY RAW WATER WITHDRAWALS BY COMMUNITY

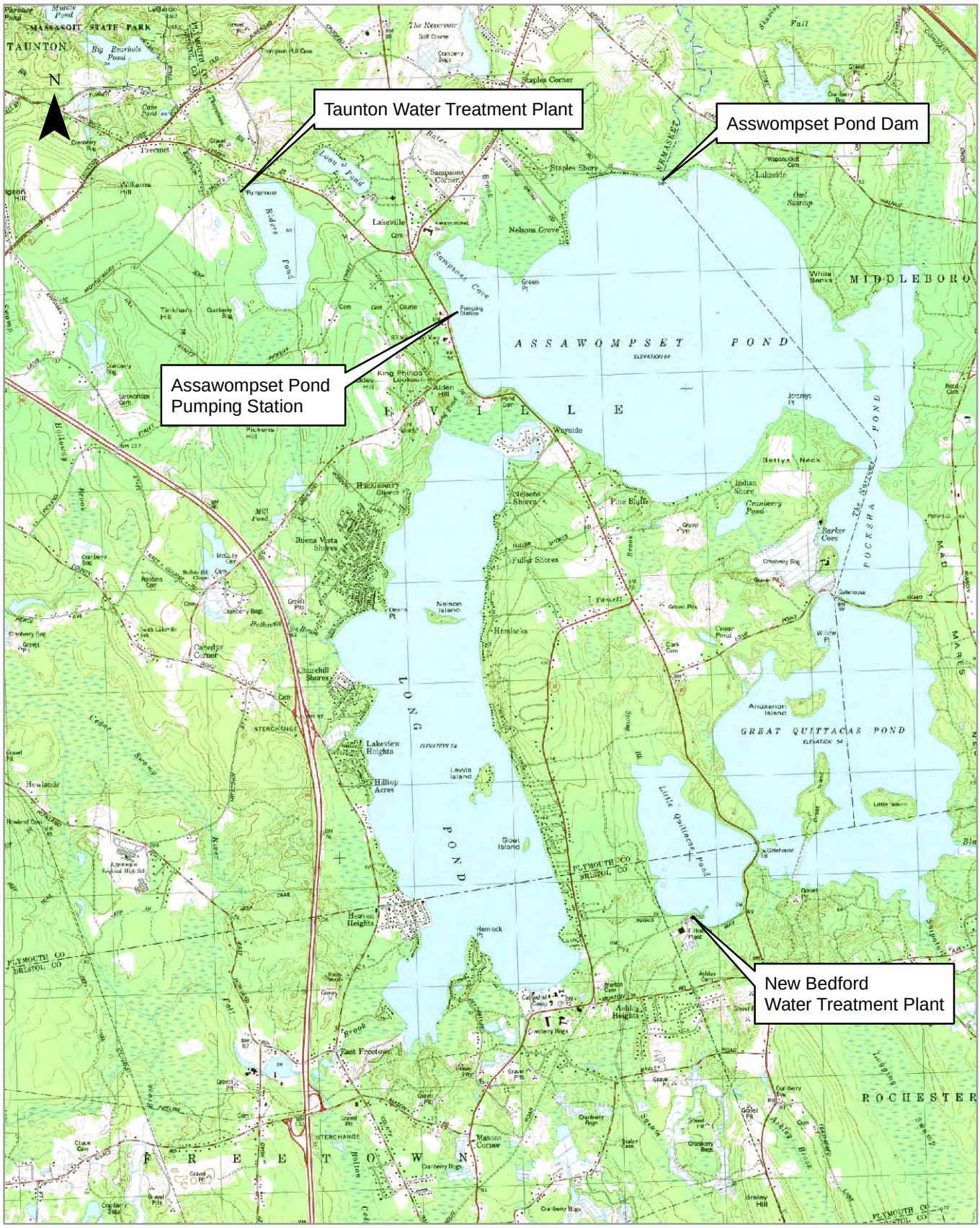
	Taunton		New Bedford	
Year	Average Day Demand* (MGD)	Available Withdrawal Remaining (MGD)	Average Day Demand** (MGD)	Available Withdrawal Remaining (MGD)
2007	6.78	0.51	12.63	5.64
2008	7.20	0.09	11.66	6.61
2009	6.68	0.61	10.80	7.47
2010	6.06	1.23	12.78	5.49
2011	5.79	1.50	12.13	6.14

*City of Taunton MADEP Annual Statistical Reports, for calendar years 2007 thru 2011.
** City of New Bedford MADEP Annual Statistical Reports, for calendar years 2007 thru 2011.

The available withdrawal amounts for the City of Taunton have been generally increasing over the last five years based on a declining average day demand. The average available withdrawal over the last five years is 0.788 MGD.

The City of New Bedford's water withdrawal is from the APC in Rochester. The maximum day demands for each of the last five years are presented in **Table 7.7-2**.

[1] "Investigation of Surplus Safe Yield Available to New Bedford"; Camp, Dresser and McKee; June 1988
[2] Massachusetts Department of Environmental Protection (MADEP) Water Management Act Registrations and Permits for both communities



SOURCE: USGS MAPS MASSGIS

1 Inch = 4,500 Feet

0 2,450 4,900 9,800 14,700 Feet

Figure 7.7-1

Assawompset Pond Complex

TABLE 7.7-2
MAXIMUM DAY DEMANDS – CITY OF NEW BEDFORD

Date	Maximum Day Demand* Millions of Gallons
July 30, 2007	17.85
July 18, 2008	19.99 **
July 18, 2009	15.04
July 12, 2010	22.17 **
July 23, 2011	17.17
Average	18.44 **

* City of New Bedford's Annual Statistical Reports, for calendar years 2007 thru 2011.
**Note: Exceeds maximum withdrawal limit of 18.27 MGD

The City of Taunton's water withdrawal from the APC in Lakeville is treated at the City's Water Treatment Plant (WTP) located at Elders Pond. The WTP has a capacity of 14 MGD. The maximum day demands for each of the last five years along with available WTP capacity are presented in **Table 7.7-3**.

TABLE 7.7-3
MAXIMUM DAY DEMANDS VERSUS AVAILABLE WTP CAPACITY – CITY OF TAUNTON

Date	Maximum Day Demand* Millions of Gallons	Available WTP Capacity Millions of Gallons
September 7, 2007	10.50	3.50
July 18, 2008	11.986	2.014
July 18, 2009	11.986	2.014
July 7, 2010	10.322	3.678
May 18, 2011	11.034	2.966
Average	11.162	2.834

*City of Taunton's Annual Statistical Reports, for calendar years 2007 thru 2011.

In the fall of 2012, the City placed the Dever Well source online. This well supply is located in Taunton and can produce 0.2 MGD on average and 0.48 MGD on a maximum day. This supply will not be treated at the existing WTP in Lakeville and therefore was not considered when evaluating the ability of the existing WTP to meet maximum day demand conditions.

Demand projections for the City of Taunton's Water System were prepared in 2009 by the Massachusetts Department of Conservation and Recreation (DCR) Office of Water Resources. These projections assumed an increasing population, and included additional development in the Myles Standish Industrial Park and development of a new industrial park in Lakeville that would be serviced by the City. The DCR provided two scenarios for the demand projections. The first assumed 65 gallons per capita per day for residential use (RGPCD) and a ten percent unaccounted for water (UAW) rate, the second assumed the current (2009) 59 RGPCD and 12.1 percent UAW. Both projections include service to out-of-town populations in Norton, Raynham, Berkley and Lakeville that are currently serviced by the City, along with water that the City wholesales to the North Dighton Fire District and the Bridgewater Correctional Institute.

Both models have a five percent buffer that accommodates for uncertainty in growth projections. The base service population in 2009 used by the DCR was 57,036. The DCR report summarizes the projected service population and water demand in the years 2015, 2020, 2025, and 2030. A summary of these projections is presented in **Table 7.7-4**. These population and demand projections served as the basis for the increase in Taunton's Water Management Act permit (WMA) with the addition of the Dever wells.

TABLE 7.7-4
DCR SERVICE POPULATION AND DEMAND PROJECTIONS FOR CITY OF TAUNTON

Year	Population	Water Demand Projection 65 RGPCD and 10% UAW (MGD)	Water Demand Projection 59 RGPCD and 12.1% UAW (MGD)
2015	63,262	7.06	6.98
2020	65,120	7.23	7.14
2025	66,676	7.36	7.27
2030	68,232	7.49	7.40

Following the 2009 evaluation by DCR, the Water Management Act Permit for Taunton was updated in 2011. At that time, the City of Taunton was authorized a total withdrawal of 7.49 MGD taken from the APC (7.29 MGD) and the Dever School Wells (0.20 MGD).

7.7.2 WATER SUPPLY SYSTEM SERVING PROJECT SITE

The Project Site receives its water supply from the City of Taunton's water system. **Figure 7.7-2** presents the existing water distribution system within and surrounding the Project Site.

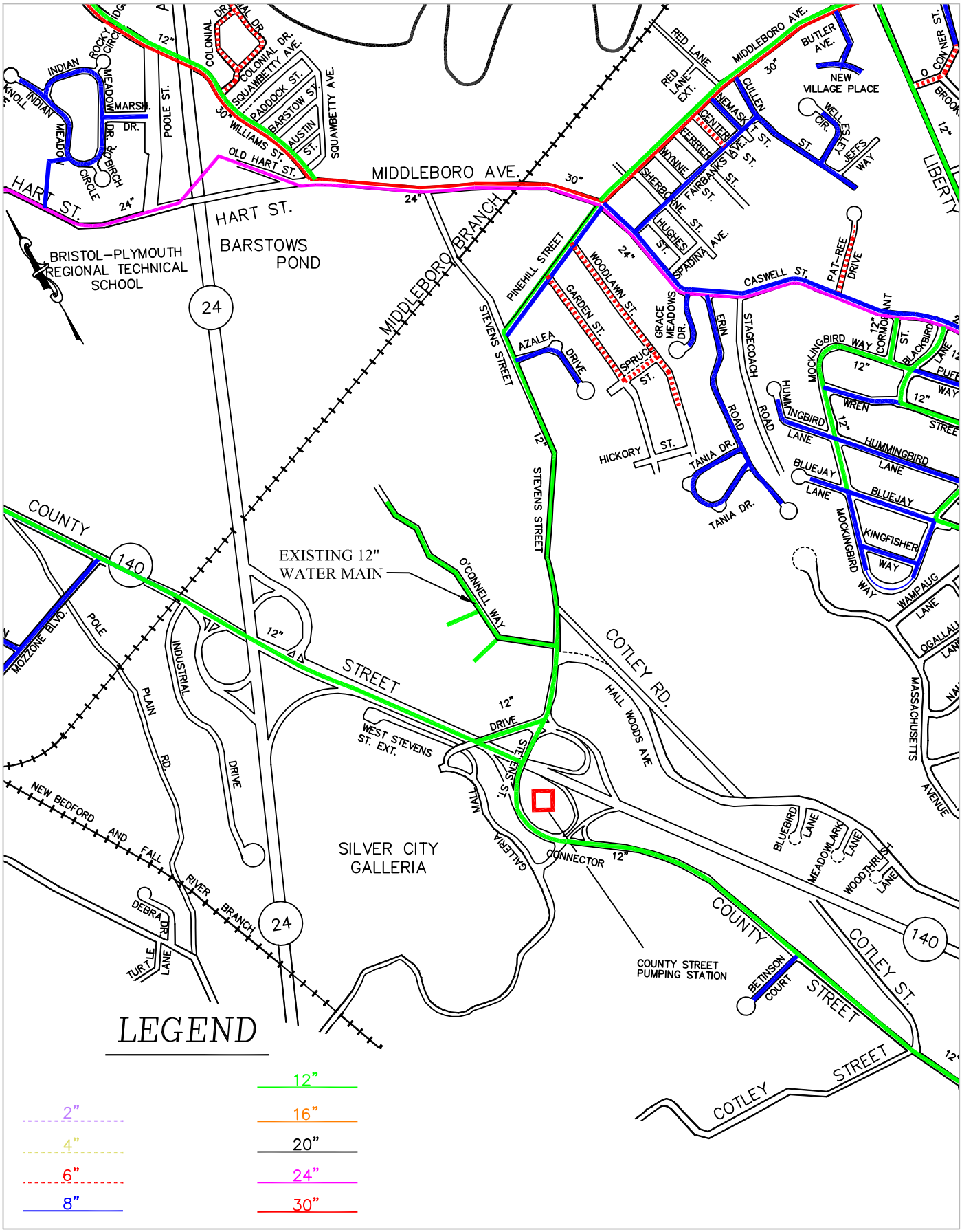
7.7.3 EXISTING DEMAND AT PROJECT SITE

The existing Site includes both occupied and unoccupied land. The current occupied land uses on the Project Site and in the immediate vicinity include a 22,480 square-foot fitness center (Work Out World), 44,100 square feet of office space at 50 O'Connell Way, (2) 175,000 square-foot warehouse buildings known as the Crossroads Commerce Center, and a 137,000 square-foot industrial/office building. The 137,000 square-foot industrial/ office building is vacant. The majority of the existing buildings are serviced from an existing 12-inch water main in Stevens Street. The Crossroads Commerce Center at 220 O'Connell Way as well as 50 and 60 O'Connell Way are serviced from a 12-inch water main located in O'Connell Way. Although the Crossroads Commerce Center is not within the Project Site, maintaining the existing water and sewer connections to this facility will be required. The current water use at these facilities is in **Table 7.7-5**.

TABLE 7.7-5
CURRENT WATER USES WITHIN PROJECT SITE

Property Address/Use Description	Average Water Use 1 year period* Gallons per Day
220 O'Connell Way (Crossroads Commerce Center)	1,531
50 O'Connell Way (Maggiore Industrial Building)	2,365
60 O'Connell Way (Maggiore Industrial Building)	60
73 Stevens Street (Office/Retail, Partial Occupancy)	1,288
71 Stevens Street (Tardie Warehouse Building)	88
61R Stevens Street (Construction Business)	52
65 Stevens Street (Residential)	352
67 Stevens Street (Residential)	52
61F Stevens Street (Residential)	225
O'Connell Way (Non-buildable vacant lot)	0
O'Connell Way Roadway Gap Parcel (Roadway)	0
Stevens Street (Non-buildable vacant lot)	0
Total Existing Water Use	6,013

* Data from Water Bills as provided by the City of Taunton. Data taken between October 2012 and October 2011.



Mashpee Wampanoag Tribe - Fee to Trust Acquisition - Draft EIS ■

SOURCE: City of Taunton, Water Distribution Map, August, 1996
Scale: 1" = 1200'

Figure 7.7-2
Existing Water Distribution System in Vincinity of Project Site

SECTION 7.8
WASTEWATER

7.8.1 CITY OF TAUNTON WASTEWATER TREATMENT

The City of Taunton's wastewater treatment facility (WWTF) is located on West Water Street. The WWTF has a permitted capacity of 8.4 MGD and a peak hourly design capacity of 15 MGD. The WWTF provides advanced secondary treatment with chlorination and dechlorination prior to discharge to the Taunton River. The plant currently receives an average flow of 7.3 MGD from all sources and complies with National Pollutant Discharge Elimination System (NPDES) permit requirements. As part of its Comprehensive Wastewater Management Plan (CWMP), the City of Taunton is planning an expansion and upgrade of the WWTF to receive projected flow increases and comply with more stringent discharge permit requirements. Design of the plant upgrade/expansion is anticipated to begin in 2014, upon effectiveness of a new NPDES discharge permit.

The City of Taunton is currently under a 2005 Massachusetts Department of Environmental Protection (MassDEP) Administrative Consent Order and an EPA Administrative Order to reduce the amount of infiltration and inflow (I/I) entering the sewer system. To achieve I/I reduction compliance, Taunton's current policy is to require new sewer connection applicants to remove five gallons of I/I for every one gallon of proposed wastewater. The City of Taunton has established an I/I removal cost of $5.00 per gallon based on seven projects completed between 2005 and 2011. In lieu of finding and removing I/I sources, applicants may alternatively contribute to the City's I/I removal program at the prescribed rate.

7.8.2 WASTEWATER COLLECTION SYSTEM SERVICING PROJECT SITE

Wastewater generated within the existing Project Site flows by gravity to a small pumping station (150 gallons per minute (GPM)) located at the end of O'Connell Way. The O'Connell Way Pumping Station is owned by the City of Taunton and operated under contract by Veolia Water. Wastewater is pumped via a 4-inch force main to a 10-inch gravity sewer on Stevens Street. Sewer service laterals from existing properties on Stevens street are connected directly to the 10-inch gravity sewer.

The Stevens Street sewer is tributary to the large Red Lane Pumping Station (1,200 GPM), which discharges through a 12-inch force main into a 15-inch gravity sewer on Hart Street. Several 4-inch force mains from pumping stations servicing subdivisions along Hart St. tie directly into the 12-inch force main from the Red Lane PS. The flow data shows that the Red Lane Pumping Station currently operates near its 1,200 GPM capacity. A hydraulic modeling report completed in 2008, identified capacity constraints in the Stevens Street gravity sewer.[1] However, to date, no rehabilitation has been performed. Due to the existing capacity constraints, no flow from any of the Development Alternatives would be discharged into the Stevens Street sewer. Wastewater flow under Alternatives is described in detail in **Section 8.8**.

[1] Stantec Consulting Services, Inc. May 22, 2008. Citywide Sewer System Hydraulic Modeling, City of Taunton, Massachusetts.

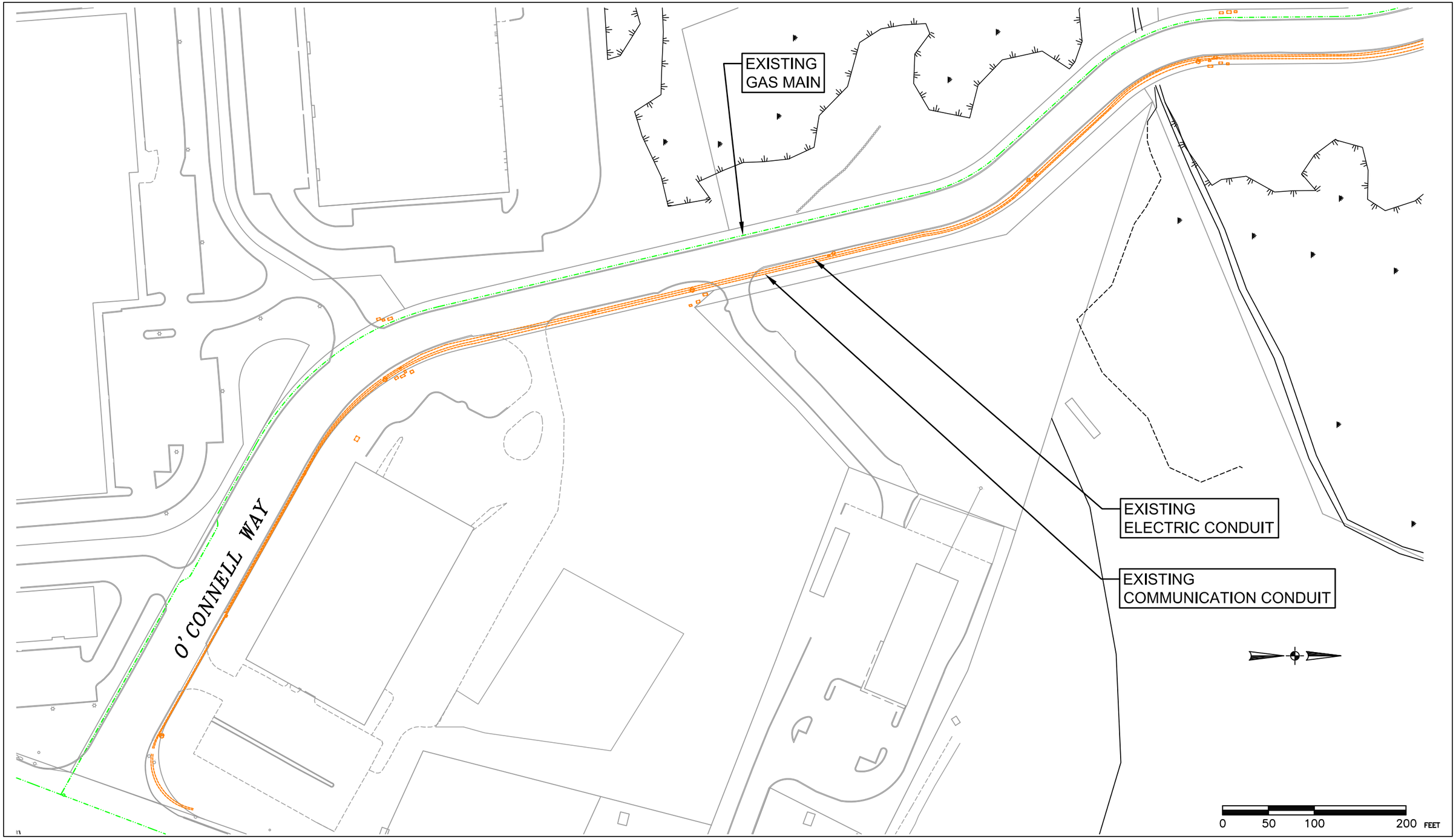
7.8.3 EXISTING FLOW AT PROJECT SITE

Wastewater from the existing properties is presumed equal to the potable water usage presented in **Table 7.7-5**. Total wastewater from the existing Project Site is approximately 6,000 GPD.

SECTION 7.9
UTILITIES

Electricity serving the Project Site in the current, industrial park configuration is provided by the Taunton Municipal Lighting Plant (TMLP), a municipal electric utility. TMLP provides electric service to approximately 35,000 customers in Taunton, Berkley, Raynham, and sections of Dighton, Lakeville and Bridgewater. Underground electric conduits feeding the Project Site run from the overhead electric at Stevens Street through the Site to distribution lines bisecting the Site as shown on **Figures 7.9-1** and **7.9-2**.

Gas is provided to the Project Site by Columbia Gas Company. **Figures 7.9-1** and **7.9-2** illustrate the gas main serving the Project Site from the main in Stevens Street.

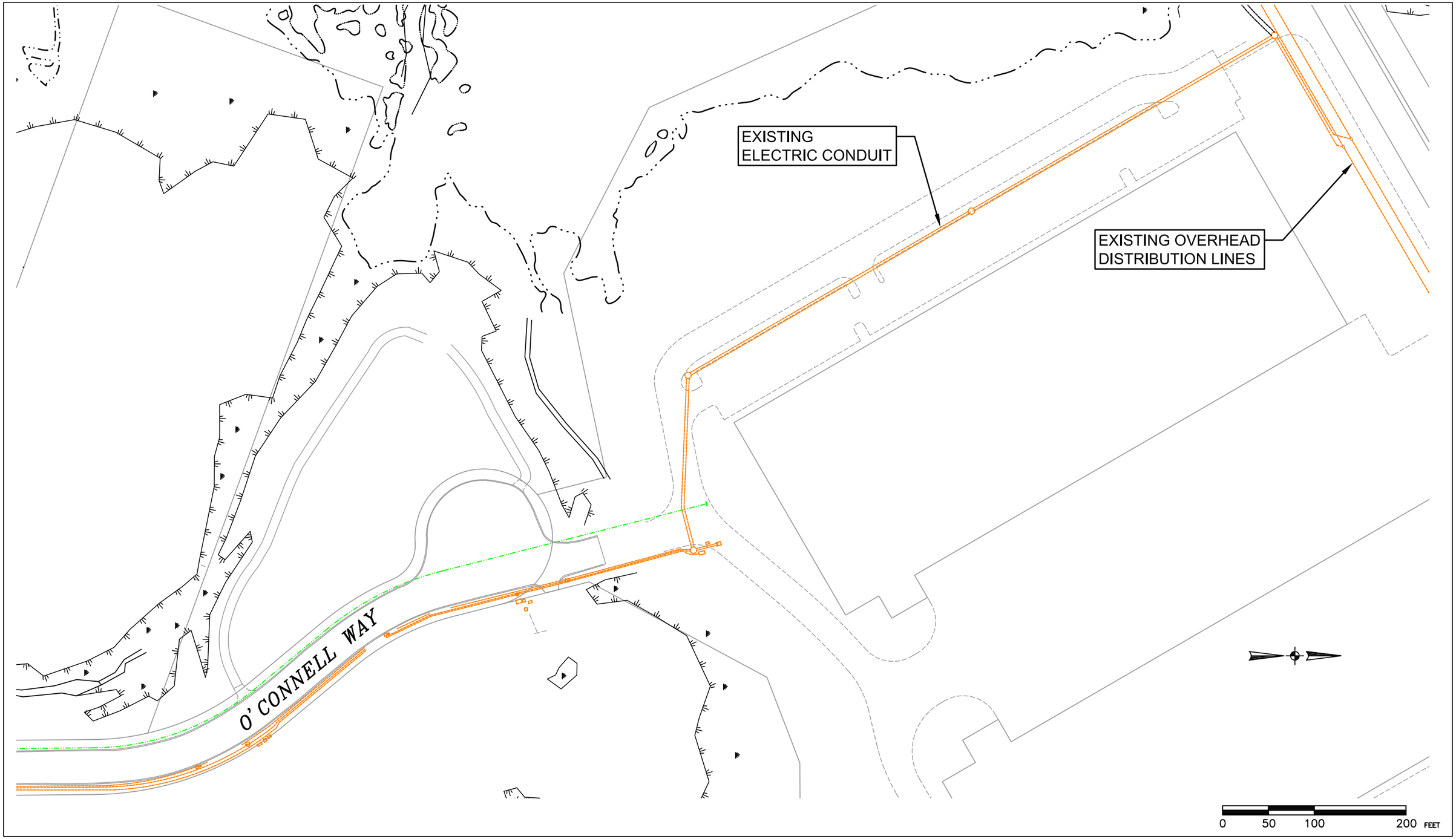


SOURCE:

Mashpee Wampanoag Tribe - Fee to Trust Acquisition - Draft EIS

Figure 7.9-1

EXISTING UTILITY EXHIBIT PLAN



SOURCE:

Mashpee Wampanoag Tribe - Fee to Trust Acquisition - Draft EIS

Figure 7.9-2
EXISTING UTILITY EXHIBIT PLAN

SECTION 7.10
SOLID WASTE

7.10.1 SOLID WASTE SERVICE

The City of Taunton Public Works Department manages solid waste for the City. The majority of residents and businesses dispose of their non-hazardous solid waste and recyclables through weekly curbside pick-ups conducted by Allied Waste Services of Fall River. The City's solid waste is currently handled at the Taunton Sanitary Landfill located at 340 East Britannia Street in Taunton. The Taunton Sanitary Landfill is located on approximately an 84 acre parcel of property owned by the City of Taunton and consists of landfill sections and cells, a residential recycling/solid waste collection drop-off area, and ancillary activities. This landfill is operated by Waste Management for the disposal of municipal solid waste (MSW), non-municipal solid waste, municipal sewage sludge, and grit and screenings from the City of Taunton's municipal wastewater treatment plant. It is permitted to handle up to 685 tons per day, and is slated to become inactive in 2016. The City of Taunton recently established an agreement with WeCare Organics LLC and Interstate Waste Technologies to replace Taunton's landfill by that time with a transfer station, recycling center, and waste-to-energy facility on land near the Myles Standish Industrial Park. The City's recycling is currently delivered by Allied Waste Services to a privately-owned recycling facility equipped to handle the City's recycling stream.

The Project Site currently includes three private homes and several businesses consisting of office and commercial-industrial-warehouse spaces. Although the homes at 61F Stevens Street, 65 Stevens Street, and 67 Stevens Street are served by the City of Taunton municipal solid waste program described above, the commercial and industrial facilities have contracted their waste removal needs out to private services. The City of Taunton and Taunton Sanitary Landfill are not responsible for the solid waste produced by these industrial and commercial companies.

Massachusetts laws and regulations only have jurisdiction over non-hazardous solid waste to the extent that they ensure that waste handling and disposal facilities are located on sites that are suitable for these activities (310 CMR 16.00[1]), are properly designed, and safely operated (310 CMR 19.000[2]). Massachusetts does not regulate or require recycling, except in special cases such as the Beverage

[1] 310 CMR 16.00: Site Assignment Regulations for Solid Waste Facilities. June 8, 2001. http://www.mass.gov/dep/recycle/laws/310cmr16.htm (accessed November 14, 2012).

[2] 310 CMR 19.000: Solid Waste Management. http://www.mass.gov/dep/service/regulations/310cmr19.pdf (accessed November 14, 2012).

Container Recovery Law (MGL c.94, s.321-327[3] and 301 CMR 4.00[4]). The Commonwealth does not regulate businesses that provide collection and hauling of solid waste from generators to handling and disposal facilities.

7.10.2 SOLID WASTE GENERATION

Table 7.10-1 contains estimates of the current generation of solid waste by residents and commercial/industrial owners and tenants on the Project Site.

TABLE 7.10-1
ESTIMATES OF CURRENT SOLID WASTE GENERATION ON PROJECT SITE

Use	Current Program	Generation Rate	Solid Waste (tons per year)
Commercial-Industrial-Warehouse	108,700 sf	0.0026 tons/sf/year	282.6
Office	40,400 sf	0.0013 tons/sf/year	52.5
Residential	9 bedrooms	0.73 tons/bedroom/year	6.6

Currently, the three residential units on the Project site contribute approximately 6.6 tons of solid waste per year to the City of Taunton's waste hauling responsibilities. Approximately 335.1 tons of solid waste are additionally generated per year by the current industrial and commercial tenants on the Project site. These industrial and commercial wastes, however, are removed and treated by private waste management companies and are not part of the City of Taunton's waste stream.

[3] Massachusetts General Laws, Chapter 94. http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleXV/Chapter94 (accessed November 14, 2012)

[4] 310 CMR 4.00: Provisions for Recycling of Beverage Containers. http://www.mass.gov/dep/service/regulations/301cmr04.pdf (accessed November 14, 2012).

SECTION 7.11
AIR QUALITY

7.11.1 INTRODUCTION

An air quality analysis has been conducted to determine the impact of pollutant emissions from mobile source emissions generated by the Project. A mesoscale analysis was performed to determine whether and to what extent the Project will increase the amount of ozone precursors in the area, as well as to determine if the Project is consistent with the Massachusetts State Implementation Plan (SIP). A microscale analysis was also performed to evaluate the potential air quality impacts of carbon monoxide (CO) due to traffic flow around the Project area.

National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in **Table 7.1-1**. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS.

TABLE 7.11-1
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-hour [7]	188	None
SO_2	Annual [1]	80	None
	24-hour [2]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	195	None
PM10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM2.5	Annual [4]	15	Same
	24-hour [5]	35	Same
CO	8-hour [2]	10,000	Same
	1-hour [2]	40,000	Same
Ozone	8-hour [3]	235	Same
Pb	3-month [1]	1.5	Same

Notes:

[1] Not to be exceeded

[2] Not to be exceeded more than once per year.

[3] Not to be exceeded more than an average of one day per year over three years.

[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from 3 successive years.

[5] Not to be exceeded based on the 98th percentile of data collection.

[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00

[7] Not to be exceeded. Based on the 3-yr average of the 98th (NO2) or 99th (SO2) percentile of the daily maximum 1-hour concentrations.

Source: 40 CFR 50 and 310 CMR 6.00

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards were applied when comparing to the modeling results for this Project.

A new one-hour NO_2 standard became effective on April 12, 2010. The form of this standard is the three-year average of the 98th percentile of the daily maximum one-hour concentrations. A new one-hour SO_2 standard became effective on August 23, 2010. The form of this standard is the three-year average of the 99th percentile of the daily maximum one-hour concentrations.

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a Fine Particulate (PM2.5) NAAQS, effective December 2006, with an annual standard of 15 microgams per cubic meter ($\mu g/m^3$) and the 24-hour standard of 35 $\mu g/m^3$.

The standards were developed by EPA to protect the human health against adverse health effects with a margin of safety.

The modeling methodology was developed in accordance with the latest Massachusetts Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[1]

7.11.2 AMBIENT AIR QUALITY

To estimate pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for the years 2007 to 2011.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. A new 1-hr NO_2 standard was recently promulgated. To attain this standard, the 3-year average of the 98^{th} percentile of the maximum daily 1-hour concentrations must not exceed 188 $\mu g/m^3$.

Ambient pollutant concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitors are at Harrison Avenue in Boston, Blue Hills in Milton, and Commercial Street in Brockton. A summary of the ambient air quality concentrations in the region are presented in **Table 7.11-2**.

[1] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

TABLE 7.11-2
OBSERVED AMBIENT AIR QUALITY CONCENTRATIONS AND SELECTED BACKGROUND LEVELS

Pollutant	Averaging Time	2009	2010	2011	Background Concentration µg/m³	Location
SO_2 [1,7,8]	1-Hour	85.8	50.2	61.9	85.8	Harrison Ave., Boston
	3-Hour	62.4	54.6	72.8	72.8	Harrison Ave., Boston
	24-Hour	33.8	22.9	33.5	33.8	Harrison Ave., Boston
	Annual	5.7	4.2	3.3	5.7	Harrison Ave., Boston
PM-10	24-Hour	47	50	42	50	Harrison Ave., Boston
	Annual	16.0	14.1	14.8	16.0	Harrison Ave., Boston
PM-2.5	24-Hour [4]	22.1	23	18.8	21.3	120 Commercial St, Brockton
	Annual [5]	8.4	7.87	8.22	8.2	120 Commercial St, Brockton
NO_2 [3]	1-Hour [6]	84.6	63.0	79.0	84.6	Blue Hills, Milton
	Annual	7.5	8.3	7.7	8.3	Blue Hills, Milton
CO [2]	1-Hour	2964	3306	2816	3306	Harrison Ave., Boston
	8-Hour	1710	2394	2166	2394	Harrison Ave., Boston

Notes:
From 2007-2011 MA DEP Annual Data Summaries
[1] SO_2 reported in ppm or ppb. Converted to µg/m^3 using factor of 1 ppm = 2600 µg/m^3.
[2] CO reported in ppm or ppb. Converted to µg/m^3 using factor of 1 ppm = 1140 µg/m^3.
[3] NO_2 reported in ppm or ppb. Converted to µg/m^3 using factor of 1 ppm = 1880 µg/m^3.
[4] Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.
[5] Background level for annual PM-2.5 is the average for three years.
[6] Maximum annual 1-hr concentrations.
[7] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
[8] The 2010 & 2011 SO_2 3-hr value is not reported. Years 2007-2009 used instead.

Air quality in the vicinity of the project is generally good, with all local concentrations found to be well below their respective NAAQS.

7.11.3 MESOSCALE ANALYSIS

A mesoscale analysis is required to ensure that the proposed Project will not adversely impact the existing SIP, which tracks how the state intends to maintain compliance with the NAAQS or plans for reductions in emissions to attain compliance in the future. A mesoscale analysis predicts the change in regional ozone precursor emissions (oxides of nitrogen [NOx] and volatile organic compounds [VOC]) due to the Project. The analysis is required to ensure that a proposed project will not negatively impact the existing SIP. The SIP is created to track how the state intends to maintain compliance with NAAQS or to plan for future emissions reductions to attain compliance.

The most current mobile source emission factor model available from the EPA is MOtor Vehicle Emission Simulator (MOVES). However, the inputs to this model are highly state-specific (inspection and maintenance programs, fleet ages and mix, etc). In order to maintain consistency, MassDEP must compile, check, and provide these data before any analysis can be accurately performed with the MOVES

model. MassDEP is in the process of compiling the data. In the interim, they have approved the use of the EPA's MOBILE6.2 mobile source emission factor model with their supplied inputs.[2] Thus, MOBILE6.2 is used for all mobile source emission factors in lieu of MOVES.

The mesoscale analysis performed for this Project predicts the change in regional ozone precursor emissions due to the proposed redevelopment of the Project Site. The total vehicle pollutant burden was estimated for the 2012 existing conditions and is presented in **Table 7.11-3**. The existing traffic conditions are described in more detail in **Section 7.1**.

TABLE 7.11-3
REGIONAL MESOSCALE (INDIRECT) EMISSIONS ANALYSIS SUMMARY (EXISTING)

Pollutant	VOC (lbs/day)	VOC (tons/yr)	NOx (lbs/day)	NOx (tons/yr)
2012 Existing	397.1	62.0	846.6	132.1

Details describing the methodology used in the mesoscale analysis are presented in **Appendix E**.

7.11.4 MICROSCALE ANALYSIS

For this project, NEPA requires the analysis of the effect on air quality of the increase in traffic generated by the Project. The Proponent is required to analyze local effects of the potential increase in traffic on ambient air quality near specific intersections. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through both signaled and unsignalized intersections. Predicted ambient concentrations of CO for the existing, build, and no-action cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. NAAQS have been established by the EPA for CO to protect the public health (known as primary standards). These standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and nine ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on late-model vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analyses followed the procedure outlined in U.S. EPA's intersection modeling guidance.[3]

The microscale analysis has been conducted using the latest versions of EPA MOBILE6.2 and CAL3QHC to estimate CO concentrations at sidewalk receptor locations.

[2] Personal Communication. Vincent Tino, Epsilon Associates, Inc. and Marc Bennett, MassDEP. November 26, 2012.

[3] U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections; EPA-454/R-92-005, November 1992.

Of the 55 intersections included in the traffic analysis, three intersections were chosen to be modeled based on their Level of Service rankings and peak vehicle counts. The top intersections are

- The intersection of Hart Street & Route 140;
- The intersection of Dean Street, Longmeadow Road, and the Honorable Gordon M. Owen Riverway; and
- The intersection of Route 44 and Orchard Street.

The modeled intersections are shown in **Figure 7.11-1.**

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These results are shown in **Table 7.11-4**. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted for the Existing Conditions in the area of the Project is 5.2 ppm (2.3 ppm for the modeled conditions plus 2.9 ppm for background) for the afternoon peak at the intersection of Dean Street, Longmeadow Road, and the Honorable Gordon M. Owen Riverway. The highest eight-hour traffic-related concentration is 3.7 ppm (1.6 ppm modeled plus 2.1 ppm background) at the same location and scenario. Both concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm. Therefore, it can be concluded that there are no adverse air quality impacts resulting from existing traffic in the area.

Details describing the methodology used in the microscale analysis are presented in **Appendix E**.

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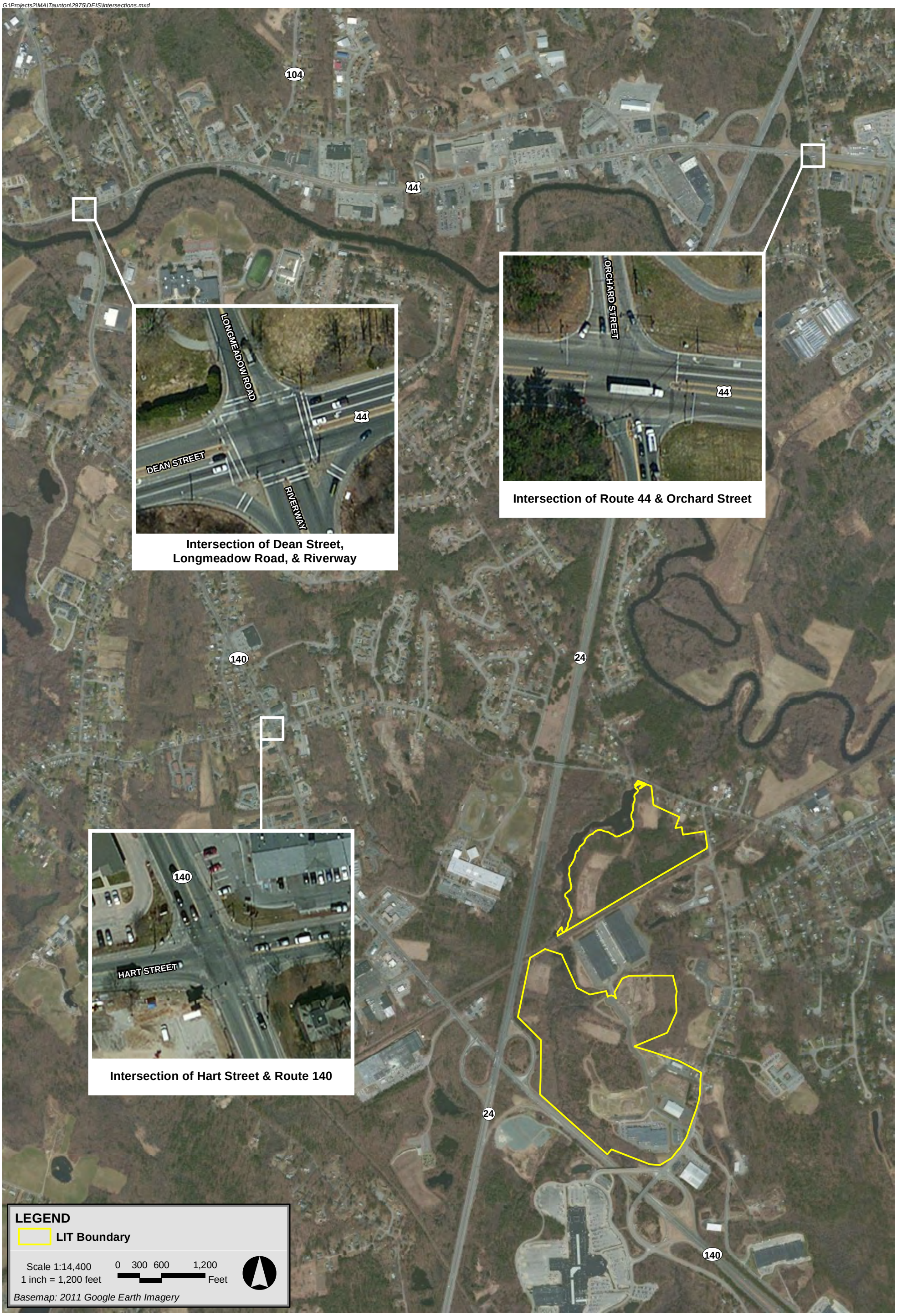

SOURCE: 2010 Vector Data, ESRI

Mashpee Wampanoag Tribe - Fee to Trust Acquisition - Draft EIS

Figure 7.11-1

Intersections Modeled in Microscale Analysis

TABLE 7.11-4
SUMMARY OF MICROSCALE MODELING ANALYSIS (EXISTING 2012)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
12. Hart Street & Route 140	AM	1.4	2.9	4.3	35
	PM	1.6	2.9	4.5	35
	SAT	1.6	2.9	4.5	35
34. Dean Street, Longmeadow Road, & the Gordon M. Owen Riverway	AM	1.9	2.9	4.8	35
	PM	2.3	2.9	5.2	35
	SAT	2.1	2.9	5.0	35
49. Route 44 & Orchard Street	AM	1.4	2.9	4.3	35
	PM	1.6	2.9	4.5	35
	SAT	1.6	2.9	4.5	35
8-Hour					
12. Hart Street & Route 140	AM	1.0	2.1	3.1	9
	PM	1.1	2.1	3.2	9
	SAT	1.1	2.1	3.2	9
34. Dean Street, Longmeadow Road, & the Gordon M. Owen Riverway	AM	1.3	2.1	3.4	9
	PM	1.6	2.1	3.7	9
	SAT	1.5	2.1	3.6	9
49. Route 44 & Orchard Street	AM	1.0	2.1	3.1	9
	PM	1.1	2.1	3.2	9
	SAT	1.1	2.1	3.2	9

Notes:
CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

SECTION 7.12
GREENHOUSE GAS

7.12.1 EXISTING SOURCES OF GREENHOUSE GAS

The Project Site currently includes three private homes and several business and industrial/warehouse spaces. Existing sources of greenhouse gas (GHG) emissions are broadly categorized into three groups: direct GHG emissions from fuel combustion for heating/cooling; indirect GHG emissions from electricity use; and transportation-related GHG emissions from motor vehicle trips.

7.12.2 DIRECT GHG EMISSIONS

Table 7.12-1 contains estimates of the current generation of direct GHG emissions by residents and commercial/industrial owners and tenants on the Project Site. This analysis assumes natural gas is used.

TABLE 7.12-1
ESTIMATES OF EXISTING CONDITIONS DIRECT GHG EMISSIONS GENERATION ON PROJECT SITE

Use	Program (square feet)	Generation Rate (Cubic Feet Of Natural Gas per square foot per year)	CO2 Emission Rate (Pounds of CO2/Cubic feet of Natural Gas)	CO2 Emissions (short tons per year)
Commercial-Industrial-Warehouse	108,700	31.8	0.12	208
Office	40,400	31.8	0.12	77
Residential	3	91.1	0.12	16

Data sources: US Energy Information Administration (EIA), Trends in U.S. Residential Natural Gas Consumption, June 2010, Table 1; http://www.epa.gov/climateleadership/documents/emission-factors.pdf, last modified November 7, 2011; 2003 EIA study of commercial buildings, per http://www.mge.com/Images/PDF/Brochures/Business/ManagingEnergyCostsInOfficeBuildings.pdf.

7.12.3 INDIRECT GHG EMISSIONS

Table 7.12-2 contains estimates of the current generation of indirect GHG emissions by residents and commercial/industrial owners and tenants on the Project Site. This is calculated through an estimate of the electricity use, converted to CO2 emissions using the annual average New England electric grid marginal CO2 emission rate in pounds per megawatt hour.

TABLE 7.12-2
ESTIMATES OF CURRENT INDIRECT GHG EMISSIONS GENERATION ON PROJECT SITE

Use	Program square feet	Generation Rate KWh/square foot/Year	CO2 Emission Rate pounds/MWh	CO2 Emissions short tons/year
Commercial-Industrial-Warehouse	108,700	17.3	829	779
Office	40,400	17.3	829	290
Residential	3 residences	11,496	829	14

Data sources: US Energy Information Administration (EIA), Trends in U.S. Residential Natural Gas Consumption, June 2010, Table 1; http://www.epa.gov/climateleadership/documents/emission-factors.pdf, last modified November 7, 2011; 2003 EIA study of commercial buildings, per http://www.mge.com/Images/PDF/Brochures/Business/ManagingEnergyCostsInOfficeBuildings.pdf
ISO-New England Final 2010 Emissions Report, Table 5.3: 2010 Calculated New England Average Emission Rates (lb/MWh)

7.12.4 TRANSPORTATION GHG EMISSIONS

Transportation-related GHG emissions are estimated based on the existing vehicle trips as described in **Section 7.1** and encompass the traffic patterns within a relatively large area. The calculation is based on per-vehicle CO2 emission rates, vehicle counts, link lengths, and modeled intersection delay times. The methodology is identical to that used in the air quality mesoscale analysis and is presented in **Section 7.11.**

Transportation GHG emissions are calculated as exhaust generated CO2. Calculations are divided into emissions while vehicles are idling at intersections, and emissions occurring on free-flowing roadway links. A total of 55 intersections and 157 roadway links were analyzed. These intersections and links correspond to the entire analyzed traffic area, of which only a relatively minor number of vehicles are related to the existing site use. The transportation related emissions for existing conditions are presented in **Table 7.12.3**.

TABLE 7.12-3
ESTIMATES OF CURRENT GHG EMISSIONS GENERATED BY AREA-WIDE TRAFFIC

Source	Emission Rate, short tons CO2/year
Roadway Link Emissions	96814.5
Intersection Emissions	1459.9
Total Transportation-Related Emissions	98274.4

7.12.5 SUMMARY GHG EMISSIONS

Existing condition annual GHG emissions are summarized in **Table 7.12-4**. Due to the size of the area of the traffic analysis, and resulting transportation emission calculation methodology, the total amount of transportation greenhouse gas emissions dwarfs the direct and indirect emissions produced by the existing site. According to the traffic analysis presented in **Section 7.1**, average daily traffic (ADT) on O'Connell Way west of Stevens Street (presumably to and from the existing site) is 0.189 percent of the area-wide ADT. Similarly, the proportion of the vehicle miles traveled (VMT, used directly in the calculation of GHG, as well as in the mesoscale analysis in **Section 7.11**) is shown to also be 0.189% of the area-wide

VMT. Since the calculation of emissions is directly proportional to VMT, it can be projected that the actual greenhouse gases attributable to the existing site are0.189% of the area-wide total, or 186 tons per year.

TABLE 7.12-4
SUMMATION OF ESTIMATES OF CURRENT GHG EMISSIONS GENERATION ON PROJECT SITE

Source	Emission Rate, short tons CO2/year
Direct Emissions	301
Indirect Emissions	1,083
Transportation Emissions	186
Total	1,571

7.12.6 EFFECTS OF CLIMATE CHANGE

The existing condition case shows no specific current effects of climate change, above and beyond any effects experienced by the entire region. The existing uses are well inland and not subject to sea level rise in the short- or medium-term. Existing structures appear to be above the current floodplain; any current efforts to protect equipment from flooding are unknown.

SECTION 7.13
CULTURAL RESOURCES

7.13.1 REGULATORY SETTING

National Environmental Policy Act

Under NEPA, federal agencies must "preserve important historic, cultural and natural aspects of our national heritage" (Section 101 [b][4]). Although NEPA does not define standards specific to cultural resources impact analysis, BIA's NEPA Handbook states that consultation tasks associated with Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code 470f) should commence at the beginning of the NEPA process. Section 106 of the NHPA (hereinafter Section 106) forms the basis of the BIA's NEPA cultural resources analysis.

Section 106 of the National Historic Preservation Act

Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The Section 106 process (detailed in implementing regulations at 36 CFR 800) normally includes the steps listed below.

- Delineate the area of potential effect (APE) and identify historic properties in consultation with the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer and any other consulting parties.
- Consult with any tribe that "attaches religious and cultural significance to historic properties that may be affected by an undertaking" regardless of the location of the historic property.
- Assess adverse effects on historic properties that are eligible for inclusion in the National Register of Historic Places (NRHP), and notify the ACHP if adverse effects are identified.
- Consult with the SHPO and other participating parties to resolve adverse effects on historic properties, generally resulting in a memorandum of agreement stipulating how properties will be treated.

Historic properties are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP (36 CFR 800.16[1]). For federal projects, cultural resources significance is evaluated in terms of eligibility for listing in the NRHP. The NRHP criteria for evaluation are defined by 36 CFR 60.4 as reproduced below.

The quality of significance in American History, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and that:

1. Are associated with events that have made a contribution to the broad pattern of history;

2. Are associated with the lives of people significant to our past;

3. Embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. Have yielded, or are likely to yield, information important in prehistory or history (36 CFR 60.4).

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) concerns the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to Native American human remains and particular cultural items with which they are affiliated. NAGPRA directs federal agencies and museums to identify, in consultation with Native Americans, the cultural affiliation of Native American human remains and associated funerary objects, sacred objects, unassociated funerary objects, or objects of cultural patrimony, in collections or holdings under their possession or control. Of greater consequence to the proposed action, NAGPRA also establishes Natives American rights to ownership of Native American human remains, funerary objects, scared objects, and objects of cultural patrimony that are excavated or discovered on federal or tribal lands after November 16, 1990 (43 CFR 10.3). All archaeological survey work has been undertaken under a Permit to Conduct Archaeological Field Investigation issued by State Archaeologist Brona Simon.

State Register Review

State Register Review requires all state agencies take into consideration the effects projects they fund, license, permit or approve on resources listed in the State Register of Historic Places (950 CMR 71). State Register Review follows a process consistent with Section 106, but applies only to properties listed on the State Register. The State Register Review process runs concurrently with the Section 106 process.

Massachusetts Environmental Policy Act

The Massachusetts Environmental Policy Act (MEPA) requires Projects consider the effects of their undertakings on resources listed in the State Register of Historic Places or included in the Inventory of Historic and Archaeological Assets of the Commonwealth. The MEPA process and consideration of effects to cultural resources generally occurs concurrently with the Section 106 and/or State Register reviews. Potential effects to historic and archaeological resources are identified and considered in documents filed for this review.

The Project has the potential to affect historic and archaeological resources within and in the vicinity of the Project Site. Results of the historic and archaeological surveys of the Project Site completed to date are described below.

7.13.2 METHODS

Characterization of the affected environment for cultural resources entailed a determination of APE, research and literature reviews, consultation with federally recognized Native American tribes, public involvement, and fieldwork.

Determination of Area of Potential Effect

The APE for the proposed action includes all resources within or in the vicinity of the Project site whose setting or viewshed is significant to the property. The APE also includes the entirety of the Project Site including all building locations, site improvements, proposed roadways and construction staging and access locations.

Research

Research methods consisted of a review of the State and National Registers of Historic Places and the Inventory of Historic and Archaeological Assets of the Commonwealth maintained by the Massachusetts Historical Commission on the Commonwealth's Massachusetts Cultural Resource Information System (MACRIS). Articles and site reports prepared for publication in journals were also reviewed for information about known archaeological sites in the Taunton area. Reports documenting cultural resource management (CRM) investigations conducted in the project area and its vicinity were also reviewed. These reports include professional publications and CRM studies completed in Taunton and the surrounding area.[1,2,3] Each of these studies included some level of archaeological research and excavation, whether or not an archaeological resource was identified.

Historical maps and atlases[4,5,6,7,8] were consulted to locate possible eighteenth, nineteenth, and early twentieth century sites within the town, as well as to trace the development of historic neighborhoods, road and trails. United States Geological Survey (USGS) topographic maps of Taunton dating from the late nineteenth century to the present were utilized to identify post-contact and modern period land alterations as well as to locate physical resources areas (e.g. wetlands) within the town. These maps were also examined to evaluate changes to transportation systems and land alteration, and to trace modern period development.

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[1] Ingham, Donna and A. Peter Mair. 2002. Intensive (Locational) Archaeological Survey, East Taunton Industrial Park, Taunton, Massachusetts. PAL Report No. 1362. Submitted to Taunton Development Corporation, Taunton, MA.

[2] Simon, Brona G., Peter F. Thorbahn, and Virginia H. Adams. 1980. Taunton Borrow Area Phase I Archaeological Survey. Public Archaeology Laboratory, Department of Anthropology, Brown University, Providence, RI. Submitted to Henley Lundgren Company, Inc., Shrewsbury, MA.

[3] Thorbahn, Peter F., editor. 1982. The Prehistoric Site Summaries. Final Report of the Interstate Highway 495 Archaeological Data Recovery Program, vol II. Department of Anthropology, Brown University Report. Submitted to the Massachusetts Department of Public Works, Boston, MA.

[4] Cobb, Morgan. 1728. Map of Taunton. Map # 357 on file, Massachusetts State Archives, Boston, MA.

[5] Leonard, C., and E. Lincoln. 1830. Plan of the Town of Taunton, in the County of Bristol. Pendleton's Lithography, Boston, MA. On file, Massachusetts State Archives, Boston, MA.

[6] Tisdale, James. 1795. Plan of the town of Taunton in the county of Bristol. On file, Massachusetts State Archives, Boston, MA.

[7] Walker, George H. 1883. Part of the city of Taunton (East Side). In Atlas of Bristol County. On file, Massachusetts State Archives, Boston, MA.

[8] Walling, Henry F. 1858. Map of Bristol County, Massachusetts. On file, State Library of Massachusetts, Boston, MA.

The bedrock, surficial geology, and geomorphology of Taunton were studied to understand depositional, erosional, and drainage patterns. Information was collected about the physical structure, heological resources, climatic changes and hydrology.[9,10,11,12] These sources were consulted to help understand the environmental settings that may have existing during the pre-contact period, and to reconstruct the natural landscape. These references also provided important information about the processes that formed Taunton's current topographic landscape. The USDA Soil Conservation Service soil survey of Bristol County, Northern Part[13] supplied information about soil types and surficial deposits within the town, and the general categories of flora and fauna that these soil styles support. In addition, studies of past environmental settings in New England were consulted.[14,15,16]

Consultation

Consultation with federally recognized Native American tribes and other parties concerning cultural resources has been undertaken as part of the Project. Federally recognized tribes are accorded specific consultation rights by the implementing regulations of Section 106 (36 CFR 800), so consultation with such entities is treated separately from non –federally recognized tribes. Non-federally recognized tribes are considered members of the public or interested parties. Efforts to consider the views of and information from interested parties are discussed in the Public Involvement section below. Consultation efforts are summarized below; the results of these consultations are presented in the Findings section.

The Public Archaeological Laboratory (PAL), the archaeological consultant for the Project, requested, by letter dated October 23, 2012, information regarding the Project area from the Mashpee Wampanoag Tribe and Wampanoag Tribe of Gay Head (Aquinnah). Concurrently, PAL requested assistance from the Massachusetts Commission on Indian Affairs in identifying areas of concern to Native American groups and appropriate individuals/groups to contact for information. Copies of the Intensive (locational) Archaeological Survey and Site Exam Report were also submitted to the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) on March 1, 2013.

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[9] Cameron, Barry, and Richard S. Naylor. 1976. General Geology of Southeastern New England. In Geology of Southeastern New England, edited by Barry Cameron, pp. 13–27. Science Press, Princeton, NJ.

[10] Fenneman, N.E. 1938. Physiography of the Eastern United States. McGraw-Hill, New York, NY.

[11] Hartshorn, Joseph H. 1976. Glacial Geology of Southeastern Massachusetts. In Geology of Southeastern New England, edited by Barry Cameron, pp. 183–184. New England Intercollegiate Geological Conference, 68th Annual Meeting. Science Press, Princeton, NJ.

[12] Williams, J.R. 1973. Water Resources of the Taunton River Basin, Southeastern Massachusetts. Hydrologic Investigations, Atlas HA 460 Sheet 3, Washington, D.C.

[13] Roffinoli, Rino J., and Charles F. Hotz. 1978. Soil Survey of Bristol County, Massachusetts, Northern Part. United States Department of Agriculture, Soil Conservation Service.

[14] Bradshaw, Richard, Sheldon Nelson, and Katrina McGowan. 1982. Paleoecological Reconstruction of the Taunton Quadrangle, Massachusetts. Final Report of the Interstate Highway 495 Archaeological Data Recovery Program, Vol. III, edited by Peter F. Thorbahn. The Public Archaeology Laboratory, Department of Anthropology, Brown University. Submitted to the Massachusetts Highway Department, Boston, MA.

[15] Nelson, Sheldon. 1984. Upland and Wetland Vegetational Changes in Southeastern Massachusetts: A 12,000 Year Record. Northeastern Geology 6(4):181–191.

[16] Simon, Brona G. 1991. Prehistoric Land Use and Changing Paleoecological Conditions at Titicut Swamp in Southeastern Massachusetts. Man in the Northeast 42:63–74.

Public Involvement

Public involvement concerning cultural resources focused on soliciting the view of, and information from, the Taunton Historical Commission (THC). Copies of the Environmental Notification Form and Draft Environmental Impact Report were submitted to the THC. To date, the THC has not commented on the documents.

Anthony L. LaCourse commented on the Environmental Notification Form submitted for the MEPA process on July 23, 2012. Mr. LaCourse requested information on how historic resources in Taunton will be protected from construction related activities and information related to the status of archaeological investigations. The proponent responded to these comments in the Draft Environmental Impact Report filed on May 15, 2013.

Cora-Dorothy Pierce commented on the Environmental Notification Form submitted for the MEPA process on August 14, 2012 Ms. Pierce commented on their concerns related to the increased use of the Assawompset Pond Complex and how it may affect Sacred Ancestral Village sites of the Pokanokets on the shores of the Assawompset, Little Quittacas, Great Quittacas, and Pocksha ponds. The proponent responded to these comments in the Draft Environmental Impact Report filed on May 15, 2013.

Field Methods

Walkover Survey

A walkover survey of the project area was conducted to document and assess present environmental conditions for the intensive (locational) archaeological survey. Environmental information documented on the project maps during the walkover included the presence, types, and extent of fresh water; drainage characteristics; presence of bedrock outcrops and level terraces; and the angle of any slopes. The current physical condition of the project area is largely defined by the absence of or degree of natural or human disturbances to the landscape.

Typically encountered disturbances within a given project area may include those resulting from agricultural plowing, gravel or soil mining, or previous construction and site preparation activities. Extensive experience indicates that such disturbances can reduce the probability for encountering contextually intact archaeological sites. However, plowing, which can move artifacts from their primary vertical and horizontal contexts and is the most common type of disturbance in New England, does not necessarily compromise the physical integrity of all cultural deposits.

Another purpose of the walkover survey was to document surface indications of archaeological sites. While pre-contact sites in New England are most often found belowground, artifact scatters are sometimes exposed on the surface through cultural agents such as pedestrian and vehicular traffic, and natural processes such as erosion. Post-contact archaeological site styles that might be visible include stone foundations, stone walls, and trash deposits. If the remains of a built resource such as a farmstead are present within a project area, it is likely that a cellar hole and associated landscape features such as

stone walls, overgrown orchards and fields, and ornamental plantings may be visible on or above the grounds surface.

Subsurface Testing

Following the walkover survey, subsurface testing was conducted in portions of the project area assessed as having a moderate or high archaeological sensitivity. Seventy-eight 50x50cm test pits were excavated as part of the intensive survey that included three sensitive areas. These test pits were excavated within two testing blocks, five linear transects, and three arrays. All test pits were excavated by shovel in arbitrary 10-cm levels to sterile subsoil. Excavated soil was hand-screened through ¼ inch hardware cloth, and all cultural materials remaining in the screen were bagged and tagged by level within each unit. The count and type of all recovered cultural material were noted. Soil profiles, including depths of soil horizons, colors and textures, were recorded for each test pit on standard test pit profile forms. All test pits were filled and the ground surface restored to its original contour following excavation. Digital images were taken of the general project area and subsurface testing locations.

The site examination for the previously identified site was undertaken. The site examination was designed to collect information about the basic attributes of the site including boundaries, physical integrity, distribution and density of cultural materials, and age. The field methodology was formulated to gather data about these attributes and the site's significance, and research questions where developed to address the site's role in what is currently understood about pre-contact Natives American land use and settlement patterns. The site examination methodology was based on the result of the initial intensive (locational) archaeological survey with had previously identified the site. The subsurface investigations consisted of excavation of 50x50cm test pits excavated along a 5 and 10 meter interval. Test pit excavations were undertaken to delineate the boundaries and explore the internal composition of the site and identify features. 1x1 meter excavation units were then undertaken. A total of 105 test pits and four excavation units were excavated. Excavated soil was hand-screened through ¼ inch hardware cloth, and all feature soils through $^{1}/_{8}$ inch hardware cloth. All cultural materials remaining in the screen were bagged and labeled with provenience information. Soil horizons were recorded for each unit. Charcoal and soil samples were collected as appropriate (eg. from features, control samples). In addition to overviews of the project area, digital photographs and scale drawings of features and artifacts found in situ were also made. All test pits were filled and the ground surface restored to its original contour following excavation.

Laboratory Processing and Analysis

All cultural materials and samples recovered during the intensive survey and site examination were brought to PAL's laboratory facility, where they were organized by provenience and recorded and logged. Cultural materials were sorted by type and either dry-brushed or cleaned with tap water depending on the material type and condition. Materials were catalogued using a Microsoft Access relations database. Materials were analyzed for their density, distribution and diversity of materials recovered. Features identified in the subsurface testing were also analyzed. All materials were then stored in acid-free Hollinger boxes with contents list and labels.

7.13.3 ENVIRONMENTAL SETTING

In order to gain an understanding of the history of human occupation of the Project area it is necessary to have an understanding about the general history, and settlement and subsistence patterns of southern Massachusetts, with a particular focus on the territory encompassed within the Taunton River drainage.

This section provides an overview of the pre- and post-contact period history of southern New England generally, and the town of Taunton specifically. This review is by no means exhaustive, but provides a framework within which to predict and interpret archaeological resources identified within the project area. The information for this context has been drawn from the results of professional CRM surveys, through a review of state site files at the MHC, pre-contact and post-contact period culture histories, and site-specific histories.

Pre-Contact Period

The Casino Project area is located within the Taunton River drainage, which, with its many tributaries, represents the most extensive drainage system in southeastern Massachusetts. The Taunton River drainage has long been a focal point of archaeological interest to both avocational and professional archaeologists. Avocational archaeologists focused their efforts on fertile areas along river floodplains and ponds where artifacts were often exposed as a result of plowing, cultivation, and decreasing water tables. Many of the recorded sites were located and excavated by members of the Cohannet Chapter of the Massachusetts Archaeological Society (MAS). Cultural resource management surveys have been filling in some of the gaps in the archaeological record over the past two decades; some of these surveys have been carried out in interior, non-coastal locations that did not attract the attention of avocational archaeologists.

The Native American presence in the Taunton River drainage of southeastern Massachusetts has been documented from the PaleoIndian (12,500–10,000 B.P.) through the Late Woodland (1000–450 B.P.) periods. There is also a substantial record of occupation by Native Americans during the contact and post-contact periods, which continued into the twentieth century. Perhaps the most striking feature of the pre-contact record of this area is the strong presence of the Early Archaic through later Small Stemmed cultural materials. Sites in this area such as Titicut, Seaver Farm, Annasnappet Pond, and Wapanucket represent the largest known assemblages of Early Archaic, Middle Archaic, and Small Stemmed materials ever found in New England.

The large number of recorded sites in proximity to the Project area reflects the favorable environmental conditions that existed in the Taunton River drainage throughout the pre-contact period. The Taunton River and its major tributaries provided a primary avenue of transportation from the coastal lowland to Narragansett Bay. Anadromous fish traveled up these waterways, making the large ponds south of the project area a major focal point of pre-contact settlement. These areas have been found to have a high probability of containing evidence of intensive pre-contact land use.[17,18]

[17] Thorbahn, Peter, F., Leonard Loparto, Deborah Cox, and Brona Simon. 1980. Prehistoric Settlement Processes in Southern New England: A Unified Approach to Cultural Resource Management and Archaeological Research. Public Archaeology Laboratory, Department of Anthropology, Brown University Report. On file, Massachusetts Historical Commission, Boston, MA

The Native American Archaeological Record of the Taunton River Drainage

The archaeological record for southern New England suggests the greater postglacial landscape was infrequently occupied between 12,500 and 5000 B.P. Many of the sites described below are multicomponent and attest to a long history of Native American land use, occupation, and settlement at these locales within the larger Taunton River drainage. Locus 8 of the Wapanucket Site (19-PL-203), situated approximately 2.5 miles south southeast of the Route 79 project area, has produced one of the most significant PaleoIndian Period deposits known from southeastern Massachusetts. Located on the north side of Assawompset Pond, Locus 8 of the Wapanucket Site yielded an assemblage of PaleoIndian fluted projectile points, gravers, scrapers, and channel flakes, as well as debitage of chert and rhyolite from a highly localized area. The site is interpreted as a temporary campsite situated atop the crest of a sand dune located 8.5 m or 28 ft above the current lake level.[19,20] A single fluted projectile point is also reported from the Titicut Site in Bridgewater.[21]

Despite Early Archaic habitations being typically scarce throughout southern New England, artifacts and sites dating to the Early Holocene period in the Taunton River Drainage are known in greater concentrations relative to the rest of the southern New England area. Sites of this age coincide to the period of rising sea levels and the inundation of previously exposed land surfaces all along the continental shelf. Diagnostic bifurcate-based projectile points have been recovered from a significant number of large multicomponent archaeological sites along a 24-km (15-mile) stretch of the Taunton River in Middleborough and Bridgewater leading some to speculate a territorial core focused in this area during the Early to Middle Archaic Period..[22] Numerous bifurcate-based projectile points have been recovered from the Titicut (19-PL-161) and Seaver Farm (19-PL-162) sites located in close proximity to one another on either side of the banks of the Taunton River in Bridgewater,[23,24] the Riverside 3 and 4 and Bridge Street II sites within the Riverside Park Archaeological District in Lakeville,[25,26,27] the Fort Hill Site in North Middleboro, as well as, at the Wapanucket[28] and Muttock-Pauwating sites in Middleborough.[29]

[18] Thorbahn 1982

[19] Robbins, Maurice. 1980. Wapanucket: An Archaeological Report. Massachusetts Archaeological Society, pp. 305-306.

[20] Robbins, Maurice and George A. Agogino. 1964. The Wapanucket No. 8 Site: A Clovis-Archaic Site in Massachusetts. American Antiquity, 29(4)509-513.

[21] Mello, Joseph. 1974-1975. Fluted Point Recovery at Titicut. Bulletin of the Massachusetts Archaeological Society, 36(1-2):8.

[22] Dincauze, Dena F., and Mitchell Mulholland 1977. Early and Middle Archaic Site Distributions and Habitats in Southern New England. Annals of the New York Academy of Sciences, 288:439–456.

[23] Taylor, William B. 1970. Seaver Farm Red Paint Burials. Bulletin of the Massachusetts Archaeological Society 31 (3&4):1-8

[24] Taylor, William B. 1976. A Bifurcate Point Concentration. Bulletin of the Massachusetts Archaeological Society 37 (3-4):36-44.

[25] Begley, William, and Ann K. Davin. 1999. Data Recovery Program, Riverside 2 (19-PL-703) and Riverside 3 (19-PL-702) Sites, Lakeville Corporate Park Project Area, Lakeville, Massachusetts. The Public Archaeology Laboratory, Inc. Report No. 511. Submitted to Canpro Investments Limited, Lakeville, MA; Sverdrup Corporation, Boston, MA; and Massachusetts Bay Transportation Authority, Quincy, MA.

[26] Donta, Christopher. 2006. Archaeology of the Nemasket River: Data Recovery Surveys at Riverside Park. UMASS Archaeoloical Services, Report UM-40; Prepared for Conpro Investments, Ltd. Middleborough, MA.

[27] Raber, Michael S., Stephen P. Carini, Gifford Fogle, and Roger Moeller. 1991. Archaeological Intensive Survey and Site Examinations for the Proposed Riverside Park, Lakeville, Massachusetts: The Bridge Street II and Riverside Sites 1-8. Raber

The Taunton River drainage system similarly appears to have been a primary core area of Middle Archaic Period settlement in southeastern Massachusetts. Diagnostic Middle Archaic Period projectile points have been recovered from a number of multicomponent sites in Lakeville and Middleborough. Numerous Neville, Neville-variant and Stark points made of rhyolite, quartzite, and local shale/argillite were recovered from the Wapanucket Site during excavations by the Massachusetts Archaeological Society.[30] The Soccer Field Site located on the west bank of the Nemasket River similarly yielded Neville and Neville variant projectile points[31] as has the Little League Site[32] in Middleborough and the Fort Hill site in North Middleborough. Neville and Stark points have also recovered from the adjacent Riverside 2 and 3 sites in Lakeville.[33,34] Farther east, a large Middle Archaic Period occupation has been identified within the Annasnappet Pond Archaeological District (19-PL-337) in Carver. The distribution of Neville and Stark projectile points, winged atl-atl weights, as well as, radiocarbon-dated features demonstrate the Middle Archaic component to the Annasnappet Pond Archaeological District is quite large, possibly representative of a Native American base-camp dating to the period.[35] The recovery of Middle Archaic tools throughout the region is consistent with small occupations of limited focus, representative of short-duration task-oriented locations associated with the acquisition and limited processing of game resources supported by the larger base-camps that were settled for longer periods of time. The distribution or concentrations of sites and deposits dating to this period may also be evidence for a circumscribed territory focused within the Taunton River Drainage dating to the Middle Archaic Period.

Late Archaic (Laurentian, Small Stemmed, Susquehanna tradition) cultural materials are all known from the region. Although all three traditions have been documented in the region, they occur at different relative frequencies. The Late Archaic Period in southeastern Massachusetts is most often represented by Small Stemmed and Squibnocket Triangle projectile points of readily available quartz. As discussed above however, the temporally diagnostic value of these artifacts has come into question. The distribution of Small Stemmed tradition projectile points indicates an intensive exploitation of interior wetlands and associated floral and faunal resources.[36] In contrast, earlier Laurentian tradition Late Archaic components tend to be smaller and contain relatively few artifacts of a limited technological

Associates Report. Submitted to Lakeville Realty Trust, Middleborough, MA.

[28] Robbins 1980.

[29] Donta, Christopher, and Jennifer Wendt. 2006. Archaeological Intensive (Locational) and Site Examination Surveys of the Muttock-Pauwating Native American Site, 19-PL-292 Middleboro, Massachusetts. UMASS Archaeological Services Report, Submitted to AGS Development, Sharon, MA.

[30] Robbins 1980.

[31] Hoffman, Curtiss. 1999. Archaeological Intensive Survey and Site Examination Middleborough Little League Site, Middleborough, Massachusetts. Report on file Massachusetts Historical Commission, Boston, MA.

[32] Hoffman, Curtiss. 2007. Middleborough Little League Site Middleborough , Massachusetts. 2007 Annual Report and Permit Renewal Request. Submitted to the Massachusetts Historical Commission, Boston, MA.

[33] Begley and Davin 1999.

[34] Raber et al. 1991.

[35] Doucette, Dianna, and John R. Cross. 1997. Annasnappet Pond Archaeological District, North Carver Massachusetts. An Archaeological Data Recovery Program. The Public Archaeology Laboratory, Inc. Report No. 580. Prepared for US Department of Transportation, Federal Highway Administration and Massachusetts Highway Department, Boston, MA.

[36] Dincauze, Dena F. 1975 The Late Archaic Period in Southern New England. Arctic Anthropology 12(2):23–34.

range, resulting from short-duration stays by peoples targeting specific resources. Dincauze (1975) has proposed that the Small Stemmed tradition represented an indigenous cultural development in southern New England. The majority of Small Stemmed projectile points recovered in the Taunton River basin has been associated with radiocarbon-dated contexts spanning the period from 4800 to 2300 B.P.[37]

Regionally, Late Archaic archaeological components are known from the Wapanucket, Nemasket River, Fort Hill, Taylor Farm (19-PL-165), Riverside 2 and 3, and Little League sites. Low densities of quartz chipping debris and a quartz Squibnocket Triangle projectile point has also been recovered from the 47 East Grove Street Site located on the west bank of the Nemasket River in Middleborough. This site has been interpreted as representing a short-term hunting location focused on resource procurement associated with the occupants of the Wapanucket Site.[38] Each of the Wapanucket loci yielded Late Archaic Period cultural materials associated with each of the three documented archaeological traditions.[39] Locus 8 of the site however, contained a particularly large Small Stemmed Tradition component that included some 484 Native American features hearths, refuse pits, post molds, and burials among them. Associated radiocarbon dates ranged from 4720 ± 140 to 3435 ± 85 B.P. Furthermore, Wapanucket also yielded numerous post holes (1,355) interpreted as representing the remains of 15 oval-shaped structures. The database of Small Stemmed tradition archaeological sites in the Taunton River Drainage argue for the presence of numerous small, short-duration sites of limited focus contrasted by larger, base camps, consisting of multiple family groups.

Surface collections and excavations from the larger, multicomponent sites within the Taunton River drainage contain projectile points considered to be diagnostic of the three phases within the Susquehanna tradition (Atlantic, Watertown, Coburn) and the Transitional Archaic Orient complex. Five radiocarbon dates from features excavated at the Riverside 3 Site in Lakeville provided evidence of occupation ranging from 3050 ± 100 to 2660 ± 90 B.P. These features along with diagnostic Susquehanna Broad and Orient Fishtail projectile points indicate continuous occupation throughout the middle and latter portion of the Transitional Archaic Period. A site on the Old Colony YMCA property in Middleboro yielded a Susquehanna-like projectile point. The Transitional Archaic Period is well represented at a number of sites located during archaeological investigations within the I-495 highway corridor. This includes the Canoe River West Site (19-BR-40), located on a tributary of the Taunton River in Norton, where loci containing Orient Fishtail points and Susquehanna tradition artifacts were identified during a data recovery program.[40]

Diagnostic artifacts in avocational and museum collections indicate a significant decrease in diagnostic Early Woodland Period projectile points (Meadowood, Rossville) as compared to Late Archaic materials.

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[37] Massachusetts Historical Commission. 1982. Historic and Archaeological Resources of Southeast Massachusetts. Massachusetts Historical Commission, Office of the Secretary of State, Boston, MA.

[38] Begley, William, and Ann K. Davin. 1995 Results of the Intensive Archaeological Survey of the 47 East Grove Street Project Area Middleborough, Massachusetts. The Public Archaeology Laboratory, Inc. Report No. 631. Submitted to Brophy & Phillips Co., Inc., Brockton, MA.

[39] Robbins 1980.

[40] Simon, Brona G. 1982. Canoe River West Site. In The Prehistoric Site Summaries: Final Report of the Interstate Highway 495 Archaeological Data Recovery Program, Vol. II, edited by Peter F. Thorbahn.

Radiocarbon dates from sites in the I-495 highway corridor suggest an extended use of Small Stemmed Point tradition tool types, at least into the Early Woodland Period. At the Bay Street I Site (19-BR-56), Small Stemmed projectile points were recovered with Vinette 1-type ceramics in a deposition radiocarbon dated to 3715 ± 180 B.P. (GX-7410).[41] Diagnostic Meadowood and Rossville projectile points were recovered at the Bassett Knoll Site (19-PL-323), a multicomponent site with dense Late Archaic through Late Woodland occupations. This site was located at the headwaters of a tributary brook to the Taunton River in Raynham.

Evidence for increased settlement in the area began during the Middle Woodland Period. Larger base camps in riverine and coastal settings appear, and regional trade networks were established. Known sites are concentrated in the Taunton River estuary system and near some wetlands and tributary streams in the central and upper part of this drainage basin. Middle Woodland components with Jack's Reef and Fox Creek projectile points are known from the large multicomponent riverine and pond zone sites such as Titicut, Seaver Farm and Wapanucket. Radiocarbon dates from six pit features at the Bassett Knoll Site ranging from 1360 ± 70 to 1020 ± 70 B.P., as well as diagnostic Fox Creek and Jack's Reef projectile points, provide evidence of a substantial Middle Woodland Period occupation at this site. A section (Locus B) of the site on the Old Colony YMCA property in Middleboro contained a small Middle Woodland Period component with a lithic workshop and lanceolate projectile points.[42]

Numerous sites dating to the Late Woodland Period have been located in the riverine environmental zones along the combined Taunton River drainage. The economy of Late Woodland Period populations included hunting and gathering, shellfish collecting, fishing, and horticulture. The Taunton River area was probably a local core area of Late Woodland settlement and other activity in this section of southeastern Massachusetts as evidenced by the frequency of material remains and human burials dating to the period. The recently identified Muttuck-Pauwating Site[43,44] situated north of the Riverside Park Archaeological District is beginning to provide archaeological evidence that concentrated Native American villages may have been an element of indigenous society within the Nemasket Drainage prior to the arrival of Europeans. In the Middleborough area, diagnostic Late Woodland artifacts, including thin-bodied ceramics and Levanna projectile points, have been recovered from a number of sites such as Wapanucket, the Indian Hill Site (19-PL-148) and the Fort Hill Field Site (19-PL-164) along the Taunton River. In addition, a number of large, multicomponent sites containing numerous lithic and ceramic artifacts and a wide diversity of features have been found in the Bridgewater, Middleborough, and Lakeville area of the Taunton River drainage. These include the Titicut, Taylor Farm, Bassett Knoll, and

[41] Cox, Deborah C. 1982. Bay Street I Site (7KP). Final Report of the Interstate Highway 495 Archaeological Data Recovery Program, Vol. II, edited by Peter F. Thorbahn. The Public Archaeology Laboratory, Department of Anthropology, Brown University Report. Submitted to the Massachu¬setts Department of Public Works, Boston, MA.

[42] Strauss, Alan. 1995. Intensive Archaeological Survey of the Proposed Soccer Field, Middleborough, Massachusetts. Report on file, Massachusetts Historical Commission, Office of the Secretary of State, Boston, MA.

[43] Chartier, Craig. 2008a. The Muttuck-Pauwating Site: Finding a Potential Late Woodland Village. Paper presented at the 48th Annual Meeting of the Northeastern Anthropological Association. University of Massachusetts, Amherst, MA.

[44] Chartier, Craig. 2008b. This Old Wetu: Identifying Native Households at the Muttock-Pauwating Site, Middleboro, Massachusetts. Paper presented at the Annual Meeting of the Conference on New England Archaeology, Franklin Pierce University, Rindge, NH.

Seaver Farm sites[45,46,47] and the Riverside Park Archaeological District.[48] Site 19-PL-588, located at 74 East Grove Street in Middleborough, consisted of an isolated Native American burial discovered during excavation in the cellar of a house. Although no diagnostic artifacts were found with this burial, it is likely of Late Woodland Period affiliation. Probable additional Late Woodland burials are also known from Titicut[49,50] and at the Muttuck-Pauwating Site.[51,52,53]

Present-day Route 44 was a former Native American trail that provided east-west access between the settlement cores of Plymouth and the upper Narragansett Bay during the years leading up to contact. Contact period sites are known within the drainage and include Titicut, which was a focal point of Late Woodland settlement and also contained contact and early post-contact period burials. The Fort Hill Site (19-PL-163) was the location of a palisaded fort built by Native American groups around 1660.[54] The Taylor Farm Site in North Middleborough also contains a contact period component with burials. The Muttock district along a section of the Nemasket River north of the town center was another local focal point of contact period Native American activity. It may have been the location of fish weirs and a burying ground, and also contained a crossroads where the Titicut, Dartmouth, and Cohannet-Taunton paths intersected. Edmund Delabarre and Harris Wilder (1920) noted that villages, cemeteries, and corn fields were oftentimes situated in proximity to one another.[55] The volume of burials from the drainage, the suspected identification of one pre-contact Native American village site in the region, and the further verification that Nemasket represented an important core area in the seventeenth century suggests the Taunton Drainage basin may have been an important Native American territorial core or "Indian homeland" that extended back well into the pre-contact past.

Contact Period (A.D. 1500–A.D.1620)

The intensive occupation of the central Taunton River drainage basin continued into the Contact Period, a transitional phase during which contact between Native groups and European explorers and settlers was initiated and intensified. The Contact Period was characterized by complex political, social, and

[45] Dodge, Karl S. 1962. The Seaver Farm Site. Bulletin of the Massachusetts Archaeological Society, 23(3 4):24–29.

[46] Fowler, William S. 1974. Two Indian Burials in North Middleboro. Bulletin of the Massachusetts Archaeological Society 35(3-4):14–18.

[47] Robbins, Maurice. 1967. The Titicut Site. Bulletin of the Massachusetts Archaeological Society, 28 (3 & 4): 33-76.

[48] Donta 2006.

[49] Phelps, Mason M. 1950. Titicut Indian Burials – A Soliloquy, Bulletin of the Massachusetts Archaeological Society, 11 (2):21.

[50] Robbins, Maurice. 1959. Some Indian Burials from Southeastern Massachusetts, Part 2 – The Wapanucket Burials. Bulletin of the Massachusetts Archaeological Society, 20 (4): 61-67.

[51] Chartier 2008a.

[52] Chartier 2008b.

[53] Donta and Wendt 2006.

[54] Massachusetts Historical Commission. 1981a. MHC Reconnaissance Survey Report: Lakeville. Massachusetts Historical Commission, Boston, MA.

[55] Delabarre, Edmund B. and Harris H. Wilder. 1920. Indian Corn-Hills in Massachusetts. American Anthropologist, 22 (3): 203-225.

economic organization. During this period, there appear to have been five major Native American core areas in southeastern Massachusetts[56] that were centers of settlement and subsistence activities. They were primarily established along major rivers because of the availability of diverse natural resources, the accessibility of agricultural lands, and the use of these rivers as transportation routes.[57] These core areas were part of the seasonal rounds between estuaries, headwaters, tributaries, and interior ponds.

The Taunton River basin was occupied by a regional native population associated with the large Wampanoag Federation that inhabited southeastern Massachusetts. As in other areas of New England, the local core area in the Taunton River basin most likely sustained a relatively small population that divided its subsistence activities between hunting, fishing, agriculture, and the collection of natural food resources on a seasonal basis.

One Contact Period site in Middleborough, the Nemasket Village Site (19-PL-291), may have been the central site of the Nemaskets, a subgroup of the Wampanoag. A number of unidentified burials and Woodland Period artifacts have been found just north of Barden Hills near a major Native American crossing at the intersection of four native trails, at what may be the site of this village. Another village site of this period, known as Muttock-Pauwating (19-PL-292) is also located in Middleborough along the Nemasket River. The Titicut Site, located along the Taunton River in Middleborough and Bridgewater, contains a large number of Woodland artifacts, as well as Contact and Historic Period burials. The Fort Hill Site, in the same vicinity, was the location of a Native palisaded fort built around 1660. [58]

Between 1650 and 1675, three small Christian Indian villages, similar to John Eliot's "praying towns," were established at Nemasket, Titicut, and Assawompsett.[59] The Wapanucket Site, located adjacent to Assawompsett Pond, is a multicomponent site with a high density of artifacts dating from the PaleoIndian through Contact periods. In addition, there was a Woodland village mentioned in the early colonial literature that was located on Betty's Neck across from Wapanucket. Known as Nateawamet, this area was occupied by Native Americans and their descendants until 1919.[60]. The Taylor Farm Site also contains a Contact Period component. Burials excavated by Massachusetts Archaeological Society members contained grave goods including aboriginal ceramic vessels, a small copper trade kettle, a hand mirror, and two hoes.[61]

Post-Contact Period

Following the 1620 landing at Plymouth, English settlements expanded along the coast and along the major river drainages. These sixteenth-century settlements formed the earliest permanent occupation of New England. The lands comprising present-day Taunton were originally part of a large tract purchased

[56] MHC 1982.

[57] MHC 1982.

[58] MHC 1981a.

[59] MHC 1982.

[60] Robbins 1980: 330.

[61] Fowler 1974

by settlers from Plymouth Colony in 1637. This "Titiquet Purchase," the Indian name for that part of the Taunton River,[62] also included parts of the towns of Mansfield, Raynham, Berkley, and Norton. The tract of land was incorporated as the town of Taunton (Cohannet) two years later. In 1668, the area was enlarged with the Taunton North Purchase which included present day Easton, Mansfield, and the western part of Norton.[63] The area that came to be known as Plymouth County was a separate colony until 1685, at which time it was divided into the three counties of Plymouth, Barnstable, and Bristol.

The first European settlement in the Taunton area occurred in 1637 along present day Dean Street. This settlement was one of the earliest communities established in southeastern Massachusetts and was primarily concentrated around Taunton's present common, a location in close proximity to water sources for fishing, mill power, and transportation. The early settlement focused on farming, utilizing the riverine lowlands and outlying territory for grazing and crop production. The Taunton River also provided an excellent base for regional trade routes and industrial development. A small industrial base was established by 1650, with a grist and sawmill complex near the junction of the Mill River and Cohannet Street. A few years later, iron ore was obtained from Scadding's Pond in the North and Furnace Pond in East Taunton.[64]

Taunton was not severely affected by King Philip's War in 1675, unlike many of the nearby towns. Only 15 residents and two homes were lost. Some say Taunton was spared because Thomas Leonard, a Taunton resident, was a good friend of King Philip. Taunton's population grew during this period, and a prospering village center developed with institutional and commercial sectors.

Land in the town was not well suited to arable cultivation, as present day soil surveys indicate. Residents focused their subsistence activities on pastoral cultivation. Most of the animals in the town in 1734 were sheep, followed by cows, oxen, swine, and horses. By the 1770s significant amounts of cider and hay were produced, reflecting orchard and grass-covered field land use rather than intense cultivation.[65] Inhabitants depended on imported staples, such as wheat and Indian corn, from colonial ports. Building its first shipyard for the construction of small sloops by 1699, Taunton's early interest in shipping resulted from the inability to produce these staple grains.

Early industries in Taunton focused on the processing of local grain, wood, and bog iron. As early as 1695, an iron forge run by the Leonard family had been established at Charthy Brook.[66] Three additional ironworks were erected by 1740. A brickyard was established in 1750 on the eastern bank of the Taunton River near the junction of the Hartford, New York, and New Haven Railroad. A stoneware pottery was erected on the east side of Ingell Street in 1772. Local brick, ironware, stoneware, etc. was shipped down

[62] Barber, John Warner. 1839. Historical Collections Relating to the History and Antiquities of Every Town in Massachusetts. Dorr, Howland and Company, Worcester, MA.

[63] Clark, George Faber. 1859. A History of the Town of Norton. Crosby and Nichols, Boston, MA.

[64] Massachusetts Historical Commission. 1981b. Town Reconnaissance Survey Report: Taunton. Massachusetts Historical Commission, Office of the Secretary of State, Boston, MA.

[65] Clark 1859.

[66] Clark 1859.

the Taunton River to Providence, Newport, and New York throughout the late seventeenth and eighteenth centuries.

The settlement pattern was concentrated on the neck of land at the junction of the Mill and Taunton rivers, and about one mile south of this on a dam on the river, at the "Great Ware." In addition, several semiautonomous villages were developed in north and east Taunton. These villages and scattered homes were connected to the town center by several late-seventeenth- and early-eighteenth-century routes, including Sommer/Williams streets, Berkley Street, and Caswell/Staples streets.

By 1800, coasting vessels were freighting out three million bricks annually, 800 tons of ironware, and 700 tons of nails, with trade oriented southward toward Newport, Providence, and New York. Most of Taunton's commercial functions were centralized along Main Street and the town green at this time, which encouraged the opening of a stage line linking the town's center to Boston and New Bedford.

Although iron manufacturing continued to play a dominant role in the nineteenth century, as it did in Colonial times, several cotton mills were also developed as a major industry in Taunton. Samuel Crocker and Charles Richmond, former employees of the iron master Samuel Leonard, started the cotton mills. By the 1820s, they dominated most of Taunton's manufacturing and real estate interests. Silver production also became an important aspect of Taunton's economy in the 1820s.

Taunton grew in economic and political standing throughout the eighteenth and nineteenth centuries. The Taunton Branch Railroad opened in 1835, connecting the town to Boston, Providence, and New York. The New Bedford Railroad opened in 1840, and the Middleboro and Taunton opened in 1853. By the 1850s, Taunton constituted one of the two major regional industrial core areas of southeastern Massachusetts and, as a regionally important transportation center, became the ideal setting for the seat of Bristol County. In 1864, Taunton was incorporated and remained a center of heavy industry, focusing on the manufacture of locomotives and copper-zinc ship sheathing.[67] The latter was called Muntz metal, and by 1855 was the largest single industry in Taunton. By the end of the Civil War, Taunton had rail lines in five directions and had become the rail center of the county.

Although Taunton's iron industry declined immediately following the war, the industrial base of the city generally expanded during the late nineteenth century. Brick yards, such as the Taunton Brick Co., formed in 1868 and by the 1880s had become the largest brick producer in the city. The textile industry also grew considerably during the period. Beginning in the 1870s, a number of cotton mills, such as the Cohannet, Elizabeth Poole, Park, and Eagle mills, were erected. Existing mills, such as the Reed & Barton and Whittenton mills, expanded and the by 1890 the annual product value of the city's textile industry was $2.7 million. At the same time, foundry and machine shop products such as the new "twist drill" were an important contributor to Taunton's economy, with an annual product value worth nearly $2 million. Taunton's shipping peaked during the late nineteenth century as the larger size of merchant vessels, such as the large schooners fitted with up to seven masts which were built in the city's shipyards, precluded their use in the relatively shallow Taunton River.

[67] MHC 1981b.

By the beginning of the twentieth century, an important urban administrative center had been established in the town. Its agricultural base remained intact, but the large-scale industrial sector was the primary catalyst in population growth and economic expansion. By the late 1920s, the population began to stabilize, which, consequently, slowed industrial growth. Shipping activity on the Taunton River declined as well.

Suburban decentralization began as industries, businesses, and residential settlement sought outlying locations from the town's crowded center. In recent years, public and private interest in urban revitalization has reversed the suburbanization trend and the physical and economic resources of the centrally located commercial district are highly valued. Today, Taunton's downtown is the focus of several ongoing rehabilitation projects designed to restore the city's most attractive commercial buildings.

7.13.4 FINDINGS

Historic Properties

The Project Site includes the former site of the Windemere Farm (TAU.579), which is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory). Located northwest of the Route 140/Stevens Street interchange, the Inventoried property was demolished for the construction of the existing commercial complex. Since the resource is no longer extant, there are no impacts to historic resources within the Project Site.

The Project Site is located in the vicinity of the C.N.C. Barstow House at 61 Stevens Street (TAU.578), which is also included in the Inventory. Since the property was surveyed in 1979, it has been radically altered, and no longer appears to retain sufficient integrity to be eligible for listing in the National Register. The Project Site is also located in the vicinity of the Stevens Street Bridge over Conrail (TAU.910) and the Stevens Street Bridge at Route 140 (TAU.914). These bridges are included in the Inventory. Both bridges have been determined not eligible for listing in the National Register by the Massachusetts Historical Commission. No other historic resources have been identified within or in the vicinity of the Project Site.

Archaeological Resources

In 2002, PAL, the Project's archaeological consultant, completed an intensive (locational) archaeological survey of portions of the current Project Site, then part of the East Taunton Industrial Park.[68] One potentially significant archaeological site (19-BR-500) was identified within the current project area, and a site examination was recommended by the Massachusetts Historical Commission (MHC). In response to the ENF prepared for the Project as part of the MEPA process, the MHC requested that an archaeological site examination be completed at site 19-BR-500 (East Taunton Industrial Park 2 Site). The MHC also requested an intensive (locational) archaeological survey of archaeologically sensitive

[68] Ingham and Mair 2002.

portions of the current Project Site that were not previously surveyed.[69] The field investigations for the combined intensive (locational) archaeological survey and the site examination of the East Taunton Industrial Park 2 Site were completed in December 2012 under permit no. 3357 issued on November 8, 2012 by the MHC. The archaeological report documenting the results and recommendations from the intensive survey and site examination reports was submitted to the MHC on February 27, 2013. Copies were also provided to the Mashpee Tribal Historic Preservation Officer (THPO), the Wampanoag Tribe of Gay Head (Aquinnah) THPO, and the US Bureau of Indian Affairs on March 1, 2013. A synopsis of the preliminary results of the surveys is provided below.

The intensive (locational) archaeological survey focused on areas that were not surveyed during the original survey for the East Taunton Industrial Park. Four archaeological sites (designated First Light 1-4 sites) were identified as part of the intensive survey. A total of 78 test pits were excavated, resulting in the identification of four archaeological sites (designated First Light 1-4 sites). The sites are considered potentially significant and may be eligible for listing in the National Register of Historic Places. The MHC, by letter dated March 28, 2013, concurred with the recommendations of the survey report that site examinations be undertaken for the four sites to determine if each is eligible for listing on the National Register of Historic Places. The Proponent intends to undertake the site examinations under a permit from the State Archaeologist.

The site examination of the East Taunton Industrial Park 2 Site (19-BR-500) included the excavation of 103 test pits and 4 excavation units. The MHC, by letter dated March 28, 2013, concurred with the recommendation of the report that the East Taunton Industrial Park 2 Site (19-BR-500) is eligible for listing on the National Register of Historic Places under Criteria A and D. The site has "yielded, or may be likely to yield, information important to prehistory or history" (36 CFR 60). The MHC concurred with the recommendation of the report that the site be subject to a data recovery if avoidance is not possible.

[69] Simon, Brona, State Historic Preservation Officer and Executive Director of Massachusetts Historical Commission. Letter addressed to Richard K. Sullivan, Jr., Secretary of Executive Office of Energy and Environmental Affairs. Dated August 9, 2012.

SECTION 7.14
NOISE

This section describes the noise environment of the Project Site. The topics addressed are: acoustical terminology, typical noise levels, regulatory criteria, and the existing noise environment around the site.

7.14.1 ACCOUSTICAL BACKGROUND AND TERMINOLOGY

There are several ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the noise measurement terminology used in this analysis.

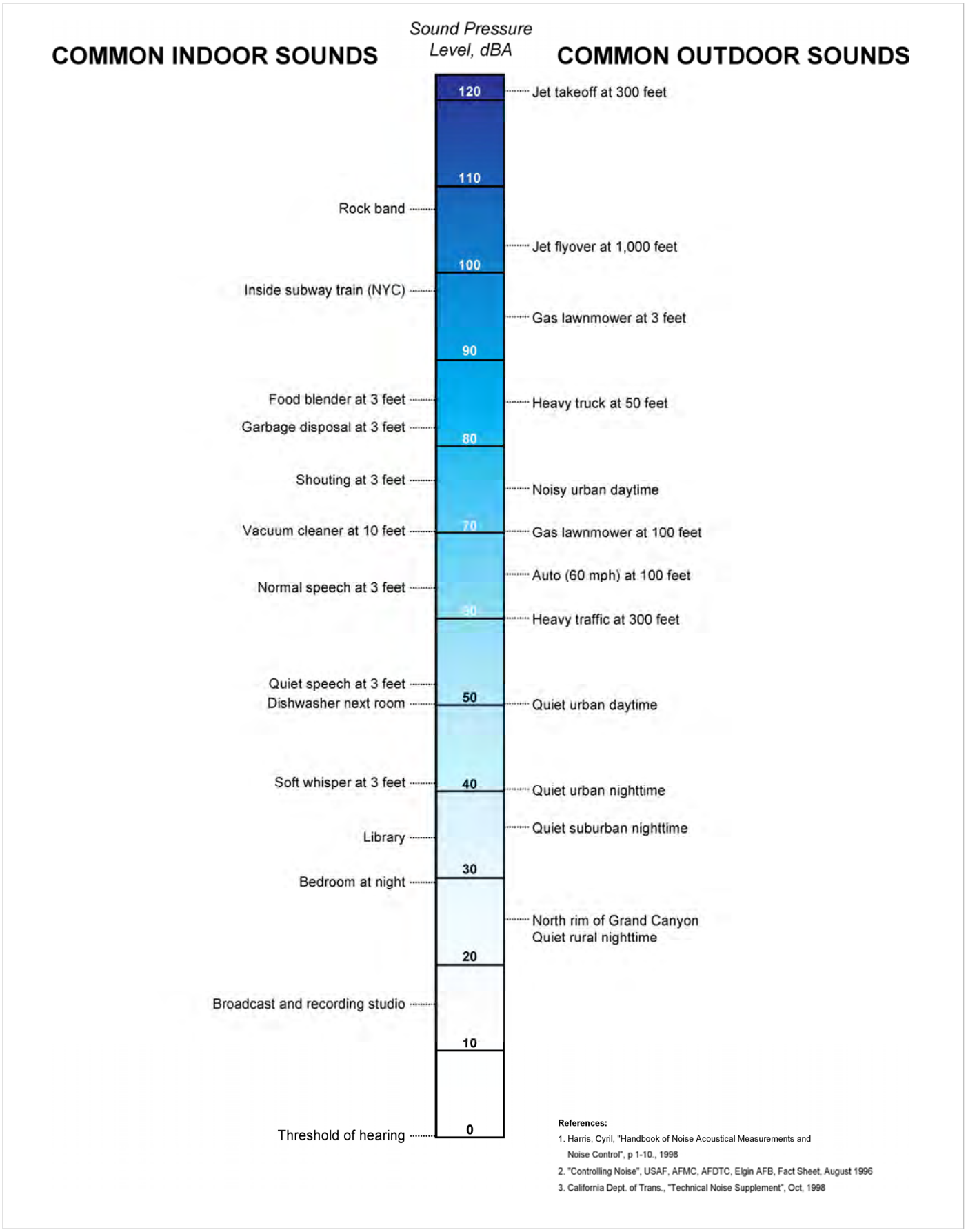
The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-decibel increase (to 53 dB), not a doubling to 100 dB. Thus, every three dB change in sound levels represents a doubling or halving of sound energy. Related to this is the fact that a change in sound levels of less than three dB is generally imperceptible to the human ear.

Another property of decibels is that if one source of noise is 10 dB (or more) louder than another source, then the quieter source does not contribute significantly to overall sound level which remains the same as that of the louder source. For example, a source of sound at 60 dB plus another source of sound at 47 dB is simply 60 dB.

The sound level meter used to measure noise is a standardized instrument.[1] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network (there are also B- and C-weighting networks). The A-weighted scale most closely approximates how the human ear responds to sound at various frequencies, and is the accepted scale used for community sound level assessments. Sounds are frequently reported as detected with the A-weighting network of the sound level meter. A-weighted sound levels emphasize the middle frequency (*i.e.*, middle pitched – around 1,000 Hertz sounds), and de-emphasize lower and higher frequency sounds. A-weighted sound levels are reported in decibels designated as "dBA." Reference sound pressure levels for some common indoor and outdoor environments are shown in **Figure 7.14-1**.

Because the sounds in our environment vary with time, they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of

[1] American National Standards Institute (ANSI). February, 1983. American National Standard Specification for Sound Level Meters (ANSI S1.4-1983). Standards Secretariat of the Acoustical Society of America, Melville, NY.



SOURCE: Epsilon Associates, Inc.

Figure 7.14-1
Common Indoor and Outdoor Sound Levels

the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value of 0 to 100 percent. Several sound level metrics that are commonly reported in community noise monitoring are described below.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the residual sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.
- L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.*, the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is also A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by occasional loud noises.

7.14.2 REGULATORY SETTING

7.14.2.1 Federal Regulations

There are no federal community noise regulations applicable to this Project. The Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC) do not apply because this is not a federally funded highway construction and/or improvement Project. Therefore, the NAC will not be evaluated as part of this analysis.

7.14.2.2 Massachusetts Department of Environmental Protection Noise Policy

The MassDEP regulates noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations and has issued a Noise Policy DAQC 90-001 dated February 1, 1990. Because the Proposed Development will be built on federal trust lands, these state noise regulations and noise policy will not apply. Nevertheless, to provide a sense of the Proposed Development's predicted noise impacts, an analysis has been done to assess the impacts in relation to the MassDEP noise policy. The policy limits a source to a 10-dBA increase above the ambient sound measured (the L_{90} sound level) at the property line for the site and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave band center frequency is 3 dB or more greater than the sound levels in each of two adjacent bands. An example of a "pure tone" is a fan with a damaged bearing that is producing an objectionable squealing sound.

7.14.3 EXISTING NOISE LEVELS

An ambient noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources include vehicular traffic on both local roads and nearby state highways (including trucks), and mechanical equipment located in and on buildings in the existing industrial park.

7.14.3.1 Noise Measurement Locations

The selection of the sound monitoring locations was based upon a review of the current land uses in the Project area. Potential "sensitive receptors" in the vicinity of the Project Site were selected as noise-monitoring locations to obtain a sampling of the ambient baseline noise environment. The measurement locations, representative of residential areas to the north, east, and south of the Project Site, are depicted in **Figure 7.14-2** and are described below.

- Location 1 is at the corner of Williams Street and Hart Street, north of the Project Site. The meter was approximately 50 feet from the edge of pavement across from the residence at 255 Hart Street. Noise sources at this location include vehicular traffic and mechanical noise from buildings at the industrial park to the south (night only).
- Location 2 is on the sidewalk in front of the residence at 34 Pinehill Street, northeast of the Project Site. Noise sources at this location include vehicular traffic from both local streets and Route 24 (night only).
- Location 3 is at the edge of the driveway for B&D Construction approximately the same distance back from Stevens Street as the residence at 64 Stevens Street. This location is east of the Project Site. Noise sources at this location include vehicular traffic and mechanical noise from buildings at the industrial park to the west and northwest (night only).

7.14.3.2 Noise Measurement Methodology

Sound level measurements were taken for 20 minutes per location during the daytime (3:00 p.m. to 4:30 p.m.) on Thursday November 29, 2012, and during nighttime hours (12:20 a.m. to 1:35 a.m.) on Friday November 30, 2012. Since noise impacts are greatest at night when existing noise levels are lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area.

The sound levels were measured at publicly accessible locations at a height of approximately 1.5 meters above the ground. The measurements were made under low wind conditions, and roadway surfaces were dry. Wind speed and temperature measurements were made with handheld instruments. Unofficial observations about meteorology, including wind speed, temperature, and humidity, as well as land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the proposed Project.

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LEGEND

LIT Boundary

Sound Level Measurement Location

Scale 1:4,800
1 inch = 400 feet

0 100 200 400 Feet

Basemap: 2011 Google Earth Imagery

HART ST
OLD HART ST
WILLIAMS ST
LEISURE LN
MIDDLEBORO AVE
BARSTOWS POND
PINE HILL ST
AZALEA DR
STEVENS ST
SYLVIA FARM DR
O'CONNELL WAY
COTLEY RD
REVOLUTIONARY DR
STEVENS ST CONNECTOR
24
140
1
2
3

SOURCE: Epsilon Associates, Inc.

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Figure 7.14-2

Baseline Sound Level Measurement Locations

7.14.3.3 Measurement Equipment

A CEL Instruments model 593.C1 Sound Level Analyzer was used to collect broadband and octave band ambient sound pressure level data. The instrumentation meets the "Type 1 – Precision" requirements set forth in American National Standards Institute (ANSI) S1.4 for acoustical measuring devices. The meter was tripod-mounted at a height of 1.5 meters above ground level (AGL). The meter has data logging capability and was programmed to log statistical data for each 20-minute sampling period for the following parameters: L_1, L_{10}, L_{50}, L_{90}, L_{max}, and L_{eq}. The meter time-weighting was set for the "slow" response.

All measurement equipment was calibrated in the field before and after the surveys with a CEL-110/1 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. The meter was calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. These calibrations were conducted by an independent laboratory within the past 12 months.

7.14.3.4 Existing Condition Sound Levels

The existing ambient noise environment consists primarily of vehicular traffic on nearby local roadways and more distant state highways, and mechanical systems from the existing industrial park at the Site. Existing condition noise monitoring results are presented in **Table 7.14-1**, and summarized below.

- The daytime residual background (L_{90}) measurements ranged from 52 to 59 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 40 to 44 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 61 to 66 dBA; and
- The nighttime equivalent level (L_{eq}) measurements ranged from 46 to 55 dBA.

TABLE 7.14-1
SUMMARY OF EXISTING SOUND LEVEL MEASUREMENTS

ID	Location	Date	Start Time	Leq (dBA)	L90 (dBA)
Loc. 1	Williams/Hart St.	Nov. 29, 2012	15:07	65	59
Loc. 2	Pine Hill St.	Nov. 29, 2012	15:41	66	52
Loc. 3	Stevens St.	Nov. 29, 2012	16:08	61	52
Loc. 1	Williams/Hart St.	Nov. 30, 2012	00:22	55	44
Loc. 2	Pine Hill St.	Nov. 30, 2012	00:48	55	43
Loc. 3	Stevens St.	Nov. 30, 2012	01:14	46	40
Note: Daytime weather: Temperature = 42˚ F, Relative Humidity = 29%, clear skies, west winds 3-5 mph. Nighttime weather: Temperature = 41˚ F, Relative Humidity = 37%, high clouds, west winds 1-2 mph.					

SECTION 7.15
VISUAL

During Scoping, several comments arose concerning the potential aesthetic impacts of the proposed casino development in Taunton, Massachusetts. This section describes the current aesthetic conditions of the Project Site and area, as shown in **Figure 7.15-1**.

7.15.1 COMMUNITY CHARACTER

The Project Site is located within the community of East Taunton, Massachusetts. A variety of uses characterize its immediate surroundings, including a residential neighborhood, an industrial park, a shopping mall, and other commercial development. Potential "sensitive receptors" in the vicinity of the Project Site include the residential neighborhood, primarily located north and east of the Project Site along Stevens Street, Middleboro Avenue, and other side roads. This neighborhood is generally made up of single-family homes on wooded properties. The East Taunton Elementary School at 58 Stevens Street and Christ Community Church at 41 Stevens Street are also within this neighborhood. To the south of the Project Site and Stevens Street neighborhood is Phase 1 of the Liberty & Union Industrial Park (LUIP), which includes a large furniture store warehouse and several other warehouse-style facilities. The Silver City Galleria is opposite the Project Site on the south side of Route 140. The Galleria is a 2-story enclosed shopping mall of approximately one million square feet that includes department stores, food court dining, and a movie theater. The mall property is heavily paved for parking but is surrounded on three sides by undeveloped forested wetlands. There are commercial properties, small residential streets, and the Bristol-Plymouth Regional Technical School to the west and north of the Project Site across Route 24. Like the rest of the area, most of these properties include or are surrounded by wooded areas. The Taunton Municipal Airport lies approximately 1.5 miles to the east of the Project Site.

7.15.2 PROJECT SITE

The Project Site, itself, currently consists primarily of low-intensity industrial park development. Large 1-and 2-story commercial, industrial, and warehouse buildings have been developed along O'Connell Way. The developed parcels, such as Work Out World, generally have small landscaped areas consisting of lawns, ornamental trees and shrubs, and associated parking lots. Parcels within the LUIP that have not yet been developed are generally wooded and contain substantial wetlands as described in **Section 7.2**. The Site is generally flat, and is only visible from the area near the intersection of Stevens Street and O'Connell Way, and from the Crossroads Commerce Center located at the north end of O'Connell Way.

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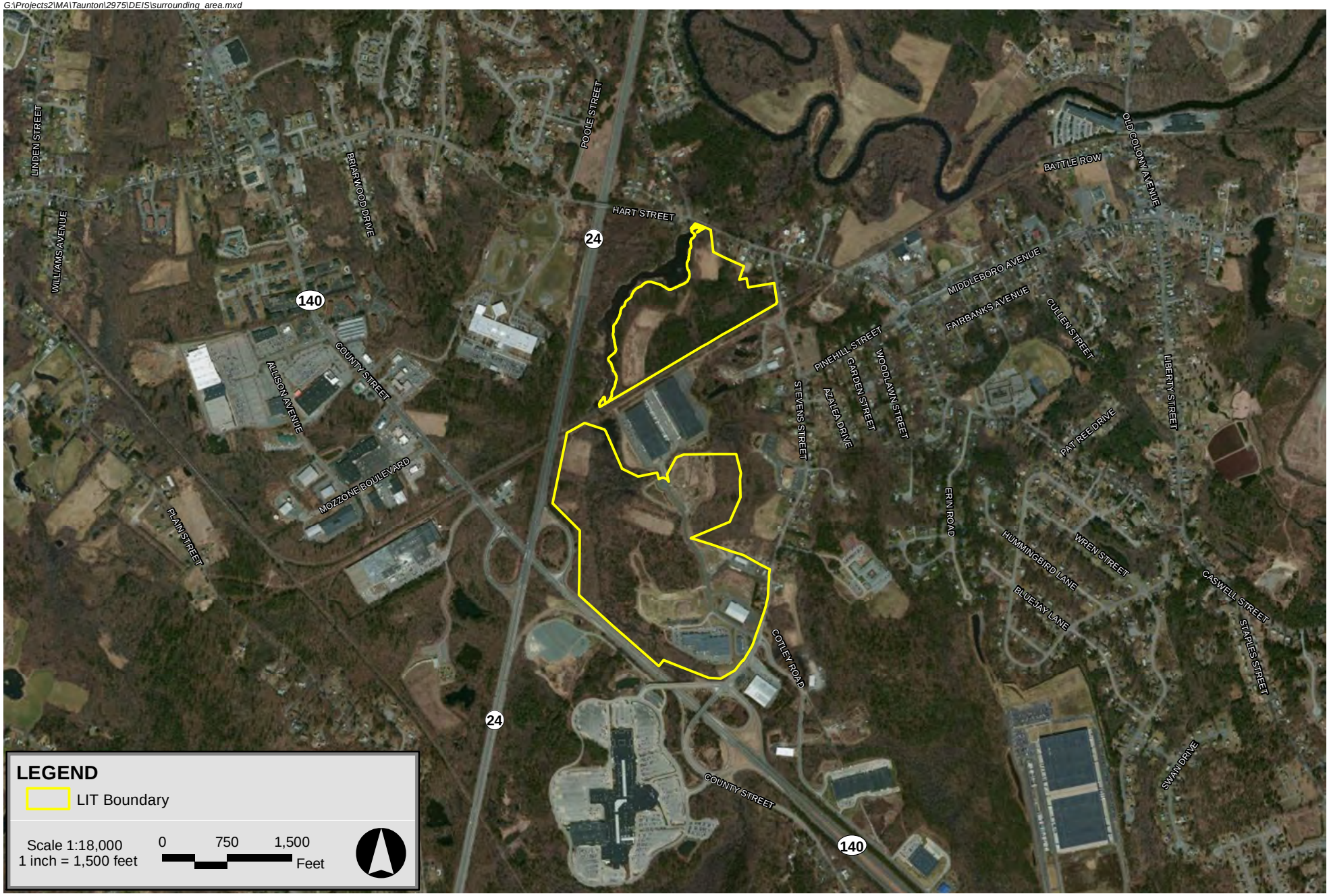

SOURCE: 2011 Bing Aerial Imagery, ESRI

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Figure 7.15-1

Project Site and Surrounding Area

SECTION 7.16
SOCIOECONOMIC CONDITIONS

7.16.1 INTRODUCTION

7.16.1.1 Study Areas

The analysis of potential impacts on socioeconomic conditions focuses on a study area that is most likely to be affected by the BIA's acquisition of trust lands on behalf of the Tribe and the construction of a destination resort casino on the Project Site. The study areas for the socioeconomic analysis include the City of Taunton and Bristol and Plymouth Counties (see **Figure 7.16-1**). Where possible, data are given for the combined area of Bristol County and Plymouth County.

7.16.1.2 Data Sources

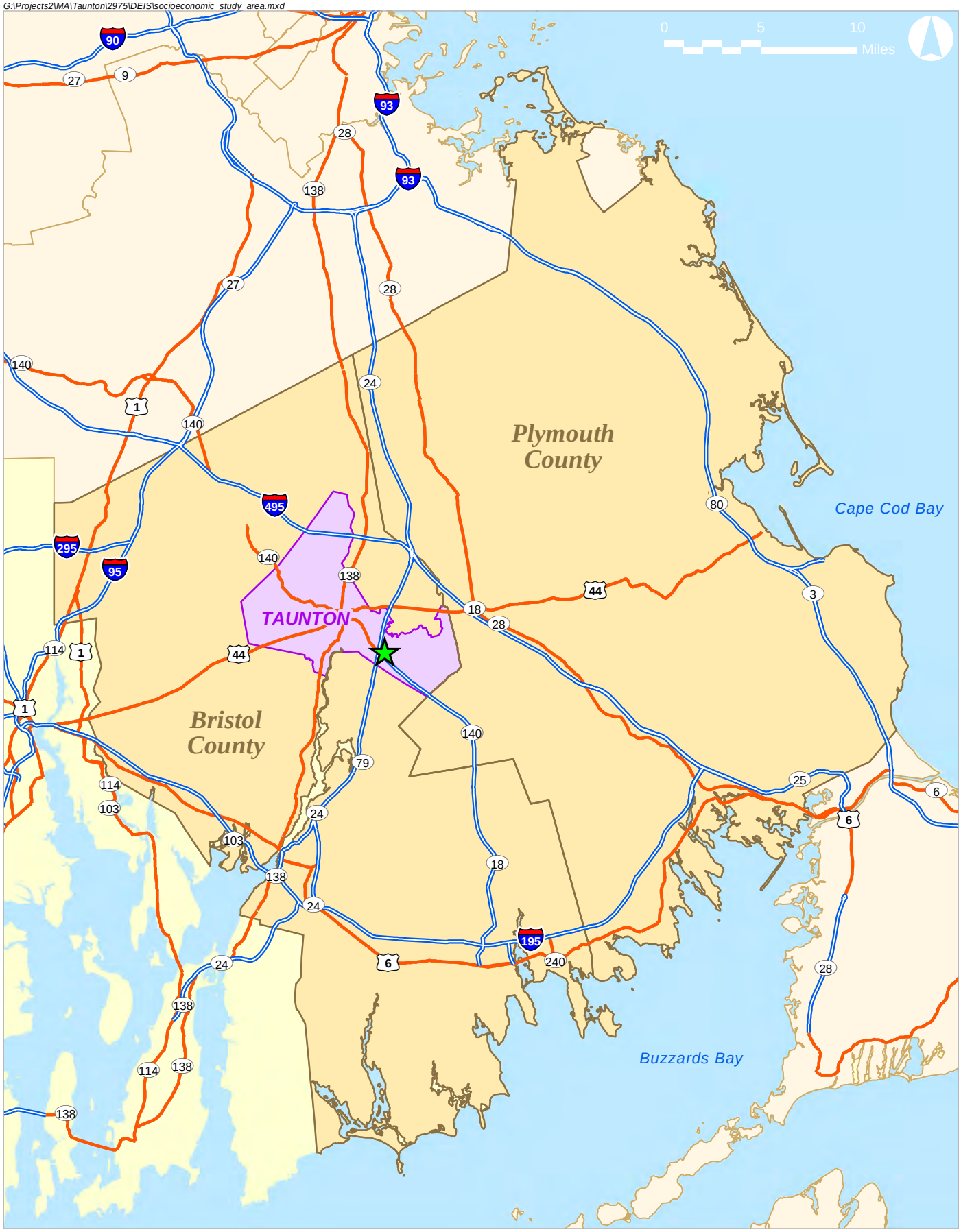
Data on demographics, income, housing, and job distribution were obtained from the U.S. Census Bureau's Decennial Census, and the 2006-2010 American Community Survey (ACS). Labor force and employment data were collected from the Massachusetts Executive Office of Labor and Workforce Development. Property tax data were obtained from the City of Taunton Assessor. All dollar values are presented in 2012 adjusted dollars, unless otherwise indicated.

Information about community infrastructure in the City of Taunton was obtained from the websites of the City of Taunton, the Commonwealth of Massachusetts, the Taunton Police Department, the Bristol County Sherriff's Office, Morton Hospital and Steward Health Care System, the American Hospital Association, the Massachusetts Department of Education, and the Taunton Public School District, and HR&A Advisors, Inc.

7.16.2 EXISTING CONDITIONS

7.16.2.1 Mashpee Wampanoag Tribe

As described in **Section 5.3.5**, the Mashpee Wampanoag Tribe has 2,647 members. Over 40 percent of Tribal members (1,098 persons) live in Barnstable County. Approximately six percent (153 members) live in Bristol County and seven percent (183 members) live in Plymouth County. The median household income of reporting Tribal members was $29,601.11 as of August 31, 2012. This represents approximately 53 percent of the median household income for the City of Taunton, 51 percent of the median for Bristol County, and 38 percent of the median for Plymouth County. In that same year, approximately 50 percent of Tribal members lived in poverty.



SOURCE: 2010 Vector Data, ESRI

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Figure 7.16-1

Socioeconomic Study Area

7.16.2.2 Demographic Trends – Study Areas

Population

As shown in **Table 7.16-1**, the City of Taunton had a population of 55,874 in 2010. Since 2000, the population in the City of Taunton has remained relatively stable, decreasing slightly by 0.18 percent. During this same time, the population of Bristol County increased by 2.54 percent, and the population of Plymouth County increased by 4.7 percent. Overall, the population in the two counties increased by 3.5 percent, from 1,007,500 in 2000 to 1,043,204 in 2010. This was similar to the population increase of 3.1 percent in Massachusetts as a whole.

TABLE 7.16-1
POPULATION: 2000, 2010

Area	2000	2010	Percent Change
City of Taunton	55,976	55,874	-0.2
Bristol County	534,678	548,285	2.5
Plymouth County	472,822	494,919	4.7
Total, Bristol and Plymouth Counties	1,007,500	1,043,204	3.5
Massachusetts	6,349,097	6,547,629	3.1
Sources: US Census			

Housing

Though the population in Taunton decreased between 2000 and 2010, the number of total housing units increased during this time by 4.3 percent (See **Table 7.16-2**). During the same time, the number of total housing units in Bristol County increased by 6.3 percent and 10.3 percent in Plymouth County, and 7.1 percent in Massachusetts as a whole.

As shown in **Table 7.16-2**, the percent of vacant housing units increased in all of the study areas between 2000 and 2010. Plymouth County had the highest vacancy rate in 2010, with 9.5 percent of housing units vacant. The City of Taunton had the lowest vacancy rate of all of the study areas, at 6.5 percent in 2010. Overall, Bristol and Plymouth Counties had a vacancy rate of 8.5 percent in 2010, slightly lower than in Massachusetts as a whole (9.3 percent).

The City of Taunton had a relatively small percentage of vacant housing units attributable to seasonal or recreational use in 2010 (3.3 percent). This was similar to the proportion of vacant housing units for seasonal or recreational use in Massachusetts as a whole (4.1 percent). Of the vacant housing units in Bristol County in 2010, 15.2 percent were attributable to seasonal or recreational use, while Plymouth County had the largest proportion of vacant housing units attributable to seasonal or

recreational use (53.4 percent). The proportion of vacant housing units that were for seasonal or recreational use decreased between 2000 and 2010 in all of the study areas except for Massachusetts as a whole.

TABLE 7.16-2
HOUSING CHARACTERISTICS: 2000, 2010

Area	Total Housing Units			Vacancy (Percent)		Percent of Vacant Housing Units for Seasonal/Recreational Use	
	2000	2010	Percent Change	2000	2010	2000	2010
City of Taunton	22,908	23,896	4.3	3.8	6.5	3.9	3.3
Bristol County	216,918	230,535	6.3	5.3	7.6	17.7	15.2
Plymouth County	181,524	200,161	10.3	7.3	9.5	65.3	53.4
Total for two Counties	398,442	430,696	8.1	6.2	8.5	43.1	35.1
Massachusetts	2,621,989	2,808,254	7.1	6.8	9.3	3.6	4.1

Source: US Census

Income

According to 2006-2010 ACS data, the median household income in the City of Taunton was $56,377, a decrease of 6.2 percent since 2000 (See **Table 7.16-3**). This was more of a decrease than experienced over the same time in both Bristol County and Plymouth County, where median household income decreased by 4.9 percent and 0.8 percent, respectively. Overall, median household income in Massachusetts decreased by 3.8 percent between 2000 and 2006-2010.

TABLE 7.16-3
MEDIAN HOUSEHOLD INCOME: 2000, 2006-2010

Area	2000	2006-2010	Percent Change
City of Taunton	$60,126	$56,377	-6.2
Bristol County	$60,809	$57,802	-4.9
Plymouth County	$77,534	$76,920	-0.8
Total, Bristol and Plymouth Counties[2]	$68,343	$66,581	-2.6
Massachusetts	$70,557	$67,851	-3.8

Notes: 1. All amounts presented in 2012 dollars.
2. Median household income for Plymouth and Bristol Counties was estimated based on a weighted average of the number of households in each county.
Sources: US Census, American Community Survey

As indicated in **Section 5.4.2**, based on 2006-2010 US Census ACS data, 10.5 percent of the population living in Massachusetts was living below the poverty level in 2010. In Bristol County and Plymouth County, 11.3 percent and 7.0 percent of the population, respectively, was living below the poverty line in 2010. In comparison, as indicated above, approximately 50 percent of the Mashpee Wampanoag Tribal population was living below the poverty line in 2008.

7.16.3 WORKFORCE CAPACITY AND OPPORTUNITIES

Major private employers in the City of Taunton include the Morton Hospital and Medical Center, Boston Apparel Group, General Dynamics C4 Systems—each employing over 500 workers. The Taunton State Hospital is also a major employer in the city. In Bristol County as a whole, hospitals are the largest employers, along with Bristol Community College in Fall River, Massachusetts, and Sensata Technologies, a supplier of sensors and controls for the automotive, appliance, aircraft, and other industries that was formerly a division of Texas Instruments.

7.16.3.1 Labor Force Employment and Unemployment

As shown in **Table 7.16-4**, the average annual labor force in the City of Taunton increased between 2001 and 2011 by 2.2 percent, a rate slightly lower than that experienced in both Bristol County (3.8 percent) and Plymouth County (3.2 percent). Overall, the two counties experienced a 3.5 percent increase in average annual labor force between 2001 and 2011. All of the study areas experienced larger percentage increases than in Massachusetts as a whole, where average annual labor force increased by 1.6 percent between 2001 and 2011.

TABLE 7.16-4
AVERAGE ANNUAL LABOR FORCE

Area	2001	2011	Percent Change
City of Taunton	30,481	31,151	2.2
Bristol County	279,582	290,171	3.8
Plymouth County	254,379	262,513	3.2
Total, Bristol and Plymouth Counties	533,961	552,684	3.5
Massachusetts	3,401,333	3,456,442	1.6

Notes: Data not seasonally adjusted.
Sources: Massachusetts Executive Office of Labor and Workforce Development

As shown in **Table 7.16-5**, average annual employment decreased in the all of the study areas between 2001 and 2011. The City of Taunton experienced the sharpest decrease over this time (-2.8 percent). Average annual employment decreased by 2.0 percent in Bristol County and by 1.4 percent in Plymouth County. Overall, average annual employment decreased by 1.7 percent in Bristol and Plymouth Counties combined, and by 2.2 percent in Massachusetts as a whole.

TABLE 7.16-5
AVERAGE ANNUAL EMPLOYMENT

Area	2001	2011	Percent Change
City of Taunton	29,295	28,470	-2.8
Bristol County	266,374	261,011	-2.0
Plymouth County	245,526	242,112	-1.4
Total, Bristol and Plymouth Counties	511,900	503,123	-1.7
Massachusetts	3,275,350	3,202,267	-2.2
Notes: Data not seasonally adjusted.			
Sources: Massachusetts Executive Office of Labor and Workforce Development			

Overall, employment distribution in the City of Taunton is similar to that in Bristol County and Plymouth County. As shown in **Table 7.16-6**, in all of the study areas, the largest percentage of employment is in the educational services, and health care and social assistance sector. This sector accounted for 23.8 percent of employment in Taunton, 24.6 percent in Bristol County, 24.2 percent in Plymouth County, and 26.7 percent in Massachusetts as a whole. In terms of employment, retail is the second largest industry in all of the study areas except for Massachusetts as a whole, accounting for 15.1 percent in Taunton, 13.3 percent in Bristol County, and 12.9 percent in Plymouth County. In Massachusetts, the second largest industry is professional, scientific, and management, and administrative and waste management services, accounting for 12.7 percent of employment. Manufacturing accounts for the next highest proportion of employment in Taunton and Bristol County (9.4 percent and 12.3 percent, respectively). In Plymouth County, the professional, scientific, and management, and administrative and waste management services sector accounts for the third highest percentage of employment (10.2 percent). In Massachusetts, retail accounts represent the third highest percentage of employment (10.7 percent).

TABLE 7.16-6
JOB DISTRIBUTION BY NAICS SECTORS (PERCENT), 2006-2010

	City of Taunton	Bristol County	Plymouth County	Massachusetts
Agriculture, forestry, fishing and hunting, and mining	0.1	0.5	0.5	0.4
Construction	7	7.6	8.1	5.9
Manufacturing	9.4	12.3	7.9	9.9
Wholesale Trade	4.6	3.9	3.3	2.7
Retail Trade	15.1	13.3	12.9	10.7
Transportation and warehousing, and utilities	5	4	4.6	3.8
Information	1.5	1.9	2.4	2.7
Finance and insurance, and real estate and rental and leasing	5.6	6.6	9.3	8.1
Professional, scientific, and management, and administrative and waste management services	8.7	8.5	10.2	12.7
Educational services, and health care and social assistance	23.8	24.6	24.2	26.7
Arts, entertainment, and recreation, and accommodation and food services	9.9	8.3	7.5	8
Other services, except public administration	4.6	4.5	4.6	4.5
Public administration	4.7	4	4.6	4.1

Sources: US Census, 2006-2010 American Community Survey

7.16.3.2 Characteristics of the Labor Pool

Table 7.16-7 compares characteristics of the labor pool in the City of Taunton, Bristol County, Plymouth County, the two counties combined, and Massachusetts as a whole. Of the study areas, the City of Taunton had the highest proportion of the population 16 years and over in the labor force (72.1 percent). Workers in Plymouth County had the highest mean travel time to work of all of the study areas (32.2 minutes). Massachusetts as a whole had the highest percentage of the populations 25 years and over with a high school diploma or higher (94.7 percent) and with a bachelor's degree or higher (40.5 percent). Of the study areas, Bristol County and Massachusetts as a whole had the lowest percentage of the population 16 years and over in the labor force (67.7 percent for both counties) and Bristol County had the lowest percentage of the population 25 years and over with a high school diploma or higher (80.1 percent). The City of Taunton had the lowest percentage of the population 25 and over with a bachelor's degree or higher (20.7 percent).

TABLE 7.16-7
CHARACTERISTICS OF THE LABOR POOL, 2006-2010

	City of Taunton	Bristol County	Plymouth County	Total for two Counties	Massachusetts
Economic Characteristics					
Percent of Population (16 years and over) in labor force	72.1	67.7	69.2	68.4	67.7
Mean Travel Time to Work	26.9	25.9	32.2	26.5	27.3
Social Characteristics					
Percent of population with high school diploma or higher (25 years and over)	81.6	80.1	91.8	85.6	94.7
Percent of population with bachelor's degree or higher (25 years and over)	20.7	24.7	32.5	28.4	40.5

Notes: 1. Total for the two counties is based on a weighted average.
Sources: US Census, 2006-2010 American Community Survey

As shown in **Table 7.16-8**, between 2001 and 2011, the number of people unemployed increased in all of the study areas except in Massachusetts as a whole, where the total number of unemployed decreased over this time. The unemployment rate increased in all of the study areas during this time, remaining highest in Bristol County (10 percent). The City of Taunton had a relatively low unemployment rate of 3.9 percent in 2001, which increased to 8.6 percent by 2011.

TABLE 7.16-8
UNEMPLOYMENT

	Unemployed		Unemployment Rate	
Area	2001	2011	2001	2011
City of Taunton	1,186	2,681	3.9	8.6
Bristol County	13,208	29,160	4.7	10.0
Plymouth County	8,853	20,401	3.5	7.8
Total for two Counties	22,061	49,561	4.1	9.0
Massachusetts	3,275,350	3,202,267	3.7	7.4

Notes: Data not seasonally adjusted.
Source: Massachusetts Executive Office of Labor and Workforce Development

As shown in **Table 7.16-9**, average weekly wages in the City of Taunton are generally lower than in Massachusetts as whole. Average weekly wages in Bristol and Plymouth counties are also generally lower than in the state as a whole, but are similar to wages in the City of Taunton.

TABLE 7.16-9
AVERAGE WEEKLY WAGES BY NAICS SECTORS, 2010

	City of Taunton	Plymouth County	Bristol County	Massachusetts
Agriculture, forestry, fishing and hunting, and mining	NA	$901	$1,595	$ 982
Construction	$1,016	$1,182	$1,063	$ 1,238
Manufacturing	$1,290	$1,122	$1,155	$ 1,519
Wholesale Trade	$1,272	$1,607	$1,144	$ 1,604
Retail Trade	$528	$537	$502	$ 561
Transportation and warehousing	$895	$878	$890	$ 953
Information	$1,198	$1,184	$1,021	$ 1,785
Finance and insurance	$1,171	$1,333	$1,084	$ 2,333
Real estate and rental and leasing	$702	$855	$766	$ 1,215
Professional and technical services	$1,663	$1,333	$1,260	$ 2,039
Management of companies and enterprises	$1,285	$1,586	$1,887	$ 2,114
Administrative and waste services	$812	$835	$557	$ 779
Educational services	$1,033	$919	$977	$ 1,071
Healthcare and social assistance	$942	$889	$882	$ 1,051
Arts, entertainment, and recreation	$472	$447	$409	$ 684
Accommodation and food services	$310	$321	$296	$ 391
Other services	$402	$498	$392	$ 557
Total, all government	$1,172	$1,149	$1,049	$ 1,202

Notes: All values reported in 2012 dollars, based on US Department of Labor, Bureau of Labor Statistics Consumer Price Index for all urban consumers in the northeast.
Sources: Massachusetts Executive Office of Labor and Workforce Development (EOLWD)

7.16.3.3 Tax Revenues

Based on assessed valuations and the fiscal year 2012 tax rates from the City of Taunton, the proposed Project Site will generate approximately $369,014 in property tax revenues during fiscal year 2012. This total represents 0.51 percent of the total tax property tax revenue for the City of Taunton. **Table 7.16-10** lists the assessed value and taxes owed for each of the Project Site parcels.

TABLE 7.16-10
MASHPEE WAMPANOAG CASINO PARCELS, TAXABLE VALUE, TAX RATES, AND TAX PAYMENTS IN CITY OF TAUNTON

Number	Parcel ID Number	Location	Estimated Total Taxes Paid
North of Railroad Tracks			
1	94-156-0	Middleborough Avenue (Lot 14)	$43,090
2	95-36-0	5 Stevens Street	$2,969
3	108-27-0	O'Connell Way (Lot 13)	$37,842
4	108-26-0	O'Connell Way (Lot 9B)	$18,453
5	118-49-0	O'Connell Way (Lot 9A)	$9,209
South of Railroad Tracks			
6	118-50-0	50 O'Connell Way	$152,791
7	118-45-0	60 O'Connell Way	$35,947
8	109-302-0	O'Connell Way (Lot 11)	$8,388
9	119-1-0	73 Stevens Street	$14,506
10	118-51-0	O'Connell Way	$486
11	118-52-0	Stevens Street	$47
12	119-67-0	O'Connell Way	$6,010
13	109-299-0	61R Stevens Street	$13,633
14	119-66-0	71 Stevens Street	$25,642
		Total	**$369,014**
		Total Property Taxes for the City of Taunton	**$72,783,646**
		Percent of Total Property Taxed for the City of Taunton	**0.51%**

Notes: Tax rates represent fiscal year 2012 rates.
Sources: City of Taunton Assessor

7.16.4 COMMUNITY INFRASTRUCTURE

This section discusses the community facilities that serve the Project Site and the surrounding area within the City of Taunton.

7.16.4.1 Criminal Justice System

The City of Taunton is under jurisdiction of the Taunton District Court, which handles civil and criminal cases for Bristol County. Local justice is handled by the Taunton District Court, which is a branch of the Massachusetts Trial Court system established under Chapter 478 of the Acts in 1978. The Bristol County Superior Court handles any civil actions over $25,000 and matters in which equitable relief is sought. In addition, the Superior Court has exclusive jurisdiction in first degree murder cases and original jurisdiction for all other crimes.

7.16.4.2 Police

Taunton Police Department

The Taunton Police Department (TPD) is located at 23 Summer Street in the City of Taunton. The TPD consists of three separate administrative divisions each headed by a captain. The largest, the Field Services Division, is responsible for responding to calls, dispatch organization, and general law enforcement. The Field Services Division consists of patrol, K-9, dispatch, traffic, and detail hiring units. The Investigative Services Division is responsible for investigation regarding serious crimes. This division consists of a detective unit, sex offender registration, and officers assigned to federal task forces. The Administrative Division handles internal operations and includes the Community Policing Unit, School Resource Officer, Internal Affairs, domestic violence, meters, training, court prosecution, firearms licensing, and clerical staff. The TPD also has a Street Crimes Unit that is outside of the normal chain of command and is responsible for drug, gang, and firearms related offenses. The TPD employs 103 officers.

Bristol County Sheriff's Office

The Bristol County Sheriff's Office (BCSO) is located at 400 Faunce Corner Road in the Town of Dartmouth. BCSO operates over 20 different divisions each with a separate set of law enforcement responsibilities. Along with these divisions, BSCO houses approximately 1,500 people in custody as part of a sentence or awaiting trial. BCSO operates three adult correctional facilities, a juvenile alternative lock-up facility, and a regional lock-up facility.

Massachusetts State Police

The City of Taunton falls under the jurisdiction of Station D-4 (Middleboro), under Troop D of the Massachusetts State Police. Station D-4 is located at 326 West Grove Street in the Town of Middleboro and is responsible for patrolling 50 miles of state and US highways, including Route 24, Route 495, and Route 140. The station also provides secondary patrol coverage for 94 miles of Routes 4, 18, 28, and 138.

7.16.4.3 Fire Protection

The Taunton Fire Department (TFD) is located at 50 School St in the City of Taunton. Currently, the TFD employs 112 officers in six stations. Five of the stations house an engine and ladder while one is reserved for administrative uses, fire inspection, and public safety officers. The TFD has five engine companies, three ladder trucks, and one heavy rescue truck. The TFD contracts with American Medical Response to provide two trucks and 16 staff dedicated to Taunton.

7.16.4.4 Emergency Medical Services and Hospitals

Residents suffering from medical emergencies are transported to Morton Hospital at 85 Washington Street in the City of Taunton. The hospital was acquired in October 2011 by Steward Health Care System, the largest fully integrated community care organization in New England. Morton Hospital

has 154 beds and had 7,496 admissions in fiscal year 2011. The Morton Hospital emergency room handled 52,794 visits in fiscal year 2010.

Outside of the City of Taunton, Bristol County includes seven hospitals: Sturdy Memorial Hospital and Arbour Fuller Hospital in Attleboro; New Bedford Rehabilitation Hospital and St. Luke's Hospital in New Bedford; and Charleton Memorial Hospital, Saint Anne's Hospital and South Coast Hospital Group in Fall River. There are nine hospitals located in Plymouth County, including: Pembroke Hospital in Pembroke, Brockton Hospital, VA Boston Healthcare System, and Caritas Good Samaritan Healthcare Center located in Brockton; Bridgewater State Hospital in Bridgewater; Tobey Hospital in Wareham; The Rehabilitation Hospital of the Cape and Islands in East Sandwich; Falmouth Hospital in Falmouth; and Cape Cod Hospital in Hyannis.

7.16.4.5 Schools

The City of Taunton is served by the Taunton Public School District, which comprises 13 schools. Enrollment for the 2011-2012 school year was 7,788 students. The district includes one preschool, eight elementary schools, three middle schools, and one high school. Total enrollment has slowly declined over the past 10 years as the school district has lost approximately 400 students since 2003.

The proposed budget for the 2013 fiscal year is approximately $66.5 million. The Taunton Public School District received approximately $47.6 million in Chapter 70 State Aid for fiscal year 2012.

As shown in **Table 7.16-11** below, Bristol and Plymouth Counties are served by a total of 317 schools, comprising 65 high schools, 79 middle schools, and 173 elementary schools. According the Massachusetts Department of Elementary and Secondary Education, the average student-teacher ratio for Massachusetts schools is 13.9 students per teacher. Bristol County Schools average 13.4 students per teacher, and Plymouth County schools average 13.4 students per teacher.

TABLE 7.16-11
SCHOOLS IN BRISTOL AND PLYMOUTH COUNTIES

County	High Schools	Middle Schools	Elementary Schools	Total
Bristol	29	39	95	163
Plymouth	36	40	78	154
	65	79	173	317

Sources: Publicschoolreview.com, accessed January 19, 2012

2010 U.S. Census American Community Survey data indicates a total school enrollment in Bristol and Plymouth County schools as 205,234 students in all grades. As shown in Table 7.16-12, below, the trend in school enrollment has shown a decrease in total student population since the 2000 U.S. Census. In 2000, the total student population was 214,657, declining to 205,234 in 2010, representing a loss of 9,423 students, a nearly 4.4 percent decrease. Projecting forward into the future, the gain in high school students will represent empty school seats as these upper grade students graduate and

move on to post-high school careers. The greatest loss of students is in the lower grades, which showed a substantial 10 percent decline, or a decrease of 12,315 students. This lower school enrollment decline suggests that the desks vacated by graduating upper school students will not be fully replenished by younger students moving up through the grades. Further, the lower school enrollment, while slightly higher than a decade ago, is not sufficient to fill the desks of the elementary school students who will be moving toward high school in the coming years, suggesting that all grades will show smaller classroom populations and, presumably, higher student-teacher ratios than currently exist.

These school population declines reflect a period during which the overall populations of Bristol and Plymouth Counties had increased by 2.5 and 4.7 percent, respectively, as shown in **Table 7.16-1**.

TABLE 7.16-12
BRISTOL AND PLYMOUTH COUNTY SCHOOL ENROLLMENT TRENDS

	High School (Grades 9-12)			**Elementary School (Grades 1-8)**			**Nursery/Pre-School/Kindergarten**		
	2000	2010	Change	2000	2010	Change	2000	2010	Change
Bristol County	30,179	30,983	+804	61,349	53,405	-7,944	17,451	17,590	+139
Plymouth County	28,835	30,522	+1,687	59,971	55,600	-4,371	16,872	17,134	+262
			+2,491			-12,315			+401

Sources: 2000 U. S. Census and 2010 U. S. Census American Community Survey.

SECTION 7.17
ENVIRONMENTAL JUSTICE

7.17.1 INTRODUCTION

On February 11, 1994, then President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."[1] This Executive Order was designed to ensure that each federal agency "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

The assessment of environmental justice considers the following:

- The areas in which the proposed Project may result in significant adverse environmental effects;
- The presence and characteristics of potentially affected minority and/or low-income populations ("communities of concern") residing in these study areas; and
- The extent to which these communities are disproportionately affected in comparison to the effects experienced by the population of the greater geographic area within which the affected area is located is determined.

Guidance documents define minorities as including American Indian or Alaskan natives, Asian or Pacific Islanders, Black, or Hispanic persons. For the purposes of this analysis, a community may be considered to have a minority population when the percentage of minorities in a study area is "meaningfully greater" than the minority percentage of the general population. The composition of the affected area population is therefore compared to the characteristics of the population in the next larger geographic area or political jurisdiction. For race and ethnicity, **Table 7.17-1** below includes Asian, Black, Hispanic, and white populations. The "other" category includes respondents to U.S. Census surveys who did not identify with any listed racial groups (white, Black, Asian), or who indicated that they are of more than one race than the U.S. census defines. The U.S. Census Bureau defines persons of Hispanic origin as those respondents who classified themselves in one of the specific Hispanic origin categories in the census questionnaire, such as "Mexican," "Cuban" or "Puerto Rican," as well as those who indicated that they were of "Other Spanish/Hispanic/Latino" origin. These respondents include those whose origins are from Spain, the Spanish-speaking countries of Central and South American or the Dominican Republic, or who are persons of Hispanic origin who identify themselves generally as Spanish, Spanish-American, Hispanic or Latino. Persons of Hispanic origin may be of any race.

[1] Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Available from U.S. Environmental Protection Agency (EPA) at http://www.epa.gov/fedreg/eo/eo12898.htm.

A community of concern can also be similarly identified by the presence of low-income populations within the affected study area. The existence of these populations can be identified using the poverty thresholds available from the U.S. census and a comparison to the general population sets the context for the assessment. The income statistics shown in **Table 7.17-1** include the percentage of households living below poverty level. Poverty level is defined by the U.S. Census Bureau, which considers a variety of factors including family size, number of children and the age of the householder. To determine a person's poverty status, total family income over a 12-month period is compared against the poverty threshold appropriate for that person's family size and composition. Since poverty status is defined at the family level and not the household level, the poverty status of a household is determined by the poverty status of the householder. Households are classified as poor when the total income in a 12-month period is below the appropriate poverty threshold. Income thresholds are not adjusted for regional or local variations in the cost of living.

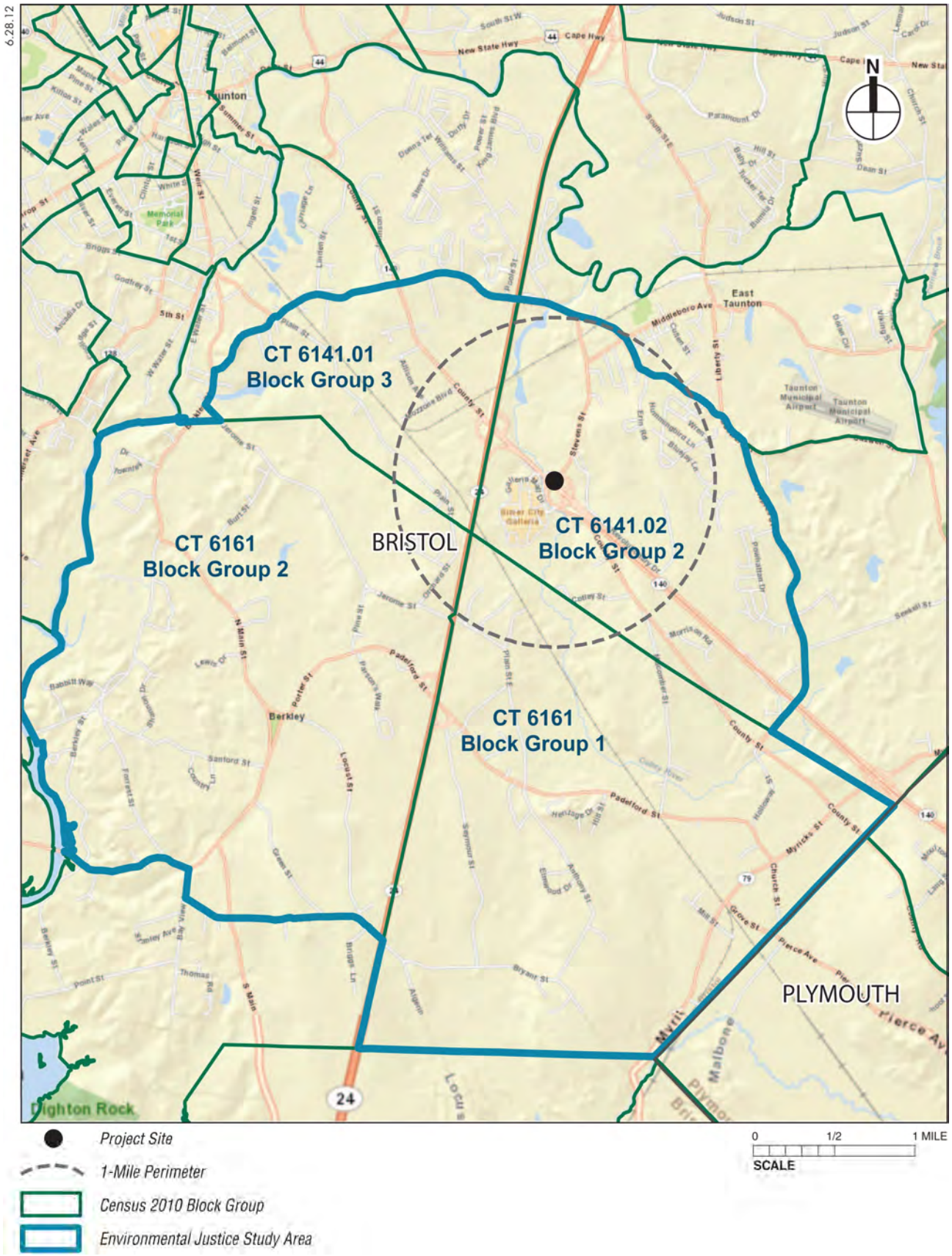
7.17.2 ENVIRONMENTAL JUSTICE COMMUNITIES

The study area for the environmental justice analysis in the City of Taunton encompasses the area most likely to be affected by the BIA's taking of land into trust for the Tribe and considers the area where potential impacts resulting from construction and operation of a destination resort casino at the Project Site could occur. As shown in **Figure 7.17-1**, the study area includes four census block groups that are partially within a one-mile radius of the Project Site. The study area includes Census Tract 6141.02, Block Group 2; Census Tract 6141.01, Block Group 3; and Census Tract 6161, Block Groups 1 and 2. These populations are compared to Bristol County and the Commonwealth of Massachusetts as the context for assessment. Population and demographic data used in this analysis was obtained from the 2010 U.S. Census and the 2006-2010 American Community Survey.

Table 7.17-1 shows population and economic characteristics for the environmental justice study area in terms of race, ethnicity, and poverty status, and compares it to Bristol County and Massachusetts as a whole.

In all four block groups in the study area, the majority of the population identified themselves as white. Three of the block groups had a lower proportion of total minority populations than in Bristol County and in Massachusetts as a whole. Census Tract 6141.01 Block Group 3 had a higher proportion of total minority population (24.7 percent) than in Bristol County (14.4 percent). This percentage is also slightly higher than that in Massachusetts (23.9 percent). As a whole, the environmental justice study area had a lower percentage minority population than both Bristol County and Massachusetts.

The study area also had a lower proportion of population living below the poverty level than in both Bristol County and Massachusetts. However, Census Tract 6141.01 Block Group 3 had a higher proportion of population living below the poverty level (24.2 percent) than in Bristol County (11.3 percent) and Massachusetts as a whole (10.5 percent).



SOURCE: Mashpee Wampanoag Tribe

Figure 7.17-1
Taunton Environmental Justice Study Area

As a whole, the study area does not exceed the proportions of minority population or population living below the poverty level of Bristol County, and is therefore not considered a potential environmental justice area. However, as Census Tract 6141.01 Block Group 3 exceeds the proportions of minority population and population living below the poverty level in Bristol County, this census tract is considered an Environmental Justice Community.

TABLE 7.17-1
POPULATION AND ECONOMIC CHARACTERISTICS

Area	Total Population	Race (percent of population)					Total Minority (percent)	Below the Poverty Level (percent)
		White	Black or African American	Asian	Other	Hispanic		
Study Area Block Groups								
Census Tract 6141.01 Block Group 3	2,438	75.3	9.4	2.0	5.7	7.6	**24.7**	**24.2**
Census Tract 6141.02 Block Group 2	2,758	87.8	4.7	0.9	3.2	3.3	12.2	0.0
Census Tract 6161, Block Group 1	1,833	95.3	1.0	0.2	1.5	1.9	4.7	5.8
Census Tract 6161, Block Group 2	2,753	94.8	1.0	0.6	1.9	1.7	5.2	4.5
Total, Study Area	9,782	88.5	3.9	0.9	3.1	3.6	11.5	8.4
Bristol County	548,285	85.6	2.9	1.8	3.7	6.0	14.4	11.3
Massachusetts	6,547,629	76.1	6.0	5.3	3.0	9.6	23.9	10.5

Notes: 1. The racial and ethnic categories provided are further defined as: White (White alone, not Hispanic or Latino); Black (Black or African American alone, not Hispanic or Latino); Asian (Asian alone, not Hispanic or Latino); Other (American Indian and Alaska Native alone, not Hispanic or Latino; Native Hawaiian and Other Pacific Islander alone, not Hispanic or Latino; Some other race alone, not Hispanic or Latino; Two or more races, not Hispanic or Latino); Hispanic (Hispanic or Latino; Persons of Hispanic origin may be of any race).

2. Population with income below established poverty level; the U.S. Census Bureau's established income thresholds define poverty level.

3. Percentages in **bold** were identified as minority or low-income communities.

Sources: U.S. Census Bureau, Census 2010, SF1, American Community Survey 2006-2010

The Mashpee Wampanoag Tribe also constitutes an Environmental Justice Community, as described in **Section 5.4** of this DEIS.