

## 1. Study Team

The Route 104 Corridor Transportation Planning Study Team will consist of the Old Colony Planning (OCPC) staff:

- Guoqiang Li – Project Manager, General Technical Analysis, Reports, and Agency and Public Outreach
- Ray Guarino – General Technical Analysis, Reports, Agency and Public Outreach
- Bill McNulty – Funding programs, Projects Development and TIP Coordination
- Matt Dyer – Data Analysis and Technical Assistance, Environmental Data Review
- Kyle Mowatt – Data Analysis and Technical Assistance
- Shawn Bailey – Data Analysis and Technical Assistance
- Andrew Vidal – GIS/Maps
- Megan Fournier – Public Engagement and Communications
- Elise Prince – Public Engagement and Communications

## 2. Purpose Statement

The purpose of the comprehensive Route 104 Corridor Transportation Planning Study is to evaluate in-depth the total center-line distance of approximately 8-mile segment for the Route 104 Corridor within the Town of Bridgewater, Massachusetts. Route 104 Corridor is mostly under local jurisdiction except that the portion over tight contraflow interchange of Route 24 and Route 104 between and including both northbound and southbound ramp intersection, which is under MassDOT jurisdiction. Route 104 is known as Pleasant Street, Plymouth, and Pond Street within our study area.

This planning level study will assess existing conditions and operations in relation to service needs for the community, regional commuting, and the economy and result in the development of short-term and long-term actions that will enhance circulation and traffic flow efficiency and improve safety. Staff will review and analyze the traffic volume, speeds, vehicle types, capacity ratios, levels-of-service, collisions, access management design, pedestrian and bicycle traffic and infrastructure, pavement conditions, traffic control, signage, and overall physical layouts and operation. Public input will be included as part of the project identification process. Staff will utilize the Old Colony Metropolitan Planning Organization's Congestion Management Process, Safety Management System, Pavement Management System, and Land Use Management System to assist in the identification and development of short-term and long-term recommendations for all road users, including motorized, transit, and non-motorized modes.

## 3. Project Timeline

The Route 104 Corridor Study will be developed under task of UPWP #3400 – Route 104 Corridor Study, during Federal Fiscal Year 2025, from October 1<sup>st</sup>, 2024, through September 31, 2025. Advance consultation with Town officials and the Massachusetts Department of Transportation will occur during Fall 2023. Traffic data collection is expected to be completed in the early stage of the study, which is around October 2024, at the year around peak when

schools are in session. Public and community outreach will occur throughout the project schedule at periodic intervals. A Final Report will be presented to the Town of Bridgewater, Massachusetts Department of Transportation, and Old Colony Metropolitan Planning Organization in the Fall of 2025.

#### 4. Public Outreach

1. Stakeholders will be identified for the study and will include those who have the potential to be impacted by the study, those who are important in the implementation of improvements, and those who have an interest in the study and process. The process will include reaching out to the business community, residents, and the public at large, groups and agencies with interests in traffic and transportation, local officials (state representatives, councilors, etc.), news organizations (local newspaper and radio), state agencies, and groups that have been traditionally underserved including the elderly, groups with limited English proficiency (LEP), minorities, and people below the poverty line.
2. The outreach program will include meetings with local officials in Bridgewater including Administration, Planning, Streets, Trees and Parks, School Department, and Public Safety. Public meetings with stakeholders will include the presentation of findings and will solicit discussion and facilitation of improvements and recommendations. In addition to public meetings, the outreach program will include public surveys, interviews with stakeholders, and meetings with state and local officials, including MassDOT. Notices of meetings will involve the use of a variety of new media, internet postings, as well as traditional means of notice (postings in public places of convenience and newspapers). Meetings may be held virtually in a webinar format. A project webpage within the OCPC website will be created and maintained throughout the project duration.

Stakeholders will include (but are not limited to) the following:

- Massachusetts State Senator Walter F. Timilty
- Massachusetts State Representative for the 8<sup>th</sup> Plymouth District: Angelo L. D’Emilia
- Massachusetts Department of Transportation (Boston and District 5)
- Bridgewater Town Council
- Bridgewater Planning Board
- Bridgewater Town Manager
- Bridgewater Police Department
- Bridgewater Parks & Recreation
- Bridgewater Fire Department
- Bridgewater Public Works
- Bridgewater Engineering Department
- Bridgewater Town Planner
- Bridgewater Elder Affairs
- Bridgewater and Area Chamber of Commerce
- Bridgewater Community and Economic Development
- Safe Route to School

- Bridgewater Raynham School District
- Bridgewater and Raynham Regional High School
- Bridgewater Middle School
- Bridgewater State University
- Brockton Area Transit (BAT)
- Massachusetts Bay Transportation Authority (MBTA)
- Others

## 5. Inventory and Review of Peer Studies and Planned Improvements

- a. Compile and review traffic studies by consultants and agencies pertinent to the study area
- b. Compile and review plans and studies by MassDOT
- c. Compile information on potential projects that will impact future trip generation within the study area network.

## 6. Assess and Analyze Existing Conditions

A. Collect daily traffic counts, speeds, and heavy vehicle percentages at the following locations in Bridgewater:

1. Pleasant Street (Route 104) west of Route 24
2. Pleasant Street (Route 104) east of Route 24 (west of Elm Street)
3. Elm Street north of Pleasant Street (Route 104)
4. Pleasant Street (Route 104) between Elm Street and North Street
5. Vernon Street south of Pleasant Street (Route 104)
6. Pleasant Street (Route 104) between North Street and South Street
7. North Street, north of Pleasant Street (Route 104)
8. South Street (Route 104) between Pleasant Street and School Street
9. Main Street (Route 28) north of Central Square
10. Broad Street (Route 18) north of Central Square
11. Bedford Street (Route 18/28) south of Central Square
12. Summer Street (Route 104) between Central Square and Railroad
13. Plymouth Street (Route 104) between Spring Street and Hayward Street
14. Plymouth Street (Route 104) between Hayward Street and Mill Street
15. High Street north of Pond Street (Route 104)
16. Pond Street (Route 104) between High Street and Roberts Road

B. Collect turning movement counts (TMC) at the following intersection locations listed below. The traffic counts will be conducted during the following times AM 7:00 AM to 9:00 AM, and PM 4:00 PM to 6:00 PM (2:00 PM to 6:00 PM at intersections heavily affected by school traffic), beginning in October 2024.

1. Route 24 at Route 104 southbound ramp intersection (signalized)
2. Route 24 at Route 104 northbound ramp intersection (signalized)
3. Pleasant Street (Route 104) at Bridgewater Place (Home Depot) (Signalized)
4. Elm Street at Pleasant Street/Old Pleasant Street at Pleasant Street (Route 104) intersection (signalized)

5. Jasmine Way/Prospect Street at Pleasant Street (Route 104) intersection (signalized)
6. Vernon Street at Pleasant Street (Route 104) intersection
7. North Street at Pleasant Street (Route 104) intersection
8. Birch Street at Pleasant Street (Route 104) intersection
9. Swift Avenue at Pleasant Street (Route 104) intersection
10. Center Street at Pleasant Street (Route 104) intersection (signalized)
11. Crescent Street at Pleasant Street (Route 104) intersection (signalized)
12. South Street at Pleasant Street (Route 104) intersection
13. South Street at School Street (Route 104) intersection (signalized)
14. Bedford Street at School Street intersection
15. Main Street/Summer Street at Central Square, including northbound right turn movement from Central Square (signalized)
16. Summer Street at Plymouth Street (Route 104) intersection (signalized)
17. Hale Street at Plymouth Street (Route 104) intersection
18. Burrill Avenue at Plymouth Street (Route 104) intersection
19. Spring Street at Plymouth Street (Route 104) intersection (signalized)
20. Hooper Street at Plymouth Street (Route 104) intersection
21. Hayward Street at Plymouth Street (Route 104) intersection
22. Mill Street at Plymouth Street (Route 104) intersection
23. High Street at Plymouth Street (Route 104) intersection
24. Roberts Road at Pond Street (Route 104) intersection

C. Turning movement counts will be conducted in September through October when school is in session to include the impact of school traffic.

D. A Physical Inventory will be completed for each TMC location. The physical inventory will be a sketch of the intersection showing roadways and all attributes necessary for analysis. These include but are not limited to:

- Sidewalks and bicycle tracks and/or pedestrian paths
- Bicycle lanes
- Utility poles and lighting
- Traffic signal and pedestrian signals (location of poles and the direction and lanes the signals face)
- Signs, signage, and traffic control (speed limits, stop signs, no turn on red, no parking and parking limitations, etc.)
- Hydrants and other utilities and fixtures including (but not limited to) guard rails, walls, traffic islands, curbs (granite or bituminous), and curb cuts.
- Number of vehicular lanes and lane use, including pavement markings, crosswalks, and curb ramps.
- Land uses and landmarks.
- Roadway and lane widths, as well as sidewalk and bicycle path widths
- Grades will be estimated in physical inventories.
- Sight distances will be measured at intersections where sight distances are limited.
- The date and initials of the person taking the inventory must be on the physical inventory sheet.

E. Signalized intersections will include sheets separate from the physical inventories showing signal timing and phasing diagrams. The locations of pedestrian signals and traffic signal heads will be shown on the physical inventories. Each signal phase shall be shown with the movements for the lanes given green marked clearly for the direction of travel, along with the clocked time. The north arrow on sketches and signal timing and phasing should always be up toward the top of the sketch.

D. Field surveillance of existing conditions will include photos and/or video of the study area corridor, documentation of locations of posted speed limits, and documentation of other pertinent traffic control and lane use restrictions within the study area corridor. The video and photos will be taken to document various conditions that affect the movement and safety of vehicles, bicyclists, and walkers. The utilization of drone technology will assist with photo and video documentation.

E. Review of existing conditions will include a field review of existing land use and a review of existing zoning within the study area.

F. Review of existing conditions will include a field review of existing pavement conditions in the study area corridors utilizing OCPC's pavement management system.

G. Traffic signal permits for signalized intersections and special speed regulation permits for study area roads will be requested from the Town of Bridgewater and MassDOT.

H. Existing peak hour level-of-service analysis for signalized and un-signalized intersections based on 2024 base year counts shall be conducted utilizing software based on the Highway Capacity Manual.

I. Review of MassDOT IMPACT Collision Data Portal to develop historical collision frequency summary along Route 104 Corridor. Collision rates for the study area intersections shall be developed based on practices published in the Manual of Traffic Engineering Studies and compared to average collision rates for the state and for the region.

J. Staff will request full collision reports for the collisions that occurred along Route 104 Corridor in the continuous years of 2022, 2023, 2024 from Bridgewater Police Department. Collision analysis will be performed in conjunction with the field audit at selected key locations. Collision patterns regarding type and cause will be discerned.

K. The study area will be screened for locations within the top five percent collision clusters to determine HSIP eligibility. The MassDOT Top 200 Collision Cluster Locations list and OCPC's Top 100 Collision Locations list will be reviewed to determine if any of the study area locations are included on those lists.

L. Data for determining non-motorized safety and accommodations at study area

intersections and within the study corridor will be collected. Non-motorized safety and

accommodation will be assessed at the study area intersections and within the study corridor.

M. Warrant analyses, in accordance with the **Manual on Uniform Traffic Control Devices** will be conducted at un-signalized intersections if necessary to determine the justification for traffic signals, stop sign, four-way stop, flashing yellow/red beacon, and protected left or right turn lanes at intersections deemed feasible. Signal Warrant Analyses, in conformance with the Manual on Uniform Traffic Control Devices (MUTCD), will be completed as needed for determining signalization, flashing beacons, and all-way Stop Sign control.

N. Various built and natural environmental GIS layers will be reviewed. Bridge and culvert inventory and condition information will be documented if applicable.

O. Maps will be developed including but not limited to illustrating the geographic scope of the study areas, as well as existing traffic counts, 85th percentile speeds, and percentage of heavy vehicles in the traffic flow.

P. Documentation of any existing transit services (i.e. MBTA, and BAT) and demand will be documented if available.

Q. Sustainability involves encouraging alternative, non-motorized modes to conserve energy and reduce reliance on fossil fuels. Principles for creating more sustainable neighborhoods include designing streets and the rights-of-way to encourage shared pedestrian, bicycle, and vehicular use (Complete Streets Concepts). The Federal Highway Administration (FHWA) defines Livability as "...tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, high-quality schools, and safe streets. This includes addressing safety and capacity issues on all roads through better planning and design." This study will consider livability and sustainability principles in the planning process and in the development of recommended improvements. The "Complete Streets" design strategy enables safe road access and operation for all users including pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities. Complete Streets strategies will be considered and utilized to implement the goals of Sustainability and Livability.

R. Prepare documentation of climate change and resiliency. Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks. Review and incorporate the Municipal Vulnerability Preparedness (MVP) Plan.

## 6. Forecast and Analyze Future Conditions

a. A horizon year of 2030 will be assessed to forecast future peak hours traffic, in conformance with MassDOT traffic study requirements. Future peak-hour traffic conditions will be estimated by using an annual compound background traffic growth rate. The results from the latest OCPC Regional Travel Demand Model and the State Travel Demand Model (TDM23.1) will be compared with archived volume data to develop . Local officials from Bridgewater will be contacted to determine the potential traffic impact for

any planned developments in estimate traffic growth. OCPC team will aid in estimating sited specific trip generation from the future development and evaluating the 2023 conditions with the proposed, funded and approved projects.

- b. Peak hour Level-of-service analyses will be performed for study area intersections for 2024 conditions including “No-Build” and “Build” conditions. 2024 “No-Build” conditions will include existing traffic volumes increased by the background growth rate plus traffic due to other planned developments. “Build” conditions will represent 2024 peak hour conditions with existing volumes increased by the background growth rate plus traffic due to other planned developments and alternative recommended improvements in place.
- c. Various enterprise data software will be considered to support the study, including but not limited to Conveyal, Replica, RITIX, MS2 and Google Traffic. The Conveyal Software will be utilized to assess existing and future transit potential. Conveyal's web-based Analysis tool helps users understand how multi-modal transportation networks connect people with destinations. RITIS data platform will be used to assist in understanding traffic delay patterns for the area.

## **7. Identify Current and Potential Deficiencies**

Current and potential deficiencies will be determined based on traffic and safety assessments, at the study area intersections and within the study area corridors, as well as through field assessments and the public outreach program. The identification of deficiencies (traffic congestion and levels-of-service, safety, lighting, signage, and sidewalk and pavement conditions, ADA) will include traffic, transit, bicycle, and pedestrian analyses. These assessments will be coordinated with state and local plans and initiatives.

## **8. Develop Recommendations**

Alternatives for improvements to traffic congestion, traffic circulation, transit, and safety hazards will be developed specific to problems identified based on the analyses, the public outreach program, and meetings with local officials and MassDOT. The improvements will also include non-motorized alternatives and will include cost-effective, short-term, and long-term recommendations.

## **9. Document Results**

A draft report will be prepared and circulated for review and comment on the document’s findings and recommendations. OCPC will prepare the draft and final reports that will include the identification of funding sources and recommendations for implementation of recommended improvements.