



ROUTE 18 CORRIDOR TRANSPORTATION PLANNING STUDY EAST BRIDGEWATER, BRIDGEWATER

Old Colony Planning Council October/2023,

Prepared Under MassDOT Contract 118969

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The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code.

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Introduction and Study Purpose

The purpose of the Route 18 Corridor Study is to develop short-term and long-term recommendations and strategies that focus on transportation equity, traffic flow and circulation, mobility, safety, and air quality for all transportation modes, including bicycle, pedestrian, and transit accommodation within the Route 18 study area. The corridor study area includes Route 18 from the Whitman town line with East Bridgewater and ends at the Bridgewater/Middleborough town line, approximately nine miles in length. The study's purpose is to identify operational deficiencies and discern system needs. The improvements resulting from this study are intended to support regional objectives, adjacent land use integration, and accommodation of future land use development. The study process conforms with industry standards and requirements based on federal and state guidelines and practices, with the consideration of local ordinance, plans, and statutes. The "Complete Streets" concept, (designing roads for all road users), traffic calming, access management, and local and state plans are considered in the development of specific improvement projects and are key to defining a long-term vision for the study corridor.

Route 18 is a major arterial route providing regional north south connections in southeastern Massachusetts between Route 3 in Weymouth to Route 44 at the Middleborough Rotary. This study focusses on key intersections in East Bridgewater and Bridgewater and the potential impact of changing land use on the Levels-of-Service. As traffic within the corridor grows, due to population growth as well as growth in retail, institutional, and commercial development, congestion and delay has also grown at key intersections. In addition, increased traffic volumes increase crash exposure, especially at intersections in East Bridgewater and Bridgewater centers with multiple turning movement conflicts. Figure 1 shows the geographic scope of the study area.

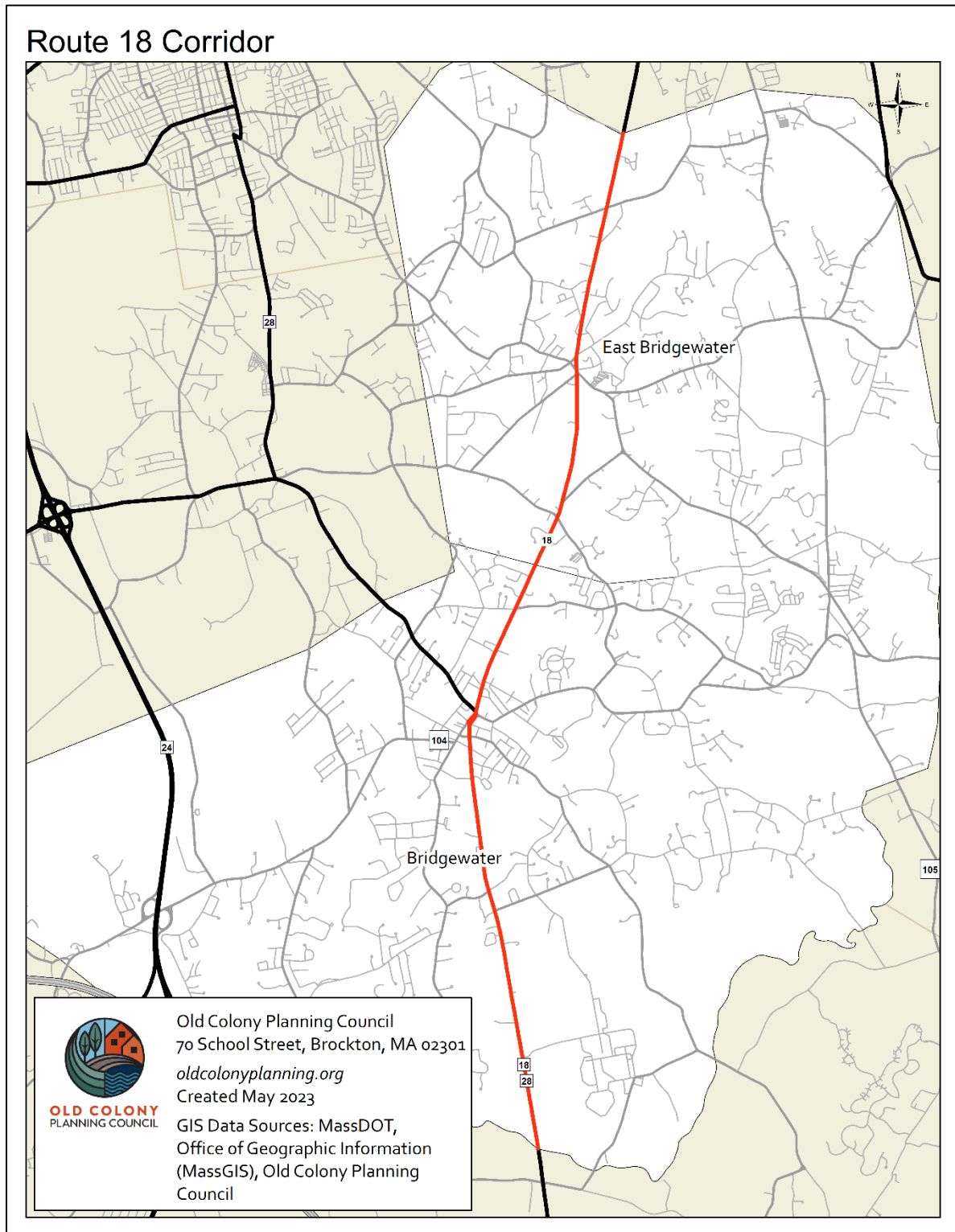
The Route 18 Corridor Study was funded under the Old Colony Metropolitan Planning Organization (MPO) Unified Planning Work Program (UPWP) Project #3300. The UPWP documents the planning activities provided and funded under the provisions of the Bipartisan Infrastructure Law (BIL). The BIL was instituted in 2022. This corridor study's purpose is to provide assistance to the communities of East Bridgewater and Bridgewater in developing solutions for transportation needs within the Route 18 corridor study area. The proposed recommendations are in keeping with the visions for the future development, character, and land use patterns of these communities. The proposed improvements in this report are intended to serve as a basis for including improvement projects in the Old Colony Metropolitan Planning Organization (MPO) Transportation Improvement Program (TIP), and Regional Long Range Transportation Plan (LRTP).

The tasks included in this study scope include:

- Providing a public participation component that includes all constituents including the traditionally underserved.
- Meeting with stakeholders in each of the communities.
- Documenting existing traffic and transportation conditions and identifying deficiencies (bottlenecks, chronic congestion, safety problems).
- Identifying future planned development and discerning the potential impact on the roadway corridor and at key intersections.
- Forecasting future conditions and identifying potential improvement projects, short-term and long-term, for the study area.

- Periodic reporting on the study's progress to the members of the Old Colony Metropolitan Planning Organization and the Old Colony Joint Transportation Planning Committee.

Figure 1 Geographic Scope



Study Methodology and Scope

This study includes a review and inventory of existing traffic conditions (traffic volumes, intersection peak hour Levels-of-Service, speeds, and heavy vehicles), physical built conditions (such as traffic control, lane use, signage, pavement conditions, intersection alignment), crash analyses, previously planned improvements, land use conditions and potential new development, community goals and plans, zoning, and previous studies focusing on the Route 18 corridor. Traffic forecasts and Level-of-Service analyses for future (five-year horizon) peak hour conditions were performed for this study.

Traffic analyses and future traffic estimates for this study were completed utilizing standard practices published in the ITE Highway Capacity Manual. The traffic analyses were completed for the intersection peak hour operations using SYNCHRO software (with SimTraffic) with future No-Build and Build peak hour condition scenarios. SYNCHRO takes into account traffic queues and delays at an intersection that interfere with acceptable operations and also with operations at other nearby intersections.

Traffic data collection and crash analyses included in this study were completed in accordance with the procedures and techniques in the Manual on Uniform Traffic Control Devices (MUTCD). Information on intersection crashes, right-of-way, highway width, functional classification, and jurisdiction were obtained from the Massachusetts Registry of Motor Vehicles, the Massachusetts Department of Transportation (MassDOT), the Federal Highway Administration (FHWA), and the Massachusetts Geographic Information System (MassGIS).

Public Outreach

Survey

Old Colony Planning Council (OCPC) developed a public survey questionnaire to help identify and prioritize problems and improvement strategies within the study area. The survey was developed using Survey Monkey and was available via link online at several web sites including the OCPC website and the Town of East Bridgewater and Bridgewater website. The survey was also available at table events such as Earth Day at Bridgewater State University. The purpose of the survey was to garner public input on transportation issues as well as to raise awareness, giving the public the opportunity to participate anonymously. In addition, participating individuals were encouraged to leave contact information to keep them updated regarding additional information or public meetings. The survey was available online via link at the OCPC web site, the Town of East Bridgewater web site, and the Town of Bridgewater web site. The survey was available via the OCPC E-newsletter and on social media. The survey was available in four languages including English, French, Haitian Creole, Portuguese, and Spanish. The following summarizes the survey questions and responses.

1. What city/town are you currently living in?
2. Is your trip destination located along the Route 18 Corridor or are you passing through?
3. Why do you travel along Route 18 (select all that apply)?
4. What mode do you use to travel along Route 18 (select all that apply)?
5. What time periods do you think the most congested time occur along Route 18 Corridor?
6. Do you feel Route 18 is a congested corridor?
7. Do you feel Route 18 is a dangerous corridor?
8. If available, would you consider the other modes to travel along Route 18?
9. Do you find yourself seeking alternate routes to avoid Route 18 congestion on a regular basis?

10. What would you like to see for the future of Route 18 Corridor?
11. What are your main concerns for Route 18 Corridor?
12. Which infrastructure investments do you think should be considered to improve access and mobility along Route 18?
13. Would you like to participate in future meetings for Route 18 Corridor Planning Study?

Survey Results

The survey was available to the public for approximately three months between April and the end of June 2023. During this time, 404 surveys were completed and compiled. Sixty-nine percent of the surveys were completed by East Bridgewater residents, twenty-seven percent were completed by Bridgewater residents, three percent were completed by residents of other surrounding communities, and 0.5 percent (one-half) were completed in Whitman as well as West Bridgewater.

Figure 2 shows the distribution of residences for the respondents of the survey. Figure 3 shows the results of Question 2, which asked whether motorists were passing through the corridor or using it for access to a destination along the corridor. About 19 percent of respondents stated that they were passing through, 17 percent stated that they had a destination along the route, and 63 percent said that they were passing through but stopped at a destination along the corridor. Six percent of the respondents indicated they were traveling on Route 18 for “other” reasons. Most of these “other” respondents were visiting friends or family for social reasons. The high percentage of traffic that has a destination along the corridor is indicative of the importance of the impact of land use in the function of the Route 18 corridor in Bridgewater and East Bridgewater. As development expands in and around both Bridgewater and East Bridgewater centers and along the corridor itself, the Route 18 corridor’s function as a destination for adjacent land use becomes prominent compared to its function as a route for providing long distance travel between regions and communities.

Figure 2

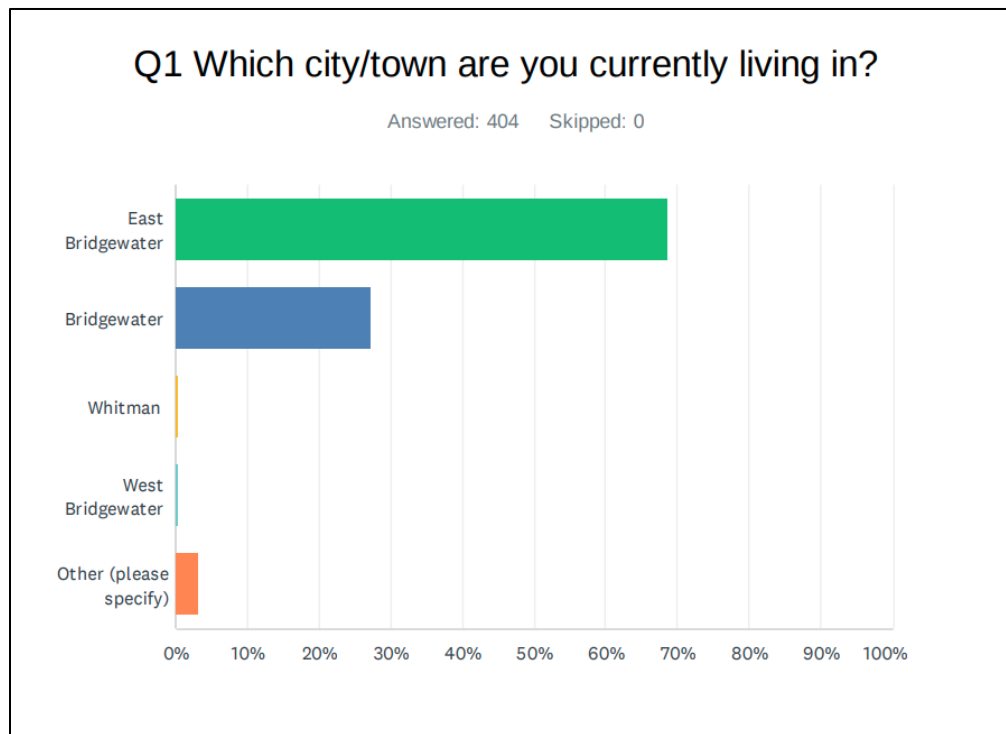
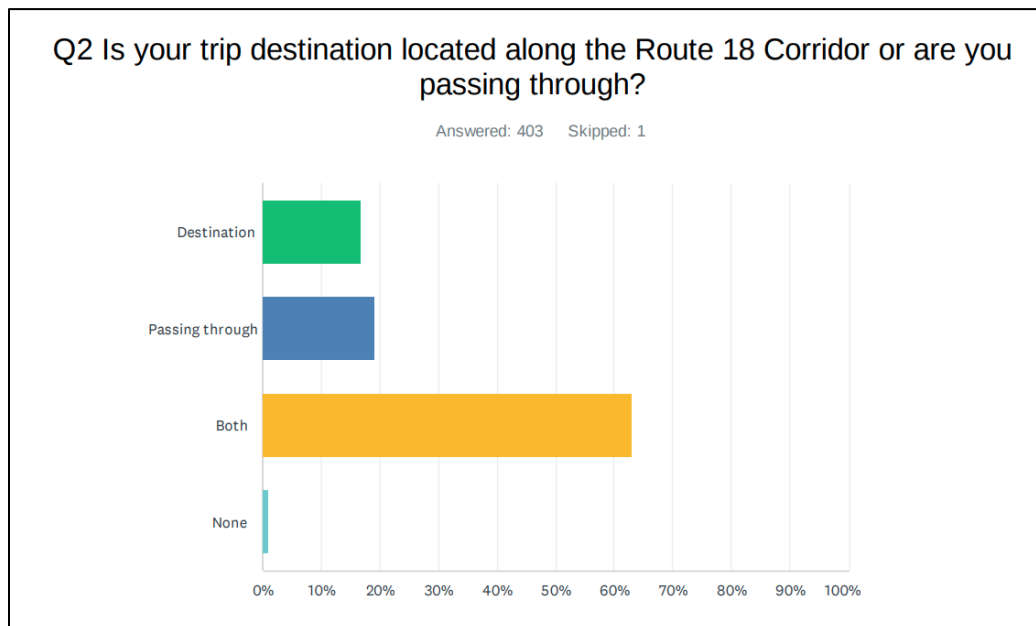


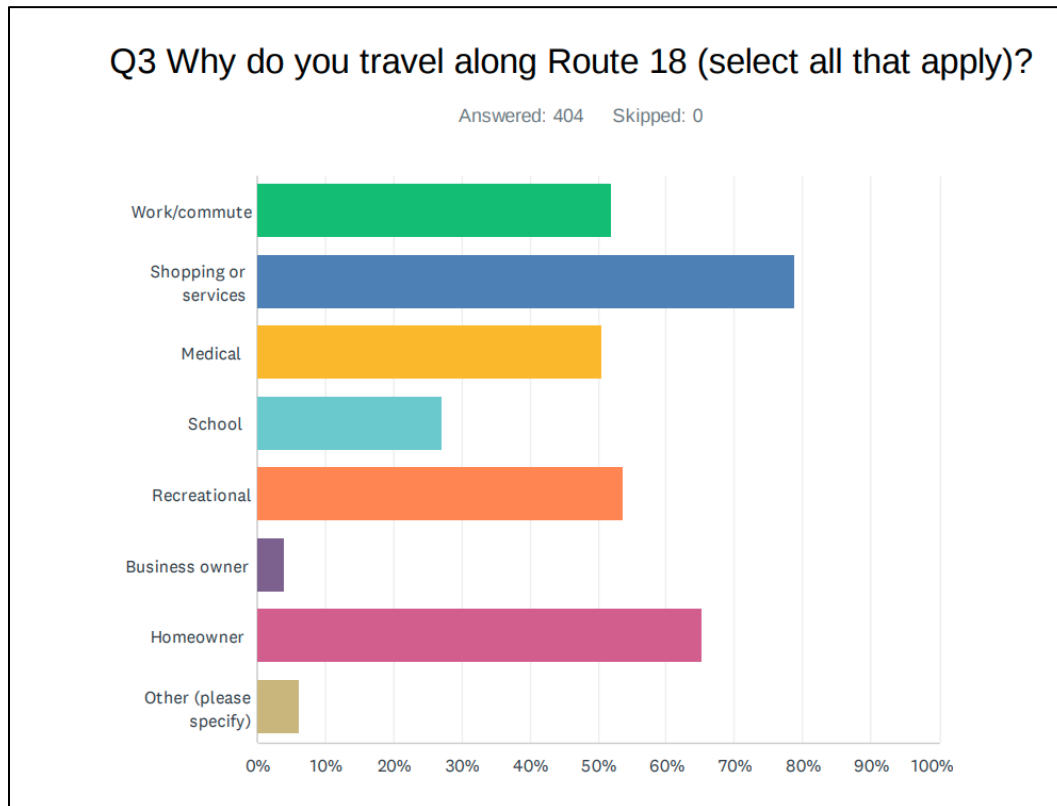
Figure 3



Question 3, which asked respondents to indicate why they travel along Route 18, gave the option for the respondents to choose more than one answer as many people use the corridor for multiple reasons. The answers to question 3 further indicate the significance of land use growth in the corridor further

evolving the prominence of developmental growth compared to its function as a route providing regional travel. Figure 4, which shows the results of Question 3, shows that the corridor is important to home and commuter trips, shopping and service trips, medical and educational trips, and recreational trips. Route 18 is, based on the answers from Question 3, important in the lives of residents of Bridgewater and East Bridgewater in work, service and shopping, medical services, education, and recreational and social activities.

Figure 4



Question 4, shown in Figure 5, asked about mode of travel. Question 4 shows that people travel by car overwhelmingly on Route 18; however, many people (14 percent) also walk along the corridor. Both East Bridgewater and Bridgewater have long established and well-defined town centers; the number of walkers is indicative of the desire for safer and expanded pedestrian amenities and safety in the town centers as well as along the Route 18 corridor.

Figure 5

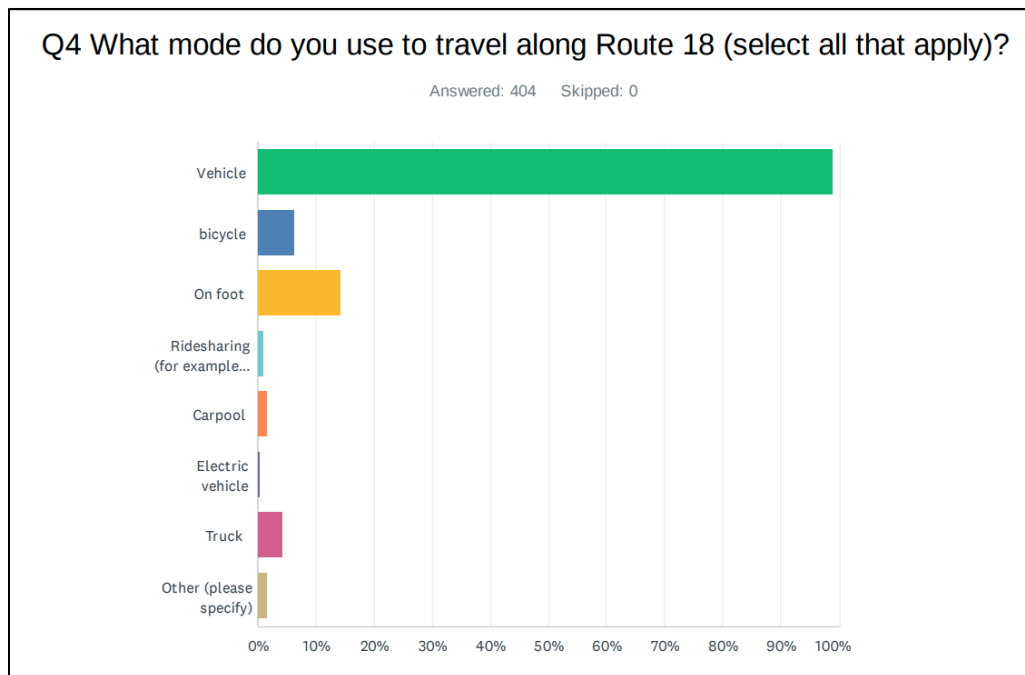
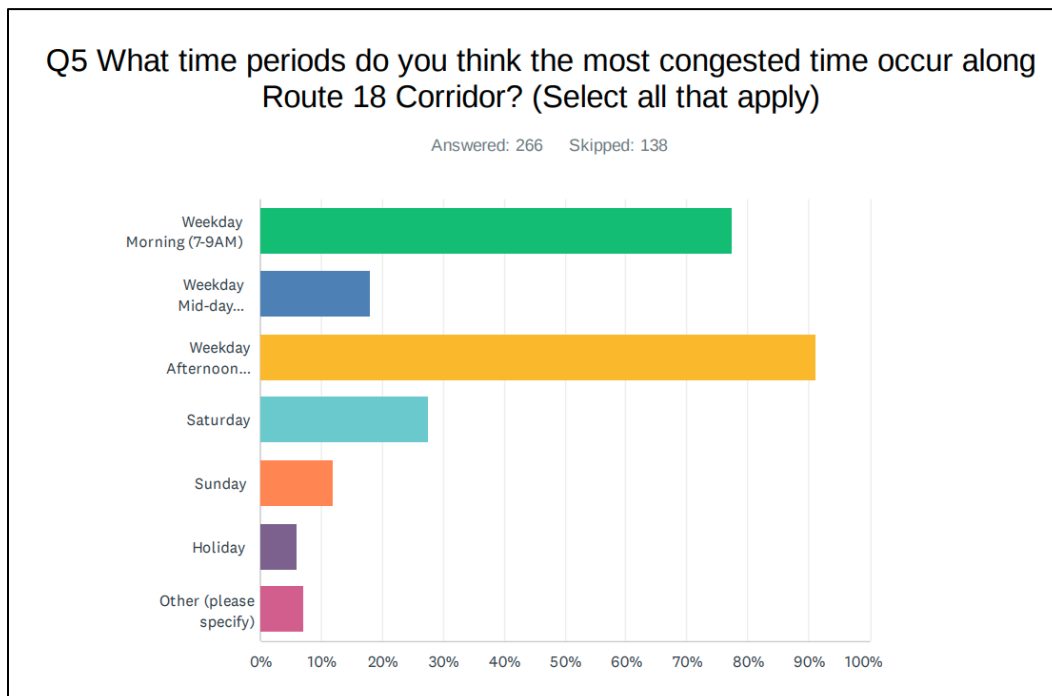


Figure 6



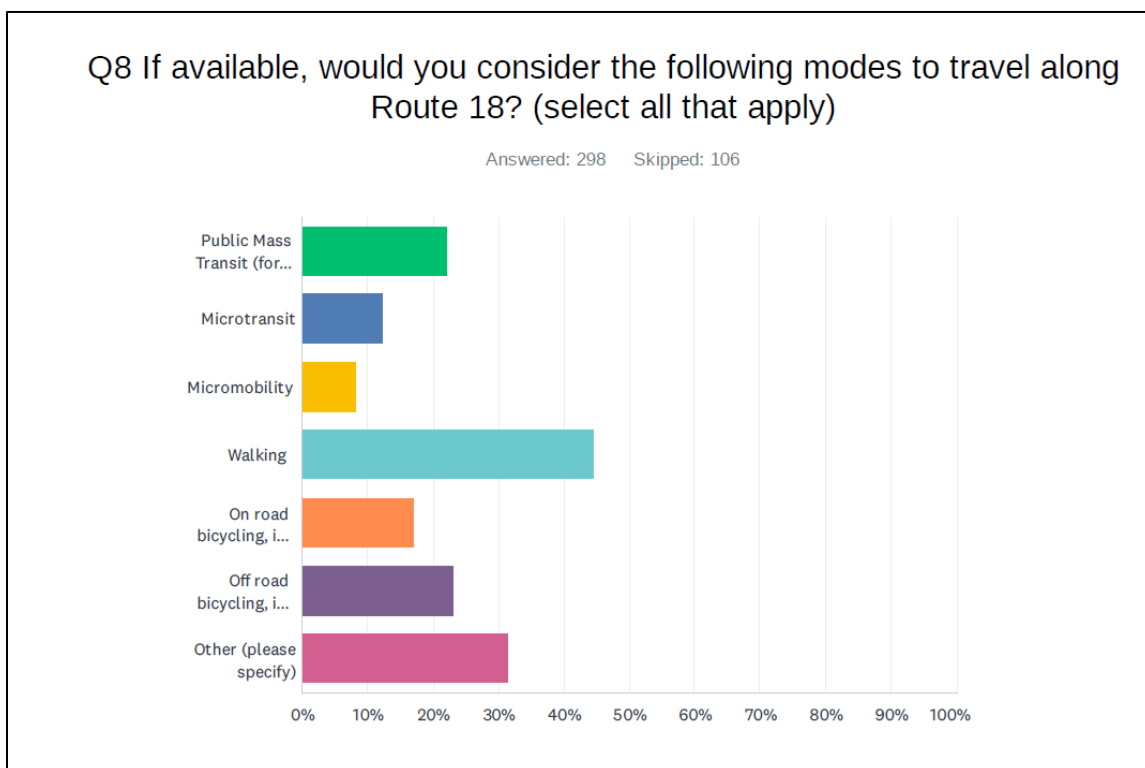
Questions five and six had to do with congestion, where respondents indicated the most congested times and locations. The weekday mornings and weekday afternoons were deemed as the most congested times. The survey respondents named the intersection of Bedford Street (Route 18) at Spring

Street/Central Street/Maple Avenue, the town center in East Bridgewater, as the location with the most congestion. In Bridgewater, the intersection of Central Square at South St/Church St/School St/Bedford Street (Route 18 and 28) was cited as the most congested location.

Question seven asked what intersection locations were the most dangerous. In East Bridgewater, respondents cited the intersection of Bedford Street (Route 18) at West Street (Route 106) and East Street as the most dangerous. The southern end of Central Square, Central Square at South St/Church St/School St/Bedford Street (Route 18 and 28), was cited as the most dangerous intersection in Bridgewater.

Question eight provided participants an opportunity to consider alternative modes of travel. Figure 7 summarizes the results of Question eight. Forty-four percent of respondents indicated that they would choose walking within the corridor, presumably if more opportunities were provided. Although 31 percent of the respondents chose “other”, all of these respondents used the opportunity to reiterate that they would choose automobile over all the other modes and did not specify any additional modes not listed.

Figure 7



Question nine indicated that 75 percent of the participants often find themselves seeking alternative routes to Route 18 due to congestion. Question Ten asked about alternative routes. Most participants indicated that they use a variety of options and back roads, especially to avoid the centers of East Bridgewater and Bridgewater. Questions eleven and twelve asked what participants see for the future of Route 18 and what their main concerns were for the corridor. These questions allowed for more than one answer or concern. Forty-eight percent responded that they would like to see less travel delays and 45 percent indicated that they would like more sidewalks in the corridor. Twenty-five percent

recognized the impact of commercial development and would like to see less commercial density and more access management in the corridor. In addition, respondents called for more signals and turning lanes. Congestion and traffic delays were a repetitive theme among respondents' concerns as well as over development of the corridor.

Meetings and Events

The public outreach included soliciting public input at town meetings, town elections, and other events including April 2023 Bridgewater Town elections, May 2023 East Bridgewater Town meeting, May 2023 East Bridgewater Town elections, as well as the Earth Day April 20, 2023, event at Bridgewater State University. These events provided opportunities for staff to encourage the public in taking the Route 18 survey as well as speaking to the public directly concerning transportation issues and concerns regarding Route 18.

OCPC held stakeholder meetings with local officials in Bridgewater in March 2023. The discussion focused around fulfilling the town's vision for the downtown. This included enhanced pedestrian safety, pedestrian awareness, and accommodation, with a functional common. It included adding bicycle lanes to the town oval on both sides, keeping traffic flowing on both sides of the common, but widening Central Square sidewalks for outside dining. Also discussed were better wayfinding for parking and better connections with Bridgewater State University, preferably utilizing School Street as a gateway.

OCPC held a meeting and field visit with East Bridgewater officials in March 2023 to review and discuss potential development in East Bridgewater due to the extension of the Brockton sewer line to East Bridgewater and the establishment of the sewer district. This sewer extension is expected to increase development along Route 18 north of the East Bridgewater downtown and an expansion of the existing Compass Medical Center.

In addition to stakeholder meetings, OCPC staff regularly updated the Joint Transportation Committee and the Metropolitan Planning Organization on the Route 18 study process and progress during regular meetings.

Remote Public Meeting

The Old Colony Planning Council (OCPC) held a public meeting remotely on October 5, 2023, to present the findings and conclusions to the public. The meeting was held remotely in cooperation with the Towns of East Bridgewater and Bridgewater. The meeting was recorded and available on the OCPC website. OCPC staff presented the potential improvements for specific locations within the corridor. In addition, the Town of Bridgewater's Director of Community and Economic Development presented and led a discussion of the town's vision for the updated design of Central Square. The Town Administrator for East Bridgewater was also a panelist at this public meeting with a discussion of the Town of East Bridgewater's vision for the Route 18 corridor and the need for improvements at the East Bridgewater Town center as well as at the Bedford Street (Route 18/106)/West Street (Route 106)/East Street intersection.

Land Use, Zoning, and Environment

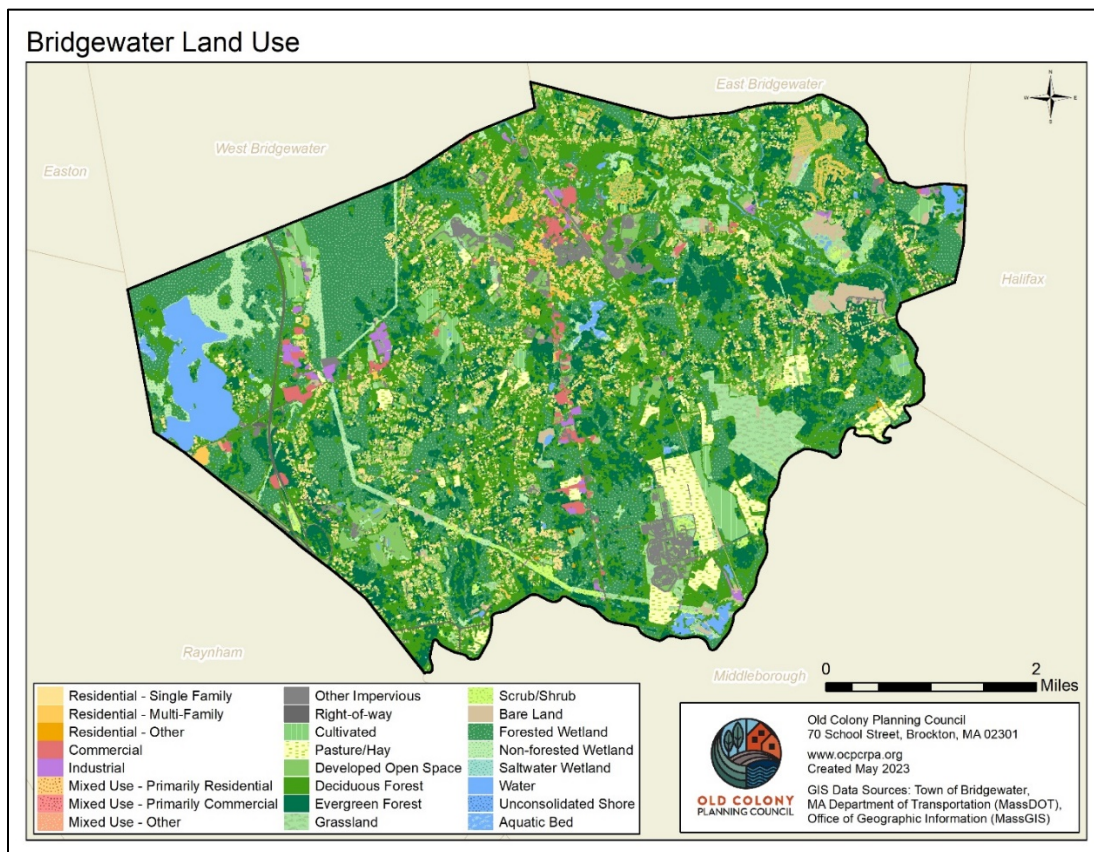
Land Use

The existing land use along the Route 18 corridor in both East Bridgewater and Bridgewater consists of a mix of uses including institutional (medical as well as schools and government services), commercial

development, and residential uses. The land use includes traditional downtowns as Route 18 traverses both the center of East Bridgewater and the center of Bridgewater (Central Square). Figures 8 and 9 show the existing land uses in Bridgewater and East Bridgewater.

Figure 8 shows commercial and industrial land uses along Route 18 in Bridgewater through the center of the land use map. Figure 8 shows that although there are large parcels of commercial and institutional land uses along Route 18 in and around Central Square, there are large areas of residential uses around Central Square also, which indicates potential walking and bicycling accessibility for Bridgewater residents to and from Central Square. South of Central Square, along Route 18, there are extensive commercial parcels spread out along the route almost to the Middleborough line. North of Central Square, the commercial area is more compact and conducive to walking, bicycling, and transit. This area is traversed by commuter rail, which currently stops at the BSU station located east of Central Square on the BSU campus. Based on meetings with the Town of Bridgewater officials, establishing a commuter rail station north of Central Square would be advantageous for locating a Transit Oriented Development with easier walking access to Central Square.

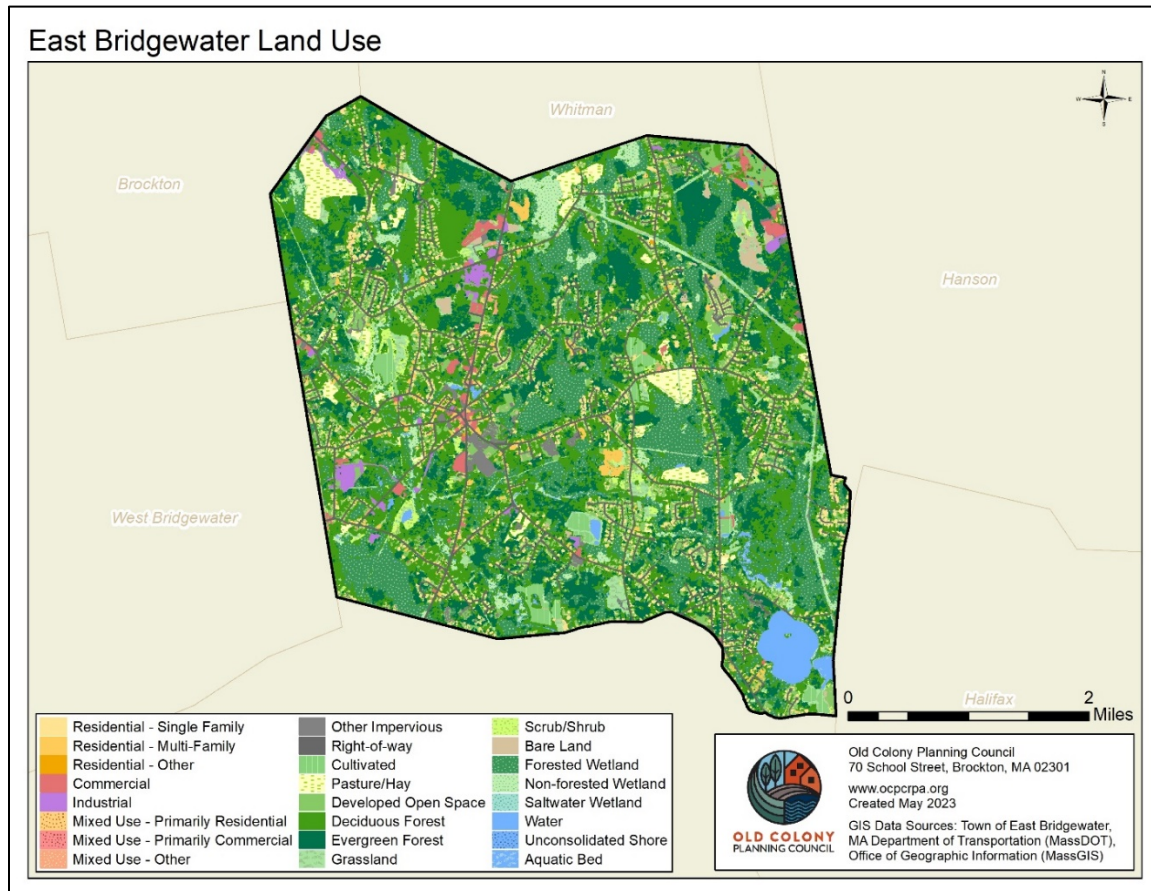
Figure 8



Several East Bridgewater schools are located near the East Bridgewater center within walking distance of the center, including an elementary school, a middle school, and the East Bridgewater High School. East Bridgewater Public Library is at the corner of Union Street and Bedford Street. The police station and the town offices are located in this area between Central Street and Route 18, as well as several ball fields and playgrounds. There are several commercial and retail establishments on the west side of

Route 18 south of the center dispersed with residential uses along Route 18 to the Bridgewater line. Figure 9 shows the land use in East Bridgewater.

Figure 9



of the center of town, the development of the 70,000 square foot Compass Medical center has impacted land use and traffic. The campus is expected to expand an additional 104,500 square feet with the addition of two new buildings. This will bring the total from the existing 70,000 square feet to 174,500 square feet. The campus expansion was prompted by a planned sewer extension from the Brockton sewer system, extending east via Thatcher Street and an easement over several parcels parallel to Route 18 to Grove Street. The extension was made available to this area by an agreement between East Bridgewater and Brockton. East Bridgewater has created a sewer district to the southwest of the Bedford Street (Route 18)/Highland Street intersection. This sewer extension is expected to prompt development and generate additional traffic within the Route 18 corridor. Figure 10 shows planned projects along Route 18 including a 240-unit condominium, a 400,000 square foot warehouse, and the two Compass Medical expansions, one 84,500 square feet and the other 20,000 square feet. Figure 11 shows the planned sewer pipe extension.

Figure 10

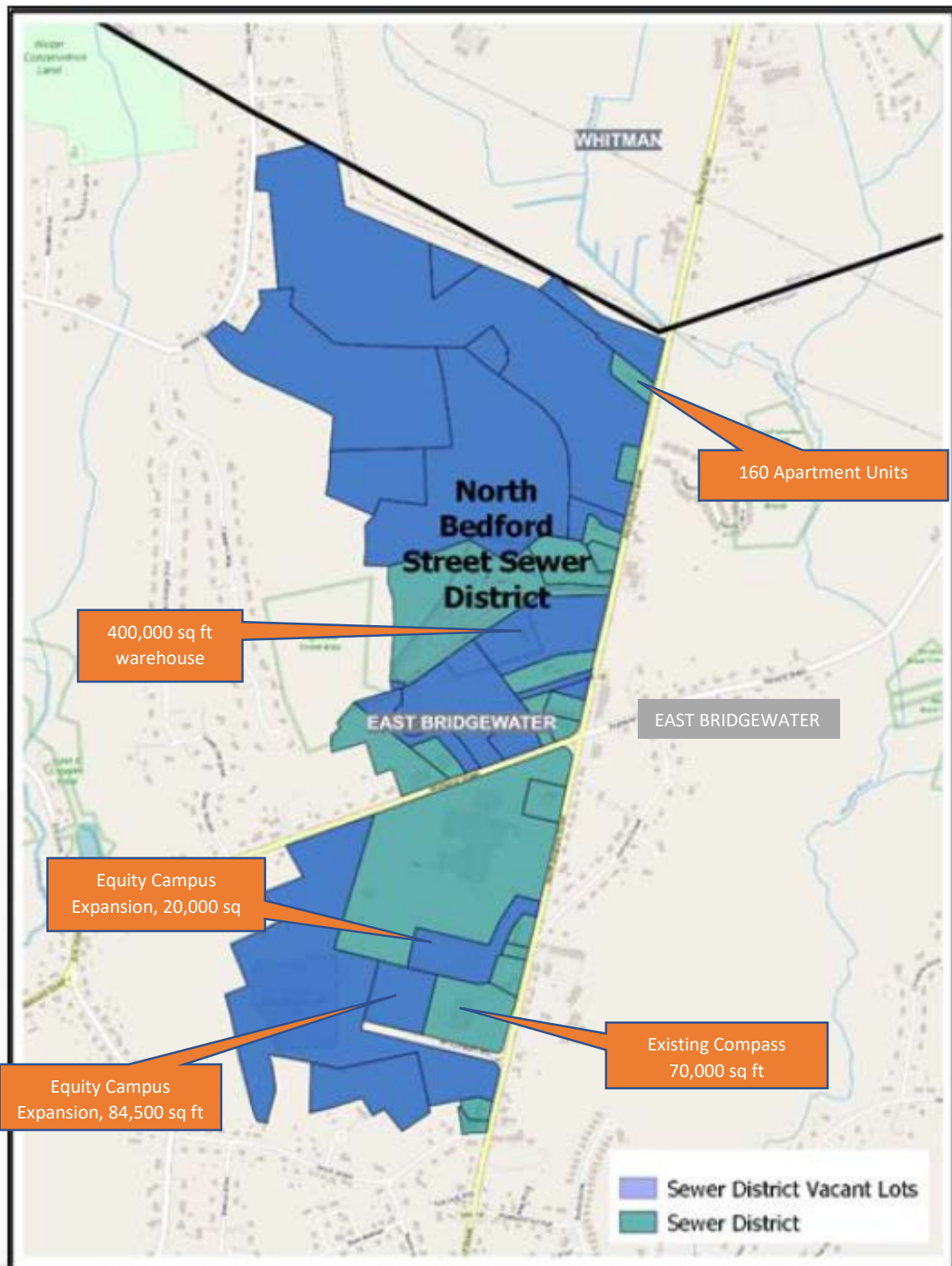
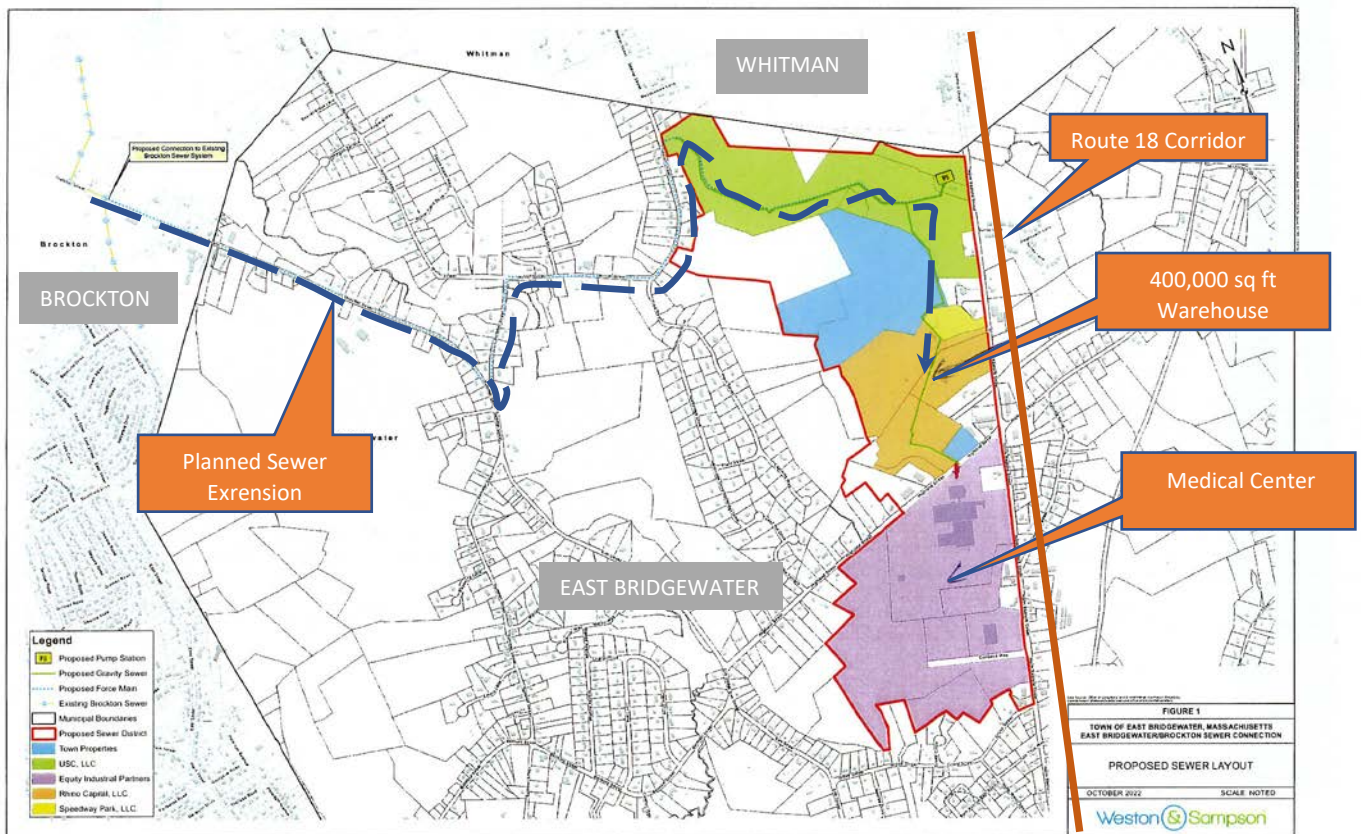


Figure 11



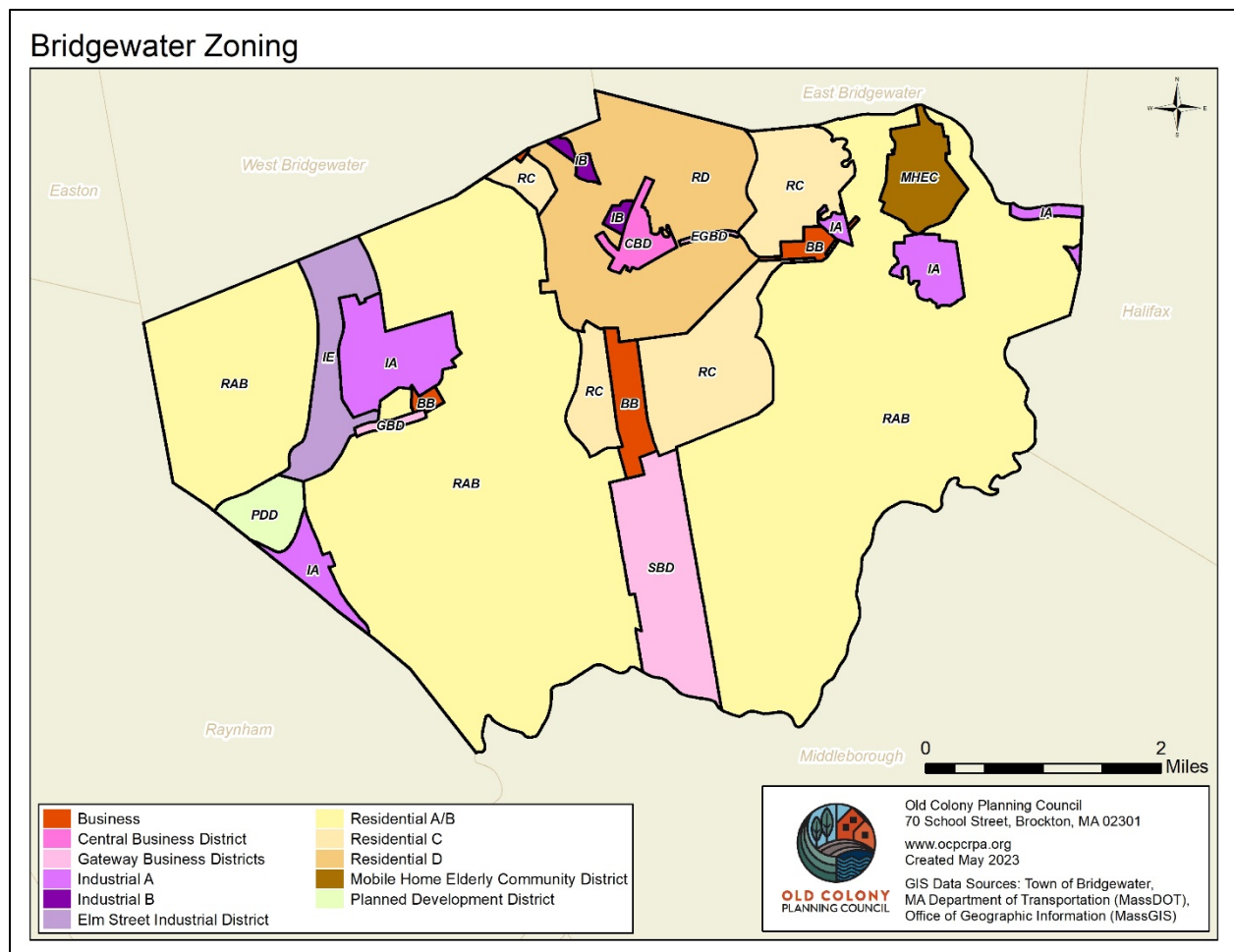
The sewer line runs past the warehouse to Highland Street, across from the medical center property (the owner of the medical center property will construct its own pipeline to connect to the Town's sewer line).

Zoning

Bridgewater

Zoning along Route 18 in Bridgewater consists of two main types, including Residential and Business. The Business zones are divided into three types, including the Central Business District, which encompasses Central Square, the Business District, and the Gateway Business District, both located south of Central Square. The Business district continues from Cottage Street to Flagg Street along Route 18 south of Central Square, and then continues along Route 18 as a Gateway Business District to the Middleborough line. The residential areas along Route 18 in Bridgewater are located north and south of Central Square. The Bridgewater Zoning Map is shown in Figure 12.

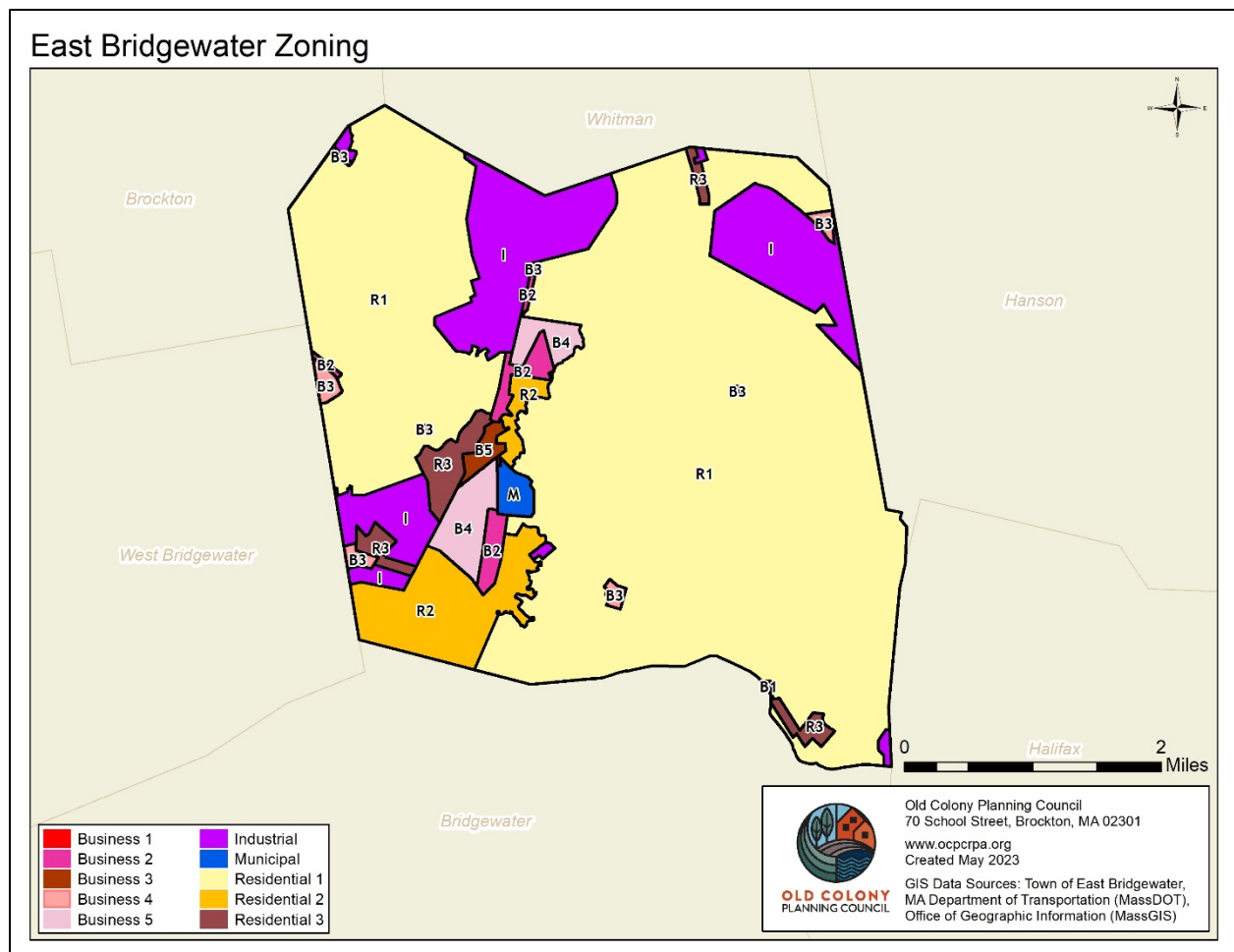
Figure 12



East Bridgewater

East Bridgewater has mostly Business Districts along Route 18 with several types of Business zones along the corridor from the Route 18/Highland Street intersection in the north through its downtown and ending at the Route 18/Whitman Street (Route 106) intersection. Residential zones along Route 18 in East Bridgewater are located near the town center and also south of the Route 18/Whitman Street (Route 106) intersection. In addition, Route 18 has a large Industrial zoned district in East Bridgewater north of the town center from Grove Street to the Whitman Line. This industrial area along the west side of Route 18 in East Bridgewater is where the new sewer district overlay is located. Figure 13 shows the zoning in East Bridgewater

Figure 13



Environmental Resources

East Bridgewater and Bridgewater, as well as the Route 18 study area within these towns, are located within the Taunton River Watershed. The Taunton River runs along the Bridgewater/Middleboro town line beneath Route 18/28. The Taunton River also runs along the eastern town line between Bridgewater and Halifax. Other features running beneath the Route 18 corridor study area in Bridgewater include the Town River, north of Bridgewater Central Square, Carver Pond and marshland south of Bridgewater Central Square, and the Sawmill Brook and marsh just north of the Middleboro town line. Figures 14 and 15 show the environmental features of Bridgewater and East Bridgewater.

The Hockomock Swamp, which is partly in Bridgewater, and shown in Figure 14, has been designated as an Area of Critical Environmental Concern, (ACEC). These areas are identified and nominated at the community level and are reviewed and designated by the state's Environmental Secretary. ACEC designation creates a framework for local and regional stewardship of these critical resource areas and ecosystems. ACEC designation also requires stricter environmental review of certain kinds of proposed development under state jurisdiction within the ACEC boundaries. The Route 18 study area is not within any ACEC areas.

Features running beneath the Route 18 corridor study area in East Bridgewater include the Matfield River, south of Whitman Street (Route 106) Forge Pond and Meadow Brook, north of East Bridgewater Central Square.

Figure 14 Environmental Features Bridgewater

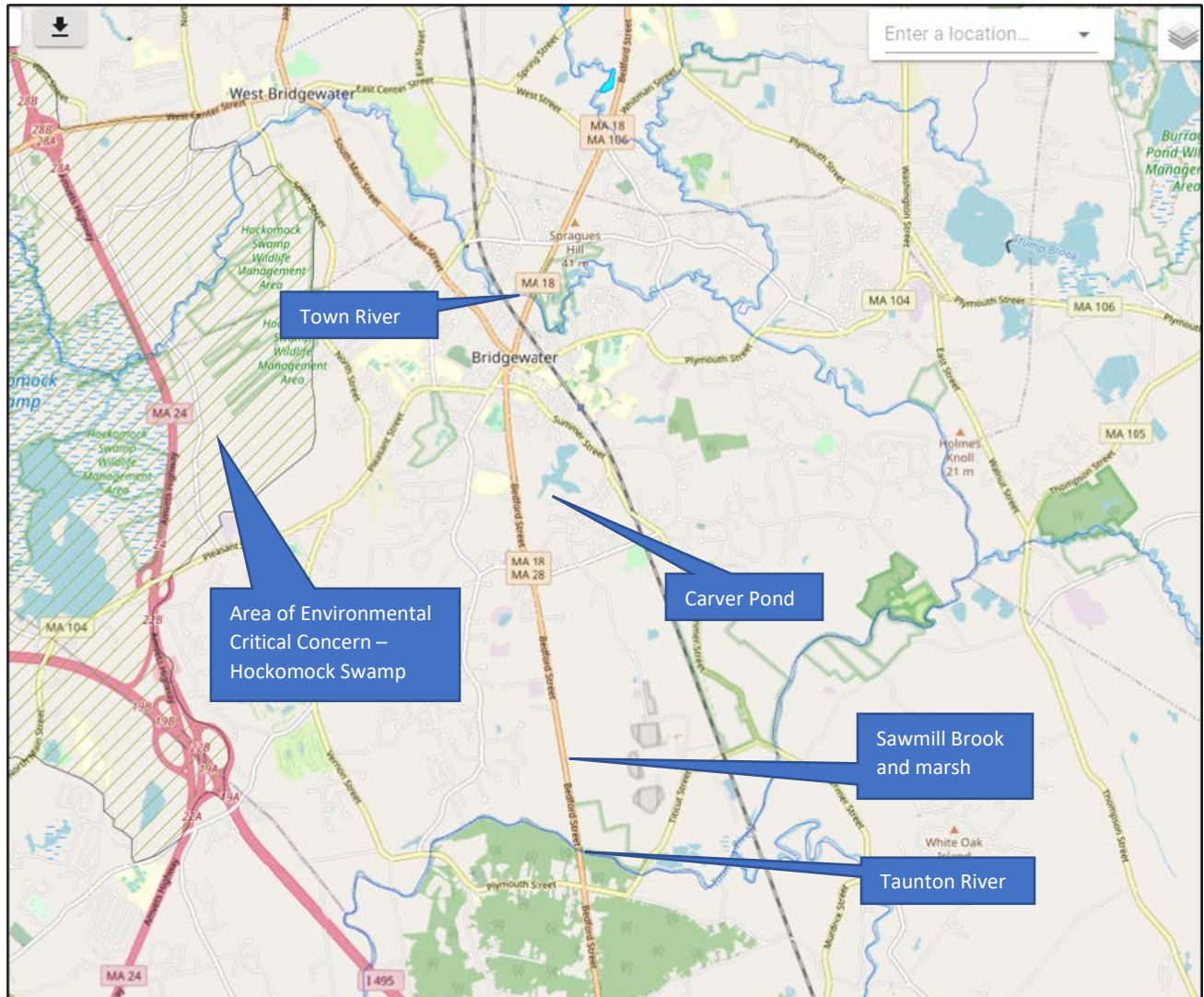
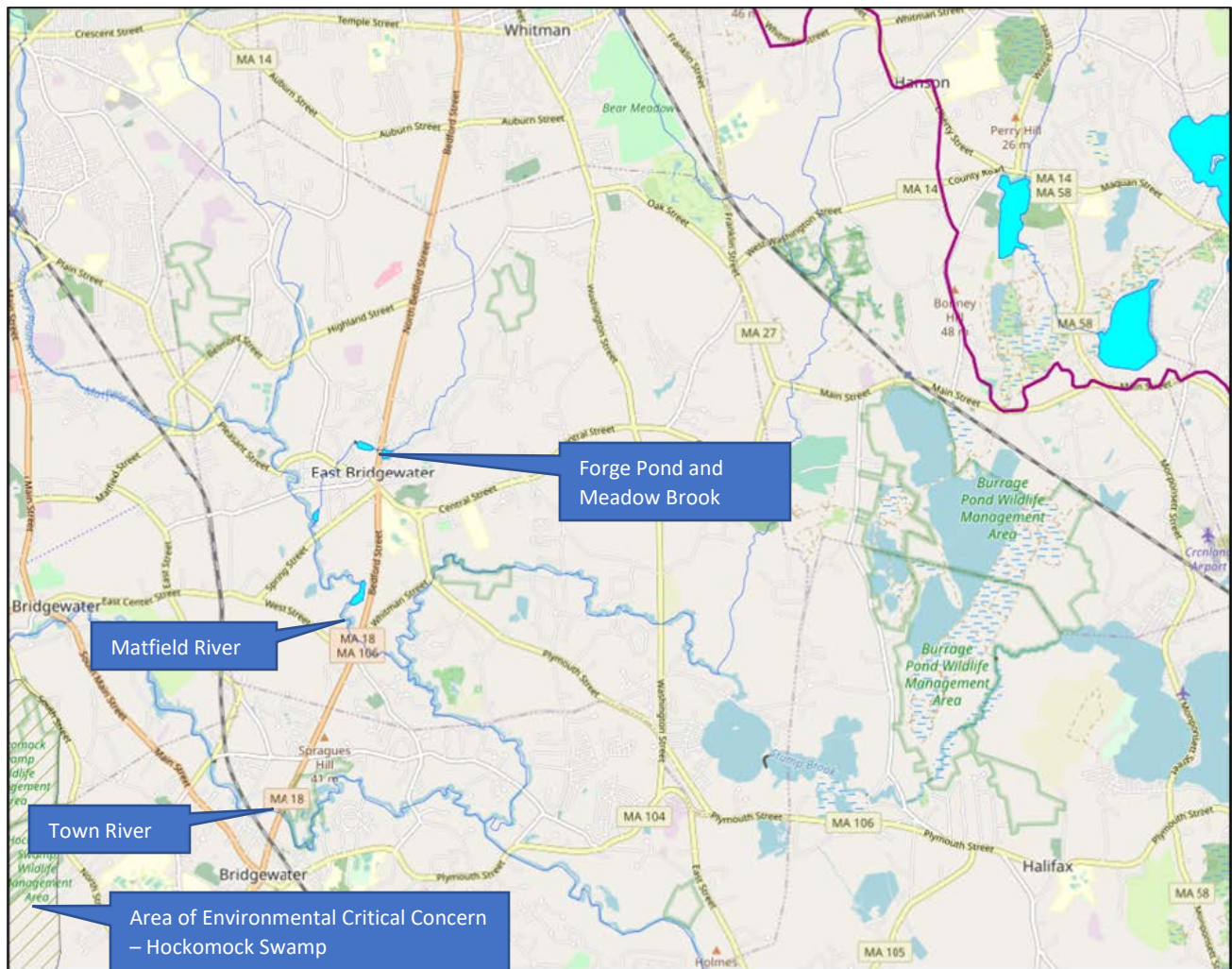


Figure 15 Environmental Features East Bridgewater



Environmental Justice

Environmental Justice Populations in the OCPC region were identified from MassDOT’s interactive online map, which is based on US Census Bureau data (released in October 2021 and March 2022, and updated on November 12, 2022). Environmental Justice areas are identified based on federal aid guidelines and utilizing census blocks and block groups that have high minority populations, high populations of low income, and high populations with limited English proficiency and foreign-born populations. Figure 16 shows the Environmental Justice areas in the study area based on US Census data for block groups, which shows no Environmental Justice Areas in East Bridgewater and three areas located in Bridgewater. As shown in Figure 16, the Route 18 corridor is located adjacent to three areas in Bridgewater. There is one area of high minority populations located north of Bridgewater Central Square along Route 18 to the East Bridgewater line. There is a second Environmental Justice area based on low income just east of Central Square and a third Environmental Justice area in the south of Bridgewater adjacent to the Route 18 corridor.

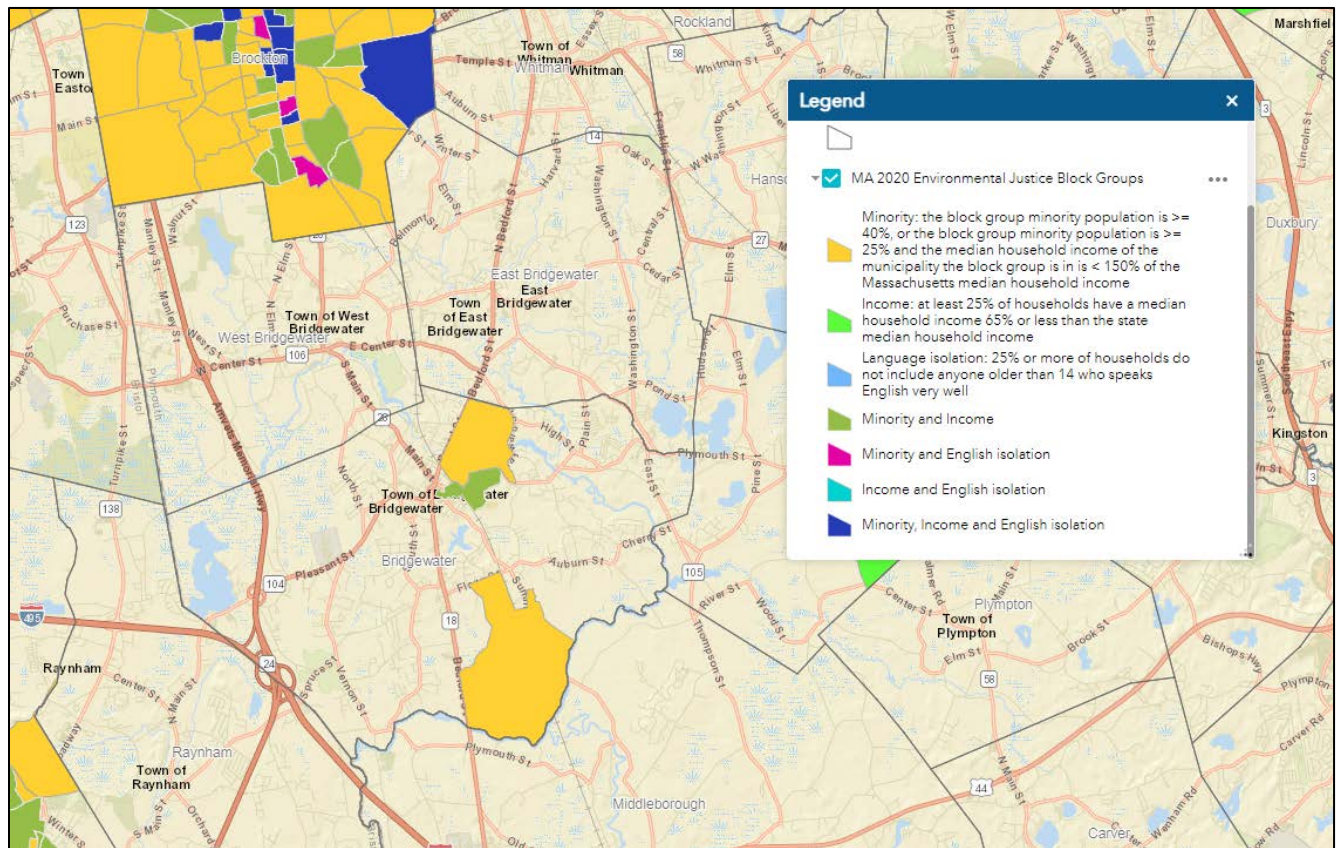
There are three fundamental Environmental Justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of project benefits by minority populations and low-income populations.

Public involvement is an integral part of transportation planning and project development decision-making. MassDOT directs greater access to information and opportunities for public participation in matters that may affect human health and the environment for minority populations and low-income populations. The objective of Environmental Justice is to ensure that there is equity in the distribution of transportation resources and services for low income and minority communities and neighborhoods. As part of this objective, Metropolitan Planning Organizations (MPOs) are required to provide full and fair participation for all socio-economic groups throughout their planning and decision-making processes. OCPC, through its public outreach process for this study, has identified Environmental Justice stakeholders and has actively sought out their participation in the study process.

The planned improvements for Route 18 are summarized in subsequent sections of this report. These improvements for Route 18 are in East Bridgewater, which falls outside the Environmental Justice areas; however, the Town of Bridgewater has expressed interest in making improvements to Central Square that will include improvements to pedestrian safety and bicycle accommodation and improve walking connections between the Bridgewater State University campus and Central Square. These improvements will be within the Environmental Justice Area located in the center of Bridgewater.

Figure 16



Brockton Area Transit Services

Currently, there are no bus services that operate along Route 18 within our study area. Brockton Area Transit Authority (BAT) plays an important role in the area bus transit services by providing on campus bus within Bridgewater State University (BSU) and an express bus route between BSU and the City of Brockton along Main Street (Route 28) that crosses Route 18 at Central Square of Bridgewater. The bus transit service has grown over the years since the partnership started in January of 1984. The Route 28 Brockton Express service operates bus service from the Harrington Hall stop at BSU to the BAT Centre in the City of Brockton from Monday to Friday. According to current BAT resources, the Route 28 Express Bus will make a stop at Kingswood Village on its return route. Passangers may also request to be dropped off or flag down the bus along Route 28 in Bridgewater and West Bridgewater.



*Resource: BSUTransit.com.

Previous Studies

East Bridgewater Square Study Area Concept Plan - OCPC 1988

The Old Colony MPO completed a study of East Bridgewater Square in 1988 as part of their Unified Planning Work Program. The Town of East Bridgewater at that time also expressed concern over the need for improvements regarding congestion and safety in the town center. The study area included the intersection of Bedford Street (Route 18) at Central Street, Spring Street, and Maple Avenue, the Bedford Street (Route 18) at East and West Union Street intersection, and the North Central Street at Union Street intersection. The purpose of the study was to identify safety and congestion problems, and to develop alternative improvement measures resulting in a concept plan for the town center.

The study included background information including socio-economic characteristics, (population, employment, and work trip characteristics), physical characteristics, (zoning and parking), traffic volumes (Average Daily Traffic and Turning Movement Counts), signage and traffic control, crash analyses, and intersection Level-of-Service analyses (average peak hour delays). As a result of the analyses, a short-range and a long-range plan were developed along with an implementation and funding plan.

The recommendations of this study included re-aligning Route 18 at Union Street and installing a traffic signal at this intersection, changes to the timing and phasing at the Bedford Street (Route 18)/Spring Street/Union Street/Maple Street intersection and widening the approaches with additional turning lanes at the Bedford Street (Route 18)/Spring Street/Union Street/Maple Street intersection.

Route 18 Corridor Study 2009

The Old Colony Planning Council completed a comprehensive study of the Route 18 corridor in 2009. The study included Route 18 in the Towns of Abington, Whitman, East Bridgewater, and Bridgewater. The purpose of the study was to identify specific problems in traffic efficiency, circulation, and safety. The study focused on key intersections as well as the road corridor itself. The study noted that as traffic within the corridor grows, due to retail and commercial development, congestion and delay also grow at key intersections and bottlenecks. In addition, increased traffic volumes heighten crash exposure, especially at driveways and side streets with multiple turning movement conflicts.

The study stated that the intersection at East Bridgewater Center, Bedford Street (Route 18) at Central Street, Spring Street, and Maple Avenue, is a major bottleneck along the Route 18 corridor and along with congestion and delay, this intersection has a higher than average crash rate. The problems are due to heavy peak hour volumes entering the intersection, and to the unusual alignment of the intersection, which has six approaches. A number of improvements for this intersection were discussed in the study including widening the northbound Route 18 approach to two lanes, as well as enhancing signage and crosswalks for pedestrian safety within the center. The crosswalk across Route 18 in the center located just north of Maple Street and Central Street needs enhanced signage to warn motorists of a pedestrian crosswalk.

The study also stated that the Bedford Street (Route 18) at West Street (Route 106) and East Street intersection operates at acceptable Levels-of-Service under Existing peak hour conditions; however, the crash rate for this intersection is at 1.51 crashes per million entering vehicles, which is well above the rate for the Massachusetts statewide average and the MassDOT District 5 average for signalized intersections. The recommendations for this intersection included adding left turn storage lanes on the northbound and southbound approaches and adding protected phases for these left turn movements.

The study concluded that Bridgewater's Central Square represents a major bottleneck for traffic flow in the Route 18 corridor. The study stated that during the morning and afternoon peak hours, delays at the signalized intersection of Broad Street (Route 18)/Main Street (Route 28)/Summer Street (Route 104) cause back-ups for vehicles in the center (northbound), which in turn causes back-ups at the two yield controlled south end intersections; South Street (Route 104) at Central Square and Bedford Street (Route 18/28) at Central Square (since 2009, the yield signs have been changed to stop signs). Traffic also queues southbound on Broad Street (Route 18) at this intersection during the AM and PM peak hours so that the queues back up past the commuter rail grade crossing, with vehicles stopped on the tracks for the signal.

The study recommendations included an extension of lane markings through the signalized intersection in the northern end Broad Street (Route 18)/Main Street (Route 28)/Summer Street (Route 104) to help to reduce congestion and confusion over lane use. Another recommendation to this intersection included the prohibition of left turning vehicles from Main Street (Route 28) approach (headed southeast) to Route 18 northbound. This would eliminate a phase in the cycle allowing more green time on other approaches such as the northbound approach with traffic entering the intersection from the town oval. Other improvements for Central Square include upgrading signage and adding more signs in the square to alert motorists of pedestrian crossings. There is a lack of pedestrian warning signs in Central Square, despite a significant amount of pedestrian traffic.

Bridgewater State University Master Plan Update 2012

Bridgewater State University (BSU) completed an update of their Master Plan for the campus in 2012 as part of a state-wide initiative to identify priority capital projects for each of Massachusetts' state universities and community colleges. The plan, which was completed by a consultant, envisioned goals and objectives to unite the West and East Campuses by strategic investments in new buildings and green spaces along ways for pedestrian connectivity and travel. The BSU Master Plan goals included:

- Reinforce pedestrian connections between destinations.
- Improve the interface between the campus and the community of Bridgewater.
- Provide spaces that enhance interaction between faculty, staff, and students.
- Move parking out of the center of campus.

The consultant's public outreach with students, faculty, and administration yielded a number of key themes, including:

- Address key space requests.
- Create identity and cohesion for academic programs.
- Make the campus the classroom.
- Improve campus connectivity with adjacent neighborhoods.
- Improve campus accessibility and remove barriers toward equal participation.
- Advance sustainability.

The "Make the Campus the Classroom" theme grew out of the outreach to faculty members and administrators who expressed a desire to think creatively about learning opportunities on campus. They envisioned a learning environment whereby the creation of "learning landscapes," on campus would allow students to engage in practical laboratory work in subjects such as biology or geology. It was suggested that the university reexamine its approach to circulation space, both inside and outside

buildings, to increase the areas where students could meet and congregate. Based on the campus outreach, it was acknowledged that the campus was split into two districts, East and West Campus, by the MBTA passenger rail tracks and that there is a need to improve the sense of unity and connectivity between the two.

The Master Plan Update stated that there are ongoing issues related to automobile access, which include traffic congestion on Plymouth Street, particularly at the intersection with Hooper Street, and the need for more parking on the West Campus. The Master Plan previous to the 2012 update recommended that BSU convert Park Avenue to a pedestrian street. The plan stated that pedestrian circulation is the most challenging element on the campus. The commuter rail line division limits pedestrian access to a single underpass that links East and West Campus. The path to the underpass traverses large surface parking lots, creating an unsafe and ambiguous pedestrian environment.

In addition to the lack of alternative pedestrian access between the East and West Campuses, vehicular traffic interferes with pedestrian access on both sides of campus. Summer Street and Park Avenue bring local traffic through the campus to the West Campus. On the East Campus, large parking lots and access roads pass through many areas, and high levels of traffic along Burrill Avenue pose dangers for drivers and pedestrians. The construction of a new parking garage on the East Campus will aid in reducing conflicts along with directing drivers to Great Hill Avenue. The construction of the garage also will allow BSU to remove the surface parking lots east of the railroad underpass, and create a new, iconic open space for East Campus. Figure 17 shows the West Campus, the pedestrian connection beneath the MBTA, and the proximity of BSU to Bridgewater Central Square. Figure 17 shows the relationship between pedestrian flow, which is in an east-west fashion, and the potential for Park Street and School Street to act as potential walking connections between Central Square and the West BSU Campus. It also shows the proximity of the Bridgewater Fire Station location on School Street and the potential for a parking garage for students and faculty utilizing School Street as a gateway to the West BSU Campus. The Town of Bridgewater is planning on relocating the fire station to a different location in the town.

Figure 17



Road Safety Audits

Central Street/North Central Street at Union Street/West Union Street, East Bridgewater 2021

The Road Safety Audit (RSA) for Central Street/North Central Street at Union Street/West Union Street in East Bridgewater was conducted on September 21, 2021, as part of the Old Colony Metropolitan Planning Organization's (MPO) Unified Planning Work Program. The RSA concluded that the combination of curvature in North Central Street and high-profile buildings immediately abutting the intersection on the southeast and southwest corners create major challenges to sight distance between North Central Street and West Union Street. Angled collisions between vehicles arriving on West Union Street and North Central Street comprise the majority of crashes at this location, and these obstructed sight lines combined with speed on North Central Street are the primary factors leading to these crashes. The RSA offered a number of potential safety enhancements including converting the intersection to an all-way stop controlled intersection forcing drivers to stop on Central Street and North Central Street to mitigate sight line issues. However, this option needs to be assessed carefully to ensure queuing will not back into Route 18. Strict speed enforcement may also mitigate this issue. In addition, evaluating the feasibility of traffic signals coordinated with Route 18 traffic signals was recommended with a warrant analysis completed before all-way stop or traffic signal controls can be installed. The Town has approved a four-way stop sign and flashing red beacon for the West Union/Union/North Central/Central. Implementation of these infrastructure improvements are expected over the next year.

Bedford Street (Route 18) at West Street (Route 106) and East Street, East Bridgewater 2020

A Road Safety Audit was conducted for the Bedford Street (Route 18) at West Street (Route 106) and East Street intersection on June 20, 2020, by an engineering consultant at the request of MassDOT. The RSA stated that this intersection is a high crash location and is listed as a Highway Safety Improvement Program (HSIP) crash cluster (years 2013-2015, 2014-2016 and 2015-2017) indicating that the location falls within the top 5 percent of high crash locations in the Old Colony Planning Council (OCPC) area. It was also listed as a top 200 intersection in 2014-2015 in the MassDOT crash database.

The RSA included that the skewed angle, offset alignment, and wide approaches at the intersection contribute to high vehicular speeds and sight distance issues. The RSA stated that high traffic speeds prevalent along Route 18 contribute to poor lines of sight for southbound left turning vehicles. A permissive left phase and the two-lane set up might be causing courtesy crashes. It was included that the intersection being on the crest a vertical grade might be a contributing factor to northbound and southbound left turning sight line issues. It was noted that there is a large turn radius between the southbound approach of Bedford Street (Route 18) and East Street due to the offset alignment of East Street to West Street (Route 106). A large radius enables and encourages drivers to turn right at higher speeds and not stop before making the turn. This also extends the amount of time turning vehicles are present in the conflict zone. In addition, the RSA noted that the traffic signals on Route 18 (upstream and downstream of the intersection) run independently of each other, potentially causing vehicular queues in the area. It was observed that the post mounted signals at the intersection were hard to see for southbound vehicles due to the wayfinding sign on the northeast corner.

The RSA improvements for this intersection included:

- Evaluate the feasibility of converting this intersection to a roundabout to address sight line issues, reduce operating speeds and reduce the collision angle of potential crashes thus reducing the severity of crashes at the intersection.
- Consider realigning the intersection to remove skew and improve sight lines and improving the vertical profile along Route 18 to address these sight line issues.
- Evaluate the feasibility of installing dedicated left-turn lanes for Route 18 approaches and evaluate traffic timing for left turns. This will provide left-turn vehicles with a space to queue.
- Consider implementing a road diet along Bedford Street (Route 18); the proposed section would include one lane per direction with a turning lane at the intersection.
- Consider reducing the turning radii where needed such as the northeast corner of the intersection thereby reducing the speed of turning vehicles.
- Install speed feedback signs on Route 18 to deter speeding.
- Evaluate the feasibility of installing new mast arms to improve their visibility, relocating signal heads for better visibility, and installing backplates for better visibility.
- Check change and clearance intervals (yellow and all-red) for adequacy and consider installing preemption signal equipment for emergency vehicles.
- Consider coordination of upstream and downstream signals to improve platooning and reduce queuing. Evaluate signal phasing for left turns on all approaches (protected, protected permissive, flashing yellow arrow etc.)

Central Square & Bedford Street (Route 28/Route 18) at Grove Street Central Square and Bedford Street (Route 18 and Route 28), Bridgewater 2019

A Road Safety Audit was conducted for Central Square and Bedford Street (Route 28/Route 18) at Grove Street on Wednesday, September 25, 2019. Central Square has been identified by MassDOT as a Highway Safety Improvement Program (HSIP)- eligible crash cluster for the years 2012-2014 and a HSIP Pedestrian Cluster for 2005-2014 and 2007-2016. Bedford Street (Route 28/Route 18) at Grove Street has been identified as a HSIP Cluster intersection for the years 2013-2015 and 2014-2016. This indicates

that Central Square and Bedford Street (Route 28/Route 18) at Grove Street are within the top 5% of crash clusters within the Old Colony Planning Council (OCPC) region.

The RSA recommended improvements included improvements to the signal and timing at Broad Street and Main Street/Summer Street as well as updating signage and improvements for pedestrian and bicycle movement. The RSA recommended evaluating the feasibility of coordinating the Main Street (Route 28) signal at Broad Street (Route 18) with the nearby railroad crossings on Broad Street (Route 18) and Summer Street (Route 104) to reduce delay and queue lengths.

The study also included evaluating visibility issues and potential conflict points between pedestrians and vehicles as pedestrians cut through the on-street angled parking to cross the oval. The RSA included evaluation of removing angled parking spaces on the Summer Street approach within the signalized intersection to increase driver visibility of pedestrians and limit parking maneuvers within the intersection.

The RSA also recommended modifying the one-way direction on Grove Street to the east of the intersection from westbound to eastbound, and re-routing westbound traffic from Grove Street to Maple Avenue. The modification would re-route the Bedford Street (Route 28/Route 18) crossing movements, reducing angled collisions and sightline visibility issues. It was also recommended that the intersection of Bedford Street (Route 28/Route 18) at Maple Avenue be evaluated with the proposed re-routing to determine if a signal warrant is met. This improvement has been currently implemented.

Completed Improvement Projects

Table 1 shows recent Transportation Improvement Project (TIP) projects completed in the Route 18 Corridor in Bridgewater and East Bridgewater. The project for resurfacing and sidewalk construction on Bedford Street (Route 18), project number 607941, was originated from the recommendations in a Road Safety Audit completed in 2014 for Bedford Street (Route 18) from Whitman Street to Central Square in the Town of East Bridgewater on April 1, 2014.

Table 1

Community	MassDOT Project Number	Description	Type	Year Complete
Bridgewater	603660	BROAD STREET (ROUTE 18) AND HIGH STREET TRAFFIC SIGNAL AND INTERSECTION IMPROVEMENTS - traffic signal upgrading and geometric improvements.	Reconstruction Including signals	2015
Bridgewater	603568	ROUTE 18/28 (BEDFORD STREET) AT WINTER STREET, SIGNALIZATION & IMPROVEMENTS - enhance safety and improve efficiency by installing a new traffic signal at the intersection of Bedford Street (Routes 18/28) and Winter Street in Bridgewater. The existing geometry will be improved to provide a bicycle lane on Winter Street and an improved radius to better accommodate trucks. This project will include the installation of crosswalks with wheelchair ramps and pushbutton pedestrian signals on both Bedford Street and Winter Street. Includes emergency pre-emption for emergency vehicles.	Reconstruction Including signals	2007
Bridgewater	603385	BRIDGEWATER- MIDDLEBOROUGH- BRIDGE REPLACEMENT, B-23-003=M-18-004, ROUTE 18 (BEDFORD STREET) OVER THE TAUNTON RIVER - replaced the Route 18 (Bedford Street) Bridge over the Taunton River with a two span structure steel beams with a concrete deck and a sidewalk on the west side. Included full depth roadway reconstruction along the approaches to the bridge.	Bridge Replacement	2006
Bridgewater	601104	BRIDGEWATER- MIDDLEBORO- RESURFACING & RELATED WORK ON ROUTES 18 & 28, FROM BRIDGEWATER TO MIDDLEBORO ROTARY – Resurfaced and drainage improvements on a portion of State-Owned Route 18/28 from Bridgewater Center to the Middleboro Rotary (intersection of Route 44).	Resurfacing	2009
East Bridgewater	607941	RESURFACING AND SIDEWALK CONSTRUCTION ON BEDFORD STREET (ROUTE 18), FROM WHITMAN STREET (ROUTE 106) TO CENTRAL STREET	Highway Reconstruction and rehabilitation	2022
East Bridgewater	601539	EAST BRIDGEWATER- INTERSECTION IMPROVEMENTS, 3 LOCATIONS ROUTE 106 @ ROUTE 18; UNION ST. @ CENTRAL ST.; & UNION ST. @ ROUTE 18 Reconstruction of three intersections: 1. Bedford Street (Route 18)/Whitman Street (Route 106), 2. Bedford Street (Route 18)/Union Street, and 3. Central Street/Union Street. Includes pavement, drainage system improvements, cement concrete sidewalk, traffic signal installation, pavement markings, traffic signs, landscaping, and other necessary work.	Intersection Reconstruction. Install signal at Route 18 at Whitman Street (Route 106)	2004

Planned Route 18 Projects

Information on MassDOT Highway projects can be found in the MassDOT on-line tracking system. Based on the on-line system, planned projects along Route 18, within the study area in Bridgewater and East Bridgewater are summarized in Table 2. These Route 18 planned improvements are located in East Bridgewater. Although there are currently no planned improvements programmed for Bridgewater on

MassDOT's projects list, the Town of Bridgewater has expressed interest in making improvements to Central Square that will include improvements to pedestrian safety and bicycle accommodation and improving walking connections between the Bridgewater State University campus and Central Square.

Table 2

Community	MassDOT Project Number	Description	Type	Status
East Bridgewater	611968	INTERSECTION IMPROVEMENTS AT BEDFORD STREET (ROUTE 18), WEST STREET (ROUTE 106) AND EAST STREET	Safety Improvements	Under Evaluation
East Bridgewater	611976	IMPROVEMENTS AT HIGHLAND STREET AND NORTH BEDFORD STREET (ROUTE 18)	Safety Improvements	Under Design

Existing Conditions

Route 18 is a state highway within East Bridgewater and Bridgewater, which is mostly a two-lane cross section within the study area except for the four-lane section in East Bridgewater between Cottage Street and Whitman Street (Route 106) just north of the Bridgewater line. New Water Street to North Water Street north of East Bridgewater center is also a four-lane cross-section. Route 18 within East Bridgewater and Bridgewater is classified as a principal urban arterial and is under the jurisdiction of MassDOT, except for Bridgewater Central Square where Route 18 is under the jurisdiction of the Town of Bridgewater. As a principal arterial, Route 18 is eligible for both state and federal funding.

Route 18 is an important north-south highway corridor in southeastern Massachusetts that extends from Route 3 in Weymouth south to Interstate I-95 in New Bedford. Route 18 provides connections for regional access to Route 128/Interstate 95 and Interstate 93 to Boston in the north and Interstate 495 to the south. Important trip generators within the Route 18 corridor include the Union Point Development (former South Weymouth Naval Air Station) in Abington, Rockland, and Weymouth, Compass Medical Center in East Bridgewater and MCI Bridgewater and Bridgewater State University in Bridgewater.

Average Daily Traffic

OCPD utilized automatic traffic recorders (ATR) to determine the average daily traffic (ADT) at specific locations on Route 18. These traffic recorders were installed for a minimum 48-hour period and recorded traffic in both directions in one-hour intervals. The average daily traffic (ADT) represents a 24-hour average of the data collected within the 48-hour data collection period. The traffic recorders were programmed to record vehicle speeds and the number of heavy vehicles in the traffic stream, as well as the traffic volumes. Table 3 shows the average daily traffic (24-hour traffic total for both directions of travel) for the Route 18 study area at the study count locations. There were eight count locations, five in East Bridgewater and three in Bridgewater. The automatic traffic recorder count reports with the one-hour interval breakdowns are included in the appendix to this study.

Table 3

Count location	Town	Date	Average Daily Traffic	85% Speed (MPH)	Percent Heavy Vehicles
Bedford St (Route 18), at Bridgewater Town Line	East Bridgewater	Oct 2022	15,270	60	12%
Bedford St (Route 18) north of East Street (Route 106)/West Street	East Bridgewater	Oct 2022	18,171	46	14.1%
Bedford St (Route 18) north of Whitman St (106)	East Bridgewater	Oct 2022	12,748	45	13.1%
North Bedford St (Route 18) at Whitman Town Line	East Bridgewater	Nov 2022	16,592	50	17.1%
North Bedford St (18) north of Maple Ave	East Bridgewater	Nov 2022	15,116	33	11.8%
Bedford St (Rt. 18/28), at Middleborough Town Line	Bridgewater	Oct 2022	12,724	55	16.9%
Bedford Street (Route 18/28) south of Central Square	Bridgewater	Oct 2022	11,797	36	9.2%
Broad Street (Route 18) north of Central Square	Bridgewater	Oct 2022	14,377	31	11.6%

The Average Daily Traffic (ADT) varies on Route 18, depending upon location. The highest ADT on Route 18 in the study area was 18,171 vehicles per day at the Bedford St (Route 18), north of East Street (Route 106)/West Street location in East Bridgewater. This is a four-lane cross section where Bedford Street is Route 106 and Route 18 are combined between West Street and Whitman Street. Route 106 runs along West Street in East Bridgewater, then follows Bedford Street to Whitman Street following Whitman Street into Halifax. The second highest ADT was recorded at the North Bedford St (Route 18), at Whitman Town Line in East Bridgewater. Broad Street north of Central Square in Bridgewater has 14,377 vehicles per day. Archived data from 2015 shows that Central Square in Bridgewater on the northbound side has 15,234 vehicles per day and 16,890 vehicles per day on the southbound side.

Table 3 shows that the highest speeds on Route 18 were recorded at the Bedford St (Route 18) Bridgewater East Bridgewater Town Line location with eighty-fifth percentile speeds at 60 miles per hour. Other high-speed locations include Bedford St (Rt. 18/28) in Bridgewater at Middleborough Town Line with 55 mile per hour eighty-fifth percentile speeds, and the North Bedford St (Route 18) Whitman Town Line location in East Bridgewater with 50 mile per hour eighty-fifth percentile speeds.

The percentage of truck traffic in the vehicle volumes varied between 9.2 percent and 17.1 percent. The North Bedford St (Route 18) at Whitman Town Line location in East Bridgewater had the highest percentage of truck in the vehicle flow with 17.1 percent. The Bedford St (Rt. 18/28), at Middleborough Town Line location in Bridgewater had the second highest percent of truck traffic with 16.9 percent in the traffic flow.

Existing Peak Hour Intersection Levels-of-Service

Manual turning movement counts were conducted at key intersections (signalized and unsignalized) within the corridor during the morning and afternoon (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) to determine the peak hours of operation. The turning movement counts include a count of pedestrians and heavy vehicles entering intersections as well as passenger cars and school buses. The turning movement counts are included in the appendix to this study. The counts at intersections near schools included the hours from 2:00 PM to 4:00 PM to include school traffic in the peak hour (the morning peak hours for schools coincides with the commuter peak or 7:00 AM to 9:00 PM).

Existing Traffic Operations Level-of-Service analyses (LOS) were completed for the study area intersections to determine the operating conditions during the morning and afternoon peak hours. Level-of-Service analysis is a qualitative and quantitative measure based on the analysis techniques published in the Highway Capacity Manual by the Transportation Research Board. Level-of-Service is a general measure that summarizes the overall operation of an intersection or transportation facility. It is based upon the operational conditions of a facility including lane use, traffic control, and lane width, and considers such factors as operating speeds, traffic interruptions, and freedom to maneuver.

Level-of-Service (LOS) represents a range of operating conditions and is summarized with letter grades from "A" to "F", with "A" being the most desirable. Level-of-Service "E" represents the maximum flow rate or the capacity on a facility. The following describes the characteristics of each Level-of-Service:

- LOS "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
- LOS "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is still relatively unaffected.
- LOS "C" is in the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. Occasional backups occur behind turning vehicles.
- LOS "D" represents high-density, but stable, flow. Speed and freedom to maneuver are restricted, and the driver experiences a below average level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
- LOS "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform level. Freedom to maneuver within the traffic stream is extremely limited, and generally requires forcing other vehicles to give way. Congestion levels and delays are very high.
- LOS "F" is representative of forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point, resulting in lengthy queues and delays.

The LOS definitions describe conditions based on several operational parameters. There are certain parameters utilized as measures of effectiveness for specific facilities. In the case for intersections, two-lane highways, and arterials, which represent the physical conditions that typify the study area corridor, time delay, average stop delay, and average travel speed are used as measures of operational effectiveness to which Levels-of-Service are assigned. Table 4 shows the delay criteria for each Level-of-Service for both un-signalized and signalized intersections.

Table 4

Level-of-Service	Stop Sign	Traffic Signal
A	0 to 10	0 to 10
B	>10 to 15	>10 to 20
C	>15 to 25	>20 to 35
D	>25 to 35	>35 to 55
E	>35 to 50	>55 to 80
F	>50	>80

Table 5 shows the signalized and un-signalized Levels-of-Service for the Route 18 study area intersections under Existing peak hour conditions. Congestion at intersections in Table 5 (LOS E and F) is shown in shaded blocks. Table 5 shows that 12 of the 20 study area intersections are stop sign controlled and 8 of the study area intersections are signal controlled. Fifteen of the 20 intersections experience LOS E or F conditions during the morning peak hour or afternoon peak hour, or during both peak hours. The LOS for signalized intersections in Table 5 is based on an average delay for the entire intersection. The LOS for un-signalized intersections in Table 5 represents the average delay for the critical movement, which is the left turn movements from the side street.

Table 5

	INTERSECTION	Community	Traffic Control	Existing AM Peak	Existing PM Peak
1	North Bedford Street (Route 18) at Highland Street at Harvard Street	East Bridgewater	Signal	B	C
2	North Bedford Street (Route 18) at Compass Way	East Bridgewater	Stop	D	E
3	North Bedford Street (Route 18) at Union Street (North Intersection)	East Bridgewater	Stop	F	F
4	North Bedford Street (Route 18) at Union Street (South Intersection)	East Bridgewater	Stop	F	F
5	Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue	East Bridgewater	Signal	F	F
6	Bedford St at EB High School	East Bridgewater	Stop	F	D
7	Bedford Street (Route 18) at Whitman Street (Route 106)	East Bridgewater	Signal	B	B
8	Bedford Street (Route 18) at West Street (Route 106) and East Street	East Bridgewater	Signal	B	B
9	Union Street at Central Street	East Bridgewater	Stop	C	F
10	Broad Street (Route 18) at High Street	Bridgewater	Signal	C	D
11	Broad Street (Route 18) at Roche Brothers Plaza north	Bridgewater	Stop	F	F
12	Broad Street (Route 18) at Roche Brothers Plaza south	Bridgewater	Stop	F	F
13	Broad Street (Route 18) Spring Street	Bridgewater	Signal	A	B
14	Main Street (Route 28) at Broad Street (Route 18)/Central Square/Summer Street (Route 104)	Bridgewater	Signal	F	F
15	Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)	Bridgewater	Stop	F	F
16	Bedford Street (Route 18 and 28) at Grove Street	Bridgewater	Stop	NA	NA
17	Bedford Street (Route 18 and 28) at Maple Avenue	Bridgewater	Stop	C	E
18	Bedford Street (Route 18 and 28) at Cottage Street	Bridgewater	Stop	C	D
19	Bedford Street (Route 18 and 28) at Winter Street	Bridgewater	Signal	C	C
20	Bedford Street (Route 18 and 28) at Flagg Street	Bridgewater	Stop	D	F

The poor LOS at the un-signalized intersections is mainly due to the heavy traffic flow on Route 18 during the peak hours, which is so heavy in both directions that there are very few gaps sufficient for the side street left turns to enter the mainstream traffic safely or without very long delays. Subsequently, side street traffic often forces its way into the main flow on Route 18, forcing Route 18 traffic to slow down, or worse, causing crashes. In addition, the critical movement from Route 18, vehicles turning left from Route 18 into the side streets, also lacks sufficient gaps in Route 18 through traffic. These left turns block traffic behind them on Route 18 if there is no room for vehicles behind them to perform a bypass maneuver.

The signalized intersections in both East Bridgewater center and Bridgewater Central Square operate under LOS F conditions with forced flow conditions during both the morning and afternoon peak hours. In East Bridgewater, there are LOS E and F intersections at un-signalized intersections in the town center. These include North Bedford Street (Route 18) at Union Street north most intersection, North Bedford Street (Route 18) at Union Street south most intersection, and Union Street at Central Street. Although the Union Street at Central Street intersection is not a Route 18 intersection, it is included in the study due to its closeness to Route 18 in the town center. This intersection is part of the circulatory system of the East Bridgewater town center. The un-signalized North Bedford Street (Route 18) at Compass Way intersection experiences long delays LOS E during the PM peak hour and LOS D during the AM peak hour as shown in Table 5. As the Compass Way campus expands, it is likely that the impact of this expansion will further degrade the LOS at this intersection. Estimates of future trip generation from the Compass expansion and the LOS impact on this intersection are shown in this report under the Future Assessment section of this report.

Crash Experience

Crash data for the study area intersections within the Route 18 corridor in East Bridgewater and Bridgewater was obtained for the latest available three-year period (2020-2021-2022) from the Massachusetts Department of Transportation (MassDOT) on-line IMPACT portal. The data is made available by the Massachusetts Registry of Motor Vehicles and then compiled by MassDOT. The data was analyzed by OCPC in accordance with the standard practices published by the Institute of Transportation Engineers (ITE) in the Manual of Traffic Engineering Studies. Crash rates were calculated and compared with the average crash rates for Massachusetts and for MassDOT District 5.

Crash rates are used, according to the *Manual of Traffic Engineering Studies*, to characterize the crash exposure of a facility. Crash rates for intersections are calculated based on the average number of crashes per million entering vehicles (MEV). The statewide average crash rates are 0.78 MEV for signalized intersections and 0.57 MEV for un-signalized intersections. The MassDOT District 5 average crash rates are 0.75 MEV for signalized intersections and 0.57 MEV for un-signalized intersections.

The purposes for analyzing crash data include:

- To define and identify high crash locations.
- To justify the installation of traffic control devices.
- To evaluate the geometric design (including lane use) and proposed changes in traffic regulations.
- To justify expenditures for improvements that offer crash reduction or prevention.
- To identify a need for traffic enforcement.
- To identify needs in pedestrian and bicycle safety and certain actions causing crashes that can be prevented through driver and/or public education.

The number of crashes often increases as traffic volumes increase. Traffic growth creates more opportunities for crashes and therefore increases vehicle exposure to crashes. A particular condition that causes crashes at an intersection can become exacerbated with increased traffic, and crash frequency will therefore rise. The crash rate utilized for intersection analysis is the crash rate per million entering vehicles, which is the average number of accidents per year (over three years) times one million, divided by the number of vehicles entering the intersection in a year.

Table 6 summarizes the number of crashes, severity (fatal, injury, non-injury), and corresponding crash rates for the study area corridor intersections for the three-year history 2020, 2021, and 2022. Crash rates that exceed the MassDOT statewide and MassDOT District 5 crash rate averages are shaded in Table 6.

Table 6

	INTERSECTION	Fatal	Personal Injury Crashes	Prop Damage Only	Total	Crash Rate (MEV)
1	North Bedford Street (Route 18) at Highland Street at Harvard Street	0	13	23	36	1.54
2	North Bedford Street (Route 18) at Compass Way	0	1	2	3	0.17
3	North Bedford Street (Route 18) at Union Street (North Intersection)	0	3	14	17	0.89
4	North Bedford Street (Route 18) at Union Street (South Intersection)	0	0	3	3	0.16
5	Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue	0	8	58	66	2.41
6	Bedford St at EB High School	0	1	4	5	0.37
7	Bedford Street (Route 18) at Whitman Street (Route 106)	0	1	17	18	0.76
8	Bedford Street (Route 18) at West Street (Route 106) and East Street	0	9	33	42	1.54
9	Union Street at Central Street	0	4	32	36	1.85
10	Broad Street (Route 18) at High Street	0	3	6	9	0.45
11	Broad Street (Route 18) at Roche Brothers Plaza north	0	1	3	4	0.23
12	Broad Street (Route 18) at Roche Brothers Plaza south	0	0	2	2	0.12
13	Broad Street (Route 18) Spring Street	0	2	9	11	0.59
14	Main Street (Route 28) at Broad Street (Route 18)/Central Square/Summer Street (Route 104)	0	1	25	26	0.79
15	Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)	0	2	7	9	0.71
16	Bedford Street (Route 18 and 28) at Grove Street	0	7	6	13	1.04
17	Bedford Street (Route 18 and 28) at Maple Avenue	0	2	0	2	0.13
18	Bedford Street (Route 18 and 28) at Cottage Street	0	1	1	2	0.12
19	Bedford Street (Route 18 and 28) at Winter Street	0	1	3	4	0.19
20	Bedford Street (Route 18 and 28) at Flagg Street	0	5	4	9	0.50

Table 6 shows that Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue at the East Bridgewater downtown had the highest number of crashes in the corridor with 66 within the study area time period. The majority of these crashes resulted in property damage only. Bedford Street (Route 18) at West Street (Route 106) and East Street intersection in East Bridgewater had the second most crashes with 42. Both North Bedford Street (Route 18) at Highland Street at Harvard Street intersection and the Union Street at Central Street were third in most crashes each with 36 crashes. Table 6 shows the Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue intersection had the highest crash rate with 2.41 crashes per million entering vehicles (MEV). The second highest crash rate, 1.85 MEV occurred at the Union Street at Central Street intersection. The Bedford Street (Route 18) at West Street (Route 106) and East Street intersection, and the North Bedford Street (Route 18) at Highland Street at Harvard Street intersection both had the third highest crash rate with 1.54 MEV.

Table 7

	INTERSECTION	Angle	Rear-End	Single Veh Crash	Head on	Sideswipe same direction	Sideswipe opposite direction	Hit Ped	Bike	Other	Total
1	North Bedford Street (Route 18) at Highland Street at Harvard Street	19	12	1	3	1	0	0	0	0	36
2	North Bedford Street (Route 18) at Compass Way	0	1	1	0	1	0	0	0	0	3
3	North Bedford Street (Route 18) at Union Street (North Intersection)	11	3	1	0	1	1	0	0	0	17
4	North Bedford Street (Route 18) at Union Street (South Intersection)	0	3	0	0	0	0	0	0	0	3
5	Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue	16	21	5	8	9	5	0	1	1	66
6	Bedford St at EB High School	3	2	0	0	0	0	0	0	0	5
7	Bedford Street (Route 18) at Whitman Street (Route 106)	2	10	0	1	4	1	0	0	0	18
8	Bedford Street (Route 18) at West Street (Route 106) and East Street	18	11	1	3	4	5	0	0	0	42
9	Union Street at Central Street	28	2	1	4	0	0	0	0	1	36
10	Broad Street (Route 18) at High Street	2	4	0	1	1	1	0	0	0	9
11	Broad Street (Route 18) at Roche Brothers Plaza north	1	2	0	1	0	0	0	0	0	4
12	Broad Street (Route 18) at Roche Brothers Plaza south	1	0	0	0	1	0	0	0	0	2
13	Broad Street (Route 18) Spring Street	4	5	1	0	1	0	0	0	0	11
14	Main Street (Route 28) at Broad Street (Route 18)/Central Square/Summer Street (Route 104)	10	10	4	0	2	0	0	0	0	26
15	Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)	4	2	2	0	1	0	0	0	0	9
16	Bedford Street (Route 18 and 28) at Grove Street	9	2	0	0	0	0	1	0	1	13
17	Bedford Street (Route 18 and 28) at Maple Avenue	1	0	0	1	0	0	0	0	0	2
18	Bedford Street (Route 18 and 28) at Cottage Street	0	2	0	0	0	0	0	0	0	2
19	Bedford Street (Route 18 and 28) at Winter Street	1	3	0	0	0	0	0	0	0	4
20	Bedford Street (Route 18 and 28) at Flagg Street	2	5	0	1	0	1	0	0	0	9

Future Assessment

Background growth and Future Trips Based on Potential Development

A five-year time horizon has been chosen for analysis of estimated future conditions, (No-Build and Build turning movement traffic volumes at study area intersections), which is consistent with state guidelines for traffic studies. A review of traffic growth rates within the Old Colony Region shows that there has been traffic growth in some arterial corridors and little or no growth on other highways. Those areas showing traffic growth reflect the impact of retail development or other uses such as office within specific highway corridors. A review of traffic counts for the Route 18 corridor, compiled by OCPC in the Old Colony Traffic Volumes Report, shows that there has been traffic growth in the corridor in East Bridgewater and Bridgewater at specific locations; however, growth has been static and has increased slowly or declined in some areas. In order to account for potential development, and a potential upswing in commuter trips in the corridor, an annual growth rate of one percent projected over a five-year horizon has been applied to the existing turning movement volumes in order to discern the future peak hour turning movements at study area intersections for No-Build and Build peak hour conditions.

The one percent per year growth rate was determined based on pre-Covid Pandemic traffic counts as the pandemic had caused unique variations in the traffic volumes between 2020 and 2022. Five automatic traffic count locations were used within the Route 18 corridor in East Bridgewater and Bridgewater to discern the annual one percent traffic growth. These include:

- Route 18 at Bridgewater/East Bridgewater Town Line
- Route 18 at the East Bridgewater/Whitman Town Line
- Route 18 Broad Street north of Central Square in Bridgewater
- Route 18 Bedford Street south of Central Square in Bridgewater
- Route 18 North of Cottage Street Bridgewater

Historic traffic volumes for these locations are shown in the appendix to this report.

In addition to the one percent per year increase in background traffic growth, additional trips were added to the existing peak hour traffic turning movements at study area intersection due to developmental growth. These were focused in the north portion of East Bridgewater based on conversations with local planners and officials. Specifically, there were four properties that included:

- A 400,000 square foot warehouse with 60 bays with access off of Harvard Street in East Bridgewater.
- At 906 North Bedford in East Bridgewater, 240 residential units (80 townhouse 160 garden style).
- At Compass Medical on Compass Way off of Route 18 North Bedford Street in East Bridgewater a 20,000 square foot medical office expansion.
- At Compass Medical on Compass Way off of Route 18 North Bedford Street in East Bridgewater an 84,500 square foot medical office expansion.

Table 8 shows the trip generation due to each of the planned developments based on the Institute of Transportation Engineers (ITE) Trip Generation Handbook. The trip assignment and distribution on the Route 18 network is shown in the appendix to this report.

Table 8

Route 18 Development	ITE Land Use Code	AM Peak Vehicles In	AM Peak Vehicles Out	PM Peak Vehicles In	PM Peak Vehicles Out
Condos 240 units off Route 18	220 Multi-Family Low Rise	25	85	85	49
Warehouse 400,000 sq. ft. access on Highland Street	150 General Warehouse	5	2	2	6
Equity Campus expansion 20,000 sq. ft.	720 Medical Office Building	44	12	19	50
Equity Campus expansion 84,500 sq. ft.	720 Medical Office Building	182	51	82	210

No-Build Peak Hour Levels-of-Service

No-Build conditions assume there are no improvements made to the intersections within the next five years (to horizon year 2028). The No-Build turning movement volumes at study area intersections were determined by increasing existing turning movement volumes by the background growth rate (one percent increase per year for five years) and adding in the trip generation due to each of the planned developments. Level-of-Service analyses were then conducted for each of the study area intersections for the morning and afternoon peak hour conditions assuming no improvements had been made at the intersections (traffic control and operating conditions the same as Existing conditions). Table 9 summarizes the future No-Build conditions compared to the Existing conditions for each of the study area intersections. Failed traffic operations in Table 9 (LOS E and F) are shown in shaded cells.

Table 9

	INTERSECTION	Community	Traffic Control	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak
1	North Bedford Street (Route 18) at Highland Street at Harvard Street	East Bridgewater	Signal	B	C	B	C
2	North Bedford Street (Route 18) at Compass Way	East Bridgewater	Stop	D	E	F	F
3	North Bedford Street (Route 18) at Union Street (North Intersection)	East Bridgewater	Stop	F	F	F	F
4	North Bedford Street (Route 18) at Union Street (South Intersection)	East Bridgewater	Stop	F	F	F	F
5	Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue	East Bridgewater	Signal	F	F	F	F
6	Bedford St at EB High School	East Bridgewater	Stop	C	D	F	D
7	Bedford Street (Route 18) at Whitman Street (Route 106)	East Bridgewater	Signal	B	B	B	B
8	Bedford Street (Route 18) at West Street (Route 106) and East Street	East Bridgewater	Signal	B	B	B	B
9	Union Street at Central Street	East Bridgewater	Stop	C	F	C	F
10	Broad Street (Route 18) at High Street	Bridgewater	Signal	C	D	C	D
11	Broad Street (Route 18) at Roche Brothers Plaza north	Bridgewater	Stop	F	F	F	F
12	Broad Street (Route 18) at Roche Brothers plaza south	Bridgewater	Stop	F	F	F	F
13	Broad Street (Route 18) Spring Street	Bridgewater	Signal	A	B	A	B
14	Main Street (Route 28) at Broad Street (Route 18)/Central Square/Summer Street (Route 104)	Bridgewater	Signal	E	E	E	E
15	Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)	Bridgewater	Stop	F	F	F	F
16	Bedford Street (Route 18 and 28) at Grove Street	Bridgewater	Stop	NA	NA	NA	NA
17	Bedford Street (Route 18 and 28) at Maple Avenue	Bridgewater	Stop	C	E	C	E
18	Bedford Street (Route 18 and 28) at Cottage Street	Bridgewater	Stop	C	D	D	D
19	Bedford Street (Route 18 and 28) at Winter Street	Bridgewater	Signal	C	C	C	C
20	Bedford Street (Route 18 and 28) at Flagg Street	Bridgewater	Stop	D	F	D	F

Potential Improvements and Build Conditions

The recommendations in this study were developed based on stakeholder meetings and discussions, public survey and outreach, and the Level-of-Service and crash analyses. Build peak hour turning movement conditions (future 2028 turning movement volumes) were developed by increasing existing turning movement volumes by the background growth rate (one percent increase per year for five years) and adding in the trip generation due to each of the planned developments and assuming that potential improvements at each of the intersections is in place.

Table 10 shows the recommended potential improvements for East Bridgewater intersections. Table 11 shows the recommended potential improvements for Bridgewater. The Towns of East Bridgewater and Bridgewater should work together closely with MassDOT to review previous studies and recommended improvements and coordinate the implementation of short term, interim, and long-term improvements for traffic as well as for sidewalk and pedestrian improvements and bicycle accommodations.

Table 10

Intersection	Existing Conditions	Potential Improvements
1. Route 18 North Bedford Street at Highland St (Harvard Street)	➤ Poor intersection alignment. ➤ Antiquated signal equipment and timing and phasing. ➤ Inadequate left turn capacity on all approaches. ➤ Excessive intersection delays. ➤ Potential increase of traffic volume and land use development in the area.	✓ Replace signals and provide geometric improvements - MassDOT project number 611976.
2. Route 18 North Bedford Street at Compass Way	➤ Stop Sign on the Compass Way approach with limited left turn lane storage on Route northbound and right turn storage southbound approach. ➤ Potential increase in volumes with continued land use development.	✓ Consider installing traffic signal when signal warrants are met.
3. North Bedford Street (Route 18) at Union Street (North Intersection)	➤ Poor Intersection alignment ➤ Lack of Bicycle and pedestrian accommodations ➤ Steep slope on the westbound approach from Union Street	✓ Consider installing RRFB at the Route 18 crosswalk at the library (south of the northmost Union Street intersection).
4. North Bedford Street (Route 18) at Union Street (South Intersection)	➤ Poor intersection alignment ➤ Steep slope on the westbound approach from Union Street	✓ Consider installing RRFB if warranted.
5. Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue	➤ Congestion and LOS F during the peak hours ➤ Lack of bicycle and pedestrian accommodation ➤ Steep slope ➤ Six way entering approaches ➤ Excessive length of intersection area ➤ Access management	✓ Upgrade signal timing and phasing plan. ✓ Consider analysis for double lane modern roundabout. ✓ Provide geometric improvements, thus eliminating turning conflict and left turn turning movement. ✓ Minimize intersection area for turning movements. ✓ Consider by-pass collector road.

Table 10 (Continued)

Intersection	Existing Conditions	Potential Improvements
6. Bedford St at EB High School	➤ New intersection, pavement, and new sidewalks project number 607941.	✓ Consider installing traffic signal when signal warrants are met.
7. Bedford Street (Route 18) at Whitman Street (Route 106)	➤ Recent reconstruction and signal upgrades east and south side of the intersection through project 607941. Wide radius entering Whitman Street from northbound.	✓ Consider lighting improvements. ✓ Consider improving turning radius.
8. Bedford Street (Route 18) at West Street (Route 106) and East Street	➤ High crashes due to traffic weaving southbound approach. ➤ Poor intersection alignment. ➤ Steep slope inclining from north to south.	✓ Replace traffic signal and provide geometric improvements. ✓ Update pavement markings and lane use markings. ✓ MassDOT Project Number 611968.
9. Union Street at Central Street	➤ Stop controlled intersection. Excessive delay at peak hours.	✓ Support recommendations suggested from RSA. Select Board recently approved this as a four-way stop sign (non-signal) intersection. Waiting for funding from the town meeting. MassDOT Project Number 601539.

Table 11

INTERSECTION	EXISTING CONDITIONS	POTENTIAL IMPROVEMENTS
10. Broad Street (Route 18) at High Street	➤ Signalization and geometric improvements implemented in 2015.	✓ Monitor traffic operation and consider realignment of the intersection as needed.
11. Broad Street (Route 18) at Roche Brothers Plaza north	➤ Speed and volume are high along Route 18. The peak hour gap time for exiting plaza is limited.	✓ Consider signal when warrants are met, provide access management plan, consolidating driveways, provide raised median and limit left turn lane entering the plaza.
12. Broad Street (Route 18) at Roche Brothers Plaza south	➤ Speed and volume are high along Route 18. The peak hour gap time for exiting plaza is limited.	✓ Consider access management plan, raised median, limit left turn into the plaza.
13. Broad Street (Route 18) Spring Street	➤ Congestion happens at peak traffic hours for BSU and MBTA rail crossing gate closure time.	✓ Consider coordinating signals with rail-road crossing signals.
14. Main Street (Route 28) at Broad Street (Route 18)/Central Square/Summer Street (Route 104)	➤ Congestion. Receiving lanes offset Southbound lane alignment.	✓ Provide additional capacity for southbound approach. Add new lane right turn lane.

Table 11 (Continued)

Intersection	Existing Conditions	Potential Improvements
15. Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)	➤ Driver confusion, wide intersection, lack of bicycle and pedestrian accommodations, speeding.	✓ Consider installing traffic signal when signal warrant is met, single point signalization minimizing conflict. ✓ Support concept proposed by Bridgewater Vision to Reality. ✓ Improvement bicycle and pedestrian safety and mobility. Rapid Rectangular Flashing Beacon (RRFB).
16. Bedford Street (Route 18 and 28) at Grove Street	➤ Safety issues identified in the Road Safety Audit.	✓ Support RSA recommendations. Improvements from RSA already instituted changing one way direction on Grove Street. ✓ Investigate Bedford Street on street parking (Grove Street to Central Square) with MassDOT District 5.
17. Bedford Street (Route 18 and 28) at Maple Avenue	➤ Speeding along Route 18.	✓ Consider installing a traffic signal when signal warrants are met. ✓ Speed Enforcement.
18. Bedford Street (Route 18 and 28) at Cottage Street	➤ Speeding along Route 18.	✓ Drainage and stormwater management improvements. Resurfacing, Management and Maintenance. ✓ Speed Enforcement.
19. Bedford Street (Route 18 and 28) at Winter Street	➤ Signalization and geometric improvement provided in 2007. Speeding along Route 18.	✓ Resurfacing, management, and maintenance.
20. Bedford Street (Route 18 and 28) at Flagg Street	➤ Speeding along Route 18.	✓ Management and maintenance. ✓ Speed Enforcement.

North Bedford Street (Route 18) at Highland Street at Harvard Street – East Bridgewater

The North Bedford Street (Route 18) at Highland Street at Harvard Street intersection is a four-way signalized intersection in the north portion of East Bridgewater (approximately 3,330 feet south of the Whitman Line). Highland and Harvard Street intersect North Bedford Street (Route 18) at a skewed angle. All four approaches provide one lane into the intersection with the minor Street (Highland Street and Harvard Street) providing a channeled island for right turns). Both of the minor street approaches are wide enough



This photo shows the eastbound approach is not lined up with the receiving lane. In addition, the approach lane is wide enough for two vehicles to stack side by side on the approach, but the intersection is lacking proper pavement markings indicating lane use.

to allow through movements to bypass left turning vehicles as they wait for a gap in opposite traffic to turn left. The skewed alignment puts eastbound through movements from Highland Street in line with the curb instead of following through to the receiving lane on Harvard Street. In addition, despite that the Existing peak hour Levels-of-Service are within acceptable ranges, (LOS B in the morning and C during the afternoon peak), the observed queues were excessive on the North Bedford Street (Route 18) northbound and southbound approaches during the afternoon peak hour. The signal timing and phasing for this intersection is fixed and the signal equipment is antiquated with post mounted signals. Recommendations for this intersection include updating signal equipment (with overhead signal heads, improved timing and phasing, and updated pavement markings. Long term improvements include realigning the intersection to remove the skewed alignment, adding longer right turn lanes on the Highland Street and Harvard Street approaches for the island channelization.

In addition, there is inadequate left turn lane capacity for Route 18 as well as for the minor street Highland Avenue approaches. There is a lack of bicycle and pedestrian accommodation at the intersection and excessive intersection delay in the peak hours and throughout the day. This intersection has the potential increase for traffic volume as land use land use development in the area increases with the sewer extension from Brockton.

Table 12 shows the LOS changes from Existing, No-Build, and Build with the proposed future improvements. The Build LOS represents the expected changes in LOS over the No-Build with improvements in place. The improvements include upgrading the signal equipment and optimizing signal timing and phasing. This includes adding left turn storage lanes on the Highland Street east and west bound approaches with permitted and protected phases and widening the Route 18 northbound and southbound approaches to two approach lanes. Long term improvements include realigning the minor street Highland Street and Harvard Street approaches 90 degrees.

Table 12

	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak	Build AM Peak	Build PM Peak
North Bedford Street (Route 18) at Highland Street at Harvard Street	B	C	B	C	B	B

Route 18 North Bedford Street at Compass Way

This intersection is a relatively new intersection created for the Compass Medical Campus. It is stop sign controlled on the Compass Way approach and provides exclusive right turn lane and left turn lane out of Compass Way to Route 18. It also provides an exclusive left turn storage lane into Compass Way on the Route 18 northbound approach and an exclusive right turn storage lane in from Route 18 southbound. The signage, striping, and pavement are new. It is recommended that traffic signal installation be considered when MUTCD signal warrants are met. The Brockton sewer extension is expected to have an impact on the need for a signal as expanded land use development is expected to increase traffic at the site. Table 13 shows the Existing, No-Build, and Build estimated peak hour Levels-of-Service at this intersection, with Build assuming signal installation.

Table 13

	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak	Build AM Peak (signal)	Build PM Peak (signal)
North Bedford Street (Route 18) at Compass Way	F	F	F	F	C	D

North Bedford Street (Route 18) at Union Street

Union Street at its intersection with North Bedford Street (Route 18) is skewed and misaligned to the degree that it operates as two separate intersections with the east leg of the intersection, Union Street, operating as a “T” type intersection north of the west leg of Union Street also operating as a “T” type intersection. Union Street as it approaches Bedford Street (Route 18) on the east and west leg is stop sign controlled. The intersection lacks bicycle and pedestrian accommodation. There is a crosswalk on Bedford Street (Route 18) located just south of the east leg of Union Street at the East Bridgewater Public Library. The Union Street eastbound intersection with Bedford Street is on a crest of a hill, with an ascending grade on the Bedford Street southbound approach and the Union Street westbound approach, creating sight line hinderances. In addition, there are no raised curbs on the west side of Bedford Street north of the intersection with wide open access to the adjacent lot.

Recommendations include installing a Rapid Rectangular Flashing Beacon at the Bedford Street (Route 18) crosswalk. In addition, implement intersection bicycle and pedestrians ADA compliance design, and reduce curb radius to help create better orderly traffic movement and reduce vehicular speed.

Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue

The intersection at East Bridgewater Center is a major bottleneck along the Route 18 corridor. Along with congestion and delay, the intersection has a higher than average crash rate. These problems are due to heavy peak hour volumes entering the intersection, and due to the unusual alignment of the intersection, which has six approaches. This intersection has long queues consistently during the peak hours on the Route 18 northbound and southbound approaches, and on the northwest and southwest Central approaches.

This intersection had been the subject of previous traffic studies conducted by OCPC, in which reconstruction and traffic flow reorganization was recommended. These recommendations included making Spring Street a one-way westbound away from the intersection and Maple Street one-way eastbound away from the intersection. The other recommendation included the construction of a new road



East Bridgewater center with queues on Route 18 southbound, Spring Street, and the northbound and southbound approaches on Central Street.

between Spring Street and the southern leg of Route 18 to re-route eastbound Spring Street traffic. It was also recommended in this study that Route 18 northbound would be widened to two lanes.

There is a lot of area within the intersection as vehicles enter, which can add to driver confusion along with the lack of access management with driveways from a gasoline station giving vehicles access from within the intersection, which add to the number of conflicting turns. In addition, vehicles waiting to turn left get hung up inside the intersection at the end of a green phase. Moving the stop lines up gives vehicles a shorter route to exit the intersection and adding dashed white lines for channeling traffic can improve channeling traffic through the intersection. Moving the stop lines into the intersection on the northbound and northwest approaches can be problematic as vehicles stopped for a red light on these approaches would be in the path of other vehicles entering the intersection from Spring Street. This did not present a problem in the recommendations from previous studies since Spring Street was proposed to be one-way westbound with no vehicles entering the intersection from Spring Street.

Other improvements for East Bridgewater Center include the enhancement of safety for pedestrians including signage and Rapid Rectangular Flashing Beacons (RRFB) at crosswalks within the center. Although there is a pedestrian actuated signal currently at the signalized Route 18/Central Street/Spring Street/Maple Street intersection, there are crosswalks across Route 18 in the center located just north of Maple Street and Central Street.

Recommendations include an engineering study focusing specifically on upgrading the signal timing and phasing, lane use, and channeling traffic through the intersection, as well as improving pedestrian and bicycle accommodation. Double lane roundabout analysis as well as geometric improvements, eliminating turning conflict should be included in the engineering study. The study should consider shortening or minimizing the length vehicles must travel through the intersection and also a potential bypass collector around the town center.

Bedford Street (Route 18) at East Bridgewater High School

This intersection is unsignalized and was recently constructed for access to the new East Bridgewater High School. In addition, MassDOT has recently completed the reconstruction of Route 18 from the Whitman Street (Route 106) intersection to East Bridgewater center, project number 607941. This included roadway and sidewalk reconstruction along Route 18 (including pavement markings) and related work including signal updates at the Whitman Street (Route 106) intersection. Bicycle lanes were also installed along Route 18.

The Bedford Street (Route 18) at the East Bridgewater High School intersection is a three way “T” type intersection stop sign controlled on the High School approach. The intersection provides a single approach lane on the Bedford Street northbound and southbound approaches and the High School westbound approach. The Existing morning and afternoon peak hour Levels-of-Service are LOS F in the morning and D during the afternoon peak. This is due to the lack of gaps in the Route 18 northbound and southbound traffic flow that are adequate for left turn critical movements into and out of the High School drive. The recommendation for this intersection is to install signals when the volumes reach the threshold for meeting MUTCD signal warrants.

Bedford Street (Route 18) at Whitman Street (Route 106)

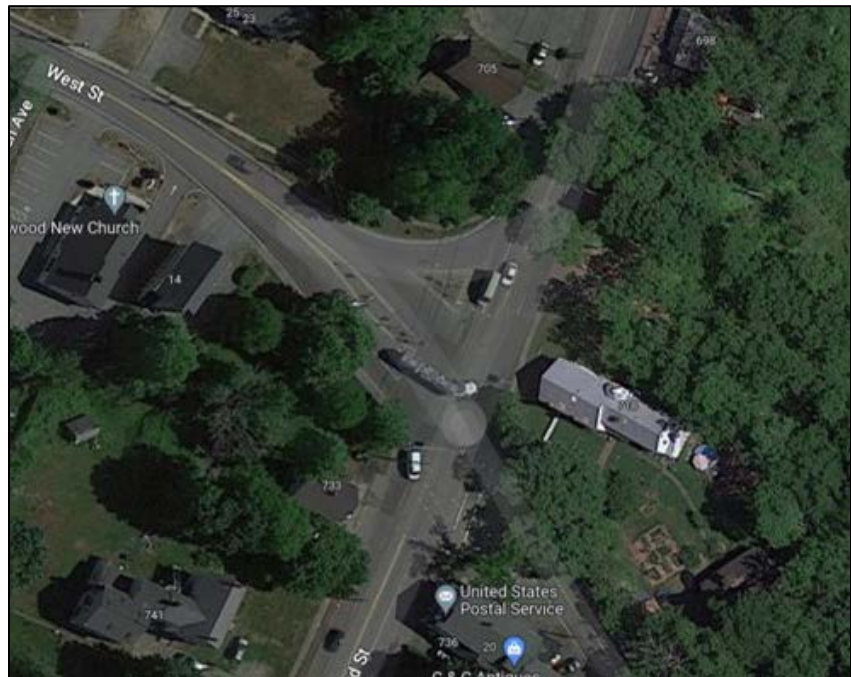
Bedford Street (Route 18) and Whitman Street (Route 106) form a “Y” type signalized intersection in East Bridgewater. Whitman Street (Route 106) intersects at a skewed angle with a liquor store located on the northeast corner of the intersection with drive access off of Whitman Street (Route 106). There is a lack of proper drainage for the right lane of Route 18 northbound and for the left lane for Whitman

Street (Route 106) as vehicles turn left onto Bedford Street (Bedford Street). This intersection has undergone reconstruction recently with an upgrade of sidewalks, pavement markings, and signal timing and phasing. Existing morning and afternoon signalized peak hour is at LOS B for the morning and B for the afternoon. In addition, the crash rate is 0.76 crashes per million entering vehicles (MEV) just below the average for signalized intersections statewide (0.78 MEV) and about even with the district wide crash rate (0.75 MEV).

Bedford Street south of Whitman Street (Route 106) is designated as Route 18 and Route 106 for 700 feet to the Bedford Street West Street (Route 106)/East Street intersection. Bedford Street (Route 18) is a four-lane cross-section within this 700-foot segment. Route 106 then continues on West Street for westbound traffic. There is a great deal of weaving within this 700 feet segment of Bedford Street (Route 18/106) as vehicles following Route 106 west from Whitman Street (Route 106) to Bedford Street (Route 18/106) southbound and then weave into the right turn lane to West Street (Route 106) to continue in the westbound direction.

Bedford Street (Route 18/106) at West Street (Route 106) and East Street

The Bedford Street (Route 18/106)/West Street (Route 106)/East Street intersection is a four-way signalized intersection located approximately 700 feet south of the Bedford Street (Route 18) at Whitman Street (Route 106) intersection. The weaving on the southbound approach of this intersection due to a large number of vehicles from the Bedford Street (Route 18) at Whitman Street (Route 106) intersection vying for the right lane to turn right to continue heading west on West Street (Route 106) has contributed to an elevated number of crashes and a high crash rate of 1.54 MEV for this



The Bedford Street (Route 18/106)/West Street (Route 106)/East Street intersection with a poorly aligned East Street approach.

intersection. In addition, the poor intersection alignment of the East Street approach, along with the lack of pavement markings for channeling traffic through the intersection leads to a high number of cross movement crashes at the intersection. The signal equipment and timing and phasing are outdated and antiquated, with the timing and phasing operating as a fixed cycle.

This intersection operates at acceptable Levels-of-Service under Existing peak hour conditions; however, the crash rate for this intersection is at 1.54 crashes per million entering vehicles, which is well above the 0.80 rate for the Massachusetts average and the 0.75 for MassDOT District 5 average. The issues discussed for this intersection at the stakeholders meeting and public meeting focused on the cause of

the high number of crashes at this location. The recommendations for this intersection include realigning the intersection as a long-term improvement, as well as adding pavement markings to denote lane use, updating signals timing and phasing, and adding left turn storage lanes on the northbound and southbound approaches with protected phases for the left turn movements.

MassDOT currently has a planned project (Project number 611968) under evaluation for safety improvements at this intersection. This project will be under evaluation as MassDOT sets its STIP priorities in the coming fiscal year. In the interim, it is recommended that incremental changes, (such as signage and pavement markings) be made in advance of any long term improvement project for reconstruction/realignment, signal and timing and phasing upgrades, and sidewalk and bicycle improvements. The Town of East Bridgewater should work together closely with MassDOT to review previous studies and recommended improvements for this intersection to coordinate the implementation of short term, interim, and long-term improvements for traffic as well as for sidewalk and pedestrian improvements.

Table 14 shows the Existing LOS and the future No-Build and Build for the Bedford Street (Route 18/106)/West Street (Route 106)/East Street intersection. The No-Build conditions represent no improvements to the intersection, the Build conditions represents conditions with improvements to the intersection.

Table 14

	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak	Build AM Peak (signal)	Build PM Peak (signal)
Bedford Street (Route 18/106) at West Street (Route 106)/East Street	B	B	B	B	B	B

Central Street/North Central Street/Union Street/West Union Street

The Central Street/North Central Street/Union Street/West Union Street intersection is a four-way stop sign-controlled intersection in the center of East Bridgewater. This intersection experiences excessive delays during the peak hours due to delays from the Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue intersection. The Central Street/North Central Street/Union Street/West Union Street intersection is on the MassDOT Top 200 Crash Location list (2017 to 2019). It has been the subject of a Road Safety Audit by OCPC in 2021. One of the major recommendations of the RSA was to make the intersection an all-way stop to improve safety. The East Bridgewater Select Board recently approved the all way stop recommendation. Although the excessive peak hour queues are directly related to the congestion



Southbound queues on Central Street during the PM peak hour extend from the Spring Street/Central Street/Maple Avenue intersection through the Central Street/North Central Street/Union Street intersection.

at the Bedford Street (Route 18) at Spring Street/Central Street/Maple Avenue intersection, the implementation of an all way ((four way) stop from the existing two way stop control at this intersection will help improve safety and cut down on crashes at the intersection. The Town of East Bridgewater has approved a four-way stop sign and flashing red beacon for this intersection with infrastructure implementation over the next year.

Broad Street (Route 18) at High Street Intersection

The signalized Broad Street (Route 18) at High Street intersection in Bridgewater is operating at acceptable Levels-of-Service under Existing conditions. This intersection has exclusive left turn lanes on the Broad Street (Route 18) northbound and southbound approaches. The High Street eastbound and westbound approaches each provide one shared use lane to the intersection. Intersection reconstruction and upgrading of traffic signal and updating of timing and phasing was completed by MassDOT in 2015 (Project number 603660). The crash rate at the intersection is 0.45 MEV, which is under the Massachusetts statewide average and MassDOT District 5 average for signalized intersections. There is one obvious observation about this intersection, which is its poor alignment as High Street eastbound and westbound approaches are not directly aligned opposite as the road intersects Broad Street (Route 18). The recommendation for this intersection is that it be monitored for safety or other issues for any potential future problems.

Broad Street (Route 18) at Roche Brothers Plaza (Campus Plaza) North Entrance

Broad Street (Route 18) forms a “T” type intersection with the Roche Brothers shopping plaza (Campus Plaza) north of Central Square. The plaza has two entrances. The northmost driveway has two lanes for exiting the plaza to Broad Street (Route 18). This exit is stop sign controlled and has two lanes, one for left turns and one for right turns to Broad Street (Route 18). Despite that this intersection is aligned as and operates as a “T” type intersection, there are a number of access drives along Broad Street (Route 18) in close proximity and opposite the Roche Brothers Plaza north entrance so that turning movements to and from those drives affect movement and are in conflict with movements in and out of the Roche Brothers north most drive. This underscores the need for an access management plan for the section of Broad Street (Route 18) north of Central Square. The peak hour Levels-of-Service at this intersection for critical movements, left turns out of the drive, are at LOS F due to a limit of acceptable gaps in the through traffic on Broad Street (Route 18) sufficient for vehicles exiting the plaza. The crash rates are well below the statewide and District 5 average; however, signal installation should be considered when warrants are met.

Broad Street (Route 18) at Roche Brothers Plaza (Campus Plaza) South Entrance

The Roche Brothers Plaza (Campus Plaza) has a second driveway access to and from Broad Street (Route 18), which is located south of the main entrance. This second entrance forms a “T” type intersection with Broad Street (Route 18). The plaza driveway provides a single approach lane and is stop sign controlled. The Broad Street (Route 18) northbound and southbound approaches also provide a single approach lane for shared use. The crash rate for the intersection is below statewide and District 5 average rates. The peak hour Levels-of-Service for the left turn movements out of the plaza drive are at LOS F due to the lack of adequate gaps in the Broad Street (Route 18) traffic flow. Recommendations should include considering an access management plan for this section of Broad Street (Route 18) and limiting left turns into and out of the plaza (right turns in and out only), especially if the Roche Brothers Plaza north most intersection with Route 18 is signalized.

Broad Street (Route 18) Spring Street

Spring Street is a local street that runs east west and connects Broad Street (Route 18) with Summer Street (Route 104). Roche Brothers Plaza (Campus Plaza) is located just north of Spring Street. Spring Street forms a signalized “T” type intersection with Broad Street (Route 18). Broad Street (Route 18) southbound approach provides two approach lanes, one through and one exclusive left turn lane. Broad Street (Route 18) northbound provides two approach lanes, an exclusive right turn lane and a through lane. Spring Street provides a left turn and right turn lane on the westbound approach to the intersection. The Existing peak hour Levels-of-Service is LOS A during the AM peak and LOS B during the afternoon peak. The crash rate is 0.59 MEV, which is under the statewide average and MassDOT District 5 average. Despite the acceptable Levels-of-Service and the low crash rate at this intersection, congestion, especially during the morning and afternoon peak hour and the Bridgewater University student peak hour, impacts this intersection with queues from the Broad Street (Route 18)/Main Street (Route 28)/Summer Street (Route 104) intersection. The queues from the Broad Street (Route 18)/Main Street (Route 28)/Summer Street (Route 104) intersection headed southbound, and the queues headed northbound due to the signal at the Broad Street (Route 18)/Spring Street intersection back up on the passenger rail tracks, which is located just 50 feet south of the Broad Street (Route 18)/Spring Street intersection. Recommendations for this intersection include considering coordinating the Broad Street (Route 18)/Spring Street signal with the passenger rail signals to prevent queues from backing up on the tracks.

Central Square/Broad Street (Route 18)/Summer Street (Route 104) at Main Street (Route 28)

Bridgewater’s Central Square is a major bottleneck for traffic flow in the Route 18 corridor. Central Square forms an oval with the intersection of Broad Street (Route 18), Main Street (Route 28), and Summer Street (Route 104) forming a signalized four-way intersection at the northern end of the oval. At the southern end of Central Square there are two stop sign controlled access points with South Street (Route 104) entering the oval with a stop sign, and Bedford Street (Route 18/28) at another stop controlled access entering Central Square. Bedford Street (Route 18/28) continues south of Central Square and is designated as both Route 18 and Route 28, while South Street (Route 104) continues along South Street connecting with Route 24 to the southwest. In addition, there is head-in angle parking inside Central Square, (on the northbound and southbound side of the oval) with parking maneuvers interfering with overall traffic operations and creating a hazard for pedestrians crossing inside the oval, as sight lines for vehicles in the oval are hindered by cars parked in the angled head-in manner.

The Broad Street (Route 18) and Route 28/Route 104/Central Square/Summer Street Intersection is operated by a traffic signal that is owned and maintained by MassDOT. Based on the collected traffic data and SYNCHRO capacity analysis, this intersection is currently operating at LOS E during morning and afternoon peak hours indicating that the traffic volume exceeds its systematic capacity. There is limited roadway width and available space for intersection geometric improvements. In addition, during the morning and afternoon peak hours, delays at this intersection cause queues for vehicles in the oval (northbound), which in turn causes queues at the two stop sign controlled south end intersections; South Street (Route 104) at Central Square and Bedford Street (Route 18/28) at Central Square. Traffic also queues southbound on Broad Street (Route 18) at this intersection during the AM and PM peak hour so that the queues back up past the commuter rail grade crossing, (just south of Spring Street) with vehicles stopped on the tracks for the signal.

Improvements for this intersection include adding an additional right turn storage lane on the Broad Street (Route 18) southbound approach as well as optimizing the signal and timing phases. In addition, an extension of lane markings through the can help to reduce driver confusion over lane use and channel left turns from Another potential modification to this intersection includes adding Table 15 summarizes the Existing, No-Build, and Build LOS for the Central Square/Broad Street (Route 18)/Summer Street (Route 104) at Main Street (Route 28) intersection.

Table 15

	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak	Build AM Peak (signal)	Build PM Peak (signal)
Central Square/Broad Street (Route 18)/Summer Street (Route 104) at Main Street (Route 28)	E	E	E	E	D	E

Central Square at South Street Church Street/School Street/Bedford Street (Route 18 and 28)

There are long delays at the Bedford Street (Route 18/28) northbound stop approach intersection entering Central Square. This intersection operates at LOS F during the AM peak hour and F during the PM peak hour. Vehicle queues from northbound traffic at the Broad Street (Route 18)/Main Street (Route 28)/Summer Street (Route 104) intersection queue into Central Square creating delays for traffic trying to enter the oval on the Bedford Street northbound stop approach and the South Street stop approach. The South Street intersection at Central Square operates at LOS F during the AM and F during the PM peak hour.

The recommendation for improving peak hour traffic flow at the south end of the oval, including the Bedford Street (Route 18) northbound approach and the South Street (Route 104) approach is to create a single point signalized intersection. Figure 18 shows a conceptual view of what a single point signalized intersection might look like at the southern end of the oval at Central Square. This concept keeps School Street open for access as a gateway to BSU.

Figure 17

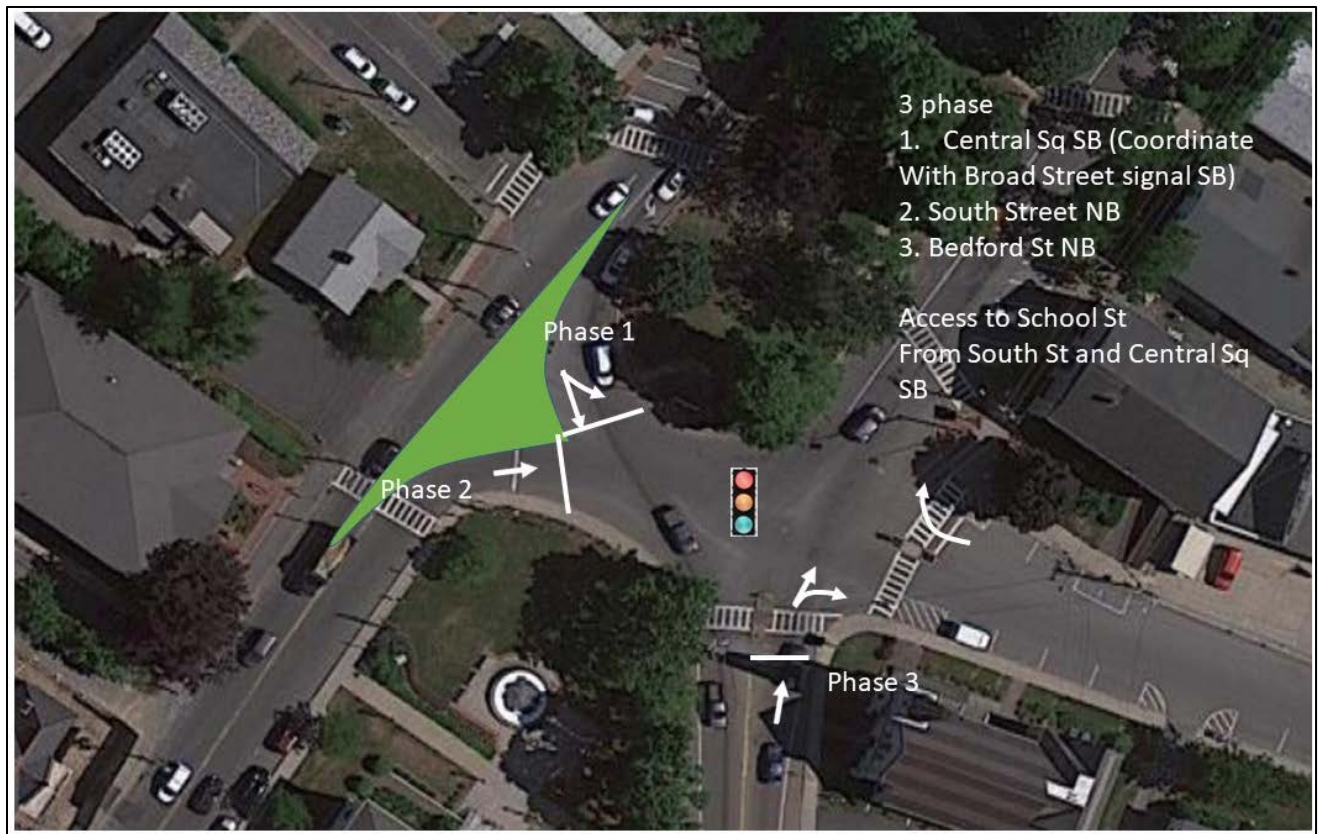


Table 16 summarizes the Existing, No-Build, and Build peak hour LOS analyses LOS for a single point signal at the south end of the oval in Central Square.

Table 16

	Existing AM Peak	Existing PM Peak	No-Build AM Peak	No-Build PM Peak	Build AM Peak (signal)	Build PM Peak (signal)
Bedford Street (Route 18/28 at Central Square and South Street (Route 106) at Central Square	F	F	F	F	B	B

As part of the Town of Bridgewater’s plan to redesign and revitalize Central Square, (called “Revitalizing the Heart of Bridgewater: Vision to Reality”), the town has developed a plan to reconfigure Central Square. This concept plan calls for reconfiguring the angled parking in the center from angled to parallel parking. The plan has one travel lane on each side of the oval (one on the northbound side and one on the southbound side). In addition, the plan would widen sidewalks for outdoor restaurant seating and a bicycle lane would be added on both sides of the oval. Rapid Rectangular Flashing Beacons would also be installed at crosswalks in Central Square to improve pedestrian visibility and safety for crossing Central Square. Figures 18 and 19 are from the Town of Bridgewater’s “Revitalizing the Heart of Bridgewater: Vision to Reality” showing the concept design for Central Square.

Figure 18



Figure 19



Bedford Street (Route 18/28) at Grove Street

The Bedford Street at Grove Street intersection was the subject of a Road Safety Audit in July of 2022, which was facilitated by the Old Colony Planning Council (OCPC) through OCPC's UPWP. The RSA focused on a discussion of safety deficiency issues and concerns and resulted in a number of potential improvements for the town and MassDOT to consider. MassDOT has jurisdiction over Bedford Street (Route 18) and the Town of Bridgewater has jurisdiction over Grove Street. The RSA recommended improvements include:

- Reverse the Grove Street westbound one-way designation to eastbound to eliminate the visual trap created by the northbound queues on Bedford Street. Reduce Grove Street to one lane on the approach and on the receiving end, creating space for bicycle lanes. Implement the one-way reversal as a pilot program, a temporary measure to gauge the impacts.
- Remove vegetation on the southeast corner of the intersection.
- Restripe crosswalks and all pavement markings, upgrade signage for appropriate location and use based on the Manual on Uniform Traffic Control Devices (MUTCD).
- Add flashing beacons at the intersection to enhance intersection visibility, flashing yellow on the Bedford Street approaches and flashing red on the Grove Street approach.
- Consider traffic calming methods such as rumble strips or speed bumps. In addition, driving lane can be narrowed from 12 feet to 10-11.5 foot; creating 20-25MPH traffic speed zone, and bicycle lanes can be added along Bedford Street.
- Consider adding bicycle facilities.

The Town of Bridgewater has implemented the reversal of the Grove Street westbound one-way designation to eastbound. Currently, traffic can enter Grove Street from Bedford Street (Route 18) in the eastbound or westbound direction; however, traffic cannot come from Grove Street in either direction to enter Bedford Street (Route 18) from Grove Street due to the new one-way designation. It is recommended that the Bedford Street (Route 18)/Maple Street intersection be monitored for safety and congestion as traffic that would have used Grove Street in the westbound direction is anticipated to use Maple Avenue as an alternative for access to Bedford Street (Route 18) and points beyond.

Bedford Street (Route 18/28) at Maple Avenue

Maple Avenue meets Bedford Street (Route 18/28) creating a four-way intersection south of the Grove Street intersection. Much like Grove Street, Maple Avenue provides a connection between BSU and South Street (Route 104) and beyond to Route 24. The intersection is stop sign controlled on the Maple Avenue eastbound and westbound minor street approaches. Maple Avenue provides a single lane approach on the eastbound and westbound approaches. Bedford Street (Route 18/28) provides a single lane on the northbound and southbound approaches. The Existing LOS for the intersection is C for the AM peak and E for the PM peak hour. The crash rate is below the statewide average and District 5 average for unsignalized intersections. The proximity of Maple Avenue to Grove Street makes it a convenient alternative for connecting between South Street (Route 104) and the BSU campus. The recommendation for this intersection is to monitor the Levels-of-Service and crash experience and crash rate at the intersection and take appropriate mitigation including signalization when the intersection meets the MUTCD thresholds for implementation.

Bedford Street (Route 18/28) at Cottage Street

Bedford Street (Route 18/28) and Cottage Street meet to form a “T” type intersection, which is stop sign controlled on the Cottage Street approach. Cottage Street provides a connection between South Street and Bedford Street (Route 18/28). The northbound and southbound Bedford Street (Route 18/28) approaches provide a single approach lane to the intersection. This section of Bedford Street (Route 18/28), which is farther south of the oval than Maple Street and Grove Street, experiences higher speed traffic. In addition to the need for speed enforcement in this vicinity, field observations indicate the need for stormwater and drainage improvements as well as pavement maintenance. The Existing AM peak hour LOS for left turn vehicles exiting Cottage Street is C and LOS D for the PM peak. This is due mainly to the lack of adequate gaps in the major street, Bedford Street (Route 18/28), traffic during the PM peak hour. The crash rate for this intersection is well below the MassDOT statewide average and District 5 average for unsignalized intersections.

Bedford Street (Route 18/Route 28) at Winter Street

Bedford Street (Route 18/28) and Winter Street form a four-way signalized intersection south of the Cottage Street intersection. The eastbound and westbound Winter Street minor street approaches offer a single shared use lane to the intersection. Both the northbound and southbound Bedford Street (Route 18/28) approaches provide an exclusive left turn lane and a shared through and right lane. The AM and PM peak hour LOS is C, which is an acceptable LOS. The crash rate is also below the MassDOT statewide and District 5 average. The speeds on this section of Bedford Street (Route 18/28) are high based on the field observations and the automatic traffic recorder data, and there is a need for speed enforcement on Bedford Street (Route 18/28) in the vicinity of this intersection.

Bedford Street (Route 18/28) at Flagg Street

Bedford Street (Route 18/28) and Flagg Street form a four-way intersection south of the Winter Street intersection with Romney Street opposite Flagg Street. The intersection is stop sign controlled on the minor street approaches, Flagg Street westbound to the intersection and on Romney Street eastbound to the intersection. The LOS is at “D” for left turn vehicles from the minor streets to Bedford Street (Route 18/28) during the AM peak hour and LOS F for left turn vehicles from the minor streets to Bedford Street (Route 18/28) during the PM peak hour (there are very few vehicles in and out of Romney Street during the morning peak and no vehicles exiting Romney during the PM peak hour). The crash rate is below the MassDOT statewide average and the District 5 average for unsignalized intersections. The speeds on this section of Bedford Street (Route 18/28) are high based on the field observations and the automatic traffic recorder data, and there is a need for speed enforcement on Bedford Street (Route 18/28) in the vicinity of this intersection.

Corridor Level Recommendations

The following is a list of overall corridor wide improvements for the Route 18 corridor in Bridgewater and East Bridgewater. As the jurisdiction of Route 18 in Bridgewater and East Bridgewater is under MassDOT, (except for Central Square and a portion of Broad Street to the Campus Plaza), it is recommended that the municipalities meet with and coordinate improvement projects with MassDOT to develop an overall collaborative vision for the future of the Route 18 corridor.

1. The Route 18 corridor experiences traffic delays and congestion at East Bridgewater Center and Bridgewater Central Square. It is recommended that a traffic engineering study (potentially

utilizing a traffic engineering consultant) that are specific to and focus on signal operation, timing and phasing, and lane use, and pedestrian and bicycle safety be completed for each of the town centers.

2. Route 18 Corridor requires maintenance, resurfacing of pavement and geometrical improvements that improve safety and capacity.
3. Along Route 18 corridor, there are sporadic locations and opportunities to implement Access Management Plan and Design. Access Management Design techniques definition:
4. Consider Traffic Calming design techniques along Route 18 as vehicles transition into and away from the Town Centers, especially south of Central Square in Bridgewater.
5. Consider Traffic enforcement needed as speeding along Route 18 to affect safety.
6. Route 18 Corridor needs evaluation of corridor wide street lighting and maintenance of existing street lighting to improve safety and security.
7. Sidewalks in many sections have discontinuous connections, inconsistent sidewalk width, and lack ADA compliance. There is demand, based on the OCPC survey questionnaire, for bike and pedestrian movement and a need for improving accommodations for bicycle or pedestrian facilities along Route 18.

Project Development and Funding

Funding is essential in ensuring the implementation of improvements recommended in this study. Although the recommendations in this planning level study are conceptual, the implementation stage takes transportation improvement projects from the concept stage through design and construction. The *MassDOT Project Development and Design Guide* explains the project development process in Massachusetts and includes the design standards for transportation projects. The MassDOT project development process, which can include Transportation Improvement Program (TIP) funding (for federal aid eligible roads) consists of the following:

- ❖ Problem/Need/Opportunity Identification (A Project Need form is submitted to MassDOT utilizing MassDOT Project online Intake Tool MaPIT)
- ❖ Planning (A project planning report is completed)
- ❖ Project Initiation (A Project Initiation Form is submitted to MassDOT)
 - Identification of Appropriate Funding
 - Definition of Appropriate Next Steps
 - Project Review Committee Action
- ❖ Environmental Design and ROW Process (Includes Plans, Specifications, and Estimates, P, S, & E)
 - Environmental Studies and Permits
 - Right-of-Way Plans
 - Permits
- ❖ Programming (Old Colony TIP and State Transportation Improvement Program, STIP)
 - Programming of Funds
- ❖ Procurement (Construction bids and contractor selection)
- ❖ Construction
- ❖ Project Assessment

On sections of federal aid eligible roadway owned and maintained by the municipality, the municipality typically initiates a project by completing and submitting the Project Need Form (available in the Appendix), as well as providing for project planning and design. Similarly, for state owned facilities, MassDOT initiates projects and provides planning and design on their section of roads.

The process outlined above is typical for funding roads that are federal aid eligible. These federal eligible roads are of higher classification (usually arterial or urban collector) and can be owned and maintained by a municipality or the Commonwealth of Massachusetts. Federal aid eligible regional transportation needs have outpaced available funding in the Transportation Improvement Program (TIP) for the past several years. All projects on the TIP go through a comprehensive evaluation process to determine priority for funding; therefore, the programming of the TIP is a competitive process.

A municipality can apply for funding utilizing The MassDOT Project Intake Tool (MaPIT). MaPIT is a Geographic Information System (GIS) and project development tool for online project planning, automated analysis, reporting, and collaboration. The system is intended to provide a user friendly, web-based environment for populating Project Need and Project Scope Forms, and for completing local aid applications for the Chapter 90, Small Bridge, Safe Routes to School and Bottleneck Funding Programs. Municipalities can open a MaPIT account and apply directly seeking funding through the Old Colony Transportation Improvement Program (TIP). For TIP projects, the town would have to have an engineer design the project to MassDOT specifications. The town would be responsible for design costs and any right of way takings.

In general, the process to fund a project through the TIP may take up to five years. Other alternative funding options are available for project construction for roads that are either not federal aid eligible or are eligible but might be chosen for other reasons, such as avoiding the TIP process.

Additional funding alternatives are outlined as follows:

- **Bipartisan Infrastructure Law** – The Bipartisan Infrastructure Law makes historic investments in the transportation sector: improving public safety and climate resilience. It provides funding for major projects including roads, bridges, airports (FAA Administration), public transit, passenger and freight rail, and ports and waterways. [Bipartisan Infrastructure Law Grant Programs | US Department of Transportation](#)
- **Capital Improvement Program (CIP) - Local Funding** has historically been utilized to help provide the design and engineering of highway projects.
- **Exactions (Developer Mitigation Agreements)** Communities have increasingly turned to exactions as a means to meet new infrastructure and public service needs. Cities and towns use developer exactions as a strategy to offset the burdens of new development on the community. Exactions contribute to regional equity by ensuring that a new development pays a fair share of the public costs that they generate. Exactions consist of a developer's payment of funds to offset the cost of necessary construction, design, or maintenance of public infrastructure directly connected to the new development. Developers commit to an agreement for funding or constructing off-site improvements in exchange for the approvals to proceed with a development project.
- **Bridge Replacement and Rehabilitation Program** provides funds for rehabilitation and replacement of any bridge on a public road. Bridges on the federal aid system or off the federal aid system are eligible for these funds.
- **Chapter 90** provides funding for highway construction, preservation, and improvement projects that create or extend the life of capital facilities. The level of funding is determined by a formula that is based upon public way mileage, population, and level of employment in each community. The Chapter 90 Program is a reimbursement program, as the community must initially pay the cost of a particular project.

- **Community Development Block Grant (CDBG) Program** provides for the development or expansion of economic opportunities and the provision of decent housing and public facilities. Eligible use of funds includes community development (construction or reconstruction of streets, water and sewer facilities, neighborhood centers, recreation facilities, and other public works).
- **Massachusetts Complete Streets Funding Program** - The MassDOT Complete Streets Funding Program addresses critical gaps in transportation networks by giving Massachusetts municipalities tools and funding to advance Complete Streets in their community. All municipally owned roadways are eligible for projects through the Complete Streets Funding Program. These roadway projects provide an opportunity to incorporate Complete Street principles into the design. Completestreets link: <https://gis.massdot.state.ma.us/completestreets>
- **Shared Streets and Spaces (applications opened September 5 also through October)** The Shared Streets and Spaces Grant Program is administered by the Massachusetts Department of Transportation (MassDOT). The program provides funding to municipalities and public transit authorities to quickly implement improvements to plazas, sidewalks, curbs, streets, bus stops, parking areas, and other public spaces in support of public health, safe mobility, and strengthened commerce. Online link: <https://www.mass.gov/shared-streets-and-spaces-grant-program>

The Link to the **MassDOT grants page** in the GeoDOT local site: <https://geodot-local-massdot.hub.arcgis.com/pages/grants>.

This website includes:

- Chapter 90
- Local Bottlenecks
- Municipal Small Bridge Program
- Safe Routes to School (SRTS)
- Community Transit Grant Program
- Complete Streets Funding Program
- Industrial Rail Access Program (IRAP)
- MassTrails
- Municipal Pavement Program
- Shared Streets and Spaces Grant Program
- Workforce Transportation Program

APPENDICES

Automatic Traffic Counts

Turning Movement Counts

Levels-of-Service

Historic Traffic Volumes and Trip Assignment

Project Need Form